RAPID RISK ASSESSMENT SUMMARY SHEET

Updated: September 2015

Andean water milfoil (*Myriophyllum quitense*)

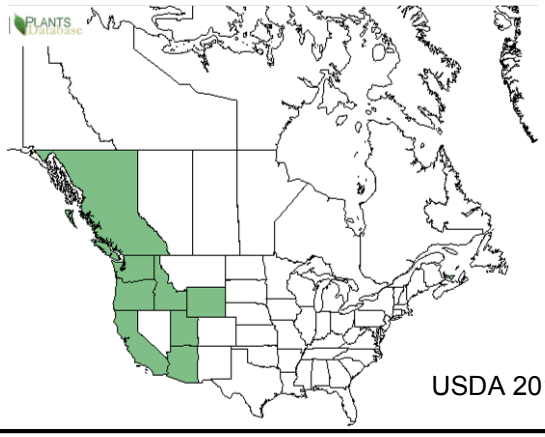
- An aquatic plant native to western North and South America
- Not yet established in GB but no environmental or climatic barriers appear to exist.
- Minor impacts in freshwater ecosystems.

History in GB

Not yet established, but there appear to be no environmental or climatic barriers to this as conditions in GB are similar to those in its native range. Found in freshwater lakes, rivers and streams, usually in cold nutrient-poor water.

Native distribution

Native to western North and South America. North American distribution below.



USDA 2015

Distribution in GB

Not yet established

Non-native distribution elsewhere

Listed as non-native in Australia and east-coast Canada. Was present but now absent in New Zealand.

Impacts

No significant impacts likely in GB. Not reported in DAISIE or GISD as a weed anywhere other than south-east Australia.

Environmental

- Listed as a prohibited species in New Hampshire, potentially due to environmental impacts.

Economic

- Reported to be a weed of irrigation channels in south east Australia.

Social

- None known

Introduction pathways

Ornamental - available in GB as an aquarium plant.

Spread pathways

Natural - can reproduce from seeds and plant fragments; potential for rapid spread if fragments enter fast flowing rivers or plants set seed in suitable locations.

Human - long distance spread could be mediated by availability in the aquarium trade.

Summary

	Risk	Confidence
Entry	UNLIKELY	MEDIUM
Establishment	LIKELY	MEDIUM
Spread	INTERMEDIATE	MEDIUM
Impacts	MINOR	MEDIUM
Conclusion	LOW	MEDIUM

Information about GB Non-native Species Risk Assessments

The Convention on Biological Diversity (CBD) emphasises the need for a precautionary approach towards non-native species where there is often a lack of firm scientific evidence. It also strongly promotes the use of good quality risk assessment to help underpin this approach. The GB risk analysis mechanism has been developed to help facilitate such an approach in Great Britain. It complies with the CBD and reflects standards used by other schemes such as the Intergovernmental Panel on Climate Change, European Plant Protection Organisation and European Food Safety Authority to ensure good practice.

Risk assessments, along with other information, are used to help support decision making in Great Britain. They do not in themselves determine government policy.

The Non-native Species Secretariat (NNSS) manages the risk analysis process on behalf of the GB Programme Board for Non-native Species. Risk assessments are carried out by independent experts from a range of organisations. As part of the risk analysis process risk assessments are:

- Completed using a consistent risk assessment template to ensure that the full range of issues recognised in international standards are addressed.
- Drafted by an independent expert on the species and peer reviewed by a different expert.
- Approved by an independent risk analysis panel (known as the Non-native Species Risk Analysis Panel or NNRAP) only when they are satisfied the assessment is fit-for-purpose.
- Approved for publication by the GB Programme Board for Non-native Species.
- Placed on the GB Non-native Species Secretariat (NNSS) website for a three month period of public comment.
- Finalised by the risk assessor to the satisfaction of the NNRAP.

To find out more about the risk analysis mechanism go to: www.nonnativespecies.org

Common misconceptions about risk assessments

To address a number of common misconceptions about non-native species risk assessments, the following points should be noted:

- Risk assessments consider only the risks posed by a species. They do not consider the practicalities, impacts or other issues relating to the management of the species. They therefore cannot on their own be used to determine what, if any, management response should be undertaken.
- Risk assessments are about negative impacts and are not meant to consider positive impacts that may also occur. The positive impacts would be considered as part of an overall policy decision.
- Risk assessments are advisory and therefore part of the suite of information on which policy decisions are based.
- Completed risk assessments are not final and absolute. Substantive new scientific evidence may prompt a re-evaluation of the risks and/or a change of policy.

Period for comment

Draft risk assessments are available for a period of three months from the date of posting on the NNSS website*. During this time stakeholders are invited to comment on the scientific evidence which underpins the assessments or provide information on other relevant evidence or research that may be available. Relevant comments are collated by the NNSS and sent to the risk assessor. The assessor reviews the comments and, if necessary, amends the risk assessment. The final risk assessment is then checked and approved by the NNRAP.

*risk assessments are posted online at:
https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=51
comments should be emailed to nnss@apha.gsi.gov.uk

Rapid Risk Assessment of: *Myriophyllum quitense*, Andean Water milfoil
Author: Jonathan Newman

Version: Final (April 2016) – Draft 1 (May 2012), Peer Review (March 2014), NNRAP 1st review (September 2014), Draft 2 (December 2014), NNRAP 2nd review (February 2015), Draft 3 (April 2015)
Signed off by NNRAP: February 2015
Approved by Programme Board: September 2015
Placed on NNSS website: November 2015

GB Non-native species Rapid Risk Assessment (NRRA)

Introduction:
The rapid risk assessment is used to assess invasive non-native species more rapidly than the larger GB Non-native Risk Assessment. The principles remain the same, relying on scientific knowledge of the species, expert judgement and peer review. For some species the rapid assessment alone will be sufficient, others may go on to be assessed under the larger scheme if requested by the Non-native Species Programme Board.

1 - What is the principal reason for performing the Risk Assessment? (Include any other reasons as comments)

Response: To assess the risk of *Myriophyllum quitense* to the RAA

2 - What is the Risk Assessment Area?

Response: Great Britain

3 - What is the name of the organism (scientific and accepted common; include common synonyms and notes on taxonomic complexity if relevant)?

Response:

Myriophyllum quitense Kunth. Andean Water milfoil (ITIS online, accessed 9th May 2012)

Synonyms:
Myriophyllum chuquitense Meyen
Myriophyllum elatinoides Gaudich.
Myriophyllum elatinoides var. *ternatum* (Gaudich.) Reiche
Myriophyllum pallidum Rusby
Myriophyllum ternatum Gaudich.
Myriophyllum ternatum var. *tetraphyllum* Hook. & Arn.
Myriophyllum titikakense Remy
Myriophyllum viridescens Gillies ex Hook. & Arn.

The synonyms are discussed in the following references (Brako & Zarucchi, 1993, Hokche *et al.*, 2008, Jørgensen & León-Yánez, 1999, Jørgensen, *et al.*, 2014, Mora-Osejo, 1984, Orchard, 1981, Zuloaga, & Morrone, 1997, Zuloaga, *et al.*, 2008).

4 - Is the organism known to be invasive anywhere in the world?

Response: Bill (1969) cites *M. elatinoides* as a weed of irrigation channels in south east Australia. It is not listed as a weed on DAISIE or on GISD anywhere else in the world. It is known to have been present in New Zealand, but is currently absent, (http://nzflora.landcareresearch.co.nz/default.aspx?selected=NameDetails&TabNum=0&NameId=4E824E97-5D8B-4F3B-8ECD-8384F60C8565) and has been recorded outside its native range on the East coast of Canada (McAlpine *et al.*, 2007)

5 - What is the current distribution status of the organism with respect to the Risk Assessment Area?

Response: Not present

6 - Are there conditions present in the Risk Assessment Area that would enable the organism to survive and reproduce? Comment on any special conditions required by the species?

Response: Yes. It is native to the mountainous western half of both North and South America and is found in Freshwater lakes, rivers, and streams, usually in cold nutrient-poor water (Orchard, 1981).

7 - Does the known geographical distribution of the organism include ecoclimatic zones comparable with those of the Risk Assessment Area or sufficiently similar for the organism to survive and thrive?

Response: Yes, *M. quitense* – west coast of North and South America (Ceska, *et al.*, 1986; Couch & Nelson, 1988). *M. elatinoides* group – Australia (Orchard, 1981)

8 - Has the organism established viable (reproducing) populations anywhere outside of its native range (do not answer this question if you have answered 'yes' to question 4)?

Response: n/a

9 - Can the organism spread rapidly by natural means or by human assistance?

Response: Reproduction is by seeds and plant fragments and it overwinters in an evergreen condition. Human assistance could aid spread.

10 - Could the organism itself, or acting as a vector, cause economic, environmental or social harm in the Risk Assessment Area?

Response: Unlikely

Entry Summary

Estimate the overall likelihood of entry into the Risk Assessment Area for this organism (comment on key issues that lead to this conclusion).

Response: *unlikely*

Confidence: *medium*

Comments (include list of entry pathways in your comments):

The pant is listed in the RHS Plant finder (2014) https://www.rhs.org.uk/Plants/79710/i-Myriophyllum-elatinoides-i/Details
It is available as an aquarium plant and described as "This is one of the most decorative milfoils" *sic*. On sale at http://www.extraplant.com/aquariumplants/myriophyllum-elatinoides.html for €2.49 a bunch and other sites.
http://www.amazon.co.uk/bunch-Myriophyllum-elatinoides-aquatic-prawns/dp/B004JIDTSO
http://www.amazon.co.uk/bunch-Myriophyllum-elatinoides-aquatic-prawns/dp/B004JIJEUQ
http://www.flowgrow.de/db/wasserpflanzen/myriophyllum-elatinoides
http://www.aquaspotworld.com/product/detail/301
http://www.theplantguy.org/Myriophyllum-elatinoides-Golden-Myrio_p_755.html

Establishment Summary

Estimate the overall likelihood of establishment (comment on key issues that lead to this conclusion).

Response: *likely*

Confidence: *medium*

Comments (state where in GB this species could establish in your comments, include map if possible):

M. quitense is common in rivers of Yellowstone National Park (Hellquist,, 2009). In the park it is found in four fast-flowing rivers where it forms emergent or submerged mats. It has been observed in various habitats from eutrophic to highly oligotrophic lakes and rivers (Ceska *et al*. 1986, Couch and Nelson, 1988). In New Brunswick it is found in upper estuarine waters (McAlpine *et al.* 2007). Inflorescences form when growing emergent in shallow waters.

There appear to be no climatic or environmental barriers to establishment in the RAA and any increase in trade would lead to inevitable escapes and establishment. It may share habitat preferences with the native *M. alterniflorum*, which is common in the north west of Scotland. In Vancouver Island, the only habitats where it has been found typically have high wave action or are in flowing waters (Warrington, 1986). This implies that the species may be restricted to CO_2 as a carbon source, limiting the possibility of establishment to highly disturbed, acidic oligotrophic waterbodies.

M. quitense is probably tolerant of brackish conditions (Orchard, 1981), increasing the likelihood of establishment in these areas. Warrington (1986) states that the species is restricted to low altitude coastal ponds and fast flowing rivers in Vancouver Island.

Spread Summary

Estimate overall potential for spread (comment on key issues that lead to this conclusion).

Response: *intermediate*

Confidence: *medium*

Comments (include list of spread pathways in your comments):

Long distance spread from the west coast to the east coast of Canada has been mediated by availability in the aquarium trade (McAlpine *et al.*, 2007, Hellquist, 2009). Fragmentation in fast flowing rivers will result in rapid spread, and flowering could result in fertile seed set in suitable locations, resulting in possible rapid spread both between and within suitable habitats.

Impact Summary

Estimate overall severity of impact (comment on key issues that lead to this conclusion)

Response: *minor*

Confidence: *medium*

Comments (include list of impacts in your comments):

The species is listed as a prohibited species in New Hampshire (http://www.invasive.org/browse/subinfo.cfm?sub=23966), and consequently may be deemed to have unacceptable environmental impacts. Hybridisation is unlikely between this species and native *Myriophyllum species.*

Climate Change

What is the likelihood that the risk posed by this species will increase as a result of climate change?

Response: *low*

Confidence: *medium*

Comments (include aspects of species biology likely to be effected by climate change (e.g. ability to establish, key impacts that might change and timescale over which significant change may occur):

M. quitense is native to mountainous areas in the west of the Americas (Orchard, 1981, Ritter and Crow 1998 (terrestrial form)). This indicates a preference for cooler temperatures and oligotrophic water. It is not known how this species may respond to climate change, although increases in CO_2 may promote the growth of the emergent form. The preference for disturbed habitats (Warrington, 1986) tends to indicate a preference for dissolved CO_2 as a carbon source for photosynthesis. Any increase in CO2 may benefit the growth of this species in other types of habitat. Increased acidification of freshwaters would promote growth of such species.

Conclusion

Estimate the overall risk (comment on the key issues that lead to this conclusion).

Response: *low*

Confidence: *medium*

Comments:

Given the success of non-native *Myriophyllum* species in the RAA the relatively low likelihood of entry and establishment I would consider this species as a low risk. The continued presence of species known as *M. elatinoides* (regardless of the actual real identity of the plant being sold)in trade may lead to a garden escape or release from an aquarium situation.

M. heterophyllum and *M. robustum* are probably the greatest risk to the RAA of the four *Myriophyllum* species currently being assessed. Their risk is equal to, or slightly greater than, the already present *M. aquaticum*

References

Provide here a list of the references cited in the course of completing assessment

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