

Using GIS to Create Useable
Christmas Tree Growing
Interpretations

by

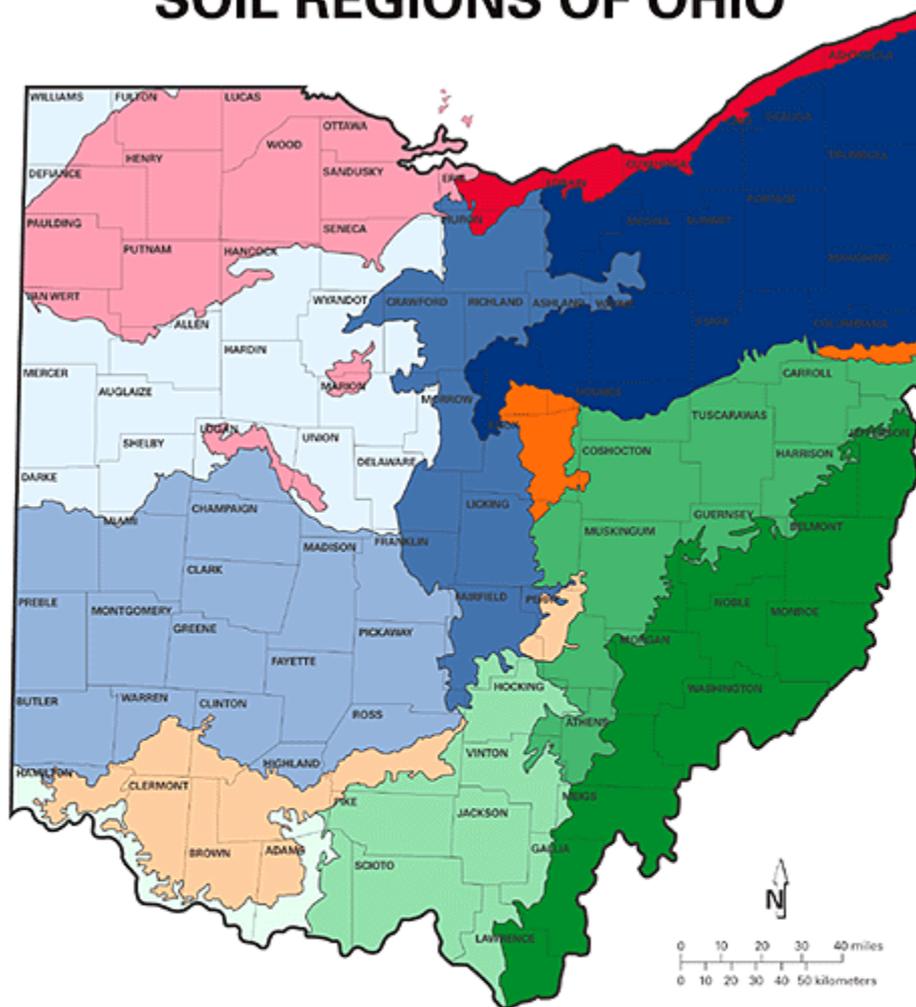
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The Fraser Fir (*Abies fraseri*) (the Perfect Christmas Tree?)



SOIL REGIONS OF OHIO

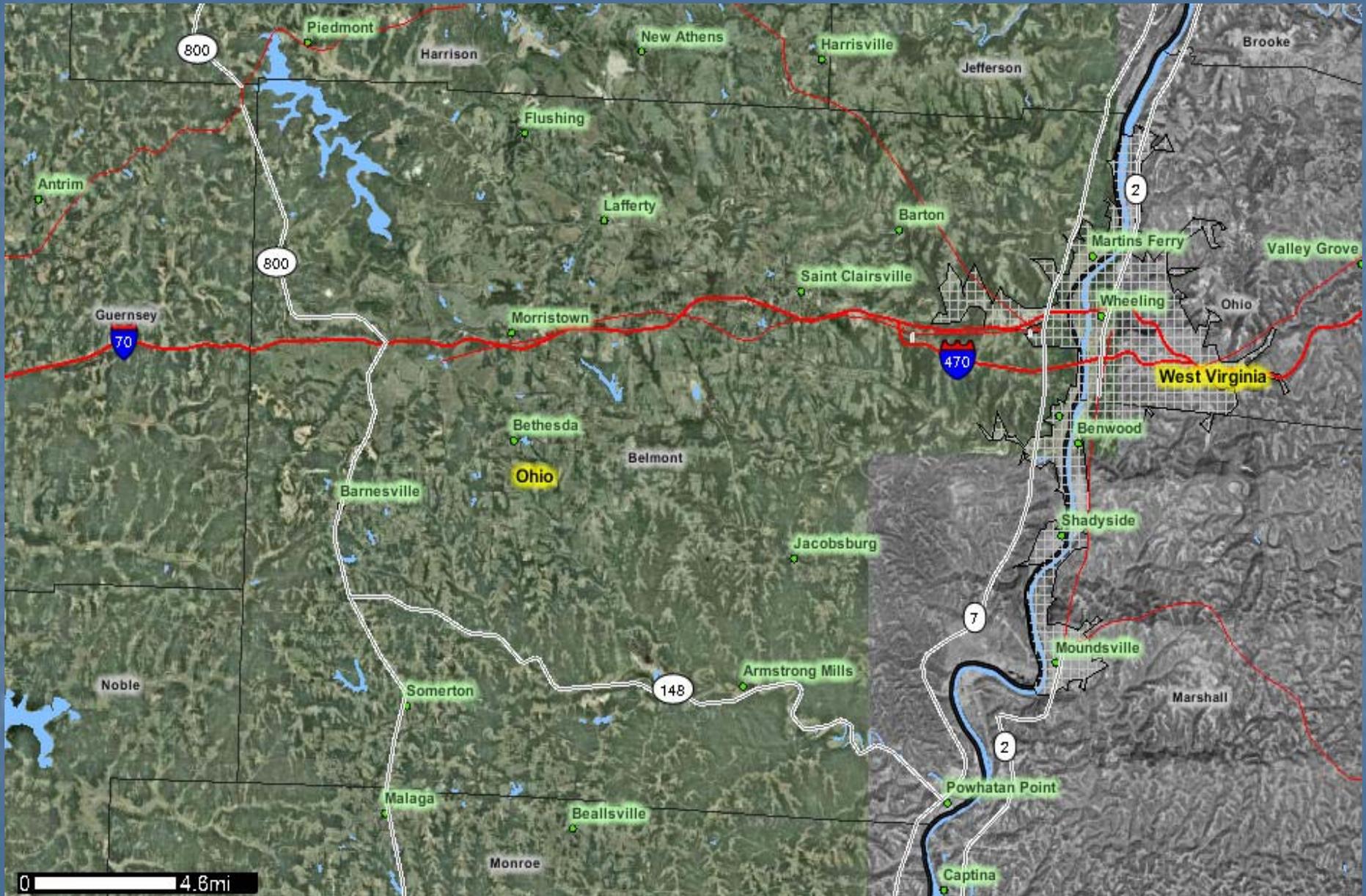


LEGEND*

- | | | |
|--|--|---|
|  1 Hoytville-Nappanee-Paulding-Toledo |  5 Bennington-Cardington-Centerburg |  9 Eden-Bratton-Brushcreek |
|  2 Conotton-Conneaut-Allis |  6 Mahoning-Canfield-Rittman-Chili |  10 Shelocta-Brownsville-Latham-Steinsburg |
|  3 Blount-Pewamo-Glynwood |  7 Clermont-Rossmoyne-Avonburg-Cincinnati |  11 Coshocton-Westmoreland-Berks |
|  4 Miamian-Kokomo-Eldean |  8 Westmoreland-Homewood-Loudonville |  12 Gilpin-Upshur-Lowell-Guernsey |

*Soil regions are identified by the names of the soil series that are common in that region

The Feisley Farm; 150 Miles East of Columbus, Ohio



The Feisley Farm



John and Geoff Feisley Farm

- Father/Son Operation
- Over 50 Years Providing Quality Trees
- Several Hundred Acres in Production
- One of the largest Christmas tree farms in Ohio
- Majority of trees used for wholesale market throughout Ohio and surrounding states
- 5 major species grown - Fraser and Douglas Fir; White and Scotch Pine; and Colorado Blue Spruce

Planting and Harvesting

- Planting density: approximately 1000 trees/acre
- Seventy-five percent yield/acre = a good harvest
- Primary cutting (1st cutting) – highest grade
- Secondary trees (2nd cutting) – retail sale, used for wreaths, greenery
- Wholesale - approximately \$20/tree
- Retail - approximately \$30 to \$80/tree
- Approx. 7 years for 1st harvest
- Approx. 12 years rotation

1 Year Old Trees



Landscape with Mature Trees



Trees Ready for Harvest



State Rankings – Top 15 in each category:

Ranked by Number of Trees Harvested in 2002

1	Oregon	6,466,551
2	North Carolina	2,915,507
3	Michigan	2,380,173
4	Pennsylvania	1,724,419
5	Wisconsin	1,605,981
6	Washington	1,164,139
7	New York	618,917
8	Virginia	507,791
9	Minnesota	463,885
10	California	383,940
11	Ohio	372,957
12	Indiana	186,303
13	Maine	164,406
14	Vermont	151,249
15	Tennessee	149,770

Total U.S.		20,808,065
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Ranked by Christmas Tree Acres

1	Oregon	67,804
2	Michigan	60,520
3	Wisconsin	47,699
4	Pennsylvania	44,905
5	New York	32,599
6	North Carolina	30,694
7	Ohio	16,625
8	Washington	15,580
9	Minnesota	15,413
10	Virginia	12,944
11	California	7,708
12	New Jersey	7,628
13	Illinois	6,355
14	Colorado	6,187
15	Indiana	5,630

Total U.S.		446,996
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Ranked by Number of Farms

1	Pennsylvania	2,164
2	Oregon	2,024
3	Michigan	1,798
4	New York	1,648
5	North Carolina	1,528
6	Wisconsin	1,387
7	New Jersey	1,167
8	Ohio	1,105
9	Washington	773
10	Virginia	767
11	California	543
12	Minnesota	518
13	Connecticut	495
14	Illinois	429
15	Massachusetts	408

Total U.S.		21,904
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The Investigation and Evaluation

- Feisleys contact the District Conservationist (DC) in Belmont Co., about dying trees
- DC contacted Rick Griffin, NRCS Area Resource Soil Scientist to help with the investigation
- First site visited, hundreds of Fraser fir seedlings planted earlier in the spring had died within months
- Fraser firs are finicky trees; they don't like wet roots or soils with high clay contents; wetness the most limiting
- An investigation of the soils at this site revealed a water table at 15 inches and a clay content in the subsoil > 30%
- On an adjacent landform, where trees had survived, the water table was > 35 in., and the clay content was between 25 and 30%
- Other farms were investigated; soil and tree characteristics were noted
- A GIS/tabular data table model was developed and later new farms were investigated to test the model

Feisley Farm # 3



Use of Soil Properties to Set Limitations in NASIS (examples)

Wetness – (Drainage)

- | | |
|----------------|--------------------|
| SWP, Poor, VPD | - Not Suited |
| MWD | - Limited |
| W | - Somewhat Limited |

Available Water Capacity

- | | |
|------------------|--------------------|
| <1 in./ in. | - Not Suited |
| 1 to 1.5 in./in. | - Limited |
| > 1.5 in./ in. | - Somewhat Limited |

Use of Soil Properties to set Limitations in NASIS (cont.)

Frost Hazard - Flood Prone Soils

Hazard of Drought - Depth to bedrock, or other limiting layers

Cracking - Soils with a high clay content in the surface or subsoil

Frost Heave - Soils with a fragipan
- Soils with thick silty surfaces

- Several published Soil Surveys in Ohio have created tables for Christmas tree productivity. The information in the surveys were used to refine the criteria for our queries in NASIS

FORESTLAND INTERPRETATIONS
Table C-5.--Christmas Tree Production

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Limitations for Fraser Fir	Value
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AaB:

Aaron-----	Somewhat Limited	
	Wetness	- 0.50
	Cracking	- 0.34
	Hazard of Drought	- 0.01

Map symbol Limitations for
and soil name Fraser Fir

Rating class and limiting features	Value
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BsC:

Brookside-----Limited

Cracking	- 0.87
Wetness	- 0.50
Hazard of Drought	- 0.36

ChB:

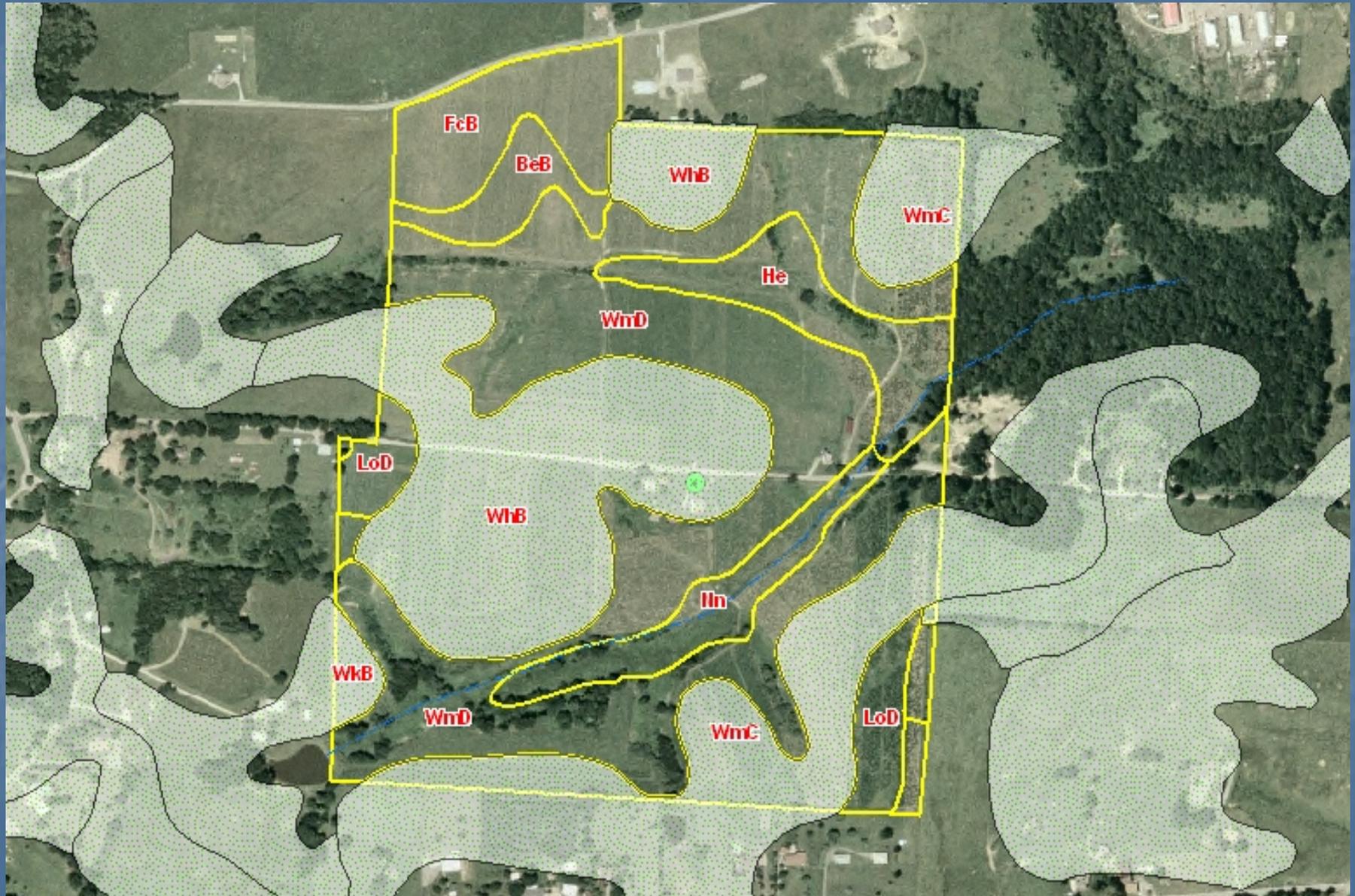
Chili-----Limited

Hazard of Drought	- 0.99
Cracking	- 0.24
Available Water Capacity - 40"	- 0.18

Feisley Farm # 3



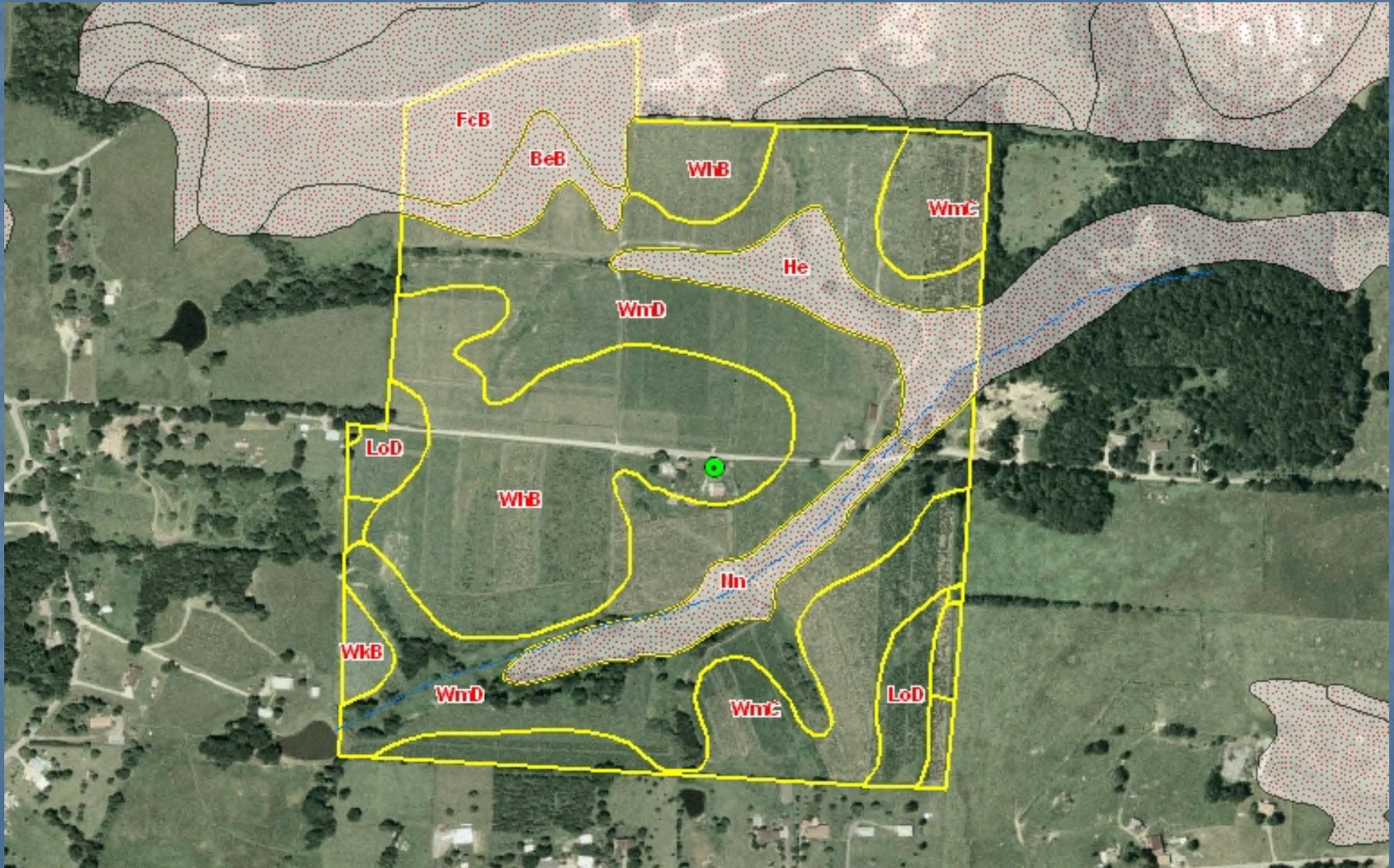
Somewhat Limited Soils



Somewhat Limited Soils (data table)

Map symbol and soil name	Limitations for Fraser Fir	
	Rating class and limiting features	Value
WhB:		
Wellston-----	Somewhat Limited	
	Cracking	- 0.40
	Hazard of Drought	- 0.06
WmB:		
Westmoreland-----	Somewhat Limited	
	Cracking	- 0.44
	Hazard of Drought	- 0.2
WmC:		
Westmoreland-----	Somewhat Limited	
	Cracking	- 0.44
	Hazard of Drought	- 0.22

Limited Soils



Limited Soils (data table)

Map symbol
and soil name

Limitations for
Fraser Fir

Rating class and
limiting features

Value

BeB:

Bethesda-----Limited

Available Water - 0.90

Capacity - 40"

Cracking - 0.50

Hazard of Drought - 0.36

Nn:

Newark Variant-----Limited

Wetness - 1.00

Frost Hazard - 1.00

Cracking - 0.44

Hazard of Drought - 0.12

Available Water - 0.06

Capacity - 40"



Findings and Conclusions



- The Feisley's will change their spring planting pattern of trees, based on new soil information
- The need for on-site investigations may still be required in many situations

Findings and Conclusions (cont.)

- After the Christmas Tree interpretation is refined, it can be used by other tree farmers across the state to help them improve their productivity
- Ease of access using NASIS and NASIS queries is difficult
- Ability to combine spatial and tabular data in GIS was difficult
- Does the State have a “go-to” person that has the abilities to use various electronic programs
- There are many projects and products just waiting for a Soil Scientist to solve!

Questions?



