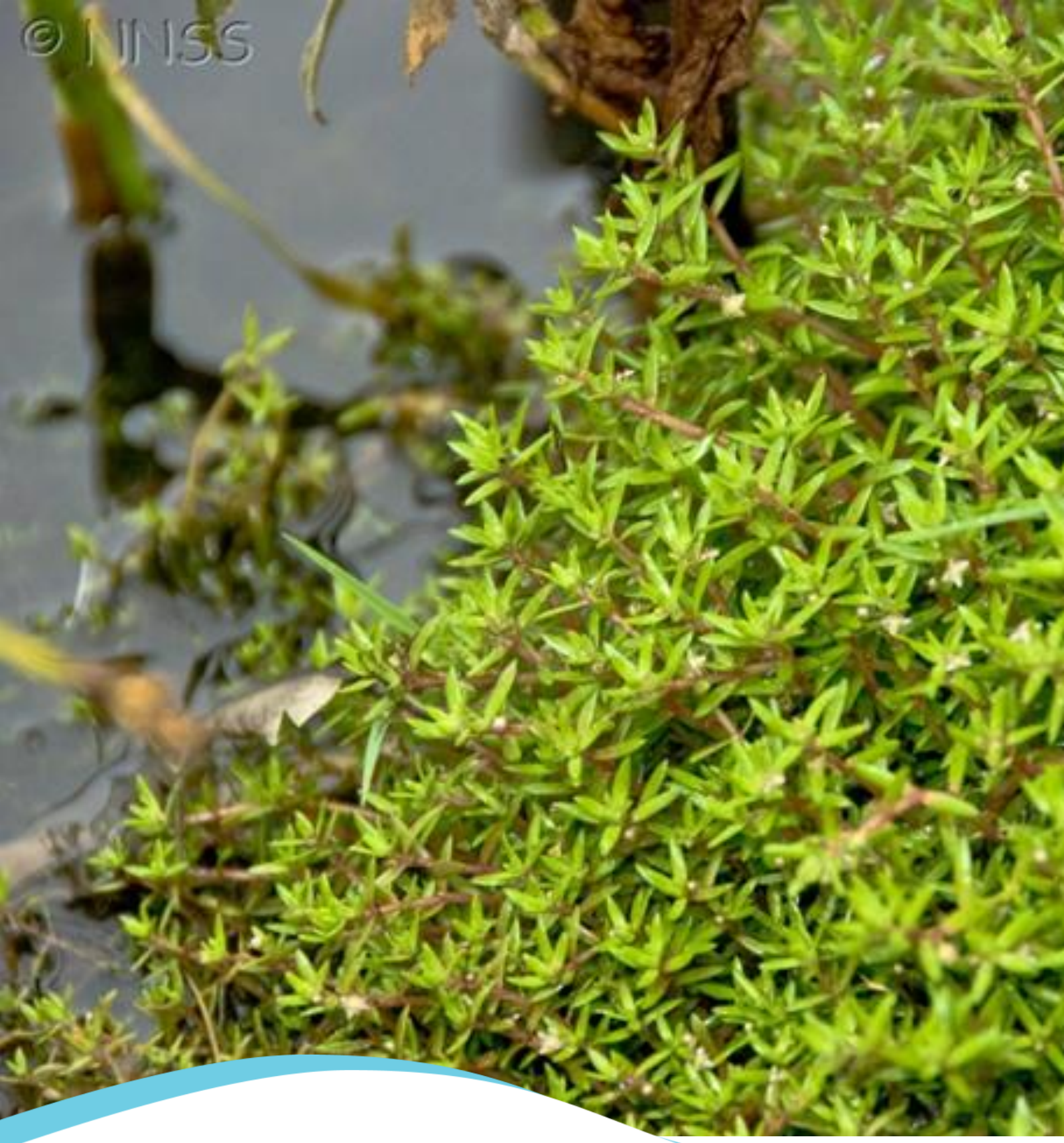

GOOD PRACTICE MANAGEMENT

New Zealand Pygmyweed (*Crassula helmsii*)

RAPID
Reducing and Preventing
Invasive Alien Species Dispersal

GOOD PRACTICE MANAGEMENT GUIDE FOR
New Zealand Pygmyweed (*Crassula helmsii*)

Other names: Australian swamp stonecrop

For ID guides and more information:

http://www.nonnativespecies.org/index.cfm?sectionid=47

https://www.cabi.org/isc/datasheet/16463

New Zealand Pygmyweed (*Crassula helmsii*)
Close up of leaves and flowers © GB NNSS

Version 1: August 2018

MANAGEMENT SUMMARY

Ecology and impact of New Zealand Pygmyweed

New Zealand Pygmyweed has three forms; submerged, emergent and terrestrial. Emergent and terrestrial forms easy to locate and ID, but submerged form can be difficult to locate. It is not capable of reproducing from seed, but readily grows from very small stem fragments, which has severe implications of management of this species, as it is incredibly easy to spread. It will grow in standing water up to 3m deep and around the damp margins of ponds and rapidly colonises and becomes the dominant plant in the community. *C. helmsii* abundance is negatively correlated to shade and is more likely to be found in open vegetation structures. It can tolerate a wide range of of pH, but prefers neutral to alkaline sites and will form dense mats under high pH conditions. This species responds particularly postively to nutrient rich soil (which often occurs as a result of pollution), with nitrate enhancing the regeneration of plant fragments and nitrogen reducing root competition.

The impacts of New Zealand Pygmyweed on native plants (and hardly research has been done on its effects on native animals) is debated, but it is thought that this species can alter plant community compositions.

Effective management: summary

There are a number of different methods by which *C. helmsii* can be controlled, as detailed below. However, the mechanical and manual methods are included in this section with a caveat. Fragments of *C. helmsii* as small as 5mm with a single node are capable of growing, and therefore mechanical or manual control comes with extreme risk of spreading the plant. Therefore, these methods should only be used when there is absolutely **no other possible course of action**. Timing of conservation measures is essential, late summer and autumn should be avoided.

Effective management: summary (cont)

A number of studies have reported success with using chemical control, and one study used a combination of environmental and chemical control with apparent success. At Mochrum Loch SSSI, where material was used as a primary treatment method, there was a 96% reduction in the need for chemical use afterward (ECUS, 2013b) and a nearly 50% reduction in area covered by the plant (ECUS 2013c). A detailed methodology is also included in the report (ECUS, 2013a). Pre and post treatment monitoring would be essential to assess the efficacy of any control method used. It would appear that, if site conditions allow, that a combination of methods are required in order to effectively control *C. helmsii*.

Adapting the habitat (such as steepening banks, creating more shade and planting more native species), can be a good management technique in some situations.

Tests of the gall-forming eriophyid mite (*Aculus* sp.) have proved very positive and CABI are in the final stages of seeking approval for release (CABI, 2017).

MANAGEMENT METHODS

Biological

Aculis sp. mite

Method: The gall-forming eriophyid mite (*Aculus* sp.) are renowned for host specificity and ability to reduce the plants reproductive success. The mites feed and shelter in shoot tips and several generations will be produced in a single growing season with no non-target damage. As of May 2018, CABI scientists are in the final stages of consultation and, following this, a release strategy will be put in place to release the mite from quarantine. (CABI, 2017).

No specific information on the use of *Aculus* can be given until CABI processes are completed.

Beavers

Beavers have the ability to reduce nutrient levels and improve overall habitat health. It is thought that they can have a significant impact on invading plant species such as *Crassula* through direct consumption and removal of plant litter. A site where this is being examined is Ham Fen nature reserve in Kent.

MANAGEMENT METHODS

Chemical

Glyphosate Treatment

Method: 6 l/ha of a glyphosate formulation specifically designed for use in aquatic environments is applied directly to the emergent growth or to the submerged growth if the water body is drained. It is best applied at 5 ml/l at a walking rate of 6m/s. Retreatment is not usually necessary.

Potential equipment requirements (excluding PPE): Knapsack sprayer with nozzle.

Most suitable situation for method: Only suitable for emergent or terrestrial growth.

Efficacy: Moderate, as it has little effect on the submerged growth. Efficacy also decreased with the thickness of the *Crassula* mat.

Constraints: Requires WQM1 approval and NPTC PA1 & PA6 qualifications. There is also potential for damage to non-targets.

When to manage *C.helmsii* with glyphosate

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Mechanical

Dredging

Method: Dredging then disposing of material through either composting or burning well away from aquatic habitats. Site needs to be netted with fine mesh to contain propagules.

Potential equipment requirements (excluding PPE): Digger or a tractor-mounted weed bucket. Vehicle and trailer also needed if not disposing of material on site. Suitable fine meshed net to enclose compost/burn site and hand nets to remove propagules from water.

Most suitable situation for method: Only suitable in areas that can be contained. This method has a significant risk of exacerbating the problem should it not be carried out with great care.

Efficacy: Low unless the method is performed meticulously. More likely to result in temporary reduction of plant cover than permanent eradication.

Constraints: This method is highly likely to spread *C. helmsii* and unlikely to provide long-term management if submerged *C. helmsii* is present. Very high standards of biosecurity are essential for all clothing and equipment used. Avoid damage to the habitats of sensitive species, such as water voles and nesting birds. The Regulatory Statement with guidance for treatment and disposal of invasive non-native plants is available at: https://www.gov.uk/government/publications/treatment-and-disposal-of-invasive-non-native-plants-rps-178/treatment-and-disposal-of-invasive-non-native-plants-rps-178

When to manage *C. helmsii* with dredging

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Mechanical (cont)

Burying

Method: Drying out waterbodies then burying all plant material to a depth of at least 20cm.

Potential equipment requirements (excluding PPE): Large digger or excavator.

Most suitable situation for method: Suitable for ponds where *Crassula* has completely taken over and no other native species of interest remain as a result. Also requires area large enough for new ponds to be created to compensate for habitat loss.

Efficacy: High. One study found this method to be 100% successful when combined with a pre-treatment of glyphosate three weeks prior to burial (Sims & Sims 2016).

Constraints: This method relies on the water bodies in question not containing any species of interest, or if they do then species which can be safely translocated to new habitat before work is carried out, ideally to waterbodies where *C. helmsii* is already established so that new populations are not established.

When to manage *C. helmsii* with burying

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Manual

Hand pulling

Method: Excavating plants by hand then disposing of the material either through composting or burning well away from aquatic habitats. Site then needs to be netted with fine mesh to contain propagules.

Potential equipment requirements (excluding PPE): Hand tools, buckets and bags. Vehicle and trailer also needed if not disposing of material on site. Suitable fine meshed net to enclose compost/burn site and hand nets to remove propagules from water.

Most suitable situation for method: Only suitable in areas that can be contained. This method has a significant risk of exacerbating the problem should it not be carried out with great care.

Efficacy: Low unless the method is performed meticulously.

Constraints: This method is highly likely to spread *Crassula* and unlikely to provide long-term management if submerged *C. helmsii* is present. Very high standards of biosecurity are essential for all clothing and equipment used. Avoid damage to the habitats of sensitive species, such as water voles and nesting birds.

When to manage *C. helmsii* with hand excavation

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Environmental

Covering site

Method: Cover with black polythene or a similar material to shade the plant for at least three months, but preferably six. Jute or burlap has worked well for *Lagarosiphon* control, but has not been tested with *Crassula* (Caffrey, et al. 2010, 2013).

Potential equipment requirements (excluding PPE): Rolls of black polythene or similar material and potential adaptations to boats or vehicles to assist with deployment.

Most suitable situation for method: Only suitable for small infestations in areas that can be kept from disturbance.

Efficacy: Moderate, but application limited by sites suitable for this method

Constraints: Requires a site that is free from obstructions and disturbance. Best deployed on land rather than in submerged situations, where gassing causes the polythene to surface unless heavily weighted. This method is non-specific, and therefore should not be used where it may harm sensitive species.

In addition to this, covering only reduces New Zealand pygmyweed temporarily and often the fragments will persist in a dormant state. This method creates bare ground (a habitat that this species thrives on), so it often quickly recolonises once the plastic is removed., once again outcompeting natives flora.

When to manage *C. helmsii* with cover

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Environmental (cont)

Flooding with salt water

Method: Flood affected areas with water at a minimum salinity of 8 parts per thousand (ppt) for a minimum 31 days in order to kill *C. helmsii* off completely, although successful field trails left areas flooded for 12 months with sea water. Sea water can be used effectively as it averages 35 ppt.

Potential equipment requirements (excluding PPE): Site dependant

Most suitable situation for method: Only really suitable for sites where a source of saline water is available and topography allows for saline water to be retained on site and topped up for long periods.

Efficacy: Very effective

Constraints: Requires a site with access to saline water, and where water can be retained. Also likely to kill off non-target species which are not tolerant of saline conditions.

When to manage *C.helmsii* with saline water

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Ineffective or unavailable control

Biological Control

Grass Carp *Ctenopharyngodon idella* is used a biological control agent and is known to feed on *C. helmsii*, however it is not thought to be a preferred food source (Dawson and Warman 1987) and *C. idella* is in itself a non-native species whose ecological impacts on native species are unknown.

Drying

Drying out has been shown to be partially successful in eradicating *C. helmsii*; however its ability to survive drying out means that alone it is unlikely to prove useful. There is little evidence to suggest how successful it would be, so for this reason it is included here.

Hot foam

Two studies have been carried out, and neither of them found that spraying a hot biodegradable foam was particularly effective in killing *C. helmsii*. The same goes for aquatic dye.

Hot water

Hot water has been proven to kill *C. helmsii* (Anderson et al, 2015) and could potentially be used to remove small patches. However, this method leaves areas of bare earth, and other studies have shown that *C. helmsii* benefits from disturbance of ground, and therefore, unless the treatment could ensure that 100% of the plant was eradicated, then the plant would simply return in the same location.

Grazing

Grazing often creates more bare ground and less shade, which increases the rate of *Crassula* colonisation.

Preventing spread

There has also been research carried out which suggest a number of best practice steps that could help to minimise or contain spread of *C. helmsii*. It has been suggested that covering existing areas of *C. helmsii* with a fine mesh can prevent it being spread by birds or other animals through fragments being transported to other water bodies. It is also thought that *C. helmsii* does better on disturbed ground, so eliminating disturbance around aquatic habitats by grazers can help to reduce or even stop the spread of the plant. One paper explored reducing *C. helmsii* growth through planting species to compete, and that the native shoreweed *Littorella uniflora* appeared to reduce abundance, possibly through a chemical effect.

Preventing the spread of *C. helmsii* between areas is key in any attempts to contain or eradicate the species. Check, clean, dry is the standard biosecurity measure implemented. However, a study has shown that treating equipment with hot water (45°C for 15 minutes) is more effective, with 90% mortality 1 hour after treatment compared with drying, which only led to a 50% mortality after 16 days.

Legislation

Under the EU Invasive Alien Species Regulation, as well as Section 14 (2) of the Wildlife and Countryside Act 1981 (as amended) and Article 15 (2) of the Wildlife (Northern Ireland) Order 1985, it is an offence to plant this species, or otherwise cause it to grow, in the wild. Under the EU Invasive Alien Species Regulation it is also an offence to import into the EU, keep, grow or cultivate, transport (to, from or within the EU; except to facilitate eradication), place on the market, use or exchange this species - unless there are specific exemption or permit.

Health and Safety

Use of glyphosate requires AqHerb01 approval and NPTC PA1 & PA6 qualifications.

Application to use herbicides in or near water

City & Guilds Level 2 Principles of Safe Handling and Application of Pesticides (PA1)

City & Guilds Level 2 Award in the Safe Application of Pesticides using Pedestrian Hand Held Equipment

Health and Safety Executive Code of Practice for Plant Protection Products

Useful resources and guidance on health and safety when planning a project working with invasive species is available on the GBNNSS website:

http://www.nonnativespecies.org/index.cfm?pageid=266

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RAPID

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Invasive Alien Species Dispersal

Where To Go For More Information

- http://www.anglingtrust.net/
- http://www.invasive-species.org/
- http://www.europe-aliens.org/
- http://www.nonnativespecies.org/beplantwise
- http://www.nonnativespecies.org/home

RAPID

RAPID is a three year EU funded LIFE project led by the Animal and Plant Health Agency (APHA), with Natural England and Bristol Zoological Society as key partners that piloting innovative approaches to Invasive Alien Species (IAS) management in freshwater aquatic, riparian and coastal environments across England. The project is supported by a number of further Technical Partners.

http://www.nonnativespecies.org/rapid

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