www.kdheks.gov

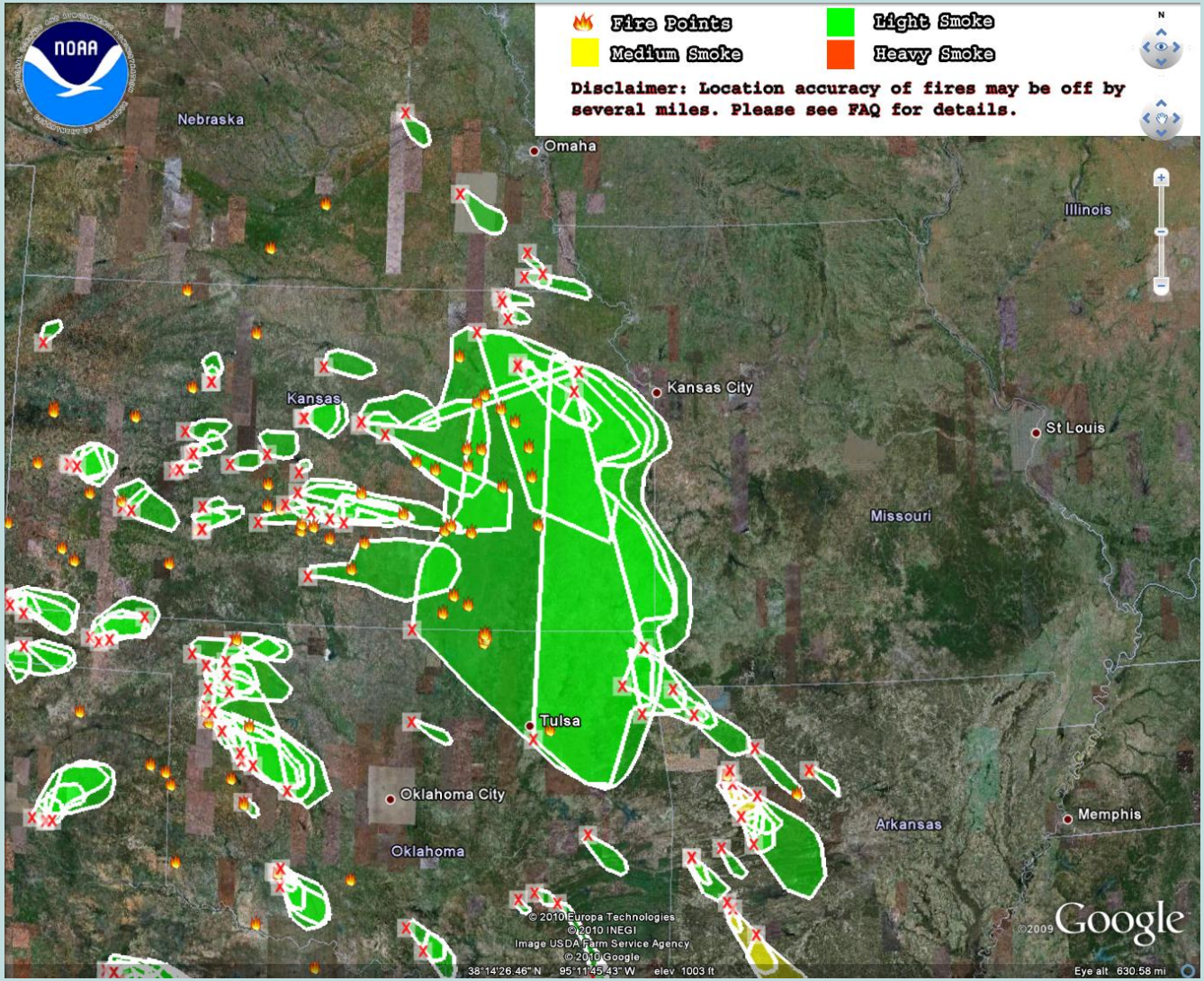
Our Vision – Healthy Kansans living in safe and sustainable environments.

Flint Hills Smoke Event

April 8 – 11, 2010

April 8, 2010

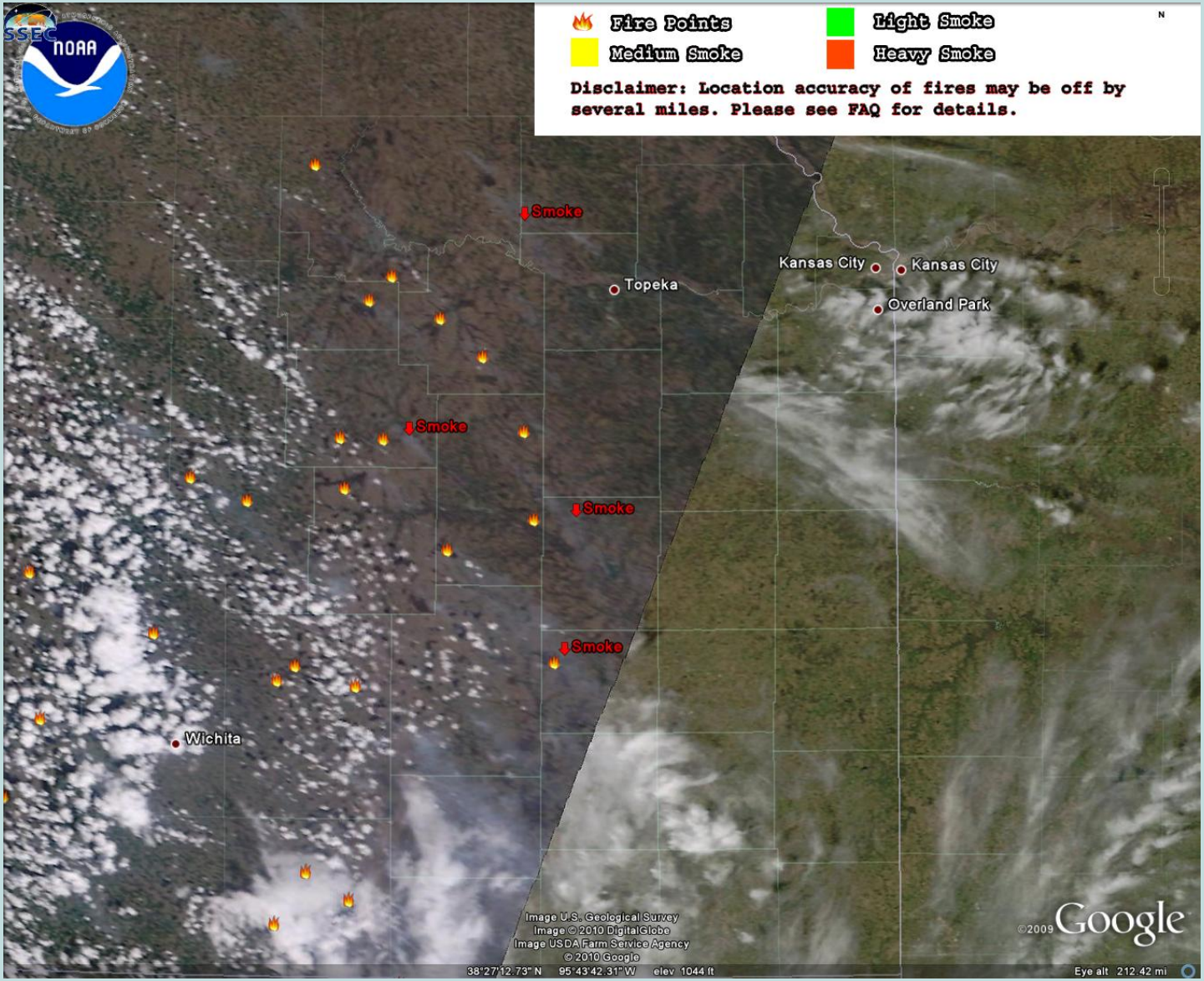
Thursday, April 8, 2010



April 8, 2010 – After a spring of strong winds and periods of rain, conditions finally improved for burning in the Flint Hills during the period from April 8-11. This NOAA Hazard Mapping System graphic depicts satellite identified fire and analyzed smoke locations for April 8th. Red Xs depict the point of origin of distinct smoke plumes. Analyzed smoke concentrations are color coded as can be seen in the legend.

Our Vision – Healthy Kansans living in safe and sustainable environments.

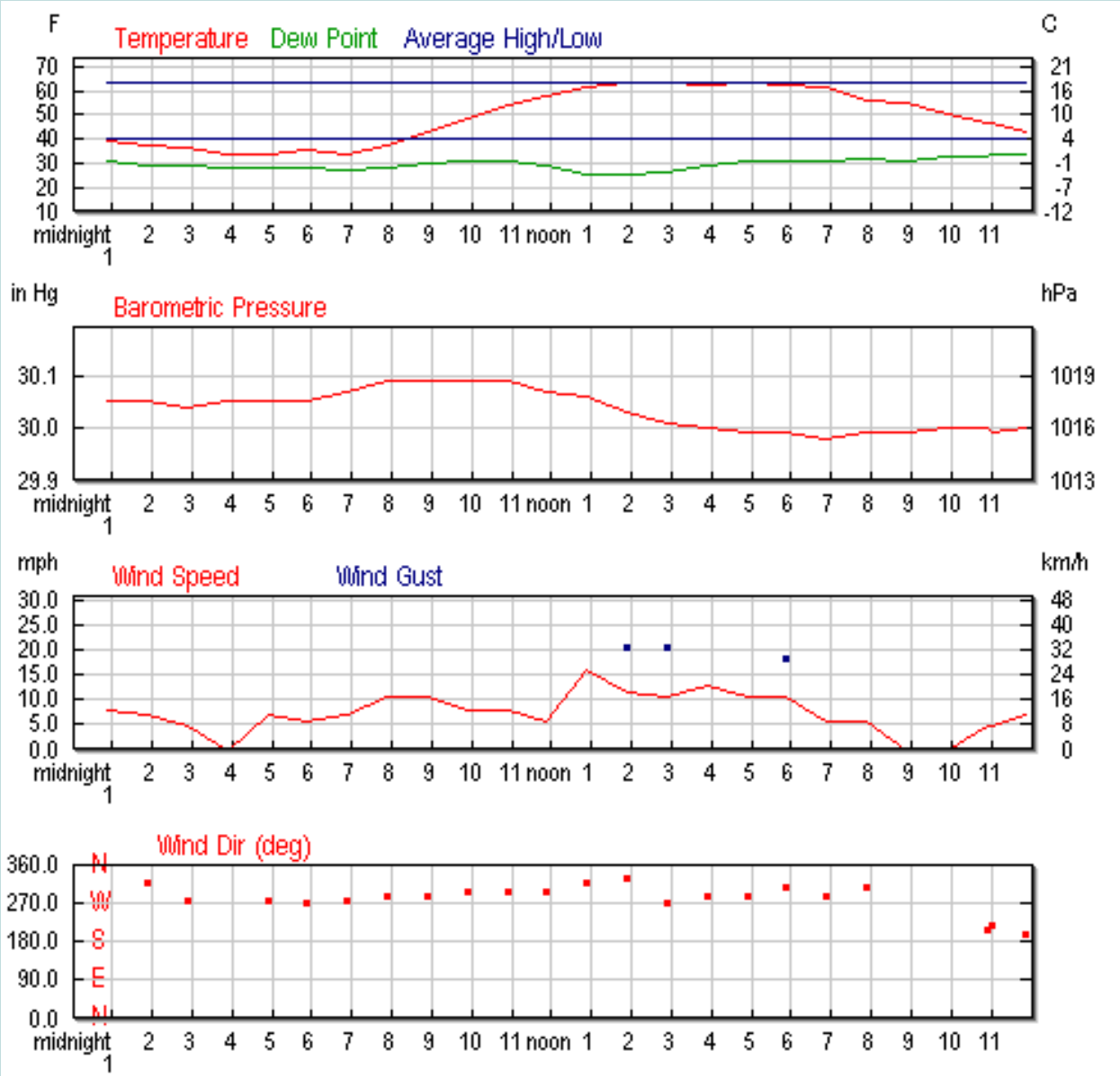
Thursday, April 8, 2010



April 8, 2010 – As can be seen on this NOAA visible satellite image, analyzed fire locations and smoke plumes are visible across the Flint Hills region. Prevailing winds from the west-northwest are pushing the smoke plumes towards Southeast Kansas.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Thursday, April 8, 2010

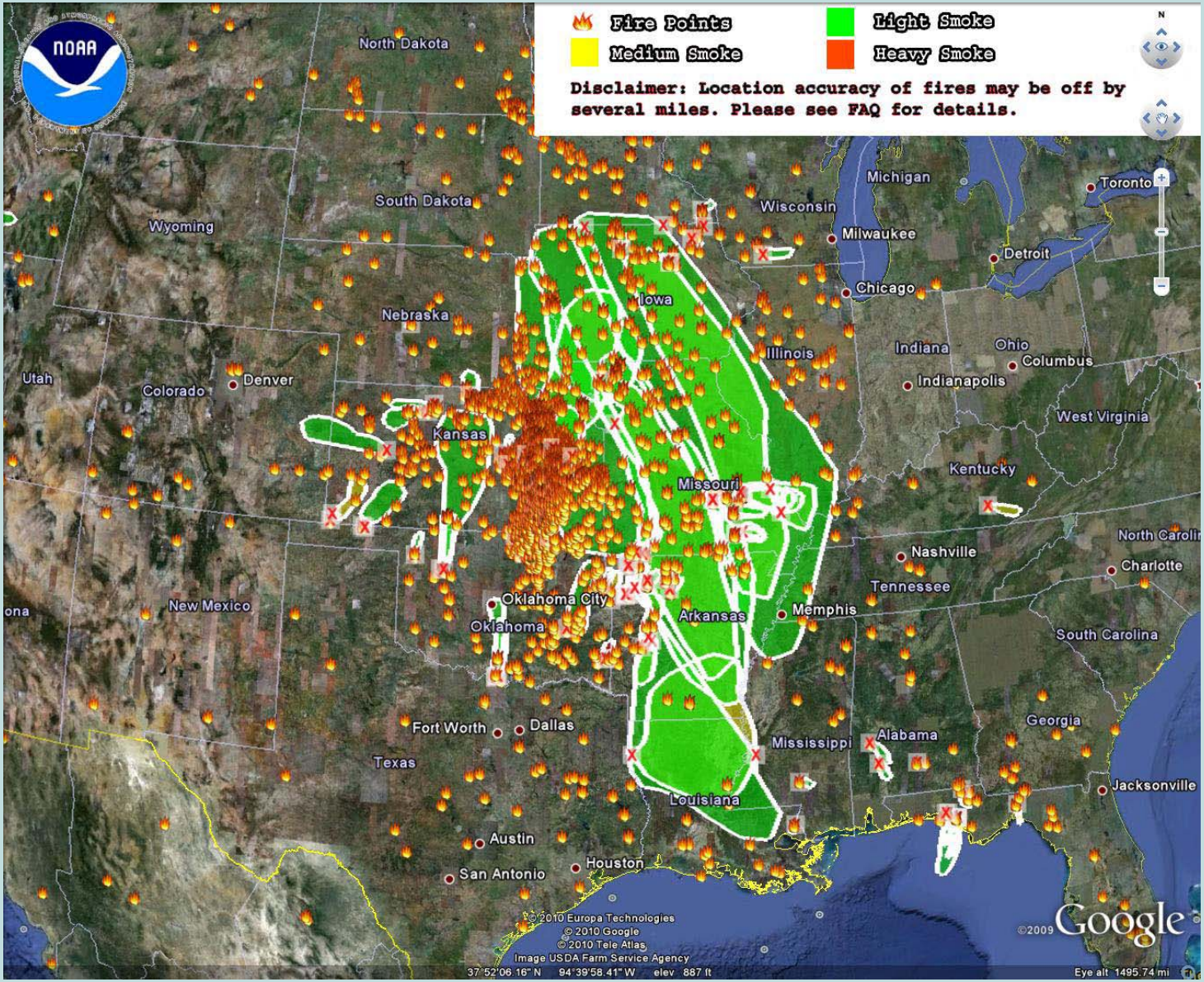


April 8, 2010 – Meteorological Data for the Emporia, Kansas Automated Surface Observing System (ASOS) Site.

Our Vision – Healthy Kansans living in safe and sustainable environments.

April 9, 2010

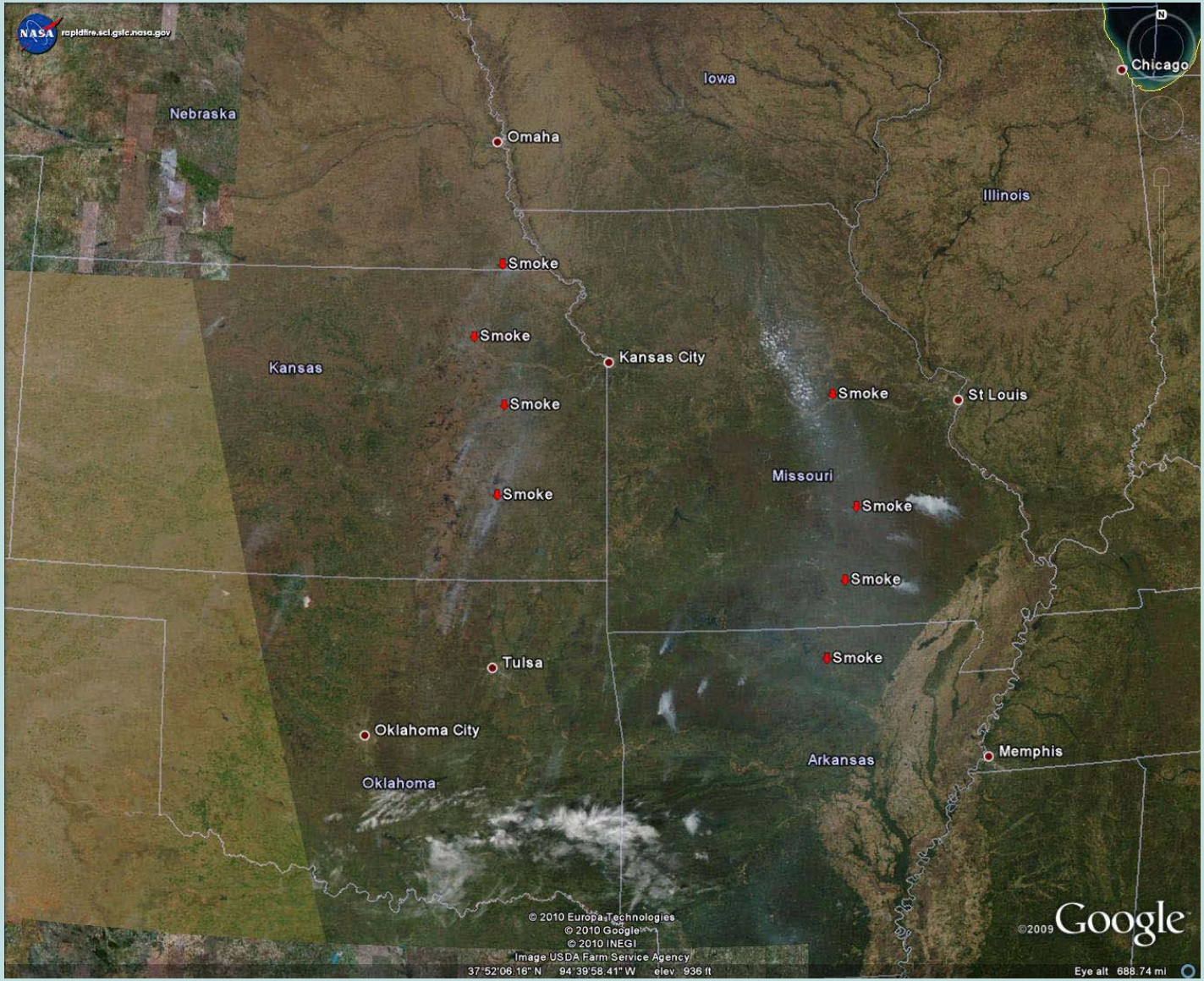
Friday, April 9, 2010



April 9, 2010 –This NOAA Hazard Mapping System graphic depicts satellite identified fire and analyzed smoke locations for April 9th. As can be seen, there has been a tremendous increase in the number of fires over the Flint Hills.

Our Vision – Healthy Kansans living in safe and sustainable environments.

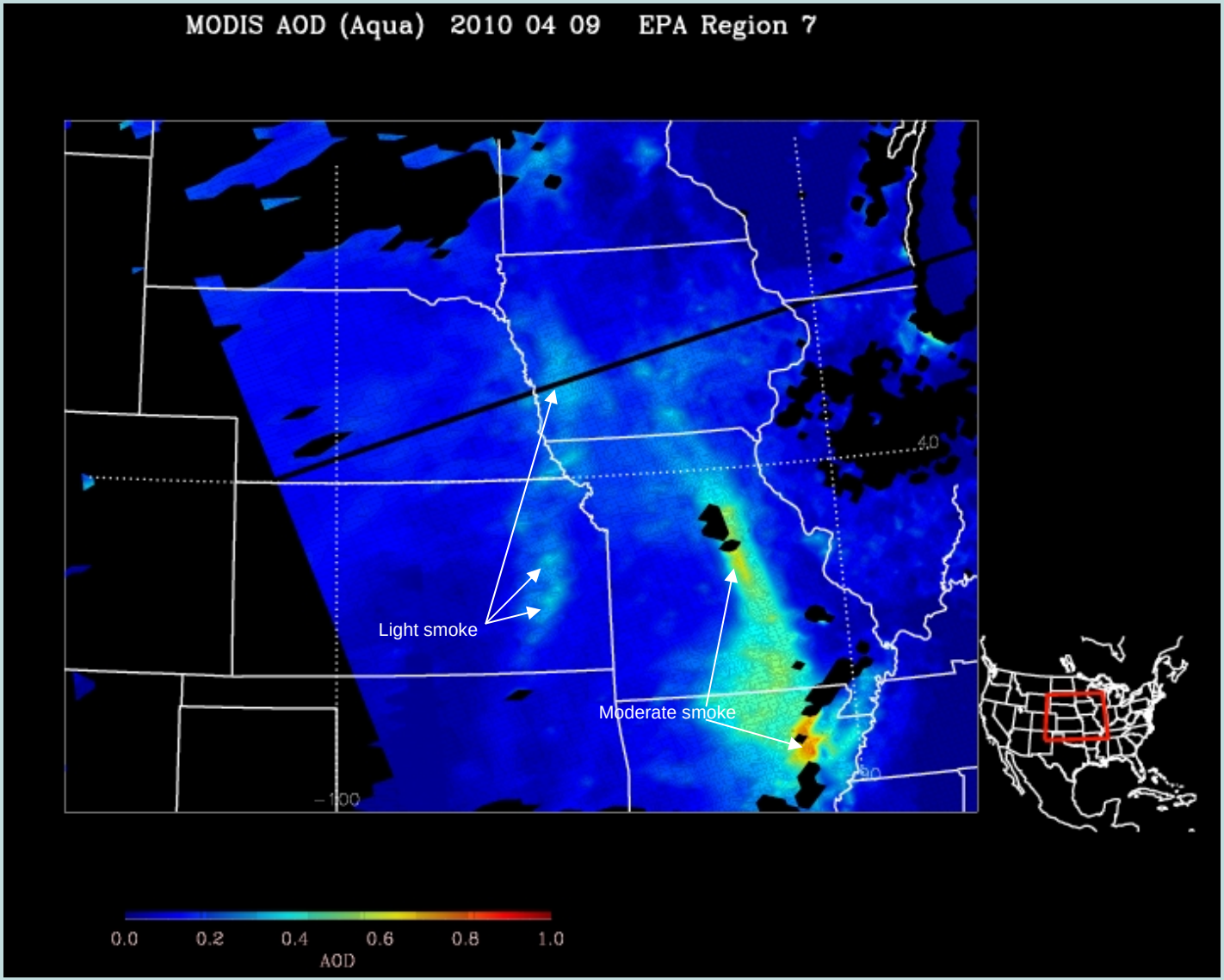
Friday, April 9, 2010



April 9, 2010 – As can be seen on this NOAA visible satellite image, smoke plumes are visible across the Flint Hills region and stretching from southern Iowa through central Missouri and into northern Arkansas. Surface winds had switched to a southerly direction at 15-25 mph and were pushing the smoke plumes towards southern Nebraska and Iowa.

Our Vision – Healthy Kansans living in safe and sustainable environments.

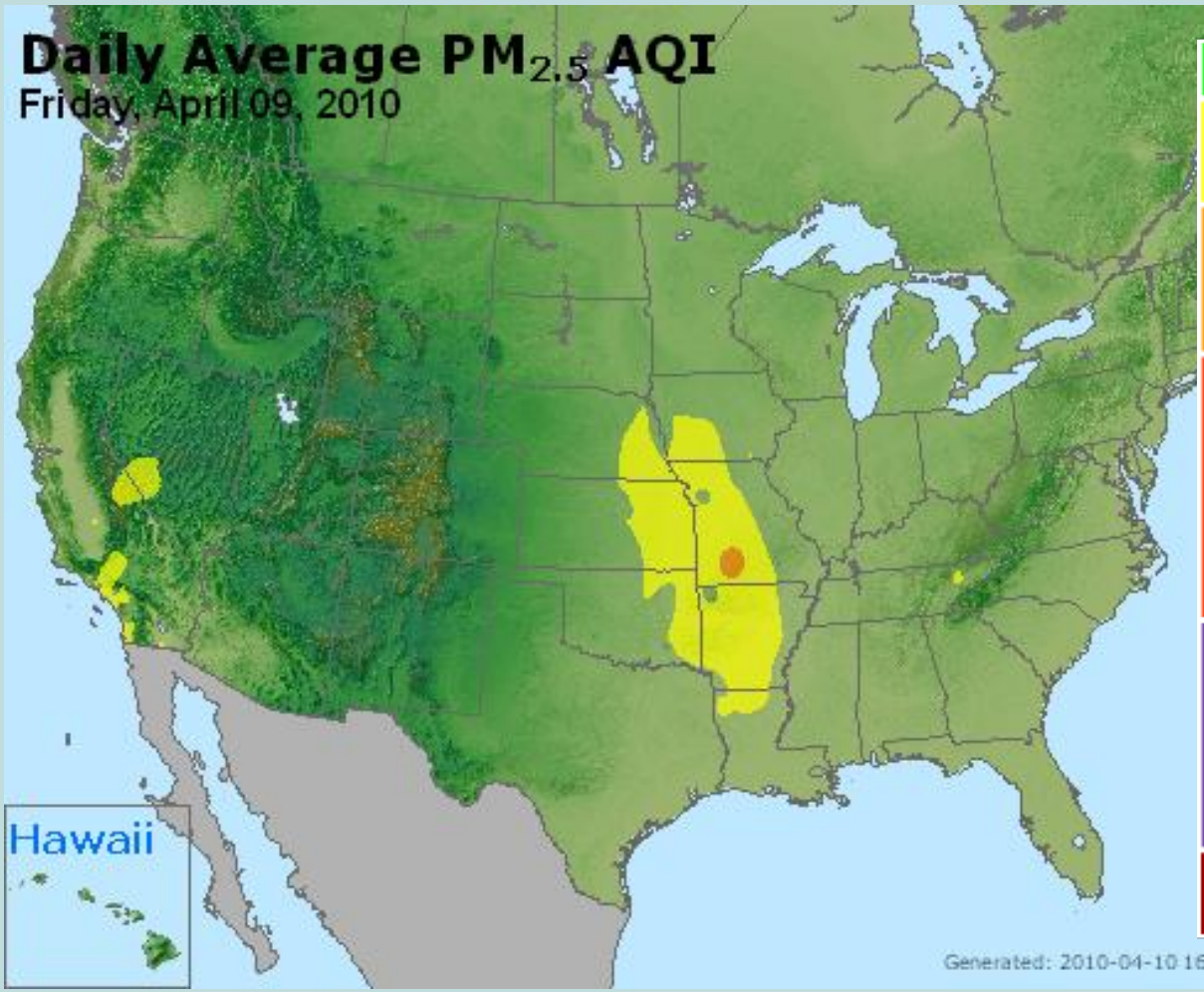
Friday, April 9, 2010



April 9, 2010 – This graphic shows aerosol amounts across the midwest on April 9 based on observations from the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite. Satellite measurements of aerosols, called aerosol optical thickness, are based on the fact that the particles change the way the atmosphere reflects and absorbs visible and infrared light. An optical thickness of less than 0.1 (blue) indicates a crystal clear sky with maximum visibility, whereas a value of 1 (reddish brown) indicates very hazy conditions.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Friday, April 9, 2010



Air Quality Index (AQI): Ozone

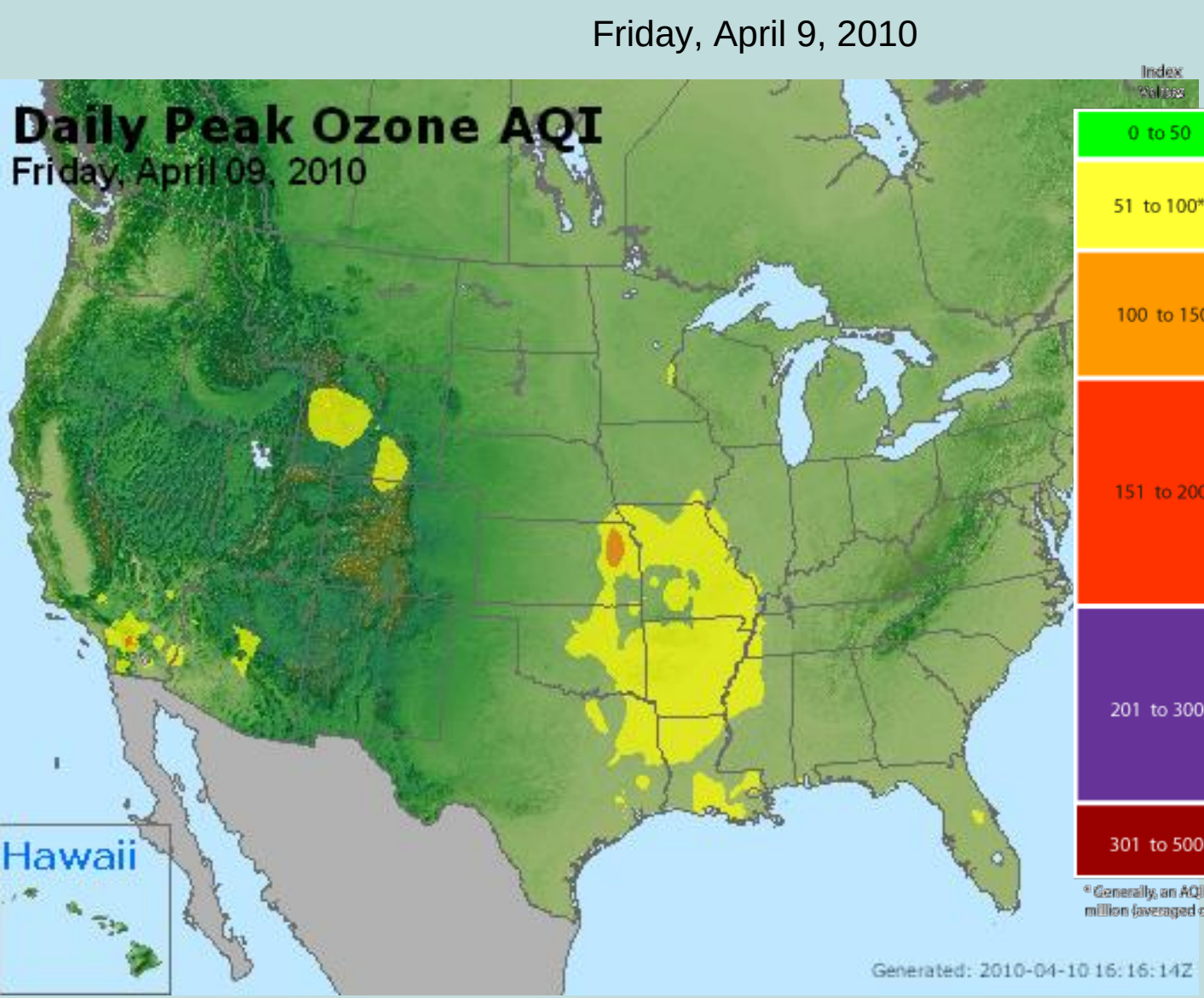
Index Values	Levels of Health Concern	Cautionary Statements
0 to 50	Good	None
51 to 100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
100 to 150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151 to 200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201 to 300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301 to 500	Hazardous	Everyone should avoid all physical activity outdoors.

* Generally, an AQI of 100 for ozone corresponds to an ozone level of 0.08 parts per million (averaged over 8 hours).

April 9, 2010 – The Air Quality Index (AQI) is an index for reporting daily air quality. The higher the AQI value, the greater the level of air pollution and the greater the health concerns. Smoke is causing elevated $PM_{2.5}$ values in areas of Eastern Kansas, Missouri and Arkansas with associated AQI values in the Moderate (yellow) to Unhealthy for Sensitive Groups (orange) recorded throughout the day.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Friday, April 9, 2010



Air Quality Index (AQI): Ozone

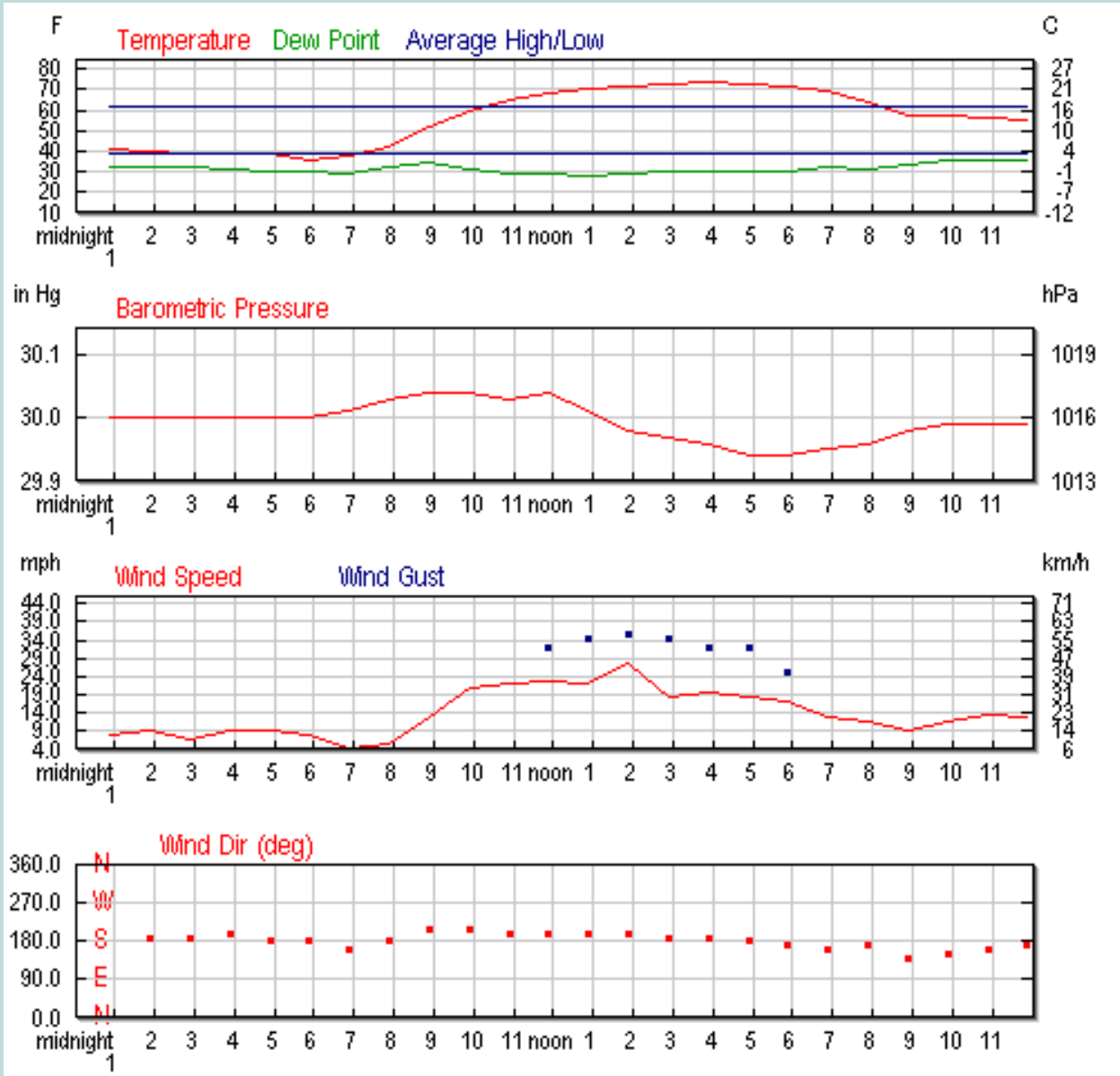
Index Values	Levels of Health Concern	Cautionary Statements
0 to 50	Good	None
51 to 100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
100 to 150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151 to 200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201 to 300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301 to 500	Hazardous	Everyone should avoid all physical activity outdoors.

* Generally, an AQI of 100 for ozone corresponds to an ozone level of 0.08 parts per million (averaged over 8 hours).

April 9, 2010 – The Air Quality Index (AQI) is an index for reporting daily air quality. The higher the AQI value, the greater the level of air pollution and the greater the health concerns. Smoke is causing elevated ozone values in areas of Eastern Kansas, Missouri and Arkansas with associated AQI values in the Moderate (yellow) to Unhealthy for Sensitive Groups (orange) recorded throughout the afternoon.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Friday, April 9, 2010

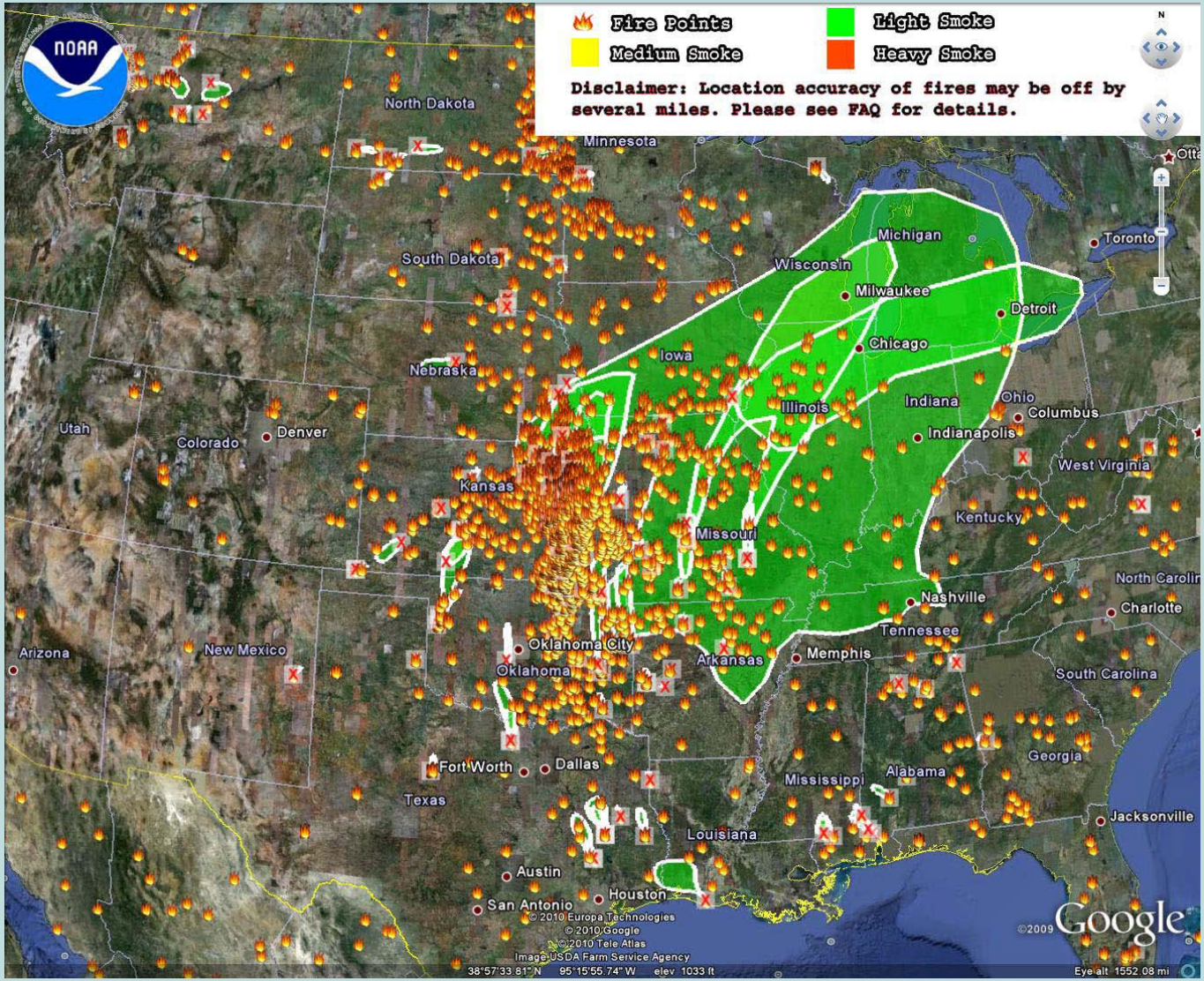


April 9, 2010 – Meteorological Data for the Emporia, Kansas Automated Surface Observing System (ASOS) Site.

Our Vision – Healthy Kansans living in safe and sustainable environments.

April 10, 2010

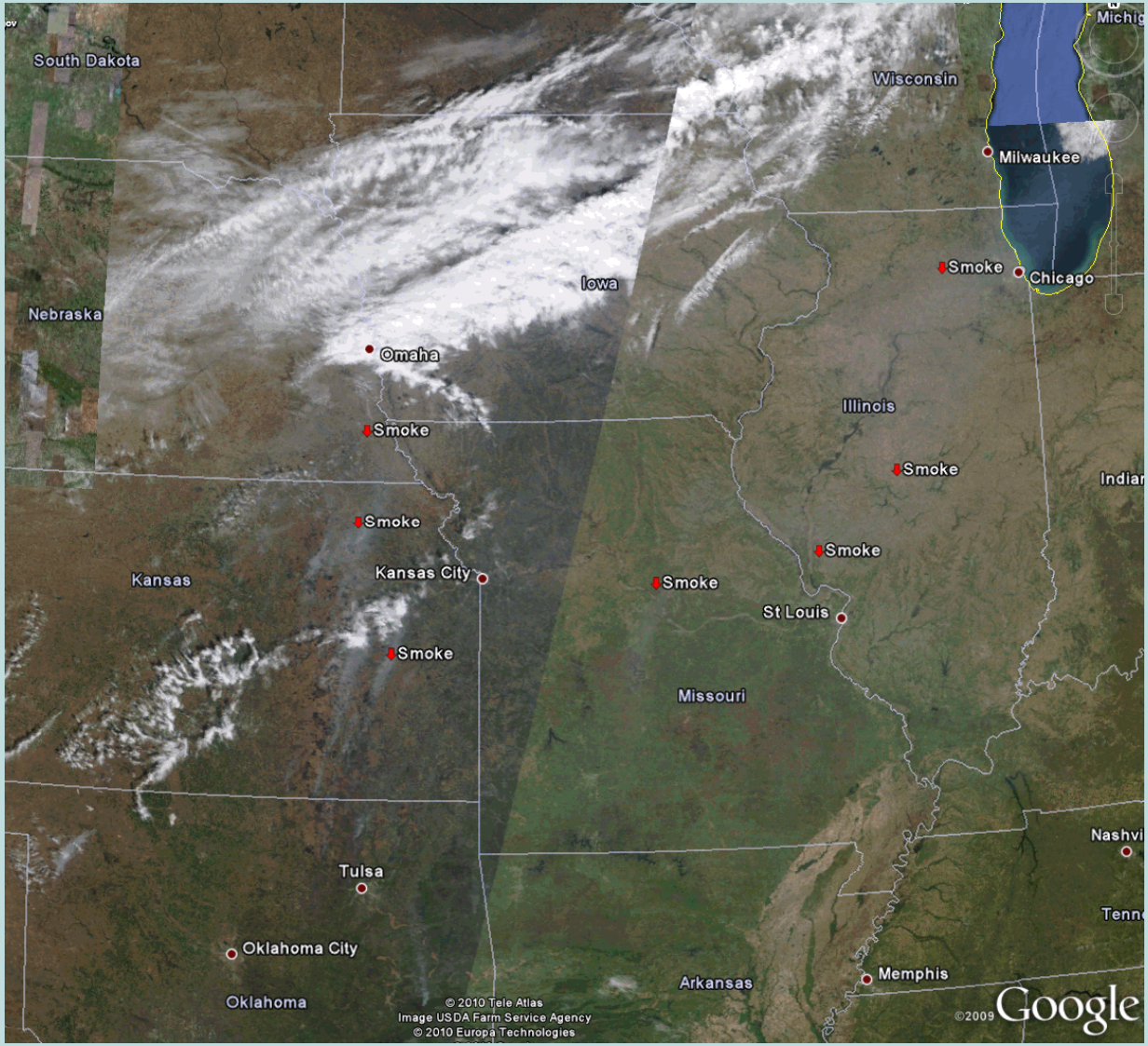
Saturday, April 10, 2010



April 10, 2010 –This NOAA Hazard Mapping System graphic depicts satellite identified fire and analyzed smoke locations for April 10th. As can be seen, there continued to be a tremendous number of fires over the Flint Hills. Smoke from the previous two days of fires has spread over a wide area of the upper Midwest, stretching from Northern Arkansas to Michigan.

Our Vision – Healthy Kansans living in safe and sustainable environments.

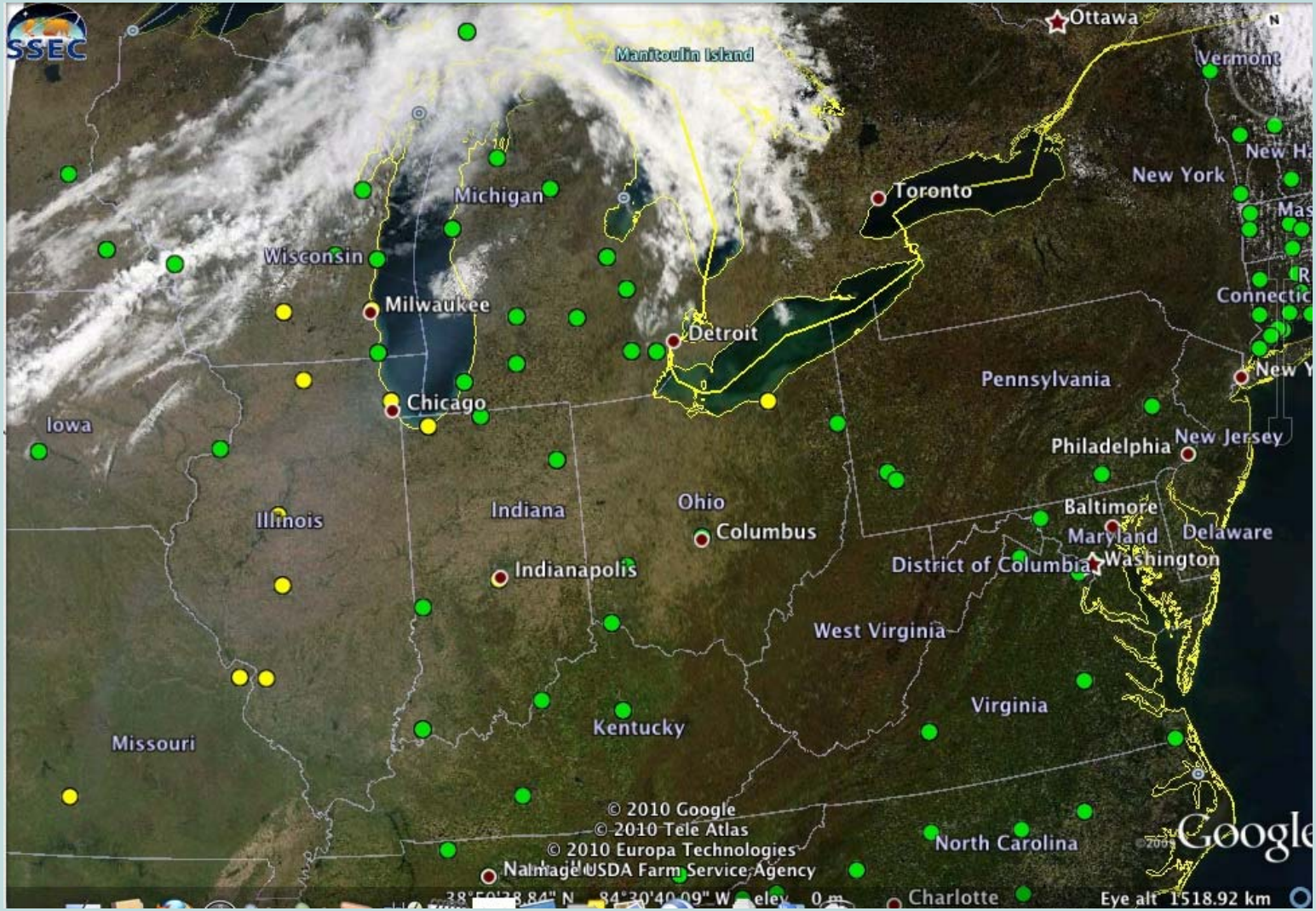
Saturday, April 10, 2010



April 10, 2010 – This NOAA visible satellite image shows smoke plumes continuing across the Flint Hills region. Surface winds continued from a southerly direction at 15-25 mph and were pushing the smoke plumes towards southern Nebraska and Iowa. Smoke from previous days fires can now be seen across Arkansas, Missouri, Illinois, Indiana, and Lake Michigan

Our Vision – Healthy Kansans living in safe and sustainable environments.

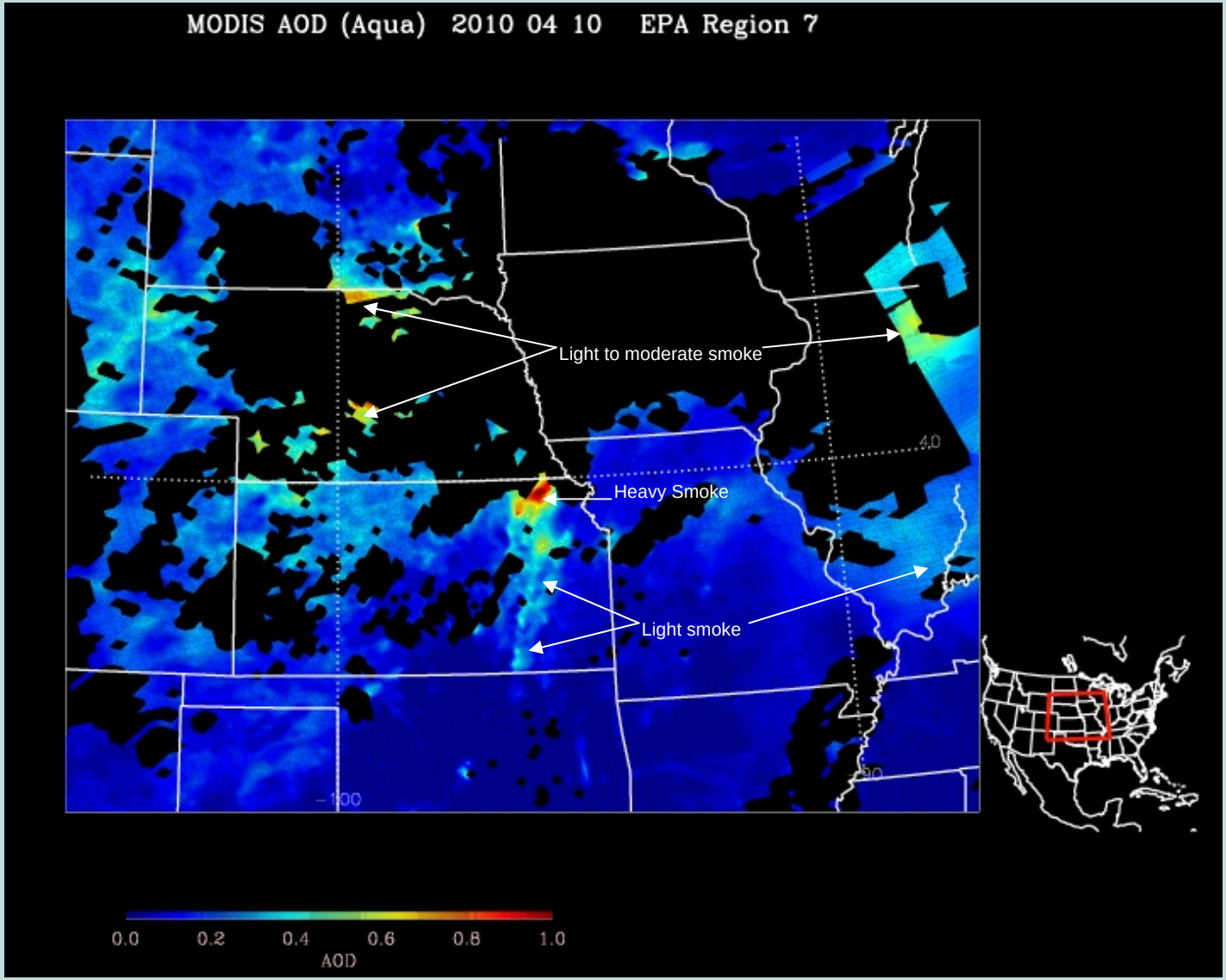
Saturday, April 10, 2010



April 10, 2010 – This NOAA visible satellite image shows smoke from previous days fires across Arkansas, Missouri, Illinois, Indiana, and Lake Michigan. The colored circles are an overlay of the $PM_{2.5}$ monitoring locations and their corresponding Air Quality Index (AQI) values. Notice the Moderate (yellow circles) AQI values correspond to the visible location of the smoke.

Our Vision – Healthy Kansans living in safe and sustainable environments.

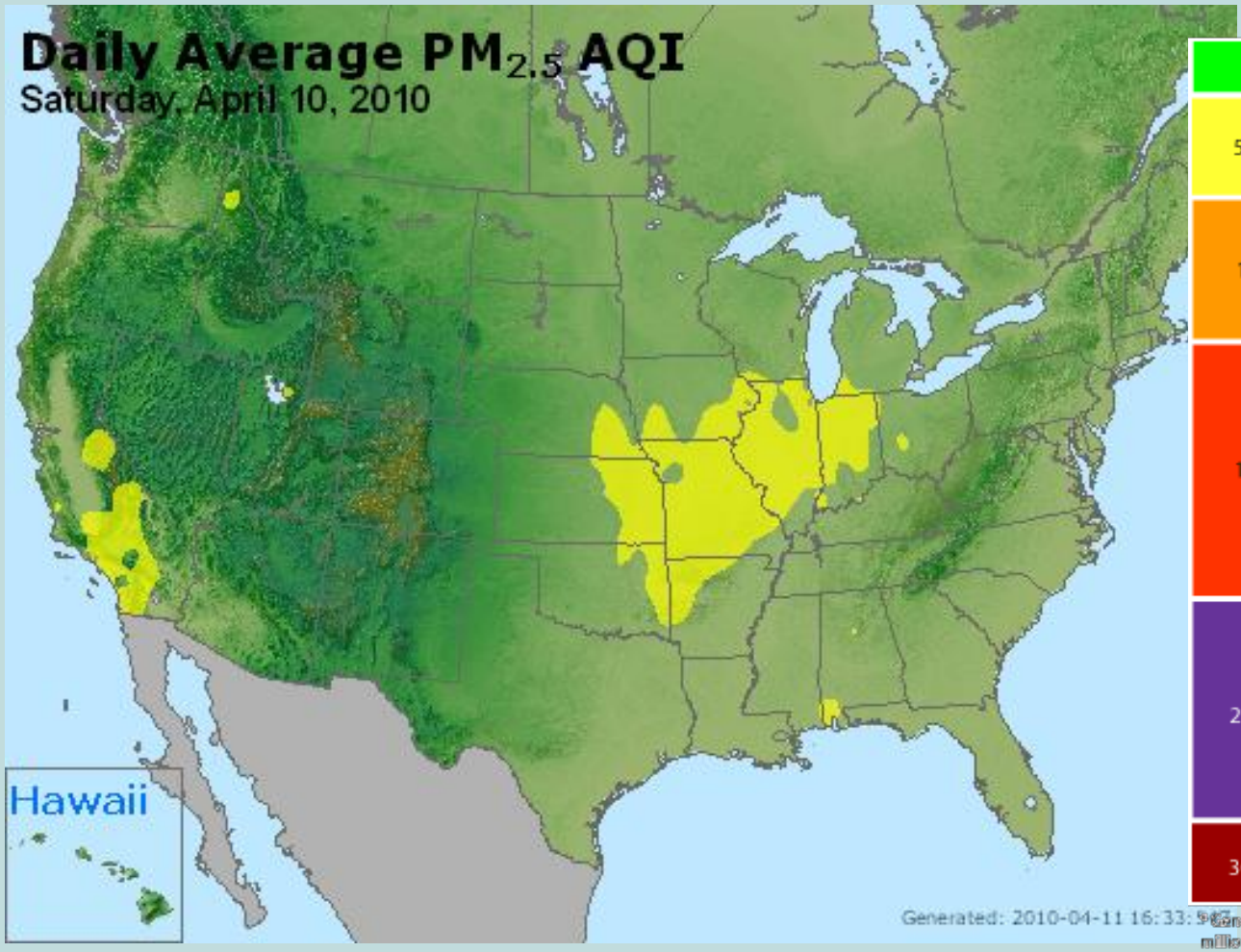
Saturday, April 10, 2010



April 10, 2010 – This graphic shows aerosol amounts across the midwest on April 10 based on observations from the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite. Satellite measurements of aerosols, called aerosol optical thickness, are based on the fact that the particles change the way the atmosphere reflects and absorbs visible and infrared light. An optical thickness of less than 0.1 (blue) indicates a crystal clear sky with maximum visibility, whereas a value of 1 (reddish brown) indicates very hazy conditions.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Saturday, April 10, 2010



Air Quality Index (AQI): Ozone

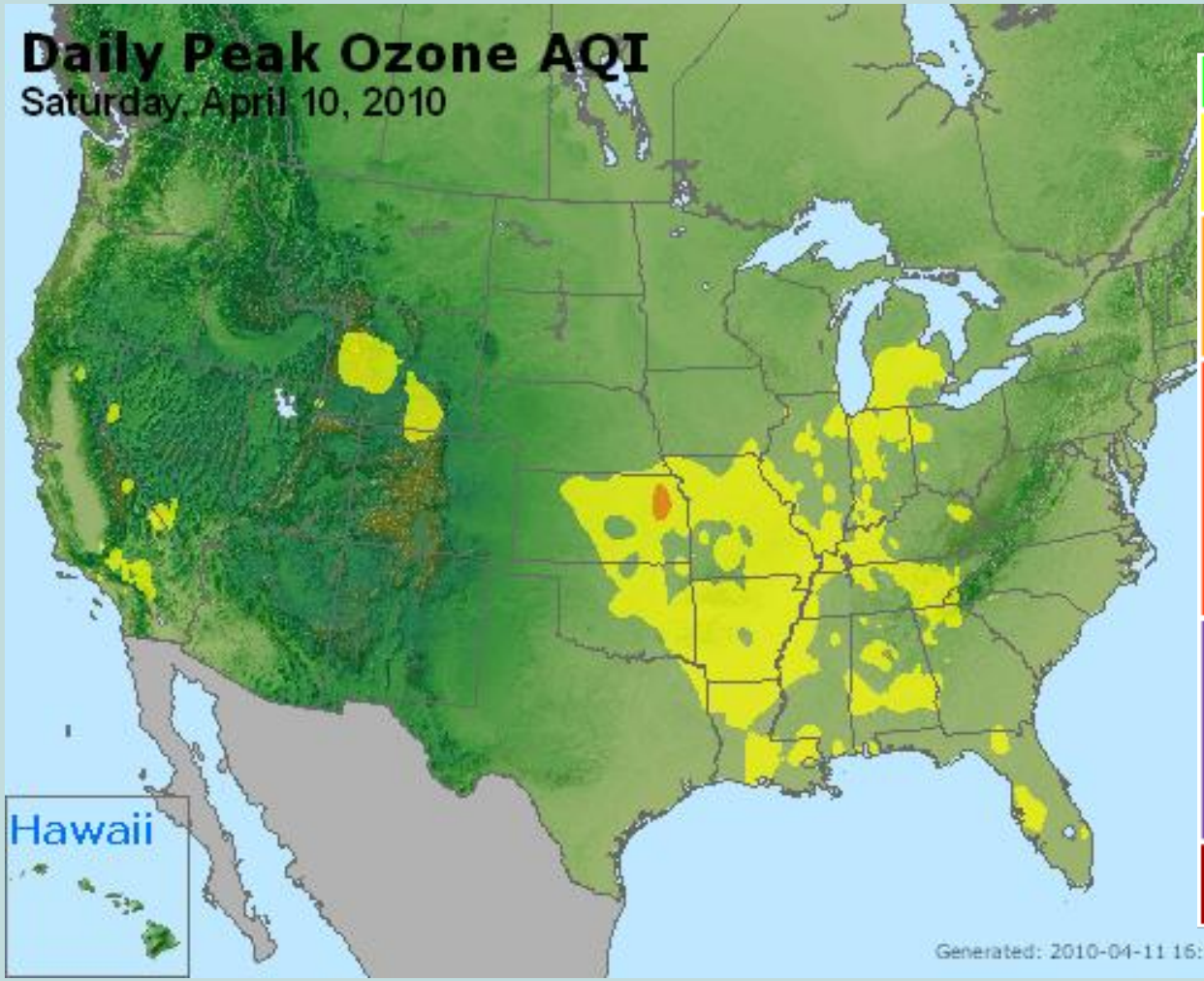
Index Values	Levels of Health Concern	Cautionary Statements
0 to 50	Good	None
51 to 100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
100 to 150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151 to 200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201 to 300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301 to 500	Hazardous	Everyone should avoid all physical activity outdoors.

*Generally, an AQI of 100 for ozone corresponds to an ozone level of 0.08 parts per million (averaged over 8 hours).

April 10, 2010 – The Air Quality Index (AQI) is an index for reporting daily air quality. The higher the AQI value, the greater the level of air pollution and the greater the health concerns. Smoke is causing elevated $PM_{2.5}$ values in areas of Eastern Kansas, Missouri, Arkansas and Illinois with associated AQI values in the Moderate (yellow) to Unhealthy for Sensitive Groups (orange) recorded throughout the day. Moderate AQI values increase across Indiana and Michigan later in the day as smoke levels increase.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Saturday, April 10, 2010



Air Quality Index (AQI): Ozone

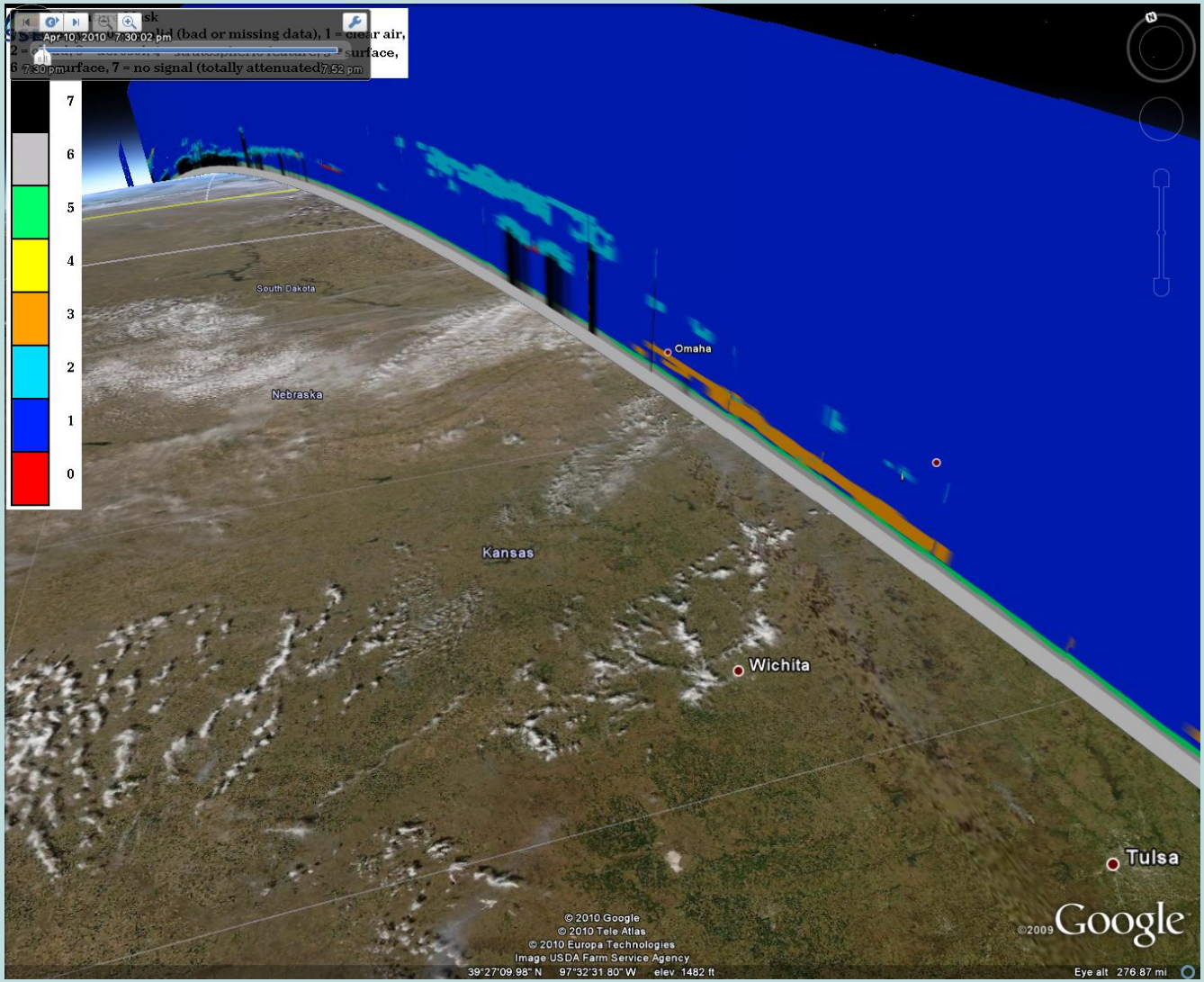
Index Values	Levels of Health Concern	Cautionary Statements
0 to 50	Good	None
51 to 100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
100 to 150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151 to 200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201 to 300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301 to 500	Hazardous	Everyone should avoid all physical activity outdoors.

* Generally, an AQI of 100 for ozone corresponds to an ozone level of 0.08 parts per million (averaged over 8 hours).

April 10, 2010 – The Air Quality Index (AQI) is an index for reporting daily air quality. The higher the AQI value, the greater the level of air pollution and the greater the health concerns. Smoke is causing elevated ozone values in areas of Eastern Kansas, Missouri, Arkansas and Western Illinois with associated AQI values in the Moderate (yellow) to Unhealthy for Sensitive Groups (orange) recorded throughout the afternoon. Ozone levels increase later in the day across the lower Great Lakes as the smoke drifts over these states.

Our Vision – Healthy Kansans living in safe and sustainable environments.

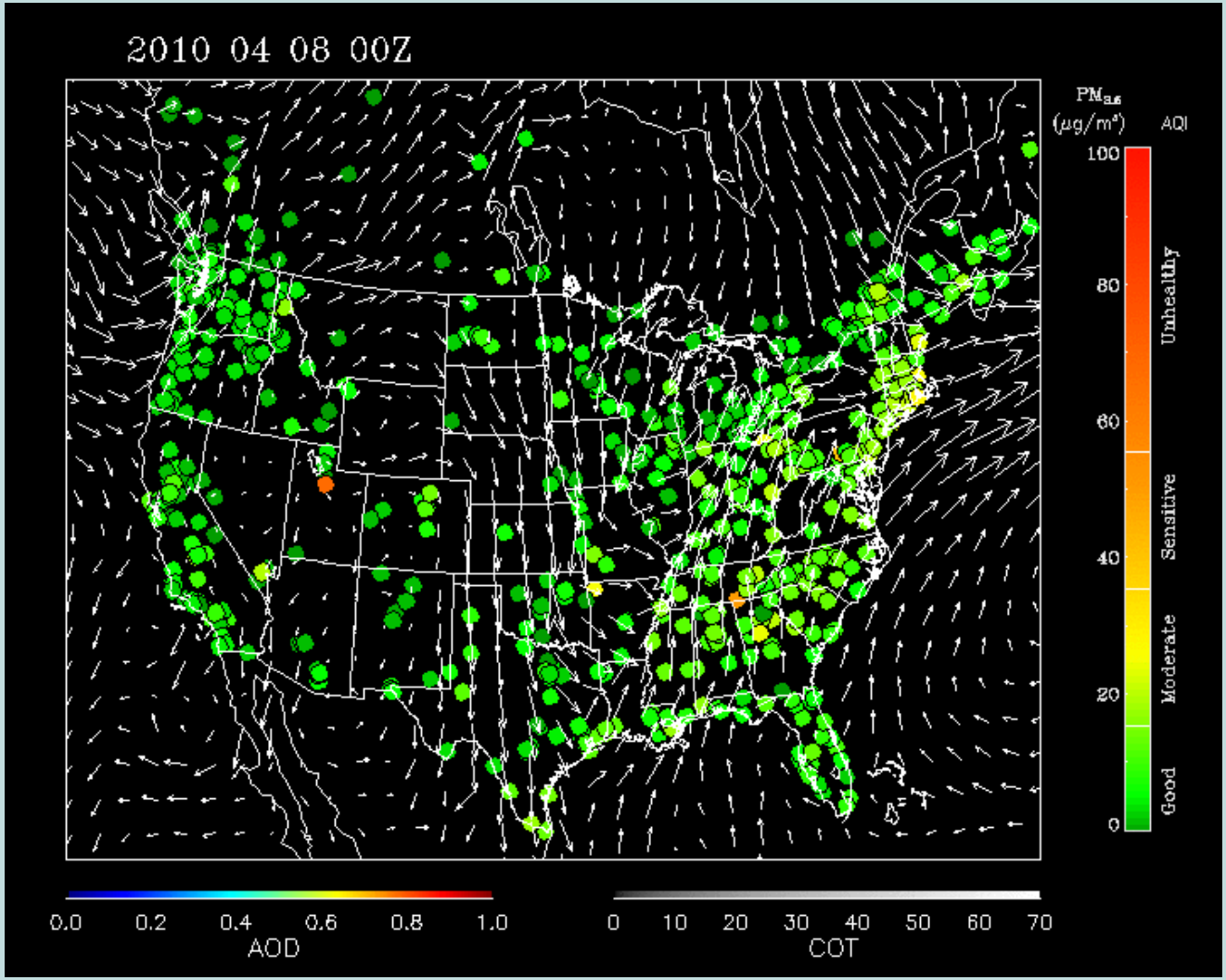
Saturday, April 10, 2010



April 10, 2010 – **CALIPSO** is a joint NASA (USA) and CNES (France) environmental satellite, built in the Cannes Mandelieu Space Center, which was launched atop a Delta II rocket on April 28, 2006. Its name stands for "Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations." Passive and active remote sensing Instruments onboard the CALIPSO satellite monitor aerosols and clouds 24 hours a day. This Calipso pass over the Flint Hills on April 10 shows the smoke plume extending into Southern Nebraska at the time of the satellite pass. The orange colors represent detected aerosols (smoke) in the atmosphere.

Our Vision – Healthy Kansans living in safe and sustainable environments.

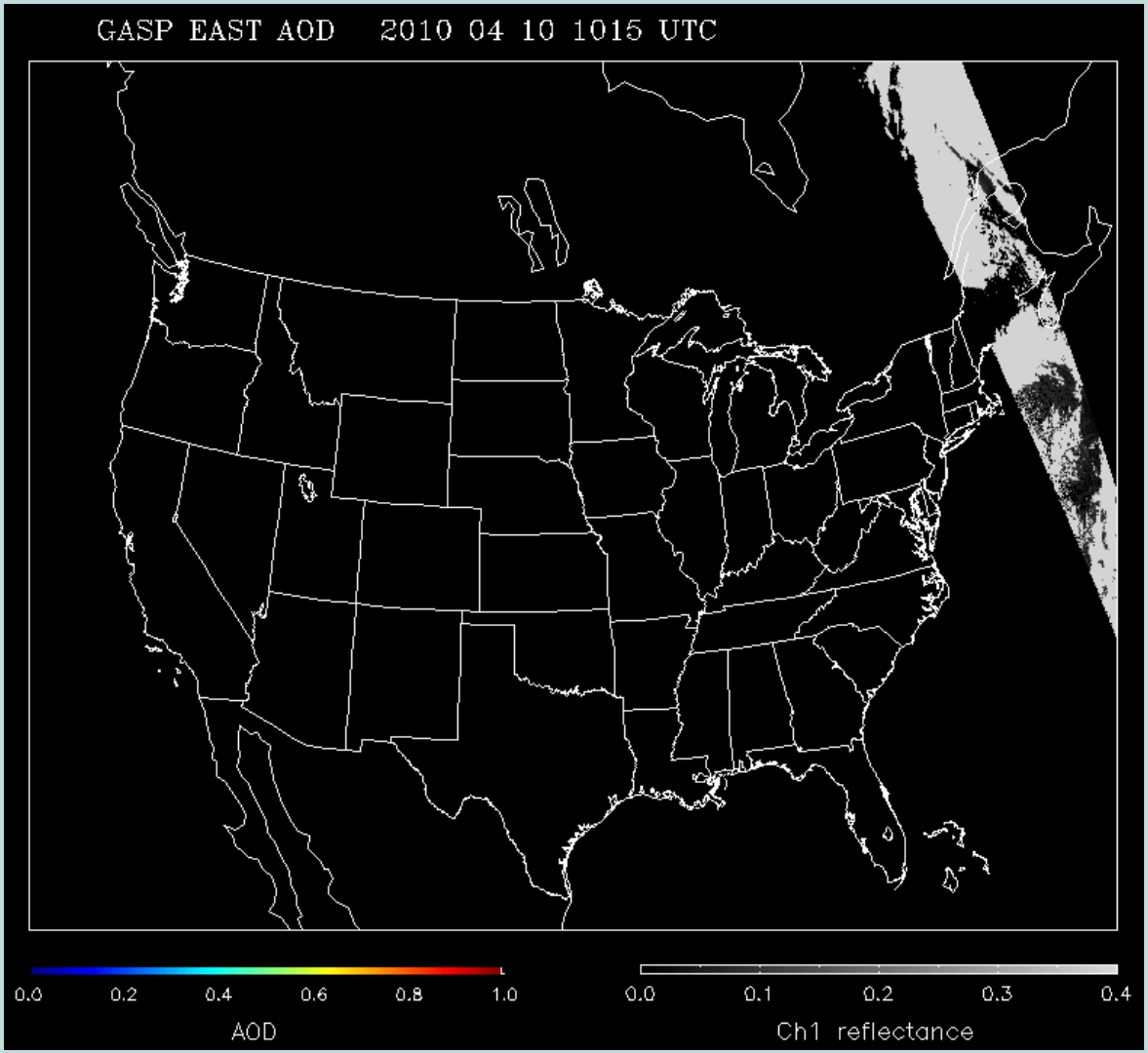
Saturday, April 10, 2010



April 10, 2010 – The data fusion animation plots the most recent three days data of available daily MODIS aerosol optical depth (in color contours), daily MODIS cloud optical thickness (in gray contours), hourly PM2.5 concentrations for the in-situ continuous monitors (vertical color bars), NAM 850mb wind field vectors, and half-hourly WF-ABBA fire counts (pink and purple diamonds) . This data fusion visualizes the relationship between the MODIS ta, hourly PM2.5 mass concentration and the air quality index, providing a pseudo-synoptic view of aerosol events across North America. This 3-day composite ends on April 10. As the animation runs, please note the 850mb wind shift late on the 8th of April and the almost immediate impact this has on the $PM_{2.5}$ values (AQI colored circles) in Eastern Kansas and Missouri as the smoke is pushed over these areas. As the wind pushes the smoke northeastward later on the 10th, sites in Iowa, Illinois and Michigan begin to show higher AQI values. **(Note – You will have to run the slide show from the PowerPoint version in order to view the animation.)**

Our Vision – Healthy Kansans living in safe and sustainable environments.

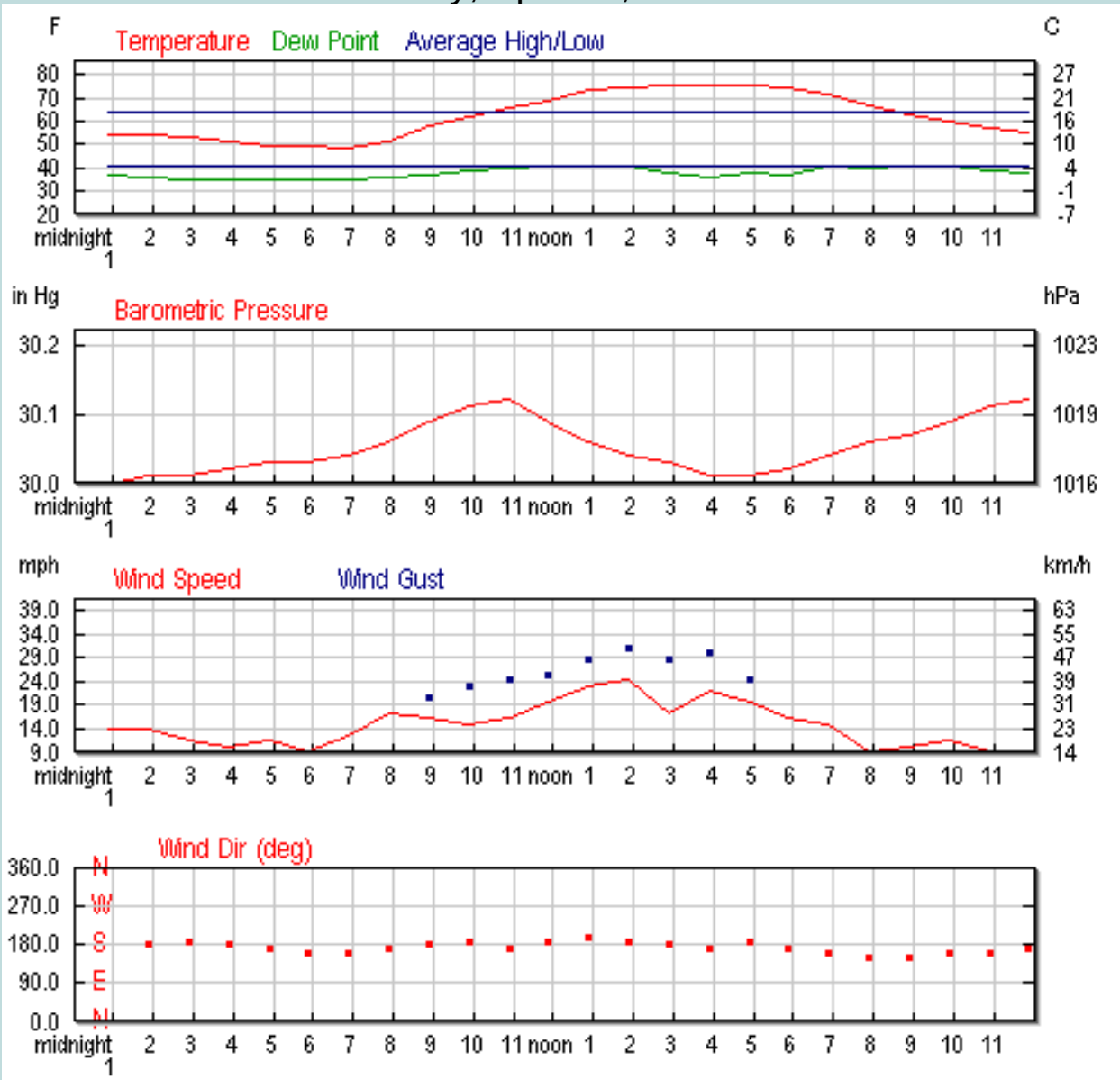
Saturday, April 10, 2010



April 10, 2010 – The GASP product is a retrieval of the Aerosol Optical Depth (AOD) made from the current GOES East visible imagery. Satellite measured aerosol optical depth (AOD) has been shown to be a good proxy for pollution monitoring especially when long-range transport is involved. This product is available at a 30-minute interval and 4 km X 4 km spatial resolution during the sunlit portion of the day. As the animation runs, large areas of smoke can be seen from the fires in the Flint Hills (yellows to red colors represent aerosol (smoke) detected in the atmosphere. **(Note – You will have to run the slide show from the PowerPoint version in order to view the animation.)**

Our Vision – Healthy Kansans living in safe and sustainable environments.

Saturday, April 10, 2010

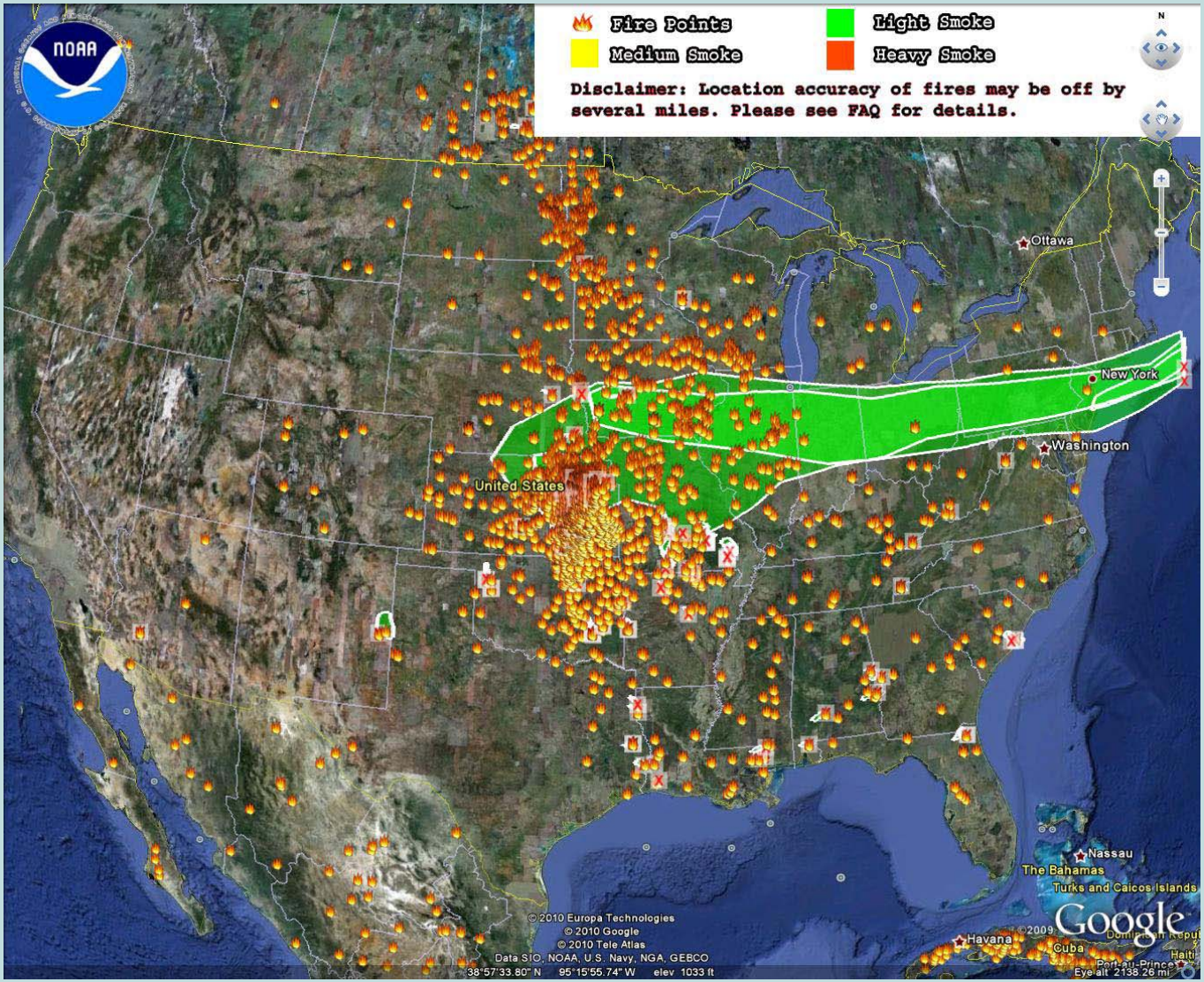


April 10, 2010 – Meteorological Data for the Emporia, Kansas Automated Surface Observing System (ASOS) Site.

Our Vision – Healthy Kansans living in safe and sustainable environments.

April 11, 2010

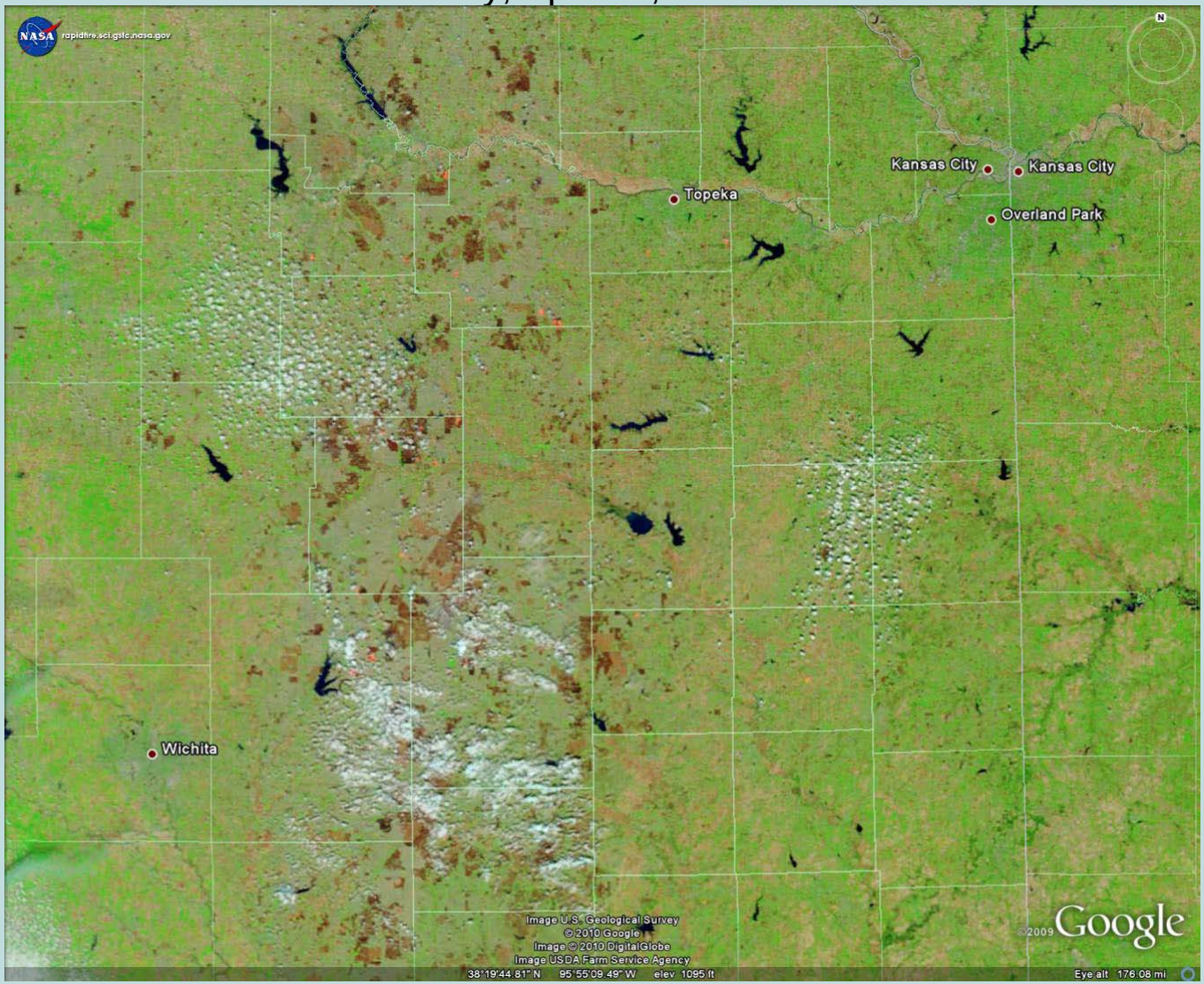
Sunday, April 11, 2010



April 11, 2010 – As can be seen, there continued to be a tremendous number of fires over the Flint Hills. Smoke from the previous three days of fires has now spread from Southern Iowa across Missouri, Illinois, Indiana, Ohio, Pennsylvania, New Jersey, Long Island and out over the Atlantic Ocean.

Our Vision – Healthy Kansans living in safe and sustainable environments.

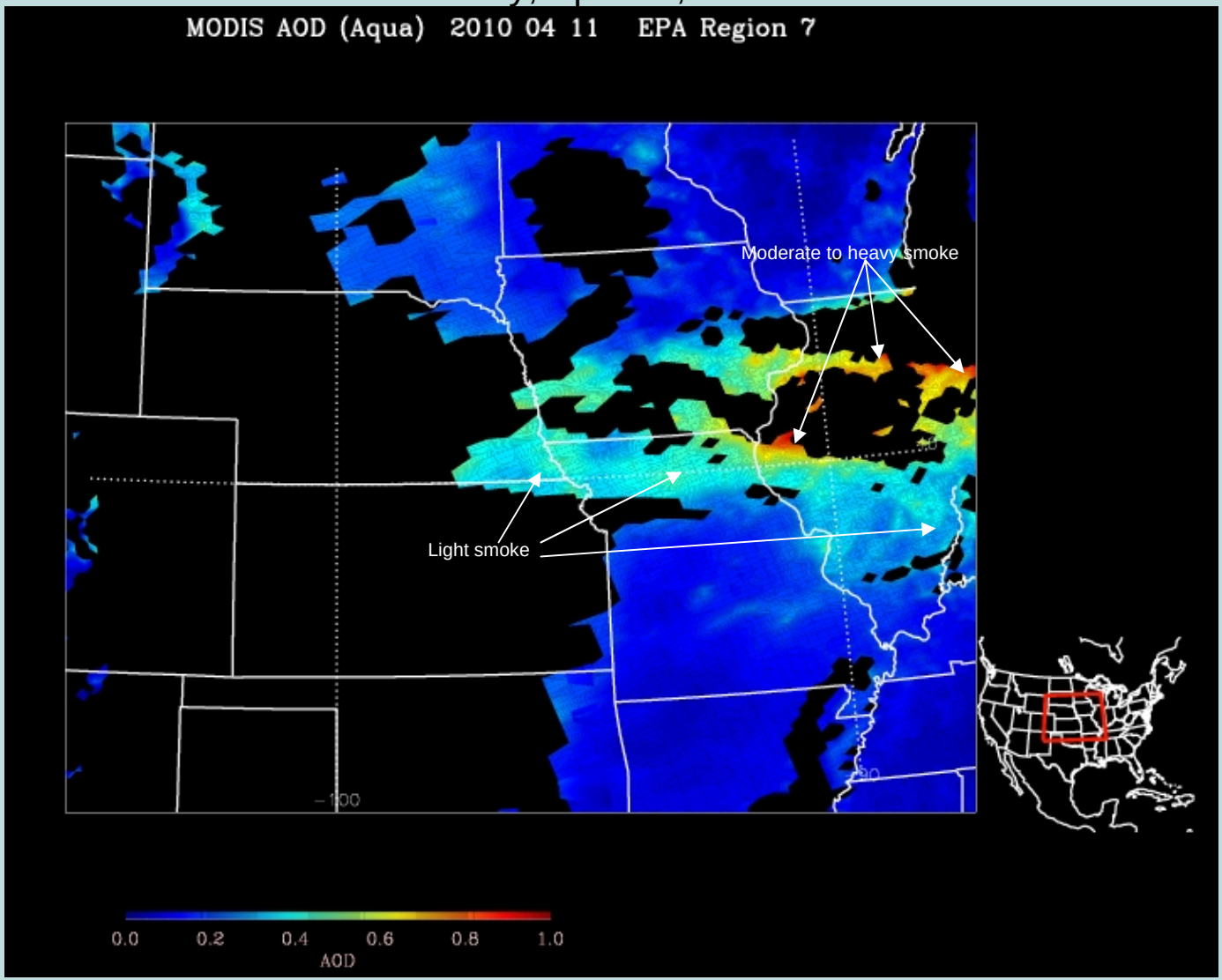
Sunday, April 11, 2010



April 11, 2010 – This NOAA MODIS visible satellite image shows burn scars over the Flint Hills counties of Kansas. The darker brown areas are recently burned areas (last two or three days) and the lighter brown areas were previous burned earlier in the Spring and are beginning to show signs of new grass growth. The dark blue outlined areas are large bodies of water and the white colored objects are cumulus clouds.

Our Vision – Healthy Kansans living in safe and sustainable environments.

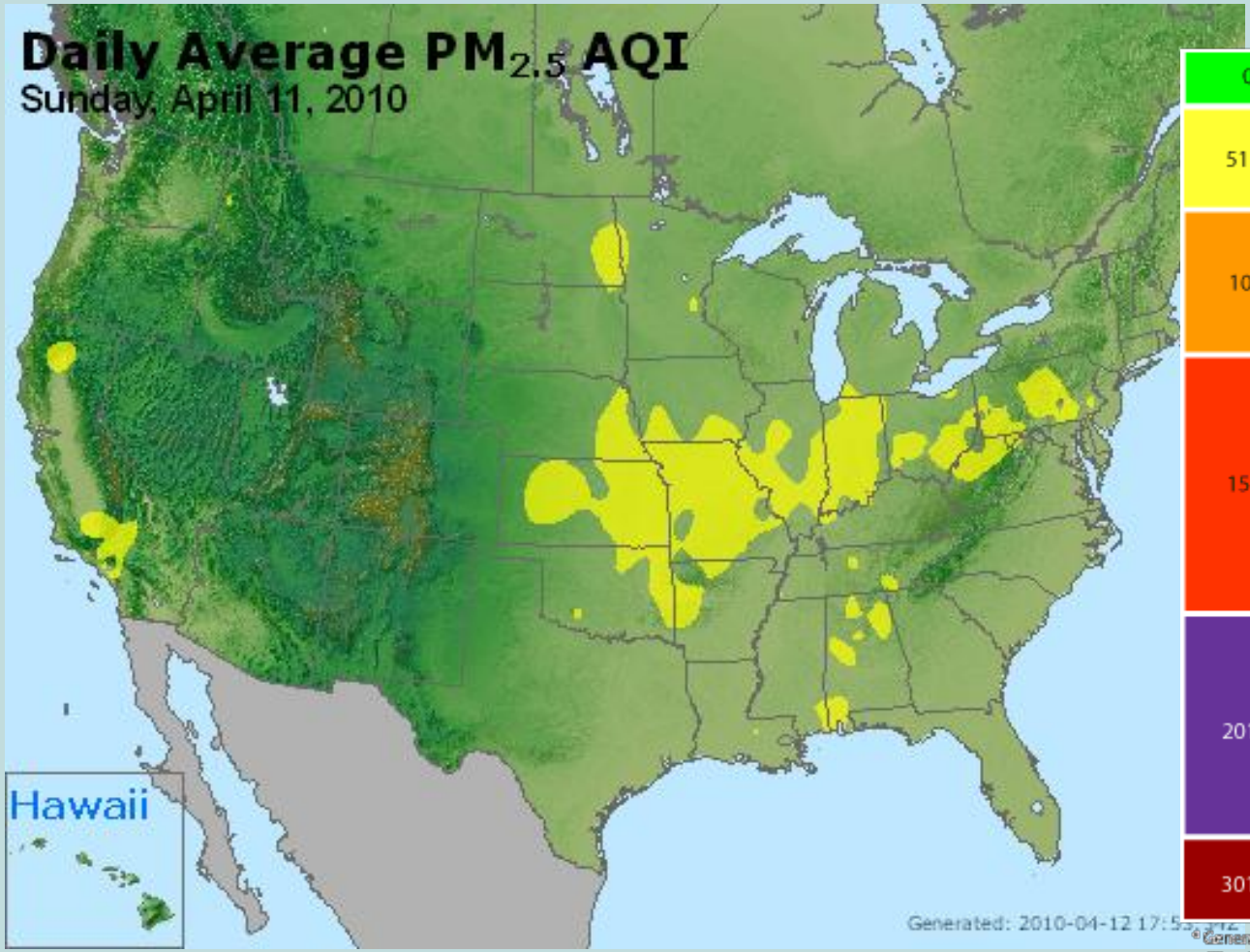
Sunday, April 11, 2010



April 11, 2010 – This graphic shows aerosol amounts across the midwest on April 11 based on observations from the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite. Satellite measurements of aerosols, called aerosol optical thickness, are based on the fact that the particles change the way the atmosphere reflects and absorbs visible and infrared light. An optical thickness of less than 0.1 (blue) indicates a crystal clear sky with maximum visibility, whereas a value of 1 (reddish brown) indicates very hazy conditions. Notice the area of smoke (lighter blues to reds) extending from Southern Nebraska across Iowa and into Illinois. Black areas are clouds that have been masked out of the image.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Sunday, April 11, 2010



Air Quality Index (AQI): Ozone

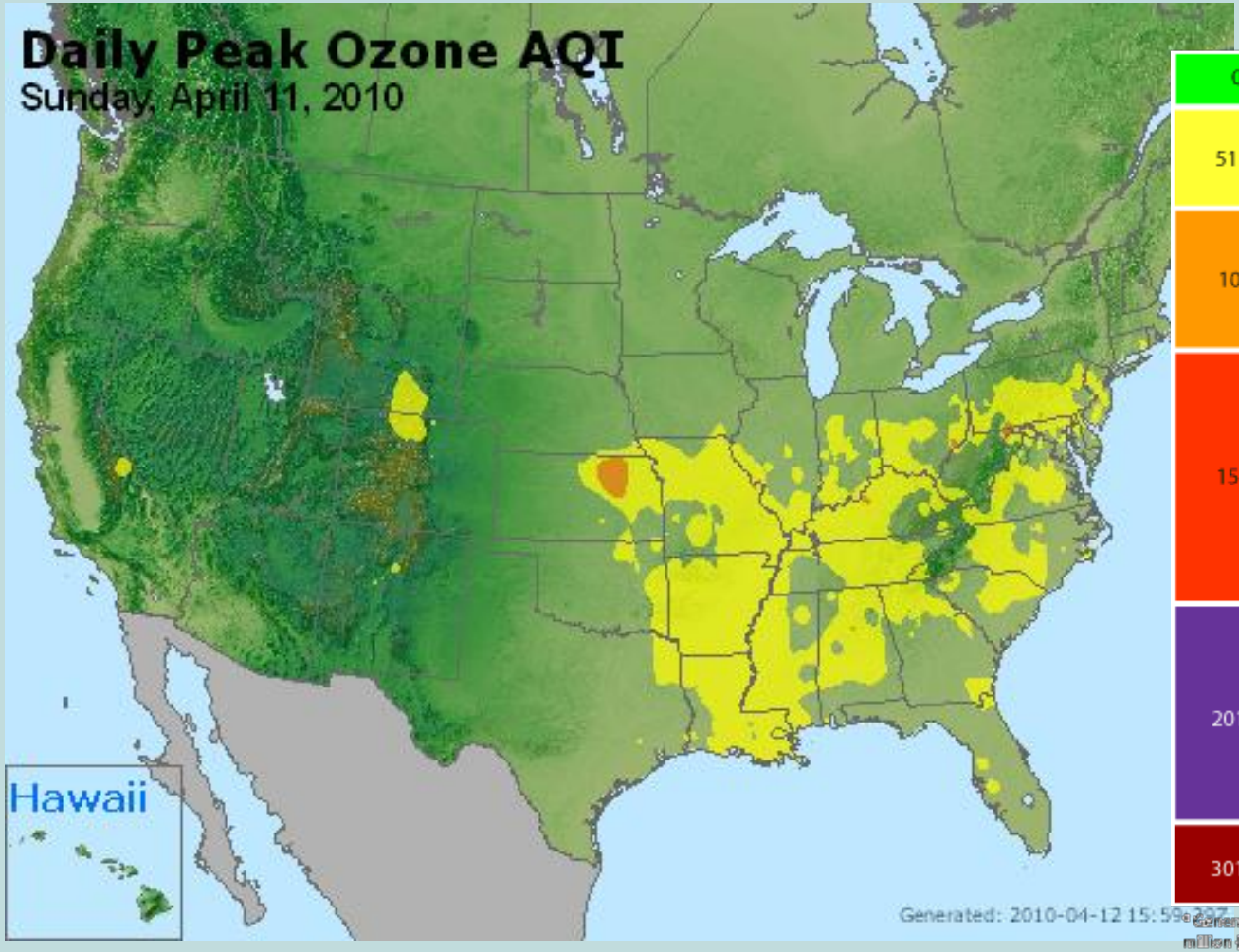
Index Values	Levels of Health Concern	Cautionary Statements
0 to 50	Good	None
51 to 100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
100 to 150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151 to 200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201 to 300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301 to 500	Hazardous	Everyone should avoid all physical activity outdoors.

* Generally, an AQI of 100 for ozone corresponds to an ozone level of 0.08 parts per million (averaged over 8 hours).

April 11, 2010 – The Air Quality Index (AQI) is an index for reporting daily air quality. The higher the AQI value, the greater the level of air pollution and the greater the health concerns. Smoke is causing elevated $PM_{2.5}$ values in areas of Eastern Kansas, Missouri, Arkansas, Illinois, Indiana and Michigan with associated AQI values in the Moderate (yellow) to Unhealthy for Sensitive Groups (orange) recorded throughout the day. Moderate AQI values increase across Ohio and Pennsylvania later in the day as smoke levels increase.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Sunday, April 11, 2010



Air Quality Index (AQI): Ozone

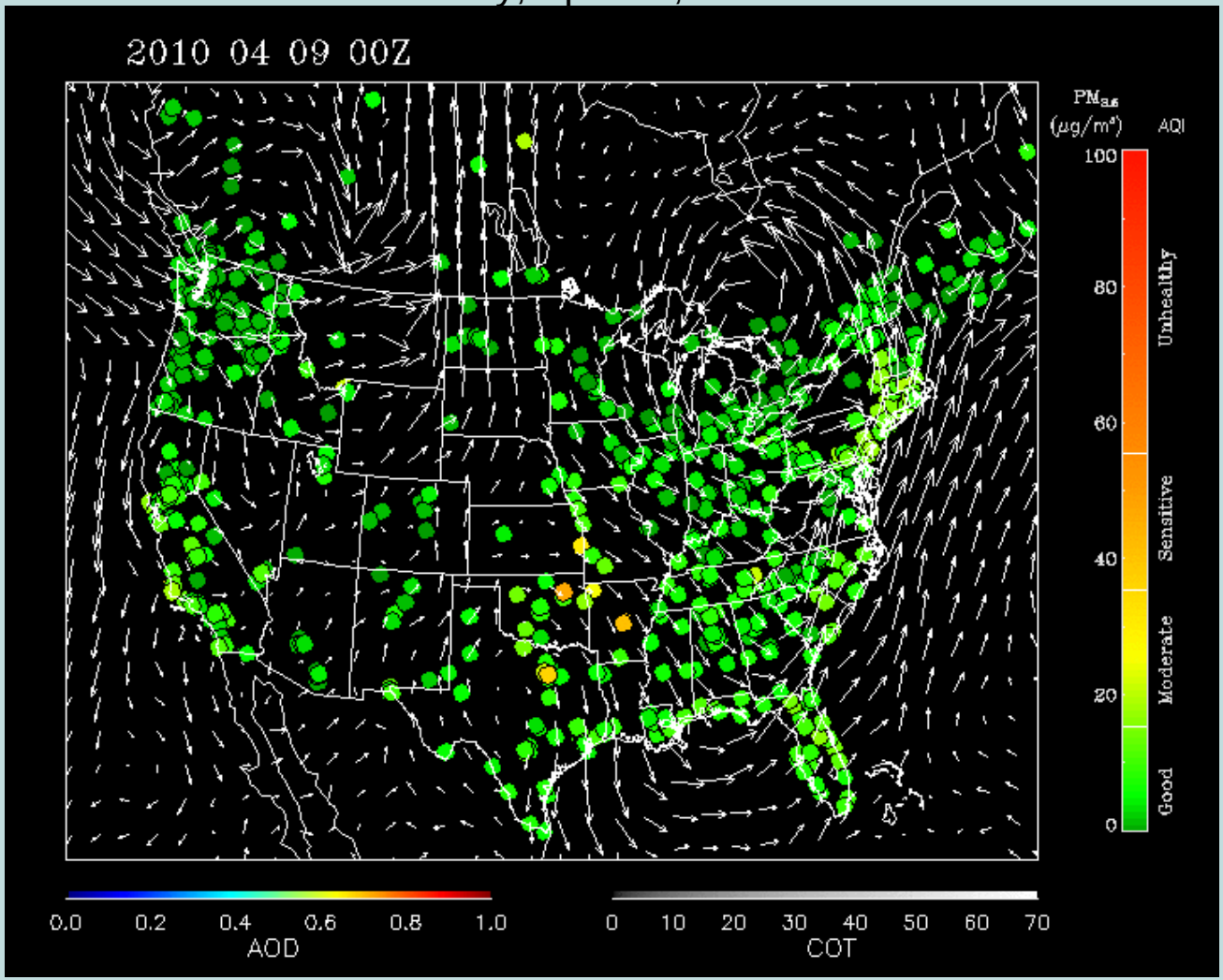
Index Values	Levels of Health Concern	Cautionary Statements
0 to 50	Good	None
51 to 100*	Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors.
100 to 150	Unhealthy for Sensitive Groups	Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.
151 to 200	Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid prolonged or heavy exertion outdoors. Everyone else, especially children, should reduce prolonged or heavy exertion outdoors.
201 to 300	Very Unhealthy	Active children and adults, and people with lung disease, such as asthma, should avoid all outdoor exertion. Everyone else, especially children, should avoid prolonged or heavy exertion outdoors.
301 to 500	Hazardous	Everyone should avoid all physical activity outdoors.

*Generally, an AQI of 100 for ozone corresponds to an ozone level of 0.08 parts per million (averaged over 8 hours).

April 11, 2010 – The Air Quality Index (AQI) is an index for reporting daily air quality. The higher the AQI value, the greater the level of air pollution and the greater the health concerns. Smoke is causing elevated ozone values in areas of Eastern Kansas, Missouri, Arkansas and Western Illinois with associated AQI values in the Moderate (yellow) to Unhealthy for Sensitive Groups (orange) recorded throughout the afternoon. Ozone levels increase later in the day across the St. Louis metropolitan area and parts of Ohio to exceedance levels as the smoke drifts over these states.

Our Vision – Healthy Kansans living in safe and sustainable environments.

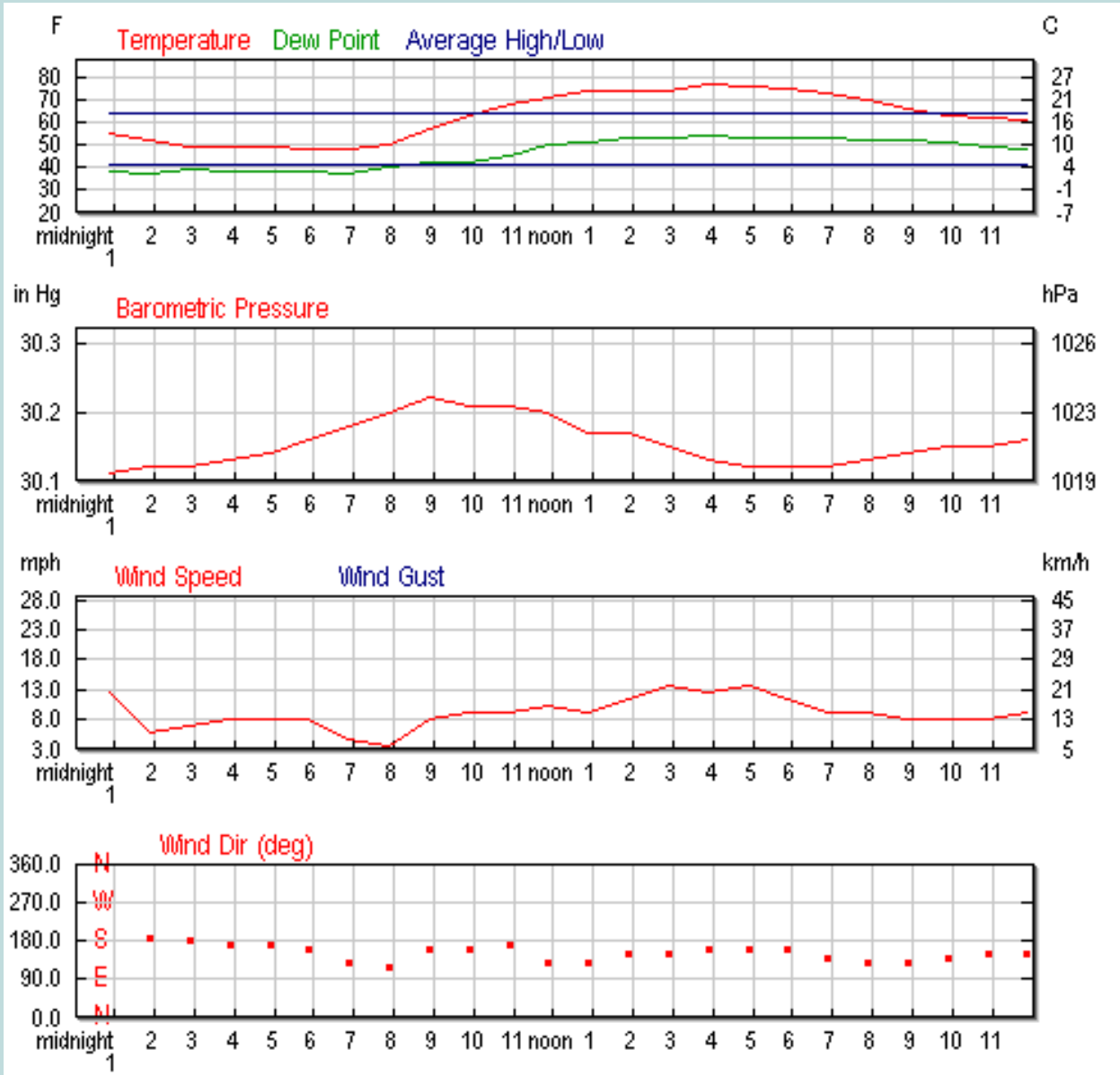
Sunday, April 11, 2010



April 11, 2010 – The data fusion animation plots the most recent three days data of available daily MODIS aerosol optical depth (in color contours), daily MODIS cloud optical thickness (in gray contours), hourly PM2.5 concentrations for the in-situ continuous monitors (vertical color bars), NAM 850mb wind field vectors, and half-hourly WF-ABBA fire counts (pink and purple diamonds) . This data fusion visualizes the relationship between the MODIS ta, hourly PM2.5 mass concentration and the air quality index, providing a pseudo-synoptic view of aerosol events across North America. This 3-day composite ends on April 11. As the animation runs, please note the 850mb wind shift late on the 8th of April and the almost immediate impact this has on the $PM_{2.5}$ values (AQI colored circles) in Eastern Kansas and Missouri as the smoke is pushed over these areas. As the wind pushes the smoke eastward later on the 11h, sites in Illinois, Indiana, Pennsylvania and New Jersey begin to show higher AQI values (colored circles). **(Note – You will have to run the slide show from the PowerPoint version in order to view the animation.)**

Our Vision – Healthy Kansans living in safe and sustainable environments.

Sunday, April 11, 2010



April 11, 2010 – Meteorological Data for the Emporia, Kansas Automated Surface Observing System (ASOS) Site.

Our Vision – Healthy Kansans living in safe and sustainable environments.

Douglas Watson
Bureau of Air
Kansas Department of Health
& Environment
Curtis State Office Building
1000 SW Jackson, Suite 310
Topeka, Kansas 66612

www.kdheks.gov

voice 785.296.0910
fax 785.296.7455
dwatson@kdheks.gov

Our Vision – Healthy Kansans living in safe and sustainable environments.

www.kdheks.gov

Our Vision – Healthy Kansans living in safe and sustainable environments.