

Parrots feather (*Myriophyllum aquaticum*): NT Weed Risk Assessment Technical Report



Parrots feather
Myriophyllum aquaticum

This report summarises the results and information used for the weed risk assessment of Parrots feather (*Myriophyllum aquaticum*) in the Northern Territory. A feasibility of control assessment has also been completed for this species and is available on request.

Online resources are available at <https://denr.nt.gov.au/land-resource-management/rangelands/publications/weed-management-publications> which provide information about the NT Weed Risk Management System including an explanation of the scoring system, fact sheet, user guide, a map of the Northern Territory weed management regions and FAQs.

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Northern Territory Government (2012) Parrots feather (*Myriophyllum aquaticum*): NT Weed Risk Assessment Technical Report, Northern Territory Government, Darwin.

Cover photo (top): Parrots feather infestation, Plant Protection Society of Western Australia, Western Weeds http://www.wswa.org.au/western_weeds/geran_halora_hydro.htm

Cover photo (bottom left): Parrots feather infestations, Tasmanian Department of Primary Industries, Parks, Water and Environment, <http://www.dpiw.tas.gov.au/inter.nsf/webpages/slen-5nl26y?open>

Cover photo (bottom right): Parrots feather leaves, Washington State Department of Ecology, <http://www.ecy.wa.gov/programs/wq/plants/weeds/aqua003.html>

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Parrots feather
Myriophyllum aquaticum

Weed Risk = High

Section A: Invasiveness	75 %
Section B: Impact	58 %
Section C: Potential distribution	36 %
Total score = A x B x C x 1000 =	153



<i>Taxon:</i>	<i>Myriophyllum aquaticum</i>
<i>Synonyms:</i>	<i>Enydris aquatica</i> , <i>M. brasiliense</i> , , <i>M. proserpinacoides</i>
<i>Common name:</i>	Parrots feather
<i>Other names:</i>	Brazilian watermilfoil, thread-of-life
<i>Family:</i>	Haloragaceae (watermilfoil family)
<i>Lifeform:</i>	Herb
<i>Environment:</i>	Aquatic
<i>Origin:</i>	South America
<i>Description:</i>	Bright green perennial freshwater herb forming vigorous mats of tangled stems. There are two different leaf forms depending on whether it is growing beneath or above the water. The submerged leaves are 1.5 to 3.5 cm long and have 20 to 30 divisions per leaf. The emergent leaves are 2 to 5 cm long and have 6 to 18 divisions per leaf. Unlike the native milfoils, the finely dissected feathery foliage persists above and below the water surface. In Australia, reproduction is wholly vegetative.
<i>Habitat:</i>	Banks of watercourses, permanent freshwater.
<i>Distribution:</i>	An escape from the aquarium trade, it is naturalised in the rivers and streams of south-western France, Africa, Japan, Java, the United States, New Zealand and eastern Australia. It was first recorded as naturalised in New South Wales in 1908 and has since spread to the South Western Slopes and all the coast north of Sydney; to southeastern Queensland; to Victoria; to the Murray River in South Australia; to Bellerive in Tasmania; and to parts of far south-western Western Australia.
<i>Legislation:</i>	Declared in Western Australia, Tasmania and the ACT. Not declared in the Northern Territory.
<i>Other:</i>	Detected by AQIS in a suburban pond in Nightcliff, Darwin in 2000. It has not yet naturalised in the Northern Territory.

Parrots feather
Myriophyllum aquaticum

Summary of weed risk information by section

Invasiveness: Highly competitive, capable of rapid growth and spread in freshwater systems. In Australia, growth is vegetative and dispersal is via stem fragments which can be spread by water, birds, animals and boats. Can grow as a terrestrial species when water dries up. Spread by humans as a cultivated plant in ponds and aquaria.

Impact: Forms dense mats that completely exclude other native plants. High tannin content means that fish tend not to eat it. Dense infestations affect recreational activities such as boating, fishing and swimming. Free-floating mats can interfere with water supplies, irrigation systems and other infrastructure and can impede water flow.

Potential distribution: Poses a threat to freshwater waterways and waterbodies in temperate, tropical and sub-tropical Australia. In the Northern Territory, higher rainfall regions provide conditions more suitable for its growth and spread (approximately greater than 1000 mm annual rainfall).

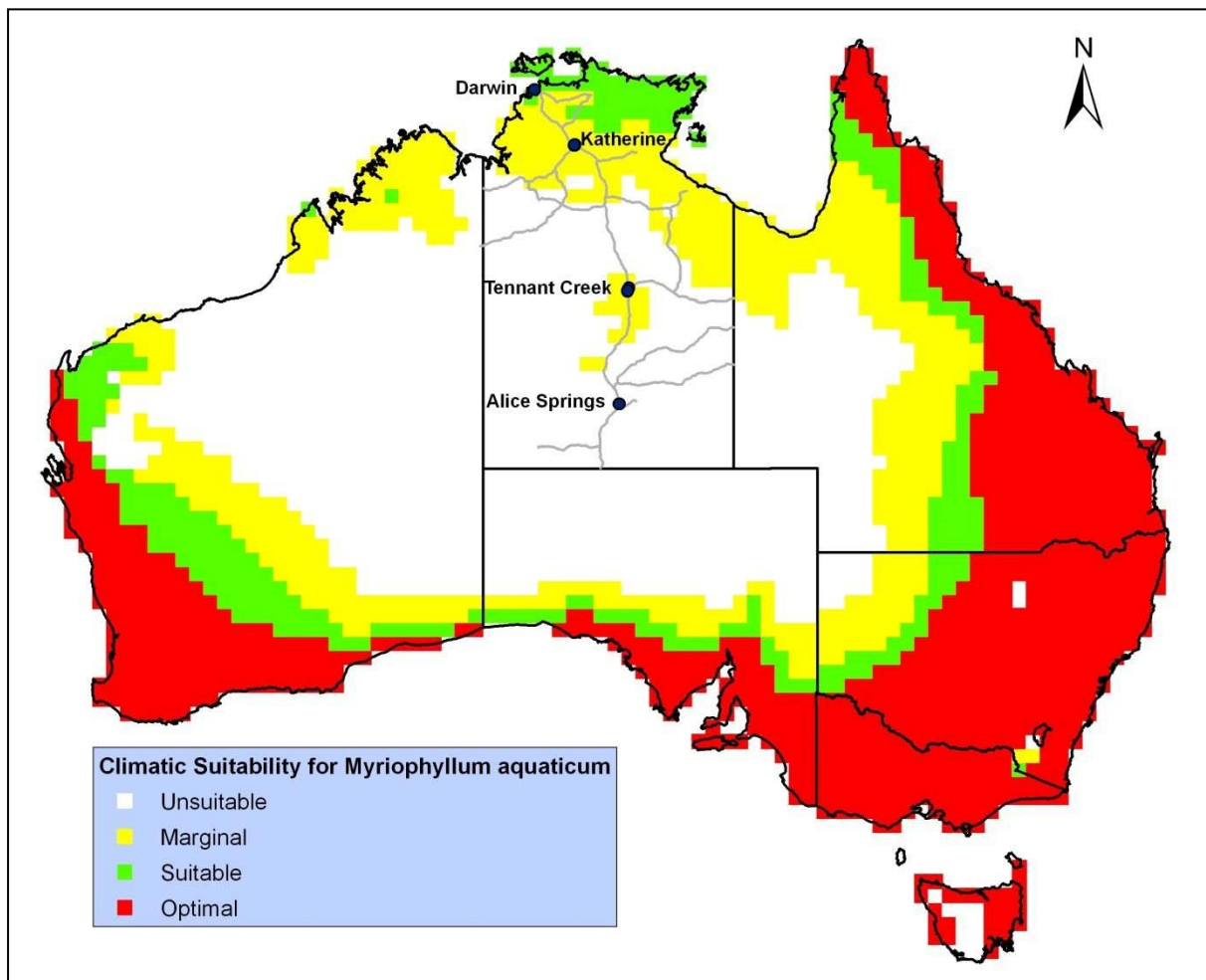


Figure 1. Potential distribution of parrots feather (*Myriophyllum aquaticum*) in Australia using the CLIMEX model. This calculates an Ecoclimatic Index from growth and stress factors to give an overall measure of how favourable the climate is for the species (V. Chejara, NT Weed Management Branch 2009)

Weed Risk Assessment - Determinations

Invasiveness

1. What is the ability of the plant to establish amongst intact native environments?
2. What is the reproductive ability of the plant?
 - a) Time to seeding
 - b) Annual production of viable seed per square metre or plant
 - c) Vegetative reproduction
3. Do propagules of the plant have properties that allow them to be dispersed long-distance by natural means?
 - a) Flying animals (birds, bats)
 - b) Other wild animals
 - c) Water
 - d) Wind
4. How likely is long-distance dispersal by human means?
 - a) Deliberate spread by people
 - b) Accidentally by people and vehicles
 - c) Contaminated produce
 - d) Domestic/farm animals

Determination

Very high

>3 years/never
None
Frequent

Yes
Yes
Yes
No

Occasional
Common
Unlikely
Occasional

Impacts

1. What is the plants competitive potential?
2. What is the plant's potential to modify the existing fire behaviour and alter the fire regime?
3. What is the plant's potential to restrict the physical movement of people, animals, vehicles, machinery and/or water?
4. What is the plant's potential to negatively affect the health of animals and/or people?
5. Does the plant potentially have negative effects on natural and cultural values?
 - a) reducing habitat quality for native animals
 - b) threatened species or communities
 - c) sites of natural significance
6. Is the plant presumed to have negative effects on environmental health?
 - a) soil chemistry/stability
 - b) water quality
 - c) hydrology

High

No potential

Medium

Low

High
More than 1
More than 1

No
Yes
Yes

Potential distribution

1. What is the climate suitability score (which indicates out of 10 the proportion of the NT environment that is suitable for the plant)?
2. How many broad habitat types in the NT will the plant potentially naturalise in (up to 5) ?
3. What is the potential of the plant to occur throughout its favoured habitat in the NT (from those identified in question 2)?

0.8

Two

Most

Weed Risk Assessment - Evidence Used

A INVASIVENESS

A1 What is the ability of the plant to establish amongst intact native environments?

<i>Myriophyllum aquaticum</i> is a highly competitive plant that is capable of rapid growth and spread.	Massachusetts Department of Conservation and Recreation (2003)
Populations of parrot feather may become quite dense and completely colonize small ponds and sloughs and impede water flow in drainage ditches and irrigation canals. It may also compete and replace native species that are of more value to fish and wildlife.	Indiana State Department of Natural Resources (2008)
It can form dense mats and compete with native aquatic plants, especially in shallow ponds.	Texas Invasive Pest and Plant Council (2007)
Forms dense stands that impede flow, especially in nutrient rich water. If male plants are introduced may become a more problem.	CRC for Australian Weed Management (2009)
It is able to grow as a terrestrial plant when ponds dry out and has even been found growing on the dry bank of a council tip in Cornwall, UK.	Centre for Ecology and Hydrology (2004)
Infestations can alter aquatic ecosystems by shading out the algae in the water column that serve as the basis of the aquatic food web.	Washington State Department of Ecology (2009)

A2a Reproductive ability: Time to seeding?

Male flowers are not recorded from Australia, so no seeds are produced in Australian populations.	Parsons & Cuthbertson (1992)
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A2b Reproductive ability: Annual production of viable seed per square meter or per plant?

Male flowers are not recorded from Australia, so no seeds are produced in Australian populations.	Parsons and Cuthbertson (1992)
No specific information available on its seed production.	No reference

A2c Reproductive ability: Vegetative reproduction?

Reproduction in Australia is wholly by vegetative means. Stem fragments, broken off by water wave action, boats or mechanical harvesting, move readily in stream flow and regenerate wherever they settle on sediments.	Parsons and Cuthbertson (1992)
Spreads vegetatively from whole plants or fragments.	Texas Invasive Pest and Plant Council (2007)

A3a Propagule dispersal: Flying animals (birds, bats)

Fragments may break off and attach to crocodiles and other aquatic animals.	NT Weed Risk Management Committee (2009)
Fragments may drift or attach to boats and wildlife and create new infestations elsewhere.	Massachusetts Department of Conservation and Recreation (2003)
Like other aquatic plants propagules dispersal, <i>M. aquaticum</i> is also known to be dispersed by water birds.	Kelly & Maguire (2009)

Weed Risk Assessment - Evidence Used

A3b Propagule dispersal: Other wild animals

Fragments may break off and attach to crocodiles and other aquatic animals. NT Weed Risk Management Committee (2009)

A3c Propagule dispersal: Water

The stems are fragile and readily break during storm; small fragments can travel long distance in stream flow. Parsons and Cuthbertson (1992)

A3d Propagule dispersal: Wind

No specific information available. No reference

A4a Human dispersal: Deliberate spread by people

Myriophyllum aquaticum has been introduced worldwide for use in indoor and outdoor aquaria. It is also a popular garden plant. However, it has escaped cultivation and spread via plant fragments and intentional plantings. Washington State Department of Ecology (2009)

A4b Human dispersal: Accidentally by people and vehicles

Boats would be the most likely vector of dispersal in the Northern Territory. NT Weed Risk Management Committee (2009)

It is known to be dispersed by or through human mediated vectors such as gardening, the horticulture trade, recreational and industrial boats, clothing and equipment. Kelly & Maguire (2009)

Major long distance dispersal of the plant, however, is mainly the result of people dumping aquarium plants in waterways. Parsons and Cuthbertson (1992)

A4c Human dispersal: Contaminated produce

Unlikely. NT Weed Risk Management Committee (2009)

A4d Human dispersal: Domestic/farm animals

Buffalo are a possible vector. NT Weed Risk Management Committee (2009)

B IMPACTS

B1 What is the plant's competitive potential?

Once established, it can form dense mats on the water surface that may restrict light to the complete exclusion of other native plants. Massachusetts Department of Conservation and Recreation (2003)

Myriophyllum aquaticum is a very aggressive plant that is capable of rapid growth and spread which can displace native species and biodiversity. Kelly & Maguire (2009)

Due to its wide range of habitat preferences it has the ability to compete with submerged, emergent and floating leaved plants. Indiana State Department of Natural Resources (2008)

It has high tannin content, so most grazers, including grass carp, find it unpalatable. Indiana State Department of Natural Resources (2008)

Weed Risk Assessment - Evidence Used

B2 What is the plant's potential to modify the existing fire behaviour and alter the fire regime?

Aquatic species would not have the potential to alter the fire regime. No reference

B3 What is the plant's potential to restrict the physical movement of people, animals, vehicles, machinery and/or water?

The dense mats formed can hamper fishing, boating, swimming and other and the loss of recreational and aesthetic value. Department of Massachusetts activities Conservation and Recreation (2003)

Populations may be quite dense, sometimes as floating mats that have been uprooted, often choking waterways and impeding navigation. Datsbase (2005) Global Invasive Species

B4 What is the plant's potential to negatively affect the health of animals and/or people?

Can cause drowning. This would be largely restricted to warmer months. Victorian Department of Primary Industries (2009)

Parrots feather provides mosquito larvae a refuge from predation, which creates a human health hazard. Sytsma & Anderson (1993)

B5a Natural & cultural values: Reducing habitat quality for native animals

Myriophyllum aquaticum forms monoculture that often does not provide ideal habitat or food for native wildlife and may limit access to the water for some species. These native wildlife populations may be forced to relocate or perish, ultimately resulting in a loss of biodiversity and a disruptions in the balance of the ecosystems. Kelly & Maguire (2009)

B5b Natural & cultural values: Threatened species of communities

The vulnerable Lorentz grunter (*Pingalla lorentzi*) (Finniss River) is potentially threatened by this species. D. Liddle, NT Biodiversity Conservation, pers. comm. (2009) Woinarski (2006)

The vulnerable Angalarri grunter (*Sortum neili*) (Victoria River District) is potentially threatened by this species. D. Liddle, NT Biodiversity Conservation, pers. comm. (2009) Stirrat et al (2006)

B5c Natural & cultural values: Sites of natural and cultural significance

Significant areas that might be impacted by this species include the Mary River catchment and Kakadu National Park. These are listed as Alligator Rivers coastal floodplains and Mary River coastal floodplains in Harrison et al. (2009). Harrison et al. (2009) NT Weed Risk Management Committee (2009)

Free floating mats can interfere with infrastructure, irrigation works, hydroelectric outputs and water supplies. Parsons and Cuthbertson (1992)

It limits the recreational value of infested waters. Parsons and Cuthbertson (1992)

Thick mats can prevent fishing, boating, swimming and other activities in a and lakes. Kelly & Maguire (2009) ponds

Weed Risk Assessment - Evidence Used

B6a Environmental health: Soil chemistry/stability

Not believed to have any impacts on soil chemistry or stability.

NT Weed Risk Management Committee (2009)

B6b Environmental health: Water quality

Dense floating mats decrease the air exchange between the water surfaces and the atmosphere. Therefore has potential to alter temperature and dissolved oxygen.

Kelly & Maguire (2009)

It has high tannin content, so most grazers, including grass carp, find it unpalatable.

Indiana State Department of Natural Resources (2008)

While parrots feather may provide cover for some aquatic organisms, it can seriously change the physical and chemical characteristics of lakes and streams.

Indiana State Department of Natural Resources (2008)

B6c Environmental health: Hydrology

The plant can form free floating mats, be attached and submerged or emergent and is reported to severely impeded water flow.

Parsons and Cuthbertson (1992)

C POTENTIAL DISTRIBUTION

C1 What is the CLIMATE suitability score (which indicates the proportion of the NT environment that is suitable for the plant)?

The CLIMEX model used by the NT Weed Management Branch predicts that 8% of the Northern Territory is climatically suitable for *Myriophyllum aquaticum*. NT Weed Management Branch (2009) (see Figure 1).

C2 How many broad vegetation types in the NT will the plant potentially naturalise in (up to 5) ?

The broad vegetation types in the Northern Territory that *Myriophyllum aquaticum* will potentially naturalise in are:

- tropical wetlands
- permanent waterbodies

Of these, the favoured vegetation type is permanent waterbodies.

NT Weed Risk Management Committee (2009)
Rossiter-Rachor et al. (2012)

C3 What is the potential of the plant to occur throughout its favoured habitat in the NT (identified in question 2)?

Myriophyllum aquaticum has the potential to occur through most of its favoured habitat.

NT Weed Risk Management Committee (2009)

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