Water primrose

(*Ludwigia* spp.)

Managing water-primrose colonisation of a canal in the Grande Brière Mottière marshes

Brière regional nature park

■ The park, initiated by the Ecology ministry in 1970, is managed by a board with members from the 20 towns in the park, from the two "gateway towns" (Nantes and Pornichet), the Loire-Atlantique department, the Pays de la Loire region, the Grande Brière Mottière commission (CSGBM) and the board for the Brivet river basin (SBVB).

■ Its main missions include:

- protecting the natural heritage, notably through suitable management of the natural environment and landscapes (marshes, wet meadows, reed beds, canals, etc.);
- contributing to territorial planning;
- contributing to economic, social and cultural development and to the quality of life;
- welcoming, educating and informing the public;
- carrying out experiments or outstanding projects in the fields mentioned above and contributing to research programmes.

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Grande Brière Mottière commission (CSGBM)

■ The commission is responsible for maintaining the Grande Brière hydraulic network and for managing the local biodiversity and human activities in the marshes.

■ It is also in charge of the project for water primrose.

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Intervention site

■ The Brière regional nature park covers a total of 55 000 hectares, of which approximately one-third are wetlands listed as a Ramsar site (18 250 hectares). In conjunction with the Donges marshes, the Brière park is also listed as Natura 2000 and ZNIEFF sites. The park is home to numerous emblematic species (Eurasian bittern, black terns, bluethroats, European otters, etc.) and remarkable flora, notably in the amphibious grasslands and the oligotrophic meadows.

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Key

- Park limits
- Road
- Hydrographic network of the marshes
- Grande Brière Mottière marshes
- Forests and semi-natural environments
- Urbanised areas
- Marsh
- Salt marsh

1. The Brière regional nature park and the different sectors.

■ In the middle of the park, the Grande Brière Mottière marshes (a joint property) cover 7 000 hectares.

■ Two species of water primrose may be found in the marshes, namely *Ludwigia grandiflora*, first identified in 1994, and *Ludwigia peploides*, first observed in 2016. In spite of the work (manual uprooting) done over a number of years, the plants are gaining ground in the park.

Disturbances and issues involved

■ Colonisation by water primrose leads to major changes in ecosystems with significant consequences for biodiversity (fauna and flora), and on the ways that the marshes are used, for example:

- loss of native species;
- loss of productivity and constraints for the extensive farming system in the marshes;

- difficulties for traditional uses of the marshes, including fishing, hunting, boating;
- accelerated filling in of aquatic environments in the marshes, with potential consequences in terms of flood risks for nearby developed areas;
- degraded living conditions and a poor image of the park, with negative impacts on tourism.

Interventions

■ The work programme was set up in the framework of the “Local agreement to combat the development of water primrose”, signed in November 2014 by the local stakeholders in the Brière regional nature park and the catchments leading into it (Brivet and Mès Rivers, Pont-Mahé Canal) in order to coordinate the work required to limit its spread.

■ To date, the canals in the Grande Brière Mottière marshes are not overly affected by water primrose, however the spread of the species raised the question of mechanically extracting the plants. The intervention was designed to test the suitability of equipment for the local conditions and to determine the costs and effectiveness of this type of work.

■ The work site was a canal 850 metres long, 13 metres wide on average, located to the south of the Grande Brière marshes, adjacent to private properties and with a dirt road along one side.

Intervention site. The lighter green areas in the meadows are the water primrose.

■ The water primrose was present in abundance in and along the canal. Over a distance of 700 metres, it occupied over 90% of the water surface area and over the remaining 150 metres, it covered an area one to two metres wide along each bank. It had also invaded the nearby meadows and water bodies.

■ Uprooting work

■ The work took place from 15 September to 2 October 2015 in order to take advantage of the better (dryer) soil conditions.

■ The plants were uprooted by an excavator equipped with wide treads and a special fork designed to limit the extraction of sediment and water.

■ The work did not address the beds on the top of the banks or the mud at the bottom of the canal. Their removal would have involved additional quantities of soil and sediment, as well as excess costs and regulatory constraints imposed by the Water law.

2. 3. 4. Canal full of water primrose prior to the work.

■ Depending on the density of the extracted plants, they were either loaded directly into a trailer or first piled on a bank and then loaded. In that water primrose is widely present in that section of the marshes (on and along the dirt road), it was not necessary to lay down tarps to protect the soil and avoid the dispersal of fragments during loading of the plants in the trailers. However, fragments around the loading zone were nonetheless collected by hand.

■ To limit the dispersal of fragments in the canal, a screen (synthetic material, similar to a wind screen with a 4-mm mesh, attached to wooden stakes) was positioned at one end of the work site. The other end was blocked by a fording site that was completely dry at the time of the work.

■ Waste management

■ The harvested plants were stored temporarily on the Pierre-Blanche agricultural site. The site was selected because it offered a number of major advantages, namely easy access for heavy machinery, considerable distance to the nearest residential area, low risk of the water primrose taking root on the landfill platform, no public access and a reasonable distance to the work site (between 1 000 and 2 500 metres depending on the extraction site along the canal and the route taken). The site was made available free of cost by the site managers.

■ The plants were deposited in a long mound and surrounded by hay bales to filter the runoff water and avoid any dispersal of fragments. The pile of plants was turned over twice during the six-week storage period to facilitate runoff and to decompact the plants.

■ The green waste was then transported by truck to the Terralys composting unit in Sainte-Marie-de-Redon (35).

Results and costs

■ Results in 2015

■ During the five days of work, 360 tons of drained, fresh biomass were collected (45 trips with the tractors and trailers) and following the storage period, 186 tons were reloaded and transported. It was difficult to reach the opposite bank in places where the canal width exceeded ten metres, i.e. in those cases, it was necessary to travel to the opposite bank with the machines.

■ The work succeeded in rapidly clearing the canal. However, the sediment probably still contained stalk and rhizome fragments, as well as numerous seeds. In addition, the beds along the tops of the banks were not removed and could thus start to recolonise the canal.

■ Results in 2016

■ Starting in June, water primrose was again present along the entire canal, primarily along the banks in a strip 1 metre to 1.5 metres wide.

■ The middle of the canal was not heavily colonised, but primrose rosettes were visible in spots.

■ In July, the beds had become more dense and taller. They remained on the banks and did not colonise the entire width of the canal. The plants in the middle of the canal remained small in number, but were clearly developing.

■ In order to limit the renewed establishment of the plants, manual uprooting took place over six days in July and August. A total of 75 tons of drained, fresh biomass were collected and transported to the composting unit.

5. The fork used to uproot the plants.
6. Temporary storage of the water primrose, surrounded by hay.
7. Removal of the water primrose.
8. Barrier across the canal to filter fragments.

Assessment

■ In 2015, three people were occupied for five days with the mechanical uprooting (one excavator operator and two tractor drivers).

■ In 2016, manual uprooting occupied ten people over six days. It should be noted that the access conditions to the work site were excellent and resulted in lower costs.

Table listing project costs.

2015	Cost (€)
Mechanical uprooting and transport to temporary storage	8 399.20
Transport to the composting unit	2 505.60
Composting	7 710.30
Work to restore the temporary storage site	297.10
Project management and monitoring	1 750.00
2016	**Cost (€)**
Manual uprooting*	6 600.00
Transport and composting*	410.00
TOTAL	27 672.20

** Estimated cost because part of an overall project.*

■ This test served to establish an initial financial estimate of the costs of mechanical uprooting of water primrose and an estimate of the quantities that must be removed.

■ It confirmed once again the need to combine both mechanical and manual techniques on sites heavily colonised by water primrose.

It is now acknowledged that many invasive alien plants cannot be eliminated from most of the open sites where they are established and that the objective of management projects is now simply to maintain their presence at a low level. Mechanised techniques can rapidly remove large quantities of biomass, but the results are short lived because the remaining fragments and seed banks enable the plants to pursue their colonisation the year following the work. Regular manual interventions to remove the fragments and the yearly crop of young primrose plants are however a means to maintain the colonisation at a low level with no significant environmental impacts

■ The temporary storage is very useful because it reduces the weight of the transported biomass and the composting costs. After six weeks of storage, the weight of the mechanically uprooted plants had been divided by two. After eight weeks, the weight of the manually uprooted plants had been divided by ten.

Information on the project

■ No particular information was published on the project, except for the reports to the local managers and notably those involved in the “Local agreement”.

Outlook

■ On the basis of the observed regrowth of the water-primrose beds, it was estimated that the situation would have returned to that prior to the mechanical intervention within two to four years if the manual work had not been undertaken.

■ To avoid a return to the intense development of the plants, manual work is now programmed annually. The amount of manual work required is expected drop progressively.

■ Earlier manual uprooting over two periods (May and July) is the preferred solution in that it limits the weight of the collected plants and produces more effective results.

■ Given the costs of mechanical interventions and the regular manual work required to reduce over the long term the quantity of water primrose in a heavily colonised area, it is clear that the best solution is to avoid situations where large areas become colonised. Regular manual work in areas with low densities of water primrose can reduce the risks of having to deal later with heavily colonised areas.

Authors: Doriane Blottière, IUCN French committee, and Jean-Patrice Damien, Brière regional nature park. June 2017.

For more information

■ Damien JP. 2015. Contrôle des plantes aquatiques invasives en Grande Brière Mottière par récolte mécanique. Action du Pacte local de lutte contre le développement de la jussie. Compte rendu d'intervention. PNR de Brière. 11 pp.

■ Local agreement to combat the development of water primrose: http://www.gt-ibma.eu/strategies-ou-en-sont-les-institutions/strategies-infranationales/pnr-briere/

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