



Hudson pear

(*Opuntia rosea*)

Project to eradicate Hudson pears from the town of Celles (Hérault department)

Grand Site Salagou - Cirque de Mourèze (SMGS) board

- The board was founded in 2006. Members include the Hérault department and the Clermontais, the Lodévois et Larzac and the Grand Orb intermunicipal boards.
- Its mission is to manage the entire Grand Site Salagou-Cirque de Mourèze area, which covers a total of almost 10 000 hectares.
- In its work to preserve landscapes, the board coordinates management projects for invasive alien species (water primrose, curly waterweed, etc.).
- Contact: Victoria Dubus, Natura 2000 policy officer - victoria.dubus@lesalagou.fr

Intervention site

- The purpose of the Salagou reservoir, created following the construction of the dam on the Salagou River in the 1960s, was to provide water for irrigation and regulate the flow of the Hérault River. The reservoir covers 750 hectares in the towns of Clermont l'Hérault, Liausson, Octon, Salasc, Celles and Le Puech.
- The humid environment stands in stark contrast to the surrounding dry landscape of ruffes¹. The mouth of the Salagou River and the banks of the reservoir are listed under the Landscapes law (1930) and as Natura 2000 (special protection zone for birds) and ZNIEFF (natural zone with high ecological value) sites.
- A Hudson pear was discovered for the first time in the region by an ONCFS (National Agency for Hunting and Wildlife) agent in 2005. The site lay to the north-west of the reservoir, on the western slopes of Mount Cébéro, above the village of Celles.
- In 2007, there were four distinct sites, covering approximately 2 000 square metres each.

Disturbances and issues involved

- The cactus has long spines that can easily pierce skin, shoes and even automobile tires. It represents a serious risk



1. Hudson pear sites in Celles.
2. A site in 2009, prior to the intervention.

of injury to livestock and wildlife, as well as a danger for people working in colonised areas.

- The segments making up the plant can easily detach and the spines enable them to cling to passing objects (animals, shoes, etc.), thus ensuring their dissemination. Once dispersed, the segments throw roots and develop into new plants. The species can thus rapidly colonise favourable habitats.



Interventions

■ Meetings

■ In the beginning of 2009, meetings were held between the Porquerolles National Botanical Conservatory (CBNMED), the Hérault Departmental Council (CD 34), the town of Celles, the SMGS, the National Agency for Hunting and Wildlife (ONCFS) and the Agriculture ministry (DGAL/SDQPV).

■ It was decided to attempt to eradicate the plants, given their limited number in a relatively small area.

■ Mechanical uprooting was planned to the greatest extent possible, given the high risks of injury involved in manual uprooting due to the spines.

■ Initial uprooting work

■ The work started with mechanical uprooting using a backhoe loader on 3, 6 and 7 April 2009.

■ It continued with several days of manual uprooting on 7, 8 and 9 April and 4, 18 and 19 May 2009. Manual uprooting was carried out using a number of tools (rakes, hoes, cultivators, pickaxes, etc.) and the plants were collected in pails, tubs and baskets before being carried to a dumpster.

■ The use of gloves was prohibited to avoid any attempts to pick up the plants with the hands given that the spines can pierce work gloves.

■ The uprooted plants were subsequently buried in a ditch two metres deep.

■ Annual monitoring and additional uprooting

■ After the initial work, a number of plants were found outside the uprooted areas.

■ Given the difficulty in spotting fallen segments and small plants, and the ease of dissemination of the species, it was decided to monitor the situation annually and to proceed with additional manual uprooting.

■ Each year, at the end of the winter or the beginning of spring, the entire area was inspected by board personnel and any detected plants were uprooted. This generally amounted to a morning of work.

Summary of additional manual uprooting done.

Date	Number of people	Approximate quantity of Hudson pear uprooted (in litres)
19 April 2010	10	100
16 May 2011	7	100
2 April 2012	8	75
9 April 2013	14	195
13 November 2013	5	A few plants
18 March 2014	15	120
5 October 2015	7	300
7 March 2017	7	240
Total	-	1 130



3. A Hudson pear developing from a segment.
4, 5, 6. Mechanical uprooting.

■ Monitoring dissemination of the species

■ In order to study the dissemination process, three plots were selected during the fall of 2013 for a special monitoring effort. In each plot, the plants and any fallen segments were counted within a radius of five metres around a central point (a stake in the ground).

■ In plot 1, 60 plants were counted. All the plants were uprooted, with the exception of one in the centre.

■ In plot 2, no plants were found.

■ In plot 3, 20 plants were detected and painted blue in order to monitor the dissemination of segments.

■ In March 2014, an additional plant was found in plot 1 and the two plants were both uprooted. In plot 2, there were still no plants. In plot 3, 18 blue plants were still present (the two missing plants would suggest a counting error during the marking process). Six non-coloured plants were also found, as well as five blue segments on the ground. Only the 18 blue plants were left untouched, the non-coloured plants were uprooted and the fallen segments were collected.

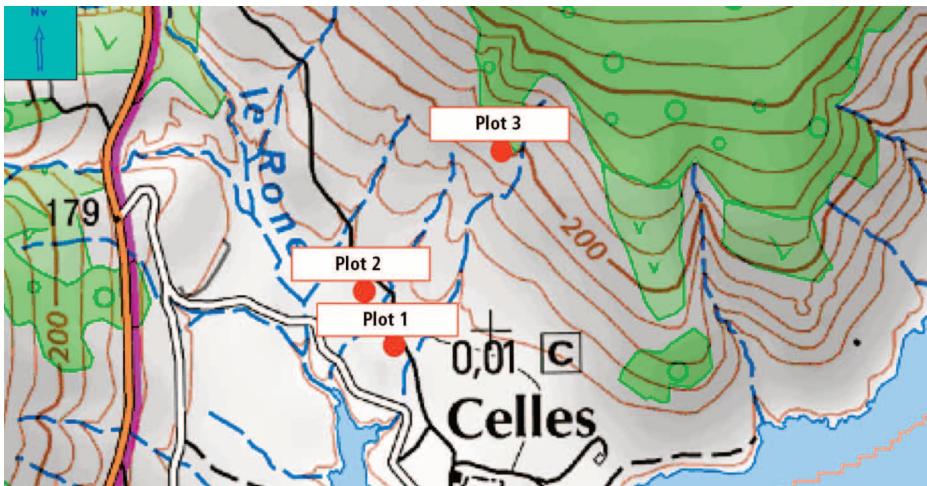
■ In May 2014, no plants were found in plots 1 and 2. In plot 3, in addition to the 18 blue plants, the monitors found 19 blue segments on the ground, 4 non-coloured plants and 1 non-coloured segment on the ground.

■ The results in plot 3 are indicative of the difficulty involved in detecting the plants and of the ease of dissemination of the species.



7, 8. Manual uprooting.

Position of the monitoring plots.



■ In May 2014, following counting in plot 3, all the plants were uprooted and all the fallen segments were collected.

Number of plants in the monitoring plots.

Date	Number of plants detected		
	Plot 1	Plot 2	Plot 3
13 November 2013	60 plants	0	20 plants (painted blue)
18 March 2014	2 plants (1 new)	0	18 blue plants + 6 non-coloured plants + 5 blue segments on the ground
23 May 2014	0	0	18 blue plants + 19 blue segments on the ground + 4 non-coloured plants + 1 non-coloured segment on the ground

Results and costs

■ Results

- During the initial interventions in 2009, the equivalent of four dumpsters (5 cubic metres each) of plants were removed, i.e. 20 000 litres.
- The additional uprooting over the following years represented a total of 1 130 litres.
- The species is still present on the site.

■ Costs

- The initial uprooting work in April and May 2009 was done by approximately 12 people over six and one-half days.
- The equipment (backhoe loader and dumpster) was supplied by the Hérault Departmental Council.
- The personnel came from the Hérault (CD 34) departmental services, including the Natural Areas and Departmental Land Agency and the Rural Land Management Directorate, the regional botanical network of the National Agency for Hunting and Wildlife (ONCFS), the Porquerolles National Botanical Conservatory (CBNMED), the SMGS and the town of Celles. Each entity covered the cost of its personnel.

Man-days of work (2009-2017) supplied by each entity.

Organisation	Man-days
CD 34	24.5
ONCFS	25
CBNMED	5.5
SMGS	10.5
Volunteers / Local officials	37.5
Total	103.0

Information on the project

- An article on Sunday, 18 April 2010, in the Midi Libre newspaper.
- On 7 June 2012, a visit to the site and a presentation of the project was given by the ONCFS botanical network to a delegation of the European plant protection organisation (EPPO) guided by Pierre Ehret (French Agriculture Ministry).
- A presentation of the project to eradicate the Hudson pear by P. Arnaud (ONCFS SD 34), R. Majurel (CD 34) and P. Ehret (Agriculture Ministry) was given during the EWRS symposium on invasive plants in Montpellier from 18 to 23 May 2014, with a visit to the site on 21 May.

Outlook

- The annual monitoring and uprooting have been continued because the smallest fragment of the plant on the site can take root and launch the start of a new colony.



9. The site in 2016 after the work.
10. Visit to the site during the EWRS symposium in May 2014.

■ The continued detection of new sprouts in spite of the fact that the interventions took place before the species had spread widely and that the area was carefully inspected each year raises doubts as to any real possibility of eradicating the species from the site.

■ In the current situation, grazing in the area is strongly not advised to avoid any risk of dispersal. It should be noted that the area was grazed by sheep up until 2009 and that signs of animals (that overcame the fences) were noted in 2014. In addition, it is impossible to stop the transport of segments by wild animals.

Authors: Doriane Blottière, IUCN French committee, and Victoria Dubus, Grand Site Salagou - Cirque de Mourèze board, for the Resource Centre on invasive alien species. July 2018. Published by the French Biodiversity Agency.

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For more information...

- Arnaud P., Majurel R., Piegay L., Andrieu F., Delforge C., Ehret P. 2014. Eradication program against *Opuntia rosea* DC. in the municipality of Celles, Herault (France). 4th International Symposium on Weeds and Invasive Plants, European Weed Research Society, 18-23 mai 2014, Montpellier. http://www.gt-ibma.eu/wp-content/uploads/2018/01/arnaud_2014_opuntia-rosea_celles.pdf
- Brunel S. (coord.). 2003. Plantes envahissantes de la région méditerranéenne. Agence méditerranéenne de l'environnement – Région Languedoc-Roussillon – Agence régionale pour l'environnement Provence-Alpes-Côte d'Azur. 50 pp.