



Large-flowered waterweed (*Egeria densa*)

Planting riparian vegetation to limit the spread of large-flowered waterweed in the Jalle de Blanquefort river basin

Bordeaux Métropole

■ As of 1 January 2016, Bordeaux Métropole, the local government for the greater Bordeaux area, took over responsibility for the GEMAPI policy (management of aquatic environments and flood prevention) for the Jalle de Blanquefort river basin from the Jalles, de Lande à Garonne board (SIJALAG). Bordeaux Métropole is now in charge of the jalles¹, the largest natural area within the urban zone. The Métropole uses the studies previously carried out by the SIJALAG and its personnel who joined the Métropole when the board was terminated. It also uses the studies done by *Cistude Nature*, particularly for the management of invasive alien species.

■ Bordeaux Métropole is responsible for regular maintenance operations on the hydrographic network in the Jalle de Blanquefort river basin. The Métropole also manages the current studies on how to improve the status of aquatic ecosystems and mitigate the effects of flooding and droughts.

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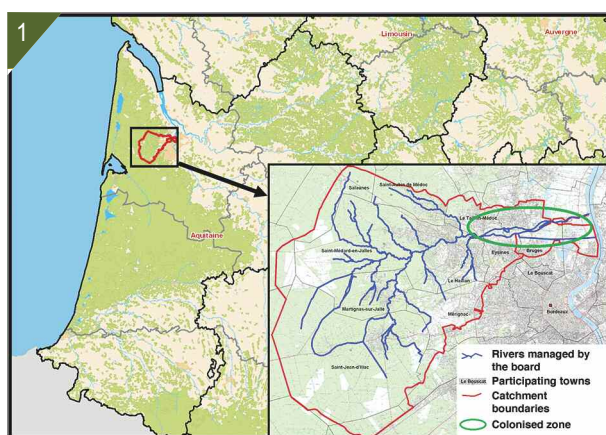
Intervention site

■ The Jalle de Blanquefort river basin covers a total of 13 towns, namely Blanquefort, Bordeaux, Bruges, Eysines, Le Bouscat, Le Haillan, Le Taillan-Médoc, Martignas-sur-Jalle, Mérignac, Saint-Aubin-de-Médoc, Saint-Jean-d'Illac, Saint-Médard-en-Jalles and Salaunes.

■ The work was done in the towns of Blanquefort, Bordeaux, Bruges, Eysines, Le Haillan, Le Taillan-Médoc and Saint-Médard-en-Jalles.

■ The Jalle area includes two Natura 2000 sites, namely the Bruges marshes nature reserve (FR710029) and the Jalle hydrographic network in Saint-Médard and Eysines (FR7200805).

■ The Jalle River itself has been heavily impacted by human activities, e.g. urban development, containment and a series of dams in the downstream section.



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1. Map showing the Jalle de Blanquefort river basin.

Disturbances and issues involved

■ *Egeria densa* has been observed on the Jalle since the middle of the 2000s.

■ It forms dense, single-species populations that hinder the flow of water (formation of hydraulic barriers), trap sediment and can provoke variations in water quality.

■ It competes for resources with native plants such as water-starwort [*Callitriche obtusangula*], Eurasian watermilfoil [*Myriophyllum spicatum*], rigid hornwort [*Ceratophyllum demersum*], etc. and can facilitate the development of another invasive plant, creeping water primrose (*Ludwigia peploides*) by providing a base for its growth.

■ The plant is also visually bothersome, particularly in certain reaches where the dense beds reach the water surface.

Interventions

■ In 2011, the SIJALAG launched a study on how to manage *Egeria densa* that at the time was present on 16 kilometres out of the 176 km in the hydrographic network.

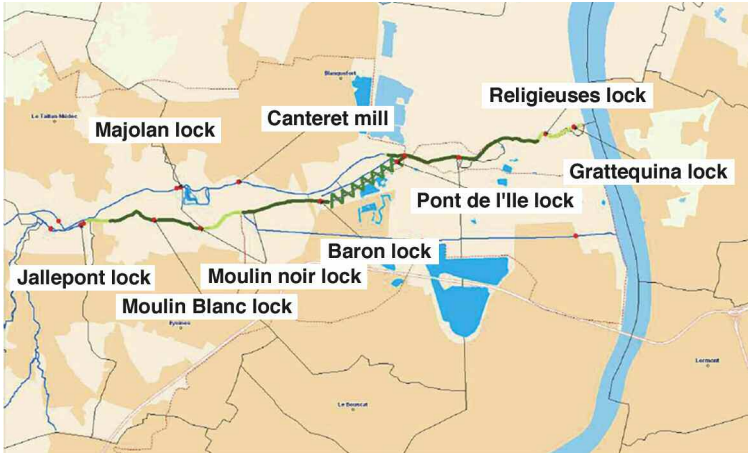
■ The main objectives were to:

- collect the available knowledge on the colonisation dynamics of the species;
- draw up a status report on the presence of the species in the river basin as well as on its ecological, social and financial impacts and costs;
- propose and experiment with management work.

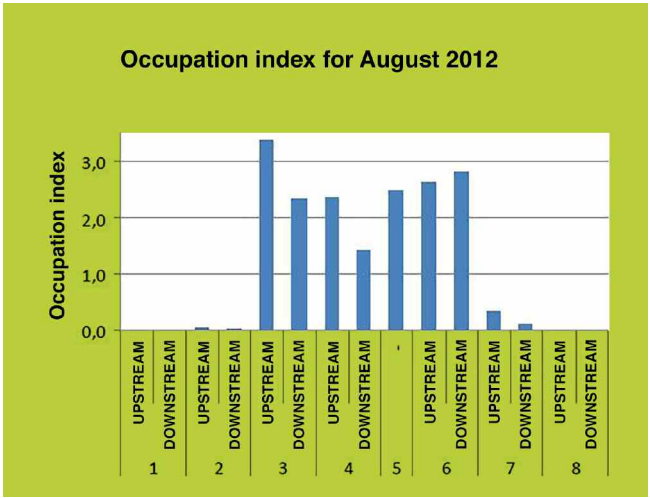


■ Study results

- The study was carried out over three years (2012 to 2014) and revealed significant variations in the presence and density of the waterweed.
- Generally speaking, the sites the farthest upstream and those downstream, near the estuary, were the least colonised, whereas the sites in the middle were much more heavily colonised (see the results for 2012 in the figure below).



Distribution of waterweed over the different sites. Dark green = high density, light green = light density. The red dots mark locks and mills.



Index for waterweed presence on each site in August 2012 (index = average abundance x number of colonised spots).

- The analysis also revealed that the presence of the plants would seem to be correlated with a set of other factors, including the flow velocity, bed width and depth, and nutrient richness in the environment (nitrates, oligophosphates). The latter factor would explain why the sites upstream of the wastewater-treatment plants are the least affected.
- High levels of shade are also correlated with an absence of waterweed.
- On the basis of these results, further study was put into the potential management techniques.

■ Tests on mechanical uprooting

- Mechanical uprooting was tested each year in 2011, 2012 and 2013 on two zones in the river, each 400 metres long. The two zones were selected because they had the highest plant densities and the plants constituted a direct, visual disturbance for the patrons of a restaurant along the river.



2. Waterweed clogging a hydraulic installation.
3. The Jalle River colonised by Egeria densa.
4. The machine used to uproot the plants.
5. Uprooting the waterweed.
6. Young trees growing at the SIJALAG nursery.

- Following this work, the occupation indices for waterweed increased downstream, which probably means that the work caused the dispersal of plant fragments.
- Given the ineffectiveness of the mechanical uprooting, its cost and impact on the rest of the ecosystem, it was decided not to continue with the technique.

■ Management proposals

- In light of the relatively low adverse impacts of waterweed on the environment, its colonisation dynamics and the ineffectiveness of the uprooting technique previously tested, it was decided to work on restoring the environment to improve its long-term ecological status. It was hoped that this would limit the colonisation of the species to acceptable levels.
- The work to restore the equilibrium of the ecosystems was organised along three lines:
 - the installation of riparian vegetation to create shade and thus limit the development of the waterweed;
 - improvements in the management of water levels by renovating the system of locks and mills to limit the reaches with low flow velocities that facilitated the development of waterweed and to restore ecological continuity (the free circulation of water, fish and sediment);
 - a study on how to divert the effluents from the wastewater-treatment plant from the upper section of the river, in order to reduce the quantity of nutrients.
- To date, only the installation of riparian vegetation has been undertaken.

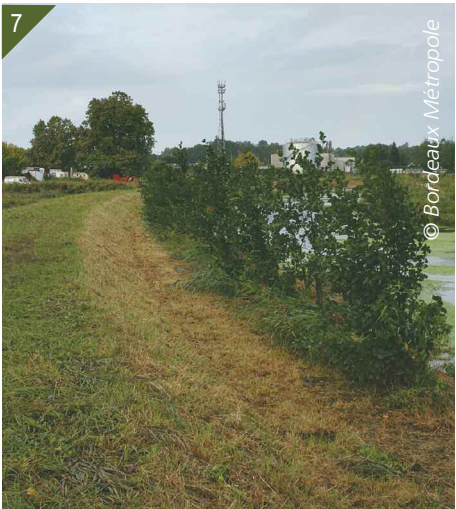
■ Installation of riparian vegetation

- Due to the presence of dikes bordering major sections of the river, the riparian vegetation could be planted only along 900 metres of the river.
- The river is not public property, therefore it was necessary first to receive permission from the owners of the banks. The increase in shade could have caused problems for the vegetable farms with fields along the river, but the project was accepted with any difficulties.
- The work started in the fall of 2014.
- A total of 300 trees, approximately 1.5 metres tall, were planted at a distance of two metres from the water, alternating taller and shorter (shrub-type) species.

Latin name	Common name	Number planted
<i>Alnus glutinosa</i>	Alder	150
<i>Fraxinus excelsior</i>	Ash	50
<i>Salix sp.</i>	Willow	25
<i>Corylus avellana</i>	Hazel	25
<i>Sorbus torminalis</i>	Checker tree	25

■ Annual maintenance

- The waterweed (plants and fragments) is removed from the hydraulic installations each year in the fall.
- A total of four to five tons of fresh waterweed are removed each year. The plants are spread on the banks of the river (above flood level) to decompose.



7. Trees planted along the Jalle.
8. Work to remove E. densa from the hydraulic installations.



Results and assessment

■ Results

- Restoration of the environment will take place only over the mid to long term, i.e. it will not be possible to draw any conclusions for several years.
- A monitoring programme is not planned for the moment due to a lack of human resources. However, a visual check will be run each year during the maintenance work on the dikes in the summer (July and August).
- As of the spring of 2017, the trees would seem to have taken root along the river. Two and a half years after being planted, the survival rate is 95% and the height of the trees is approximately three metres. Most losses are due to vandalism.

■ Assessment

- Three technicians spent ten days to plant the riparian vegetation.
- The maintenance work in the fall also requires three persons for approximately ten days of work.

Table listing project costs.

	Year	Cost (€)	Funding
Study of the colonisation dynamics	2012 - 2014	59 000	60% Adour-Garonne Water agency, 40% Bordeaux Métropole
Mechanical uprooting	2011 2012 2013	28 600 30 000 30 000	40% Adour-Garonne Water agency, 35% Bordeaux Métropole, 25% SIJALAG
Fall maintenance	Every year	8 000	60% Adour-Garonne Water agency, 20% Gironde departmental council, 20% Bordeaux Métropole
Riparian vegetation	2014	10 000	60% Adour-Garonne Water agency, 20% Gironde departmental council, 20% Bordeaux Métropole

Information on the project

- An information sheet was prepared for the general public.

■ Outlook

- River compliance in terms of ecological continuity should be achieved by the end of 2019, following a study on the hydromorphology of the hydrological network. Work will also be put into setting up a more rigorous management system for water abstractions by the vegetable farmers because currently, there is no overall management system.
- The project to divert the effluents of the wastewater-treatment plant is also in the planning stage.

Authors: Doriane Blottière, IUCN French committee, and Fabrice Demarty, Bordeaux Métropole. January 2018.

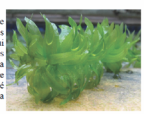

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Egeria densa dans la Jalle de Blanquefort

Egeria, qui est elle ?

L'*Egeria densa* (appelé Egeria dans le reste du document) est originaire du Brésil et des régions côtières d'Argentine et d'Uruguay. Elle cause à l'heure actuelle des difficultés dans différentes parties du monde comme : l'Australie, la Nouvelle Zélande, l'Afrique du Sud, l'Amérique latine, et l'Europe et notamment en France. Elle y a été importée et cultivée depuis les années 1920 et s'observe en milieu naturel depuis 1960, sur la jalle milieu des années 2000.




Egeria densa est une herbacée pérenne aquatique submergée qui forme des peuplements mono-spécifiques denses qui restreignent la circulation des eaux, piègent les sédiments et provoquent des variations de la qualité de l'eau. Elle a également affectée le statut de certaines espèces menacées. Elle a été introduite à travers le monde entier via l'aquariophilie.

Quels impacts réels ? Quels problèmes ?

Cette plante fait partie des espèces exotiques envahissantes qui causent par leurs proliférations des nuisances très importantes vis-à-vis des usages des milieux naturels. A part les deux espèces de jussie, elles sont en vente libre comme plantes ornementales. Il serait profitable de ne pas les acheter et de les remplacer par des espèces indigènes.

- Le premier des effets négatifs est celui de la gêne visuelle.
- Egeria va aussi occuper des niches écologiques des plantes indigènes qui se développent de moins en moins.
- Un autre problème, est le fait que l'Egeria devient un support de développement des algues filamenteuses et d'une autre invasive : la jussie rampante (*Utricularia perfoliata*).
- Elle a aussi des incidences hydrauliques : création de bouchons hydrauliques entraînant une perturbation localisée des écoulements, voire une augmentation ponctuelle des niveaux d'eau.




Etude sur la dynamique et la colonisation d'*Egeria densa* dans la Jalle de Blanquefort 2012-2014.

Le but de l'étude a été d'identifier les facteurs qui influencent le développement de l'Egeria et d'autre part de faire une description plus détaillée de son habitat et de sa distribution en déterminant le comportement de la plante en amont/ aval des ouvrages, entre différents ouvrages, dans la zone ayant subi des aménagements, en présence de la station d'épuration, etc.

Les sites étudiés sont : Moulins du Thil, Ecluse de Jallipont, Moulins, Ecluse du moulin Blanc, Ecluse du moulin noir, La Rotonde, Moulins du Baron, Ecluse du pont de l'Île, Ecluse des Religieuses.

L'étude a pu mettre en évidence que transparence, paramètres physiques de l'eau, profondeur, vitesse du courant, ombrage, substrats du fond du lit, apports nutritionnels (nitrates et orthophosphates) et conditions climatiques sont les facteurs agissant de la prolifération de cette plante.



9. The information sheet on E. densa.

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