

# Removal of twenty small structures and diversification of the main channel of the River Couasnon

## The operation

Category	Restoration
Type of operation	Total or partial dam or weir removal
Type of environment	Headwaters and intermediate river zone
Issues at stake (water, biodiversity, climate)	Good status of habitats, water quality and river continuity
Start of operation	June 2006
End of operation	August 2009
Length of river affected by the works	26,686 m

## River in the restored section

Name	The Couasnon
Distance to source (upstream point)	0 km
Mean width	3.5 m
Mean gradient	1.8 ‰
Mean flow rate	0.224 m <sup>3</sup> /s at Pontigné 0.929 m <sup>3</sup> /s at Gée

## Aims of the project owner

- Improve the quality of habitats for brown trout.
- Improve water quality.
- Restore river continuity.

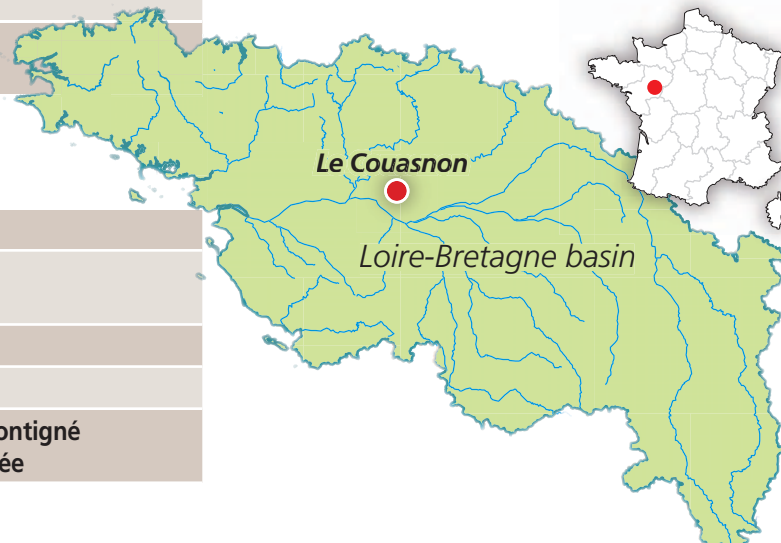
## Environment and pressures

The River Couasnon flows into the River Authion in two arms after a journey of 39.6 kilometres. The 14 km upstream of the Baugé urban area are classified as a fishery in the first category and the rest of the river is classified as second category. The river was resized and straightened during the 1970s and 1980s. Numerous hydraulic structures line the river and affect its hydraulic operations. 27 flaps and 5 flow splits were installed for agricultural requirements in addition to the 11 mills that already existed. Approximately two-thirds of the Couasnon's flows are diverted into the mill structures and reaches.

The cleaning and straightening operations, in addition to the installation of hydraulic structures, caused the water quality to drop and damaged habitats.

## Location

Country	France
River basin	Loire-Bretagne (Brittany)
Region(s)	Pays-de-la-Loire
Département(s)	Maine-et-Loire
Commune(s)	Auverse, Baugé, Beaufort-en-Vallée, Chavaignes, Fontaine-Guérin, Gée, Lasse, Le Vieil-Baugé, Pontigné, Mazé



The structures prevented the free movement of fish, caused the siltation of the river, led to the proliferation of aquatic vegetation and increased the water temperature. They also led to the disappearance of the brown trout in the upstream section of the river.

## Opportunities to act

The pumping of water from the Couasnon for irrigation is now prohibited, thus rendering many of the structures useless. The restoration carried out by the Syndicat intercommunal pour l'aménagement du Couasnon (SIAC –

Regulatory context:	Parc naturel régional Loire-Anjou-Touraine (Natural Regional Park)
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## References in relation to European Directives

Water body ref.	FRGR1561 and FRGR0453
Natura 2000 site ref.	Not applicable



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A flap on the Couasnon at Chavaignes, prior to its opening (top) and afterwards (2008, bottom).

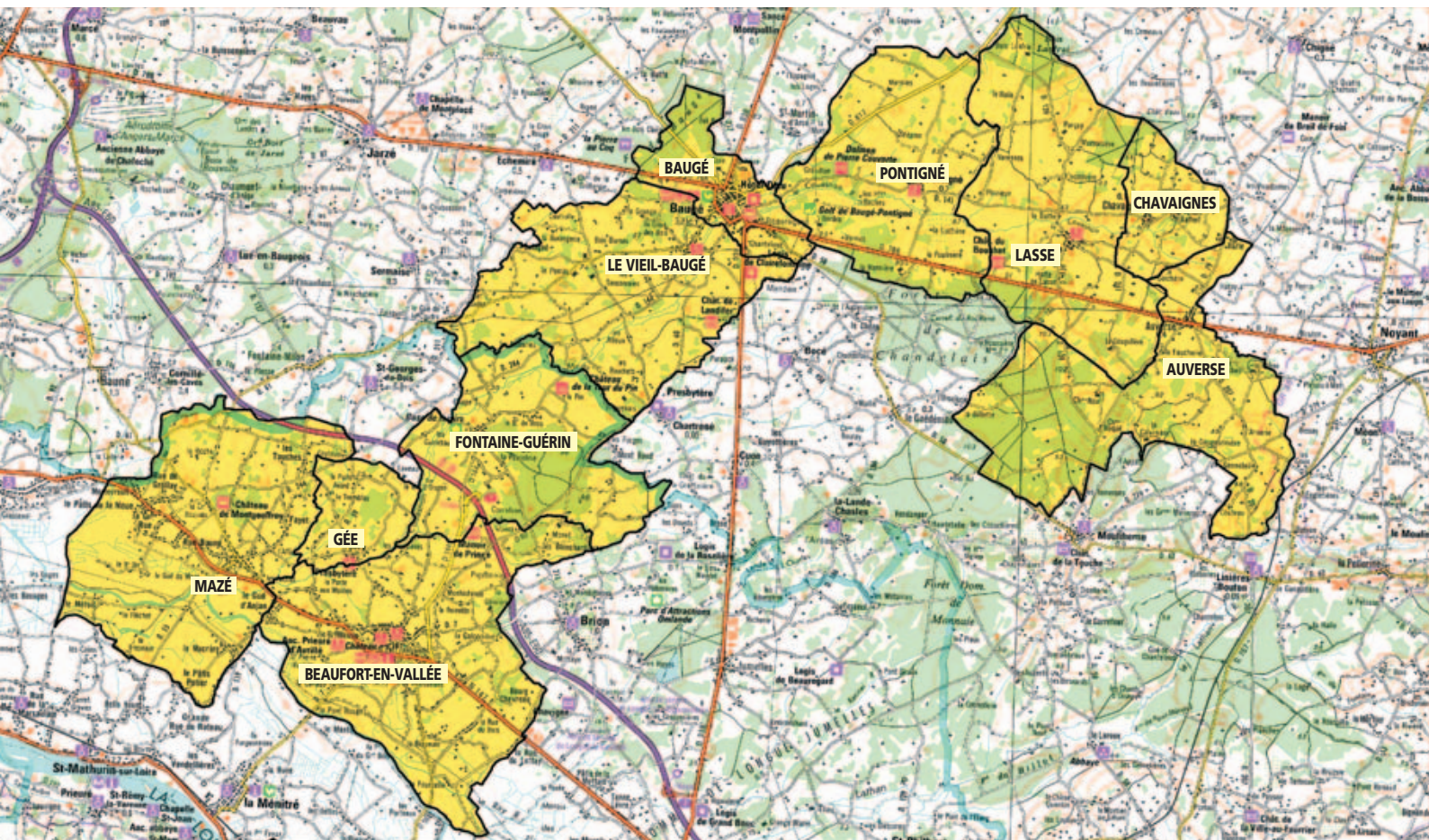
Intermunicipal Association for the Development of the Couasnon) forms part of a Contrat restauration entretien (CRE- Restoration and Maintenance Contract), signed in 2004, whose purpose is to establish free-flowing water ("Regain a natural low flow") and diversify habitats ("Ensure the free movement of fish"). The Couasnon forms part of the area of the SAGE (Water Management and Development Scheme) for the River Authion which is currently being established.

### ■ Works and developments

Between 2004 and 2008, the flaps of the 22 structures were lowered. All of the structures retained their concrete and metal structures, but the flaps on some of them can no longer be moved, as the cables have been dismantled.

In the section classified as a fishery in the first category, 550 tonnes of blocks were used to diversify the bed and create over 110 deflectors. 1,500 tonnes of gravel was deposited in the river bed in order to reconstitute riffles. Following these interventions, restocking was carried out in order to initiate the recolonisation of the river by brown trout in the upstream part (introduction of 1,700,000 brown trout [*Salmo trutta*] fry).

In the section classified as a fishery in the second category, 580 tonnes of gravel and 474 tonnes of blocks were deposited. The final phase of the works ended in



2009 in the downstream part, where 505 tonnes of blocks, stones and gravel were deposited.

### Regulatory approach

The last phase executed on the downstream section was in an area covered by the Plan de prevention du risque d'inondation (PPRI – Flood Risk Prevention Plan), which required the creation of a flood expansion area that was equal to the volume of the added materials.

### Post-restoration management

No specific management measures have been implemented.

### Monitoring

An initial assessment was carried out by a consultancy in order to define the CRE objectives. It concerned the biology, hydraulics and morphodynamics of the river. In 2008, an electric fishing operation was carried out by the fishing federation at two stations situated in the part classified as a first-category fishery. There are plans to continue the monitoring in the next CRE.

### Outcome of the project and outlook

River continuity has been re-established over two 7-kilometre sections. A structure remains in the middle, which will be dealt with in the framework of the next CRE.

Fishing operations carried out in 2008, upstream of Baugé, revealed that the fish population was close to the theoretical reference population. Roach and carp have disappeared, being replaced by trout and bullhead. Fast-flowing water cyprinids and brook lamprey have not yet returned.



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A flap weir on the Couasnon at Baugé, prior to its removal (top) and afterwards (2008, bottom)

The amount of sediment in the river has reduced and eutrophication phenomena have disappeared. The chosen restoration technique is a compromise between establishing a good ecological status and maintaining agricultural activities. The agricultural context did not allow work to be carried out on the river's floodplain, which explains the use of deflectors. Unfortunately this technique, which was intended to revitalise the environment, has been quite disappointing on the Couasnon. Indeed, this is a low-energy river with a slow flow, transporting small amounts of sediments. As yet, there has been virtually no accumulation of materials downstream of the deflectors and more time is required for gravel shoals to develop. The recreation of a sinuous bed in the main channel has not been observed. The results concerning the diversification of habitats are thus rather mixed in the short-term. For

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Flow deflector on the Couasnon

## Costs

In euros excl. VAT

Cost of studies	Unknown
Cost of acquisitions	Not applicable
Cost of operations and developments	For the first phase: <b>€171,120</b> For the last phase: : <b>€36,000</b>
Cost of promotion	Unknown
<b>Total cost of the actions</b>	<b>€207,120</b>

Financial partners and funding:  
*Agence de l'eau (Water Agency)*

Technical partner of the project:  
*Fédération départementale de la pêche (Departmental Fishing Federation)*

the next restoration works, the creation of berms will be prioritised in order to reduce the width of the bed and create meanders. The cost efficiency of the operation is quite variable according to the actions carried out. Indeed, the benefits of the restoration originate mainly from the opening

of the flaps which cost nothing or very little, in relation to the cost of the deflectors, which had little immediate impact.

From a social point of view, the diversification measures and the handling of riverside vegetation have been positively received, whereas the opening of the flaps is still frowned upon by fishermen, who have witnessed a drop in the water level and the disappearance of still water species. The association has drafted an article in response to the preconceived ideas about the subject; read: [http://www.sage-authion.fr/IMG/pdf/Courrier\\_Ouest\\_21\\_08\\_2009.pdf](http://www.sage-authion.fr/IMG/pdf/Courrier_Ouest_21_08_2009.pdf)

In the second-category part of the river, pike spawning beds have been developed. The fishing federation also wishes to reintroduce sensitive species which are currently absent. In the next CRE, the removal of other more problematical weirs must be undertaken and two pilot sites will be remeandered.

### Promotion of the project

- Information boards on the project site.
- Publication of public relations brochures and booklets.
- Article in «*Le pêcheur d'Anjou*» magazine (n°. 30, Oct. 2008).



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Creation of a riffle on the Couasnon at Vieil-Baugé

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