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Aponogeton distachyos

Fig 1. *Aponogeton distachyos.* Photo: Eigenes Werk

Species description

Cape-pondweed (*Aponogeton distachyos*) is a submerged and floating perennial aquatic plant native to South Africa. The species was introduced to Europe, including Belgium, through the horticultural trade as a popular ornamental plant for garden ponds and botanical gardens. The first records of cape-pondweed's presence in the environment in Belgium appear to date back to 1993. Intentional introduction in water systems is probably at the origin of its escape into the wild. Today, while emerging in some countries like Belgium, the plant might become a problematic aquatic invasive species in the near future. It is therefore a species of the LIFE RIPARIAS alert list. Although easily detectable, its presence on the Belgian territory probably remains underestimated due to a lack of recorded observations and monitoring efforts.

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Photo: H. Zell

Aponogeton distachyos

Cape-pondweed grows in stagnant or slow-moving waters up to 1.5 m deep, often rich in nutrients such as streams, ponds or ditches. As an emerging invasive species, the plant might cause diverse environmental, social and economic impacts in the near future. For instance, this invader has the ability to form dense mats on the surface of the water, with subsequent detrimental impacts on the ecosystem and biodiversity through light restriction, modification of water quality and vegetation composition. The species also facilitates algal blooms and alters stream flows. Social and economic effects might include restriction of recreational activities (angling, boating), increased risks of flooding, and management-related costs.

Biological characteristics, reproduction and spread

This species, which develops from a tuber, has semi-persistent floating leaves. Flowering of cape-pondweed occurs twice; once in spring and a second time in autumn. In some parts of its introduced range, the plant sometimes appears to go dormant during the summer months, but this is not always the case. Cape-pondweed overwinters in sediments as seeds and tubers, although flowering during all winter is possible if temperatures allow it (mild weather). The species is not resistant to drought and cold temperatures. Exposition to those conditions could result in high mortality.

Fig 2. Cape-pondweed forming a mat on the surface of a stream. Photo: Marie Patinet

References

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In western Europe, cape-pondweed reproduces both sexually and asexually. The species has a vast system of tuberous rhizomes, and vegetative expansion is possible via rhizomes and tubers. Sexual reproduction relies on seed production. Seeds are contained in fruits which are buoyant and, therefore, able to float for a limited amount of time before releasing the seeds, which will, in turn, germinate on the water surface. On average, each inflorescence can produce several hundred seeds. Seed survival time remains rather uncertain but appears to be relatively short. Spread of this invasive weed mainly occurs through seed drift within water systems but also via human activities with viable plant material (seeds or tubers) being attached to boats, waders or any other water equipment. However, as the species is vulnerable to drought, it is likely that transported plant material will not survive long during overland transportation. The species' high regeneration and dispersal abilities highlight the importance of implementing effective management measures.

Fig 3. Monitoring and manual removal of a cape-pondweed population in Belgium. Photo: Marie Patinet

General considerations about management

Very few management options have been tested to control and eradicate the species, with manual removal being the most suitable available measure. There is, however, a lack of available information on cape-pondweed management. Local eradication of cape-pondweed is believed to be achievable for small infestations in confined water bodies, although really effective management techniques are still being sought for this species. Nevertheless, the eradication feasibility of populations must be assessed on a case by case basis, considering site specificities, and be thoroughly discussed within the management team.

Due to the species' ability to reproduce both sexually and asexually, precautionary measures must be implemented before management to prevent spread within the managed area or to other water systems. Because seeds are transported downstream, management must begin with upstream infestations and progress downstream. Management actions are also initiated before the species sets seeds. Finally, managed areas are also isolated by physical barriers.

The harvested plant material must be safely disposed of far away from the water and is either composted or transported to disposal sites. Material that has been in contact with the plant as well as with the substrate that may contain seeds (e.g. clothing, tools, shoes), should be checked, cleaned and dried before being taken to another site.

While information on seed viability are lacking, the precautionary principle is applied. Managed areas and downstream sites must therefore remain under enhanced surveillance with regular monitoring for at least 5 years after the last treatment.

Manual removal

v Local eradication can be achieved

v Manual removal is highly selective and will have minimal impact on ecosystems and other organisms

x The method is only practical for really small infestations

x Manual removal is time-consuming and labor intensive

Method description

The principle is to remove the whole plant from the ecosystem. Depending on the substrate and water depth, plants are either dug out or pulled out by the roots by operators walking in the water, working from a boat or from the bank. This management strategy, conducted during the vegetative period, begins with upstream infestations and progresses downstream. Operators must verify that seeds are not being produced and must avoid creating rhizome fragments. They must also ensure that all tubers and rhizomes are removed from the sediments to prevent regrowth. Frequent checks are conducted to remove plants that have been overlooked, as well as seedlings and regrowth from tubers and rhizomes. Manual removal must be repeated until no seedling and regrowth occur.

Material

Management: Waders, gloves, garden fork, rakes

Transport: Bags

Precautionary measures: Containment net

References

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The impact of management actions on ecosystem services

While the adverse effects of IAS are well-known and provide strong incentives for implementing management actions, the impacts of these management actions on ecosystems and the services they provide are less considered. The matrices are the result of expert assessments of the evolution of relevant ecosystem services (ES) from a highly invaded situation towards a managed situation. ES evolution is considered over 2 given periods of time: 1 year and 5 years after the initiation of management.

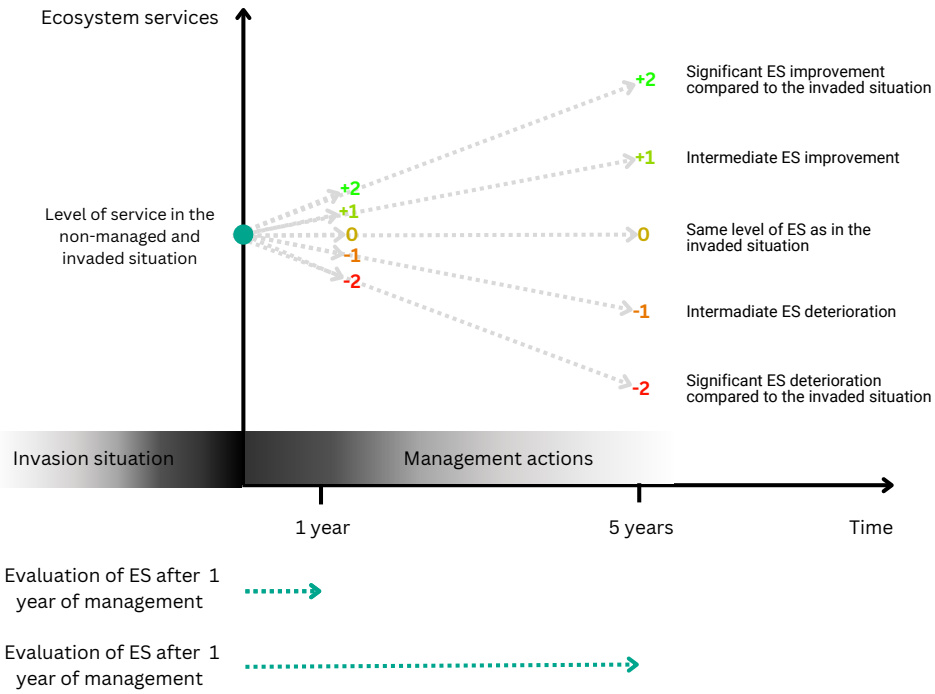

Fig 4. Representation of the survey process

Each matrix displays the average impact scores of management methods on ecosystem services. These scores have been associated to colours to facilitate the visualization of the impacts of every method on every relevant ecosystem service. Green indicates a significant improvement in the ecosystem services (ES) due to management, orange represents no or minimal effect, and red signifies a negative impact of the method on the ES.

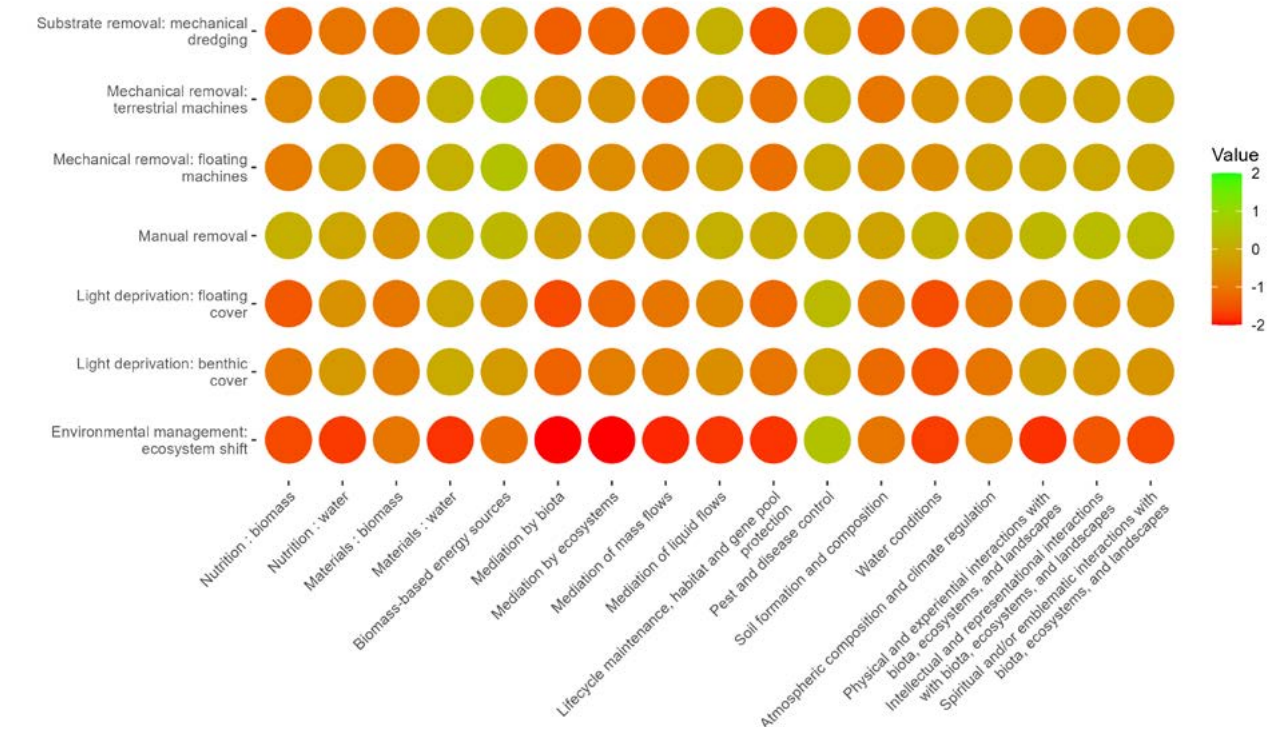

Fig 5. Matrix displaying the impact of management methods for aquatic plant species on ecosystem services after 1 year

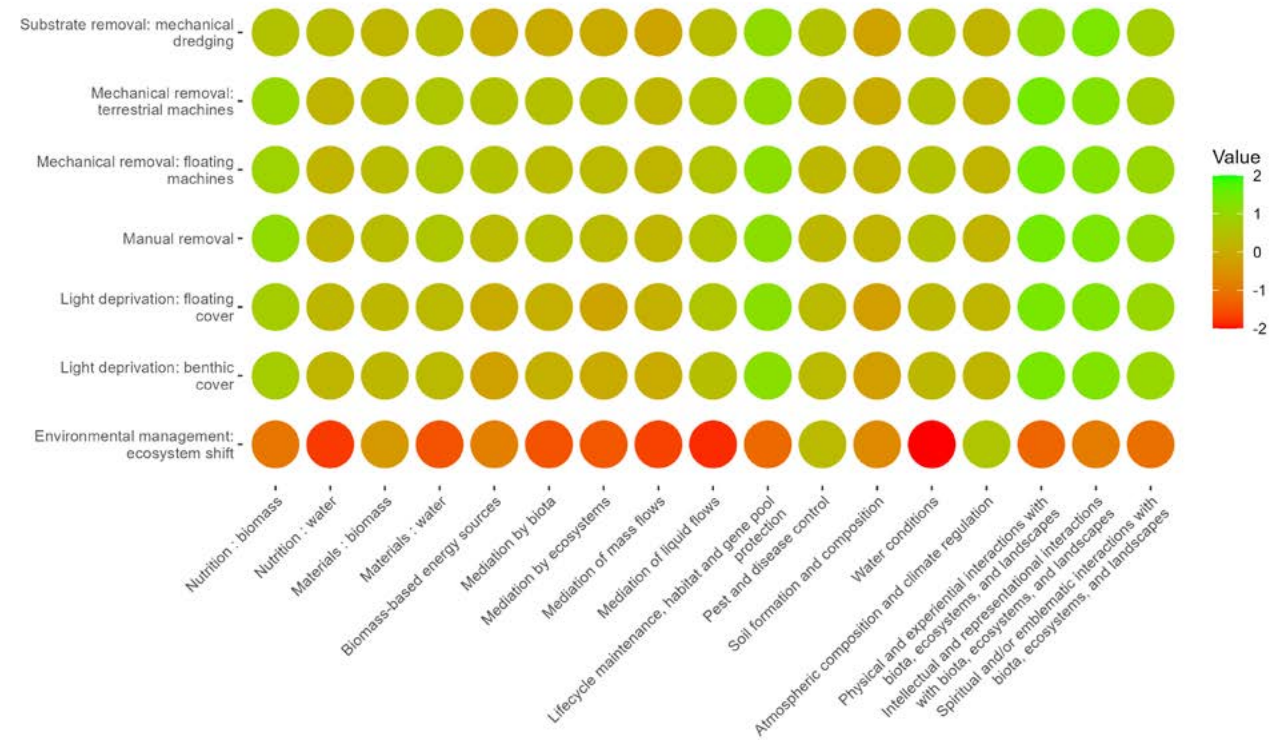

Fig 6. Matrix displaying the impact of management methods for aquatic plant species on ecosystem services after 5 years

LIFE RIPARIAS

Reaching Integrated and Prompt Action in Response to Invasive Alien Species

Citation

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