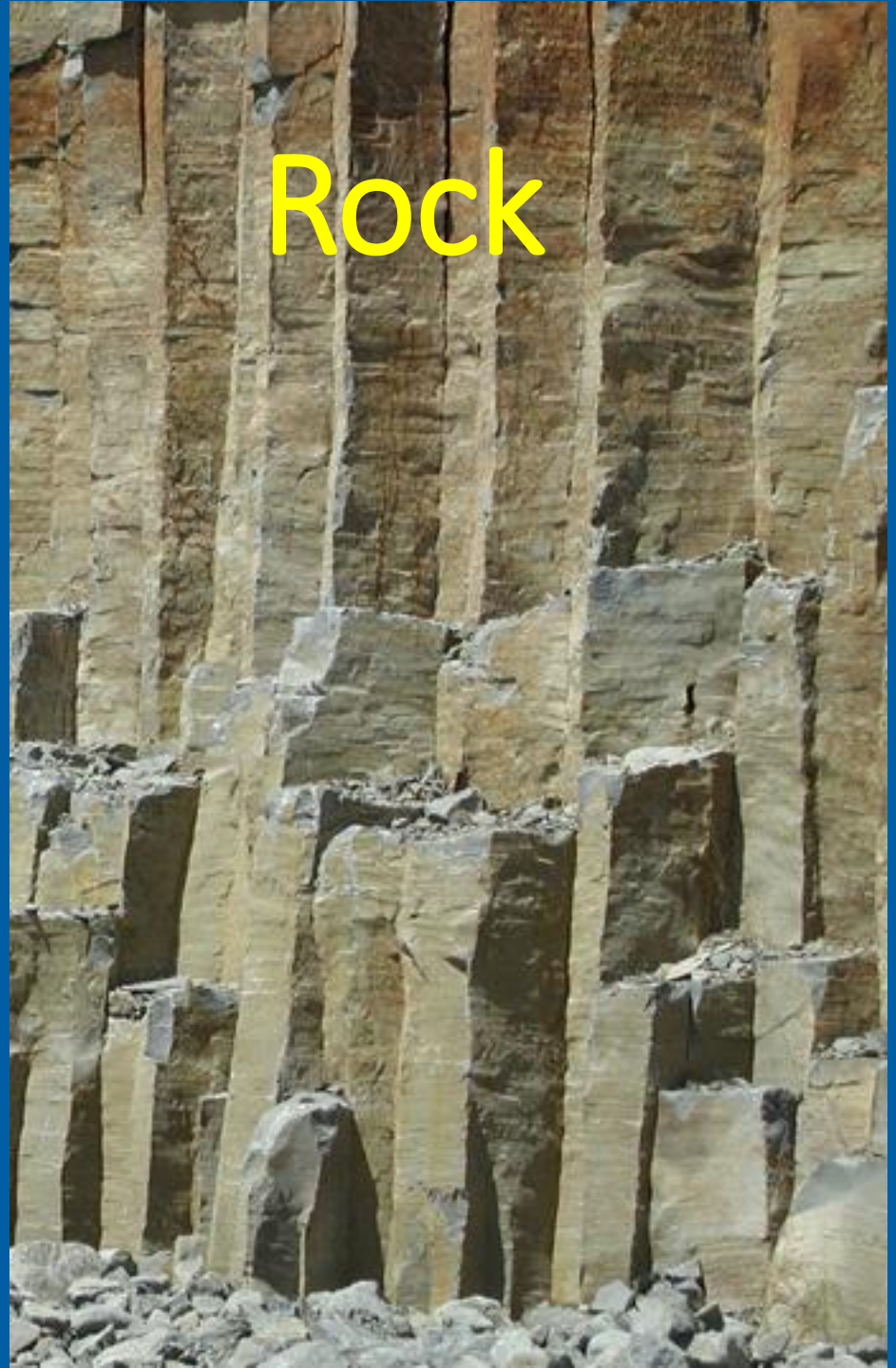
Oregon Geology “Rocks”:
Part 2:

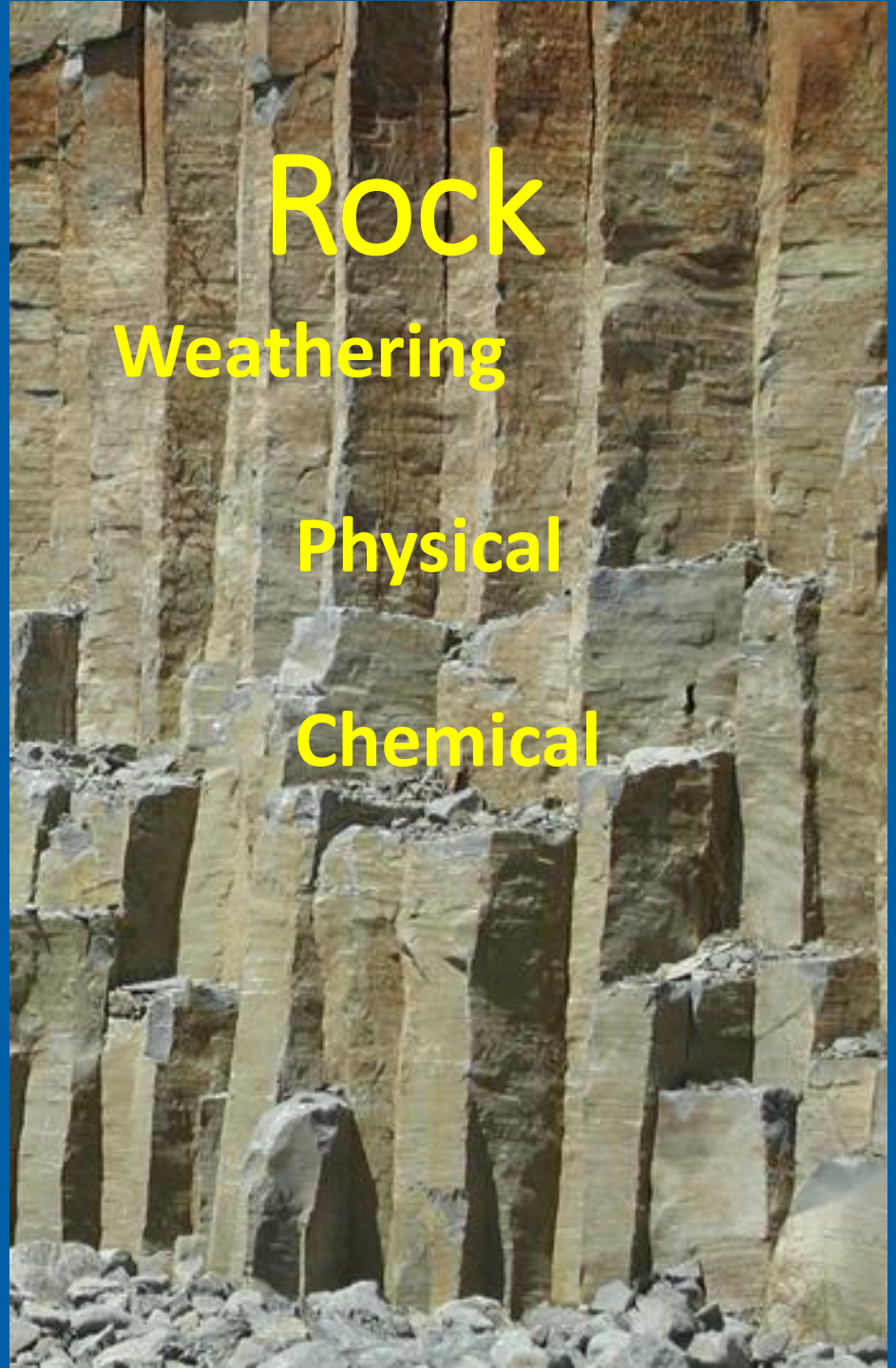
The Arc of Oregon Winesoils

Oregon Wine Symposium 2016
Portland, Oregon

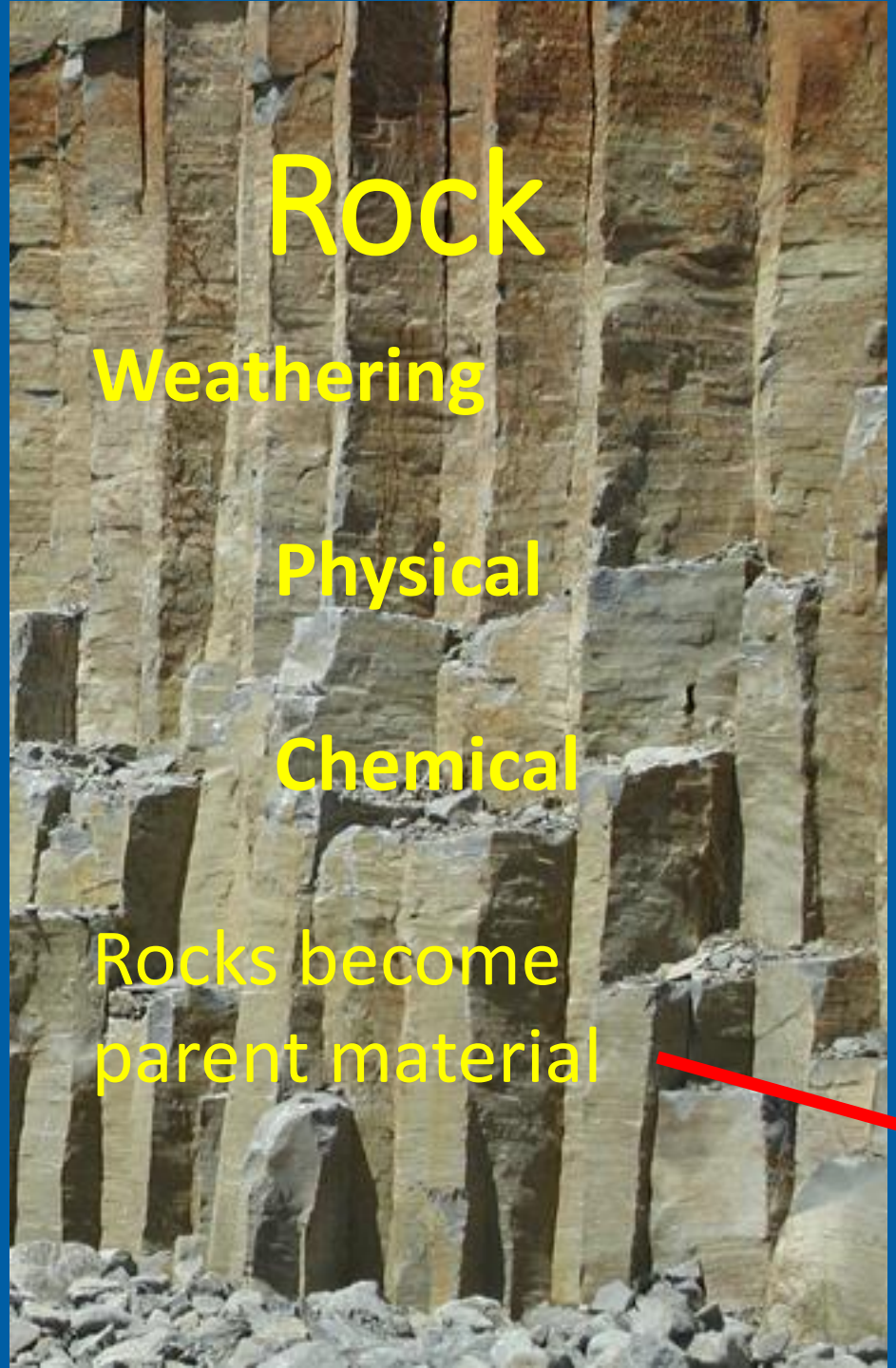
By: Andy Gallagher
Red Hill Soils
Corvallis, Oregon

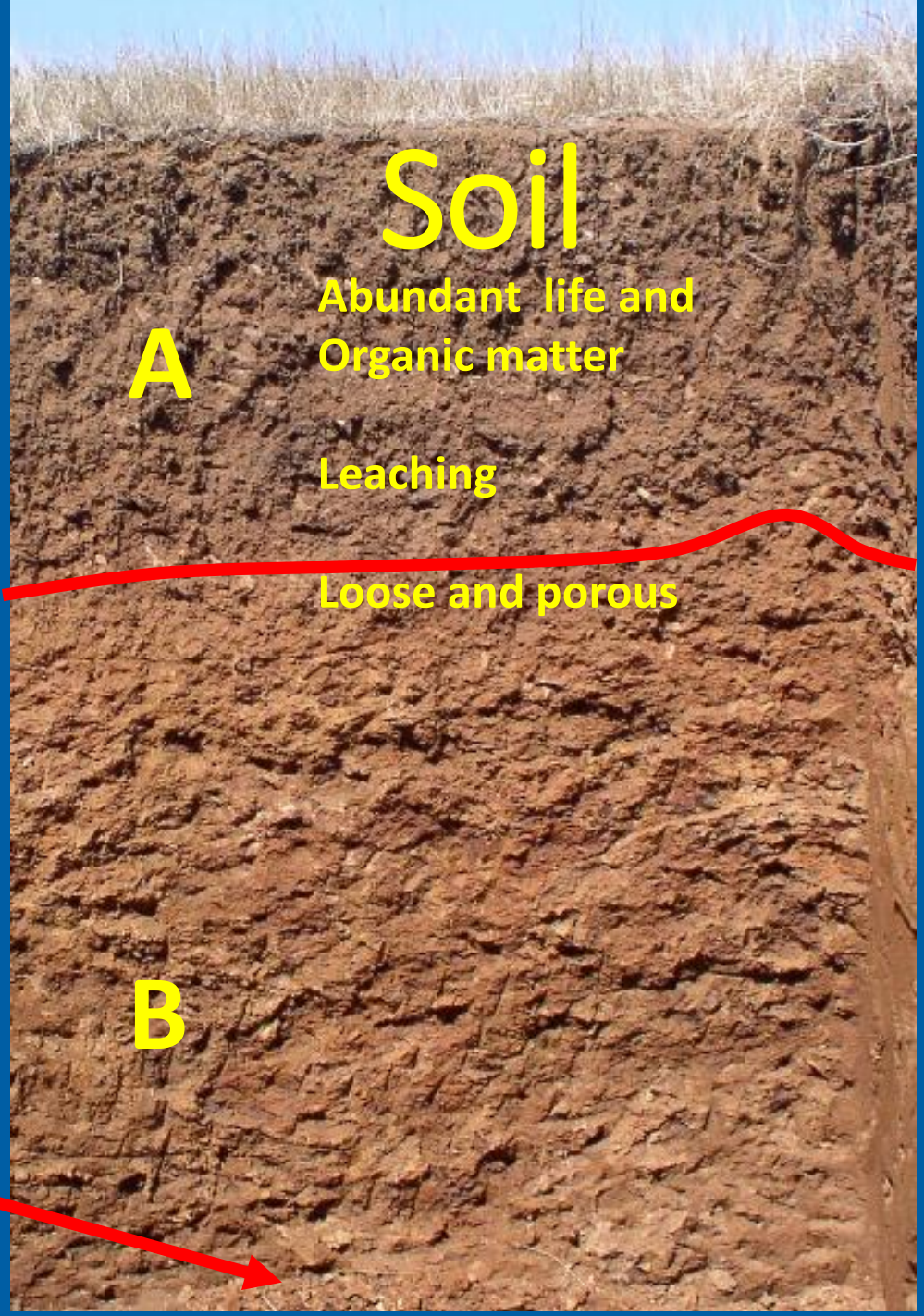

Rock

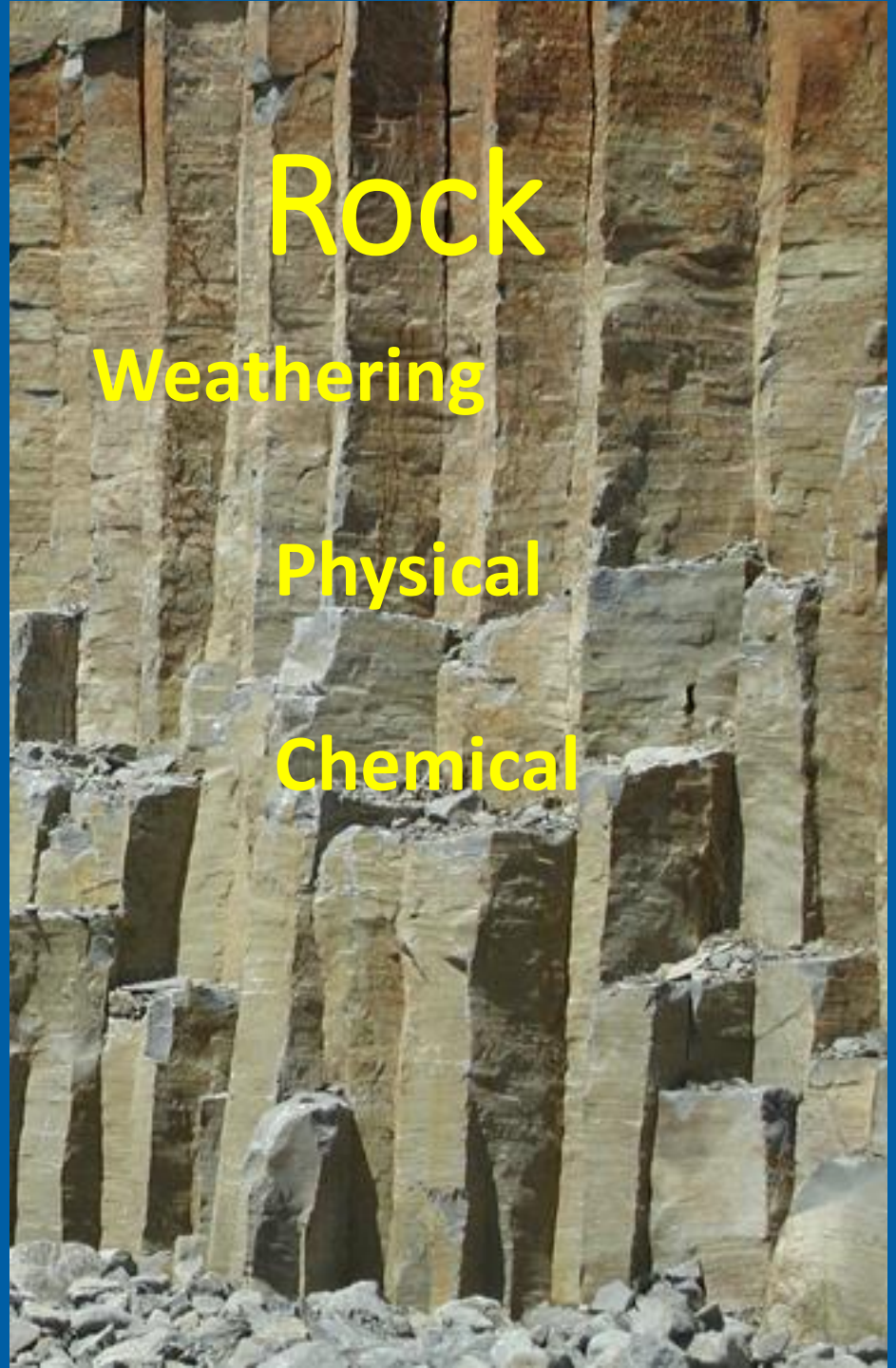

Soil

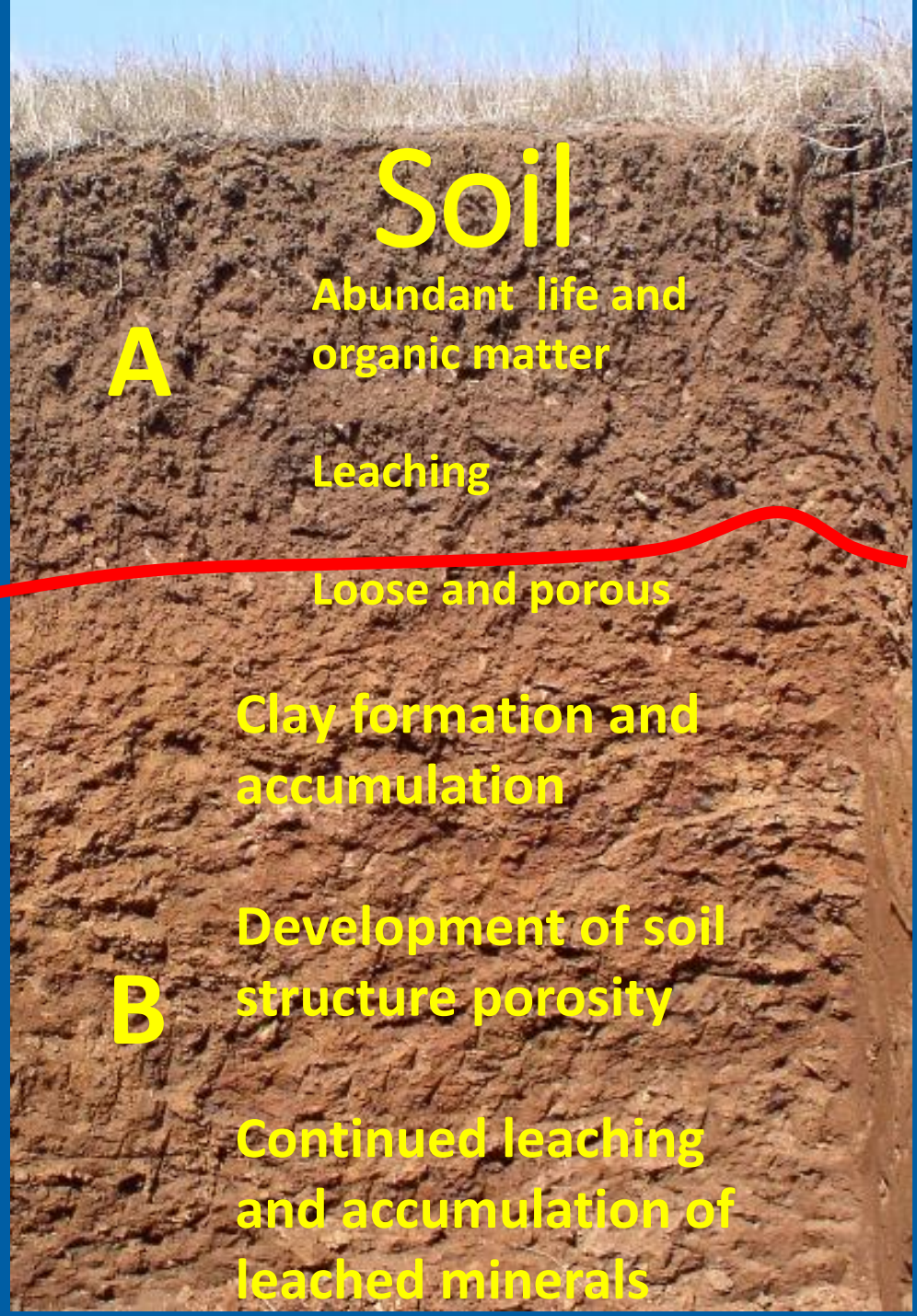

Rock
Weathering
Physical
Chemical


Soil


Rock
Weathering
Physical
Chemical
Rocks become
parent material


Soil
Abundant life and
Organic matter
A
Leaching
Loose and porous
B


Rock
Weathering
Physical
Chemical

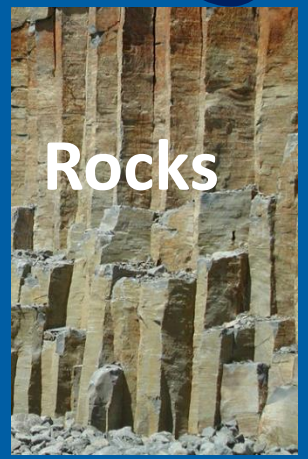

Soil
A
Abundant life and organic matter
Leaching
Loose and porous
Clay formation and accumulation
B
Development of soil structure porosity
Continued leaching and accumulation of leached minerals

For a given geology, different soils can form depending on other:

Soil Forming Factors

Climate

Soils



Age

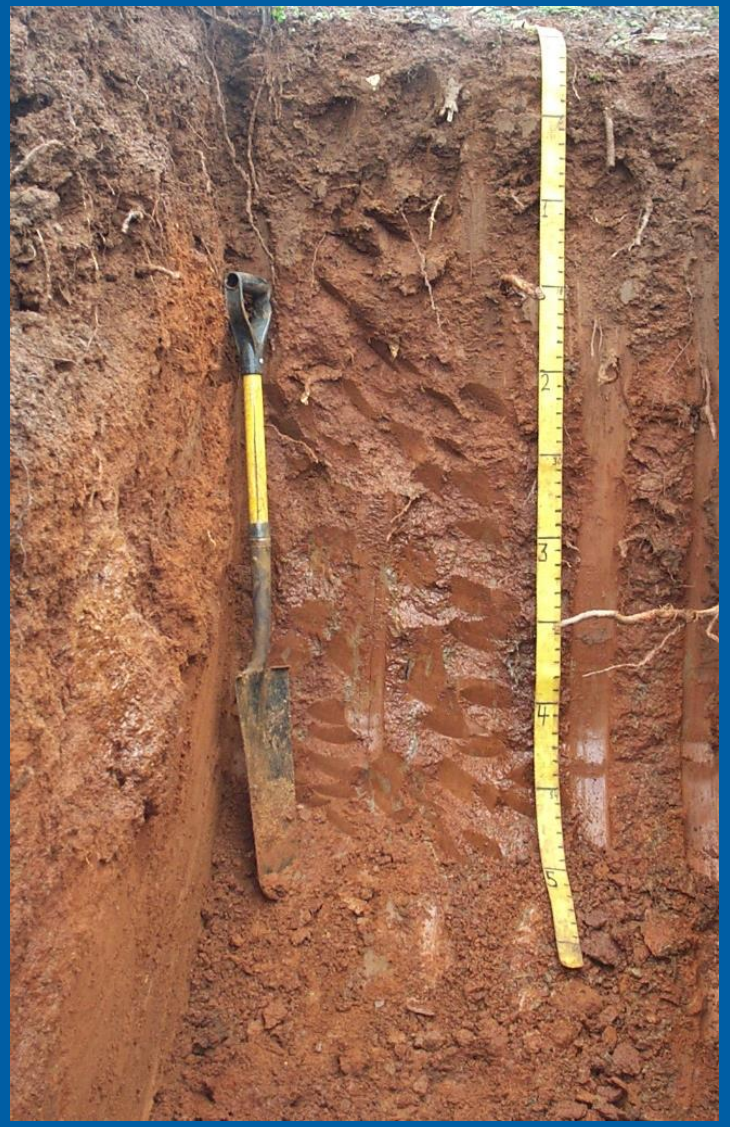
Soils vary with climate, vegetation, slope etc.

Compare:

- On similar parent material very different soils
- Willamette Valley – deeply weathered, strongly developed, acidic soils
- Columbia Valley of Eastern Oregon – little weathering, weakly developed neutral to alkaline soils

Differences a result of climate, age, vegetation

Why do soils matter to wine?



?

Winesoil Properties

One focus of our tour is inherent soil properties:

- Depth, drainage, texture and structure
- Available water holding capacity and water dynamics
- Restrictive layers
- Morphology related to rocks, age, climate and vegetation

Soil Scientists/Classifiers…

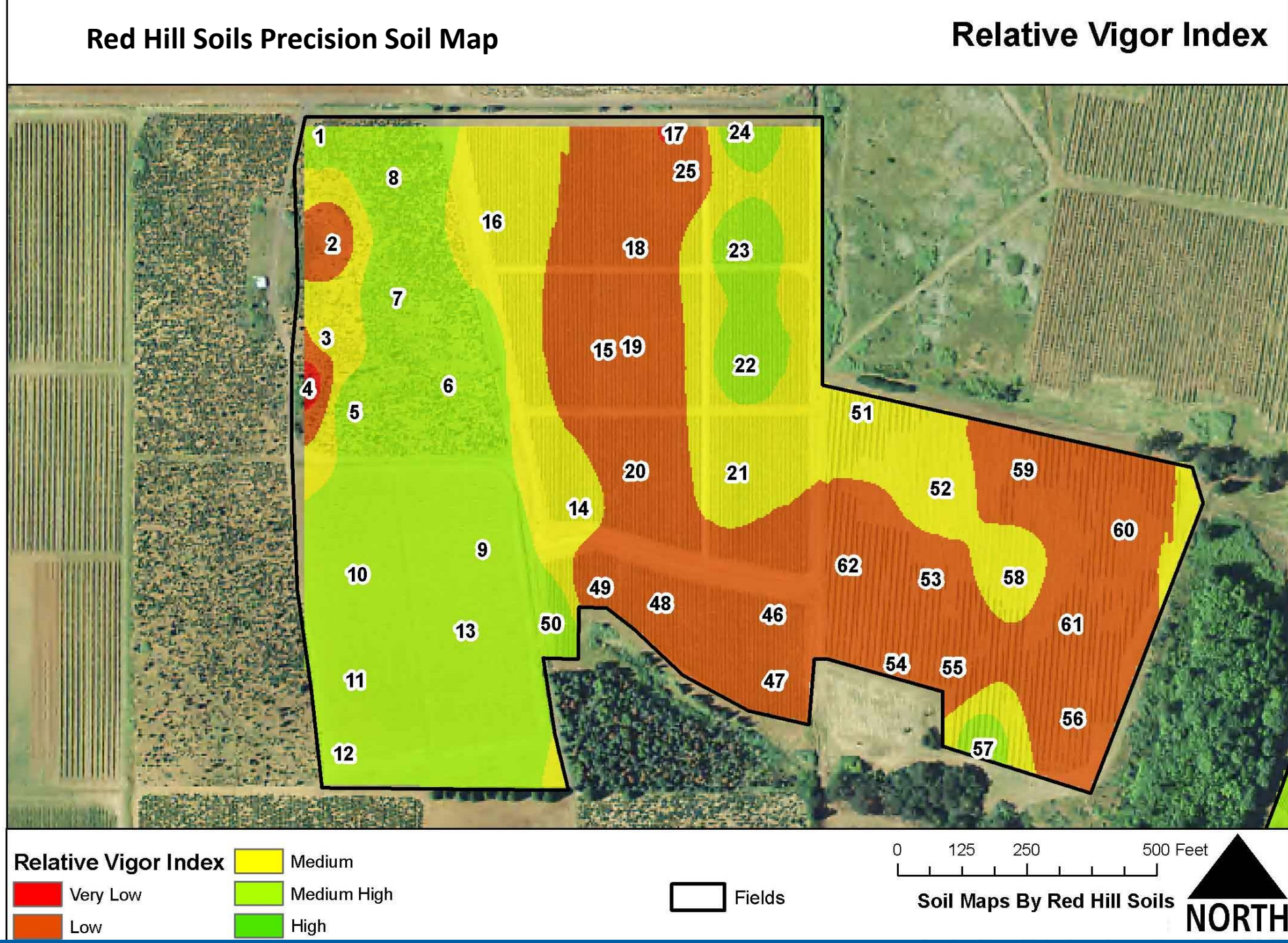
We use soil sampling techniques to make soil maps that show the soil patterns and we make interpretations for:

site selection
vineyard development
management

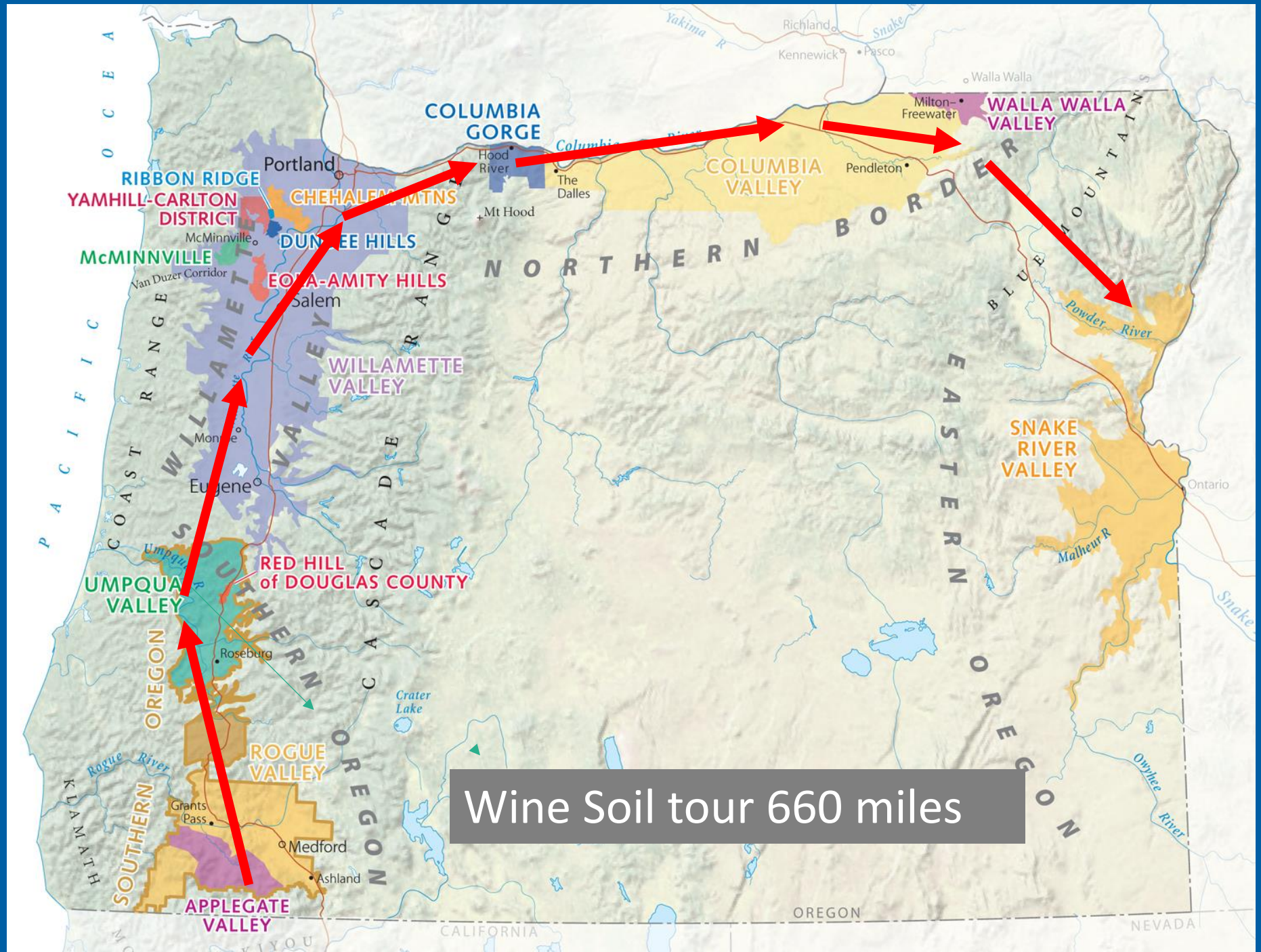
For Example:

Thematic Soil Map

Interpretation for Grapevine Vigor



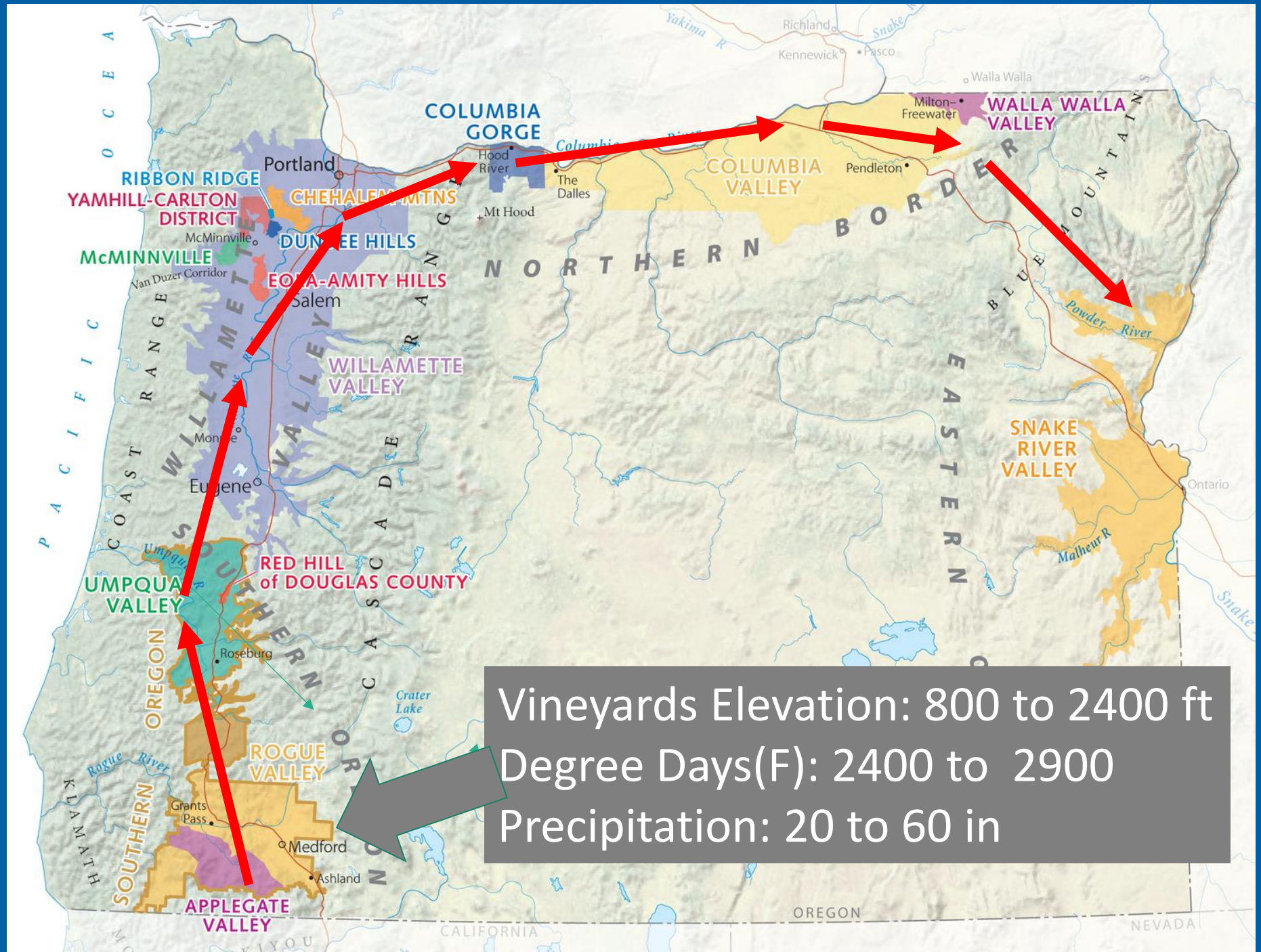
ARC OF OREGON WINESOILS




Get on the Bus!
Winesoil tours

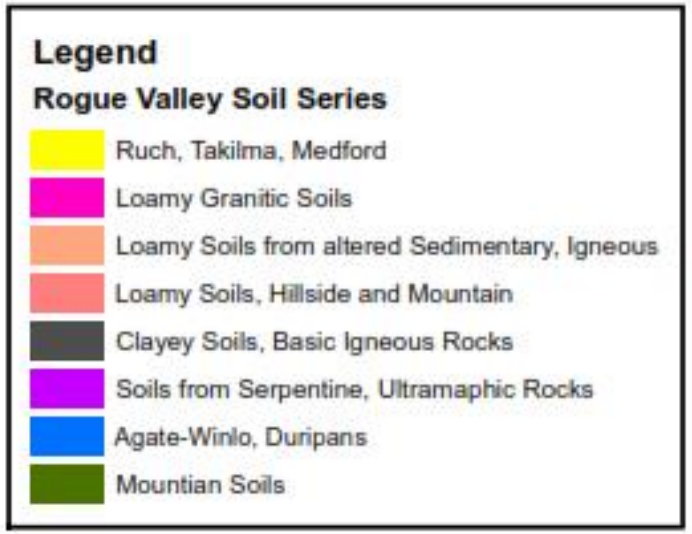
ARC
OF OREGON
WINESOILS

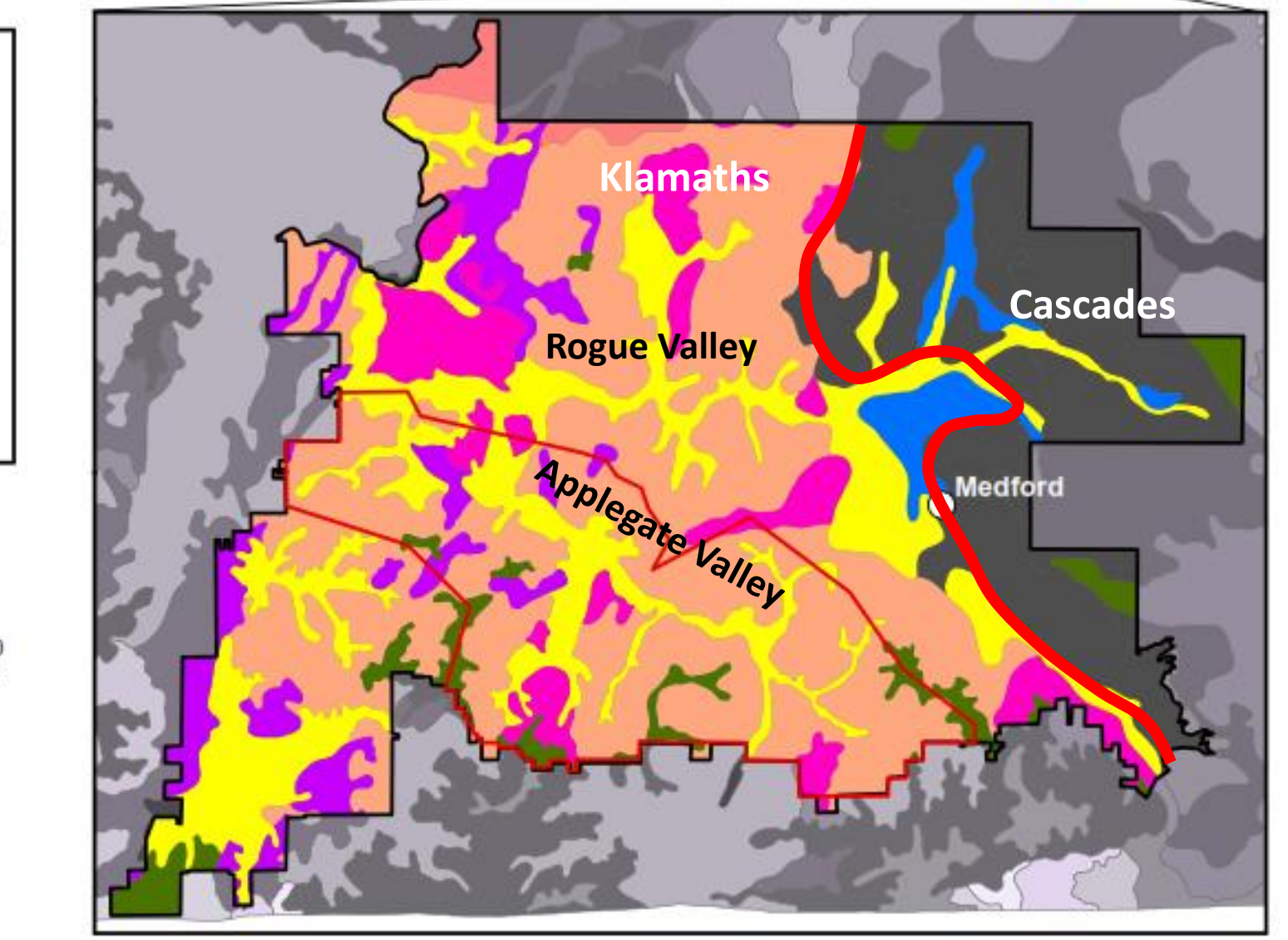
Rogue and Applegate Valleys



Vineyards Elevation: 800 to 2400 ft
Degree Days(F): 2400 to 2900
Precipitation: 20 to 60 in

Rogue Valley Soil Associations





Data Source: Natural Resources Conservation Service;
Everyvine American Viticultural Areas
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Rogue and Applegate Valley Landscape

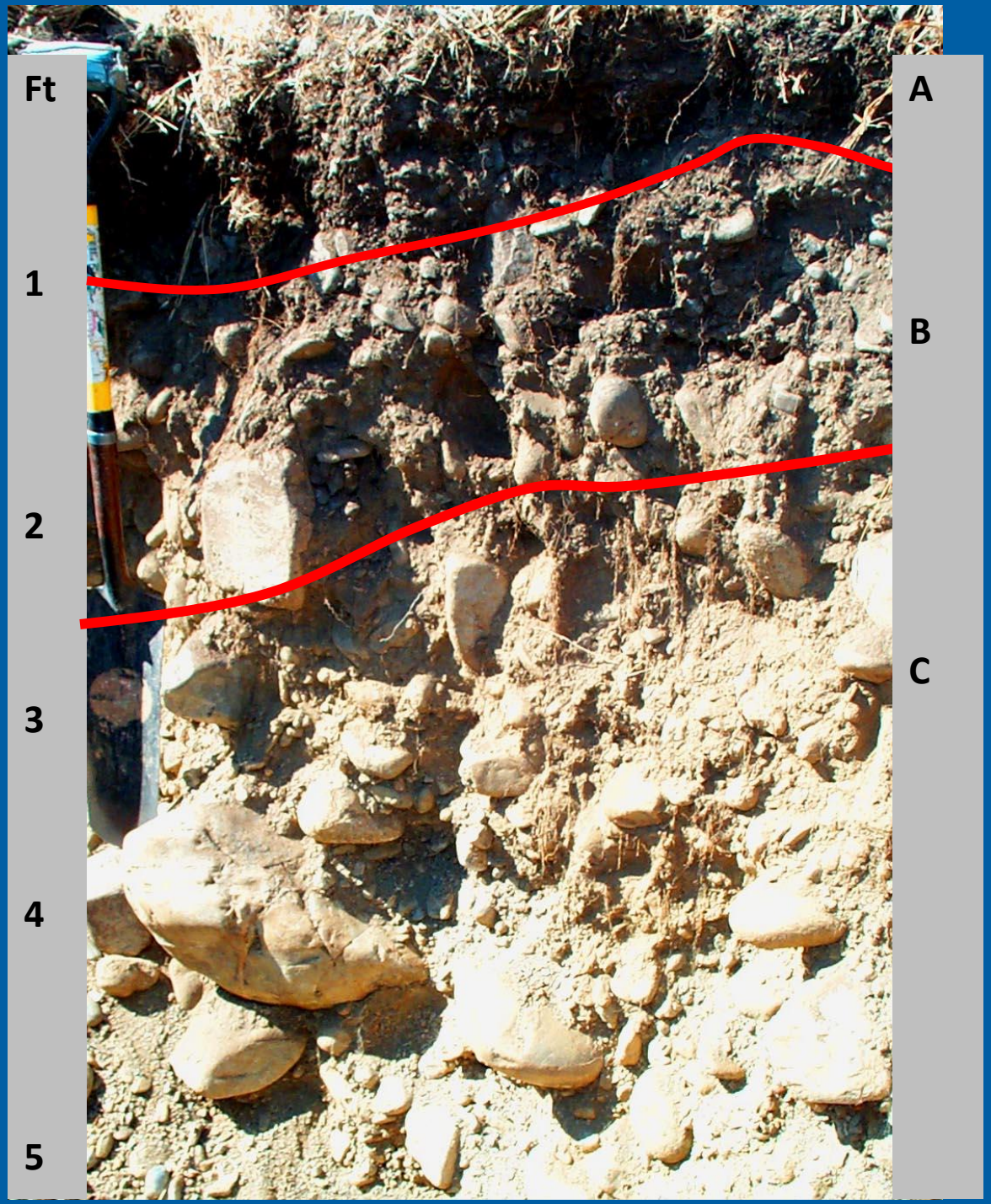
Takilma gravelly loam

Alluvium on terraces

Oak, Douglas fir, pine, madrone, cool season grasses

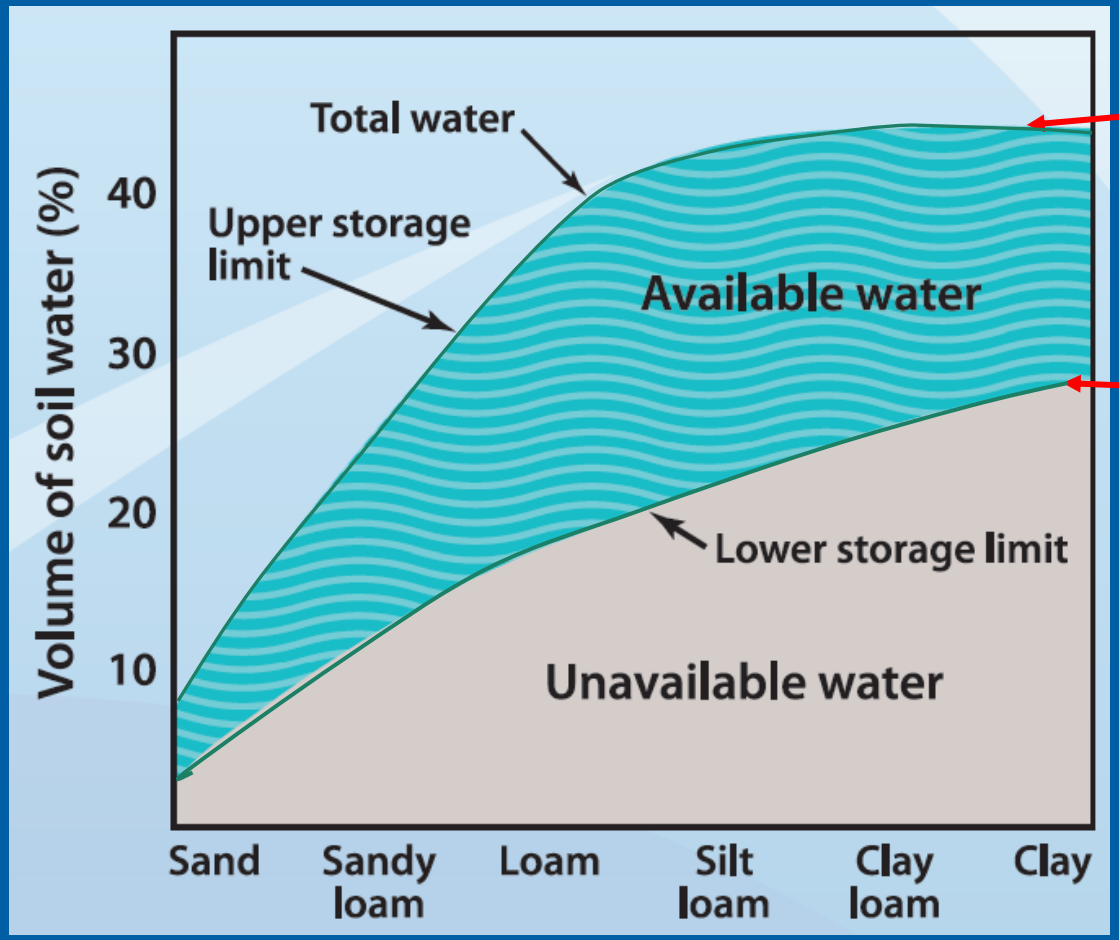
Takilma gravelly loam

- Low water holding capacity
- High organic matter content in surface
- Lots of rocks! (maybe a little gold)



Available Water Holding Capacity

- Measure of stored soil water that is available to the vine



Field moisture capacity

Permanent wilting point

Available Water Holding Capacity (AWHC)

High AWHC

Very deep loamy soils

Low AWHC

Gravelly sands and shallow soils

Carney Clay

Formed on alluvial fans and on hillslopes from colluvium and alluvium of breccia and tuff (volcanic)

Carney Clay

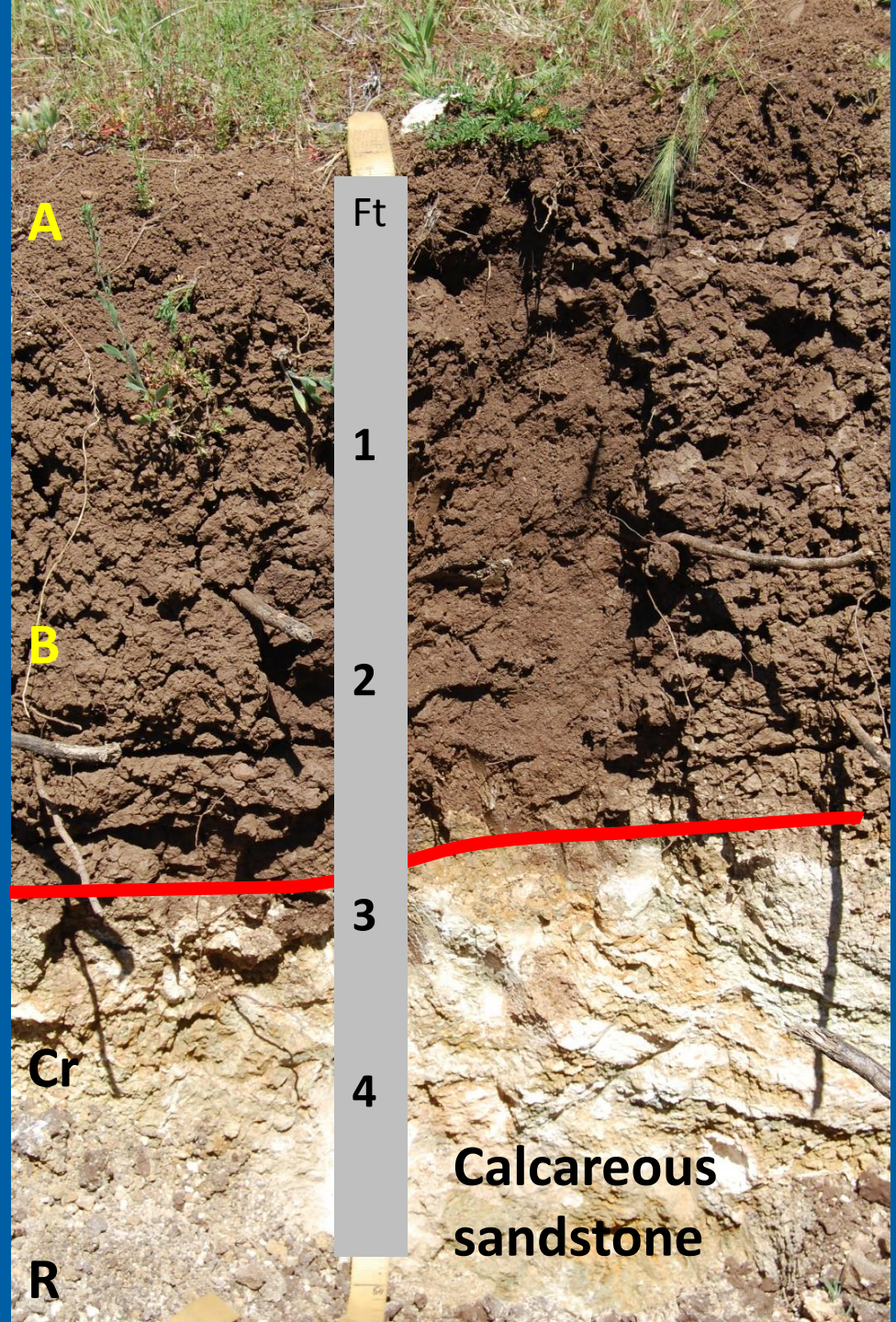
Clay surface and subsoil

Crack in summer, swells tight when wet

Seasonal high water table at 2-3 ft

20 to 40 in to calcareous sandstone

Rootstock tolerance needs
free lime + drought + wetness + clay



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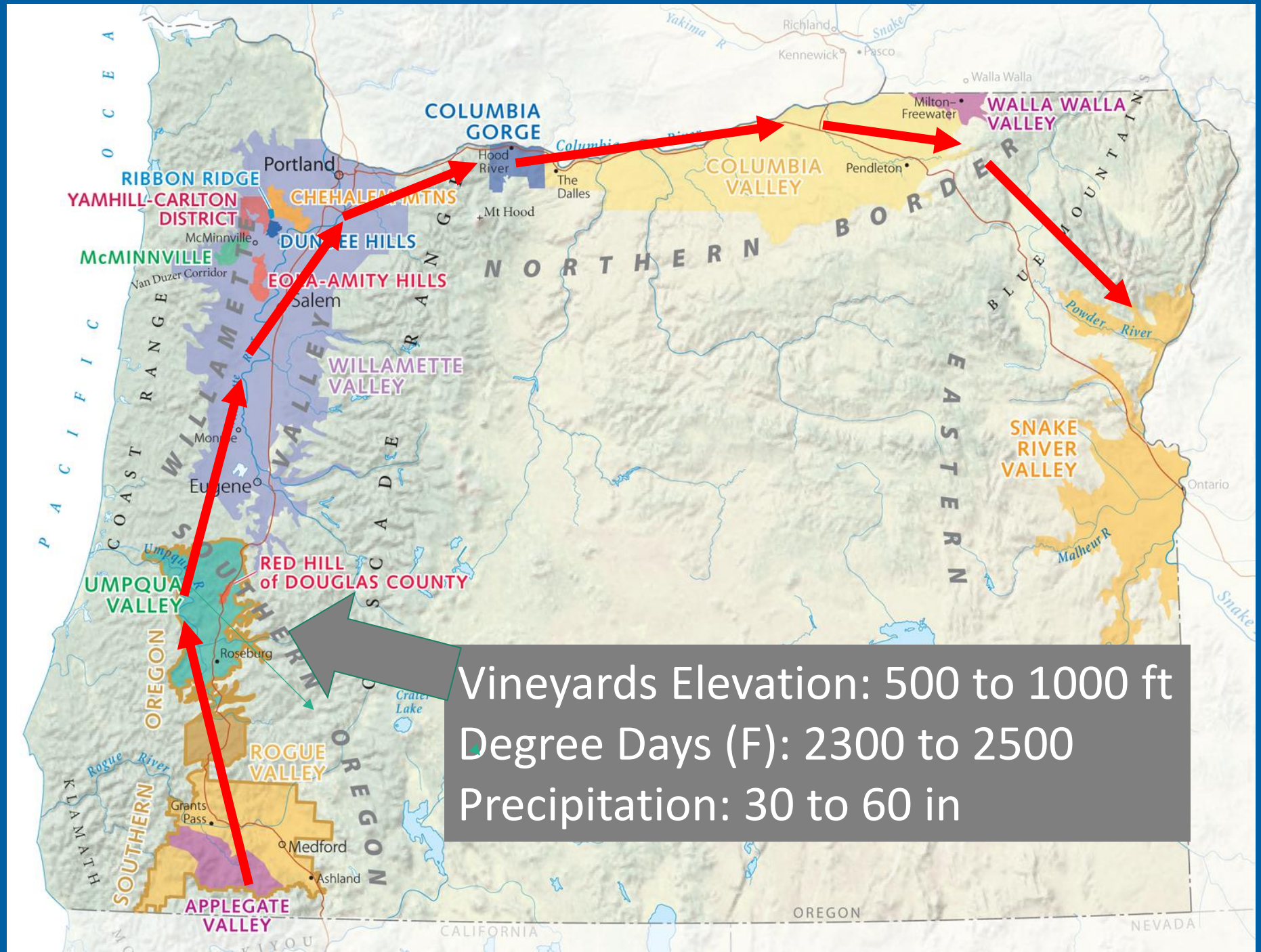
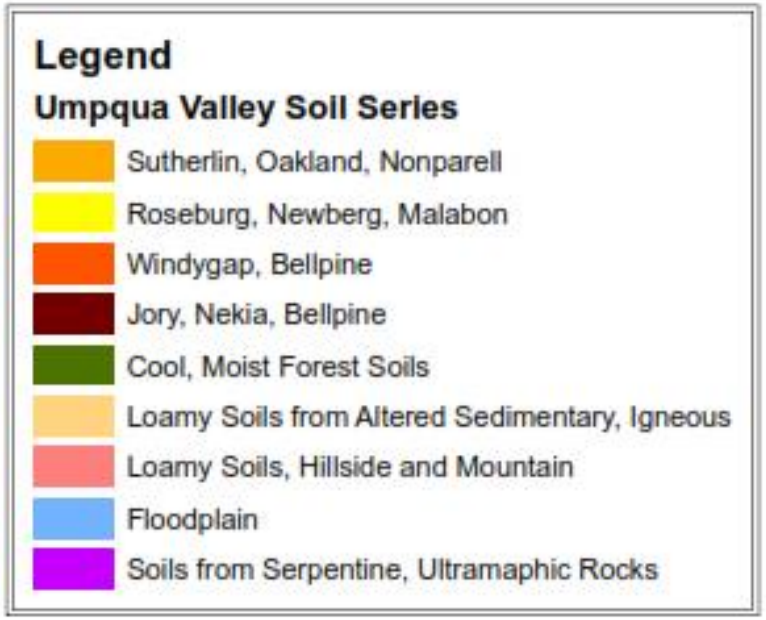
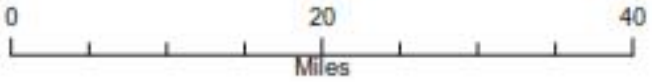
Umpqua Valley

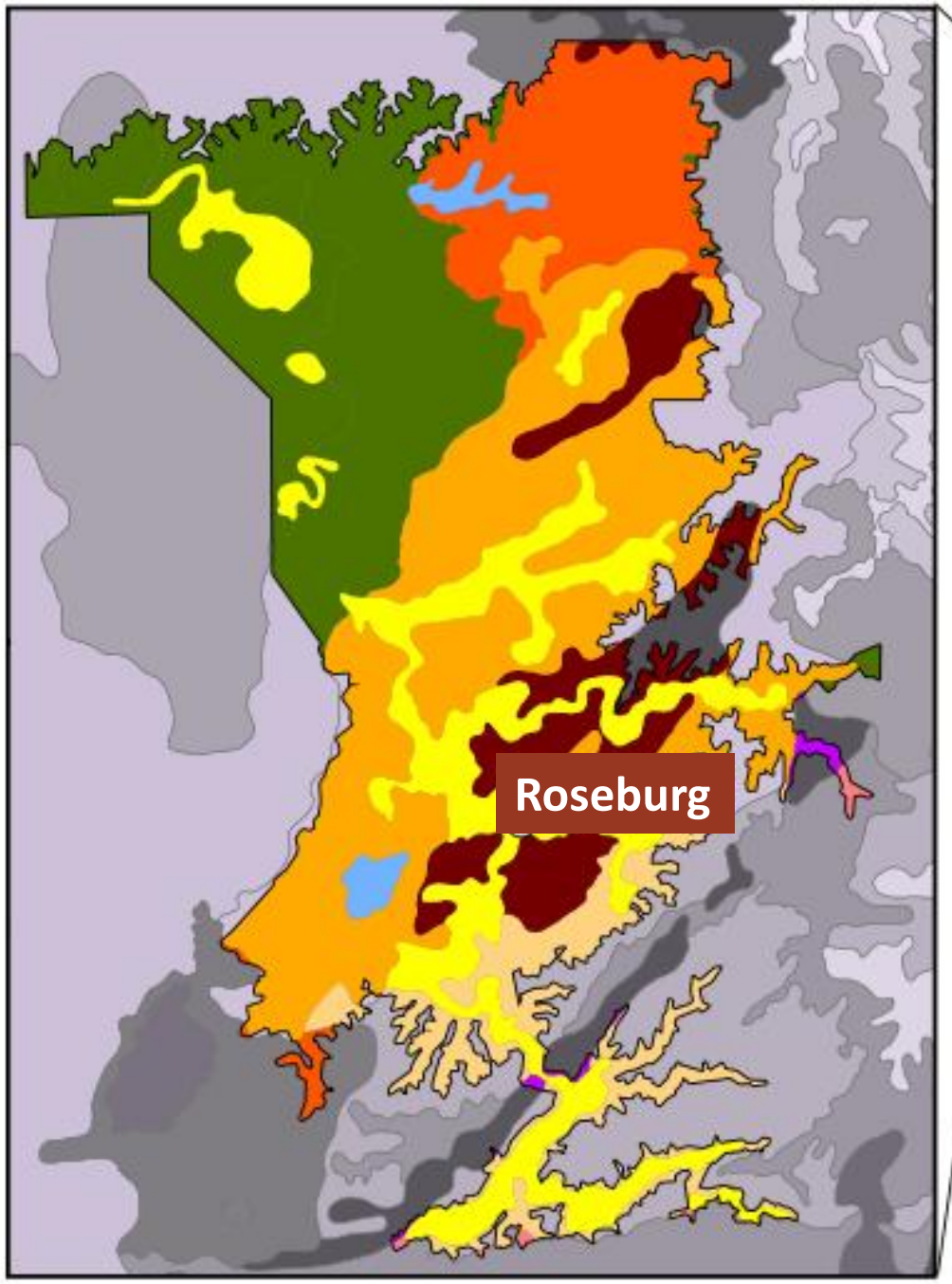


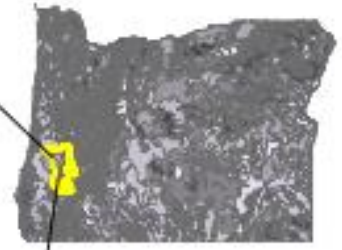
Umpqua Valley Soil Associations





Data Source: Natural Resources Conservation Service;
Everyvine American Viticultural Areas
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984





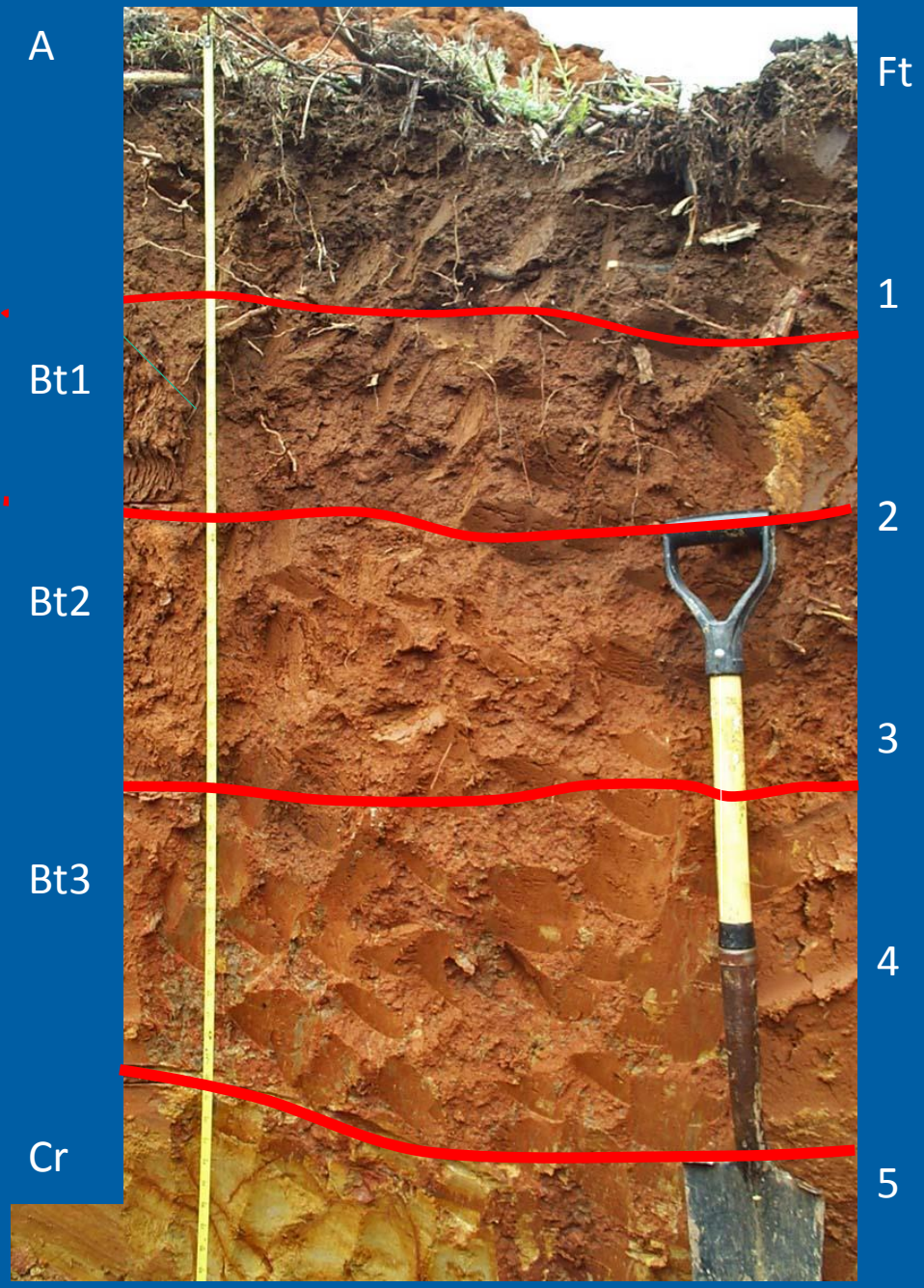
Windygap silty clay loam

Coast Range foothills, hillslopes

Mixed hardwood and conifer vegetation

Windygap silty clay loam

- Well drained
- Moderately high AWHC, moderate vigor potential
- Deep red color indicates old age
- Clayey subsoil over weathered sandstone



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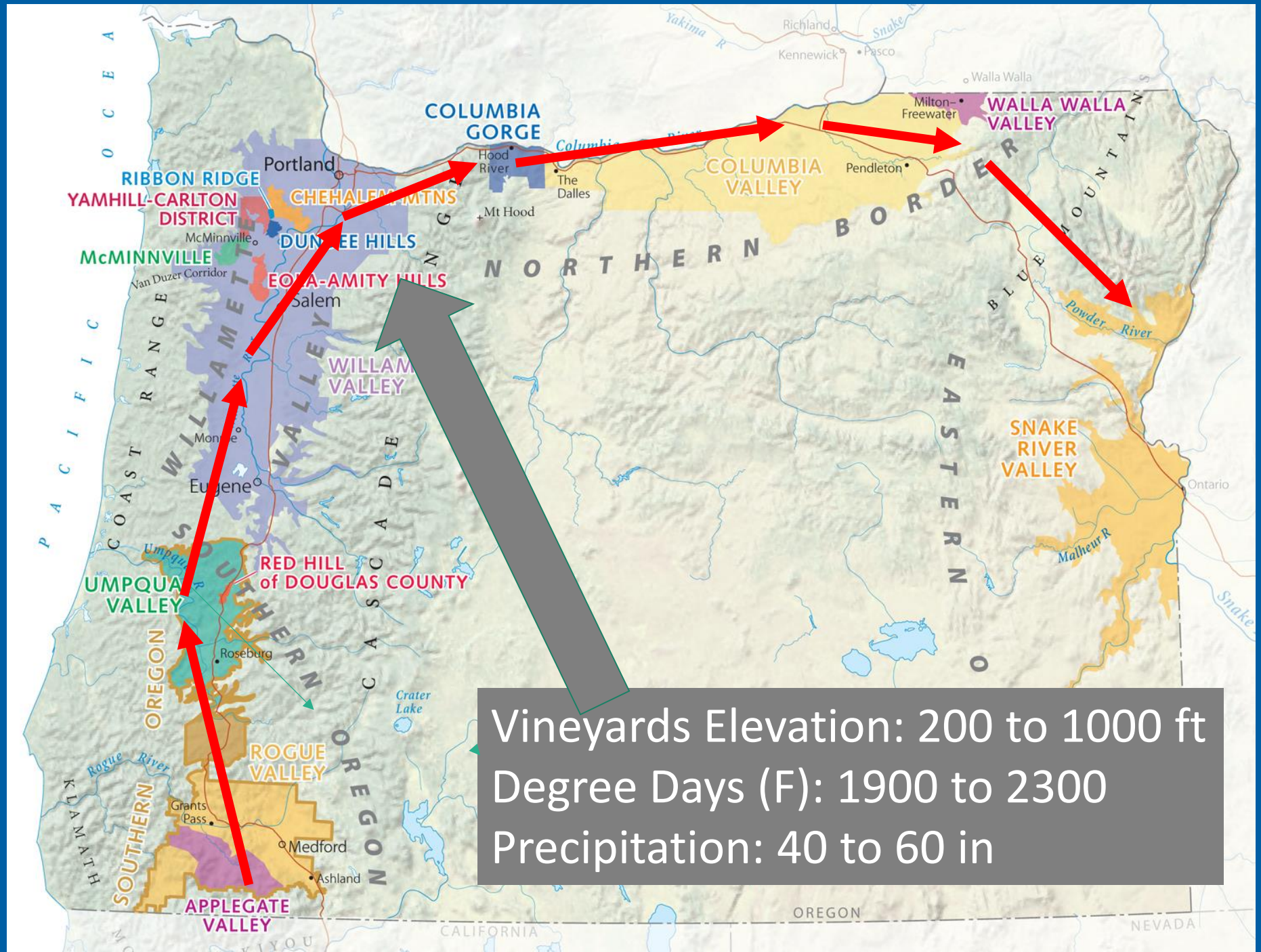


Vineyards Elevation: 200 to 1000 ft
Degree Days (F): 1900 to 2300
Precipitation: 40 to 60 in

Willamette Valley

Willamette Valley Soil Associations

Legend

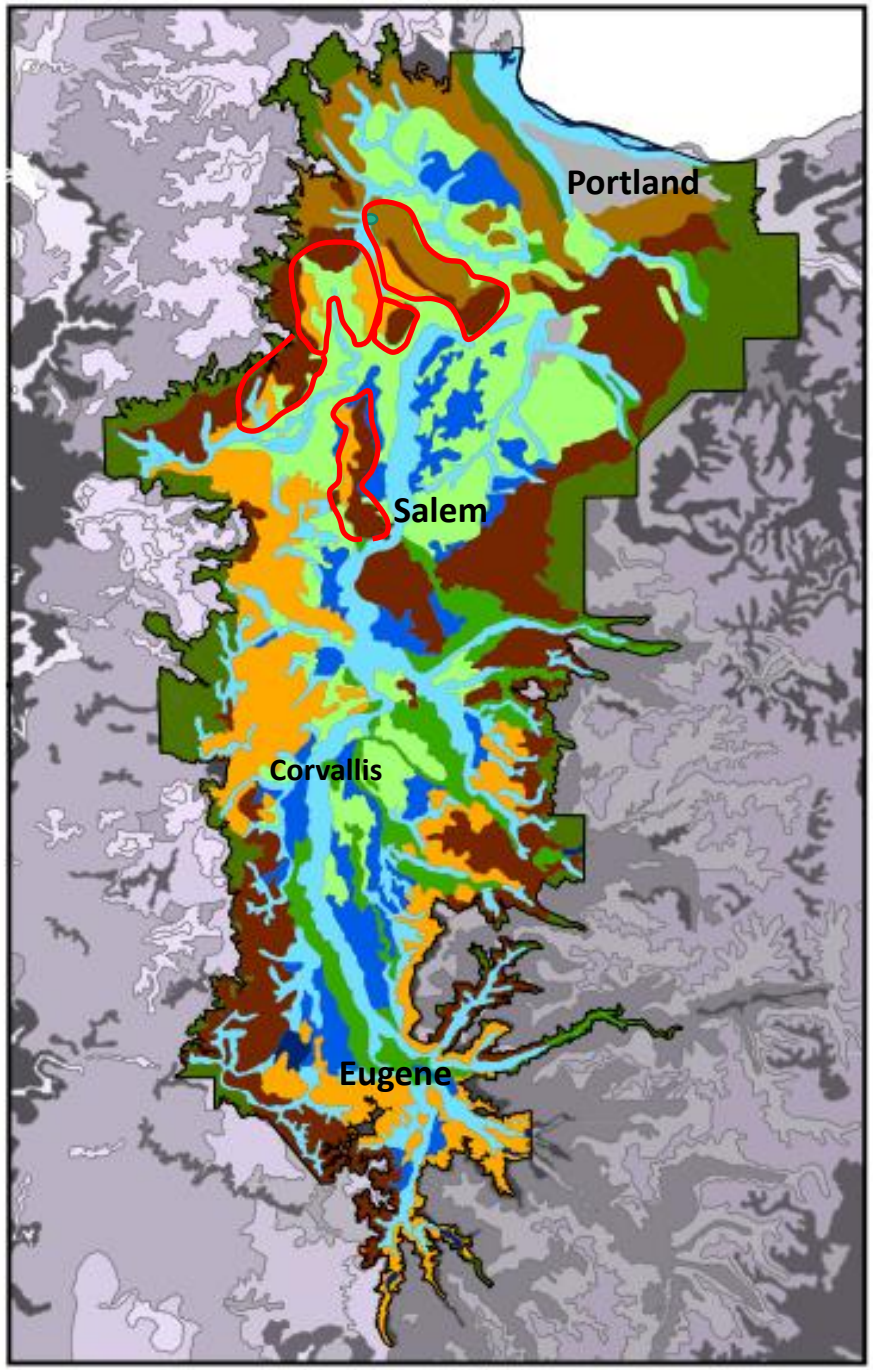
Willamette Valley Soil Series

- Jory, Nekia, Bellpine
- Willakenzie, Goodin, Bellpine
- Laurelwood, Kinton, Cornelius
- Woodburn, Willamette
- Floodplain
- Clayey, Wet Terrace Soils
- Low Terrace
- Cool, Moist Forest Soils

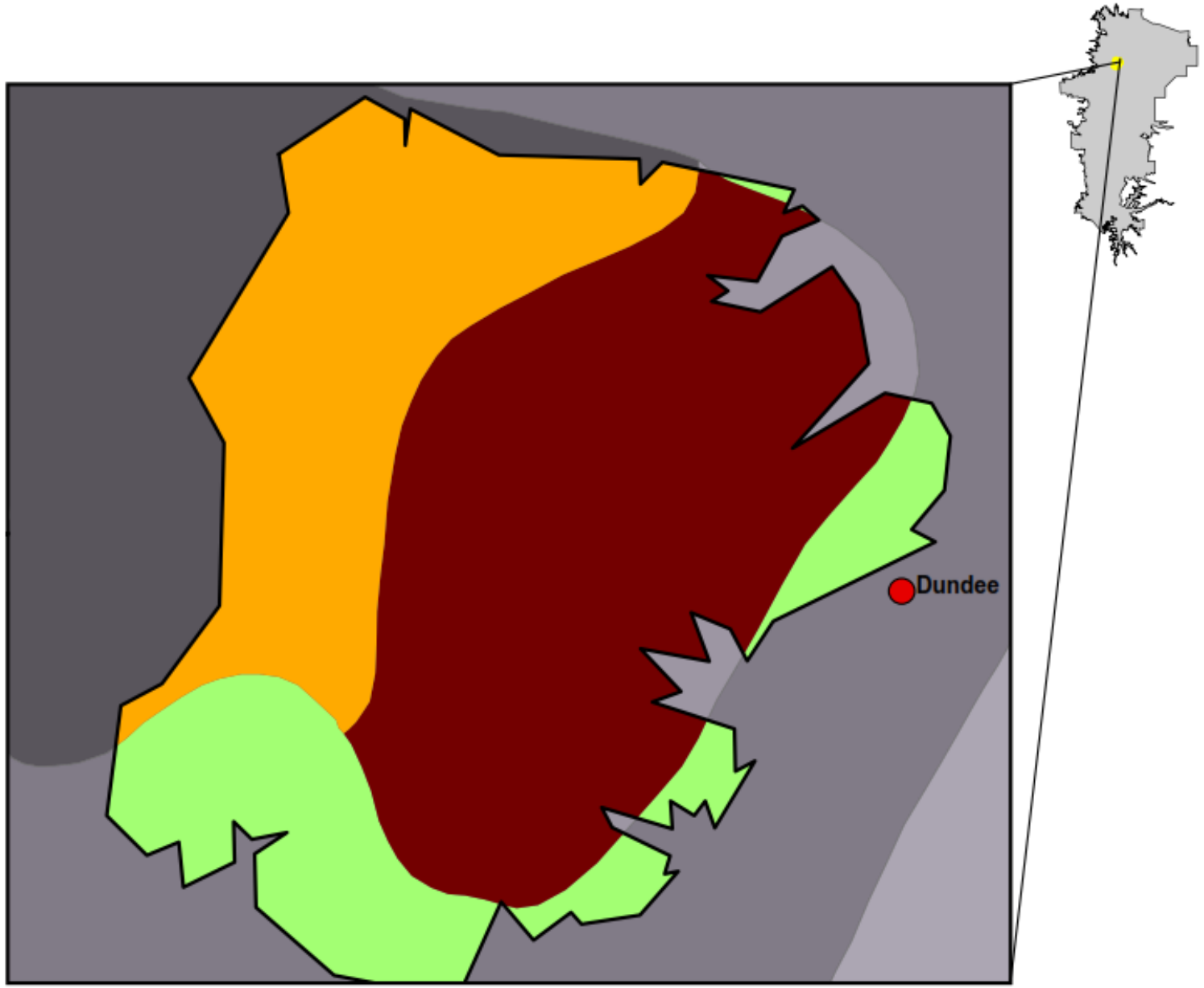
N

0 40 80
Miles

Data Source: Natural Resources Conservation Service;
Everyvine American Viticultural Areas
Projection: WGS 1984



Dundee Hills Soil Associations



Legend

Dundee Hills Soil Series

- Jory, Nekia, Bellpine
- Goodin, Steiwer, Hazelair
- Woodburn, Willamette

N

0 1.5 3

Miles

Data Source: Natural Resources Conservation Service;
Everyvine American Viticultural Areas
Projection: Mercator Auxillary Sphere
Datum: WGS 1984

Dundee Hills Landscape

Dundee Hills Landscape

Basalt flows in quarry

Steepest slopes, North-facing slopes, highest elevations and drainages are forested

Jory silty clay loam

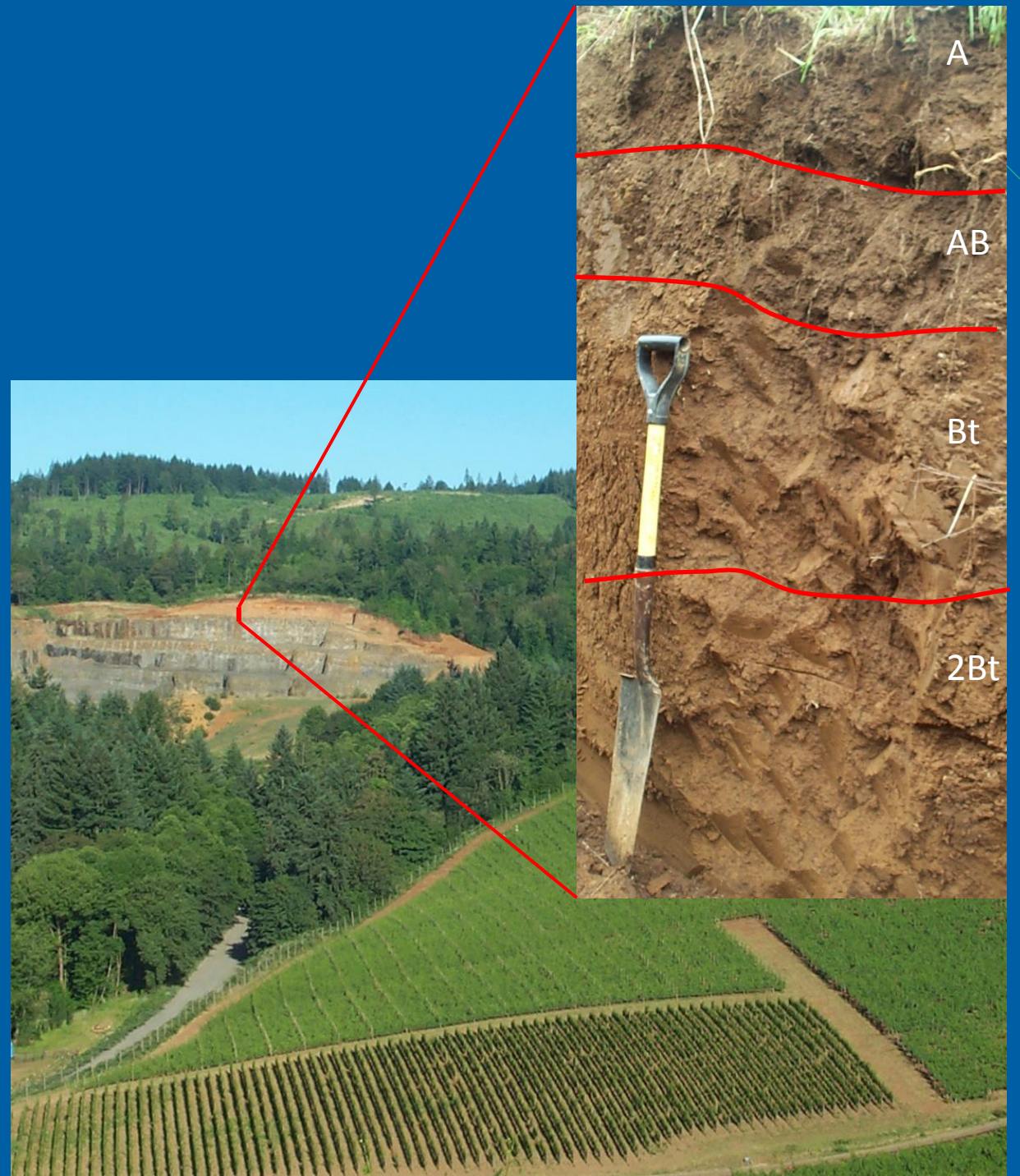
Formed from Volcanic rock

Very Deep, weathered and
well drained

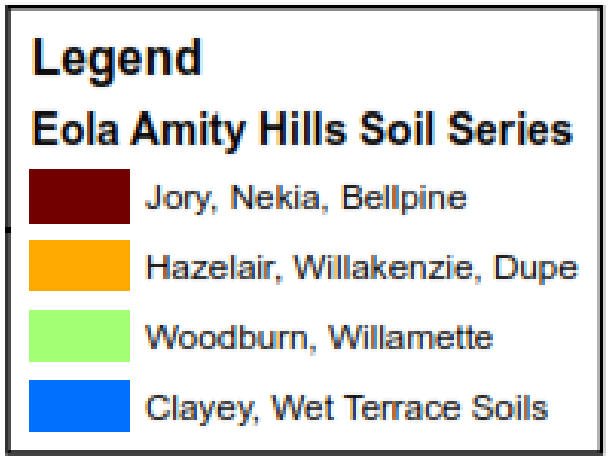
Reddish hues from iron pigments

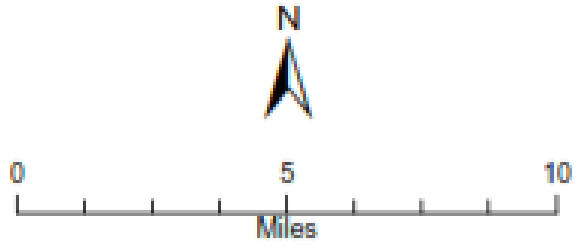
High potential vigor is managed using:

- rootstocks
- competition from cover crops
- canopy management etc.



Eola-Amity Hills Soil Associations





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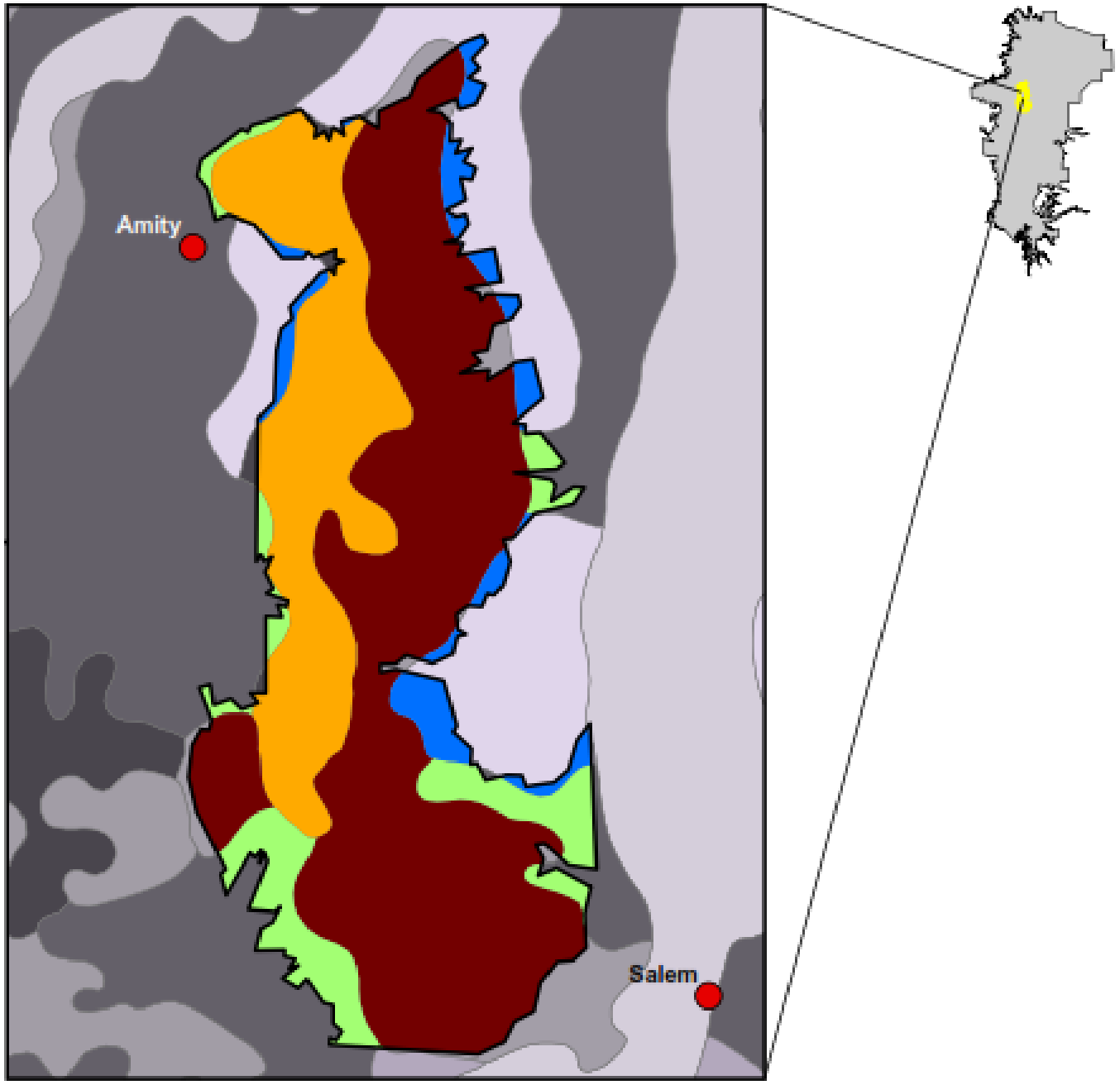
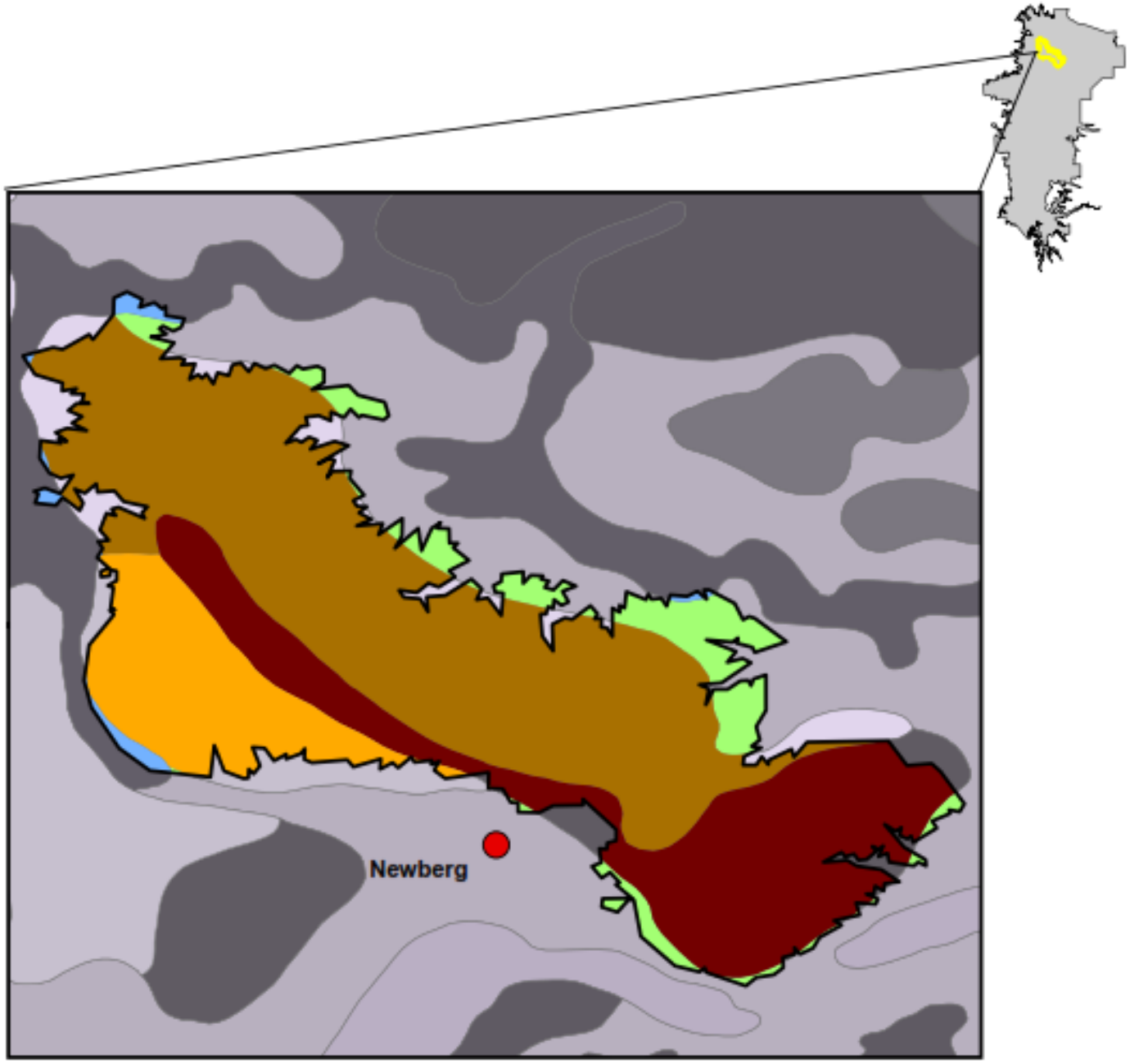


Eola Hills Landscape

Eola Hills volcanic rocks and soils on top, Ritner and Witzel gravelly loams

Chehalem Mountains Soil Associations



Data Source: Natural Resources Conservation Service; Everyvine American Viticultural Areas
Projection: Mercator Auxiliary Sphere
Datum: WGS 1954

Laurelwood silty clay loam

Formed from loess over
older volcanic soils

Laurelwood silty clay loam

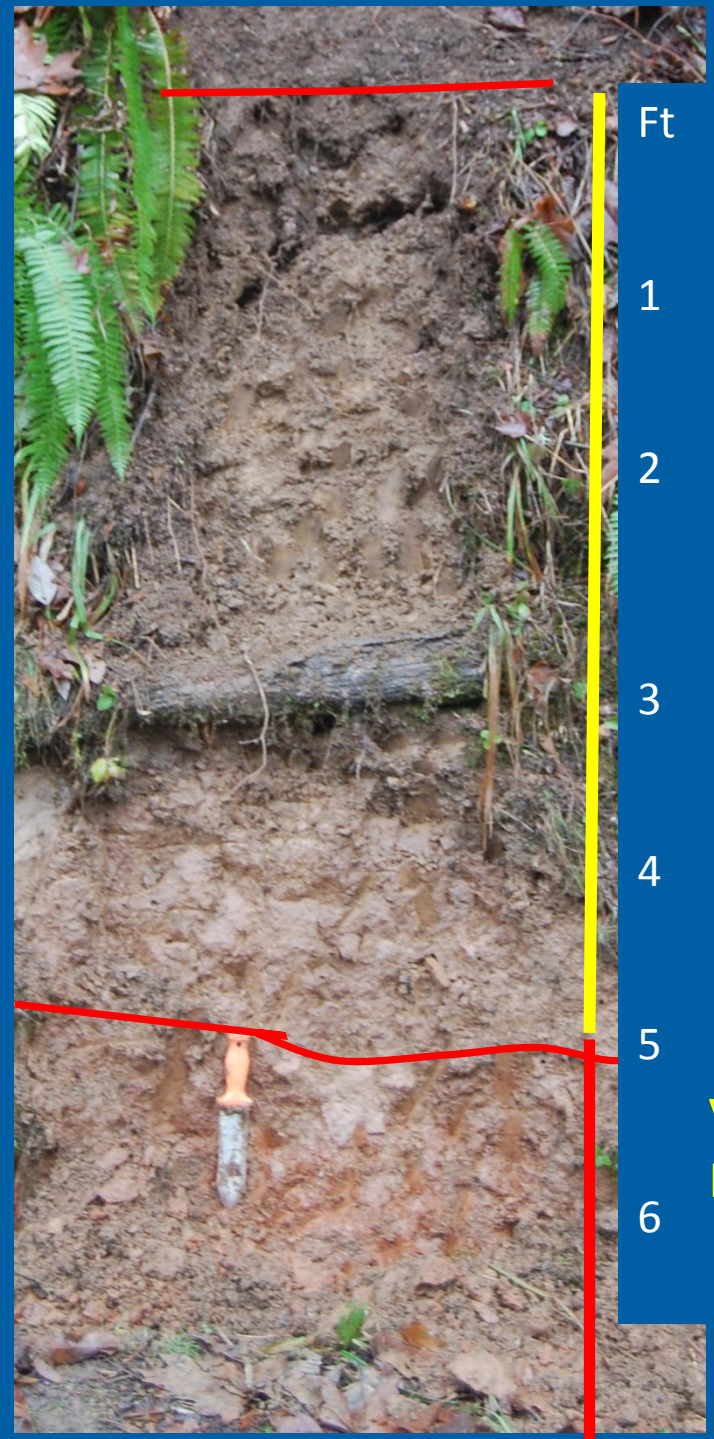
Formed from loess over
older volcanic soils

Well drained

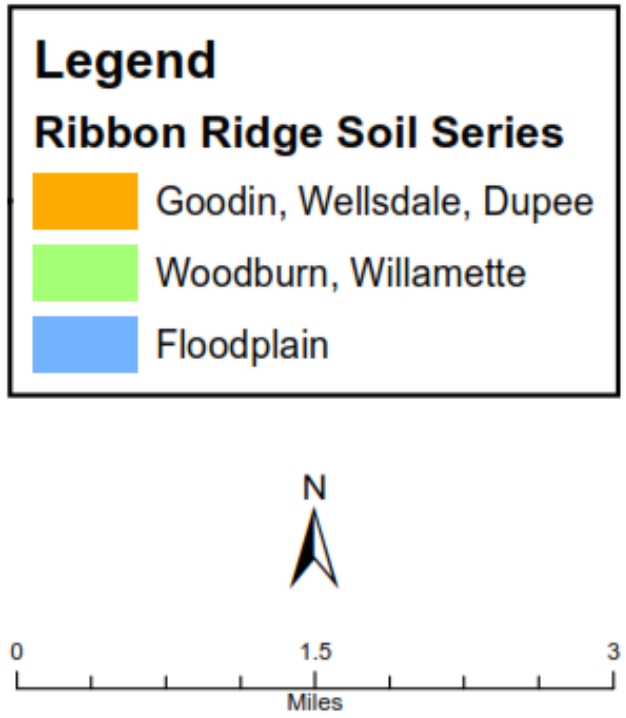
High water holding capacity

Fertile

Associated with several soils with
Fragipan (Hardpan)



Ribbon Ridge Soil Associations



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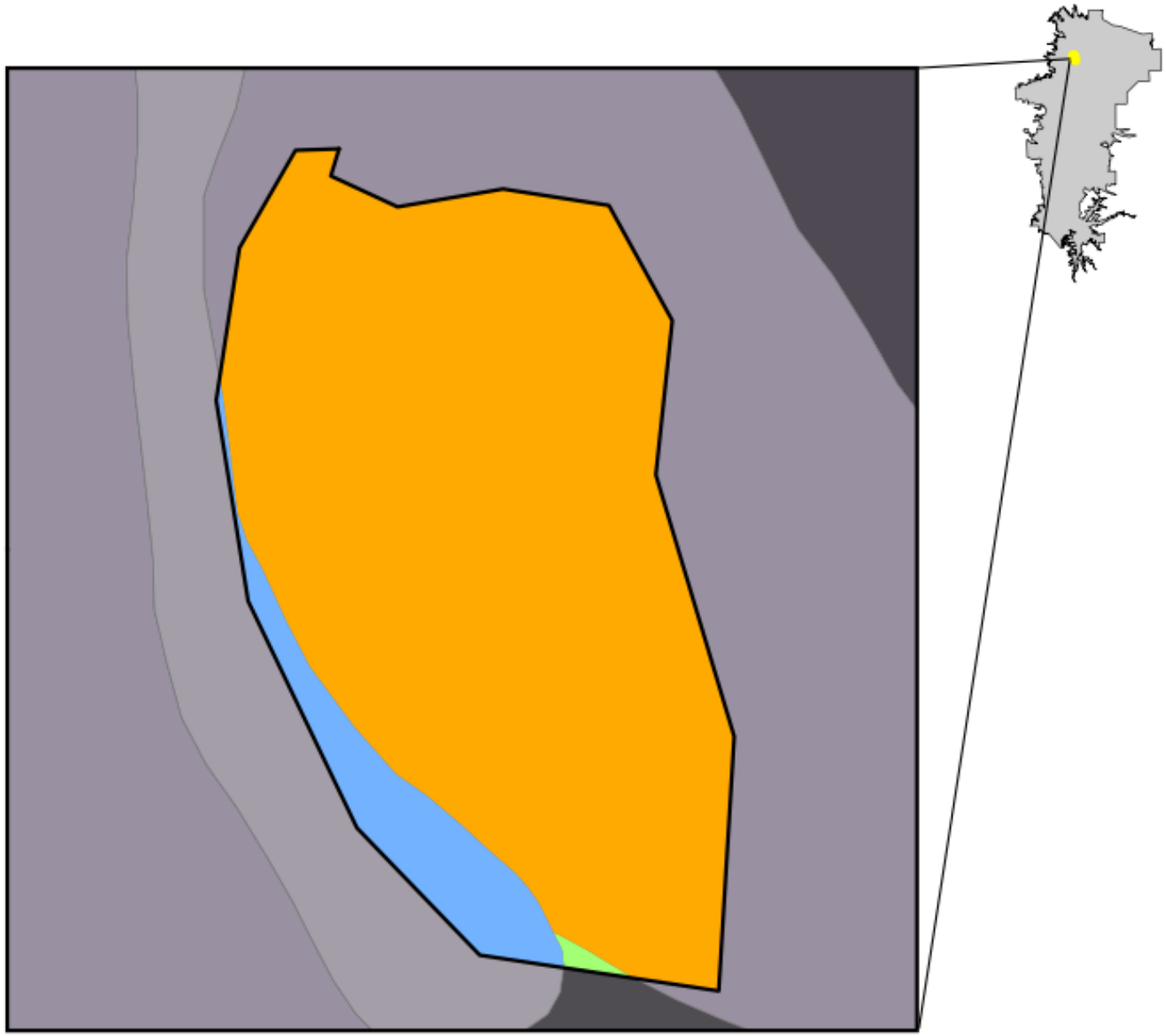

Wellsdale and Dupee Silty clay loams

- Formed sedimentary rock parent material
- Seasonal high water table needs drainage
- Moderately high vigor potential
- Enough water available to dry farm

(Windridge Vineyard- one of the wines in the tasting)

Yamhill Carlton Soil Associations

Legend

Yamhill Carlton Soil Series

- Willakenzie, Goodin, Bellpine, Steiwer
- Jory-Bellpine, Saum
- Woodburn, Willamette
- Laurelwood, Kinton, Cornelius
- Floodplain
- Cool, Moist Forest Soils

N

0 5 10

Miles

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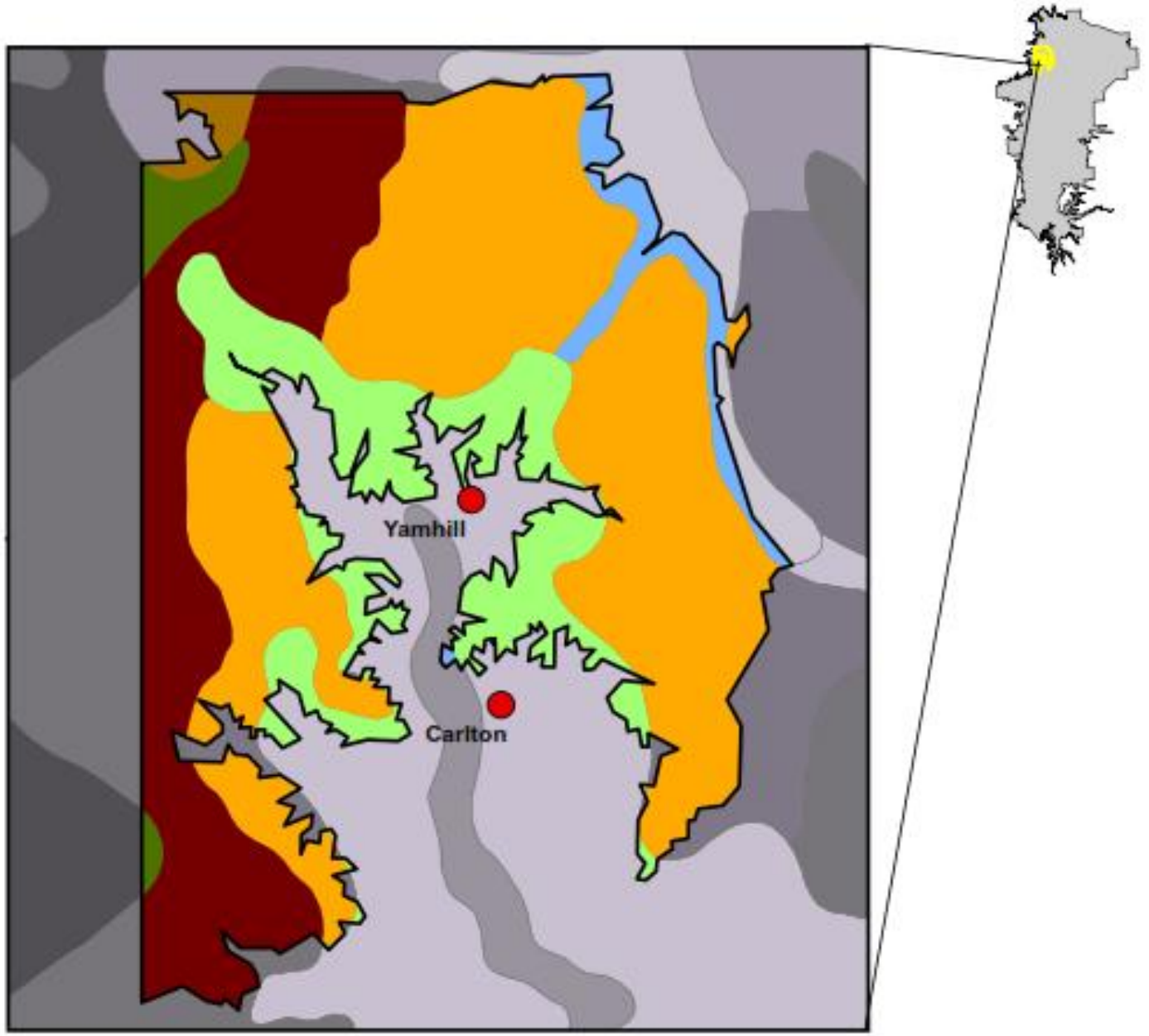
Datum: WGS 1984

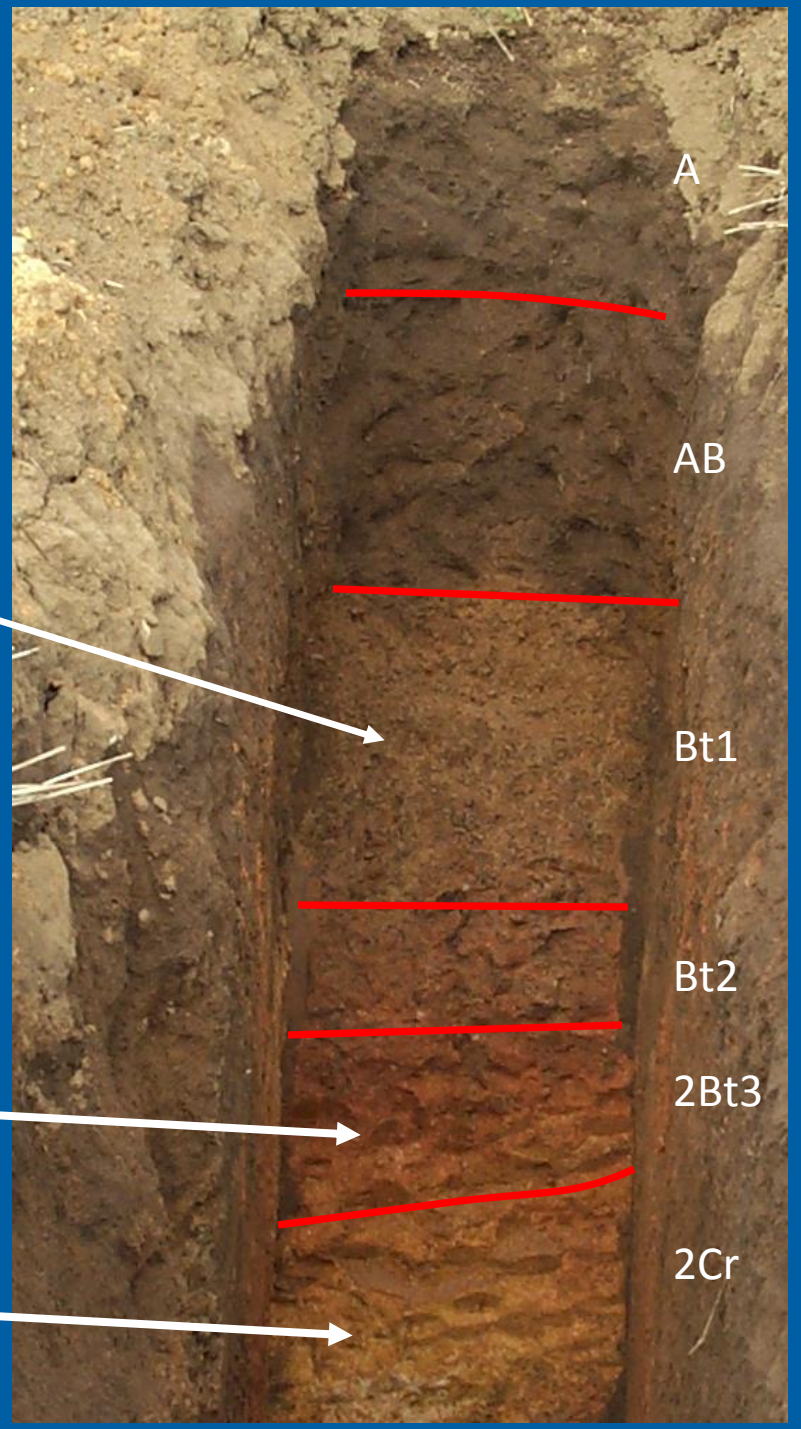


Willakenzie
and
Goodin Silty clay loams

(and Friends)

Willakenzie and Goodin and Friends

Soils formed from silty deposits on paleosol on sedimentary rock parent material.



Chehulpum silt loam

Shallow to soft fractured siltstone

Dark “prairie” surface

Low water holding capacity in upper profile, roots go deep

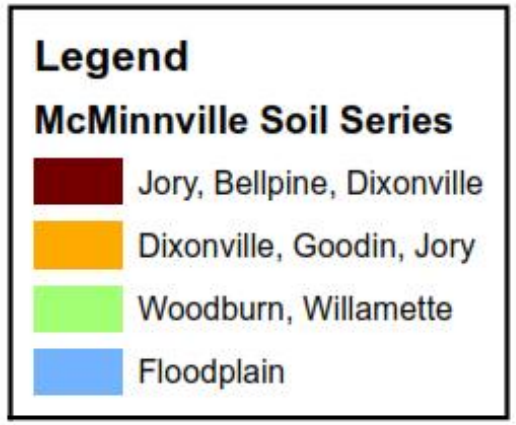
Convex foothills often on nose slope

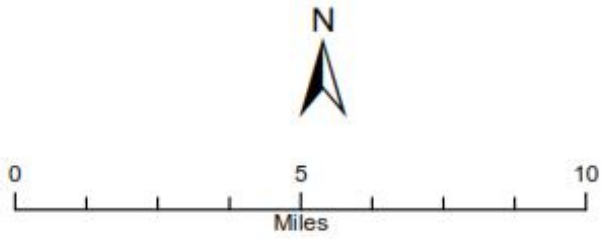
Low vine vigor

High quality wine potential

Oak savannah, poison oak

McMinnville Soil Associations





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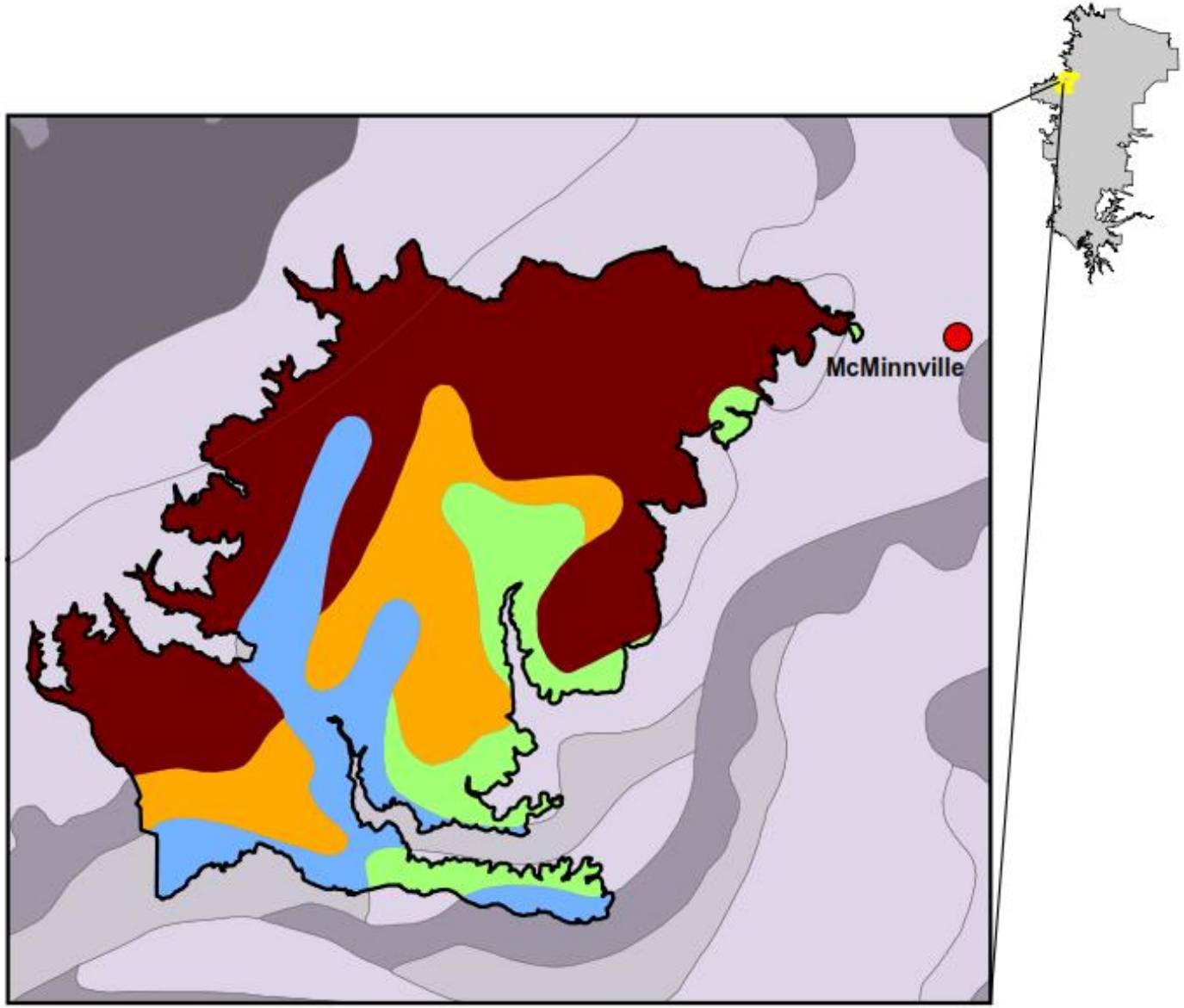
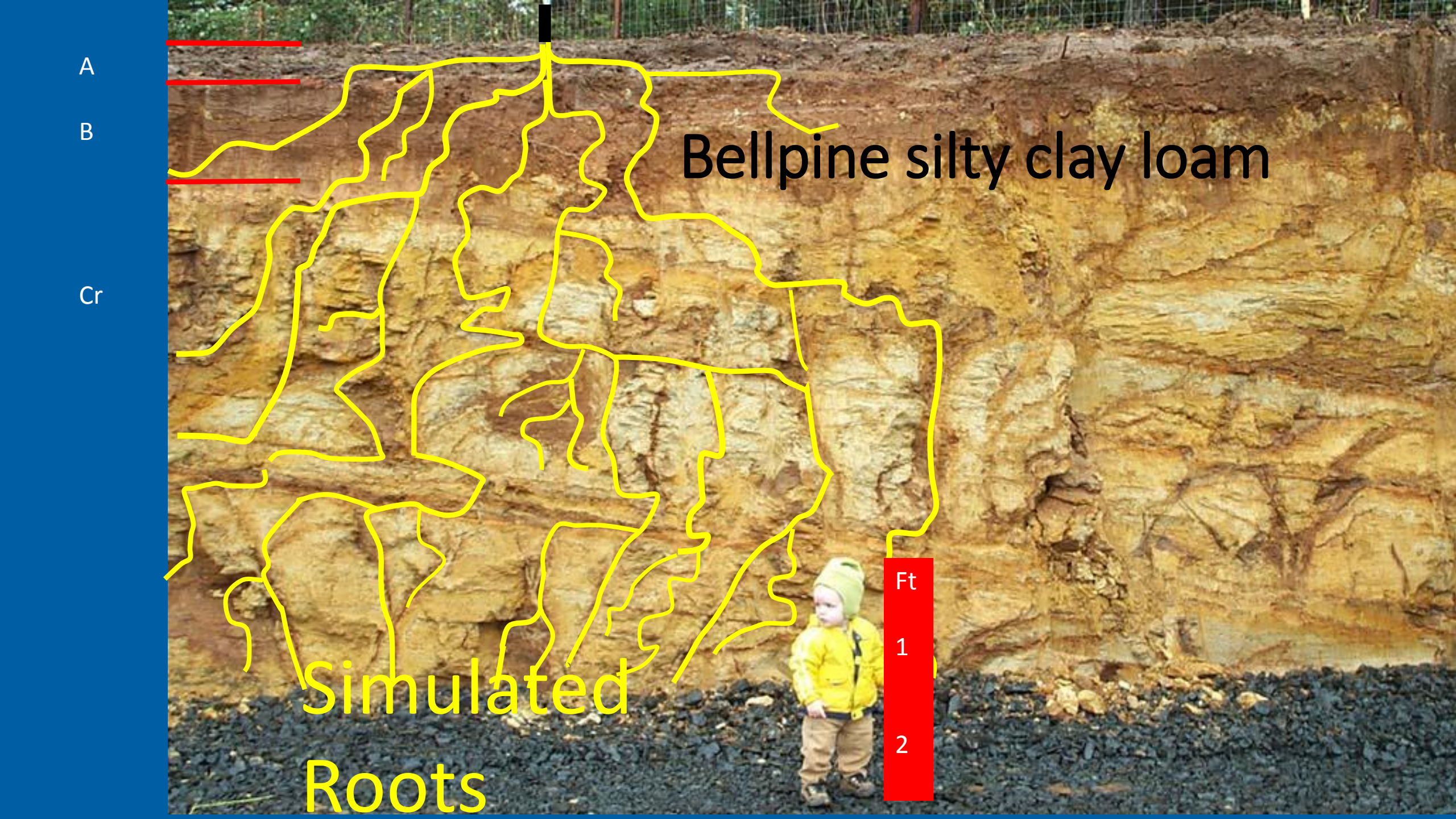


A

B

Cr


A
B
Cr
Bellpine silty clay loam
Simulated Roots
Ft
1
2

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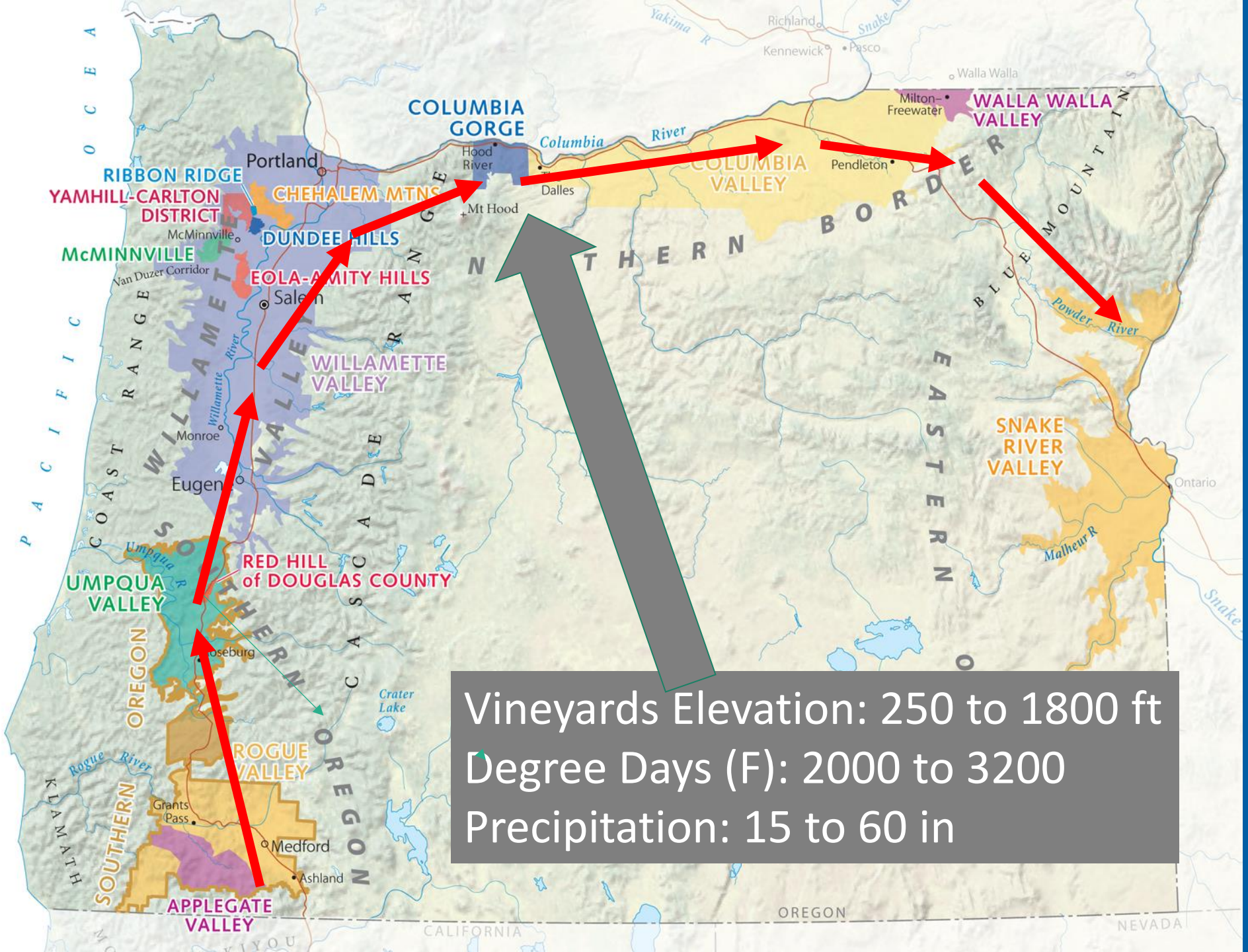
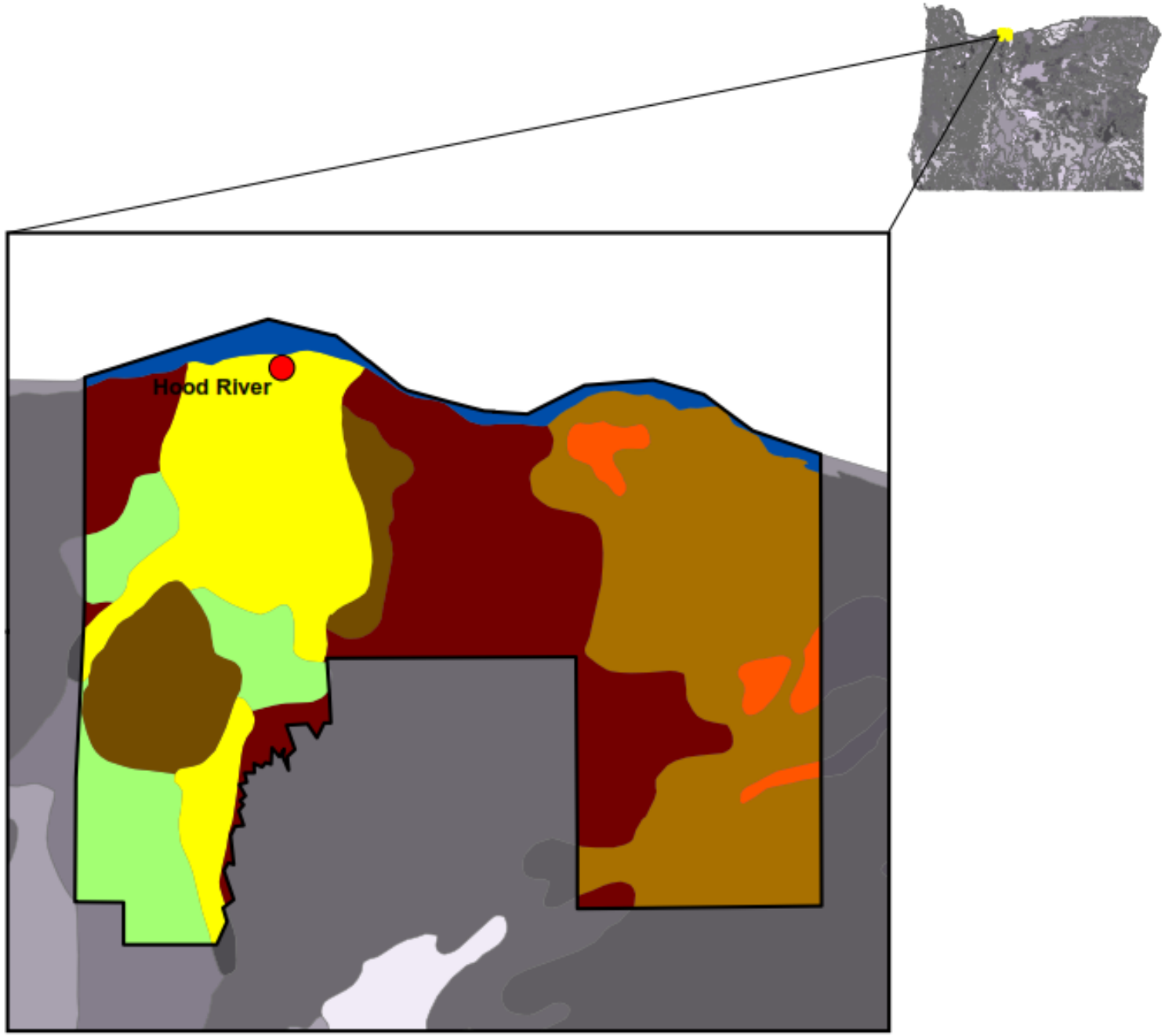
Columbia Gorge



Vineyards Elevation: 250 to 1800 ft
Degree Days (F): 2000 to 3200
Precipitation: 15 to 60 in

Columbia Gorge Soil Associations



Legend

Columbia Gorge Soil Series

- Bins-Bindle
- Wind River-Oak Grove-Hood
- Uplands
- Wyeth-Bodell-Bald
- Parkdale-Dee
- Cherryhill-Chenoweth
- Water

N

0 7.5 15

Miles

Data Source: Natural Resources Conservation Service;
Everyvine American Viticultural Areas
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Columbia River Gorge: Chemewa soils

Andisols that formed from air-fall ash and lapilli from Cascade Volcano

Andisols are soils characterized by……..glass, amorphous colloidal sized particles, high-P retention, low bulk density Thixotropic

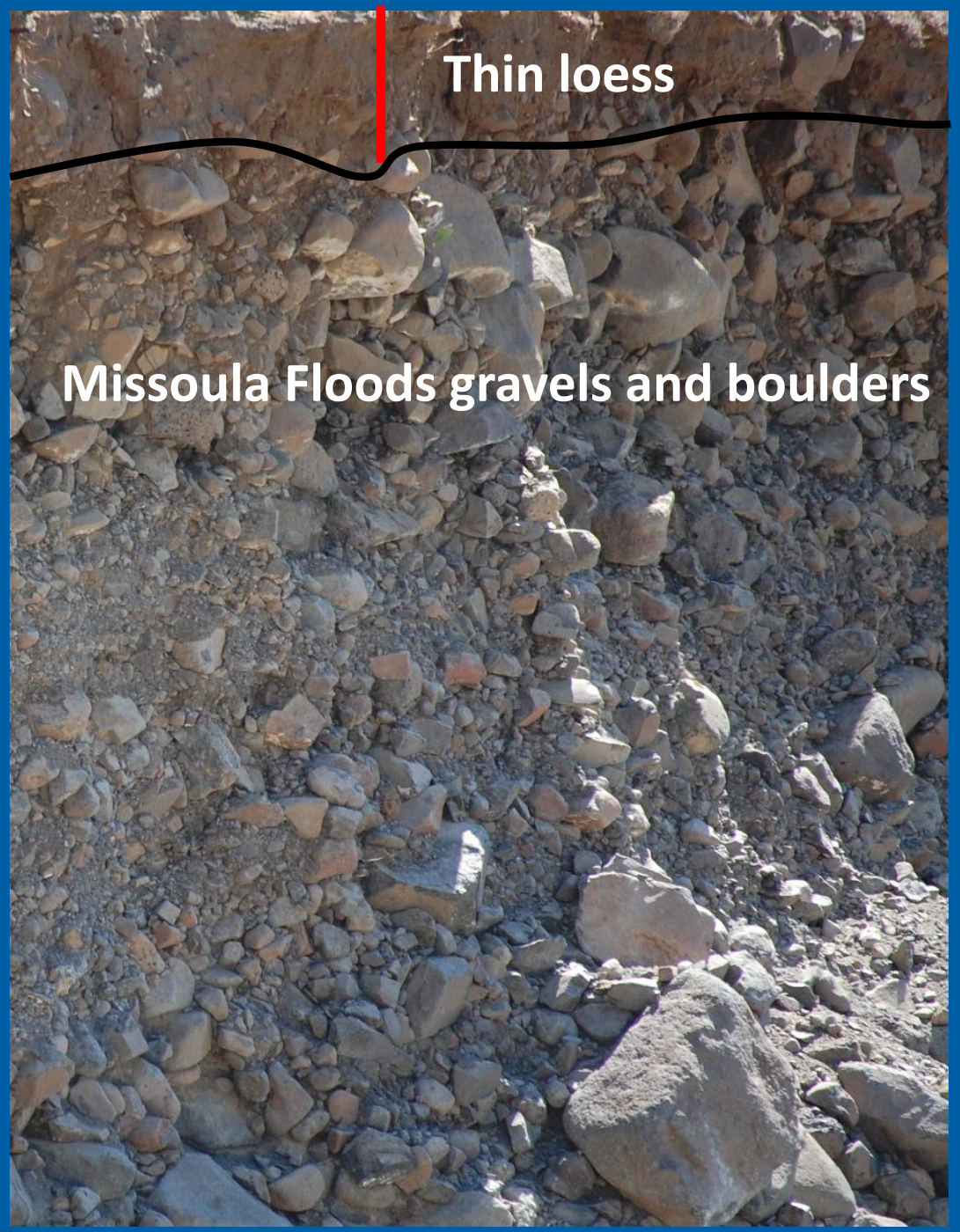
43 inches of precipitation = dry farmed

2250 Degree days (F)

White wines, and pinot noir on Scott Henry trellis

Location: Celilo vineyards on Washington side of the Gorge across from Hood River.

Lapilli found in “shotty loams” are little balls of semi-molten lava ejected in a volcanic eruption that land while still partially molten.



Columbia River Gorge, Columbia Valley Dallesport soil

Formed in thin loess deposits over coarse textured alluvium on terraces formed in the the Missoula Floods

Good drainage, deep rooting because of great depth of sand to boulder sized particles

Irrigation needed- 10 to 15 inches of precipitation and low available water holding capacity.

Good airflow from bench positions

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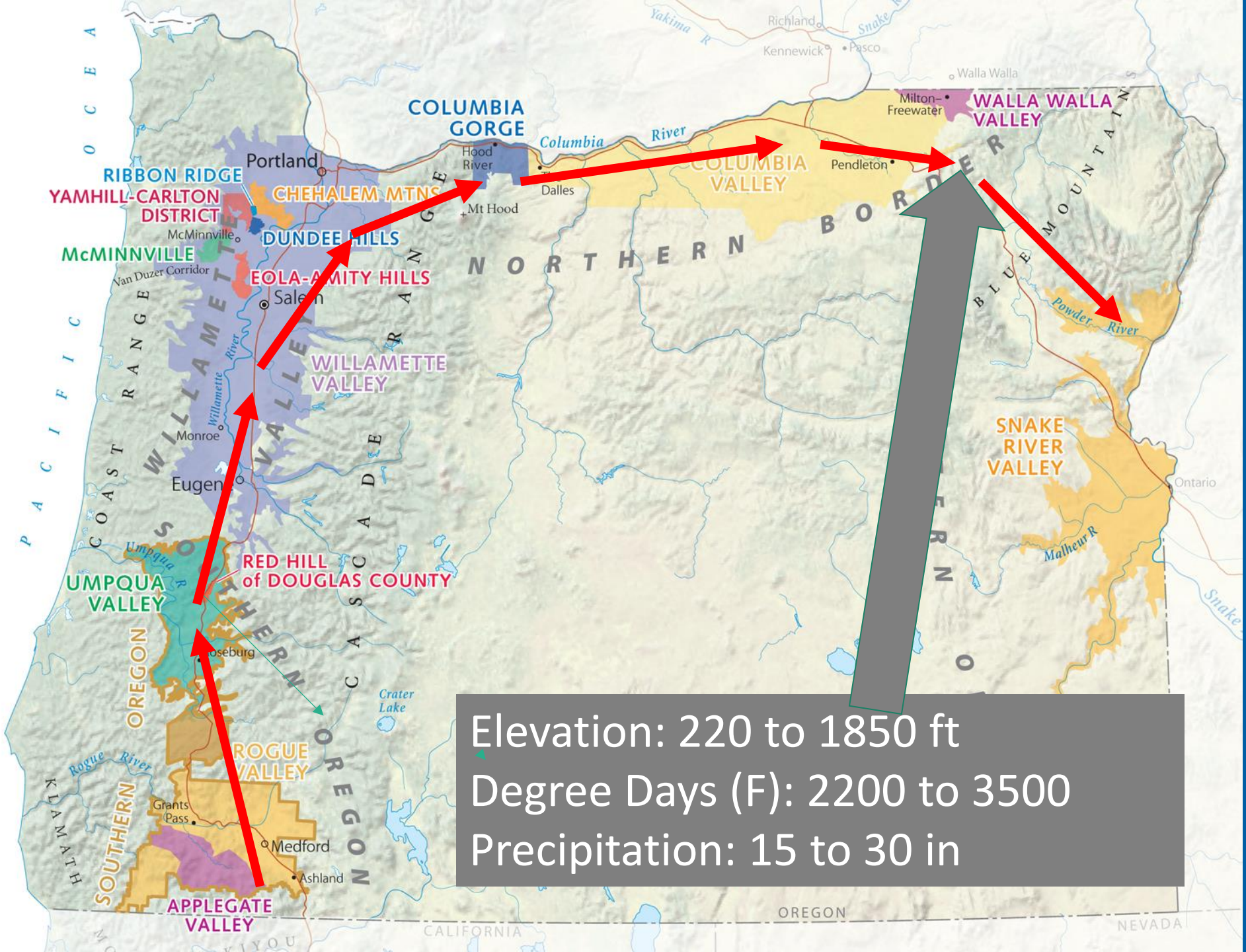
Columbia Valley

Walla Walla Valley
Sub AVA



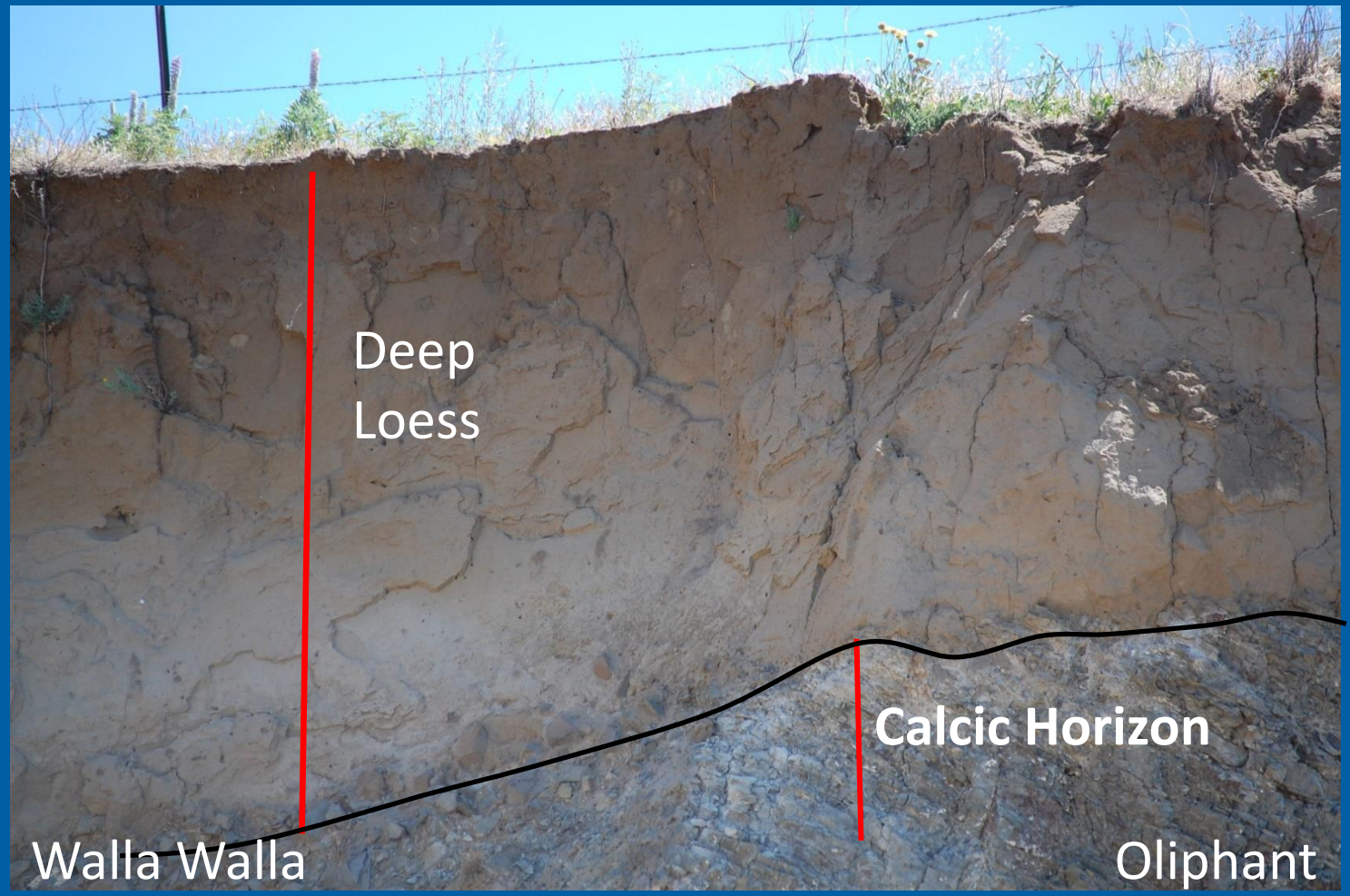
Columbia River Valley

Columbia River Valley Landscape

Columbia River Valley Landscape

Walla Walla and Oliphant silt loams

Walla Walla and Oliphant silt loams



Formed in deep loess with calcic horizon below 40 inches.

Darker surface is from organic matter

Weak profile development

Low rainfall and
high evapotranspiration (ET)
slow leaching.

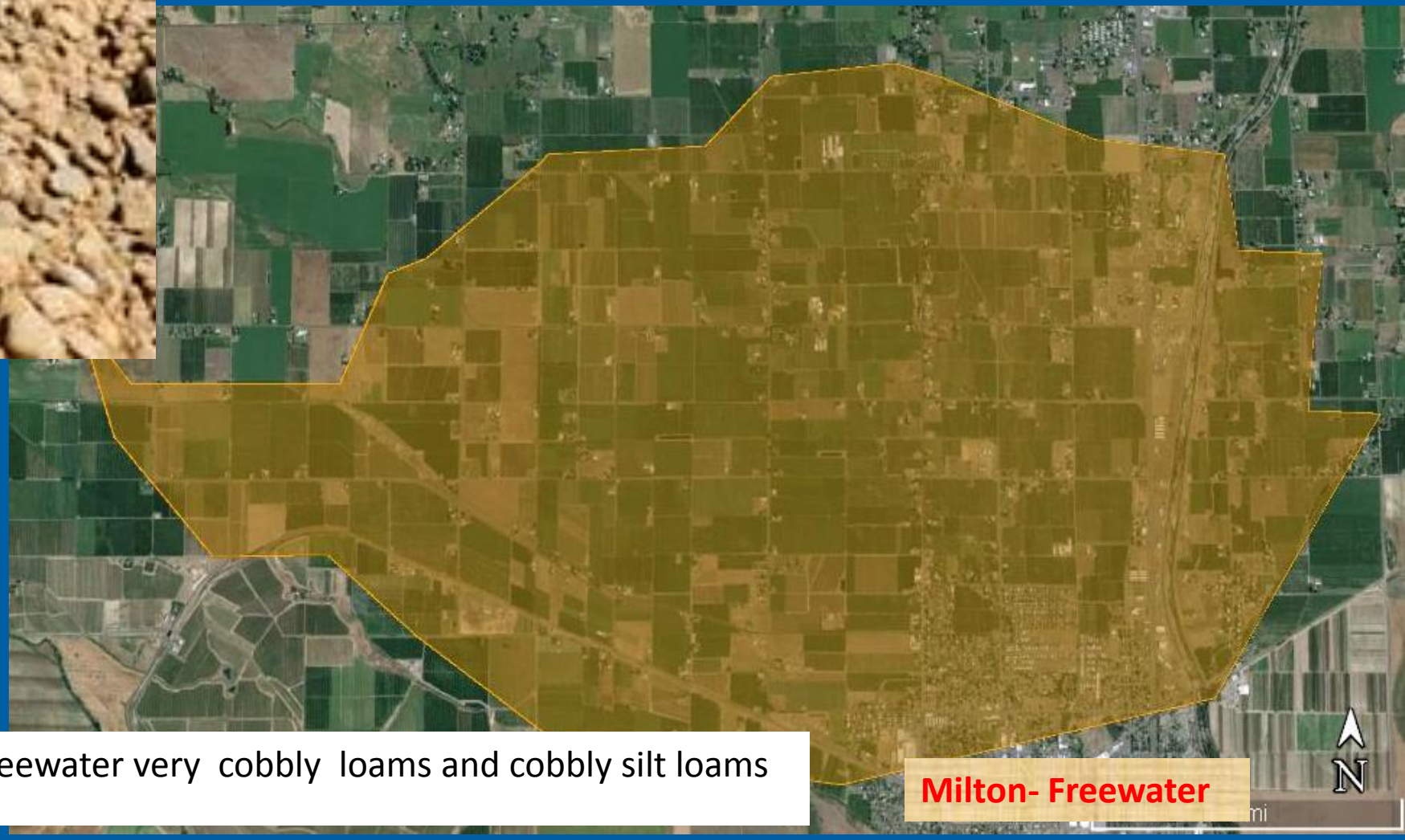
High available water holding capacity
Fertile soils

Underlying gravel and basalt bedrock with lime accumulations in lower part of subsoil and in rock fissures.

The Rocks District of Milton-Freewater

Distinguished by the soil, 96% of the District has Freewater soils.

These are very deep gravel and cobble deposits.



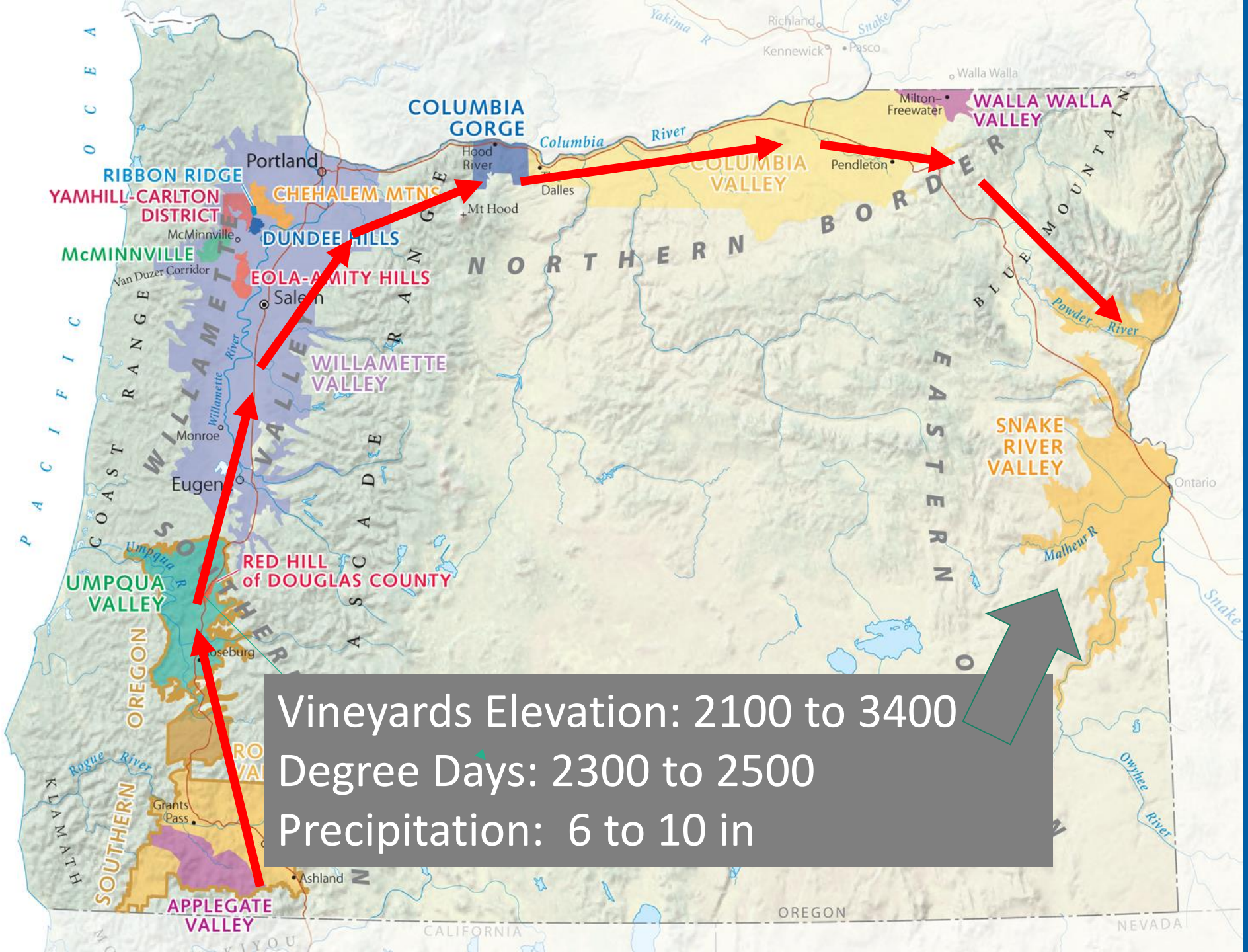
Dry climate presents potential for regulated deficit irrigation (RDI)

High irrigation

vs

Low irrigation

Photo: Wample and Smithyman



Vineyards Elevation: 2100 to 3400

Degree Days: 2300 to 2500

Precipitation: 6 to 10 in

ARC
OF OREGON
WINESOILS

Snake River Valley

Snake River Valley Landscape

Photo of Mother Lode Vineyards near Baker City Oregon, with Wallowa Mountains in background

Snake River Valley AVA
The New Frontier “Go East Young Person!”

Large AVA over 8000 square miles

Follows the drainage of the Snake River and Tributaries.

Relatively Flat Basin surrounded by high mountains.

Soils are variable but many derived from lake sediments from Ancient Lake Idaho.

This AVA has the highest elevation vineyards in Oregon


The End