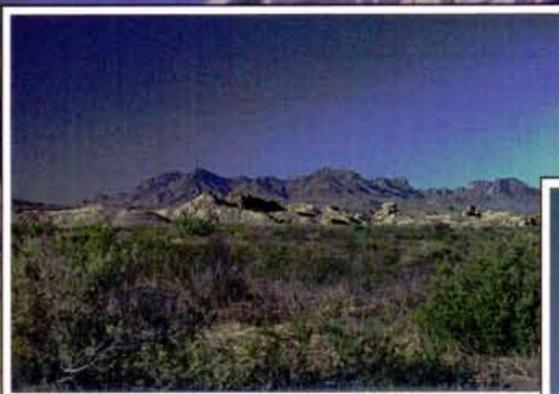


HOW FAR CAN YOU SEE?



Visibility is at its greatest during winter months when prevailing winds are from the northwest. This excellent visibility averages 90 miles or more. During the summer, unimpaired visibility occurs only 4% of the time. Why?



Prevailing summertime winds are from the southeast. Due to the effects of air pollution carried by these southeast winds, average summertime visibility ranges between 30 and 90 miles. Typical visibility in the summer averages 69 miles and occurs 58% of the time.



On the most polluted summer days, poor visibility of 30 miles or less occurs 6% of the time. The worst pollution to occur in Big Bend reduces visibility to less than 10 miles!

During a visit to Big Bend National Park, you can discover some of the United States' most precious natural, cultural, and recreational resources. Big Bend's desert, mountain and canyon vistas are spectacular and inspirational—they are national treasures! But air pollution is damaging the scenic views that visitors enjoy. Are air quality and its effects on visibility in Big Bend National Park important to you—does it matter “How Far Can You See?”

Big Bend National Park is one of our country's most scenic places. It includes majestic mountains towering above rugged badlands, the ribbon-like Rio Grande meandering across vegetation-lined floodplains or charging through sheer-walled canyons, and panoramic vistas spanning across endless miles of Chihuahuan Desert as far as the eye can see. As far as the eye can see? Well, perhaps. On some days of the year Big Bend's air quality is so good that visitors can actually see the detail of large objects over 100 miles away. Unfortunately, park visitors find poor hazy views on most days, with conditions of less than 30 miles visibility 6% of the time. **Pollution not only affects visual range but also our ability to perceive color, texture, and form of distant objects.** On a few days of the year Big Bend registers the filthiest air, in terms of visibility impairment, within any western national park!



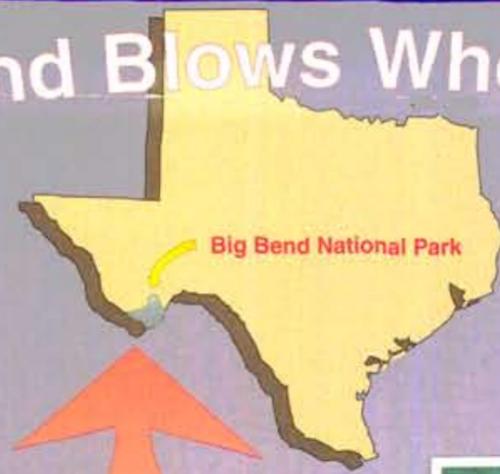
POLLUTANT	SOURCES	HUMAN HEALTH EFFECTS	ENVIRONMENTAL EFFECTS	CONTROLS
Sulfur Dioxide (SO2)	Coal and oil electrical power plants, oil refineries, smelters, home heating units, and volcanoes.	Blocks breathing passages, increases instances and severity of lung disease.	Reduces visibility, damages food crops and stunts plant growth, forms acid rain as it combines with other chemicals in the air, deteriorates monuments, statues, and buildings.	Utilize coal and oil low in sulfur, treat coal and oil to remove sulfur before use, add scrubbers to smokestacks.
Nitrogen Oxides (NO and NO2)	High temperature combustion from industry, power plants, and autos.	Irritates lungs, eyes, nose, throat, and skin. Can be fatal in high concentrations.	Reduces visibility, forms ozone and acid rain as it reacts with other chemicals in the atmosphere, stunts plant growth and damages eggs of fish and other amphibians.	Difficult to control. Processing of fuel before burning, catalytic converters on cars, and special industrial boilers with catalytic controls help.
Particulates (solid particles and liquid droplets)	Coal burning, construction, mining, farming, windstorms, forest fires, volcanoes, dust stirred by cars.	Causes throat irritation, worsens heart and respiratory problems, can carry compounds and heavy metals into lungs.	Reduces visibility, corrodes metal, soils buildings and other painted surfaces, interferes with photosynthesis, may alter climate.	Special boilers, collectors, and scrubbers are used. Sprays reduce dust on roads.

What is pollution and where does it come from?

From sources in the U.S. and Mexico such as:



"The Wind Blows Where It Will..."



Although nearly half of Big Bend's visibility reduction is due to human-made sulfates, some natural sources also contribute to pollution. Circulating, summer weather patterns arrive into Big Bend carrying windblown soil and dust. Smoke from desert wildfires makes additional contributions to this source of pollutants.



Another source that contributes to Big Bend's visibility pollution is Mexico City and its surrounding urban area, over 700 miles from Big Bend. Large circulating weather patterns may collect, transport, and deliver to Big Bend such pollutants as sulfates, organic carbons, and nitrates from this region.



Continuing inland from the Gulf, a summer weather system may migrate into North Central Mexico. This region includes the urban/industrial centers of Monterrey and Monclova and the Carbon I and II power plants. Air masses approaching Big Bend from the southeast bring the highest concentrations of sulfates and the poorest visibility conditions.

Using back-trajectory analysis, researchers can track prevailing wind patterns and trace the origin of pollutants. A typical summer wind pattern for Big Bend may begin days earlier in East Texas, circulate into Louisiana, dip south along the Gulf Coast and pick up pollutants from this region's industries.

Big Bend & the Clean Air Act. The goal of the Clean Air Act is safe and acceptable air quality by attaining, and maintaining, national air standards. "Primary" standards are set to protect public health while "secondary" standards are to protect such things as scenic resources found in national parks.



The Act seeks to "prevent significant deterioration" of air quality, particularly in certain areas of special natural, scenic, or historic values known as "Class I Areas". Congress expressed the national desire to preserve the ability to see long distances, entire panoramas, and specific features in the Class I Areas like Big Bend National Park.



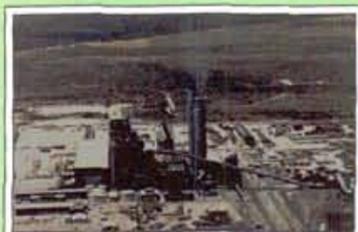
Current Knowledge. In spite of Big Bend's remote location and presumed immunity to such urban problems as air pollution, noticeable changes in the park's air quality appeared during the 1970s. In response to this impending threat, and prompted by new amendments to the Clean Air Act, park managers began an air monitoring program. After years of data collection and analysis, researchers are now able to better interpret the transport and transformation of pollutants contributing to the park's reduced visibility.

Studies at Big Bend. Big Bend's air quality monitoring program includes several data collection systems: a **transmissometer** sends a light beam across the desert to a collection monitor for 10 minutes each hour, measuring the amount of light blocked, absorbed, or deflected by air pollution; an **aerosol sampler** inhales air for 24 hours twice per week. Filters are analyzed for substances such as sulfates, nitrates, organic carbon, and soil; an **acid rain monitor** measures the acid content of precipitation; and an **ozone monitor** measures ozone in the atmosphere on a continuous basis.



The IMPROVE Particulate Sampler

Carbon I and II Power Plants. The Carbon I and II power plants are located near Piedras Negras, Coahuila, Mexico, 136 miles from Big Bend National Park. While both plants meet all standards established by the Mexican government, neither power plant has air pollution controls for sulfur dioxide emissions.



Together they will emit an estimated 240,000 tons of sulfur dioxide into the atmosphere annually. Pollution models suggest that visibility in the park may be reduced by up to 60% on some days. The added pollution may potentially damage natural and cultural resources due to increased acid deposition.

WHAT YOU CAN DO

- Learn about air pollution issues in your community. Find out if there are any efforts taking place to clean up the air in your city or town. Public libraries contain books and references on air pollution.
- During your next visit to Big Bend National Park join a ranger for a guided walk or evening presentation to learn more about issues affecting park resources.
- Electricity generation is a major source of air pollution. At home, at school, or at work save electricity by using energy-efficient lighting whenever possible. Have a family member ask your utility company about its consumer energy conservation program. Purchase energy-efficient appliances.
- Let people know that you care. Family members can become involved in local efforts by supporting ballot measures and candidates sensitive to air quality issues. Talk to your state or federal environmental agency to find out what it is doing in your area.