Chapter Six – Reasonable Progress for the Jarbidge Wilderness Area

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6.1 INTRODUCTION

The Regional Haze Rule (RHR) requires states to establish reasonable progress goals for each Class I area within the state (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions by 2064. 40 CFR 51.308(d)(1) USEPA also released guidance, *Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program,* on June 7, 2007 for setting reasonable progress goals. The reasonable progress goals must provide for improvement in visibility for the most-impaired (20 percent worst) days over the period of the SIP and ensure no degradation in visibility for the least-impaired (20 percent best) days over the same time. The planning period for the initial regional haze SIP is 2004 through 2018, with an interim review due five years after submittal of the initial implementation plan.

Chapter Two identifies the uniform rate of progress (URP) for Nevada's only Class I area, the Jarbidge Wilderness Area (Jarbidge WA). Nevada compared baseline visibility conditions to natural visibility conditions to determine the uniform rate of visibility improvement (in deciviews) that would need to be maintained during each implementation period in order to attain natural visibility conditions by 2064, as shown on Table 2-1 and Figure 2-5.

Visibility modeling was used to determine the expected 2018 visibility improvements for the Jarbidge WA resulting from existing federal and state regulations, including presumptive sulfur dioxide (SO_2) Best Available Retrofit Technology (BART) limits for coal-fired electric generating units (EGU) with capacity greater than 750 MW. Visibility modeling indicates that implementation of existing rules coupled with installation of BART controls, as captured by the projected PRP18a emissions inventory, provides for an improvement in visibility better than the URP for the Jarbidge WA on the most-impaired days over the period of the SIP and identifies no degradation in visibility for the least-impaired days over the same period.

The modeled 2018 extinction of 11.05 dv represents Nevada's reasonable progress goal (RPG). Nevada's long-term strategy to achieve this RPG is detailed in Chapter Seven. Given the significant emissions reductions anticipated from Nevada's BART requirements and the implementation of other Clean Air Act (CAA) programs during this planning period, implementation of these programs represents reasonable progress in Nevada for the initial regional haze planning period. The resulting modeled visibility improvement is identified as Nevada's 2018 RPG.

The BART analyses conducted by Nevada were based, in part, on an assessment of many of the same factors addressed in establishing the RPG. The control requirements imposed by Nevada's BART determinations also satisfy the RPG-related requirements for source review in the first planning period. Therefore, Nevada will not require additional emissions controls beyond BART for these sources during the first planning period.

Nevada concludes, based on its assessment of the state's significant emissions reductions in this first planning period, that it achieves reasonable progress toward the national visibility goal for this planning period. Furthermore, Nevada deems it is unreasonable at this time to request additional emission controls on Nevada sources beyond those discussed below due to the

negative "…implication of compliance costs to the health and vitality of industries within …" Nevada (USEPA June 2007, p.5-1). It is reasonable for Nevada to defer additional reductions to later planning periods in order to maintain a consistent glidepath toward the long-term goal. Our assessment is consistent with guidance provided in sections 1.2, 4.1, and 5.0 of USEPA's *Guidance for Setting Reasonable Progress Goals under the Regional Haze Program.*

6.2 STEPS FOR DEVELOPING REASONABLE PROGRESS GOALS

The steps in USEPA's guidance for developing a RPG are listed below.

1. Establish Baseline and Natural Visibility Conditions.
2. Determine the Glidepath (or Uniform Rate of Progress).
3. Identify and Analyze the Measures Aimed at Achieving the Uniform Rate of Progress:
   a. Identify the key pollutants and sources and/or source categories that are contributing to visibility impairment at each Class I area.
   b. Identify the control measures and associated emission reductions that are expected to result from compliance with existing rules and other available measures for the sources and source categories that contribute significantly to visibility impairment.
   c. Determine what additional control measures would be reasonable based on the statutory factors and other relevant factors for sources and/or source categories you have identified.
   d. Estimate the improvement in visibility that would result from implementation of the control measures you have found to be reasonable and compare this to the uniform rate of progress.
4. Establish a RPG.

The following sections describe how Nevada's regional haze SIP addresses each of the steps listed above and documents the technical basis of each component of the RPG. The discussion of Step3c, listed above, is deferred to Chapter Seven, which details Nevada's long-term strategy.

6.3 ESTABLISHING BASELINE AND NATURAL VISIBILITY CONDITIONS

Chapter Two, sections 2.2 and 2.3, of this SIP discusses the methodologies employed to identify the baseline and natural visibility conditions for the Jarbidge WA. These data were used to determine the rate of progress needed to attain natural visibility conditions by the year 2064.

6.4 DETERMINING THE UNIFORM RATE OF PROGRESS

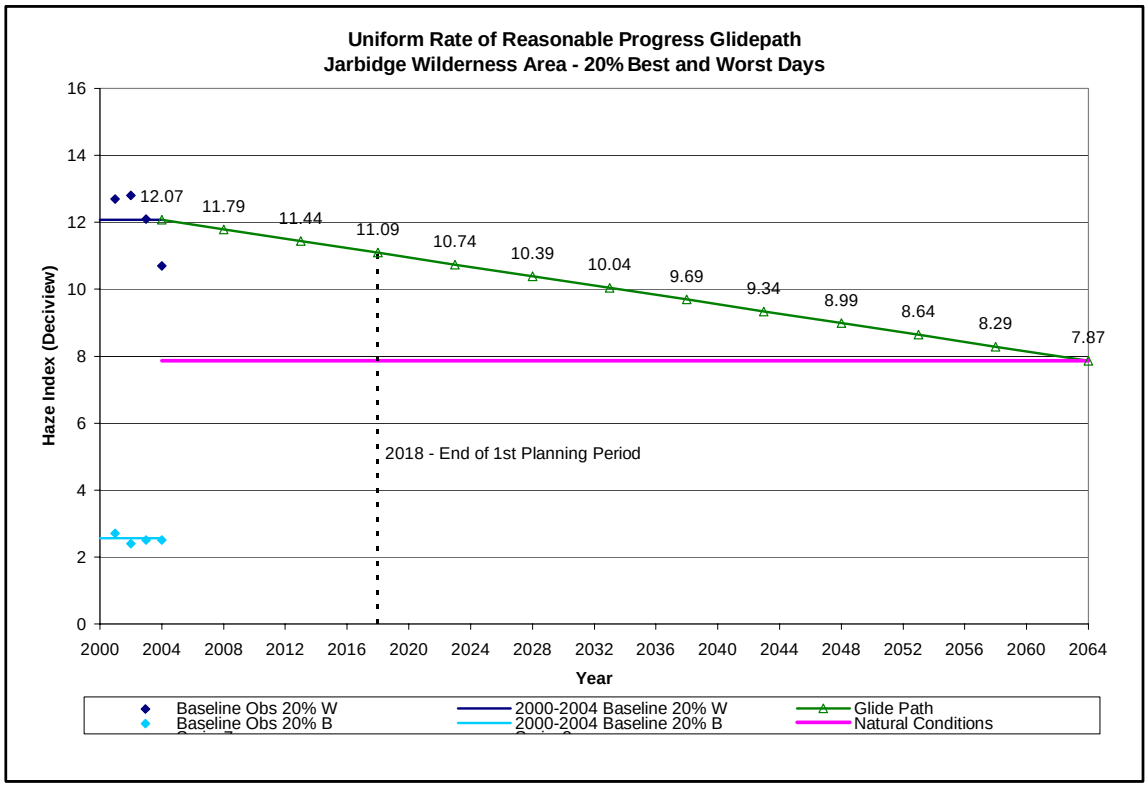
Chapter Two, section 2.4, of this SIP identifies the URP needed to attain natural visibility conditions for the Jarbidge WA. Nevada compared the baseline visibility conditions to natural visibility conditions to identify the uniform rate of visibility improvement that would need to be maintained during each implementation period in order to attain natural visibility conditions by 2064.

The URP or glidepath is shown on Figure 6-1, reproduced from Chapter Two. The baseline conditions for the 20 percent worst days are shown by the upper short line on Figure 6-1, while

natural visibility conditions for the worst days are shown by the long horizontal line. The baseline visibility conditions for the 20 percent best days are shown by the short lower line. The diamonds represent the annual average visibility conditions for each of the baseline years for the worst and best days. The URP or glidepath is shown by the sloping line interrupted by open triangles identifying the URP in five-year increments. The 2018 URP for the Jarbidge WA is 11.09 deciviews.

FIGURE 6-1

UNIFORM RATE OF PROGRESS GLIDEPATH



6.5 IDENTIFYING THE MEASURES TO ACHIEVE THE UNIFORM RATE OF PROGRESS

40 CFR 51.308(d)(1)(i)(B) requires states to consider the uniform rate of progress and the emission reductions needed to achieve it for the period covered by the plan. The next step in setting the RPG is identifying and analyzing the measures aimed at achieving the URP, including: identifying the key visibility-impairing pollutants and their sources; identifying the existing control measures and the associated reductions; identifying reasonable additional control measures; and estimating the resulting visibility improvement, as discussed in the following sections.

6.5.1 Key Pollutants and Sources of Impairment

The analyses of the Interagency Monitoring of Protected Visual Environments (IMPROVE) monitor data, as presented in Chapter Two, section 2.5, identify organic matter carbon (OMC) and coarse matter (CM) as the two most significant components of annual average visibility impairment at the Jarbidge Wilderness Area for the worst days of the baseline period. *For the worst days, OMC and CM account for more than sixty percent of the average annual reconstructed extinction at JARB1*. For these days, SO_4 and NO_3 account for less than a quarter of the extinction, as shown on Table 6-1, modified from Table 2-2.

TABLE 6-1

MONITORED CONTRIBUTIONS TO AVERAGE ANNUAL
RECONSTRUCTED EXTINCTION FOR BASELINE PERIOD

	OMC Extinction	CM Extinction	SO_4 Extinction	Soil Extinction	EC Extinction	NO_3 Extinction	Sea Salt Extinction
20% Worst Days							
Average	**40.0%**	**22.3%**	**16.7%**	**9.7%**	**6.5%**	**4.5%**	**0.3%**
20% Best Days							
Average	**26.3%**	**9.2%**	**40.9%**	**2.8%**	**9.4%**	**9.8%**	**1.6%**

Compilation and analyses of baseline (2002) and 2018 emissions inventories, presented in Chapter Three, demonstrate that nearly three quarters of Nevada's total emissions originate from natural (i.e., non-anthropogenic) sources, see Table 3-2. Sulfur oxides (SO_x), nitrogen oxides (NO_x), and ammonia (NH_3) are the only pollutants whose 2018 emissions are dominated by anthropogenic sources, although both particulate matter fine (PMF) and particulate matter coarse (PMC) 2018 emissions are sub-equally divided between natural and anthropogenic sources. Note that the existing 2018 emission inventories do not include reductions resulting from the installation of BART, except for SO_x presumptive limits for subject-to-BART EGU's with capacity greater than 750 MW.

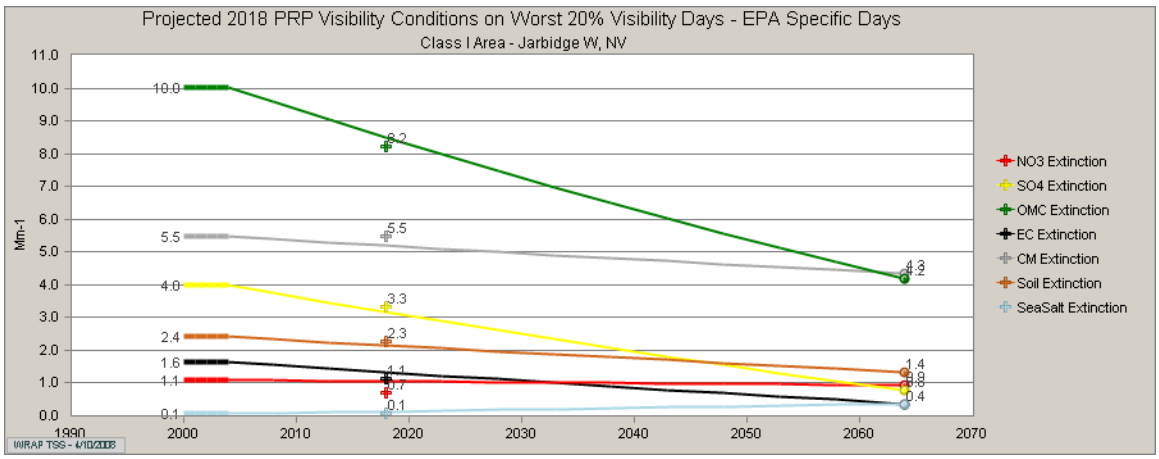
Analyses of the *projected 2018* emissions data have led to the following conclusions.

- The majority of the emissions that form the monitored species OMC, volatile organic compounds (VOC) and primary organic aerosol (POA) emissions, are from biogenic (88 percent) and natural fire (91 percent) sources, respectively.
- Emissions of PMC are predominantly from windblown dust (50 percent) and fugitive dust (36 percent) sources.
- Point sources account for the majority (61 percent) of emissions of SO_x, a component of monitored species SO_4.
- Emissions of PMF are predominantly windblown dust (43 percent) and fugitive dust (30 percent) sources.
- Emissions of elemental carbon (EC) are dominated by natural fire (83 percent).
- Point sources account for the majority (50 percent) of NO_x emissions, a component of monitored species NO_3; although mobile sources are also a significant (27 percent) contributor.

Visibility modeling projections, shown in Figure 6-2, indicate the relative contribution to 2018 visibility impairment at the Jarbidge WA for each visibility impairing species in units of inverse megameters (Mm^{-1}). This graph shows an extinction reduction for each species by the end of the first planning period, except Sea Salt and CM. CM emissions were held constant from the baseline to 2018 and Sea Salt is not an importance component of extinction at JARB1. As noted above, VOC and POA, and CM emissions leading to OMC (shown by the green line on Figure 6-2) and CM (shown by gray line) extinction respectively, are dominated by natural sources.

FIGURE 6-2

CMAQ MODEL PROJECTED EXTINCTION
BY SPECIES FOR JARB1 2018 WORST DAYS



The SO_4 and NO_3 source apportionment modeling identifies the relative concentration due to SO_x and NO_x emissions by source area and source category, as shown in Figures 6-3 and 6-4, respectively. Figure 6-3 shows the dominating effect of uncontrollable emissions from outside the modeling domain (right side of the x axis) on SO_4 concentrations at the Jarbidge WA. Outside Domain contributions are four times greater than any other source category. SO_x emissions from the Pacific Offshore source category (PO on x axis of graph) are also a significant contributor to SO_4 concentrations at JARB1. Emissions from three other states, Idaho, Oregon, and Washington, have larger contributions to the SO_4 concentration than does Nevada for both 2002 and 2018.

Figure 6-4 shows the largest contributor to NO_3 concentrations at the Jarbidge WA is NO_x emissions from Idaho, closely followed by the uncontrollable emissions from outside the modeling domain. Idaho's NO_x contribution to baseline NO_3 formation is largely due to mobile and area sources, with a large increase in the importance of area source emissions for 2018. Emissions from Utah have a larger contribution to NO_3 concentration than does Nevada for 2002, but slightly less than Nevada for 2018 due to mobile source emissions reductions. Note the significant reduction in 2018 concentrations due to reductions in mobile source emissions from all states.

FIGURE 6-3

SULFATE PSAT SOURCE REGION BAR
CHART FOR WORST DAYS 2002 AND 2018

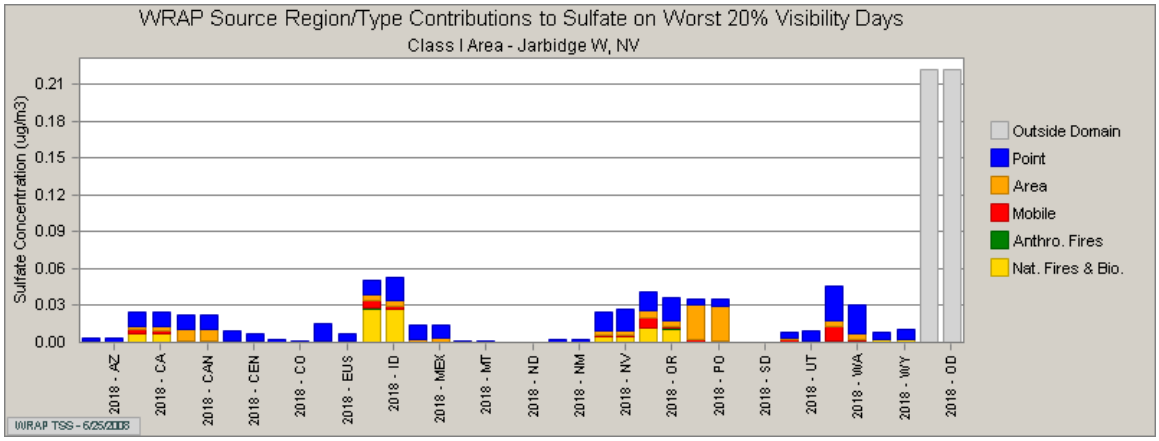
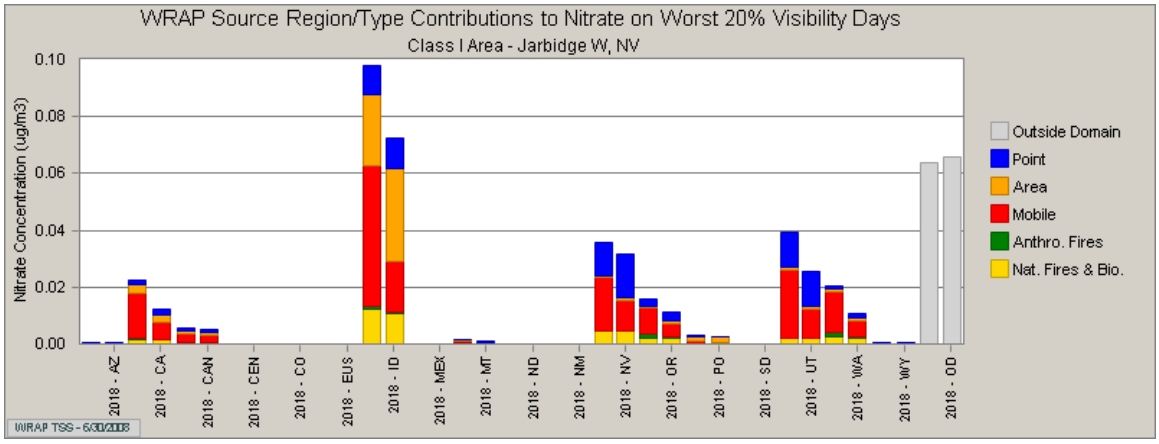


FIGURE 6-4

NITRATE PSAT SOURCE REGION BAR
CHART FOR WORST DAYS 2002 AND 2018



6.5.2 Emissions Reductions due to Existing Air Pollution Control Measures

The RHR requires states to submit a long-term strategy that includes such measures as are necessary to achieve the RPG for each Class I area. RPGs are interim goals that represent incremental improvement over time toward the goal of natural background conditions. Prior to developing a long-term strategy, existing control measures must be assessed. As stated in USEPA guidance (June 2007):

> "One important factor to keep in mind when establishing a RPG is that you cannot adopt a RPG that represents less visibility improvement than is expected to result from the implementation of other CAA requirements. You must therefore determine the amount of emissions reductions that can be expected from identified sources or

> source categories as a result of requirements at the local, State, and federal levels during the planning period of the SIP and the resulting improvements in visibility at Class I areas. Given the significant emissions reductions that we anticipate to result from BART, the CAIR, and the implementation of other CAA programs, including ozone and $PM_{2.5}$ NAAQS, for many States this will be an important first step in determining your RPG, and *it may be all that is necessary to achieve reasonable progress in the first planning period for some States."* (p. 4-1) *emphasis added*

There are significant control programs being implemented between the baseline period and 2018, on the federal, state and local levels. Emissions reductions from "on-the-way" and "on-the-books" control programs and the implementation of BART, as captured in the PRP18a emission inventory, are projected to achieve substantial visibility improvement by 2018 at the Jarbidge WA and other Class I areas in the west. In fact, the Jarbidge WA represents the only western Class I area where the RPG meets or exceeds the URP for 2018. In general, these programs consist of regulations affecting mobile source emissions and, to a lesser degree, stationary sources. The following sections describe emissions control programs considered in developing the 2018 emissions inventory PRP18a based on control measures that are expected to result from compliance with existing rules and other available measures.

6.5.2.1 Federal Rules

Emissions reductions due to the following federal pollution control programs were incorporated into the PRP18a emissions inventory. These programs affect mobile, point and area source emissions.

Heavy Duty Diesel (2007) Engine Standard (On-road trucks and buses)
The USEPA set a PM emissions standard for new heavy-duty engines of 0.01 grams per brake-horsepower-hour (g/bhp-hr), to take full effect for diesel engines in the 2007 model year. This rule also included standards for NO_x and non-methane hydrocarbons (NMHC) of 0.20 g/bhp-hr and 0.14 g/bhp-hr, respectively. These NO_x and NMHC standards will be phased in together between 2007 and 2010 for diesel engines. Sulfur in diesel fuel must be lowered to enable modern pollution control technology to be effective on these trucks and buses. Pursuant to USEPA rule, a 97 percent reduction in the sulfur content of highway diesel fuel from 500 ppm (low sulfur diesel) to 15 ppm (ultra-low sulfur diesel) became effective in Nevada in October 2006.

Tier 2 Tailpipe (On-road vehicles)
The USEPA mobile source rules include the Tier 2 fleet averaging program, modeled after the California Low Emission Vehicle II standards. Manufacturers can produce vehicles with emissions ranging from relatively dirty to zero emissions, but the mix of vehicles a manufacturer sells each year must have average NO_x emissions below a specified value. Tier 2 standards became effective in the 2005 model year.

Large Spark Ignition and Recreational Vehicle Rule
The USEPA has adopted new standards for emissions of NO_x, hydrocarbons and carbon monoxide from several groups of previously unregulated non-road engines. Included in these are

large industrial spark-ignition engines and recreational vehicles. Non-road spark-ignition engines are those powered by gasoline, liquid propane gas or compressed natural gas rated over 19 kilowatts (25 horsepower). These engines are used in commercial and industrial applications, included forklifts, electric generators, airport baggage transport vehicles, and a variety of farm and construction applications. Non-road recreational vehicles include snowmobiles, off-highway motorcycles and all-terrain-vehicles. These rules were initially effective in 2004 and will be fully phased in by 2012.

Non-road Diesel Rule
This rule sets standards that will reduce emissions by more than 90 percent from non-road diesel equipment and reduce sulfur levels by 99 percent from current levels in non-road diesel fuel starting in 2007. This step will apply to most non-road diesel fuel in 2010 and to fuel used in locomotives and marine vessels in 2012.

Industrial Boiler/Process Heater MACTs
The USEPA issued final rules to substantially reduce emissions of toxic air pollutants from industrial, commercial, and institutional boilers and process heaters. These rules reduce emissions of a number of toxic air pollutants, including hydrogen chloride, manganese, lead, arsenic and mercury by 2009. This rule also reduces emissions of SO_2 and PM in conjunction with the toxic air pollutant reductions. The applied Maximum Achievable Control Technology (MACT) control efficiencies were 4 percent for SO_2 and 40 percent for PM_{10} and $PM_{2.5}$. The USEPA's industrial boiler MACT rules were vacated on June 8, 2007. WRAP states decided to leave these controls in the modeling since it is believed that by 2018 the USEPA will have re-promulgated a boiler MACT rule or states will have addressed the issue through rulemaking.

Combustion Turbine and Reciprocating Internal Combustion Engines MACT
The projection inventories do not include the NO_x co-benefit of the MACT regulations for Gas Turbines or Stationary Reciprocating Internal Combustion Engines, which the USEPA estimates to be small compared to the overall inventory.

VOC 2-, 4-, 7- and 10-year MACT Standards
Various point source MACTs and associated emission reductions were implemented. Reductions occurring before 2002 were assumed to be accounted for in the 2002 base year inventory.

6.5.2.2 Consent Agreements

The following section describes consent agreements for the Mohave Generating Station (Mohave) and Reid Gardner Generating Station (Reid Gardner). Mohave is owned by Southern California Edison (SCE) and is located in Laughlin, Nevada. Reid Gardner is owned by NV Energy (formerly Nevada Power Company) and is located near Moapa, Nevada. Both facilities are located in Clark Country and permitted through NDEP.

Mohave Generating Station[1]

On February 8, 2002, USEPA promulgated a final rule revising Nevada's federal implementation plan for protection of visibility in Class I areas (visibility FIP; 40 CFR 52.1488). That revision concerned emissions reduction requirements for Mohave. The requirements were based on a consent decree between the owners of Mohave and the Grand Canyon Trust, the Sierra Club and the National Parks and Conservation Association, addressing issues raised by the U.S. Department of the Interior (DOI) regarding Mohave's contribution to visibility impairment at the Grand Canyon National Park (GCNP) from SO_2 emissions. In addition, by incorporating the requirements of the consent decree into the long-term strategy of the Nevada visibility FIP, USEPA argued that there would be allowance for reasonable progress toward the national visibility goal with respect to Mohave's contribution to visibility impairment at GCNP from SO_2 emissions according to the criteria set forth in Section 169A(g)(1) of the CAA.

This rule was USEPA's first report assessing the long-term visibility strategy for Nevada since promulgating the Nevada visibility FIP. USEPA reviewed the long-term strategy only for the purpose of addressing DOI's certification of existing visibility impairment at GCNP and Mohave's contribution to that impairment, and evaluating whether the terms of the Mohave consent decree would make reasonable progress toward the national visibility goal. The revision of the long term strategy of the Nevada visibility FIP was to allow for reasonable progress toward the CAA national visibility goal with respect to Mohave's contribution to visibility impairment at GCNP due to SO_2 emissions. USEPA did not conduct a comprehensive review of the long-term strategy of the Nevada visibility FIP at that time. According to the Federal Register notice (67 FR 6130), federal land managers did not provide any information for such a review and USEPA did not have any evidence that visibility impairment at any other Class I area could be attributed to a specific source or group of sources located in Nevada. USEPA reasoned that the regional haze rule would result in a regional strategy for western states and would provide for additional progress toward the national visibility goal. The National Park Service did review the consent decree and believed that a USEPA rulemaking which adopts the emission limits and other requirements from the decree was an appropriate means of addressing its concerns regarding the impact of SO_2 emissions from Mohave on visibility impairment at GCNP.

The requirements of the visibility FIP were included as an applicable requirement in the schedule of compliance section of Mohave's Title V operating permit:

> Interim Emission Limits - For the period of time between the entry of the decree (December 15, 1999) and the date on which each unit must commence compliance with the final emission limitations set forth in Section VI.A.2.b of the Operating Permit, the following SO_2 and opacity emission limits shall apply:
>
> a. SO_2 emissions shall not exceed 1.0 lb/MMBtu of heat input calculated on a 90 boiler operating day rolling average basis for each unit.

[1] On June 10, 2009, the owners of the Mohave Generating Station, including Southern California Edison (SCE), announced the decision to decommission the station and remove the generating facility from the site. The SCE news release states that in 2010, the plant's generating equipment will be removed and its operating permits terminated (http://www.edison.com/pressroom/pr.asp?bu=sce&year=2009&id=7234).

b. The opacity of emissions shall be no more than 30 percent, as averaged over each separate 6-minute period within an hour, beginning each hour on the hour, measured at the stack, with no more than 375 exceedances of 30 percent allowed per calendar quarter (including any pro rated portion thereof), regardless of reason.

The consent decree required installation of low NO_x burners with over-fire air and fabric filter dust collection devices, but no associated emission limitations for either NO_x or PM/PM_{10}; however, opacity was limited to 20 percent. The consent decree required the controls to be installed and operational by January 1, 2006 or the plant would need to cease operations. The plant has been in a period of temporary shutdown since January 1, 2006.

However, Mohave has maintained their operating permit during this period in anticipation of restarting or selling the facility, and SCE has submitted a BART analysis, discussed in Chapter Five, as Mohave is subject to BART under the RHR as an EGU with capacity greater than 750 MW. As such, the PRP18a emission inventory incorporated the presumptive BART SO_2 limit. The PRP18a inventory has projected SO_2 and NO_x emissions from Mohave of 8,701 tpy and 19,595 tpy, respectively. Mohave emissions represent 19 percent of projected 2018 (18PRPa) statewide SO_2 emissions and 14 percent of projected statewide NO_x emissions.

However, SCE's BART analysis proposes fuel switching from coal to natural gas. Fuel switching will result in significant emissions reductions of SO_2 and NO_x with a greater than 95 percent reduction in SO_2 emissions from the PRP18a projections and a 75 percent reduction in NO_x emissions from the PRP18a projections. The BART emissions limits required by this SIP will be incorporated in future Western Regional Air Partnership (WRAP) visibility modeling and are anticipated to reduce visibility impairment at Class I areas. SCE's BART analysis is discussed in Chapter Five, where a link is provided to the complete analysis.

Reid Gardner Generating Station

The recent action at Reid Gardner was not related to any visibility impairment certification. Rather, the order issued by NDEP and the consent decree issued by USEPA in cooperation with NDEP and Reid Gardner were related to compliance issues at the station, specifically, record keeping and opacity exceedances. Nevertheless, some of the reductions ordered at Reid Gardner may result in visibility improvements.

In a letter and order, dated April 3, 2007, NDEP required Nevada Power Company (now NV Energy) to install natural gas igniters on units 1 through 4 at Reid Gardner no later than July 1, 2009, and install baghouses on units 1 through 3 Reid Gardner no later than July 1, 2010. These requirements were also found in the Reid Gardner consent decree entered into by Nevada Power Company, NDEP and the USEPA on April 3, 2007 and approved by the United States District Court on June 14, 2007. The consent decree further imposed SO_2 limitations beginning on the effective date of the decree: Measured separately, units 1, 2 and 3 shall not have SO_2 emissions in excess of 0.40 lb/MMBtu, based on a 10-day rolling average period.

Installation of the mandated emissions controls will have the effect of reducing projected 2018 (18PRPa) SO_2 emissions by 11 percent or 219 tpy and NO_x emissions by 17 percent or 1822 tpy from the Plan02d inventory. Reid Gardner is also subject to BART under the RHR. Proposed

BART controls for Reid Gardner will result in a 60 percent reduction in NO_x emissions from those projected in the PRP18a emissions inventory but a 30 percent increase in SO_2 emissions from the PRP18a inventory, resulting in an overall reduction of nearly 5,000 tpy of NO_x/SO_x combined. The BART analysis is discussed in Chapter Five where a link is provided to NV Energy's BART report. The BART emissions limits required by this SIP will be incorporated in future WRAP visibility modeling and are anticipated to reduce visibility impairment at Class I areas.

6.5.2.3 Other Air Pollution Control Measures

Additional air pollution control measures were incorporated in the PRP18a emissions inventory to account for emissions reductions due to all on-the-way or on-the-books control programs. Some of these programs are specific to Nevada, while others have broader application in the WRAP states. These programs are identified below:

- Emissions reductions resulting from smoke management programs were accounted for by applying emissions reduction techniques to the 2000 to 2004 average fire emissions.
- Emissions reductions resulting from state oil and gas emissions control programs for Rocky Mountain States.
- Emissions reductions resulting from the installation of known BART for facilities in Colorado, Utah, North Dakota and one facility in Oregon.
- Application of presumptive SO_2 BART limits for EGU's with capacity greater than 750 MW across the WRAP region.
- Emissions reductions resulting from ozone and PM_{10} SIPs in place across the WRAP region. Nevada's ozone and PM_{10} SIPs are discussed below.

In 2000, Nevada had several nonattainment area SIPs in place. These SIPs are effective in Washoe and Clark Counties, the locations of Reno and Las Vegas, respectively. In NDEP's jurisdiction, the only nonattainment area was the Central Steptoe Valley, which was out of attainment for SO_2 because of emissions from a copper smelter. This area was designated attainment in 2002. Table 6-2 shows the designation status for Nevada's nonattainment areas.

TABLE 6-2

NONATTAINMENT AREA
REDESIGNATION STATUS AS OF SEPTEMBER 2008

Planning Area	Nonattainment Date	Redesignations
Carbon Monoxide		
Lake Tahoe Basin (HA90)	3/3/78	USEPA approved 12/15/03; effective 2/13/04
Las Vegas Valley (HA212)	3/3/78 and 11/15/90	Request submitted 9/18/08
Truckee Meadows (Reno) (HA87)	3/3/78 and 11/15/90	USEPA approved 7/3/08
Ozone		
Washoe County	1/6/92 (1 hr) 1/16/01 (1 hr)	6/15/05 1 hr NAAQS revoked; Maintenance plan approved 1/18/08; effective 3/18/08
Clark County	9/13/2004 (8 hr)	
PM_{10}		
Las Vegas Valley (HA212)	11/15/90	
Pahrump Valley[2] (HA162)	does not apply	MOU Sept 2003
Truckee Meadows (Reno) (HA87)	11/15/90	
SO_2		
Central Steptoe Valley (HA179M)	3/3/78	USEPA approved 4/12/02; effective 6/11/02

Clark County

Clark County has PM_{10} and carbon monoxide (CO) SIPs. For many years, the Las Vegas Valley severely violated air quality standards for PM_{10} airborne particulate matter. Fugitive dust contributed substantially to this problem, but there were thousands of PM_{10} sources spanning an area of over 300,000 acres. In an unprecedented strategy, Clark County adopted fugitive dust rules more stringent than any prior program in the country and employed a team of 28 field compliance officers dedicated to enforce fugitive dust regulations. To make its approach effective, the program targeted large construction sites and conducted an extensive public outreach campaign to educate owners of large expanses of vacant residential land. The department also funded new research in PM_{10} paved-road and vacant-land emissions, which provides new techniques with greater accuracy for estimating emissions. Clark County's advanced dust control program serves as a national model and has been integral in leading the Las Vegas Valley to achieve PM_{10} concentrations below the USEPA's standard. In the June 2007 Milestone Achievement Report, Clark County demonstrated achievement of the 24-hour PM_{10} National Ambient Air Quality Standards (NAAQS) and continued attainment of the annual PM_{10} standard. CO control strategies include cleaner burning gasoline, transportation control measures, the state Alternative Fueled Vehicle program and woodstove and fireplace regulations.

[2] Pahrump Valley is not a designated nonattainment area. A Memorandum of Understanding is in place, which defers a nonattainment designation, to accelerate attainment of the PM_{10} national ambient air quality standards.

Washoe County
Washoe County or the Truckee Meadows Hydrographic Area (HA 87) has SIPs for ozone, CO and PM_{10}. Control measures focus on off-road and on-road vehicles, oxygenated fuel, gasoline vapor recovery, transportation control measures, residential wood burning and dust control measures such as the street sweeping program.

This section summarized the significant federal, state, and local control programs that are being implemented between the baseline period and 2018. These control program focus primarily on mobile (both on- and off-road) emissions sources and to a lesser degree area and stationary source emissions. Emissions projections based on implementation of all the described programs have been incorporated into the preliminary reasonable progress emissions inventory (PRP18a). The emission inventory will be updated in late 2008 or 2009 to incorporate BART emissions estimates for further visibility modeling.

6.5.3 Resulting Improvement in Visibility

Utilizing WRAP Regional Modeling Center modeling results, Nevada has estimated the expected visibility improvements by 2018 at the Jarbidge WA resulting from the implementation of existing federal and state regulations discussed above. Figure 6-5 shows the URP glide slope with a modeled 2018 visibility projection of 11.05 dv, although the value in Figure 6-5 has been rounded to one decimal place.

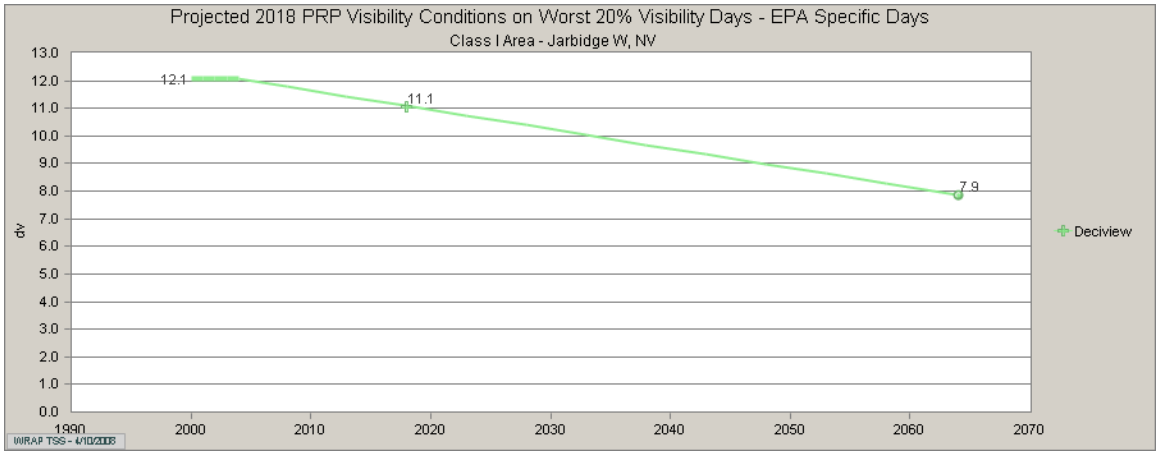
6.6 ESTABLISHING REASONABLE PROGRESS FOR NEVADA

WRAP baseline modeling demonstrates that the 2018 preliminary reasonable progress scenario (PRP18a) provides for an improvement in visibility better than the uniform rate of progress at the Jarbidge WA for the most impaired days over the period of the implementation plan, and ensures no degradation in visibility for the least impaired days over the same period (see Figure 6-5 and Table 6-3). The improvement is the result of the emissions reductions from existing and planned emissions controls due to federal and state programs (i.e., on-the-way and on-the-books), as discussed in Chapter Three.

For the 20 percent worst days, the reasonable progress goal for Jarbidge provides for greater visibility improvement by 2018 than the area's uniform rate of progress, as shown on Table 6-3. For the 20 percent best days, the reasonable progress goal for Jarbidge indicates an improvement of visibility by 2018 greater than current best day conditions. These projections are based on the modeling results discussed in Chapter Four.

FIGURE 6-5

CMAQ MODEL PROJECTIONS IN HAZE INDEX
FOR JARB1 2018 WORST DAYS



Identification of the 2018 reasonable progress goal for Jarbidge is a required element of Nevada's regional haze SIP. Nevada's reasonable progress goal for the Jarbidge WA is 11.05 dv for the 2018 worst days and 2.50 dv for the 2018 best days, as shown in Table 6-3.

TABLE 6-3

SUMMARY OF MODEL PREDICTED PROGRESS
TOWARD 2018 UNIFORM RATE OF PROGRESS AT JARB1

Mandatory Class I Federal Area	20% Worst Days				20% Best Days		
	Worst Days Baseline (Deciview)	2018 URP (Deciview)	RPG 2018 Modeling Results (Deciview)	CMAQ Modeling Percent Toward 2018 URP	Best Days Baseline (Deciview)	2018 Modeling Results (Deciview)	CMAQ 2018 Modeling Result Less Than Baseline?
Jarbidge Wilderness Area	12.07	11.09	11.05	104.1%	2.56	2.50	Yes

The background and results of the monitoring, emissions and modeling analyses are discussed in Chapters Two, Three, and Four of this SIP and provide the technical basis for the establishment of Nevada's reasonable progress. Nevada has utilized the technical analyses developed by the WRAP to comply with USEPA's guidance for developing its RPG.

6.7 DEMONSTRATION THAT THE RPG FOR WORST DAYS IS REASONABLE

USEPA guidance (June 2007) indicates, ". . . States may establish a RPG that provides for greater, lesser, or equivalent visibility improvement as that described by the glidepath," (p. 1-3) and goes on to state, "It is reasonable for you to defer reductions to later planning periods in order to maintain a consistent glidepath toward the long-term goal." (p. 1-4) It further states:

> "After determining the amount of emissions reductions of visibility impairing pollutants that may be expected from implementation of other CAA programs, you will be ready to *identify any additional measures that are reasonable (emphasis added).* The RHR gives States wide latitude to determine additional control requirements, and there are many ways to approach identifying additional reasonable measures; however, you must, at a minimum, consider the four statutory factors. Based on the contribution from certain source categories and the magnitude of their emissions *you may determine that little additional analysis is required to determine further controls are not warranted for this category*."(p. 4-2) *emphasis added*

The 2018 RPG identified in Table 6-3 for the 20 percent worst days show an improvement in visibility better than the 2018 URP. For this reason, in conjunction with other evidence and documentation described below and the fact that Nevada is meeting its share of emissions reductions at Class I areas outside of the state (see section 7.9.3.2), Nevada maintains its RPGs are reasonable. The following factors support this conclusion:

1. <u>The 2018 RPG shows better progress than the 2018 URP.</u> As shown in Table 6-3, Nevada's 2018 RPG shows better visibility improvement that the 2018 URP for the worst days and ensures no visibility degradation for the least impaired days of 2018. Therefore, it is reasonable to defer additional emissions reductions to later planning periods in order to maintain a consistent glidepath toward the long-term goal.
2. <u>Reductions in anthropogenic emissions consistent with 2018 URP are reasonable.</u> Meeting the 2018 URP at the Jarbidge WA requires an 8.1 percent reduction in the haze index expressed in deciviews. The PRP18a emission inventory shows a 33 percent reduction of SO_x emissions and a 17 percent reduction of NO_x emissions when compared to the Plan02d inventory. When the installation of BART controls on Nevada sources is taken into account, the reductions increase to 44 percent for SO_x and nearly 33 percent for NO_x from the Plan02d inventory. The WEP emissions projections show a 14.5 percent reduction for NO_x, but a 16.8 percent increase in SO_x by 2018. The SO_x increase is due partly to the siting of a proposed coal-fired EGU in eastern Nevada, as well as the significant SO_x emissions reductions from mobile and point sources in Idaho, which increase the relative contribution of Nevada emissions. This combination of emissions reductions from anthropogenic sources consistent with the required reduction in haze index supports the demonstration of reasonable progress.
3. <u>Reductions in anthropogenic emissions are consistent with Nevada's share of emissions reductions to meet RPGs of Class I areas in other states.</u> Analyses of the relationships between Nevada's SO_x and NO_x emissions, source apportionment modeling, and visibility impairment at Class I areas in adjacent states indicates Nevada's emissions reductions by 2018 represent Nevada's share of the emissions reductions necessary for

these Class I areas to achieve reasonable progress. The analyses are presented in section 7.9.3.2 of Chapter Seven.

4. Major reductions in mobile source emissions. Mobile sources, both on- and off-road, are significant emitters of NO_x and to a lesser degree SO_x. These source categories show a considerable reduction in emissions by 2018, a 63 percent reduction in SO_x and 49 percent reduction in NO_x from 2002 levels. Although these reductions are primarily due to "on-the-books" federal regulations, the emissions reductions are consistent with and support Nevada's demonstration of reasonable progress.

5. Offshore marine shipping and international emissions contribute significantly to visibility impairment. Source apportionment modeling (section 4.3 of Chapter Four) identifies the significant contribution of international and off-shore marine emissions (e.g., source categories Outside Domain, Canada, Mexico, and Pacific Offshore) to visibility impairment at the Jarbidge WA. These source categories are major contributors to SO_4 and NO_3 extinction as shown by the source apportionment modeling results with outside domain, Mexican, and Canadian emissions representing 51 percent of the SO_4 visibility impact and 30 percent of the NO_3 impact at JARB1. Control of international and off-shore sources will likely account for greater improvement in the SO_4 and NO_3 extinction contribution at the Jarbidge WA. Although USEPA has recently addressed off-shore emissions by the Marine Diesel Engine Rule (see section 7.9.2.3 of Chapter Seven), no United States regulatory body has authority to control international emissions.

6. Natural sources contribute significantly to visibility impairment. Nevada's analyses of the monitoring, emissions and modeling data (Chapters Two, Three, and Four) strongly support the finding that the contribution of natural and uncontrollable emissions sources, such as natural fire and windblown dust, and the pollutants associated with these sources (OMC, EC, PMC and PMF), contribute significantly to visibility impairment. The 2018 emission inventory shows increased emissions of these pollutants, except EC, while the emissions of SO_x and NO_x decrease significantly. The role of natural fire is discussed below.

7. Consideration of the costs of compliance, time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and remaining useful life of existing sources that contribute to visibility impairment. In light of the 6 factors listed above, it is Nevada's position that the costs of any additional control measures beyond those documented in this chapter and Chapter Seven are unreasonable at this time and would impose unnecessary burdens on the health and vitality of industries within our state. Since the costs of compliance are unreasonable, no further analysis of these four factors was conducted.

6.7.1 The Role of Natural Fire in Nevada

The role of natural fire contributions to visibility impairment at the Jarbidge WA is undeniable as shown in Figure 6-6, which displays time lines for each visibility impairing species from 1988 to 2006 for all IMPROVE sample days. As noted previously, annual visibility impairment due to OMC emissions from natural fires are highly variable from year to year. Some of the monitored visibility impairment is due to local natural fires, but regional transport of smoke is common, as

2002 demonstrates when large timber fires in Arizona, Colorado and Oregon contributed to elevated OMC extinction at the Jarbidge WA.

The natural fire data presented in Table 6-4 show significant burned acreage in proximity to the Jarbidge WA for 1999, 2006 and 2007. These data were downloaded from the National Interagency Fire Center (http://www.nifc.gov/fire_info/fire_stats.htm) list of 1997-2007 fires greater than 100,000 acres and year-to-date fires for 2008. Only data for fires in northeastern Nevada and southern Idaho within approximately 100 miles of the Jarbidge WA were compiled. Comparison of Figure 6-6 and Table 6-4 demonstrates the correlation of large fires and visibility impairment at the Jarbidge WA for 1999 and 2006. No fires in excess of 100,000 acres were recorded in Nevada from 2000 to 2005.

FIGURE 6-6

SPECIES TIME SERIES EXTINCTION FOR PERIOD OF RECORD
AT THE JARBIDGE WILDERNESS AREA

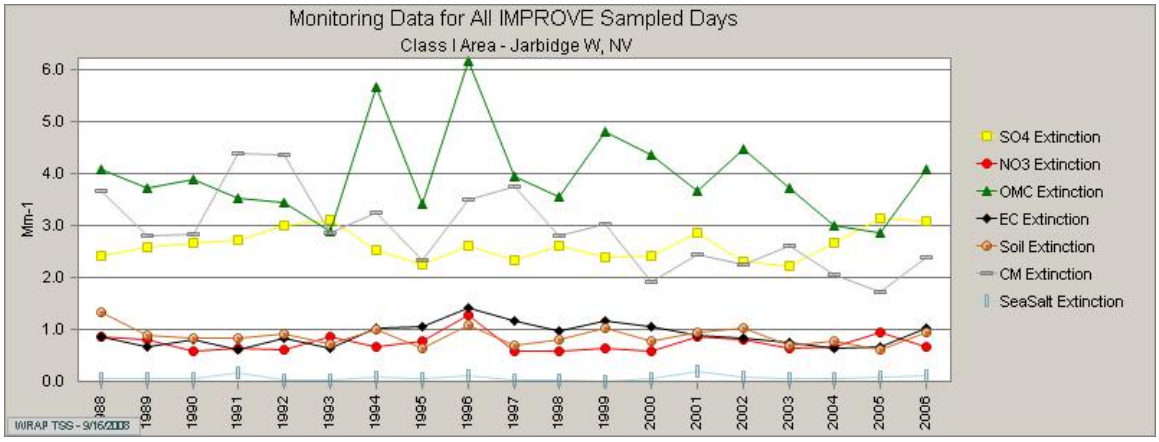


TABLE 6-4

LARGE NATURAL FIRES NEAR THE JARBIDGE WILDERNESS AREA 1999 - 2008

Year	Fire Name	State	Acreage
1999	Dun Glen Complex	Nevada	288,220
1999	Sadler Complex	Nevada	224,509
1999	Battle Mountain Complex	Nevada	169,608
1999	Jungo Complex	Nevada	169,220
		1999 Acreage	**851,557**
2006	Winters	Nevada	238,458
2006	Charleston Complex	Nevada	190,421
2006	Sheep	Nevada	150,270
		2006 Acreage	**579,149**
2007	Murphy Complex	Idaho	652,016
		2007 Acreage	**652,016**
2008	East Slide Rock Ridge	Nevada	54,549
		2008 Acreage	**54,549**

Figures 6-7 through 6-9, show MODIS fire detections for 2006, 2007 and 2008 in California and Nevada and their proximity to the Jarbidge WA. The yellow depicts areas burned since January 1st of each year. These maps were downloaded from the MODIS Active Fire Mapping Program website at http://activefiremaps.fs.fed.us/activefiremaps.php?op=maps&rCode=cgb .

Figure 6-7 shows the 2006 Winters, Charleston Complex and Sheep fire detections in northeastern Nevada. The Jarbidge WA is located in the northeast corner of Nevada, between the eastern-most large fire shown in Figure 6-7 and the Idaho border. The IMPROVE monitor JARB1 location is depicted in black. Recall that 2006 has a large OMC extinction component that may in part be due to these fires.

FIGURE 6-7

2006 MODIS FIRE DETECTIONS IN CALIFORNIA AND NEVADA

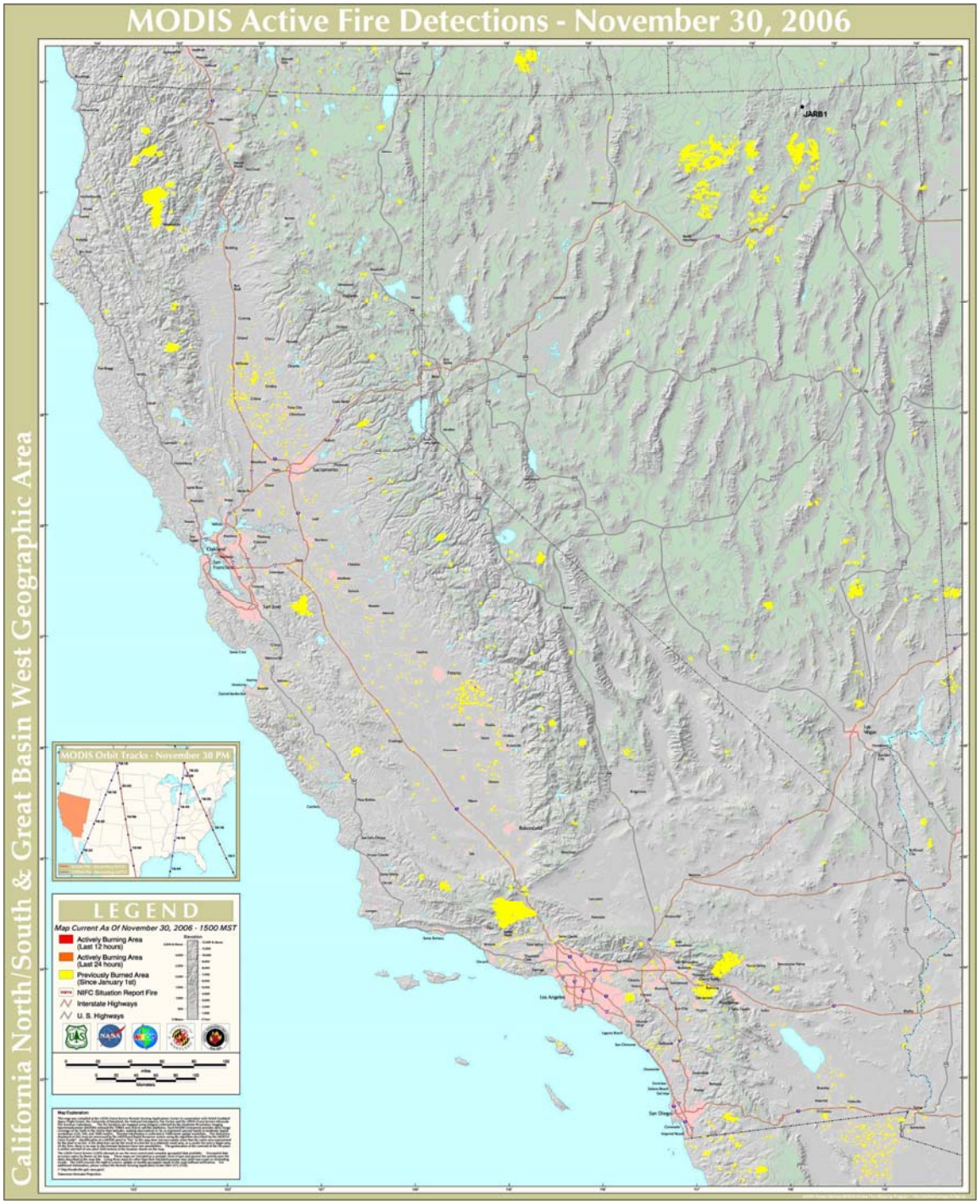


Figure 6-8 shows the Jarbidge WA surrounded by the 2007 Murphy Complex Fire detections on the west, north, and east where nearly two thirds of a million acres burned in this one fire complex.

FIGURE 6-8

2007 MODIS FIRE DETECTIONS IN CALIFORNIA AND NEVADA

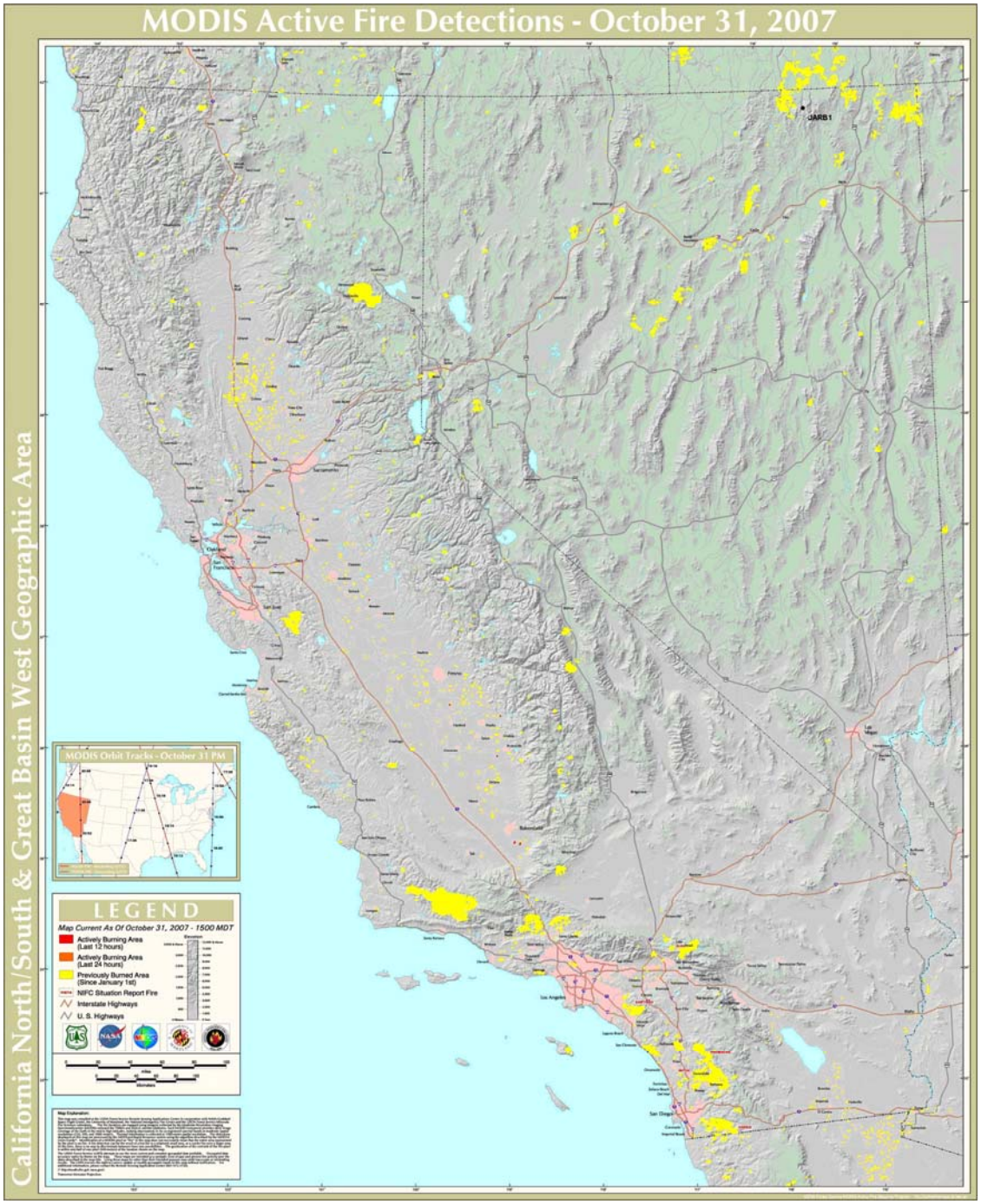
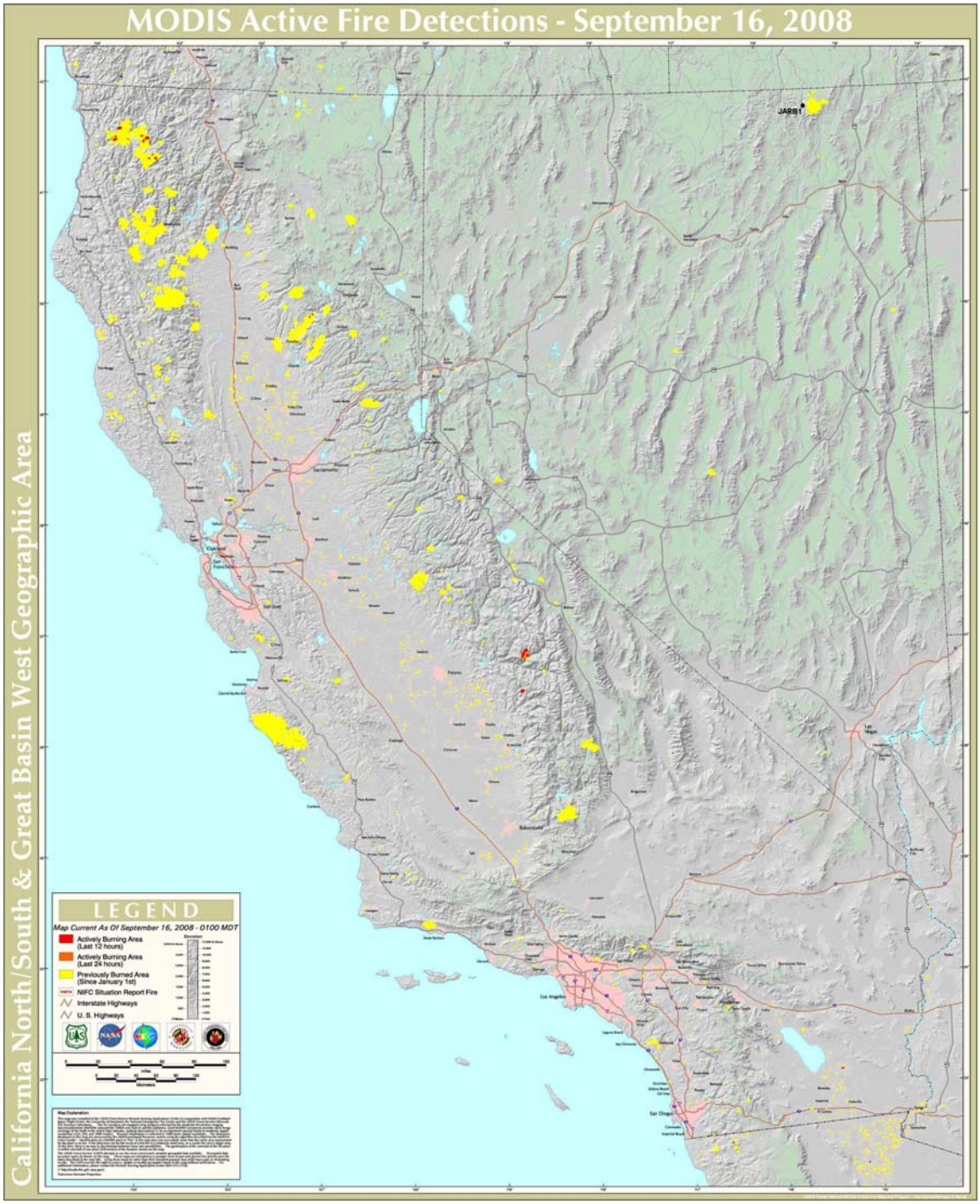


Figure 6-9 shows the 2008 East Slide Rock Ridge fire partially within the Jarbidge WA and burning out of the wilderness area to the east. This long-lived fire started as a lighting strike within the wilderness area and was allowed to burn as wildland fire use fire until it crossed out of

the wilderness area and was partially suppressed. The listed acreage does not represent full containment of this fire, as of early October 2008 and the acreage will likely increase.

FIGURE 6-9

2008 MODIS FIRE DETECTIONS IN CALIFORNIA AND NEVADA



Monitor data is not yet available for 2007 to assess the impact of the Murphy Complex fire on visibility at the Jarbidge WA, nor is data for 2008 to assess the impacts of the East Slide Rock Ridge fire and the effects of the prolonged regional transport of smoke from the 2008 northern California fires. Nevada suspects the visibility impacts from natural fires are not limited to OMC and EC emissions, but include CM and SOIL emissions due to windblown transport from the denuded burn areas which may persist for years after a fire. Rehabilitation efforts on the Murphy Complex have been hampered by low soil moisture conditions likely resulting in significant local transport of particulates due to windblown dust. It is clear from Figure 6-6 that the relative extinction contribution of both OMC and CM increased significantly in 2006. The relative contribution of EC and SOIL also increased, although less markedly than OMC and CM. The extinction increases for these species are likely a result of the large acreages burned in northern Nevada during 2006.

The 2006 monitoring data, presented in Figure 6-6, show the visibility impairment resulting from natural sources such as natural fire and windblown dust overwhelms the effects of emissions reductions resulting from additional control of Nevada's anthropogenic emissions. Nevada anticipates a similar result for 2007 and possibly 2008 based on the active fire season in these years.

6.8 REFERENCES

U.S. EPA 2007. Guidance for Setting Reasonable Progress Goals under the Regional Haze Rule. U.S. Environmental Protection Agency, Office of Air Quality and Standards, Research Triangle Park, North Carolina. June 1, 2007 rev.

U.S. EPA 2001. Guidance for Demonstrating Attainment of Air Quality Goals for $PM_{2.5}$ and Regional Haze, Draft Report. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. January 2, 2001.

U.S. EPA 2007. Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze-Draft 3.2. U.S. Environmental Protection Agency, Office of Air Quality and Standards, Research Triangle Park, North Carolina. April, 2007.