



# **Air Quality Forecast Comparison for Summer 2012**

**NOAA Air Quality Forecaster Focus Group Workshop  
September 13 – 14, 2012**

**Laura Landry  
Senior Meteorologist**

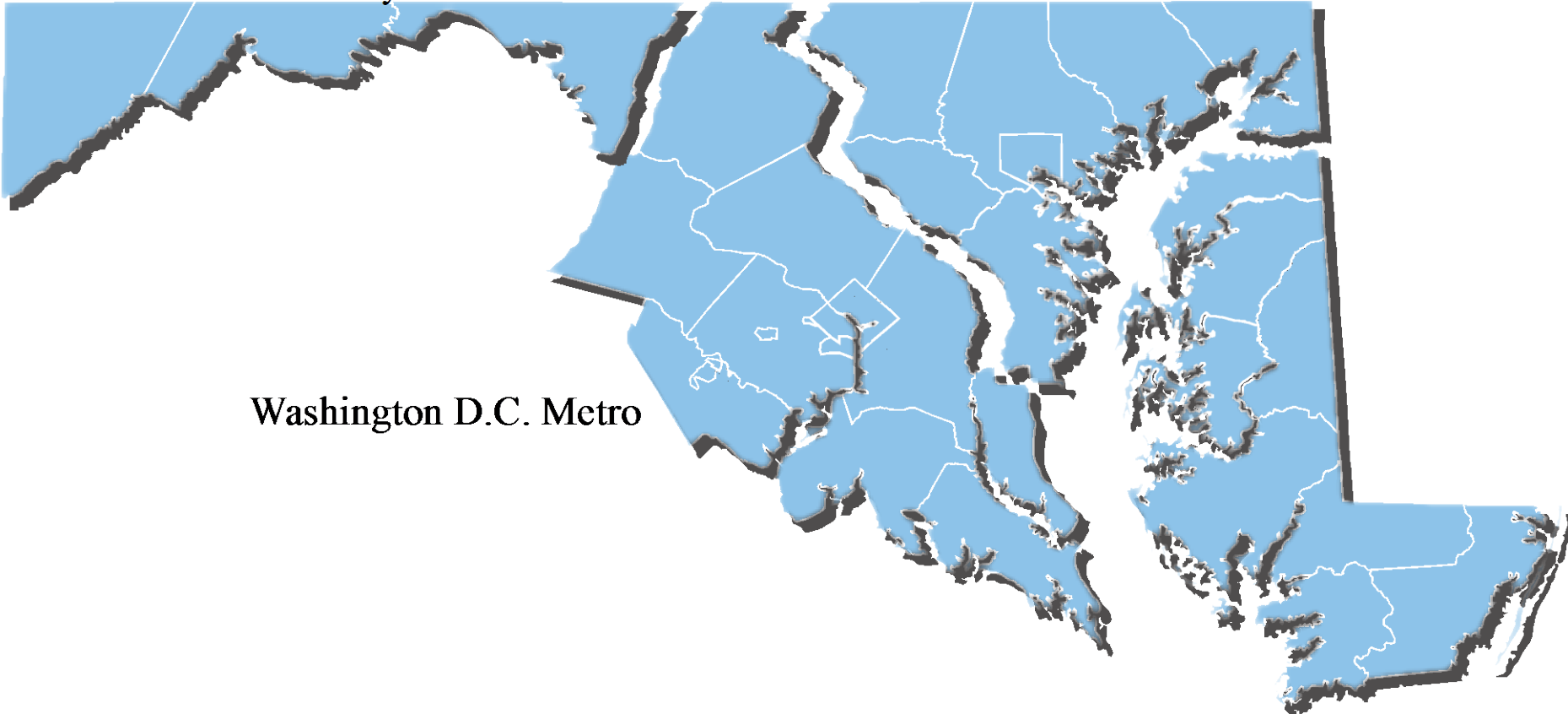
# Forecast Regions

Western Maryland

Baltimore Metro

Washington D.C. Metro

Eastern Shore



# Ozone Season 2012

- 29 Maryland ozone exceedance days of the 75 ppb 8-hour NAAQS\* (27 days in 2011, 43 in 2010)
  - 26 Code Orange days
  - 3 Code Red days
  - June 29, 2012, Maryland's worst day of the season
    - All MDE monitors  $\geq$  85 ppb for 8-hour average
      - Last instances where all MDE monitors exceeded the current NAAQS was 2003
      - MDE had 15 monitors in 2003 and 18 monitors in 2012
    - Highest 8-hour average was 113 ppb at Horn Point monitor on the Eastern Shore
    - Highest 1-hour average was 130 ppb at Essex in the Baltimore Metro region

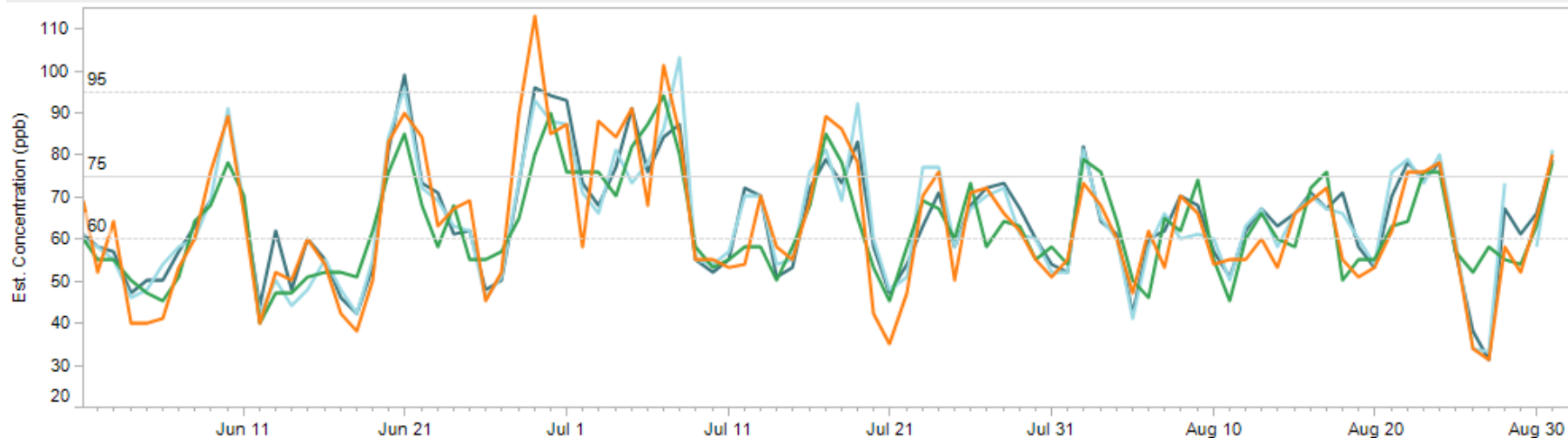
# Forecast Statistics

<b>Statistic</b>	<b>Units</b>	<b>Definition</b>
Percent Correct	%	Percent of forecasts correctly predicted for event or non-event.
Probability of Detection (POD)	%	Percent of times a forecast of higher pollution verified.
False Alarm Rate (FAR)	%	Percent of times a forecast of higher pollution did not verify.
Bias	AQI	Indicates, on average, if the forecasts are underpredicted or overpredicted. Value closer to 1 are best where values < 1 are underprediction.
Mean Absolute Error (MAE)	ppb	Average “closeness” between the forecast and observed values.

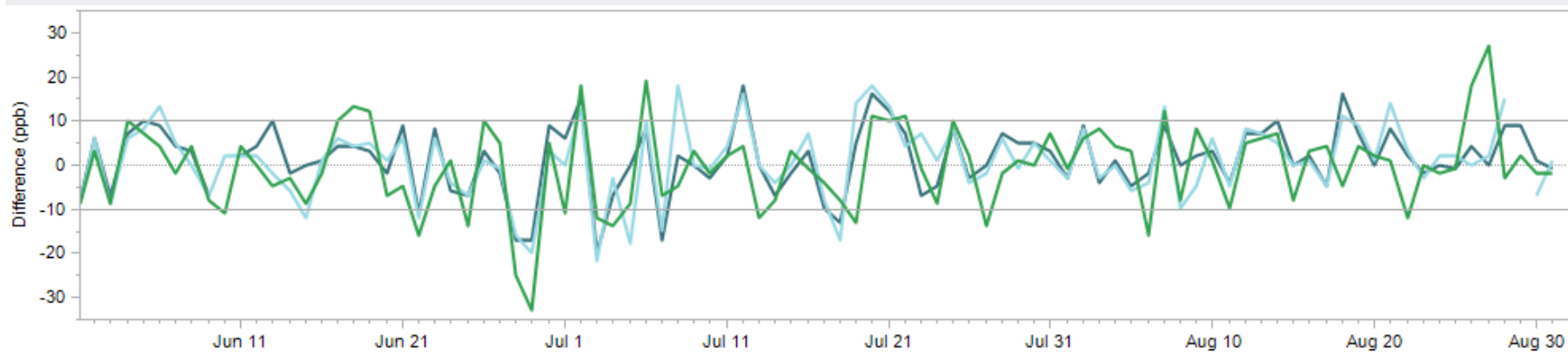
Source: EPA Guidelines for Developing an Air Quality (Ozone and PM2.5) Forecasting Program

# Maryland & Washington Ozone Forecast Verification June - August 2012

## Comparison of Observed to Forecast Ozone



## Forecast Difference from Observed Ozone



### Forecast Statistics at USG Threshold

**2011**

Agency	% Correct	POD	FAR	Bias	MAE (ppb)		
Official	88	67	54	22	36	0.86	7
NOAA 06z	87	67	85	26	61	0.9	6
NOAA 12z	89	65	85	19	59	0.8	6

### Forecast Source

- Observed
- Official
- NOAA 06z
- NOAA 12z

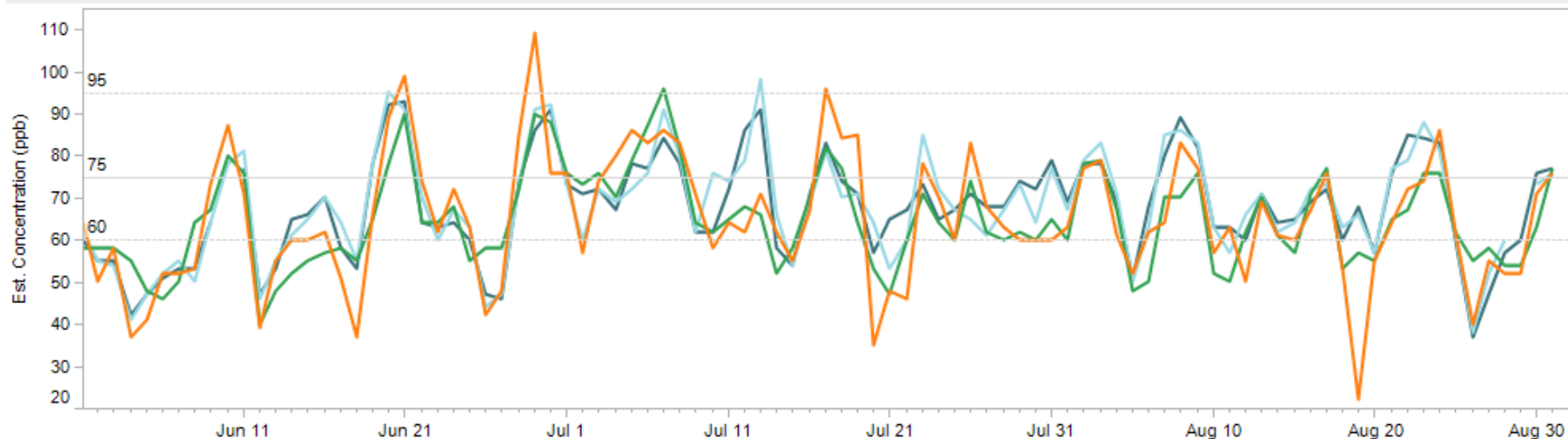
### Region

- Eastern Shore
- Metro Baltimore
- Metro Washington
- Western Maryland

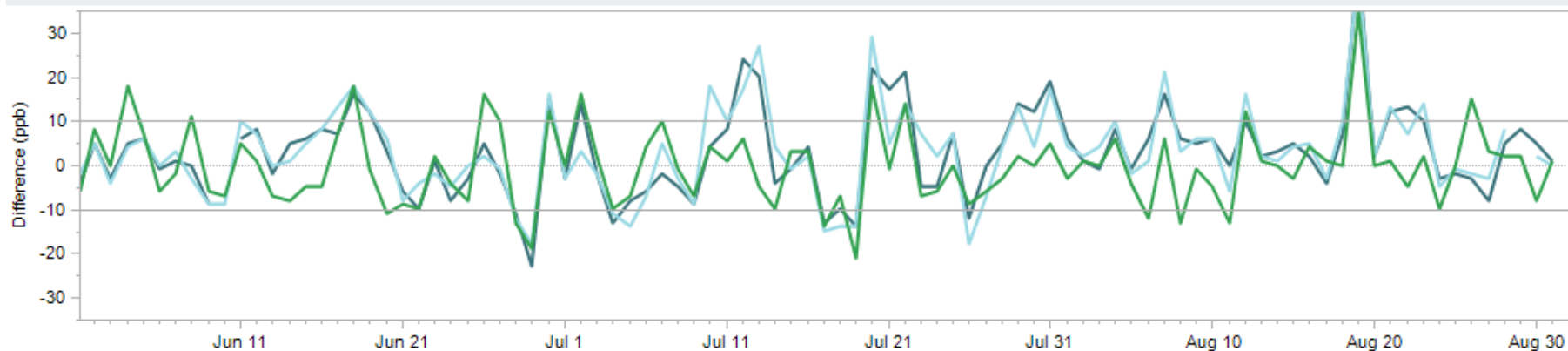
Concentrations are within +/- 2 ppb as derived from AQI values.  
Sources: MDE, MWCOC, VADEQ, PSU, AIRNow Tech

# Maryland & Washington Ozone Forecast Verification June - August 2012

## Comparison of Observed to Forecast Ozone



## Forecast Difference from Observed Ozone



### Forecast Statistics at USG Threshold

Agency	% Correct	POD	FAR	Bias	MAE (ppb)		
Official	89	73	<b>61</b>	20	<b>26</b>	0.91	7
NOAA 06z	81	68	<b>86</b>	40	<b>58</b>	1.14	8
NOAA 12z	82	71	<b>86</b>	40	<b>59</b>	1.19	8

**2011**

### Forecast Source

- Observed
- Official
- NOAA 06z
- NOAA 12z

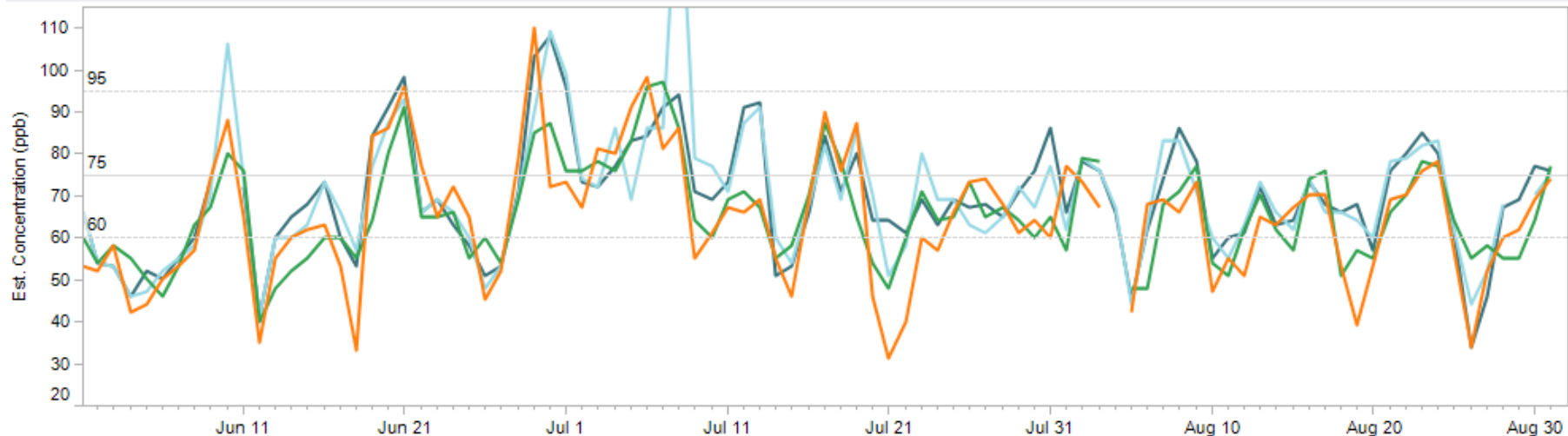
### Region

- Eastern Shore
- Metro Baltimore
- Metro Washington
- Western Maryland

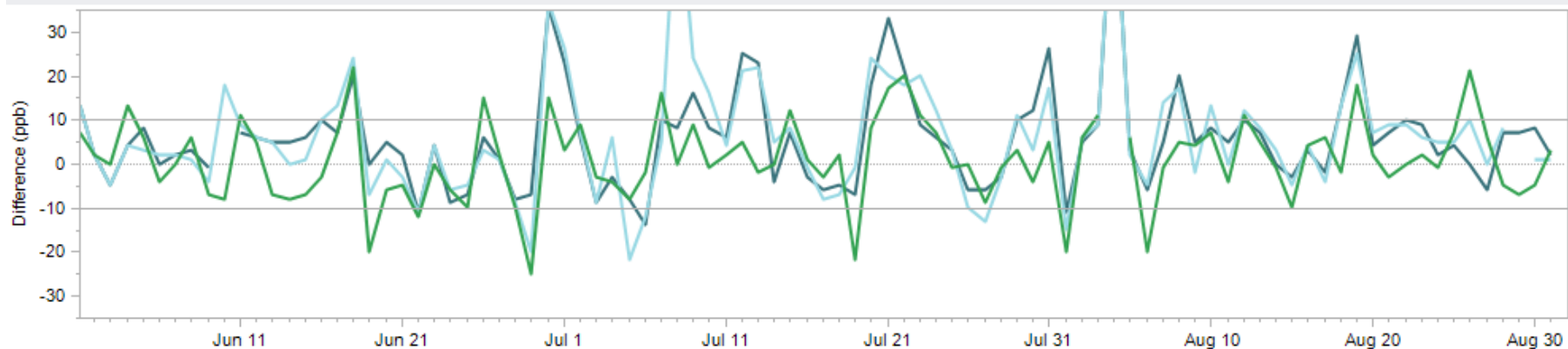
Concentrations are within +/- 2 ppb as derived from AQI values.  
Sources: MDE, MWCOG, VADEQ, PSU, AIRNow Tech

# Maryland & Washington Ozone Forecast Verification June - August 2012

## Comparison of Observed to Forecast Ozone



## Forecast Difference from Observed Ozone



### Forecast Statistics at USG Threshold

Agency	% Correct	POD	FAR	Bias	MAE (ppb)		
Official	86	72	<b>79</b>	38	<b>40</b>	1.17	7
NOAA 06z	77	67	<b>94</b>	56	<b>68</b>	1.5	10
NOAA 12z	79	71	<b>89</b>	54	<b>70</b>	1.53	9

**2011**

### Forecast Source

- Observed
- Official
- NOAA 06z
- NOAA 12z

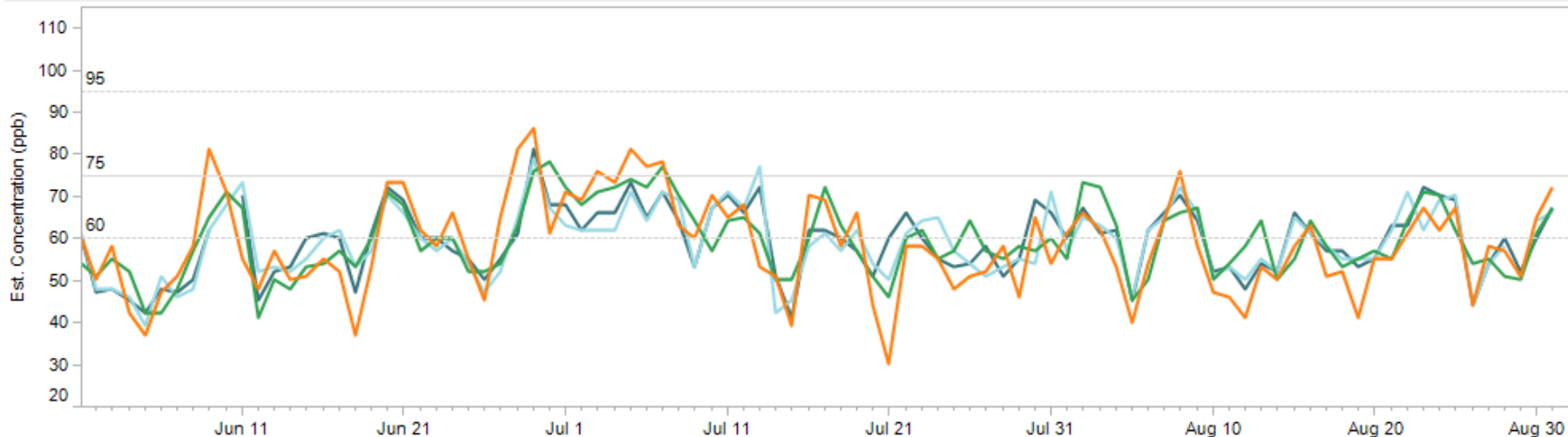
### Region

- Eastern Shore
- Metro Baltimore
- Metro Washington
- Western Maryland

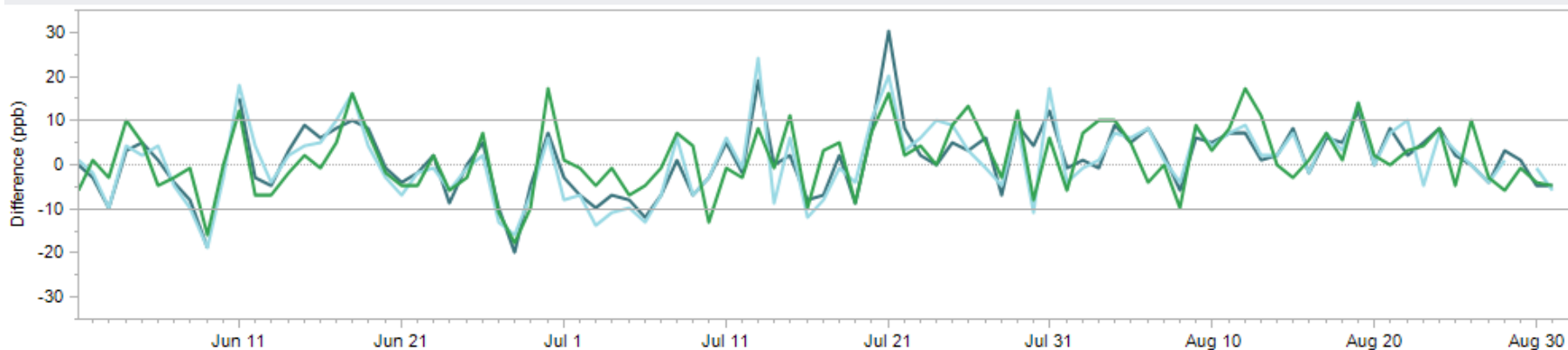
Concentrations are within +/- 2 ppb as derived from AQI values.  
Sources: MDE, MWCOG, VADEQ, PSU, AIRNow Tech

# Maryland & Washington Ozone Forecast Verification June - August 2012

## Comparison of Observed to Forecast Ozone



## Forecast Difference from Observed Ozone



### Forecast Statistics at USG Threshold

**2011**

Agency	% Correct	POD	FAR	Bias	MAE (ppb)
Official	92	25 <b>0</b>	33 <b>0</b>	0.38	6
NOAA 06z	91	13 <b>0</b>	50 <b>100</b>	0.25	7
NOAA 12z	92	13 <b>0</b>	0 <b>100</b>	0.13	6

### Forecast Source

- Observed
- Official
- NOAA 06z
- NOAA 12z

### Region

- Eastern Shore
- Metro Baltimore
- Metro Washington
- Western Maryland

Concentrations are within +/- 2 ppb as derived from AQI values.  
Sources: MDE, MWCOG, VADEQ, PSU, AIRNow Tech



# Summary

- ❑ Generally in Maryland, NOAA 06z and 12z have improved in their forecast statistics
  - Seem to approach levels of Official forecasts in most regions
  - Does not appear that NOAA 12z does better than NOAA 06z
  - Official forecast often has the best bias and false alarm rate
- ❑ POD/FAR 2012 to 2011
  - Official forecasts were very similar to 2011 with some improvement
  - NOAA models showed significant improvement in FAR; however, this lead to some decrease in POD

# Contacts

Laura Landry  
410-537-3122

[llandry@mde.state.md.us](mailto:llandry@mde.state.md.us)

Air Monitoring Program  
Air and Radiation Management Administration

**Maryland Department of the Environment**  
1800 Washington Boulevard | Baltimore, MD 21230  
410-537-3000 | TTY Users: 1-800-735-2258  
[www.mde.state.md.us](http://www.mde.state.md.us)