TOUR DU VALAT

Activity Report 2013

A research centre
for the conservation
of mediterranean
wetlands

60 ANS
TOUR DU VALAT
1954-2014

◦ Black-headed Bunting

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◦ Gediz delta - Turkey

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Activity Report 2013

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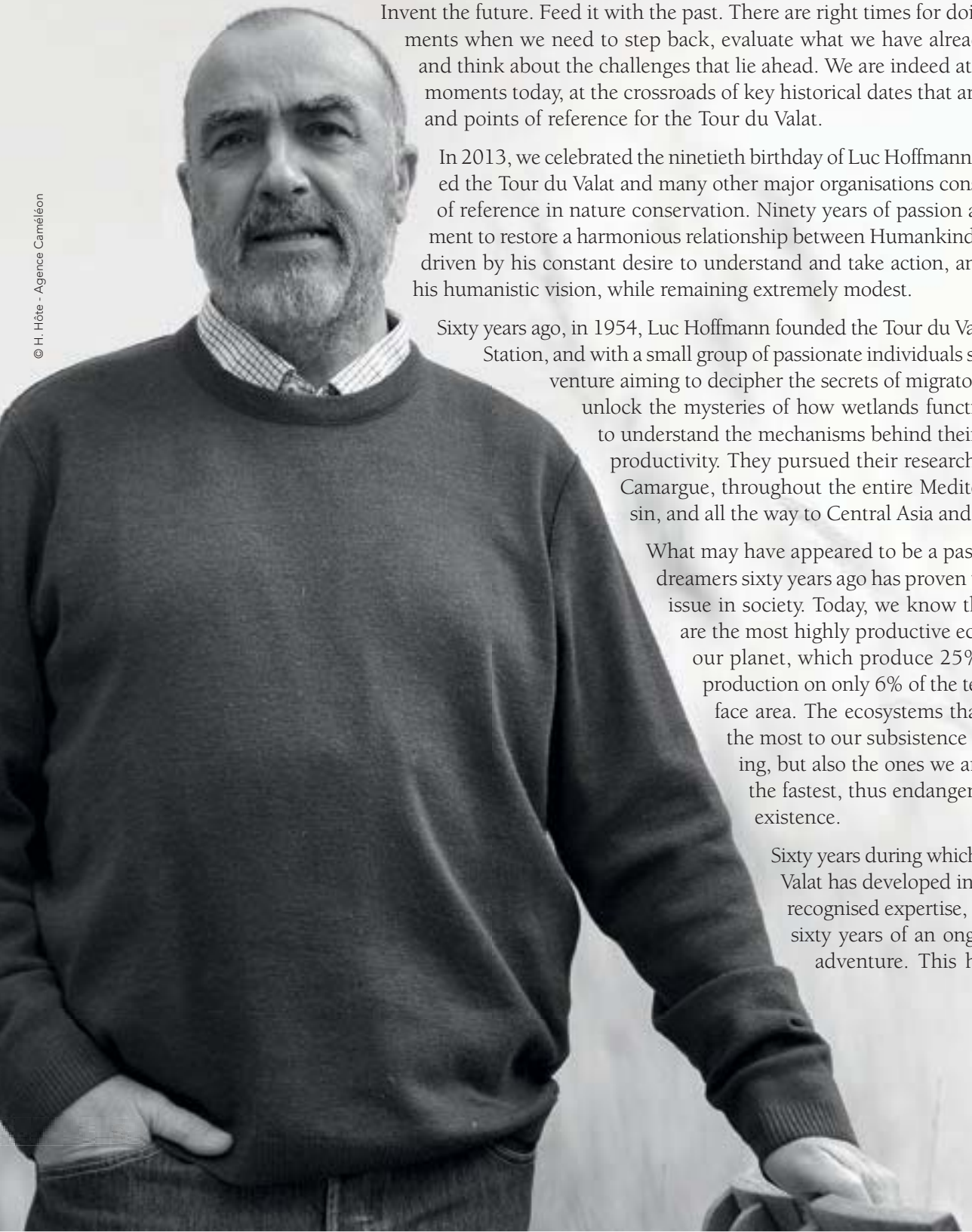
Editorial



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In Malraux's words, "The future is a present given to us by the past."

Invent the future. Feed it with the past. There are right times for doing that, moments when we need to step back, evaluate what we have already achieved, and think about the challenges that lie ahead. We are indeed at one of these moments today, at the crossroads of key historical dates that are milestones and points of reference for the Tour du Valat.

In 2013, we celebrated the ninetieth birthday of Luc Hoffmann, who founded the Tour du Valat and many other major organisations considered to be of reference in nature conservation. Ninety years of passion and commitment to restore a harmonious relationship between Humankind and Nature, driven by his constant desire to understand and take action, and guided by his humanistic vision, while remaining extremely modest.

Sixty years ago, in 1954, Luc Hoffmann founded the Tour du Valat Biological Station, and with a small group of passionate individuals started an adventure aiming to decipher the secrets of migratory birds, and unlock the mysteries of how wetlands function, in order to understand the mechanisms behind their exceptional productivity. They pursued their research beyond the Camargue, throughout the entire Mediterranean basin, and all the way to Central Asia and West Africa.

What may have appeared to be a pastime for idle dreamers sixty years ago has proven to be a major issue in society. Today, we know that wetlands are the most highly productive ecosystems on our planet, which produce 25% of primary production on only 6% of the terrestrial surface area. The ecosystems that contribute the most to our subsistence and well-being, but also the ones we are destroying the fastest, thus endangering our very existence.

Sixty years during which the Tour du Valat has developed internationally recognised expertise, but above all sixty years of an ongoing human adventure. This has been the

adventure of Luc Hoffmann and his family, but also the adventure of hundreds of women and men who have accompanied Luc for a few months or years, or sometimes their entire lives. So many personal stories are linked by this unique experience, which has created a community we must cultivate and consolidate.

This 60-year heritage of passion and commitment, these experiences constantly facing and consolidated by the reality in the field, are the proof of our ability to provide concrete and operational answers to the issues of tomorrow.

And the challenge is tremendous. Despite successes in terms of gaining recognition for wetlands and improving their conservation, their degradation has continued. The pressure on water and other natural resources is increasing at an unprecedented rate. In the next 40 years, we will have to produce more food than during the previous 8000 years. In order to accomplish this feat, we will have to extract two times more water than today, while we are already using more water than is currently available as renewable water in many countries, particularly in the Mediterranean basin. Furthermore, the Mediterranean basin is currently experiencing a severe economic crisis and institutional disorder, pushing environmental issues to the very bottom of the political agenda.

Nevertheless, we must remain optimistic for the future for several reasons. Because the community of wetland experts and conservationists is steadily growing both in numbers and influence. Because bridges are being built between people working on development issues and those involved in the field of conservation. Because people are starting to see things as a whole, and understand that the survival of Humankind is very closely linked to the well-being of our environment. Because, finally, some key ideas have emerged during these 60 years of experience and thanks to the example given to us by Luc Hoffmann, such as stubborness, synergy, and resilience.

Finally, our firm conviction is that wetlands are the vital link in life, which is essential for biodiversity and the well-being of Humankind.

Jean-Paul Taris
President

Jean Jalbert
Director General

Isabelle Muller,

doctoral student working on the "Ecosytems restoration project"

"Doing a Ph.D. at the Tour du Valat is both a chance to be right in the middle of a beautiful natural reserve, and also to work with friendly colleagues who like to laugh, talk about scientific issues, hunting, conservation, agriculture, ecology and the Feria! What more could you ask for while spending three wonderful years completing your degree?"

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Loïc Willm,

"Mediterranean Wetlands" Research project manager

"The Tour du Valat's wetland conservation activities are helping to sow the seeds of tomorrow. I make my small contribution with a great deal of conviction and passion."

The Tour du Valat

Created more than 50 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.

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 organization. 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.

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.

© Tour du Valat

European Pond Turtle

- 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
- Scamandre Regional Nature Reserve

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 a 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).

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

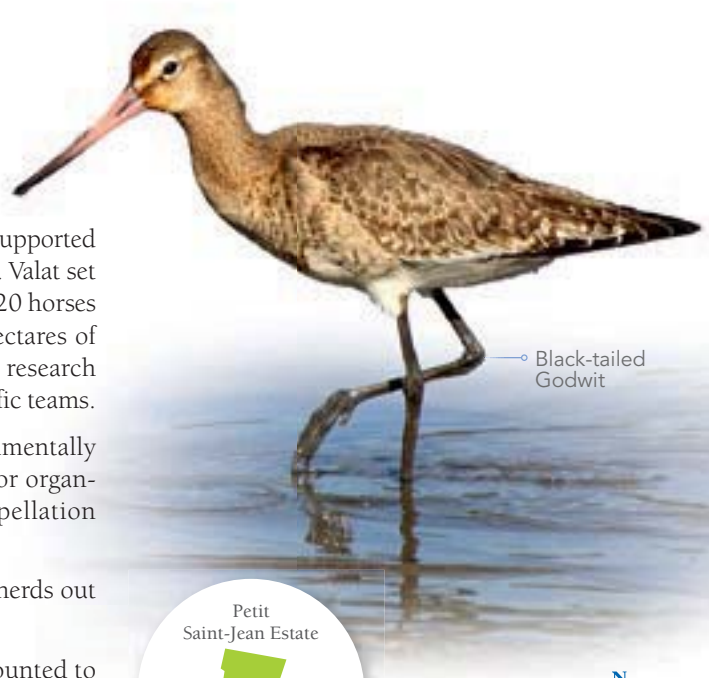
The aim is to learn the lessons needed to maintain biodiversity, optimise management practices, combat undesirable species, and restore degraded habitats.

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.

© T. Galewski

Eurasian Hoopoe



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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.

© N.Trillaud / Tour du Valat

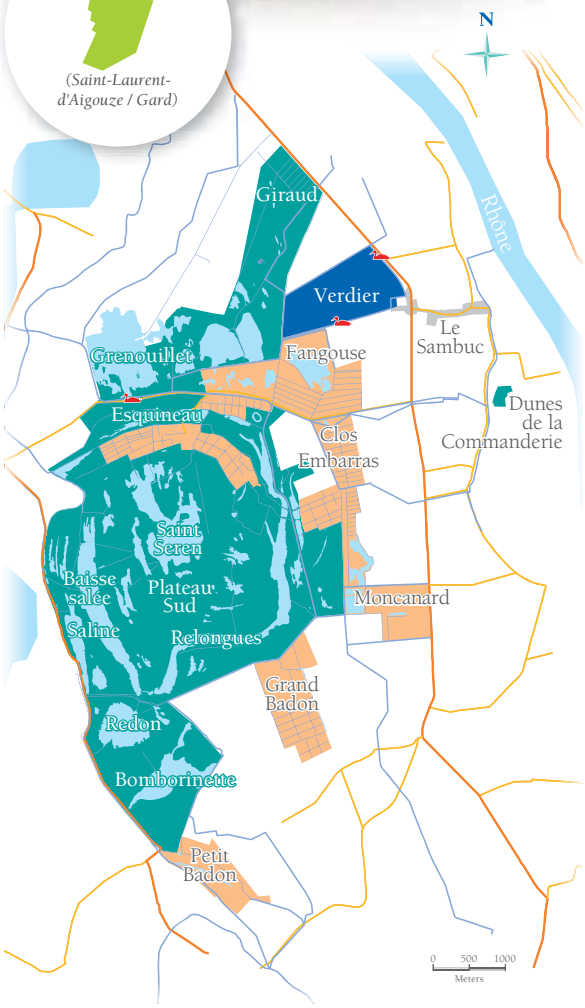
Caracteristic landscape of the estate - The "Cerisières"

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).



Tour du Valat Foundation property

- Land devoted to farming and hunting
- Regional natural reserve (restricted access)
- Verdier Marshes (open accessto the public)
- Petit Saint-Jean Estate
- Observatory (free access)
- irrigation or drainage canals
- secondary road
- Township road


© D. Cohez / Tour du Valat

Equisetopsida Brassicales


© T. Blanchon / Tour du Valat

Yellow-browed Warbler


© D. Cohez / Tour du Valat

Gladiolus byzantinus

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. There was a cool and humid spring in 2013 (regular rainfall from March to May), and a dry summer and autumn. The consequence for the Natural Reserve in the spring was a green pelouse covered in flowers and long dry periods in the marshes. The annual total rainfall was far below average (440 mm in 2013 compared to 600 mm on average).

Réserve Naturelle Régionale
TOUR DU VALAT

Floristic discoveries

We made several interesting discoveries again this year, including:

- a beautiful colony of Yellow Orphys *(Ophrys lutea)* on the Esquineau pelouse (about 100 plants),
- the locally protected scurvygrass species, (*Lonopsidium glastifolium)*, which had only been observed at the Tour du Valat once before,
- the very rare liverwort *"Riella helicophylla"* in two more pools on the Reserve,
- a colony of the nationally protected species Summer Snowflake *(Leucojum aestivum)*, on the edge of the estate, with some plants growing along an adjoining canal.

The year's unusual conditions also helped some plants already observed on the site, but particularly well-represented this year, such as the Eastern Gladiolus *(Gladiolus byzantinus)* and the Flowering Rush *(Butomus umbellatus)*. The dwarf garlic species *"Allium chamaemoly"*, a rare plant which has national protection, was also identified in three new areas of pelouse on the estate.

Nesting birds

Normally scheduled every five years, the next census of nesting waterbirds on the estate was supposed to take place in 2015. The count was conducted earlier, in the spring of 2013, within the framework of the monitoring of the impact of mosquito control in the Camargue: a comparison of communities of nesting passerines was conducted between a site with mosquito control (Palissade) and without mosquito control (Tour du Valat). It was necessary to have one year of common data for both sites.

At the Tour du Valat, 115 listening points (20 minutes) located every 500 meters were monitored between 6 May and 7 June. 70 species were observed for an estimated 1950 pairs of birds. The three most common species were the Common Nightingale (292 pairs), Eurasian Skylark (230 pairs), and Western Yellow Wagtail (140 pairs).

Some trends, already noticed in 2010, were confirmed this year:

- a significant decline of the Eurasian Tree Sparrow, European Green Woodpecker, and Corvidae species (Eurasian Magpie, Western Jackdaw, Carrion Crow).
- a clear increase in the number of Corn Bunting, Crested Lark, and Common Blackbird.

Plain Tiger

Yellow Ophrys

European Turtle Dove

There was also a decrease in the number of cold-sensitive passerines after the cold wave in February 2012: the European Stonechat, Fan-tailed Warbler, Sardinian Warbler, Cetti's Warbler, and Common Kingfisher.

Finally, aquatic species were poorly represented due to the low level of water in the marshes last year.

Among the other nesting species on the site, three colonies of Collared Pratincoles were observed, with a total of 36 pairs. The facilities installed for this species at Moncanard had a positive effect and were also used by a few pairs of Northern Lapwing, Black-winged Stilt, and Eurasian Stone Curlew.

The northern Relongues reedbed, maintained flooded in the spring, hosted another colony of Purple Herons, a pair of Great Bittern, and one of Little Bittern.

The White Stork population continued to increase: there are now 18 pairs.

Migratory and wintering birds

A record number of Greylag Goose was reached in January (2200 birds); however, their numbers were particularly low in the autumn (max. 1000 birds). Small groups of Greate White-fronted Goose are now commonly observed among these geese.

The Common Crane wintering site continued to develop. In the autumn, some 1000 cranes visited the estate and the surrounding area. A roost was even set up for a few days at the Saint Seren marsh, allowing us to observe an amazing sight.

As usual, the pre- and post-nuptial counts gave us the chance to spot a few rare individuals, such as a Great Snipe and some Red-throated Pipits in May, as well as a Barred Warbler and two Yellow-browed Warblers in October and November.

Reptiles

Following the study conducted in 2012, monitoring was set up this year for the Ocellated Lizard. This species was sighted on four of the 30, 2500m² plots monitored, but it may be the same individual. This large lizard is still present at the Tour du Valat, but in very low numbers.

Invertebrates

Some interesting butterflies were sighted this year, including:

- a Plain Tiger *(Danaus chrysippus)*, seen on the Esquineau fossil dunes on 2 August,
- a Two-tailed Pasha *(Charaxes jasius)* near the laboratory on 30 October.

It should also be noted that with the warmer temperatures at the end of the year, Red Admiral *(Vanessa atalanta)* and Common Clouded Yellow *(Colias croceus)* were still in flight in December.

The Corn Bunting, an increasing species on the estate.

Charlotte Perrot,

doctoral student in the Species Department

"To find a mating partner, Greater Flamingoes perform stylish synchronized 'dance' in groups: 'I turn my head, unfold my wings, preen my feathers, scratch my chin…' My work is to decipher the information conveyed during this strange choreography to improve our understanding of how this species breeds."

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The programme

our commitment

© M. Vittecoq / Tour du Valat

The programme


© J.E. Roché

European Pond Turtle

The social and economic environment in the Mediterranean region, where our programme is based, has changed considerably in recent years, encouraging us more than ever before to engage in adaptive management practices. The experts who conducted the mid-term assessment of our 2011-2015 programme made a positive report about our achievements over the past three years, highlighting the quality of our scientific production, as well as the care we take in applying our results to the protection and sustainable management of wetlands and their biodiversity. However, our internal organisation and the transfer of our results, must be improved. Discussion and reflection will be conducted to that effect within our team and scientific committee.

In 2013, we were very active in the field, developing new projects without neglecting the already existing ones (impacts of mosquito control, restoration...), while continuing our long-term studies on the Greater Flamingo, and the eel, among others. Our team was really mobilised by the research project on the former salt works marshes, in Salin-de-Giraud. Coordinated by the Camargue Regional Natural Park, in partnership with the National Nature Protection Society (SNPN), the objective of the project is to understand the dynamics of these ecosystems, formerly used for salt farming, in order to establish sustainable management practices there, which are beneficial to biodiversity and all local communities.

Farmland is one of our new projects. It brings together teams of researchers from France, Germany, the United Kingdom, Spain, and Canada to assess the role of crop heterogeneity on biodiversity and ecosystem services in farmland areas, and has resulted in intense multidisciplinary activity in the Camargue. Another project, developed in collaboration with the Office National de la Chasse et de la Faune Sauvage (the National Hunting and Wildlife Agency), also concerns farming land. It studies the positive interactions between farming practices and wintering mallard populations. We also started the LIFE+ENVOLL project, within a broad-based partnership for the conservation of nesting Charadriiformes in the French Mediterranean region.


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Slender-billed Gull ringing

Glossy Ibis ringing

Romulae ramiflora

In the Mediterranean basin, our projects focused in particular on the use of remote sensing to evaluate trends in land occupation in coastal wetlands (GlobWetland-2), and on supporting and coordinating our local partners for their waterbird censuses. Three doctoral theses were defended 2013 on wetlands restoration, Greater Flamingo feeding ecology, and European Pond Terrapin population dynamics. At the same time, three new theses were undertaken on the Greater Flamingo and the Slender-billed Gull (2).

In 2014, our programme will focus on the same areas, and we will reflect on the initial ideas for putting together the next one. The conclusions and suggestions made in the 2013 mid-term assessment will play an important role in this process. The next programme must take account of recent changes in the Mediterranean basin, and attempt to provide concrete responses to the conservation and sustainable management issues affecting wetlands and their biodiversity.

Patrick Grillas
Programme Director

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.

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Lacerta trinlineata - Prespa Lake

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.

Training on the European Otter in the Camargue

© Tour du Valat

In 2013, numerous scientific results were validated in publications, and can now be used to increase our positive impact on the conservation of Mediterranean wetland species.

Our long-term monitoring results on the European Pond Terrapin were used and promoted in the framework of Sébastien Ficheux's doctoral thesis. His research is innovative because it combines different approaches (Capture-Mark-Recapture analysis and population genetics), and shows why an integrated approach is of interest (see Focus p20).

For the Greater Flamingo, a new area of research has been developed on the feeding ecology of the species and was strengthened by the completion of Anne-Sophie Deville's doctoral thesis. By combining thermodynamic models (NicheMapper) and experiments in a controlled environment on flamingoes in captivity (at Basel Zoo), she was able to estimate the daily energy needs of flamingoes and their ability to meet them in function of the prey available. A first individual-based spatially explicit model was developed for explaining the distribution of Greater Flamingoes in the different Salin-de-Giraud lagoons. Since breeding took place this year in Fangassier II with no addition of water other than rainfall and inflow from the sea, it was decided to abandon, for the moment, the project to move the islet in order to concentrate instead on the restoration of the current islet.

We were able to conduct an initial assessment of the eel stocking experiment in the Vigueirat Marshes. The results suggest that silver eels can be obtained in three years, and validate the hypothesis that these stocking operations are effective for producing spawners. Nonetheless, the quality of these spawners must still be assessed.

Our research on health ecology was continued with the identification of a new virus among Yellow-legged Gulls, and the detection of antibioresistant bacteria among Slender-billed Gulls. This research was extended to rodents sampled across an anthropogenic gradient in order to understand how these bacteria can be transmitted from hospitals to wildlife.

The research carried out in our Species Department, particularly our expertise in long-term monitoring and data management, will be transferable to the Mediterranean and Africa through two projects supporting waterbird censuses in these regions (International Waterbird Census - IWC, and Africa Eurasian Waterbird Agreement - AEWA), which are now fully operational.

Arnaud Béchet
Head of Departmentt

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FOCUS

Dispersal of the European Pond Turtle

Dispersal is defined as the movement of individuals that leave their birth population to breed in another population. Understanding the movements of individuals between different populations provides a better comprehension of population dynamics and, with a view to effective conservation, enables appropriate protection measures to be taken. The fragmentation of habitats is a particularly important threat to relatively sedentary species because it leads to the isolation of populations, making them more vulnerable to the extinction process.

› A revealing case study, the European Pond Turtle

The European Pond Turtle (*Emys orbicularis*) is a small freshwater terrapin that has "Near Threatened" status in France and Europe (IUCN France Red List). The species has suffered a considerable regression in its geographical distribution due to both natural and artificial causes. At present, pond turtles are heavily impacted by the disappearance and fragmentation of their habitat. Their dispersal is becoming more and more hazardous: being run over when crossing roads, drowning in fishing nets or the siphons of hydraulic structures. With its limited movements, the European Pond Turtle is one of the species that is vulnerable to the fragmentation of wetlands. Aware of this fragility, the Tour du Valat set up a study of the population dynamics of pond turtles at two sites using capture-mark-recapture (CMR) monitoring of individuals. On the Tour du Valat estate, two core populations (The Faïsses and The Esquineau) have been monitored since 1997.The other study, at Kerkini Lake in Greece, has been underway since 1999.

An European Pond Turtle, which shell has been crushed by livestock

© Tour du Valat

In the last three years, this monitoring has been completed by a genetic study of the populations in the framework of a joint doctoral thesis managed by the Tour du Valat and the Biogeoscience laboratory of the University of Burgundy. The thesis tackled three major questions: 1) What are the factors that influence the dispersal of the species? 2) What are the consequences of habitat fragmentation on the population structure and dynamics? 3) What are the impacts of changes in water management and grazing practices on Pond Turtle population dynamics in the Camargue?

› Low dispersal capacities

Even though the two core populations studied at the Tour du Valat are geographically close to each other (less than two km apart) and highly connected by numerous aquatic corridors, the results show that the 274 females studied are absolutely faithful to their birth site and that only a few males (about 2.75 % out of the 254 males studied) moved from one population to the other. Juveniles also seem to be very faithful to their birth site and the dispersal of young males does not start until they are five or six years old. No other factor tested seems to influence dispersal (size of individuals, variation between years). The population genetics results confirm the data obtained by CMR with some effective dispersal movements (exchanges of genes between populations) on the part of certain males. However, dispersal is much too low on this site to lead to a homogenisation of genetic diversity. Consequently, the populations present on the Tour du Valat estate remain very genetically differentiated. We put forward the hypothesis that the availability of resources (nesting sites and food) is sufficiently high and the recruitment of juveniles too low to generate high levels of dispersal. It would thus be more advantageous for the European Pond Turtles of the Camargue to restrict themselves to their birth site and avoid the risks associated with dispersal.

› Populations preserved by high longevity

The situation observed in Greece contrasts considerably with these results. At the Kerkini site, the damming of the River Strymon in 1932 and 1982 does not seem to have had an impact on the current genetic structure of populations. Despite the distances separating the five different populations, nearly 20 km for the furthest apart, no genetic differentiation between them was detected. The European Pond Turtles' long generation time (about 12 years) and the very high population numbers (several hundred individuals per population) appear to considerably slow genetic erosion phenomena due to genetic drift.

© Tour du Valat

Fyke nets liftings at the Tour du Valat within the frame of long-term monitoring

Although it is fragilised by low dispersal capacities, the high longevity of the European Pond Turtle would therefore enable it to preserve the genetic diversity of its populations, thus making it less vulnerable to the fragmentation of habitats.

› Highly resilient

Other investigations carried out at the Tour du Valat highlighted the species' high resilience capacities subsequent to disturbance. Due to the sharp decline of the population at l'Esquineau, management changes were implemented, in particular the artificial flooding of the marshes in spring and autumn, which is more favourable to pond turtles, and less intensive grazing in winter (the pond turtles' hibernation period). These new conditions led to a significant increase in the population at the Esquineau. The reduction in grazing pressure could have reduced the level of trampling by cows, and reduced disturbance during the nesting period made the habitat even more favourable to the species.

All of these results, obtained by an integrated approach, contribute to a better definition of the factors influencing the dispersal movements of the European Pond Turtle. This behaviour seems to be highly dependent on the ecological context, the dynamics of each population, and the availability of food resources and nesting sites.

© A. Crivelli/ Tour du Valat

Buffaloes attending the same spots as European Pond Turtles in Greece

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Alain Crivelli

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Arnaud Béchet, Anthony Olivier, Sébastien Ficheux, Claire Koenig et Marie Suet.

Financial partners:

MAVA Foundation, Burgundy Region, University of Burgundy.

Technical partners:

DREAL PACA, CEFE-CNRS, EPHE, University of Burgundy.

Blongios nain

(Ixobychus minutus)

This bird is our smallest Heron. Often associated to marshes that are heavily vegetated and especially reed beds, it has strongly declined in its distribution area. The Camargue shelters one of the last population of importance in France.

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THE PROJECTS:

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

AT A GLANCE

© Tour du Valat

Elaphe sauromates - Gediz delta -Turkey

Dynamics of populations in response to human activities

Arnaud Béchet
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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.

Sébastien Ficheux's thesis on the population dynamics and genetics of the European Pond Turtle has been completed (see Focus). Three theses were started in September on population dynamics, one on the Greater Flamingo and two others on the Slender-billed Gull.

Funding obtained from the Critical Ecosystem Partnership Fund (CEPF) enabled us, together with Noé Conservation, to begin implementing actions for the conservation of Pelican populations through long term local capacity building.

The monitoring of all the colonial gulls & terns and wader species on the Ile de la Camargue was extended and funding was obtained through the Life+ ENVOLL project for continuing this work and maintaining the study of Slender-billed Gull population dynamics.

Claire Pernollet continued her fieldwork (ONCFS/TdV joint thesis) and highlighted the considerable utilisation of rice fields by wintering ducks.

Finally, the programmes supporting the census of Mediterranean waterbirds (IWC) and the support unit for the counting of waterbirds in Africa (AEWA), supported by the French Sustainable Development Ministry (MEDDE), gathered pace through the facilitation of several workshops that identified the expectations and needs of the African partners.

Ecology of health and conservation

Michel Gauthier-Clerc

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.

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Slender-billed Gull ringing

THE PROJECTS: "Conservation of species and their populations

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.

In 2013, the work carried out in the framework of Audrey Arnal's thesis on the viruses circulating among Yellow-legged Gulls in the Mediterranean Basin were finalised and will be published in PloS One early in 2014. They most notably revealed the regular circulation between 2009 and 2012 of a virus close to Meaban virus in the Medes islands colony off the north-east Spanish coast. This virus seems to be transmitted by ticks in the colony. Given that it is related to West Nile Virus, which can be fatal to humans and horses, it now needs to be determined whether the virus, detected for the first time in the Mediterranean region, may represent a risk to human health.

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Young Slender-billed Gull

The investigations carried out in collaboration with MIVEGEC-CNRS-Montpellier on antibiotics-resistant bacteria in Yellow-legged Gulls were extended to Slender-billed Gulls. The objective is to assess whether two species that frequent the same habitats but eat different foods show comparable infection rates. The sets of bacterial strains gathered are being analysed. In particular, they will be compared with strains recently detected in the region's hospitals in order to understand the exchanges of resistant bacteria that take place between wild animals and human populations.

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Dalmatian Pelicans - Turkey

Finally, a collaborative study was initiated with Sylvie Hutrez's team (CNRS Montpellier) with the aim of understanding which species are involved in the circulation of common liver fluke in the Camargue. The livers of the cattle of the Tour du Valat herd slaughtered in 2013 were examined together with those of wild boar killed by hunting on the estate. Most of the cattle were host to flukes whereas only one boar was infected by the parasite. The work is continuing, now also targeting coypus, which could be one of the natural reservoirs of the parasite in the region.

Introduced species and interactions with local species

Alain Crivelli - a.crivelli@tourduvalat.org

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.

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).

in the context of global changes”

AT A GLANCE

1 Catfish and fish populations

Elimination of the Wels Catfish was continued for the fifth consecutive year in 2013. The new objective is to maintain the predator at a minimum population level at which we have observed it only has limited effect on other fish populations. Although a very marked reduction in the numbers of the largest individuals was observed, breeding persists. Certain other fish species populations show encouraging signs of recovery, while others are still a long way from the numbers found before the Catfish was introduced.

2 Rainbow Trout and Marble Trout

In 2013, we continued our sampling operations, in both spring and autumn, in various watercourses where Marble Trout, Brown Trout and hybrid trout cohabit with established populations of Rainbow Trout. As of 2013, we have a geographically isolated population (i.e. allopatric speciation) of Rainbow Trout and two populations mixed with a closely related species (i.e. sympatric speciation), one with Marble Trout and the other with hybrid trout, on which we have started individual marking operations. In addition, twice a year we monitor two other sympatric populations with hybrid trout, in particular to assess the winter mortality rate of the fingerlings of the year (0+). An initial isotopic analysis was carried out to determine the level of cannibalism among the Marble Trout populations. The first results confirm for certain populations, notably the smallest, that there is considerable cannibalism which could play a significant role in their population dynamics. We are continuing our policy of duplicating pure Marble Trout populations, our genetic and, population dynamics analyses, and the modelling of the resilience of pure populations to catastrophic rises in water level.

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.

Anne-Sophie Deville defended her thesis in December 2013. It studied the food ecology of flamingoes and modelling their distribution in the salt pans in function of different management and habitat change scenarios.

In the context of the project “D'un marais à l'autre, marais en mutation, exercice de réflexivité au sein du système eaux et territoires : renaturation/restauration de zones humides”, (From one marsh to another, changing marshes, an exercise in reflexivity within the water and land system: renaturation/restoration of wetlands) the results of the studies of the Vallée des Marais des Baux in the Alpilles Regional Natural Park and Salins-de-Giraud area reveal major modifications of landscapes and associated ecological at both study habitats during the last 60 years.

The team:

Audrey Arnal, Antoine Arnaud, Fatiha Bakaria, Arnaud Béchet, Thomas Blanchon, Anne-Laure Brochet, Clarisse Boulenger, Pascal Contournet, Alain Crivelli, Anne-Sophie Deville, Sébastien Ficheux, Charlotte Franceciaz, Michel Gauthier-Clerc, Christophe Germain, Yves Kayser, Stephen Larcombe, Claire Pernollet, Charlotte Perrot, Alain Sandoz, Marion Vittecoq.

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Team lunch

Ecosystem modelling, restoration & management

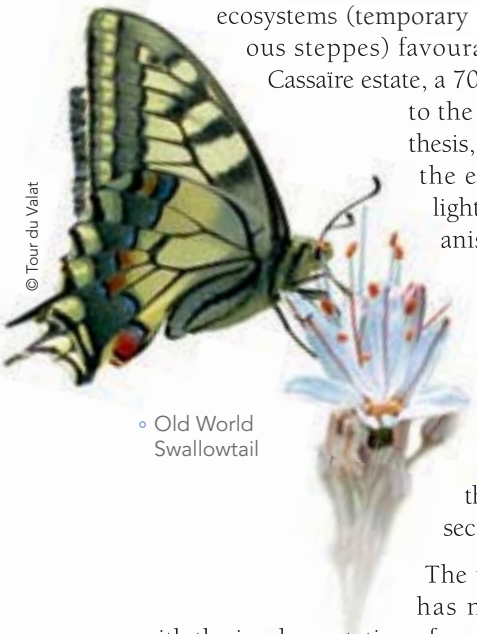
Mediterranean wetland ecosystems are modified by many forces, some of which have recently increased as a result of the combined effects of climate change and human activities. The popularity of coastal areas of the Mediterranean Basin, changes in land tenure, and intensification of uses and of agriculture, as well as future changes in environmental conditions, call into question the capacity of wetlands to maintain their condition and their biodiversity and to continue to provide their functions and services. The existing socio-economic and political contexts tend to generate short-term responses, which are not very consistent with the long-term environmental issues. The implementation of appropriate responses (management) requires the development of tools to explain the changes that are taking place in ecosystems and to anticipate their development and their impacts, in order to redirect management or to undertake active rehabilitation initiatives.

The Department's overall objective is to conserve biodiversity, functions, and ecosystems services in the context of global changes, in accordance with a multidisciplinary framework that sets out five approaches corresponding to five specific projects:

1. **The modelling of ecosystem dynamics, centred on the interactions among 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 their functionality, making use of scientific expertise to direct restoration activities and management decisions;**
3. **The adaptive and inter-sectoral management of ecosystems, integrating the territorial dynamics and favouring a long-term site-based approach;**
4. **The adaptive management of former saltworks, grouping together all the activities carried out by the Tour du Valat on the 6758 ha of coastal ecosystems recently acquired by the Conservatoire du Littoral (CdL, the French coastal protection agency), managed in partnership with the PNRC (Camargue Regional Natural Park) and the SNPN (National Society for the Protection of Nature);**
5. **The transfer of knowledge between site managers, decision makers, scientists and the general public by means of appropriate communication tools, particularly the actions of the programme Pôle-relais lagunes méditerranéennes (PRLM, Mediterranean Lagoons Transfer Unit).**

Within the modelling project, in 2013 the team's resources were largely monopolised by the European "Farmland" project. Financed by ERA-Net BiodivERsA, the aim of this project is to determine the contribution of the complexity of landscapes to biodiversity and ecological services in habitats that are predominantly (>60%) agricultural. In this first year of sampling in the Camargue, 74 bird species, 220 plant species and 19 butterfly species were listed (pollinating and predatory insects are currently being identified) in 96 agricultural plots. The richest plots are generally organically farmed. The threshold proportion of natural habitats that encourages a diversity of bird species is 25%.

Observation of insects - Farmland project



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◦ Old World Swallowtail

The key action of the restoration project is to recreate, from former rice fields, Mediterranean ecosystems (temporary marshes and halophilous steppes) favourable to hunting at the Cassaïre estate, a 70 ha property belonging to the CdL. Isabelle Muller's thesis, which she defended at the end of the year, highlighted the principal mechanisms that contribute to the establishment of a plant community, and tested restoration techniques and assessed their consequences for biodiversity. The results of this work are the subject of the "Focus" section p.28 this year.

The management project has not been outdone, with the implementation of new research activities on the Gediz Delta pilot site and the development of an agro-ecological partnership to improve the Petit Saint-Jean estate, a 100 ha property in the Camargue Gardoise (west of the Petit Rhone) bequeathed to the Tour du Valat Foundation.

On the site of the former saltworks, management guidelines have been drawn up pending the finalisation of the acquisitions by the CdL. The rapid evolution of the site since pumping was stopped and due to the multiplication of breaches in the dykes, lends itself perfectly to adaptive management. Despite the lack of perspective, major decisions must be taken. Management decisions become hypotheses and actions become experimental measures, regularly reassessed in function of the results obtained and the responses of plant and animal communities.

Globally speaking, this year was characterised by particularly intense interaction between researchers, users and site managers, attaining a new strategic axis of the Pôle-relais lagunes méditerranéennes (Mediterranean Lagoons Transfer Unit).

Brigitte Poulin

Head of department

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FOCUS

Rehabilitation of the Cassaïre site as a wetland for conservation and hunting

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Land use changes can present opportunities to restore ecosystems degraded by intensive anthropogenic activities. Such is the case for the 70 ha Cassaïre site, which was purchased by the French Coastal Protection Agency (CdL) in 2004 when rice growing activities were abandoned. Originally a swampy area, the Cassaïre site has undergone major transformations since the 18th century, particularly since the 1950s (exportation of materials, ground levelling, farming inputs). This project has several aims. On the one hand, we would like to demonstrate that by applying hydrological management that is close to natural conditions (low intensity management), it is possible to obtain plant communities with a high natural heritage value, while maintaining hunting activities; and, on the other hand, test out techniques for optimising the speed and cost of plant restoration operations.

› The creation of two types of threatened ecosystems

Our project aims to create **temporary marshes** (in the floodable areas) and **meso-xeric grasslands** (in the higher areas). It is based on setting up a specific hydrological regime in the floodable areas, which will be flooded in the autumn and dry out naturally in the spring to enable wildfowl hunting, and with a prolonged dry period in years with a severe drought to control undesirable plant species. On the contrary, the local management of hunting marshes is based on maintaining these areas flooded during the warmest months, contrary to natural conditions in which there is a dry period in the summer. As a result, certain Mediterranean species are replaced by common and/or exotic plants, some of which are potentially invasive *(e.g., Halmifolia)*.

Before starting the engineering works, feasibility studies were conducted on the nature and permeability of the soil to maximize the likelihood of success in terms of the hydrological regime and to lower the cost of fossil fuels (earth works). We studied the composition of the current plant cover as well as the availability of target species and the presence of potentially invasive species in the plant matrix.

› Additional experiments

In the framework of Isabelle Muller's thesis, experiments were conducted in mesocosms to better understand the mechanisms concerned, their consequences on plant community dynamics, and the causes of potential problems, such as unexpected colonisations, potential invasions, and blocking phases. These studies focused on the seed bank, and the role of hydrological conditions on its expression, the roles played by wind and water in the arrival of seeds, as well as tests on restoration techniques.

The introduction of local species appeared to be necessary, due to the low number of target species among the plants, in the seed bank, and the seed flow (due to water and wind). Two seed introduction methods were then tested. Typically used for ecological restoration, the first consists in using seeds found in hay harvested on the reference ecosystems (pelouses). This method was applied on the highest parts. The second consisted in implanting exogenous soil samples on the surface of the floodable parts of the site (soil inoculation). It is based on the preliminary identification on the donor sites of soil areas rich in the target species, their harvesting during the dormant season, and the mixing of all the soil from the donor sites before the inoculation takes place. This method makes it possible to obtain for each inoculate a range of species corresponding to significantly different ecological conditions. This kind of inoculation enabled the establishment of all the target species harvested.

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Engineering works on site

In the first method, based on transferring seeds from hay, nearly 50% of the target species from the pelouses were established, which may be considered to be a satisfactory result.

Restoration is now being carried out at the site scale. We are currently testing out the pertinence of various kinds of interventionist management: assessing the gains (time needed to obtain target communities, permeability to undesirable species) and constraints (time, cost, and difficulty of operations) in function of the density of the seeds introduced, the surface areas seeded or inoculated (small vs. large surface area) and their spatial distribution (Fig. 2).

The results obtained are promising; however, the success of restoration projects cannot be measured on the basis of the first years alone. Medium- and long-term assessments must be made on the vegetation, as well as on grazing and hunting activities to be able to draw valid conclusions from this restoration work. Adjustments (adaptive management) aiming to optimise hydrological management and grazing will be made. Nonetheless, the idea is to propose management scenarios that are quite flexible (not requiring extremely precise conditions), so that they can be reproduced in other hunting marshes. The decision to introduce all the target species found in the various local temporary marshes, whereas no natural reference marsh contains all of these species, is based on this objective. Our hypothesis is that this diversity of species, each of which has its own requirements, will ensure a favourable response by each community to variations in habitat conditions, thereby making the system relatively impermeable to undesirable species.

Among the numerous questions we address, the role played by the order in which species are established on the subsequent composition of the community (priority effect) is fundamental in terms of applied ecology (the ecological consequences) and theoretical ecology. It should lead us to conduct new experiments under controlled conditions to determine the specific role played by the principle factors which effects are combined in the field.

This project is based on fruitful collaboration and dialogue between the Friends of the Vigueirat Marshes Association (site manager), the Tour du Valat, and the Institut Méditerranée de Biologie et d'Ecologie [Mediterranean Biology and Ecology Institute] (Elise Buisson). These organisations work together on a steering committee, which also includes the French Coastal Protection Agency (CdL), National Hunting and Wildlife Agency (ONCFS), and local authorities. It could not have become reality without considerable financial support from the CdL for the initial studies, the Rhone-Mediterranean-Corsican Water Agency for the ecological engineering phases, and the Provence-Alpes-Côte d'Azur Region, which funded the doctoral thesis.

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Project leader: *François Mesléard*

Team:

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Genista ancistrocarpa

(Krimda bog, Larache)

is a steno-Mediterranean that is endemic to Morocco and the Iberian Peninsula, which colonizes peat marshes on siliceous soils.

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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 in the local area, 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.

Climatic scenarios for the Mediterranean predict an increase in summer temperatures and drought, with rarer and more intense rain episodes in the autumn. The rise in sea level and growing climatic irregularity are making it more difficult to jointly manage the water levels, salinity and biological flows of the Vaccarès system. Hydrological modelling of the delta has enabled the creation of a simulation tool that can be used as a decision-making aid by the Camargue executive water commission. The application of alternative, more adaptive, management also depends on the future creation or restoration of water management systems. In parallel, a second hydrological model based on 10 years' monitoring of water levels in the marshes has been developed to quantify the proportion of hydrological phenomena that can be attributed to human intervention and help managers to adapt their management system in the best possible way through the creation of an interactive tool: www.Mar-O-Sel.net

In the framework of the study of the effects of mosquito control in the Camargue, microbiological analysis confirmed the persistence and proliferation of Bti *(Bacillus thuringiensis israelensis)* in the reedbeds. These results explain the considerable impacts on non-target fauna observed in the last few years. The deposits of Bti, inaccessible to mosquito larvae which feed in open water, contribute to the reduction of the more bottom-feeding chironomids, with repercussions for the whole food web.

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Predictive model for the management of water levels www.Mar-O-Sel.net

A study was carried out with the Water Agency, ONEMA (National Office for Water and Aquatic Habitats) and IFREMER (French Institute for Research and Exploitation of the Sea), in the context of the Water Framework Directive, regarding the production and testing of a "macrophytes" indicator suited to low-salinity (oligo-mesohaline) lagoons.

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THE PROJECTS: "Modelling, restoration and management of

Restoration of ecosystems

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Doctorants : Solène Masson, Isabelle Muller.

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

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 colonisation mechanisms of plant communities. Active restoration actions, capitalising on the lessons learned from the Cassaïre project, will be carried out if necessary.

Lestes macrostigma

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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.

Rehabilitation of the Cassaïre Estate (see the focus section p.28)

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, reedbeds, habitat mapping, mammal populations, and grazing pressure.

A new 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.

ecosystems”

Tour du Valat Estate

The 2011-2015 Estate's management plan, was approved by the reserve's Scientific Council, and officially validated by the PACA (Provence-Alpes-Côte d'Azur) Regional Government in 2012.

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

In addition to the numerous animal and plant discoveries (see double page on biodiversity p.12), 2013 was marked by two main projects:

- In the framework of the Life Chiromed project and in partnership with the Camargue Regional Natural Park, three roosts were set up in the buildings to host Greater Horseshoe Bat and Geoffroy's Bat colonies.
- A project to preserve halophilous steppes and meadows financed by the French national heritage foundation Fondation du Patrimoine (2013-2014) aims to eliminate Narrow-leaved Phillyrea *(Phillyrea angustifolia)* using three techniques: cutting very young plants with strimmers, pulling up several-year old plants with heavy-duty spades, and uprooting the oldest individuals using draught horses.


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Uprooting of Narrow-leaved Phillyrea using draught horses

The third consultative committee of the natural reserve was held at the end of the year. A special motion on Wild Boar was voted by the committee, approving the efforts implemented by the site manager to regulate the boar population and calling for a rapid resolution of the dispute with the Bouches-du-Rhône hunters' federation.

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. 2014 will be an opportunity to review what has been achieved and redefine a long-term strategy.

AT A GLANCE


Myosotis welwitschii

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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.

Other sites and management methodologies

The management plan of the departmental properties in the Camargue, drawn up in collaboration with BRL-ingénierie and the SNPN (National Society for the Protection of Nature), was validated in 2013. It concerns the enhanced ecological status of lagoon habitats (reduction of pollution, increased biological exchanges with the sea), the sustainable exploitation of fish resources, the restoration of natural and seasonal variability of water levels, and controlled public access. An ecological and hydraulic rehabilitation programme for the Mas du Ménage is also planned, together with the classification of the Etang de Consécanière as a Natural Reserve.

Our team also contributed widely to participative approaches to integrated management tools for coastal zones via the FP7 PEGASO project. Workshops were also organised with IFREMER this year with the principal stakeholders in the Bouches-du-Rhône in order to validate spatial indicators (LEAC - Land and Ecosystem Account method).

In the industrial zone of Fos-sur-Mer, together with the State services, the Mediterranean National Botanical Conservatory and the GPMM (Marseille port authority), a project has been finalised intended to assess the populations and ecology of three rare and protected species: *Althenia filiformis, Tolypella salina and Riella helicophylla*. In the lakes and lagoons of the Western Camargue (Camargue gardoise), in the context of the Habitat Directive, there is a study underway to identify the aquatic habitats and assess their conservation status (with Languedoc-Roussillon DREAL (regional environmental directorate) and the local authority grouping (Syndicat Mixte pour la Gestion Camargue gardoise).

2013 Retrospective in pictures


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Eurasian spoonbills ringing


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Open Days at Tour du Valat


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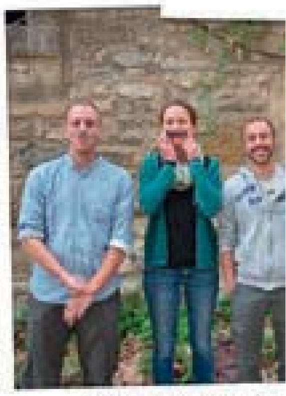
Warm good-byes to Mireille from two of our PhD Students


Mustache movember: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The envies rhônements festival


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Flamingo ringing seen from a different angle


The future is assured for flamingo ringing


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Beautiful snowy view from the library


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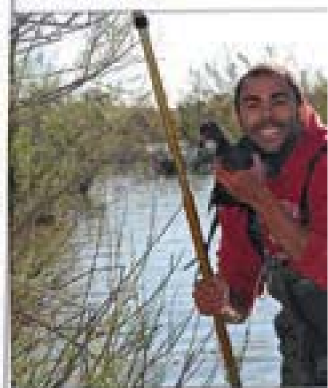
Foraging at the Verdier!


"All-smiles Sébas

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Landscape reading with Patrick Grillas

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Inter-department team work at the Petit Saint-Jean Estate

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Shell grones for amazed children's eyes

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Mission in the Gediz delta (Turkey)

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Luc Hoffmann and Thymio Papayannis on a Prespa mission (Greece)

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Ecosystem department meeting: you need to hang on !

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International Symposium on Aging Lakes (Burdur, Turkey)

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Outing on the Petit Saint-Jean Estate

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The old days told by the "Elders" of the Tour du Valat

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European Bee-eaters

THE PROJECTS: "Modelling, restoration and management of

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, Jean-Paul Rullmann, 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 Conservatoire du Littoral (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 5 000 ha of this area for salt production starting in the 1960s extended the zones flooded by sea water, and greatly increased the length of dykes.

The acquisition of these areas by the CdL raises questions in terms of how to manage water and the coastline. 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.

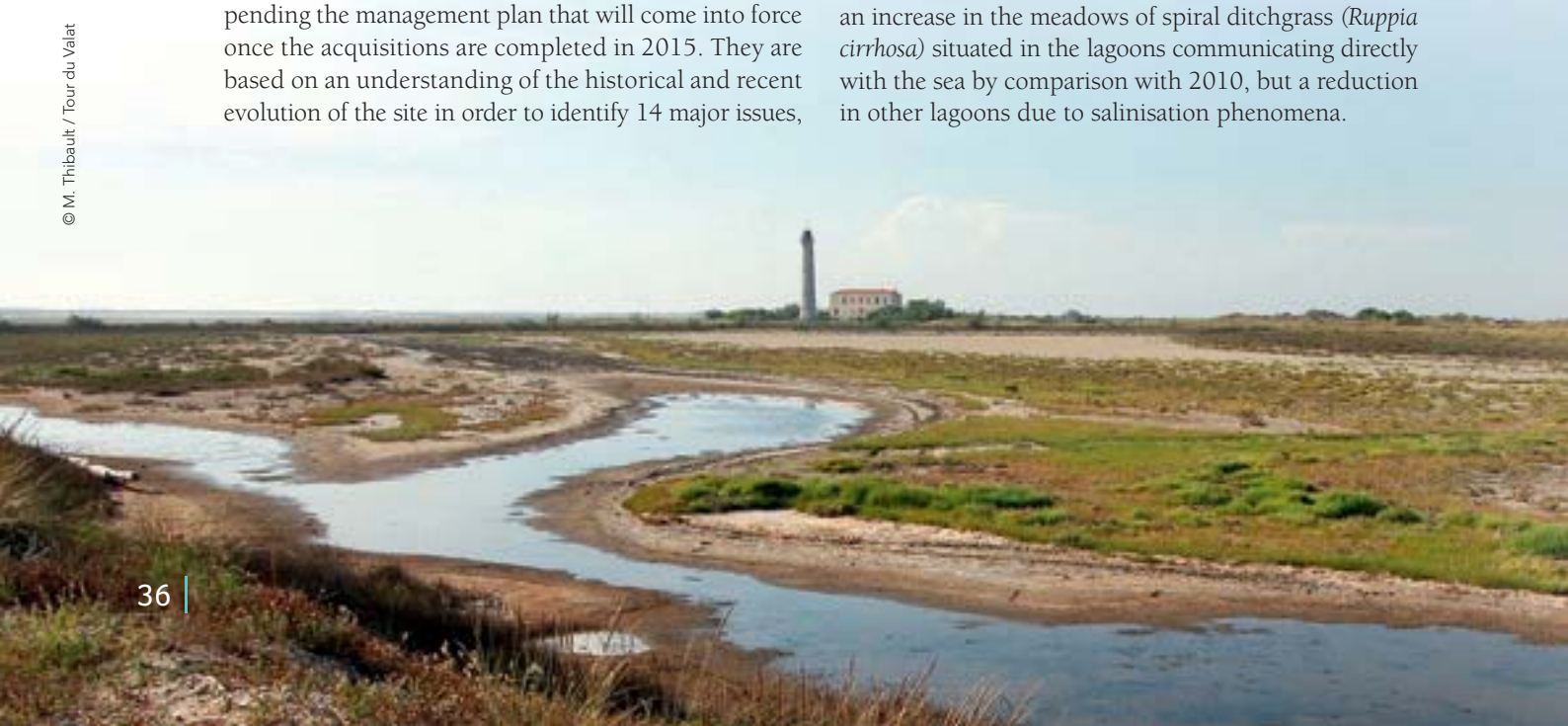
Management guidelines were finalised in early 2013, pending the management plan that will come into force once the acquisitions are completed in 2015. They are based on an understanding of the historical and recent evolution of the site in order to identify 14 major issues, detailing objectives and a short-term (three years) programme of actions appropriate to the rapid evolution of the site.

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). A proposition from the Tour du Valat to set up a protective enclosure for Little Tern over eight hectares of the Pointe de Beauduc enabled a colony to establish itself and breed in the area for the first time since 2009.

In support of the ongoing vegetation mapping process, the potential of satellite imagery for monitoring the evolution of the site was tested in 2013. Using SPOT-5 images, the method provides high-precision (99%) mapping of perennial sansouires (saline grasslands). The result is a net gain of 149 hectares (76%) between 2005 (196 ha) and 2012 (345 ha), which is consistent with the increase in the surface areas exundated and in the exundation periods of several salt pans.

The monthly bird counts reveal a complementarity between the lands acquired by the CdL and peripheral areas (salt works) due to their different hydrological regimes. Numbers of Greater Flamingoes were at their maximum in April on the CdL lands (n = 8076) but in August for the salt pans still being exploited (n = 8321). As in 2012, an increasing trend in the numbers of wintering Anatidae was observed (up to 2354 individuals between October and February), in parallel with the reduction in the salinity of certain sectors of the site.

The monitoring of aquatic vegetation in 2013 revealed an increase in the meadows of spiral ditchgrass *(Ruppia cirrhosa)* situated in the lagoons communicating directly with the sea by comparison with 2010, but a reduction in other lagoons due to salinisation phenomena.



ecosystems”

AT A GLANCE

Pôle-relais lagunes méditerranéennes (Mediterranean Lagoons Transfer Unit)

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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.

Uprooting of Narrow-leaved Phillyrea with Accor

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It is an innovative programme, which provides assistance to all lagoon habitat stakeholders, regardless of the geographical or administrative situation.

The Mediterranean Lagoons Transfer Unit encourages the sustainable management of these environments, providing expertise and advice with:

- Knowledge transfer via its website, Lagoons newsletter, bibliographic database, and on-line directory.
- The organisation of information-exchange meetings for the stakeholders.
- The publication of guides and articles for the general public.
- Communication and awareness-raising activities.

In 2013, several key actions were carried out in the framework of the programme, including:

- Coordination of the World Mediterranean Wetlands Days, with 91 events involving 4080 participants, and European Heritage Days at lagoon sites, with nearly 100 free events and a record number of participants (7500 counted).

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Training on the European Pond Turtle

- Organisation of a training course on the “identification of stoneworts (*Characeae*) in lagoon wetlands in collaboration with the ONCFS (National Hunting and Wildlife Office) bringing together seven management organisations from the regions Languedoc Roussillon and Provence-Alpes-Côte d’Azur (PACA).
- Organisation of a training day “inventory and monitoring methods for European Pond Turtle populations” at the Tour du Valat with some 20 managers from the PACA region.
- Awarding of the second Pôle-relais lagunes méditerranéennes prize on the theme of culture and artistic creation in lagoon zones to the Narbonnaise en Méditerranée Regional Natural Park for their project “Les archives du sensible”.
- Creation of 17 knowledge dissemination files for the PACA wetlands inventory and eight issues of the newsletter “Lettre des lagunes”.
- Testing the methodology for assessing the conservation status of the habitat of priority community interest “Mediterranean Coastal Lagoons” on the scale of the Natura 2000 sites in Languedoc-Roussillon.
- Assessment of wetland operations on the Languedoc-Roussillon coast.

European Stonechat

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.

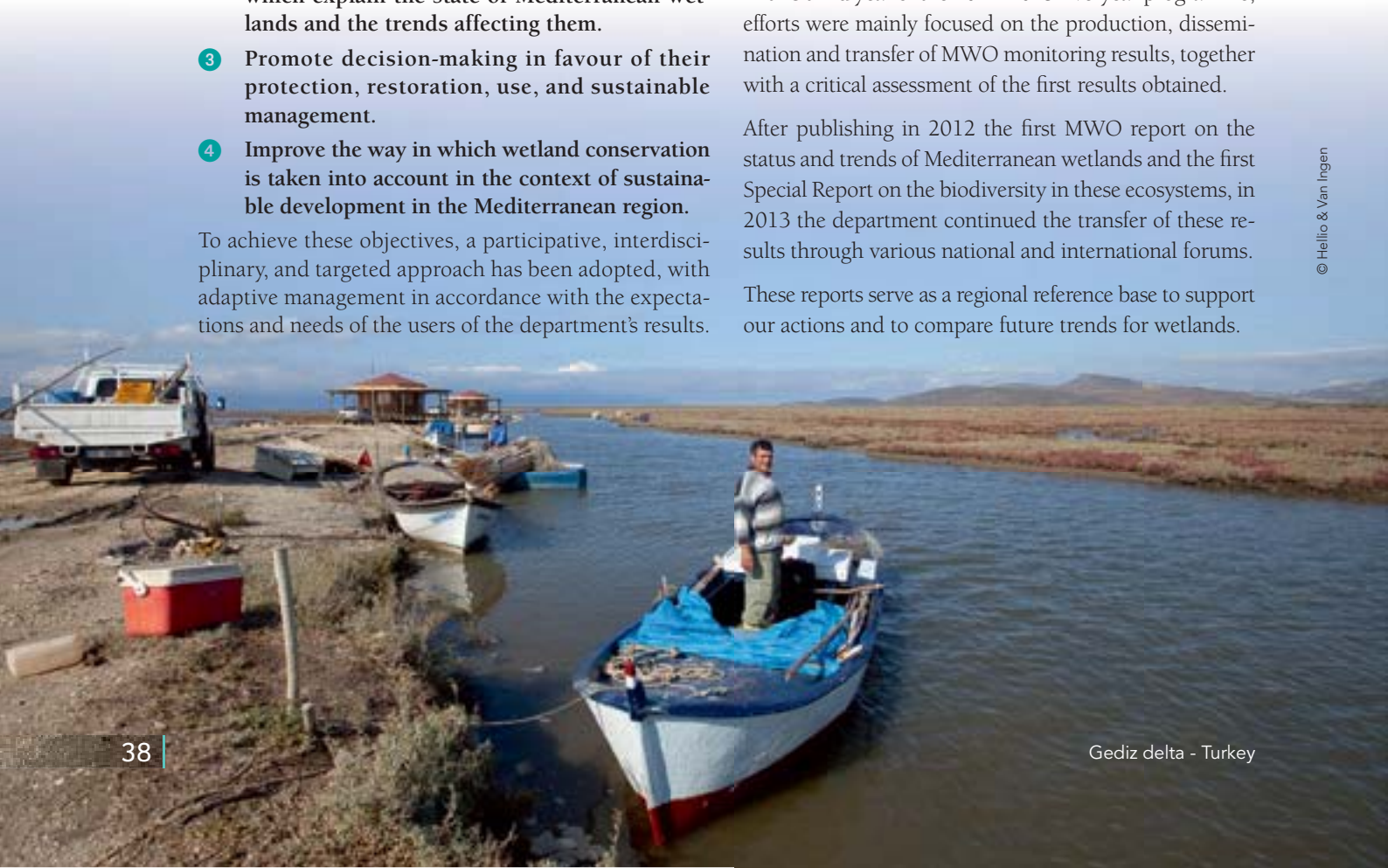
The activities take place within two interdependent projects; the first, "Methodology and innovation for monitoring wetlands" feeding directly into the second, "Observatories and wetlands policies".

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 third year of the 2011-2015 five-year programme, efforts were mainly focused on the production, dissemination and transfer of MWO monitoring results, together with a critical assessment of the first results obtained.

After publishing in 2012 the first MWO report on the status and trends of Mediterranean wetlands and the first Special Report on the biodiversity in these ecosystems, in 2013 the department continued the transfer of these results through various national and international forums.

These reports serve as a regional reference base to support our actions and to compare future trends for wetlands.



Gediz delta - Turkey

The GlobWetland 2 project continued its mapping activities and the calculation of spatial indicators, extending its scope to the northern Mediterranean region. Its results will be disseminated in 2014 in the MWO's second Special Report, covering the evolution of spatial indicators, including the total surface area of wetlands, and their conversion into agricultural or urban areas.

The indicators developed by the MWO mainly concern the monitoring of cultural services at nine Mediterranean sites, together with the indicators connected with water, which were thoroughly reassessed. An initial synopsis of studies of wetlands and local planning was also drawn up; however, the development of the resulting indicator was postponed to 2014-2015.

The RhoMeO project (Rhône catchment) was completed in December, with the production of a final report and a presentation at the closing seminar held in Lyon. It will also be disseminated in the form of a scientific article, currently in progress.

New projects were started in 2013:

1. **A three-year programme to develop the monitoring of indicators (Water, Biodiversity, Ecosystem Services) and to disseminate the MWO's results, financed by the Prince Albert II of Monaco Foundation;**
2. **Assisting the French Ecology Ministry (MEDDE) in the development of the National Wetlands Observatory;**
3. **Assisting the coordinators of the national waterbird censuses in North Africa with the calculation of biodiversity indicators and management aids, enabling better exploitation of census data (CEPF - Critical Ecosystem Partnership Fund - project coordinated by our Species Department).**

The start of the capacity building project for Non-Governmental Organizations funded by the MAVA Foundation and managed by WWF MedPo was postponed until 2014.

Finally, the Committee of Mediterranean Wetlands validated the transfer of the MedWet secretariat to the Tour du Valat in early 2014, which will provide the opportunity for new synergies with the MWO, particularly for improving the transfer of its results to decision-makers.

Gediz delta - Turkey

Laurent Chazée,
Head of department

FOCUS

Wetlands, a means of adapting to climate change

Tour du Valat, in the framework of a project led by the Plan Bleu, is studying in what ways wetlands can alleviate the effects of climate change. The approach of ecosystem-based adaptation is at the core of this process.

Glasswort picking - Turkey

Climate change is a major challenge facing both human societies and ecosystems. By 2100, the mean temperature of the Earth's surface could increase by 4.8°C, and the mean sea level rise at a rhythm of 1.6 cm/year. It is expected that extreme climatic phenomena such as droughts, flooding, and storms will become more frequent in certain regions, due to greater intensity and variability of precipitation. The Mediterranean Basin is particularly vulnerable. In the face of these natural risks, humans have constructed dykes, reservoirs, and protective walls. These artificial infrastructures are the traditional adaptation solution. Another, complementary, approach is also possible: that of adaptation based on ecosystems. This solution involves making use of biodiversity and the services provided by ecosystems. Humans benefit from the functioning of ecosystems via the "ecological services" they provide.

› Ecological services: "shock absorbers" of the effects of climate change

Wetlands provide numerous ecological services of various kinds. For example, the production of construction materials, regulating the concentrations of certain pollutants, and opportunities for leisure or educational activities. Among this broad range of ecological services, a bibliographical review and interviews with experts identified four that are directly linked to the attenuation of (i.e. reduced greenhouse gas emissions) and adaptation to climate change.

› Storing carbon

Wetlands could be the greatest natural terrestrial reservoirs of carbon on the planet. The organisms responsible for the decomposition of organic matter act in the presence of oxygen; however, oxygen is rare in wetland soils. Organic carbon therefore accumulates as peat is formed from dead plants. Carbon is also sequestrated by vegetation through the process of photosynthesis. In the Mediterranean region, this service is mainly provided by alluvial plains, lakes, and undrained marshes. Preserving wetlands thus prevents the release of this stock of carbon, which if it came into contact with oxygen would increase emissions of carbon dioxide (CO_2). Another consequence of draining wetlands is to release methane (CH_4), a greenhouse gas 20-25 times more virulent than CO_2.

› Protecting coastlines, in particular, from extreme climatic phenomena

Capable of attenuating the destructiveness of storms, and the power and speed of waves, certain wetlands act as buffer zones. Protecting wetlands can thus be an adaptation measure in that respect, because it reduces the vulnerability of populations in the face of these climatic events. In the Mediterranean, this service is above all provided by coastal wetlands such as lagoons and salt-marshes.

› Controlling floods

Most wetlands can store water, underground or on the surface. They can thus lessen peak rises in river levels, spread the sheet of water and reduce the speed of the current. This capacity depends considerably on the local hydrological and ecological context. Floodplains, lakes, marshes, and lagoons are particularly able to provide this flood control service.

› Combating drought

Many wetlands store water in wet periods, either directly or through progressive infiltration into the ground, feeding into water tables and watercourses. They can therefore become reserves of water in dry periods, and thus limit the effects of droughts. This role is carried out by certain marshes, lagoons, lakes, peatbogs, and floodplains, but it still needs to be demonstrated for the Mediterranean Basin.

Ecological services are not distributed in a systematic way. They depend entirely on the type of wetland, and on the geographical, topographical, hydrological and meteorological conditions. Analysis at local level is therefore required in order to comprehend them.

› Recognising the importance of this role

The role of wetlands as "shock absorbers" of the consequences of climate change has received little attention until now, and is not well understood. Tour du Valat, by participating in the Plan Bleu project, wants to encourage greater consideration of these ecosystems in national strategies and policies for adapting to climate change. One tool for stressing the importance of the ecological services identified is to carry out an economic assessment, for example by showing the costs that the sustainable management of a lagoon would avoid by comparison with traditional artificial coastal protection solutions. The great advantage of the conservation of wetlands with a view to adapting to climate change is that they provide extra benefits: for example, wetlands host exceptional biodiversity, which is not the case of dykes or most reservoirs. In addition, sustainably managing the services provisioning water, food and raw materials can contribute to reducing poverty.

› Implementing the approach

The project "Economic assessment of the ecological services provided by wetlands in the context of climate change" is to be implemented at four pilot sites in the Mediterranean Basin during the course of 2014.

For more information, see the study report (in French) Services écologiques rendus par les zones humides en termes d'adaptation au changement climatique - Etat des lieux et évaluation économique (Ecological services provided by wetlands in terms of adaptation to climate change. Current state and economic assessment).

http://www.tourduvalat.org/fr/documentation/rapport_plan_bleutour_du_valat

Project leaders:

Céline Dubreuil (Plan Bleu), Coralie Beltrame (Tour du Valat)

Team:

Diane Vaschalde, Céline Dubreuil, Coralie Beltrame, Christian Perennou, Laurent Chazée

Financial and technical partner:

Plan Bleu

Gediz delta - Turkey

Pseudopus apodus

(Gediz delta, Turkey)

Issued from the same family as the Slowworm, this Saurian - which can measure up to 1,4 meter - shows two remnants of legs near the cloaca. This species lives on the Balkanic peninsula and as far as Kirghizistan.

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THE PROJECTS:

"Wetland Monitoring-assessment and policies"

AT A GLANCE

Wetland Observatories and Policies

Laurent Chazée - chazee@tourduvalat.org

Coralie Beltrame, Thomas Galewski, Anis Guelmami, Christian Perennou.

This project is divided into two areas: the Mediterranean Wetlands Observatory 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 habitats.

The second part is a direct practical application of the first, aiming to raise the awareness of decision makers through institutional, strategic, and policy capacity building within countries and international organizations.

In 2013 we continued to disseminate the monitoring results of the Mediterranean Wetlands Observatory, published in 2012 in its first reports. In particular, presentations were given at the international conference "Canal 2013" at Agropolis, the UNESCO conference "Management and Protection of Mediterranean Groundwater-related Coastal Wetlands and their Services", the workshop "Integrated Water Resources Management" in Barcelona, the international conference "Drying Lakes," and the MedCoast world conference (Turkey).

The visibility of the MWO's work and results is enhanced by a website and an electronic newsletter.

The Observatory's results were promoted in 10 countries (Morocco, Algeria, Tunisia, Albania, Spain, France, Turkey, Italy, Switzerland, and the UK). A preliminary study of Serbian wetlands was carried out in order to assess the possibilities of reinforcing the Observatory's work in Serbia.

After the mid-term assessment, it was decided to enhance the targeting of and effective transfer towards decision-makers and the general public, and the scientific validation of the results via publications.

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The banks of the drying Burdur lake have receded of several hundreds of meters over the past 20 years.

The department completed its contribution to the drawing up of the Moroccan wetlands strategy, and assisted the setting up of two new observatories in France, at both national and regional scale (the National Wetlands Observatory and the PACA Regional Biodiversity Observatory - ORB PACA). We are also involved in a feasibility study for the creation of the Edough Park in Algeria, including Lake Fetzara. In particular, the team helped with the formatting of surveys to be carried out with local communities, camps, and households: socio-economic situation, community-territory relations, etc. In 2014, an Algerian intern will perform the analysis phase.

Methodology and innovation for monitoring wetlands

Christian Perennou : perennou@tourduvalat.org

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.

Exploratory research is also completed in new areas, for which indicators have not yet been developed.

In 2013, four major actions were completed:

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

Preliminary discussions were held with regional and national partners regarding the possible adoption of these indicators by the PACA Regional Biodiversity Observatory and the National Wetlands Observatory. In this framework, the Living Planet Index method was revised 1) selecting only specialist wetland species; 2) dividing the indicator according to groups of species specialising in the main types of wetlands (lagoon habitats, watercourses, wetlands).

Finally, the evolution of nesting bird communities in the Camargue since 1840 was reconstructed. Using the MWO indicators, these changes were linked to the profound landscape modifications to which the delta has been subjected.

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

The preliminary set of indicators adopted in 2009 was reviewed in depth, alternatives proposed and an international workshop organized in order to define the future monitoring strategy of the Observatory re. the water component.

3 Assessment of changes in surface area and land occupation in Mediterranean wetlands

Subsequent to the methodological tests carried out in 2012, the selected indicators were systematically applied at local level (Rhône catchment area) in the framework of the RhoMeO project. The latest results, targeting agricultural and urban pressures on wetlands, were presented at a closing seminar and in a final synoptic report.

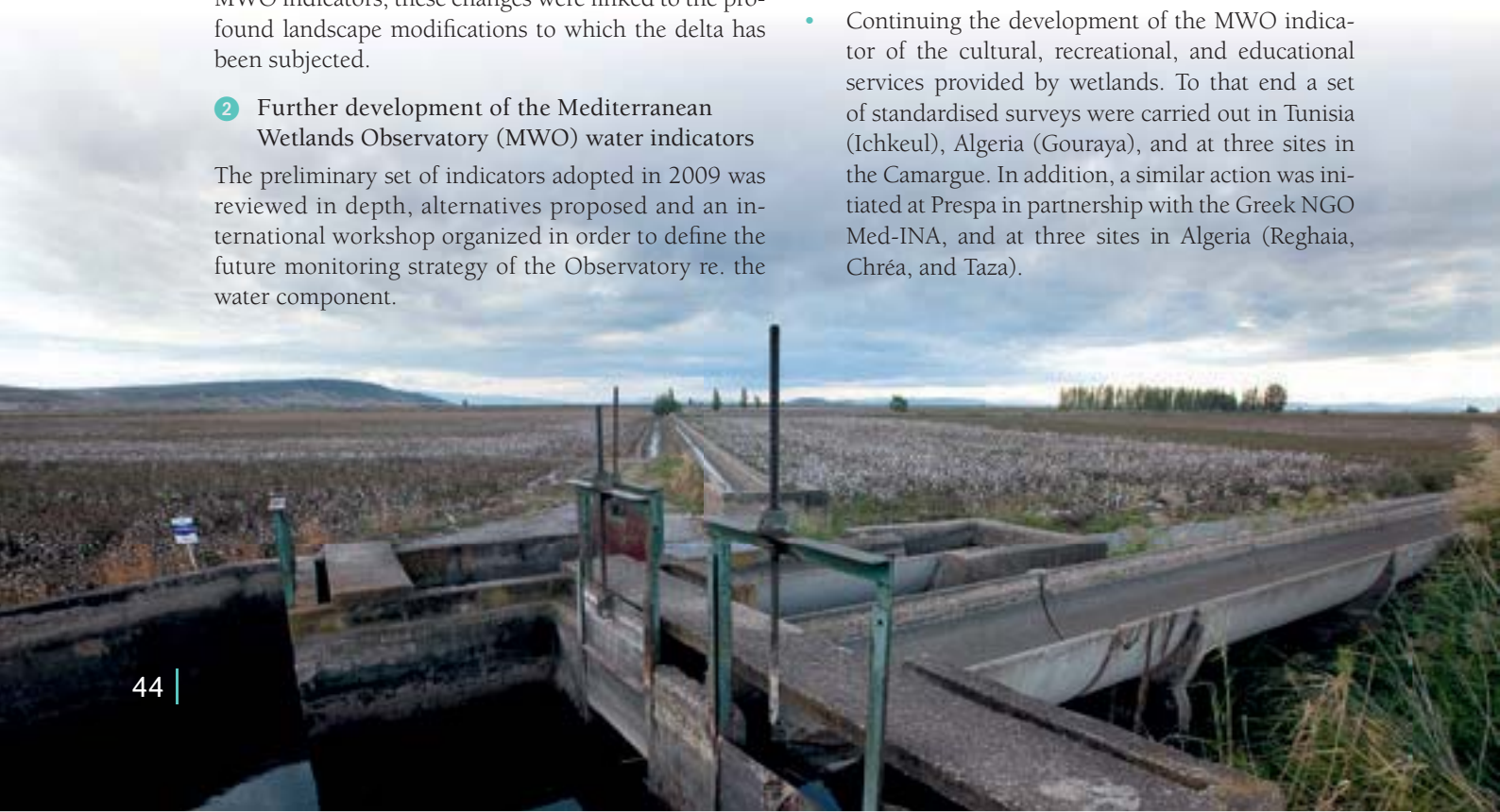
In the framework of the GlobWetland 2 project, a "toolbox" was developed integrating the calculation from satellite data of surface area and land occupation indicators. These indicators were calculated for 283 wetland sites in the coastal zone of the Mediterranean. Joint analysis of the data began in 2013. In 2014, this work will culminate in the publication of the Observatory's second thematic Special Report, focussing on land occupation changes in wetlands.

Also in the framework of GlobWetland 2, training courses on how to use the toolbox for mapping land occupation and calculating the indicators in and around wetlands were continued in North African countries.

4 Work on Ecological Services

It was conducted from two angles:

- A bibliographical review concerning the potential role of wetlands in helping human societies to confront and adapt to climate change (cf. project "Focus" p. 40). Carried out in partnership with Plan Bleu, the review was the preliminary phase of a more substantial project that may get underway in 2014.
- Continuing the development of the MWO indicator of the cultural, recreational, and educational services provided by wetlands. To that end a set of standardised surveys were carried out in Tunisia (Ichkeul), Algeria (Gouraya), and at three sites in the Camargue. In addition, a similar action was initiated at Prespa in partnership with the Greek NGO Med-INA, and at three sites in Algeria (Reghaia, Chréa, and Taza).



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

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 reports

- Mediterranean wetlands outlook: 1st Mediterranean Wetlands Observatory report
- Thematic report 1: Biodiversity, status and trends of species in Mediterranean wetlands

Gwenael Wasse,

Librarian and Communication officer

The Tour du Valat has an excellent collection of books on wetland ecology and ornithology, housed in a charming old sheepfold. My job is to shepherd these resources and make them easily accessible while receiving a wide range of visitors, including Tour du Valat staff, interns, and scientists from the other side of the Mediterranean. It's a big job that is constantly changing!

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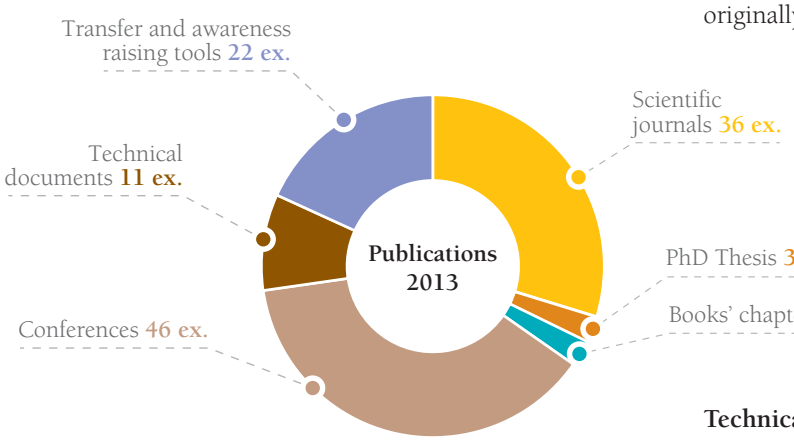
The publications

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.

Diversity of publications of Tour du Valat's 2013 programme



Scientific output was sustained and diversified in 2013 (Figure 1), although a little lower than in the previous year, with 36 papers published or in press in international journals, documents dealing with technical subjects (11), and awareness-raising and transfer documents (22). The number and significance of our scientific publications remains at a high level given the size of the team.

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.

More technical publications and awareness-raising documents are also indispensable for making our research useful for the conservation of Mediterranean wetlands. 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 paper introducing the scientific basis for extending to ecosystems the IUCN Red List approach, which was originally developed for species.

Keith D. A. et al. 2013 - Scientific foundations for an IUCN Red List of Ecosystems. PLoS ONE, 8(5): e62111. doi:10.1371/journal.pone.0062111.

A paper demonstrating how viruses, with no identified impact on health, are likely to affect humans and wildlife.

Vittecoq M. et al. - 2013 - Recent circulation of West Nile Virus and potentially other closely related flaviviruses in Southern France. Vector-Borne and Zoonotic Diseases, 13, 610-613.

Technical reports:

PNRC, TDV, SNPN-Réserve Nationale de Camargue. 2013 - Notice de gestion 2013-2016 des Etangs et Marais des Salins de Camargue. 124 p. + annexes.

Knowledge transfer documents:

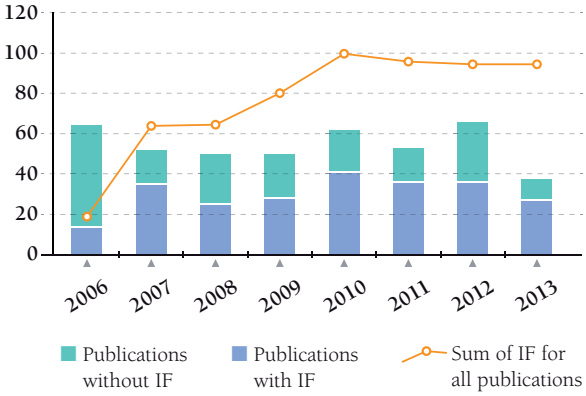
Crivelli A., Association Migrateurs Rhône Méditerranée, Hermeloup C. 2013 - L'Anguille européenne. Collection Sciences et gestion, Tour du Valat Ed. 32p. ill.

After three years of editing work by Jacques Blondel, Régis Vianet, and Guy Barruol, the Encyclopedia of the Camargue has been published by Buchet-Chastel, with 150 authors, including contributions from 19 Tour du Valat scientists, a former employee (Alan Johnson), and a researcher who works with the Tour du Valat (Aline Waterkeyn). This work examines all aspects of the Camargue, and will be a reference document for the delta.

Ph.D. students play an important role in the scientific output of the Tour du Valat. Three Ph.D. theses were submitted in 2013.

Finally, we also produced three regular newsletters (Tour du Valat, Mediterranean Wetlands Observatory, and Mediterranean Lagoons Transfer Unit).

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.

- Berrebi P., Tougard C., Dubois S., Zhaojun S., Koutseri I., Svetozar P. & Crivelli A.J. 2013 - Genetic diversity and conservation of Prespa trout in the Balkans. International Journal of Molecular Sciences, 14, 23454-23470.
- Davranche A., Poulin B., Lefebvre G. 2013 - Mapping flooding regimes in Camargue wetlands using seasonal multispectral data. Remote Sensing of Environment, 138: 165-171.
- Desprez M., Crivelli A.J., Lebel I., Massez G. & Gimenez O. 2013 - Demographic assessment of a stocking experiment in European eels. Ecology of Freshwater Fish, 22, 412-420.
- Deville A.-S., Grémillet D., Gauthier-Clerc M., Guillemain M., Von Houwald F., Gardelli B. & Béchet A. 2013 - Non-linear feeding functional responses in the Greater Flamingo *(Phoenicopterus roseus)* predict immediate negative impact of wetland degradation on this flagship species. Ecology and Evolution, 3:1413-1425.
- Doxa A., Besnard A., Béchet A., Lebreton J.D. & Sadoul N. 2013 - Inferring dispersal dynamics from local population demography modelling: the case of the Slender-billed Gull in the Camargue. Animal Conservation, 16-684-693.
- Ernoul L., Béchet A., Gaubert P. Mesléard F. 2013 - Limits to agri-environmental schemes uptake to mitigate human-wildlife conflict: lessons learned from Flamingoes in the Camargue, southern France. International Journal of Agriculture Sustainability. DOI:10.1080/14735903.2013.798897.
- Ernoul L., Wardell-Johnson A. 2013 - Governance in integrated coastal zone management: A social networks analysis of cross-scale collaboration. Environmental Conservation, 40 (03): 231-240.
- Fabre P.-H., Galewski T., Tilak M.-K. & Douzery E.J.P. 2013 - Diversification of South American spiny rats *(Echimyidae)*: a multigene phylogenetic approach. Zoologica Scripta, 42 (2): 117-134.
- Gayet G., Guillemain M., Defos du Rau P. & Grillas P., 2013. Effects of mute swans on wetlands: a synthesis. Hydrobiologia DOI 10.1007/s10750-013-1704-5.
- Gayet G., Guillemain M., Mesléard F., Fritz H., Curtet L. & Broyer J. 2013 - Annual usage of man-made wetlands by a resident waterbird species. Journal of Environmental management, 120: 120-126.
- Guillemain M., Green A. J., Simon G. & Gauthier-Clerc M. 2013 - Individual quality persists between years: individuals retain body condition from one winter to the next in Teal. Journal of Ornithology, Springer 154: 1007-1018
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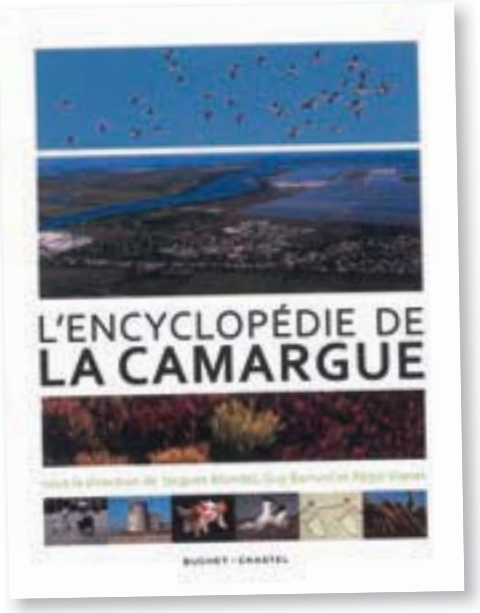

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Conferences and seminars

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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

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 Emeritus Professors Peter and Rosemary Grant, from Princeton University, USA, who presented their work on "Long-term Field Study of Evolution".

Seminars

Generally these seminars take place each Monday morning from 11.00 to 12.00 with between 20 and 50 participants. Most of the participants are staff members from the Tour du Valat. The programme of seminars is also communicated to all managers of natural spaces with whom we are in contact, and is available on our website:

www.tourduvalat.org

- **Observatoire de la biodiversité en PACA : un outil d'analyse, de compréhension et de suivi des progrès ou des dégradations de la biodiversité en région**
  Corinne Dragone et Thomas Fourest *(ARPE PACA)*
- **Recherches sur l'Oie cendrée**
  Bernard Voslamber *(Institut ornithologique SOVON, Pays-Bas)*
- **"A contre courant : le canard Merganette au Chili"**
  Claire Pernollet *(Tour du Valat / ONCFS)*
- **Fonctionnement hydro-sédimentaire des milieux lagunaires sur des échelles de temps multiples : application au complexe lagunaire palavasien**
  Jérôme Castaings
- **Le projet RhoMeO : suivi des zones humides du bassin versant du Rhône**
  Christian Perennou et Anis Guelmami (Tour du Valat)
- **L'ADN environnemental : une méthode innovante pour les inventaires de la biodiversité**
  Pauline Jean (SPYGEN)
- **Présentation de l'Unité de Soutien Technique à l'Initiative africaine de l'AEWA - le contexte, les enjeux, les missions et les premiers résultats**
  Clémence Deschamps, Anne-Laure Brochet, Pierre Defos du Rau et Jean-Yves Mondain-Monval *(Tour du Valat / ONCFS)*
- **Présentation de la Notice de Gestion des étangs et marais des salins de Camargue**
  Gaël Hémery *(PNRC)*, Anaïs Cheiron *(SNPN-Réserve Nationale de Camargue)* et Marc Thibault *(Tour du Valat)*
- **Etude de faisabilité pour la réhabilitation du mas du Petit Saint-Jean (30220)**
  Sarah Guémené et Mélanie Lastre *(Ecole Nationale Supérieure d'Architecture de Montpellier)*
- **Etude sur les relations entre les ONGE et les bailleurs de l'aide publique au développement**
  Fanny Guillet *(Muséum National d'Histoire Naturelle, Paris)*
- **Histoire de la colonisation de l'ambroisie à feuille d'armoise (*Ambrosia artemisiifolia*) en France**
  François Bretagnolle *(Université de Bourgogne, UMR Biogéosciences)*
- **Le Lapin de Garenne : Connaissances générales et gestion des populations**
  Stéphane Marchandeau et Jérôme Letty *(ONCFS, Direction des Études et de la Recherche, CNERA Petite Faune Sédentaire de Plaine)*

Media

The Tour du Valat enjoys good media coverage with over a hundred articles published in the written press, and several reports on TV and radio.

"Le chasseur français", the impact of Mallard release on wild fauna

Interview of Anne-Sophie Deville in France 3 TV show "C'est pas sorcier"

The national press spoke about our research and its implications in terms of "biodiversity and health" by citing an AFP dispatch that appeared when the book *Notre santé et la biodiversité* (Our health and biodiversity) (Buchet-Chastel 2013) was published (in French).

The regional press also covered the release of several works in which the Tour du Valat played a role, including the *Encyclopaedia of the Camargue* (in French).

In terms of the specialised press, the magazines *Chasseur français* (French Hunter) and *Chasser en Provence* (Hunting in Provence) relayed Jocelyn Champagnon's research into the impact on wild birds of releasing Mallard.

Other themes covered include mosquito control in the Camargue, hunting, the quality of the water flowing into the Fangassier lagoon, the condition of wetlands in the region, and the various events we organize or are involved in (Open Day, Nature Day, Envies rhônements festival, workshops held during the Marseille-Provence 2013 event, and educational workshops).

In 2013, our long-term monitoring projects were well covered by the various national television stations on three different prime time shows, *Thalassa*, *C'est pas sorcier*, and *Des racines et des ailes*. Our work on flamingos was showcased, and also our activities in the Petite Camargue, west of the Rhone.

A television report was also broadcasted on the regional news about our research into the impacts of mosquito control on non-target fauna.

AFP dispatch

Interview of Jean Jalbert - "Gazette de Nîmes"

Feature on the quality of the water that supplies the Fangassier Islet

Library

The library was established 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.

The catalogues of publications of the researchers at the Tour du Valat, as well as the bibliographic references of the journals and publications are available at:

www.tourduvalat.org

Collections

Comprising:

- 9,600 publications and thesis
- 1,200 different periodicals of which 500 are running
- 22,200 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
- Botany

Arrangements for 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 is 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

Olivier Pineau,

Director of the Estate

"The responsibility as well as the pleasure of managing an incomparable estate: an island on the Ile de Camargue."

The structure

our foundations

The Tour du Valat is a non-profit public benefit organisation. Its governance is handled by two official bodies: the Board, made up of three committees: the founders, ex officio members, and qualified personalities; and the Scientific 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 Scientific Council.

In November 2014, two seats in the College of internationally acclaimed scientists on our Advisory Board Executive Committee are to be renewed, because Mike Moser and Elizabeth Laville are coming to the end of their second terms.

To anticipate this renewal, the best potential candidates were identified in advance and associated with activities at the Tour du Valat before the beginning of their official term, so that we could all "get to know each other" progressively.

At our Advisory Board Executive Committee meeting in November 2013, we thus had the pleasure of welcoming Antonio Troya, Director of the IUCN Centre for Mediterranean Cooperation in Malaga (Spain), and Tobias Salathé, Ramsar Senior Advisor for Europe in Gland (Switzerland).

Meanwhile, our Scientific Council was very busy analysing the midterm assessment of the 2011-2015 programme, conducted by an international panel of five people, including two thematic experts, François Renaud and Luis Costa, who came to offer their support to our programme.

Mobilization of the team for the mid-term evaluation of the programme

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Governance

Board of Directors, June 2013

Board

- **Luc Hoffmann** . . . . . *Honorary president*

COLLEGE OF FOUNDERS

- **André Hoffmann** . . . . . *Vice-president*
- **Maja Hoffmann**
- **Vera Michalski**
- **Jean-Paul Taris** . . . . . *President*

COLLEGE OF EX OFFICIO MEMBERS

- **Pierre Castoldi** . . . . . *Sub-prefect of Arles, representing the Home Office*
- **Jean-Philippe Nabot** . . . . . *Regional representative for Research and Technology, representing the Ministry of Higher Education and Research*
- **Anne-France Didier** . . . . . *PACA Regional Director for Environment, Planning and Housing, representing the Ministry of Ecology, Sustainable Development, Transport and Housing*
- **Hervé Schiavetti** . . . . . *Mayor of Arles, representing the town council of Arles*

COLLEGE OF QUALIFIED PERSONALITIES

- **Lucien Chabason** . . . . . *Deputy director of the "Institut du développement durable et des relations internationales"*
- **Elisabeth Laville** . . . . . *PDG of Utopies and sessional lecturer at HEC*
- **Dr Mike Moser** . . . . . *Treasurer - Consultant in environment*
- **Thymio Papayannis** . . . . . *Secretary - MedWet Senior Advisor, President of MedINA*

Scientific Council

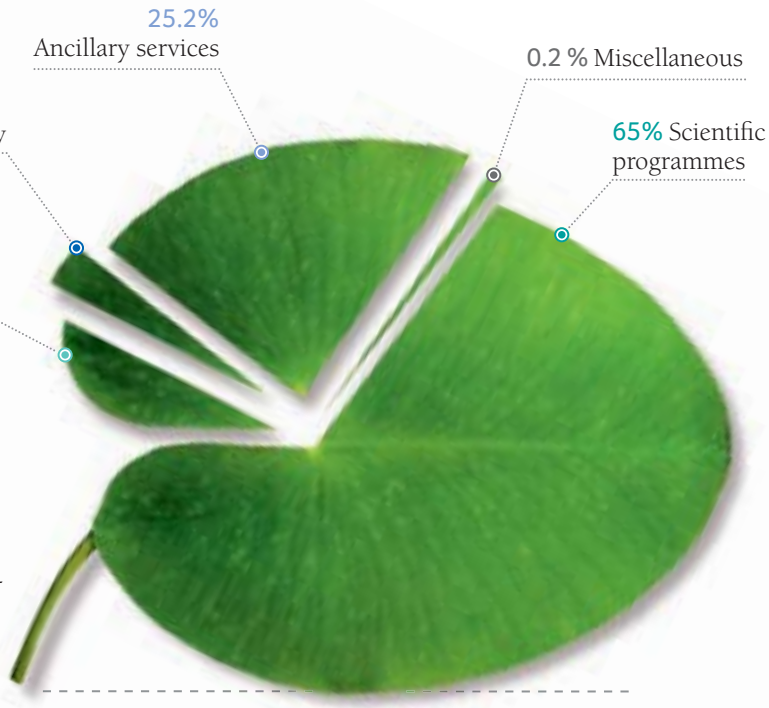
- **Dr Patrick Dugan** . . . . . *President - WorldFish Centre, Penang, Malaysia*
- **Pr Tim Clutton-Brock** . . . . . *University of Cambridge, UK*
- **Dr Jean-Dominique Lebreton** *Vice-président - Centre d'écologie fonctionnelle évolutive/CNRS, Montpellier*
- **Pr Jean-Claude Lefeuvre** . . . . *Muséum National d'Histoire Naturelle and University of Rennes*
- **Dr Laurent Mermet** . . . . . *ENGREF, Paris*
- **Pr William Sutherland** . . . . . *University of Cambridge, UK*

THEMATIC EXPERTS

In support of the Scientific 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 2013 amounts to 4,920,000 Euros.

Expenditure:

- 3,201,000 Euros have been allocated to the scientific programmes, including 890,000 euros for the "Conservation of species and their populations in the context of global changes" department, 1,338,000 euros for the "Ecosystem modelling, restoration and management" department, 306,000 euros for the "Monitoring and evaluation & wetlands policies" department, 372,000 euros for the management of the estate, and 295,000 euros for shared scientific activities (scientific management, conferences, training, transfer, project development, etc.).
- 294,000 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.).
- 177,000 euros have been allocated to managing the Tour du Valat library, principally the purchase of books and scientific journals.
- 1,238,000 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.

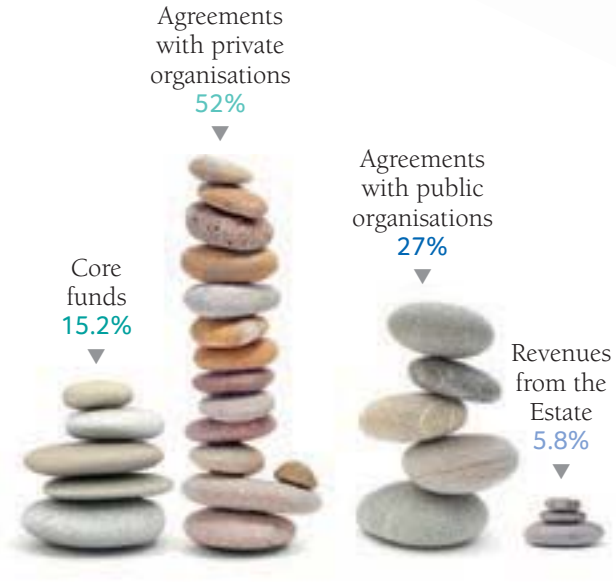
Tour du Valat receives its financing from a number of sources:

- 15.2 % of its receipts come from its own funds, held by the Pro Valat Foundation.
- 50 % of its receipts come from the MAVA Foundation.
- 27 % of its receipts come from agreements with public organisations.
- 2 % of its receipts come from agreements with private organisations.
- 5.8 % of its receipts are revenues from the estate.

Expenditure in euros

Scientific programmes	3 201 000
General management / Communication	294 000
Library	177 000
Ancillary services	1 238 000
Miscellaneous	10 000

Total: **4 920 000**



Receipts in euros

Core funds	751 000
Agreements with private organisations	2 556 000
Agreements with public organisations	1 326 000
Revenues from the Estate	287 000

Total: **4 920 000**

Environmental management

A mid-point 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.*
- *Energy consumption reduced by 35% after installing cellulose wadding and rice straw insulation (176 kW/m²/yr before insulation work, 114 kW /m²/yr after).*
- *CO_2 em issions reduced by 77% due to the modified heating system (39 tonnes of CO_2 in 2010 compared with 168 in 2009) and to the installation of a 160 kW multi-fuel biomass boiler (replacing five fuel oil and gas boilers with a total output of 580 kW), combined with a 590 m heating network and seven substations controlling the input to each building.*

2013 - Completing our "Energy Optimisation" project

The main work in 2013 consisted in replacing 60 old-fashioned windows with energy-efficient double glazed argon-filled windows, and insulating 400 m² of our northern façade with rice straw external insulation. In addition to improving the energy efficiency of our building, this insulation project was conceived to promote local resources and give a local company the chance to learn how to complete this kind of thermal renovation work.

Filling-test of the formwork with rice straw

This ambitious €900,000 project* has kept us busy for more than five years. In spite of some problems with the heating system that caused some delays, the overall budget was respected, and today we have an energy-efficient heating system, which should be copied by our neighbours, particularly the isolated old Camargue farmhouses (mas). We are going to monitor its performance very closely.

The extension of the storage area under the barn enables us to store more than 70m³ of biomass fuel, which provides us with more than 30 days of energy. Additional investments have been planned for 2014 with support from the bank Caisse d'Epargne Provence-Alpes-Côte d'Azur (CEPAC). For instance, we will be purchasing a wood chipper to be able to exploit part of the wood that grows on the Tour du Valat estate, and setting up a system for extracting and storing rice hull ash with a view to using this biomass fuel.

Travel

Our next sustainable energy project will concern our travel policy, working on four particular areas: streamlining the Tour du Valat's car fleet, encouraging the use of clean transport on the Tour du Valat estate, optimising commuting by encouraging car-pooling and the use of public transport, and decreasing and optimising national and international travel.

To encourage the use of public transport, a shuttle has already been put into service for employees who wish to go from the Tour du Valat to the Le Sambuc bus stop, where the bus leaves for Arles.

* The Tour du Valat Energy action plan was co-funded by the European Union. Europe is committed to investing in the Provence Alpes Côte d'Azur Region with the FEDER 2007-2013 European operational programme. The other contributors are Ademe, PACA Region, Limosa, The Pro Valat Foundation, SCA Petit Badon, and Tour du Valat.

© François Nimal

FIBA

Hosted organisations

The Tour du Valat has been hosting three partner organisations at its site for many years:

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 more:
www.oncfs.gouv.fr

Office National de la Chasse et de la Faune Sauvage

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 more:
www.lafiba.org

FIBA

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 more:
www.takh.org

TAKH

Vincent Boy,

IT specialist

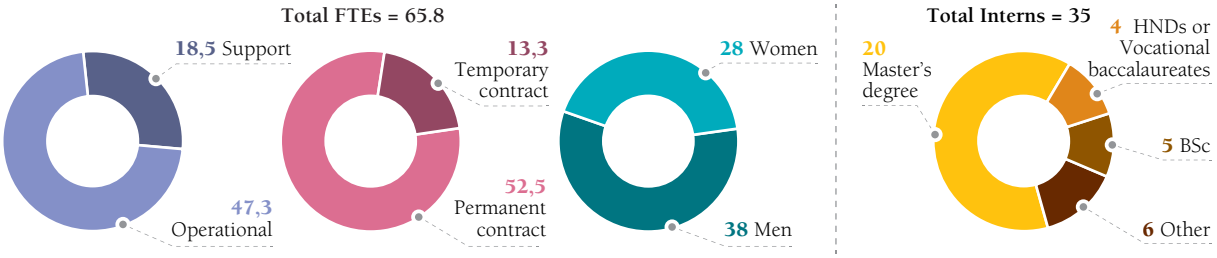
Some species (not specific to wetlands) are not threatened by extinction, and are even invasive. However, you still have to take very good care of them!

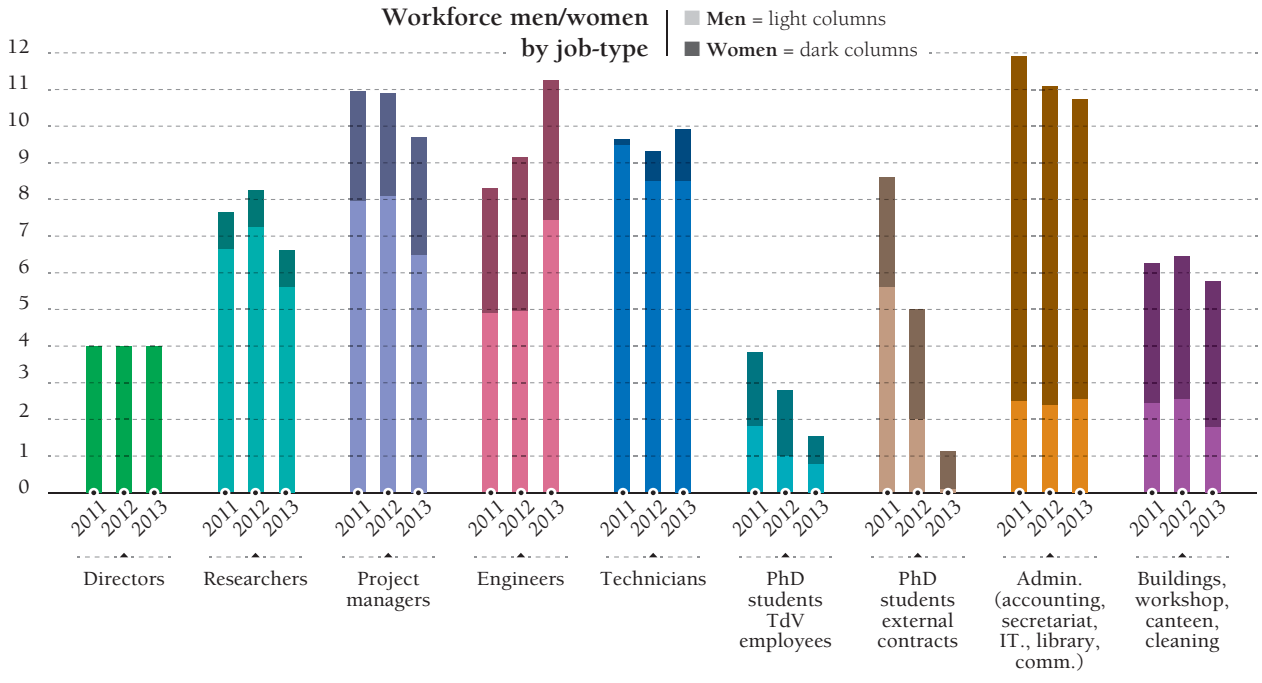
The teams

our living force

In 2013, we worked on several fundamental activities concerning our human resources. We continued our efforts undertaken in 2012 in terms of workplace ergonomics, working conditions, and safety by setting up a Health, Safety, and Working Conditions Committee, a function previously assumed by the Works Council. An ergonomic analysis was completed on the common work situations facing the teams working on the estate. It led to substantial investments to buy new equipment, which were partially funded by the AGEFIPH (an organisation that helps disabled people remain in the workplace).
An organisation was set up to manage occasional work from home, aiming to improve and standardise individual working conditions of employees while at the same time limiting useless commuting. Finally, serious reflection was undertaken on our employee savings plan, which should be completely overhauled in early 2014.

In 2013, there were 72 employees on the Tour du Valat team, along with 6 doctoral students, who have a contract with external organisations. In all, that means 65.8 full-time equivalents. In addition, our team is strengthened by 35 trainees, who provide their enthusiasm and precious skills to help achieve the scientific work conducted 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 Michel Gauthier-Clerc** .... *Head of Department, Research director*
- **Dr Arnaud Béchet** ..... *Head of Department, Research Scientist*
- **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*
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- **Dr Alain Crivelli** ..... *Research Director*
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- **Nicolas Beck** ..... *Project Leader*
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- **Dr Philippe Chauvelon** ..... *Research Scientist*
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- **Lisa Ernoul** ..... *Project Leader*
- **Samuel Hilaire** ..... *Research Technician*
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- **Laurent Martinez** ..... *Research Assistant*
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- **Virginie Mauclert** ..... *Project Leader*
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- **Loïc Willm** ..... *Research Assistant*
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- **Dr Hector Rodriguez** ..... *Post-doc*

DEPARTMENT "MONITORING AND EVALUATION & WETLANDS POLICIES"

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- **Dr Coralie Beltrame** ..... *Project Leader*
- **Dr Thomas Galewski** ..... *Project Leader*
- **Anis Guelmami** ..... *Research Assistant*
- **Dr Christian Perennou** ..... *Project Leader*

ESTATE MANAGEMENT

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

SUPPORT SERVICES

- **Anne Ackermann** ..... *Management Secretary*
- **Mireille Arnoux** ..... *Secretary*
- **Vincent Boy** ..... *Computer Specialist*
- **Nicodème Conin** ..... *Management Secretary*
- **Jacqueline Crivelli** ..... *Management Secretary*
- **Corinne Cuallado** ..... *Cook*
- **Florence Daubigney** ..... *Management Secretary*
- **Marie-Antoinette Diaz** ..... *Secretary*
- **Rosalie Florens** ..... *Management Secretary*
- **Cécile Girard** ..... *Cleaning Officer*
- **Stéphanie Gouvernet** ..... *Cleaning Officer*
- **Coralie Hermeloup** ..... *Communication Manager*
- **Jean-Claude Pic** ..... *Chief Accountant*
- **Catherine Picard** ..... *Accountant*
- **Josiane Trujas** ..... *Canteen Assistant*
- **Josiane Xuereb** ..... *Accountant*
- **Gwenael Wasse** ..... *Librarian/ Communication Officer*
- **Emmanuel Thévenin** ..... *Project leader seconded to GIP ATEN*

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FIXED-TERM CONTRACTS (SHORT PERIOD)

Cyril Caillat, Emilie Clarion, Alain Dindeleux, Guillaume Gayet, Mark Gillingham, Maëlis Renaudin, Ana Sanchez de Dios

Our partners

- A AGROOF - France
- Languedoc- Roussillon Conservatory of Natural Spaces - France
- ACCOR Group - France
- ADEME - France
- AEWA - Germany
- Agro-Paris-Tech - France
- Agropolis Foundation - France
- Alpilles Regional Natural Park - France
- ANSES - Animal Health Laboratory - France
- Arles Chamber of Commerce and Industry - France
- Arles Hunting Group - France
- Artelia - France
- Asphodèle Association - France
- Atlantic Marshes, Channel and North Sea Transfer Unit - France
- Autonomous Region of Sardinia - Italy
- B Banc d'Arguin National Park - Mauritania
- Barcelona Convention - Greece
- Biodiversity Indicators Partnership
- Bird Paradise Union of Izmir (Izku) - Turkey
- BirdLife International
- Bolmon and Jaï Joint Association - France
- Botiaux-Dulac Foundation - France
- Bouches-du-Rhône Departmental Territories and Sea Authority - France
- Bouches-du-Rhône General Council - France
- British Trust of Ornithology, UK
- BRL ingénierie - France
- Burgundy Region - France
- C Caisse d'Epargne Provence-Alpes-Corse (CEPAC) - France
- Camargue Horse Centre - France
- Camargue National Reserve - France
- Camargue Regional Natural Park - France
- CEPF
- Cepralmar - France
- CEREGE - France
- CESAB/Aix-en-Provence - France
- Chrea National Park - Algeria
- Chiroptera Group of the Provence - France
- CIHEAM/IAMM/Montpellier - France
- CNRS - CEBC - France
- CNRS - CEFE - France
- CNRS - DESMID - France
- CNRS - France
- CNRS - MIVEGEC - France
- Coastal Protection Agency - France
- Coastal Protection and Planning Agency - Tunisia
- Conservatories of Natural Spaces Federation - France
- Convention on Biological Diversity
- Corsica Regional Direction for Environment, Planning and Housing - France
- Corsican Environment Office - France
- D Departemental Hunting Federations (Bouches-du-Rhône, Gard) - France
- Doga Dernegi - Turkey
- Doga Koruma Merkezi - Turkey
- Doñana Natural Space - Spain
- Dynafor, Toulouse - France
- E Ebro Delta Natural Park - Spain
- Egyptian Environment Affairs Agency - Egypt
- EID Méditerranée - France
- El Kala National Park - Algeria
- Electricité Réseau Distribution de France (ErDF) - France
- ENSAT - Functional Ecology and Environement Team/ Toulouse - France
- Environment Quality Authority - Palestinian Authority
- Euro-Mediterranean system of information and water datas - France
- European Environment Agency - Danemark
- European Space Agency
- European Topic Centre on Land Use and Spatial Information - Spain/UK
- European Union - FEDER, FP7, Life+, SMAP, EVS
- F Foundation for Biodiversity Research - France
- Foundation of France - France
- Foundations of Success
- France Natural Reserves - France
- France-Quebec Office for Youth
- French Ecological Society - France
- French Foundations Centre - France
- French Mire Resource Center - France
- French Rice Centre - France
- Friends of the Birds Association - Tunisia
- Friends of the Pont de Gau Ornithological Park Association - France
- Friends of the Vigueirat Marshes Association - France
- Fuente de Piedra Natural Reserve - Spain
- G Gard Chamber of Agriculture - France
- Gard Departmental Territories and Sea Authority - France
- Gard General Council - France
- Géco Ingénierie - France
- GIPREB - France
- Gouraya National Park - Algeria
- Government Service for Land and Water Management (DLG) - The Netherlands
- Greek Biotope/Wetland Centre - Greece
- Green Balkans NGO - Bulgaria
- H Hebraic University of Jerusalem - Israel
- Heritage Foundation - France
- High Commission for Waters and Forests and the Fight against Desertification - Morocco
- HydroSciences - France
- I Ichkeul National Park - Tunisia
- Ifremer - France
- Initiative Centre for the promotion of Agriculture and rural envrionement of the Gard region - France
- INRA - ENSAM - France
- INRA - INNOVATION - France
- INRA - LAMETA - France
- INRA - UAPV Mediterranean Environment and Agro-Hydro-systems Modelisation - France
- Institute for Environmental Protection and Research (ISPRA) - Italy
- International Foundation of Banc d'Arguin - France
- IRD - CNRS Evolution of Symbiotic Systems Team - France
- IRSTEA - France
- ISIS - SPOT images - France
- IUCN French Committee - France
- IUCN International - Switzerland
- IUCN Mediterranean Cooperation Centre - Spain
- Izmir Provincial Department for Forestry and the Environment (National Parks) - Turkey
- J Joint Association for the Management of the Palissade Estate - France
- Joint Association for the Protection and Management of the Camargue gardoise - France
- L Languedoc-Roussillon Graine - France
- Languedoc-Roussillon Region - France
- Languedoc-Roussillon Regional Centre for Forestrian Property - France
- Languedoc-Roussillon Regional Direction for Environment, Planning and Housing - France
- Le Citron jaune/Ilotopie, National Centre for Street Arts - France
- League for the Protection of Birds - France
- Listel - France
- M Marseille Fos Port Authority - France
- Marseille Provence 2013, Euromediterranean workshops - France
- MAVA Foundation - Switzerland
- MedINA - Greece
- Mediterranean Botanical Conservatory of Porquerolles - France
- MedPan Association - France
- MedWet - Greece
- Meridionalise - France

Funding | Scientific | Technical | Institutional

- Ministry of Agriculture and Hydraulic Resources - Directorate General of Forests - Tunisia
- Ministry of Agriculture and Rural Development - Directorate General of Forests (DGF) - Algeria
- Ministry of Ecology, Sustainable Development and Energy - France
- Ministry of Environement - Lybia
- Ministry of Environment and Forests - Turkey
- Ministry of Higher Education and Research - France
- Molentargius-Saline Regional Nature Park - Italy

N

- Narbonnaise Regional Nature Park - France
- National Agronomy School of Montpellier - France
- National Environment Protection Agency (ANPE) - Tunisia
- National Institute of Agronomy/ Tunis - Tunisia
- National Museum of Natural History - France
- National Office for Hunting and Wildlife (ONCFS) - France
- National Office for Hunting and Wildlife (ONCFS) / Migratory Birds CNERA - France
- National Office for Water and Aquatic Environments (ONEMA) - France
- National Research Agency (ANR) - France
- National School of Architecture of Montpellier - France
- National Space Studies Centre - France
- National Veterinary School/ Lyon - France
- Nature Conservation - Egypt
- Noé Conservation - France

O

- OPTRONIK - Germany
- OSEO “Salinalgues” - France
- Ostraka Workshop - France
- Overseas Transfer Unit - France

P

- Pasteur Institute - Molecular Genetics of RNA Viruses - France
- Paul Sabatier University/Toulouse - France
- Permanent Centre for Environmental Initiatives/Arles - France
- Po Delta Emilia-Romagna Regional Park - Italy
- Polytechnic Institute of Milan - Italy
- Ponds, Inland wetlands, and Flood Plains Transfer Unit - France
- Pont de Gau Ornithological Park - France
- Practical School of Higher Education (EPHE)/Montpellier - France
- Prince Albert II of Monaco Foundation - Monaco
- Pro Valat Foundation - Switzerland
- Provence-Alpes-Côte d’Azur Conservatory of Natural Spaces - France
- Provence-Alpes-Côte d’Azur Graine - France
- Provence-Alpes-Côte d’Azur Region - France
- Provence-Alpes-Côte d’Azur Regional Direction for Environment, Planning and Housing - France

R

- Ramsar Convention - Switzerland
- Ramsar France Association - France
- Regional Agency for Environment/PACA - France
- Regional Council for the Environment of Andalucía - Spain
- Regional Network of Aquatic Ecosystems Managers/PACA - France
- Regional Network of Naturel Spaces Managers/PACA - France
- Remote Sensing Centre/Montpellier - France
- Research Group for Bird Protection in Morocco - Morocco
- Research Group for organic Agriculture - France
- Rhône-Alpes Conservatory of Natural Spaces - France
- Rhone-Mediterranean and Corsica Water Agency - France
- Rhone-Mediterranean Migratory Fish Association - France
- Royal Society for Nature Conservation - Jordan

S

- Saintes-Maries-de-la-Mer Town Council - France
- Salins Group - France
- Savoie Conservatory of Natural Spaces - France
- Savoie Natural Heritage Conservatory - France
- Scamandre Regional Natural Reserve - France
- Scientific Institute/Rabat - Morocco
- Society for the Protection of Prespa - Greece
- Spanish Centre for Wetlands (CEHUM) - Spain
- SPEA - Portugal
- Sustainable Research Centre - Australia

T

- Taza National Park - Algeria
- Technical Workshop for Natural Areas (ATEN) - France
- Tlemcen National Park - Algeria
- Tolmin Angling Association - Slovenia
- TOTAL Foundation - France
- Tunisian Observatory for Environment and Sustainable Development - Tunisia

U

- UNEP Mediterranean Action Plan
- UNEP-RAC/Blue Plan
- UNEP-RAC/SPA - Tunisia
- University Hassan II of Casablanca - Morocco
- University Joseph Fournier of Grenoble - UMR LECA, UFR PHITEM - France
- University Moulay Ismail - Morocco
- University of Aix-Marseille - CEJU - France
- University of Aix-Marseille - IMEP - France
- University of Aix-Marseille - UFR Sciences - France
- University of Aix-Marseille - UMR Espace - France
- University of Angers - UMR LETC LEESA - France
- University of Annaba - Wetlands Research Team - Algeria
- University of Avignon - IUT/ Hydrogeology Team - France
- University of Biskra - Algeria
- University of Brookes Oxford - UK
- University of Burgundy - UMR BioGéoSciences - France
- 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 - France
- University of Malta - Malta
- University of Montpellier 2 - Ecosym Team - France
- University of Montpellier 2 - Institute of Evolutionary Sciences - France
- University of New South Wales - Australian Wetlands Rivers and Landscapes Centre - Australia
- University of Oxford - Edward Grey Institute - UK
- University of Parma - Italy
- University of Provence - Chemistry and Environment Team - France
- University of Rennes - UMR ECOBIO - France
- University of Rennes 1 - OSUR - France
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- University of Sfax - Tunisia
- University of Sienna - Italy
- University of Skikda - Algeria
- University of Tel-Aviv - Israel
- University of the Sunshine Coast – Sustainable Research Centre - Australia
- University of Tizi-Ouzou - Algeria
- University of Toulouse - Ecolab - France
- University of Tripoli - Libya
- University of Uppsala - Sweden

V

- Verdier Marshes Association - France
- VERSeau Development Association - France

W

- Water Footprint Network
- Wetlands International - The Netherlands
- World Conservation Monitoring Centre - UK
- WWF France - France
- WWF International - Switzerland
- WWF Mediterranean Programme Office - Italy

Z

- Zoological Institute - UK

Funding | Scientific | Technical | Institutional

We were able to carry out our activities in 2013 thanks to our partnerships with various sponsors, in particular:

THE MAVA FOUNDATION

Created by Luc Hoffmann in 1994, the mission of the MAVA Foundation is to establish solid partnerships in order to preserve biodiversity for future generations. The Tour du Valat is one of the key projects backed by the MAVA Foundation, from which it receives major support.

THE PRO VALAT FOUNDATION

In 1974, Luc Hoffmann created the Tour du Valat capital endowment, which is today managed by the Pro Valat Foundation. Its revenues cover 15% of the organisation's budget.

THE TOTAL FOUNDATION

Following to a privileged partnership initiated seven years ago, The Total Foundation has contributed this year to our Greater Flamingo research programme, Slender-billed Gull monitoring, the creation of an interactive wetlands management tool, and biodiversity monitoring in the marshes, as well as supporting the Mediterranean Wetlands Observatory.

THE PRINCE ALBERT II OF MONACO FOUNDATION

Since the Mediterranean Wetlands Observatory was set up, the Prince Albert II of Monaco Foundation has helped the Tour du Valat to assess the status and trends of wetlands in the Mediterranean Basin, in particular by defining the indicators needed to analyse their water resources and biodiversity.

FONDATION DU PATRIMOINE

In order to protect rare and threatened habitats, the Fondation du Patrimoine (Heritage Foundation) contributed to the project aimed at clearing the Tour du Valat Regional Natural Reserve of the invasive shrub Phillyrea. For that purpose, it funded the rental of draught horses, a back-to-work scheme, and the purchasing of the equipment required.

THE CAISSE D'EPARGNE PROVENCE ALPES CORSE (CEPAC) BANK

The CEPAC Bank has just made a commitment to help the Tour du Valat by supporting the acquisition of a wood chipper to capitalize on some of the wood that grows on the Tour du Valat estate, and a rice hull ash extraction and storage system. It will also contribute to the funding of an alternative mosquito control project, which uses no insecticides.

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.
- If you would like to receive information about the programmes and other events the Tour du Valat organizes for the general public, please write to us at:

secretariat@tourduvalat.org

60 ANS

TOUR DU VALAT

1954-2014

A research centre for the
conservation of Mediterranean wetlands

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