LAKE FOURCADE NATURE TRAIL

Having been purchased by the municipality of Saint-Nexans in 2019, the objective for the site of Lake Fourcade is for it to be a **haven of biodiversity**. Walk the trail between the l**ake, stream, channel, wetland** and **bocage** (mixed woodland and pasture) and discover the biodiversity that surrounds you with the help of the **information panels** alongside the path.

We hope you enjoy your walk!

THE ROUTE

DURATION OF TRAIL : 1h 30 - distance 2 km

Wetlands are highly biodiverse areas with rare and protected plants and animals.
Please follow certain precautions during your walk.

Regulated

In case of rain

POINTS OF INTEREST

1. Bocage
2. Wild animals
3. The Conne
   Water course management
   Riparian and alluvial forest
4. Invertebrates
   Aquatic insects
5. Invasive exotic species
   Amphibians
6. Fish
   Aquatic habitats
7. Rock features
8. Birds
   Bats
9. Microorganisms
10. Channel and mill
    Pond management
11. Wetlands
    Differentiated management
    Noteworthy species

COMMUNITY INVOLVMENT

The municipality of Saint-Nexans is committed to **sustainably managing** Lake Fourcade. Development and maintenance is undertaken here by **observing nature** and its rhythm, its evolution and its needs.
To leave more room for **biodiversity**, only the paths are regularly mown. The other areas (hedges, copses, grassland, etc.) are only subject to interventions in winter in order to **maintain open spaces** whilst limiting the impact on the flora and fauna.

What are the advantages of differentiated management ?

- **Energy and time savings: fewer machines and heat-emitting tools operating**
- Fewer CO_2 emissions (greenhouse gases)
- **Creation and maintenance of more numerous habitats, and thus greater biodiversity (e.g.: dead trees preserved)**
- Work carried out at appropriate times of the year (late mowing of grassland)
- **More peace and quiet for animal species to accomplish their life cycle (birth, growth, metamorphosis, reproduction, etc.)**
- Opportunity for plants to reach maturity (flowering and production of fruit/seeds)

Design : Bureau d'Études Au Fil du Temps

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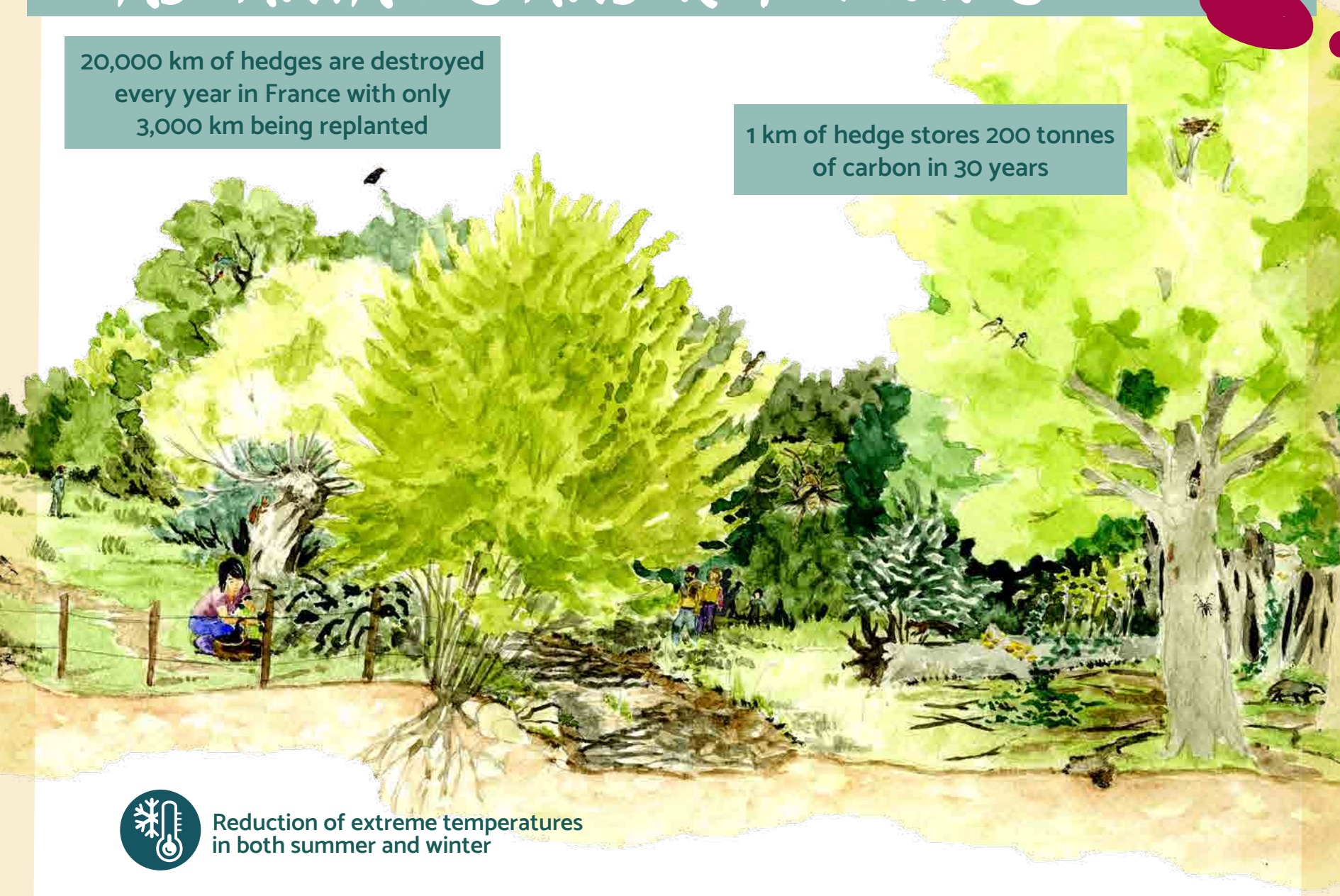
BOCAGE
(MIXED WOODLANDS AND PASTURE)

Bocage is the **belt of vegetation** made up of trees and shrubs surrounding grassland or cultivated fields. Where previously it was very common, the **mechanisation** of agriculture and the enlargement of plots of land have destroyed this network that is still **essential** for the "**auxiliary**" species that are so important for farming (earthworms, bees, ladybirds, bats, hedgehogs, hawks, etc.).

ADVANTAGES AND KEY FIGURES

20,000 km of hedges are destroyed every year in France with only 3,000 km being replanted

1 km of hedge stores 200 tonnes of carbon in 30 years



- Reduction of extreme temperatures in both summer and winter
- Cleansing of agricultural inputs
- Source of food for animals (leaves, berries, seeds, etc.)
- Source of nectar and pollen for pollinators (bees, butterflies, etc.)
- Combating of soil erosion: wind-break effect and limiting of run-off
- Storage of carbon
- Movement zone for numerous species - ecological corridor

COMMUNITY INVOLVMENT

The municipality has committed to implementing **balanced management of the bocage** in the Conne valley by maintaining the existing hedges and **encouraging the establishment** of new ones. The preferred species are **small fruiting plants** which represent an important source of food for the animal life here and notably for the **birds**.

Some species that make up the hedges :

COMMON DOGWOOD
Cornus sanguinea

BLACKTHORN
Prunus spinosa

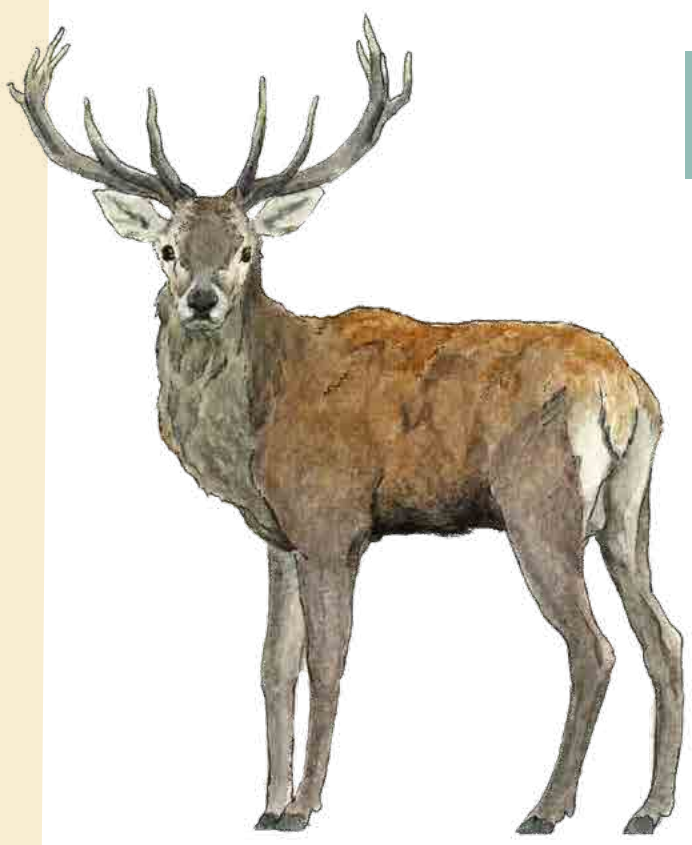
DOG ROSE
Rosa canina

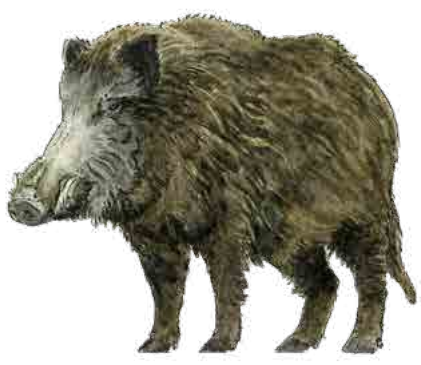
WILD ANIMALS

Wild animals are able to flourish here thanks to the efforts of the community to **preserve and develop their habitats**. If you are quiet, perhaps you will have the opportunity to see a **mammal** drinking. Alternatively, look carefully at the ground; you are sure to be able to identify some **evidence of animals moving around** !

MAMMALS AND THEIR FOOTPRINTS

Find the matching footprint for each mammal:

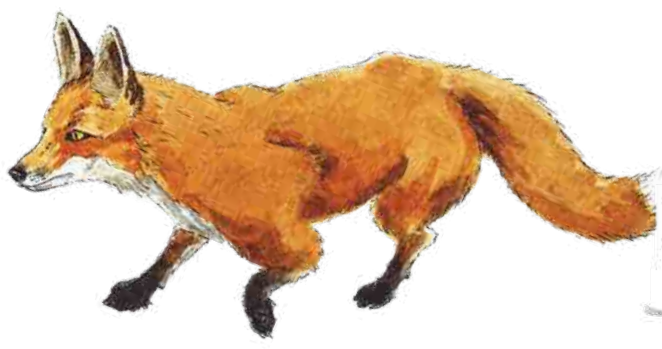




1. **RED DEER** *Cervus elaphus*

2. **WILD BOAR** *Sus scrofa*

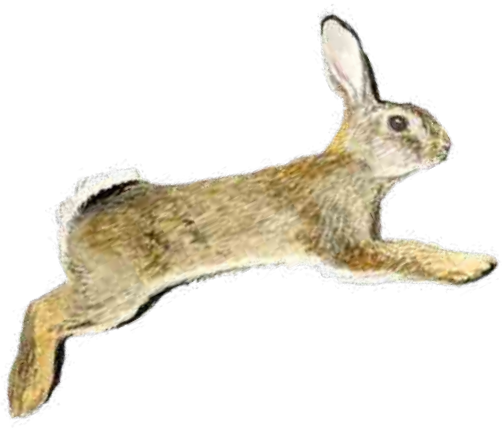
3. **ROE DEER** *Capreolus capreolus*



4. **EUROPEAN BADGER** *Meles meles*

5. **RED FOX** *Vulpes vulpes*

6. **PINE MARTEN** *Martes martes*



7. **EUROPEAN HARE** *Lepus europaeus*

8. **EUROPEAN RABBIT** *Oryctolagus cuniculus*

9. **RED SQUIRREL** *Sciurus vulgaris*

A. 

B. 

C. 

D. 

E. 

F. 

G. 

H. 

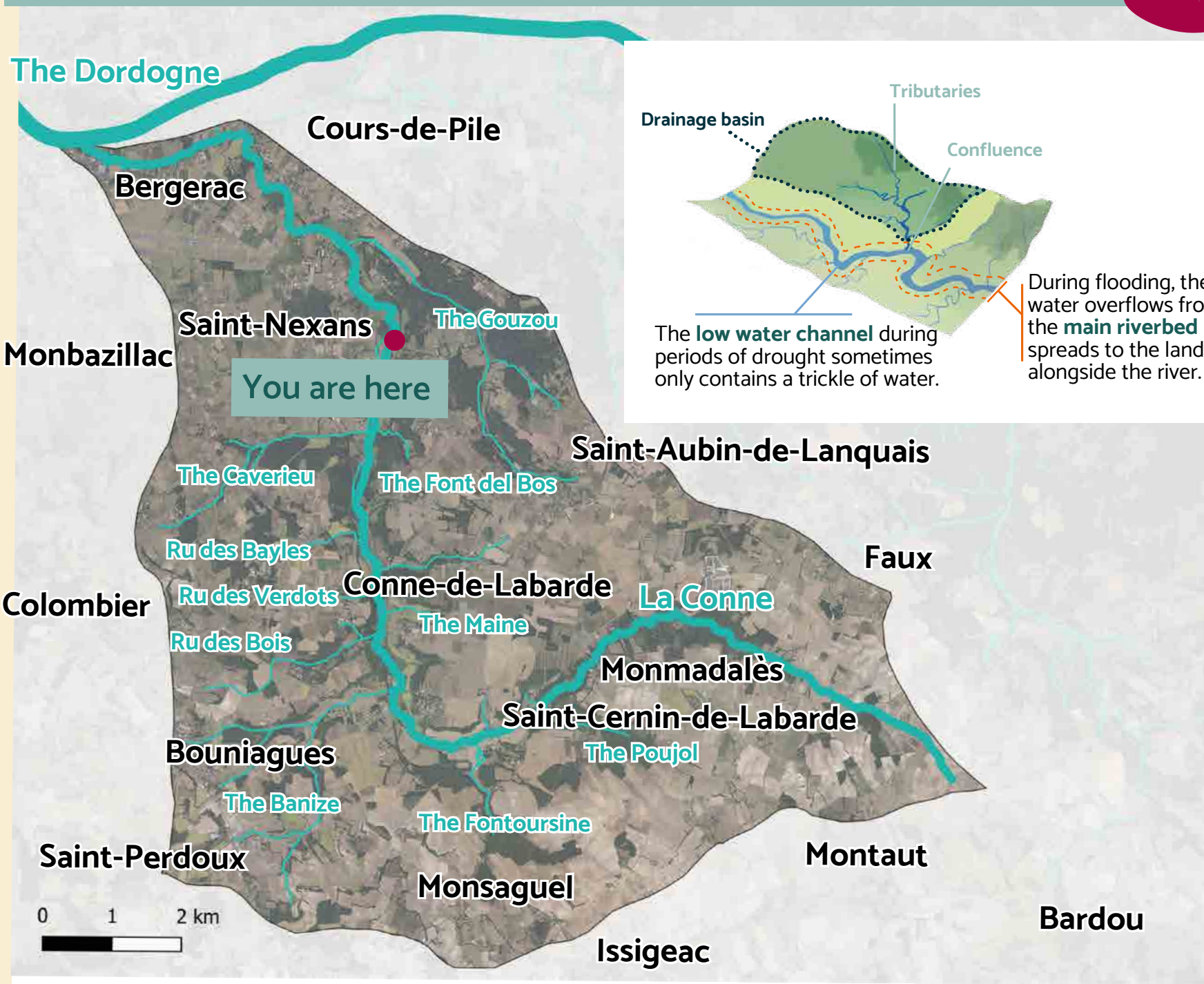
I. 

Answers : 1-G ; 2-I ; 3-C ; 4-A ; 5-F ; 6-E ; 7-H ; 8-B ; 9D

THE CONNE

The Conne rises between the communes of Faux and Montaut at **123 metres** above sea level. At **24 km** long, the Conne flows into the Dordogne at Bergerac.
A stream or a river is part of a "**drainage basin**". It forms a **network** with other water courses and crosses an **area** characterised by its inhabitants, its history, its geology and its climate, etc.

THE DRAINAGE BASIN



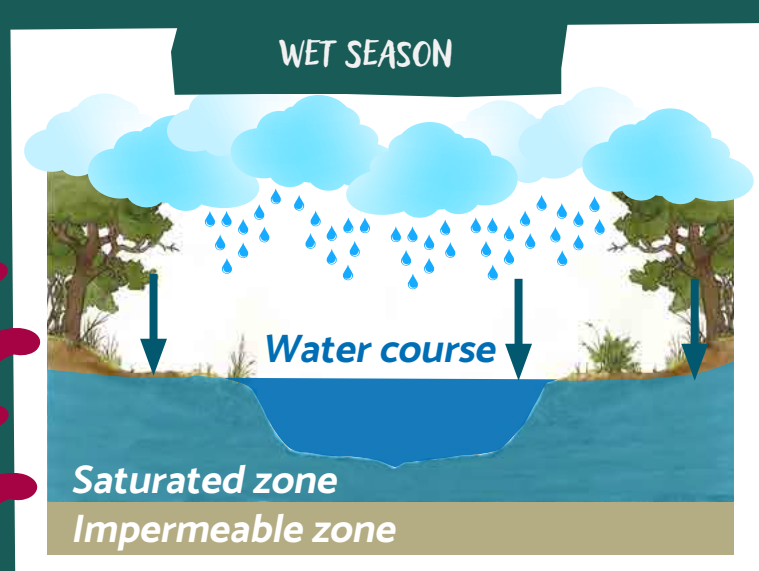
The drainage basin of a water course is the **area drained by a river and its tributaries**. All of the water that falls on and circulates in this area converges towards a common outlet. Taking the drainage basin into account is paramount when it comes to **managing the quality and quantity** of water, because many different stakeholders can have an impact or be impacted throughout the area.

The drainage basin of the Conne covers an area of **86 km²** for a total linear length of the water course of **64.3 km** (the Conne and its tributaries). It is part of a larger drainage basin - that of the **Dordogne**.

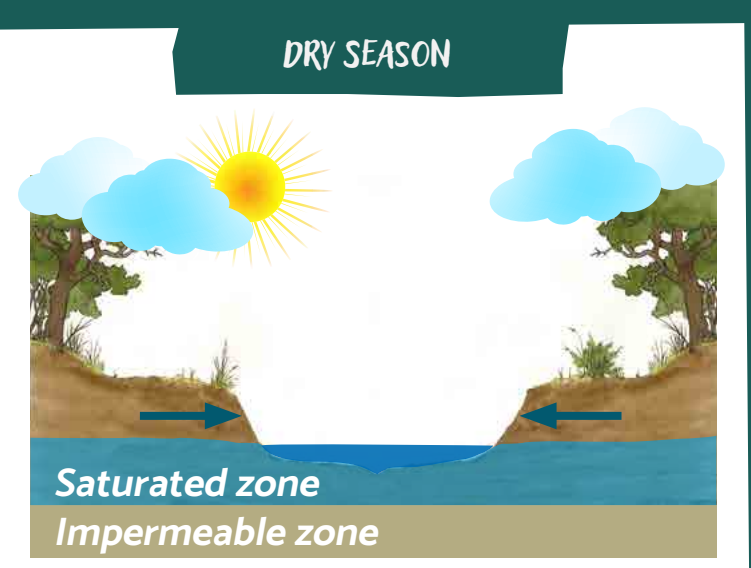
WHAT IS GROUNDWATER ?

Groundwater is **water that circulates** at varying speeds and depths between the granules that make up **the soil** (sand, earth, pebbles, etc.).
Depending on the season, the groundwater **absorbs or returns** water from or to the water courses. This mechanism is disrupted when man interferes with or moves the stream beds. This can exacerbate droughts and/or floods.

Groundwater and water course depending on the season



Replenishment of groundwater during rainfall

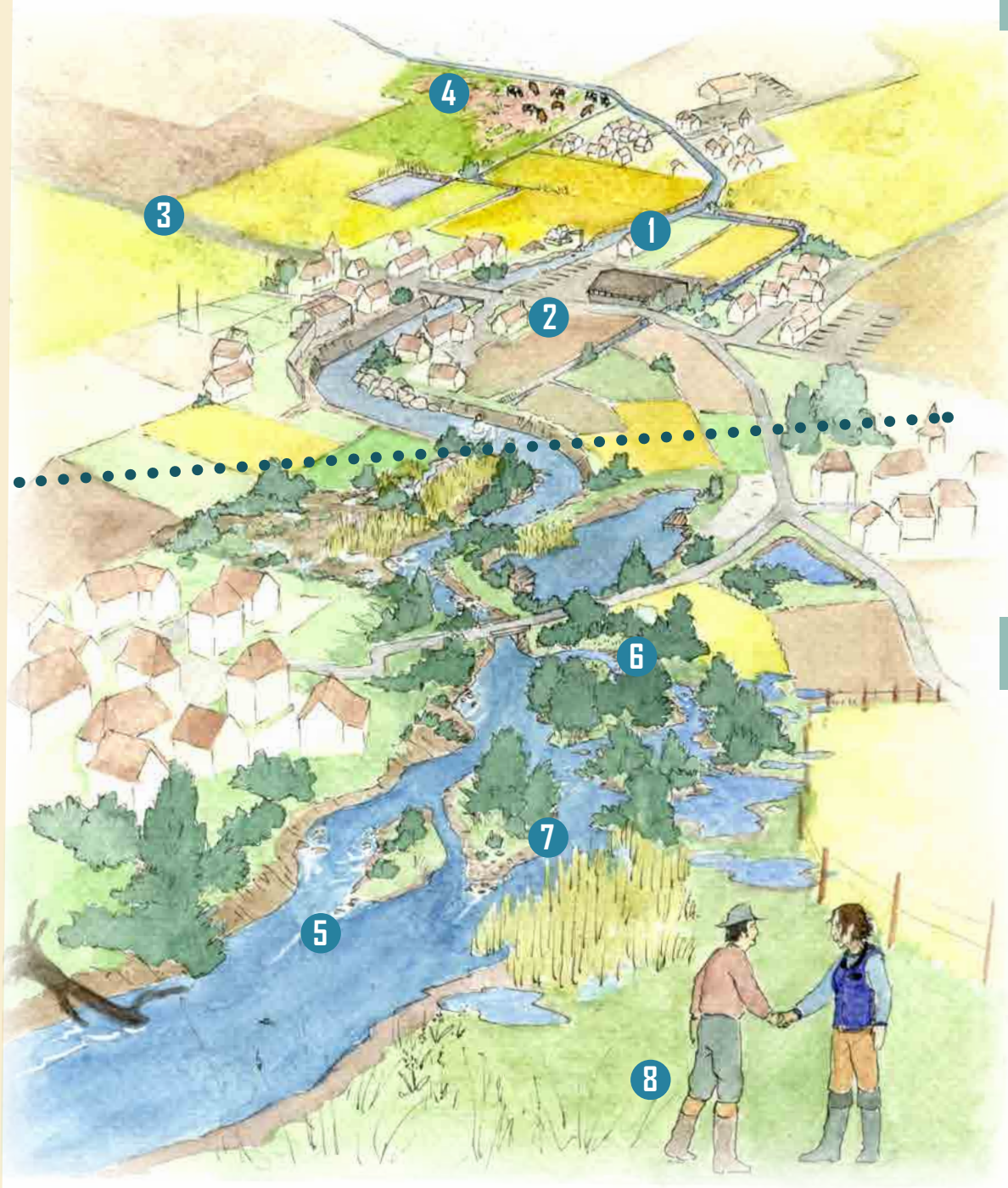


Returning of water from the groundwater to the water course

WATER COURSE MANAGEMENT

The management of aquatic areas and the prevention of flooding (**GEMAPI**), which falls under the responsibility of the Agglomeration Community of Bergerac (CAB), aims to restore the **functioning** of the rivers to their **natural state**, to limit flooding, to safeguard the local population and to **improve water quality and quantity**. This is done in **collaboration** with landowners and users.

MANAGEMENT EVOLUTION



Bad practices

1. Destruction of wetlands, straightening and artificial disruption of water courses to create arable land or land for construction
2. Extension of urbanised areas and rendering the ground impermeable
3. Intensification of crops, destruction of copses and woody hedges
4. Elimination of riparian woodland and trampling of the river bed by cattle

Good practices

5. Maintaining the water courses in the valley bottom and accepting their winding paths
6. Preservation and management of wetlands encouraging overflow on to undeveloped land
7. Maintenance and upkeep of diverse riverside vegetation that is suited to wetlands
8. Collaboration between public environmental management bodies, local elected representatives, residents and users to encourage best practice

For more information, you can download the **residents' guide** on the CAB website.

THE OTTER

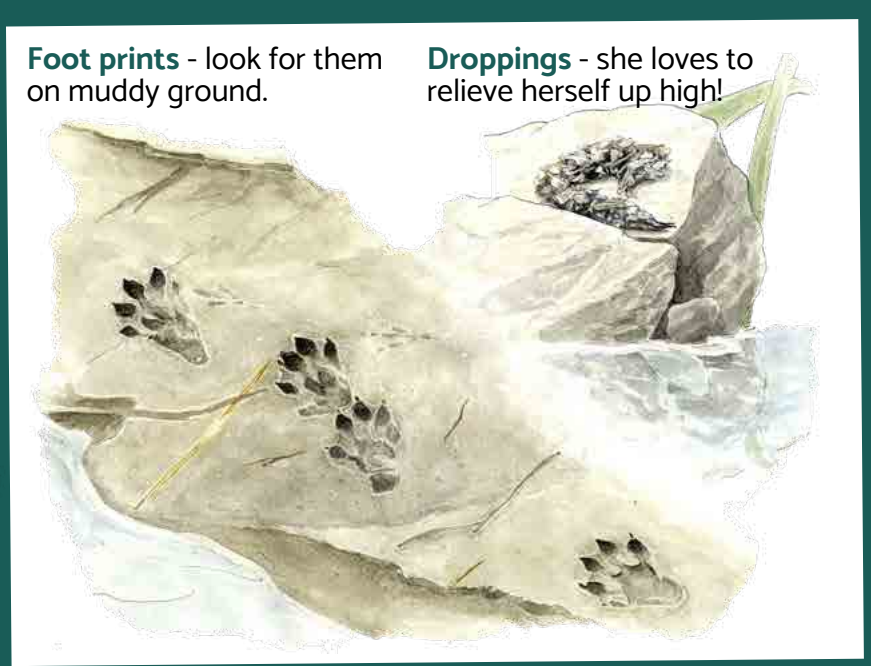
The otter is an **emblematic species** of the Conne drainage basin. It had almost completely disappeared due to the **decline in its living environment** and being hunted for its pelt. It is rarely seen but is certainly present.
Try to find its tracks around Lake Fourcade!

The traces left by the otter

EURASIAN OTTER
Lutra lutra

Foot prints - look for them on muddy ground.

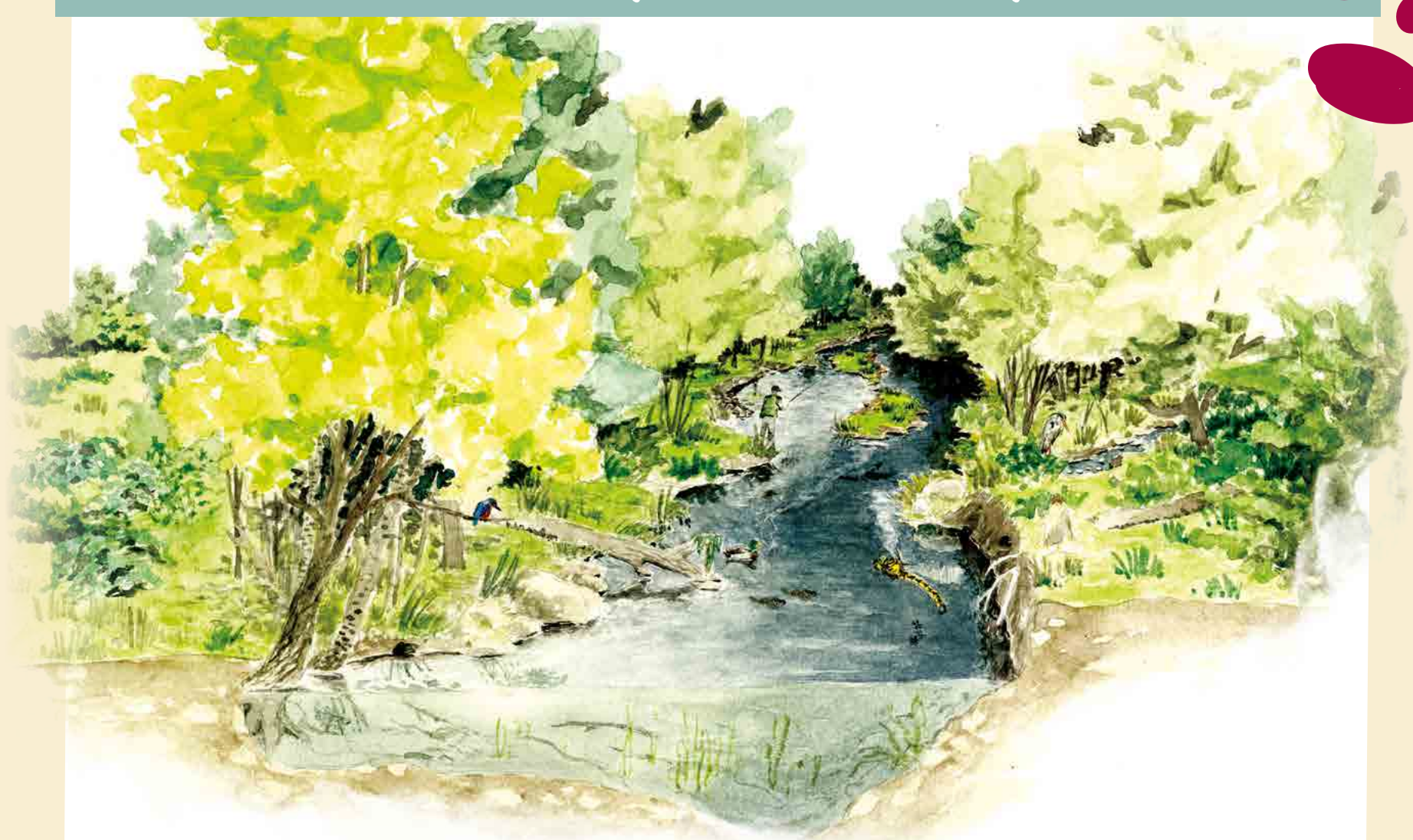
Droppings - she loves to relieve herself up high!



RIPARIAN FOREST AND ALLUVIAL FOREST

The **vegetative growth on the riverbanks** or "**riparian woodland**" ensures the proper ecological functioning of water courses. It should be **diverse** and made up of **local species** suited to wetlands.

FUNCTIONS AND SERVICES PERFORMED



- Preserving the freshness of the water
- Combating riverbank erosion
- Purification of the water by the vegetation
- Transition area between the aquatic and terrestrial environments
- Feeding zone for numerous species
- Area through which numerous species pass
- Production of lumber and firewood
- Combating diffuse pollution

COMMUNITY INVOLVMENT

The **diversity of natural habitats** directly influences the **diversity of the species** that flourish there.
The municipality therefore has committed itself to a **differentiated management** approach to the area around the Conne to encourage the **establishment of diverse vegetation** of varying sizes: grasses, shrubs, trees, dead wood, woody debris, aquatic plants, etc.

Which species are growing alongside the water?

COMMON ELDER
Sambucus nigra

ASH
Fraxinus excelsior

BLACK ALDER
Alnus glutinosa

FISH

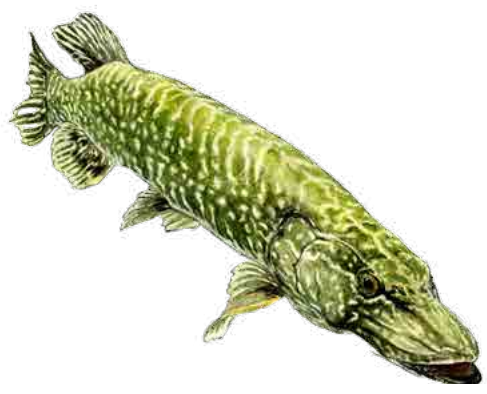
The presence of **running water** from the Conne and **standing water** in Lake Fourcade supports a large variety of **species of fish** in a small area. The drainage basin of the Conne is classified as being **category 2 for fish** (predominance of minnows and carps). Among all of these fish, some have been **introduced**. They cohabit with the local species but can also be **predators** or **competitors**.

VARIED SPECIES

Carnivores

EUROPEAN PERCH
Perca fluviatilis

Origin: Europe



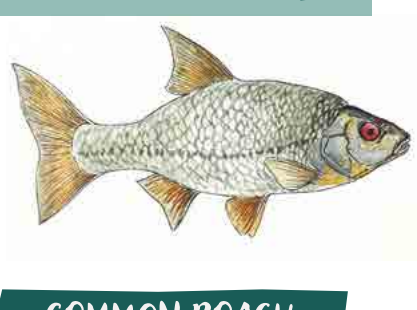
NORTHERN PIKE
Esox lucius

Origin: Europe

LARGEMOUTH BLACK-BASS
Micropterus salmoides

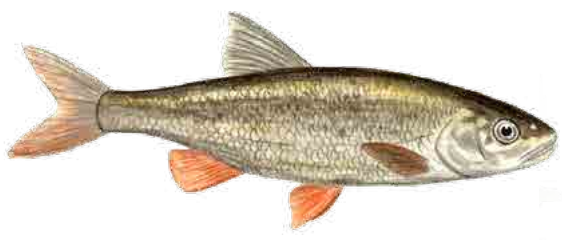
Origin: North America

Minnows and carps



COMMON ROACH
Rutilus rutilus

Origin: Europe



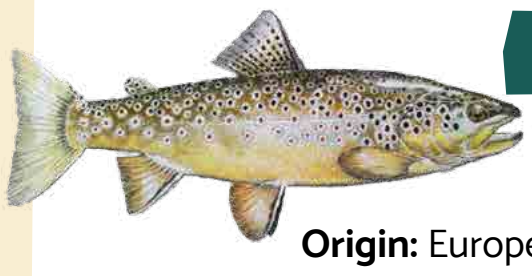
COMMON CHUB
Squalius cephalus

Origin: Europe and Asia

COMMON CARP
Cyprinus carpio

Origin: China

An at-risk salmonid

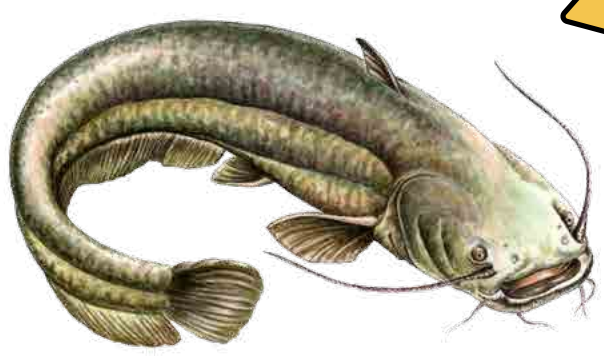


BROWN TROUT
Salmo trutta

Origin: Europe

The brown trout is at **risk of extinction** in the Dordogne. A species that prefers **fresh, flowing and oxygenated** water, it has seen its environment changed by human activity and **climate change**.

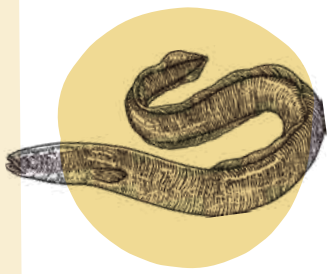
An interloper in the drainage basin



WELS CATFISH
Silurus glanis

Origin: Eastern Europe

EEL



The eel is a **migratory fish**, which used to be found in abundance.
It is at **critical risk of extinction** today for the same reasons as the trout with, in addition, the phenomenon of overfishing of its fry: the **elver**, also known as the "**glass eel**". **The eel grows up in rivers and reproduces at sea**, unlike other migratory fish (shad, salmon, etc.) which return to rivers to reproduce.

The life cycle of the eel

The **yellow eel** is the young eel that comes from the sea to develop in fresh water. At the age of between 12 and 15 years for the female (5 to 8 years for the male), it turns **silver** and returns to the sea to reproduce off the coast of the United States.

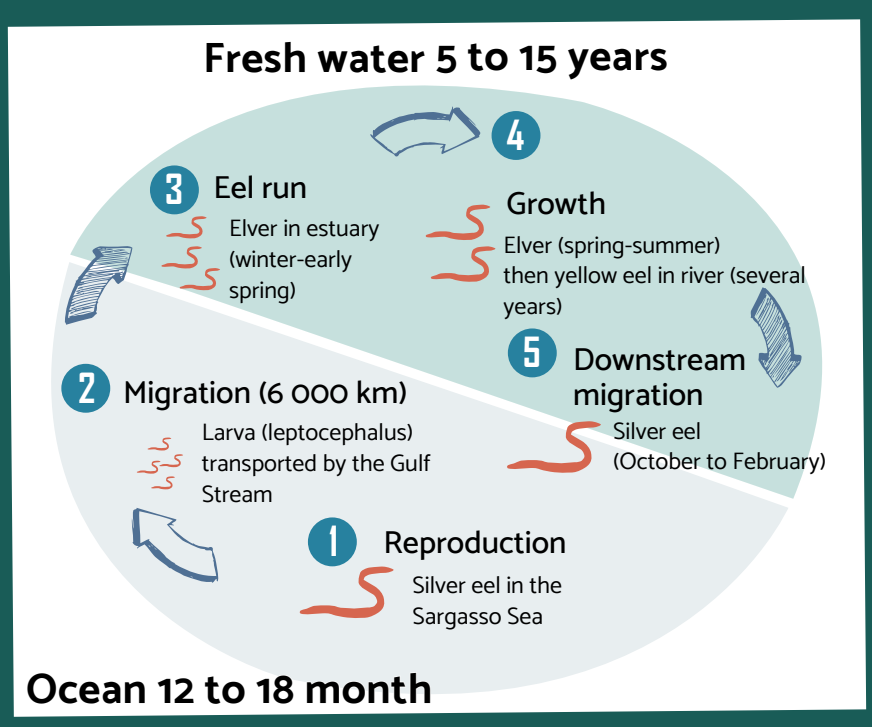
Yellow eel

Fishing permitted but controlled

Silver eel

Fishing forbidden

EUROPEAN EEL
Anguilla anguilla



AMPHIBIANS

Amphibians are capable of living in **an array of environments** depending on their stage of development. For the most part, the lake is where they **reproduce and lay their eggs**. These protected species are threatened by **human pressures** on **wetland areas** and by **water quality** degradation.

OBSERVABLE SPECIES

Anurans

COMMON MIDWIFE TOAD
Alytes obstetricans

COMMON FROG
Rana temporaria

EUROPEAN TREE FROG
Hyla arborea

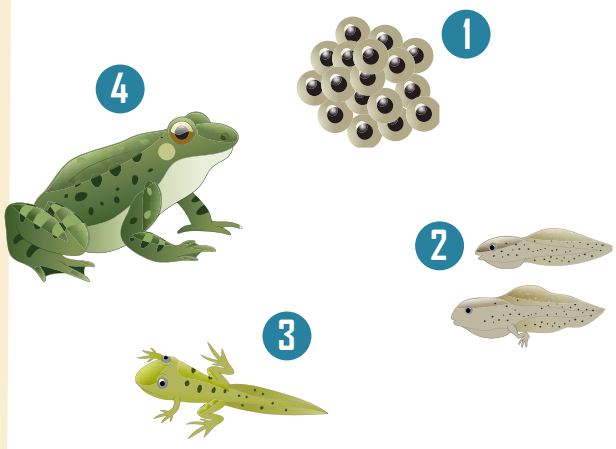
Urodeles

MARBLED NEWT
Triturus marmoratus

PALMATE NEWT
Lissotriton helveticus

FIRE SALAMANDER
Salamandra salamandra

Life cycle of the frog



1. During the winter, frogs gather together in bodies of water to mate.
The eggs produced by the females are fertilised externally by the males secreting their sperm as they are released.
2. Tadpoles have gills and a tail adapted to the aquatic environment. Their metamorphosis may take several months depending on the species.
3. Mature tadpoles have lungs and their tails eventually disappear. They are able to move around out of the water.
4. At the adult stage, frogs frequent both land and aquatic environments and are able to reproduce.

COMMUNITY INVOLVMENT

Almost a **quarter of amphibian species** in France are threatened by extinction due to the **fragmentation of natural environments** and the **drying out of wetlands**. Added to this is a recent sickness that has affected their populations, known as **chytridiomycosis**. Having arrived in Europe in 2013, this Asian fungus affects the skin of amphibians. Its spread has been exacerbated by water body users.

Amphibians at risk

All amphibians are protected in France. The most vulnerable are identified on the red list of endangered species. Since 8 January 2021, the state has put in place a statutory protection order for amphibians and reptiles.

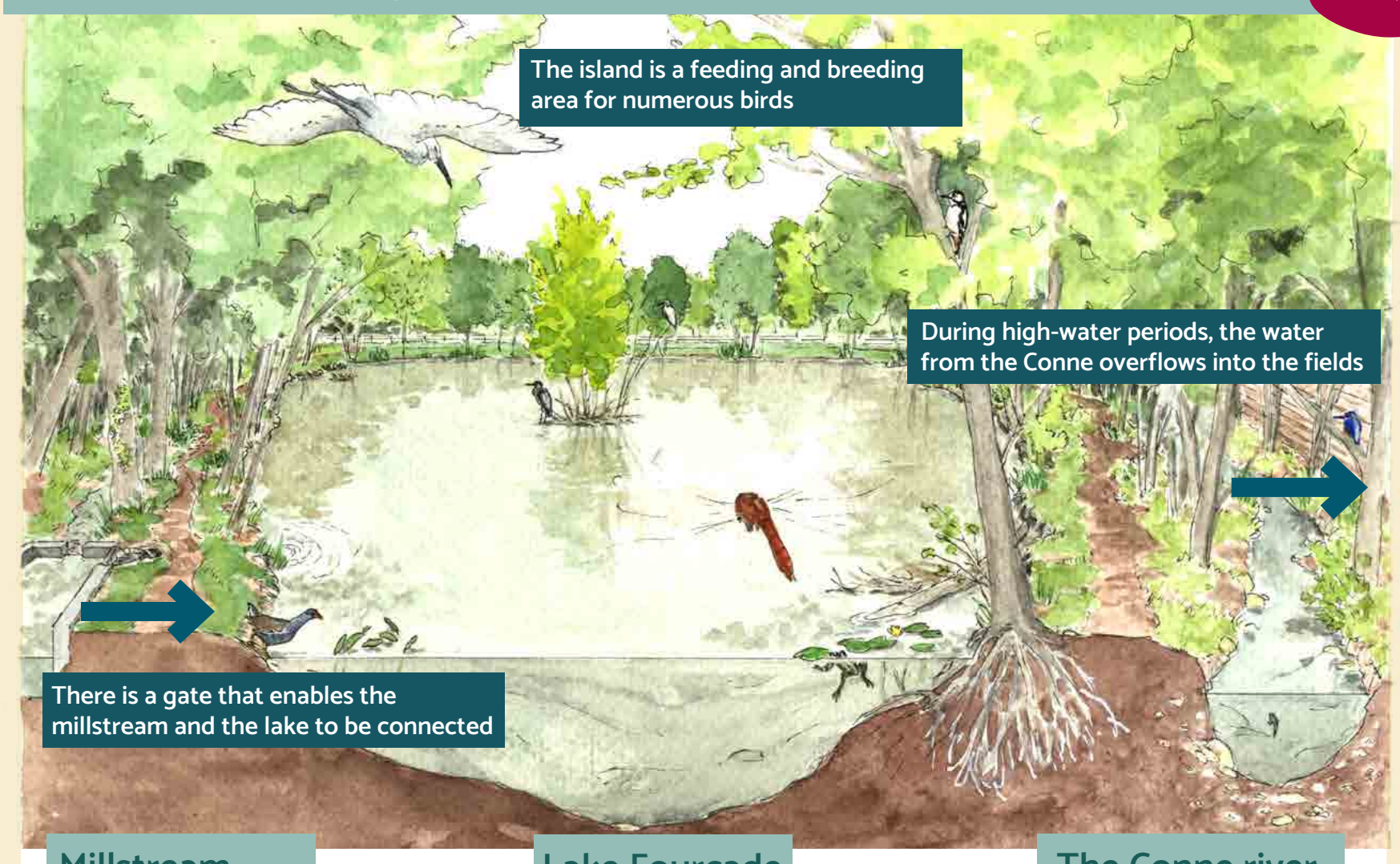
YELLOW-BELLIED TOAD
Bombina variegata

COMMON PARSLEY FROG
Pelodytes punctatus

AQUATIC HABITATS

Water courses, temporary or permanent wetland areas, ponds and lakes are all ecosystems with a wealth of species.
Some of them spend their **entire life cycle** there, whereas others only frequent them for **feeding or reproduction purposes**.

CONNECTED ENVIRONMENTS



Millstream

The millstream is an **artificial channel** excavated from a dam to an intake positioned on a water course, in this case the Conne.
It enables **water to be conveyed as far as the mill** at Le Cousseil.

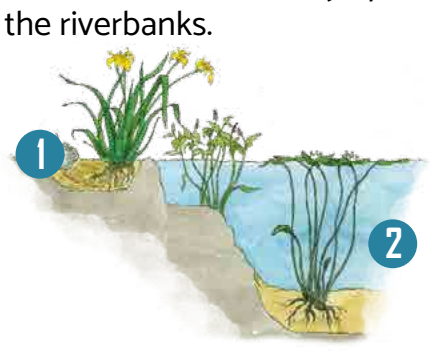
Lake Fourcade

The lake is an artificial, **lentic environment** (= closed with still water), in which the various plants, roots and dead trees provide places for aquatic fauna to **hide**.

The Conne river

The river is a **lotic environment** (= open with running water) where the current encourages the **oxygenation of the water** and transports **sediments** and accumulations of woody debris (stumps, branches, etc.) naturally uprooted from the riverbanks.

Different **macrophyte plants** (= aquatic plants) cohabit in these environments, including **helophyte** plants 1 (= vegetative growth above the water with aquatic roots) and **hydrophites** 2 (= vegetative growth and roots submerged in the water)



COMMUNITY INVOLVMENT

The municipality is working to **diversify the aquatic habitats** of the Conne and Lake Fourcade. Some fallen trees are deliberately left in the water, **aquatic plants** have been established and **woody debris** (= trees/branches that have fallen in the water) are not removed unless they cause a risk or proven dysfunctions.

Some aquatic plants observed on the site

YELLOW IRIS
Iris pseudacorus

RUSH
Juncus sp.

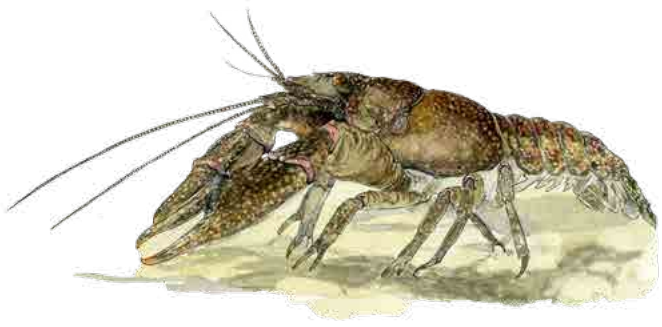
YELLOW WATER LILY
Nuphar lutea

INVASIVE EXOTIC SPECIES

These species are generally **imported deliberately** for decorative purposes (horticulture, fishkeeping) or farming (fur) and are easily able to colonise wetlands. These plants and animals often have no predators and enter into **competition with local species**, sometimes causing them to die out altogether.

SOME « IES » PRESENT IN THE DORDOGNE

RED-EARED SLIDER
Trachemys scripta elegans



SPINYCHEEK CRAYFISH ⚠
Orconectes limosus

SIGNAL CRAYFISH ⚠
Pacifastacus leniusculus

BLACK BULLHEAD CATFISH ⚠
Ameiurus melas

COYPU ⚠
Myocastor coypus

ASIAN CLAM ⚠
Corbicula fluminea

JAPANESE KNOTWEED
Reynoutria japonica

BUTTERFLY BUSH
Buddleja davidii

AMERICAN POKEWEED ⚠
Phytolacca americana

COMMUNITY INVOLVMENT

The species marked with a ⚠ have already been seen on the site. They are subject to **particular attention and isolated interventions** to limit or stop their spread.

Some examples of interventions

TRAPPING OF COYPUS
Activité règlementée soumise à permis

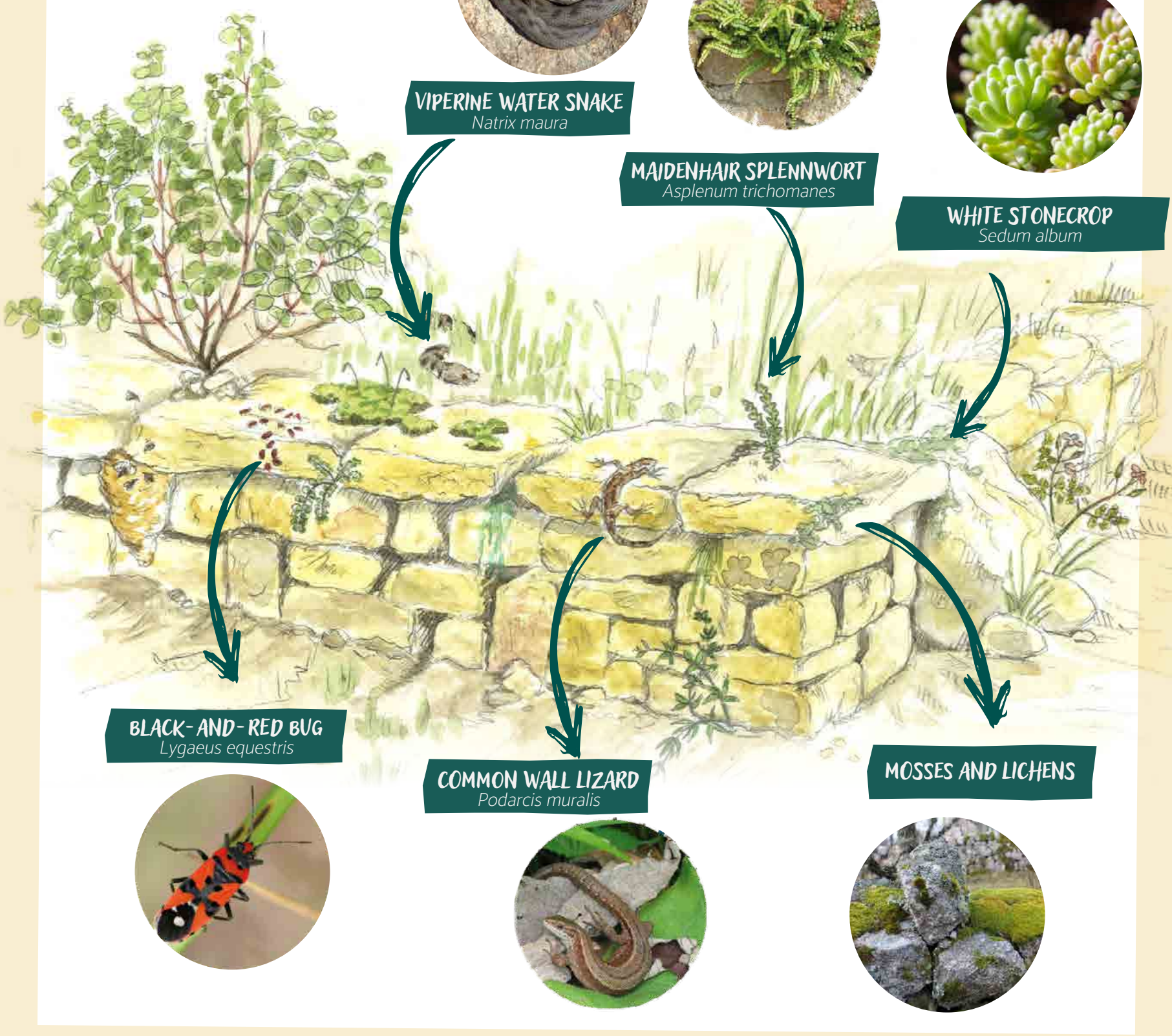
EMPTYING OF THE LAKE
Élimination des écrevisses et poissons-chats

UPROOTING OF PLANTS

ROCK FEATURES

Rock features in the form of rock piles or dry-stone walls are **dry habitats** in very poor soils where “pioneer” plants thrive.
They provide a habitat for particular species such as **reptiles** and **refuges** for insects, toads and small mammals.

BIODIVERSITY



COMMUNITY INVOLVMENT

The municipality has created artificial rock features to **diversify the habitats** on the site. They are positioned intentionally in **sunny spaces** to suit certain **insects, small mammals** and, above all, **reptiles**.
Since January 8th, 2021, the French government has put in place a **statutory protection order** for amphibians and reptiles throughout the national territory.

Open your eyes and you might see:

COMMON SHREW
Sorex araneus

WOLF SPIDER
Alopecosa albofasciata

GREEN WHIP SNAKE
Hierophis viridiflavus

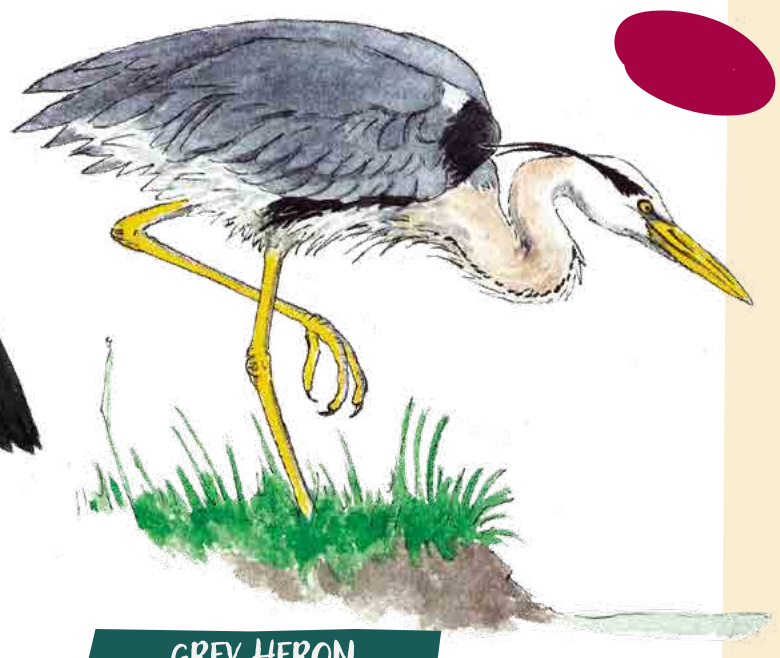
BIRDS

Throughout the year, the lake, its **island** and **wooded shorelines** all encourage a **wealth of birdlife**. With quietness and patience, you can **see** and **hear** numerous species!

OBSERVABLE SPECIES

WESTERN CATTLE EGRET
Bubulcus ibis

GREAT CORMORANT
Phalacrocorax carbo



GREY HERON
Ardea cinerea

SAND MARTIN
Riparia riparia

EURASIAN BLACKCAP
Sylvia atricapilla

COMMON BUZZARD
Buteo buteo

COMMON KINGFISHER
Alcedo atthis

MALLARD (MALE)
Anas platyrhynchos

EUROPEAN GREEN WOODPECKER
Picus viridis

GREEN SANDPIPER
Tringa ochropus

COMMON MOORHEN
Gallinula chloropus

COMMON GOLDEN ORIOLE
Oriolus oriolus

COMMUNITY INVOLVMENT

The **management of the lake and its surroundings** is monitored in order to offer habitats, food and breeding areas to different species, including the conservation of dead trees, preservation of the herbaceous vegetation around the lake, bocage, etc.
Maintenance is carried out **outside of the spring and summer nesting season** (mid-February to August).

BATS

Often disliked, bats are inoffensive and pay an essential role in **regulating crop pests** (the European grapevine moth, for example).
They regularly visit this site where they find both **food and refuge**.

SOME LOCAL SPECIES

COMMON NOCTULE
Nyctalus noctula

WESTERN BARBASTELLE
Barbastella barbastellus

MEDITERRANEAN HORSESHOE BAT
Rhinolophus euryale

GREATER HORSESHOE BAT
Rhinolophus ferrumequinum

GEOFFROY'S BAT
Myotis emarginatus

DAUBENTON'S BAT
Myotis daubentonii

KUHL'S PIPISTRELLE
Pipistrellus kuhlii

COMMON PIPISTRELLE
Pipistrellus pipistrellus

GREATER MOUSE-EARED BAT
Myotis myotis

COMMUNITY INVOLVMENT

Sixteen species of bats have been identified in the Bergerac region out of the 36 identified in Metropolitan France. Even though there are no caves on the site, they still find refuge in the **cavities** made by woodpeckers in **dead trees**. This is why it is important to leave these trees in place.

The woodpecker is a real estate agent !

CAVITIES ABANDONED BY WOODPECKERS

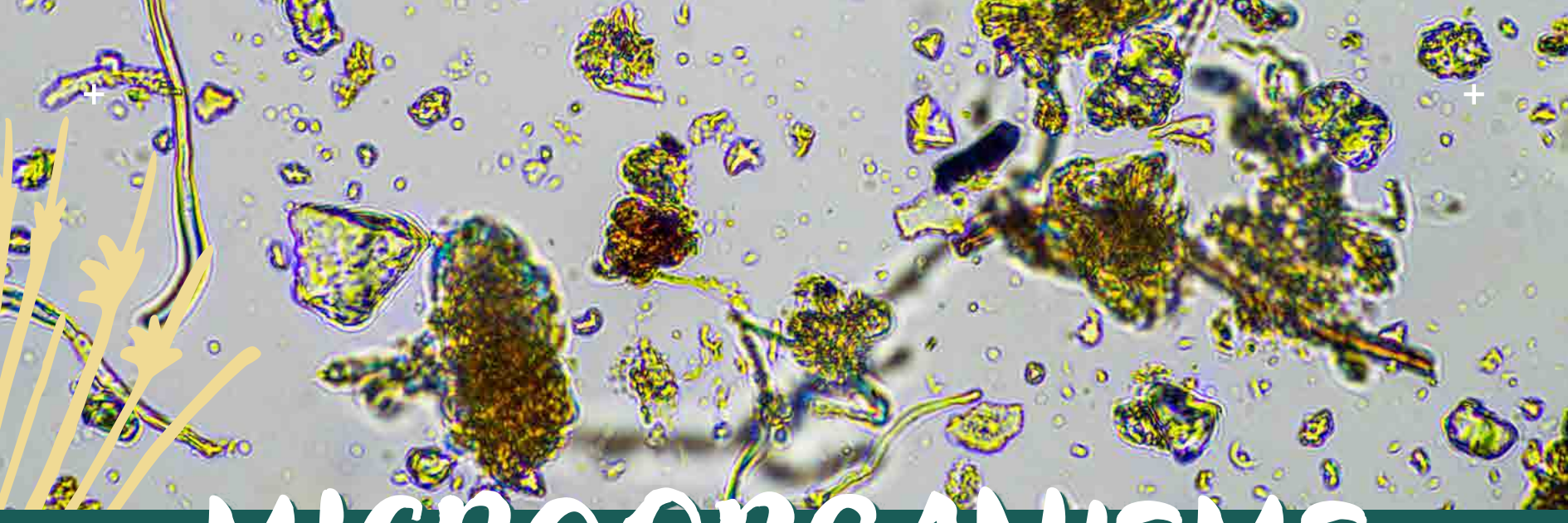
These are used by noctule-type bats but also many other opportunist animals such as nocturnal raptors, tits, squirrels, hornets, bees, etc.

LITTLE OWL
Athene noctua

LESSER SPOTTED WOODPECKER
Dryobates minor

ROUND AND OVAL HOLES

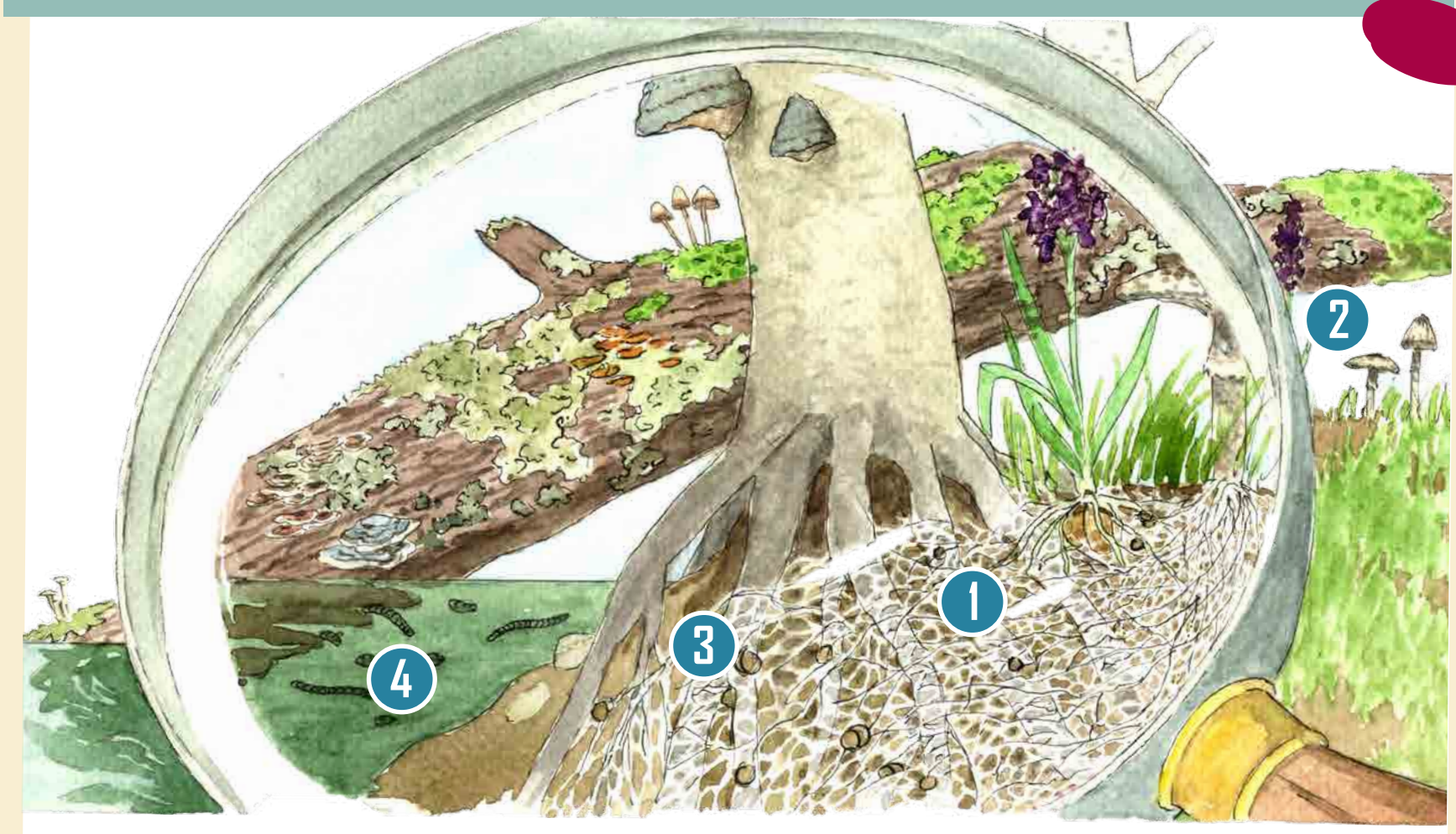
Woodpeckers like to nest in trees between 3 and 10 metres from the ground. The round holes tend to be where their nests are, whilst the oval holes are more for feeding.



MICROORGANISMS

Often invisible but **omnipresent** on all surfaces and at all latitudes, microorganisms underpin **life on earth** thanks to their many characteristics and capabilities. Depending on the species, **bacteria, viruses, protozoa** and **fungi** may be beneficial or unfavourable for the living things that surround them.

LETS ZOOM IN...

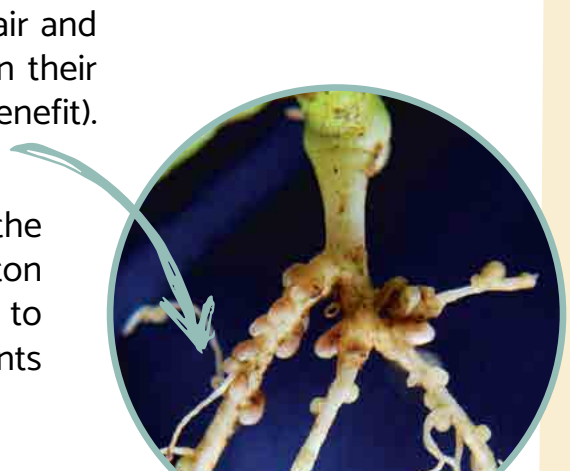


1. The **mycelium** (the vegetative part of a mushroom or toadstool) weaves a large network of fibres in the soil. It decomposes organic matter (both animal and plant), captures carbon and facilitates the absorption of nutrients by plants. An essential player in life on Earth, it operates at the bottom of the food chain.

2. In reality, what is commonly known as the "**mushroom**" is the reproductive organ of the mycelium!

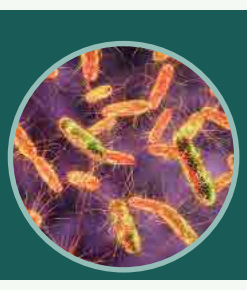
3. **Nitrogen-fixing bacteria** capture the nitrogen contained in the air and make it accessible to plants (nitrate). Some plants make nodes in their roots to shelter these bacteria (symbiosis = the two species both benefit).

4. **Cyanobacteria** are aquatic bacteria capable, like plants, of using the sun's rays to grow (photosynthesis). There are part of the phytoplankton and help to oxygenate the water. But some species are able to proliferate en masse (bloom) in stagnant water enriched with nutrients (organic pollution) and are toxic for humans and animals.



BENEFICIALS AND PATHOGENS

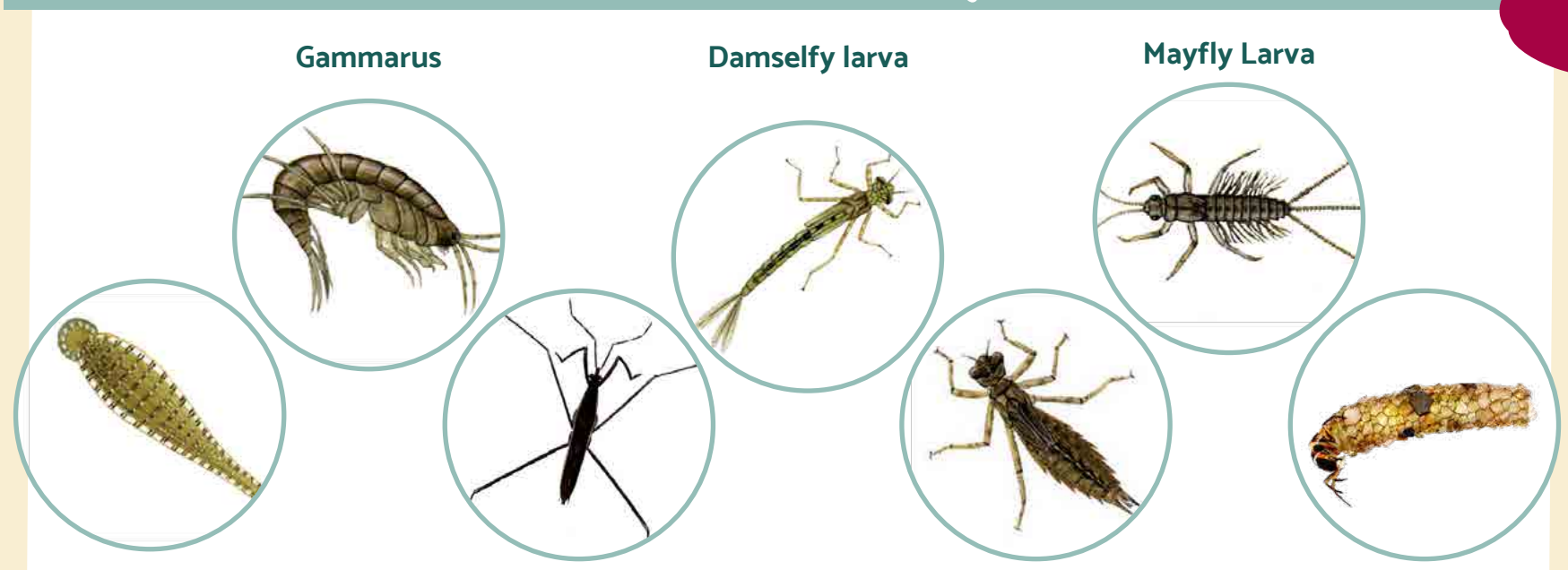
Microorganisms are highly **diverse** and each have their own special features. Their spread depends on the physical, chemical and biological conditions of the environments in which they develop. They can have no impact on the infected species (**commensalist**), be beneficial (**symbiotic**) or pathogenic (**parasitic**). Here are some examples of impacts on human activities:

	Virus	Bacteria	Fungus
Bénéfiques			
	BACTERIOPHAGES Feed on bacteria	LACTOBACILLUS Gut flora	BOTRYTIS CINEREA Liqueur wines
Pathogens			
	INFLUENZA Flu virus	SALMONELLA Polluted aquatics environments	PHYTOPHTHORA INFESTANS Causes mildew

INVERTEBRATES

By definition, this is all of the animals that have **neither a spinal column nor bones** (insects, molluscs, crustaceans, worms, etc.). They represent **99 % of the known animal biodiversity**! Some of them are **good indicators** of the quality of the water and aquatic environments.

INDICATORS OF WATER QUALITY



QUALITY OF WATER IN THE CONNE

Poor quality → **Good quality**

The **ecological status** of a water course is regulated by the European Water Framework Directive (WFD) dated October 23rd, 2000 and implemented in France by the law of April 21st, 2004.

The aim is to achieve a good ecological state on the basis of various parameters, including the "**bio-indicators**" - invertebrates, algae, aquatic plants and fish.

Surber net enabling the sampling of aquatic invertebrates.

The hydrological condition of the Conne is considered to be "intermediate" at the tracking station in Bergerac.

This water course suffers from summer droughts which limit the aquatic life and tend to concentrate the various pollutants.

This situation, which is not irreversible, is partly explained by the artificial drainage of the catchment area and the destruction of the wetlands.

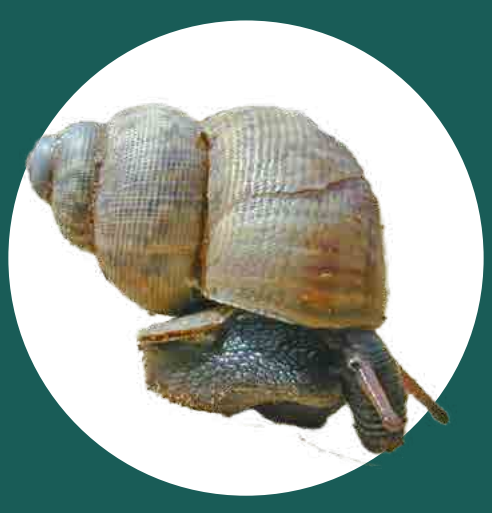
More details on the site of the Water Information System (SIE) of the Adour Garonne basin:

COMMUNITY INVOLVMENT

Each species has its own particular features, and it is therefore important to **diversify the habitats** in order to welcome as many species as possible.
Organic matter is at the bottom of the food chain, which is why the municipality does not export the **green waste** produced on the site.
Dead trees and **stumps** are kept as they are habitats and sources of food for numerous species.

Some invertebrates present on the site

STAG BEETLE
Lucanus cervus



ROUND-MOUTHED SNAIL
Pomatias elegans

FRESHWATER MUSSEL
Anodonta sp.

AQUATIC INSECTS

Whether their different **stages of development** take place 100% in the water or only during the larval stage, the aquatic environment is home to a considerable **variety of insects**.
Their **adaptability** and **transformability** are sometimes absolutely astonishing!

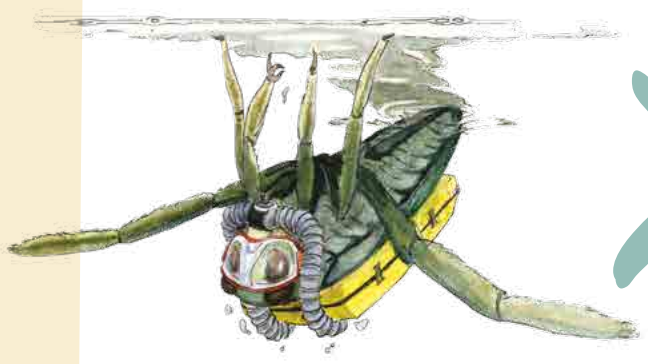
IT IS POSSIBLE TO BREATHE UNDERWATER!

THE WATER BOATMAN

Bug family

Larval stage

It **stores air** by surfacing and holding it under its wings as if it were an oxygen bottle!



In the water, its **black ventral side** points upwards and its **greenish dorsal side** points downwards. It is practically invisible!

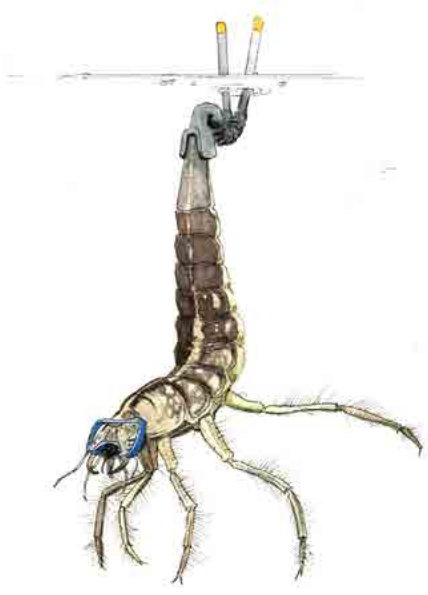
Adult stage

The adult water boatman is almost **identical** to its larva.
It is able to leave the water and fly.

THE DIVING BEETLE

Beetle (coleoptera) family

Larval stage



The larva has **spiracles** at the rear of its body enabling it breath as though through a snorkel!

Depending on the **temperature** and the availability of **food**, the development of the larva lasts from several weeks to several months and takes place in **3 stages**.

Adulte stage

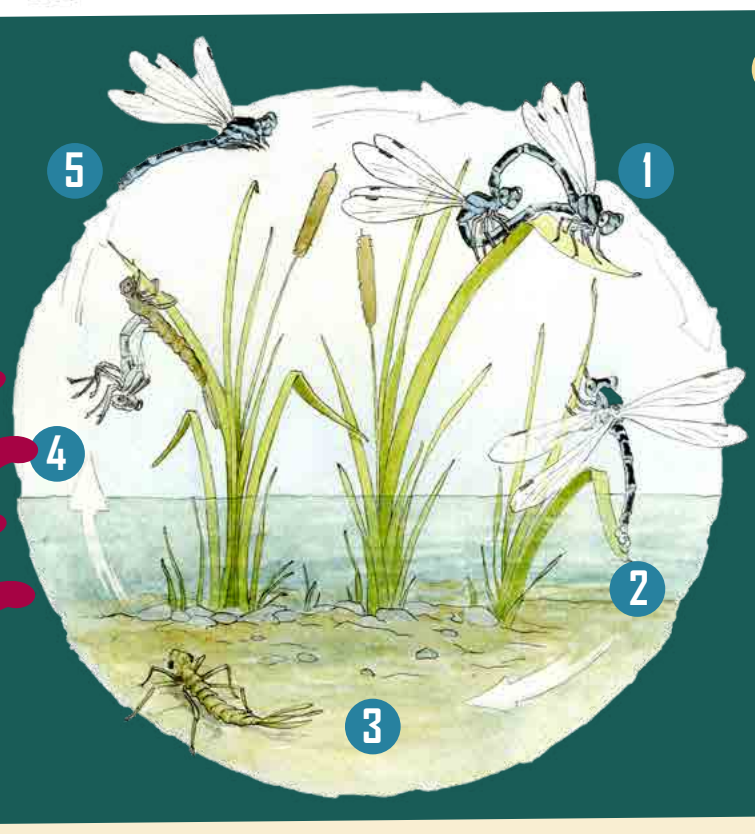
The adult diving beetle is quite **different** from and often smaller than its larva!

COMMUNITY INVOLVMENT

The municipality is working to ensure that the **transition between the aquatic and terrestrial environments** is as gradual as possible in order to optimise the development of the species that use both environments during their **life cycle**, such as the **odonates** (dragonflies and damselflies).

Damselfly

Dragonfly



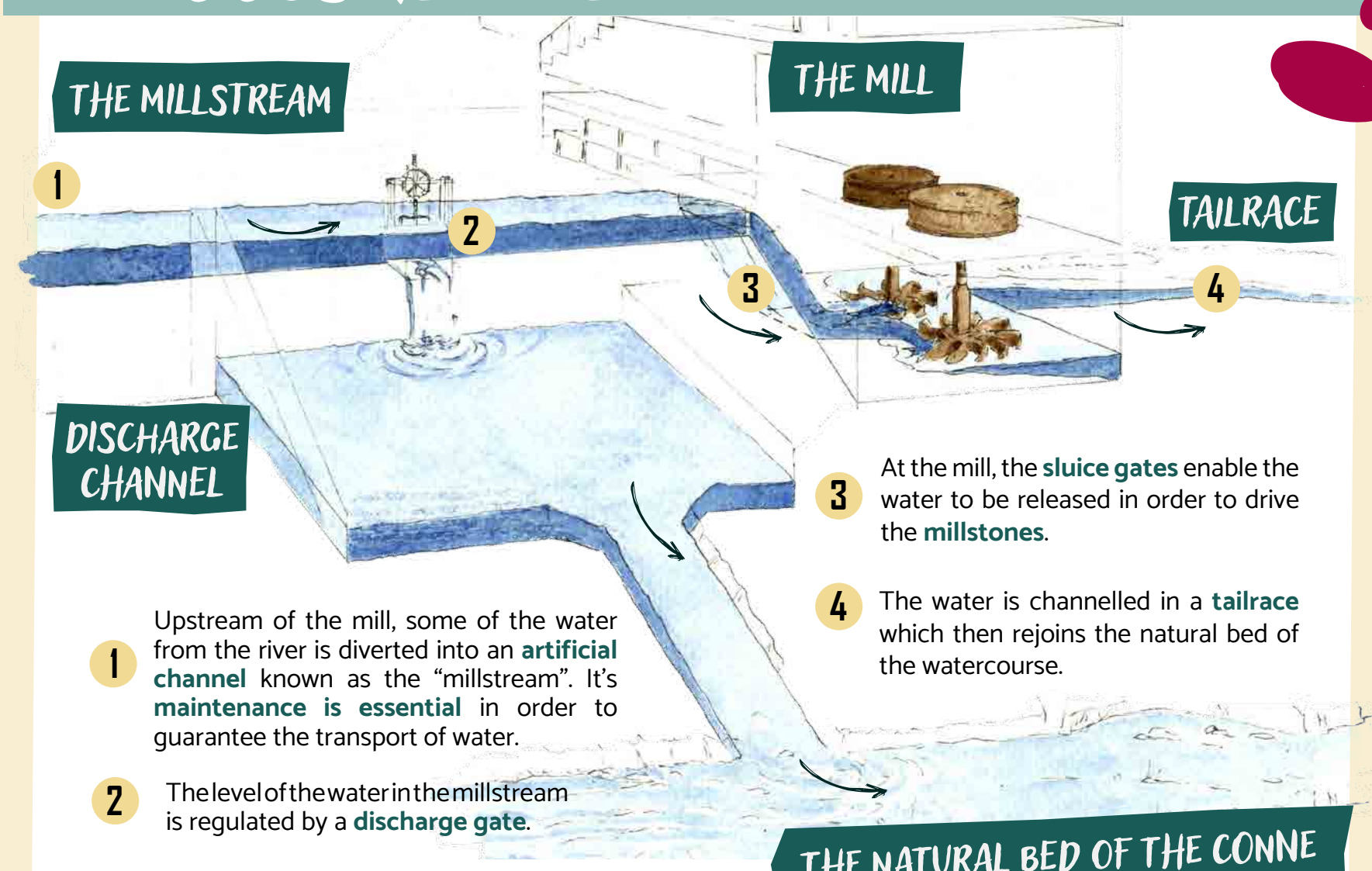
Odonate development

1. **Mating :** the male grasps the female at the back of the head.
2. **Egg-laying :** the larva develop and live in the water (between 1 and 5 years depending on the species).
3. **Larval stage :** the larva are formidable predators. They eat other larva, tadpoles and other aquatic animals.
4. **Imaginal mouth :** the larva climb the length of the vegetation to metamorphose into imagos.
5. **Imago :** the imago (= adult) tears off its outer casing and stays in the sun to dry its wings. Its airborne life does not last more than a few months.

THE CHANNEL AND THE MILL

This small channel was dug to **supply water** to the **mill** at Le Cousseil, which is located downstream. In the past, this mill used hydraulic energy from the Conne, which was diverted **963 metres** upstream to produce **flour**.

LE COUSSEIL MILL



1. Upstream of the mill, some of the water from the river is diverted into an **artificial channel** known as the "millstream". It's **maintenance is essential** in order to guarantee the transport of water.

2. The level of the water in the millstream is regulated by a **discharge gate**.

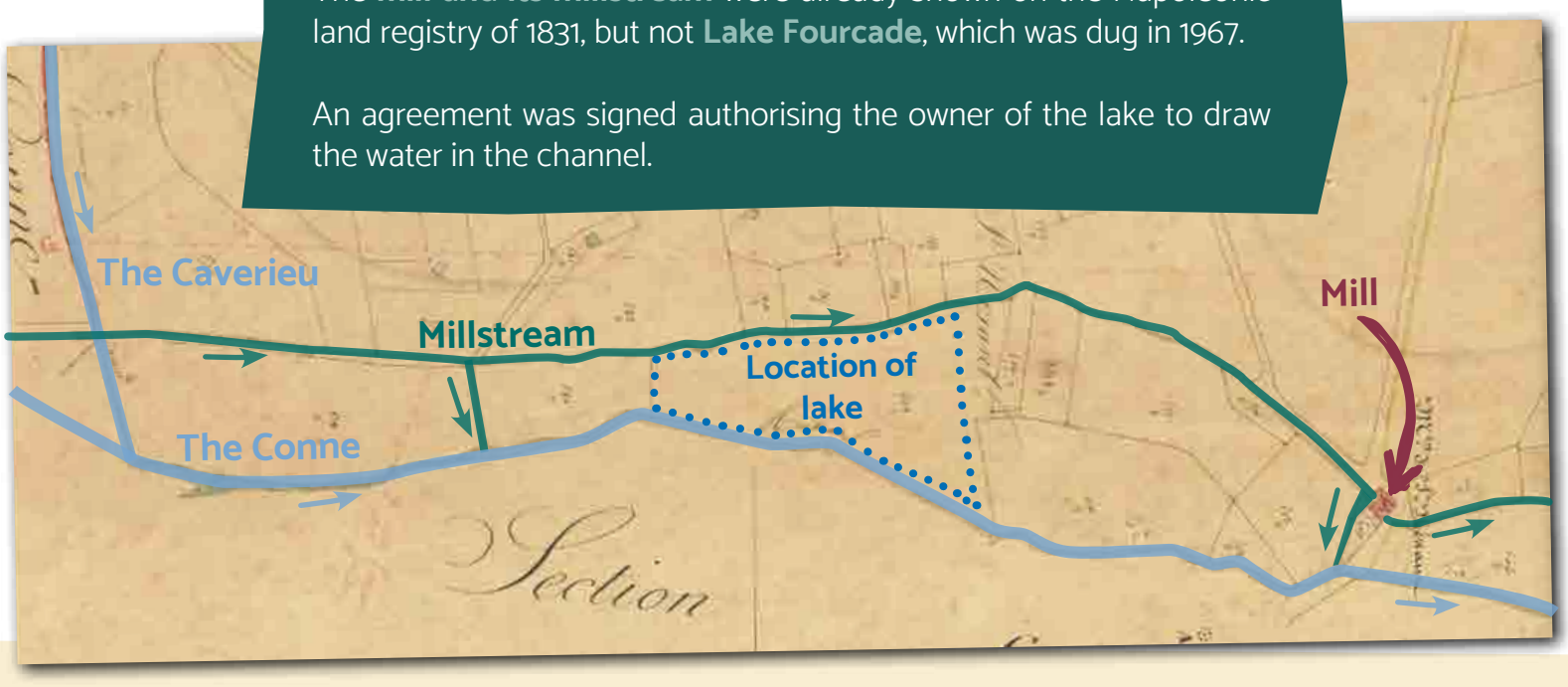
3. At the mill, the **sluice gates** enable the water to be released in order to drive the **millstones**.

4. The water is channelled in a **tailrace** which then rejoins the natural bed of the watercourse.

THE NATURAL BED OF THE CONNE

The **mill and its millstream** were already shown on the Napoleonic land registry of 1831, but not **Lake Fourcade**, which was dug in 1967.

An agreement was signed authorising the owner of the lake to draw the water in the channel.



RIGHTS AND OBLIGATIONS

With the ubiquity of water, there are **special rules** that mill owners need to be aware of. Mills are subject to the **Water and Aquatic Environment Act** of 2006.
Note : declarations and requests for authorisation for works and developments must be directed to the water policy service of the department (DDT).

Rights

USE OF HYDROPOWER

This right may be withdrawn if the structures are abandoned.

RIGHT OF OWNERSHIP

The mill includes the ownership of the millstream and ancillary structures.

EASEMENT

For maintaining and managing the structure.

Obligations

REGULATION OF THE WATER

Maintenance of the millstream, legal water level, prohibition against operating the sluice gates in summer...

PRESERVATION OF THE AQUATIC ENVIRONMENT

MAINTENANCE OF THE BUILDING IN GOOD CONDITION

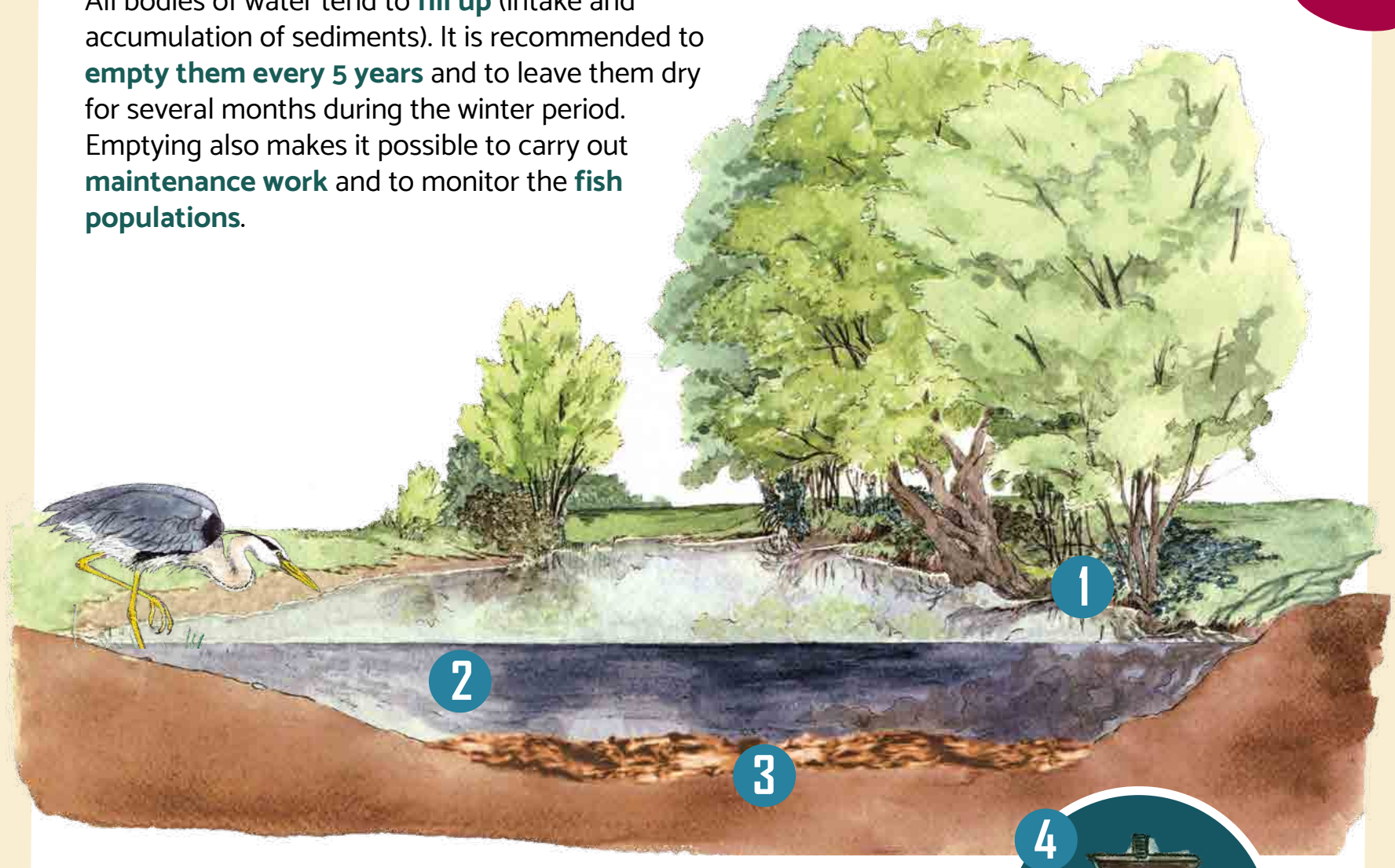
MAINTENANCE OF A MINIMUM FLOW OF WATER INTO THE BED OF THE WATER COURSE

LAKE MANAGEMENT

Lake Fourcade is a recent **artificial body of water**. It was landscaped by M. Fourcade in **1967** by capturing the water from the millstream. Lakes and ponds are **reserves of water and biodiversity**.
They may, nevertheless, have more or less negative impacts on river hydraulics and aquatic environments.

WHY EMPTY BODIES OF WATER?

All bodies of water tend to **fill up** (intake and accumulation of sediments). It is recommended to **empty them every 5 years** and to leave them dry for several months during the winter period. Emptying also makes it possible to carry out **maintenance work** and to monitor the **fish populations**.



1. Precipitation causes run-off which **picks up and transports** material into the bodies of water.

2. The **fauna** and **flora** in the water die and accumulate at the bottom of the lake.

3. The **silts** are made up of **organic matter** which, under certain conditions, contributes to the **spread of microalgae** which suffocate the environment (eutrophication). Emptying the lake with a prolonged dry period makes it possible for the **organic matter to mineralise**, which alleviates this phenomenon.

4. The **gate** at the bottom of the dam enables the lake to be emptied. The work has to be done gradually and undertaken during **high-water periods** so that the silt from the body of water does not clog up the bed of the river Conne downstream.

COMMUNITY INVOLVMENT

In summer, the body of water is no longer fed by the channel and its **level falls** (evaporation and leakage). To limit this phenomenon, the municipality strives **to control leaks** and maintains a significant level of **plant cover** on the lake.
Note : owners of lakes larger than 1000 m2 are required to declare them to the departmental water policy service (DDT 24).

Some examples of interventions

REPAIRING OF LEAKS
Exacerbated by the coypus and crayfish.

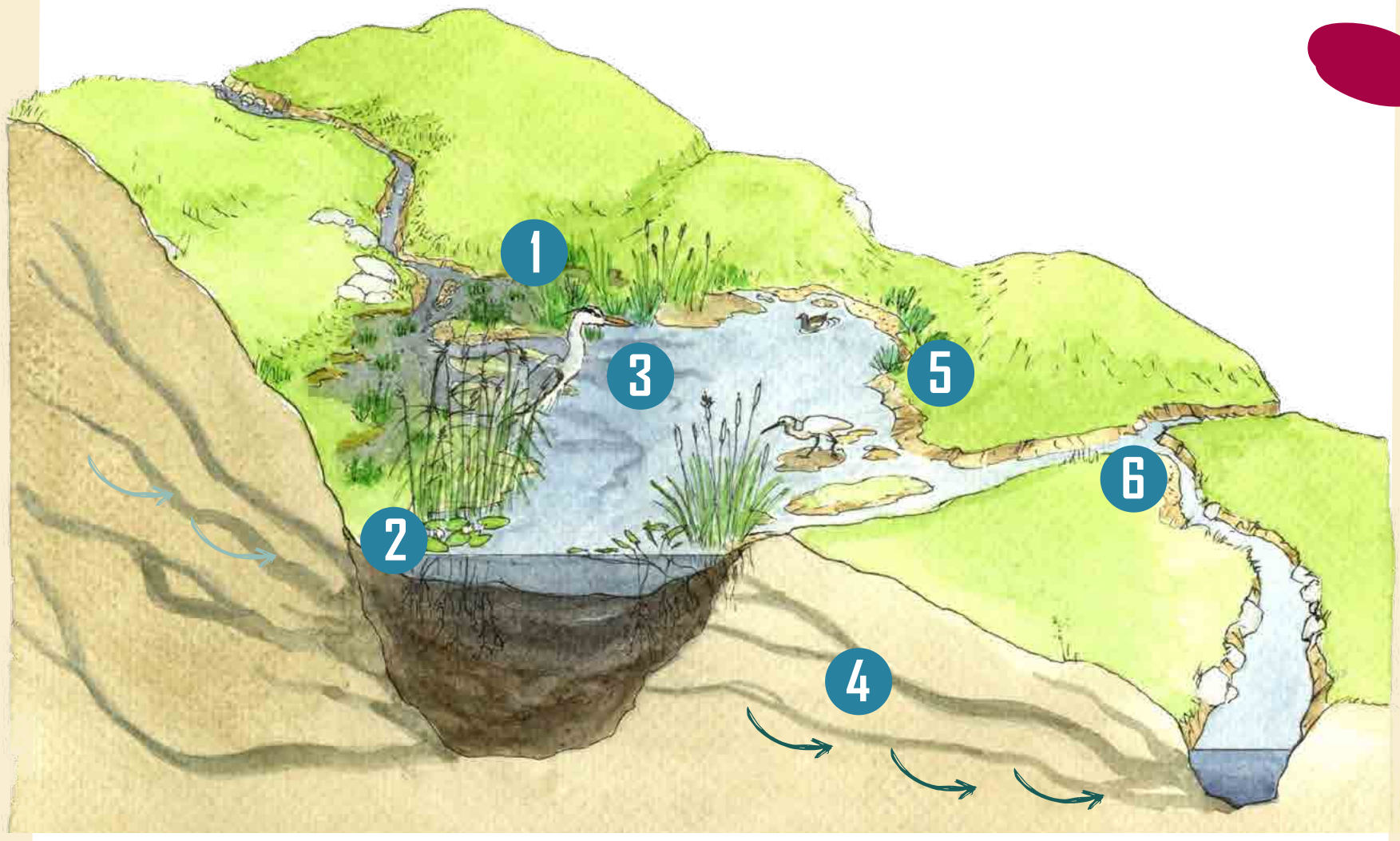
ESTABLISHMENT OF VEGETATION ON THE SHORELINES

REMOVAL OF FLOATING REFUSE

WETLANDS

Wetlands are **vital** for the proper functioning of ecosystems. They are characterised by the presence of **temporary or permanent water** and are home to a host of particular animal and plant species.
As fragile areas that have been hugely damaged by human activity, there is an **awareness-raising day** dedicated to them every year on **2nd February**.

BENEFITS OF WETLANDS



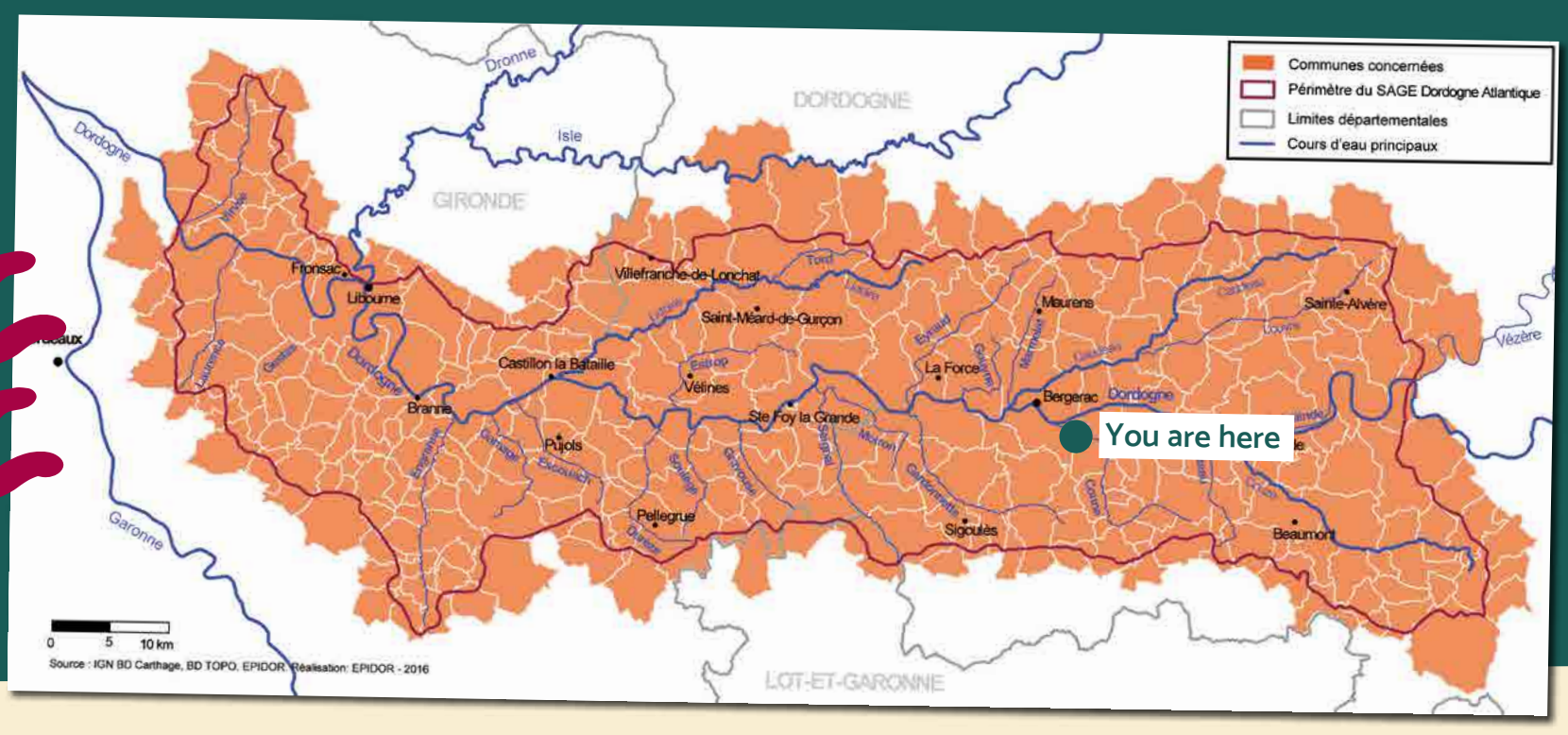
1. **Flood plains for water courses** to reduce flooding downstream.
2. **Clean-up of contaminants** and sediments by aquatic plants and associated microorganisms.
3. **Reservoir of biodiversity** for endangered wetland species.
4. Effective **accumulation** of water in the ground then **slow release** towards the water course in the dry season.
5. **Carbon sink**, more efficient than forests.
6. **Better quality water** at the exit of the wetland.

The Lake Fourcade wetland is fed by **run-off water**, water from the millstream and that from the Conne. The regular variation of the level of the groundwater in the soil causes **iron particles to oxidise,** which leads to the formation of **orange-coloured strata** in the soil, which are specific to wetlands.

COMMUNITY INVOLVMENT

At the local level, the Dordogne Atlantique **Water Planning and Management Scheme** (SAGE) sets the **common goals of usage**, enhancement and protection of water as a resource in a territory of over 2,700 km2! Wetlands are recognised there as being of **major importance** for responding to the consequences of climate change.

SAGE Dordogne-Atlantique



NOTEWORTHY SPECIES

Wetlands are home to **specific species** that are sometimes **protected** at departmental, regional or national level. **Surveys** carried out by the CAB and the Conservatory of Natural Spaces in Nouvelle-Aquitaine have enabled several of these species to be identified.
The preservation of an open wetland area encourages the development of and colonisation by **flying insects**.

FLORA

YELLOW IRIS
Iris pseudacorus

SNAKE'S HEAD FRITILLARY
Fritillaria meleagris

ROMAN HYACINTH
Bellevalia romana

DOCK
Rumex

COMMON REED
Phragmite australis

FAUNA

MARSH FRITILLARY
Euphydryas aurinia

Its caterpillars only feed on dock leaves.

LARGE COPPER
Lycaena dispar

FALSE RINGLET
Coenonympha oedippus

BANDED DEMOISELLE
Calopteryx splendens

BLACK-TAILED SKIMMER
Orthetrum cancellatum

BROAD-BODIED CHASER
Libellula depressa

SOOTHING PLANTS

Numerous wetland plant species are used by man for **therapeutic purposes** or for **consumption**.

You can identify these plants by photographing them with the **Plantnet** mobile application:

Pl@ntNet

Some plants and their uses

COMMON HOP
Humulus lupulus

BEER
To consume with moderation

MEADOWSWEET
Filipendula ulmaria

ANTI-INFLAMMATORY
Contains salicylic acid

WILLOW
Salix sp.

ASPIRIN
Contains salicylic acid

DIFFERENTIATED MANAGEMENT

The landscapes of the Conne valley alternate primarily between **crops, forests and pastures**. In the absence of human intervention, all environments tend to evolve towards the “forest” stage and thus close up.
To retain a certain amount of diversity, the decision was taken to maintain open areas through **judicious interventions**.

JUDICIOUS MEASURES

The **management plan** was devised by the GEMAPI service of the Agglomeration Community of Bergerac in partnership with the Conservatory of Natural Spaces in Nouvelle-Aquitaine (CENNA), then validated with the municipality and its maintenance officers.
Regular snapshots of the development of the site make it possible to align and adapt the management techniques used.

Ecograzing

This **reduces the use of machines and avoids the compacting of the soil**. It is implemented in larger areas than here (e.g. Pombonne Park in Bergerac).

Late mowing

The grassland is mown **once or twice a year**. The work takes place in September and April in order to minimise the impact on the area during the main breeding season of the fauna and flora (summer).

Clearing

Used locally to **maintain open spaces** and thus encourage the movement of flying insects.

Regular maintenance

Regular maintenance is **limited** solely to areas where the **general public have access**.

Woody debris accumulations

Woody debris is not removed from the bed of the Conne unless it is too large and constitutes a risk. It is **removed from** the artificial **millstream** to ensure that the lake and mill are supplied with water.

Free development

Some woody islets and dead trees are purposely conserved to **diversify the available habitats**.

COMMUNITY INVOLVMENT

A **school project** carried out in 2023/2024, in partnership with the Cluzeau Agricultural Secondary School (Sigoulès-et-Flaugeac) allowed for the **shaping of the landscapes**.
Don’t hesitate to leave areas that you mow less frequently **at home**.
You could see a **lot more life** there. This also means time and energy **savings** as far as the operation of mowers and brush cutters is concerned!

Our thanks go to the young people at the Agricultural Secondary School in Cluzeau !

CLEARING
In the pass areas

SELECTIVE CUTTING

REMOVAL OF SOME WOODY DEBRIS