

# WATER LETTUCE

## 1. Description of the problem

(a) *Location of the case-study*

New Zealand, two known field sites

(b) *History (origin, pathway and dates, including time-period between initial entry/first detection of alien species and development of impacts) of introduction(s)*

Water lettuce was first discovered in New Zealand waterways in 1973. It was introduced in the aquarium trade, and could have been present long before its 1973 discovery.

(c) *Description of the alien species concerned: biology of the alien species (the scientific name of species should be indicated if possible) and ecology of the invasion(s) (type of and potential or actual impacts on biological diversity and ecosystem(s) invaded or threatened, and stakeholders involved)*

*Pistia stratiotes* L. (*Araceae*) is a free-floating aquatic plant, able to rapidly colonise fertile waters with temperatures of ~20 C for a significant part of the year. It is also known as water lettuce. It spreads by the production of daughter plants on stolons; its sexual reproduction in New Zealand is not known.

*P. stratiotes* is one of the most widely distributed hydrophytes - it occurs on all continents except in Europe and in Antarctica and is found throughout much of the tropics and subtropics. In Europe it is used as a summer plant in garden ponds but in the tropics it is a serious weed.

*P. stratiotes* was first reported in Florida in 1765 which led many to believe it was native to North America. However, the origin of the species is still speculative, with others suggesting South America because of the abundance of regionally native insects associated with water lettuce.

The most commonly accepted pathway of this species into the United States is in ballast water in ships from South America.

Because of its rapid reproduction, *P. stratiotes* can cover a water body completely in a relative short period. This causes problems, such as loss of habitat, a decrease of oxygen levels in the water and sometimes navigation problems for boats. Dense mats deplete oxygen in underlying water and sediments by blocking the air-water interface, by respiration of the roots, and by the decay of dead plants. The root system of water lettuce increases siltation, which changes the benthic substrates, making them unsuitable for nesting sites for fishes or as habitat for macroinvertebrates.

(d) *Vector(s) of invasion(s) (e.g. of deliberate importation, contamination of imported goods, ballast water, hull-fouling and spread from adjacent area. It should be specified, if known, whether entry was deliberate and legal, deliberate and illegal, accidental, or natural.)*

*Pistia stratiotes* L (*Araceae*) was deliberately imported by the aquarium trade for use as an ornamental plant. It was also deliberately planted at the two known field sites.

- (e) *Assessment and monitoring activities conducted and methods applied, including difficulties encountered (e.g. uncertainties due to missing taxonomic knowledge)*

Plants were collected and identified by the Ministry of Agriculture and Forestry's (MAF) Aquatic Plant Section (now restructured as the National Institute of Water and Atmospheric Research). There were no similar species so there was no taxonomic problem.

## 2. Options considered to address the problem

- (a) *Description of the decision-making process (stakeholders involved, consultation processes used, etc.)*

*P. stratiotes* was considered a great enough threat to be classified a Class A Noxious Plant under the Noxious Plants Act 1978, along with water hyacinth and salvinia.

The plants were duly classified by an Order in Council based on advice from MAF Aquatic Plants to the Noxious Plants Council, and on to the then Minister of Agriculture. (The Council was set up as regulatory body by the Noxious Plants Act.)

- (b) *Type of measures (research and monitoring; training of specialists; prevention, early detection, eradication, control/containment measures, habitat and/or natural community restoration; legal provisions; public education and awareness)*

Both sites discovered in the wild were eradicated by hand removal of plants, although provision in Act allowed for herbicide use (2,4-D amine) without need for Discharge Permit. This species was eradicated early so no educational information was required, but posters and television advertising has been produced for the other two noxious aquatic plants – water hyacinth and salvinia.

Overseas, options for control include biological control using a weevil, *Neohydronomus affinis* (Coleoptera: Curculionidae) and the moth *Namangana pectinicornis*.

- (c) *Options selected, time-frame and reasons for selecting the options*

See 2(a).

- (d) *Institutions responsible for decisions and actions*

Ministry of Agriculture and Forestry (MAF)

### **3. Implementation of measures, including assessment of effectiveness**

*(a) Ways and means set in place for implementation*

MAF Field Officers/County Council Noxious Plants Officers (now Regional Plant Pest Officers)/MAF Aquatic Plant Section carried out the programme, based on Management Plans designed by MAF Aquatic Plant Section.

*(b) Achievements (specify whether the action was fully successful, partially successful, or unsuccessful), including any adverse effects of the actions taken on the conservation and sustainable use of biodiversity*

Fully successful. The weed has since been successfully eradicated from two known field sites where it had been deliberately planted. Plants were removed by hand.

*(c) Costs of action*

Minimal cost

### **4. Lessons learned from the operation and other conclusions**

*(a) Further measures needed, including transboundary, regional and multilateral co-operation*

*(b) Replicability for other regions, ecosystems or groups of organisms*

*(c) Information compilation and dissemination needed*

The legal and organisation framework at a national level, co-ordinating with regional staff, has resulted in the near eradication of another four Class A Noxious Plants, plus a number of other aquatic species of limited distribution.

The Noxious Plant Act has since been replaced by the Biosecurity Act 1993, although Class A species management is still based on the Noxious Plant Act. The Biosecurity Act is currently managed at a regional level for aquatic plant control, with no structured national overview, though there are informal links with NIWA.

Control of new incursions require a Resource Consent which may take more than one year to obtain (and sometimes significant costs) in which time the plant may have spread to such an extent that control costs much more, and in some cases is not achievable.

The Department of Conservation is beginning to actively manage weed species on land it manages, but links with Regional Council Plant Pest Management programmes are inconsistent.