

SECTION	PAGE
CHAPTER 1 · PURPOSE AND NEED	1.1
CHAPTER 2 · ALTERNATIVES	2.1
CHAPTER 3 · AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	3.1
3.1 AIR QUALITY	3.6
3.2 SOILS	3.49
3.3 WATER	3.51
3.4 AQUATIC ECOSYSTEMS AND FISH SPECIES	3.60
3.5 RIPARIAN AREAS AND WETLAND ECOSYSTEMS	3.65
3.6 TERRESTRIAL ECOSYSTEMS AND PLANT SPECIES	3.67
3.7 SPECIAL BIOLOGICAL DIVERSITY FEATURES	3.69
3.8 FIRE AND FUELS	3.70
3.9 INSECTS AND DISEASE	3.71
3.10 TERRESTRIAL WILDLIFE AND WILDLIFE SPECIES	3.72
3.11 INVASIVE SPECIES	3.82
3.12 TIMBER MANAGEMENT AND WOOD PRODUCTS	3.84
3.13 SPECIAL FOREST PRODUCTS	3.85
3.14 LIVESTOCK GRAZING MANAGEMENT	3.86
3.15 MINERALS AND ENERGY: FLUID MINERALS	3.88
3.16 MINERALS AND ENERGY: SOLID MINERALS	3.89
3.17 MINERALS AND ENERGY: GEOTHERMAL ENERGY	3.90
3.18 MINERALS AND ENERGY: ALTERNATIVE ENERGY SOURCES	3.91
3.19 ACCESS AND TRAVEL MANAGEMENT	3.92
3.20 RECREATION	3.94
3.21 HERITAGE AND CULTURAL RESOURCES	3.96
3.22 SCENERY, VISUAL RESOURCES, AND THE BUILT ENVIRONMENT	3.99
3.23 LANDS AND SPECIAL USES	3.101
3.24 UTILITY CORRIDORS AND COMMUNICATIONS SITES	3.102
3.25 ECONOMICS	3.103
3.26 DEMOGRAPHICS	3.106
3.27 LOCAL GOVERNMENTS	3.107
3.28 RESEARCH NATURAL AREAS	3.112
3.29 AREAS OF CRITICAL ENVIRONMENTAL CONCERN	3.113
3.30 PALEONTOLOGICAL RESOURCES	3.114
3.31 SCENIC BYWAYS	3.115
3.32 NATIONAL RECREATION AND SCENIC TRAILS	3.116
3.33 WILD AND SCENIC RIVERS	3.117
3.34 WILDERNESS AND ROADLESS AREAS	3.118
3.35 OTHER FINDINGS	3.119

CHAPTER 4 · PREPARERS	4.1
CHAPTER 5 · REFERENCES	5.1
CHAPTER 6 · LIST OF ACRONYMS	6.1

LIST OF TABLES

S-1.1	Surface Ownership in the Gothic Shale Gas Play (GSGP) Area	2
S-2.1	Oil and Gas Availability by Alternative (reprinted from the Draft EIS Table 2.9.6 in Chapter Two)	3
S-2.2	Summary Table of 2006 RFD and 2009 RFD for Well, Well Pad, and Surface Disturbance Projections for the San Juan Public Lands Planning Area	4
S-2.3	Projected Wells in the Gothic Shale Gas Play (GSGP) for Federal and Non-Federal Mineral Estate	4
S-2.4	GSGP Projected Activities with DRAFT EIS Projections for the San Juan Public Lands: Alternative A	5
S-2.5	GSGP Projected Activities with DRAFT EIS Projections for the San Juan Public Lands: Alternative B	5
S-2.6	GSGP Projected Activities with DRAFT EIS Projections for the San Juan Public Lands: Alternative C	5
S-2.7	GSGP Projected Activities with DRAFT EIS Projections for the San Juan Public Lands: Alternative D	6
S-2.8	GSGP Projected Activities with DRAFT EIS Projections for the San Juan Public Lands: No Lease Alternative	6
S-2.9	Oil and Gas Leasing Availability by Alternative for the GSGP Area (acres)	6
S-3.0.2	Projected Cumulative Development Statistics (including Draft EIS projections for the Paradox Basin and the GSGP area)	5
S-3.1.1	Background Air Quality Data	7
S-3.1.2	Four Highest Daily 1-hour Average NO ₂ Measurements in 2008 and 2009 at Shamrock Station near Bayfield, Colorado (Air Resource Specialists, 2009 and 2010)	7
S-3.1.3	Four Highest 8-hour Average Ozone Measurements in 2008 and 2009 at Shamrock Station near Bayfield, Colorado (Air Resource Specialists, 2008 and 2009)	8
S-3.1.4	Background Deposition Data, Mesa Verde National Park	10
S-3.1.5	Air Quality Standards, Increments, and AQRV Criteria	15
S-3.1.6	Well Numbers Current Federal Leases and on State and Private Lands	20
S-3.1.7	Well Numbers for Maximum Potential Development (RFD) on Currently Un-leased Lands	20
S-3.1.8	Incremental Impacts to NO ₂ Concentrations from Leased and Unleased Lands in the Paradox Basin	21
S-3.1.9	Comparison of Maximum Predicted NO ₂ Impacts Compared to NAAQS and PSD Increments	21
S-3.1.10	Incremental Impacts to SO ₂ Concentrations from Leased and Unleased Lands in the Paradox Basin	23
S-3.1.11	Comparison of Maximum Predicted SO ₂ Impacts Compared to NAAQS and PSD Increments	24
S-3.1.12	Incremental Impacts to PM ₁₀ and PM _{2.5} Concentrations from Leased and Unleased Lands in the Paradox Basin	27
S-3.1.13	Comparison of Maximum Predicted PM _{2.5} Impacts Compared to NAAQS and PSD Increments	28

S-3.1.14	Comparison of Maximum Predicted PM ₁₀ Impacts Compared to NAAQS and PSD Increments	28
S-3.1.15	Nitrogen and Sulfur Deposition at Mesa Verde National Park Class I area from Leased and Unleased Lands in the Paradox Basin	29
S-3.1.16	Percent Change Acid Neutralizing Capacity High Mountain Lakes in Weminuche from Nitrogen and Sulfur Deposition, RFD Scenario	30
S-3.1.17	Cumulative % Change Acid Neutralizing Capacity High Mountain Lakes in Weminuche from Nitrogen and Sulfur Deposition	30
S-3.1.18	CALPUFF Modeling Results Compared to Class I Areas in the Modeling Domain Having IMPROVE Monitors	31
S-3.1.19	Visibility Method 6 for the RFD Scenario at Class I Areas. Estimated Maximum Change in Extinction Coefficient (b_{ext}), Number of Days with Extinction Changes Greater than 5% and Greater than 10%	32
S-3.1.20	Visibility Method 6 for the RFD Scenario at Class II Areas. Estimated Maximum Change in Extinction Coefficient (b_{ext}), Number of Days with Extinction Changes Greater than 5% and Greater than 10%	33
S-3.1.21	Greenhouse Gas Emissions RFD Scenario	34
S-3.1.22	Well Numbers Current Federal Leases and on State and Private Lands	34
S-3.1.23	Comparison of Maximum Predicted NO ₂ Impacts Compared to NAAQS and PSD Increments, No Lease Alternative	35
S-3.1.24	Comparison of Maximum Predicted SO ₂ Impacts Compared to NAAQS and PSD Increments	36
S-3.1.25	Comparison of Maximum Predicted PM _{2.5} Impacts Compared to NAAQS and PSD Increments	38
S-3.1.26	Comparison of Maximum Predicted PM ₁₀ Impacts Compared to NAAQS and PSD Increments	38
S-3.1.27	Nitrogen and Sulfur Deposition at Mesa Verde National Park Class I area from Leased and Unleased Lands in the Paradox Basin	39
S-3.1.28	% Change Acid Neutralizing Capacity High Mountain Lakes in Weminuche from Nitrogen and Sulfur Deposition, RFD Scenario	40
S-3.1.29	Cumulative % Change Acid Neutralizing Capacity High Mountain Lakes in Weminuche from Nitrogen and Sulfur Deposition	40
S-3.1.30	Visibility Method 6 for the No Lease Alternative at Class I Areas. Estimated Maximum Change in Extinction Coefficient (b_{ext}), Number of Days with Extinction Changes Greater than 5% and Greater than 10%	41
S-3.1.31	Visibility Method 6 for the No Lease Alternative at Class II Areas. Estimated Maximum Change in Extinction Coefficient (b_{ext}), Number of Days with Extinction Changes Greater than 5% and Greater than 10%	42
S-3.1.32	Estimated Greenhouse Gas Emissions, No Lease Alternative	42
S-3.1.33	Summary of Mitigation Options Considered to Reduce Air Pollution Emissions, RFD Scenario	44
S-3.3.1	Ac-ft of Water for the Drilling and Completion of Wells on Currently Leased and Unleased Federal Lands in the Gothic Shale Gas Play Area	52
S-3.3.2	Summary of Watersheds within the GSGP Area Most Sensitive to Anthropogenic Disturbances (Appendix J, SJPL Draft LMP)	56
S-3.3.3	Summary of Key Salient Points for Proposed Alternatives*	57
S-3.4.1	Projected Water Used in Well Drilling, Fracturing, and Completion (Acre-Feet) for the GSGP over a period of 15 Years for USFS lands, BLM lands and Non-Federal Leases under Alternative A	61
S-3.4.2	Projected Number of Gas Wells and Water Used in Well Drilling, Fracturing, and Completion (Acre-Feet) for the GSGP over a period of 15 years by Major River Basin for USFS lands and BLM lands under Alternative A	61

S-3.4.3	Projected Surface Disturbance (in acres) for Gas Well Development in the GSGP Over a period of 15 Years for USFS lands, BLM lands and Non-Federal Leases under Alternative A	61
S-3.10.1	Gunnison Sage-Grouse Habitat with Federal Minerals within the Gothic Shale Play Area	76
S-3.14.1	Direct, Indirect and Cumulative Impacts of Oil and Gas Activities within the Gothic Shale Gas Play	87
S-3.25.1	Projected Changes in Employment (jobs) for the 5-County Colorado Area and San Juan County, New Mexico Related to Minerals by Alternative in 2015	104
S-3.25.2	Projected Changes in Labor Income (millions) for the 5-County Colorado Area and San Juan County, New Mexico Related to Oil and Gas by Alternative in 2015	104
S-3.27.1	Projected Impacts to Colorado FML Receipts Originating in the Counties Potentially Affected by the SJPL Minerals Program by Alternative for 2015 (thousands)	108
S-3.27.2	Projected Impacts to Local Property Tax Revenue (thousands) Originating in the Potentially Affected Counties Related to the SJPL Minerals Program by Alternative for 2015	109
S-3.27.3	Projected Impacts to State and Local Sales Tax Revenue (thousands) Originating in the Potentially Affected Counties Related to the SJPL Minerals Program by Alternative for 2015	110

LIST OF FIGURES

S-1.1	Gothic Shale Gas Play Area	1.3
S-3.1.1	Human Caused NO _x Emissions within the Four Corners Region (4 km domain)	3.9
S-3.1.2	Human Caused VOC Emissions within the Four Corners Region (4 km domain)	3.9
S-3.1.3	Mean Extinction 2000 - 2006 by Class I Area.	3.11
S-3.1.4	20% Worst Days Extinction 2000 - 2006 by Class I Area.	3.11
S-3.1.5	CALPUFF Modeling Domain, with Class I and Class II Areas to be Evaluated	3.18
S-3.1.6	Fine Grid (8 km) Receptors in the San Juan Public Lands Region, and Coarse Grid	3.18
S-3.1.7	Composite of the Cumulative Highest Second-Highest 24-Hour SO ₂ Modeled Impacts for 2001-2003 including the RFD Scenario Wells	3.26