

*Let's adapt our habits
to preserve the natural state of our rivers*

HANDBOOK FOR

WATERMILL OWNERS

VOCABULARY

Catchment area (Bassin versant)

An area from which surface runoff is carried away by a single drainage system

Ecological continuity (Continuité écologique)

Process allowing the circulation of living organisms and their access to areas essential for their breeding, feeding, development, protection, as well as the natural circulation of sediments, and proper functioning of biological reservoirs

Eutrophication (Eutrophisation)

Excessive richness of nutrients in a lake or other body of water, frequently due to run-off from the land, which causes a dense growth of plant life (sometimes toxic). This phenomenon causes the reduction of oxygen concentration

Fish ladder (Passe à poissons)

Mechanism that allows fish to bypass unsurmountable hydraulic infrastructures

GEMAPI

Qualification that territorial organisations have on monitoring aquatic environments and preventing floods (GEstion des Milieux Aquatiques et Prévention des Inondations). Organisations in charge are called Syndicats GEMAPI

Hydraulic flushing (Chasse hydraulique)

Rapid evacuation of sediments

Hydraulic infrastructures (Ouvrages hydrauliques)

Hydraulic elements of a watermill : sluice, tailrace, spillway gates... They allow the regulation of water level

Logjam (Embâcle)

Blockage caused by the crowding together of a number of logs or plant debris floating in a river

Low-water level (Etiage)

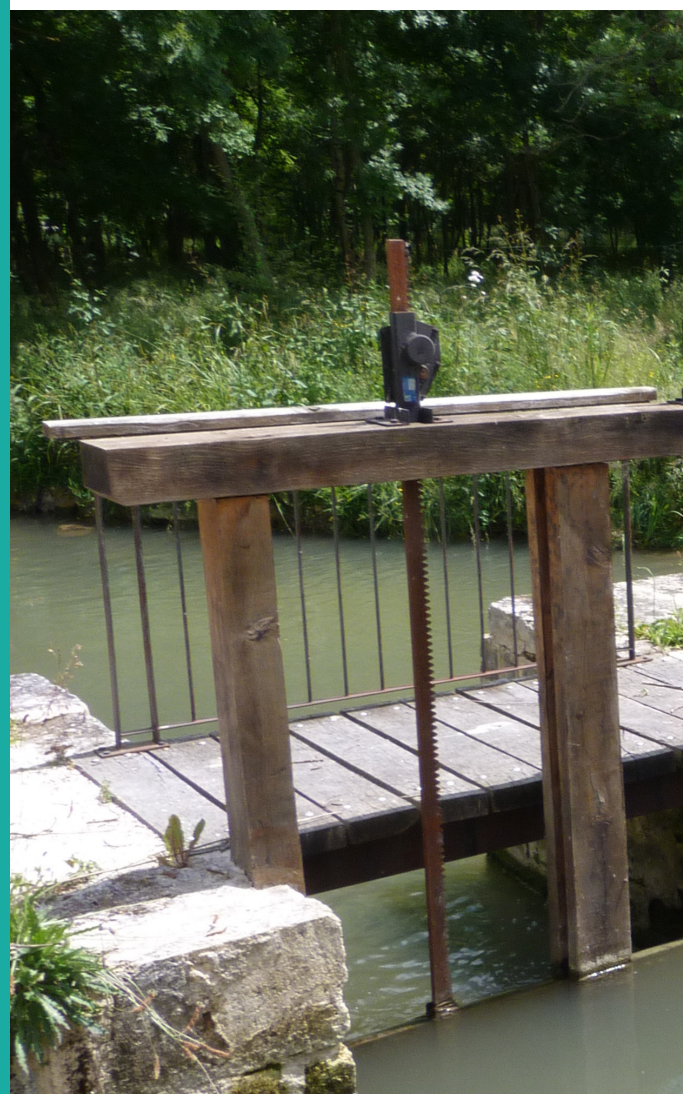
Flow of water in a stream during prolonged dry weather

Sediment transport (Transit sédimentaire)

Movement of solid particles (sand, gravel, boulders...) by the movement of a fluid

Wetland (Zones humides)

Area where the water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year.



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PRELUDE

A water mill is an **infrastructure designed to use the hydraulic force of a river**. It can transform hydropower into electricity or mechanical force. Historically, it was used to crush cereales by the rotating of a grindstone. Water mills were then used for other purposes : oil mills, metalworking, papermaking...

By diverting or diverting watercourses and using mobile or stationary infrastructures, mankind has been exploiting the hydraulic energy of rivers to have **sufficient drop heights to activate the rotation of mill wheels**. Water mills used to be essential production machineries, with very specific rights and duties undertaken by owners or millers.

Nowadays most mills are residential areas, as they have ideal pleasant settings. Still, some are exploited for other purposes such as to produce electricity, grind flour or oil.

AN INFRASTRUCTURE DIRECTLY LINKED TO AQUATIC ECOSYSTEMS

All elements within the watermill can **alter the natural ecological functioning of the river**. Other hydraulic infrastructures can also have an impact on aquatic ecosystems : hydroelectric dams, drinking water dams, weirs, sluices ...



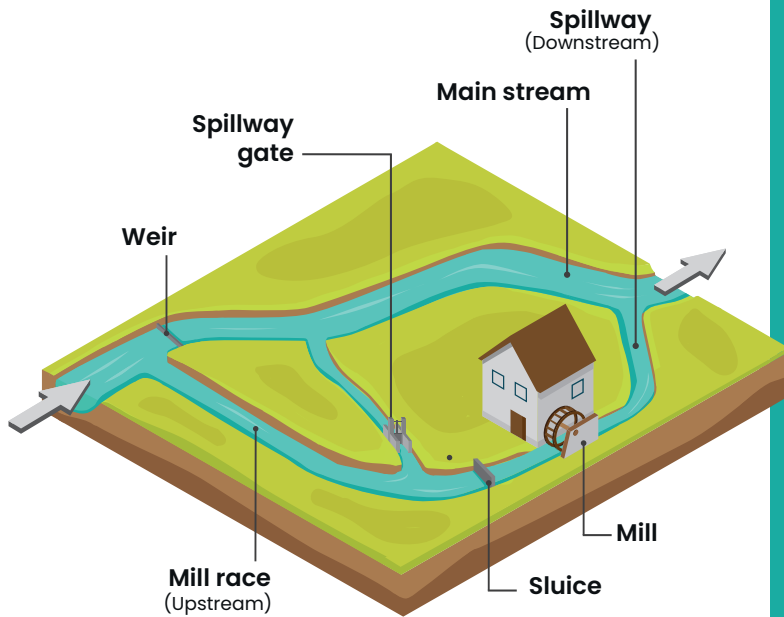
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HISTORY



MECHANICS OF A WATERMILL

The watermill is actually part of many other hydraulic infrastructures that all belong to the owner of the mill.



COMPONENTS OF A MILL

Weir (seuil de répartition)

Low dam built across a river to raise the level of water upstream or regulate its flow. It also can deviate part of the stream towards a mill.

Millrace (bief)

Artificial channel carrying the current of water that drives a mill wheel

Spillway (Canal de fuite)

Channel used to control the release of water from a dam mill into the mainstream

Spillway gate (Vannes de décharge)

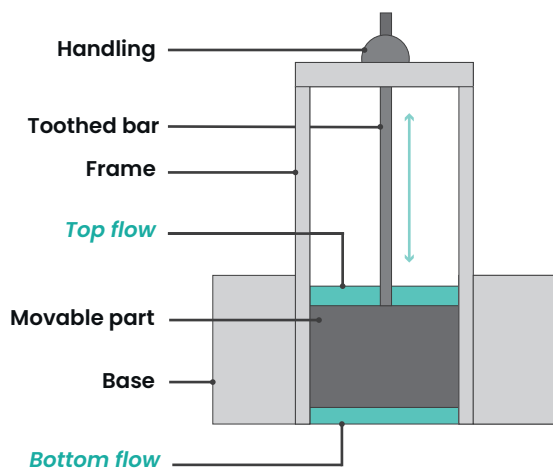
A gate for regulating the flow from a reservoir or stream. It is located upstream from the watermill and allows the miller to regulate the water flow

Sluice (Vanne ouvrière)

Sliding gate for controlling the flow of water

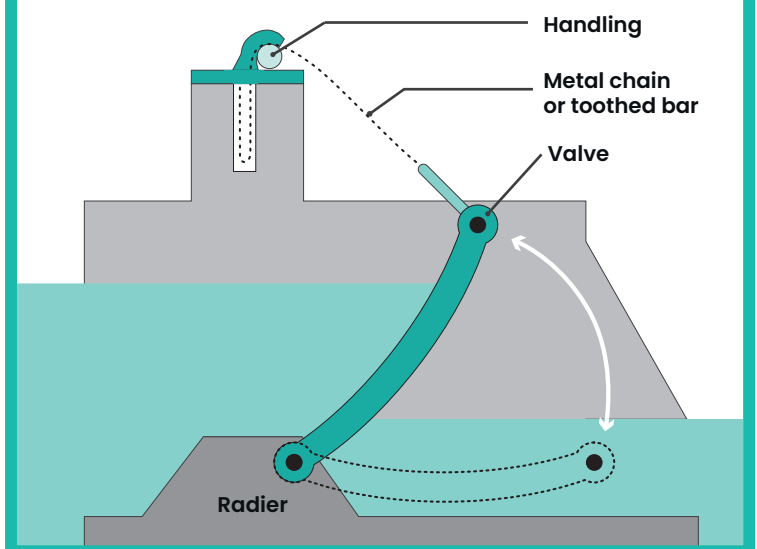
SPILLWAY GATE

guillotine style



SPILLWAY GATE

valve style



RIGHTS AND DUTIES

Water mills require a particular maintenance adapted to their regulatory status.



« DROIT D'EAU »

A watermill owner can use the hydraulic energy produced from the mill only with legal authorisation. The owner can deviate **the natural watercourse to exploit it with a hydraulic engine**. The droit d'eau can be obtained or authorised through two different ways.

HOW CAN I RECEIVE THE DROIT D'EAU ?

Droit d'eau fondé en titre

All hydraulic infrastructure that were constructed **before the French Révolution in 1789** are concerned. This right is perpetual, and doesn't require any renewal procedure or authorization.

The owner needs to find the construction date through an **authentic title or any other archive**, to prove its existence prior to the French Révolution (notarial deed, extract of Cassini's map, proof of business activity...).

This right can be removed in case of general public interest : flood risk, presence of ruins, threats on aquatic ecosystems, safety or health risk (article L214-4 of the environmental code). Moreover, any construction that could modify the hydraulic force **needs to be authorized by the DDT(M)** of your département. The infrastructure could then have the title of « droit d'eau fondé sur titre ».



ATTENTION

All hydroelectric infrastructures authorized before October 16th 1919, are also considered **as fondées en titre** (article L511-9 of the code de l'énergie).

Droit d'eau fondé sur titre

This right is the result of **a procedure of authorization delivered by prefectorial decree**. It concerns all watermills constructed before 1789 that would have been modified to enhance the original engine power mentioned in the original title of ownership.

RÈGLEMENT D'EAU

This water regulation declares management rules for all watermills receiving the droit d'eau fondé sur titre. It takes into account :

- The legal weir level
- The dimensions for all hydraulic infrastructures (weir, spillway gates...)
- All maintenance and management duties the owner is responsible for



RIGHT OF OWNERSHIP

All annex infrastructures (channels, millrace...) are privately owned structures. **Except otherwise proved, they belong to the owner of the mill**, even if they are located on different properties.

When a watermill is directly located on the mainstream, the owner is responsible for all infrastructures present in the area where water flow is visually influenced by the mill.

REGARDING RESIDENTS SURROUNDING HYDRAULIC ANNEXES

They are not allowed to extract water or modify the water level. They can also be submitted to a contract specifying a right of way (**servitude de passage**) so that the owner can have access to all hydraulic annexes.



MAINTENANCE

According to regulations associated to watermill rights, all infrastructures should be maintained **in working conditions** :

- Weirs and spillways in good condition and deprived of any logjams
- All gates should be functional and easily operated
- Fish ladders, if present, should be deprived of any logjams or plant debris

Your local DDT needs to be informed of any potential maintenance work or repairs, especially if they require the lowering of water level. **Please maintain your infrastructure regularly** rather than occasionally, to avoid any severe impact on water flow or aquatic ecosystems in general.



DID YOU KNOW ?

The establishment of a **collaborative management of spillway gates manoeuvres between property owners** located on the same watercourse is a very useful and relevant organisation to adapt each management.

> **Contact your local syndicat GEMAPI** (See map p.12)



MANAGEMENT

Every infrastructure should be managed according to water regulation (**règlement d'eau**) and other possible local regulations (Plan de Prévention des Risques Inondations, drinking water dispositions, recreational purposes, irrigation...).

The regular and progressive manoeuvre on hydraulic infrastructure reduces their impact on watercourses :

FLOOD RISK

The owner is responsible for upkeeping its gates and sluices to always maintain the legal water level. This regulation requires the presence of person in charge at all times. Contact your syndicat GEMAPI to learn more on flood management.

SEDIMENT TRANSPORT

Spillway gates should often be opened to facilitate the circulation of sediment. Historically, owners on a same watercourse would open their spillway gates at the same time on Sundays and hollidays to allow a better and more dynamic circulation.

LOW-WATER LEVELS

To protect a watercourse's biological life, owners should leave a minimal water flow upstream of their weir at all times.



BRINGING INFRASTRUCTURES UP TO REGULATION ENVIRONMENTAL CODE

WATERCOURSE CATEGORIES

Watercourses on list 1

The construction of any new infrastructure is forbidden as it could be an impact to the ecological continuity. The renewal of existing authorisations is supported by new regulations on species conservation and freshwater quality.

Watercourses on list 2

The existing infrastructures should allow sufficient sediment transport and fish circulation.

A mill should not be a barrier to the circulation of aquatic flora and fauna. It is also important that it's effect on sediment transport is limited. Two types of regulation exist on watercourse management.

(Article L-214-17 of the French Environmental Code)

IMPACT ON AQUATIC ECOSYSTEMS

Hydraulic infrastructures can be barriers to the ecological continuity, including aquatic species circulation and sediment transport.



POSSIBLE IMPACTS OF HYDRAULIC WORKS ON WATERCOURSES

- **Habitat fragmentation** limits the access of fish to reproduction sites, or even genetic mixing within aquatic species ;
- Deterioration and aquatic habitat homogenisation due to the **impediment of natural sediment transport** in the watercourse ;
- Alteration of freshwater quality due to **water stagnation** upstream of hydraulic infrastructures (water warming, decrease of oxygen concentration) that can lead to the spread of algae (eutrophication) and aquatic fauna asphyxiation.
- **Modification of water flow** downstream

MAINTENANCE ON WATER FLOW BARRIERS

Only a part of all identified barriers are considered to have an impact on water flow.

If a hydraulic infrastructure has an impact on water flow, the owner is responsible for any ecological continuity restoration needed. Bringing the structure up to regulation can include the installment of fish ladders, maintenance or the construction of new structures.

These regulations support other actions aiming the regaining of freshwater quality and aquatic ecosystems conservation (reduction of contamination risk, wetland conservation, waterways renaturation...). All these measures contribute to the restoration of dynamic and healthy rivers, biodiversity richness and climate change adaptation.

on 3rd January 2019

(Source : Observatoire national de la biodiversité).

1 barrier
every 6 km
of watercourse
identified in France

100 100
Barriers
identified in France
99 000
Barriers identified
on French mainland

DID YOU KNOW ?

The impact of watermills on aquatic species circulation has been observed for the first time during the 19th century. This phenomenon increased during the 20th century, that's why maintenance and management modifications were made on existing structures : heightening of weirs and dams, changes in spillway gates, firsts hydroelectric mills (severe impact of turbines on aquatic fauna), changes in the use of coating materials (concrete)... All these modifications have led to mills being insurmountable barriers for the aquatic fauna.

Fish populations have also been impacted on by other factors (contamination, watercourse morphology modification, removal of smaller adjacent waterways...)

MAINTENANCE ON AQUATIC ECOSYSTEMS

Syndicats GEMAPI are essential participants in the maintenance of hydraulic infrastructures, as well as to ensure the proper execution of bringing up to regulation these structures.

Maintenance on le Moulin de Maine Brun

SAINT-SATURNIN ET ASNIÈRE-SUR-NOUÈRE | SYBRA

Construction was undertaken thanks to a financial opportunity, and with the agreement of the owner. Actions that were carried out concerned granulometric input, reinforcement of the riverbed, and weir repairs.



Maintenance on le Moulin de Beaumont

COMMUNE DE GALGON | SMG SGL

Construction was undertaken to bring the structure up to regulation as it's a watercourse on list 2, in addition to compensatory financial measures from the construction of a railway line. Actions carried out were the construction of a branch river to allow fish species migration.



Maintenance on le Moulin Bas Veillard

COMMUNE DE BOURGE CHARENTE | SBV NÉ

This watermill was identified as becoming a ruin. To restore the ecological continuity, a fish ladder were installed, hydraulic infrastructures were restored, and systems to prevent floating waste were set up.



I AM INTERESTED IN **BUYING A WATERMILL**, WHAT DO I NEED TO KNOW BEFORE PURCHASING IT ?

Purchasing a watermill is **not trivial** : it's not only a residential area, but also a very peculiar property. It requires a **lot of maintenance and management**. Before purchasing it, it is recommended to :

1. Check the **land ownership, and its extent to all hydraulic infrastructures** connected to the watermill
2. Be aware of le **droit d'eau et du règlement d'eau (regulation on water use)**
3. Be aware of the potential existence of a **convention de gestion et de servitude**
4. Evaluate the **general state of the mill** and all its **components (sluice, spillway gates, weirs...)**, and the need to bringing them up to regulation
5. Determine the state of the mill towards **the respect of ecological continuity**

To learn more about important information you need before purchahsing a watermill :

- > Contact your local **syndicat GEMAPI** (See map p.12)
- > Contact your local **DDT(M)** (Information p.12)
- > Ask the property **owner/seller**

WHAT TO DO WHEN **FLOODING** ?

The owner is in charge of respecting the **legal range of water-level** at all times. Spillway gates need to be regularly opened, and deprived of any logjams or plant debris that could be accumulated, to ensure the natural water flow.

When flooding, it's important that the owner :

- **Is present** – in case of extented absence, please make sure the property is accessible (leave keys for all gates and easy access to all hydraulic infrastructures)
- **Anticipate the opening of spillway gates** before flooding :
- **Open slowly and progressively** all gates to allow a more natural and regulated water flow
- **Encourage the circulation of water located at the bottom of the water column** to improve sediment transport and fish circulation
- **After the flood, remove all logjams and plant debris from every hydraulic infrastructure**



© SABV DA



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WHAT TO DO DURING A PERIOD OF **LOW-WATER LEVEL** ?

During low-water period, maintenance changes are needed :

- You need to respect the **minimal legal water level** and all regulations on gate manoeuvres imposed by **prefectorial decree** during low-water period
- **Encourage the circulation of water located at the bottom of the water column** to improve the ecological continuity and to stir freshwater (careful not to create a brutal flushing during low-water period as mater in suspension could cause the clogging of the riverbed downstream).



© Charente Eaux

CAN A MILL **SUSTAIN A WATERCOURSE** DURING LOW-WATER PERIOD ?

Volumes of water retained by a weir or a "chaussée" **are too limited to sustain** the whole watercourse during low-water period.

When doing works on a mill, it is important to **evaluate the dynamic of the whole equipment**, to make sure the connexion between the watercourse and adjacent land plots.

This connectivity allows the vegetation to **play their role of sponges**, and to **limit the negative impact of droughts** on aquatic ecosystems.



© SYBTB

To learn more on the best management approach in this situation :

> **Contact your local syndicat GEMAPI** (See map p.12)

MY MILL IS NOT USED ANYMORE. WHAT CAN I DO WITH IT ?

Evaluate its future with the adequate administration :

> **Contact your local DDT(M)** (See map p.12)

I WANT TO RESTORE MY MILL TITLED AS "FONDÉ EN TITRE" **TO PRODUCE ELECTRICITY**, HOW CAN I DO IT ?

You need to contact the local Préfet, that will give you all requirements on aquatic ecosystems protection and the sustainable management of freshwater quality.

> **Consulter la DDT(M) qui indiquera les éléments à fournir**

WHOM CAN I CONTACT



> La Direction Départementale des Territoires (et de la Mer) [DDT(M)]

Charente :
ddt-seer@charente.gouv.fr
05 17 17 37 37

Autres départements :
Visiter annuaire.service-public.fr

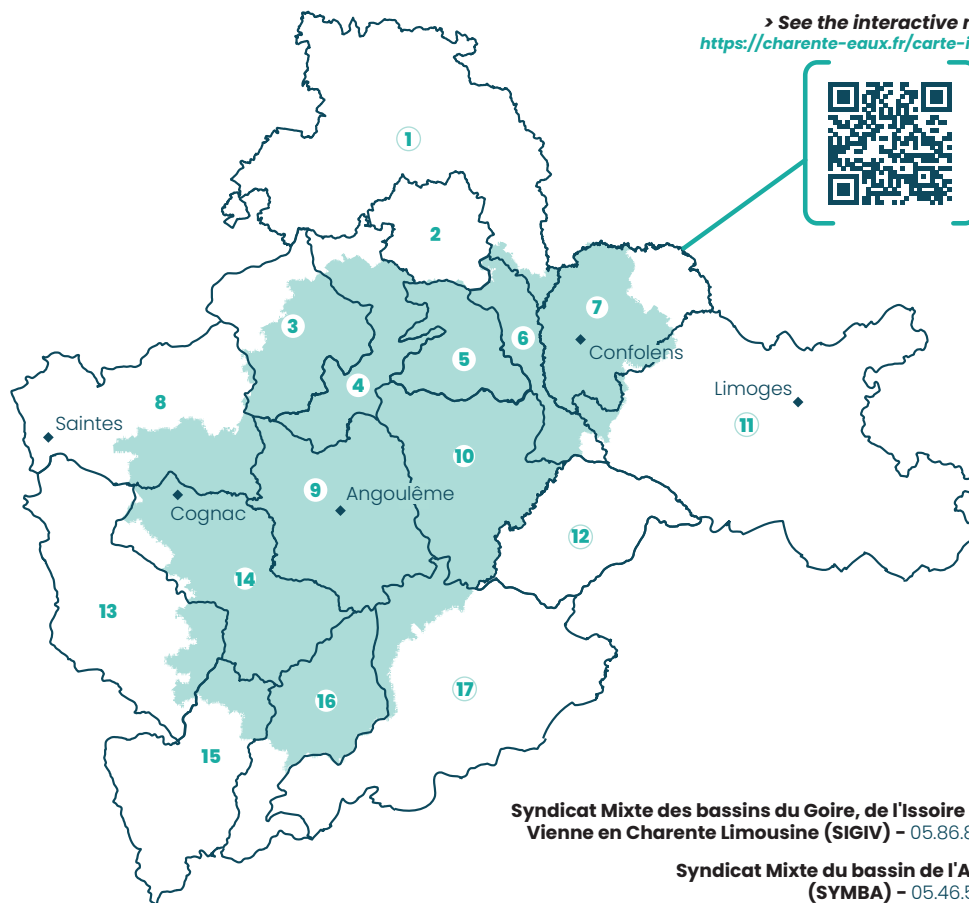


> Office Français de la Biodiversité [OFB]

See the directory of the OFB to contact the local/regional branch

Charente : 05 45 39 00 00

> See the interactive map
<https://charente-eaux.fr/carte-interactive/>



> **Contacter un syndicat GEMAPI**

Les syndicats GEMAPI présents sur le territoire **sont disponibles pour répondre à vos questions et pour vous accompagner** dans certaines démarches.

- ① **Syndicat Mixte des Vallées du Clain Sud (SMVCS)** - 05.49.37.81.34
- ② **Communauté de Communes du Civraisien en Poitou (CCCCP)** - 05.49.87.67.88
- ③ **Syndicat Mixte d'Aménagement des bassins Aume-Couture, Auge et Bief (SMABACAB)** - 05.45.21.01.91
- ④ **Syndicat des bassins Charente et Péruse (SBCP)** - 05.45.22.86.34
- ⑤ **Syndicat des Bassins de l'Argentor, L'izonne et Son-Sonnette (SBAISS)** - 05.45.31.14.67
- ⑥ **Syndicat Mixte d'Aménagement du bassin de la Charente Amont (SMACA)** - 05.45.85.38.64

- ⑦ **Syndicat Mixte des bassins du Goire, de l'Issoire et de la Vienne en Charente Limousine (SIGIV)** - 05.86.84.05.28
- ⑧ **Syndicat Mixte du bassin de l'Antenne (SYMBA)** - 05.46.58.62.64
- ⑨ **Syndicat du bassin des rivières de l'Angoumois (SYBRA)** - 05.45.38.16.71
- ⑩ **Syndicat d'Aménagement des rivières du Bandiat, de la Tardoire et de la Bonnieure (SYBTB)** - 05.45.38.10.26
- ⑪ **Syndicat d'Aménagement du Bassin de la Vienne (SAB Vienne)** - 05.55.70.77.17
- ⑫ **Syndicat Mixte des Bassins Bandiat Tardoire (SYMBA Bandiat Tardoire)** - 05.55.70.27.31
- ⑬ **Syndicat Mixte du bassin de la Seugne (SYMBAS)** - 05.16.48.40.04
- ⑭ **Syndicat du bassin versant du Né (SBV Né)** - 05.45.78.74.45
- ⑮ **Syndicat Mixte de Gestion des bassins de la Saye, du Galostre et du Lary (SMGBV SGL)** - 05.57.25.36.28
- ⑯ **Syndicat d'aménagement du bassin versant Dronne aval (SABV Dronne Aval)** - 05.45.98.59.61
- ⑰ **Syndicat de Rivières du Bassin de la Dronne (SRB Dronne)** - 05.53.91.98.78

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