Terroir Differentiation of Pinot Noir Vineyards in the Northern Willamette Valley, Oregon - A Soil Analysis

Kathryn Nora Barnard and Scott F. Burns
Portland State University

Association of Environmental & Engineering Geologists
55th Annual Meeting
Salt Lake City, Utah
September 21, 2012

Portland State UNIVERSITY

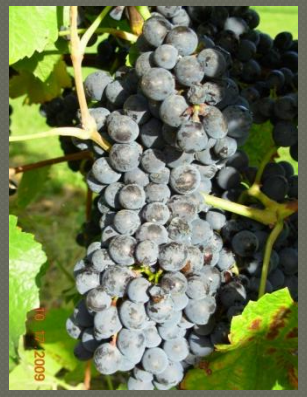
Outline

- Terroir
- Willamette Valley American Viticultural Area (AVA) and sub-AVAs
- Debate
- Field work sites during Summer 2011/2012
- Results of field site investigation and grain size analysis
- Conclusions so far…
- Future steps

Terroir

"The taste of the place"

- Geology
- Soil
- Climate
- Varietal
- Viticulture
- Viniculture



By Ray Wells, Open File Report 2006-1069

New Oregon AVAs

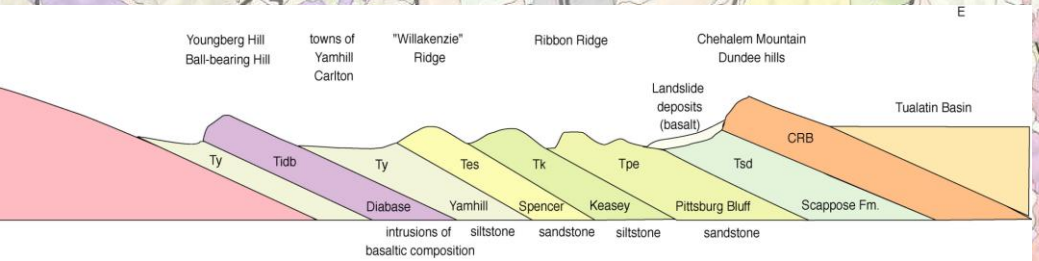
Yamhill-Carlton District Viticultural Area

Ribbon Ridge Viticultural Area

Chehalem Mountains Viticultural Area

Newberg

Dundee Hills Viticultural Area

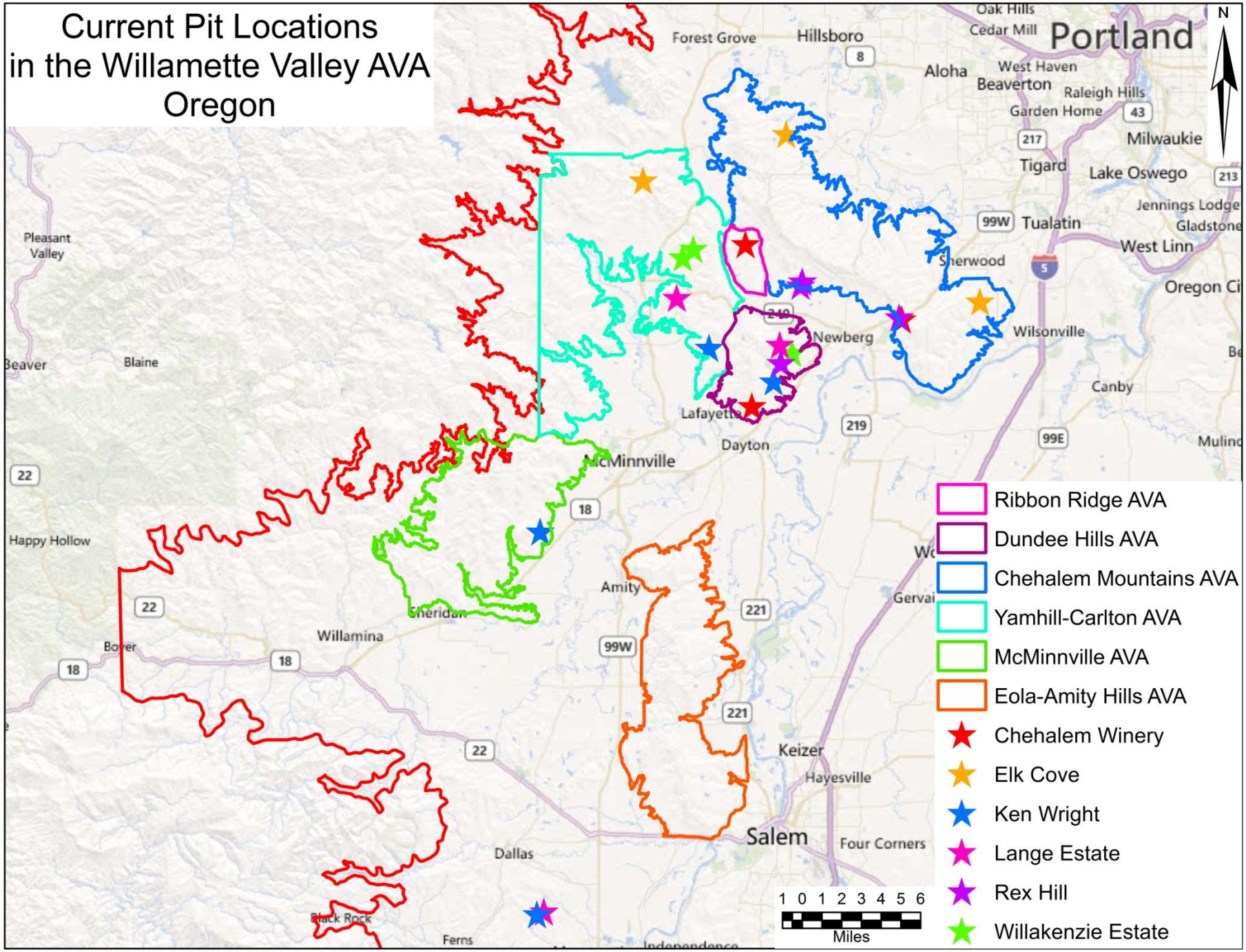


The Debate

- What soil type produces the “best” Pinot Noir?
  - Jory – wine is *generally* lighter in color and red currants, Bing cherry, raspberry and strawberry flavors dominate
  - Willakenzie – darker color and tastes like dark cherries and blackberries
  - Laurelwood – light color with earth and strong cherry flavors
  - A few other soils are producing excellent wine too!

The Willamette Valley

- Natural laboratory and experiment
  - Winemakers purchased land on each soil type
  - Vineyard and winemaking techniques constant
  - Varietal – Pinot Noir
  - Xeric moisture regime


Current Pit Locations
in the Willamette Valley AVA
Oregon
N
Portland
Forest Grove
Hillsboro
Oak Hills
Cedar Mill
Aloha
West Haven
Beaverton
Raleigh Hills
Garden Home
Milwaukie
Tigard
Lake Oswego
Jennings Lodge
Gladstone
West Linn
Tualatin
Sherwood
Oregon Ci
Wilsonville
Newberg
Canby
Dayton
Lafayette
McMinnville
Pleasant Valley
Beaver
Blaine
Happy Hollow
Amity
Willamina
Sheridan
Bower
Keizer
Hayesville
Salem
Four Corners
Dallas
Black Rock
Ferns
Gervai
1 0 1 2 3 4 5 6
Miles
Ribbon Ridge AVA
Dundee Hills AVA
Chehalem Mountains AVA
Yamhill-Carlton AVA
McMinnville AVA
Eola-Amity Hills AVA
Chehalem Winery
Elk Cove
Ken Wright
Lange Estate
Rex Hill
Willakenzie Estate

Methods

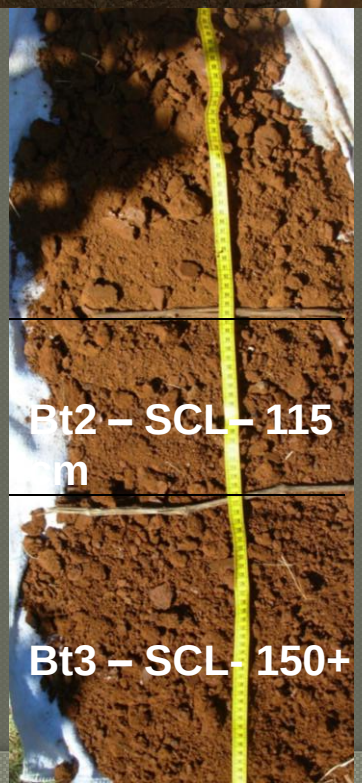
Results

- Jory
  - Primarily dark red with clay loam Bt horizons
  - Beautiful clay films on ped faces
  - 28% to 41% average clay, Increasing with depth
  - Basalt bedrock or extremely weathered basalt residuum
- Willakenzie
  - Yellowish brown silt loam with sandy clay loam Bt horizons
  - 17% to 39% average clay, increasing with depth
  - Sandstone is deep and still moist late in season
- Laurelwood
  - Many concretions (pisolites) making silt loam into sandy loam in A horizon
  - Brown clay loam Bt horizons with clay films
  - Loess varies in thickness, basalt beneath
- Other soils
  - Some basalt may be older than the Columbia River Basalts
  - Landslide deposits have Btg and lots of gravel

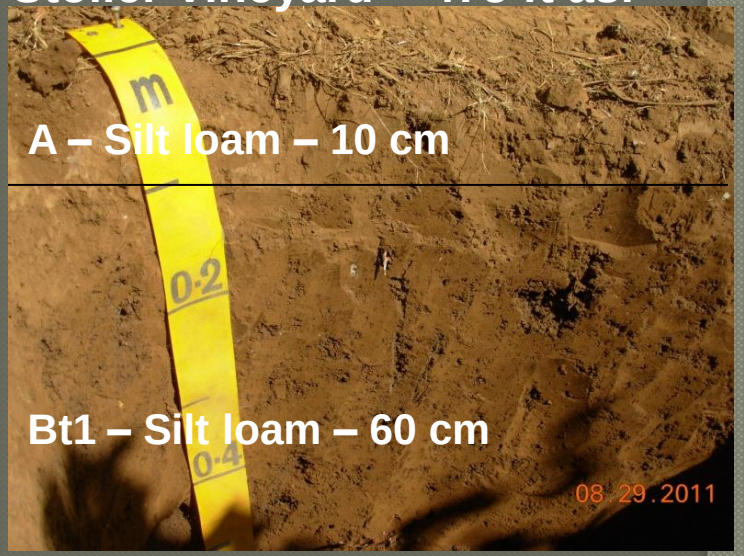
Jory

- Xeric Palehumult (CL)
  - Chehalem Winery Stoller Vineyard
  - Willakenzie Estate Jory Hills
  - Elk Cove Clay Court
  - Rex Hill Sims Block 2
  - Lange Estate Mia North
  - Ken Wright Nysa Midblock

Clay Court – 611 ft asl



Stoller Vineyard – 475 ft asl



Bt2 – Clay loam – 100 cm

Bt3 – Sandy clay loam – 135 cm

Jory Parent Material

- Columbia River Basalts (~15 Ma)
- Highly weathered
- Sometimes vineyards identify it as sandstone

Willakenzie

- Ultic Haploxeralf (CL)
  - Chehalem Winery Ribbon Ridge
  - Willakenzie Estate Alliette Block
  - Elk Cove Roosevelt Vineyard
  - Lange Estate Yamhill Vineyard
  - Ken Wright Abbot Claim
  - Lange Freedom Hill (Bellpine)
  - Ken Wright Freedom Hill (Bellpine)

Roosevelt– 623 ft asl

Alliette– 604 ft asl

Willakenzie Parent Material

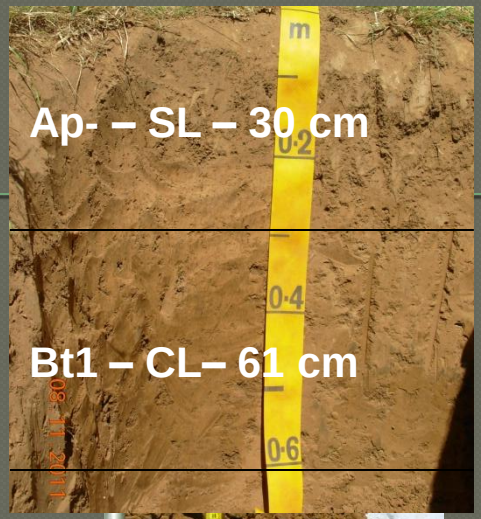
- Spencer or Pittsburg Bluff sandstones (~30 Ma)
- Keasey Siltstone?

Laurelwood

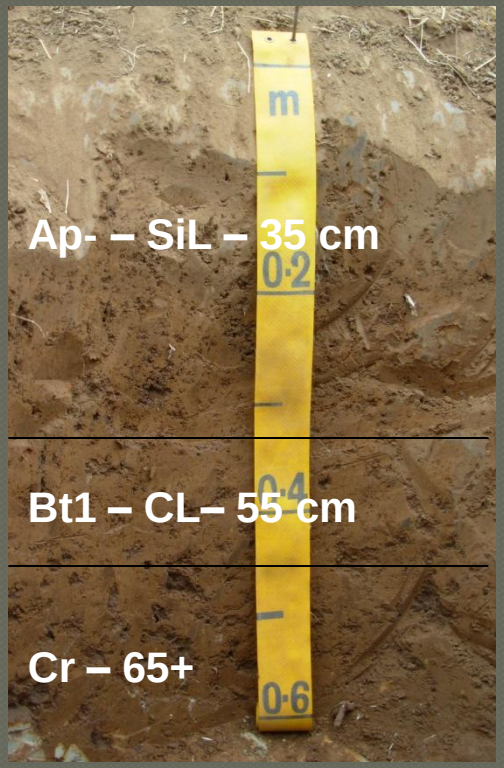
- Ultic Haploxeralf (CL/ML)
  - Chehalem Corral Creek
  - Elk Cove Five Mountain
  - Rex Hill Block 12
- 15 ka Missoula Flood loess on 15 Ma Columbia River Basalts

Pisolites

Five Mountain – 362 ft asl



Corral Creek– 373 ft asl



Other Soils

- Willakenzie Terre Basses
- Ken Wright Martha Block (40 Ma or 50 Ma basalts?)
- Rex Hill Jacob Hart Block 1 & 5 (Ancient landslide deposit on Scappoose Fm?)

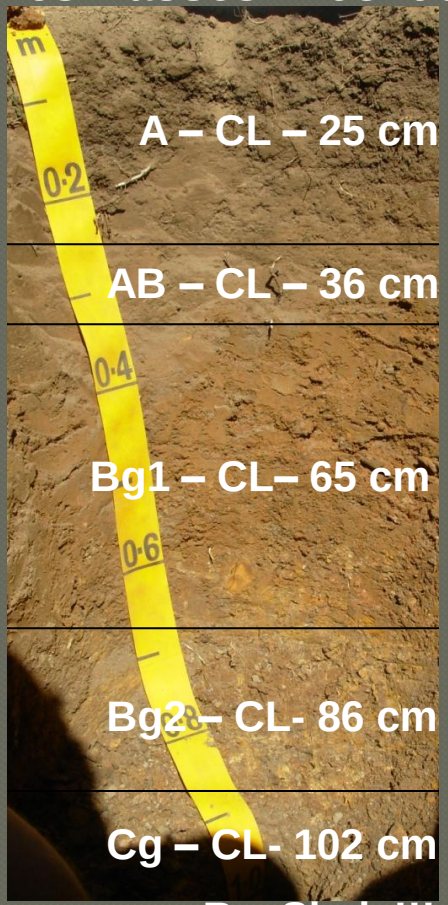
Martha Block– 669 ft asl

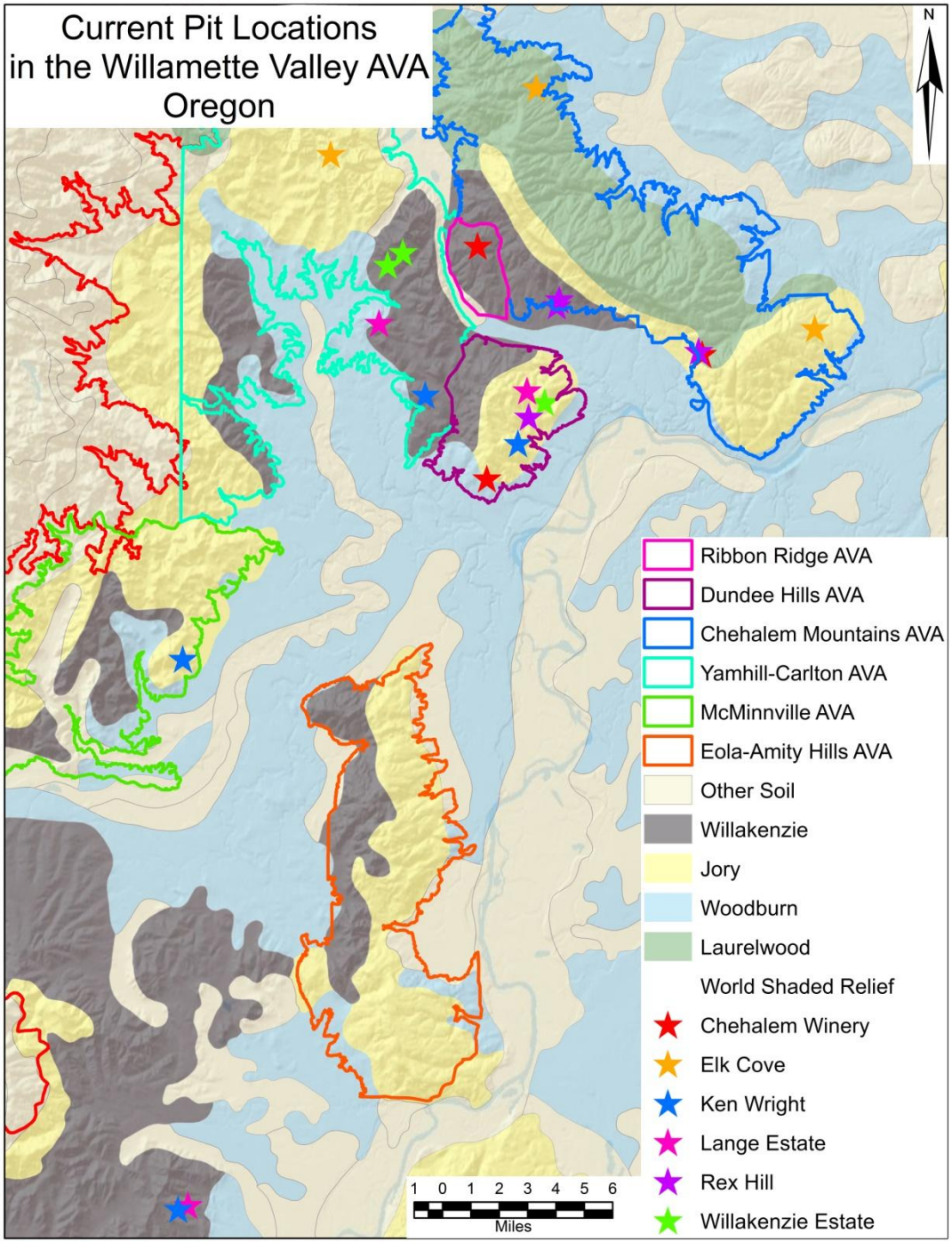
Bt1 – SCL – 72 cm

Bw – LS – 121 cm

Cr – LS – 204+ cm

Terres Basses– 293 ft asl





Conclusions

- Soil maps not accurate at the vineyard scale
- Many variations in the Jory and Willakenzie
- Still need to find an official name for some soils we found

Further Research

- Clay mineralogy using XRD (Dr. Mike Cummings, Portland State University)
- Microwave digestion and trace element analysis of soils using ICP-OES (Dr. Ben Perkins, PSU)
  - Analysis of grape juice from vines immediately next to soil pits from 2011 and 2012 harvest
  - Analysis of wine made from each vineyard block before and after bottling for 2011 and 2012 vintages
- Sensory wine analysis by professional panel
- Expected completion December 2013


08.11.2011


08.01.2011


BPA
REGIONAL
SCIENCE
BOWL
2011


08.29.2011


Thank you


VIKINGS
08.29.2011


08.29.2011