

Invasive Species in Manitoba:

River, Lake and Wetland Invaders



**A Pocket Field Guide by the
Invasive Species Council of Manitoba**



Credits:

This 2011 third edition was produced with the support of the Fisheries Enhancement Fund. This guide book was first produced in 2008 as a joint project between the Manitoba Purple Loosestrife Project and the Invasive Species Council of Manitoba.

Thank you to all the photographers for allowing their photos to be used, and particularly Frank Koshere from Wisconsin DNR who personally sent many quality images for the first edition.

The information contained in this guide was obtained from a number of sources including:

Invasive plants of natural habitats in Canada

(www.cws-scf.ec.gc.ca/publications/inv/cont/_e.cfm)

PLANTS Database (plants.usda.gov)

Weeds of Canada – France Royer, Richard Dickinson

Biology of Canadian Weeds (www.cwss-scm.ca/Weeds/index.html)

Global Invasive Species Database(www.issg.org/database/welcome)

Invasive Species Council of Alberta (www.invasiveplants.ab.ca/)

And many more. For a full list of references, contact the ISCM.

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Cover Photo: Common Tansy by Steve Dewey, Utah State University, Bugwood.org and Round Goby by Eric Engbretson, US Fish and Wildlife Service, Bugwood.org



Canada



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What are invasive species or “unwanted invaders”?

Invasive species are plants, animals or other organisms that are growing out of their country or region of origin and are outcompeting or even replacing native organisms. Since they come from ecosystems in other parts of the world, “unwanted invaders” escape their natural enemies. That means they are missing the natural checks and balances that hold them back in their home environments. They have a distinct advantage over our native species whose populations are kept in check by native predators, competitors, or disease.

Why should you care?

Invasive species tend to be aggressive and reproduce at a high rate, often “taking over” entire areas and choking out native plants and animals. This reduces the biodiversity (variety of life) in an area, taking away habitat for wildlife that evolved with native organisms. Invasive species can also become costly crop weeds, impede water flow and quality, and interfere with recreation activities like boating or fishing.

How did they get here?

Invasive species can be introduced or spread through global and regional movement of goods and people via air, rail, water, or roads. They can also spread through their own natural dispersal methods such as using wind and especially water flow. Climate change, with its warming environment may allow less cold tolerant species to spread north and invade new territory.

Invasive species have become a major threat to the world's ecosystems, and Manitoba's lands and waters are no exception. The purpose of this pocket field guide is to raise awareness of some of the unwanted invaders that currently live near rivers, lakes, and wetlands in Manitoba, as well as species that we expect will arrive in the future.

Some invaders, such as purple loosestrife, leafy spurge and common carp are well established and widespread in the province. At this point they are virtually impossible to eradicate in Manitoba and in these cases, we can only work on preventing their further spread. In other cases, we have chosen species for the field guide that are relatively new or not even existent in the province yet, such as Salt cedar, Eurasian watermilfoil, and European frog-bit. In some of these instances, we may be able to contain or ideally, eradicate these newer species. In all cases we must work to limit the spread of all invasive species in Manitoba.

A common myth is that if only a few invasive plants or animals are spotted, there is no reason for concern. However, every sighting of an invasive organism represents the potential for a population explosion that may be expensive, difficult or impossible to reverse. Another misconception is that if an invasive species is well established in one area of the province, that it must be a problem to all regions of Manitoba. This is often not the case, and we need to document established invasive populations to protect the areas that have not been infested.

What can you do?

Prevention, early detection and rapid response are critical for saving habitats from invasive species. You can do your part by reporting any sightings of "unwanted invaders" to the Invasive Species Council of Manitoba at (204) 232-6021, info@invasivespeciesmanitoba.com. or www.invasivespeciesmanitoba.com

Purple Loosestrife

(Lythrum salicaria)

Common Names: Spiked loosestrife, swamp loosestrife

History: Purple loosestrife is native to Eurasia. It was probably first introduced to North America in the early 1800s for ornamental purposes.

Physical Description:

General: A perennial found mostly in wet areas such as riverbanks, wetlands and ditches. Mature plants have upwards of 50 stems per plant, reaching 2 m (7') in height. The stems are square-shaped.

Leaves: Opposite leaf arrangement of dark-green lance-shaped leaves.

Flowers and Fruit: Showy purple flowers arranged in a spike at the end of each stem bloom from July to September. Fruit is a small capsule containing over 100 seeds. Purple loosestrife is highly prolific and can produce up to 2 million seeds per year from a single plant.

Threat: The impact of purple loosestrife is severe in the form of a loss of native flora and fauna in infested wetlands, degradation of wetland habitats and the clogging of irrigation systems.

Distribution: Purple loosestrife is found throughout southern Manitoba. Do not include purple loosestrife in ornamental plantings. Report sightings to the ICSM.



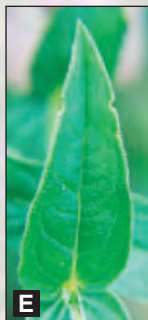
[A] A close-up of flowers.
[B] Square stem cross section.



[C] Purple loosestrife plant with multiple stems.



[D] Infestation of purple loosestrife. **[E]** Close-up of leaf.



Photos: **[A]** F. Koshere, WI-DNR **[B]** H. Catton, MB Purple Loosestrife Project **[C]** S. Dewey, Utah State University, Bugwood.org **[D]** MB Purple Loosestrife Project **[E]** G.H.S. USFW

Leafy Spurge (*Euphorbia esula*)

Common Names: Wolf's-milk

History: Leafy spurge is native to Europe. It was introduced to North America from ships or as a seed contaminant in the early 1800s.

Physical Description:

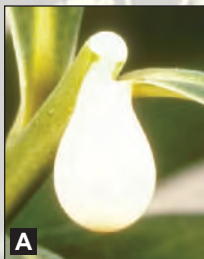
General: A deeply rooted, erect perennial that grows from 40-90 cm (15-36") tall. Stems are pale green, hairless, tough, and smooth. A milky white sap is secreted from all parts of the plant when damaged. Spreads rapidly by seed production and vegetative reproduction.

Leaves: Numerous smooth narrow green leaves 2-7.5 cm ($\frac{3}{4}$ - 3") long are found along the stems.

Flowers and Fruit: Flowers are not prominent and are found at the tips of the stems. They are arranged in numerous small clusters surrounded by green to yellow heart-shaped bracts (modified leaves). Flowers appear from May to July. Fruit is a 3-seeded capsule that explodes upon ripening and hurls seeds up to 5 m (16') from the plant.

Threat: Leafy spurge is capable of dominating habitats. All parts of the plant contain poisonous latex sap capable of killing cattle and causing skin problems in humans and livestock.

Distribution: Leafy spurge is very problematic in Manitoba, and is especially concentrated in the southwest part of the province. Check vehicles, livestock, forage and seed stock for leafy spurge seeds and plants. Report sightings to the ISCM.



[A] Milky latex sap found in all parts of the plant.

[B] Flea beetle feeding on leafy spurge, view of flower.

[C] View of whole plant.

[D] An area infested with leafy spurge.

Photos: [A] N. E. Rees, USDA Agricultural Research Service [B] USDA APHIS PPQ Archive [C] W. M. Ciesla, Forest Health Management International, Bugwood.org [D] M. Ammeter, Macdonald Weed District



Nodding Thistle

(*Carduus nutans*)

Common Names: Nodding thistle, musk thistle

History: Originally from southern Europe and western Asia, it was first introduced to Canada in the mid 1800s as an ornamental plant.

Physical Description:

General: Biennial taproot thistle that grows 30-180 cm (1-6 ft) tall. Typically forms a rosette in first year of growth.

Leaves: The leaves are alternate and deeply lobed with wavy, spiny edges. Spines cover all portions of the stem except below the flower head.

Flowers and Fruit: Flowers from June to October. Reddish-purple flowers are clustered in a single head, 2.5 to 5 cm (1-2 in) across, at the ends of branches. The flower head bracts have a sharp, spiny tip. When mature they become heavy and flop, therefore giving the name "Nodding Thistle". Fruit are straw-colored achenes (1-seeded capsule) and adorned with feathery bristles.

Threat: Nodding thistle is an aggressive species that forms extremely dense stands. It crowds out native plants and decreases productivity of rangeland and pastures.

Distribution: This plant has spread from North Dakota into the Pembina Valley region of Manitoba.

Please report any sightings to ISCM, as a containment plan is being developed.



- [A]** A flower head. **[B]** Nodding Thistle infesting field.
[C] Close up of the prickly leaves and stem.
[D] Close-up of the plant structure.

Photos: **[A]** John M. Randall, The Nature Conservancy, Bugwood.org
[B] Loke T. Kok, Virginia Polytechnic Institute and State University, Bugwood.org
[C] L. L. Berry, Bugwood.org
[D] USDA PLANTS Database, USDA NRCS PLANTS Database, Bugwood.org



Flowering Rush

(*Butomus umbellatus*)

Common Names: Grass rush, grassy rush, water gladiolus

History: This exotic was brought to North America in the late 1800s from Africa and Eurasia for use in gardens.

Physical Description:

General: A moderately tall, rush-like perennial with green stems that are triangular in cross section. It has an extensive root system. New plants will grow from disturbed roots.

Leaves: Along the shore, erect leaves grow to about 1 m (3') in height and may be spirally twisted. Under water, the leaves are limp and floating. Leaves originate from the base of the plant.

Flowers and Fruit: Produces an umbrella-like flower head on a leafless flower stalk 1 to 1.5 m (40 - 60") tall. Each of the many individual flowers is 2-3 cm ($\frac{3}{4}$ - $1\frac{1}{4}$ ") across, pink to white and blooms from June to August. The fruit is many-seeded and dry.

Threat: This plant forms dense stands which may interfere with recreational lake use, crowd out native plants and harm fish and other wildlife.

Distribution: Flowering rush is in Manitoba and can be found across most of Canada. It reproduces by seed production and vegetative spread of its root-stocks (bulblets) and both can be moved by water currents. Report sightings to the ISCM.



[A] Stalk, flowers and leaves of flowering rush. **[B]** Close-up of flower. **[C]** Close-up of the umbrella-like flower head with an infestation in the background.

Photos: [A] Å. Park [B] C. Fischer [C] G. Hnatiuk



Himalayan Balsam

(*Impatiens glandulifera*)

Common Names: Ornamental jewelweed, Indian balsam, policeman's helmet, poor man's orchid

History: Originally from the western Himalayas, this plant is thought to have been introduced by foreign ships or from ornamental escapes.

Physical Description:

General: An annual herb that is succulent, smooth and hairless; ranges from 0.6-3 m (2-10') tall with upright, hollow, branching stems with a purplish hue.

Leaves: The leaf arrangement can be opposite or whorled, with (usually) three leaves arising from the same point on the stem. The leaves are oblong to egg shaped, about 15 cm (6") long and 7.5 cm (3") wide with saw-toothed edges.

Flowers and Fruit: Several white to pink to reddish-purple flowers are borne on an elongated stalk. The flowers have 5 petals (2 fused) and 3 sepals (2 fused). The fruit is a five chambered capsule and when touched it explodes and ejects up to 800 seeds.

Threat: Himalayan balsam ejects seeds into rivers and streams which spread far and fast to new locations. Infestations are also spread quickly by mowing. Once established, this tall plant is very competitive and has been known to regularly suffocate native vegetation.

Distribution: Is currently found in Manitoba. Avoid purchasing and planting Himalayan balsam to prevent further spread. Report sightings to the ISCM.

[A] Top portion of the plant including flowers and leaves.

[B] Flower.

[C] Height comparison.

[D] Leaf. **[E]** Whole

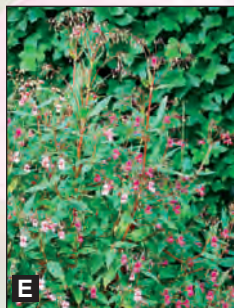
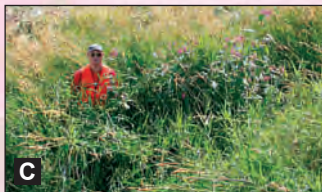
plant. **[F]** Stem node.

[A] B. Tokarska-Guzik,
University of Silesia,
Bugwood.org

[B] [E] A. Karwath

[C] [F] M. Shephard, USDA
Forest Service, Bugwood.org

[D] T. Heutte, USDA Forest
Service



European Buckthorn

(*Rhamnus cathartica*)

Common Names: Common buckthorn, buckthorn

History: A native of Eurasia, European buckthorn was introduced to North America as an ornamental shrub, for fence rows and for wildlife habitat.

Physical Description:

General: A large shrub to 6 m (20') tall tree. The outer bark is dark with small pores (lenticels) and the inner bark is orange. It usually has a stout thorn at the end of the twigs. Substances in the bark, leaves, and berries have a strong laxative effect if eaten.

Leaves: The leaves are in pairs, but not exactly opposite. Leaves are dark green, elliptic to ovate, 3.5-7.5 cm (1¼ -3") long with slightly serrated edges and curving veins. Leaves come out early in spring and stay until late fall, extending its growing season.

Flowers and Fruit: Flowers are small, greenish to yellowish, short-stalked and in small clusters. Female trees produce many small blue to black berry-like fruit that each contain four seeds.

Threat: This plant is able to successfully invade habitats because of its tolerance of a wide range of moisture and light conditions, and its prolific seed production. The dense shade produced by stands often reduces biodiversity in a habitat. Thorns can be harmful to humans or animals that come into contact.

Distribution: This plant is found in Manitoba and is a large problem in natural areas within Winnipeg. Avoiding buying and planting this species to prevent further spread.



Quick Fact: It has been suggested that European buckthorn may be allelopathic, meaning it may produce substances that inhibit the growth of surrounding plants!

[A] Stand of buckthorn.
[B] Close-up of leaf.
[C] The bark of an old and young tree.
[D] Berries & leaves.
[E] Leaves, thorns and twigs in late autumn.

Photos:

[A] [B] J. Dupont, Manitoba Naturalists Society

[C] [D] [E] H. Fabbri, City of Winnipeg Naturalist Services Branch

Common Tansy (*Tanacetum vulgare*)

Common Names: Common tansy, bitter buttons, cow bitter, mugwort, golden buttons, stinking willie, scented fern, arbor vitae

History: Introduced from Europe in the 1600s and has a long history of use in horticulture and medicine. Circa 1525 it was listed (under the spelling “Tansey”) as “necessary for a garden” in Britain.

Physical Description:

General: A perennial plant that can reach heights of 1.5 m (5 ft). Stems are purple-red color, branched and covered with glands.

Leaves: The leaves alternate on the stem and are divided into many slender leaflets with smooth edges. Strongly aromatic when crushed.

Flowers and Fruit: Individual flowers are bright yellow, look like a button, and occur in clusters at the top of the stem. The fruit is a tiny achene (1-seeded capsule) dotted with glands.

Threat: Forms thick stands which displace native vegetation and reduce productivity of pastures for livestock. Tansy contains alkaloids that are toxic to both humans and livestock if eaten or absorbed through the skin.

Distribution: Common tansy is found in Manitoba and throughout Canada in pastures, roadsides, river banks, abandoned fields and natural areas. Designated a noxious weed in many parts of North America, do not use this species in ornamental plantings. Tansy infests river valleys heavily in some areas of the Prairies.

Please report any sightings to ISCM.



[A] Tansy flower and leaves.

[B] Close-up of leaves growing in gravel.

[C] Stalk, flower and leaves.

[D] Infestation in a field.



Photos:

[A] Steve Dewey, Utah State University, Bugwood.org

[B] Richard Old, XID Services, Inc., Bugwood.org

[C] Michael Shephard, USDA Forest Services, Bugwood.org

[D] Steve Dewey, Utah State University, Bugwood.org

Common Burdock

(*Arctium minus*)

Common Names: Bardane, beggar's button, lesser burdock, wild rhubarb, cockle button, hurr-burr

History: Common burdock is native to Europe and came to North America via an accidental introduction. It was first reported in North America in 1638.

Physical Description:

General: A tall biennial herb. Stems are erect, coarse, branched and thick, have a reddish tinge and may be grooved or angular. It can grow 1-2 m (3-6') tall.

Leaves: First year plants form large rosettes, then a stout flowering stalk is formed in the second year. Leaves are large, heart-shaped, and very hairy on the undersides, lower leaves are up to 50 cm (18") long. Stalk leaves are alternate and broadest at the base of the stalk. Leaf edges are wavy or toothed.

Flowers and Fruit: Flowers are pink to purple and borne in short-stalked clusters along the stems. Spiny, hooked modified leaves surround the florets. Flower heads are 20-25 mm ($\frac{3}{4}$ -1") wide and bloom from July to October. Fruit is a round, bristly, 10-20 mm ($\frac{1}{2}$ - $\frac{3}{4}$ ") wide clinging bur.

Threat: Burs can bother and lower the health and market value of livestock. Its large leaves can shade out smaller plants. It also acts as a secondary host for pathogens that affect economically important plants.

Distribution: Burdock is widespread in Manitoba. Prevent new invasions by ensuring burs are not attached to clothes, pets and vehicles when leaving infested areas.



Did you know? The clinging burs of common burdock were the inspiration for Velcro.

Photos: [A] A plant in its second year with a flower stalk. [B] A close-up of the flowers. [C] A close-up of the leaf. [D] Mature burs. [E] A young burdock plant in rosette form.



Photos: [A] [B] [C] M.E. Harte, Bugwood.org [D] Ohio State Weed Lab Archive, Ohio State University, Bugwood.org [E] J. Dupont, Manitoba Naturalists Society

Yellow Flag Iris

(*Iris pseudacorus*)

Common Names: Pale-yellow iris, water flag, yellow flag, yellow iris, yellow water flag, yellow water iris

History: Native to Eurasia and northern Africa. Yellow flag iris was introduced to North America for ornamental purposes, for erosion control or to remove metals in sewage treatment plants, as it is effective at removing nutrients and trapping sediments.

Physical Description:

General: A herbaceous perennial growing to a height of 40 -150 cm (1½ - 4'). The roots are pink fleshed, and 1 - 4 cm (½ - 1½") in diameter.

Leaves: The distinct broad, sword-shaped leaves are stiff, erect, and green with hint of greyish-blue. The leaves are 50 -100 cm (20 - 40") long and 10 - 30 mm (½ - 1¼") wide. Leaves have a central ridge on both their topsides and undersides.

Flowers and Fruit: Each stem has several white or yellow flowers blooming from April to June. The flowers are 8 -10 cm (3 - 4") in diameter. The fruit is dry, egg-shaped, and contains around 120 seeds.

Threat: Yellow flag iris colonizes in large numbers, forming very dense stands. It outcompetes other plants, displacing native species and altering habitat for animals. All parts of the plant are poisonous.

Distribution: Yellow flag iris has been reported in Manitoba. It spreads through the break up of roots or from seeds produced in abundance. The seeds float and can be dispersed over long distances by water.



[A] View of the whole plant, and the distinctive leaves. **[B]** Close-up view of flowers. **[C]** Leaves, stems and flowers of yellow flag iris. **[D]** Infestation along a bank.



Photos: **[A]** N. Loewenstein, Auburn University, Bugwood.org
[B] **[C]** **[D]** F. Koshere, WIS-DNR

Curly Leaf Pondweed (*Potamogeton crispus*)

Common Names: Curly pondweed

History: Curly leaf pondweed is native to Eurasia and was introduced into the USA in the mid 1800s.

Physical Description:

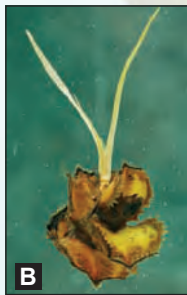
General: Curly leaf pondweed is a perennial and has long, flat and slender underground stems that are red or buff coloured.

Leaves: Leaves are submersed, stalkless and slender, 3-8 cm (1-3") long and 5-12 mm ($\frac{3}{8}$ - $\frac{1}{2}$ ") wide. The leaf tip is often rounded, and leaf edges are finely toothed and ruffled (like a lasagna noodle). Turions (buds) form during the warm months and consist of 3-7 thickened leaves that project from the stem.

Flowers and Fruit: Inconspicuous white to brown flowers are borne on a short spike that extends above the surface of the water. Fruits are flat, small and have a distinct, pointed beak that is erect or somewhat curved.

Threat: Dense colonies of curly leaf pondweed can restrict access to docks and fishing areas during spring and early summer months. It can grow in dense beds and outcompete native aquatic plants.

Distribution: Curly leaf pondweed has been reported in Manitoba. This plant has been spread across much of North America by waterfowl, intentional planting and recreational activities. Report sightings to the ISCM immediately.

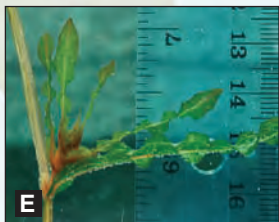


[A] Infestation of curly leaf pondweed. **[B]** A turion beginning to sprout. **[C]** Close-up view of the lasagna-noodle-like edge of the leaf.



[D] Flower spike. **[E]** Formation of a turion.

Photos: F. Koshere, WI-DNR



Spiny Water Flea

(*Bythotrephes longimanus*)

Common Names: Spiny water flea

History: Originally from Eurasia, Spiny Water Flea is a zooplankton species (microscopic animal) that was introduced to North America in 1982 through the ballast water of ocean-going ships.

Physical Description:

General: Adults are 1 to 1.5 cm (0.4 to 0.6 in) long and have a long tail with barb-like hooks. They are commonly found in clumps in the water that look like gelatin or cotton-batting with tiny, black spots. They can attach to fishing lines or fishing gear.

Threat: Reproduces quickly and not readily eaten by native small fish species because of their long, barbed tail. They reduce the abundance of native zooplankton such as *Daphnia*, which are an important food source for native fish. Adults and eggs can be easily transported through the bilge water, bait buckets and livewells. Their eggs are resistant to drying and freezing, thus it is easy to unknowingly introduce this invader to new, un-infested areas. They are a nuisance to fishers because clumps of Spiny Water Flea can attach to fishing line, downrigger cables, ropes and nets, and can clog fishing-rod eyelets preventing the landing of fish.

Distribution: Spiny Water Flea prefers cold, deepwater lakes. It was first found in North America in Lake Ontario in 1982 and is now found throughout the Laurentian Great Lakes. Spiny Water Flea has been found in the Lake of the Woods, Ontario as well as the Winnipeg River in Manitoba.

**A****C**

[A] Spiny Water Flea on fishing line.

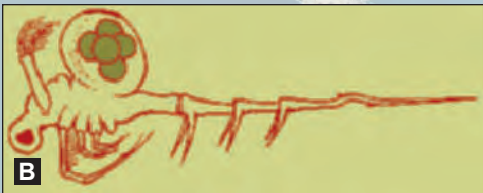
[B] Spiny Water Flea eggs are first carried in spheres on female.

[C] Spiny Water Flea tail can be seen that propel them in water.

Photos: [A] Jeff Gunderson, Minnesota Sea Grant

[B] <http://www.seagrant.umn.edu/exotics/spiny.html>

[C] J. Lindgren, MN DNR. Global Invasive Species Database, www.iisgcp.org/EXOTICSP

**B**

Reed Canary Grass

(*Phalaris arundinacea*)

Common Names: Gardener's-garters, Reed canary grass, ribbon grass, variegated grass

History: Reed canary grass is native to North America, but it has also been widely introduced in the form of European cultivars for hay and forage. The native type has hybridized with introduced variations. There are no clear characteristics to differentiate between the native and introduced plants.

Physical Description:

General: A long lived perennial, 0.6-3 m (2-8') tall; the stem is hairless, waxy and stands erect. The grass forms a thick creeping root system that quickly dominates the soil and produces new stems.

Leaves: Rough-textured, tapering leaves are flat, 0.2-2 cm ($\frac{1}{8}$ - $\frac{3}{4}$ ") wide and up to 0.5 m (20") long.

Flowers and Fruit: Produces a compact flower head (panicle) that is usually between 7-20 cm (3-8") in length. Immature panicles are compact and resemble spikes, but they open and become slightly spreading. The flowers are green to purple early in the season and change to a straw colour over time.

Threat: Reed canary grass forms dense, persistent stands in wetlands, meadows, and riverbanks. These stands exclude and displace desirable native plants and animals and clog waterways and irrigation canals because they promote silt deposition.

Distribution: Reed canary grass is found widely throughout Manitoba.

**A****B**

Quick Fact: When in flower, this species produces abundant pollen which aggravates hay fever and allergies.

[A] Mature panicle.

[B] Flowering reed canary grass. **[C]** Field of reed canary grass.

[D] Immature panicle.

**C****D**

Photos: [A] C. Evans, River to River CWMA, Bugwood.org
 [B] T. Heutte, USDA Forest Service, Bugwood.org [C] [D] J. Nielsen, University of Alaska Fairbanks, Cooperative Extension Service, Bugwood.org

Invasive Phragmites

(*Phragmites australis* subsp. *australis*)

Common Names: Ditch reed, giant reed, yellow cane

History: *Phragmites* is native to North America. However, there is a non-native subspecies that was accidentally introduced in the 1700s from Europe. It established on the Atlantic coast and has since spread across areas of North America.

Physical Description:

General: Tall, semi-aquatic perennial grass that can grow to heights of 4.6 m (15 ft) or more forming dense monocultures. Commonly confused with native *Phragmites*.

Leaves: Blue-green leaves are 1-4 cm (1-1.5 in) wide and 75cm (30 in) long. Unlike native *Phragmites*, leaf sheaths remain attached and are difficult to remove. The plant remains green and growing when all the native plants have already died-back for the winter.

Flowers and Fruit: Characteristic, dark brown to black flowering head with dense seed clusters up to 40 cm (16 in) long. Flowering occurs from August to mid-October long after native *Phragmites* has already died-back for the winter and is dry, brittle and golden-brown.

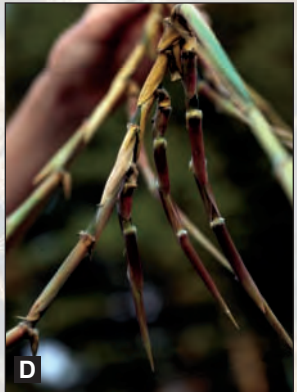
Threat: Plants form thick stands which out-compete native plants, alters habitat for wildlife, changes nutrient cycling, and impacts hydrology.

Distribution: Native *Phragmites* has a nearly worldwide distribution. The non-native subspecies is now found in areas throughout the United States and Canada, preferring disturbed wetland areas. Recently, a number of stands were discovered in Winnipeg and the surrounding area.

Please report any sightings to ISCM.

**A****B**

[A] Mature panicle. **[B]** Showing the possible height of Phragmites. **[C]** “Dark” look of immature panicle. **[D]** Rhizomes of Phragmites.

**C****D**

Photos: **[A]** Richard Old, XID Services, Inc., Bugwood.org
[B] James Miller, USDA Forest Service, Bugwood.org
[C] Ohio State Weed Lab Archive, The Ohio State University, Bugwood.org
[D] Ohio State Weed Lab Archive, The Ohio State University, Bugwood.org

European Frog-bit

(*Hydrocharis morsus-ranae*)

Common Names: Frog-bit, frog's-bit

History: European frog-bit escaped from an ornamental planting in the Ottawa area in the 1930s.

Physical Description:

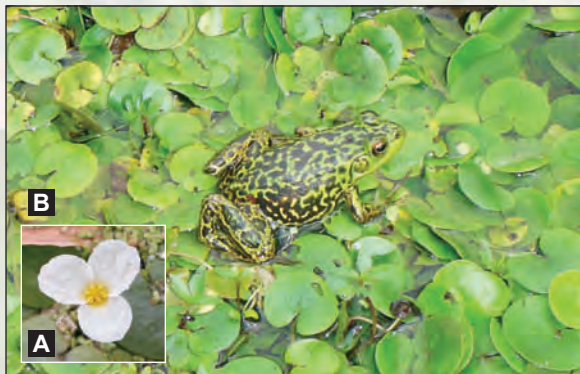
General: A free-floating aquatic plant that can reach 20 cm (8") in length. It lives in calm open waters like marshes and ditches. The well-developed root system tangles among other vegetation to form dense masses instead of rooting to the bottom.

Leaves: The leaves of this plant are usually floating and are leathery, hairless, circular to heart shaped and measure 1-6 cm ($\frac{1}{2}$ - $2\frac{1}{2}$ ") in length. Leaves are green, with the underside often dark purple.

Flowers and Fruit: Small white flowers with three petals open just above the water surface. Frog-bit reproduces primarily vegetatively from its horizontal stems. It also produces winter buds (turions).

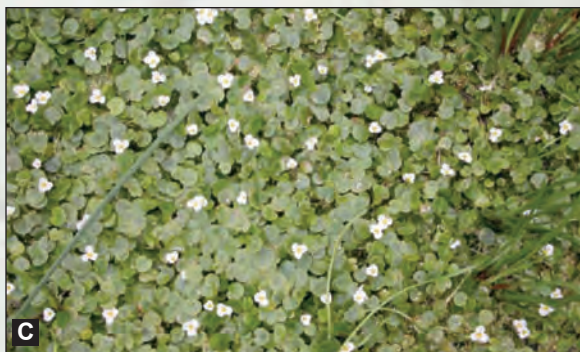
Threat: Dense floating mats of vegetation restrict available light, dissolved gases, and nutrients to the underwater community. European frog-bit displaces native plants and causes dramatic declines in habitat for native aquatic animals.

Distribution: European frog-bit is currently not in Manitoba. The nearest known infestation is in the Great Lakes, however recreational activities, migrating waterfowl, and any other means of lake to lake dispersal can allow it to spread. Report any sightings to the ISCM immediately.



[A] The flower of European frog-bit. **[B]** A frog resting on water infested with European frog-bit.
[C] Infestation of European frog-bit.

Photos: [A] [C] S. J. Darbyshire, Canadian Weed Science Society - Société canadienne de malherbologie (<http://www.cwss-scm.ca>)
[B] C. Savage, Environment Canada



Eurasian Watermilfoil

(*Myriophyllum spicatum*)

Common Names: Spiked water-milfoil

History: Eurasian watermilfoil is native to Europe, Asia, and northern Africa. Eurasian watermilfoil was initially introduced to North America in the Chesapeake Bay area in the early 1900s.

Physical Description:

General: A submersed aquatic perennial herb that reproduces primarily by vegetative fragmentation. It grows in water from 0.5-10 m (1½ - 33') deep. Plants root at the bottom of the water body and grow towards the surface, forming a dense canopy.

Leaves: The leaves are deeply divided, soft and feather-like, about 5 cm (2") long and are arranged in whorls of 3-6 leaves about the stem. There are 12 or more leaf segments on each side. Growing tips are often red.

Flowers: Reddish and very small. They are held above the water on an immersed flower spike.

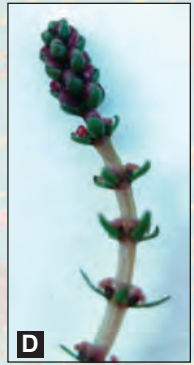
Threat: Dense growth can displace native plant species, impact fish spawning, and impede human use of water bodies for recreation and reservoir purposes.

Distribution: Eurasian watermilfoil is not yet reported in Manitoba, but it is in neighbouring provinces and states. Check boats and other equipment for fragments of the plant to avoid spreading it between lakes. Report sightings to the ISCM immediately.



[A] Close-up view of leaflets.

[B] Top of plant and leaves. **[C]** Dense mat of Eurasian watermilfoil. **[D]** Close-up of flowering spike.



Photos: **[A]** **[C]** F. Koshere, WIS-DNR **[B]** R.H. Mohlenbrock, USDA NRCS PLANTS Database, Bugwood.org **[D]** Maryland DNR - www.dnr.maryland.gov

Salt Cedar

(*Tamarix* spp.)

Common Names: Saltcedar, Tamarisk, Tamarix

History: Salt cedar is native to Eurasia and Africa and was introduced into the western USA as an ornamental in the early 1800s.

Physical Description:

General: Most salt cedars are deciduous shrubs or small trees growing to 4.5 m (15') in height and forming dense thickets. A few species can grow into large trees.

Bark: The bark of young branches is smooth and reddish-brown; becoming furrowed and purplish-brown with age.

Leaves: Leaves are scale-like, bluish-green, very small and overlap each other along the stem.

Flowers and Fruit: Flowers are pink to white with 5 petals. They are in dense masses on 2-5 cm ($\frac{3}{4}$ -2") long spikes at the end of twigs. Fruit are capsules, 3-5 cm (1-2") long, and split on maturity.

Threat: Salt cedar invades streambanks, lake shores and wetlands. It crowds out native species, creates deposits of salt, reduces water tables and drains wetlands with its high water usage. This plant can interfere with the water cycle and increase the frequency, intensity and effect of fires and floods.

Distribution: Salt cedar is not currently naturalized in Manitoba, although it has been reported in North Dakota. Prevent spread by avoiding it in ornamental plantings and report sightings to the ISCM.



[A] A salt cedar bush in flower.

[B] Close-up view of flowers.

[C] Close-up view of leaves.



Quick Fact:

Several species of *Tamarix* are considered invasive in North America and distinguishing them can often be difficult.

T. ramosissima is one of the most invasive types. Another, *T. parviflora* is similar in appearance, but has flowers with 4 petals instead of 5.



Hydrilla

(*Hydrilla verticillata*)

Common Names: Hydrilla, Florida elodea, water thyme, Indian star-vine

History: Hydrilla is native to parts of Asia, Africa and Australia. It is thought to have been introduced into North America through the aquarium trade in Florida in the 1960s.

Physical Description:

General: Hydrilla is a submersed, rooted aquatic plant that can grow from depths of 6 m (20') or more. Its appearance can vary considerably depending upon growing conditions.

Leaves: Leaves are whorled in bunches of 3-8. Their midribs are reddish in colour and the leaf edges are slightly toothed. Leaf colour varies from green to brown. Tubers grow from the roots; winter buds (turions) are produced in the leaf axils.

Flowers and Fruit: Tiny, translucent to white flowers are produced on the upper branches in late summer and fall.

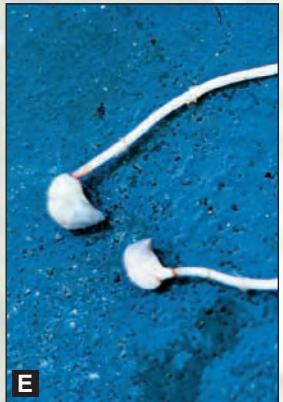
Threat: Hydrilla crowds out native plants by shading them and outcompeting them for nutrients. Its dense masses interfere with recreational activities such as boating, fishing and swimming.

Distribution: Hydrilla is not yet found in Manitoba, but it is expanding its range northward and along both coasts of the USA. Hydrilla can be dispersed by flowing water, waterfowl and recreational activities and is unfortunately often sold as an aquarium plant. Report sightings to the ISCM immediately.



[A] Infestation of Hydrilla. **[B]** Hydrilla tangled on a boat motor. **[C]** View of a Hydrilla plant. **[D]** Serrated leaves. **[E]** Turions at the end of stems.

Photos: **[A]** D. J. Moorhead, University of Georgia, Bugwood.org
[B] W. Robles, Mississippi State University, Bugwood.org
[C] C. Evans, River to River CWMA, Bugwood.org
[D] J. H. Rodgers **[E]** USDA ARS Archive



Dutch Elm Disease

(*Ophiostoma* spp.)

Common Names: Ophiostoma, DED

History: First found in North America in Ohio prior to 1930, DED is thought to have been introduced from diseased elm logs from Europe. It has since spread throughout almost the entire North American range of elms. The disease was first found in Manitoba in 1975.

General: DED is caused by a fungus and spread by elm bark beetles and root grafting between elm trees. Host trees include all the elms native to North America and Europe such as the American Elm.

Symptoms: Infected trees show symptoms ranging from curling, wilting and yellowing of leaves on one or more branches, to a rapid death of the entire tree. Frequently, by the time first symptoms are noted, the fungus has already done lethal damage.

Threat: Once the fungus is established within a tree, it spreads rapidly in water conducting vessels in the roots, trunk and branches. The tree forms gums within these vessels in response to the fungus. This blocks water movement in the tree and causes it to wilt and eventually die.

Distribution: DED is found throughout North America and is a major problem in Manitoba. You can help to limit spread by ensuring all dead elm trees are cut down and properly disposed of, not using or transporting elm firewood, and avoiding pruning your elm trees between April 1 and July 31. For suspected DED trees within Winnipeg call (204) 986-7623, for all other areas call the Provincial Tree Line (204) 945-7866.



[A] Close-up of the American elm bark beetle. **[B]** Close-up of the smaller European elm bark beetle.

Photos: J.R. Baker & S.B. Bambara, North Carolina State University, Bugwood.org

How does DED spread? DED is spread both by specialized bark beetles and through root systems. The main species of beetles responsible for carrying the fungus are the American elm bark beetle (*Hylurgopinus rufipes*) and the introduced smaller European beetle (*Scolytus multistriatus*). These beetles, 2-3 mm ($\frac{1}{8}$ ") long, breed in stressed or recently killed elms. They lay eggs under the bark that hatch into larvae. Spores of the DED fungus are carried on the bodies of beetles and spread from tree to tree.

Root grafting occurs when elms growing in close proximity have roots that contact and join. The graft unites the root systems, allowing for the sharing of water, nutrients and unfortunately, the DED fungus between trees.



[C] A branch infected with DED.
[D] Close-up of wilt.

Photos: [C] J. O'Brien, USDA Forest Service, Bugwood.org
[D] Minnesota Department of Natural Resources Archive, Bugwood.org

Round Goby

Common Name: Round goby

History: Originally from Eastern Europe, it arrived in the Great Lakes Region in the late 1980s through the ballast water of ships.

Physical Description: A fish species that is 7 to 25 cm (3 to 10 in) long at maturity and mottled-brown in colour. The young are slate-gray. They have a pelvic fin shaped like a suction cup, a prominent black spot on the dorsal fin and frog-like eyes.

Threat: Round goby are very aggressive and outcompete native fish by using optimal habitat, spawning multiple times per season and eating eggs of native fish. There is no way known to eliminate Round goby from a waterbody once they arrive.

Distribution: Round goby has invaded all of the Great Lakes and some inland lakes in Ontario and Michigan. Currently they are expected to enter the southeastern portion of the province. They can reach a density of 100 fish per cubic meter of water.

Please report any sightings to ISCM.





[A] A Round goby adult.

[B] Close-up of the Round goby's head.

Photos:

[A] Eric Engbretson, US Fish and Wildlife Service, Bugwood.org

[B] U.S. Fish and Wildlife Service Archive, US Fish and Wildlife Service, Bugwood.org



Rusty Crayfish

(*Orconectes rusticus*)

History: Rusty crayfish is an aggressive species native to the Ohio River Basin, USA. It began to spread into the northern Great Lakes regions including Minnesota, Wisconsin and Ontario in the 1960s, often transported by anglers using specimens as bait.

Physical Description: Rusty crayfish have large claws with black bands near the tips and are larger in size than our native crayfish. They have dark, rusty spots on each side of their brown body (as though you picked up the crayfish with paint on your forefinger and thumb.) The spots may not always be present or well developed on rusty crayfish from some waters.

Threat: The major threat is the reduction of aquatic plant beds and the species that live in these environments. It is said that the damage rusty crayfish does to the aquatic system is the equivalent of clear cutting forests. Rusty crayfish, especially juveniles, feed heavily on aquatic plants, small fish and water insects, often twice as much as native crayfish. This puts strain on the food sources for young fish and other invertebrates.

Distribution: Rusty crayfish is a new invader to Manitoba, being first found in Falcon Lake in 2007. It is illegal to possess crayfish in Manitoba. This law will help prevent the spread of this species between bodies of water from bait bucket transfers.



[A] Rusty crayfish (note nail head on the dock for scale). **[B]** Slightly different colour variation.

Photos: D. Watkinson, Fisheries and Oceans Canada (Freshwater Institute Winnipeg) [B] J. Gunderson, MN Sea Grant



Zebra Mussels

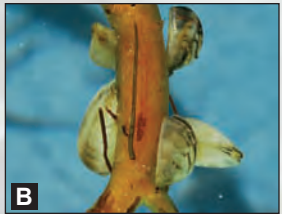
(*Dreissena polymorpha*)

History: Native to the Black and Caspian Sea region of Eurasia, zebra mussels were likely introduced to North America in the 1980s by a cargo ship in the Great Lakes region. By 1990, zebra mussels had spread to all of the Great Lakes.

Physical Description: Zebra mussels are small invertebrates named for the striped pattern on their shells. Colour patterns can vary to the point of having only dark or light coloured shells and no stripes. Size is less than 50 mm (2") long, and most are around 30 mm (1¼") or smaller. When placed on a surface zebra mussels are stable on their flattened underside. They are typically found attached to submerged objects, surfaces, or each other by threads underneath their shells.

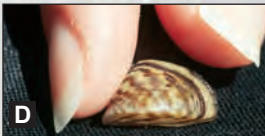
Threat: Zebra mussels are notorious for colonizing and constricting water flow through supply pipes of power plants and industrial facilities. They can also have profound effects on the ecosystems they invade through reducing the amount of food available to other species. Native mussel populations have decreased dramatically where zebra mussels are present.

Distribution: Zebra mussels are not currently in Manitoba, but have been expanding their range, moving northwards in Minnesota, and west through Ontario. Check boats, trailers and other equipment while moving between lakes. Report sightings to Manitoba Water Stewardship (1-877-867-2470) immediately.



[A] Zebra mussels colonizing on another aquatic invertebrate. **[B]** Zebra mussels attached to vegetation. **[C]** A clump of zebra mussels attached to a mat of Eurasian watermilfoil (see page 32). **[D]** A zebra mussel in comparison to a finger. **[E]** A front and back view of a zebra mussel.

Photos: [A] R. Westbrook, U.S. Geological Survey, Bugwood.org
 [B] [C] F. Koshere, WIS-DNR
 [D] [E] A. Benson, U.S. Geological Survey, Bugwood.org



Glossary

Alternate: Leaves that are staggered on the stem, not placed directly across from each other.

Aquatic: Growing or living in or near water.

Biennial: A plant that completes its life cycle in two years. The first year it produces leaves and stores energy. The second year it blooms and produces seed.

Bract: A modified or specialized leaf.

Capsule: A dry fruit that splits open at maturity.

Cluster: A large group of flowers or fruits on a plant.

Compact: Closely and firmly packed together.

Cultivar: A cultivated variety or “breed” of plant.

Deciduous: Plants that drop their leaves in the fall.

Elliptic: Oval-shaped, with the widest part in the middle and tapering toward both ends.

Eurasia: The land mass formed by the continents of Europe and Asia.

Fauna: Animals and all living things in an ecosystem that are not plants or fungi.

Flora: Plants and things that look like plants (fungi) in an ecosystem.

Herb: Flowering plant with no significant woody tissue above the ground (forbs and grasses).

Hybrid: The result of a cross between two different species.

Inconspicuous: Not prominent or readily noticeable.

Inflorescence: A cluster of flowers on a plant.

Introduced: A species or organism which arrives and establishes as a result of human activities.

Invasive: Introduced species or organism which causes damage to biodiversity, agricultural production or human health.

Invertebrates: Collective term for all animals that lack backbones; for example insects.

Lance shaped (Lanceolate): Shaped like a spear-head, considerably longer than wide, tapering towards the tip from below the middle.

Lobed: Having deeply indented, curvy or wavy leaf edges.

Midrib: The central vein of a leaf.

Native: Indigenous or occurring naturally in a given geographic locale (not introduced by humans).

Naturalized: An introduced species that currently exists in the wild as a self-perpetuating population.

Oblong: Longer than wide having parallel sides.

Opposite: Leaves situated directly across the stem from each other.

Ornamental: A plant grown for its beauty or decoration.

Ovate: Egg-shaped.

Panicle: A pyramid shaped, loosely branched flower cluster; a panicle is a type of inflorescence.

Pappus: Tuft of hairs or bristles; often on the 'seeds' (achenes) of plants in the Asteraceae family.

Perennial: A plant that continues to live and grow from year to year.

Petals: Uppermost, leaf-like structures of a flower that are usually brightly coloured.

Prolific: Reproducing in abundance and at a rapid rate.

Rosette: A cluster of spreading or radiating leaves close to the ground.

Sepals: Modified leaves that surround the base of a flower to protect the developing seed or fruit, often green.

Serrated: Having a toothed or notched edge.

Spike: A cluster of flowers or fruits with a narrow, finger-like shape, as in wheat or purple loosestrife.

Submersed: Pertaining to a plant or plant structure growing entirely underwater.

Substrate: The mineral and/or organic material that forms the bed of a stream.

Succulent: A plant that has fleshy stems or leaves capable of retaining large amounts of moisture.

Tendrils: Modified “clinging” leaf structures that occur on climbing plants such as vines.

Turions: Detached, overwintering, and usually fleshy buds produced by certain water plants.

Vegetative fragmentation: When a plant is split into fragments that each develop into mature, fully grown individuals that are clones of the original organism (non-sexual reproduction).

Vegetative reproduction: Non-sexual plant reproduction where plants are formed not from seeds, but from specialized structures of the root, stem or leaf.

Whorls: The circular arrangement of three or more flowers, parts of a flower, leaves, or shoots arising from a stem of a plant.





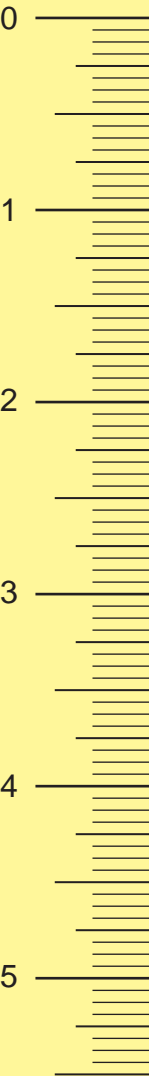
Please report sightings of invasive species to:

The Invasive Species Council of Manitoba

Phone (204) 232-6021

info@invasivespeciesmanitoba.com

www.invasivespeciesmanitoba.com



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