

White Paper

Lakeland Security -- A National Crisis Facing Our Lakes
What Can Be Done? And Why Can't We Do It Now?

New Weapons on the Horizon



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Abstract

A wide survey of aquatic biologist, regulatory agencies, and industry experts all agree on two things:

1. Invasive species are the worst problem facing our lakes.
2. The invasive species problem is getting worse.

Experts differ is on how rapidly the problem is spreading and their variance ranges from near critical to critical.

The purpose of this white paper is to assess the current state of the treatment of aquatic pests, the threats, and the future potential. The secondary goal is to identify the threats, trends, and opportunities on the horizon that will impact the growth of the entire industry.

While the knowledge base ranges from elementary to advanced this paper may serve novices, potential customers, journalists, as well as industry experts.

Executive Summary

While invasive species were growing from a phenomenon to an epidemic the ignorance of the public made it virtually impossible for scientists and lake experts to convey what was going to happen to our aquatic resources.

While the public was slow to realize the ecological and economic repercussions of invasive species, the slow and painful deliberation over safe and effective treatments allowed the problem to grow at exponential rates. This is where we will begin our analysis.

The Slow Progress of the Public's Education

Over the past 3 years the level of awareness regarding invasive species has grown at a rapid pace. Internet searches as well as Lexis/Nexus searches of media publications have increased along with the amount of available material on the subject. Lake patrons and journalists alike are learning more about the invasive species crisis and are spreading the news.

In the Sunday edition of the December 12th 2004 Milwaukee Journal-Sentinel, the headline reads, *Paradise in peril Lake Michigan is showing signs of vulnerability - or even ecological breakdown*, It was a lead story on the front page, in a 3 part series.

Why would something as innocuous as aquatic weeds be of interest to so many people? This problem is important to many diverse people and industries. Industries such as real estate, tourism, recreation, fishing, boating, resorts, wildlife enthusiasts as well as environmental activists, have a keen interest in this problem and a vested interest in seeing that it is remedied.

Almost as important as being aware of the problem is the growth of understanding on how to resolve the problem before it is too late. Most would agree, ignorance of invasive species has allowed the problem to grow unabated for many years. Unfortunately, the fear of chemical solutions almost let the problem develop into a death sentence for our lakes.

Carlton Layne of the Aquatic Ecosystem Restoration Foundation compared the situation to a terminal cancer patient being told by a doctor or the FDA that the best treatment for his situation is 4 years away from being released so he should just enjoy the last 6 months of his life taking comfort that his destiny was certain.

That analysis is insightful because today government regulators must weigh the safety of long and laborious testing and trials against the pleading of patients and their families to make the drugs/treatments available to save a child or loved one's life in the face of certain death.

Regulatory agencies are rightly concerned that they don't want to replace one problem with another. Especially if they believe there is a chance the replacement problem could be worse and more irreversible than the first.

Where There is Economic Pain, There Are Funds Available to Alleviate It

The Wisconsin Department of Natural Resources(WDNR) shows us the economic pain invasive species causes everyone.

From the WDNR website:

Economics. *The costs of controlling exotic species in the United States increase every year. A typical consumer absorbs these costs through higher water and electric bills. A Cornell University study reports that exotic species on land and water already cost the United States \$138 billion annually. The Great Lakes sport and commercial fishing industry, valued at almost \$4.5 billion annually, is at risk due to the growing numbers of exotics such as the zebra mussel, spiny water flea, sea lamprey, ruffe and round goby that prey on clams and mussels, invertebrates of all sizes, as well as fish eggs and small fish. Large water users in the Great Lakes, including municipalities and industries, spent about \$120 million from 1989 to 1994 to combat the spread of zebra mussels.*

Health. *Some exotic species may cause significant health problems. For example, a South American strain of human cholera bacteria was found in ballast water tanks of ships in the port of Mobile, Ala. in 1991. Cholera strains also were found in oyster and fin/fish samples in Mobile Bay, resulting in a public health advisory to avoid handling or eating raw oysters or seafood. Temporary bans on commercial harvest may be put into effect when health concerns exist.*

Ecological. *The rapid spread of zebra mussels in the Great Lakes shows how profoundly an exotic can alter the aquatic environment. These tiny mussels rapidly reproduce. Coupled with consumption of microscopic plants and animals, zebra mussels affect the aquatic food web, decimate native mussel/clam populations and place valuable ecological community's resources at risk.*

Recreational. *Invading species such as the sea lamprey, ruffe and round goby can harm native fish such as lake trout, walleye, yellow perch and catfish, which threaten a national sport and commercial fishing industry valued at almost \$4.5 billion annually that supports 81,000 jobs in the Great Lakes. Aquatic invasive plant species such as purple loosestrife and Eurasian water milfoil quickly established themselves and in some cases replaced native plants. The proliferation of these exotic plants impairs boating, swimming and fishing, navigation and flood control, and degrades water quality as well as fish and wildlife habitat. -- List compiled from the Aquatic Nuisance Species Task Force and the Great Lakes Panel on Aquatic Nuisance Species.*

The Nations Post 9/11 Attitudes Shape Industry Policy and Lifestyles

What possible impact could 9/11 have on the best management practices of a lake? That catastrophic event showed us the value of preparedness in our personal and professional lives. It showed us that intervention and prevention can save lives, cost less, and produce better long term outcomes. We are finally seeing this philosophy being applied to lake management. Since invasive species has been recognized by nearly every respected professional involved in studying, managing, and restoring lakes, a new attitude is taking

hold – Lakeland Security. Much like homeland security, the mentality is to a.) Educate the public to the nature of the threat, b.) Take measures to prevent an event, c.) If an event takes place, have procedures in place to minimize the destruction, d.) Maintain vigilance to prevent a similar event from taking place nearby or as far away as any part of the country.

“Clipping” The Consequences of Harvesting

Some lake managers and regulatory agencies took solace in weed harvesting as a far better alternative to “dreaded chemicals.” Slowly people on the lake have realized that the time elapsing between “harvests” was getting shorter and shorter due to a cultivation effect that was creating more fragments with every cut.

Lake managers began to notice that invasive species were showing up in other parts of the lake as a result of the fragmented plants being transported throughout the lake. Some industry experts feel that these harvesters may be spreading exotic species to other lakes through undetected sprigs on the equipment when used in other lakes. It is accepted fact: that if you transport Eurasian Water Milfoil plant fragments whether on a harvester or a boat trailer to another lake there is a high possibility that you will infest a new lake!

As the outcomes of harvesting became more obvious it went from a preferred method to a solution that can cause a faster spread of exotic plant species to other parts of the lake, or even other lakes.

Weevils and Other Biological Treatments

The advancement of weevils as a treatment method has shown demonstrated success in various environments and on specific species. Weevils would seem to be the dream solution for a biologist – an insect that is feeding upon a plant that you want eradicated or at the very least, limit its growth. Unfortunately, weevils act much like a virus acts toward its host. A virus attacks the host not with the intent to kill it but to ensure the virus has a meal ticket for years to come.

Fortunately for viruses, but unfortunately for weevils, they both are highly vulnerable to temperature and other environmental changes. This would not be a huge issue as weevils could be replaced on a seasonal basis. The major drawback is that weevils can be very expensive so ongoing replacement may not be financially possible. Unfortunately, the larger the body of water, and/or treatment area, the greater the need for a larger quantity of weevils. This could make the financial cost of treatment completely out of reach.

Biologists and environmentalists have to wonder whether some day the weevils they introduce into a body of water will become an invasive species.

Advances in Chemicals

Since the size of the Aquatic industry is only a small fraction of the size of the agricultural industry, chemical companies have been reluctant to invest in bringing new products to market. Considering the massive development costs, regulatory approval costs, the uncertainty of approval, and the lengthy time to market, their efforts could net better returns on a much larger market.

In spite of all these barriers several success stories are emerging in the aquatic pesticide industry. What is also encouraging is the news that there has been an increase in the amount of registrations being filed giving the industry hope of a whole new generation of chemicals that will offer lower levels of toxicity, higher selectivity and efficacy.

Perhaps the best news of all is the attitude of regulatory agencies and the patrons of states natural resources. Many now see pesticides applications as a preferred method versus the treatment of last resort. This enlightenment could greatly slow the proliferation of invasive species and hopefully reverse the trend the experts see as “getting substantially worse” downgraded to at least, staying the same.

The Last Barrier

Nearly every patron of the environment stated their level of comfort, using chemicals as a preferred method, was much higher than three years ago. So, why aren't regulatory agencies green lighting projects at a higher rate than three years ago? Application methods are their concern. When asked about their hesitation they stated, “They didn't want to let loose a bunch of nozzle heads on the environment.”

In spite of:

- a. All the education and awareness on the invasive species problem
- b. With people realizing that they must take a “Lakeland Security” philosophy to protect the lakes
- c. With the knowledge that other methods such as harvesting may actually make the problem worse
- d. With the unfulfilled promises of weevils and other biological methods
- e. With the advances of safe, effective, selective and low toxicity chemicals

What is the key component missing to best solve invasive species problems and launch the growth of the industry?

The Birth of Precision Application Systems for Aquatics

The missing component in aquatic pesticide application is a precision application system designed to enhance the planning, selectivity, efficacy, reporting, and overall application of aquatic pesticides. Such a system would alleviate many concerns facing lake managers seeking the right treatment for their lake as well as regulatory agencies issuing permits to treat lakes.

One of the biggest winners would be the professional aquatic pesticide applicator. A precision application system gives the professional applicator greater credibility over “part-time” applicators when bidding for projects. It is entirely possible that all bids, especially bids involving local, state, or federal grant money, would have precision application methods bid specifications.

What Exactly is a Precision Application System?

A precision application system uses the latest technology in dispensing/application equipment, global positioning unit, and floatation device and configured into a fully integrated system. This paves the way for computer technology to pull it all together using *CB-PLC (Computer Based Program Logic Control)* to accurately measure flow, location, water depth, mapping, report writing, as well as hundreds of other parameters specific to each project.

History of the Aquatic Pesticide Application System (APAS)

From the start of his career in assessing exotic species impact on endangered species, Joshua Britton continuously looked for better and more precise ways to treat lakes. Mr. Britton recognized the importance of the chemicals used to manage lakes were not only safe and effective, but could actually save the lakes from their own demise.

It always concerned Mr. Britton that the contemporary application methods of the time and accuracy though well intentioned left much to be desired. Those methods were causing excess applications in areas that required less treatment and insufficient applications in areas that needed higher concentrations. The results caused waste of expensive chemicals, unnecessary higher concentrations in benign parts of the lake and more importantly, the potential for negative impacts on non-target species.

At that time, Mr. Britton was quite familiar with remote sensing and Global Positioning Systems. Even though they were not commonly used, were very expensive and not as accurate as today’s systems. He integrated the 3 elements of his aquatic pesticide application system. 1. A dispensing system. 2. A flotation device and 3. The GPS Processor which made the other two elements more effective and created possibilities for aquatic pesticide applications, reporting, increased efficiency, greater accountability and tracking.

Through carefully engineered methodology a complete system was developed using the latest technology, combining the best practices of the multiple industries, proprietary mapping and calibration software. After years of experimentation and refinement the first working prototype was introduced as proof of concept.

Since its inception, the results are measurably better than conventional methods. As more development took place more benefits to the industry began to emerge.

What Will This Do For the Industry?

The impact of Precise Application Systems will revolutionize the Aquatic Pesticide industry as well as regulatory agencies, lake management groups, chemical

manufacturers and even environmentalists. The system essentially reduces the fear of over applying even the safest of chemicals to the most toxic.

A comprehensive reporting system is being developed that will take the captured data from an application and upload it to a state, EPA, or conservation organization giving them, and the public, total access to the data. This information and the access to it, raises the credibility of the industry to an entirely higher level.

Professional pesticide applicators believe the system may become the industry standard raising the standards and investment to participate in the industry. This may lead to “part-time” application “companies” from remaining and discourage “part-time nozzle heads” from entering the industry.

Professional applicators should be able to increase their profit margins in the following ways:

- ◆ Faster, and more accurate pre treatment surveys
- ◆ Better quotations through better knowledge of the scope of the project
- ◆ Less waste of costly chemicals by over spraying untargeted areas or species
- ◆ Accurate and professional after action reports that can be given to the regulatory official or customer for complete maintenance coverage
- ◆ A reporting system that can download all application data to Federal or State regulatory agencies so they can better track applications, by lake, by chemical, by applicator, by target species and allows them to issue permits with confidence.

On the consumer side, the demands of the customer seeking precision application services may insist on a certified or licensed service provider to treat their lake.

It is also entirely possible for regulatory agencies to revise their policies to insist that companies and individuals be trained on and equipped with precision application systems in order to get a license or permission from their respective states regulatory agency.

It may not be too far fetched that some chemical companies may require their products be used only with precision application methods to lower their liability and develop more favorable relationship with regulatory agencies.

Conclusion

As the awareness of aquatic invasive species grows, so will the demands that something be done. We all hope that sound logic will take the place of hysteria in addressing the severity of the problem as well as the implementing the best solutions available to solve it. If common sense prevails, and unfortunately that is not always the case, the aquatic pesticide industry is well positioned to grow in public acceptance, credibility and sales volume.

No industry is immune from controversy or resistance to change. Many unseen barriers may be lurking in the shadows. When analyzing the dynamics of the industry there are no obvious losers should precise application practices become an industry standard or even mandatory.

Consumers, lake enthusiasts, lake property owners and the like see improvements in their lake environments, fish populations, water clarity, and property values. Not a bad deal considering the alternative is a dead lake.

State and Local governments see improvements in their aquatic resources and the associated benefits, such as increased tourism, property values, etc. that follow those improvements.

Regulatory agencies see relief from the public by being confidently proactive versus conservatively reactive due to their concern of replacing a bad situation (invasive species) with a potentially worse situation (dangerous chemical saturation).

Chemical companies benefit by having a measurable industry standard in which to safely apply their product. While less waste through more precise applications could lead to marginally smaller sales volume, as in other chemical industries and products, demand for newer permits should rise exponentially as consumers' and regulators' confidence in the safety and effectiveness of chemical applications grows. The potential for more registrations or fast tracking in process registrations may result from the assurance that those chemicals will be applied in the safest manner possible.

Aquatic Pesticide applicators should see a boom in their business. The downside of licensing and additional equipment costs should be more than offset by the additional business they should generate through their certification. Small aquatic pesticide applicators or self-licensed applicators may find the capital outlay beyond what they would like to invest in their business. To them, the cost to invest in the license, training and equipment may be beyond their means. The cost of non compliance may force them to exit the business.

Precise measurement and placement of chemicals could be the key, opening the door to treating lakes, and slowing the spread of invasive species before the problem becomes insurmountable and forces the public to resort to drastic, and unsafe measures.

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