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The spread of invasive species and harmful pathogens

Best Practice for Control of New Zealand Pigmyweed Crassula helmsii

Iascach Intíre Éireann
Inland Fisheries Ireland

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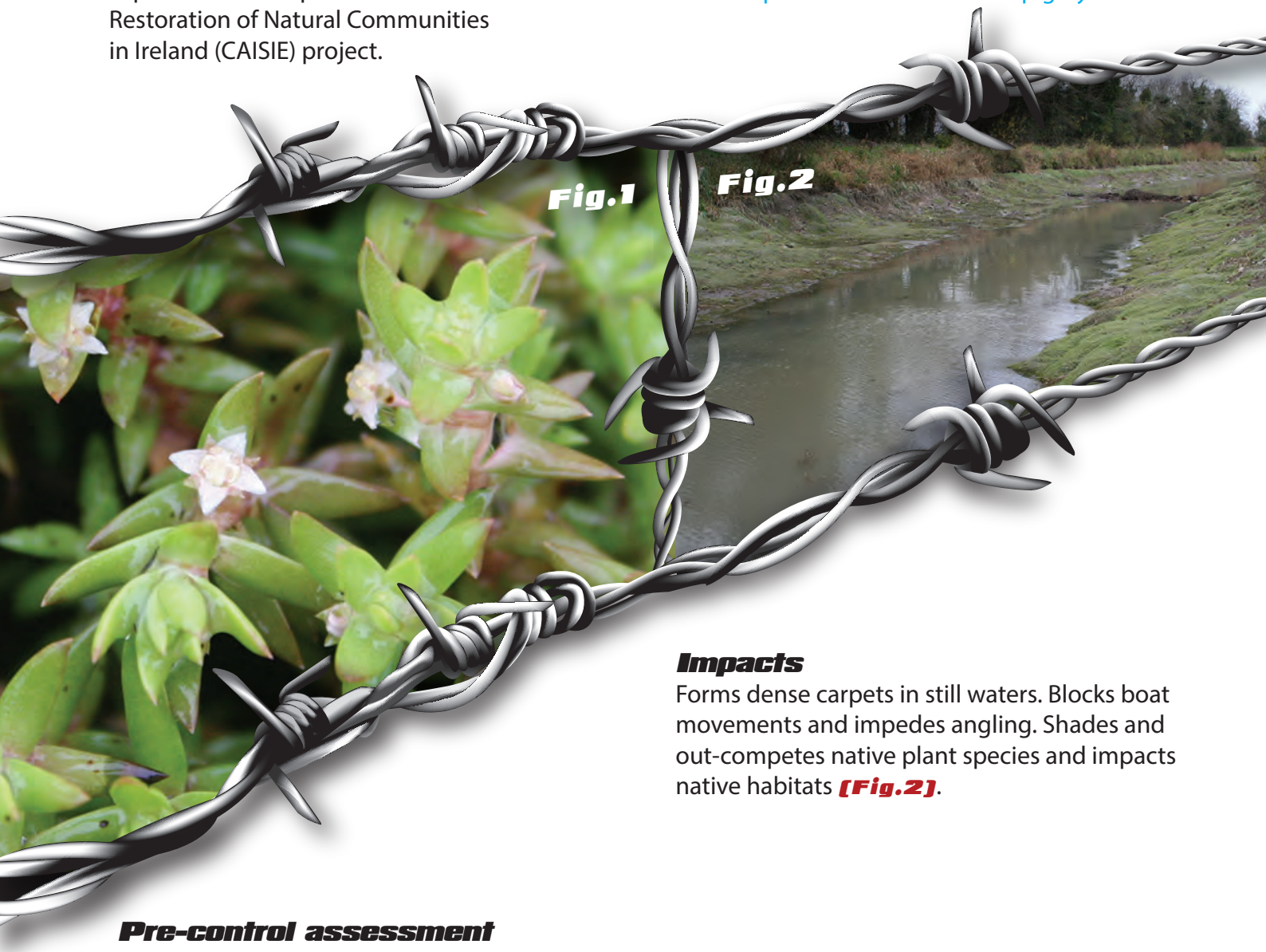
Scope

This best practice document provides guidance to stakeholders on effective measures to control the highly invasive aquatic plant New Zealand pigmyweed *Crassula helmsii* based on methods used and developed by Inland Fisheries Ireland (IFI) under the EU LIFE+ funded Control of Aquatic Invasive Species and Restoration of Natural Communities in Ireland (CAISIE) project.

Identification

The plant grows in water and along the banks. Leaves have a pointed tip, grow in opposite pairs and are somewhat fleshy **(Fig.1)**. The submerged form grows from a basal rosette and has sparsely-leaved stems. The bankside form has more densely arranged and shorter, succulent leaves, and grows from creeping stems. Flowers are small and white and are only produced above the water surface. An identification sheet and video can be found here: http://www.fisheries ireland.ie/Invasive-species-list/new-zealand-pigmyweed.html



Impacts

Forms dense carpets in still waters. Blocks boat movements and impedes angling. Shades and out-competes native plant species and impacts native habitats **(Fig.2)**.

Pre-control assessment

Establish the distribution and abundance of the weed in the target area: As this weed can grow to 3 metres depth, direct observations from the bankside or a boat should be undertaken, supplemented by a benthic viewer, snorkelling or scuba diving, as required. Mark the location of all weed stands present on a map or using a GPS and record the size of each stand. For infestations that occupy a large area (>1000 m^2), use parallel transects to survey, with transects delineated by marker buoys or pre-determined GPS waypoint routes. The distance between each transect should be determined with consideration to water visibility and the time available. Any native vegetation encountered should also be recorded. Data should be entered into a GIS mapping system, if possible.

Effective control measures

The following effective control methods have been successfully used and developed by IFI under the EU LIFE+ CAISIE project to target New Zealand pigmyweed. Repeat treatments targeting any regrowth may be necessary to achieve long-term control. Mechanical cutting is not recommended due to the high potential for further spread from plant fragments arising from this process. The weed stands targeted for control should be demarcated with surface marker buoys. The area of infestation may determine the control approach used.

Manual removal (hand-picking)

using scuba diving for treatment of infestations of low abundance (<0.5 m^2): Working downstream of any water current to maintain visibility, carefully extract the weed from the substrate ensuring all roots are removed **(Fig.3)**.

Requirements: Support boat, scuba divers, mesh bags, marker buoys, rope and weights.

Place the plant material into a fine mesh bag and compost on dry land. It is recommended that the composting area should be underlain with plastic sheeting to inhibit any attempts by the weed to re-establish. Extreme care is required during the manual removal process as the weed can regenerate from small nodal fragments < 5 mm length.

Light-excluding jute matting

Pre-cut biodegradable jute matting sheets are fed out from the shore or a boat, as appropriate **(Fig. 4)**. For water depth >1 m this will require scuba divers. A purpose-modified boat with a rear-mounted dispensing reel may be used to deploy sheets > 30 m length. Weights are attached at the corners of the sheet and at 3 m intervals using tying wire (1 kg weights can be made up from jute sacks containing washed pea gravel tied off with tying wire). The sheet is then stretched out and laid flush to the bottom over the infested area. The matting should be water-saturated before deployment to enable it to sink more effectively. Adjacent sheets can be stitched together using tying wire. A double layer of jute matting is recommended.

This control method has the additional demonstrated benefit of facilitating the re-generation of native charophyte and other vegetation that can germinate from seed reserves and re-establish in the absence of the invasive weed.

Requirements: Purpose-modified boat with rear-mounted dispensing reel (for large jute sheets,) support boat, scuba divers, pre-cut jute matting sheets, marker buoys, rope and weights, 2.5 mm gauge tying wire, washed pea gravel. Jute matting is sourced from an Irish distributor in rolls 900 m long x 5.16 m wide sheets (weave density 4 mm^2; weight 187 g/m^2)

Herbicide treatment can be an effective means to target extensive dense stands of New Zealand pigmyweed where the infested watercourse can be drained during the treatment period ***(Fig.5)***. Glyphosate with Codacide Oil and a TopFilm adjuvant is recommenced for the treatment of exposed weed stands after water drawdown (mix ratio of 6:3:1) at an application rate of 6 litres per hectare.

Requirements: Purpose-modified boat with rear-mounted dispensing reel (for large jute sheets,) support boat, scuba divers, pre-cut jute matting sheets, marker buoys, rope and weights, 2.5 mm gauge tying wire, washed pea gravel. Jute matting is sourced in rolls 900 m long x 5.16 m wide sheets (maximum weave density 4 mm^2; weight 187 g/m^2).

Herbicide application should only be carried out by suitably qualified contractors or operators, with strict reference to the product label, local land use, health and safety considerations and any pertinent regulations. Herbicide should be applied in a manner (e.g. using spot treatment when possible) to minimise drift to any adjacent non-target native plant species present.

Knapsack sprayers are most appropriate for bankside work with long-lances useful for treating hard to reach areas. Two weeks after treatment, the area should be surveyed and any patches of weed missed during the original operation should be sprayed.

Requirements:
Appropriate herbicide and personal protective equipment, qualified contractor / operators, knapsack sprayer and long-lance.

Mechanical removal using an excavator can be an effective means to target extensive dense stands of New Zealand pigmyweed where the infested site can be readily accessed from the bank (e.g. a canal with an adjacent towpath). The infested area should be drained of all water before such operations commence ***(Fig.6)***. The top 10 cm layer of infected substrate should be removed using an appropriate excavator ***(Fig.7)***. The spoil should subsequently be transported to a disposal pit and covered over by at least a 1 metre of layer of uninfected spoil. For optimal control, mechanical removal operations can be preceded by herbicide treatment as described in the previous section.

Requirements:
Excavator, loader, and disposal pit.

Post-control monitoring

In order to properly evaluate the efficacy of the control measures implemented and monitor the natural recovery of the native habitat, post-control assessment is necessary. Such monitoring should be conducted immediately after the control operations are concluded to assess the need for further control and additionally on at least an annual basis. Re-survey the area targeted in the same manner used during the pre-control assessment and compare the results. Consider appropriate remediation measures to enhance habitat recovery, if required, in consultation with appropriate experts and agencies. This may include the re-planting, re-location or transplantation of extirpated native species. Consider further control treatment, if necessary.

Further information

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Additional considerations

An appropriate risk assessment, which includes Health & Safety considerations, should be carried out before any control or survey work is undertaken. Permission or licences from the appropriate authorities may be required to carry out invasive species control work in some locations such as Natural Heritage Areas, Special Areas of Conservation, Special Protection Areas and waterways. The requirements listed under each control method are not prescriptive and only provide information on the principal items required.

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The CAISIE Project is an EU Life+ funded programme co-financed by the National Parks and Wildlife Service.

The primary purpose of the project is to control and possibly eradicate aquatic invasive species in Lough Corrib and the Grand Canal and Barrow Navigation, the development and dissemination of effective control methods and raising the awareness of such species through stakeholder engagement.

Please report aquatic invasive species sightings to info@caisie.ie
or Lo-Call 1890 34 74 24

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An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
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