

Growing Chestnuts

BOB STEHLI — WINTERGREEN TREE FARM



Where to Start

Take into consideration...

- length of growing season
- amount of sunlight
- local microclimates
- amount of rainfall
- heat units
- extreme winter low temperatures
- soil type and drainage
- ground slope and air drainage

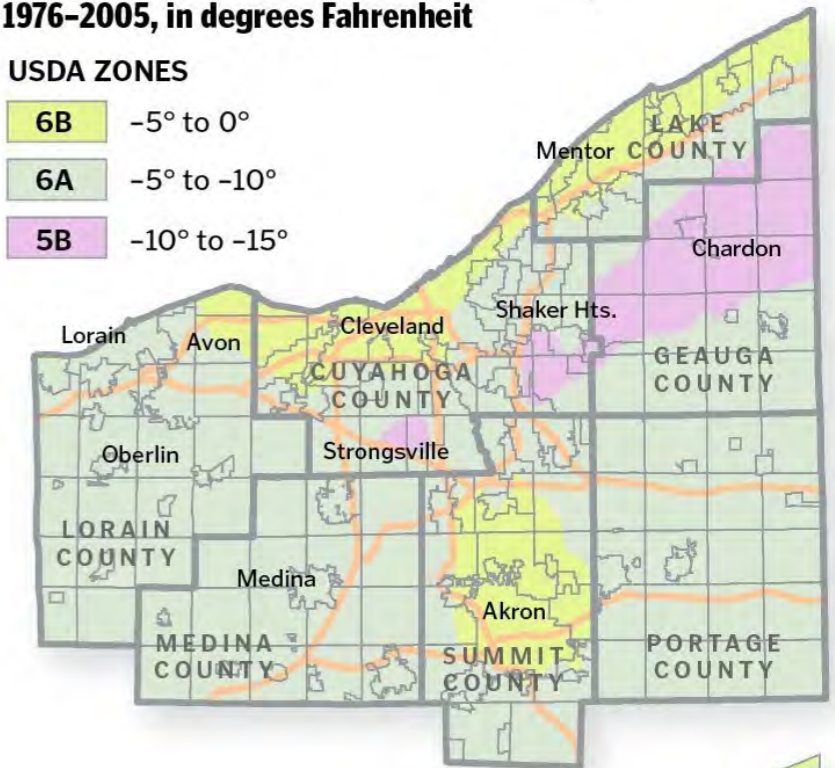
USDA unveils new plant-hardiness map

The U.S. Department of Agriculture recently unveiled its new Plant Hardiness Zone Map, moving most of Ohio from Zone 5 to Zone 6. That means warmer temperatures are sustaining plants that at one time would not survive winters here.

Average annual extreme low temperature, 1976–2005, in degrees Fahrenheit

USDA ZONES

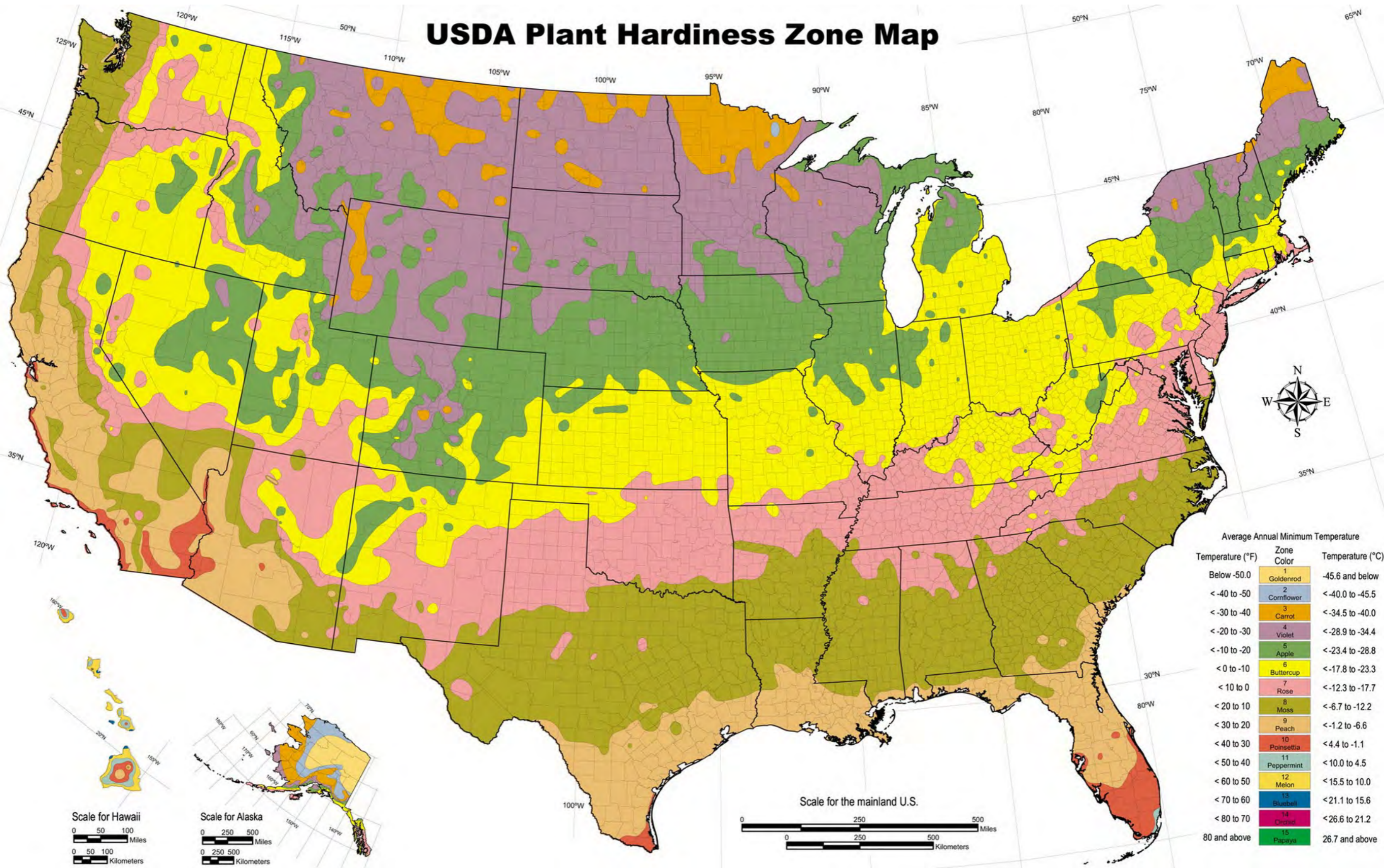
6B	-5° to 0°
6A	-5° to -10°
5B	-10° to -15°



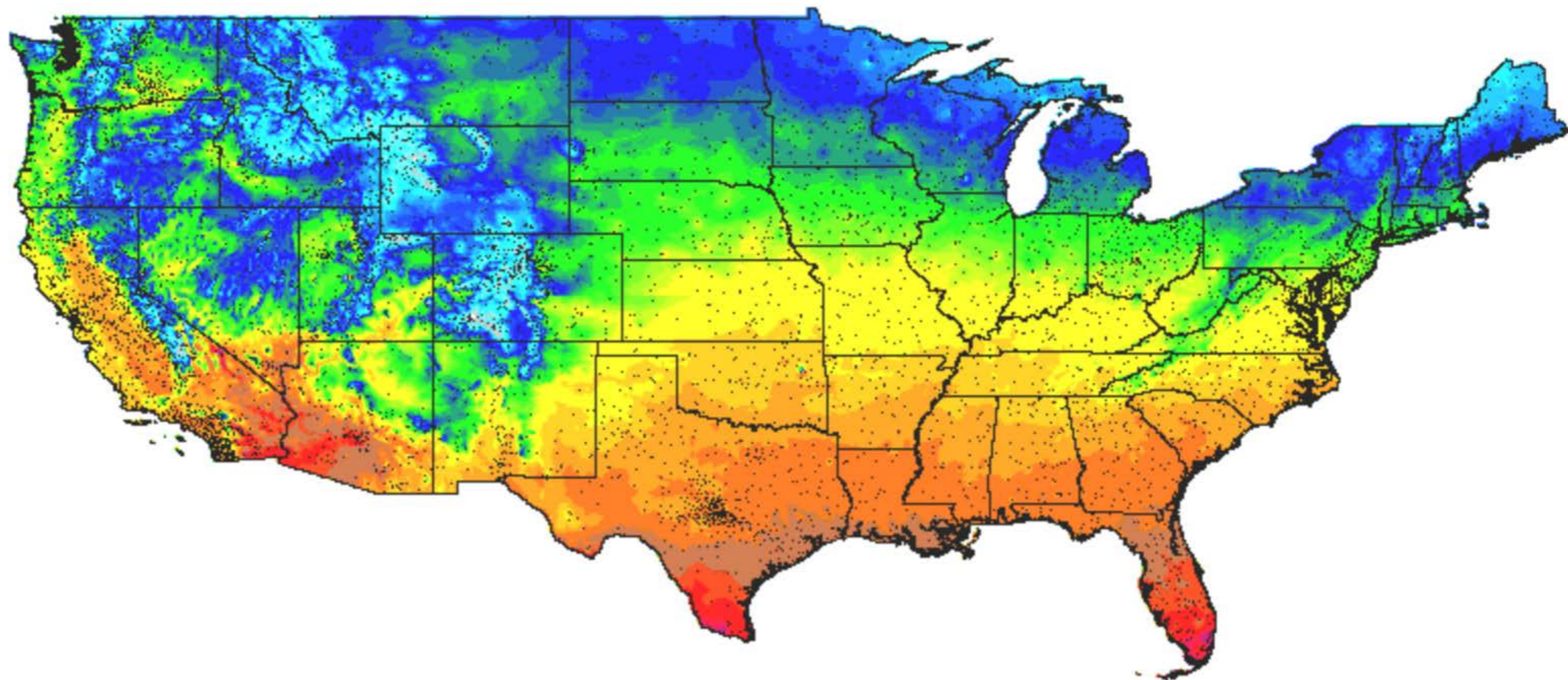
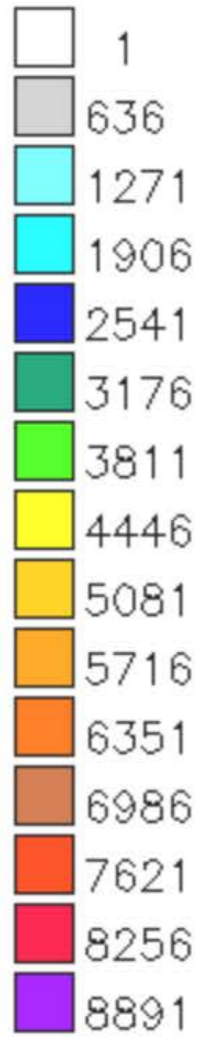
SOURCE: USDA

KEN MARSHALL | THE PLAIN DEALER

USDA Plant Hardiness Zone Map



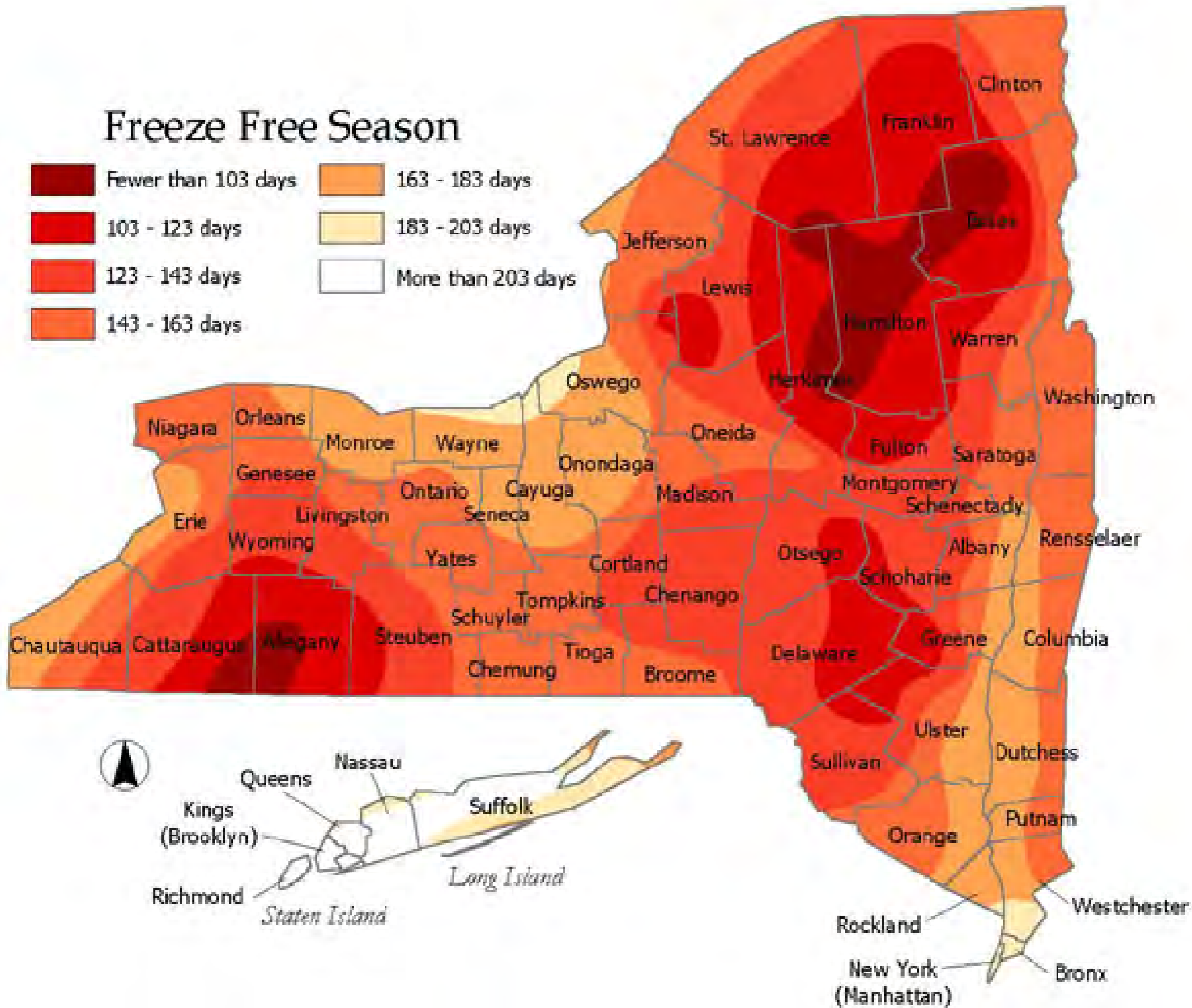
Degree-days
since Jan 1
(32 F threshold)



Cumulative degree-days in Us Jan 1 – Jul 10 2016

Created Jul 11 2016 at OSU IPCC from 9178 realtime weather stations, and PRISM climate data

Freeze Free Season



Once Site is Selected

- Will you make improvements?
 - soil drainage
 - soil fertility, PH
 - Deer Fence?





Example of Effects of Poor Drainage





Cultivars or Seedlings?

- Climatic Factors
- Cost Factor
- Cultural Factors



What Species or Hybrids?

- European Cultivar
- Chinese Cultivar
- Seedlings



Where it all begins







Seedling Bed Transplant



Lifting Seedlings







Planting Transplants to Field



Blueberry Hill



Progression







Initial 25 acres
-Ashland



Home Field





Hiram Orchard— first test plot



Trunk Markings

- White: average nut will pass through 1 1/8 in round hole
- Blue: no nuts pass through 1 1/8 in round hole
- Width of stripe: related to yield





Chestnut Pests

- Leaf Miner
- Gypsy Moth
- Oriental Chestnut Gull Wasp
- Asian Oak Weevil
- Chestnut Weevil
- Japanese Beetle
- Potato Leaf Hopper
- Cicadas
- Deer

Leaf Miner







http://www.purdue.edu/uns/html3month/040301_Ellis_gypsy.html



<http://agr.wa.gov/plantsinsects/insectpests/gypsymoth/gm101/identification.aspx>



<http://www.observatree.org>

Oriental Chestnut Gull Wasp

Chestnut Weevil

Asian Oak Weevil



Japanese Beetle



Potato Leafhopper



© Marlin E. Rice



Cicadas

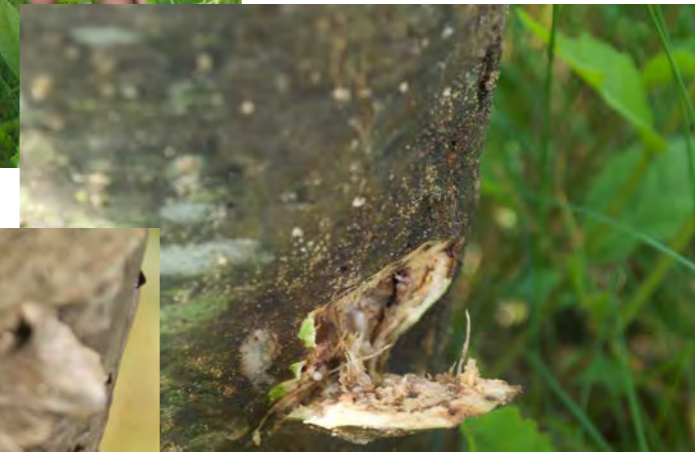


Deer



Chestnut Diseases

- Sour Sap Disease
- Phytophthora
- Chestnut Blight
- Blossom End Rot *



Sour Sap Disease





Phytophthora



Chestnut Blight



Blossom End Rot

- Fungal pathogen
- Related to decline of oriental chestnut gall wasp
- Infection starting at blossom end
- Rotting inside of shell – nut will turn black



Environmental Factors



Other difficulties

- Maintaining proper spacing in orchard
- Proper spraying practices
 - Minimizing drift
- Helping hands for harvest
- Post-harvest storage
- Sales



Breeding Traits

- Vigor
- Disease Resistance
- Tree Form
- Nut Yield
- Nut Quality
- Allelopathy



Harvest and Marketing



- Harvest:

- Employee manual labor
- Machines \$\$\$
- Pick your own

- Market:

- Pick your own
- Buy from farm
- Co-op
- Some re-wholesalers
- Stores

Harvest — pick your own





Outdoor market





- Advantages of belonging

to a co-op:

- Shared knowledge
- Shared resources
- Post-harvest treatment, storage and sales

- Reduced rates

- Licensing benefits

- Value added products

- Leaves

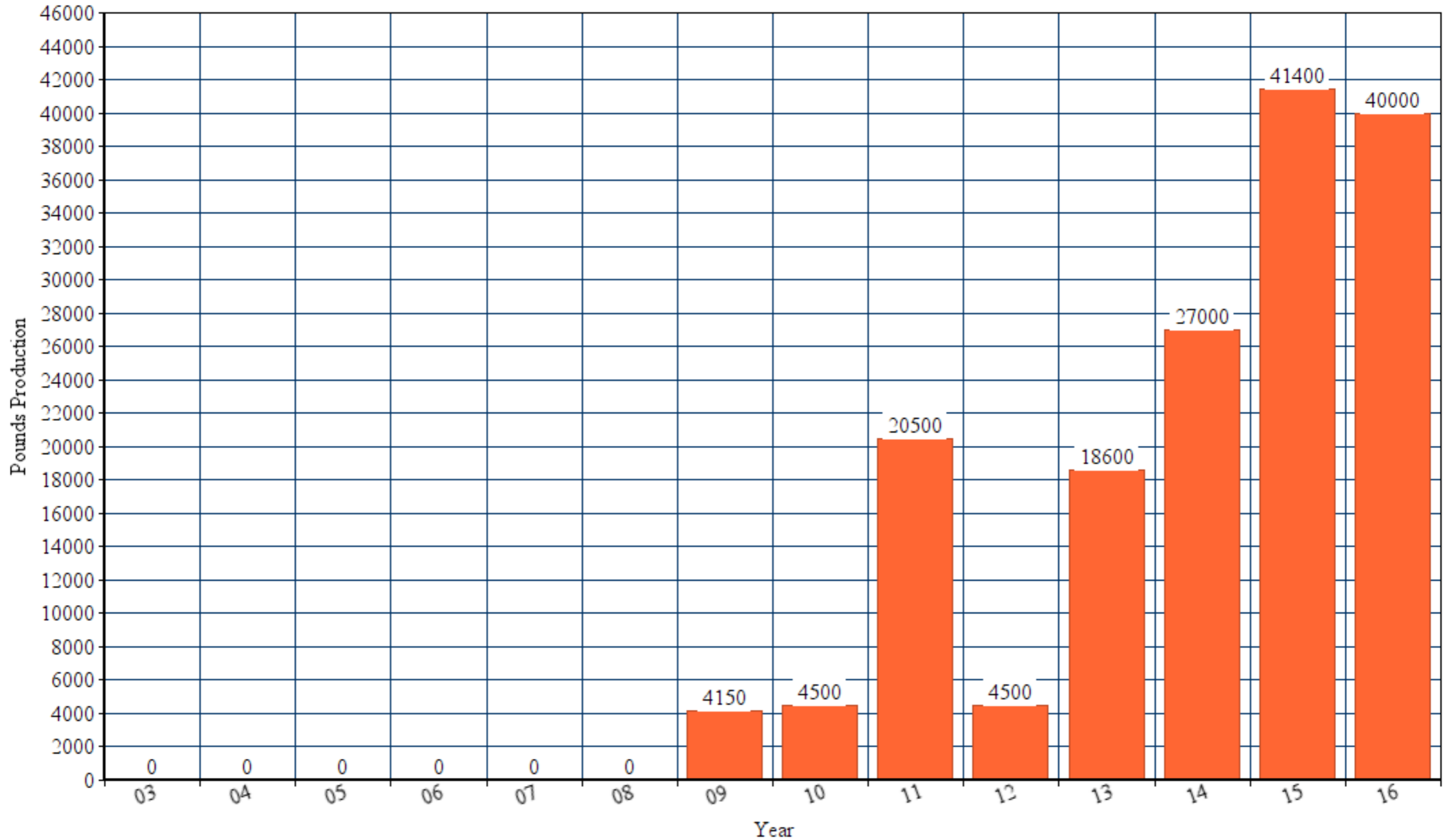
- Flour

- Deer bait

Economics



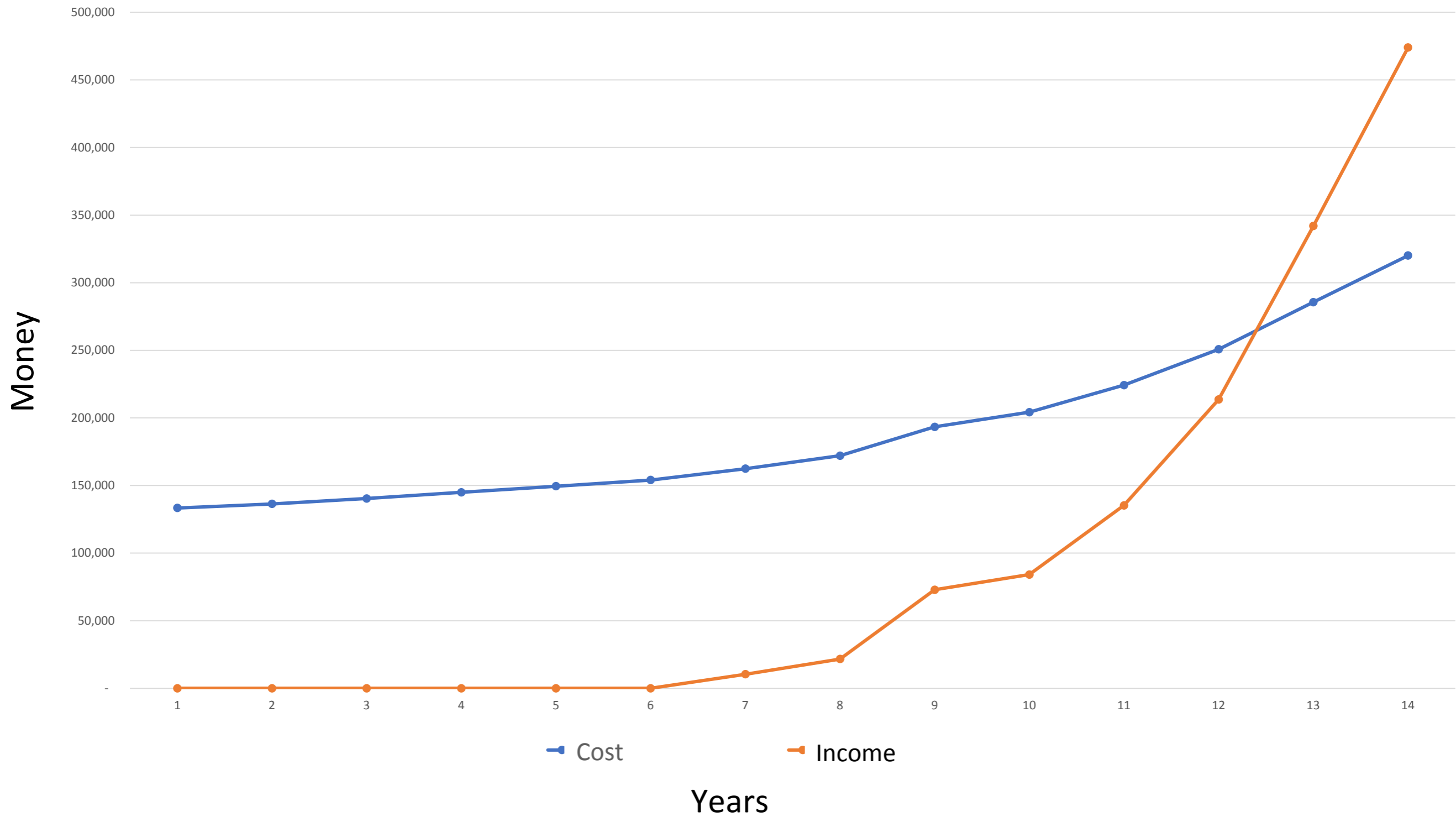
Ashland Chestnut Production



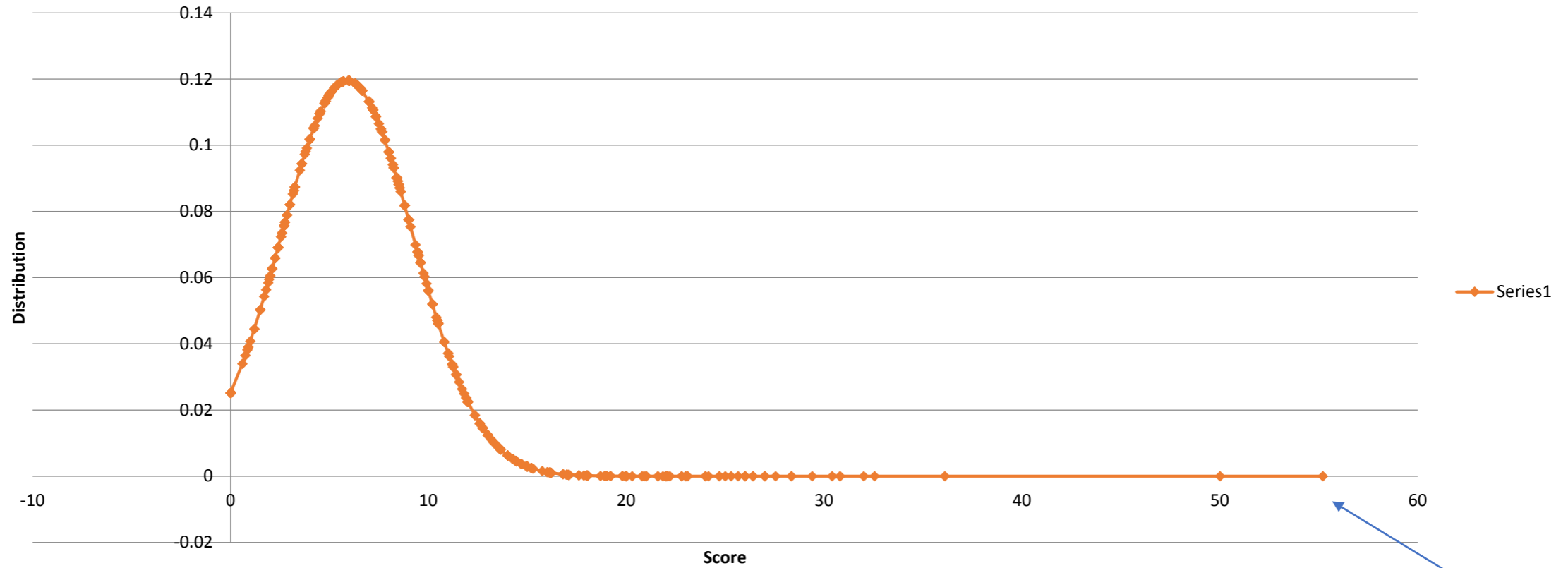
Cost/Income of Ashland Planting

Economics of Ashland Ohio planting				25 Acre Chestnut seedling planting in Ashland County Ohio							
Year	Mowing	Fertilizer	Spray	Pruning	Harvesting	Processing (cleaning & bagging)	Misc	Cumuulative Total Cost + set-up*	Annual Income	Cumulative Income	Cumulative net Profit/Loss
2003	700	200	-	-	-	-	1,000	133,400	-	-	(133,400)
2004	1,400	400	200	-	-	-	1,000	136,400	-	-	(136,400)
2005	2,100	600	300	-	-	-	1,000	140,400	-	-	(140,400)
2006	2,500	700	350	-	-	-	1,000	144,950	-	-	(144,950)
2007	2,500	700	350	-	-	-	1,000	149,500	-	-	(149,500)
2008	2,500	700	350	-	-	-	1,000	154,050	-	-	(154,050)
2009	2,500	1,600	600	-	2,075	623	1,000	162,448	10,375	10,375	(152,073)
2010	2,500	1,600	600	-	2,250	675	2,000	172,073	11,250	21,625	(150,448)
2011	2,500	1,600	600	1,250	10,250	3,075	2,000	193,348	51,250	72,875	(120,473)
2012	2,500	1,600	600	1,250	2,250	675	2,000	204,223	11,250	84,125	(120,098)
2013	2,500	1,600	600	1,250	9,300	2,790	2,000	224,263	51,150	135,275	(88,988)
2014	2,500	1,600	1,600	1,250	13,500	4,050	2,000	250,763	78,300	213,575	(37,188)
2015	2,500	1,600	600	1,250	20,700	6,210	2,000	285,623	128,340	341,915	56,293
2016	3,000	1,600	600	1,250	20,000	6,000	2,000	320,073	132,000	473,915	153,843
*set-up cost includes cost of land (\$75,000) and improvements-fencing (\$13,000), seedling chestnuts (\$22,500), planting (\$4000),											
initial fertilizer & grass seed (\$16,000)											

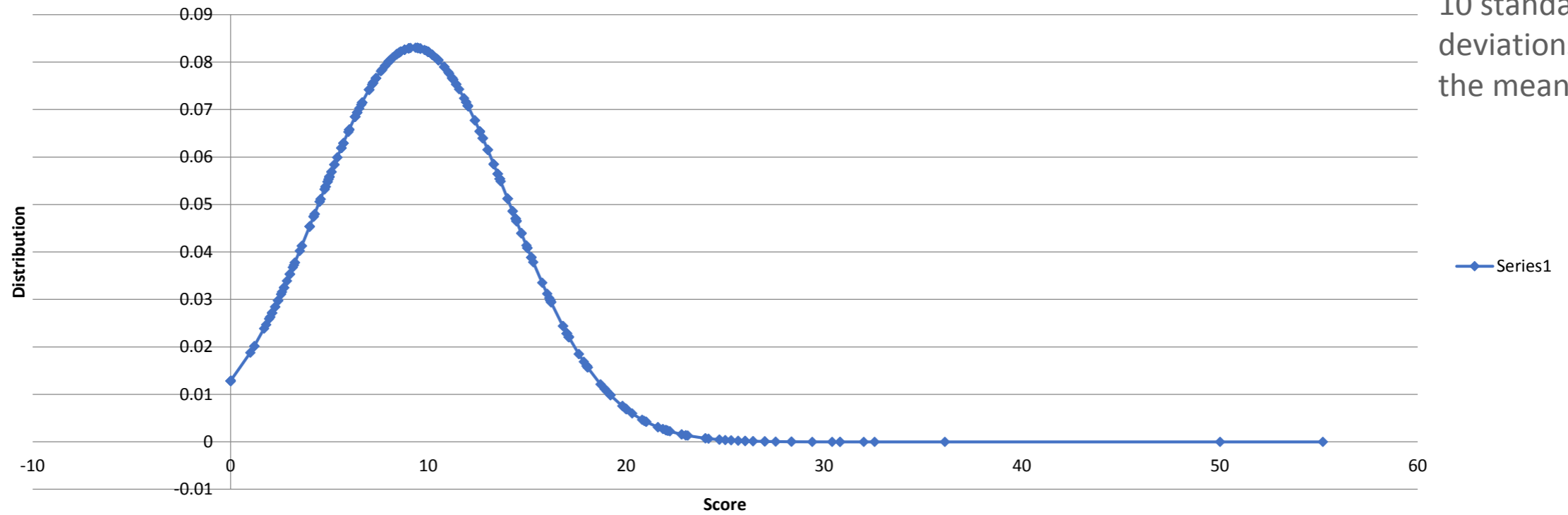
Cost/Income of Ashland Planting



Ashland 3rd Planting (rows 36-51) Pre-Culling



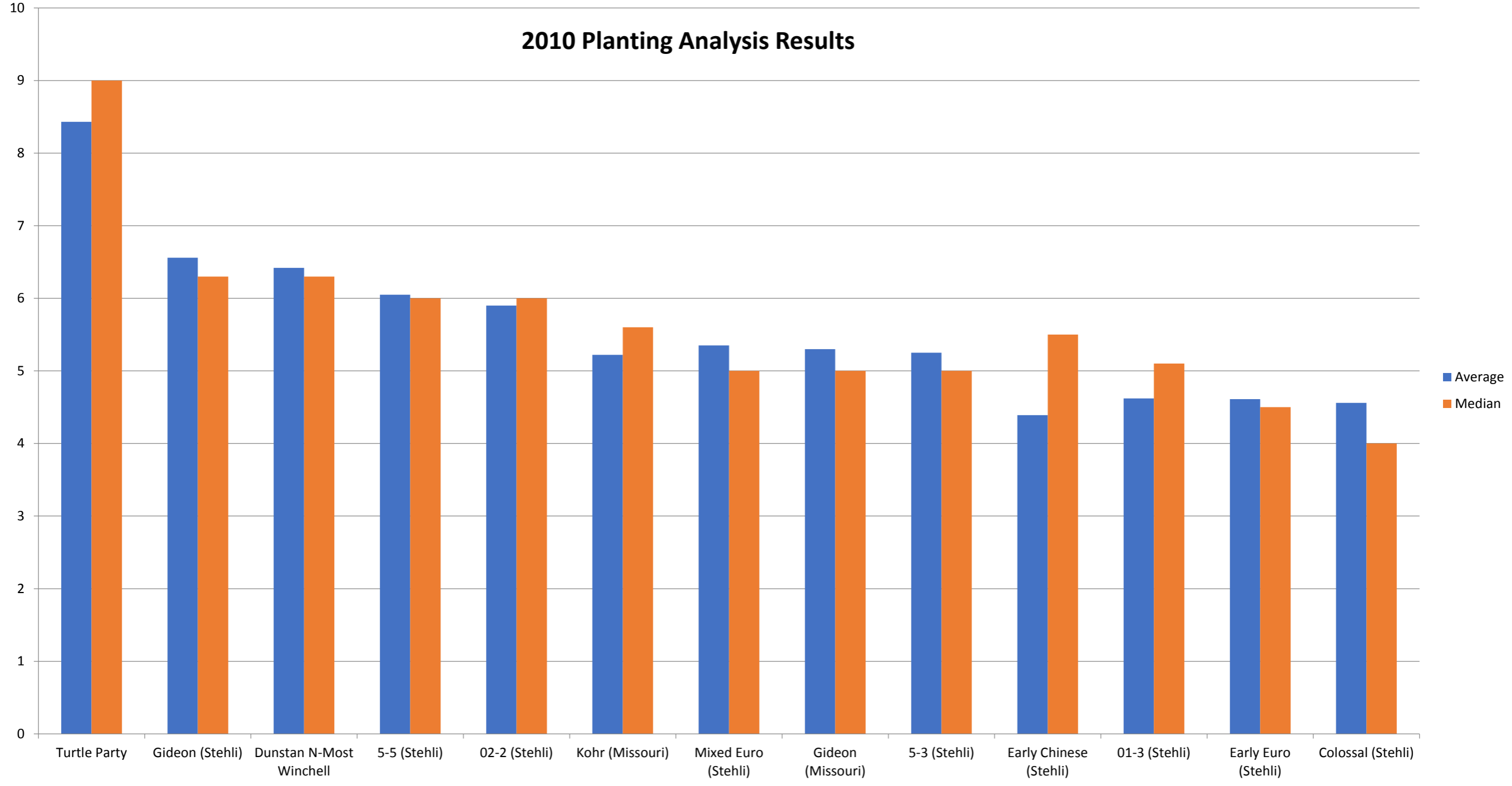
Ashland 3rd Planting (rows 36-51) Post-Culling



Approximately
10 standard
deviations from
the mean.

2016 Chestnut Seedlings were planting in 2005 on a 7 ½ x 20ft spacing. Graph 1 represents the 610 trees remaining at the end of 2016. Graph 2 represents the remaining 456 trees after the 2017 culling.

2010 Planting Analysis Results



Represents average and median Genetic Value Scores of the 2336 seedlings of different seed sources planted in Ashland in 2010.

Hedge Beds with Diversity/ Alternative Methods









