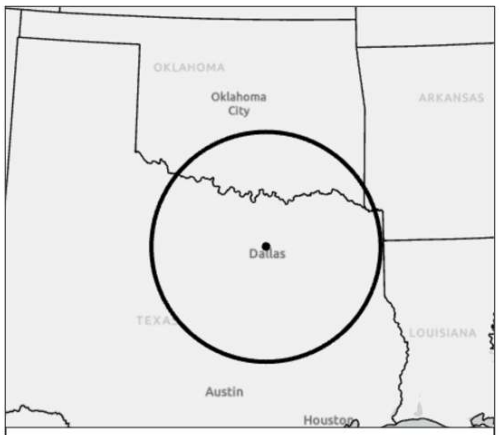
A Pine-Scented Fantasy in North Texas?

As a child, getting a live tree at Christmastime was always a highlight of the season. But while picking a tree out from a lot or from a nursery was fun, I always thought it'd be more fun to cut down our own tree at a farm. Unfortunately, there weren't any tree farms near my hometown of Dallas, so that was an unrealized dream. But even though tree farms were non-existent when I was growing up, the question is clear – could some sort of Christmas tree species actually grow in the greater North Texas region?

After some quick research, it was obvious that certain species of conifers would not be worth considering in greater Dallas. The large fir trees – Noble, Fraser, and Douglas among others – all have native habitats that are much colder and, more importantly, much higher in elevation than Dallas. Digging further, I found a couple less common, but still certainly adequate, species of pine trees potentially capable of growing in North Texas.

With that, this capability analysis will determine the viability of growing the Virginia Pine tree (Pinus virginiana) and the Eastern White Pine tree (Pinus strobus) in an area within 150 miles from my parents' home in Dallas.



The study area - a circle with a 150-mile radius from my childhood home.


Eastern White Pine (Pinus Strobus)


Virginia Pine (Pinus virginiana)

In order to assess whether conditions near Dallas could support the Eastern White Pine or the Virginia Pine, I relied primarily on the USDA Forest Service's ecology report for each tree. The two reports detailed many factors present in each tree's native habitat, and I homed in on average annual temperature(C), average annual precipitation(mm), typical soil pH, and typical elevation(m). The following table summarizes the associated GIS layers I gathered for these factors:

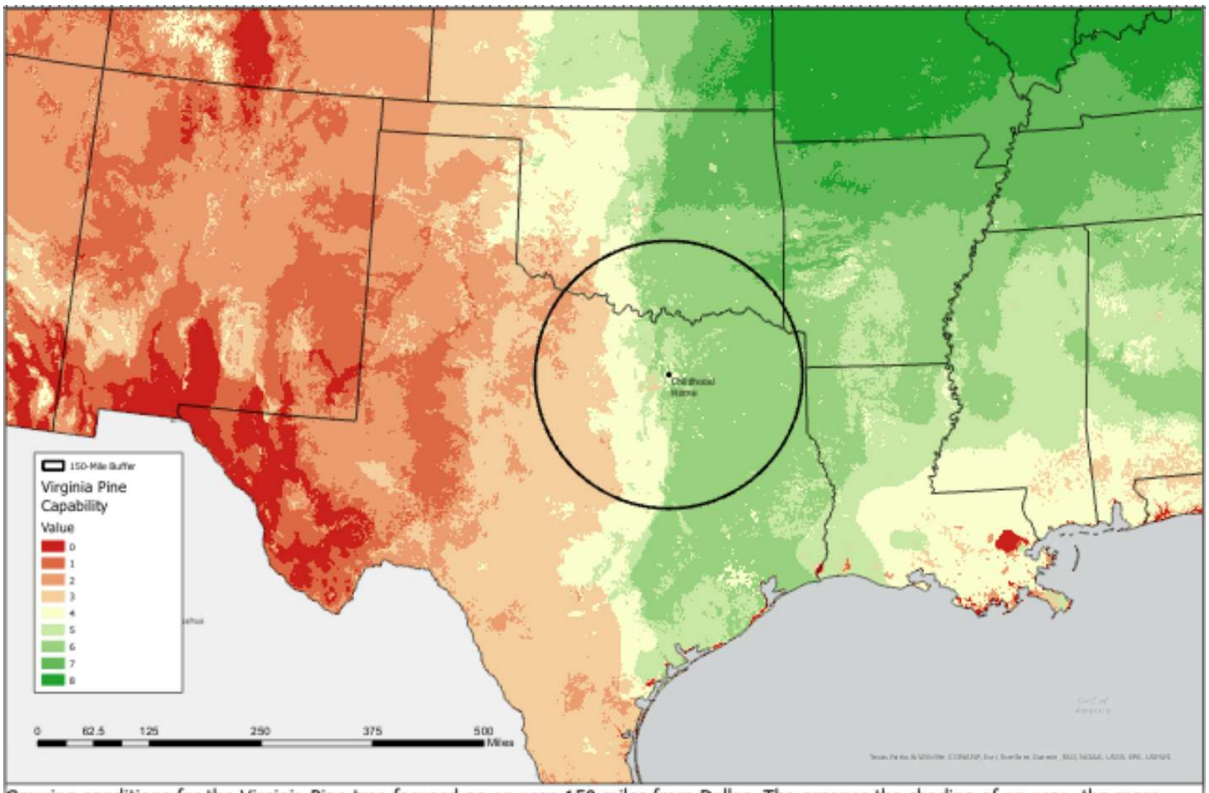
Variable	Layer Description	Data Source	Raster or Vector	Raster Cell Size	Date
Precipitation	Annual mean precipitation in millimeters for the 48 contiguous states (measured from 1950-2000)	https://www.cec.org/north-american-environmental-atlas/precipitation-1950-2000-annual/	Raster	1000m	2011
Temperature	Annual mean temperature in degrees Celsius for the 48 contiguous states	https://databasin.org/datasets/35bed46ed5674db58d3a56fd3423a3f6/	Raster	1000m	July 2016
Elevation	Elevation in meters for the 48 contiguous states	https://www.arcgis.com/home/item.html?id=2729e694b9b34738a59075aed367dedd	Raster	1000m	12/18/2024
Soil pH	pH readings for topsoil ranging between 0 and 14 for 48 contiguous states	https://www.arcgis.com/home/item.html?id=0961138215b8460e9f4e436d38c3b3b4	Raster	1000m	10/25/2023
*each layer's raster resolution was converted to 1000m using the Resample tool in ArcGIS Pro					

The analysis was completed using an Ordinal Combination Addition of Factors. For each of the four factors, a rating of 0 (not capable), 1 (somewhat capable), or 2 (capable) was assigned. Using the Raster Calculator tool, the individual ratings for each factor were added together to get a total score which ranged from 0 to 8. Here is a summary of the factors, ranges, and ratings:

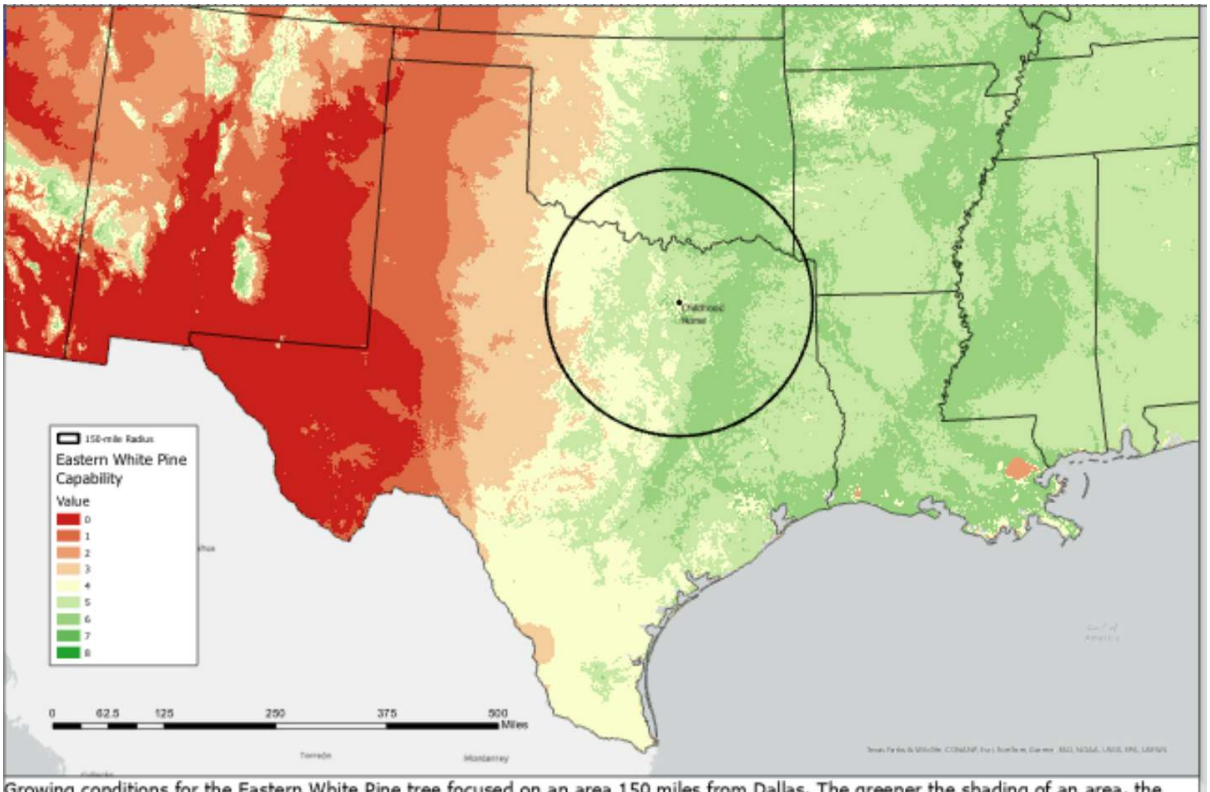
Eastern White Pine				Virginia Pine			
Factor	**Value Range**	**Rating**	**Rating meaning**	**Factor**	**Value Range**	**Rating**	**Rating meaning**
Temperature (C)	<4.5	0	Not capable	Temperature (C)	<8	0	Not capable
	4.5-6.5	1	Somewhat capable		8-10	1	Somewhat capable
	6.5-10.5	2	Capable		10-14	2	Capable
	10.5-12.5	1	Somewhat capable		14-16	1	Somewhat capable
	>12.5	0	Not capable		>16	0	Not capable
Elevation (m)	<450	2	Capable	Elevation (m)	<750	2	Capable
	450-750	1	Somewhat capable		750-1100	1	Somewhat capable
	>750	0	Not capable		>1100	0	Not capable
Soil	<4.5	0	Not capable	Soil	<4.0	0	Not capable
	4.5-5.5	1	Somewhat capable		4.0-5.0	1	Somewhat capable
	5.5-6.5	2	Capable		5.0-7.0	2	Capable
	6.5-7.5	1	Somewhat capable		7.0-8.0	1	Somewhat capable
	>7.5	0	Not capable		>8.0	0	Not capable
Precipitation (mm)	<400	0	Not capable	Precipitation (mm)	<790	0	Not capable
	400-500	1	Somewhat capable		790-890	1	Somewhat capable
	500-2100	2	Capable		890-1400	2	Capable
	2100-2200	1	Somewhat capable		1400-1500	1	Somewhat capable
	>2200	0	Not capable		>1500	0	Not capable

Two maps were produced to display the ability of North Texas and surrounding areas to support growing the trees (see each map at the end of this report). Each map shaded the raster calculations in a green to red color band covering the values from 0 to 8. The deeper the red, the less capable the land is for the tree, and conversely, the darker the green, the more capable the land. Focusing on the 150-mile radius out from Dallas, the results appeared to be promising for young Will Georgia. Both trees appeared to have viable stretches of land primarily to the east of the city that might work. In particular, East Texas – specifically near Tyler, Texas – looked like a strong candidate for Christmas tree farms. And the Virginia Pine looked to have a wider range of highly capable land with large stretches having values near 6. It was striking how areas to the west of Dallas were far less capable of supporting the trees. Neutral to light red values dominate the western halves of the areas for both trees. This reflects Dallas' location near the geographical border between the wetter, lusher Southeast and the dryer, more barren Southwest.

Overall, there were more viable areas than I expected. While I knew East Texas and other points east were relatively lush, I thought ideal conditions would be limited to the fringes of the 150-mile radii. Looking at the factors mapped individually for both trees, it appears that temperature was the most limiting factor. Each tree's map showed temperature values across the 150-mile radius that were almost all 0. If the temperature ratings were higher (meaning actual average temperatures were lower), then perhaps Christmas tree farms would already be ubiquitous in the area. Given the current state of global climate conditions, temperatures are likely only going to increase on average in Texas and elsewhere. As a result, if I were to prepare this analysis again, I might reevaluate the calculation by introducing a weight to each factor. In particular, I might consider giving temperature a much higher weight than the other factors. Those results might dash all hope for viable Christmas tree farms near Dallas.



Growing conditions for the Virginia Pine tree focused on an area 150 miles from Dallas. The greener the shading of an area, the more capable that area is for growing Virginia Pines. Conversely, the deep red areas are incapable of supporting the trees.



Growing conditions for the Eastern White Pine tree focused on an area 150 miles from Dallas. The greener the shading of an area, the more capable that area is for growing Eastern White Pines. Conversely, the deep red areas are incapable of supporting the trees.

References:

U.S. Department of Agriculture, Forest Service. (n.d.). *Pinus strobus: Eastern white pine*. U.S. Forest Service, Southern Research Station. Retrieved March 1, 2025, from https://www.srs.fs.usda.gov/pubs/misc/ag_654/volume_1/pinus/strobus.htm

U.S. Department of Agriculture, Forest Service. (n.d.). Pinus virginiana: Virginia pine. U.S. Forest Service, Southern Research Station. Retrieved March 1, 2025, from https://www.srs.fs.usda.gov/pubs/misc/ag_654/volume_1/pinus/virginiana.htm