



Curly waterweed

(*Lagarosiphon major*)

Managing curly waterweed in the Blanc Pond

Géolandes, the board in charge of saving and managing the ponds and lakes of the Landes department

- The public board for intermunicipal cooperation was created in 1988.
- Members are the Grands-Lacs, Mimizan and Côte-Landes-Nature intermunicipal associations, the towns of Moliets-et-Maâ, Messanges, Azur, Soustons, Seignosse, Tosse, Ondres and Tarnos, and the Landes departmental council.
- The main missions include:
 - balanced management of ponds and lakes to avoid sedimentation (sand and mud), through preventive work (creation and maintenance of decanting basins for sand on the tributaries) and curative work (sediment extraction);
 - design and creation of installations on ponds and lakes (e.g. beaches) for the public, while preserving natural environments;
 - efforts to control the proliferation of aquatic species and to preserve native species;
 - studies on general and specific topics (hydraulic monitoring, water quality, monitoring of aquatic vegetation, bathymetric studies, impact studies, etc.);
 - participation in collaborative management of water resources and wet lands.

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Intervention site

- The territory covered by Géolandes includes 15 freshwater ponds and lakes of very different size and depth, representing a total of over 10 000 hectares and including highly diverse plant communities.
- Géolandes manages curly waterweed in the Blanc Pond, located in the towns of Seignosse, Soustons and Tosse in the southern section of the department. The pond covers 183 hectares and has a maximum depth of 2 metres. It lies in the basin of the Courant de Soustons River and is part of a string of ponds (between the Noir and Hardy Ponds).



1. The Blanc Pond.

- The Blanc Pond and its banks are listed as natural sites in a decree by the *Conseil d'État*, under the name *Étangs landais*, representing a total surface area of 830 hectares. The Blanc Pond and its basin are also part of the Natura 2000 site for the wetlands behind the Marensin dune.

Disturbances and issues involved

- Curly waterweed started to colonise Blanc Pond in the middle of the 1980s and spread over a surface area of up to 120 hectares. This submergent plant occupies the entire depth of the water in the form of very dense beds, particularly in the western section of the pond where the muddy sediment contains high levels of organic matter.

■ Ecological impacts

- Regression of native hydrophytes.
- Reduced biodiversity and greater environmental uniformity.
- Accelerated sedimentation and filling of the pond.
- Enhanced transparency due to nutrient consumption resulting in a reduction in phytoplankton.
- Increase in fish production.

■ Impacts on pond use

- Significant obstacle to boating activities (a vacation centre is located on the southern edge of the pond).
- Significant obstacle to fishing and hunting of waterfowl.

Interventions

Following the tests on equipment in the years 1988 and 1989, Géolandes launched annual operations to harvest *Lagarosiphon major* starting in 1990.

■ Annual harvesting

- Harvesting took place in May and June, before the summer season.
- The surface areas harvested annually represented 40 hectares up to 2009 and from 15 to 25 hectares starting in 2010.

The work targeted the areas most important for the various activities.

■ Technical characteristics:

- simultaneous cutting and harvesting by the harvester boat;
- 30 cubic metres of storage capacity on the boat;
- cutting depth as close as possible to the bottom and the base of the plants (approximately 2 metres);
- transfer of the plants to a carrier system comprising multiple containers or to a tractor with a trailer.

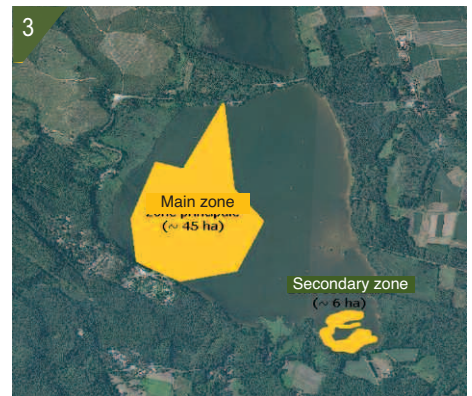
In 2012 and 2013, prior to the work, echo-sounding systems were used by the CARMA research unit from Irstea along transects to detect the most infested sectors in the important areas in order to set up the harvesting plan.

■ Storage and elimination of the plants

- The plants were deposited in dry sections of forest (sandy substrates) for drying or natural composting.
- The selected areas on town property (towns of Seignosse and Soustons) were dry and located near the point where the harvester boat unloaded the plants.

Results and costs

- From 1998 to 2009, the harvested volumes of *Lagarosiphon major* varied significantly and the cost per cubic metre increased gradually.
- Starting in 2010:
 - reduction in the harvested area (-35% to -60% depending on the year);
 - greater flexibility in the procurement procedure (public contracts divided into sections);
 - more precise selection of the harvested areas (echo-sounding along transects in 2012 and 2013).



2. Blanc Pond colonised by *Lagarosiphon major*.
3. Potential harvesting zones.
4. Harvester boat.

- These modifications in policy made it possible to reduce costs while meeting the needs of users.
- Harvesting is the only technique capable of handling large surface areas while limiting the disturbances and damage to the environment. Manual uprooting is possible only for limited surface areas (technical constraints and high costs).
- Concerning plant elimination, drying and natural composting in dry forest areas (sandy substrate) produce good results in eliminating the harvested biomass that consists essentially of water.

Total cost and cost per cubic metre of work to manage *Lagarosiphon major* in the Blanc Pond from 1998 to 2013.



Outlook

- Géolandes commissioned Irstea (CARMA research unit) to assess the impact of harvesting *Lagarosiphon major* in Blanc Pond (2011-2013) and to update its assessment of the management strategy.
- After 20 years of harvesting *Lagarosiphon major*, the other types of macrophytes would appear to be in good physiological condition and there were no notable physical-chemical differences (water and sediment) between the studied areas (colonised - non colonised, harvested - non harvested, etc.).
- On the basis of the above observations, the probable effects of harvesting, that should be better characterised by setting up additional experiments, are the following:
 - annual harvesting limits plant development;
 - harvesting every two years has no effect;
 - a halt in regular harvesting for several years encourages plant development.

■ The study results do not indicate the need for any changes in the management strategy of Géolandes over the short term. It should be noted that the use of the echo-sounding technique prior to harvesting is a very useful contribution when setting up the harvesting plan.

Information on the project

■ Training sessions on aquatic plants were organised by Géolandes in conjunction with Cemagref (now Irstea) in 1991 and 2004 for the personnel of the local governments participating in Géolandes and for the organisations managing natural environments (fishing and hunting federations, environmental-protection groups, etc.).

■ Information was regularly made available to the general public and to the persons involved in management operations for aquatic plants.

■ Information was regularly made available to elected officials during the meetings of the Géolandes board, during the delivery of studies and during visits in the field.

■ Numerous articles on the management of invasive aquatic plants were published in the regional press and in the bulletin of the Landes departmental council.

■ A number of scientific and technical articles were published in conjunction with Cemagref (Irstea) on the management of invasive plants in the ponds of the Landes department.

■ Presentation of management insights acquired by Géolandes concerning invasive plants during various symposia, e.g.:

- the Aquitaine Nature professional meetings (Bordeaux, April 2010);
- the symposium titled Biological invasions in aquatic environments (Paris, 12-14 October 2010);
- the workshop titled Macrophytes! (Talence, 28-30 May 2013).

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For more information

■ Géolandes board:

<http://www.gt-ibma.eu/strategies-ou-ensont-les-institutions/strategies-infranationales/syndicat-mixte-geolandes/>

■ Fournier L., Zuazo A. 2012. Organisation de la gestion des plantes exotiques envahissantes dans les lacs et étangs littoraux landais. Sciences, Eaux et Territoires, 6 : 42-45.

■ Dutartre A., Oyarzabal J., Fournier L. 2003. Interventions du Syndicat Mixte Géolandes dans la régulation des plantes aquatiques envahissantes des lacs et des étangs du littoral landais. Gestion des espèces exotiques envahissantes en zones humides, Sallertaine, 13 et 14 novembre 2003. Aestuarina, 6 : 79-97.

■ Géolandes, 2004. Document de session de formation plantes aquatiques « Présentation des lacs et des étangs landais, de la dynamique de quelques plantes aquatiques indigènes et exotiques et des modalités de gestion des plantes exotiques envahissantes ».

■ Castagnos E., Dutartre A. 2001. Évolutions récentes des peuplements de plantes aquatiques exotiques dans les lacs et les étangs landais (Landes, France). Cemagref, unité de recherche Qualité des eaux et Géolandes, Étude 66, 227 pp.

■ Dutartre A., Delarche A. et Dulong J. 1989. Plan de gestion de la végétation aquatique des lacs et étangs landais. Etude CEMAGREF Bordeaux, 38 : 121 pp.