



# New Zealand pigmyweed (*Crassula helmsii*)

## Experiment in managing New Zealand pigmyweed using a thermal weed-control technique

### 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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### 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.

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

■ New Zealand pigmyweed was first observed in the Pays de la Loire region in 2010 and 2011, including three stands in towns belonging to the Brière regional nature park (Guérande, Donges and Saint-Lyphard). The species was identified for the first time in the Grande Brière Mottière and Brivet marshes in May 2015.



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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.

■ Given the invasive nature of New Zealand pigmyweed, its potential for establishing itself in the marshes and the potential impacts its proliferation could have on local ecosystems and biodiversity, the park immediately initiated a study on how to manage the species.

### Disturbances and issues involved

■ To date, there is little pigmyweed in the park, but given its potential for proliferation, it could spread to the banks and wet areas around the canals and invade the wet meadows, causing significant impacts on biodiversity (competition with native plants, fatal anoxic conditions for fish, etc.) and on local activities (agriculture, boating, fishing, hunting, etc.).



## Interventions

### ■ Testing a mulching method in 2015

■ Following an agreement with the site manager, a mulching test was carried out along the Rozé Canal in the first stand of pigmyweed identified in the Brière marshes. A thick layer (50 to 70 cm) of reeds, drawn from a nearby reed bed, was placed over the plants and secured by metal fencing material anchored using wooden stakes (chestnut wood). The test was halted seven days later because the installation fell victim to arson.

### ■ Discussions with the partners

■ A technical meeting was held on 20 April 2016 with participants from the regional nature park, the CSGBM commission, the regional environmental directorate, the regional federation against pests (FREDON 44) and the Pays de la Loire nature conservatory.

■ The potential problems caused by the plant were discussed and it was decided to intensify the efforts to locate and monitor stands.

■ In addition, given the very rare positive feedback on management work for pigmyweed and in order to acquire meaningful experience in its management, it was also decided to launch pilot projects to pre-empt its probable spread and limit the dynamics of its colonisation process.

■ A number of methods were discussed, but not selected:

- manual uprooting, deemed ineffective (see the test results in the Pierre-Constant reserve in 2015) and highly time consuming;

- tarping, expensive and difficult to implement, with excessive risks of damage by animals (grazing) and by humans, given the intentional destruction of the mulching test in 2015;

- use of plant-protection products, due to their environmental impact, regulatory restrictions and the need to better assess their effectiveness.

■ Thermal weed control was the only technique selected for testing in that it is relatively easy to implement (technically and administratively) and it was thought to be relatively effective.

### ■ Inventory

■ The inventory of pigmyweed stands was carried out in the framework of the overall inventory of invasive alien aquatic plants run by the regional nature park from 4 August to 8 September 2016.

■ That part of the year was selected because the plants had developed sufficiently to facilitate their identification in the meadows and particularly in the mud flats no longer covered with water. The inventory was joined with that for water primrose which had spread over a total of 742 kilometres of canals and ditches, and 5 300 hectares of meadows and water bodies.

■ A total of 153 stands of pigmyweed were found, i.e. eight times more than in 2015, ranging from dense beds covering several hundreds of square metres to single, isolated plants, representing a surface area of 40 300 square metres.



2. New Zealand pigmyweed in a meadow near a water body.

3. Pigmyweed on a mud flat.

4. Installing the mulch.

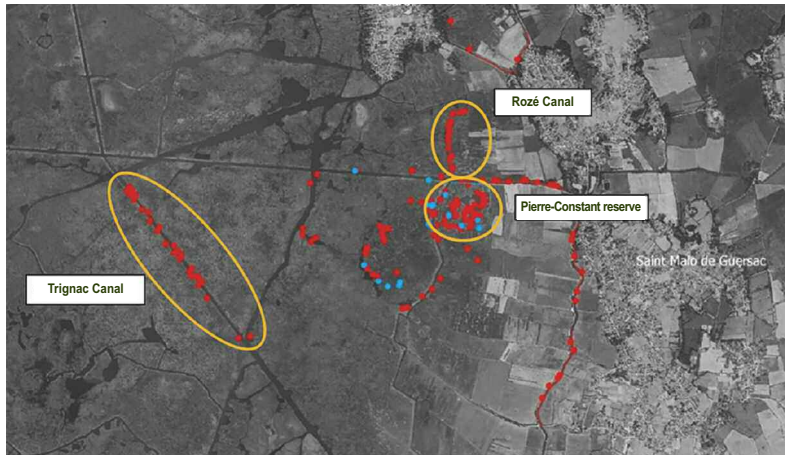
5. The arsoned mulch installation.

## ■ Thermal weed control

■ The technique was first employed in early August 2016. The objective was to teach the technique to the personnel and to test the equipment along the Rozé Canal.

■ Subsequent work was done by FDGDON personnel. They were accompanied by at least one person from the park board or from the CSGBM commission during the work which took place on:

- 29 and 30 September 2016 and during the morning of 3 October in the Pierre-Constant reserve;
- 17 and 18 October 2016 along the Trignac Canal.



Positions of pigmyweed stands in the work sector. Stands discovered in 2015 are marked in blue, those discovered in 2016 in red.

■ The time of year was selected because it facilitated access to the sites (lower water levels, emergent land, drying mud flats) and the visibility of the plants.

■ The danger of fires at that time of year meant that particular care had to be taken during the work, i.e. suitable weather conditions (little or no wind) were required.

■ Standard equipment for thermal weeding was used, i.e. a nozzle connected to a 13-kg tank of liquid propane gas via a flexible hose several metres long.

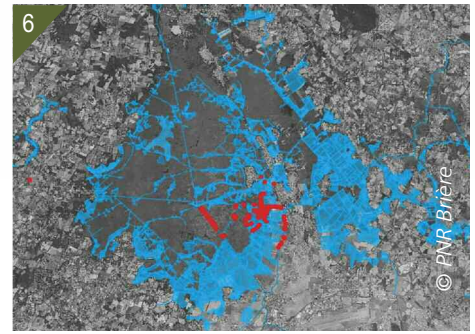
■ The equipment and the workers were transported to the sites either by boat or by 4-wheel quad.

■ The work was done either on foot or by transporting the equipment with the quad. The flame must be applied to each plant for about five seconds.

■ The plants were first marked with paint to facilitate their identification by each two-man team. Some plants were marked with a stake and photographed for subsequent monitoring.

■ In the Pierre-Constant reserve, 56 stands were identified (consisting mainly of dispersed beds covering a total of 11 410 square metres, though one bed covered 120 m<sup>2</sup>) and 53 stands were treated. No work was done on the three stands along the western edge of the reserve due to large potential sources of propagules in the immediate vicinity and their position in a reed bed, which would have complicated the work. Stakes were planted near 35 plants for monitoring purposes.

■ Along the Trignac Canal, 27 stands were identified, representing a total surface area of 8 800 square metres (4 220 m<sup>2</sup> of dispersed beds, 3 440 m<sup>2</sup> of fragmented beds and 1 140 m<sup>2</sup> of continuous beds). One bed on the northern side of the canal was not treated due to a problem with the gas supply (the number of remaining beds did not justify a return trip to the site).



6. Map showing the inventoried areas (in blue) and the stands of New Zealand pigmyweed (in red) in 2016.

7. Identifying the plants prior to the work.

8. 9. 10. Thermal weed control



## Results and costs

### ■ Results

■ Three weeks after the work, initial observations were made on the marked plants:

- in the Pierre-Constant reserve, no completely dead plants were observed. All the marked plants still had at least one living branch or section. In the area with a continuous bed, the upper parts of the plants were dead (dry), but the lower parts close to the ground were still green. A few of the unmarked plants were dead. New plants were also observed;
- along the Trignac Canal, no monitoring was carried out in 2016 due to the difficulty of accessing the site and insufficient resources. The effectiveness of the work will be assessed in 2017.

### ■ Financial aspects

*Costs and time spent on the work (payroll expenses calculated as 225 € per man-day).*

	Cost (€)	Man-days
Preliminary test		
Equipment	127.75	-
Personnel costs	900	4
Inventory of pigmyweed		
Personnel costs	3 150	14
Work in P-C reserve and along Trignac Canal		
Equipment	36.60	-
Personnel costs	1 462.50	6.5
Work by FDGDON	3 510	-
Total	9 186.85	24.5

## Outlook

■ The test revealed a number of difficulties in organising the work during the most favourable periods. On the basis of the initial results, thermal technique would appear to be fairly ineffective. It is difficult to work on 100% of the plants in an area because they are difficult to locate when highly dispersed. This fact hinders any selective management of the plants (e.g. manual uprooting) targeting the initial establishment of the species. Their growth is spread over time, meaning that a single passage is not sufficient to eliminate all the potential shoots.

■ Further evaluation of the results will be carried out in 2017 with at least two passages planned in the treated zones. New Zealand pigmyweed is one of the species targeted by the annual inventory of invasive alien aquatic plants that will be carried out again in 2017.

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*This management report was drafted in June 2017 by the work group for biological invasions in aquatic environments, set up by the French biodiversity agency and IUCN France, in addition to those already presented in the second volume of the book titled "Invasive alien species in aquatic environments, Practical knowledge and management insights", in the Knowledge for action series published by the French biodiversity agency.*

(<http://www.onema.fr/sites/default/files/EN/EV/cat7a-EEE-vol2.html>).



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11. Living parts of treated plants.

12. Dead upper parts of plants, but lower parts still alive and green.

13. Dead plants that had poorly developed prior to the work.

### For more information

- PNR Brière. 2016. Essai de contrôle de la Crassule de Helms par désherbage thermique 2016. Note technique d'intervention. Parc naturel régional de Brière. 14 pp.

