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# Creating ArcGIS Story Maps of the Morris Arboretum: Mapping People, Plants, and Place

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An independent study project report by The Walter W. Root Memorial Arborist Internship Endowment (2014-2015)

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## **Abstract**

This project explores the use of ArcGIS Story Maps in digital interpretation projects at the Morris Arboretum. Story Maps are web applications that bring together maps, images, and stories, into a cohesive, interactive, format. The completed deliverable, “Exploring a Century of Cherry Trees at the Morris Arboretum,” will be available to view via the Morris Arboretum website for the annual cherry blossom festival. This project shows that this method of digital interpretation is well-suited for future use at the Arboretum and opens the door to use many ArcGIS mapping and web application products.

## **Disciplines**

Horticulture | Instructional Media Design

## **Comments**

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*The Martha S. Miller Endowed Urban Forestry Intern*

**DATE:** April 2015

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This project explores the use of ArcGIS Story Maps in digital interpretation projects at the Morris Arboretum. Story Maps are web applications that bring together maps, images, and stories, into a cohesive, interactive, format. The completed deliverable, “Exploring a Century of Cherry Trees at the Morris Arboretum,” will be available to view via the Morris Arboretum website for the annual cherry blossom festival. This project shows that this method of digital interpretation is well-suited for future use at the Arboretum and opens the door to use many ArcGIS mapping and web application products.

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## INTRODUCTION

The Morris Arboretum is a historic Victorian garden in Chestnut Hill, Philadelphia, PA. It stewards about 200 acres of land and over 12,000 accessioned plants, and is enjoyed by 130,000 visitors each year. Interpretation of the Arboretum's plant, landscape features, and history is important to make visits meaningful and to introduce visitors to other opportunities such as membership and class offerings. Currently, interpretation is provided in many ways, such as guided tours, signage, and printed materials.

An important facet of interpretation is making maps accessible to visitors, which can add meaning and context to their perspective on the Arboretum in ways that a picture, a tour of the website, or even a visit to the Arboretum itself cannot. Digital interpretation can take many forms, especially at an institution like the Morris Arboretum that strives to share its plants, people, and place, with multitudes of visitors each year. Through a grant from the Pew Foundation, Stacey Kutish has been hired as the Arboretum's digital interpretation strategist for the next two years. This project complements her work by exploring a method of digital interpretation called Story Maps.

Story Maps are a web-based application available for use on the ArcGIS Online environment. They are a type of ready-made web application (one of a whole suite of web applications available on ArcGIS Online) that allows for the display of web maps, pictures, text, and videos, all hosted on an organization's ArcGIS online environment. Users of the completed web applications are able to click through and explore the displayed media within the limits of the web app's design. Story Maps have already been made by many of the Morris Arboretum's peer institutions, including the Smithsonian Gardens, Mt. Cuba Center, and Longwood Gardens.

The Morris Arboretum Archives is an excellent and significant resource that can provide abundant inspiration and material for Story Maps. This robust collection features historic maps and plans of the Arboretum. This map collection ranges from atlases that were created by John and Lydia Morris in 1909 and 1914, to commissioned architectural plans for projects that were never completed. Each map tells a story about the Arboretum within the context of the time of its creation. Not only can we learn about where and when buildings and plants were located, but we can also see trends like changing horticultural practices in light of different periods of time. At present, most of these maps have not been digitized. Future interpretation projects would require digitizing and converting them to the format needed for that particular project. The Morris Arboretum Archives database is managed using the Past Perfect Museum software. This essential tool allows staff to use the Arboretum's historical resources.

## **GOALS OF THE CHERRY ROW STORY MAP**

This project explores the possibility of using a program like Story Maps to digitally interpret the Arboretum's historical maps, imagery, and narratives. The deliverables include this report and a Story Map telling the history of Cherry Row, a section of the Arboretum just below the English Park.

Goals of Cherry Row Story Map:

- Showcase the Morris Arboretum's archived maps and images
- Guide visitors through the history of the Arboretum
- Explore digital interpretation using Story Maps

Goals of this Report:

- Explain methods to make this project replicable
- Lay groundwork for future directions for data gathering

### ***Cherry Row History***

The Morris Arboretum's history with cherry trees spans over a century; from our founders' first journeys to Japan at the turn of the 20th century, to our modern day Cherry Blossom Festival, an annual two week celebration of the Arboretum's cherry collection and Japanese culture. Cherry Row is located by the path between the group of towering Metasequoias at the Sculpture Garden and English Park. Cherry Row's long history at the Arboretum and its important role in one of our most popular spring events, the Cherry Blossom Festival, made it a natural choice for the subject of this Story Map project.

Little is known about the original planting of Cherry Row, except that it was most likely planted at some point between 1915 and 1922. The first mention of its existence is a picture in the log book of the head gardener, Mr. Tonkin, during the Morrises era. Unfortunately, in 1933, the cherries were removed after most of them froze and died in a heavy winter. This is evidenced by their absence from aerial images taken in 1942, and plant records of that time that show lilacs planted in their place.

Cherry Row was replanted in 1959. During this period, the Morris Arboretum was beginning to revive after a period of relative neglect and administrative turnover. The aerial imagery from 1971 shows the full, leafy, crowns of the second Cherry Row, contrasting with the blank spaces visible in the 1942 aerial image. The cherries planted in 1959 were a variety of different cultivars, all documented in the plant records of the time. Today, well over half a century later, Cherry Row has entered another phase in its life. The remaining trees are aging and veteran tree management practices are being used to maintain their health and extend their life as much as possible.

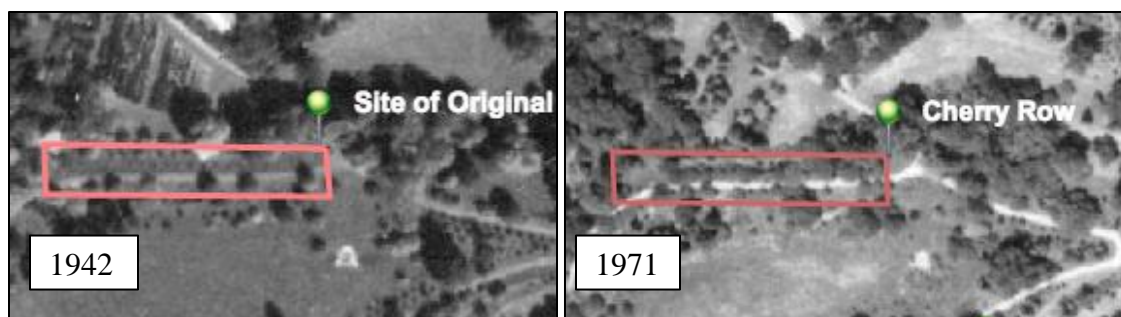


Figure 1. Aerial imagery of Cherry Row from 1942 and 1971 respectively.

## METHODS

The primary phases in this project were gathering data and creating the Story Map. However, another component was to lay groundwork for the future use of Story Maps at the Arboretum. Most technical issues that arose in the course of this project, as well as their resolutions, are documented in the technical appendix.

The storyline and history of the Cherry Row came from conversations with Tony Aiello, Director of Horticulture, who has thoroughly researched the history of the cherries. The timeline of the planting and replanting of Cherry Row drove the structure of the Story Map. The sections of the Story Map are:

- The Early Days at Compton
- The First Planting
- The Removal
- The Second Planting
- Aging Cherries
- The Cherry Blossom Festival Today

Archival research required accessing photos through the Morris Arboretum's PastPerfect software. There are many archived maps that could be digitized and used in the future. Aerial imagery used in this project was downloaded from PennPilot ([www.pennpilot.psu.edu](http://www.pennpilot.psu.edu)) and georeferenced to points on the ESRI Topographic basemap.

Story Maps are an open source web application created by ESRI to allow users to integrate web maps created with ArcGIS Online with a variety of multimedia content. ArcGIS Online is the cloud based platform that allows our organization to create and share dynamic web maps. The Morris Arboretum has access to this software through its ArcView license, which is currently used by the Urban Forestry team. The maps for this Story Map were prepared in ArcGIS for Desktop and then published to the Morris Arboretum Urban Forestry team's ArcGIS Online organization. Importantly, the web maps and accompanying data associated with this Story Map were hosted on ArcGIS Online, not on the Morris Arboretum/University of

Pennsylvania servers. From ArcGIS Online, the web maps, chosen images, and texts, were brought together using the easy-to-use Story Map Builder.

## DISCUSSION

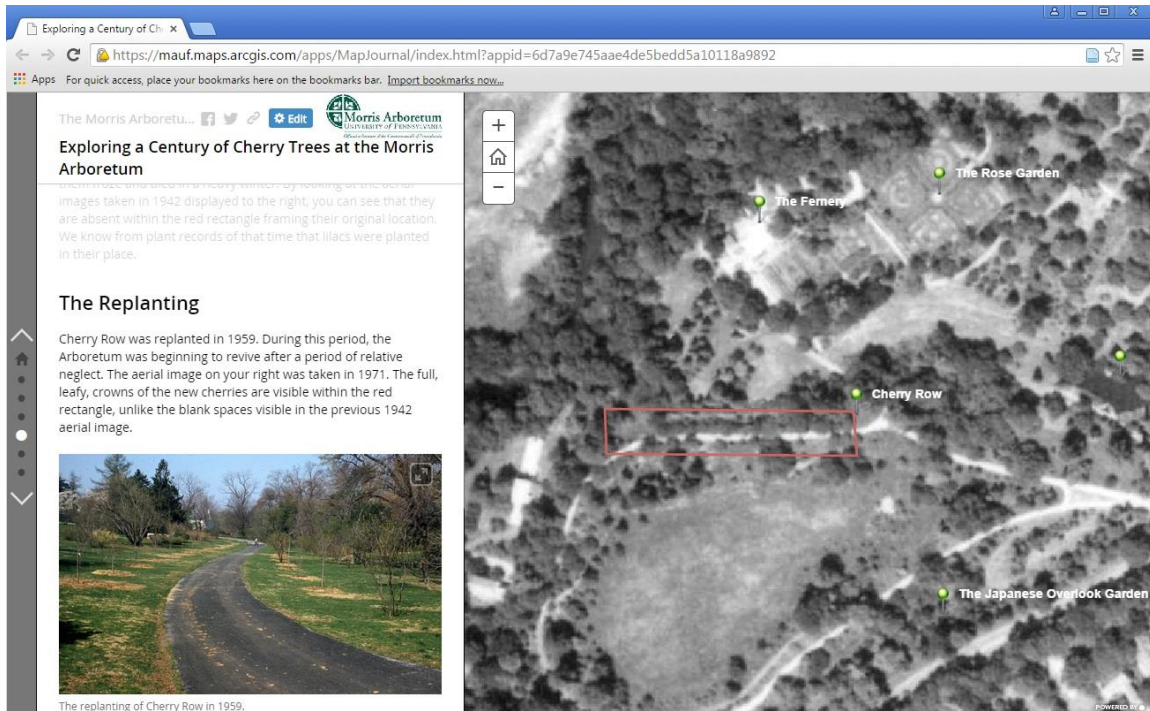


Figure 2. A section of the Cherry Row Story Map.

The final product is a finished Story Map titled “Exploring a Century of Cherry Trees at the Morris Arboretum.” The Story Map integrates maps, images, and text, in an engaging format that visitors can access through the Morris Arboretum website and via any mobile device. As this project’s progressed, several potential issues have arisen with using Story Maps, and this project has elicited many ideas for the future use of Story Maps at the Arboretum.

One potential obstacle is mobile device access within the garden. Story Maps are easily accessed from mobile devices and are built to scale for a variety of screen sizes. However, they do require sufficient data access to load and function adequately. Reception is not good in many parts of the garden, which may be exacerbated by the user’s data carrier. There is also a question as to whether the Arboretum’s decision-makers want to encourage visitors to use their smart phones in the garden. The Cherry Row Story Map is probably best suited for use on a personal computer or on a mobile device while in the café or Visitor’s Center because it could be difficult to read all of the text while standing in a garden. Though there are Story Maps that would work well in a tour format for use while walking through the garden, the Cherry Row Story Map is probably best read while stationary, not on the go.



### Proposed ideas for future Story Maps:

#### *Know Your Horticulturalist!*

This Story Map would display the sections of the Arboretum and each individual section's gardening styles, collections, and features. This would give visitors a behind-the-scenes look at the work and thought behind the sections of the Arboretum, as well as a peek into the lives of our professional horticulturalists.

#### *What the Morris Arboretum Could Have Been.*

The archives have a large collection of old architectural plans. These have ideas for buildings and gardens that never came to fruition. Some of these ideas include a native pollinator garden designed in the 1960s, old plans for an elaborate horticultural school to be built on Bloomfield Farm, and plans for an almost complete replanting of the public garden side. Digitizing these old plans would be a great way to show landscape architectural trends through the ages.

## **CONCLUSION**

The main deliverable from this project, the finished Story Map, will significantly aid visitors' understanding of the place and the story of Cherry Row within the wider context of the Morris Arboretum. This project also shows that Story Maps can and should be used to display information visually and to take advantage of the resources our ArcGIS license offers. While the Cherry Row Story Map only shows some of the potential uses for Story Maps at the Arboretum, the exploration of this project into new areas of digital interpretation for the Arboretum is significant. The Morris Arboretum has the capability to create interactive maps to enhance the visitor experience with already available resources. Story Maps are an excellent medium to be used in future digital interpretation endeavors.

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**Stephanie McNabb**, *Web Manager/Marketing Assistant*

**Jason Lubar**, *Associate Director of Urban Forestry*

## TECHNICAL APPENDIX

This technical appendix will include supplemental information specifically on creating a Story Map at the Morris Arboretum. It is not a comprehensive tutorial or help section; there are very clear tutorials and help sections on using ArcGIS Online and creating Story Maps. These can be found on the ArcGIS website at:

<http://learn.arcgis.com/>  
<http://doc.arcgis.com/en/arcgis-online/>

### 1. Creating ArcGIS Online usernames for Arboretum staff to use

The Morris Arboretum ArcGIS Online Organization's administrators are currently the members of the Urban Forestry department. Administrators can create individual usernames for people wishing to create Story Maps. Descriptions of the types of roles can be found within My Organization>Edit Settings. To create a Story Map, the user should be able at a minimum to create, edit, and share, fully within the organization. Publishing privileges can be given at the discretion of the administrator. While it is possible to create your own roles, the predefined roles of User and Publisher are suited for Arboretum staff who wish to create maps and web apps.

### 2. Morris Arboretum Style Guide

Any publishing of a product under the Morris Arboretum name should be done in consultation with the marketing department and the Morris Arboretum Style Guide. This contains important guidelines on text and logo formatting.

### 3. Uploading images

Images cannot be stored in web maps or web apps. They must be uploaded to the ArcGIS account or any other number of photo storage sites, like Flickr or Picasa, and inserted into a web map or app using a unique link. A Flickr account was created to easily host pictures to be shown in the Cherry Row Story Map, these can be accessed through the username "urbforintern." Photos can also be uploaded to an individual's ArcGIS Online account and shared via a link.

### 4. ArcGIS Notes

- Coordinate system in feature class creation

Coordinate system: WGS 1984 Web Mercator (auxiliary sphere)

This is the default coordinate system of ESRI ArcGIS Online basemaps. To simplify, use this coordinate system when creating any feature classes.

- Layer Extent

The Compton web app contains two layers, one with the Compton atlas at full resolution and the other with the Compton atlas at quarter resolution. The full resolution image has a grainy appearance when viewed at too large a scale, while the quarter image loses clarity at a small

scale. The full resolution image is set to be visible at the small scales where it has a clearer image than the quarter resolution, and the quarter resolution image is set to be visible at larger scales at which the full resolution images looks grainy