Distribution of Milfoil in the Belgrade Lakes and Unexploited Potential Milfoil Habitat

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Invasive species are alien species that colonize new habitats and outcompete native species or alter the structure and function of the ecosystem. They often have an economic impact.

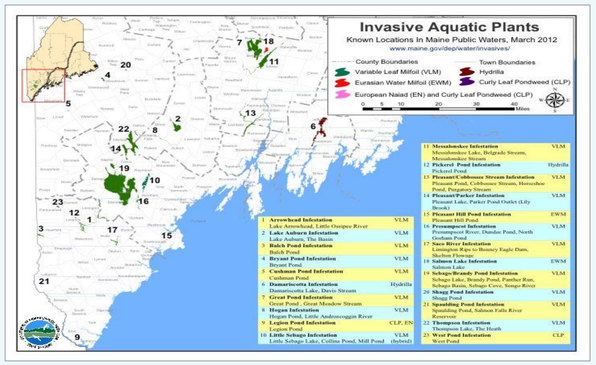

Figure 1. Invasive aquatic plants in southern Maine.

Variable leaf milfoil (*Myriophyllum heterophyllum*)

- Invasive aquatic plant in the Belgrade Lakes
- Grows at depths of up to 15 feet
- Present in 27 Maine lakes systems, including streams
- First colonized in Sebago Lake in 1970
- Grows quickly when exposed to light, displaces beneficial plants
- Can reproduce when fragmented– difficult to eradicate manually.
- Forms a mat at the surface
    - Makes swimming and boating difficult
    - Reduces habitat quality for fish, birds, wildlife
- May play a role in lake nutrient dynamics and affect eutrophication.
- In 2011, surveys found evidence of milfoil in North Bay and the Great Meadow Stream.

Goal: Predict movement of milfoil in the Belgrade Lakes

- Mapped bathymetry data of Long Pond, Great Pond, Messalonskee Lake, and Belgrade Stream.
    - Defined depth limit of 15 feet or 4.5 meters to show where milfoil can physically grow
    - Ranked high, medium and low risk in shades of green and mapped depths free of exposure in blue
- Mapped areas where milfoil growth was determined by the BRCA in the summer of 2012 in North Bay on Great Pond
    - Ran a Euclidean Distance to determine areas that are in close proximity to present growth – reclassified data
    - Defined depth limit of 15 feet or 4.5 meters to show where milfoil can physically grow-reclassified data.
    - Ran a raster calculation (Euclidean Distance Value + Depth Value) to determine the areas that are the closest to present plants and shallowest, therefore the most ideal for milfoil growth.
- Data was used from BRCA and Philip Nyhus
- Coordinate System: NAD 1983 UTM Zone 19N

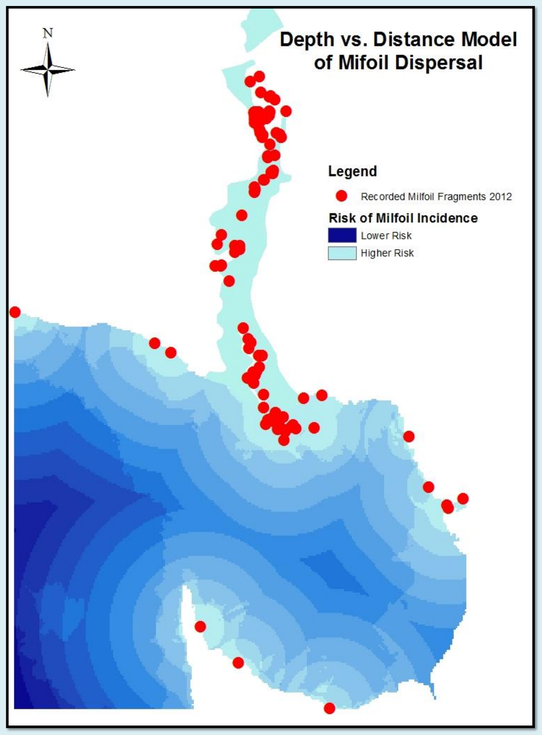

Figure 2. Map of milfoil found in 2012 in North Bay on Great Pond. Shows a gradient of low to high risk of milfoil presence based on a distance and depth model.

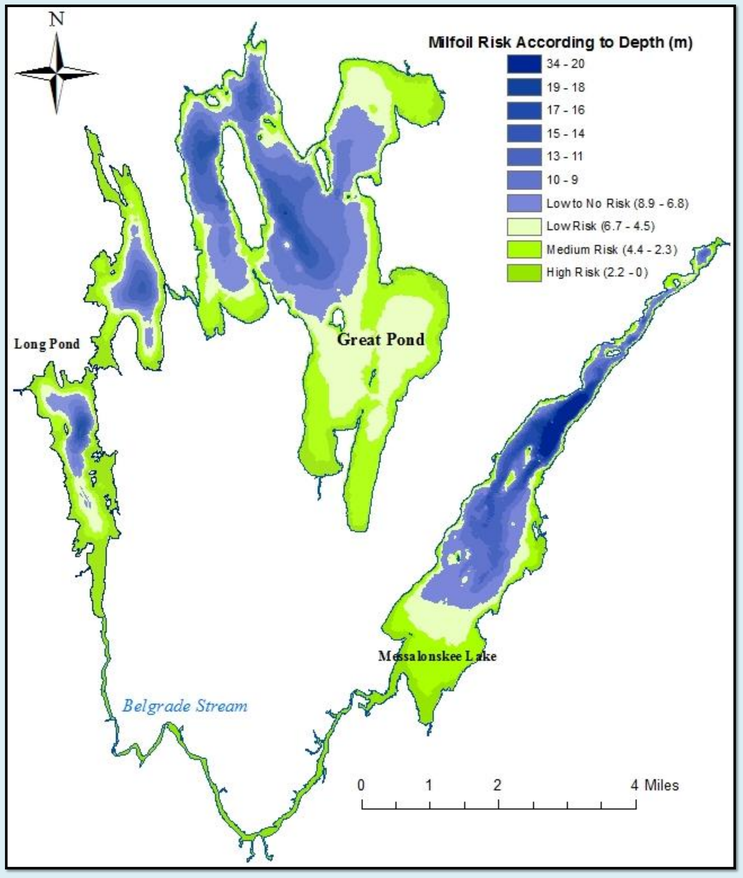

Figure 3. Possible risk of milfoil based on depths less than 15 feet or 4.5 meters in Long Pond, Great Pond, Belgrade Stream and Messalonskee Lake

Results

- Mifoil was present in North Bay in 2012
- Our depth and distance model shows that milfoil can easily spread throughout the entirety of North Bay and presumably into Great Pond.
- Our Belgrade Lakes Region depth analysis shows that there are high risk areas in the littoral zones of each lake we evaluated.
- There are also certain vulnerable areas on the middle of Messalonskee Lake.
- Belgrade stream could play a critical role in the spread of milfoil due to its contact with both Messalonskee and Great Pond.

Conclusions

Our data show that variable leaf milfoil could potentially spread through the Belgrade Lakes. It is currently present in North Bay in Great Pond. Though the milfoil invasion has been contained in North Bay, it is important to continue to work to control and even eradicate this invasive plant.

Eradication efforts:

- Belgrade Regional Conservation Alliance formed a milfoil committee in 2002
- Courtesy boat inspections and invasive plant surveys to prevent spread of milfoil
- Milfoil control options:
    - Manual removal
    - Diver operated suction harvest
    - Benthic barriers
    - Mechanical harvesting
- Removal of milfoil biomass helps remove excess nutrients from the lake system.

Future research:

- Control and eradication efforts continue
- Monitor outside current infested areas
- Continue boat inspection programs
- Potential biological control

Acknowledgements

Thanks to Phil Nyhus, Manny Gimond, the Belgrade Regional Conservation Alliance, Colby Environmental Assessment Team (ES494), Jazmine Russell, and Jack Mauel.