Oregon DEQ
Hermiston – Columbia Basin
Summer 2016 O3 Study

NW Airquest Annual Meeting
Pullman WA
17 June 2016

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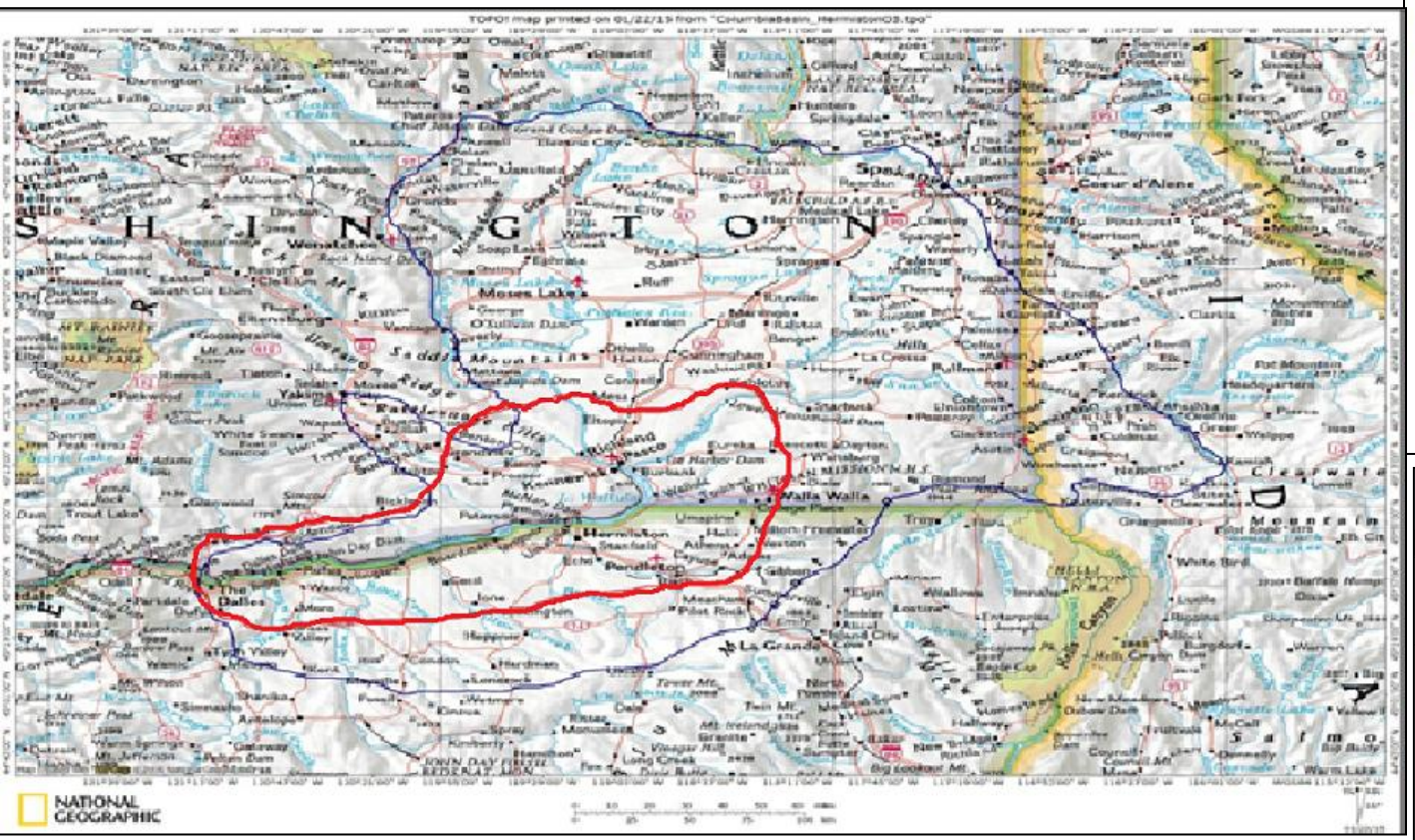
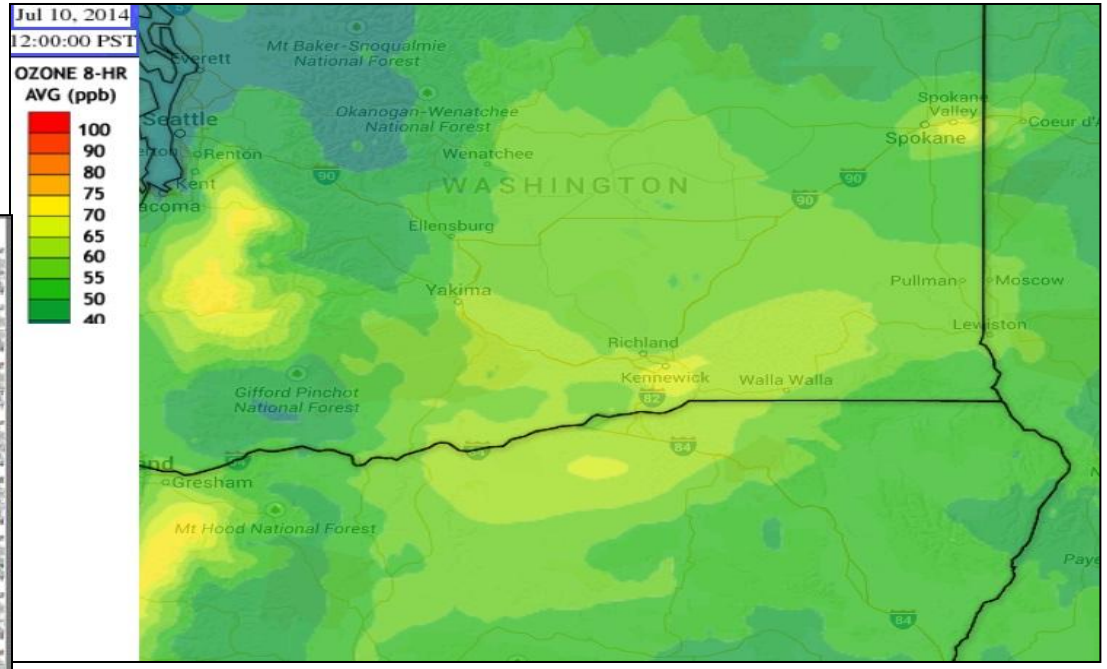
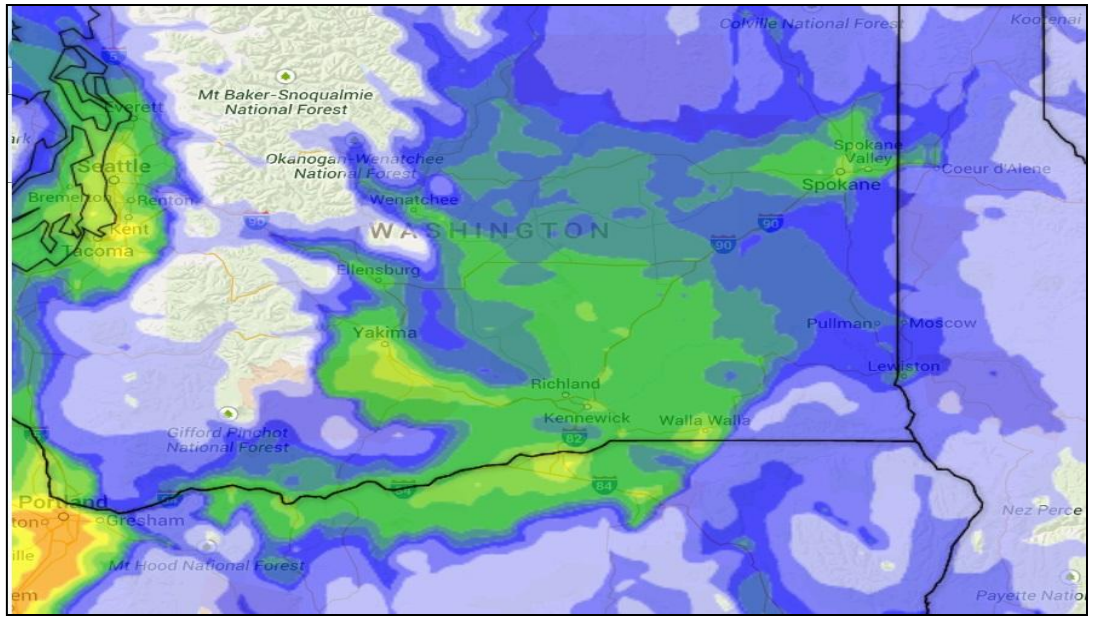
Jacinda Mainord PSU
Caleb Minthorn Umatilla Tribes

Multiple partners

Oregon DEQ
Portland State University
Umatilla Tribes
U.S. Forest Service
EPA


NATIONAL GEOGRAPHIC


Jul 10, 2014
12:00:00 PST
OZONE 8-HR AVG (ppb)
100
90
80
75
70
65
60
55
50
Mt Baker-Snoqualmie National Forest
Okanogan-Wenatchee National Forest
Seattle
Renton
Kent
Tacoma
Wenatchee
Spokane Valley
Spokane
Coeur d'Alene
WASHINGTON
Ellensburg
Yakima
Pullman
Moscow
Lewiston
Richland
Kennewick
Walla Walla
Gifford Pinchot National Forest
Gresham
Mt Hood National Forest


Colville National Forest
Mt Baker-Snoqualmie National Forest
Okanogan-Wenatchee National Forest
Seattle
Bremerton
Renton
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Tacoma
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Spokane Valley
Spokane
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Portland
Gresham
Mt Hood National Forest
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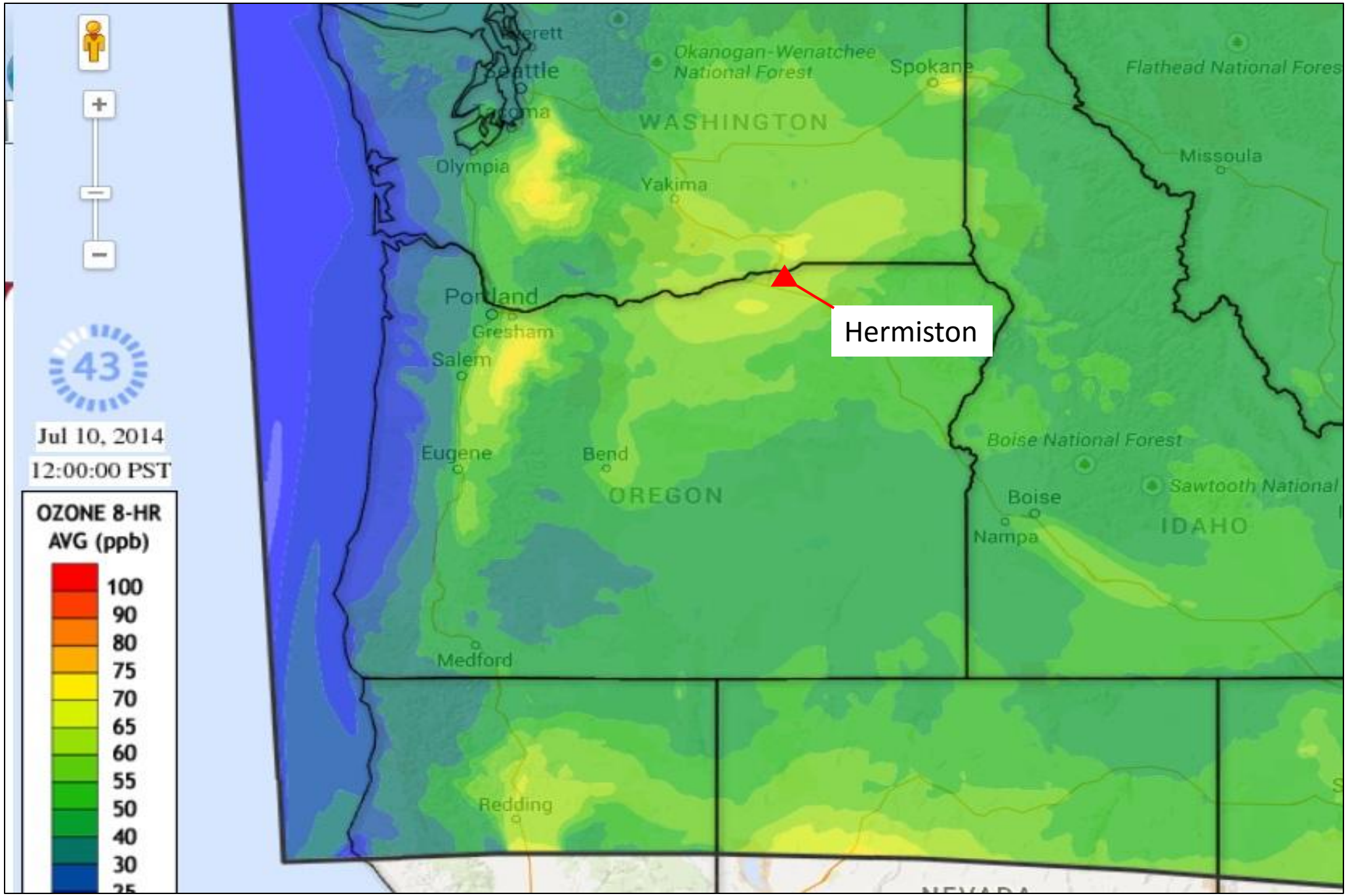

Okanogan-Wenatchee National Forest
Spokane
Flathead National Fores
WASHINGTON
Missoula
Olympia
Yakima
Portland
Gresham
Salem
Hermiston
Eugene
Bend
OREGON
Boise National Forest
Sawtooth National
Boise
Nampa
IDAHO
Medford
Redding
43
Jul 10, 2014
12:00:00 PST
OZONE 8-HR AVG (ppb)
100
90
80
75
70
65
60
55
50
40
30

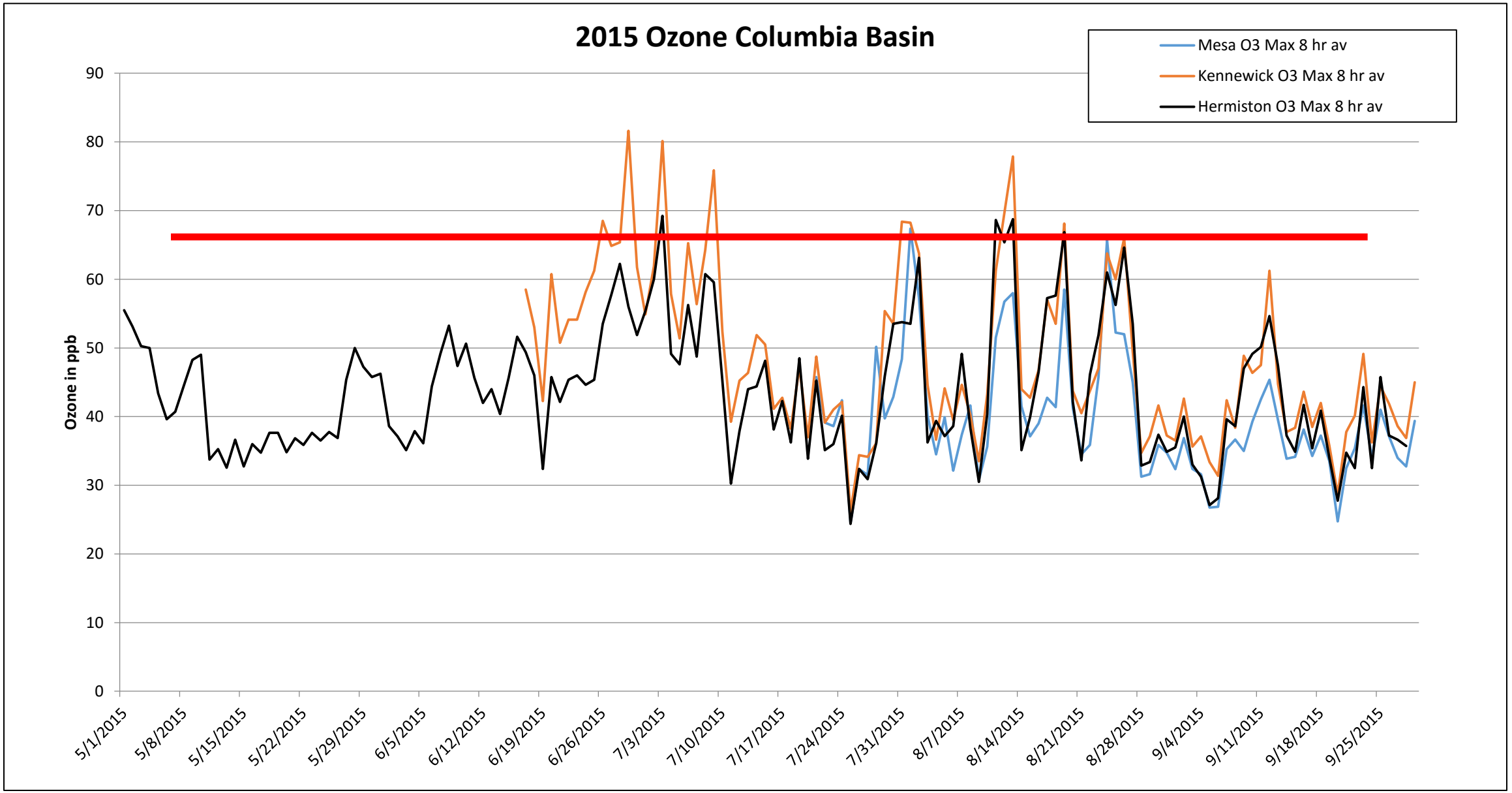
What does this mean for Hermiston Area?

- Hermiston barely meets standard

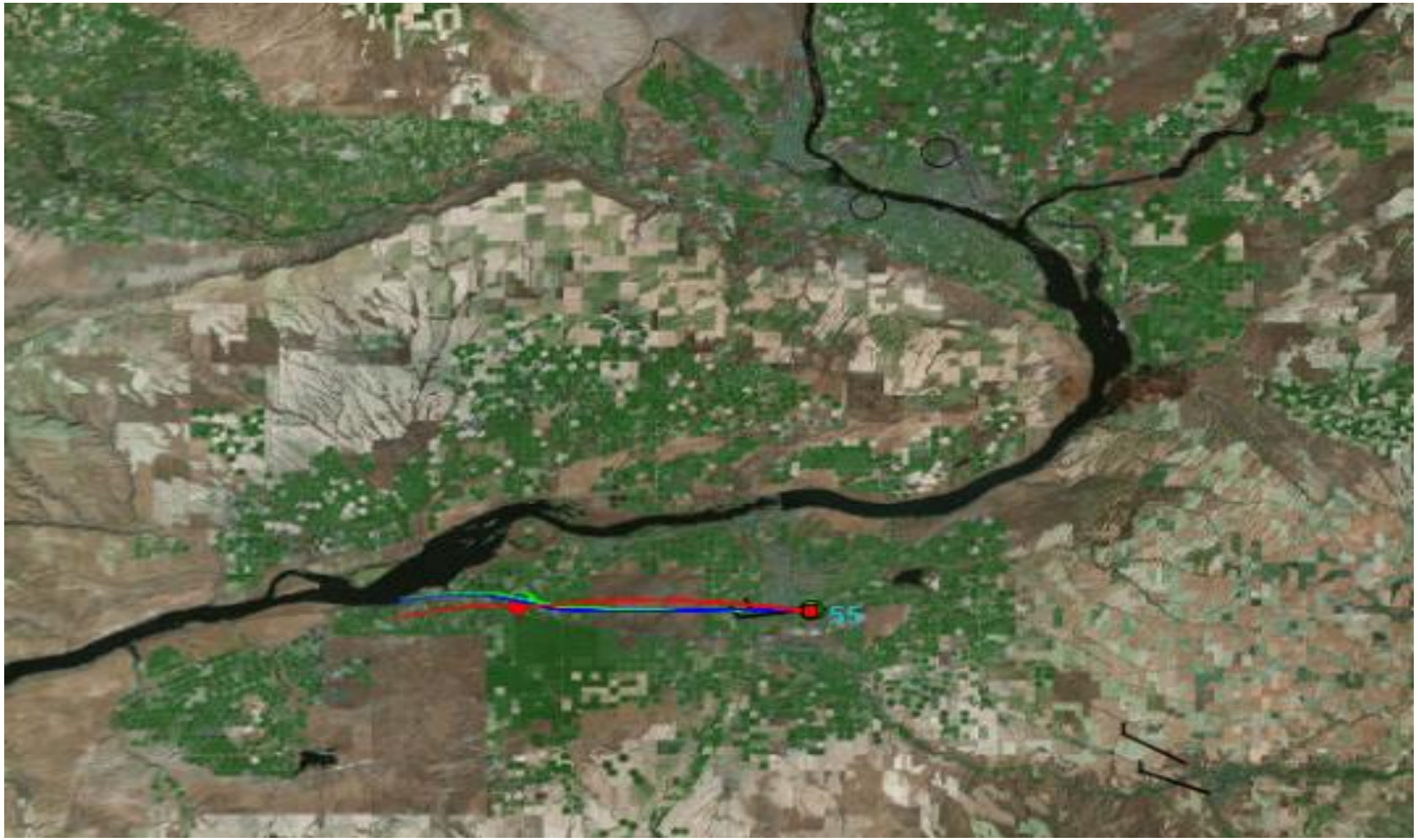
- The specific sources of precursors that form ozone in Hermiston are not clear

- The extent of the area affected
  is not known.

What does Hermiston's Data Show?



Hermiston O3 Back Trajectory 7/28/14 18:00; 8hr ave = 65ppb



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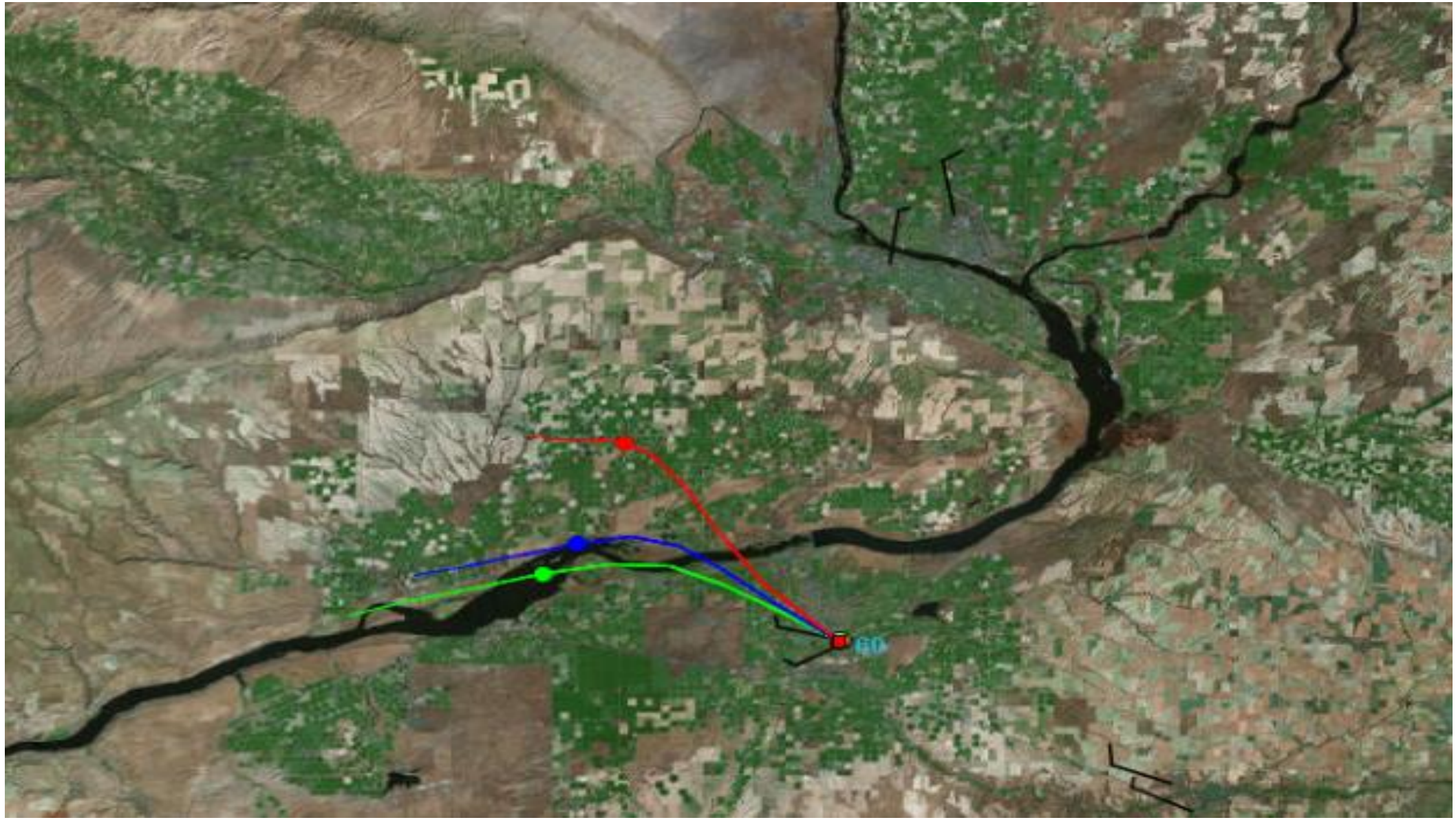
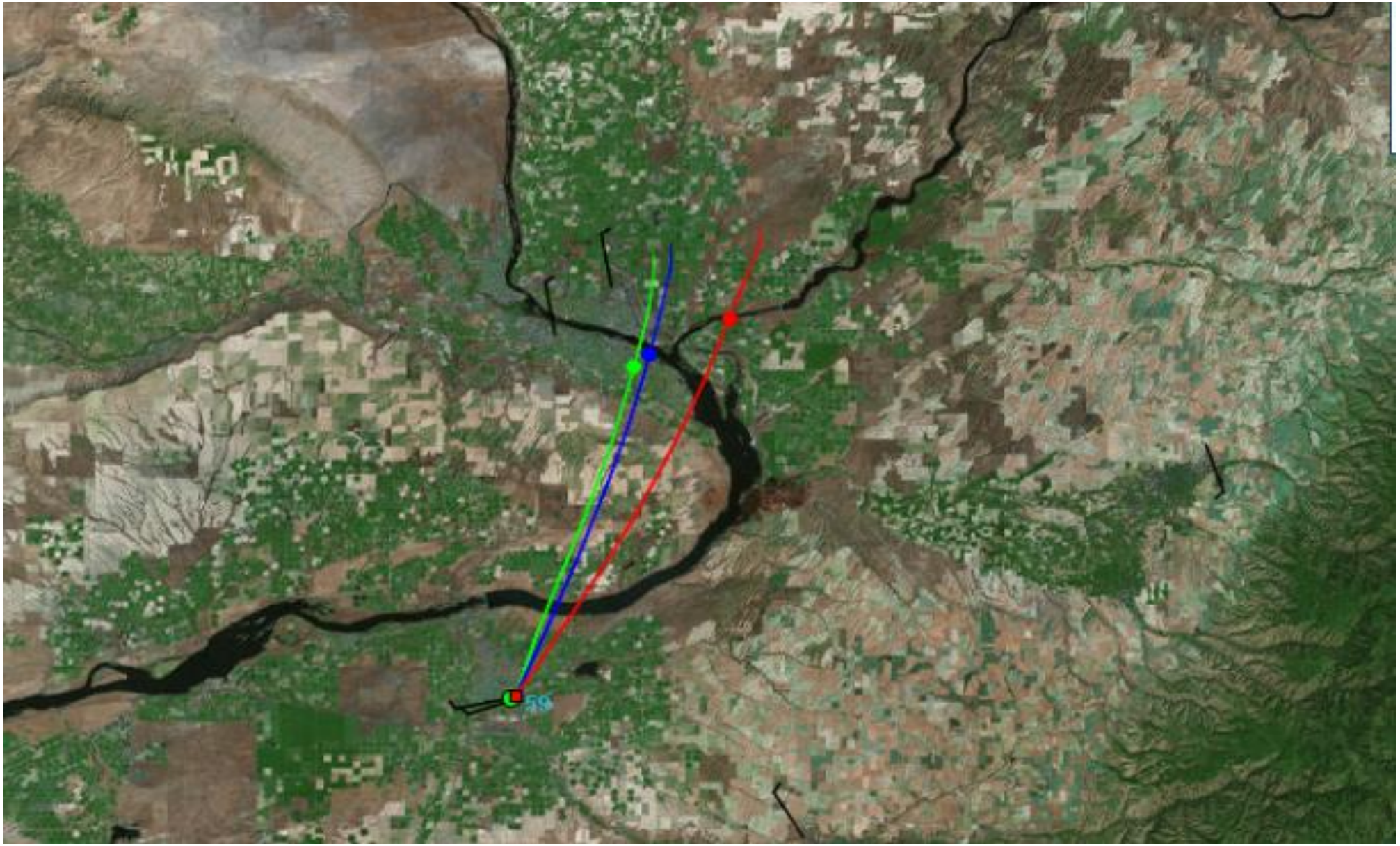


Hermiston O3 Back Trajectory 8/3/14; 8hr ave = 64ppb




80 to 100
75 to 80
70 to 75
65 to 70
60 to 65
O3, ppb
Richland
Kennewick
Indian Island
Burbank
Highland
Finley
Foundation Island
Umatilla
Van Skinner Island
© 2013 Google
Image Landsat
Google earth
Imagery Date: 4/9/2013 11 T 329832.87 m E 5101240.88 m N elev 1248 ft eye alt 14.53 mi

Some Thoughts on Sources

- Possible Nitrogen Oxide(s) sources
  - Power Plants (coal and natural gas) and other sources that use natural gas.
  - Vehicles

- Possible VOC sources
  - Solvent; Gas distribution facilities; ethanol facilities
  - Vegetation – agricultural and forestry
  - Vehicles

- Energy Source – Sun and Hot summer days

Oregon Study

1) DEQ O3 Monitoring Network
   a) The Dalles monitor
   b) 2B Model 202 Model monitors
      Paterson School
      Bureau of Reclamation Pump Station
      Port Kelley
      possible mobile monitor

2) Cell Towers: five O3, NO2, and NO monitors

3) PSU Passive samplers for NO, NO2 and O3: Fifty in the Hermiston region to capture average levels of NO, NO2 and O3 upwind, within and downwind of Hermiston.

3) Meteorological station at Port Kelley

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   Four deployments:

   - Deployment #1: Before high ozone levels are expected but winds are from the west in order to capture precursor levels before high levels of oxidation (i.e. cooler temperatures but westerly winds)
   - Deployment #2 , #3, #4 : During peak ozone seasons in July,

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ODEQ Monitoring and APIS Cell Tower Sites

PSU portion of the Study

PSU Passive samplers for NO, NO2 and O3: Fifty in the Hermiston region to capture average levels of NO, NO2 and O3 upwind, within and downwind of Hermiston.

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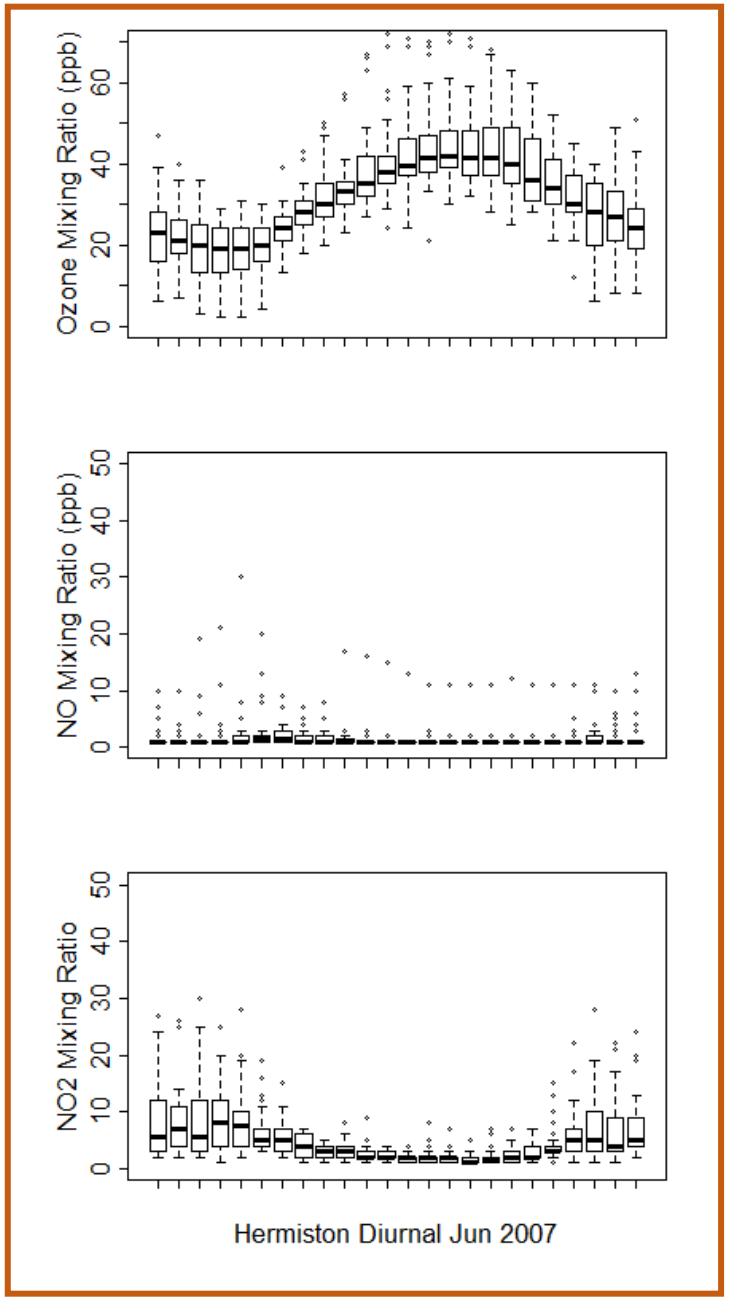
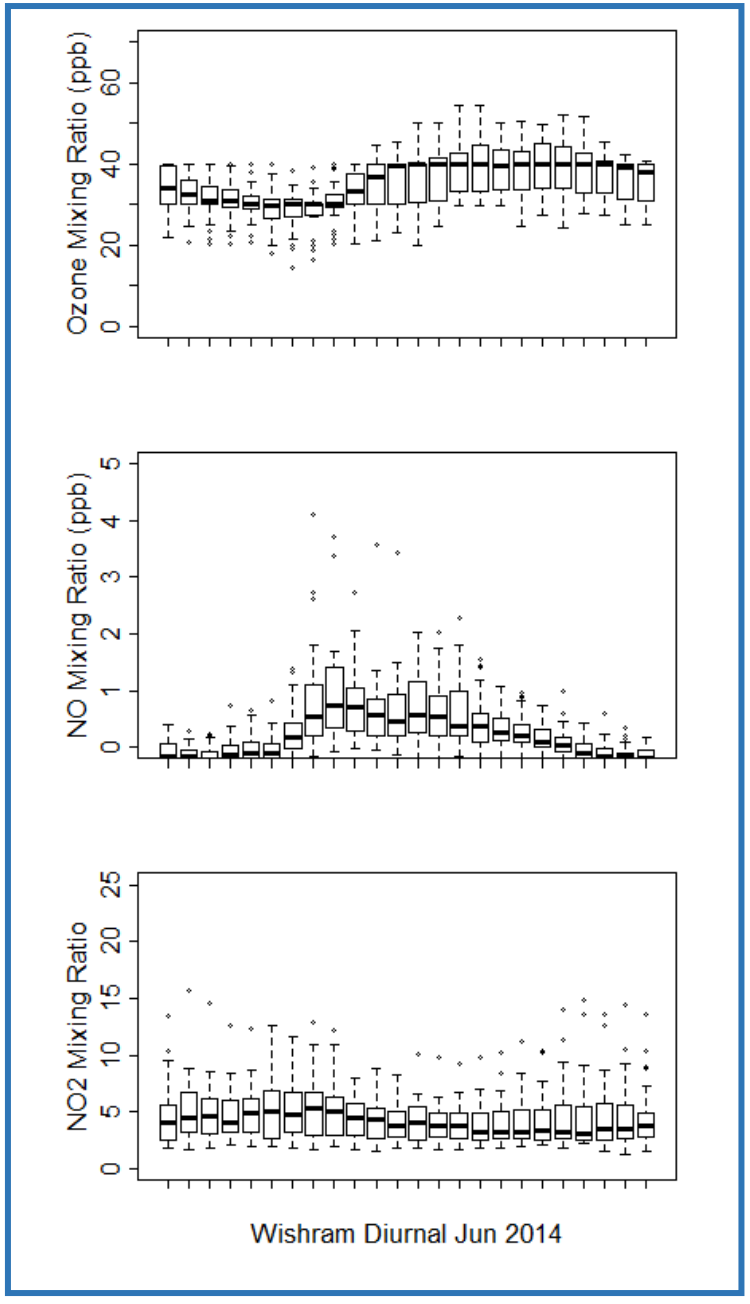
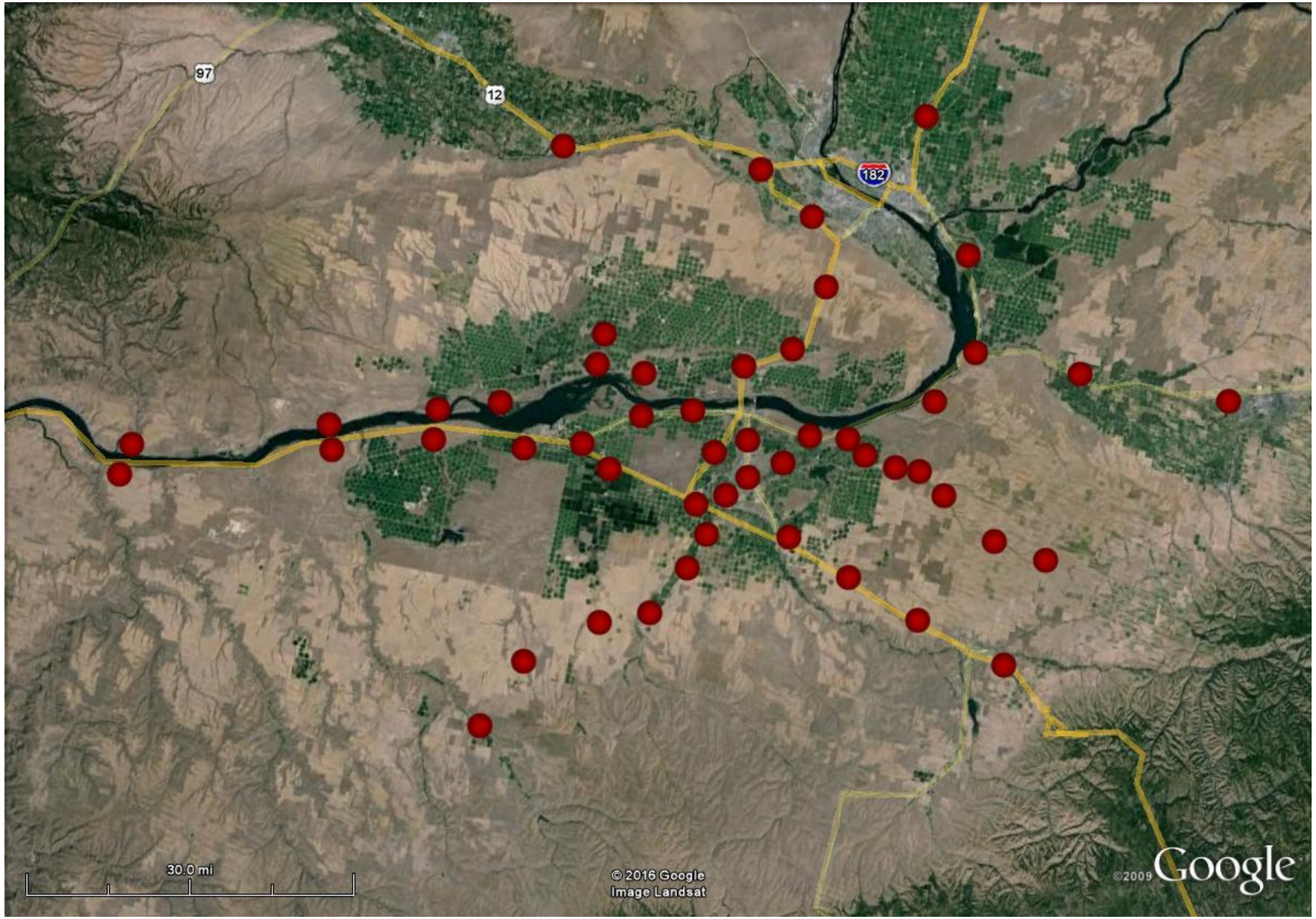
Where are the sources that lead to ozone formation?
Are they limited to Hermiston in the Columbia Basin?

NOTE:
Y axis values for NOx are different for Hermiston and Wishram





Potential PSU Passive Sampling Sites



Paterson School on bluff overlooking Columbia to the south

Paterson School Shed

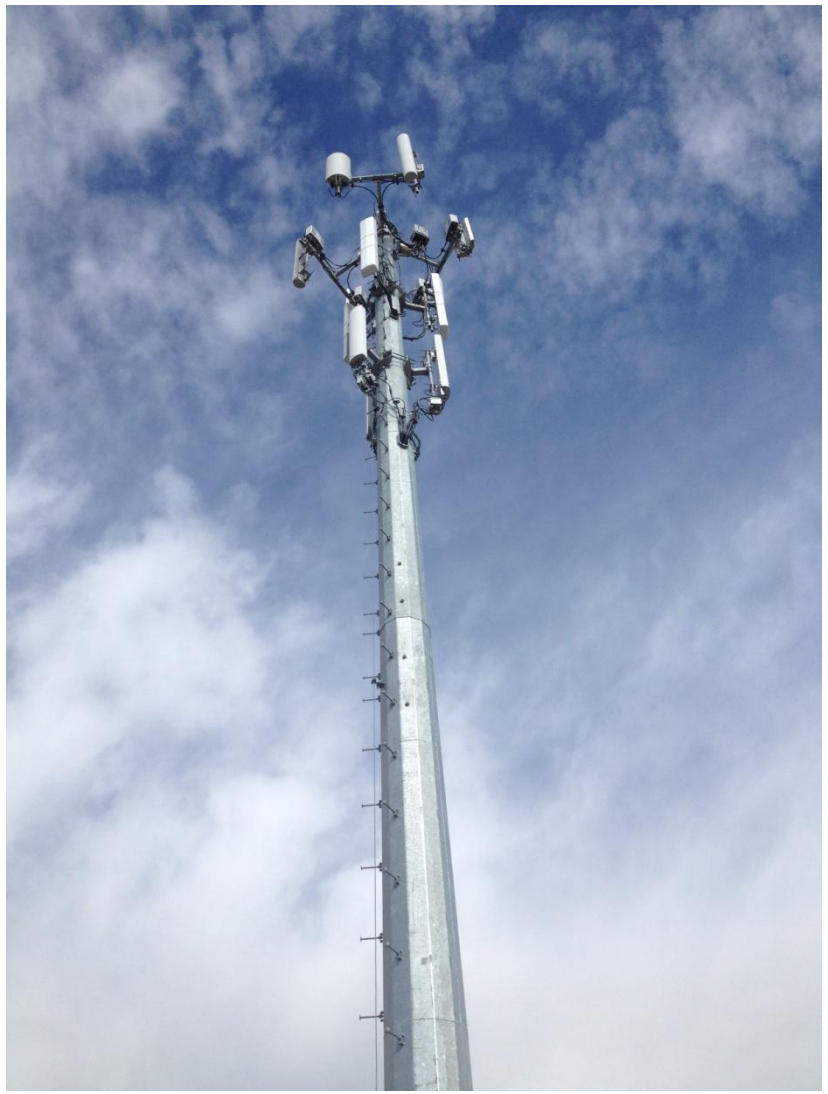
Bureau of Reclamation Pumping Station looking NE towards Wallula Gap

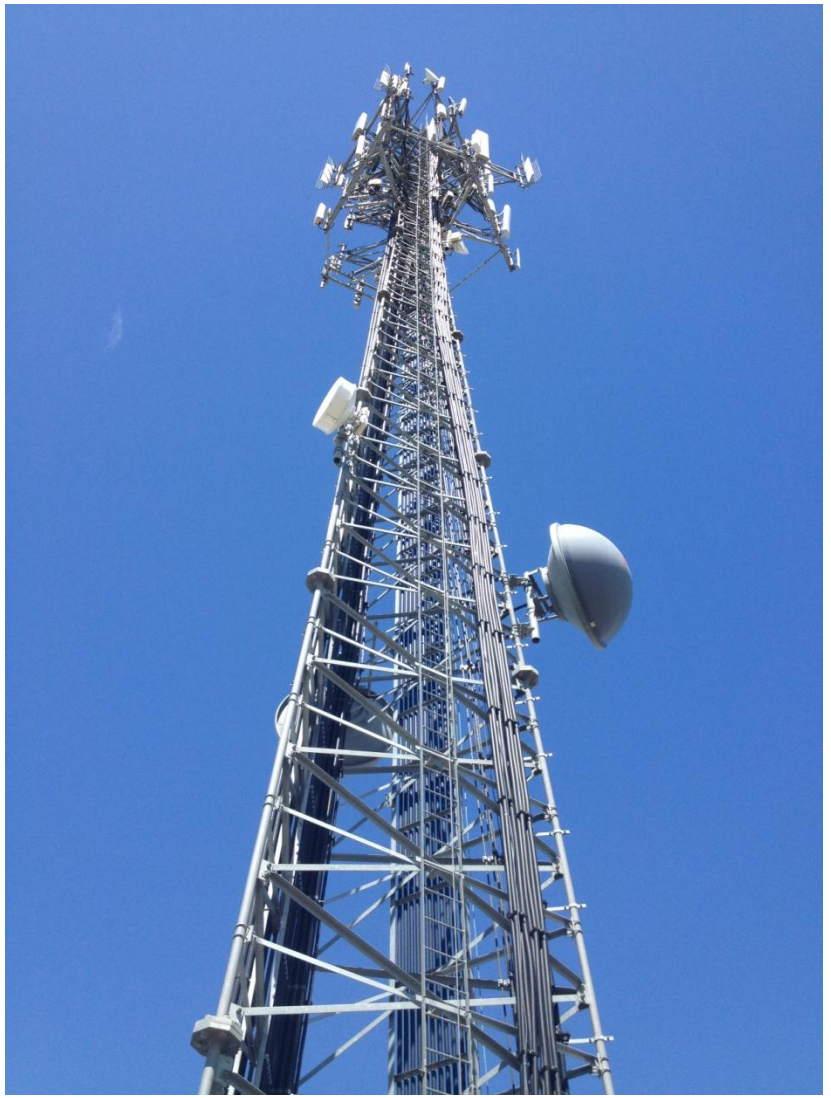
Wallula Yacht Club Shed

Wallula Yacht Club Open Space

Wallula Yacht Club looking N towards Wallula Gap

Cell Towers





Cell Tower 1: Above Wallula Gap

Cell Tower: Near Hermiston

Cell Tower Understory

Cell Tower Understory

Questions

Yada yada yada