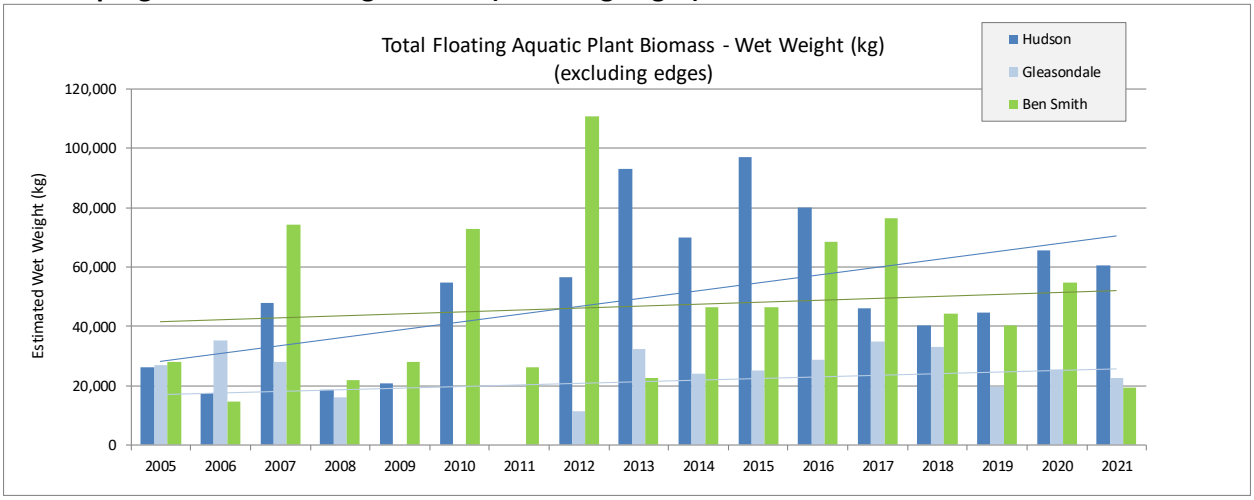
OARS Biomass Summary 2021

B. Wetherill October 14, 2021

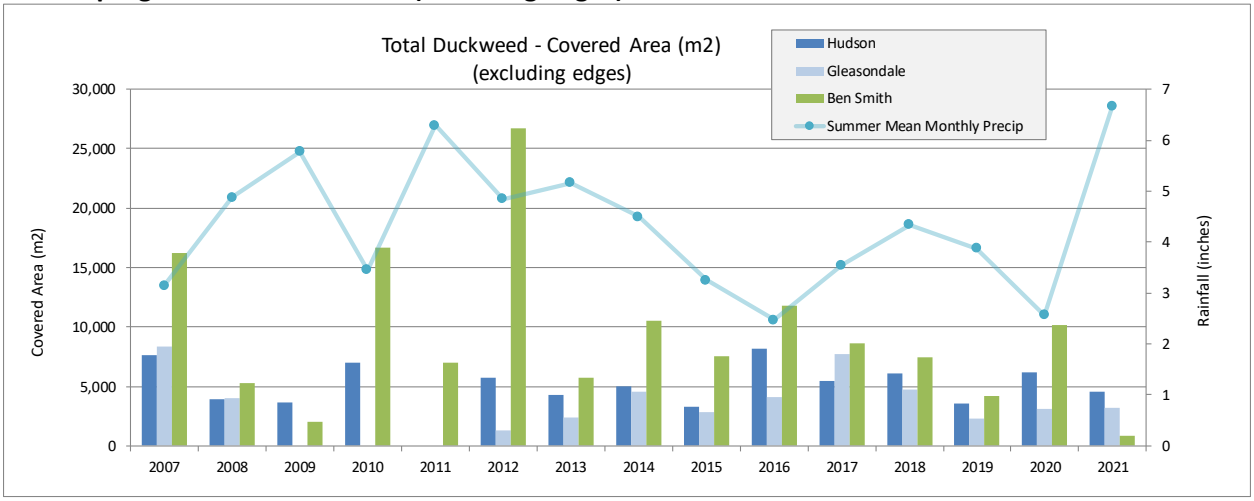
2021 was characterized by very heavy precipitation. Summer average rainfall was higher than any other year since these surveys began. All biomass volumes were reduced, especially duckweed. The graph below shows a strong visible inverse relationship between precipitation and duckweed. For total floating biomass, our data show a strong inverse correlation with precipitation in the Ben Smith impoundment and a strong positive correlation with temperature in the Hudson impoundment. The other correlations are not as strong. The upward trend in total biomass in Hudson still holds, even with the reduced 2021 volumes, and it continues to be dominated by filamentous green algae. The eutrophication issue in Hudson seems to be getting worse.

Pearson Corr.	Hudson	Gleasondale	Ben Smith
Temperature	0.40	-0.29	0.28
Precipitation	-0.27	-0.18	-0.51

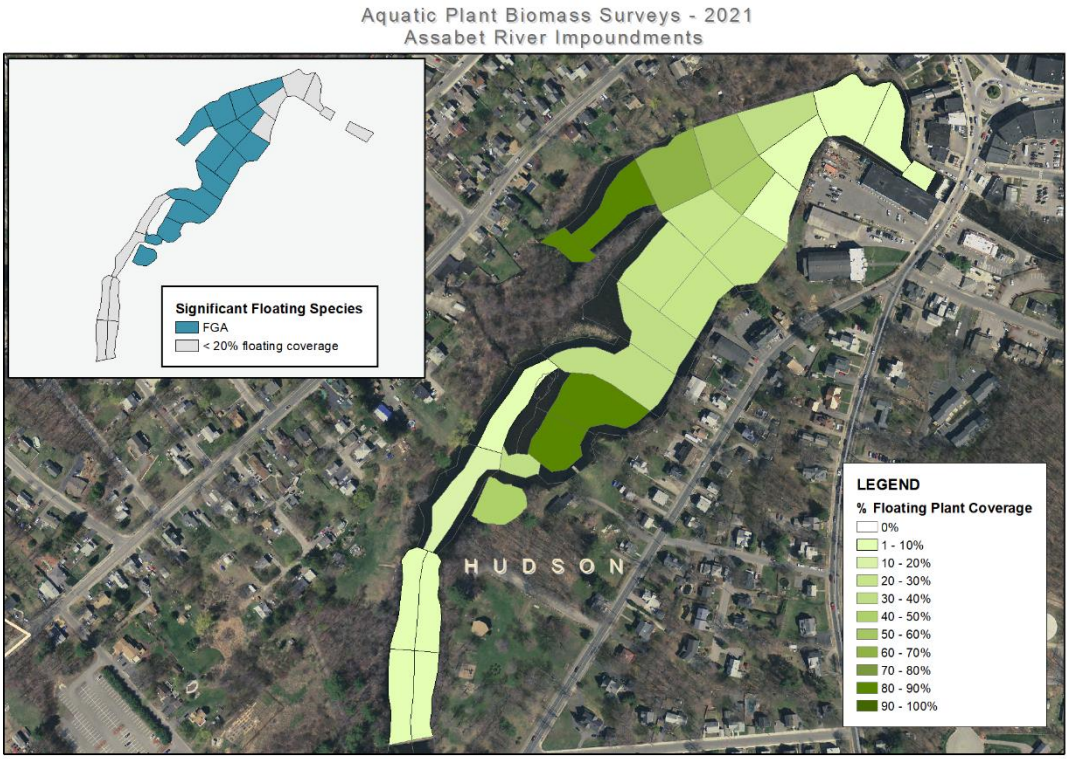
Annual progression of Floating Biomass (excluding edges)



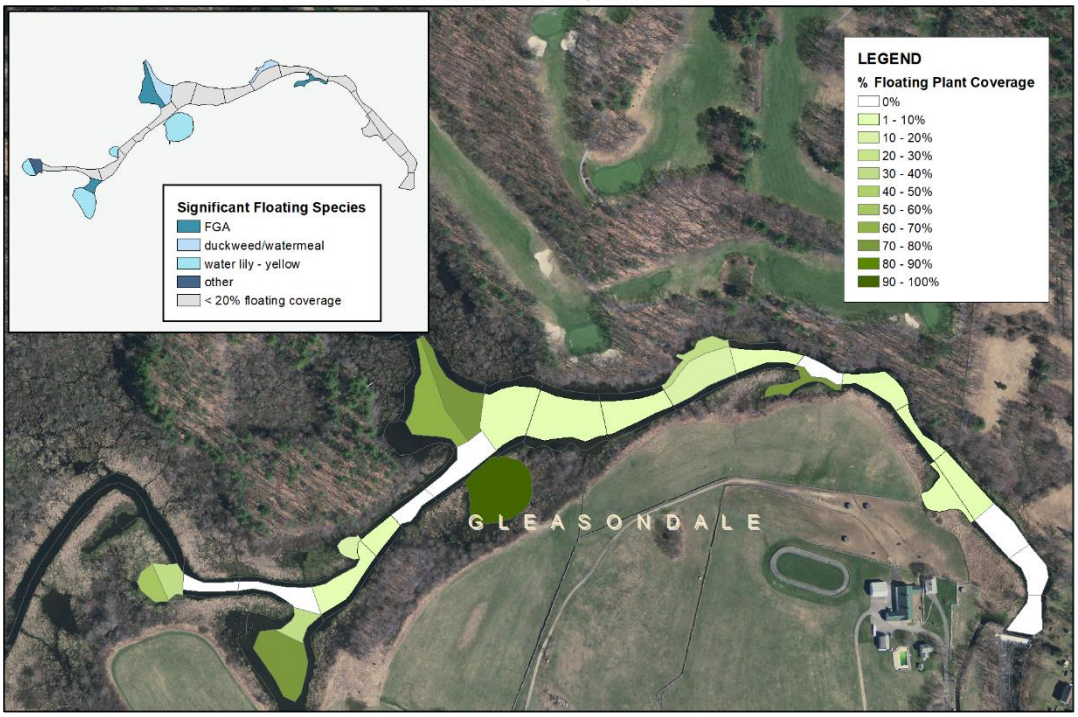
Annual progression of Duckweed (excluding edges)



Note: Starting in 2020, the survey was conducted on the central areas of the impoundments only. Edges were excluded to save time. It was proposed that the real objective of the survey should be biomass in the central portion of the impoundments, not biomass that has collected along the shore. Also, the edge sectors, as drawn, included large portions of exposed land, so percent coverage was somewhat misleading. All years have been adjusted accordingly. The excluded edges can be seen as a faint gray line in the maps below.



Aquatic Plant Biomass Surveys - 2021
Assabet River Impoundments



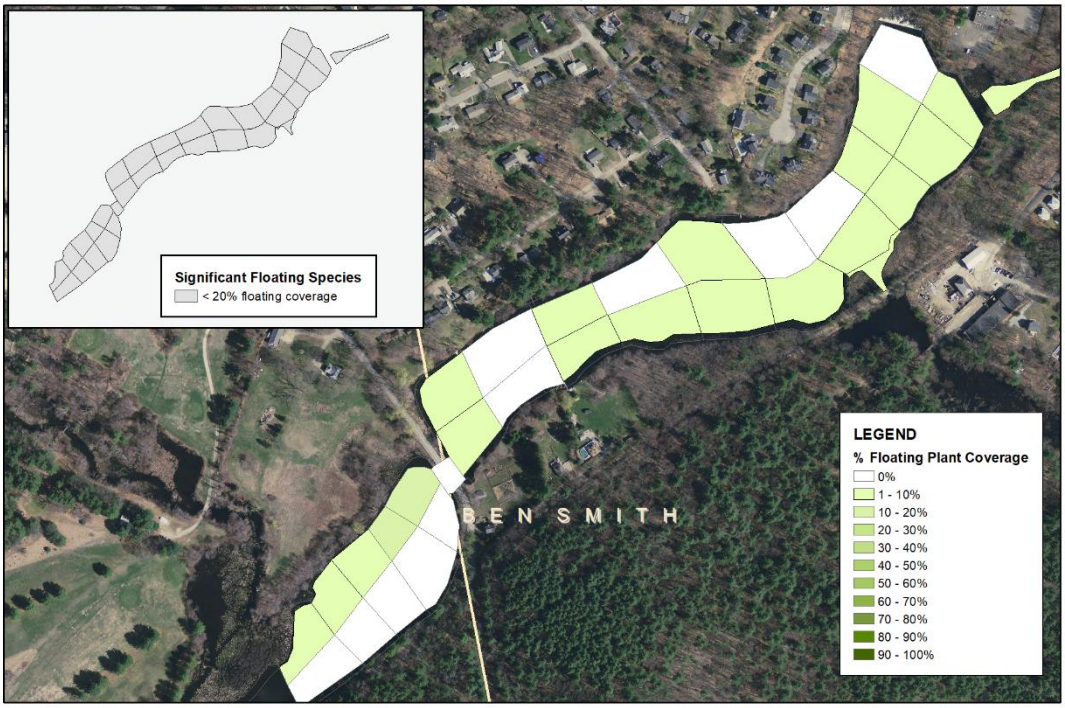
Created by B. Wetherill, OARS, 2021
Basemap from MassGIS
Software ArcGIS donations from ESRI Conservation

N

1:3,500

Gleasondale Impoundment of the Assabet River
Field observations: August 31, 2021

Aquatic Plant Biomass Surveys - 2021
Assabet River Impoundments



Created by B. Wetherill, OARS, 2021
Basemap from MassGIS
Software ArcGIS donations from ESRI Conservation

N

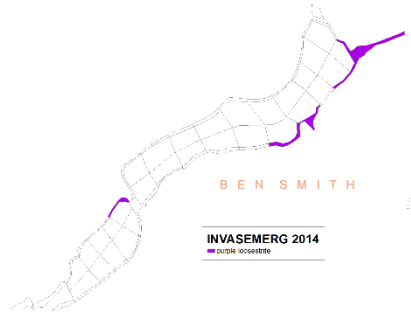
1:4,000

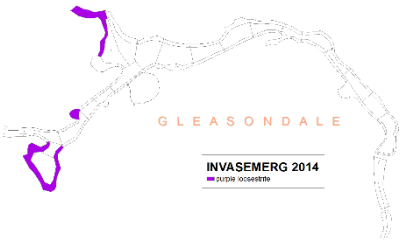
Ben Smith Impoundment of the Assabet River
Field observations: August 31, 2021

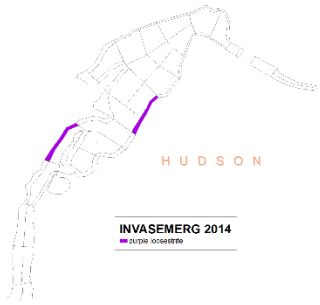
Purple Loosestrife

Maps of sectors with purple loosestrife from 2014, 2016, and 2021 show what seems like an increase in extent. However, a graph by year of the number of sectors with purple loosestrife shows less of a trend. The year 2014 seems to have been a very low year. Our records show that CISMA and OARS released Galerucella leaf-eating beatles in 2012 (or 2013?), 2014, and 2015. The 2014 release could explain the low levels in 2014, but it is not clear why counts bounced back in 2015.

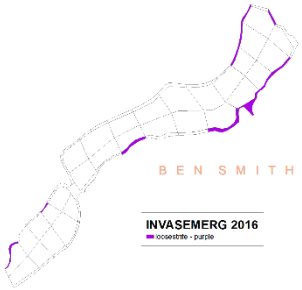
2014

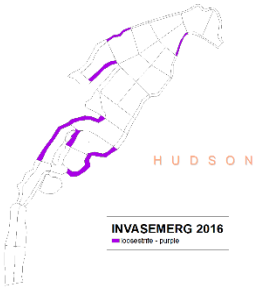




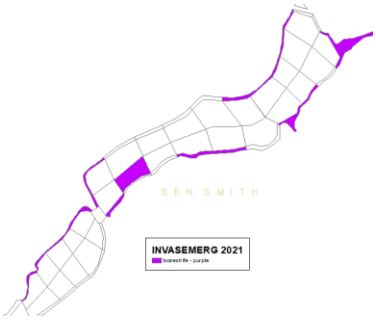


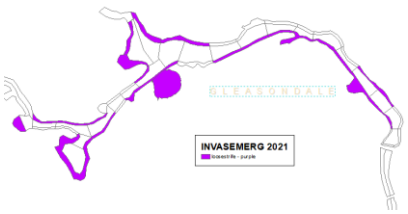
2016

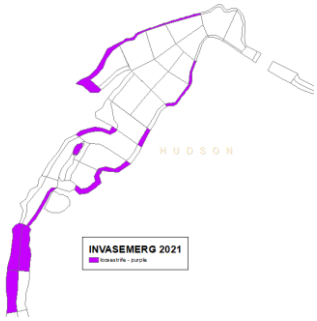


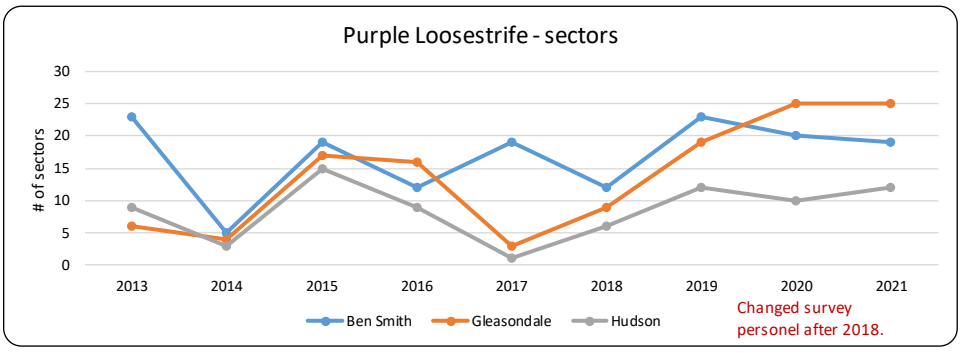


2021





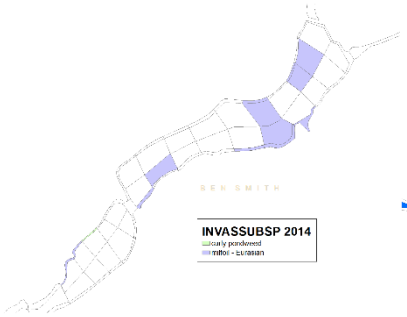


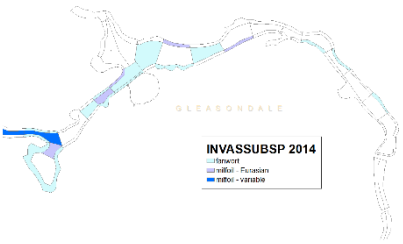


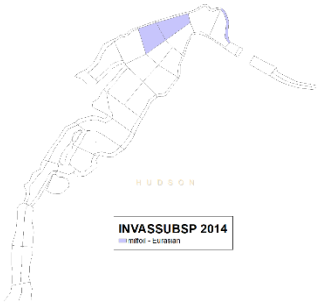
Submerged Invasives

Maps of sectors with invasive submerged species from 2014, 2016, and 2021 highlight differences between the impoundments. In Ben Smith and Gleasondale, there is no visible trend over time, but in Hudson there does seem to be a trend for the worse. A graph by year of the number of sectors with submerged invasives supports the suggestion that Hudson is getting worse, but also suggests that Gleasondale may be improving. One point evident in the maps is that milfoil and fanwort seem to move around significantly from year to year.

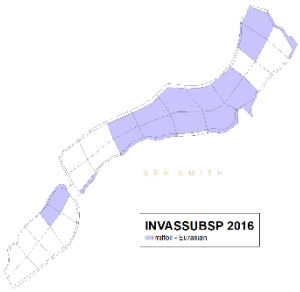
2014

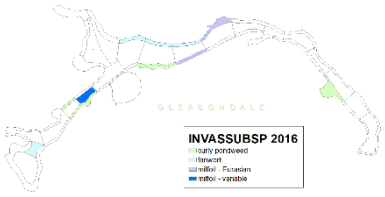


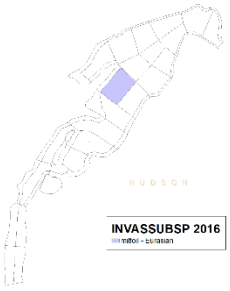




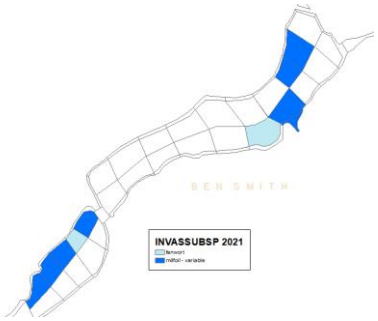
2016

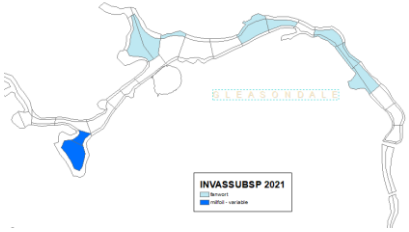


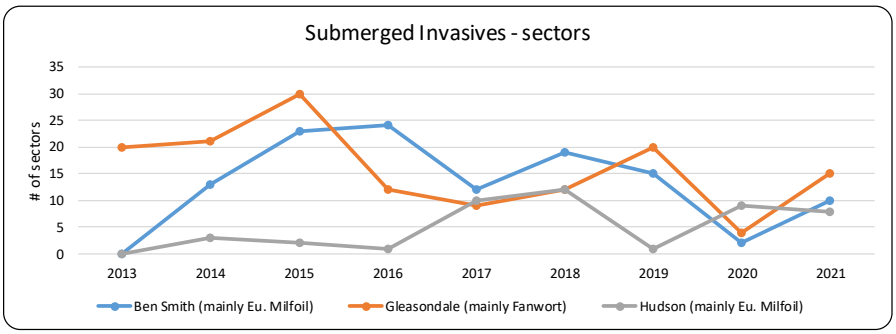




2021



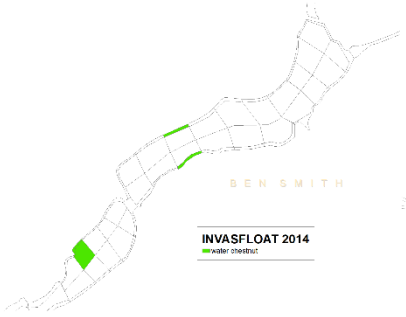


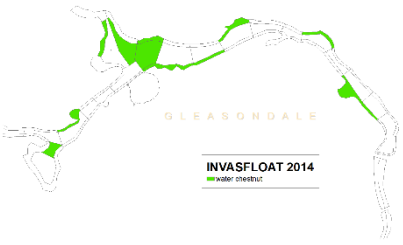


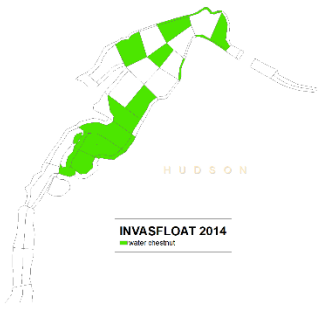
Water Chestnut

Maps of sectors with water chestnut from 2014, 2016, and 2020 show a reduction in water chestnut everywhere except for Gleasondale. There was no water chestnut at all in 2021. Note that these surveys always take place after the water chestnut removal activities, such as the Rapid Response team, so the data is not completely representative of actual distribution. In 2020, the Rapid Response team did not get to Gleasondale, which probably explains the presence in Gleasondale.

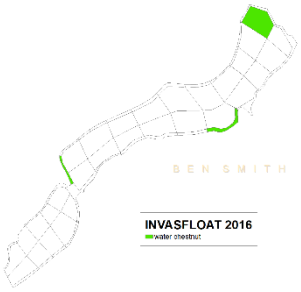
2014

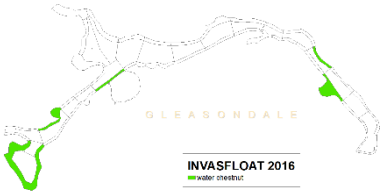


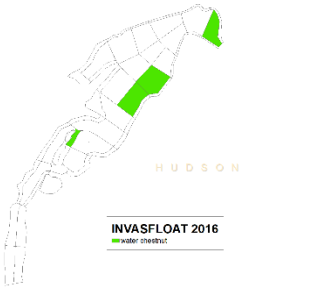




2016







2020