

The results shown in Table 4-10 indicate that potential BLM sources, along with existing inventory sources, could result in a perceptible or “just noticeable” impact (1.0-dv reduction) on visibility at several of the PSD Class I areas in the study domain. Results of an analysis using the USFS threshold of 0.5-dv change may be found in the TSD (Trinity 2004). As with the five alternatives analyzed, the Class II areas have no visibility protection under existing State or Federal laws but are included to provide decision-makers with a more complete picture of potential impacts throughout the region.

Refined Analysis. Because the screening visibility showed potential impacts at one or more Class I areas, a daily refined analysis was conducted based on hourly IMPROVE (2002) optical monitoring data measured at Canyonlands National Park for the years 1986-2002. Daily optical values were calculated based on at least 6 hours of valid data each day (Archer 2002, per Trinity 2004). Also, the maximum relative humidity was limited to no more than 90 percent. The basis for limiting aerosol growth at 90 percent relative humidity is that direct optical monitoring devices are not reliable at humidity values above this level, and measurements above 90 percent were not reported as “valid” by the IMPROVE data contractor.

Air Resource Specialists, Inc. (2002, per Trinity 2004) states that these data are not labeled as valid because “...small random temperature or absolute humidity fluctuations along the path can lead to condensation of water vapor causing meteorological interferences. Thus, in accordance with the philosophy expressed above [viz., of ensuring that impacts are not underestimated], the 90 [percent] relative humidity limit was selected for this test.” Therefore, the maximum relative humidity was limited at 90 percent for optical data comparison. Again, the FLAG 1.0-dv (10 percent change in extinction) “just noticeable change” cumulative source threshold was used to assess the significance of potential impacts. The results of the refined modeling analysis are also presented in Table 4-10.

Note that the refined visibility results show that operations of proposed BLM and Inventory sources could result in a “just noticeable” (1.0-dv reduction) impact on visibility at only one Class I area (the Black Canyon of the Gunnison; maximum potential impact is 1 day). No BLM sources (Vernal and Glenwood Springs) cause significant impacts to this, or any, Class I area.

Acid Neutralizing Capacity. Where background lake chemistry data were available, an analysis of potential changes to ANC was performed using the procedure recommended by the USFS (2000). This screening methodology takes deposition values of sulfur and nitrogen estimated by CALPUFF and converts these values into a potential change in the ability of a given lake to neutralize acid precipitation. These values were compared to a 10-percent change in ANC for lakes with background ANC values equal to, or above, 25 µeq/L. For lakes with background ANC values less than 25 µeq/L, the threshold is no more than 1.0 µeq/L total change in ANC.

The results indicate that none of the lakes analyzed would be adversely affected by modeled sources.

4.3 BIOLOGICAL ENVIRONMENT

4.3.1 Upland Vegetation and Riparian/Wetland Areas

Introduction

A number of management actions proposed for incorporation into the RMP have the potential to impact native vegetation. Two categories of actions are described and assessed by alternative below. The first category includes management actions directed at vegetation resources. The second category includes other proposed management actions such as oil and gas development, livestock grazing and range management, and travel management.

Native vegetation in the Planning Area is conceptually subdivided into the general

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community types described and quantified by area in Section 3.3.1. A distinction is made between upland vegetation and those areas classified as riparian/wetland areas. Additionally, noxious weeds are considered a separate vegetation category. These distinctions are carried through the following discussion.

For oil and gas development, assumed numbers of wells and well pads and acres of surface disturbance associated with wells, roads, and pipelines under the five alternatives are taken from Table 4-1. Extent of existing and proposed surface-use stipulations are also shown in Table 4-1 and described in Table 2-1. For this analysis, estimated disturbance areas are assumed to be distributed among upland and riparian/wetland communities in proportion to their relative area, unless otherwise restricted by surface-use stipulations.

Direct impacts to upland vegetation are considered to include disruption or removal of rooted vegetation resulting in a reduction in areas of native vegetation; reduction of total numbers of plant species (species richness) within an area; and/or reduction or loss of total area, diversity, structure, or function of wildlife habitat. Direct impacts to riparian/wetland areas include those expressed for upland vegetation as well as increased sedimentation due to local surface disturbance, soil and bank erosion, and changes to channel morphology.

A number of indirect impacts to vegetation resources are possible as a result of proposed management actions. Potential indirect impacts include disruption or reduction of pollinator populations; loss of habitat suitable for colonization due to surface disturbance; introduction of noxious weeds by various vectors or conditions that enhance the spread of weeds; and general loss of habitat due to surface occupancy, surface compaction, or trampling. Uprgradient physical disruption can result in sedimentation into occupied habitat and/or potential habitat. Failed reclamation or mitigation may also cause indirect impacts to these resources. Indirect impacts to riparian/wetland areas also include disruption of hydrological processes, decreased ability to trap

sediments and nutrients and to moderate surface flow, decreased infiltration for groundwater recharge, increased run-off, and focused grazing pressure or wildlife use in less-impacted riparian/wetland areas. Additional indirect impacts from increased erosion and sedimentation could occur to riparian/wetland areas located downgradient from surface disturbances, even if the resource itself may be purposely avoided to reduce direct impacts.

Most indirect impacts are assumed to result from direct impacts in proportion to the relative amount of surface disturbance.

Cumulative impacts are discussed in terms of past, present, and future actions in non-BLM portions of the Planning Area and the surrounding region, as well as the additive effects of multiple management actions on vegetation resources. For this discussion, this region is considered to be the area comprising two large regional watersheds that define the regional vegetation map: Parachute-Roan Creek and Colorado River-Plateau Creek (Section 3.3.1).

For the following analysis, implementation of all general mitigation measures listed in Section 2.2 are assumed for areas designated SSR/CSU or with standard restrictions and limitations. Some of the latter include areas subject to permit-level special mitigation requirements to reduce long-term impacts and enhance reclamation of temporary impacts. For any of the SSR/CSU areas under all alternatives and special management areas under Alternatives II through IV, site revegetation would require that an entity causing a permitted ground-disturbing activity:

1. Drill seed the disturbed area with a seed mix of species native to the local area at a rate of 100 seeds per square foot (rate would be doubled for broadcast or hydroseeding where drill seeding is impracticable) following adequate soil preparation that includes removal of annual weeds, decompaction (“fluffing”) of compacted soil, and harrowing to prepare the seedbed.

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2. Seed disturbed areas in fall or early winter (depending on elevation) to exploit elevated moisture normally available in winter and spring as an aid in germination and seedling establishment.
3. Mulch seeded areas with certified weed-free native hay or straw.
4. Control all listed noxious weeds until the site is returned to the desired condition.
5. Plant containerized native shrubs and trees (as appropriate based on the surrounding plant community) when conditions warrant following successful noxious weed control, in natural-appearing groups at a spacing that approximates the structure of local plant communities.
6. Fence revegetated well pads to exclude livestock grazing for a minimum of 2 years.

Standardized definitions were used to categorize impacts of specific management actions on vegetation resources. A range of areas of estimated disruption is associated with each category. When quantitative analysis is not possible, categories are based upon the potential physical impacts in terms of Colorado Land Health Standards (Appendix F). For riparian/wetland vegetation, these categories are based on the potential physical impacts in terms of Colorado Land Health Standard #2. For upland vegetation, these categories are based upon the potential physical impacts to this resource in terms of Colorado Land Health Standard #3.

The following general terms are used to define levels of adverse impacts to vegetation:

- **None** – Effects unlikely to impair the resource value. No physical disruption to resources.
- **Negligible** – Detectable effects would last no more than 1 year (i.e., not detectable after one full growing season) and are unlikely to be noticeable in terms of Land Health Standards. A more severe impact may be

negligible if it is temporary (duration <2years).

- **Minor** – Total area of disruption less than 5 percent of the resource. May result in noticeable but not substantial impairment of the resource value in terms of Land Health Standards. Effects may be of concern to the general public.
- **Moderate** – Total area of disruption 6 to 15 percent of the resource. May cause substantial impairment of the resource value in terms of Land Health Standards. These effects may increase over time or be long-term or permanent. Effects are likely to be visible and may be of concern to the general public.
 - **Major** – Total area of disruption greater than 15 percent of the resource. Likely to cause substantial impairment of the resource value in terms of Land Health Standards. These effects may increase over time, or be long-term or permanent. If negative, they would likely result in unmitigatable impacts regulated by major environmental laws such as the ESA. Effects would be highly visible and of concern to the general public.

The same terms are applied in a more relative sense to describe beneficial impacts.

Table 4-11 summarizes impacts to upland and riparian/wetland vegetation under the five alternatives.

4.3.1.1 Alternative I

Under Alternative I, the general objective is to maintain current ecological values and processes and biological diversity under existing management direction and activities. This analysis assumes that resource condition and trends described in Section 3.3.1 would continue.

Table 4-11. Summary of Impacts to Upland and Riparian/Wetland Vegetation by Alternative

Management Action	Alternative				
	I	II	III	IV	V
Upland Vegetation Management	Minor to Moderate (-)	Moderate (+)	Minor to Moderate (-)	Minor to Moderate (-)	Moderate to Major (-)
Riparian/Wetland Vegetation Management	Minor to Moderate (-)	Major (+)	Moderate (+)	Moderate (+)	Moderate to Major (-)
Rangeland Management	Minor (+)	Moderate to Major (+)	Moderate (+)	Moderate (+)	Moderate (-)
Travel Management	Localized Major (-)	Moderate (+)	Moderate (+)	Moderate (+)	Moderate (+)
Oil and Gas Development	Minor (-)	Minor (-)	Minor (-)	Minor (-)	Minor to Moderate (-)

¹ Does not include special status plant species or plant communities; see Section 4.3.3.

Direct and Indirect Impacts

Vegetation Management Actions — Under continuing management actions, the condition of upland vegetation communities above the rim would be expected to continue to be good. The only exception is the trend for noxious weeds. Under existing noxious weed management (Section 3.3.1.3), such populations are expected to increase in frequency, density, and diversity over the time period of this analysis. This presents the potential for minor to moderate negative impacts to these resources if noxious weed populations invade and expand into native plant communities.

Some upland communities below the rim would most likely continue in fair to poor condition with a declining (decreasing) trend. Noxious weeds would be expected to increase below the rim as well. Over time, this would result in minor to moderate negative impacts to most of these communities.

Most riparian/wetland areas could be expected to be at PFC, or FAR in an upward trend, or to make progress toward meeting land health standards if precipitation levels are adequate, riparian restoration projects are implemented, and rangeland improvements continue to be realized. However, continuing increases in noxious weed population frequency, density, and

diversity are expected under current management actions. Over time, this would result in minor to moderate negative impacts to most of these communities.

Range Management Actions — Continuation of rangeland projects and administrative solutions (season-of-use revisions, stock level adjustments, pasture exclusions and utilization stipulations) are expected to result in continuing, gradual, long-term improvements to range condition and trend. In addition, this alternative would include high-intensity monitoring of allotments where resource conflicts have been identified. However, land treatments are only required for those allotments not meeting a minimum ecological condition rating of 40 percent (failing standards). These actions would be expected to result in minor positive impacts to both upland and riparian/wetland vegetation.

Travel and Recreation Management — The no-action alternative would allow the most unrestricted travel throughout the Planning Area (Section 2.4.1). All of the area would be open to cross-country and motorized or mechanized travel. Based on current levels of use in the Hubbard Mesa area and expected increased recreational use of the Planning Area, this could be expected to result in increasing numbers of pioneered roads. Such roads could result in major, localized direct impacts where upland

and/or riparian/wetland vegetation is removed, as well as indirect impacts from fragmentation of communities, and may in turn cause a loss of ecological processes and habitat structure and function, and increased spread of noxious weeds (Harris and Silvea-Lopez 1992, Zink et al. 1995).

Oil and Gas Development — Although no new oil and gas (or other mineral) leasing would occur on top of the plateau, an estimated ten new wells on seven new pads would be located on existing leases in this area, resulting in approximately 31 acres of long-term surface disturbance from pads and supporting roads (Table 4-2) and minor impacts to vegetation resources. The remaining area, representing more than 99 percent BLM lands atop the plateau, would not be subject to these impacts.

Below the rim, 28 percent of the area (10,912 acres) would remain unleased (Table 4-1), resulting in no impacts from oil and gas activities. Continued development of areas currently leased for oil and gas would cause an estimated 1,120 acres of long-term impacts to areas below the rim, representing 2.9 percent of this part of Planning Area. An additional 730 acres (1 percent) of temporary impacts are also estimated. The total area of ground disturbance below the rim represents 4.8 percent of this area. These actions would result in minor impacts to portions of the pinyon/juniper woodlands and sagebrush shrublands below the rim

Alternative I would protect 60.1 percent of BLM lands in the Planning Area (44,267 acres) in no-lease areas, 18.9 percent (13,912 acres) with NGD/NSO stipulations, and 11.2 percent (8,256 acres) with SSR/CSU stipulations (Table 4-1). The remaining 9.7 percent (7,167 acres) would be available for oil and gas development with standard lease terms. Assuming the application of special reclamation mitigation actions to SSR/CSU areas and that BLM causes proposed ground-disturbing activities to be located to avoid and protect riparian vegetation, these actions are expected to result in minor impacts to vegetation resources. It is possible that steep slopes such as occur in this area can preclude relocation as far from a stream corridor as might

otherwise be preferable. In these cases some amount of riparian vegetation would be negatively affected, but the number and magnitude of such cases is expected to be small.

A portion of the estimated long-term disturbance from oil and gas development under this alternative is associated with construction or widening/improving 152 miles (513 acres) of access roads (Table 4-3). The portion of new versus widened access roads cannot be determined at this time. In addition to the direct impacts of vegetation removal, these roads will indirectly impact vegetation resources by fragmenting communities and creating increased opportunities for invasion by noxious weeds. These impacts will be cumulative to those estimated in the discussion of travel management, above.

Offsite and Cumulative Impacts

Future development of oil and gas on non-BLM portions of the Planning Area and adjacent areas is assumed to result in impacts similar to those from development on BLM portions. These cumulative impacts would be greater if reclamation of short- and long-term disturbances and avoidance of riparian areas were not performed to the standards discussed above. Reclamation on private lands is negotiated between the landowner and oil and gas operator and may therefore be less stringent in terms of plant species composition, cover, or structure. Failure to perform adequate reclamation or avoid riparian/wetland areas could result in indirect impacts to BLM lands by creating a seed source for noxious weed infestations or contributing to sedimentation in riparian areas. Degradation of these areas would also cause a decrease in the areal extent of vegetation communities and in the quality of wildlife habitat and human recreation experience throughout the area.

Offsite impacts could occur if the Planning Area becomes a source for noxious weed invasions of contiguous sites. This is not likely, as the infestation of surrounding areas is expected to be similar to that on the Planning Area. However, if more pristine sites do occur in the vicinity,

and management actions do not discourage proliferation of noxious weeds onsite, the Planning Area could become a source for these plant species. This would be especially true in areas where human traffic or wildlife movement would move weed seeds into new sites.

All of the potential negative impacts discussed for riparian/wetland areas within the Planning Area are cumulative, with prior degradation of these areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and drought effects (Section 3.3.1). These negative factors are assumed to be present and unmitigated in many riparian/wetland areas in the surrounding region as well. Therefore, negative impacts that may result from management actions under this RMP have the potential to be cumulatively greater than when assessed in isolation.

Regardless of management actions within the Planning Area, direct and negative impacts to native vegetation will result from ongoing human development throughout the general region, which will bring new roads, housing projects, commercial development, and increasing recreational use of wildlands. The same indirect impacts to native vegetation discussed above will also result. In many cases, the loss or fragmentation of native plant communities is highly visible. These impacts will continue on a regional scale and will be in addition to impacts expected from land uses and resource management activities in the Planning Area. If negative impacts to these resources continue to increase as expected, their condition on public lands will become even more important because of their intrinsic value, the biodiversity they represent, and the continuation of the ecological values they support.

Summary of Impacts and Mitigation

Several management actions proposed in this alternative would simultaneously affect upland and riparian/wetland vegetation. These include direct management of the resources themselves as well as management of noxious weeds, travel, grazing, and oil and gas development. Potential impacts to upland and riparian/wetland

vegetation are discussed above and summarized in Table 4-11.

4.3.1.2 Alternative II

Under Alternative II, ecological values and processes and biological diversity would be protected by limiting surface disturbance and promoting natural ecosystem processes and functions in all systems.

Direct and Indirect Impacts

Vegetation Management Actions — The condition of upland vegetation communities throughout the Planning Area would be expected to continue to be good, moving in an upward trend due to specific focus on achieving goals for diverse native composition and production on upland sites. This includes using only native species in revegetation seed mixes and emphasizing natural processes to rehabilitate or restore natural plant communities.

This is the only alternative with a stated emphasis on noxious weed inventory, detection, and monitoring. These management actions will allow for a far more focused and effective application of the current weed management program by providing data and information upon which to base a number of important decisions such as incipient population locations, priority-to-control strategies, and the efficacy of different integrated methods for particular species and locations. Over time, this combination of management actions would indirectly have a moderate positive impact on upland vegetation.

Riparian areas and river corridors are a focus of protection and management under this alternative. This includes a specific objective for maintaining proper hydrologic function and protection of areas adjacent to these resources. Due to these protections and specific management actions, a large number of riparian reaches would be expected to return to PFC over time, resulting in major positive impacts to riparian/wetland areas within the Planning Area.

Range Management Actions — Administrative solutions (season-of-use revisions, stock level adjustments, pasture exclusions and utilization

stipulations) would be emphasized over rangeland projects for meeting resource management objectives. These are expected to result in accelerated progress towards meeting or achieving land health standards in terms of long-term improvements to range condition and trend than the other four alternatives. In addition, Alternative II provides for high-intensity monitoring of highest-priority allotments and allotments not meeting land health standards. Allotment management plans would be developed for several situations, including not meeting, or having identified issues in meeting standards and direct conflicts with wildlife, watershed, and riparian/wetland, botanical, or wilderness values. Land treatments would be required for those allotments not meeting a minimum ecological condition rating of 70 percent. Generally improving range condition and specific management of sites with vegetation resources in conflict with livestock management would produce moderate to major positive impacts to both upland and riparian/wetland vegetation resources over time.

Travel and Recreation Management — Although an SRMA for OHV use would be designated in the Hubbard Mesa area, travel within the SRMA and the remainder of the Planning Area would be limited to designated routes. This prohibition of cross-country travel would prevent continued expansion of unauthorized travel routes throughout the Planning Area, and the associated impacts of physical damage to vegetation, fragmentation of plant communities, increased soil erosion or compaction, and creation of invasion corridors for noxious weeds. When combined with the closure and revegetation of existing routes, these proposed management actions would result in moderate positive impacts to upland and riparian/wetland resources.

Oil and Gas Development — Development of fluid mineral resources under Alternative II would allow an estimated 310 new well pads and an associated 1,348 acres of new long-term disturbance (1.8 percent of BLM lands in the Planning Area) during the 20-year period of analysis (Table 4-3). An additional 916 acres of temporary impacts are also estimated, for a total

disturbance to 3.1 percent of BLM lands in the Planning Area.

A total of 70 percent of upland plant communities on the top and sides of the plateau would remain unleased (21,382 acres, 29.1 percent of Planning Area) or be protected by NGD/NSO stipulations (31,200 acres, 41.4 percent) associated with the ACECs. An additional 7,015 acres (9.6 percent) would be designated as SSR/CSU (Table 4-1).

Areas of standard restrictions and limitations (14,005 acres, 20.0 percent) would occur primarily below the rim in pinyon/juniper and sagebrush shrublands. A smaller area of standard restrictions and limitations is located near the northern edge of the Planning Area, which supports a mosaic of aspen and conifer woodlands and sagebrush shrublands. If short-term disturbances in the SSR/CSU and areas subject to special mitigation are revegetated as described above, impacts of the disturbances on upland plant communities would be minor.

A portion of the estimated long-term disturbance from oil and gas development under this alternative is associated with construction or widening/improving 186 miles (602 acres) of access roads (Table 4-2). In addition to the direct impacts of vegetation removal, these roads will indirectly impact vegetation resources by fragmenting communities, increasing the potential for noxious weed infestation. These impacts will be in addition to those estimated in the discussion of travel management.

Special Resource Management — A number of positive impacts to upland and riparian/wetland vegetation would result from the special management stipulations proposed for these resources under the proposed ACECs, as well as positive impacts due to management of noxious weeds, travel, and rangeland. Considered together with the comprehensive protection of large areas by NGD/NSO designations, it is anticipated that upland and riparian/wetland vegetation within the Planning Area would generally experience local and widespread positive impacts under Alternative II. Exceptions may include some negligible to

localized minor negative impacts to upland and riparian/wetland areas, mostly below the rim, where ground-disturbing activities may be cumulative from existing weed infestations and other degradation.

Above the rim, a broad protection zone would be afforded riparian/wetland areas due to specific NGD/NSO stipulations to protect genetically pure populations of Colorado River cutthroat trout from direct and indirect impacts, and to protect special status plant species and significant plant communities, as well as the hydrological and ecological processes that support them (Section 3.5.7). Eligibility of some stream segments for WSR designation would protect an area of 0.25 mile on either side of stream centerlines from ground-disturbing activities that might impair values until a suitability analysis has been completed. In addition, an SSR/CSU stipulation would provide controls on the specific location of proposed surface uses within a 500-foot buffer outside the edge of the riparian or wetland vegetation in these areas.

Below the rim, most riparian/wetland areas would also be protected by NGD/NSO or SSR/CSU stipulations. For the remainder, BLM could require a proposed ground-disturbing activity to be shifted by up to 200 meters. Impacts of oil and gas development on riparian/wetland resources would be negligible except in areas where steep slopes or other resource management concerns such as visual resources, sensitive species, and wildlife preclude shifting of an oil and gas activity. This could result in negligible to minor loss of riparian/wetland vegetation.

Offsite and Cumulative Impacts

Offsite and cumulative impacts under Alternative II would be similar to those for Alternative I. Although the same types of impacts from oil and gas development would occur regardless of location on BLM or private lands, private landowners negotiate their own agreements with oil and gas companies regarding reclamation standards, road design, and other factors.

Failure to perform adequate reclamation or avoid riparian/wetland vegetation during offsite development could in turn result in indirect impacts to BLM lands through invasion of noxious weeds or transport of eroded soils and sediments. Degradation of these areas would also cause a decrease in the areal extent of vegetation communities and in the quality of wildlife habitat and human recreation throughout the area.

Increased impacts to offsite areas could occur if the Planning Area becomes a source of noxious weeds for contiguous sites. This is not likely, as the infestation of surrounding areas is expected to be similar to that on the Planning Area. However, if more pristine sites do occur in the vicinity, and management actions do not discourage proliferation of noxious weeds onsite, the Planning Area could become a source for noxious weed infestation, especially in areas where human traffic and livestock or wildlife movement can serve to spread weed seeds into new sites.

All potential negative impacts discussed for riparian/wetland areas within the Planning Area are cumulative with prior degradation of these areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and drought effects (Section 3.3.1). These negative factors are assumed to be present and unmitigated in many riparian/wetland areas in the greater region as well. Therefore, negative impacts due to management actions being considered for incorporation into the RMP have the potential to be cumulatively greater than when assessed in isolation.

Regardless of management actions within the Planning Area, direct and negative impacts to native vegetation will result from ongoing human development throughout the general region, which will bring new roads, housing projects, commercial development, and increasing recreational use of wildlands. The same indirect impacts to native vegetation discussed above will also result. In many cases, the loss or fragmentation of native plant communities is highly visible. These impacts will continue on a regional scale and will be in

addition to impacts expected from land uses and resource management activities in the Planning Area. If negative impacts to these resources continue to increase as expected, their condition on public lands will become even more important because of their intrinsic value, the biodiversity they represent, and the continuation of the ecological values they support.

Summary of Impacts and Mitigation

Alternative II provides the most comprehensive protection of riparian/wetland areas from surface disturbance by several, sometimes overlapping, stipulations and conditions. Additionally, several management actions proposed in this alternative would affect upland and riparian/wetland vegetation. These include direct management of the resources themselves as well as management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to upland and riparian/wetland vegetation are discussed above and summarized in Table 4-11.

4.3.1.3 Alternative III – Preferred Alternative

Under Alternative III, important ecological values and processes would be protected by the designation of two ACECs (East Fork Parachute Creek and Trapper/ Northwater Creek) and of the WSR-eligible stream corridors. In addition, the entire Parachute Creek watershed would be given special management focus as a designated WMA. Alternative III emphasizes developing and implementing management prescriptions that would limit surface disturbance, implement active management, and mitigate effects of disturbances.

Direct and Indirect Impacts

Vegetation Management Actions — The condition of upland vegetation communities above the rim would be expected to continue to be good, except for an expected increase in noxious weed population frequency, density, and diversity. Some communities below the rim would probably continue in fair to poor condition with a decreasing trend. Noxious

weeds would be expected to increase below the rim to an even greater extent, given current conditions. Over time, this would result in minor to moderate negative impacts to most of these communities.

Riparian areas and river corridors are a focus of protection and management under this alternative. This includes a specific objective for maintaining proper hydrologic function and protection of areas adjacent to these resources. Due to these protections and specific management actions, it is expected that a large number of riparian reaches would gradually return to PFC, resulting in major positive impacts to riparian/wetland areas within the Planning Area. However, these positive impacts would be diluted by expected continuing increases in the frequency, density, and diversity noxious weed populations.

Range Management Actions — Alternative III is similar to Alternative I in that both would use rangeland improvements and administrative solutions (season-of-use revisions, stock level adjustments, pasture exclusions and utilization stipulations) in order to progress towards meeting land health standards. In addition, both alternatives require that only native species be used for revegetation seeding. However, land treatments would only be required within allotments identified as not meeting a minimum ecological condition rating of 50 percent. Alternative III also provides for development of allotment management plans for several situations, including direct conflicts with wildlife, watershed, and riparian/wetland, botanical, or wilderness values. Generally improving range condition, and specific management of sites with vegetation resources in conflict with livestock management will produce moderate positive impacts to both upland and riparian/wetland vegetation resources over time.

Travel and Recreation Management — Motorized or mechanized travel would be restricted to designated routes, including within the Hubbard Mesa SRMA. This restriction, combined with the closure and revegetation of 26 miles of existing routes and limiting another

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24 miles of existing routes to only administrative use, would result in moderate positive impacts to upland and riparian/wetland resources.

Oil and Gas Development — A total of 1,761 acres (2.4 percent of BLM lands in the Planning Area) of long-term disturbance is expected to occur from oil and gas development under Alternative III in 20 years, based on 1,324 wells and 402 new pads (Table 4-3). An additional 1,187 acres of short-term disturbance is also expected, for a combined disturbance to 4.0 percent of BLM lands in the Planning Area. Most of these impacts would occur to vegetation below the rim.

The deferral of leasing and drilling for oil and gas on top of the plateau under Alternative III would not affect the type and extent of impacts to upland or riparian/wetland vegetation, except to the degree that it affects the number and location of wells and other facilities during the 20-year period of analysis and the rate at which they are developed upon the end of the deferment period.

Upland vegetation would benefit from the deferral of leasing above the rim through limitation of large-scale surface disturbance for a period of 10 to 20 years or more (estimated at 16 years for this RMPA/EIS).

Once leasing is allowed, vegetation atop the plateau would be subject to less impact from oil and gas development than under Alternative II, with a total of only 51 wells on 39 pads estimated during the 20 years (Table 4-2).

One or more NGD/NSO stipulations would apply to an estimated 42.0 percent of BLM lands (30,928 acres). Most of this area wraps around the lower cliffs and so comprises much of the pinyon/juniper woodland and contiguous Douglas-fir forest habitats in the Planning Area, as well as some mountain shrublands. The remaining NGD/NSO designations focus on riparian areas along Trapper/Northwater and East Fork Parachute Creeks.

Another 29,594 acres (40 percent) would have SSR/CSU designations, and permit-level special

mitigation could be required in portions of the ACECs and within the WMA. Standard restrictions and limitations would apply to 13,080 acres (17.8 percent) of the BLM lands.

A portion of the estimated long-term disturbance from oil and gas development under this alternative is associated with construction or improvement of 241 miles (817 acres) of access roads (Table 4-2). In addition to the direct impacts of vegetation removal, these roads will indirectly impact vegetation resources by fragmenting plant communities, increasing the potential for noxious weed infestation. These impacts would be cumulative to those estimated in discussion of travel management.

Impacts to upland vegetation and riparian/wetland vegetation from oil and gas development would be minor.

Special Resource Management — SSR/CSU areas and special resource management areas consist primarily of open woodlands, mountain shrublands, and coniferous forests on top of the plateau and in pinyon/juniper woodlands along the eastern flanks. The areas subject to standard restrictions and limitations comprise some lower pinyon/juniper and sagebrush shrublands on the lower, eastern side of the Planning Area. If short-term disturbances in SSR/CSU and special management areas are revegetated using the special measures described above, these would result in minor impacts to upland vegetation communities.

Like Alternative II, Alternative III would protect riparian/wetland areas from surface disturbance by several, sometimes overlapping, stipulations and conditions. Above the rim, a number of beneficial impacts to riparian/wetland vegetation would result from the special management stipulations proposed for these resources within the proposed ACECs as well as the Parachute Creek WMA. These would provide a broad protection zone for riparian/wetland areas through specific NGD/NSO stipulations to protect genetically pure populations of Colorado River cutthroat trout from direct and indirect impacts and to protect special status plant species and significant plant communities, and

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the hydrological and ecological processes that support them (Section 3.5.7) as well as prescribe special management goals, objectives, and actions for the entire WMA.

Eligibility of some stream segments for WSR designation would protect an area of 0.25 mile on either side of stream centerlines from ground-disturbing activities that might impair values until a suitability analysis has been completed. In addition, an SSR/CSU stipulation would provide controls on the specific location of proposed surface uses within a 500-foot buffer outside the edge of the riparian or wetland vegetation in these areas.

Alternative III would not identify or provide special protection to areas identified as having wilderness character. However, a total of 9,006 acres would be managed so as to protect roadlessness and naturalness under associated NGD/NSO designations that would not be subject to would not be subject to modification, waiver or exceptions (Map 36).

Below the rim, most riparian/wetland areas would also be protected by NGD/NSO or SSR/CSU stipulations. For the remainder, BLM could require the shifting of proposed ground-disturbing activity by up to 200 meters as necessary. Resultant impacts of oil and gas development to riparian/wetland resources protections would be negligible except in areas with steep slopes or other resource management concerns such as visual resources, sensitive species, and wildlife. These issues can preclude movement of proposed disturbances so that relocation stipulations may not be completely implemented. In these cases, some amount of riparian vegetation is lost, which could cause minor impacts in these areas.

Offsite and Cumulative Impacts

Offsite and cumulative impacts under Alternative III would be similar to those for Alternatives I and II. Although the types of impacts from oil and gas development would occur regardless of whether on BLM or private lands, private landowners negotiate their own agreements with oil and gas companies

regarding reclamation standards, road designs, and related factors.

Failure to perform adequate reclamation or avoid riparian/wetland vegetation during offsite development could in turn result in indirect impacts to BLM lands by invasion of noxious weeds or transport of eroded soils and sediments. Degradation of these areas would also cause a decrease in the areal extent of vegetation communities and in the quality of wildlife habitat and human recreation throughout the area.

Increased impacts to offsite lands could occur under Alternative III if the Planning Area becomes a source for spreading noxious weeds to contiguous areas. This is not likely, as the infestation of surrounding areas is expected to be similar to that on the Planning Area. However, if more pristine sites do occur in the vicinity, and management actions do not discourage proliferation of noxious weeds onsite, the Planning Area could become a source for noxious weed infestation, especially in areas where human traffic and livestock or wildlife movement can serve to spread seeds.

All of the potential negative impacts discussed for riparian/wetland areas within the Planning Area are cumulative with prior degradation of these areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and drought effects (Section 3.3.1). These negative factors are assumed to be present and unmitigated in many of the riparian/wetland areas in the surrounding region as well. Therefore, negative impacts due to management actions under this RMP have the potential to be cumulatively greater than when assessed in isolation.

Regardless of management actions within the Planning Area, direct and negative impacts to native vegetation will result from ongoing human development throughout the general region, which will bring new roads, housing projects, commercial development, and increasing recreational use of wildlands. The same indirect impacts to native vegetation discussed above will also result. In many cases,

the loss or fragmentation of native plant communities is highly visible. These impacts will continue on a regional scale and will be in addition to impacts expected from land uses and resource management activities in the Planning Area. If negative impacts to these resources continue to increase as expected, their condition on public lands will become even more important because of their intrinsic value, the biodiversity they represent, and the continuation of the ecological values they support.

Summary of Impacts and Mitigation

Several management actions proposed in this alternative would affect upland and riparian/wetland vegetation. These include direct management of these resources as well as management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to upland and riparian/wetland vegetation are discussed above and summarized in Table 4-11.

A number of positive impacts to upland and riparian/wetland vegetation would be anticipated under Alternative III. These would result from proposed ACEC and WMA designations and special management stipulations, as well as beneficial impacts due to rangeland and travel management. These beneficial impacts could be diluted when considered cumulatively with anticipated minor to moderate impacts to upland vegetation from noxious weeds and ground-disturbing activities, including oil and gas development.

4.3.1.4 Alternative IV

Under Alternative IV, the most important ecological values and processes would be protected by developing and implementing management prescriptions that would limit surface disturbance, implement active management, and mitigate effects of disturbances.

Direct and Indirect Impacts

Vegetation Management Actions — The condition of upland vegetation communities

above the rim would be expected to continue to be good, except for an expected increase in the frequency, density, and diversity of noxious weed populations. Some communities below the rim would probably continue in fair to poor condition with a decreasing trend. Noxious weeds would be expected to increase below the rim to an even greater extent, given current conditions. Over time, this would result in minor to moderate negative impacts to most of these communities.

Riparian areas and river corridors are a focus of protection and management under this alternative. This includes a specific objective for maintaining proper hydrologic function and protection of areas adjacent to these resources. Due to these protections and specific management actions, it is expected that a large number of riparian reaches would gradually return to PFC, resulting in major positive impacts to riparian/wetland areas within the Planning Area. However, these positive impacts would be diluted by expected continuing increases in noxious weed population frequency, density, and diversity.

Range Management Actions — Alternative IV is similar to Alternative I in that both would use rangeland improvements and administrative solutions (season-of-use revisions, stock level adjustments, pasture exclusions, and utilization stipulations) in order to progress towards meeting land health standards. In addition, both alternatives require that only native species be used for revegetation seeding. However, land treatments would only be required within allotments identified as not meeting a minimum ecological condition rating of 50 percent. Alternative IV also provides for development of allotment management plans for several situations, including direct conflicts with wildlife, watershed, and riparian/wetland, botanical, or wilderness values. Generally improving range condition, and specific management of sites with vegetation resources in conflict with livestock management, will produce moderate positive impacts to both upland and riparian/wetland vegetation resources over time.

Travel and Recreation Management — Travel would be restricted to designated routes, except that cross-country travel would be permitted in an SRMA at Hubbard Mesa. While this could impact vegetation on Hubbard Mesa, much of the area has already been impacted, and providing this recreational opportunity could reduce unauthorized OHV travel in other parts of the Planning Area. When combined with the closure and revegetation of existing routes, these proposed management actions would result in moderate positive impacts to upland and riparian/wetland resources.

Oil and Gas Development — A total of 1,940 acres (2.6 percent of BLM lands in the Planning Area) of long-term disturbance is expected to occur from oil and gas development under Alternative IV during 20 years, based on 1,324 wells and 449 pads (Table 4-3). Another 1,329 acres of short-term disturbance is also expected, for a combined disturbance to 7.5 percent of BLM lands in the Planning Area. Most of these impacts would affect vegetation below the rim.

One or more NGD/NSO stipulations would apply to an estimated 42.0 percent of BLM lands (30,928 acres). Most of this area wraps around the lower cliffs and so comprises much of the pinyon/juniper woodlands and contiguous Douglas-fir forests within the Planning Area, and some mountain shrublands. Another 27,486 acres (37.3 percent) would have SSR/CSU designation, and permit-level special mitigation could be required for portions of the ACECs and the WMA. Standard restrictions and limitations would apply to 15,188 acres (20.6 percent) of the BLM lands (Table 4-1).

A portion of the estimated long-term disturbance from oil and gas development is associated with construction or improvement of 270 miles (861 acres) of access roads (Table 4-2). In addition to the direct impacts of vegetation removal, these roads will indirectly impact vegetation resources by fragmenting communities, increasing the potential for noxious weed infestation. These impacts will be cumulative to those estimated in discussion of travel management.

Special Resource Management — SSR/CSU and special management areas are primarily located in aspen woodlands, mountain shrublands, and coniferous forests on top of the plateau and in pinyon/juniper woodlands along the eastern flanks. The areas subject to standard restrictions and limitations comprise some lower pinyon/juniper and sagebrush shrublands on the lower, eastern side of the Planning Area. If short-term disturbances in SSR/CSU and special mitigation areas are revegetated using the special measures described above, these disturbances would result in minor impacts to upland vegetation communities from oil and gas development. This alternative includes designation of the Trapper/Northwater Creek WMA, with the specific management objectives listed in Table 2-3.

Alternative IV would protect riparian/wetland areas from surface disturbance by several, sometimes overlapping stipulations and conditions, although the area of these protections is smaller than in Alternatives II or III.

Above the rim, a number of beneficial impacts to riparian/wetland vegetation would result from the special management proposed for these resources within the Trapper/Northwater Creek WMA. Specific NGD/NSO stipulations to protect genetically pure populations of Colorado River cutthroat trout from direct and indirect impacts would also protect special status plant species and significant plant communities and the hydrological and ecological processes that support them (Section 3.5.7).

Eligibility of some stream segments for WSR designation would protect an area of 0.25 mile on either side of stream centerlines from ground-disturbing activities that might impair values until a suitability analysis has been completed. In addition, an SSR/CSU stipulation would provide controls on the specific location of proposed surface uses within a 500-foot buffer outside the edge of the riparian or wetland vegetation in these areas.

Below the rim, most riparian/wetland areas would also be protected by NGD/NSO or SSR/CSU stipulations. For the remainder, BLM

could require the shifting of proposed ground-disturbing activity by up to 200 meters as necessary. Resultant impacts of oil and gas development to riparian/wetland resources protections would be negligible except in areas with steep slopes or other management concerns such as visual resources, sensitive species, and wildlife. These issues can preclude movement of proposed disturbances so that relocation stipulations may not be completely implemented. In these cases, some amount of riparian vegetation is lost. This could cause minor impacts in these areas.

Offsite and Cumulative Impacts

Offsite and cumulative impacts under Alternative IV would be similar to those for Alternatives II and III. Although the types of impacts from oil and gas development would occur regardless of whether on BLM or private lands, private landowners negotiate their own agreements with oil and gas companies regarding reclamation standards, road designs, and related factors.

Failure to perform adequate reclamation or avoid riparian/wetland vegetation during offsite development could in turn result in indirect impacts to BLM lands by invasion of noxious weeds or transport of eroded soils and sediments. Degradation of these areas would also cause a decrease in the areal extent of vegetation communities and in the quality of wildlife habitat and human recreation throughout the area.

Increased impacts to offsite lands could occur under Alternative IV if the Planning Area becomes a source of noxious weeds to spread to contiguous sites. This is not likely, as the infestation of surrounding areas is expected to be similar to that on the Planning Area. However, if more pristine sites do occur in the vicinity, and management actions do not discourage proliferation of noxious weeds onsite, the Planning Area could become a source for noxious weed infestation, especially in areas where human traffic and livestock or wildlife movement can serve to spread seeds.

All potential negative impacts discussed for riparian/wetland areas within the Planning Area are cumulative with prior degradation of these areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and drought effects (Section 3.3.1). These negative factors are assumed to be present and unmitigated in many of the riparian/wetland areas in the surrounding region as well. Therefore, negative impacts due to management actions under this RMP have the potential to be cumulatively greater than when assessed in isolation.

Regardless of management actions within the Planning Area, direct and negative impacts to native vegetation will result from ongoing human development throughout the general region, which will bring new roads, housing projects, commercial development, and increasing recreational use of wildlands. The same indirect impacts to native vegetation discussed above will also result. In many cases, the loss or fragmentation of native plant communities is highly visible. These impacts will continue on a regional scale and will be in addition to impacts expected from land uses and resource management activities in the Planning Area. If negative impacts to these resources continue to increase as expected, their condition on public lands will become even more important because of their intrinsic value, the biodiversity they represent, and the continuation of the ecological values they support.

Summary of Impacts and Mitigation

Several management actions proposed in this alternative would affect upland and riparian/wetland vegetation. These include direct management of these resources as well as management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to upland and riparian/wetland vegetation are discussed above and summarized in Table 4-11.

A number of positive impacts to upland and riparian/wetland vegetation would be anticipated under Alternative IV. These would result from special management stipulations, as well as

beneficial impacts due to travel and rangeland management. These beneficial impacts could be diluted when considered cumulatively with anticipated minor to moderate impacts to upland vegetation from ground-disturbing activities, including oil and gas development and weed management.

4.3.1.5 Alternative V

Under Alternative V, modifications to ecological values and processes and biological diversity would result from ground-disturbing activities related to more intensive resource development and management, and mitigation or management conditions would be imposed to lessen impacts to identified key resources.

Direct and Indirect Impacts

Vegetation Management Actions — Proposed management actions include rehabilitation or revegetation of communities not meeting desired range conditions due to dominance of annual or weedy species, or juniper with forage-producing perennial seed mixes that would support livestock production and other commodity values. There is no requirement that these be native species. Over time, this would lead to a reduction in the diversity of native plant species and potential reduction in native plant communities. The frequency, density, and diversity of noxious weed populations would be expected to increase due to grazing pressure (see discussion below) and unfocused weed management. Some communities below the rim would most likely degrade on a steeper downward trend as they are already in fair to poor condition and contain larger areas of noxious weeds. Over time, this would result in moderate to major negative impacts to most upland communities.

The condition of many riparian/wetland areas could be expected to decline under this alternative due to continued expansion of noxious weed populations and the likelihood that livestock grazing will become more intensive and focused in these areas. The result would be moderate to major negative impacts over time.

Range Management Actions — Rangeland projects and land treatments would be emphasized as the preferred solution for meeting resource management objectives. These actions are expected to result in increased livestock distribution and therefore, forage utilization. Like Alternative I, Alternative V would include high-intensity monitoring of allotments where resource conflicts have been identified. However, allotment management plans would only be developed for situations where units are not meeting, or have identified concerns meeting, land health standards. Conflicts with other resources such as watershed, wetland/riparian, or botanical would not require management plans.

The condition of native upland vegetation communities would be expected to degrade as progress toward meeting land health standards would be limited to areas where practicable and treatments would only be required where allotments are identified as not meeting a minimum of 40% ecological condition (failing standards). Optimization of forage production and access to available forage would be emphasized, wider grazing distribution would occur, and seeding with non-native, forage-producing species would result in the net decrease and diversity of native plant species. Over time, this would result in moderate negative impacts to both upland and riparian/wetland communities.

Travel and Recreation Management — Travel would be restricted to designated routes. Cross-country travel would not be allowed, reducing the expansion of travel routes that fragment uplands, disturb riparian/wetland vegetation cover, and introduce noxious weeds. When combined with the closure and revegetation of existing routes, these proposed management actions would result in moderate benefit to upland and riparian/wetland resources.

Oil and Gas Development — A total of 2,495 acres (3.4 percent) of long-term disturbance is estimated for BLM lands in the Planning Area as a result of oil and gas development in 20 years, based on 1,582 wells and 584 pads (Table 4-3). An additional 1,726 acres of temporary

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disturbance is expected, for a combined disturbance to 5.7 percent of BLM lands.

A portion of the estimated long-term disturbance from oil and gas development under this alternative is associated with construction or widening of 350 miles (1,112 acres) of access roads (Table 4-2). In addition to the direct impacts of vegetation removal, these roads will indirectly impact vegetation resources by additional fragmentation of communities, increasing the potential for noxious weed infestation. These impacts will be cumulative to those estimated in the discussion of travel management.

Special Resource Management — Under this alternative, an estimated 21,609 acres (29.4 percent) of BLM lands in the Planning Area would be protected by NGD/NSO stipulations. Most of this area wraps around the lower cliffs and so comprises approximately half of the site's pinyon/juniper woodlands and most of the contiguous Douglas-fir forests, as well as limited amounts of mountain shrublands and coniferous forests on top of the plateau. Some additional protection would be provided in 21,517 acres of SSR/CSU stipulations (29.2 percent), mostly in small areas of aspen woodland and mountain shrubland on top of the plateau and pinyon/juniper woodland along the eastern flanks. The remaining 41.4 percent would have standard restrictions and limitations. Moderate negative impacts from oil and gas development would be expected in areas of standard restrictions and limitations.

Above the rim, almost all riparian/wetland areas would be protected from direct impacts from ground-disturbing activities by NGD/NSO buffers, although such buffers would be narrower for smaller tributaries and some headwater areas.

Below the rim, most of the riparian/wetland areas would be protected by NGD/NSO or SSR/CSU stipulations. The remainder would be subject to the standard lease provision that gives BLM authority to require shifting of a proposed ground-disturbing activity by up to 200 meters to protect a resource value. In all cases, the

physical protection to riparian and wetland communities could be narrower than that provided by the other alternatives. As a result, direct and indirect impacts of oil and gas development to riparian/wetland resources could range from minor to moderate.

Offsite and Cumulative Impacts

Offsite and cumulative impacts under Alternative V would be similar to those for the previous alternatives. Although impacts from oil and gas development would occur regardless of whether on BLM or private lands, private landowners negotiate their own agreements with oil and gas companies regarding reclamation standards, road designs, and related factors.

Failure to perform adequate reclamation or avoid riparian/wetland vegetation during offsite development could result in indirect impacts to BLM lands through invasion of noxious weeds or transport of eroded soils and sediments. Degradation of these areas would also cause a decrease in the areal extent of vegetation communities and the quality of wildlife habitat and human recreation throughout the area.

Increased impacts to offsite lands could occur under Alternative V if the Planning Area becomes a source for noxious weeds to spread to contiguous sites. This is not likely, as the infestation of surrounding areas is expected to be similar to that on the Planning Area. However, if more pristine sites do occur in the vicinity, and management actions do not discourage proliferation of noxious weeds onsite, the Planning Area could become a source for noxious weed infestation, especially in areas where human traffic and livestock or wildlife movement can serve to spread seeds.

All of the potential negative impacts discussed for riparian/wetland areas within the Planning Area are cumulative with prior degradation of these areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and drought effects (Section 3.3.1). These negative factors are assumed to be present and unmitigated in many of the riparian/wetland areas in the greater region as well. Therefore,

negative impacts due to management actions being considered for incorporation into the RMP have the potential to be cumulatively greater than when assessed in isolation.

Regardless of management actions within the Planning Area, direct and negative impacts to native vegetation will result from ongoing human development throughout the general region, which will bring new roads, housing projects, commercial development, and increasing recreational use of wildlands. The same indirect impacts to native vegetation discussed above will also result. In many cases, the loss or fragmentation of native plant communities is highly visible. These impacts will continue on a regional scale and will be in addition to impacts expected from land uses and resource management activities in the Planning Area. If negative impacts to these resources continue to increase as expected, their condition on public lands will become even more important because of their intrinsic value, the biodiversity they represent, and the continuation of the ecological values they support.

Summary of Impacts and Mitigation

Several management actions proposed in this alternative would simultaneously affect upland and riparian/wetland vegetation. These include direct management of the resources themselves as well as management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to upland and riparian/wetland vegetation are discussed above and summarized in Table 4-11.

When impacts are considered cumulatively, upland and riparian/wetland vegetation within the Planning Area would generally experience local and widespread negative impacts under Alternative V.

4.3.1.6 Overall Summary of Impacts to Vegetation

Potential impacts to upland and riparian/wetland vegetation are summarized by alternative and management action in Table 4-11. These summaries are based on the more detailed

information presented above for the five alternatives. As shown by the table, land uses and management actions under different alternatives would result in differing levels of positive and negative impacts. Alternative V generally has the highest level of adverse impacts to vegetation resources, with impacts ranging from minor to major. Overall, Alternative II has the least adverse impacts to upland and riparian/wetland vegetation. Some of the impacts to vegetation described above may represent an irreversible and irretrievable commitment of natural resources (see Section 4.6).

4.3.2 Terrestrial and Aquatic Wildlife

Introduction

In general, the occurrence, abundance, and distribution of wildlife are most strongly affected by habitat type, quality, and accessibility. All of these habitat characteristics may be severely altered as a result of increased human activity and resource development, as well as by resource management activities aimed at specific wildlife or other environmental concerns. These include (1) actions aimed at preserving or enhancing fish and wildlife resources, and (2) other actions, including oil and gas development, vegetation management, livestock management, and travel management.

Impacts to fish and wildlife resources associated with Alternatives I through V are summarized in the following subsections. These impacts can be either direct or indirect and can result from any activity involving removal or modification of vegetation and increased levels of human activity. Major impacts associated with human intrusion into an ecosystem are discussed below.

Impact Types

Direct Habitat Loss — Direct habitat loss occurs when required life-sustaining conditions are lost, e.g. through removal of vegetation or draining a pond. Vegetation impacts are the most significant for future land use and management actions. Removal of vegetation affects wildlife by reducing the extent or quality

of habitat in terms of food, cover, and structure for nesting and other uses. These impacts are relatively simple to quantify by comparing the amount of habitat loss to the amount preserved. For example, removal of vegetation during construction of a road or well pad essentially strips the affected area of any wildlife value. While closure and reclamation of temporarily disturbed areas can eventually restore lost habitat values, the disturbance may have a long duration (20 or more years for a well) or require years or decades for recovery of pre-disturbance structure and function (pipeline corridors, reclaimed roads).

Habitat Modification — Changes in habitat are generally less obvious and less severe than losses of habitat but can be significant, especially if small impacts accumulate across large areas. Examples include removal of forage by domestic livestock, trampling of soils by domestic livestock, invasions of weeds in areas where native plant vigor or cover is reduced, and removal of tree cover during timber harvesting. Modification of aquatic habitats can also occur as a result of increased human use and resource development, including diversions for agricultural and other uses. Low-water crossings or culverted crossings of roads can create impassable segments that interfere with upstream-downstream movement by fish and aquatic macroinvertebrates. A change in grade at the crossing point can create depositional or erosional regimes that affect the type of substrate, channel stability, and water quality. Roadway approaches to streams are often relatively steep and may provide an ongoing source of sediments that can make the substrate unsuitable for spawning or feeding, and increased suspended loads can smother fish eggs, suffocate larvae, and change the temperature or other physicochemical characteristics.

Habitat modification can also be beneficial and is an important tool in wildlife management. Examples include use of prescribed fires to stimulate new growth on senescent (older) woody vegetation, thinning of overly dense shrubs to enhance forage production, construction of protective fencing along riparian

areas, and creation of alternative watering features to reduce the need for cattle to access streams.

Habitat Fragmentation — This type of impact is increasingly recognized as an important, and often the most important, impact of human population growth and associated development on wildlife. Impacts of habitat fragmentation relate to the reduced size of individual habitat blocks and the increased percentage of “edge” on smaller blocks as compared to larger blocks. Thus, two 50-acre blocks of habitat may support fewer individuals of a particular species than one 100-acre block, and four 25-acre blocks may be incapable of sustaining any individuals of that species. Fragmentation may benefit as many species as it harms by creating conditions favorable for “edge species” (those that prefer the interface between two or more habitat types) and “habitat generalists” (those that are not restricted to a specific habitat to meet their needs). However, species adversely affected by fragmentation — “habitat-interior” species and most “habitat-specialist” species — include many of the special status species described in Section 3.2.3. These and other habitat-interior or habitat-specialist species have suffered disproportionate levels of adverse impact from human population growth and resource development. Therefore, while some species benefit from fragmentation, they tend not to be the species of special concern within a given area, while species adversely affected by fragmentation typically are. Moreover, species benefiting from habitat fragmentation include most of the species commonly associated with human habitation, including farmlands, ranchlands, and rural or suburban residential development.

Habitat-interior species may avoid habitat edges because the species are either (1) less well-adapted there than edge specialists and habitat generalists, or (2) more secretive and likely to seek the greater seclusion available away from an edge. Gutzwiller et al. (1998) found that more detectable (brightly colored or loudly and frequently singing) forest birds were more furtive than less detectable species. In general, the more detectable species are migrants. The

need for bright colors and loud or frequent songs is associated with the greater likelihood of having to find a new mate each year due to migrational mortality and the need to establish a territory and form a pair bond more quickly. Maurer and Heywood (1993) noted that neotropical migrant songbirds (see Section 3.2.3) tend to be both more detectable and to be habitat-interior and habitat-specialist species; these species include warblers, vireos, and tanagers.

Relevant examples of published findings concerning habitat fragmentation include the following:

- Hargis et al. (1999) found that American martens respond negatively to small amounts of fragmentation and do not occupy forests when more than 25 percent of the tree canopy has been removed by logging of patchwork clearcuts.
- Moore and Hooper (1975, cited in Whitcomb et al. 1981), Forman et al. (1976), and Galli et al. (1976) all reported that numbers of bird species in forests increased as habitat blocks increased in size. Areas ranged from less than 1.0 acre to nearly 125 acres. Whitcomb et al. (1981) reported that neotropical migrant forest-interior species (see Section 3.2.3) were rare in blocks of 2.5 to 12 acres, intermediately abundant in blocks of 15 to 35 acres, and abundant in blocks of 175 acres or more, occurring at 80 to 90 percent of their normal density in extensive unfragmented tracts. McIntyre (1995) reported that small tracts (<8 acres) had only 742 total birds and an average of 2.9 species per patch, compared to 1,041 total birds and 3.9 species per patch for large tracts (up to 325 acres) with the same number of tracts in each size group.
- Forman and Alexander (1998) reported reduced use by habitat-interior birds extending 150 meters away from forest roads and 1 to 2 kilometers away from grassland roads. Forman (2000) reported that the “road-effect” zone averages 200 meters (660 feet or 0.125 mile) wide for secondary roads. Ingelfinger (2001)

reported that numbers of sagebrush steppe songbirds are reduced by up to 60 percent within 100 meters of high-traffic roads (>12 vehicles per day) associated with oil and gas development and by up to 50 percent within 100 meters of low-traffic roads.

- For elk, Ward (1976) and Irwin and Peek (1979) reported reductions in use within 400 meters (0.25 mile) of little-used, slow-speed National Forest roads; Hershey and Leege (1976) reported reduced use within 0.4 mile and avoidance within 0.25 mile of forest roads in summer range; Lyon (1979) reported that use by elk was reduced by 37 percent within 0.1 mile of a road and by 57 percent within 0.2 mile. Pedersen (1979) and Rost and Bailey (1979) reported that use by elk decreased within 250 meters (825 feet) of a road, with paved roads showing more impact than unpaved roads and the latter more impact than primitive roads. Gillin and Irwin (1985) reported reduced use of calving habitat within about 1,200 meters (0.75 mile) of seismic exploration roads in more open (unforested) summer range. Thiessen (1976) stated that for a study area in Idaho, 75 percent of use by elk was in the 25 percent of the site that was roadless. Similarly, Frederick (1991) found that 73 percent of use by elk occurred in the 50 percent of an area more than 400 meters (0.25 mile) from a road.
- For deer, Knight et al. (2000) found that use by mule deer was reduced within 200 meters of a road (i.e., the road-effect zone is 200 meters, or 0.125 mile).
- Some researchers have described road effects in terms of road density (length of roads per unit area). For example, Lyon (1983) stated that use by elk is reduced 25 percent at a road density of 1 mile per square mile, and 50 percent at 2 miles per square mile. Baker and Cai (1992) reported that a road density of 1.7 miles per square mile caused an 80-percent reduction in elk use and total avoidance by mountain lions, and that a density greater than 4.2 miles per square mile also eliminated elk use.

The current road density on BLM land within the Planning Area is approximately 2.3 miles per square mile, based on 259 miles of mapped motorized routes. This number is misleading because the total consists primarily of primitive routes that receive little use except during hunting season. The combination of Class 3 (light-duty, constructed), Class 4 (unimproved, constructed or user-created, sedan clearance), and Class 5 (unimproved, constructed or user-created, four-wheel-drive clearance) motorized routes, excluding ATV trails and dirt-bike single tracks, includes 222 miles, or 1.9 miles per square mile. Although this density is substantial and approximates the level reported to cause a 50-percent decline in elk (see above), it represents a baseline condition for the Planning Area except for additional impacts associated with increased use of the roads. The current ATV and dirt bike routes, though narrow, represent potentially severe disturbance due to noise, dust, speed, and the potential for travel onto adjacent off-route lands.

Disturbance — These impacts generally overlap with habitat fragmentation, because many of the more common and important types of fragmentation (e.g. roads) also include increased levels of human activity. Continuing with the above example of elk and roads, Thomas (1979) used data of Perry and Overly (1977) to plot use of summer range by deer and elk in responses to different types of roads and differing road densities. At a density of 2 miles of road per square mile of habitat, use by elk decreased only 3 percent for primitive (narrow, unimproved) roads but 40 percent and 54 percent for secondary and primary roads, respectively. Main roads were 1.5 or more lanes wide, improved, regularly maintained, and regularly traveled. In comparison, use by mule deer at the same road density decreased by 6 percent, 8 percent, and 16 percent. At densities of 3 miles per square mile, decreases in use by elk were 4, 52, and 65 percent for primitive, secondary, and primary roads, while deer decreased 14, 16, and 31 percent, respectively.

Witmer and DeCalesta (1985) found that habitats adjacent to closed spur roads showed no reduced elk use, while open spur roads showed a

significant reduction up to 250 meters away. Edge and Marcum (1985) found that elk avoided logging roads by distances of 500 to 1,000 meters on working days but showed no avoidance of the roads on weekends. Earlier, Irwin and Peek (1979) found that elk tended to remain in an area later into the fall in areas of closed roads than in areas of open roads accessible to hunters. Considering the generally higher quality of summer range, this tendency for earlier migration could affect winter survival. However, Holland (1989) reported that seasonal road closures for one month during the hunting season reduced the impact of the road by only 12 percent, compared to a 70-percent reduction in impacts for year-round closures to public access (except administrative use) and a 90-percent reduction for permanent closures.

While some species are more tolerant of human activity than others, virtually all species have some threshold of disturbance above which they will abandon or avoid an area. The result is a *de facto* loss of habitat, because avoided areas meet no survival needs. The amount of habitat actually available to wildlife is called “effective habitat,” and reductions in the amount of effective habitat can greatly exceed any direct habitat loss. For example, Reed et al. (1996) estimated that the effective habitat loss of roads was 2.5 to 3.5 times as great as actual habitat loss. Construction of a straight road 30 feet wide (a typical width for an oil and gas access road) would represent 3.6 acres of direct habitat loss. Multiplying this figure by 3.5 (the upper end of the range reported by Reed) yields an effective habitat loss of approximately 23 acres, or 3.6 percent of a square mile. This amount of loss is comparable to the 3-percent and 6-percent decreases in use of summer range by elk and deer, respectively, at a density of 2 miles of primitive roads per square mile of habitat, as described by Thomas (1979).

Roads are not the only cause of disturbance. Gutzwiller et al. (1998) experimentally subjected forest birds to increased human activity, which consisted of walking through breeding territories. Effects included nest abandonment and reduced nest attentiveness leading to nest failure. However, Riffell et al.

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(1996) noted that this impact is not cumulative — i.e., does not carry across years if the disturbance ceases. Friesen et al. (1995) discussed the exacerbating effect of disturbance on habitat fragmentation due to decreased seclusion in the interiors of smaller patches. They found that 10-acre woodlots not located near human habitations supported more species and individuals of neotropical migrant songbirds than did 62.5-acre urban woodlots.

Freddy et al. (1986) reported that deer would move away in response to pedestrian traffic as close as 200 meters (660 feet), similar to the distance reported by Ward et al. (1980) who also reported a “locomotor response” distance for elk of only 86 meters (about 200 feet). Parker et al. (1984) emphasized the importance of avoiding situations in which wintering deer would be forced to move to avoid human activity, owing to decreased energy stores in winter and greater effort in moving through snow. Ward (1986) reported that elk were disturbed by firewood gathering closer than 800 meters (0.5 mile), with a similar buffer requirement from logging operations (Ward 1976).

Williams and Lester (1996) compiled an annotated bibliography of OHV and other recreational impacts on wildlife. Joslin and Youmans (1999) provide in-depth information on the effects of recreation on Rocky Mountain wildlife in Montana. Their compendium includes a listing by Knight and Cole (1995) of specific effects of recreational activities on wildlife (excerpted below):

- Viewing (close encounters) — Altered behavior, unnecessary energy expenditure during flight, altered nest placement, and reduced survivorship of young due to abandonment or predation.
- Backpacking/hiking/riding/cross-country skiing — Flight, displacement, or elevated heart rate.
- Rock climbing — Disturbance of preferred raptor perching and nesting sites.
- Spelunking (caving) — Disturbance or abandonment of bat roosting and maternity sites.

- Pets (dogs) — Stronger predator-alarm response than a person without a dog; increased stress and energy expenditure while fleeing, risk of injury or mortality.
- OHVs — Potential disturbance (flight and stress) and redistribution.
- Snowmobiles — Same as OHVs, and potential release of toxic by-products from combustion.

Boyle and Samson (1985) also discussed recreation effects on wildlife and found that many more species were adversely affected by hiking and camping, boating, wildlife viewing/photography, OHV use, snowmobiles, caving, swimming, and rock climbing than were either unaffected or benefited.

While habituation may occur for some species and some types of activities, this is less of an offsetting factor than suggested by the well-documented tendency for un hunted populations of ungulates and carnivores to appear indifferent to human presence. For these species, habituation is unlikely or less marked in hunted populations, in migratory populations of ungulates, or when the human activity is infrequent and represents a wide amplitude of disturbance. Conversely, habituation is most likely for un hunted populations and when the human activity becomes routine and occurs at a relatively low, consistent level (e.g., road traffic and day-to-day activities at rural residences).

In terms of potential oil and gas development in currently undeveloped portions of the Planning Area, the degree of avoidance due to disturbance is difficult to predict because it would depend on the dispersion of “disturbance centers” and specific vehicular travel routes required. If simultaneous well construction is clustered in adjacent or nearby 40-acre blocks, wildlife would be expected to avoid buffer zones (e.g., 0.5 mile for elk) around the individual areas of human activity and the main access routes but to continue to use the remaining habitat available. Van Dyke and Klein (1996) reported that elk tended to shift their habitat use patterns in response to oil well drilling but did not avoid the area altogether. Hiatt and Baker (1981) found

that an oil well drill pad was temporarily avoided by elk but that the access road was not (although the study was of only a single well). Johnson et al. (1990) found that elk avoided oil and gas activities but returned to these areas when the activities ceased. Knight (1980) reported that elk showed alarm responses when exposed to a continually shifting seismic exploration line but not in relation to regular activities at an oil and gas well pad and access road.

These studies appear to suggest that impacts to elk (and, by inference, other wildlife species) from disturbance associated with oil and gas development might not be as severe as indicated by some of the studies cited previously in this section. However, the latter group of references did not consider long-term population impacts. For example, a species may be able to shift its use for a short period, but the presumably less suitable habitat into which it moves would be unable to sustain the same level of use over the long term. Further, the return of wildlife to an area of avoidance following cessation of the disturbing activity might not apply to situations such as potential future development of the Planning Area, in which development would be likely to continue for 20 years and beyond. Therefore, regarding oil and gas development in the Planning Area, multiple disturbance centers and access roads associated with dispersed drilling locations could result in reduced wildlife use of the entire area of construction because of overlapping zones of avoidance. Using the example of elk, a 0.5-mile buffer around each new well site could preclude use in the intervening distance between sites as far apart as 1 mile. A spacing of several miles would be needed for the intervening habitat to receive undiminished use. This indicates that clustered development is probably preferable overall, although the degree of impact at the area of focused drilling would be greater than at more dispersed sites. Widely dispersed drilling could be desirable if the separation between sites is very large, although the potential for multiple major access roads in this situation would be less undesirable.

Interference with Movement Patterns — Habitat loss or modification, habitat fragmentation, and disturbance impacts can also affect wildlife by altering important daily or seasonal movement patterns. These patterns may be altered through shifts to avoid human activity, to avoid crossing open areas that provide inadequate cover, or to circumvent some physical barrier (e.g., fences, steep roadcuts). This type of impact is not as much of an issue for small mammals or reptiles that do not move across large areas, or for birds that easily avoid them. Even without the need for these regular movements, most mammals tend toward some population dispersal as young seek new habitats to occupy. This is important to the species to ensure that suitable habitat is occupied and facilitate gene exchange between distinct populations. This is also seen in snakes and other reptiles. Barriers that prevent snakes from accessing winter dens or that isolate amphibian breeding pools from feeding areas can also affect or even eliminate a population.

For large mammals such as deer and elk, changes in the landscape can profoundly affect their ability to meet daily and annual requirements. For example, these large species must drink water regularly (daily during warm weather, even during winter), and home ranges include sources of water. Blockage of a route between foraging or bedding areas and watering areas can cause the animals to abandon the larger area altogether. Seasonal movements between summer and winter range are also important for these species. In the Planning Area, for example, movement through the cliffs is limited to a few areas, many of which are included in the seclusion areas described previously. Any human activity or landscape modification that prevents the use of one or more of these limited migration corridors could effectively reduce the use of habitat either above or below the constrictions (“bottlenecks”).

Harassment and Impacts from Dogs — Harassment is an extreme type of disturbance and involves intentional actions to frighten or chase a species. Because wildlife react more severely to directed movements by people rather than incidental movements, the magnitude and

duration of the displacement is generally greater. This increases the risk of injury to the fleeing animal, placing greater stress on the animal by increasing metabolic rates and creating more prolonged disruption in behavior and habitat use.

One potentially important source of harassment results when wildlife is chased by dogs. See Sime and Schmidt (1999) for a treatise on the topic. In some cases, this can result in direct mortality if the dogs either kill or mortally wound an animal. Less obvious, but potentially as serious, is the increase in stress that occurs when wildlife are forced to flee or are simply displaced from an area. As noted above, this can be of particular importance during winter, when animals have low energy reserves and are more vulnerable to stress because of low temperatures and, depending on conditions, movement through snow. Dogs can also cause especially severe disturbance during the fawning and calving seasons, when young or pregnant females are highly susceptible to stress and less able to flee. Young are especially vulnerable to stress and more likely to be directly attacked.

Direct Mortality — In addition to attacks by dogs, direct mortality can result in areas of increasing human use due to collisions with (or being run over by) vehicles, electrocution of raptors on utility lines, increased likelihood of illegal hunting, or inadvertent trampling of nests. In the case of oil and gas development, wildlife mortality associated with petroleum pollution has also been reported. The USFWS (1991) and Esmoil and Anderson (1995) have described wildlife mortality associated with oil pits in Wyoming, although the situation is different from existing or anticipated gas fields in the Planning Area. The pits were not primarily petroleum but instead consisted of produced water that contained some oil and oil by-products. Affected species included waterbirds as well as large mammals, raptors, and songbirds; 616 animals were found dead at oil pits during the 2-year study. Another 237 bird and mammal mortalities were attributable to hydrogen sulfide gas being stripped from the petroleum.

Impact Analysis

As throughout this RMPA/EIS, the general terms none, negligible, minor, moderate, and major are used to describe the level of effects anticipated under each of the five alternatives. As pertains to fish and wildlife, adverse impacts are defined as follows:

- **None** – No changes in species occurrence, distribution, or abundance are expected.
- **Negligible** – Changes in distribution or abundance of some species may occur, but at levels that may not be discernible or demonstrable except at specific impact sites.
- **Minor** – Changes in distribution or abundance of some species would be discernible and demonstrable at a localized level, but current types and patterns of use and species occurrence would continue.
- **Moderate** – Changes in distribution or abundance would be readily discernible and demonstrable, and some species may occur in markedly lower numbers or be exterminated from localized parts of the Planning Area.
- **Major** – Similar to moderate, except that several species may occur at markedly lower numbers, and some species are likely to be exterminated from large portions of the Planning Area.

The same terms are applied in a more relative sense to describe beneficial impacts.

Emphasis on Oil and Gas Development — The following subsections describe fish and wildlife impacts associated with future management actions and land uses contained within each of the five alternatives for analysis identified as part of this RMPA/EIS. Some impacts are direct, while others are indirect and affect wildlife through a change in another resource. Also, some of the most ecologically sensitive species such as raptors, and most recreationally important species such as big game, are highly mobile and require large areas to meet their annual requirements. Thus, onsite

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impacts could also result in offsite and cumulative impacts.

Although fish and wildlife would be affected to some degree by all of the future land uses and management actions associated with implementation of the selected alternative arising from this RMPA/EIS process, impacts resulting from development of oil and gas on both Federal and private land are likely to be the most important (i.e., detectable, demonstrable, and deleterious). This conclusion is based on the increasing amount of habitat loss, habitat fragmentation, and disturbance from human activity associated with increasing levels of development. Therefore, the analyses below emphasize this land use.

Each phase of oil and gas development — from exploration and construction through operation and abandonment — has a specific combination of impact type, intensity, and duration.

- Exploration and Construction – The initial phase of development typically lasts for 25 to 40 days, depending on depth, and is very equipment-intensive. Associated activities include blading an access road and pad (with an average combined area of 3.4 acres per well, comprising 1.9 acres of long-term and 1.5 acres of short-term disturbance) and nearly continuous operation of a drill rig and other specialized heavy equipment. On average, 580 round trips by heavy trucks and pickups are associated with each new well. These impacts are exacerbated when the first well is drilled in an area, because wildlife will not have had an opportunity to habituate to low-level disturbance or adjust their movement patterns to avoid high-level disturbance.
- Operation and Production – This phase typically involves minimal personnel in the field except at compressor stations and water disposal facilities, with periodic traffic to each well for monitoring and maintenance. Reclamation of temporarily disturbed areas begins upon completion of construction. Successful reclamation for weed and erosion control is expected to occur within 3 to 5 years after disturbance; however, restoration

to productive wildlife habitat could take up to 20 years. The remainder of the disturbed area is occupied by surface facilities and ongoing human activity throughout the life of the well.

- Abandonment – The final phase of an oil or gas well occurs at the end of its productive life, typically ranging from 20 to 40 years. During abandonment, surface facilities are removed, wells are plugged, and access roads are reclaimed unless deemed necessary for resource management or if requested by the landowner. These activities involve a short-term increase in workers and vehicles in the project areas. Abandonment and reclamation activities require approximately 3 days per well and 4 days per mile of access road, for a crew of four people.

Reclamation of temporarily disturbed areas begins upon completion of construction. Successful reclamation for weed and erosion control is expected to occur within 3 to 5 years after disturbance; however, restoration to productive wildlife habitat could take up to 20 years. The remainder of the disturbed area is occupied by surface facilities and ongoing human activity throughout the life of the well.

Mitigation — Direct and indirect impacts of oil and gas development and other land uses or activities are generally best mitigated by avoiding or minimizing the impact to the degree practicable given other management considerations. The various surface use restrictions outlined in Table 4-1 and described in Section 4.1 emphasize this approach for protecting fish and wildlife resources. Impacts that cannot be avoided may be minimized by a variety of mitigation measures, examples of which are provided in the following subsections.

In addition to avoidance or minimization, adverse impacts to fish and wildlife can also be offset by measures that improve the quality of habitats remaining available for wildlife. These may be implemented in portions of the Planning Area not affected or only minimally affected by development (e.g., the various no-lease or

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NGD/NSO areas under the five alternatives) or, potentially, in offsite areas.

A recent example of offsite mitigation occurred in GMU 42, in which an oil and gas operator purchased 320 acres of deer and elk winter range and implemented habitat improvements such as vegetation treatments (including prescribed fires and mechanical manipulation), construction of fences to protect riparian areas, and development of upland water sources (BLM 2002a). A variant on the concept of offsite mitigation is that of “habitat banking.” Under this concept — analogous to the widely used practice of wetland banking — relative large and unfragmented blocks of habitat would be improved and/or preserved in perpetuity for the purpose of supporting a specific wildlife use. The bank would then be used to offset unavoidable impacts in the project area. When applied correctly, an offsite bank or other mitigation area may be of more benefit to wildlife than attempting to minimize or offset impacts in multiple smaller (fragmented) areas subject to ongoing disturbance by human activity.

The levels of impact ascribed to each alternative and resource component in the following analyses assume that all applicable stipulations and other management actions constituting an element of the alternative will be applied and enforced. Management prescriptions specific to oil and gas development and common to all alternatives include the following:

1. Place locked gates across well access roads to prevent unauthorized motorized use.
2. Require that development be “contained” so that produced waters and other drilling products are hauled offsite and disposed safely rather than retained onsite where they could pose a potential risk of toxicity to wildlife or pollution of surface waters.
3. Require that water used in drilling operations, dust suppression, pad revegetation, or other consumptive uses be hauled from offsite areas so that natural watering sources for wildlife are not depleted or unnecessarily disturbed.

4. Require that new oil and gas drill pads and access roads be located to avoid or minimize new drainage crossings, unless avoiding a drainage would cause greater impacts from increased road length, cut-and-fill, etc.
5. Where practicable, use radiotelemetry to monitor oil and gas production facilities as a means of reducing vehicular traffic, especially in sensitive habitats or seasons of sensitive wildlife use.
6. Where feasible and deemed appropriate by BLM, use clustering, collocation, or consolidation of facilities to reduce habitat loss, habitat fragmentation, and vehicular activity.
7. Construct watering sources (e.g., “guzzlers”) in areas not subject to oil and gas development to reduce the need for movement from secluded areas to watering areas along drainages, some of which may necessitate crossing through areas of increased human activity or new roads.
8. Prohibit oil and gas crews from bringing dogs onto BLM lands during the course of their work.
9. Develop cooperative programs among the oil and gas lessees, BLM, and CDOW to fund and implement onsite or offsite habitat enhancement measures, such as prescribed fires or other vegetation treatments, to offset unavoidable onsite impacts and reduce regional habitat loss.

While these measures would not prevent direct or indirect impacts to fish and wildlife, they would help reduce the severity of these impacts or slow the rate at which they accumulate.

The analysis of impacts of oil and gas development on fish and wildlife resources within the Planning Area under the five alternatives also assumes the numbers of pads and acres of short-term and long-term surface disturbance presented in Tables 4-2 and 4-3. Cumulative impacts of oil and gas development are discussed in terms of BLM and private

portions of the Planning Area and surrounding portions of the GSRA during the 20-year period of analysis (Table 4-3).

Although generally less important as a source of adverse impacts to fish and wildlife than oil and gas development, other land uses and activities — such as recreation and grazing and, to a lesser extent, range management and travel management — are also addressed below for each alternative. Specific mitigation measures described for the alternatives typically apply to these other activities as well as to oil and gas.

4.3.2.1 Alternative I

Under Alternative I, the objective for ecological values and processes and biological diversity is to maintain current conditions with existing management direction and activities. For big game, the seclusion areas identified in the 1999 FSEIS (see Map 17) would apply. No management actions to enhance big game habitat or other special use areas are planned or precluded under this alternative; such actions would be considered on a case-by-case basis. See Section 4.3.3 for objectives related to special status species, including the endangered Colorado River fishes and genetically pure populations of the Colorado River cutthroat trout.

Direct and Indirect Future Impacts

Vegetation and Range Management — Continuation of current management would generally retain upland and riparian/wetland vegetation in its current condition, including trends in noxious weed frequency, density, and diversity (Section 4.3.1). While nothing under this alternative would preclude BLM from implementing more systematic weed management than at present, this analysis assumes that current management practices and trends would continue. Over time, an increase in noxious weeds could result in mostly adverse impacts to native ungulates, small mammals, raptors, and small birds using these habitats, and generally lesser impacts to other species groups. Continuation of rangeland projects and administrative solutions (season-of-use

revisions, stock level adjustments, pasture exclusions, and utilization stipulations) under this alternative is expected to result in gradual, long-term improvements to range condition and trend.

Travel and Recreation Management — This alternative would allow the most unrestricted travel throughout the Planning Area, with no restrictions on cross-country travel and no routes closed to motorized or mechanized travel. The numerous roads, trails, and ATV paths within the Planning Area provide the potential for a high level of human disturbance to all wildlife species. Currently, the level of use is low throughout most of the year, except for high levels of recreational use in the Hubbard Mesa area and a seasonal influx of hunters atop the plateau in early fall. The lack of restrictions on cross-country travel under Alternative I and the expected increase in recreational use could result in increasing numbers of pioneered roads throughout the Planning Area. As discussed in Section 4.3.2.1, this would result in loss of seclusion, including during the sensitive big game birthing season and the raptor and songbird nesting seasons. While raptor nests are protected from oil and gas activities by TL and NSO stipulations, they would not be protected from disturbance associated with recreational use.

Some direct and indirect habitat loss would occur because of the tendency for wildlife to avoid roads and areas of increased recreation, extending up to several hundred meters from the road for furtive species such as mammalian and avian predators. Increased off-road use through sensitive habitats and across streams would have an adverse effect proportionately greater than the increase in number of miles. It is not possible to estimate the degree to which existing road-effect zones would become wider with additional use, but all areas would probably continue to be within the same general classes of use as at present (primary, secondary, or primitive). Therefore, impacts from increased recreational travel would be expected to be minor overall but more severe (moderate) in localized areas of concentrated recreational use.

Oil and Gas Development — No new oil and gas, coal, or oil shale leasing would occur on top of the plateau, eliminating these potential sources of impacts to upland or riparian/wetland communities in the 44,267 acres (60.1 percent of BLM lands in the Planning Area) within NOSRs 1 and 3. All of the mapped crucial mule deer winter range (24,978 acres) and big game seclusion areas (11,373 acres) on BLM lands made available for leasing would be protected by TL and NSO stipulations, respectively. Nonetheless, additional oil and gas development on existing leases or areas available to future leasing under this alternative would result in an estimated 1,120 acres of long-term habitat loss during the 20-year period of analysis. Since nearly all of this development would occur below the rim, the effect would be to reduce the amount of winter range by approximately 4.5 percent.

The TL stipulations for deer winter range would prevent or minimize construction-related disturbance impacts along oil and gas roads during winter but would not affect vehicular traffic associated with routine oil and gas operations. Applying a factor of 2.5 to 3.5 for estimating effective habitat loss due to disturbance from permissible routine operations during winter (see Reed et al. 1996, discussed in introduction to this section) indicates a reduction in effective winter range of 3,920 acres. This represents an effective loss of 15.7 percent of the winter range habitat in the Planning Area. Using a high density of 40 deer per square kilometer (one deer per 6.3 acres) of winter range (Lubow 1996), this roughly corresponds to a potential reduction in the population of 622 animals, assuming that (1) the winter range onsite is able to support such high densities and (2) the population is at carrying capacity. A more realistic estimate, based on CDOW's population goal for deer in GMU 41 and the area of winter range available, is a density of approximately one deer per 10 acres, resulting in an estimated reduction in carrying capacity of 392 animals at the end of the 20-year period of analysis.

Standard lease terms would allow BLM to shift the well pad and road alignments by up to 200 meters to minimize habitat loss. Nonetheless,

the entire area of mapped winter range is used by deer to some extent, if only for important relaxation on warm, dry slopes. Therefore, any effective habitat loss would translate to some amount of decreased carrying capacity, since winter range is a limiting factor.

Another type of analysis would use the assumption reference described in the 1997 WRRR RMP (see 1999 FSEIS):

“[A]voidance-related disuse, in most situations, accounts for up to 50 percent of potential forage and cover use within 300 feet of a road in heavy cover types, and 600 feet in open situations. Big game avoidance is considered minor at road densities of 1.5 miles per square mile or less (about 10 percent loss of effective habitat). As road density increases, the influence increases exponentially, such that at road densities of 3 miles per square mile, effective habitat is reduced by about 30 percent.”

As described in the introduction to this section, other authors (e.g., Lyon 1983; Baker and Cai 1992) have estimated higher levels of effective habitat loss. The current road density of BLM lands in the Planning Area is approximately 2.3 miles per square mile (including all motorized-use routes); an additional 24 miles of new roads would be sufficient to increase the density to 2.9 miles per square mile — approaching the density at which the 1997 WRRR RMP predicted a 30-percent reduction in use by deer and elk and from which Thomas (1979) described 52-percent and 65-percent reductions for secondary and primary roads, respectively. The 247 new oil and gas pads estimated for Alternative I, mostly located in winter range habitats below the rim, would result in 148 miles of new or widened access roads based on BLM's assumed figure of 0.6 mile of access road per pad (Appendix H). Although this would include some unknown degree of overlap with existing roads and routes to remain open for other administrative or recreational uses, it would cause the road density to exceed the levels discussed above. However, because the current road density is the baseline condition, and because of the uncertainty around the increased density required for new oil and

gas development, road density is best used in this RMPA/EIS as a qualitative factor for assessing impacts in this RMPA/EIS.

A third method for assessing road impacts was used in the 1999 FSEIS. In this approach, the GIS database was used to create a 0.125-mile buffer along roads for deer and a 0.5-mile buffer for elk based on values reported in the scientific literature (see Section 4.3.2.1). These values resulted in effective habitat loss of 103 acres and 411 acres per mile of road for deer and elk, respectively. However, this method is of limited applicability for oil and gas fields that use existing roads where practicable for access (although widened or otherwise improved) and build new roads as spurs off the existing roads. Furthermore, most of the road use occurs during construction of wells, with much less frequent use thereafter. This would be the case in the Planning Area. A 40-acre surface spacing consists of blocks 1,320 feet long on a side, with 660 feet from the edge to the center — exactly the same as the 0.125 mile buffer. Thus, this method would suggest that the entire 40-acre block would be unusable by deer. This degree of habitat fragmentation would be an issue for habitat-interior species, but mule deer are often associated with habitat edges or mosaics and are habitat generalists. Therefore, a 0.125-mile avoidance zone is probably applicable only during the construction phase. Over the long term, the access roads would function ecologically as linear surface impacts rather than frequently traveled roads. Based on these considerations, this method appears to overestimate the avoidance zone for lightly traveled oil and gas roads during the long-term production phase.

Two important difficulties in attempting to quantify effective habitat loss from oil and gas well pads and access roads are (1) the uncertainty concerning the degree to which pads will share new access roads and use existing routes and (2) the precise location, distribution, timing/sequencing, and duration of construction. On the one hand, increased traffic on existing roads would tend to increase the level of disturbance and perhaps widen the road-effect zone. On the other hand, this use would not

occur concurrently throughout the entire area, instead being distributed in specific portions of the 39 square miles of winter range within BLM portions of the Planning Area in any given year. New habitat loss would occur in areas of active development, but impacts in areas of operation and maintenance would be subject to no additional direct loss, some improvement in conditions as revegetated areas become established, and a lower level of human activity and vehicular traffic.

Regardless of which method is a better predictor of impacts to mule deer winter range under Alternative I, it is clear that any estimate of reductions in effective habitat would also apply to other species using the area in other seasons. Thus, for example, this effective-loss factor of 2.5 to 3.5 described previously would apply to many species of mammals, raptors, and small birds that use the pinyon/juniper woodlands, sagebrush shrublands, and other winter range habitats to meet their annual requirements. The TL 1 stipulation would have minimal benefit to these species.

Fragmentation impacts — i.e., reducing habitat blocks to sizes too small to support a species — are probably not great for the winter range habitats that would be affected by oil and gas under Alternative I, because the habitat in this area is already patchy. Current vegetation consists of a mosaic of pinyon/juniper, sagebrush mixed with other shrubs, and semi-desert scrub, depending on elevation, slope, and aspect, rather than a homogeneous community.

Elk winter range occurs over only a small portion of the existing area available for leasing under this alternative. Mountain lion populations would be most affected by changes in abundance of their favorite prey, mule deer. The preferred habitat of mountain lions consists of steep, rugged terrain, much of which is protected by NSO stipulations within the Planning Area, thus reducing direct habitat loss and disturbance to mountain lion. Most black bear habitat occurs above the rim and would remain unavailable for development under this alternative.

Alternative I would also protect the 11,373 acres of wildlife seclusion area below the rim from ground-disturbing activities by a combination of the NSO 11 stipulation and the no-lease designation in the NOSRs under this alternative. As described in Section 3.3.2, the seclusion areas are considered important for providing rugged, wooded, relatively inaccessible (to people) terrain in which large mammals may find refuge and forage during periods of heavy human use, particularly the hunting season. Although established for big game (including deer, elk, and mountain lions), the seclusion areas are also important for other species, including small neotropical migrant birds that are attracted by the presence of relatively unfragmented forest and woodland (see Section 4.3.4).

Raptor nests would be protected by TL stipulations during the season of active use and narrower but permanent NSO buffers throughout the year (Section 3.2.2). Bald eagle roost sites along the major riparian corridors would also be protected by NSO and TL stipulations. Therefore, no direct impacts to raptors would be expected from oil and gas development. However, indirect impacts would occur from loss of hunting habitat (i.e., areas where raptors seek prey, typically much larger than the territories defended around nests). The area of low-elevation habitats where oil and gas development would occur under this alternative are mostly used by species such as the golden eagle, red-tailed hawk, American kestrel, and western screech-owl and not the more sensitive species (see Section 4.3.4).

Waterfowl and shorebird nesting at Fravert Reservoir would be protected by the TL stipulation under all alternatives.

Offsite and Cumulative Impacts

Oil and gas development on private lands within the Planning Area and general region is expected to be similar in nature and extent to the impacts on BLM portions of the Planning Area. These would result in cumulative impacts to native vegetation, including big game winter range and other habitat types. Moreover, impacts on

private lands could be significantly greater than on BLM lands if reclamation of disturbed areas and avoidance of riparian areas is not performed to the same standards as required by BLM. Similarly, protective stipulations are not required of private surface owners.

Impacts to wildlife would result from increasing levels of human use and development throughout the region, regardless of management actions within the Planning Area. For larger, more wide-ranging species, the combined effect of this accumulation of smaller scale impacts can become disproportionately large and result in population declines that greatly exceed the amount of actual habitat loss. For example, the 24,978 acres of mule deer winter range in the BLM portion of the Planning Area represents approximately 31 percent of the amount in GMU 32 (Table 3-13, Section 3.3.2). Since most of the area of anticipated oil and gas development on private land is below the rim, it is also mostly winter range (see 1999 FSEIS). The combined 58,584 acres of winter range within the entire Planning Area represents 72 percent of the 81,516 acres of deer winter range in GMU 32. Development of oil and gas on private land within the Planning Area would cause impacts to the mapped elk winter range along Parachute Creek sideslopes. These areas would not be affected by development on BLM land in the Planning Area.

Assuming that the private land is developed at a 20-acre surface spacing and excludes only areas steeper than 50 percent would result in an estimated 1,112 additional pads and 4,802 acres of additional long-term disturbance during the 20-year period of analysis. The combined direct long-term impact to 6,149 acres represents 4.8 percent of the Federal and private lands in the Planning Area. The exact amount of cumulative habitat loss would depend on specifics of oil and gas development locations and rates, the degree of disturbance-related habitat avoidance or diminished use, the effectiveness of reclamation and mitigation measures, and the ability of wildlife to tolerate the increased human activity and habitat fragmentation or successfully adjust their patterns of habitat use.

Summary of Impacts and Mitigation

Above the rim, long-term adverse impacts on wildlife under Alternative I would range from negligible to minor due to lack of restrictions on cross-country OHV use, anticipated continued increases in OHV and other recreational visitation, and the likely continued spread of noxious weeds and effects on plant communities. Below the rim, impacts would be more severe (minor to moderate) because that area would be subject to the bulk of oil and gas development. In all areas, the greatest impacts (localized major) would be temporary from noise, dust, and human activity in areas of active road, pad, and well construction or other ground-disturbing activities. Riparian and wetland areas throughout the Planning Area would be protected by NSO stipulations, as would the Anvil Points cave habitat for bats and the nests of raptors and waterbirds.

Impacts to mule deer winter range associated with oil and gas development on BLM lands could range from minor, based on 4.5 percent of direct habitat loss in this habitat type, to moderate based on a reduction in effective habitat of 15.7 percent or higher using one analytical approach. The wide range in possible impacts reflects the uncertainty concerning the actual extent to which deer would avoid roads, the extent to which the TL 1 seasonal restriction on construction would minimize behavioral avoidance by deer, and any effects of habituation to increased human presence. Pinyon/juniper woodland songbirds and other smaller species in the winter range habitats could suffer minor to moderate impacts, although probably not major due to generally narrower road-effect zones.

Measures that could help mitigate the impacts of increased oil and gas development in mule deer winter range include the management prescriptions common to all alternatives (see Section 4.3.2.1) as well as the following:

1. Require the operator to sequence exploration and construction into specific areas in a given year so that disturbance and habitat

loss are limited to a small portion of developable land rather than dispersed throughout.

2. Increase the amount of riparian restoration to enhance the quality and extent of this important habitat; measures could include fencing of most or all riparian corridors to exclude livestock.

While these measures would not offset the loss of winter range or other habitats described above, they would help to reduce or slow the decline and benefit a variety of other species. Impacts of different management and land-use actions under this alternative are summarized in Table 4-12. See Section 4.3.4 for a discussion of impacts to special status species (including Federally listed or candidate threatened or endangered species and BLM or USFS sensitive species) under Alternative I.

4.3.2.2 Alternative II

The management goal for Alternative II is to protect ecological values and processes, and biological diversity, by limiting surface disturbance and promoting natural ecosystem processes and functions in all systems.

Protection of wildlife would result from the application of the same NSO and TL stipulations for winter range, wildlife seclusion, and raptor nesting habitats applied under Alternative I (see above). Additional protection would result from extension of these stipulations to NGD and TL stipulations for non-oil and gas activities, no-lease restrictions for areas having wilderness character (East Fork Parachute Creek, Northeast Cliffs, and Southeast Cliffs); NGD restrictions for stream segments eligible for WSR designation; and NGD or SSR designation for other areas of sensitive watersheds and designated ACECs in the areas of Anvil Points, Magpie Gulch, East Fork Parachute Creek, and Trapper/Northwater Creek. All of these special management areas would be subject to requirements for the special mitigation measures described previously.

Table 4-12. Summary of Impacts of Alternative I to Terrestrial and Aquatic Wildlife ¹

Taxonomic or Trophic Group	Vegetation and Range Management	Recreation and Travel Management	Oil and Gas Development	Special Resource Management Designations
Large Mammals (Deer Summer Range, Elk, Mountain Lion, Black Bear)	Negligible (+)	Minor (-)	Negligible (-)	None
Crucial Deer Winter Range	Negligible (+)	Minor (-)	Minor (-)	None
Medium-size Predators and Small Mammals	Negligible (+)	Minor (-)	Negligible to Minor (-)	None
Raptors	Negligible (+)	Minor (-)	Negligible to Minor (-)	None
Waterbirds	Negligible (+)	Negligible (-)	Negligible (-)	None
Small Birds	Negligible (+)	Minor (-)	Minor (-)	None
Reptiles and Amphibians	Negligible(+)	Negligible (-)	Minor (-)	None
Aquatic Species	Negligible (+)	Negligible to Minor (-)	Negligible to Minor (-)	None

¹ Does not include special status (threatened, endangered, candidate, or sensitive) species; see Section 4.3.4.

A new stipulation, NGD/NSO W-2, would prohibit long-term ground-disturbing activity (i.e., lasting longer than 2 years) in the unroaded wildlife habitat below the rim in the Anvil Points and Magpie Gulch ACECs, and SSR/CSU W-3 would protect and preserve bat habitat values associated with the Anvil Points ACEC.

An SRMA designation for the Hubbard Mesa OHV area would limit travel to designated routes, and 86 miles of existing routes (mostly atop the plateau) would be either closed and rehabilitated (43 miles) or limited to administrative use (an additional 43 miles). The entire portion of the Planning Area on BLM land would be closed to cross-country travel, including over-snow travel by snowmobile. Additionally, a total of 21,382 acres in areas having wilderness character would be closed to all motorized or mechanized use.

Direct and Indirect Future Impacts

Vegetation and Range Management — Vegetation goals would focus on improving the diversity, production, and native species

composition of upland and riparian sites, including closure and revegetation of some existing routes. These proposed management actions would result in moderate positive impacts. Implementation of rangeland projects would be limited, but administrative solutions would be expected to result in more rapid, long-term improvements to range condition and trend, and hence wildlife habitat quality, than under the other four alternatives.

Travel and Recreation Management — Closing 21,382 acres to motorized and mechanized travel, limiting this travel to designated routes in the remaining 45,552 acres of BLM lands (including the Hubbard Mesa SRMA and over-snow travel by snowmobile), closing/rehabilitating 43 miles of existing routes, and limiting an additional 43 miles of existing routes to administrative use would increase the amount of solitude for wildlife and reduce the area of habitat loss associated with current road-effect zones along these routes.

Of the combined 86 miles of roads closed or limited to administrative use, all but 9 miles would be above the rim in areas that include crucial elk calving habitats, fawning habitats for

deer, summer range for mountain lions and black bears, and nesting habitat for a host of small birds and raptors. Using the road-effect zone calculation applied for mule deer winter range under Alternative I indicates that the amount of effective habitat gain above the rim would be substantial, assuming a 250-meter-wide zone of reduced use along these roads.

Oil and Gas Development — Slightly more than 70 percent of habitats on the top and sides of the plateau would either not be leased for oil and gas development under this alternative (21,382 acres) or would be protected with NGD/NSO stipulations (31,200 acres) or SSR/CSU stipulations (7,015 acres). The TL stipulations under this alternative would apply to the 10,206 acres of deer winter range outside the no-lease and NGD/NSO areas. All of the 3,645 acres of wildlife seclusion habitat would be protected by NSO 11 and a comparable NGD for other activities, and thus subject to limited habitat loss or fragmentation.

This alternative would result in approximately 66 new well pads above the rim and 244 below the rim. The wells below the rim would result in direct, long-term loss of an estimated 1,105 acres of deer winter range, plus displacement of deer (due to behavioral avoidance) from up to one-third of the remaining winter range within the developable area. Using a factor of 3.5 for calculating effective habitat loss associated with ongoing activities permitted during the 5-month TL stipulation (see Alternative I) would yield a total loss of approximately 3,868 acres, or approximately 15.5 percent of the winter range on BLM lands in the Planning Area. This amount is similar to the area affected under Alternative I. Using an assumed density of one deer per 10 acres of winter range (see discussion for Alternative I) indicates a potential decrease in carrying capacity by approximately 387 animals by the end of the 20-year period of analysis. The same mitigation measures listed for Alternative I (see above) could be applied under Alternative II to help reduce the severity and rate of this effective habitat loss.

While Alternative II would represent oil and gas development comparable to Alternative I below

the rim, it would cause a qualitative change above the rim by opening an area that is currently characterized by its naturalness and seclusion for most of the year, excluding hunting season. The estimated 66 new pads and associated roads and pipelines above the rim under this scenario would result in long-term loss of an estimated 243 acres, plus the zone of behavioral avoidance, yielding an effective habitat loss of 847 acres based on a factor of 3.5. This represents 2.4 percent of the BLM land above the rim. Although small in absolute terms, the introduction of the type of disturbance associated with oil and gas development, including noise, areas of intensive human and vehicular activity, travel by much larger vehicles than currently venture into this remote area, and light pollution (if drilling occurs at night) could have substantially greater impacts than indicated by the small amount of land.

Of particular concern is the impact of habitat loss and increased human activity during the deer and elk birthing season in late spring and early summer. Initially, deer and elk could undergo marked shifts in patterns of use, including avoidance of areas suitable for bearing and rearing their young. The initial impacts would be relatively greater than indicated by the acres of habitat loss due to the disturbance being novel. Eventually, however, the initial level of impact should decrease as the animals learn what areas remain available for seclusion. Habitats atop the plateau generally provide good vegetation and topographic cover for wildlife, except for sagebrush shrublands and mixed mountain brush along open ridgetops and some sideslopes along upper reaches of drainages. This would tend to reduce the width of the road-effect zone and the duration of avoidance of construction activities.

Habitat fragmentation is a type of impact for species with relatively restricted home-range sizes (e.g., forest-interior neotropical migrant songbirds) and does not apply to wide-ranging ungulates at the scale of fragmentation associated with oil and gas pads (versus large-scale fragmentation from quilt-work clearcutting and clearing of ski slopes). Because each new well pad and associated road and pipeline within

the 40-acre surface locations atop the plateau would represent 1.9 to 2.5 acres of direct long-term impacts, increased to approximately 7 to 9 acres using the factor of 3.5, effective habitat loss in each 40-acre location would be reduced by up to 22.5 percent. This amount would probably be sufficient to cause abandonment of the locations by some habitat-interior species and reduced use by other species (see Section 3.2.2). Two additional considerations concerning fragmentation are noteworthy:

- For wide-ranging wildlife such as deer and elk, larger avoidance zones around areas of active development are such that the remaining habitat within 20-acre or 40-acre blocks, or clusters of blocks being developed concurrently, would be effectively unavailable to these species.
- Although the level of disturbance within 40-acre blocks would be more severe and concentrated than that along access roads, the latter could extend through several miles of habitat. Thus the localized, limited-duration impacts of access roads would also be substantial. For example, Thomas (1979) estimated a 65-percent decrease in use of summer range by elk at a density of 3 miles of primary roads per square mile of habitat. Access roads for oil and gas development would easily meet his definition of a primary (“main”) road during the construction period.
- For species with smaller home ranges, such as most of the forest-interior songbirds and small mammals, the existing conifer habitat is already quite linear due to the ridge-and-valley topography atop the plateau. Therefore, these habitats may already have too much edge to support forest specialists to the extent indicated by the numbers of acres present.
- For forest-interior species, the natural topography and existing degree of road fragmentation (2.3 miles of motorized routes per square mile) may make further fragmentation disproportionately more severe due to the limited capacity of the habitat blocks to absorb further habitat loss.

Impacts on other species, including raptors and the diverse and abundant small bird and small mammal species associated with the types of habitat atop the plateau (see Section 3.3.2), would also be greater than under Alternative I due to opening of more of the highlands to oil and gas development. However, the most important habitats (including aspen, spruce/fir forest, old-growth Douglas-fir forest, and riparian corridors) would be largely protected because of the no-lease designations, NGD/NSO and SSR/CSU stipulations, and special mitigation requirements related to areas having wilderness character, streams eligible for WSR designation, ACECs, or special status plant and wildlife species.

Offsite and Cumulative Impacts

These impacts would be similar to those for Alternative I, except that the overall loss of deer winter range in the Planning Area and region would be reduced, while loss of deer and elk summer range and fawning/calving habitat (and other habitat atop the plateau) would also occur.

Combined long-term impacts on Federal and private lands in the Planning Area are estimated at 6,148 acres, or 4.8 percent of the Planning Area during the 20-year period of analysis. Approximately 96 percent of this impact would occur in areas below the rim. Because the potential development on private land within the Planning Area is almost totally limited to winter range below the rim, no cumulative impacts to summer habitat (and year-round habitat for resident species atop the plateau) would occur as a result of development above the rim. However, impacts to offsite highland habitat could occur with oil and gas or other development and increased recreational use in other nearby areas, potentially including other BLM lands, National Forest lands, and some private lands. To the extent that highland habitats are affected elsewhere, the impacts atop the plateau under Alternative II would represent a cumulative impact.

Beneficial impacts of road closures and prohibiting cross-country travel would help offset anticipated increases in recreational use or

other vehicle-related disturbance offsite as a consequence of continued human population growth. The degree of offset would depend on the specific timing, rate, and distribution of development (e.g., clustered or dispersed) under this alternative. These specifics are unknown at present.

Summary of Impacts and Mitigation

Overall, Alternative II would have minor to localized moderate long-term adverse impacts to wildlife. More severe (localized major) temporary impacts would occur in areas of active road, pad, or well construction or other ground-disturbing activities. Beneficial impacts from travel restrictions and vegetation/range management would offset much of the adverse impact from oil and gas development. Levels of impacts would be comparable among species/trophic groups.

The highly sensitive and important stream corridors atop the plateau would be protected by WSR eligibility, while these and lesser streams below the rim would also carry the NGD/NSO stipulation for riparian and wetland areas. The NGD/NSO for high- and moderate-risk fish habitat under this alternative (see Section 4.3.4) would also benefit other wildlife; these stipulations are not included under Alternative I, reducing the level of protection for riparian and aquatic systems. Similar NGD/NSO protection would also apply to the Anvil Points cave area and, along with TLs, to raptor and waterbird nesting areas. The old-growth Douglas-fir remnant communities would also be protected by an NGD/NSO, preserving unfragmented habitat for forest-interior small birds.

The greatest impacts under this alternative would be to developable portions of mule deer critical winter range (although less extensive than for Alternative I) and to seasonally sensitive uses of deer and elk production habitat and raptor and small bird breeding habitat atop the plateau. The latter group of impacts would be negligible in most of the highlands but locally moderate to major for some species in localized areas of oil and gas development. The severity of these impacts would be offset to some extent

by the decrease in OHV use, especially cross-country travel, and by the presence of considerable areas of SSR/CSU or special mitigation designations with the associated opportunities for additional mitigation measures.

Special mitigation measures that could be applied under this alternative to lessen the impact on deer, elk, and other species — and which would be in addition to the management prescriptions that would apply to all alternatives (see Section 4.3.1) — could include the following:

1. Limit construction, drilling, and major routine maintenance atop the plateau to the winter months (November through April) when elk, deer, and mountain lions are generally not present atop the plateau, and when black bears are hibernating.
2. Alternatively, prohibit drilling and non-essential activities (regularly scheduled major maintenance) during the late spring/early summer season (May through mid-July), which encompasses the birthing season for deer and elk, the early rearing season for these species and black bears and mountain lions, and the nesting season for songbirds and several hawk species.
3. In areas of summer range and calving/fawning habitat, construct fencing to exclude cattle but allow passage of deer and elk along stream corridors to increase the amount of cover and forage for these species while concurrently improving habitat for songbirds, small mammals, amphibians, and aquatic species.
4. In areas of winter range, require that final revegetation include native shrubs in the seed mix and planting of native shrub “tubelings.”
5. Require use of a biodegradable erosion-control mat to enhance revegetation success.

Table 4-13 summarizes direct and indirect impacts to major groups of terrestrial and aquatic wildlife under Alternative II. For impacts to special status species, see Section 4.3.4.

Table 4-13. Summary of Impacts of Alternative II to Terrestrial and Aquatic Wildlife ¹

Taxonomic or Trophic Group	Vegetation and Range Management	Recreation and Travel Management	Oil and Gas Development	Special Resource Management Designations
Large Mammals (Deer Summer Range, Elk, Mountain Lion, Black Bear)	Moderate (+)	Moderate (+)	Minor (-)	Moderate (+)
Crucial Deer Winter Range	Moderate (+)	Moderate (+)	Minor (-)	Minor (+)
Medium-size Predators and Small Mammals	Moderate (+)	Moderate (+)	Minor (-)	Moderate (+)
Raptors	Moderate (+)	Moderate (+)	Minor (-)	Moderate (+)
Waterbirds	Negligible (+)	Minor (+)	Negligible (-)	Minor (+)
Small Birds	Moderate (+)	Moderate (+)	Minor (-)	Moderate (+)
Reptiles and Amphibians	Moderate (+)	Moderate (+)	Minor (-)	Moderate (+)
Aquatic Species	Moderate (+)	Moderate (+)	Minor (-)	Moderate to localized Major (+)

¹ Does not include special status (threatened, endangered, candidate, or sensitive) species; see Section 4.3.4.

4.3.2.3 Alternative III – Preferred Alternative

The objective for ecological values under this alternative is to protect important ecological values and processes by developing and implementing management prescriptions that would limit surface disturbance and mitigate the effects of surface disturbance. This objective is within the context of an overall management objective for Alternative III of balancing oil and gas development with focused mitigation. For wildlife, this includes protective measures for special status species, including the Colorado River cutthroat trout (Section 4.3.3). This alternative includes designation of the Trapper/Northwater Creek drainage as a WMA, with the specific management objectives listed in Table 2-3.

NGD/NSO and TL stipulations related to raptor nests and nesting areas would continue, as would the waterfowl and shorebird nesting area TL at Fravert Reservoir. The TL stipulation for mule deer winter range would also be applied.

No special protection would be provided in the areas identified under Alternative II as having wilderness character. However, two ACECs would be designated (East Fork Parachute Creek and Trapper/Northwater Creek), the WSR-eligible stream corridors would be protected, and the entire Parachute Creek watershed would be given special management focus by a WMA designation.

The Hubbard Mesa SRMA for OHV recreation under Alternative II would also be designated under this alternative, with travel limited to designated routes. Not including the SRMA, a total of approximately 26 miles of existing routes would be closed, and an additional 24 miles would be limited to administrative use.

Alternative III would not designate the big game seclusion areas of Alternative II, meaning that the NGD/NSO stipulation for this specific resource would be removed. However, some seclusion would be provided through restrictions on travel, management actions to enhance big game habitat where practicable, and measures to preclude, limit, or mitigate habitat loss within the seclusion habitat. Fortunately, some of

these habitats would be protected by an NGD/NSO aimed at one or more other resource values, such as steep slopes, sensitive viewsheds, and remnant plant communities (including old-growth Douglas-fir). If this alternative were selected and implemented without these other NGD/NSO stipulations, the resultant habitat loss, fragmentation, or disturbance of the seclusion areas would be expected to affect deer and elk populations adversely.

Direct and Indirect Future Impacts

Vegetation and Range Management — Under Alternative III, wildlife habitat types (vegetation communities) would not receive the same management focus as in Alternative II. Measures to improve the upland vegetation and riparian/wetland condition of these areas would be beneficial at a localized level but diluted overall by the potential for decline in other areas. Rangeland improvements and administrative solutions to livestock issues to be implemented under Alternative III are expected to result in more rapid improvements to range condition and trend than under Alternative I, but less than under Alternative II (see Section 4.3.1.4).

Travel and Recreation Management — Prohibiting cross-country motorized or mechanized travel throughout the Planning Area (including the Hubbard Mesa SRMA), limiting 24 miles of existing routes to administrative use, and closing/rehabilitating an additional 26 miles of existing routes would increase the amount of solitude for wildlife and reduce the area of habitat loss associated with current road-effect zones along these routes.

Of the 50 miles of roads closed or limited to administrative use, all but 9 miles would be above the rim in areas that include crucial elk calving habitats, fawning habitats for deer, summer range for mountain lions and black bears, and nesting habitat for a host of small birds and raptors. Using the road-effect zone calculation applied for mule deer winter range under Alternative I indicates that the amount of effective habitat gain above the rim would be

substantial, assuming a 250-meter-wide zone of reduced use along existing roads.

Deer and elk hunting opportunities and levels could decline as the attractiveness of the area to hunters decreases (due to oil and gas operations), regulations become more restrictive due to lower deer populations, and cross-country OHV travel is prohibited. In the case of deer, for example, population declines in 1999 triggered a change in regulations and resulted in a 72-percent decrease in hunter numbers within the Planning Area. Although unlikely, deer population declines associated with this alternative could exceed those that precipitated the hunting reduction in 1999, depending on specifics of where and at what rate new oil and gas development occurs and whether seasonal migration routes are affected.

Oil and Gas Development — Alternative III would result in an estimated 402 new well pads, of which 363 would be below the rim in big game winter range. NGD/NSO and TL stipulations related to raptor nests and nesting areas would continue, as would the waterfowl and shorebird nesting area TL at Fravert Reservoir. Oil and gas development, including construction or widening/improvement of 218 miles of access roads, would result in direct habitat loss of 1,595 acres of mule deer winter range in 20 years. Using the factor of 3.5 to estimate effective habitat loss indicates a decrease of 5,582 acres, or 22.3 percent of the amount on BLM lands in the Planning Area.

The existing 5-month TL stipulation for oil and gas development in big game winter range, intended to reduce disturbance and displacement during the crucial months of December through April, would also be applied under this alternative. The winter months create stresses on deer and elk due to a combination of reduced food availability and nutrition, cold temperatures, and difficulty in moving through deep snow. The protection afforded by the 5-month TL is more important under Alternative III than either of the two previous alternatives due to the greater total development in lower elevation (winter) habitats and the additional drilling intensity during the deferral period.

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Therefore, the actual drilling intensity at lower elevations under this alternative is greater than indicated by the total number of pads and miles of new roads, because the bulk of these would be completed in less time than the 20-year period of analysis (potentially as little as 10 years).

Habitats on top of the plateau would be subject to less impact from oil and gas development than under the two previous alternatives. This area includes big game summer range and other high-quality habitats for non-game species including raptors and a rich assemblage of small birds and small mammals (see Section 3.3.2). An estimated 39 new pads and 166 acres of long-term disturbance, including that along 23 miles of new or widened access roads, would result in effective loss of 581 acres using the factor of 3.5. This represents 1.7 percent of these habitats on BLM lands — compared to 2.4 percent under Alternative II.

These impacts would occur in areas that are currently essentially natural and mostly untrammeled. Assuming that oil and gas development is dispersed throughout the area, the amount of development under Alternative III would fragment the habitat into smaller unbroken blocks with proportionately more edge and less habitat interior than at present. Only the WSR-eligible stream corridors and the NGD/NSO stipulation for Colorado River cutthroat would provide substantial seclusion from development above the rim. Together, human activity and habitat fragmentation associated with oil and gas development atop the plateau would have proportionately less impact on deer fawning, elk calving and summer use, and other species (e.g., habitat-interior songbirds and furtive mammal species) than previous alternatives during the deferral period but greater impact on these species once drilling is initiated. Thus, benefits of deferring development on top of the plateau would be offset by the greater development intensity once it begins and the much greater area ultimately available for development.

To help reduce impacts to sensitive, furtive, or habitat-interior species from increased human

activity at higher elevations following the deferral period, BLM (with input from CDOW) may conclude that one of two alternative approaches should be emphasized:

- Encourage dispersed drilling to minimize the number of overlapping disturbance envelopes, thus providing nearby refugia for less mobile species or those with small home ranges.
- Encourage concentrated drilling, leaving other areas available to provide seclusion for more mobile, wide-ranging species.

The first option would benefit smaller and more territorial species, while the second option would benefit species such as elk and large carnivores.

Additionally, BLM and CDOW could conclude that the area atop the plateau should be closed to hunting in areas of active development following the deferral period. Such a restriction could be necessary for the safety of hunters as well as oil and gas workers, and by the loss of some existing refuge for big game animals. Creating unhunted areas on top of the plateau could also facilitate the habituation of deer, elk, and large carnivores to the oil and gas operations in these areas.

While disturbance-related impacts are difficult to avoid, the surface-use restrictions under Alternative III — with most of the development being in SSR/CSU areas — would give BLM the ability to reduce direct habitat impacts by requiring that a proposed ground-disturbing activity be shifted by more than 200 meters to protect a resource or to require special mitigation measures.

Another feature of Alternative III is the lack of specific protection of wildlife seclusion areas. These areas generally correspond to deer/elk seasonal migration routes between summer and winter range. The Roan Cliffs are a formidable obstacle to movement along most of their length, with only a few passages allowing elevational migration. If the NGD/NSO stipulations that coincidentally protect these movement routes

under Alternative III (i.e., stipulations intended to protect other resource values) were dropped under this alternative, impacts to deer and elk movement would be severe unless oil and gas operations were sited to avoid creation of a migration barrier. The 200-meter relocation of ground-disturbing activities permissible under standard restrictions and limitations would probably be insufficient to ensure unimpeded movement of deer and elk through these confined corridors — especially in light of the more intensive development than under Alternatives I and II (in terms of wells per year) anticipated atop the plateau at the end of the deferral period.

Offsite and Cumulative Impacts

Below the rim, the types of offsite and cumulative wildlife impacts under Alternative III would be similar to those for Alternative II. However, the magnitude of offsite impacts would be greater due to the increased amount of oil and gas development and the more intensive development rate during the deferral period. This could shift more animals to offsite areas, potentially affecting the habitat quality of the offsite areas due to overuse and interfering with movement patterns of large, mobile species (e.g., deer).

Above the rim, both the greater level of oil and gas development than under Alternative II and, especially, the considerably greater intensity of development following the deferral period are likely to lead to the following offsite impacts after drilling begins on top of the plateau: (1) displacing more animals from onsite to offsite areas, with the associated adverse impacts to those lands, and (2) potentially reducing populations of elk and other large or wide-ranging species for which the home range includes both onsite and offsite areas.

Cumulatively, the onsite and offsite impacts resulting from implementation of this alternative would be in addition to habitat loss and disturbance impacts associated with oil and gas development in other areas. Similarly, these impacts would be cumulative to impacts from other sources, such as grazing and increasing

levels of recreational use. Potentially, the intensity of oil and gas development could reach a level that reduces the attractiveness of parts of the area to recreationists — especially atop the plateau following the deferral period.

Combining the potential long-term impacts in the BLM portion of the Planning Area with likely development levels on private lands (see previous alternatives) would result in a potential direct loss of 5,923 acres, roughly 3.1 percent of the total area. Roughly 96 percent of this total would be in habitats below the rim.

Summary of Impacts and Mitigation

Overall, Alternative III would have minor to localized moderate long-term adverse impacts on wildlife. Compared to Alternative II, the impacts would be somewhat greater for species primarily using or relying on habitats below the rim but generally less for species on top of the plateau due to the estimated 16-year oil and gas deferral. Following the deferral period, the estimated annual development rate at the higher elevations (approximately 17 wells per year) would be greater than for Alternative II (approximately 4.4 wells per year, assuming that the drilling is relatively uniform throughout the 20-year period). Thus, while the total amount of development would be less than under Alternative II, the greater intensity of development following the deferral period would be greater and thus have more impact to sensitive or furtive species once it begins.

Another consideration is that the sudden increase in development from none to an estimated 17 wells per year would allow less opportunity for habituation than the slower development rate atop the plateau under Alternative II. Again, however, impacts from oil and gas would be virtually non-existent during the deferral.

Beneficial effects of travel restrictions, vegetation and range management, and special protection of WSR-eligible streams, and wilderness values, and the Parachute Creek WMA would help offset adverse impacts from oil and gas development. More severe

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temporary impacts would occur in proximity to active road, pad, or well construction due to noise, dust, and human activity, especially once development begins at the higher elevations. Other ground-disturbing activities could have similar effects, although at a lower level.

Discussions concerning impacts of Alternative II to species that inhabit pinyon/juniper and other winter range habitats and the myriad species that occupy habitats atop the plateau also apply to Alternative III. However, the severity of impacts under this alternative would be less due to fewer wells and less associated human activity, and larger areas of SSR/CSU or special mitigation protection instead of NGD/NSO stipulations. While the ability to shift a proposed ground-disturbing activity by more than 200 meters to avoid a sensitive resource with an SSR/CSU stipulation is preferable to the standard stipulation of up to 200 meters, the protection is clearly not as great as with an NGD/NSO.

The highly sensitive and important stream corridors atop the plateau would be protected by WSR eligibility, the East Fork Parachute Creek and Trapper/Northwater Creek ACECs, the riparian and wetland NGD/NSO, and the Colorado River cutthroat trout moderate- and high-risk habitat NGD/NSO. Raptor and waterbird nesting areas would continue to be protected.

Mule deer winter range could undergo an effective loss of 36 percent on BLM lands in the Planning Area, a moderate to potentially major impact in terms of reduced carrying capacity of this limiting resource. The potential for this outcome depends on the exact extent, timing, and duration of oil and gas development, as well as the effectiveness of mitigation measures. Greater-than-anticipated habituation of deer to oil and gas activities could also reduce the severity of the impact. Increased fragmentation of the pinyon/juniper woodland under this alternative would also increase the potential that one or more habitat-interior or habitat-specialist species could be exterminated from the Planning Area, or at least markedly reduced.

Effective loss of summer range would be approximately 70 percent that of Alternative II due to deferred development but would occur at approximately four times the annual rate once initiated. While habitat fragmentation associated with pads and access roads would be less under this alternative than Alternative II, this benefit would apply only during the 20-year period of analysis. Eventually, the decreased amount of surface-use restrictions under Alternative III would further decrease the carrying capacity for year-round or summer-resident habitat-interior species or other forest specialists atop the plateau. Fragmentation of currently small areas of conifer forest and mountain grassland could be especially detrimental due to the limited extent of these habitats on BLM lands (see Section 3.2.1) and their importance to some species. The riparian/wetland areas also have a small areal extent and are linear features, making them more vulnerable to fragmentation. These areas would be protected from direct impacts by NSO 2 and an analogous NGD for other land uses or management actions, but indirect impacts from disturbance could cause effective habitat fragmentation. These impacts would be expected to be lower in the two ACECs atop the plateau.

The combined effective habitat loss of 6,164 acres in BLM lands would represent an 8-percent reduction in habitat available to avian and mammalian predators for hunting and a comparable reduction in prey abundance. Therefore, mountain lions and black bears would be reduced, probably to a greater extent than indicated due to their furtiveness. For raptors, even the protective NGD/NSO and TL stipulations relative to raptor nesting may not be sufficient to maintain current populations, depending on precisely where and in what manner oil and gas development occurs. Forest-interior species such as the northern goshawk and boreal owl would probably be disproportionately affected due to the habitat fragmentation that would result from new well pads and access roads.

Quantifying impacts to wildlife is difficult due to the many project-, climate-, and behavior-

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related unknowns, unknowns concerning oil and gas development rate locations, and impacts of other land uses and management activities (e.g., recreation, range management) that affect species differently. Nonetheless, it is reasonable to conclude that Alternative III could cause the BLM portion of the Planning Area to suffer approximate declines of 33 percent in deer, 5 percent in elk, and 9 percent in overall wildlife abundance, as well as an unknown number of localized extirpations.

Although restricting motorized and mechanized travel to designated routes throughout the Planning Area would benefit a variety of species and resource values, it is unlikely that this restriction would fully offset the adverse impacts from the anticipated level of oil and gas development, especially after the deferral period. Table 4-14 summarizes impacts to fish and wildlife under Alternative III. See Section 4.3.4 for a discussion of impacts to special status species.

Table 4-14. Summary of Impacts of Alternative III to Terrestrial and Aquatic Wildlife ¹

Taxonomic or Trophic Group	Vegetation and Range Management	Recreation and Travel Management	Oil and Gas Development	Special Resource Management Designations
Large Mammals (Deer Summer Range, Elk, Mountain Lion, Black Bear)	Minor (+)	Moderate (+)	Moderate (-)	Moderate (+)
Crucial Deer Winter Range	Minor to Moderate (+)	Minor (+)	Moderate (-)	None
Medium-size Predators and Small Mammals	Minor (+)	Moderate (+)	Moderate (-)	Moderate (+)
Raptors	Negligible (+)	Moderate (+)	Moderate (-)	Moderate (+)
Waterbirds	Minor (+)	Minor (+)	Negligible (-)	Minor (+)
Small Birds	Minor (+)	Moderate (+)	Moderate (-)	Moderate (+)
Reptiles and Amphibians	Negligible to Minor (+)	Moderate (+)	Minor (-)	Moderate (+)
Aquatic Species	Minor (+)	Moderate (+)	Minor to localized Moderate (-)	Moderate (+)

¹ Does not include special status (threatened, endangered, candidate, or sensitive) species; see Section 4.3.4.

4.3.2.4 Alternative IV

The objective for ecological values under this alternative is to protect important ecological values and processes by developing and implementing management prescriptions that would limit surface disturbance and mitigate the effects of surface disturbance. This objective is within the context of an overall management objective for Alternative IV of balancing oil and gas development with focused mitigation. For wildlife, this includes protective measures for special status species, including the Colorado River cutthroat trout (Section 4.3.3). This alternative includes designation of the Trapper/Northwater Creek drainage as a WMA,

with the specific management objectives listed in Table 2-3.

NGD/NSO and TL stipulations related to raptor nests and nesting areas would continue, as would the waterfowl and shorebird nesting area TL at Fravert Reservoir.

The TL stipulation for mule deer winter range would not be retained, but a shorter (60-day) TL would be applied as a COA. The 60-day period includes January and February, while the 5-month TL stipulation of Alternatives I through III also includes December, March, and April. It is difficult to assess the difference between these two levels of protection quantitatively. While January and February are the two coldest months

in the region, they typically do not produce as deep or protracted a snow cover as March and April, which is the time when the animals' energy reserves are most depleted. Late winter/early spring is particularly difficult for a pregnant doe, which must ingest enough food to sustain itself and its fetus (sometimes twins) and must expend more energy to avoid a source of disturbance. Both an inability to obtain sufficient food intake and excessive stress from disturbance may lead to mortality of the fetus. Because the exact relationship between a 2-month and 5-month TL cannot be calculated — and in fact is likely to vary from year to year and site to site — this analysis assumes that a 2-month COA is only 40 percent as beneficial.

Alternative IV would also exclude the big game seclusion areas designated under Alternative II, meaning that the NGD/NSO stipulation for this specific resource would be removed, but some seclusion would be provided through restrictions on travel, management actions to enhance big game habitat where practicable, and measures to preclude, limit, or mitigate habitat loss within the seclusion habitat. Fortunately, some of these habitats would be protected by an NGD/NSO aimed at one or more other resource values, such as steep slopes, sensitive viewsheds, and remnant plant communities (including old-growth Douglas-fir). If this alternative were selected and implemented without these other NGD/NSO stipulations, the resultant habitat loss, fragmentation, or disturbance of the seclusion areas would be expected to affect deer and elk populations adversely.

No special protection would be provided in areas identified under Alternative II as having wilderness character. However, a total of 9,006 acres would be managed in ways that would protect roadlessness and naturalness (Map 35). Additionally, two ACECs would be designated (East Fork Parachute Creek and Trapper/Northwater Creek), including the same areas as Alternative III. Protection of stream and riparian habitats along the WSR-eligible streams would also be the same as Alternatives II and III. A WMA would also be designated, but only for Trapper/Northwater Creek.

The Hubbard Mesa SRMA for OHV recreation under Alternatives II and III would also be designated, with motorized and mechanized travel limited to designated routes. Not including the SRMA, a total of approximately 26 miles of existing routes would be closed and additional 24 miles limited to administrative use.

Direct and Indirect Future Impacts

Vegetation and Range Management — Under Alternative IV, wildlife habitat types (vegetation communities) would not receive the same management focus as in Alternative II. Measures to improve the upland vegetation and riparian/wetland condition of these areas would be beneficial at a localized level but diluted overall by the potential for decline in other areas. Rangeland improvements and administrative solutions to livestock issues to be implemented under Alternative IV are expected to result in more rapid improvements to range condition and trend than in Alternative I, but less than Alternative II (see Section 4.3.1.4).

Travel and Recreation Management — Prohibiting cross-country motorized or mechanized travel throughout the Planning Area (except for the Hubbard Mesa SRMA), limiting 24 miles of existing routes to administrative use, and closing/rehabilitating an additional 26 miles of existing routes would increase the amount of solitude for wildlife and reduce the area of habitat loss associated with current road-effect zones along these routes.

Of the 50 miles of roads closed or limited to administrative use, all but 9 miles would be atop the plateau in areas that include crucial elk calving habitats, fawning habitats for deer, summer range for mountain lions and black bears, and nesting habitat for a host of small birds and raptors. Using the road-effect zone calculation applied for mule deer winter range under Alternative I indicates that the amount of effective habitat gain above the rim would be substantial, assuming a 250-meter-wide zone of reduced use along existing roads.

Deer and elk hunting opportunities and levels could decline as the attractiveness of the area to

hunters decreases (due to oil and gas operations), regulations become more restrictive due to lower deer populations, and cross-country OHV travel on top of the plateau is prohibited. In the case of deer, for example, population declines in 1999 triggered a change in regulations and resulted in a 72-percent decrease in hunter numbers within the Planning Area. Although unlikely, deer population declines associated with this alternative could exceed those that precipitated the hunting reduction in 1999, depending on specifics of where and at what rate new oil and gas development occurs and whether seasonal migration routes are affected.

Oil and Gas Development — Alternative IV would result in an estimated 449 new well pads, of which 323 would be below the rim in big game winter range. NGD/NSO and TL stipulations related to raptor nests and nesting areas would continue, as would the waterfowl and shorebird nesting area TL at Fravert Reservoir. Oil and gas development, including construction or widening/improvement of 194 miles of access roads, would result in direct habitat loss of 1,466 acres in mule deer winter range. Using the factor of 3.5 to estimate effective habitat loss indicates a decrease of 5,131 acres, or 20.5 percent of the amount on BLM lands in the Planning Area.

Alternative IV would eliminate the existing 5-month TL stipulation for oil and gas development on winter range, currently in place to reduce disturbance and displacement of wintering deer, but a shorter (60-day) TL would be applied as a COA. The 60-day period includes January and February, while the 5-month TL stipulation of Alternatives I, II, and III also includes December, March, and April. It is difficult to assess quantitatively the difference between these two levels of protection. While January and February are the two coldest months in the region, they typically do not produce as deep or protracted snow cover as March and April, which is the time when the animals' energy reserves are most depleted. Late winter/early spring is particularly difficult for a pregnant doe, which must ingest enough food to sustain themselves and its fetus (sometimes

twins) and expend more energy to avoid disturbance. Both excessive stress from disturbance and an inability to obtain sufficient food may lead to mortality of the fetus.

Because the exact relationship between 2-month and 5-month TLs cannot be calculated — and in fact is likely to vary from year to year and site to site — this analysis assumes that a 2-month COA is only 40 percent as beneficial across the entire 5-month winter season. This is represented mathematically using the factor of 8.75 ($3.5 \div 0.4$) to estimate effective (disturbance-related) habitat loss in winter range during the 5-month winter season. However, this applies only to construction during the winter season and not to ongoing operational activities, which are assumed to remain represented by the factor of 3.5. Therefore, the elevated loss of winter range would apply only to oil and gas activities during the 5-month winter-use season, and the time-weighted impact factor is $([5 \times 8.75] + [7 \times 3.5]) \div 12 = 5.7$. Using this factor yields an effective habitat loss of 8,356 acres (33.5 percent), roughly equivalent to 836 animals assuming a density on winter range of one deer per 10 acres (see introduction to Section 4.3.2).

As an alternative analysis method, the estimated 194 miles of new roads could include approximately 124 miles on winter range, assuming a proportional distribution through the area below the rim. This equates to about 3.2 miles of road per square mile of habitat. As discussed previously, this density would be expected to reduce deer use by about 32 percent (Thomas 1979). Therefore, the range of potential decline in mule deer carrying capacity is 513 animals (assuming that the 60-day COA is as effective as the 5-month TL stipulation) to an estimated 799 animals using the road-density method and 836 animals assuming that the 60-day COA is only 40-percent effective compared to the 5-month stipulation.

As described for the previous alternatives, some mitigation measures such as clustering of wells in a given year, implementing measures to improve unimpacted habitat, and avoiding or limiting new road crossings of drainage

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corridors could reduce and partially offset the unavoidable adverse impacts.

Big game summer range and other high-quality habitats for non-game species atop the plateau, including raptors and a rich assemblage of small birds and small mammals (see Section 3.3.2), would also be subject to more impacts from oil and gas development than under the two previous alternatives. An estimated 126 new pads and 474 acres of long-term disturbance, including 76 miles of new or widened access roads, would result in effective loss of 1,659 acres, representing 4.8 percent of highland habitat on BLM lands — roughly double the amount under Alternative II. Although small in terms of acres, these impacts would occur in an area that currently is essentially natural and mostly untrammeled. Therefore, the level of new activity and associated disturbance and habitat fragmentation would have some impact on deer fawning, elk calving and summer use, and other species, including habitat-interior and habitat-specialist songbirds, proportionally greater than the previous alternatives. Assuming that oil and gas development is dispersed around the area, this level of development, while small, is likely to eliminate existing large, contiguous tracts of undisturbed habitat. Only the WSR-eligible stream corridors and the NGD/NSO stipulation for Colorado River cutthroat would provide substantial seclusion from development above the rim.

Habitat fragmentation under Alternative IV would also be greater than for the previous Alternatives, except for areas below the rim under Alternative III. Although the fragmentation effect on the surrounding habitat of each pad would be the same as discussed for Alternatives II and III, the effect of more pads above the rim (126 and 39, respectively) would be to fragment a greater portion of highland habitat. Most of the additional oil and gas development (compared to Alternative II) would be above the rim in areas designated for SSR/CSU stipulations. This would ameliorate potential adverse impacts by allowing BLM to require that a proposed ground-disturbing activity be shifted by more than 200 meters to reduce potential impacts to specific resources.

The special mitigation measures listed for Alternative II could also be required in the SSR/CSU areas and in other areas with special management designations. Special mitigation could be specified as an LN or required as a COA.

Compared to Alternative III, which is assumed to have the same number of wells, habitat fragmentation and disturbance impacts under Alternative IV would be slightly less for areas below the rim but substantially more for areas atop the plateau due to the estimated 16-year deferral period in Alternative III (see Section 4.3.2.3). Total impacts under Alternative IV during the 20-year period of analysis would also be higher due to a larger number of pads and miles of new or widened access roads. However, the estimated annual drilling rate atop the plateau would be less under Alternative IV than under Alternative III once drilling at the higher elevations begins.

Alternative IV would not provide specific protection to wildlife seclusion, which generally corresponds to seasonal migration routes for deer and elk between summer and winter range. The Roan Cliffs are a formidable obstacle to movement along most of their length, with only a few passages allowing elevational migration. If the NGD/NSO stipulations that coincidentally protect these movement routes under Alternative IV (i.e., stipulations intended to protect other resource values) are dropped from this alternative, impacts to deer and elk movement would be severe unless oil and gas operations are sited to avoid creation of a migration barrier. The 200-meter relocation of ground-disturbing activities permissible under standard restrictions and limitations would probably not be sufficient to ensure unimpeded movement of deer and elk through these confined corridors.

Offsite and Cumulative Impacts

The types of offsite and cumulative wildlife impacts under Alternative IV would be similar to those under Alternative III. However, the impact levels could differ substantially due to the 2-month (instead of 5-month) TL for big game winter range under Alternative IV, and the

deferral of drilling on top of the plateau until the last part of the 20-year period of analysis.

The 2-month TL could result in greater impacts to winter range, potentially displacing wildlife and adversely affecting movement patterns. For example, if deer concentrate in areas that offer some seclusion, whether on private or BLM lands, habitat quality could suffer in those areas due to overuse. If the areas to which deer are displaced are of lower quality than those they leave, or if the dispersal causes behavioral or physiological stress in the animals, the result could be a lower rate of winter survival.

Overall, the more protracted period of oil and gas development at higher elevations under Alternative IV than Alternative III (i.e., no deferral for development on top) would probably have less adverse impact on offsite wildlife. Because development would occur at a more uniform pace, wildlife would have a better opportunity to habituate and adjust their patterns of habitat use. This would be expected to reduce the amount of displacement to offsite areas compared to the rapid development on top of the plateau after the deferral period under Alternative III.

Cumulatively, the onsite and offsite impacts resulting from implementation of this alternative would be in addition to habitat loss and disturbance impacts associated with oil and gas development in other areas. Similarly, these impacts would be cumulative to impacts from other sources, such as grazing and increasing levels of recreational use. Potentially, the intensity of oil and gas development could reach a level that reduces the attractiveness of parts of the area to recreationists — especially atop the plateau following the deferral period.

Combining the potential long-term impacts in the BLM portion of the Planning Area with likely development levels on private lands (see previous alternatives) would result in a potential direct loss of 6,741 acres, roughly 5.3 percent of the total area. Nearly 93 percent of this total would be in habitats below the rim.

Summary of Impacts and Mitigation

Overall, Alternative IV would have minor to localized moderate long-term adverse impacts on wildlife, a generally greater level for each species/trophic group than for Alternative II. For mule deer, the potential decrease in effective winter range carrying capacity would be moderate to localized major, and potentially higher if the 60-day TL is less effective than assumed in this assessment.

Beneficial effects of travel restrictions, vegetation/range management, and special protection of WSR and wilderness values would help offset adverse impacts from oil and gas development. More severe temporary impacts would occur in proximity to active road, pad, or well construction due to noise, dust, and human activity. Other ground-disturbing activities could have similar effects.

Discussions concerning impacts of Alternatives II and III to species that inhabit pinyon/juniper and other winter range habitats and the myriad species that occupy habitats atop the plateau also apply to Alternative IV. Compared to Alternative II, the severity of impacts would be greater due to more wells and associated human activity and larger areas of SSR/CSU or special mitigation protection instead of NGD/NSO stipulations. While the ability to shift a proposed ground-disturbing activity by more than 200 meters to avoid a sensitive resource with an SSR/CSU stipulation is preferable to the standard stipulation of up to 200 meters, the protection is clearly not as great as with an NGD/NSO.

Compared to Alternative III, impacts under this alternative would be greater overall due to the greater number of pads, especially the much larger number of wells atop the plateau in 20 years, and the designation of the Hubbard Mesa SRMA for open OHV travel. The greater number of wells atop the plateau would be offset to some extent by the lower annual development rate assumed for the top of the plateau under Alternative IV than for the same area following the deferral period under Alternative III.

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The highly sensitive and important stream corridors atop the plateau would be protected by WSR eligibility, the East Fork Parachute Creek and Trapper/Northwater Creek ACECs, the riparian and wetland NGD/NSO, and the Colorado River cutthroat trout moderate- and high-risk habitat NGD/NSO. Raptor and waterbird nesting areas would continue to be protected. The Trapper/Northwater WMA would also provide BLM with some flexibility in managing for specific resources, including the ability to require special mitigation measures.

Mule deer winter range could undergo an effective loss of 33 percent on BLM lands in the Planning Area, a moderate to potentially major impact in terms of reduced carrying capacity of this limiting resource. The potential for this outcome depends on the exact extent, timing, and duration of oil and gas development, as well as the effectiveness of mitigation measures. Greater-than-anticipated habituation of deer to oil and gas activities could also reduce the severity of the impact. Increased fragmentation of the pinyon/juniper woodland under this alternative would also increase the potential that one or more habitat-interior or habitat-specialist species could be exterminated from the Planning Area, or at least markedly reduced.

Effective loss of summer range in 20 years would also be approximately twice as great as under Alternative II and more than three times as great as under Alternative III. Habitat fragmentation associated with the larger number of pads and associated access roads would further decrease the carrying capacity for year-round or summer-resident habitat-interior species or other forest specialists atop the plateau. Fragmentation of the currently small areas of conifer forest and mountain grassland could be especially detrimental due to the limited extent of these habitats within BLM lands (see Section 3.2.1) and their importance to some species. The riparian/wetland areas also have a small areal extent and are linear features, making them more vulnerable to fragmentation. These areas would be protected from direct impacts by NSO 2 and an analogous NGD for other land uses or management actions, but

indirect impacts from disturbance could cause effective habitat fragmentation. These impacts would be expected to be lower in the two ACECs atop the plateau.

The combined effective habitat loss of 6,790 acres in BLM lands would represent a 9-percent reduction in habitat available to avian and mammalian predators for hunting and a comparable reduction in prey abundance. Therefore, mountain lions and black bears would be reduced, probably to a greater extent than indicated due to their furtiveness. For raptors, even the protective NGD/NSO and TL stipulations relative to raptor nesting may not be sufficient to maintain current populations, depending on precisely where and in what manner oil and gas development occurs. Forest-interior species such as the northern goshawk and boreal owl would probably be disproportionately affected due to the habitat fragmentation that would result from new well pads and access roads.

Quantifying impacts to wildlife is difficult due to the many project-, climate-, and behavior-related unknowns, unknowns concerning oil and gas development rate locations, and impacts of other land uses and management activities (e.g., recreation, range management) that affect species differently. Nonetheless, it is reasonable to conclude that Alternative IV could cause the BLM portion of the Planning Area to suffer approximately a 36-percent decline in deer, a 2-percent reduction in elk, an overall 8-percent reduction in wildlife abundance, and an unknown number of localized extirpations.

Although restricting motorized and mechanized travel to designated routes throughout the Planning Area would benefit a variety of species and resource values, it is unlikely that this restriction would fully offset the adverse impacts from the anticipated level of oil and gas development.

Table 4-15 summarizes impacts to fish and wildlife under Alternative IV. See Section 4.3.4 for a discussion of impacts to special status species.

Table 4-15. Summary of Impacts of Alternative IV to Terrestrial and Aquatic Wildlife ¹

Taxonomic or Trophic Group	Vegetation and Range Management	Recreation and Travel Management	Oil and Gas Development	Special Resource Management Designations
Large Mammals (Deer Summer Range, Elk, Mountain Lion, Black Bear)	Minor (+)	Moderate (+)	Negligible to Minor (-)	Moderate (+)
Crucial Deer Winter Range	Minor to Moderate (+)	Minor (+)	Moderate (-)	None
Medium-size Predators and Small Mammals	Minor (+)	Moderate (+)	Minor to Moderate (-)	Moderate (+)
Raptors	Negligible (+)	Moderate (+)	Minor to Moderate (-)	Moderate (+)
Waterbirds	Minor (+)	Minor (+)	Negligible (-)	Minor (+)
Small Birds	Minor (+)	Moderate (+)	Minor to Moderate (-)	Moderate (+)
Reptiles and Amphibians	Negligible to Minor (+)	Moderate (+)	Minor (-)	Moderate (+)
Aquatic Species	Minor (+)	Moderate (+)	Minor to localized Moderate (-)	Moderate (+)

¹ Does not include special status (threatened, endangered, candidate, or sensitive) species; see Section 4.3.4.

4.3.2.5 Alternative V

Objectives for ecological values under Alternative V are to allow ecological values and processes, and biodiversity, to be modified by surface disturbance associated with resource development, with mitigation focused on lessening impacts to identified key resources. This alternative includes no WSRs, ACECs, or special management of areas having wilderness character, and NGD/NSO stipulations are eliminated from most discretionary (non-regulatorily driven) resource values to which they were applied in some or all of the previous alternatives. Examples of retained NGD/NSO stipulations include raptor and waterfowl nesting areas, the Anvil Points cave area, and high-risk cutthroat trout habitat (see previous alternatives and Section 3.3.2 and 3.3.3. for descriptions). For big game, mitigation would be developed in response to ground-disturbing activities, with no other protection or management actions to improve habitat. This includes no NGD/NSO stipulations specific to wildlife seclusion areas and no TL, either as a 5-month stipulation or a 2-month COA, for mule deer winter range.

Fortuitously, some of the winter range would remain protected by other resource-driven NGD/NSO designations, but the following impact analysis does not consider these, because they could be dropped from the alternative during subsequent phases of the RMPA/EIS process and because they mostly affect poor-quality winter (e.g., slopes steeper than 50 percent) or are linear (riparian corridors) or patchy (raptor nests).

Direct and Indirect Future Impacts

Vegetation and Range Management — Under proposed management actions, noxious weed populations would be expected to increase due to grazing pressure and lack of specific mitigation measures. Over time, this would result in moderate to major negative impacts to most of these habitats (Section 4.3.1).

Travel and Recreation Management — Like Alternatives II through IV, this alternative would prohibit most cross-country travel by motorized or mechanized vehicles, except for over-snow travel by snowmobile. The Hubbard Mesa area would not be designated an SRMA, but OHV travel would be restricted to designated routes

there as well. Although the existing 259 miles of existing routes throughout the Planning Area would remain open to motorized and mechanized use, the prohibition against cross-country travel would reduce the expansion of travel routes that fragment habitat, disturb wildlife, and encourage erosion and introduction of weeds. This would benefit a variety of species and resource values, but it is unlikely that this restriction would offset the adverse impacts of habitat fragmentation and disturbance from the anticipated level of oil and gas development.

Oil and Gas Development — Compared to Alternative II, this alternative would replace approximately 10,000 acres of NGD/NSO and approximately 7,000 acres of SSR/CSU with standard restrictions and limitations, and the special mitigation areas would be dropped entirely. The result would be up to 584 well pads, of which 175 would be above and 409 below the rim. Direct long-term impacts above and below the rim would encompass approximately 641 and 1,854 acres, respectively.

For mule deer winter range below the rim, the 1,854 acres of long-term impacts during the 20-year period of analysis, including 245 miles of new or widened access roads, would translate to 6,489 acres of effective habitat loss using the factor of 3.5. This figure represents 26.0 percent of the winter range on BLM land in the Planning Area. However, lack of a TL stipulation or COA to reduce disturbance-related impacts to mule deer winter range during the season of use would result in substantially greater impacts. For example, a 200-meter (660-foot) impact width (315 feet on each side of a 30-foot road) would be expected to reduce use by approximately 50 percent in heavy cover types (woodlands and tall shrublands) (see 1999 FSEIS). A 50-percent reduction in use across a 660-foot width represents approximately three times as much impact as total avoidance across 105 feet (a factor of 3.5 for a 30-foot-wide road). Thus, the factor of 3.5 would become a factor of 10.5 for estimating effective habitat loss during the 5 months of winter use. The time-weighted impact factor (see Alternative IV) is $([7 \times 3.5] + [5 \times 10.5]) \div 12 = 8$, and the resultant impact on

winter range is approximately 14,832 acres. This represents 59.4 percent of the winter range and is roughly equivalent to 1,483 deer at a density of one deer per 10 acres. However, this impact level may be unrealistically large, for four reasons:

1. The impact width for a sinuous road is less than for a straight road due to overlap at curves.
2. Some access roads already occur in the winter range area.
3. The impact level assumes no habituation to oil and gas activities and traffic; some habituation is likely because of the gradual increase in activity over 20 years (i.e., about 5 percent of total impacts per year).
4. The impact level assumes that areas within 315 feet on either side of a road are totally avoided, when in reality they would be avoided only during regular human use and would be used by deer to some extent when an area is in operational mode or shut down due to inclement weather (studies indicate that deer move back into an area when disturbance ceases; see introduction to Section 4.3.2).

Using the alternative road-density method and assuming a proportionate distribution of roads throughout the area below the rim, approximately 64 percent of the 245 miles of new or widened access roads (i.e., 157 miles) would be located in winter range. The total areal winter range of 39 square miles yields a density of slightly more than 4 miles of road per square mile of habitat. Using the road-density method described in the introduction to Section 4.3.2, this density level would be expected to cause a 50 percent decline in deer use for secondary roads (1 to 1.5 miles wide, somewhat improved, good to fair condition, irregular maintenance). The resultant 50-percent reduction in effective habitat would decrease mule deer carrying capacity by approximately 1,249 animals using an average density of one deer per 10 acres (see Alternative II). Whether this estimate or the slightly higher estimate using

the time-weighted impact factor method (1,483 animals) is more realistic, the net effect would be major.

Other species using the habitats below the rim, including several bird species that occur primarily in pinyon/juniper habitat, would be affected to a lesser extent, ranging from the amount of direct habitat loss to a decline of 26-percent using the factor of 3.5 (moderate impacts).

For all species, impacts of Alternative V atop the plateau would be greater than Alternative IV. The 641 acres of direct long-term habitat loss above the rim equates to 2,244 acres of effective loss during the 20-year analysis period, based on the factor of 3.5. Because new pads and increased traffic would occur throughout most of the highlands except drainage floors, the habitat loss and fragmentation could be major if impacts to spruce/fir and aspen forests are not avoided or minimized. This conclusion is based on the fact that most of the forest-interior and habitat-specialist species known or likely to occur atop the plateau occur in these types of habitats. Some forest species would likely be exterminated, at least from some blocks, and most species would be markedly reduced. Edge species and habitat generalists might benefit except for the offsetting impact of increased disturbance from human activity and actual habitat loss. Increased brood parasitism by brown-headed cowbirds on species such as the plumbeous vireo could also become a problem, and hunting and nesting habitat for the northern goshawk and boreal owl could be eliminated (see Section 4.3.3). The reduction in actual and usable summer range and calving habitat could cause elk numbers to decline by 6 to 7 percent using the factor of 3.5. This figure could be much higher if the most severe estimates of road-avoidance impacts to this limiting resource occur (see discussion in introduction to this section).

Due to reduced seclusion, habitat availability, prey abundance, and increased habitat fragmentation, mountain lions and black bears would also be expected to decline by an unknown percentage. Other predators, including

raptors, would also be subject to decreases in prey abundance and the amount of habitat used for hunting prey, although once again the impact is difficult to quantify because the exact timing and distribution of new pads and roads is unknown. However, on a simple arithmetic basis, the combined loss of 3,885 acres of effective habitat in BLM portions of the Planning Area would be likely to represent at least that much total wildlife loss, corresponding to slightly more than 5 percent.

Offsite and Cumulative Impacts

Offsite and cumulative impacts resulting from implementation of Alternative V would be greater than the other alternatives due to the incrementally greater amount of habitat loss, habitat fragmentation, and human activity.

The combined 7,287 acres of long-term habitat loss under this alternative represents 5.7 percent of the combined Federal and private land in the Planning Area. Although Alternative V would allow a higher proportion of oil and gas development atop the plateau than the other alternatives, more than 91 percent of the impacts would be in winter range habitats below the rim. Therefore, cumulative impacts on wildlife at the higher elevations would largely be associated with wide-ranging species that also use lower areas. For example, many or most of the deer that winter on private land below the rim spend the summer on BLM land atop the plateau, and wide-ranging raptors such as golden eagles, prairie falcons and, in winter, bald eagles use both types of lands as hunting habitat.

Summary of Impacts and Mitigation

This alternative would result in moderate to major long-term adverse impacts to most species/trophic groups in the Planning Area, with the greatest impacts on species that are furtive or most vulnerable to habitat fragmentation. Beneficial impacts from travel management and vegetation/range management would not offset adverse impacts from oil and gas as much as under the other alternatives.

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Riparian species would be subject to lesser impacts than upland species due to the continued preservation of riparian corridors. However, indirect impacts and fragmentation from stream crossings by new roads or increased traffic on existing roads across drainage floors would reduce the abundance and contiguity of these vulnerable areas as well. All upland habitat types would be reduced in extent, contiguity, and connectivity at a level that could cause localized extirpations and/or marked declines in some species — notably forest-interior species, habitat specialists, and furtive species, which include many of the special status species (Section 4.3.3).

As described for Alternative IV, quantifying impacts to wildlife is difficult due to the many unknowns concerning oil and gas development location, distribution, and timing/sequencing, as well as the adverse or beneficial impacts of other land uses and management activities (e.g., recreation, range management). All of these factors affect species differently. Nonetheless, it is reasonable to conclude that Alternative V could cause the BLM portion of the Planning

Area to suffer a 50-percent decline in deer, a 6- to 7-percent reduction in elk, an overall 12-percent reduction in wildlife abundance, and a greater (but unknown) number of localized extirpations. Even this level of impact could be surpassed if mitigation measures are less effective than anticipated or if the degree of behavior avoidance is greater than assumed in the 3.5 factor used throughout the analysis.

Although restricting motorized or mechanized travel to designated routes throughout BLM lands would benefit a variety of species and resource values, it is unlikely that this restriction would offset adverse impacts from anticipated levels of oil and gas development, and especially the 350 miles of new or widened access roads.

To reduce the severity of unavoidable impacts, the management prescriptions common to all alternatives and the mitigation measures listed above for the four previous alternatives should be applied to this alternative. Table 4-16 summarizes impacts to fish and wildlife under Alternative V. Special status species are discussed in Section 4.3.4.

Table 4-16. Summary of Impacts of Alternative V to Terrestrial and Aquatic Wildlife ¹

Taxonomic or Trophic Group	Vegetation and Range Management	Recreation and Travel Management	Oil and Gas Development	Special Resource Management Designations
Large Mammals (Deer Summer Range, Elk, Mountain Lion, Black Bear)	Minor to Moderate (-)	Moderate (+)	Moderate to localized Major (-)	Minor (+)
Crucial Deer Winter Range	Negligible (+)	Minor (+)	Major (-)	None
Medium-size Predators and Small Mammals	Minor to Moderate (-)	Moderate (+)	Moderate to localized Major (-)	Minor (+)
Raptors	Minor to Moderate (-)	Moderate (+)	Moderate to Major (-)	Minor (+)
Waterbirds	Minor (-)	Minor (+)	Minor (-)	Minor (+)
Small Birds	Minor (-)	Moderate (+)	Moderate to Major (-)	Minor (+)
Reptiles and Amphibians	Negligible (-)	Moderate (+)	Moderate (-)	Minor (+)
Aquatic Species	Minor (-)	Moderate (+)	Moderate to localized Major (-)	Minor (+)

¹ Does not include special status (threatened, endangered, candidate, or sensitive) species; see Section 4.3.4.

4.3.2.6 Overall Summary of Impacts to Fish and Wildlife

Several land uses and management actions proposed in this alternative would adversely affect terrestrial and aquatic wildlife resources. These consist primarily of direct and indirect impacts from oil and gas development and continued use for grazing of domestic livestock. Under Alternatives II through V, restrictions on motorized and mechanized use would benefit wildlife, as would range management actions aimed at better control of weeds and restoration of areas degraded by intensive grazing use. The degree to which these beneficial measures would offset some of the adverse impacts from oil and gas varies, both among alternatives and between higher and lower elevations of the Planning Area. In general, impacts are lowest for Alternative II and greatest for Alternative V, although this is not consistently true.

The primary factor affecting the degree of impacts from oil and gas is the combination of no-lease areas, protective surface use stipulations (NGD/NSO, SSR/CSU, and TL), and special mitigation measures — all of which vary among the alternatives. Other important variables include the estimated 16-year deferral for drilling atop the plateau under Alternative III and unknowns regarding the exact scale, location, and timing of oil and gas construction activities under all alternatives and the ability of wildlife to adapt to the changed conditions.

For habitat-interior species, the unavoidable habitat fragmentation caused by new well pads and roads would make some areas of currently intact habitat either less suitable or unsuitable. For most species, disturbance associated with oil and gas traffic and drilling activities would cause temporary abandonment of areas surrounding intensive human use, although some long-term changes in wildlife distribution, habitat use, and abundance would also occur. For deer and elk, which are heavily hunted in the Planning Area, it is conceivable that any areas closed to hunting due to intensive oil and gas development could create a refuge effect, attracting the animals during hunting season. However, if a reduction in hunting pressure

occurs, benefits to individual animals are likely to be more than offset by the adverse impacts of habitat loss and fragmentation.

Table 4-17 presents an overall summary of impacts to fish and wildlife resources under the five alternatives, using the broad impact levels described in the analyses above.

As shown in Tables 4-13 through 4-17, the potentially greatest impacts identified during this RMPA/EIS include direct or indirect loss of crucial mule deer winter range. The higher impact levels of Alternatives III through V compared to Alternative II are associated not only with increased oil and gas development, but also with replacement of the 5-month TL with a 2-month TL (Alternative IV) or elimination of the TL altogether (Alternative V). These changes would result in disproportionate levels of disturbance-related impacts as well as direct habitat loss. The estimated impacts on mule deer are based on the following:

- Winter range is the limiting factor for mule deer in the Planning Area and project region.
- Winter range receives more concentrated use than summer range, and relatively large numbers of animals would therefore be affected per unit area of habitat loss or disturbance.
- Under all five alternatives, the area below the Roan Cliffs, which consists largely of winter range, would receive the most intensive oil and gas development.
- Winter through early spring is the period when deer are most easily stressed and fatigued when forced to move to another area to find suitable habitat or avoid a source of disturbance.

Notwithstanding these considerations, note that the impact descriptions for the five alternatives are presented in terms of habitat loss and potential reduction in carrying capacity. Thus, the estimates of declining deer based on an assumed 10 acres per deer are reductions in potential populations and not necessarily in current populations. Actual decreases in the

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deer population of the Planning Area and vicinity cannot be precisely quantified because:

- The existing deer population is substantially below carrying capacity, and reductions in habitat may therefore not translate directly to declines in deer numbers.
- Winter range is a mosaic of habitat types of varying quality and importance to wintering deer. It is not known precisely how oil and gas development or other impacts (e.g., recreational travel) would affect these different types, because the location and dispersion of wells and pads are not known.
- Oil and gas development and other impacts would occur incrementally and irregularly over the 20-year period of analysis. Thus, the impacts described in the text above and

summarized in Tables 4-12 through 4-17 represent accumulated habitat loss across 20 years and not a sudden, total loss of habitat that could occur with some types of development (e.g., inundation by a new reservoir).

- The incremental development would allow time for the animals to habituate to some extent and shift their movement and use patterns in response to the changing environment. Complete avoidance of an area by wildlife would occur primarily during initial road construction and well development, and the degree of avoidance would be likely to diminish as habituation occurs, especially as the intensity of human activity decreases or ceases.

Table 4-17. Overall Summary of Impacts to Fish and Wildlife ^{1,2}

Taxonomic or Trophic Group	Alternative				
	I	II	III	IV	V
Large Mammals (Deer Summer Range, Elk, Mountain Lion, Black Bear)	Negligible to Minor (-)	Negligible to Minor (-)	Negligible to localized Moderate (-)	Minor to localized Moderate (-)	Moderate (-)
Crucial Deer Winter Range	Minor (-)	Minor (-)	Moderate (-)	Moderate (-)	Major (-)
Medium-sized Predators and Small Mammals	Negligible to Minor (-)	Negligible to Minor (-)	Minor to Moderate (-)	Minor to Moderate (-)	Moderate (-)
Raptors	Negligible to Minor (-)	Minor (-)	Moderate (-)	Moderate (-)	Moderate to Major (-)
Waterbirds	Negligible (-)	Negligible (-)	Negligible (-)	Negligible (-)	Minor (-)
Small Birds	Negligible to Minor (-)	Minor (-)	Minor to Moderate (-)	Moderate (-)	Moderate to Major (-)
Reptiles and Amphibians	Negligible to Minor (-)	Minor (-)	Minor (-)	Minor (-)	Moderate (-)
Aquatic Species	Negligible to Minor (-)	Minor (-)	Minor to Moderate (-)	Minor to Moderate (-)	Moderate (-)

¹ Overall impact level after combining adverse and beneficial effects of land uses and management actions after incorporating mitigation measures described in text.

² Does not include special status (threatened, endangered, or sensitive) species; see Section 4.3.4 and Table 4-19.

In considering the impact levels for mule deer winter range, it should also be remembered that this species is a focus of hunting throughout the region. In this regard, deer (and other game

species) are fundamentally different from the special status species discussed in Section 4.3.4. Much of the concern regarding game species involves the maintenance of populations that can

support the desired level of exploitation (“harvest”), while the primary concern for special status species is the potential for local or regional extirpation. However, very large reductions in deer (or elk) populations would adversely affect the quality of the recreational experience for visitors who enjoy seeing and observing wildlife as either the purpose or a desirable outcome of their outdoor activity.

The other important consideration regarding wildlife impacts is the deferral of oil and gas development atop the plateau under Alternative III. This is reflected by the range in the summary impact level for some species groups in Table 4-17. However, once drilling is initiated on top under Alternative III, the annual drilling rate would be four times the average annual rate for Alternative II and twice that for Alternative IV. This would be of particular concern for sensitive, furtive, or habitat-interior species, although they would benefit greatly during the deferment period. Some of the impacts to wildlife described above, including reductions in mule deer winter range and carrying capacity, could represent an irreversible and irretrievable commitment of natural resources (see Section 4.6).

4.3.3 Special Status Plants and Significant Plant Communities

Introduction

The special status plant species and significant plant communities addressed in this section are defined and listed in Section 3.3.3. A number of management actions proposed for incorporation into the RMP have the potential to impact these species and communities. These fall into two categories. The first is management actions directed specifically at these resources. The second is all other proposed management actions, including noxious weed management, rangeland management, oil and gas development, and travel management.

BLM Manual 6840 (IM No. 97-118) (BLM 2001b) directs the “conservation of special status species means the use of all methods and procedures which are necessary to improve the

condition of special status species and their habitats to a point where their special status recognition is no longer warranted.” Under all alternatives, the general management goal in regard to these resources is to ensure that no actions contribute to the need to add candidate or sensitive species to the Federal list of threatened or endangered species.

Additional specific management objectives are discussed in Section 3.3.3 and at the beginning of each alternative section below.

Direct impacts to these plant resources include the physical disruption or removal of rooted vegetation or disruption of habitat in the immediate vicinity of rooted plants; disruption to a plant community that results in the reduction of total numbers of plant species (species richness) within an area; and/or reduction or loss of total area, diversity, structure, and/or function of a community.

Potential indirect impacts include disruption or reduction of pollinator populations; disruption of hydrological processes (particularly in relation to wetlands and riparian habitat); loss of habitat suitable for colonization due to surface disturbance; introduction of noxious weeds by various vectors or conditions that enhance the spread of weeds; and general loss of habitat due to surface occupancy, surface compaction, or trampling. Upgradient physical disruption can result in sedimentation into occupied habitat and/or potential habitat. Failed reclamation or mitigation may also cause indirect impacts to these resources. Most indirect impacts are assumed to result from direct impacts in proportion to the relative amount of surface disturbance that occurs.

For the impact analysis of oil and gas development, the following measures are assumed:

- BLM would determine whether potential habitat for these resources occurs in a lease area during pre-drill review.
- A botanical survey would be performed in any appropriate habitat.

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- If a resource is found in areas under CSU stipulations, the proposed disturbance would be moved up to 400 meters from the outer resource perimeter, as well as its local habitat, to prevent negative impacts.
- In areas of standard lease terms, the proposed structures would be moved up to 200 meters to avoid these impacts.
- If structures are moved to avoid direct impacts to sensitive plant resources and their habitat but are still in their vicinity, a fence would be constructed around the resource and its local habitat to protect it from inadvertent trampling or other disturbance and to alert people to the presence of the plant resource.

This same protocol is assumed for the analysis of other activities that result in localized ground disturbance.

Standardized definitions were used to categorize impacts of specific management actions on special status plant species and significant plant communities. Categories are based upon the potential physical impacts to this resource in terms of the special status species policy (BLM 2001b) and Colorado Land Health Standard #4: these species and their habitats are maintained or enhanced by sustaining healthy, native plant communities. As an indicator, stable and increasing populations of endemic and protected species must occur in suitable habitat and suitable habitat must be available for recovery of endemic and protected species.

The following categories were used to define levels of adverse impacts to special status plants and significant plant communities:

- **None** – Effects unlikely to impair the resource value. No physical disruption to resources.
- **Negligible** – Detectable effects would last no more than 1 year (i.e., not detectable after one full growing season) and are unlikely to be noticeable in terms of Land Health Standards. A more severe impact may be negligible if it is temporary (duration <2 years).
- **Minor** – Total area of disruption less than 5 percent of the resource. May result in noticeable but not substantial impairment of the resource value in terms of Land Health Standards. Effects may be of concern to the general public.
- **Moderate** – Total area of disruption 6 to 15 percent of the resource. May cause substantial impairment of the resource value in terms of Land Health Standards. These effects may increase over time or be long-term or permanent. Effects are likely to be visible and may be of concern to the general public.
- **Major** – Total area of disruption greater than 15 percent of the resource. Likely to cause substantial impairment of the resource value in terms of Land Health Standards. These effects may increase over time, or be long-term or permanent. If negative, they would likely result in unmitigatable impacts regulated by major environmental laws such as the ESA. Effects would be highly visible and of concern to the general public.

Note that the same terms are applied in a more relative sense to describe beneficial impacts.

It is assumed that any additional special status plant species or new locations of known species found on the Planning Area subsequent to the implementation of the selected alternative will be managed in the same way described for currently known locations under the alternative discussions below.

4.3.3.1 Alternative I

Alternative I would maintain current ecological values and processes and biological diversity with existing management direction and activities. This includes a requirement to protect and maintain known special status plant species and significant plant communities and their habitat.

Direct and Indirect Impacts

Continuation of existing noxious weed management (Section 3.3.1) would be likely to increase the frequency, density, and diversity of such populations. This presents the potential for minor to moderate negative impacts to these resources if noxious weed populations invade and expand into suitable habitat for special status plant species and significant plant communities.

This alternative would allow the most unrestricted travel throughout the Planning Area (Section 2.4.1). There would be no restrictions to designated routes and no areas closed to motorized or mechanized travel. Based on current levels of use in the Hubbard Mesa area and expected increased recreation use of the Planning Area, this could be expected to result in increasing numbers of pioneered roads throughout the Planning Area. These could potentially cause moderate to major, localized direct impacts to sensitive species and/or significant plant communities, as well as potential indirect impacts from habitat destruction and fragmentation, deposition of dust, and increased spread of noxious weeds.

As noted in Section 3.3.3, several spurs off of the Anvil Points Rim Road dissect portions of the Great Basin grassland, causing fragmentation and increasing the potential for noxious weed invasion and potentially resulting in minor to moderate negative impacts to this significant plant community.

Of some special concern under this alternative is the status of the population of Parachute penstemon that occurs near the Anvil Points Mine. The road into this area has been gated, precluding public access into the area. However, a new well pad was constructed uphill from the gate in late summer of 2003. Since then, the gate has not been kept consistently closed, allowing greater access to the vicinity of the Parachute penstemon population. This could result in minor to moderate direct impacts to individual plants due to damage from road maintenance, vehicles, trampling, or collecting of plants, as well as indirect impacts from

sedimentation of ground disturbance and increased opportunity for noxious weed entry into the habitat. The potential impacts from the gate removal on the road could be reduced considerably by installing a gate above the new well pad.

Currently, livestock grazing is not actively prevented from occurring in the vicinity of any of these resources and so would continue to be a potential source of direct negative impacts from trampling and grazing, as well as the indirect effect of local erosion and sedimentation and the spread of noxious weeds. Likewise, construction of range improvements (fences, ponds, etc.) in the vicinity of populations or communities could disrupt these resources both directly and indirectly by the physical disturbance as well as by focusing livestock grazing and trampling in a small area.

Even a short-term grazing event, if highly focused in the vicinity of one of these populations or communities, could result in localized disturbance with moderate to major impacts.

Under current management, the no-lease area contains all of the known special status plant species and significant plant communities on top of the plateau and along the upper portions of the cliffs. These resources would therefore incur no direct impacts from oil and gas development. Occupied and potential habitats for these resources below the rim are protected by CSU restrictions (Map 21) that require a clearance for these species be performed prior to approval of a well location. BLM can require that the proposed location be moved more than 200 meters to avoid impacts to these resources. The overall result of the CSU designation should result in minor localized negative impacts to sensitive plant species and/or significant plant communities and their habitat from oil and gas development below the rim.

Offsite and Cumulative Impacts

The Parachute penstemon population at the Anvil Points Mine is located very near the interface of BLM and private lands in the south-

central part of the Planning Area. It is also the intersection of areas under no-lease and NGD/NSO areas. For the purpose of this analysis, it is assumed that this location would not be leased and would otherwise be managed under the NGD/NSO restrictions; therefore, it would experience no negative impacts from any of the ground-disturbing actions discussed above. However, additional mitigation measures such as boundary fencing and signing may be required to protect this unique and very rare resource from negative offsite impacts.

A positive impact to offsite areas could occur should some or all of the existing populations of special status plant species within the Planning Area expand, or new populations be recruited, due to positive responses as a result of management actions. These populations could potentially serve as larger sources for propagation of these species into new offsite areas. In addition, information collected from monitoring these species may be useful in managing them on other sites.

Under this alternative, more suitable habitat for sensitive species and significant plant communities may be retained as a result of the large area of no-lease lands above the rim being precluded from disturbance by oil and gas development. However, these areas are still subject to disturbance by other management actions discussed above.

It is believed that some sensitive plants are being heavily impacted by increasing human habitation and disturbance throughout the region due to road construction and residential and commercial development (CNHP 2001). Threatened or endangered plant species that occur on private lands are not specifically protected under the Endangered Species Act. Likewise, the State of Colorado provides no legal protection for any plant species but the State flower, the columbine. Neither special status plant species nor significant plant communities are necessarily inventoried on private lands. Therefore, monitoring and protection of these species occurs on a voluntary basis on private lands. If negative impacts to these resources continue to increase as expected,

the occurrences on public lands become even more important to their survival and continuation.

Any potential negative impacts to significant riparian communities are cumulative to some past and some ongoing degradation of surrounding riparian areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and current drought effects (Section 3.3.1).

Several management actions proposed in this alternative would affect special status plant species and significant plant communities. These include management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to special status plant species and significant plant communities are discussed above and summarized in Table 4-18. For Alternative I, the cumulative impact of these actions includes potential moderate to major impacts on a localized scale from travel and rangeland management with more widespread indirect impacts to the limited habitat for these resources from noxious weed management and gas and oil development below the rim.

4.3.3.2 Alternative II

Under Alternative II, protection of ecological values and processes and biological diversity would be addressed by designating four ACECs, managing three areas for wilderness characteristics, and managing streams atop the plateau for WSR eligibility as well as placing special management attention on enhancement of botanical and ecological resource values. Limited ground-disturbing activities would be allowed within occupied habitat, potential habitat, and areas of supporting ecological processes for these resources.

Direct and Indirect Impacts

Under this alternative, the entire footprint of each of the four ACECs would be covered with several special management stipulations specific to the relevant and important values they contain, including special status plants and

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significant plant communities. These stipulations are described in detail in Section 3.5.7 and Tables 2-2a-d. The result would be protection of these resources from most direct and indirect impacts through protection of entire watersheds, estimated areas of ecosystem processes, and large areas of potential habitat. This could result in minor to moderate positive impacts in terms of total population size and long-term sustainability of special status plant species as it would allow for colonization opportunities in new areas of suitable habitat. This is particularly important for those species whose current habitat may become unsuitable over time due to ecological succession.

Alternative II is the only alternative with a stated emphasis on noxious weed inventory, detection, and monitoring. These management actions would allow for a far more focused and effective application of the current weed management program by providing data and information upon which to base a number of important decisions such as incipient population locations, priority-to-control strategies, and the efficacy of different integrated methods for particular species and locations. Over time, this would indirectly provide minor to moderate positive impacts to special status plant species and significant plant communities.

Riparian areas and river corridors are a focus of protection and management under this alternative. Specific stipulations for the protection of riparian areas and significant riparian plant communities within the designated ACECs are described in detail in Section 3.5.7 and Tables 2-2a-d. These include a specific objective for maintaining proper hydrologic function and protection of areas adjacent to these resources. Due to these protections and specific management actions, it is expected that a large number of riparian reaches would return to PFC over time, resulting in major positive impacts to riparian/wetland areas within the Planning Area, including those that contain, or are adjacent to significant riparian plant communities. This would result in minor to major positive impacts to these resources.

Management would limit OHV use and prohibit cross-country travel as well as restrict travel to designated routes and areas. In addition, all routes within 21,382 acres of lands having wilderness character would also be closed to motorized or mechanized travel. These actions would halt the expansion of travel routes throughout the Planning Area that could potentially disrupt these resources and/or introduce noxious weeds. Combined with the closure and revegetation of existing routes such as the Anvil Points Mine Road and those that currently bisect significant plant communities, these proposed management actions would result in minor to moderate positive impacts to special status plant species and significant plant communities.

Of some special concern under this alternative is the status of the population of Parachute penstemon that occurs near the Anvil Points Mine. The road into this area has been gated, precluding public access into the area. However, a new well pad was constructed uphill from the gate in late summer of 2003. Since then, the gate has not been kept consistently closed, allowing greater access to the vicinity of the Parachute penstemon population. This could result in minor to moderate direct impacts to individual plants due to damage from road maintenance, vehicles, trampling, or collecting of plants, as well as indirect impacts from sedimentation of ground disturbance and increased opportunity for noxious weed entry into the habitat. The potential impacts from the gate removal on the road could be reduced considerably by installing a gate above the new well pad.

Range management under this alternative would be expected to result in more rapid, long-term improvements to range condition and trend than under the other alternatives. Indirectly, this would have a positive impact on special status plant species and significant plant communities by eventually reducing the potential for infestation and spread of noxious weeds into their habitat. In addition, this alternative provides for development of allotment management plans for situations where there is direct conflict with botanical values. If

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monitoring detects the incipient stages of these conflicts, and management plans are devised to protect sensitive resources, a moderate positive impact could result.

A number of surface-use stipulations are proposed under Alternative II to protect these resources in the Planning Area (Map 22). These include the NSO and CSU stipulations for existing leases (see Section 4.3.3.1), which would be extended to other land uses and management actions by analogous NGD and SSR stipulations. Additional new stipulations are also proposed for Alternative II. The additional stipulations, indicated by a “P” (plants) prefix, would be applied only to new oil and gas leases and other uses. The current and proposed surface-use stipulations are described below.

- NGD/NSO 12 – No ground-disturbing activities in occupied habitat and adjacent ecosystem processes for Federally listed endangered, threatened, proposed, or candidate species.
- SSR/CSU 3 – Require special design, construction, implementation, and/or mitigation measures including relocation of operations by more than 200 meters for those species listed as sensitive by BLM and for significant natural plant communities.
- NGD/NSO P-1 – No ground-disturbing activities within occupied habitat for sensitive plants or significant plant communities, or within the adjacent areas that provide ecosystem processes needed to support these vegetation resources.
- NGD/NSO P-2 – No long-term ground-disturbing activities within areas of potential habitat of special status plant species or significant plant communities to allow for long-term viability and recovery of the resources or ecosystem processes.
- NGD/NSO P-3 – No long-term ground-disturbing activities within occupied habitat of old-growth Douglas-fir, including no removal of trees of any age class.
- NGD/NSO P-4 – No long-term ground-disturbing activities in areas designated as

High Risk for special status plant species or significant plant communities (i.e., a high probability of occurrence of these species or communities).

- NGD/NSO P-5 – No long-term ground-disturbing activities in areas of Moderate Risk for special status plant species or significant plant communities, designated as having Moderate Risk Hydrologic Values that support these vegetation resources.

The result of implementing these stipulations would be that all known special status plant species and significant plant communities, much of the potential habitat for these resources, and a large portion of the watersheds and ecological processes that support them, would be contained within NGD/NSO areas (Map 22). These protections would reduce direct and indirect potential negative impacts from oil and gas development to negligible to minor.

Four Utah fescue populations atop the plateau occur outside specific special status plant NGD/NSO areas (Map 22). Two of these populations are located within areas with ACEC-specific NGD/NSO restrictions, which would protect relevant and important values, including special status plants. The other two Utah fescue populations occur in an area overlapped by NGD/NSO designations for WSR-eligible streams.

Offsite and Cumulative Impacts

Of some special concern under this alternative is the population of Parachute penstemon that occurs near the Anvil Points Mine. This population is located near the BLM and private land interface in the south-central part of the Planning Area. For the purpose of this analysis, it is assumed that this population would be managed under NGD/NSO stipulations and so would experience no negative impacts from any of the ground-disturbing actions discussed above. However, additional mitigation measures such as boundary fencing and signing may be required to protect this unique and very rare resource from negative offsite impacts.

A positive impact to offsite areas could occur should some or all of the existing populations of special status plant species within the Planning Area expand, or new populations be recruited, due to positive responses to management actions. Most potential habitat for sensitive species and significant plant communities is contained within ACECs and would be protected from disturbance by an NGD/NSO. These populations could potentially serve as larger sources for propagating these species into new offsite areas. In addition, information collected from monitoring these species may be useful in managing them on other sites.

It is believed that some sensitive plants are being heavily impacted by increasing human habitation and disturbance throughout the region due to road construction and residential and commercial development (CNHP 2001). Threatened or endangered plant species that occur on private lands are not specifically protected under the Endangered Species Act. Likewise, the State of Colorado provides no legal protection for any plant species but the State flower, the columbine. Neither special status plant species nor significant plant communities are necessarily inventoried on private lands. Therefore, monitoring and protection of these species occurs on a voluntary basis on private lands. If negative impacts to these resources continue to increase as expected, the occurrences on public lands become even more important to their survival and continuation.

Any potential negative impacts to significant riparian communities are cumulative to some past and some ongoing degradation of surrounding riparian areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and current drought effects (Section 3.3.1).

Several management actions proposed in this alternative would affect special status plant species and significant plant communities. These include special management stipulations under the ACEC designations as well as management of noxious weeds, travel, rangeland, and oil and gas development. The

potential impacts of these actions to special status plant species and significant plant communities are discussed above and summarized in Table 4-18.

A number of positive impacts to special status plant species and significant plant communities would be anticipated under this alternative. These would result from the special management stipulations under the proposed ACECs and protection of WSR-eligible streams, as well as positive impacts due to management of noxious weeds, travel, and rangeland. When these impacts are considered cumulative to the comprehensive protection of these resources by large areas of NGD/NSO restrictions, which prohibit ground-disturbing activities including oil and gas development, it is anticipated that special status plant species and significant plant communities in the Planning Area would experience local and widespread positive impacts under this alternative.

4.3.3.3 Alternative III – Preferred Alternative

Alternative III would allow a greater degree of surface disturbance than Alternative II by dropping management of areas for wilderness character and two ACECs and reducing the size of the remaining ACECs. A total of 9,006 acres would be managed in a way that would protect roadlessness and naturalness under associated NGD/NSO designations that would not be subject to modification, waiver or exceptions. Special status plant species and significant plant communities would receive protections from retaining the East Fork Parachute Creek and Trapper/Northwater Creek ACECs. WSR-eligible streams would continue to be protected. In addition, NGD/NSO and SSR/CSU stipulations specific to special status plants and significant plant communities would be applied and the Parachute Creek WMA would have special mitigation goals and objective to protect high value resources (Map 23).

The large increase in SSR/CSU areas under this alternative, and the accompanying decrease in no-lease and NGD/NSO areas, would allow more ground-disturbing activities in potential

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habitat and areas supporting ecological processes while continuing to protect the resources themselves. As described previously, SSR/CSU stipulations would allow BLM to require that a proposed ground-disturbing activity be shifted by more than 200 meters from its proposed location to protect a resource, and SSR/CSU areas would be subject to the same supplemental mitigation as identified for special mitigation areas.

Most of the SSR/CSU areas above the rim overlap with the Parachute Creek WMA. Ground-disturbing activities within this area would be subject to management actions that would minimize potential impacts to special status plant species and significant plant communities from disruption of the hydrologic regime, habitat integrity/function, and invasion of noxious weeds (Table 2-3). As these actions would only be applied if potential surface disturbance were planned to occur, they have negligible impact to these resources outside of such actions.

Direct and Indirect Impacts

This alternative includes several special management stipulations to protect special status plant species and significant plant communities. These stipulations, described in Table 2-1 and Section 3.5.7, include allowing future conditions to be determined largely by natural processes. This is especially pertinent to management of the several sensitive plants that are early successional species. These require ongoing natural disturbances for potential habitat. If all of these stipulations are implemented, the result would be minor to moderate positive impacts to these resources.

Noxious weeds would be managed under a continuation of existing noxious weed management. Following current trends (Section 3.3.1), noxious weed populations are expected to increase in frequency, density, and diversity. This presents the potential for minor to moderate negative impacts if noxious weed populations invade and expand into suitable habitat for special status plant species and significant plant communities.

Management would limit off-road vehicle use and restrict travel to designated routes and areas, including within the 2,460-acre Hubbard Mesa SRMA. This would reduce the expansion of travel routes throughout the Planning Area that have the potential to introduce physical disturbance and noxious weeds in the vicinity of special status plant species and significant plant communities. Combined with the closure and revegetation of existing routes such as the Anvil Points Mine Road and those that currently bisect significant plant communities, these proposed management actions would result in minor to moderate positive impacts to special status plant species and significant plant communities.

Of some special concern under this alternative is the status of the population of Parachute penstemon that occurs near the Anvil Points Mine. The road into this area has been gated, precluding public access into the area. However, a new well pad was constructed uphill from the gate in late summer of 2003. Since then, the gate has not been kept consistently closed, allowing greater access to the vicinity of the Parachute penstemon population. This could result in minor to moderate direct impacts to individual plants due to damage from road maintenance, vehicles, trampling, or collecting of plants, as well as indirect impacts from sedimentation of ground disturbance and increased opportunity for noxious weed entry into the habitat. The potential impacts from the gate removal on the road could be reduced considerably by installing a gate above the new well pad.

Due to greater emphasis on improving vegetation condition, this alternative is expected to result in more rapid, long-term improvements to range condition and progress in meeting land health standards than Alternative I, but less than Alternative II. Indirectly, this would have a positive impact on special status plant species and significant plant communities by eventually reducing the potential for infestation and spread of noxious weeds into their habitat. In addition, this alternative provides for development of allotment management plans where there is direct conflict with botanical values. If monitoring detects the incipient stages of these

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conflicts, and management plans are devised to protect sensitive resources, this could have minor to moderate positive impact on these resources.

The NSO and CSU stipulations for existing oil and gas leases described for Alternative I would also be applied under Alternative III and extended to other land uses and management actions as NGD and SSR restrictions. These include NGD/NSO 12 for threatened or endangered species and SSR/CSU 3 for plant species and communities designated by BLM as sensitive. As with Alternative II, new stipulations that would be applied to new oil and gas leases and other management actions or land uses include NGD/NSO P-1 and NGD/NSO P-4 (see Section 4.3.3.2). These pertain to sensitive plant species, significant plant communities, and areas that provide ecological or hydrological functions needed to sustain these resources.

Alternative III also includes proposed stipulations related to botanical/ecological resources that differ from Alternative II. These proposed stipulations, described below, represent a lower level of protection (e.g., SSR/CSU rather than NGD/NSO) for special status plants and significant plant communities:

- SSR/CSU P-7 – In areas of Moderate Risk habitat for sensitive plant species or significant plant communities (designated as Moderate Risk Hydrologic Values), allow only activities that would not disturb, alter, or interrupt the hydrologic or ecological processes needed to support these vegetation resources. Special design, construction, operation, mitigation, and reclamation measures may be required, including relocation of a proposed facility or activity by more than 200 meters. Replaces NGD/NSO P-5.
- SSR/CSU P-10 – In areas of potential habitat for sensitive plant species and significant plant communities, allow only activities that would not reduce the habitat or disturb, alter, or interrupt ecological functions needed to support these resources. Special design, construction, operation, mitigation, and reclamation measures may

be required, including relocation of a proposed facility or activity by more than 200 meters. Replaces NGD/NSO P-9.

- SSR/CSU P-12 – Cluster human-induced disturbances to prevent fragmentation in, or loss of, more than 10 percent of a contiguous block of old-growth Douglas-fir. Replaces NGD/NSO P-3.

As a result of implementing these stipulations, most known locations of special status plant species and significant plant communities would be contained within NGD/NSO areas (Map 23). However, in many cases these species and communities occur at the very edge of these areas, which lessens the protection afforded them. Likewise, much of the potential habitat and many of the ecological processes that support these resources are in CSU areas, where avoidance of these resources would be enforced, but indirect impacts such as noxious weed introductions and sedimentation from upgradient disturbance areas could still occur within the vicinity.

Four occurrences of Utah fescue are located in the central part of the plateau not included in either NGD/NSO or SSR/CSU areas. Two of these populations are located within ACEC and WSR-eligible NGD/NSO areas. The other two populations of Utah fescue would be protected by required COA or special design, construction, implementation, and/or mitigation; however, indirect impacts to these populations could occur.

The deferral of leasing and drilling for oil and gas on top of the plateau under Alternative III would not affect the type and extent of impacts to known locations of special status species and significant plant communities resources, except to the degree that it affects the number and location of wells and other facilities during the 20-year period of analysis and the intensity of development above the rim upon the lifting of the lease deferral.

Within the 20-year plan life, and after leasing is allowed on top of the plateau, vegetation in that area plateau would be subject to less overall impact from oil and gas development than under

Alternative II due to the smaller total of 51 wells on 39 pads. In addition, all of the surface use stipulations discussed above would apply. The combination of these factors would result in implementation of Alternative III having in localized minor negative impacts to these resources.

Offsite and Cumulative Impacts

Of some special concern under this alternative is the population of Parachute penstemon near the Anvil Points Mine. This population is located very near the BLM and private land interface in the south-central part of the Planning Area. For the purpose of this analysis, it is assumed that this population would be managed under NGD/NSO stipulations and would experience no negative impacts from any of the ground-disturbing actions discussed above. However, additional mitigation measures such as boundary fencing and signing may be required to protect this unique and very rare resource from negative offsite impacts.

A positive impact to offsite areas could occur should some or all of the existing populations of special status plant species within the Planning Area expand, or new populations be recruited, due to positive responses as a result of management actions. These populations could potentially serve as larger sources for propagating these species into new offsite areas. In addition, information collected from monitoring these species may be useful in managing them on other sites. This is potentially less likely under this alternative than Alternatives I and II, and more likely than under Alternative V, due to the relative areas of habitat protected from surface disturbance by no-lease, NGD/NSO and SSR/CSU stipulations in each alternative.

It is believed that some sensitive plants are being heavily impacted by increasing human habitation and disturbance throughout the region due to road construction and residential or commercial development (CNHP 2001). Threatened or endangered plant species that occur on private lands are not specifically protected under the Endangered Species Act.

Likewise, the State of Colorado provides no legal protection for any plant species but the State flower, the columbine. Neither special status plant species nor significant plant communities are necessarily inventoried on private lands. Therefore, monitoring and protection of these species occurs on a voluntary basis on private lands. If negative impacts to these resources continue to increase as expected, the occurrences on public lands become even more important to their survival and continuation.

Any potential negative impacts to significant riparian communities are cumulative to some past and some ongoing degradation of surrounding riparian areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and current drought effects (Section 3.3.1).

Several management actions proposed in this alternative would affect special status plant species and significant plant communities. These include special management stipulations as well as management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to special status plant species and significant plant communities are discussed above and summarized in Table 4-18.

A number of positive impacts to special status plant species and significant plant communities would be anticipated to occur under this alternative. These would result from the special management stipulations proposed for these resources, as well as positive impacts as a result of travel and rangeland management actions. These positive impacts would be offset by widespread minor to moderate negative impacts that may result from noxious weed management actions.

Cumulative to these impacts would be an inevitable reduction of potential habitat and ecological processes due to a large portion of these areas being under SSR/CSU stipulations that would protect actual occurrences and occupied habitat, but not necessarily prevent all indirect impacts. Cumulative impacts would

therefore include widespread positive impacts to sensitive plants and significant plant communities combined with some general negative impacts from increasing noxious weed infestations and localized minor to moderate impacts from ground-disturbing activities.

4.3.3.4 Alternative IV

Under Alternative IV, no areas would be managed for wilderness character. The East Fork Parachute Creek and Trapper/Northwater Creek ACECs would be designated, WSR-eligible streams would continue to be protected, and various NGD and SSR stipulations and special mitigation areas would be applied to protect high value resources. This alternative includes designation of the Trapper/Northwater Creek drainage as a WMA, with the specific management objectives listed in Table 2-3.

As in Alternative III, the large increase in SSR/CSU areas under this alternative, and accompanying decrease in no-lease and NGD/NSU areas, would allow more ground-disturbing activities in potential habitat and areas supporting ecological processes while continuing to protect the resources themselves (Map 23). As described previously, SSR/CSU restrictions would allow BLM to require that a proposed ground-disturbing activity be shifted by more than 200 meters from its proposed location to protect a resource, and SSR/CSU areas would also be subject to the same supplemental mitigation as identified for special mitigation areas.

Direct and Indirect Impacts

This alternative includes several special management stipulations to protect special status plant species and significant plant communities. These stipulations, described in Table 2-1 and Section 3.5.7, include allowing future conditions to be determined largely by natural processes. This is especially pertinent to management of the several sensitive plants that are early successional species. These require ongoing natural disturbances for potential habitat. If all of these stipulations are implemented, the result

would be minor to moderate positive impacts to these resources.

Noxious weeds would be managed under a continuation of existing noxious weed management. Following current trends (Section 3.3.1), noxious weed populations are expected to increase in frequency, density, and diversity. This presents the potential for minor to moderate negative impacts if noxious weed populations invade and expand into suitable habitat for special status plant species and significant plant communities.

Management would limit off-road vehicle use and restrict travel to designated routes and areas, except within the Hubbard Mesa SRMA. This would reduce the expansion of travel routes throughout the Planning Area that have the potential to introduce physical disturbance and noxious weeds into the vicinities of special status plant species and significant plant communities. When combined with the closure and revegetation of selected existing routes, such as those that currently bisect significant plant communities, and the Anvil Points Mine Road, these proposed management actions would result in minor to moderate positive impacts to special status plant species and significant plant communities.

Of some special concern under this alternative is the status of the population of Parachute penstemon that occurs near the Anvil Points Mine. The road into this area has been gated, precluding public access into the area. However, a new well pad was constructed uphill from the gate in late summer of 2003. Since then, the gate has not been kept consistently closed, allowing greater access to the vicinity of the Parachute penstemon population. This could result in minor to moderate direct impacts to individual plants due to damage from road maintenance, vehicles, trampling, or collecting of plants, as well as indirect impacts from sedimentation of ground disturbance and increased opportunity for noxious weed entry into the habitat. The potential impacts from the gate removal on the road could be reduced considerably by installing a gate above the new well pad.

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As under Alternative III, greater emphasis on improving vegetation condition is expected to result in more rapid, long-term improvements to range condition and progress in meeting land health standards than Alternative I, but less than Alternative II. Indirectly, this would have a positive impact on special status plant species and significant plant communities by eventually reducing the potential for infestation and spread of noxious weeds into their habitat within range allotments. In addition, this alternative provides for development of allotment management plans where there is direct conflict with botanical values. If monitoring detects the incipient stages of these conflicts, and management plans are devised to protect sensitive resources, this could have a minor to moderate positive impact on these resources.

The NGD/NSO and SSR/CSU restrictions described for Alternative II and III would also be applied under Alternative IV. These include NGD/NSO 12 for threatened or endangered species and SSR/CSU 3 for plant species and communities designated by BLM as sensitive. Both of these are currently applied to existing leases. As with Alternative II and III, Alternative IV also includes proposed new restrictions that would be applied only to new oil and gas leases and other uses. These include NGD/NSO P-1 and NGD/NSO P-4 stipulations (see Section 4.3.3.2), which pertain to sensitive plant species, significant plant communities, and areas that provide ecological or hydrological functions needed to sustain these resources.

Alternative IV also includes proposed stipulations related to botanical/ecological resources that differ from Alternative II (Map 23). These proposed stipulations, described below and summarized in Tables 2-2a-d, represent a lower level of protection (e.g., SSR/CSU rather than NGD/NSO) for certain resources:

- SSR/CSU P-7 – In areas of Moderate Risk habitat for sensitive plant species or significant plant communities (designated as Moderate Risk Hydrologic Values), allow only activities that would not disturb, alter, or interrupt the hydrologic or ecological

processes needed to support these vegetation resources. Special design, construction, operation, mitigation, and reclamation measures may be required, including relocation of a proposed facility or activity by more than 200 meters. Replaces NGD/NSO P-5.

- SSR/CSU P-10 – In areas of potential habitat for sensitive plant species and significant plant communities, allow only activities that would not reduce the habitat or disturb, alter, or interrupt ecological functions needed to support these resources. Special design, construction, operation, mitigation, and reclamation measures may be required, including relocation of a proposed facility or activity by more than 200 meters. Replaces NGD/NSO P-9.
- SSR/CSU P-12 – Cluster human-induced disturbances to prevent fragmentation in, or loss of, more than 10 percent of a contiguous block of old-growth Douglas-fir. Replaces NGD/NSO P-3.

As a result of implementing these stipulations, most known locations of special status plant species and significant plant communities would be contained within NGD/NSO areas (Map 23). However, in many cases these species and communities occur at the very edge of these areas, which lessens the protection afforded them. Likewise, much of the potential habitat and many of the ecological processes that support these resources are in SSR/CSU areas, where avoidance of these resources would be enforced, but indirect impacts such as noxious weed introductions and sedimentation from upgradient disturbance areas could still occur within the vicinity. Therefore, localized minor impacts could be expected to occur as a result of oil and gas development.

Four occurrences of Utah fescue are located in the central part of the plateau not included in either NGD/NSO or SSR/CSU areas. One of these populations is located within the Trapper/Northwater Creek ACEC NGD/NSO areas. A second is located within the Trapper/Northwater Creek WMA. The other two populations of Utah fescue would be protected by required COA or special design,

construction, implementation, and/or mitigation; however, indirect impacts to these populations could occur.

Under Alternative III, most known special status plant species and significant plant community locations would be included in NGD/NSO areas (Map 23). This would protect these occurrences from surface disturbance, but not indirect impacts. Most of the potential habitat and/or ecological processes that support these resources atop the plateau would receive special mitigation through the designation of the Parachute Creek WMA. However, these resources located on or below the rim receive reduced surface protection under this alternative. This could seriously compromise the continuing health of these resources and would result in moderate negative impacts to some or all of them.

Offsite and Cumulative Impacts

Of some special concern under this alternative is the population of Parachute penstemon near the Anvil Points Mine. This population is located very near the interface of BLM and private land in the south-central part of the Planning Area. For the purpose of this analysis, it is assumed that this population would be managed under NGD/NSO stipulations and would experience no negative impacts from any of the ground-disturbing actions discussed above. However, additional mitigation measures such as boundary fencing and signing may be required to protect this unique and very rare resource from negative offsite impacts.

A positive impact to offsite areas could occur should some or all of the existing populations of special status plant species within the Planning Area expand, or new populations be recruited, due to positive responses as a result of management actions. These populations could potentially serve as larger sources for propagating these species into new offsite areas. In addition, information collected from monitoring these species may be useful in managing them on other sites. This is potentially less likely under Alternative IV than Alternatives I and II, and more likely than under Alternative V, due to the relative areas of habitat

protected from surface disturbance by no-lease, NGD/NSO and SSR/CSU stipulations in each alternative.

It is believed that some sensitive plants are being heavily impacted by increasing human habitation and disturbance throughout the region due to road construction and residential or commercial development (CNHP 2001). Threatened or endangered plant species that occur on private lands are not specifically protected under the Endangered Species Act. Likewise, the State of Colorado provides no legal protection for any plant species but the State flower, the columbine. Neither special status plant species nor significant plant communities are necessarily inventoried on private lands. Therefore, monitoring and protection of these species occurs on a voluntary basis on private lands. If negative impacts to these resources continue to increase as expected, the occurrences on public lands become even more important to their survival and continuation.

Any potential negative impacts to significant riparian communities are cumulative to some past and some ongoing degradation of surrounding riparian areas in the past due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and current drought effects (Section 3.3.1).

Several management actions proposed in this alternative would affect special status plant species and significant plant communities. These include special management stipulations for these resources as well as management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to special status plant species and significant plant communities are discussed above and summarized in Table 4-18.

A number of positive impacts to special status plant species and significant plant communities would be anticipated under this alternative, due to the special management stipulations proposed for these resources, as well as positive impacts resulting from travel and rangeland management actions. These positive impacts would be offset

by widespread minor to moderate negative impacts that may result from noxious weed management actions.

Cumulative to these impacts would be an inevitable reduction of potential habitat and ecological processes because a large portion of these areas would be under SSR/CSU stipulations to protect actual occurrences and occupied habitat, but not necessarily prevent all indirect impacts. Cumulative impacts would therefore include widespread positive impacts to sensitive plants and significant plant communities combined with some general negative impacts from increasing noxious weed infestations and localized minor to moderate impacts from ground-disturbing activities.

4.3.3.5 Alternative V

This alternative would protect known populations of, and habitat for, Federally listed or candidate plant species. However, disturbances to BLM sensitive species, other plant species of special concern, significant plant communities, and their habitat would be permitted with mitigation applied to lessen impacts. No special management stipulations for special status plant species and significant plant communities would be applied through designation of ACECs or WMAs, and it is assumed that WSR-eligibility would not be maintained.

Direct and Indirect Impacts

Alternative V provides a continuation of existing noxious weed management. Following current trends (Section 3.3.1), noxious weed populations are expected to increase in frequency, density, and diversity. This presents the potential for minor to moderate negative impacts if noxious weed populations invade and expand into suitable habitat for special status plant species and significant plant communities.

Travel management under this alternative would limit off-road vehicle use and restrict travel to designated routes. Cross-country travel would not be allowed. This would reduce the expansion of public travel routes throughout the

Planning Area that could introduce physical disturbance and noxious weeds in the vicinity of special status plant species and significant plant communities. (Roads to support oil and gas development are discussed below.) No closure and revegetation of existing routes is proposed under this alternative. As noted in Section 3.3.3, several spurs off the Anvil Points Rim Road dissect portions of the great basin grassland, causing fragmentation and increasing the potential for noxious weed invasion, potentially resulting in minor to moderate negative impacts to this significant plant community. Overall, these proposed management actions would result in minor negative impacts.

Of some special concern under this alternative is the status of the population of Parachute penstemon that occurs near the Anvil Points Mine. The road into this area has been gated, precluding public access into the area. However, a new well pad was constructed uphill from the gate in late summer of 2003. Since then, the gate has not been kept consistently closed, allowing greater access to the vicinity of the Parachute penstemon population. This could result in minor to moderate direct impacts to individual plants due to damage from road maintenance, vehicles, trampling, or collecting of plants, as well as indirect impacts from sedimentation of ground disturbance and increased opportunity for noxious weed entry into the habitat. The potential impacts from the gate removal on the road could be reduced considerably by installing a gate above the new well pad.

Rangeland projects and land treatments proposed for this alternative are to be made in coordination with other land uses. However, while development of allotment management plans would be required within administrative units that have identified issues meeting land health standards, they are not necessarily required for identified conflicts with watershed, wetland/riparian, or botanical values. Therefore, the possibility exists that the emphasis on rangeland projects and land treatments in areas outside of surface-use stipulations could result in minor to moderate direct or indirect negative

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impacts to special status plant species and /or significant plant communities.

Four occurrences of Utah fescue are located in in the central part of the plateau and not included in either NGD/NSO or SSR/CSU areas. These populations would be protected by required COA or special design, construction, implementation, and/or mitigation; however, indirect impacts to these populations could occur.

The existing NSO and CSU stipulations described for Alternative I would also be applied to other land uses and management actions as NGD and SSR stipulations, respectively, under Alternative V. These include NGD/NSO 12 for threatened or endangered species and SSR/CSU 3 for plant species and communities designated by BLM as sensitive. As with Alternatives II through IV, Alternative V includes proposed new stipulations that would be applied only to new oil and gas leases and management actions or land uses. These include NGD/NSO P-1 and NGD/NSO P-4 (see Section 4.3.3.2), which pertain to sensitive plant species, significant plant communities, and areas that provide ecological or hydrological functions needed to sustain these resources.

Alternative IV also includes proposed stipulations related to botanical/ecological resources that differ from Alternative II (Map 23). These proposed stipulations, described below and summarized in Tables 2-2a-d, represent lesser protection (e.g., SSR/CSU rather than NGD/NSO) for certain resources:

- SSR/CSU P-7 – In areas of Moderate Risk habitat for sensitive plant species or significant plant communities (designated as Moderate Risk Hydrologic Values), allow only activities that would not disturb, alter, or interrupt the hydrologic or ecological processes needed to support these vegetation resources. Special design, construction, operation, mitigation, and reclamation measures may be required, including relocation of a proposed facility or activity by more than 200 meters. Replaces NGD/NSO P-5.

- SSR/CSU P-10 – In areas of potential habitat for sensitive plant species and significant plant communities, allow only activities that would not reduce the habitat or disturb, alter, or interrupt ecological functions needed to support these resources. Special design, construction, operation, mitigation, and reclamation measures may be required, including relocation of a proposed facility or activity by more than 200 meters. Replaces NGD/NSO P-9.
- SSR/CSU P-12 – Cluster human-induced disturbances to prevent fragmentation in, or loss of, more than 10 percent of a contiguous block of old-growth Douglas-fir. Replaces NGD/NSO P-3.

As a result of implementing these stipulations, most known locations of special status plant species and significant plant communities would be contained within NGD/NSO areas (Map 23). However, in many cases these species and communities occur at the very edge of these areas, which lessens the protection afforded them. Likewise, much of the potential habitat and many of the ecological processes that support these resources are in SSR/CSU areas, where avoidance of these resources would be enforced, but indirect impacts such as noxious weed introductions and sedimentation from upgradient disturbance areas could still occur within the vicinity. Therefore, minor to moderate impacts could be expected to occur as a result of oil and gas development.

Most known special status plant species and significant plant community locations would be included in NGD/NSO areas (Map 23). This would protect these occurrences from disturbance. However, much of the potential habitat and/or ecological processes that support the resources receive no surface protection or special mitigation requirements under this alternative. This could seriously compromise the continuing health of these resources and would result in moderate negative impacts to some or all of them.

Offsite and Cumulative Impacts

The population of Parachute penstemon near the Anvil Points Mine is located very near the interface of BLM and private land in the south-central part of the Planning Area. For the purpose of this analysis, it is assumed that this population would be managed under NGD/NSO stipulations and would experience no negative impacts from any of the ground-disturbing actions discussed above. However, additional mitigation measures such as boundary fencing and signing may be required to protect this unique and very rare resource from negative offsite impacts.

A positive impact to offsite areas could occur should some or all of the existing populations of special status plant species within the Planning Area expand, or new populations be recruited, due to positive responses as a result of management actions. These populations could potentially serve as larger sources for propagating these species into new offsite areas. In addition, information collected from monitoring these species may be useful in managing them on other sites. Expansion of these populations is less likely under this alternative than the others due to the relatively reduced areas of habitat protected from surface disturbance by no-lease, NGD/NSO and SSR/CSU stipulations.

It is believed that some sensitive plants are being heavily impacted by increasing human habitation and disturbance throughout the region due to road construction and residential or commercial development (CNHP 2001). Threatened or endangered plant species that occur on private lands are not specifically protected under the Endangered Species Act. Likewise, the State of Colorado provides no legal protection for any plant species but the State flower, the columbine. Neither special status plant species nor significant plant communities are necessarily inventoried on private lands. Therefore, monitoring and protection of these species occurs voluntarily on private lands. If negative impacts to these resources continue to increase as expected, the

occurrences on public lands become even more important to their survival and continuation.

Any potential negative impacts to significant riparian communities are cumulative to some past and some ongoing degradation of surrounding riparian areas due to livestock grazing, unregulated stream crossings, noxious weed proliferation, and current drought effects (Section 3.3.1).

Several management actions proposed in this alternative would affect special status plant species and significant plant communities. These include management of noxious weeds, travel, rangeland, and oil and gas development. The potential impacts of these actions to special status plant species and significant plant communities are discussed above and summarized in Table 4-18.

Under Alternative V, the cumulative impact of these actions includes potential moderate to major negative impacts to special status plant species and significant plant communities on a localized scale from rangeland management, with more widespread indirect negative impacts from noxious weed management. These would be cumulative to minor to moderate positive impacts from travel management. However, all of these impacts would occur in the context of much-reduced areas of protection from ground-disturbing activities, both for potential habitat and ecological processes. This would result in such a degree of potential negative impacts that some of these resources could experience irreparable and irretrievable damage.

4.3.3.6 Summary of Impacts to Special Status Plant Species and Significant Plant Communities

Potential impacts to special status plant species and significant plant communities are summarized by alternative and management action in Table 4-18. Detailed discussions of these impacts are provided in the alternative descriptions above. Some of the impacts to special status plants and significant plant communities described above may represent an

irreversible and irretrievable commitment of natural resources (see Section 4.6).

Table 4-18. Summary of Impacts to Special Status Plants and Significant Plant Communities

Management Action	Alternative				
	I	II	III	IV	IV
Special Stipulations for ACECs	NA	Minor to Moderate (+)	Minor (+)	Minor (+)	NA
Protection of WSR-eligible Streams	NA	Minor to Moderate (+)	Minor to Moderate (+)	Minor to Moderate (+)	NA
Watershed Management Areas	NA	Minor to Moderate (+)	Minor to Moderate (+)	Minor (+)	NA
Management for Wilderness Values	NA	Minor to Moderate (+)	Minor (+)	NA	NA
Vegetation/Weed Management	Minor to Moderate (-)	Minor to Moderate (+)	Minor to Moderate (-)	Minor to Moderate (-)	Minor to Moderate (-)
Recreation/Travel Management	Localized Moderate to Major, (-) ²	Minor to Moderate (+)	Minor to Moderate (+)	Minor to Moderate (+)	Minor (-)
Range Management	Localized Moderate to Major (-)	Moderate (+)	Minor to Moderate (+)	Minor to Moderate (+)	Minor to Moderate (-)
Oil and Gas ¹ Development	Localized Minor (-)	Negligible to Minor (-)	Localized Minor (-)	Localized Minor (-)	Minor to Moderate (-)

¹ Oil and gas impacts for Alternative I almost entirely below cliffs due to no-lease of NOSR 1.

² Minor to Moderate (-) for Great Basin grassland.

4.3.4 Special Status Fish and Wildlife

Introduction

Special status fish and wildlife species discussed in this section are defined and listed in Section 3.3.4. A number of management actions have already been established for the production area of NOSR 3 or are proposed for the Planning Area as a whole under some of the alternatives analyzed in this RMPA/EIS. These include actions focused on different resources (e.g., vegetation, visual resources, or recreational travel) but that could affect fish and wildlife either positively or negatively. The five alternatives represent different combinations of management actions and land-use or resource-development scenarios, each with differing types and levels of impacts.

Under all alternatives, the general management goal is to ensure against actions that would jeopardize currently listed, proposed, or candidate threatened or endangered species or

contribute to the need to list additional species as threatened or endangered. Further management objectives specific to each alternative are described below for the five alternatives.

Potential impacts to special status fish and wildlife fall into one or a combination of the categories described in Section 4.3.2 and include habitat loss or modification, habitat fragmentation, disturbance, interference with movement patterns, and direct mortality. These impacts can reduce numbers of one or more species, potentially to the point of local extirpation; disrupt community composition and function through changes in the distribution, relative abundance, and habitat use of various species (e.g., reduced prey abundance affects predator abundance); and make populations and communities hypersensitive to other perturbations.

For example, increased habitat fragmentation can make forest-interior species more vulnerable

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to disturbance by reducing patch size, increasing the amount of edge, and increasing accessibility to predators or (in the case of songbirds) nest parasitism by brown-headed cowbirds.

As described in Section 4.3.2 for non-special status wildlife, impacts associated with changes in management, human use, and resource development can have direct and indirect impacts on these species. For wide-ranging or migratory species, onsite impacts can also affect community composition and function in offsite areas, and project impacts can combine with non-project impacts to cause cumulative impacts.

For the impact analysis of oil and gas development, it is assumed that BLM will evaluate whether habitat for special status species is present in a specific area during the review of an APD. If the area is covered by a CSU stipulation, BLM may cause the proposed activity to be shifted by more than 200 meters to avoid or minimize the impact. In special mitigation areas as well as CSU areas, BLM may require that the applicant undertake specific measures to reduce the potential for, or severity of, impacts associated with the proposed activity. These may be imposed through the COA process, and one or more LNs may already have been designated for the area, putting the applicant on notice of the need for special measures. Some standard restrictions and limitations also provide a measure of protection.

As pertains to special status fish and wildlife, the analysis uses the following general terms to describe adverse impacts:

- **None** – Changes in species occurrence, distribution, or abundance are not expected.
- **Negligible** – Changes in distribution or abundance of some species may occur, but at levels that may not be discernible or demonstrable except at specific impact sites.
- **Minor** – Changes in distribution or abundance of some species would be discernible and demonstrable at a localized level, but current types and patterns of use and species occurrence would continue.
- **Moderate** – Changes in distribution or abundance would be readily discernible and demonstrable, and some species may occur in markedly lower numbers or be exterminated from localized parts of the Planning Area.
- **Major** – Similar to moderate, except that several species may occur in markedly lower numbers, and some species are likely to be exterminated from large portions of the Planning Area

Note that the same terms are applied in a more relative sense to describe beneficial impacts.

While these impact categories are applied in a general sense to all special status species, including Federally listed, proposed, or candidate threatened or endangered species, interagency consultation with USFWS pursuant to Section 7 of the ESA will address potential adverse impacts on these species during the preparation of a Biological Assessment (BA) and issuance of a Biological Opinion (BO) for the selected alternative.

The following alternatives analysis considers both short-term and long-term impacts to fish and wildlife resources. For the purpose of this analysis, short-term or temporary impacts are those that most often are associated with a period of initial habitat loss or modification and intensive human activity. In the context of future management and development scenarios for the Planning Area, short-term impacts are mostly associated with oil and gas development, during which activity at a specific well may last for several weeks or months but then is reduced in severity as that part of the field enters the production phase. This already occurs to some extent in the production area of NOSR 3 and nearby private lands. Short-term impacts also currently occur during the hunting season, during which time the number of visitors atop the plateau is much higher than in the remaining seasons, and the activity is coupled with noise, harassment, and pursuit, injury, or mortality of wildlife.

Long-term impacts are those that last more than 2 years, and most of these would extend

throughout or potentially beyond the period of the management action or development activity. Examples include impacts associated with the continued presence of elevated levels of human activity throughout the life of the oil and gas field (40 years or longer) and the protracted period needed for final reclamation of disturbed areas. Permanent impacts are those with a likely duration of more than 50 years.

4.3.4.1 Alternative I

The 1988 GSRA RMP had no specific objective for managing special status species but identified monitoring, maintaining, or improving habitat for threatened or endangered species as a priority for implementation. For the production area of NOSR 3 below the rim, the 1999 FSEIS and ROD established the following stipulations to reduce or avoid potential impacts from the oil and gas development on special status species and their habitats:

- NSO 3 (Major River Corridors) – Avoid a 0.5-mile buffer on either side of the Colorado River.
- NSO 7 and TL 6 (Raptors, general) – Avoid a 0.125-mile buffer around raptor nests year-round and a 0.25-mile buffer from February 1 through April 15.
- NSO 8, TL 10, and TL 11 (Bald Eagles) – Avoid a 0.25-mile buffer around a nest or roost site year-round, a 0.5-mile buffer around nest sites from December 15 to June 15, and a 0.5-mile buffer around roost sites from November 15 to April 15.
- NSO 9 and TL 12 (Peregrine Falcons) – Avoid a 0.25-mile buffer around the cliff-nesting complex year-round and a 0.5-mile buffer around the cliff-nesting complex from March 15 to July 31.
- NSO 12 (Threatened or Endangered Species) – Avoid occupied habitat and any habitat required for the maintenance or recovery of the specific species.
- TL 13 (Waterfowl and Shorebird Nesting) – Avoid a 0.25-mile buffer around the nesting and brood-rearing habitat of Fravert Reservoir.

- CSU 3 (BLM Sensitive Species) – Special design and relocation by more than 200 meters may be required to protect the resource.

Alternatives II through V would add analogous NGD and SSR designations for land uses, resource development activities, and management actions not related to oil and gas

In addition, protective stipulations that are not aimed solely at species or groups of special status fish and wildlife would also benefit them. These include NSO 2 and CSU 2 for riparian and wetland zones, NSO 11 for wildlife seclusion areas, NSO 15 for areas with slopes steeper than 50 percent, NSO 19 for the Anvil Points Cave area, and TL 1 for big game winter range during the 5-month period December through April.

While the stipulations described above are specific to the GSRA portion of the Planning Area, the 1997 WRRRA RMP lists additional stipulations for special status species that apply within the small part of the Planning Area in Rio Blanco County. These include NSO, TL, and CSU stipulations for the protection of the Colorado River cutthroat trout, raptor nests, and bald eagles nests, roosts, or concentration areas (BLM 2002a). The purpose of these stipulations is to meet the following objectives of the 1996 RMP: “(1) contribute to the recovery of special status animals (i.e. listed, proposed, or candidate threatened or endangered [or] BLM sensitive) in an effort to ultimately remove these species from special status consideration; (2) maintain or restore special status animal populations, and the suitable extent and/or utility of important habitats on public lands; (3) ensure that Federally authorized actions do not adversely disrupt or compromise important biological activities or contribute to increased mortality or depressed production or recruitment into a breeding population, and (4) maintain or improve to proper functioning condition, bank, channel, and floodplain processes associated with designated critical habitats for listed and candidate fishes of the Upper Colorado River Basin.”

Direct and Indirect Impacts

The general objective for ecological resources under Alternative I is to maintain current ecological values and processes, and biological diversity, with existing management direction and activities. This includes the requirement to protect special status fish and wildlife species and their habitat.

Due to the limitation of current noxious weed management, noxious weed populations are expected to increase in frequency, density, and diversity under this alternative. While this has the potential to affect special status species, the impacts are likely to be limited to slight changes in abundance and distribution of ground-dwelling species such as the Utah milk snake and avian predators (raptors) that may feed on ground-dwelling small mammals affected by the change in upland vegetation. Any impacts to riparian vegetation from weed infestations would be more serious because of the potential for damage to the riparian community, which supports a variety of neotropical migrant small birds as well as raptors and other species. Of particular concern would be any impacts to riparian vegetation that would affect in-stream habitat quality (e.g., decreased bank stability, decreased vegetation cover, and increased sedimentation) in reaches that either support the Colorado River cutthroat trout or are located upstream or in tributary reaches that could impact the occupied reaches.

This alternative would allow the most unrestricted travel throughout the Planning Area. No areas would be closed to off-route motorized or mechanized travel, and no existing routes would be restricted. As recreational use continues to grow based on projected regional population growth and the increasing popularity of outdoor recreation, the resulting potential for damage to vegetation and increased disturbance is likely to increase the size and severity of “road-effect zones” along commonly used routes. This would reduce effective habitat extent, increase effective habitat fragmentation, and potentially disrupt important movement patterns. Continued use of the Hubbard Mesa OHV area under current management would

probably not add markedly to existing levels of wildlife avoidance.

Additionally, Alternative I would allow an estimated 247 new well pads in the production area of NOSR 3 below the rim, with an associated 1,120 acres of long-term habitat loss. This would represent a direct loss of 2.9 percent of lower-elevation habitats — including pinyon/juniper, sagebrush, and semi-desert scrub and smaller areas of Douglas-fir, riparian, and mountain shrub habitats. Using a factor of 3.5 to account for disturbance-related effective habitat loss (see Section 4.3.2) yields 3,920 acres or approximately 10.1 percent of these lower-elevation areas. Wildlife uses of these habitats include nesting/denning and hunting/feeding habitat for several special status mammals, birds, reptiles, and amphibians.

Potential impacts to special status species are summarized below. Species present in portions of western Colorado but not likely to occur in the Planning Area and vicinity, or to be affected by activities in the Planning Area, are not discussed below. See Section 3.3.4 (Table 3-16) for a listing and synopsis of the habitat requirements and range limitations of special status fish and wildlife in the Planning Area and vicinity.

Federally Listed or Candidate Threatened or Endangered Species

Colorado River Fishes — USFWS has designated critical habitat for both the razorback sucker and Colorado pikeminnow within the Colorado River and 100-year floodplain along the southern boundary of the Planning Area from the town of Rifle downstream. In addition, critical habitat for the bonytail and humpback chubs has been designated for the Black rocks area near the Colorado-Utah border approximately 80 miles downstream. No significant impacts are expected to these species, based on the fact that Alternative I would not result in reduction of water volumes, increase in sediment transport, or decrease in water quality that would affect these species. Indeed, reduced sediment loads in the Colorado River and tributaries due to construction of dams is

considered one of the key contributing factors to the historic decline of these native species. The NSO for protection of the Colorado River corridor would further reduce potential direct impacts to these species.

In terms of water quantity, USFWS previously agreed with BLM's position that oil and gas development would not deplete streamflows in the Upper Colorado River Basin and could actually increase flows.

An existing potential threat to these species is transport of contaminants to the Colorado River from the spent oil shale pile located on BLM land north of I-70 and within the Planning Area. Remediation (removal or capping) of the pile under any of the five alternatives would be expected to reduce or eliminate this potential threat. Development of industrial and other uses on private lands along the Colorado River, including oil and gas development, also represent a potential threat from transport of pollutants in surface runoff or unintended releases of contaminants. Potential impacts from oil and gas contaminants, generated both on private and BLM lands at lower elevations of the Planning Area, are minimized by standard restrictions and limitations aimed at capturing spills and releases before they can be transported to the river.

Boreal Toad — This candidate species is not known to occur in the Planning Area. The site is near the lower elevational limits of the species, and suitable habitat types within the Planning Area are limited and isolated.

Bald Eagle — The bald eagle is not known to nest in the Planning Area or vicinity but occurs as a winter visitor. Mature trees along riparian corridors provide perching and roosting habitat, while the Colorado River and nearby areas of open terrain provide hunting habitat. No significant impacts to the bald eagle would be expected under Alternative I based on NSO protection of the Colorado River corridor and other riparian areas, and NSOs and TLs for nests or winter roosts. Any loss of hunting habitat from oil and gas development would represent a small portion of the suitable habitat in the area.

Mexican Spotted Owl — This species is not known to occur in the Planning Area, but potentially suitable habitat occurs in tributary gulches of the Parachute Creek drainage. NSO restrictions on riparian corridors and wildlife seclusion areas under Alternative I would reduce the potential for impacts to this species. If the species were found to be present, any nest, brood-rearing habitat, or other critical habitat would be protected by the NSO for Federally listed species. However, the extent to which this alternative could affect potential hunting habitat is unknown, since that would depend on the location of any nest.

Lynx — This subalpine forest species is not expected to occur in the Planning Area. As discussed in Section 3.3.4, suitable conifer habitat is present atop the plateau, but the habitat is limited in extent, generally narrow (large edge-to-interior ratio), and isolated from more extensive habitats offsite.

BLM and USFS Sensitive Species, USFWS Birds of Conservation Concern, and State-listed Species

Native Non-game Fishes — The roundtail chub, flannelmouth sucker, and bluehead sucker are found in the mainstem of the Colorado River in the Planning Area vicinity and may occur in lower reaches of Parachute Creek. The Colorado River and general riparian area NSOs afford protection to these species except for any degradation of riparian habitat due to livestock grazing and cross-country OHV travel, and sediment transport from oil and gas development below the rim. Even these impacts probably would not affect either species because of their tolerance for turbid streams. Loss of vegetation along the streams could affect water temperature but would be unlikely to significantly raise the temperature of the large streams. Water depletions would not be expected (see discussion for endangered fishes, above). The existing spent oil shale pile located north of I-70 within the Planning Area may pose an ongoing risk of contaminant transport to the Colorado River, but this area is expected to be remediated (removed or capped) under any of the five alternatives. Transport of chemical pollutants,

including dissolved salts, as runoff or releases from oil and gas activities on private and public lands below the rim are minimized by standard mitigation measures.

Based on the discussion above, potential impacts to these species are expected to be none to negligible.

Colorado River Cutthroat Trout — Genetically pure populations of this subspecies would be subject to some impacts related to increased human use above the rim, especially due to unregulated cross-country travel, as well as continuation of grazing and the potential for weed infestations. Impacts could result from increased sediment load, siltation of substrate, loss of vegetation for screening and thermal regulation, and overfishing due to unregulated OHV access. The oil and gas NSO for riparian habitats would have little benefit to this subspecies under Alternative I, because the stream segments and watershed areas it occupies are limited to the no-lease area of NOSR 1. Therefore, impacts would result primarily from disturbance of soils or streambeds, and destruction of riparian vegetation, by cross-country OHV travel and livestock grazing.

Due largely to unregulated off-trail travel and limited range improvements, Alternative I could result in minor to localized major impacts to this subspecies.

Amphibians — The occurrence of both the Great Basin spadefoot and the northern leopard frog is limited by the availability of aquatic habitats: seasonal ponds or pools for the toad and perennial ponds or slow-flowing streams for the frog. Impacts under Alternative I would consist primarily of the potential for habitat degradation associated with livestock grazing and cross-country OHV travel.

Impacts would be negligible to minor, depending on whether drainages crossed by new well roads below the rim are used by toads or frogs. The potential for impacts above the rim is lower due to the less intensive use anticipated.

Reptiles — The Utah milk snake and midget faded rattlesnake are expected or known to occur in the Planning Area. The NSO for steep slopes would preserve much of the potential denning habitat for the rattlesnake, which would also be protected by the CSU for BLM sensitive species. The milk snake occurs along riparian corridors and moist gulches and would be generally protected by the riparian corridor NSO. Either species could be affected by cross-country OHV travel and by livestock grazing due to degradation of vegetation cover or direct mortality from being run over or trampled.

Overall, impacts to either species would be expected to be negligible.

Waterbirds — Barrow's goldeneye and the white-faced ibis are known to occur as migrants in the Planning Area or vicinity. The Colorado River corridor provides the most suitable habitat, although the goldeneye and ibis also occur at Fravert Reservoir. The TL for waterbird nesting at Fravert Reservoir provides seasonal protection for these and other waterbird species that may nest there, but the Colorado River NSO is probably the most important habitat protection within the Planning Area. A more extensive TL stipulation for bald eagle winter roosting extends into part of the spring migration season for Barrow's goldeneye and the white-faced ibis and therefore also benefits these species.

Raptors — The peregrine falcon, prairie falcon, ferruginous hawk, Swainson's hawk, golden eagle, northern goshawk, northern harrier, boreal owl, flammulated owl, and burrowing owl could be affected under Alternative I due to some loss of hunting habitat and, except for cliff-nesters such as the peregrine falcon and golden eagle, potential loss of nesting habitat. However, the direct loss of 1,151 acres under Alternative I would be a small fraction (1.6 percent) of the Planning Area. Cliff-nesting areas for the two falcon species and the golden eagle are especially important because these species depend on high cliffs for nesting. For the peregrine falcon, formerly Federally listed as threatened but now delisted, proximity to a large body of water (the Colorado River) is also important because it supports the falcon's

favorite prey — waterfowl. The other two cliff-nesters hunt in open terrain, potentially including sparsely vegetated habitats below the rim and sagebrush shrublands atop the plateau. The cliff-nesting area would continue to be protected by NSO and TL stipulations under Alternative I.

For the northern goshawk and boreal owl, aspen and conifer forests at higher elevations of the Planning Area and some areas of old-growth Douglas-fir just below the rim provide suitable hunting and nesting sites. The flammulated owl could occur in any of these habitats as well as denser stands of pinyon/juniper. Even with the limited oil and gas development atop the plateau under Alternative I, the forest habitats required by these species would be subject to increased disturbance from recreational OHV use.

Another special status raptor, the northern harrier, nests and hunts in more open habitats dominated by grasses, forbs, and low shrubs. Therefore, the additional oil and gas development below the rim under Alternative I would represent more of a potential impact than for the primarily forest-dwelling species at higher elevations. Swainson's hawk could occur at any elevation.

Based on the continuation of existing protective stipulations and limited oil and gas development, impacts to raptors under Alternative I are expected to range from none to negligible.

Neotropical Migrants and Other Small Birds — Not all neotropical migrants are designated as sensitive, nor are all of them forest species. However, many of these species, including several species on the USFWS list of birds of conservation concern, either occur or could occur in habitats of the Planning Area (see Section 3.3.4). Lower-elevation sensitive species or birds on the BCC list, such as Lewis's woodpecker, loggerhead shrike, gray vireo, Virginia's warbler, black-throated gray warbler, and sage sparrow (as well as many other, unlisted species) would lose the same percentage of habitat as other species below the rim. Because of their smaller home ranges, however, these species would be more affected by the

direct habitat loss below the rim (2.9 percent) than by effective habitat loss associated with behavior avoidance of oil and gas activities or other intensive land uses (10.1 percent).

For areas atop the plateau, the aging condition of the aspen forest due to fire suppression could gradually affect sensitive small birds such as the three-toed woodpecker, Williamson's sapsucker, the olive-sided flycatcher, and other birds above the rim. An uncontrolled wildfire in these areas could have a more devastating effect on forest birds. Increased disturbance from growing motorized recreational use, including cross-country travel, could affect some species, as could any impacts on riparian habitats from livestock overuse of areas along drainages.

Habitats of particularly high quality for many birds, including some special status raptors, are the seclusion areas protected by NSO 11. As described in Section 4.3.2, these areas offer dense, rugged, unfragmented habitat that includes dense cover, water, proximity to open lands, and a connection through the cliffs between higher and lower elevations.

BLM has not yet developed conservation strategies for species on the BCC list. However, existing NSO and CSU stipulations aimed at reducing impacts to high-quality habitats — including riparian corridors, some areas with steep forest slopes, and areas around raptors nests — would benefit these species. On the other hand, the most important habitats for supporting BCC species and other small birds include mixed aspen and conifer forests atop the plateau, which are not afforded special protection or management. Alternative I, while not specifically managing for these species, would benefit them by retaining most of the area atop the plateau in a no-lease designation, limiting adverse impacts primarily to habitat damage associated with permissible cross-country OHV travel and rangeland impacts from livestock grazing.

Overall, impacts to sensitive small birds from Alternative I would be expected to be negligible, with most of the impacts occurring below the rim.

Bats — Gour species of sensitive bats known to occur in the area (spotted bat, fringed myotis, Yuma myotis, and Townsend's big-eared bat) and the big free-tailed is a potential resident. All would be largely protected by NSOs intended to protect riparian corridors, major river corridors, wildlife seclusion areas, slopes steeper than 50 percent, and the Anvil Points cave areas. Loss of some pinyon/juniper woodland below the rim would reduce roosting and hunting habitat for the bats, but only at the level of direct loss (2.9 percent). The actual reduction is probably much lower due to preferential use of other wooded or rocky areas.

Overall, impacts to these species from implementation of Alternative I would be expected to range from none to negligible. Potential sources of impacts would include increased and relatively unfettered recreational use above the rim.

Carnivores — The American marten is a denizen of mature subalpine forests and is not known to occur in the Planning Area. Although spruce/fir and Douglas-fir forests atop the plateau and along some cliff sections provide potentially suitable habitat, the onsite habitat is probably too limited in extent, perhaps too low in elevation, and too isolated from more extensive habitats offsite to support a viable population. Under Alternative I, habitats atop the plateau would be subject to disturbance and potential fragmentation from increased motorized recreation, including cross-country use.

Because of the low likelihood of occurrence, no impacts to the species would be expected from implementation of Alternative I. If the species were present, disturbance associated with increased recreational travel and the effective habitat fragmentation of disturbance corridors could cause a major impact if sufficient to force a group of martens to abandon the area.

Another USFS sensitive species and State-listed endangered species potentially present but not known to occur onsite is the river otter. If this aquatic carnivore were to disperse into or through the Planning Area from future release

sites or natural dispersion from occupied habitat, movement would be along the Colorado River, which is protected by an NSO. Impacts to riparian vegetation by livestock and to seclusion areas by cross-country vehicle use could affect habitat quality for the otter.

Offsite and Cumulative Impacts

Cumulative impacts under Alternative I would be associated with the combination of oil and gas development on BLM land and private land within the Planning Area. Because of assumed higher well densities and lower levels of ecological protection on private lands, the combined result would be direct habitat loss of 4.7 percent and effective habitat loss of 16.4 percent of the Planning Area during the 20-year period of analysis. The larger number uses a factor of 3.5 to account for disturbance-related impacts (see Section 3.3.2). Nearly all private lands and about 97 percent of Federal lands impacted by oil and gas would be in habitats at lower elevations below the rim, including habitats such as pinyon/juniper, sagebrush, and semi-desert scrub mixed with smaller areas of mountain brush, Douglas-fir, and riparian/wetland vegetation. Impacts to the combined public and private lands below the rim would include a 6.4-percent direct habitat loss and 22.5-percent effective habitat loss.

For large, wide-ranging, or furtive species such as raptors and carnivores, this level of oil and gas development could represent a minor to moderate impact during construction and a minor impact over the long term. A higher impact level is not assumed despite the nearly 29-percent overall loss and 23-percent loss at lower elevations because the Planning Area would not represent the entire hunting habitat for species such as a wintering bald eagle or a nesting peregrine falcon. A northern goshawk atop the plateau would be more likely to have its hunting habitat entirely within the Planning Area, but the higher level of impact associated with construction would not occur simultaneously throughout the entire area. The NSO and TL restrictions for raptor nesting also reduce the potential for impacts.

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For smaller species such as the boreal owl, flammulated owl, and neotropical migrant songbirds, the amount of direct habitat loss at full build-out would represent negligible to localized minor habitat loss due to their smaller home ranges and narrower zones of avoidance around areas human activity.

Offsite impacts could occur if future management or development actions result in reduced populations of wide-ranging species such as the bald eagle, which roosts mostly offsite but may feed onsite, and the peregrine falcon, which nests and roosts onsite but hunts offsite.

4.3.4.2 Alternative II

Alternative II would protect ecological values and processes and biological diversity by limiting surface disturbance and promoting natural ecosystem processes and functions. To accomplish these goals, four ACECs would be designated, and special management attention would be prescribed to protect and enhance ecological resource values.

Alternative II would incorporate the same surface-use stipulations as listed for Alternative I above, with the addition of ACEC-specific measures. These include:

- NGD/NSO stipulations W-4 and W-5 would prohibit loss or degradation of high-risk and moderate-risk habitat, respectively, for the Colorado River cutthroat trout.
- NGD/NSO W-6 would prohibit long-term (lasting longer than two growing seasons) ground-disturbing activities in areas of high value watershed processes upstream or upslope from occupied habitat of the Colorado River cutthroat trout.

Direct and Indirect Impacts

Several special management stipulations are proposed for special status plant species and significant plant communities within the designated ACECs (Section 4.3.3). Specific emphasis would be placed on noxious weed

inventory, detection, monitoring, and specific project actions. Riparian areas and river corridors are a focus of vegetation protection and management under this alternative. This includes a specific objective for maintaining proper hydrologic function and protection of areas adjacent to these resources. Due to these protections and specific management actions, it is expected that many riparian reaches would return to PFC over time, resulting in positive impacts to riparian/wetland habitats, riparian wildlife communities, and aquatic species.

Travel management under this alternative would prohibit motorized or mechanized cross-country travel, including over-snow travel by snowmobile and OHV travel in the Hubbard Mesa SRMA. These measures would retard or prevent further expansion of travel routes throughout the Planning Area and reduce the impact of associated disturbance and habitat degradation. Permanently closing 34 miles of existing routes and limiting 44 miles of existing routes to administrative travel would also benefit wildlife. Together, these actions would result in some benefit to sensitive wildlife, depending on their vulnerability to disturbance and the size of their home range. These positive impacts would partially, but not fully, offset impacts from oil and gas development, especially atop the plateau.

An estimated 66 well pads above the rim and 244 below the rim are anticipated under this alternative. The lower elevation wells would result in long-term loss of approximately 1,105 acres of habitat, with effective loss of an estimated 3,868 acres. The latter figure represents 10.0 percent of BM lands below the rim. Closure of a small portion of the roads below the rim would have some benefit, as would restriction to designated routes of OHV travel in the Hubbard Mesa SRMA. However, the high level of use and disturbance (noise, dust, fast movement, etc.) on the designated OHV trails would still limit wildlife use of this area.

Another impact under this alternative would be oil and gas development atop the plateau in areas that currently are essentially “pristine”

except for livestock grazing and the presence of lightly traveled roads and associated recreational use. The long-term habitat loss above the rim due to oil and gas development would be approximately 243 acres, or an effective loss of 847 acres of habitat, representing 2.4 percent of the highland habitats.

Impacts to specific groups of special status species would be as follows:

Endangered Colorado River Fishes and Sensitive Non-game Fishes — No impacts are expected for these species, for the reasons discussed under Alternative I. The increased development above the rim under this alternative is not an issue because the area does not include suitable habitat and is too far removed from occupied or potential habitat along the major streams for local stream impacts to have an influence. Closing 38 miles of routes and restricting travel to designated routes could benefit the species in terms of additional protection along lower elevation streams.

Colorado River Cutthroat Trout — Only negligible to minor impacts would occur based on the special management NGD/NSO stipulations described above, and especially if suggested mitigation measures to protect stream quality are implemented (see Section 4.3.2). Closing 38 miles of routes above the rim to public motorized use and restricting cross-country travel would further reduce stream impacts and also reduce the potential for overfishing or for ad hoc introductions of genetically impure strains, other subspecies, or other species by making access to some areas more difficult. Beneficial impacts to riparian corridors from active management and changes in grazing would also benefit the trout.

Amphibians — Impacts to the boreal toad, Great Basin spadefoot, and northern leopard frog would be negligible to minor, depending on whether drainages crossed by new well roads support breeding toads or contain perennial pools that support frogs.

Proposed mitigation measures under Alternative II would preclude new road crossings where

feasible and require use of culverts or bridges to reduce impacts to streams.

Reptiles — The potential impacts to the Utah milk snake and midget faded rattlesnake would be similar to those described for Alternative I, as would the amount of oil and gas development at lower elevations where these species might occur. Neither species is expected above the rim. Restriction of travel to designated routes under this alternative would reduce the potential for direct and indirect impacts from habitat degradation and direct mortality from being run over by ATVs, dirt bikes, or bicycles.

Waterbirds — Barrow's goldeneye and the white-faced ibis occur in the Planning Area as migrants. Impacts would be similar to those for Alternative I, except that restriction of motorized travel to designated routes would reduce the potential for disturbance.

Bald Eagle — In general, the potential for adverse impacts would be the same as described under Alternative I. Impacts would be none to negligible based on the Colorado River NGD/NSO stipulation and the NGD/NSO and TL stipulations for nests and winter roosts. Some loss of hunting habitat could result from oil and gas development, but this represents a small portion of likely winter hunting habitat. Restriction of travel to designated routes would benefit the species, especially if it were to prevent disturbance of roosting eagles during the winter.

Mexican Spotted Owl and Western Yellow-billed Cuckoo — These Federally listed or candidate species are unlikely to occur. If present, impacts would be similar to those under Alternative I except for decreased disturbance due to limitation of OHV travel to designated routes under this alternative. The western yellow-billed cuckoo is a bird of mature riparian forest, and potential habitat would be protected by stipulations aimed at aquatic and riparian areas. Retention of wildlife seclusion area protection would preserve the most important potential habitat for the Mexican spotted owl.

Other Raptors — Sensitive or State-listed raptors such as the peregrine falcon, prairie falcon, ferruginous hawk, Swainson's hawk, golden eagle, northern goshawk, northern harrier, flammulated owl, boreal owl, and burrowing owl would be subject to negligible to minor impacts based on the relatively minor amount of nesting and hunting habitat affected, and continued NGD/NSO stipulations for the Colorado River, other riparian areas, nesting areas, and wildlife seclusion areas, as well as the TL stipulation for nests.

The northern goshawk and boreal owl and, to a lesser extent, the flammulated owl are the special status raptors most likely to occur above the rim. The effective loss of 840 acres of highland habitat during the 20-year period of analysis would represent 2.4 percent of the habitat for these species, a negligible amount. Protection of most of the forested habitat within the WSR-eligible stream corridors and in areas having wilderness character would probably result in most wells being in more open sagebrush ridgetops, which generally are less important habitats for these species. Another sensitive raptor, the northern harrier, could both nest and hunt in the open sagebrush, semi-desert scrub, and grassland/pasture habitats of the Planning Area. For this species, as well as the ferruginous hawk and Swainson's hawk, the greater degree of oil and gas development on open ridgetops atop the plateau would cause greater habitat loss than for forest-dwelling species (minor impacts).

Closing 43 miles of existing routes under this alternative, limiting 43 miles of existing routes to administrative use, and prohibiting cross-country motorized or mechanized travel would reduce impacts associated with OHV use. This would create a greater degree of seclusion for all raptors and help offset some of the impacts associated with oil and gas development.

Neotropical Migrants and Other Small Birds — As described for Alternative I, not all neotropical migrants are designated as special status species, nor are all of them forest species. However, many of the species nest in pinyon/juniper woodland, aspen forest, or

conifer forest habitats such as occur in the Planning Area. The total of 1,348 acres of direct habitat loss and 4,711 acres of effective habitat loss under this alternative would represent 1.8 and 6.4 percent, respectively, of BLM lands in the Planning Area during the 20-year period of analysis. However, since smaller species are affected by relatively small-scale impacts, most of the disturbance-avoidance effects would coincide with active construction, which would occur gradually over many years. Thus, the habitat loss in any one year would represent a gradual accrual of long-term impacts, plus impacts related to specific areas of construction. Since most of the impact would be direct rather than indirect, and since most of the higher-elevation forests would be avoided under Alternative II (due to WSR, wilderness character, and other NGD/NSO stipulations), impacts to these species would be negligible. The closure of existing routes and restriction of motorized travel on designated routes could offset any adverse impacts.

Bats — Due to protection of the Anvil Points cave area, the steep slope stipulation, and protection of most forest areas under various NGD/NSO and TL stipulations described above, the 1,348 acres of direct habitat loss — much of it semi-desert scrub or sagebrush habitat — would result in negligible impacts to bats under Alternative II.

Carnivores — In the unlikely event that the lynx, wolverine, or American marten occur in the Planning Area (the marten being the most likely), impacts would be greater under Alternative II because of the substantially greater amount of aspen and conifer habitat atop the plateau that would be affected by oil and gas development. The effective habitat loss of 2.4 percent of the highland habitats would represent a negligible to minor impact, depending on specific locations relative to occupied home ranges. Because of protective stipulations for the WSR-eligible stream segments, areas having wilderness character, and other specific resources, it is expected that most impacts would be in habitats not currently suitable for these secretive species. This consideration, coupled with the road closures and restrictions to

designated routes, could offset any potential adverse impact from oil and gas development. Should the river otter occur, none of the anticipated land use or management action impacts would be likely to affect this aquatic species because its habitat is essentially limited to the Colorado River, which is protected by various stipulations related to other riverine resources (see above).

Offsite and Cumulative Impacts

Cumulative impacts under Alternative II would be associated primarily with the combination of oil and gas development on BLM land and private land within the Planning Area. Cumulative impacts from continued increases in recreational use throughout the region would also be expected, but the route closures and restrictions on cross-country motorized travel under Alternative II would reduce these, and the private land in the Planning Area would receive less-intensive recreation than the BLM land. In terms of oil and gas development, the cumulative impact during the 20-year period of analysis would result in an estimated 6,148 acres of direct loss and 21,518 acres of effective habitat loss, with about 78 percent of this amount on private lands. The direct and effective habitat loss estimates for the entire Planning Area during the 20-year analysis period are 4.8 and 16.9 percent, respectively.

Nearly all of the private land and about 82 percent of the BLM land affected by oil and gas would be in lower-elevation habitat types such as pinyon/juniper, sagebrush, and semi-desert scrub mixed with smaller areas of mountain brush, Douglas-fir, and riparian/wetland vegetation. Therefore, impacts to combined public and private lands at these lower elevations would represent direct and effective habitat losses of approximately 7 percent and 23 percent, respectively.

For large, wide-ranging, or furtive species such as raptors and carnivores, the effective habitat loss could represent a moderate impact during construction and over the long term. A higher impact level is not assumed despite the nearly 9-percent overall loss and 23-percent loss at lower

elevations because the Planning Area would not represent the entire hunting habitat for species such as a wintering bald eagle or a nesting peregrine falcon. A northern goshawk atop the plateau would be more likely to hunt entirely within the Planning Area, but the level of impact associated with construction would not occur simultaneously throughout the entire area, being spread over many years. The NGD/NSO and TL restrictions for raptor nesting areas would also reduce the potential for adverse effects on these species.

For smaller species such as the boreal owl, flammulated owl, and neotropical migrant birds, the direct habitat loss would be negligible to minor; they have smaller home ranges and narrower zones of avoidance due to human activity. Most impacts would be below the rim.

Offsite impacts could also occur if future management or development actions result in reduced populations of wide-ranging species such as the bald eagle, which roosts mostly offsite but may feed onsite, and the peregrine falcon, which nests and roosts onsite but hunts offsite.

4.3.4.3 Alternative III – Preferred Alternative

This alternative makes the entire Planning Area available for oil and gas development, although leasing and drilling atop the plateau would be deferred until 80 percent of anticipated wells below the rim have been drilled. Two of the four ACECs and the areas having wilderness character assumed for Alternative II would not be carried into Alternative III, although the WSR-eligible streams and other surface-use would be applied, and 9,006 acres would be managed in ways that would protect roadlessness and naturalness (Map 36). Specific measures associated with the East Fork Parachute Creek and Trapper/Northwater Creek ACECs include NGD/NSO W-4 to protect high-risk habitat for Colorado River cutthroat trout from direct impacts, and SSR/CSU W-7 to protect moderate-risk cutthroat trout habitat from most indirect impacts. The SSR/CSU W-7 stipulation provides less protection than the

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NGD/NSO W-6 stipulation for the same areas under Alternative II. This alternative includes designation of the Trapper/Northwater Creek drainage as a WMA, with the specific management objectives listed in Table 2-3.

Most other stipulations for Alternatives I and II would also be applied under this alternative. Exceptions are that the 5-month TL stipulation for big game winter range would be replaced with a 2-month COA, and the NGD/NSO W-2 stipulation for wildlife seclusion areas would be dropped.

Direct and Indirect Impacts

Due to the emphasis on active measures to improve range condition, Alternative III could hasten long-term improvements compared to both Alternatives I and II. However, this assumes that related ground-disturbing activities, such as new stockpounds to disperse livestock use, are designed, located, and built in a way that minimizes impacts. Improved range condition and distribution of livestock would benefit some special status species, including indirect impacts related to increased abundance of prey species in the areas of improving plant cover and forage quality. Aquatic species would also benefit due to enhancement of some currently degraded areas along streams that attract concentrated wildlife use. Offsetting this benefit to a degree would be a less systematic approach to weed management than under Alternative II. Overall, range condition improvements would have negligible to localized minor beneficial impacts to special status wildlife.

Alternative III would limit motorized or mechanized travel to designated routes, including the Hubbard Mesa SRMA but excluding over-snow travel by snowmobile. These management actions would reduce the expansion of travel routes throughout most of the Planning Area, thereby reducing direct and effective habitat loss resulting from impacts to vegetation, sediment transport to streams, dispersed sources of disturbance to wildlife solitude, and (potentially) fishing pressure on the Colorado River cutthroat trout. Combined with

the closure of 26 miles of existing roads or routes and restriction to administrative use on an additional 24 miles, the overall impact of travel management on special status fish and wildlife would be positive. These positive impacts would help offset, but not fully offset, adverse impacts from increased oil and gas development.

All BLM lands would be open to oil and gas leasing, but more than 31,000 acres would remain closed to ground-disturbing activities due to NGD/NSO stipulations associated with sensitive resources. Alternative III would result in an estimated 402 new well pads, of which 323 would be below the rim and 39 above the rim. These pads would require approximately 241 miles of new or widened access roads. Impacts below the rim would include an estimated 1,595 acres of direct and 5,582 acres of effective habitat loss over 20 years. The latter represents 13.4 percent of lower-elevation habitats (mostly pinyon/juniper, sagebrush, and semi-desert scrub). The 39 pads above the rim would directly impact 166 acres, with 581 acres of effective habitat loss (1.7 percent of the higher elevation areas). These areas include aspen, conifer, sagebrush, and mixed mountain brush communities. Both above and below the rim, the new pads and associated impacts would create additional habitat fragmentation and increased disturbance from human activity, although these would be offset to some extent by the more stringent restrictions on cross-country motorized travel than at present.

Habitat fragmentation would be greater than for Alternative II overall, although less so for the area atop the plateau during the 20-year period of analysis due to deferred drilling. However, the annual drilling rate in that area would be considerably greater once drilling is initiated, resulting in increased fragmentation from human disturbance and more rapid habitat loss.

Impacts to specific groups of special status species are summarized below. For all species using habitats on top of the plateau, the impact discussions address the post-deferral period, estimated to occur approximately 16 years into the 20-year period of analysis.

Endangered Colorado River Fishes and Sensitive Non-game Fishes — No impacts are expected for these species, for the reasons discussed under Alternative I. The increased development above the rim under this alternative is not an issue because the area does not include suitable habitat and is too far removed from occupied or potential habitat along major streams for local stream impacts to have an influence. Closing roads and restricting travel to designated routes could benefit the species by additional protection along lower elevation streams.

Colorado River Cutthroat Trout — Eventually, impacts would be greater for Alternative III than for Alternative II because of the increased area available for oil and gas development. However, the increased impacts would not begin until late in the 20-year period. After drilling has begun in that area, NGD/NSO stipulations for high- and moderate-risk trout habitat and riparian/wetland vegetation would protect the occupied habitat and much of the adjacent watershed. While some areas with other NGD/NSO stipulations in Alternative II would instead have SSR/CSU stipulations under this alternative, the remaining NGD/NSO areas and the ability under SSR/CSU to shift surface facilities by more than 200 meters is expected to continue to keep impacts to trout habitat in the minor range. However, impacts to the trout and occupied or suitable habitat would be moderate in localized areas following initiation of drilling if stream crossings are not minimized and if “low-water” stream crossings (instead of culverts or bridges) are permitted.

Closing 41 miles of existing routes above the rim to public motorized use and restricting cross-country travel would further reduce stream impacts and reduce the potential for overfishing by making access to some areas more difficult. Improvements in the quality of riparian corridors from active management and changes in grazing would also benefit the trout.

Amphibians — The boreal toad, Great Basin spadefoot, and northern leopard frog would suffer negligible to minor impacts, depending on whether drainages crossed by new well roads

support breeding toads or contain perennial pools that support frogs. Proposed mitigation measures would preclude new road crossings where feasible and require the use of culverts or bridges to reduce physical impacts to streams.

Reptiles — The types of potential impacts to the Utah milk snake and midget faded rattlesnake would be similar to those described for Alternative II, but the area impacted in lower elevation habitats would be approximately 36 percent greater. Neither species is expected above the rim. Continuation of the Alternative II restriction on travel to designated routes would reduce the potential for direct and indirect impacts from habitat degradation and direct mortality from being run over by ATVs, dirt bikes, or bicycles.

Waterbirds — Impacts to Barrow’s goldeneye and the white-faced ibis would be similar to those for the previous alternatives due to protective stipulations, except that restriction of motorized travel to designated routes would reduce the potential for disturbance impacts.

Bald Eagle — As with the previous alternative, impacts would be none to negligible based on the Colorado River NGD/NSO stipulation and the NGD/NSO and TL stipulations for nests and winter roosts. Some loss of hunting habitat could result from oil and gas development below the rim, but this represents a small portion of likely winter hunting habitat.

Mexican Spotted Owl and Western Yellow-billed Cuckoo — These species are considered unlikely to occur. If present, they would be subject to impacts similar to those under Alternative I, except for decreased disturbance due to limitation of OHV travel to designated routes under this alternative. Additionally, Alternative III differs from Alternatives I and II because it does not include the NGD/NSO stipulation for wildlife seclusion areas, which provide some of the most important potential habitat for the Mexican spotted owl due to the combination of remoteness, compositional and structural diversity, and lack of fragmentation. The western yellow-billed cuckoo is a bird of mature riparian forest, and potential habitat

would be protected by stipulations aimed at aquatic and riparian areas.

Other Raptors — The peregrine falcon, prairie falcon, ferruginous hawk, Swainson's hawk, golden eagle, northern harrier, northern goshawk, flammulated owl, boreal owl, and burrowing owl would be subject to the same types of impacts as for the previous alternatives. Impact levels to these special status species would be expected to remain in the range of minor based on the amount of nesting and hunting habitat affected under Alternative III and the application of NGD/NSO stipulations for the Colorado River, other riparian areas, and raptor nests (coupled with TLs during the nesting season). However, dropping the NGD/NSO protection for wildlife seclusion would increase the potential for impacts, especially for the flammulated owl.

The northern goshawk and boreal owl are typically associated with the types of habitats that occur above the rim. The effective habitat loss of 581 acres in nesting and hunting areas for the portion of the 20-year period of analysis following the oil and gas deferral would reduce the total habitat available by approximately 1.7 percent, a negligible to minor impact. Most of the forest habitat would be protected by various NGD/NSO stipulations associated with sensitive resources. Consequently, ground-disturbing activities would occur primarily in more open sagebrush ridgetops, which generally are less important habitats for these species. The northern harrier, ferruginous hawk, Swainson's hawk, and golden eagle could occur in open sagebrush, semi-desert scrub, and grassland/pasture habitats atop the plateau and would be more likely affected (minor impacts) by their preference for the type of open terrain where much of the potential oil and gas impact is likely to occur.

As with other special status species, the closure of 17 miles of existing routes above the rim, restriction to administrative access on 24 miles of existing routes, and prohibition against cross-country motorized travel would reduce impacts associated with OHVs. This would create a greater degree of seclusion for raptors and help

offset some of the impacts associated with oil and gas development.

Neotropical Migrants and Other Small Birds

— For the special status small-bird species that use Douglas-fir, pinyon/juniper, sagebrush, or other habitats below the rim, the estimated 5,582 acres of effective habitat loss (using a factor of 3.5) would represent 14.4 percent of this portion of the BLM lands and could reduce population sizes proportionately. The same is true for the 1.7 percent of effective habitat loss above the rim in sagebrush, mountain brush, aspen, and mixed conifer habitats. These losses represent negligible to localized minor impacts to small birds (including species on the BCC list) during the 20-year period of analysis. However, since smaller species are affected by relatively small-scale impacts, avoidance of disturbance zones around the areas of direct habitat loss would be greatest during active construction, which would occur gradually over many years. Thus, the habitat loss in any one year would represent a gradual accrual of long-term impacts, plus impacts related to specific areas of construction. Fortunately for these species, much of the riparian and conifer forest habitat would be avoided under Alternative III due to NGD/NSO stipulations, limiting adverse impacts to species associated with these habitats.

The closure of some existing routes and restriction of motorized travel on designated routes could offset some adverse impacts. However, the lack of NGD/NSO protection for the approximately 3,400 acres of wildlife seclusion areas would add to the impacts for several BCC and other neotropical migrant bird species because these areas offer mature, diverse, remote, and unfragmented habitat.

Bats — Due to protection of the Anvil Points cave area, the steep slope stipulation, and protection of most forest areas under various NGD/NSO and TL stipulations described previously, the direct loss of relatively small areas of habitat (1.6 percent of the BLM portion of the Planning Area) would represent negligible impacts to hunting habitat for bats. This conclusion is based on the fact that the highest-quality hunting and roosting habitat for bats —

including riparian areas, mature forests, and cliffy areas — would be less impacted than more open, scrubby terrain.

Carnivores — Although the lynx, wolverine, and American marten are unlikely to occur in the Planning Area, impacts to any of these species that could be present would be potentially greater under Alternative III due to the greater amount of oil and gas development above the rim. If any of these species were present (the marten is the most likely), the loss of habitats above the rim would amount to only about 1.7 percent of the total in the Planning Area. While this would appear negligible to minor, the fragmentation and loss of seclusion to these furtive species resulting from the increased development (including 23 miles of access roads above the rim) and deletion of special protection measures for areas having wilderness character, two ACECs, and wildlife seclusion areas could have a moderate to localized major impact. Road closures and restrictions to designated routes could help offset any potential adverse impacts to these species from oil and gas development.

Should the river otter occur, it would be expected only along the Colorado River corridor, which would remain largely unaffected by any proposed land uses or management actions under this alternative and remain protected by NGD/NSO and TL stipulations aimed at other aquatic or riparian resources (see above).

Offsite and Cumulative Impacts

As with Alternative II, offsite and cumulative impacts under Alternative III would be associated primarily with the combined effect of oil and gas development on BLM land and on adjacent or nearby private land. Although cumulative impacts from other uses such as recreation and livestock would occur, these would be less marked than impacts from oil and gas. This conclusion is based on (1) the greater amount of direct and indirect habitat loss from oil and gas development than anticipated with other uses, (2) the proportionately lower recreational use on private lands than BLM

lands, and (3) the relatively small differences among the alternatives in terms of grazing impacts, which are ongoing and expected to continue at a similar (though reduced) level.

Cumulative impacts from oil and gas development during the 20-year period of analysis would result in an estimated 3,923 acres of direct habitat loss and 13,730 acres of effective habitat loss using a factor of 3.5. The latter value represents 10.8 percent of the Federal and private lands in the Planning Area. Nearly all private lands and about 76 percent of BLM lands affected by oil and gas development would be in lower elevation habitat types such as pinyon/juniper, sagebrush, and semi-desert scrub, with smaller areas of mountain brush, Douglas-fir, and riparian/ wetland vegetation. Direct and effective habitat loss would represent approximately 8.3 percent and 29.2 percent, respectively, of these portions of the Planning Area below the rim.

For large, wide-ranging, and furtive sensitive species such as raptors and carnivores, this could represent a moderate to localized major impact during construction and over the long term. A higher impact level is not assumed despite the nearly 11-percent overall loss and more than 29-percent loss at lower elevations because the Planning Area would not represent the entire hunting habitat for a wintering bald eagle and would represent only minor hunting habitat for a peregrine falcon. A northern goshawk atop the plateau would be more likely to hunt entirely within the Planning Area, but the higher level of impact associated with construction would not occur simultaneously throughout the entire area, being spread over many years.

For smaller species such as the flammulated owl, boreal owl, and neotropical migrants, the direct habitat loss would be negligible to minor due to their smaller home ranges and narrower zones of avoidance around areas of human activity.

Offsite impacts could also occur if future management or development actions result in reduced populations of wide-ranging species such as the bald eagle, which roosts mostly

offsite but may feed onsite, and the peregrine falcon, which nests and roosts onsite but hunts offsite.

4.3.4.4 Alternative IV

This alternative emphasizes a variety of multiple uses, balancing development of mineral resources with focused mitigation. To accomplish this, two of the four ACECs and the areas having wilderness character assumed for Alternative II would not be carried into Alternative IV, although the WSR-eligible streams and other surface-use stipulations would be retained. Specific measures associated with the East Fork Parachute Creek and Trapper/Northwater Creek ACECs include NGD/NSO W-4 to protect high-risk habitat for Colorado River cutthroat trout from direct impacts, and SSR/CSU W-7 to protect moderate-risk cutthroat trout habitat from most indirect impacts. The SSR/CSU W-7 stipulation provides less protection than the NGD/NSO W-6 stipulation for the same areas under Alternative II. This alternative includes designation of the Trapper/Northwater Creek drainage as a WMA, with the specific management objectives listed in Table 2-3.

Most other stipulations described for Alternatives I and II would also apply under this alternative, except that the 5-month TL stipulation for big game winter range would be replaced with a 2-month COA, and the NGD/NSO W-2 stipulation for wildlife seclusion areas would be dropped.

Direct and Indirect Impacts

Due to the emphasis on active measures to improve range condition, Alternative IV could hasten long-term improvements compared to both Alternatives I and II. However, this assumes that related ground-disturbing activities, such as new stockpounds to disperse livestock use, are designed, located, and built in a way that minimizes impacts. Improved range condition and distribution of livestock would benefit some special status species, including indirect impacts related to increased abundance of prey species in the areas of improving plant

cover and forage quality. Aquatic species would also benefit due to enhancement of some currently degraded areas along streams that attract concentrated wildlife use. Offsetting this benefit to a degree would be a less systematic approach to weed management than under Alternative II. Overall, range condition improvements would have negligible to localized minor beneficial impacts to special status wildlife.

Alternative IV would restrict motorized or mechanized travel to designated routes throughout the Planning Area, excluding the Hubbard Mesa SRMA and excluding over-snow travel by snowmobile. These management actions would reduce the expansion of travel routes throughout most of the Planning Area, thereby reducing direct and effective habitat loss resulting from impacts to vegetation, sediment transport to streams, dispersed sources of disturbance to wildlife solitude, and (potentially) fishing pressure on the Colorado River cutthroat trout. Combined with the closure of 26 miles of existing roads or routes and restriction to administrative use on an additional 24 miles, the overall impact of travel management on special status fish and wildlife would be positive. These positive impacts would help offset, but not fully offset, adverse impacts from increased oil and gas development.

All Federal minerals would be available for leasing, but more than 31,000 acres would remain closed to ground-disturbing activities due to NGD/NSO stipulations associated with sensitive resources. Alternative IV would result in an estimated 449 new oil and gas pads: 323 below the rim and 126 above the rim. These pads would require approximately 270 miles of new or widened access roads. Impacts below the rim would include an estimated 1,466 acres of direct and 5,131 acres of effective habitat loss over the long term. The latter represents 13.2 percent of the lower-elevation habitats (mostly pinyon/juniper, sagebrush, and semi-desert scrub). The 126 pads above the rim would directly impact 474 acres, with 1,659 acres of effective habitat loss (4.8 percent of the higher elevation areas). These areas include aspen, conifer, sagebrush, and mixed mountain brush

communities. Both above and below the rim, the new pads and associated impacts would create additional habitat fragmentation and increased disturbance from human activity, although these would be offset to some extent by the more stringent restrictions on cross-country motorized travel than at present.

Habitat fragmentation would be greater than for Alternative II. Although the fragmentation effect on the surrounding habitat of each pad would be the same as discussed for Alternative II, the effect of more pads above the rim (126 versus 66) and more miles of access roads (76 versus 40) would be to fragment a greater portion of highland habitat. Most of the additional wells above the rim would be in areas designated for SSR/CSU stipulations.

Impacts to specific groups of special status species are as follows:

Endangered Colorado River Fishes and Sensitive Non-game Fishes — No impacts are expected for these species, for the reasons discussed under Alternative I. The increased development above the rim under this alternative is not an issue because the area does not include suitable habitat and is too far removed from occupied or potential habitat along the major streams for local stream impacts to have an influence. Closing roads and restricting OHV travel to designated routes could benefit the species by additional protection along lower elevation streams.

Colorado River Cutthroat Trout — Impacts would be greater for Alternative IV than for Alternative II because of the increased area available for oil and gas development. This 91-percent increase between the alternatives during the 20-year period of analysis would be reflected by a 98-percent increase in acres of long-term impacts from pads, roads, and associated direct and indirect impacts. However, the continued application of NGD/NSO stipulations to high- and moderate-risk trout habitat and to riparian/wetland vegetation would protect the occupied habitat and much of the adjacent watershed. While some areas with other NGD/NSO stipulations in Alternative II would

be replaced with SSR/CSU stipulations under this alternative, the remaining NGD/NSO areas and the ability under SSR/CSU to shift surface facilities by more than 200 meters is expected to continue to keep impacts to trout habitat in the minor range. However, impacts to the trout and occupied or suitable habitat would be moderate in localized areas if stream crossings are not minimized and if “low-water” stream crossings (instead of culverts or bridges) are permitted.

Closing 41 miles of existing routes above the rim to public motorized use and restricting cross-country travel would further reduce stream impacts and reduce the potential for overfishing by making access to some areas more difficult. Improvements in the quality of riparian corridors from active management and changes in grazing would also benefit the trout.

Amphibians — The boreal toad, Great Basin spadefoot, and northern leopard frog would suffer negligible to minor impacts, depending on whether drainages crossed by new well roads support breeding toads or contain perennial pools that support frogs. Proposed mitigation measures would preclude new road crossings where feasible and require the use of culverts or bridges to reduce physical impacts to streams.

Reptiles — Potential impacts to the Utah milk snake and midget faded rattlesnake would be similar to those described for Alternative II, but the area impacted in lower elevation habitats would be approximately 33 percent greater. Neither species is expected above the rim. Continuation of the Alternative II restriction on travel to designated routes would reduce the potential for direct and indirect impacts from habitat degradation and direct mortality from being run over by ATVs, dirt bikes, or bicycles.

Waterbirds — Impacts to Barrow’s goldeneye and the white-faced ibis would be similar to those for the previous alternatives due to protective stipulations, except that restriction of motorized travel to designated routes would reduce the potential for disturbance impacts.

Bald Eagle — As with the previous alternative, impacts would be none to negligible based on

the Colorado River NGD/NSO stipulation and the NGD/NSO and TL stipulations for nests and winter roosts. Some loss of hunting habitat could result from oil and gas development below the rim, but this represents a small portion of likely winter hunting habitat.

Mexican Spotted Owl and Western Yellow-billed Cuckoo — These species are considered unlikely to occur. If present, they would be subject to impacts similar to those under Alternative I, except for decreased disturbance due to limitation of OHV travel to designated routes under this alternative. Additionally, Alternative IV differs from Alternatives I and II because it does not carry forward the NGD/NSO stipulation for wildlife seclusion areas, which provide some of the most important potential habitat for the Mexican spotted owl due to the combination of remoteness, compositional and structural diversity, and lack of fragmentation. The western yellow-billed cuckoo is a bird of mature riparian forest, and potential habitat would be protected by stipulations aimed at aquatic and riparian areas.

Other Raptors — The peregrine falcon, prairie falcon, ferruginous hawk, Swainson's hawk, golden eagle, northern harrier, northern goshawk, flammulated owl, boreal owl, and burrowing owl would be subject to the same types of impacts as for the previous alternatives. Impact levels to these special status species would be expected to remain in the range of minor based on the amount of nesting and hunting habitat affected under Alternative IV and the continued application of NGD/NSO stipulations for the Colorado River, other riparian areas, and raptor nests (coupled with TLs during the nesting season). However, dropping the NGD/NSO protection for wildlife seclusion would increase the potential for impacts, especially for the flammulated owl.

The northern goshawk and boreal owl are typically associated with the types of habitats that occur above the rim. Therefore, the effective habitat loss of 1,659 acres in nesting and hunting areas would reduce the total habitat available by approximately 4.8 percent, a negligible to minor impact. Most of the forest

habitat would be protected by various NGD/NSO stipulations associated with sensitive resources. Consequently, ground-disturbing activities would occur primarily in more open sagebrush ridgetops, which generally are less important habitats for these species. The northern harrier, ferruginous hawk, Swainson's hawk, and golden eagle could occur in open sagebrush, semi-desert scrub, and grassland/pasture habitats atop the plateau and would be more likely to be affected (minor impacts) by their preference for the type of open terrain where much of the potential oil and gas impact is likely to occur.

As with other special status species, the closure of 17 miles of existing routes above the rim, restriction to administrative access on 24 miles of existing routes, and prohibition against cross-country motorized travel, would reduce impacts associated with OHVs. This would create a greater degree of seclusion for raptors and help offset some of the impacts associated with oil and gas development.

Neotropical Migrants and Other Small Birds — For the special status small-bird species that use Douglas-fir, pinyon/juniper, sagebrush, or other habitats below the rim, the estimated 5,131 acres of effective habitat loss (using a factor of 3.5) would represent 13.2 percent of this portion of BLM lands and could reduce population sizes proportionately. The same is true for the 4.8-percent effective habitat loss above the rim in sagebrush, mountain brush, aspen, and mixed conifer habitats. These losses represent negligible to localized minor impacts to small birds (including species on the BCC list) during the 20-year period of analysis. However, since smaller species are affected by relatively small-scale impacts, avoidance of disturbance zones around the areas of direct habitat loss would be greatest during active construction, which would occur gradually over many years. Thus, the habitat loss in any one year would represent a gradual accrual of long-term impacts, plus impacts related to specific areas of construction. Fortunately for these species, much of the riparian and conifer forest habitat would be avoided under Alternative IV due to NGD/NSO

stipulations, limiting adverse impacts to species associated with these habitats.

The closure of some existing routes and restriction of motorized travel on designated routes could offset some adverse impacts. However, the lack of NGD/NSO protection under this alternative for the approximately 3,400 acres of wildlife seclusion areas would add to the impacts for several BCC and other neotropical migrant bird species because these areas offer mature, diverse, remote, and unfragmented habitat.

Bats — Due to protection of the Anvil Points cave area, the steep slope stipulation, and protection of most forest areas under various NGD/NSO and TL stipulations described previously, the direct loss of relatively small areas of habitat (2.6 percent of the BLM portion of the Planning Area) would represent negligible impacts to hunting habitat for bats. This conclusion is based on the fact that the highest-quality hunting and roosting habitat for bats — including riparian areas, mature forests, and cliff areas — would be less impacted than more open, scrubby terrain.

Carnivores — Although the lynx, wolverine, and American marten are unlikely to occur in the Planning Area, impacts to any of these species that may be present would be potentially greater under Alternative IV due to the greater amount of oil and gas development above the rim. If any of these species were present (the marten is the most likely), the loss of highland habitat would amount to only about 4.8 percent of the total highland habitat in the Planning Area. While this amount of habitat loss would appear negligible to minor, the fragmentation impact and loss of seclusion to these furtive species resulting from the increased development (including 76 miles of access roads above the rim) and deletion of special protection measures for areas having wilderness character, two ACECs, and wildlife seclusion areas could have a moderate to localized major impact. Road closures and restrictions to designated routes could help offset any potential adverse impacts from oil and gas development on these species.

Should the river otter occur, it would be expected only along the Colorado River corridor, which would remain largely unaffected by any of the proposed land uses or management actions under this alternative and protected by NGD/NSO and TL stipulations aimed at other aquatic or riparian resources (see above).

Offsite and Cumulative Impacts

As with Alternative II, offsite and cumulative impacts under Alternative IV would be associated primarily with the combined effect of oil and gas development on BLM land and on adjacent or nearby private land. Although cumulative impacts from other uses such as recreation and livestock would occur, these would be less marked than impacts from oil and gas. This conclusion is based on (1) the greater amount of direct and indirect habitat loss from oil and gas development than anticipated with other uses, (2) the proportionately lower recreational use on private lands than BLM lands, and (3) the relatively small differences among the alternatives in terms of grazing impacts, which are ongoing and expected to continue at a similar (though reduced) level.

Cumulative impacts from oil and gas development during the 20-year period of analysis would result in an estimated 6,742 acres of direct habitat loss and 23,597 acres of effective habitat loss using a factor of 3.5. The larger area would represent 18.6 percent of the public and private lands in the Planning Area. Nearly all of the private land and about 76 percent of the BLM land affected by oil and gas development would be in lower-elevation habitat types such as pinyon/juniper, sagebrush, and semi-desert scrub, with smaller areas of mountain brush, Douglas-fir, and riparian/wetland vegetation. Direct and effective habitat loss would represent approximately 14.3 percent and 50.2 percent, respectively, of these portions of the Planning Area below the rim.

For large, wide-ranging, and furtive sensitive species such as raptors and carnivores, this could represent a moderate to localized major impact during construction and over the long term. A higher impact level is not assumed despite the

nearly 37-percent overall loss and more than 50-percent loss at lower elevations because the Planning Area would not represent the entire hunting habitat for a wintering bald eagle and would represent only minor hunting habitat for a peregrine falcon. A northern goshawk atop the plateau would be more likely to hunt entirely within the Planning Area, but the higher level of impact associated with construction would not occur simultaneously throughout the entire area, being spread over many years.

For smaller species such as the flammulated owl, boreal owl, and neotropical migrants, direct habitat loss would represent negligible to minor habitat loss due to their smaller home ranges and narrower zones of avoidance around areas of human activity.

Offsite impacts could also occur if future management or development actions result in reduced populations of wide-ranging species such as the bald eagle, which roosts mostly offsite but may feed onsite, and the peregrine falcon, which nests and roosts onsite but hunts offsite.

4.3.4.5 Alternative V

This alternative emphasizes development of oil and gas and other non-renewable resources. To accommodate a higher degree of energy development, this alternative would allow leasing on all portions of the Planning Area and would not include any ACEC designations or special protection for areas having wilderness character. This alternative assumes that the WSR-eligible streams atop the plateau are either found to be unsuitable for designation or suitable but not designated. Nonetheless, all wildlife-related protective stipulations described above for Alternative IV would also be applied under this alternative, except that the NGD/NSO for moderate-risk cutthroat trout habitat would be replaced by a CSU. As with Alternative IV, the wildlife seclusion areas of Alternatives I and II would not be provided NGD/NSO protection under Alternative V, and the 2-month COA-level TL for big game winter range TL would be dropped.

Direct and Indirect Impacts

Due to expected limitations of noxious weed management, populations of these species would be likely to increase, causing minor to moderate negative impacts to some plant communities. Rangeland projects and land treatments would cause native vegetation to degrade over time, with allotments managed to minimum standards and focused on forage for livestock. Both upland and riparian/wetland communities would be impacted over time, reducing the amount and quality for forage for native wildlife and reducing the cover needed for prey species.

Travel management under Alternative V would restrict motorized or mechanized use to designated routes throughout the Planning Area, including the Hubbard Mesa area (which would not be designated an SRMA). However, cross-country over-snow travel by snowmobile would be permitted, unlike Alternatives II through IV. The travel restrictions would reduce further expansion of travel routes, although not as much as under the three previous alternatives due to the availability of off-route travel by snowmobile. Nonetheless, compared to Alternative I, the non-snowmobile restrictions would reduce impacts to vegetation and seclusion, the potential for increased soil erosion and impacts to stream habitat quality, and the potential for overfishing of the Colorado River cutthroat trout. The travel restrictions would help offset adverse impacts to fish and wildlife from other management or land-use actions but would not be sufficient to compensate fully for adverse impacts.

Oil and gas development would result in an estimated 584 pads on BLM land: 175 above the rim and 409 below the rim. New or widened access roads would include an estimated 105 miles above and 245 miles below the rim. The increase in impacts compared to Alternative IV would be similar above and below the rim. The 641 acres of direct long-term habitat loss above the rim equates to 2,244 acres of effective loss using a factor of 3.5, representing 6.5 percent of the total highland habitat. Because oil and gas wells and increased traffic would occur throughout most of the highlands except for

along drainage floors, the habitat loss and fragmentation would create a moderate to localized major impact on some forest-interior and habitat-specialist species.

Below the rim, the effective habitat loss of 6,489 acres (16.7 percent) using the factor of 3.5 would proportionately reduce usable nesting, resting, and feeding sites. This would be a moderate impact overall but potentially major in localized areas of concentrated development during construction. Impacts to special status species would be as follows:

Endangered Colorado River Fishes and Sensitive Non-game Fishes — No impacts are expected for these species, for the reasons discussed under Alternative I. The increased development above the rim under this alternative is not an issue because the area does not include suitable habitat and is too far removed from occupied or potential habitat along the major streams for local stream impacts to have an influence. Restricting travel to designated routes could benefit the species in terms of additional protection along lower elevation streams.

Colorado River Cutthroat Trout — Impacts would be potentially greater for Alternative V than any of the previous alternatives due to the large number of oil and gas wells atop the plateau. The continued application of NGD/NSO stipulations to high-risk trout habitat and to riparian/wetland vegetation would protect the occupied habitat and much of the adjacent watershed to some extent, but most watershed protection would be in the form of SSR/CSU stipulations, with no special mitigation areas. Therefore, impacts to the Colorado River cutthroat trout and occupied or suitable habitat would be moderate to major in localized areas if stream crossings are not minimized and if “low-water” stream crossings (instead of culverts or bridges) are permitted. Restricting motorized travel to designated routes under Alternative V would offset these impacts to some extent, but probably not enough to lower the impact estimate of moderate to localized major.

Amphibians — Impacts to the boreal toad, Great Basin spadefoot, and northern leopard frog

would be similar to those for Alternative IV and would be negligible to minor, depending on whether drainages crossed by new well roads support breeding toads or have perennial pools that support frogs. Proposed mitigation measures would preclude new road crossings where feasible and require the use of culverts or bridges to reduce physical impacts to streams.

Reptiles — Potential impacts to the Utah milk snake and midget faded rattlesnake would be similar to those described for Alternative IV, but the amount of oil and gas development in lower elevations where these species might occur would be 27 percent greater. Neither species is expected above the rim. As with Alternatives II through IV, restriction of travel to designated routes would reduce the potential for direct and indirect impacts from habitat degradation and direct mortality from being run over by ATVs or bicycles.

Waterbirds — Impacts to Barrow’s goldeneye and the white-faced ibis would be similar to those for the previous alternatives due to retention of protective stipulations, except that restriction of motorized travel to designated routes would reduce the potential for disturbance impacts.

Bald Eagle — As with the previous alternatives, impacts would be none to negligible based on the Colorado River NGD/NSO stipulation and the NGD/NSO and TL stipulations for nests and winter roosts. Some loss of hunting habitat could result from oil and gas development, but this represents a small portion of likely winter hunting habitat.

Mexican Spotted Owl and Western Yellow-billed Cuckoo — Both of these Federally listed or candidate species are considered unlikely to occur. If present, impacts would be similar to Alternative I except for decreased disturbance due to limitation of OHV travel to designated routes under this alternative. Additionally, Alternative V has the potential to impact the Mexican spotted owl because it does not include the NGD/NSO stipulation for wildlife seclusion areas, which provide some of the most important potential habitat for this species through key

elements of remoteness, compositional and structural diversity, and lack of fragmentation. The western yellow-billed cuckoo is a bird of riparian forests, and stipulations aimed at protecting the Colorado River corridor and other riverine areas would tend to protect habitat for this species.

Raptors — The peregrine falcon, prairie falcon, ferruginous hawk, Swainson's hawk, golden eagle, northern goshawk, northern harrier, flammulated owl, boreal owl, and burrowing owl would be subject to greater impacts under Alternative V than the previous alternatives due to more intensive oil and gas development. The peregrine falcon would probably be less affected than other raptors because of the remoteness and protection of its cliff-nesting area and the fact that it hunts primarily along the Colorado River (which would continue to be protected) and across other wide areas.

The effective habitat loss of 8,698 acres of nesting and hunting habitat on BLM land during the 20-year period of analysis would represent an 11.8-percent reduction overall. Although the percentage of the area above the rim effectively lost due to oil and gas development would represent only 6.5 percent of these higher elevation habitats, the fragmentation impact on forest species such as the northern goshawk and boreal owl could be disproportionately large. Similarly, lack of protection for wildlife seclusion areas could affect the flammulated owl. Therefore, impacts to raptors overall would be minor under this alternative, but impacts to aspen and conifer forest species could be moderate to potentially major in localized areas.

As with other special status species, raptors would benefit from the restriction of motorized travel to designated routes, except for the Hubbard Mesa OHV area. This would create a greater degree of seclusion for raptors and help offset some of the impacts associated with oil and gas development.

Neotropical Migrants and Other Small Birds

— For the sensitive small-bird species occurring in Douglas-fir, pinyon/juniper, sagebrush, or other habitats below the rim, the 6,489 acres of

effective habitat loss (19.7 percent of the BLM lands at these lower elevations) would have the potential to reduce population sizes proportionately. The same is true for the 6.5-percent reduction in effective habitat loss above the rim. These partial losses of nesting and feeding habitat would cause moderate to localized major impacts overall. As described previously, wildlife avoidance of disturbance zones around areas of direct habitat loss would be greatest during construction, which would occur gradually over many years. Thus, the habitat loss in any one year would represent a gradual accrual of long-term impacts, plus impacts related to specific areas of construction.

Restriction of motorized or mechanized travel to designated routes would reduce the impacts associated with disturbance away from roads and reduce the potential for increased habitat degradation and fragmentation. However, the lack of NGD/NSO protection for approximately 3,400 acres of wildlife seclusion areas would add to the impacts for many neotropical migrant and other small bird species because these areas offer mature, diverse, remote, and unfragmented habitat.

Bats — Because of protection of the Anvil Points cave area, the steep slope stipulation, and protection of some forest areas under various NGD/NSO and TL stipulations described previously, the relatively small areas of direct habitat loss (about 3.4 percent of the Planning Area during the 20-year period of analysis) would represent a negligible to minor impact. This conclusion is based on the fact that the highest-quality hunting and roosting habitat for bats — including riparian areas, mature forests, and cliff areas — would be less impacted than more open, scrubby terrain.

Carnivores — The lynx, wolverine, and American marten are unlikely onsite; if they do occur, they would be expected in aspen and conifer habitats on top of the plateau. Oil and gas activities atop the plateau at the levels possible under Alternative V would have at least moderate, and possibly major, impacts to these secretive species due to habitat fragmentation and loss of seclusion. The restriction of

motorized travel to designated routes would help reduce the impacts, but it is likely that the remaining blocks of unfragmented forest habitat would be too small to support viable populations.

Should the river otter occur, none of the anticipated land use or management action impacts would be likely to affect this aquatic species because its habitat is essentially limited to the Colorado River, which is protected by various stipulations related to other riverine resources (see above).

Offsite and Cumulative Impacts

Offsite and cumulative impacts under Alternative V would be associated primarily with the combined effect of oil and gas development on BLM land and on adjacent or nearby private land. Although cumulative impacts from other uses such as recreation and livestock would occur, these would be less marked than impacts from oil and gas. This conclusion is based on (1) the greater amount of direct and indirect habitat loss with oil and gas development than other uses, (2) an assumed lower level of recreational use on private lands than BLM lands, and (3) relatively small differences among the alternatives in terms of grazing impacts, which are ongoing and expected to continue at a similar level.

Cumulative impacts from oil and gas development on private and Federal lands under Alternative V during the 20-year period of analysis would result in an estimated 7,287 acres of direct habitat loss and 25,505 acres of effective habitat loss using a factor of 3.5. These represent 5.7 and 20.1 percent, respectively, of the Planning Area. With nearly all private land impacts and 75 percent of Federal land impacts being below the rim, the direct and effective habitat loss in these areas would represent approximately 7.2 percent and 25.3 percent, respectively, of the lower elevation habitats.

For larger, wider-ranging, and more sensitive species such as raptors (bald eagle, peregrine falcon, ferruginous hawk, etc.), this would

represent a moderate impact during construction and over the long term. A higher impact level is not assumed despite the 20-percent overall loss and 25-percent loss at lower elevations because the Planning Area would not represent the entire hunting habitat for a wintering bald eagle and would represent only minor hunting habitat for a peregrine falcon. A northern goshawk would be more likely to have its hunt entirely within the Planning Area, but the higher level of impact associated with construction would not occur simultaneously throughout the entire area.

For smaller species such as the flammulated owl, boreal owl, and neotropical migrants, the direct loss of habitat would represent a minor to moderate impact. The severity of impact would depend on the home range size of the particular species, its need for unfragmented habitat, and the width of any disturbance/avoidance zone around an area of human activity.

Offsite impacts could also occur if future management or development actions result in reduced populations of wide-ranging species such as the bald eagle, which roosts mostly offsite but may feed onsite, and the peregrine falcon, which nests and roosts onsite but hunts offsite. However, as described above, impacts to these two species are unlikely to be greater than negligible under Alternative V.

4.3.4.6 Summary of Impacts to Special Status Fish and Wildlife

Impacts to special status species of various management actions under the five alternatives are summarized in Table 4-19. Some impacts may represent an irreversible and irretrievable commitment of natural resources (see Section 4.6).

4.3.5 Wild Horses and Burros

No managed populations of wild horses or wild burros occur in the Planning Area or GSRA, and these non-native ungulates are therefore not discussed in this RMPA/EIS.

Table 4-19. Summary of Impacts to Special Status Fish and Wildlife Species ¹

Management Action	Alternative				
	I	II	III	IV	IV
Special Stipulations for ACECs	NA	Major (+)	Moderate to Major (+)	NA	NA
Protection of WSR-eligible Streams	NA	Moderate to Major (+)	Moderate to Major (+)	Moderate (+)	Moderate (+)
Watershed Management Areas	NA	Moderate to Major (+)	Major (+)	NA	NA
Special Management for Wilderness Values ²	NA	Moderate to Major (+)	Moderate (+)	NA	NA
Vegetation/Weed Management	Minor to Moderate (-)	Minor to Moderate (+)	Minor to Moderate (+)	Minor to Moderate (-)	Minor to Moderate (-)
Recreation/Travel Management	Moderate (-)	Moderate to Major (+)	Moderate to Major (+)	Moderate to Major (+)	Moderate (+)
Range Management	Moderate (-)	Moderate (+)	Moderate (+)	Moderate (+)	Minor (-)
Oil and Gas Development ^{3,4}	Negligible to Minor (-)	Minor to localized Moderate (-)	Negligible to localized Moderate to localized Major (-)	Moderate to localized Major (-)	Moderate to Major (-)

¹ For Federally listed, proposed, or candidate threatened or endangered species, USFWS would issue a Biological Opinion (BO) addressing potential effects and required conservation measures.

² Limited to roadlessness and naturalness under Alternative III.

³ Under Alternative I, oil and gas impacts for Alternative I almost entirely below cliffs due to no-lease of NOSR 1.

⁴ Under Alternative III, development above the rim deferred until 80% of anticipated total wells below the rim during the 20-year period of analysis have been drilled. "The "negligible to localized moderate" level reflects area above the rim during and after the deferral period, estimated at 16 years.

4.4 HUMAN ENVIRONMENT

4.4.1 Visual Resources

Introduction

As outlined in Section 3.4.1, VRM classes are assigned to the various parts of the landscape based on visual characteristics or to meet management objectives. These range from preserving a natural landscape and existing characteristics (Class I) to providing for management activities that allow major modification of the landscape (Class IV). While numerous management activities can impact visual values, the most significant impacts are large-scale or cumulative ground-disturbing activities that alter the existing form, line, color, and texture that characterize the existing landscape.

Impacts to visual resources are considered major if they substantially change or degrade the character of the landscape as seen from sensitive viewsheds or if the allowable modifications exceed VRM classifications. While topography can allow for some landscape modifications, many types of disturbance, such as roads and artificial structures, can dominate the landscape depending on their size, distance, topographic position, presence or absence of screening, and contrast with surrounding conditions. Viewsheds deemed to be of high value are those that have high scenic quality, such as East Fork Canyon, or high visual sensitivity due to the large amount of public interest and viewing.

A viewshed analysis was performed for each of five alternatives assessed by this RMPA/EIS. Although the alternatives include various resource management actions and land uses, increased levels of oil and gas development under each alternative would be the dominant