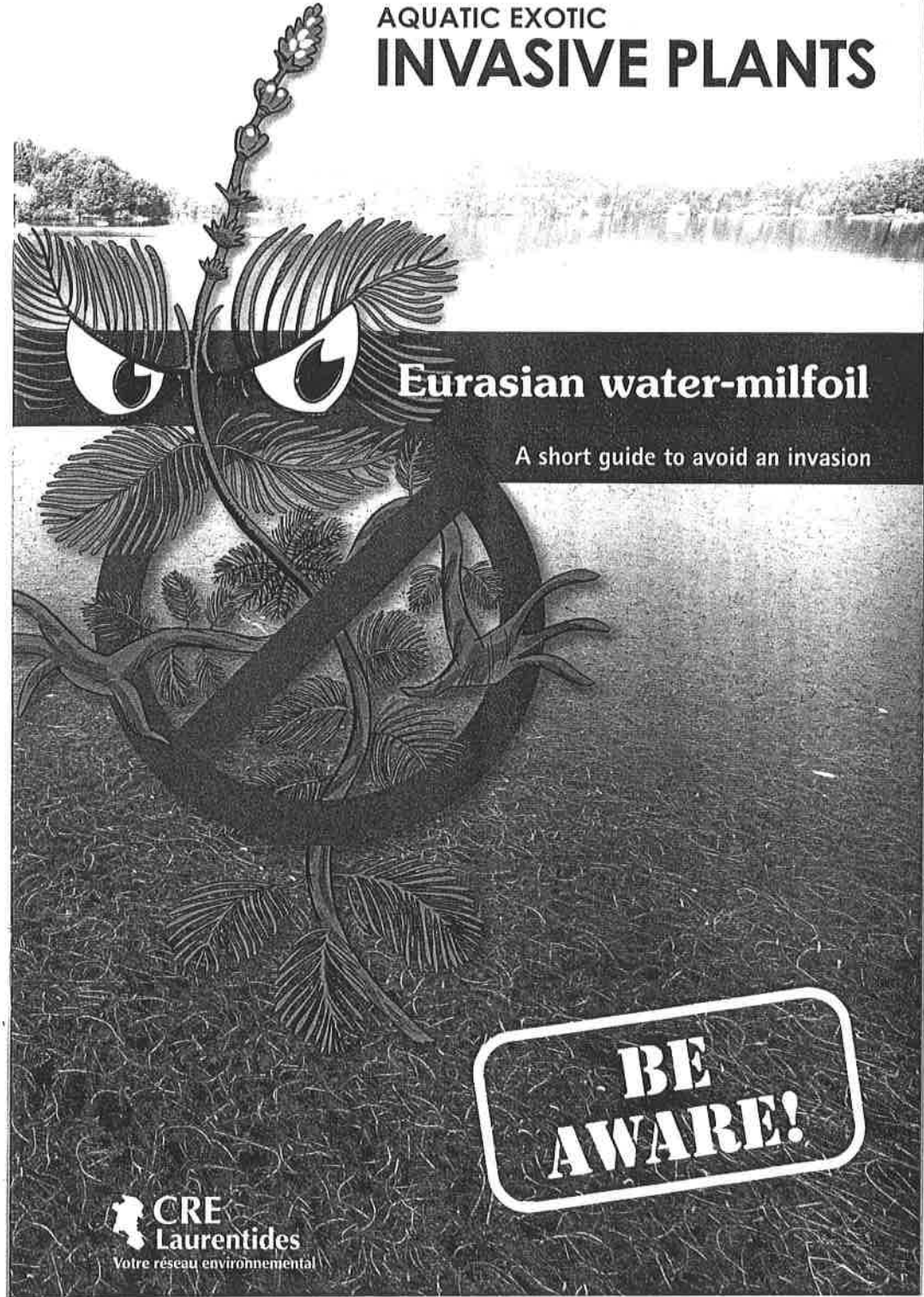


AQUATIC EXOTIC
INVASIVE PLANTS



Eurasian water-milfoil

A short guide to avoid an invasion

**BE
AWARE!**

Plants that invade our waterbodies

A plant is considered exotic when it is found outside of its natural range. The newly colonised environment is often devoid of predators of this foreign plant. This factor combined with other advantages linked to growth and reproduction makes exotic plants ferocious competitors of indigenous plants to the point where they become invasive.

Aquatic exotic invasive plants (AEIP) can represent a serious threat to the environment. They alter the composition of natural ecosystems and disturb local biodiversity. Their proliferation has negative repercussions on the economy and on society, mainly by reducing tourism and the development of cottages. Recreational activities such as fishing, canoeing and swimming can be limited by the infestation of AEIP. The multiplication of AEIP can also affect negatively the value of lakeshore properties.

Controlling and managing AEIP is difficult. Once in place, it is almost impossible to limit their propagation. That is why it is crucial to insure that they do not enter our lakes.

In Quebec, many species of AEIP are present and established in varying levels including European frog-bit (*Hydrocharis morsus-ranae*), yellow floating heart (*Nymphoides peltata*), water chestnut (*Trapa natans*), curly-leaf pondweed (*Potamogeton crispus*) and Eurasian water-milfoil (*Myriophyllum spicatum*).

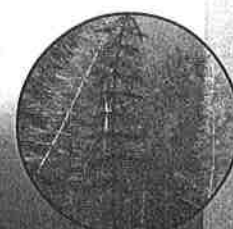


Eurasian water-milfoil, way too fond of our lakes!

Eurasian water-milfoil (*Myriophyllum spicatum*) is a species of AEIP native from Eurasia that is now well established in Quebec. Its progression is in constant evolution. In 2016, in the Laurentians, its presence was signaled in over forty lakes.

This submersed plant forms very dense patches and can take root at depths ranging between 1 and 10 metres; reaching the lake surface at depths of less than 5 metres. Although this polyvalent plant can colonise a wide variety of habitats (lakes, rivers, wetlands, etc.) its maximum growth occurs in transparent lakes that have finely textured, nutrient-rich sediments.

Beside the scarcity of natural predators, Eurasian water-milfoil has yet another asset: it can reproduce by stem fragmentation. Therefore, a small piece of sectioned stem can take root and grow into a whole new plant. These plant fragments can be transported by currents, users of waterbodies and animals.



Don't let Eurasian water-milfoil break loose...

In addition to the six species of indigenous milfoil (*Myriophyllum spp.*) found in Quebec, Eurasian water-milfoil can also be confused with similar species of aquatic plants such as utriculars (*Utricularia spp.*) and hornworts (*Ceratophyllum spp.*).

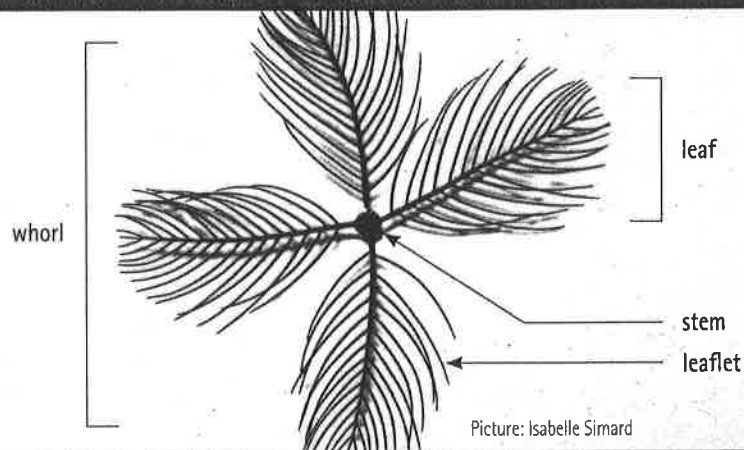
Here are a few hints to help you locate and distinguish Eurasian water-milfoil from similar aquatic indigenous plants.

How to recognise it



GENERAL

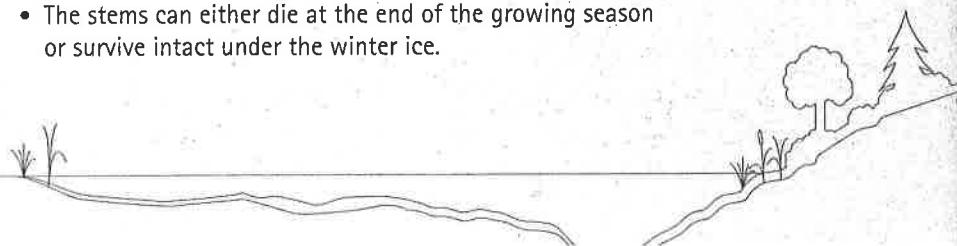
Submersed aquatic plant with small floating spikes often emerging from the lake surface.



Picture: Isabelle Simard

STEMS

- The stems are slender and bend in order to float at the surface of the water.
- They are abundantly branched near the surface and form dense patches of vegetation.
- The space between whorls is greater than 1 cm.
- The stems can either die at the end of the growing season or survive intact under the winter ice.



LEAVES

Leaf arrangement: WHORLED

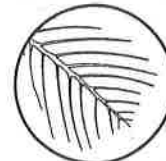
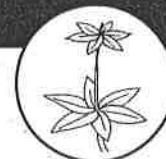
- The whorls are composed of 3 to 6 leaves, though there are commonly 4.

Leaf type: FINELY-DIVIDED

- The leaves are finely-divided and comprised of 12 to 24 pairs of leaflets.
- The tip of the leaves is frequently blunt.

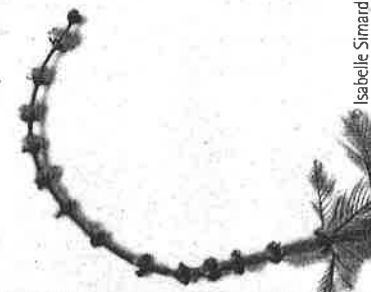
Leaf division pattern: FEATHERY

- The leaves resemble a feather.



FLOWERS

- The flowers are often reddish and are arranged in whorls on the emerging spikes.
- The flower spikes can measure between 5 and 20 cm.
- Certain colonies don't produce flowers.



Isabelle Simard

Identify the intruder!

Species of water-milfoils that are native to Quebec also possess whorled leaves that are finely-divided and feathery. In order to identify and distinguish them from Eurasian water-milfoil, one only needs to count the number of pairs of leaflets on many leaves at different heights of the stem.

Eurasian water-milfoil is comprised of 12 LEAFLETS or more per leaf whereas indigenous plants have generally less than 12 leaflets.



EURASIAN WATER-MILFOIL
12 to 24 pairs of leaflets
Space between whorls > 1 cm

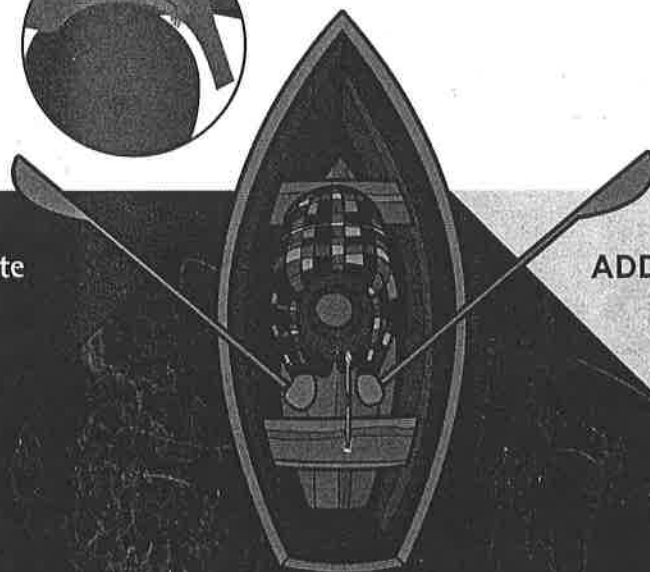
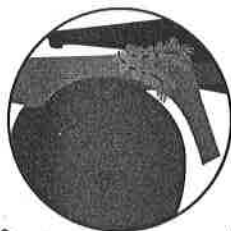
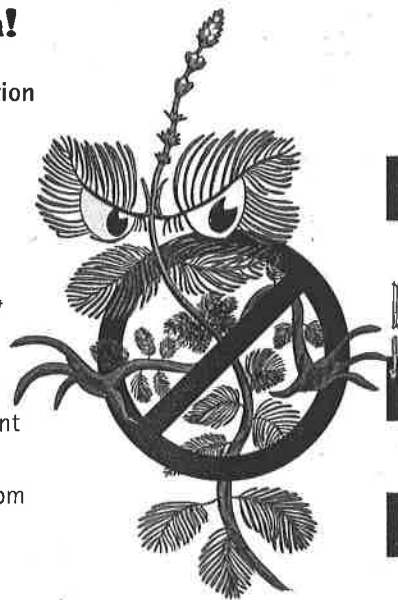


INDIGENOUS WATER-MILFOILS
3 to 14 pairs of leaflets
Space between whorls < 1 cm

Prevention is a better option!

General recommendations to prevent the introduction and propagation of AEIP in waterbodies:

- Use indigenous aquatic plants in water gardens and ornamental gardens.
- Inspect and clean boats and nautical equipment following the guidelines proposed in this booklet.
- Avoid circulating where aquatic plants proliferate.*
- Don't pull out aquatic plants from lakes.*
- Limit sediment and nutrient inputs to waterbodies in order to prevent creating a favorable environment for the growth of aquatic plants.
- Don't release any aquatic organisms originating from a different waterbody.
- Learn to identify the various aquatic plant species.



* Pulling out or cutting plants could aggravate the situation because many of them, such as Eurasian water-milfoil, propagate by fragmentation, which means a plant fragment can grow into a whole new plant.

3 simple steps to avoid the worst!

When leaving a waterbody and before visiting another one:

STEP

1

Inspect the boat, trailer, equipment and material to fully remove all mud, aquatic plants and visible debris before leaving the waterbody. It is important to dispose of them in a place that will prevent their reintroduction into the natural environment.

STEP

2

Empty all water found on the boat, for example in the bait containers, motor, bilge and coolers before leaving the waterbody.

STEP

3

Clean the boat, trailer and equipment that was in contact with water. It is recommended to use a pressure cleaner at a pressure of 2600 psi in order to fully remove all organisms without damaging the boat. The use of cold water is perfectly acceptable. However, the use of hot water at 50°C not only removes all organisms but also kills them.

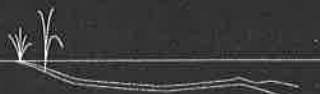
OR

Dry the boat, trailer and equipment for at least five days at a humidity rate of 65% or less before accessing a new lake.

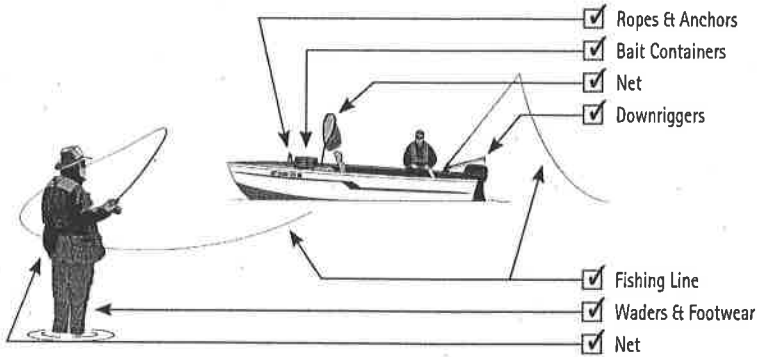
ADDITIONAL INFORMATION

If you clean your boat before accessing a waterbody, it is recommended that you do so at least 30 metres away from any watercourse including streams, ditches and manholes. This will prevent the percolation of soiled water into the waterbody.

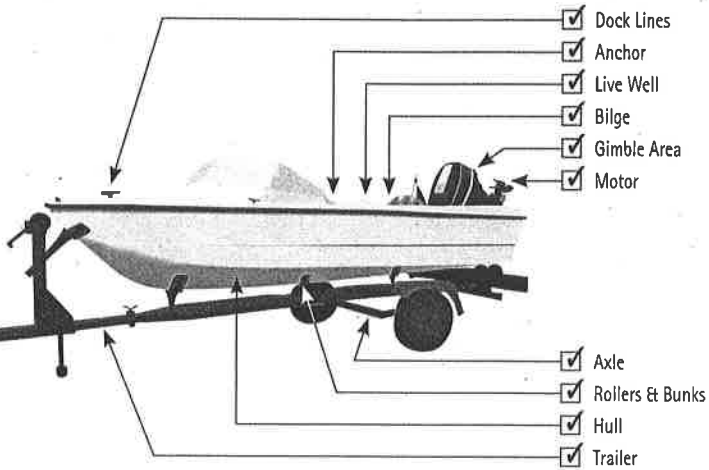
It is preferable to clean the boat on absorbent ground without slope to allow the water to evaporate afterwards.



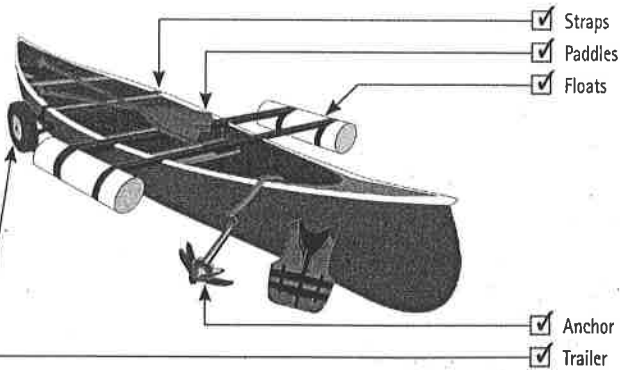
For each use an inspection!



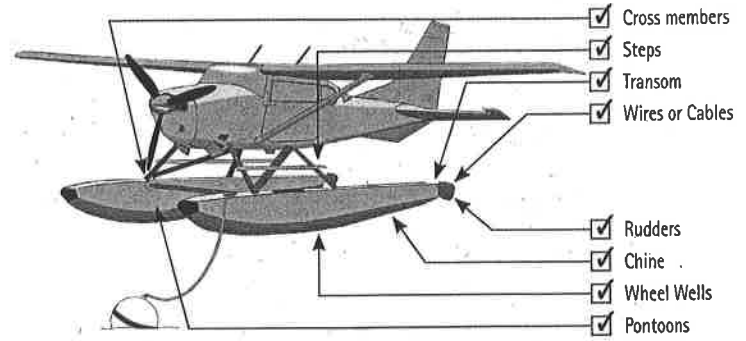
- Ropes & Anchors
- Bait Containers
- Net
- Downriggers
- Fishing Line
- Waders & Footwear
- Net



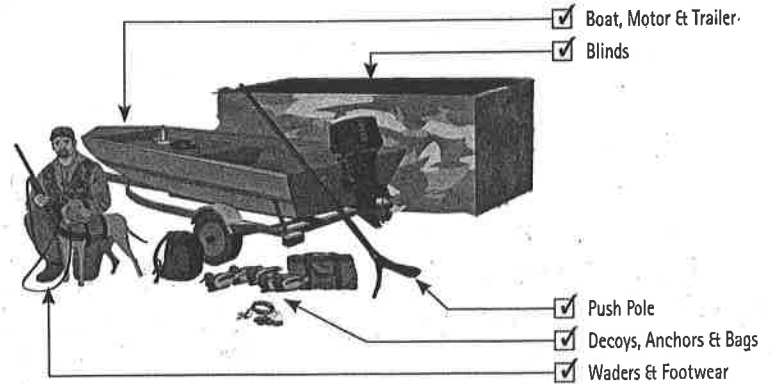
- Dock Lines
- Anchor
- Live Well
- Bilge
- Gimble Area
- Motor
- Axle
- Rollers & Bunks
- Hull
- Trailer



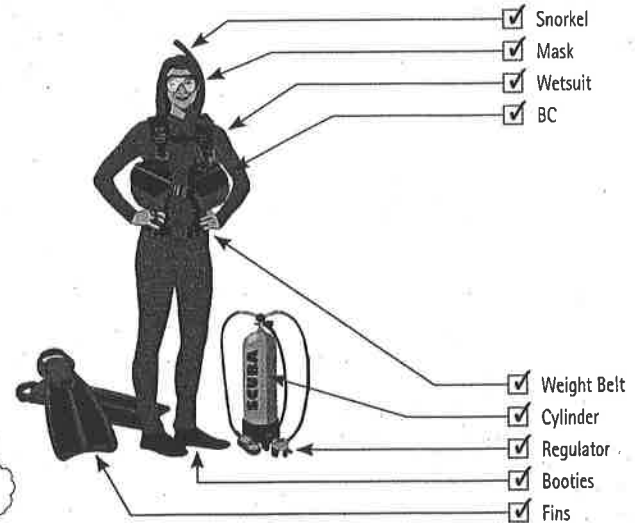
- Straps
- Paddles
- Floats
- Anchor
- Trailer



- Cross members
- Steps
- Transom
- Wires or Cables
- Rudders
- Chine
- Wheel Wells
- Pontoons



- Boat, Motor & Trailer
- Blinds
- Push Pole
- Decoys, Anchors & Bags
- Waders & Footwear



- Snorkel
- Mask
- Wetsuit
- BC
- Weight Belt
- Cylinder
- Regulator
- Booties
- Fins

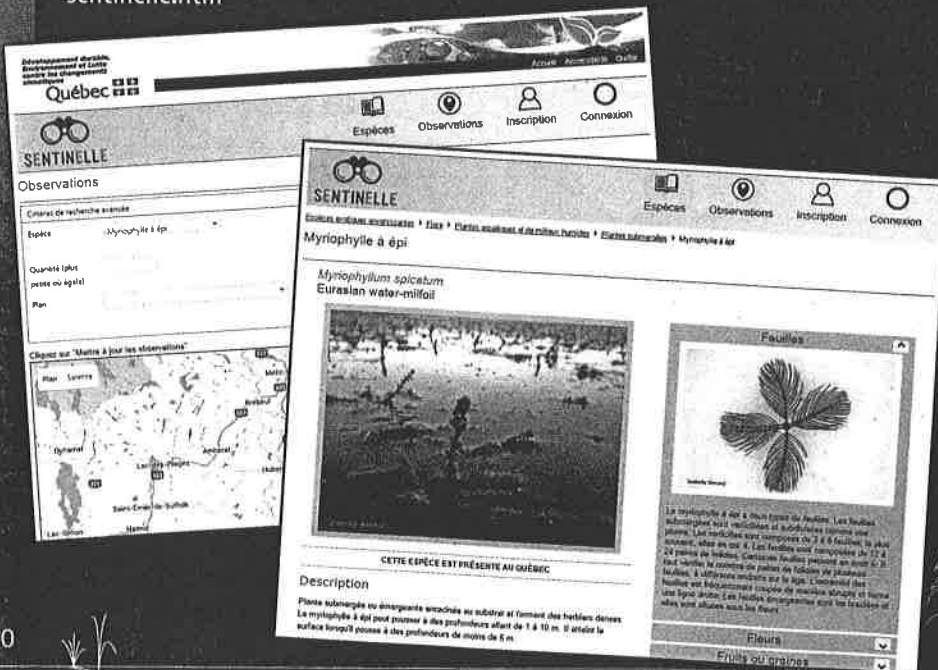


SENTINELLE

You think you have unmasked the impostor? Signal it in Sentinelle!

Sentinelle is a tool used in the detection of exotic invasive species (EIS) that is composed of a mobile application and a mapping system accessible on the Web. Developed by the ministry of the Environment (MDEELCC), this tool allows users to signal the presence of the most preoccupying EIS (animals and plants) and to consult other users' reports. Sentinelle also offers a free guide to identify EIS that are being monitored.

For more information, please consult (in French only):
<http://www.mddecc.gouv.qc.ca/biodiversite/especes-exotiques-envahissantes/sentinelle.htm>



REFERENCES

We thank the Corporation de l'aménagement de la rivière l'Assomption (CARA) for their permission to use certain elements of their guide.

Conseil québécois des espèces exotiques envahissantes. Guide « Surveillez les envahisseurs des milieux aquatiques – Ouvrez l'œil ! ». vecteurs.cqee.org

Conseil régional de l'environnement des Laurentides. Panneau « Propagez le message! Pas les plantes ! ». www.crelaurentides.org

Conseil régional de l'environnement des Laurentides. Fiche sur les plantes aquatiques de la Trousse des lacs. www.troussedeslacs.org

Corporation de l'Aménagement de la Rivière l'Assomption (CARA). Guide « Les plantes exotiques envahissantes... Soyez à l'affût ! ». www.cara.qc.ca/index.jsp?p=73

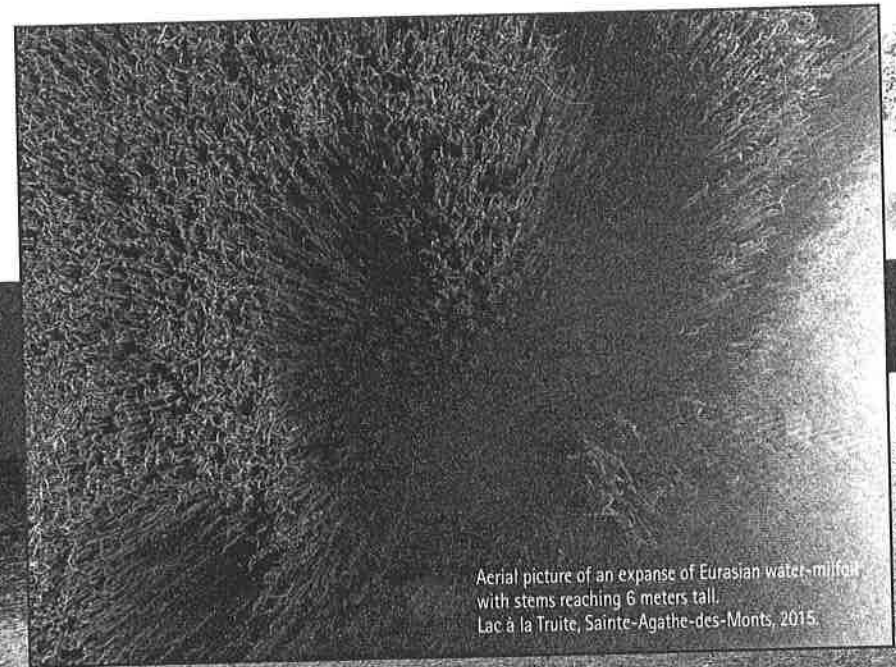
Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDEELCC). Les espèces exotiques envahissantes (EEE). www.mddecc.gouv.qc.ca/biodiversite/especes-exotiques-envahissantes/index.asp

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDEELCC). *Sentinelle* – Outil de détection des espèces exotiques envahissantes – Fiche sur le myriophylle à épi. www.mddecc.gouv.qc.ca/biodiversite/especes-exotiques-envahissantes/sentinelle.htm

Ministère des Forêts, Faune et Parcs (MFFP). Méthodes pour prévenir l'introduction et la propagation d'espèces exotiques envahissantes. www.mffp.gouv.qc.ca/faune/especes/envahissantes/methodes-prevention-controle.jsp

Ministère des Forêts, Faune et Parcs (MFFP). Espèces exotiques envahissantes – 5 étapes pour protéger son lac – Vidéo. www.youtube.com

University of Minnesota Sea Grant Program and U.S. Fish and Wildlife Service. « Go giddy over guidelines for recreational activities ». Présentation réalisée dans le cadre du *18th International Conference on Aquatic Invasive Species*.



Aerial picture of an expanse of Eurasian water-milfoil with stems reaching 6 meters tall.
Lac à la Truite, Sainte-Agathe-des-Monts, 2015.

This guide was created as part of a project to prevent the introduction of AEIP on the territory of MRC d'Argenteuil, which englobes the municipalities of Brownsburg-Chatham, Gore, Grenville, Grenville-sur-la-Rouge, Harrington, Lachute, Mille-Isles, Saint-André-d'Argenteuil and Wentworth.

The electorate and the administrators of Argenteuil have decided to make a priority of the AEIP situation in 2016 with the goal of preventing their introduction in lakes. The CRE Laurentides has been identified as a key partner for the elaboration of an action plan, in which the main objectives are to characterise aquatic plants in Argenteuil's lakes in collaboration with local stakeholders and to organise an awareness campaign among users of the main waterbodies.