Lake Notes

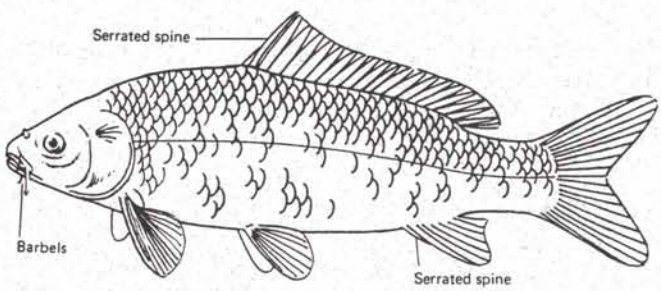
Aquatic Exotics

Exotic species are plants and animals released—accidentally or intentionally—into areas where they are not native. Such introductions usually occur through human activities. Removing a species from its native environment frees it from natural predators, parasites, pathogens, and competitors that limit its numbers. A newly-introduced exotic species is often capable of explosive population growth.

This *Lake Notes* publication will introduce you to some aquatic exotics that could become a problem in your lake. Included are profiles of seven exotics that are currently present throughout Illinois or are spreading through the state. Each profile will help you identify the species and give you some background on how it spreads and what effects it can have on a lake ecosystem. On the back page is a checklist you can use to help control the spread of aquatic exotics.

Common Carp

In 1885, to improve commercial fishing in the state, every river system in Illinois was stocked with common carp (*Cyprinus carpio*). Originally from Europe, the carp was chosen for this purpose because it is quite hardy, spawns in large numbers, grows rapidly, and can sustain a very high population level over a wide range of conditions.



Carp can tolerate water with extremely low oxygen levels and high temperatures, unlike many native fish that perish under such conditions. Carp's acute senses of smell, taste, and hearing allow them to function well in low light conditions, giving them a competitive advantage over sight-feeding fish such as sunfish, bass, and perch. In fact, the bottom-feeding habits of carp perpetuate the low light conditions in which they excel, allowing carp to out-compete other fish species for food.

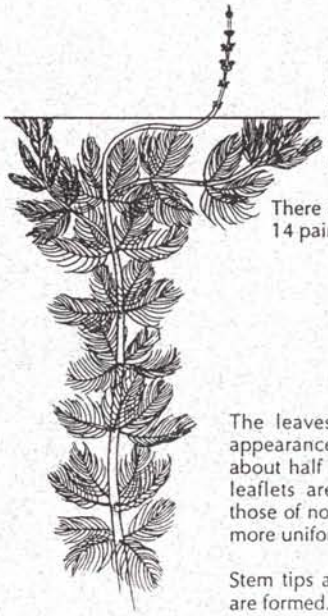
Carp feed by rooting along the bottom, pushing their snouts through silty substrates. Lakes with significant carp populations can have their water clarity reduced to a few inches by carp feeding activity. Furthermore, existing aquatic plants are uprooted by the carp, and new plants cannot become established due to the low water clarity and continued bottom disturbance. By disturbing sediments, carp promote the recycling of nutrients to the overlying water, creating the potential for increased algae growth.

Eurasian Watermilfoil

Eurasian watermilfoil (*Myriophyllum spicatum*) is a submergent aquatic plant native to Europe, Asia, and North Africa. Whether it was inadvertently introduced into the United States or deliberately brought in as an aquarium plant is unknown. Its first documented sighting was in the District of Columbia in 1942. Since then, Eurasian watermilfoil has expanded its range to at least 36 states as well as Canada.

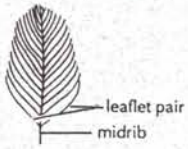
Eurasian watermilfoil forms thick underwater tangles of stems with vast mats of vegetation breaking the surface. The stems become wrapped around boat propellers, and the vegetative mats are nearly impossible to swim through. Because the vegetation is so thick, it impairs the ability of predatory fish to catch smaller fish, often leading to an overpopulated and stunted fish community.

Eurasian watermilfoil has the ability to grow from stem fragments and stolons (specialized stems that "creep" over the lake bottom). A fragment as small as one stem segment with leaves can take root and grow. Fortunately, Eurasian watermilfoil has difficulty becoming established in lakes with an undisturbed native plant community.



Eurasian water milfoil is a submersed aquatic plant with feather-like leaves arranged in whorls (circles) on the stem.

There are usually more than 14 pairs of leaflets per leaf.



The leaves have a distinct feather-like appearance, with the lower leaflet pairs about half the length of the midrib. The leaflets are more equal in length than those of northern water milfoil, creating a more uniform leaf margin.

Stem tips are tassel-like. No winter buds are formed.

Branching is abundant in water 3-10 ft. deep.

However, it is able to quickly take advantage of any disturbed areas, and its growth habits allow it to rapidly dominate a lake and shade out native plants. It is very easy to transport Eurasian watermilfoil from lake to lake on boats, trailers, anchors, personal watercraft, or any other equipment that moves from lake to lake. Following the checklist on the back of this publication can reduce the likelihood of spreading Eurasian watermilfoil.

Purple Loosestrife

Purple loosestrife (*Lythrum salicaria*) is a rather attractive plant that grows in moist soils (including shallow water areas), with a preference for disturbed areas. Purple loosestrife was introduced to the United States in the early 1800s as an ornamental plant. It was cultivated in the eastern U.S. and spread to the Midwest in the 1880s.

Purple loosestrife grows in very dense masses in wetland environments and along lake shorelines. It can take over a wetland, becoming virtually the only plant growing in the area by literally shading out native species. Wildlife numbers also decline in a purple loosestrife-dominated system due to the reduction in habitat diversity and the limited habitat and reduced food value purple loosestrife provides.

Purple loosestrife spreads primarily from seed. Each plant can produce as many as 10,000 seeds each year, although plants also can grow from broken stems that root in moist soil. Seeds may lie dormant for several years waiting for appropriate conditions. Any area that has supported purple loosestrife in the past likely will have a large bank of dormant seeds in the surrounding soil. The seeds are easily carried by animals or flowing water.

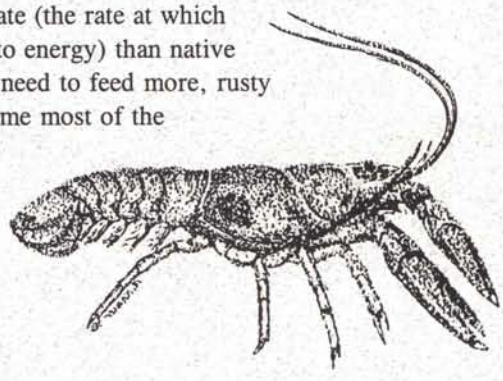
Most sunny wetlands or shorelines are suitable habitat for purple loosestrife. Chances of colonization are greatly enhanced by disturbances such as water drawdown, damaged vegetation, or exposed soils. Invasion by purple loosestrife usually begins with a few pioneering plants that build up a seedbank in the soil. When an appropriate disturbance comes along, the population explodes.

Purple loosestrife grows 2 to 7 feet tall above the water; has numerous small purple flowers at the tip of a stiff, four-sided stem; 5-6 petals per flower; opposite, sessile leaves (attached directly to the stem); blooms July to September.

Rusty Crayfish

The rusty crayfish (*Orconectes rusticus*) is native to the southern United States and was introduced to Illinois by fishermen discarding unused bait into lakes and streams. The rusty crayfish was first seen in Illinois in 1973. It is now found throughout the northern half of the state, often near areas of intense recreational fishing pressure.

Native crayfish are displaced by rusty crayfish in systems where rusty crayfish have become established. Rusty crayfish are generally larger and more aggressive than native crayfish. They can physically force the native crayfish out of sheltered areas, making the natives more susceptible to predation. Because rusty crayfish have a higher metabolic rate (the rate at which food is converted to energy) than native crayfish, and thus need to feed more, rusty crayfish can consume most of the aquatic vegetation in an area. This, in turn, deprives small or juvenile fish of necessary habitat.



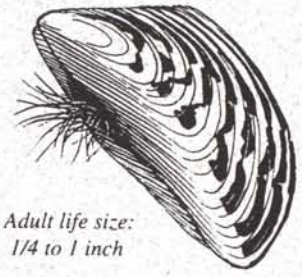
Rusty crayfish can be identified by dark rusty spots on each side of their carapace (midsection). These spots appear as if someone with paint on their forefinger and thumb had picked the crayfish up. The claw of the rusty crayfish is relatively smooth and gray-green to reddish-brown.

Illinois law prohibits the possession and sale of live rusty crayfish. Strict enforcement of this law is the only currently known means to slow the spread of the rusty crayfish in Illinois. You can help by notifying your regional office of the Illinois Department of Natural Resources (IDNR) if you suspect they're being sold as live bait.

Zebra Mussel

Zebra mussels (*Dreissena polymorpha*) are fingernail-sized mussels native to the Caspian Sea area of Asia. They were discovered in Lake St. Clair near Detroit in 1988. Tolerant of a wide range of environmental conditions, they have since spread throughout the Great Lakes and the Mississippi River system. They are now showing up in inland lakes throughout the Midwest.

Zebra mussels cause economic damage by clogging intake pipes of water treatment and power plants as well as boat engine cooling systems. Ecologically, they have reduced and may eradicate native mussel species by colonizing upon them in huge numbers and essentially smothering them. Zebra mussels can become so dense (30,000 to 70,000 per square yard) that their filter feeding activity (up to a quart of water per day per mussel) can have a dramatic effect on the surrounding waterbody. By filtering plankton out of the water, they can significantly increase water clarity and change the ecological structure of the lake community.



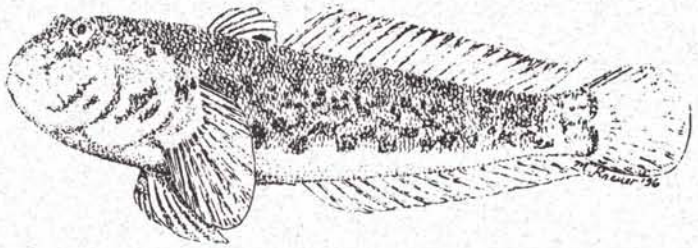
Adult life size: 1/4 to 1 inch

Zebra mussels were originally introduced to North America through the bilge water of an oceangoing vessel and have used similar means to travel to new lakes and rivers since their arrival. The adult mussels can survive out of the water for several days (longer in a moist environment). Zebra mussel larvae (called veligers) can be transported in engine cooling water, live wells, bilges, etc.—as long as there is a pool of water available. The best way to reduce accidental transport of zebra mussels is to follow the checklist on the back page. If you suspect zebra mussels have become established in your lake, call one of the phone numbers listed.

Round Goby

The round goby (*Neogobius melanostomus*) is a small fish that is native to the Black and Caspian Sea areas of Asia. It was first seen in North America in 1990 in the St. Clair River near Detroit. It is suspected that the fish was transported in the ballast water of an oceangoing ship. By 1995, the round goby was known to be established in Duluth, Minnesota; Cleveland, Ohio; South Haven, Michigan; and along most of Illinois' Lake Michigan shoreline.

Round goby are bottom-dwellers and compete for food and habitat with native fish like sculpins. Compared to the sculpin, the round goby is more aggressive, breeds more prolifically, and occurs in greater densities. The round goby also is able to tolerate degraded water quality.



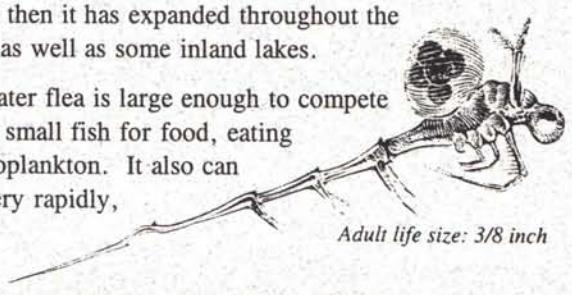
Even though it has not been found outside the Great Lakes, it seems likely that the round goby is capable of surviving in the Midwest's inland waters. Round goby should not be transported to any waterbody, for any reason.

The round goby is easily confused with native sculpin. The goby is a soft-bodied fish that can reach 10-12 inches in length. It is covered with small scales, unlike native sculpin which are scaleless or sparsely covered with prickles. The round goby has pelvic fins that are fused into a disk, a distinguishing characteristic for the goby family. Sculpin have two independent pelvic fins. Scientists at the IDNR-Natural History Survey's Lake Michigan Biological Station are especially interested in the round goby. If you think you may have found a round goby outside of Lake Michigan, please call the Lake Michigan Biological Station (847/872-8677).

Spiny Water Flea

The spiny water flea (*Bythotrephes cederstroemi*) is a small (less than ½-inch long) crustacean native to northern Europe. It first appeared in the U.S. in Lake Huron in 1984. Since then it has expanded throughout the Great Lakes as well as some inland lakes.

The spiny water flea is large enough to compete directly with small fish for food, eating primarily zooplankton. It also can reproduce very rapidly,



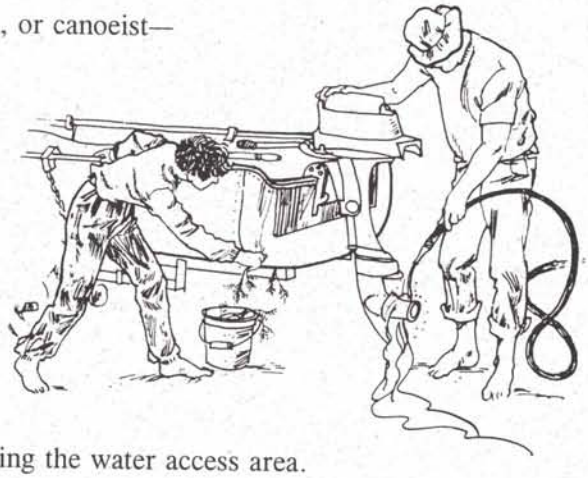
Adult life size: 3/8 inch

up to ten offspring every two weeks. As its name suggests, the spiny water flea has a long, sharp, barbed tail spine. This spine makes it difficult for predators to ingest. In fact, would-be-predators often spit the spiny water flea back out unharmed.

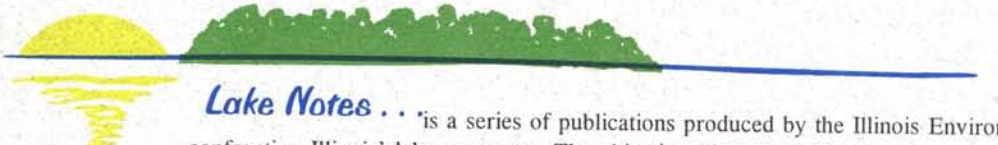
Spiny water fleas can travel from lake to lake unseen in bilge and bait bucket water or attached to fishing tackle or other equipment. When seen on a fishing line, they look like bristly gobs of jelly with black spots. Following the steps in the checklist below will help control their spread.

Help stop the spread! Follow this checklist against aquatic exotics:

If you are a water recreationist—a boater, angler, water skier, sailor, or canoeist—there are some important things you can do to help prevent the spread of aquatic exotic species.



- ✔ Don't transport water, animals, or plants from one lake or river to another.
- ✔ Never dump live fish from one body of water into another.
- ✔ Remove plants and animals from your boat, trailer, and accessory equipment (anchors, centerboards, trailer hitch, wheels, rollers, cables, and axles) before leaving the water access area.
- ✔ Drain your livewells, bilge water, and transom wells before leaving the water access area.
- ✔ Empty your bait bucket on land, never into the water. Never dip your bait or minnow bucket into one lake if it has water in it from another.
- ✔ Wash your boat, tackle, downriggers, and trailer with hot water when you get home. Flush water through your motor's cooling system and other boat parts that normally get wet. If possible, let everything dry for three days (both hot water and drying will kill zebra mussel larvae).
- ✔ Learn what these organisms look like. Don't purchase exotic species as bait or for ornamental plantings. If you suspect a new infestation of an exotic plant or animal, report it to Illinois EPA's Lakes Unit (217/782-3362), Illinois DNR's Division of Natural Heritage (217/785-8774), or Illinois DNR's Natural History Survey at the Havana Field Station (309/543-6000) or the Lake Michigan Biological Station (847/872-8677).
- ✔ Consult with Illinois EPA's Lakes Unit (217/782-3362) or your local Illinois DNR district fishery biologist for guidance before you try to control or eradicate an exotic "pest." Remember, exotic species thrive on disturbance. Do-it-yourself control treatments often make matters worse and can harm native species.



Lake Notes . . . is a series of publications produced by the Illinois Environmental Protection Agency about issues confronting Illinois' lake resources. The objective of these publications is to provide lake and watershed residents with a greater understanding of environmental cause-and-effect relationships, and actions we all can take to protect our lakes.

Appreciation is extended to the Illinois DNR, Wisconsin DNR, and Minnesota DNR for permission to excerpt illustrations from their publications, and to Martha Kneuer of the Illinois DNR-Natural History Survey for her rusty crayfish and round goby sketches.

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For more information about other publications in this series and to request copies, please contact: Illinois Environmental Protection Agency, DWPC-Lake and Watershed Unit, P.O. Box 19276, Springfield, Illinois, 62794-9276; 217/782-3362.

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