



# Curly waterweed

(*Lagarosiphon major*)

## Managing curly waterweed in Lough Corrib, Ireland

### Inland Fisheries Ireland (IFI)

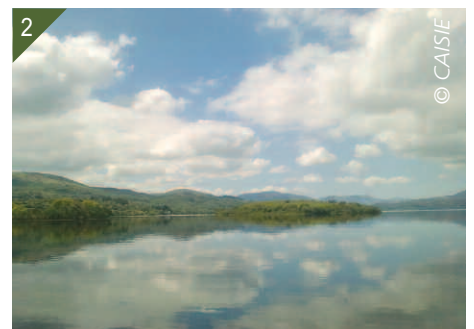
IFI is the public agency in charge of protecting, managing and conserving Irish inland fisheries and ocean fish stocks. The agency was created in 2010 and manages 74 000 kilometres of river and 120 000 hectares of lakes and ponds in Ireland.

### Context and issues involved

*Lagarosiphon major* was introduced in Ireland as a plant intended to oxygenate artificial water bodies. The species was discovered in 2005 in Lough Corrib, the second largest lake in Ireland (17 800 hectares) and a Natura 2000 zone containing important spawning grounds for brown trout (*Salmo trutta*). Since 2005, curly waterweed has colonised 113 sites representing a total surface area of 92 hectares.

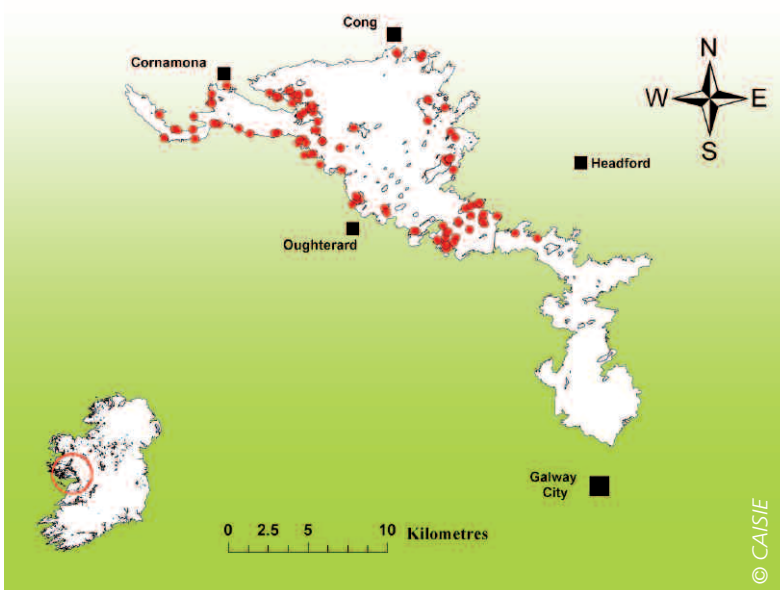
Curly waterweed colonised the sites very rapidly, creating a thick blanket on the water surface that blocked the light and hindered the development and even the continued existence of native macrophytes. This had an effect on the structure of the macroinvertebrate community and on the salmonid population.

Other problems concerning the use of the lake (fishing and boating) were also observed and flooding risks caused by poor water circulation were also mentioned.



1. The study site.  
2. Lough Corrib.

Distribution of *L. major* in Lough Corrib in 2007.



## Interventions

■ In the framework of a LIFE project addressing invasive alien species in general in Ireland (Control of aquatic species and restoration of natural communities in Ireland - CAISIE Project), a programme to manage and study the impacts of curly waterweed on biodiversity was conducted from 2008 to 2013. The programme consisted of:

- studying the biological cycle of *Lagarosiphon major* in Lough Corrib;
- developing good management practices and new methods to control *Lagarosiphon major*;
- assessing the effectiveness of the control techniques used and the impact of species management on the ecosystem;
- determining the impacts of *Lagarosiphon major* on the native communities of fish, macroinvertebrates and plants;
- testing techniques to ecologically rehabilitate the lake following the management operations.

■ Depending on the current development stage of the species, three main management techniques were employed:

- blocking the light by laying a sheet of biodegradable burlap along the bottom of the lake from the beginning of the summer to the beginning of the fall. The burlap was positioned using boats. The fabric was supplied in rolls 5 metres wide and 900 metres long, with a density of 200 grammes per square metre;
- mechanical cutting using V-shaped bars capable of reaching the roots, during the coldest months (mid-fall to the beginning of April). Nets were installed to avoid dispersal of fragments of curly waterweed and to facilitate mechanical recovery of the plants;
- manual uprooting by divers in areas where plant densities were very low.

## Results

■ In 2008, prior to the start of the coordinated management operations, a total of 92 hectares were colonised by *L. major* in Lough Corrib. At the end of the CAISIE programme, 90% of the affected surface areas had been treated and the area requiring management had been reduced to 9 hectares.

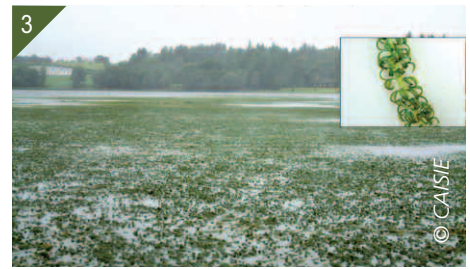
■ Mechanised operations (cutting and harvesting) were carried out on 98 hectares. The harvested plants were dried and composted on site. Manual uprooting was done in very small areas (a total of 0.5 hectare) and made it possible to selectively manage *L. major* in sections where its density was low. Regrowth of native macrophytes occurred, but at slower rates than on the sites where sheets of burlap were used.

■ The latter method was implemented on a total of 5 hectares and had a number of advantages:

- ease of use (the biodegradable fabric rapidly absorbs water and sinks to the bottom, it is not necessary to remove it);
- the curly waterweed covered by the fabric quickly dies;
- native macrophytes regrow through the burlap fabric after approximately 4 months and the original plant community fully recovers after about 2 years.

■ Cost of managing *Lagarosiphon major* in Lough Corrib:

- 400 000 euros from 2005 to 2008;
- 1.5 million euros from 2009 to 2012;



3. 4. Lough Corrib, before (1) and after (2) the management work on curly waterweed.
5. Installing a biodegradable geotextile in Lough Corrib.
6. Cutting and harvesting of plants.
7. Efforts to raise the awareness of school children.

- 300 000 euros in 2013;
- estimated cost of 300 000 euros for management in the coming years;
- i.e. a total of 2.2 million euros for the period from 2005 to 2013.

■ The CAISIE programme (LIFE07 NAT/IRL/000341) as a whole cost 1.5 million euros over 5 years (with European funding covering 45%). A socio-economic study (Kelly *et al.*, 2013) calculated that the damages inflicted on the Irish economy by invasive alien species and the cost of their management represented over 200 million euros per year. The annual impact on aquaculture, fishing and recreational activities was estimated at 4 million euros for a sector (fisheries) that currently employs 10 000 people with sales of over 500 million euros. The CAISIE programme served to develop management and awareness-raising methods designed to reduce those socio-economic impacts.

## Outlook

■ The management work will continue to be conducted in Lough Corrib and good-practices guides will be drafted for personnel trained to use the methods tested during the CAISIE programme. Inland Fisheries Ireland will continue to support the current efforts (management, awareness raising and biosecurity measures), by launching research programmes on the management of invasive alien species, including a programme on the biological control of Himalayan balsam.

## Information on the project

■ In parallel with the management work, special efforts were made in the framework of the CAISIE programme to raise the awareness of the public and managers through informational documents, a disinfection protocol for fishing equipment, cleaning kits, demonstrations of management techniques, a film, a news bulletin and presentations in schools.

■ The results of the work on curly waterweed in the framework of the CAISIE LIFE programme were presented in detail during an international conference held in April 2013 and titled Freshwater invasives, Networking for strategies.

■ The CAISIE programme also dealt with other invasive alien species in aquatic environments in Ireland. Management projects were set up for Asian clams (*Corbicula fluminea*), Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*) and New Zealand pigmyweed (*Crassula helmsii*).

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### For more information

- CAISIE programme:  
[www.caisie.ie](http://www.caisie.ie)
- Inland Fisheries Ireland  
<http://www.fisheriesireland.ie/>
- Caffrey J.M., Millane M., Evers S., Moran H. and Butler M. 2010. A novel approach to aquatic weed control and habitat restoration using biodegradable jute matting. *Aquatic Invasions* 5 : 123-129.
- Caffrey J. 2013. Control of Aquatic species and restoration of natural communities in Ireland (CAISIE). Layman's report. 17 pp.
- Caffrey J. 2013. Control of Aquatic species and restoration of natural communities in Ireland (CAISIE). Final report. 69 pp.
- Kelly J., Tosh D., Dale K. and Jackson A. 2013. The economic cost of invasive and non-native species in Ireland and Northern Ireland. Northern Ireland Environment Agency and National Parks and Wildlife Service, Invasive Species Ireland. 95 pp.