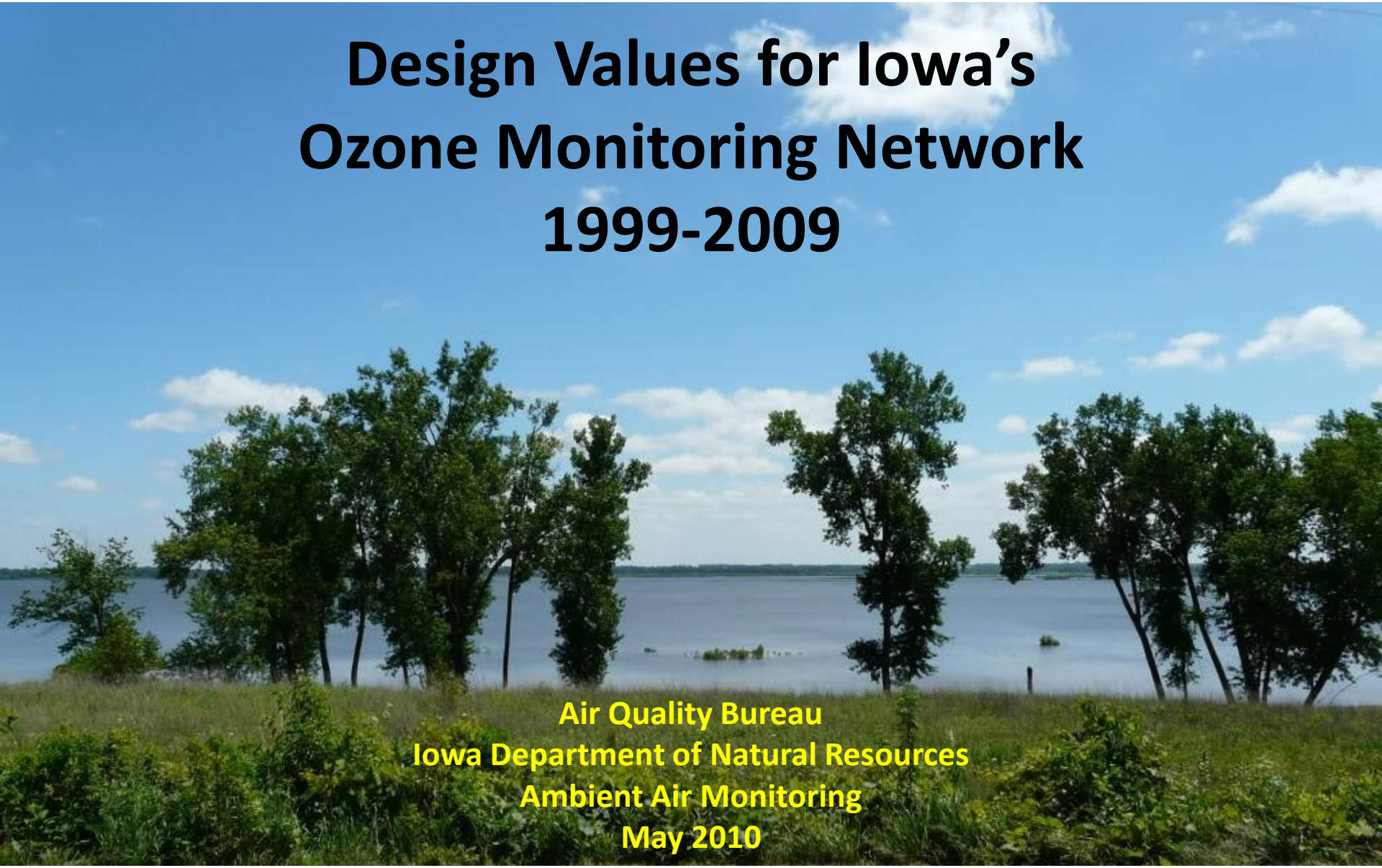
# Design Values for Iowa's Ozone Monitoring Network 1999-2009



Air Quality Bureau
Iowa Department of Natural Resources
Ambient Air Monitoring
May 2010

# Ozone Design Values

The design value is a statistic that is computed from three years of data at an ambient air monitoring site. Design values are used to establish whether EPA's National Ambient Air Quality Standards (NAAQS) are met at a monitoring location. According to the procedures contained in 40 CFR Part 50, the ozone design value is the 3-year average of the annual 4$^{th}$ highest daily maximum 8-hour average ozone concentrations at a monitoring site. In 1997, EPA established that a monitoring site with an ozone design value of 85 parts per billion (ppb) or greater violated the NAAQS. In 2008, EPA lowered this threshold from 85 ppb to 76 ppb.

This report contains tables and graphs of ozone design values for the ten year period between 1999 through 2009. The network's median ozone design value dropped from 70 ppb to 64 ppb over this period. While the air quality improved by 6 ppb over 10 years, these gains were offset by the new, more protective standard. The median level was 82% of the 85 ppb (old) NAAQS at the beginning of the period, and 84% of the 76 ppb (new) NAAQS at the end. Currently (5/2010), EPA has proposed to modify the ozone NAAQS to level between 60 and 70 ppb. The final proposal is due out in August of 2010.

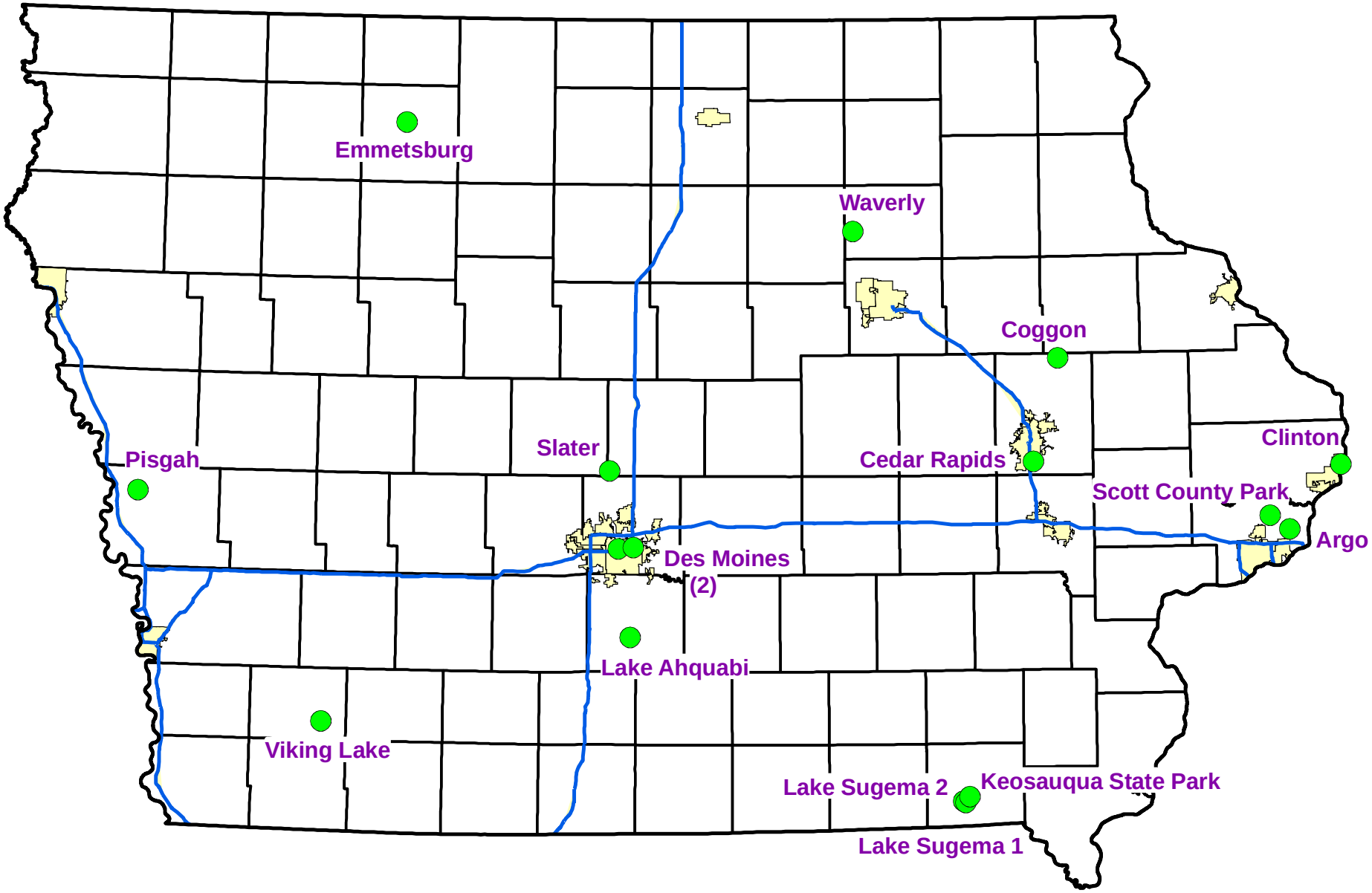
# 1999 – 2009 Ozone Design Values (ppb)

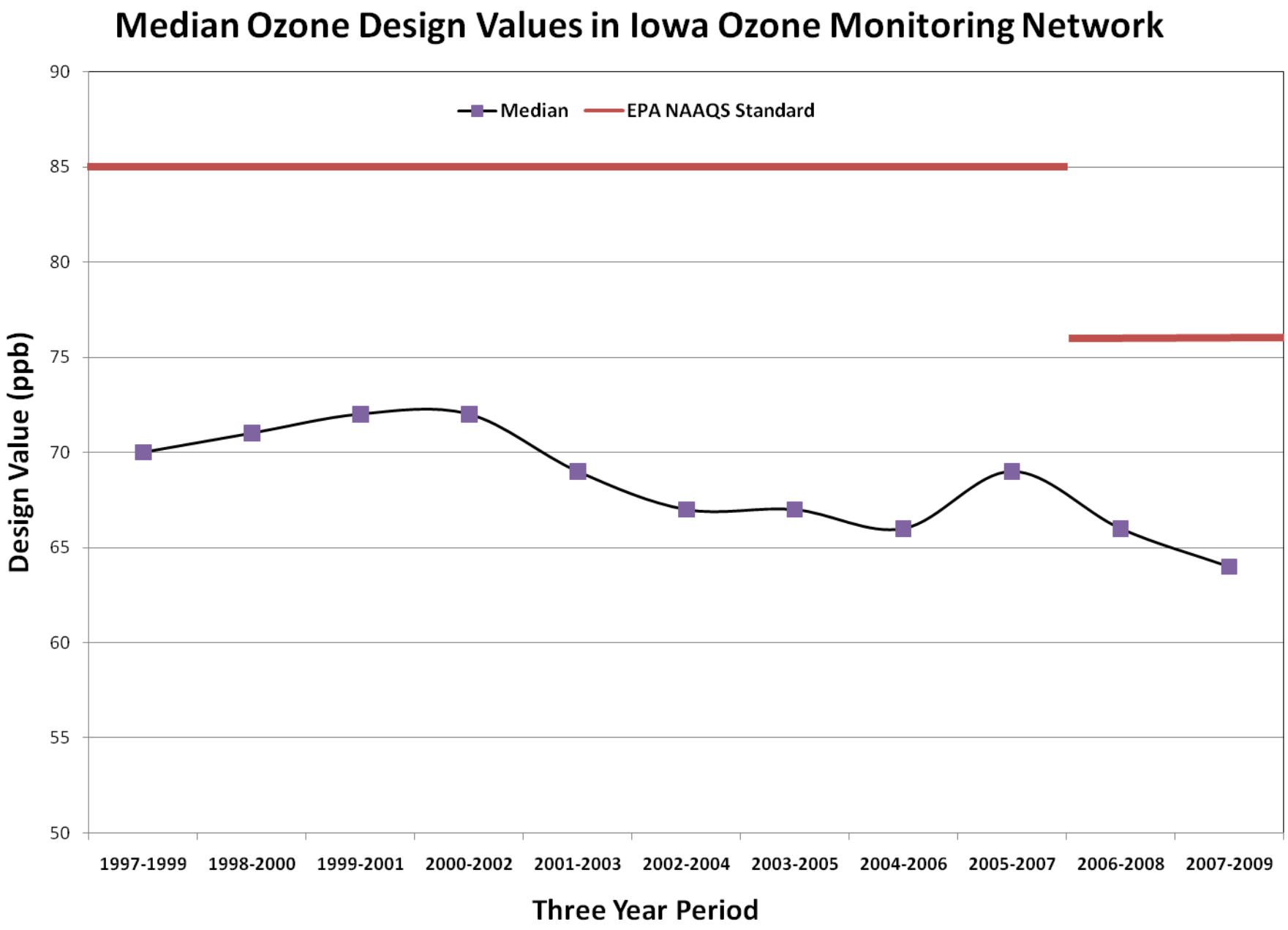
| Three Year Period | Omaha-Council Bluffs Downwind (Pisgah, Highway Maintenance Shed) | Southwest Background (Viking Lake State Park) | Northwest Background (Emmetsburg, Iowa Lakes Community College) | Des Moines Upwind (Indianola, Lake Ahquabi State Park) | Des Moines Metro (Des Moines, Health Department) | Des Moines Metro (Des Moines, Phillips School) | Des Moines Downwind (Slater, Elementary/City Hall) | Cedar Rapids Upwind (Cedar Rapids, Kirkwood College) | Cedar Rapids Downwind (Coggon Elementary School) | Waterloo Downwind (Waverly, Airport) | Southeast Background (Keosauqua State Park) | Southeast Background (Lake Sugema 1) | Southeast Background (Lake Sugema 2) | Davenport Downwind (Scott County Park) | Davenport Downwind (Argo, Highway Maintenance Shed) | Clinton Metro (Clinton, Rainbow Park) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1997-1999** | 72 | | 64 | 66 | | 59 | 72 | | 69 | | 70 | | | | 76 | |
| **1998-2000** | 74 | | 71 | 71 | | 58 | 70 | | 72 | | | | | | 77 | |
| **1999-2001** | 74 | | 69 | 67 | | 60 | 66 | 70 | 73 | | | | | 79 | 77 | 79 |
| **2000-2002** | 77 | | 66 | 63 | | 60 | 64 | 69 | 71 | 72 | | 74 | | 79 | 77 | 78 |
| **2001-2003** | 76 | | 63 | 60 | | 56 | 60 | 69 | 69 | 69 | | 74 | | 79 | 76 | 78 |
| **2002-2004** | 74 | 67 | 62 | 57 | | 56 | 58 | 66 | 67 | 67 | | 72 | | 75 | 73 | 73 |
| **2003-2005** | 75 | 65 | 61 | 61 | | 60 | 58 | 66 | 68 | 67 | | | | 74 | 72 | 73 |
| **2004-2006** | 75 | 64 | 60 | - | | 66 | 59 | 66 | 67 | 65 | | | | 68 | | 69 |
| **2005-2007** | 74 | 68 | 62 | 68 | | | 66 | 71 | 70 | 67 | | | 69 | 69 | | 72 |
| **2006-2008** | 67 | 66 | 58 | 64 | | | 64 | 68 | 67 | 65 | | | 66 | 65 | | 67 |
| **2007-2009** | 64 | 63 | 58 | 63 | 61 | | 62 | 66 | 66 | 64 | | | 64 | 66 | | 67 |

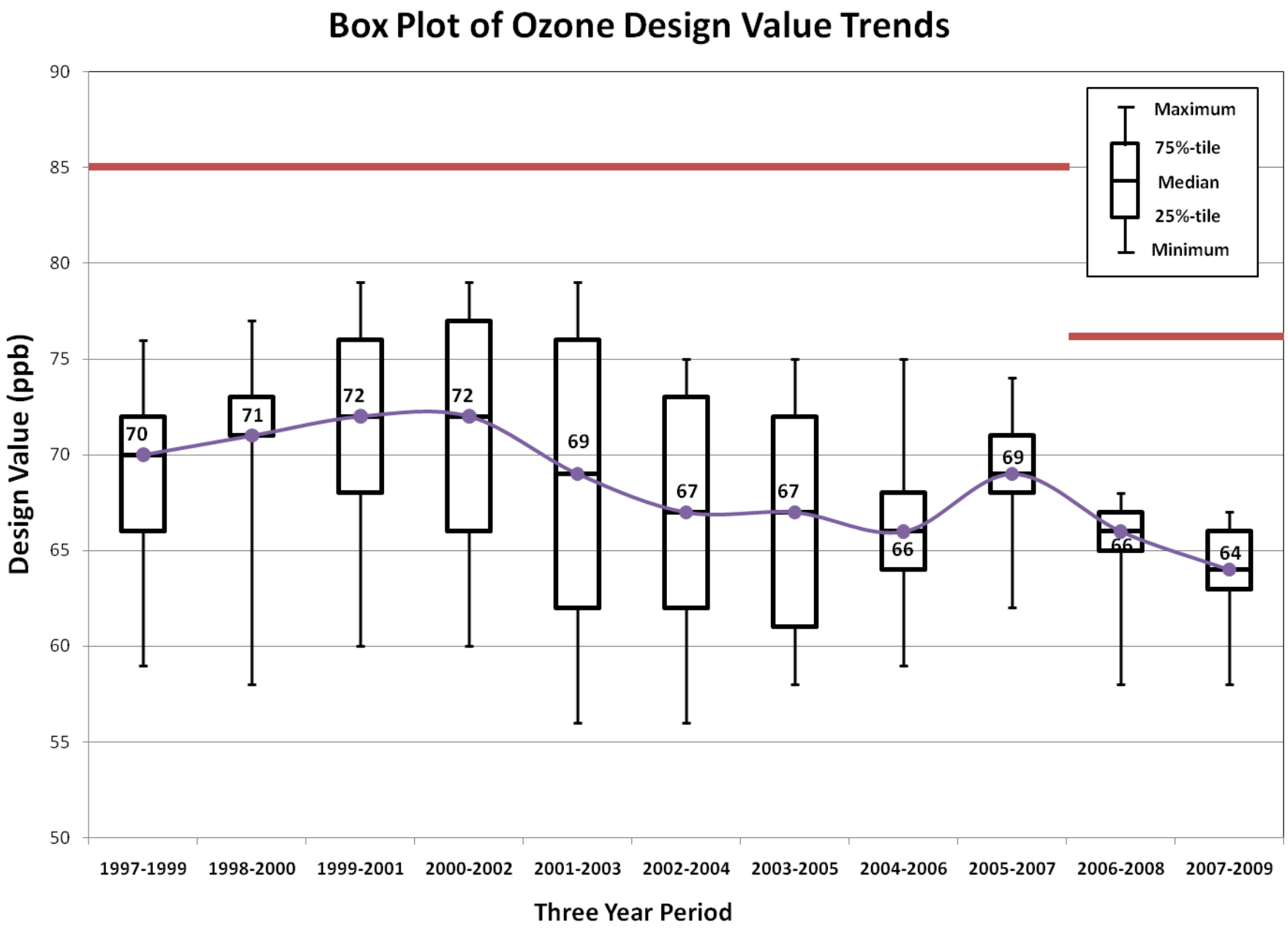
# Iowa Ozone Monitoring Site Information

| Label | City | Site Name | Address | County | AQS Site ID |
|---|---|---|---|---|---|
| Davenport Downwind (Argo) | Argo | Highway Maintenance Shed | Hwy Z-30 1.5 miles N of Argo | Scott | 191632011 |
| Cedar Rapids Upwind (Kirkwood College) | Cedar Rapids | Kirkwood College | 6301 Kirkwood Blvd SW (Iowa Hall) | Linn | 191130028 |
| Clinton Metro (Rainbow Park) | Clinton | Rainbow Park | Roosevelt St. | Clinton | 190450021 |
| Cedar Rapids Downwind (Coggon Elementary) | Coggon | Coggon Elementary School | 408 E Linn St. | Linn | 191130033 |
| Des Moines Metro (Phillips School) | Des Moines | Phillips School | 1701 Lay St. | Polk | 191530058 |
| Des Moines Metro (Public Health Building) | | Health Department | 1907 Carpenter | Polk | 1915530030 |
| Northwest Background (Emmetsburg) | Emmetsburg | Iowa Lakes College | Iowa Lakes Community College | Palo Alto | 191471002 |
| Des Moines Upwind (Lake Ahquabi State Park) | Indianola | Lake Ahquabi | 1650 118th Ave. | Warren | 191810022 |
| Omaha-Council Bluffs Downwind (Pisgah) | Pisgah | Highway Maintenance Shed | 1575 Hwy 183 | Harrison | 190851101 |
| Des Moines Downwind (Slater) | Slater | Slater Elementary | 505 Linn St. | Story | 191690011 |
| | | City Hall | 105 Greene | | |
| Waterloo Downwind (Waverly) | Waverly | Waverly Airport | Waverly Airport | Bremer | 190170011 |
| Southwest Background (Viking Lake State Park) | - | Viking Lake | 2780 Viking Lake Road | Montgomery | 191370002 |
| Davenport Downwind (Scott County Park) | - | Scott County Park | Scott County Park | Scott | 191630014 |
| Southeast Background (Keosauqua State Park) | - | Keosauqua State Park | Keosauqua State Park | Van Buren | 191770004 |
| Southeast Background (Lake Sugema 1) | - | Lake Sugema 1 | 24430 Lacey Trl, Keosauqua Lake Sugema | Van Buren | 191770005 |
| Southeast Background (Lake Sugema 2) | - | Lake Sugema 2 | 24660 Jasmine Rd., Keosauqua Lake Sugema | Van Buren | 191770006 |

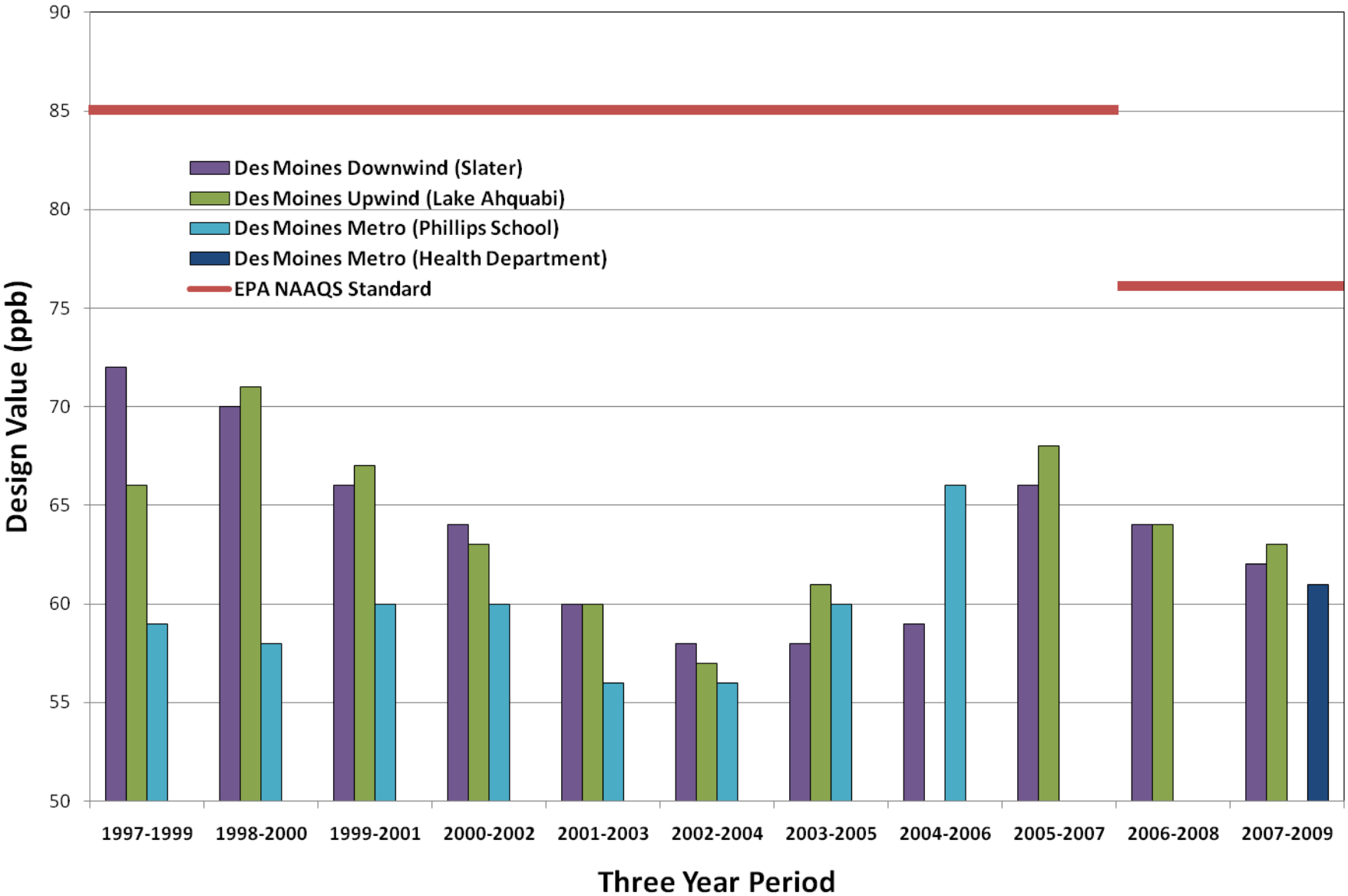
# Monitor Locations for Iowa's Ozone Monitoring Network 1999 - 2009



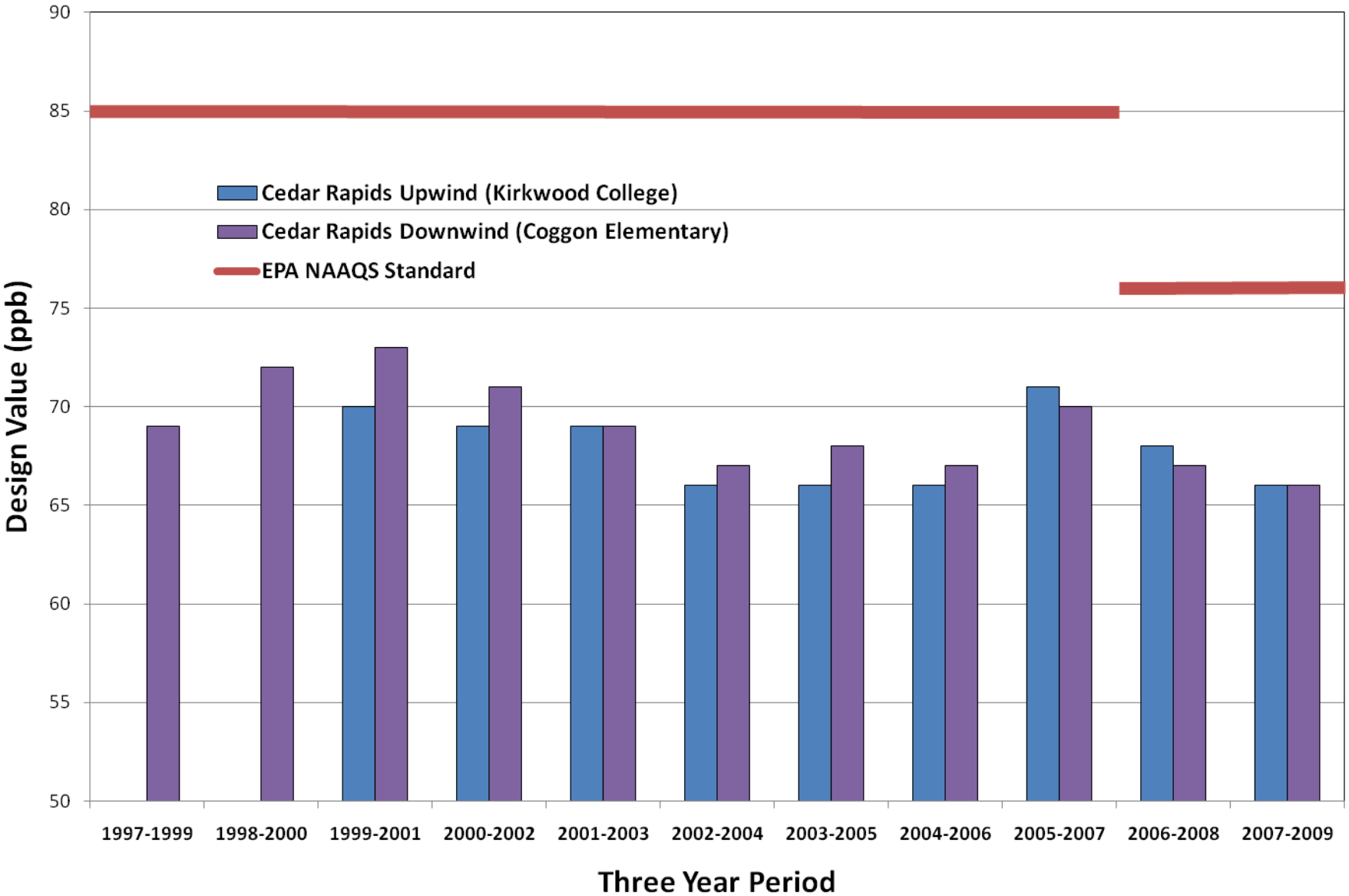

Median Ozone Design Values in Iowa Ozone Monitoring Network
Median
EPA NAAQS Standard
Design Value (ppb)
90
85
80
75
70
65
60
55
50
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period

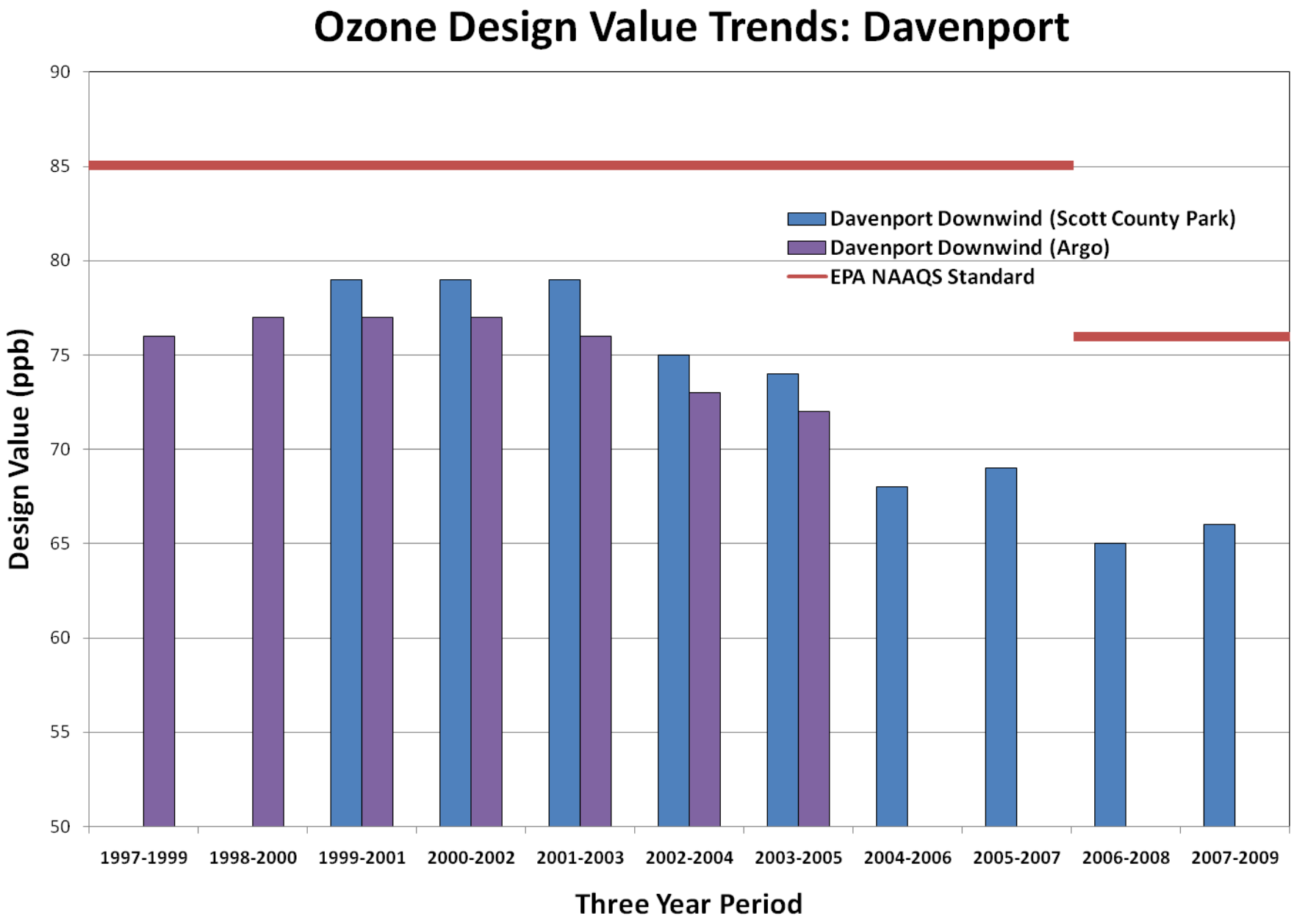

Box Plot of Ozone Design Value Trends
Maximum
75%-tile
Median
25%-tile
Minimum
Design Value (ppb)
90
85
80
75
70
65
60
55
50
70
71
72
72
69
67
67
66
69
66
64
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period

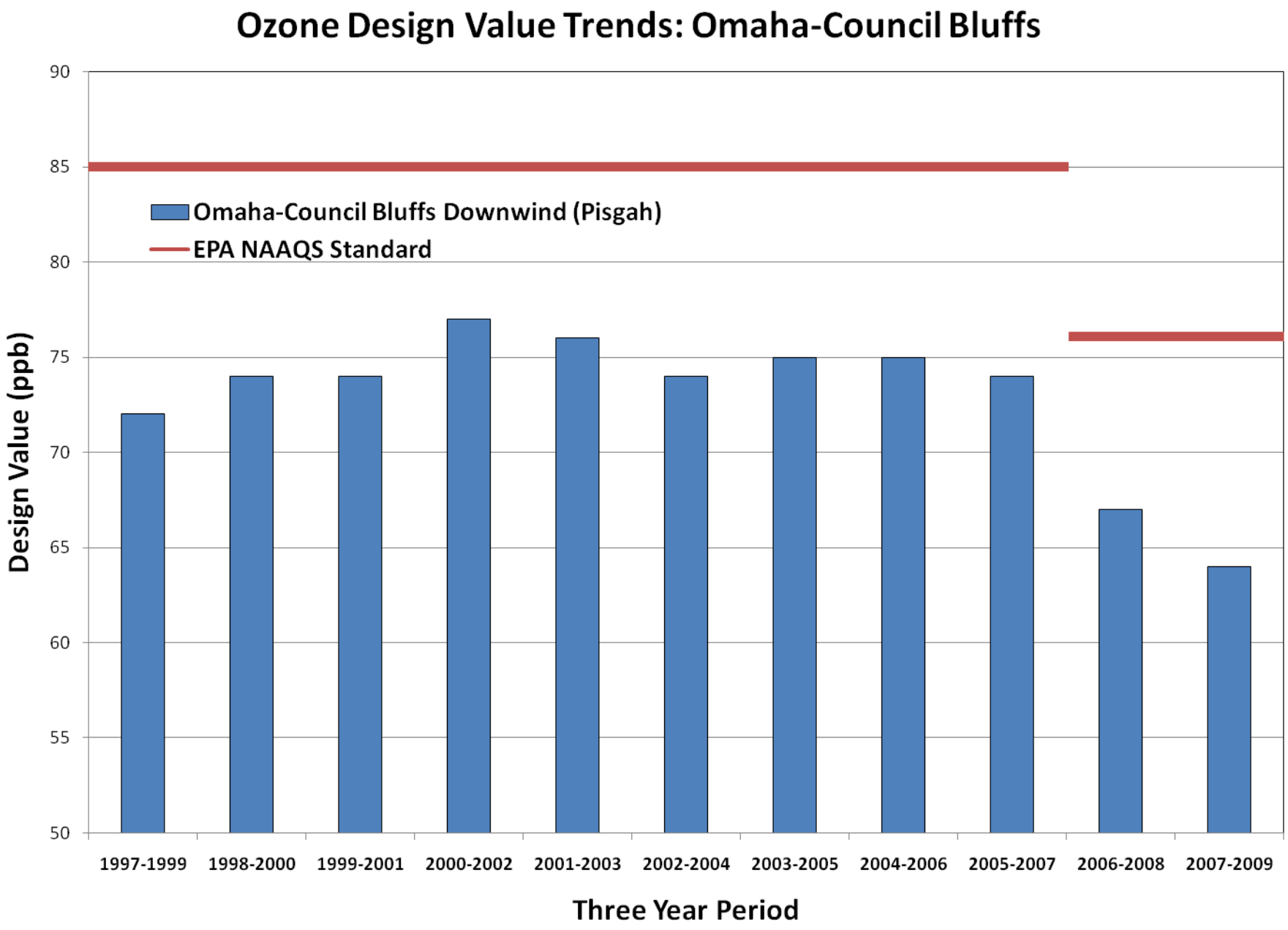
# Ozone Design Value Trends: Des Moines

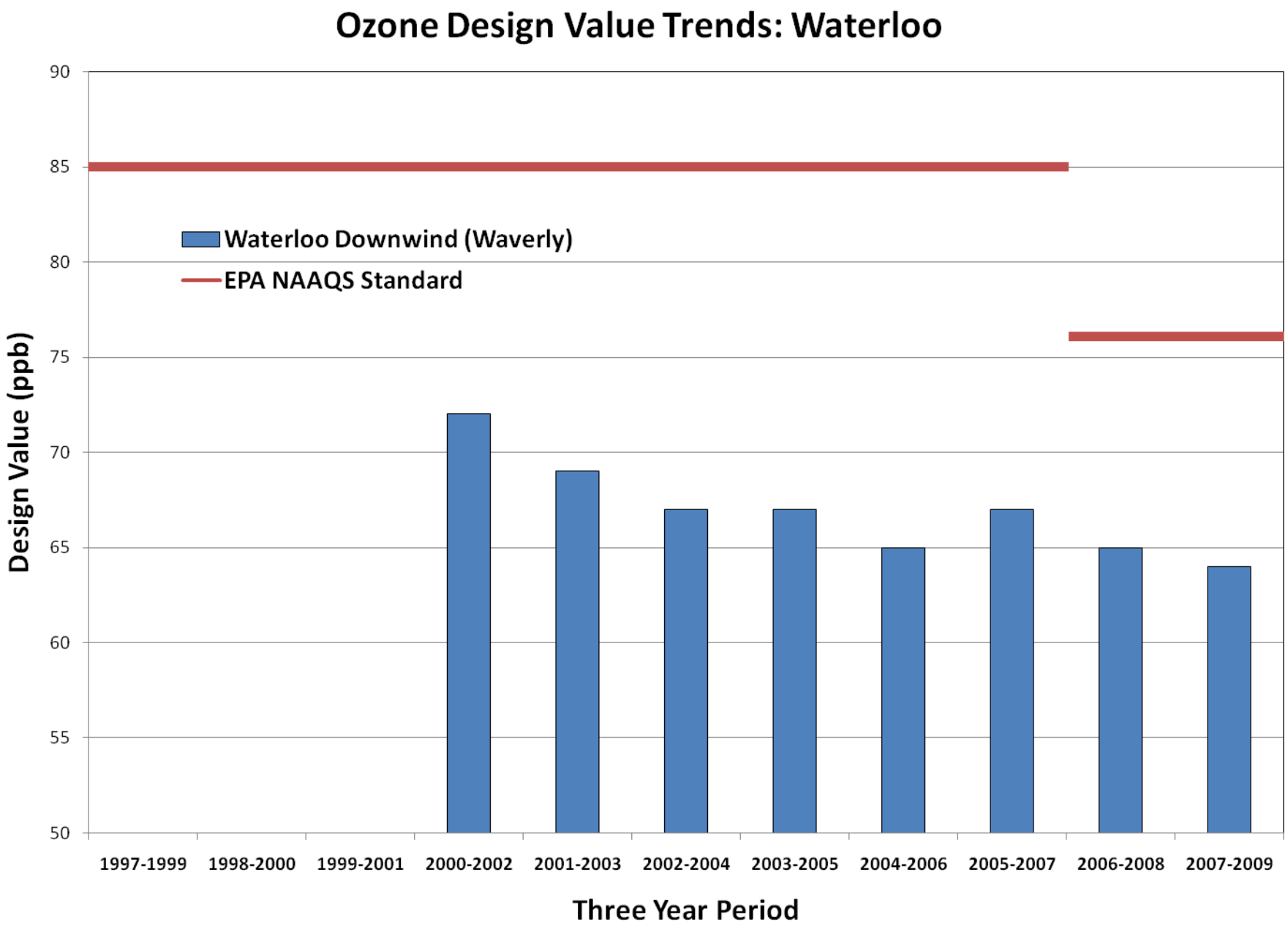


# Ozone Design Value Trends: Cedar Rapids

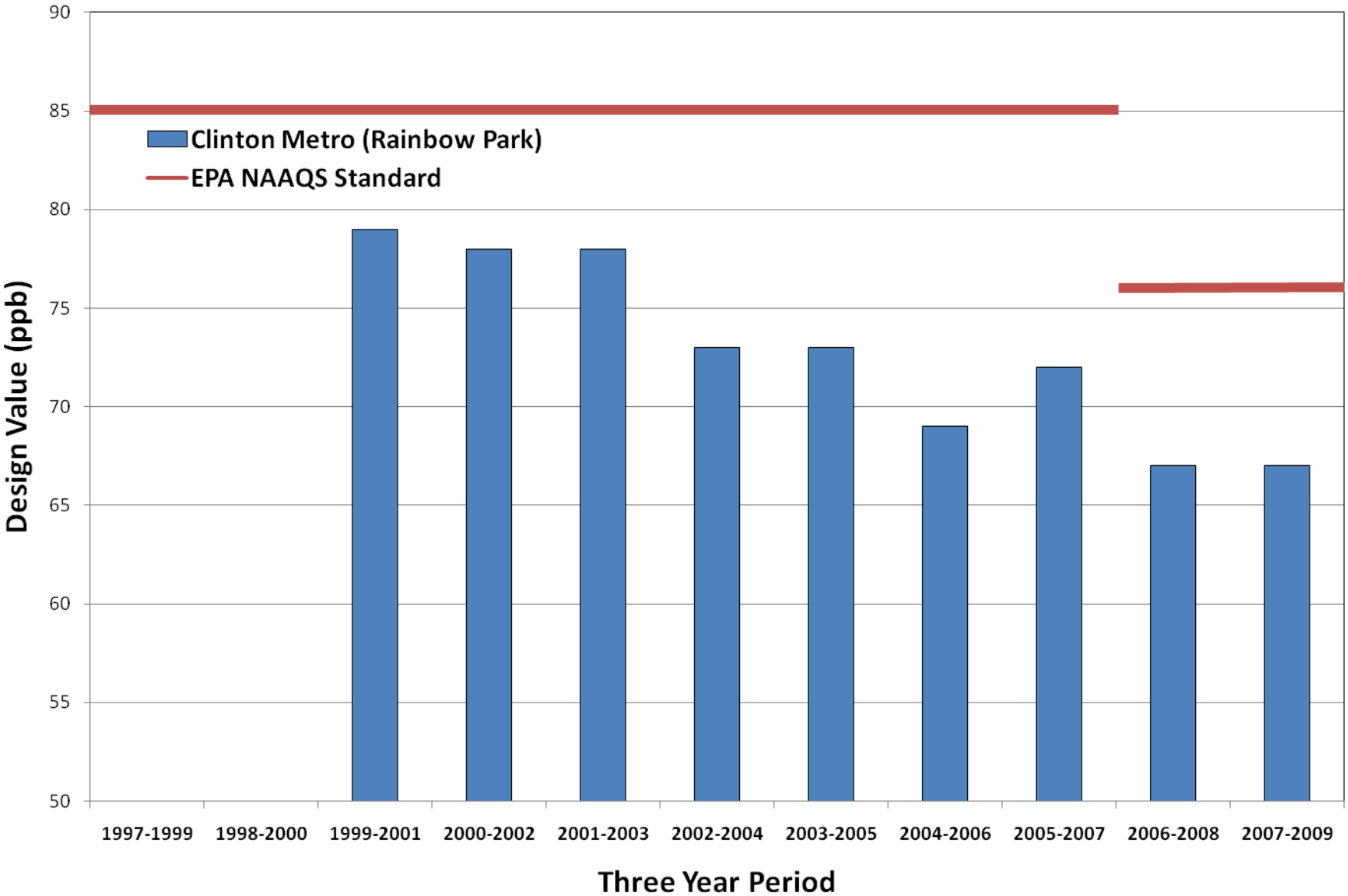


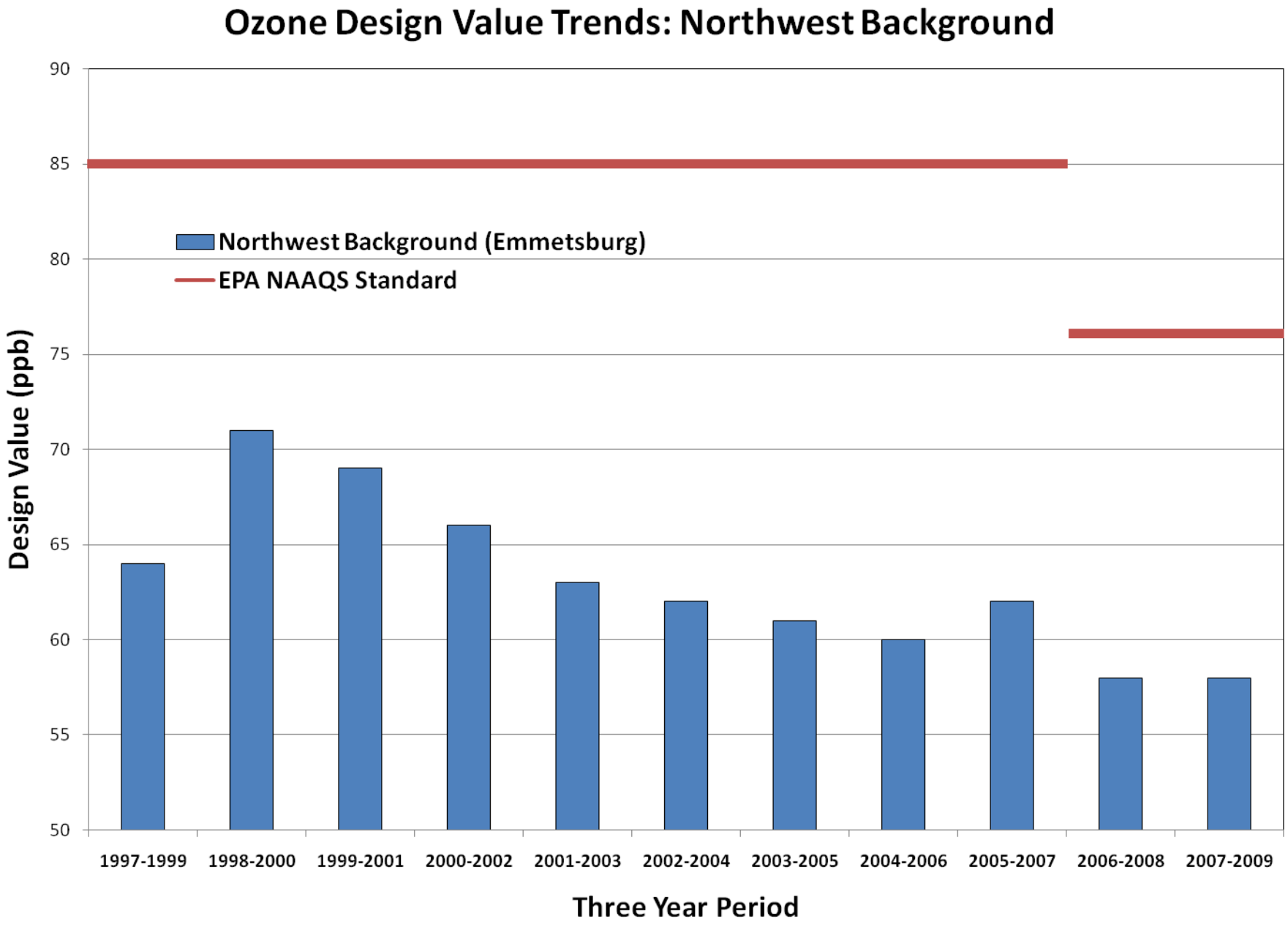

Ozone Design Value Trends: Davenport
Design Value (ppb)
90
85
80
75
70
65
60
55
50
Davenport Downwind (Scott County Park)
Davenport Downwind (Argo)
EPA NAAQS Standard
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period

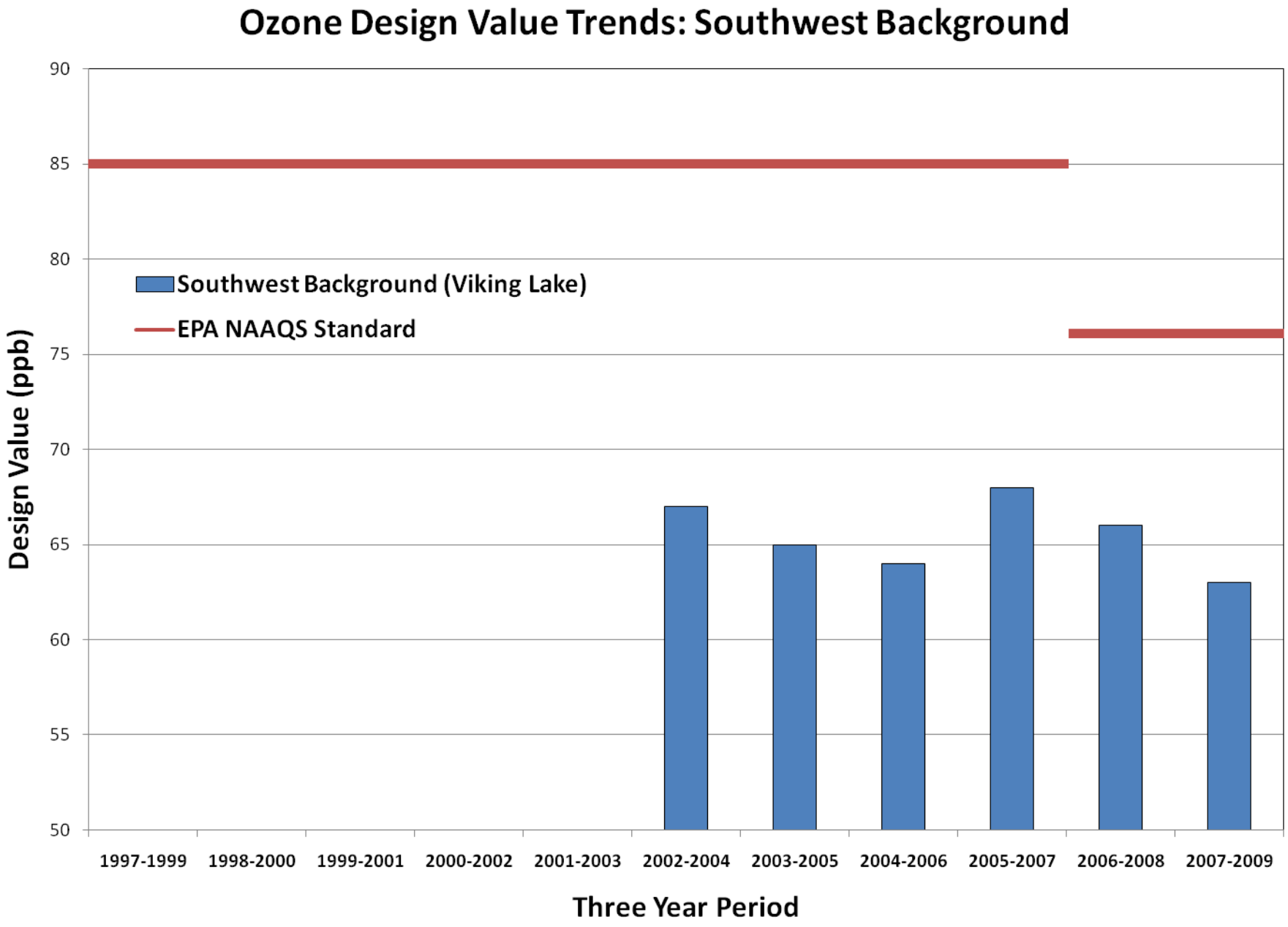

Ozone Design Value Trends: Omaha-Council Bluffs
Omaha-Council Bluffs Downwind (Pisgah)
EPA NAAQS Standard
Design Value (ppb)
90
85
80
75
70
65
60
55
50
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period

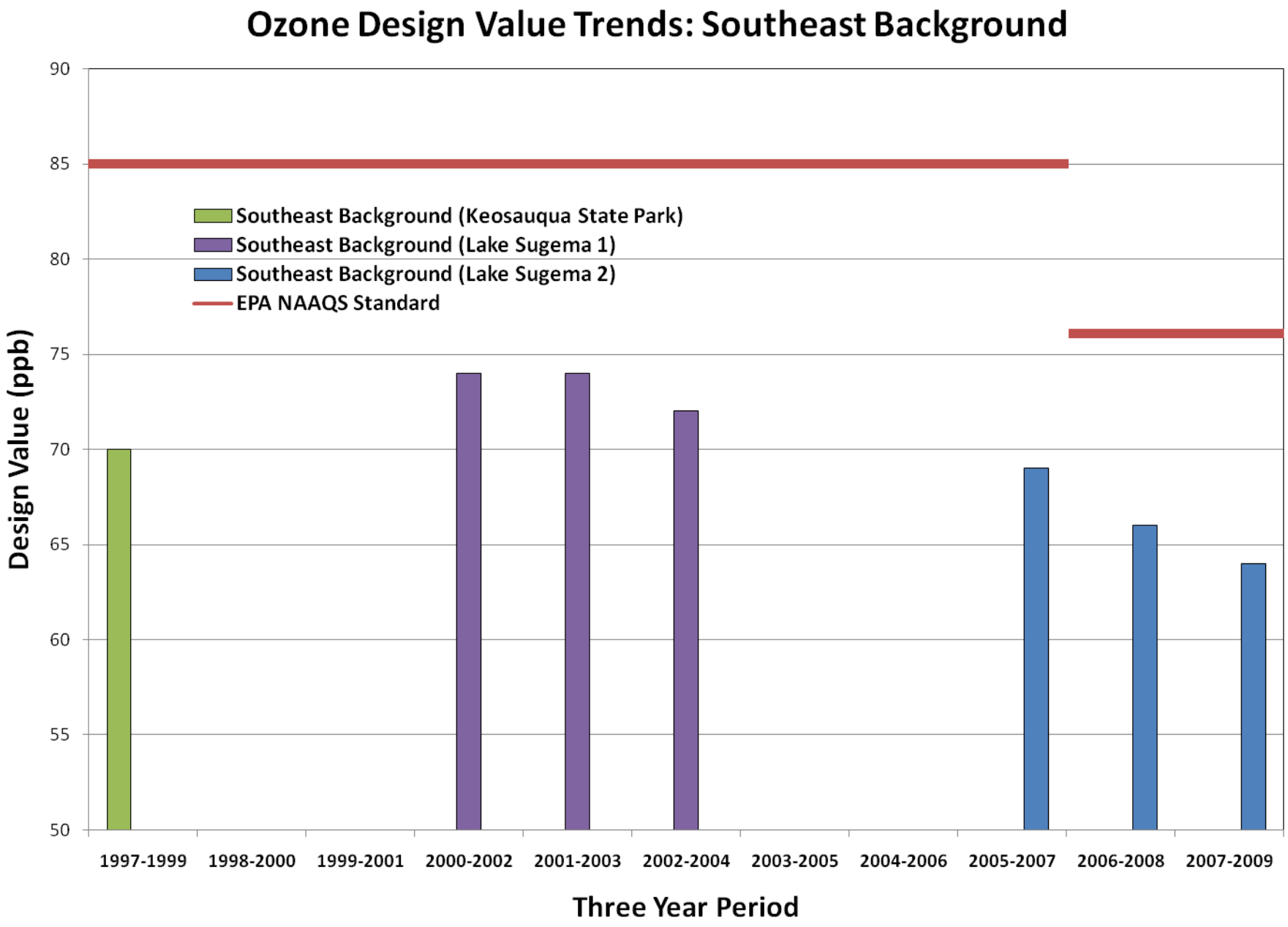

Ozone Design Value Trends: Waterloo
Waterloo Downwind (Waverly)
EPA NAAQS Standard
Design Value (ppb)
90
85
80
75
70
65
60
55
50
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period

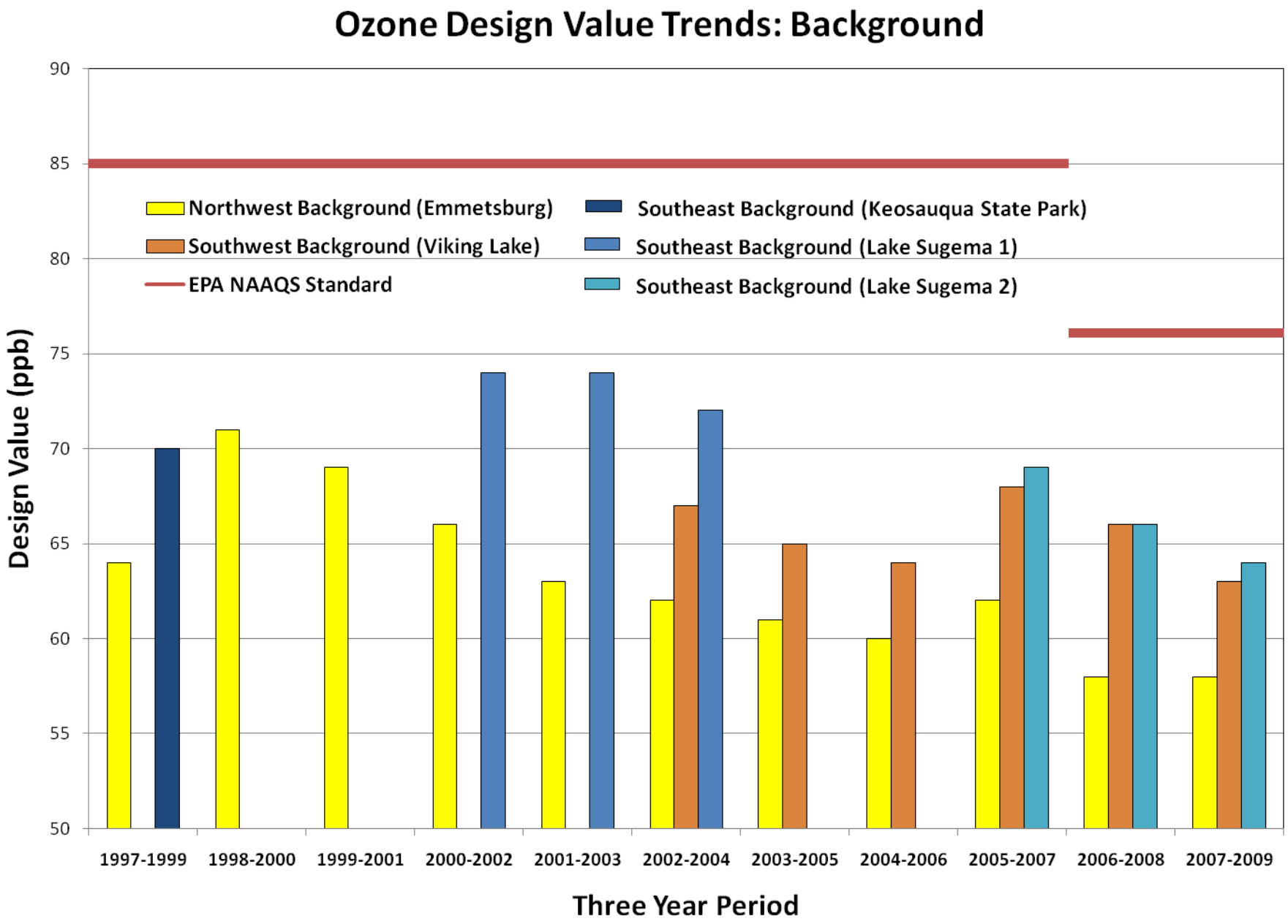
# Ozone Design Value Trends: Clinton



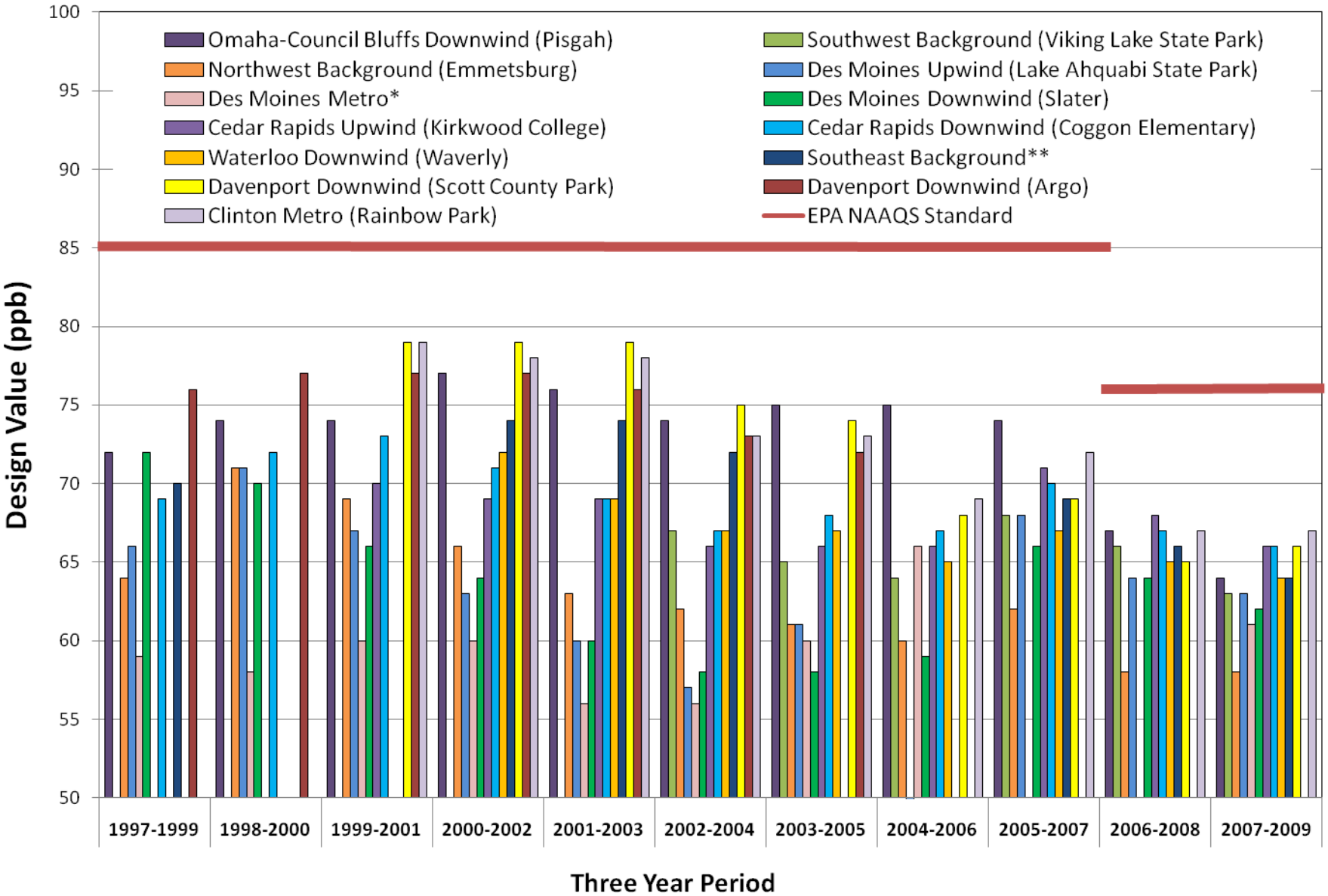

Ozone Design Value Trends: Northwest Background
Northwest Background (Emmetsburg)
EPA NAAQS Standard
Design Value (ppb)
90
85
80
75
70
65
60
55
50
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period


Ozone Design Value Trends: Southwest Background
90
85
80
75
70
65
60
55
50
Design Value (ppb)
Southwest Background (Viking Lake)
EPA NAAQS Standard
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period


Ozone Design Value Trends: Southeast Background
Southeast Background (Keosauqua State Park)
Southeast Background (Lake Sugema 1)
Southeast Background (Lake Sugema 2)
EPA NAAQS Standard
Design Value (ppb)
90
85
80
75
70
65
60
55
50
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period

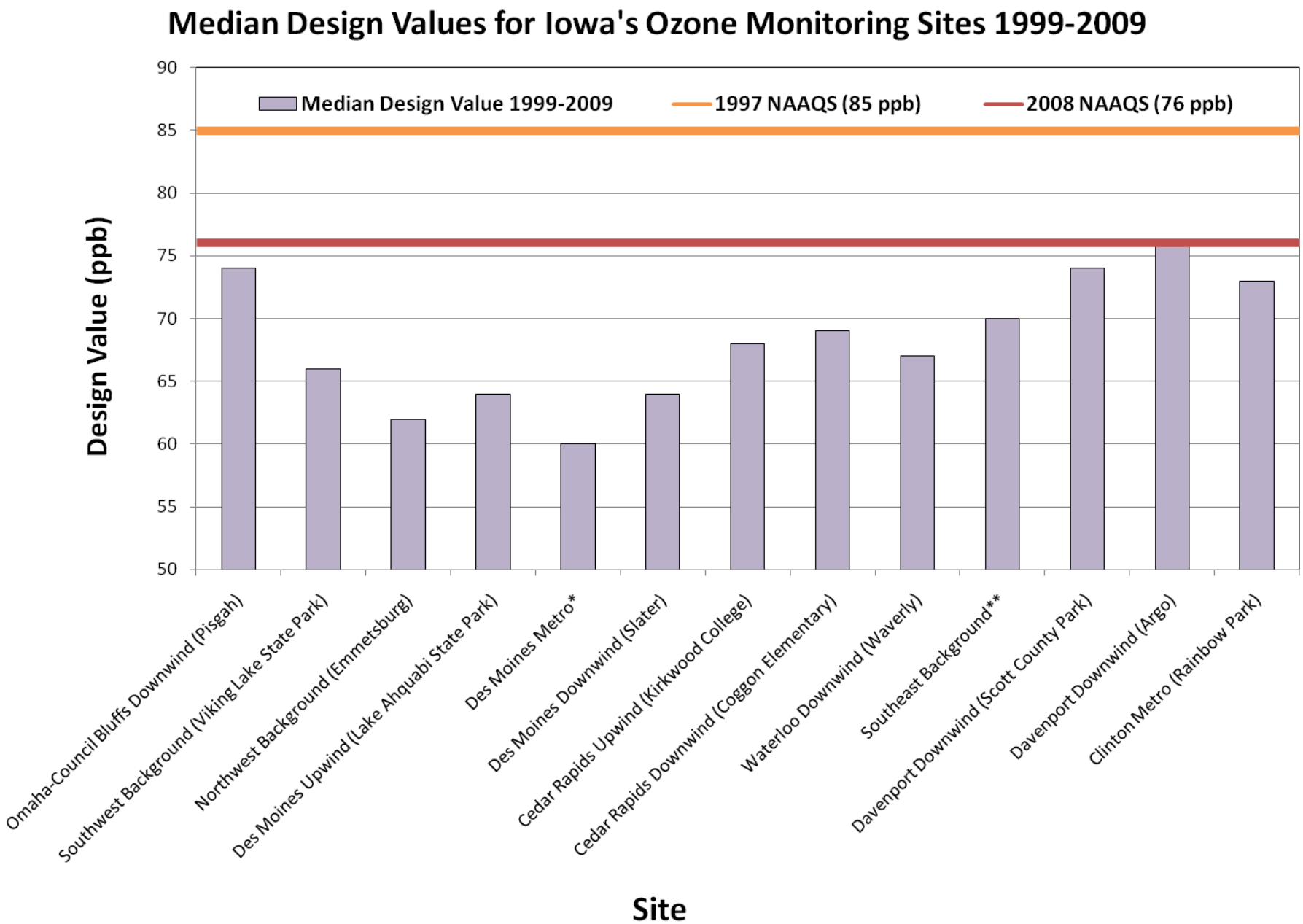

Ozone Design Value Trends: Background
Northwest Background (Emmetsburg)
Southwest Background (Viking Lake)
EPA NAAQS Standard
Southeast Background (Keosauqua State Park)
Southeast Background (Lake Sugema 1)
Southeast Background (Lake Sugema 2)
Design Value (ppb)
90
85
80
75
70
65
60
55
50
1997-1999
1998-2000
1999-2001
2000-2002
2001-2003
2002-2004
2003-2005
2004-2006
2005-2007
2006-2008
2007-2009
Three Year Period

# Design Value Trends: Statewide




*Includes two Des Moines Metro Sites: Phillips School and Public Health Building

**Includes three Southeast Background Sites: Keosauqua State Park, Lake Sugema 1, and Lake Sugema 2.

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