

Dispersal of Invasive Aquatic Plants by Public Boat Launches



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ABSTRACT

Invasive species can be detrimental to freshwater ecosystem functions, ecosystem services, and biodiversity. Public boat launches can be a mechanism of dispersal for invasive aquatic plants, yet the extent to which invasive species are dispersed by watercraft among lakes in Connecticut remains poorly known. Furthermore, prevention programs are cost-effective management practices that are popular, as state agencies realize the economic and ecological impact of invasive species. Yet how often prevention practices are applied remains unresolved. This research aims to (1) investigate the frequency in which invasive aquatic plants occur on watercraft leaving public boat launches, and (2) how often boaters inspect and clean their watercraft for invasive species. 132 surveys and inspections were performed, and we found that 24% of watercraft exiting the water had invasive aquatic plant fragments attached, with more than half of boaters not always cleaning and inspecting their boat. Our results support that public boat launches are a major mechanism of aquatic plant dispersal in Connecticut.

INTRODUCTION

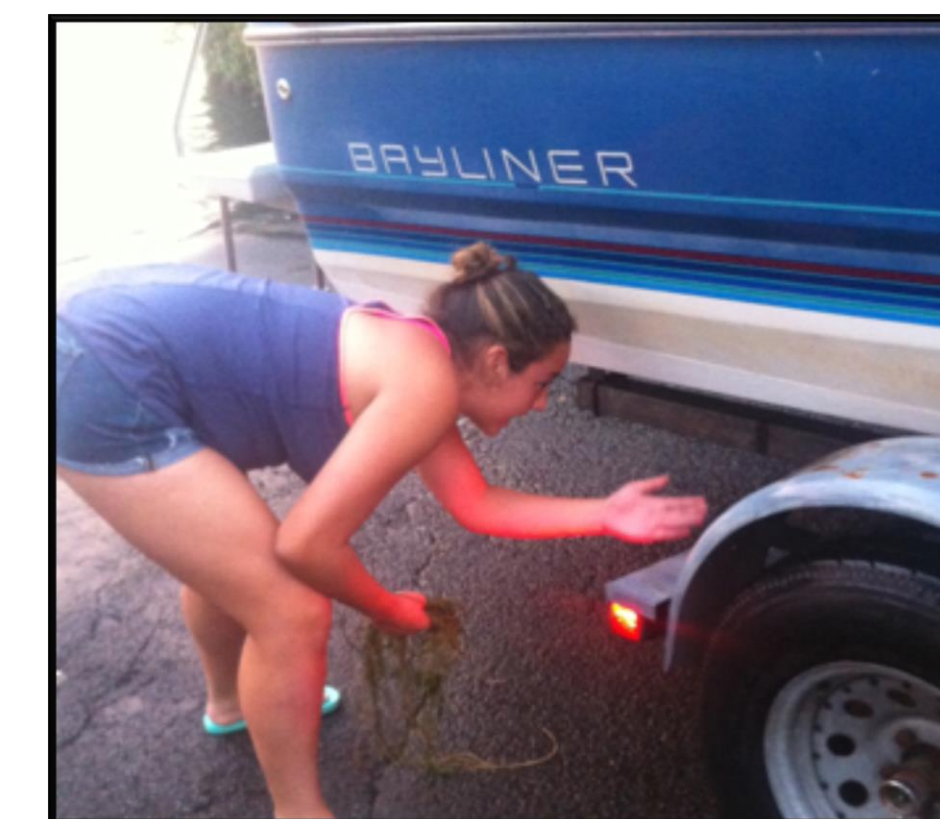
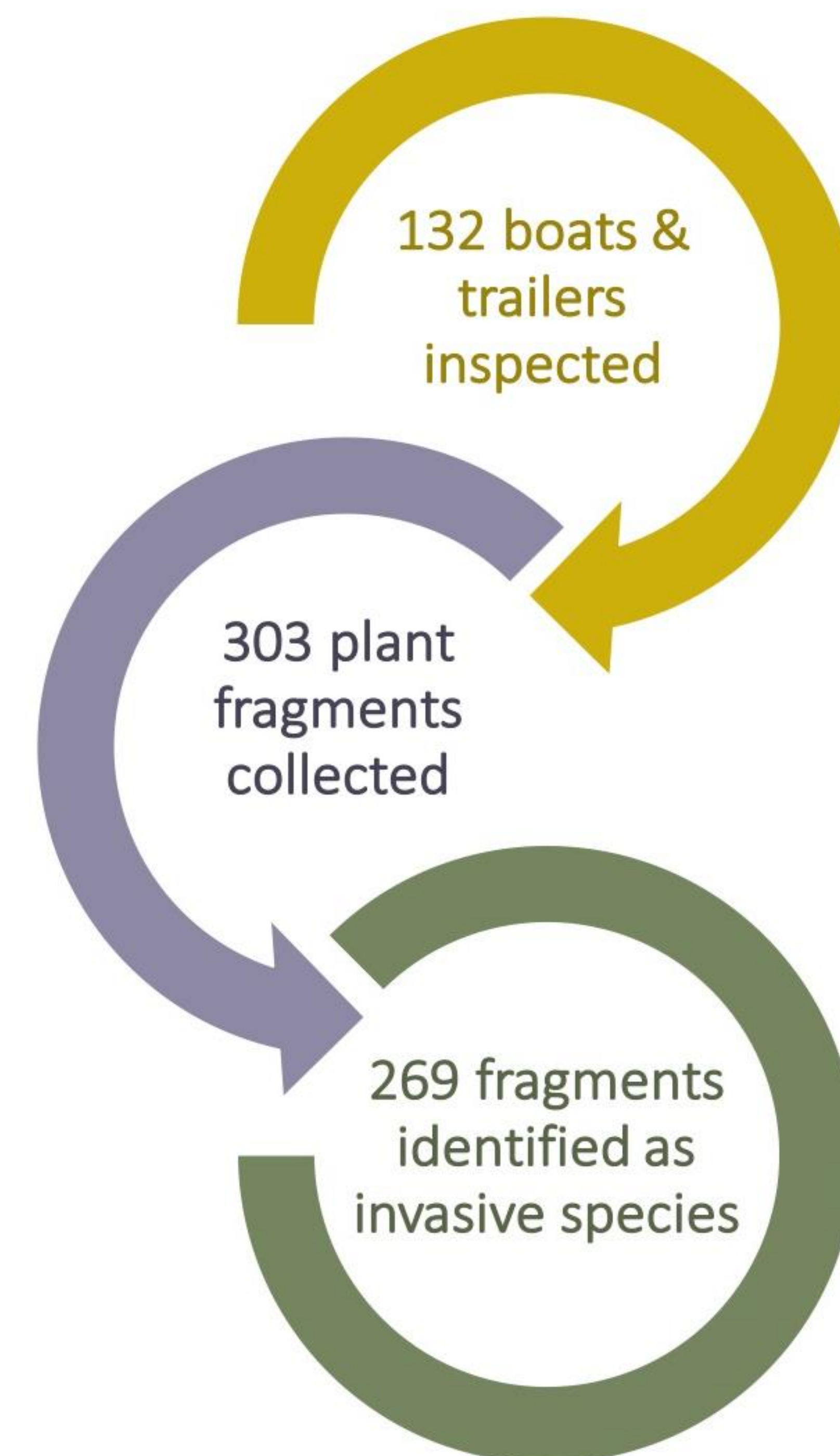
- Invasive species are those that are non-native to an ecosystem, and whose introduction causes negative environmental, economic, or human health effects.¹
- Invasive species are the second most frequent cause of native species endangerment in the U.S.², and can affect ecosystem functions³, ecosystem services⁴, and biodiversity.⁵
- Invasive aquatic plants in freshwater systems can affect drinking water, recreation, irrigation, transportation, and property values.⁶
- Aquatic invasive plants are potentially transported by humans through boats, trailers, and other aquatic equipment. Policies nationwide recommend boat and trailer inspection and cleaning upon entering and exiting a waterway.⁷
- The extent to which boaters perform inspections and cleaning and find invasive plant fragments at public boat launches in Connecticut is not well documented.
- We aimed to (1) investigate the frequency with which boats or trailers had aquatic plant fragments attached when exiting a lake; (2) determine how often boaters clean and inspect their boat when exiting a lake.

REFERENCES

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- (3) Ehrenfeld, J.G. (2010) *Annual Review of Ecology, Evolution, and Systematics*.
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- (5) Hejda et al. (2009) *Journal of Ecology*.
- (6) Bugbee et al. (2015) *A guide to Invasive Aquatic Plants of Connecticut*.
- (7) Adirondack Watershed Institute of Paul Smith's College. Taken on February 11, 2017. <http://www.adkwatershed.org/invasive-species/invasive-species-information>

METHODS

1. Inspections and surveys of 132 watercraft (boats and trailers) at four lakes in Connecticut were performed during July – September. Each of the four lakes have had invasive aquatic plant populations present for a minimum of twelve years.
 - Beseck Lake (Middlefield, CT)
 - Candlewood Lake (Danbury, CT)
 - Cedar Lake (Hebron, CT)
 - Lake Quonnipaug (Guilford, CT)
2. Aquatic plant fragments were collected, documented, and identified for each boat exiting the lake (and that would allow inspection) via the public boat launch.
3. Each participating boater was asked to complete a short survey during the boat inspection. Each survey asked questions regarding: type of watercraft, location and frequency of watercraft use, how often the boater inspects and cleans the watercraft when exiting, and how often the boater finds aquatic plant fragments. We present and discuss a portion of those results.



Top: Educating boaters about invasive species dispersal after a survey. Center: Inspecting a boat for aquatic plants at Beseck Lake. Bottom: Identifying collected species.

RESULTS

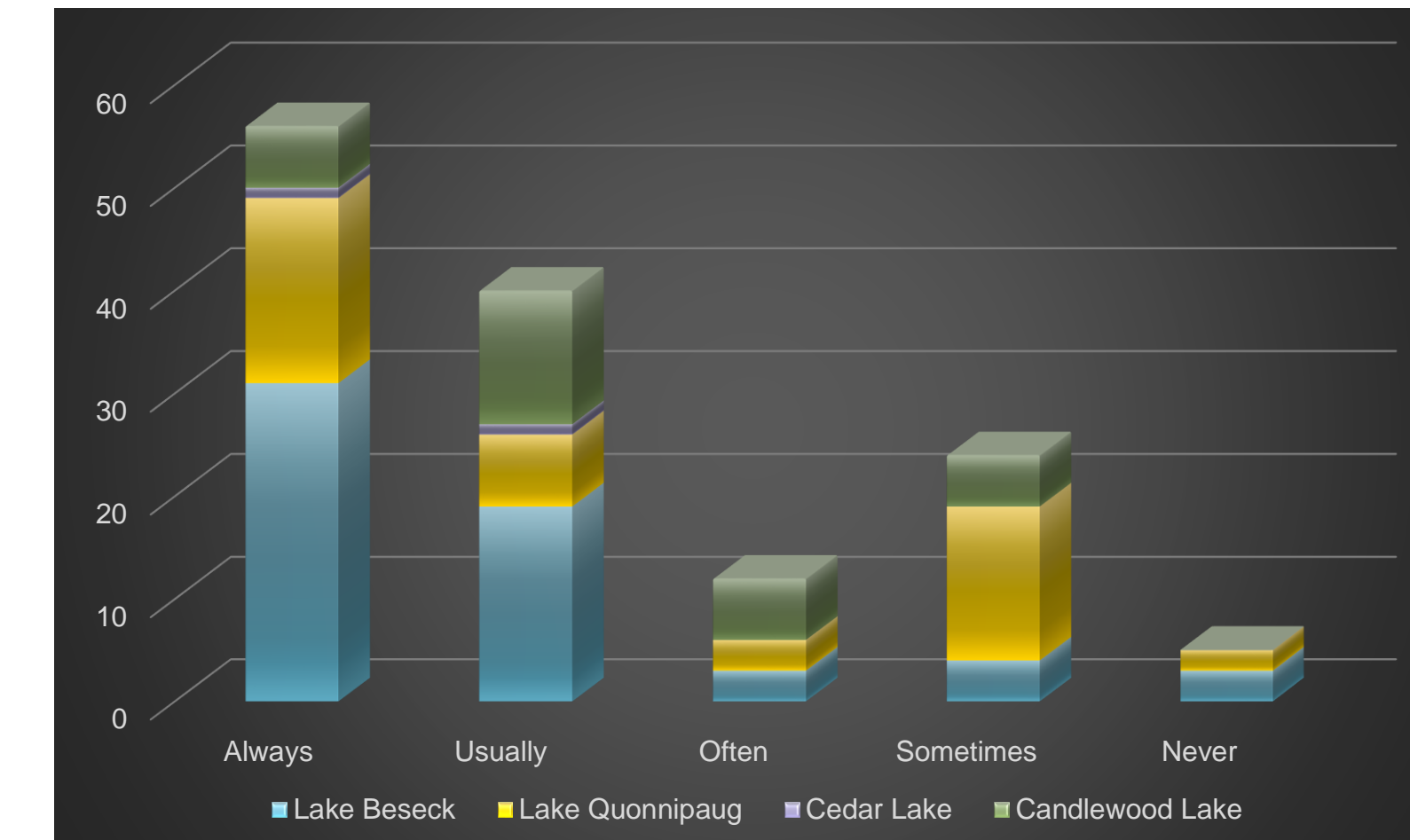


Fig 1: Response to survey question: How often do you inspect/clean your boat/trailer for aquatic plants before leaving a lake/pond?

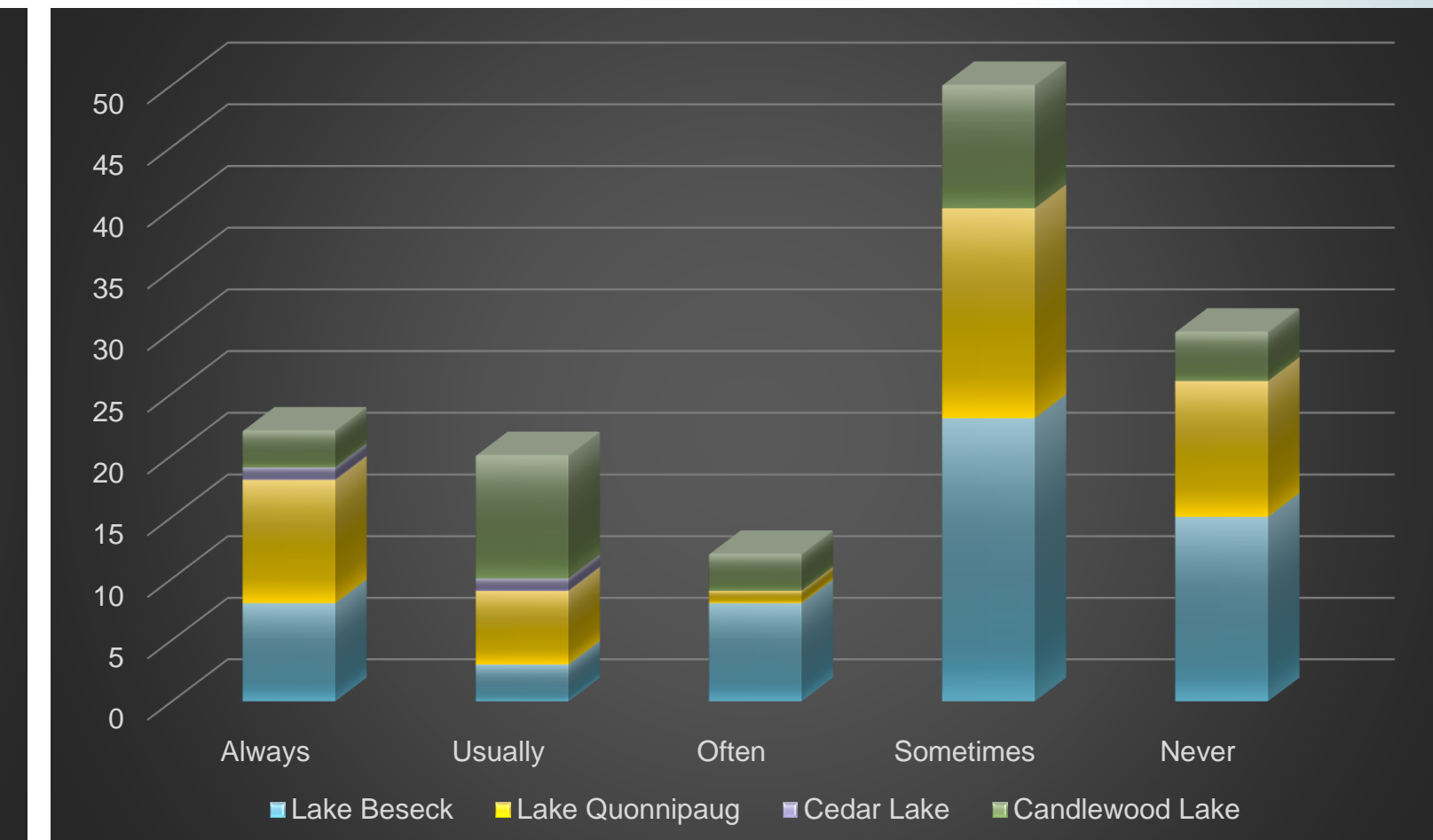


Fig 2: Response to survey question: How often do you notice aquatic plant fragments from prior trips entering the water on a new trip to a lake/pond?

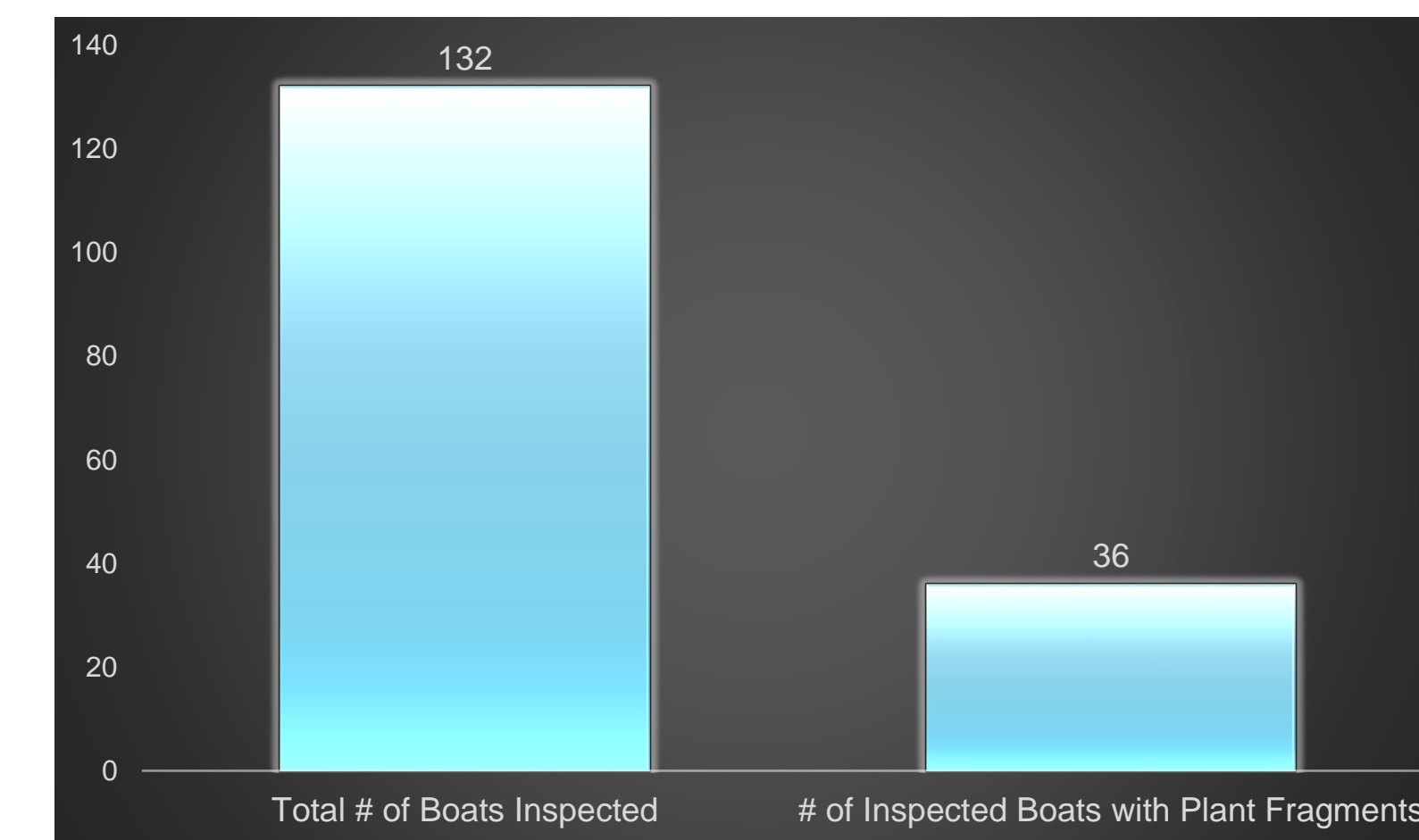


Fig 3: Number of boats inspected and number of boats inspected with plants fragments found.

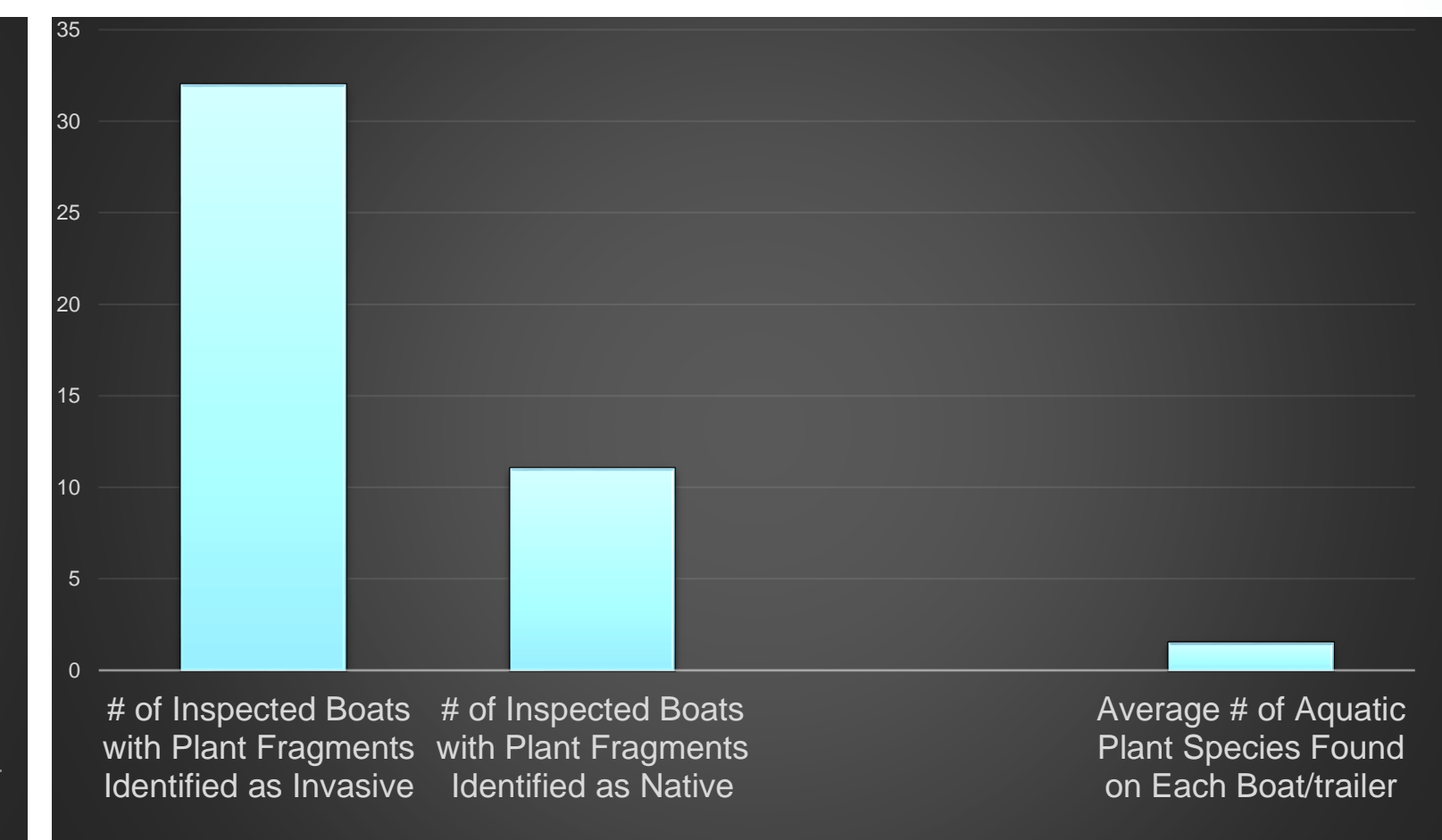


Fig 4: The number of boats with invasive and native plant fragments found and the average number of aquatic plant species found on each boat.

CONCLUSION

Preventative measures like boat inspections are instrumental in limiting the introduction of new invasive aquatic plants into local freshwater systems. Despite the importance of preventative measures, our results show that most boaters do not always inspect their watercraft (Fig 1). Of the 132 surveyed, only 56 (42%) of boaters reported “Always” inspecting and cleaning their watercraft before leaving a lake, which is concerning, considering that invasive aquatic plant fragments were found on 24% of the watercraft inspected (Figs 3 & 4). 103 boaters (78%) reported seeing plants from prior visits entering the water during a new visit (Fig 2), leading to concerns that watercraft are not being fully cleaned even when inspected.

Eurasian water-milfoil was the most prevalent invasive aquatic plant found on watercraft leaving the lakes. 28 of the 132 (21%) watercraft inspected had Eurasian water-milfoil fragments upon exiting the lakes. The most common occurrence took place at Beseck Lake with 20 of the 55 (36%) watercraft inspected carrying fragments of Eurasian-watermilfoil. Eurasian water-milfoil accounted for 225 of the 303 individual plant fragments identified, highlighting that one particular watercraft may be carrying many individual fragments, each able to form a new plant.

ACKNOWLEDGEMENTS

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