Asian knotweed

(*Reynoutria* spp.)

Experiments to manage Japanese knotweed in the Saint-Pierre-et-Miquelon archipelago

Saint-Pierre-et-Miquelon departmental territorial and maritime directorate (DTAM 975)

■ The management programme for Asian knotweed was financed by DTAM, a part of the Ecology ministry. The Saint-Pierre-et-Miquelon DTAM is an interministerial agency of the French State under the authority of the Prefect. The main objective is to protect the natural heritage and living conditions in the Saint-Pierre-et-Miquelon archipelago.

■ The main missions include:

- improving knowledge on invasive alien species (IAS) and natural environments, protecting and conserving species and ecosystems;
- preventing the spread of IASs in Saint-Pierre-et-Miquelon;
- informing the public on the work undertaken.

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Intervention site

■ Saint-Pierre-et-Miquelon is a group of seven islands (Saint-Pierre, Miquelon, Langlade, Colombier, Île aux Marins, Île Pigeon, Île Vainqueur) covering a total surface area of 242 square kilometres and located less than 20 kilometres from the southern coast of Newfoundland. The archipelago comprises significant biodiversity and the only boreal forest in France, but also a large number of marshes, peat bogs, grasslands, heathlands and fir forests. The soil is generally poor in nutrients, acid and worn down by both glacial erosion and the climate.

■ The importation of fodder, wood, ornamental plants and the great dependence on neighbouring Canada has resulted in the introduction of many plant species. A total of 136 vascular plants have been introduced, representing 30% of the flora on the islands. The boreal environment is highly sensitive to these disturbances. However, the climate and the environmental quality of the islands constitute an obstacle for plant invasions and only some 20 grass species risk becoming truly invasive. That being said, climate change may lessen that obstacle.

1. Map showing the location of knotweed on Saint-Pierre.

Disturbances and issues involved

■ Seven species of knotweed have been observed on Saint-Pierre-et-Miquelon, namely Japanese knotweed (*Reynoutria japonica*), Himalayan knotweed (*Polygonum polystachum*), common knotgrass (*Polygonum aviculare*), pale persicaria (*Polygonum lapathifolium*), spotted knotweed (*Polygonum persicaria*), arrowleaf tearthumb (*Polygonum sagittatum*) and wild buckwheat (*Polygonum convolvulus*).

■ Japanese knotweed was introduced in 1940 to the archipelago and has progressively colonised numerous areas. Observations have revealed that the areas colonised are gaining in size, notably due to environmental disturbances caused by human activities in areas surrounding towns and in natural areas. The humid nature of the soil and the virtual lack of shade also facilitate the spread of the species.

■ Its colonisation of the islands has also caused a drop in the local plant and animal diversity. The slow decomposition of the litter produced by the plant forms a thick layer of organic matter that hinders the germination of native species.

Interventions

Objective of the interventions

The purpose of the work was to propose, experiment and implement management methods for Asian knotweed in view of eliminating the species (*R. japonica)*. The work also included efforts to raise awareness, inform and prevent the establishment and spread of new plant IASs in the archipelago.

Participation of other stakeholders and partners

Also involved in the work were a local environmental-protection group (SPM Frag'îles) and a local company that provided the necessary machines and equipment.

Mapping and monitoring

As the first step, all public land colonised by knotweed (Japanese and Himalayan) on the islands of Saint-Pierre, Miquelon-Langlade and Île aux Marins was precisely mapped. A team of four people equipped with a GPS, a tape measure and a pH meter travelled the islands during the summer period (23 June to 1 July 2010). The position and size of the knotweed stands was recorded, as was the soil pH data. A total of 497 knotweed stands, covering 25 231 square metres, were found (Table 1).

Sites	Number of stands	Surface area (m²)
Saint-Pierre	435	22 315
Miquelon	28	575
Langlade	5	428
Île aux Marins	29	1 918
TOTAL	497	25 231

Table 1. Number of stands detected and their total surface area.

The pH values recorded for each stand ranged from 4.5 to 7, with an average of 6.4, indicating that knotweed plants prefer slightly acidic soil. The growth rate of Japanese knotweed was observed on a plot over a period of 47 days.

Identification of priority zones

Work priority levels were defined for each of the mapped stands on the basis of two criteria:

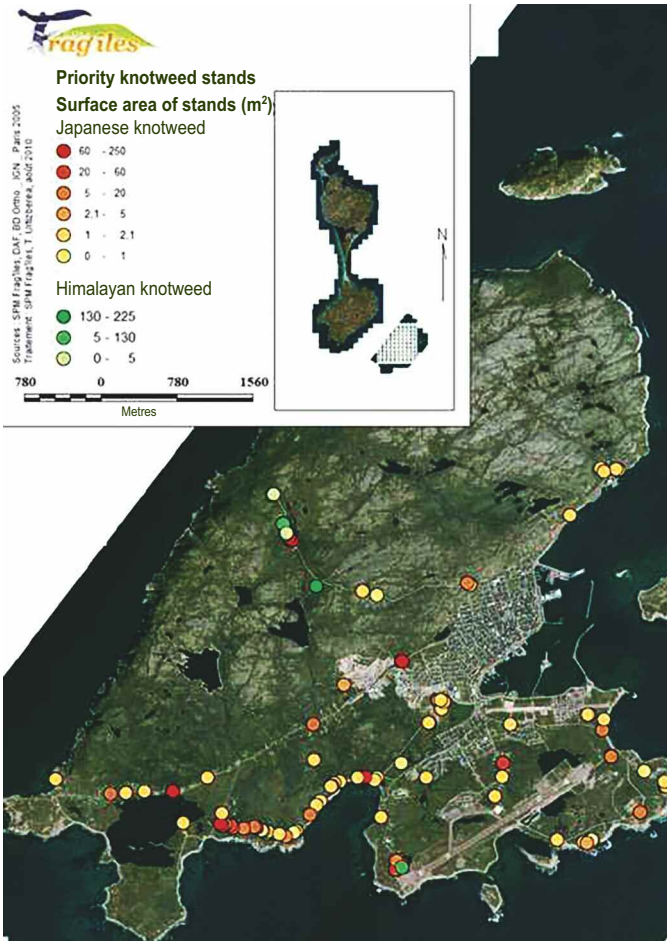
- the proximity of the stand to the natural environment, e.g. near a pond, a stream, along a forest, etc.;
- the size of the stand (management of small stands is less costly and more effective).

Out of the 497 stands of knotweed mapped, 151 with a total surface area of almost 3 800 square metres were ranked as priority stands (Table 2). Given the very small number of stands on Miquelon and Langlade, all of them were designated as priority stands.

2. 3. 4. Typical Saint-Pierre-et-Miquelon landscapes.
5. A stand of knotweed.

Sites	Number of priority stands	Surface area (m²)
Saint-Pierre	117	2 787
Miquelon	28	575
Langlade	5	428
Île aux Marins	1	1
TOTAL	151	3 786

Table 2. Stands designated as priorities for work.



Example of a map showing the priority stands of knotweed on Saint-Pierre.

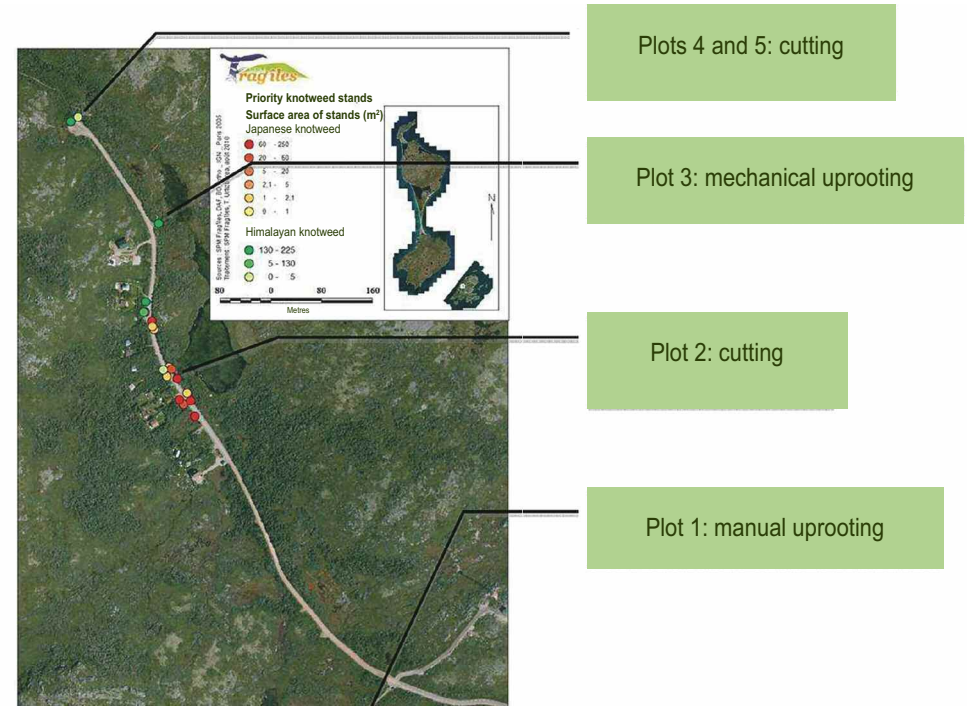
6. 7. Collecting data in the field.
8. Manual cutting of knotweed.

■ Description of the interventions

■ After analysing and comparing the various methods experimented in France, Switzerland and the U.K., it was decided to test three techniques (cutting, manual uprooting and mechanical uprooting) on the Japanese knotweed. On Saint-Pierre, the techniques were tested on five plots. On Miquelon, only manual uprooting was tested.

■ *Manual-uprooting technique:*

- manual cutting of the knotweed, gathering of the plants, raking and gathering any plant debris, storage in the large bags;



Experiments carried out on Saint-Pierre.

- uprooting and collection of the rhizomes, storage on a tarp, then in the large bags. The waste was transported by a specialised company (Impermembrane) to a recycling depot;
- restoration of the area in the fall by planting native species (alder and fir);
- the equipment used included 2 rakes, 1 shovel, 2 pickaxes, 1 metal rod, large collection bags and personal protective equipment;
- human resources: 4 workers.

■ *Mechanical-uprooting technique:*
- manual cutting, raking and removal of debris (similar to manual uprooting);
- removal of a layer of top soil using a small excavator (scraping to a depth of 40 cm), sieving the soil (grid 5 x 5 cm) to recover any remaining rhizomes;
- sections around the plot difficult to access were handled manually;
- removal of the waste for processing by a specialised company;
- restoration of the area in the fall by planting native species;
- the equipment used included 1 small excavator, 2 rakes, 2 shovels, a large screen as a sieve, 2 pickaxes, 2 wheelbarrows, large collection bags and personal protective equipment;
- human resources: 4 workers and 1 excavator operator.

■ Special precautions were taken to avoid dispersal of the knotweed during the work, e.g. storage and burning of the waste, limited movements of machines and equipment, rigorous cleaning of machines and equipment before leaving the site.

■ A decision-aid document was drafted to assist in selecting the work method for each stand of knotweed (see below).

■ Monitoring the plots

■ Annual monitoring of the plots was carried out for at least two years. Any new shoots were uprooted during the monitoring visits. The volume of waste removed from the plots was not calculated.

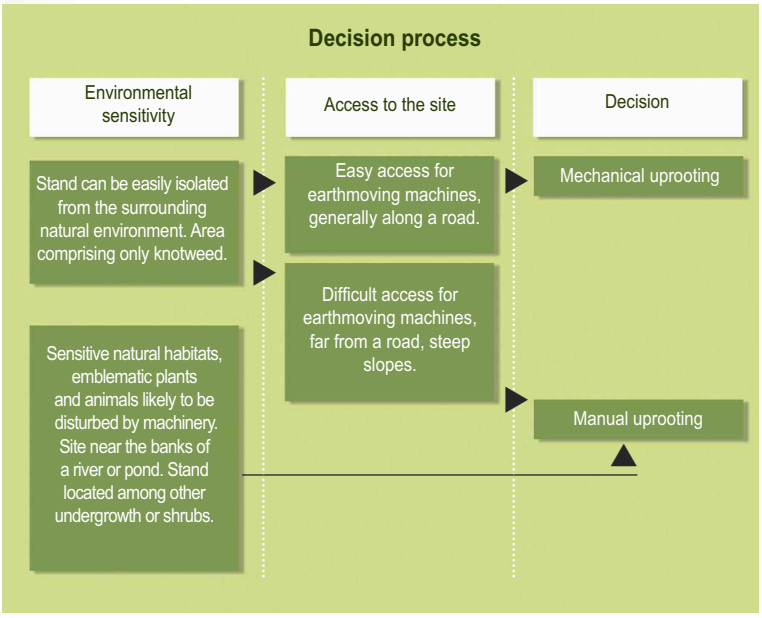


Diagram showing the decision process for work techniques depending on the environmental sensitivity of the site and access.

Results and costs

■ Results

The experiments demonstrated the effectiveness of the techniques, but did not succeed in totally eradicating the knotweed. The density fell considerably on the treated sites, with just a few shoots remaining. It may be hoped that after four or five years of work, the level of knotweed presence will have dropped to the point that the work will no longer consist of major interventions, but of simple maintenance.

■ Human and financial aspects

Item	Cost in euros
Salary of the project manager (two months)	6 000
Salaries of the workers (4 people x 1.5 months)	12 000
40 large bags (sealable) for the plant waste	1 000
Rental of a truck and container to transport the waste to the recycling depot	500
GPS (5-metre accuracy)	400
Instrument to measure soil hygrometry and pH	300
Tools and gloves for manual uprooting	1 000
Supplies (computers, mapping, report, etc.)	300
Travel around the islands during mapping and monitoring	500
Total	22 000

Table of intervention costs (2010).

9. Storage in large bags for collection.
10. Uprooting, collection and storage of rhizomes.
11. Removal of the waste.
12. Scraping the surface with the small excavator.
13. Sieving the soil.

Information on the project

- Informational document for the general public.
- Signs on the work sites presenting knotweed, its impact and the techniques employed.

Outlook

- Due to insufficient funding, the management experiments were interrupted after the first year.

Authors: Emmanuelle Sarat, IUCN France, and Frank Urtizberea, DTAM 975 SAAEB. February 2017.

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14. 15. Examples of informational documents.

For more information

- Claireaux M., Hacala A., Quedinet P., Urtizberea T. et Lemallier E., 2010. Lutte contre les espèces exotiques envahissantes végétales sur l'archipel de Saint-Pierre-et-Miquelon. SPM Frag'îles. 41 pp + annexes.
- Soubeyran Y., 2008. Espèces exotiques envahissantes dans les collectivités françaises d'outre-mer. État des lieux et recommandations. Collection Planète Nature. Comité français de l'UICN, Paris, France.

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