



# Goldenrod

(*Solidago spp.*)

## Experiments in managing Canadian goldenrod in the Chenevières meadows

### Centre nature conservatory

■ The non-profit association, founded in 1990 and certified as a nature conservatory by the State and the Centre region, has its headquarters in the city of Orléans.

■ The main missions include:

- conducting studies and compiling naturalist inventories to learn more about environments and species;
- protecting natural environments in line with the environmental policies set up by the State and local governments;
- managing sites according to the management plans approved by the scientific council of the conservatory and implemented with in-house personnel or with partners, including farmers, social insertion groups, specialised firms, volunteers, etc.;
- enhancing the managed sites and welcoming the public by offering nature walks, work projects for volunteers, public meetings and other suitable projects (nature trails, informational signs, etc).

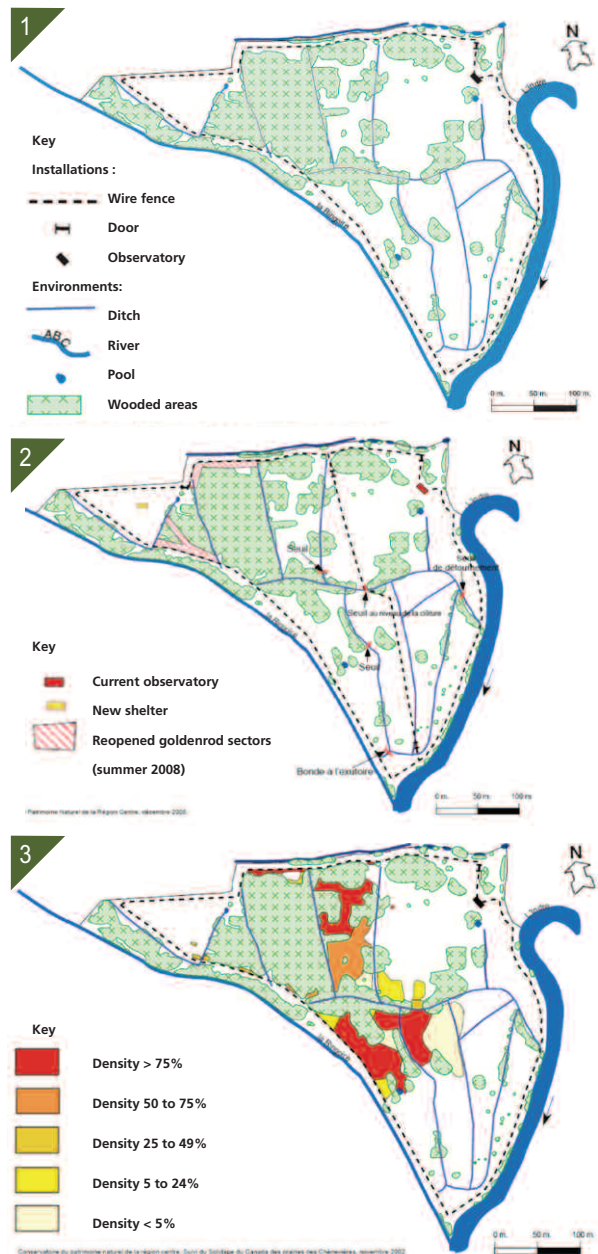
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### Intervention site

■ The Centre nature conservatory is an active participant in managing Canadian goldenrod (*Solidago canadensis*) in the Chènevières meadows in the town of Déols (Indre department). Following a management agreement signed with the town, the conservatory now manages the entire site.

■ The Chènevières meadows are influenced by the Indre River and its tributary the Ringoire, which both contribute to flooding the meadows. The impermeable, clay-rich soil retains water on the surface during winter and spring flooding. The Chènevières meadows are a regionally important site and are divided into two parts:

- a fenced wetland (11.3 hectares) that has been grazed since 1993 by Camargue horses. This area comprises a eutrophic marsh (a patchwork of transition areas between wetlands and forests covering 6.5 hectares) spotted with oligo-mesotrophic pools, a stand of willows in swampy terrain (2.6 ha) and calcareous idle land (2.2 ha);
- a peripheral zone open to the public with a walking trail around the fenced area. A series of informational signs present the marsh and its features.



1. Map of the Chènevières meadows.  
 2. Positions of the outlet and weirs installed in 2007.  
 3. Densities of Canadian goldenrod in the Chènevières meadows in 2002

■ This natural area is part of a network of protected sites including the Montet meadows (50 hectares, also managed by the conservatory) and the Saint-Gildas meadow. It is also part of the Vallée de l'Indre Natura 2000 site.

## Disturbances and issues involved

■ unauthorised dump and the strong growth of shrubs. The site was colonised by Canadian goldenrod due to green waste deposited by nearby vegetable gardens. The species was not consumed by the Camargue horses and subsequently developed rapidly to the point of occupying a total of 2 hectares in 2000.

■ *Solidago canadensis* has a very effective means of propagation for rapid and massive colonisation of sites resulting in significant impacts:

- competition with native plant species including a number of emblematic and/or protected species (Carey, reed canary grass, reeds, etc.);
- colonisation of emblematic and/or protected wet natural habitats (sedge wetland, transition areas between wetlands and forests);
- decreased grazing value (low palatability).

■ The conservatory also works to restore the wetlands on the site (swampy meadows and grassy edges) and to preserve the remarkable species (fauna and flora) linked to those habitats.

## Interventions

■ Starting in 2003, the conservatory set up an experimental management system for Canadian goldenrod in the framework of the successive management plans (2003 to 2010 and 2010 to 2017) for the Chènevières meadows.

■ The work consists of shredding the plants followed by flooding of the site thanks to the weirs that make it possible to prolong the flooded period.

■ Technical problems rendering access to the site difficult (fragile soil due to heavy rains) made it impossible to use the rotary cutter in 2008 and 2010.

### ■ Mechanical and manual cutting

■ The work was done in the month of July by the technical department of the town of Déols.

■ The surface areas ranged from 0.98 hectares to 0.35 ha from 2002 to 2012.

■ Mechanical cutting:

- a tractor equipped with a rotary cutter was used in the accessible areas;
- the areas most densely colonised by *Solidago canadensis* were treated;
- the work was done by three technical personnel and a technical assistant.

■ Manual cutting:

- the work was done using brushcutters;
- the areas treated including border and wooded areas, and relatively inaccessible places;
- the work involved 6 to 8 people;
- the cut plants were not removed, but simply decomposed naturally on site in 2 to 3 weeks.

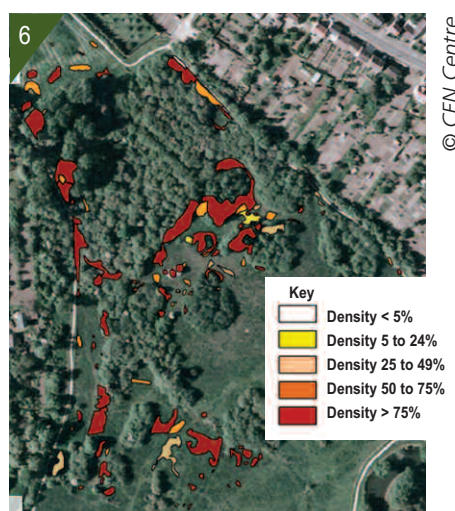
### ■ Hydraulic restoration of the meadows

■ The work was done in 2007 by a social reintegration association.

■ A manually adjustable drain was installed at the outlet of the ditch system in conjunction with a set of weirs.

### ■ Annual monitoring of colonisation

■ Since 2002, the conservatory has carried out annual monitoring of Canadian goldenrod on the site. The result was mapping of the species distribution according to five density classes. In parallel, the number of days the site is flooded is estimated using the network to measure discharges established by the regional environmental directorate and an inventory of plants is produced to monitor the appearance of new plant species.



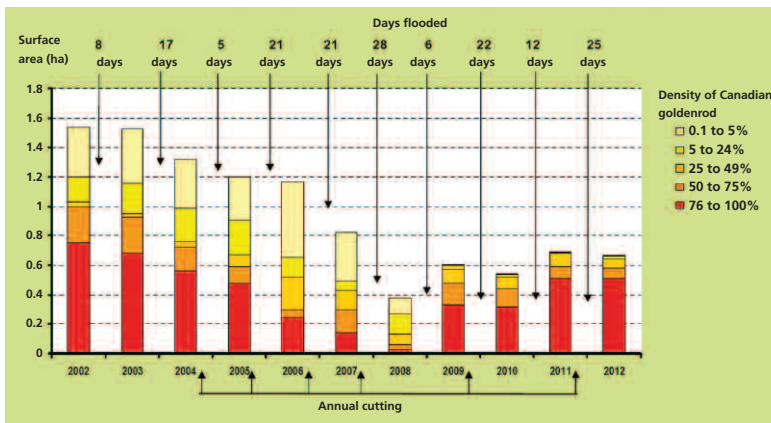
4. Mechanical shredding using a rotary cutter.  
5. Mechanical means used to uproot the plants and strip the top layer of soil.  
6. Densities of Canadian goldenrod in the Chènevières meadows in 2012.

■ The person conducting the annual monitoring changed in 2009. This change may have somewhat affected the analysis results concerning the spread of Canadian goldenrod, in particular the estimates concerning densities.

## Results and assessment

### ■ Results

- From 2002 to 2012, the colonised surface area was reduced by 55%.
- A number of highly colonised areas (density greater than 76%) persist, in spite of the overall reduction observed from 2002 to 2008. The proportion of these areas rose sharply from 2008 to 2012.
- Colonised surface areas increased markedly the year following a year without any work:
  - an increase of 60% from 2008 to 2009;
  - an increase of 28% from 2010 to 2011.



Surface areas colonised by Canadian goldenrod in the Chênevières meadows from 2002 to 2012. Source: Centre nature conservatory.

## Outlook

- Pursue the management work until Canadian goldenrod has been completely eliminated from the site (the 2013 monitoring programme is now being finished).
- Since 2012, management work on Canadian goldenrod has been carried out on another conservatory site, the “Floodable meadows along the Loire River” site in the town of Herry (Cher department), in the framework of a Natura 2000 contract and using the same techniques.

## Information on the project

- Documents available on the conservatory site:
  - a page on Canadian goldenrod (*Solidago canadensis*) with a description of the species and the management techniques;
  - an annual report on the activities of the conservatory.
- Informational signs on sensitive natural areas and on the Chênevières meadows are set up at the entry to the site and on the foot path.
- A feedback report on the management work was published in the Management guide for peat bogs and fens in the alluvial valleys of Northern France (Crassous and Karas, 2007).

### For more information

- Centre nature conservatory internet site:  
<http://www.cen-centre.org/groupe-plantes-invasives/>  
<http://www.CEN-Centre.org/groupe-plantes-invasives/>
- Crassous C., Karas F. 2007. Guide de gestion des tourbières et marais alcalins des vallées alluviales de France septentrionale. Fédération des conservatoires d’Espaces Naturels, Pôle-relais tourbières, 203 pp.
- Gressette S. (CEN Centre). 2007. Gestion expérimentale pour l’élimination du Solidage du Canada (*Solidago canadensis*) – Prairies des Chênevières à Déols – Année 2007.
- Chorein A. (CEN Centre). 2009. Gestion expérimentale pour l’élimination du Solidage du Canada (*Solidago canadensis*) – Prairies des Chênevières à Déols – Année 2009.
- Chorein A. (CEN Centre). 2010. Gestion expérimentale pour l’élimination du Solidage du Canada (*Solidago canadensis*) – Prairies des Chênevières à Déols – Année 2010.
- Chorein A. (CEN Centre). 2011. Gestion expérimentale pour l’élimination du Solidage du Canada (*Solidago canadensis*) – Prairies des Chênevières à Déols – Année 2011.
- Chorein A. (CEN Centre). 2013. Gestion expérimentale pour l’élimination du Solidage du Canada (*Solidago canadensis*) – Prairies des Chênevières à Déols – Année 2012.

