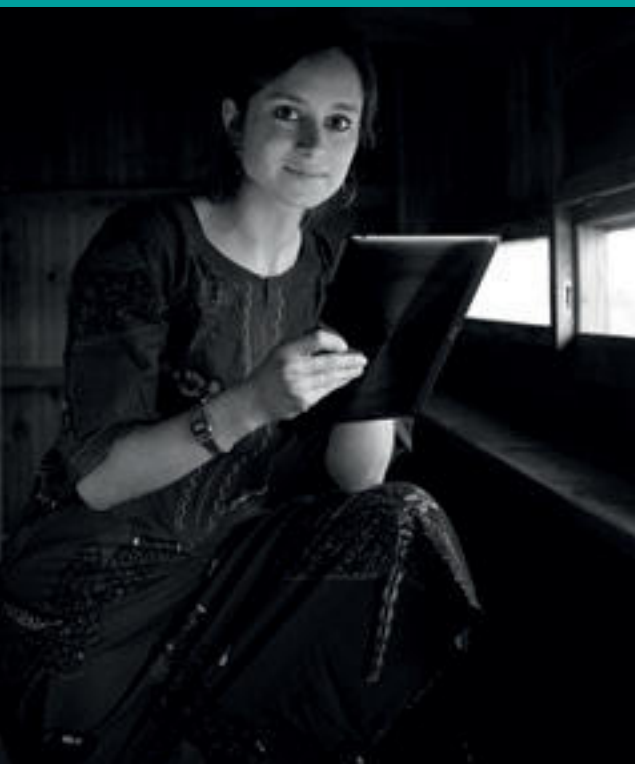
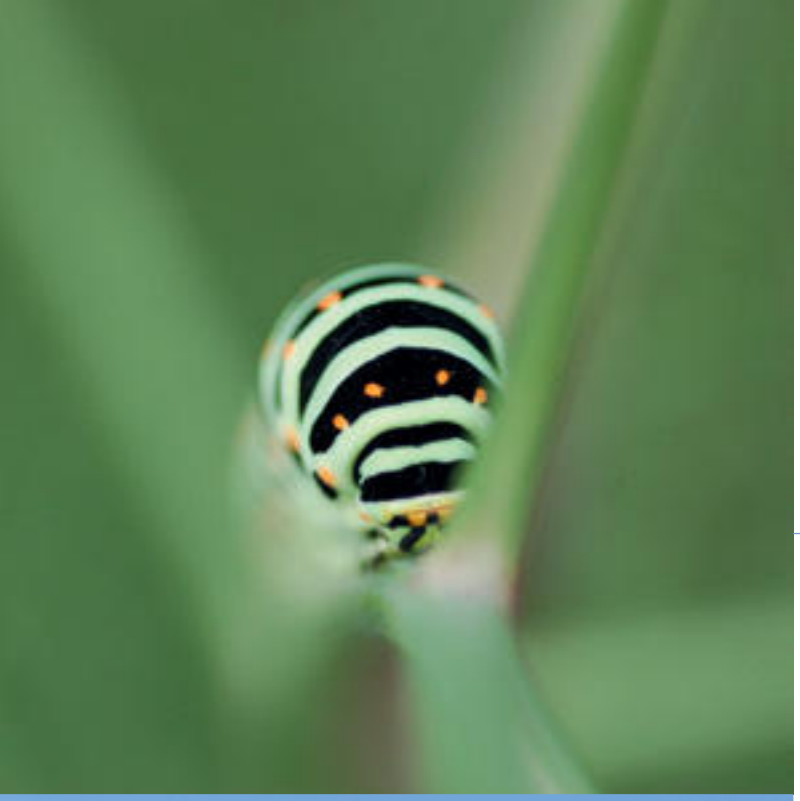
TOUR DU VALAT

Activity Report 2014



A research centre
for the conservation
of mediterranean
wetlands

TOUR DU VALAT



© S. Hilaire

Machao
carterpillar

© S. Hilaire

Greylag gooses on Saint Seren marshland

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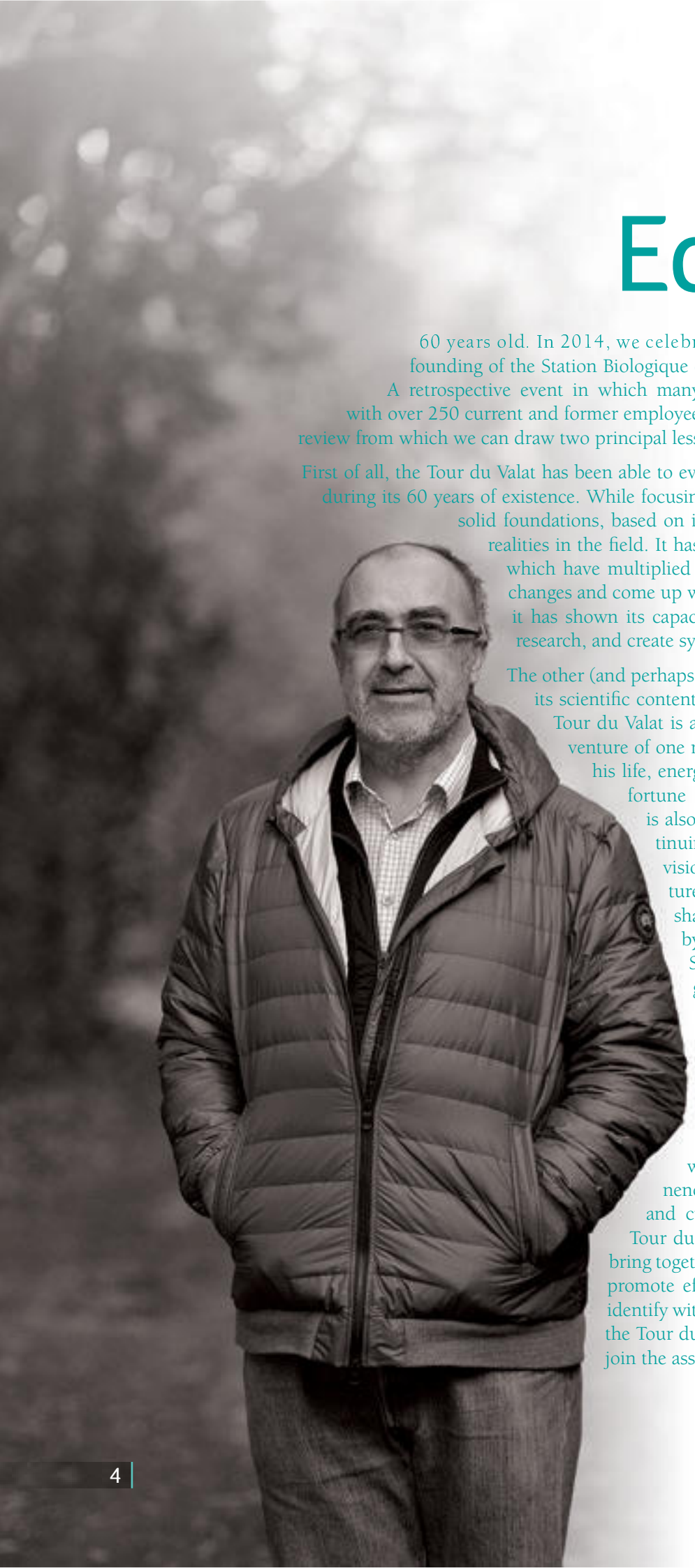
Activity Report 2014

TOUR DU VALAT

Editorial

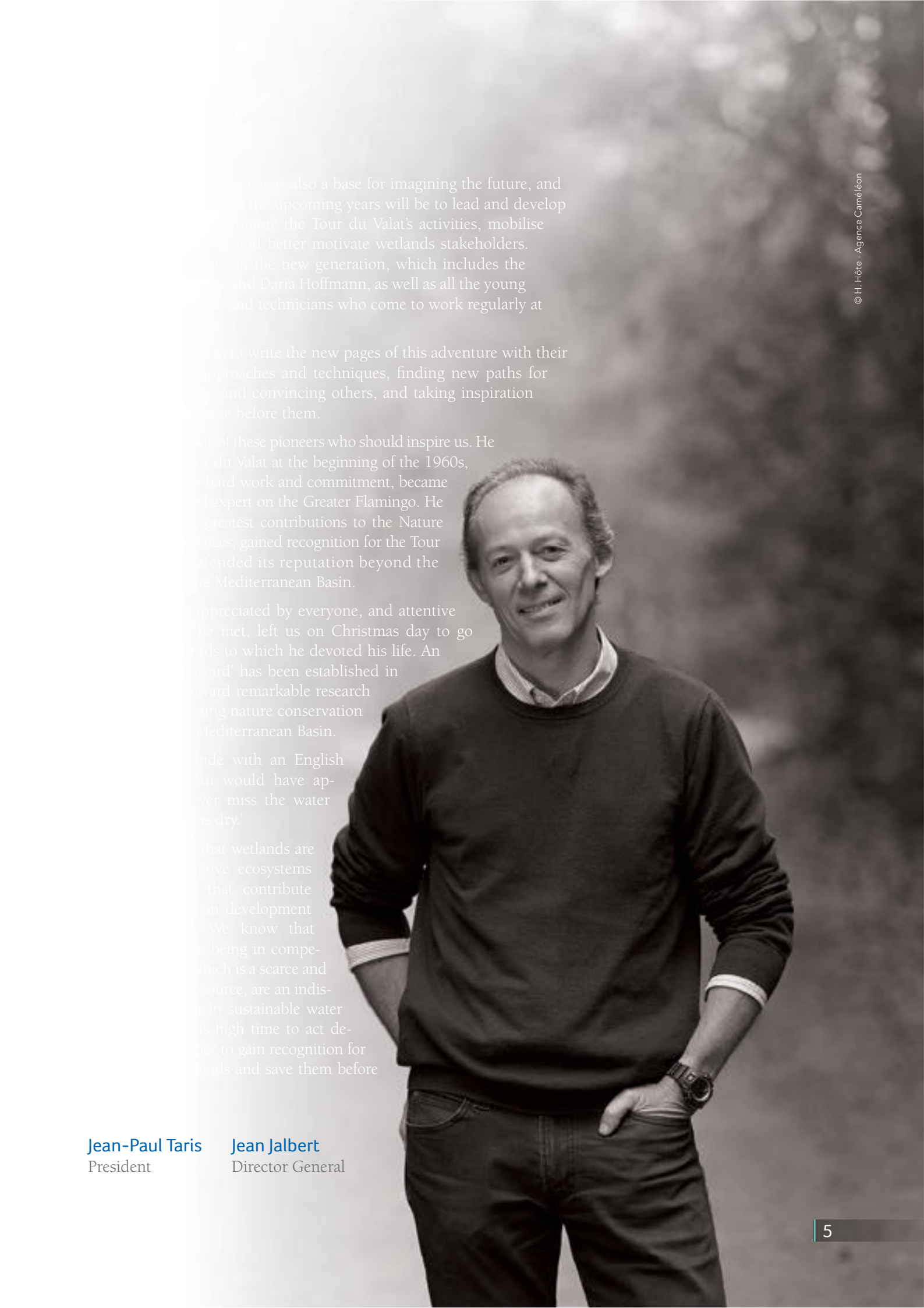
60 years old. In 2014, we celebrated the sixtieth anniversary of the founding of the Station Biologique de la Tour du Valat by Luc Hoffmann. A retrospective event in which many of our partners participated, along with over 250 current and former employees and trainees. A rich and meaningful review from which we can draw two principal lessons.

First of all, the Tour du Valat has been able to evolve, adapt to, and anticipate changes during its 60 years of existence. While focusing its efforts on key issues, it has built solid foundations, based on its expertise continually tested against realities in the field. It has also undertaken long-term activities, which have multiplied its capacity to analyse environmental changes and come up with the appropriate responses. Finally, it has shown its capacity to convey its knowledge, catalyse research, and create synergies around a common stake.



The other (and perhaps most important lesson) is that beyond its scientific content or specific mission the history of the Tour du Valat is above all a human adventure. The adventure of one man, Luc Hoffmann, who has devoted his life, energy, power of persuasion, and personal fortune to reconciling people with nature. It is also the story of his family, which is continuing and developing Luc's humanistic vision. Over the years, this family adventure has become a common project, first shared by a handful of enthusiasts, then by hundreds of concerned individuals. So many personal trajectories tied together by one man's vision. So many men and women who share the same values, have a common vision, and work together to lay the foundations for common action.

This community is certainly the Tour du Valat's principal heritage, bearing witness to the constancy and pertinence of its actions. In order to maintain and cultivate this heritage, the Friends of Tour du Valat Association has been created to bring together people, exchange information, and promote effective wetlands conservation. If you identify with these values, and would like to assist the Tour du Valat in its actions, we hope you will join the association! (see p. 66)



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...ew is also a base for imagining the future, and ... the upcoming years will be to lead and develop ... promote the Tour du Valat's activities, mobilise ... and better motivate wetlands stakeholders. ...ds on the new generation, which includes the ... and Daria Hoffmann, as well as all the young ... and technicians who come to work regularly at ...

...n to write the new pages of this adventure with their ...pproaches and techniques, finding new paths for ...e and convincing others, and taking inspiration ...me before them.

...e of these pioneers who should inspire us. He ...r du Valat at the beginning of the 1960s, ...s hard work and commitment, became ...d expert on the Greater Flamingo. He ... greatest contributions to the Nature ...nces, gained recognition for the Tour ...efended its reputation beyond the ...he Mediterranean Basin.

...ppreciated by everyone, and attentive ...he met, left us on Christmas day to go ...nds to which he devoted his life. An ...Award' has been established in ...ward remarkable research ...oung nature conservation ...Mediterranean Basin.

...lude with an English ...an would have ap- ...ver miss the water ...ns dry.'

... that wetlands are ...ctive ecosystems ... that contribute ...an development ... We know that ...n being in compe- ...which is a scarce and ...source, are an indis- ... in sustainable water ...s high time to act de- ...er to gain recognition for ...lands and save them before

Jean-Paul Taris
President

Jean Jalbert
Director General

Céline Hanzen,

European volunteer

'European volunteer:
An enthusiastic and versatile person, who works joyfully on all kinds of scientific, agricultural, and other missions. Beware! These invasive species generally come from distant lands and may speak with a northern accent!'

Contents

Elvin Miller,

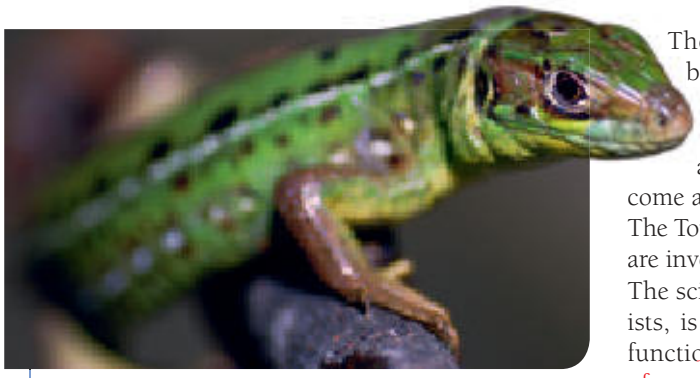
Technician - guard

'Working for the Tour du Valat nature reserve gives me the privilege of roaming around an estate with amazing biodiversity, and carefully monitoring it to conserve it for present and future generations... A wide range of tasks for an active and enjoyable outdoor job!'

© H. Hôte - Agence Caméléon

The Tour du Valat

Created more than 60 years ago by Luc Hoffmann, visionary naturalist and patron, the Tour du Valat has since then developed its research activities for the conservation of Mediterranean wetlands with the constant desire to achieve: "Better understanding for better management". Convinced that it will only be possible to preserve wetlands if human activities and the protection of the natural heritage can be reconciled, the Tour du Valat has for many years been developing programmes of research and integrated management that promote interchanges between wetland users and scientists



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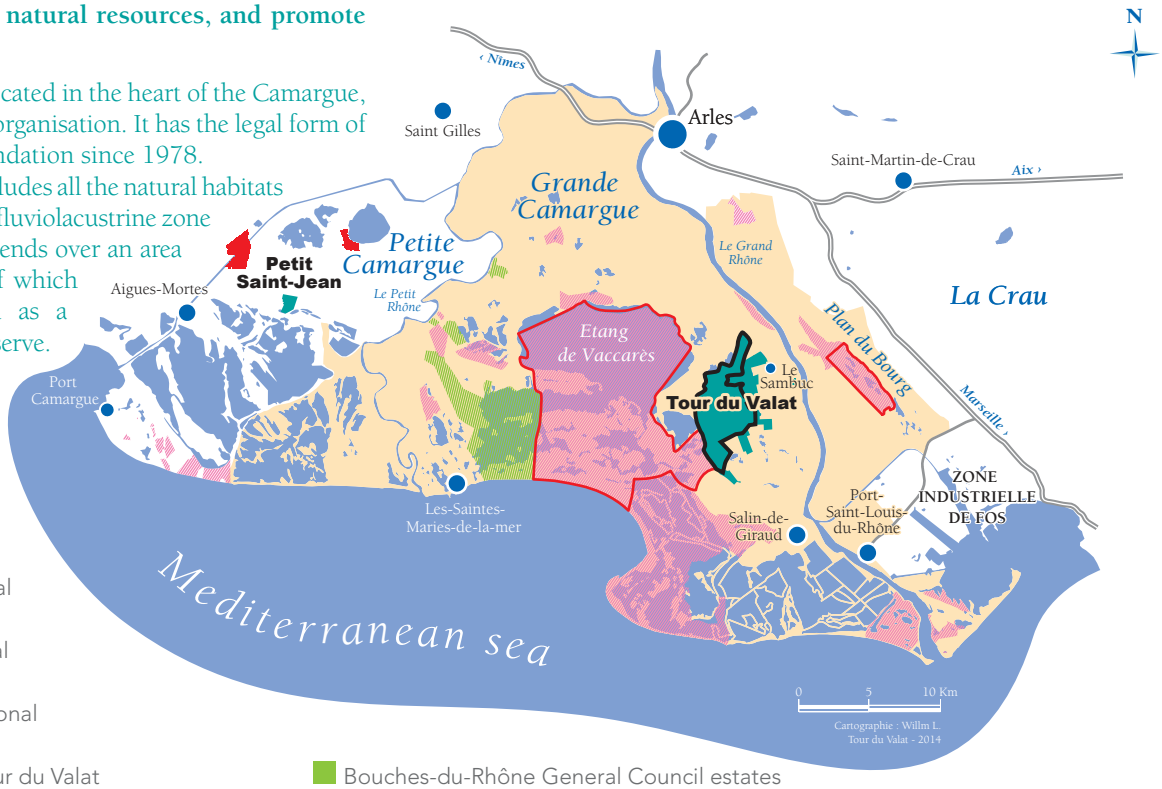
Lacerta bilineata

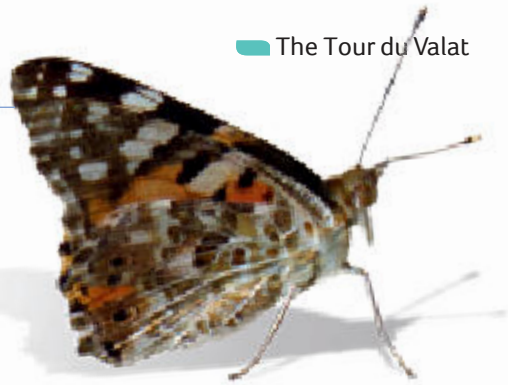
The Tour du Valat is also a unique bibliographical resource centre in the Mediterranean, specialized in wetlands ecology. Each year, hundreds of researchers, teachers and students from the Mediterranean basin come and consult the library's reference material.
The Tour du Valat employs around sixty employees who are involved throughout the Mediterranean.
The scientific team, comprising around thirty specialists, is working on programmes of research into the functioning of wetlands, and is testing out methods of management.
The results are communicated via training and the implementation of innovative projects being carried out in collaboration with a wide range of partners.

It has set itself the mission to halt and reverse the destruction and degradation of Mediterranean wetlands and their natural resources, and promote their wise use.

The Tour du Valat, located in the heart of the Camargue, is a private research organisation. It has the legal form of a public-benefit foundation since 1978.
The estate, which includes all the natural habitats representative of the fluviolacustrine zone of the Camargue, extends over an area of 2,700 hectares, of which 1,845 are classified as a Regional Natural Reserve.
A certain amount of experimental work is carried out by the Tour du Valat's researchers on this estate.



- Camargue Regional Natural Park
- Camargue National Natural Reserve
- Tour du Valat Regional Natural Reserve
- Property of the Tour du Valat
- Coastal Protection Agency estates
- Bouches-du-Rhône General Council estates
- Mahistre-Musette and Scamandre Regional Nature Reserve



Painted Lady
(Vanessa Cardui)

© O. Pineau

The Estate

The Tour du Valat Estate extends over almost 2,700 hectares and consists of a mosaic of natural habitats characteristic of the Camargue, notably some rare and threatened habitats such as temporary pools and fossil dunes, and also wide expanses of sansouires (saline scrub).

The fauna and flora are adapted to these special habitats.

In July 2008, 1 845 hectares of the estate received approval as a Regional Natural Reserve.

The Tour du Valat was one of the first natural reserves in France to draw up a management plan (in 1986). Since then the plan has been updated every five years; it sets the objectives that are to be attained and the means to achieve them.

The Petit Saint-Jean estate, located in the Gard, which was donated to the Tour du Valat by M. Marcel Bernard in 1981, was finally integrated into the estate in 2012, following thirty-year litigation. This site covers 101 ha, and includes a remarkable pine grove (50 ha), marshes (24 ha), and agricultural parcels (26 ha with a 5 ha vineyard).

© C. Hanzen

Little Egret

The principles for the management of the estate are set out within the framework established by the management plan, and are based on three main concepts:

1 The conservation of the exceptionally rich natural heritage, in particular by means of low intervention management that takes into account the highly natural character of the site.

To this end, a wide range of natural heritage surveys and monitoring programmes are regularly carried out: vegetation mapping, botanical surveys, water bird censuses, mammal counts, etc.

The estate team sees to it that the natural reserve regulations are adhered to and that the hydraulic infrastructure that enables 640 hectares of marsh to be kept in optimal condition for supporting biodiversity is well-maintained.

2 The implementation of research programmes with an experimental proving ground

The aim is to learn the lessons needed to maintain biodiversity, optimise management practices, combat undesirable species, and restore degraded habitats.

The results are put to use in assisting with the management of other sites, drawing up management plans, getting involved in technical networks, and signing up to economic mechanisms (Agri-Environmental Measures, Local Farming Contracts, Sustainable Farming Contracts, etc).

The Tour du Valat also accommodates scientists and natural area managers on the estate, to exchange ideas about various projects involving research and its application.

© O. Pineau

3 Maintaining traditional activities

Traditionally, the Tour du Valat's pastures have supported horses, sheep, and bulls. In 1994, the Tour du Valat set up its own extensive farm with 230 cattle and 20 horses of the Camargue breed, which graze 1200 hectares of natural habitats.

This farm contributes to the research programmes that are carried out by the scientific teams.

The estate's farm is self-financed and environmentally friendly, and conforms to the specifications for organic farming and for the "Camargue Bulls" Appellation d'Origine Protégée (AOP). Four herdsmen (livestock farmers) turn their herds out to graze on a thousand hectares of the estate.

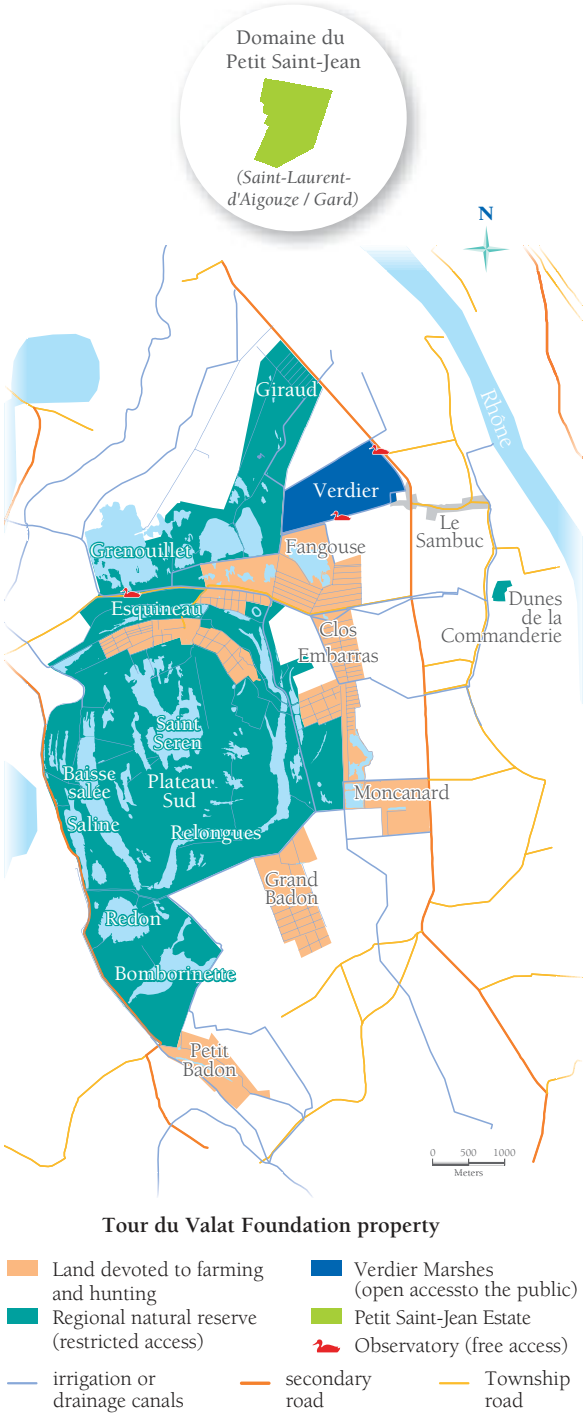
In 2013, the livestock grazing on the site amounted to about 450 cattle and 70 horses.

Other areas of land are also used for organic farming within a farming cycle that is traditional in the Camargue: rice, wheat, and hay.

Hunting is also an activity that has been carried out traditionally on the estate.

It takes place subject to innovative regulations:

- to avoid lead poisoning among ducks, traditional lead shot has been banned since 1994 in favour of tungsten or steel alternatives; detailed shooting records are kept (number of shoots and number of kills) so as to provide reliable statistical data for scientific studies.
- The Tour du Valat hunting group comprises about twenty current and retired employees of the organisation, who hunt over nearly 25% of the site.
- The Tour du Valat also takes an active part in local efforts to control the wild boar population, by organising drives (to which many hunters from the region are invited), arranging shoots to protect crops, and organising hunting by bow and arrow in the most sensitive areas (the core nature reserve).



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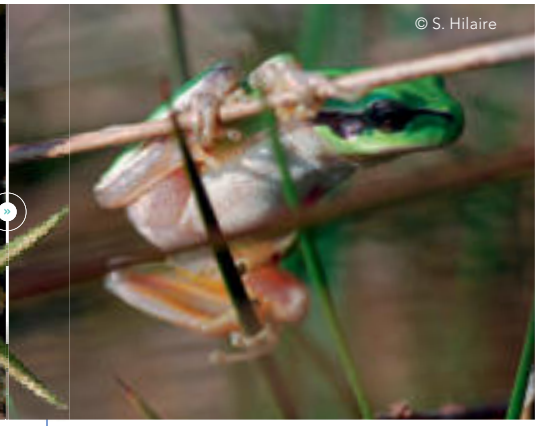
Eurasian Bittern

Water stars, *Damasonium Polyspermum*



Stripeless tree frog

Biodiversity on the Regional Natural Reserve

The monitoring of its natural heritage, outlined and structured by the site management plan, is one of the most important steps in managing and conserving the Tour du Valat Regional Natural Reserve.

In order to preserve the site in its highly natural state, the management approach implemented on the Natural Reserve is relatively non-interventionist and leaves considerable room for the variability of the Mediterranean climate.

The summer of 2014 was cool and rainy. The frequent storms limited evaporation in the marshes, and at the end of August there was still water in the Saint Seren and Baisse Salée marshes, unlike previous years. On the contrary, the autumn was particularly hot and dry, and most marshes dried up during this period. The next inundation was relatively brutal - the water level in Baisse Salée increased by 1.20 m in just 10 days due to major rain episodes in early December.

Réserve Naturelle Régionale
TOUR DU VALAT

We thought it had disappeared!

Bird's-foot Clover (Trifolium ornithopodioides) is a small Fabacae species found along the Atlantic and Mediterranean coasts in short cropped grass and saline meadows. In rapid decline in France, this small clover was considered to have disappeared in the Provence-Alps-Côte d'Azur Region. Observed by Molinier and Talon on the Estate in the 1960s, it was rediscovered in the spring along the borrow pit along the Cerisières nord area.

Following the discovery of several stands since 2012, the liverwort Riella helicophylla, which is protected nationally and listed in Annex II of the Habitats Directive, was widespread this spring among the halophilic plants in the Saline and Baisse Salée marshes and at the Trafalgar pond.

Starfruit (Damasonium polyspermum) was also widespread near the temporary ponds in the Cerisières area. Listed as vulnerable on the IUCN (International Union for the Conservation of Nature) Red List, this plant is a key concern for our natural reserve.

A fourth historical observation for France

Two adults of a small earwig, Nala lividipes, were identified in August. They had been attracted by a mercury lamp installed for a night survey of lepidopterans by Philippe Geniez. It had only been observed previously in 1820 and 1905, and was spotted in the Hérault in 2012 (Geniez, 2014).

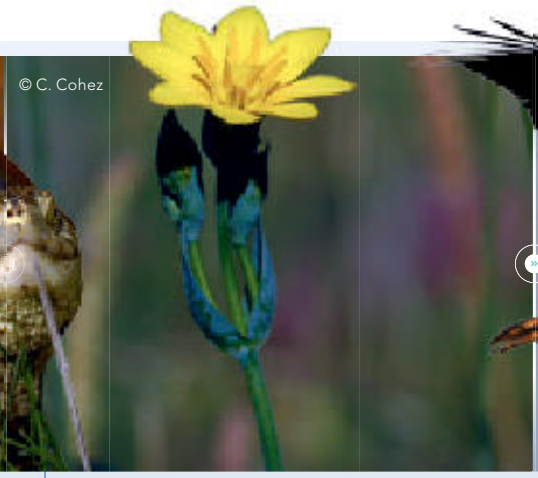
The same survey enabled 127 species of lepidopterans to be identified, 26 of which are new for the Estate.

Nala lividipes

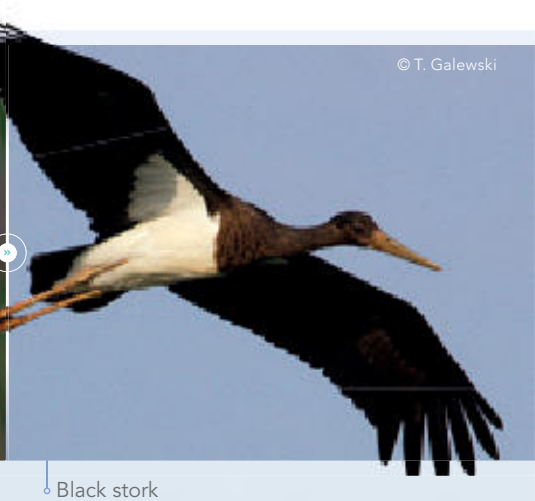
A mixed season for waterbirds

Wintering numbers were not very high in 2014, particularly for the Greylag Goose, which was present in its smallest numbers since 2000, probably due to excessive human disturbance. Among these geese, a fairly large group of Greater White-fronted Goose was observed early in the year (14 in January and 13 in February). The number of ducks seemed to be less severely affected, being slightly below average (max. 9900 birds in January and 10,600 in December).

European pond turtle



Linum maritimum



Black stork

Common Crane roosted on the site again, with nearly 900 birds staging there in February.

In the spring, the adequate level of water in the reed beds enabled contact to be made on the Estate with at least nine booming bitterns and the nesting of two colonies of Purple Heron, totalling 31 pairs.

For the fourth consecutive year, Collared Pratincole nested in the facilities created on the Moncanard steppe grasslands. Two other colonies also nested on the Estate. With over 40 pairs, nearly half of the French population of these birds breeds at the Tour du Valat.

The summer storms maintained shallow water in some of the large marshes, which dried up more slowly thus enabling wading birds to hunt the fish and crayfish trapped in the last waterholes. Spectacular groups were observed. There were at least 570 Black-winged Stilt during summertime in the Bomborinette marsh, 190 White Spoonbill in the Baisse Salée marsh, and 245 in the Saint Seren marsh, as well as 11 Black Stork.

We were able to check two ringed birds, which had been marked in their nests in 2013 in Germany and Belgium.

An original survey

A partnership has been established with the Mediterranean Institute of Marine and Terrestrial Biodiversity and Ecology (IMBE, Aix-Marseille University) for the European Pond Terrapin monitoring programme on the Estate. As they marked the terrapins, scientists noticed that some terrapins had their shell covered with brown algae similar to Vaucheria. In order to study this phenomenon, a survey of these epizoic algae was conducted as the terrapin were captured and marked. In all, 49 different species of algae were identified in five different groups (Cyanobacteria, Bacillariophytes, Chlorophytes, Xanthophytes, and Dinophytes). No such survey had ever been conducted in Europe before.

Philippe Lambret,

Project Leader

'To improve the conservation status of a threatened species, for instance by restoring its habitat, it is vital to understand its basic needs. That's why I'm studying the ecology of Lestes macrostigma, a damselfly that is so specific to and emblematic of the Camargue.'

The programme

our commitment

© S. Hilaire

Our programme

The Tour du Valat's programme is based on research and conservation projects that aim to provide concrete solutions to conservation issues facing Mediterranean wetlands. Our programme is made up of complementary studies that 1) contribute to our knowledge of how Mediterranean wetlands function, 2) assess the problems to be resolved, 3) propose and test out innovative solutions, and 4) help to transfer these solutions to natural area managers and decision-makers. 2014 was a very productive year for all of the different projects in our programme.

Our research teams discovered a considerable amount of new information on Mediterranean wetland species and ecosystems. For example, at Mediterranean Basin scale, land cover trends were analysed at a large number of sites, which showed that wetlands are continuing to decline even in the northern part of the Basin where conservation measures have been applied (cf. p.38). New results were also obtained for a wide range of other subjects such as the geographic range and population dynamics of the Greater Flamingo, the circulation of viruses in waterbird populations, the risk of new diseases emerging that will affect people and wildlife, and the size of waterbird populations around the Mediterranean Basin.

Practical solutions were also proposed to resolve problems affecting biodiversity and human activities. In the Camargue, for instance, instead of spraying an insecticide that would negatively affect biodiversity, mosquito traps were used successfully to limit the nuisances caused by this insect in inhabited areas (cf. p. 31). In addition, we used modelling tools to optimise our capacity to pinpoint and define the characteristics of hydraulic infrastructure to enable better management of waterbird breeding sites (cf. p. 28). With the National Office for Hunting and Wildlife (ONCFS), we analysed how effective wintering ducks are for decreasing the stocks of weed seeds in rice fields (cf. p. 24).

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© D. Cohez

Allium Chamaemoly

© AAO, équipe com

First Tunisian Greater Flamingo ringing

© P. Grillas

Skadar National Park, Montenegro

We also engaged in direct action in the field to protect wetlands and help to make them sustainable. For example, the Tour du Valat has completed wetland restoration work in the Camargue on a wide range of sites (cf. p. 32), from the largest (6500 ha of the former salt works in the Camargue) to the smallest (making a temporary pond).

Transferring our results to potential users is also a key issue for improving the conditions of Mediterranean wetlands. In 2014, as in previous years, our team worked very closely with natural site managers and decision-makers in France and throughout the Mediterranean Basin, and in various ways (joint projects, participation on different committees, support for management plans, etc.) The Mediterranean Lagoons Transfer Unit focuses completely on these transfer activities along the entire French Mediterranean coast. Our new activities, and the relocation of the MedWet Secretariat at the Tour du Valat, will establish important links with decision-makers, particularly those in the Mediterranean Wetlands Observatory.

In 2015, we will be preparing our new programme (2016-2020) and conducting our scientific activities at the same time, which will require considerable efforts from the whole team. Our overall aim will be to contribute better to the conservation of wetlands in a context marked by increasing tension around environmental issues.

Patrick Grillas
Programme Director

© N. Patry

Flora survey on the Farmland project

© F. Revest

Just ringed slender-billed gulls

Conservation of species and their populations in the context of global changes

The overall objective of the Department is to contribute to the conservation of Mediterranean wetland species and to assist in managing conflicts between these species - not necessarily threatened ones - and human activities. Within this approach, the department concentrates on major impacts of human activities which conform with the definition of global changes.

This involves contributing:

- to the conservation of species, or of certain of their populations,
- to the management of species in conflict with human activities (pests, health, etc.),
- to the management of key species for human activities (exploitation, tourism etc.).

Conservation objectives rely on scientific knowledge, whether applied to the direct running of defined research projects, or to the transfer and application of knowledge generated by the scientific world in general.

The Department focuses on four major themes that are considered to be very important issues for Mediterranean wetlands, and which fall within the sphere of our current areas of expertise:

- population dynamics of Mediterranean wetland species under pressure from human activities;
- the interaction between species conservation and problems of health, both human and animal;
- the interaction between Mediterranean wetland species with unfavourable conservation status and introduced alien species;
- predicting the distribution and abundance of species in 5, 10, and 25 years time, in conjunction with landscape modifications, climate change, and exploitation.

© F. Revest

On the way to ring spoonbills

Since the departure of Michel Gauthier-Clerc at the end of 2013, the scientific team has recruited two new colleagues to strengthen its staff. Marion Vittecoq was hired in early 2014 to continue her research on health ecology. The overall objective is to take advantage of our location in the Camargue to develop innovative research on the ecology and evolution of infectious agents in wildlife. Meanwhile, Jocelyn Champagnon joined our department in early 2015 to develop his research in modelling population dynamics.

In the Camargue, the number of wintering ducks was lower than in 2013, especially due to a drop in the number of Mallard and Common Coots. The number of Greylag Geese and cranes continued to increase.

We were able to monitoring flamingo breeding in spite of the fact that it took place in the Aigues-Mortes salt works area this year. We managed to ring 450 of the 600 chicks that succeeded in leaving their nests. The first ringing of flamingos in Tunisia, which was supported by the Tour du Valat, took place in the Korba Lagoon. Our study on the mating strategies of the species is being continued in Charlotte Perrot's doctoral thesis.

Our monitoring of Charadriiformes species was continued within the framework of the Life+ENVOLL project. The breeding season was particularly good for Slender-billed Gull, which bred at three sites (Salins d'Hyères, La Palissade, and Grand Bastit). On the contrary, both Common and Little Tern, and Mediterranean Gull had a poor breeding season. A study of the factors influencing the population dynamics of these species and the benefits they may enjoy from the creation of artificial islets is being conducted within the Life+ ENVOLL project and Charlotte Francesiaz's doctoral thesis.

Our long-term fish studies are being continued with a very interesting situation in which there is a gradual return of populations in the Fumemorte Canal in response to the progressive elimination of European Catfish.

Our long-term collaboration with the National Office for Hunting and Wildlife (ONCFS) on hunted species is being continued through Claire Pernollet's doctoral thesis on the use of rice fields by wintering ducks.

© A. Olivier

Ophisops elegans macrodactylus, Gediz, Turquie

This work in the Camargue seeks to define the best practices to apply in rice fields between the crop-growing seasons so that these areas can be used as feeding habitats by the ducks while providing agronomic benefits to the farmers.

Sophie Véran has replaced Anne-Laure Brochet at the head of the International Waterbird Census (IWC) programme, and was able to keep the networking dynamics alive at Mediterranean level. A medium-term capacity building programme was developed, intended particularly for our partners in the south of the Mediterranean (cf. p. 20).

Arnaud Béchet
Head of Department

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FOCUS

The IWC-MED programme

Support for the International Waterbird Census programme and wetlands conservation in the Mediterranean Basin

› Background

Waterbirds are some of the best ambassadors for drawing attention to the conservation needs of Mediterranean wetlands. Organised at the international level by Wetlands International, International Waterbird Censuses (IWCs) are a good tool for determining the number of waterbirds and assessing their trends to evaluate the relative importance of wetlands and establish conservation priorities. IWC results are thus directly used in the application of the Ramsar Convention and the African-Eurasian Waterbird Agreement (AEWA), an intergovernmental treaty established under the auspices of the Convention on the Conservation of Migratory Species (CMS).

Most of the waterbirds concerned by these counts are migratory species. Therefore, it is necessary to strengthen the national networks of observers, and put in place regional and international coordination of IWCs, particularly in terms of sharing and processing the data gathered.

Given the essential role played by these counts in terms of waterbird and wetlands conservation in North Africa, North African AEWA stakeholders have recognised the need to strengthen this programme in North Africa. That is the aim of the IWC-MED programme, which was initiated in 2012, and is co-supervised by the Tour du Valat and the National Office for Hunting and Wildlife (ONCFS), with support from the French Ministry of Ecology, Sustainable Development, and Energy (MEDDE), and the MAVA Foundation for Nature. This project aims to improve the activities linked to IWCs in the Mediterranean Region, where many wetlands face short-term threats and waterbird monitoring capacity-building needs are significant in NGOs as well as government agencies. This IWC-MED programme runs the Mediterranean Waterbirds network (www.medwaterbird.net), and strives to improve the synergies with the other waterbird and wetlands programmes in the region. This project is complementary to and strengthens the AEWA Plan of action for Africa, but it is especially a direct response to the expectations formulated by the five North African countries consulted in June 2013 in El Kala, Algeria in the framework of the AEWA African initiative.

© H. Azafzaf

© ONCFS

Pelicans and cormorants, Egypt

Objectives

The principal objectives of the IWC-MED programme are to:

- improve the spatial coverage of IWCs in collaboration with Wetlands International and the different national focal point coordinators;
- participate in capacity building activities and in reinvigorating the networks interested in IWCs in the region;
- support and facilitate initiatives and national and international projects aiming to develop IWCs and other waterbird monitoring projects (fund raising project coordination, etc.);
- lead and reinforce the Mediterranean Waterbirds network.

Results

A joint workshop to promote the findings of the first coordinated counts

In late November 2014, the Friends of the Birds Association, Tunisia, GREPOM—research group for the protection of Moroccan birds, the Algerian Directorate General of Forests, the Egyptian Environmental Affairs Agency, the Tour du Valat, the Italian Institute for Environmental Protection and Research (ISPRA) and the French National Office for Hunting and Wildlife (ONCFS) met in Tunis to analyse the results of the recent IWCs, and envisage how the programme will be continued.

The number of sites monitored, the number of birds counted in Tunisia, Morocco, and Algeria increased between 2013 and 2014. In spite of security problems in Libya, motivation was high and partners there worked very hard and were able to cover some sites. North Africa is the potential host of some two million wintering waterbirds, and is a vital stopover place for migratory waterbirds before they cross the Sahara or the Mediterranean Sea. A field visit to Lake Ichkeul highlighted the major interest of this National Park for wintering ducks, geese and coots of the Palaearctic as well as the major investments made by Tunisia to manage this site.

The IWC results from January 2013 for five North African countries were analysed during this workshop coordinated by the IWS-Med programme. This analysis was unprecedented at the regional level, and enabled us to understand better the factors affecting the spatial distribution of waterbird populations in this region of Africa. It should enable a long-term upward revision of the populations of the Marbled Teal, White-headed Duck, and Ferruginous Duck, for which the numbers observed in this region are greater than the population size estimates published for this flyway.

There are two principal lines of development for this project. On the one hand, strengthening support for the Mediterranean network through capacity-building programmes for teams in the field and teams analysing census data and writing up articles; and, on the other, progressively extending the project to the north and east of the Mediterranean. In the future, analyses focusing on historical data will attempt to estimate population trends, particularly for some emblematic species with an unfavourable conservation status.

The international cooperation recommended by the AEWA to protect this extremely rich and shared biodiversity is more than ever a common concern on both sides of the Mediterranean.

In the second phase of this project, capacity building will be continued in the field, as well as in terms of analysing and publishing articles based on the data. The network and support for IWCs will also be developed in the northern and eastern parts of the Mediterranean Basin.

Project Leaders:
Anne-Laure Brochet, Sophie Véran

Team:
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Financial partners:
French Ministry of Ecology, Sustainable Development, and Energy (MEDDE) and MAVA Foundation

Technical partner:
National Office for Hunting and Wildlife (ONCFS), Association of the Friends of the Birds (AAO)

Crimson-speckled Moth,

Utetheisa pulchella

Is a handsome little butterfly which also flies during the day. It is one of France's migratory species and is seen mostly on the Mediterranean coastline. On the estate it reproduces regularly, and caterpillars can be found on the stems of the *Heliotropium europaeum* growing on herbal dunes.

The Projects

"Conservation of species and their populations in the context of global changes"

AT A GLANCE


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Marion Vittecoq carrying out samples during the flamingo ringing

Ecology of health and conservation

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The scientific objective is to understand the interactions between biodiversity and public health or veterinary problems affected by global changes.

The applied objectives are: to help to reconcile the conservation of the biodiversity of Mediterranean wetlands with the presence and well-being of human populations; and to help conserve unfavourable status species impacted by epizootic or pollution events.

There are four axes of research:

- studying zoonoses and the role of Mediterranean wetland species in their epidemiology;
- analysing the impact of different treatments (antiparasitic, antibiotic, anti-vectorial, etc.) on the fauna of Mediterranean wetlands;
- assessing the impact of pathogens on the dynamics of Mediterranean wetland species;
- analysing the impact of pollutants on the fauna of Mediterranean wetlands.

2014 was marked by the broadening of the antibiotic resistance and wildlife project, and the strengthening of the existing joint projects.

The antibiotic-resistant bacteria already isolated in Slender-billed and Yellow-legged Gulls were subjected to phylogenetic and molecular analysis at the MIVEGEC laboratory (Infectious Diseases and Vectors: Ecology, Genetics, Evolution and Control, a Mixed Research Unit of the National Scientific Research Centre (CNRS), which in particular compared them with strains circulating among humans in the region. In light of the results, exchanges between wildlife and human populations would appear to be frequent and to include, amongst others, bacteria resistant to the latest generation of antibiotics.

To pursue this research, a micro-mammal capture network was set up in the Camargue to cover different habitats ranging from the most heavily impacted by humans (for example wastewater treatment plants) to the best preserved (for example protected natural areas). Through this network, sampling of the faeces of these micro-mammals will be carried out in 2015 to understand better where these exchanges of antibiotic-resistant bacteria take place.

We developed a joint project with Sylvie Hutrez' team (CNRS Montpellier) aimed at understanding which species are involved in the circulation of the Common Liver Fluke, Fasciola hepatica, in the Camargue. In addition to the livers of cattle from the Tour du Valat herd slaughtered in 2014 and those of wild boar hunted on the estate, the livers of 34 Coypu, mostly culled on the estate, were also examined. The adult flukes detected in these three species are currently undergoing phylogenetic analysis with a view to understanding, in particular, whether there are regular exchanges of the parasite between the three groups. Preliminary research was carried out into the populations of Lymnaea pond snails, the intermediate host of the Common Liver Fluke, present on the Tour du Valat Estate. Zones were identified where the snails are present, but no individuals carrying the parasite were detected. This research will be continued in 2015.

Finally, cloacal sampling was carried out on Greater Flamingo chicks during the annual ID ringing campaign. The operation was performed in collaboration with Karine Laroucau's team (French Agency for Food, Environmental and Occupational Health & Safety, ANSES, Maisons-Alfort) in order to study the Chlamydiaceae bacteria found in the species. 21 of the 96 individuals sampled were carriers of this type of bacteria. The strains isolated are currently being identified. Phylogenetic analysis will determine their place within the Chlamydiaceae family, and whether they belong to a new, undescribed species.

The Projects

Dynamics of populations in response to human activities

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The aim is to understand better the variation in species' responses to the effects of global changes (land use, exploitation, etc.) in order to reveal problems of species conservation and propose more favourable management methods, or control methods for problematic species.

There are three principal activities:

- Demographic analysis of populations and metapopulations by means of Capture-Mark-Recapture (CMR) and genetic studies (birds, fish, reptiles);
- long-term monitoring of biodiversity in the Camargue (in particular communities of birds, fish, amphibians and reptiles);
- Development of tools for gathering, managing, analysing, networking and presenting data.

The monitoring of amphibians, terrapins, and reptiles in general on the Tour du Valat estate was continued. The sampling of flamingo microbiome in several Mediterranean countries (Tunisia, France, and Spain) was successfully completed by Mark Gillingham together with the University of Burgundy and Ulm University in Germany.

Isotopic analysis was carried out in collaboration with the University of Konstanz in Germany on the feathers of 175 Slender-billed Gull chicks from several different colonies in order to assess the effect of using resources on the breeding success of the colonies and the body condition of the chicks.

A study of the loss of ID rings among Greater Flamingo suggests that the phenomenon is non-negligible for certain cohorts after 15 years. It should therefore be taken into account statistically in the estimation of demographic parameters for older birds. These results were presented to the partners of the Mediterranean and West African Flamingo network at the Sixth International Workshop on the Greater Flamingo organised by the Tour du Valat alongside the Third International Symposium held in San Diego, California in November.

On this occasion, Alan Johnson was presented with a special award by the flamingo expert community in recognition of his lifetime commitment to the study and conservation of the Greater Flamingo.

Claire Pernollet has been carrying out a doctoral thesis on the use of rice fields by wintering ducks (joint project with the French National Hunting and Wildlife Office, ONCFS) since January 2013. The aim of her thesis is to test alternative post-harvest agricultural practices to the burning and ploughing traditionally applied in the

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Slender-billed Gull

Camargue in winter, and to measure their consequences in terms of: 1) food availability (rice, non-crop plants) and 2) use of plots by wintering ducks. This work was complemented in 2014 by a six-week field campaign at the Doñana Biological Station in Spain, where Claire carried out a study of the diurnal and nocturnal use of rice fields by waterbirds. The first results show that winter flooding, which is practised on only 7% of rice growing land in the Camargue, not only makes seeds more accessible to waterbirds but also provides agricultural benefits to farmers (decomposition of rice straw and some non-crop plants). Claire will perform a cost-benefit analysis for the Camargue during the last year of her thesis (2015).

Introduced species and interactions with local species

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Invasive species can threaten local species, modify their habitats, and even affect the functioning of the ecosystem. This project only covers interactions between introduced predatory fish and threatened local species.

Studies concerning the negative impacts of introduced species on local species are often unconvincing, for the following reasons: (a) there are no data available prior to introduction, (b) the introduction date is unknown,(c) the studies are carried out on a short-term basis, and (d) it is difficult for the studies to differentiate between the effects due to introduced species and those caused by environmental and anthropogenic modifications.

Taking into account these reservations, this project offers two opportunities to study the possible impact of introduced predatory fish on threatened local species.

AT A GLANCE

There are two axes of research:

① studying the interactions between Wels Catfish (introduced) and the other fish species present;

② Studying the interactions between Rainbow Trout (introduced) and Marble Trout (endemic to the Mediterranean).

① Catfish and other fish populations

The elimination of Wels Catfish was continued for the sixth consecutive year in order to maintain its numbers at the minimum possible level, and thus limit its effect on other fish species in the Fumemorte population. Certain species in this population show encouraging signs of recovery, while others are still a long way from the numbers present when the Catfish was introduced.

② Rainbow Trout and Marble Trout

Sampling of Rainbow Trout and Marble Trout was continued during 2014 in various watercourses where Marble Trout, Brown Trout, and hybrid trout cohabit with established Rainbow Trout populations. We are carrying out long-term marking of individuals from both a geographically isolated (i.e., allopatric) population of Rainbow Trout and a mixed (i.e., sympatric) population of Rainbow and Marble Trout.

We also monitor, twice a year, two other populations sympatric with hybrid trout so as to evaluate the winter mortality rate for alevins hatched during the year (0+). Several isotopic analyses were carried out to determine the level of cannibalism among Marble Trout populations. The first results confirm that cannibalism is significant for certain populations, particularly the smaller one, and could play a notable role in their population dynamics. We are continuing our policy of duplicating pure Marble Trout populations, our genetic and population dynamics analyses, and modelling the resilience of pure populations to catastrophic floods.

Prediction of distribution and population numbers

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The objective is to predict, at timescales of 5, 10, 25 or 50 years, the evolution as a result of human activities (landscape change, climate change, over-exploitation, etc.) of species' distribution and population numbers, including parasite vectors or the parasites themselves, and their associated diseases.

There are four principal activities:

- Predicting the distribution of species in function of landscape variables;
- Predicting the distribution of species in function of climatic variables (both local and global);
- Predicting the emergence of epizooties;
- Predicting species number in function of their exploitation.

Two projects financed by the French Ministry of Ecology, Sustainable Development, and Energy (MEDDE) were completed in 2014.

The project Eaux et Territoires : d'un marais à l'autre (Water and Land: from one marsh to another), which we coordinated, was finalised in 2014. The complexity of the natural and anthropogenic issues involved makes the two study areas, the former salt works of Salin-de-Giraud and the Valley of Les Baux, particularly interesting. The project provided new understanding that will enable better governance of the areas and their water-linked uses. Predictive models of trends in land uses and land cover were developed for scenarios regarding society's demand for water resources. The response of ecosystems and land areas to this demand will show whether it is compatible with the maintenance, improvement, or even ecological restoration of natural areas, in particular wetlands.

The Landscapes and Sustainable Development project 'DEEPCAM' was also finalised. This project deals with the participative management of landscapes with a view to local people appropriating the biodiversity issues involved. In the Camargue, characterisation of landscape-determining factors reveals extreme sensitivity to anthropogenic dynamics. This leads managers to rethink their approach to naturalness when they are confronted with declining human activities. Faced with this high dependency of landscapes on human activities, managers are torn between three approaches: the 'heritagisation' of those activities, the forbidding or containment of other land uses, or finally landscape beautification when it is not possible to regulate land use. Participative landscape management takes into account the perception of inhabitants and how they appropriate landscapes, which enables the question of naturalness and especially biodiversity to be reconsidered.

Two chapters have been written for books to be published in 2015.

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Ecosystem modelling, restoration & management

The Department's overall objective is to conserve biodiversity, functions, and ecosystems services in the context of global changes, based on multidisciplinary research.

Five projects structured around four research themes:

1. The modelling of ecosystem dynamics for a better understanding of the interactions between the physical, biological, and social components of the functioning of the hydrosystem and the principal ecosystems in the Camargue;
2. The restoration of degraded ecosystems, to improve their biodiversity and functionality, making use of scientific expertise to direct restoration activities and management decisions;
3. The adaptive and inter-sectoral management of ecosystems, integrating territorial dynamics and favouring a long-term site-based approach;
4. The adaptive management of a former saltworks, where modelling, restoration, and management are combined to orient the development of this site acquired by the French coastal protection agency (CdL), managed in partnership with the PNRC (Camargue Regional Natural Park) and SNPN (National Society for the Protection of Nature);
5. The sharing of knowledge and good practices, and awareness-raising for site managers, decision-makers, local authority and State employees, scientists, and the general public through the production of appropriate tools, particularly the actions of the Pôle-relais lagunes méditerranéennes (Mediterranean Lagoons Transfer Unit).

Team lunch

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Ponds and marshes of the former saltworks of the Camargue

© J. Jalbert

Concerning the modelling project, the development of predictive models combining field data (330 point counts), the processing of satellite images, and spatial analyses enabled the population numbers of nine migratory or nesting marsh passerine species to be estimated over the 9200 ha of reedbeds in the Camargue.

The key action of the restoration project last year concerned the creation of ten temporary ponds in the Camargue in order to create good conditions for flora and fauna specific to these habitats, in particular the Dark Spreadwing damselfly Lestes macrostigma, a species listed as vulnerable in Europe, which was also studied for a better understanding of its ecological requirements.

With regard to the management project, the Tour du Valat re-affirmed its leadership role for the management of natural areas by working with ATEN (Natural Area Documentation and Training Centre) to organize the thematic sessions of management plans at the Managers' Forum and contributed to the drawing up of a new methodological guide.The rapid development of the former marshes and saltworks in the Camargue continues on its course, with the implementation of works planned in the context of a LIFE project to restore the hydro-biological functioning of the site and create new islets for flamingos, waders, gulls, and terns.

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Spotted Longhorn, *rutpela maculata*

Globally speaking, last year was once again characterised by intense interaction between researchers, users, and managers, in line with a new strategic axis of the Mediterranean Lagoons Transfer Unit.

Brigitte Poulin
Head of Department

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FOCUS

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Predictive water level management models
www. Mar-O-Sel.net

Mar-O-Sel

an interactive tool for better marsh management in a context of climate variability

Mediterranean wetlands are dominated by temporary and semi-permanent marshes that dry out naturally in the summer. This dry period is a specific characteristic of Mediterranean wetlands. It is due to the high temperature in summer that increases the rates of evaporation and evapotranspiration (by plants) with no compensation from precipitation. These wetlands provide habitats that support remarkable fauna and flora adapted to dry periods, which explains their original contribution to biodiversity. However, water is frequently added to Mediterranean marshes so they can be exploited for various uses (reed harvesting, hunting, grazing, fishing, ecotourism, and nature conservation management). These interventions are essentially based on pumping in water or on a gravity-based system with water coming from rivers, streams, reservoirs, or canals (irrigation or drainage), and are often justified by the increasing number of wetlands converted into polders, or other factors modifying land cover that contribute to disconnecting them from their catchment area. While it is important to avoid an excessive addition of water, which would be contradictory to their natural cycles, a rational addition of water is in many cases necessary to maintain specific uses, and for the sustainable management and conservation of Mediterranean wetlands

› Why such a tool?

Climate change scenarios for the Mediterranean region predict higher temperatures and more severe dry periods in the summer, with a greater concentration of rain in the autumn with less frequent but more intense rainy episodes. Along the coast, these modifications are likely to result in a decreasing quantity of lower quality water (salinisation, increased use of drainage water), at least during certain times of the year. How can we decrease the need to supply additional freshwater while maintaining current practices and the biodiversity in these wetlands? How can we modulate water levels in winter to avoid the inflow of saline or lower quality water at other times of year? Will today's temporary marshes be able to survive to the predicted climate changes without intervention on their hydrological systems? What volumes of water are currently required, or will be in the future, for the various management schemes and specific uses of these marshes? ?

› How does Mar-O-Sel work?

In order to respond to these questions and promote the sustainable and adaptive management of Mediterranean marshes, in 2013-2014, the Tour du Valat developed an interactive on-line tool. Using a hydrological model based on 10 years of surface and ground water levels (piezometric levels) in thirty marshes in the Camargue, it enables the observation of monthly variations in water levels in coastal marshes in function of meteorological conditions, as well as the volume of water required to attain various management objectives. Up to three management scenarios (monthly water levels throughout the year) can be tested continuously or alternately to observe the total impact over 10 years. The hydrological model is linked to a salinity model, which makes it possible to observe the impact of different management schemes (input/outflow of freshwater or saltwater at different months in the year) on the salinity of the surface and ground water in the marsh. Variations in water level and salinity have an effect on the wildlife and plants in marshes, as has been demonstrated in recent studies conducted by the Tour du Valat (Barbraud et al. 2002; Poulin et al. 2002, 2005, 2009). Translated into equations, these relationships were combined with the hydro-salinity model to observe the impact of management choices on the density and height of reeds, the composition of submerged macrophyte beds in function of their Mediterranean specificity, the probability of Ludwigia spp. (invasive exogenous species), the abundance of nesting reed passerines, and the probability of having booming bitterns (singing males), a colony of purple herons, and the nidification of mallard ducks.

Waders, including Eurasian Spoonbills on one of Tour du Valat's marshes

› How can Mar-O-Sel be used?

The Baisse salée, a former branch of the Rhone, is the deepest marsh on the Tour du Valat Estate. The objective established in the 2011-2015 management plan for this 50 ha marsh surrounded by reeds is to ensure the conditions required to achieve its carrying capacity for waterbirds (purple herons, shorebirds, wading birds, diving ducks and dabbling ducks) without intervening in its hydrological system (Cohez et al. 2011). However, the indicators defined to assess whether this objective has been reached have been unfavourable in recent years. Based on 17 years of meteorological data, Mar-O-Sel was used to demonstrate that without intervention with regard to water level, the 'waterbirds' objective can only be achieved 3 years out of 10, and that only highly interventionist management, with the addition of water in summer and autumn totalling an average of 8,500 m^3/ha/year, would enable the objective to be achieved on a regular basis. Since this solution is not considered to be compatible with the management philosophy of the Estate, according to which the hydrological regimes of the marshes must respect natural cycles, Mar-O-Sel was used again to test out various management scenarios based on a better compromise between minimising the amount of artificial water provided and maximising the carrying capacity for waterbirds. We chose to apply two alternative management options that can adapt to the meteorological conditions. When there is a naturally occurring dry period in June, the marsh will be flooded in the autumn (50 cm in October), and when the dry period occurs instead in July, a 10 cm layer of water will be maintained in July and August. In this way, the site will be favourable in different years to waders and other wading birds (particularly White Spoonbill) during the summer, or to waterfowl and waders in the postnuptial migration and wintering season. This management approach will help to avoid the very long dry periods observed in recent years. It entails on average the addition of 3,400 m^3/ha/year of water, and may also be favourable to reed passerines and Great Bittern in particularly rainy years. Inter-annual variations will further help to enhance the Mediterranean character of the marsh and favour greater floristic biodiversity.

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http://www.mar-o-sel.net

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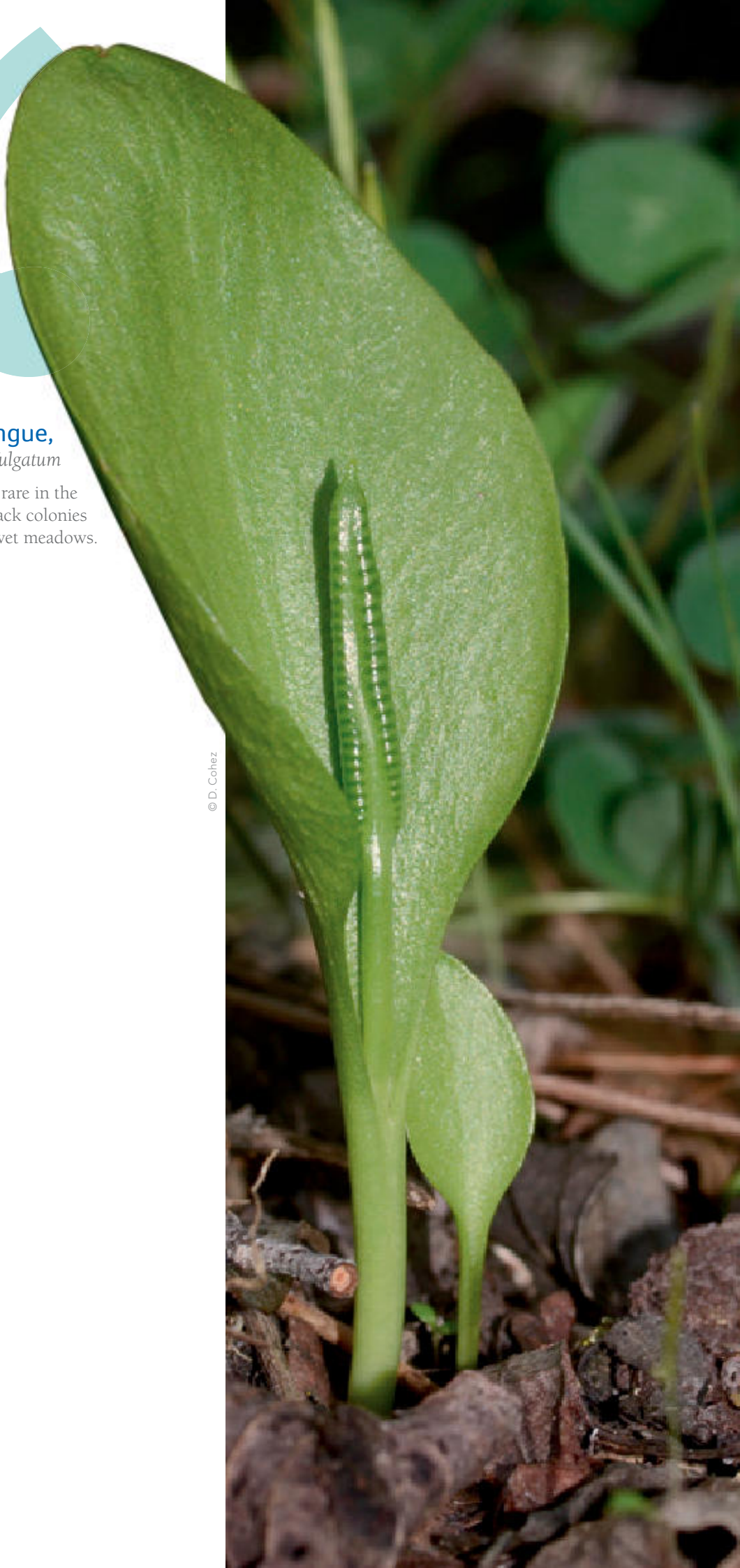
Technical partners:
Syndicat Mixte Camargue Gardoise (Gard Federation for the Camargue)

Adder's Tongue,

Ophioglossum Vulgatum

Is a protected species in France ; it is rare in the Mediterranean region, and forms slack colonies in wet meadows.



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The projects

"Modelling, restoration and management of ecosystems"

AT A GLANCE

Modelling the dynamics of ecosystems

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This project's objectives are to conserve biodiversity and the functions and services provided by ecosystems, in the context of global changes, through (1) the acquisition of knowledge on their functioning and dynamics; (2) the development of models based on predictive scenarios that include changes in water management, salinity, and uses linked to global change; (3) transfer and exchange tools for stakeholders, as well as managers and researchers to encourage the implementation of sustainable and adaptive practices.

The Camargue, where biogeographic and social issues are closely related, is particularly well-suited for studying this type of approach.

Hydrology, management and climate

Climate scenarios in the Mediterranean area are predicting an increase in temperature and decrease in rainfall during the summer period, with less frequent but more intense rainfall events in autumn. Sea level rise and climate changes make the joint management of water level, salinity levels and biological exchanges in the Vaccarès system more difficult. A simulation tool based on the hydrological modelling of the Rhône delta can now be used to assist decision-making by the Executive Water Commission. This tool can also be used to define a new water management regime for the delta (new rules for managing, creating or restoring hydraulic structures etc...). Hydrodynamic modelling of the lagoons also enables the specific influence of each stressor (wind, operation of the infrastructure, drainage) on the runoff to be determined for each lagoon, together with the associated retention time. In addition, a model of the dynamics of Zostera seagrass beds was developed with Paul Sabatier University in Toulouse. This model is currently being combined with the hydrodynamic model of the lagoons, which will enable us to study the impact of various water management systems on the dynamics of these seagrass beds.

Remote sensing & marsh-nesting passerines

In the framework of a study financed by the Total Foundation, by combining point counts with the analysis of SPOT-5 satellite images, we were able to identify pixel signatures enabling the prediction of presence probabilities for 10 passerine species. These data were extrapolated to the scale of all the reed beds in the Camargue to estimate the number of individuals (migrating species) or pairs (nesting species) by using spatial analyses. Population estimates are therefore now available for all these species and all the reed bed sites in the Camargue.

Mosquito control & scientific monitoring in the Camargue

This study on the effects of mosquito control using Bacillus thuringiensis israelensis (BTi) in the Camargue, which has been carried out for eight years in the Salin-de-Giraud and Port Saint-Louis du Rhône sectors, was continued in 2014. Given the proven impacts on non-target fauna (chironomids, dragonflies, reed invertebrates, House Martins, several waterbird and passerine species) and the proliferation of BTi in the bulrush and reed beds sprayed, monitoring is being increasingly oriented towards alternative methods to traditional mosquito control. The efficacy of three types of trap, including a prototype developed locally and adapted for local authorities, was tested on the Tour du Valat Estate in 2014. The approach reduced the nuisance caused by mosquitoes by 70% and, in addition, proved to be effective against the Tiger Mosquito, which is a growing health threat along the Mediterranean coast.

Eurasian Blue Tit

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The Projects "Modelling, restoration and management

Restoration of ecosystems

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Caissaïre marshes

The needs for the restoration of Mediterranean wetlands and the development of appropriate restoration techniques are important. Local changes in land-use allocation offer opportunities for ecological rehabilitation projects.

The objectives of this project are to (1) restore biodiversity compartments and/or functions of ecosystems and degraded communities;(2) test out and promote rehabilitation and management methods.

It is based on knowledge of the processes involved in the dynamics and organization of ecosystems to predict and shape how they will evolve. Developed through partnerships, it consists of three sub-projects:

Rehabilitation of the Cassaïre Estate

The Cassaïre Estate (70 ha belonging to the French Coastal Protection Agency, CdL) consists mainly of formerly cultivated areas. We are using it to test our capacity to rehabilitate a wetland for several uses. Based on development (ecological engineering) and management scenarios, which vary according to the target ecosystems, techniques for the reintroduction and/or building up of communities have been set up, with long-term management and monitoring of the evolution of habitats.

The creation of temporary ponds

The heritage value and continual regression of temporary ponds require a strategy of restoration and connectivity creation to enable exchanges between populations. To this effect, a project initiated by les Amis des Marais du Vigueirat (the Friends of the Vigueirat Marshes) and involving numerous other partners (CPIE – Permanent Centre for Environmental Initiative, DESMID, IMBE- Mediterranean Institute for Ecology and Biodiversity, PNRC - Natural Regional Park of the Camargue) was implemented to create ponds on former agricultural land that had previously been levelled. We are particularly involved in hydrological diagnosis and the colonization mechanisms of plant communities. Active restoration actions, capitalising on the lessons learned from the Cassaïre project, will be carried out if necessary.

Rangeland restoration

The rangelands face many threats, such as habitat closure and the development of undesirable species, which undermine their value for grazing and conservation purposes. The causes have been generally well-identified and concern in the first place irrigation and inappropriate livestock management.

For the 2011-2015 programme, we will focus our efforts on fighting against the closure of these habitats by Phillyrea and bramble.

In addition, Solène Masson defended her doctoral thesis entitled: From landscape to population: impacts of land-use changes and restoration faced with the expansion of an invasive species (Rubus ulmifolius Schott.) in a sub-steppic Mediterranean ecosystem on 10 December at Avignon University.

Vegetation survey, Gediz, Turkey

© L. Enoul

of ecosystems”

AT A GLANCE

Management of sites

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This project aims to 1) test and validate management methodologies and approaches on specific sites, 2) implement and monitor activities identified in the management plan on the Tour du Valat Estate, 3) inform and influence site managers on sustainable site management approaches, 4) improve our understanding of stakeholder decision-making processes to increase our effectiveness in terms of conservation, and 5) develop tools for transfer and awareness raising concerning the methodologies developed and tested.

International pilot site: Gediz Delta, Turkey

The project has initiated a stakeholder analysis in the delta. Outcomes of this analysis phase include contacts that have been made and the development of partnerships for setting up monitoring operations on hydrology, reed beds, habitat mapping, mammal populations, and grazing pressure.

A collaboration has been implemented between researchers at Izmir University and the Tour du Valat in order to carry out research projects on the restoration of habitats and the monitoring of reptiles and amphibians.

In addition, a research project is being developed with Curtin University (Australia), to assess the importance local communities place on biodiversity and their perception of nature management, based on a comparison of the Gediz Delta and the Camargue.

Tour du Valat Estate

The management plan places a priority on natural heritage conservation, focusing on the naturalness and the functional characteristics of Camargue habitats.

Amongst the floristic discoveries of 2014, we should note Trifolium ornithopodioides, a species presumed to be extinct in the Provence-Alps-Côte d’Azur (PACA) region. The project for the preservation of dry grasslands, financed by the Fondation du Patrimoine (French Natural Heritage Foundation) in 2013- 2014 aimed at eliminating Phillyrea incursions (Phillyrea angustifolia) was continued in 2014 with the pulling out of 6800 young plants.

There is a project underway whose final aim is to demolish two medium-tension power lines, which have a significant negative impact on the site. Works to underground a new power line and drinking water pipe started at the end of the year, with demolishment planned for summer 2015.

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Clearing works of the invasive shrub Phillyrea

An agreement was signed with a local nature guides office (Bureau des Guides Naturalistes) for them to provide regular general public visits to the natural reserve (by reservation, every second Saturday of the month between November and April).

The fourth consultative committee of the natural reserve was held at the end of the year.

The Bouches-du-Rhône Hunters’ Federation annulled its dispute with the protected natural area management organisations of the Camargue (including the Tour du Valat) with regard to the regulation of wild boar populations in natural habitats.

After validating its second participative management plan, the Verdier Marshes Association continued the activities it has developed over the past 10 years, thanks to the commitment of numerous volunteers among the villagers of Le Sambuc.

Educational activities were reinforced in partnership with the school of Le Sambuc and the environmental education association CPIE Rhône-Pays d'Arles. The rules for joining the Verdier Marshes Association were also tightened to ensure better overall adherence to the project’s long-term objectives.

Le Petit Saint-Jean is an estate located in the Gard that was recently bequeathed to the Tour du Valat, and was included in the Estate’s management plan in 2012. This site covers 101 ha, and includes a remarkable pine grove (50 ha), marshes (24 ha), and agricultural parcels (26 ha with a 5 ha vineyard).

A demonstrative agro-ecological project, capitalising on innovative agricultural practices that synergise with the conservation management of the natural heritage is currently being implemented thanks to the development of a partnership supported by the Fondation de France.

Management methodologies

A publication about the development of management plans in France over the last 20 years led to joint consideration with the Natural Area Documentation and Training Centre (ATEN) concerning the drawing up of a new methodological guide for management plans, presented at the Managers’ Forum in the spring. Several members of the team were trained in the methodology ‘Open Standards for the Practice of Conservation’, which will be tested for the drawing up of the management plans of the Estate and Petit Saint-Jean in 2015.

The Projects "Modelling, restoration and management

Adaptive Management of former saltworks

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Antoine Arnaud, Nathalie Barré, Arnaud Béchet, Thomas Blanchon, Olivier Boutron, Philippe Chauvelon, Damien Cohez, Alain Crivelli, Lisa Ernoul, Patrick Grillas, Jean Jalbert, Yves Kayser, Gaëtan Lefebvre, François Mesléard, Elvin Miller, Anthony Olivier, Marc Thibault, Loïc Willm, Nicole Yavercovski.

This project capitalises on the expertise of the Species and Ecosystem Departments to guide the rehabilitation of an exceptional site by encouraging a transdisciplinary approach that includes different spatial and temporal scales.

The former salt works area is made up of 6,758 ha purchased by the Coastal Protection Agency (CdL) in three different operations since September 2008. These areas have a high ecological potential and are adjacent to the Camargue National Reserve, representing the largest sustainable protection unit on the French coast (20 000 ha).

The development of 5000 ha for salt production as from the 1960s led to the creation of a network of dykes to form saltpans, into which seawater was pumped. The transfer of these areas to the CdL resulted in major changes to the management of the site, with the desire of the owner and co-managing bodies to return to a more naturel hydrologic regime, and implement an adaptive management approach to the rise in sea level.

The Tour du Valat is involved on the site as co-managing body together with the Camargue Regional Natural Park (PNRC) and the National Society for the Protection of Nature (SNPN), and as a partner in the LIFE+ project MC-SALT.

The former saltworks

The current management guidelines, detailing the short-term objectives (2013-2015) of a programme of actions, are based on an understanding of the historical and recent evolution of the site that identified 14 major issues. The definitive management plan will be drawn up once the acquisition process has been finalised.

Hydrological monitoring has been implemented, enabling the modelling of the system's hydraulic regime to be initiated in order to test different management scenarios and determine the location and size of the hydraulic reconnection works planned for 2014 (LIFE+ project MC-SALT). This work also involves the creation of two new nesting islets, respectively for Greater Flamingo, and for colonial gulls & terns and waders.

Team of the Life MC Salt project

A financial partnership was set up with WWF in the framework of the Coca-Cola Replenish programme to support hydraulic reconnection actions and biological work on the site, including analysis of the quality of water and sediments at various points on the site

The monthly waterbird counts were continued. As in 2013, an increasing trend in wintering ducks, geese, and swans was observed (up to 2585 individuals in January), in parallel with the reduction in salinity of certain sectors of the site.

A new monitoring campaign was put in place in 2014, with the setting up of 100 point counts to monitor nesting birds. 60 species shown or assumed to be nesting were counted, with 38 in the former salt works and 48 in the Bélugue part of the site. The most frequently encountered species was Yellow-legged Gull (62% of points), followed by Yellow Wagtail (59%), Tawny Pipit (54%), Kentish Plover (41%), Sardinian Warbler (39%), Barn Swallow (38%), Skylark (36%), Common Shelduck (31%), Spectacled Warbler (30%), and Fan-tailed Warbler (29%). The most abundant species was Greater Flamingo (835 individuals), followed by Yellow-legged Gull (195), Slender-billed Gull (193), and Skylark (182).

The mapping of the terrestrial vegetation of the site and the botanical surveys were continued in 2014. The standardised monitoring of the aquatic vegetation in the lagoons was not continued in 2014, but will be in 2015. The fortuitous discovery of Zostera marina seagrass in the Etang de Beauduc is one more element that indicates this lagoon is increasingly well-connected to the sea.

The Tour du Valat also took part in the concertation process at Salin-de-Giraud organised by the PNRC in the framework of a Fondation de France project, and helped to organise a LIFE+ MC-SALT project seminar held in the Camargue from 19 to 21 May.

AT A GLANCE

Mediterranean Lagoons Transfer Unit

Virginie Mauclert / mauclert@tourduvalat.org
Nathalie Barré, Nathalie Chokier.

The Mediterranean Lagoons Transfer Unit is included in the Wetlands Transfer Units network which was set up in 2001 as part of the National Wetlands Plan. It is coordinated by the Tour du Valat in the PACA Region, and works closely with the Languedoc-Roussillon Conservatory of Natural Spaces and the Corsican Environment Office in order to have representatives in each French Mediterranean Region. It is an innovative programme, which provides assistance to all lagoon habitat stakeholders, regardless of the geographical or administrative situation.

A charter recognising the knowledge dissemination and sharing activities of the Wetlands Transfer Units was signed in 2014. The Lagoons Unit was thus attributed an official label by the State for a renewable period of three years.

The third National Wetlands Action Plan (2014-2018) also reaffirmed the importance of the Transfer Units for ‘greater awareness of wetlands and the services they provide’.

In 2014, the Mediterranean Lagoons Transfer Unit continued to encourage best management practices and enhanced recognition of these habitats, acting in three ways:

Knowledge sharing and good practices

The website was considerably developed and now features 1000 pages of content, with 135,000 visits since it went online in 2012. Nine issues of the Lagoons Newsletter have been disseminated to 2400 stakeholders, including two special issues on the topics ‘The tools available for knowing about wetlands’, and ‘Lagoons and pesticides’. Finally, there are more than 6000 bibliographic entries available.

Facilitating an exchange network

Two training and exchange days were organised on the themes ‘indicators for monitoring visitor numbers in coastal habitats’ and ‘managing reed beds for birdlife’, bringing together between 30 and 50 people: lagoon site managers, scientists, and local authority and State civil servants.

The facilitation of FILMED was continued for the simplified physicochemical monitoring of some twenty lagoons in Languedoc-Roussillon and PACA, and is currently being set up for Corsica.

Key awareness-raising events

In 2014 we celebrated 10 years of coordinating World Wetlands Day in the Mediterranean on and around 2 February, with the theme ‘Wetlands and Agriculture, Partners for Growth’. There were 5600 participants, including 70 in the Camargue at a Camargue RNP event specifically aimed at local farmers.

In addition, the European Heritage Days on the theme ‘Cultural Heritage, Natural Heritage’ in lagoon sites attracted a record attendance of more than 10,500 participants.

Day of dialogue on the topic: "Diagnosis of reedbeds in favour of marsh avifauna" organized by Lattes Maison de la Nature

2014 Retrospective in pictures

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In 2014, we celebrated our 60th Anniversary!

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The first employees of the Tour du Valat surrounding Luc Hoffmann

Signature of the first "Contract for the Future" at the Tour du Valat

Signature of the tripartite agreement ONCFS – MEDDE – Tour du Valat

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Don't they look proud, those bulls of ours at arena games!

© Tour du Valat

The CoGes team during its seminar in the Ardèche

The 10th A

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The MedWet secretariat is moving in at the Tour du Valat

René Sol also celebrated his 60th birthday!

First gre

© Tour du Valat

k you Mike for your large contributions to the
nance of the Foundation these past 24 years!

First harvest on
the Petit Saint-Jean estate

© Tour du Valat

The Board of Directors of the Association
"Friends of Tour du Valat"

© D. Gaillardon-ONCFS

© F. Revest

Who is it?

© C. Hanzen

Here are the newcomers on the Manade

Kites?
No way, avocets!

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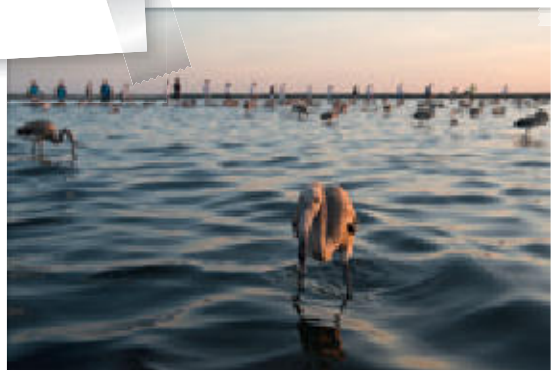
nniversary of the Verdier Marshes



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I think they did not notice my leaving!

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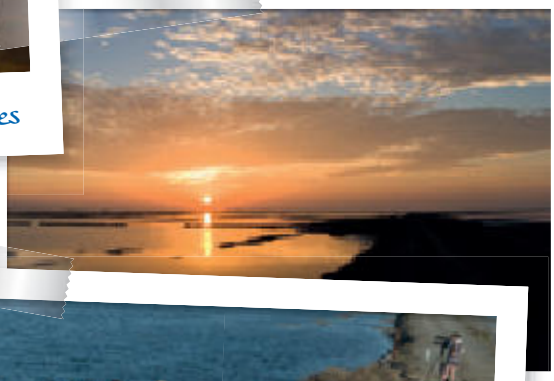
Here comes the new generation!



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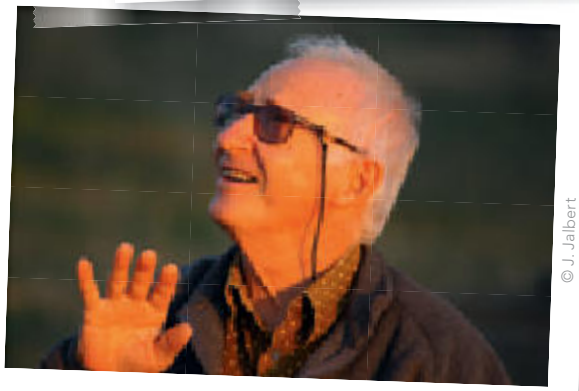

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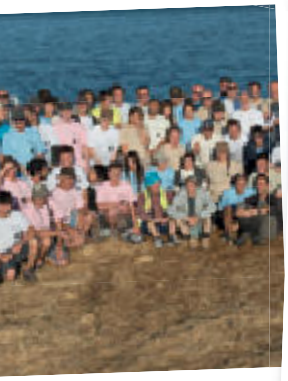
Farewell Alan...



ter flamingo ringing...

© J. E. Roché

...in Aigues-Mortes

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Monitoring and evaluation & wetlands policies

Evaluating and communicating the state of wetlands conservation, their functioning and their values; continuous assessment of the trends affecting these habitats as well as the causes of changes in respect of which it is possible to act: these activities are of the highest priority for raising the awareness of decision makers and the general public. These activities have been defined while acknowledging that the information that would enable this need to be addressed is still fragmentary, not always up to date, and has not been transferred in an adequate way to the various target groups.

The "Monitoring and evaluation & wetlands policies" department, in liaison with the other two departments, aims to:

1. **Catalogue, evaluate, develop, share, and promote knowledge about the state, trends, and management of Mediterranean wetlands ;**
2. **Identify and analyse the factors and pressures which explain the state of Mediterranean wetlands and the trends affecting them ;**
3. **Promote decision-making in favour of their protection, restoration, use, and sustainable management ;**
4. **Improve the way in which wetland conservation is taken into account in the context of sustainable development in the Mediterranean region.**

To achieve these objectives, a participative, interdisciplinary, and targeted approach has been adopted, with adaptive management in accordance with the expectations and needs of the users of the department's results.

The activities take place within two interdependent projects; the first, "Methodology and innovation for monitoring wetlands" feeding directly into the second, "Observatories and wetlands policies".

The Mediterranean Wetlands Observatory (MWO) forms the backbone of the department and brings together a wide-ranging technical and institutional partnership as well as the 27 MedWet member states.

In this fourth year of the 2011-2015 five-year programme, we essentially concentrated our efforts on **producing new MWO results, developing partnerships, fund-seeking, and revising the MWO's strategy for the next programme (2016-2020).**

After a first special report on biodiversity (2012), a second report on land cover changes in Mediterranean wetlands was finalised (see Focus section, p 40.) The report was based on results, primarily mapping results, accumulated over four years in the framework of the GlobWetland II project (in partnership with the European Space Agency) in North Africa and the Middle East together with similar work carried out at the Tour du Valat for Mediterranean Europe. These results were analysed initially at the pan-Mediterranean scale. The database compiled in the framework of this project provides interesting perspectives for developing other questions, particularly by cross-referencing it with data concerning biodiversity.

The analysis of biodiversity trends in Mediterranean wetlands was continued in two ways. First, the Living Planet Index was reviewed in order to adapt it better to the particular case of wetlands. For each type of wetland (lagoon, reed bed, watercourse, etc.), a set of dependent bird species was identified. Based on the recently obtained land cover data, this list will be used to study the relationships between trends in waterbird populations and habitats. In addition, an index of the abundance of communities based on nature observation data was defined and tested for the particular case of the Camargue. It enables trends to be characterised based on a prior reference state and species to be included that are rarely taken into account in biodiversity monitoring.

© Tour du Valat

Ichkeul Lake, Tunisia


© P. Grillas

Skadar Lake, Montenegro

The work on water indicators was relaunched in late 2014 in partnership with the Global Footprint Network, and should be further developed in 2015.

A summary report on local planning and wetlands was drawn up, bringing to a close four years of study at the Mediterranean Basin level, in particular within five countries outside the European Union.

The study programme on the cultural services provided by wetlands, started in 2012, was completed with the analysis of the results of four sites in Algeria. The summary report will be drawn up in 2015, based on a total of nine sites, and the cultural services indicator will be finalised.

Two new projects launched in 2014:

The capacity-building project for Non-Governmental Organisations (NGOs), financed by the MAVA Foundation and managed by WWF MedPo, was initiated at a joint meeting in Tunisia.

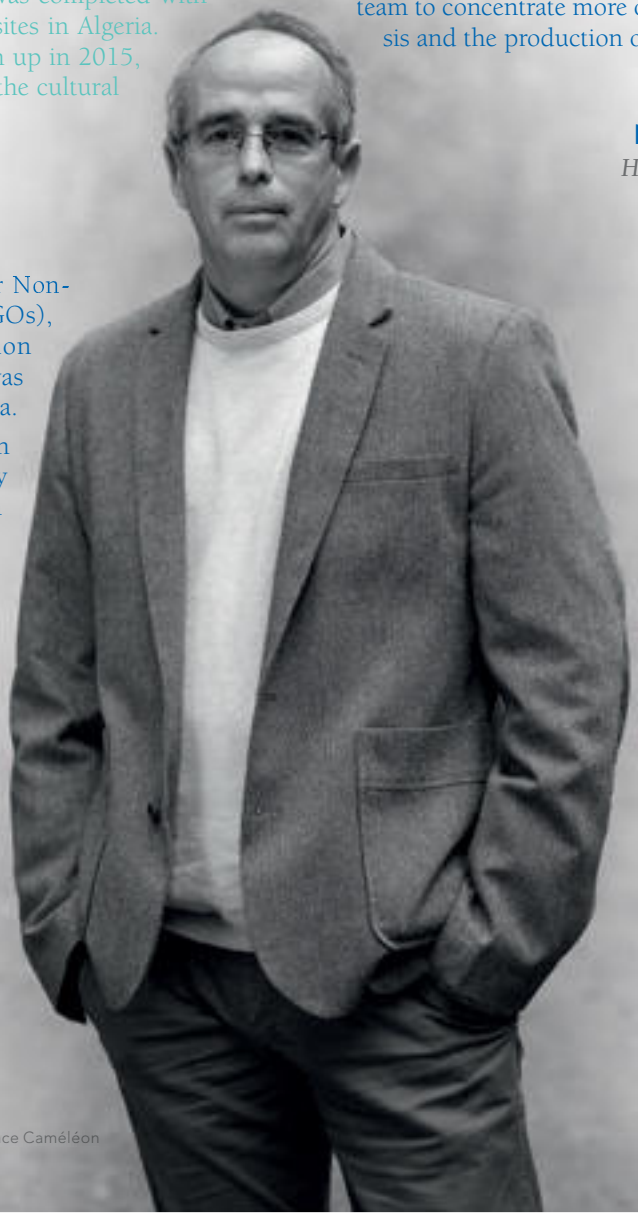
A project piloted by Plan Bleu on the ecological services provided by coastal wetlands was also started in 2014. The project is based on four case studies and is co-funded by the MAVA and Prince Albert II of Monaco Foundations.

Reinforced transfer at the heart of the department's adjusted strategy

The transfer of knowledge about the importance of wetlands, and their status and trends, is a major issue for the department and an important aspect of the team's work. At the national level (France), the department produced overview documents on agriculture and wetlands aimed at decision-makers (in the framework of the theme of the year for the Ramsar Convention). In the same vein, two leaflets were produced on biodiversity and land cover in Mediterranean wetlands (co-financed by the Prince Albert II of Monaco Foundation and the French Ministry of Ecology, Sustainable Development and Energy - MEDDE).

The relocation of the MedWet Secretariat to the Tour du Valat in 2014 provides new perspectives for more effective transfer to policy makers, This recent development has been taken into account for preparing the 2016-2020 programme, which will be finalised in 2015. The fact that the MedWet team is taking responsibility for political transfer will enable the Tour du Valat team to concentrate more on scientific analysis and the production of new results.

Laurent Chazée,
Head of Department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FOCUS

Land cover trends from 1975 to 2005 in Mediterranean coastal wetlands

Mediterranean coastal wetlands are among the most important areas in the region in terms of biodiversity and size. However, the coast is a highly urbanised area where many people live, and where there is a great deal of economic activity and transport infrastructure. As a result, the pressures on natural habitats are particularly strong. To assess the situation, the Mediterranean Wetlands Observatory (MWO) conducted a study on land cover trends in 214 coastal wetland zones in 22 countries from 1975 to 2005.

› A study on land cover trends in wetland by means of satellite images

This study was completed using the methodology developed within the European Space Agency (ESA) GlobWetland-II project. Maps were established using satellite images, and then indicators were calculated that provided information on the trends and surface areas of natural and artificial habitats in wetlands. In each wetland, there are five principal types of habitats that include different habitat classes: natural wetland habitats, artificial wetland habitats, natural non-wetland habitats, agricultural habitats, and urbanised habitats.

› A clear decline in natural wetland habitats over 30 years

The surface area of natural wetland habitats decreased by 10% from 1975 to 2005, for a total loss of 1248 km². Wet meadows and marshes lost 43% and 16% of their total area. For example, in the Macta marshes (Algeria), the area of natural wetland habitats decreased from 272 km² in 1975 to 194 km² in 2005, a 28% loss in 30 years. This loss was mainly due to the construction of three additional dams in the catchment area, and more severe droughts.

In addition, large wetlands such as lakes and lagoons were also severely affected. For example, the lagoons in the Nile delta, which are so crucial for biodiversity, experienced a dramatic loss of 398 km².

› Artificial wetland habitats expanded considerably from 1975 to 2005

At the same time, the surface area of artificial wetland habitats increased by 54% (a total increase of 661km² at the 214 sites studied). This increase came from the construction of ponds and reservoirs, and the development of aquaculture. This artificialisation occurred especially from 1975 to 1990.

Skadar lake, Montenegro

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Urban expansion in the Gediz Delta, Turkey.

› Agriculture: the primary direct cause of natural wetland habitat disappearance

From 1975 to 2005, 891 km² of natural wetland habitats were converted into farmland (71% of the total loss of natural wetland habitats during this time). Because they are flat, have abundant water resources, and often very fertile soil, wetlands are very well adapted to the development of irrigated agriculture, which expanded rapidly during this period in the Mediterranean Basin.

› Other factors explaining the loss of natural wetland habitats

The expansion of urban and industrial areas and transportation networks has gradually taken over natural and agricultural habitats, thus representing one of the principal driving forces behind the land cover changes observed. 95 km² of wetlands were converted into urban habitats, which represents 8% of the direct loss of natural wetland habitats. Likewise, from 1975 to 2005, the Famagusta wetland in Cyprus lost 44% of its natural wetland habitats, principally because of urban expansion. Meanwhile, the new urban areas are especially built on peri-urban agricultural land, which is then displaced to the neighbouring natural habitats.

With only 3% of world water resources and 7% of the population, water is scarce and overexploited in the Mediterranean Region. Excessive water abstraction in natural habitats as well as the artificialisation of water resources and the use of infrastructure such as dams and networks of canals to manage it are all factors resulting in the loss or modification of natural wetland habitats.

Coastal wetlands, and in particular deltas and lagoons, are also affected by the receding coastline, which was visible at some of the sites studied. It is the consequence of the rising sea level due to the effects of climate warming and the eroding coastline, which stems in particular from the decreasing amounts of sediments deposited by rivers.

These findings have led us to make the following recommendations. We should:

- Develop and implement techniques for inventorying existing wetlands that combine the use of satellite images, topographic data, and monitoring in the field;
- Preserve and restore natural wetland habitats, particularly those that have experienced major losses such as wet meadows, and renaturalize artificial wetland habitats;
- Provide effective management of protected natural areas and Ramsar sites;
- Manage water resources sustainably by using it wisely for agriculture, and taking account of the water requirements of different ecosystems;
- Reconsider coastal planning collectively to adapt to the receding coastline.

All of these findings were published in a special report from the Mediterranean Wetlands Observatory, which is summed up in a summary note you can find on Internet. This work will be continued in 2015 to refine the results in function of the specificities of the different Mediterranean Regions. These data will then be compared with climatic data and wintering waterbird population monitoring data to better understand and be able to predict the relative impact of climate changes and land cover changes on the communities of wintering waterbirds that use Mediterranean wetlands zones.

www.tourduvalat.org/en/documentation/nos_brochures

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Chief editor :

Coralie Beltrame.

Team:

Laurent Chazée, Thomas Galewski, Anis Guelmami, Patrick Grillas, Christian Perennou.

Financial partners:

Total Foundation, MAVA Foundation, Prince Albert II of Monaco Foundation, French Ministry of Ecology, Sustainable Development, and Energy (MEDDE), European Space Agency (ESA).

Technical partner:

GlobWetland II project team, coordinated by Jena-Optronik GmbH.

The Projects "Wetland Monitoring-assessment and policies"

Wetland Observatories and Policies

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Coralie Beltrame, Thomas Galewski, Christian Perennou.

This project is divided into two areas: the Mediterranean Wetlands Observatory (MWO) and institutional support for wetland policies. The Observatory is a scientific monitoring tool that acts as a major management and communication instrument for monitoring the conservation status of these ecosystems.

The second area is a direct value-addition of the MWO, aiming to raise the awareness of decision makers through institutional, strategic, and policy capacity building within countries and international organizations.

© P. Grillas

Dalmatian Pelican

In 2014, we continued our scientific monitoring within the framework of the MWO, and presented our results in two synthetic reports written for decision-makers:

- Note n° 1: Biodiversity in Mediterranean Wetlands
- Note n° 2: Status, trends, and prospects for Mediterranean wetlands

A third report on land cover spatial dynamic in Mediterranean coastal wetlands from 1975 to 2005 has been finalised and will be disseminated in the first half of 2015.

The recent move of the MedWet Secretariat to the Tour du Valat enable better synergies to be developed between the two organisations. Indeed, the MWO now benefits from substantial support from the MedWet team, so it can enhance the dissemination of its productions to more targeted audience.

The first thematic report on biodiversity sent by the MedWet Secretariat to the representatives of Mediterranean countries is an example of this new dynamic.

Synergies will also be developed for the dissemination of information from the MWO through electronic channels such as web sites, and social networks.

Concerning the second area in which we work, our department has maintained its support for the National Wetlands Observatory (France), particularly for the development of indicators and for its first thematic publication Agriculture, aquaculture, and wetlands. It has also continued working with the Provence-Alps-Côte d'Azur Region by participating in the Regional Biodiversity Observatory (ORB PACA). Involved in the overall strategy for biodiversity in the PACA Region, and in preparing the COP21 on climate change, we have contributed to a Mediterranean focussed meeting, which was coordinated by the PACA Region. We also applied to be an observer on the Ramsar Scientific and Technical Review Panel (STRP). Finally, we participated in the meeting of the African group in Tunisia to prepare the meeting of the contracting parties (12th Ramsar COP, Uruguay).

© T. Galewski

Ichkeul lake, Tunisia

AT A GLANCE

Methodology and innovation for monitoring wetlands

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Coralie Beltrame, Laurent Chazée, Thomas Galewski, Anis Guelmami.

This project develops and tests methodologies, concepts, and wetland monitoring indicators before they are validated and implemented on a routine basis within the framework of the Observatories and wetlands policies project. It also involves prospect oriented research in new areas, for which indicators have not yet been developed.

In 2014, six major actions were completed:

1 Further development of the Mediterranean Wetlands Observatory (MWO) biodiversity indicators

Three of our principal achievements included 1) defining an indicator on the basis of the IUCN (International Union for Conservation of Nature) Red List to characterise the risk of extinction of species in Mediterranean wetlands, 2) creating a simplified database for calculating the Living Planet Index (LPI), and 3) drawing up a list of wetland-specific species. These activities were completed first of all for France and enabled an LPI indicator to be adapted in the monitoring framework of National (France) Wetlands Observatory. A set of indicators was defined based on waterbird counts, which will be used in six wetlands in Morocco, Algeria, and Tunisia. These indicators will enable managers to make beneficial use of the results of their bird counts and to limit the impact of their management practices on target species.

2 Further development of the Mediterranean Wetlands Observatory (MWO) water indicators

During the 'MWO water indicators' workshop held at the end of 2013, major changes were proposed to this list of indicators, which would involve new partnerships and a considerable amount of technical work. We started exploring these new lines of development in 2014 with in-depth discussions with several partners and experts in this field. An initial project was undertaken with the Water Footprint Network, a feasibility study that should lead to a subsequent project. In addition, satellite image data were analysed to understand the extent to which wetlands are inundated (continuation of the GlobWetlandII project).

© M. Renaudin

Irrigated tomato fields in the Ichkeul catchment basin, Tunisia

3 Support for the National (France) Wetlands Observatory

In 2014, this support led to a first publication by the National Wetlands Observatory, 'Agriculture and wetlands: key figures,' which was completed in partnership with the French Ministry of Ecology.

4 Assessment of changes in surface area and land use in Mediterranean wetlands

Our study on trends in the size of wetlands and agricultural and urban pressures from 1975 to 2005 was completed and published as the second special thematic issue in the MWO series. It is based on analysis of 214 coastal wetlands around the Mediterranean Basin. It was implemented within the framework of the GlobWetland II project, as well as its extension to the northern part of the Mediterranean Basin. A toolbox for monitoring wetlands in the Rhone basin was published at the end of the RhoMéO project, and the MWO is helping to set up a LIFE+ project aiming to extend this initiative throughout France.

5 Work on Ecosystem Services

Initiated in 2013 with the "Plan Bleu", our partnership to assess the role played by Mediterranean wetlands in terms of adapting to climate changes was continued. A comprehensive bibliography review was done and made available on line, and a project for the second phase was prepared with the Plan Bleu, and approved by the MAVA Foundation and the Prince Albert II of Monaco Foundation. A joint initiative was also launched together with the 'Health Ecology' project in the Tour du Valat Species Department and an IRD laboratory (Institute of Research for Development) on the link between the status of biodiversity (land cover and species) and epidemics affecting human beings.

6 Local planning and wetlands' and 'Cultural services' indicators

The preparatory work conducted from 2011 to 2013 in various sites/countries to define these two indicators resulted in an initial analysis in 2014 at the Mediterranean level.

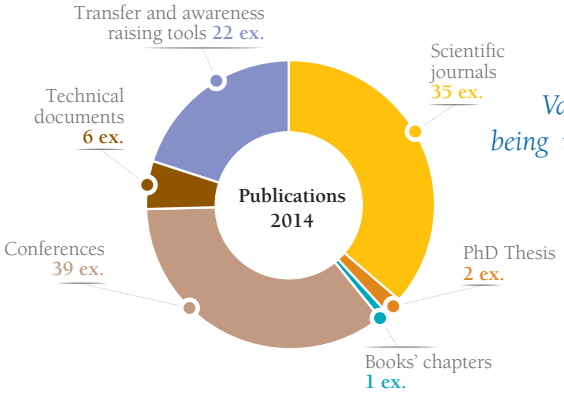
Nathalie Chokier,

Database Specialist

'My mission is to collect information on French Mediterranean lagoons, and share it with the stakeholders and managers concerned using our communication tools (website, newsletter, document base, etc.). Working at the Tour du Valat is really a plus in terms of conveying this knowledge to others and participating in the conservation and restoration of these unique habitats.'

The publications

our achievements



Transfer is at the heart of the Tour du Valat's mission, and particular efforts are being undertaken in this sphere. Communication with the scientific world, via publications and conferences, and making our research results available to potential users (managers in particular), are major activities for our team.

A wide range of publications in 2014 for the Tour du Valat

In all, 35 scientific articles were published in 2014, with 30 in international journals. Two doctoral theses were also defended in 2014. The publication of our research in scientific journals is essential, as much in terms of it being validated in peer reviewed journals, as in terms of disseminating our results to the scientific world. An increasing number of these scientific publications concern experimentations on the management of populations and species, and thus contribute directly to their conservation.

Along with articles in journals, the Tour du Valat's publications are also aimed at students, as we see in the work Conservation Sciences, published in 2014. Its other publications can also be more technical in nature or even awareness-raising documents, which are equally crucial for the conservation of Mediterranean wetlands.

Given the size of our team, the number and impact factor of our scientific publications remain at a high level.

Among the wide range of Tour du Valat publications illustrating the variety of fields in which we work, we may draw attention to our:

Scientific publications:

A summary paper identifying the dangers of global changes on wildlife and human health in terms of emerging infectious diseases.

Vittecoq M., Thomas F., Jourdain E., Moutou F., Renaud F. & Gauthier-Clerc M. 2014 - Risks of emerging infectious diseases: Evolving threats in a changing area, the Mediterranean basin, Transboundary and emerging diseases 61(1):, 17-27.

An article proposing a rigorous scientific approach for defining compensatory measures that are effective for protecting species affected by development projects.

Meineri E., Deville A.-S., Gremillet D., Gauthier-Clerc M. & Béchet A. 2014 - Combining correlative and mechanistic habitat suitability models to improve ecological compensation. Biological Reviews. doi: 10.1111/brv.12111

Technical reports:

A report on the impacts of Bti mosquito control presented at the Camargue Regional Natural Park.

Poulin B. 2014 - Rapport final sur le suivi scientifique annuel mené en 2013 en parallèle aux opérations de démoustication au Bti sur le périmètre du Parc Naturel Régional de Camargue. 156 pp.

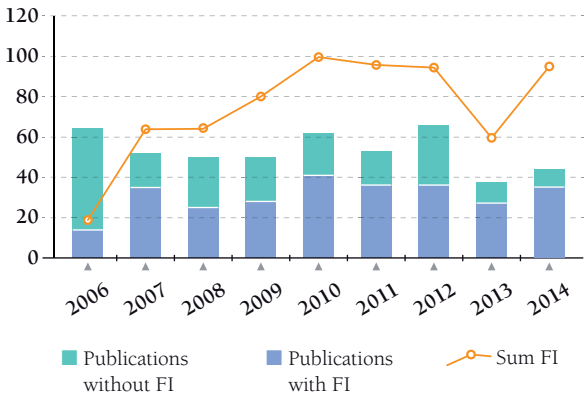
Knowledge transfer documents:

A special report coordinated by Coralie Beltrame, which presents the results of a study on trends in Mediterranean coastal wetlands from 1975 to 2005, based on methodology developed within the framework of the GlobWetland-II project in partnership with the European Space Agency.

Observatoire des Zones Humides Méditerranéennes, 2014 - Occupation des sols - Tendance dans les zones humides méditerranéennes littorales de 1975 à 2005. Dossier thématique N°2. Tour du Valat, France. 48 p.

Michel Gauthier-Clerc, François Mesléard, and Jacques Blondel co-edited a comprehensive work entitled Conservation Sciences published by De Boeck. It is a reference work intended for students, as well as for other people interested in environmental issues. Specialists from numerous fields made a contribution to this important new book.

Publications



Annual summary of the number of scientific publications in journals with and without Impact Factor (IF), and sum of Impact Factor for all publications. Although not devoid of bias, the Impact Factor (IF) is a commonly used measure of the importance of scientific journals.

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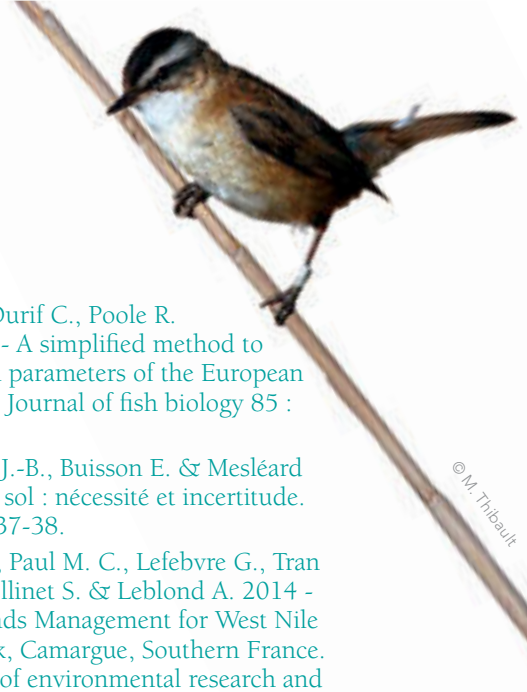

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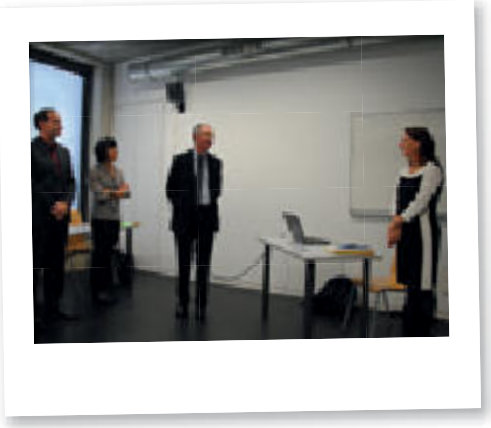

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Conferences and seminars


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Conference for Young Scientists

Tour du Valat welcomes numerous partners and scientists to attend conferences and seminars dealing with the conservation of Mediterranean wetland areas. Other subjects are also approached.

Conferences

The second edition of the "*Mediterranean Conservation Sciences Conference for Young Scientists*" was held on April 28th, 29th and 30th, under the chairmanship of Jacques Blondel, Director Emeritus for research at the CNRS. Four lecturers had been invited:

- **Arnaud Béchet** *(Tour du Valat, France)*
  Greater flamingos in the Anthropocene: risks or opportunities
- **François Sarrazin** *(MNHN, Paris, France)*
  Conservation beyond anthropocentrism: an evolutionary perspective
- **Maria B. Garcia** *(Pyrenean Institute of Ecology (CSIC), Spain)*
  Past and present approaches to track the dynamics of plant diversity. European legislation, unusualbiology, and citizen science
- **Juan José Negro** *(Estación Biológica de Doñana, (CSIC), Spain*
  Doñana's frontier: the practice of conservation in a human landscape

The organization committee is composed of Patrick Grillas, Arnaud Béchet and Florence Daubigney.

Tour du Valat organizes an annual lecture on conservation biology, in order to highlight the work on waterbirds conservation of Heinz Hafner. This year, we welcomed Ms. Pat Monaghan, Professor at the University of Glasgow, Scotland, who presented her work on "The long term effects of early life conditions; consequences for individuals, populations and conservation biology".

Seminars

- **Dynamique et génétique des populations de cistudes d'Europe** *(Emys orbicularis)* | *Sébastien Ficheux (Tour du Valat - Université de Bourgogne)*
- **Diagnostic écologique des zones humides du Sud-Constantinois** | *Meliha Allaoui (Laboratoire d'Ecologie fonctionnelle de l'Université de Batna, Algérie)*
- **La perception des changements globaux dans le delta du Rhône** | *Laurence Nicolas (CNRS et bureau d'études RESSOURCE)*
- **D'autres acteurs dans le conflit entre les riziculteurs et les oiseaux : la Talève sultane dans le delta de l'Ebre, et la Cigogne blanche dans l'estuaire du Sado** | *Eduardo Soler Garcia de Oteyza (organisation environnementale espagnole Limonium)*
- **Étude de l'écologie d'une libellule menacée : *Lestes macrostigma*** | *Philippe Lambret (Tour du Valat)*
- **Agriculture et zones humides en Camargue, évolutions d'hier et défis de demain** | *Jean Jalbert (Tour du Valat)*
- **La mise en politique du moustique** | *Marie Chandelier et Raphaël Mathevet (CEFE/CNRS & Université de Montpellier 3)*
- **Un outil interactif pour promouvoir une gestion raisonnée des marais méditerranéens** | Brigitte Poulin, Gaëtan Lefebvre & Christophe Germain (Tour du Valat)
- **Suivi quantitatif de l'avifaune nicheuse le long des cours de la Loire et de l'Allier : quels changements en deux décennies (1990-2012)** | *Jean Roché, Bruno Faivre et Bernard Frochot (Consultants en environnement)*
- **Conséquences d'aptitude phénotypique de la socialité : l'exemple de la Marmotte alpine** | *Dominique Allaine (Laboratoire de Biométrie et Biologie Evolutive, Université Lyon 1)*
- **Une approche écologique et évolutive du cancer** | *Frédéric Thomas (DR1 CNRS, MIVEGEC IRD, Montpellier)*
- **When the structure of species communities rules a pathogen** | *Gabriel E. Garcia-Peña (MIVEGEC - Centre IRD de Montpellier)*
- **Quelques réflexions sur les études de dynamique des populations et leurs applications en biologie de la conservation** | *Sophie Véran (Tour du Valat)*
- **Etude de la diversité des phytovirus et de leurs dynamiques spatio-temporelles dans deux agro-systèmes (le Fynbos sud-africain et la Camargue) à l'aide de la géo-méta génomique** | *Philippe Roumagnac (CIRAD Montpellier)*
- **Evaluation des bénéfices de la restauration des écosystèmes lagunaires : le cas des étangs palavasiens** | *Rutger De Wit (Ecologie des Systèmes marins côtiers)*
- **L'ambivalence de la menace et de sa mesure : le cas de la gestion des populations de loups en France** | *Antoine Doré (INRA Toulouse)*
- **From host immunity to pathogen invasion : linking helminth co-infection and microparasite dynamics** | *Vanessa Ezenwa (University of Georgia, USA)*
- **Le projet "Des rives"** | *Bastien Defives (collectif Transit)*

Transfer tools

Our annual report describes the various aspects of the Tour du Valat and each year zooms in on a single project or theme that has been developed in each of our three programmes. It does not aim to be exhaustive. If you wish to go further you can find out about our full range of activities at our website:

www.tourduvalat.org/documention

A number of general-public publications, leaflets, and reports can also be obtained at cost price from the secretariat of the Tour du Valat:

secretariat@tourduvalat.org

"Conservation of Mediterranean Wetlands" collection

Between 1994 and 2005, the Tour du Valat has been publishing a series of booklets "Conservation of Mediterranean Wetlands" as part of the MedWet Initiative. The central aim of the series is to improve the understanding of Mediterranean wetlands and to make sound scientific and technical information available to those involved in their management.

To date, the series is composed of thirteen titles:

- Characteristics of Mediterranean Wetlands
- Functions and Values of Mediterranean Wetlands
- Aquaculture in Lagoon and Marine Environments
- Management of Nest Sites for Colonial Waterbirds
- Wetlands and Water Resources
- Aquatic Emergent Vegetation
- Conservation of Freshwater fish
- Vegetation of Temporary Marshes
- Salinas and Nature Conservation
- Wetlands and Hydrology
- Amphibians and Reptiles
- Mediterranean Riparian Woodlands
- Integrated Management of Mediterranean Wetlands

At the end of the LIFE "Temporary Pools" project coordinated by the Tour du Valat from 2000 until 2005, a management guide in two volumes was produced.

It summarizes the main outputs of the programme and is also available for sale:

- Mediterranean Temporary Pools: Volume 1 - Issues relating to conservation, functioning and management
- Mediterranean Temporary Pools: Volume 2 - Species information sheets

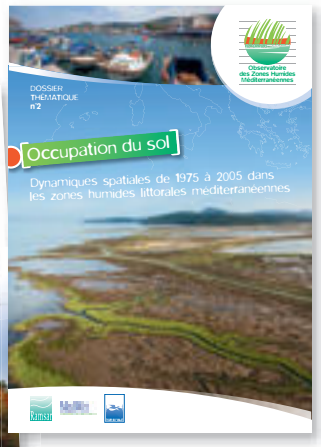
"Science and management" collection

The booklets in our "Science and management" collection are at the crossroads of research outcomes and implementation in the field.

- Regards croisés sur 20 ans d'expériences en Camargue
- Gestion Partagée d'un marais en Camargue
- Cistude d'Europe en Camargue
- Refus de pâturage dans les parcours de Camargue
- La Glaréole à collier en Camargue
- L'Anguille européenne

MWO documents

- Thematic documents and reports are available on line.



Media

The Tour du Valat enjoyed good media coverage for the 60th Anniversary of the foundation, with more than 150 articles published in the written press, several reports on TV and radio.

In 2014, the most covered topics were:

- Flamingo ringing in the Camargue and our technical support to the one organized in Tunisia;
- The 60th Anniversary of the Tour du Valat;
- The valorization of a scientific publication: *"Impacts of extreme climatic events on the energetics of long-lived vertebrates: The case of the Greater Flamingo facing cold spells in the Camargue"* published in The Journal of Experimental Biology and mentioned in an AFD dispatch;
- Mosquito control ;
- The energy rehabilitation of the built infrastructure;
- The signature of a tripartite agreement with the French Ministry for Ecology (MEDDE) and the National Office for Hunting and Wildlife (ONCFS);
- Hunting topics such as the impact of the release of farm Mallards;
- The numerous scientific monitoring performed by the Tour du Valat;
- The Tour du Valat's Conference for Young Scientists;
- Events organized by the Tour du Valat (Open House Day, World Wetland Day, The Festival of Nature, Energy Celebration…)
- And…arena games in which our bulls participated.

Seven television reports concerning the Tour du Valat have been broadcasted on French channels. The number of articles published in the national press, in the specialized press, and in the foreign press has grown significantly. We also started to valorize scientific publications through the dissemination of press releases. The coverage by the local press remains very good.

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Anne Ackermann,

Executive Assistant

'When I arrived at the Tour du Valat, I discovered people who were strongly devoted to saving Mediterranean wetlands. I was inspired by their enthusiasm and real commitment to taking action so the next generation can also enjoy these natural marvels surrounding us, and so I joined the team!'

The structure

our Foundation

The Tour du Valat is a non-profit public benefit organisation. Its governance is handled by two official administrative bodies: the Board, made up of three committees: the founders, ex officio members, and experts; and the Science Council, composed of internationally acclaimed scientists from the major fields in wetlands research and conservation. In addition, six thematic experts (two for each of the three scientific Departments), provide specialised advice to support the Science Council.

These two administrative bodies were partially renewed in 2014 due to the departure of some 'historical figures' whose mandates could not be renewed. It was a good occasion to express our most heartfelt thanks to two scientists in particular who had assisted and guided the Tour du Valat for many years. First, Mike Moser, who defended his doctoral thesis at the Tour du Valat in 1979. He went on to develop and direct Wetlands International for ten years, before devoting 24 years to the governance of our Foundation, which he undertook with a great deal of commitment, providing invaluable strategic support. Second, Tim Clutton-Brock, eminent specialist of behavioural ecology, and Director of Research at the University of Cambridge, who worked on our Board, and then on our Science Council for 31 years, and pushed us to develop high-level research that could be translated into concrete results for conservation. We would also like to thank Elisabeth Laville, the founder of Utopies, for her assistance during the past eight years.

To replace Mike Moser and Elisabeth Laville on the College of Experts, the Advisory Board welcomed two experts with whom the Tour du Valat has worked closely for many years, Antonio Troya, Director of the IUCN Centre for Mediterranean Cooperation, in Málaga (Spain), and Tobias Salathé, Senior Advisor for Europe of the Ramsar Convention Secretariat, in Gland (Switzerland). A warm welcome to both of you!

Finally, the Science Council should propose somebody to replace Tim Clutton-Brock before its next meeting in November 2015.

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Governance

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The Board of Directors - November 2014

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- **Tobias Salathé** . . . . . *Ramsar Senior Advisor for Europ in Gland (Switzerland)*
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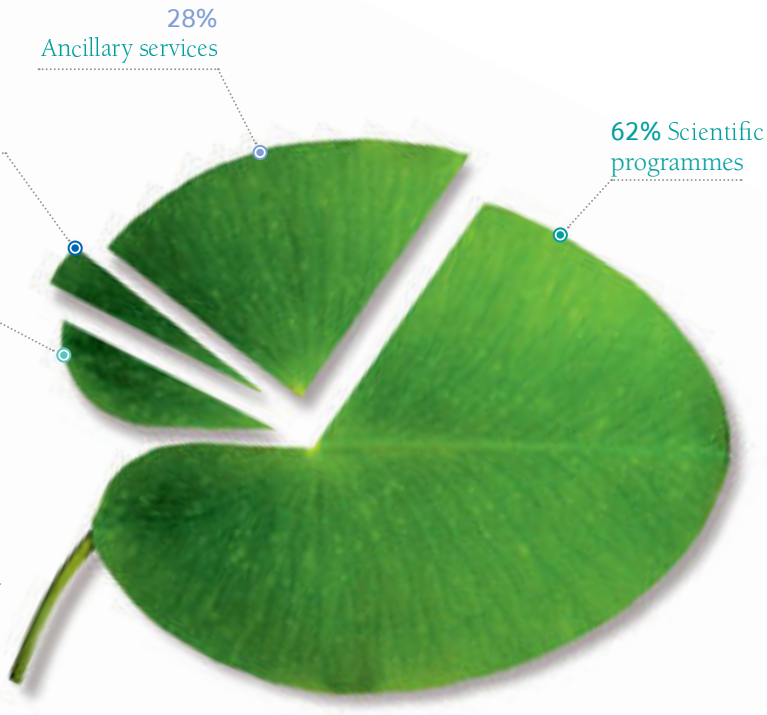
- **Pr William Sutherland** . . . . . *University of Cambridge, UK*

THEMATIC EXPERTS

In support of the Science Council, a high level of expertise will be provided by six thematic experts, two for each of the three Tour du Valat programmes, for the duration of the five-year plan.

- **Jacques Blondel** . . . . . *Centre d'écologie fonctionnelle évolutive/CNRS, Montpellier*
- **Pierre Chevallier** . . . . . *Institut de recherche pour le développement/CNRS, Laboratoire d'hydrosciences, Montpellier*
- **Luis Costa** . . . . . *SPEA/BirdLife, Portugal*
- **Jonathan Loh** . . . . . *Institute of Zoology, Zoological Society of London, UK - WWF International*
- **François Renaud** . . . . . *Institut de recherche pour le développement / CNRS, Montpellier*
- **Sophie Thoyer** . . . . . *Supagro-Lameta, Montpellier*

Budget



The budget for the year 2014 amounts to 4,868,000 Euros.

Expenditure:

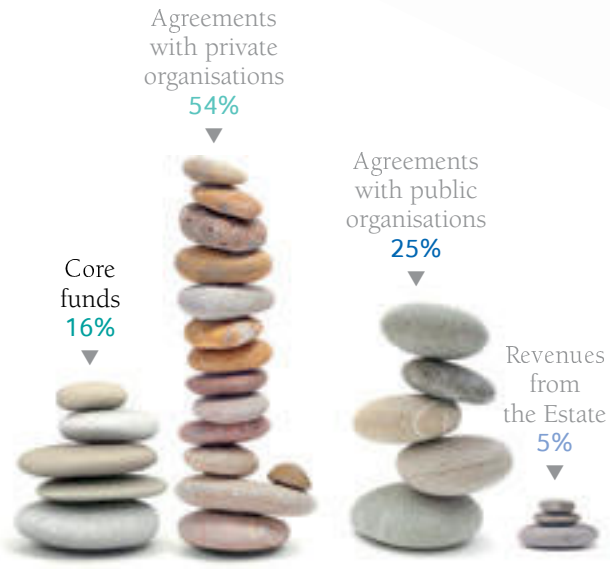
- 3,020,000 euros have been allocated to the scientific programmes, including 888,000 euros for the "Conservation of species and their populations in the context of global changes" department, 1,331,000 euros for the "Ecosystem modelling, restoration and management" department, 229,000 euros for the "Monitoring and evaluation & wetlands policies" department, 328,000 euros for the management of the estate, and 244,000 euros for shared scientific activities (scientific management, conferences, training, transfer, project development, etc.).
- 352,000 euros have been allocated to general management (including the governance of the organisation as well as the representation of the Tour du Valat in major forums) and to communication (website, annual report, etc.).
- 135,000 euros have been allocated to managing the Tour du Valat library, principally the purchase of books and scientific journals.
- 1,361,000 euros have been allocated to ancillary services, which include financial and administrative services, the canteen, building maintenance, and the repairs workshop.
- 10,000 euros have been set aside to cover the retirement allowances.

The Tour du Valat receives its financing from a number of sources:

- 16 % of its receipts come from its own funds, held by the Pro Valat Foundation (682,000 €)
- 52 % of its receipts come from the MAVA Foundation (2,531,000 €)
- 25 % of its receipts come from agreements with public organisations (1,217,000€)
- 2 % of its receipts come from agreements with private organisations (97,000€)
- 5 % of its receipts are revenues from the estate (341,000€)

Expenditure in euros

Scientific programmes	3 020 000
General management / Communication	352 000
Library	135 000
Ancillary services	1 361 000
Total général :	**4 868 000**



Receipts in euros

Core funds	682 000
Agreements with private organisations	2 628 000
Agreements with public organisations	1 217 000
Revenues from the Estate	341 000
Total général :	**4 868 000**

Environmental management

In the framework of its environmental mission, the Tour du Valat has developed a three-point environmental and management strategy concerning the built infrastructure based on:

- *improving waste processing,*
- *renovating the heating system,*
- *defining an environmentally-friendly transportation policy.*

A midpoint review in figures

- 100 % of wastewater is cleaned by our reed bed water treatment plant.
- 100% of household waste is sorted, with fermentable waste processed on-site (compost) and the rest recycled through specific recycling channels.
- 49% less energy consumed by our buildings after they were insulated with cellulose wadding and rice straw insulation, and some of the window units were replaced by energy-efficient double-glazed windows.

The brand new wood chipper

- 87% less CO2 emissions because of our new 160 kW multi-fuel biomass boiler, which is combined with a 590 m long heating network and seven substations that control the heat input for each building. This system replaced five fuel oil and gas boilers that had a total output of 580 kW.

Inauguration of our Energy Optimisation project

More than four years after launching the energy optimisation works for the Tour du Valat buildings, this spring we inaugurated our new installations. Our institutional and financial partners attended the event (Provence-Alps-Côte d'Azur Region, Arles sub-prefecture, Camargue Regional Natural Park, Arles Town Hall), as did the general contractor, design office, and companies that helped us complete this ambitious project. It was the occasion to make an initial assessment of our three-point energy strategy based on:

1. improving the energy efficiency of our buildings by installing appropriate insulation, some of which is made of locally-produced rice straw,
2. using a multi-fuel biomass boiler to produce our heat, and distribute it via a heating network,
3. producing our own hot water with solar energy.

This ambitious 900,000€ renovation project benefited from significant financial support from:

- FREE (regional financing for the environment and energy—a 2009-2013 framework agreement between the State, the Region, and the ADEME (French environment and energy management agency);
- FEDER (European operational programme 'Europe makes a commitment in Provence-Alpes-Côte d'Azur');
- the local energy and environment plan local backed by the Camargue Regional Natural Park.

The initial results are promising!

This renovation project has enabled us to make the following savings.

- Cut our energy consumption in half. This is a promising result, but still far from the initial objective to reduce it by 75%.
- Cut our CO2 emissions by 87%, which is better than our initial objective.
- Cut our heating costs by 70%. This major savings is the result of our decreased consumption of energy, and the replacement of fossil fuels by wood chips. It should be further improved when we start burning rice husk from the Camargue.
- Save 22,000 € per year on heating fuel.

This energy efficiency should be further improved in the future, by replacing some old window and door units, continuing to renovate the insulation of our buildings, and remaining vigilant in terms of personal behaviour. We are also going to make better use of the energy resources on the Tour du Valat estate by producing some of the wood chips with the wood chipper purchased with help from the Provence-Alps-Corsica savings bank (CEPAC).

Finally, we must share our experience on this pilot project with as many organisations as possible. Several public and private backers of projects interested by this approach have already contacted us, and several site visits and information sharing sessions have been organised. We will continue working in that direction in order to encourage more people to adopt this kind of approach.

Launching reflections on a virtuous transportation policy

Last year, four workgroups assessed our transportation practices, and made concrete propositions to improve the principal points in our transportation policy in order to:

- optimise the management of the Tour du Valat's car fleet,
- encourage the use of clean means of transportation on the Tour du Valat estate,
- optimise commutes to and from work by encouraging carpooling and public transport,
- decrease and optimise national and international travelling.

Their findings were compared and discussed. In 2015, the conclusions of these reflections will be used to refine the analyses and better comprehend the technical and financial feasibility of the solutions proposed. Our transportation policy will then be officially adopted and implemented. It will complement the other two points of our environmental management strategy, which are already operational.

© Tour du Valat

Inauguration of the new energy optimisation installations

© C. Hanzen

Purple heron,
Ardea purpurea

2014 was a good year for the Purple heron. 800 nesting couples, spread over 14 colonies, were identified within the reed beds of the Camargue.

© Marc Thibault

Library

The library was established in 1954 at the same time as the Tour du Valat Research Centre. It is dedicated to François Bourlière, a pioneer in the field of nature conservation and ecology. The library's reference material, at first devoted mainly to ornithology, has been built up to include related fields of research, ecology and conservation.

Collections

Comprising:

- 9,600 publications and thesis
- 1,200 different periodicals of which 350 are running
- 22,000 offprints, booklets and reports

The reference section specializes in the following fields:

- General ecology, wetland ecology
- Nature conservation
- Management and protection of wetlands, especially in the Mediterranean region
- Ornithology
- Zoology: mammalogy, ichthyology, herpetology, entomology
- Botany

Access

The library is open to anyone who wishes to consult publications on site; they may not be removed from the library. A copying machine (chargeable) and a scanner are available.

Opening hours

Monday, Wednesday, Thursday and Fridays from 9am till noon and from 1 till 5pm

Please inform us of your coming in advance.

Address

Tour du Valat
Bibliothèque
Le Sambuc - 13200 Arles
Tél. : +33 (0)4 90 97 20 13
Fax : +33 (0)4 90 97 20 19
E-mail : biblio@tourduvalat.org

Cyril Caillat,

Mechanic

"I started working as a freelancer at the Tour du Valat, and today I have become an employee. I make sure all the vehicles and agricultural machinery are in good working order. I even help to design some of the tools used for the research. I really love working here!"

© H. Hôte - Agence Caméléon

The teams

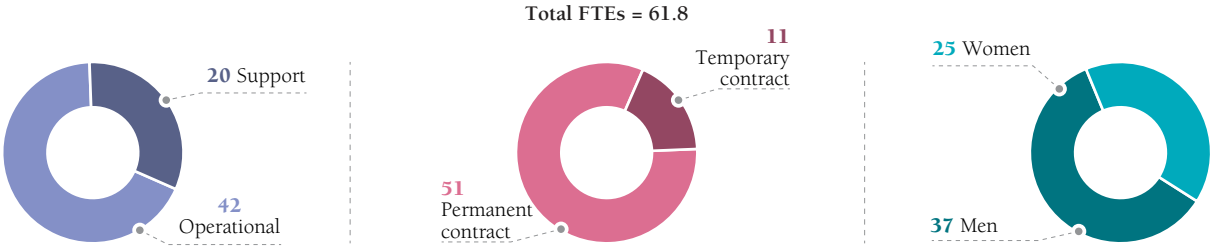
our life force

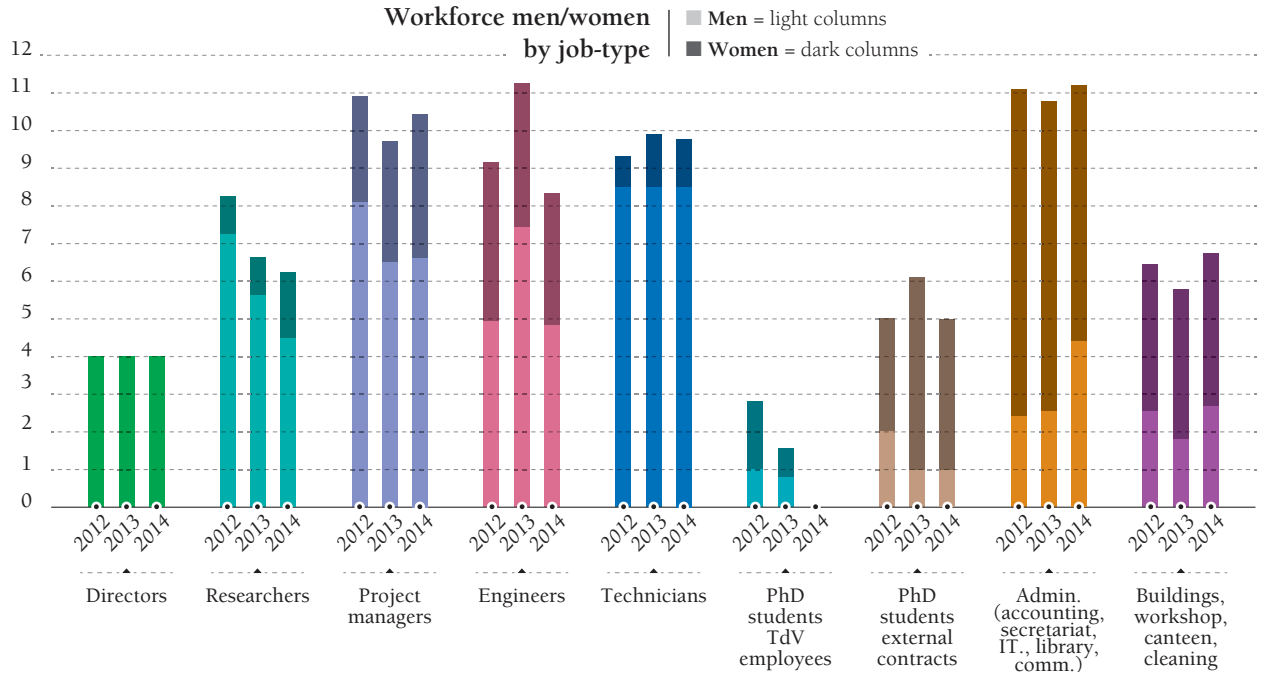
In 2014, we undertook various actions to reorganise our human resources, which included redefining our company agreements on the Employee Savings Plan and the Time Savings Plan. The latter was made less flexible in terms of increasing time saved, and more restrictive in terms of using it, in order to decrease the number of days saved, and therefore limit the long-term risks for the Foundation.

In order to strengthen the cleaning service and accounting staff, the Tour du Valat also gave a chance to three young people by hiring them within a government-subsidised job creation scheme.

In 2014, there were 70 employees on the Tour du Valat team, along with 5 doctoral students who have outside contracts, for a total staff of 61.8 full-time equivalents: 37 men, and 25 women.

Our team was strengthened by 23 trainees and 3 European volunteers, adding their enthusiasm and precious ideas to the scientific activities at the Tour du Valat.





Us

MANAGEMENT

- **Jean Jalbert** ..... *Director General*
- **Dr Patrick Grillas**..... *Programme Director*
- **Olivier Pineau** ..... *Director of the Estate*
- **Jean-Jacques Bravais**..... *Administrative and Financial Director*

DEPARTMENT "CONSERVATION OF SPECIES AND THEIR POPULATIONS IN THE CONTEXT OF GLOBAL CHANGES"

- **Dr Arnaud Béchet** ..... *Head of Department, Research Scientist*
- **Paul Acker**..... *PhD, University of Toulouse EPHE Montpellier*
- **Antoine Arnaud** ..... *Research Technician*
- **Thomas Blanchon** ..... *Research Technician*
- **Clarisse Boulenger** ..... *PhD, Muséum National d'Histoire Naturelle (co-funding Brittany Region)*
- **Dr Anne-Laure Brochet** ..... *Project leader*
- **Pascal Contournet**..... *Research Technician*
- **Dr Alain Crivelli**..... *Research Director*
- **Clémence Deschamps** ..... *Project Officer*
- **Charlotte Francesiaz** ..... *PhD, University of Montpellier II (co-funding SIBAGHE)*
- **Christophe Germain**..... *Research Assistant*
- **Yves Kayser**..... *Research Assistant*
- **Claire Pernollet** ..... *PhD, University of Montpellier II (co-funding ONCFS)*
- **Charlotte Perrot** ..... *PhD, University of Montpellier (co-funding Montpellier Supagro)*
- **Dr Alain Sandoz**..... *Research Assistant*
- **Dr Sophie Véran** ..... *Project Leader*
- **Dr Marion Vittecoq**..... *Research Scientist*

DEPARTMENT "ECOSYSTEM MODELLING, RESTORATION AND MANAGEMENT"

- **Dr Brigitte Poulin** ..... *Head of Department, Research Scientist*
- **Nathalie Barré**..... *Research Technician*
- **Nicolas Beck**..... *Project Leader*
- **Dr Olivier Boutron** ..... *Research Assistant*
- **Dr Philippe Chauvelon** ..... *Research Scientist*
- **Nathalie Chokier** ..... *Research Assistant*
- **Dr Lisa Ernoul** ..... *Project Leader*
- **Samuel Hilaire**..... *Research Technician*
- **Philippe Lambret** ..... *Project Leader*
- **Dr Gaëtan Lefebvre**..... *Research Assistant*
- **Dr Solène Masson** ..... *PhD, University of Avignon*
- **Virginie Mauclert**..... *Project Leader*
- **Dr François Mesléard**..... *Research Director*
- **Nathalie Patry**..... *Research Assistant*
- **Marc Thibault** ..... *Project Leader*
- **Loïc Willm** ..... *Research Assistant*
- **Nicole Yavercovski** ..... *Research assistant*

DEPARTMENT "MONITORING AND EVALUATION & WETLANDS POLICIES"

- **Dr Laurent Chazee** ..... *Head of Department (on sabbatical leave until November 2014)*
- **Dr Coralie Beltrame** ..... *Project Leader*
- **Dr Thomas Galewski** ..... *Project Leader*
- **Anis Guelmami**..... *Research Assistant*
- **Dr Christian Perennou** ..... *Project Leader*

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ESTATE MANAGEMENT

- Cyril Caillat ..... *Estate Technician*
- Cédric Cairello ..... *Estate Technician*
- Frédéric Castellani ..... *Estate Technician*
- Richard Chanut ..... *Estate Team leader*
- Damien Cohez ..... *Deputy Director of the Estate*
- Dimitri Gleize ..... *Estate Technician*
- Morad Martoune ..... *Estate Technician*
- Ludovic Michel ..... *Estate Technician*
- Elvin Miller ..... *Technician - Guard*
- Anthony Olivier ..... *Technician - Guard*

SUPPORT SERVICES

- Anne Ackermann ..... *Management Secretary*
- Vincent Boy ..... *Computer Specialist*
- Corinne Cuallado ..... *Cook*
- Florence Daubigney ..... *Management Secretary*
- Marie-Antoinette Diaz ..... *Secretary*
- Kamal El Bachir ..... *Accountant*
- Rosalie Florens ..... *Management Secretary*
- Cécile Girard ..... *Cleaning Officer*
- Stéphanie Gouvernet ..... *Cleaning Officer*
- Coralie Hermeloup ..... *Communication Manager*
- Jean-Claude Pic ..... *Chief Accountant*
- Catherine Picard ..... *Accountant*
- Justine Piccini ..... *Cleaning Officer*
- Josiane Trujas ..... *Canteen Assistant*
- Josiane Xuereb ..... *Accountant*
- Gwenael Wasse ..... *Librarian/ Communication officer*
- Emmanuel Thévenin / Evanne Lefur .. *Project leader seconded to GIP ATEN*

STUDENTS

David Bartholomew, Arthur Broche, Nathaly Collet, Martin Delpuech, Sofia Djemaa, Nicolas Fesselet, Mélanie Giguère, Dorian Girod, Thibaud Gravez, Anita Jeyam, Mélanie Le Naour, Juan Lozano, Emilie Marchwicki, Charles Meyerstein, Mattias Perez, Quentin Queiros, Maguelone Rajot, Nina Schoen, Ludmilla Terres, Jean-Matthieu Thevenot, Julien Vasseur, Alexandre Vilain, Céline Vincent

EUROPEAN VOLONTARY SERVICE | Erasmus+

Céline Hanzen, Imogen Rutter, Radka Vrabelova

FIXED-TERM CONTRACTS (SHORT PERIOD)

Nicole Bonfils, Emilie Clarion, Guillaume Gayet, Ana Sanchez de Dios

Our partners

A

- ACCOR Group - FR
- AEWA
- Agency for Environment and Energy Management (ADEME) - FR
- Agro-Paris-Tech (Paris Institute of Technology of Life, Food and Environemental Science - FR
- AGROOF - FR
- Agropolis Foundation - FR.
- Alpilles Regional Natural Park - FR
- ANSES (National Agency for Health Security) Animal Health Laboratory - FR
- Arles Chamber of Commerce and Industry - FR
- Arles Town Council -FR
- Arles Hunting Group (GCA) - FR
- Artelia Water & Environment- FR
- Asphodèle Association - FR
- Atlantic Marshes, Channel and North Sea Transfer Unit - FR
- Authorized coalition of the Fumemorte (ASA Fumemorte) - FR
- Autonomous Region of Sardinia - Italy

B

- Banc d'Arguin National Park - Mauritania
- Barcelona Convention
- Bagnas National Nature Reserve - FR
- Berre Pond joint association(GIPREB) - FR
- Bird Paradise Union of Izmir (Izkus) Turkey
- BirdLife International
- Biotope - FR
- Bolmon and Jaï intercommunal coalition - FR
- Botiaux-Dulac Foundation - FR
- Bouches-du-Rhône Departmental Territories and Sea Authority (DDTM Bouches-du-Rhône) - FR
- Bouches-du-Rhône General Council (CG13) - FR
- BPI FR
- British Trust for Ornithology - UK
- BRL ingénierie - FR
- Burgundy Region - FR

C

- Camargue Horse Centre - FR
- Camargue National Reserve / SNPN- FR
- Camargue Regional Natural Park (PNRC)- FR
- Catalan Technical Centre for forestry
- Center for Evolutive and Functional Ecology (CNRS - CEFE) - FR
- CEPF (Critical Ecosystem Partnership Fund)
- Cepralmar - FR
- Chiroptera Group of Provence - FR
- Chrea National Park - Algeria
- CIHEAM/IAMM/Montpellier (Mediterranean Agronomic Institute of Montpellier) - FR
- Convention on Biological Diversity
- CNRS - DESMID (Ecological and Social Dynamics in the Delta Habitat) - FR
- CNRS - MIVEGEC Montpellier: Infectious Diseases and Vectors: Ecology, Genetics, Evolution and Control - FR
- Coalition of Natural Area Conservatories - FR
- Corsica Regional Direction for Environment, Planning and Housing (DREAL Corse) - FR
- Corsican Environment Office (OEC) - FR
- Coastal Mediterranean mosquito control coalition (EID Méditerranée) - FR
- Coastal Protection and Planning Agency - Tunisia
- Coastal Protection Agency - FR
- Convention on Biological Diversity
- Cultural and Natural Heritage Industries Unit FR

D

- Departemental Hunting Federations (FDC13, FDC 30) - FR
- Direction of National Parks - Senegal
- Doga Dernegi - BirdLife - Turkey
- Doñana Biological Station - Spain

E

- Ebro Delta Natural Park - Spain
- Egyptian Agency for Environmental Affairs - Egypt
- El Kala National Park - Algeria
- Estagnol National Nature Reserve - FR
- European Environment Agency
- Environment Quality Authority - Palestinian Authority
- Euro-Mediterranean system for information and water datas - FR
- European Research and Teaching Center for Geoscience and Environment (CEREGE) - FR
- European Space Agency (ESA)
- European Topic Centre on Land Use and Spatial Information
- European Union (FEDER, FP7, Life+, ERASMUS+, SMAP, EVS projects)
- Eurosite

F

- Federation for the Protection and Management of the Camargue in the Gard (SMCG)- FR
- Foundation for Biodiversity Research - FR
- Foundation of France - FR
- France-Quebec Office for Youth
- French Development Agency (AFD)
- French Ecological Society - FR
- French Electricity Distribution Network (ErDF)
- French Foundations Centre (CFF) - FR
- French National Nature Reserves - FR
- French Peatland Resource Center - FR
- French Research Institute for Exploitation of the Sea (Ifremer) - FR
- French Rice Centre (CFR) - FR
- French Space Agency (CNES) - FR
- French Society for the Study of Odonates - FR
- Friends of Pont de Gau Ornithological Park Association - FR
- Friends of the Birds Association (AAO) - Tunisia
- Friends of the Vigueirat Marshes Association - FR
- Fuente de Piedra Natural Reserve - Spain

G

- Gard Chamber of Agriculture - FR
- Gard Departmental Territories and Sea Authority (DDTM Gard) - FR
- Gard General Council (CG30) - FR
- Géco Ingénierie - FR
- Global Footprint Network
- Gouraya National Park - Algeria
- Greek Biotope/Wetland Centre - Greece
- Green Balkans NGO - Bulgaria

H

- Hebraic University of Jerusalem - Israel
- Heritage Foundation (Fondation du Patrimoine) - FR
- High Commission for Waters and Forests and the Fight against Desertification - Morocco
- HydroSciences Laboratory - FR

I

- Ichkeul National Park - Tunisia
- Initiative Centre for the promotion of Agriculture and rural environment of the Gard region (CIVAM Bio) - FR
- INRA - ENSAM - (National Institute for Agronomy) FR
- INRA - INNOVATION - FR
- INRA - LAMETA-SupAgro - FR
- INRIA LEMON (National Research Institute in Computing and Automation)- FR
- INRA - Avignon University - FR
- International Foundation of Banc d'Arguin (FIBA)
- Institute for Ecology and Environment (CNRS -INEE) - FR
- Institute for Environmental Protection and Research (ISPRA) - Italy
- IRD - CNRS Evolution of Symbiotic Systems Team - FR
- IRSTEA (National Research Institute of Science and Technology for the environment and agriculture) - FR
- ISIS - SPOT images Programme - FR
- IUCN (International Union for the Conservation of Nature) French Committee - FR
- IUCN International (International Union for the Conservation of Nature)
- IUCN Mediterranean Cooperation Centre - Spain
- Izmir Provincial Department for Forestry and the Environment (National Parks) - Turke

L

- Laboratory of Geophysical and Industrial Flows
- Languedoc-Roussillon Region - FR
- Languedoc- Roussillon Conservatory for natural areas (CEN LR) - FR
- Languedoc-Roussillon Regional Centre for Forestrian Property - FR
- Languedoc-Roussillon Regional Direction for Environment, Planning and Housing - FR (DREAL LR)
- Languedoc - Roussillon Régional Network for Environmental Education (GRAINE LR) - FR
- Le Citron jaune/Ilotopie, National Centre for Street Arts - FR
- League for the Protection of Birds (LPO) - FR
- Libelo - FR
- Listel - FR
- Local nature guides office - FR

€ Funding | Scientific | Technical | Institutional

FR = France

M

- Marseille Fos Port Authority (GPMM) - FR
- MAVA Foundation - Switzerland
- MedINA - Greece
- MedPan Association
- Mediterranean Botanical Conservatory of Porquerolles - FR
- MedWet
- Meridionalis - FR
- Ministry for Agriculture and Hydraulic Resources - Directorate General of Forests - Tunisia
- Ministry for Agriculture and Rural Development - Directorate General of Forests (DGF) - Algeria
- Ministry for Ecology, Sustainable Development and Energy (MEDDE) - FR
- Ministry for Environement - Lybia
- Ministry for Environment and Forests - Turkey
- Ministry for Higher Education and Research - FR
- Mohamed V University of Rabat - Morocco
- Molentargius-Saline Regional Natural Park - Italy

N

- Narbonnaise Regional Natural Park - FR
- National Center for Scientific Research - Chizé Centre for Biological Studies (CNRS - CEBC) - FR
- National Environment Protection Agency (ANPE) - Tunisia M
- National Institute for Agronomy/ Tunis - Tunisia
- National Institute for Youth and Community Education - FR
- National Museum for Natural History - FR
- National Office for Hunting and Wildlife (ONCFS) - FR
- National Office for Water and Aquatic Environments (ONEMA) - FR
- National School of Agronomy, Montpellier- FR
- National School of Agronomy of Toulouse (ENSAT) - FR
- National Research Agency (ANR) - FR
- National School of Architecture, Montpellier - FR
- National Veterinary School/ Lyon - FR
- Natural Area Documentation and Training Centre (ATEN) - FR
- Nature Conservation - Egypt
- Noé Conservation

O

- OPTRONIK - Germany
- Ostraka Workshop - FR
- Overseas Transfer Unit - FR

P

- Pasteur Institute - Molecular Genetics of RNA Viruses - FR
- Paul Sabatier University/Toulouse - FR
- Permanent Centre for Environmental Initiatives/Arles (CPIE) - FR
- Plaine des Maures National Nature Reserve - FR
- Po Delta Emilia-Romagna Regional Park - Italy
- Polytechnic Institute of Milan - Italy
- Ponds, Inland wetlands, and Flood Plains Transfer Unit - FR
- Pont de Gau Ornithological Park - FR
- Practical School for Higher Education (EPHE), Montpellier - FR
- Prince Albert II of Monaco Foundation - Monaco
- Pro Valat Foundation - Switzerland
- Provence-Alps-Côte d'Azur Conservatory for natural areas (CEN PACA) - FR
- Provence-Alps-Côte d'Azur Region - FR
- Provence-Alps-Côte d'Azur Régional Network for Environmental Education (GRAINE PACA) - FR
- Provence-Alps-Côte d'Azur Regional Direction for Environment, Planning and Housing (DREAL PACA) - FR
- Provence-Alps-Côte d'Azur Regional Network of Natural Area Managers (RREN)- FR
- Provence-Alps-Côte d'Azur Regional Environmental Protection Agency (ARPE)- FR
- Provence-Alps-Corsica Savings Bank (CEPAC) - FR

R

- Ramsar Convention
- Ramsar France Association - FR
- Regional Council for the Environment of Andalucia - Spain
- Regional Network of Aquatic Ecosystem Managers - FR
- Remote Sensing Centre/Montpellier - FR
- Research Group for Bird Protection in Morocco - Morocco
- Research Group for organic Agriculture - FR
- Rhône-Alps Conservatory for natural areas (CEN RA) - FR
- Rhone-Mediterranean and Corsica Water Agency - FR
- Rhone-Mediterranean Migratory Fish Association - FR
- Royal Society for Nature Conservation - Jordan

S

- Saint-Laurent d'Aigouze Town council - FR
- Saintes-Maries-de-la-Mer Town Council - FR
- Salins Group - FR
- Savoy Conservatory for natural areas (CEN Savoie) - FR
- Savoy Natural Heritage Conservatory - FR
- Scientific Institute/Rabat - Morocco
- Society for the Protection of Prespa - Greece
- Sommer Foundation - FR
- Spanish Centre for Wetlands (CEHUM) - Spain
- SPEA Birdlife (Portuguese Society for the Protection of Birds) - Portugal
- Sustainable Research Centre - Australia
- Synthesis and Analysis Center for Biodiversity (CESAB)- FR

T

- Tlemcen National Park - Algeria
- Tolmin Angling Association - Slovenia
- TOTAL Foundation - FR
- Tunisian Observatory for Environment and Sustainable Development - Tunisia

U

- UNEP-RAC/Blue Plan (United Nations Programme for Environment / Regional Activity Center)
- UNEP-RAC/SPA - Tunisia
- UNEP Mediterranean Action Plan
- University Hassan II of Casablanca - Morocco
- University Joseph Fourier of Grenoble - UMR LECA, UFR PHITEM - FR
- University Moulay Ismail - Morocco
- University of Aix-Marseille - CEJU - FR
- University of Aix-Marseille - IMBE (Mediterranean Institute for Biodiversity, Marine and Continental Biology) - FR
- University of Aix-Marseille - UFR Sciences - FR
- University of Aix-Marseille - UMR Espace - FR
- University of Angers - UMR LETC LEESA - FR
- University of Annaba - Wetlands Research Team - Algeria
- University of Avignon - IUT/ Hydrogeology Team - FR
- University of Biskra - Algeria
- University of Burgundy - UMR BioGéoSciences - FR
- University of Cambridge - UK
- University of Chott Meriem - Tunisia
- University of Ege - Turkey
- University of El Tarf - Algeria
- University of Gabès - Science Department - Tunisia
- University of Göttingen - Germany
- University of Guelma - Algeria
- University of Kalmar - Sweden
- University of Konstanz -Germany
- University of Kristianstad - Sweden
- University of Leuven - Belgium
- University of Ljubljana - Slovenia
- University of Lyon - FR
- University of Malta - Malta
- University of Montpellier 2 - Institute of Evolutionary Sciences - FR
- University of Montpellier 2 - Ecosym Team - FR
- University of Oxford - Edward Grey Institute - UK
- University of Parma - Italy
- University of Provence - Chemistry and Environment Team - FR
- University of Rennes - UMR ECOBIO - FR
- University of Rennes 1 - OSUR - FR
- University of Sassari -Italy
- University of Sfax - Tunisia
- University of Skikda - Algeria
- University of the Sunshine Coast - Sustainable Research Centre - Australia
- University of Tel-Aviv - Israel
- University of Tizi-Ouzou - Algeria
- University of Toulouse - Ecolab - FR
- University of Tripoli - Libya
- University of Uppsala - Sweden

V

- Verdier Marshes Association - FR
- Verots Foundation - FR
- VERSeau Development Association - FR

W

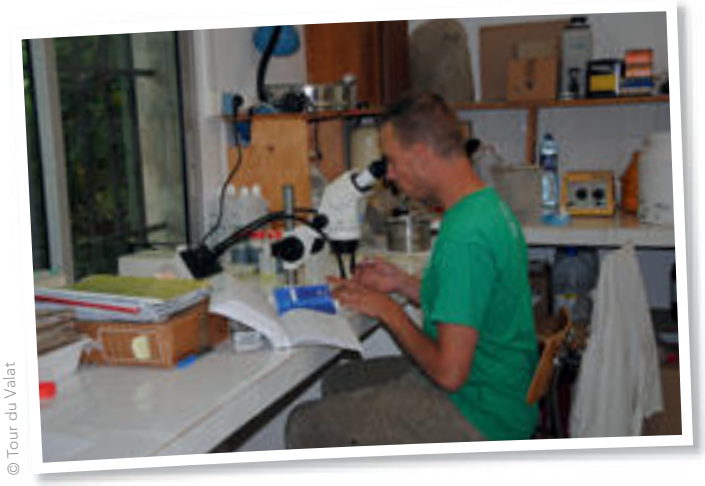
- Water Footprint Network
- Water Research Unit - FR
- Wetlands International
- Wetlands International European Association
- World Conservation Monitoring Centre
- WWF France - FR
- WWF International - Switzerland
- WWF Mediterranean Programme Office

Z

- Zoological Institute - UK
- Zoological Society of London - UK

FR = France

Funding | Scientific | Technical | Institutional



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Support the activities of the Tour du Valat

In order to help the Tour du Valat to continue its actions for the common good, we need your support. There are several ways to provide it.

Join the association "Friends of Tour du Valat"

Friends of
TOUR DU VALAT
Association

The association was founded in 2014, on the occasion of the 60th anniversary of the Tour du Valat, in order to bring together the fabulous human capital built up over the years by all those who have made the Tour du Valat what it is, and more broadly all those who share our values and the sense of our actions. Its aim is to provide exchange and knowledge-sharing, and to promote the work of the Tour du Valat.

All you have to do to join is download the membership coupon from our website:
www.tourduvalat.org/support
or contact us for further information at:
amis@tourduvalat.org.

Make a gift

Gifts enable us to continue and intensify our research work to conserve the biodiversity of Mediterranean wetlands and encourage the wise use of their natural resources.

To make a gift just download the gift form (.pdf) available on our website:
www.tourduvalat.org/support
and send it to us together with your payment.

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TAX-DEDUCTIBLE SUPPORT

The Tour du Valat Foundation is recognised as being of public interest and therefore authorised to receive gifts of money. 66% of your gift is tax-deductible up to the limit of 20% of your taxable income. A gift of 100 € will thus only really cost you 34 € after tax deduction.

Sponsor a Greater Flamingo

By sponsoring one or more banded flamingos, you will support the "Greater Flamingo Network" and be involved in protecting the species at pan-Mediterranean scale.

© Hellio & Van-Ingen

Sponsoring costs 25 € per flamingo per year. This sum is entirely dedicated to buying optical equipment such as binoculars and telescopes to be given to our partners in the south and east of the Mediterranean Basin so that they can contribute to monitoring flamingos throughout their range.

© Hellio & Van-Ingen

On becoming a sponsor you will be informed of the movements of "your" flamingo all through the year, and whether it bred successfully.

Each time an observation of your flamingo is communicated to us, you will be informed by email and will be able to consult the records of its movements on an interactive dynamic map and in the form of a table.

If you sponsor two flamingos (2 X 25 €) it will only really cost you 17 € after tax deduction.

You can subscribe via the website:
www.tourduvalat.org/support
under "adopt a flamingo"

or contact us for more information:
parrainageflamants@tourduvalat.org

Make a donation or bequest

Because the Tour du Valat's values are dear to you, and you appreciate the quality and independence of its work, you can act on a long-term basis and help us to shape its future by making a donation or bequest to the Tour du Valat Foundation. Again, you will benefit from tax rebates. Don't hesitate to contact us for further information.

partenariat@tourduvalat.org

THE PETIT SAINT-JEAN ESTATE

Thanks to the generosity of Mr Bernard, the Tour du Valat has become the owner of an estate in the Gard whose total area of 101 hectares includes a remarkable pine wood (50 ha), marshes (24 ha), and agricultural land (26 ha). In keeping with the spirit of its donor, the Tour du Valat is using the site for an agro-ecological partnership project aimed at developing a productive, sustainable, resilient and autonomous agricultural system based on synergies with natural habitats.

© N. Beck

Partner-ships

Thanks to the CEPAC Savings Bank, a wood-chipper could be purchased, so enabling us to value the wood of the Petit-Saint-Jean Estate

Slender-billed gull monitoring is one of the actions supported by the Total Fondation.

Clearing of the invasive shrubs Phillyrea with draught horses thanks to a funding by the Heritage Fondation (Fondation du Patrimoine).

Foundation Prince Albert II of Monaco supports studies on cultural services conducted within the Mediterranean.

We were able to carry out our activities in 2014 thanks to our partnerships with various sponsors, in particular:

MAVA FONDATION POUR LA NATURE

ProVALAT Fondation

FONDATION TOTAL

Steering committee of the agro-ecological project on the Petit Saint-Jean Estate supported by the Foundation of France

© Tour du Valat

Pruning of the vines, a collective work with Accor Group

© N. Barré

© Hervé Hôte

© Hervé Hôte

Exchanges with our institutional partners during the 60th Anniversary Celebrations

The College of Founders of the Foundation Tour du Valat surrounded by three of our Partners (MedWet, PACA Region, CEPAC Savings Bank) for the 60th Anniversary of the Tour du Valat

FONDATION PRINCE ALBERT II DE MONACO

FONDATION du PATRIMOINE

CAISSE D'EPARGNE PROVENCE - ALPES - CORSE

Fondation de France

Hosted organisations

The Tour du Valat is hosting five partner organisations in its premises.

National Office for Hunting and Wildlife (ONCFS)

The French National Office for Hunting and Wildlife (ONCFS) is a public organisation employing 1,700 officers. Its twofold mission is to safeguard the environment and hunting, and to conduct studies and research on wildlife and their habitats. The offices of the ONCFS at the Tour du Valat accommodate two units of the Centre National d'Etudes et Recherches Appliquées (CNERA), one of which is devoted to the smaller resident plains fauna and the other to migratory birds.

Learn: www.oncfs.gouv.fr

FIBA

The Fondation Internationale du Banc d'Arguin was created in 1986, on the initiative of Dr Luc Hoffmann and a number of research and conservation organisations, to support the Parc National du Banc d'Arguin (PNBA) in Mauritania, which is today a management model in this ecoregion. Drawing on this experience, it has extended its area of intervention to countries in the West African coastal zone by becoming involved in the Regional Programme for the Conservation of Marine and Coastal Areas in West Africa (PRCM).

Learn: www.lafiba.org

Association TAKH

Through the safeguard and study of the Przewalski horse as a flagship species, Association Takh leads a pilot conservation project which allies steppe and wetland restoration, as well as endangered species protection, to the promotion of sustainable development, on Khomyn Tal in Mongolia.

Learn: www.takh.org

MedWet Secretariat

The MedWet initiative is composed of 26 partner countries in the Mediterranean basin and the Palestinian Authority. Its mission is to promote the implementation of the Ramsar Convention's objectives and initiatives in the Mediterranean region. Since 1992, MedWet has been encouraging partnerships in order to ensure and support a rational use and an effective conservation of wetlands. In 2014, at the invitation of the French Government and with the support of the Rhône Mediterranean Corsica Water Agency and Fondation MAVA, the MedWet secretariat has been relocated at Tour du Valat, and works closely with the Mediterranean Wetlands Observatory.

Learn: www.medwet.org

Association Friends of Tour du Valat

The association has been created for the 60th Anniversary of the foundation and links many an employee, current or former, intern, partner be it private or public, friend, patron who share the values and the philosophy of Tour du Valat. Its goal is to unite, advance, promote and support the action of the foundation through this vast network of people linked professionally as well as personally.

Learn: www.tourduvalat.org/support

Visiting us...

The Tour du Valat is open to the general public on several occasions each year:

- On World Wetlands Day, usually the first Sunday in February, the Tour du Valat has an open house, with conferences, video presentations and guided tours of the Estate.
- Together with the Bureau des Guides Naturalistes (BGN), paying guided visits are organized from November till April, every second Saturday. Registration is compulsory at BGN Bureau:
  +33 695 907 048
- If you wish to receive information about the programmes and other events organized at the Tour du Valat for the general public, please contact us at:
  secretariat@tourduvalat.org

TOUR DU VALAT

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