



A GUIDE TO

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# FRESHWATER PEST PLANTS IN OUR DISTRICT

2017

**GISBORNE DISTRICT COUNCIL**  
TE KAUNIHERA O TE TAIRĀWHITI

  
Taihoro Nukurangi



## PURPOSE

This Freshwater Pest Plant Guide includes key information on aquatic plant species that pose a serious threat to aquatic environments in the Gisborne District.

Plant identification guides are provided for 23 plant species known to cause problems in lakes, ponds, streams, rivers and drains, in surrounding regions. Individual fact sheets are provided containing identification notes and photos, a brief description of why the plant is a problem, its preferred habitat and how they are spread.

These pest plants pose a serious threat to the Gisborne District so if you see any of these plants, please report your findings to the Gisborne District Council's Biosecurity team.

Phone: 06 8672049

Website: [www.gdc.govt.nz/pests](http://www.gdc.govt.nz/pests)

Email: [service@gdc.govt.nz](mailto:service@gdc.govt.nz)



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NIWA's Freshwater Biosecurity Group provides research, services and solutions spanning the spectrum of freshwater pest problems in New Zealand.  
[www.niwa.co.nz](http://www.niwa.co.nz)



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# Understanding aquatic plants

Aquatic plants are plants that have adapted to living in or around water and they play an important role in the overall health of our region's waterways, ponds and lakes. They provide food and shelter to native fish and wildlife, lend stability to shorelines and lake beds, tie up nutrients thereby reducing algal blooms, improve water clarity, produce oxygen by day and can provide aesthetic beauty to an area.

Aquatic plants can grow in a variety of different forms. Some grow rooted in shallow water along shorelines and are called emergent plants because much of these plants stand up out of the water. Some float freely or have floating leaves but are rooted to the bottom sediments, and others grow almost entirely under water and are called submerged plants.

In New Zealand, we have a unique and special assemblage (biodiversity) of 'native' aquatic plants that naturally occur and grow in our water bodies, and these plants seldom cause problems.



Native aquatic plant species growing in Lake Waikaremona (North Island).

However, our waterways are now under attack! Invasive ‘alien’ aquatic plants – plant species that have originated from other countries – have been introduced into our water ways by humans, either accidentally or on purpose, with many having escaped from garden ponds and fish tanks. The most serious pest plants continue to be liberated, or spread by contaminated boats or fishing gear. These pest plants have no natural enemies (such as plant-eating insects) and have the ability to spread and grow more quickly than our native aquatic plants causing major ecological damage to our freshwater habitats. As well as smothering out our native plant communities, dense invasive weed growth can restrict the movement of water, cause flooding, block irrigation and drinking water intakes, destroy habitats for native fish and wildlife, decrease water quality and can restrict recreational activities such as boating, fishing and swimming.



Invasive weed bed (*Lagarosiphon major*) dominating all other vegetation in a North Island lake.

# Prevent the spread

The best way to prevent potential weed issues is to stop aquatic pest plants from getting into our waterways in the first place.

To help prevent aquatic weed invasions, always:

**CHECK** – before leaving a waterway check boats (anchors and bilges), trailers, fishing gear (particularly nets), and other equipment and machinery such as diggers for any plant material and remove it. Remember a thumb-nail sized plant fragment may be all that is needed!

**CLEAN** – wash all equipment (e.g., nets, machinery and footwear) thoroughly using detergent (5% dishwashing liquid) or salt water (sea strength or 1 cup of table salt per 1 liter of water) until completely soaked.

**DRY** – dry completely inside and out and then leave dry for at least another 48 hours.

What else can you do?

- Always empty aquarium contents onto the compost heap, NOT into or near a waterway or drain.
- Know your enemy. Learn to identify plants in and around your waterways, or contact the Gisborne District Council's pest plant team if you see something new or suspicious.

*For more information on preventing the spread of invasive species – CHECK, CLEAN, DRY message – visit the Ministry for Primary Industries website:*

[www.biosecurity.govt.nz/biosec/camp-acts/check-clean-dry](http://www.biosecurity.govt.nz/biosec/camp-acts/check-clean-dry)

# Control options

Control options fall into 4 general categories:

1. **Physical/Mechanical control** – is the removal of plants (and/or roots) by pulling (hand weeding), cutting, raking or mowing. For larger areas, specially designed weed harvesters that cut and collect plants can be used. Diggers are commonly used to remove aquatic plant material from drains.
2. **Habitat manipulation** – disturbing the plants' ability to grow by altering the light, sediment or water conditions. Shading is an effective physical control technique that reduces the amount of light available for plant growth. Shading or bottom-lining products such as weed mat, black plastic or carpet can be used for this purpose as long as it reduces light by 90%. Shading provided by riparian planting on the northern side of a waterway may also reduce weed abundance. Water level lowering to dry and kill underwater plants can also be effective in some instances.
3. **Biological control** – reduces the growth of the plants by introducing a plant predator species. Currently the only biological agent for use on submerged aquatic weeds is Grass carp *Ctenopharyngodon idella*. Grass carp can provide long-term control for underwater plants, however the area would need to be assessed for suitability and made secure for the fish. Permission is required from the Department of Conservation (DOC).
4. **Chemical control** – is the use of herbicides which can kill or stunt the growth of pest plants. The successful use of herbicides in aquatic or riparian situations is dependent on a **range of factors including:**
  - Species of aquatic pest plant being targeted.
  - Registered use of a herbicide on a particular species.
  - The size, depth, flow rate, temperature and turbidity of the water body.
  - Whether a resource consent is required.
  - A possible resource consent, depending on the relevant rules and legislation in regard to discharging herbicides over, on or into water as covered under Gisborne's regional plans.
  - The actual application of herbicides will require certified trained personnel and possibly specialist equipment.

For these reasons every water body or riparian area needs to be assessed on an individual basis and a site specific management plan developed. Anyone considering control of aquatic pest plants using herbicides should contact the Gisborne District Council for advice.



# Identifying aquatic weeds

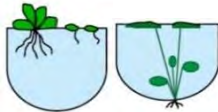
Aquatic plants grow in a variety of different life forms. Look for these symbols on the pest plant identification guides to assist in their correct identification.



**Erect emergent** – plants grow above the water’s surface in shallow areas such as around the edges of lakes and shorelines, e.g., Yellow Flag Iris.



**Sprawling emergent** – grow across the ground and out over the water surface, e.g., Water pepper.



**Floating** – float freely (e.g., Azolla species) or are rooted with leaves that float on the water’s surface, e.g., water lily .



**Submerged** – grow beneath the water’s surface, though flowers may appear above the water surface, e.g., Oxygen weed species such as egeria and lagarosiphon.

Also be aware that depending on what time of year observations are taking place, described flowers may or may not be present.



## ALLIGATOR WEED

*Alternanthera philoxeroides*

### WHAT DOES IT LOOK LIKE?

- Sprawling marginal plant that can form floating mats over water.
- Bright green, waxy leaves grow in opposite pairs along a stem.
- Stems are thick, hollow and often reddish in colour.
- White, papery clover-like flower clusters form on the end of stalks during summer.



## WHY IS IT A PROBLEM?

Currently New Zealand's worst sprawling emergent weed, affecting arable and pastoral land in addition to aquatic habitats.

Dense mats of weed growth can reduce water flow impeding drainage.

Threat to biodiversity - can significantly alter the structure of water body margins and riparian plant communities.

## SIMILAR LOOKING SPECIES

The native nahui, *Alternanthera sessilis*, Senegal tea and primrose willow. Nahui is much smaller, with flowers lacking stalks. Senegal tea differs in that it has serrated and wavy leaf margins. Primrose willow has alternate leaves.

## PREFERRED HABITATS

Warm still and slow flowing water bodies, swamps, ponds, stream banks and flooded pasture land.

## HOW DOES IT SPREAD?

Reproduction is vegetative by the extension of stems or stem fragmentation. The floating fringe of marginal mats is also readily fragmented and dispersed. Seed set is unknown in New Zealand.

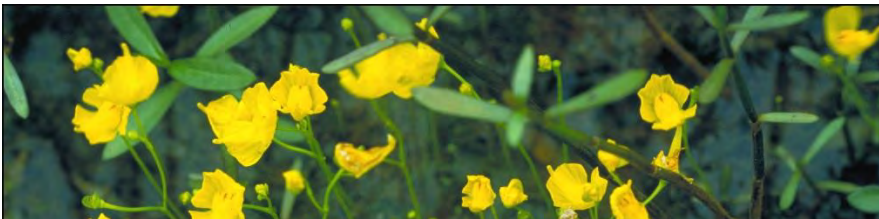


# BLADDERWORT

*Utricularia gibba*

## WHAT DOES IT LOOK LIKE?

- Forms dense floating mats underwater and can superficially, look like a filamentous algae, often covering other submerged plants.
- Leaves are filamentous, up to 1 cm long and sparsely branched.
- Has small round bladders (usually black) attached at the base of leaves.
- Flowers are small and yellow and most commonly produced above the water surface in summer and autumn.



## WHY IS IT A PROBLEM?

Biodiversity threat – dense mats can shade out native submerged vegetation, but this species may co-exist with native plants under some circumstances.

## SIMILAR LOOKING SPECIES

The native *Utricularia australis*. *Utricularia gibba* has entire or nearly entire leaves, whereas *U. australis* has leaves divided many times into filiform segments and has large bladders up to 3 mm long.

## PREFERRED HABITATS

Slow flowing and still waters.

## HOW DOES IT SPREAD?

Vegetative fragments, but predominantly being moved about by seed spread by waterfowl.



## EELGRASS

*Vallisneria australis*

### WHAT DOES IT LOOK LIKE?

Submerged aquatic plant arising from long creeping stems.

- Thick ribbon-like leaves grow up to 5m long.
- Leaf tips can have finely toothed margins.
- Small green flowers form on long, thin stalks, often spiralled, that can reach the water surface.



## WHY IS IT A PROBLEM?

Dense submerged masses of weed can block water flow, interfere with pumping and irrigation equipment, and adversely affect drinking water supplies. Can also interfere with recreational activities like fishing, boating and swimming.

Eelgrass is of limited distribution around New Zealand, and is subject to total control under Regional Pest Management Strategies (Wellington and Marlborough).

*Threat to biodiversity* – dense weed beds smother and replace beneficial native submerged plants.

## SIMILAR LOOKING SPECIES

*Sagittaria subulata*, *S. platyphylla* and swamp lily (*Ottelia ovalifolia*). The submerged leaves of these species look similar to the submerged leaves of eel grass, however eel grass never has emergent leaves or conspicuous white flowers.

## PREFERRED HABITATS

Moderately fast flowing to still water bodies. Colonises lake-bed sediment in water up to 9m deep.

## HOW DOES IT SPREAD?

Spread by stolon fragmentation and detached plantlets. There is no evidence of viable seed production in NZ, with most infestations being solely female plants (except Lake Pupuke in Auckland).



# EGERIA

*Egeria densa*

## WHAT DOES IT LOOK LIKE?

- A bottom rooted submerged plant growing up to 5m tall.
- Denser and more leafy than other oxygen weeds, with larger leaves usually in whorls of 4-5 (sometimes 3-8).
- Leaves narrow towards the tip and are 10-30mm long.
- Egeria is the only oxygen weed with visible white flowers (<20mm) forming just above the water surface in summer.





## WHY IS IT A PROBLEM?

Dense submerged masses of weed can block water flow, interfere with pumping and irrigation equipment, and adversely affect drinking water supplies. Can also interfere with recreational activities like fishing, boating and swimming. Egeria is a weed in hydroelectric dams.

Threat to biodiversity – tall, dense weed beds smother and replace beneficial native submerged plants.

## SIMILAR LOOKING SPECIES

Canadian pondweed (*Elodea canadensis*) and lagarosiphon (*Lagarosiphon major*). Canadian pondweed almost always has smaller leaves arranged in whorls of only three. Lagarosiphon has leaves that curl downwards and are not arranged in whorls.

## PREFERRED HABITATS

Moderate flowing to still water in lakes, ponds, rivers and streams. Usually found in moderate to highly enriched water bodies.

## HOW DOES IT SPREAD?

New plants develop from buds on stem fragments. Egeria does not produce seed in New Zealand with only male flowering plants being present. Spreads to other waterways via boats, trailers, nets and contaminated machinery.



# HORNWORT

*Ceratophyllum demersum*

## WHAT DOES IT LOOK LIKE?

- Submerged aquatic plant that can grow to more than 10m deep and forms dense surface reaching weed beds.
- Stiff dark green leaves are finely divided with small teeth - makes the plant rough to touch.
- Feathery leaves are arranged in whorls on the stem of 5 or more.
- Has no roots but buried whorls of leaves can anchor it to bottom sediments.
- Flowers are minute and located at the base of the leaves.



## WHY IS IT A PROBLEM?

Hornwort grows rapidly and can survive as a free floating mat absorbing all the nutrients it needs from the surrounding water. Dense submerged masses of weed can block water flow, interfere with pumping and irrigation equipment, and adversely affect drinking water supplies. Can also interfere with recreational activities like fishing, boating and swimming. Hornwort is a major weed in hydroelectric dams.

Threat to biodiversity – tall, dense weed beds smother and replace beneficial native submerged plants.

### SIMILAR LOOKING SPECIES

Fanwort (*Cabomba caroliniana*) and *Myriophyllum* species (in particular *M. triphyllum*), all have finely divided submerged leaves.

Unlike hornwort, fanwort has leaves arranged in pairs, not whorls and *Myriophyllum* species differ in that their leaves are not forked like hornwort but are in a feather-like arrangement.

### PREFERRED HABITATS

Moderate flowing to still water in lakes, ponds, rivers and streams.

### HOW DOES IT SPREAD?

New plants develop from stem fragments from its brittle stems. Flowers occur on this species but there is no evidence of seed production in New Zealand. Spreads to other waterways via boats, trailers, nets and contaminated machinery.



# HYDRILLA

*Hydrilla verticillata*

## WHAT DOES IT LOOK LIKE?

- Tall submerged aquatic plant growing up to 6m tall.
- Many branched stems.
- Leaves occur in whorls of three to eight with obvious toothed edges.



## WHY IS IT A PROBLEM?

Dense submerged masses of weed can block water flow, interfere with pumping and irrigation equipment, and adversely affect drinking water supplies. Can also interfere with recreational activities like fishing, boating and swimming. Egeria is a weed in hydroelectric dams.

Threat to biodiversity – tall, dense weed beds smother and replace beneficial native submerged plants.

## SIMILAR LOOKING SPECIES

Canadian pondweed and Egeria also have leaves in whorls. Hydrilla is most easily distinguished from these two species by its toothed leaf margins.

## PREFERRED HABITATS

Moderate flowing to still water in lakes, ponds, rivers and streams.

## HOW DOES IT SPREAD?

The most common method of spread is from stem fragments. Hydrilla also spreads via tubers and turions, underground rhizomes, and above ground stolons.



# LAGAROSIPHON

*Lagarosiphon major*

## WHAT DOES IT LOOK LIKE?

- A submerged plant that is anchored to the bottom, with slender, brittle and branched stems that can grow up to 5m tall.
- Leaves are strongly curved downwards (J shape) and are arranged in a spiral pattern around the stem.
- Leaves are small (6-20mm long) and are clustered more densely at the tips of branches.



## WHY IS IT A PROBLEM?

Dense submerged masses of weed can block water flow, interfere with pumping and irrigation equipment, and adversely affect drinking water supplies. Can also interfere with recreational activities like fishing, boating and swimming.

*Threat to biodiversity* – tall, dense weed beds smother and replace beneficial native submerged plants.

## SIMILAR LOOKING SPECIES

Canadian pondweed (*Elodea canadensis*), egeria (*Egeria densa*) and hydrilla (*Hydrilla verticillata*). These three species have leaves arranged in whorls on the stem, whereas lagarosiphon has leaves arranged alternatively in a spiral pattern.

## PREFERRED HABITATS

Moderately fast flowing to still water bodies. Likes high levels of light, so is usually found in clear waters only to a maximum depth of 6m.

## HOW DOES IT SPREAD?

New plants develop from stem fragments. No seed is produced in New Zealand with only female plants of this species being present. Spreads to other waterways via boats, trailers, nets and contaminated machinery.



# MANCHURIAN WILD RICE

*Zizania latifolia*

## WHAT DOES IT LOOK LIKE?

Large growing marginal aquatic plant.

- Coarse grass-like tufts grow up to 4m high.
- Leaves are long and straight with visible lines tapering to a sharp point.
- Leaves grow in fans.
- Flowers purplish or reddish brown, November to December.





## WHY IS IT A PROBLEM?

Dense stands of weed can block drains, destabilise stop banks, and cause flooding. It also invades flood-prone pastures and wetlands.

Threat to biodiversity – can significantly alter the structure of water body margins and riparian plant communities.

## SIMILAR LOOKING SPECIES

Raupo (*Typha orientalis*). Raupo is usually shorter (1-3 m) than Manchurian wild rice, with bluish-green leaves with a characteristic twist in the leaf blade and cylindrical brown flower spike.

## PREFERRED HABITATS

Lowland still and slow flowing water bodies.

## HOW DOES IT SPREAD?

From rhizome fragments and seed, quite often from contaminated machinery. Can also be moved about by forming floating mats.



# MARSHWORT

*Nymphoides montana*

## WHAT DOES IT LOOK LIKE?

- Floating leaved aquatic plant with waterlily shaped leaves.
- Leaves are bright green on top and often pinkish underneath, can grow up to 10 cm across.
- Leaves lack a distinct main vein underneath (unlike true waterlilies).
- Grows from creeping underwater or floating stems.
- Flowers are yellow and can grow up to 4 cm across. Flowers have 5 petals with each petal having a fringe of hairs on the margin.



## WHY IS IT A PROBLEM?

Dense mats of weed growth can reduce water flow impeding drainage.

Biodiversity threat – dense growth can shade out native submerged vegetation.

## SIMILAR LOOKING SPECIES

Fringed water lily (*Nymphoides peltata*), water poppy (*Hydrocleys nymphoides*), water lily (*Nymphaea spp.*), and yellow water lily (*Nuphar lutea*). Fringed water lily has leaves with scalloped margins, whereas marshwort has entire leaf margins. Yellow water lily has very thick spongy stolons and much larger floating leaves. Water lily has a larger leaf with a distinct main vein. Water poppy has an ovate leaf with an inflated mid-vein on the underside.



## PREFERRED HABITATS

Still and slow flowing water bodies.

## HOW DOES IT SPREAD?

Spread by creeping stem growth and fragmentation. Deliberate plantings.



# MEXICAN WATERLILY

*Nymphoides mexicana*

## WHAT DOES IT LOOK LIKE?

- Plant has fleshy creeping stems, with banana-like 'brood bodies'.
- Leaves waterlily shaped and almost round, growing up to 20 cm across.
- Leaves have brown or purple blotches on the upper surface and are green or pink on the lower surface with
- Pale yellow flowers grow up to 15cm across.
- 



## WHY IS IT A PROBLEM?

Dense mats of weed growth can reduce water flow impeding drainage.

Biodiversity threat – dense growth can shade out native submerged vegetation.

## SIMILAR LOOKING SPECIES

Common waterlily (*Nymphaea alba*), marshwort (*Nymphoides geminata*), and fringed waterlily (*Nymphoides peltata*). Common waterlily has a horizontal rhizome distinguishing it from Mexican water lily, which has an erect rhizome and also often has brown blotches on the upper surface of leaves, which don't occur on the leaves of common waterlily.

## PREFERRED HABITATS

Still and slow flowing waterbodies.

## HOW DOES IT SPREAD?

Can grow from rhizomes, tubers and seed. Usually moved about by deliberate plantings or within a waterbody by vegetative spread.



## YELLOW WATER LILY

*Nuphar lutea*

### WHAT DOES IT LOOK LIKE?

- Plant has massive spongy creeping rhizomes.
- Floating leaves are oval (longer than wide) and grow up to 30 cm long.
- Submerged leaves thin and crinkled like lettuce.
- Flowers are yellow, buttercup-like, and up to 6 cm across.



## WHY IS IT A PROBLEM?

Dense mats of weed growth can reduce water flow impeding drainage.

Biodiversity threat – dense growth can shade out native submerged vegetation.

## SIMILAR LOOKING SPECIES

*Nymphaea* spp., water poppy (*Hydrocleys nymphoides*), marshwort (*Nymphoides montana*), and fringed water lily (*Nymphoides peltata*). *Nymphaea* species have a much rounder leaf and lack the thick spongy rhizomes that are so distinctive in yellow water lily. Water poppy, marshwort, and fringed water lily have much smaller floating leaves than the large leaves of yellow water lily, and also lack the distinctive rhizome.

## PREFERRED HABITATS

Still and slow flowing waterbodies.

## HOW DOES IT SPREAD?

Can grow from rhizomes fragments and seed. Usually moved about by deliberate plantings.



# PARROT'S FEATHER

*Myriophyllum aquaticum*

## WHAT DOES IT LOOK LIKE?

- A marginal plant with stems forming dense mats of vegetation on the water surface, or growing on damp ground.
- Emergent leaves are a light bluish-green and deeply divided giving them a feathery appearance.
- Leaves are usually arranged in whorls of 4-6.
- The stem can be up to 2m long, but with only up to the top 10cm emerging above the water.
- Flowers are white, tiny (up to 1.5mm across), with no petals, and form at the base of each leaf.





## WHY IS IT A PROBLEM?

Dense mats of weed growth can break off and block water flow (cause flooding), and can interfere with pumping and irrigation equipment.

Threat to biodiversity – dense weed smothers out beneficial native submerged plants.

## SIMILAR LOOKING SPECIES

Native milfoil (*Myriophyllum*) species. Of the native milfoils, the rare *M. robustum* is the most similar to parrot's feather, but differs by having a pointed leaf tip whereas parrot's feather has a rounded leaf tip.

## PREFERRED HABITATS

Usually found along the edges of still or slow moving water bodies and in drains. Likes nutrient rich, wet conditions.

## HOW DOES IT SPREAD?

New plants develop from stem fragments and lateral stem growth. There is no seed production in New Zealand with only female flowers known to be present here. Spreads to other waterways via boats, trailers, nets and contaminated machinery. Initially escaped from cultivated pond plants.



# PHRAGMITES

*Phragmites australis*

## WHAT DOES IT LOOK LIKE?

- Tall bamboo like grass forming dense bands of weed up to 3 m tall.
- Thick far-reaching rhizomes
- Leaf lacking a petiole, often aligning in one direction
- Flower heads are a purplish colour, feathery and can grow up to 40 cm long.



## WHY IS IT A PROBLEM?

Plants grow prolifically on the margins of water bodies forming very dense, tall growths. Can block access to the water and interfere with pumping and irrigation equipment.

Threat to biodiversity – can significantly alter the structure of water body margins and riparian plant communities. May exclude water fowl and nesting activities.

## SIMILAR LOOKING SPECIES

Giant reed (*Arundo donax*) and bamboos. Giant reed is taller with arching stems. Bamboos have stalked leaves rather than leaves that attach directly to the stalk as is the case with phragmites.

## PREFERRED HABITATS

Still and slow flowing water bodies, wetlands and reported from salt marshes overseas.

## HOW DOES IT SPREAD?

Rhizome fragments or deliberate plantings. Spreads to other waterways via contaminated machinery including mowers.



## RIMROSE WILLOW

*Ludwigia peploides* subsp. *montevidensis*

### WHAT DOES IT LOOK LIKE?

- Sprawling marginal plant that can form floating mats over water.
- Stems are branched with roots at the nodes.
- Swollen white floating roots sometimes present.
- The glossy leaves are arranged alternately (not opposite\_
- Black rounded stipules present at the base of leaves.
- Flowers are bright yellow and arise on stalks.



## WHY IS IT A PROBLEM?

Dense mats of weed growth can reduce water flow impeding drainage.

Threat to biodiversity - can significantly alter the structure of water body margins and riparian plant communities.

## SIMILAR LOOKING SPECIES

*Ludwigia palustris* and alligator weed. *Ludwigia palustris* has reddish opposite leaves. Alligator weed also has opposite leaves.

## PREFERRED HABITATS

Still and slow flowing waterbodies.

## HOW DOES IT SPREAD?

Stem fragments and seed. Spreads to other waterways via contaminated machinery, nets and boats.



## PURPLE LOOSESTRIFE

*Lythrum salicaria*

### WHAT DOES IT LOOK LIKE?

- Tall emergent aquatic plant, normally 60 – 100cm tall, but can grow taller.
- Leaves are narrow and usually opposite on the upper stem, while heart-shaped or wider and rounder at the base, often in whorls of three.
- Purple flowers form on dense flower spike, 20-25cm long, December to February.



## WHY IS IT A PROBLEM?

Plants grow prolifically on the margins of water bodies forming very dense weed growth. Can block access to the water and interfere with pumping and irrigation equipment.

Threat to biodiversity – can alter the structure of water body margins and riparian plant communities. May exclude water fowl and nesting activities.

## PREFERRED HABITATS

Lake margins and wetlands.

## HOW DOES IT SPREAD?

Seed or vegetative fragments. Spreads to other waterways via contaminated machinery and deliberate planting.



## REED SWEET GRASS

*Glyceria maxima*

### WHAT DOES IT LOOK LIKE?

- Robust bright green tall grass with leaves up to 60 cm long.
- Leaf tip is boat shaped.
- Leaf sheath has obvious cross veins.
- Flower heads are large and comprise of a large number of spikelets that range from yellow to green in colour, with a purplish tinge. Flowering occurs in spring and summer.





## WHY IS IT A PROBLEM?

Creeping rhizomes form dense stands of weed that can block drains, destabilise stop banks, and cause flooding.

Threat to biodiversity – dense mats of weed displace native marginal and submerged plants. May exclude water fowl and nesting activities.

## SIMILAR LOOKING SPECIES

*Glyceria declinata* and *G. fluitans*. Both of the other *Glyceria* species present in New Zealand are much smaller in size (up to 50 cm) and form low clumps as opposed to the tall erect clumps formed by reed sweetgrass.

## PREFERRED HABITATS

In drains and other slow flowing waterbodies, often forming dense floating mats in open frost-free areas. Also in swamps.

## HOW DOES IT SPREAD?

Spreads by floating vegetative fragments but also by seed. Spreads to other waterways via contaminated machinery.



# SALVINIA

*Salvinia molesta*

## WHAT DOES IT LOOK LIKE?

- Small free-floating aquatic fern forming extensive mats.
- Light green to brown-green rounded leaves overlapping, folded with upper surfaces covered in hairs.
- Lower submerged leaves look more like roots and can be up to 30cm long.



## WHY IS IT A PROBLEM?

Dense mats of weed growth can reduce water flow impeding drainage.

Biodiversity threat – dense growth can shade out native submerged vegetation.

## SIMILAR LOOKING SPECIES

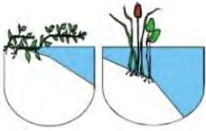
The juvenile form resembles *Azolla* spp, but it is very distinctive when mature.

## PREFERRED HABITATS

Still and slow flowing water bodies in warm areas as is susceptible to frost damage in a severe winter.

## HOW DOES IT SPREAD?

Spreads rapidly by fragmentation and producing plantlets from the old end of the horizontal axis, and can grow from a single node. The plant is a sterile hybrid. Spreads to other waterways via boats, trailers, nets and contaminated machinery. Initially escaped from cultivated pond plants.



## SENEGAL TEA

*Gymnocoronis spilanthoides*

### WHAT DOES IT LOOK LIKE?

- Tall sprawling aquatic plant growing in leafy green clumps up to 2m tall.
- Leaves vary in size from 5-20cm long, taper to a point and are in opposite pairs on the stem.
- Leaf margins have toothed edges and are slightly wavy.
- Flowers are highly scented and grouped in ball-like clusters of tiny white petals at the end of stems.



## WHY IS IT A PROBLEM?

Dense tall growths and can extend some meters over water forming dense mats of weed. Can block access to the water and interfere with pumping and irrigation equipment.

Threat to biodiversity – dense mats of weed displace native marginal and submerged plants. May exclude water fowl and nesting activities.

## SIMILAR LOOKING SPECIES

Is similar to *Alternanthera philoxeroides* (alligator weed) when in its sprawling phase but can be differentiated from alligator weed by its lance-shaped leaves with serrated margins. Senegal tea also has highly scented, soft flowerheads, compared to the papery scentless flowers of alligator weed.

## PREFERRED HABITATS

Wet marshy soils and at water margins. Plant also grows in wetland communities in still or flowing water.

## HOW DOES IT SPREAD?

Spreads by stem fragments and seed. Spreads to other waterways via contaminated machinery. Initially escaped from cultivated pond plants and still spread deliberately or by dumped garden waste.



# SPARTINA

*Spartina* spp.

## WHAT DOES IT LOOK LIKE?

- Rhizomatous clump forming emergent grass growing to 1.5m high.
- Leaves are wide at the base tapering to a point and are ribbed.
- Hollow stems.
- Flowers are produced in a head of short flattened spikelets.
- Usually found growing in the intertidal zone of estuaries where it forms dense mats.



## WHY IS IT A PROBLEM?

Threat to biodiversity – dense clumps can displace ecologically important shellfish beds.

## SIMILAR LOOKING SPECIES

Is the only grass that can tolerate growing in the intertidal zone of estuaries.

## PREFERRED HABITATS

Estuaries, mangroves and other intertidal areas with soft sediment.

## HOW DOES IT SPREAD?

Reproduces from seed and rhizome fragments. Seed is dispersed by wind and water. Livestock, and wave action can dislodge rhizome fragments. Fragments can be spread by contaminated machinery. Plants may also be intentionally planted.



# WATER CELERY

*Apium nodiflorum*

## WHAT DOES IT LOOK LIKE?

- A sprawling marginal plant with hollow stems that can grow to over a meter in height.
- Leaves are bright green and glossy and arranged alternately on the stem.
- Each leaf is made up to 2 to 8 pairs of leaflets which are toothed and stalkless.
- Leaves have distinctive carrot or celery smell when crushed.
- White flowers are produced on short stalked clusters (umbels) at the base of leaves.
- Flowers from November to February.





## WHY IS IT A PROBLEM?

Dense weed growth can block water flow and interfere with pumping and irrigation equipment.

Threat to biodiversity – dense mats of weed displace native marginal and submerged plants.

## SIMILAR LOOKING SPECIES

Wild celery (*Apium graveolens*), NZ celery (*Apium prostratum*) and water cress (*Nasturtium* spp.). Wild celery don't root at the nodes and NZ celery has thicker leaves that have three lobes. Water cress has a peppery rather than carrot smell.

## PREFERRED HABITATS

Shallow water ponds, drains and the margins of slow moving streams.

## HOW DOES IT SPREAD?

Establishes easily from detached shoots and seed. Can sometimes be mistaken for water cress and transported around this way.



## WATER HYACINTH

*Eichornia crassipes*

### WHAT DOES IT LOOK LIKE?

- Free floating aquatic plant.
- Rosettes of thick, glossy, rounded leaves.
- Stems at base of leaves have a distinctive, swollen bladder for buoyancy.
- Thick masses of feathery roots hang in the water.
- Mauve-blue flowers with a yellow spot are produced on a single flower stalk.



## WHY IS IT A PROBLEM?

Dense mats of weed growth can reduce water flow impeding drainage.

Biodiversity threat – dense growth can shade out native submerged vegetation.

## SIMILAR LOOKING SPECIES

None.

## PREFERRED HABITATS

Still and slow flowing water bodies in warm areas.

## HOW DOES IT SPREAD?

Seeds and plants can be dispersed by water movement, wind, movement of machinery and equipment, and, planned or accidental planting and release by humans.

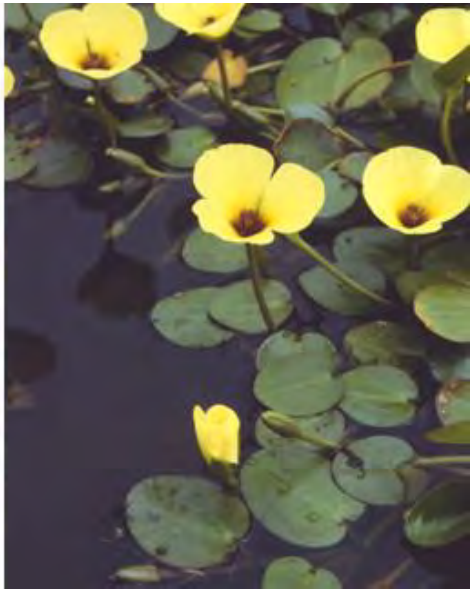


## WATER POPPY

*Hydrocleys nymphoides*

### WHAT DOES IT LOOK LIKE?

- Floating leaves attached to rubbery creeping stems floating or near the water surface.
- Leaves and roots attached at each node along the stem.
- Leaves are bright glossy green, oval, 7 cm long, and have an inflated main vein on the underside. Leaves are barely notched.
- Showy lemon yellow flowers have 3 yellow petals and a purple centre.



## WHY IS IT A PROBLEM?

Dense mats of weed growth can reduce water flow impeding drainage.

Biodiversity threat – dense growth can shade out native submerged vegetation.

## SIMILAR LOOKING SPECIES

Yellow water lily (*Nuphar lutea*), marshwort (*Nymphoides montana*), and fringed water lily (*Nymphoides peltata*). Yellow water lily has very thick spongy stolons (up to 10 cm) and much larger floating leaves (up to 40 cm long and 30 cm wide). Marshwort and fringed water lily do not have an inflated mid-vein on the underside of the leaves. They also have wings on the outer edges of their petals.

## PREFERRED HABITATS

Still and flowing water bodies, including ponds, streams and lake margins to ca 2m water depth.

## HOW DOES IT SPREAD?

Vegetative spread by stolon fragments or deliberate planting.



## YELLOW FLAG IRIS

*Iris pseudacorus*

### WHAT DOES IT LOOK LIKE?

- Tall marginal plant that grows as leafy green clumps up to 2m tall.
- Has thick creeping rhizomes up to 3cm in diameter, which can grow across the water surface.
- Leaves are sword-shaped, 2-3cm wide and emerge in fans from a reddish base.
- Yellow flowers up to 12cm across, are produced from October to December.
- Flowers are followed by seed capsules containing many brown flattened seeds. Plant dies back in winter.



## WHY IS IT A PROBLEM?

Plants grow prolifically on the margins of water bodies forming very dense, tall growths and can extend some meters over water forming dense floating rafts of weed. Can block access to the water and interfere with pumping and irrigation equipment. Yellow flag iris is toxic to humans and livestock. Seeds can survive up to about 10 years.

Threat to biodiversity – dense mats of weed displace native marginal and submerged plants.

## SIMILAR LOOKING SPECIES

Raupo (*Typha orientalis*) has narrower leaves than yellow flag and has a characteristic twist in the top of the leaf blade. Manchurian wild rice (*Zizania latifolia*) is much taller and has sharp-edged leaves.

## PREFERRED HABITATS

Usually found around the edges of still or slow moving fresh or brackish water bodies. Can also invade flood-prone pasture.

## HOW DOES IT SPREAD?

Seeds spread by water and by contaminated drainage machinery. Can also be spread by rhizome fragments and deliberate plantings.



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