Water Column

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Exotic Invaders: Watershed Disturbances and Considerations

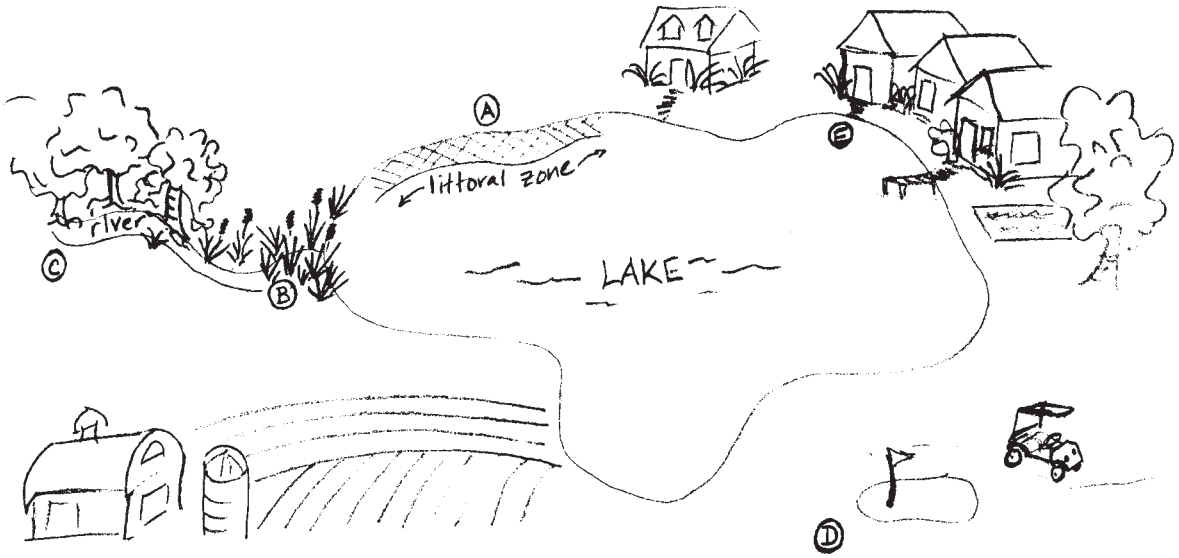
by Melissa Clark

With European expansion into the New World, not only did human cultures and traditions expand but we've also seen the widespread transport and expansion of plants, animals, and disease organisms. Humans have aided this transport, intentionally and accidentally. For example, over three-quarters of the exotic aquatic plants affecting the northeastern U.S. are escapees from human cultivation. Biologist C.S. Elton has called this expansion "one of the great historical convulsions in the world's fauna and flora." This convulsion of exotic organisms is "biological pollution" to the ecosystem's integrity. Because of the widespread transport of exotic organisms, this cosmopolitan concern now threatens the biological integrity of many lakes in Indiana and the United States in general.

Exotic species are organisms not native to the established ecosystem and are usually significantly distant from their native geographic range. According to Richter et al. (1997), there are three primary impacts that affect watersheds: (1) exotic species, (2) sediment and nutrient loads, and (3) changes in water levels. Exotic species' impacts may surpass the others in importance because of their ability to completely change native plant and animal communities. Human disturbances of natural environments are inevitable in growing populations where new development replaces natural areas. Along with this growth come continued opportunities for invaders.

Disturbances and land alterations within watersheds provide a window of opportunity for exotic species to invade stressed habitats, further pushing out and replacing the native species. There are two primary pathways for exotics to get established in new areas, and this often results in the extinction of native species. First, human disturbances create "novel microhabitats" that are more inviting to the invaders, which are often opportunistic organisms. Second, once exotic invaders occupy microhabitats, they establish a "foothold" from which they can spread even further. Both of these scenarios allow exotic species even better opportunities to become more colonized as more disturbances occur.

What sort of disturbances would we expect with our Indiana lakes? Well, lakes suffer from many natural disturbances and an increasing number of human-caused disturbances. Wave action and flooding are examples of natural disturbances, while increased nutrient runoff and habitat destruction are a few examples of human contributions. The *ecotones* or margins of lake systems, primarily wetlands and littoral zones, are most intensely subject to these disturbances and this is where we find most exotic invaders. Joy Zedler spoke of the aggressiveness and invisibility of exotic invaders at the 2001 NALMS Symposium. Her studies of the aquatic species "reed canary grass" (*Phalaris arundinacea*) demonstrated this species' ability to displace an entire community. Reed canary grass was able to invade and establish the foothold necessary to dominate the entire native community and establish a monoculture.



Note many of the areas of possible watershed disturbances that provide exotic species with the "foothold" advantage. (A) The littoral zone of lake and reservoirs is always subject to wave action and more intense human disturbance. This can allow more aggressive vegetation strains to dominate that aquatic community. (B) Wetlands are the interface for the aquatic and terrestrial systems. Because they occupy the narrow band between two other habitats, these wetlands are more susceptible to disturbance, increasing the opportunity for invaders. (C) Riparian corridors provide a pathway for exotics to move throughout the watershed. (D) Watershed activities such as agriculture and golf courses subject the plant communities to additional and sometimes excessive nutrients and irrigated water. Native plants, which are accustomed to our hot dry summers, won't indulge in the excess. (E) Lakeshore activities can encourage exotic invaders through habitat alterations and increased nutrient loading from lawn care products. For example, sea walls cause more erosive wave energy that stresses native plants giving them less resilience to an invasion. Drawing by Melissa Clark.

Why is this important to our lakes? Anyone living within a lake watershed has the ability to contribute to communities of exotic invaders, both positively and negatively. For example, many people enjoy green lawns and vibrant flowerbeds. Irrigating and fertilizing lakeshore lawns increases the availability of nutrients to exotic species as well. This then provides the invaders with the advantage needed to out-compete native species and establish a foothold. Why don't the native species respond with the same aggressiveness? In most cases, enhanced nutrient and water levels are unnecessary and excessive for the survival of native species, but they instead stimulate the exotic species. For example, the aquatic plant species that is most troublesome in Indiana lakes, Eurasian watermilfoil (*Myriophyllum spicatum*), prefers growing in soft sediments, often supplied by recent sediment additions to lakes. Once established, Eurasian watermilfoil forms dense canopies that shade out native, more desirable aquatic plants.

Managing and controlling exotic species is a time- and resource-intensive activity, so understanding which exotic species are impacting your lake system is critical. Some exotics, like the reed canary grass, are more aggressive than others, and thus demand higher prioritization.

In addition, although exotic invaders carry many negative attributes, they do occupy space and perform a function in the lake ecosystem. How do you replace this missing function when removing the exotic species? If your lake association plans to remove exotic plant species, is there a plan to jump-start the system by planting native species to replace the exotics? Remember, removal is a disturbance that the same or another exotic invader can take advantage of and gain another foothold.

Extra Hunts Nixed as Canada Goose Control

Northeast Indiana lake residents honked off about too many Canada geese in their front yard won't be getting any help from area hunters, at least not yet. According to Melody Miller, waterfowl research biologist with the Division of Fish and Wildlife, not enough is known about the make-up of late winter nuisance goose populations for northeast Indiana to qualify for a late-season goose hunt.

Proponents of late-season hunting say nuisance goose concentrations could be reduced by hunting in certain areas just in time before nesting. Contrary to claims by local lake residents who say fall and winter flocks of geese are comprised mostly of birds that stay the year-round, Miller says too many migratory non-native geese may be mixed in with the native goose population.

Based on criteria established by the U.S. Fish and Wildlife Service, non-native geese—called "interiors"—must comprise less than 20% of the geese in a nuisance area in order to qualify for a late-season hunt.

Because Canada geese are migratory, the USFWS has authority over how individual states regulate goose hunting. Current rules, based on public input, allow hunters in northeast Indiana to shoot geese only through mid-December. States can, however, petition the USFWS to change local regulations where justified.

A survey conducted last year between January 14 and March 11 indicated non-native geese made up more than 20% of the population in northeast Indiana. Without more data, Miller says the area does not qualify for a special late-season hunt.

Miller says at least two more years of study are needed before the area might potentially qualify for a special late-season hunt, but a planned survey this past winter was cancelled due to state budget limits. "Now we'll have to wait even longer for a possible late-season hunt," says Miller.

Grass Carp Prove "Safe" After Ten Years

Ten years after Indiana fish and wildlife officials lifted a ban on importation and stocking of triploid grass carp in private ponds, fisheries biologists have yet to find a single specimen of the large sterile, plant-eating fish in northeast Indiana natural lakes.

Biologists say few grass carp have apparently escaped from private waters and those that may have gotten into public lakes cannot reproduce. No grass carp have been caught during standard fish population surveys of dozens of natural lakes in the region and no anglers have reported catching grass carp in any natural lake.

Pond owners were granted approval by the Division of Fish and Wildlife to stock triploid grass carp in private waters in 1992 as a supplement or alternative to using herbicides to control aquatic plants.

The fish, originally imported from Asia but made functionally sterile by hatchery techniques, feed on soft, rooted aquatic plants submerged below the surface but will also eat cattails, rushes, and other emergent plants. As a result, biologists have been concerned that widespread distribution of grass carp could damage sensitive wetlands and natural lake ecology.

During the past five years, DFW records indicate 5,600 grass carp have been stocked into 492 lakes and ponds in a seven-county area, including Elkhart, LaGrange, Steuben, Kosciusko, Noble, DeKalb, and Whitley.

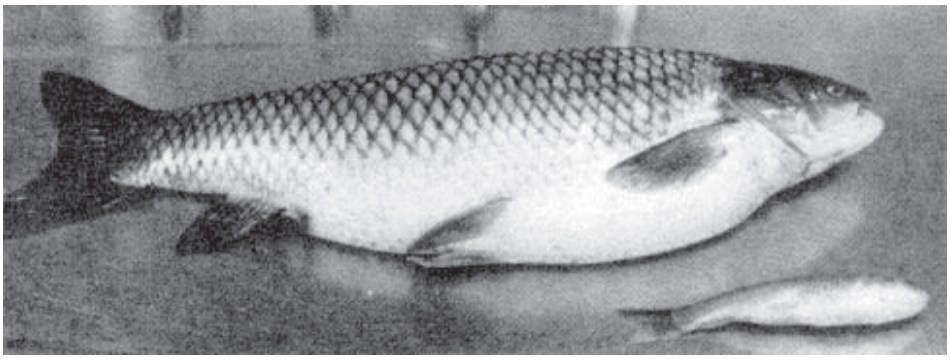
Despite the large number of stockings. Pearson says current rules limit the chances of widespread distribution of grass carp and reduce the risk to natural lakes. All grass carp stocked anywhere in Indiana must be triploid grass carp. Triploid fish, unlike diploids, have a third set of chromosomes induced by cold-shocking grass carp eggs in the hatchery. This prevents the development of normal eggs in adult fish.

Second, all grass carp stockings must be made on-site by licensed aquaculturists. Any pond owner who wants triploid grass carp must have the fish stocked personally by a private hatchery. Pond owners cannot pick up and stock the fish themselves.

In addition, the DFW maintains a ban on any grass carp stockings at public natural lakes. Lake residents who want to control vegetation along their lakefront property must use other means.

"We think the decision to allow triploid grass carp in private waters was a good one," says Pearson. "Pond owners are apparently using them in a responsible way and haven't stocked them indiscriminately or in places where they are likely to escape."

A nine-inch triploid grass carp stocked in a plant-infested pond can grow to lengths of 29 inches and weights of almost 20 pounds in 16 months. Source: University of Georgia School of Forestry



Water News in Brief

Chapman Lake is On the Web

Dan Lee, president of the Chapman Lake Conservation Association, Inc. reports that their new Web site is up and running at: www.chapmanlake.com. The group developed the site to provide information to their members. Included on the site are: "hot topics", educational materials, and links to other sites.

If other lake associations out there sponsor their own Web site, please let us at *Water Column* know and we can help you publicize it.

New Laws Bring Penalties for Boating Accidents, Tossing Cigarettes

Associated Press

Randy Delph remembers lying in the boat, his right side sliced open from armpit to hip, as he listened to the motor of another vessel fade into the darkness. The people aboard the speedboat that had just hit him yelled that they would send help. They never did.

Now, a year after the collision on Morse Reservoir north of Indianapolis, a new state law creates tougher penalties for anyone who leaves the scene of a boating accident resulting in serious injury.

The tougher boating penalties took effect July 1, along with dozens of other new laws approved this spring by the Indiana General Assembly. Delph and a fishing buddy who was also injured were eventually rescued by two off-duty police officers. They later testified before lawmakers in support of the new, stiffer penalties.

At the time of the July 14 crash, fleeing a serious boat accident was a misdemeanor, punishable by up to 60 days in jail and a $500 fine. The new law makes leaving the scene of a boating accident resulting in injury or death a felony, punishable by up to eight years in prison and a $10,000 fine.

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Perspectives

- If you can start your day without caffeine,
- If you can always be cheerful, ignoring aches and pains,
- If you can eat the same food every day and be grateful for it,
- If you can understand when your loved ones are too busy to give you any time,
- If you can forgive your friends for their lack of consideration,
- If you can take criticism and blame without resentment,
- If you can ignore a friend's limited education and never correct him,
- If you can face the world without lies and deceit,
- If you can conquer tension without medical help,
- If you can sleep without the aid of drugs,
- If you can honestly say that deep in your heart you have no prejudice against creed, color, religion, or politics,
- Then, my friend, you're almost as good as . . . my dog!

—Author Unknown

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