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SPOTTED KNAPWEED

Centaurea maculosa

BASIC ID A biennial or short-lived perennial composite with a stout taproot. Seedling leaves form a rosette. The slender tubular flowers are white to pink or purple.

HISTORY A native of Europe, it was accidentally introduced to North America. It is now taking over millions of rangeland acres in the western states, and has moved into natural areas in the Midwest.

MANAGEMENT Pulling and digging will reduce populations. Reseeding with a native species is recommended. Herbicides can be used if infestations are large.

FOR MORE INFORMATION
http://tncweeds.ucdavis.edu/

ORIENTAL BITTERSWEET

Celastrus orbiculata

BASIC ID This bittersweet is a deciduous woody vine, which climbs by means of twining about a support. The branches are brown with lighter marks called lenticels. Fruit contains brown seeds in a fleshy red aril. Leaves are alternate but extremely varied in size and shape.

HISTORY Native to Asia. It may severely damage desirable plants by strangling and/or overtopping them. Many habitats are vulnerable to Oriental bittersweet invasion and dominance.

MANAGEMENT Vegetation in the entire area is cut to the ground early in the growing season and allowed to grow back. Approximately one month later, foliar applications of an herbicide.

FOR MORE INFORMATION
http://tncweeds.ucdavis.edu/

AUTUMN OLIVE & RUSSIAN OLIVE

Elaeagnus umbellata & Elaeagnus angustifolia

BASIC ID Both shrubs can reach up to 7.6 meters and have smooth reddish-brown bark, silvery-gray leaves and woody thorns.

HISTORY Autumn olive is native to Asia. Russian olive is native to Europe and western Asia. Both were brought to North America in the early 1900s and promoted for windbreaks, erosion control and wildlife habitat enhancement. They can produce up to 200,000 seeds each year and spread quickly over a variety of habitats, choking out native vegetation.

MANAGEMENT Control before fruiting to prevent spread of seeds. Cut and apply herbicide to trunk summer through late winter.

FOR MORE INFORMATION
http://tncweeds.ucdavis.edu/

DAME'S ROCKET

Hesperis matronalis

BASIC ID This showy, short-lived perennial has large, loose clusters of fragrant white, pink or purple 4-petaled flowers that bloom from May-July on 0.5 to 1.0 meter stalks.

HISTORY Native to Eurasia, and used as a garden plant, it can escape into the wild and spread rapidly by seed. It thrives in woodlands, roadsides and open areas.

MANAGEMENT
- Check "wildflower" mixtures before planting
- Pull plants or cut flower heads after they bloom
- Prevent plants from going to seed
- Prescribed burns
- Apply a broadleaf herbicide

FOR MORE INFORMATION
www.dnr.state.wi.us/org/land/er/invasive/

JAPANESE KNOTWEED

Polygonum cuspidatum

BASIC ID An herbaceous perennial that forms large clumps 1-3 meters high. The stout stems are hollow and bamboo-like, and the large, toothed, ovate leaves are alternately arranged. Small white flowers appear in July and are borne in tight clusters near the end of the stems.

HISTORY Native to eastern Asia as an ornamental in the 1800s. Its early emergence and great height combine to shade out other vegetation reducing species diversity and damaging wildlife habitat.

MANAGEMENT Repeated mowings are effective. Herbicide may be necessary.

FOR MORE INFORMATION
http://tncweeds.ucdavis.edu/

SWALLOWWORT

Vincetoxicum nigrum

BASIC ID An herbaceous perennial twining vine that can grow to one or two meters. They have opposite leaves that are 5-10 cm long, hairless and smooth narrowing to a point at the tip. Flowers are deep purple, almost black, with small hairs on the petals.

HISTORY Native to Mediterranean regions, it came to North America as a horticultural plant. It is frequently established in disturbed areas such as old agricultural fields, utility and transportation corridors.

MANAGEMENT In areas with small infestations, cutting the stem and applying herbicide works well. Best to treat prior to mid-July before viable seeds are produced. Digging is very effective but the whole crown must be removed.

FOR MORE INFORMATION
http://tncweeds.ucdavis.edu/

GARLIC MUSTARD

Alliaria petiolata

BASIC ID This cool-season, biennial herb grows 30-100 cm tall, has triangular shaped leaves with toothed edges and smells of garlic when crushed. It has clusters of small flowers with 4 petals. First year plants are low rosettes with rounded leaves.

HISTORY An invasive European species, it prefers forested areas. Rapidly spread by seed, it is a serious problem in southern forests and is spreading elsewhere.

MANAGEMENT
- Hand pull before flowering or pull and bag up when flowering
- Apply herbicides in early spring or late fall
- Prevent any plants from going to seed

FOR MORE INFORMATION
www.dnr.state.wi.us/org/land/er/invasive/

WILD PARSNIP

Pastinaca sativa

BASIC ID The first year's rosette has 15-45 cm compound leaves. The flower stalks grow about 1.2 meters and have umbrella-like clusters of yellow flowers that form large flat seeds.

HISTORY Native to Eurasia, this plant spreads by seed in open habitats. CAUTION! If plant juices come in contact with the skin in the presence of sunlight, a painful burn or blistering can occur resulting in a skin discoloration for several months.

MANAGEMENT
- WEAR PROTECTIVE CLOTHING!
- Cut entire root 2" below the ground
- Prescribed burn with spot herbicide follow-up
- Mow to remove flowerheads around July 1

FOR MORE INFORMATION
www.dnr.state.wi.us/org/land/er/invasive/

COMMON BUCKTHORN & GLOSSY BUCKTHORN

Rhamnus cathartica & Rhamnus frangula

BASIC ID Both shrubs can reach 6 meters tall and have dark bark with silvery marks called lenticels. Common buckthorn has dull, green, toothed-edged leaves and female plants have dark fruits in fall and winter. The glossy's buckthorn leaves are untoothed and shiny on top.

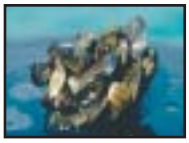
HISTORY Native to Eurasia, both were introduced in North America as ornamentals. Well-established and spread by seed, they form dense thickets in southern woodlands.

MANAGEMENT
Cut and apply herbicide to trunk in late summer through late winter.

FOR MORE INFORMATION
www.dnr.state.wi.us/org/land/er/invasive/

"...we can and are working to stop the introduction of more invasives to minimize their already substantial damages to Michigan's freshwater systems."

Aquatic Aliens



ZEBRA MUSSEL

Dreissena polymorpha

BASIC ID A small D-shaped clam, yellowish to brownish shell, with dark and light colored stripes. Usually found in clusters, attached to solid objects via a strong series of thread-like structures. Usually found in water less than 30 feet deep.

HISTORY A native of the Ponto-Caspian region of Eurasia, it has spread to Europe and first appeared in North America in 1988 in the Great Lakes, probably introduced from the ballast discharge of commercial cargo vessels. It has since spread throughout the midwest via the Mississippi and Ohio River waterways, and also to a few east coast states. In Michigan, it has spread from the Great Lakes and is now established in many of our larger inland lakes and rivers. Our most infamous aquatic invader, zebra mussels eliminate native clams from lakes, irrevocably alter aquatic food chains, and impact industrial and recreational uses of aquatic systems.

MANAGEMENT Prevention of introduction is the only known strategy to protect waterways. Individual recreational boaters and anglers should take proper precautions to reduce the risk of transporting this mollusk to uninfested waters.

FOR MORE INFORMATION

http://nas.er.usgs.gov/zebra.mussel/ or
http://miseagrant.umich.edu/ans/mussels.html

SPINY WATERFLEA

Bythotrephes cederstroemi

FISHOOK WATERFLEA

Cercopagis pengoi

BASIC ID Small planktonic waterfleas, both have a body of about 2 mm in length with a spiny tail of 8-10 mm long. They are difficult to see individually, but are most often detected as masses of animals snagged on nets or fishing line, with an appearance of cotton batting.

HISTORY Both these species were probably introduced to the Great Lakes via ballast water from deballasting cargo vessels. Spiny waterfleas are found in all the Great Lakes and a few inland lakes, and have been present since the mid-1980s. Fishook waterfleas are more recent invaders, discovered in Lake Ontario in 1998, and are now found in all Great Lakes. These species impact basic elements of the foodchain of the Great Lakes because both feed on other species of zooplankton and are able to attain extremely high population densities. Impacts may eventually reverberate up the food chain into fish populations.

MANAGEMENT There is no ecologically sound way to control these species once they become established. Anglers and recreational boaters need to take precautions to prevent their inadvertent introduction into inland lakes.

FOR MORE INFORMATION

http://www.great-lakes.net/envt/flora-fauna/invasive/spinyflea.html

or

http://www.epa.gov/glnpo/monitoring/exotics/cercopagis.html

ROUND GOBY

Neogobus melanostomus

BASIC ID A small bottom-dwelling fish (usually less than 18 cm) that is mostly restricted to waters of the Great Lakes. Gobies have large heads and soft bodies, and the appearance of adults can vary from having blotches of black and brown to grey to solid black. They also resemble sculpins, which are a native bottom dwelling fish. But unlike sculpins, gobies have a fused pelvic fin on their underside.

HISTORY Round gobies were probably introduced into the Great Lakes via ballast water discharge from commercial cargo vessels. They were first discovered in the St. Clair River in 1990 and have since expanded to all the Great Lakes, the St. Lawrence Seaway and the Mississippi River via the Chicago Sanitary Ship Canal. Gobies can outcompete and displace native bottom-dwelling species such as sculpin and some darters, and have the ability to survive in degraded water conditions.

MANAGEMENT An electric control barrier installed in the Chicago Sanitary Ship canal was too late to prevent gobies from moving into the Mississippi River, but similar barriers can prevent its dispersal into other canal-connected waterways. Control strategies are mostly limited to efforts to keep the goby from spreading, as there are no known environmentally sound control options.

FOR MORE INFORMATION

http://www.great-lakes.net/envt/flora-fauna/invasive/goby.html#overview

EURASIAN WATER MILFOIL

Myriophyllym spicatum

BASIC ID This species can be difficult to tell apart from other native aquatic plants. Like many other aquatic plants, it has slender stems with feathery leaves. It often forms dense mats of vegetation in shallow water.

HISTORY Eurasian water milfoil reached the Great Lakes from the east in the 1950s via boats and the movement of waterbirds. It is found in most if not nearly all inland lakes in Michigan, and can form dense mats of vegetation that crowds out native species. Its ability to establish itself from plant fragments is one of the reasons why this pest species has become so ubiquitous in inland waters in Michigan.

MANAGEMENT Mechanical harvesting and chemical treatments have long been used to control Eurasian milfoil, but such efforts are costly and can cause adverse ecological side effects. Recently, experimental releases of a native weevil that feeds preferentially on Eurasian milfoil have had some success in curtailing problematic milfoil infestations in some lakes.

FOR MORE INFORMATION

http://www.dnr.state.wi.us/org/land/er/invasive/factsheets/milfoil.htm

RUSTY CRAYFISH

Orconectes rusticus

BASIC ID Crayfish are very difficult to identify. A general characteristic which can be helpful in identifying rusty crayfish are rust-colored spots which sometimes appear on the sides of the body.

HISTORY Native to the central midwest, the rusty crayfish has expanded its range mainly via non-resident anglers bringing crayfish north for use as bait. It outcompetes native crayfish, and can have a substantial negative impact on beds of native plants, which are an important fish habitat.

MANAGEMENT Like most other aquatic invasive animals, there is no ecologically sound way to control this species other than preventing its spread.

FOR MORE INFORMATION

http://www.great-lakes.net/envt/flora-fauna/invasive/rusty.html

EURASIAN RUFFE

Gymnochephalus cernus

BASIC ID Ruffe resemble yellow perch in the body and have coloration similar to walleye (both relatives of the ruffe), but are smaller than both these species. Adults are typically 10 to 15 cm long, and differ from perch and walleye in that they have a large continuous dorsal fin with spots between its rays.

HISTORY Probably a ballast water introduction, ruffe were first detected in western Lake Superior in the mid 1980s and have been spreading slowly to other areas of the Great Lakes. Besides Superior, they are now found in Lake Huron near Alpena and Lake Michigan near Escanaba. Their aggressive nature has enabled them to out compete native fish species. They constitute over 80% of the bottom-dwelling fish community in the St. Louis Estuary in Lake Superior, and have invaded a small number of Lake Superior tributary rivers.

MANAGEMENT There is no known control strategy for this species, other than implementing strategies to prevent its spread. This species can potentially be spread to inland waters via bait buckets.

FOR MORE INFORMATION

http://www.seagrant.umn.edu/exotics/ruffeid.html

CURLY LEAF PONDWEED

Potamogeteon crispus

BASIC ID This invader is distinguished from other aquatic plants by undulating (or "curly") leaves.

HISTORY Curly leaf pondweed has been long established in Michigan, predating most of our other well-known invaders. It can be found in the Great Lakes as well as many if not most inland lakes and rivers, and can form dense mats of vegetation, much like Eurasian water milfoil.

MANAGEMENT Chemical control and mechanical harvesting have been used to control this species, but such measures are not without related adverse ecological impacts.

FOR MORE INFORMATION

http://www.great-lakes.net/envt/flora-fauna/invasive/pondweed.html

"While this is in no way an exhaustive list of all the "bad bugs" in Michigan, these creepers are of special concern to us now, while we still have a chance to minimize or prevent the damage they are likely to cause."

Bad Bugs

EMERALD ASH BORER

Agrilus planiplennis

BASIC ID Adults are slender beetles roughly 1.25 cm long, and metallic, coppery-green in color. Larvae are white, flat, slender grubs, about 2.5 cm long, with a pair of brown, pincer-like appendages at the rear of the abdomen. Infected ash trees exhibit small, D-shaped exit holes.

HISTORY EAB is native to northeastern China, Japan, Korea, far eastern Russia, and Taiwan. In China, it feeds only on ash trees and ash is the only species affected in Michigan. EAB also feeds on walnuts and elms in Japan. Thought to have been introduced to North America around 1996, EAB has been found in southeast Michigan, Ohio, Maryland and Ontario. EAB threatens to destroy native ash trees of all species throughout Michigan and beyond.

MANAGEMENT USDA has imposed a quarantine for Genessee, Ingham, Jackson, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Shiawassee, Washtenaw, and Wayne Counties. Survey ash trees for symptoms and contact the Michigan Dept. of Agriculture, Emerald Ash Borer Hotline (866-325-0023) if infected trees are identified. Don't transport ash trees or firewood from these counties!

FOR MORE INFORMATION
www.michigan.gov/mda (key word "ash borer"); or
http://www.na.fs.fed.us/spfo/eab/index.html

HEMLOCK WOOLY ADELGID

Adelges tsugae

BASIC ID A small, aphid-like insect that appears as white, cottony masses on the twigs and leaves of the eastern hemlock.

HISTORY The HWA first appeared in North America in 1924 and started feeding on hemlocks as it does in its native China. The insects suck the sap from the twigs and leaves and inject a toxic saliva. Leaves and twigs on lower branches will die first, and the entire tree will die within 2-3 years. Hemlocks in western North America are not affected, but eastern species are. Major die-backs have occurred in parts of the east, but not yet in Michigan.

MANAGEMENT The Michigan DNR recommends land owners carefully monitor hemlock trees and report any infestation immediately. Since HWA is primarily spread to native trees from planted stock, carefully inspect any purchased trees prior to planting. Do not bring hemlock trees into Michigan from infested areas.

FOR MORE INFORMATION
http://www.michigan.gov/dnr/0,1607,7-153-10367_11853_11944-33881--,00.html

ASIAN LONGHORNED BEETLE

Anoplophora glabripennis

BASIC ID The body of the adult beetle (excluding antenna) is about 3.2 cm in length, and shiny black with small white markings on its wing coverings. The long antennae are banded in black and white.

HISTORY The ALB was first detected in 1996 in New York City, where it was attacking maple and horse-chestnut trees. Three infestations have been discovered in Chicago, and insects have been found in packing material at a shipyard in Ohio. Native to southern China, Korea, and Japan, this beetle could enter Michigan either from existing infestations or via shipments of wood products from Asia. In 2003, an infestation of ALB was discovered in Toronto.

MANAGEMENT Report all suspected ALB infected trees to the Michigan DNR's Forest Management Division at (517) 373-1275. Once identified, prompt removal and destruction of infected trees is the recommended treatment.

FOR MORE INFORMATION
http://www.dnr.state.oh.us/forestry/Health/alb.htm

BALSAM WOOLY ADELGID

Adelges piceae

BASIC ID The BWA starts as a tiny (1.0 mm) crawler that matures into a small adult. Adults develop a wooly-white covering that gives them their name. Infected trees exhibit reddish foliage on dead branches.

HISTORY Established in North America in 1900, the BWA has spread throughout the US and southern Canada, infecting all species of true firs (Abies spp.). The Fraser (A. fraseri) and balsam (A. balsamea) firs are particularly susceptible, and massive die-offs have occurred. Infected trees produce abnormal, woody growths that compromise normal growth. Eventually, infected branches and the entire tree dies, typically over a period of 2-7 years.

MANAGEMENT The Michigan DNR recommends land owners carefully monitor balsam firs and report any infestation immediately. Since BWA is primarily spread to native trees from planted stock, carefully inspect any purchased trees prior to planting. Do not bring fir trees into Michigan from infested areas.

FOR MORE INFORMATION
http://www.michigan.gov/dnr/0,1607,7-153-10367_11853_11944-33877--,00.html

BEECH BARK DISEASE

combination of scale insect (Cryptococcus fagisuga) and a fungus (Nectria coccinea var. faginata)

BASIC ID The scale is a soft-bodied insect. At maturity, it is yellow, elliptical, and 0.5 to 1.0 mm long, typically covered by a white, wooly wax.

HISTORY The beech scale insect was introduced to Nova Scotia in about 1890, and by the 1930s was killing American beech (Fagus grandifolia) trees throughout eastern provinces and northern New England. Since then, it has spread westward and was identified in Michigan within the last 5 years. The scale weakens trees and opens the bark to allow infection by the fungus, which further weakens or kills the tree. The disease can kill 20-28 percent of adult trees, and weaken many more making them susceptible to other fungi.

MANAGEMENT Inspect beech trees for presence of the scale insect and report all positive identifications to the Michigan DNR (see website below). Ornamental trees can be treated with an insecticide (consult with a forest pest expert or county agricultural agent). Losses of trees in forests can be minimized only by salvage cutting. Some resistant trees occur naturally and propagation of these trees is showing promising results.

FOR MORE INFORMATION
http://forestry.msu.edu/msaf/ForestInfo/Health/BBdisease.htm

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