

CHAPTER 5 – CUMULATIVE EFFECTS

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5.0. CUMULATIVE EFFECTS

5.1. Introduction/Approach

Cumulative effects are those effects on the environment which result from the incremental effect of a Federal action when added to other past, present, and reasonably foreseeable actions in the cumulative effects study areas (CESAs), regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant actions, taken over a period of time. There are obviously innumerable actions which would contribute to the effects from the MMPO and land disposal alternatives. Therefore, the cumulative effects analysis necessarily focuses on only the more important effects from other categories of actions or individual actions when such is appropriate, with an emphasis on surface disturbance.

The major past and present categories of actions and their surface disturbance within the CESAs are roads, utility corridors, wildfire¹/prescribed burning, livestock grazing, agriculture, mining, land use, recreation, residential development, and timber/vegetation management. The following cumulative effects analysis is only for effects of greater than negligible magnitude from the MMPO or land disposal alternatives.

For each resource the extent to which the effect from the project could reasonably be detected was considered, and then a logical geographic area was defined as the CESA; large enough to capture the effects from other meaningful actions, but small enough to prevent excessive dilution of the cumulative effects. For simplicity, when reasonable and conservative, a single CESA was used for multiple resources that would otherwise have had slightly different CESAs. This approach to defining CESAs is based on guidance from the CEQ (1997, 2005). The CESA for each resource and the rationale for the boundary of each CESA are described in their respective sections.

For the land disposal alternatives, the negligible effects to most of the resources for the Garden Creek property precluded its inclusion in the cumulative effects analysis for all of the resources except minerals (Section 5.2.) and tribal treaty rights and interests (Section 5.14).

5.1.1. Context

The CESAs include a variety of jurisdictions (Table 5.1-1). The cumulative effects analysis compares to the effects from past and present actions (Table 5.1-2., Appendix C) and the effects from reasonably foreseeable actions (Table 5.1-3., Appendix C) with the (direct and indirect) effects of the MMPO and land disposal alternatives.

¹ Wildfire is typically evaluated as a cumulative effect even though many wildfires are natural events.

Table 5.1-1. Land jurisdiction by CESA.

CESA		BLM Challis FO ¹	BLM Pocatello FO	SCNF	BOR	Bureau of Indian Affairs	Private	State of Idaho	TOTAL
Geology resources; Soil resources	ac. ²	14,125	0	106,334	0	0	6,103	440	127,002
	%	11.1	-	83.7	-	-	4.8	0.4	100.0
Minerals; Air quality	ac.	803,558	0	2,121,665	0	0	182,210	54,036	3,161,469
	%	25.4	-	67.1	-	-	5.8	1.7	100.0
Vegetation, forest resources, and Invasive, non-native plants; Wetlands, floodplains, and riparian areas	ac.	74,698	0	119,767	0	0	14,697	4,353	213,514
	%	35.0	-	56.1	-	-	6.8	2.0	100.0
Range resources	ac.	37,043	-	56,285	0	0	0	1,395	94,722
	%	39.1	-	59.4	-	-	-	1.5	100.0
Wildlife; Transportation	ac.	261,419	-	350,905	0	0	34,014	16,059	662,397
	%	39.5	-	53.0	-	-	5.1	2.4	100.0
Fish and aquatic resources; Water resources	ac.	75,400	-	119,767	0	0	14,986	4,353	214,506
	%	35.2	-	55.8	-	-	7.0	2.0	100.0
TES ³ fish species	ac.	793,675	0	797,373	0	0	149,941	51,271	1,792,261
	%	44.3	-	44.5	-	-	8.4	2.9	100.0
Noise	ac.	9,860	0	18,898	0	0	4,547	348	33,653
	%	29.3	-	56.2	-	-	13.5	1.0	100.0
Visual resources	ac.	38,392	0	194,715	0	0	8,426	1,751	243,284
	%	15.8	-	80.0	-	-	3.5	0.7	100.0

CESA		BLM Challis FO ¹	BLM Pocatello FO	SCNF	BOR	Bureau of Indian Affairs	Private	State of Idaho	TOTAL
Land use and recreation	ac.	803,558	-	2,121,665	0	0	182,210	54,036	3,161,469
	%	25.4	-	67.1	-	-	5.8	1.7	100.0
Socioeconomic factors; Cultural resources	ac.	1,380,222	0	4,187,901	0	0	427,320	91,722	6,087,165
	%	22.7	-	68.8	-	-	7.0	1.5	100.0
Tribal treaty rights and interests	ac.	1,380,222	75,646	4,307,135	17	115,533	806,078	139,625	6,824,256
	%	20.2	1.1	63.1	<0.1	1.7	11.8	2.0	100.0

¹ Field Office

² acres

³ threatened, endangered, and sensitive

Table 5.1-2. Surface disturbance from past and present categories of actions by CESA.

CESA		Roads interst. and primary ¹	Roads second. and State ²	Roads local, rural, city ³	Roads other, 4WD ⁴	Utility Corr. ²	Wildfire/ Prescribed Burning [*]	Grazing [*]	Mining (present and past) ⁵	TOTAL (not incl.) [*]
Geology resources; Soil resources 127,002 ac.	length or area	0	13 mi. 80 ac.	20 mi. 62 ac.	132 mi. 192 ac.	50 mi. 303 ac.	1,193 ac.	85,648 ac.	2,954 ac.	3,591 ac.
	%	-	< 0.1	< 0.1	0.2	0.2	0.9	67.4	2.3	2.8
Minerals; Air quality 3,161,469 ac.	length or area	84 mi 1,016 ac.	98 mi. 596 ac.	747 mi. 2,264 ac.	NC	801 mi. 4,856 ac.	304,965 ac.	2,295,888 ac.	5,962 ac.	14,694 ac.
	%	< 0.1	< 0.1	< 0.1	-	0.2	9.7	72.6	0.2	0.5
Vegetation, forest resources, and invasive, non-native plants; Wetlands, floodplains, and riparian areas 213,514 ac.	length or area	3.4 mi. 41 ac.	30 mi. 184 ac.	55 mi. 167 ac.	300 mi. 437 ac.	170 mi. 1,031 ac.	2,718 ac.	152,202 ac.	2,907 ac.	4,767 ac.
	%	< 0.1	< 0.1	< 0.1	0.2	0.5	1.3	71.3	1.4	2.2

CESA		Roads interst. and primary ¹	Roads second. and State ²	Roads local, rural, city ³	Roads other, 4WD ⁴	Utility Corr. ²	Wildfire/ Prescribed Burning*	Grazing*	Mining (present and past) ⁵	TOTAL (not incl.)*
Range resources 94,722 ac.	length or area	0	0	3.2 mi. 9.7 ac.	208 mi. 303 ac.	53 mi. 323 ac.	4,463 ac.	92,242 ac.	2,860 ac.	3,496 ac.
	%	-	-	< 0.1	0.3	0.3	4.7	97.4	3.0	3.7
Wildlife resources; Transportation 662,397 ac.	length or area	23 mi. 276 ac.	47 mi. 286 ac.	167 mi. 505 ac.	NC	405 mi. 2,455 ac.	30,760 ac.	486,615 ac.	3,006 ac.	6,528 ac.
	%	< 0.1	< 0.1	< 0.1	-	0.4	4.6	73.5	0.5	1.0
Fish and aquatic resources; Water resources 214,506 ac.	length or area	3.4 mi 41 ac.	38 mi. 227 ac.	54 mi. 165 ac.	288 mi. 419 ac.	183 mi. 1,107 ac.	2,718 ac.	152,780 ac.	2,887 ac.	4,846 ac.
	%	< 0.1	0.1	< 0.1	0.2	0.5	1.3	71.2	1.3	2.3
TES fish species 1,792,261 ac.	length or area	86 mi. 1,046 ac.	29 mi. 173 ac.	556 mi. 1,685 ac.	NC	695 mi. 4,189 ac.	68,149 ac.	1,463,379 ac.	3,034 ac.	10,136 ac.
	%	< 0.1	< 0.1	< 0.1	-	0.2	3.8	81.6	0.2	0.6

CESA		Roads interst. and primary ¹	Roads second. and State ²	Roads local, rural, city ³	Roads other, 4WD ⁴	Utility Corr. ²	Wildfire/ Prescribed Burning*	Grazing*	Mining (present and past) ⁵	TOTAL (not incl.)*
Noise 33,653 ac.	length or area	0	3.1 mi. 19 ac.	8.9 mi. 27 ac.	39 mi. 57 ac.	25 mi. 149 ac.	326 ac.	21,983 ac.	2,850 ac.	3,102 ac.
	%	-	< 0.1	< 0.1	0.2	0.5	1.0	65	8.5	9.2
Visual resources 243,284 ac.	length or area	0	23 mi. 141 ac.	45 mi. 135 ac.	298 mi. 433 ac.	125 mi. 758 ac.	11,937 ac.	169,877 ac.	3,189 ac.	4,656 ac.
	%	-	< 0.1	< 0.1	0.2	0.3	4.9	70	1.3	1.9
Land use and recreation 3,161,469 ac.	length or area	84 mi. 1,016 ac.	98 mi. 596 ac.	747 mi. 2,264 ac.	NC	801 mi. 4,856 ac.	304,965 ac.	2,295,888 ac.	5,962 ac.	14,694 ac.
	%	< 0.1	< 0.1	< 0.1	-	0.1	9.6	72.6	0.2	0.5
Socioecon. factors; Cultural resources 6,087,165 ac.	length or area	171 mi. 2,067 ac.	196 mi. 1,185 ac.	1042 mi. 3,157 ac.	NC	926 mi. 5,613 ac.	1,057,557 ac.	4,016,570 ac.	9,055 ac.	21,077 ac.
	%	< 0.1	< 0.1	< 0.1	-	0.1	17.4	66.0	0.1	0.3

CESA		Roads interst. and primary ¹	Roads second. and State ²	Roads local, rural, city ³	Roads other, 4WD ⁴	Utility Corr. ²	Wildfire/ Prescribed Burning*	Grazing*	Mining (present and past) ⁵	TOTAL (not incl.)*
Tribal treaty rights and interests 6,824,256 ac.	length or area	374 mi. 4,527 ac.	198 mi 1,201 ac.	1,306 mi. 3,956 ac.	NC	1,359 mi. 8,239 ac.	1,081,322 ac.	4,243,960 ac.	10,088 ac.	28,011 ac.
	%	< 0.1	< 0.1	< 0.1	-	0.1	15.8	62.2	0.1	0.4

* To group all types of disturbance together would not provide an accurate picture of the CESA, much of which, though grazed or burned, is relatively undisturbed. The inclusion of burned, grazed, or habitat improvement areas in this table conservatively acknowledges that some level of modification to the natural state has occurred. Areas are not necessarily exclusive and may overlap.

NC = Not calculated due to size of the CESA.

¹ ROWs estimated as 100 feet in total width

² ROWs estimated as 50 feet in total width; corr. = corridors

³ ROWs estimated as 25 feet in total width

⁴ ROWs estimated as 12 feet in total width

⁵ Reclaimed areas are conservatively included in the mining surface disturbance. Mining in Custer County is considered to be the area of the TCM (2,823 acres), the Grouse Creek mine (544 acres) (Hecla 2014), Three Rivers Stone quarry (182 acres, BLM 2008b), Persistence mine (25 acres), Trail Creek gem exploration project (5 acres), Bruno Creek exploration project (3 acres), ~ 350 rock pits (~ 4 acres each, ~ 100 active), and 980 historic mines (a few involve 10s acres, many had negligible surface disturbance, most have been naturally revegetated, as an order-of-magnitude approximation each is assumed to have 1 acre of current surface disturbance; includes the IMA exploration project); Mining in the CESA for socioeconomic factors and cultural resources (Custer and Lemhi counties) is considered to be that in Custer County plus 100 rock pits (~ 4 acres each, ~ 20 active), 1,031 historic mines and mines (~ 1 acre each), the Idaho Cobalt Project (132 acres), the Blackbird mine (830 acres), and the Beartrack mine (700 acres) in Lemhi County. Mining for the CESA for geology and soil resources is considered to be the TCM, 5 rock pits (45.1 acres), the Bruno Creek exploration project (3 acres), and 83 historic mines (~ 1 acre each). Mining for the CESA for tribal treaty rights and interests is considered to be that of Custer and Lemhi counties plus 100 rock pits (~ 4 acres each), 93 historic mines (~ 1 acre each), and the Gay phosphate mine (540 acres) in Bannock County. The area of phosphate mining in southeast Idaho is 17,619 acres comprising 15,000 acres through 2001 (Moyle and Kayser 2006) plus 1,369 additional acres for the Smoky Canyon mine (2,177 acres for Panels A-E, 592 acres for Panel F, less 1,400 acres as of 2001), 739 acres for the Blackfoot Bridge mine, 336 acres for the South Rasmussen Ridge mine, and 175 acres for the North Rasmussen Ridge mine (the 490 acres of the Central Rasmussen Ridge mine are included in the 2001 calculations as the “Rasmussen Ridge mine”) (BLM Idaho Falls District 2014).

Table 5.1-3. Surface disturbance from categories of reasonably foreseeable actions by CESA.

CESA		Timber/Vegetation Management	Utility Corridors	Mining ¹
Geology resources; Soil resources 127,002 ac.	ac.	3,200	3	3
	%	2.5	< 0.1	< 0.1
Minerals; Air quality 3,161,469 ac.	ac.	3,200	3	30
	%	0.1	< 0.1	< 0.1
Vegetation, forest resources, and invasive, non-native species; Wetlands, floodplains, and riparian areas 213,514 ac.	ac.	0	0	3
	%	0.0	0.0	< 0.1
Range resources 94,722 ac.	ac.	0	0	0
	%	0.0	0.0	0.0
Wildlife Resources; Transportation 662,397 ac.	ac.	0	0	30
	%	0.0	0.0	< 0.1
Fish and aquatic resources; Water resources 214,506 ac.	ac.	0	0	3
	%	0.0	0.0	< 0.1
TES fish species 1,792,261 ac.	ac.	3,200	0	30
	%	0.2	0.0	< 0.1

CESA		Timber/Vegetation Management	Utility Corridors	Mining ¹
Noise 33,653 ac.	ac.	0	0	3
	%	0.0	0.0	< 0.1
Visual resources 243,284 ac.	ac.	0	0	3
	%	0.0	0.0	< 0.1
Land use and recreation 3,161,469 ac.	ac.	3,200	3	30
	%	0.1	< 0.1	< 0.1
Socioeconomic factors; Cultural resources 6,087,165 ac.	ac.	3,200	3	30
	%	< 0.1	< 0.1	< 0.1
Tribal treaty rights and interests 6,824,256 ac.	ac.	3,200	3	5,065
	%	< 0.1	< 0.1	< 0.1

¹ Reasonably foreseeable mining apart from TCM in the CESAs is considered to be 0 acres for the CESA for range resources, 3 acres of rock pits for CESAs focused on the TCM, and 30 acres of rock pits for the other CESAs except reasonably foreseeable mining in the CESA for tribal treaty rights and interests is considered to be 30 acres of rock pits in Custer County, 60 acres of rock pits in the Pocatello Field Office area, and 4,975 acres of phosphate mining in the Pocatello Field Office area comprising the Smoky Canyon Mine Panel G (748 acres) and Panel G Modification (169 acres), Dairy Syncline mine (2,133 acres), North Rasmussen Ridge mine (155 acres of the 330 acres authorized), Rasmussen Valley mine (421 acres), Husky 1/North Dry Ridge mine (1,051 acres), Lanes Creek mine (130 acres), and Husky 2/Freeman Ridge exploration project (168 acres) (BLM Idaho Falls District 2014).

5.1.2. Past, Present, and Reasonably Foreseeable Actions

The major categories of past, present, and reasonably foreseeable actions that have affected or would reasonably affect the CESAs are roads and utility corridors, wildfire/prescribed burning, livestock grazing, agriculture, mining, land use, recreation, residential development, and timber/vegetation management. These categories of actions obviously do not account for all of the effects in the CESAs. However, GIS analysis, agency records, and the professional judgment of a large number of interdisciplinary team specialists in land management indicate that these are the primary categories of actions of concern for cumulative effects analysis in the subject CESAs. Where specific data was not available (e.g., fugitive dust emissions or acres of agricultural land within a CESA), comparable data was used (e.g., acres of surface disturbance or percentage of private land).

5.1.2.1. Road and Utility Corridors

There are extensive networks of roads and utility corridors (power lines, pipelines, telephone lines, fiber optic cables, etc.) in the CESAs. An average total width was assigned to each type of corridor (i.e., ROW) to calculate the maximum surface disturbance from such features: 100 feet for interstate and primary roads; 50 feet for State highways and utility corridors; 25 feet for city, local and rural roads; and 12 feet for 4WD and other less developed roads (Table 5.1-2). Roads and utility corridors would be constructed in the CESAs in the future, mostly due to rural residential development.

5.1.2.2. Wildfire/Prescribed Burning

The CESAs (except the Garden Creek property) are in the BLM East Fork Fire Management Unit (FMU) (BLM 2005d) and the SCNF FMU 2 and FMU 3 (SCNF 2012). The East Fork FMU is ranked as moderate priority for fire suppression partially due to the concern of the spread of invasive, non-native species (“weeds”). The dominant causes of wildfire in the FMU are humans and lightning. Wildfire typically occurs in the East Fork FMU from mid-July through August and, with much lower frequency, during the fall hunting season (human-caused fires). Between 1983 and 2004 wildfire burned only 858 acres in the FMU and 64 percent of those fires were less than 0.2 acre in size. The spread of wildfire in the FMU is limited by topography and lack of vegetative continuity (rock, bare soil, and talus slopes) (BLM 2005d). Although equivalent data are not available for the SCNF FMUs (SCNF 2012), the fire histories of FMU 2 and FMU 3 are probably comparable to that in the East Fork FMU as the three FUMs are adjacent with similar topography, climate, and vegetation.

Prescribed burning may reduce wildfire hazards, increase landscape diversity, improve rangeland and forest health (e.g., creates wildlife forage and habitat, protects watersheds), and creates defensible space for wildfire suppression activities. The fire activity in the CESAs in the future is expected to be similar to the fire history of the CESAs (e.g., acres burned by wildfire and prescribed burning, Table 5.1-2.), apart from possibly a trend toward larger, longer lasting, and more intense fires due to climate change.

5.1.2.3. Livestock grazing

Livestock grazing began in the CESAs with the start of mining in the 1860s. The grazing occurs on Federal lands primarily in spring and summer with some use in fall before the livestock return to private lands for the winter. Grazing is expected to remain a primary use of Federal lands in the CESAs (Table 5.1-2). Grazing management may be modified in the future based on allotment specific conditions to meet long term resource objectives and issues that arise, such as new management constraints related to ESA-listed species. Grazing permits would be renewed every 10 years, and the fundamentals for rangeland health would be met or significant progress towards achievement made (43 CFR 4180).

5.1.2.4. Agriculture

The majority of the private land in the CESAs is along the major valley floors bisected by US Highway 93 and SH 75, and has a mixture of agricultural and residential development. Hay production is the dominant agricultural activity in the CESAs. Subdivision of ranches along the Salmon River and East Fork Salmon River has resulted in the conversion of agricultural land to residential use, yielding pockets of residential development separated by relatively large areas of agricultural land. The trend in the foreseeable future for agricultural land in the CESAs would be the continued conversion to residential property, e.g., 140,701 acres of land in farms in Custer County in 1992 compared to 124,191 acres in 2007 (Table 3.13.12).

5.1.2.5. Mining

McHugh et al. (1991) report that as early as 1862 prospectors were searching the valleys of the Salmon River for gold. The discovery of gold placers in Stanley Basin in that year led to a tradition of mining that continues today in Custer County. Precious metals were discovered in the county in the Bayhorse mining district in 1864 (ISHS 1980), and in 1866 gold was discovered in the Yankee Fork Salmon River (HCA 2013). The best placer deposits were found and depleted within a few years, after which attention turned to precious-metal lodes which were mined in the 1870s and 1880s. Attention then focused on base-metal lodes which were mined in the late 1800s and early 1900s. The production of base metals diminished after World War I, but some production continued into the 1980s. The production of copper, lead, zinc, and tungsten were important for the region during World War II. Molybdenum was discovered in 1967 and development of high-quality, building stone deposits began in the 1970s (Gardner 2008, McHugh et al. 1991).

Prospecting and small-scale mining continued until 1880 when the smelter was constructed at the Bayhorse Townsite, after which mining activity dramatically increased. The IGS (2013) documents 980 prospects and mines in Custer County, including mines near the project area such as the Buckskin mine, Clayton mine (and smelter), Ramshorn quarry, Redbird mine, and Twin Apex mine (Appendix C). In addition, there are approximately 350 rock pits (~ 4 acres each) in the CESA. The surface disturbance associated with mining has been cataloged by CESA (Table 5.1-2).

5.1.2.6. Land Use

Changes in land use occur primarily due to changes in land jurisdiction and land management. Changes in land jurisdiction occur as Federal agencies sell, purchase, and exchange lands, and

less commonly by Congressional or Presidential actions, e.g., the designation of a special management area with a change in the land management agency. Changes in land management occur as land management agencies implement land use plans (including travel management plans) and the applicable laws and regulations (e.g., issue permits for agriculture, mining, etc.) or modify land use plans (e.g., designate an area to be developed with a trail system). Changes in land management also occur by Congressional or Presidential actions, e.g., the President could establish the proposed Boulder-White Cloud National Monument or Congress could establish a Boulder-White Cloud Wilderness Area, which in either case would almost certainly be withdrawn from many of the Federal land and mining laws. In addition, changes in land management occur on private land such as the residential development of agricultural land or the steady decrease in public access to private lands as land owners restrict such access.

The US policy of land disposal changed to land retention in 1976 with the FLPMA. However, the cumulative effects of Federal land sales, purchases, and exchanges is still a slight net decrease in the area of Federal lands. For example, the (legal) area of the SCNF decreased from 4,237,004 acres in 2002 to 4,235,940 acres in 2012, a decrease of 0.025 percent (USFS 2014). The trend in the foreseeable future compared to the last 30 years in the CESAs would be a similar to slightly smaller net decrease in Federal lands as the land retention policy of the FLPMA is steadily implemented.

5.1.2.7. Recreation

Recreation in the CESAs consists primarily of hunting, fishing, boating, camping, OHV use, hiking, antler shed hunting, and general enjoyment of the outdoors. Less common is horseback riding, shooting (“plinking”), skiing, mountain biking, rockhounding, wildlife/wild flower viewing, nature photography, berry picking, backpacking, scenic viewing, etc. Many people from outside Custer County come to the county to recreate, e.g., outfitters and guides provide hunting, floating, and fishing opportunities along the Salmon River in the CESA (Section 3.12). The population of Custer County has been nearly constant since 2000, but the population of Idaho increased during 2000 to 2010 by 21.1 percent (Section 3.13.2.1). Therefore, there continues to be an increase in the number of people recreating in Custer County, and land management agencies will place a greater emphasis in the future than in the past on the development of recreational facilities and management of recreational activities to reduce their effects to natural resources and to reduce conflicts between user groups. The surface disturbance from recreation is captured by the area of 4WD roads in the CESA (Table 5.1-2).

5.1.2.8. Residential Development

Residential development has increased in the CESAs since the 1860s commensurate with mining booms; although, the majority of the CESAs remain undeveloped. Residential development is focused along the main valley floors which are bisected by highways and rivers, with scattered development along the lower edges of foothills with scenic views. The four main settlements in Custer County are the cities of Challis, McKay, Stanley, and Clayton. In the early 1980s several hundred houses were constructed in Challis for the TCM. In 2000 and 2013, respectively, there were 2,983 housing units (~ 1,490 acres)² and 3,081 housing units (~ 1,540 acres) in Custer County, and in 2012 there were 8 building permits in Custer County (US Census Bureau 2014).

² ~ 0.5 acre per housing unit on average across urban and rural areas

There is little land in the CESAs available for residential development, e.g., most (92.5 %) of the land in the county is Federal land (Table 5.1-1). However, the most important reasons for the limited residential development in the CESAs are the lack of quality jobs and the relatively few people who want to retire in the CESAs. The trend in the future will probably be a very slow increase in residential development in the CESAs, e.g., of the order of 10 new residences (5 acres) each year in Custer County. The development will be concentrated near existing cities and along the main valley floors, particularly adjacent to the Salmon River and East Fork Salmon River.

5.1.2.9. Timber/Vegetation Management

Timber management such as selective thinning (prescribed fire is evaluated with wildfire, Section 5.1.2.2.) are implemented by BLM and the SCNF to help restore overstocked timber stands to more natural historic levels. The objectives of such management are to improve forest health, decrease hazardous fuel loading, improve wildlife habitat, and stimulate aspen growth. Vegetation management includes spraying, mechanical crushing, and seeding treatments. The objectives of such management include reducing sagebrush cover, restoring herbaceous understory, and increasing the amount of grasses available for livestock and wildlife. The BLM Challis Field Office on average has performed of the order of 100 acres per year of timber/vegetation management, and would probably perform a similar amount of such management in the foreseeable future. The SCNF probably has performed and would perform the same order of magnitude of such management (Redick, P. 2014).

The CESAs contain weed infestations that are small, localized, and usually associated with some sort of disturbance; however, many species of noxious weeds are found in Custer County and adjacent counties and it is probable that they will eventually be found in the CESAs. Weeds would continue to be treated by chemical, biological, and mechanical methods.

5.2. Geologic Resources and Geotechnical Issues

5.2.1. Introduction

The CESA for geologic resources is the Thompson Creek and S.³ Creek 5th level watersheds (127,002 acres) (Figure 5.2-1). The CESA for minerals is Custer County (3,161,469 acres) (Figure 5.2-2), but with national and global molybdenum markets also considered. The potential effects to geologic resources would be changes in topography/geologic exposure and changes to the availability or quantities of mineral resources, especially molybdenum. Wildfire/prescribed burning, grazing, agriculture, recreation, residential development, and timber/vegetation management do not contribute to cumulative effects to geologic resources.

³ *Squaw Creek* is an official place name in Custer County, and appears in numerous published documents including US Geological Survey topographic maps. The name was established by the US Board of Geographic Names to maintain uniform geographic name usage throughout the Federal Government. However, the word *squaw* is offensive to some people including the Shoshone-Bannock Tribes. Therefore, *Squaw Creek* is hereafter referred to in the main text as *S. Creek*.

Geotechnical effects (slope stability hazards) are not evaluated in this chapter because there would be no meaningful slope stability hazards from the WRSFs, pit, or the TSF under any of the MMPO alternatives. The effects of the MMPO alternatives on paleontological resources would be negligible and are not further evaluated in this section.

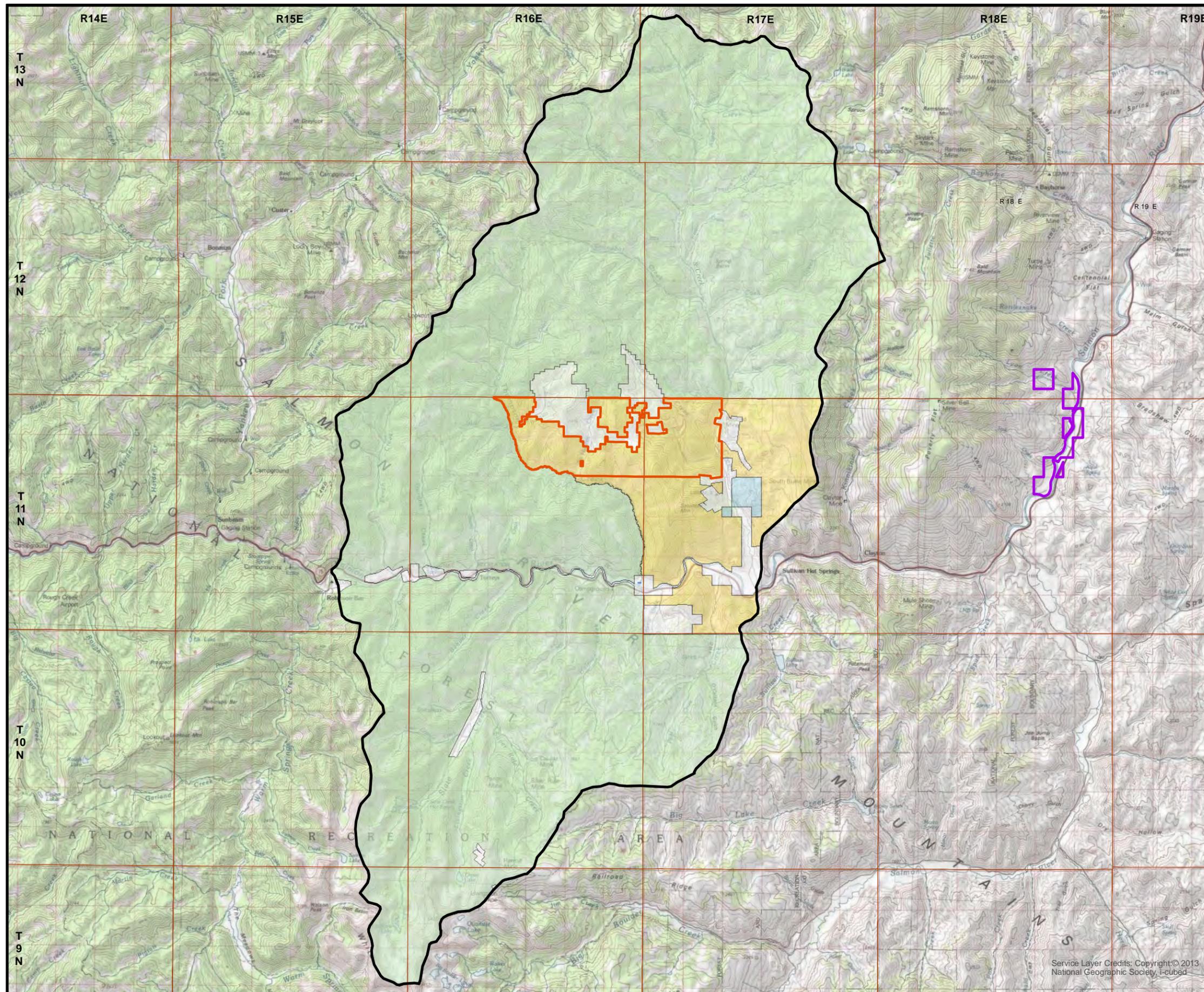
5.2.2. Past, Present, and Reasonably Foreseeable Actions

Custer County has an extensive history of mining with some 980 recorded prospects and mines (Section 5.1.) (IGS 2013). The most important minerals by value extracted in the county are molybdenum, silver, building stone, lead, zinc, copper, gold, tungsten, and fluorspar. All of the molybdenum produced in the county has been from the TCM (Gardner 2008). Furthermore, the current mineral production in Custer County is nearly all (by value) from the TCM, followed by salable minerals from rock pits (sand and gravel, riprap, etc. from ~ 100 active rock pits), and flagstone (Ramshorn quarry). The Persistence mine (formerly known as the Rat's Nest mine) also produces a few hundred pounds a year of specimen mineral crystals (heulandite). The Three Rivers Stone quarry (inactive since December 2012) produces flagstone. The Idaho Cobalt project, 45 miles west of the town of Salmon in Lemhi County, would be an underground cobalt-copper-gold mine, processing plant (mill), and ancillary facilities, but the project is currently inactive pending the ability of the owners to raise sufficient funds to finish construction of the mine.

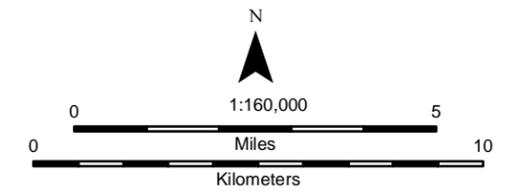
The TCM and Three Rivers Stone quarry, current mines, would be expected to continue operations for the foreseeable future, with intermittent closures typical of the mining industry. A small rock pit (~ 4 acres) would continue to be developed in Custer County perhaps once every year or two. There could also be exploration operations at a few historic sites such as the Clayton Silver mine, IMA mine, or the Stanley area uranium prospects, as well as at the active mines and at the active Trail Creek agate and jasper exploration projects (Gardner 2008, 2013b). The IMA molybdenum project would not be developed in the foreseeable future. There are no reasonably foreseeable new mines (locatable, salable, or leasable) that would substantially affect mineral resources in Custer County (Gardner 2013b).

The TCMC-Forest Service land exchange proposal (if approved) would reduce the Federal land available near the mine for locatable, salable, or leaseable mineral actions by approximately 2,850 acres. However, this land has not been available for locatable mineral entry by anyone other than TCMC since the late 1960s and early 1970s due to mining claims controlled by TCMC that cover the land, and no leaseable or salable mineral actions would occur at the land in the foreseeable future. The land exchange proposal would make approximately 260 acres⁴ of private land available for locatable, salable, or leaseable mineral actions in Custer County.

⁴ which would not include Livingston mine parcels (~ 145 acres) which is withdrawn from future mineral actions



- Legend**
- Selected land
 - Offered land - Broken Wing Ranch
 - CESA
- Land Ownership within CESA**
- BLM
 - Private
 - State
 - Forest Service

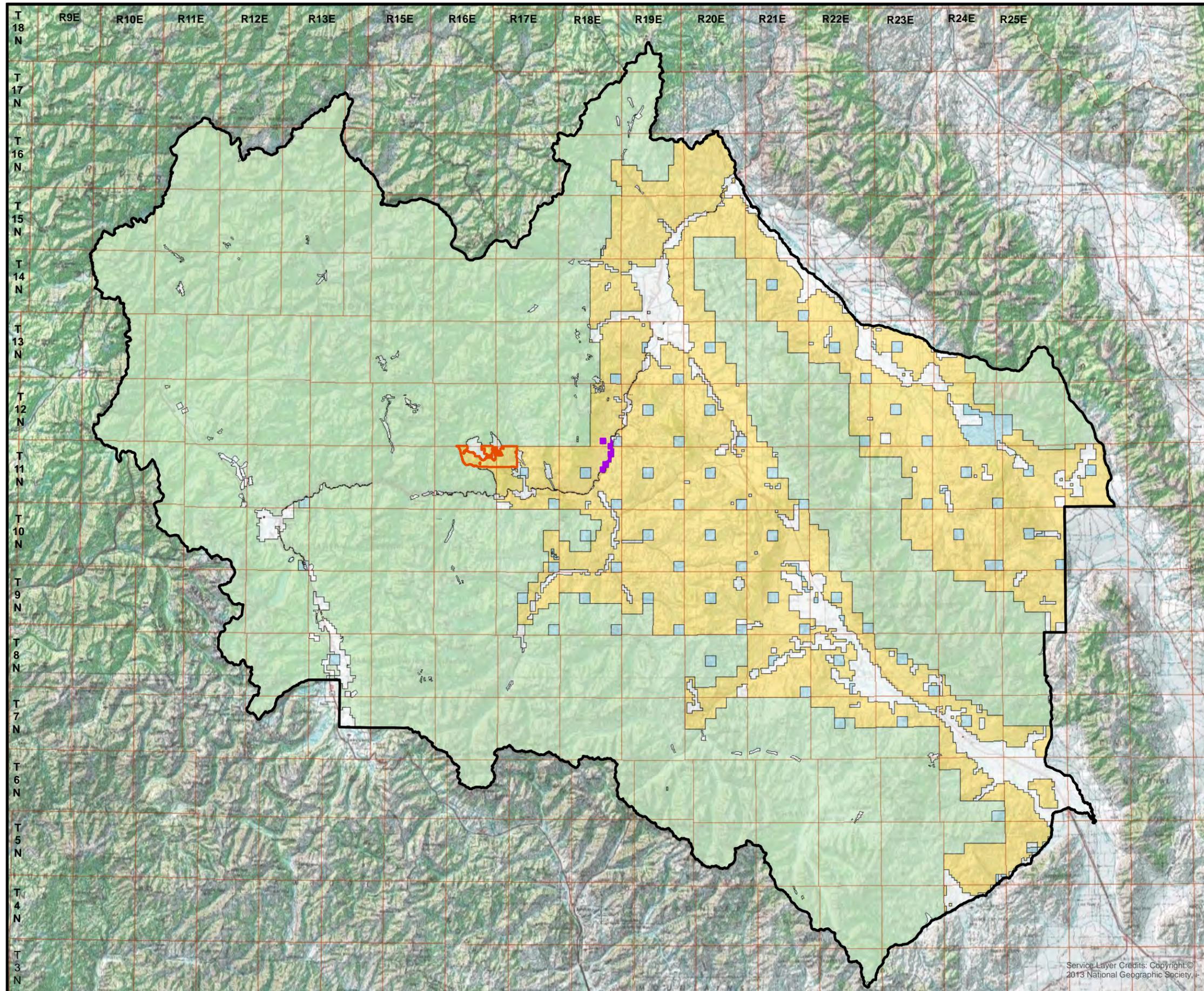


Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83

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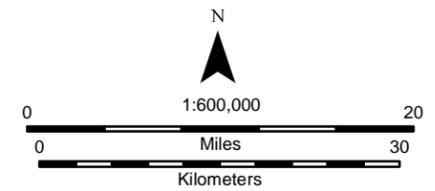
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Figure 5.2-1
Geologic and soil resources CESA
Thompson Creek Mine EIS



Legend

- Selected land
- Offered land - Broken Wing Ranch
- CESA
- Land Ownership within CESA**
- BLM
- Private
- State
- Forest Service



Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83

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**Figure 5.2-2
Minerals and air quality CESA
Thompson Creek Mine EIS**

5.2.3. Cumulative Effects

There would be no actions besides the MMPO alternatives that would meaningfully alter topography and geologic exposure in the CESA for geologic resources (the Three Rivers Stone quarry is outside the CESA). For example, none of the mines apart from the TCM in the CESA are large enough to meaningfully alter the topography of the CESA and no there are no reasonably foreseeable new mines in the CESA. Rock pits and historic mines and prospects provide 131 acres of geologic exposure in the CESA. However, bedrock is readily exposed in the CESA and thus none of the rock pits and historic mines and prospects provide unique geologic exposure in the CESA.

A relatively small amount of salable (common) minerals such as sand, gravel, and rip-rap would continue to be extracted in the CESA for minerals (Custer County), e.g., a few 10,000s cubic yards per year. There would continue to be widespread mineral specimen collection (rockhounding) in the CESA, but only a few cubic yards of specimens would be collected each year in the CESA. No other minerals would be produced in the CESA in the reasonably foreseeable future, apart from flagstone production at the Three Rivers Stone quarry (up to 30,000 short tons per year) and molybdenum produced from the TCM.

There is sufficient molybdenum production and reserves in the US and the world to supply demand for the foreseeable future, e.g., 141 million pounds of molybdenum produced in the US, 551 million pounds of molybdenum produced in the world, 2,980,000 short tons of molybdenum reserves in the US, and 11,020,000 short tons of molybdenum reserves in the world (Table 3.13-1., USGS 2012a). New mines will be developed or production at existing mines will be increased to meet the overall increasing demand for molybdenum in the US and the world. No molybdenum production apart from that from the TCM is reasonably foreseen in the CESA for minerals. There are no molybdenum reserves apart from those of the TCM in Custer County, but there are several molybdenum prospects (Worthington 2007), the most advanced of which is the IMA project. However, no exploration work on these prospects is reasonably foreseen (Gardner 2013b).

The molybdenum produced under the MMPO alternatives would not meaningfully affect the US or world molybdenum resources, and would reduce the US reserves by only 2 percent. There would be no potential disposals of salable minerals (e.g., quartzite at the ranch) that would meaningfully affect mineral production in the CESA. There would be over 8,000 acres in Federal lands transferred to private ownership (i.e., land disposal alternatives, TCMC-Forest Service land exchange) that would no longer be available for locatable, salable, or leasable mineral actions under Federal laws and regulations. However, some 80 percent of this area has not been available, and would not be available for the foreseeable future, for locatable mineral actions by anyone other than TCMC due to mining claims on the area owned by TCMC (Gardner 2013b). In general, the changes in the amount of Federal lands available for mineral exploration in the CESA for minerals in the foreseeable future would be relatively very small, e.g., a net increase of 175 acres per year (Section 5.12).

5.3. Soil Resources

5.3.1. Introduction

The CESA is the Thompson Creek and S. Creek 5th level watersheds (127,002 acres) (Figure 5.2-1). The CESA encompasses two watersheds due to the effect that soil disturbance would have on surface water quality through erosion, soil loss, and sedimentation. Soil resources outside the watersheds would not be affected. Direct effects would be limited to primary disturbed areas, and indirect effects (e.g., erosion and sedimentation of streams) would be limited to proximal downstream areas.

The use of OHVs disturbs soil, but the effects are inconsequential compared to the effects on soil from mining, roads/utility corridors, residential development, wildfire/prescribed burning, livestock grazing, timber/vegetation management, etc. Apart from actions which remove soil, equipment used to remove timber or vegetation causes compaction that further increases the erosion potential of soil by increasing run-off and decreasing infiltration. Roads can alter water flow on the soil surface, creating impervious surfaces that concentrate run-off and increase erosion. The primary effect of these activities on soil resources is increased erosion of in-situ soil with the secondary effect of increased sediment loading in downstream surface waters.

5.3.2. Past, Present, and Reasonably Foreseeable Actions

The categories of actions that have most affected and would most affect soil in the CESA are agriculture, residential development, mining, and road and utility corridors (Table 5.1-2., Section 5.1.2). Livestock grazing, wildfire/prescribed burning, and timber/vegetation management would affect relatively large areas of soil in the CESA, but the effects would be much less than the soil compaction and loss/removal due to the other categories of actions.

Soil texture is regularly disrupted by agriculture, which also causes soil compaction and soil loss due to water and wind erosion as well as distinct changes in soil chemistry/productivity and vegetative cover. Residential development typically causes soil removal and burial during property development, as well as compaction and changes in soil chemistry/productivity and vegetative cover, e.g., development of lawns. Mining causes compaction, burial, and loss of soil as soil is removed and (for modern mines) stored and replaced during reclamation. Hence, soil textures, soil chemistry/productivity, vegetative cover, and biological crusts are altered or destroyed for periods of decades or more. A soil loss of 30 percent is typical for stockpiled soil due to handling losses and wind and water erosion.

Soil is displaced from roads as fugitive dust, but settles on nearby travel routes, i.e., no appreciable amounts of soil would be removed from the CESA as fugitive dust from roads (and agricultural fields and mines). However, there has been and would continue to be relatively high rates of soil loss from water erosion of roads and natural-surface recreational facilities. The nature and extent of the effect varies with the type of road, the extent of use, and the level of maintenance. For example, primitive 4WD roads, OHV trails, and power line service roads are naturally surfaced, rarely used, and almost never maintained, making them potentially susceptible to gullying and rilling, especially on relatively steep grades.

Livestock grazing causes soil erosion by decreasing the vegetative cover, altering/destroying biological crusts, and increasing compaction. Localized damage in riparian areas from compaction and vegetation removal by cattle can occur, allowing sediment to enter the waterway and contributing to the alteration of streambanks. Such effects to soil would be expected to continue in the foreseeable future.

Wildfire/prescribed burning increases soil erosion by removing the organic material from the soil surface. Extremely hot fires have the potential to permanently alter the top layers of the soil, changing the soil structure, productivity, chemistry, and erosion potential. The effects to soil from wildfire/prescribed in the CESA have varied by location, timing of the fire, soil and vegetation type, and post-fire environment.

Timber/vegetation management includes removing trees and vegetation which may increase soil erosion. Instream habitat improvement projects also cause effects to soil during project implementation, but such effects are nearly always inconsequential due to the small areas of the projects, their short construction time frames, and the BMPs typically used.

5.3.3. Cumulative Effects

There is and would be little effect to soil in the CESA due to the relatively small amount of agriculture or residential development in the CESA, e.g., only 4.8 percent of the CESA is private land. The dominant effect to soil in the CESA is and would be from mining (2,954 acres, 2.3 % of the CESA), but only a few acres of additional mining (apart from the TCM) are reasonably foreseeable in the CESA (Table 5.1-2., Table 5.1-3).

After mining, road and utility corridors have most affected soil in the CESA. For example, 334 acres (0.3 %) of the CESA is subject to the potential for relatively high water erosion and off-site sedimentation due to roads. In particular, primitive roads comprise 192 acres (57 %) of the area of all roads in the CESA. These roads do and would have relatively high rates of water erosion due to their dirt surfaces, relatively steep grades, and less maintenance. In contrast, the 142 acres (0.1 %) in the CESA of secondary and local roads (Table 5.1-2.) are commonly gravel-surfaced, less steep, and receive a higher level of maintenance than primitive roads. For example, most of these roads have engineered prisms and appropriately spaced culverts to drain run-off. Consequently, these roads have relatively little water erosion. Utility corridors are conservatively estimated to have disturbed 303 acres (0.2 %) of soil in the CESA. However, only small areas within the (legal) corridors have been and would typically be disturbed (Table 5.1-2., Table 5.1-3).

The areas of past wildfire/prescribed burning and livestock grazing in the CESA are 1,193 (0.9 %) and 85,648 acres, respectively (Table 5.1-2). The area of past, present and future timber/vegetation management in the CESA would be a small fraction of the few hundred acres that typically occur each year in BLM Challis Field Office area and the SCNF.

5.4. Vegetation, Forest Resources, and Invasive and Non-native Species

5.4.1. Introduction

The CESA is the Thompson Creek, S. Creek, and Bayhorse Creek 5th level watersheds (213,514 acres) (Figure 5.4-1). The effects to vegetation, forest resources, and weeds from the MMPO and land disposal alternatives would be limited to within these watersheds, and the cumulative effects to these resources would be most important on a watershed scale.

The most important effects are changes to the type and amount of vegetation, which affects ecosystem processes and habitat functionality. The major vegetation types (85.7 % of the CESA) are montane forest-steppe transition (38.3 %), shrub steppe and grasslands (28.5 %), and montane forests (18.9 %) (Table 5.4-1).

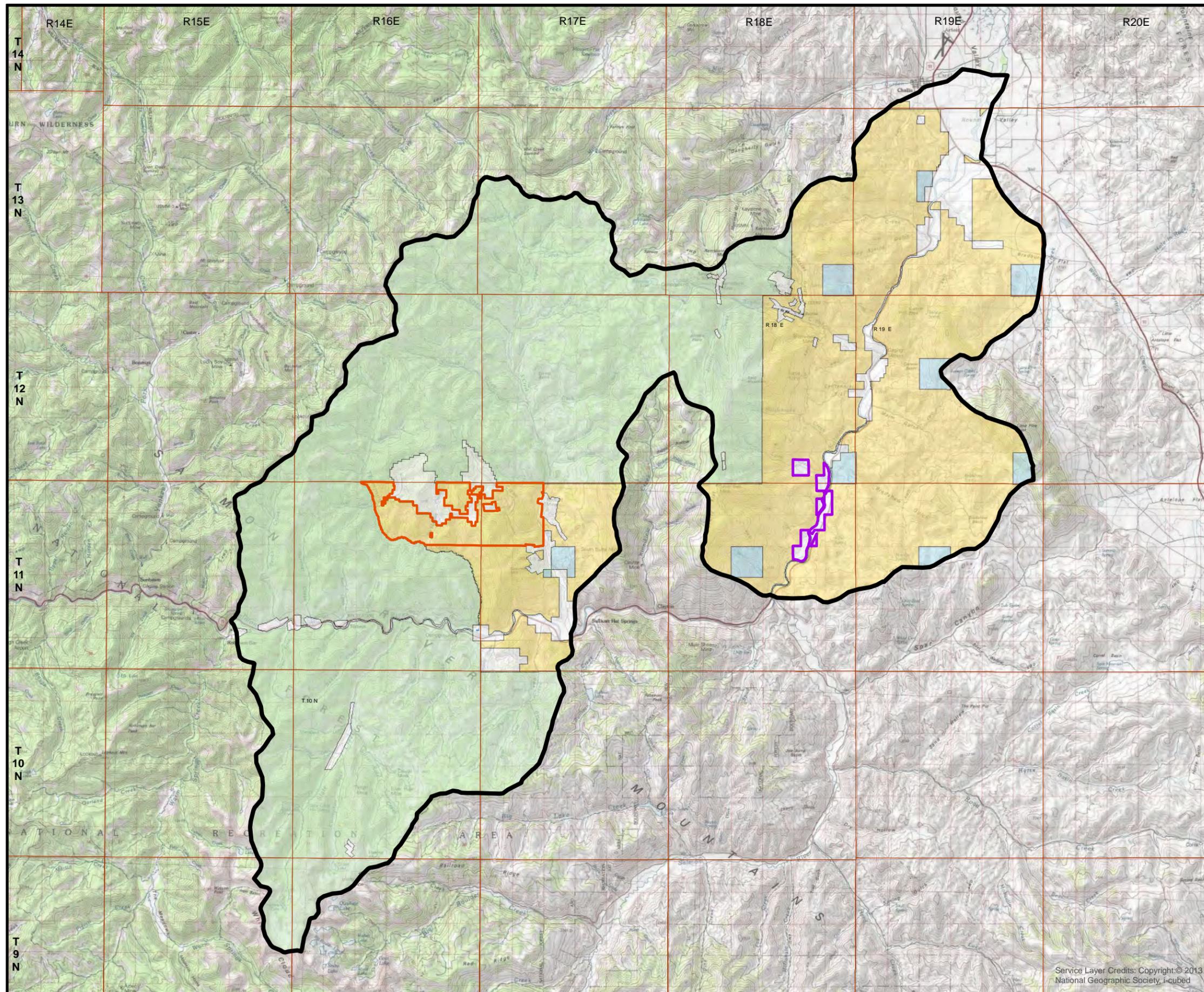
Table 5.4-1. Vegetation types in the CESA.

Vegetation type	acre	%
Alpine	1,627.8	0.8
Cultural landscapes (agricultural cropland and pasture)	1,698.5	0.8
Montane forest-steppe transition	81,689.9	38.3
Montane forest	40,315.8	18.9
Montane shrubland	658.4	0.3
Riparian and wetland	2,759.9	1.3
Shrub steppe and grasslands	60,796.0	28.5
Subalpine forest	12,921.7	6.1
Subalpine parklands	11,046.1	5.2
TOTAL	213,514	100.0

BLM and Forest Service corporate GIS data; GAP Analysis Program (GAP 2013) data

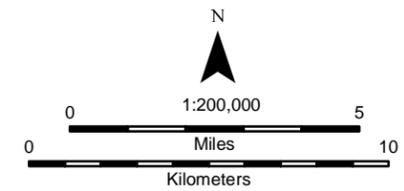
5.4.2. Past, Present, and Reasonably Foreseeable Actions

The disturbance of vegetation in the CESA is primarily due to timber/vegetation management, mining, wildfire/prescribed burning, agriculture, residential development, and roads and utility corridors. The vegetation disturbed by such categories of actions typically requires decades to recover to its former species composition and density due to the arid climate of the CESA and the rapid development of weeds on disturbed soil. In addition, wildfire/prescribed burning changes the type and maturity of vegetation, and contributes to the spread of weeds.



Legend

- Selected land
- Offered land - Broken Wing Ranch
- CESA
- Land Ownership within CESA**
- BLM
- Private
- State
- Forest Service



Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83

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Figure 5.4-1
CESA for multiple resources
Thompson Creek Mine EIS

Livestock grazing and timber/vegetation management cause widespread effects to vegetation in the CESA, but to a much less degree than the other categories of actions which typically cause the distinct removal or complete conversion (e.g., native vegetation to commercial crops) of vegetation as well as substantial increases in weeds on the relatively disturbed areas (Table 5.1-2., Section 5.1.2., Table 5.4-1).

Livestock grazing on BLM and NFS land would continue in grazing allotments of the CESA pursuant to the Challis RMP (BLM 1999) and Challis National Forest LRMP (USFS 1987), which state goals of managing vegetation resources to achieve or maintain resistant and resilient ecological conditions while providing for sustainable multiple uses and options for the future across the landscape. These resistant and resilient ecological conditions include healthy, productive, and diverse populations of native or desirable non-native plant species appropriate to site characteristics. In addition, the RMP and LRMP specify goals and objectives to meet range health standards, which are directly related to vegetative cover. Grazing on private lands would also continue in the CESA.

Livestock grazing can result in specific, localized removal of riparian vegetation as well as introducing and spreading weeds. Grazing also utilizes the grass/forb species which reduces competition for the natural regeneration of tree/shrub species. There are isolated sites within the landscape not meeting the rangeland health standards; however, broader areas must be in proper functioning condition and meeting the standards. In any case, the allotments in the CESA are in good condition and meeting the rangeland health standards (Redick, P. 2014). The effects of livestock grazing in the CESA in the reasonably foreseeable future would be similar to that in the recent past and the present: maintaining or making significant progress towards attainment of the rangeland health standards. The BLM and SCNF will continue to monitor and evaluate allotments to determine if they are continuing to meet or are making significant progress towards meeting the standards for rangeland health, and management prescriptions adjusted accordingly. Any future changes to grazing management on these allotments would be designed to improve range conditions, which would also result in improvements to vegetative communities. The primary effects to vegetation associated with timber/vegetation management in the CESA have been and would be changes in species composition and density.

5.4.3. Cumulative Effects

Past, present, and reasonably foreseeable disturbance has and would directly affect vegetation on 3.7 percent of CESA. Mining and wildfire/prescribed burning have and would have the dominant effect to vegetation in the CESA, having distinctly affected 2,907 acres (1.4 %) and 2,718 acres (1.3 %), respectively, in the CESA. However, many of the historic mines have naturally revegetated during the 50 years or more since most of the mines were developed. In addition, much of the vegetation at the TCM (2,823 acres, 1.3 % of the CESA) is being and would be restored by reclamation (Table 5.1-2).

The amount of agricultural land and residential development in the CESA is expected to remain nearly constant: 1,699 acres (0.8 %) of agricultural land and perhaps 150 rural residences (75 acres, < 0.1 %), apart from Alternative L2-B for which the irrigated cropland (424 acres) at the ranch would be converted to sagebrush grassland, increasing the sagebrush steppe and grasslands by 0.7 percent and decreasing the agricultural cropland and pasture by 23.6 percent in

the CESA (Figure 5.4-1). That is, apart from Alternative L2-B, there would be on average a few acres of agricultural land converted to residential development each year (Table 5.4-1., Section 5.1.2).

Roads and utility corridors cause the removal of vegetation and an increase in weeds in the CESA. Roads and utility corridors cover 392 acres (0.2 %) and 1,031 acres (0.5 %), respectively, of the CESA (Table 5.1-2). In the case of large expanses of unfenced Federal lands (such as BLM land), unauthorized OHV use and the development of unauthorized roads are common with distinct effects to vegetation in the road prisms (vegetation removal and/or lower vegetation productivity) and land adjacent to the roads (spread of weeds). There would be negligible vegetation removed by roads and utility corridors in the reasonably foreseeable future (Table 5.1-3). A small portion of the CESA (1,676 acres, 0.8 %) contains weeds, typically in small areas on or near roads and utility corridors. There would be a small increase (~ 1 %) in disturbed land which is susceptible to weeds; however, weed prevention/control measures would limit the development of weeds to perhaps less than half of the additional disturbed land in the CESA (Table 5.1-3).

All of the BLM land in the CESA (~ 1/3 of the CESA) except the BLM Bruno Creek Allotment is available for livestock grazing. Grazing also occurs on NFS and private lands in the CESA. Thus, grazing has and would continue to affect vegetation on 152,202 acres (71.3 %) of the CESA (Table 5.1-2).

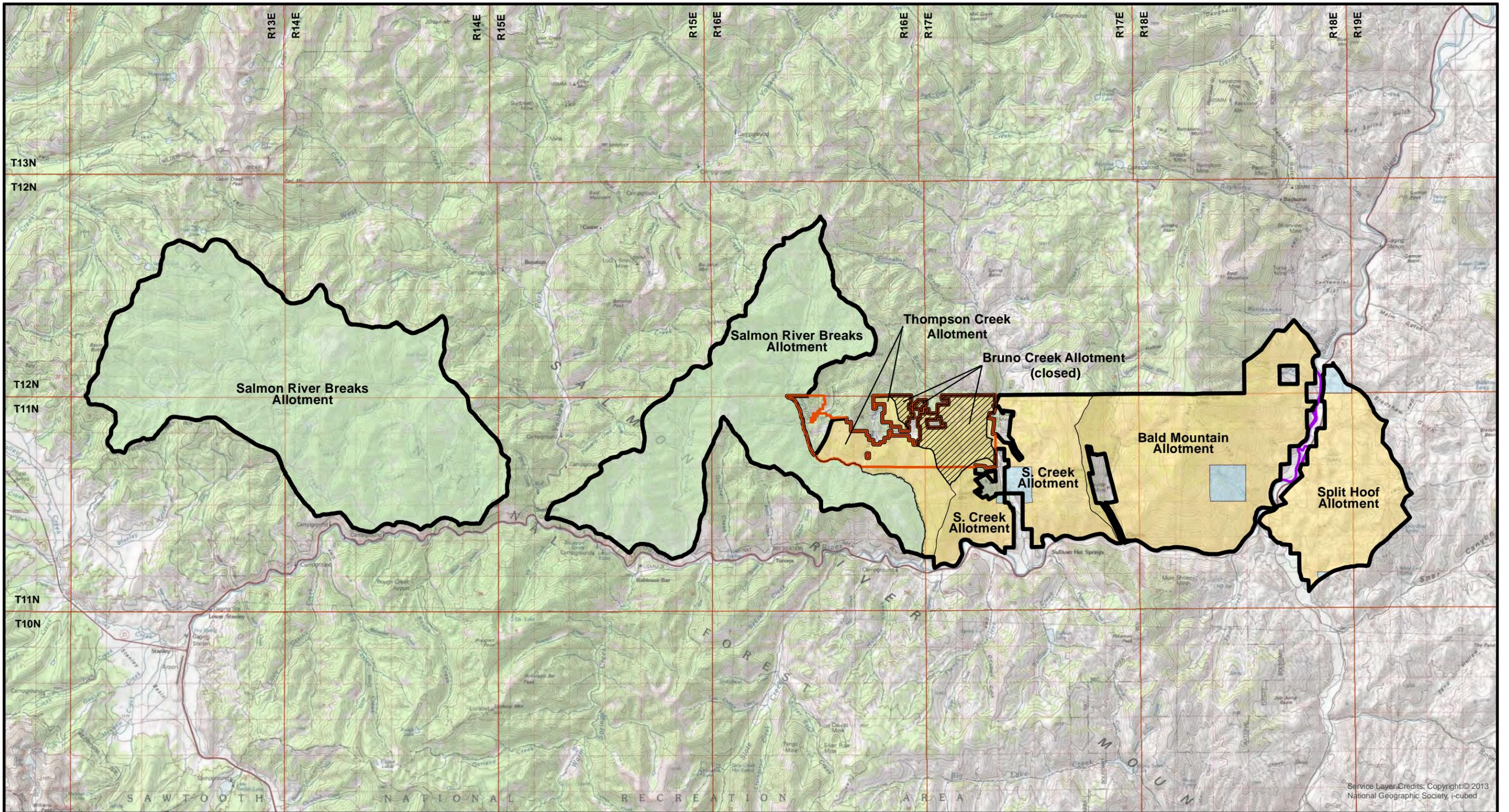
No timber sales or prescribed burns in the SCNF are reasonably foreseeable in the CESA, and future timber/vegetation treatments in the CESA would be a small fraction of the few hundred acres per year that would occur on average in the BLM Challis Field Office area and the SCNF. Forest product extraction (including fuel, posts, poles, plant gathering, and Christmas trees) has and would continue to affect very small scattered areas of vegetation and forest resources in the CESA. Past timber sales and fuels reductions projects have reduced stand densities, simplified stand structure, and have resulted in the partial treatment of created fuels (logging slash) through the use of thinning, fire, and mechanical treatments. Approximately 5,000 acres (2 %) in the CESA have been treated with prescribed fire or mechanical thinning in the recent past.

5.5. Range Resources

5.5.1. Introduction

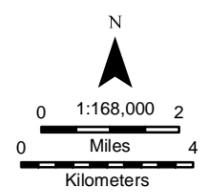
The CESA for range resources includes the Federal grazing allotments which contain any portion of the areas of the MMPO alternatives or any of the selected or offered lands: four active BLM livestock grazing allotments (Thompson Creek, S. Creek, Bald Mountain, and Split Hoof), one closed BLM allotment (Bruno Creek), and one vacant Forest Service allotment (Salmon River Breaks) for a total of 94,722 acres (Figure 5.5-1). There are 883 AUMs (35,925 acres) currently permitted for the four active BLM allotments. Portions of each of these allotments are in the project area and would be affected by the project. The Salmon River Breaks Allotment (56,285 acres, 441 AUMs) is currently vacant. Livestock grazing historically occurred on the BLM Bruno Creek Allotment (2,511 acres,⁵ 130 AUMs) between the S. Creek and Thompson

⁵ 2,378 legal acres in the Challis RMP (BLM 1999)



Legend

- Selected land
- Offered land - Broken Wing Ranch
- CESA
- Allotments within CESA**
- Active Allotment
- Closed Allotment



Selected land from Thompson Creek Mine data, polygons created by Ken Gardner.
 Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management,
 Idaho State Office, Geographic Sciences.
 Coordinate system UTM Zone 11 NAD 83

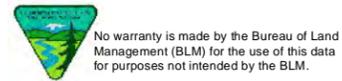


Figure 5-1
Range resources CESA
Thompson Creek Mine EIS

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Creek allotments. However, the BLM Bruno Creek Allotment is closed for grazing due to the TCM (BLM 1999, p. 37). The effects to range resources in the CESA are primarily from timber/vegetation management, livestock grazing, wildfire/prescribed burning, mining, and roads and utility corridors.

Livestock displaced from the project area due to the MMPO alternatives would move to other portions of the allotments. There would not be any effect to livestock grazing or range resources on the Garden Creek property; therefore, no allotments associated with the Garden Creek property were included in the CESA.

5.5.2. Past, Present, and Reasonably Foreseeable Actions

The effects to range resources in the CESA have been and would be primarily from timber/vegetation management, weeds, livestock grazing, wildfire/prescribed burning, mining, residential development, roads and utility corridors, and changes in land jurisdiction. The effects from timber/vegetation management in the CESA include changes in the types and density of species, which typically increase the available forage for grazing animals such as cattle and elk. On a much smaller scale, weeds reduce available forage. However, with proper management of livestock grazing, sufficient residual vegetative cover and litter remain to prevent and/or limit the spread of weeds. Weeds are not prevalent in the CESA, and typically occur in small, disturbed areas such as along roads. The general trend of increased recreation on Federal lands will result in greater vehicle traffic on roads and trails, which could lead to more weeds. The potential for the spread of weeds (degradation of range quality) from OHV use is greater than that from other vehicles due to the relatively large amount of OHV use on less developed roads. However, Federal, State and local agencies would continue to aggressively work to minimize the spread of weeds.

Livestock grazing has been and is expected to remain a primary land use in the CESA and would be managed in relatively the same manner as during the last few decades. Grazing permits would continue to be renewed every 10 years and would require that the fundamentals for rangeland health are being met or there is significant progress towards attainment of the standards (43 CFR 4180). At the time of the permit renewals, modifications to the permits may occur to ensure compliance with the fundamentals of the rangeland health standards. Changes may occur to the timing of grazing use, modifications to the grazing use criteria, duration of use, permitted AUMs, and authorization of additional range improvements (fences, water developments, etc). No fundamental changes to livestock grazing of Federal lands (apart from the effects of the MMPO and land disposal alternatives) are reasonably foreseeable in the CESA, apart from a decrease in the area and AUMs of the Salmon River Breaks Allotment available for grazing due to the proposed TCMC-Forest Service land exchange. A decrease in AUMs causes increased livestock grazing on private lands in the vicinity.

The other categories of actions reduce the AUMs available for livestock grazing, change the distribution of livestock on the allotments, may affect the timing of livestock grazing, and cause the spread of weeds and a reduction in the vegetative cover. Livestock grazing on reclaimed areas is typically restricted until vegetation has been successfully re-established. In many cases, the change from a pre-mine forested environment to reclamation grasslands provides increased forage for grazing animals.

The CESA contains a network of roads generally providing good access for trailing livestock into the allotments. However, in places roads make it challenging to appropriately separate livestock by grazing allotment. In addition, livestock are injured or killed and vehicles are damaged through vehicle-livestock collisions on roads. Wildfire size may increase with climate change and/or with more fine fuels available due to the trend of less AUMs being authorized for livestock grazing in the CESA.

5.5.3. Cumulative Effects

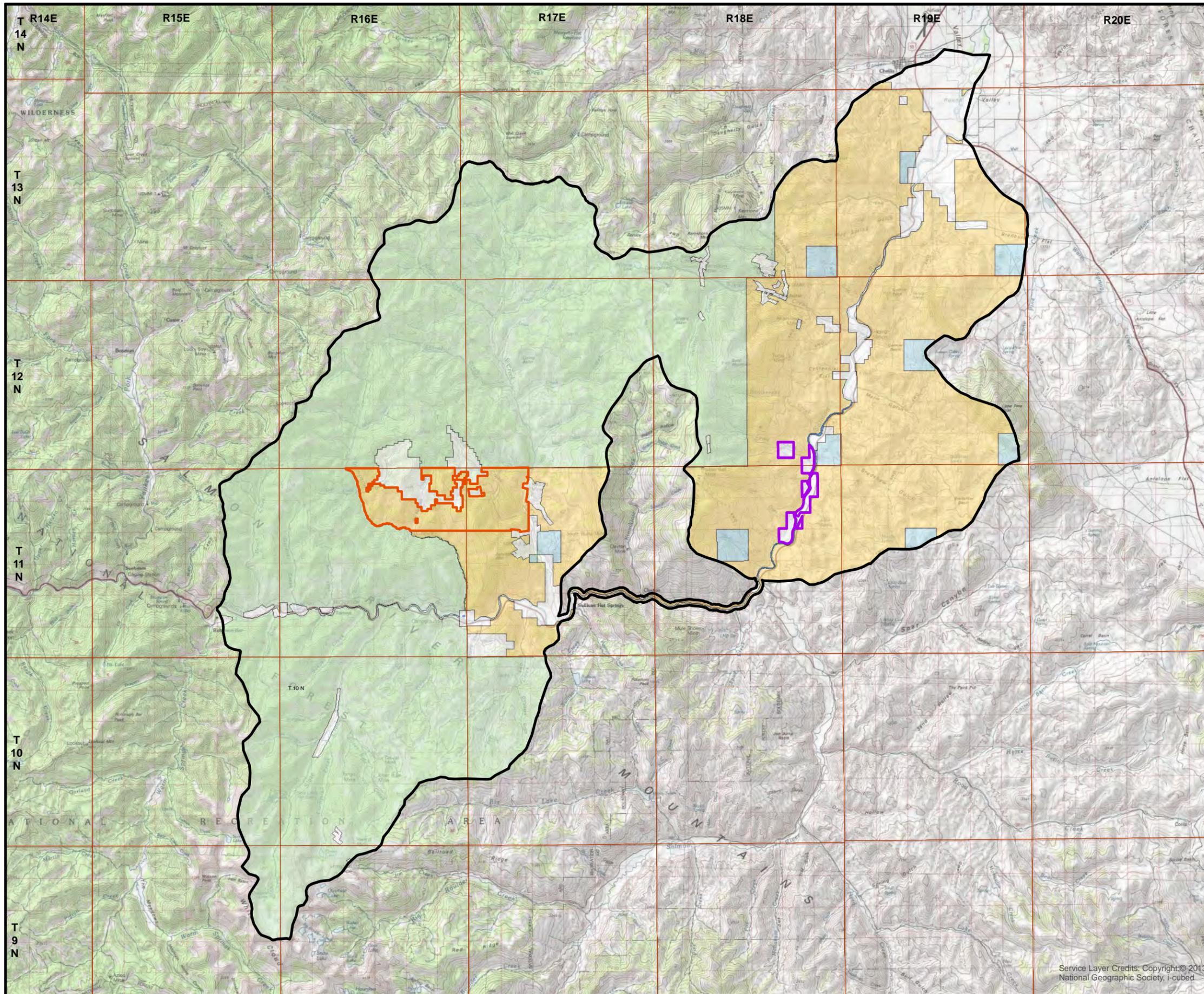
Timber/vegetation management has been and would continue to have a small effect to range resources in the CESA, e.g., < 10 acres per year on average. The trend for weeds in the CESA would be a gradual increase, concentrated along roads and trails. There has been and would be no meaningful effect to AUMs from roads (313 acres, 0.3 %) or utility corridors (303 acres, 0.3 %). Furthermore, much of the area in many utility corridors is vegetated and available for forage. In addition, many of the roads at the TCM would be reclaimed in the reasonably foreseeable future. Wildfire/prescribed burning would be similar to as in the past (4,463 acres, 4.7 %). Mining would affect 2,860 acres (3.0 %) of the CESA, and the Bruno Creek Allotment was closed in 1981 due to the TCM, a decrease of 130 AUMs. There are and would be only a few residences in the CESA (Table 5.1-2., Table 5.1-3). The TCMC-Forest Service land exchange would decrease (622 acres, 1.1 %) the area and AUMs of the Salmon River Breaks Allotment available for grazing.

5.6. Water Resources

5.6.1. Introduction

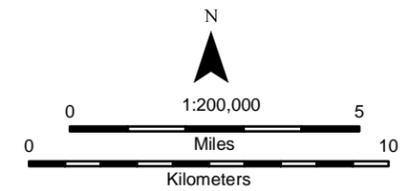
The CESA for surface water and groundwater is the Thompson Creek, S. Creek, and Bayhorse Creek 5th level watersheds, plus the Salmon River from its confluence with Thompson Creek downstream to where effects would not be detectable, if residual effects would extend that far (214,506 acres) (Figure 5.6-1). The CESA was selected considering the following. First, changes in water quality/quantity due to the mine in the Thompson Creek and S. Creek watersheds would occur in the drainages downstream of the WRSFs, the open pit, and the TSF (i.e., Buckskin, Pat Hughes, No Name, Bruno, and Redbird creeks), and could continue downstream into Thompson Creek, S. Creek, and the Salmon River. Second, deeper, regional aquifers have not been affected by the mine to date. Only the water quality of shallow aquifers just downgradient of the WRSFs and the TSF have been measurably affected by the mine (Section 3.6). However, since the local aquifers discharge to local streams (i.e., Thompson, Bruno, S., Redbird, and No Name creeks) effects downstream of the discharge points would most likely be through mixing with surface water. Third, the management of the Broken Wing Ranch has the potential to affect water resources, most likely through changes in water use and fish habitat improvement projects.

Unlike the effects to many resources, the effects to surface water (apart from sediment load) and groundwater resources do not correlate well with surface disturbance. For example, water quantity is typically most affected by humans in the CESA by a few points of diversion.



Legend

- Selected land
- Offered land - Broken Wing Ranch
- CESA
- Land Ownership within CESA**
- BLM
- Private
- State
- Forest Service



Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83

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Figure 5.6-1
Fish and aquatic, water resources CESA
Thompson Creek Mine EIS

Similarly, water quality is typically most affected by bedrock geochemistry (water in the CESA typically has relatively high concentrations of arsenic and selenium due to groundwater interaction with certain units in the sedimentary basement rocks), runoff from agricultural fields and roads, runoff from livestock enclosures with a high density of livestock, septic system failures, chemical spills into water ways, chemical leaks into groundwater (e.g., leaking underground fuel tanks), changes in riparian vegetation which affect water temperature, etc.

5.6.2. Past, Present, and Reasonably Foreseeable Actions

5.6.2.1. Surface Water

The categories of actions with the greatest potential effects to surface water in the CESA are roads (construction, use, and maintenance); livestock grazing; timber/vegetation management, agriculture, mining, and any other water consuming or ground disturbing activities such as residential development. These actions affect surface water primarily by consuming water and introducing sediment from upland soil erosion and/or streambank erosion from increased water running off of disturbed ground.

In some cases these actions may introduce contaminants to surface water via runoff from agricultural fields and roads, runoff from livestock enclosures with a high density of livestock, chemical spills into water ways, or bacteria from livestock or human waste deposited in or near surface water, etc. Mining may also affect surface water due to suspended sediment and dissolved constituents from mine workings and on-site waste rock, including tailings (finely processed ore). In particular, mine workings and waste rock with relatively high concentrations of sulfur are prone to generating acidic water with relatively high concentrations of metals and sulfate (ARD). However, the Salmon River in the CESA is not considered impaired for beneficial uses due to any trace elements (IDEQ 2011a). The reach of the Salmon River between the mouths of Thompson Creek and S. Creek is listed as impaired for sedimentation/siltation, but the Salmon River is not listed upstream or downstream of the CESA (IDEQ 2011a).

The effects of sedimentation in surface water from erosion are a distinct function of the soil type, vegetative cover, rainfall intensity, slope, and distance from the erosion site to the water. Climate change is not expected to materially affect the overall quantity of surface water, but could cause earlier spring melt and warmer water in the CESA.

5.6.2.2. Groundwater

As surface water and groundwater are interconnected, the same categories of actions that affect the quantity of surface water affect the quantity of groundwater. When groundwater is diverted (e.g., intercepted by wells or surface or underground mine workings), there may be reduced groundwater discharge leading to reduced streamflow and less groundwater and surface water available for other users.

Groundwater is inherently insulated from sedimentation and temperature changes. Thus, the categories of actions with the greatest potential to affect the quality of groundwater in the CESA are those that could introduce contaminants into groundwater: mining, agriculture, and residential development. Climate change is not expected to materially affect the overall quantity or quality (temperature) of groundwater in the CESA.

5.6.3. Cumulative Effects

5.6.3.1. Surface Water

By far greatest consumption of surface water in the CESA is from agriculture, which comprises more than 90 percent of the consumptive water use in Idaho. For example, the consumptive water use in the CESA for alfalfa hay is 882 mm per day from evapotranspiration and 779 mm per day from irrigation,⁶ there are 7,734 acres of irrigated land in the CESA (Fry et al. 2011), and the consumptive water use from agriculture in the CESA is on average 58.2 cfs throughout the year, although all of the water is consumed during April through October. This compares to the (maximum) use of 26.86 cfs by the TCM (Section 3.6), which is by far more than any other individual user. The Three Rivers Stone quarry uses (at maximum) 0.47 cfs (340 acre-feet/year) for dust suppression. There are three irrigation wells along the Salmon River between the confluence of the Salmon River and Thompson Creek and the confluence of the East Fork Salmon River and the Salmon River and approximately 25 domestic wells in the same area. Consumption of water from residential development (~ 150 wells for domestic consumption) would be the next largest effect to the quantity of surface water, with negligible consumption of water from other actions such as livestock grazing, timber/vegetation management, and recreation. The reasonably foreseeable consumption of surface water from these categories would be similar in the past, present, and reasonably foreseeable future, particularly since little water in the CESA is available for appropriation, which is strictly administered by the IDWR to protect existing water uses as well as environmental and public interest factors.

The effects to the quality of surface water in the CESA have been and would be primarily from agriculture: contaminants from runoff of agricultural fields, 7,734 acres, 3.6 % and runoff from livestock enclosures with a high density of livestock. The next greatest effect would probably be from mining. There are 157 historic mines, mostly for metals, in the CESA as well as the TCM, Three Rivers Stone quarry, Ramshorn quarry. The surface disturbance of these mines (4,846 acres, 2.3 %) contributes sediment to the more proximal surface water. More importantly, a few of the mines, apart from the TCM, contribute metals and sulfate to surface water, typically in upland groundwater recharge zones. These mines include the Tungsten Jim mine and mill sites along Thompson Creek and the Twin Apex mine in the Bruno Creek drainage. The Twin Apex mine is responsible for a large percentage of the baseflow in lower Bruno Creek, as groundwater affected by the mine is discharged from the entrance of the abandoned mine. The discharge contributes antimony, cadmium, lead, and zinc to Bruno Creek.

Other effects to the quality of surface water have been and would be from bacteria from livestock or human waste deposited in or near surface water, as well as water ways with relatively warm water due to reduced riparian vegetation in places due to agriculture, livestock grazing, firewood cutting, wildlife activity, etc. The quality of surface water is also affected by sediment from runoff from agricultural land (7,734 acres, 3.6 %); utility corridors (1,107 acres, 0.5 %); roads (852 acres, 0.4 %), and residential development (~ 75 acres, < 0.1 %) (Table 5.1-2).

In addition to the effects from past and present categories of actions, the reasonably foreseeable effects to the quality of surface water in the CESA would include chemical spills along roads;

⁶ data for Challis from <http://www.kimberly.uidaho.edu/cgi-bin/getcuir.pl?fname=challis.dat&GetIt=Retrieve>

although the details of such are too speculative for meaningful cumulative effects analysis. However, ore and tailings from the Tungsten Jim mine (20,000 cubic yards) and mill (10,000 cubic yards) would be removed from along Thompson Creek and encapsulated in the Pat Hughes drainage (~ 2 acres) below the toe of the Pat Hughes WRSF (Marek and Lechner 2011; Gardner 2013b). This would reduce the concentrations of metals in Thompson Creek or the potential for metals from the sites to enter Thompson Creek, especially since the encapsulation site would inherently be included in the water management at the TCM. However, no metal loads from the Tungsten Jim sites have been inferred to date at the monitoring sites for the TCM.

All active mines must comply with discharge permits; WQs in S. Creek, Thompson Creek, and the Salmon River are being met. The contributions of trace elements from mining to the Salmon River are currently at levels that do not affect the beneficial uses in the river. The EPA has the ability to control point source releases through the NPDES program, and would continue to do so by setting the necessary effluent limits on a case-by-case basis to ensure that the desired water quality in the Salmon River is maintained.

5.6.3.2. Groundwater

As surface water and groundwater are interconnected, the same categories of actions that affect the surface water similarly affect groundwater except as noted. The IDWR (2012) well database shows that TCMC is the sole user of groundwater in the Thompson Creek, Bruno Creek, S. Creek, Redbird Creek, and No Name Creek basins, apart from domestic water for the Redbird mine property, a few other residences along S. Creek, and a few residences at the mouth of Thompson Creek. The quality of groundwater would be affected by septic system leaks at residences (~ 150) in the CESA, contaminants flushed into septic systems that are not consumed by bacteria before release into groundwater, and leaks from aboveground and underground chemical storage tanks.

5.7. Wildlife Resources

5.7.1. Introduction

The CESA includes all wildlife habitats in a 15 mile radius of the center of the mine and selected land, and the center of the Broken Wing Ranch. The two 15 mile radii overlap yielding a CESA of 662,397 acres (Figure 5.7-1., Figure 5.7-2). The CESA encompasses a realistic home range or movement radius for most species with minor effects to habitat (Section 4.7.), including wide-ranging species (i.e., big game, gray wolf, fisher, and wolverine) and migratory birds (primarily raptors, including boreal owl, flammulated owl, great gray owl, and northern goshawk). The CESA is also a realistic dispersal distance for pikas, for which moderate habitat effects could occur under the MMPO alternatives (including Alternative M1 – No Action). By focusing on the potential cumulative effects to the majority of species, which are likely to utilize a 15 mile radius from the project locations, the CESA captures the greatest potential effect to wildlife. Most effects to terrestrial wildlife would occur from the expansions of the TCM WRSFs and TSF, with minor effects to most wildlife and sensitive species from decreases in habitat under the MMPO alternatives.

Cumulative effects to terrestrial wildlife and special status species would result if other past, present, and reasonably foreseeable actions in the CESA were to have an incremental effect,

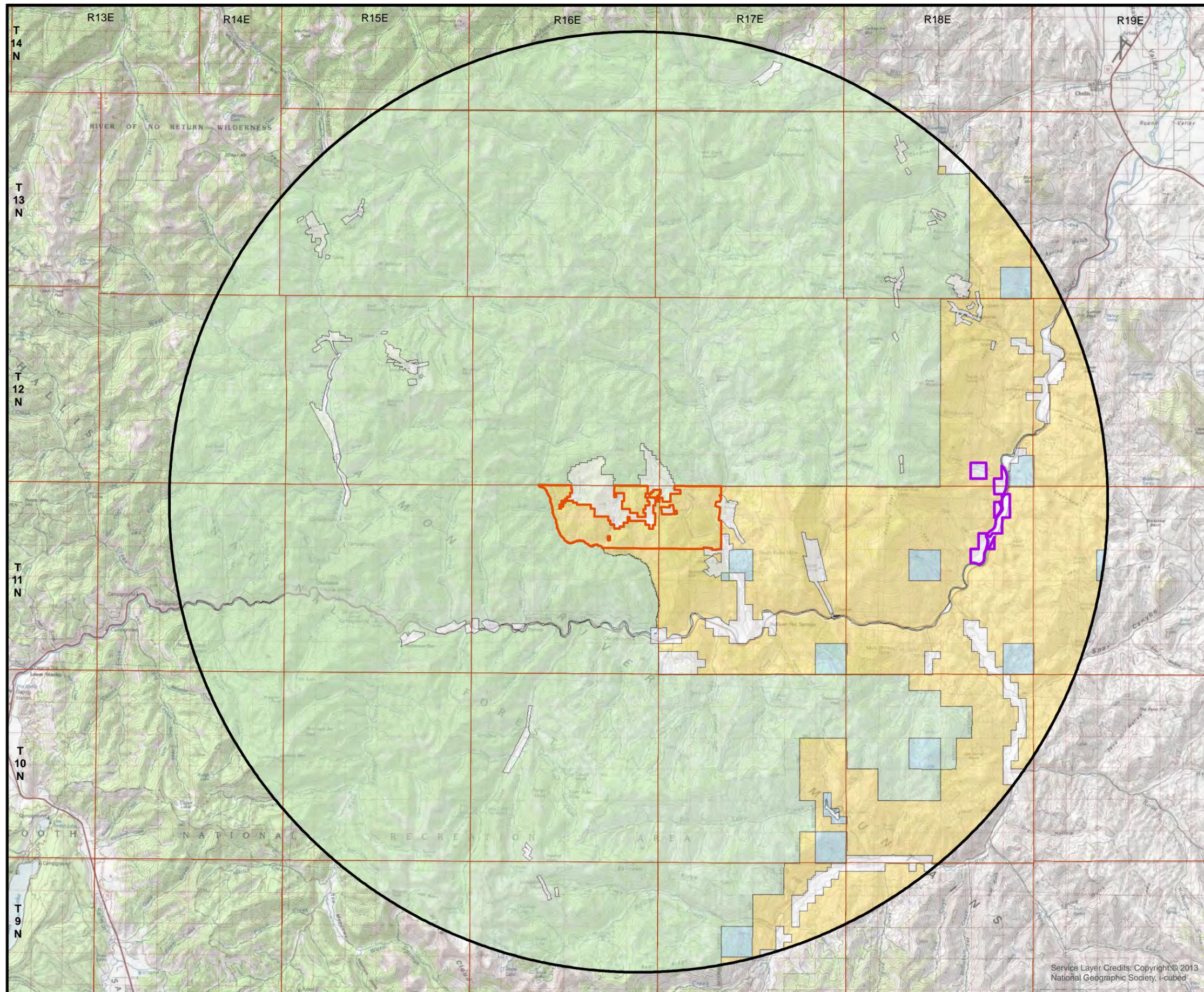
when added to the MMPO or land disposal alternatives, which passed a certain effect threshold for a particular species. In general, the threshold for a cumulative effect to a wildlife species in this discussion is a decline in the reproductive rate of a population, i.e., any effect that limits or lowers the population or viability of wildlife species. These effects may include a reduction in local or regional population, population density, or habitat capability.

Only wildlife or special status species that would be affected (above a negligible level) by the MMPO alternatives is included in this discussion. The following special status species are not discussed because effects under the alternatives would be negligible: Canada lynx, pygmy rabbit, spotted bat, Townsend's big-eared bat, greater sage-grouse, bald eagle, brewer's sparrow, peregrine falcon, willow flycatcher, spotted frog, and garter snake. There would also be negligible effects on riparian species. In addition, certain effects are not discussed because they were found to be negligible for all terrestrial wildlife species (Section 4.7). Such effects include uptake of contaminants of concern, traffic increases, noise, and fragmentation.

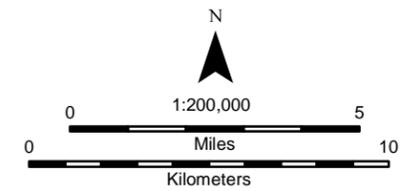
5.7.2. Past, Present, and Reasonably Foreseeable Actions

The surface disturbance in the CESA includes that from livestock grazing (486,615 acres, 74 %); wildfire/prescribed burning (30,760 acres, 4.6 %); mining (3,006 acres, 0.5 %); utility corridors (2,455 acres, 0.4 %); roads (1,067 acres, 0.2 %); agriculture (1,571 acres, 0.2 %); residential development (~ 100 residences, 50 acres, < 0.1 %); and timber/vegetation management (~ 10 acres/year) (Table 5.1-2). Of course, the disturbance from livestock grazing, wildfire/prescribed burning, and timber/vegetation management does not affect wildlife as much as the more permanent and more severe disturbance from the other categories; although, livestock grazing in some areas has probably changed the structure and composition of native plant communities (Ruediger et al. 2000). Approximately 5 percent (33,837 acres) of the land in the CESA is private where there has been and continues to be distinct mining, livestock grazing, agriculture, and residential development. Most of the private land in the CESA is distinctly concentrated along the Salmon River, East Fork Salmon River, S. Creek, Kinikinic Creek (Clayton), and the Bayhorse drainage.

The more distinct disturbance to vegetation has removed or fragmented wildlife habitats and displaced certain wildlife populations. Road and utility corridors have also caused and would continue to cause changes in wildlife behavior. Roads are also a substantial cause of wildlife mortality, particularly highways during dawn and dusk: there are more than 236 miles of roads in the CESA, not including 4WD trails, and 405 miles utility corridors. There are 23 miles of highway in the CESA.



- Legend**
- Selected land
 - Offered land - Broken Wing Ranch
 - CESA
- Land Ownership within CESA**
- BLM
 - Private
 - State
 - Forest Service

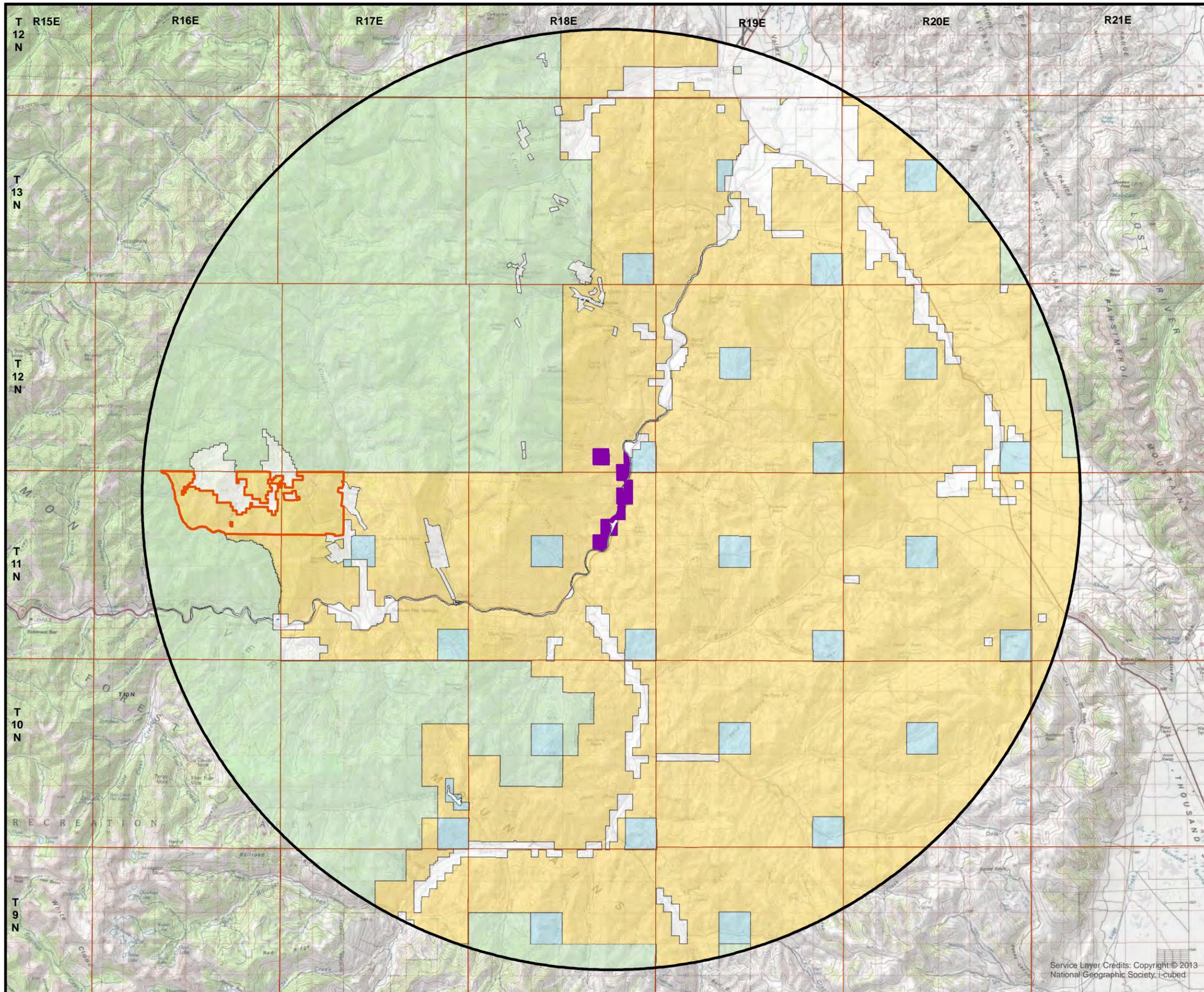


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Figure 5.7-1
Wildlife and transportation CESA,
selected land
Thompson Creek Mine EIS



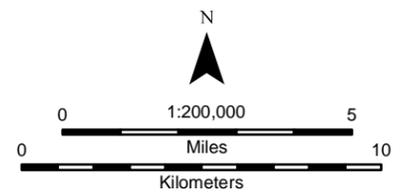
Legend

- Selected land
- Offered land - Broken Wing Ranch
- CESA
- Land Ownership within CESA**
- BLM
- Private
- State
- Forest Service

Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83



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**Figure 5.7-2
Wildlife CESA, Broken Wing Ranch
Thompson Creek Mine EIS**

Timber harvest in the CESA has caused wildlife habitat alteration such as forest removal followed by reforestation, with a short period of early seral conditions. Timber/vegetation management are generally favorable to big game as the actions typically reset successional changes to provide a variety of vegetation useful for wildlife. Past and present recreational uses such as hunting, fishing, OHV and snowmobile use, camping, and picnicking have introduced human disturbance and noise in wildlife habitats. The reasonably foreseeable effects would be comparable to the past and present effects, except for a probable trend of increased wildfire due to climate change and the steady residential development of agricultural land in the CESA.

5.7.3. Cumulative Effects

Past, present, and foreseeable actions in the wildlife CESA have caused and will probably cause both beneficial and negative effects to wildlife and special status species. The foremost affect to wildlife and special status species in the CESA has been and will be habitat modification. The reasonably foreseeable disturbance due to mining and timber harvests/vegetation management, when added to the past and present disturbance, would slightly increase (1.0 %) the disturbance of BLM and NFS land in the CESA. Data from the GAP analysis program, BLM Challis Field Office, and SCNF show montane forest-steppe transition, montane forest, and shrub steppe/grassland are the dominant vegetation types in the CESA. These wildlife habitats are the most probable to be disturbed in the CESA. When the potential disturbance of the MMPO action alternatives is added to the past, present, and reasonably foreseeable disturbance in the CESA, the disturbance increases to 1.1 percent of the BLM and NFS land in the CESA.

Incremental habitat modifications in the CESA have had and would continue to have detectable effects to all wildlife and special status species. However, no incremental habitat modifications would result in a decline in the viability or reproductive rate of any species population, with the exception of pika. Incremental effects to wildlife species are discussed below.

5.7.3.1. Wide-ranging species

Wide-ranging species, including big game, gray wolf, fisher, and wolverine, have been and would be affected by the incremental decreases in habitat in the CESA. Disturbance generally is limited to the attractiveness of the CESA to these species because most require extensive tracts of undisturbed land. However, the mobility of individuals improves the likelihood that wide-ranging individuals in the CESA are able to modify their behavior and seek out undisturbed habitats when familiar areas become disturbed or unusable. In general, wide-ranging species would be more affected by habitat fragmentation that would limit movements and break up large tracts of habitat.

Regarding big game winter range, the decrease of big game winter range habitat when added to the incremental decreases in habitat occurring in the CESA would not be sufficient to cause a cumulative effect to big game species. Based on observations at the TCM, mule deer and elk individuals occupy modified habitat and tolerate a proximity to humans. For mule deer or elk, it is highly improbable that an incremental decrease in habitat with the addition of decreases in habitat from the TCM would adversely affect the growth rate of any mule deer or elk population. Bighorn sheep would not be affected by incremental habitat alterations because the affected habitat is only marginally suitable and there would be no substantial decrease in the amount of bighorn habitat in the CESA.

Regarding wide-ranging species that are BLM-sensitive (gray wolf, fisher, wolverine), it is improbable that more than a few transient individuals occur in the CESA at any one time and any effects to these individuals from incremental habitat alterations would not be sufficient to adversely affect the reproductive rate of the population of any sensitive species.

5.7.3.2. Migratory birds

Migratory birds, particularly raptors (including boreal owl, flammulated owl, great gray owl, and northern goshawk), have been and would be affected by the incremental habitat alteration and removal in the CESA. Human presence limits the attractiveness of the CESA to migratory raptors and owls as nesting birds are likely to become stressed or abandon a nest if a disturbance persists within too close a range. An effect would result if nest abandonment or reduced nesting success was frequent enough within a population to result in a diminished reproductive rate. The decreases or alteration in raptor habitat would not cause a meaningful effect to raptor populations (including sensitive species) because of the relatively small amount of such habitat that would be affected, and because such habitat in most cases is only marginally suitable due to its proximity to human activities. It is unlikely that raptors would choose such habitat for nesting unless they are accustomed to the nearby activity. Also, pre-construction surveys and mitigation measures for any nests found within specific buffers for projects on Federal lands would continue to ensure that disturbance-related nesting losses are rare.

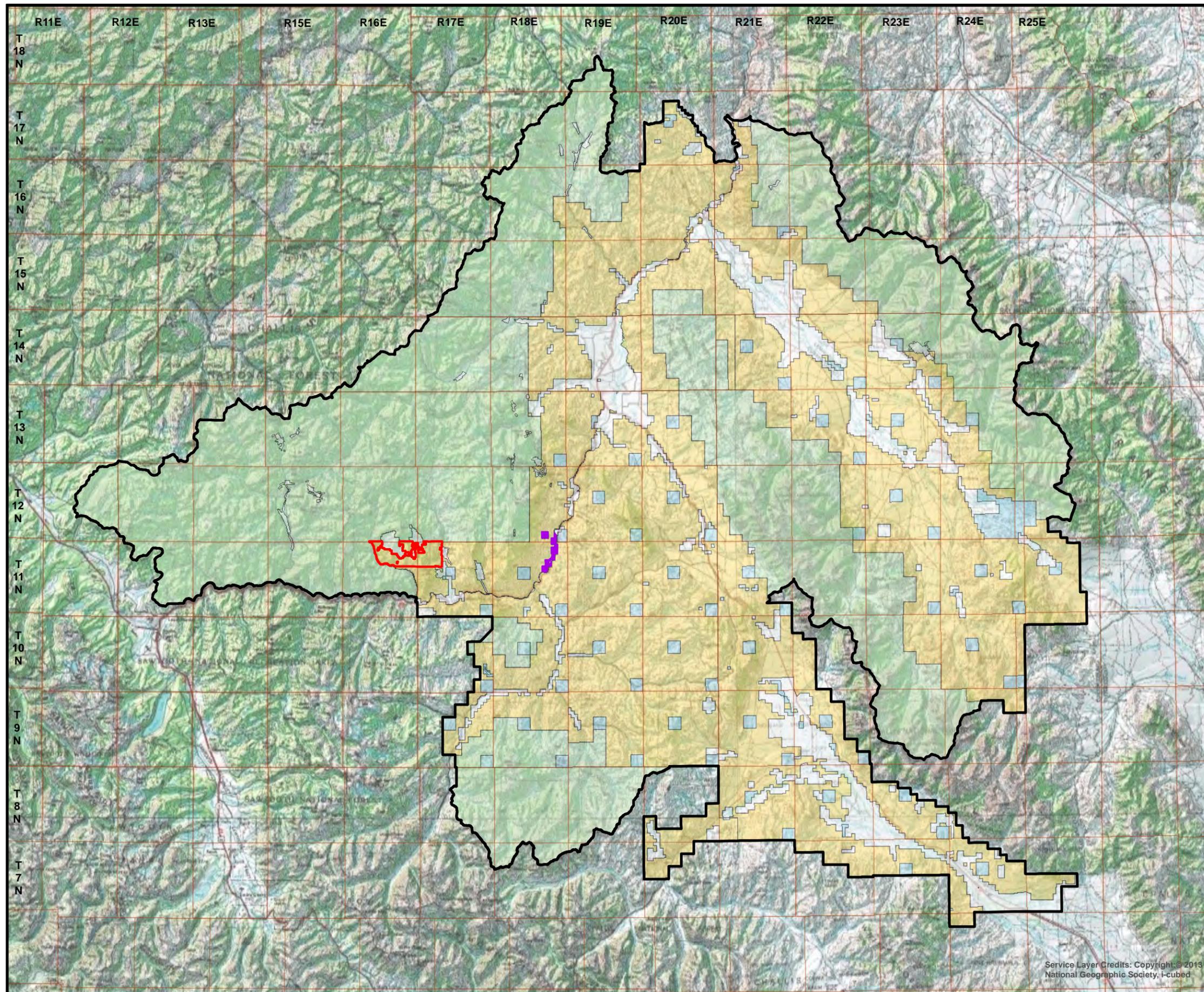
5.7.3.3. American pika

American pikas have been and would continue to be affected by the alteration of talus habitat in the CESA, primarily due to mining. For example, small areas of talus habitat (< 1 acre) occur at some of the 314 historic mines in the CESA. Only the TCM and Three Rivers Stone quarry have created relatively large amounts of talus habitat from WRSFs, but only the TCM WRSFs are of high enough elevation for use by pikas. In the foreseeable future, reclamation at the TCM and other historic mines would decrease talus habitat causing a reduction in the reproductive rate and thus viability of local pika populations.

5.8. Fish and Aquatic Resources

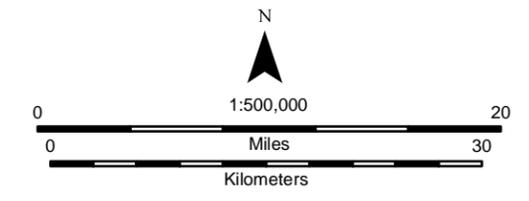
5.8.1. Introduction

The CESA for fish and aquatic resources is the Thompson Creek, S. Creek, and Bayhorse Creek 5th level watersheds, plus the Salmon River between the Thompson Creek and Bayhorse Creek watersheds (214,506 acres) (Figure 5.6-1). The CESA for special status fish species is the BLM Challis Field Office area and the Challis–Yankee Fork Ranger District of the SCNF (1,792,261 acres) (Figure 5.8-1). The CESAs were selected because the effects to fish and aquatic resources from the MMPO and land disposal alternatives would be limited to these watersheds. However, for special status species all habitats and metapopulations contained in the administrative boundaries listed above were included to incorporate all effects to populations of these species.



Legend

- Selected land
- Offered land - Broken Wing Ranch
- CESA
- Land Ownership within CESA**
- BLM
- Private
- State
- Forest Service



Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83

Map created September 17, 2012
By C. Pixton

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Figure 5.8-1
Special status fish species CESA
Thompson Creek Mine EIS

Land uses in the CESA that have affected fish and aquatic resources include water diversions, livestock grazing, and timber harvest as these activities increase sedimentation, alter streamflow, alter temperature, and affect water quality. Mining has also caused effects to water quantity (Section 5.6). In some cases, mining related activities impede streamflow such as in Cherry Creek which no longer discharges to Thompson Creek; the lower reach of Cherry Creek has been filled and the water diverted to the pumping station to be used at the mill. The effects from residential development and agriculture are limited as there is little (7 %) private land in the CESA.

5.8.2. Past, Present, and Reasonably Foreseeable Actions

The effects to fisheries and aquatic resources, including special status fish, are largely the same as the effects to water resources (Section 5.6). Water diversions for irrigation on the Salmon River and many tributaries have decreased streamflow in the CESAs relative to pre-agricultural conditions. As a result, low streamflow and high temperatures limit many fish populations (including special status species) in the CESAs including populations in Thompson Creek and S. Creek (BLM 1998, IDFG 2005a).

The TCM is by far the largest mine in the CESAs; the other mines are small (typically < 10 acres) historic mines, primarily in the Bayhorse drainage, except for the (inactive) Three Rivers Stone quarry (182 acres) and the historic Clayton Silver mine (30 acres, closed since 1986). Several of the historic mines are very near the TCM such as the Tungsten Jim mine next to Thompson Creek upstream of Buckskin Creek (with encapsulated mill tailings along Thompson Creek between the mouth of Cherry Creek and the mouth of Thompson Creek); the Twin Apex mine in the Bruno Creek drainage; and the Redbird lead-zinc mine next to S. Creek and just upstream of the confluence of Bruno Creek and S. Creek. The effects to water quality from these (and other) historic mines have not been quantified. However, the Tungsten Jim and Twin Apex mines may respectively contribute to contaminants to Thompson Creek and S. Creek (Section 5.6). In addition, a portion of the Bayhorse Mining District is being developed as a State historical park. The BLM is cooperating with the State in the assessment of possible environmental and safety risks and planning safety closures on sites adjacent to the proposed State park (BLM 2013).

Other than mining, the primary land uses in the CESAs affecting fish and aquatic resources are agriculture and grazing (Table 5.1-2., Section 5.6). The agriculture and livestock industries have been integral parts of the CESAs since human settlement of the area in the mid- to late 1800s. However, the trend in the CESAs is a steady decrease in agriculture and reduction in livestock grazing. The effects of grazing near aquatic habitats typically includes effects to riparian vegetation and streambank stability, which can lead to increased water temperatures and increased levels of sediment suspended in the stream and deposited on the substrate. High water temperatures and sedimentation are both detrimental to fisheries, particularly salmonids such as bull trout, Chinook salmon, steelhead/rainbow trout, and cutthroat trout.

There has been modest timber thinning and harvest (1,124 acres, 0.5 %) (unrelated to mining) in the CESA for fish and aquatic resources. Removal of trees and vegetation increase the potential for sedimentation into nearby aquatic environments through run-off and decreasing infiltration. Furthermore, roads can alter water flow on the soil surface, creating impervious surfaces that concentrate run-off and increase erosion. The primary effect of these activities on aquatic systems is increased erosion with the secondary effect of increased sediment loading in downstream surface waters. The level of erosion and sedimentation as a result of timber harvest in the CESA has not been quantified; however, the effects described are typical of disturbance associated with timber harvest and have probably occurred in the CESA to some extent at various points in time.

There are a variety of actions aimed at improving aquatic habitat in the CESAs (e.g., Appendix C). For example, the IDFG installed a pipeline to replace an existing open ditch, resulting in a water savings with more water in Lyon Creek for native fish. In addition, the diversion was screened, which reduces fish entrapment and benefits Lyon Creek fish populations. The Yankee Fork Rehabilitation Project would restore a dredged mined area on the Yankee Fork Salmon River to a more natural condition; although, this project is outside the general CESA for fish and aquatic resources, beneficial effects from the project would occur within the CESA. The project is within the special status fish species CESA.

In general, most actions that have occurred in the CESAs are expected to continue in the reasonably foreseeable future such as water diversions, mining, livestock grazing, and timber harvest/vegetation management (e.g., Mosquito Flat Fuels Reduction Project, West Fork Morgan Creek Vegetation Management Project). These actions affect water quantity (water diversions and mining), water quality (mining, grazing, timber harvest), and stream substrate conditions (mining, grazing, and timber harvest) (Section 5.8.2). Although these actions will continue in the future, they will essentially continue at or near current levels. Consequently, the existing condition of aquatic habitat is expected to remain similar to current conditions.

5.8.3. Cumulative Effects

The past, present, and reasonably foreseeable categories of actions in the CESAs would not be expected to appreciably change the flow in Thompson Creek or S. Creek and the current aquatic conditions in these streams would remain essentially the same. The actions, apart from the TCM, would not appreciably affect WQSs. The current baseline condition (Section 3.6.) accounts for the other contributors of contaminants in these watersheds such as the historic mines near streams. However, it is unknown if contaminants from actions such as historic mining would increase in the future.

Due to the migratory nature of fish in the Salmon River system (including both anadromous and fluvial migrants), the effects to fish populations in Thompson Creek and S. Creek could result in similar effects to fish populations (including TES fish) in the upper Salmon River system. However, such effects would depend on the degree to which fish in Thompson Creek and S. Creek are migratory, which is unknown for many fish populations (i.e., steelhead/rainbow trout, westslope cutthroat trout, and bull trout) and varies with hatchery efforts in S. Creek.

5.9. Wetlands, Floodplains, and Riparian Areas

5.9.1. Introduction

The CESA is the Thompson Creek, S. Creek, and Bayhorse Creek 5th level watersheds (213,514 acres) (Figure 5.4-1). The CESA was selected because the effects to wetlands and riparian area from the MMPO and land disposal alternatives would be limited to these watersheds and cumulative decrease or increase of these effects would be important on a watershed scale (there would be no effects to floodplains from the MMPO or land disposal alternatives).

5.9.2. Past, Present, and Reasonably Foreseeable Actions

There are 2,760 acres (1.3 %) of wetlands and riparian areas in the CESA. The effects to wetlands and riparian areas may include modification in wetland sizes, function, or continuity. The effects to wetlands and/or riparian areas in the CESA have occurred mainly from mining and development of roads and utility corridors (Table 5.1-2), and are from the same categories of actions as described for vegetation, forest resources, and weeds (Section 5.4).

5.9.3. Cumulative Effects

The principal past and present effects to wetlands and riparian areas in the CESA was from the construction of SH 75 along the Salmon River, initially as a wagon road in the late 1800s and then as a paved highway likely in the late 1930s. In addition, the construction of US 93 and BLM/Forest Service roads along S., Pat Hughes, No Name, Buckskin, Cherry, Thompson, and Bruno creeks have also disturbed an unspecified area of wetlands. The areas of roads and utility corridors are, respectively, 829 acres (0.4 %) and 1,031 acres (0.5 %) in the CESA (Table 5.1-2.). The portion of these areas with disturbed wetlands and riparian areas is clearly much less, but there are no specific data allowing these effects to be quantified. As these roads were constructed prior to 1977 (EO 11990), off-site mitigation for the effects to wetlands was not required.

Other disturbance to wetlands and riparian areas in the CESA includes an unquantified amount of wetlands and riparian areas buried by mining activities at the historic mines and by the original development of the TCM in the early 1980s, especially related to the construction of the WRSFs in the Buckskin and Pat Hughes drainages and the construction of the TSF in the Bruno Creek drainage. Some effects to wetlands and riparian areas, although not specifically described, probably have occurred or would probably occur from road maintenance and livestock grazing, particularly on private land in the CESA as such land is abundant along the bases of drainages where wetlands and riparian areas are concentrated. The conversion of lands to agricultural and residential uses has further affected riparian areas, wetlands, and springs on private land causing a reduction in the diversity of seral plant communities on the private land. Although additional wetlands in the CESA could be disturbed in the future, compensatory mitigation would be required by the USACE for most new projects that affect wetlands (Appendix B). Such mitigation would thus essentially eliminate a potential net decrease and other incremental effects to wetlands in the CESA.

5.10. Air Quality, Noise, and Climate Change

5.10.1. Introduction

The CESA for air quality is Custer County (3,161,469 acres) (Figure 5.2-2). However, changes in emissions from off-site transportation and processing of molybdenum concentrate and effects of operations on climate change are considered regionally and globally. The CESA for noise is the area within a 4 mile radius of the center of the mining activities and a 300 foot buffer around the S. Creek and Thompson Creek roads from SH 75 to the start of the Bruno Creek Road (mine entrance) and around the Broken Wing Ranch (33,653 acres) (Figure 5.10-1., Figure 5.10-2). Custer County was selected as the CESA for air pollutants due to the reasonably large area in which air pollutants typically disperse. There would be no meaningful emissions of GHGs for any of the MMPO or land disposal alternatives (Section 4.10.3). The relatively small CESA for noise was selected because noise from mining is rapidly attenuated by vegetation and topography to levels that are not discernible to humans. Noise related to access traffic and haul roads is of importance to persons along nearby public roads and in nearby residences.

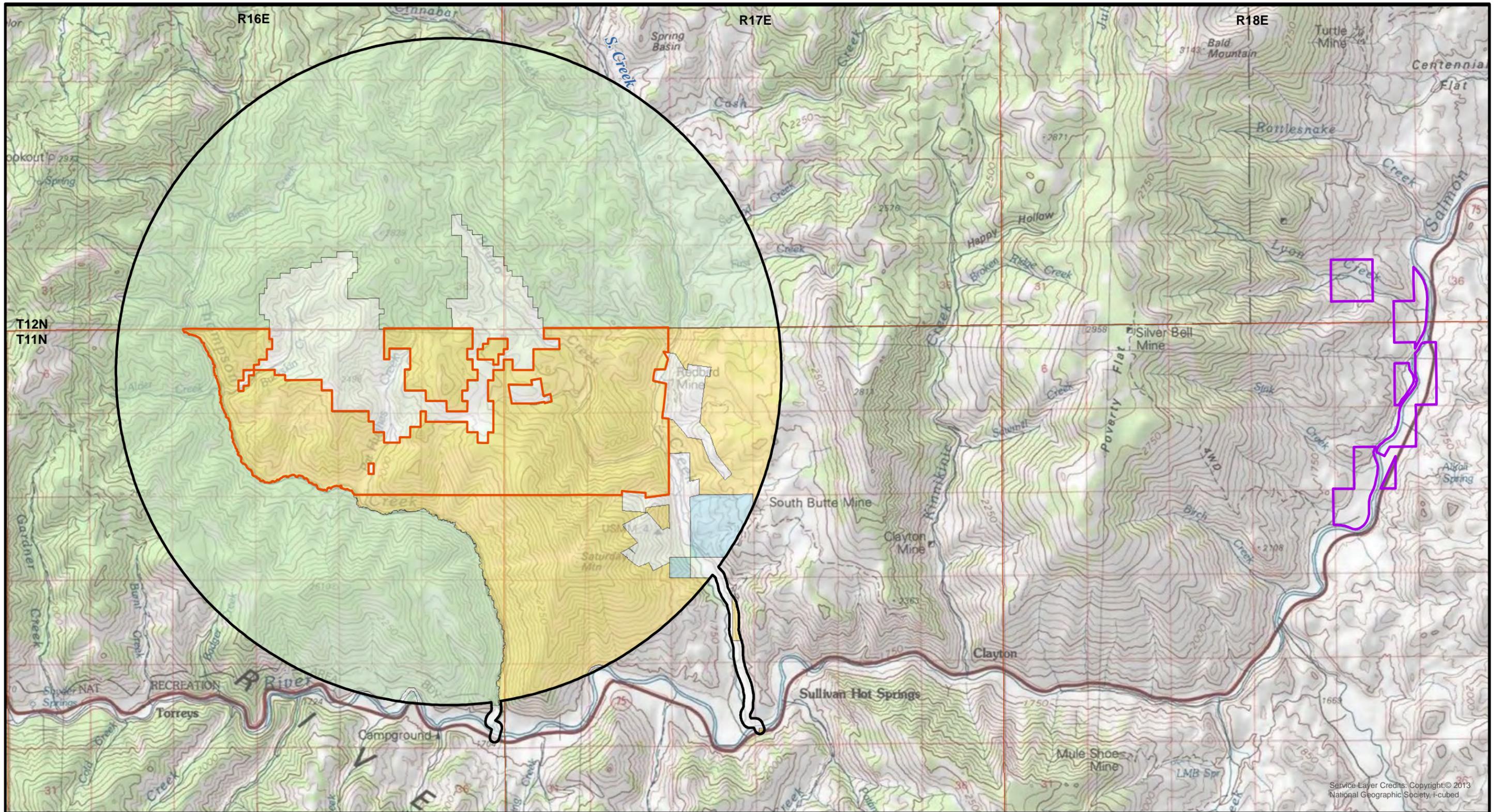
5.10.2. Past, Present, and Reasonably Foreseeable Actions

5.10.2.1. Air Quality

There are no Class I air quality areas in the CESA; the nearest Class I area is the Sawtooth Wilderness Area. The region surrounding the mine is mostly Federal land, and is very sparsely populated. There are no Title V major air pollution sources within 50 miles of the mine or in the CESA, and few permitted minor sources. Air quality in the CESA is generally excellent, e.g., 24 hour PM_{2.5} concentrations of 3 to 6 µg/m³.

The effects to air quality in the CESA from past, present, and reasonably foreseeable actions have been and would continue to be largely from fugitive dust from agriculture, mining (TCM and the Three Rivers Stone quarry), wildfire/prescribed burning, and vehicle travel on unpaved roads, as well as PM_{2.5} from wood-burning stoves during September through May. The construction of roads and utility corridors temporarily produces fugitive dust in very local areas. Only wildfires/prescribed burning and the TCM typically produce PM_{2.5} that affects air quality over large areas (100s of acres). In addition, prescribed burning on Federal lands in the CESA is conducted only when meteorological conditions favorable to air quality exist so that ambient air quality standards will not be exceeded.

Livestock grazing, horseback riding, timber/vegetation management, and residential development produce fugitive dust, but the quantities are minimal and are expected to remain approximately equal to present conditions. Vehicle travel on roads affects air quality from engine emissions, but has not appreciably affected air quality in the past and is not considered a concern for the present or reasonably foreseeable future in the CESA. Future residential development is limited as less than 6 percent of the CESA is private land.



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Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83

Legend

- Selected land
- Offered land - Broken Wing Ranch
- CESA

Land Ownership within CESA

- BLM
- Private
- State
- Forest Service

N

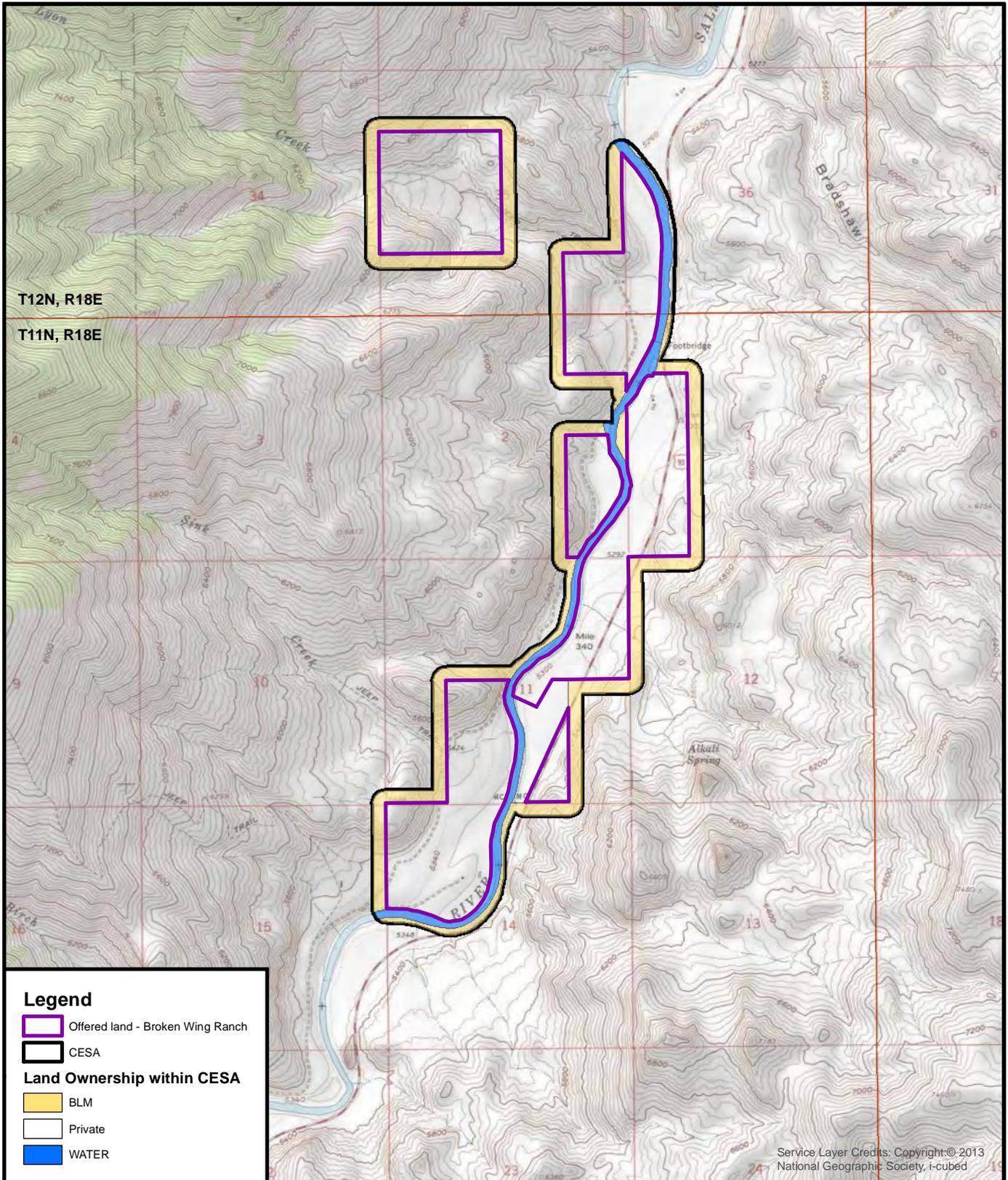
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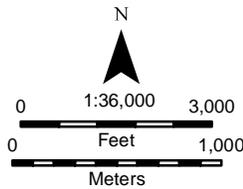
0 Kilometers

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Figure 5.10-1
Noise CESA, selected land
Thompson Creek Mine EIS



Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 11 NAD 83



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Figure 5.10-2
Noise CESA, Broken Wing Ranch
Thompson Creek Mine EIS

5.10.2.2. Noise

Most of the CESA is in undeveloped or rural areas. The primary sources of noise are from vehicles and motorized equipment at mines (TCM, Three Rivers Stone quarry, rock pits) and on agricultural land and construction projects, aircraft, wind, gunfire, wildlife, cattle, and human voices. The noise is typically of very short duration and rarely displaces wildlife (e.g., deer and elk are common on and adjacent to roads) apart from human voices or gunfire.

5.10.3. Cumulative Effects

5.10.3.1. Air Quality

The amounts and locations of fugitive dust would probably remain stable, apart from those from wildfire, in the reasonably foreseeable future as the dust emission rate is approximately proportional to disturbed areas in the CESA: 304,965 acres (9.7 %) from wildfire/prescribed burning; 5,692 acres (0.2 %) from mining; 4,856 acres (0.2 %) from utility corridors; and 3,876 acres (0.1 %) from roads not including primitive roads and trails (Table 5.1-2).

Wildfire has the greatest potential to affect air quality in the CESA because 1) wildfire may produce very large amounts of PM_{2.5}, carbon monoxide, nitrogen oxides, and volatile organic compounds; and 2) large wildfires cause very large amounts of PM_{2.5} to rise high into the atmosphere and travel for hundreds of miles affecting entire states for weeks. It is common for wildfire to cause exceedances of the ambient air quality standards for PM_{2.5}. The increase in fuels in forested and non-forested vegetation in the CESA coupled with climate change will cause increased wildfire in the reasonably foreseeable future.

5.10.3.2. Noise

The sources and amounts of noise would continue to be fairly constant to slightly increasing proportional to the slightly increasing levels of mining, agriculture, construction, recreation, aircraft travel, residential development, and associated vehicle traffic that are reasonably foreseeable in the CESA.

5.11. Visual (Aesthetic) Resources

5.11.1. Introduction

The CESA for visual resources is an 11 mile radius around the TCM, the distance from the mine to the furthest KOP (243,284 acres) (Figure 5.11-1). This viewshed contains all relevant actions in the region of the mine, and a large portion of the White Cloud Mountains and the relevant portions of the Salmon River corridor; using a larger area would not capture any additional relevant effects.

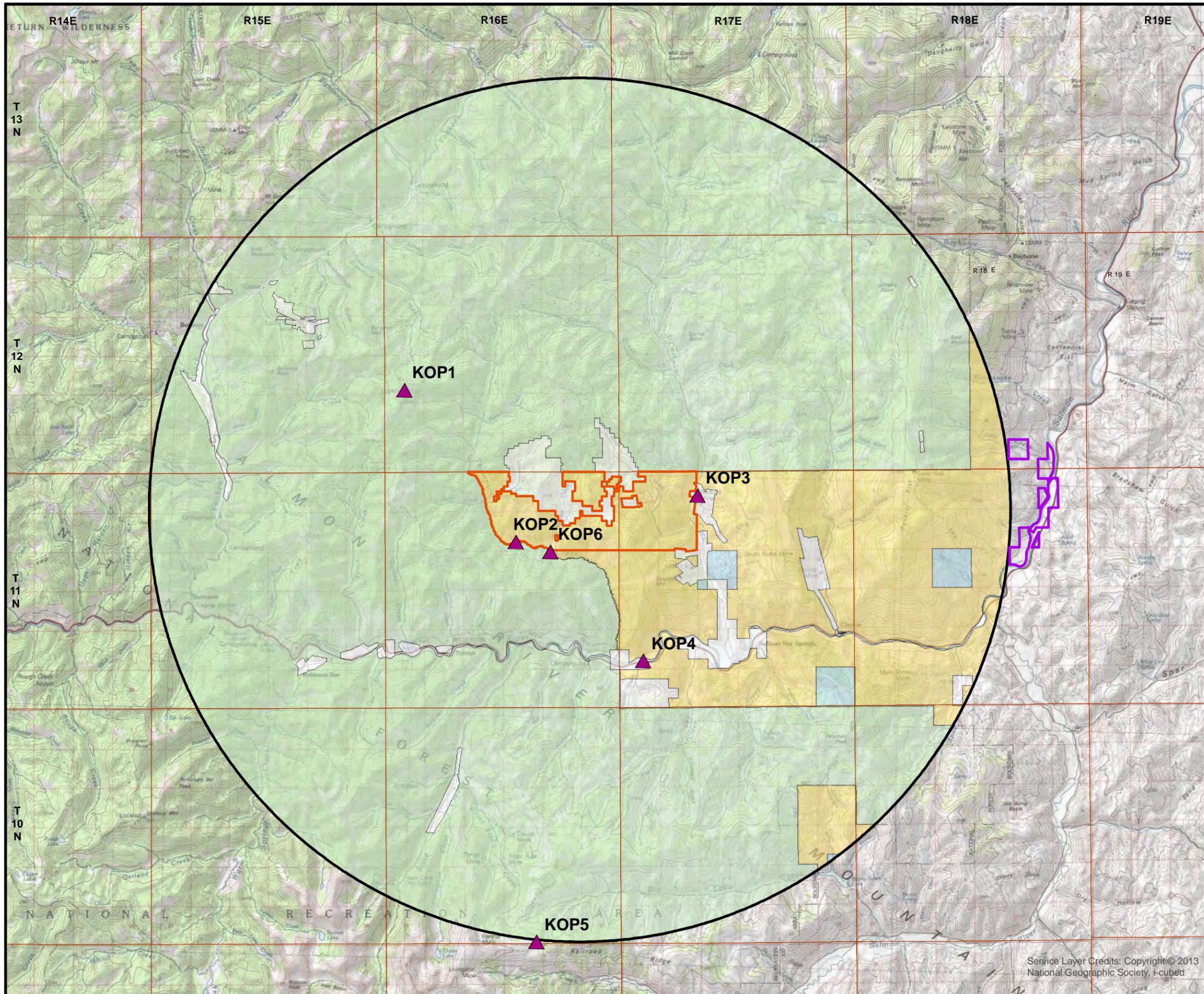
The CESA is in a region of mountain ranges and valleys. The most common landforms in the area are steep mountainsides, which are cut by small creeks and drainages. Although scenic variety exists in the topography and densities, arrangements, and colors of vegetation, no visually distinct landscapes are found in the CESA. The majority of BLM land in the CESA is managed under VRM Class III, with the rest managed under VRM Class II. The general VQO for the portions of the MMPO and action alternative on NFS land is Modification, under which, “management activities may visually dominate the original characteristic landscape” (USFS 1974).

5.11.2. Past, Present, and Reasonably Foreseeable Actions

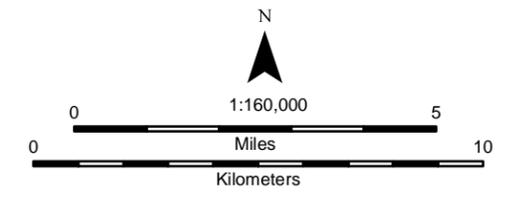
The CESA is generally not disturbed visually at the landscape scale except along the bottoms of major valleys where human actions are concentrated: roads and utility corridors, agriculture, and residential development. The actions that most affect the landscape in primitive areas are wildfire/prescribed burning, timber/vegetation management, mining, roads, recreation sites, and utility corridors. In many cases the disturbance from mining coincides with the disturbance from timber/vegetation management, since timber harvest often occurs as mines are developed and mineral exploration projects begin. Scattered livestock and range improvements such as troughs and fences rarely affect visual resources at the landscape scale. However, cattle, fences, troughs, irrigation equipment that are concentrated on ranches in the bottoms of valleys might be detected at the lowest levels of the visual contrast rating system.

5.11.3. Cumulative Effects

The past, present, and reasonably foreseeable effects to visual resources at the landscape scale have been and would continue to be primarily from mining (3,189 acres, 1.3 %); wildfire/prescribed burning (11,937 acres, 4.9 %); utility corridors (758 acres, 0.3 %); roads (709 acres, 0.3 %); agriculture (434 acres, 0.2 %); timber/vegetation management (~ 10 acres/year); and residential development (~ 50 residences, 25 acres, < 0.1 %). There is very little private land (8,426 acres, 3.5 %) in the CESA. Mining in the CESA comprises 164 historic mines, 5 rock pits, the TCM, and the Three Rivers Stone quarry. However, only a few of the historic mines would affect visual resources at the landscape scale due to small size of the mines; the limited, mostly underground development of the mines; natural revegetation at the mines; and the rugged topography in the CESA. In addition, such affects would mostly be from KOPs on higher elevation trails to the Custer Fire Lookout or points such as Railroad Ridge. In the reasonably foreseeable future, final reclamation of the TCM would reduce most of the effects from mining in the CESA with the dominant remaining effect being from the Three Rivers Stone quarry. However, the majority of the affects from mining in the CESA would not be mitigated until more than 50 years after reclamation when trees of moderate height become established.



- Legend**
- Selected land
 - Offered land - Broken Wing Ranch
 - CESA
 - ▲ KOP
- Land Ownership within CESA**
- BLM
 - Private
 - State
 - Forest Service



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Figure 5.11-1
Visual resources CESA
Thompson Creek Mine EIS

5.12. Land Use and Recreation

5.12.1. Introduction

The CESA is Custer County (3,161,469 acres) (Figure 5.12-1.), which contains the mine and all of the selected and offered lands except for 82 acres of offered land in Bannock County. Accordingly, the most meaningful cumulative effects related to land use and recreation would occur Custer County.

The majority of the land (94.2 %) in Custer County is Federal or State land, 25.4 percent of which is administered by the BLM Challis Field Office, 67.1 percent of which is administered by the SCNF, and 1.7 percent of which is administered by the State (Table 5.1-1). The dominant cumulative effects would thus result from changes in Federal land jurisdiction and land management affecting areas used by many people.

Special management areas in the CESA include the Challis ERMA, Upper Salmon River SRMA, the Challis Wild Horse and Burro Herd Management Area, and the S. Creek IRA #06-005. Portions of three of central Idaho's high country landmarks are in the CESA: the Frank Church River of No Return Wilderness to the north, the Sawtooth National Recreation Area to the west, and the Boulder-White Cloud Mountains to the south. There are numerous primitive campgrounds and a variety of other developed campgrounds and recreational facilities (e.g., The Land of the Yankee Fork State Park) in the CESA (Section 3.12).

Enjoyment of the recreational opportunities in the CESA is largely contingent on a reasonable degree of motorized or non-motorized public access. Once a visitor is on Federal lands, the enjoyment of the recreation depends, in part, on the relative level of disturbance from other land uses, particularly in the semi-primitive areas. The dominant recreational uses of public lands in the CESA are big game hunting, fishing, and boating.

5.12.2. Past, Present, and Reasonably Foreseeable Actions

The past, present, and reasonably foreseeable categories of actions that most affect land use and recreation in the CESA have been and would be livestock grazing, wildfire/prescribed burning, agriculture, mining, utility corridors, timber/vegetation management, residential development, roads, and changes in land jurisdiction and land management (Table 5.1-2., Table 5.1-3., Section 5.1.2.4., Section 5.1.2.9).

Livestock grazing is widespread and, along with mining, is one of the original two historic land uses in the CESA. Livestock grazing does not typically preclude use of land in the CESA for other purposes, but affects recreation when people encounter livestock and their dung. Wildfire/prescribed burning typically affect small areas in the CESA, but a major wildfire would completely alter the land use and recreational character of the CESA for at least several years. The direct areas of agriculture and residential development are precluded from most other land uses and recreation, apart from limited hunting in some agricultural areas. The direct area of mining precludes most other land uses and recreation. The direct area of road and utility corridors precludes many other land uses, but roads and trails are critical for recreation.

Timber/vegetation management modifies land uses, but does not typically have material effects to recreation in the CESA.

Changes in land jurisdiction comprise sales, purchases, and exchanges of land involving the US. Federal lands that are transferred to private ownership are typically no longer available for public use such as recreation and grazing, and private lands acquired by the US are typically available for public use. Federal land management is focused on multiple use. However, changes in land management (Federal, State, local, private) may establish single use or limited use for certain areas, e.g., a new land use plan will be created for the BLM Challis Field Office during this decade. However, no major changes in travel management (e.g., the BLM Challis Field Office Travel Management Plan, BLM 2008c) on Federal lands are reasonably foreseeable.

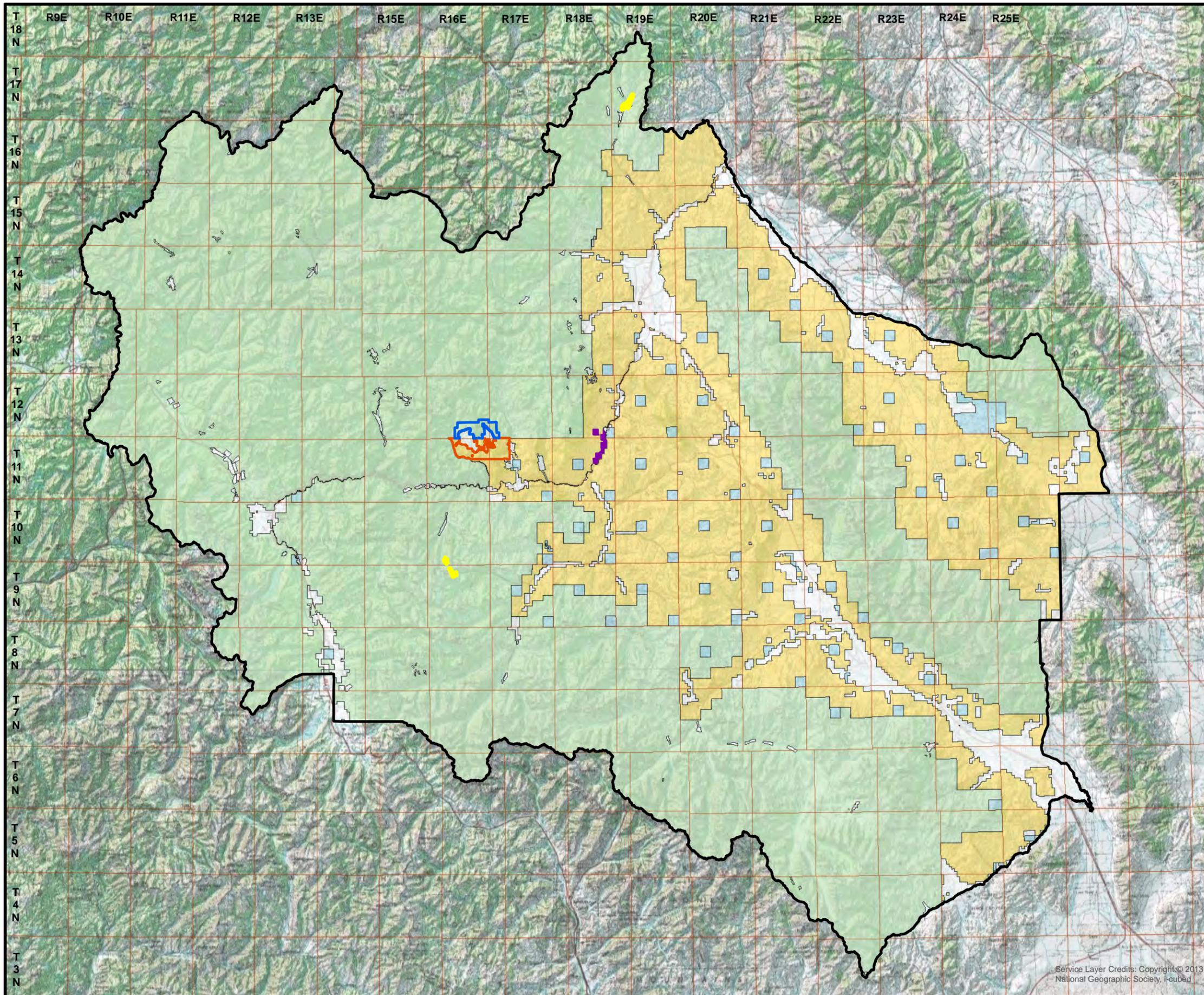
Recreation is concentrated near the mine and area of the TCMC-BLM land exchange along the Salmon River/SH 75 (Salmon River Scenic Byway) and East Fork Salmon River. Numerous recreation facilities have been developed in the CESA including campsites, trails, a shooting range, walking/bike paths, fishing areas, boat ramps, and picnic areas. In addition, there are numerous recreation outfitters and guiding companies that provide river rafting, fishing, hunting, trail rides, auto touring, backpacking, and hiking tours on public lands in the CESA.

5.12.3. Cumulative Effects

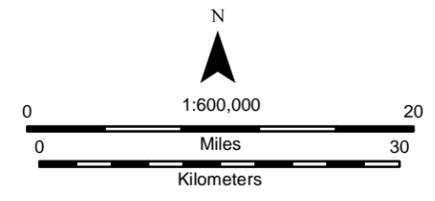
The past, present and reasonably foreseeable categories of actions in the CESA that have and would most affect land use and recreation are livestock grazing (2,295,888 acres, 72.6 %); wildfire/prescribed burning (304,965 acres, 9.6 %); agriculture (~ 140,701 acres/4.5 % in 1992 declining to 124,191 acres/3.9 % in 2007, Table 3.13-12., Section 5.1.2.4.); mining (5,992 acres, 0.2 %); utility corridors (4,859 acres, 0.2 %); timber/vegetation management (7,200 acres, 0.2 %);⁷ residential development (~ 1,540 acres, < 0.1 % with a few acres being developed each year); and roads (3,876 acres, 0.1 %) (Table 5.1-2 and Table 5.1-3).

Regarding land jurisdiction, there has been a decreasing trend in land sales and increasing trend in land purchases and land exchanges. In Custer County during 1980 to 2013 the BLM and Forest Service have made 32 land sales (1,019 acres, ~ 30 acres/year), 133 land purchases (18,340 acres, ~ 540 acres/year), and 16 land exchanges with 865 acres (~ 25 acres/year) of selected (Federal) lands and 21,040 acres (~ 620 acres/year) of offered (private) lands. Of these actions, the Forest Service made two land sales (46 acres), 83 land purchases (17,601 acres), two land exchanges (10 acres of selected lands and 4 acres of offered lands). However, the data is skewed by the Twin Buttes land exchange in 1988 in which 13,985 acres of private lands in Custer County were obtained by the US, but the selected lands disposed by the US (13,874 acres to the Idaho Department of Lands) were in Bingham and Bonneville counties (LR2000 2014).

⁷ reasonably foreseeable ≈ 3,200 acres; past and present ≈ 200 acres/year x 20 years (Section 5.1.2.9).



- Legend**
- Selected land
 - Selected land - TCMC-USFS land exchange
 - Offered land - Broken Wing Ranch
 - Offered land - TCMC-USFS land exchange
 - CESA
- Land Ownership within CESA**
- BLM
 - Private
 - State
 - Forest Service



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Figure 5.12-1
Land use and recreation CESA
Thompson Creek Mine EIS

For the foreseeable future the area of land sold each year by the US would steadily decrease (e.g., an average of ~ 10 to 20 acres/year), and the area of land purchased each year by the US would remain similar (~ 500 acres/year). The area of offered lands obtained each year by the US would be closer to 210 acres⁸ instead of 620 acres if the Twin Buttes land exchange is ignored. However, the TCMC-BLM land exchange (5,068 acres selected land, 895 acres offered lands) and the TCMC-Forest Service land exchange (~ 2,850 acres selected land, ~ 525 acres offered lands) would result in an increased average annual area of offered lands (~ 60 acres/year)⁹ being obtained by the US and an increased average annual area of selected lands (~ 370 acres/year)¹⁰ being disposed by the US. In short, there would be a net increase of 175 acres per year¹¹ of Federal lands in the foreseeable future in the CESA due to sales, purchases, and land exchanges.

The dominant reasonably foreseeable change in land jurisdiction is the TCMC-Forest Service land exchange (~ 2,850 acres of selected land and ~ 525 acres of offered lands). The public would gain access to the offered lands. Very few people use such selected land, but those people might no longer have such access unless TCMC were to allow public access to the selected land, e.g., via the Access Yes Program.

The dominant change in land management would be the potential designation of the Boulder - White Cloud National Monument/Wilderness Area (~ 600,000 acres of Federal, State and private land). However, the details of such land management are presently speculative, apart from probably a withdrawal of the area from Federal land and mining laws. Perhaps one easement for public access across private land to provide ready access to a few hundred acres of public land might be obtained by a government agency each decade. In addition, a few hundred acres of private land in Custer County (in addition to the selected lands of the TCMC-BLM and TCMC-Forest Service land exchanges) might become available for public access under the Access Yes Program.

The Land of the Yankee Fork State Park (20 acres) is east of the project area at the junction of US Highway 93 and SH 75. Private land in the Bayhorse mining district (500 acres) was recently acquired by the Idaho Department of Parks and Recreation (IDPR) which is developing the land as the new Bayhorse Unit of the Land of the Yankee Fork State Park. The Bayhorse Townsite, Beardsley, and Pacific mine sites have been remediated and are open for public use. The IDPR has or is in the process of preserving and restoring historic features in the Bayhorse Unit to provide recreational and educational opportunities to the public. The other dominant recreation site being developed in the CESA is the Forest Service Basin Creek Dispersed Campsite project: five to seven rustic campsites along Basin Creek to replace campsites in the decommissioned Forest Service Basin Creek Campground.

⁸ (21,040 acres - 3,985 acres) / 34 years

⁹ divide historic average by two to account for adding two large offered lands separately:
25 acres/year / 2 + 1,420 acres / 30 years ≈ 60 acres/year

¹⁰ divide historic average by two to account for adding two large selected lands separately:
210 acres/year / 2 + 27,918 acres / 30 years ≈ 370 acres/year

¹¹ (500 + 60 - 370 - 15) acres

5.13. Socioeconomic Factors

5.13.1. Introduction

The CESA for socioeconomic factors is Custer and Lemhi counties (6,087,165 acres) (Figure 5.13-1). The individuals and businesses that would be affected by the project would be primarily in these counties, with the cumulative effects greater for the individuals and businesses in Custer County where the TCM is located.

5.13.2. Past, Present, and Reasonably Foreseeable Actions

Mining and agriculture have been the dominant industries in the CESA. These categories of actions along with recreation and Federal Government employment are the present dominant industries and would be for the reasonably foreseeable future. Wildfire/prescribed burning would have the short-term effect of reducing forage for livestock and the long-term effect of reducing the amount of timber available for harvest. Changes in land jurisdictions would have little effect to socioeconomic factors due to the relatively small areas with changes in land jurisdiction in the CESA. There would be few changes in land management in the reasonably foreseeable future with material effects to socioeconomic factors, apart from the proposed Boulder - White Cloud National Monument/Wilderness Area (Section 5.12).

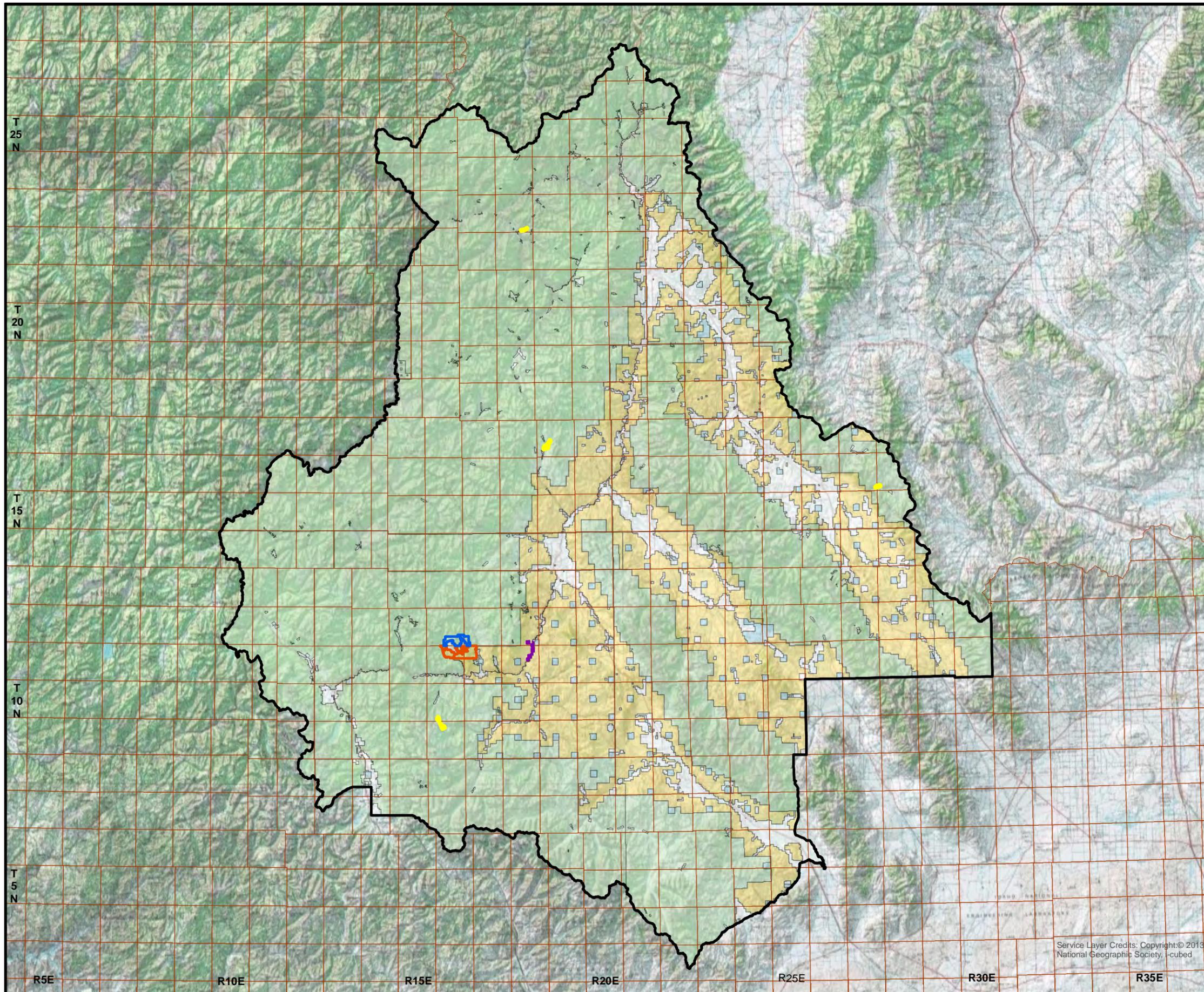
5.13.3. Cumulative Effects

The dominant effect to socioeconomic factors in the CESA has been from mining, e.g., most recently the most important mining actions have been the TCM, Three Rivers Stone quarry, Idaho Cobalt Project, Beartrack mine, Clayton Silver mine, IMA exploration project, Ramshorn quarry, and some 60 rock pits. The scale of the effects to socioeconomic factors from past mining is evident from the surface disturbance from mining (9,055 acres, 0.1 %) in the CESA. The most important reasonably foreseeable mining actions would be the TCM, Three Rivers Stone quarry, and some 60 rock pits, even though activity from the TCM and Three Rivers Stone quarry is cyclical. The Idaho Cobalt Project could be developed in the foreseeable future during the next boom in metal prices.

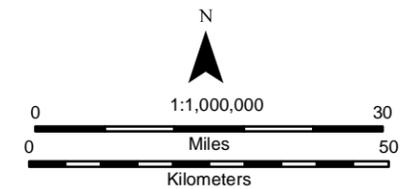
Regarding agriculture, there were 268 farms (147,913 acres, 2.4 %) in 1997 and 272 farms (142,776 acres, 2.3 %, \$26,240,000 of revenue) in 2012 in Custer County. There were 308 farms (196,584 acres, 3.2 %) in 1997 and 350 farms (187,374 acres, 3.1 %, \$32,152,000) in 2012 in Lemhi County.¹²

The effects of wildfire to livestock grazing cause short-term but major effects to a few individuals as there are few opportunities to replace AUMs lost to wildfire in the CESA. The magnitude of the effects is evident by the area of wildfire/prescribed burning (1,057,557 acres, 17.4 %) and grazing (4,016,570 acres, 66.0 %) in the CESA. The effects of wildfire to forest resources would be negligible due to the lack of commercial timber harvest in the CESA.

¹² http://www.agcensus.usda.gov/Publications/1997/Census_Highlights/Idaho/idc019.txt;
http://www.agcensus.usda.gov/Publications/1997/Census_Highlights/Idaho/idc030.txt;
http://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Idaho/cp16059.pdf;
http://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Idaho/cp16037.pdf;



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Figure 5.13-1
Socioeconomic factors and
cultural resources CESA
Thompson Creek Mine EIS

The unemployment rate in Custer County in November 2013 was 6.6 percent, higher than the rate for Idaho but lower than the national rate. The unemployment rate for Lemhi County in December 2013 was 9.3 percent, higher than either the Idaho or national rate (Idaho Department of Labor 2014). The decrease in TCMC employees after mining (or during cyclical downturns, e.g., the mine began operating in a very limited state in December 2014 with only 52 employees) would contribute to the unemployment rate in the CESA, putting a greater burden on Federal, State, and county public services (i.e., unemployment wages, Medicare/Medicaid, etc). There would be a local decrease in private and public income and a wider decrease in secondary income to vendors and suppliers of the closed facilities.

The present socioeconomic character of the CESA would remain similar in the reasonably foreseeable future. Such would be the case even with the designation of the Boulder - White Cloud National Monument/Wilderness Area due to the enormous amounts of primitive, highly scenic land in the CESA, i.e., 93 percent of the land in the CESA is Federal or State land.

5.14. Tribal Treaty Rights and Interests

5.14.1. Introduction

The CESA for tribal treaty rights and interests is Custer, Lemhi, and Bannock counties (6,824,256 acres), which includes the BLM Challis Field Office area, SCNF, and Pocatello Field Office area. The Shoshone-Bannock Tribes and the Nez Perce Tribe have the right to hunt, fish, and gather natural resources on all unoccupied Federal lands in the CESA (Figure 5.13-1., Figure 5.14-1). The CESA was selected because these three counties contain all of the lands for which there would be changes in jurisdiction or in unoccupied/occupied status related to the project.

There are no tribal lands in Custer or Lemhi counties. Part (115,533 acres, 21.4 %) of the Shoshone-Bannock Tribes' Fort Hall Indian Reservation is in Bannock County. Most of the CESA is Federal lands (5,763,003 acres, 84.4 %). Tribal members exercise treaty rights on unoccupied Federal lands, such as in the vicinity of the mine, including the Salmon River and East Fork Salmon River, by hunting, fishing, and gathering and conducting other traditional uses of the resources. The Tribes consider the entire area surrounding the Salmon River corridor to have cultural significance, both historically and presently. The ability of Native Americans to exercise treaty rights and practice their traditional culture in the CESA depends on access to Federal lands which has been reduced through decrease of "unoccupied lands" and degradation of the resources over time.

5.14.2. Past, Present, and Reasonably Foreseeable Actions

Past and present effects to resources include dams along the Snake River that have affected salmon runs and limited the availability of salmon for consumption. Development of open space, access restrictions, and land disposals reduce the amount of unoccupied lands for practicing tribal treaty rights, and may reduce the availability of big game for tribal harvest. Wildfire/prescribed burning, grazing, mining, and timber/vegetation management have affected vegetation and water resources. Mining limits tribal access in and around mine sites, affects the tribal viewshed, reduces the area available for traditional gathering, fishing, hunting, and other

traditional activities; active mines on Federal land are considered occupied Federal lands that are currently not available for exercising treaty rights.

According to information provided by the Shoshone-Bannock Tribes (BLM 2008b), the past creation of the East Fork campground removed an important cultural site for the Tribes and the excavation of Pit 1 at the Three Rivers Stone quarry altered a key geographical landmark marking the confluence of the East Fork Salmon River and Salmon River.

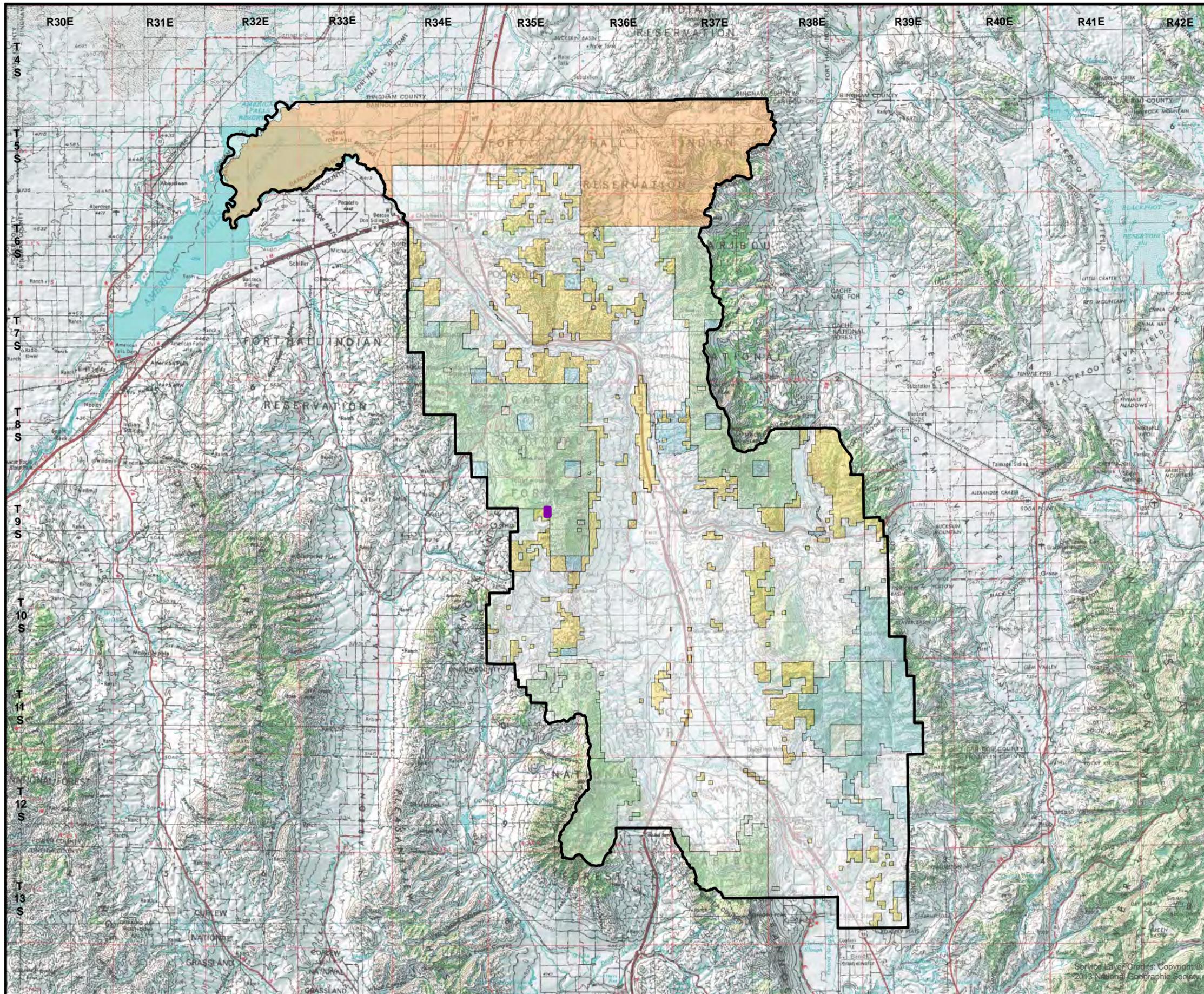
Natural resources available on unoccupied Federal lands are enhanced by a variety of projects such as the BLM Landscape Fire Restoration project, the Bonanza Forest Products project, the Garden Creek Fuels Reduction project, the Muley Creek Aspen Restoration Project, the Yankee Fork Restoration project, the Upper Yankee Fork Fuels Reduction Project, the Mosquito Flat Fuels Reduction Project, the Morgan Creek Allotment Fence Project, and the Federal weed management programs (Appendix C).

5.14.3. Cumulative Effects

Mining has and continues to affect (10,088 acres, 0.1 %) the CESA. However, the dominant active mines are the TCM, Three Rivers Stone quarry, and several hundred small rock pits. The active mines represent several thousand acres of occupied Federal land. The other primary categories of actions causing occupied Federal land in the CESA are roads (9,684 acres, 0.1 %) and utility corridors (8,239 acres, 0.1 %).

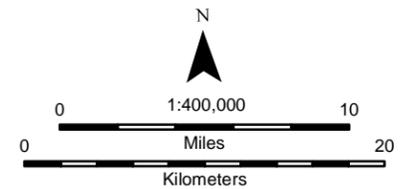
Overall, the amount of unoccupied Federal lands has decreased in the CESA. For example, land jurisdiction in Custer County in 2000 included 2,937,675 acres of Federal lands (813,965 acres BLM and 2,123,710 acres National Forest System) (93.2 % of the land in the county) (IDC 2012). In 2011, 2,935,509 acres of land in Custer County were under Federal administration (USDOI 2012), 2,166 acres less than in 2000. In addition, the legal area of the SCNF decreased from 4,237,004 acres in 2002 to 4,235,940 acres in 2012 (USFS 2014), a decrease of 1,064 acres. The decreases (3,230 acres) are 0.05 % of the area of Federal lands in the CESA. In addition, the TCMC-BLM land exchange and the TCMC-Forest Service exchange would cause a net decrease (~ 6,600 acres, 0.1 %) in Federal land in the CESA. However, the trend in the reasonably foreseeable future is a slight increase in Federal land in the CESA, e.g., 175 acres per year in Custer County (Section 5.12).

Regardless, overall there would be a net decrease in unoccupied Federal lands available for the Shoshone-Bannock and Nez Perce tribes to exercise treaty rights due to the continued development of mining, roads, utility corridors, communication sites, recreation sites, etc. Hence many of the resources used by the tribes would continue to decline in quantity and diversity as unoccupied Federal lands are occupied and/or otherwise disposed and therefore no longer available for exercising tribal treaty rights and interests. However, in recent years, the numbers of elk, moose, and deer have increased in many areas in the CESA. Federal and State agencies are enhancing native fish and wildlife habitat. In the shift towards ecosystem management, Federal land managers have reintroduced more natural processes such as fire across the landscape. These efforts to improve the condition of natural resources collectively serve to protect and restore tribal treaty resources.



Legend

- Offered and - Garden Creek property
- CESA
- Land Ownership with CESA**
- BLM
- Bureau of Reclamation
- Indian Reservation
- Private
- State
- Forest Service



Selected land from Thompson Creek Mine data, polygons created by Ken Gardner. Ownership data is at 1:24,000 and created and maintained by the Bureau of Land Management, Idaho State Office, Geographic Sciences. Coordinate system UTM Zone 12 NAD 83



No warranty is made by the Bureau of Land Management (BLM) for the use of this data for purposes not intended by the BLM.

Figure 5.14-1
Tribal treaty rights and interests
and cultural resources CESA,
Garden Creek property
Thompson Creek Mine EIS

5.15. Cultural Resources

5.15.1. Introduction

The CESA for cultural resources is Custer and Lemhi counties (6,087,165 acres) (Figure 5.13-1). Custer and Lemhi counties represent a reasonably broad cultural domain, and include the portions of the project with cultural resources that would be most affected by the proposed Federal actions. The MMPO or land disposal alternatives would not affect cultural resources outside of this area. Activities associated with the project that might affect cultural resources could occur outside of the actual disturbance of the project, but not likely outside of the CESA.

Cultural resources potentially vulnerable to cumulative effects include prehistoric sites, prehistoric landscapes, historic sites, historic structures, and traditional cultural properties. The incremental degradation or elimination of the resources reduces the information and interpretive potential of historic properties. Degradation of the integrity of a site, or characteristics that qualify the site for the NRHP, can be diminished to an extent it is no longer eligible for listing on the NRHP.

5.15.2. Past, Present, and Reasonably Foreseeable Actions

The past and present actions in the CESA that have potentially affected cultural resources include wildfire/prescribed burning, timber/vegetation management, vandalism/looting, road construction and maintenance, aboveground and underground utility construction and maintenance, mining, livestock grazing, agriculture, changes in land jurisdiction, residential and community development, and other construction projects such as the development of recreation sites. However, no Forest Service timber sales are proposed for the CESA in the current planning cycle.

Known cultural sites that have been determined ineligible for the National Register do not require avoidance and therefore have likely been affected by activities requiring a cultural resource inventory (i.e., mining, utility corridors, fences, etc.). As directed by Section 106 of the NHPA, National Register eligible sites are generally avoided or mitigated (e.g., data recovery under a treatment plan) if avoidance is not possible for projects with a Federal or State nexus. The effects to cultural sites from projects prior to 1966 (i.e., prior to the NHPA) and/or those without a Federal or State nexus are generally unknown.

Some projects or developments benefit cultural resources. The Land of Yankee Fork State Park has preserved and provides interpretation of many historic features including the Yankee Fork Gold Dredge, the Custer Motorway, and the ghost towns of Bonanza, Custer, and Bayhorse. The prehistoric site known as the Challis Bison Jump is also interpreted and maintained. The Bayhorse Mining District is currently undergoing preservation and restoration of historic features as IDPR creates a State park unit focusing on historic mining operations. The Bayhorse Townsite, Beardsley mine, and Pacific mine sites have been remediated and restored and provide educational and recreation opportunities open for use to the public.

Recreational use is expected to increase and additional facilities are likely to be developed including the Basin Creek dispersed campsites and continued development of the Bayhorse Unit

of the Land of the Yankee Fork State Park. An increase in the dispersed recreational use of the area increases the potential for vandalism and/or artifact collection at cultural sites.

5.15.3. Cumulative Effects

Numerous cultural sites have been identified in the CESA and innumerable past actions have adversely affected many cultural resources, in contrast to the relatively few actions which have benefited cultural resources. There are undoubtedly numerous undiscovered cultural resources in the CESA. The most important past, present, and reasonably foreseeable categories of actions affecting cultural resources in the CESA are wildfire/prescribed burning (1,057,557 acres, 17.4 %); mining (9,055 acres, 0.1 %); roads (6,409 acres, 0.1 %); and utility corridors (5,613 acres, 0.1 %); as well as (illegal and legal) archaeological excavation and vandalism. The scale of effects from agriculture and residential development is proportional to the private land (427,320 acres, 7.0 %) in the CESA (Table 5.1-1). None of the land disposal alternatives would result in adverse effects to cultural resources eligible for the NRHP. Therefore, there would not be cumulative effects to cultural resources related to the land disposal alternatives. However, one cultural resources site eligible for the NRHP (10CR758) would be adversely affected by the MMPO alternatives. As directed by Section 106 of the NHPA, this site would be mitigated (e.g., data recovery under a treatment plan) if avoidance is not possible. This effect, in addition to other reasonably foreseeable future activities on Federal or State lands, would be minor. Data recovery of NRHP-eligible sites that could not be avoided would expand the regional database and knowledge of prehistoric and historic contexts. The mitigation measures developed to avoid direct and indirect effects to cultural resources would also minimize contributions to cumulative effects.

5.16. Transportation, Access, and Public Safety

5.16.1. Introduction

The CESA is the area within a 15 mile radius of the center of the TCM (452,389 acres) (Figure 5.7-1). The CESA was selected to include the major travel routes for TCM-related traffic, the portion of the Salmon River Scenic Byway on SH 75 nearest the project area, and the area in the vicinity of the mine typically used by recreationists. The CESA contains transportation routes, including State highways, county roads, local roads, and designated Forest Service and BLM roads and trails.

The transportation network in the TCM locality (e.g., S. Creek Road, Bruno Creek Road, and Thompson Creek Road) was previously described (Section 3.16). The roads and trails on NFS land are managed under the SCNF Travel Planning and OHV Route Designation plan (USFS 2009b). This plan designated open, motorized vehicle routes and areas for public use on the SCNF to comply with the Travel Management and OHV Rule to produce a motor vehicle use map. The BLM roads are managed under the BLM Challis Field Office Travel Management Plan (BLM 2008c).

The CESA contains a network of transportation routes including paved, gravel, and dirt roads that provide access to the TCM, private land, the BLM Challis Field Office area, and the SCNF. The main thoroughfare through the CESA is the segment of SH 75 (two-lanes, paved) connecting Challis to Sunbeam. The Custer Motorway (one-lane, gravel and dirt surface) is

accessible to most vehicles seasonally and snowmobiles in the winter. The road traverses through the northern portion of the CESA. Originally a toll road from Challis to Bonanza, the road was completed in 1879 and remained the only wagon and stage access to the area for years. Because of its popularity for access to the Yankee Fork area, the old road was reconstructed by the Civilian Conservation Corps in 1933 and is now known as the Custer Motorway. The road is used mostly for recreational purposes, as it is a scenic route that passes from Challis to the Land of the Yankee Fork Historic Area with the Sunbeam Dam, Yankee Fork Gold Dredge, and the Custer and Bonanza ghost towns.

5.16.2. Past, Present, and Reasonably Foreseeable Actions

The effects to transportation and access are generally from additional traffic from a variety of actions which can increase travel times and congestion, or from increases or decreases in access. For example, maintenance and improvements are expected to continue along SH 75 and many of the roads and trails in the CESA. Any future, temporary roads built in association with other projects in the BLM Challis Field Office area or in the SCNF, such as timber harvests, utility corridors, mining (including exploration), etc., would be required to be reclaimed.

5.16.3. Cumulative Effects

There are more than 230 miles of improved roads in the CESA, in addition to trails (Table 5.1-2). The length and type of roads and trails is expected to remain fairly stable in the foreseeable future. Roads associated with active mining generally would not be available for public use and would mostly be reclaimed after mining ceases. Residential development in the CESA would not meaningfully increase traffic because the population has remained relatively stable for several decades and would be expected to remain relatively stable in the CESA. However, there will be greater traffic on the transportation network in the CESA because of increase recreation due to the steady and large increase in population in the US.

A few roads and trails may become unavailable for most public access due to washouts or timber blowdowns. Such affects to public access would typically be for a few weeks or less for more important roads, except in the case of an expensive bridge or road surface repair. Less important roads and trails could remain inaccessible for years.

5.17. Hazardous Materials and Solid Waste

5.17.1. Introduction

The CESA is all landfills not on the TCM mine that could be affected by the MMPO alternatives. The land disposal alternatives are not evaluated for cumulative effects to hazardous materials and solid waste because the selected and offered lands do not/would not contain appreciable hazardous materials or solid waste. Hazardous materials and solid waste generated by the mine would be transported by contractors to permitted landfill facilities, except for certain solid waste buried in landfills at the mine. Under the MMPO action alternatives, the use, storage, and disposal of hazardous materials or solid waste would not change. The cumulative effects of the expanded WRSFs and the TSF are included in the following discussion of mine disturbance in the CESA.

5.17.2. Past, Present, and Reasonably Foreseeable Actions

There are four solid waste transfer stations in Custer County: Challis, East Fork, Mackay, and Stanley (Custer County 2012). Non-hazardous solid waste generated by TCMC is buried at the TCM as there is a solid waste disposal permit for the mine from the county. There is also an old landfill in the Spud Creek locality (Clayton), and numerous unauthorized disposals of solid waste on Federal lands. Mining, agriculture, and unauthorized dumping and/or drug manufacturing have the potential for chemical (including petroleum) spills and possible contamination of surface water or groundwater in the Upper Salmon River Subbasin.

5.17.3. Cumulative Effects

The largest potential for chemical spills would be from vehicles, and particularly chemical transport trucks traveling on SH 75, or from agriculture or weed eradication in the CESA. Chemical spills may also have occurred in the past and could occur in the reasonably foreseeable future at mines, farms, and construction projects. However, BMPs and a SPCC Plan would typically be employed for active mines and construction projects, substantially reducing the risk of such spills. However, the greatest effects from hazardous materials and solid waste would probably be from unauthorized dumping and/or illegal drug manufacturing on Federal lands in the CESA.

The present and reasonably foreseeable generation of hazardous materials and solid waste locally and regionally would be well within the existing capacities of current disposal facilities. There would be no incremental change in the effects of waste management activities from mining in the CESA. It is highly improbable that hazardous materials or solid waste would start or contribute to wildfire, or would impede recreation or residential development unless, for example, someone wanted to recreate or build residential dwellings on an existing landfill. Given the existing capacity and regulatory framework for generators, transporters, and transport, storage and disposal facilities, the past, present, and reasonably foreseeable actions would have negligible effects on hazardous materials and solid waste in the CESA, apart from such related to illegal activities.