

**The New England Botanical Club
Graduate Student Research Awards
2018 AWARD WINNER**

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Identifying the presence of submersed aquatic plant species at low abundances using the eDNA (environmental DNA) method and next-generation sequencing

Aquatic ecosystems are particularly vulnerable to degradation by anthropogenic disturbance, and aquatic plants that are sensitive to such disturbances are at risk of local or regional extinction. The first step in any conservation planning is getting basic information about extant populations of a rare species. However, obtaining such information is often a challenge for rare fully submerged aquatic plant species because of the nature of the aquatic habitat and the highly similar morphologies of a lot of such plant species. An efficient alternative to traditional field surveys might significantly improve our ability to identify the presence of submersed aquatic plant species at low abundances. One such alternative could be the newly developed eDNA (environmental DNA) method, which uses molecular traces of organisms left in their environment for species presence identification. The aim of the currently proposed research project is to modify this method for best identification of least abundant submersed aquatic plant species, as well as to see how well the method identifies the plant community structure of a particular lake. Sixty-five lake water samples have been collected from 18 different lakes located in Massachusetts, Vermont, and Connecticut. DNA extraction of the filtered water samples will be followed by PCRs amplifying appropriate DNA markers, which will be subsequently run on Illumina MiSeq to get next-generation sequencing data. The data will be analyzed to compare with the existing GenBank entries for the purpose of species identification. Species abundance will also be assessed and compared to actual species abundances observed in the field.

The New England Botanical Club offers each year up to \$3,000 total in support of botanical research to be conducted by graduate students. The awards are made to stimulate and encourage botanical research on the New England flora, and to make possible visits to the New England region by those who would not otherwise be able to do so. It is anticipated that two awards will be given, although the actual number and amount of awards will depend on the proposals received. The awards are given to the graduate student(s) submitting the best research proposal dealing with systematic botany, biosystematics, plant ecology, or plant conservation biology.