

**Table 2. 2008 Summary of 8-hour average ozone concentrations (ppb).**

| National Park Unit                                  | Site Name                   | Valid Number of Days | 1 <sup>st</sup> Highest | 2 <sup>nd</sup> Highest | 3 <sup>rd</sup> Highest | 4 <sup>th</sup> Highest <sup>a</sup> | 5 <sup>th</sup> Highest | # Days with 8-Hour Average O <sub>3</sub> Values ≥76 ppb <sup>a</sup> |
|---|-----------------------------|----------------------|-------------------------|-------------------------|-------------------------|--------------------------------------|-------------------------|---|
| <b>Sites operated by the National Park Service</b>  |                             |                      |                         |                         |                         |                                      |                         |   |
| Big Bend  | K-Bar Ranch Road            | 349                  | 69                      | 68                      | 67                      | 65                                   | 65                      | 0   |
| Canyonlands   | Island in the Sky           | 354                  | 75                      | 73                      | 72                      | 71                                   | 68                      | 0   |
| Chiricahua  | Entrance Station            | 361                  | 73                      | 69                      | 69                      | 68                                   | 68                      | 0   |
| Craters of the Moon                                 | Visitor Center              | 358                  | 71                      | 69                      | 69                      | 67                                   | 65                      | 0   |
| Death Valley  | Park Village                | 349                  | 94                      | 87                      | 80                      | 77                                   | 77                      | 5   |
| Denali  | Headquarters                | 354                  | 76                      | 72                      | 69                      | 68                                   | 67                      | 1   |
| Glacier   | West Glacier Horse Stables  | 352                  | 59                      | 58                      | 58                      | 57                                   | 56                      | 0   |
| Grand Canyon  | The Abyss                   | 353                  | 73                      | 71                      | 71                      | 71                                   | 70                      | 0   |
| Great Basin   | Maintenance Yard            | 328                  | 76                      | 73                      | 73                      | 71                                   | 71                      | 1   |
| Great Smoky Mountains                               | Clingmans Dome              | 185                  | 86                      | 86                      | 85                      | 80                                   | 78                      | 9   |
| Great Smoky Mountains                               | Cove Mountain               | 361                  | 83                      | 81                      | 80                      | 79                                   | 78                      | 7   |
| Great Smoky Mountains                               | Look Rock                   | 357                  | 87                      | 83                      | 83                      | 82                                   | 82                      | 14  |
| Joshua Tree   | Black Rock                  | 352                  | 110                     | 107                     | 106                     | 105                                  | 105                     | 72  |
| Joshua Tree   | Cottonwood Canyon           | 159                  | 88                      | 86                      | 85                      | 84                                   | 83                      | 17  |
| Lassen Volcanic                                     | Manzanita Lake Fire Station | 345                  | 104                     | 85                      | 84                      | 83                                   | 82                      | 8   |
| Mammoth Cave  | Houchin Meadow              | 363                  | 73                      | 73                      | 71                      | 70                                   | 69                      | 0   |
| Mesa Verde  | Resource Management Area    | 344                  | 71                      | 70                      | 69                      | 69                                   | 68                      | 0   |
| Mount Rainier                                       | Tahoma Woods                | 350                  | 64                      | 57                      | 57                      | 54                                   | 53                      | 0   |
| Petrified Forest                                    | South Entrance              | 323                  | 75                      | 74                      | 73                      | 72                                   | 71                      | 0   |
| Pinnacles   | SW of East Entrance Station | 354                  | 94                      | 87                      | 87                      | 86                                   | 84                      | 12  |
| Rocky Mountain                                      | Long's Peak                 | 355                  | 81                      | 77                      | 77                      | 76                                   | 73                      | 4   |
| Sequoia and Kings Canyon                            | Ash Mountain                | 262                  | 121                     | 120                     | 112                     | 112                                  | 111                     | 74  |
| Sequoia and Kings Canyon                            | Lower Kaweah                | 351                  | 113                     | 104                     | 102                     | 101                                  | 98                      | 73  |
| Shenandoah  | Big Meadows                 | 355                  | 81                      | 80                      | 79                      | 78                                   | 77                      | 5   |
| Voyageurs   | Sullivan Bay                | 290                  | 63                      | 60                      | 60                      | 59                                   | 58                      | 0   |
| Yellowstone   | Water Tank                  | 329                  | 68                      | 67                      | 65                      | 65                                   | 65                      | 0   |
| Yosemite  | Turtleback Dome             | 347                  | 102                     | 101                     | 98                      | 94                                   | 93                      | 33  |
| Zion  | Dalton's Wash               | 352                  | 76                      | 74                      | 73                      | 72                                   | 72                      | 1   |
| <b>Sites operated by cooperating state agencies</b> |                             |                      |                         |                         |                         |                                      |                         |   |
| <i>Acadia</i>                                       | Cadillac Mountain           | 174                  | 78                      | 75                      | 74                      | 74                                   | 73                      | 1   |
| <i>Acadia</i>                                       | McFarland Hill              | 360                  | 70                      | 67                      | 65                      | 64                                   | 62                      | 0   |
| <i>Badlands</i>                                     | Visitor Center              | 361                  | 56                      | 55                      | 54                      | 53                                   | 52                      | 0   |
| <i>Cape Cod</i>                                     | Cape Cod                    | 179                  | 106                     | 86                      | 82                      | 75                                   | 75                      | 3   |
| <i>Chamizal</i>                                     | Chamizal                    | 342                  | 84                      | 84                      | 80                      | 74                                   | 73                      | 3   |
| <i>Congaree</i>                                     | Congaree Bluff              | 355                  | 74                      | 74                      | 74                      | 73                                   | 72                      | 0   |
| <i>Cowpens</i>                                      | State Monitor               | 342                  | 86                      | 81                      | 80                      | 79                                   | 77                      | 5   |
| <i>Everglades</i>                                   | Cutler Road                 | 350                  | 81                      | 77                      | 77                      | 74                                   | 73                      | 3   |
| <i>Great Smoky Mountains</i>                        | Cades Cove                  | 223                  | 78                      | 75                      | 72                      | 72                                   | 71                      | 1   |
| <i>Great Smoky Mountains</i>                        | Purchase Knob               | 206                  | 89                      | 85                      | 81                      | 80                                   | 79                      | 5   |
| <i>Indiana Dunes</i>                                | Ammunition Bunker           | 170                  | 77                      | 67                      | 63                      | 62                                   | 61                      | 1   |
| <i>Mount Rainier</i>                                | Jackson Visitor's Center    | 193                  | 58                      | 52                      | 52                      | 51                                   | 51                      | 0   |
| <i>Saguaro</i>                                      | Pima County                 | 365                  | 80                      | 74                      | 74                      | 74                                   | 73                      | 1   |
| <i>Theodore Roosevelt</i>                           | Painted Canyon Visitor Cntr | 364                  | 66                      | 62                      | 62                      | 61                                   | 61                      | 0   |
| <i>Wind Cave</i>                                    | Visitor Center              | 353                  | 63                      | 62                      | 60                      | 59                                   | 59                      | 0   |

**Table 2. 2008 Summary of 8-hour average ozone concentrations (ppb) (continued).**

| National Park Unit                                   | Site Name                | Valid Number of Days | 1 <sup>st</sup> Highest | 2 <sup>nd</sup> Highest | 3 <sup>rd</sup> Highest | 4 <sup>th</sup> Highest <sup>a</sup> | 5 <sup>th</sup> Highest | # Days with 8-Hour Average O <sub>3</sub> Values ≥76 ppb <sup>a</sup> |
|--|--------------------------|----------------------|-------------------------|-------------------------|-------------------------|--------------------------------------|-------------------------|---|
| <b>Portable ozone monitoring systems<sup>b</sup></b> |                          |                      |                         |                         |                         |                                      |                         |   |
| <u>Agate Fossil Beds</u>                             | Residence Area           | 125                  | 72                      | 71                      | 69                      | 66                                   | 65                      | 0   |
| <u>Assateague Island</u>                             | Maintenance Area         | 159                  | 83                      | 79                      | 76                      | 74                                   | 73                      | 3   |
| <u>Carlsbad Caverns</u>                              | Maintenance Area         | 154                  | 75                      | 73                      | 72                      | 72                                   | 72                      | 0   |
| <u>Colorado</u>                                      | Maintenance Yard         | 172                  | 71                      | 69                      | 69                      | 67                                   | 67                      | 0   |
| <u>Cumberland Gap</u>                                | Hensley Settlement       | 156                  | 76                      | 75                      | 71                      | 70                                   | 70                      | 1   |
| <u>Devil's Tower</u>                                 | Joyner Ridge Trail       | 106                  | 62                      | 62                      | 62                      | 62                                   | 62                      | 0   |
| <u>Dinosaur</u>                                      | West Entrance Housing    | 165                  | 69                      | 67                      | 67                      | 66                                   | 66                      | 0   |
| <u>Joshua Tree</u>                                   | Pinto Wells              | 178                  | 85                      | 83                      | 82                      | <b>81</b>                            | 81                      | 13  |
| <u>Mojave</u>  | Kelso Mountains          | 181                  | 100                     | 96                      | 90                      | <b>86</b>                            | 86                      | 35  |
| <u>Natchez Trace Parkway</u>                         | Dancy Ranger Station     | 90                   | 60                      | 59                      | 59                      | 58                                   | 58                      | 0   |
| <u>Olympic</u>                                       | Hurricane Ridge Portable | 82                   | 69                      | 67                      | 59                      | 58                                   | 52                      | 0   |
| <u>Padre Island</u>                                  | Malaquite Visitor Center | 82                   | 75                      | 70                      | 67                      | 65                                   | 60                      | 0   |
| <u>Yosemite</u>                                      | School Yard              | 124                  | 105                     | 79                      | 77                      | 74                                   | 73                      | 3   |

<sup>a</sup> The primary and secondary National Ambient Air Quality Standard for ozone is 0.075 ppm over an 8-hour period. (An exceedance of the standard occurs when an 8-hour average ozone concentration is greater than or equal to 76 ppb. A violation of the standard occurs when the 3-year average of the fourth highest daily maximum 8-hour average ozone concentration equals or exceeds 76 ppb.) Exceedances of the standard are highlighted here in orange or red.

<sup>b</sup> The Gaseous Pollutant Monitoring Program Portable Ozone Monitoring Systems (POMS) do not meet EPA standards for regulatory monitoring. However, ozone summary statistics from portable systems can be compared to EPA standards for reference purposes.

Note: The color coding break points follow the color categories used on the EPA's AIRNow Web Site (<http://www.airnow.gov>).

Operating agency key: plain text = site operated by the National Park Service  
*italics* = site operated by a state agency  
underline = site operated by the National Park Service, but consisting of non-EPA certified portable instrumentation

Color shading key: 4<sup>th</sup> highest 8-hour average  = 76 - 104 ppb ozone concentration # days with 8-hour average ≥76 ppb  = 4 - 10 days  
 ≥ 105 ppb ozone concentration  > 10 days

### *Annual Ozone Summaries*

In 2008 the primary NAAQS for ozone changed from 0.08 ppm (85 ppb equivalent) over an 8-hour period to 0.075 ppm (76 ppb equivalent) over an 8-hour period ([http://www.epa.gov/ttn/naaqs/standards/ozone/s\\_o3\\_index.html](http://www.epa.gov/ttn/naaqs/standards/ozone/s_o3_index.html)). An exceedance of the standard occurs when an 8-hour average ozone concentration is greater than or equal to 76 ppb. An exceedance of the standard is not the same as a violation. A violation occurs when the 3-year average of the fourth highest daily maximum 8-hour average ozone concentration equals or exceeds 76 ppb. The secondary ozone standard defined by the EPA, which is supposed to protect the environment, is the same as the primary standard. In this report, ozone concentrations are compared to the NAAQS that was in place during the time period reported.

Table 2 summarizes O<sub>3</sub> measurements with respect to the daily maximum 8-hour average concentrations at each NPS monitoring site. The five highest daily maximum 8-hour average ozone concentrations are listed, as well as the total number of days with exceedances of the 8-hour standard. At each site with an EPA-certified monitor, the fourth highest value column and the number of days column are both color-coded to identify sites where the fourth highest daily maximum 8-hour average ozone value exceeded the standard during 2008. Note that other sites may have experienced fewer than four exceedances of the standard, and are not color coded. Ozone summary statistics for POMS are highlighted bold where exceedances occurred. These sites should be compared to EPA standards for reference purposes only.

The map in Figure 2 presents the annual fourth highest 8-hour average ozone concentrations for all network sites listed in Table 2. Ozone values for EPA-certified sites are color-coded to represent values below (green) and above (orange and red) the national standard. Values from portable sites (no color) are included for reference only.

The map in Figure 3 presents the annual number of days which exceeded the 8-hour standard for all network sites listed in Table 2. The data points are color-coded to distinguish between sites that did not exceed NAAQS (green) and those that did (orange and red). Data from portable sites (no color) are included for reference.

## Annual Fourth Highest 8-Hour Average Ozone Concentrations (in ppb)

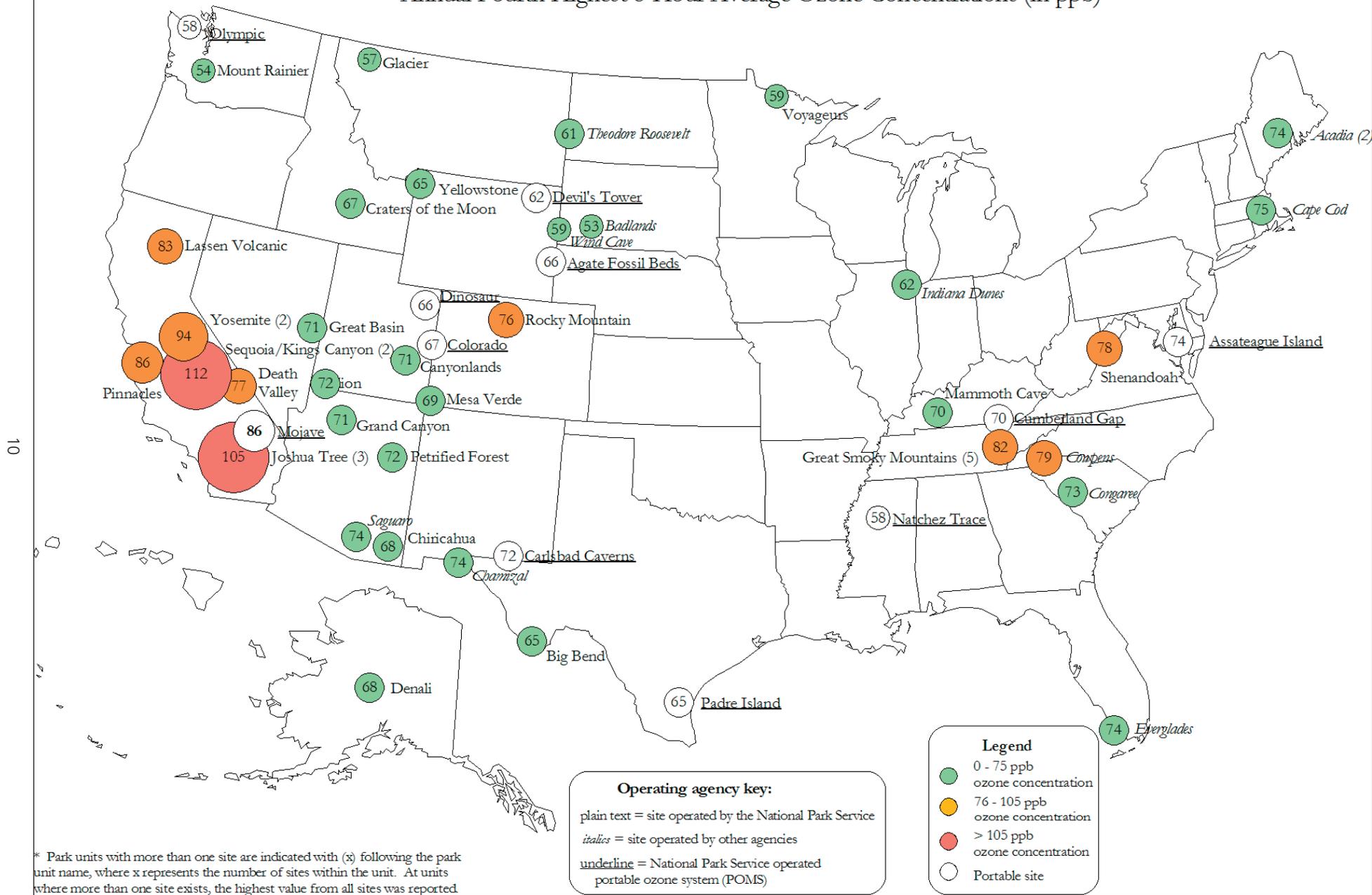


Figure 2. 2008 Annual fourth highest daily maximum 8-hour average ozone concentrations (in ppb).