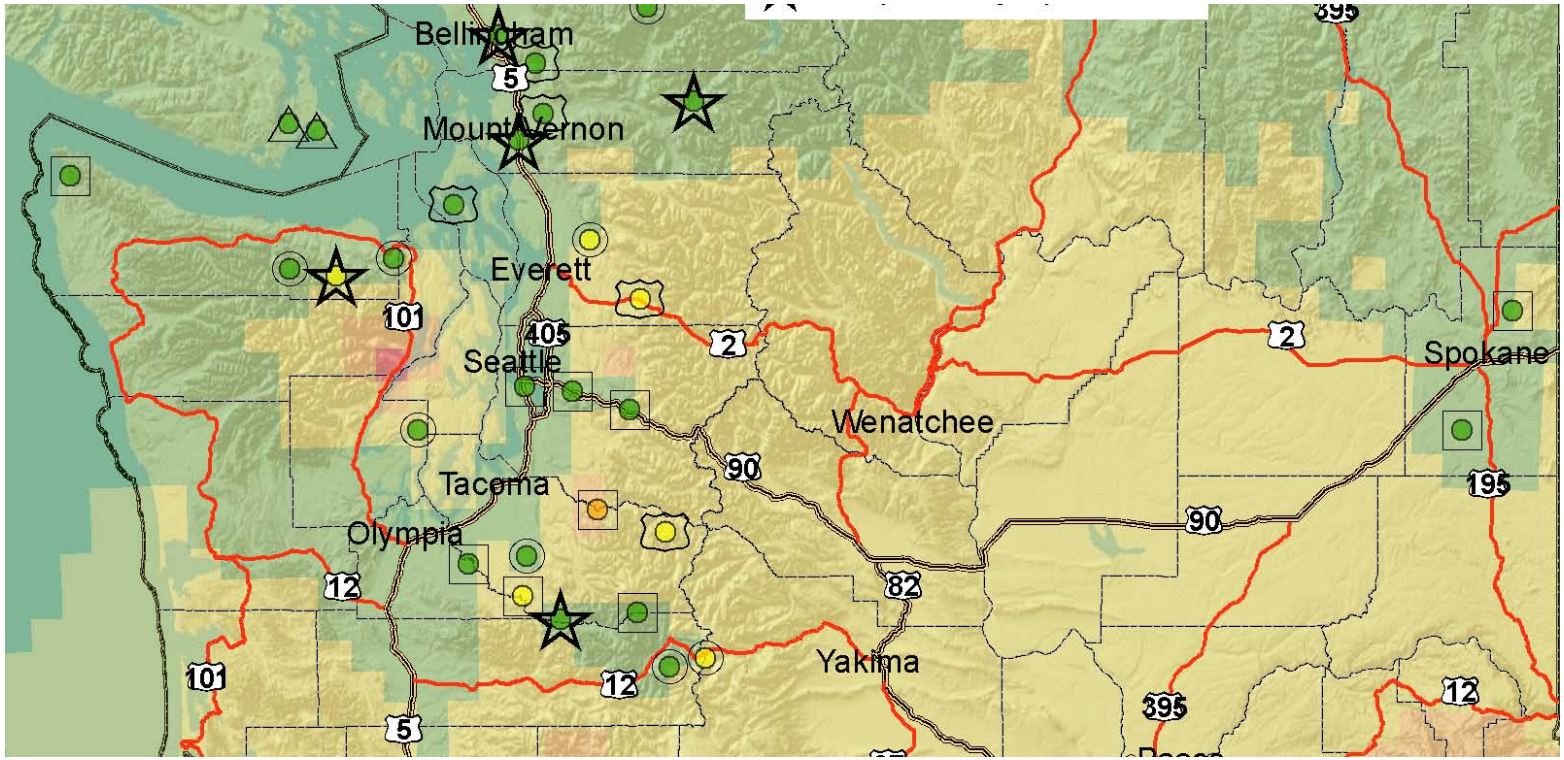
Maps of background concentrations of criteria pollutants



NW Airquest meeting

8 June 2012

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Context

- Permitting work requires background concentrations for all criteria pollutants
- Without realistic background in rural areas, urban values must be applied
- Urban concentrations are often higher and end up unfairly restricting businesses
- To obtain realistic background concentrations with limited spatial coverage of monitors, Ecology has been using a model-monitor interpolated product.
- 24hr means of AIRPACT-3 model runs have been archived at Ecology since 2007.
- Fielding an increasing number of requests for background concs
- Ecology, IDEQ & ODEQ recently agreed to prepare 3-state maps for all criteria pollutants, for all averaging periods associated with the NAAQS.

Determining the spatial variability of criteria pollutants

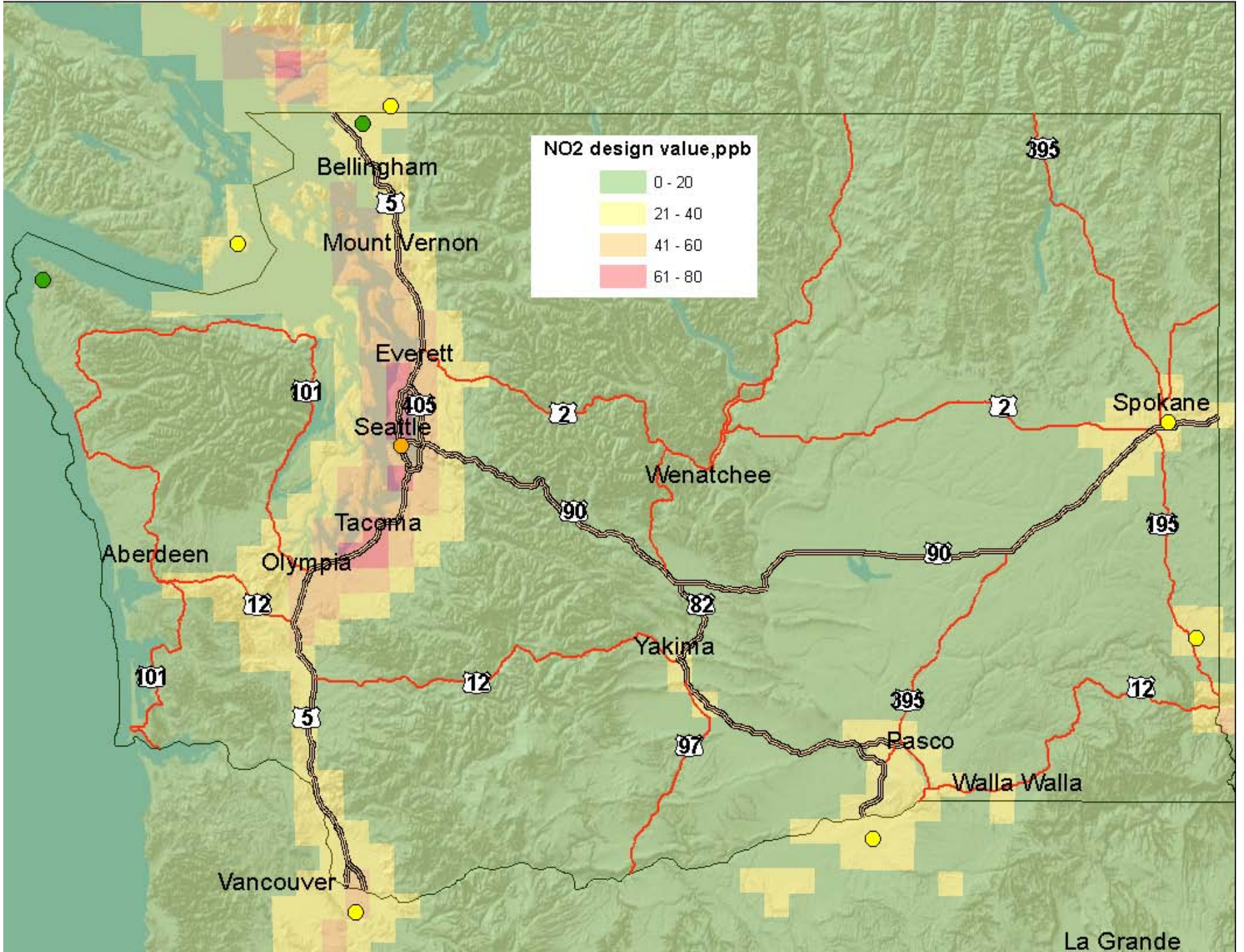
- Using measured design values between 2009- 2011, from as many sites as possible.
- Need to collect some data from “border” sites just outside the domain to prevent an extrapolation
- Calculate modeled design values for each gridcell, over the same period
- Spatially interpolate using the monitor to fix the value, and the model to determine spatial variability (using Voronoi nearest neighbor with $1/d^n$ weighting)
- For pollutants likely to be concentrated into confined areas ($PM_{2.5}$, CO, maybe PM_{10}), n= 2. For O_3, n=1. For SO_2 and NO_2, suggest using n=1 since monitor density is low.

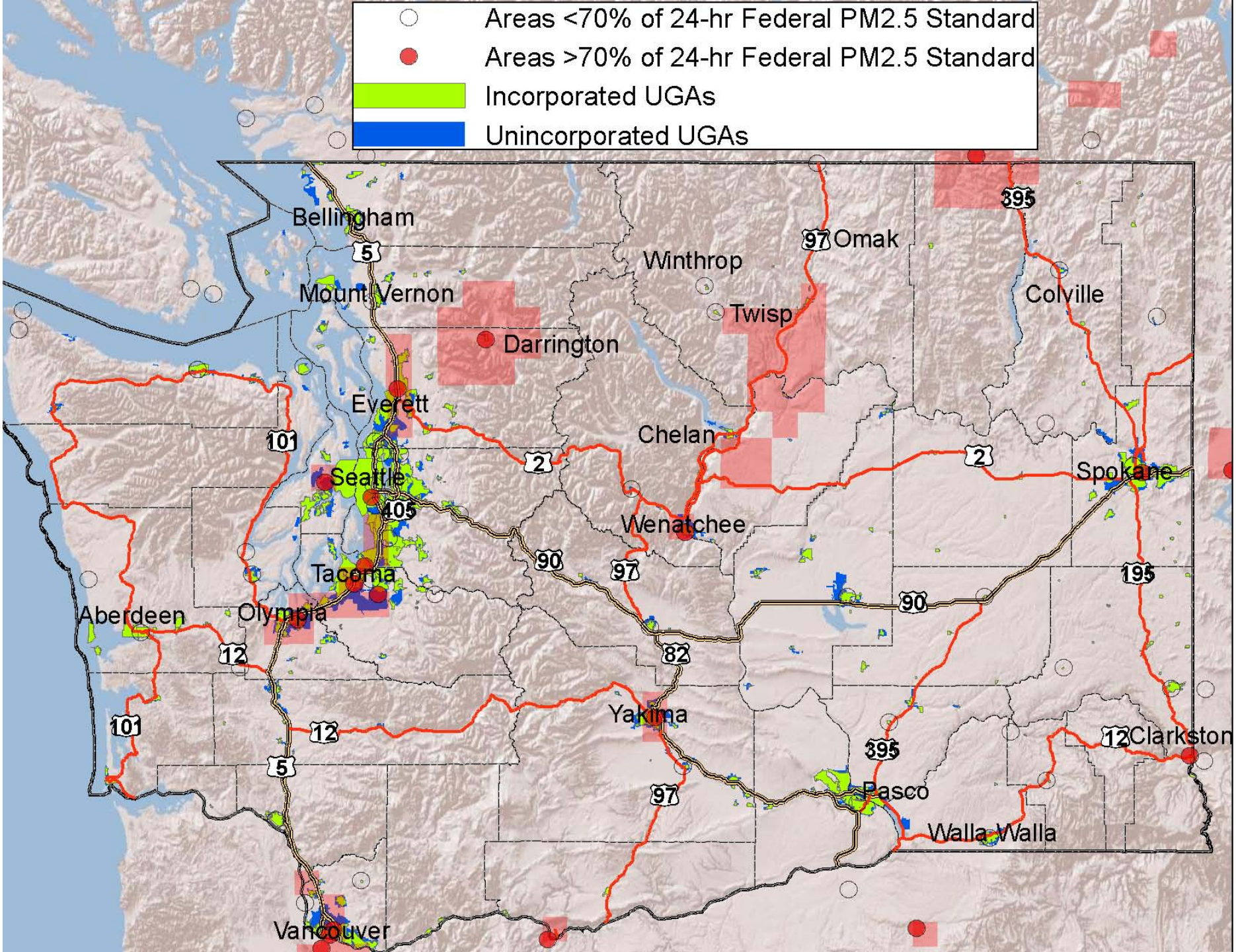
Wheels are in motion but some quirks to iron out …

- The modeled medians are used for $PM_{2.5}$ interpolation, mainly to avoid unrealistic numbers associated with wildfires.

- Only daily means of modeled SO_2 and CO were saved. The NAAQS however require the max hourly conc each day.
  Solution:
  Scale interpolated concentration field by interpolated [measured DV based on daily max/ measured “DV” based on daily means]

- Data from British Columbia Ministry of Environment- operated sites are:
  Reported at the END of the hour (as opposed to EPA’s START of the hour)
  Until early 2011, PM concentrations were reported at standard conditions (as opposed to EPA’s ambient conditions)


NO2 design value,ppb
0 - 20
21 - 40
41 - 60
61 - 80
Bellingham
Mount Vernon
Everett
Seattle
Tacoma
Olympia
Aberdeen
Wenatchee
Spokane
Yakima
Pasco
Walla Walla
Vancouver
La Grande
5
101
405
2
90
82
12
97
395
195


Areas <70% of 24-hr Federal PM2.5 Standard
Areas >70% of 24-hr Federal PM2.5 Standard
Incorporated UGAs
Unincorporated UGAs
Bellingham
Mount Vernon
Darrington
Everett
Seattle
Tacoma
Olympia
Aberdeen
Vancouver
Winthrop
Twisp
Omak
Colville
Chelan
Wenatchee
Spokane
Yakima
Pasco
Walla Walla
Clarkston
5
101
12
2
90
82
97
395
405
195