Appendix F: FLM Formal Consultation and Comment Documents

iowa.gov

Johnson, Matthew <matthew.johnson@dnr.iowa.gov>

Iowa's Draft Regional Haze SIP – 60 Day FLM Consultation and Review Period

1 message

Johnson, Matthew <matthew.johnson@dnr.iowa.gov> Tue, Oct 11, 2022 at 6:52 AM
To: Tim Allen <tim_allen@fws.gov>, Trent Wickman <trent.wickman@usda.gov>, "Peters, Melanie" <melanie_peters@nps.gov>, "Pohlman, David C." <david_pohlman@nps.gov>, "King, Kirsten L" <kirsten_king@nps.gov>
Cc: "Jed D. Wolkins" <wolkins.jed@epa.gov>, "Olson, Bethany" <olson.bethany@epa.gov>, "Mcgraw, Jim" <jim.mcgraw@dnr.iowa.gov>, Peter Zayudis <peter.zayudis@dnr.iowa.gov>, Jessica Reese McIntyre <jessica.reesemcintyre@dnr.iowa.gov>
Bcc: Matthew Johnson <matthew.johnson@dnr.iowa.gov>

Dear FLM Contacts,

Please find attached Iowa's draft Regional Haze SIP for the second implementation period (2019-2028). The appendices and a folder containing the draft permits are posted to a Google Drive accessible via the following link: https://drive.google.com/drive/folders/1iGhal7tupgfCwslazPXbkyR-di3IQVuG?usp=sharing

This correspondence announces Iowa's formal FLM consultation opportunity and comment period to address 40 CFR 51.308(i). The FLM review period will span 60 days, starting October 11, 2022, and ending December 9, 2022. The Iowa DNR therefore requests that you provide any discussion points and comments on Iowa's draft regional haze plan no later than December 9, 2022.

Comments should be sent to matthew.johnson@dnr.iowa.gov or mailed to:

Matthew Johnson
Air Quality Bureau
Iowa Department of Natural Resources
502 E. 9th St.
Des Moines, IA 50319-0034

During this FLM review period, the DNR welcomes discussions of your assessment of impairment of visibility in any mandatory Class I Federal area and recommendations on the development and implementation of strategies to address visibility impairment. To accommodate 42 USC §7491(d), the Iowa DNR will not hold a public hearing during this FLM review period and will include a summary of the conclusions and recommendations of the FLMs when the public hearing is eventually noticed.

The DNR intends to schedule a virtual meeting with you to review Iowa's draft regional haze SIP. Look for a separate email in the near future. In the meantime, if you have any questions or would like an opportunity for consultation in person, please contact Matthew Johnson by email at matthew.johnson@dnr.iowa.gov or by telephone at (515) 725-9554.

Sincerely,
Matthew Johnson

DNR
www.iowadnr.gov

Matthew Johnson | Environmental Specialist Senior
Air Quality Bureau
Iowa Department of Natural Resources
P: 515-725-9554
502 E. 9th Street, Des Moines, IA 50319

iowaRH2_SIP-FLM.pdf
6557K

USDA United States Department of Agriculture | Forest Service | Superior National Forest Supervisor's Office | 8901 Grand Avenue Place Duluth, MN 55808 218-626-4300

Date: 12/08/2022

Matthew Johnson
Iowa Department of Natural Resources
Air Quality Bureau
502 E. 9th Street
Des Moines, IA 50319

Dear Mr. Johnson:

On October 11, 2022, the State of Iowa submitted a draft Regional Haze State Implementation Plan describing your proposal to continue improving air quality by reducing regional haze impacts at mandatory Class I areas across our region. We appreciate the opportunity to work closely with your state through the initial evaluation, development, and now subsequent review of this plan. Cooperative efforts such as these ensure that together, we will continue to make progress toward the Clean Air Act's goal of natural visibility conditions at our Class I areas. We are especially grateful for your sustained, continuous efforts to communicate with us and solicit our input over the years.

This letter acknowledges that the U.S. Department of Agriculture, U.S. Forest Service, has received and conducted a substantive review of your proposed Regional Haze State Implementation Plan. This review satisfies your requirements under the federal regulations 40 C.F.R. § 51.308(i)(2). Please note, however, that only the U.S. Environmental Protection Agency (EPA) can make a final determination about the document's completeness, and therefore, only the EPA has the ability to approve the document.

We have attached comments to this letter based on our review. While we have some technical issues we will bring to your attention, we want to recognize the overall high quality of your draft plan. It is among the best we have reviewed and believe it is one of the best in the nation. We look forward to your response required by 40 C.F.R. § 51.308(i)(3). For further information, please contact Trent Wickman at trent.wickman@usda.gov or (218) 341-8646.

Again, we appreciate the opportunity to work closely with the State of Iowa. The Forest Service compliments you on your hard work and dedication to significant improvement in our nation's air quality values and visibility.

Sincerely,

THOMAS HALL
Forest Supervisor

CC: Melanie Peters, Tim Allen, Dave Pohlman, Don Shephard

Iowa Regional Haze Plan - Technical Comments

Overall, the plan is very comprehensive and well organized. It is logically sequenced and very well explained. We very much appreciated your adherence to EPA direction such as the various EPA regional haze guidance documents and the "Clarifications" memo dated July 8, 2021.

Air Quality Setting

According to the draft Minnesota Regional Haze SIP, ammonium sulfates and nitrates accounted for roughly 68% of the total visibility impairment in the initial baseline year (2004) and 59% in 2018 in the Boundary Waters Canoe Area Wilderness (BWCAW). Iowa was listed as one of the top six states whose emissions contribute to visibility impairment in the BWCAW and Voyageurs National Park.

Source Selection

Only two sources were selected for a four-factor analysis based on the cumulative impact of an area of influence study: Louisa and Walter Scott Unit 3. While we agree that the selection of these two sources was appropriate, we believe two other sources, George Neal North Unit 3 and South Unit 4, should also have had a four-factor analysis completed. Lousia and Walter Scott Unit 3 were selected based on their visibility impacts. If George Neal North Unit 3 and South Unit 4 were assessed together their impacts would be:

- 0.15 + 0.21 or 0.36 percent combined total EWRT*Q/d at the BWCAW
- 0.26 + 0.36 or 0.62 percent combined total EWRT*Q/d at Voyageurs National Park

These values are between Louisa and Walter Scott Unit 3 at both the BWCAW and Voyageurs National Park. Additional facts that support looking the two sources together include:

- the George Neal units are owned by the same company,
- are only about 1.5 miles apart, and
- are served by a common rail line.

Even if the two George Neal units were not grouped together, the impacts of the units individually are in the range of units selected by Minnesota for a four-factor analysis, such as American Crystal Sugar – East Grand Forks and Southern Minnesota Beet Sugar.

The two George Neal units are very similar to Louisa and Walter Scott Unit 3. The following boiler features are the same, or nearly the same:

- size,
- fuel,
- firing configuration,
- age,
- existing sulfur dioxide controls.

Due to their similarity, it seems highly likely that the sulfur dioxide controls that are being proposed at Louisa and Walter Scott Unit 3 could also be applied at the George Neal units at the same extremely low cost documented in your plan.

iowa.gov

Johnson, Matthew <matthew.johnson@dnr.iowa.gov>

NPS Consultation Comments on Draft Iowa Regional Haze SIP

1 message

Pohlman, David C. <David_Pohlman@nps.gov> Thu, Dec 8, 2022 at 12:41 PM
To: "matthew.johnson@dnr.iowa.gov" <matthew.johnson@dnr.iowa.gov>
Cc: "Mcgraw, Jim" <jim.mcgraw@dnr.iowa.gov>, Jessica <jessica.reesemcintyre@dnr.iowa.gov>, Peter Zayudis <peter.zayudis@dnr.iowa.gov>, "King, Kirsten L" <kirsten_king@nps.gov>, "Peters, Melanie" <Melanie_Peters@nps.gov>, "Miller, Debra C" <Debra_Miller@nps.gov>, "Salazer, Holly" <Holly_Salazer@nps.gov>, "Stacy, Andrea" <Andrea_Stacy@nps.gov>, "Shepherd, Don" <Don_Shepherd@nps.gov>, "Wickman, Trent -FS" <trent.wickman@usda.gov>, "Wolkins, Jed" <wolkins.jed@epa.gov>, "Allen, Tim" <tim_allen@fws.gov>

Hello Matthew,

The National Park Service (NPS) appreciates the opportunity to review the Federal Land Manager (FLM) review draft of the Iowa Regional Haze State Implementation Plan (SIP) for the Second Implementation Period (2018–2028). While Iowa does not contain any NPS-managed Class I areas, Iowa emissions impact Voyageurs National Park in Minnesota, Isle Royale National Park in Michigan, as well as Badlands and Wind Cave National Park in South Dakota.

On November 29, 2022, staff from the NPS Air Resources Division (ARD) and NPS Interior Regions 3, 4, and 5 hosted a regional haze consultation meeting with the Iowa Department of Natural Resources (DNR) to discuss NPS input on the draft Iowa Regional Haze SIP. Representatives from the U.S. Forest Service and Environmental Protection Agency (Region 7) also attended. Detailed technical feedback and supporting calculation worksheets are attached. This email and the attachments document NPS conclusions and recommendations presented at the November 29, 2022, meeting, and serve as our formal regional haze consultation, as required by 42 U.S.C. §7491(d).

Overall, the NPS commends Iowa DNR for developing a well written, technically sound SIP that requires significant reductions in sulfur dioxide (SO_2) emissions. In reviewing the draft SIP, the NPS finds that there may be additional reasonable opportunities for emission reductions that would address regional haze in NPS Class I areas. It is with this in mind that we provide the following feedback detailed in our attached technical document and accompanying calculation workbooks.

We support Iowa DNR's selection of the Louisa Generating Station (LGS) and Walter Scott Energy Center (WSEC) facilities for four-factor analysis. In addition, our review finds that the George Neal North and George Neal South facilities both have significant impacts on visibility in NPS Class I areas (see technical feedback for details). We recommend that you consider broadening the Iowa source selection criteria and conduct four-factor analysis of SO_2 and nitrogen oxide (NO_x) emission reduction opportunities for the George Neal North and George Neal South facilities.

We agree with Iowa's determination requiring efficiency improvements on existing dry flue gas desulfurization (FGD) systems at the LGS and WSEC facilities to reduce SO_2. These improvements will achieve 9,700 tons of SO_2 emission reductions per year. Our preliminary assessment of the George Neal North and George Neal South facilities finds that similar improvements to dry FGD systems are likely feasible and cost effective. We find that dry FGD improvements at the George Neal facilities could secure an additional 5,900 tons per year of SO_2 emission reductions for less than $300/ton.

We also find that SNCR, and potentially SCR, NO_x controls for LGS, WSEC, and George Neal North are technically feasible and would be found cost-effective under thresholds used by several other states. If required for LGS, WSEC, and George Neal North, SNCR could reduce a combined 2,300 tons per year of NO_x emissions. We recommend that Iowa DNR establish a cost threshold to support the reasonable progress determinations as discussed in our technical review. Please see the attached technical feedback document and calculation workbooks for details.

The emission reductions secured by this SIP will benefit visibility in Class I areas across the region. Iowa DNR has the opportunity to improve the SIP by evaluating additional facilities and requiring further controls. We sincerely appreciate the early engagement and substantive consultation that Iowa and the NPS have had during SIP development and look forward to continuing to work together for clean air and clear views into the future. If you have any questions or would like to talk through any of these recommendations, please feel free to reach out.

Best,

David

Attachment List:
NPS-IA Cost Worksheets.zip
Iowa_NPS_RH_2022.11.29.pdf
NPS-IA_RH-SIPFeedback_12.08.2022.docx

David Pohlman

Air Quality Specialist
National Park Service
Interior Region 3: Great Lakes
Interior Region 4: Mississippi Basin
Interior Region 5: Missouri Basin

111 Kellogg Blvd. E., Suite 105
Saint Paul, MN 55101
Phone: ~~651-293-8448~~
Now working from home: 651-491-3497

3 attachments

Iowa_NPS_RH_2022.11.29.pdf
6412K

NPS-IA Cost Worksheets.zip
1154K

NPS-IA_RH-SIP-Feedback_12.08.2022.docx
87K

National Park Service (NPS) Regional Haze SIP feedback for the Iowa, Department of Natural Resources (DNR)

December 8, 2022

Contents

1 Executive Summary

The NPS commends Iowa DNR for a well-written SIP that clearly explains the basis for its conclusions and appreciates the high-quality technical work that went into the SIP development. Iowa DNR used sound analytical techniques for source selection and used EPA-recommended methods and factors for cost analyses. The NPS also appreciates the time that Iowa DNR devoted to providing meaningful opportunities for consultation during development of the SIP. The NPS finds that the draft Iowa SIP requires meaningful reductions in emissions in this planning period that will reduce impacts to visibility in NPS Class I areas.

The NPS supports Iowa DNR's selection of the Louisa Generating Station (LGS) and Walter Scott Energy Center (WSEC) facilities for four-factor analysis; these sources are also at the top the NPS impact list. The NPS agrees with Iowa's determination requiring efficiency improvements on existing dry flue gas desulfurization (FGD) systems at the LGS and WSEC facilities to reduce SO_2. These improvements will achieve 9,700 tons of SO_2 emission reductions per year.

The NPS analysis finds that George Neal North and George Neal South facilities also have significant impacts on visibility in NPS Class I areas (discussed in Section 2.1) and that cost-effective controls may be available for these units (discussed in Section 3.3). NPS source-specific review finds that for SO_2, dry FGD improvements at the George Neal facilities could likely secure an additional 5,900 tons per year of emission reductions for less than $300/ton.

For NO_x, the NPS finds that SNCR, and potentially SCR, controls for LGS, WSEC, and George Neal North are technically feasible and would be found cost-effective under thresholds used by several other states. If required for LGS, WSEC, and George Neal North, SNCR could reduce a combined 2,300 tons per year of NO_x emissions. The NPS recommends that Iowa DNR establish a cost threshold to support the reasonable progress determinations as discussed in Section 2.2.

2 Overarching Feedback

2.1 Source Selection

Iowa DNR used the results of an area of influence (AOI) study commissioned by the Central States Air Resource Agencies (CenSARA) regional planning organization to evaluate which Iowa sources to select for four-factor analysis. This study is described in detail in Chapter 4 of the draft SIP. The AOI analysis identified the 20% most anthropogenically impaired days during the 5-year period from 2012–2016 using monitoring data collected at Class I areas and then computed the arrival paths, or back trajectories, for air masses that arrived on those days. The analysis of these trajectories identified geographic areas that air masses were most likely to pass over before arriving at a given Class I area on an impacted day. This information was then combined with information about the visibility extinction attributed to each pollutant to create an index called the extinction-weighted residence time (EWRT) for nitrate and sulfate. EWRT values were multiplied by the ratio of an individual source's emissions to the distance to the Class I area (referred to as the Q/d) for both SO_2 and NO_x. The EWRT*Q SO_2/d and EWRT*Q NO_x/d values were then summed for each facility/Class I areas. This generated a unique AOI index for each facility for each Class I area. The result was used to rank sources by their relative

contributions to visibility impairment at each Class I area. Sources located both in and outside of CenSARA member states were included in the analysis.

Iowa DNR ranked the facilities' relative contributions from highest to lowest and chose those facilities comprising the top 50% of the total Class I areas cumulative impact to identify sources for possible four-factor analysis. Iowa DNR examined the rankings and found that two Iowa sources, Louisa Generating Station (LGS) and Walter Scott Jr. Energy Center (WSEC), met the criteria for impacts to any of the 12 Class I areas considered in the analysis.

The NPS finds that the approach taken by Iowa DNR is preferable to a simple metric such as emissions over distance (Q/d), as it incorporates meteorology and extinction into the index. The NPS also agrees with Iowa's decision to select facilities for analysis based upon the cumulative contribution of those facilities to the total visibility impact. However, the NPS recommends using a higher threshold—such as 80% of the cumulative AOI impact for each Class I area—to ensure that the sources with the most significant impacts to NPS Class I areas are selected for analysis and that a reasonable number of sources are evaluated. The original list of sources recommended by the NPS for consideration was based on the top 80% of Q/d impacts to NPS Class I areas as was recommended by the draft 2016 Regional Haze Guidance.

NPS staff examined the CenSARA AOI analysis results provided by Iowa DNR and identified 14 Iowa sources that contribute to the top 80% of impact for at least one NPS Class I area. This list of 14 sources includes nine electrical generating facilities (EGUs) and five non-EGUs. Four of the EGUs —LGS, WSEC, George Neal North, and George Neal South—are ranked the top four most-impacting Iowa facilities and are on the 80% of impact list for two or more NPS Class I areas. The WSEC, George Neal South, and George Neal South facilities are each on the 80% lists for Isle Royale, Voyageurs, Badlands, and Wind Cave National Parks. The LGS facility is on the 80% of impact list for Isle Royale and Voyageurs National Parks. Sources comprising the 80% of the impact for NPS Class I areas are identified in Table 1 below (sources highlighted in green are those the NPS recommends that Iowa DNR address in the SIP).

Table 1. Iowa sources contributing to the top 80% of visibility impact at NPS Class I areas

Facility	Iowa Facility Rank for NPS C1As	Number of NPS C1As Impacted by the Facility (on 80% list)	Total Number of C1As Impacted by the Facility (on 80% list)
WALTER SCOTT JR ENERGY CTR	1	4	9
MIDAMERICAN ENERGY CO - GEORGE NEAL SOUTH	2	4	7
MIDAMERICAN ENERGY CO - LOUISA STATION	3	2	5
MIDAMERICAN ENERGY CO - GEORGE NEAL NORTH	4	4	6
MUSCATINE POWER & WATER	5	2	4
ADM CORN PROCESSING - CEDAR RAPIDS	6	2	4
IPL - BURLINGTON GENERATING STATION	7	1	4
IPL - OTTUMWA GENERATING STATION	8	1	4
IPL - PRAIRIE CREEK GENERATING STATION	9	1	3
CONTINENTAL CEMENT COMPANY - DAVENPORT PLANT	10	1	2
ADM CORN PROCESSING / COGEN PLANT - CLINTON	11	1	2
CARGILL, INC - EDDYVILLE	12	1	2
GUARDIAN INDUSTRIES CORPORATION	13	1	2
UNIVERSITY OF NORTHERN IOWA - POWER PLANT	14	1	1

The NPS further refined this list of sources after reviewing additional available information for each of the 14 facilities on this list. This included additional information in Title V operating permits, consent decrees, proposed fuel conversions from coal to natural gas, proposed shutdowns and existing levels of control and recent emissions. After this more refined review, the NPS screened all but four of the identified sources out from being recommended for further analysis in this planning period.

With respect to the George Neal facilities, NPS review finds that both are well below the 80% of visibility impact threshold recommended by the NPS, ranking in the top 60% at Badlands National Park, 66% at Wind Cave and Isle Royale National Parks, and a 75% at Voyageurs National Park. In addition, like the LGS and WSEC, the George Neal facilities have existing dry lime flue gas desulfurization (FGD) systems with relatively high SO_2 emission rates (approximately 0.34 lb/MMBtu). Based on these findings, the NPS recommends that Iowa address both George Neal North and George Neal South by conducting four-factor analyses and implementing cost-effective control options in this planning period. Facility specific analyses and recommendations are described in section 3.3.

2.2 Decision-Making Criteria for Reasonable Progress Determinations

The NPS recommends that Iowa establish cost thresholds to aid in documenting the rationale behind final determinations. The cost of control is likely the most important factor for many states when making reasonable progress determinations. The NPS recommends that states identify the criteria used when evaluating controls, including those for costs, as required under

the regional haze (RH) regulations.[1] The rule requires the state to document *why* each of the four-factors, including the costs of controls, would or would not be considered reasonable for the source in question. In their 2019 regional haze guidance, EPA recommends that a useful metric in making such determinations is the estimated cost per ton of pollutant reduced.[2] EPA further elaborates in the 2019 guidance that:

> *When the cost/ton of a possible measure is within the range of the cost/ton values that have been incurred multiple times by sources of similar type to meet regional haze requirements or any other CAA requirement, this weighs in favor of concluding that the cost of compliance is not an obstacle to the measure being considered necessary to make reasonable progress. . . .Where the cost/ton of a possible measure exceeds the historical range of cost/ton values, we recommend that the state not automatically conclude that the cost of compliance by itself makes the measure not necessary to make reasonable progress.*

Many states have identified a cost-effectiveness threshold in their proposals in this round of regional haze planning. Some of the controls evaluated and recommended by the NPS for Iowa sources are within these cost-effectiveness ranges. For example, other states have proposed the following cost/ton thresholds:

- A range from $4,000 to $6,500/ton in Arizona
- $5,000/ton in Arkansas (EGUs) and Texas
- $6,100/ton in Idaho
- $10,000/ton in Colorado, Nevada, and Oregon

[1] 40 CFR § 51.308 (f)(2)(i): The State *must include* in its implementation plan a description of *the criteria it used* to determine which sources or groups of sources it evaluated and *how* the four factors were taken into consideration in selecting the measures for inclusion in its long-term strategy. [Emphasis added]
[2] 2019 EPA Guidance on Regional Haze State Implementation Plans for the Second Implementation Period, Part II, Step 5—Decisions on what control measures are necessary to make reasonable progress.

3 Facility-Specific Recommendations for Iowa

The NPS-estimated costs for included NO_x control costs are based on 2019 dollars to facilitate comparison with costs presented in the SIP, which also assumed 2019 dollars. SO_2 control costs estimated using the Retrofit Cost Analyzer worksheet are based on 2016 dollars, consistent with the four-factor analysis. The rate of inflation has increased substantially in recent years, and cost estimates using 2022 dollars will be higher than those presented here.

3.1 Louisa Generating Station

3.1.1 SO_2 emissions

The Louisa Generating Station (LGS) operates a single dry bottom wall-fired boiler with a capacity of 811.9 MW. The boiler is equipped with a dry lime flue gas desulfurization system, low-NO_x burners, and overfire air.

Section 5.2 of the Iowa draft SIP presents historical emissions for LGS. Iowa DNR selected the period 2017–2019 as representative of typical operations because operations were impacted by the pandemic in 2020 and possibly into 2021. The following table shows baseline emissions data for LGS.

Table 2. Baseline emissions at Louisa Generating Station, 2017-2019.

Year	Heat input (MMBtu)	SO_2 emissions (tons)	SO_2 emissions rate (lb/MMBtu)	NO_x emissions (tons)	NO_x emissions rate (lb/MMBtu)
2017	36,681,145	5,237	0.286	3,490	0.190
2018	51,727,847	7,332	0.283	4,871	0.188
2019	34,547,040	5,286	0.306	2,960	0.171
Average	40,985,344	5,952	0.292	3,774	0.183

The four-factor analysis supplied by the facility indicates that the efficiency of the existing dry desulfurization system can be improved to achieve an emissions rate of 0.1 lb/MMBtu for a cost of $282/ton. Iowa DNR has decided to implement this emissions reduction measure and the SIP includes a draft permit that incorporates the new requirement. This will reduce SO_2 emissions from LGS by 3,900 tons per year. Iowa DNR also evaluated wet flue gas desulfurization and determined that it is not cost-effective based on the high incremental costs when compared to improving the existing dry desulfurization system. The NPS supports Iowa DNR's SO_2 control determination for LGS.

3.1.2 NO_x emissions

The four-factor analysis also evaluated the potential costs of selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR) to reduce NO_x emissions. The four-factor analysis used the EPA's Retrofit Cost Analyzer tool to estimate costs for SNCR and EPA's SCR Cost Calculation Spreadsheet provided with the Control Cost Manual (CCM) to estimate costs for SCR. The NO_x control costs estimated by MidAmerican are shown in the following table:

Table 3. Four-factor cost estimates for potential NO_x controls at Louisa Generating Station.

	SNCR	SCR
Emissions change from baseline (tons/year)	-566	-2,739
Cost Effectiveness (2019 $/ton)	$6,398	$8,862

Iowa DNR also estimated NO_x control costs, using the CCM worksheets that are provided in Appendix D-2. The four-factor analysis provided by MidAmerican does not explain why the retrofit cost analyzer was used to estimate costs for SNCR. While the resulting cost estimates are similar, the NPS agrees that the CCM Cost Calculation spreadsheet used by Iowa DNR is the appropriate tool to use.

The NPS also estimated NO_x control costs using the CCM worksheets for SCR and SNCR, included as attachments *Louisa SCR NPS.xlsm* and *Louisa SNCR NPS.xlsm*. NPS analyses used the regression equation in Figure 1.1c of Section 4, Chapter 1, of the CCM to estimate the NO_x removal efficiency of an SNCR system at LGS. This resulted in an estimated efficiency of 21%, which is somewhat higher than the 15% reduction efficiency assumed in the SIP. In addition, NPS used equation 1-17 of the same CCM chapter to estimate the normalized stoichiometric ratio for SNCR using urea as the reagent rather than using the default value. NPS-estimated NO_x control costs, shown in the following table, would be found cost effective under thresholds established by other states, as discussed in section 2.3 above. The NPS encourages Iowa to establish a cost threshold in line with other states, and require installation of all technically feasible, cost-effective controls.

Table 4. NPS NO_x Control Cost Estimates--Louisa

	SNCR	SCR
NO_x Removed (tons/year)	788	2,749
Cost Effectiveness ($/ton of NO_x removed in 2019 dollars)	$4,797	$8,797

3.2 Walter Scott Energy Center Unit 3

3.2.1 SO_2 Emissions

The Walter Scott Energy Center (WSEC) includes two dry bottom wall-fired boilers with nameplate capacities of 725.8 MW (Unit 3) and 922.5 MW (Unit 4). As Unit 4 is equipped with a lime spray dryer and SCR, and has relatively low SO_2 and NO_x emission rates, the SIP did not evaluate it for additional controls. Unit 3 is also equipped with a lime spray dryer, low-NO_x burners, and overfire air. The unit's emissions over the 2017–2019 baseline period are shown in the following table.

Table 5. Baseline emissions at Walter Scott Energy Center Unit 3, 2017-2019

Year	Heat input (MMBtu)	SO_2 emissions (tons)	SO_2 emissions rate (lb/MMBtu)	NO_x emissions (tons)	NO_x emissions rate (lb/MMBtu)
2017	48,261,687	8,486	0.352	5,437	0.225
2018	45,240,043	8,118	0.359	5,186	0.229
2019	41,855,533	7,520	0.359	4,466	0.213
Average	45,119,088	8,041	0.357	5,030	0.223

The four-factor analysis supplied by the operator indicates that the efficiency of the existing dry desulfurization system can be improved to achieve an emissions rate of 0.1 lbs/MMBtu for a cost of $216/ton. The DNR has decided to implement this emissions reduction measure and the SIP includes a draft permit that incorporates the new requirement. This will reduce SO_2 emissions from WSEC Unit 3 by 5,785 tons per year. Iowa DNR also evaluated wet flue gas desulfurization and determined that it is not cost effective based on the high incremental costs when compared to improving the existing dry desulfurization system. The NPS supports Iowa DNR's SO_2 control determination for WSEC.

3.2.2 NO_x emissions

The four-factor analysis provided by MidAmerican also evaluated the potential costs of SCR and SNCR to reduce NO_x emissions. The four-factor analysis used the EPA's Retrofit Cost Analyzer tool to estimate costs for SNCR and EPA's SCR Cost Calculation Spreadsheet provided with the Control Cost Manual (CCM) to estimate costs for SCR. The NO_x control measure costs estimated by MidAmerican are shown in the following table:

Table 6. Four-factor cost estimates for potential NO_x controls at Walter Scott Energy Center Unit 3

	SNCR	SCR
Emissions change from baseline (tons/year)	-755	-3,849
Cost Effectiveness (2019 $/ton)	$5,616	$6,436

Iowa DNR also estimated NO_x control costs, using the CCM provided worksheets that are provided in Appendix D-2. The four-factor analysis supplied by the operator does not explain why the retrofit cost analyzer was used to estimate costs for SNCR. While the resulting cost estimates are similar, the NPS agrees that the CCM Cost Calculation spreadsheet used by Iowa DNR is the appropriate tool to use.

NPS estimated NO_x control costs using the CCM worksheets for both SCR and SNCR, included as attachments *Walter Scott SCR NPS.xlsm* and *Walter Scott SNCR NPS.xlsm*. NPS used the regression equation in Figure 1.1c of Section 4, Chapter 1, of the Control Cost Manual (CCM) to estimate the NO_x removal efficiency of an SNCR system. This resulted in an estimated

efficiency of 21%, which is higher than the 15% reduction efficiency assumed in the SIP. In addition, NPS used equation 1-17 of the same CCM chapter to estimate the normalized stoichiometric ratio for SNCR using urea as the reagent. NPS-estimated NO_x control costs, shown in the following table, would be found cost effective under thresholds established by other states, as discussed in section 2.3 above. The NPS encourages Iowa to establish a cost threshold in line with other states, and require installation of all technically feasible, cost-effective controls.

Table 7. NPS NO_x Control Cost Estimates--Walter Scott Energy Center Unit 3

	SNCR	SCR
NO_x Removed (tons/year)	1,093	3,902
Cost Effectiveness ($/ton of NO_x removed in 2019 dollars)	$3,861	$6,005

3.3 George Neal North and George Neal South

The George Neal North and George Neal South electrical generating facilities were not selected by the state for analysis in the SIP. The facilities are located approximately 10 miles south of Sioux City, Iowa, roughly two miles apart. The North unit consists of a single 584.1 MW coal-fired boiler and the South unit consists of a single 695.9 MW coal-fired boiler. Both units are equipped with dry lime flue gas desulfurization systems, low-NO_x burners, and overfire air. The South unit boiler is also equipped with SNCR for NO_x reduction. The following table shows emissions data for both units during the 2017-2019 baseline period. Emissions and heat input data were obtained from EPA's Clean Air Markets Program Data and used to calculate emissions rates.

Table 8. NPS SO_2 Control Cost Estimates—George Neal North and George Neal South

Unit	Year	Heat input (MMBtu)	SO_2 emissions (tons)	SO_2 emissions rate (lb/MMBtu)	NO_x emissions (tons)	NO_x emissions rate (lb/MMBtu)
George Neal North	2017	24,747,639	4,203	0.340	2,534	0.205
	2018	25,303,920	4,336	0.343	2,498	0.197
	2019	17,928,951	3,113	0.347	1,836	0.205
George Neal South	2017	24,495,403	4,381	0.358	2,316	0.189
	2018	31,378,659	5,628	0.359	2,751	0.175
	2019	15,250,259	2,617	0.343	1,382	0.181

3.3.1 SO_2 Emissions

NPS estimated the cost of reducing the SO_2 emissions rate at both George Neal facilities to 0.1 lb/MMBtu by improving the efficiency of the existing dry flue gas desulfurization units. NPS followed the same calculation method used in the four-factor analysis provided by MidAmerican for LGS and WSEC Unit 3. In the four-factor analysis, MidAmerican estimated the cost of reducing SO_2 emissions from the uncontrolled rate to the baseline rate and the cost of reducing

the SO_2 emissions rate from the uncontrolled rate to the desired rate of 0.1 lb/MMBtu. The analysis then computed the difference in operating costs only (including increased lime usage and waste disposal costs), ignoring capital costs, and divided the result by the difference in tons of SO_2 to get the final cost in $/ton of SO_2. MidAmerican used the EPA Retrofit Cost Analyzer to estimate these costs. As this tool includes some costs such as owner's costs that are disallowed by the CCM, the SO_2 cost estimation tool provided with the CCM should be used instead (Wet and Dry Scrubbers for Acid Gas Control Cost Calculation Spreadsheet). NPS estimated the cost of improving the SO_2 scrubbing efficiency using both worksheets, and in this case the costs were the same as capital costs did not affect the result. For simplicity, results presented here used the Retrofit Cost Analyzer tool.

In order to use this method to estimate costs for improving SO_2 removal efficiency at the two George Neal facilities, NPS had to first estimate the uncontrolled emissions rates for the units. NPS obtained coal consumption data from the Energy Information Administration that includes the percent sulfur content and estimated the total pounds of SO_2 that could be emitted. This was divided by the total amount of energy input to the boilers to estimate the potential SO_2 emissions rate. Details on this calculation can be found in the attached Excel workbook *George Neal estimate uncontrolled SO2.xlsx*.

NPS estimated the cost of reducing SO_2 emissions from the potential uncontrolled rate to the current rate and the cost of reducing emissions from the uncontrolled rate to 0.1 lb/MMBtu in the same manner as the four-factor analysis using the EPA Retrofit Cost Analyzer tool for both George Neal boilers. Costs estimated using the Retrofit Cost Analyzer are in 2016 dollars. These calculations are documented in four attached Excel workbooks:

- *retrofit_cost_tool_2019_06_04 George Neal S 77pct reduction.xlsx,*
- *retrofit_cost_tool_2019_06_04 George Neal S 17pct reduction.xlsx,*
- *retrofit_cost_tool_2019_06_04 George Neal N 17pct reduction.xlsx, and*
- *retrofit_cost_tool_2019_06_04 George Neal N 75pct reduction.xlsx.*

NPS then computed the difference in operating costs only, ignoring capital costs, and divided the result by the difference in tons of SO_2 to get the final cost in $/ton of SO_2. The resulting estimate is $280/ton SO_2 removed for both units and potential SO_2 emissions reductions are estimated at 2,639 tons/year at George Neal North and 3,271 tons/year at George Neal South. The final result is documented in the Excel workbook *George Neal SO2 reduction cost summary NPS.xlsx*. The estimated cost effectiveness for improving the efficiency of the SO_2 scrubbers at the George Neal units is very similar to the four-factor analysis estimates for LGS and WSEC Unit 3.

3.3.2 NO_x emissions

NPS also estimated the cost of reducing NO_x emissions at George Neal North by adding SNCR, as this unit does not currently employ post-combustion controls. NPS estimated costs for SNCR using the CCM worksheet for SNCR, which is attached as *George Neal North SNCR NPS.xlsm*. SNCR would reduce emissions by an estimated 487 tons/year of NO_x at a cost of $5,546/ton NO_x

removed. This would be found cost effective under thresholds established by other states, as discussed in section 2.3 above. The NPS encourages Iowa to establish a cost threshold in line with other states, and require installation of all technically feasible, cost-effective controls.

11/29/2022: National Park Service (NPS) Formal Consultation Call for Regional Haze SIP Development with the Iowa Department of Natural Resources, Environmental Services Division (Iowa DNR). As noted below, representatives from the other Federal Land Managers and the Environmental Protection Agency (Region 7) also attended.

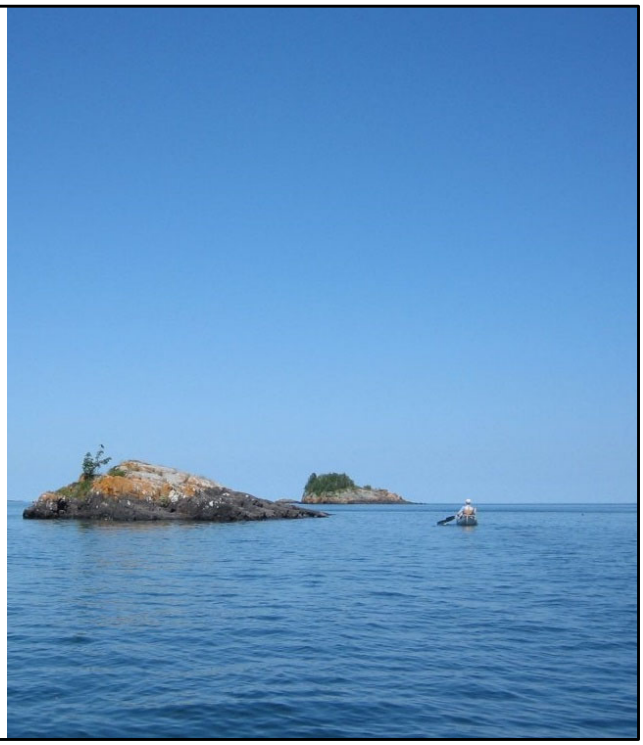
Attendees:

- National Park Service
    - Kirsten King, Air Resources Division (ARD)
    - Debbie Miller, ARD
    - Melanie Peters, ARD
    - Holly Salazer, ARD
    - Andrea Stacy, ARD
    - Don Shepherd, ARD
    - David Pohlman, Midwest Region
- Iowa DNR
    - Matthew Johnson
    - Jim Mcgraw
    - Jessica Ress Mcintyre
    - Peter Zayudis
- U.S. Forest Service
    - Trent Wickman
- Environmental Protection Agency (Region 7)
    - Jed Wolkins

NPS photos from left to right: Great Smoky Mountains NP, Denali NP, Yellowstone NP, Grand Canyon NP

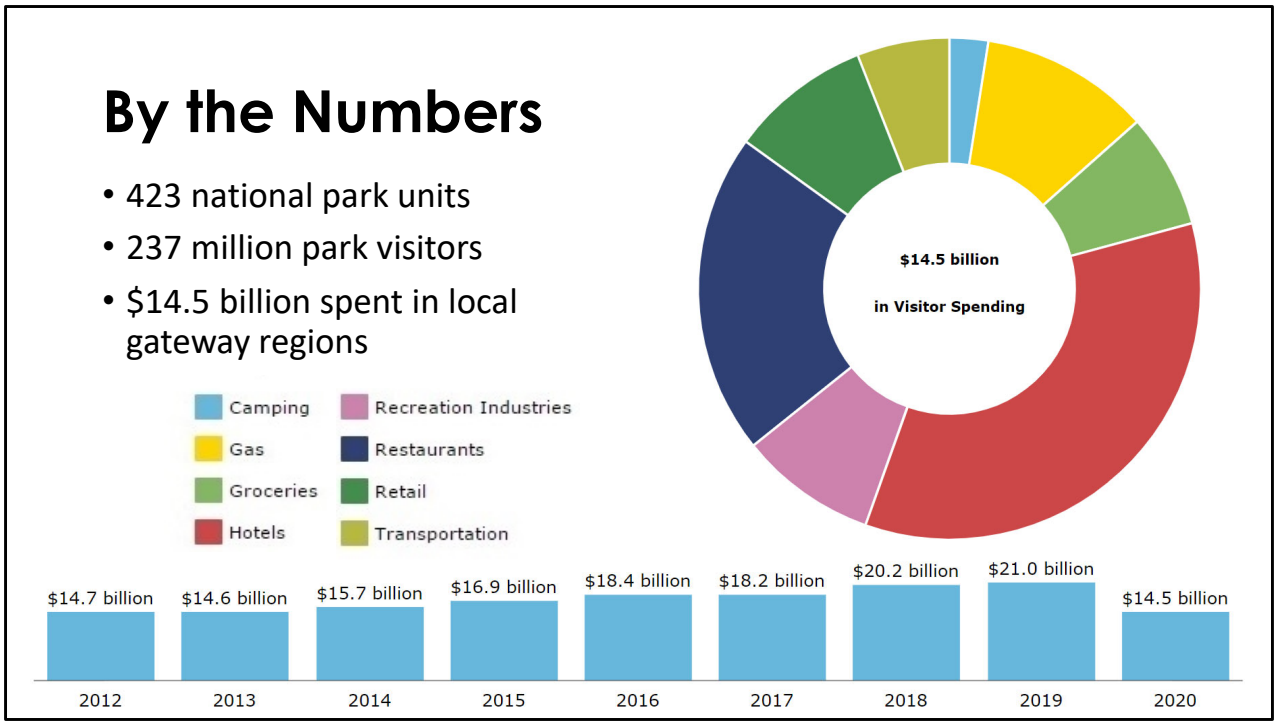
Agenda

- Welcome & Introductions
- NPS Regional Haze Background
- NPS Class I Areas Most Affected by Iowa
  - Isle Royale, Voyageurs, Badlands, and Mammoth Cave National Parks
- SIP feedback:
  - Source Selection
  - Facility-specific review
- Summary Conclusions
- Next-Steps



We welcome discussion at any time during this presentation. Please feel free to ask questions or add information along the way.

NPS Photo, Isle Royale NP



Nationally, in 2020 NPS visitation and spending numbers were down due to the pandemic. It is pretty amazing that even in 2020 there were 237 million park visitors who generated $14.5 billion for the economy – perhaps emphasizing more than ever the economic value of National Parks to our country.

For comparison in 2019:

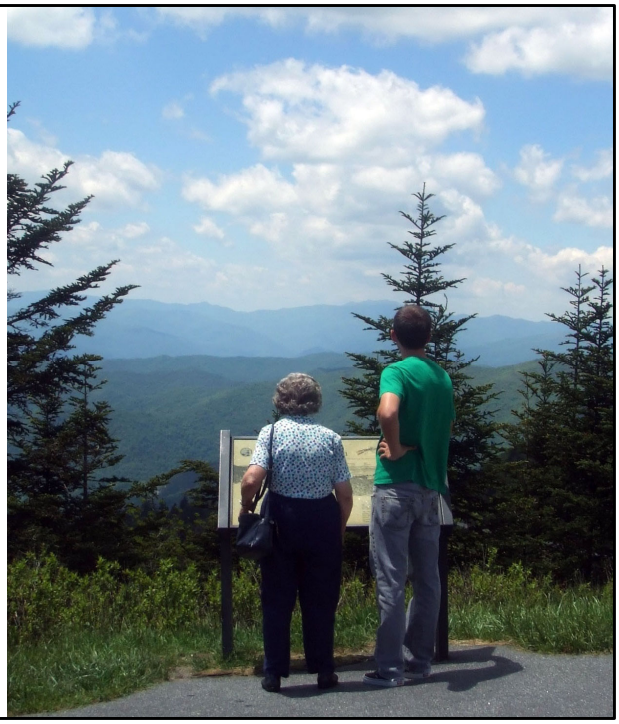
328 million park visitors spent an estimated $21 billion in local gateway regions while visiting National Park Service lands across the country.

These expenditures supported a total of
- 341 thousand jobs,
- $14.1 billion in labor income,
- $24.3 billion in value added, and
- $41.7 billion in economic output in the national economy.

https://www.nps.gov/subjects/socialscience/vse.htm

By the Numbers

- **48** Class I areas
- In **24** states
- **90%** of visitors surveyed say that scenic views are ***extremely*** to ***very*** important
- **100%** of visitors surveyed rate clean air in the **top 5** attributes to protect in national parks



List of Class I areas: https://www.nps.gov/subjects/air/npsclass1.htm

States with at least one Class I area:
AK, AZ, CA, CO, FL, HI, ID, KY, ME, MI, MN, MT, NC, ND, NM, OR, SD, TN, TX, UT, VA, VI, WA, WY

Statistics citation:
Kulesza C and Others. 2013. National Park Service visitor values & perceptions of clean air, scenic views, & dark night skies; 1988–2011. Natural Resource Report. NPS/NRSS/ARD/NRR—2013/622. National Park Service. Fort Collins, Colorado

NPS photo of Great Smoky Mountains NP, NC & TN

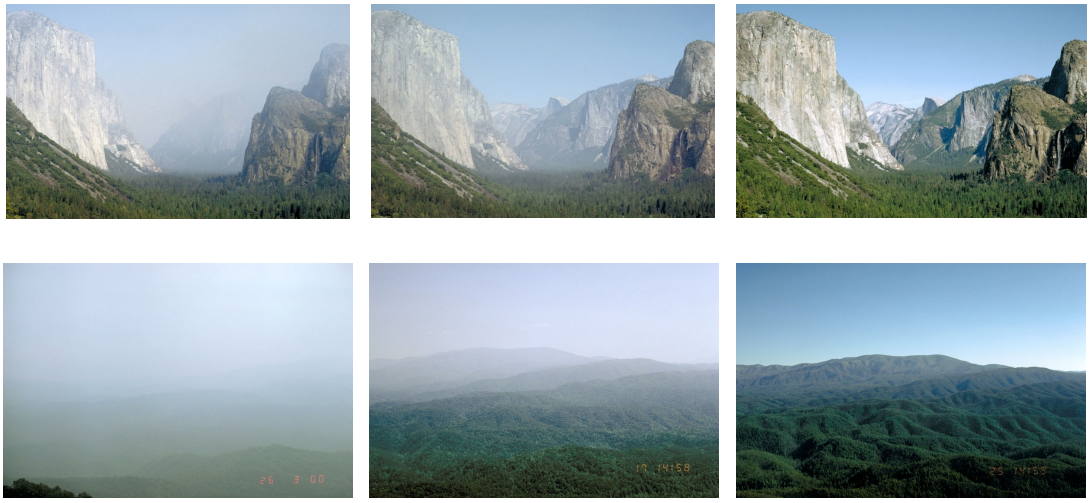
The NPS has an affirmative legal responsibility to protect clean air in national parks.

- 1916 NPS Organic Act: created the agency with the mandate to conserve the scenery, natural and cultural resources, and other values of parks in a way that will leave them unimpaired for the enjoyment of future generations. This statutory responsibility to leave National Park Service units "unimpaired" requires us to protect all National Park Service units from the harmful effects of air pollution.
- 1970 Clean Air Act: authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources. The Act also requires the Environmental Protection Agency to set air quality standards.
- 1977 Clean Air Act Amendments: these amendments to the Clean Air Act provide a framework for federal land managers such as the National Park Service to have a special role in decisions related to new sources of air pollution, and other pollution control programs to protect visibility, or how well you can see distant views. The Act established a national goal to prevent future and remedy existing visibility impairment in national parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres that were in existence when the amendments were enacted (Class I areas).
- 1990 Clean Air Act Amendments: created regulatory programs to address acid rain and expanded the visibility protection and toxic air pollution programs. The acid rain regulations began a series of regional emissions reductions from electric generating facilities and industrial sources that have substantially reduced air pollutant emissions.

NPS photo of Washington DC: https://npgallery.nps.gov/AirWebCams/wash

Visibility goal:

Restore natural conditions by 2064

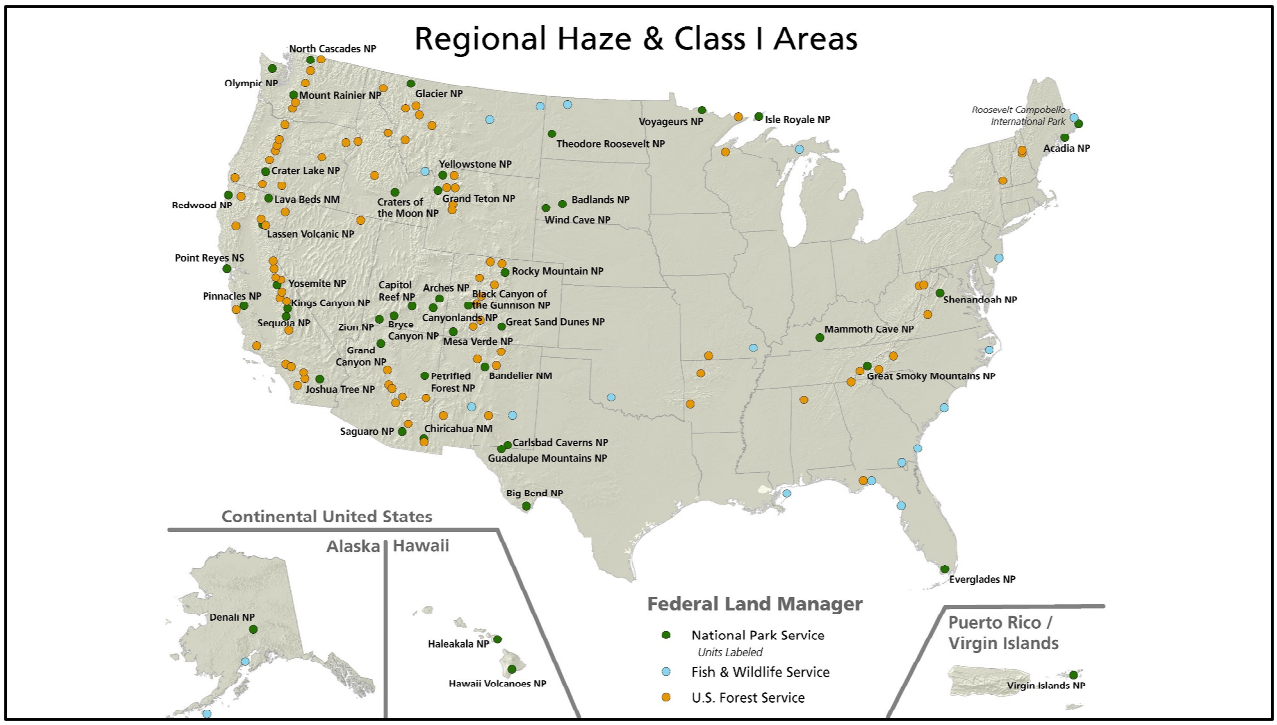


Yosemite NP, California and Great Smoky Mountains NP, Tennessee and North Carolina

Left to right images illustrate hazy to clear conditions.

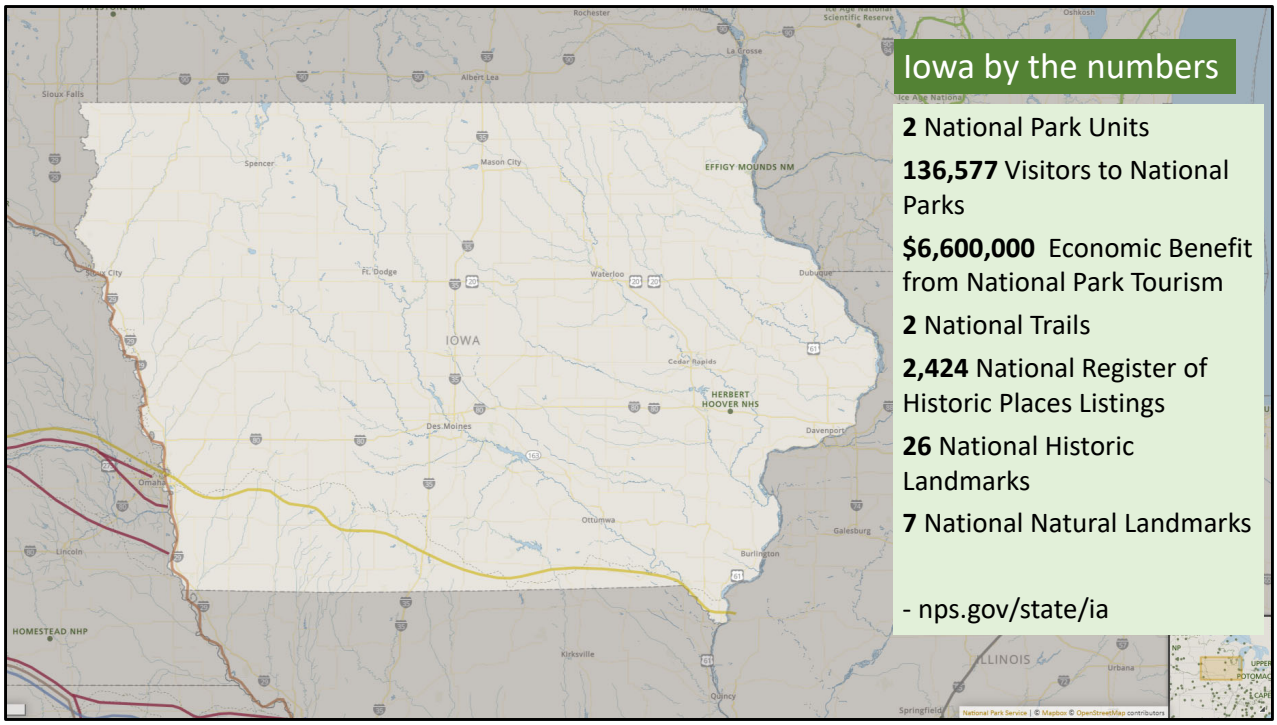
Haze obscures the color and detail in distant features.

NPS photos



As you know, the NPS is one of three Federal Land Managers (FLMs) with responsibility for the 156 Class I areas with visibility as an important attribute nationwide. The NPS manages 48 Class I areas including Mammoth Cave NP in Kentucky.

NPS map of Class I areas, 2020



Units managed by the National Park Service in Iowa:

1. **Effigy Mounds** National Monument, Harpers Ferry, IA
2. **Herbert Hoover** National Historic Site, West Branch, IA

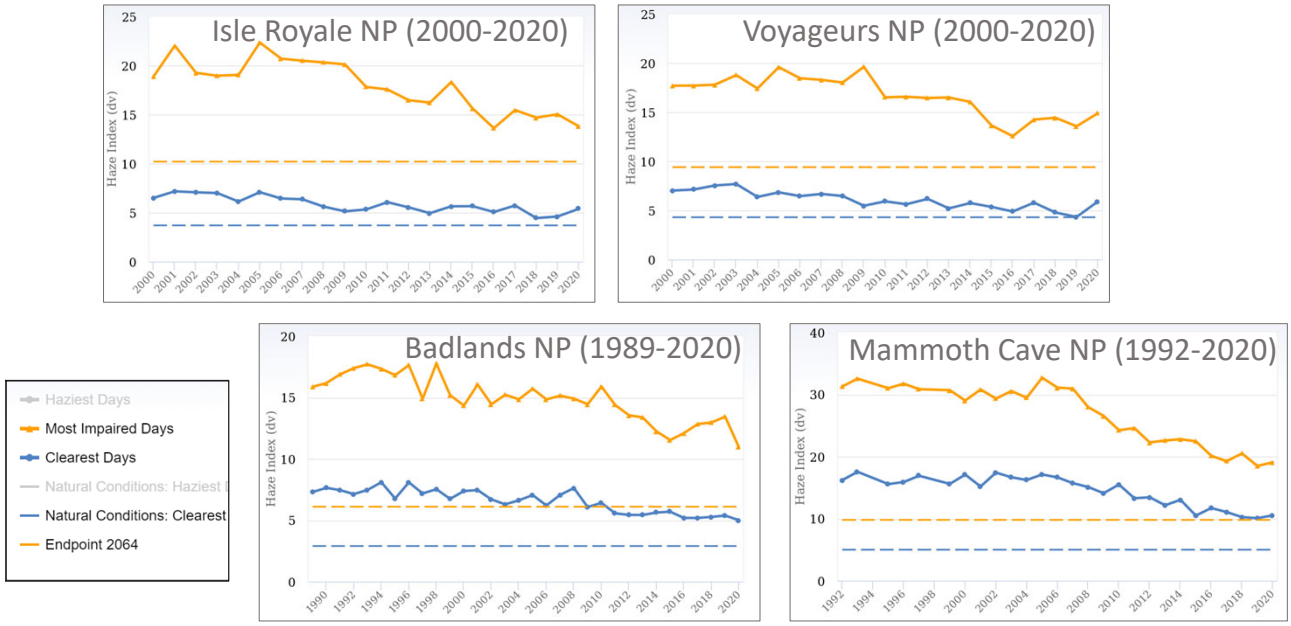
- **Lewis & Clark** National Historic Trail, Sixteen States: IA,ID,IL,IN,KS,KY,MO,MT,NE,ND,OH,OR,PA,SD,WA,WV
- **Mormon Pioneer** National Historic Trail, Various States IL,IA,NE,UT,WY

nps.gov/state/ia
https://www.nps.gov/subjects/socialscience/vse.htm

NPS map, 2022

*Note, the absolute value of Iowa sources contribution to visibility impairment at Mammoth Cave NP, in Kentucky, is higher than it is in Isle Royale NP (for example). However, because visibility at Mammoth Cave National Park is so much more impaired, Iowa's percent contribution is not in the top 80%. However, Iowa sources are in the top 80% for Wind Cave National Park, South Dakota. The long-term visibility trends and haze composition data for Wind Cave NP are generally similar to Badlands National Park.

Long-term Visibility Trends

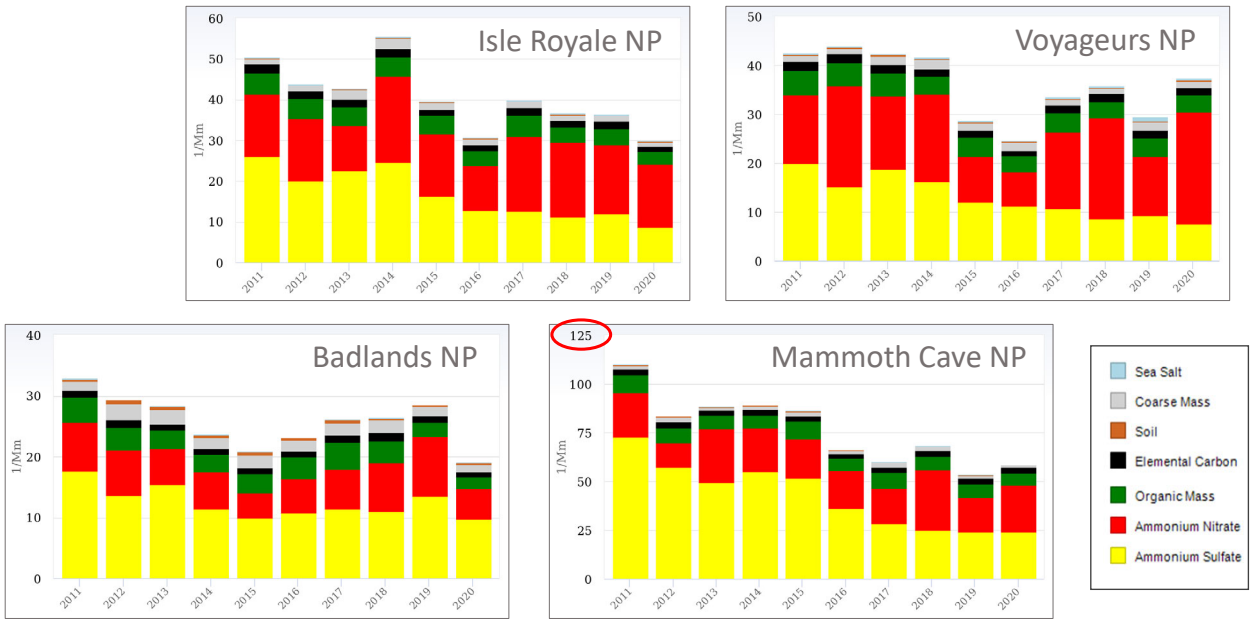


There is a long history of visibility monitoring in our regional Class I areas.

- The monitors for Isle Royale and Voyageurs NP's each date back to 2000 while the monitor for Badlands NP began operation in 1989 and the one at Mammoth Cave NP began operation in 1992. NPS staff support the operation of the IMPROVE monitoring network nationally and for many individual monitoring sites. This is how we keep track of the visibility conditions in our Class I areas and monitor progress.
- Graphs shown here highlight the annual average light extinction on most impaired days and on clearest days compared to the target condition (endpoint) for most impaired days and estimated natural conditions on clearest days. These charts show long term improvement across this group of parks and recent increases in haze on most impaired days at Voyageurs.

Long term visibility trend graphs generated from:
http://views.cira.colostate.edu/fed/Express/AqrvTools.aspx

Haze Composition on Most Impaired Days (2011-2020)



These annual extinction bar graphs show total haze composition over the past 10 years at Isle Royale, Voyageurs, Badlands, and Mammoth Cave NPs. These areas have generally seen improvements in light extinction on most impaired days over the past 10 years. Ammonium nitrate appears to be increasingly more responsible for visibility impairment in recent years, most notably at Isle Royale and Voyageurs.

Note the different scales of light extinction – Impairment at Mammoth Cave NP is significantly higher than the other featured parks.

Most-impaired days annual light extinction composition stacked bar graphs from:
http://vista.cira.colostate.edu/Improve/aqrv-summaries/

Iowa Draft SIP Feedback

Source Selection (1 of 2)

- Iowa DNR used an EWRT*Q/d analysis of point source impacts to Class I areas for NO_x and SO_2 and selected facilities contributing to the majority (top 50%) of impact to Class I areas.
- This approach identified 2 Iowa facilities affecting Isle Royale and Voyageurs NPs:
  - Louisa Generating Station
  - Walter Scott Jr. Energy Center
- The original NPS list of sources recommended for consideration was based on the top 80% of Q/d impact at Class I areas.

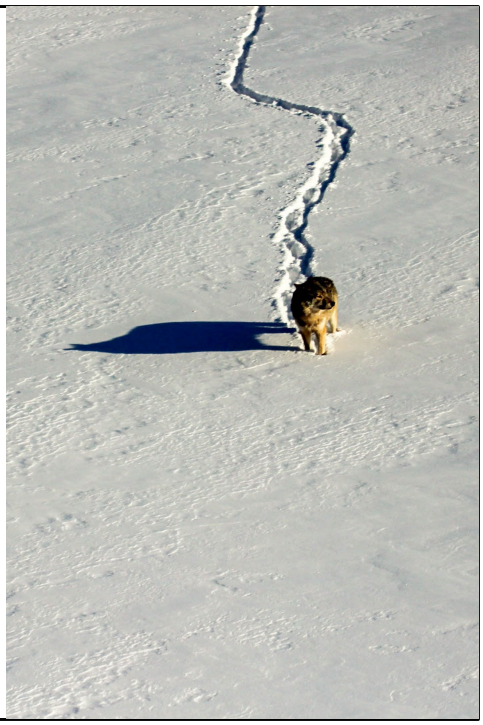
NPS Photo of North Canoe Program, Voyageurs NP

Iowa Draft SIP Feedback

Source Selection (2 of 2)

- NPS Recommendations

- Increasing the % of impact in the EWRT*Q/d analysis would have identified additional sources.
  - Choosing 60% identifies George Neal North & George Neal South as affecting Badlands NP and George Neal South as affecting Isle Royale NP.
  - Many other states considered the equivalent of 70% contribution or higher.
- The NPS recommends evaluating emission reduction opportunities at the George Neal North and South facilities in this planning period.



NPS recommendations are based on:

- The NPS lists of sources that contribute up to 80% of the AOI impact at NPS Class I areas (both initial and revised rankings).
- Original NPS source recommendations based on Q/d
- Source information in the CAMD database

Iowa Draft SIP Feedback

Overarching Themes for NPS Facility-Specific Feedback

The NPS recognizes Iowa for:

- Applying the Regional Haze Rule process to identify reasonable reduction measures
- High quality technical work
  - SIP document clearly explains analysis methods
  - Used EPA-recommended methods and factors for cost analyses
- Requiring meaningful emissions reductions that will address haze in this planning period

Iowa Draft SIP Feedback

Louisa Generating Station (1 of 2)

- MidAmerican Energy Co.

- Single 811 MW coal-fired boiler, equipped with dry lime spray dryer, low-NO_X burners, and overfire air
- SIP concluded SO_2 emissions could be reduced by 3,900 tons for $282 (2019$)/ton by improving existing controls, which will be required in new permit
- NPS supports this conclusion

Iowa Draft SIP Feedback

Louisa Generating Station (2 of 2)

- MidAmerican Energy Co.

- SIP estimated NO_X emission reduction cost at $6,400 (2019$)/ton using selective non-catalytic reduction (SNCR) and $8,860 (2019$)/ton using selective catalytic reduction (SCR)
- The NPS SNCR costs estimate is somewhat lower at $4,800 (2019$)/ton
- Costs up to $10,000/ton have been deemed reasonable by other states (CO, OR, NV)

Iowa Draft SIP Feedback

Walter Scott Jr. Energy Center (1 of 2)

- MidAmerican Energy Co.

- Two coal-fired boilers: Unit 3 (725.8 MW) and Unit 4 (922.4 MW)
- Unit 4 equipped with dry lime spray dryer, low-NO_X burners, overfire air, SCR
- Unit 3 equipped with dry lime spray dryer, low-NOx burners, overfire air
- SIP concluded SO_2 emissions at Unit 3 could be reduced by 5,785 tons for $282 (2019$)/ton by improving existing controls, which will be required in new permit
- NPS supports this conclusion

Iowa Draft SIP Feedback

Walter Scott Jr. Energy Center (2 of 2)

- MidAmerican Energy Co.

- SIP estimated potential NO_X emission reduction costs at $5,600 (2019$)/ton for SNCR and $6,400 (2019$)/ton for SCR
- NPS SNCR costs estimate somewhat lower at $3,900 (2019$)/ton
- Costs up to $10,000/ton have been deemed reasonable by other states (CO, OR, NV)

Iowa Draft SIP Feedback

George Neal North & South (1 of 2)

- MidAmerican Energy Co.

- North unit is 584.1 MW coal-fired boiler, South unit is 695.9 MW coal-fired boiler
- Both equipped with dry lime FGD
- NPS used four-factor analysis method to estimate cost to improve SO_2 rate to 0.1 lb/MMBtu at $280 (2019$)/ton for both units
- Estimated potential SO_2 reductions of 2,640 tons/year at George Neal North and 3,270 tons/year at George Neal South
- Cost estimates very similar to those deemed cost-effective for Louisa Generating Station and Walter Scott Unit 3

Iowa Draft SIP Feedback

George Neal North & South (2 of 2)

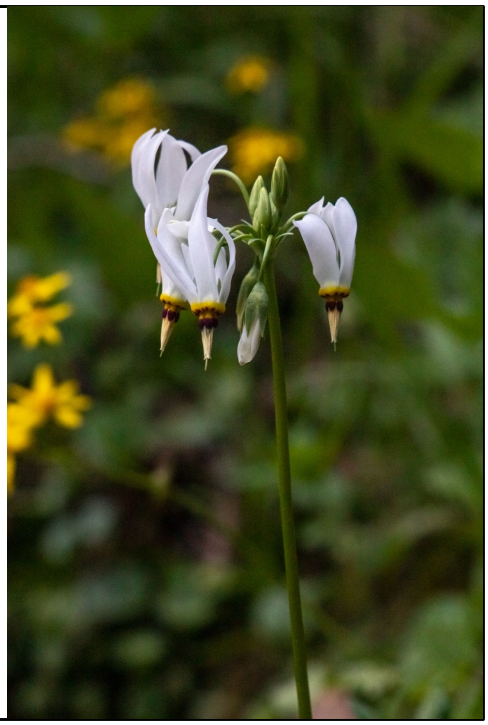
- MidAmerican Energy Co.

- Both equipped with low-NO_X burners and overfire air; South unit includes SNCR
- NPS estimated cost of adding SNCR to North unit at $5,500 (2019$) per ton of NO_X removed.

Iowa Draft SIP Feedback

Potential Emission Reductions

- The SO_2 emission reductions identified for Louisa and Walter Scott will achieve 9,700 tons of reductions per year.
- Requiring similar control improvements for emission units at the George Neal North & South Stations could reduce SO_2 emissions by an additional 5,900 tons/year
- If required, SNCR could reduce NO_x emissions ~ 2,300 tons/year from Louisa, WSEC-3, and George Neal North combined.



NPS Photo by Kait Evensen of Shooting Star (Dodecatheon meadia), Mammoth Cave NP

Iowa Draft SIP Feedback

Summary Conclusions

- Thank you for addressing haze causing emissions by requiring SO_2 controls for Louisa and WSEC-3
- Recommend expanding source selection criteria and evaluating emission reduction opportunities for George Neal North and South
- SO_2 reductions for George Neal North and South are also highly cost effective and recommended for inclusion in this planning period.

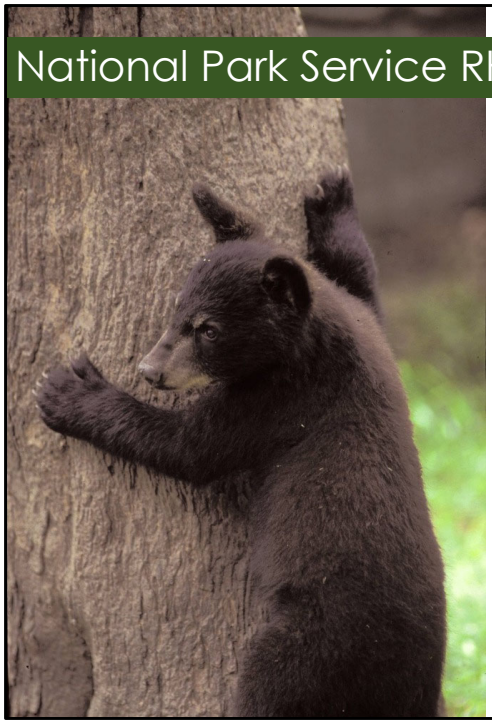
NPS Photo by Jackie Wheet, Mammoth Cave NP.

Iowa Draft SIP Feedback

Summary Conclusions

- SNCR NO_x emission reductions identified for Louisa and WSEC would be found cost effective by several other states.
- The NPS recommends reconsidering these NO_x controls now or in future planning periods
- The NPS also recommends establishing a cost threshold like those established by other states in this round of regional haze planning to thoroughly document decisions.

NPS Photo by Ashley Decker of kayaks beside the Green River, Mammoth Cave NP



National Park Service RHR - Round 2

- Thank you for meeting with us!
- Please share:
  - Anticipated SIP schedule
  - How you will respond to NPS comments
  - * Note – CAA requirement to summarize FLM conclusions in public notice
- Please let us know:
  - When public comment period opens
  - If/when a public hearing will be held
- The NPS will:
  - Email call summary & add'l technical information
    - By **December 9, 2022**
  - Share our comments with EPA Region 7

The NPS will submit an email summary of our November 29, 2022 consultation call along with final review comments by December 9th, 2022. The NPS requests that the state notify us when the draft SIP will be open for public review and comment, and alert us to any public hearing dates.

Please note that the CAA requires states include a summary of FLM conclusions and recommendations in the public notice. We tuned in to this requirement in December, 2021 and are now sharing it with states. The CAA language is:

> *§7491. Visibility protection for Federal class I areas*
> *(d) Consultations with appropriate Federal land managers*
>
> *Before holding the public hearing on the proposed revision of an applicable implementation plan to meet the requirements of this section, the State (or the Administrator, in the case of a plan promulgated under section 7410(c) of this title) shall consult in person with the appropriate Federal land manager or managers and shall include a summary of the conclusions and recommendations of the Federal land managers in the notice to the public.*

https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partC-subpartii-sec7491.htm

NPS photo of a black bear cub at Great Smoky Mountains NP.

Please reach out to us with any questions.

For any formal notifications of public documents, please include the above list of NPS staff.

The NPS acknowledges and appreciates the emission reductions that Iowa has made since the beginning of the Regional Haze program and that are proposed in this Round 2 SIP. We welcome future opportunities to engage with Iowa and work together on efforts to reduce haze causing pollution and promote clean air and clear views in our national parks.

NPS photo of Isle Royale NP.