



IrisBG
Collection Management

Coffee Chat

An Invisible Loss: How Data Analysis Uncovered 350 Lost Trees

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Morris County Park Commission Overview

Level II Arb Net Accredited Arboreta

Frelinghuysen Arboretum (1971)

- Country Place Era home of the Frelinghuysen Family
- American Conifer Society Reference Garden
- 15 NJ Champion Trees
- 127 acres

Bamboo Brook Outdoor Education Center (1972)

- Home of 2nd U.S. female landscape designer, Martha Hutcheson
- 687 acres

Willowwood Arboretum (1980)

- Passion project of two brothers started in 1910.
- 2 National Champion Trees & 57 NJ Champion Trees
- 136 acres



Martha Brookes Hutcheson

Plant Records

- Transferred from BG-Base to IrisBG in 2018
- The 3 properties are managed in 2 databases.
- One full-time plant records staff member
- Have mapped 80% of the collections since 2018
- As of December 2021, there are 7,216 living accessions and 10,465 plant items.
- The database has records on over 25,000 accessions.



Ginkgo biloba circa 1910

Data Analysis Project

Scope:

- Analyze data for trees in the collections
 - Graph their age
- Seek to quantify trends in tree longevity

Assumptions:

- Trees decline as they age so the collections will be mostly comprised of mature and/or younger trees
- New trees are being planted at a sufficient rate to replace aging trees



Sequoiadendron giganteum 'Hazel Smith'

Cleaning the Data

- “Life Form” in the taxa record was used to identify tree records
 - Tree, Deciduous Tree, Evergreen Tree, and Semi-Evergreen Tree were selected
 - A report for plants with a blank life form field was also run and manually reviewed to see if any trees would be missed due to this field not being complete.
- The “Material Type” in the accession record was also reviewed
 - Primarily our trees were planted as “Plants” or were added later as an “existing” tree
 - Many of these were incorrectly listed as unknown because older records had this data stored in the comments field.
 - All tree accession records were selected and manually reviewed to ensure accuracy.



Cryptomeria japonica

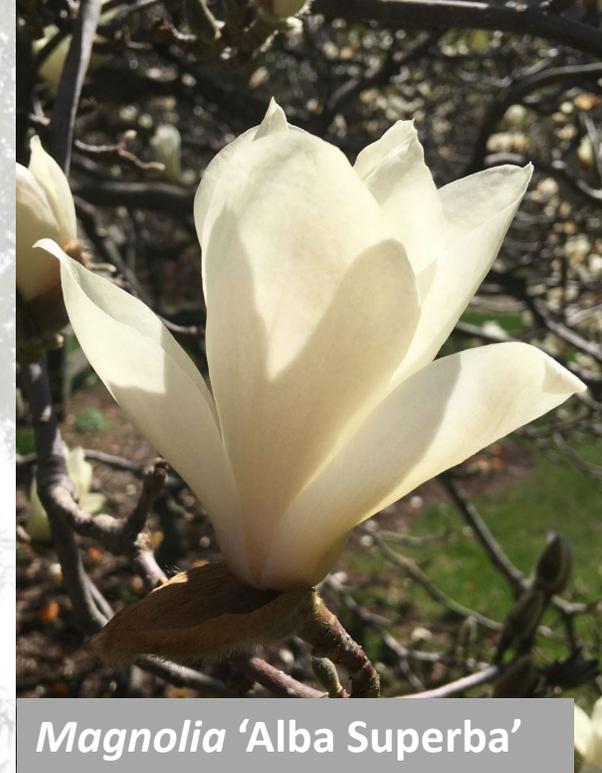
Exporting the Data

- Use the report feature to export all tree data by utilizing “Life Form”
- You may want to create a custom report template

Useful fields to export:

- Living Data Set: Genus, Species, Cultivar, Infra, Acc Num, **Acc Year**, Provenance, Origin Name, Location Code, **Material Type**
- Dead Data Set: Genus, Species, Cultivar, Infra, Acc Num, Item Status, **Acc Year**, **Item Status Date**, Item Loc Code, Material Type

*Our data was also separated by site and the location code was used to sort Willowwood and Bamboo Brook data.



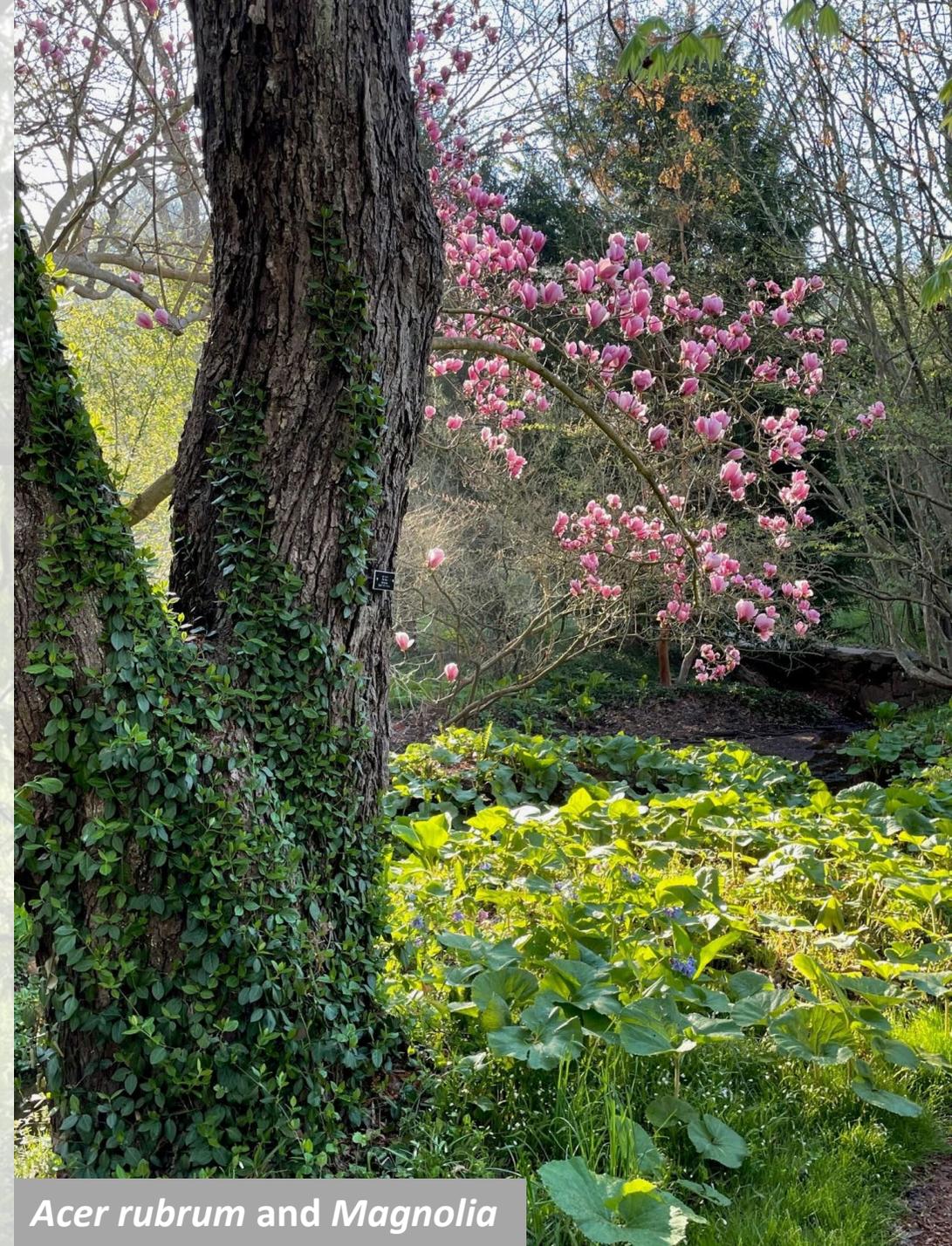
Magnolia 'Alba Superba'



Larix kaempferi

Filtering the Data

- All “Existing” trees had unknown planting dates and ages. These were omitted by utilizing the “Material Type” column
- Unplanted trees in the nursery, conservatory, or in containers were omitted
- Any trees with a blank status date of 0000 were omitted
- This created a data set for all trees with a known material type/origin and planting date



Acer rubrum and *Magnolia*

Data Overview

Willowwood:

- 111 year span
- Average tree age: 41 years old
- 1206 living trees and 2511 non-living trees

Frelinghuysen:

- 51 year span
- Average tree age: 21 years old
- 677 living trees and 672 non-living trees

Bamboo Brook:

- 43 year span
- Average tree age: 15 years old
- 150 living trees and 87 non-living trees



Malus 'Prairifire'



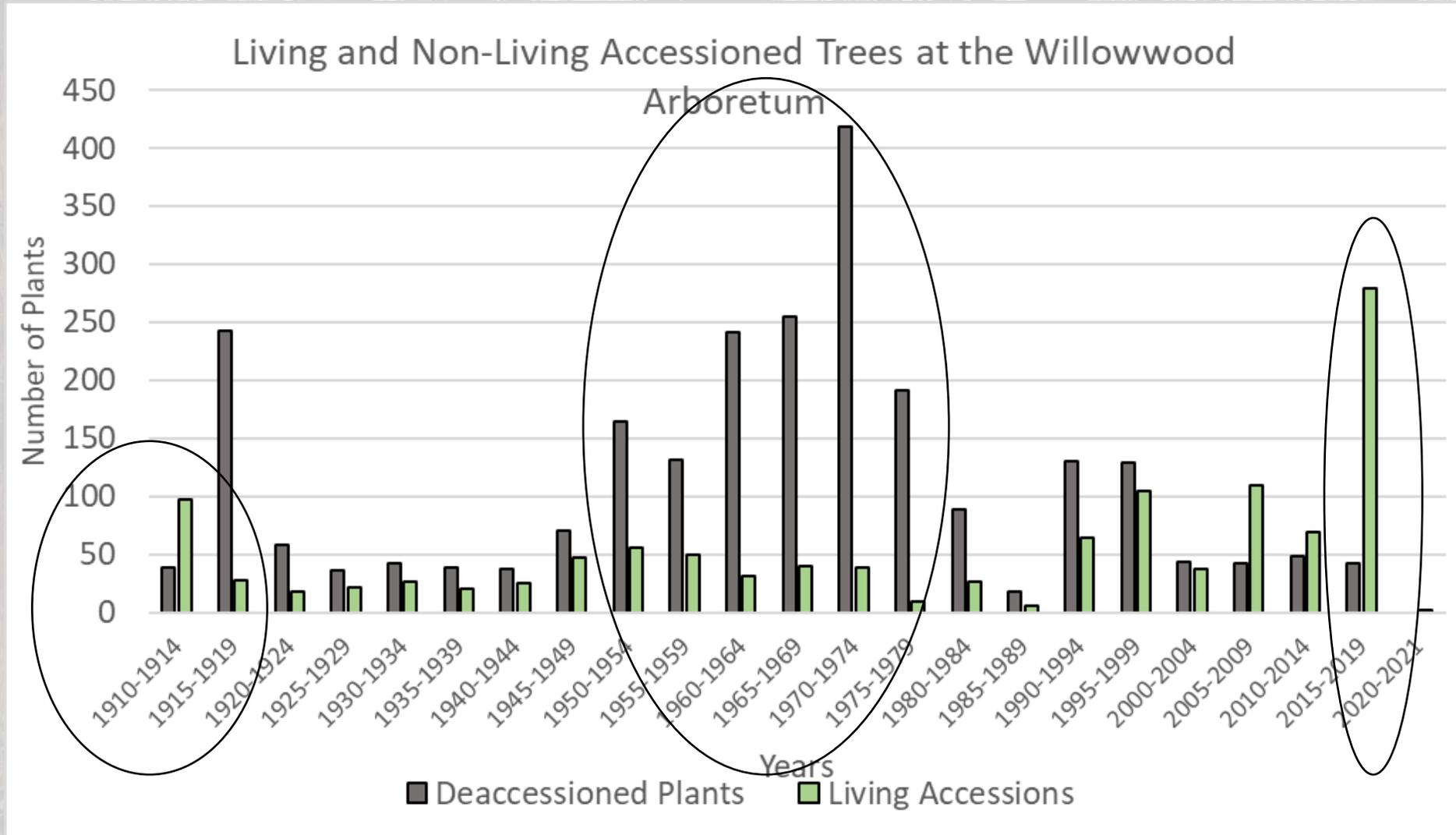
Fagus sylvatica 'Purpurea Tricolor'

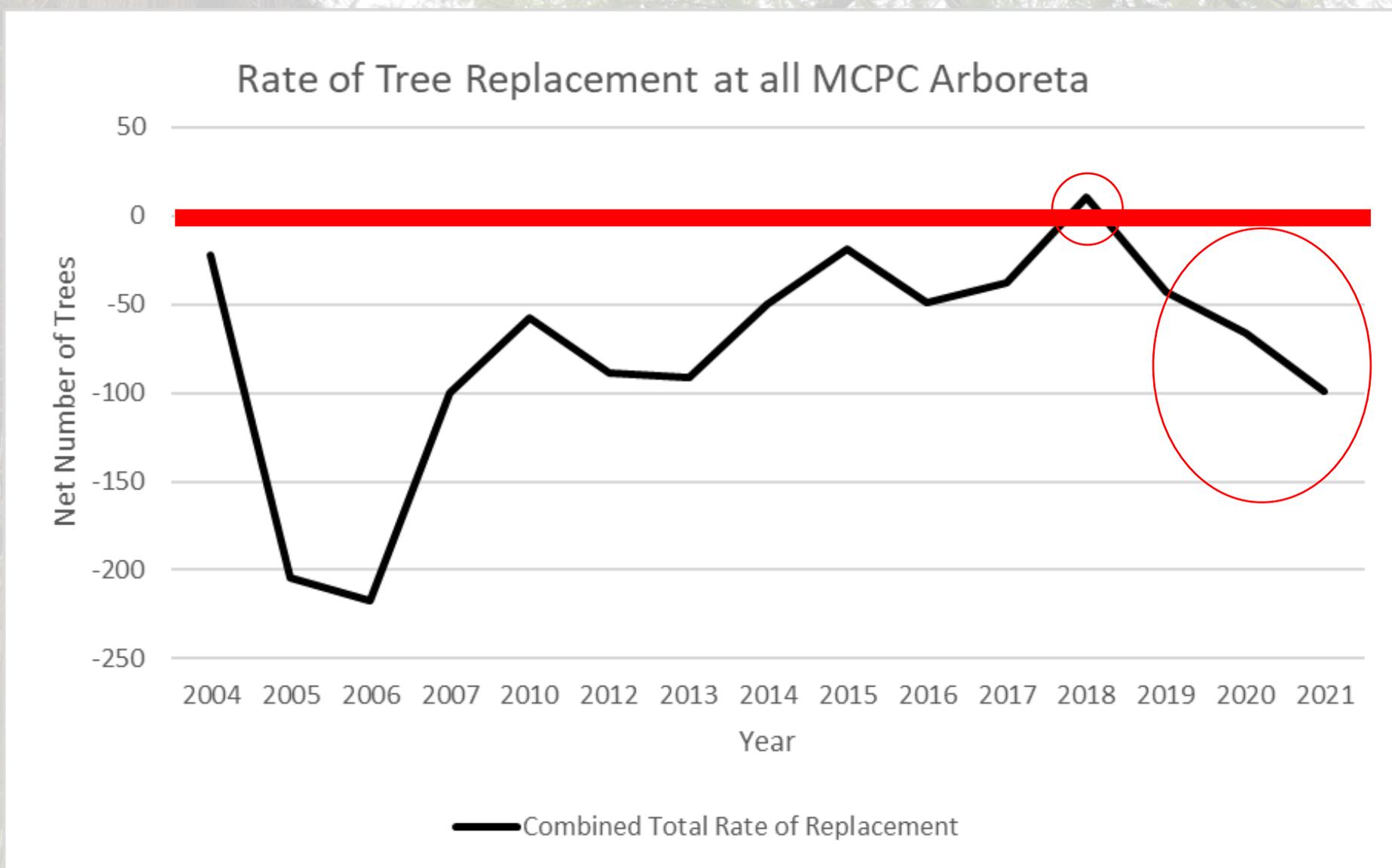
Working with the Data



Cornus macrophylla

Sort by acc year
in each data set
and count the
number of trees
in your living and
non-living data
set.





Quantity of Trees Planted – Quantity of Trees Removed = Net Quantity of New Plantings

Note: Years 2008, 2009, and 2011 were outliers due to deaccessioning records in natural areas & were omitted from this graph.

Trends in the Last Decade

Rate of Planting vs. Removal Per Year

Willowwood:

+11.7 trees : -31.4 trees

Bamboo Brook:

+2.4 trees : -4.8 trees

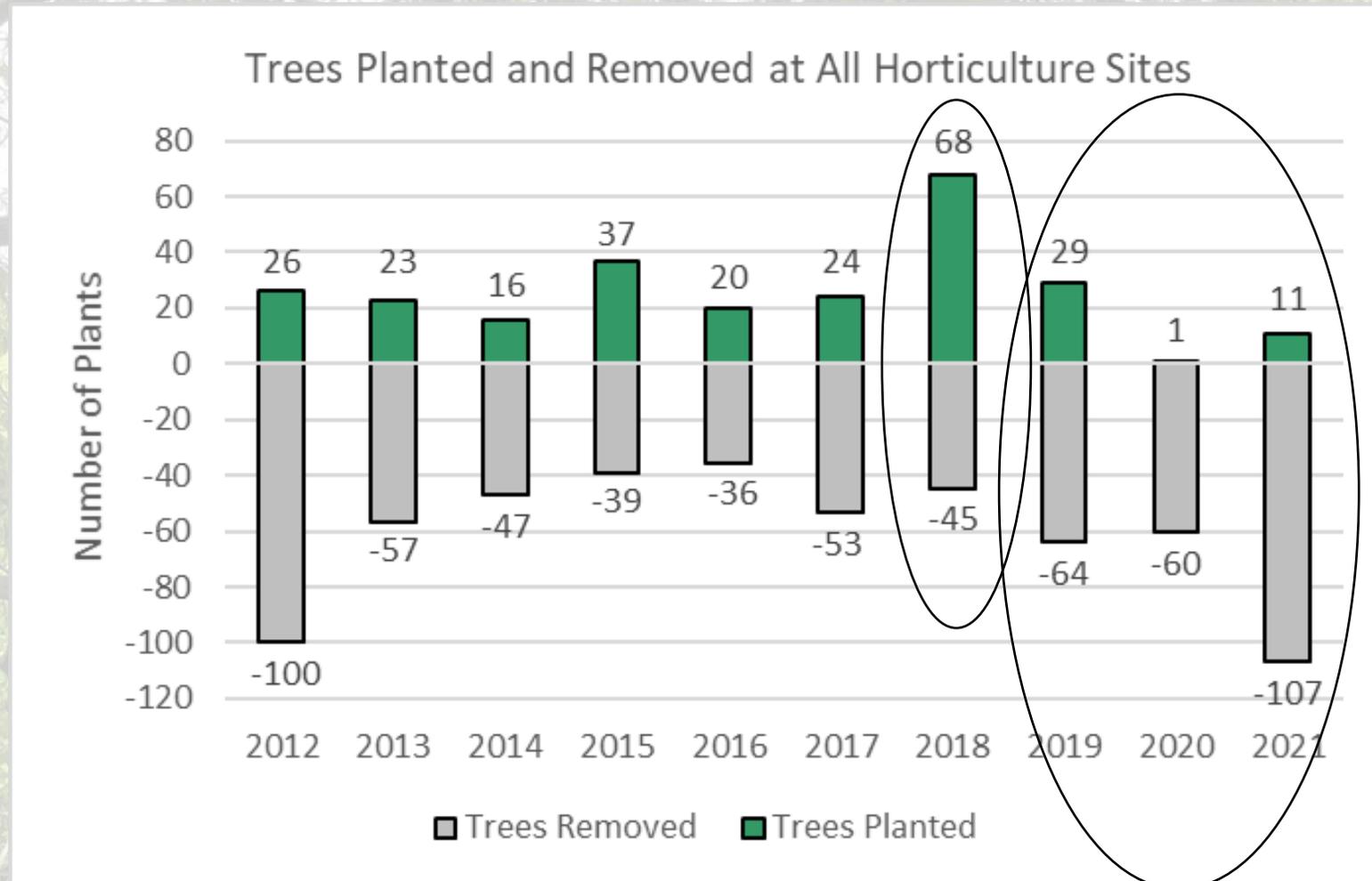
Frelinghuysen:

+11.5 Trees : - 24.5 trees

Combined:

+25.5 : -60.8

**conservative since "existing" trees weren't included in removals*

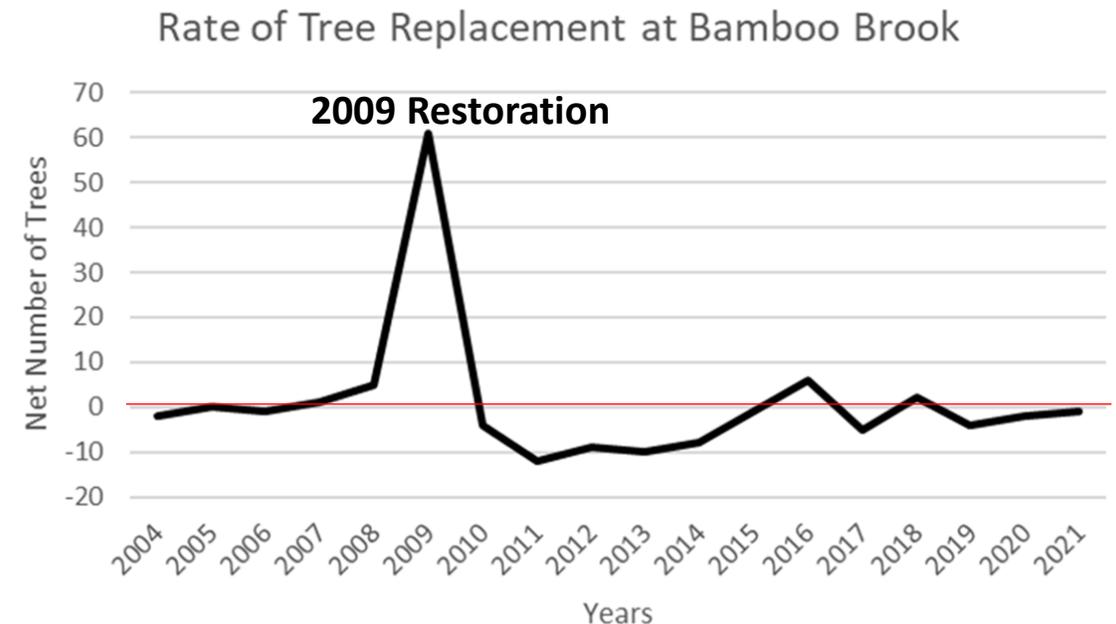
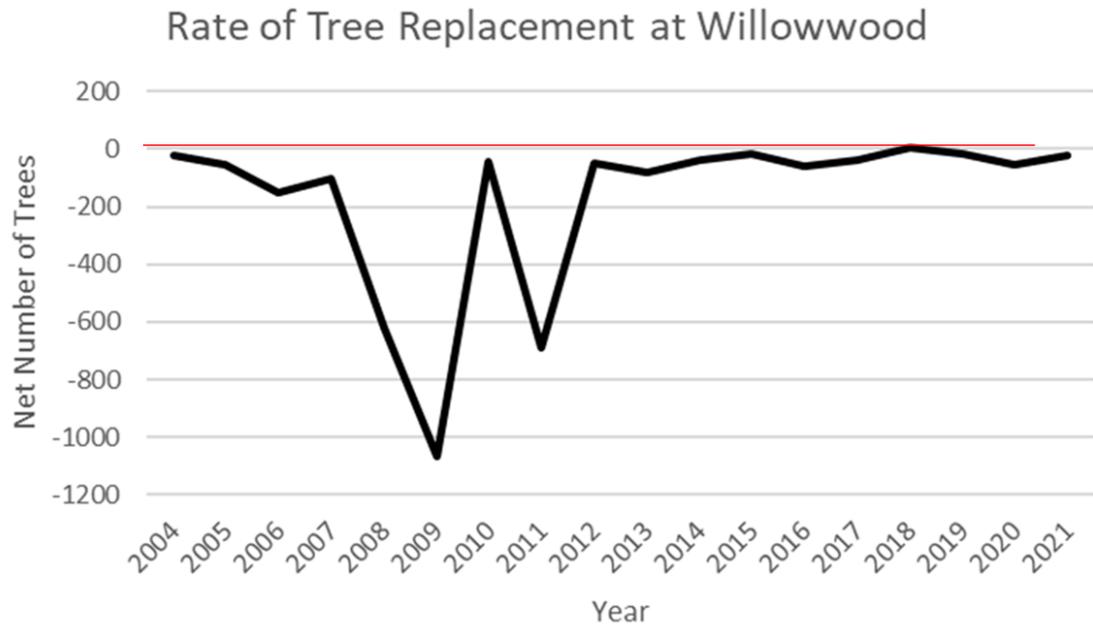
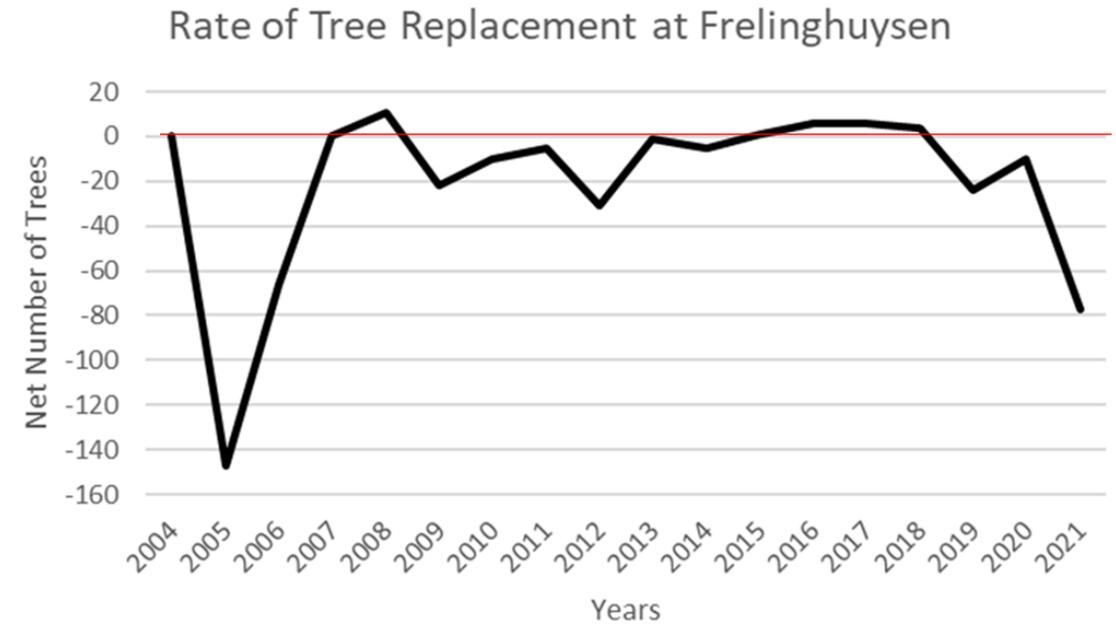


Negative Rate of Replacement

Willowwood: 17 of last 18 years

Frelinghuysen: 11 of 18 years

Bamboo Brook: 12 of 18 years

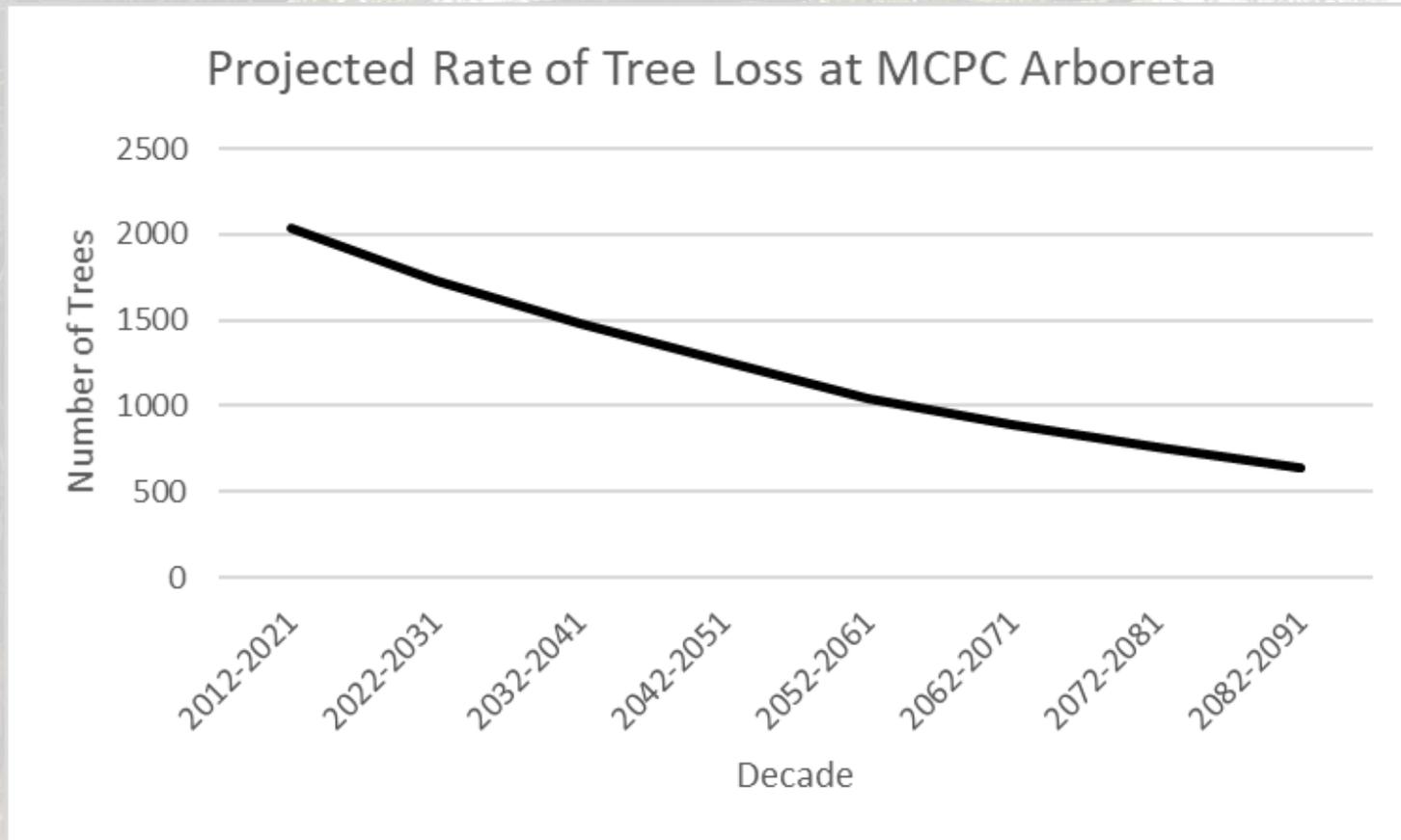


A Bleak Outlook

From 2012-2021, **352** more accessioned trees were removed than replaced.

This is a 14.75% loss in collections in the last decade

If this trend continues at this rate then this is the projected number of accessioned trees:



1 For 1 Tree Replacement Policy

In 2011, The Morris County Park Commission created a policy saying that they “will plant replacement trees for each tree that is removed from parkland”.

How many trees weren't replaced since then?

- From 2012-2021, the arboreta removed **352** more accessioned trees **in the collections** than they replaced.
- If “existing” trees are included, then another 233 trees were removed. This would bring the total to **585** trees.
 - Over the last few years, an additional 222 unaccessioned pines were removed. In addition, some unaccessioned ash & dead trees in natural areas have been removed from the arboreta. That brings the total to over **807** trees.



Styrax 'Emerald Pagoda'

Insights

Positive Rate

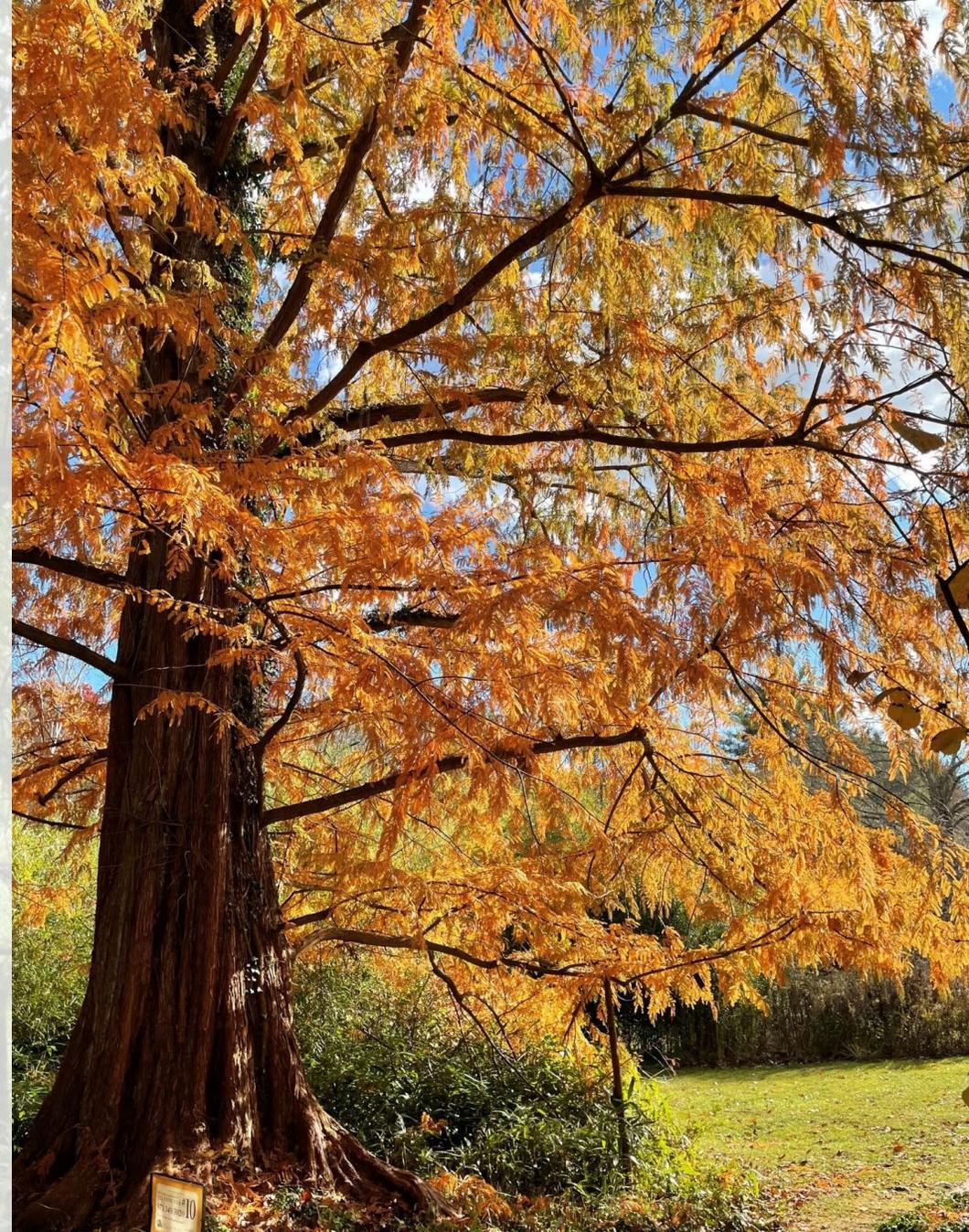
- Indicative of a growing collection and/or new planting projects
- Useful figures for promotional statistics and marketing
- Gardens can anticipate the aging out of trees proactively

Net Zero Rate

- Indicative of sustainable maintenance practices
- Could quickly transition to negative or positive when facing changing circumstances

Negative Rate

- Indicative of unaddressed underlying issues. Possibly lack of funding, staffing, mission, maintenance...
- Can communicate the need for resources to staff and stakeholders
- Gardens can calculate necessary changes to improve trends



Metasequoia glyptostroboides

Why is this important?

- The tree collections are what make us arboreta!
- Trees form the basis for educational programs, connect us to the history of the sites, and provide beauty, natural habitat, and ecological resources.
- We should be planting and stewarding trees that could become future Champion Trees
- We can prepare for the impacts of extreme weather, pest infestations, and disease outbreaks
- We can model ecological stewardship and provide diverse habitat
- We should be setting an example that tree planting is important
- We can uphold the legacy and vision of the Tubbs Brothers, Martha Hutcheson, and Matilda Frelinghuysen



Acer palmatum 'Ornatum'



ar·bo·re·tum

/ˌɑːrbəˈrɛdəm/

noun

plural noun: arboreta

a botanical garden devoted to trees.

Next Steps

- The plant records curator specialist will monitor this trend annually
- The PRCS shared findings with horticulture staff
- The PRCS will also present the data to the county commissioners
- Commemorative tree program shifting focus from benches to trees
- Acknowledge differences among sites and plan accordingly
- Possibly engage in propagation, fundraising, and additional monitoring





Thank you!



I'd love to hear about this at your garden!

Feel free to follow-up with me at
zcheetham@morrissparks.net

NEXT: BREAKOUT DISCUSSION

@willowwoodarboretumfoundation

@morriscountygardens



Malus baccata



Community Discussion

1. What are the biggest challenges or success stories that your institution has gone through related to preserving/maintaining/removing aging trees in your collections?
2. Does your institution have any policies/plans regarding trees? *Ex. allocating a fund for replacing trees or reaching a tree-related goal?*
3. Are there other ideas you have that you'd like to include or questions you'd like to try to answer when/if applying this analysis at your institution?
4. How are you monitoring tree removal for unaccessioned trees in natural areas? *Do you not record these removals? Do you make an accession and record the removal? Something else?*



Pinus koraiensis 'Silveray'