

UNIVERSITY OF MINNESOTA

Twin Cities Campus

*Department of Forest Resources
College of Food, Agricultural and
Natural Resource Sciences*

*115 Green Hall
1530 Cleveland Avenue North
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*Office: 612-624-3400
Fax: 612-625-5212
www.forestry.umn.edu*

June 13, 2014

Aitkin County Board of Commissioners
217 2nd St. NW
Aitkin, MN 56431

JUN 18 2014

Dear Aitkin County Board of Commissioners,

I am writing to acknowledge the incredible generosity and service once again shown towards me and my Silviculture Class by Bob Kangas and Rich Courtemanche on our Saturday field trip to Aitkin County on May 3. This is the seventh straight year the Aitkin County Land Department has hosted my class for this Saturday field trip and each year I am humbled by the amazing land ethic and creativity Bob and Rich apply to the forests of Aitkin County to ensure many future generations have an incredible resource to enjoy. I view this annual trip as an opportunity for my students to spend a day with individuals who I truly believe are the most talented and innovative foresters in the state and Aitkin County is so fortunate to have them as stewards of their lands.

In planning my courses, I often struggle to find cutting edge, state-of-the art examples of forestry in practice to expose my students to. Needless to say, I am so grateful I can rely on the incredible foresters and long-term innovation in management contained within the Aitkin County Land Department to ensure the students get exposure to what is truly the gold standard in forest management for the state and beyond.

I am sure Bob and Rich have many other things they can be doing with their free time on Saturdays and I cannot express enough how much I appreciate their continued generosity with their time to help support our teaching mission. Please make sure to extend my gratitude to Bob and Rich, as I know many of the students, like me, left inspired by the work they do and were comforted to know our state's resources are in such capable hands.

Sincerely,

Tony D'Amato
Associate Professor
Silviculture and Applied Forest Ecology

Cc: Mark Jacobs, Bob Kangas, and Rich Courtemanche

Aitkin County Environmental Services Planning and Zoning
209 Second Street NW
Room 100
Aitkin, MN 56431
Phone: 218-927-7342
Fax: 218-927-4372



June 16, 2014

Travis and Shelley Lettner
7813 Joliet Ave S
Cottage Grove, MN 55016

COPY

RE: Parcel #29-0-050201
Address – 16843 481st Ln

Dear Mr. and Mrs. Lettner:

This is the **second and final notice** that will be sent by this Office to inform you of regulations regarding the rental of vacation/private homes in Aitkin County. We have become aware that you are or intend to rent your dwelling located on the above referenced property. The rental of vacation/private homes is regulated by the Aitkin County Zoning Ordinance. The Aitkin County Zoning Ordinance Section 17 requires an Interim Use Permit (IUP) for any vacation/private home rentals of 30 days or less. Included are the application materials for an IUP and the ordinance language for Section 17. An IUP must be granted by the Aitkin County Planning Commission after holding a public hearing and meeting all 7 findings of fact listed in Section 11.03 of the Aitkin County Zoning Ordinance (see enclosed copy of the findings of fact sheet).

All vacation/private home rentals must be in compliance with Section 17 of the Aitkin County Zoning Ordinance by April 1, 2014. This will require an IUP to be applied for and approved by the Aitkin County Planning Commission before you can rent the property.

Failure to be in compliance with Section 17 of the Aitkin County Zoning Ordinance, before renting the property, is a misdemeanor and a citation may be issued by this office. A citation issued for a violation of the Ordinance will require a court appearance including a penalty of up to \$1,000.00 and/or 90 days imprisonment, or both, for each day the violation is allowed to occur. Please plan accordingly and apply early for the Interim Use Permit.

If you have any questions or need assistance in completing the IUP application, please contact our Office at 218-927-7342.

Sincerely,



Terry Neff
Environmental Services Director

COPY

enclosures

cc: Jim Ratz, Aitkin County Attorney
Roxy Traxler, Interim Aitkin County Administrator
Michelle Leitinger, Environmental Health Specialist

c:\zoning\vrboformletter

Aitkin County Environmental Services Planning and Zoning
209 Second Street NW
Room 100
Aitkin, MN 56431
Phone: 218-927-7342
Fax: 218-927-4372



June 16, 2014

Marvin and Beverly Midthun
36368 320th St
Aitkin, MN 56431

COPY

RE: Parcel #24-0-020800
Address – 36368 320th St

Dear Mr. and Mrs. Midthun :

This is the **second and final notice** that will be sent by this Office to inform you of regulations regarding the rental of vacation/private homes in Aitkin County. We have become aware that you are or intend to rent your dwelling located on the above referenced property. The rental of vacation/private homes is regulated by the Aitkin County Zoning Ordinance. The Aitkin County Zoning Ordinance Section 17 requires an Interim Use Permit (IUP) for any vacation/private home rentals of 30 days or less. Included are the application materials for an IUP and the ordinance language for Section 17. An IUP must be granted by the Aitkin County Planning Commission after holding a public hearing and meeting all 7 findings of fact listed in Section 11.03 of the Aitkin County Zoning Ordinance (see enclosed copy of the findings of fact sheet).

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Sincerely,



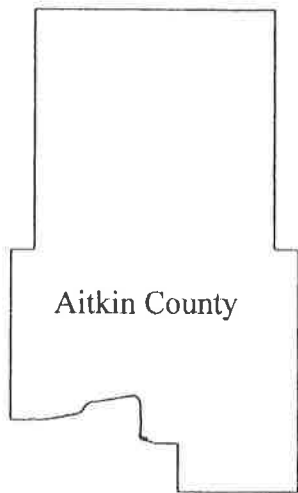
Terry Neff
Environmental Services Director

COPY

enclosures

cc: Jim Ratz, Aitkin County Attorney
Roxy Traxler, Interim Aitkin County Administrator
Michelle Leitinger, Environmental Health Specialist

c:\zoning\vrboformletter



Aitkin County Association of Townships

Serving all of Aitkin County

JUN 11 2014

The next quarterly meeting of the Association will be July 17, 2014 at the Waukenabo Community Center at 7:30p.m.

There will be a vote on sending people to the Annual Convention in Duluth this year.

Haugen will be celebrating 100 years in September.

Not sure of speaker at this time, possible Terry Neff on new Sewer Ordinance.

Anita

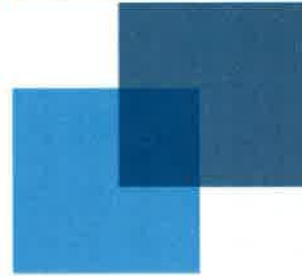
pjamande@centurylink.net

218-927-6700



Bio-based Control for Invasive Mussels

Prepared for



Manufactured by Marrone Bio Innovations, Inc.

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Forward Looking Statement



This presentation may include forward-looking statements. These statements reflect the current views of the Company's senior management with respect to future events and financial performance. These statements include forward-looking statements with respect to the Company's business and industry in general, including statements regarding potential market size of Company products, anticipated product launches, target geographic markets, factors for the barriers to entry into the market, and strategies for growth. Statements that include the words "expect," "intend," "plan," "believe," "project," "forecast," "estimate," "may," "should," "anticipate" and similar statements of a future or forward-looking nature identify forward-looking statements for purposes of the federal securities laws or otherwise. Forward-looking statements address matters that involve risks and uncertainties such as the timing of and costs associated with the launch of products, the difficulty in predicting the timing or outcome of product research and development efforts and regulatory approvals. Accordingly, there are or will be important factors that could cause the Company's actual results to differ materially from those indicated in these statements. The statements made herein speak only as of the date of this presentation.

Topics of Discussion



- **About Marrone Bio and Our Mussel Team**
- **The Invasive Mussel Challenge**
- **About Zequanox**
- **Treatment Programs**
- **Sample Case Studies**
- **Wrap Up / Next Steps**



Marrone Bio Innovations: Delivering the Next Generation in Biopesticides



- Public Company
 - [NASDAQ – MBII]
- Founded April 2006 by Dr. Pamela Marrone
- Headquartered in Davis, CA
- 150+ employees
- Strategic investors: DSM, Syngenta, Mitsui
- Fermentation facility in Bangor, MI
- 21 issued patents and more than 200 patents pending

 **Marrone**[®]
Bio Innovations



We discover, develop, and
market effective and
environmentally responsible
bio-based pest management
products for agriculture and
water applications

ZEQUANOX[®]
Invasive Mussel Control



Wide Breadth of Biopesticide Expertise

In-house Discovery & In-licensed Technology	Biopesticide Company with the Broadest Screen	Natural Product Chemistry Advantage	Rapid Development & Commercialization	Formulation, Fermentation & Manufacturing
<i>Internally-discovered break-through products</i>	18,000+ microorganisms	<i>Identify and patent natural compounds</i>	<i>Targeted launch with key large growers</i>	<i>Microbial formulation expertise</i>
<i>Access to others' technology at earlier stage. Add IP to in-licensed technology</i>	350+ plant extracts	<i>Proprietary compound analytics for higher efficacy and consistency</i>	<i>Highly specialized commercial team</i>	<i>Fermentation optimization at scale</i>
				

More than 200 patents and patent applications

Why Bio?



- Safer alternatives to standard chemicals to protect public health and the environment
- Well established technology in the pharmaceutical and agricultural industries
 - Currently about 11% of pesticides and >50% of human drugs are derived from natural products
 - *Bacillus thuringiensis (israelensis)* used to control black fly larva in open waters - globally
 - Other *Pseudomonas* species are registered for plant health and frost protection in the US and Canada

Often highly selective/target specific

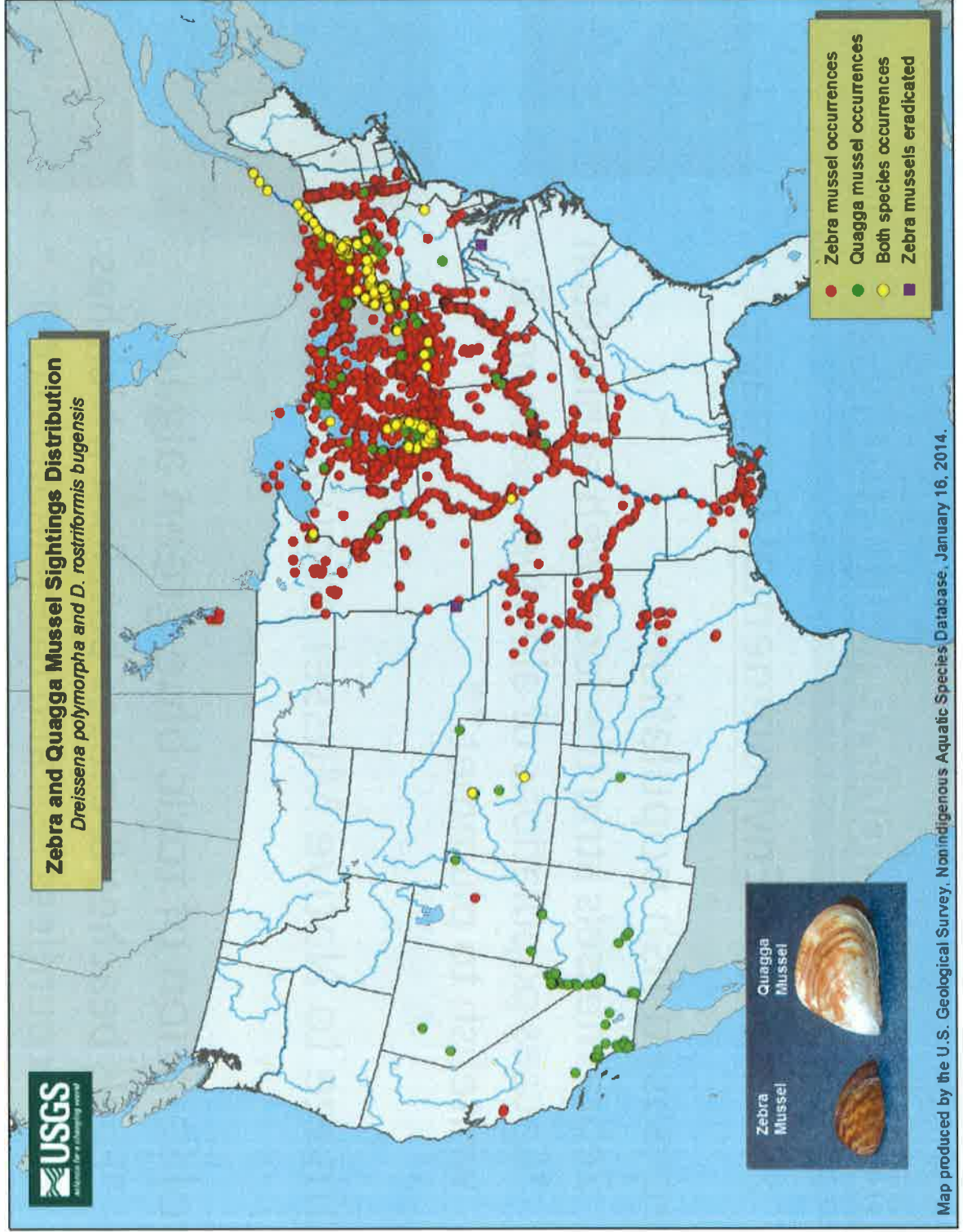
Safer for workers

Delayed onset of resistance

Better public perception



Zebra and Quagga Mussels are Spreading Throughout US and Canada



Invasive Mussels Cause \$ Billions in Economic & Environmental Damage



Environmental Damage

- Decreased fish populations
 - Zebra mussels strip the food web of plankton
 - “Causes populations of alewives, salmon, & whitefish to plummet.”*
- Damage to Native Mussel populations
- Proliferation of toxic blue-green algae
 - “Fouls beaches & causes botulism which has killed countless fish and more than 70,000 aquatic birds in the last ten years.”*



*<http://www.nwfw.org/Wildlife/Threats-to-Wildlife/Invasive-Species/Invasive-Mussels.aspx>

Invasive Mussels Cause \$ Billions in Economic & Environmental Damage



- Injuries during recreational events
- Limited use of private lakefront and public recreational areas

PAOLA VIELDES PENABAZA, NEWS

ZEBRA MUSSEL NEWS

SCHEDULE: MARCH 13, 2004

7

Home Center for the Performing Arts, 27579 Grandfield Drive in King, on Saturdays, March 20 at 2 and 4 p.m. Tickets are \$38 for adults and \$19 for students for the evening performance and \$30 for adults and \$15 for students at the matinee performance. For reservations, call 544-0403.

UPCOMING - The Middle Western Orchestra League School District and Friends of School plans for the 15th Winter Festival on March 22, 24 and 25 at the North Center for the Performing Arts, 27579 Grandfield Drive in King. All shows begin at 7:30 p.m. For tickets, call the district box office at 544-0403.

CHOCOLATE - The Chocolate Ridge, 21872 S. Western Ave., Suite 113 in King, co-sponsors "Band Theory's Choice," an exhibit of 3-D collage by artist Steve Lombardi, through March 30. For gallery hours, call 501-3573.

CHOCOLATE - "National Treasures" exhibit continues

Fond du Lac-area teen seriously injures knee in 'Cold Water Challenge'

Two years ago, U.S. Navy personnel and their families migrated to the Fond du Lac area, home of the U.S. Navy's 7th Fleet. The base has many young people, many of whom are active in the community. One of the most popular events is the "Cold Water Challenge," a local fundraiser for the local hospital. The event is held annually in the winter months and is a popular event for the community.

For the third year in a row, a local teenager named [Name] participated in the challenge. He was participating in the challenge when he fell into the water. He was seriously injured and had to be hospitalized.

The incident has caused a lot of concern in the community. The base has many young people, many of whom are active in the community. The incident has caused a lot of concern in the community.

Another incident occurred at the base. A young man named [Name] was participating in a recreational activity when he was injured. He was seriously injured and had to be hospitalized.

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the bridge

THE BRIDGE is a unique and exciting experience for all ages. It is a fun and educational activity that can be enjoyed by the whole family. The bridge is a great way to spend time together and enjoy the outdoors. It is a fun and educational activity that can be enjoyed by the whole family.

For more information, call 544-0403.



Invasive Mussels Cause \$ Billions in Economic & Environmental Damage



Negative Economic Impact

- Decreased lakefront property values
- Cost of Management / Removal
- Additional costs to municipalities / industry



ZEQUANOX
Invasive Mussel Control

Traditional Chemical Solutions Treat Mussels, But Introduce Lasting Environmental Impact



- Toxic to all aquatic organisms
- Residual food chain risks
 - Copper, potassium
- Long treatment times
 - Negative commercial & recreational impacts



Zequanox: The Environmentally Compatible Alternative to Chemicals

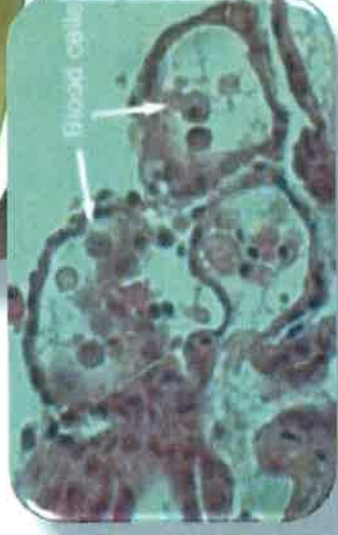
Zequanox: The Only Biopesticide for Invasive Mussel Control



- Environmentally friendly
 - Derived from soil microbe (*Pseudomonas fluorescens*)
 - Composed of 100% dead cells
- Controls mussels in all life stages
- Highly selective toward zebra/quagga mussels
- Effective in a broad range of water conditions and temperatures
- Noncorrosive to infrastructure and equipment
- Nonvolatile



NEW YORK State Museum

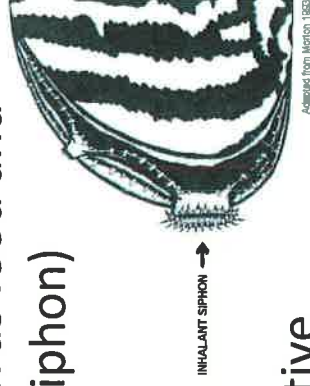


ZEQUANOX[®]
Invasive Mussel Control

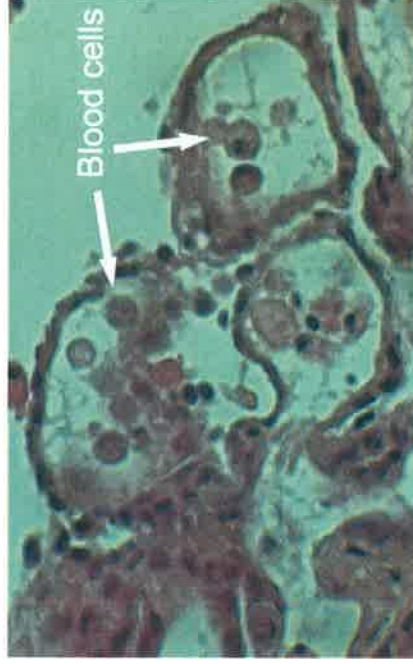
Zequanox Mode of Action



- Dead *Pseudomonas fluorescens* cells contain compounds that destroy epithelial cells in the mussel's digestive system, causing hemorrhaging and death
- Mussels perceive Zequanox as food and readily feed (i.e., actively siphon)
- Zequanox (*Pseudomonas fluorescens*) is highly selective to zebra and quagga mussels (*Dreissena* species)



Digestive gland before ingesting Zequanox:
Healthy epithelial cells (arrows) surround the tubules in the digestive gland



Following ingestion of Zequanox:
Blood cells are abundant inside the hemorrhaging digestive gland

Extensive Ecotox Studies Show No Impact to Other Aquatic Species



FISH

- Bluegill sunfish (*Lepomis macrochirus*)
- Channel catfish (*Ictalurus punctatus*) †
- Chinook Salmon (*Oncorhynchus tshawytscha*)
- Coaster brook trout (*Salvelinus fontinalis*)
- Common Carp (*Cyprinus carpio*)
- Fathead Minnow (*Pimephales promelas*) *
- Klamath Suckers (*Catostomus sucker spp*)
- Lake sturgeon (*Acipenser fulvescens*) †
- Largemouth bass (*Micropterus salmoides*) †
- Rainbow Trout (*Oncorhynchus mykiss*) *
- Sacramento Splittail (*Pogonichthys macrolepidotus*)
- Smallmouth bass (*Micropterus dolomieu*) †
- Striped Bass (*Morone saxatilis*)
- Walleye (*Sander vitreus*) †
- Yellow perch (*Perca flavescens*) †



OTHERS

- Mallard Duck *
- Midge (*Chironomidae*)
- Mayfly (*Baetis*)
- Amphipod (*Hyalella azteca*) *
- European Freshwater Crayfish (*Austropotamobius pallipes*)
- Freshwater Crustacean (*Asellus aquaticus*)
- Freshwater Water Flea (*Daphnia magna*) *

MOLLUSCS

- Blue Mussel (*Mytilus edulis*) *
- Freshwater Mussel - Duck Mussel (*Anadonta*)
- Freshwater Mussel - Black Sandshell (*Ligumia recta*) †
- Freshwater Mussel - Fatmucket (*Lampsilis siliquoidea*)
- Freshwater Mussel - Pink mucket (*Lampsilis abrupta*)
- Freshwater Mussel - Hickorynut (*Obovaria olivaria*) †
- Freshwater Mussel - Higgins Eye (*Lampsilis higginsii*) †
- Freshwater Mussel - Mucket (*Actinonaias ligamentina*) †
- Freshwater Mussel - Paper Pond Shell (*Utterbackia imbecillis*) †
- Freshwater Mussel - Plain Pocketbook (*Lampsilis cardium*) †
- Freshwater Mussel - Washboard (*Megalonaias nervosa*)
- Freshwater Snail (*Lymnaea peregra*)



PLANTS AND ALGAE

- Algae *
- Bindweed (*Convolvulaceae*)
- Common Water Plantain (*Alisma subcordatum*)
- Curly Dock (*Rumex crispus*)
- Mallow (*Malvaceae*)
- Nightshade (*Solanaceae*)
- Smallflower Umbrella Sedge (*Cyperus difformis*)



* EPA required

† Final report expected in 2014.

Studies conducted by Institute of Technology, Sligo, Ireland; New York State Museum and USGS; U.S. Bureau of Reclamation;

Certified Good Laboratory Practices (GLP) Lab; Missouri State University; and MBI lab

Zequanox Open Water Use Patterns



- Recreational rehabilitation
 - Beaches and boat launches
 - Private lakefront property
- Marinas
 - Docks, submerged ladders, navigational buoys, deicing equipment
- Submerged infrastructure
 - Intakes for irrigation, fire suppression, or drinking water
- Restoration and protection of critical habitat
 - Fish spawning beds
 - Native mussel beds
- Rapid response approach
 - Prevent or postpone large scale infestations



Regulatory Items to Consider Prior to Treatment



- Licensed aquatic pesticide applicator required
- Zequanox open water EPA registration pending
 - Need both federal and state registration
 - Prior to open water label approval, may apply for either:
 - Special Local Needs (24c)
 - Emergency Exemption (Section 18)
- Invasive species collection/handling permit
 - May be needed to collect/handle mussels for monitoring
 - Requirements vary by state, check with local regulators

Zequanox Treatment Programs



- Treatments can be completed within hours and normal use can be resumed immediately
- Product concentration measured using turbidity
- Mortality typically monitored by placing locally-collected mussels in mesh or net containers

Annual

High Concentration designed for high adult mortality
6-10 hour treatments occur annually; typically end of season

Bi-Weekly Lakefront Property Maintenance

Low concentration designed for new settlement prevention

Will also achieve 30%-40% adult mortality
2-hour treatments every other week throughout the settlement season

Zequanox Application Strategies



Whole Water Column

- Applied using wand, sprayer, or trailing hose to evenly dispense the stock solution in entire treatment area
- High mortality achieved on both veligers and adults

Benthic Layer

- Create grid of injection points across the treatment area
- Product injected at the shallowest point of the water where mussel control is desired
- High mortality on adult mussels

Zequanox Application Strategies



- Barrier curtains are recommended to maintain treatment concentrations within desired area
 - Zequanox readily disperses laterally in the water
 - MBI uses Type II Turbidity Curtains, however other impermeable barrier materials are acceptable



Zequanox Open Water Case Studies

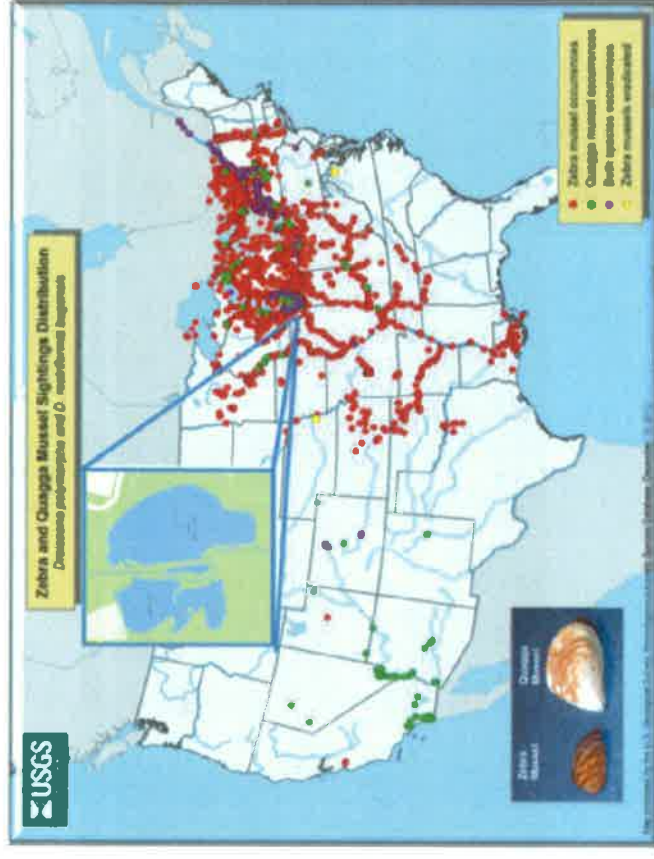


Deep Quarry Lake, IL

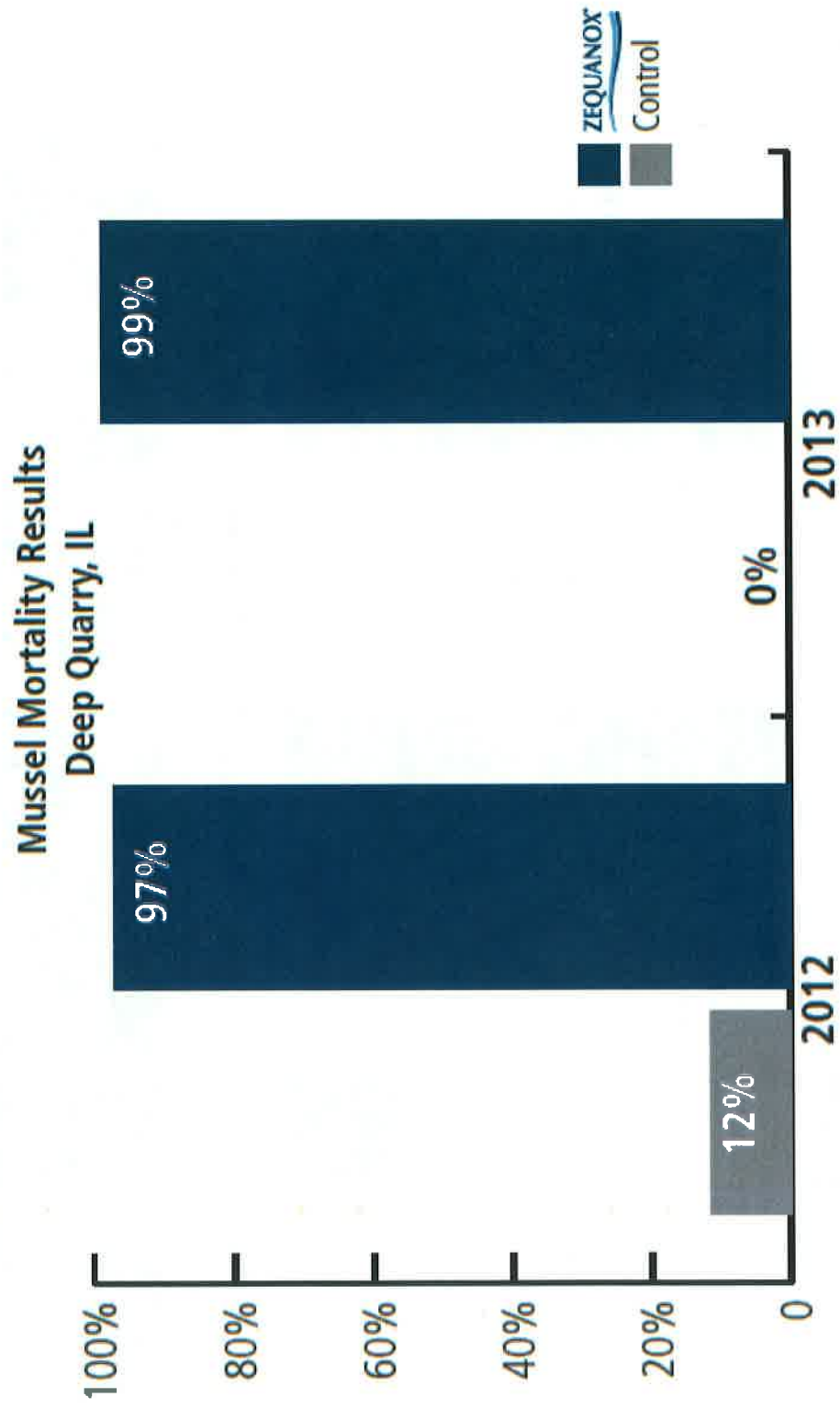


- Multi-year collaborative project with Southern Illinois University, Forest Preserve District of DuPage County, and Illinois Dept. of Natural Resources

- 2012 Focus
 - Efficacy & water quality testing
- 2013 Focus
 - Efficacy repeatability, application methods, adult & veliger efficacy, commercial treatment circumstances

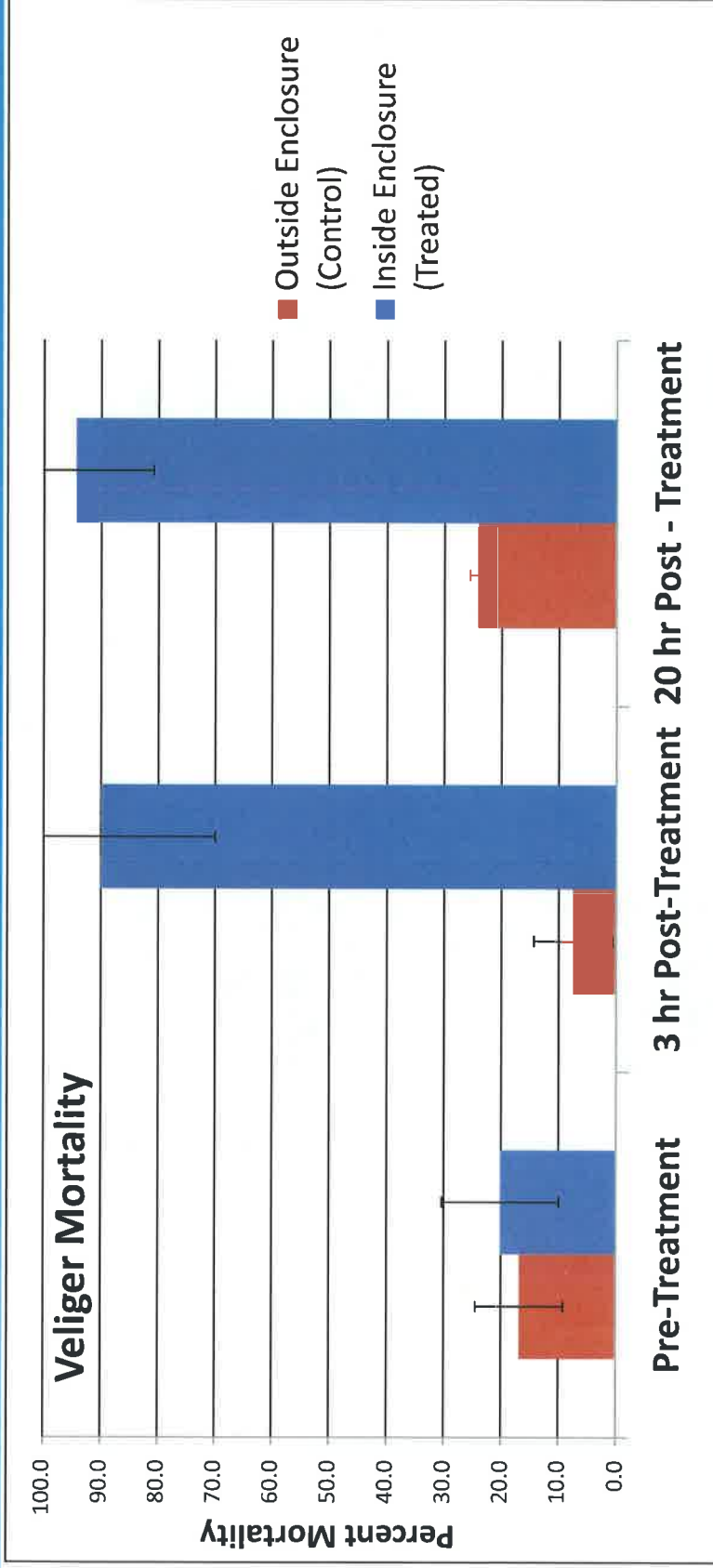


Deep Quarry Lake, IL (Overview - Adults)



Open water trials conducted at Deep Quarry Lake in Illinois, summer of 2012 and 2013

Deep Quarry Lake, IL (2013 Results)



Contained Adult Mussels (48 days post-application):	Percent Mortality	Standard Deviation (+/- %)
Within 5 meters of an application point	98.8	1.9
Between 5 and 8 meters from an application point	95.0	1.4
In shoreline areas shallower than application points	55.5	7.2
Untreated mussels (outside the barrier)	0.0	0.0

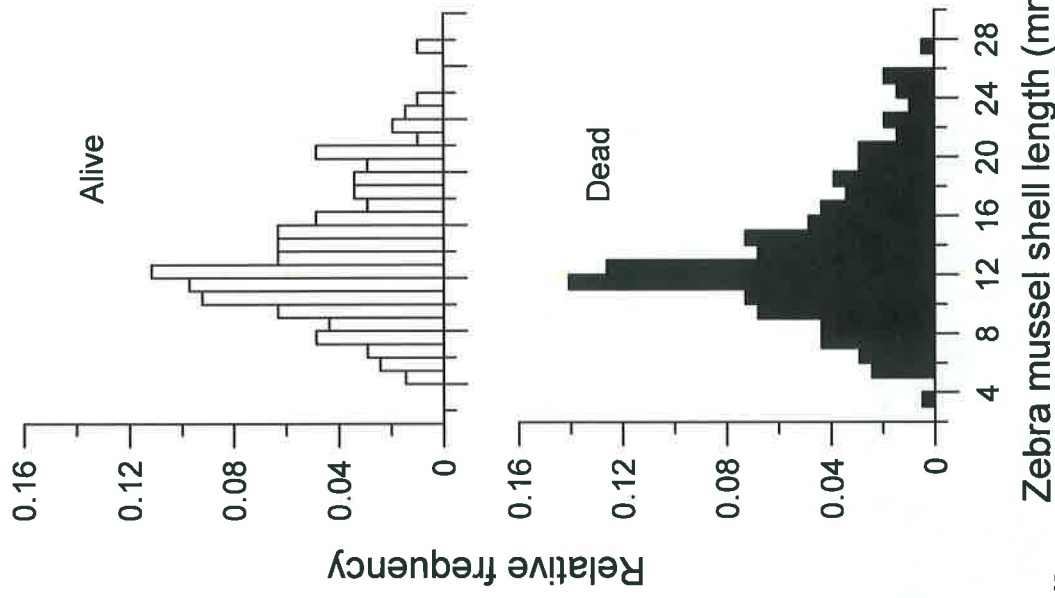


Deep Quarry Lake, IL



2012 Comparison of Mussel Size of Live vs Dead Mussels in Treated Plots

- Repeated trials both achieved high efficacy
- Size of mussel did not impact survival rate
- No lasting impacts to water quality
- Targeting the benthic layer of water is effective



Lake Minnetonka, MN



- CRADA research with United States Geological Survey, Upper Midwest Environmental Services Center (USGS UMEESC)

- Comparison of application techniques found targeted benthic applications are effective, and significantly reduce amount of product needed

- Found no difference in mussel size class between live and dead treated mussels



Working Together

Consulting and Services for Successful Mussel Control



EXPERIENCED SCIENTISTS

Expert team of biologists

Multiple PhDs on staff

Deep knowledge of invasive mussels—metabolic activity, spawning behavior, etc.

Internal wet lab facilities



REGULATORY GUIDANCE

Extensive experience with federal and state regulators

Ensure compliance at every level

Provide assistance for securing necessary permits (e.g., NPDES permits, NEPA/CEQA compliance, etc.)



MANAGEMENT and ENGINEERING

Onsite assessment of water system

Treatment recommendation and best practices

Engineering and setup of application equipment

Treatment and monitoring of results

Zequanox Delivers the Lowest Risk with the highest Environmental Compatibility



- **Promote Environmental Stewardship**
 - *Eliminate the use of harsh chemicals for mussel control*
- **Postpone or Prevent Large-Scale Infestation**
 - *Eliminate isolated adult colonies in newly infested water bodies*
- **Manage Existing Infestations**
 - *Reduce adverse impacts of mussels to recreational areas and sensitive aquatic habitats*

Questions?



Michael Toth
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(651) 888 – 0843
www.zequanox.com



ZEQUANOX[®]

Invasive Mussel Control

www.zequanox.com



