ADDENDUM to

Specialist Report 13.0
Air Quality Resources

Oil and Gas Leasing EIS
on Lands Administered by the
Dixie National Forest

Prepared For:
US Forest Service
Dixie National Forest
1789 N. Wedgewood Lane
Cedar City, Utah 84721

Prepared By:

JBR

8160 South Highland Drive
Sandy, Utah 84093

JUNE 2011

Reviewed/Approved by: Susan Baughman Date: 6-24-2011
Sue Baughman

Addendum Table of Contents

1.0 Introduction 1
2.0 Changes between Draft and Final EIS 1
2.1 Revised Leasing Options 1
2.2 New GIS Model 2
2.3 Errata 2
2.3.1 Clarifications 2
2.3.2 Expanded Analyses 3
2.3.3 New information or Agency direction (since 2008) 3
3.0 Changes to Air Quality Resources 4
3.1 Supplemental Information Report 4
3.2 Errata 4

Addendum Tables

Table 1 Changes to leasing options since the DEIS reflected in the new GIS model. 1
Table 3.12-7 Ozone Monitoring Data from Zion National Park 5

Addendum Figures

Figure 5.12-2 Current year 8-hour ozone Design Values (DVC) from the enhanced MATS unmonitored area analysis for the 2005 meteorological year. 13
Figure 5.12-3 Current year 8-hour ozone Design Values (DVC) from the enhanced MATS unmonitored area analysis for the 2006 meteorological year. 14
Figure 5.12-4 Projected 2012 8-hour ozone Design Values (DVF) from the enhanced MATS unmonitored area analysis for the 2005 meteorological year. 15
Figure 5.12-5 Projected 2012 8-hour ozone Design Values (DVF) from the enhanced MATS unmonitored area analysis for the 2006 meteorological year. 16
Figure 5.12-6 Differences in the projected 2012 (DVF) and current year (DVC) 8-hour ozone Design Values from the enhanced MATS unmonitored area analysis for the 2005 meteorological year (DVF-DVC). 17
Figure 5.12-7 Differences in the projected 2012 (DVF) and current year (DVC) 8-hour ozone Design Values from the enhanced MATS unmonitored area analysis for the 2006 meteorological year (DVF-DVC). 18
Figure 5.12-8 Modeled annual average PM2.5 for comparison to NAAQS for the 2005 meteorological year (left column) and 2006

meteorological year (right column). 21
Figure 5.12-9 Modeled 24-hour average PM2.5 for comparison to NAAQS for the 2005 meteorological year (left column) and 2006 meteorological year (right column). 22

1.0 INTRODUCTION

This addendum updates Specialist Report 13.0: Air Resources, which informed the DEIS. This addendum provides the supplemental information necessary to inform the FEIS and make a decision. The specific purposes of this supplement are to:

1. Provide an overview of changes between the Draft and Final EIS (**Section 2.0**).
2. Highlight the changes since the DEIS that were made specifically to protect Air Quality Resources or that are otherwise relevant to Specialist Report 13.0 (**Section 3.0**).

2.0 CHANGES BETWEEN DRAFT AND FINAL EIS

A number of changes were made to the DEIS in preparing the FEIS. These changes were primarily minor edits, corrections, and updates, and are reflected in the FEIS. Chapter 7 was added to the FEIS and contains an analysis of the public comments received on the DEIS and responses from the Dixie National Forest. The public involvement process since the DEIS is described in detail in Chapter 7, and summarized in Section 1.9.1 of the FEIS.

A Supplemental Information Report (SIR) was issued in January 2009 to address comments on the DEIS from agencies and the public concerning air resources and climate change. Other changes (i.e., not related to air and climate change) were not substantial changes to the proposed action, or significant new circumstances bearing on the proposed action (following 40 CFR Part 1502.9) that would require a supplemental DEIS. These changes are summarized in the following sections.

2.1 Revised Leasing Options

Several changes were made to the action alternatives, and specifically leasing options, in response to public comments on the DEIS. Other changes to leasing options reflect Forest or other Agency decisions made since the DEIS that have bearing on the resources analyzed. **Table 1** summarizes the changes to leasing options since the DEIS.

Table 1 Changes to leasing options since the DEIS reflected in the new GIS model.

Resource	DEIS Leasing Option	FEIS Leasing Option	Alternatives Affected
Inventoried Roadless Areas	NSO (mod*)	NSO	C, D1, and E1
SIO Unassigned	LN	CSU	B, C, D, and E
NPS Protective Measure (new)	n/a	NL	B
	n/a	NSO	C
ROS Primitive	NL	NSO	C
Sage-Grouse Leks	1-mile buffer	2-mile buffer	B and C
Fisheries Habitat	300-foot buffer	500-foot buffer	C
Boreal Toad Habitat (new)	n/a	Added to “Forest Service-Sensitive Species and Suitable Habitat”	A-E
Desert Tortoise Habitat	various	No suitable habitat determination	A-E

Desert Tortoise Critical Habitat	various	No suitable habitat determination	A-E
Lava Fields over Sensitive Aquifers	NSO	NL	B and C
Class I Airsheds – 60 km buffer (new)	n/a	CSU	A-E
Iron Town Historic District	various	No acres on Dixie National Forest	A-E

*Actual leasing option CSU but called a "modified NSO."

2.2 New GIS Model

The GIS model was re-run to incorporate the changes made to leasing options and the addition of new resources in the FEIS. The new model output, or the number of acres under each leasing option across the Forest, and revised baseline acres where appropriate, is reflected in each resource section in the FEIS. Regarding these specialist report updates (i.e., addendums), individual number replacements in the text that reflect the new model output for the FEIS are not listed in the errata sections. Instead, tables of data, usually replacing a specific table in the DEIS specialist report, are presented in each specialist report addendum to summarize the data changes in the FEIS.

2.3 Errata

Errata correct (**Section 2.3.1**) or expand on data previously presented (**Section 2.3.2**), or incorporate new information or decisions since the DEIS (**Section 2.3.3**).

2.3.1 Clarifications

Clarifications to the DEIS were made to correct errors or to eliminate confusion. Most were made as responses to public comments on the DEIS.

- Chapter 1
  - Section 1.5.2, Lands Not Legally Available for Leasing, clarification to language describing Utah Wilderness Act of 1984.
  - Section 1.5.2, Lands Not Legally Available for Leasing, clarification to language describing Split-estate parcels.
  - Section 1.8.2, 2001 Roadless Area Conservation Rule and Legal Activity, clarification to how Roadless Areas on the Dixie are officially identified.
- Chapter 3
  - Section 3.5.4, Aquatic Species and Habitat, clarification to which waterbodies on the Dixie are Blue Ribbon Fisheries, following a memo from the Blue Ribbon Fisheries Advisory Council dated 26 March 2006.
  - Section 3.6.2.3, Candidate Species, GIS error and clarification on acres of greater sage-grouse brood-rearing habitat within the Dixie.
- Chapter 4
  - All Sections, all effects determinations under NL were changed to "No Effect" (from "negligible").
  - Section 4.6.4, Impacts of Connected Actions by Leasing Option, reducing impact adversity determinations for Utah prairie dog, greater sage-grouse, and pygmy rabbit.
  - Sections 4.6.4, 4.6.5, 4.9.4, and 4.9.5, Impacts of Connected Actions by Leasing Option and by Alternative: Reduced impact adversity determinations for pygmy rabbit, sensitive bats, sensitive raptors, big game, and marginally unstable slopes (soils) under CSU for some of the action alternatives due to misunderstanding

(by the consultant) of the application of resource-specific CSUs.
  - Section 4.6.4, Impacts of Connected Actions by Leasing Option, road density was clarified as Open Motorized Road Density (OMRD).
  - Section 4.7.4, Impacts of Connected Actions by Leasing Option, clarification added to lava fields over sensitive aquifer impacts regarding the BLM Onshore Oil and Gas Order requirement for well casing.
  - Section 4.12.2.4 and 4.12.2.5, Class I Cumulative Impact Analysis and Visibility and Deposition Analysis, clarifications added (since SIR) regarding the need for additional air quality analyses for proposed projects and the criteria under which further analyses are required.
  - Section 4.12.2.7 (new), Direct Ozone Impacts, this section was added to clarify that ozone impacts are discussed in the cumulative effects section of Air Resources (5.12.3.1).
  - Section 4.17, Forest Plan Consistency Determination, assessments of compliance with the Forest Plan in the DEIS were eliminated due to the Forest Plan amendment that will be implemented to reflect the stipulations needed for resource protection.
- Chapter 5
  - Section 5.6.2, Past, Present, and Reasonably Foreseeable Future Actions, cumulative effects discussion regarding grazing effects to Utah prairie dog and greater sage-grouse expanded to include more of the scientific information available.

2.3.2 Expanded Analyses

Expanded analyses were made as a result of the comments received on the DEIS. Apart from the SIR, which presented a new analysis on Climate Change and other aspects of Air Resources not in the DEIS (e.g., ozone), the main areas with information added were night skies (Visual Resources, 3.2 and 4.2), unroaded/undeveloped areas (IRAs/WSRs, 3.3 and 4.3), and greater sage-grouse (Special Status Species, 3.6 and 4.6). In the case of greater sage-grouse, impact determinations were re-assessed for alternatives B-E. Scientific evidence or Agency direction not previously considered was added to these discussions in response to public comments on the DEIS from government agencies and environmental groups.

The Air Resources analysis expanded upon in the SIR was further expanded in response to public comment on the SIR. Areas with new information include NAAQS for nitrogen oxides and ozone, secondary $PM_{2.5}$ analysis, updated ozone monitoring data from Zion NP, an expanded ozone analysis based on the UBAQS, and additional information on the impacts to sagebrush habitat from climate change.

2.3.3 New information or Agency direction (since 2008)

The following decisions, regulations, or information were incorporated in the FEIS where applicable:

- Omnibus Public Land Management Act 2009
- Memorandums 1042-154 (2009) and 1042-155 (2010) (RACR)
- Wild and Scenic Rivers Suitability Study (2008)
- Forest Service Strategic Plan (2007-2012)
- National Visitor Use Monitoring Study (2010)
- Motorized Travel Plan (2009)

- Dixie National Forest Annual Monitoring Reports (2008 and 2009)
- Dixie National Forest Aquatic Monitoring Amendment (2010)
- Conservation Agreements for southern leatherside (UDWR 2010)
- New BLM RFPs – Cedar City and Richfield Field Offices (both 2008)
- Alton Coal Development update
- Updated R4 TESP list (2011)
- New definition of Sensitive Fisheries Habitat on the Dixie (=occupied *and suitable*; 2009)
- Updated occurrence and habitat data for TES species on the Dixie (2008-2010)
- Biological Opinion from USFWS (2011), including Lease Notices
- USFS SOPA (since 1st quarter 2011; updates to Foreseeable Future Actions)
- BLM IM No. UT 2010-055 (Protection of Ground Water Associated with Oil and Gas Leasing, Exploration, and Development – Utah BLM)

3.0 CHANGES TO AIR QUALITY RESOURCES

3.1 Supplemental Information Report

The SIR updated the Air Resources Sections of the EIS between DEIS and FEIS, and thus the Air Resources Specialist Report (13.0). Changes made to the FEIS with regard to Air Resources since the SIR are listed in Section 3.2.

3.2 Errata

Errata specific to Specialist Report 13.0 expand on or correct data previously presented, or incorporate new information or decisions **since the SIR**. Some changes, clarification and updates to resource-specific data and analysis were made as a result of the comments received on the SIR.

Areas with new information include NAAQS for nitrogen oxides and ozone, secondary $PM_{2.5}$ analysis, updated ozone monitoring data from Zion NP, an expanded ozone analysis based on the UBAQS, and additional information on the impacts to sagebrush habitat from climate change.

The errata below update the SIR.

<u>Page 4</u>

- In Table 3.12-1, add "0.060-0.070ppm[(6)]" under "Primary Concentration" for "Ozone" and add footnote 6:

  [(6)] Proposed range for promulgation of new ozone NAAQS.

- In Table 3.12-1, replace the "Nitrogen Oxides" row with:

Nitrogen Oxides (NO_x)	Annual Arithmetic Mean	100 µg/m3 (0.053 ppm)	Same as primary

	1 hour [(2)]	0.100ppm	None

Page 6

- In Table 3.12-2, add the following row to bottom of table:

$PM_{2.5}$	24-hour	Undefined	Undefined
	Annual	Undefined	Undefined

Page 12

- Replace "UDEQ 2005b" with "UDEQ 2008" in last sentence of first paragraph.

Page 13 (**Section 3.12.8**)

- Replace last sentence in first paragraph with:

  Visibility protection programs are being developed for Class I areas in the western U.S. (WRAP 2010); these programs should also result in some visibility protection and improvement in the Class II wilderness areas on the Forest.

Page 14

- Replace Table 3.12-7 with:

Table 3.12-7 Ozone Monitoring Data from Zion National Park

MONITORING SITE	AVERAGING PERIOD	CASTNET OZONE CONC. (PPB) 8 HR AVERAGE
Zion National Park	2008	72
	2007	71
	2006	72
	2005	91
	2004	74
NAAQS		71 [1]

[1] Based upon a three year (2006-2008) average of the fourth highest daily maximum eight hour average, revised down in 2009 from 78.

Page 16 (**Section 3.12.10**)

- Delete last paragraph.

Page 18 (**Section 4.12.2**)

- Replace first paragraph with:

  A CSU stipulation for Air Resources would be applied within 60 km of all Class I areas (i.e., Bryce Canyon National Park, Capital Reef National Park, Zion

National Park, and the Grand Canyon). This CSU would cover about 96 percent of the Dixie National Forest and is intended meet or exceed guidance in the Federal Land Managers Air Guidance document (USFS et al. 2008). The CSU lists various design and mitigation measures beyond those in the Standard Lease Terms and Conditions that could be implemented to reduce impacts from connected actions on a lease. This is the only leasing option that applies directly to Air Resources.

In the following sections, the impacts of connected actions under the Reasonably Foreseeable Development Scenario (RFDS) are discussed assuming no restriction or stipulations on oil and gas activities relative to air resources other than those listed on BLM Lease Form 3100-11 Standard Lease Terms and Conditions (SLT) and the environmental protection measures that would be implemented by other laws and regulations as described in Section 1.8.5.2 (of the FEIS). Although the CSU applies to much of the Dixie National Forest under all alternatives, impacts will be discussed assuming no restrictions other than SLT because the CSU application is project-dependent.

Page 19 (**Section 4.12.2.1**)

- In 2nd sentence, replace "PM_{10}" with "PM_{10} and $PM_{2.5}$"

Page 19 (**Section 4.12.2.1**)

- Add to end of 1st paragraph:

  However, under the cumulative impacts section of this document an assessment of region VOC and ozone effects has been included utilizing existing regional modeling simulations.

Page 20 (**Section 4.12.2.1**)

- In Table 4.12-1, replace "PM_{10}" with "PM_{10}/$PM_{2.5}$" in "Natural Gas Exploration Flare"

Page 20 (**Section 4.12.2.1**)

- In last paragraph before Table 4.12-2, replace "PM_{10}" with "PM_{10}/$PM_{2.5}$"

- Add at end of paragraph before Table 4.12-2

  For the impact assessment of primary $PM_{2.5}$ PM_{10} impacts were used as a conservative assessment given that primary $PM_{2.5}$ is a subset of primary PM_{10}.

- Add to Table 4.12-2 under "Criteria Pollutant":

$PM_{2.5}$	24-hour	Undefined	Undefined	12.4	2.77	1.20	0.53
	Annual	Undefined	Undefined	3.09	0.69	0.30	0.13

Page 21 (**Section 4.12.2.1**)

- Replace fist sentence under Table 4.12-2 with

  The modeling results shown in **Table 4.12-2** indicate that emissions from predicted exploration activities would comply with the applicable NAAQS for Class II areas at all distances shown when combined with reasonable regional background values.

- Add after last sentence in section

  Based on this information, all proponents of exploratory projects within 5km of a Class I area will be required to provide an additional AQRV analysis prior to project approval.

- Replace USFS et al. (2008) with USFS et al. (2010) in last paragraph

Page 22

- In Table 4.12-3, replace "PM_{10}" with "$PM_{10}/PM_{2.5}$" in the column heading.

Page 22 (**Section 4.12.2.3**)

- In first sentence, add $PM_{2.5,}$ to "…primarily NO_x, SO_2, PM_{10},…"

- Add to end of 1st paragraph:

  For the impact assessment of primary $PM_{2.5}$ PM_{10} impacts were used as a conservative assessment given that primary $PM_{2.5}$ is a subset of primary PM_{10}.

Page 23 (**Section 4.12.2.3**)

- Add to Table 4.12-4 under "Criteria Pollutant":

$PM_{2.5}$	24-hour	Undefined	Undefined	25.0	5.62	2.44	1.06
	Annual	Undefined	Undefined	6.25	1.40	0.61	0.27

- Replace "NAAQS" with "increment" in first 2 paragraphs after Table 4.12-4 (3 replacements)

Page 24 (**Section 4.12.2.4**)

- Add after last paragraph in section:

  As a result of the proposed impacts, Appendix C of the EIS provides lease stipulations that will compel development proponents to complete an additional air quality analysis for exploratory projects within 5km of any adjacent Class I area and for development projects within 60 km of an adjacent Class I area. Also, any project that will meet or exceed the total project emissions assumed within this EIS will be compelled to complete an additional air quality analysis.

Page 25 (**Section 4.12.2.5**)

- In last sentence of first paragraph, replace "Federal Land Managers request" with "Federal Land Managers shall request"

Page 24 (**Section 4.12.2.5**)

- Add after last paragraph in section:

  As a result of the proposed impacts, Appendix C of the EIS provides lease stipulations that will notify development proponents about the need to complete an additional air quality analysis for exploratory projects within 5km of any adjacent Class I area and for development projects within 60km of an adjacent Class I area. Also, any project that will meet or exceed the total project emissions assumed within this EIS will be compelled to complete an additional air quality analysis.

Page 26

Add new section before "Impacts by Alternative"

Direct Ozone Impacts

The reasonably foreseeable development scenarios analyzed within this EIS document produce ozone precursor emissions that are extremely limited in scale. Additionally, impacts associated with atmospheric ozone are typically regional in nature and are related to the movement and aggregation of precursor emissions from multiple regional sources. As a result, the impacts associated with ozone will be addressed under the Cumulative Effects Section (5.12.3.1) of this document.

Page 29

- In the 2nd sentence of 1st paragraph, add $PM_{2.5,}$ to "Current oil and gas activities result in NO_2, SO_2, PM_{10}, and CO emissions."

Page 30 (**Section 5.12.3**)

- In last paragraph, replace "provincial" with "regional"

- In last paragraph, replace (PM_{10}, and NO_x) with ($PM_{2.5}$, PM_{10}, VOC, and NO_x)

Page 30

Replace **Section 5.12.3.1** ("Ozone") with:

Unlike other atmospheric pollutants, ozone is not primarily emitted into the atmosphere. Ozone is produced in the atmosphere as a result of combining precursor pollutants with solar radiation. These precursor pollutants can reside in the atmosphere for significant amounts of time and travel over significant

distances. As a result, ozone impacts are best assessed on a regional scale, accounting for the precursor pollutant emissions from all available sources within a reasonable distance. Such an analysis should account for the emission and modeled transport of ozone and its precursors as well as the modeled atmospheric chemistry that would result from their interaction.

To complete a modeling analysis of this complexity was found to be beyond the economic limitations of this leasing EIS project. As a result, the USFS has developed an ozone analysis based on the best currently available "scientifically credible" evidence. The analysis, which was based on existing regional modeling simulations, also describes the relative completeness of the information available as well as the potential shortcomings of the available modeling data. To ensure that the requisite "hard look" was completed under NEPA, the analysis was completed in keeping with 40 CFR Section 1502.22 which reads:

"When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking...

(b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:

1. a statement that such information is incomplete or unavailable;
2. a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
3. a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and
4. the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

For the purposes of this section, "reasonably foreseeable" includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason."

Given that a novel photochemical modeling analysis could not be reasonably completed for a cost that would not be considered exorbitant, the USFS acknowledges that the assessments of ozone impacts on both a direct and cumulative level are potentially incomplete.

With ambient ozone data indicating that regional ozone has been increasing throughout the State of Utah, particularly in regions with oil and gas development, the issue of ozone impacts is important to the determination of overall adverse impacts associated with this EIS.

As a result, the USFS has undertaken an assessment of existing scientifically credible evidence that would be able to bound the potential regional impacts associated with ozone concentrations. Given that potential future ozone impacts are best predicted by the use of a photochemical modeling analysis, the initial assessment focused on the availability of such modeling analyses. The assessment concluded that the most recent, peer-reviewed, photochemical modeling analysis which included the project area within its modeled domain was the Uinta Basin Air Quality Study. As a result, this modeling simulation was selected for use in assessing total ozone impacts for this EIS leasing project.

The Uinta Basin Air Quality Study (UBAQS) was initiated in 2008 and was completed in June 2009 (IPAMS 2009). The study, funded by the Independent Producers of the Mountain States (IPAMS), sought to assess the regional air quality impacts of oil and gas production on the Uinta Basin in Utah. Although the study was targeted to assess impacts in the Uinta Basin, the domain of the project was sufficiently large to allow assessments of air quality in regions throughout much of Utah.

UBAQS sought to assess the cumulative change in air quality from the regional expansion of oil and gas resources. In order to develop this assessment, primary and precursor emissions were developed for two modeled scenarios. These scenarios, occurring in model year 2005/2006 and 2012, included recorded (for 2005/2006) and reasonably foreseeable (for 2012) emissions from all sources that resided or would reside within the model domain. Proposed oil and gas-related sources for both modeled scenarios were sourced from regional and sub-regional emissions assessments. They utilized best available information to determine spatially representative oil and gas emissions. These emissions were then extrapolated forward in time to account for growth of oil and gas production throughout the domain for the 2012 scenario.

Emissions developed for both the base year (2005/2006) and future year (2012) were modeled utilizing the Community Multi-Scale Air Quality Model (CMAQ). EPA guidance for projecting future 8-hour ozone concentrations recommends using the model in a relative sense to scale current observed 8-hour ozone Design Values. In order to perform this scaling operation EPA developed the Modeled Attainment Test Software (MATS) tool that uses modeling results, observed 8-hour ozone Design Values to project 8-hour ozone concentrations that reflect the change in emissions from a base case to an alternative emissions scenario.

For the UBAQS, the MATS tool was used to assess the effects of oil and gas development activities as well as regional emissions in the modeling domain on 8-hour ozone. The MATS tool performs 8-hour ozone Design Value projections at existing monitoring sites for comparison with the 8-hour ozone NAAQS. Additionally, the MATS tool has a capability to perform an Unmonitored Area Analysis (UAA) that performs a spatial interpolation of the current year observed 8-hour ozone Design Values using the ozone concentration gradients calculated from the gridded model base year outputs.

Because the nearest existing ozone monitoring location to the Dixie National Forrest is located in Canyonlands National Park, approximately 150 miles to the

east, the UAA developed in the UBAQS was used to provide an assessment of impacts associated with this EIS.

Figures 5.12-2, **5.12-3, 5.12-4, and 5.12-5** below present the current and future year predicted 8-hour ozone design values for the entire UBAQS modeling domain when using modeled meteorological conditions from base years 2005 and 2006 respectively. **Figures 5.12-6** and **5.12-7** present the projected increase or decrease in design value from the base to the future projection year.

Depending on the current year meteorological inputs used for the modeling simulation, the area-weighted average for the regions managed by the Dixie National Forest indicate current and future year 8-hour ozone design values that are at or near the existing 8-hour ozone NAAQS. Specifically, for the 2005 meteorological inputs, the current and future year 8-hour design values range from 70-86ppb depending on the sub-region of the forest that is analyzed. For the 2006 meteorological inputs, the current and future year 8-hour design values range from 70-75ppb depending on the sub-region of the forest that is analyzed. Given the diversity in predicted impacts associated with meteorological inputs the predicted impacts are best reviewed in relative terms, i.e. one should review the predicted change in ozone concentrations due to emissions increases rather than due to meteorological inputs. Figures **Figures 5.12-6 and 5.12-7** below quantify just such and analysis. Depending on the particular sub-region of the forest, design values associated with the impact of potential future oil and gas development, as well as regional growth, is forecast to remain stagnant for much of the Forest with only a slight increase or decrease in some regions. Both growth and contraction of the region's projected 8-hour ozone design values are constrained to less than one part per billion in ambient air.

As a result, the predicted impacts from the UBAQS suggest that regional ozone in the project area is unlikely to vary significantly from its current monitored conditions. When combined with monitored ambient ozone data from Washington County, UT. The UBAQS study suggest that the ozone impacts in the region are likely to remain below the existing ozone NAAQS. Specifically, when the most recent official annual ozone data (observation year 2008) was released for the UDEQ ozone monitoring station at 1215 N. Lava Flow Drive, Santa Clara, Washington County, UT, the closest FRM certified monitor to the project region, the maximum 8-hour average for the entire reporting year was 68ppb. Although the monitoring station has not been in place for three years and therefore a formal design value cannot be calculated, the level of maximum 8-hour ozone would suggest that a shift of only 1ppb, as predicted by the UBAQS study would not be likely to produce ozone levels that would even approach the existing ozone NAAQS. In addition, when data from the nearby Zion National Park ozone monitoring site is used for a similar analysis, the most recent design value (2006-2008) of 72ppb suggests that a increase or decrease of 1ppb would be unlikely to produce exceedances of the ozone NAAQS. These findings support that the connected actions to leasing described in this EIS will not result in a significant impact on regional cumulative ozone concentrations.

Although the UBAQS represents the best available peer-reviewed photochemical modeling simulation which includes the EIS project region, it should be noted that the UBAQS does have potential shortcomings that are recognized by the USFS.

To ensure that all available information is provided with regard to the existing scientific evidence available for review, the following items should be noted in regards to the use of the UBAQS.

1. There is not sufficient air monitoring data in the UBAQS modeling study, because at the
time the study was performed, this data was not available for the area.
2. The UBAQS primary modeling domain was subdivided into 12-km grid squares, instead of the preferred 4-km grids, for a large portion of central and eastern Utah and western Colorado. The accuracy of modeled predictions from a 12-km or greater grid spacing for
areas of complex terrain has tended to be suspect.
3. The UBAQS oil and gas focus area, and associated emission inventory within that area,
comprised the six-counties of the Uintah Basin. The Dixie National Forest occurs outside
this focus area, but was covered within the overall UBAQS statewide modeling domain.
4. The modeling domain was subdivided into 12-km grid squares to provide additional detail on the locations of existing oil and gas emission sources. It is not clear how hypothetical emissions from the Dixie National Forest oil and gas leasing scenarios were reflected in the UBAQS study.
5. The UBAQS future modeled predictions for year 2012 are not particularly useful for project development activities occurring beyond the year 2012.

Given that the UBAQS does contain shortcomings, the USFS feels that its use is appropriate only in the limited exploration and development scenarios inherent to this EIS. Should proposed oil and gas activity exceed the bounds of the scenarios reviewed in this analysis additional ozone analyses need to be completed to affirmatively defend the finding of this EIS. The specific requirements for additional analysis are included in Appendix C of the EIS.

Figure 5.12-2 Current year 8-hour ozone Design Values (DVC) from the enhanced MATS unmonitored area analysis for the 2005 meteorological year.

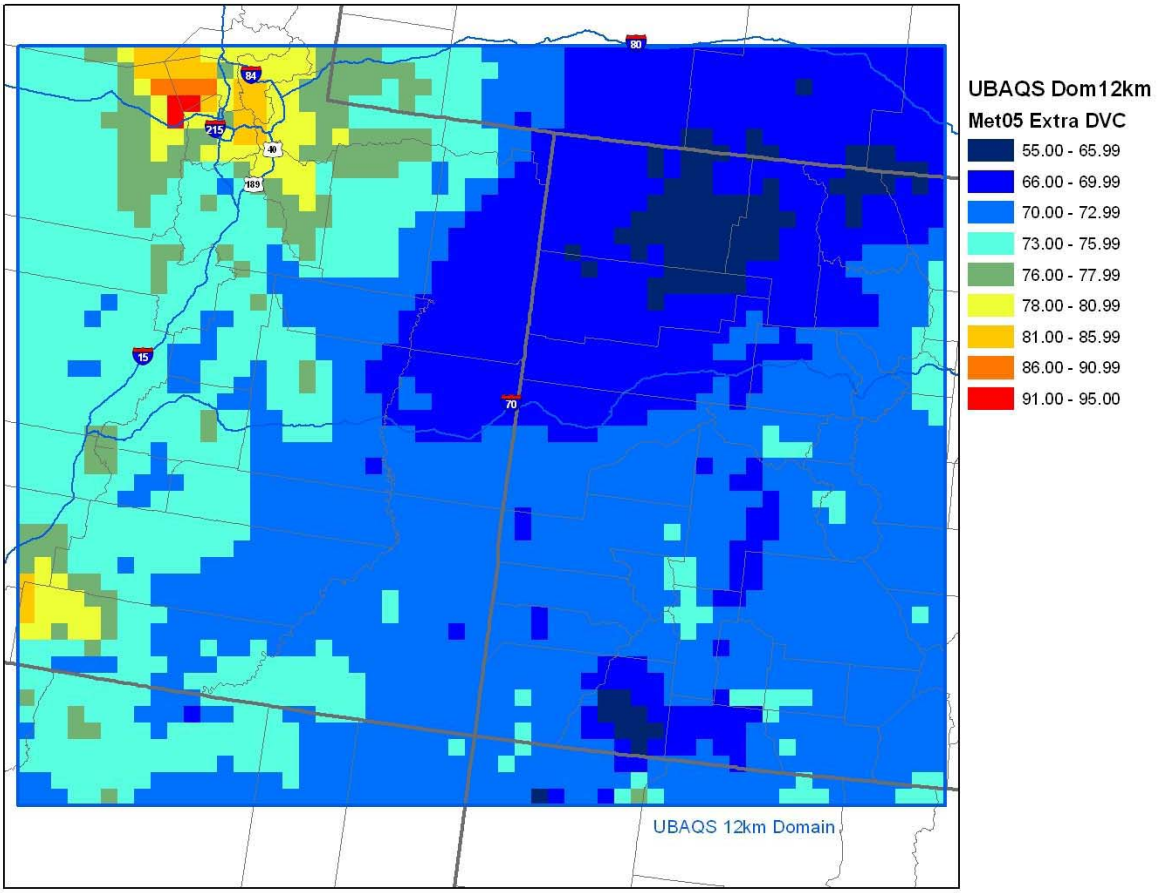


Figure 5.12-3 Current year 8-hour ozone Design Values (DVC) from the enhanced MATS unmonitored area analysis for the 2006 meteorological year.

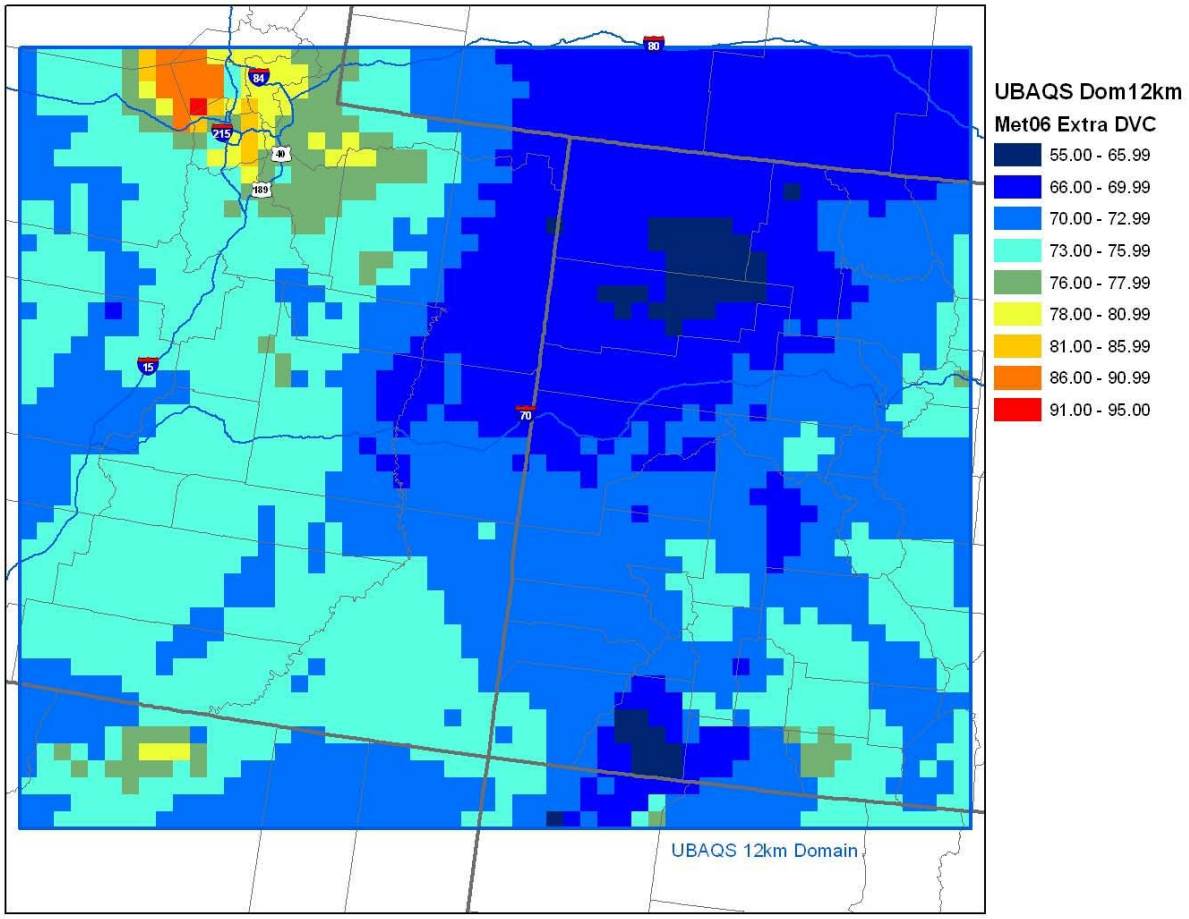


Figure 5.12-4 Projected 2012 8-hour ozone Design Values (DVF) from the enhanced MATS unmonitored area analysis for the 2005 meteorological year.

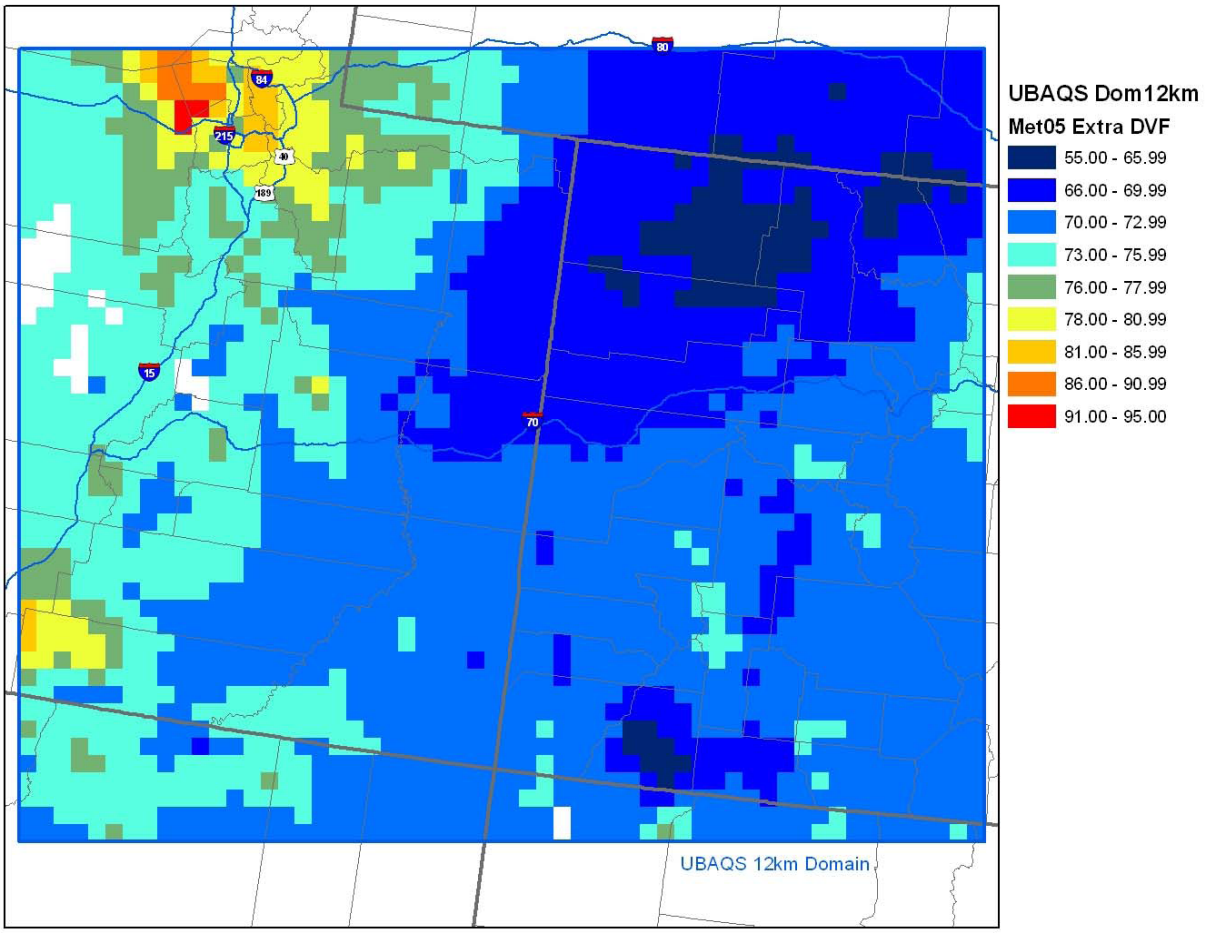


Figure 5.12-5 Projected 2012 8-hour ozone Design Values (DVF) from the enhanced MATS unmonitored area analysis for the 2006 meteorological year.

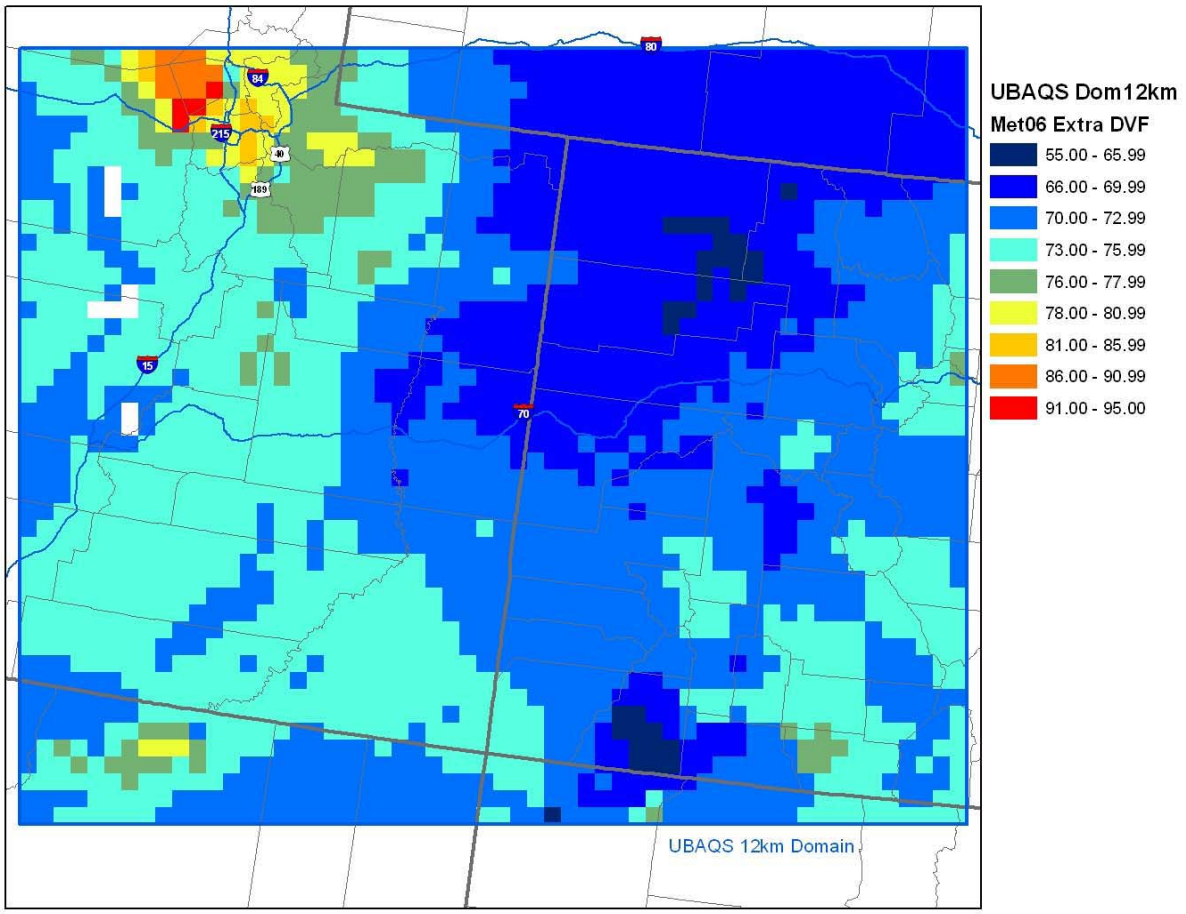


Figure 5.12-6 Differences in the projected 2012 (DVF) and current year (DVC) 8-hour ozone Design Values from the enhanced MATS unmonitored area analysis for the 2005 meteorological year (DVF-DVC).

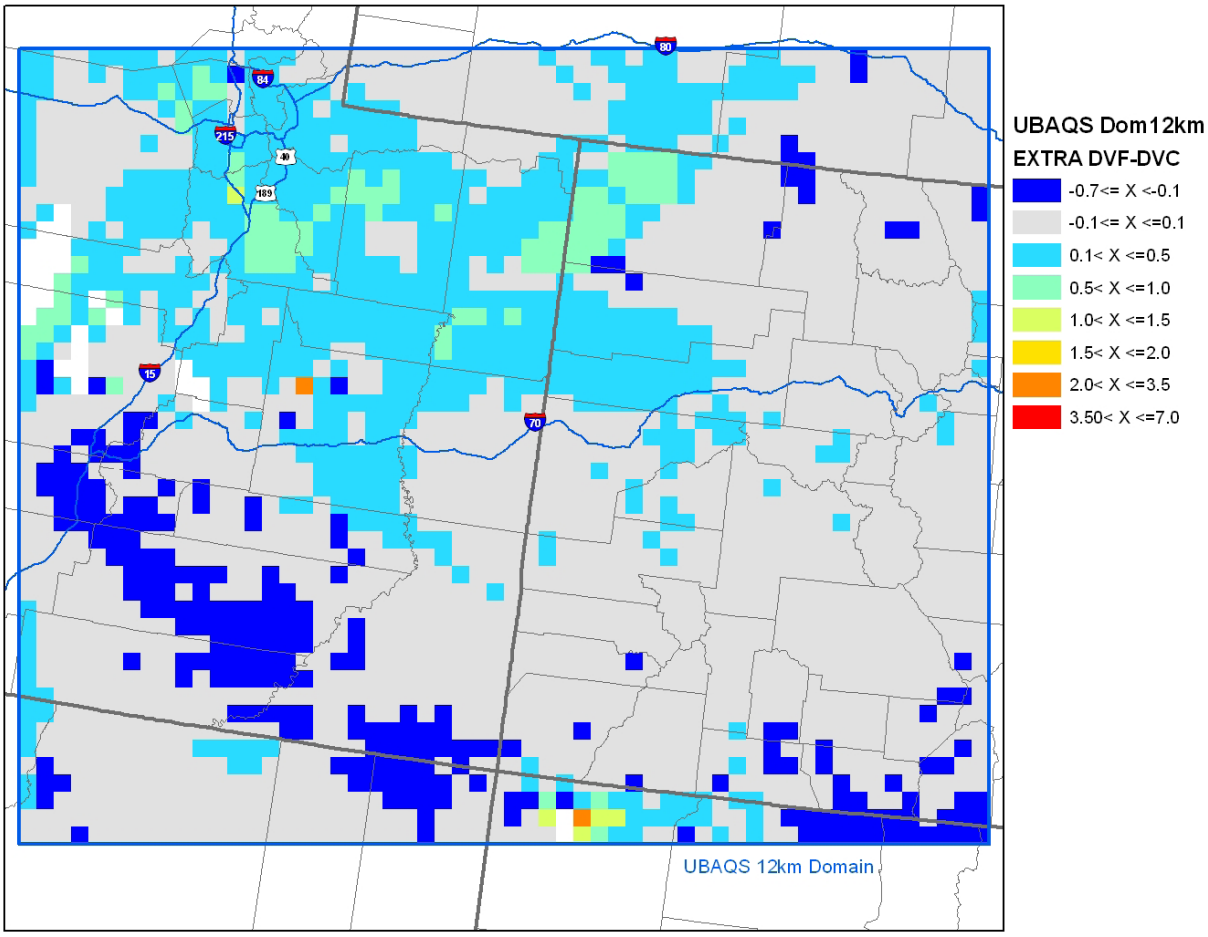
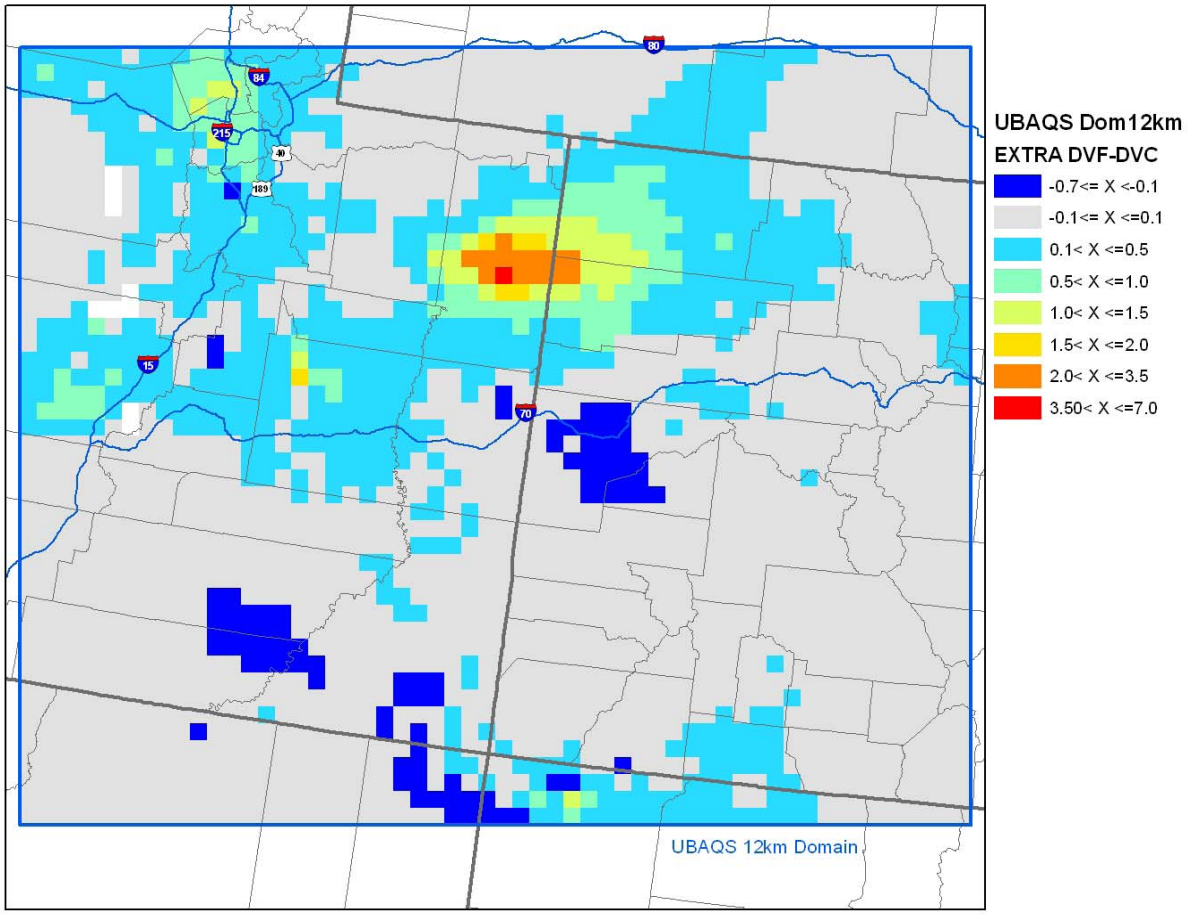


Figure 5.12-7 Differences in the projected 2012 (DVF) and current year (DVC) 8-hour ozone Design Values from the enhanced MATS unmonitored area analysis for the 2006 meteorological year (DVF-DVC).



Page 35

Add new Section before "Climate Change"

Secondary $PM_{2.5}$

As with ozone, secondary $PM_{2.5}$ is not directly emitted into the atmosphere. Instead, secondary $PM_{2.5}$ is formed through the chemical combination of precursor pollutants that have been released into the ambient atmosphere. As a result, $PM_{2.5}$ must be assessed utilizing a regional photochemical modeling simulation. As with ozone, based on a review of the costs associated with completing such an analysis, the USFS was compelled to develop the secondary $PM_{2.5}$ analysis utilizing existing scientifically credible information. Based on the reliance on the Uinta Basin Air Quality Study (UBAQS) for the ozone portion of this EIS, that study was once again selected as the most representative and recently produced assessment of PM2.5 for the Dixie EIS region.

Although the UBAQS contains the shortcoming previously mentioned in Section 5.12.3.1, it remains the most recently developed and technically defensible assessment of region-wide total (primary and secondary) $PM_{2.5}$ impacts for the Dixie National Forest region.

The UBAQS produced an assessment of absolute modeled $PM_{2.5}$ concentrations. These values were generated for the entire 12km modeling domain and can be used for direct comparison to the NAAQS, which are 35 µg m-3 for the 24-hour average and 15 µg m-3 for the annual average. As with the ozone modeling described in Section 5.12.3.1, the absolute modeled $PM_{2.5}$ concentrations were calculated based upon "current" and "future" year emissions assessments. The current year emissions were based on assessments of emissions as they occurred during calendar year 2006 while the future year emissions where based on forecasted emissions growth for all emissions sources to the future year of 2012. Each of these emissions scenarios were modeled utilizing two sets of meteorological conditions. Those observed in calendar year 2005 and those observed in calendar year 2006. These simulations were then used to calculate the absolute modeled $PM_{2.5}$ impacts.

Annual average and 24-hour average $PM_{2.5}$ plots for both meteorological years are shown below in Figures 5.12-8 and 5.12-9, respectively.

For the 2005 meteorological year, the current and future year emissions scenarios show $PM_{2.5}$ annual average values that are less than 15 µg m-3 everywhere in the 12 km domain including throughout the entire Dixie EIS study region, indicating compliance with the NAAQS. In both the current and future year emissions scenarios, the maximum annual average $PM_{2.5}$ value within the 12 km domain is 14 µg m-3 which occurs in the Salt Lake City region. Values within the Dixie EIS study region are not predicted to exceed approximately 6 µg m-3.

For the 2006, meteorological year, the annual $PM_{2.5}$ is within the NAAQS everywhere within the 12 km domain except in the Salt Lake City area, where the maximum value is 17 µg m-3 in both the current and future year emissions scenarios. In both the 2005 and 2006 meteorological years, there is a secondary $PM_{2.5}$ maximum extending from the center of the modeling domain southwest toward the Utah-Arizona border, but this region of elevated PM2.5 does not exceed the annual average standard. The annual average $PM_{2.5}$, impacts are greater in the 2006 meteorological year than in 2005, however in no modeled scenario does absolute $PM_{2.5}$ impacts exceed 9 µg m-3 in the Dixie EIS study region

5.12-9 shows that the 98th percentile of the 24-hour $PM_{2.5}$ (8th highest 24-hour average) is less than the 35 µg m-3 standard over much the domain for both the current and future year emissions scenario, but exceeds 35 µg m-3 in the Salt Lake City area and in the Uinta/Pinceance Basin in east-central Utah/west-central Colorado for both meteorological years. However, in both meteorological years, the Dixie EIS study region is predicted to remain below the 35 µg m-3 standard, and in most locations of the forest the impacts are predicted to be significantly below that value.

The pattern of changes in annual and 24-hour average $PM_{2.5}$ going from current to the future year emissions scenarios are similar in the 2005 and 2006 meteorological years. Maximum increases occur in northeastern Utah in the Uinta Basin and along the Arizona-Utah border and maximum decreases occur in western Colorado in the Piceance Basin, in Southwest Wyoming, and around Salt Lake City. In the Dixie EIS study region, $PM_{2.5}$ impacts are projected to remain relatively constant and will not posed a threat to exiting $PM_{2.5}$ NAAQS on either an annual or 24-hr timescale.

Figure 5.12-8 Modeled annual average PM2.5 for comparison to NAAQS for the 2005 meteorological year (left column) and 2006 meteorological year (right column).

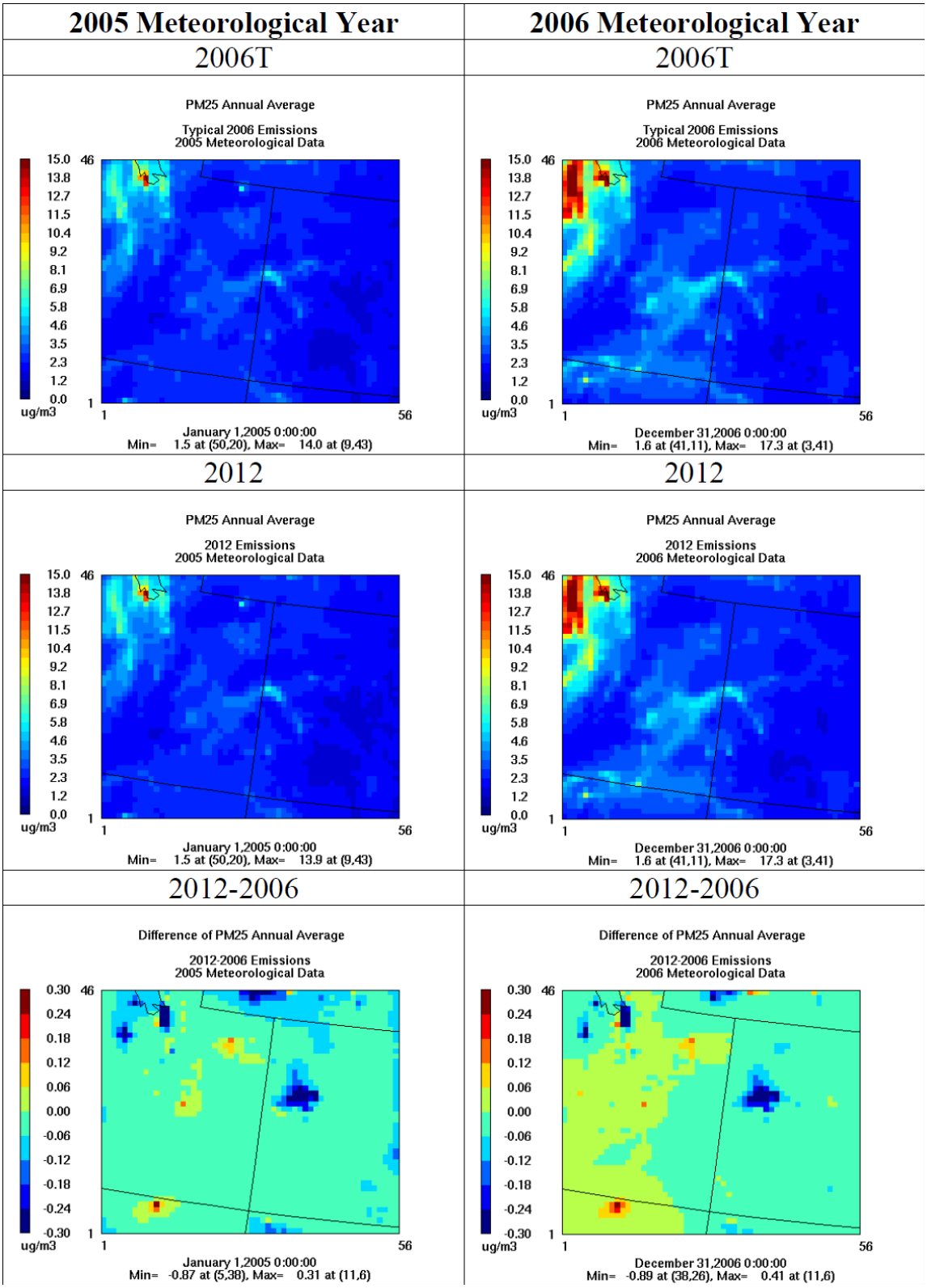
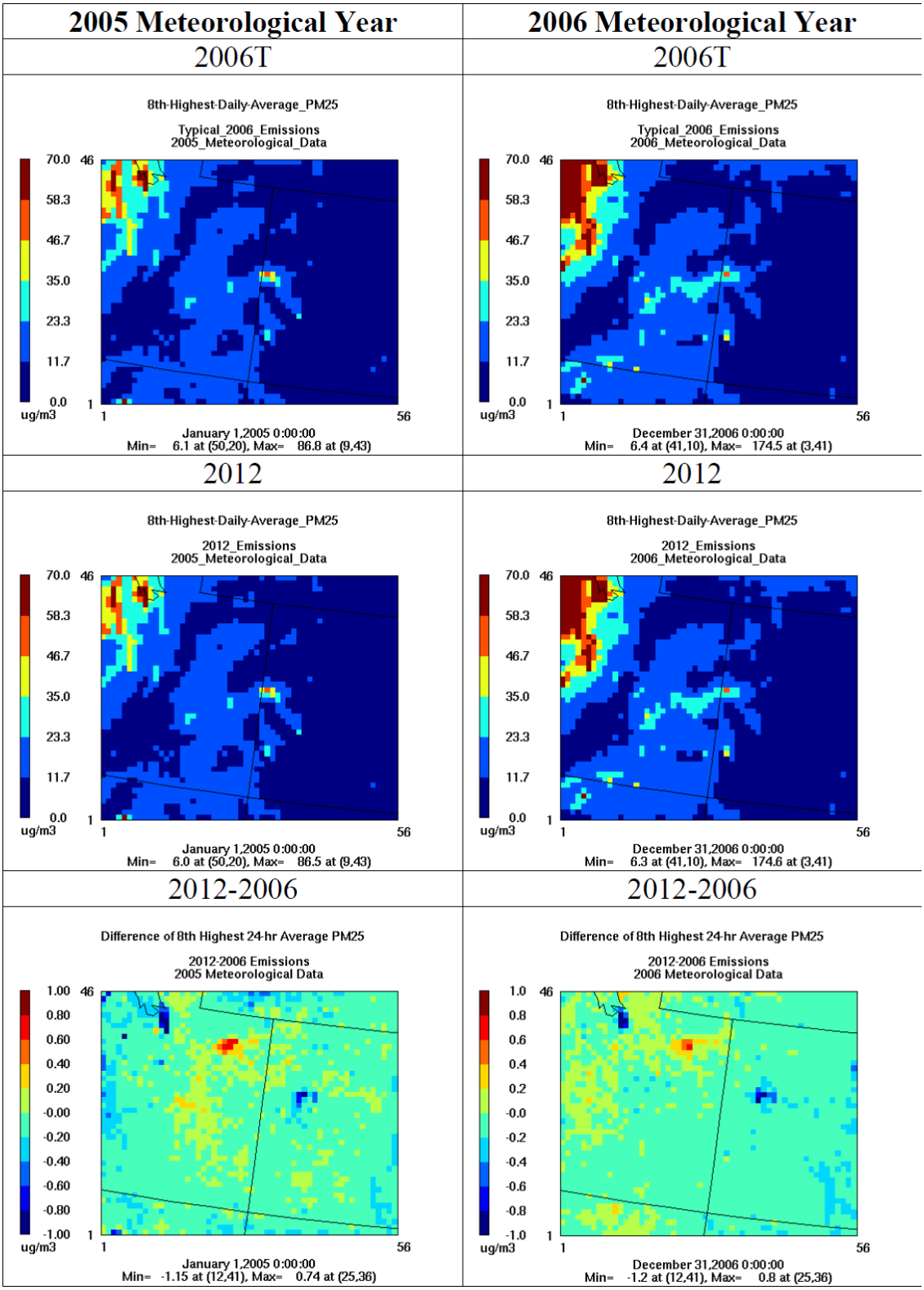


Figure 5.12-9 Modeled 24-hour average PM2.5 for comparison to NAAQS for the 2005 meteorological year (left column) and 2006 meteorological year (right column).



Page 36

Add to end of "Climate Change" section:

> The extent of sagebrush habitat is expected to decline in the future due to climate change, if current predictions are realized, due in large part to the expansion of *Bromus tectorum* under increased carbon dioxide conditions, which would fragment sagebrush habitat and lead to more frequent wildfires (FR 75(55):13910-14014, published 23 March 2010). A decline in sagebrush would indirectly affect wildlife, including special status species that depend on sagebrush, such as greater sage-grouse (Candidate) and pygmy rabbit (Sensitive).

Page 48

Add the following new references:

Independent Petroleum Association of Mountain States (IPAMS). 2009. Uinta Basin air quality study. Denver, Colorado. 31 July 2009.

US Forest Service (USFS), National Park Service (NPS), and US Fish and Wildlife Service (USFWS). 2010. Federal land managers' air quality related values workgroup (FLAG). Phase I Report – REVISED. Natural Resource Report NPS/NRPC/NRR – 2010/232. National Park Service, Denver, Colorado.

Western Regional Air Partnership (WRAP). 2010. Section 309 Regional Haze State Implementation Plan: Overview. Available online at http://www.wrapair2.org/reghaze.aspx.