3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section discusses the existing physical, biological, and social factors, as they currently exist within the RBU Project Area and surrounding region. All resources considered during preparation of this EA are listed in **Appendix A**, the Interdisciplinary Team Analysis Record Checklist. Resources that were considered but dismissed from further analysis are also listed in **Appendix A**. This chapter provides the baseline for comparison of impacts/consequences described in **Chapter 4**.

3.2 RESOURCES BROUGHT FORWARD FOR ANALYSIS

3.2.1 Air Quality

Regional air quality is influenced by a combination of factors including climate, meteorology, the magnitude and spatial distribution of local and regional air pollution sources, and the chemical properties of emitted pollutants. Within the lower atmosphere, regional and local-scale air masses interact with regional topography to influence atmospheric dispersion and transport of pollutants. The following sections summarize the climatic conditions and existing air quality within the RBU Project Area and surrounding region.

3.2.1.1 Climate

The RBU Project Area is within a semiarid mid-continental climate regime typified by dry windy conditions and limited precipitation. The Uinta Basin is bordered by the Wasatch Range to the west, which extends north and south through the middle of the State, and the Uinta Mountains to the north, which extend east and west through the northeast portion of the State. Elevation of the RBU Project Area ranges from 4,800 feet above mean sea-level (amsl) to 5,400 feet amsl.

The closest climate measurements to the Project Area were recorded at Ouray 4 NE, Utah (1955-2006). The Ouray 4 NE station is located 8 miles north of compressor station TAP 5 at an elevation of 5,000 famsl (Western Regional Climate Center 2006). **Table 3.2-1** summarizes the mean temperature range, mean total precipitation, and mean total snowfall by month at that location.

Prevailing synoptic-scale westerly air masses originating from the Pacific Ocean are typically interrupted by the western mountain ranges before reaching the Uinta Basin. As a result, the lower elevations of the Uinta Basin receive a relatively low amount of precipitation. The higher elevations of the area generally receive a higher amount of precipitation.

3.2.1.2 Winds and Atmospheric Stability

The transportation and dilution of air pollutants are primarily a function of wind speed and direction. As wind speed increases, the dispersion of emitted pollutants also increases, thereby reducing pollutant concentrations.

Wind data within the RBU Project Area have not been directly measured. Local terrain effects will influence the wind profiles specific to the RBU Project Area. However, general wind speed and direction data are available from the Vernal Airport, (Vernal, Utah). **Figure 3.2-1** presents a wind rose depicting wind speed and direction for the period of 2005 – 2009. Note that the data represent the direction from which the wind is blowing (e.g., Wind Direction Origin). As shown, winds originate predominately from the west and west-northwest. Winds are calm 10.1 percent of the time.

Table 3.2-1. Temperature, Precipitation and Snowfall at Ouray 4 NE, Utah (1955-2006).

Season	Month	Average Temperature Range (° Fahrenheit)	Average Total Precipitation (inches)	Average Total Snowfall (inches)
Spring	March	23.7 – 54.1	0.5	1.4
	April	33.4 – 65.8	0.7	0.6
	May	42.8 – 77.2	0.7	0.0
	Total Spring Average	*33.3 – 65.7*	*1.9*	*2.0*
Summer	June	50.2 – 87.6	0.5	0.0
	July	56.1 – 94.7	0.6	0.0
	August	53.9 – 91.6	0.6	0.0
	Total Summer Average	*53.4 – 91.3*	*1.7*	*0.0*
Fall	September	43.9 – 81.1	0.8	0.0
	October	32.1 – 67.4	0.9	0.4
	November	20.6 – 47.6	0.5	1.8
	Total Fall Average	*32.2 – 65.4*	*2.2*	*2.2*
Winter	December	7.7 – 33.2	0.4	3.9
	January	2.8 – 29.2	0.4	4.3
	February	9.9 – 37.8	0.4	2.8
	Total Winter Average	*6.8 – 33.4*	*1.2*	*11.0*
Total Annual Average		***31.4 – 63.9***	***6.9***	***15.2***

Source: Western Regional Climate Center 2006. Data collected at Ouray 4 NE, Utah from 1955 to 2006.

3.2.1.3 Air Quality Evaluation Criteria

Criteria Pollutants

The EPA has promulgated National Ambient Air Quality Standards (NAAQS) to protect human health and welfare with an adequate margin of safety. Standards have been set for the following pollutants: ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), and particulate matter less than 10 microns in diameter (PM_{10}) or 2.5 microns in diameter ($PM_{2.5}$). The primary standards are set to protect public health, whereas secondary standards are set to protect public welfare (e.g., injury to crops or forests). When an area meets the NAAQS through monitoring, it is designated as attainment. Conversely if an area does not meet the NAAQS, it is designated as nonattainment. If an area does not have enough air monitoring data to make a NAAQS determination, it is designated as unclassified and is regulated as an attainment area. Uintah County is currently designated as unclassified/attainment for all criteria pollutants.

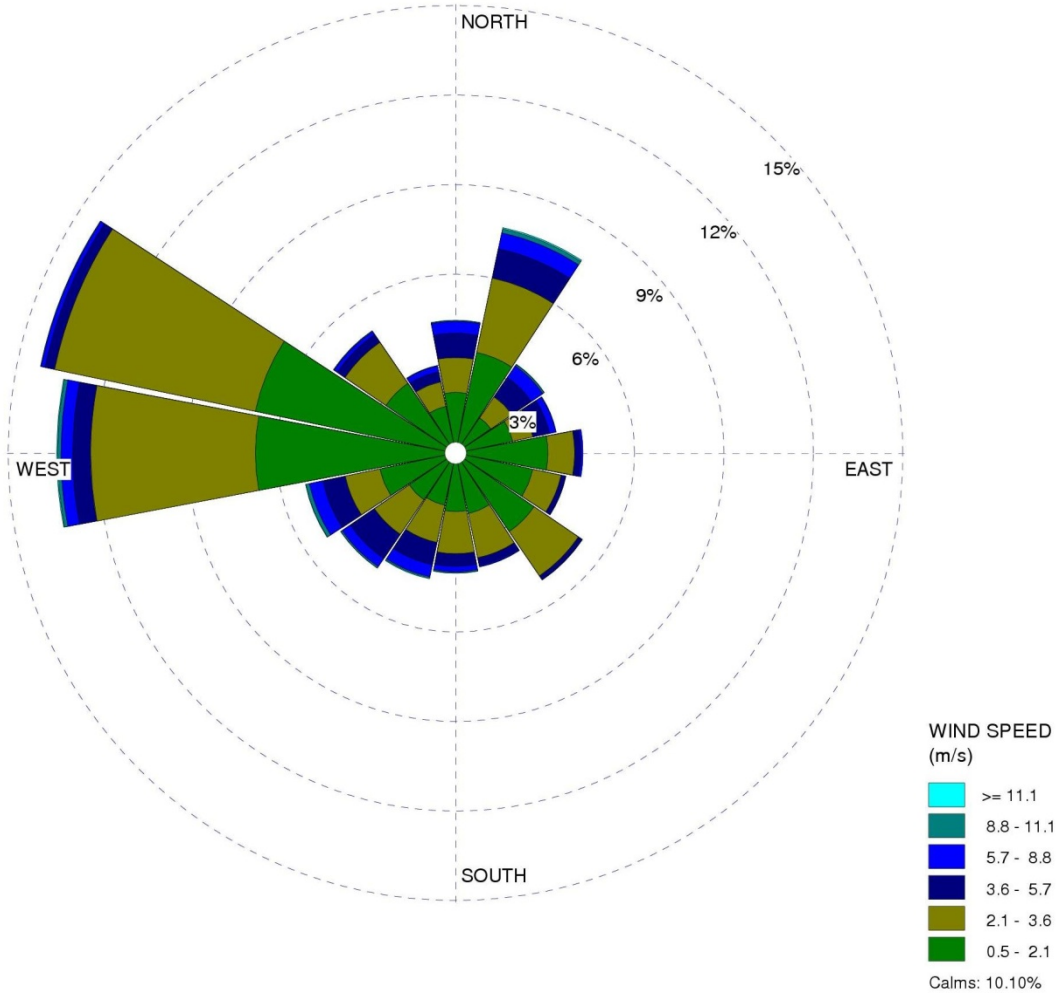


Figure 3.2-1. Wind Rose from Vernal Airport Data 2005-2009 (Vernal, UT)

Under the Prevention of Significant Deterioration (PSD) provisions of the Clean Air Act (CAA), incremental increases of specific pollutant concentrations are limited above a legally defined baseline level. Many national parks and wilderness areas are designated as PSD Class I. The PSD program protects air quality within Class I areas by allowing only slight incremental increases in pollutant concentrations. Areas of the State not designated as PSD Class I are classified as Class II. For Class II areas, greater incremental increases in ambient pollutant concentrations are allowed as a result of controlled growth. The closest Class I areas are Arches National Park (65 miles south) and Canyonlands National Park (85 miles south).

The NAAQS standards, and the PSD increments as reported by the Utah Department of Environmental Quality (UDEQ) Division of Air Quality (UDAQ) for Class I and II areas, are presented in **Table 3.2-2**.

Table 3.2-2. Ambient Criteria Pollutant National and State Ambient Air Quality Standards, and Prevention of Significant Deterioration (PSD) Increments

Pollutant	Averaging Period(s)	Uinta Basin Background Concentration [a] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	PSD Class II Increment ($\mu g/m^3$)
SO_2	3-hour 1-hour	16.7 21.7	1,300 197	512 --
NO_2 NO_2	Annual 1-hour	9.0 69.9	100 188	25 --
PM_{10}	24-hour	18.0	150	30
$PM_{2.5}$	Annual 24-hour	12.3 21.6[b]	15 35	4 9
CO CO	8-hour 1-hour	3,910 6,325	10,000 40,000	None None
O_3	8-hour	117 ppb[c]	75 ppb	None

[a] Data for this table were obtained from the USEPA Air Quality System (AQS) website (Greater Natural Buttes FEIS, AQTSD, March 2012). Background data from: Ouray Monitoring Station Data (USEPA AQS Database). 2009/2010 data period = 7/30/09 to 6/30/2010. 20010/2011 period = 7/1/2010 to 6/30/2011. Redwash Monitoring Station Data (USEPA AQS Database). 2009/2010 data period = 7/30/09 to 6/30/2010. 20010/2011 period = 7/1/2010 to 6/30/2011.

[b] Value for PM 2.5 24-hour is 2-year average from the Ouray monitor.

[c] Ozone data is the Highest 4th High from Ouray Monitoring Station data (AQIA, Greater Natural Buttes Supplement to the DEIS, Feb 2011 based on USEPA AQS Database). Ozone data shown is unofficial and non-regulatory, and presented for informational purposes only

Active year-round air quality monitoring in the Uinta Basin began in the summer of 2009 south of Vernal at two monitoring sites: Red Wash and Ouray. As of the Fall of 2011, the monitors at Ouray and Redwash were certified as Federal Reference Method (FRM). The data collected after they were certified can be used to make a NAAQS determination. The complete EPA Ouray and Redwash monitoring data can be found at: http://www.epa.gov/airexplorer/index.htm.

Before being certified as FRM monitors, both the Ouray and Red Wash monitoring sites recorded numerous exceedances of the 8 hour ozone standard during the winter months (January through March 2010 and 2011). Winter ozone is being formed under a "cold pool" process whereby stagnate air conditions with very low mixing heights form under clear skies with snow-covered ground and abundant sunlight that, combined with area precursor emissions (NO_x and VOCs), create intense episodes of ozone. Similar high numbers were not seen during the 2012 monitoring season due to the lack of snow cover. This phenomenon has also been observed in similar types of locations in Wyoming and has contributed to a nonattainment designation for ozone for Sublette County, Wyoming. Winter ozone formation is a newly recognized issue, and the methods of analyzing and managing this problem are still in development. Existing photochemical models are currently unable to replicate winter ozone formation satisfactorily, in part due to the very low mixing heights associated with the unique meteorology of these ambient conditions.

The Utah Division of Air Quality (UDAQ) conducted limited monitoring of $PM_{2.5}$ in Vernal, Utah in December 2006. During the 2006-2007 winter seasons, $PM_{2.5}$ levels were measured at the Vernal monitoring station that were higher than the $PM_{2.5}$ health standard that became effective in December 2006. The $PM_{2.5}$ levels recorded in Vernal were similar to other areas in northern Utah that experience wintertime inversions. The sources of elevated $PM_{2.5}$ concentrations during winter inversions in Vernal, Utah haven't been identified as of yet. The most likely causes of elevated $PM_{2.5}$ at the Vernal monitoring station are probably those common to other areas of the western U.S. (combustion and dust) plus nitrates and organics from oil and gas activities in the Basin. $PM_{2.5}$ monitoring that has been conducted in the vicinity of oil and gas operations in the Uinta Basin by the Red Wash and Ouray monitors beginning in summer 2009 have not recorded any exceedances of either the 24 hour or annual NAAQS.

In 2008, the BLM participated in the Uinta Basin Air Quality Study (UBAQS) technical analysis of the potential air quality and air quality related value impacts that may result from oil and gas industry activity and other emission sources within the Uinta Basin. This analysis, known as the UBAQS, was finalized in 2009. The analysis calculated that air quality in the Basin is expected to remain in compliance with the NAAQS for criteria pollutants out to 2012 (IPAMS, UBAQS 2009). Additional analysis carried out for the GASCO EIS and Anadarko Greater Natural Buttes EIS have also shown that air quality in the Basin is expected to remain in compliance with the NAAQS for criteria pollutants.

Hazardous Air Pollutants

Under section 112(d) of the CAA, the EPA is required to develop regulations establishing national emission standards for hazardous air pollutants for all industries that emit one or more of the pollutants in major source quantities. These standards are established to reflect the maximum degree of reduction in HAP emissions through application of maximum achievable control technology (MACT). Source categories for which MACT standards have been implemented include Oil and Natural Gas Production and Natural Gas Transmission and Storage.

There are no applicable Federal or State of Utah ambient air quality standards for assessing potential HAP impacts to human health. However, the State of Utah has adopted Toxic Screening Levels (TSLs) which are applied during the air permitting process to assist in the evaluation of HAPs released into the atmosphere (UDEQ-UDAQ 2000). The TSLs are derived from Threshold Limit Values (TLVs) published in the American Conference of Governmental Industrial Hygienists (ACGIH) – "Threshold Limit Values for Chemical Substances and Physical Agents" (ACGIH 2007). These levels are not standards that must be met, but screening thresholds which if exceeded, would suggest that additional information is needed to evaluate potential health and environmental impacts. The UDEQ-UDAQ, TSLs are presented in **Table 3.2-3**.

Greenhouse Gases

According to the EPA (EPA 2008a and 2008b), the burning of fossil fuels over the past 200 years and deforestation have caused the concentrations of heat-trapping "greenhouse gases" to increase in our atmosphere. These gases prevent heat from escaping to space, somewhat like the glass panels of a greenhouse.

Greenhouse gases are necessary to life as we know it, because they keep the planet's surface warmer than it otherwise would be. But, as the concentrations of these gases continue to increase in the atmosphere, the Earth's temperature is climbing above past levels. According to National

Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) data, the Earth's average surface temperature has increased by about 1.2º F to 1.4º F in the last 100 years. The eight warmest years on record (since 1850) have all occurred since 1998, with the warmest year being 1998. However, according to the British Meteorological Office's (BMO) Hadley Centre (BMO 2009), the United Kingdom's foremost climate change research center, the mean global temperature has been relatively constant for the past nine years after the warming trend from 1950 through 2000. So while scientists believe that Earth will continue to warm in the future, this warming has not occurred for the past ten years. Therefore, quantified or globally accepted predictions on the ultimate outcome of global warming, is still unknown. The warmest year on record was 1998, a year associated with the most intense El Nino global phenomena ever experienced. Most of the warming from 1950 through 2000 is speculated to be the result of human activities. Other aspects of the climate, such as rainfall patterns, snow and ice cover, and sea level, are also changing.

Table 3.2-3. Utah Toxic Screening Levels (TSLs)

Pollutant and Averaging Time	TSLs (µg/m^3)
Formaldehyde (1-hour)	36.8
Acrolein (1-hour)	22.9
Benzene[a] (24-hour)	53.2
Toluene (24-hour)	2,512
Ethylbenzene (24-hour)	14,473
Xylenes (24-hour)	14,473
n-Hexane (24-hour)	5,875
1,3 Butadiene	147

Although there exists an acute TLV for benzene, the State of Utah does not apply a comparison to an acute TSL since the chronic TSL is more stringent.
Source: UDEQ-UDAQ, 2008b

If greenhouse gases continue to increase, climate models predict that the average temperature at the Earth's surface could increase from 3.2º F to 7.2º F above 1990 levels by the end of 21st Century. Scientists speculate that human activities are changing the composition of the atmosphere, and that increasing the concentration of greenhouse gases will change the planet's climate. But scientists are not sure by how much it will change, at what rate it will change, or what the exact effects will be.

3.2.1.4 Existing Sources of Air Pollution

The Uinta Basin has seen recent oil and gas development on Federal, Tribal, State, and private lands.

Existing point and area sources of air pollution within the RBU Project Area and surrounding region include the following:

- Exhaust emissions, primarily CO, NO_2, and formaldehyde, from existing natural gas-fired compressor engines used in production of natural gas;
- Natural gas dehydrator still-vent emissions of VOCs, BTEX and *n*-hexane;

- VOC emissions from fugitive sources;
- Gasoline and diesel-fueled vehicle tailpipe emissions of VOC, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$;
- SO_2, NO_2, and fugitive dust emissions from coal-fired power plants and coal mining and processing;
- Fugitive dust (in the form of PM_{10} and $PM_{2.5}$) from vehicle traffic on unpaved roads, wind erosion in areas of soil disturbance, and road sanding during winter months; and
- Long-range transport of pollutants from distant sources contributing to regional haze.

3.2.2 Soils

The development of soils is governed by many factors, including climatic conditions (e.g., the amount and timing of precipitation, temperature, and wind), the parent material that the soil is derived from, topographic position (e.g., slope, elevation, and aspect), geomorphic processes, and time.

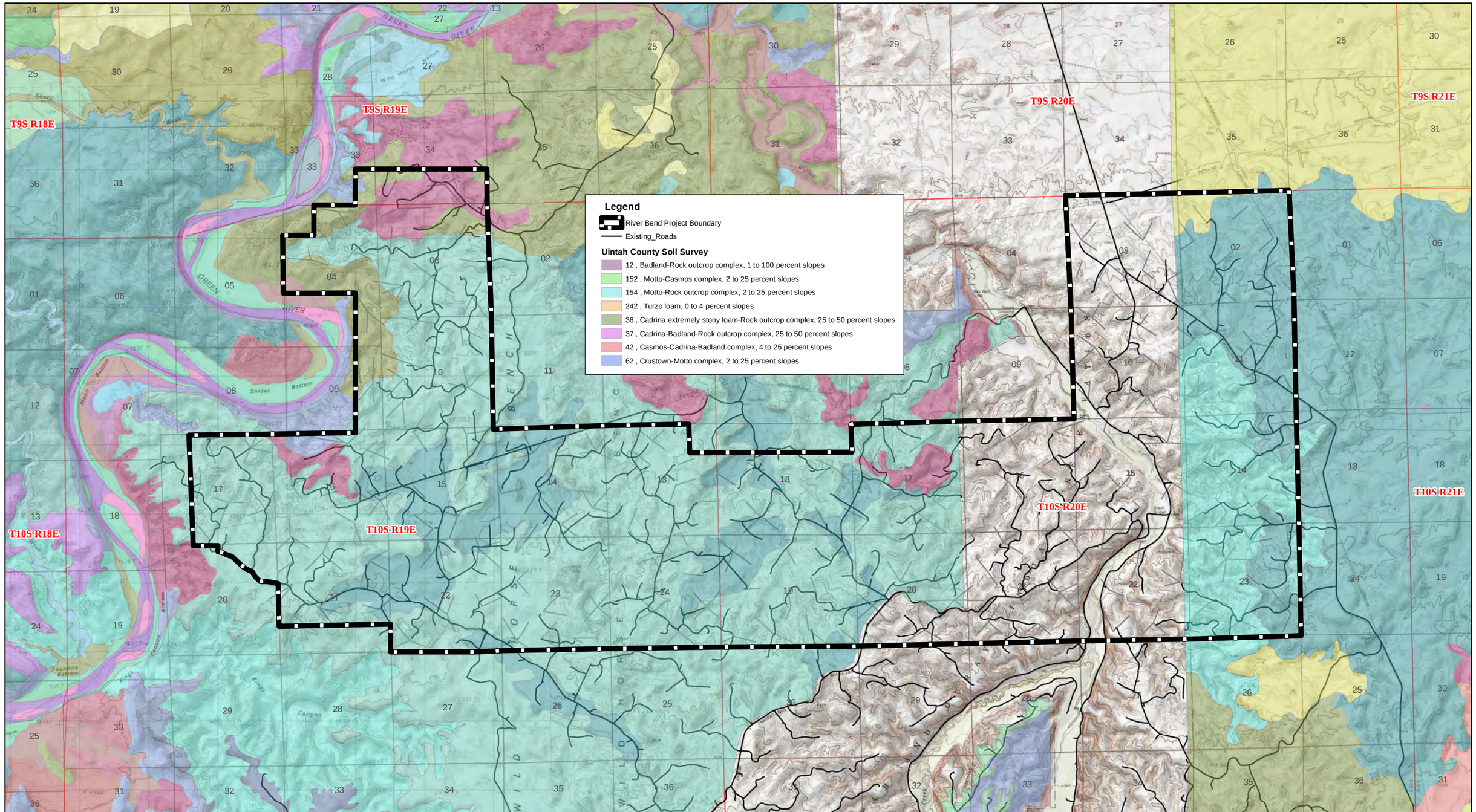
3.2.2.1 RBU Project Area Soil Types

The Soil Survey of Uintah Area, Utah – Parts of Daggett, Grand, and Uintah Counties, published by the U.S. Department of Agriculture (USDA) Soil Conservation Service, is the primary source of information concerning soils in the RBU Project Area (USDA-NRCS 2003). This survey has been supplemented by additional information available on the National Resource Conservation Service (NRCS) soils web site (USDA-NRCS 2007a). Soil information is not available for that portion of the RBU Project Area located on Tribal lands.

Soils in the RBU Project Area are developed on the side slopes of canyons, benches, ridges, hills, alluvial fans, and floodplains. In addition, about 59 acres of the RBU Project Area are covered by bare rock outcrop. **Figure 3.2-2** illustrates the eight soil map units within the RBU Project Area and shows the relationship of these soil units with the proposed development locations. **Appendix C** summarizes the soil textures, parent materials, landforms, slopes, depth class, runoff speed, and other factors of the soil map units in the RBU Project Area that are relevant to erosion and reclamation potential. Sixty-nine percent of the RBU Project Area is covered by just three soil types. Over 42 percent (7,111 acres) is covered by the Motto-Casmos complex that consists largely of clay loams. Another 19 percent (3,105 acres) is covered by the Motto-Rock Outcrop complex, which consists largely of similar soil types; and 8 percent (1,257 acres) is covered by the Cadrina extremely stony loam-rock outcrop complex. The five remaining soil types cover between 15 and 539 acres each. The soils on the Tribal surface are assumed to be similar in nature to the soils that occur in the rest of the RBU Project Area.

3.2.2.2 Biological Soils

Many soils in the Uinta Basin possess characteristics typical of soils with a high potential to include biological soil crusts. Biological soil crusts (also known as cryptogrammic, cryptobiotic, microbiotic, and microphytic soils) are composed of a symbiotic association of cyanobacteria, lichens, mosses, green algae, microfungi, and bacteria that form a rough carpet on the surface and a soil-binding matrix below. Biological soil crusts typically occur as brownish or black soil crusts that appear on the surface of sandy desert soils. Since biological soils crusts are highly adaptable, they occur in the full range of arid soil types from shallow to deep, heavy to light textures, and moist to drier conditions. No site-specific inventories have been completed to



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N W E S

Mapping Reference:

Basemap from ESRI Online Maps.
Existing Well data from UDOGM.

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DRAWN BY:	A. Leonard
CHECKED BY:	A. Antipas
FILE NAME:	Soil.mxd

Soils

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-2

document the presence of biological soil crusts in the RBU Project Area. As such, it is assumed for the purpose of this EA that biological soils crusts may occur intermittently in the Project Area.

3.2.2.3 Erosion and Reclamation Potential of RBU Project Area Soils

The key attributes used to evaluate potential environmental impacts to soils are erosion potential and ease of reclamation after soil disturbance. Soil mapping conducted by the NRCS typically provides information about each soil type within the mapped area that can be used to evaluate the erosion potential and reclamation potential of each soil unit (USDA-NRCS 2007a; USDA-NRCS 2007b).

Erosion Potential

Erosion potential can vary widely across soil units within a given area, and depends on the particle size distribution of the soil, the slopes on which it is found, and the amount and type of vegetative cover. The USDA-NRCS typically rates each of the soil units according to its water erosion potential (K_w). The erosion potential indicates the general susceptibility of a soil to sheet and rill erosion. The value of K_w ranges from 0.02 to 0.69. The higher the K_w value of a soil type, the more susceptible the soil type is to sheet and rill erosion. Erosion hazards become critical issues when protective vegetation is removed during and following activities such as well pad expansion. Typically, soils found on steeper slopes have a higher erosion hazard than those found on gentler slopes. Soils with more fines are at greater risk of wind erosion, and soils with more gravel and/or stones have a lower risk of wind erosion.

Most of the soil types within the RBU Project Area have erosion potentials of 0.15 or less, indicating moderate water erosion potential. Higher erosion potentials of 0.17 to 0.37 are given for the Crustown loamy sand (62) and Turzo loam (242). Soils on slopes greater than 40 percent and badland areas could be expected to have severe erosion potentials.

Reclamation Potential

Reclamation potential depends on soil structure, pH conditions, and soil salinity. Excessive salinity (salt content) or sodicity (sodium content) can inhibit the growth of desirable vegetation and therefore, successful reclamation.

The USDA has provided reclamation material source ratings for the soils in the RBU Project Area on the Web Soil Survey (USDA-NRCS 2007a). With the exception of the Turzo soils, all of the soils in the RBU Project Area are rated poor for reclamation potential based on the attributes of the primary soil type. The poor ratings are generally due to the shallow depth to bedrock, low organic matter content, high stone content, and excessive salinity or sodicity.

3.2.3 Water Resources

Water resources within the RBU Project Area include perennial surface water flows in Willow Creek; intermittent flows in ephemeral tributaries to Willow Creek, Hill Creek, and the Green River; and alluvial and bedrock groundwater.

3.2.3.1 Surface Water

Figure 3.2-3 shows the surface water features in the vicinity of the RBU Project Area. The RBU Project Area is primarily drained by Willow Creek and its ephemeral tributaries. Small portions

of the RBU Project Area also drain to Hill Creek and directly to the Green River. With the exception of Willow Creek, other streams in the RBU Project Area are ephemeral and only flow in direct response to rainfall events. These streams have developed a dendritic drainage pattern and are incised with rills and gullies typical of badland topography.

Stream Classification

All streams and water bodies in Utah are assigned to one or more of five classes by the Utah Water Quality Board (UWQB). All streams within the RBU Project Area are classified as Class 2B, 3A, and 4. Class 2B streams are protected for secondary contact recreation such as boating, wading, or similar uses. Class 3A streams are protected for cold water species of game fish and other cold water aquatic life. Class 4 streams are protected for agricultural uses including irrigation of crops and stock watering.

Stream Flow

The USGS formerly maintained two surface water gauging stations in the vicinity of the RBU Project Area on Willow Creek and Hill Creek. The locations of these stations are shown on **Figure 3.2-3**. The station on Willow Creek monitored the combined flow from both creeks. The Hill Creek station was only monitored for discharge until September 1981, and the Willow Creek station was only monitored until 1983, but these data are still useful for determining flow conditions for these streams. **Table 3.2-4** presents summary flow data for the two stations.

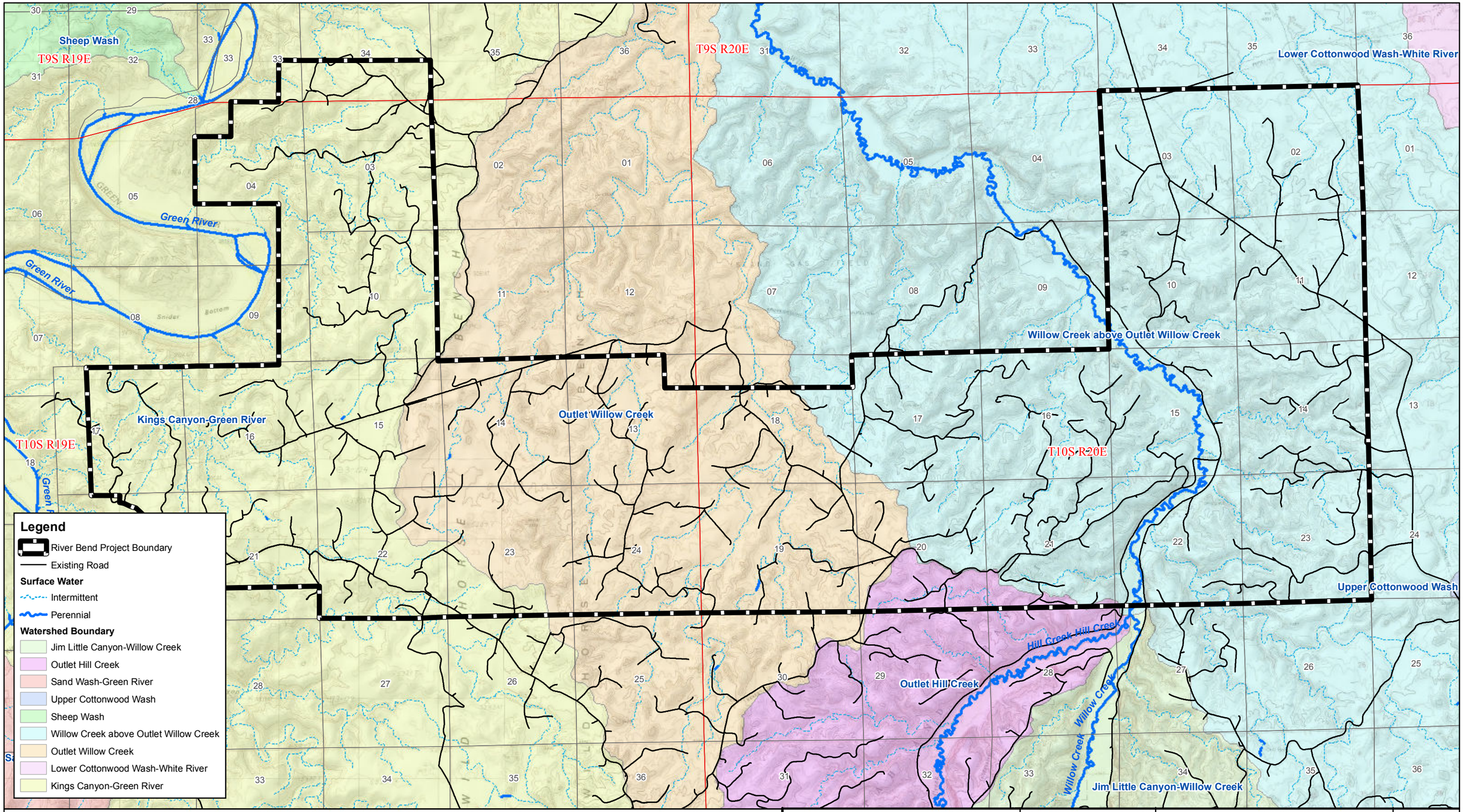
Monthly mean discharge measured at the Willow Creek station over the period of record ranged from 10.4 cubic feet per second (cfs) in September to 66.5 cfs in May. Fifty percent of all flows were greater than 16 cfs at this location, and zero flow was recorded 3.4 percent of the time. The mean monthly discharge measured on Hill Creek was much less and ranged from 0.67 cfs in September to 16.7 cfs in May. Hill Creek is frequently dry during the late summer and winter months. No flow was recorded 46 percent of the time at this station during the period of record.

Table 3.2-4. Historic Stream Flow Data for USGS Gauging Stations

USGS Gauging Station Name and Number	Range of Monthly Mean Discharge (cfs)	Peak Daily Discharge (cfs)	Mean Annual Discharge (cfs)	Period of Record
Willow Creek near Ouray, Utah 09308000	10.4 (September) to 66.5 (May)	500 (August 27, 1952)	25.6	July 1947 – September 1983
Hill Creek Mouth near Ouray, Utah 09307900	0.67 (September) to 16.7 (May)	88 (May 26, 1979)	5.40	October 1974 – September 1981

Surface Water Quality

Table 3.2-5 provides a summary of the historic water quality data available for Hill Creek and Willow Creek. Water quality data were collected at the two USGS gauging stations described above, but not since 1983.



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DRAWN BY:	N. Peace
CHECKED BY:	B. Norling
FILE NAME:	Resources.mxd

Surface Water Features

Riverbend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-3

Table 3.2-5. Historic Water Quality Data for Hill Creek and Willow Creek

Monitoring Station Name and Number	Parameters	Period of Record
Hill Creek Mouth near Ouray, Utah (USGS 09307900)	General Water Quality (alkalinity, hardness, pH, SC, TDS, TSS, temp, SAR), major ions (Ca, Mg, K, Na, HNO_3, Cl, F, SiO_2, ammonia, NO_2, NO_3, SO_4), trace metals (Al, As, Ba, B, Cu, Fe, Mn, Se, Sr, Zn)	February 1975 – November 1981
Willow Creek near Ouray, Utah (USGS 09308000)	General Water Quality (alkalinity, hardness, pH, SC, TDS, TSS, temp, SAR), major ions (Ca, Mg, K, Na, HNO_3, Cl, F, SiO_2, ammonia, NO_2, NO_3, SO_4), trace metals (Al, As, Ba, B, Cu, Fe, Mn, Se, Sr, Zn)	December 1950 – January 1955; October 1974 – September 1983
Willow Creek Near Ouray Above Conf w/ Green River (UDEQ 4933500)	General Water Quality (alkalinity, hardness, pH, DO, SC, TDS, TSS, temp, Turbidity), major ions (Ca, Mg, K, Na, HNO_3, Cl, ammonia, NO_2, NO_3, SO_4), trace metals (Al, As, Ba, B, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn)	August 1982 – May 1983; March 1995 – June 1996; August 2000 – April 2001; July 2005 – November 2008
Willow Creek 1.5 Miles Above Jim Little Canyon (UDEQ 4933524)	General Water Quality (alkalinity, hardness, pH, DO, SC, TDS, TSS, temp, Turbidity), major ions (Ca, Mg, K, Na, HNO_3, Cl, ammonia, NO_2, NO_3, SO_4), trace metals (Al, As, Ba, B, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn)	July 2006 – October 2007

Sources: USGS 2012, EPA 2012

The Utah Division of Environmental Quality (UDEQ) monitors and assesses Willow Creek on a regular basis to determine if the stream is supporting beneficial uses. Water quality data have been, and are currently being, collected from Willow Creek at UDEQ station 4933500 located downstream of the RBU Project Area near Ouray, Utah above the confluence with the Green River **(see Figure 3.2-3**). These data are stored in the EPA STORET database.

Table 3.2-6 provides a summary of the sample results for UDEQ station 4933500 for the period August 1982 to November 2008. Based on these data, the waters in Willow Creek are described as calcium-magnesium bicarbonate-sulfate type waters with high to very high hardness (260 to 700 mg/L as $CaCO_3$). Specific conductance values are similar to those recorded at USGS station 09308000. Total Dissolved Solids (TDS) range from 410 to 1,950 milligrams per liter (mg/L) and average 866 mg/L, in excess of the secondary standard of 500 mg/L. Total suspended solids (TSS) are highly variable and ranges from 14.4 mg/L to over 31,000 mg/L during the period of record. Ammonia, sulfate, aluminum, arsenic, and copper exceed the applicable standards for one or more samples each.

Willow Creek is listed on the Utah 2004 list of 303(d) impaired water bodies for TDS (UDEQ 2004). The majority of the elevated TDS in Willow Creek is due to erosion of the naturally saline geologic formations in the area, including the slightly to moderately saline Uinta Formation. Other potential sources of TDS in the watershed include irrigation return flows, erosion of unpaved road surfaces, and oil and gas activities.

3.2.3.2 Groundwater

The principal aquifers in the RBU Project Area include unconsolidated alluvial deposits along Willow Creek, sandstone layers within the Uinta Formation, and two deeper sandstone zones within the Green River Formation (Hood and Fields 1978; Schlotthauer et al. 1981). The alluvial

aquifers are usually unconfined whereas the consolidated aquifers are generally unconfined near outcrops and confined down dip.

Unconsolidated materials present in the valley fill along Willow Creek form the principal aquifer in the RBU Project Area. These deposits range in thickness from about 50 to 70 feet within the stream channels to about 200 feet near the mouths of major canyons. These alluvial aquifers can produce significant quantities of water (up to 1,000 gpm) from the floodplain deposits of the Green and White Rivers but generally produce lower quantities from deposits located along the ephemeral or intermittent streams (Hood and Fields, 1978; Schlotthauer et al. 1981). Other small areas of saturated alluvium may exist along the larger unnamed ephemeral streams in the area.

Table 3.2-6. Summary of Water Quality Analysis for Willow Creek, UDEQ Station 4933500

Parameters	Standards		Summary Statistics			
	Drinking Water	Aquatic Biota[3]	No. of Samples	No. of Detects	Range of Detects	Mean
General Water Quality Indicators						
Alkalinity as $CaCO_3$ (mg/L)			58	58	190 – 535	344
Dissolved Oxygen (mg/L)		>6.5	44	44	**5.1** – 19.52	9.53
pH	6.5 to 8.5[2]	6.5 to 9.0	103	103	8.10 – **9.15**	8.52
Hardness (mg/L)			52	52	260 – 700	396
Spec. Cond. (umhos/cm)			107	107	368 – 2,753	1,266
Temperature (^oC)			52	52	-0.26 – 24.7	11.1
Total Dissolved Solids (mg/L)	500[2]	1,200	58	58	410 – **1,950**	**866**
Total Suspended Solids (mg/L)		90	58	58	14.4 – **31,700**	**1,682**
Ionic Constituents (Total)						
Bicarbonate (mg/L)			58	58	232 – 650	398
Calcium (mg/L)			28	28	35 – 84	62.6
Chloride (mg/L)	250[2]		29	29	7.0 – 100	26.4
Magnesium (mg/L)			29	29	34.0 – 96.1	63.1
Ammonia (mg/L)		0.11 to 0.49[4]	30	10	0.05 – **0.121**	NC
Nitrite + Nitrate, total (mg/L)	10(1[5])	4	35	22	0.04 – 2.11	NC
Phosphate (mg/L)			96	93	0.01 – 1.42	0.31
Potassium (mg/L)			58	58	2.0 – 6.38	3.30
Sodium (mg/L)			29	29	66.0 - 458	195
Sulfate (mg/L)	250[2]		29	29	123 – **1,120**	**441**
Trace Metals (Dissolved)						
Aluminum (ug/L)	50 to 200[2]	750	7	7	30.6 **– 235**	93.3
Arsenic (ug/L)	10[1]	190	7	7	8.0 – **30.8**	**14.2**
Barium (ug/L)	2,000[1]	1,000	7	7	38.6 – 142	71.8
Cadmium (ug/L)	5	250	8	1	**62**	NC
Chromium (ug/L)	100[1]	74	7	0	--	NC
Copper (ug/L)	1300[1], 1000[2]	9	7	1	**13.5**	NC

Parameters	Standards		Summary Statistics			
	Drinking Water	Aquatic Biota[3]	No. of Samples	No. of Detects	Range of Detects	Mean
Iron (ug/L)	300[2]	1,000	7	7	33.2 – **393**	121
Lead (ug/L)	15[1]	2.5	7	0	--	NC
Manganese (ug/L)	50[2]		7	3	5.3 – 11.9	NC
Selenium (ug/L)	50[1]	5	7	3	1.1 – 2.9	NC
Silver (ug/L)	100[2]	1.6	7	0	--	NC
Zinc (ug/L)	5,000[2]	120	7	0	--	NC

Bold values exceed standards
NC = Mean not calculated due to undefined non-detect values in database
(1) Federal Drinking Water Primary Maximum Contaminant Level (MCL)
(2) Federal Drinking Water Secondary Standard (SMCL)
(3) Aquatic life (Utah Water Quality Standards, R317-2 Utah Administrative Code).
(4) Value is dependent on temperature and pH
(5) Federal Drinking Water Quality Standard is 1 mg/L for Nitrite and 10 mg/L for Nitrate
Source: EPA 2012.

Unconsolidated deposits of alluvium and gravel on mesa tops and ridges may also locally contain some groundwater.

The Uinta Formation covers the majority of the RBU Project Area and contains water-bearing zones within confined sandstone layers surrounded by fine-grained siltstones and mudstones. Two zones within the Green River Formation are considered to be regional aquifers. The Birds Nest Aquifer, which may be present beneath the RBU Project Area, lies between the upper part of the Parachute Creek Member and the Mahogany Oil Shale Zone. The Douglas Creek Member of the Green River Formation also produces water to some wells from fine- to medium-grained sandstone beds (Howells et al. 1987).

The Instruction Memorandum (IM) No. UT 2010-055, published by the U.S. Department of Interior – Bureau of Land Management, provides information and guidance for locating and evaluating potential usable groundwater zones. The IM supports Onshore Oil and Gas Order No. 1 drilling plan requirements outlined in Section III, D., 3. and surface use plan of operation requirements in Sec. III, D., 4.

The IM was utilized to determine if the RBU Project Area has the potential to impact private wells and usable groundwater zones identified as Sole Source Aquifers (SSAs) or Drinking Water Source Protection Zones (DWSPZs). Attachments K and L of the IM were reviewed to determine if the RBU Project Area overlies a SSA. To determine if the RBU Project Area is located in a designated DWSPZ, a UDEQ interactive map was referenced and the results of the review indicated that the RBU Project Area does not overlie a SSA. The nearest SSA (Castle Valley) is located approximately ninety (90) miles to the south. In addition, the RBU Project Area does not overlie or intersect a DWSPZ. The closest DWSPZ (T4) is located approximately thirty-five (35) miles to the north.

Groundwater Quality

There is limited information concerning the quality of groundwater in the RBU Project Area. Groundwater in unconsolidated alluvial aquifers in the southern Uinta Basin generally reflects the overall water quality of nearby streams, rivers, or recharge sources. Away from outcrop areas,

water quality generally is poorer and becomes much higher in dissolved solids with depth. TDS concentrations in the Uinta Formation are reported to range from 3,260 mg/L to 64,300 mg/L (Schlotthauer et al. 1981). The Bird's-Nest Aquifer generally produces water with TDS between 3,000 and 10,000 mg/L, but some water from the zone is unusable (TDS more than 10,000 mg/L). The TDS of water in the Douglas Creek aquifer is also generally between 3,000 and 10,000 mg/L.

Use of groundwater from the Uinta and Green River Formations is limited to livestock watering and industrial uses because of its poor quality in terms of TDSs and hardness.

3.2.3.3 Floodplains

The most recent data available regarding 100-year floodplains in the RBU Project Area are from a 1977 U.S. Department of Housing and Urban Development and Federal Emergency Management Agency survey, which inventoried public and State lands in Uintah County.

Mapped 100-year floodplains are located along Willow Creek to the north of the RBU Project Area, along the Green River, and the lower reaches of a series of unnamed ephemeral washes in the center of the RBU Project Area, as shown on **Figure 3.2-3**. These floodplains are generally located on benches above the current stream channels that were formed by deposition of sediment carried by runoff from the adjacent ridges and canyon walls during storm and snowmelt events. These floodplains support riparian vegetation in some areas, and are underlain by alluvial groundwater aquifers.

3.2.4 Paleontological Resources

The entire RBU Project Area is underlain by exposed bedrock of the Uinta and Green River formations. Exploration of these deposits for vertebrate fossils began over 130 years ago and is still active today. The Uinta Formation has documented occurrences of invertebrate fossils, plants, and trace fossils in the form of invertebrate burrows, bird and mammal tracks, and coprolites. The Green River Formation has documented occurrences of vertebrate and invertebrate fossils throughout the formation. Soils are generally less than 20 inches deep, and bedrock outcroppings are found throughout the RBU Project Area. However, the occurrence of fossils in both formations is sporadic and unpredictable. Therefore, both of these units are classified as Class 4a (high occurrence of scientifically important fossils with little or no soil or vegetative cover)

3.2.5 Cultural Resources

The Area of Potential Effect (APE) for the proposed undertaking is the RBU Project Area. A Class I cultural resource inventory was conducted within the proposed RBU Project Area, on public lands administered by the BLM VFO, the BIA, and SITLA. The objective of the inventory was to identify the extent of previous cultural resource investigations within the RBU Project Area and the number, locations, types, and significance of those previously documented cultural resources. The Class I data review is used to predict the type and potential site density of cultural resources and provides a basis for assessing the potential impact to archaeological sites in the event that lands are developed for oil and gas exploration or other surface-disturbing land uses.

3.2.5.1 Cultural Background

The cultural-chronological sequence in the RBU Project Area includes the Archaic stage (7000 B.C. to A.D. 400), which can be further subdivided into Early, Middle, Late, and Terminal periods; the Formative stage (A.D. 700 to A.D. 1250) (Matson, 1991), which is largely associated with the San Rafael Fremont in the RBU Project Area; the Protohistoric stage (A.D. 1200 to A.D. 1750), largely associated with Numic-speaking (Ute) peoples; and the historic period, which began with the arrival of Europeans in the eighteenth century.

3.2.5.2 Summary of Inventory Results

The Class I data-review resulted in the identification of 284 previous cultural resource inventories that have been conducted in the RBU Project Area. Most of the inventories were conducted during the permit process for oil and gas exploration and development, including seismic lines and well pad and pipeline construction. Of the 284 previous inventories, 251 (88 percent) resulted in a finding of no cultural resources. Thirty-three (12 percent) of these previous cultural resource inventories identified a total of 51 archaeological sites within the RBU Project Area (**Appendix D**). Of the 51 known archaeological sites that have been located within the RBU Project Area, 31 (61 percent) were evaluated to be eligible for listing on the NRHP, 18 (35 percent) were evaluated to be ineligible for listing on the NRHP, and two (0.04 percent) were not evaluated. These known archeological resources in the RBU Project Area are dominated by prehistoric sites (67 percent of the sites identified). Prehistoric site types within the RBU Project Area consist of lithic scatters, rock art, open camps, and rock shelters. Historic site types within the RBU Project Area consist of temporary camps, rock art, cairns, and Gilsonite mining sites.

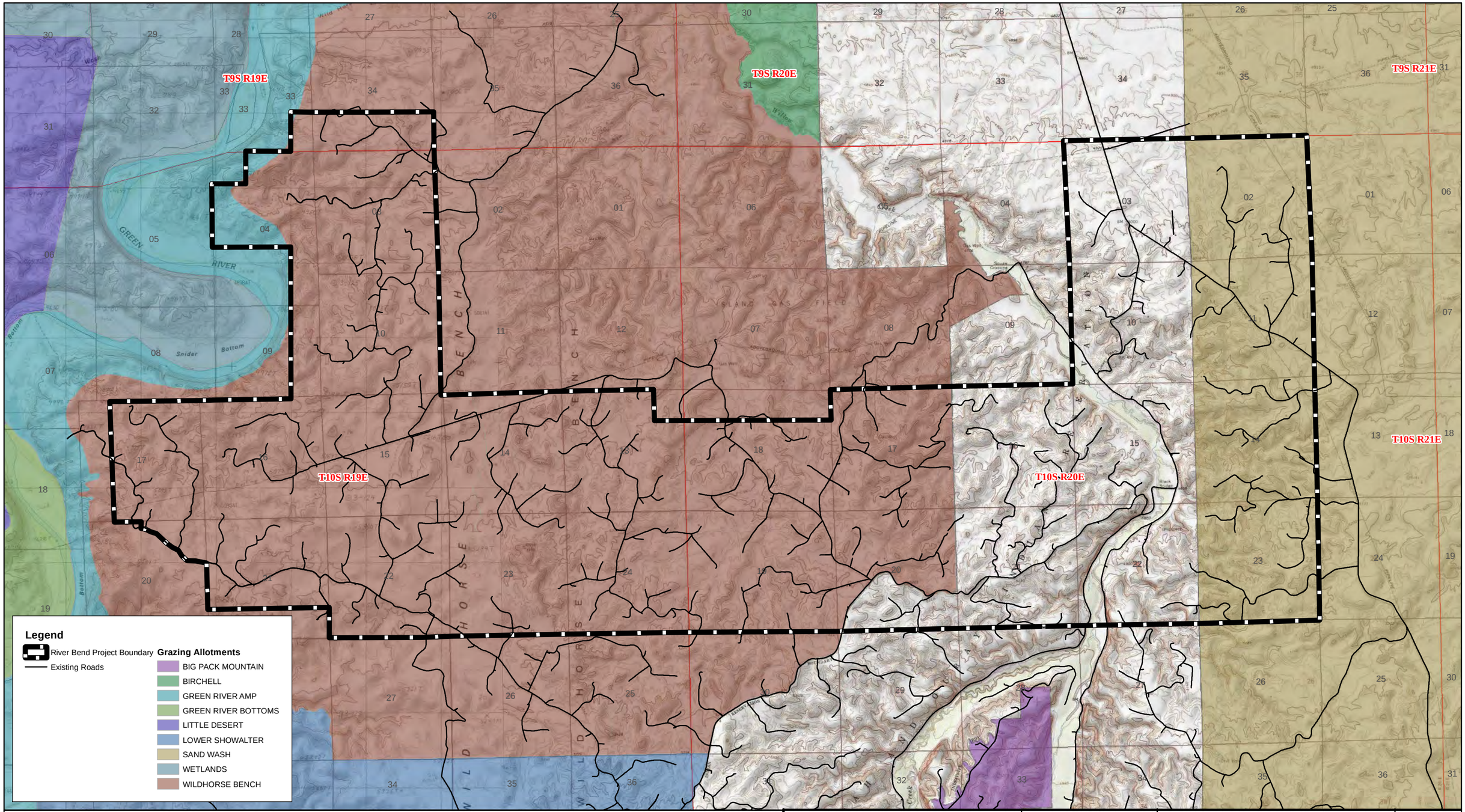
Based on the results of the Class I data review, predictions about site density, location, type, and sensitivity within the RBU Project Area can be made tentatively. Because inventories in the RBU Project Area have been done mostly in response to clearances required for individual projects, their findings may not be representative of the entire RBU Project Area. However, given the available information, we can anticipate that sites would most likely be associated with temporary use of the area during the prehistoric time period. The available documentation indicates that sensitive sites (eligible to the NRHP) having additional research potential may be common in the immediate study area.

3.2.6 Livestock Grazing

The RBU Project Area contains portions of three grazing allotments: Green River AMP, Sand Wash, and Wild Horse Bench Allotments. These three allotments in the RBU Project Area are grazed by sheep or cattle during various grazing periods. **Figure 3.2-4** provides a map of the grazing allotments that occur in the RBU Project Area. Livestock grazing also occurs throughout portions of the RBU Project Area on Tribal lands. Formal allotments and grazing seasons have not been identified on Tribal or private lands.

An animal unit month (AUM) is defined as “the amount of dry forage required by one animal unit for one month based on a forage allowance of 26 pounds per day” (BLM, 2008c). Between the three allotments, there are approximately 2,325 livestock AUMs on 12,635 acres of usable land allotted for grazing within the RBU Project Area.

All allotments have been placed in one of three management categories: Category M (Maintain Existing Resource Conditions), Category I (Improve Existing Resource Conditions) and Category



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N W E S

Mapping Reference:

Basemap from ESRI Online Maps.
Existing Well data from UDOGM.

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DRAWN BY:	N. Peace
CHECKED BY:	A. Antipas
FILE NAME:	Vegetation.mxd

Grazing Allotments

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-4

Table 3.2-7. Grazing Allotment Information in the RBU Project Area

Allotment Name	Type	Management Status	Use Period	Permitted AUMs Active	Permitted AUMs Suspended	Total Permitted AUMs	Total Allotment Acres	Usable[1] Allotment Acres within the RBU Project Area	Permitted AUMs[2] within the RBU Project Area
Green River AMP Allotment	Cattle	Improve	6/01 - 10/15	437	117	554	10,090	157	6
Sand Wash Allotment	Cattle	Maintain	11/30 - 04/30	4,526	1,350	5,876	74,424	2,592	160
Wild Horse Bench Allotment	Sheep	Improve	11/16 - 4/15	4,619	-	4,619	9,115	9,886	3,997
Total						**11,049**	**93,629**	**12,635**	**4,163**

Source: BLM, 2010
[1] Usable land is defined as land that has a slope lower than 40 percent.
[2] Allotment AUMs within the RBU Project Area were calculated using total permitted AUMs and total acreage for each grazing allotment.

C (Custodial Management). Designation of categories is dynamic and primarily based on resource potential, resource use conflicts, opportunity for positive economic return on public investments, and the present management situation (BLM, 2008c). Details on each allotment, including management categories, within the RBU Project Area are summarized in **Table 3.2-7.**

3.2.7 Vegetation Including Special Status Plant Species and Invasive or Noxious Weeds

3.2.7.1 General Vegetation

The plant communities encountered in the RBU Project Area consist of typical Intermountain Basin shrubland associations. These communities are often mixed, transitional, or widely distributed.

The vegetation communities are mapped and described using data and descriptions from the Southwest Regional Gap Analysis Project (SWReGAP) vegetation maps (Lowry et al. 2007) according to methodologies and nomenclature adopted by the U.S. National Vegetation Classification System (US-NVCS) (FGDC 1997). In this effort, a total of 14 vegetation communities are recognized and mapped within the RBU Project Area **(Figure 3.2-5) (Table 3.2-8).** These 14 vegetation types can be grouped into five general land cover types. In order of abundance, they are Scrub/Shrub, Grasslands/Herbaceous, Woody Wetland, Barren Lands, and Disturbed Land.

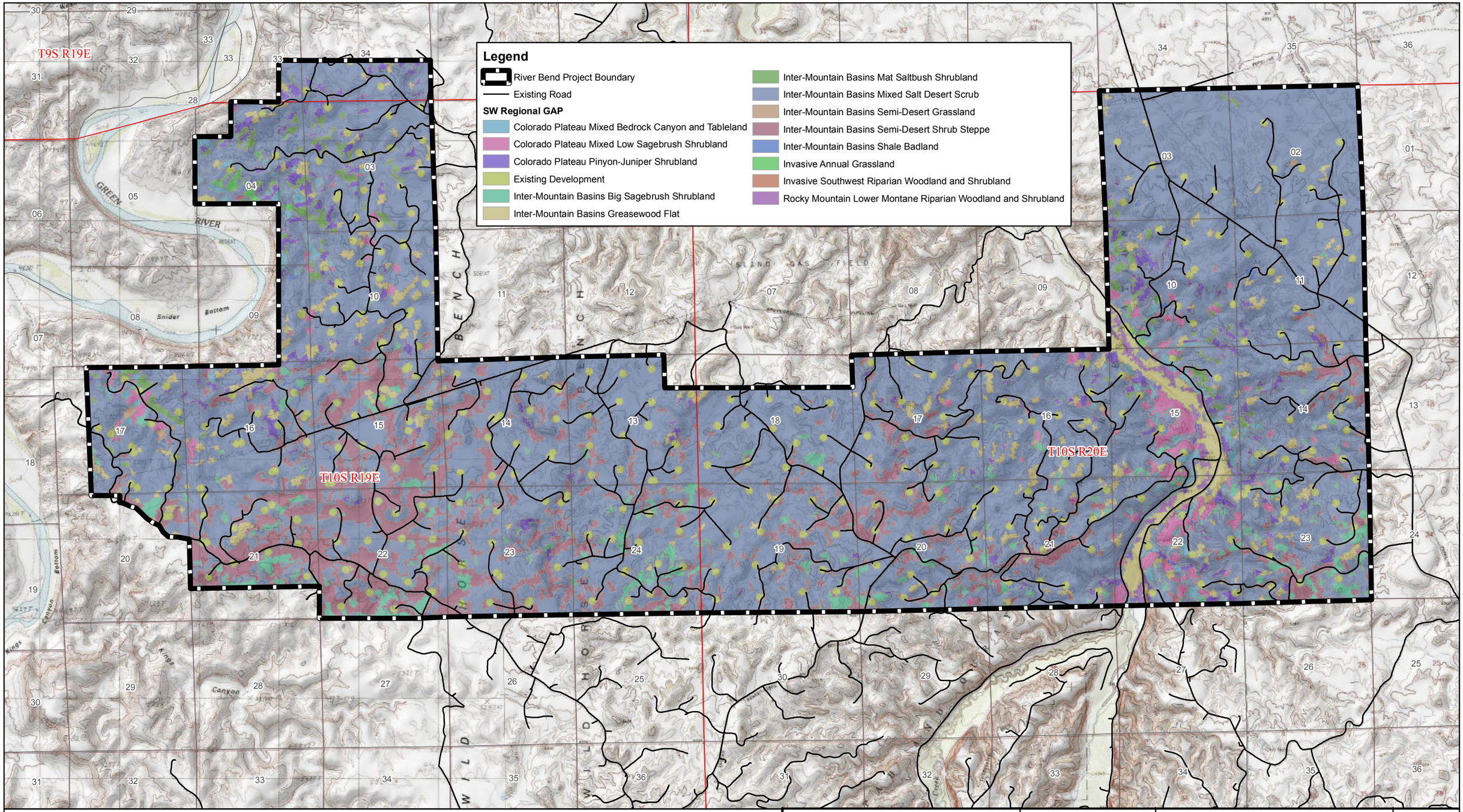
<u>Scrub/Shrub</u>

The Scrub/Shrub land cover type covers approximately 12,831 acres within the Project Area and includes five vegetation cover types: Colorado Plateau Mixed Low Sagebrush Shrubland; Colorado Plateau Pinyon-Juniper Shrubland; Inter-mountain Basins Big Sagebrush Shrubland; Intermountain Basins Mat Saltbrush Shrubland; and Inter-mountain Basins Mixed Salt Desert Scrub. The five scrub/shrub vegetation types that occur in the Project Area are described briefly below.

Colorado Plateau Mixed Low Sagebrush Shrubland - This vegetation cover type occurs in the Colorado Plateau, Tavaputs Plateau, and Uinta Basin in canyons, gravelly draws, hilltops, and dry flats at elevations generally below 6,000 feet amsl. Soils are often rocky, shallow, and alkaline. It includes open shrublands and steppe dominated by black sagebrush (*Artemisia nova*) or Bigelow sagebrush (*Artemisia bigelovii*) sometimes with Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). The Colorado Plateau Mixed Low Sagebrush Shrubland type covers 332 acres within the Project Area.

Intermountain Basins Big Sagebrush Shrubland - This vegetation cover type occurs throughout much of the western U.S., typically at elevations between 5,000 and 7,500 feet amsl in broad basins between mountain ranges, plains, and foothills. Soils are typically deep, well drained, and non-saline. These shrublands are dominated by Basin big sagebrush (*Artemisia tridentata ssp. Tridentata*) and/or Wyoming big sagebrush. Scattered Juniper spp., greasewood (*Sarcobatus vermiculatus*) and saltbush (*Atriplex* spp.) may be present in some stands. Rubber rabbitbrush (*Ericameria nauseosa*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), antelope bitterbrush (*Purshia tridentata*), or mountain snowberry (*Symphoricarpos oreophilus*) may codominate disturbed stands. The Inter-mountain Basins Big Sagebrush Shrubland type covers 534 acres within the Project Area.

Intermountain Basins Mat Saltbush Shrubland - This vegetation cover type occurs on gentle slopes and rolling plains on Mancos Shale in the northern Colorado Plateau and Uinta Basin and on arid, wind-swept basins and plains across parts of Wyoming. Substrates are shallow, typically saline, alkaline, fine-textured soils. These landscapes that typically support dwarf shrublands composed of relatively pure stands of saltbush such as mat saltbush (*Atriplex corrugate*) or Gardner's saltbush (*Atriplex gardneri*).



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Mapping Reference:

Basemap from ESRI Online Maps.
Existing Well data from UDOGM.

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DRAWN BY:	N. Peace
CHECKED BY:	B. Norling
FILE NAME:	Resources.mxd

Vegetation

Riverbend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-5

Table 3.2-8. Vegetation Communities within the RBU Project Area

Land Cover Type	Vegetation Community	Acres within the Project Area	Percent within the Project Area
Scrub/Shrub	Colorado Plateau Mixed Low Sagebrush Shrubland	332	2.0
	Intermountain Basins Big Sagebrush Shrubland	534	3.2
	Inter-Mountain Basins Mat Saltbush Shrubland	191	1.1
	Inter-Mountain Basins Mixed Salt Desert Scrub	11,328	67.8
	Colorado Plateau Pinyon-Juniper Shrubland	446	2.7
Total		**12,831**	**76.8**
Grasslands/ Herbaceous	Inter-Mountain Basins Semi-Desert Grassland	18	0.1
	Inter-Mountain Basins Semi-Desert Shrub Steppe	1,928	11.5
Total		**1,946**	**11.6**
Woody Wetland	Inter-Mountain Basins Greasewood Flat	694	4.2
	Rocky Mountain Lower Montane Riparian Woodland and Shrubland	62	0.4
Total		**756**	**4.6**
Barren Lands	Inter-Mountain Basins Shale Badland	59	0.4
	Colorado Plateau Mixed Bedrock Canyon and Tableland	241	1.4
Total		**300**	**1.8**
Disturbed	Invasive Annual Grassland	24	0.1
	Invasive Southwest Riparian Woodland and Shrubland	< 1	--
	Existing Development (i.e., roads, well pads, other surface facilities)	861	5.1
Total		**885**	**5.2**
Grand Total		**16,719**	**100.0**

Other dominant or codominant dwarf-shrubs may include longleaf wormwood (*Artemisia longifolia*), birdfoot sagebrush (*Artemisia pedatifida*), or bud sagebrush (*Picrothamnus desertorum*), sometimes with a mix of other low shrubs such as winterfat (*Krascheninnikovia lanata*) or shortspine horsebrush (*Tetradymia spinosa*). The Inter-mountain Basins Mat Saltbush Shrubland type covers 191 acres within the Project Area.

Intermountain Basins Mixed Salt Desert Scrub - This widespread shrub-steppe system is dominated by perennial grasses and forbs and occurs throughout much of the northern Great Basin and Wyoming. Soils are typically deep and nonsaline, often with a microphytic crust. Shrubs may increase following heavy grazing and/or with fire suppression. The vegetation is characterized by a typically open to moderately dense shrubland composed of one or more saltbush species such as shadscale saltbush (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), cattle saltbush (*Atriplex polycarpa*), or *Atriplex spinifera*. Other shrubs present to codominate may include Wyoming big sagebrush, yellow rabbitbrush, rubber rabbitbrush, Mormon tea (*Ephedra nevadensis*), spiny hopsage (*Grayia spinosa*), winterfat, bud sagebrush, or shortspine horsebrush. These shrublands and steppe habitats are the most prevalent vegetation community in the Project Area, covering approximately 11,328 acres, or 68 percent, of the Project Area.

Colorado Plateau Pinyon-Juniper Shrubland - This vegetation cover type occurs in dry mountains and foothills of the Colorado Plateau region including from the Western Slope of Colorado to the Wasatch Range. It is typically found at lower elevations ranging from 5,000 to 8,000 feet amsl. The vegetation is dominated by dwarfed (usually < 3 m tall) two-needle pinyon (*Pinus edulis*) and/or Utah juniper (*Juniperus osteosperma*) trees forming extensive tall shrublands in the region along low-elevation margins of pinyon-juniper woodlands. Other shrubs, if present, may include black sagebrush, Wyoming big sagebrush, yellow rabbitbrush, or blackbrush (*Coleogyne ramosissima*). This vegetation cover type covers 446 acres within the Project Area, and it occurs at higher elevations than Great Basin Pinyon-Juniper Woodland.

Grasslands/Herbaceous

The Grasslands/Herbaceous land cover type covers approximately 1,946 acres within the Project Area and includes two vegetation cover types: Intermountain Basins Semi-desert Shrub Steppe and Intermountain Basins Semi-desert Grassland. The two grasslands/herbaceous vegetation types that occur in the Project Area are described below.

Intermountain Basins Semi-desert Shrub Steppe - This vegetation cover type includes open-canopied shrublands of typically saline basins, alluvial slopes, and plains across the intermountain western U.S. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils, but they can include some coarser-textured soils. The vegetation is characterized by a typically open to moderately dense shrubland composed of one or more saltbush species, with a sparse to moderately dense herbaceous layer dominated by perennial grasses. Characteristic grasses include Indian ricegrass (*Achnatherum hymenoides*), blue grama (*Bouteloua gracilis*), saltgrass (*Distichlis spicata*), needle-and-thread grass (*Hesperostipa comate*), James' galleta (*Pleuraphis jamesii*), Sandberg bluegrass (*Poa secunda*), and alkali sacaton (*Sporobolus airoides*). Characteristic shrub species include fourwing saltbush, sand sagebrush (*Artemisia filifolia*), Greene's rabbitbrush (*Chrysothamnus greenei*), yellow rabbitbrush, rubber rabbitbrush, broom snakeweed (*Gutierrezia sarothrae*), and winterfat. Scattered Basin big sagebrush may be present but does not dominate. The Inter-mountain Basins Semi-Desert Shrub Steppe type covers 1,928 acres of the Project Area.

Intermountain Basins Semi-desert Grassland - This vegetation cover type occurs throughout the intermountain western U.S. on dry plains and mesas at approximately 4,750–7,600 feet in elevation. These grasslands occur in lowland and upland areas and may occupy swales, playas, mesa tops, plateau parks, alluvial flats, and plains, but sites are typically xeric. The dominant perennial bunch grasses and shrubs within this system are all very drought-resistant. These grasslands are typically dominated or codominated by Indian ricegrass, three-awn (*Aristida* spp.), blue grama, needle-and-thread grass, Torrey's muhly (*Muhlenbergia torreyana*), or James' galleta, and may include scattered shrubs and dwarf-shrubs of species of sagebrush, saltbush, blackbrush, snakeweed, or mulefat (*Baccharis salicifolia*). The Inter-mountain Basins Semi-Desert Grassland type covers 18 acres within the Project Area.

Woody Wetland

The Woody Wetland land cover type covers approximately 756 acres within the Project Area and includes two vegetation cover types: Inter-mountain Basins Greasewood Flat and Rocky Mountain Lower Montane Riparian Woodland and Shrubland. The two woody wetland vegetation types that occur in the Project Area are described below.

Inter-mountain Basins Greasewood Flat - This vegetation cover type occurs throughout much of the western U.S. in intermountain basins and extends onto the western Great Plains. It typically occurs near

drainages on stream terraces and flats or may form rings around more sparsely vegetated playas. Sites typically have saline soils and a shallow water table. They may flood intermittently but remain dry for most growing seasons. This vegetation cover type usually occurs as a mosaic of multiple communities, with open to moderately dense shrublands dominated or codominated by greasewood, fourwing saltbush, shadscale saltbush, or mulefat may be present to codominant. Occurrences are often surrounded by mixed salt desert scrub. The Inter-mountain Basins Greasewood Flat type occurs on 694 acres of the Project Area.

Rocky Mountain Lower Montane Riparian Woodland and Shrubland - This vegetation cover type is found in the foothills, canyon slopes, and lower mountains of the Rocky Mountains and on outcrops and canyon slopes in the western Great Plains. These shrublands occur between 5,000 and 9,500 feet amsl in elevation and are usually associated with exposed sites, rocky substrates, and dry conditions, all of which limit tree growth. Dominant trees may include boxelder (*Acer negundo*), narrowleaf cottonwood (*Populus angustifolia*), balsam poplar (*Populus balsamifera*), eastern cottonwood (*Populus deltoids*), Fremont cottonwood (*Populus fremontii*), Douglas-fir (*Pseudotsuga menziesii*), peachleaf willow (*Salix amygdaloides*), or Rocky Mountain juniper (*Juniperus scopulorum*). Dominant shrubs include Rocky Mountain maple (*Acer glabrum*), speckled alder (*Alnus incana*), water birch (*Betula occidentalis*), red osier dogwood (*Cornus sericea*), river hawthorn (*Crataegus rivularis*), stretchberry (*Forestiera pubescens*), chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), park willow (*Salix monticola*), Drummond's willow (*Salix drummondiana*), narrowleaf willow (*Salix exigua*), sandbar willow (*Salix irrorata*), shining willow (*Salix lucida*), or silver buffaloberry (*Shepherdia argentea*). The Rocky Mountain Lower Montane Riparian Woodland and Shrubland type occurs on 62 acres of the Project Area.

Barren Lands

The Barren Lands land cover type covers approximately 300 acres within the Project Area and includes two vegetation cover types: Intermountain Basins Shale Badland and Colorado Plateau Mixed Bedrock Canyon and Tableland. The two barren lands vegetation types that occur in the project area are described below.

Intermountain Basins Shale Badland - This widespread vegetation cover type of the intermountain western U.S. is composed of barren and sparsely vegetated substrates typically derived from marine shales, but it also includes substrates derived from siltstones and mudstones (clay) with a high rate of erosion and deposition. Landforms are typically rounded hills and plains that form a rolling topography. The harsh soil properties and high rate of erosion and deposition are driving environmental variables supporting sparse dwarf-shrubs, e.g., mat saltbush, Gardner's saltbush, birdfoot sagebrush, and herbaceous vegetation. The Intermountain Basins Shale Badland type covers 59 acres within the Project Area.

Colorado Plateau Mixed Bedrock Canyon and Tableland - The distribution of this vegetation cover type is centered on the Colorado Plateau where it is composed of barren and sparsely vegetated landscapes on steep cliff faces, narrow canyons, and open tablelands of predominantly sedimentary rocks, such as sandstone, shale, and limestone. The vegetation is characterized by very open tree canopy or scattered trees and shrubs with a sparse herbaceous layer. Common species includes two-needle pinyon, Ponderosa pine (*Pinus ponderosa*), Juniper species, littleleaf mountain mahogany (*Cercocarpus intricatus*), and other short-shrub and herbaceous species, utilizing moisture from cracks and pockets where soil accumulates. The Colorado Plateau Mixed Bedrock Canyon and Tableland type covers 241 acres of the Project Area.

Disturbed Land

The Disturbed Land cover type covers approximately 885 acres within the Project Area and includes three vegetation cover types: Invasive Annual Grassland, Invasive Southwest Riparian Woodland and Shrubland, and Existing Development. The Invasive Annual Grassland type covers approximately 24 acres within the Project Area. These areas are dominated by introduced annual grass species such as cheatgrass (*Bromus tectorum*) and California brome (*Bromus carinatus*). The Invasive Southwest Ripararian Woodland and Shrubland type covers < 1 acre and is dominated by tamarisk (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*). Existing development includes areas that are cleared of vegetation such as roads, well pads, and other surface features which cover an estimated 861 acres of the Project Area.

3.2.7.2 Invasive and Noxious Weeds

A "noxious weed" is defined as any plant the Utah Department of Agriculture commissioner determines to be especially injurious to public health, crops, livestock, land, or other property per the Utah Noxious Weed Act (Utah State Legislature 2007). Invasive weeds include plants that are not listed as noxious, but are not native to a particular area.

State and County listed noxious weeds are organized into three levels: A, B, and C. Class A weeds have a relatively low population size within the State and are highest priority, being an early detection and rapid response weed. Class B weeds have a moderate population throughout the State and are generally thought to be controllable in most areas. Class C weeds are found extensively in the State and are thought to be beyond control, and efforts would be towards containment of smaller infestations. **Table 3.2-9** summarizes those weeds designated and published as noxious for the State of Utah, under the Commissioner of Agriculture, Section 4-17-3, Utah Noxious Weed Act.

The most common locations for weeds include existing disturbance areas such as roadsides, well pads, pipelines, adjacent washes, and areas where grazing has removed native species. The most problematic noxious weeds in this area of Uintah County are saltcedar (*Tamarix ramosissima)* and hoary cress (*Cardaria draba)*. The most common invasive species (not listed on the noxious weed list for the area) in the RBU Project Area are Russian thistle (*Salsola iberica*), halogeton (*Halogeton glomeratus*), and cheatgrass (*Bromus tectorum*).

Table 3.2-9 Uintah County and State of Utah Noxious Weeds.

Common Name	Scientific Name	State or County Noxious Weed List
Black Henbane	*Hyoscyamus niger*	State List Class A
Diffuse Knapweed	*Centaurea diffusa*	State List Class A
Johnsongrass	*Sorghum halepense*	State List Class A
Leafy Spurge	*Euphorbia esula*	State List Class A
Medusahead	*Taeniatherum caput-medusae*	State List Class A
Oxeye Daisy	*Chrysanthemum leucanthemem*	State List Class A
Purple Loosestrife	*Lythrum salicaria*	State List Class A
St. Johnswort	*Hypericum perforatum*	State List Class A
Spotted Knapweed	*Centaurea maculosa*	State List Class A
Sulfur Cinquefoil	*Potentilla recta*	State List Class A
Yellow Starthistle	*Centaurea solstitialis*	State List Class A

Common Name	Scientific Name	State or County Noxious Weed List
Yellow Toadflax	*Linaria vulgaris*	State List Class A
Bermudagrass	*Cynodon dactylon*	State List Class B
Dalmation Toadflax	*Linaria genistifolia*	State List Class B
Dyer's Wood	*Istatis tinctoria*	State List Class B
Hoary Cress	*Cardaria draba*	State List Class B
Perennial Pepperweed	*Lepidium latifolium*	State List Class B
Poison Hemlock	*Conium maculatum*	State List Class B
Russian Knapweed	*Centaurea repens*	State List Class B
Squarrose Knapweed	*Centaurea virgata*	State List Class B
Scotch Thistle	*Onopordum acanthium*	State List Class B
Canada Thistle	*Cirsium arvense*	State List Class C
Field Bindweed	*Convolvulus arvensis*	State List Class C
Houndstongue	*Cynoglossum officiniale*	State List Class C
Quackgrass	*Elytrigia repens*	State List Class C
Saltcedar	*Tamarix ramosissima*	State List Class C
Common Teasel	*Dipsacus fullonum*	Uintah County List A
Puncturevine	*Tribulus terrestris*	Uintah County List B
Russian Olive	*Elaeagnus angustifolia*	Uintah County List C

3.2.7.3 Special Status Plant Species

Special status plant species include those listed as threatened or endangered under the ESA of 1973, as amended, species proposed for listing, species of special concern and other species identified either by the USFWS, BLM, Utah Natural Heritage Program (UNHP), or Utah Native Plant Society (UNPS) as unique or rare, and which have the potential to occur within the RBU Project Area and surrounding region.

Based on examination of USFWS, UNHP, and BLM data, two Federally-listed plant species are known to occur or have potential to occur within the RBU Project Area: the Uinta Basin hookless cactus (*Sclerocactus wetlandicus*) and clay reed-mustard (*Schoenocrambe argillacea*). Refer to the "Summary of Potential Occurrences of Special Status Plant Species" (**Appendix E**) for an analysis of all special status plant species potentially occurring in the VFO area and their potential to occur in the RBU Project Area.

<u>Uinta Basin Hookless Cactus</u>

The Uinta Basin hookless cactus (*Sclerocactus glaucus*) was listed as threatened under the ESA in 1979. Recently, the Uinta Basin hookless cactus has been reclassified and three species, which were collectively recognized as Uinta Basin hookless cactus during the time of its listing, are now recognized separately; Colorado hookless cactus (*S. glaucus*), Pariette cactus (*S. brevispinus*) and Uinta Basin hookless cactus (*S. wetlandicus*). Of these three species, *S. wetlandicus* has the potential to occur in the RBU Project Area and is analyzed in this EA.

Information on the habitat requirements and distribution of this species has been rapidly changing as more studies and surveys are conducted in the Uinta Basin. Currently, it is known to occur on Quaternary and Tertiary alluvium soils overlain with cobbles and pebbles of the Duchesne River, Green River, and

Mancos Formations between 4,500 to 6,600 feet in elevation (BLM 2008; UNPS 2006). It is found on the gravelly hills and terraces on river benches, valley slopes, and rolling hills along the Green, White, and Duchesne rivers. Preferred habitat is generally associated with Pleistocene outwash terraces with coarse-textured, alkaline soils overlain by a surficial pavement of large, smooth, rounded cobble. It can be found in a range of vegetative communities including clay badlands, salt desert shrub, and pinyon-juniper. Associated species include black sagebrush, shadscale saltbush, James' galleta, and Indian ricegrass.

Approximately 15,896 acres of USFWS designated potential habitat for the Uinta Basin hookless cactus has been identified within RBU Project Area **(Figure 3.2-6)**. This habitat was derived using observed populations and other variables (e.g., aspect, soil, and formations), and will be refined over time as additional surveys are conducted. Within designated potential habitat for the Uinta Basin hookless cactus, the USFWS has proposed *Sclerocactus wetlandicus* and *S. brevispinus* core conservation areas and management recommendations in response to the ongoing energy development in the Uinta Basin. The purpose of the proposed core conservation areas and management recommendations is to protect the most important populations or sub-populations, and ensure survival and recovery of both *Sclerocactus* species. Areas where cactus numbers are known to be highly concentrated (most dense per unit area) are classified as Level 1 core conservation areas. As proposed, the most restrictive conditions for oil and gas development would occur in Level 1 areas, where no new surface disturbance would be allowed. In Level 2 areas, existing surface disturbance would not be allowed to exceed 5 percent of the total designated area and surface well density cannot exceed 4 wells per section. Approximately 251 and 1,156 acres of Level 1 and 2 core conservation areas occur in the RBU Project Area, respectively. It is important to note that at the time this document was developed, these proposed measures are interim management recommendations that have not been finalized or formally adopted as standard mitigation practices by the BLM.

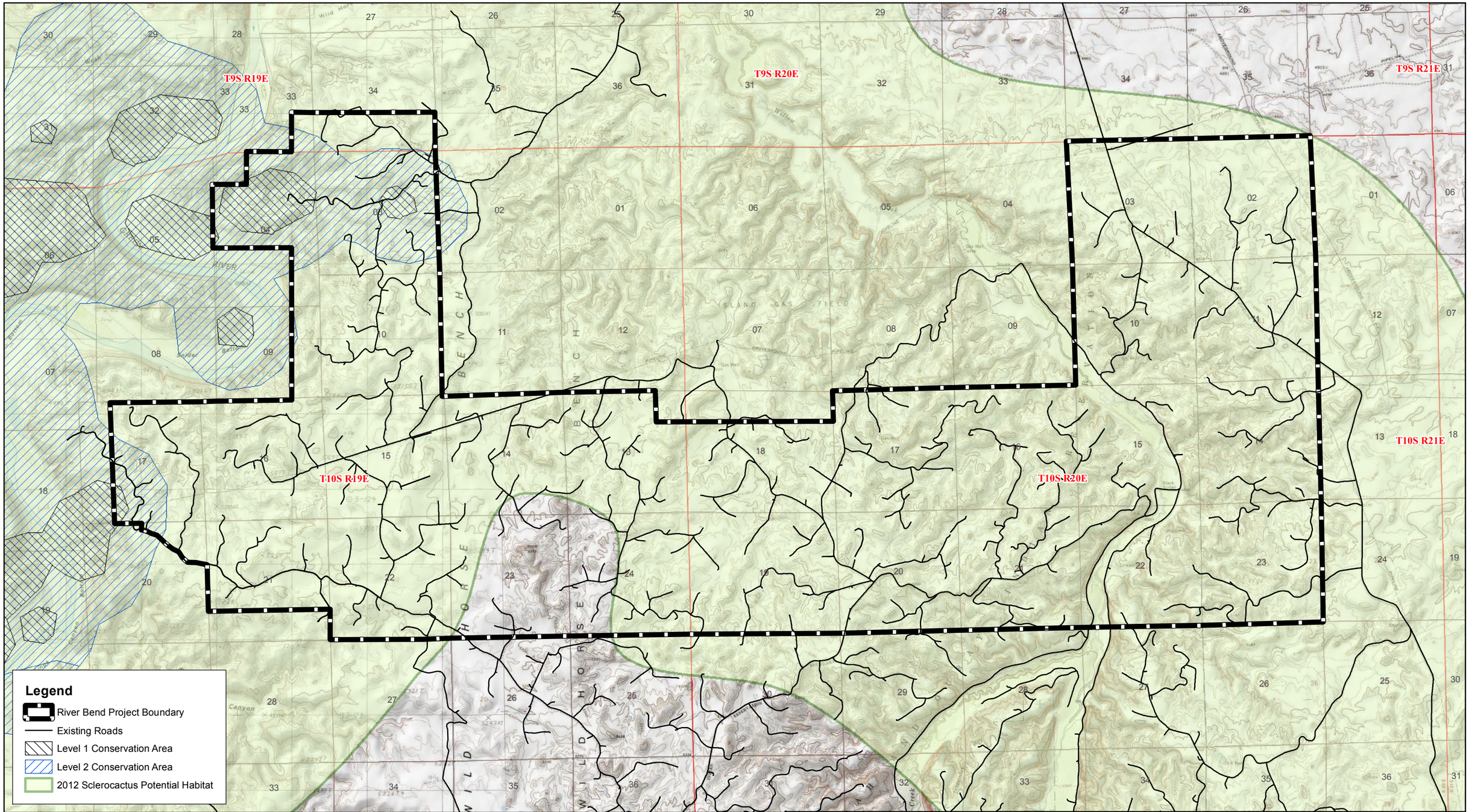
Clay Reed-Mustard

Clay reed-mustard (*Schoenocrambe argillacea*) is a Federally-threatened perennial herbaceous plant that is endemic to the Uinta Basin in Uintah County, Utah. Clay reed-mustard typically grows on steep, north-facing slopes with fine textured soil overlain with sandstone talus derived from the zone of contact between the Green River and Uinta Formations. More specifically, the species has been documented below the rocky contact zone of the Uinta Formation and the Evacuation Creek Member at elevations ranging from 4,700 to 5,800 feet amsl (UNHP-UDWR 2007). Clay reed-mustard is associated with the mixed desert shrub community. Dominating shrub species associated with clay reed-mustard populations include Utah serviceberry (*Amelanchier utahensis*), black sagebrush, Castle Valley clover (*Atriplex gardneri cuneata*), shadscale, and green rabbitbrush (UNHP-UDWR 2007).

Known populations of clay reed-mustard occur in the central portion of Uintah County, with portions of several populations extending onto the Uintah and Ouray Indian Reservation. The species has the potential to occur within the western portion of RBU Project Area where the geological formations and soils associated with this species are found. BLM data include occupied habitat in the southwest corner of the Project Area, which was identified in 1991. Population count information is not available for this area.

Spanish Bayonet

Spanish bayonet *(Yucca sterilis)* is a perennial shrub/subshrub in the Agavaceae family. The species is a BLM sensitive plant species, and is also known as a rhizomatous subspecies of the *Yucca harrimaniae*. The species has been collected while in flower, but is not known to produce fruit. *Y. sterilis* grows in the lower elevations of Duchesne and Uintah Counties in salt and mixed desert shrub vegetation communities. There is potential for the species to occur in the RBU Project Area.



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Uinta Basin Hookless Cactus Habitat

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-6

3.2.8 Fish and Wildlife Including Special Status Species

3.2.8.1 Wildlife Habitats

The Project Area and surrounding region support a variety of natural vegetation communities and landscape features that offer a diversity of wildlife habitat types. While these habitat types correspond with the vegetation community types discussed in **Section 3.2.7** above, they are also defined by a number of distinct landscape features such as washes and gullies, rock outcrops and hillsides, cliffs and taluses, and cave and mine entrances. All contribute to the diversity and abundance of wildlife in the area as they generally provide a microhabitat for wildlife uniquely adapted to or dependent on, these features. Although the RBU Project Area comprises approximately 16,719 acres, past oil and gas development has highly fragmented wildlife habitats in the area.

3.2.8.2 General Wildlife

Small mammals potentially found within the RBU Project Area and surrounding region include the cottontail rabbit (*Sylvilagus* spp.), black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), western spotted skunk (*Spilogale gracilis*), and various species of rodents and bats. Bird species that may be present include the black-throated sparrow (*Amphispiza bilineata*), Say's phoebe (*Sayornis saya*), ferruginous hawk (*Buteo regalis*), Brewer's sparrow (*Spizella breweri*), sage sparrow (*Amphispiza belli*), grasshopper sparrow (*Ammodramus savannarum*), and horned lark (*Eremophila alpestris*). Herptiles potentially found in the region include the wandering garter snake (*Thamnophis elegans vagrans*), Great Basin gopher snake (*Pituophis catenifer deserticola*), milksnake (*Lampropeltis triangulum*), Great Basin spadefoot toad (*Scaphiopus intermontana*), western whiptail (*Cnemidophorus tigris*), sagebrush lizard (*Sceloporus graciosus*), and shorthorned lizard (*Phymosoma douglassii*).

Although all of these species are important members of wildland ecosystems and communities, most are common and have wide distributions within the region. Consequently, the relationship of most of these species to the proposed project is not discussed in the same depth as species that are threatened, endangered, sensitive, of special economic interest, or are otherwise of high interest or unique value.

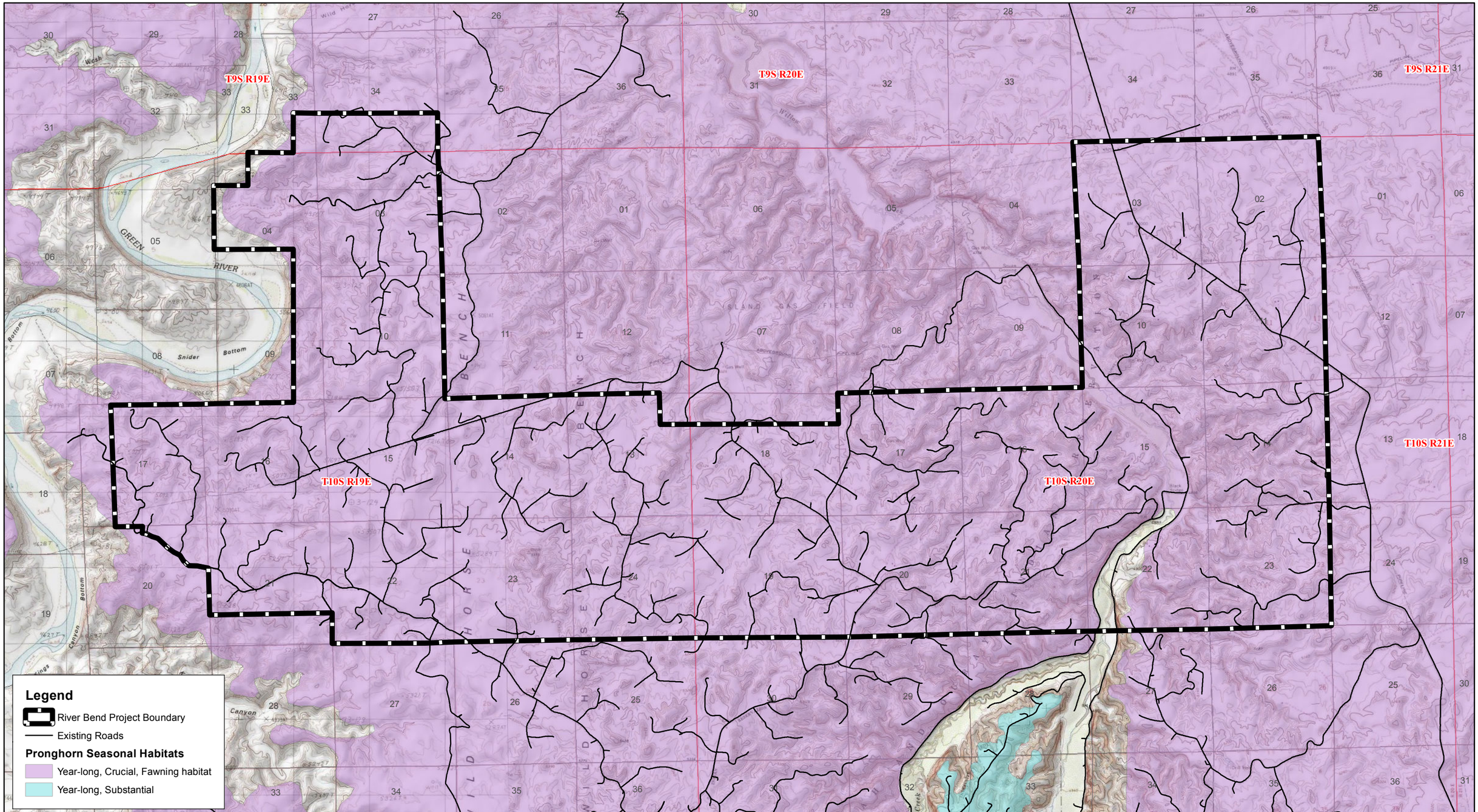
3.2.8.3 Big Game

Three resident big game species are known to occur in the RBU Project Area: pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), and Rocky Mountain bighorn sheep (*Ovis canadensis*).

<u>Pronghorn Antelope</u>

Pronghorn antelope occupy the majority of the RBU Project Area on a year-round basis. The UDWR has identified approximately 16,478 acres of the RBU Project Area as crucial value, year-long fawning pronghorn habitat (**Figure 3.2-7**). Pronghorn that occupy the RBU Project Area are considered to be a part of the Book Cliffs pronghorn herd unit (Herd Unit #10). The Book Cliffs pronghorn herd unit had a 2010 pre-season population of approximately 244 animals, which is 46 percent below the objective for this population. Pre-hunt production ratios in 2010 ranged from 23 to 44 fawns per 100 does for the Book Cliffs-Bitter Creek subunit and Book Cliffs-South subunit, respectively (Bernales et al. 2010).

Although most leases in the RBU Project Area do not contain stipulations other than the standard lease terms at the time of issuance, one Federal lease, U-76500, contains a notice that seasonal restrictions may be implemented during the antelope kidding season (May 15 through June 20).



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Pronghorn Seasonal Ranges

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-7

Mule Deer

Mule deer occupy the Green River corridor, located west of the RBU Project Area, on a year-round basis. The UDWR has identified only a small area (approximately 149 acres) in the western portion of the RBU Project Area as year-long, crucial value fawning habitat (**Figure 3.2-8**). Mule deer numbers in the RBU Project Area are low and mainly occur along the Green River. Mule deer that occupy the RBU Project Area are part of the Book Cliffs mule deer herd unit (Herd Unit #10). The Book Cliffs mule deer herd unit had a 2010 winter population estimate of 7,000 animals, which is approximately 53 percent below the objective for this population. Pre-hunt production ratios in 2010 were 47 fawns per 100 does, which was slightly above the three year average of 41 from 2008 to 2010 (Bernales et al. 2010).

Rocky Mountain Bighorn Sheep

In the RBU Project Area, Rocky Mountain bighorn sheep intermittently occupy (both spatially and temporally) the Willow Creek and Green River corridors on a year-round basis. Bighorn sheep in this area are not native but instead were introduced onto the Ouray Indian Reservation. No management objectives exist for this Rocky Mountain bighorn sheep Tribal population (UNHP-UDWR 2008). The UDWR has identified approximately 6,806 acres of year-long, crucial value bighorn sheep habitat in the western and eastern portions of the RBU Project Area (**Figure 3.2-9**).

3.2.8.4 Migratory Birds

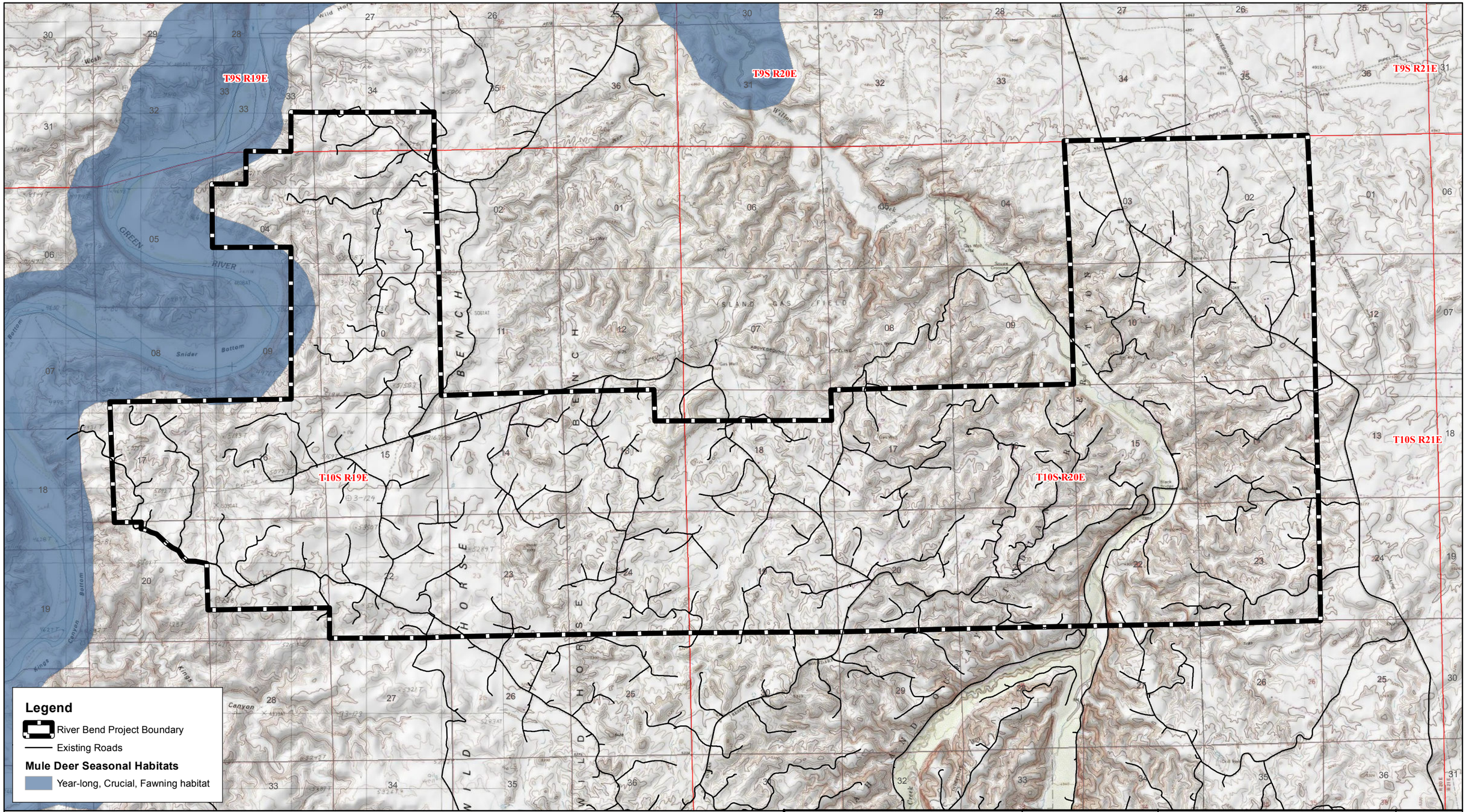
The western portion of the RBU Project Area along the Green River has been designated by the Utah Steering Committee (USC) as a Bird Habitat Conservation Area (BHCA) (USC 2005). Bird Habitat Conservation Areas are intended to identify areas where bird habitat conservation projects may take place, predicated on concurrence, collaboration, and cooperation with all landowners involved; however, BHCAs have no official status (USC 2005). The BHCA that occurs in the RBU Project Area is the Green River BHCA (BHCA #37), which includes the lowland riparian priority habitat type and extends from the town of Ouray, north of the RBU Project Area, south to the fork of the Colorado River.

Migratory bird species that may utilize the RBU Project Area are listed below based on preferred habitats (i.e., nesting and foraging habitats) and vegetative communities present in the area. Those migratory bird species (including special status raptor species) that are Federally-listed are candidates for Federal listing under the ESA, or are State sensitive are addressed in **Section 3.2.8.6**, Utah Partners in Flight [2]Priority Species are denoted by an asterisk (*). Non-special status raptor species are addressed in **Section 3.2.8.5**.

Intermountain Basins Mat Saltbush Shrubland, Intermountain Basins Mixed Salt Desert Scrub, and Colorado Plateau Pinyon-Juniper Shrubland - The following migratory bird species may be associated with these scrub/shrub communities, which comprise the largest proportion of vegetation within the RBU Project Area: black-throated sparrow (*Amphispiza bilineata*), black-chinned hummingbird* (*Archilochus alexandri*), common yellowthroat (*Geothlypis trichas*), Lewis's woodpecker (*Melanerpus lewis*), gray flycatcher* (*Empidonax wrightii*), western kingbird (*Tyrannus verticalis*), green-tailed towhee (*Pipilo chlorurus*), northern mockingbird (*Mimus polyglottos*), Say's phoebe (*Sayornis saya*), ferruginous hawk* (*Buteo regalis*), and prairie falcon (*Falco mexicanus*).

Intermountain Basins Big Sagebrush Shrubland and Colorado Plateau Mixed Low Sagebrush Shrubland - Although the following birds are often associated with these vegetation communities, they may also use

[2] Utah Partners-in-Flight is a cooperative partnership among Federal, State, and local government agencies as well as public organizations and individuals organized to emphasize the conservation of birds not covered by existing conservation initiatives.



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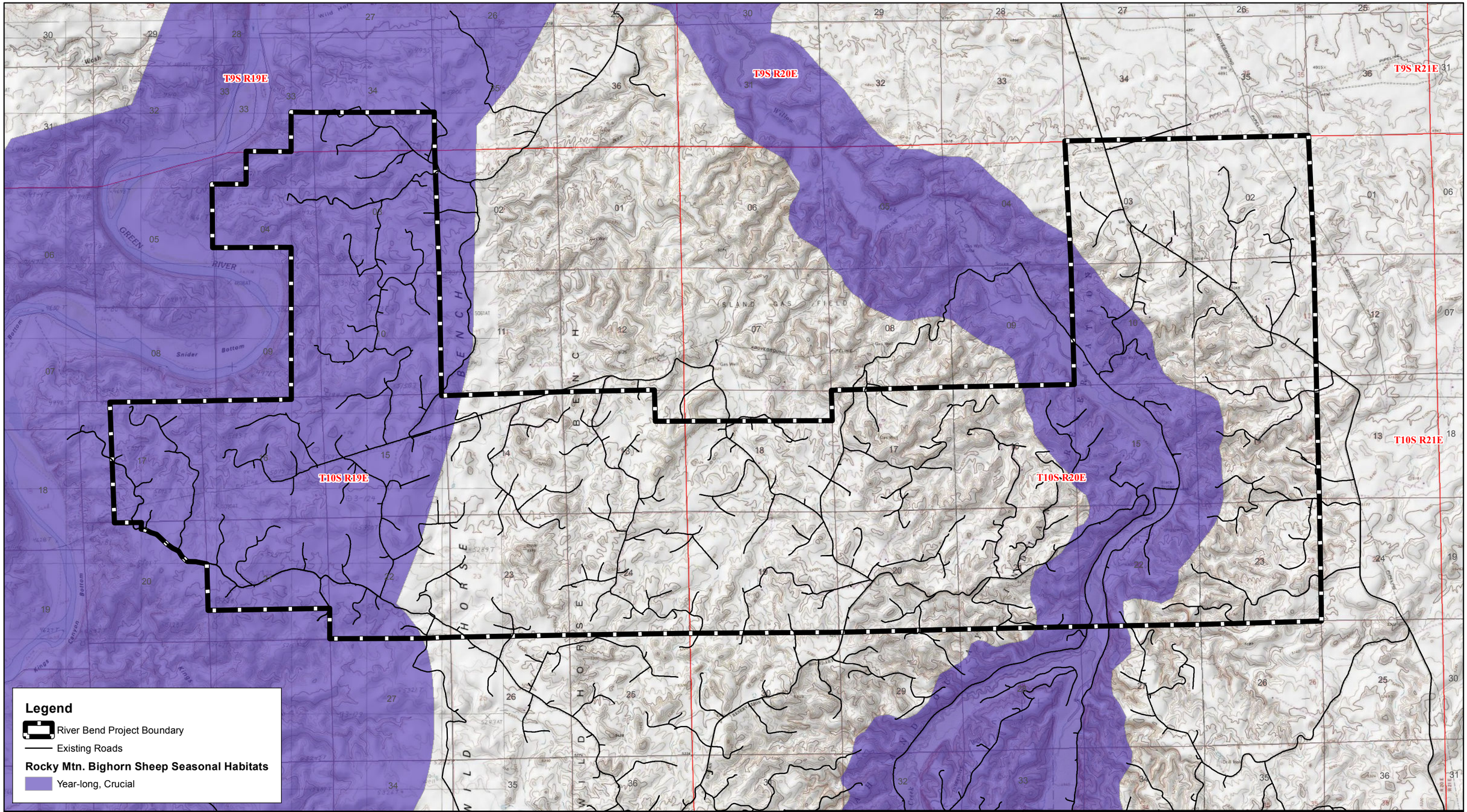
Mule Deer Seasonal Ranges

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-8



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Rocky Mountain Bighorn Sheep Seasonal Ranges

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-9

other scrub/shrub vegetation communities as well: Brewer's sparrow* (*Spizella breweri*), mountain bluebird (*Sialia currucoides*), sage sparrow* (*Amphispiza belli*), grasshopper sparrow* (*Ammodramus savannarum*), horned lark (*Eremophila alpestris*), greater sage-grouse* (*Centrocercus urophasianus*), sage thrasher (*Oreoscoptes montanus*), and vesper sparrow (*Pooecetes gramineus*).

Inter-Mountain Basins Shale Badland and Colorado Plateau Mixed Bedrock Canyon and Tableland - Although these birds may forage in other vegetation communities, the following migratory birds may utilize the badland and rock outcrop areas in the RBU Project Area: canyon wren (*Catherpes mexicanus*), barn swallow (*Hirundo rustica*), cliff swallow (*Hirundo pyrrhonota)*, common raven (*Corvus corax*), and rock wren (*Salpinctes obsoletus*).

3.2.8.5 Raptors

The RBU Project Area supports habitat for territories, nests, and/or roosting sites for numerous species of raptors. Nest sites could occur on rock outcrops, on taller shrubs, or in trees. **Table 3.2-10** provides the raptor species with the potential to occur in or near the RBU Project Area, and a description of their typical nesting habitats.

Table 3.2-10. Raptor Species with the Potential to Occur In or Near the RBU Project Area

Common Name	Scientific Name	Nesting Habitats
American Kestrel	*Falco sparverius*	Holes in tree cavities, cliff crevices
Bald Eagle	*Haliaeetus leucocephalus*	Large trees near rivers, lakes, marshes, or other wetland areas
Burrowing Owl	*Athene cunicularia*	Mammal burrows, typically prairie dog colonies
Cooper's Hawk	*Accipiter cooperii*	Woodland and riparian zones
Ferruginous Hawk	*Buteo regalis*	Trees and shrubs, cliffs, utility structures, and rock outcrops
Golden Eagle	*Aquila chrysaetos*	Cliff ledges and rock outcrops
Great-horned Owl	*Bubo virginianus*	Cliff ledges or nests of other species
Northern Harrier	*Circus cyaneus*	Ground within thick vegetation
Peregrine Falcon	*Falco peregrinus*	Cliff ledges
Prairie Falcon	*Falco mexicanus*	Cliff ledges
Red-tailed Hawk	*Buteo jamaicensis*	Cliff ledges, rock outcrops, aspen, pinyon-juniper woodlands
Short-eared Owl	*Asio flammeus*	Typically a ground nester.
Swainson's Hawk	*Buteo swainsoni*	Nest in trees in or near open areas.
Turkey Vulture	*Cathartes aura*	Rock outcrops, caves, and tree cavities

All raptor species and their nests are protected from take or disturbance under the MBTA of 1918 (16 U.S.C. 703 et seq.); however, because golden eagles, bald eagles, and burrowing owls are considered to be special status raptor species, they are discussed in further detail in **Section 3.2.8.6**.

3.2.8.6 Special Status Wildlife Species

This section discusses wildlife species that have a special-status designation, which includes:

- Species Federally-listed as threatened or endangered, proposed for Federal listing as threatened or endangered, or considered to be a candidate for Federal listing as threatened or endangered under the ESA, or listed as sensitive by the BLM;

- Species listed as sensitive by the UDWR, including both wildlife species of concern and species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing; and
- Species protected under certain specified regulations.

Special status wildlife species that have the potential to occur within the RBU Project Area or be affected by development activities within the RBU Project Area are discussed below. Refer to the "Summary of Potential Occurrence of Special Status Wildlife Species" (**Appendix E**) for an analysis of all special status wildlife species found in the VFO area and their potential to occur in the RBU Project Area.

White-tailed Prairie Dog

The white-tailed prairie dog (*Cynomys leucurus*) is listed by the BLM as a sensitive species and is also listed as a UDWR Wildlife Species of Concern (Tier II species in the Utah CWCS). The USFWS was petitioned in May 2010 to federally list the white-tailed prairie dog as threatened or endangered under the ESA, but subsequently decided that the petition was not warranted.

Colonies of this species occur primarily in mountain valleys, semi-desert grasslands, and open shrublands (Fitzgerald et al. 1994). They are distributed in relatively large, sparsely populated complexes and live in loosely knit clans (UDWR 2006). In Utah, the white-tailed prairie dog occurs predominantly in the Uinta Basin and the northern part of the Colorado Plateau. This species is the main food source of the endangered black-footed ferret (Fitzgerald et al. 1994).

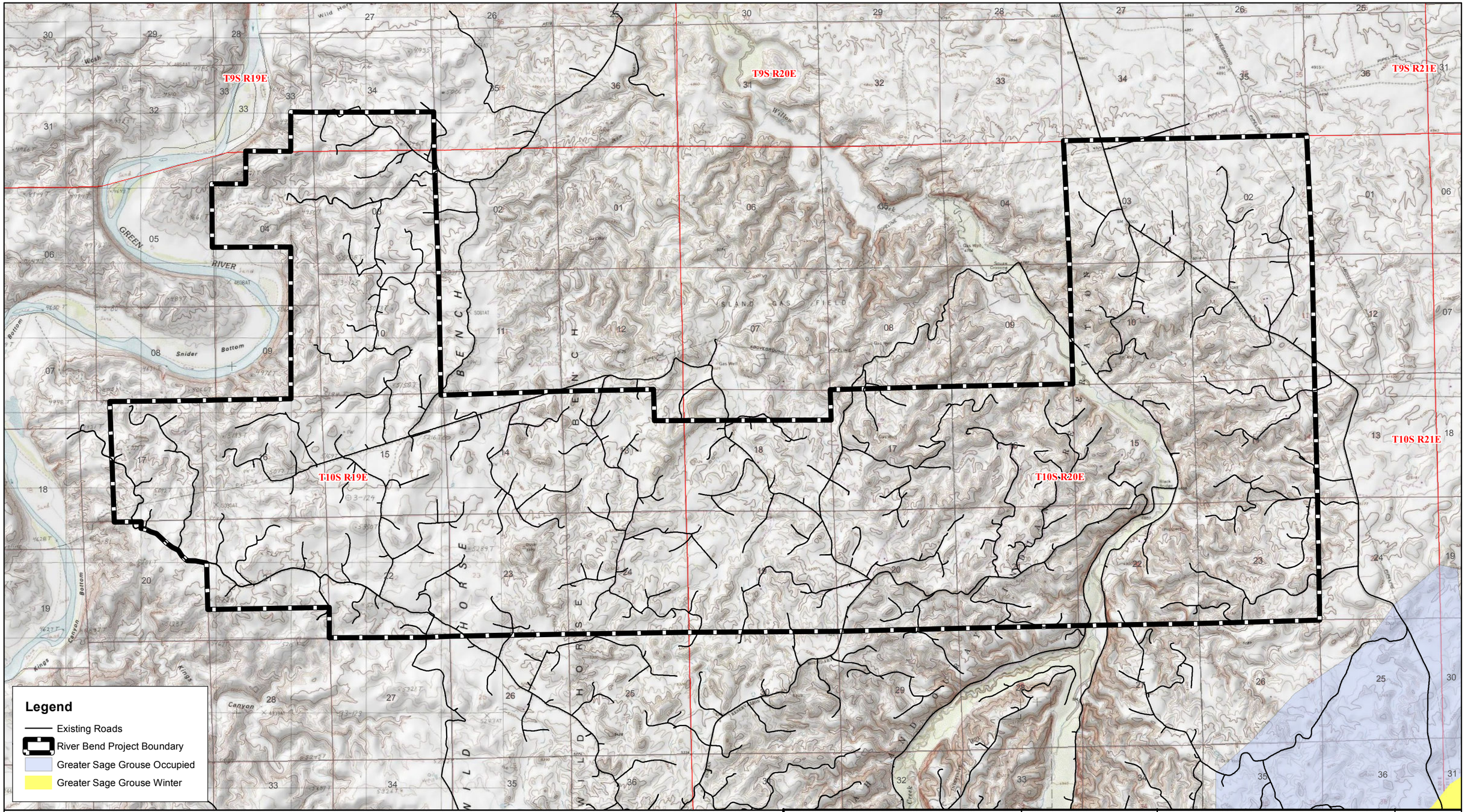
While white-tailed prairie dogs are likely to be present within portions of the Project Area, UDWR and the BLM have not conducted prairie dog colony surveys or burrow density estimates for white-tailed prairie dog colonies within the entire RBU Project Area boundary.

Greater Sage Grouse

As of March 5, 2010, the greater sage grouse (*Centrocercus urophasianus*) is a candidate for listing under the ESA (75 FR 13910-13958). This means the species does not receive statutory protection under the ESA and individual states currently retain responsibility for managing the bird (USFWS 2010). However, the USFWS will review the status of the species annually to determine whether it warrants more immediate action (USFWS 2010).

The BLM Washington Office Instruction Memorandum (IM) No. 2012-043 and 2012-044 (BLM 2012) supplements the BLM's 2004 National Strategy for sage-grouse and identifies those management actions necessary to sustain sage-grouse populations while also achieving the Department of the Interior's energy-related priorities. Priority habitat, which is the habitat of highest conservation value relative to maintaining suitable sage-grouse populations range-wide, has not yet been identified by the UDWR using a consistent methodology. The Governor's task force is in the process of identifying the preliminary priority habitat and the preliminary general habitat in accordance with IM 2012-044. In the meantime, the BLM is using UDWR identified occupied sage grouse habitat as preliminary priority habitat. The nearest preliminary priority habitat is located approximately 0.4 mile southeast of the southeast corner of the Project Area.

No sage grouse leks are known to occur in the Project Area, nor is any part of the Project Area known to be within a 2-mile buffer zone of a lek. The nearest document lek is located approximately 6.8 miles southeast of the Project Area (**Figure 3.2-10**). In addition, no habitats designated as occupied, brood rearing, or winter habitats for sage grouse occur within the RBU Project Area. Although most of the



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Greater Sage Grouse Habitat

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-10

habitat within the Project Area is marginal for sage grouse breeding and nesting, it is possible that a few individual sage grouse occasionally use portions of the Project Area.

Yellow-billed Cuckoo

The yellow-billed cuckoo (*Coccyzus americanus*) is a candidate for listing under the ESA. This species is a neotropical migratory species that breeds in the U.S. and Canada and winters in South America (USFWS 2001). The cuckoo is a riparian obligate bird that feeds in cottonwood groves and nests in willow thickets. Nest sites have been correlated with large patches (greater than 10 hectares) of cottonwood-willow stands, dense understories, high local humidity, low local temperatures, and in proximity to slow or standing water. In Utah, this species nests in riparian areas and has been documented in cottonwood habitat along the Green River west of the RBU Project Area. Breeding has been confirmed in the Ouray National Wildlife Refuge located along the Green River approximately 13 miles upstream from the RBU Project Area (Howe and Hanberg 2000). Although the RBU Project Area does not support the necessary habitat elements to support the yellow-billed cuckoo, potential habitat for the species does occur immediately west of the RBU Project Area along the Green River.

Bald Eagle

Effective August 8, 2007, the USFWS delisted the bald eagle (*Haliaeetus leucocephalus*) in the lower 48 states from the Federal list of endangered and threatened wildlife (72 FR 37346). However, the bald eagle is still protected under the Bald and Golden Eagle Protection Act and the MBTA. Although no bald eagle nesting sites exist within or near the RBU Project Area, known winter roost sites are located along the Green River, west of and outside the RBU Project Area. Wintering bald eagles concentrate at established roosting sites for the purpose of feeding and sheltering in close proximity to sufficient food sources. Specifically, 15 bald eagle roosting sites are located within 0.5 mile of the RBU Project Area boundary, however all three roosts are located immediately adjacent to the Green River which is physically screened from project development by canyons walls. Winter roosting usually occurs from early November through late March, and bald eagles may use the RBU Project Area as foraging habitat during this period.

Golden Eagle

The golden eagle (*Aquila chrysaetos*) is protected under the MBTA and Bald and Golden Eagle Protection Act, based on the similarity of the juvenile bald eagle's physical appearance to that of the adult golden eagle. Populations of golden eagles in Utah are considered to be year-round residents.

Two active golden eagle nests have been located along the western boundary of the RBU Project Area. These nests were located on cliffs facing the Green River along the northwestern boundary of the RBU Project Area. Potential nesting and foraging habitat is found throughout the RBU Project Area, and therefore additional breeding golden eagles could establish territories/nests in the future.

Burrowing Owl

The burrowing owl (*Athene cunicularia*) is listed as a UDWR Wildlife Species of Concern and BLM Sensitive Species. Burrowing owls are summer residents on the plains over much of Utah and usually arrive on breeding grounds from late March to mid-April (Johnsgard 2002). In Utah, prairie dog burrows are the most important source of burrowing owl nest sites. Burrowing owls' use of abandoned prairie dog towns is minimal: active prairie dog towns are the primary habitat for the owls.

Burrowing owl surveys have not been conducted in the RBU Project Area. However, as there are scattered prairie dog colonies in portions of the RBU Project Area, the burrowing owl has the potential to occur within the RBU Project Area.

Bonytail Chub

The bonytail chub (*Gila elegans*) is a Federally-endangered fish species. Historically, the bonytail was a common species in the main river channels of the Colorado River systems. However, today the bonytail chub exists in very low numbers in its natural habitat (USFWS 1994). There are currently no self-sustaining populations of bonytail chub in the wild, and very few individuals have been caught throughout the Upper Colorado River Basin in Utah. A few individuals have been caught in the Green River in Hideout Canyon and Gray Canyon, and at the confluence of the Colorado River and the Green River. Releases of hatchery-reared bonytail chub into the Upper Basin have resulted in low survival, with no evidence of reproduction or recruitment. The bonytail chub is adapted to major rivers where it has been observed in pools and eddies. Flooded bottomland habitats are important growth and conditioning areas for bonytail chub, particularly as nursery habitats for young (USFWS 2002a).

In Utah, a total of 139 river miles and their associated 100-year floodplains have been designated by the USFWS as critical habitat for the bonytail chub in portions of the Green River and Colorado River. The closest designated critical habitat is located in the Green River approximately 20 miles downstream from the RBU Project Area (USFWS 2007).

Colorado Pikeminnow

The Colorado pikeminnow (*Ptychocheilus lucius*) is a Federally-endangered fish species. The Colorado pikeminnow (formerly known as the Colorado squawfish) is endemic to the Colorado River Basin where it has adapted to rivers with seasonally variable flow, high silt loads, and turbulence. In Utah, the Colorado pikeminnow was historically found in the Colorado, Green, Duchesne, San Juan, White, and Dolores Rivers and probably numerous smaller streams. Today, the species is most abundant in the Green River below the confluence with the Yampa River; the White River from Taylor Draw Dam near Rangely, Colorado, downstream to the confluence with the Green River; and the mainstem of the Colorado River from Palisade, Colorado to Lake Powell. The Yampa River and Gray Canyon of the lower Green River hold the two principal spawning sites of this species (USFWS 2002b).

A total of 726 river miles in Utah have been designated by the USFWS as critical habitat for the Colorado pikeminnow. This critical habitat occurs in portions of the Green, Colorado, White, and San Juan Rivers and their respective 100-year floodplains, including portions of the Green River that flow west of the RBU Project Area (USFWS 2007).

Humpback Chub

The humpback chub (*Gila cypha*) is a Federally-endangered fish species. In Utah, specimens of humpback chub have been reported from the upper Green River, Desolation Canyon on the Green River, the lower Yampa River, the White River, and the Colorado River above and below Glen Canyon Dam. Populations of adult humpback chub are found in boulder-strewn river canyons where they utilize a variety of habitats including pools, riffles, eddies, rocky runs, and travertine dams. The highest known concentrations of humpback chub are found in the Westwater Canyon and Grand Canyon reaches of the Colorado River. Humpback chub in the Desolation and Gray canyons of the Green River hold the third most abundant population of this species (USFWS 2002c).

In Utah, a total of 139 river miles and their associated 100-year floodplains have been designated by the USFWS as critical habitat for the humpback chub in portions of the Green River and Colorado River. The closest designated critical habitat is located in the Green River approximately 20 miles downstream from the RBU Project Area (USFWS 2007).

Razorback Sucker

The razorback sucker (*Xyrauchen texanus*) is a Federally-endangered fish species. In the Upper Colorado River Basin in Utah, the razorback sucker is currently found in the Green River, upper Colorado River, and San Juan River sub-basins. The fish are mostly aged adults with little or no recruitment, except in the middle Green River, where small numbers of juveniles and young adults indicate low recruitment levels. The largest population of razorback sucker in the Upper Colorado River Basin exists in low-gradient, flat-water reaches of the middle Green River between the Duchesne River and Yampa River (USFWS, 2002d). Adult razorback suckers occupy a variety of habitat types including impounded and riverine areas, eddies, backwaters, gravel pits, flooded bottoms, flooded mouths of tributary streams, slow runs, sandy riffles, and others. They typically move into flooded areas in early spring and begin spawning migrations to specific locations as they become reproductively active. Spawning occurs over rocky runs and gravel bars (USFWS 2002d).

A total of 688 river miles in Utah have been designated by the USFWS as critical habitat for the razorback sucker. This critical habitat occurs in portions of the Green, Colorado, Duchesne, White, and San Juan Rivers and their respective 100-year floodplains, including portions of the Green River that flow west of the RBU Project Area (USFWS 2007).

Roundtail Chub

The roundtail chub (*Gila robusta*) is listed as a Utah State sensitive species and is found in the Upper Colorado River Basin. This species is a large member of the minnow family found most often in major rivers and smaller tributary streams. The roundtail chub has been described as varying from sedentary to mobile, depending on life stage and habitat conditions (Sigler and Sigler 1996).

Roundtail chub populations occur in the Green River from the Colorado River confluence upstream to Echo Park and in the White River from the Green River confluence upstream to near Meeker, Colorado. In the Upper Colorado River Basin (New Mexico, Utah, Colorado and Wyoming), the species has been extirpated from about 45 percent of its historical range, including the Price River and portions of the San Juan, Gunnison and Green Rivers. Data on smaller tributary systems are largely unavailable, and population abundance estimates are available only for short, isolated river reaches. Known distribution of this species includes portions of the Green River west of the RBU Project Area (UNHP-UDWR 2007).

Bluehead Sucker

The bluehead sucker (*Catostomus discobolus*) is a Utah State sensitive species found in the Upper Colorado River Basin. Bluehead suckers occur in small to large streams, rivers, and tributaries in the Upper and Lower Colorado River Basin, including the Green River. Large adult bluehead may inhabit stream environments as deep as 6 to 9 feet, although they most commonly feed in riffles and swift runs. Spawning occurs in spring and early summer at lower elevations and mid- to late summer in higher, colder waters. Spawning occurs on gravel beds in shallow water (Sigler and Sigler 1996).

Populations of this species currently occur in the mainstream Green River from the Colorado River confluence upstream to Lodore, Colorado, and in the White River from the Green River confluence upstream to Meeker, Colorado. In the upper Colorado River Basin (Utah, Wyoming, Colorado, and New

Mexico), bluehead suckers currently occupy about 45 percent of their historical habitat. Recent declines of the species have occurred in the White River below Taylor Draw Dam, and in the upper Green River. Known distribution of this species includes portions of the Green River west of the RBU Project Area (UNHP-UDWR 2007).

Flannelmouth Sucker

The flannelmouth sucker (*Catostomus latipinnis*) is listed as a Utah State sensitive species found in the Upper Colorado River Basin. Flannelmouth suckers typically inhabit deep water habitats of large rivers, but are also found in small streams and occasionally in lakes. Flannelmouth suckers spawn during March and April in the southern portions of Utah and from May to June in northern Utah at higher elevations (Sigler and Sigler 1996).

Flannelmouth sucker populations can be found from the Green River from the Colorado River confluence upstream to the Flaming Gorge Reservoir, and the White River from Kenny Reservoir in Colorado to the Green River. Recent investigations of historical accounts and museum specimens indicate that flannelmouth suckers occupy approximately 50 percent of their historic range in the Upper Colorado River Basin (Utah, Wyoming, Colorado, and New Mexico). Populations have declined since the 1960s due to impoundment of the Green River in Wyoming and Utah (Flaming Gorge Reservoir) and the Colorado River in Glen Canyon, Utah (Lake Powell). Known distribution of this species includes portions of the Green River west of the RBU Project Area (UNHP-UDWR 2007).

3.2.9 Visual Resources

The RBU Project Area lies within the Uinta Basin of the Colorado Plateau physiographic province. The general visual characteristics of the Uinta Basin topography west of the Green River can be described as relatively flat with wide, shallow valleys that are not more than a few hundred feet below the surrounding country (Stokes 1986). The landscape is composed of scenery that is typical of the central Uinta Basin: a predominance of shallow, gently rolling hills and drainages; shale-colored bluffs and steeply incised drainages near the Green River and Nine Mile Canyon; distant views of the Uinta Mountains to the north, the Roan Cliffs and Book Cliffs to the south, and the Wasatch foothills to the west.

There is no human habitation within the Project Area and oil and gas activities, structures, and surface disturbances are present in much of the region. Modifications of the landform and vegetation, and placement of structures on the land, are prevalent throughout most of the project area. Lands along the Green River adjacent to the western portion of the Project Area are parts of an area inventoried and found to have natural landscape character and an appearance of naturalness (BLM 2008c). These lands are being managed to protect natural landscapes, as they are large, roadless, and relatively undeveloped.

3.2.9.1 Visual Resources Management

The project area lies within BLM-administered public land that has been inventoried and is managed for its visual resources. The BLM uses a Visual Resource Management (VRM) system to inventory and manage visual resources on public lands. The primary objective of VRM is to manage visual resources so that the quality of scenic (visual) values is protected (BLM 1992). The VRM system uses four classes (and their associated visual resource objectives) to describe the different degrees of surface disturbance or modification allowed on the landscape (see **Table 3.2-11**). The classes are visual ratings that describe an area in terms of visual quality, viewer sensitivity to the landscape (i.e., the public's perception of the importance of scenery and scenic quality within an area), and the distance

from which a viewer would be likely to observe an area (BLM 1986). The area's BLM-designated VRM class and visual resource objectives can be used to analyze and determine the visual impacts of proposed activities on the land, and to gauge the amount of disturbance an area can tolerate before it exceeds the visual objectives of its VRM class (BLM 1986).

Table 3.2-11. BLM Visual Resource Management (VRM) Class Objectives

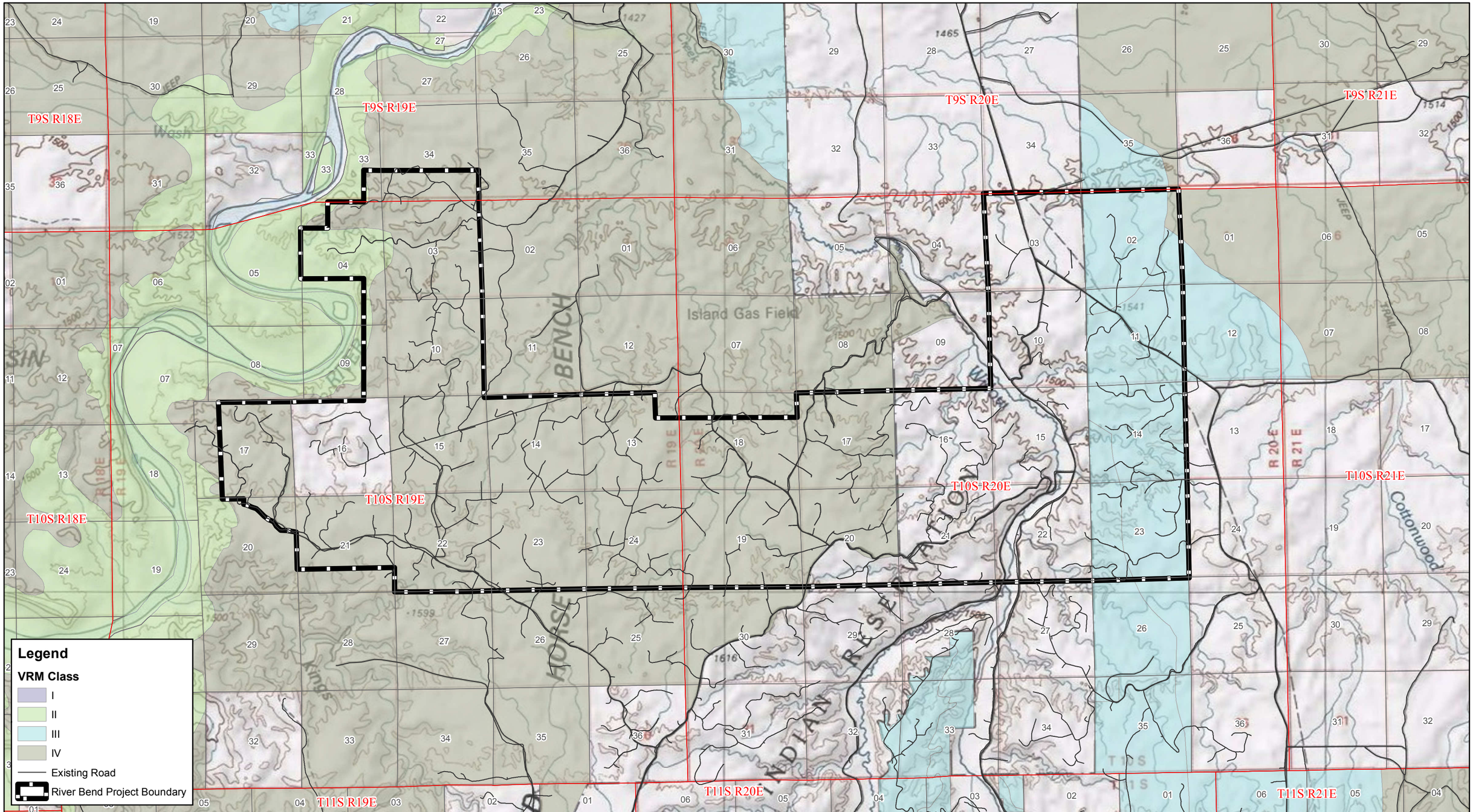
VRM Class	VRM Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and should not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities, which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the landscape.

The Vernal RMP manages the BLM-administered lands in the Project Area under VRM Class I, II, III, and IV objectives. The designation of these management classes was based on resource use of the area, the area's visual quality and viewer sensitivity, the level of use by the public, and the type of visitor use that the area receives (BLM 1992). Public visitation within the proposed project area is not high; however, areas adjacent to the project area (Green River corridor), are high-quality recreational and scenic destinations.

VRM classes within the RBU Project Area are shown in Figure 3.2-11. The total number of acres of each VRM class within the RBU Project Area is tabulated below in **Table 3.2-12.**

Table 3.2-12. VRM Classes within the RBU Project Area

VRM Class	Acres of Project Area	Percent on BLM Land in Project Area
Class I	0	0
Class II	357	3
Class III	2,540	21
Class IV	9,098	76



0 0.5 1 2 Miles

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Mapping Reference:

Basemap from ESRI Online Maps.
Existing Well data from UDOGM.

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PROJECT NO.	116160
DRAWN:	9/4/2012
DRAWN BY:	B. Carlin
CHECKED BY:	B. Norling
FILE NAME:	VRM.mxd

VRM Classes

River Bend Unit Infill Development EA

Uintah County, Utah

FIGURE

3.2-11

3.2.10 Socioeconomics and Environmental Justice

Entities of interest for the socioeconomic analysis include Uintah and Duchesne Counties, the Ute Tribe, and the State of Utah. It should be noted that although all project-related development would occur in Uintah County, Uintah and Duchesne Counties share a common boundary and are linked by a transportation network that integrates the labor force and support services that serve the oil and gas industry in the Uinta Basin. As such, the study area for this project was established to encompass the effects of the project on the economy, population, and housing throughout both counties.

3.2.10.1 Uintah and Duchesne Counties

Population and Housing

Table 3.2-13 below summarizes key demographic statistics as provided by the Demographic and Economic Analysis section of the Governor's Office of Planning and Budget in Utah. The (2010) combined population for Uintah and Duchesne Counties is approximately 51,195 persons. There are an estimated 21,420 housing units in the study area and the employed labor force is 27,100 persons. Based on this information, the ratio of employees to the overall population is one employee for every 1.9 persons.

The balance between jobs and housing is the relationship between the numbers of people employed in an area versus the potential housing opportunities in that area. In theory, a balanced community would have 1.0 to 1.5 employees for every housing unit. A ratio over this range indicates that there are more jobs than available housing. Conversely, a ratio less than this range indicate that there is more housing than available jobs. There are an estimated 21,420 housing units in Duchesne and Uintah Counties and the employed labor force is 27,100 persons (GOPB 2011). Based on this information, the ratio of employees to the potential housing opportunities is 1.27 employees for every housing unit.

Table 3.2-13. Demographic Characteristics of the Socioeconomic Study Area

County	Population[1]	Housing Units[1]	Employment Labor Force[2]	Individuals per Household[1]
Duchesne County	18,607	9,493	9,784	2.62
Uintah County	32,588	11,927	17,316	2.95
State of Utah	2,763,885	979,709	1,181,544	3.04*

* Weighted average of persons per household in both counties.
(1) Source: U.S. Census Bureau, 2010b.
(2) Source: GOPB, 2011

Table 3.2-14 shows the numeric change in demographic characteristics from 2000 to 2010 and the corresponding Average Annual Rate of Change (AARC). As shown, employment labor force and housing units over the last 10 years have been increasing much faster than the overall growth in population.

Table 3.2-14. Demographic Trends, 2000-2010, Uintah and Duchesne Counties

Demographic Trend	2000	2010	AARC (Percent)
Employment Labor Force[2]	16,670	27,100	6.3
Population[1]	39,595	51,195	2.9
Housing Units[1]	12,746	21,420	6.8

(1) Source: U.S. Census Bureau, 2010a
(2) Source: GOPB, 2011

In terms of racial composition, in 2010 approximately 89 percent of Duchesne County's population was White and five percent was Native American. In terms of ethnicity, six percent were of Hispanic origin (GOPB, 2011). The racial composition of Uintah County was as follows: 87 percent White and eight percent Native American. In terms of ethnicity, seven percent were of Hispanic origin.

Local Economy and Employment

In Uintah and Duchesne Counties, the top three employment sectors in 2010 were government; natural resource and mining; and transportation, trade, and utilities. **Table 3.2-15** provides a breakdown of nonagricultural sources of employment by economic sector.

Table 3.2-15. Sources of Employment by Sector, 2011

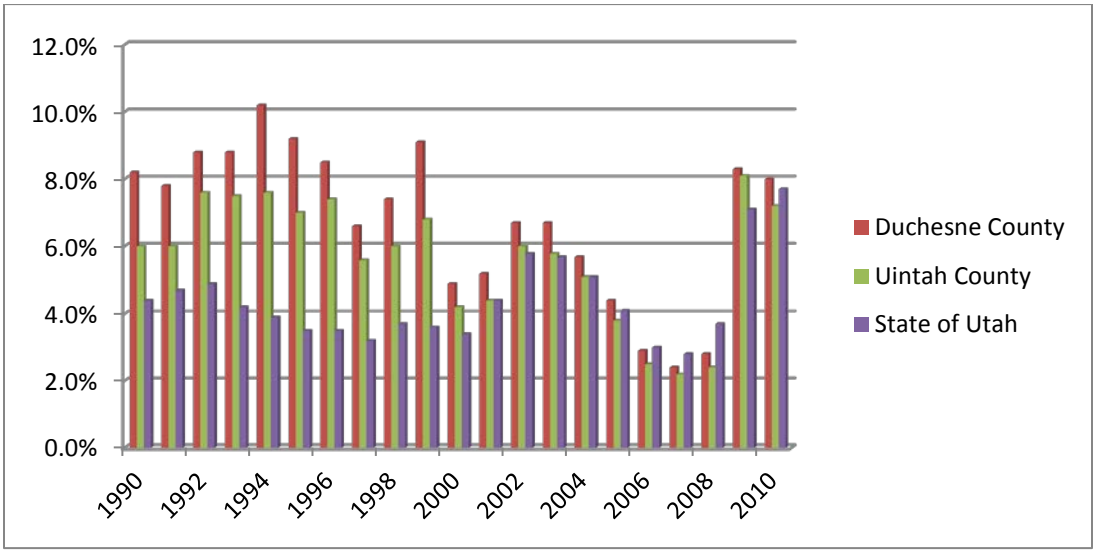
Employment Sector	Duchesne County		Uintah County	
	Jobs	% Total	Jobs	% Total
Natural Resources and Mining	1,510	20.6%	2,627	19.8%
Construction	523	7.1%	957	7.2%
Manufacturing	170	2.3%	166	1.3%
Trade, Transportation, and Utilities	1,707	23.3%	3,031	22.8%
Information Services	193	2.6%	136	1.0%
Financial Activity	177	2.4%	537	4.0%
Professional and Business	206	2.8%	684	5.2%
Education and Health	349	4.8%	966	7.3%
Leisure and Hospitality	374	5.1%	976	7.3%
Other Services	184	2.5%	365	2.7%
Government	1,938	26.4%	2,835	21.3%
Total	**7,331**	**100.0**	**13,280**	**100**

Source: GOPB, 2011

Annual data from the Utah's Department of Workforce Services (UDWS) show that for 2010 the unemployment rate in Duchesne County (8.0 percent) was slightly higher than the statewide average of 7.7 percent. However, the unemployment rate in Uintah County (7.2 percent) was slightly lower than the statewide average. The unemployment rate for the State of Utah has almost doubled, from 3.7 percent in 2008 to 7.7 percent in 2010. Utah, while lower than the national unemployment rate, has followed the national trend where the unemployment rate increased from 4.6 percent in 2007 to 5.8 percent in 2008, 9.3 in 2009, and 9.6 in 2010 (Bureau of Labor Statistics, 2011). Utah's economy has gradually strengthened in 2010. Though economic activity has been on the uptick, slack hiring has driven a slight increase in the unemployment rate from 7.1 percent in 2009 to 7.7 percent in 2010.

In 2009, the per capita income in Uintah County ($29,034) was lower than the State of Utah average ($31,886), and the national average ($38,846). However, the per capita income for Duchesne County ($34,107) in 2009 was higher than both the State and national average. It should be noted that Utah is unique when comparing personal income and median household income. Although Utah has a very low per capita personal income, the State's median household income is ranked tenth highest in the nation. This is due to the fact that Utah has the largest household size in the nation, and per capita figures are

diluted by a larger number of children. As such, median household figures provide a more accurate measure of family income. In 2010, Utah's three-year average $59,857 median household income was 118.9 percent of the national average of (GOPB, 2011). Although there are no median household income statistics available for Uintah and Duchesne Counties, based on the information presented above, it can be assumed that the median household income is competitive with the national average.



Source: UDWS, 2010

Figure 3.2-12. Average Annual Unemployment Rates: 1990-2010

The U.S. Bureau of Economic trends for 2009 are discussed in this EA. The recession beginning in late 2007 had a diverse impact across counties in Utah, where 45 percent of counties had decreases while 55 percent experienced increases. The largest percentage declines were in the natural resource dependent Uintah County (-10.3 percent) and Duchesne County (-8 percent) (GOPB, 2011).

As shown by comparing **Table 3.2-15** and **Table 3.2-16**, payroll from natural resources and mining comprises a high percent of the total wages in Uintah and Duchesne Counties relative to the total employment within the sector.

Local Government Fiscal Conditions and Revenues from Oil and Gas Activities

Oil and gas operations contribute considerable revenue to various local, State, and Federal governmental entities through payment of various royalties and taxes. The following types of revenue are typically generated by oil and gas development.

Federal Mineral Lease Royalties – Federal mineral lease royalties are collected from oil and gas extraction operations located on Federally-held minerals. At present, the Federal royalty rate is 12.5 percent of the total production rate. Federal mineral leasing regulations require that 50 percent of royalties collected from mineral lease royalties are returned to the State of origin.

State Mineral Lease Royalties – Similar to Federal mineral royalties, the State of Utah receives mineral lease royalties at a rate of approximately 12.5 percent for all oil and gas development on State lands. Within the RBU Project Area all State lands are managed by the SITLA. The SITLA is an independent

agency that manages lands granted to the State of Utah by the United States predominantly for the purpose of supporting public schools and academic institutions. Within the State of Utah, the largest source of trust land revenue is oil and gas.

Table 3.2-16. Non-Agricultural Payroll Wages by Employment Sector, 2011

Employment Sector	Duchesne County		Uintah County	
	Wages (Millions)	% of Total	Wages (millions)	% of Total
Natural Resources and Mining	104.9	34.5	172.2	30.8
Construction	23.3	7.7	44.9	8.0
Manufacturing	7.0	2.3	5.3	0.9
Trade, Transportation, and Utilities	64.8	21.3	126.2	22.6
Information Services	7.4	2.4	4.5	0.8
Financial Activity	5.7	1.9	26.7	4.8
Professional and Business	8.9	2.9	27.0	4.8
Education and Health	11.3	3.7	27.6	4.9
Leisure and Hospitality	4.2	1.4	12.5	2.2
Other Services	6.9	2.3	11.7	2.1
Government	59.4	19.6	100.9	18.0
Total	**303.8**	**100.0**	**559.5**	**100.0**

Source: GOPB, 2011

Sales and Use Tax Revenue – Sales taxes are paid by oil and gas operations when purchases of equipment, materials, or supplies are made in the local area. Examples of purchases that generate sales tax revenue include gravel, pipe, fuel, and other supplies purchased locally. Like property tax revenue, sales and use tax revenues are used by local cities and counties to fund a wide variety of important local services and community facilities.

As of January 01, 2011, the Utah sales and use tax rate has been 4.75 percent with a maximum possible sales tax (including local and municipal sales taxes) of 13.1 percent. Local governments in Utah are allowed to add a local sales tax of up to 3.6 percent on top of the Utah State sales tax for all qualifying sales in their jurisdiction. Thus, the actual sales tax paid on any purchase in Utah can be up to 8.35 percent depending on the location. The average sales tax in Utah, including local sales taxes charged by counties and cities, ranges from 5.95 percent to 8.35 percent.

Severance Tax – Severance tax is a tax levied by the State on oil and gas produced, saved, sold or transported from the field where it was produced. These taxes are paid on crude oil, condensate, unprocessed gas, residue gas, and natural gas liquids. Within the State of Utah, severance taxes are collected at a split rate. For example, the severance tax rate for oil is 3 percent of the value of the oil up to and including the first $13 per barrel of oil, and 5 percent of the value of the oil from $13.01 and above per barrel of oil. The severance tax rate for natural gas is 3 percent for the value of the gas up to and including the first $1.50 per one thousand cubic feet (MCF), and 5 percent of the value of the gas from $1.51 and above per MCF. The severance tax rate for natural gas liquids is 4 percent of the taxable value of the natural gas liquids. It should be noted that no tax is imposed upon stripper wells, with oil wells at less than 20 barrels barrels of oil per day (BOPD) and gas wells at less than 60 one thousand cubic feet per day (MCFD); the first 12 months of production for wildcat wells; and the first six months of production for development wells.

Oil and mining severance tax is one of Utah's eight major miscellaneous tax revenue sources (sales, income, corporate franchise, insurance, beer, cigarette, tobacco, oil and mining severance taxes). In 2010, the State of Utah collected $56,200,970 (Utah State Tax Commission 2010). Severance taxes are paid to the Utah State Tax Commission and deposited into the State's general tax fund. Because taxes are paid directly to the State of Utah, collection information is not available on a per county basis. However, due to the prevalence of oil and gas activity within the Uinta Basin, it can be assumed that the majority of severance tax collected originates in Duchesne and Uintah Counties.

Conservation Tax – A conservation tax is collected by the Utah State Tax Commission at a rate of two-tenths of one percent (0.002) of the value of oil and gas produced, sold, or transported from any oil and gas field in Utah. Revenue generated from the conservation tax is paid to the Utah State Tax Commission and deposited into the State's general tax fund. During 2010, the State of Utah collected approximately $4,191,039 from conservation fees (Utah State Tax Commission 2010).

3.2.10.2 Ute Indian Tribe

Demographics of the Ute Indian Tribe

The Uintah and Ouray Indian Reservation (also referred to as the Reservation), established in 1861, is Utah's largest Reservation and is the home of the Northern Ute (e.g., White River, Uintah, and Uncompahgre bands). The population of the Reservation is 24,369 residents; however, only 2,951 residents are American Indian (U.S. Census Bureau, 2010a). Approximately 50 percent of those with Ute Indian Tribal membership (3,157 individuals) currently live on the Reservation or on off-Reservation trust land (Ute Tribe, 2011).

Today the Reservation is approximately one-third its original size of four-million acres. In a series of land taking by the U.S. Government, the Reservation was gradually reduced in a piecemeal fashion in the early 1900's. Legal disputes over land ownership and water, which have continued over the last century, have resulted in the expansion of the Reservation to its current size. Currently, the Reservation, which is slightly more than one-million acres, comprises one-fourth of the Uinta Basin and includes portions of four Utah counties. Mineral resources are the Ute Tribe's greatest economic asset (Utah Department of Community and Culture-DIA, 2009).

Local Economy and Employment

While revenues from mineral extraction provide substantial revenue for the Ute Tribe, the local economy is sustained by a variety of industries. Major sources of employment include education, health, and social services; agriculture, forestry, mining, and fishing and hunting; retail trade; public administration; arts, entertainment, recreation, accommodation, and food services; and construction. **Table 3.2-17** provides a breakdown of sources of employment by industry. Approximately one-fourth of the Reservation's working class is employed by the government (U.S. Census Bureau, 2009). Under Ordinance No. 92-07, the Ute Tribe established a Contracting Preference Ordinance for all Reservation employers. This Ordinance, passed in 1992, requires enterprises doing business within the Reservation to employ, to the greatest extent possible, Tribal members and Tribally-owned subcontractors (Ute Indian Tribe, 1992).

According to the U.S. Census 2008-2010 American Community Survey 3-Year Estimates, the unemployment rate on the Uintah and Ouray Reservation was 3.0 percent, which was slightly lower than the average unemployment rate in the State of Utah (4.8 percent), and in the United States (5.8percent) (U.S. Census Bureau, 2010d).

Table 3.2-17. Ute Tribe Sources of Employment by Industry

Employment Sector	Number of Jobs	Percent of Total
Agriculture, Forestry, Mining, and Fishing and Hunting	1,554	17.2%
Construction	741	8.2%
Manufacturing	150	1.7%
Wholesale Trade	172	1.9%
Retail Trade	1029	11.4%
Transportation, Warehousing, and Utilities	569	6.3%
Information	236	2.6%
Finance, Insurance, Real-estate and Rental and Leasing	219	2.4%
Professional, Scientific, Management, and Administrative Services	539	6.0%
Education, Health, and Social Services	1,820	20.1%
Arts, Entertainment, Recreation, Accommodation, and Food Services	801	8.9%
Other Services	356	3.9%
Public Administration	847	9.4%
Total	**9,033**	**100.0%**

Source: U.S. Census Bureau, 2010d

According to the U.S. Census 2008-2010 American Community Survey 3-Year Estimates, the per capita income of Tribal members was approximately $23,507, which was higher than the State of Utah ($22,828) and lower than the national average ($26,942) (U.S. Census Bureau, 2010d). As of the U.S. Census 2008-2010 American Community Survey 3-Year Estimates, approximately 11.5 percent of Reservation residents lived below the poverty level. Poverty thresholds in the United States are determined by a combination of factors such as age, income, and family size. The U.S. Census Bureau's 2010 weighted average poverty threshold for an individual was $10,956 (U.S. Census Bureau, 2010a).

In terms of employment, under Ordinance No. 92-07, the Ute Tribe established a Contracting Preference Ordinance. This Ordinance, passed in 1992, requires enterprises doing business within the Reservation to employ, to the greatest extent possible, qualified Tribal members and Tribally-owned subcontractors.

Ute Tribal Fiscal Conditions and Revenues from Oil and Gas Activities

Revenue generated through mineral extraction is an important source of income for Tribal members. Within the Uintah and Ouray Reservation, there exists a complex mix of surface ownership of mineral rights; however, within the RBU Project Area, mineral ownership generally mirrors surface ownership. In areas where the Ute Tribe has mineral ownership, lease royalties are collected. The mineral lease royalty rate on Tribal minerals is minimally 12.5 of the gross value of the resources being sold. Due to confidentiality reasons, the exact mineral lease rate on Tribal lands is not disclosed.

In addition to collecting mineral lease royalties, the Ute Tribe charges a severance tax on all oil and gas that is produced, transported, or sold. Severance taxes are collected at a rate between four and eight percent of the gross value of the resources being sold.

In areas where surface and mineral ownership are held in split estate, the Ute Tribe collects revenue by entering into Surface Use Agreements (SUAs). SUAs provide compensation for the disturbance and/or

the loss of income (e.g., agricultural land and crop production lost as a result of oil and gas development). Revenue from SUAs in the RBU Project Area is negotiated with the Ute Tribe on a case-by-case basis.

3.2.10.3 Split-Estate

Many of the lands within the RBU Project Area contain split-estate ownership. Split-estate ownership means that the individual or entity owning the surface rights does not own the sub-surface mineral rights. Split-estates allow holders of mineral rights to pursue resource extraction operations on land where the surface may be owned or managed by other individuals or agencies. In split-estate situations, mineral rights take precedence over surface rights associated with the property.

Of the 4,075 acres of Tribal land within the RBU Project Area, only 520 acres of sub-surface minerals are owned by the Ute Tribe. Of the remainder, 240 acres are owned by State of Utah, and 3,315 acres are Federally-owned. Mineral ownership is considered proprietary data by the Ute Tribe; therefore, only surface ownership is included on figures in this EA.

Of the approximately 12,002 acres of Federal Lands within the RBU Project Area, approximately 11,362 acres of minerals are owned by the Federal government. The remaining 640 acres are owned by the State of Utah.

All minerals under State lands within the RBU Project Area are owned by the State of Utah.

3.2.10.4 Environmental Justice

Environmental Justice is the principle defined by Executive Order 12898 and implemented by agency directives that low-income, minority and Tribal groups should not have to experience a disproportionate share of any negative effects resulting from a plan or project.

The BLM standard for identifying a low-income population is the poverty level used by the U.S. Census Bureau. The standard for identifying minorities is either: (1) the minority of the population of the affected area exceeds 50 percent or (2) the minority population percentage of the affected areas is "meaningfully greater" than the minority population percentage in the general population or other appropriate unit of geographic analysis. For environmental justice compliance, the relevant minority population is the total minority population comprising all persons of a minority race plus persons of Hispanic origin. **Table 3.2-18** shows the minority and poverty levels in communities within the study area.

As shown in **Table 3.2-18**, the communities with a poverty rate of over 50 percent in the study area include the Fort Duchesne Census Designated Place (CDP), Randlett CDP and White Rocks CDP, which are located on the Uintah and Ouray Indian Reservation. The table also shows that these same communities are also minority communities. Communities elsewhere in Duchesne and Uintah Counties would not be considered environmental justice communities.

Table 3.2-18. Poverty and Minority Population Characteristics of Selected Communities in the Study Area

Area of Concern	Percent of Total Population in Poverty	Minority Race or Hispanic as a Percent of Total Population	Percent American Indian
Duchesne City	10.8	6.9	1.7
Roosevelt	18.7	22.3	10.9
Duchesne County[1]	10.8	13.7	4.5
Vernal	15.6	13	3
Uintah County[1]	11.5	13.4	7.7
Fort Duchesne CDP	36.9	98.7	94.9
Randlett CDP	59.7	96.4	93.3
White Rocks CDP	18.6	96.2	96.2
Uintah and Ouray Reservation[1]	**11.5**	**21.3**	**13.9**

CDP = Census Designated Place.
(1) Source: U.S. Census Bureau, 2010a