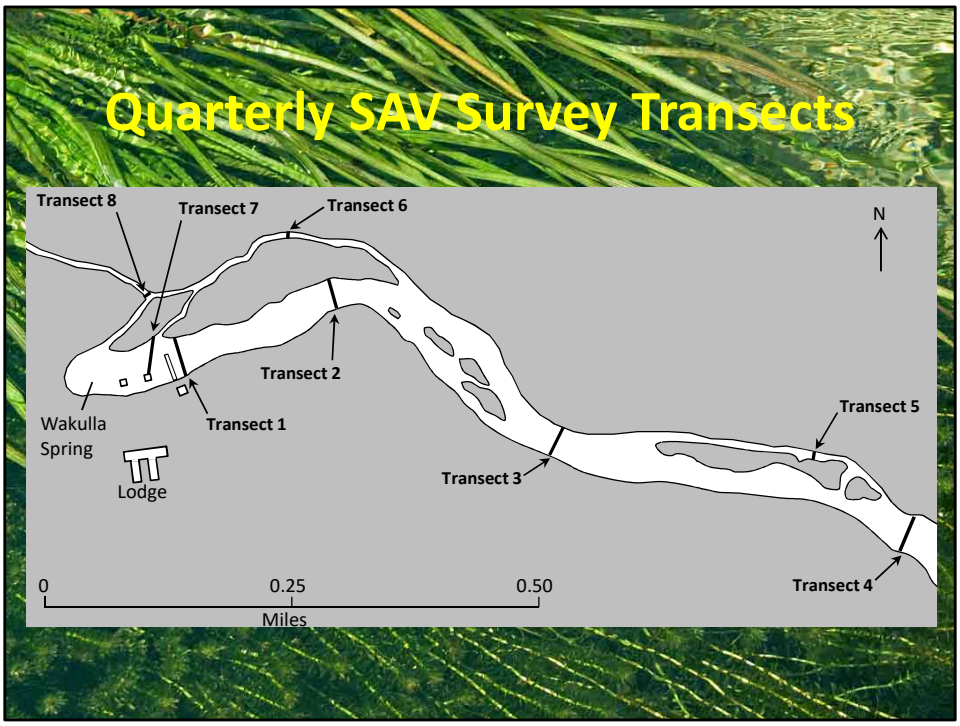
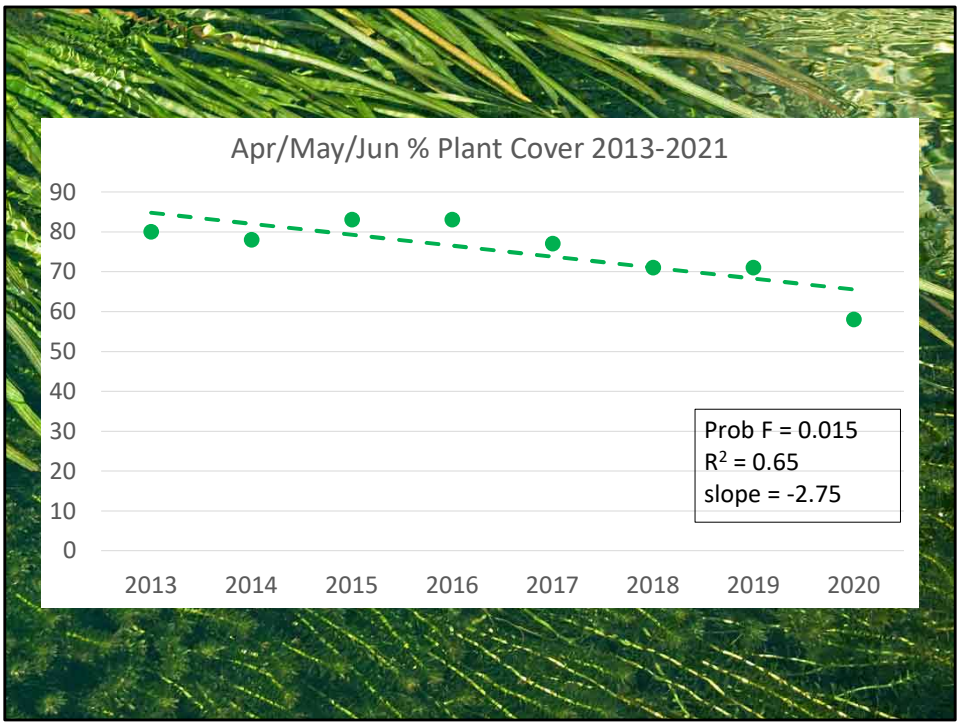

- Submerged aquatic vegetation, or SAV, along with the emergent plants that grow along the margins of river, ought to comprise the foundation of the aquatic food web in the upper Wakulla River
- As I've suggested before, that may not be exclusively the case any longer; the ecosystem may be moving to a food web that is more based on detritus than photosynthesizing aquatic plants.
- Be that as it may, the only data we have on SAV comprise quarterly surveys initiated by volunteers and park staff in 2013
- This brief presentation offers an overview of what those data suggest may be happening




- Volunteers and park staff began surveying SAV along seven transects in the upper river in April 2013
- An eighth transect, at the mouth of the Sally Ward Run, was added in 2017 to track a fairly robust patch of hydrilla
- Observations are taken at regular intervals along each transect:
    - 30 feet along the longer transects
    - 10 feet along the shorter ones

- A one-meter PVC sampling frame is thrown off the front of the pontoon boat
- Initially the sample positions were defined using a metered rope that was tied to trees at either end of the transect
- In 2015 or 2016, the decision was made to use a range-finder instead.
- Individual sample locations vary as a function of range-finder accuracy, boat position, and how the sampling frame is thrown
- So I prefer to examine aggregate measures rather than point data or even individual transect data

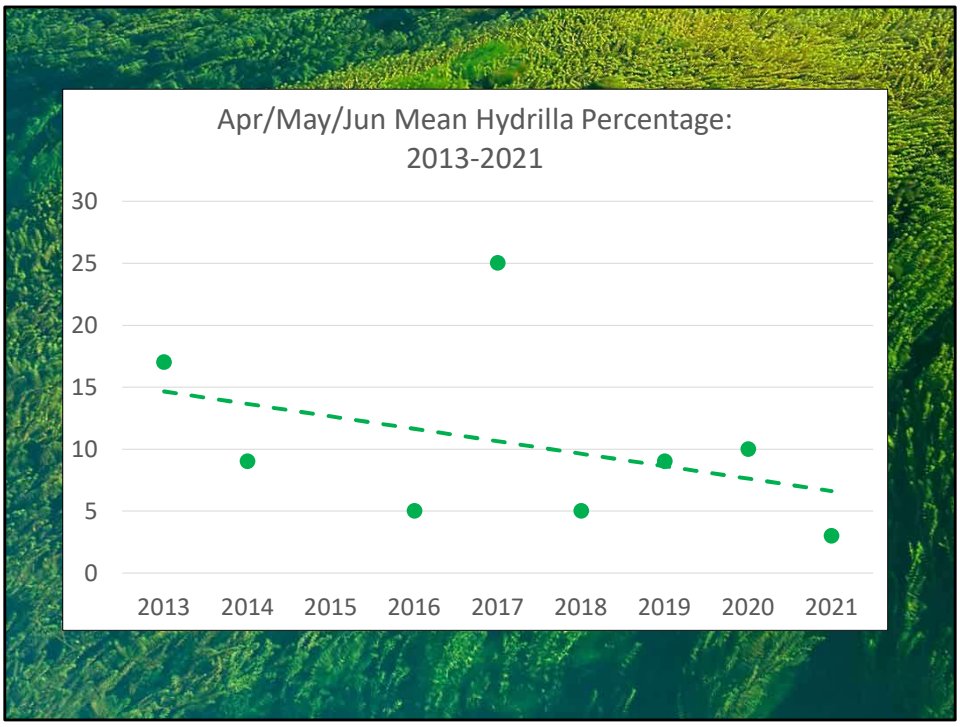

- These two charts illustrate the imprecision of the sampling method
- These track percent cover by eelgrass (Vallisneria americana) at plots # 1 and 2 along transect 7 which runs from the swim raft nearest the T dock to the other side of the river
- This is an area with dense, but patchy eelgrass stands
- Sometimes the sampling frame landed in the midst of a patch;
    - sometimes it straddled an edge;
    - other times it missed altogether
- So let's look at some aggregate data




- This chart depicts percent plant cover during the months of April, May, and June, averaged across all sample points and all transects by year
- This is the level at which I have the most confidence that the trends might be reasonably accurate
- The inverse of this pattern is the percent of bare sediment
- There appears to be a downward trend **[click to next slide]**
- This is borne out by fitting a regression line to the data
- The regression model is significant at the 98.5% confidence level with an R2 of 0.65 indicating that 65% of the observed variation in % plant cover is explained by the passage of time.
- This is consistent with my informal observations, namely that there appears to be more and more bare sediment, likely as a result of stream bottom erosion that has been occurring since the first large-scale herbicide kill of the hydrilla in April 2002

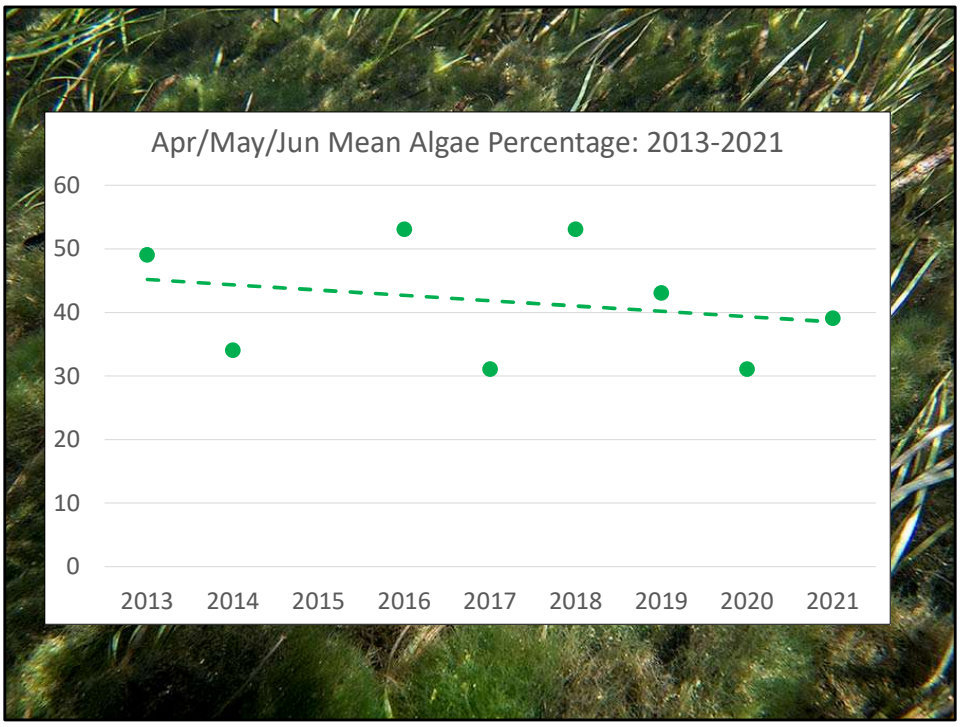
- This is a photo taken by Bob Thompson in Feb 2005 showing the dense stands of hydrilla that persisted despite herbicide treatment the preceding spring.
- **[click for image with algae]**

- Algae proliferated during the herbicide campaign to remove hydrilla, because they were able to reproduce quickly to take advantage of more available nitrogen
- As this photo illustrates, as the algae proliferated they tended to grow over and amongst the hydrilla stems
- The manatee appear to graze back hydrilla stems above the algae
- The survey method counts whatever is on top, so where hydrilla are completely covered by algae the cover is recorded as algae



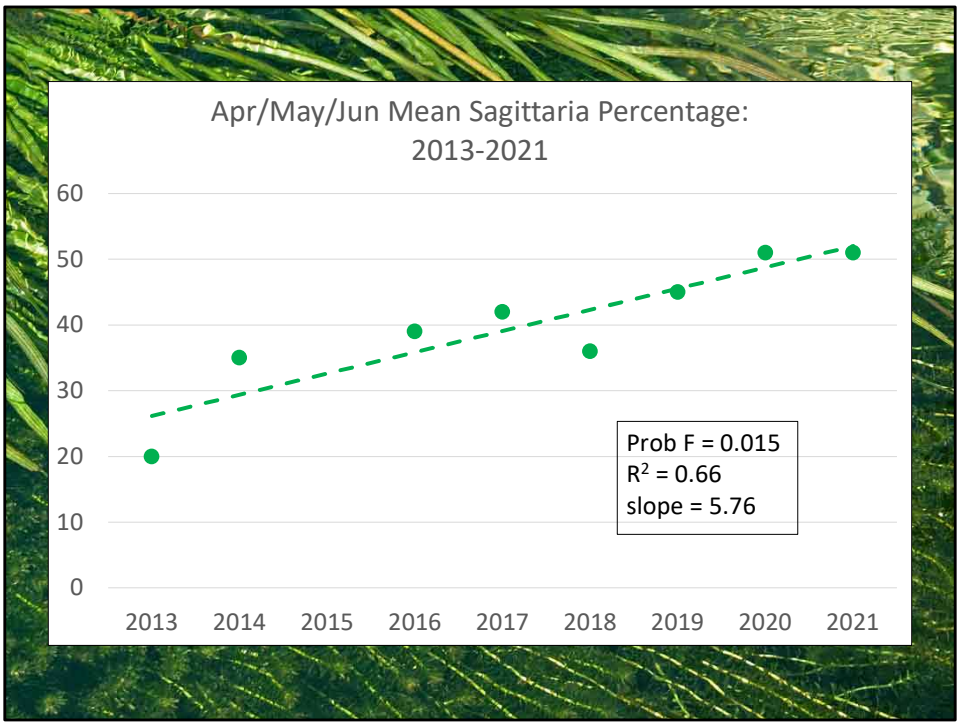

- These are observations of the total mean hydrilla percentage of all SAV present for samples collected in April, May and June from all plots and transects.
- With the exception of the 2017 total mean percentage, the trend appears to be declining
- Examining the data for 2017 suggests that the higher hydrilla counts resulted from hydrilla protruding above the algal mats
- **[click]** Nonetheless, a fitted regression line does have a negative slope even with the 2017 outlier
- However, the trend is not statistically significant at the 95% level of confidence

- This is a photo taken by Bob Thompson in the swimming area in March 2015 showing algae growing over and among strands of spring tape grass – Sagittaria kurziana
- **[click to show chart]**

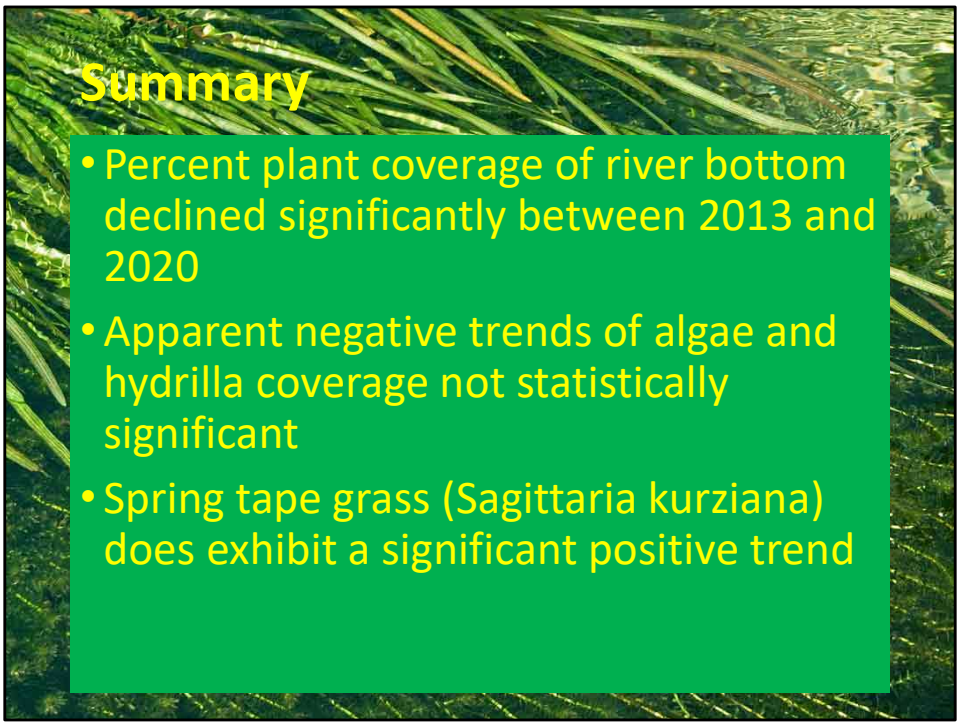



- Here we see observations of the total mean algae percentage of all SAV present for samples collected in April, May and June.
- **[click]** The apparent trend is negative suggesting that we may be making some progress in the right direction, although the slope is small
- In fact, the trend is not statistically significant at the 95% level of confidence

- This photo, again by Bob Thompson, shows spring tape grass, aka Sagittaria kurziana, growing with hydrilla, taken in Feb 2005




- These are observations of the total mean Sagittaria percentage of all SAV present for samples collected in April, May and June.
- They reveal an apparent upward trend **[click]**
- Which is made clear when we fit a regression line to the data
- **[click]** In fact this trend is significant at 98.5 % level
- This is a positive sign since the consensus among those who were around before the hydrilla invasion is that spring tape grass was the dominant SAV species in the river




- So to summarize:
- **[click]** Percent plant coverage of the river bottom during the months of April through June declined significantly between 2013 and 2020
- **[click]** While the percentage of algae and hydrilla exhibit apparent negative trends over the same time period those trends are not statistically significant
- **[click]** However, spring tape grass (Sagittaria kurziana) does exhibit a significant positive trend