Appendix F

Projected Activities for Impacts Analysis

INTRODUCTION

This appendix, in conjunction with Chapter 2 of the Final Environmental Impact Statement (FEIS), describes the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) projected activities and assumptions that were used in the analysis of environmental consequences in Chapter 3 of the FEIS. All figures in this document are estimates of outputs and suitable acres.

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Fuels Treatment	Alternative A	Alternative B	Alternative C	Alternative D
Pinvon-iuniner	500 mastication	500 mastication	500 mastication	1,000 mastication
i myön jumper	500 prescribed fire	500 prescribed fire	500 prescribed fire	500 prescribed fire
Mixed	2,000 mastication	2000 mastication	2000 mastication	2,000 mastication
shrubland	1,000 prescribed fire	1000 prescribed fire	1000 prescribed fire	1,000 prescribed fire
	1,000 mastication	1000 mastication	1000 mastication	1,500 mastication
Dondorogo nino	3,500 prescribed fire	3500 prescribed fire	3500 prescribed fire	3,500 prescribed fire
Ponderosa pine	500 mechanical	500 mechanical	500 mechanical	500 mechanical
	restoration	restoration	restoration	restoration
Worm dry	1,000 prescribed fire	1,000 prescribed fire	1,000 prescribed fire	1,000 prescribed fire
walli uly mixed conifer	500 mechanical	500 mechanical	500 mechanical	500 mechanical
inixed conner	restoration	restoration	restoration	restoration
Mixed	1 to 20,000	1 up to 50,000 fire	1 up to 50,000 fire	1 up to 50,000 fire
wasstation	fire managed for	managed for resource	managed for resource	managed for resource
vegetation	resource benefit	benefit	benefit	benefit
	1 to 20,000 fire	1up to 50,000 fire	1 up to 50,000 fire	1 up to 50,000 fire
Spruce-fir	managed for resource	managed for resource	managed for resource	managed for resource
	benefit	benefit	benefit	benefit

 Table F.1: San Juan National Forest Acres of Fuels Treatments by Cover Type (average acres, per year, over the life of the Land and Resource Management Plan)

Table F.2: Tres Rios Field Office Acres of Fuels Treatments by	Cover Type (average acres, per year, over the
life of the Land and Resource Management Plan)	

Fuels Treatment	Alternative A	Alternative B	Alternative C	Alternative D
Dinuon juninor	500 mastication	500 mastication	500 mastication	500 mastication
Pinyon-jumper	500 prescribed fire	500 prescribed fire	500 prescribed fire	500ac prescribed fire
Mixed	500 mastication	500 mastication	500 mastication	500 mastication
shrubland	500 prescribed fire	500 prescribed fire	500 prescribed fire	500 prescribed fire
	500 mastication	500 mastication	500 mastication	500 mastication
Dondorosa nino	500 prescribed fire	500 prescribed fire	500 prescribed fire	500 prescribed fire
r onderosa pine	200 mechanical	200 mechanical 200 mechanical		200 mechanical
	restoration	restoration	restoration	restoration
Worm dry	500 prescribed fire	500 prescribed fire	500 prescribed fire	500 prescribed fire
mixed conifer	500 mechanical	500 mechanical	500 mechanical	500 mechanical
mixed conner	restoration	restoration	restoration	restoration
Mixed	1 up to 10,000 fire	1 up to 10,000 fire	1 up to 10,000	1 up to 10,000 fire
winted	managed for resource	managed for resource	fire managed for	managed for resource
vegetation	benefit	benefit	resource benefit	benefit
	1 up to 10,000 fire	1 up to 10,000 fire	1 up to 10,000	1 up to 10,000 fire
Spruce-fir	managed for resource	managed for resource	fire managed for	managed for resource
	benefit	benefit	resource benefit	benefit

Cover Type	Alternative A	Alternative B	Alternative C	Alternative D
Dondorogo nino	1,000 Rest*	1,000 Rest*	900 Rest*	1,500 Rest*
Ponderosa pine	500 PC	500 PC	400 PC	500 PC
Warme dry mined souther	250	250 Rest*	200 Rest*	500 Rest*
warm-dry mixed confier	Rest* 250 PC	250 PC	225 PC	250 PC
Cool-moist mixed conifer	400 PC	250 PC	40 PC	575 PC
Aspen	400 CC	500 CC	400 CC	600 CC
Spruce-fir	100 PC	100 PC	40 PC	226 PC

Table F.3: San Juan National Forest Timber Treatment Acres by Cover Type (average acres, p	oer year,	over
the life of the Land and Resource Management Plan)		

* Also counted as mechanical fuels acres.

PC = Partial cut; Rest = Restoration harvest; CC = Clearcut.

Table F.4: Tres Rios Field Office Timber Treatment Acres by Cover Type (average acres, per year, over the life of the Land and Resource Management Plan)

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Cover Type	Alternative A	Alternative B	Alternative C	Alternative D
Ponderosa pine	150 Rest*	150 Rest*	130 Rest*	200 Rest*
Warm-dry mixed conifer	25 Rest*	25 Rest*	N/A	40 Rest*
Cool-moist mixed conifer	N/A	N/A	N/A	N/A
Aspen	N/A	N/A	N/A	N/A
Spruce-fir	10 PC	10 PC	4 PC	24 ac PC

* Also counted as mechanical fuels acres.

PC = Partial cut; Rest = Restoration harvest; CC = Clearcut.

Table F.5: Watershed, Riparian, and Aquatic Habitat Improvement Projections by Alternative

Estimated Management	Alternative A	Alternative B	Alternative C	Alternative D
Activities				
• BLM stream improvements	1 mile	1 mile	5 miles	0 miles
 BLM riparian improvements 	10 acres	50 acres	100 acres	10 acres
• BLM lake/fen Improvements	1 acre	1 acre	5 acres	0 acres
• BLM stream structure projects	10 structures	10 structures	20 structures	10 structures
(new or maintained)	19 structures	19 structures	50 structures	19 structures
• BLM riparian and watershed	11 agree	51 acres	105 acres	10 agres
improvement	11 acres	51 acres	105 deres	10 acres
 USFS riparian and watershed 	30 acres	150 acres	300 acres	150 acres
improvement	50 acres	150 acres	500 acres	150 deres
 USFS or BLM fish habitat 	6 miles	6 miles	0 miles	5 miles
enhanced or improved	0 111105	0 111105	9 miles	5 miles
 USFS or BLM watershed road 				
densities reduced (e.g., road	0 mile	3 miles	10 miles	0 miles
decommissioning)				

Table F.6: Wildlife Habitat Improvement

Estimated Management	Alternative A	Alternative B	Alternative C	Alternative D
Activities				
BLM Gunnison's sage grouse	1,500 acres	2,500 acres	2,500 acres	1,000 acres
habitat improvement and				
restoration				
BLM and USFS Nokomis	1 site	2 sites	2 sites	0 sites
fritillary butterfly habitat				
improvement and restoration				
BLM and USFS bat habitat	All	All	All	All
restoration and protection via				
installation of structures				

		A 14 D		
Estimated Management	Alternative A	Alternative B	Alternative C	Alternative D
Activities				
associated with mine closures				
USFS inventory and monitor	3,000 acres	5,000 acres	5,000 acres	2,500 acres
wildlife special status species				
USFS terrestrial wildlife habitat	1,500 acres	2,000 acres	2,000 acres	1,500 acres
improvement and restoration				
USFS ponderosa pine restoration	1,000 acres	3,000 acres	3,000 acres	2,000 acres
to support associated wildlife				
populations				
USFS cool-moist mixed conifer	1,000 acres	2,000 acres	2,000 acres	1,000 acres
and spruce-fir restoration to				
support associated wildlife				
populations				
USFS winter range habitat	1,500 acres	5,000 acres	2,500 acres	1,500 acres
improvement for big game				
USFS aspen restoration to	1,000 acres	3,000 acres	3,000 acres	1,000 acres
support associated wildlife				
populations				

PROJECTED OIL AND GAS DEVELOPMENT ASSUMPTIONS

The leasing decisions associated with this Land and Resource Management Plan (LRMP) and FEIS include which lands are available for lease and for those lands made available, as well as which stipulations will be applied to mitigate potential impacts from development. The leasing decisions primarily focus on future leases. However, the analysis does consider the potential impacts of new development on already leased lands, as well as cumulative impacts from development of adjacent non-federal mineral development (i.e., private, state, other).

Within the planning area there are three basins with moderate to high potential for mineral occurrence: the Paradox Basin (referred to as the Paradox Leasing Analysis Area [PLAA] for this analysis), the Northern San Juan Basin (NSJB) and the San Juan Sag. This analysis focuses on the PLAA because it is the area with the highest leasing interest within the planning area, as well as having high development potential as reflected in the Reasonably Foreseeable Development projections for the area, and because much of the area is currently unleased and subject to lease after approval of the LRMP. On the basis of these factors, the impacts from oil and gas focus on the PLAA.

The NSJB, primarily on San Juan National Forest (SJNF) lands, also has high potential for development. However, unlike the Paradox Basin, the NSJB is fully leased and developed. Within the NSJB, the remaining question is how to condition further development of existing leases as additional wells are proposed. Anticipated development would involve constructing infill wells on existing, expanded well pads. The analysis of NSJB development and the relation to the revised LRMP decisions is also analyzed in this chapter.

A third area with potential is the San Juan Sag. Given the limited past limited development history in the San Juan Sag, only one to two exploratory wells, annually, over the life of the LRMP are projected for the San Juan Sag. Because of the assumed minimal leasing interest in the San Juan Sag, and minimal development projections, the FEIS does not include a detailed analysis San Juan Sag.

Hence, the following development assumptions focus primarily on the PLAA area, including shale gas development associated with the Gothic Shale Gas Play (GSGP) and conventional oil and gas development. The additional development projected on already leased lands in the NSJB, follow the PLAA assumptions. And lastly, the minor projections for the San Juan Sag are included.

Paradox Basin Projected Development Assumptions for Shale Gas and Conventional Oil and Gas Development

Surface Disturbance Assumptions for Conventional Oil or Gas Wells in the Paradox Basin

- Well pad disturbance includes pads, roads and water ponds and construction impacts.
- Average pad disturbance per producing well = 1.6 acres.
- Average road disturbance per well = 2.4 acres/0.5 miles.
- Total surface disturbance per well = 4 acres.

Surface Disturbance Assumptions for Shale Gas Wells

- Well pad disturbance includes pads, reserve pits, fresh water storage ponds and construction impacts.
- Average pad disturbance per single well on a single pad = 4.5 acres.
- Average pad disturbance per two wells on single pad = 5.5 acres.
- Forty-four percent (44%) of the development will be on single well/pad locations and 56% will be on two wells/pad location.

- Average road disturbance per well = 2.4 acres/0.5 mile.
- Total surface disturbance single well on a single pad = 6.9 acres.
- Total surface disturbance two wells per pad = 7.9 acres.
- Associated flow lines will be collocated in access road rights-of-way = 0 acres of surface disturbance.
- Downhole well spacing for the GSGP area is assumed to be 160 acres (i.e., four wells per square mile). Pad spacing is assumed to be 320 acres (i.e., two pads per square mile).

Assumptions for Well Site-related Surface Disturbance

- One major gas transmission pipeline may be needed as the GSGP develops and is assumed to be located on private surface land.
- Gathering pipelines, compressor stations, and gas processing plants may be needed and are assumed to be located on public (60%) and private surface (40%) land and parallel to an existing pipeline corridor in the area.

Disposal of Waste Water and Fracing Material Assumptions (GSGP)

- No evaporative pits would be authorized on public lands.
- At a minimum, waste water would be disposed of according to U.S. Environmental Protection Agency and Colorado Department of Public Health and Environment standards

Water Consumption Assumptions

- Water consumption for a <u>conventional well</u> in the Paradox Leasing Area would equal 32,000 barrels (i.e., 1,000,000 gallons or 3.1 acre-feet of water)—plus or minus 25%, meaning that the exact amount is a function of well depth.
- Water consumption for a typical <u>GSGP well</u> would use 100,000 barrels (4,200,000 gallons) of water to drill, fracture and complete the well. No water would be obtained from public lands. All water would be purchased by the gas companies from private sources. There would be a 40% water recycle rate, meaning that 60,000 barrels would be required on average per well after the first well is supplied.
 - 100,000 barrels of water = 4,200,000 gallons of water = 12.89 acre-feet of water
 - 60,000 barrels of water = 2,520,000 gallons of water = 7.73 acre-feet of water
 - 8 gas wells to a cluster over 2 sections, since there will be 4 gas wells/section
 - 1st well will need 100,000 barrels or 12.89 acre-feet of water to drill, fracture, and complete
 - 2nd through 8th wells will need 60,000 barrels or 7.73 acre-feet of water to drill, fracture, and complete

The following tables include projections for BLM and National Forest System lands for leased and unleased lands, and for the GSGP area and conventional gas development within the PLAA.

Well Pads

Table F.7: Number of Gothic Shale Gas Play and Conventional<u>Well Pads</u> on <u>Unleased</u> Lands in the Paradox Leasing Analysis Area

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF GSGP well pads	342	321	286	341	0
BLM GSGP well pads	122	80	73	111	0
SJNF conventional well pads	110	107	79	109	0
BLM conventional well pads	91	75	65	83	0
Total	665	583	503	644	0

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF GSGP	67	67	67	67	67
BLMGSGP	180	180	180	180	180
SJNF conventional	8	8	8	8	8
BLM conventional	103	103	103	103	103
Total	358	358	358	358	358

Table F.8: Number of <u>V</u>	<u>Well Pads</u> Gothie	e Shale Gas Plag	y and Conventional	<u>Leased</u> Lands in	the Paradox
Leasing Analysis Area					

Table F.9: Total Conventional and Gothic Shale Gas Play <u>Well Pads</u> On Leased and Unleased Lands in the Paradox Leasing Analysis Area

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF	527	503	440	525	75
BLM resource area	496	438	421	477	283
Total	1,023	941	861	1,002	358

Wells

Table F.10: Number of Conventional and Gothic Shale Gas Play <u>Wells</u> on <u>Unleased</u> Lands in the Paradox Leasing Analysis Area by Jurisdiction

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF Unleased Conventional	110	107	79	109	0
BLM Unleased Conventional	91	75	65	83	0
SJNF Unleased GSGP	476	446	401	475	0
BLM Unleased GSGP	172	114	102	156	0
Total	849	742	647	823	0

Table F.11: Number of Conventional and Gothic Shale Gas Play	<u>Wells</u> on <u>Leased</u> Lands in the Paradox
Leasing Analysis Area by Jurisdiction	

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF leased Conventional	8	8	8	8	8
BLM leased Conventional	103	103	103	103	103
SJNF leased GSGP	93	93	93	93	93
BLM leased GSGP	248	248	248	248	248
Total	452	452	452	452	452

 Table F.12: Total of Combined Conventional and Gothic Shale Gas Play Wells
 On Leased and Unleased

 Lands in the Paradox Leasing Analysis Area

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF	687	654	581	685	101
BLM resource area	614	540	518	590	351
Total	1,301	1,194	1,099	1,275	452

Road Miles

 Table F.13: <u>Road Mile</u> Projections, by Jurisdiction on <u>Unleased</u> Lands for Conventional and Gothic Shale

 Gas Play within the Paradox Leasing Analysis Area, by Alternative

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF road miles conventional	56	53	40	54	0
BLM resource area road miles conventional	45	38	32	41	0
SJNF road miles GSGP	172	161	142	167	0
BLM resource area road miles GSGP	61	40	37	55	0
Total	334	292	251	317	0

 Table F.14: <u>Road Mile</u> Projections, by Jurisdiction on <u>Leased</u> Lands for Conventional and Gothic Shale Gas

 Play within the Paradox Leasing Analysis Area, by Alternative

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF road miles conventional leased	4	4	4	4	4
BLM resource area road miles conventional leased	50	50	50	50	50
SJNF road miles GSGPleased	40	40	40	40	40
BLM resource area road miles conventional GSGP leased	89	89	89	89	89
Total	183	183	183	183	183

 Table F.15: Total Combined Road Mile Projections on Leased and Unleased Lands for Conventional and Gothic Shale Gas Play within the Paradox Leasing Analysis Area, by Alternative

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
USFS conventional and GSGP					
acres of disturbance	272	258	226	265	44
BLM conventional and GSGP acres					
of disturbance	245	217	208	235	139
Total	517	475	434	500	183

Surface Disturbance

Table F.16: Total <u>Acres of Disturbance on Unleased</u> Lands for Gothic Shale Gas Play and Conventional Development

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF acres of disturbance conventional	440	425	320	435	0
BLM resource area acres of disturbance conventional	365	300	265	335	0
SJNF acres of disturbance GSGP	2,600	2,440	1,920	2,590	0
BLM resource area acres of disturbance conventional GSGP	925	608	545	805	0
Total	4,330	3,773	3,050	4,165	0

Table F.17: Total	Acres of Disturbance on	Leased Lands for Goth	ic Shale Gas Play	and Conventional
Development			-	

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
SJNF acres of disturbance conventional leased	35	35	35	35	35
BLM resource area acres of disturbance conventional leased	410	410	410	410	410
SJNF acres of disturbance GSGP leased	495	495	495	495	495
BLM resource area acres of disturbance conventional GSGP leased	1,370	1,370	1,370	1,370	1,370
Total	2,310	2,310	2,310	2,310	2,310

Table F.18: Total Combined Acres of Disturbance on Leased and Unleased Lands for Conventional and Gothic Shale Gas Play w/in the Paradox Leasing Analysis Area, by Alternative

Jurisdiction	Alt A	Alt B	Alt C	Alt D	No Lease
USFS conventional and GSGP	3,570	3,395	2,770	3,555	530
acres of disturbance					

BLM conventional and GSGP acres of disturbance	3,070	2,688	2,590	2,920	1,780
Total	6,640	6,083	5,360	6,475	2,310

Table F.19: Cumulative Gas Development – Paradox Basin Planning Area (including Draft Environmental Impact Statement projections for the Paradox Basin and the new Gothic Shale Gas Play area projections)

	FED	ERAL LI	EASES	PRIVATE AND STATE LEASES			
	Number	Miles	Total acres	Number	Miles	Total acres	
	of well	of	of	of well	of	of	
	pads	road	disturbance	pads	road	disturbance	
Existing wells	171	87	pprox 680	90	≈ 45	≈ 360	
GSGP - projected on federal leases	659	324	4,368				
Conventional - projected on federal	293	147	1,630				
leases							
GSGP projected on private and				485	≈ 242	≈ 3,590	
state							
Conventional projected on private				50	≈ 25	pprox 200	
and state mineral estate							
Total	1,123	558	6,678	625	312	4,150	
Other infrastructure requirements:							
gathering lines, compressor							
stations, gas processing plants							
National Forest System and BLM			275				
administered lands							
Private and state mineral estate						455	
Total			6,953			4,605	

Northern San Juan Basin Development Projections and Assumptions

- All conventional oil or gas wells and coalbed methane (CBM) wells, for both the USFS and BLM, are projected to occur on already leased lands, and thus are the same for all alternatives.
- Water consumption for a <u>coal-bed methane well in the NSJB</u> is assumed to use 5,072 barrels (i.e., 160,000 gallons or 0.5 acre-feet of water) per well.
- Water consumption for a conventional well in NSJB and in the San Juan Sag is assumed to use 12,680 barrels (i.e., 400,000 gallons or 1.2 acre-feet of water) per well.

Table F.20: Projections for the Northern San Juan Basin by Jurisdiction

	USFS	BLM
CBM well pads on existing leases	255	84
CBM miles of road	70	14
CBM acres of disturbance	585	165
Conventional well pads	30	10
Conventional miles of road	0	0
Conventional acres of disturbance	15	5

San Juan Sag Development Projections and Assumptions

- All conventional oil or gas wells in the San Juan Sag are projected to occur on SJNF lands; no development is projected in the San Juan Sag for BLM lands.
- Projections are the same for all alternatives, as historically the San Juan Sag has not resulted in many productive wells, and thus the analysis has been simplified.

	US	SFS	BLM
	Leased	Unleased	
Well pads	5	25	0
Miles of road	2	12	0
Acres of disturbance	20	100	0

Table F 21.	Futuro	Develor	mont P	raiactions	for the	Northern	San I	uan Rac	in hv	Iurisdicti	on
Гаріе г.21 :	ruture	Develop	ment P	rojections	for the	Northern	San J	uan das	m dy	Jurisaicu	on

STIPULATIONS BY ALTERNATIVE FOR FEIS ANALYSIS

The table below illustrates the range of stipulations by alternative that were used for analysis in Chapter 3 of the FEIS. Alternative A was defined by the current USFS and BLM land management plans, as well as the 1991 Colorado oil and gas leasing availability decision, and standards and guidelines in the current LRMP. Alternative B represents the stipulation identified for the Preferred Alternative and are detailed in Appendix H, Leasing Stipulations. Alternatives C and D were developed based on the theme of those alternatives, i.e., generally Alternative C is more restrictive and Alternative D is less restrictive. For some resource stipulations, Alternative C may indicate fewer stipulated acres than the other alternatives. This primarily occurs because Alternative C has made the area or resources within the areas, not available for lease. Lease notices are not included in this table.

The following acronyms are used in the table.

- SLT- Standard Lease Terms
- TL-Timing Limitation
- CSU-Controlled Surface Use
- NSO-No Surface Occupancy
- NAL-Not Available for Lease
- PLAA-Paradox Leasing Analysis Area

Additionally, the table identifies the amount of acres for each alternative. Alternatives A, B, C, and D columns identify the acres unit wide (i.e., SJNF and Tres Rios Field Office [TRFO] federal mineral estate); and the PLAA column identifies acres affected within that basin specifically. Acres are not available for resource stipulations that are not mapped. Resources not mapped are indicated with an asterisk. Acres for the PLAA are specifically identified because it is the area where the greatest amount of development is projected to occur over the life of the LRMP, and thus analysis of potential impacts to and from oil and gas development focus upon this area. The Hydrocarbon Occurrence Potential and Prospective Basins map in Appendix V identifies the location of the PLAA.

Resources	St	ea	Paradox Leasing Analysis Area affected acres		
	Alt A	Alt B	Alt C	Alt D	
Water and Soil					
Municipal Watersheds and Public Water Supply	SLT	NSO – 17,168	NAL – 14,558	CSU – 17,194	A – n/a
Lands within 1,000 horizontal feet of either side of a classified surface					B – 5562
water supply stream segment (as measured from the average high water					C – 5206
mark of a water body) for a distance of five (5) miles upstream of a					D – 5588
public water supply intake with the classification "Water Supply"					
Municipal Watersheds and Public Water Supply	SLT	CSU – 15,768	NAL – 12,366	SLT	A − n/a
Oil and Gas operations located greater than 1,000 horizontal feet but					B-4662
less than 2300 horizontal feet of a classified surface water supply					C – 3652
stream segment (as measured from the average high water mark of a					D – n/a
water body) for a distance of five (5) miles upstream of a public water					
supply intake with the classification "Water Supply"					
Major River Corridors: Prohibit surface occupancy and surface-	SLT	NSO – 72,358	NSO – 28,508	CSU – 78,501	A − n/a
disturbing activities within stream channels, stream banks, and the area					B – 55,406
2,500 horizontal feet either side of the ordinary high-water mark (bank-					C – 19,766
full stage).					D-61,124
Perennial Streams, Water Bodies, Riparian Areas and Fens:	NSO – 213,414	NSO – 211,602	NSO – 127,499	CSU – 215,023	A – 98,925
Prohibit surface occupancy and surface disturbing activities within a					B – 98,940
minimum buffer distance of 325 horizontal feet for all perennial					C – 67,257
waters. See Stip for full description of distances where NSO applies.					D – 99,942
Perennial Streams, Water Bodies, Riparian Areas and Fens: From	CSU – 110,137	CSU – 104,074	CSU – 67,462	SLT	A – 53,051
325 to 500 horizontal feet from the perennial water body, controlled					B-51,842
surface use restrictions will apply. See Stip for full description of					C – 37,537
distances where NSO applies.					D - n/a
Intermittent and Ephemeral Streams*: NSO of 50 horizontal feet as	SLT	NSO	NSO	SLT	*
measured from the top of the stream bank for all intermittent or					
ephemeral streams (see stipulation for diagram and full details).					
Intermittent and Ephemeral Streams*: CSU from the edge of NSO	SLT	CSU -	NSO	SLT	*
buffer to 100 horizontal feet.					
Jurisdictional Dams*	NSO	NSO	NSO	NSO	*

Table F.22: Stipulations by Alternative Planning Area Wide and for the Paradox Leasing Analysis Area

Resources	S	SJNF and TRFO Lease Stipulations for Entire Planning Area						
	Alt A	Alt B	Alt C	Alt D				
Groundwater Resources (Shallow)* : Oil and gas surface operations over shallow (<2,000 feet) potentially usable groundwater (<10,000 TDS) shall use be subject to protection measures (see stipulation for full details)	SLT	CSU	CSU	SLT	*			
Groundwater Resources* : Oil and gas operations using multi-stage hydraulic fracturing shall be subject to protection measures to protect potentially usable water bearing intervals (see stipulation for full details)	SLT	CSU	CSU	SLT	*			
Reservoirs and Lakes : For reservoirs and lakes one acre or larger as measured by the high water mark, no surface occupancy will be allowed within 1/4 mile of the high water shoreline.	NSO - 3943	NSO - 3912	NSO - 1725	CSU - 3943	A - 1340 B - 1340 C - 836 D - 1340			
Slopes Greater than 35 Percent	NSO slopes >40% 450,068	NSO Slopes >35% 521,795	NSO Slopes >35% 234,950	CSU 567,995	A – 173,265 B – 213,139 C – 114,069			
Slopes of 25 to 35 Percent * and shale soils	SLT	CSU – 238,391	NSO – 183,171	SLT	$\begin{array}{c} D = 223,700 \\ \hline A = n/a \\ B = 166,569 \\ C = 128,749 \\ D = n/a \end{array}$			
Lands Prone to Mass Movement	NSO – 47,086	NSO – 46,983	NSO – 19,871	CSU – 47,385	A – 7788 B – 7788 C – 5814 D – 7788			
Gypsum Soils	SLT	CSU – 6215	NSO – 50,787	SLT	$ \begin{array}{c} A - n/a \\ B - 6033 \\ C - 45,973 \\ D - n/a \end{array} $			
Biological Soil Crust*	SLT	CSU	NSO	SLT	*			
Fruitland Formation Outcrop Zone Check acres	CSU 22,699	CSU 21,797	CSU 22,699	CSU 22,699				

Resources	St	SJNF and TRFO Lease Stipulations for Entire Planning Area						
	Alt A	Alt B	Alt C	Alt D				
Vegetation and Plants								
Threatened, Endangered, Proposed, and Candidate Plant Species (partially mapped)	NSO – 14,133	NSO – 13,367	NSO - 6352	NSO – 14,228	$\begin{array}{c} A - 4713 \\ B - 4713 \\ C - 2859 \\ D - 4714 \end{array}$			
Sensitive Plants *	SLT	CSU	NSO	SLT	*			
Special Botanical Areas	NSO – 276 CSU - 388	NSO - 664	NSO - 664	CSU - 664	A - 0 $B - 0$ $C - 0$ $D - 0$			
Research Natural Areas- Existing and Proposed	NSO - 2456	NSO – 12,395	NAL – 68,453	NSO - 7834	A – 1971 B – 5219 C – 7699 D – 1971			
Old Growth Forests and Woodlands	SLT	NSO 24,955	NSO – 36,982	CSU – 24,954	A - n/a B - 2478 C - 11,158 D - 2478			
Wildlife and Aquatics								
Mexican Spotted Owl	NSO – 49,069	NSO – 49,065	NSO – 43,683	NSO – 49,240	$\begin{array}{c} A - 49,070 \\ B - 49,065 \\ C - 43,683 \\ D - 49,240 \end{array}$			
Lynx, Landscape Linkage, Denning and Winter Foraging Habitat	TL – 488,024	CSU – 435,924	CSU – 206,745	CSU – 488,199	A – 153,577 B – 148,424 C – 69,547 D – 153,581			
Lynx Denning Sites : Within one mile of known, active, den sites (not mapped)	TL	TL	TL	TL				
Southwest Willow Flycatcher: No surface occupancy within 325 ft of ordinary high watermark in mapped habitat.	NSO - 1169	NSO - 1169	NSO - 809	NSO - 1169	A - 0 $B - 0$ $C - 0$ $D - 0$			

Resources	St	SJNF and TRFO Lease Stipulations for Entire Planning Area						
	Alt A	Alt B	Alt C	Alt D				
Southwest Willow Flycatcher : No surface use is allowed during May1-Aug. 15 mapped in suitable nesting habitat.	TL - 433	TL - 433	TL - 266	TL - 433	$\begin{array}{c} \mathbf{A} - 0 \\ \mathbf{B} - 0 \\ \mathbf{C} - 0 \end{array}$			
					D - 0			
Gunnison Sage-grouse Proposed Occupied Critical Habitat to protect habitat and species.	NSO ¼ mi. of lek sites 1,909	NSO – 65,531	NAL – 65,531	NSO – 65,531				
Gunnison Sage-grouse Proposed Occupied Critical Habitat to reduce habitat fragmentation or loss of habitat	SLT	CSU- 65,531	CSU- 65,531	CSU- 65,531	A - n/a B - 65,531 C - 65,531 D - 65,531			
Gunnison Sage-grouse Proposed Unoccupied Critical Habitat	N/A	CSU – 50,682	NSO – 50,682	CSU – 50,682	$\begin{array}{c} A - n/a \\ B - 41,810 \\ C - 41,810 \\ D - 41,810 \end{array}$			
Gunnison Sage-grouse – Noise Restriction in Proposed Occupied and Unoccupied habitat	N/A	CSU – 117,125	CSU – 117,125	CSU – 117,125	$\begin{array}{c} A - n/a \\ B - 107,342 \\ C - 107,342 \\ D - 107,342 \end{array}$			
Columbian Sharp-tailed Grouse Lek Site: No surface occupancy is allowed within 0.4 miles buffer of a lek.	TL - 258	NSO - 258	NSO - 258	TL - 258	A - 258 B - 258 C - 258 D - 258			
Columbian Sharp-tailed Grouse Noise Restrictions (partially mapped)	SLT	CSU - 1992	NSO - 1992	CSU - 1992	A – n/a B – 1992 C – 1992 D – 1992			
Colorado River Cutthroat Trout	NSO – 26,502	NSO – 25,492	NSO - 7924	CSU – 26,536	A - 824 B - 824 C - 486 D - 824			

Resources	St	SJNF and TRFO Lease Stipulations for Entire Planning Area						
	Alt A	Alt B	Alt C	Alt D				
Greenback Cutthroat Trout:	NSO - 8136	NSO - 4068	NSO - 6226	NSO - 8137	A – 8136			
					B - 4068			
					C – 6226			
					D-8137			
Eagles, All Accipiters, Falcons, Buteos, and Owls: Within specified	NSO – 61,431	NSO – 61,426	NSO – 69,650	NSO – 62,178	A – NSO –			
distance from nest and communal winter roost sites. See Stip and Table	TL-61,431				27,884			
H-1: Raptor Conservation Measures.					A – TL –			
					27,885			
					B – 27,879			
					C - 43,796			
		TT (1.40)	2100 (0.655	TT (0.150	D – 28,621			
Lagles, All Accipiters, Falcons, Buteos, and Owls:	NSO – 61,431	TL – 61,426	NSO – 69,655	TL - 62, 178	A - NSO -			
A timing limitation will be applied to all development activities See	1L - 61,431				27,884			
Stip and Table H-1: Kaptor Conservation Measures.					A - 1L - 27.995			
					27,885 D 27.970			
					B = 27,879 C 42,706			
					C = 43,790 D 28.621			
Dig Cama Darturitian	TI 112 615	TI 442 421	NSO 240 506	SI T	D = 20,021			
big Game Farturition	1L - 445,015	1L = 442,431	1130 - 240,300	SLI	R = 310,003 R = 310,063			
					C = 178,768			
					D = n/a			
Big Came Winter Range CSU to provide for healthy ungulate	SI T	CSU-	CSU-	SI T	$\frac{D}{A} = n/a$			
nonulations	5E1	1 869 453	2 148 396	5L1	B = 1.331.921			
populations		1,009,100	2,110,590		C = 1.495.410			
					D –n/a			
Big Game Winter Range : No surface use is allowed in mapped winter	TL - 1.636.005	TL - 1.635.533	NSO –	SLT	A – 1.194.278			
range areas during species specific time period(s)	,,		1,461,760		B – 1.194.051			
			, ,		C – 1,053,544			
					D - n/a			
Gunnison Prairie Dog	SLT	CSU – 338,762	CSU – 262,710	SLT	A – n/a			
-					B-248,201			
					C – 175,834			
					D – n/a			

Resources	S	SJNF and TRFO Lease Stipulations for Entire Planning Area						
	Alt A	Alt B	Alt C	Alt D				
Bats*: NSO within one-quarter mile radius of known maternity roosts	SLT	NSO	NSO	SLT	*			
or hibernacula of BLM and Forest Service sensitive bat species.								
State Wildlife Areas: Bodo SWA, Dan Noble SWA, Dry Creek SWA,	SLT	NSO – 22,920	NAL – 22,920	CSU – 22,920	A – n/a			
Lone Cone SWA, Lone Dome SWA, Perins SWA (and BLM lands to					B – 18,512			
comprise HMA), Puett Reservoir SWA, Williams Reservoir SWA,					C – 18,512			
Coalbed Canyon SWA, Devil Creek SWA, Fish Cr. SWA, Haviland					D – 18,512			
SWA, and Joe Moore SWA. Check acres.								
Cultural, Historic, Recreation and Visual Stips	ſ	I	ſ	ſ				
Cultural Resources	NSO - 941	NSO – 23,775	NAL – 23,775	NSO – 23,775	A – 0			
National Register Districts: Lost Canyon, Spring Creek					B - 8170			
• Proposed National Register Districts : Saul's Creek, Turkey					C – 8170			
Creek, Armstrong Ritter					D – 8170			
Mesa Verde Escarpment								
Anasazi remnant, aka Anasazi Archeological Areas								
Bull Canyon Rock Shelter								
Indian Henry's Cabin								
Horse Range Mesa Paleontological Site	NSO - 981	NSO - 981	NSO - 979	CSU - 981	A – 981			
					B – 981			
					C – 979			
					D – 981			
View Shed, Auditory and Night Sky Protection for Chimney Rock	SLT	NSO – 48,684	NAL – 60,115	CSU – 48,957	A – n/a			
Archeological Area					B – 18			
					C – 18			
	~~~~			~~ -	D – 18			
View shed for the Glade Guard Station, and Aspen Guard Station	SLT	CSU - 873	NSO - 898	SLT	A - n/a			
					B - 873			
					C – 898			
	OL T	NGO	NGO	NICO	D - n/a			
<b>Uld Spanish Trail</b> : No surface-disturbing activities up to ¹ / ₂ mile of	SL1	NSU	NSO	NSU	A - n/a			
either side of the centerline of the congressionally designated trail in		⁷ 2 m1 5388	5 ml.	½ m1 5388	B - 4140			
nign potential segments.			125,555		$C = \delta 2,417$			
					D - 4140			

Resources	St	SJNF and TRFO Lease Stipulations for Entire Planning Area						
	Alt A	Alt B	Alt C	Alt D				
<b>Old Spanish Trail-Visual*</b> : CSU for the horizon on either side of the centerline of the congressionally designated trail in high potential segments.	SLT	CSU	CSU	SLT	*			
<b>Developed Administrative and Recreation Sites</b> : Within one-quarter mile around developed administrative and/or recreation sites.	NSO – 27,874	NSO – 27,942	NSO – 21,184	NSO – 28,088	A - 6362 B - 6411 C - 4356 D - 6529			
<b>Developed Administrative and Recreation Sites</b> : Surface use or occupancy will be prohibited unless the operator demonstrates that operations can be acceptably conducted within one mile of developed administrative and recreation sites.	CSU – 322,423	CSU – 286,088	NSO – 201,675	SLT	$\begin{array}{c} A - 98,661 \\ B - 93,993 \\ C - 71,916 \\ D - n/a \end{array}$			
Special Recreation Management Areas: BLM SRMAs: Durango, Dolores River Canyon, Silverton, Cortez	SLT	CSU – 80,866	CSU – 92,011	SLT	A - n/a B - 36,661 C - 42,136 D - n/a			
National Scenic Byways, All American Roads and Backcountry Byways, Designated Scenic, Recreation and Historic Trails and Recreation-Emphasis Corridors: Within the identified foreground viewshed, up to one-half mile on either side of the following: San Juan Skyway, Trail of the Ancients, the Alpine Loop Back Country Byway, Old Spanish Trail, Continental Divide Trail, Colorado Trail, Calico Trail, Highline Loop Trail, East Fork Road, West Fork Road, First Notch Road, Piedra Road, Poison Park Road, Lime Creek Road, South Mineral Road, La Plata Canyon Road, West Dolores Road, and Durango-Silverton Narrow Gauge Railroad.	NSO – 114,771 CSU – 74,952	NSO – 185,524	NSO – 96,369	CSU – 190,170	A - NSO - 42,951 A - CSU - 31,442 B - 74,000 C - 37,486 D - 75,452			
High Scenic Integrity Objective and Visual Resource Management Class II Areas (partially mapped)	CSU – 349,211	NSO – 334,283	NSO – 134,740	SLT	$\begin{array}{c} A-128,537\\ B-121,851\\ C-54,027\\ D-n/a \end{array}$			
Area Specific	•							
SJNF Colorado Roadless Areas	NSO – 564,754	NSO – 557,810	NAL	NSO – 566,010	$\begin{array}{c} A-145,335\\ B-145,393\\ C-n/a\\ D-145,393\end{array}$			

Resources	SJNF and TRFO Lease Stipulations for Entire Planning Area				Paradox Leasing Analysis Area affected acres
	Alt A	Alt B	Alt C	Alt D	
TRFO Lands managed for their Wilderness Characteristics	SLT	NSO – 11,867	NAL – 36,574	SLT	A – n/a
					B – 11,867
					C – 36,574
	NGO	NGO	NAT 42.024	NGO 27.277	D - n/a
Dolores River Canyon	NSO 20.400	NSO 20.275	NAL – 43,934	NSO – 37,277	A – 29,490
	29,490	39,275			B = 39,275
					C = 43,934 D = 37,277
Wild Scenic Rivers - Scenic Segments	NSO - 6732	NSO – 19 538	NSO - 7406	NSO - n/a	A = 6732
Who seeme revers - seeme segments	1100 0752	1100 19,000	1100 /100	1100 11/4	B - 10.376
					C – 5359
					D – n/a
Spring Creek Wild Horse Herd Foaling Area: Protecting wild horse	TL – 15,006	TL – 15,006	CSU - 8487	TL – 15,006	A – 15,006
foaling April 1-July 31.					B-15,006
					C – 8487
					D – 15,006
Spring Creek Wild Horse Herd Management Area-Water Sources:	SLT	CSU - 5942	CSU - 3215	SLT	A - n/a
No motorized or surface-disturbing activities within a 2,000-foot radius					B – 5942
around the mapped water sources in the Spring Creek Basin Herd					C = 3215
Management Area, including the approximately 15 earthen reservoirs,					D - n/a
Management Area 1 – Natural Processes Dominate-SINF only	NSO - 1046	NSO - 62 951	NSO - 484	NSO – 16 819	A = 0
Wanagement Area 1 - Waturar Processes Dominate-551(Poiny	1150 - 1040	1150 - 02,951	1150 - 404	10,017	R = 2906
					C - 482
					D - 482
Developed Downhill Ski Areas (including Management Area 8 on	NSO – 15,566	NSO - 6174	NSO - 2156	NSO – 13,585	A - 324
SJNF lands)					B – 7
					C – 7
					D – 12
*Resource not mapped.					