FINAL ENVIRONMENTAL ASSESSMENT

PICEANCE PROPERTY EXCHANGE

Involving Lands and Water Rights
Owned by
Colorado Division of Wildlife
And
Shell Frontier Oil & Gas Inc.

RIO BLANCO COUNTY, COLORADO

Decision Relating to
FEDERAL ASSISTANCE GRANT W-33-L

Prepared by the

Colorado Division of Wildlife

and the

U.S. Fish and Wildlife Service – Division of Federal Assistance
Region 6
Denver, CO

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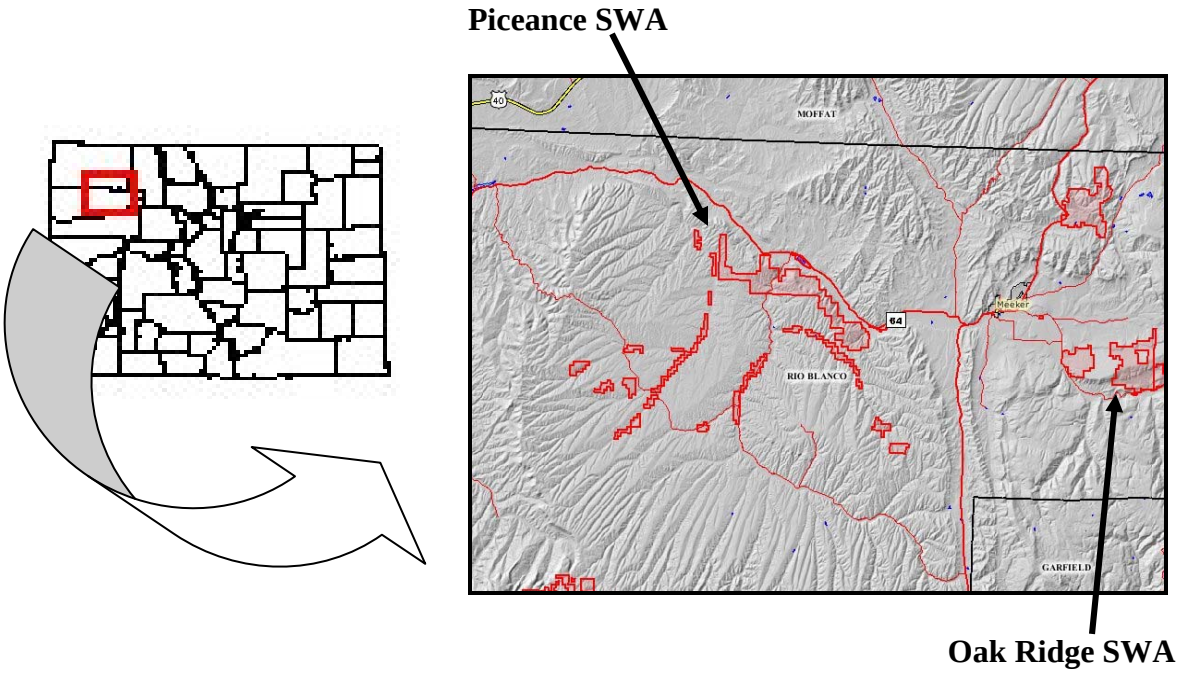
I. PURPOSE & NEED

The Colorado Division of Wildlife (Division) has prepared this draft Environmental Assessment (EA) for the U.S. Fish and Wildlife Service (Service) in response to a proposal by the Division to exchange certain parcels and water rights within the Piceance State Wildlife Area (SWA) with Shell Frontier Oil & Gas Inc. (Shell) for parcels of land which would become part of the Oak Ridge SWA (Figure 1.1). The SWA parcels were previously acquired with federal funds provided through the Pittman-Robertson Federal Aid in Wildlife Restoration Act (PR), which is administered by the Division of Federal Assistance of the Service. Federal regulations require the approval of the Service prior to the disposal of any land acquired with PR funds. The Service's decision to approve or disapprove the proposed land exchange constitutes a federal action pursuant to the National Environmental Policy Act of 1969 (NEPA). This EA has been prepared to examine the impacts of the land exchange in compliance with NEPA requirements.

Figure 1.1 Location of Exchange Parcels in Rio Blanco County in Northwest Colorado



The Division exchange parcels (Piceance Parcels) include seven different separated parcels with water rights, as well as 17 severed water rights that currently comprise part of the Piceance SWA (Appendix A). Shell intends to use the Piceance Parcels as part of their energy development plans in the Piceance Basin in northwest Colorado. The original Division purchases of land for the Piceance SWA occurred primarily in the 1950s to acquire big game habitat (primarily deer winter range), as well as for hunter access. The Piceance Parcels have been impacted by drought over the past several years and the increased mineral development activities in the surrounding areas. These areas now exhibit reduced wildlife habitat values and resultant smaller big game populations (Division, unpublished data). Drought has also been somewhat responsible for diminished habitat quality, including reduced amounts of forage and sources of water. Increased mineral development activities are believed to have been responsible for movement of deer and elk out of the Piceance Basin, once considered to be the number one deer herd in our country. Because the Division does not own the subsurface mineral rights for these parcels and cannot prohibit future energy development activities on these parcels, habitat quality and wildlife populations may continue to diminish. This may then also result in decreased value of the Piceance Parcels to the public.

The Piceance Parcels currently occur in part as separated, disjunct tracts with associated water rights that have created issues for efficiently managing the Piceance SWA by the Division. The severed Piceance water rights included in the Piceance Parcels were retained during earlier exchanges in the Piceance Basin so they could later be disposed of when their value had increased. The severed water rights included in the exchange have, however, been a source of conflict and management problems for the Division over the years. The Division attempted to sell these water rights a few years ago and did not receive any serious offers to purchase them. Ultimately, the value of the water rights may be diminished due to difficulties by the Division in maintaining the water rights. Eventually, the Division may need to consider abandoning these water rights due to the cost to maintain them.

In exchange for the Piceance Parcels, the Division will acquire two parcels form Shell (Shell Parcels) in the adjacent White River drainage, which are in-holdings at the Division-owned Oak Ridge SWA. These parcels (Appendix B) occur between two disconnected tracts that currently comprise Oak Ridge SWA. Connecting the two Oak Ridge tracts with the Shell Parcels will allow the Division to more effectively and efficiently manage Oak Ridge SWA as one contiguous property and will preclude problems associated with managing two separate tracts. In addition, the Shell Parcels provide high quality big game habitat, important areas for seasonal migration, and will provide management opportunities, such as grazing, for the improvement of big game habitat not currently available with the disjunct parcels. The acquisition of the Shell Parcels will only include surface ownership rights; however, it is highly unlikely that future development of subsurface energy resources will occur on the Shell Parcels given the known location of geological strata containing oil and gas resources in the Piceance Basin.

Therefore, the Division and Shell have proposed to exchange these parcels. The Division has determined that the affected wildlife resources and public recreational interests would benefit most through the proposed exchange. An initial informal internal scoping and planning meeting with the Service's Division of Federal Assistance was held at Division Headquarters in Denver on February 17, 2006. A public meeting was held on June 15, 2006 from 5:30-7:00pm in Meeker, CO. Little public attendance occurred at the public meeting and no opposing views were voiced from those in attendance. The Rio Blanco County Commission reviewed the proposed exchange on April 13, 2006 and has responded favorably to the proposal.

II. ALTERNATIVES

Alternative A (PREFERRED ACTION) –

Exchange of Identified Piceance Parcels (Lands and Water Rights) for Shell Parcels (Land)

The proposed exchange will involve a total of approximately 3,108 acres of disjunct tracts of fee title land and water owned and managed by the Division as the Piceance SWA in Rio Blanco County. Approximately 2,651 acres of these land and water rights were purchased with federal funding (Piceance Parcels). The appraised value of the Piceance parcels (all land and water rights) is $3,009,000. The Division will obtain approximately 1800 acres of high quality big game habitat fee title property from Shell that currently exists as an in-holding between lands already owned by the Division at Oak Ridge SWA. The appraised value of the Shell parcels is $2,880,000. Shell will reimburse the difference of $129,000 to the Division in cash.

The location of all of the Piceance Parcels is shown in Appendix A. The Piceance Parcels (lands with water rights) include Square S #2 and #4, Duck Creek #1 and #2, Coral Gulch #1, and Stake Springs #1 and #2 tracts. The lands are further described in Appendix C and their associated water rights, the severed water rights, and wetland areas and are further described in Appendix D.

A Memorandum of Agreement (MOA, 2007) between the Division and Shell has been approved to provide protection of two identified resources (one cultural resource site and populations of one federally listed plant species) found to occur on the Piceance Parcels. Prior to any disturbance Shell will be responsible to follow the guidance from the State Historical Preservation Office (SHPO) and the Service Region 6 Archeologist for the development of a site recovery plan to assure sufficient further study and complete documentation of one cultural resource site identified at Stakes Springs #2. Prior to any disturbance, Shell will also be responsible for the long-term protection of populations and potential habitat of one federally protected plant species found to occur on the Duck Creek #1 and #2 tracts (Appendix E).

Alternative B (NO ACTION)

If no action is taken, the Division would cancel the exchange with Shell and retain the current ownership and status of parcels and water rights in both Piceance SWA (Piceance Parcels) and Oak Ridge SWA (Shell Parcels). The Division would, therefore, still have management conflicts with the separate, disjunct parcels of land in the Piceance SWA and would still have in-holding conflicts at the Oak Ridge SWA. The Division would not have the opportunity to obtain new lands with higher wildlife value and increased management potential adjacent to Oak Ridge SWA. Wildlife values on the Piceance Parcels would continue to be diminished by increased energy development activities. The Division would continue to have conflicts with the management of the severed water rights and may need to abandon them due to the cost of maintenance. Ultimately, the Division would have to allow the development of the privately owned subsurface mineral rights on the Piceance Parcels.

Other Alternatives Considered but Dismissed from Further Analysis

Disposal of Piceance Severed Water Rights and Retention of Piceance Lands

The exchange for lands adjacent to Oak Ridge SWA would be canceled. Presumably, Shell would dispose of the Oak Ridge lands to another party and the Division would be left with the same inholding and management problems at the Oak Ridge SWA. The exchange with Shell would be canceled because the values of the water rights alone are insufficient to complete the exchange and the Division does not have authority to purchase the Shell Parcels from Shell. The Division would retain the water rights directly associated with and suitable for use on the currently identified Piceance Parcels. The severed water rights could be offered for sale at public bid as required by statute. However, the Division attempted to dispose of the severed water rights earlier and did not receive acceptable offers of compensation for these assets. It is anticipated that few, if any, bids would be received based on previous attempts to sell these rights. The disposal of the water rights would relieve the Division of necessary expenditures, though, to upgrade the water rights diversion and delivery structures to keep these water rights active. But the disposal or abandonment of the rights would represent an abandonment of the investment made in those water rights to date.

In the long term, the Division would continue to manage the Piceance Parcels similarly to the current practices. At some point, the energy resources could be further developed by subsurface mineral

owners. The Division believes the impact of this energy development on affected wildlife habitats has and will continue to diminish wildlife values and, in turn, public use values in the area. Development of subsurface energy resources under the Piceance Parcels will also directly diminish wildlife and public use values on Division lands. Under these circumstances, the Division would not be able to effectively protect wildlife values or public use opportunities in this part of the Piceance Basin

Therefore, this alternative is not viable for the Division and will not be addressed any further.

Disposal of Piceance Parcels (Lands and Water Rights)

The Piceance lands and water rights were purchased with Pittman-Robertson Wildlife Restoration Act funds. If the Piceance Parcels were offered for disposal as surplus property, the Division would be required to replace any parcels or water rights at current fair market value based on appraisals. This option is not fiscally feasible for the Division.

The exchange for lands adjacent to Oak Ridge SWA would be canceled. Presumably, Shell would dispose of the Oak Ridge lands to another party and the Division would be left with the same in-holding and management problems at the Oak Ridge SWA. The exchange with Shell would be canceled because the Division does not have authority to purchase the Shell Parcels from Shell.

The Division attempted to dispose of the severed water rights earlier and was not offered acceptable compensation for these assets.

Therefore, this alternative is not viable for the Division and will not be addressed any further.

III. AFFECTED ENVIRONMENT

LOCATION, MANAGEMENT, & USE:

The parcels proposed for the exchange occur entirely within Rio Blanco County in northwest Colorado (Figure 1-1). The Piceance lands and water rights (Appendix A) are located in drainages (Piceance Creek, Ryan Gulch, Corral Gulch, Stake Springs Gulch, and Duck Creek) within the Piceance Basin in northwest Colorado (Appendix A). They are located near the towns of Meeker and Rangely. They can be accessed by traveling north on Highway 13 from Rifle, CO and northwest on County Road 5, or south on Highway 13 from Meeker, CO, west on Highway 64 and south on County Road 5. This acreage is un-surveyed and in an area with irregular sections sizes. Estimates are based on Bureau of Land Management (BLM) geographic land acreages data.

The Shell Parcels occur within the White River drainage in northwest Colorado (Appendix B). The Shell Parcels would become part (in-holdings) of the Oak Ridge SWA in northwestern Rio Blanco County southeast of the town of Meeker. The Shell Parcels can be accessed by traveling east on Highway 13 from Meeker and southeast on County Road 8.

The Piceance Basin is primarily comprised of federally owned public lands managed by the BLM. Cattle ranching in Rio Blanco County began in the mid 1800s (USDA/USDI, 1982). Large tracts of BLM land in this area are still leased for cattle grazing. The Division currently owns and manages four SWAs in the Piceance Basin: Piceance SWA, Square S SWA, Rio Blanco Lake SWA, and Little

Hills SWA. These SWAs occur in Rio Blanco County as does Oak Ridge SWA, which the Division also owns and manages.

At one time, this area in Colorado was known to contain the largest mule deer herd in the Nation. Over time the use of the Piceance Basin by deer has changed. This change in use has been generally attributed to several causes including lower deer population numbers, shifting of deer habitat preferences to favor other locations outside of the Piceance Basin, and by changes in human use primarily related to energy development.

The Piceance Basin (Basin) contains significant deposits of oil shale, nahcolite, natural gas, and other mineral resources (USGS, 1987). The greatest amount of mineral resource development in the Basin in the past and currently is related to increased energy resource (oil shale and natural gas) extraction and transport. Development of natural gas resources in the Basin has generally increased since the late 1980s. This is expected to continue over the next decade based on current trends for consumer gas use, the high price of natural gas, and estimates of the local reserves. The recent completion of major new pipelines and the repair and/or enlargement of existing pipelines and transport facilities will also continue to stimulate gas production in the area.

The Piceance Basin is also renowned for its significant oil shale deposits (USGS, 1987). The shale deposits are estimated to contain 1.2 trillion barrels of shale oil. Periodic efforts (boom-and-bust cyclic patterns) to extract oil from shale deposits have occurred over the past half century and continue in the 21st century due to the current price of oil. The proposed Shell parcel and water right exchange occurs in the vicinity of two earlier major efforts to develop oil shale, Federal Tracts C-a and C-b. Work on both lease tracts has been suspended since the 1980s.

During the last shale development phase, the Division exchanged lands with several energy companies. In some cases, the Division retained the water rights associated with the parcels that were exchanged due to the presumed future value of these (severed) water rights to the energy interests. The Division weighed the values of the habitat and access on those areas with the value and habitat to be obtained by those earlier exchanges. In the end, the Division completed a series of exchanges, which resulted in the creation of three new SWAs: Jensen, Garfield Creek, and Oak Ridge. Over the years, however, the Division has had difficulty managing the severed water rights at the Piceance SWA for wildlife purposes. The difficulty in management has resulted in numerous legal challenges to Division ownership and use. These water rights soon will be up for review by the Colorado Water Conservation Board due to inactivity.

The oil shale development and associated extraction experiments that have occurred since the original purchase of the Piceance Parcels resulted in the development of an extensive county road network on both private and public lands in the Piceance Basin. The road network has largely eliminated the earlier need for additional access to public land. It has also most likely been responsible for reducing deer populations in the area. Therefore, both original purposes for purchasing the Piceance parcels - to protect big game winter range and to provide hunter access - have diminished over time.

Due to the current market forces, oil and gas development has dramatically increased in northwestern Colorado. The Division does not own or control the subsurface mineral resources associated with the Piceance Parcels. The minerals are under the control of several different private companies and the BLM Minerals Management Division. Colorado state law provides that subsurface mineral right owners have the dominant estate over surface land owners in cases where the mineral and surface ownerships are severed (i.e., held by different parties). The subsurface minerals associated with the

Piceance Parcels and adjacent lands have been leased for mineral development. The net result is that habitat and future use of Division lands can and will likely be decided by the energy and mineral markets and federal mineral policy. These factors are beyond the control of the Division. Three draft environmental assessments are currently going through public review for oil shale pilot projects on nearby lands. These are adjacent to or in the near vicinity of the Piceance Parcels lands leased by the BLM to Chevron Oil and Shell Oil companies. These oil shale projects are scheduled to begin in 2007 (BLM, 2006). Other mineral resources such as Nahcolite (sodium bicarbonate-baking soda), along with significant quantities of halite (sodium chloride) and dawsonite (an aluminum-rich carbonate), have been the subject of mineral leasing and development proposals over the years. Some efforts to develop solution mining of nahcolite continue in the Basin.

SOCIO-ECONOMIC RESOURCES:

Population: The 2000 census found that Rio Blanco County had a total population of 5,986, with a total of 2,855 housing units. The county is largely rural and has two small towns. Meeker, located on the eastern side of the county and closest to the location of the exchange parcels, has a population of approximately 2,242 people with approximately 1,054 housing units. Rangely, located on the extreme western side of the county, has a population of approximately 2,100 people. Historic population growth in Rio Blanco County has occurred at a slower rate than the national average and is expected to continue to grow at an annual rate of 1.94 percent until 2025. Growth rates for the county could greatly increase, however, if projected oil and gas development continues.

Employment: The 2000 census found that there were 4,252 active jobs in Rio Blanco County. The largest percentage of these jobs was in the service sector. Government jobs were the second most common source of employment. Three other primary sources of income for county residents came from oil, gas, and mineral exploration and mining, agriculture, and tourism. The tourism/recreation industry is expected to provide a higher percentage of overall employment in the county in the future.

Income: The annual per capita income for Rio Blanco County was $26,039 in the 2000 census. By the year 2025, the annual per capita income is expected to rise primarily as a result of increased oil and gas development and increases in recreation and tourism. Agricultural-based income is expected to decrease over this same time period.

Hunting: Big-game hunting comprises a large percentage of Rio Blanco County's recreation income and greatly contributes to the revenue base of the local economies (Appendix F):

> *Piceance Parcels* - A large number of people annually hunt in Game Management Unit (GMU) 22 which primarily consists of Bureau of Land Management lands. GMU 22, though, also consists of deeded private property and all units of the Piceance SWA. Based upon a two-year average (2004-2005), a total of 273 resident deer hunters, 334 non-resident deer hunters, 1,419 resident elk hunters, and 1,248 non-resident elk hunters hunted in GMU 22. Annual total expenditures by these deer and elk hunters are estimated at $2,389,800 (Appendix D).
>
> *Shell Parcel* - A greater percentage of Rio Blanco County's big-game hunters annually hunt in GMU 23. GMU 23 consists of U. S. Forest Service lands, BLM lands, deeded private property, and Oak Ridge SWA. Based upon the same two-year average, a total of 488 resident deer hunters, 427 non-resident deer hunters, 2,130 resident elk hunters, and 2,577 non-resident elk hunters recreated in GMU 23. Total annual expenditures by these deer and elk hunters are estimated at $4,778,985.

ARCHAEOLOGICAL, HISTORICAL, & CULTURAL RESOURCES:

In July 2006, SWCA Environmental Consultants conducted a Class III cultural resource inventory of the Piceance Parcels (approximately 2,651 acres) owned and managed by the Division (SWCA, 2006). The inventory was conducted to identify any significant historic resources or properties located within the exchange parcels and to evaluate them for their eligibility for inclusion on the National Register of Historic Places (NRHP).

Forty cultural resources were identified during the inventory including nineteen prehistoric isolated finds, ten previously recorded prehistoric sites, five previously recorded historic sites, two newly recorded prehistoric sites, and four newly recorded historic sites. The isolated finds are not likely to yield important data on prehistoric or historic activity in the area and, therefore, are not considered eligible for inclusion in the NRHP.

Nineteen of the sites identified were recommended as not eligible for NRHP consideration due to the lack of association with significant persons or events, lack of information potential, disturbance that has compromised the integrity of the sites, or lack of distinctive methods of construction or design. Since these sites do not meet the criteria for inclusion in the NRHP, no further work is recommended.

One of the sites located on the Stakes Springs #2 tract is recommended as eligible for NRHP consideration due to its depositional potential by the SHPO, as well as the Service Region 6 Archaeologist (Appendix G). This suggests that the site may produce further information that can contribute to the knowledge of prehistory. Provisions are proposed, as part of the exchange, to protect the site and will be fully described in a site recovery plan to be prepared by Shell prior to any disturbance at the Stakes Springs #2 tract; they will be outlined in a separate agreement between the Division and Shell (Appendix E). Steps by Shell to assure this site is fully surveyed and documented will be completed within one year of closing on the real estate transaction.

PHYSICAL ENVIRONMENT:

Landscape

The Upper Colorado River Basin encompasses approximately 113,500 square miles in parts of Arizona, Colorado, New Mexico, Utah, and Wyoming. The Piceance Basin is located near the center of the Upper Colorado River Basin. The Piceance Basin is a large drainage composed of about 2.1 million acres characterized by mesas that are bisected by gullies and gulches cut by mostly intermittent and some permanent streams.

The Piceance Basin (Basin) includes four major drainages. Piceance Creek and Yellow Creek drain the northern part of the Basin and discharge into the White River; the exchange parcels occur within these two drainages. The Roan Creek and Parachute Creek drain the southern part of the Basin and discharge into the Colorado River.

Geological Resources

Approximately 48 million years ago during the Eocene Epoch, several large lakes covered thousands of square miles in parts of Wyoming, Utah, and Colorado. One of these lakes occupied two large

structural basins in northeastern Utah and northwestern Colorado and has been named Lake Uinta. At its maximum size, Lake Uinta covered about 22,000 square miles (about the size of Lake Michigan) and extended about 190 miles from east to west and as much as 110 miles from north to south.

Vast quantities of oil shale accumulated as organic-rich marls in the deeper parts of the lakes. These marls, which are hundreds of feet thick, accumulated in the eastern part of Lake Uinta, now known as the Piceance Basin in Colorado. Scientists believe that algae and bacterial detritus were buried with these sediments that drained into the lake and eventually solidified to form oil shale along with the formation of several other mineral resources.

The structural basin is a geologically downwarped region surrounded by uplifted regions which are common in the Rocky Mountain region. The downwarped region is a depositional basin filled with eroded sediments that have been consolidated to form sedimentary rock. The unusual longevity of Lake Uinta was made possible by continuous downwarping of the structural basins occupied by the lake. When downwarping ceased the basins filled rapidly with sediment and Lake Uinta disappeared about 40 million years ago. Some use the term "Piceance Creek Basin" to describe the part of the structural and depositional basin that lies between the Colorado River on the south, the White River on the north, the Douglas Creek arch on the west, and the Grand Hogback on the east.

Portions of the Exchange parcels that are occupied by bottomlands are comprised of an alluvium made up of mud, silt, sand, and gravel. Most of these alluvium geological materials were probably derived from nearby sources. The hillslopes are comprised of intertongued Uinta and Green River Formations (Eocene) materials. These tongues consist of mostly light-gray to white, variably silty marlstone; smaller amounts of local algal limestone; and some sandstone, siltstone, and claystone also occur.

Soils and Topography

The Piceance lands and water rights are located in drainages within the Piceance Basin (Piceance Creek, Ryan Gulch, Corral Gulch, Stake Springs Gulch, and Duck Creek). Therefore, the parcels are primarily comprised of bottomlands and alluvial fans with the edges and/or corners of the parcels extending up on adjacent hill slopes. The Piceance Parcel soils types are shown Appendix H. The data indicate that the main soil types in the Piceance Parcels are loams, loamy sands, and fine sandy loams. Outcrops occasionally exist, normally near the upper parts of adjacent hill slopes. No prime and/or unique farmlands occur within the Exchange parcels (NRCS, 2006).

Climate

The climate in the Piceance Basin is arid to semi-arid; normal annual precipitation in the Piceance basin ranges from about 12 to 20 inches. Average annual precipitation for Rio Blanco County is 18.76 inches. Precipitation, in the form of rain and snow, is the source of the water that replenishes stream-flow and recharges the ground-water reservoirs. Occasionally, precipitation events are quite intense and result in large amounts of runoff heavily loaded with sediment to rush down through the drainages. An estimated 98 percent of precipitation is lost through evapotransporation. The remaining water runs off rapidly and replenishes stream-flow or recharges the aquifers. The natural recharge replenishes the ground water that moves slowly toward sites of natural discharge along the streams.

Air Quality

Although specific air quality monitoring is not conducted throughout most of the Exchange area, air quality conditions are likely to be very good. This air quality results from a combination of factors:

relatively few air pollution emission sources (industrial, residential, etc.); good atmospheric dispersion conditions; and limited air pollutant transport into the area. In sum, these factors result in relatively low local air pollutant concentration (BLM, 2006). Energy companies are collecting air quality data at locations throughout the Basin (BLM, 2006). Air quality in Rio Blanco County, though, will undoubtedly be impacted by future potential energy developments. Rio Blanco County will be working (Rio Blanco Co. Planning Commission, 2006) with the energy companies to develop a plan for addressing and reducing predicted increases in air pollution and, therefore, decreased air quality in the area (BLM, 2006).

Water Resources

Additional details regarding all water and wetland topics can be found in Appendix I..

Water Rights and Surface Water Resources -

The Division owns nearly 60 water rights throughout the Piceance Creek SWA and 28 of these comprise the water rights that are a part of the Piceance Parcels. Eleven of the rights associated with the Piceance Parcels remain appurtenant to the land they were decreed to and 17 were severed in the late 1970s and early 1980s from the lands originally purchased (Appendix D-1). One of the Division's responsibilities has been to manage its portfolio of ditch rights, spring rights, and well rights for the beneficial use for wildlife. The Division also owns and manages surface lands that have both permanent and ephemeral water resources that support wet meadow and riparian wetland habitats, including the parcels that are the subject of this exchange. The Division's land management objectives include enhancing riparian characteristics where perennial flow persists, maintaining meadow habitats, and promoting healthy upland range habitats to minimize erosion and sedimentation.

The water rights associated with the Piceance Parcels are located within the Piceance and Yellow Creek drainages. Yellow Creek and its tributaries are where most of the land and water rights of this exchange are located. Piceance and Yellow Creeks are the only perennially flowing creeks within the Piceance SWA, although reaches of Yellow Creek (formed below the Stake Springs Draw / Corral Gulch confluence) are intermittently dry. Other major drainages within the SWA that contain water rights associated with the Piceance Parcels include tributaries to Yellow Creek (Stake Springs, Corral Gulch, Duck Creek) and Piceance Creek (Ryan Gulch). These tributaries go dry on occasion either during annual low flow or spatially with distance from source water. Groundwater discharge accounts for nearly 80 percent of total annual surface flow (SEO, 1978), highlighting the importance of spring flows for the maintenance of perennial water within the Piceance and Yellow Creek watersheds. Since the latest dry cycle began in circa 2000, baseflow (mean daily flows) in these tributaries indicate diminishing baseflow values.

Complex geomorphological responses to precipitation and runoff in many of the ephemeral (seasonally flow-limited) and intermittent (spatially flow-limited) drainages results in highly incised gullies and narrow within draw riparian resources with standing surface water. Because some of these gullies are incised more than 20 feet below the surrounding valley bottom, the beneficial effects of surface water are often confined to the bed of an incised channel. Some discontinuous gully erosion in many drainages also occurs.. This creates a stepped-character of many draws in response to erosional/depositional sequences. Where spring sources occur in a depositional area, the channel is wider or closer to the valley bottom elevation, enlarging the extent of the wetland/riparian character within a drainage. Many of the ditch water rights subject to this exchange were once used on depositional fill materials that created irrigable lands across valley bottoms. Subsequent stormflow and channel incision into these sediments destabilized both the headgate structures and the lands they irrigated.

The highest mean daily flows are short-duration spikes in streamflow caused by late summer thunderstorms; these 10 to 100-yr type storm events appear to be responsible for the discontinuous gullying observed in Yellow Creek and small tributaries in the region. Longer duration flows that occur due to rapid winter melt or rain on snow are primarily responsible for reworking the fine bed and bank materials deposited within the alluvial bottomlands.

Water Quality-

Water quality within the Piceance and Yellow Creek watersheds is highly variable due to the differences in the types and sources of flow. Surface runoff from hillslopes is typically generated by intense storms, sometimes in the form of rain on melting snow in spring, and thus carries a heavy sediment load, which subsequently increases the salinity load. Baseflows are dominated by source water from the bedrock aquifers, thus, water quality reflects the chemistry of the geologic parent material(s) that the water travels through. Surface water derived mainly from snowmelt contains less sediment and dissolved minerals, but may contain organic constituents derived from flow off agricultural land. In addition, return flows during the irrigation season on Piceance Creek increase the organic and nutrient components of flow.

BIOLOGICAL ENVIRONMENT:

Vegetation Resources

The Piceance Parcels are generally characterized by bottomlands and drainages, adjacent alluvial fans, and the lower slope and occasionally up to the top of adjacent, relatively low hills (see Appendix J). The vegetation occurring in the Exchange parcels is characterized predominantly by medium-tall (up to approximately 5-6 feet high) stands of big sagebrush *(Artemisia tridentata),* big rabbitbrush *(Chrysothamnus nauseous),* and greasewood *(Sarcobatus vermiculatus)* in the bottomlands. Lower big sagebrush (1-2 feet in height) occurs on the alluvial fans and feet of steeper slopes, which gradually grades into sparse pinyon-juniper woodland on the upper slopes and at the tops of hills. Four-wing saltbush *(Atriplex canescens)* and spineless horsebrush *(Tetradymia canescens)* are also subdominant components of many of the bottomlands. Sparse understory occurs in either the bottomlands or the hillslopes except for snakeweed *(Guteriezia* sp.), Indian rice grass *(Orhizopsis hymenoides),* and cheatgrass *(Bromus tectorum).* Apparently, habitat manipulations (fire) have been used in the past in a few locations to remove the thick growth of shrubs in the bottomlands. As a result, grasses such as Basin wild rye *(Leymus cinereus*) or, in some adjacent areas, crested wheatgrass (*Agropyron cristatum*) have revegetated these areas.

Although weedy species occurs sporadically throughout all of the parcels, no invasive weed infestations currently exist in and around the Piceance Parcels.

Wildlife Resources

A large variety of wildlife species can be found on the Piceance Parcels. Appendix K provides a complete list of the resident and migrating species which can be found on the Division Parcels.

Greater sage-grouse:
Greater sage-grouse occur in sagebrush and wet meadow environments in some areas of the Piceance Basin. Current populations are largely restricted to sagebrush areas located high on the southern end

of the Piceance Basin along the drainage divide between the Piceance drainage and the Parachute and Roan Creek drainages to the south as well as the Cathedral Bluffs to the western side of the Piceance Basin. These areas lie a considerable distance to the south and southwest of the Piceance Parcels included in this exchange. A few greater sage-grouse also occupy the sagebrush habitat around the Magnolia Oil Camp to the east of the Piceance Parcels included in this exchange. Sagebrush habitats currently occupied by greater sage-grouse in the Piceance Basin are generally located above the pinyon-juniper zone.

All the Piceance Parcels proposed for exchange are located in habitats mapped by the Division as Vacant/Unknown and are not believed to have been occupied by sage-grouse for some time. Historically, greater sage-grouse occurred in low elevation areas in the north-central Piceance Basin. Rogers (1964) reports sage-grouse lek activity at the 84 Mesa lek site during the 1950s and 1960s. This site is located within a mile to the northeast of the Corral Gulch parcels and south of the Duck Creek parcels. Other historic sites were located on Airplane and Wolf ridges, 3-4 miles west of the Stake Springs parcels. Division lek counts (Division unpublished data) indicate that strutting activity at the 84 Mesa site last occurred in the early 1980s. Leks on Airplane and Wolf ridges have also been inactive for a number of years. The nearest currently active lek is located on Bar D Ridge at least 2.5 miles southwest of the closest Division parcel. Most greater sage-grouse in the Piceance Basin are believed to nest within 2 miles of leks.

Greater sage-grouse use in the lower elevation portion of the Piceance Basin close to the Piceance Parcels has ceased as occupied range for the population has contracted to the south and to higher elevations. Advanced vegetation succession by pinyon-juniper and mountain shrub types, as well as past industrial activity, are believed to have contributed to this range contraction. No sage-grouse use has been documented on any of the exchange parcels for many years, although they probably provided some nesting and winter habitat historically, and brood rearing habitat in wet meadows along the stream courses. The small and scattered nature of these parcels makes their future suitability for greater sage-grouse subject to habitat conditions on the broader land ownership matrix surrounding the parcels. They cannot be effectively managed for sage-grouse habitat independently.

Two grouse species, greater and Columbian sharp-tail, historically occurred on the Piceance Parcels (Appendix K). Although these species could occur on the parcels, current populations of these species are restricted to locations that lie quite some distance away. Both species are known to occur in habitat that differs significantly from the parcels. Two locations of sharp-tailed grouse have been reported in the Piceance Basin: one on the Cathedral Bluffs in the 1960s and the other near the Magnolia Camp in 2004. Both were in areas quite a bit higher in elevation than the Piceance Parcels, where more moist sagebrush grasslands and mountain shrub communities predominate. It is unlikely that Columbian sharp-tailed grouse made extensive use of the Piceance Basin historically and no locations have occurred in proximity to any of the Piceance Parcels. The distribution of habitat types preferred by sharp-tailed grouse away from Piceance Parcels makes it highly unlikely that any of the parcels has ever supported Columbian sharp-tailed grouse.

The Service has reviewed petitions to list both greater and Columbian sharp-tail grouse under the Endangered Species Act and have concluded that neither bird warrants listing at this time (www.fws.gov).

Riparian Habitats:

Several of the Piceance Parcels (Stake Springs, Corral Gulch, and Duck Creek particularly) support live surface water drainages and narrow herbaceous riparian areas. Riparian shrubs and trees are not present to any great extent on any of the parcels. These riparian areas are in short supply in the

Piceance and Yellow Creek drainage systems and provide valuable habitat to migrating waterfowl and shorebirds, as well as many other species of wildlife. The small and scattered nature of these parcels makes it difficult to manage riparian habitats effectively in many cases, however, because much of the drainage lies on lands managed by other owners. Most of the drainages are deeply incised, limiting the potential for substantial expansion of riparian influence zones on the Piceance Parcels.

Several of the Piceance Parcels are classified as mule deer summer and winter range, as well as elk summer range. During fall migration, deer move into the area and remain there until late April. Elk may use a large portion of the Piceance Basin for production, including Stake Springs #1 and #2, Duck Creek #1, and the Corral Gulch #1 tracts. Appendix M shows the potential use and distribution of deer, elk, and sage grouse in this part of Piceance Basin. Historically this area supported the largest deer herd in the country. This part of Colorado was a favorite area to hunt deer and elk. More recently deer and elk herds have diminished in the Piceance Basin; presumably large numbers of deer and elk have left the basin over the past 20-30 years due changes in land use, which have been attributed to increased energy resource development in the area.

SPECIAL STATUS SPECIES:

The following table lists the federally listed and candidate species per the Endangered Species Act for Rio Blanco County:

Birds-	Bald eagle (Threatened) Yellow-billed cuckoo (Candidate)
Mammals-	Black-footed ferret (Endangered) Canada lynx (Threatened)
Fish & Amphibians-	Bonytail chub (Endangered) Colorado pikeminnow (Endangered) Humpback chub (Endangered) Razorback sucker (Endangered)
Plants-	Dudley Bluffs twinpod (Threatened) Dudley Bluffs bladderpod (Threatened) Graham's beardtongue (Candidate) White River beardtongue (Candidate)

Wildlife -

The Bald eagle (*Haliaetus leaucocephalus*) tends to utilize the Piceance Parcels as part of its wintering grounds. The Division is not aware of any communal night roosts. The birds use suitable trees along the White River (north of the parcels) for nesting. They also occasionally use suitable trees along the Piceance Creek as hunting perches. Very occasionally, Bald eagles have been observed in the upland areas hunting for carrion.

Yellow-billed cuckoos could possibly occur in upland shrub habitat; however, the closest known occurrence of these birds was noted in Hayden, Colorado in Routt County approximately 60 miles northwest from the Exchange parcels. Yellow-billed cuckoo are quite rare in northwestern Colorado, although occasional pairs are located in the Yampa River riparian areas east of Hayden, CO. The birds are occupants of old growth riparian cottonwood stands with dense understories (Righter et al. 2004). The closest areas providing these habitat conditions occur along the White River above the mouth of Piceance Creek. The exclusively herbaceous nature of riparian areas on the Piceance Parcels makes it exceedingly unlikely this species is located on any of the parcels.

No protected fish species occur in aquatic habitat within the Piceance Parcels. Canada lynx and black-footed ferrets do not currently occur in the vicinity of the Piceance Parcels.

Plants -

Two federally protected plant species are known to occur in geological formations that are common in this part of the Piceance Basin: Dudley Bluffs bladderpod (*Lesquerella congesta)* and Dudley Bluffs twinpod (*Physaria obcordata)*. Both of these plant species are members of the mustard family (Brassicacea) and are known to occur in small populations on barren, white shale outcrops derived from the oil-bearing shale of the Green River and Uinta Formations in Colorado. They are currently listed as "Threatened" in their known range which includes the Piceance Creek, Yellow Creek, and Lower White River drainages within the Piceance Basin in northwest Colorado. A recovery plan has not been recently approved for either species. During a recent survey the occurrence of Dudley Bluffs bladderpod was verified on both Duck Creek exchange parcels (Appendix E).

Graham's beardtongue and White River beardtongue are not known to occur in this part of Rio Blanco County.

FLOODPLAINS AND WETLANDS:

Floodplains and wetlands within Yellow Creek and regional tributaries are the result of re-sorting of depositional materials following significant geomorphic events, as previously described. The resulting topography reflects these sequences of scour and fills within draws, creeks, and across valley bottoms. Floodplains are spatially discontinuous and most often occur where a source of perennial water – generally near springs – enables vegetation to grow and stabilize the bank and floodplain of a newly formed channel. Floodplain wetlands are a common feature in the Yellow Creek drainage, with generally larger and more continuous wetland complexes in the downstream direction from the location of the Piceance Parcels.

Floodplains on Piceance Creek are generally a more permanent landscape feature due to the stabilizing influence of long-term agriculture within the Piceance Creek bottomlands. A substantial wetland/wet meadow complex exists at the mouth of the Dry Fork on the Square S parcels. However, Piceance Creek is also defined by the destabilizing influences of very high, but infrequent peak flows, fine soils, and intensive grazing in most of the bottomlands. Changes in the base level of the channel can be observed throughout the drainage. Channel down-cutting below the Burch No. 2 headgate results in a vegetative conversion toward more mesic pasture grass versus the facultative and wetland obligate species that occur upstream.

Wetlands on the Piceance Parcels are stratified to indicate their general size and character (Appendix D-2). All vegetated wetlands would be characterized as "palustrine emergent" (USFWS, 1979). Wetlands on the Piceance Parcels are dominated by sedge, rush, and wet-meadow grass species (e.g., *Scirpus* spp., *Juncus* spp., *Typha* spp., *Distichlis* spp., *Sporabolus* spp.) and either wetland obligates or facultative species (USFWS 1988). Salinity in the form of calcium and sodium carbonates also affects species composition with increasing sodium in the downstream direction on both Yellow and Piceance Creeks. Most are seasonally or semi-permanently flooded with duration of saturation corresponding closely to hydrologic conditions of the source water. Riparian wetland communities are those well defined on the floodplains of Piceance and Yellow Creeks. In addition, non-vegetated waters under the jurisdiction of the U.S. Army Corps of Engineers pursuant to the Clean Water Act (COE, 1987)

include the ephemeral washes on Ryan Gulch, Stake Springs Draw, Corral Gulch, Duck Creek, and reaches of Yellow Creek not supported by a perennial water source.

No wetlands occur on the Shell Parcels at the Oak Ridge SWA. A few minor springs and seeps do occur, however, on these parcels. Any water rights associated with these areas are not part of the exchange.

IV. ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES A AND B:

ALTERNATIVE A (PREFERRED ACTION) (*Exchange of Identified Lands and Water Rights)*

After the exchange, the Division would no longer own and manage several small disjunct parcels that currently comprise the Piceance SWA in northwestern Colorado. The Division would be left with a more contiguous state wildlife area in the Piceance Basin. The Piceance Parcels are part of what was once an important deer use area both in Colorado and in our country. Over the past several decades, changes in deer use on the Piceance Parcels have been influenced by changes in the intensity and types of other land uses. The cyclic natures of energy development and drought have been the two overriding influences to the environment in the Piceance Basin over the past 50 years. Currently, the increasing development of energy resources in the Piceance Basin appears inevitable given demand for these resources, the resources available, and trends toward increasing prices for oil and gas. Due to this expected development, the Division anticipates increased impacts to deer and elk in the area, ultimately resulting in a decreased benefit to the public for hunting on these parcels.

Although the Division would exchange 28 water rights with Shell, the Division would also no longer need to be concerned with the costly maintenance of 17 of those severed water rights. Also, Shell would obtain several wetlands owned and managed by the Division. These water rights and wetlands currently exist as part of tracts that occur as disjunct parcels that comprise the Piceance SWA.

Shell and the Division have entered into an agreement to assure continued and thorough study of one identified cultural resource site at Stake Springs #2 (SWCA, 2006), as well as long-term protection of populations of one federally protected plant species at Duck Creek #1 and #2 (Appendix E).

Shell has not indicated plans to immediately develop the individual Piceance parcels. It does seem likely, however, that current plans for oil shale development will be undertaken by Shell in the near future if pilot oil shale project results are favorable (BLM, 2006).

The Shell Parcels that the Division will acquire through the exchange will add important high quality deer and elk habitat at Oak Ridge SWA and will ultimately enhance hunting opportunities in the adjacent White River drainage. The proposed exchange resolves a significant in-holding issue on the Oak Ridge SWA. Completion of the exchange also addresses other use conflicts and provides the options to use grazing management to improve big game habitat in the Oak Ridge SWA. The Division will not obtain the subsurface mineral rights as part of this Exchange; the mineral rights are currently privately owned. However, mineral resources in this part of Rio Blanco County are known to not be as substantial and to be located much deeper below the surface than those of the Piceance Parcels. This would make these resources much less economically viable to development. Only minor seeps and springs are located on the Shell Parcels; the water rights associated with these are not included in the exchange.

The Division believes it will not be able to effectively protect wildlife or public values on a short-term or long term basis on the Piceance Parcels due to imminent oil shale and energy development activities adjacent in the area, as well as the fact that the Division does not control the subsurface mineral rights for these parcels. Under these circumstances, the Division believes it is prudent to protect and enlarge those properties it owns with the highest wildlife values, greatest opportunity for use of management practices to enhance wildlife habitat, and that are least likely to be impacted by energy resource development in the future.

ALTERNATIVE B (NO ACTION)

If the No-Action alternative occurs, the Division would retain ownership and management of the Piceance Parcels that are disjunct from the larger portions of the SWA. The Division would still face difficulties in managing these areas. Under the No-Action alternative, the Division would need to expend funds to develop and/or improve extensive water diversion structures and facilities for maintenance of the 17 severed water rights to retain them or to abandon them. The Division's expenditure of funds to develop water use facilities required to maintain these selected rights would come from funds that could be used to benefit wildlife at other locations or on other project purposes. Ultimately, the Division may need to abandon the water rights due the high cost of maintaining these water rights.

In the end, whether or not this exchange occurs, the Division has little to no ability to protect the Piceance Parcels (lands and water rights) since it does not own the underlying mineral rights. Both lands and water rights comprising the Piceance Parcels would likely be subject to subsurface mineral development by other owners. Future subsurface mineral resource development could still have serious impacts to the identified cultural resource at Stakes Springs #2 tract and the occurrence of one federally listed plant species on the Duck Creek tracts. At that point, little to no protection would be afforded these two resources. Development of subsurface mineral resources on the Piceance Parcels could result in impacts to not only surface water quality, but also possibly ground water quality. Any impacts to the water resources by energy development would need to be documented and mitigated for in the future by the mineral rights lessee.

Shell has obtained the Shell Parcels at Oak Ridge SWA in anticipation of the exchange with the Division. If the No Action alternative occurs, the Shell Parcels would most likely be disposed of to a private party by Shell, since the Division would not be able to purchase them. Therefore, the Division would still have the same in-holding and grazing management problems at the Oak Ridge SWA, which would continue to limit the Division's ability to effectively manage the Oak Ridge SWA. Also, the Division would not be able to obtain big game habitat with high wildlife values in the Oak Ridge SWA area.

In summarizing the Division's decision for proposing the exchange, it appears evident that when assessing the future of the Piceance Basin in terms of potential for energy development, the Proposed Action would cause the least adverse overall impacts to wildlife while providing the most public benefit. A summary of potential impacts to identified impact topics is provided below for both alternatives in Table IV-1.

Table IV-1. Summary Table of Potential Impacts to Identified Impact Topics.

Impact Topics	Impacts by Alternative	
	Proposed Action	No Action

WILDLIFE	**Piceance** – Big game species (deer and elk) could continue to experience impacts from energy development and drought. The Division would retain more contiguous properties, which would improve management of the remaining parcels and water rights comprising the Piceance SWA **Shell** - Land with higher wildlife values (improved habitat/migration corridors), and located further from future potential energy development would be acquired. In-holding issues would be resolved; management benefits for the Division would include grazing opportunities to improve wildlife habitat.	**Piceance** - Potential energy development will continue to cause decreased deer and elk populations. The Division would still have management conflicts with the disjunct Piceance Parcels. **Shell** - Lands higher wildlife value (habitat /migration corridors) would not be protected or managed. In-holding issues would still exist for the Division. The Division would not obtain management opportunities to use grazing to improve big game habitat
WATER RESOURCES	**Piceance** - Twenty-eight water rights (11 appurtenant; 17 severed) are included in the exchange. Management conflicts with disjunct parcels will be resolved. The Division would not have to maintain costly severed water rights. **Shell -** Water rights are not included.	**Piceance –** The Division would still have management conflicts with disjunct parcels with water rights. The Division would still need to maintain costly water rights.
WETLANDS	**Piceance** - Wetland areas associated with water rights could be impacted by potential energy development. **Shell** - Minor new seeps and small springs, would be acquired.	**Piceance -** Wetland areas could still be impacted by energy development since the Division does not own the subsurface mineral rights **Shell –** Minor seeps and small springs would remain unchanged.
SPECIAL STATUS SPECIES	**Piceance** - One threatened plant species could be impacted on the Duck Creek #1 and #2 tracts. The Division and Shell have entered into a agreement for the long term protection of this species and its habitat (MOU 2007)	**Piceance** - One threatened plant species could still be impacted on the Duck Creek #1 and #2 tracts since the Division does not control the subsurface mineral rights. This species would not be afforded any long term protection.
CULTURAL RESOURCES	**Piceance** - One cultural resource site could be impacted at Stake Springs #2. Negotiations with Service and SHPO have determined that the best course of action is for Shell to assure further study and documentation of this finding (MOU 2007). A Site Recovery Plan will need to be prepared and additional survey work will be conducted per approved specifications.	**Piceance** - One cultural resource site could still be impacted on the Stakes Springs #2 tract since the Division does not control the subsurface mineral rights. This site would not be afforded any additional study and documentation.

Cumulative Impacts

A cumulative impact on the environment results from incremental effects of present proposed actions when considered in light of past, present, or reasonably foreseeable future actions, regardless of who implements them. Cumulative impacts can result from individually minor but collectively significant

actions taking place over time. An important question in the current NEPA analysis is whether the present proposed action is likely to result in an unintended, but significant cumulative effect.

Past boom-and-bust cycles of energy development in the Piceance Basin have most likely resulted in diminished big game populations and overall wildlife values in this area. With the current increase in energy resource development in the Basin, apparently big game herds in this area will continue to diminish. The Division does not own the subsurface mineral rights under the Piceance Parcels so is not able to control future development of these minerals and resultant significant impacts to wildlife values in this area. If this was to occur, any chance to protect big game habitat, special status species, and cultural resources occurring on public lands would be lost.

This exchange would aid the Division in the management of public lands in the Piceance Basin and the White River drainage. The Division would no longer need to manage disjunct tracts and water rights in the Piceance Basin and, as a result, would retain a more contiguous Piceance SWA. Any cumulative loss of hunting lands accessible to the public in the Piceance Basin through the exchange would be offset by the availability of additional hunting areas with much higher wildlife values at Oak Ridge SWA.

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APPENDICES