

Aquatic invasive species prevention: getting the best bang for the buck!

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Background

Common AIS prevention efforts focus on public education, watercraft inspection, and watercraft decontamination. While these prevention efforts are currently widely implemented, **little is understood about the cost-effectiveness of these methods.**

Methods

Effectiveness:

- Three types of participants were recruited to represent three different prevention techniques:
 - Boaters:** effectiveness of public education and outreach
 - Watercraft inspectors:** effectiveness of watercraft inspections programs
 - Watercraft decontaminators:** effectiveness of watercraft decontamination programs
- Standardized experimental inspections were conducted by spiking a boat in ten locations with zebra mussels, spiny water flea, or Eurasian water milfoil, and residual water that could harbor AIS.
- Participants were provided a real-life scenario and were told to 'do what they would normally do'. Participant behavior (i.e., looking, touching boat) and AIS removals were recorded. Decontaminators were evaluated with a thermal imager to monitor duration and water temperature.



Costs:

- Interviews were conducted with county AIS program managers to estimate annual prevention effort expenditures. Results were compared with effectiveness data to understand which prevention technique is the most cost-effective.

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For more information

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Results

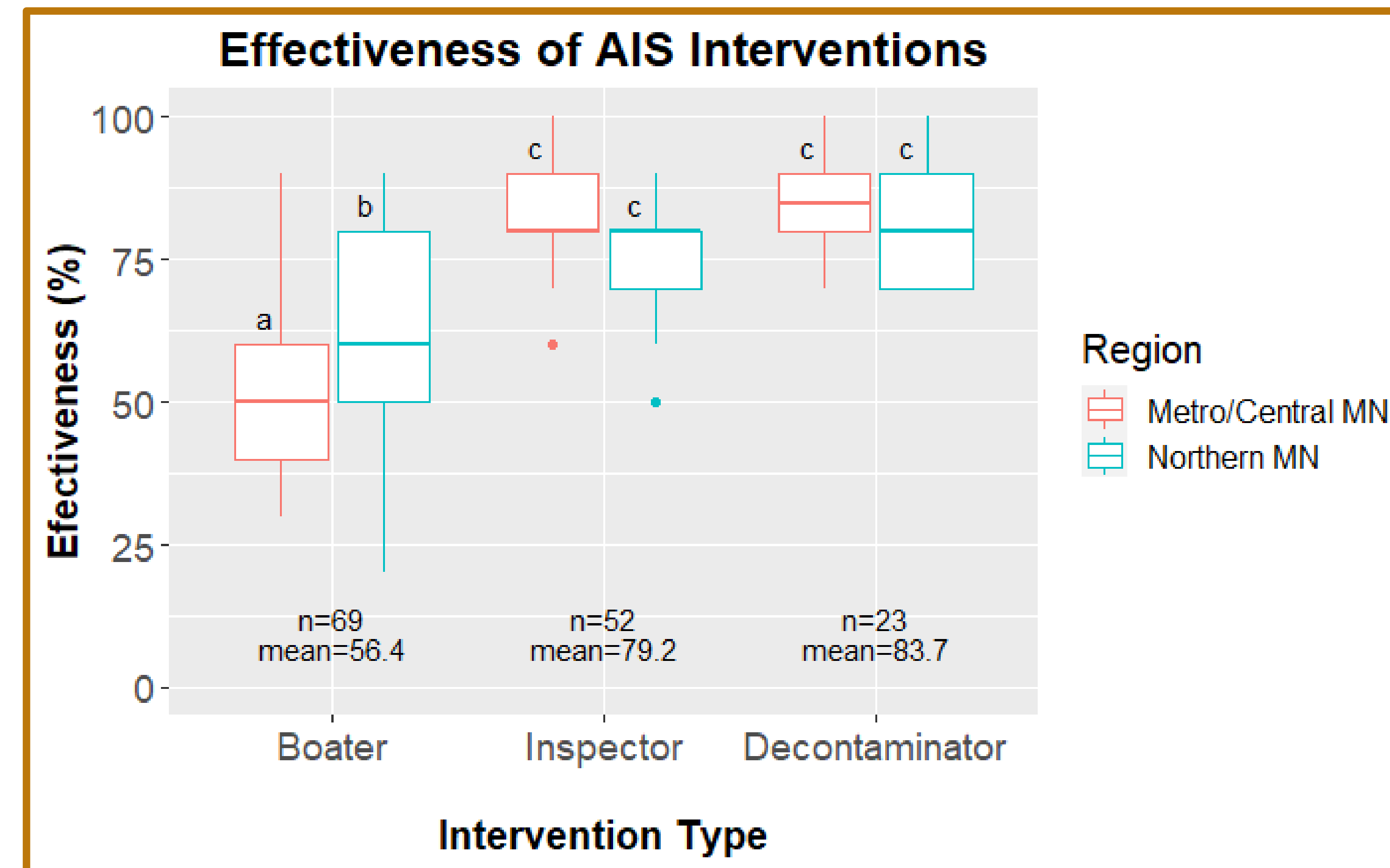


Fig. 1: Effectiveness of three different invasive species prevention techniques. Boater effectiveness was significantly less effective when compared by region and when compared to watercraft inspectors and decontaminators.

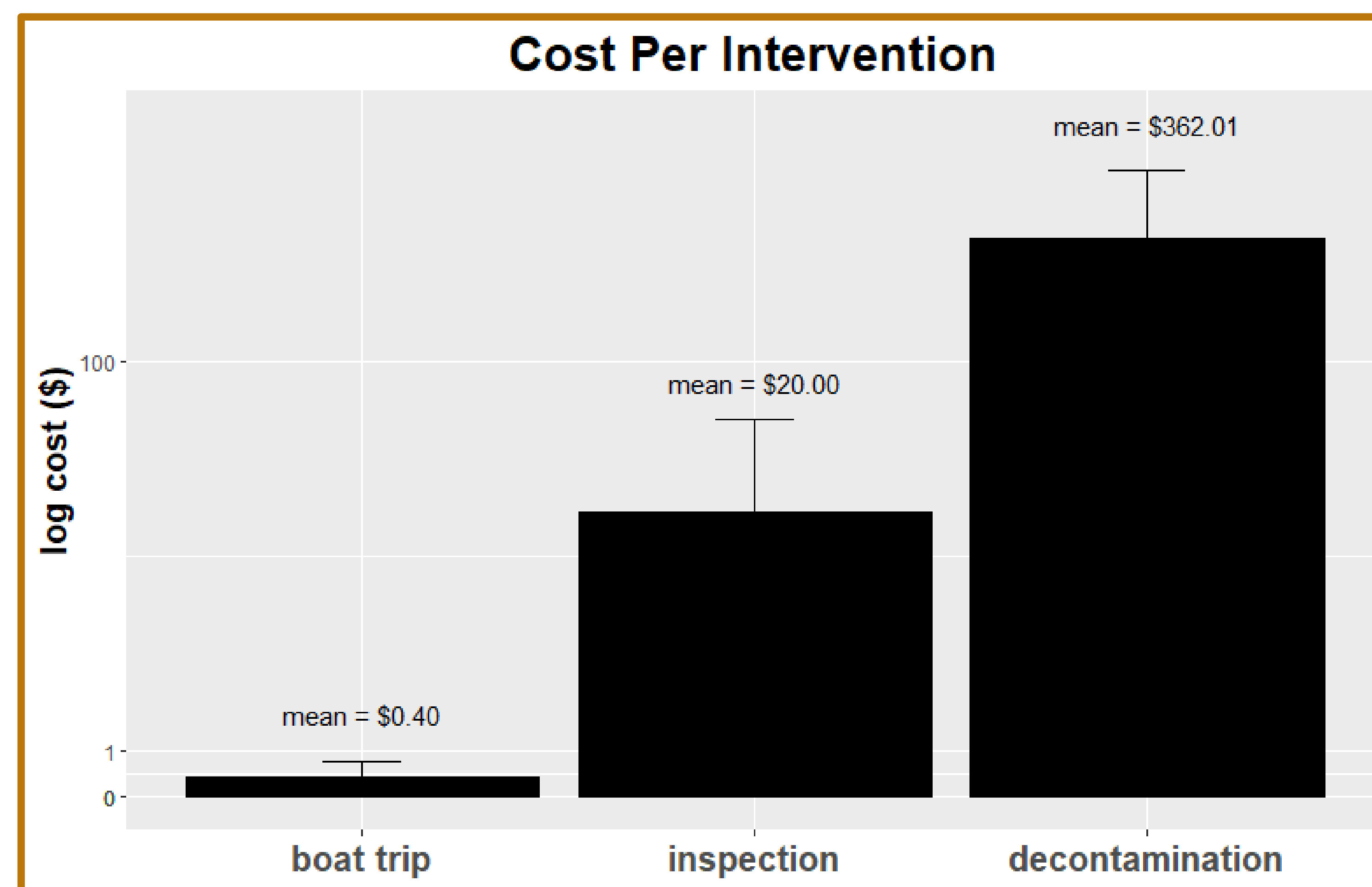
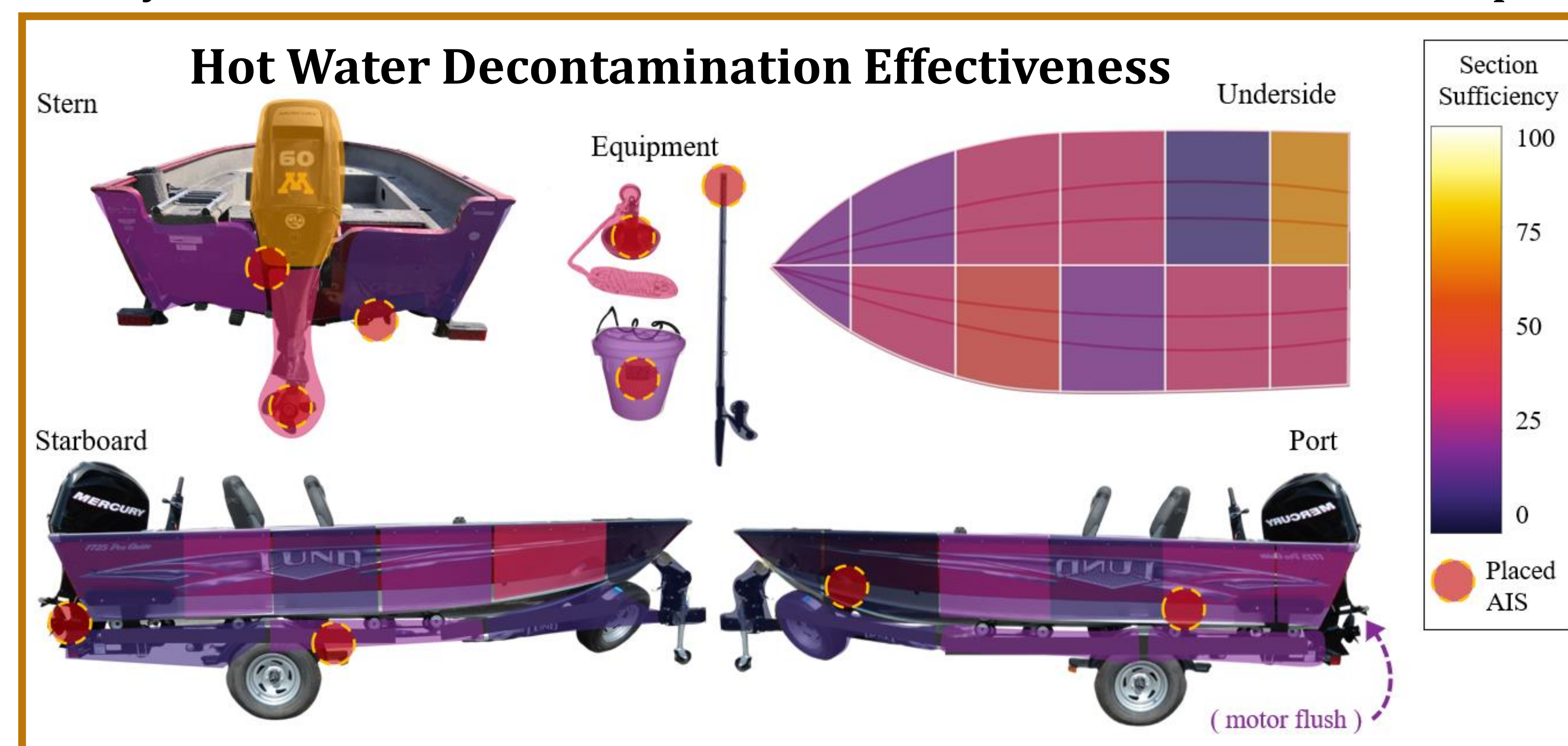


Fig. 2: Costs of three different invasive species prevention techniques. While each intervention's cost was significantly different from one another, the economy scale of these estimates needs to be considered. See next steps...



Management Implications

Quantifying the cost-effectiveness of AIS prevention efforts is critical to informing cost-benefit decisions for AIS prevention planning. Furthermore, the results will help inform future outreach and training programs aimed at improving the effectiveness of AIS interventions.

Ongoing Research and Next Steps

- Cost-effectiveness depreciation:** Investigate the scalability of AIS prevention cost-effectiveness metrics considering depreciation of effectiveness and efficiency over time.
- Experience Impact:** Conduct surveys with experimental inspection participants to understand how an individual's education, exposure, and experience with aquatic invasive species impacts their ability to inspect and remove AIS from a typical fishing boat.
- Program planning tool:** A new "Intervention Impact" application is being developed for the AIS Explorer, an online dashboard that supports decision-making related to AIS surveillance and watercraft inspections, to visualize the cost-benefit of AIS prevention efforts. (aisexplorer.umn.edu)

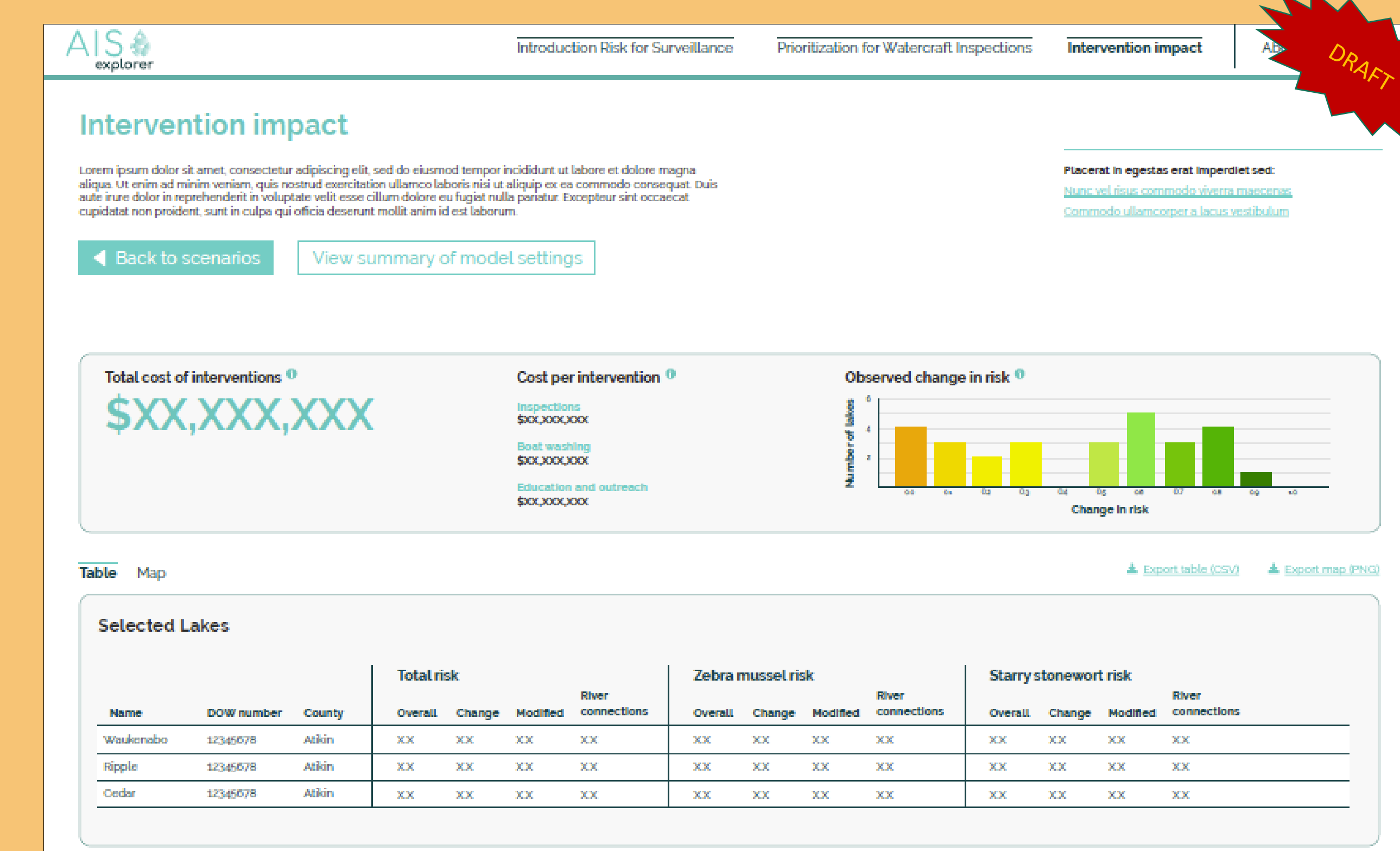


Fig. 3: Thermal imagery results from seven boat decontaminations resulted in less than half of examined boats meeting minimum temperature requirements.

UPMS Decontamination protocol states that a hot water spray for 10 seconds at 60°C will kill 100% of adult zebra mussels, lower temperatures and times may still kill juvenile zebra mussels and other AIS.