



Breathing New Life Into Your Water Course

Specialists in aquatic and bank weed control, pond and lake restoration, silt pumping and dredging, treatment and control of algae, reed, bulrush and lily control.

Aquatic Weed Identification Guide

In order to tackle an aquatic weed problem you have on any body of water, initial identification is essential. You can then learn about its growth habits and discover how to remove the weed and the best time to do it.

We have listed here the most common aquatic weeds, and details about each one.

Australian Swamp Stonecrop

Australian Swamp Stonecrop -*Crassula helmsii* - was introduced to Britain in 1911 from Tasmania. It was first sold as an “oxygenating plant” in 1927 by Perry’s Hardy Plant Farm in Enfield. The first recorded natural occurrence was at Greensted Pond in Essex in 1956.

The plant will grow around the damp margins of ponds and in water up to 3m deep. It forms very dense stands. It first appears as a small light green tussock on the sediment. These tussocks grow and spread rapidly to form a dense mat of vegetation. The dense mat out-competes all other aquatic vegetation, eliminates native flora and creates a poorer ecosystem for invertebrates and fish. Severe oxygen depletion can occur below dense growths of this plant. The plant assimilates CO₂ for 20 hours of the day when submerged due to the possession of crassulacean acid metabolism and grows throughout the year. There is no dormant period.

Mechanical control - Cutting and removal of the vegetation can be done with our amphibious Truxor. Care is taken to prevent further infestations downstream.

Chemical control - Once the dense mat of vegetation has been removed a follow-up spray of approved herbicide can be applied.

Glyphosate can be applied to any emergent material, either on the bank or in the water, as long as it is dry. Only formulations of glyphosate which are specifically recommended for use in aquatic situations should be used.

Biological control - There are no known biological control agents for this plant in this country. It will be eaten by grass carp if the infestation is small and not well developed, but dense infestations cause severe fluctuations in dissolved oxygen content of the water and the fish do not usually survive.

Environmental control - Australian Swamp Stonecrop *C. helmsii* is tolerant of shade for long periods. It is frost tolerant, desiccation tolerant and cannot easily be controlled by any method of environmental control. Covering with black plastic or carpet can effectively eliminate small patches. The shade material should remain in place for at least 8 weeks, and preferably for 6 months.



Aquatic Weed Identification

Bulrushes - *Typha Latifolia*

Rushes are perennial plants which grow in or near static or flowing water and on marshy ground. When growing in water, they are usually found in less than 1 m depth. Most species have rhizomes from which aerial shoots emerge in the spring, growing to a height of 3m (depending on the species) and dying back in the autumn. Although some species reproduce by seed, the main method of spread is by growth from rhizomes. Once plants are established in shallow water, they trap silt around the roots and shoots, impeding or diverting water flow, and allowing further spread of the plants into water previously too deep to sustain them.

Mechanical control - Our Truxor aquatic weed cutter can do an excellent job of cutting through the rhizome thatch to clear channels and large areas of rushes. The damage done to rhizomes severely hampers regrowth, making this an effective method of control. Cutting should not take place before mid July unless absolutely necessary as birds will be nesting. Delaying the cut until later in July and August also reduces the time for shoots to regrow before the end of the growing season. After cutting, weed must be removed from the water and deposited well back from the bank where it cannot fall or be washed by floods into the water. It may be necessary to remove the weed and dispose of it elsewhere.

Dredging often removes the rhizomes as well as the emergent shoots and so produces longer control. When it is anticipated that dredging is required, it may be beneficial to spray the emergent weeds with glyphosate at least three weeks before dredging to kill the rhizomes and prevent their spread from dumped spoil into adjacent agricultural land.

Chemical control - Rushes are susceptible to the herbicide glyphosate. This a relatively slow acting herbicide applied as a spray directly onto exposed, undamaged foliage, usually in mid to late summer, and is then trans-located to the rhizomes. The dead rhizome should be removed from the water course to prevent the decomposing of the root mass in the water. Our amphibious Truxor can remove this mass on the bank well away from the water's edge. Biological control

Biological control - Cattle and, to a lesser extent, sheep graze on some types of rushes and can provide a cost-effective form of management of grasses and other terrestrial plants as well as bankside rushes and reeds. However, livestock cause damage to banks and require fencing and regular husbandry and these disadvantages can outweigh the benefit of the weed control.

Environmental control - It is sometimes possible to control rushes either by raising the water level or by dredging. The creation of a steep bank descending immediately into water of more than 1 m deep will limit the growth of these plants to a narrow fringe along the bank.



Aquatic Weed Identification

Canadian Pond Weed

Canadian Pondweed or Waterweed -*Elodea canadensis* - is native to North and South America where it occurs in lakes ponds, canals and slow flowing water. It was introduced to Ireland in 1836 as a fragment on an imported log from Canada, and rapidly spread to Europe soon after, occurring in similar habitats.

It grows from stolons (creeping stems) and has vertical, narrow, sparsely branched stems with leaves in whorls of three. The leaves are flat and it can form dense mono-specific strands. It does not reproduce by seed in the UK and relies entirely on vegetative reproduction for its spread.

Although it is now regarded as a naturalised aquatic plant, in the UK it causes problems by competing for nutrients and outgrowing many native species. However, it is now considered preferable to certain related weeds like *Lagarosiphon major* and *E. nuttallii* and where there is a danger of invasion from these species after control, care should be exercised not to eradicate all of the plant.

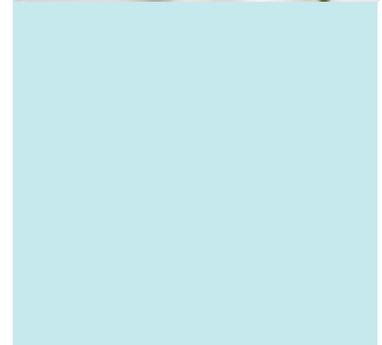
Mechanical control - This plant is easily cut and controlled by mechanical methods for variable time periods which are determined by numerous factors. The cut weed should be removed from the water to avoid de-oxygenation. The cut weed can be left to decompose in small heaps away from the side of the water, taking care to avoid seepage of the liquor back into the water.

Cutting early in spring may delay the onset of the peak biomass period. Continued cutting will weaken the plant and may lead to its disappearance from the system. Our amphibious weed cutter is an excellent way to remove or control this plant.

Chemical control - There are no approved herbicides to control Canadian Pondweed as it grows below the surface. Cutting and removal is the only option.

Biological control - The use of herbivorous Grass Carp is appropriate as a control method for this plant. Common Carp, and other bottom feeding fish, which create turbid water, can also be effective in preventing regrowth of the plant after mechanical removal or control by a herbicide.

Environmental control - Shade will control most submerged aquatic plants. This can be achieved by planting trees on the south side of water bodies or by using a floating sheet of opaque material. Care must be taken when using the latter to prevent sudden de-oxygenation.



Curly Waterweed - *Lagarosiphon major*

First recorded in Britain in a chalk pit in 1944, it has since spread to many locations and has displaced Canadian Pondweed by virtue of its superior photosynthetic capacity in alkaline water.

It is sold by garden centres and aquarists as an oxygenating plant, often mislabelled as *Elodea crispata* (no such plant!). All plants in the UK are thought to be female. The flowers are borne singly in the axils of leaves on a long stem (called a hypanthia) and they float on the surface of the water. The flower has a sail composed of 3 staminodes (petals) and they blow freely across the surface of the water. Pollination is achieved when a male and female flower encounter each other on the surface. Because there are no male plants in the UK, all reproduction is by fragmentation or vegetative reproduction. Small fragments can become rooted, and in many sites lateral branches become detached and float to increase dispersal within a lake or pond.

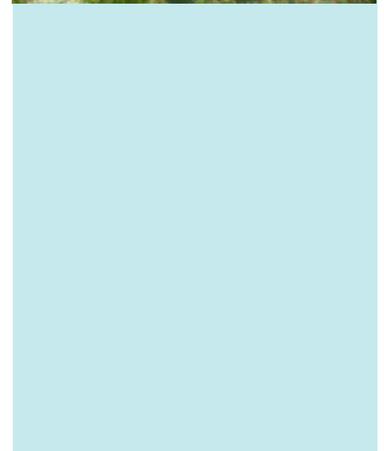
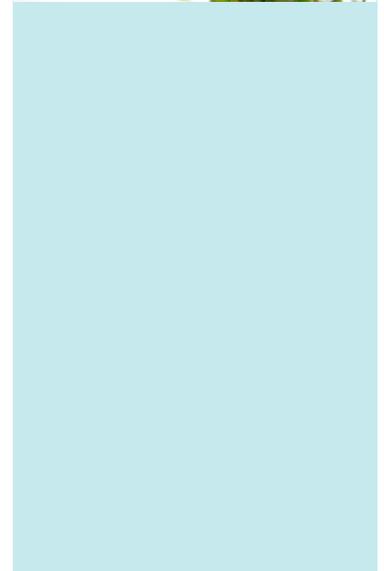
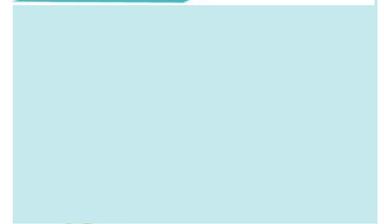
Curly waterweed will grow down to 3 m in still water, and in canals, drainage ditches and slow-flowing rivers. The leaves measure between 6 and 300 mm in length and are between 1 and 3 mm wide. They are strongly recurved, and are borne in a whorl or spiral of 3s around the stem.

Mechanical control - This plant tends to survive over-winter in southern areas of Britain, and therefore mechanical control with our Truxor weed cutter can be undertaken early in the season. Further north, the plant mass collapses, but never dies down completely, meaning that early season cutting should be delayed until the plant has started to grow in late April. Care should be taken to remove as much cut material as possible because of the problem of vegetative reproduction from fragments.

Chemical control - There are no approved herbicides to control this plant as its leaves are below the water line. Removal with our amphibious Truxor is our only recommendation.

Biological control - Grass carp will eat *Lagarosiphon* if they have no other choice, but it is not one of their preferred foods. There are no known classical biological control agents appropriate for release in the UK.

Environmental control - Increasing shade will reduce the growth of this species, although because it tends to occupy such large areas, the application of shade will often be inappropriate. Excavation to depths of over 4 m will also prevent growth but again this is impractical. Increasing flow may reduce the growth of the species in situ, but is likely to spread the plant to other previously unaffected areas.



Duckweeds (Lemna species)

Duckweeds are small free-floating plants often forming dense mats on the surface of still or slow flowing water. They grow best in eutrophic (nutrient rich) waters. The leaves are small, often not exceeding 5mm in length (except *Spirodela polyrhiza* which can be up to 1 cm), either single (*Lemna minuta* and *Lemna gibba*) or in groups of two or three (*Lemna minor*).

The leaves of *L. gibba* are always swollen, whereas those of *L. minor* can be slightly swollen under some circumstances. *L. minuta* has very small leaves and short roots. The leaves of *L. minuta* tend to be more ellipsoidal than those of *L. minor* and the plants do not stick together on the surface, behaving like individuals rather than as a mat.

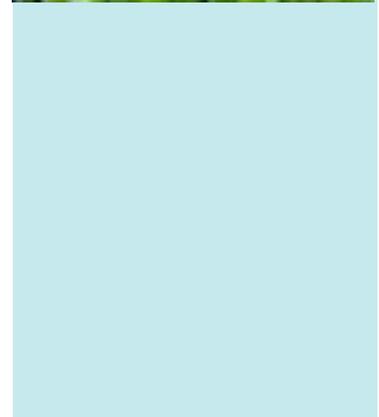
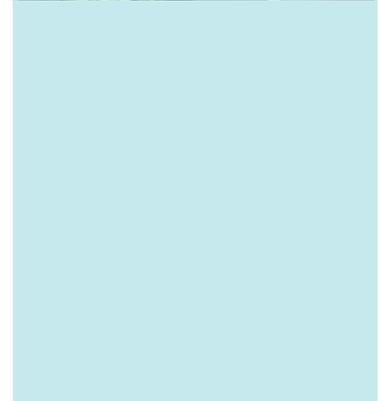
The plants grow mainly by vegetative reproduction, two daughter plants bud off from the adult plant. This form of growth allows rapid colonisation of new water and re-colonisation after treatment in previously infested areas. The doubling times in high summer can be as short as 2-3 days. *L. minuta* is becoming more prevalent as it tends to winter better than other species, remaining green throughout winter.

Mechanical control - Removal of Duckweed using our amphibious Truxor weed cutter will have an instant effect and can last for a reasonable length of time although continuous removal is often necessary.

Chemical control - Glyphosate can be applied from our boat, but this will only control the leaves that are above the surface.

Biological control - Grass carp will eat Lemna species. Further information on the use of Grass Carp for Aquatic Weed Control is available from the Environment Agency in R&D Note 57.

Environmental control - The use of shade has been successful in reducing the amount of duckweed growth although very deep shade is often required. Shade can be achieved by planting trees on the south side of a water body. Lemna does not compete well with other floating leaved plants such as waterlilies and planting species with floating leaves can substantially reduce the nuisance level of duckweeds. Duckweeds prefer still water and increasing the disturbance of the water surface can reduce the amount of duckweed. This can be achieved by the use of a fountain or, on canals, by increasing the amount of boat traffic. The minimum amount of boat traffic required to eliminate Lemna is reckoned to be about 1500 boat movements per annum. Boat traffic of less than this will reduce the competitive ability of the species and may aid in their eventual elimination.



Aquatic Weed Identification

Floating pennywort - *Hydrocotyle ranunculoides*

A North American plant which was introduced to the UK in the 1980s by the aquatic nursery trade, Floating pennywort roots in shallow margins of slow-flowing water bodies, particularly in ditches, slow flowing dykes and lakes.

Here it forms dense mats covering the water's surface and out competing most native aquatic plants. This causes de-oxygenation of the water, which in turn affects fish and invertebrate populations and causes a choking of drainage systems and sluices, sometimes causing localised flooding.

Mechanical control - Floating pennywort can be cut by our Truxor amphibious vehicle, but as the plant is capable of growing back rapidly from single nodes, re-cutting will be necessary throughout the growth season. Without thorough removal of all cut material, the plant will spread .

Where cutting is deemed appropriate, the affected areas should be carefully fenced or, netted off, to reduce the risk of downstream infestation and to ensure that all cut plant material can be removed. This will also prevent de-oxygenation of the water due to decomposing weed.

Chemical control - Due to the dense nature of the vegetation repeat spraying of approved herbicides will be required, with a follow up treatment on any re-growth after our Truxor has removed the dead or dying vegetation.

Although the growth of Floating pennywort is noticeable throughout the season it does not usually reach nuisance proportions on larger water bodies until later in the summer or early autumn. However, treatment earlier in the season will reduce man hours, equipment and chemicals needed to control the weed at a later date. Agreement must be obtained from the local Environment Agency office before applying herbicides in, on or near controlled waters.

Biological control - There are no known methods of biological control appropriate for use in the UK.

Environmental control - Shade may be an effective method of control as the plant does not establish well in shaded conditions, and is best achieved by planting trees on the south side of the water body. This is unlikely to be practical to implement on larger water bodies. Increasing flow will restrict the growth of Floating pennywort in situ but may increase the spread of the plant downstream. Increasing rooting depth to below 1 metre may reduce the ability of Floating pennywort to root at the margins. This, however, is unlikely to be a feasible option.



credit: Richard Torrens www.Torrens.org.uk/



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Parrots feather - *Myriophyllum aquaticum*

This is an alien invasive species. It was first found in Britain in 1960 and is now found in about 300 sites in the UK. It is found mostly in ponds, but has also been found in reservoirs, gravel pits, streams, canals and ditches. It is most often found in eutrophic water bodies. In contrast to other members of the genus, it is able to grow as a terrestrial plant when ponds dry out. It produces emergent shoots in addition to submerged ones which give it the characteristic feathery appearance reflected in its common name.

Only female plants have become established in the UK. It spreads by asexual means. Stems are brittle and the plant can propagate itself by growth of the small fragments of parent plants.

Unfortunately the species is widely grown in small garden ponds and sold by aquatic garden centres and nurseries. Often garden centres also sell *M. brasiliense*, or *M. propernaciodes*, or *M. propium* all of which are highly invasive and should be avoided.

Mechanical Control - Parrot's Feather can be removed with our Truxor which is effective at removing large infestations, a follow up spray using an approved herbicide would be advisable on any re-growth.

Chemical control - The plant is controlled by applications of glyphosate late in the season, and also to some extent by applications from April onwards. Chemical control will lead to a short-term eradication of this species, as re-colonisation from original sources will often occur. It is important to establish where the infestation has come from and take action to eliminate the source.

Biological control - Grass carp will not eat this species unless they are at least 2 years of age and then only reluctantly as long as no other preferred species are present.

Environmental control - This species is not tolerant of fast flow. Increasing flow by narrowing slow flowing channels may be a way of controlling growth. This effect is achieved when the plant itself grows in slow flowing systems and may result in self-limitation in this type of channel.

Most emergent species are controlled by increasing shade. This can be achieved by planting trees along the south side of water bodies or by placing a floating opaque material over the water surface in early spring. Shade needs to be maintained for at least twelve months to give good control.

Because of the association with eutrophic waters a reduction in the nutrient loading to the water may help reduce the competitive ability of this species



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Credit: british-wild-flowers.co.uk



Phragmites Australis - Common Reed

Reeds are perennial plants which grow in or near static or flowing water and on marshy ground. When growing in water, they are usually found in less than 1 m depth. Most species have rhizomes from which aerial shoots emerge in the spring, growing to a height of 3m (depending on the species) and dying back in the autumn. Although some species reproduce by seed, the main method of spread is by growth from rhizomes. Once plants are established in shallow water, they trap silt around the roots and shoots, impeding or diverting water flow, and allowing further spread of the plants into water previously too deep to sustain them. It is an extremely invasive species that, if not controlled, the extensive root system will develop and spread to take over the water body in which it is growing to such an extent that it will suck all the moisture out and revert the area back to land.

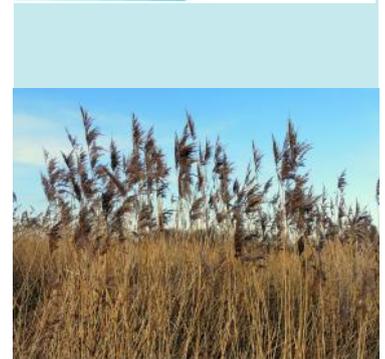
Mechanical control - Our Truxor aquatic weed cutter can do an excellent job cutting and removing the rhizome thatch to clear channels and large areas of reeds. The damage done to rhizomes hampers regrowth, making this an effective method of control. Cutting should not take place before late July, or August to avoid disturbing nesting birds and to reduce the time for shoots to regrow before the end of the growing season. After cutting, the reed must be removed from the water and deposited well back from the bank where it cannot fall or be washed by floods into the water.

Excavation using our specialised attachment removes the rhizomes as well as the emergent shoots and as a result produces longer control.

Chemical control - Reeds are susceptible to the herbicide glyphosate. This a relatively slow acting herbicide applied as a spray directly onto exposed foliage, usually in mid to late summer, and is then trans-located to the rhizomes. The dead rhizome should be removed from the water course to prevent the decomposing of the root mass in the water. Our amphibious Truxor can cut and remove this mass on the bank well away from the water's edge.

Biological control - Cattle and, to a lesser extent, sheep graze on some types of reeds and can provide a cost-effective form of management of grasses and other terrestrial plants as well as bankside rushes and reeds. However, livestock cause damage to banks and require fencing and regular husbandry and these disadvantages can outweigh the benefit of the weed control.

Environmental control - It is sometimes possible to control rushes either by raising the water level or by dredging. The creation of a steep bank descending immediately into water of more than 1 m deep will limit the growth of these plants to a narrow fringe along the bank.



Aquatic Weed Identification

Spiked Water Milfoil - *Myriophyllum spicatum*

This is a submerged aquatic macrophyte. It is characterised by groups of four feathery leaves arranged around a circular stem. The stem can be slightly reddish in colour and the flowers are red. Identification should be carried out carefully as it can be confused with *M. verticillatum* which has light green emergent leaves, or *M. alterniflorum*, a species characteristic of low nutrient / slightly acidic - oligotrophic - waters.

It often forms dense mono-specific stands, or is commonly associated with Canadian Pondweed - *Elodea canadensis*. This plant often grows in lakes, ponds and ditches, but is not found in faster flowing water. It reproduces by seed and by vegetative growth and control measures should take this into account.

Mechanical control - This plant responds well to mechanical control. The cut material must be removed from the water to avoid de-oxygenation. The cut weed can be left to decompose in small heaps away from the side of the water, taking care to avoid seepage of the liquor back into the water. Our amphibious weed harvester can effectively cut and remove this weed from your water body.

Chemical control - None, due to the banning of previously used chemicals.

Biological control - The use of herbivorous Grass Carp is appropriate as a control method for this plant. Common Carp, and other bottom feeding fish, which create turbid water, can also be effective in preventing regrowth of the plant after mechanical removal.

Environmental control - Shade will control most submerged aquatic plants. This can be achieved by planting trees on the south side of water bodies or by using a floating sheet of opaque material. Care must be taken when using the latter to prevent sudden de-oxygenation.



Credit: photo by Gianluca Nocollella



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Credit: Photo by Gianluca Nocollella

Water-lilies

Characterised by their circular floating leaves and white or yellow flowers water-lilies grow at the edges of slow flowing rivers, in canals, lakes and ponds. They can grow in water of up to 5m deep, but prefer depths of between 1m and 3m.

Nuphar lutea (Yellow Water-lily) and *Nymphaea alba* (White Water-lily) are the most frequently encountered species with *Nuphar pumila* (Least Water-lily) being less common. *N. lutea* (Yellow Water-lily) is common in rivers and, unlike *N. alba*, produces submerged as well as floating leaves.

The White Water-lily is becoming rarer and therefore has conservation value. The species can be distinguished before flowering by the different shaped floating leaves. *Nuphar* species have an oval shaped floating leaf and *Nymphaea* species have a round leaf which overlaps slightly behind the stalk.

Water-lilies are slow spreading and have extensive rhizome systems from which leaf and flower stalks emerge each year. Water-lilies are often preserved because the leaf stalks have little effect on flow and the shading effect of the floating leaves helps to suppress the growth of more troublesome submerged plants. However, where control is necessary, some plants should be left along the margins or in localised clumps where they do not cause a problem.

Mechanical control - Cutting, followed by the removal of the leaves to prevent de-oxygenation can be done with our Truxor amphibious machine. Cutting should be carried out as late in the season as possible to reduce the risk of regrowth. Removal of the rhizome can be carried out at any time of year but may be more effective in summer when the location of the rhizomes can be detected by the presence of floating leaves.

Chemical control - Spraying the floating leaves of Yellow and White Water-lilies with glyphosate is a very effective method of control. This technique cannot be used on the Yellow Water-lily when only submerged leaves are present (usually in fast flowing situations). Glyphosate can be applied to achieve localised control to create a clear channel down the centre of the river or a clear patch in a lake while retaining a fringe of Water-lilies at the margins. Our qualified boat operators can provide this service.

Biological control - Ducks are renowned for their appetite for the buds and submerged leaves of Water-lilies. Increasing wildfowl populations will have a marked effect on the amount of Water-lily growth.

Environmental control - Shade is an effective method of control for this species.



[Steve Fareham](#) / [CC BY-SA 2.0](#)



Aquatic Weed Identification

Water Starworts - *Callitriche* spp

Water-Starworts are named after the rosette / star shape of their leaves. They are most common in slow-flowing waters where it is muddy and silty, although they will grow in still and fast-flowing conditions up to 1 m deep.

They are intolerant of inorganic pollution. They have slender stems and long, thin submerged leaves which expand when they reach the surface. The submerged leaves are characterised by the notched ends. They can take on different leaf shapes in different environmental conditions. Classification and distinction between species is often only possible by examination of the flowers and seeds.

The seeds sink to the bottom when released and can lie dormant in the mud for up to five years. Often this accounts for their sudden appearance in waters which have recently been cleared or dredged. Darkness inhibits the germination of the seed.

The Water-Starworts cause problems by blocking flow in drainage systems and by dominating slow-flowing ponds and canals. In such conditions they form dense mono-specific stands. They are important as food and shelter for fish, as an invertebrate habitat and as food for ducks.

Mechanical control - Cutting and removal using our Truxor gives good control for this species. Care should be taken to restrict the spread of viable fragments out of the area in which the plant is controlled. Cutting should ideally be delayed until after July if longer term control is required.

Being perennial, they retain their leaves overwinter and rooting internodes bearing lateral buds can remain in the mud overwinter and regrow the following spring. This characteristic makes mechanical control late in the season less likely to produce a good long-term reduction in plant density.

Chemical control - This is not an option as there are no approved herbicides for this underwater plant.

Biological control - Grass carp will control the growth of *Callitriche* species. Wildfowl will also eat the submerged plant material. Increasing wildfowl numbers may reduce the amount of weed growth, but may promote algal growth due to higher nutrient enrichment from the wildfowl.

Environmental control - Deepening the water to below 1 metre will make the conditions unsuitable for the growth of this plant. Shading is another possibility, although deep shade will be required.



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A selection of the sectors and corporations we do business with

