



A family viewing the scenic landscape of Shenandoah National Park, VA. ©Keithpics | dreamstime.com

# Cleaning up the Haze: Protecting People and America's Treasured Places

## Recommendations to Strengthen EPA's Approach



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## Introduction

With sweeping bipartisan support, Congress adopted the visibility protection program in the 1977 amendments to the Clean Air Act.<sup>1</sup> The program mandates the elimination of visible air pollution at lands owned by the American people: national parks and wilderness areas. Through this mandate Congress sought to protect the “intrinsic beauty and historical and archeological treasures” of what should be the nation’s most pristine public lands.

The same pollution that brings hazy air to the nation’s iconic treasured areas is also dangerous to breathe. Haze pollution contributes to heart attacks, asthma attacks, chronic bronchitis and respiratory illness, and even premature death. That is why it is essential that the U.S. Environmental Protection Agency (EPA) honor the Clean Air Act’s mandate to swiftly clean up the oldest and dirtiest sources of air pollution impairing our country’s gems.



A kayaker in the Smokies. © iStock photo.

Visitors to national parks and wilderness areas consistently rate visibility and clear scenic vistas as one of the most important aspects of their experience.<sup>2</sup> In 2010, national park tourism contributed approximately \$32 billion to the U.S. economy sustaining over a quarter of a million jobs.<sup>3</sup> Studies have found that the economic benefit of eliminating haze from power plants impacting the nation’s treasured landscapes is \$5.62 billion dollars a year.<sup>4</sup>

This report highlights a dozen of the greatest haze causing polluters — antiquated coal-fired power plants in the eastern half of the U.S.<sup>5</sup> — that will escape urgently needed pollution control requirements if EPA doesn’t abandon a recently proposed rule to exempt hundreds of coal plants from visibility protection regulations.

<sup>1</sup> The CAA 1977 amendments passed the House 326-49 and passed the Senate 73-7.

<sup>2</sup> The Clean Air Task Force. “Out of Sight: Haze in our National Parks.” September 2000. Accessed online January 24, 2012. [http://www.catf.us/resources/publications/files/Out\\_of\\_Sight.pdf](http://www.catf.us/resources/publications/files/Out_of_Sight.pdf) [hereinafter Clean Air Task Force].

<sup>3</sup> Southwick Associates. “The Economics Associated with Outdoor Recreation, Natural Resources Conservation and Historic Preservation in the United States.” October 10, 2011. Accessed online January 24, 2012. [www.nfwf.org/Content/ContentFolders/NationalFishandWildlifeFoundation/HomePage/ConservationSpotlights/TheEconomicValueofOutdoorRecreation.pdf](http://www.nfwf.org/Content/ContentFolders/NationalFishandWildlifeFoundation/HomePage/ConservationSpotlights/TheEconomicValueofOutdoorRecreation.pdf); United States Department of the Interior, Office of Policy Analysis. “The Department of the Interior’s Economic Contributions.” June 21, 2011. Accessed online January 24, 2012. [www.doi.gov/ppa/upload/DOI-Econ-Report-6-21-2011.pdf](http://www.doi.gov/ppa/upload/DOI-Econ-Report-6-21-2011.pdf).

<sup>4</sup> Abt Associates found that the impact of power plant emissions on visibility in parks and wilderness areas totaled \$4.3 billion per year in 2000 dollars, adjusted in 2011 dollars is \$5.62 billion, as measured in people’s willingness to pay for visibly cleaner [note- this estimate does not include economic benefits related to public health]. See Clean Air Task Force supra note 2 at 10.

<sup>5</sup> References to “eastern half of the U.S.” or “eastern U.S.” throughout this report refer to the following states covered under the Cross State Air Pollution Rule or CSAPR: Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia and Wisconsin.

## Executive Summary

The promise of clean, haze free air in America's national parks and wilderness areas dates back to 1977, when Congress declared that our nation's greatest natural treasures, known as "[Class I areas](#),"<sup>6</sup> should be free of the unhealthy air that plagues many of our urban areas. Old coal-fired power plants are a major cause of haze pollution, and the Clean Air Act requires that they cleanup by installing "Best Available Retrofit Technology," (BART)—essentially state-of-the-art pollution controls. After decades of delay, these antiquated coal plants continue to spew dangerous chemicals into our iconic public lands. The EPA is finally in the process of implementing the visibility protection program (or Regional Haze Rule), including BART requirements, to make these plants limit their pollution.

In November 2011 EPA agreed that within one year it would finalize haze pollution cleanup plans for every state. [EPA's historic agreement](#)<sup>7</sup>, if adequately enforced, will provide cleaner and clearer air for generations to come in places like Great Smoky Mountains (NC/TN), Voyageurs (MN) and Acadia (ME) national parks, and Brigantine (NJ), and Caney Creek (AR) wilderness areas as well as their surrounding communities. Unfortunately, EPA recently proposed a rule that threatens to hinder progress toward cleaner air in these and other Class I areas in the eastern U.S.

On December 23, 2011 EPA proposed a [BART rule exemption](#) that will allow 28 states in the eastern U.S. to avoid compliance with the BART program. EPA will instead allow these states to rely on emissions reductions they may make under the [Cross State Air Pollution Rule](#) (CSAPR)<sup>8</sup> in order to satisfy their obligations under the BART program to protect Class I air quality. While the emission trading program created by CSAPR will result in significant air quality benefits for many eastern states, it will not require some of the most egregious polluters of iconic Class I national landscapes to clean up their pollution to the same level that would be required under BART.

We call on EPA to drop its proposed BART rule exemption so that our country's most iconic natural places are fully protected from unsightly and unhealthy air. EPA must close the loophole that otherwise would allow many outdated and inefficient coal-fired power plants to avoid cleanups that are needed to protect air quality at Class I national parks and wilderness areas.



Some Class 1 Areas contain historical resources in addition to the natural, as seen in this lighthouse photo from Cape Romain Wilderness Area. © wilderness.net.

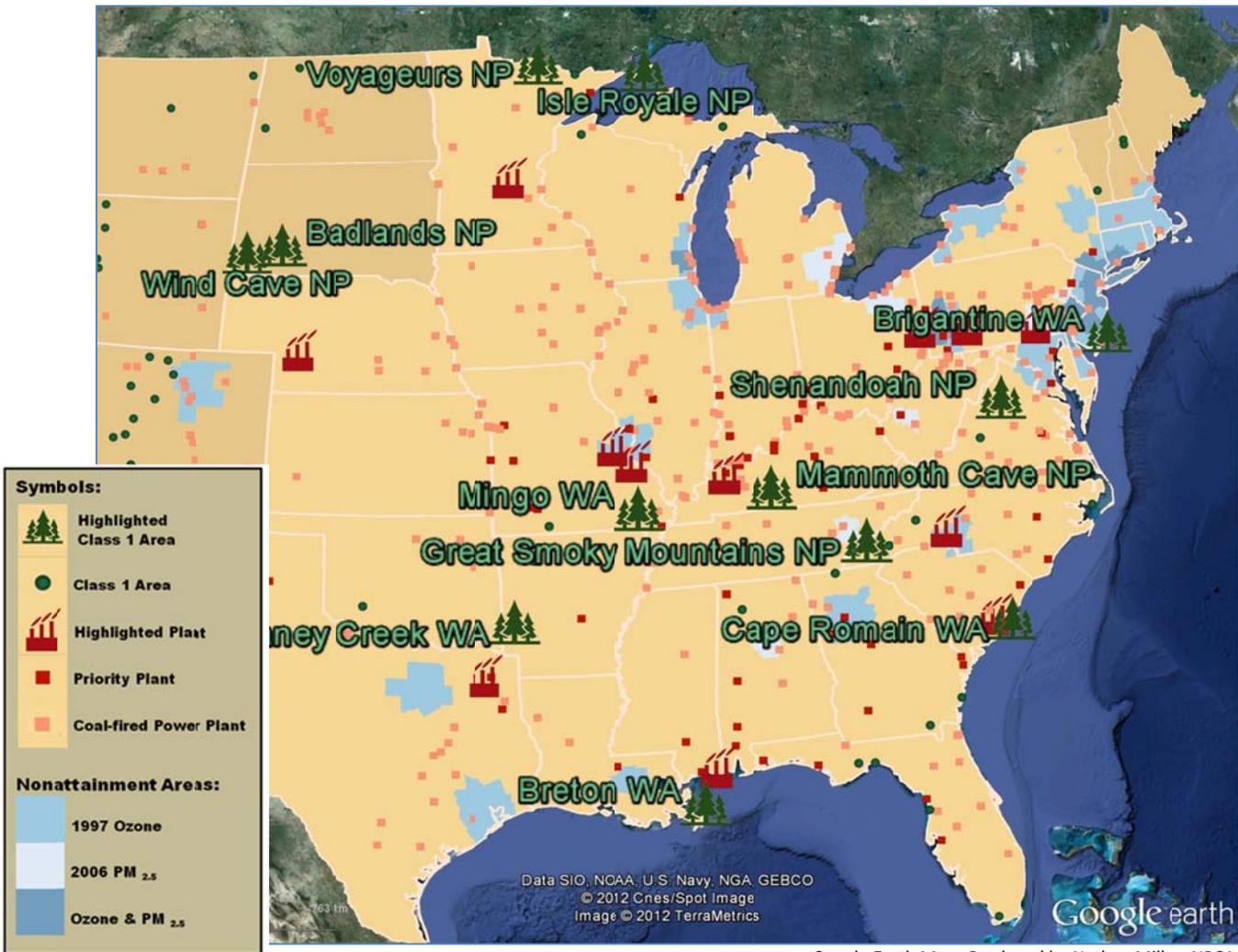
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<sup>6</sup> The 1977 Clean Air Act established the concept of Federal Class I areas, and in 1979 EPA identified [156 Class I areas](#), currently listed in 40 C.F.R. pt. 81, subpt. D, §§ 81.401-437; they include the nation's largest and most scenic national parks and wilderness areas.

<sup>7</sup> The [consent decree](#) setting deadlines for haze cleanup plans requires court approval.

<sup>8</sup> On December 30, 2011 the DC Circuit Court issued a stay of CSAPR in response to an industry lawsuit. Unless and until the CSAPR stay is lifted, emissions reductions expected from this rule are speculative and uncertain. The litigation over CSAPR makes it even more imperative that EPA halt its proposal to exempt eastern states from full compliance with the BART program.

Map 1: Highlighted Coal Plants and Class 1 Areas



Google Earth Maps Produced by Nathan Miller, NPCA

### EPA's Proposed BART Rule Exemption Fails to Fully Protect Class I Areas

EPA asserts that CSAPR is “better than BART” at protecting air quality at national parks and wilderness areas in the eastern half of the U.S. and that is why states in the CSAPR region should be excluded from implementing the BART program. BART requires that many old and dirty coal-fired power plants impairing a Class I area be evaluated for pollution controls that will reduce or eliminate their haze-causing emissions.<sup>9</sup> Based on the record of power plants that have already been required to cleanup under the BART program, the best available retrofit technologies are cost-effective, widely used in the electric power industry, and provide measurable benefits to Class I areas. If BART is fully enforced, Class I areas will realize improved air quality, not to mention the significant public health co-benefits.

<sup>9</sup> BART emission limits are required for polluting sources that (1) have the potential to emit 250 tons or more of any air pollutant that may impair visibility at a Class I area, (2) fall within one of 26 categories of industrial sources defined by the Clean Air Act, (3) were in existence on August 7, 1977 and began operating after August 7, 1962 and (4) are responsible for impacting visibility in one or more Class I areas.

CSAPR on the other hand is not designed to protect Class I areas. Its purpose is to limit emissions of sulfur dioxide and nitrogen oxides that cross state lines and cause or contribute to violation of clean air standards in downwind states within the eastern half of the country. It does this by establishing an overall emission budget for each state covered by the standard and apportioning that budget among the states' power plants. Power plants may comply with CSAPR by either reducing their portion of the state's emissions budget or by purchasing emissions reduction credits from another power plant located within the state or in other states within the applicable CSAPR control area, subject to certain limitations.

EPA's proposed BART rule exemption rule would supplant BART with CSAPR in the east. This means that some power plants that are significantly impairing Class I areas would be able to avoid cleanup by purchasing emissions reduction credits from another plant. Such plants would be allowed to continue to pollute the downwind Class I areas indefinitely. The proposed BART rule exemption would also allow nearly 150 coal plant units to avoid installing widely available and cost effective pollution controls and would exempt them from having to achieve emission rates routinely required at coal plants nationwide. Adequate enforcement of BART for these coal-fired power plants would result in cleaner air. *EPA's proposal clearly does not achieve air quality gains that BART would achieve in many important instances.*

This report highlights twelve specific examples of power plants that will be allowed to avoid pollution controls needed to clean up haze pollution in national parks and wilderness areas. Our analysis demonstrates that *EPA's proposed BART rule exemption will allow many outdated coal-fired power plants to avoid pollution controls needed to protect air quality in some of our most treasured Class I areas.* Adequate enforcement of BART at these power plants would curb these excessive and unnecessary emissions. Accordingly, EPA should not allow power plants covered under CSAPR to be exempt from the BART program.

### Key findings

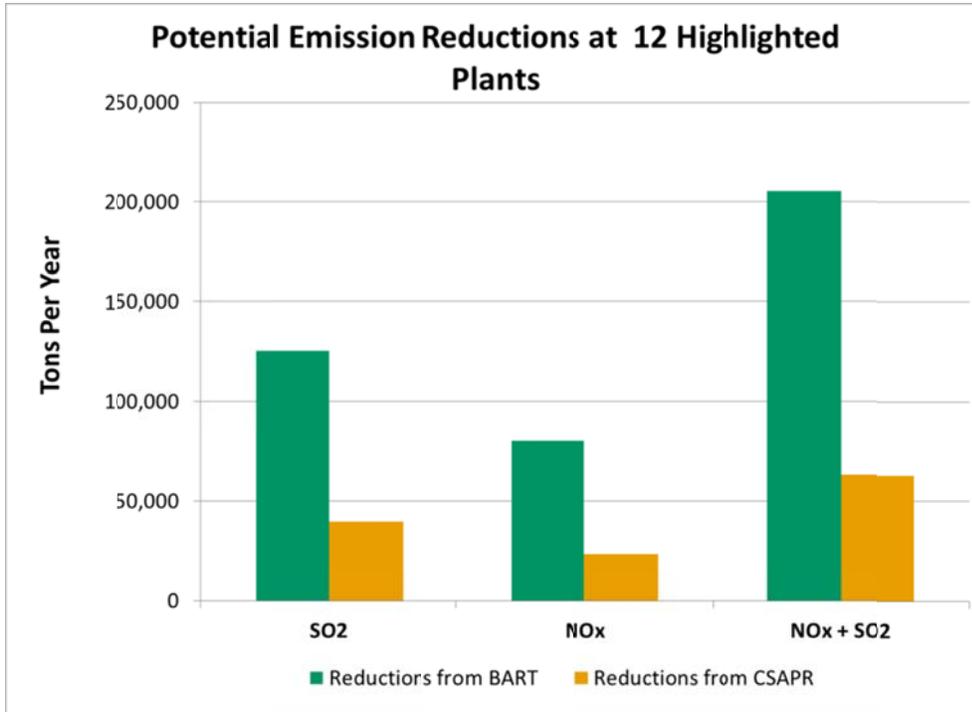
By exempting some of the eastern U.S.'s oldest and dirtiest coal-fired power plants from "best available retrofit technology", EPA's proposed BART rule exemption will result in dirty air continuing to reach some of America's most treasured natural landscapes and their surrounding communities. Without adequate BART requirements, these old power plants — many of which were built in the late 1950s and early 1960s — will continue spewing dangerous and unnecessary pollution for generations to come.

## *Cleaner Air in Parks and Wilderness Areas Stimulates Local Economies*

Improved visibility may result in increased visitation to national parks by as much as 25%, potential local economic benefits of between \$17 million and \$418 million, and between 390 and 4,188 new jobs. A 25% increase in visitors could also provide an additional \$248 million in increased fee collection. Concession sales are also likely to flow from increased visitorship<sup>1</sup>.

<sup>1</sup>Figures are adjusted to 2011 dollars: \$320 million (2000) = \$418 million (2011), \$13 million (2000) = \$17 million (2011), \$190 million (2000) = \$248 million (2011). See The Clean Air Task Force supra note 2 at 10.

Chart 1: Comparison of potential emission reductions under BART and under CSAPR for the highlighted dozen coal plants.



This report highlights a dozen examples of outdated coal-fired power plants in the eastern half of the U.S. that will not adequately clean up under EPA's proposed BART rule exemption. For these plants and Class I areas, CSAPR is clearly not better than BART at cleaning up air pollution. Chart 1 illustrates the potential emission reductions that

adequate BART limits would require above and beyond the pollution reducing potential of CSAPR at the dozen coal plants highlighted in this report.<sup>10</sup>

### Highlighted Coal-Fired Power Plants and Threatened Class I Areas

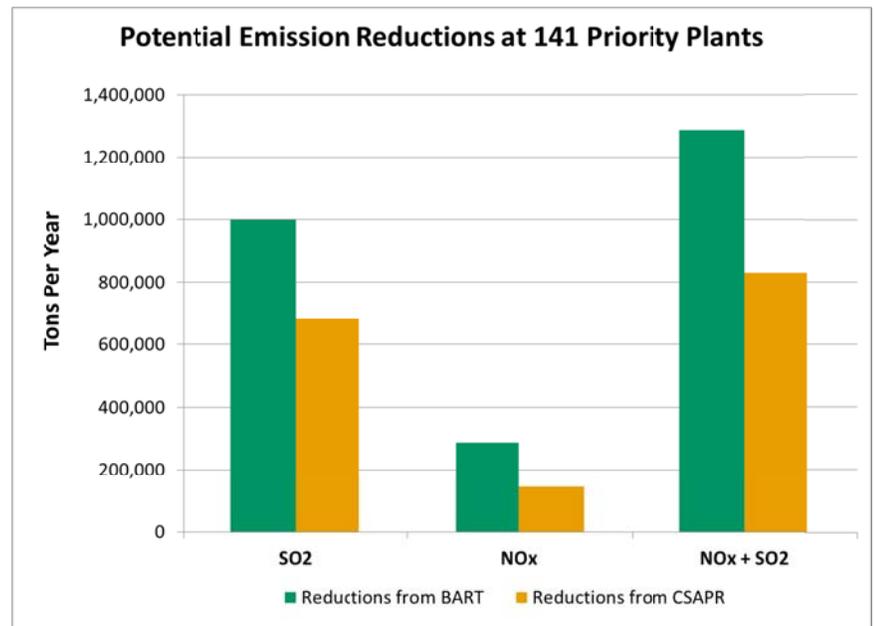
- ✚ Gerald Gentleman (NE)—Badlands and Wind Cave
- ✚ Daniel (MS)—Breton Wilderness
- ✚ Brunner Island (PA)—Brigantine Wilderness
- ✚ Monticello (TX)—Caney Creek Wilderness
- ✚ Jeffries (SC)—Cape Romaine Wilderness
- ✚ Marshall (NC)—Great Smokies
- ✚ RD Green (KY)—Mammoth Cave
- ✚ Labadie (MO)—Mingo Wilderness
- ✚ Rush Island (MO)—Mingo Wilderness
- ✚ Conemaugh (PA)—Shenandoah
- ✚ WH Sammis (OH)—Shenandoah
- ✚ Sherburne (MN)—Voyageurs and Isle Royale

<sup>10</sup> The results provided in this chart are only for coal plants in the airshed of one or more Class I areas and only address pollutants for which the plant lacks adequate pollution controls.

Chart 2: Comparison of emission reductions under BART and under CSAPR for 141 coal plants.

At least 141 coal-fired power plants will not be required by CSAPR to reduce emissions to levels that would be required through the installation of BART. For these units and the Class I areas they threaten, CSAPR is not better than BART at cleaning up air pollution. Chart 2 illustrates the potential pollution reductions that would be realized if adequate BART limits are required at the 141 facilities analyzed in this report.<sup>11</sup>

EPA's proposal is likely to result in pollution hotspots caused by excess and unnecessary power plants emissions affecting many of the 38 Class I areas and neighboring communities in the eastern U.S. As a result, visitors to national parks and wilderness areas as well as local residents will see and breathe more needless pollution.



## Proposed Alternative to BART Rule is Not Consistently Better than BART

### Clean Air Act Requirements of Alternative to BART Program

The Regional Haze Rule allows “an emissions trading program or other alternative measure” to replace the BART program if the alternative program or measure achieves *greater reasonable progress*<sup>12</sup> at the Class I area or areas at issue than would be achieved through the installation and operation of BART.” To replace BART, several things are required of the alternative program. One of the requirements is a demonstration that the alternative program will achieve greater reasonable progress than would have resulted from BART at “*all sources subject to BART in the State and covered by the alternative program.*” The full list of requirements is detailed at 40 C.F.R. 51.308(e)(2).

### Key Problems with EPA's Proposed BART Rule Exemption

CSAPR requires reductions in pollution over a broad geographic area – from the eastern seaboard to as far west as Texas. It does not specifically require power plants that impair air quality at Class I areas to clean up. Our analysis shows that at least a dozen power plants would get a pass to continue emitting significant quantities of pollutants, and some of the dozen would not clean up at all. In total, nearly 150 power plants will not reduce pollution to the extent that would be required under BART if CSAPR is used as an alternative to the BART program. By proposing to allow CSAPR to take the place of BART in the eastern U.S., EPA is leaving many Class I areas and their surrounding communities without the full level of clean air protection mandated by Congress.

<sup>11</sup> Chart 2 provides results based only on coal plants in the airshed of one or more Class I areas and only addresses pollutants for which the plant lacks adequate pollution controls.

<sup>12</sup> The term “reasonable progress” refers to the federal mandate that requires states to take actions to prevent future and remedy existing visibility impairment in order to make “reasonable progress” towards the national goal of restoring visibility to natural conditions in Class I areas by 2064.



Another problem with EPA's proposal is the agency did not evaluate individual power plants in the east to determine what emissions they could each achieve through installation of the best available retrofit technology. Instead, for example, EPA assumed that nearly all affected power plants would only be required to reduce NO<sub>x</sub> emissions by a limited amount. However, the NO<sub>x</sub> emission rates assumed by EPA are up to 12 times higher than the best available level of control that has already been demonstrated. Widely available, cost-effective best available retrofit technology has been shown to reduce these emissions by more than 90%. For these and other reasons, EPA's proposed BART rule exemption will allow more pollution at places like Acadia National Park, Great Smoky Mountains, Shenandoah National Park, and Brigantine National Wilderness Area than would result from adequate enforcement of the BART rule.

#### **Proposed Solutions to Protect Class I National Parks and Wilderness Areas:**

EPA should not allow some of the oldest and dirtiest coal plants in the eastern U.S. to get a pass to continue

polluting. To protect the nation's iconic public lands and their neighboring populations, we recommend that EPA:

1. ***Ensure that clean-up plans for polluters will result in air quality improvements at Class I areas.*** CSAPR does not require that the best available retrofit technology is installed or operated at coal-fired power plants that impair air quality at national parks and wilderness areas. EPA must make certain that adequate emission reductions occur at pollution sources that actually affect Class I areas in order to fully meet the stated requirements and goals of the BART program.
2. ***Accurately account for the emission reductions possible under the BART program.*** In assuming that CSAPR would achieve better results than BART, EPA significantly underestimates the amount of pollution that would actually be reduced through the installation and operation of the best available retrofit technology. EPA must be consistent in its evaluation and analyze every power plant impairing air quality at a Class I area for adequate best available retrofit technology controls. EPA must then revisit its conclusion that CSAPR is better than BART across the eastern half of the U.S in light of such a revised analysis.



Badlands National Park on a clear day (left) and a hazy day (right). ©IMPROVE.

# Cleaner Skies for Badlands & Wind Cave

## *Better pollution limits for Gerald Gentleman Station*

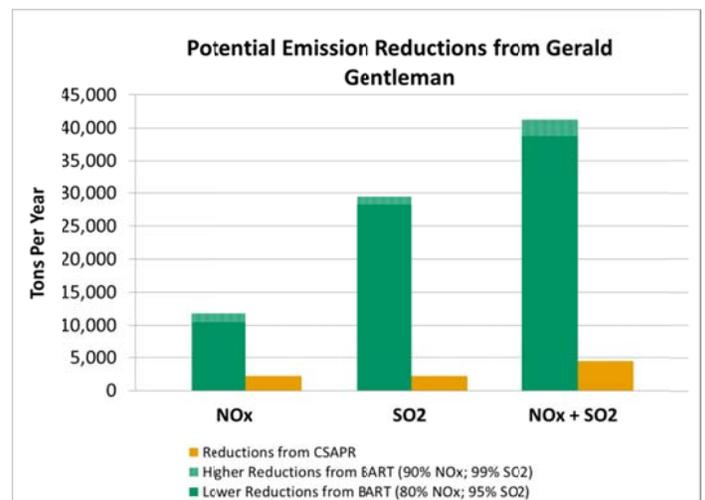
### Why EPA Must Better Limit Pollution at Gerald Gentleman Station

- The Clean Air Act is supposed to clean and clear the air at treasured American places like South Dakota's Badlands and Wild Cave national parks.
- But EPA has proposed a rule that will exempt Nebraska's Gerald Gentleman Station from adequately cleaning up the air pollution it emits into the Class I air sheds of Badlands, Wind Cave, and Rocky Mountain national parks, as well as Hercules Glades, Mingo and Wichita Mountains wildernesses.
- Unless EPA's proposed exemption is dropped, the Gerald Gentleman plant will emit at least 316% more nitrogen oxides and 1,749% more sulfur dioxide into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality in these places and cause serious health damage in addition to hazy skies.

### *Badlands National Park (SD)*

#### Air Quality Information

- On the clearest days views at the park range between 96-142 miles. Hazy air can diminish these views to 9-56 miles.



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Power plants threatening Badlands & Wind Cave National Parks and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO <sub>2</sub>	NO <sub>x</sub>	Mortality	Asthma Attacks	Lost Work Days
1	Gerald Gentleman Station, 1	NEBRASKA PUBLIC POWER DIST	1979	665	-13%	2%	23	403	2,961
	Gerald Gentleman Station, 2		1982	681	-2%	-28%			

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



An American Bison at Wind Cave National Park. © iStock.



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## Air Quality Information Cont'd

- Ozone and particle pollution account for most haze observed in the park on poor visibility days. These same pollutants also cause asthma attacks and heart damage.
- Field studies by the National Park Service show that ozone pollution damages some types of vegetation in the park.
- There is minimal threat of acid deposition at the park.

## Resources & Significance

- Badlands National Park consists of half mixed-grass ecosystems and half geologic formations in a sea of prairie.
- Named so because of its difficulty to traverse, the badlands are abundant in fossils that demonstrate several different geologic periods- a rarity in most deposits.
- The 400+ plant species support the park's most popular wildlife- bison herds and prairie dog colonies. In addition, there is 69 species of butterflies!
- Animal species living in the park adapt quickly to changing weather; extreme fluctuations have limited the number of inhabitants.

## Economic Highlights

- Almost 1 million people visited Badlands in 2010 leading to over \$23 million in revenue to nearby communities.
- Nearly 100 people are employed here for a total added value of \$6 million.

## *Wind Cave National Park (SD)*

### Air Quality Information

- Wind Cave National Park is in a rural area with comparatively good air quality, but the park is nevertheless vulnerable to nearby and distant sources of air pollution.
- Park visitors could see up to 91 miles away on the clearest of days but on the haziest of days

visitors could only see between 13 miles and 25 miles away.

## Resources & Significance

- In addition to being a culturally sacred place for the Lakota people, Wind Cave National Park possesses the 5<sup>th</sup> largest cave system in the world.
- This park provides an in-depth story of the region's geologic history with rock exposures that are 2 billion years old and fossil remnants that span 600 million to 60 million years ago.
- Wind Cave was one of the first areas to have free-roaming bison herds reintroduced after their populations were nearly decimated. The park also provides habitat for an array of smaller animal species- mammals, reptiles, and amphibians, as well as microorganisms in the deep, dark locations.

## Economic Highlights

- With over 500,000 visitors in 2010, the surrounding communities estimate gaining \$51.5 million from tourists to Wind Cave.
- Nearly 100 people are employed at this unit for a total added value of \$5 million.



A tour visiting Badlands National Park. © Bigstock Photo



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A Tern colony at Breton Wilderness Area. © wilderness.net

## Cleaner Skies for Breton Wilderness Area

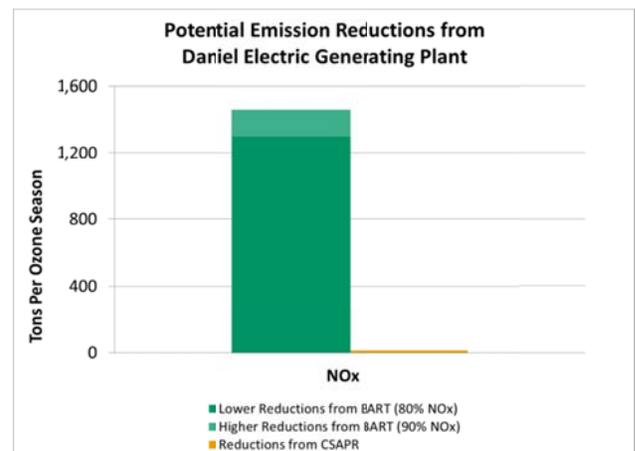
### *Better pollution limits for Daniel Electric Generating Plant*

#### Why EPA Must Better Limit Pollution at Daniel Electric Generating Plant

- The Clean Air Act is supposed to clean and clear the air at treasured American places like Louisiana's Breton Wilderness.
- But EPA has proposed a rule that will exempt Mississippi's Daniel Electric Generating Plant from adequately cleaning up the air pollution it emits into the air shed surrounding Breton Wilderness (46 miles from the plant).
- Unless EPA's proposed exemption is dropped, the Daniel plant will emit at least 396% more nitrogen oxides into Breton's air shed than the best pollution controls would allow. These pollutants are directly linked to poor air quality in the wilderness area and cause serious health damage in addition to hazy skies.

#### Breton Wilderness Air Quality Information

- Research along the Gulf Coast has demonstrated that pollution (mainly from power plants and automobiles) has contributed to fertilization of coastal waters resulting in algae blooms, loss of seagrass beds, and deterioration of fish and wildlife habitat.

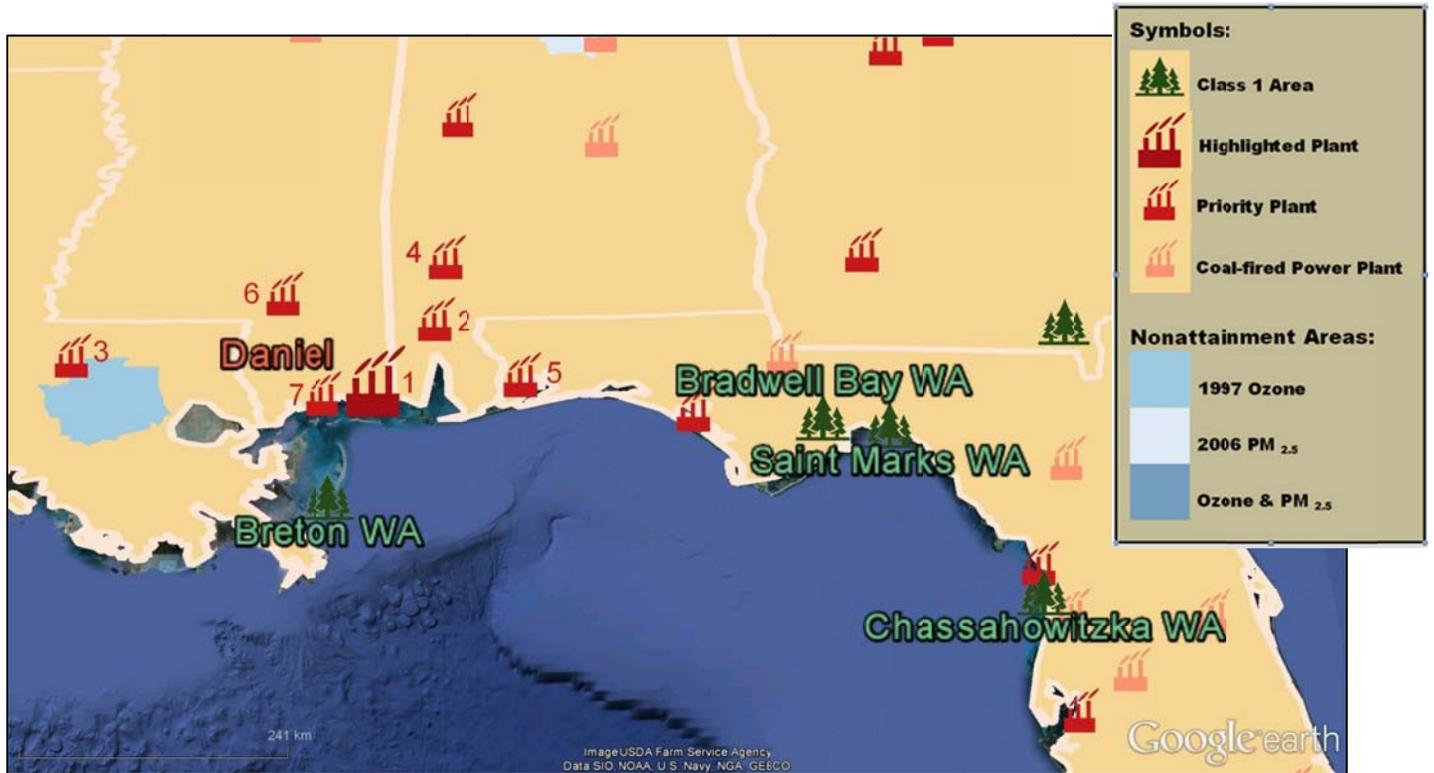


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### Power plants threatening Breton Wilderness Area and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO <sub>2</sub>	NO <sub>x</sub>	Mortality	Asthma Attacks	Lost Work Days
1	Daniel Electric Generating Plant, 1	MISSISSIPPI POWER CO	1977	514		0%	28	479	3,476
2	Barry, 4	ALABAMA POWER CO	1969	362	-27%	-28%	50	844	6,150
3	Big Cajun 2, 2B1	NRG ENERGY INC	1980	580		-32%	30	523	3,763
4	Charles R Lowman, 1	ALABAMA ELECTRIC COOP INC	1969	86	-63%	-55%	17	287	2,125
5	Crist Electric Generating Plant, 6	GULF POWER CO	1970	302		-55%	43	718	5,255
6	R D Morrow Senior Generating Plant, 1	SO MISSISSIPPI ELEC POWER ASSN	1978	180		-54%	8	142	1,024
	R D Morrow Senior Generating Plant, 2		1978	180		-57%			
7	Watson Electric Generating Plant, 4	MISSISSIPPI POWER CO	1968	230		21%	22	375	2,710
	Watson Electric Generating Plant, 5		1973	476		-39%			

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.
- ❖ For states only regulated during the ozone season (AR, MS, FL, LA, OK), the percent reduction in NO<sub>x</sub> was calculated by comparing 2010 emissions during the ozone season to CSAPR ozone season allocations. SO<sub>2</sub> reductions are blank because CSAPR does not compel any reductions in SO<sub>2</sub> in these states.



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### Breton Air Quality Information Cont'd

- Water quality in the wilderness area may be at risk from air pollution.
- The Fish and Wildlife Service monitors airborne particles responsible for visibility impairment at Breton.

### Wilderness Resources & Significance

- Breton Wilderness (Louisiana) lies within the Breton National Wildlife Refuge and consists of barrier islands, including the Chandeleurs, located in the Gulf of Mexico off the southeast coast of Louisiana.
- President Theodore Roosevelt created the refuge through an executive order after hearing about the destruction of birds and their eggs on Chandeleur and Breton Islands. He visited the islands in June 1915—the only refuge he ever visited.
- Breton has large nesting colonies of Brown Pelicans, royal and sandwich terns and

provides nesting and habitat for various other colonial seabirds. The Western Gulf Coast population of brown pelican inhabits the refuge year-round.

- Other wildlife species found on the refuge include raccoons and several species of sea turtles.

### Economic Highlights

- Approximately 2,500 people visit Breton National Wildlife Refuge each year. Spring, summer, and early fall are popular visiting times for tourists.
- Despite the relatively low number of annual visitors (the area is only accessible by boat), tourist spending is high.
- In 2011, tourist dollars added \$255,000 in value to the local economy.



Aerial view of Chandeleur Island at Breton Wilderness Area. © wilderness.net.





A piping plover chick at Brigantine Wilderness Area. © Nick Kontonicolos/wilderness.net

## Cleaner Skies for Brigantine Wilderness Area

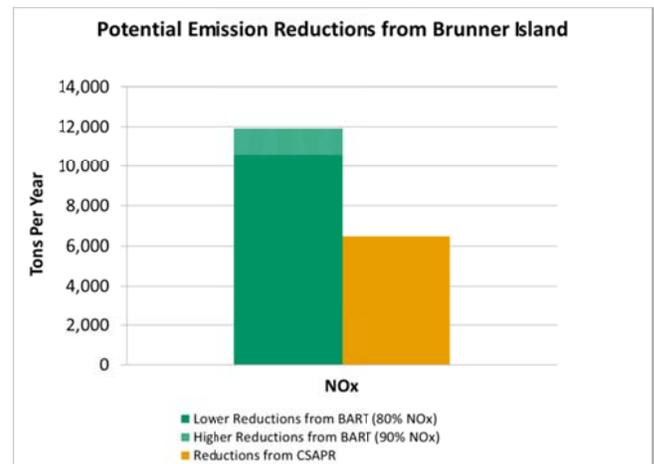
### *Better pollution limits for Brunner Island Power Station*

#### Why EPA Must Better Limit Pollution at Brunner Island Power Station

- The Clean Air Act is supposed to clean and clear the air at treasured American places like New Jersey's Brigantine Wilderness.
- But EPA has proposed a rule that will exempt Pennsylvania's Brunner Island Power Station from adequately cleaning up the air pollution it emits into the Class I air sheds of Brigantine, Dolly Sods, and Otter Creek wildernesses and Shenandoah National Park.
- Unless EPA's proposed exemption is dropped, the Brunner Island coal plant will emit at least 156% more nitrogen oxides into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality in these places and cause serious health damage in addition to hazy skies.

#### Brigantine Air Quality Information

- On the clearest days in Brigantine, visitors could see up to 107 miles away. On the haziest days, visitors can only see 9 miles into the distance.

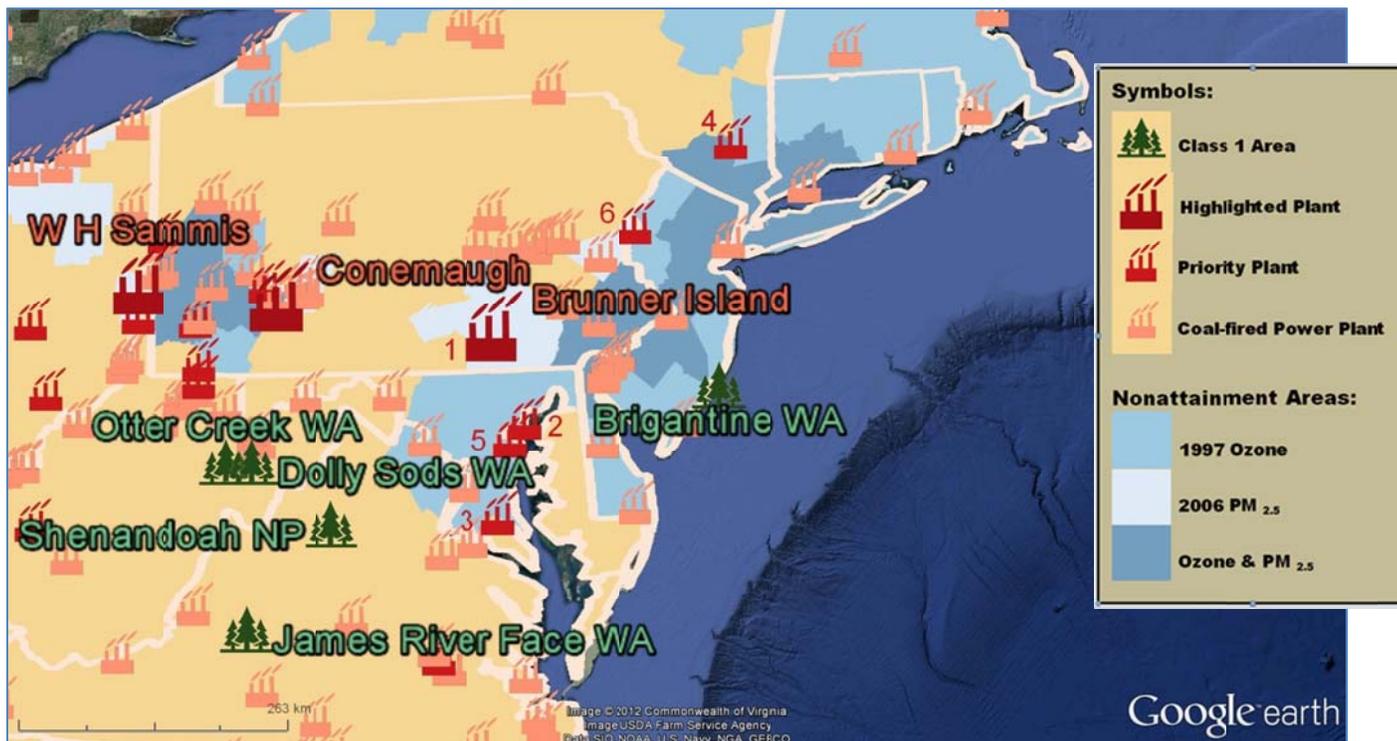


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Power plants threatening Brigantine Wilderness Area and other Class 1 Areas in the vicinity

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					SO <sub>2</sub>	NO <sub>x</sub>	Mortality	Asthma Attacks	Lost Work Days
1	Brunner Island, 2	PPL GENERATION LLC	1965	387	-56%	<b>-48%</b>	150	2,364	18,033
	Brunner Island, 3		1981	754	-52%	<b>-49%</b>			
2	C P Crane, 2	CONSTELLATION ENERGY GEN GRP	1963	200	<b>-79%</b>	<b>-64%</b>	59	956	7,260
3	Chalk Point, 2	MIRANT CORP	1965	342	50%	<b>-46%</b>	10	162	1,228
4	Dynegy Danskammer, 4	DYNEGY NORTHEAST GENERATION	1967	239	<b>-81%</b>	<b>-47%</b>	30	480	3,643
5	Herbert A Wagner, 3	CONSTELLATION ENERGY GEN GRP	1966	324	<b>-71%</b>	175%	22	362	2,747
6	Portland, 2	RELIANT ENERGY INC	1962	243	<b>-91%</b>	<b>-28%</b>	30	499	3,781

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



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## Brigantine Air Quality Information Cont'd

- Brigantine is located in a highly industrialized airshed, with air pollution coming from many sources.
- Sulfur dioxide and ozone monitors continuously operate on the west side of the refuge. The monitors have detected numerous ozone violations.
- The refuge analyzes atmospheric pollutants in rain and fine particles that are responsible for visibility impairment at the park.

## Wilderness Resources & Significance

- Brigantine Wilderness Area, part of the Edwin B. Forsythe National Wildlife Refuge, is considered to be one of the top 20 shorebird

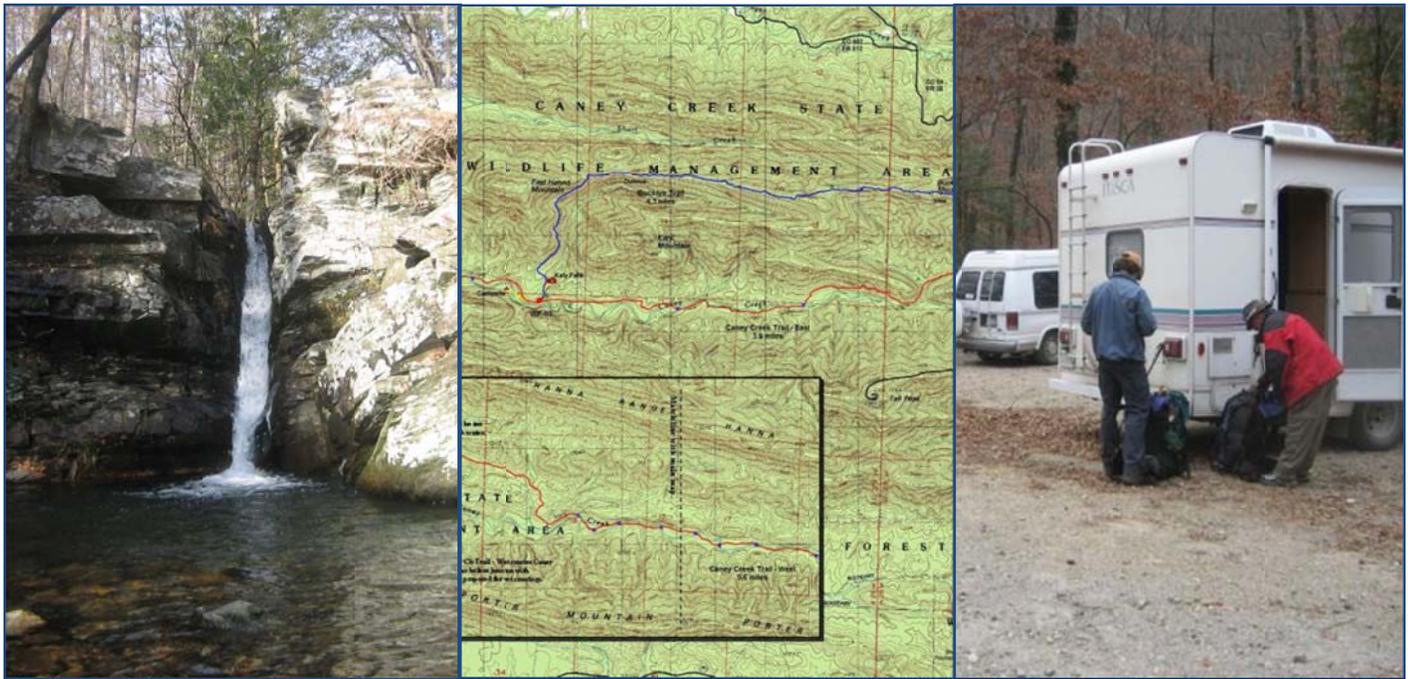
migration sites in the eastern United States during the fall migration period.

- At least 16 species of colonial waterbirds inhabit Brigantine for nesting and feeding.
- Holgate and Little Beach, two of the few remaining undeveloped barrier beaches in New Jersey, lie within Brigantine. These beaches provide vital habitat for rare and threatened birds—including the piping plover.
- Visitors can learn about the importance of beaches and beach grasses to beach-nesting birds through the refuge's Environmental Education program.
- In total, there are 121 species of special emphasis in the Brigantine, including the endangered peregrine falcon, black skimmer, least tern, seaside evening primrose, and seabeach milkwort.



Visitors strolling along Holgate Beach at Brigantine Wilderness Area. © Ed Idzik/wilderness.net.





(L to R) Waterfall, trail map, and hikers at Caney Creek Wilderness Ara. © Charlie Williams/OuachitaMaps.com.

# Cleaner Skies for Caney Creek Wilderness Area

## *Better pollution limits for Monticello Steam Station*

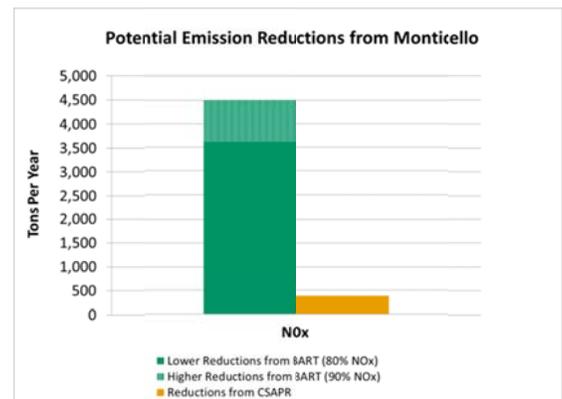
### Why EPA Must Better Limit Pollution at Monticello Steam Station

- The Clean Air Act is supposed to clean and clear the air at treasured American places like Arkansas' Caney Creek Wilderness.
- But EPA has proposed a rule that will exempt Texas's Monticello Steam Station from adequately cleaning up the air pollution it emits into the Class I air shed of Caney Creek Wilderness (105 miles from the plant).
- Unless EPA's proposed exemption is dropped, the Monticello coal plant will emit at least 179% more nitrogen oxides into this Class I air shed than the best pollution controls would allow. These pollutants are directly linked to poor air quality in the wilderness area and cause serious health damage in addition to hazy skies.

- The Wilderness has a partnership with the Interagency Monitoring of Protected Visual Environments (IMPROVE) program, which measures fine airborne particles responsible for visibility impairment.
- Visitors at Caney Creek can experience views up to 180 miles in the distance on a clean air day. On hazy days this view is restricted to just 16-27 miles.

### Caney Creek Air Quality Information

- Caney Creek monitors deposition using seven monitors.



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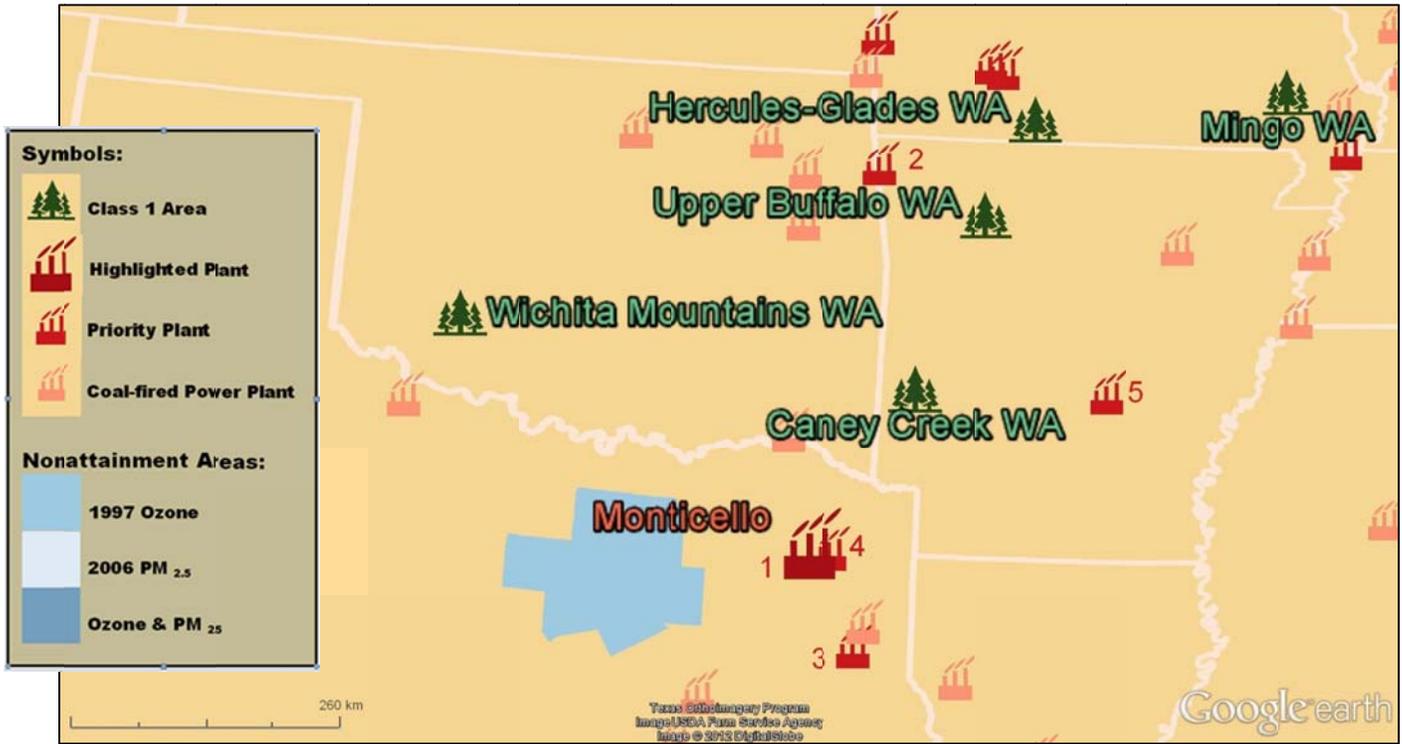
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Wilderness Resources & Significance

- Caney Creek Wilderness Area (Arkansas) is a 14,460-acre area featuring secluded forest scenic overlooks, flowing streams, and hiking trails. It is located on the southern segment of the Ouachita National Forest.

- Common Caney Creek vegetation includes beech trees, pines, and bottomland hardwoods.
- There are over 13 stream crossings meandering throughout Caney Creek created by the Blaylock Creek, Caney Creek, Katy Creek, and the Cossatot River.
- Over 8,000 acres of Caney Creek Wilderness is designated game refuge.



Google Earth Maps Produced by Nathan Miller, NPCA

Power plants threatening Caney Creek Wilderness Area and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO2	NOx	Mortality	Asthma Attacks	Lost Work Days
1	Monticello, 1	LUMINANT POWER CO LLC	1974	565	-52%	-4%	50	863	6,327
	Monticello, 2		1975	565	-53%	-9%			
2	Flint Creek Power Plant, 1	SOUTHWESTERN ELEC POWER CO	1978	528		-24%	20	339	2,505
3	Martin Lake, 1	LUMINANT POWER CO LLC	1977	750	-50%	-38%	42	722	5,284
	Martin Lake, 2		1978	750	-40%	-27%			
	Martin Lake, 3		1979	750	-53%	-39%			
1	Monticello, 3	LUMINANT POWER CO LLC	1978	750	-30%	-30%	50	863	6,327
4	Welsh Power Plant, 1	SOUTHWESTERN ELEC POWER CO	1977	528	-17%	-46%	37	642	4,702
5	White Bluff, 1	ENTERGY ARKANSAS INC	1980	815		-32%	61	1,021	7,491

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.
- ❖ For states only regulated during the ozone season (AR, MS, FL, LA, OK), the percent reduction in NOx was calculated by comparing 2010 emissions during the ozone season to CSAPR ozone season allocations. SO2 reductions are blank because CSAPR does not compel any reductions in SO2 in these states.





Cape Romain Wilderness Area on a clear day (left) and a hazy day (right). © IMPROVE.

# Cleaner Skies for Cape Romain Wildlife Refuge

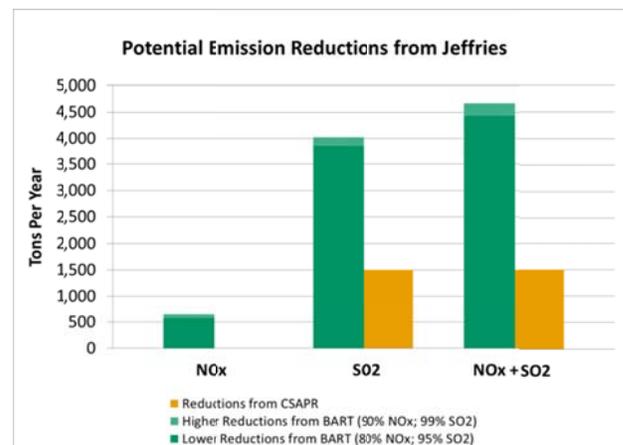
## *Better pollution limits for Jeffries Generating Station*

### Why EPA Must Better Limit Pollution at Jeffries Generating Station

- The Clean Air Act is supposed to clean and clear the air at treasured American places like South Carolina's Cape Romain Wilderness.
- But EPA has proposed a rule that will exempt South Carolina's Jeffries Generating Station from adequately cleaning up the air pollution it emits into the Class I air sheds of Cape Romain (31 miles from the plant) and Wolf Island wildernesses.
- Unless EPA's proposed exemption is dropped, the Jeffries coal plant will emit at least 400% more nitrogen oxides and 1,162% more sulfur dioxide into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality in these wilderness areas and cause serious health damage in addition to hazy skies.

### Cape Romain Air Quality Information

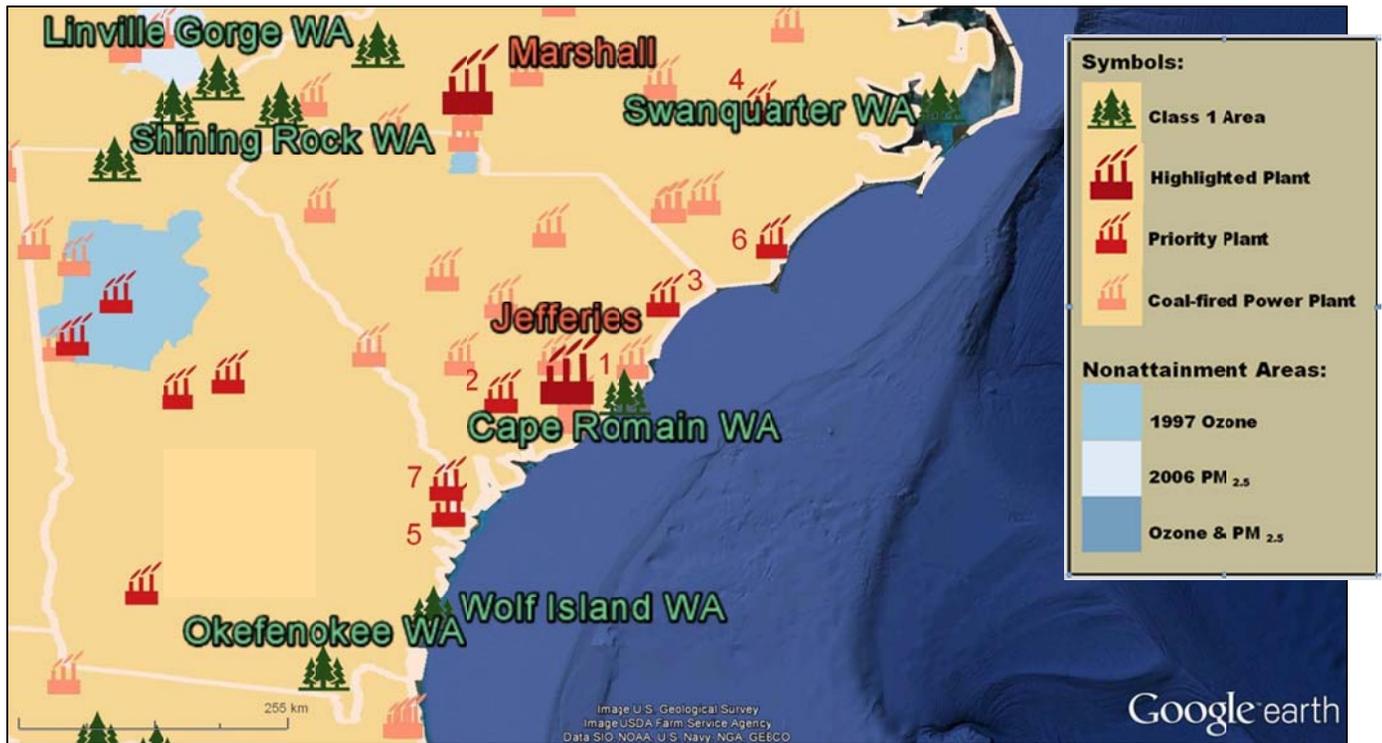
- On the clearest days in Cape Romain, visitors could see at least 42 miles and up to 91 miles away. On the haziest days, visitors could only see views between 13 and 25 miles in the distance.



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### Power plants threatening Cape Romain Wilderness Area and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO <sub>2</sub>	NO <sub>x</sub>	Mortality	Asthma Attacks	Lost Work Days
1	Jefferies, 4	SANTEE COOPER	1970	153	<b>-37%</b>	<b>3%</b>	21	355	2,645
2	Canadys Steam, CAN2	SOUTH CAROLINA ELEC & GAS CO	1964	116	<b>-54%</b>	<b>-30%</b>	33	556	4,144
	Canadys Steam, CAN3		1967	175	<b>-56%</b>	<b>-19%</b>			
3	Dolphus M Grainger, 1	SANTEE COOPER	1966	85	<b>-54%</b>	<b>-31%</b>	13	208	1,559
	Dolphus M Grainger, 2		1966	85	<b>-62%</b>	<b>-38%</b>			
4	H F Lee Steam Electric Plant, 3	PROGRESS ENERGY CAROLINAS	1962	248	<b>-90%</b>	<b>-71%</b>	13	215	1,605
1	Jefferies, 3	SANTEE COOPER	1970	153	<b>-62%</b>	<b>-42%</b>	21	355	2,645
5	Kraft, 3	GEORGIA POWER CO	1965	102	<b>-79%</b>	<b>-80%</b>	12	205	1,528
6	L V Sutton, 3	PROGRESS ENERGY CAROLINAS	1972	403	<b>-89%</b>	<b>-66%</b>	40	662	4,965
7	McIntosh (6124), 1	GEORGIA POWER CO	1979	157	<b>-64%</b>	<b>-59%</b>	10	165	1,225

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



## Cape Romain Air Quality Cont'd

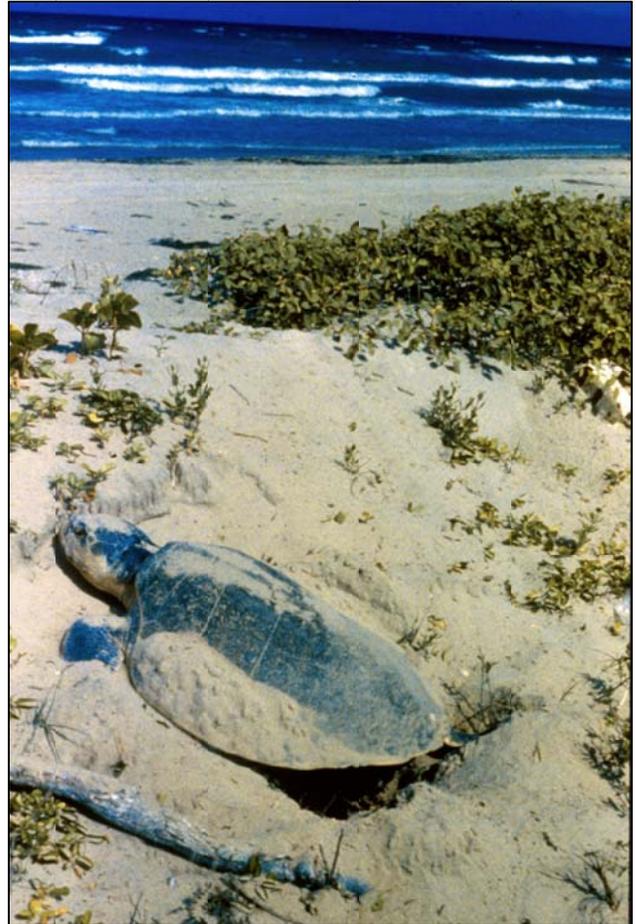
- Excessive Ground level ozone harms vegetation at Cape Romain. Peer-reviewed research illustrates that ambient ozone causes stippling in Winged Sumac, Chinese Tallowtree, and Wild Grape.
- The Fish and Wildlife Service monitors acid rain and fine particles at the Refuge and has recently begun a program to study the impact of air pollution on the Refuge's resources.

## Wilderness Resources & Significance

- Cape Romain Wilderness is part of the Cape Romain National Wildlife Refuge, a barrier island and salt marsh complex extending for 22 miles along the Atlantic Coast of South Carolina.
- Bulls Bay and the creeks behind Bulls Island have a rich war and military history. The area was a notorious hideout for pirates, a restocking point for British warships during the Revolutionary War, and a safe house for Confederate blockade runners.
- Two historic lighthouses stand on the refuge's Lighthouse Island. These lighthouses are listed on the National Register of Historic Places. The first was built in 1827 and is the oldest of its kind existing in the United States. The second, built in 1857, operated until 1947.
- Over 277 species of birds can be found on the refuge, including concentrations of waterfowl, shorebirds, wading birds, and raptors.
- The refuge is home to the largest nesting population of loggerhead sea turtles outside the state of Florida and the largest nesting rookery for brown pelicans, terns and gulls on the South Carolina coast.

## Economic Highlights

- In 2011, 164,000 people visited Cape Romain.
- The refuge supports 135 jobs, adding over \$3.3 million in value.
- The estimated economic impact of tourism was \$6.7 million and support of over 32,000 jobs in the neighboring communities of Charleston, Berkeley, Dorchester and Georgetown Counties in South Carolina.



Sea turtle nesting at Cape Romain Wilderness Area.  
© wilderness.net.





Great Smoky Mountains National Park on a clear day (left) and a hazy day (right). © IMPROVE.

# Cleaner Skies for Great Smoky Mountains

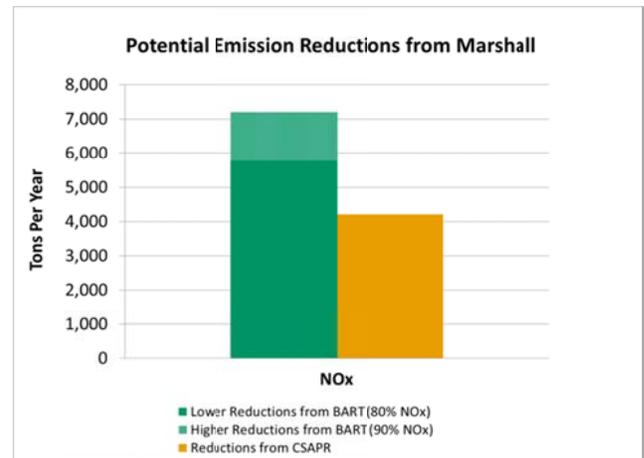
## *Better pollution limits for Marshall Steam Station*

### Why EPA Must Better Limit Pollution at Marshall Steam Station

- The Clean Air Act is supposed to clean and clear the air at treasured American places like Great Smoky Mountains National Park.
- But EPA has proposed a rule that will exempt North Carolina's Marshall Steam Station from adequately cleaning up the air pollution it emits into the Class I air sheds of Great Smoky Mountains National Park (142 miles from the plant) and James River Face, Joyce Kilmer-Slickrock, Linville Gorge and Shining Rock wildernesses.
- Unless EPA's proposed exemption is dropped, the Marshall coal plant will emit at least 54% more nitrogen oxides into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality these places and cause serious health damage in addition to hazy skies.

### Great Smoky Mountain Air Quality Information

- Since 1948, based on regional airport records, average visibility in the southern Appalachians has decreased 40% in winter and 80% in summer.



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### Power plants threatening Great Smoky Mountains National Park and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO <sub>2</sub>	NO <sub>x</sub>	Mortality	Asthma Attacks	Lost Work Days
1	Marshall, 1	DUKE ENERGY CAROLINAS LLC	1965	378	177%	<b>-39%</b>	131	2,156	16,244
	Marshall, 2		1966	378	180%	<b>-37%</b>			
	Marshall, 4		1970	657	134%	<b>-56%</b>			
2	Big Sandy, BSU1	KENTUCKY POWER CO	1963	260	<b>-74%</b>	<b>20%</b>	55	865	6,593
	Big Sandy, BSU2		1969	800	<b>-86%</b>	0%			
3	E W Brown, 2	KENTUCKY UTILITIES CO	1963	160	-89%	<b>-43%</b>	68	1,087	8,277
	E W Brown, 3		1971	422	-64%	<b>-49%</b>			
4	HarLee Branch, 1	GEORGIA POWER CO	1965	266	<b>-78%</b>	<b>-61%</b>	145	2,489	18,474
	HarLee Branch, 2		1967	325	<b>-74%</b>	<b>-52%</b>			
	HarLee Branch, 3		1968	509	<b>-84%</b>	<b>-68%</b>			
	HarLee Branch, 4		1969	507	<b>-83%</b>	<b>-66%</b>			
5	Jack McDonough, MB1	GEORGIA POWER CO	1963	258	<b>-77%</b>	<b>-47%</b>	51	880	6,547
	Jack McDonough, MB2		1964	259	<b>-81%</b>	<b>-58%</b>			
6	John S. Cooper, 1	EAST KENTUCKY POWER COOP INC	1965	116	<b>-89%</b>	<b>-64%</b>	35	557	4,237
	John S. Cooper, 2		1969	225	<b>-90%</b>	<b>-67%</b>			
7	Scherer, 1	GEORGIA POWER CO	1982	837	<b>-66%</b>	<b>-39%</b>	175	2,974	22,023
	Scherer, 2		1984	843	<b>-64%</b>	<b>-43%</b>			
	Scherer, 4		1989	891	<b>-56%</b>	<b>-26%</b>			
8	Yates, YGBR	GEORGIA POWER CO	1974	352	<b>-87%</b>	<b>-63%</b>	106	1,838	13,630
	Yates, Y7BR		1974	355	<b>-88%</b>	<b>-67%</b>			

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



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## Great Smoky Mountain Air Quality Information Cont'd

- Annual average visibility at the park is 25 miles, compared to natural conditions of 93 miles. During severe haze episodes, visibility has been reduced to under one mile.
- Ozone exposures in the park are among the highest in the East and in recent years have exceeded levels that threaten human health.
- The park receives the highest sulfur and nitrogen deposits of any monitored national park. Research shows that certain high elevation soils in the park are receiving so much airborne nitrogen that they are suffering from advanced nitrogen saturation.
- Rainfall in the Great Smoky Mountains is 5 to 10 times more acidic than normal. Many park trees are dead or dying, and streams are too acidic to support some native fish species.

## Park Resources & Significance

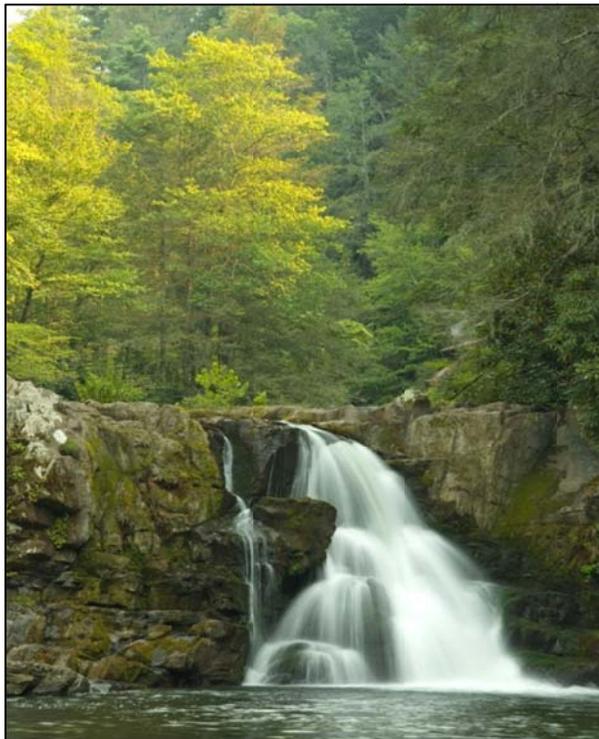
- The Great Smokies (Tennessee/North Carolina) is the most visited national park, with over 2,100 miles of stream and rivers

flowing through its mountains, which are the highest in the Appalachian chain.

- The forests that dominate this landscape consist of 5 cover-types with more than 200 native tree and shrub species.
- The mammalian symbol of this park is the black bear- in which it is estimated 1,500 thrive within its boundaries in addition to 65 other mammal species and 120 bird species.
- Perhaps more uncommonly known, is this park's nickname of "Salamander Capital of the World". Fittingly, this park provides habitat for 30 salamander species with 5 different families.

## Economic Highlights

- The Smokies had 9,463,538 visitors in 2010 bringing an estimated \$818,000,000 in value to the local economy that year.
- This unit employs 339 staff for a total of \$19M in added value.



Abrams Falls at Great Smoky Mountain National Park.  
© Dreamstime.





Mammoth Cave National Park on a clear day (left) and on a hazy day (right). © IMPROVE.

# Cleaner Skies for Mammoth Cave National Park

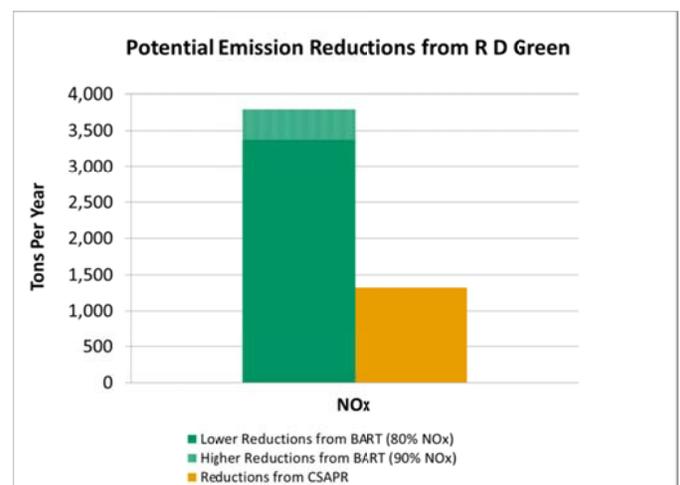
## *Better pollution limits for RD Green Power Plant*

### Why EPA Must Better Limit Pollution at RD Green Power Plant

- The Clean Air Act is supposed to clean and clear the air at treasured American places like Kentucky's Mammoth Cave National Park.
- But EPA has proposed a rule that will exempt Kentucky's Marshall Steam Station from adequately cleaning up the air pollution it emits into the Class I air sheds of Mammoth Cave National Park (131 miles from the plant) and Mingo Wilderness.
- Unless EPA's proposed exemption is dropped, the RD Green coal plant will emit at least 243% more nitrogen oxides into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality in these places and cause serious health damage in addition to hazy skies.

### Mammoth Cave Air Quality Information

- Visitors to the Park could see up to 90 miles in the distance on a clear day, but when the views are obstructed by haze, they may be diminished to just 7 miles.

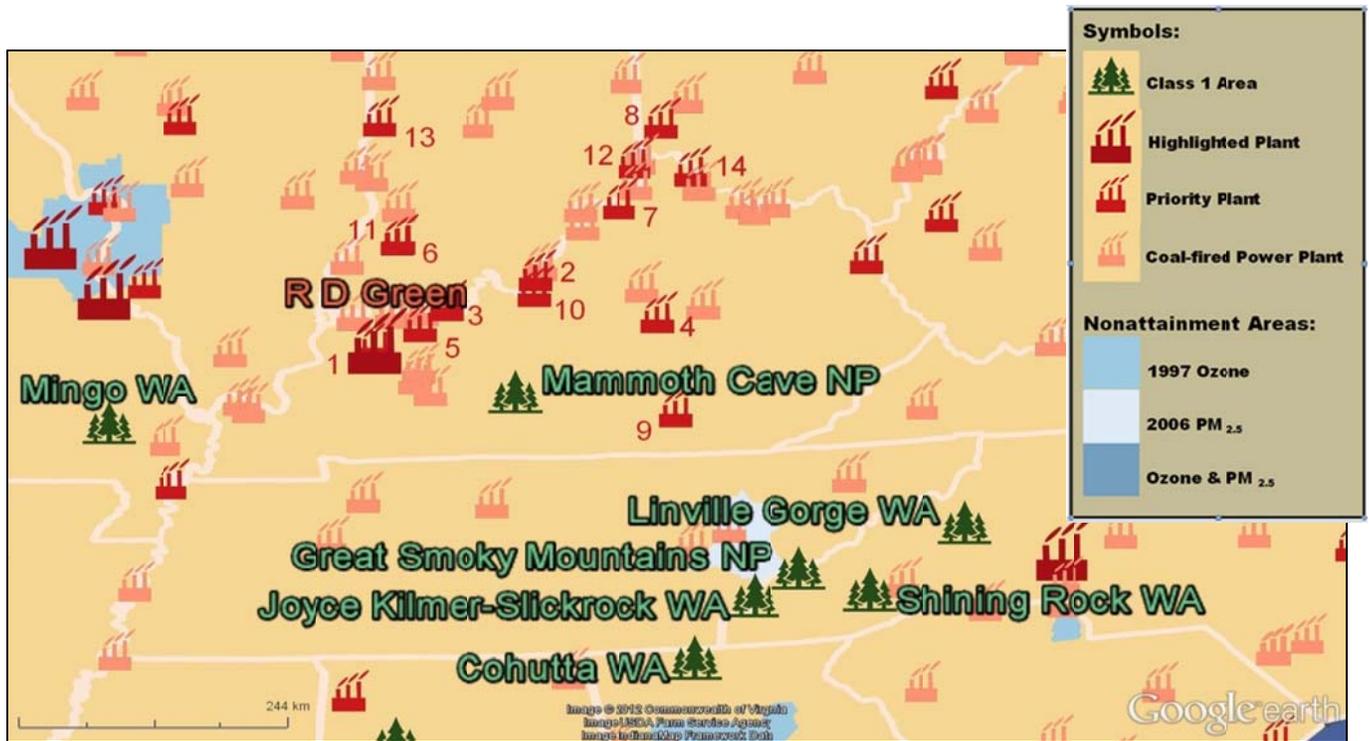


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### Power plants threatening Mammoth Cave National Park and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO2	NOx	Mortality	Asthma Attacks	Lost Work Days
1	R D Green, G1	WESTERN KENTUCKY ENERGY	1979	231	61%	-30%	13	211	1,561
	R D Green, G2		1981	233	87%	-33%			
2	Cane Run, 5	LOUISVILLE GAS & ELEC CO	1966	168	-53%	-67%	23	383	2,866
	Cane Run, 6		1969	240	-71%	-43%			
3	Coleman, C1	WESTERN KENTUCKY ENERGY	1969	150	-50%	-55%	52	850	6,337
	Coleman, C2		1970	150	-5%	-47%			
	Coleman, C3		1971	155	-53%	-56%			
4	E W Brown, 2	KENTUCKY UTILITIES CO	1963	160	-89%	-43%	68	1,087	8,277
	E W Brown, 3		1971	422	-64%	-49%			
5	Elmer Smith, 2	OWENSBORO MUNICIPAL UTIL	1974	261	-73%	-47%	10	171	1,265
6	Frank E Ratts, 1SG1	HOOSIER ENERGY	1970	122	-90%	-44%	22	362	2,671
	Frank E Ratts, 2SG1		1970	121	-89%	-44%			
7	Ghent, 2	KENTUCKY UTILITIES CO	1977	469	-20%	-24%	110	1,795	13,439
8	Hamilton Municipal Power Plant, 9	HAMILTON MUNICIPAL UTILITIES	1974	51	-44%	11%	9	157	1,162
9	John S. Cooper, 1	EAST KENTUCKY POWER COOP INC	1965	116	-89%	-64%	35	557	4,237
	John S. Cooper, 2		1969	225	-90%	-67%			
10	Mill Creek, 1	LOUISVILLE GAS & ELEC CO	1972	303	-58%	-52%	75	1,223	9,166
	Mill Creek, 2		1974	301	-60%	-56%			
11	Petersburg, 1	INDIANAPOLIS POWER & LIGHT CO	1967	232	-49%	-12%	57	952	7,022
1	Robert Reid, R1	WESTERN KENTUCKY ENERGY	1966	65	-95%	-69%	10	173	1,278
12	Tanners Creek, U4	INDIANA MICHIGAN POWER CO	1964	500	-83%	-29%	118	1,924	14,386
13	Wabash River Gen Station, 6	DUKE ENERGY INDIANA INC	1968	318	-92%	-48%	74	1,238	9,168
14	Walter C Beckjord Generating Station, 5	DUKE ENERGY OHIO INC	1962	238	-94%	-71%	141	2,294	17,174
	Walter C Beckjord Generating Station, 6		1969	414	-95%	-64%			

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



## Mammoth Cave Air Quality Cont'd

- The park is downwind of many sources of air pollution, including power plants and other industrial sources in Kentucky and Tennessee as well as urban areas.
- Ground-level ozone often reaches harmful levels in the park, injuring ozone-sensitive plants. Ozone levels also exceed human health standards at times.
- Airborne toxics such as mercury accumulate in park ecosystems and harm wildlife, including the reproductive systems in native bats.
- Nitrogen and sulfur are carried into the park, threatening sensitive surface waters and soils.

## Park Resources & Significance

- Mammoth Cave National Park has the longest known cave system in the world. In 1990 the park was designated an International Biosphere Reserve.

- The set of drainage basins, that extend over 400 square miles are intricately linked to the ecosystems that thrive above them.
- Mammoth Cave NP contains fossils of marine life that are hundreds of millions of years old, and today supports a plethora of biota—70 species of which are listed as federally or state-level threatened or endangered.
- The caves themselves are home to more than 130 animal species, and the park in general is known for its floral diversity with over 1,300 species.

## Economic Highlights

- Mammoth Cave had almost 500,000 visitors in 2010 benefiting the local economy with \$33 million in revenue.
- This park employs almost 200 staff for a total of \$9 Million in added value.



Area students who participate in Mammoth Cave's environmental education program study both above and below the surface of the park. © NPS.





Mingo Wilderness Area habitat. © Vergial Harp/USFWS.

## Cleaner Skies for Mingo Wilderness Area

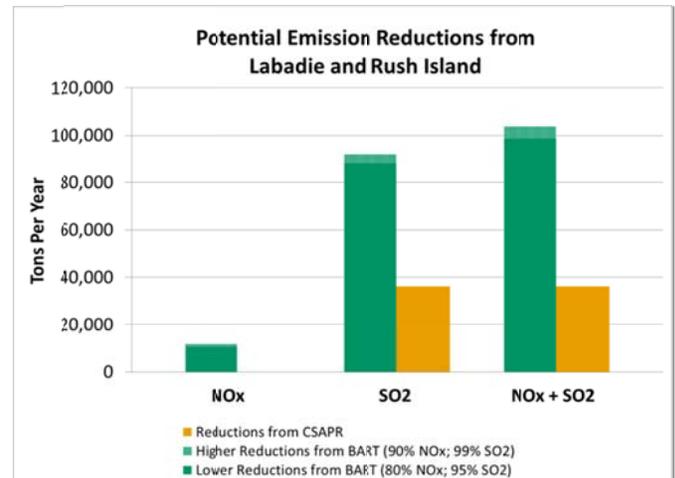
### *Better pollution limits for Labadie and Rush Island Power Stations*

#### Why EPA Must Better Limit Pollution at Labadie and Rush Island Power Stations

- The Clean Air Act is supposed to clean and clear the air at treasured American places like Missouri's Mingo Wilderness Area.
- But EPA has proposed a rule that will exempt North Carolina's Marshall Steam Station from adequately cleaning up the air pollution it emits into the Class I air sheds of Mingo Wilderness (79 and 114 miles away, respectively), and Hercules Glades Wilderness.
- Unless EPA's proposed exemption is dropped, the Labadie and Rush Island coal plants will emit at least 400% more nitrogen oxides and 1,121% more sulfur dioxide into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality in these wilderness areas and cause serious health damage in addition to hazy skies.

#### Mingo Air Quality Information

- On the clearest days in Mingo NWR, visitors could see up to 105 miles away but on a very hazy day, visitors could only see 12 miles into the distance.



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### Power plants threatening Mingo Wilderness Area and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO <sub>2</sub>	NO <sub>x</sub>	Mortality	Asthma Attacks	Lost Work Days
1	Labadie, 1	AMERENUE	1970	597	<b>-43%</b>	<b>3%</b>	113	1,917	14,142
	Labadie, 2		1971	594	<b>-42%</b>	<b>4%</b>			
	Labadie, 3		1972	612	<b>-43%</b>	<b>6%</b>			
	Labadie, 4		1973	612	<b>-42%</b>	<b>0%</b>			
2	Rush Island, 1	AMERENUE	1976	604	<b>-36%</b>	<b>8%</b>	57	974	7,173
	Rush Island, 2		1977	604	<b>-21%</b>	<b>45%</b>			
3	Baldwin Energy Complex, 1	DYNEGY MIDWEST GENERATION	1970	624	<b>-39%</b>	<b>63%</b>	56	944	6,960
	Baldwin Energy Complex, 2		1973	629	<b>-43%</b>	<b>65%</b>			
	Baldwin Energy Complex, 3		1975	629	<b>-5%</b>	<b>15%</b>			
4	Elmer Smith, 2	OWENSBORO MUNICIPAL UTIL	1974	261	<b>-73%</b>	<b>-47%</b>	10	171	1,265
5	James River, 4	SPRINGFIELD CITY UTIL (MO)	1964	56	<b>-14%</b>	<b>-37%</b>	19	311	2,307
	James River, 5		1970	97	<b>-16%</b>	<b>-35%</b>			
6	Kincaid Station, 1	DOMINION ENERGY INC	1967	584	<b>-47%</b>	<b>-81%</b>	43	736	5,449
	Kincaid Station, 2		1968	584	<b>-40%</b>	<b>-79%</b>			
7	New Madrid Power Plant, 1	ASSOCIATED ELECTRIC COOP INC	1972	580	<b>-6%</b>	<b>19%</b>	70	1,150	8,475
	New Madrid Power Plant, 2		1977	580	<b>23%</b>	<b>43%</b>			
8	R D Green, G1	WESTERN KENTUCKY ENERGY	1979	231	61%	<b>-30%</b>	13	211	1,561
	R D Green, G2	WESTERN KENTUCKY ENERGY	1981	233	87%	<b>-33%</b>			
	Robert Reid, R1	WESTERN KENTUCKY ENERGY	1966	65	<b>-95%</b>	<b>-69%</b>			
9	Sioux, 1	AMERENUE	1967	497	<b>-68%</b>	<b>-51%</b>	95	1,616	11,988
	Sioux, 2		1968	497	<b>-67%</b>	<b>-49%</b>			
10	Southwest, 1	SPRINGFIELD CITY UTIL (MO)	1976	178	<b>-19%</b>	<b>43%</b>	4	61	451

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



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## Mingo Air Quality Cont'd

- Peer-reviewed research has determined that ground-level ozone damages vegetation at the Refuge. Impacted species include Wild Grape, Ash, and Black Cherry.
- The Fish and Wildlife Service operates a fine particle sampler that measures the pollutants in the air responsible for visibility impairment at Mingo.

## Wilderness Resources & Significance

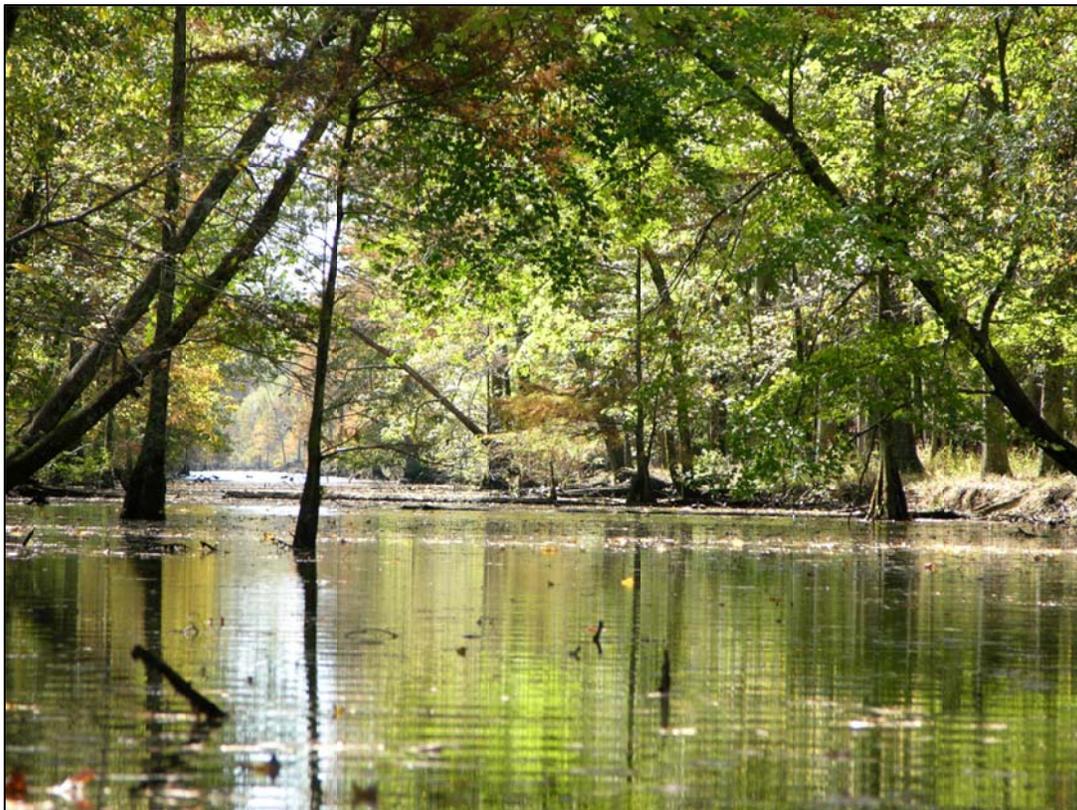
- Mingo Wilderness area is in the western portion of the Mingo National Wildlife Refuge which is the largest remnant of bottomland hardwoods remaining out of an original 2.5 million acres in the Missouri Bootheel region.
- Mingo is a major migration and wintering area for migratory waterfowl, where

populations of 125,000 mallards and 75,000 Canada geese have been recorded.

- Over 250 species of birds have been seen at Mingo, including the endangered whooping crane and threatened bald eagle-- where they have successively nested since 1985.
- Mingo is also home to over 39 mammal species, 65 amphibian and reptile species, and 47 fish species.
- Over 140 identified archaeological sites exist on the refuge.

## Economic Highlights

- In 2011, 119,000 people visited the Mingo National Refuge.
- Visitors to Mingo added \$1.4 million in local economic benefit to surrounding communities including those in Stoddard and Wayne Counties in Missouri.
- Mingo employs 20 people.



Stanley Creek at Mingo Wilderness Area. © wilderness.net.



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Shenandoah National Park on a clear day (left) and a hazy ay (right). © IMPROVE.

## Cleaner Skies for Shenandoah National Park

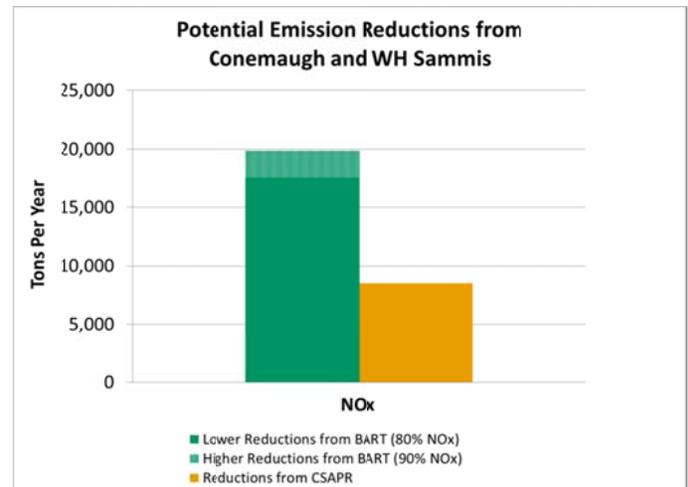
### *Better pollution limits for WH Sammis and Conemaugh Plants*

#### Why EPA Must Better Limit Pollution at WH Sammis and Conemaugh Coal Plants

- The Clean Air Act is supposed to clean and clear the air at treasured American places like Virginia's Shenandoah National Park.
- But EPA has proposed a rule that will exempt Ohio's WH Sammis and Pennsylvania's Conemaugh coal plants from adequately cleaning up the air pollution it emits into the Class I air sheds of Shenandoah National Park and Dolly Sods and Otter Creek wildernesses.
- Unless EPA's proposed exemption is dropped, the WH Sammis and Conemaugh coal plants will emit at least 195% more nitrogen oxides into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality in these places and cause serious health damage in addition to hazy skies.

#### Shenandoah Air Quality Information

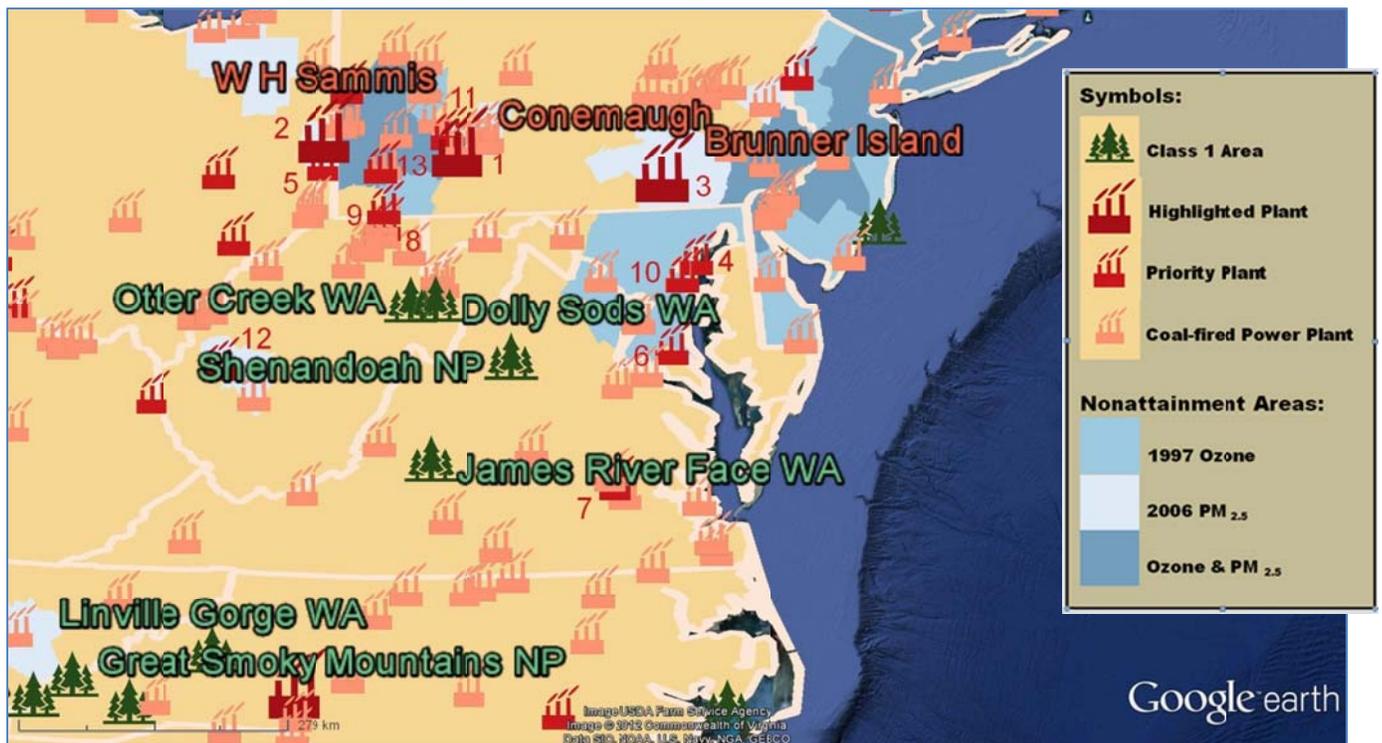
- On hazy days, visitors can only see between 11 miles – 24 miles into the distance, while on clear days, visitors could see 69 to 197 miles away.



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### Power plants threatening Shenandoah National Park and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO2	NOx	Mortality	Asthma Attacks	Lost Work Days
1	Conemaugh, 1	RELIANT ENERGY INC	1970	850	10%	<b>-44%</b>	27	426	3,264
	Conemaugh, 2		1971	850	21%	<b>-35%</b>			
2	W H Sammis, 4	FIRSTENERGY GENERATION CORP	1962	180	134%	<b>-40%</b>	163	2,506	19,149
	W H Sammis, 5		1967	300	101%	<b>-22%</b>			
3	Brunner Island, 2	PPL GENERATION LLC	1965	387	-56%	<b>-48%</b>	150	2,364	18,033
	Brunner Island, 3		1981	754	-52%	<b>-49%</b>			
4	C P Crane, 2	CONSTELLATION ENERGY GEN GRP	1963	200	<b>-79%</b>	<b>-64%</b>	59	956	7,260
5	Cardinal, 3	CARDINAL OPERATING CO	1977	630	<b>-84%</b>	221%	55	840	6,419
6	Chalk Point, 2	MIRANT CORP	1965	342	50%	<b>-46%</b>	10	162	1,228
7	Chesterfield Power Station, 5	DOMINION VIRGINIA POWER	1964	310	<b>-85%</b>	164%	94	1,552	11,759
8	Fort Martin Power Station, 1	ALLEGHENY ENERGY SUPPLY CO LLC	1967	552	155%	<b>-64%</b>	148	2,288	17,552
	Fort Martin Power Station, 2		1968	555	107%	<b>-65%</b>			
9	Hatfield's Ferry Power Station, 1	ALLEGHENY ENERGY SUPPLY CO LLC	1969	530	437%	<b>-56%</b>	89	1,373	10,530
	Hatfield's Ferry Power Station, 2		1970	530	505%	<b>-54%</b>			
	Hatfield's Ferry Power Station, 3		1971	530	409%	<b>-56%</b>			
10	Herbert A Wagner, 3	CONSTELLATION ENERGY GEN GRP	1966	324	<b>-71%</b>	175%	22	362	2,747
11	Homer City, 1	MIDWEST GENERATION EME LLC	1969	620	<b>-93%</b>	48%	43	661	5,068
	Homer City, 2		1970	614	<b>-94%</b>	22%			
12	John E Amos, 1	APPALACHIAN POWER CO	1971	800	<b>-74%</b>	443%	87	1,362	10,395
13	Mitchell Power Station, 33	ALLEGHENY ENERGY SUPPLY CO LLC	1963	277	72%	<b>-20%</b>	9	139	1,063

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



## Shenandoah Air Quality Cont'd

- Air pollution, particularly during the summer season, has significantly degraded the distance, color, contrast and landscape details of park views from Skyline Drive, the Appalachian Trail, and high points in the park.
- The park does not currently meet ground-level ozone standards set by the U.S. Environmental Protection Agency to protect public health and welfare. The park registers some of the highest ground-level ozone measurements recorded at all national parks.
- Acid deposition has adversely impacted the acid-sensitive blacknose dace and acid-tolerant Appalachian brook trout.

## Park Resources & Significance

- Shenandoah National Park (Virginia) is the largest continually protected area in the mid-Appalachian region.

- It contains exposed strata of one of the oldest mountain ranges in the world; approximately 70 watershed basins leading to 90 streams and waterfalls abundant with aquatic life
- The park's maturing forests and changing vegetation (a natural process) provide habitat for a variety of wildlife: 200+ bird species, 30 fish species, 50 mammal species, and 50+ reptile and amphibian species.
- Scientists believe the park's wetlands contain globally rare plant communities that are only endemic to this park.

## Economic Highlights

- Shenandoah had almost 1.2 million visitors in 2010 providing approximately \$72 million in value to neighboring communities.
- This unit employs 234 staff for a total of \$16 million in added value.



A father and daughter observing a deer herd at Shenandoah National Park. © iStock.





Voyageurs National Park on a clear day (left) and a hazy day (right). © IMPROVE.

# Cleaner Skies for Voyageurs & Isle Royale

## *Better pollution limits for Sherburne County Plant*

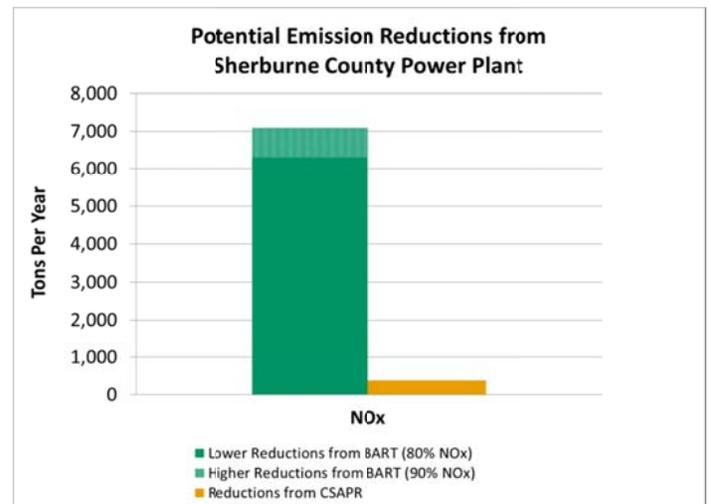
### Why EPA Must Better Limit Pollution at Sherburne County Plant

- The Clean Air Act is supposed to clean and clear the air at treasured American places like Minnesota’s Voyageurs National Park and Michigan’s Isle Royale National Park.
- But EPA has proposed a rule that will exempt Minnesota’s Sherburne County Plant from adequately cleaning up the air pollution it emits into the Class I air sheds of Voyageurs and Isle Royale national parks and Boundary Waters Canoe Area Wilderness.
- Unless EPA’s proposed exemption is dropped, the Sherburne coal plants will emit at least 376% more nitrogen oxides into these Class I air sheds than the best pollution controls would allow. These pollutants are directly linked to poor air quality in these places and cause serious health damage in addition to hazy skies.

### *Voyageurs National Park (MN)*

#### Air Quality Information

- On the haziest days, visitors can only see 18 miles away, compared to the clearest days where visitors could experience up to 185 miles of clear skies.



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Power plants threatening Voyageurs & Isle Royale National Parks and other Class 1 Areas in the vicinity

No.	Facility & Unit	Company	Start Year	MW	Emissions Change Required by CSAPR		2010 Health Impacts (Estimated)		
					SO2	NOx	Mortality	Asthma Attacks	Lost Work Days
1	Sherburne County, 2	NORTHERN STATES POWER CO (MN)	1977	752	10%	9%	92	1,604	12,062
	Sherburne County, 1		1976	762	-6%	-9%			
2	Presque Isle, 5	WE ENERGIES	1974	88	-48%	-54%	31	501	3,759
	Presque Isle, 6		1975	88	-46%	-52%			
	Presque Isle, 7		1978	85	-19%	-61%			
	Presque Isle, 8		1978	85	-25%	-64%			
	Presque Isle, 9		1979	85	-10%	-57%			
3	Pulliam, 8	WISCONSIN PUBLIC SERVICE CORP	1964	133	-65%	-45%	16	267	1,996
4	Taconite Harbor Energy Center, 3	MINNESOTA POWER	1967	68	-58%	-55%	N/A	N/A	N/A

- ❖ Bold type in a given column indicates that the unit lacks the best available controls for that pollutant.
- ❖ Estimated health impacts reflect the emissions from the entire facility, not individual units.



Red fox at Isle Royale National Park. © iStock.



Sunrise at Chippewa Harbor in Isle Royale National Park. © Dreamtime.



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## *Voyageurs National Park (MN)*

### Air Quality Information Cont'd

- Although Voyageurs NP is relatively distant from large urban and industrial areas, long-range transport of pollution as well as pollutants emitted by local sources, can affect air quality in the park.
- The National Park Service is particularly concerned about ambient concentrations, deposition, and effects of airborne toxics, such as persistent organic pollutants, and mercury in particular.
- Ozone and deposition have been monitored at Voyageurs NP since 1986 and 2000 respectively.

### Resources & Significance

- Voyageurs National Park was carved out by glaciers and today combines dramatic upland and aquatic ecosystems and southern boreal and northern hardwoods forest types.
- The park is part of the Canadian Shield and has a rich geologic history. It possesses exposed rock features that are 2 billion years older than the first dinosaurs.
- Today, the landscape thrives with animal species that are comfortable in a seasonal and northern climate- bears, wolves, white-tailed deer, and bald eagles- among others.

### Economic Highlights

- With over a quarter of a million recreational visits in 2010, the estimated revenue is nearly \$12 million.
- This unit employs 65 staff for a total added value of over \$5 million.

## *Isle Royale National Park (MI)*

### Resources & Significance

- Isle Royale National Park is a unique island situated in Lake Superior with a rich collection of native artifacts.
- Glaciers retreated from this region only 10,000 years ago and in doing so, separated the island from the mainland.
- Due to its isolation, migration of animal species to the island is difficult, but also helps maintain the pristine conditions of its wilderness which is dominated by paper birch and conifer tree stands.
- This park offers the most backcountry use per acre than any other unit in the system, and hikers can marvel at the sights of painted turtles, red-bellied snakes, foxes, coyotes; and hear the call of the loons and the wolves in the distance.

### Isle Royale Air Quality Information

- Preliminary results from a recent study showed fish collected in Isle Royale NP had mercury levels which exceeded the Michigan Fish Consumption Advisory level, thus posing a risk to the health of those that consume fish from the area.
- Isle Royale visibility is greatly impaired. On clean air days visitors could see up to 174 into the distance. On the haziest days, visitors only had a viewing range of 6 - 43 miles.

### Economic Highlights

- This remote island had almost 16,000 visitors in 2010. These recreationists brought in an estimated \$2 million in revenue to the surrounding economy of Upper Michigan.
- This unit employs 64 staff for a total added value of almost \$5 million.



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## Background Information

### CSAPR and BART

The [Cross State Air Pollution Rule \(CSAPR\)](#), finalized in July 2011 would substantially reduce emissions of sulfur dioxide and nitrogen oxides in 28 eastern states, protecting the health of millions of Americans from pollution in neighboring states. The rule is currently in litigation. In December of 2011 the D.C. Circuit Court of Appeals stayed CSAPR and has issued an expedited briefing schedule that would conclude in the late spring. CSAPR has substantial health benefits for the American people<sup>13</sup> and its emissions reductions will also benefit Class I areas in the eastern U.S. However, CSAPR does not require specific coal plants to clean up to specific levels. Instead it uses a market-based approach whereby each state is given “pollution budget” and power plants can clean up or buy emissions reduction credits from other plants in the state, or in other states provided certain conditions are met, so long as overall emissions reductions stay within state budgets. EPA has produced unit allocations that provide guidance to states and polluting sources as to the way in which facilities might cleanup to help states achieve its pollution reductions, but these allocations are tradable. Therefore, under CSAPR some coal plants will clean up while others may not, or will only partially clean up. The CSAPR system therefore does not require all plants that are polluting our national parks and wilderness areas to adequately clean up.



Class 1 Areas exist all over the U.S. and offer diverse resources that thrive within their habitats. Left: A deer in Great Smoky Mountains National Park (NC & TN). Right: Sunset at Namakan Lake in Voyageurs National Park (MN). © iStock.

<sup>13</sup> EPA estimates that on an annual basis, enforcement of CSAPR will result in the saving of 13000 - 34000 lives, avoidance of 400,000 asthma attacks, avoidance of 420,000 respiratory symptoms in addition to multiple other health-related benefits. The final rule is expected to yield \$120 to \$280 billion in annual health and environmental benefits in 2014 at a cost of \$800 million in annual projected costs of this rule in 2014. This cost is in addition to the approximately \$1.6 billion annual capital investments made as a result of CAIR.

The [Best Available Retrofit Technology \(BART\) program of the Regional Haze Rule](#) has different objectives than CSAPR. While CSAPR is focused on reducing overall levels of sulfur dioxide and nitrogen oxides, BART is focused on protecting specific places – Class I areas – from air pollution. BART is an emission limit that, after unit-specific analysis, reflects the best technology for reducing each pollutant that causes visibility impairment at a polluting source. BART applies to specific power plants (and other industrial sources) that are responsible for causing or contributing to visibility impairment at Class I areas. The Regional Haze Rule requires state or federal implementation plans for each state to contain emission limits reflecting BART for all BART sources within its borders to help reach the national goal of eliminating visibility impairment in all Class I areas by 2064.

### BART & CSAPR Rule Comparison

	BART	CSAPR
<b>Purpose</b>	Protecting the 156 Class I areas that must be restored to pristine air quality under the Clean Air Act	Attaining National Ambient Air Quality Standards (NAAQS) for ozone and PM <sub>2.5</sub> in the eastern U.S
<b>Application</b>	Applies to 26 source categories, including coal-fired power plants, refineries, paper mills, etc. which were built between 1962 and 1977 and impair visibility at one or more Class I areas	Applies to all power plants in the 28 eastern U.S. states without regard to age
<b>Targeted location</b>	Throughout the country	28 eastern U.S. states
<b>Pollutants at issue</b>	SO <sub>2</sub> , NO <sub>x</sub> , PM, VOCs, ammonia and other visibility-impairing pollutants	SO <sub>2</sub> and NO <sub>x</sub> (precursors to ozone and PM <sub>2.5</sub> )
<b>Pollution control requirements</b>	Unit-by-unit pollution control analysis and determination for BART-eligible sources	Varying degrees of control based on unit allocations, state emission budgets and trading allowances
<b>Timing for pollution controls</b>	Retrofit pollution controls for BART sources must be in operation within five years of a final implementation plan	States must comply with annual budgets during the first year of the rule (originally 2012) but now in question, due to stay
<b>Rule Status</b>	Enforceable final rule	In litigation—final rule stayed.

Though CSAPR and RHR have some overlapping attributes, the programs are not redundant. They have significantly different application and objectives. Exempting certain BART-eligible plants from the BART program because they fall under CSAPR would mean that certain Class I areas would be exposed to more pollution.

## Report Methodology

### How the Cross State Air Pollution Rule Works

The goal of CSAPR is to reduce a state’s contribution to downwind states’ violation of specific clean air standards. Each state must meet the rule’s annual budgets for two pollutants: nitrogen oxides, or NO<sub>x</sub>, and

sulfur dioxide, or SO<sub>2</sub>. CSAPR gives pollution credits to individual sources in each state (“unit allocation”). If the allocation is lower than the source’s current pollution, it can comply by reducing its pollution or through buying credits from a source with extra. If the allocation is higher than the source’s current pollution, it can sell the extra credits. This means that no one unit is forced to reduce its pollution to any specific level. It is up to each source to make a decision as to whether it is economical to keep polluting and buy pollution credits, or whether to put on controls.

EPA decides how big an allocation to give each power plant based on how much energy is in the fuel the power plant has used in the past (“historic heat input”), relative to other sources in the state. The unit’s allocation cannot be higher than its highest annual emissions from 2003 – 2010, or higher than allowed by any relevant federal consent decrees.

### How the Best Available Retrofit Technology Program Works

The BART program requires a determination of the “best available retrofit technology” on a case-by-case basis for each covered unit. The most effective, and therefore “best” technologies can reduce NO<sub>x</sub> by more than 90% percent – via Selective Catalytic Reduction, or SCR – and SO<sub>2</sub> by more than 99% percent – by means of scrubbers, also called flue gas desulfurization systems, or FGD.

### Our Comparative Analysis

Our analysis compares the emissions reductions required by 2014 under CSAPR with the existing emissions in 2010 from the same BART-eligible units. Emissions data from 2010 is used as a benchmark in this report because it is the most recent information available. It only includes units with all of the following characteristics:

- **Inadequate pollution controls.** The units we analyzed do not have effective pollution controls such as Selective Catalytic Reduction (or SCR) to control NO<sub>x</sub> and/or scrubbers or other end-of-process SO<sub>2</sub> control.
- **Inadequate emission limits.** For NO<sub>x</sub>, units were included if they were required to reduce less than 80% percent from 2010 emissions under CSAPR. An adequate BART determination would require reductions of 80-90% percent or more. For SO<sub>2</sub>, units were included if they were required to reduce less than 95% percent from 2010 emissions under CSAPR. An adequate BART determination would require reductions of 95-99% percent or more. We used the NO<sub>x</sub> and SO<sub>2</sub> cutoffs of 80% and 95% respectively to provide a conservative analysis, knowing that emissions controls widely used throughout the industry are well capable of greater reductions.
- **Within the airshed of one or more Class I areas.** We assumed an airshed of 300 km (or about 220 miles) from the Class I area, as routinely relied on by Federal Land Managers, such as the National Park Service or Forest Service that are responsible for managing public land resources including air quality. Sources outside of the 300 km area may also be included if a state identified the source as having an impact on one or more Class I area.

Our analysis also identifies the most significant unit or units impacting each highlighted Class I area. Among other factors, this selection took into account each unit’s existing emission rate and pollution controls; reduction in emissions under CSAPR; the impact of remaining emissions after CSAPR reductions; and distance from the highlighted Class I area and nearby Class I areas.

## Our Data Sources

Emissions data, latitude/longitude, pollution control data, and other relevant facility attributes were taken from EPA's Clean Air Markets Database, supplemented by state implementation plans (SIPs),<sup>14</sup> Carbon Monitoring for Action (CARMA), company websites and reports. BART-eligibility was determined either from SIPs or from determining applicability based on regulations. If a state determined that a source was not subject to BART for SO<sub>2</sub> and NO<sub>x</sub> based on modeling and other source-specific information, the source was not included here.

### What is Haze and How is it Measured?

- Regional haze results from small particles in the atmosphere that limit the ability to see long distances, color and geologic formation. While some haze causing particles result from natural processes, most are from anthropogenic sources of pollution.
- Haze forming pollutants include: sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), volatile organic compounds (VOCs), and ammonia (NH<sub>3</sub>). These air pollutants contribute to the deterioration of air quality and to reduced visibility.
- Visibility impairment is measured in "deciviews." The deciview is a visual index for measuring visual air quality changes. It is analogous to the decibel index for sound. The deciview scale is zero for pristine conditions and increases as visibility degrades. Each deciview change represents a perceptible change in visual air quality to the average person.
- A polluting source is considered to "contribute" to visibility impairment if its contribution to one or more Class I areas is 0.5 deciview or higher. A source is considered to "cause" visibility impairment if it is responsible for 1 deciview impairment or more.

### Regional Haze Rule History

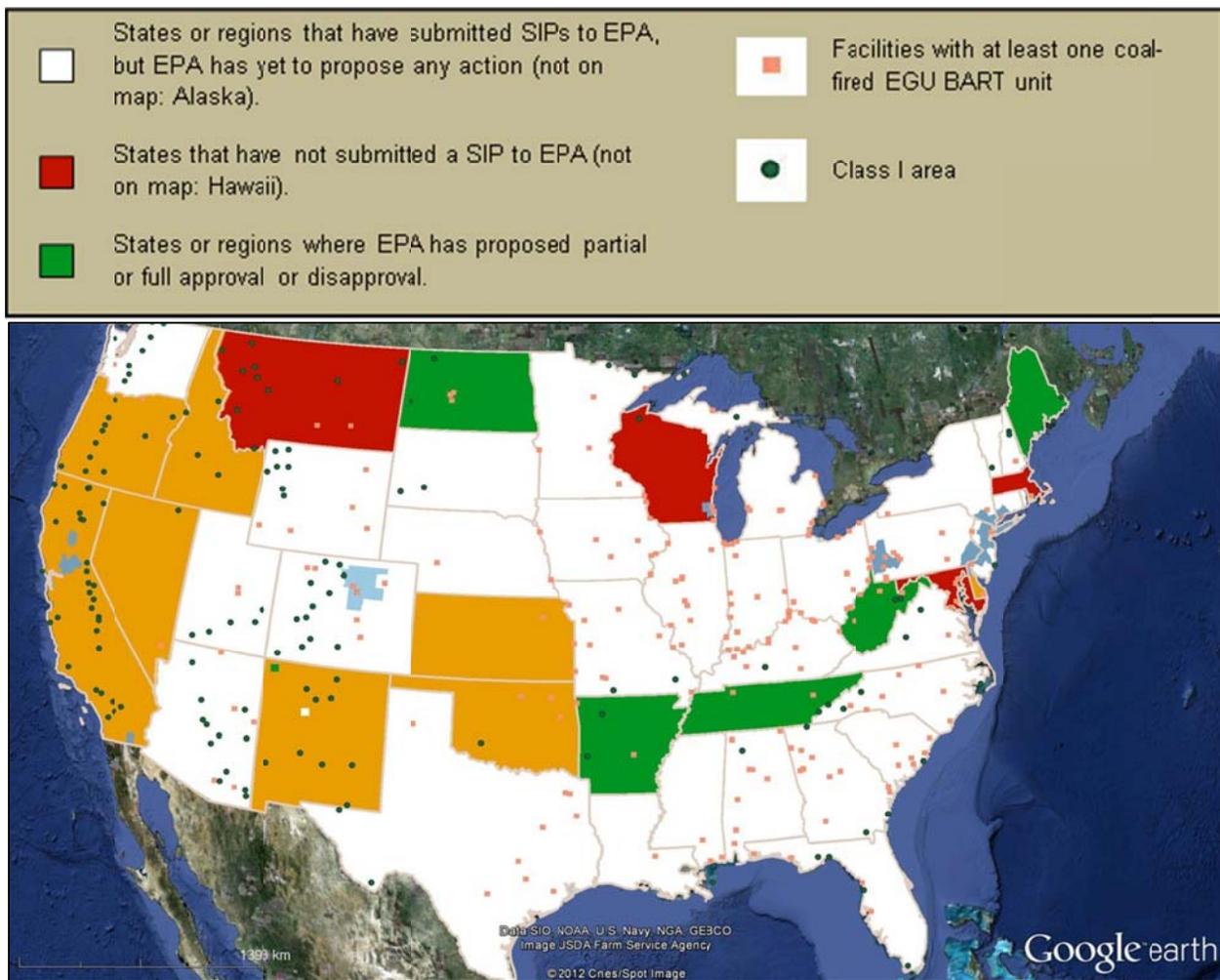
- **1977:** Congress declared a national goal of remedying visibility impairment in Class I areas in 1977 when it amended the Clean Air Act.
- **1979:** In response to the mandate in the 1977 Clean Air Act, EPA adopted rules to assure "reasonable progress" towards preventing and remedying visibility impairment in the nation's Class I national parks and wilderness areas.
- **1999:** EPA established regulations to eliminate visibility impairment and improve air quality in 156 Class I areas, commonly known as the "Regional Haze Rule."
- **2007:** The first deadline for states to submit plans to eliminate regional haze was December 17, 2007. However, 39 states failed to submit plans that complied with the Regional Haze Rule.
- **2008:** In October 2008, NPCA sued the EPA over its failure to enforce deadlines for the states to adopt these clean air plans.

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<sup>14</sup> Each state is required to have a state implementation plan (SIP) that identifies how the state will meet Clean Air Act requirements, including those mandated by the visibility protection program. The SIP may only become final after several processes including a public comment period and EPA review and approval.

- **2009:** On January 15, 2009, the EPA found that 39 states, the District of Columbia, and the Virgin Islands failed to submit appropriate SIPs. This finding triggered a 2-year clock under the Clean Air Act for EPA to complete federal haze control plans for those states.
- **January 2011:** EPA was required to finalize a regional haze cleanup plan for every state in the nation by January 15, 2011, but failed to finalize a single one.
- **November 2011:** EPA agreed to finalize regional haze plans for all states without a final plan
- **January 2012:** EPA has finalized full or partial haze plans for 7 states.
- **2064:** Visibility is to be restored to natural conditions in all 156 Class I areas.

**Map 2: Regional Haze Status**



Google Earth Map Produced by Nathan Miller, NPCA

## Acknowledgements

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Where content in this report is not immediately referenced, we used the following as sources:

- NPS economic data: [http://35.8.125.11/mgm2\\_new/](http://35.8.125.11/mgm2_new/)
- Refuge econ data: FWS phone conversations and websites
- “Value Added” Definition from NPS economic data on case studies: Value added is a commonly used measure of the contribution of an industry or region to gross national or gross state product. Value added is personal income plus rents and profits, plus indirect business taxes. As the name implies, it is the "value added" by the region to the final good or service being produced. Value added can also be defined as the final price of the good or service minus the costs of all of the non-labor inputs to production. ([http://35.8.125.11/mgm2\\_new/](http://35.8.125.11/mgm2_new/))

### Additional Notes:

The charts (located on page 1 for each case study) for Monticello (Caney Creek), Marshall (Great Smokies) WH Hammis (Shenandoah): Emissions reduction calculations for these units conservatively account for the possibility that the existing NO<sub>x</sub> control may no longer be operated if the best available controls are installed. In addition, WH Sammis (Shenandoah): Emissions reduction calculations for W H Sammis Unit 5 conservatively account for the possibility that the existing NO<sub>x</sub> control may no longer be operated if the best available controls are installed.

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