



Large-flowered waterweed

(*Egeria densa*)

Management and scientific monitoring of large-flowered waterweed in the Vendée River

Board for the Marais Poitevin marshes and the Vendée, Sèvre and Autises basins

- Intermunicipal association (16 towns) created in 1992 in the south-western section of the Vendée department, in the Pays-de-la-Loire region.
- In charge of the 2008-2012 Contract to restore and maintain wetlands (CRE ZH) for the Marais Poitevin marshes in the Vendée department.
- In charge of the *Egeria densa* management programme in the Vendée basin since 2006. This management programme was folded into the CRE ZH contract in 2008 and targets:
 - restoring balanced functioning between the ecosystem compartments;
 - reducing the visible aspects in the town of Fontenay-le-Comte during the summer period;
 - making possible traditional uses of the Vendée River (fishing, boating);
 - avoiding the spread of the plant to other canals in the Vendée basin and to other ecologically important areas downstream (the Marais Poitevin marshes).

Vendée departmental federation for fishing and the protection of aquatic environments

- Main missions assigned by the Vendée departmental council (CG 85):
 - centralise and organise information on the presence of invasive alien aquatic plants (status report) in the Vendée department (85);
 - identify, with CG 85, the priority sites for interventions;
 - coordinate work sites;
 - represent the department in the regional committee for the management of invasive species.
- Managing entity for the *Egeria densa* management programme, responsible for:
 - providing the board with technical assistance in carrying out the management work;
 - monitoring the work sites;
 - assessing the results achieved;

- participating in the scientific monitoring by Agrocampus Ouest since 2010.

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Intervention site

- The intervention site is a reach of the Vendée River located in the town of Fontenay-le-Comte (85). The Vendée River is a tributary to the Sèvre-Niortaise River and flows through the Marais Poitevin marshes.
- In 2012, the work was carried out on a reach 3.5 kilometres long. A weir in the town marked the upstream limit and the Boisse dam the downstream limit of the site.
- Upstream of the intervention site is the Mervent reservoir that is used as a supply of drinking water and as a means to attenuate low-flow levels and manage flooding



1. Section of the Vendée River where the work took place in 2012 (the limits are shown in red).

Disturbances and issues involved

Egeria densa was observed for the first time in isolated groups on the Vendée River in 1997 in the town of Fontenay-le-Comte. In 2005, the plant had colonised almost 10 kilometres of river, covering up to 90% of the surface in places. Its propagation was reinforced by releases of water from the Mervent reservoir, that transported plant fragments and entire plants over long distances.



■ Ecological impacts

- Formation of dense beds limiting the development of native plant species.
- Reduction in the movement of fish species.

■ Impacts on human activities

- Disturbances to boating activities.
- Development of dense beds making fishing impossible.
- Unsightly conditions caused by the dense beds largely covering the surface.

Interventions

■ 2012 is the seventh year of efforts to manage *Egeria densa* on the Vendée River. Mowing and harvesting are used to control the development of the plant. Special technical specifications set the technical requirements for the work. From the start, the intervention site was divided into 14 sections in order to carry out annual monitoring of the most heavily infested parts of the river. Subsequently, the sections served to study the progress of colonisation, calculated on the basis of the volumes removed from each section. Clear, easily identifiable landmarks signalled the beginning and end of each section.

■ Mowing and harvesting work

- The work took place from 2 to 27 July 2012.
- Three boats were used for the work. A mower and a pusher-harvester were present for the first week of work and a harvester was present from beginning to end.
- Nets were installed across the entire width of the river at 3 different places to limit the dispersal of *Egeria densa* fragments.
- The mowed plants were temporarily stored for 1 to 2 days at two different places on the banks to dry.

■ Storage and fate of the harvested plants

- Transportation by truck (without tarps) from the temporary sites to the final site.
- The final site was farm land (no flood risk) in the town of Fontaines, less than 10 km from Fontenay-le-Comte.
- The plants were mixed with fertiliser and spread in fields.

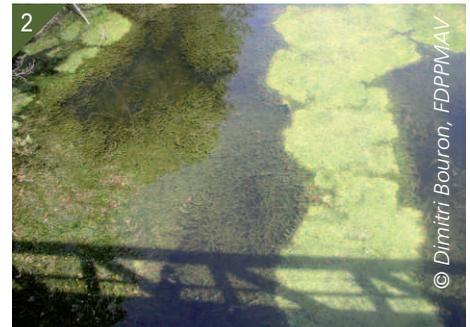
Scientific monitoring

Starting in 2010, Agrocampus Ouest set up scientific monitoring of the project in order to participate in management of *Egeria densa* by tracking plant development and assessing the effectiveness of the management work.

■ A partnership between the fishing federation and Agrocampus Ouest was established, with financial support from the Pays-de-la-Loire regional environmental directorate.

■ Two observation and sampling campaigns were carried out before (beginning of June) and after (end of July) each annual intervention. They consisted of:

- setting up a control sector, where no work took place, upstream of the intervention site;
- estimating the percentage of the water surface covered by the plants by analysing maps of the intervention site and analysing contact points on transects created in 2012;
- estimating the plant biomass using 0.25 square-metre quadrants for samples drawn on foot (along the banks) and, since 2012, 1 m² quadrants for samples drawn by diving in the middle of the riverbed.



2. Beds of *Egeria densa* in the Vendée River, in the town of Fontenay-le-Comte.



3. Pusher-harvester boat.

4. Harvester boat.

5. Net installed across the river.

Results

■ Results of interventions

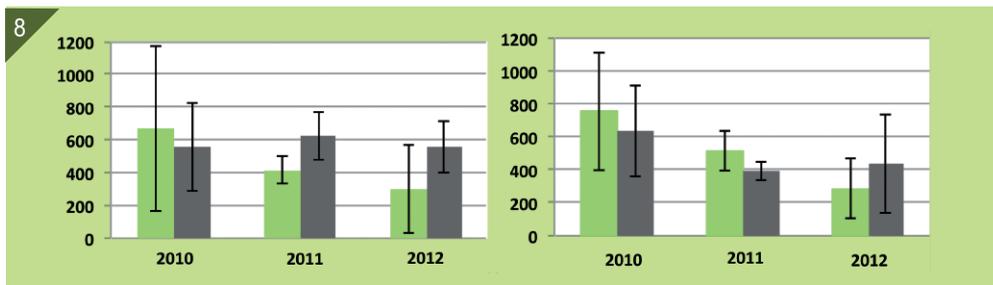
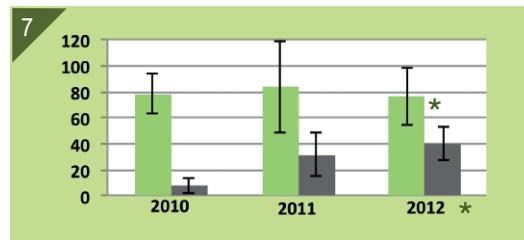
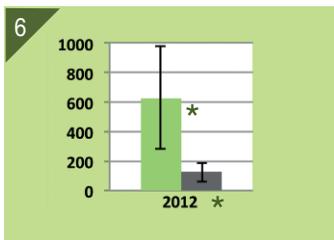
- In 2012, a total of 1 200 cubic metres of *Egeria densa* (fresh plants) were removed over a river section 3.5 km long.

Results since 2010.

Year	2010	2011	2012
Harvested volumes (cubic metres per kilometre)	154	230	343
Total amount billed (euros)	22 620	29 080	Approx. 21 000
	(4 kilometres)	(4 kilometres)	(3.5 kilometres)

■ Results of the scientific monitoring

- No statistically significant differences in terms of biomass with the control sector. No interannual or seasonal variations.
- Significant effect of the work on the biomass of *Egeria densa* in 2012 (samples drawn by diving).
- The results from 2010 to 2012 indicate that the effects of the work done were short lived (just a few months).



- Before work
- After work
- * Statistically significant changes

6. Average biomass of *Egeria densa* in the intervention zone (in grammes of dry matter per square metre).
 7. Average cover of *Egeria densa* in the intervention zone (in %).
 8. Average biomass of *Egeria densa* in the 0.25 square-metre quadrants (in grammes of dry matter per square metre). Control zone (no intervention) on the left (green) and work zone on the right (brown).



Outlook

- Preparation of a report on the Contract to restore and maintain wetlands (CRE ZH) with the partners and drafting of a new contract with an addition for 2013 to ensure the continuation of the work.
- Monitoring to detect the presence of other invasive alien plants (Japanese knotweed and water primrose) in the Vendée River.
- Continuation of the partnership between the fishing federation and Agrocampus Ouest, and of the scientific monitoring.
- Launch of electrofishing campaigns by the fishing federation to determine the impact of *Egeria densa* on fish populations.

Information on the project

- Information panels were set up on the banks of the river to inform on the work carried out in Fontenay-le-Comte.

Remarks

- An initial intervention was already carried out in 1999. Problems involving coordination between the partners and practical aspects led to a halt in the work until 2006.
- The harvesting boats cannot work on the beds in very shallow water along the banks. As a result, the biomass samples drawn on foot (0.25 square metre quadrants) are not indicative of the effectiveness of the work on *Egeria densa* in those areas.
- In 2012, the reduction in cover by *Egeria densa*, compared to 2011 (prior to the work), and the increase in the volume of the plants mowed and harvested may indicate more effective work in that year.

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For more information

- **Internet site of the board:**
www.cc-vendee-sevre-autise.com
- Technical specifications for the work to harvest and transport *Egeria densa*, 2012.
- Work site to mow, harvest and transport *Egeria densa*. Brief summary of the work in 2012.
- Bouron D., F.V.P.P.M.A. 2010. Poster « Organisation et difficultés d'un projet de gestion d'espèces envahissantes : Cas de l'Égérie dense sur la rivière Vendée ».
- Haury J., Bouron D. 2012. Approche scientifique au service des gestionnaires : la saga d'*Egeria densa* dans le Massif armoricain. In Haury J., Matrat R. (Eds), 2012. Plantes invasives, la nécessité de différentes approches. Actes du colloque régional Les plantes invasives en Pays-de-la-Loire, 11-12 mai 2011, Angers, Terra botanica. Æstuarina, collection Paroles des Marais atlantiques : 83-96.
- Moyon F. 2012. Évaluation de la gestion d'*Egeria densa*, plante aquatique invasive sur la rivière Vendée à Fontenay le Comte. Propositions d'actions et recommandations aux gestionnaires - 50 pp. Maître de stage : Haury J.

