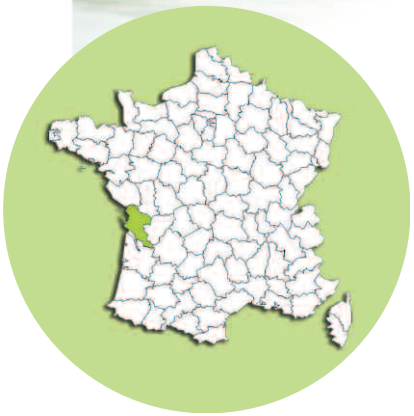


Large-flowered waterweed

(Egeria densa)

Managing large-flowered waterweed in the Marans La Rochelle canal

Charente-Maritime departmental council (CG 17)

■ CG 17 is a local government, owner since 2007 of 170 kilometres of rivers in the Public River Domain (DPF) that are no longer considered waterways and are located in the department.

■ Concerning those rivers, the main missions assumed by CG 17 are to manage the hydraulic installations, maintain the riverbed and the banks, monitor and ensure the conservation of the public domain, define and implement restoration and enhancement projects.

■ Two services within the Water division are particularly active in executing those missions:

- the waterways service (SEVE) manages and maintains the DPF, contact: Catherine Labat - catherine.labat@cg17.fr ;
- the river service manages the departmental aquatic-environments policy, including efforts against invasive alien species, contact: Sylvie Fonteny - sylvie.fonteny@cg17.fr.

Intervention site

■ The Marans La Rochelle canal is part of the DPF owned by CG 17. The canal, 22 kilometres long, is located in the northern section of the Charente-Maritime department and links the southern edge of the Marais Poitevin marshes to the city of La Rochelle (it ends in the maritime channel of the city). The average width of the canal is 15 metres and at its start (northern end), the altitude is 2.1 metres above sea level.

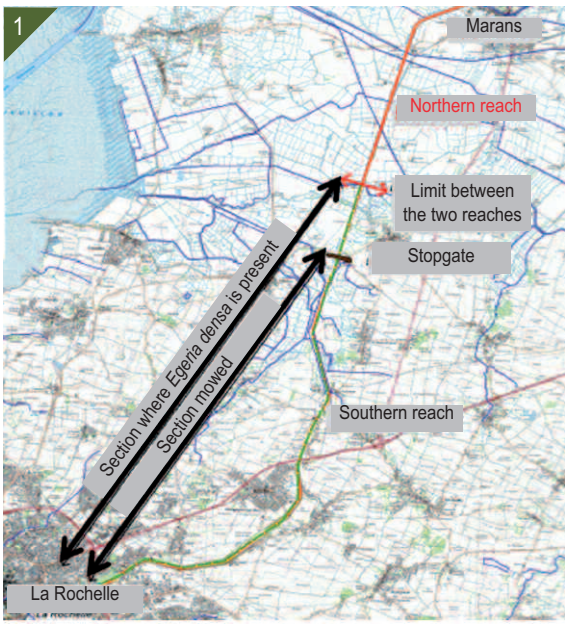
■ The canal traverses two types of geological terrain. The northern section is marsh land, whereas in the southern section, the canal was dug through a limestone plain where the surrounding hills can reach an altitude of 30 metres.

■ In hydraulic terms, the canal is made up of two distinct reaches, separated by a third section. It is supplied primarily by runoff from the surrounding basin (38.2 square kilometres) and with water from the underlying aquifer.

■ The canal and its banks are a recreational area and a number of enhancement studies have been carried out since the 1980s.

■ *Egeria densa* was present particularly in the southern reach, a section 16 kilometres long. The work was done in this section.

■ Recently, the increasing presence of *Egeria densa* renewed debate about dredging the canal, an operation required for its upkeep and that would also serve to control the invasive species. Projects to manage the plant were launched while waiting for the decision on whether to dredge the canal.



© CG 17

1. The Marans La Rochelle canal.

Disturbances and issues involved

Initially identified in 2001, *Egeria densa* rapidly spread over the 16 kilometres of the southern section and is now virtually the sole species forming a bed covering the entire canal.

■ Impacts on the ecosystem

■ Disappearance of other plant species.
■ Contribution to sediment build-up.
■ Obstacle to flow.
■ Contribution to the development of filamentous algae on the surface.

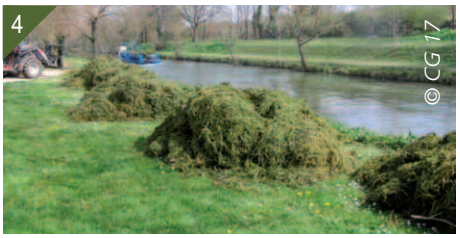
■ Socio-economic impacts

■ Hindrance for boating.
■ Unsightly.
■ Negative impact on fishing.

The issues involved in managing *Egeria densa* in the Marans La Rochelle canal are primarily socio-economic in nature. The objective is the meet the needs of users and to develop tourism by enhancing the site and improving the aquatic environment.

Interventions

- The work on managing *Egeria densa* in the Marans La Rochelle canal started in 2001.
- From 2001 to 2004, technical trials were conducted on different management techniques, e.g. mowing-harvesting, mechanical uprooting, chemical treatments. None of these techniques had any real effect on the beds of *Egeria densa* that simply grew back and returned to the initial condition over the three months following the work. In 2004, a stopgate was installed 13 kilometres from the southern outlet to limit the progression of the plant to the north, into the marches and toward the Marais Poitevin marshes.
- Since 2005, a part of the colonised zone (13 kilometres out of the 16 in the southern reach) is mowed and harvested, a technique already used in other water bodies in the DPF.
- This work is done early in the year starting in April to enable various activities, e.g. fishing, local sports events and boating.
- The work is carried out by contractors from April to July each year.
- The harvester boat can mow two-thirds of the canal bed.
- In sections where the public is not present on the banks (narrow sections), the plants are deposited on the banks and not removed. In the other sections, the plants are transported to a composting unit.
- The quantity of plants harvested was evaluated visually (each pile was considered to represent approximately 1 cubic metre).



2. Zone colonised by Egeria densa *and algae.*
3. Harvester boat and transport of plants.
4. Piles of cut plants deposited on the banks.

Results and costs

Results

- The results should be evaluated with caution because the quantities of plants harvested were determined strictly on a visual basis and depended on the person making the evaluation. In addition, non-negligible quantities of filamentous algae were also harvested and included in the estimates.

Costs

- Mowing of the plants, in spite of the repeated interventions, did not reduce the quantities of *Egeria densa*.
- Improvements were achieved in the visual appearance of the canal and in the main uses of the canal by humans.
- The interventions were expensive in terms of the equipment required and the human and financial resources. The average cost per kilometre and per year over the years 2009 to 2012 was 1 594 euros, which does not include consumables (oil, fuel, etc.).

*Table breaking down the costs of interventions from 2009 to 2013 (*average man-day cost = 87.50 €).*

Year	Period	Section treated (metres)	Number of piles (= 1 cubic metre)	Days worked	Payroll costs* A	Mower repairs and transport B	Total (A + B)	Average cost per km
2009	April - May	13 500	255	26	4 550 €	11 967.07 €	16 517.07 €	1 223.49 €
2010	April - July	13 500	145	29	5 075 €	6 317.66 €	11 392.66 €	843.90 €
2011	April - July	13 500	282	46	8 050 €	18 124.77 €	26 174.77 €	1 938.87 €
2012	April - June	13 500	150	29	5 075 €	26 897.82 €	31 972.82 €	2 368.36 €
2013	February -March	8 700	207	20	3 500 €	Not available	Not available	Not available

Current project to dredge the canal

Starting in 2005, the continued growth of *Egeria densa* resulted in renewed interest in the project to dredge the canal. Dredging of the entire canal was planned from 2012 to 2014. The work, using hydraulic or dry dredging, involved removing the sediment from the canal bed. The quantity of sediment to be removed was estimated on the basis of bathymetric measurements.

End of 2012 - mid 2013. Hydraulic dredging of the northern reach (not colonised by *Egeria densa*), linear distance 6 300 metres, 70 000 cubic metres of sediment removed, i.e. only half of the sediment in order to reduce costs and not impact the reed beds. Maintenance of the canal did not require removal of all the sediment.

Mid 2013 - beginning of 2014. Dry dredging of the southern section of the southern reach, linear distance 8 700 metres, 66 500 cubic metres of sediment removed, representing all the sediment in order to effectively counter the growth of *Egeria densa*.

End of 2013 - end of 2014. Hydraulic dredging of the northern section of the southern reach, linear distance 6 800 metres, 135 000 cubic metres of sediment removed, representing all the sediment in order to effectively counter the growth of *Egeria densa*. Initially, the plan was to dry dredge the entire southern reach, however geotechnical difficulties (compressible clays) resulted in the decision to use the technique only in the southern section.

The sediment removed using hydraulic dredging was placed in a draining basin and then spread over agricultural fields. The sediment removed using other means was spread directly in fields.

Total cost of project: 6 598 000 € before VAT.

Breakdown of costs. Northern reach: 1 115 000 € before VAT. Southern reach: 5 483 000 € before VAT.

Funding was provided by the French State, the EU, the Loire-Bretagne water agency and local governments.

The programme is still under way and no conclusions have been drawn concerning the effectiveness of the work.

5. Marans La Rochelle canal colonised by Egeria densa.

Outlook

The task now is to monitor the impact and assess the effectiveness of the dredging work on the presence of *Egeria densa* and to observe the reaction of the environment by:

- during the work, analysing the agronomic value of the drained sediment and any changes in the abundance and regrowth potential of *Egeria densa* on the temporary and final storage sites for the sediment;
- following the work, monitoring water quality (each quarter), sediment quality (every 5 years) and sedimentation (every 5 years with bathymetric measurements every 20 years);
- following the work, monitoring plant species (the monitoring protocol must still be adapted to the site).

Information on the project

Participation in the Hydrocharitaceae work group launched by the Pays-de-la-Loire regional environmental directorate.

The departmental council informed elected officials, local residents and people using the canal by inviting them to visit the dredging sites in March 2013 and publishing articles in the local press.

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For more information

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la Charente Maritime