

## Lake Bomoseen Boat Wash Program – Estimated Costs

Lake Bomoseen has two primary public launch points. The Kehoe Boat Ramp on the western shore off Creek Road attracts the most traffic. The Evanoika Boat Ramp, just south of the Float Bridge, is also popular but used less intensively. As Bomoseen is infested with zebra mussels as well as Eurasian milfoil, we believe we need at least one high pressure, hot water boat wash station. (Manual removal is generally insufficient to deal with zebra mussels. Hot water kills both milfoil and zebra mussels, as well as most other AIS. Charts at the end of this document, from the Wisconsin Department of Natural Resources, provide relevant data.) We are proposing to place a waterless, self-serve boat cleaning station at each boat ramp and to build a high-pressure, hot-water cleaning station at Kehoe. Greeters and signage at Evanoika will direct boaters with more serious infestation to the hot-water cleaning station at Kehoe.

Because neither launch site has access to municipal water or sewer, we are assuming that at Kehoe we will need a containment pad to capture and recycle water, as well as storage and filtration systems for clean water and to hold unrecycled runoff and contaminants.

Finally, there is evidence that smart behavioral design of access and signage makes a big difference in boater compliance.

Here is a comparison and example of waterless and hot-water boat cleaning stations:

The image compares two boat cleaning methods. On the left, a 'Waterless systems' station is shown on a trailer. It features a brush, a plug wrench, a wet/dry vacuum, and a grabber tool. Labels indicate 'Pressurized air' and 'Brush' are used. On the right, a 'Water-based systems' station is shown, which is a large white unit with a red panel. It is labeled 'Heated and Pressurized Water' and 'Water Containment and Recycling'. Below each image is a list of how AIS are removed or killed.

Waterless systems	Water-based systems
<ul style="list-style-type: none"><li>▪ AIS are either:<ul style="list-style-type: none"><li>▪ Removed by visual inspection with the tongs</li><li>▪ Killed by removal of residual water and subsequent desiccation</li></ul></li></ul>	<ul style="list-style-type: none"><li>• AIS are either:<ul style="list-style-type: none"><li>• Removed by the water spray</li><li>• Killed by exposure to high temperatures</li></ul></li></ul>

Accordingly, we have estimated the cost of the project as follows:

• 2 Solar Waterless Stations	\$65,000 – 75,000
• 1 High Pressure Hot Water Heater (2000 PSI, 4 GPM):	10,000 – 15,000
• Concrete pad, drainage, water reclamation, filtering, tanks, plumbing and installation:	40,000 – 50,000
• Propane tank and installation for heater:	1,000 – 2,000
• Building to house and secure equipment at Kehoe	4,000 – 5,000
• Electrical connection	1,000. – 1,500
• Engineering Study & Permitting	5,000 – 10,000
• Access Design & Signage	5,000 – 10,000
• General Contractor	10,000 – 15,000
• Contingency (20%)	<u>15,000 – 20,000</u>
Total	\$157,000 – 203,500

Ongoing operating costs for the stations:

• Labor - Kehoe staffed 7 days/week in summer, weekends and holidays in spring and fall, Evanoika staffed weekends and holidays	\$40,000
• Electric + Propane	1,000
• Equipment maintenance	4,000
• Water supply and pump out	5,000
• Contingency	<u>5,000</u>
Total	\$55,000

Our current greeters program budget is \$44,000 (\$32,000 of hard costs plus \$12,000 in-kind). This is funded through a combination of grants and LBA cash. Clearly, we will need to increase our fund-raising to support the operation of these stations, but the increase is not that significant. We believe that as we begin to take more proactive, visible steps to fight AIS, donations will follow.

**Table 1 Efficacy of treatment methods for macrophytes and algae.**

AIS	Steam Cleaning (212°F)	Hot Water (140°F, ≤10 min)	Drying (5 days)	Chlorine (500 ppm, ≤10 min)	Virkon (2:100 solution, ≤20 min)	Freezing (26°F, ≤24hrs <sup>†</sup> )
Curly Leaf Pondweed	Ⓡ	Ⓡ	☑ <sup>3,55</sup>	Ⓡ	Ⓡ	⊗ <sup>52</sup>
Curly Leaf Pondweed Turion	☑	☑ <sup>53</sup>	⊗ <sup>3</sup>	Ⓡ	Ⓡ	?
Eurasian Watermilfoil	☑	☑ <sup>15</sup>	☑ <sup>12,55</sup>	Ⓡ <sup>57*</sup>	Ⓡ	⊗ <sup>58*</sup>
Eurasian Watermilfoil Seed	?	?	⊗ <sup>56</sup>	?	?	?
Hydrilla	?	?	☑ <sup>55*,59,60*,61</sup>	?	?	?
Yellow Floating Heart	?	?	⊗ <sup>62*</sup>	?	?	?
Starry Stonewort	?	?	?	?	?	?
Didymo	☑	☑ <sup>13,70</sup>	☑ <sup>13,70</sup>	☑ <sup>13,48,49,50,51</sup>	☑ <sup>1</sup>	☑ <sup>70</sup>

\*Additional details:

<sup>†</sup>Freezing times vary therefore specific citation should be consulted for appropriate time

**Table 2 Efficacy of treatment methods for invertebrates.**

AIS	Steam Cleaning (212°F)	Hot Water (140°F, ≤10 min)	Drying (5 days)	Chlorine (500 ppm, ≤10 min)	Virkon (2:100 solution, ≤20 min)	Freezing (26°F, ≤24hrs <sup>†</sup> )
Faucet Snail	☑	☑ <sup>18*</sup>	⊗ <sup>18,35</sup>	⊗ <sup>18</sup>	Ⓡ <sup>18</sup>	☑
New Zealand mud snail	☑	☑ <sup>4,65*</sup>	☑ <sup>6*,66*</sup>	⊗ <sup>21, 78*</sup>	☑ <sup>10*, 76, 77</sup>	☑ <sup>4,6*</sup>
Quagga Mussel (Adults)	☑ <sup>+</sup>	☑ <sup>7*,16*</sup>	☑ <sup>14*,67</sup>	☑	☑ <sup>9</sup>	☑
Quagga Mussel (Veligers)	☑ <sup>+</sup>	☑ <sup>4,17</sup>	☑ <sup>69*, 79*</sup>	☑	☑ <sup>9</sup>	☑
Zebra Mussel (Adult)	☑ <sup>+</sup>	☑ <sup>7*,8*,54,67</sup>	☑ <sup>14*,25*,67</sup>	☑ <sup>11,19,22</sup>	Ⓡ	☑ <sup>25,27,67,68</sup>
Zebra Mussel (Veligers)	☑ <sup>+</sup>	☑ <sup>4</sup>	Ⓡ	☑	Ⓡ	☑
Asian Clam	☑	☑ <sup>4,37,41,42,43</sup>	⊗ <sup>4,44*,45</sup>	⊗ <sup>36*,37*,38*,39*,40</sup>	☑ <sup>23</sup>	☑ <sup>46*</sup>
Spiny Water Flea (Adult)	☑	☑ <sup>7*,47*</sup>	☑ <sup>4</sup>	☑ <sup>78</sup>	☑ <sup>78</sup>	☑ <sup>78</sup>
Spiny Water Flea (Resting Eggs)	☑	☑ <sup>2*</sup>	☑ <sup>2*</sup>	⊗ <sup>2, 78*</sup>	☑ <sup>78</sup>	☑ <sup>2*</sup>
Bloody Red Shrimp	Ⓡ	Ⓡ	Ⓡ	Ⓡ	Ⓡ	Ⓡ
Rusty Crayfish	?	?	?	?	?	?