**Late springtime ozone enhancement occurs yearly in the sparsely populated agricultural area of the Upper Midwest.**

* Eastern SD, Western and Southern MN, northern IA and SW Wisconsin (and probably areas of the entire Upper Midwest “corn belt”)
* Highest ozone occurs in a small two week timeframe in late May and early June as warmer, summerlike temperature first occur in the Region
  + This sparsely populated, high latitude region can see some of the highest ozone in the U.S. during this short timeframe
  + Exceedances of the NAAQS occur (see yearly Tables below)
    - At least 8 rural area exceedances in the area in 2018, 7 in the area in 2019, 1 in 2020 thus far
  + NAAQS violations (4th MDA8) do not appear to be an issue due to the small two week time window that the highest ozone occurs
* Causes – conceptual model
  + High levels Satellite NO2 appear in this area in the late spring
  + Sources of NO2
    - Peak time for soil NOx in the region?
    - The yearly drying of flooded rivers and streams, and/or flooded farmland?
      * The amount of flooding varies by year
    - Farming begins for the season?
      * Tilling of fields, crop burning?, fertilizer application?
  + Emissions from large metros (Minneapolis, MN, Chicago, Ill) and smaller metros (Sioux Falls, SD and Des Moines, IA) likely influence some, but not main cause, especially when taking into account meteorology (surface winds) on the high ozone days.

**2018 Ozone Information**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **# of exceedances** | **Max MDA8 (ppb)** | **Date of Max MDA8** | **4th High**  **(ppb)** |
| Brookings, SD | 1 | 71 | 2018-06-05 | 67 |
| Sioux Falls, SD | 3 | 75 | 2018-05-27 | 69 |
| Detroit Lakes, MN | 0 | 70 | 2018-05-24 | 63 |
| Rochester, MN | 0 | 66 | 2018-05-27 | 58 |
| Eu Claire, WI | 1 | 79 | 2018-05-27 | 66 |
| La Crosse, WI | 0 | 68 | 2018-05-29 | 62 |
| Emmitsburg, IA | 1 | 73 | 2018-05-27 | 67 |
| Waterloo, IA | 2 | 73 | 2018-05-29 | 68 |

2018 Summary: 8 Ozone exceedances in the “agriculture” area of eastern SD, Western and Southern MN, northern IA and SW Wisconsin occurring in a two timeframe in late May and early June.

**2019 Ozone**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **# of exceedances** | **Max MDA8 (ppb)** | **Date of Max MDA8** | **4th High**  **(ppb)** |
| Brookings, SD | 5 | 78 | 2019-05-30 | 71 |
| Sioux Falls, SD | 1 | 72 | 2019-06-06 | 65 |
| Detroit Lakes, MN | 1 | 72 | 2019-05-30 | 59 |
| Rochester, MN | 0 | 59 | 2019-05-16 | 54 |
| Eu Claire, WI | 0 | 67 | 2019-05-31 | 56 |
| La Crosse, WI | 0 | 64 | 2019-06-08 | 58 |
| Emmitsburg, IA | 0 | 68 | 2019-06-06 | 65 |
| Waterloo, IA | 0 | 67 | 2019-06-06 | 61 |

2019 Summary: 7 Ozone exceedances in the “agriculture” area of eastern SD, Western MN, with 5 occurring at Brookings, SD (population – 22,000).

**2020 Ozone Information**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **# of exceedances** | **Max MDA8 (ppb)** | **Date of Max MDA8** | **4th High MDA8**  **(ppb)** |
| Brookings, SD | 0 | 66 | 2019-05-30 | - |
| Sioux Falls, SD | 0 | 67 | 2019-06-06 | - |
| Detroit Lakes, MN | 1 | 71 | 2020-06-02 | - |
| Rochester, MN | 0 | 70 | 2020-06-04 | - |
| Eu Claire, WI | 0 | 68 | 2019-06-08 | - |
| La Crosse, WI | 0 | 68 | 2020-06-04 | - |
| Emmitsburg, IA | 0 | 66 | 2020-06-02 | - |
| Waterloo, IA | 0 | 66 | 2020-06-08 | - |