WESTAR Regional Haze 2018 SIP Update Plan

April 2, 2014

Contents

WESTAR Regional Haze 2018 SIP Update Plan

Introduction

The WESTAR States have developed this plan to guide their work for the regional haze SIPs due on July 31, 2018. The plan identifies the regional and technical work elements that will be needed for these SIPs, how these elements fit together, and estimates the time needed to complete each task.

In a separate process, WESTAR States have worked to identify and recommend to EPA potential changes to the Regional Haze Rule (RHR) and supporting guidance.[1] At this time, EPA has not made changes to the regional haze rule or guidance; thus, the tasks identified here are based on the RHR as it is currently written and existing guidance. Should EPA make substantive changes to the rule or guidance, this plan may need to be modified. In the absence of certain rule and guidance changes, this plan identifies areas where the states will need to make certain assumptions or interpretations, and areas where states cannot proceed without further direction. Also, to date, no resources have been identified by EPA to assist states in conducting the work needed for 2018, so this plan assumes in-kind and extramural funding sources will be leveraged to accomplish the work identified in this plan.

Since the RHR requires a comprehensive plan review every 10 years, much of the work for the 2018 plan will be similar to the work required for the first haze SIPs. States have the benefit of having been through the process once before, thereby having a better understanding of the requirements and work needed

Regional Haze Program Requirements

The requirements for the regional haze rule are identified in 40 CFR 51.308. Specifically, 51.308(f) lists the requirements for haze SIP updates, including a reference to the requirements in 51.308(d). Appendix A shows the text of the RHR and briefly identifies the associated work the states will undertake for each paragraph.

Section 51.308(f) Requirements

Section 51.308(f) requires that states revise and submit regional haze plans to EPA by July 31, 2018. In addition to re-evaluating all elements required in paragraph (d), the states must also

- Assess current visibility conditions for the most impaired and least impaired days
- Address actual progress made towards natural conditions during the previous implementation period
- Determine the effectiveness of the long-term strategy for achieving reasonable progress goals over the prior implementation period
- Affirm or revise reasonable progress goals according to procedures in paragraph (d)

[1] WESTAR Regional Haze Workgroup "Five Core Issues"

Section 51.308(d) Requirements

As noted above, the section addressing the requirements for the SIP revisions references the requirements of paragraph (d). This paragraph's requirements address

- Establishing reasonable progress goals for the implementation period, including the four-factor analysis
- Determining current visibility conditions and comparing to natural conditions
- Developing long-term strategies to reduce emissions that contribute to visibility impairment
- Submitting a monitoring strategy

Throughout this plan, the sections of the regional haze rule most relevant to each task are cited. The RHR drives the work that needs to be done either explicitly, by requiring specific analyses (such as determining current visibility conditions), or implicitly, by requiring states to make planning decisions (such as identifying control measures to improve visibility). In order to make sound planning decisions, the states must complete a regional analysis, which requires the use of certain methods, inputs, timelines, and resources. There is not always a direct relationship between individual sections of the rule and specific tasks.

Appendix A identifies the work needed to be able to effectively comply with each paragraph of the rule.

Work Products Overview

Exhibit 1 outlines the tasks to develop the regional haze SIPs and shows how they fit together. The regional work products are briefly described in Exhibit 2 with further detail in the sections below.

Timeline

This plan identifies an initial description and timeline for the substantial work that is needed over the next four years to complete the 2018 SIP. The timing to complete the plans by July 2018 depends on a reliable sequence of technical and planning work at the regional level and by individual states. In addition to these efforts, the states must provide time for consultation with the Federal Land Managers (FLMs) and for a public comment period, as well as the state adoption process. This all points to the need for states to start the 2018 SIP development process in early 2014. Exhibit 3 shows an overview of the timeline to develop these SIPs. With the exception of the Monitoring Data Analysis, the activities listed in this table will be covered, at least in part, in the Western Regional Modeling Framework work plan. A more detailed timeline is available in Appendix B.

Exhibit 1 – Regional Haze SIP Development Flowchart

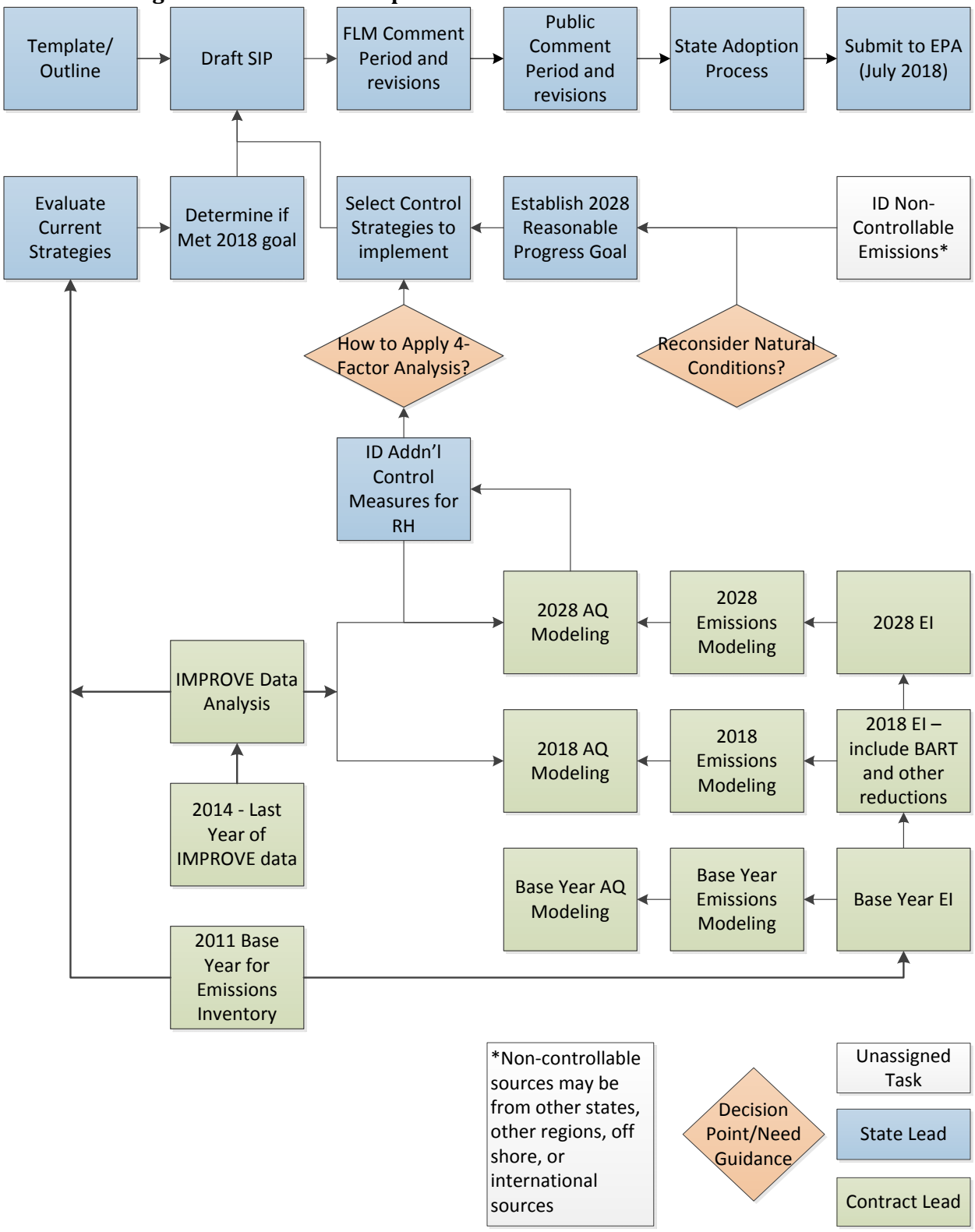


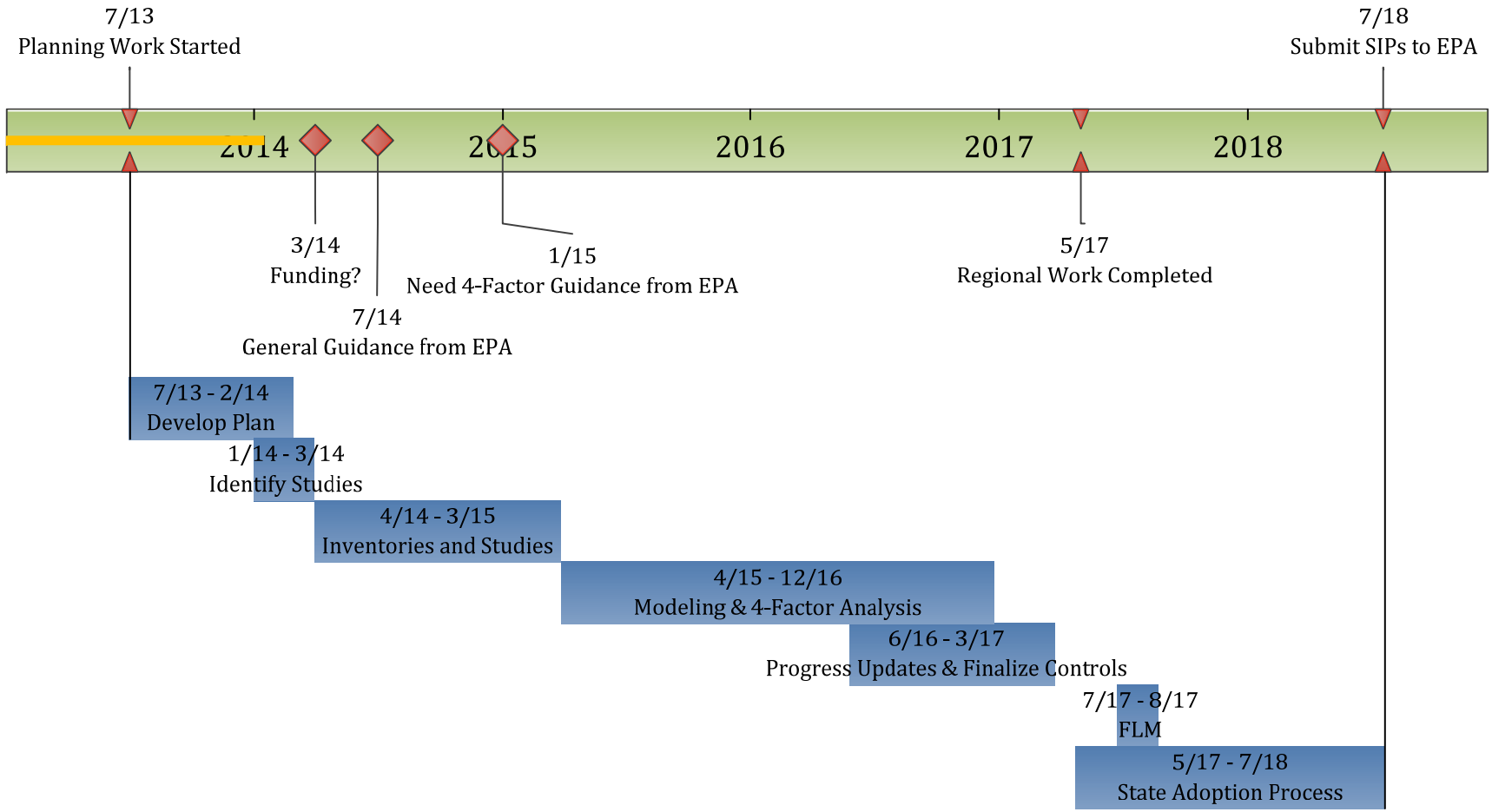
Exhibit 2 – Regional Analysis

Regional Activity	Timeframe	Comments
IMPROVE Monitoring Data Analysis*	2010-2012 by end of 2014 2013 by end of 2015 2014 by end of 2016	Analysis of 2005-09 complete
Emission inventory*	2011 base case by Spring, 2014 2018 projection by Fall, 2014 2028 scenarios by Fall, 2015	Collective western states' involvement critical to timely development of 2018 projection and 2028 planning cases
Meteorological modeling**	Work underway now, complete by Spring, 2014	Use 2011 data for 2018 and 2028
Emissions modeling**	Summer 2014 through late 2015	Lags emission inventory work by 3-4 months Cross-reference 2018 and 2028 "What If" control strategies
AQ modeling base case & source apportionment**	2011 base case, fully evaluated in 2014	Use existing WestJump AQMS 2008 base year source apportionment results to assist initial work on RH planning New 2011 base year source apportionment – work will start Spring 2014
Regional "What If" control strategies*	Work from Spring, 2014, continue as needed until late 2015	
Air Quality 2018 projection & 2028 scenarios modeling & source apportionment**	2018 projections: Late 2014 through Fall, 2015 2028 scenarios: Fall, 2016	Results from 2028 "What If" scenarios needed no later than Summer, 2016
Final state and regional control strategies**	Work from Summer, 2016 through end of 2016	All control strategies "on the books" or "on the way" starting from 2011 base case to be included in 2018 projections and 2028 planning cases for inclusion in July, 2018 RHR SIPs

* will need contractor support

** can be partially covered by 3-State Data Warehouse Regional Modeling Framework

Exhibit 3 – Regional Haze Timeline



The SIP adoption process varies from state to state. Colorado, with the requirement for their SIP to be approved by the state legislature, has the lengthiest process among the WESTAR States. In order to meet the July submission deadline, the Colorado SIP needs to be ready for adoption at the beginning of 2018. Add in time to consult with the FLMs and put the SIP out for public comment, the technical work must be completed by May 2017.

Template/Outline

For the first regional haze SIP, states worked together to develop a common template for their SIPs. For this second regional haze SIP, states anticipate using their initial SIPs as a general template. Where needed, states will work together to develop a common description of SIP elements.

IMPROVE Monitoring Data Analysis

Analyzing monitoring data is required to meet several sections of the regional haze rule:

- For all future implementation plan revisions, the number of deciviews by which current conditions, as calculated under paragraph (f)(1) of 40 CFR 51.308, exceed natural visibility conditions for the most impaired and least impaired days. (51.308(d)(2)(iv)(B))
- Address current visibility conditions for the most impaired and least impaired days, and actual progress made towards natural conditions during the previous implementation period. (51.308(f)(1))
- The effectiveness of the long-term strategy for achieving reasonable progress goals over the prior implementation period(s). (51.308(f)(2))

The monitoring data analysis required for the SIP revisions is similar to the analysis supporting the five-year progress reports; as such, states will use a similar approach for this requirement. As part of this effort, states will continue to rely upon the WRAP TSS to store and display the data.

The RHR specifies that, "The period for calculating current visibility conditions is the most recent five-year period preceding the required date of the implementation plan submittal for which data are available." In the April 2013 "General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans," EPA states that states should "consider a chart of the rolling average." In light of these two documents, states will provide the visibility conditions for the most recent five-year period, as well as rolling averages to better illuminate the overall visibility trends in recent years.

Because it takes 15-18 months before IMPROVE data is available, 2014 will be the last year of monitoring data evaluated for the SIPs, and the most recent five-year period will be 2010 through 2014. Data for 2014 will be available in mid-2016. Once the data is available, the contractor will prepare the analysis and provide a regional report on current visibility and recent trends to the states. The report is expected to be available to the states by the end of 2016, leaving a few months for states to incorporate the results into the SIP document.

Exhibit 4 is an excerpt from the full project timeline in Appendix B and highlights the timeline for completing the analysis of current visibility and recent trends.

Exhibit 4 – Timeline to Evaluate Current Visibility and Trends

Task	Days	Start	Finish
Last year of monitoring data collected	360	January 2014	December 2014
Data analyzed	540	January 2015	June 2016
Haze analysis by contractor	180	July 2016	December 2016
Determine if visibility goal met	90	January 2017	March 2017

Regional Modeling and Analysis

Regional modeling assists the states in addressing a number of requirements in the regional haze rule:

- Submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within the State and for each mandatory Class I Federal area located outside the State which may be affected by emissions from the State. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas. (51.308(d)(3))
- For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period. (51.308(d)(1))
- The State may not adopt a reasonable progress goal that represents less visibility improvement than is expected to result from implementation of other requirements of the CAA during the applicable planning period. (51.308(d)(1)(vi))
- Where other States cause or contribute to impairment in a mandatory Class I Federal area, the State must demonstrate that it has included in its implementation plan all measures necessary to obtain its share of the emission reductions needed to meet the progress goal for the area. If the State has participated in a regional planning process, the State must ensure it has included all measures needed to achieve its apportionment of emission reduction obligations agreed upon through that process. (51.308(d)(3)(ii))
- The anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy. (51.308(d)(3)(v)(G))
- Affirmation of, or revision to, the reasonable progress goal in accordance with the procedures set forth in paragraph (d)(1) of this section. If the State established a

reasonable progress goal for the prior period which provided a slower rate of progress than that needed to attain natural conditions by the year 2064, the State must evaluate and determine the reasonableness, based on the factors in paragraph (d)(1)(i)(A) of this section, of additional measures that could be adopted to achieve the degree of visibility improvement projected by the analysis contained in the first implementation plan described in paragraph (d)(1)(i)(B) of this section. (51.308(f)(3))

In addition, assessing, "actual progress made towards natural conditions during the previous implementation period" will depend on regional modeling. Monitoring data for the full previous planning period will not be available until after the 2018 SIPs are due. To assess visibility conditions in 2018, regional modeling will be required.

In order to complete these tasks, states must analyze the effects of current and future emissions to determine their effects on visibility at Class I areas. For most of the WESTAR States, this analysis will be done through regional modeling, with the exceptions of Alaska and Hawaii.

The regional modeling process includes several substantial tasks: emission inventory development, emissions modeling, meteorological modeling, and regional modeling. In addition, for states to evaluate the effects of potential strategies in 2028, multiple scenarios will need to be developed and modeled.

Emissions Inventories

Emissions inventories serve both as inputs to regional modeling and as assessment tools. Requirements relying on emission inventories include

- The State must identify all anthropogenic sources of visibility impairment considered by the State in developing its long-term strategy. The State should consider major and minor stationary sources, mobile sources, and area sources. (51.308(d)(3)(iv))
- A statewide inventory of emissions of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I Federal area. The inventory must include emissions for a baseline year, emissions for the most recent year for which data are available, and estimates of future projected emissions. The State must also include a commitment to update the inventory periodically. (51.308(d)(4)(v))
- The effectiveness of the long-term strategy for achieving reasonable progress goals over the prior implementation period(s). (51.308(f)(2))

Analysis for the initial regional haze SIPs was based on the 2002 emission inventory and projections. For the reasonable progress reports, the WESTAR States are using the 2008 inventory, leveraging work done for the WestJumpAQMS study. The 2018 SIPs will be based on the 2011 National Emissions Inventory (NEI), with projections to 2018 and 2028. Projections to 2018 will assist the states in evaluating progress made during the first

implementation period, as well as setting a starting point for the next implementation period. Projections out to 2028 will allow the States to define their goals for the period and evaluate potential packages of emission reduction strategies. To accomplish this work, at least four inventories will be needed:

- 2011 Baseline Inventory – NEI inventory with regional adjustments, as needed
- 2018 Projected Inventory – 2011 inventory projected and adjusted to reflect emission changes that are "on the books" to be installed by 2018, but were not implemented by 2011, e.g., BART controls that will be installed between 2011 and 2018
- 2028 Projected Inventory – 2011 inventory projected and adjusted to account for emission changes that are known to be coming, for example, mobile fleet changes, but are not reflected in the 2018 inventory
- 2028 Control Scenario – Modifications to the 2028 inventory to test the regional effects of potential control strategies and establish reasonable progress goals for 2028

The WESTAR States anticipate that having the emission inventories completed by the middle of 2015 will allow sufficient time to do the subsequent modeling. Although 2014 is a NEI year and will begin the preparation of another emission inventory, inventories for 2014 will not be available until long after the inputs are needed for modeling. For this reason, it is not feasible to use the 2014 NEI as the basis for the 2018 SIP.

Emission Inventory Projection Methods

Some emission categories have well-accepted projection methods; mobile sources and electric generation fall into this group. Some source categories are more challenging to project, including wildland fire and oil and gas development. The WESTAR States will work together to develop mutually acceptable projection methods for each emissions inventory category. The earlier the states can agree on projection methods for these sources, the simpler and quicker emissions can be developed for modeling.

For some source categories, an option is to use the same emissions for multiple years. This approach was used in the past for fire emissions. For other categories, such as oil and gas, states may need to develop their own projections based on expected activity in the individual state.

Additional Emission Inventory Studies

To prepare the first Regional Haze SIP, the WRAP led the development of a number of special studies, such as developing data sets or tools for gathering data (e.g., FETS) for the first time, which will not need to be repeated. Some of the studies were emission inventories for specific sectors, which may need additional scrutiny to adequately support the 2018 SIP development.

Topics potentially warranting additional study or inventory development or refinement for the 2018 SIP include

- Oil and gas sector
- Canada and Mexico
- Marine/offshore shipping
- Global (China, etc.)
- Dust
- Wildfire average
- Ammonia (agricultural)

Sector Methods

For this interstate planning effort, consistent and comparable emission inventories are important. Interstate coordination on emission inventory preparation and adjustments will improve the accuracy of these emission sectors. Consistency among state inventories will also ensure fair and reasonable apportionment for Class I areas affected by emissions from outside the state.

Some sectors will require additional refinements or considerations. For example, because wildland fire emissions vary greatly from year to year, and are not predictable, states will need to agree on an estimation method. Other refinements may be specific to individual states or a few states, such as emissions from the oil and gas industry in some states. Methods specific to individual sectors must be developed early on so that they can be consistently applied throughout the process.

Emission Inventory Method Changes

As emission inventory tools and methods improve over time, the states must reconcile differences in methods when comparing emissions from year to year to determine progress. For example, at the time of the first SIPs, MOBILE6.2 provided on-road emission estimates, but now MOVES has replaced the older tool.

Regional Modeling

Regional modeling supports assessing previous progress, estimating future visibility, selecting visibility improvement strategies, and developing reasonable progress goals:

- For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period. (51.308(d)(1))

- The State may not adopt a reasonable progress goal that represents less visibility improvement than is expected to result from implementation of other requirements of the CAA during the applicable planning period. (51.308(d)(1)(vi))
- Where other States cause or contribute to impairment in a mandatory Class I Federal area, the State must demonstrate that it has included in its implementation plan all measures necessary to obtain its share of the emission reductions needed to meet the progress goal for the area. If the State has participated in a regional planning process, the State must ensure it has included all measures needed to achieve its apportionment of emission reduction obligations agreed upon through that process. (51.308(d)(3)(ii))
- The anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy. (51.308(d)(3)(v)(G))
- Affirmation of, or revision to, the reasonable progress goal in accordance with the procedures set forth in paragraph (d)(1) of this section. If the State established a reasonable progress goal for the prior period which provided a slower rate of progress than that needed to attain natural conditions by the year 2064, the State must evaluate and determine the reasonableness, based on the factors in paragraph (d)(1)(i)(A) of this section, of additional measures that could be adopted to achieve the degree of visibility improvement projected by the analysis contained in the first implementation plan described in paragraph (d)(1)(i)(B) of this section. (51.308(f)(3))

Meteorological and Emissions Modeling

Meteorological and emission modeling will prepare the inputs for regional modeling. To complement the 2011 emissions inventory, 2011 meteorological data will be used for all the regional modeling analyses.

Alaska Analysis

For the first regional haze SIP, Alaska was not included in the regional modeling domain. Instead, back trajectory and weighted emission potential analysis (WEP) provided insight into the sources of haze affecting Alaska's Class I Areas. Similar analysis will be required for the 2018 regional haze SIPs. Alaska will need to complete other analysis the same as other states.

Additional Studies

To fill in data gaps for the original SIP, the WRAP contracted several additional emission studies specific to Alaska:

- Alaska Rural Emissions Inventory
- Alaska Aviation Emissions Inventory
- Alaska Marine Emissions Inventory

Alaska DEC has brought the Rural Inventory in-house and is currently working to update it. DEC staff are also working to compare the Alaska specific marine and aviation inventories with the NEI inventories to determine what additional analysis will be required for the 2018 SIP.

Hawaii Analysis

Like Alaska, Hawaii is not included in the Western state regional modeling domain. Nonetheless, Hawaii will need to complete the other required analysis.

Emission Reduction Strategies and Reasonable Progress Goals

The regional haze rule requires that

- In establishing a reasonable progress goal for any mandatory Class I Federal area within the State, the State must: (A) Consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources, and include a demonstration showing how these factors were taken into consideration in selecting the goal. (51.308(d)(1)(i))

These four considerations are commonly referred to as the "four-factor analysis." Several other paragraphs of the regional haze rule also rely on work stemming from the four-factor analysis:

- For the period of the implementation plan, if the State establishes a reasonable progress goal that provides for a slower rate of improvement in visibility than the rate that would be needed to attain natural conditions by 2064, the State must demonstrate, based on the factors in paragraph (d)(1)(i)(A) of this section, that the rate of progress for the implementation plan to attain natural conditions by 2064 is not reasonable; and that the progress goal adopted by the State is reasonable. The State must provide to the public for review as part of its implementation plan an assessment of the number of years it would take to attain natural conditions if visibility improvement continues at the rate of progress selected by the State as reasonable. (51.308(d)(1)(ii))
- The State must identify all anthropogenic sources of visibility impairment considered by the State in developing its long-term strategy. The State should consider major and minor stationary sources, mobile sources, and area sources. (51.308(d)(3)(iv))
- Affirmation of, or revision to, the reasonable progress goal in accordance with the procedures set forth in paragraph (d)(1) of this section. If the State established a reasonable progress goal for the prior period which provided a slower rate of progress than that needed to attain natural conditions by the year 2064, the State must evaluate and determine the reasonableness, based on the factors in paragraph

(d)(1)(i)(A) of this section, of additional measures that could be adopted to achieve the degree of visibility improvement projected by the analysis contained in the first implementation plan described in paragraph (d)(1)(i)(B) of this section. (51.308(f)(3))

Four-Factor Analysis

Four-factor analysis is complex and time consuming. For the first SIP, most western states focused their four-factor analysis on sources requiring analysis for best available retrofit technology (BART). For the 2018 SIP, the regional haze rule does not identify any set of sources to focus analysis on. This void means that states must first identify which sources or source categories warrant four-factor analysis and then complete the analysis.

In addition to not providing direction on which sources or source categories to focus the four-factor analysis on, EPA has not provided any guidance on how to compete the analysis on non-BART sources.

The western states plan to identify sources or source categories for potential four-factor analysis using simple screening methods, such as total emissions and Q/d (emissions quantity divided by distance to Class I area) comparisons. By setting thresholds for these screening analyses, the sources or source categories most likely to affect visibility at Class I areas can be identified and those not likely to affect visibility will not receive additional time-consuming analysis. The western states will also remove sources already controlled under either BART or other requirements from the pool of those possibly receiving additional scrutiny. Although they may be affecting visibility, if little can be done to further control the emissions, analyzing them is not and efficient use of resources.

Essential to any evaluation of controls is the ability to demonstrate how the identified sources or source categories are affecting Class I area visibility, in order to quantify or measure improvements in haze. However, there are major technical and resource issues that states will face in conducting such evaluations, and limited assistance expected from regional planning organizations in the future. Without a strong technical basis to show reasonably attributable visibility impairment, and without more clarity in the RHR on how to demonstrate "reasonable progress," it will difficult for states to make any progress in improving haze and implementing the RHR.

Potential Visibility Effects

One question often raised with four-factor analysis regards the potential effect of the proposed emission reductions on overall visibility: Will implementing the proposed controls improve visibility at the Class I areas the source affects? Or alternately considered, how much emission reduction is needed to make a visibility improvement?

The states expect to be challenged when requiring emission controls that have little noticeable effect on visibility; they must focus on controls that have demonstrable effects on visibility.

Reasonable Progress Authority

All states will need to ensure that that they have sufficient authority to implement strategies selected for inclusion in their regional haze SIP. During the development of the first haze SIPs, a number of states had to adopt additional rules that would allow them to implement the strategies required under BART. For this second SIP, if strategies are selected because they help the state meet reasonable progress, the state may need to adopt rules allowing them to use reasonable progress as criteria for implementing controls. Stated another way, does the state have the authority to require emission limits for reasonable progress?

Reasonable Progress Goal

Section 51.308 (d)(1) identifies the requirements for setting and evaluating reasonable progress goals. Regional modeling provides the information needed for these tasks.

> **(1)*Reasonable progress goals.*** For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.
>
> **(i)** In establishing a reasonable progress goal for any mandatory Class I Federal area within the State, the State must:
>
> **(A)** [4-Factor Analysis] Consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources, and include a demonstration showing how these factors were taken into consideration in selecting the goal.
>
> **(B)** [Rate of Progress for 2064] Analyze and determine the rate of progress needed to attain natural visibility conditions by the year 2064. To calculate this rate of progress, the State must compare baseline visibility conditions to natural visibility conditions in the mandatory Federal Class I area and determine the uniform rate of visibility improvement (measured in deciviews) that would need to be maintained during each implementation period in order to attain natural visibility conditions by 2064. In establishing the reasonable progress goal, the State must consider the uniform rate of improvement in visibility and the emission reduction measures needed to achieve it for the period covered by the implementation plan.
>
> **(ii)** For the period of the implementation plan, if the State establishes a reasonable progress goal that provides for a slower rate of improvement in visibility than the rate that would be needed to attain natural conditions by 2064, the State must demonstrate, based on the factors in paragraph (d)(1)(i)(A) of this section, that the rate of progress for the implementation plan to attain natural conditions by 2064 is not reasonable; and that the progress goal adopted by the State is reasonable. The

State must provide to the public for review as part of its implementation plan an assessment of the number of years it would take to attain natural conditions if visibility improvement continues at the rate of progress selected by the State as reasonable.

(iii) In determining whether the State's goal for visibility improvement provides for reasonable progress towards natural visibility conditions, the Administrator will evaluate the demonstrations developed by the State pursuant to paragraphs (d)(1)(i) and (d)(1)(ii) of this section.

(iv) In developing each reasonable progress goal, the State must consult with those States which may reasonably be anticipated to cause or contribute to visibility impairment in the mandatory Class I Federal area. In any situation in which the State cannot agree with another such State or group of States that a goal provides for reasonable progress, the State must describe in its submittal the actions taken to resolve the disagreement. In reviewing the State's implementation plan submittal, the Administrator will take this information into account in determining whether the State's goal for visibility improvement provides for reasonable progress towards natural visibility conditions.

(v) The reasonable progress goals established by the State are not directly enforceable but will be considered by the Administrator in evaluating the adequacy of the measures in the implementation plan to achieve the progress goal adopted by the State.

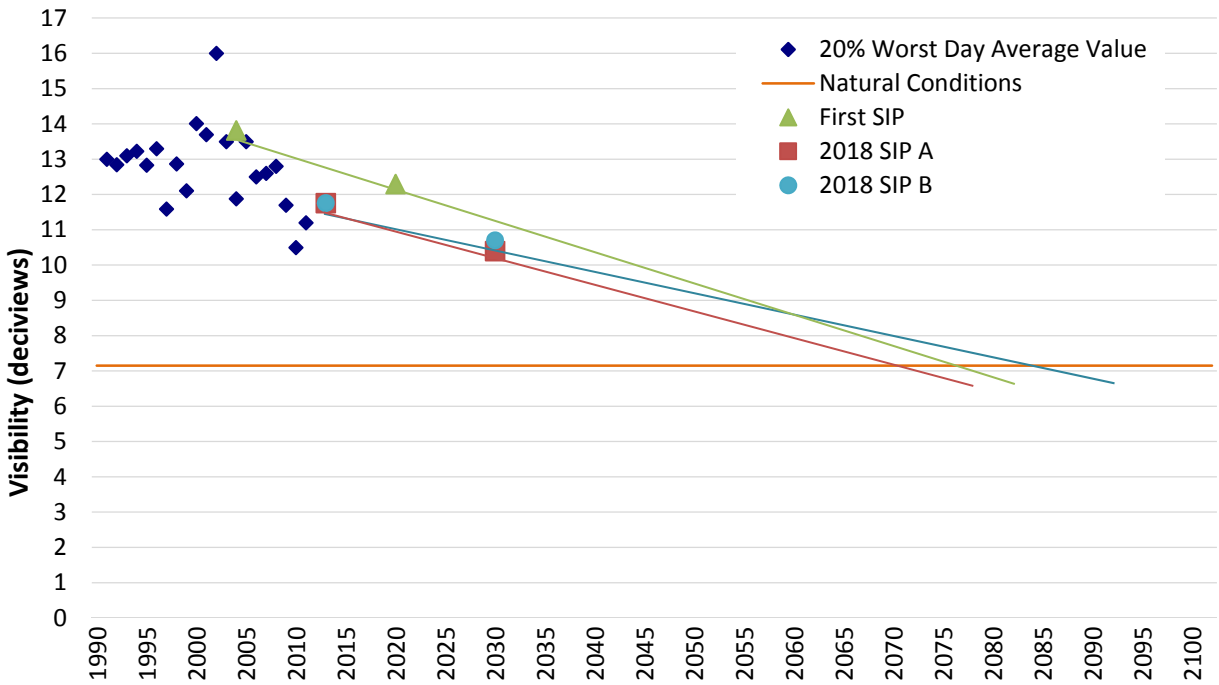
(vi) The State may not adopt a reasonable progress goal that represents less visibility improvement than is expected to result from implementation of other requirements of the CAA during the applicable planning period.

In order to project progress, the WESTAR States will calculate the planning period's reasonable progress goal and the end date for the regional haze process based on the results of the 2011, 2018, and 2028 modeling runs.

The 2018 SIP represents the second SIP and will have a new starting point, the average of 2009-2014, and a new 10-year reasonable progress goal. The line connecting these two points, will determine a new final year for meeting natural conditions. As illustrated in Exhibit 5, this new end-year could be early or later than the year identified in the first regional haze SIP.

Under the RHR, a State must demonstrate reasonable progress based on implementation of the emission reduction strategies in its SIP. However "uncontrollable" sources (both natural and some anthropogenic) can adversely impact the reasonable progress demonstration such as an abnormally high wildfire year affecting the 20% worst days. In such cases, the RHR should allow a State to make an "affirmative demonstration" that it is making reasonable progress – except for impairment caused by natural events or uncontrollable anthropogenic sources that are beyond the State's legal authority or jurisdiction.

Exhibit 5 – Establishing Planning Period Reasonable Progress Goals



Other Issues Affecting Direction of Regional Haze Work

In their recommendations to EPA, the western states identified specific areas for revising the RH rule or where additional guidance is needed. These are referred to as the five "core issues." Several of these issues apply to developing the 2018 SIPs.

The Five "Core Issues"

A workgroup of regional haze coordinators from WESTAR States developed specific recommendations to address five "core issues" associated with the RHR, focusing mostly on potential rule changes, and the need for further guidance. Representatives from the Regional Haze Workgroup presented these core issues to EPA in August 2013, at their headquarters in North Carolina. At this date, there is no formal response from EPA or indication if the issues will be addressed far enough in advance of 2018 to assist states in preparing the 2018 RH SIPs.

1. 5-Year Progress Reports

The focus of this core issue is to simplify the process and requirements for states in submitting 5-year progress reports, by eliminating the requirements for a SIP revision and a "determination of adequacy."

2. Achieving Natural Conditions and Reasonable Progress

This core issue addresses the primary goal of the regional haze rule – to achieve natural conditions – and the concerns states have about how achievable this goal is, the dilemma it poses for states in terms of "controllable vs. uncontrollable" sources and eliminating all anthropogenic contribution to haze by 2064.

3. Developing Effective Long-Term Strategies after BART to Achieve Reasonable Progress

This core issue focuses on "post-BART" implementation, and the concerns states have about the lack of clear and consistent criteria or guidelines in the regional haze rule for developing effective ongoing, long-term strategies to reduce regional haze and achieve Reasonable Progress by 2064.

4. Integrate Planning

This core issue deals with the need for a multi-pollutant focus and better integration of NAAQS into the regional haze SIP planning process, as NAAQS-related controls are a major source of emission reductions and provide significant visibility benefits, yet often are out of sync with regional haze SIPs.

5. Class I Area Visitation as a Consideration

This core issue focuses on whether visitation should play a role in developing regional haze strategies.

Core Issues critical to meet the 2018 SIP deadline.

Of the above core issues, numbers 2 and 3 are the most relevant to the work that states need to conduct in preparing their 2018 SIPs, while others are options for rule changes that are less essential for 2018. For example, under core issue 2, revisiting the goal of achieving natural conditions, or recalculating the 2064 estimate of natural conditions, are key elements of this core issue, but are not as essential as the need to focus on "controllable" sources. Equally important under core issue 3 is the need for clear and consistent criteria or guidance for developing long-term strategies that are "post-BART." This information would include the requirements for conducting the "four-factor analysis," which due to the lack of any guidance, makes it necessary for states to develop the criteria on their own.

Controllability of Emissions

The regional haze guidance assumes that a dominant set of anthropogenic sources are affecting visibility and can be reduced through control measures. There are areas in the west where this assumption may not hold true.

Two factors determine whether an emissions source is controllable: the location of the emission source and whether the emissions are naturally occurring or are anthropogenic. For emissions to be controllable by a state, they must originate from sources in the state and be caused by human activity. Exhibit 6 shows the four possible combinations of location and source type – only one is controllable.

Because of uncontrollable sources, the trend in visibility impairment does not necessarily track with the trend in the states' controllable emissions. Monitoring results indicate the overall pollution levels and visibility impairment. However, separating out the contributions of sources a state can control from the contribution of sources the states cannot control is challenging at best. The states may need to look at inventories and other information about sources to determine visibility trends from controllable sources.

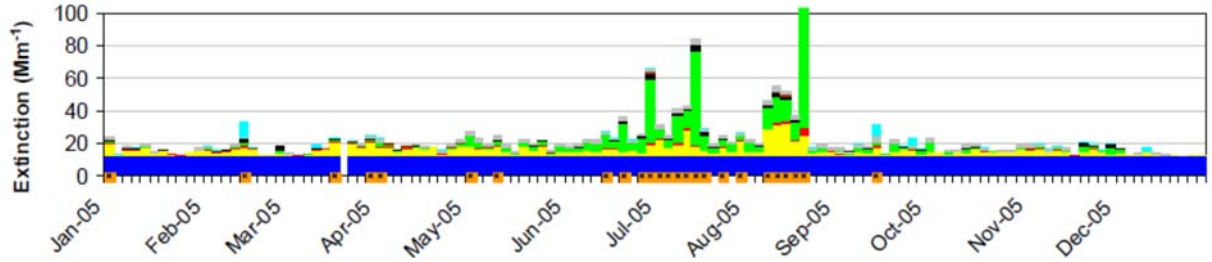
Exhibit 6 – Emissions Controllability

	Originate in US	**Originate outside US**
Anthropogenic	Controllable	Not controllable by states
Natural	Not controllable	Not controllable

Wildland fire emissions have the added challenge of varying greatly from year to year. However, states have mechanisms such as FETS, to track wildland fire emissions. Fire emissions at times dwarf the controllable emissions, particularly on worst days. Fire emissions are also difficult to forecast, such as for estimating reasonable progress goals for the future.

Trapper Creek, in 2005, demonstrates the potential magnitude of the effects from wildfire emissions. Organic mass carbon is strongly correlated with wildland fires. In Exhibit 7, extinction from organic mass carbon is identified in green. In 2005, the words days are heavily dominated by wildland fires in July and August.

Exhibit 7 – Extinction at Trapper Creek, Alaska



Anthropogenic emissions from other regions, including Asia, Canada, and Mexico are also likely affecting visibility in the western states. These emissions are more stable from year to year than fire emissions, but also hard to quantify.

When uncontrollable emissions overwhelm controllable emissions, they readily disguise trends in visibility impairment caused by sources the states can regulate. For planning efforts, the worst days are selected based on overall visibility impairment. By including uncontrollable emissions in the selection criteria, the states cannot be sure the emission reductions they are working toward will be the most effective at improving visibility. Given the overwhelming nature of wildland fire emissions, it is possible that, although the state

may go to great lengths to reduce controllable emissions, visibility may not improve substantially. The effects of international emissions are less clear.

The western states intend to focus their analytical and planning efforts on controllable emissions, i.e., anthropogenic emissions within state boundaries that have technically and economically feasible emission controls.

At this time, it is unclear how the changing climate may affect the states' ability to meet regional haze goals. Potentially, hotter drier summers could cause more and more severe wildfires. Likewise, extended dry periods could affect dust events. Without a clear understanding of how the climate may be changing, the western states will continue to use base year meteorology for regional modeling.

Resources for Regional Work

Completing the analysis work for the western region will require resources. The WRAP currently has several projects underway and will be able to leverage aspects of these projects to support regional haze. In addition, both as part of the WRAP work, and for regional haze specifically, state staff will support analysis efforts by providing data and reviewing work.

Additional work and resources needs will be outlined in the forthcoming WRAP work plan.

Appendix A – Regional Haze Rule

	Rule Text	Summary	Regional Work Needed
(d)What are the core requirements for the implementation plan for regional haze?			
51.308(d)	The State must address regional haze in each mandatory Class I Federal area located within the State and in each mandatory Class I Federal area located outside the State which may be affected by emissions from within the State. To meet the core requirements for regional haze for these areas, the State must submit an implementation plan containing the following plan elements and supporting documentation for all required analyses:	States will submit SIPs.	–
51.308(d)(1)	***Reasonable progress goals.*** For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.	State will establish new RP goals based on current monitoring data, emissions estimates, control strategies, and other information.	Regional modeling
51.308(d)(1)(i)	In establishing a reasonable progress goal for any mandatory Class I Federal area within the State, the State must: (A) Consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources, and include a demonstration showing how these factors were taken into consideration in selecting the goal.	Use 4-factor analysis to determine reduction measures.	Four- factor analysis
51.308(d)(1)(i)(B)	Analyze and determine the rate of progress needed to attain natural visibility conditions by the year 2064. To calculate this rate of progress, the State must compare baseline visibility conditions to natural visibility conditions in the mandatory Federal Class I area and determine the uniform rate of visibility improvement (measured in deciviews) that would need to be maintained during each implementation period in order to attain natural visibility conditions by 2064. In establishing the reasonable progress goal, the State must consider the uniform rate of improvement in visibility and the emission reduction measures needed to achieve it for the period covered by the implementation plan.	Depending on the expected emission reductions, states may revise the date natural conditions are expected to be achieved.	Regional modeling, rate of progress determination.
51.308(d)(1)(ii)	For the period of the implementation plan, if the State establishes a reasonable progress goal that provides for a slower rate of improvement in visibility than the rate that would be needed to attain natural conditions by 2064, the State must demonstrate, based on the factors in paragraph (d)(1)(i)(A) of this section, that the rate of progress for the	States will revise RP goal based on emission reductions available for this implementation period. If the expected date to achieve	Four-factor analysis

	Rule Text	Summary	Regional Work Needed
	implementation plan to attain natural conditions by 2064 is not reasonable; and that the progress goal adopted by the State is reasonable. The State must provide to the public for review as part of its implementation plan an assessment of the number of years it would take to attain natural conditions if visibility improvement continues at the rate of progress selected by the State as reasonable.	natural conditions is later than 2064, states must demonstrate unreasonableness of meeting natural conditions in 2064.	
51.308(d)(1)(iii)	In determining whether the State's goal for visibility improvement provides for reasonable progress towards natural visibility conditions, the Administrator will evaluate the demonstrations developed by the State pursuant to paragraphs (d)(1)(i) and (d)(1)(ii) of this section.	No state action.	No state action.
51.308(d)(iv)	In developing each reasonable progress goal, the State must consult with those States which may reasonably be anticipated to cause or contribute to visibility impairment in the mandatory Class I Federal area. In any situation in which the State cannot agree with another such State or group of States that a goal provides for reasonable progress, the State must describe in its submittal the actions taken to resolve the disagreement. In reviewing the State's implementation plan submittal, the Administrator will take this information into account in determining whether the State's goal for visibility improvement provides for reasonable progress towards natural visibility conditions.	Must consult.	State consultation process.
51.308(d)(1)(v)	The reasonable progress goals established by the State are not directly enforceable but will be considered by the Administrator in evaluating the adequacy of the measures in the implementation plan to achieve the progress goal adopted by the State.	Reasonable progress goals are not enforceable.	No state action.
51.308(d)(1)(vi)	The State may not adopt a reasonable progress goal that represents less visibility improvement than is expected to result from implementation of other requirements of the CAA during the applicable planning period.	Reasonable progress goal must be at least as much as is expected from other CAA requirements.	Regional analysis of 'on the books' emission reductions from other CAA requirements to determine 'base case' visibility.

	Rule Text	Summary	Regional Work Needed
51.308(d)(2)	***Calculations of baseline and natural visibility conditions.*** For each mandatory Class I Federal area located within the State, the State must determine the following visibility conditions (expressed in deciviews): (i) Baseline visibility conditions for the most impaired and least impaired days. The period for establishing baseline visibility conditions is 2000 to 2004. Baseline visibility conditions must be calculated, using available monitoring data, by establishing the average degree of visibility impairment for the most and least impaired days for each calendar year from 2000 to 2004. The baseline visibility conditions are the average of these annual values. For mandatory Class I Federal areas without onsite monitoring data for 2000-2004, the State must establish baseline values using the most representative available monitoring data for 2000-2004, in consultation with the Administrator or his or her designee;	Completed as part of the initial SIP. Same values will be used unless the visibility formula is modified.	No state action at this time.
51.308(d)(2)(ii)	For an implementation plan that is submitted by 2003, the period for establishing baseline visibility conditions for the period of the first long-term strategy is the most recent 5-year period for which visibility monitoring data are available for the mandatory Class I Federal areas addressed by the plan. For mandatory Class I Federal areas without onsite monitoring data, the State must establish baseline values using the most representative available monitoring data, in consultation with the Administrator or his or her designee;	Not applicable beyond initial SIP.	No state action.
51.308(d)(2)(iii)	Natural visibility conditions for the most impaired and least impaired days. Natural visibility conditions must be calculated by estimating the degree of visibility impairment existing under natural conditions for the most impaired and least impaired days, based on available monitoring information and appropriate data analysis techniques; and	Completed as part of the first haze SIP. Same values will be used unless the natural conditions calculations are revised.	No state action at this time.
51.308(d)(2)(iv)(A)	For the first implementation plan addressing the requirements of paragraphs (d) and (e) of this section, the number of deciviews by which baseline conditions exceed natural visibility conditions for the most impaired and least impaired days; or	Not applicable beyond initial SIP.	No state action.
51.308(d)(2)(iv)(B)	For all future implementation plan revisions, the number of deciviews by which current conditions, as calculated under paragraph (f)(1) of this section, exceed natural visibility conditions for the most impaired and least impaired days.	Calculate difference between current conditions and natural conditions.	IMPROVE monitoring data analysis
51.308(d)(3)	***Long-term strategy for regional haze.*** Each State listed in §51.300(b)(3) must submit a long-term strategy that addresses regional haze visibility impairment for each mandatory Class I Federal area within the State and for each mandatory Class I Federal area located outside the State which may be affected by emissions from the State. The long-term	States must submit a long-term strategy.	–

	Rule Text	Summary	Regional Work Needed
	strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas. In establishing its long-term strategy for regional haze, the State must meet the following requirements:		
51.308(d)(3)(i)	Where the State has emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area located in another State or States, the State must consult with the other State(s) in order to develop coordinated emission management strategies. The State must consult with any other State having emissions that are reasonably anticipated to contribute to visibility impairment in any mandatory Class I Federal area within the State.	States must consult.	State consultation process
51.308(d)(3)(ii)	Where other States cause or contribute to impairment in a mandatory Class I Federal area, the State must demonstrate that it has included in its implementation plan all measures necessary to obtain its share of the emission reductions needed to meet the progress goal for the area. If the State has participated in a regional planning process, the State must ensure it has included all measures needed to achieve its apportionment of emission reduction obligations agreed upon through that process.	States must demonstrate its plan includes all measures necessary to obtain emission reduction goals for the areas it affects.	Regional analysis and source apportionment
51.308(d)(3)(iii)	The State must document the technical basis, including modeling, monitoring and emissions information, on which the State is relying to determine its apportionment of emission reduction obligations necessary for achieving reasonable progress in each mandatory Class I Federal area it affects. The State may meet this requirement by relying on technical analyses developed by the regional planning organization and approved by all State participants. The State must identify the baseline emissions inventory on which its strategies are based. The baseline emissions inventory year is presumed to be the most recent year of the consolidate periodic emissions inventory.	States must document technical analysis. The 2011 emissions inventory will be the baseline for this implementation period.	Regional analysis documentation
51.308(d)(3)(iv)	The State must identify all anthropogenic sources of visibility impairment considered by the State in developing its long-term strategy. The State should consider major and minor stationary sources, mobile sources, and area sources.	Focus on controllable anthropogenic sources.	Emission inventories, four-factor analysis
51.308(d)(3)(v)	The State must consider, at a minimum, the following factors in developing its long-term strategy: (A) Emission reductions due to ongoing air pollution control programs, including measures to address reasonably attributable visibility impairment;	–	–
51.308(d)(3)(v)(B)	Measures to mitigate the impacts of construction activities;	–	–

	Rule Text	Summary	Regional Work Needed
51.308(d)(3)(v)(C)	Emissions limitations and schedules for compliance to achieve the reasonable progress goal;	–	–
51.308(d)(3)(v)(D)	Source retirement and replacement schedules;	–	–
51.308(d)(3)(v)(E)	Smoke management techniques for agricultural and forestry management purposes including plans as currently exist within the State for these purposes;	–	–
51.308(d)(3)(v)(F)	Enforceability of emissions limitations and control measures; and	–	–
51.308(d)(3)(v)(G)	The anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the long-term strategy.	–	Regional modeling
51.308(d)(4)	***Monitoring strategy and other implementation plan requirements.*** The State must submit with the implementation plan a monitoring strategy for measuring, characterizing, and reporting of regional haze visibility impairment that is representative of all mandatory Class I Federal areas within the State.	States must submit a monitoring plan.	
51.308(d)(4)	This monitoring strategy must be coordinated with the monitoring strategy required in § 51.305 for reasonably attributable visibility impairment.	–	–
51.308(d)(4)	Compliance with this requirement may be met through participation in the Interagency Monitoring of Protected Visual Environments network.	–	–
51.308(d)(4)	The implementation plan must also provide for the following: (i) The establishment of any additional monitoring sites or equipment needed to assess whether reasonable progress goals to address regional haze for all mandatory Class I Federal areas within the State are being achieved.	Monitoring considerations may need to include provisions for reduced IMPROVE budget.	–
51.308(d)(4)(ii)	Procedures by which monitoring data and other information are used in determining the contribution of emissions from within the State to regional haze visibility impairment at mandatory Class I Federal areas both within and outside the State.	States must describe how monitoring data and other information are used to determine contributions to impairment at Class I sites.	Document source apportionment and regional modeling.
51.308(d)(4)(iii)	For a State with no mandatory Class I Federal areas, procedures by which monitoring data and other information are used in determining the contribution of emissions from within the State to regional haze visibility impairment at mandatory Class I Federal areas in other States.	Not applicable to western states.	Not applicable to western states.

	Rule Text	Summary	Regional Work Needed
51.308(d)(4)(iv)	The implementation plan must provide for the reporting of all visibility monitoring data to the Administrator at least annually for each mandatory Class I Federal area in the State. To the extent possible, the State should report visibility monitoring data electronically.	Done through IMPROVE network?	–
51.308(d)(4)(v)	A statewide inventory of emissions of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I Federal area. The inventory must include emissions for a baseline year, emissions for the most recent year for which data are available, and estimates of future projected emissions. The State must also include a commitment to update the inventory periodically.	Baseline inventory was completed as part of initial SIP. The 2011 EI will be used as the foundation for the analysis for this SIP revision, with projections to 2018 and 2028.	Emission inventories.
(f) Requirements for comprehensive periodic revisions of implementation plans for regional haze			
51.308(f)	Each State identified in § 51.300(b)(3) must revise and submit its regional haze implementation plan revision to EPA by July 31, 2018 and every ten years thereafter. In each plan revision, the State must evaluate and reassess all of the elements required in paragraph (d) of this section, taking into account improvements in monitoring data collection and analysis techniques, control technologies, and other relevant factors. In evaluating and reassessing these elements, the State must address the following:	States will submit revised SIPs by July 31, 2018.	–
51.308(f)(1)	Current visibility conditions for the most impaired and least impaired days, and actual progress made towards natural conditions during the previous implementation period. The period for calculating current visibility conditions is the most recent five year period preceding the required date of the implementation plan submittal for which data are available. Current visibility conditions must be calculated based on the annual average level of visibility impairment for the most and least impaired days for each of these five years. Current visibility conditions are the average of these annual values.	Analysis similar to what was done for the progress reports. Monitoring data for visibility calculations is expected to be available through 2014.	IMPROVE monitoring data analysis.
51.308(f)(2)	The effectiveness of the long-term strategy for achieving reasonable progress goals over the prior implementation period(s); and	The effectiveness of the long-term strategy over the prior period will be addressed through the analysis of the monitoring data, emissions data, and other relevant information.	IMPROVE monitoring data analysis and emission inventories for comparison.

	Rule Text	Summary	Regional Work Needed
51.308(f)(3)	Affirmation of, or revision to, the reasonable progress goal in accordance with the procedures set forth in paragraph (d)(1) of this section. If the State established a reasonable progress goal for the prior period which provided a slower rate of progress than that needed to attain natural conditions by the year 2064, the State must evaluate and determine the reasonableness, based on the factors in paragraph (d)(1)(i)(A) of this section, of additional measures that could be adopted to achieve the degree of visibility improvement projected by the analysis contained in the first implementation plan described in paragraph (d)(1)(i)(B) of this section.	See paragraph (d) section above.	Regional modeling and four-factor analysis
(i) What are the requirements for State and Federal Land Manager coordination?			
51.308(i)(1)	By November 29, 1999, the State must identify in writing to the Federal Land Managers the title of the official to which the Federal Land Manager of any mandatory Class I Federal area can submit any recommendations on the implementation of this subpart including, but not limited to: (i) Identification of impairment of visibility in any mandatory Class I Federal area(s); and (ii) Identification of elements for inclusion in the visibility monitoring strategy required by § 51.305 and this section.	Not applicable.	No state action required.
51.308(i)(2)	The State must provide the Federal Land Manager with an opportunity for consultation, in person and at least 60 days prior to holding any public hearing on an implementation plan (or plan revision) for regional haze required by this subpart. This consultation must include the opportunity for the affected Federal Land Managers to discuss their:	FLM consultation	FLM coordination with regional analysis.
51.308(i)(2)(i)	Assessment of impairment of visibility in any mandatory Class I Federal area; and	–	–
51.308(i)(2)(ii)	Recommendations on the development of the reasonable progress goal and on the development and implementation of strategies to address visibility impairment.	–	–
51.308(i)(3)	In developing any implementation plan (or plan revision), the State must include a description of how it addressed any comments provided by the Federal Land Managers.	–	–
51.308(i)(4)	The plan (or plan revision) must provide procedures for continuing consultation between the State and Federal Land Manager on the implementation of the visibility protection program required by this subpart, including development and review of implementation plan revisions and 5-year progress reports, and on the implementation of other programs having the potential to contribute to impairment of visibility in mandatory Class I Federal areas.	–	–

Appendix B – Detailed Timeline

2011 Base Case				2013	2014	2015	2016	2017	2018
Task	**Days**	**Start**	**Finish**	J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J
Template/Outline	360	12/13	12/14						
Analysis	1354	7/13	3/17						
Meteorological Modeling - 2011	270	1/14	9/14						
Identify sectors for additional studies	89	1/14	3/14						
Additional sector studies	360	3/14	3/15						
Emissions Inventory - 2011	360	7/13	6/15						
Emissions Modeling - 2011	270	3/15	12/15						
AQ Modeling - 2011	360	9/15	9/16						
ID existing controls implemented by 2018	180	1/14	6/14						
Emissions Inventory - 2018	270	1/14	6/15						
Emissions Modeling - 2018	270	3/15	12/15						
AQ Modeling - 2018	450	9/15	12/16						
ID existing controls implemented by 2028	360	1/14	12/14						
Identify "What If" Control Strategies - 2028	450	1/14	3/15						
Emissions Inventory - 2028	270	1/14	6/15						
Emissions Modeling - 2028	360	3/15	3/16						
AQ Modeling - 2028	450	9/15	12/16						
Identify how to do 4-Factor Analysis	360	1/14	12/14						
4 Factor Analysis	720	12/14	12/16						
Finalize State and Regional Control Strategies	270	6/16	3/17						
Establish 2028 Reasonable Progress Goals	1200	1/14	4/17						
Decide if going to reconsider natural conditions	89	1/14	3/14						
Reconsider natural conditions	450	3/14	6/15						
Identify emission reductions to 2028	180	9/16	3/17						
Evaluate glideslope & set 2028 goal	120	12/16	4/17						
Evaluate Previous Period's Progress	1170	1/14	3/17						
Last year of monitoring data collected	360	1/14	12/14						
Data analyzed	540	12/14	6/16						
Haze analysis	180	6/16	12/16						
Determine if 2018 goal met	90	12/16	3/17						
State Adoption Process (calculates backwards)	450	5/17	7/18						
Draft SIP	60	5/17	7/17						
FLM comment period	60	7/17	9/17						
Revised based on comments, respond to comments	60	9/17	11/17						
Public comment period	30	11/17	12/17						
Revise based on comments, respond to comments	30	12/17	1/18						
State approval process (CO needs to start 1/1/18)	210	1/18	7/18						
Submit to EPA	1	7/18	7/18						

Regulatory required time periods
Flexible dates