Information on measures and related costs in relation to species included on the Union list

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This technical note provides information on the effectiveness of measures, alongside the required effort and resources, used to prevent the introduction, and to undertake early detection, rapid eradication, and management for the invasive alien species under review. Each table represents a separate measure.

Species (scientific name)	*Myriophyllum heterophyllum* Michx.
Species (common name)	Broadleaf watermilfoil
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Summary

Highlight of measures that provide the most cost-effective options to prevent the introduction, achieve early detection, rapidly eradicate and manage the species, including significant gaps in information or knowledge to identify cost-effective measures

Myriophyllum heterophyllum (Haloragaceae) is a perennial submerged macrophyte species native to the eastern United States. The plant is present in Austria, Belgium, France, Germany, Hungary, the Netherlands, Spain and Switzerland (EPPO, 2016). It is still absent from many Member States (MS) but there is a high risk of further introductions and spread. The species could establish all over Europe, and climate change is likely to increase the potential invasion area (Newman, 2014). Because this plant has shown invasive behaviour where it has been introduced elsewhere, it can be considered an emerging invader in Europe.

The control of the species is difficult once it has become established. Therefore, **to prevent introductions** in unaffected MSs **or further spread into the areas where this species is not yet present**, it is important to act at the earliest stage of invasion and to prevent additional introductions and further spread in those areas in which it is already present so as to avoid costs linked to managing the species when widely established. Containment and control is likely to be costly, which reinforces the need for preventive action

Early detection and treatment is critical for limiting the spread of invasive aquatic plants (Moody and Les, 2010).

As with most other invasive alien species, the best way to deal with the threat posed by *Myriophyllum heterophyllum* to biodiversity and society is through a combination of preventative measures, early detection and rapid response to new incursions, with permanent management only as the last option. Total eradication after extensive establishment is unlikely. The ban on imports, sale, transport, exchanges, breeding and release of this species, as required under Article 7 of IAS Regulation should prevent its wider establishment in more MS.

Early detection is best achieved by using a well-coordinated citizen science programme combined with public awareness campaigns to identify and prevent further spread in other MS, as well as through the use of specific molecular DNA barcoding for *M. heterophyllum.*

Physical removal of small patches may be successful through careful and thorough hand-pulling and improved in combination with Hydro Venturi or using a tarpaulin. Mechanical control options on *M. heterophyllum* have not been studied in detail yet.

The main knowledge gap is in biological control. A host-specific biological control candidate for this species should be found, and models that predict the likelihood of invasion are required to aid the prioritisation of monitoring, and reduce associated time and costs.

Prevention – measures for preventing the species being introduced, intentionally and unintentionally. This section assumes that the species is not currently present in a Member State, or part of a Member State's territory. **This table is repeated for each of the prevention measures identified.**	
Measure description Provide a description of the measure	**A ban on keeping, importing, selling, breeding and growing of this species as required under Article 7 of the IAS Regulation** will prevent its wider establishment across the EU. International aquarium and horticultural trade is the only intentional introduction pathway identified for the

	species (EPPO, 2015). Therefore, the main measure is the prohibition of import into and within the MSs. Because many species are imported under incorrect names, it is necessary to screen imported aquatic plants for the presence of *M. heterophyllum*. It has been purchased from a variety of vendors under different common names (myrio, foxtail, and parrot feather) (Lafontaine, 2013), and in the Netherlands is sold under other misapplied names of *M. hippuroides*, *M. propinquum*, *M. scabratum* (van Valkenburg, 2011; van Valkenburg & Boer, 2014). *M. heterophyllum* may be incorrectly identified as a number of *Myriophyllum* species (Aiken, 1981; Thum *et al.,* 2006). Therefore, in addition to the existing requirement for a phytosanitary certificate (PC) by the exporting country, confirmation of the correct identification and labelling of the species should be required.
Effectiveness of measure e.g. has the measure previously worked, failed	The plant has already been banned in some MS: in the Netherlands all major growers and retail chains agreed not to sell *M. heterophyllum* (Verbrugge *et al.*, 2014). In Belgium, different initiatives regarding regulation are in preparation to prohibit the import, export and transit of *M. heterophyllum*, and there is agreement to withdraw this plant from sales or plantations (Halford *et al.,* 2011). The effectiveness of import bans requires border and customs staff to be trained in plant identification. *M. heterophyllum* is already assigned to the Black List and classified as an A1 species in Belgium and included on the Black List/Action List of invasive alien plants in Germany (EPPO, 2016). In the UK, *M. heterophyllum* would probably be subject to some kind of control and orders on invasive non-native species (Newman, 2014). The species is sold as an ornamental aquatic plant in some MSs. However, the species is often mislabelled as other species. Molecular DNA barcoding has been developed for *M. heterophyllum* (Ghahramanzadeh *et al.,* 2013) to confirm the presence of the species in trade and from unidentified wild populations.
Effort required e.g. period of time over which measure need to be applied to have results	Considerable effort is required to train border and customs inspectors in plant identification. This is an ongoing requirement and is estimated at c. €100,000 per MS per annum (based on the cost of training three customs staff for 1 week and monitoring imports on a country by country basis using expert identification skills at national institutes). It is estimated that three staff, plus training costs at the main port of entry to the EU (i.e. The Netherlands) would be sufficient to significantly reduce imports.
Resources required [1]	Given the ease of spread of this plant and the costs linked to its management once established,

e.g. cost, staff, equipment etc.	prevention would be the cheapest course of action.
Side effects (incl. potential) i.e. positive or negative side effects of the measure on public health, environment, non-targeted species, etc.	None known. A positive effect could be that other invasive Myriophyllum species might also be identified in trade (especially important for mislabelled plants).
Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.	Banning the trade bears some costs for the sectors concerned, but it is not considered to be economically important and was sold in less than 10% of garden centres in Belgium (Vanderhoeve *et al.* 2006; Halford *et al*. 2011) and was not found in aquatic plant shops in Germany (Hussner *et al.* 2014). Alternative species are available.
Additional cost information [1] When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects	Additional costs for MSs include the costs of monitoring and reporting, and further assessment of management requirements. These can usually be included within the normal activities of regulatory bodies or nature conservation organisations.
Level of confidence [2] See guidance section	**High** The plant was already banned from the horticultural trade in some MS, and it was included in the Black Lists for Belgium and Germany.

Prevention – measures for preventing the species being introduced, intentionally and unintentionally. This section assumes that the species is not currently present in a Member State, or part of a Member State's territory. **This table is repeated for each of the prevention measures identified.**	
Measure description Provide a description of the measure	**Unintentional introductions**. Human-assisted unintentional spread is one of the main causes of dispersal for *M. heterophyllum* in the USA (Green Mountain Conservation Group, 2017). The potential for long-distance spread of *M. heterophyllum* is high because the species is very tolerant of desiccation (Barnes *et al.* 2013), meaning that hitch-hiker fragments are likely to remain viable for prolonged periods of time, allowing its spread (EPPO, 2015).

	Preventative management efforts should be focused on public information campaigns. This is because spreading can occur via recreational equipment (boats, fishing equipment). The vegetative part of the plants is the main mechanism of spreading; seed production has not been observed in Europe yet (Fritschler 2007; Hussner 2010). Such measures will prevent plant fragments being disseminated and avoid further spread. Public awareness campaigns are needed to prevent spread from existing populations in countries at high risk.
Effectiveness of measure e.g. has the measure previously worked, failed	There are already public information campaigns and inspections of boats and fishing equipment, as per the "Check, Clean and Dry" Campaign in the UK (GB Non-Native Species Secretariat, 2017) and other regional information portals (EUBARnet, 2013). If these measures are not implemented by all countries, they will not be effective since the species could spread from one country to another (EPPO, 2015).
Effort required e.g. period of time over which measure need to be applied to have results	Public awareness campaigns need to be run in the long term.
Resources required [1] e.g. cost, staff, equipment etc.	There is no information available about the cost of public campaigns. However, given the ease of spread of this plant and the costs linked to its management once established, prevention would be the cheapest course of action.
Side effects (incl. potential) i.e. positive or negative side effects of the measure on public health, environment, non-targeted species, etc.	None known. A positive effect could be that other invasive plants may be prevented from spreading. Negative impacts on native plants have not been reported yet.
Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.	The suggested measures could have a related impact on recreational water activities, but this impact is low compared to the potential impact of the species. Therefore, any restriction of this measure should be acceptable.
Additional cost information [1] When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness	There is no information available about the cost of public campaigns, but the cost of inaction should be greater than the cost of implementing prevention methods, due to the difficulty of eradication of this species once established.

- the socio-economic aspects	
Level of confidence [2] See guidance section	**High** Public awareness campaigns have been run in a number of countries, including within the EU and are important tools to stop the human-mediated spread of invasive aquatic plants with positive results in the countries in which they have been implemented.

Early detection - Measures to achieve early detection and run an effective surveillance system for achieving an early detection of a new occurrence (cf. Article 16 of the IAS Regulation). This section assumes that the species is not currently present in a Member State, or part of a Member State's territory. **This table is repeated for each of the early detection measures identified.**	
Measure description Provide a description of the surveillance method	**Citizen Science** in collaboration with a coordinating national body, *e.g.* (Maistrello, 2016). Citizen science can broadly be defined as the involvement of volunteers in science. Over the past decade there has been a rapid increase in the number of citizen science initiatives. The breadth of environmental-based citizen science is immense. Citizen scientists have surveyed for and monitored a broad range of taxa, and also contributed data on weather and habitats reflecting an increase in engagement with a diverse range of observational science. Citizen science has taken many varied approaches from citizen-led (co-created) projects with local community groups to, more commonly, scientist-led mass participation initiatives that are open to all sectors of society. Citizen science provides an indispensable means of combining environmental research with environmental education and wildlife recording (Roy, *et al.*, 2012). The problem of early detection by citizen science in the case of *Myriophyllum heterophyllum* is that it is very difficult to determine the species accurately because of the high phenotypic plasticity of the species within the genus Myriophyllum. One of the best options early detection and ongoing surveillance of aquatic invasive plants in general is development of eDNA analysis (Scriver et al., 2015).
Effectiveness of the surveillance e.g. has the surveillance previously worked, failed	Delaney *et al*. (2008) successfully used the data collected by citizen scientists to create a large-scale standardized database of the distribution and abundance of native and invasive crabs along the rocky intertidal zone in Massachusetts, USA. An assessment of the accuracy of data collected by citizen scientists showed that, depending on experience, between 80 and 95% accuracy in identification was achieved (Delaney *et al.*, 2008). In the case of *M. heterophyllum* this percentage is likely to be lower except during flowering.

Effort required e.g. required intensity of surveillance (in time and space) to be sufficiently rapid to allow rapid eradication	Roy *et al.* (2012) state that "Environmental monitoring relies on long-term support in terms of volunteer liaison, data handling, quality assurance, publication and statistical support for measuring trends, requiring the involvement of a professional scientific organisation. The use of volunteers in Citizen science is critical for the success and is supported at a European-level through the SEBI (Streamlining European 2010 Biodiversity Indicators) "public awareness indicator" which reported that over two-thirds of EU citizens report personally making efforts to help preserve nature. The Pan-European SEBI initiative was launched in 2005. SEBI aims to develop a European set of biodiversity indicators to assess and inform European and global biodiversity targets. SEBI links the global framework, set by the Convention on Biological Diversity (CBD), with regional and national indicator initiatives. Many of the headline indicators rely entirely on the availability of monitoring data and particularly datasets on biodiversity developed by volunteer naturalists (Levrel et al., 2010). The participation of volunteers in the development of these monitoring schemes is not only beneficial in collating large-scale and long-term datasets but also results in other advantages including improvement of the public's knowledge of biodiversity (Cooper et al., 2007), support of public debates and reduction in the costs of biodiversity monitoring (Levrel et al., 2010)."
Resources required [1] e.g. cost, staff, equipment etc.	Integration of accurate citizen science requires a coordinating scientific or government body. Normally the work would be funded by research grant funding, or by direct funding of scientific organisations by MS Governments. Annual costs for running citizen science projects in the UK in 2007 – 2008 were estimated at between €80,000 and €170,000 (Roy *et al*., 2012).
Side effects (incl. potential) i.e. positive or negative side effects of the method on public health, environment, non-targeted species, etc.	Positive side effects included greater awareness of environmental problems by the public and trade bodies. The active involvement of volunteers is also likely to provide feedback on potential new non-native species.
Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.	Generally, this technique is accepted by stakeholders, and involvement with research and the scientific community tends to increase acceptance of public funding of such bodies.
Additional cost information [1] When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects	There is a very large cost benefit ratio for citizen science which effectively leverages scientific effort. Volunteer observers for biodiversity surveillance in the UK were estimated to contribute time in-kind worth more than £20 million during 2007–08 (http://www.jncc.gov.uk/page-3721).
Level of confidence [2]	**High**

See guidance section	Citizen science has been shown to provide significant leverage in observation power, accurate data (depending on experience and training in taxonomic identification) and should be encouraged as a valuable tool in the early detection of *Myriophyllum heterophyllum* in the EU.

Rapid eradication - Measures to achieve rapid eradication after an early detection of a new occurrence (cf. Article 17). This section assumes that the species is not currently present in a Member State, or part of a Member State's territory. **This table is repeated for each of the eradication measures identified.**	
Measure description Provide a description of the measure	**Physical removal** of small patches may be successful through careful and thorough hand-pulling or using a tarpaulin (Washington State Noxious Weed Control Board, 2007). Great care should be taken with such methods since they cause fragmentation of the plant and therefore increase potential spread (EPPO, 2016). Benthic barriers may be used in small areas (swimming beaches, boating lanes, around docks) to restrict light and upward growth (Bailey & Calhoun, 2008). In a shallow (<1m) pond system in Düsseldorf (Germany) a hand application of the Hydro Venturi system combined with hand removal reduced the plant abundance > 99% after a single treatment (one year after the treatment the abundance was still 99% reduced) (Hussner, pers. comm.). A Hydro Venturi System works by using a high pressure jet of water to uproot submerged aquatic plants and suck them to a collection point at the surface using a venture water entrainment device. This is less damaging to the aquatic environment than conventional dredging.
Effectiveness of measure e.g. has the measure previously worked, failed	Hand removal is more cost-effective and more efficient in areas with small, high-density infestations. Eradication may only be feasible in the initial stages of infestation.
Effort required e.g. period of time over which measure need to be applied to achieve rapid eradication	In small infestations, manual removal is relatively easily achieved depending on the sediment, The stems are brittle, and even in soft sediments a combination with prior Hydro Venturi works better (Hussner, pers. comm.). Careful hand picking of fragments is necessary in order to avoid fragmentation and spreading.
Resources required [1] e.g. cost, staff, equipment etc.	The removal of areas of less than 100m^2 should take not more than one day, with the involvement of at least three people.
Side effects (incl. potential) i.e. positive or negative side effects of the measure on public health, environment, non-targeted species, etc.	Benthic barriers can have a negative impact on benthic organisms and need to be properly maintained (EPPO, 2009). It is important that native *Myriophyllum* species are not confused with the target species. Careful identification by an aquatic plant expert is required to confirm reliable identification of this species.
Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.	This type of mechanical control (hand-pulling) is generally accepted by stakeholders. Issues that tend to cause problems are the disposal of waste, especially when piles of rotting material are left.
Additional cost information [1]	Once removed, it is very likely that regrowth from fragments will occur, despite careful biosecurity

When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects	arrangements. Therefore, additional monitoring of the managed site will be required on a regular basis after removal. Early detection and rapid eradication: given the costs of management, a prompt response to newly establishing populations will be important to avoid later management costs.
Level of confidence [2] See guidance section	**Medium.** Recently detected infestations may be successfully eradicated through careful and thorough hand-pulling or by using a tarpaulin. Great care should be taken with such methods since they can cause fragmentation of the plant and therefore may enhance its spread.

Management - Measures to achieve management (cf. Article 19). This section assumes that the species is already established in a Member State, or part of a Member State's territory. **This table is repeated for each of the management measures identified.**	
Measure description Provide a description of the measure	**Physical control methods:** removal by hand, cutting and benthic mats have been assessed for *M. heterophyllum* in the USA (Bailey and Calhoun, 2008). Mechanical removal using a hydro-venturi system has been practised in the Netherlands (van Valkenburg *et al*., 2011). Dense stands occurring in shallow lakes (Germany) have been regularly cut for > 10 years in summer using a weed-cutting boat without remarkable reduction of the biomass and abundance (Hussner *et al* 2005; Hussner and Krause, 2007; Hussner, pers. comm.). The potential for long-distance spread of *M. heterophyllum* is high because the species is very tolerant of desiccation (Barnes *et al.,* 2013) and the harvested shoots can even grow in a small terrestrial form when disposed of (Hussner, pers. comm.), meaning that hitch-hiker fragments are likely to remain viable for prolonged periods of time, allowing for introduction of viable fragments to new locations. Drawdown (a deliberate lowering of the water level in lakes and ponds) has been proposed by EPPO (2015) but this method of control has not been assessed.
Effectiveness of measure e.g. has the measure previously worked, failed	Hand removal, and benthic mats significantly lowered regrowth and were more effective than cutting. The Hydro Venturi system in combination with hand removal of the uprooted plants showed a reduction of 99% in cover (Hussner, pers. com.). The removal of up to 190 tonnes of fresh weight, using a weed-cutting boat to make regular cuts in summer, does not produce any long-term reduction (Hussner and Krause, 2007).

Effort required e.g. period of time over which measure need to be applied to have results	However, mechanical control options may be better practised during the winter, when the plant is less active and regrowth is less likely, to reduce the effect on native vegetation and to reduce the competitive advantage of evergreen *M. heterophyllum* in spring (EPPO, 2015). Benthic mats can only be applied in the case of small infestations; they are not effective for large infestations (Bailey and Calhoun, 2008).
Resources required [1] e.g. cost, staff, equipment etc.	Hand pulling and cutting is one-third the cost of benthic mats (Bailey and Calhoun, 2008). Costs of the Hydro-venturi system, when taking into account all preparatory work and aftercare, can be around €1.35-2.05m^2 (EPPO, 2015) but the cost will be depend on the extent of the affected area and type of sediments, etc. (van Valkenburg *et al*., 2011). The cost of removal using a weed-cutting boat is €45,000 for more than one lake (Hussner and Krause, 2007).
Side effects (incl. potential) i.e. positive or negative side effects of the measure on public health, environment, non-targeted species, etc.	Environmental impact is limited when the infestation is small. Hand-pulling control is mostly selective and therefore non-target plants will be not damaged. Mechanical control such as cutting can damage surrounding areas and non-target plants can be affected.
Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.	Mechanical control of aquatic and riparian weeds is generally accepted by stakeholders, unless considerable damage is seen to be done without any effort to reinstate the area.
Additional cost information [1] When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects	Once removed, it is very likely that regrowth from fragments will occur, despite careful biosecurity arrangements. Therefore, additional monitoring of the managed site will be required on a regular basis. The cost of inaction will be very high. Total eradication after extensive establishment is unlikely.
Level of confidence [2] See guidance section	**Medium** Physical control is the only method available for EU countries. More research should therefore be undertaken.

Management - Measures to achieve management (cf. Article 19). This section assumes that the species is already established in a Member State, or part of a Member State's territory. **This table is repeated for each of the management measures identified.**	
Measure description Provide a description of the measure	**Chemical control.** Herbicide control is recommended in some states of the USA for the management of this species (Getsinger *et al*., 2003). Triclopyr is effective against *M. heterophyllum* over a wide range of concentrations and exposure times (Getsinger *et al*., 2003).

	However, none of the active ingredients are currently approved for use in or near water in the EU.
Effectiveness of measure e.g. has the measure previously worked, failed	-
Effort required e.g. period of time over which measure need to be applied to have results	-
Resources required [1] e.g. cost, staff, equipment etc.	-
Side effects (incl. potential) i.e. positive or negative side effects of the measure on public health, environment, non-targeted species, etc.	-
Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.	None of the active ingredients are currently approved for use in or near water in the EU.
Additional cost information [1] When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects	-
Level of confidence [2] See guidance section	**-**

Management - Measures to achieve management (cf. Article 19). This section assumes that the species is already established in a Member State, or part of a Member State's territory. **This table is repeated for each of the management measures identified.**	
Measure description Provide a description of the measure	**Biological control.** Natural enemies from the plants in its native range have been observed to feed on emergent or submerged leaves, petioles and stems of *M. heterophyllum*: *Donacia cincticornis*

	(Coleoptera, Chrysomelidae), *Perenthis vestitus* (Coleoptera, Curculonidae), *Mystacoides longicornis* L., *Oecetis cinerascens*, *Triaenodes injusta*, *Triaenodes marginata*, *Triaenodes* spp (Trichoptera, Leptocertidae) (McGaha, 1952). Initial surveys of nematode communities have been conducted in the USA (University of New Hampshire, 2008). The aquatic weevil *Eubrychius velutus* is distributed throughout Europe and Asia; it feeds on the meristem and leaves of diverse species of G. *Myriophyllum* including *M. heterophyllum* and has potential as a biological control agent (Newman *et al.* 2006). No specific biological control agents have been identified. Hussner (pers. comm., 2017) reports significant damage to *M. heterophyllum* (particularly to the apices) from *Eubrychius sp. (the species level must still be confirmed by an expert)*. Biological control agent. Grass carp (*Ctenopharyngodon idella*) have been used in Dusseldorf (Germany) after the failure of mechanical control (EPPO, 2015), resulting in a biomass reduction but not in a sustainable method of control (Hussner pers comm). It should be borne in mind that the release of macro-organisms as biological control agents is currently not regulated at EU level. Nevertheless national/regional laws are to be respected. Before any release of an alien species as a biological control agent an appropriate risk assessment should be made.
Effectiveness of measure e.g. has the measure previously worked, failed	The use of Grass carp in Germany have not eradicated the species (EPPO, 2015). In the USA, Hanlon *et al*. (2000), a reduction in cover from 54 to 24% was noted when triploid Grass carp were present. Please include the NZ experience as well: http://www.doc.govt.nz/get-involved/apply-for-permits/interacting-with-freshwater-species/options-for-weed-control/grass-carp/
Effort required e.g. period of time over which measure need to be applied to have results	The only experiment available with Grass carp reduced by half the cover of the stand and took 6 years Hanlon et al. (2000). For biological control, the initial period of host-specificity testing would take approximately 3 years, after which the agent could be released.
Resources required [1] e.g. cost, staff, equipment etc.	Usually significant effort is required before release of a biological control agent.
Side effects (incl. potential) i.e. positive or negative side effects of the measure on public health, environment, non-targeted species, etc.	~~In a well-managed biological control programme, there should be no side effects.~~ It should be borne in mind that the release of microorganisms as biological control agents is not regulated at EU level. Nevertheless national/regional laws are to be respected. Before any release of an alien species as a biological control agent an appropriate risk assessment should be made.

Acceptability to stakeholders e.g. impacted economic activities, animal welfare considerations, public perception, etc.	Socio-economic impacts are rare and often supportive if the problem and solution is explained fully. Careful management of biological programmes is usually necessary, despite the adverse impact of the target weed.
Additional cost information [1] When not already included above, or in the species Risk Assessment. - implementation cost for Member States - the cost of inaction - the cost-effectiveness - the socio-economic aspects	The cost/benefit ratio for biological control programmes involving aquatic weeds ranges from 2.5:1 to 15:1 (McConnachie *et al.,* 2003), and up to 4,000:1 (Culliney, 2005). As yet, however, successful biological control programmes on aquatic plants have been applied exclusively on free-floating and emergent-leaved aquatic plants, and this should be borne in mind in any cost estimation.
Level of confidence [2] See guidance section	**Low** Further research on Grass carp as an agent of biological control is necessary. Research to identify the potential insects to be used for biological control is also needed.

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Notes

1. Costs information. The cost information depends on the information available.

2. Level of confidence provides an overall assessment of the confidence that can be applied to the information provided for this method.

- **High**: Information comes from published material, or current practices based on expert experience applied in one of the EU countries or third country with similar environmental, economic and social conditions.
- **Medium**: Information comes from published data or expert opinion, but it is not commonly applied, or it is applied in regions that may be too different from Europe (e.g. tropical regions) to guarantee that the results will be transposable.

- **Low**: data are not published in reliable information sources and methods are not commonly practiced or are based soley on opinion; This is for example the case of a novel situation where there is little evidence on which to base an assessment.

3. Citations and bibliography. The APA formatting style for citing references in the text and in the bibliography is used.
e.g. Peer review papers will be written as follows:
In text citation: (Author & Author, Year)
In bibliography: Author, A. A., & Author, B. B. (Publication Year). Article title. *Periodical Title*, Volume(Issue), pp.-pp.

(see http://www.waikato.ac.nz/library/study/referencing/styles/apa)