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What are invasive species?

Invasive species are plants, animals, pathogens or any other organisms that are growing out of their region of origin or country and are able to outcompete native organisms and agricultural crops. Since they come from other countries or ecosystems, invasive species escape their natural enemies. They have a distinct advantage over our native species and agricultural crops whose populations are kept in check by predators, competitors, or disease.

Why should you care?

Invasive species impact humans economically, environmentally, socially and they can even impact our health. West Nile Virus is an example of an invasive species with health implications. Invasive species tend to be aggressive and reproduce at a high rate, often "taking over" entire areas and choking out native plants, animals and crops. This reduces the biodiversity in an area, taking away habitat for wildlife. Invasive species can also impede water flow and quality, and interfere with activities like boating, swimming, fishing or agricultural production.

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. Once introduced, they can spread through natural dispersal methods using wind and water flow or human caused transport on equipment or material movement. Climate change, with its warming environment may allow less cold tolerant species to spread north and invade new territory.

Why is this Pocket Field Guide important?

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 in or near our rivers, lakes, and wetlands in Manitoba, and to provide information on possible upcoming threats so their introductions can be slowed or prevented.

In addition to species already found in Manitoba, we have chosen species for the field guide that are relatively new or have a high chance of arriving such as Salt Cedar, Zebra and Quagga Mussels, and European Frog-bit. Every sighting of an invasive organism represents the potential for a population explosion that may be expensive, difficult or impossible to reverse. If detected early enough, together, we have the opportunity to contain or eradicate these newer invaders. It is important to document the specific areas, preferably with GPS coordinates, where invasive populations are found in Manitoba so together we can protect un-infested areas and curtail the potential further spread in the province.

What can you do?

Report all sightings:

We need your help as we cannot do this alone. Everyone has a responsibility to help prevent the spread of invasive species. Your help to report new sightings and to prevent their spread is vital! Prevention, early detection and rapid response are critical for saving habitats from invasive species. Always err on the side of caution and report a sighting even if you are uncertain.

You can be the one who stops an invasion. Prevention is Manitoba's best defense. Once invasive species establish, they are extremely costly to control and almost, if not impossible to eradicate.

Please do your part by reporting all sightings to the Invasive Species Council of Manitoba (ISCM) at 204-232-6021, info@invasivespeciesmanitoba.com. Or visit www.invasivespeciesmanitoba.com

Be part of the solution and not the problem!

- ❑ Learn how to identify invasive plants and organisms.
- ❑ Do not buy any plants or organisms that are known to be invasive. Talk to stores that sell invasive species and let them know about your concerns.
- ❑ Dispose of unwanted invasive animals properly by freezing and putting them in the trash.
- ❑ Never flush anything down the toilet or directly release anything live or dead into any waterway. For any invasive plant, double bag and dispose of in the trash.

What you can do to prevent introducing or transporting aquatic invasive species:

Help protect our precious lakes, rivers, and wetlands by taking a few important precautions when boating, or before moving any water-based equipment and gear such as nets, bait buckets, ropes, buoys, life jackets, anchors and totes, between waterbodies.

Prevention starts with you and it is our best defense!

Before Launching and Before Leaving:

1.CLEAN
Clean and inspect watercraft, trailer and all water-based gear. Remove all plants, animals and mud. Rinse using high pressure and extremely hot tap water — preferably 50°C (120°F).

2. DRAIN
Drain all water from watercraft and gear including the motor, livewell, bilge, bait buckets and totes before transporting.

3. DRY
Dry watercraft, trailer and all water-based gear for at least 5 days in the hot summer sun, 18 days in the spring/fall, or freeze for 3 days (if rinsing is not available).

4. DISPOSE
Dispose of unwanted live bait and worms in the trash, and dump all water from bait buckets and totes on land away from any waterbody.

For more information, visit: manitoba.ca/StopAIS or call toll-free: 1-877-867-2470

What's new in this edition versus past editions of this field book?

We have added the Noxious Weed and the Prohibited Species designations to the appropriate invasive species in this field book. It is illegal to possess, transport or release species that are designated either a Noxious Weed or a Prohibited Species in Manitoba.

Noxious Weed: control of these plants is required under the law if found your property. For more information please visit: http://web2.gov.mb.ca/laws/statutes/ccsm/n110e.php

Prohibited Species: it is illegal to possess, transport or release 87 species found in Schedule IX of Manitoba Fisheries Regulation, 1987 under the Federal Fisheries Act. An online link to the Prohibited Species list can be found at: http://laws-lois.justice.gc.ca/eng/regulations/SOR-87-509/page-21.html#h-40

For more information on the Prohibited Species List or Aquatic Invasive Species please visit: manitoba.ca/StopAIS or call, toll-free: 1-877-867-2470.

Invasive Species Council of Manitoba Vision and Objectives

Vision: To maintain a healthy, bio-diverse landscape through prevention, early detection, and education and awareness of invasive alien species management practices in order to eradicate or limit further spread.

Objectives:

1. Focus on prevention and coordination of a system of early detection and rapid response, investigate possible control or eradication
2. Improve cooperation between stakeholders
3. Establish a digital provincial directory
4. Identify and promote coordinated monitoring and research
5. Promote public awareness and understanding
6. Operate in a spirit of partnership and collaboration

Purple Loosestrife

(Lythrum salicaria)

NOXIOUS WEED

Background: 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 high quality wetland habitat and reduced biodiversity in infested wetlands, and the clogging of irrigation systems.

Distribution: Purple Loosestrife is found throughout southern Manitoba.

What can I do? Do not include Purple Loosestrife in ornamental plantings or give seed or plant parts to others. Report all sightings, or for more information contact the ISCM.

[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)
NOXIOUS WEED

Background: 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 (¾ - 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 hurtles 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 that can cause allergic reaction or irritation.

Distribution: Leafy Spurge is concentrated in the southwest part of the province but isolated infestations are found in many areas of the province.

What can I do? It is important to detect new infestations and stop their spread before they become well established. Spot spraying can be used to control small infestation. Please contact your local GO Office or Weed Supervisor for advice. To control spread check vehicles, livestock, forage, hay and seed stock for Leafy Spurge seeds and plants. Report all sightings, or for more information contact 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/Musk Thistle

(Carduus nutans)

NOXIOUS WEED

Background: 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.

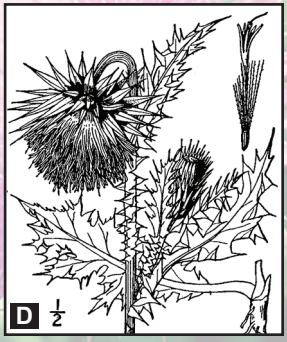
Threat: Nodding Thistle is an agressive species that forms extremely dense stands. It crowds out native plants and decreases productivity of rangeland and pastures.

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

What can I do? Spot spraying can be used to control small infestation. Please contact your local GO Office or Weed Supervisor for advice. Nodding Thistle spreads by seed so remove seed heads and double bag and dispose in the trash to prevent further spread. 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)

Background: This exotic was brought to North America in the late 1800s from Africa and Eurasia for use in gardens. Also currently used in the water garden and garden trade.

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 (¾ - 1¼") across, pink to white and blooms from June to August. The fruit is many-seeded and dry.

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

Distribution: There have been a few reports of Flowering Rush in Winnipeg and near Dauphin. It reproduces by seed production and vegetative spread of its rootstocks (bulblets); both can be moved by water currents. Once established it is very difficult to physically remove.

What can I do? Do not buy or transplant. Report all sightings, or for more information contact 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)

PROPOSED NOXIOUS WEED

Background: Originally from the western Himalayas, this plant is thought to have been introduced by foreign ships.

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: It has been reported throughout Winnipeg and has been found immediately east and north of the city.

What can I do? Avoid planting Himalayan Balsam in your garden to prevent further spread. Do not give seeds to others and double bag all seed heads and dispose of in the trash. Report all sightings, or for more information contact 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)

Background: 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.

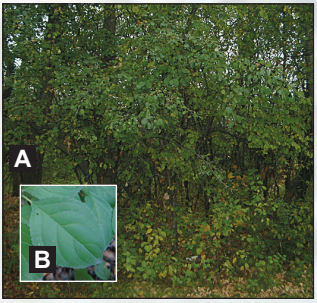
Leaves: The leaves are in pairs, but not exactly opposite. Leaves are dark green, elliptic to ovate, 3.5-7.5 cm (1¼ -3") long with slightly serrated edges and curving veins. Leaves come out early in spring and stay until late fall, extending its growing season.

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 has been found south of Lake Manitoba and Lake Winnipeg and is a large problem in natural areas within Winnipeg. It has been reported in the Pembina Valley as well.

What can I do? Avoid buying and planting this species to prevent further spread. Report all sightings, or for more information contact the ISCM.



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)

NOXIOUS WEED

Background: 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 grows in pastures, roadsides, river banks, abandoned fields and natural areas. There have been numerous small to medium infestations found in Southern Manitoba with high concentrations found near Somerset and Dauphin. Tansy infests river valleys heavily in some areas of the Prairies.

What can I do? Do not plant as an ornamental or transplant to other areas. Dig up plants, double bag and dispose of in the trash. Report all sightings, or for more information contact the 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] Mary Ellen Harte, Bugwood.org
[C] Michael Shephard, USDA Forest Services, Bugwood.org
[D] Steve Dewey, Utah State University, Bugwood.org

Common Burdock

(Arctium minus)

NOXIOUS WEED

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

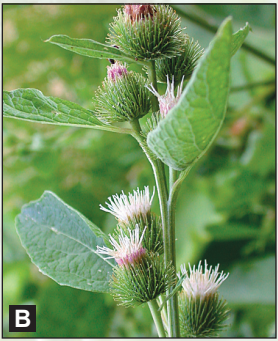
Physical Description:
General: A tall biennial herb. Stems are erect, coarse, branched and thick, have a reddish tinge and may be grooved or angular. It can grow 1-2 m (3-6') tall. Leaves: First year plants form large rosettes, then a stout flowering stalk is formed in the second year. Leaves are large, 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 (¾-1") wide and bloom from July to October. Fruit is a round, bristly, 10-20 mm (½-¾") 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.

What can I do? Prevent new invasions by ensuring burs are not attached to clothes, pets and vehicles when leaving infested areas. Plants can be dug up, cutting off the root at least 4 inches in the ground. If the plant has already flowered remove, double bag and dispose of seed heads in the trash. Herbicide treatments can also be used. Contact your local GO Office or Weed Supervisor for advice. Report all sightings, or for more information contact the ISCM.

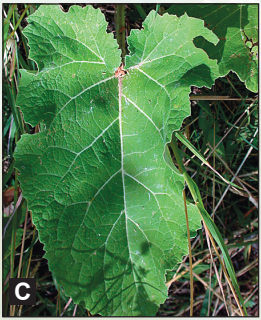


Did you know? The clinging burs of Common Burdock were the inspiration for Velcro.

[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)

PROPOSED NOXIOUS WEED

Background: 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: There have been unconfirmed reports in Manitoba. We have the opportunity to stop Yellow Flag Iris before it becomes a problem. 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.

What can I do? Do not plant in your garden or transplant to other areas. Dig up, double bag and dispose in the garbage. Report all sightings, or for more information contact the ISCM.

[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

Reed Canary Grass
(Phalaris arundinacea)

Background: 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.

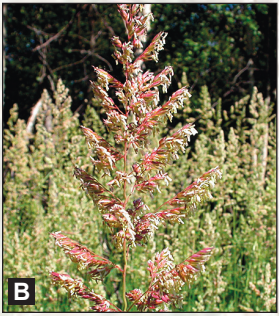
Physical Description:
General: A long-lived perennial, 0.6-3 m (2-8') tall; the stem is hairless, waxy and stands erect. The grass forms a thick creeping root system that quickly dominates the soil and produces new stems. Leaves: Rough-textured, tapering leaves are flat, 0.2-2 cm ($^1/_8$-$^3/_4$") wide 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 can be very aggressive and careful thought should be given before planting as it forms dense, persistent stands in wetlands, meadows, and riverbanks. These stands exclude and displace desirable tame forages, native plants and animals and clog waterways and irrigation canals because they promote silt deposition.

Distribution: It is mostly concentrated just south of Lake Winnipeg, but infestations have been found around Brandon and Winnipeg as well as in the south-east corner of Manitoba.

What can I do? Although recommended as a forage species in Manitoba, Reed Canary Grass is included in this booklet because of its very aggressive tendency. Thought should be given before planting as control will be impossible if the plant escapes into unintended areas. Extreme caution is advised when planting this species near waterways.



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.

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 (Giant Reed)

(Phragmites australis subsp. australis)

PROPOSED NOXIOUS WEED

Background: This non-native subspecies of Phragmites native to Eurasia was accidentally introduced to the Eastern Seaboard in the 1700s and the Great Lakes in the 1990s.

Physical Description:
General: Tall, semi-aquatic perennial grass that can grow to heights of 4.6 m (15 ft) forming dense monocultures. Commonly confused early in the growing season with native *Phragmites australis.*

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 between 20 and 40 cm long. Flowering in Manitoba occurs from late August to mid-October long after native Phragmites has already died-back for the winter.

Threat: Plants quickly form thick stands which out-compete native plants, alters habitat for wildlife, changes nutrient cycling, and impacts hydrology. Primarily spread along rights of ways by machinery by moving seeds and rhizomes.

Distribution: A number of stands have been discovered in and around Winnipeg, Highway 1 East, Highway 44 East and possibly in the Whiteshell.

What can I do? This is a new arrival to Manitoba thus reporting all sightings are critical as this plant could possibly be eradicated from areas if found early enough. Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or the ISCM immediately.

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

Photos: [A] Leslie J. Mehrhoff, University of Connecticut, 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

Non-Plant Terrestrial and Aquatic Invasive Species Found in Manitoba

Dutch Elm Disease (DED)
(Ophiostoma spp.)

Background: First found in North America in Ohio prior to 1930. Dutch Elm Disease (DED) is thought to have been introduced to North America 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.

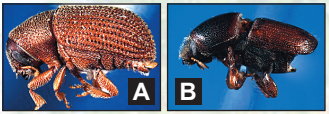
General: DED is caused by a fungus and spread by elm bark beetles and root grafting between elm trees. Host trees include all the elms native to North America and Europe such as the American elm.

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.

What can I do? You can help to limit the spread by ensuring elm trees remain healthy. Do not prune your elm trees between April 1 and July 31 and cut all dead elm trees down and properly dispose of them. Do not use or transport elm firewood. For suspected DED trees within Winnipeg call 311, 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 ($^1/_8$”) 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

Spiny Waterflea

(Bythotrephes longimanus)

PROHIBITED SPECIES

Background: Originally from Eurasia, Spiny Waterflea is small zooplankton species (microscopic animal) inadvertently introduced in the Great Lakes in 1982 through the dumping of 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 barbed tail. Spiny Waterfleas are commonly found in floating clumps on water's surface resembling cotton-batting with tiny, black spots.

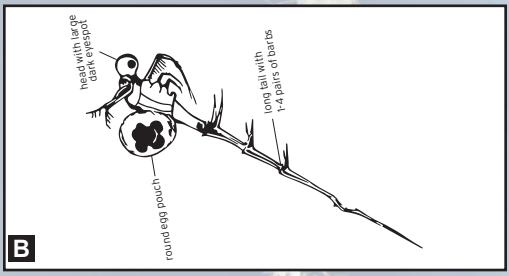
Threat: Reproduces quickly and not readily eaten by native small fish species because of their barbed tail. They reduce the abundance of native zooplankton important food source for native fish. Adults and eggs can be transported un-noticed through the undrained bilge, bait buckets and livewells. Spiny Waterflea produce eggs are resistant to drying and freezing. They are a nuisance to fishers because clumps of Spiny Waterflea can foul fishing line, ropes and nets, and can preventing the landing of fish.

Distribution: It was first found in the Winnipeg River by Pointe du Bois in 2009 then throughout Lake Winnipeg as of the fall 2012. Once established, they cannot be eradicated.

What can I do? Prevent the further spread - CLEAN, DRAIN, DRY, and DISPOSE every time you move watercraft and water-based equipment. Never release any invasive or unknown animal or plant into any waterbody. Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or the ISCM immediately.

[A] Spiny Water Flea.
[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] Province of Manitoba, Department of Conservation and Water Stewardship
[C] Andrea Miehls, Michigan State University



Rusty Crayfish

(Orconectes rusticus)

PROHIBITED SPECIES

Background: Rusty Crayfish is a highly 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 illegally by anglers 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 spot on each side of their brown body close to the start of their tail. Unlike the native crayfish, when Rusty Crayfish close their claws there is a gap.

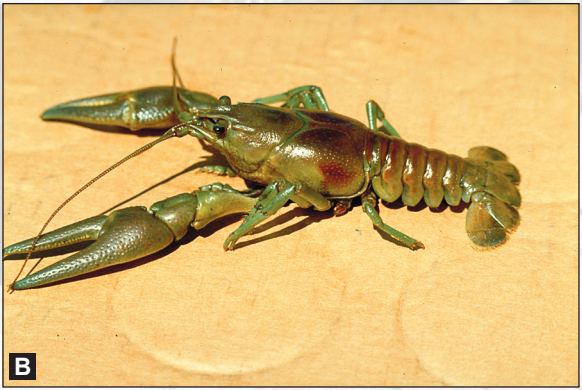
Threat: The major threat is the reduction of aquatic plant beds and the species that live in these environments. It is said that the damage Rusty Crayfish does to the aquatic system is the equivalent of clear cutting forests. Rusty Crayfish, especially juveniles, feed heavily on aquatic plants, small 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 relatively new invader to Manitoba being first found in Falcon Lake in 2007 and now confirmed in a portion of the Birch River near Prawda. Since 2007, it has been illegal to possess any species of crayfish in Manitoba. This regulation was enacted to prevent the spread of Rusty Crayfish between waterbodies bodies and from illegal bait bucket transfers.

What can I do? Never transport or possess crayfish in Manitoba – it's illegal. In 2007, a zero possession limit for all species of crayfish in Manitoba was enacted. This provincial regulation is to prevent the spread of rusty crayfish between waterbodies in Manitoba and to prevent illegal bait bucket transfers. Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or the ISCM immediately.

[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



Invasive Terrestrial and Aquatic Plants in Close Proximity to Manitoba

Curly-leaf Pondweed
(Potamogeton crispus)

Background: Curly-leaf Pondweed is native to Eurasia and was inadvertently introduced into the USA in the mid 1800s. It is also a popular plant in the aquarium industry.

Physical Description:
General: Curly-leaf Pondweed is a freshwater, 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 ($^3/_8$-$^1/_2$") wide. The leaf tip is often rounded, and leaf edges are finely toothed and look similar to 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 beds of Curly-leaf Pondweed can out-compete native aquatic plants, negatively affect recreational opportunities such as swimming and fishing and depletes water oxygen levels impacting native fish and wildlife.

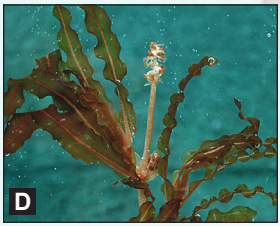
Distribution: Curly-leaf Pondweed has been reported on the U.S. side of Lake Metigoshe a lake that is located on the North Dakota/ Manitoba border in south-western Manitoba. The plant has not been confirmed in Manitoba.

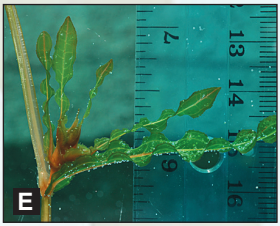
What can I do? Inspect and clean watercraft, trailer and all water-based gear before transporting or launching. Always CLEAN, DRAIN, DRY and DISPOSE. Remove all plant fragments to avoid spreading this plant between water bodies. Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or 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





European Frog-bit

(Hydrocharis morsus-ranae)

Background: European Frog-bit escaped from an ornamental planting in the Ottawa area in 1932. Today commonly used in the aquaria trade and the water garden trade.

Physical Description:
General: A free-floating, freshwater aquatic plant that can quickly choke shallow ponds, wetlands, ditches and lake edges.

Leaves: The leaves of this plant are usually floating and are leathery, hairless, circular to heart shaped and measure 1-6 cm (½ -2 ½") 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: Forms dense floating interlocking mats with dangling roots which restrict available light, dissolved gases, and nutrients to the underwater community. European Frog-bit displaces native plants, causes dramatic declines in aquatic habitat and interferes with recreational activities.

Distribution: European Frog-bit is currently not in Manitoba. The nearest known infestation is in Dryden, Ontario and the Great Lakes. However it can spread by transporting un-cleaned watercraft and water-based recreational gear, migrating waterfowl, and improper disposal of plants.

What can I do? Do not buy this plant. Dispose of unwanted plants by double bagging and placing in the trash and never release into any water body. Prevent its introduction into Manitoba by CLEAN, DRAIN, DRY, and DISPOSE every time you move watercraft and water-based equipment from one water body to another.
Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or 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)

Background: Eurasian Watermilfoil is native to Europe and Asia. It was suspected to be first introduced into North America in the late 1800s.

Physical Description:
General: A submersed freshwater aquatic perennial 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 to 5 feathery leaves circling the stem. Each leaf has 12 to 21 leaflet pairs unlike native milfoils such as Northern (American) Watermilfoil *(Myriphyllum sibiricum)* which has fewer (5-10) leaflet pairs. 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 choke water bodies and hinder native aquatic plant growth, impact fish spawning, and impede swimming, fishing and watercraft activities. New plants can quickly establish from plant fragments carried on un-cleaned watercraft and gear or by interconnected waterways.

Distribution: Eurasian Watermilfoil has not been reported in Manitoba, but it is in neighbouring provinces and states.

What can I do? Inspect and clean watercraft and all water-based gear before transporting or launching. Always CLEAN, DRAIN, DRY and DISPOSE. Remove all plant fragments to avoid spreading this plant between water bodies. Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or 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 (Tamarisk)

(Tamarix spp.)

Background: 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 (¾-2") 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 Saskatchewan and North Dakota.

What can I do? 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 .

Photos: S. Dewey, Utah State University, Bugwood.org

Hydrilla (Elodea)

(Hydrilla verticillata)

Background: Hydrilla is native to parts of Asia, Africa and Australia. Introduced into Florida by the aquarium trade in the 1960s. Used in the water garden and aquarium trade.

Physical Description:
General: Hydrilla is a submersed, rooted, freshwater, aquatic plant with stems growing 7.5 m (25 feet) forming dense mats.

Leaves: Strap-like and pointed. They grow in whorls of 4 to 8 around the stem. Their midribs are reddish in colour and the leaf edges are slightly toothed. Leaf colour varies from green to brown. Potato-like 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 long stalks.

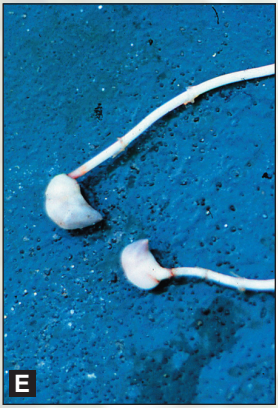
Threat: Hydrilla shades and out-competes native plants for nutrients. Its dense masses interfere with recreational activities such as boating, fishing and swimming.

Distribution: Hydrilla is not found in Manitoba. It is expanding its range northward and along both coasts of the USA. Hydrilla can be dispersed by stem fragments, movement by waterfowl, un-cleaned watercraft and water-based recreational gear and is often sold as an aquarium plant.

What can I do? Do not buy or transport this plant in Manitoba. Inspect and clean all watercraft, and water-based gear and remove all plant fragments before transporting. Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or 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



Non-Plant Aquatic Invasive Species in Close Proximity to Manitoba

Round Goby

(Neogobius melanostomus)

PROHIBITED SPECIES

Background: Originally from Eastern Europe and accidentally in the Great Lakes in the 1990s through the dumping of ballast water of ocean-going ships.

Physical Description: A small-bodied, freshwater/slightly marine fish species that is 7 to 25 cm (3 to 10 in) long at maturity and generally mottled grey, brown, or black in colour. Round Goby have bulging, frog-like eyes. The young are slate-gray. They have a distinctive pelvic fin shaped like a suction cup and a prominent black spot on the dorsal fin. Round Gobies are generally nocturnal.

Threat: Round Goby are very aggressive, out-competing and displacing native fish by using optimal habitat. They can spawn multiple times per season and eat eggs of native fish. They can reach shoreline densities of 100 fish per cubic meter of water and can have negative impacts on commercial and recreational fishing. Once introduced, Round Goby is impossible to eliminate.

Distribution: Round Goby has invaded all of the Great Lakes and some inland lakes in Ontario and Michigan.

What can I do? Never bring in any live fish as bait into Manitoba – it's illegal. Never move and release any fish, or water from one water body to another. Report all sightings, or for more information call the Aquatic Invasive Species Hotline at 1-877-867-2470 or the ISCM immediately.

[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

Zebra Mussels
(Dreissena polymorpha)
and Quagga Mussels
(Dreissena rostiformis)

PROHIBITED SPECIES

Background: Native to the Black and Caspian Sea region of Eurasia, Zebra and Quagga Mussels were introduced to the Great Lakes in the late 1980s by cargo ships.

Physical Description: Zebra and Quagga Mussels are small, clam-like invertebrates. Zebra Mussels grow from 1-2.5 cm (0.4 to 1 inch) and Quagga Mussels are slightly larger. Zebra and Quagga Mussels are the only freshwater mussels that physically attaches firmly to underwater surfaces, such as rocks, aquatic plants, docks, ropes and watercraft.

Threat: Adult Zebra and Quagga Mussels can survive up to 15 days out of water thus can be moved to new water bodies on un-cleaned watercraft, trailers or water-based equipment. They and are a multi-million dollar threat to industry by clogging water intake pipes. Zebra and Quagga Mussels have profound effects on the ecosystems they invade. They ruin beaches, threaten fisheries and are a nuisance to boaters, anglers and commercial fishers.

Distribution: Zebra Mussels are not found in Manitoba, but have been found in the U.S. portion of the Red River south of Fargo, North Dakota. There is a high probability that both Zebra and Quagga Mussels can survive throughout Manitoba. Prevention is our best defense.

What can I do? CLEAN, DRAIN, DRY, DISPOSE – Every time! Clean and inspect watercraft, trailers and all water-based gear before transporting and launching. Watercraft users are the predominant vector for introducing these species to new areas. Drain all water. The mussel's early stage of development, called a veliger, is free-floating and microscopic in water and can be transported unknowingly in un-drained bilge, livewells and bait buckets. Thoroughly dry everything before transporting to another water body and never bring live bait or water into Manitoba.

Report all sightings immediately! Call the Aquatic Invasive Species Hotline at 1-877-867-2470 or the ISCM.

[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. Westbrooks, 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 largely as a result of human activities.

Invasive: A species (animals, plants, parasites, viruses etc) not native to a region that when introduced, either intentionally or accidentally, out-competes native species for available resources. They can have economic, social, environmental and human health implications.

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.