

# ACCIONA

## GLOBAL COMMITMENT TO BIODIVERSITY





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“Halting biodiversity loss and tackling climate change, are one of the main challenges facing humanity”

Organisation for Economic Co-operation and Development. OECD - 2008.

## Prologue

***“Only when the last tree is cut down, the last fish caught, the last river poisoned, only then we will realize that one cannot eat money” (Cree Indians, Canada)***

One of ACCIONA's most noteworthy challenges is the commitment to sustainable development. It is a challenge that begins in the present and heads straight into the future, to coming generations. You may have heard of the sentence recalling that the Earth is not inherited from our ancestors, we borrow it from our children. But as we already know, human beings are capable of deciphering the most complicated of scientific mysteries but incapable of understanding thoughts as simple as the one you have just read. The footprint that man has left in the past matters little now with respect to directing our actions and proposals. And above, all regarding our warnings and considerations. We draw conclusions from the past, but there is no solution there that can guide us in our interest to warn

public opinion about the consequences of climate change. The worst of which, without a doubt, is the one that threatens life on the planet.

We could take inventory of how bad we understand the meaning of biodiversity, which is nothing other than the variety of life on Earth, meaning all living plants and animals inhabiting the planet. And we could look the other way when we learn that the species extinction rate is currently 1000 times faster than the historical rate of natural extinction. Preserving biodiversity means that we must be fully committed to the rules that the Earth imposes upon us.

Business strategies are also established this way, with clarity and conviction. And this is how we would like to be understood in ACCIONA: in our commitment to the environment, in the fight against climate change, in the challenges that are set before us by economic and social

ACCIONA drives the transition towards a low carbon economy

development linked to the preservation of the planet. There is no middle ground, nor can there be. You are either in or out. Today, nobody has any doubt about the fact that all plant and animal species, no matter how simple, are a repository of genetic information resulting from thousands of years of evolution, and when they go extinct, they disappear and are lost forever.

Dear reader, the report you have in your hands reflects, with both humbleness and decisiveness, the labour that those of us who work at ACCIONA perform in favour of preserving biodiversity wherever our brand is present. We would like you to consider it as a written commitment that binds us to continuously adapt.



Conserving the natural environment and biodiversity is a mainstay of the ACCIONA's environmental strategy



Conservation of biodiversity and the responsible use of our natural heritage are, for ACCIONA, as well as an ethical commitment, a necessary condition for global sustainability

## Principles of ACCIONA's biodiversity policy

- Incorporate biodiversity conservation into Company strategy, as a prominent element in its decision-making.
- Promote awareness and training on biodiversity and conservation in its various lines of business, promoting best practices and communication internally and externally.
- Drive training of Company personnel in biodiversity.
- Develop a programme for offsetting impacts generated on the natural environment and biodiversity.
- Establish regular monitoring of the impacts on biodiversity of the Company's different projects and facilities.
- Underscore and communicate relevant actions in the field of environmental conservation, fostering a culture of biodiversity conservation.
- Promote actions aimed at protecting and improving the natural environment.
- Collaborate with government, local communities, social organisations and other stakeholders in the development of biodiversity conservation, awareness and research actions.

## Introduction

The Convention on Biological Diversity (CBD), at its meeting of the Conference of the Parties, held in Japan in 2011, set out its Strategic Plan for Biological Diversity 2011-2020. This Plan recognises the progress that has taken place towards the integration of biodiversity conservation and sustainable use of resources into companies' economic activities, setting a series of targets to make variables related to biodiversity an important element in business decision making.

For ACCIONA, in addition to the fight against climate change, conserving the natural environment and biodiversity is a mainstay of its environmental strategy. It has had a specific Natural Environment and Biodiversity organisational unit since 2011, as well as a Panel of Experts in Biodiversity. Since 2012, it went further towards achieving the principles defined in its Biodiversity Policy, promoting reconciliation between conserving species and natural places and carrying out its production business.





## → Biodiversity Offsetting and Improvement Programme



This programme is ACCIONA's own voluntary initiative, with the sole purpose of conserving and improving biodiversity

*"ACCIONA is aware that biodiversity itself is a key and valuable natural resource, promotes its value and conservation as a necessary measure for economic development and social progress."*

For this reason and in the framework of its four environmental policies, ACCIONA has an Environmental Offsetting Plan, through which actions constitutes a differentiation by the positive impact they generate, are implanted.

Within this Plan is developed the Biodiversity Offsetting and Improvement Programme which designs and execute initiatives that go beyond administrative environmental requirements on a voluntary basis aimed to favour certain threatened species and/or ecosystems.

### Some of the noteworthy actions within this program are:

- Nesting boxes for protected species in ACCIONA's facilities.
- Using photo-trapping to research the presence and behaviour of wild animals around ACCIONA's facilities.
- Fruit trees in bear country.
- Regional network for the protection of threatened species in Extremadura, Spain.
- Captive Breeding project for european mink, for reintroduction to the natural environment.
- Creating a wetland and a bankside wood using renewable energies.

# Nesting boxes for protected species in ACCIONA's facilities

**The group of nocturnal birds of prey plays an essential role in maintaining the ecological balance in many of the planet's ecosystems. For this reason they are fully protected by legislation in numerous countries.**

In recent decades, some of these species have seen their populations drop in several countries, Spain among them, for several reasons, including the scarcity of appropriate nesting places.

Indeed, the majority of these species,

at least those living in Spain, make their nests in holes in old trees, which are often cut down and removed from the countryside. Therefore, the availability of appropriate breeding places usually acts as a limiting factor for the majority of these species.

In order to benefit populations of nocturnal birds of prey, ACCIONA initiated in 2012, a campaign to install nesting boxes appropriate for these species, which are being placed in a significant number of its facilities.

These are nesting boxes that look like those commonly made for insect-eating bird nesting, but of a much bigger size. Specifically, their dimensions are 35 cm x 35 cm at the base and 40-50 cm high. The width of the opening varies between 7 cm and 12 cm in diameter, depending on the species they are aimed at. They are made from certified pine wood and treated with linseed oil to protect them from the inclemency of the weather.

The NGO Brinzal, which specialises in nocturnal birds of prey, offered technical

advice in the project.

Furthermore, the Disabled Employment Centre of the Prodis Foundation, a not-for-profit institution whose purpose is to improve the social and working integration of young people with learning disabilities, have collaborated in the nesting boxes construction.

In total, 500 nesting boxes have been made for its installation in ACCIONA's facilities throughout Spain, while 40 were sent to Mexico to be installed in the

Atotonilco waste water treatment plant, the largest in the world. Based on previous experiences in Spain and México, in 2015, the Company have proceeded to deliver and install nesting boxes for protected species in Portugal. Currently, its working on the manufacture and installation of 65 nesting boxes in the Camp-Parque Ambiental Do Alambre, Sado Estuary Natural Reserve and in ACCIONA Agua and ACCIONA Service facilities in Portugal

The target species for the nesting boxes in Spain are the following nocturnal birds

of prey: tawny owl (*Strix aluco*), barn owl (*Tyto alba*), little owl (*Athene noctua*) and eurasian scops-owl (*Otus scops*). Nesting boxes can also be used for nesting by other species of diurnal birds of prey, also of great interest, such as the common kestrel (*Falco tinnunculus*) and the lesser kestrel (*Falco naumanni*).

All these species are fully protected under spanish regulations and are included in *Spanish Catalogue of Threatened Species*.



Thanks to this project over 200 chicks of diurnal and nocturnal birds of prey were born

**500 nesting boxes located in ACCIONA's facilities: waste water treatment plants, water purification plants, solar plants, hydroelectric power plants, vineyards, buildings, etc**

Other birds have also made their nests in the nesting boxes, such as the spotless starling or the rock pigeon, and several have been occupied by bees, which is also of great environmental interest, as these insects perform an excellent function in pollinating plants and their numbers are plummeting around the world.

ACCIONA has carried out the monitoring of some of the breeding pairs, with some truly surprising information about its feeding results. In particular, one pair of barn owls that nested in a nesting box located in a facility in Castilla y León carried around twenty voles to the nest each night to feed their chicks during their feeding period.

As voles are considered to be pests for agriculture in Castilla y León, this means that a single pair of barn owls eliminates around 2,000 voles per year, confirming the importance of nocturnal birds of prey to maintaining the ecological balance and how beneficial they are to agriculture.

During the last two years, monitoring of the occupation in the breeding period has carried out, with the aim of obtaining information about species and its distribution. The results obtained have been very successful, 100% of the target species have nested. In the Atotonilco Wastewater Treatment Plant in México DF, it's the first year that has been tracked 14 nesting boxes, and the occupation

of some of them have been confirmed. Thanks to this project, more than 200 bird of prey chicks have already born as barn owls, Eurasian scops-owls, little owls, tawny owls, common kestrels and lesser kestrels.

As can be seen, this is a project of great environmental and social interest. The placement of nesting boxes in ACCIONA's facilities is going to constitute an own distinguishing mark of the Company and one proof more of its commitment with the protection and improvement of the biodiversity.



During 2016, 10% of ACCIONA's nesting boxes were occupied by colonies of bees which is of great environment interest



Little owl nesting in a nesting box in an ACCIONA's facility

## Benefiting bees

Numerous studies have shown a worldwide decline in bee populations, which is attributed mainly to the use of phytosanitary products and to pollution in general. In this regard, various international organisations have raised the alarm, as preserving bees is fundamental not only to conserving the natural environment, but also to food production, given their pollinating function.

Some of ACCIONA's nesting boxes, especially those with round openings, have been occupied by colonies of bees. This is of great environmental interest as it benefits species which has undergone significant decreases in populations in recent years and which are essential for pollinating crops and conserving ecosystems.





Roe deer in the vicinity of a wind farm in Galicia



Genet near a waste water treatment plant in Autonomous Community of Madrid



Fox near a wind farm in Castilla y León

## Using photo-trapping to research the presence and behaviour of wild animals around ACCIONA's facilities

ACCIONA has carried out an environmental research project to study the wild fauna inhabiting the area around its facilities, using a photo-trapping technique.

The objective has been to act over the fauna group of terrestrial mammals on which it is interesting its relationship with exploitations and infrastructures, due to their special features have to be located in the natural environment, as wind farms, solar plants, being thermal or photovoltaic, waste water treatment plants, roads or vineyards.

To perform the work, a total of 42 photo-trapping cameras, with sensors for activation by movement, were located around 30 facilities in six autonomous regions.

The cameras remained installed for 15 months, although the number of months they were in place in each facility varied from one facility to another, but always within this period.

Over that time, more than 21,000 photographs and videos of various animal species were taken.

Focusing on carnivorous mammals, which was the main target group for the work and for being a good indicator of the presence or not of the empty effect around a facility, it has been photographed 12 of the 15 native carnivorous mammals species which inhabits in Spain, they were photographed.

Additionally, the three that were not detected was due to the fact that none of the facilities studied were in areas where those species inhabit.



Work was carried out in 30 ACCIONA's facilities in six autonomous regions of Spain and more than 21,000 photos and videos of wild animals were taken

Male Spanish ibex in the vicinity of a wind farm on a mountain in Valencia



Fox near a wind farm in Castilla y León



A family of egyptian mongooses in the vicinity of a waste water treatment plant in the Autonomous Community of Madrid.



Wolf in a wind farm surroundings in Castilla y León

## Results obtained

The results obtained can be considered to be highly satisfactory because all the carnivorous mammals that could be present in the habitats around the facilities studied were detected and photographed around them. Some species were even confirmed to be present in certain areas where they were unexpected. In fact the data obtained provides very interesting information on certain species from the biological and environmental point of view.

An stable presence of european wildcats has been detected in Valencia, a species whose distribution has been drastically reduced in recent years, especially in the southern half of the country.

Foxes (*Vulpes vulpes*), stone martens (*Martes foina*), pine martens (*Martes*

*martes*), polecats (*Mustela putorius*), genet (*Genetta genetta*), eurasian badgers (*Meles meles*), weasels (*Mustela nivalis*), european wildcats (*Felis silvestris*), egyptian mongooses (*Herpestes ichneumon*), eurasian otters (*Lutra lutra*), wolves (*Canis lupus*) and bears (*Ursus arctos*) were photographed. The american mink (*Neovison vison*), which has established itself in the wild in recent decades, needs to be added to these species.

**80% of the iberian peninsula's carnivorous mammals species were photographed**



European wildcat near a wind farm in Castilla y León

The most frequent of all of them was the fox and, to a lesser extent, the stone marten, both of which were present in the surroundings of practically all the facilities studied.

European wildcats were photographed in Castilla y León, Galicia and Valencia, in which it was especially interesting to find them, as this is a species that was present in practically all of Spain until recently, were is becoming much rarer

in the southern half of the country in recent years.

Egyptian mongooses were photographed near a thermosolar plant in Extremadura and the waste water treatment plants in Madrid, where photos and videos confirmed their breeding. This fact is highly relevant as it is a species that was not present in the region ten years ago, having arrived naturally from southern Spain.

Wolves were detected at the wind farms in Galicia and Castilla y León, having confirmed how they habitually use the service roads of some of the wind farms, in which they even hunt.

Finally, highlight the detection of the brown bear, which is an endangered species of which only a little over 200 individuals survive in Spain. It was photographed in a wind farm in Castilla y León.



Family of stone martens in the vicinity of a wind farm in Valencia

**The northward shift of several mammal species that lived in southern latitudes is observed, which might be due to climate change**

The photographs and videos obtained have also provided a significant amount of information on the behaviour of various species of mammals, for example about their diurnal or nocturnal nature



Eurasian badger in the vicinity of a wind farm in Castilla y León, at an altitude of over 1,500 metres



Red deer in a wind farm in Castilla y León



Wild boars in a wind farm in Valencia

## Terrestrial mammals are perfectly adapted to the studied facilities

Other non-carnivorous mammals were photographed around the facilities, such as rabbits (*Oryctolagus cuniculus*), hares (*Lepus capensis*), wild boars (*Sus scrofa*), spanish ibex (*Capra pyrenaica*), roe deer (*Capreolus capreolus*) and red deer (*Cervus elaphus*), among others. The photographs and videos taken confirm the abundance of wild boars in the majority of habitats, as well as their wandering life, the abundance and expansion of roe deers in many areas and the natural colonisation of new areas by red deers.

Species such as the egyptian mongoose were found to be completely diurnal (practically all the photographs and videos were taken during the day), as were the spanish ibex.

Species such as wild boars, roe deers, pine martens, wildcats, foxes and wolves were photographed both during the day and night. Others, such as badgers, stone martens and genets have shown nocturnal habits.

Roe deer near a highway that ACCIONA maintains



Water rail at the effluent outlet of a waste water treatment plant in the Community of Madrid



Numerous relevant findings were obtained on the behaviour and geographical distribution of some species



Young wild boars in the vicinity of a wind farm in Valencia



Otter near a thermosolar plant in Extremadura

Another interesting finding was how the different species of carnivorous mammals tend to avoid each other, as only one photograph was obtained showing individuals of different species at the same time.

Although birds were not the target of this work, around 60 species were also photographed, providing interesting information, such as the stable presence of water rail (*Rallus aquaticus*) at the outlet of a waste water treatment plant.



Hare in the vicinity of a wind farm in Castilla y León

This combined action by ACCIONA and FOP supports brown bear conservation by applying measures to improve biodiversity in general and brown bear habitats in particular. As such, it contributes effectively to the recovery of one of our most emblematic animal species



Bear and her breeding



Action in the bear area, which is the only breeding unit where only 40 individuals remain

Photos: Brown Bear Foundation (FOP); www.fundacionosopardo.org

## Fruit Trees in Bear Country

**14,500 fruit trees planted in three years in the Cantabrian Mountains to benefit brown bears.**

The brown bear (*Ursus arctos*) is listed as "threatened" by the Spanish Catalogue of Threatened Species. Although the population of cantabrian bears has been growing in Spain in recent years, this growth has been significantly slower in the eastern subpopulation, which includes the palentino hills in Palencia and Liébana as well as Polaciones hills in Cantabria. This subpopulation slightly exceeds 40 individuals.

Various scientific studies indicate that reproductive success and the survival of

the cubs appear to be directly linked to the availability of food, hence greater feed diversity would be supremely important for their recovery. This is why ACCIONA and the Brown Bear Foundation (FOP) initiated this project, with the main objective of enriching the hills where the bears live in Palencia and Cantabria by planting fruit trees to improve the availability, in terms of variety and amount, of food for brown bears.

The main woodlands in Palencia and Cantabria are oak (*Quercus spp.*) and beech (*Fagus sylvatica*), woods, which are very attractive to bears, but they need a greater variety of fruit-bearing species to

compensate during years when acorn and beechnut production is scarce, as well as to offer high energy foods in seasons of scarcity, such as summer.

In total, from 2012 to 2015, ACCIONA planted 14,500 fruit trees of various species: cherry, apple, whitebeam, alpine buckthorn, alder buckthorn and rowan distributed in numerous copses to cover a larger enriched terrain. Their survival rate exceeds 93%.

→ **Location of the fruit tree plantation areas in Palencia and Cantabria (2012 to 2015)**



This action enriches mountains where bears live by creating a series of feeding points and, in turn, contributes to improve biodiversity and CO<sub>2</sub> fixation

# Regional Network for the Protection of Threatened Species in Extremadura

**This project has been included in the 10-year review report of the Monfragüe Biosphere Reserve (MBR) in the UNESCO Man and the Biosphere (MAB) Programme.**

Within this programme, ACCIONA's actions are specifically highlighted as innovative and are framed as the main conservation programmes that have been carried out in this biosphere reserve during the last 10 years.

The purpose of this project has been to favour certain birds of prey species whose existence is threatened. It was initiated at the beginning of 2013 in the Autonomous

Community of Extremadura and it was designed and carried out by ACCIONA in cooperation with the Regional Government.

It has been a regional scale project with clear international implications, given the large number of over-wintering birds of prey that have been favoured, which nest in northern and central Europe in the summer and spend the winter in central and southern Spain.

It has been the establishment and maintenance of three strategic feeding sites in the region for these species. The sites are located in the Monfragüe National Park and Biosphere Reserve

(Cáceres), La Roca de La Sierra (Badajoz) and Trujillo (Cáceres).

Each feeding site has consisted of a fenced plot of land between 5,000 and 10,000 m<sup>2</sup>, where specific food for these species have been regularly provided.

The main target species of this project has been the red kite (*Milvus milvus*), given that its Spanish population has dropped drastically between 40% and 50% in just one decade. This is why the Environmental Administration raised the category of the species in the *Spanish Catalogue of Threatened Species* to "In danger of extinction".



Egyptian vulture

The project has also favoured other species of carrion-eating birds of prey that are as well threatened, such as the cinereous vulture (*Aegypius monachus*) and the Egyptian vulture (*Neophron percnopterus*), both listed as "vulnerable" in the Spanish Catalogue of Threatened Species, and to a lesser extent, also the black kite (*Milvus migrans*), listed as "special protection".

The main achievement of the project has been the design of a method that allows the selective feeding of the target species, versus other opportunistic species such as the griffon vulture (*Gyps fulvus*), this carrion-eating bird is very abundant in our country, and it tends to monopolise feeding stations for carrion-eating birds, thereby hindering other species from accessing food.

Consequently, a number of selective techniques for providing and distributing food were experimented until the established objective was reached. The results have been very satisfactory, given that the targeted bird species have been regularly observed at the feeding place, which have contributed to stabilise its populations.

ACCIONA has implemented a specific feeding system which provided a supplementary source of food for species like red kite



Red kite

→ Location of the three feeding sites, in Extremadura, Spain



Pioneering project of environmental interest that have favoured threatened birds of prey



Platforms installed in the scrubland for feeding kites

## Monfragüe National Park feeding site

The Monfragüe National Park, declared as Biosphere Reserve by UNESCO, is one of the areas of major importance worldwide for some bird species that are typical of mediterranean scrubland area, which houses the largest colony of cinereous vultures in the world.

Even though this feeding point had previously existed, it was inactive. Thanks to ACCIONA's intervention, it began to

operate again in this new stage.

The species of greatest interest that have fed at this site are the egyptian vulture and the cinereous vulture, and sporadically the golden eagle. The black kite and the griffon vulture also visited this feeding site. However, it has been possible to minimise the presence of the griffon vulture in favour of the former birds.



Black kite



Cinereous vulture



Black kites at one of the feeding sites

## La Roca De La Sierra feeding site

**It is located in the Dehesa Boyal in the township of La Roca de la Sierra (Badajoz),** it was created for the main purpose of favouring the red kite, given the large number of this species over-winter in the surrounding area, where there is at least one nesting pair.

It was regularly visited by red kites, and in winter, it has been common to observe between 5 and 15 individuals

of the species feeding there or flying overhead.

Also in this case, it was possible to minimise and even prevent the griffon vulture from going down to feed.



Feeding platforms at La Roca de la Sierra

It was created for the main purpose of favouring the **red kite**, given the large number of this species over-winter in the surrounding area

The population of the **red kite** (*Milvus milvus*), a species in danger of extinction, has dropped drastically in Spain by **more than 35%** in just one decade



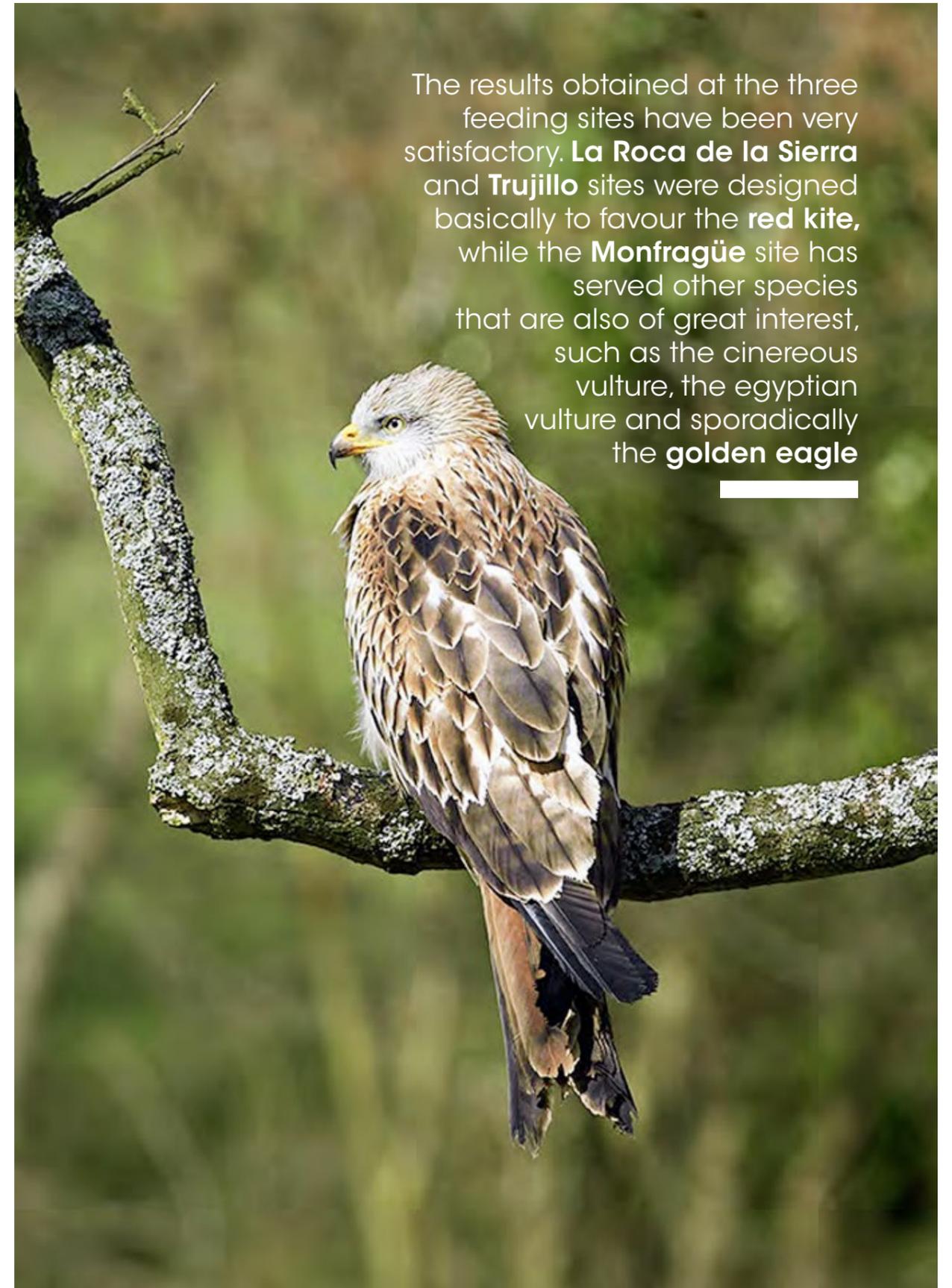
Red kites in a roosts closer to the feeding point

## Trujillo feeding site

**It was located in the Dehesa Boyal of Trujillo (Cáceres).**

The main objective of this feeding site has been to favour the red kite, given the large number of this species over-winter in the surrounding area.

In winter, this feeding site has been regularly visited by a larger number of red kites than at the La Roca de la Sierra site. It has also been possible to reduce visits by the griffon vulture, which are seen only sporadically for not being able to access food.



The results obtained at the three feeding sites have been very satisfactory. **La Roca de la Sierra** and **Trujillo** sites were designed basically to favour the **red kite**, while the **Monfragüe** site has served other species that are also of great interest, such as the cinereous vulture, the egyptian vulture and sporadically the **golden eagle**



European mink

## Captive Breeding Project for european mink, for reintroduction to the natural environment

ACCIONA has been collaborating actively since 2012 with the Foundation for Research in Ethology and Biodiversity (FIEB) on the Captive Breeding Project for european mink (*Mustela lutreola*) which Foundation carries out at its facilities at Casarrubios del Monte (Toledo). This is the one of the only two captive breeding

centres authorised in Spain for this endangered species.

The European mink is the Europe's most endangered mammal, having seen its populations fall dramatically in recent years, partly as a consequence of the irruption of american mink.

One of the only three populations of european mink remaining in Europe is in Spain, extending itself through part of the Basque Country, Navarre, La Rioja, northern Soria and north-eastern Burgos, where their populations keeps decreasing. For this reason, it is listed in the Spanish Catalogue of Threatened Species as "endangered".

### This european project is part of the Captive Breeding Programme within the national strategy for the conservation of this species

The objective of this project is to achieve captive breeding of this species, generating a certain number of individuals for later reintroduction to the areas where the species lives, where the causes of their disappearance have gone, both in Spain and in other countries in the European Union.

In 2015, in this facilities, 4 breedings were born in perfect condition, which is a success for the quick retrieval of good

results and for the contribution to the viability of the European mink captive breeding programme.

ACCIONA is collaborating in extending and improving the facilities, considerably increasing the facility size per individual as well as the water pool each individual has. The facilities also have closed-circuit cameras and sensors that allows the monitoring of the individuals 24 hours a day.

This project is carried out with the support of the Biodiversity Foundation, the Ministry of Agriculture, Food and Environment and the collaboration of ACCIONA.



**A few breedings have already born within the framework of this project**



By carrying out this project in a degraded area of little natural value, ACCIONA and the FIEB managed to reverse the process, supporting its environmental regeneration. This also represents a novel conjunction between improving **the natural environment** and **using renewable energies**

## Creating a wetland and a bankside wood using renewable energies

ACCIONA, in collaboration with the Foundation for Research in Ethology and Biodiversity (FIEB) have proceeded to the creation of a wetland with its associated bankside vegetation, near the Foundation's facilities in the province of Toledo.

This action was carried out in collaboration with La Caixa Foundation on a plot of a

little more than one hectare alongside a stream, which could potentially have bankside vegetation, as well as small temporary marshes, but it was heavily degraded by human activity.

ACCIONA and FIEB agreed to carry out a project of environmental regeneration and improvement of the area, substantially

increasing its biodiversity. In this regard, a wetland of approximately 500 m<sup>2</sup> was created. To do this, the soil was removed from the area to a depth of 1.5 metres, setting up gentle slopes around the whole perimeter of the wetland. An island was left in the middle of the basin.

The banks were then lined with grass root balls, obtained from a nearby area. Four hundred native willows, of two different species, have been planted on these banks, using cuttings taken from specimens in the surroundings. In this way, apart from revegetating the banks with native species, erosive processes were avoided.

The soil removed to create the wetland was spread and levelled to an existing bank on one side of the plot and it was sown with a mixture of gramineae and legumes.

On the rest of the plot, 350 bankside trees were planted, mainly ash (*Fraxinus*

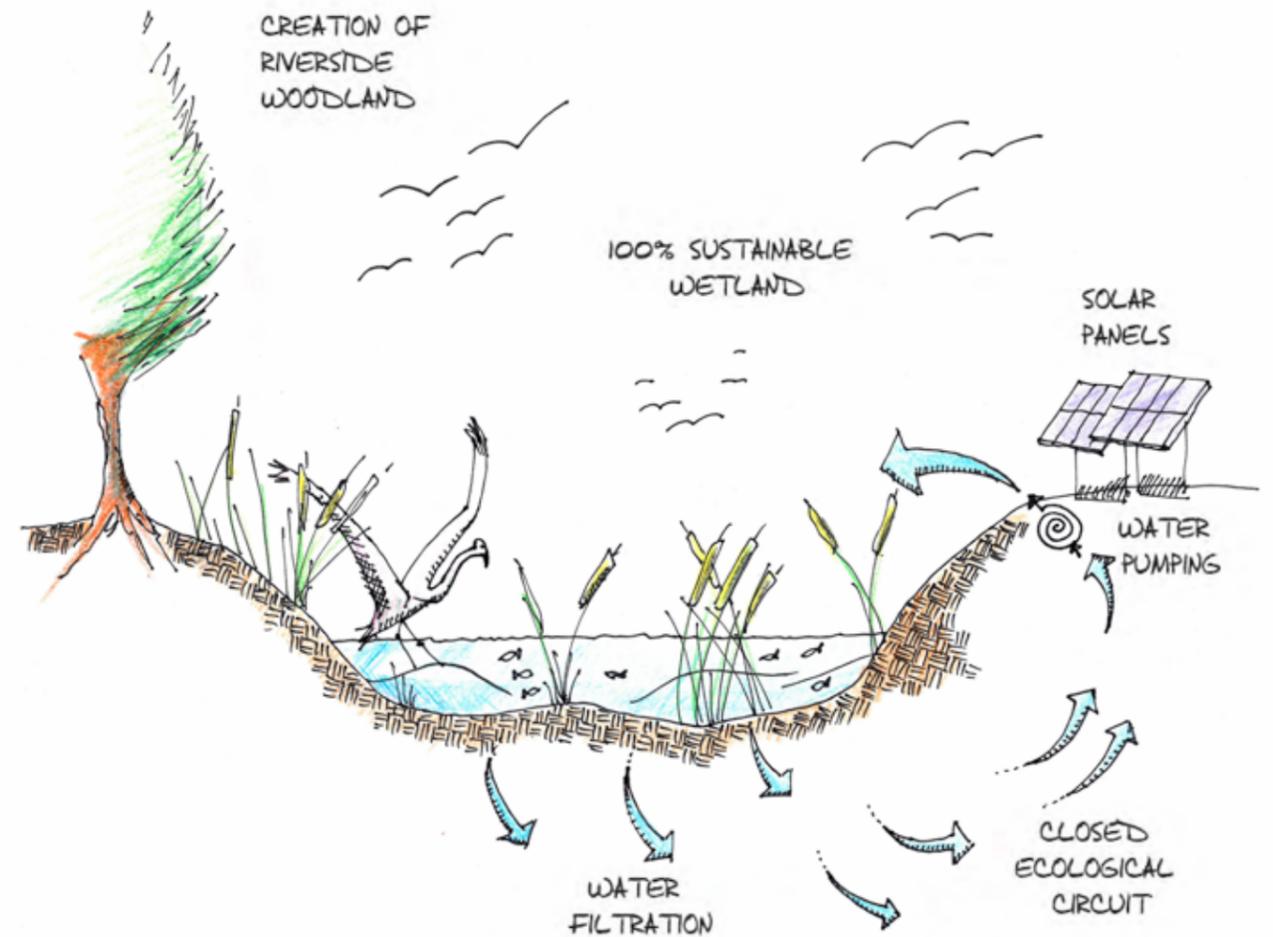
*angustifolia*) as this is the dominant native tree species on the streams in the area.

The wetland is intended to maintain a thin layer of water all year round. To achieve this, water is drawn from an existing well using solar panels, which supply energy to the extraction pump so that water is pumped while the panels are operating, which flows into the wetland.

This will guarantee the maintenance and availability of a permanent sheet of water in the wetland throughout the seasons, using only renewable energy. Additionally, part of the water discharged into the pool

will percolate down through lower strata and will reach the same aquifer from where it was extracted in time. Hence the wetland will not produce any kind of environmental impact in operation and maintenance, forming almost a closed ecological circuit.

### → Operation diagram of the wetland





→ **Good practices  
in biodiversity  
linked to ACCIONA's  
business**

From the rain forests of Canada to the deserts of Peru, through temperate forest or tropical jungles, ACCIONA has carried out widely varied biodiversity preservation actions involving a large number of species.

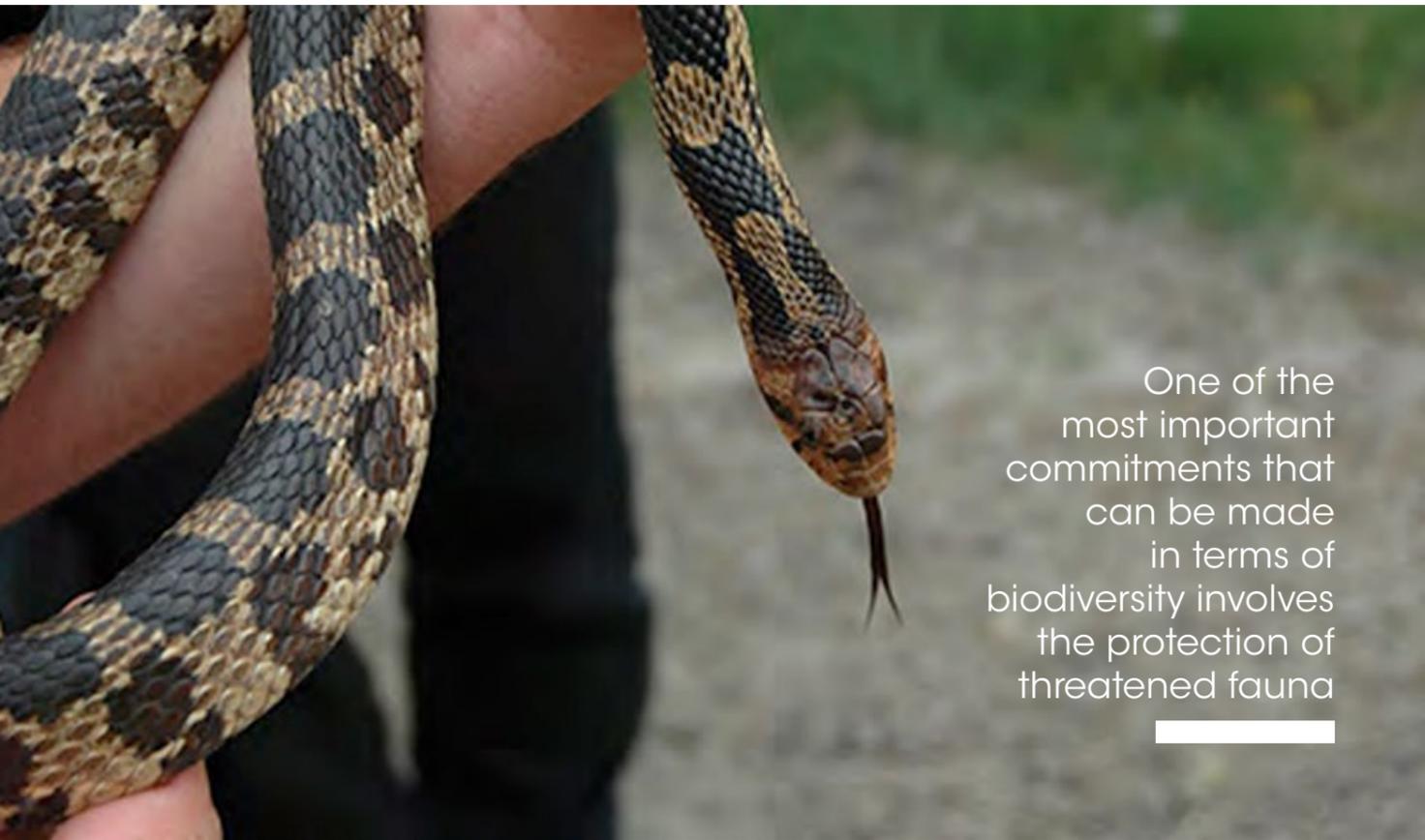
Next are detailed some of the most striking and interesting actions as well as the Company's commitment to protecting ecosystems and species.

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## WORKING TO BENEFIT THE FAUNA

Many of ACCIONA's projects around the world need to work with habitats where protected species live, or they are projects where special monitoring of some species is necessary to check their behaviour or their interaction with the environment or the project. Some of the work can be highlighted.





One of the most important commitments that can be made in terms of biodiversity involves the protection of threatened fauna



Specimens of the two species were also radio tagged to know their behaviour and to be able to monitor their biometric data

*Thamnophis butleri*

*Elaphe gloydi*



## Improving the habitat for protected ophidian in Ontario, Canada

**Improving the habitat for protected ophidian in The Rt. Hon. Herb Gray Parkway Project in Canada.**

*Elaphe gloydi* and *Thamnophis butleri* are two Canadian ophidian species that inhabit the areas around the Rt. Hon. Herb Gray Parkway project at Windsor (Canada) and are the species with which work has been carried out to support the expansion of

their habitat and develop monitoring and control measures.

An action protocol was established to prevent impacts on both species, from placing specific barriers to prevent them from passing into work areas, to establishing a rescue, capture and relocation system operated by experts in the subject and specialised personnel.



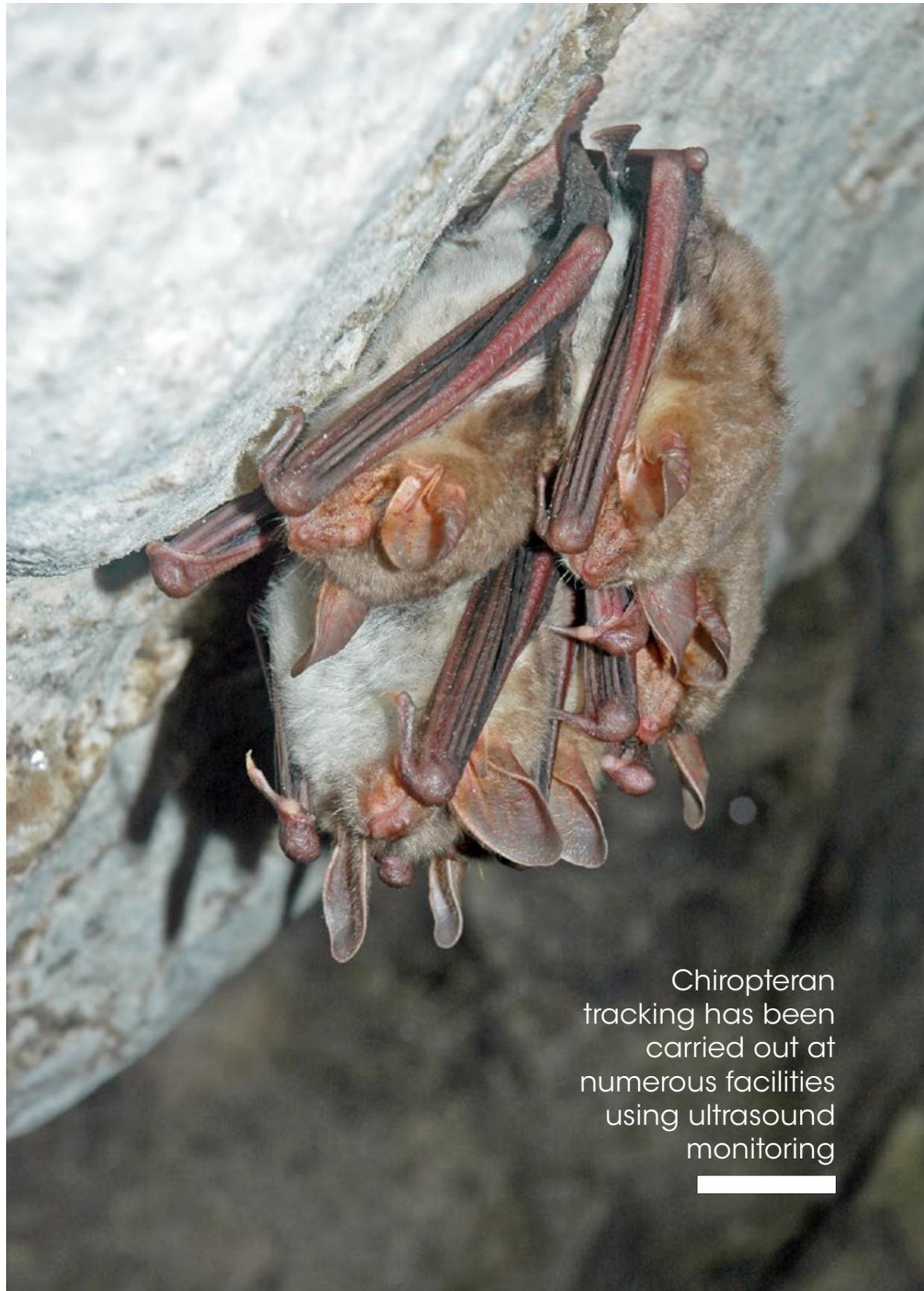
One of the most outstanding actions was the creation of hibernaculum for this type of threatened fauna.

These are structures capable of housing hundreds of specimens during the winter, where they spend the cold season in large groups. It is hoped that this intervention will have a significant positive impact on numbers of these species.

In addition, various forestry and population control actions were used to manage the wet prairie areas around the project where woodland vegetation was colonising the wet prairies, endangering numerous highly interesting animal and plant species. Controlled fires have been prescribed to reduce the woodland vegetation colonization. Some areas have

been replanted and restored and woodland invasion of these ecosystems are kept under control.

Rescue, capture and relocation system operated by experts in the subject and specialised personnel



*Rhinolophus hipposideros*

Chiropteran tracking has been carried out at numerous facilities using ultrasound monitoring



White-tailed eagles (*Haliaeetus albicilla*)

Environmental monitoring allows to know interesting data on the behaviour of these species



*Pipistrellus kuhlii*



Horseshoe bat (*Rhinolophus ferrumequinum*)



Eurasian eagle-owls (*Bubo bubo*)

## Monitoring birds of prey and chiropteran in wind farms

Especially interesting species are monitored within the environmental monitoring and surveillance measures for various wind power facilities. In this way, monitoring has been carried out in various facilities: chiropteran colonies in Croatia and Mexico, white-tailed eagles (*Haliaeetus albicilla*) in Poland and eurasian eagle-owls (*Bubo bubo*) in Spain.

This work seeks to gather precise information on the behaviour of these species as well as to propose improvement measures for the populations or to control impacts.

In the case of chiropteran, monitoring protocols are established using ultrasound to distinguish between the different species and monitor their nocturnal flight

patterns. In the case of eurasian eagle-owls (*Bubo bubo*) pairs on a spanish wind farm, the aim is to study the breeding success of the pairs settled in the facility itself.



Waterfowl and seabirds

## Protecting fish and bird habitats in the river Thames

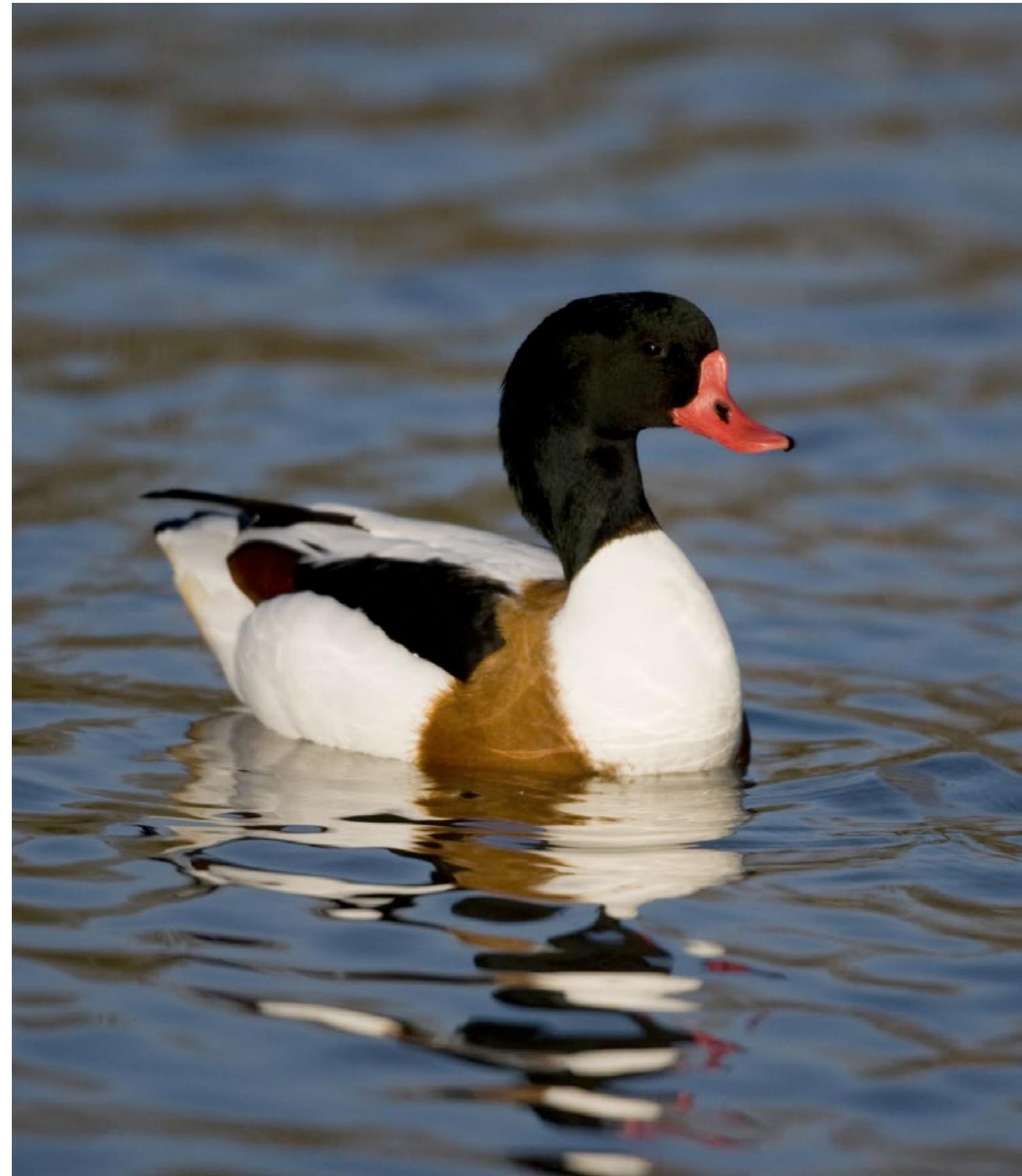
Fish and invertebrates are groups that usually go unnoticed in many works as their behaviour, habitat and size are not usually studied in as much depth as groups of birds or mammals.

During the construction of the Beckton desalination plant (London), work on the riverside was carried out on barges to avoid impacts on aquatic fauna, especially crustaceans and molluscs. Furthermore, methods were used in the

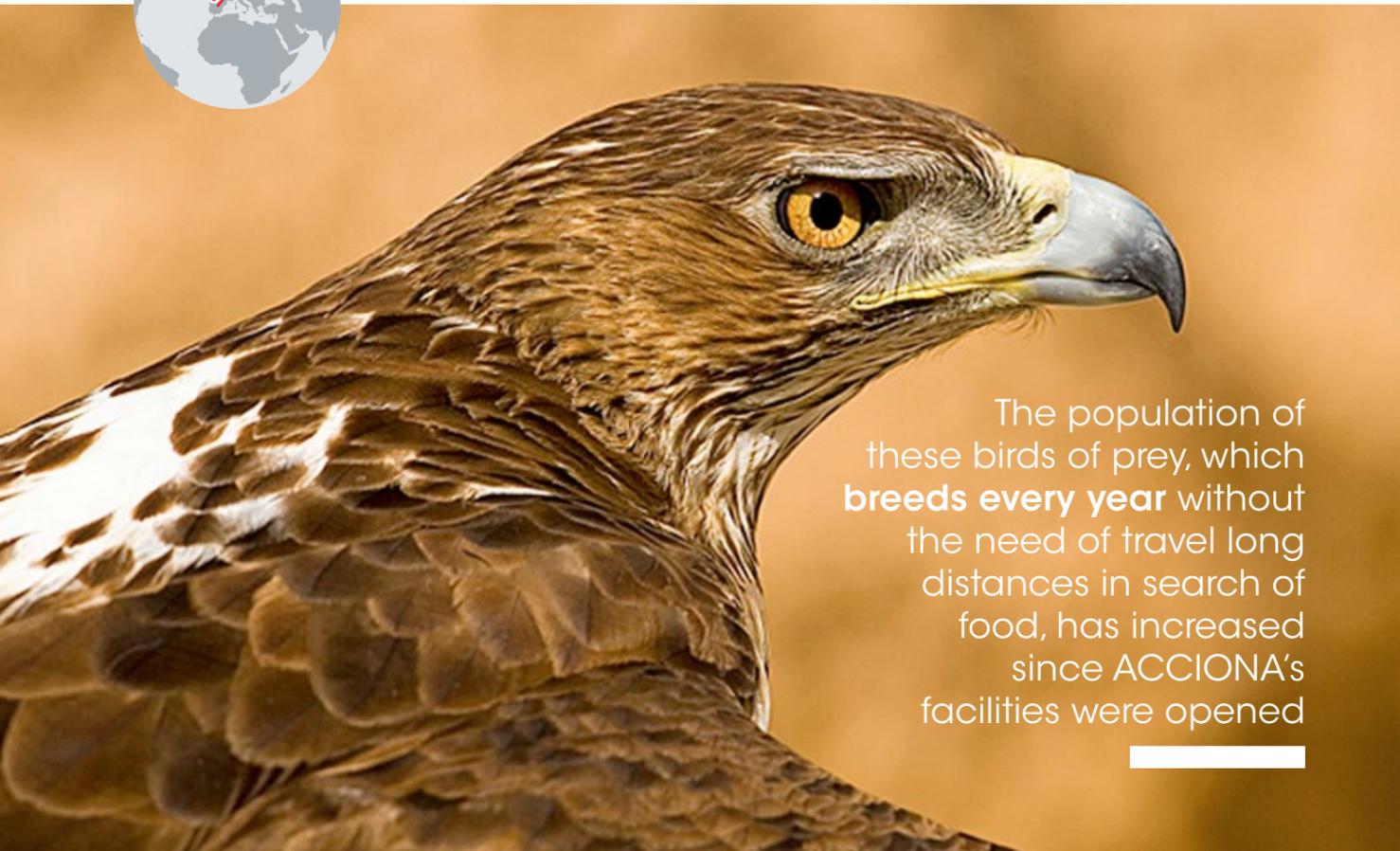
facility to protect aquatic fauna in the surroundings using grilles, audible alarms and countercurrent air sweeps of pipes. In this manner, the suction pipes act intermittently such that they only operate at low tide, mainly to protect marine fauna. Also, a 200 dB underwater sound barrier is created to form a special escape route for fish.

The desalination plant's surroundings are now extensively used by hundreds of

water birds of numerous species looking for food, mainly small fish, crustaceans and molluscs conserved using the impact prevention measures implemented during the construction.



ACCIONA has built and maintained two facilities aimed to provide supplementary food for a pair of this species and other birds of prey



The population of these birds of prey, which breeds every year without the need of travel long distances in search of food, has increased since ACCIONA's facilities were opened

Bonelli's eagle (*Aquila fasciata*)

## Improving the amount of preys for bonelli's eagles in Spain

Bonelli's eagle (*Aquila fasciata*) is one of the largest European bird of prey species most threatened. Among the environmental measures associated with wind powerplants, ACCIONA has built and maintained two facilities aimed to provide supplementary food for a pair of this

species and other birds of prey in order to improve their breeding success.

Each facility has numerous breeding pairs of pigeons which are subject to a breeding and release process to act as possible prey for these specimens. The pigeons undergo

worming and health checks to make sure they are in good health and can breed normally in this facility. These specimens are prey species for the various pairs of birds of prey inhabiting the surrounding area.

## Safeguarding montagu's harrier nests

### PROGRAMME TO SAFEGUARD THE NESTING OF MONTAGU'S HARRIERS (*Circus pygargus*) IN SPAIN.

Montagu's harriers basically raise their young in cereal crops, that's why one of the main problems they face now is the mechanised crop harvesting. In the warmest areas or in years with certain climate conditions, the combine harvesters consume their nests before the chicks have the ability to escape.

ACCIONA has carried out a programme to safeguard the nesting of this species at some sites in Cuenca, Spain. The work has allowed that numerous nests were saved

from destruction by combine harvesters. Over the 5 years of the project, 77 nests were spotted, so the overall balance was highly satisfactory. A total of 118 new specimens have flown, almost 24 specimens per year, which is a highly significant result for the population in the area.

Montagu's harrier chicks in their nest



**118 new specimens** have flown, almost 24 specimens per year, which is a highly significant result for the population in the area

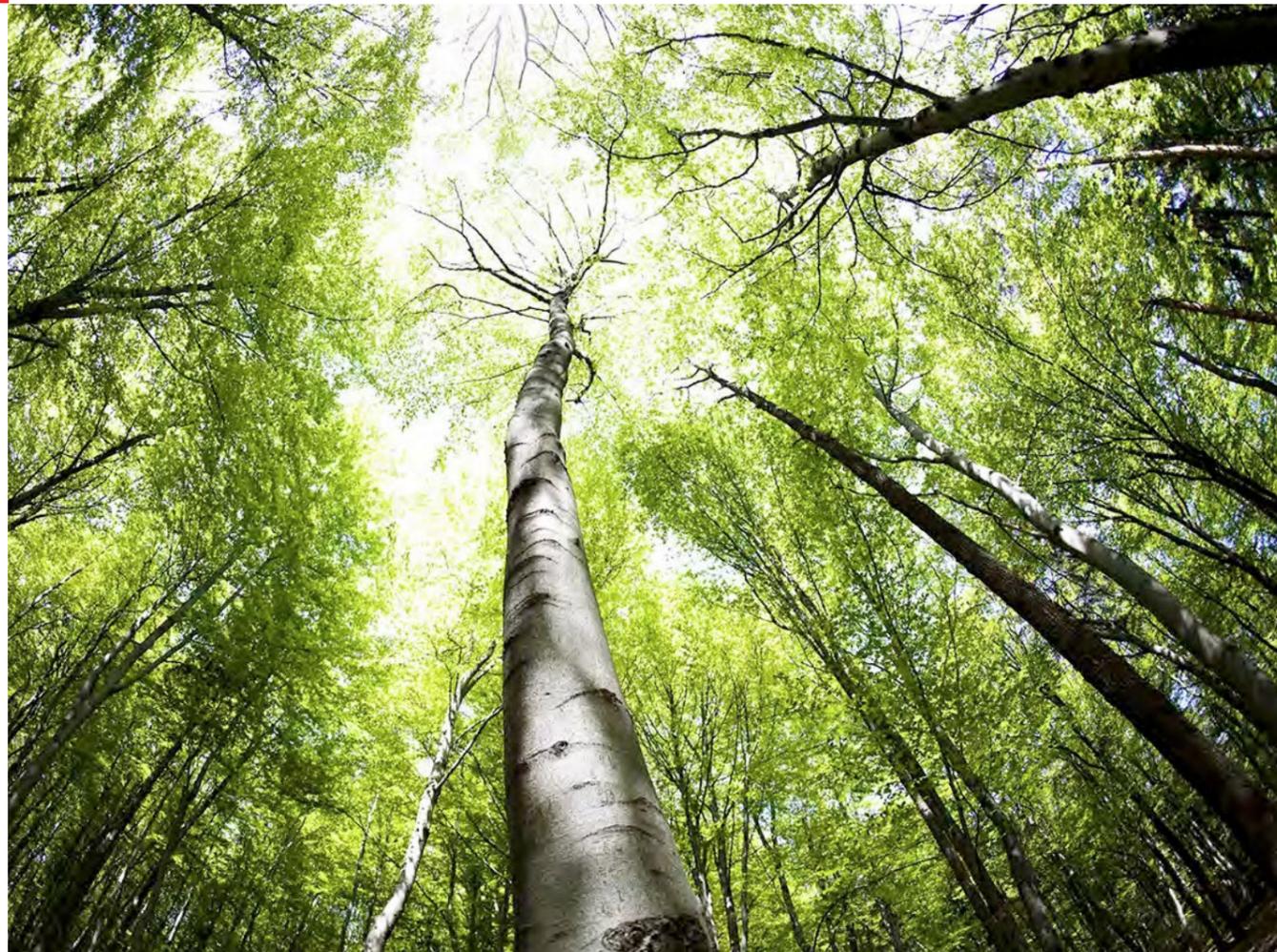
## WORKING WITH FLORA

Within ACCIONA's various projects worldwide, there are situations where working with flora is needed, by protecting or rescuing specimens or generating new populations. It has worked with numerous species and groups, and performing work ranging from classic collection and transplanting to the most innovative measures, such as reproducing of specimens or carrying out research into little-known species.



SPAIN

*Ferula latipinna*, vulnerable species whose populations were increased by the project



## Generating new populations of threatened species in a World Biosphere Reserve (UNESCO)

### ACTIONS AIMED AT CONSERVING AND IMPROVING BIODIVERSITY ON THE ISLAND OF LA PALMA, SPAIN.

The island of La Palma, UNESCO World Biosphere Reserve, stands out for its flora, as the Canary Islands are among the major botanic singularity territories on the planet. In order to build Los Sauces road, in which ACCIONA is involved, an environmental operation was carried out on the island with a threatened plant

species, *Ferula latipinna*, managing to reproduce it in a nursery for first time. This "ex situ", reproduction technique, pioneer for this species, made it possible to ensure the viability of growing this protected species in nurseries.

A volcanic cone which had previously been used as a dump was restored to house the nursery for *Ferula latipinna* and other native plants. The restoration of the cone allowed a pair of kestrels (*Falco*

*tinnunculus*), a species catalogued as of interest for Canary Island ecosystems, to take up residence and nest in a hollow of the inner wall of the cone itself.

A highly prized asset on the island has also been generated; old agricultural soil has been restored with surplus soil from the construction site.



CHILE



Several thousand new specimens of **Copihue** were planted, improving the species' population situation over the whole territory

Picture of the Copihue, Chile's national flower

## Working to preserve the Copihue, Chile's national flower

The plant called "Copihue" (*Lapageria rosea*), is a protected species declared Chile's "National Flower" since 1916.

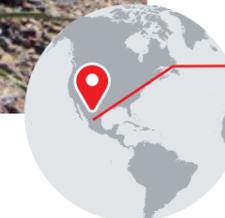
On improving and renovating the road called Route 160 in Chile, an inventory was made one by one of all the specimens of the species that could be affected by the works and, in order to offset the impact on the species, several thousand new specimens were planted, improving the species' population situation over the whole territory.

On the other hand, an innovative information campaign was implemented on the presence and characteristics of the Copihue at tolls on the new road, to raise people's awareness of the importance of conserving this protected plant.

As an additional measure, 47.5 hectares of native forest was planted in deforested areas in the Pedro del Río Zañartu Park, in the city of Concepción.



Plantation of the species



MEXICO

Desert cactaceae and succulent plants are species of high ecological value, being Mexico the zone with the greatest variety of these species on the planet

## Recovering and reproducing species from the desert in Mexico

In many works it's needed to occupy spaces inhabited by interesting species of flora. This was the case of the Atotonilco waste water treatment plant in Mexico, which is one of the world's biggest waste water plant and will provide wastewater treatment for 10.5 million inhabitants.

Associated with the works, a complete plan was developed for relocating specimens of species affected by the project site, many of them cactaceae of high environmental value. These species

were recovered and transferred using various techniques and spread around natural areas and landscaped zones. Additionally, some specimens were taken to a nursery created to house the rescued flora from spaces affected by the project. The objective of this was also to produce native flora, including cactaceae.

Workers from local communities were trained so that, at the end of the project, this nursery would become a production unit with all the necessary permits,

managed by the community. This will enable them to produce and market these species, which will permit an economic development for the zone and a new production business linked, in this case, to the environment and biodiversity.



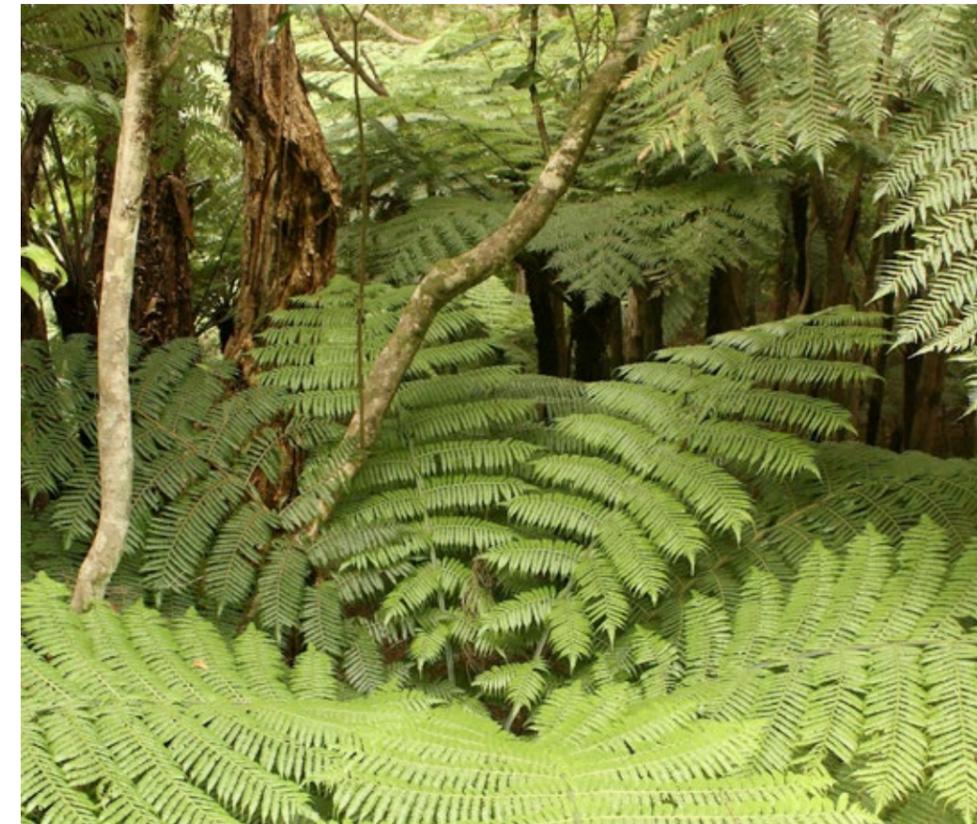
*Platanthera leucophaea*, species of the area



*Symphyotrichum praealtum* (aster), species used by Canadian indigenous tribes



ACCIONA has worked with **mosses and lichens**; species rarely benefited in conservation projects



## Recovering and reproducing protected species in Ontario, Canada

### PROGRAMME FOR THE CONTROL AND OVERSIGHT OF THREATENED SPECIES IN THE RT. HON. HERB GRAY PARKWAY PROJECT, CANADA.

American wet prairies are among Canada's most exceptional ecosystems. In this habitat, a mixture between a wetland zone and meadows, there are many native species of flora.

In the Rt. Hon. Herb Gray Parkway project in Ontario (Canada), a series of environmental measures were established in order to safeguard populations of the zone's threatened species and promote the reproduction of the most interesting

habitats of the wet prairies of this region of North America.

In those cases where occupying these habitats could not be avoided, new habitats were created in other areas as a restoration measure.

<http://www.hgparkway.ca/>

New areas of these plant communities were created with the aim of creating environments with the native characteristics of this ecosystem. Seed spreading, propagule collection and elements of vegetative reproduction were used, as well as the setting up

of a specific nursery for reproducing specimens.

Among other measures, the orchid *Liatris spicata* was collected, safeguarded and reproduced, generating a population of 70,000 specimens. Numerous species used by the native Indians in the area were recovered, including the Willowleaf aster (*Symphyotrichum praealtum*), by transplanting their vegetative structures and planting them later.

### TRANSPLANTING AND CONSERVING PLANT SIGNIFICANT SPECIES OF FLORA IN COLOMBIA.

There are groups of species that usually go unnoticed in environmental restoration projects. For example, ferns and epiphytic plants and groups of non-vascular plants; mosses and lichens, among others.

However, on the construction of the Cusiana Gas Pipeline in Colombia, corrective actions were performed for these types of species. Transplanting them presented a great technical challenge. Firstly, the plant species of greatest interest, which could be affected by the

route of the installation, were identified. In total, 200 tree fern (*Cyathea divergens*) specimens, 1,000 epiphytic plants (orchids and bromeliads) and multiple groups of non-vascular species (mosses and lichens) were registered and saved.

A protocol was developed for transferring specimens of tree ferns up to 4 metres tall, which were subject to different transplanting techniques. These specimens were relocated in areas depending on each species' needs. After planting them, maintenance tasks were performed, helping to achieve a survival rate of nearly 100%.

Work was also performed with other high environmental value species, such as orchids and bromeliads. A complex transfer procedure was developed to save them, involving moving their entire root structures and implanting them in their new homes, on trunks or in spaces prepared for the purpose.

# RESTORING AND CARING FOR ECOSYSTEMS

In some settings and with some kinds of projects it is necessary to carry out ecosystem restoration work or create new habitats to support the biodiversity of a whole area. ACCIONA has worked in various geographical settings to restore new habitats to reflect the natural make up of these ecosystems.



CANADA



Wetlands in the work area



## Recovering and creating new wetlands in Alberta, Canada

### WETLAND AREAS ARE AMONG THE MOST BIODIVERSE ECOSYSTEMS IN THE WORLD.

As they are migratory stopover areas, they become very valuable spaces and need to be preserved. In executing the Stoney Trail Ring Road project in Alberta (Canada), several actions have been carried out aimed at mitigating and offsetting impacts that the work generates on habitats in the area, especially wetlands. One hundred and twenty hectares of

new wetlands and natural meadows were created.

In the case of wetlands, a specific treatment was carried out to eliminate any type of contamination that may be found in the substratum before flooding (contamination caused by pesticides and other agricultural substances).

To recreate the original ecosystem of natural prairies, the aim has been to recreate this habitat with flora such as

exists prior to agriculture being introduced into the area, using native species of flora from the area.

These new zones provide habitat and food to migratory birds and native fauna from the area.



ACCIONA reconstructed the natural network of wetlands and peat bogs with regeneration of plant species

Drosera specimens are among those to have gained most from the project



Vineyards

The management system for the three vineyards of the Bodegas Palacio, takes full account of all types of measures linked to preserving the natural environment and the use of sustainable, non-polluting growing techniques



Regenerative pool for wild fauna

## Restoring peat bogs and creating new wetlands in Spain

Peat bogs are a type of wetland that fulfil valuable environmental functions and are of high value for biodiversity. However, they have been subject to numerous disturbances that have affected their state of conservation, above all in the mountainous areas in southern Europe where authentic ones are rare.

Within one of ACCIONA's projects, action

was taken on peat bog and wetland areas in the province of Burgos, restoring them to recover these exceptional habitats.

Work was carried out to make a pool, recovering an old area open to flooding, to recover a significant area of peat bogs and make other pools along the river Úrbel as a system for containing flood waters and recovering an old dump area around

Úrbel del Castillo.

Restoring the peat bogs returned the original water flow to the area, flooding the surface with a sheet of water a few millimetres deep and so regenerating plant communities, especially of *Drosera rotundifolia* y *Drosera intermedia*, two small protected carnivorous plants.

## Combining wine production and biodiversity conservation

Worth highlighting within the environmental actions in these vineyards, the conservation and fostering of natural habitats in areas not set aside for growing vines.

The plots between each vineyard recovers and preserves the natural vegetation development, such as mediterranean forest, and bush and, in general, any other

native tree or bush species that may be of interest.

In the plantations, both the natural environment and the buildings are inhabited by a large number of species, such as barn owls, buzzards, little owls, kites, various species of passerine birds, bats, etc. All nests are left alone, ensuring that they are not damaged and hunting is

SPAIN



prohibited to prevent disturbances.

Regarding cultivation and land management techniques, it stands out the use of biological methods for pest control and actions of conservation and restoration of soils.

# FIGHTING AGAINST INVASIVE SPECIES

Some species can cause serious environmental problems when they extend beyond their natural area of distribution. Invasive species are now a serious environmental and economic problem in many parts of the world. In some ACCIONA projects the need arises to control and to stop the expansion of these species and implement measures to prevent their proliferation.



The campaign began in April 2013 with quarterly edition of local environmental and social issues

AUSTRALIA



Lantana



Mother of millions



Groundsel bush

## Pest control and invasive species in Australia

An environmental awareness program called BEST (Building Environmental Sustainability Together) was developed in order to train employees and contractors on the environmental aspects of projects implemented in Australia. These activities were launched under the slogan "BEST commitment of all".

One of the main environmental aspects of the work in the Australian continent is the control of pests and invasive species, the management of which is crucial. To this purpose a full action protocol for invasive species was developed within the

Environmental Management Plans, for the ACCIONA's works on the Australian continent.

Among these initiatives are highlighted:

- Protocol to avoid the arrival of adult specimens to the areas comprised within the project.
- In-depth monitoring of the arrival of seeds or any vegetation structure to the work site, to which purpose a battery of preventive and control measures are implemented.

- Certificates of absence of seeds.
- Activities to mechanically eliminate any presence of specimens of these plagues in the entire area, whether seeds, rhizomes or adult plants.
- Activities regarding animal specimens, among others the dangerous fire ants that have caused devastating environmental damage throughout southern Australia.

The **zebra mussel** is an invasive foreign species, which proliferation is generating severe environmental, social and economic problems



*Dreissena polymorpha*

## Controlling the zebra mussel invasion in Spain



The zebra mussel is an invasive foreign species, which proliferation is generating severe environmental, social and economic problems as it blocks numerous water facilities of all kinds. It also affects aquatic fauna as it occupies beds and flooded areas, asphyxiating native species.

Its great capacity for resistance and reproduction means it is difficult to

eliminate, in most cases turning to the use of chemical products with the consequent environmental damage to water quality.

ACCIONA has participated in the construction of a system to avoid the entry of the zebra mussel into the irrigation network of a large housing development that draws water from the Canal Imperial de Aragón in Zaragoza.

This facility consists of a sophisticated system of large capacity filters, the effectiveness of which has been shown. The great advantage is that the process is entirely physical, avoiding the use of any chemical products.

## Controlling invasive species at Mundaring, Australia

Nature throughout Oceania is seriously affected by invasions of non-native species, so great efforts were made to control this aspect in works that ACCIONA carried out at Mundaring (Australia).

One of the aspects controlled is the expansion of the oomycete *Phytophthora cinnamomi*, which has seriously affected woodlands in the project area, with very

negative effects on the natural vegetation. This mould is included in the list of 100 of the world's worst invasive alien species by the International Union for Conservation of Nature (IUCN).

A complete protocol was also prepared on the delivery and use of pine wood, as the *Hylotrupes bajulus* beetle, a pest that affects pine and structural and building wood, has been detected in the area. This

The impacts on forests and wood of various invasive species is an important problem in Australia



*Hylotrupes bajulus*



*Larva de Hylotrupes bajulus*

was found in Western Australia for the first time in 2004. It has continued its spread through the county of Perth since that time.

To prevent its propagation throughout the work area, studies were prepared on its presence in the zone, with detailed mapping, and on the necessary control measures to prevent its arrival due to works activities.



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