RAMSEY COUNTY

New Infestation Response Plan

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Ramsey County

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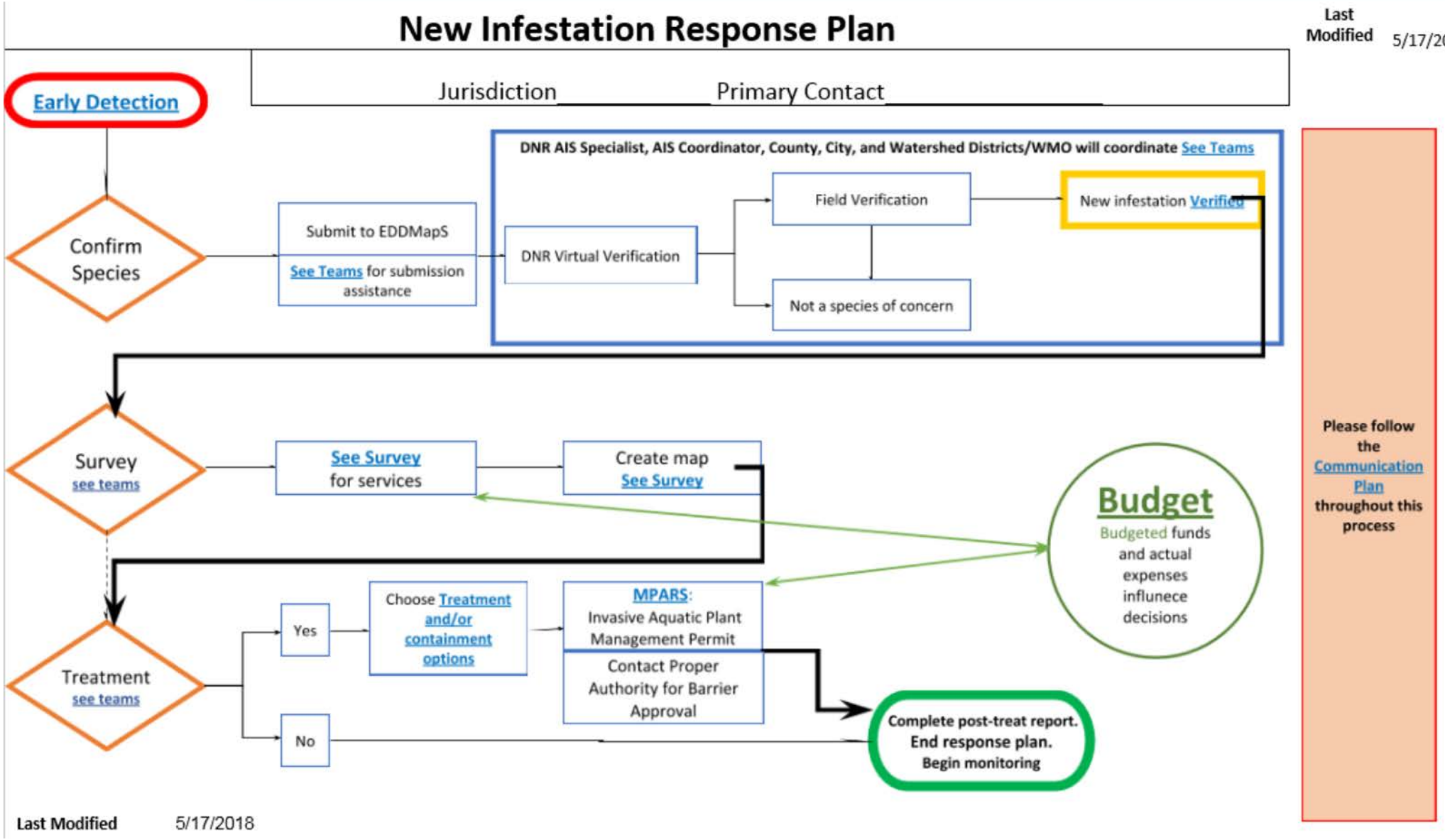
New Infestation Response Plan-Analysis

- **Timeline**
  - **8/19/2018-Three zebra mussel reported on a boat launch dock. NIRP implemented**
  - **8/20- DNR confirmation of zebra mussel and initial wading search began**
  - **8/23- Rice Creek Watershed District, Ramsey County, and Dept. of Natural Resources staff search using SCUBA and Snorkel. No additional mussels found from above searches.**
  - **8/30- LJIS board and Ramsey County meet to discuss additional surveys.**
  - **9/11- Contract is signed by Steve McComas of Bluewater Science to complete 40 hours of additional surveying**
  - **9/20- Steve begins searching**

Next Steps

- Continue searches
- Explore new detections methods (eDNA)
- Research best practices for treatment and discuss if it is desired.


New Infestation Response Plan
Last Modified 5/17/2018
Jurisdiction
Primary Contact
Early Detection
DNR AIS Specialist, AIS Coordinator, County, City, and Watershed Districts/WMO will coordinate See Teams
Confirm Species
Submit to EDDMapS
See Teams for submission assistance
DNR Virtual Verification
Field Verification
New infestation Verified
Not a species of concern
Survey
see teams
See Survey for services
Create map
See Survey
Budget
Budgeted funds and actual expenses influnece decisions
Treatment
see teams
Yes
Choose Treatment and/or containment options
MPARS: Invasive Aquatic Plant Management Permit
Contact Proper Authority for Barrier Approval
No
Complete post-treat report. End response plan. Begin monitoring
Please follow the Communication Plan throughout this process
Last Modified 5/17/2018

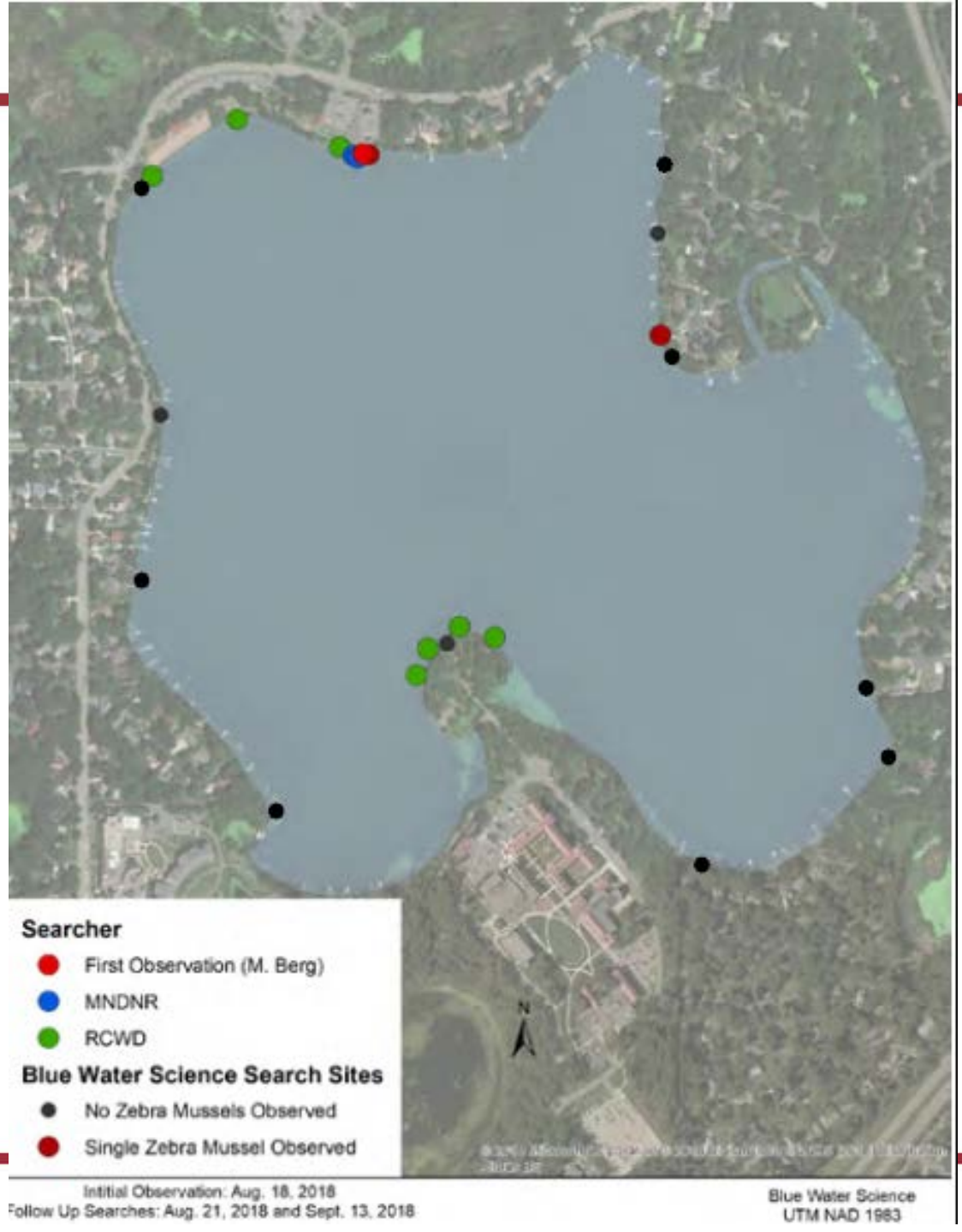

Searcher
First Observation (M. Berg)
MNDNR
RCWD
Blue Water Science Search Sites
No Zebra Mussels Observed
Single Zebra Mussel Observed
N
Initial Observation: Aug. 18, 2018
Follow Up Searches: Aug. 21, 2018 and Sept. 13, 2018
Blue Water Science
UTM NAD 1983

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Figure 1. Zebra mussels found in Lake Johanna, collected in 2018. Two distinct year classes were found (top numbers on ruler are in mm).

Photos 3-5. Five additional adult zebra mussels found near the public access on Lake Johanna on 21 August 2018. Size of mussels ranged from approximately 2 to 3.4 cm in length.

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Why Should I Care?

Shells are extremely sharp
At scale they foul equipment (clogged engine intakes)
Eat the base of the food chain fish species rely on
Change water clarity increasing nuisance plants

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2018 May-sept Epilimnetic Means

Mean Cchla (Mg/M3)	Conductivity (Umhos)	Ph
8.53	757.8	8.57

Table 3. Zebra Mussel Suitability for Lake Johanna uses water column criteria to predict growth conditions.

JOHANNA		Little Potential for Adult Survival	Little Potential for Larval Development	Moderate (survivable, but will not flourish)	High (favorable for optimal growth)
Shell Formation Factors					
Calcium (mg/l)	Johanna				31.2 (Aug 17, 2015)
	Mackie and Claudi 2010	<8	8 - 15	15 - 30	>30
pH	Johanna				8.7 (Aug 17, 2015)
	Mackie and Claudi 2010	<7.0 or >9.5	7.0 - 7.8 or 9.0 - 9.5	7.8 - 8.2 or 8.8 - 9.0	8.2 - 8.8
Alkalinity* (as mg $CaCO_3$/l)	Johanna			71 (Aug 17, 2015)	
	Mackie and Claudi 2010	<30	30 - 55	55 - 100	100 - 280
Conductivity* (umhos)	Johanna				605 (Aug 17, 2015)
	Mackie and Claudi 2010	<30	30 - 60	60 - 110	>110
Food Factors					
Secchi depth (m) (May-Sept)	Johanna		2 (10 year average)		2 (10 year average)
	Mackie and Claudi 2010	<1 or >8	1 - 2 or 6 - 8	4 - 6	2 - 4
Chlorophyll a (ug/l)(food source) (May-Sept)	Johanna			11 (10 year average)	
	Mackie and Claudi 2010	<2.5 or >25	2.0 - 2.5 or 20 - 25	8 - 20	2.5 - 8
Total phosphorus (ug/l) (May-Sept)	Johanna				28 (10 year average)
	Mackie and Claudi 2010	<5 or >50	5 - 10 or 35 - 50	10 - 25	25 - 35

*Mackie, G.L. and R. Claudi. 2010. Monitoring and control of macrofouling mollusks in fresh water systems. Second Edition. CRC Press, Boca Raton, FL.

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Bottom Line

Invasions are hard to predict
Best we can tell zebra mussel numbers will increase
Suitable substrate is limited. Watch your boats and lifts!
Report new sightings

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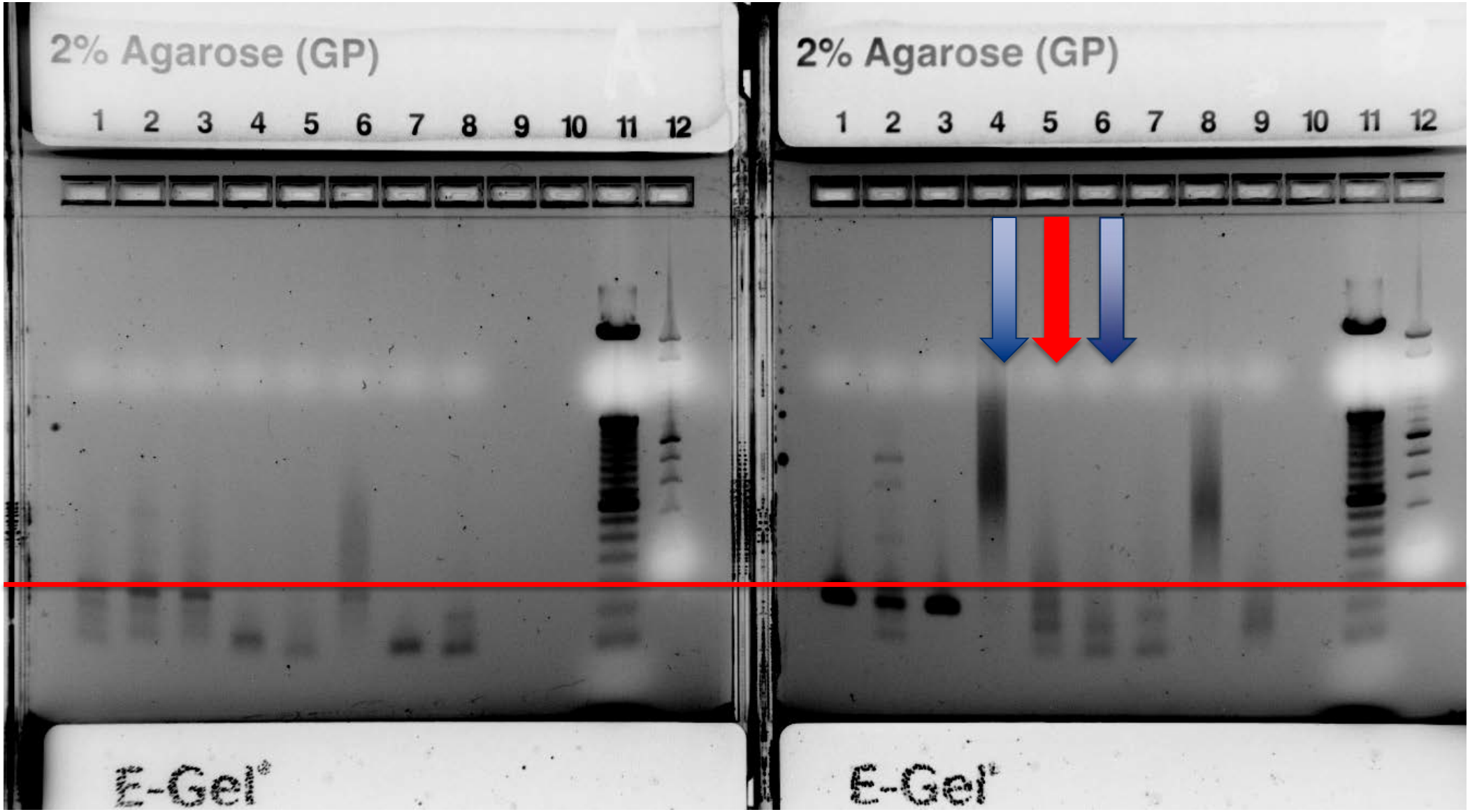

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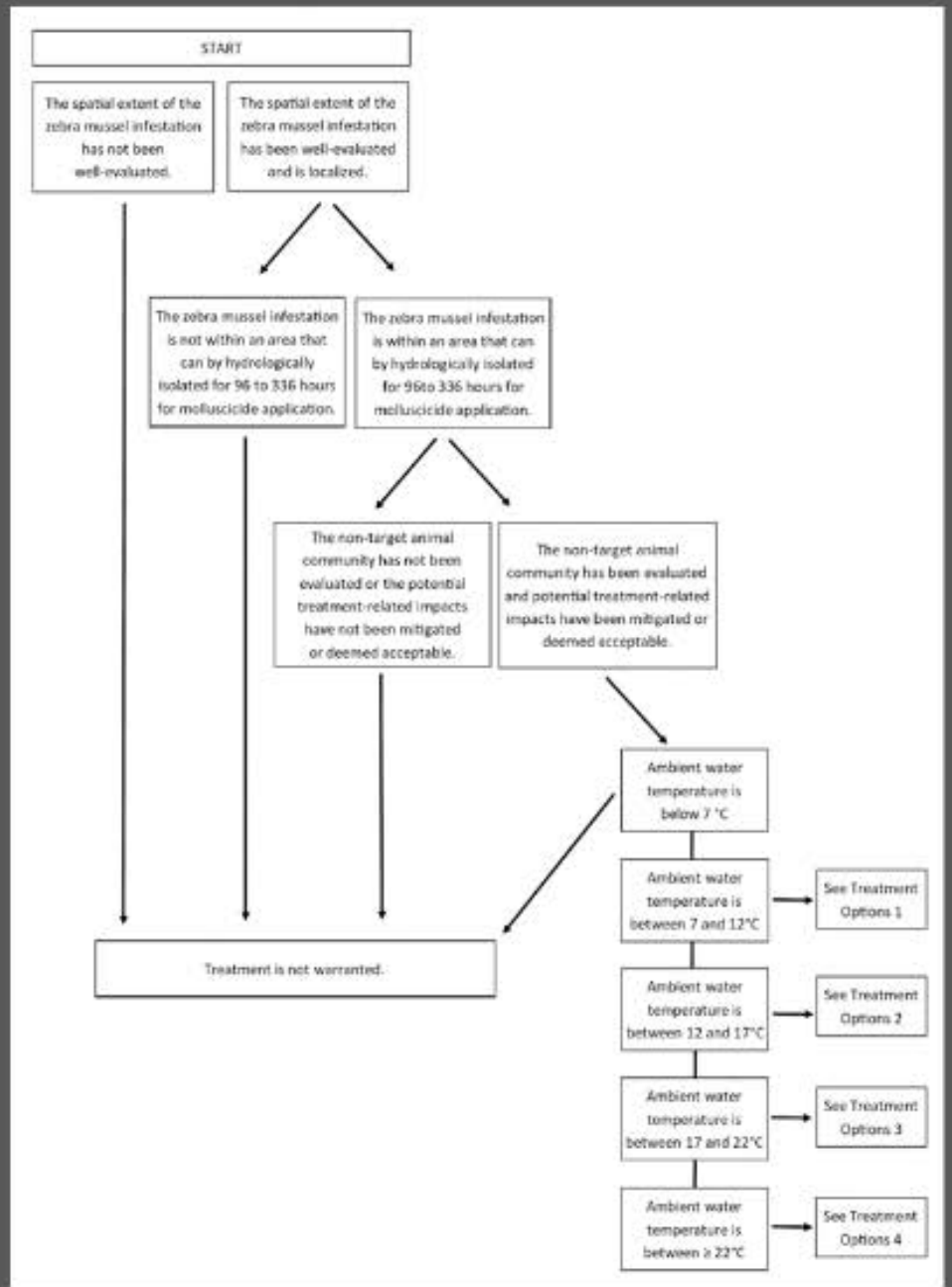
Management/Minimization Options

- Do nothing and monitor changes to water quality parameters
- What we will not do-ideas that have no scientific bases or unintended consequences
- Hand removal of isolated patches
- If we find them in an isolated area and have a good chance of eradication-Molluscisides
  - Earthtec, potash, or Zequanox
  - Ramsey County will use WBL ZMs in Johanna water in a jar to refine dosage

Prevention of new AIS such as Starry stonewort, Brittle niad, phragmites, and flowering rush will continue to be key in ensuring we do not exacerbate pressures on Lake Johanna

MAISRC – White Paper Summarization of Results



Treatment options 1
EarthTec QZ: *12.0 mg/L* for 336 hours
Niclosamide: 0.06 mg/L for 336 hours

Treatment options 2
EarthTec QZ: 26.0 mg/L for 96 hours or *6.0 mg/L* for 336 hours
Niclosamide: 0.10 mg/L for 336 hours or 0.14 mg/L for 96 hours or 0.20 mg/L for 24 hours
Potassium chloride: 165 mg/L for 336 hours

Treatment options 3
EarthTec QZ: *20.0 mg/L* for 96 hours or *6.0 mg/L* for 336 hours
Niclosamide: 0.10 mg/L for 336 hours or 0.14 mg/L for 96 hours or 0.20 mg/L for 24 hours
Potassium chloride: 150 mg/L for 336 hours

Treatment options 4
EarthTec QZ: *20.0 mg/L* for 96 hours or *6.0 mg/L* for 336 hours
Niclosamide: 0.10 mg/L for 336 hours or 0.14 mg/L for 96 hours or 0.20 mg/L for 24 hours
Potassium chloride: 125 mg/L for 336 hours or 220 mg/L for 96 hours

USGS

Questions?

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Goals of Lake Johanna's Patrons

What goals are important for you…

- Recreation?
- Fishing?
- Water quality?

…and how do we ensure ZMs do not interrupt these?

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