

# The Branches of Tree Identification

## Can we identify apple trees based on appearance?

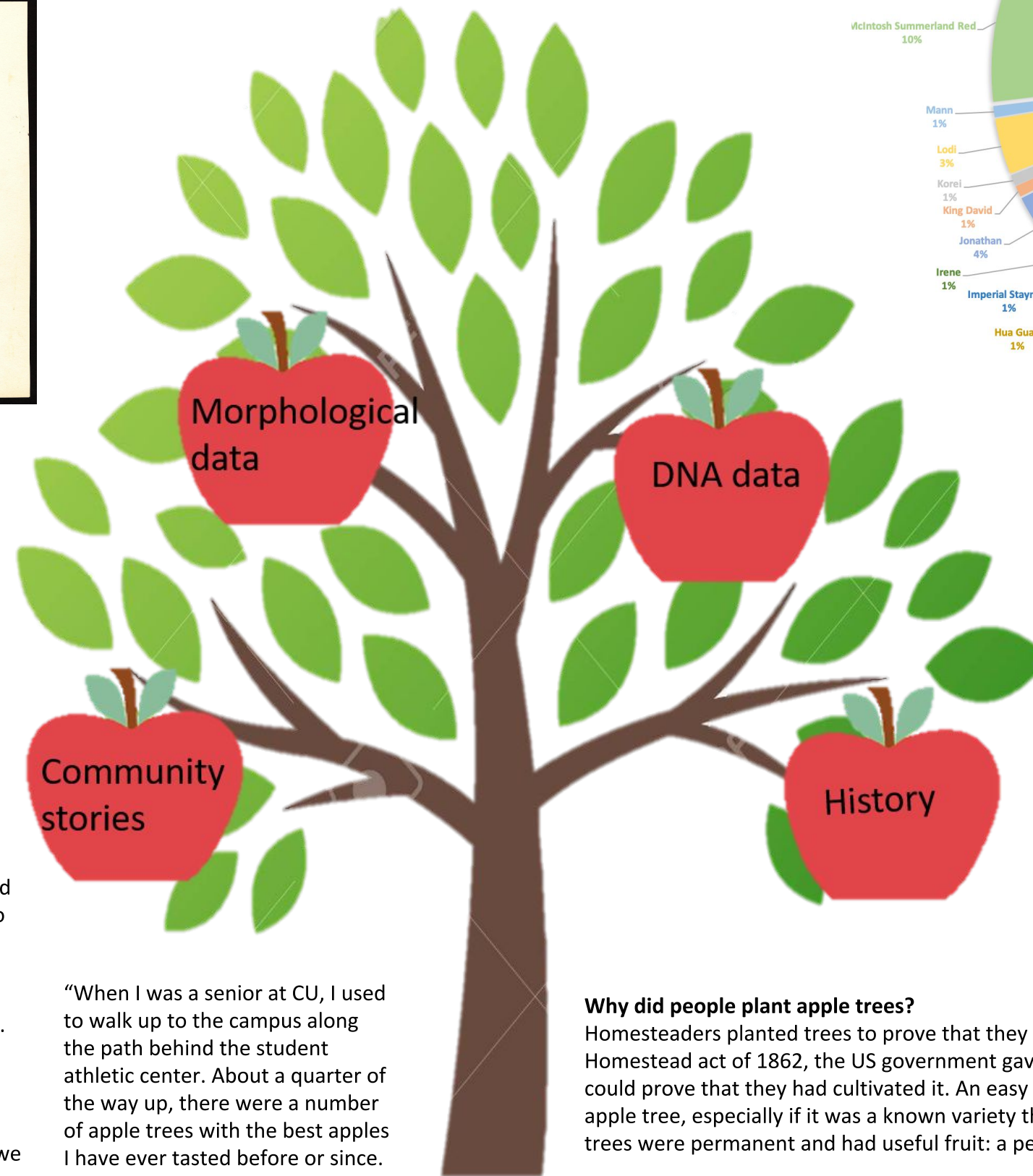
We make observations of the trees we find to help identify them and learn from them. We take measurements of the tree trunk, leaves, and fruit to determine the approximate age of the tree and the variety. This type of data is also helpful to learn about disease resistance and affect of environmental factors on fruit and tree health.

As we have discovered, there are hundreds of varieties of apples that aren't grown for commercial use anymore. Some researchers are turning to a unique source of identification: watercolors. In the (late 19<sup>th</sup> and early 20<sup>th</sup> century), the USDA employed watercolor artists to paint apples from various types of trees in order to have a reference from which they could identify other trees. The watercolors include numerous images of fruit that we presume "lost." In theory, they could be used to identify old trees. Unfortunately, the fruit of one tree varies so much from year to year due to weather conditions and health of the tree that it extremely difficult to identify trees based on watercolors. Nevertheless it is a fun thought experiment and the paintings are beautiful links to history.



"We owned this property for 23 years. It used to be part of an orchard. We had very old apple trees on the property and did everything we could to keep them viable. Except for two more recent trees, they were very old and a variety I could not identify in any book of apples ... The apples were delicious. When green, they were like a granny smith. As they ripened, they got red stripes coming from the top core. With further ripening, the skin turned yellow. They were great in pies and cider."

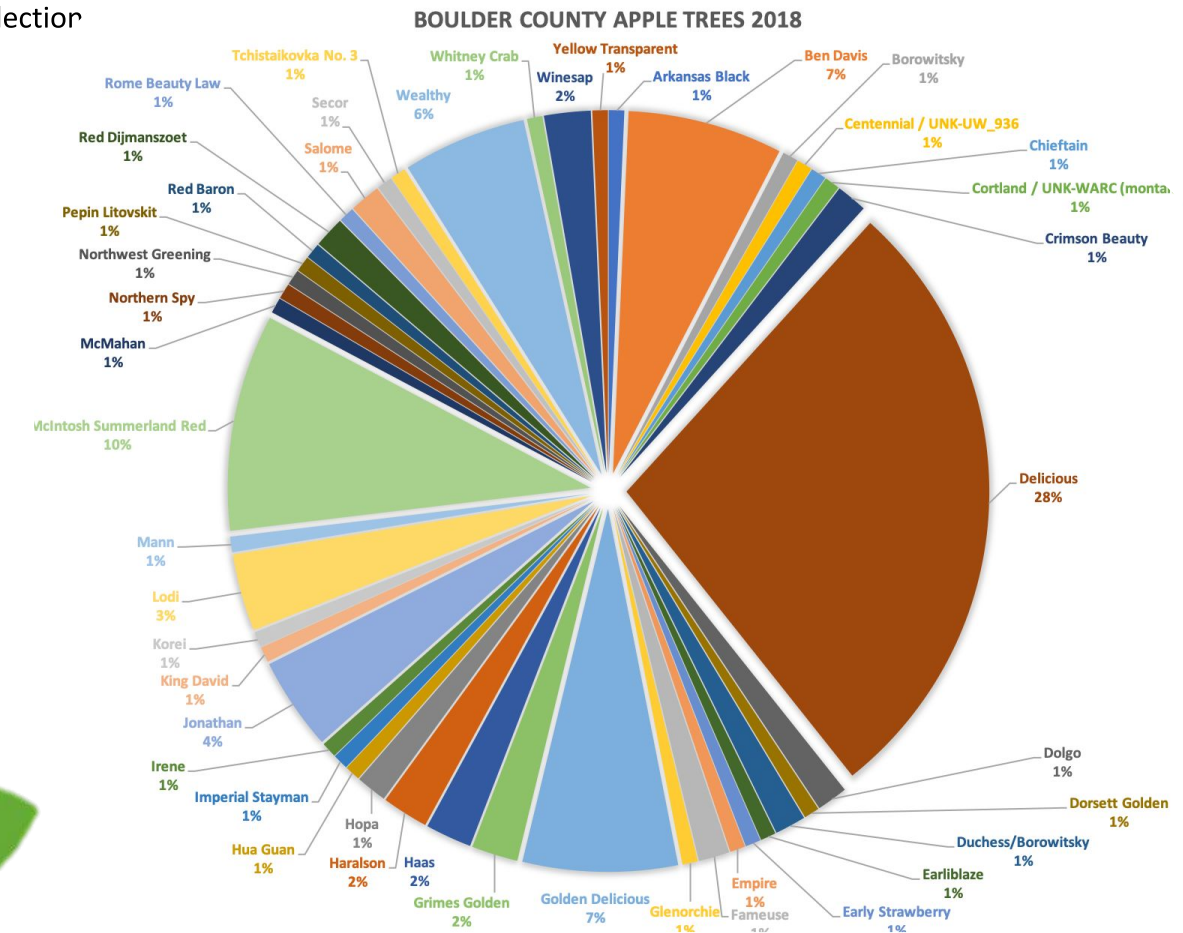
"When we moved to our home in Louisville two years ago, we were told by our neighbors that the apple tree in our front yard produces some of the best apples in Louisville. When the tree produces fruit, we get people from all over town stopping in our yard to get apples. We've learned that the tree is somewhat famous. The apples are green, medium sized, and slightly sweet. They are tasty to eat right off the tree and make fantastic apple turnovers."



"When I was a senior at CU, I used to walk up to the campus along the path behind the student athletic center. About a quarter of the way up, there were a number of apple trees with the best apples I have ever tasted before or since. I would leave the path at a bend in the trail, climb a low wall and there they were. I ate them every day in the fall and into winter ... That was 34 years ago."

## So what is the best way to identify trees?

DNA testing is the most reliable and comprehensive method to identify apple trees. We extract DNA from leaves using a kit that contains all the necessary materials. Once the DNA is isolated, we are able to compare it to the data from genebank collection



Sometimes, the results are inconclusive because the tree we are testing is not represented in the genebank database.

1. The tree is a local, unnamed variety from farmers in the Boulder area
2. The tree was an important cultivar but has not been added to the genebank
3. The tree grew from a seed; since seeds are genetically unique from the parent tree, we can't identify these trees based on DNA.
4. The graft of the cultivar died off but the rootstock survived.  
Unfortunately, we can't tell which of these reasons is causing an apple tree to remain unidentified.

## Why did people plant apple trees?

Homesteaders planted trees to prove that they had claimed the land. Per the Homestead act of 1862, the US government gave settlers free land in the west if they could prove that they had cultivated it. An easy way to prove settlement was to plant an apple tree, especially if it was a known variety that couldn't occur in the wild. Apple trees were permanent and had useful fruit: a perfect tree for pioneers.

Apple trees were also planted for commercial purposes. Large orchards provided fruit especially for cider, a less intoxicating alternative to other alcohol that could be consumed if fresh water wasn't available. Apples also provided feed to livestock like chickens and pigs.

Apples were also an important part of local economy and social life. People baked with them, ate them, and sold them to mining camps, circulating cultivars, recipes, and stories along with the actual fruit.



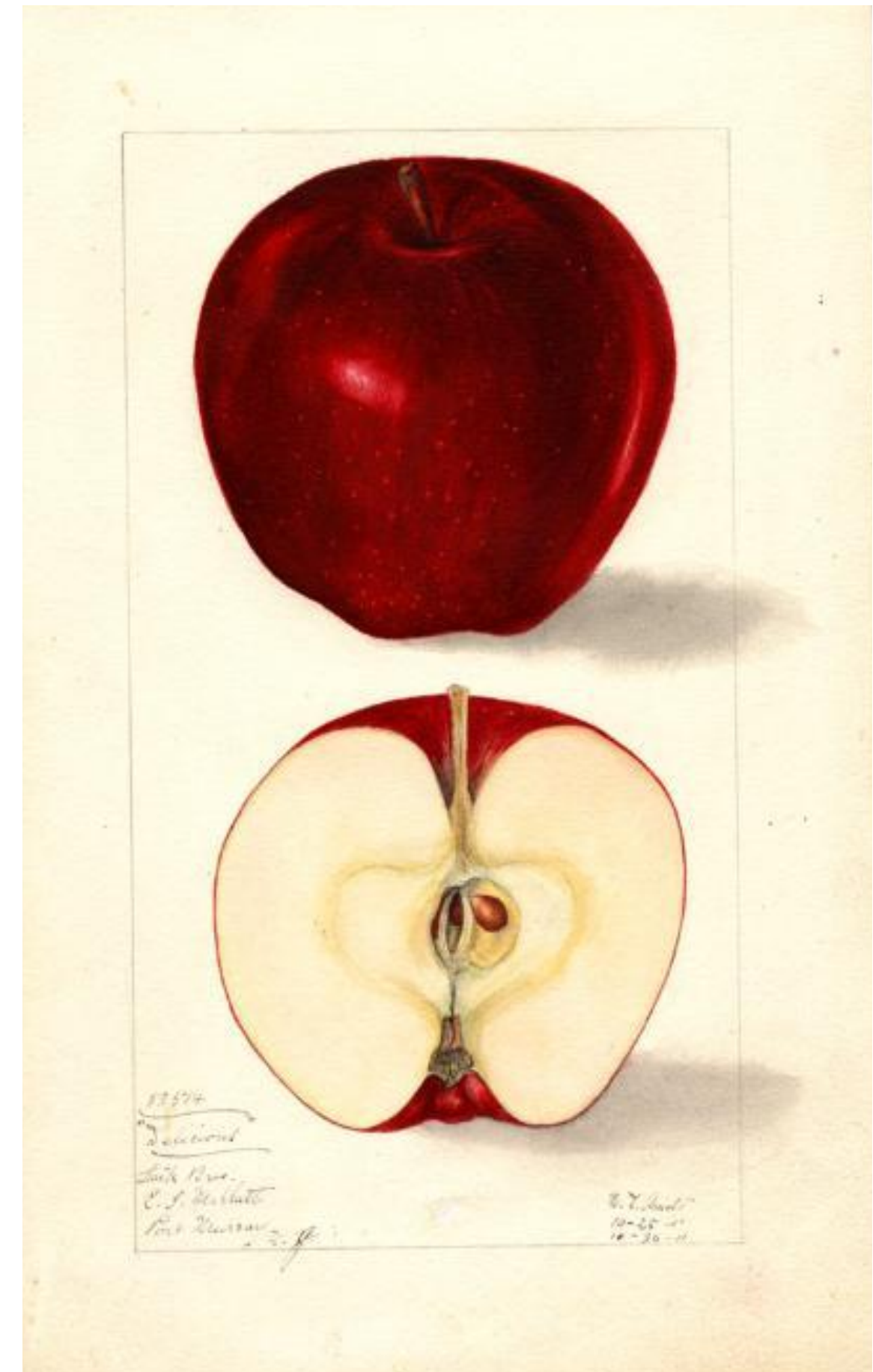
# Physical observations

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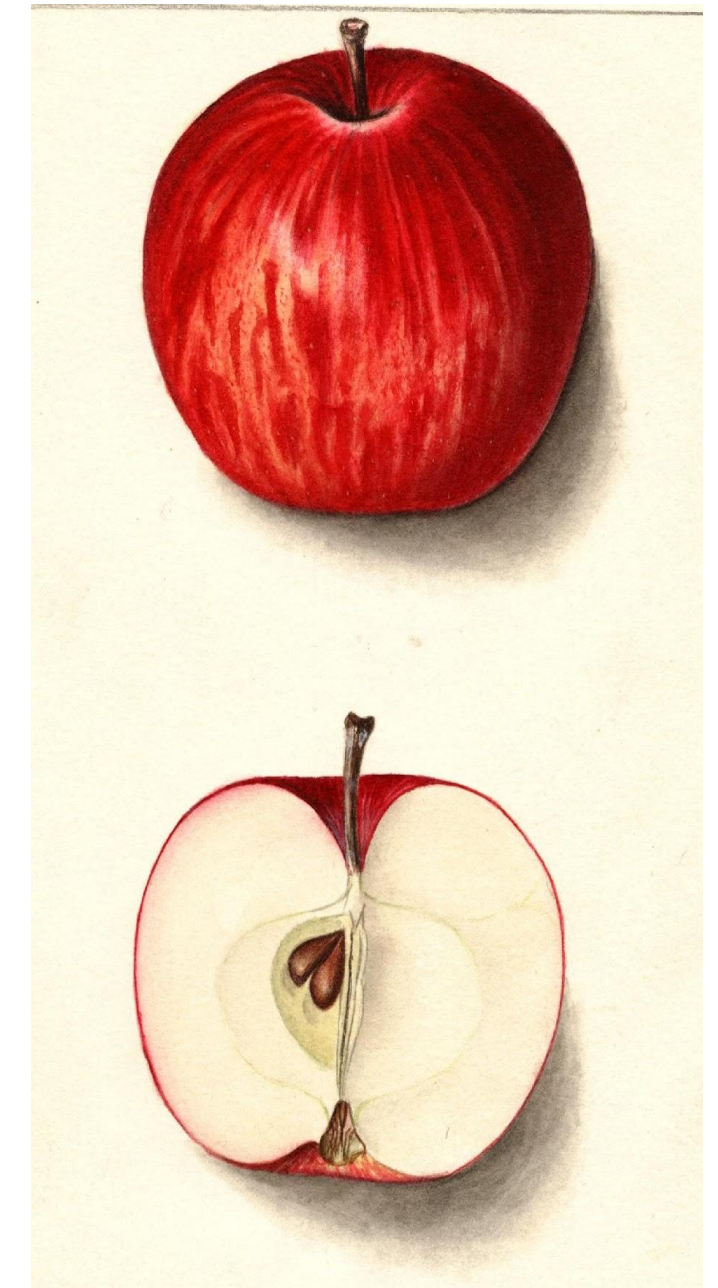
We make observations of the trees we find to help identify the variety and learn from them. We take measurements of the tree trunk, leaves, and fruit to determine the approximate age of the tree and the variety. This data helps us understand disease resistance and the effect of environmental factors that impact fruit and tree health.

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# Watercolor comparison



Fruit collected from tree #238 – It has been identified with DNA testing and is the same variety as one of the watercolors. Can you tell which one?

Haas Watercolor

Fameuse Watercolor

# DNA data

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USDA orchard in Geneva, New York.  
Photo credit Gayle Volk

# History

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Two daughters of the Young family standing beneath blossoming apple trees in Niwot. Carnegie Library for Local History/Museum of Boulder Collection

# Community Stories

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Many of the trees we have identified are on private land. The property owners often have stories of their experience with the apple trees. Sometimes these stories help us identify the trees but more often, and more importantly, they prove that the trees mean something to people. We are saving the trees not only because they are scientifically valuable, but because they have significance in the life of the community.

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