

US EPA ARCHIVE DOCUMENT

Analysis of 8-Hour Ozone Concentrations in Cass County, Michigan; and Muskegon County, Michigan

The purpose of this paper is to summarize ozone modeling and data analyses for Cass County, Michigan; and Muskegon County, Michigan, to support reclassification of these counties from moderate to marginal nonattainment.

Introduction

On April 15, 2004, the U. S. Environmental Protection Agency (USEPA) designated areas as attainment (or nonattainment) of the 8-hour ozone standard. The nonattainment areas were sorted under either Subpart 1 or Subpart 2 of the Clean Air Act. The Subpart 2 areas are classified as marginal, moderate, serious, or severe based on the area's 8-hour design value calculated using the most recent three years of data. Section 181(a)(4) of the Clean Air Act allows Subpart 2 nonattainment areas to be reclassified if that area would have been classified in another category if the design value in the area were five percent greater or less than the level on which the classification was based. For example, moderate nonattainment areas may be "bumped-down" to marginal nonattainment areas, if their design value is 96 ppb or less. In West Michigan, the following counties are eligible to be bumped-down from moderate to marginal: Cass County, Michigan (2001-2003 design value = 93 ppb); and Muskegon County, Michigan (95 ppb).

The USEPA identified the following criteria to support a classification adjustment (bump-down): request by state, discontinuity (i.e., reclassification must not result in an illogical or excessive discontinuity relative to the classifications of surrounding areas), attainment (i.e., show that the proposed area will be able to attain by the earlier date specified for the lower classification); emission reductions (i.e., show that the area will achieve the appropriate emission reduction necessary to attain by the earlier date); and trends. This paper contains information on ozone air quality, including trends in 8-hour ozone concentrations for the two counties in question, and modeling results for 2007, the attainment year for marginal nonattainment areas.

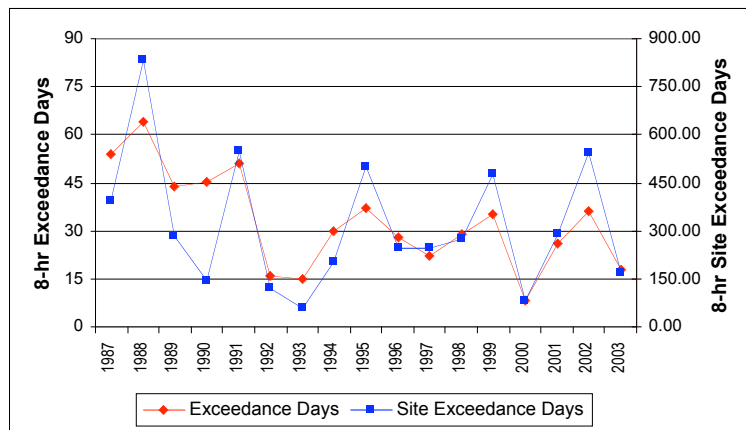
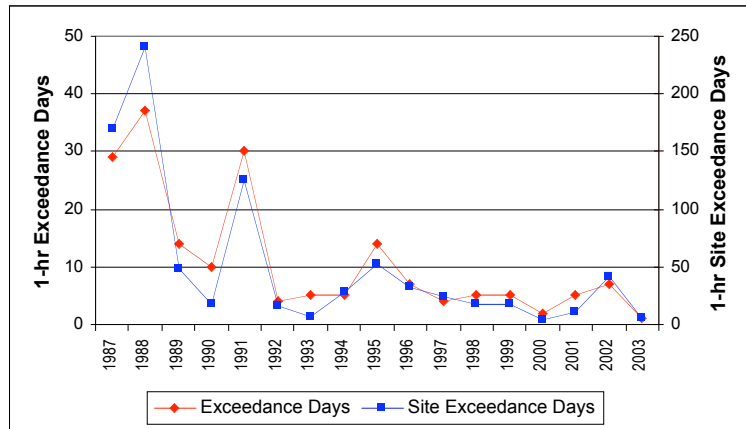
Ozone Air Quality

A few simple parameters are presented here to characterize the change in ozone air quality over time: number of exceedance days, number of site exceedance days, and design value (i.e., average of fourth high concentration over 3-year period).

The figure below shows: (a) the number of exceedance and site exceedances days for the 1-hour ozone standard, (b) the number of exceedance and site exceedances days for the 8-hour ozone standard, and (c) the number of hot days and cooling degree days for the period 1987 – 2003 in the Lake Michigan region. These plots show:

- Ozone is strongly influenced by meteorology. The number of exceedance days (and site exceedance days) is higher during the hotter summers.
- There appears to be a general downward trend in 1-hour and 8-hour ozone levels from the late 1980s through the early 1990's, but little change since then.

- The improvement in ozone air quality since the late 1980s is consistent with the reduction in regional Volatile Organic Compound (VOC) emissions in upwind states due to motor vehicle control programs (e.g., inspection and maintenance, and reformulated gasoline); area source control programs; and stationary source controls. While these control programs have been successful in “shaving” the peak 1-hour ozone levels, additional emission reductions are needed to lower 8-hour ozone levels. Further progress in reducing 8-hour ozone levels is expected to come from reductions in regional Oxides of nitrogen (NOx) emissions (i.e., NOx SIP Call, Wisconsin’s NOx rule, federal nonroad standards, and possible additional federal programs, such as the proposed Interstate Air Quality Rule). (Note, additional discussion of these trends and the expected future improvements is provided in a Lake Michigan Air Directors’ Consortium (LADCO) document titled “Mid-Course Review for 1-Hour Ozone in the Lake Michigan Region”, May 10, 2004.)



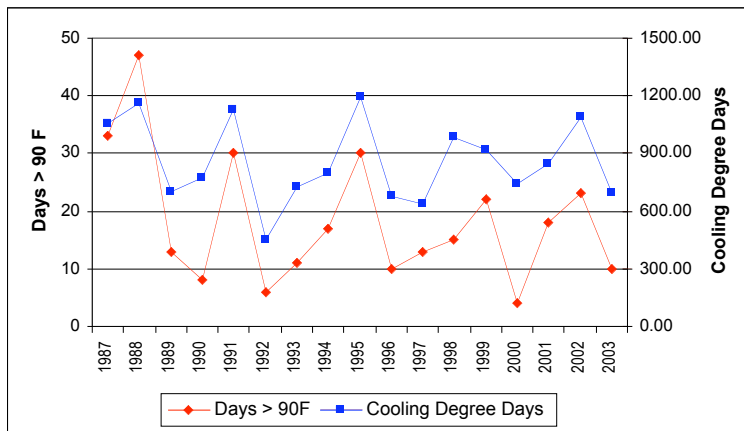


Figure 1. Trends in Ozone and Weather in Lake Michigan Region

Spatial plots of 8-hour design values below also indicate a decrease since the late 1980s, but little change since then.