Ozone Special Study 2010-2011 Preliminary Results

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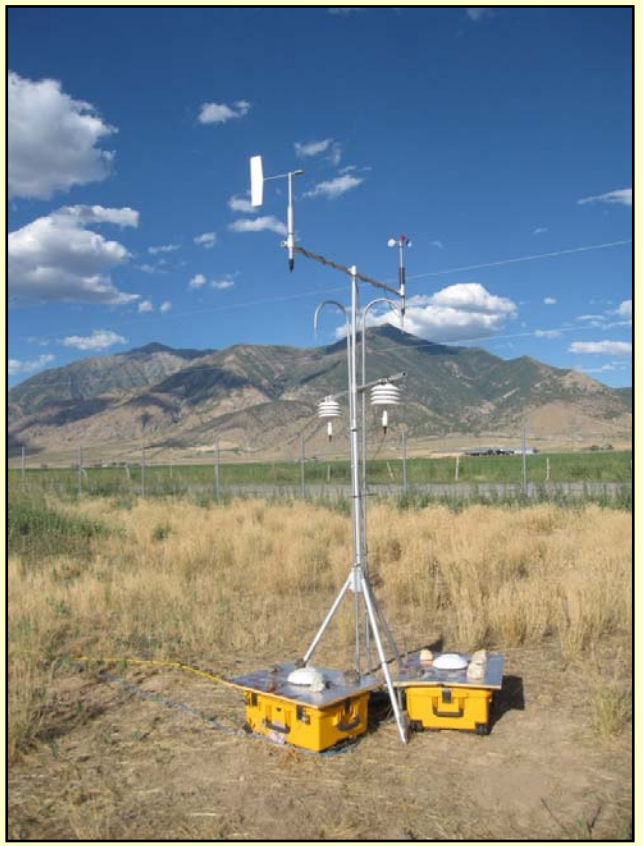
Need for a Special Study

- Lower ozone standard?
  - Ozone NAAQS will be reviewed in 2013
- No ozone data outside Wasatch Front
  - Ozone in rural areas or mountain valleys?
- Regional ozone pollution
  - Transport from other large cities, power plants



Study Objectives

1. Determine extent of potential ozone nonattainment area
2. Assess role of regional pollution
3. Examine the influence of Great Salt Lake

Portable ozone monitoring equipment

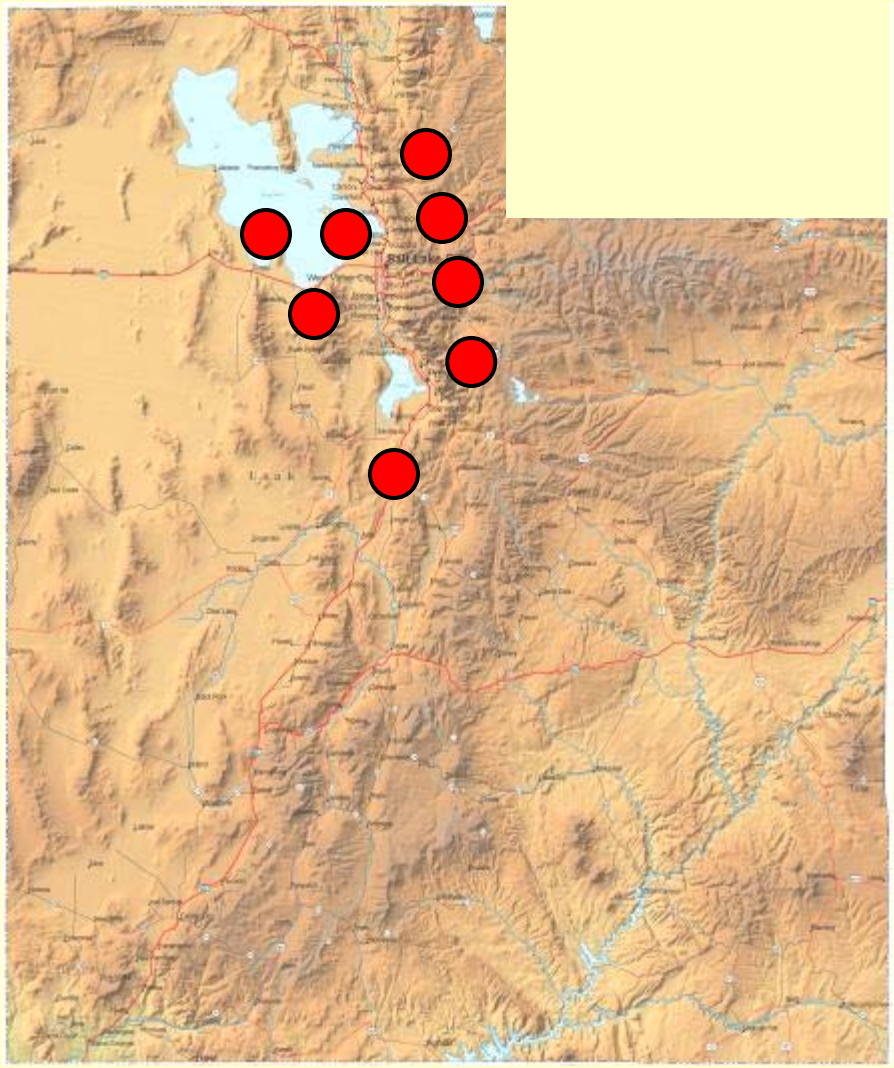
Park City 2010

Portable ozone monitor

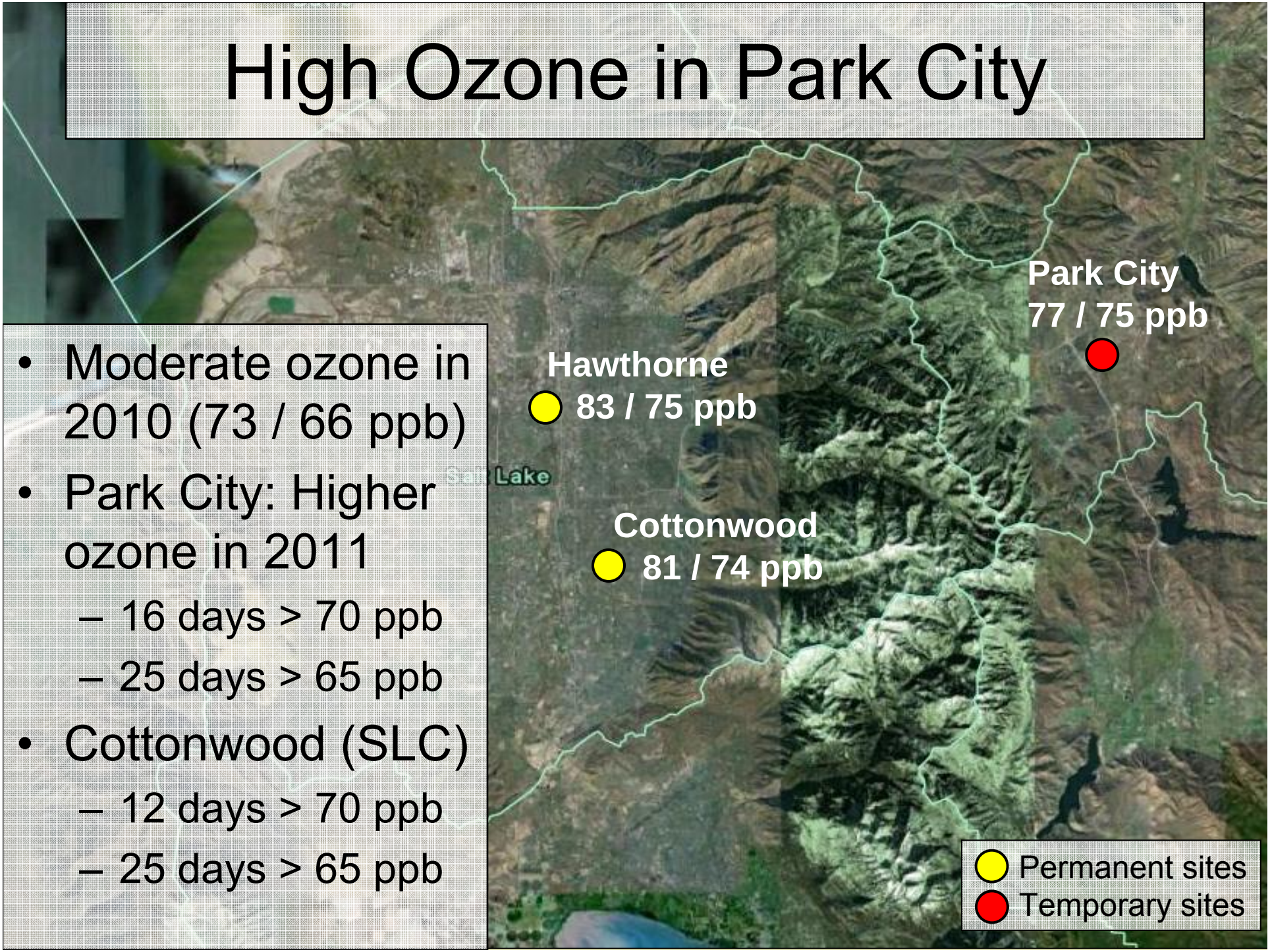
Park City 2011

Ozone adjacent to Wasatch Front 2010-2011

- Mountain valleys
- Tooele Valley
- Nephi
- Great Salt Lake sites

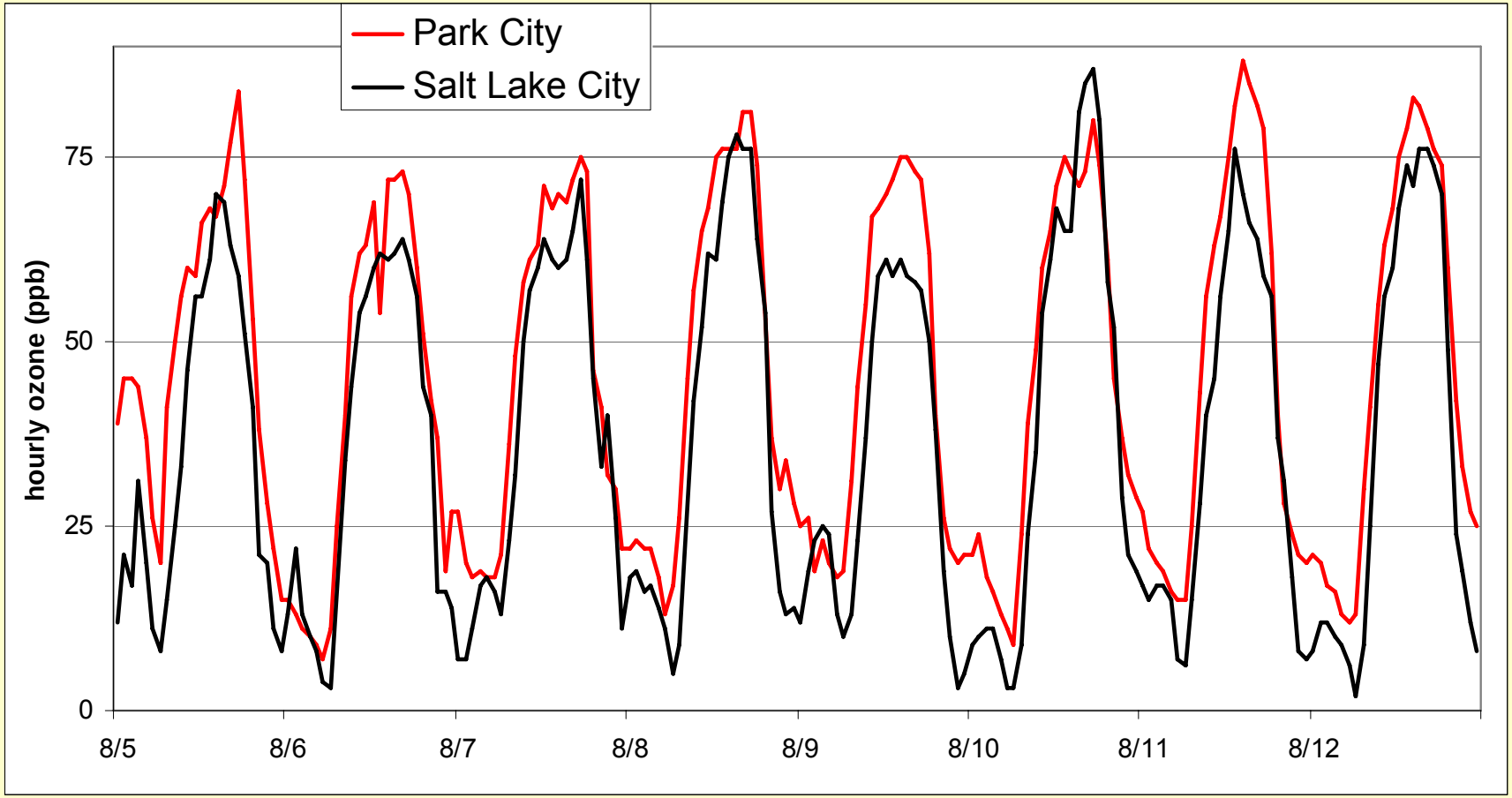


High Ozone in Park City

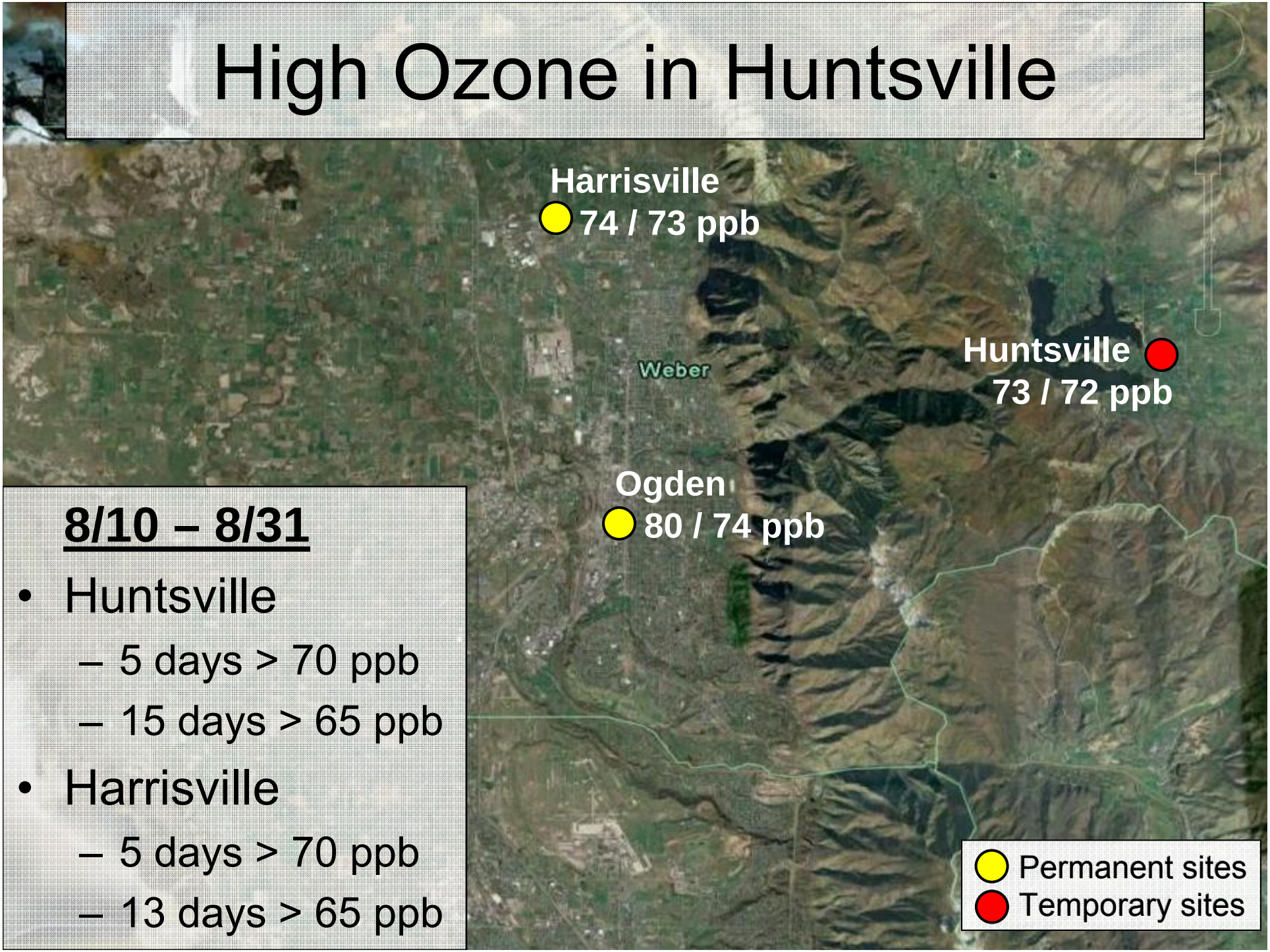


- Moderate ozone in 2010 (73 / 66 ppb)
- Park City: Higher ozone in 2011
  - 16 days > 70 ppb
  - 25 days > 65 ppb
- Cottonwood (SLC)
  - 12 days > 70 ppb
  - 25 days > 65 ppb

Park City and Salt Lake City (2011)



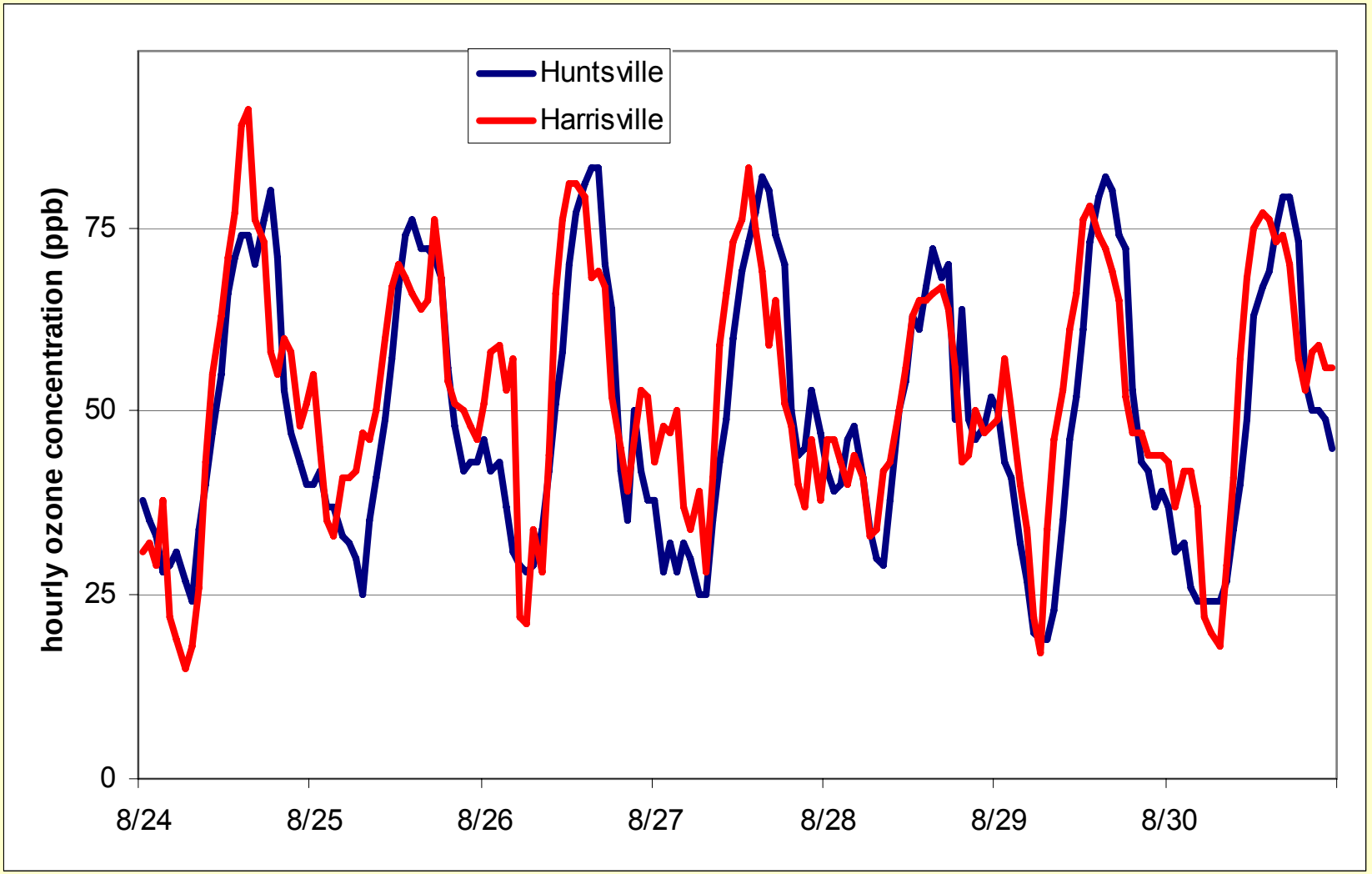
High Ozone in Huntsville



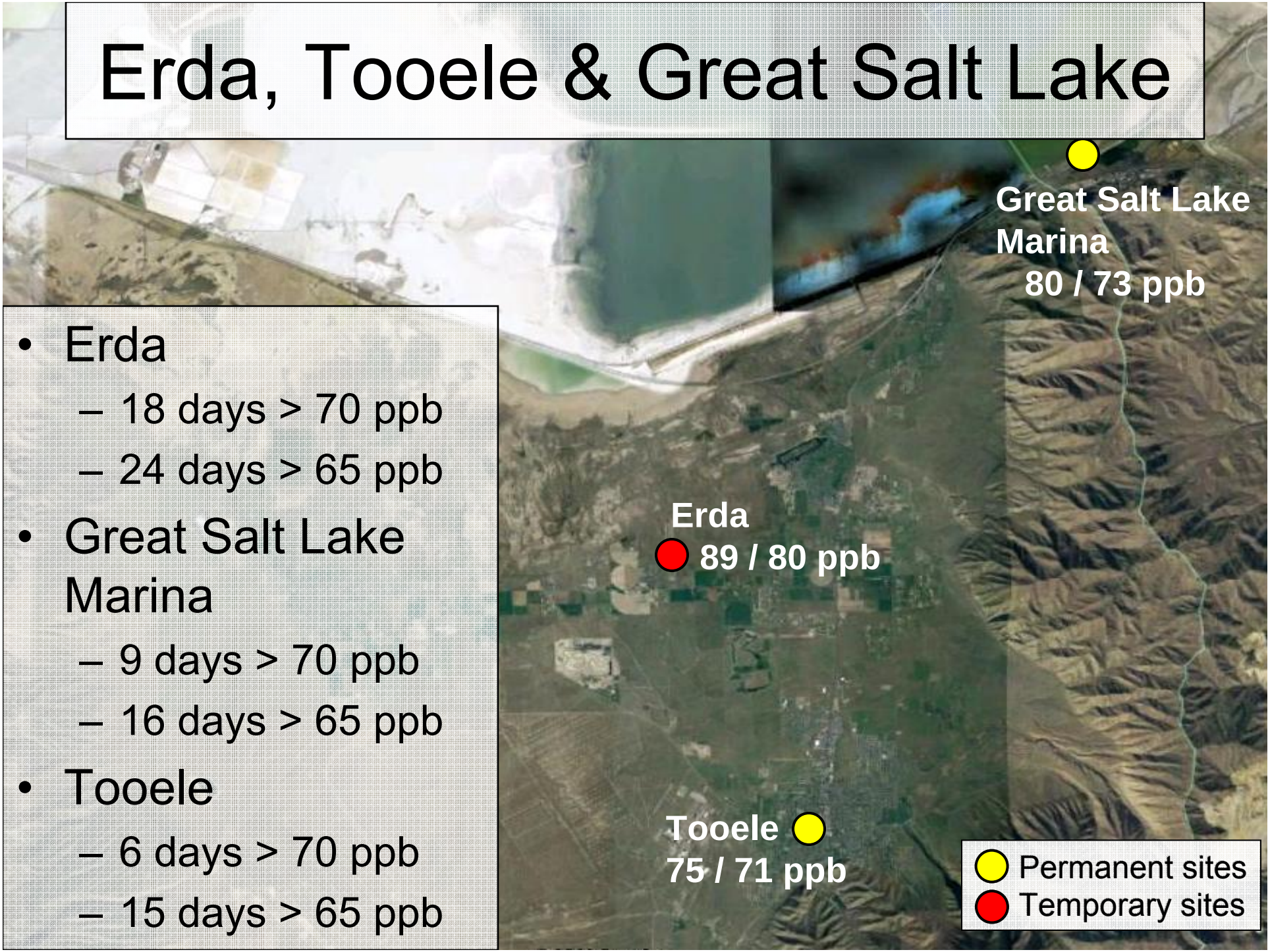
8/10 – 8/31

- Huntsville
  - 5 days > 70 ppb
  - 15 days > 65 ppb
- Harrisville
  - 5 days > 70 ppb
  - 13 days > 65 ppb

Ozone in Huntsville and Harrisville (2011)

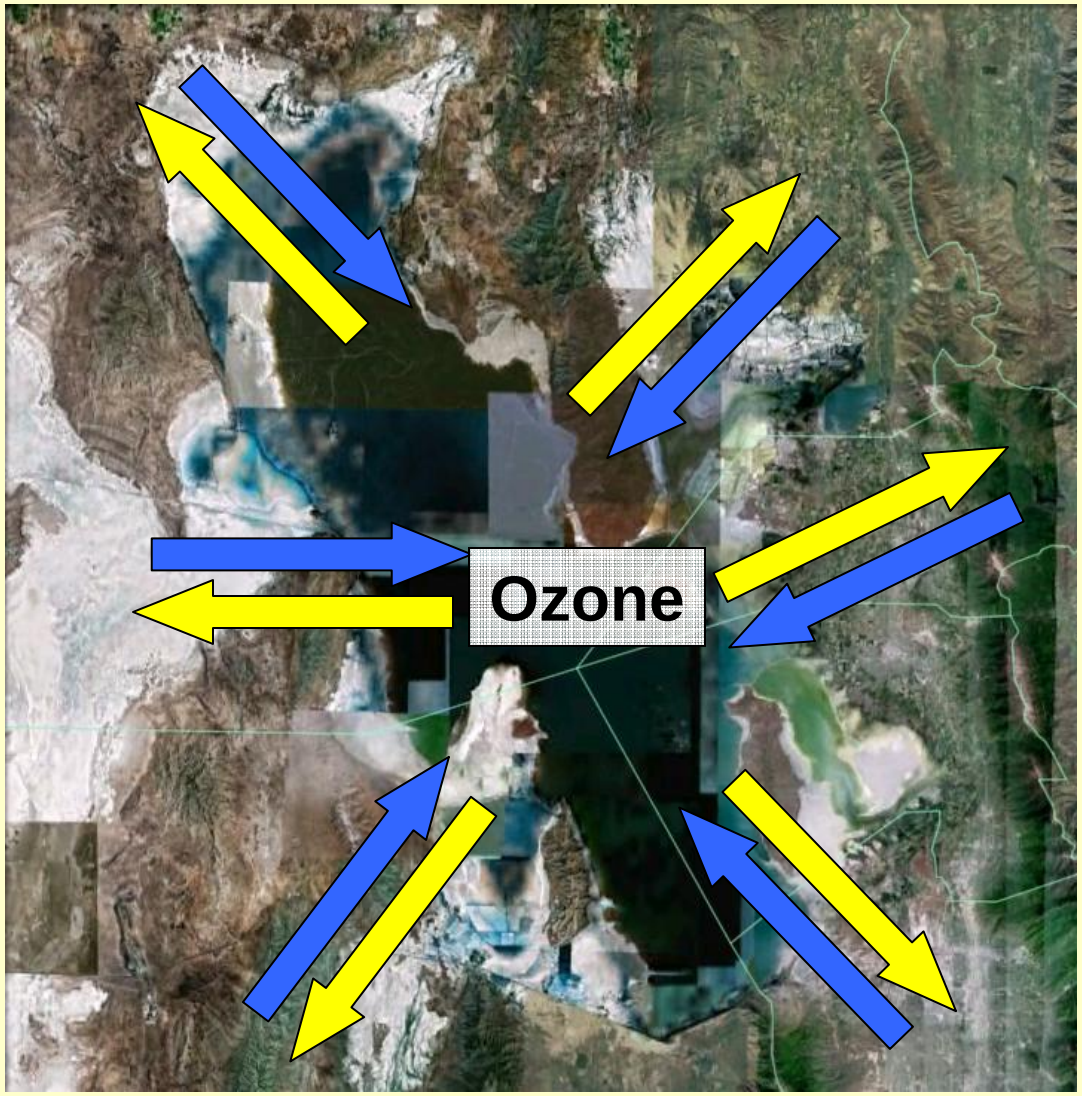


Erda, Tooele & Great Salt Lake

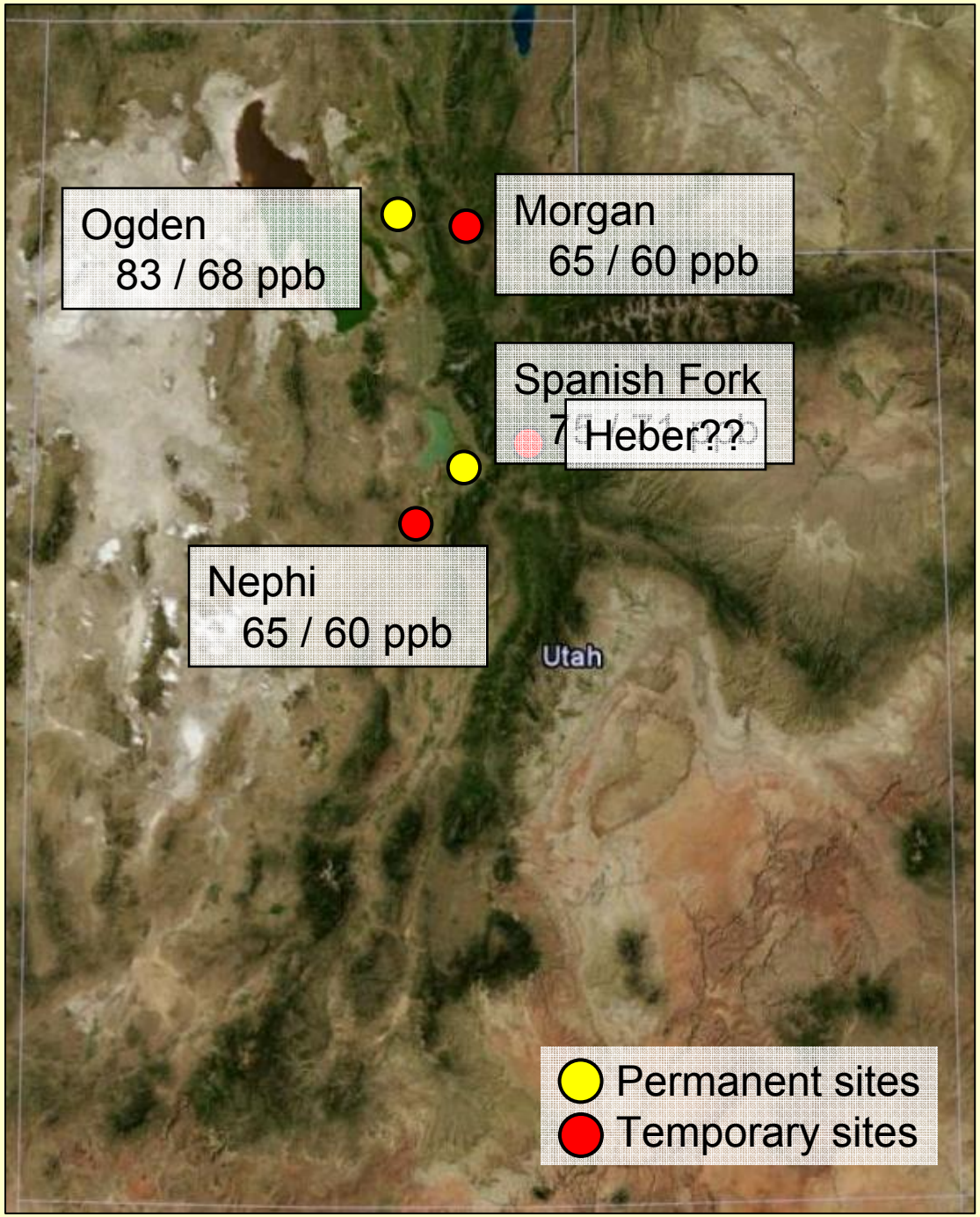


- Erda
  - 18 days > 70 ppb
  - 24 days > 65 ppb
- Great Salt Lake Marina
  - 9 days > 70 ppb
  - 16 days > 65 ppb
- Tooele
  - 6 days > 70 ppb
  - 15 days > 65 ppb

Great Salt Lake can enhance ozone formation



- Ozone forms early in day over lake
  - High albedo
- Morning heating
  - Wind blows away from lake
- Evening cooling
  - Down-canyon winds
  - Higher ozone over lake
- Diurnal pattern remains during high pressure

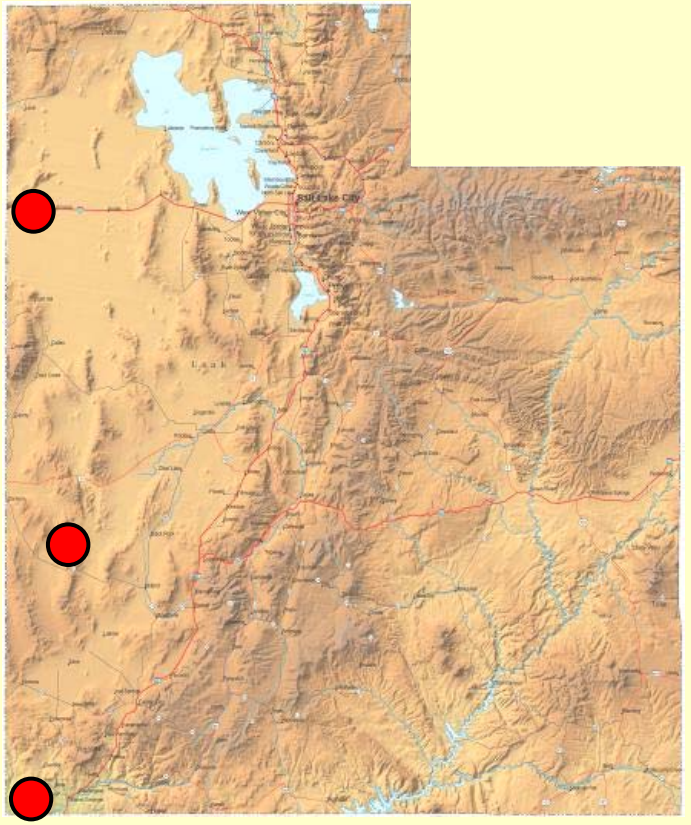


2010 Ozone

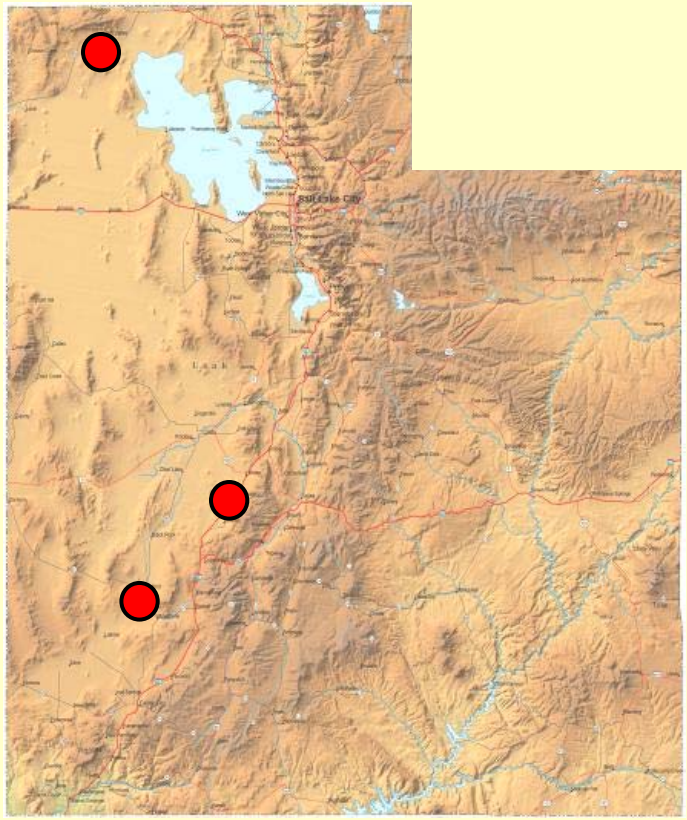
- Lower at Morgan compared to Ogden
- Lower at Nephi compared to Spanish Fork
- Heber similar to North Provo

High ozone at rural western Utah sites

- Wendover (2011)
  - 70/68 ppb
  - 1 day > 70 ppb
  - 10 days > 65 ppb
- Desert Range (2011)
  - 74/69 ppb
  - 3 days > 70 ppb
  - 11 days > 65 ppb
- Lytle Ranch (2011)
  - 78/72 ppb
- Sites very remote
  - No nearby source of ozone precursors

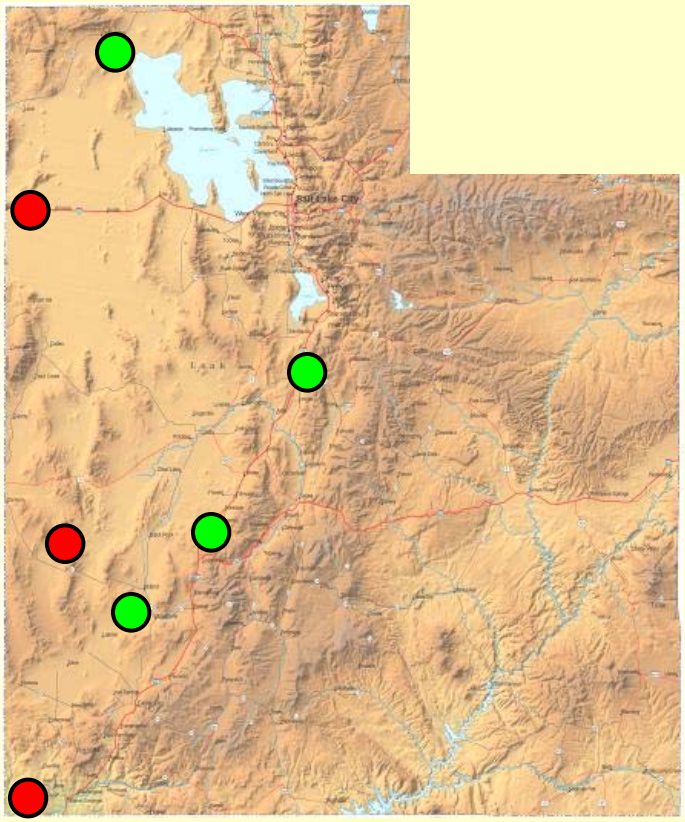


Low to moderate ozone at *other* rural Utah sites

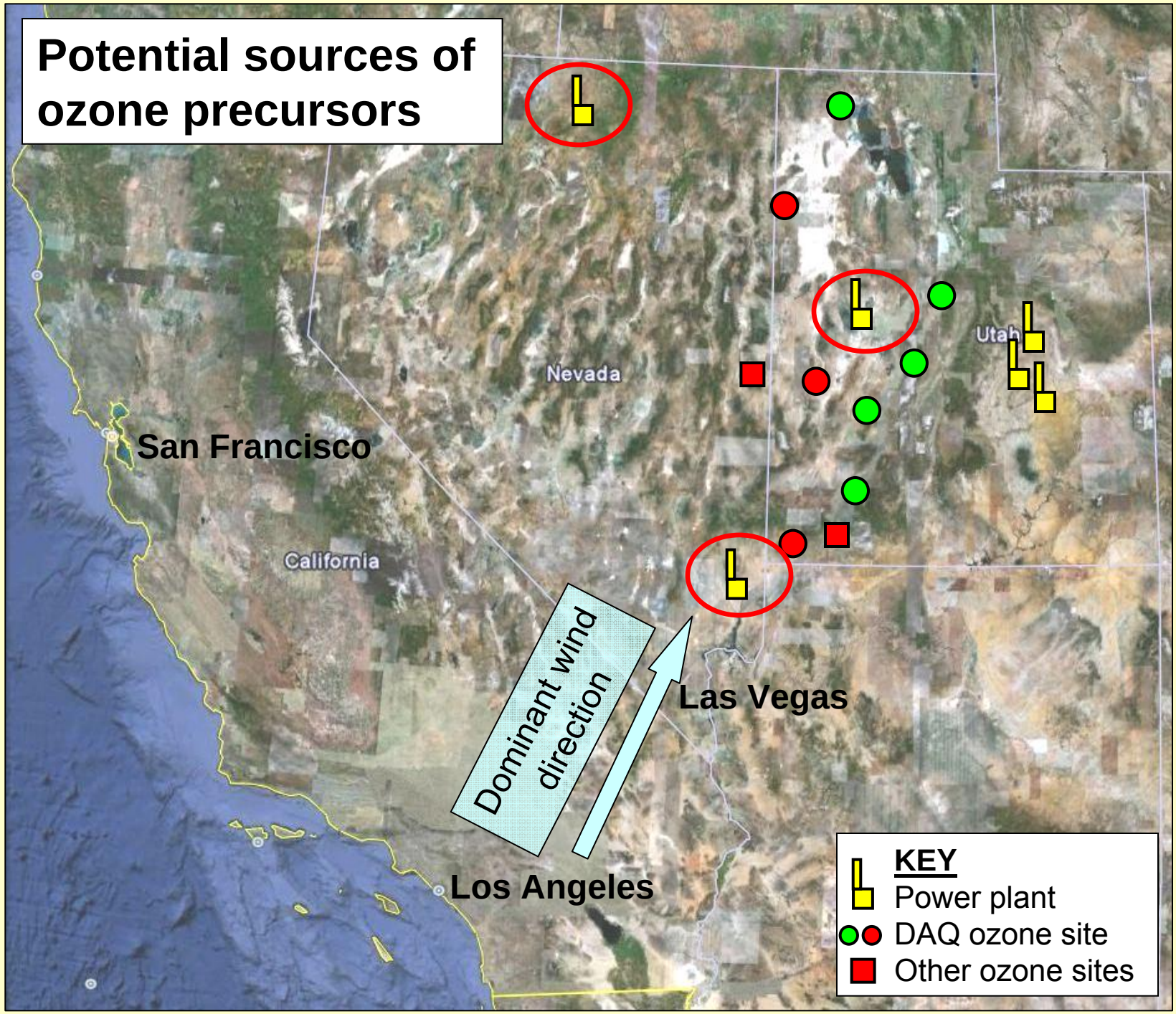


- Park Valley (2010)
  - 69 / 58 ppb
  - Wildfire smoke outlier
- Milford (2010)
  - 55 / 55 ppb
- Filmore (2011)
  - 62 / 60 ppb

Why high ozone in western Utah?



- Not sure yet, but….
- Biogenic VOCs
  - High ozone events in spring to early summer
- Potential transport of ozone precursors
  - NO_x and VOCs
  - Las Vegas, Los Angeles
  - Coal-fired power plants in Nevada and Utah


Potential sources of ozone precursors
Nevada
Utah
San Francisco
California
Dominant wind direction
Las Vegas
Los Angeles
KEY
Power plant
DAQ ozone site
Other ozone sites

Ozone NAAQS

- All of Utah currently in attainment
- Erda had highest ozone in 2011
- Park City and Huntsville surprisingly high
- If standard is lowered to ≤70 ppb:
  - Potential nonattainment in counties of:
    - Davis, Salt Lake, Weber (all)
    - **Beaver, Box Elder, Carbon, Summit, Tooele, Utah, Wasatch, Washington**
    - Uinta Basin – Brock LeBaron

Future Directions

- Surprising results in 2011
  - More questions than answers
- Ozone saturation studies
  - Summit County
  - Tooele County
- Long-range transport issue
  - NO_x in West Desert?
- Focus on Great Salt Lake

Questions?