APPENDIX Q

VERTEBRATE WILDLIFE, PLANT & MANAGEMENT INDICATOR SPECIES (MIS) SPECIALIST REPORT

FOR THE

RE-ISSUANCE OF TERM GRAZING PERMITS ON EIGHT CATTLE ALLOTMENTS BEAVER MOUNTAIN TUSHAR RANGE

ON THE

BEAVER RANGER DISTRICT

FISHLAKE NATIONAL FOREST

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I. INTRODUCTION

This specialist report analyzes the potential effects of the proposed action (Alternative A) to re-issue term grazing permits on 8 cattle allotments administered by the Beaver Ranger District on migratory birds, management indicator species (MIS), threatened, endangered, candidate, and sensitive (TECS) vertebrate and plant species on the Fishlake National Forest—MIS as outlined in the Fishlake National Forest Land Resource Management Plan - 1986 (see Table 1). This report also analyzes the potential effects of the "No Action – No Grazing" (Alternative B), and Alternative C- Sustainable Multiple Use Grazing (SMU-G) to migratory birds, management indicator species, threatened, endangered, candidate, and sensitive vertebrate and plant species on the Fishlake National Forest. The purpose of this report is to analyze, in detail, and make a determination regarding the effects of the proposed action, the "No Action – No grazing", and the SMU-G alternatives on migratory birds and management indicator species as well as for threatened, endangered, candidate and sensitive vertebrate and plant species. For a complete analysis and determination regarding effects of the proposed action (Alt. A) on threatened, endangered, candidate, and sensitive species, refer to the Biological Assessment, Biological Evaluation for Sensitive Vertebrate Species, and Biological Evaluation for Sensitive Plant Species specifically prepared for this project. Tables 1, 2, 3, and 4 indicate the suitability of the analysis area for all species analyzed and the justification for eliminating those species with unsuitable habitat from further evaluation.

Table 1. Shown is the suitability of habitat within the analysis area for Fishlake National Forest Management Indicator Species. Habitat characteristics for each of the following species were reviewed and based on information found within Rodriguez (2005) and Madsen (2003).

SPECIES	SUITABILITY OF HABITAT FOR MANAGEMENT INDICATOR SPECIES AND MIGRATORY BIRDS	
	SUITABLE	HABITAT UNSUITABLE BASED ON THE FOLLOWING
Elk	X	
Mule deer	X	
Northern goshawk	X	

Cavity Nesters (hairy woodpecker, western bluebird, and mountain bluebird)	**X**	
Sage Nesters (Brewer's sparrow, vesper sparrow, & sage thrasher)	**X**	
Riparian Guild (Lincoln's sparrow, yellow warbler, song sparrow, Macgillivrays warbler)	**X**	
Bonneville Cutthroat Trout	**X**	
Resident trout (rainbow, brown, brook, cutthroat, and lake)	**X**	
Macroinvertebrates	**X**	
Rydberg's milkvetch	**X**	
Migratory Birds	**X**	

Information regarding MIS can be found in *Life History and Analysis of Endangered Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake National Forest, Version 4.0* (Rodriguez 2005). This document contains summarized population trend and monitoring information for the Fishlake National Forest.

> "Populations of wildlife are extremely difficult to quantify, and in some cases can vary substantially from year to year. Environmental factors can dramatically influence the recruitment of young and survival of adults. A precise figure on the number of animals is very difficult if not impossible to determine, and would only be valid for a short period of time.
>
> Population trend is most appropriately addressed at a scale above the project level. Many of the selected MIS occur and range far beyond a local scale such as a project analysis. Individuals, family groups, or herds such as elk, annually use areas much larger area than a typical analysis area and population trend must be examined on a much larger scale to be meaningful. For National Forest Management Act implementation, this scale is the Fishlake National Forest. At a site-specific project level, there is a great deal of fluctuation in wide ranging populations. For most species, it would be technically, and practically inappropriate to conduct population trend sampling at the scale of individual projects. Individual projects contribute to the total population trend but do not usually make up the entire population and trend, unless they are a locally endemic species. For this reason, it is not appropriate to determine population trend at a local level.
>
> Population trend for threatened, endangered and candidate species is addressed using recovery plans or conservation assessments, strategies and agreements. These broad scale documents are used because they occur and range far beyond the scale of the forest.
>
> Because population trend is best addressed at a much larger scale than the project level, data from organizations such as the Nature Conservancy (NatureServe Explorer), the Division of Wildlife Resources, and the United States Geological Survey, Breeding Bird Survey (BBS) were used in the discussions on trend. For far ranging species such as elk that can range across multiple forest boundaries and land ownerships, broad scale data were obtained from the Division of Wildlife Resources, Southern Region" (Rodriguez

2005).

Table 2. Shown are the names, status, and occurrence of suitable habitat for endangered, threatened, and candidate species known or suspected to occur on the Fishlake National Forest within the analysis area. Habitat characteristics for each of the following species were reviewed and based on information found within Rodriguez (2005), Madsen (2003), Atwood et al. (1991), and Spahr et al. (1991).

SPECIES	**STATUS**	**SUITABLE**	**HABITAT UNSUITABLE BASED ON THE FOLLOWING**
San Rafael Cactus *Pediocactus despainii*	Endangered		Only known to occur on the Loa Ranger District. Endemic to Emery and Wayne counties. No suitable habitat in the analysis area.
*Bald Eagle *Haliaeetus leucocephalus*	Threatened	**X**	
SPECIES	**STATUS**	**SUITABLE**	**HABITAT UNSUITABLE BASED ON THE FOLLOWING**
Mexican Spotted Owl *Strix occidentalis lucida*	Threatened		No steep or narrow canyons for roosting/ nesting in the vicinity of the analysis area. Not recognized by the FWS as occurring in Beaver, Piute, or Millard county. The small portions of Iron and Garfield Counties at the southern end of the Beaver Ranger District have no suitable canyon habitat according the Willey / Spotsky 2000 MSO Model.
Prairie Dog *Cynomys parvidens*	Threatened	**X**	
Maguire's Daisy *Erigeron maguirei*	Threatened		No suitable habitat within the analysis area. Strongly associated with Wingate, Chinle, and Navajo sandstone not present in the analysis area. Only known to occur on the Loa Ranger District.
Last Chance Townsendia *Townsendia aprica*	Threatened		No suitable habitat within the analysis area. Strongly associated with Arapien and Mancos shale not present in the analysis area. Only known to occur on the Loa and

			Richfield Ranger Districts.
Rabbit Valley Gilia *Gilia caespitosa*	Candidate		No suitable habitat within the analysis area. Strongly associated with Carmel and Navajo sandstone not present in the analysis area. Only known to occur on the Loa Ranger District.
Western Yellow-Billed Cuckoo *Coccyzus americanus occidentalis*	Candidate	**X**	

*Suitable as wintering habitat only.

Table 3. Shown is the suitability of habitat for regionally sensitive vertebrate species within the analysis area. Habitat characteristics for each of the following species were reviewed and based on information found within Rodriguez (2004) and Spahr et al. (1991).

SPECIES	**SUITABILITY OF HABITAT FOR SENSITIVE VERTEBRATE SPECIES**	
	SUITABLE	**HABITAT UNSUITABLE BASED ON THE FOLLOWING**
Spotted Bat *Euderma maculatum*	**X**	
Townsend's Big-eared Bat *Corynorhinus townsendii*	**X**	
Northern Goshawk *Accipiter gentilis*	**X**	
Flammulated Owl *Otus flammeolus*	**X**	
Three-toed Woodpecker *Picoides tridactylus*	**X**	
Peregrine Falcon *Falco peregrinus anatum*	**X**	
Greater Sage Grouse *Centrocercus urophasianus*	**X**	
Pygmy Rabbit *Brachylagus idahoensis*	**X**	
Colorado River Cutthroat Trout *Oncorhynchus clarki pleuriticus*	**X**	While potentially suitable, the project area is outside of the native range of this cutthroat subspecies.
Bonneville Cutthroat Trout *Oncorhynchus clarki utah*	**X**	

Table 4. Shown is the suitability of habitat for regionally sensitive plant species within the analysis area. Habitat characteristics for each of the following species were reviewed and based on information found within Rodriguez (2005), Madsen (2003), Clark (2002), Tuhy (1992), Atwood et al. (1991), and Spahr et al. (1991).

	SUITABILITY OF HABITAT FOR SENSITIVE PLANT SPECIES

SPECIES	SUITABILITY OF HABITAT FOR SENSITIVE PLANT SPECIES	
	SUITABLE	**HABITAT UNSUITABLE BASED ON THE FOLLOWING**
Barneby Woody Aster *Aster kingii* var. *barnebyana*		No suitable habitat within the analysis area. Strongly associated with Precambrian quartzite cliffs and ledges not present in the analysis area. Only occurs on the Fillmore District at high elevations in the Canyon Mountains.
Bicknell Milkvetch *Astragalus consobrinus*		No suitable habitat within the analysis area. Only known from Curtis, Navajo, Carmel, Mancos Shale, and gypsiferous soils not present in the analysis area. Only known to occur on the Loa Ranger District.
Tushar Paintbrush *Castilleja parvula* var. *parvula*	**X**	
Pinnate Spring-Parsley *Cymopterus beckii*		No suitable habitat within the analysis area. Only found in Navajo sandstone, Cutler, and Wingate Formations not present in the analysis area. Only known to occur on the Loa Ranger District.
Creeping Draba *Draba sobolifera*	**X**	
Nevada Willowherb *Epilobium nevadense*		No suitable habitat within the analysis area. Strongly associated with Precambrian quartzite cliffs and ledges not present in the analysis area. Only occurs on the Fillmore District at high elevations in the Canyon Mountains.
Elsinore Buckwheat *Eriogonum batemanii* var. *ostlundii*	**X**	
Fish Lake Naiad *Najas caespitosa*		No suitable habitat within the analysis area. Associated with shallow water environments on Fish Lake. Only known to occur on the Loa Ranger District.
Little Penstemon *Penstemon parvus*		No suitable habitat within the analysis area. Strongly associated with tertiary volcanic gravels not present in the analysis area. Only known to occur on the Loa Ranger District with a single suspected population on the Richfield Ranger District.
Ward's Beardtongue *Penstemon wardii*	**X**	

Arizona willow *Salix arizonica*	**X**	
Beaver Mountain Groundsel *Senecio castoreus*	**X**	
Peterson's Catchfly		No suitable habitat within the analysis area.

Silene petersonii		Strongly associated with open calcareous limestone talus not present in the analysis area. Not known to occur on the Fishlake National Forest.
Bicknell Thelesperma *Thelesperma subnudum* var. *alpinum*		No suitable habitat within the analysis area. Only found on Navajo Sandstone and Carmel Formations not present in the analysis area. Only known to occur on the Loa Ranger District. Endemic to Wayne county.
Sevier Townsendia *Townsendia jonesii* var. *lutea*		No suitable habitat within the analysis areas. Strongly associated with Arapien shale not present in the analysis area. Endemic to Sevier, Piute, Juab, and Sanpete counties.

II. DESCRIPTION OF THE PROPOSED ACTION—ALT. A

The proposed action is to reissue 10-year term grazing permits to continue authorizing cattle grazing, on eight allotments within the Beaver Mountain Tushar Range analysis area (see Map 1-Allotments and District Boundary). Implementation of existing Allotment Management Plans (AMPs) would prescribe the manner by which livestock operations would be conducted and would**:**

1. Continue livestock grazing with current permitted numbers and seasons of use.
2. Revise allotment management plans to incorporate objectives and action plans to maintain or achieve desired conditions.
3. Maintain the existing inventory of structural range improvements, allowing maintenance and/or reconstruction when necessary.
4. Through appropriate re-treatment, maintain moderately high forage production levels on vegetation type-conversion sites where it is economically practical.
5. Cooperate with permittees in improving rangeland stewardship and compliance with forage utilization standards, management prescriptions, and livestock accountability.
6. Emphasize rangeland monitoring to assess the effectiveness of objectives and action plans in achieving desired conditions.

This proposed action does not intend to address changes in cattle numbers or grazing seasons. The underlying principle of the proposed action is that adherence to site-specific resource use standards, designed to meet desired conditions, mitigate the need to address capacity and stocking rates. The number and class of livestock, season of use, and grazing system required to meet desired conditions is a permit administration decision, not a NEPA decision.

None of the project allotments require new structural range improvements (fences or water developments) for cattle management. The proposed action does include provision for maintenance of existing structural and non-structural range improvements. Vegetation type-conversions (sagebrush and pinion-juniper to grass/forb types) would be subject to periodic maintenance on the North-Indian Creek, Marysvale, Circleville, Ten Mile, Cottonwood, South Beaver, and Pine Creek/Sulphurdale Allotments. Maintenance of existing structural range improvements would include 113 miles of fences, 27 cattle guards, 48 developed springs, 48 stock ponds, 29 miles of pipeline, and 60 watering troughs. Noxious weed

infestations would require treatment on all of the allotments except Ten Mile, Junction, and Cottonwood, where no noxious weeds are currently inventoried.

The following management requirements would be mandatory for the Re-issuance of Term Grazing Permits on Eight Cattle Allotments within the Tushar Mountain Range: Birch Creek West Drainage - yearly maintenance of the livestock exclosures prior to livestock turnout, monitoring during the grazing season to ensure exclosures are functioning and that standards are not being exceeded on portions of the stream outside of the exclosures, and an end of season evaluation of the grazing season on whether the exclosures were effective and standards were met on Birch Creek West.

The allotments are located in portions of Beaver, Iron, Garfield, Piute, or Millard Counties in west-central Utah along the eastern edge of the Basin and Range province. The decision associated with this proposal and analysis will determine where livestock can graze, when grazing will occur and what specific guidelines will be established to regulate the timing, intensity, and duration of grazing.
Map 1. Shown is the Fishlake National Forest, Beaver Ranger District Boundary and proposed action grazing allotments.

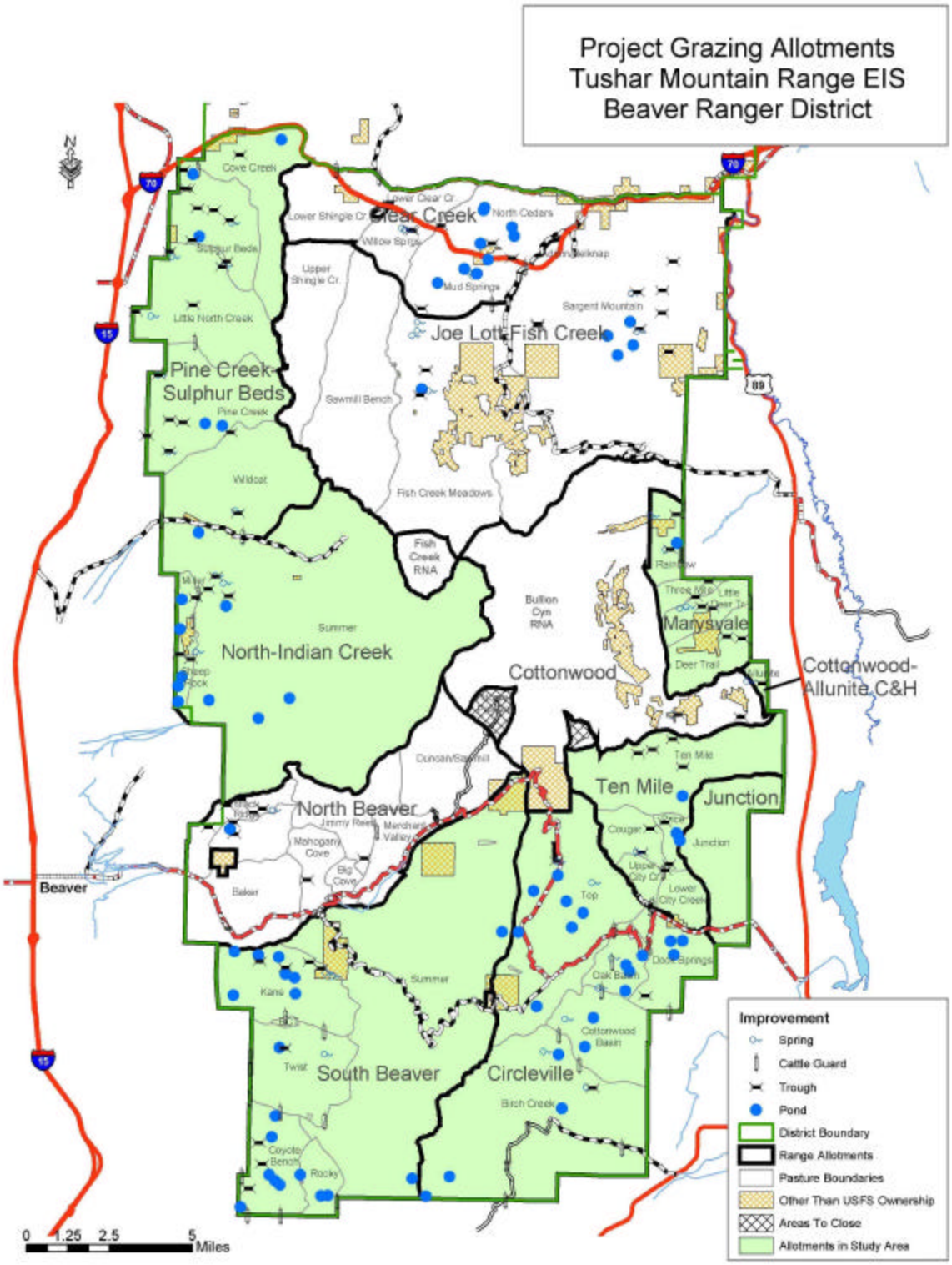

Project Grazing Allotments
Tushar Mountain Range EIS
Beaver Ranger District
Clear Creek
Joe Lott Fish Creek
Pine Creek
Sulphur Beds
North-Indian Creek
Cottonwood
Marysvale
Cottonwood-
Allunite C&H
Ten Mile
Junction
North Beaver
South Beaver
Circleville
Beaver
Improvement
Spring
Cattle Guard
Trough
Pond
District Boundary
Range Allotments
Pasture Boundaries
Other Than USFS Ownership
Areas To Close
Allotments in Study Area
0 1.25 2.5 5 Miles

TABLE 1-1 ALLOTMENT INVENTORIES					
Beaver Ranger District					
Allotment	**Acres**	**Livestock Class**	**Permitted Number**	**Season Of Use**	**Grazing System**
North-Indian Creek	34,858	Cow-calf pairs	640	7/21-9/30	Deferred Rotation
Marysvale	6,338	Cow-calf pairs	147	6/1-9/30	Rest Rotation
Ten Mile	12,620	Cow-calf pairs	200	6/11-10/10	Rest Rotation
Circleville	38,019	Cow-calf pairs	359	6/1-10/15	Rest Rotation
Pine Creek/Sulphurdale	29,537	Cow-calf pairs	600	6/16-9/30	Rest Rotation
Junction	6,172	Cow-calf pairs	35	11/1-2/15	Winter
South Beaver	45,596	Cow-calf pairs	520	6/1-10/15	Rest Rotation
Cottonwood	500	Cow-calf pairs	30	6/1-7/31	Seasonal Deferred

The proposal focuses on authorization of cattle grazing at proper use under prescribed utilization levels identified in the Forest Plan and implemented through an Allotment Management Plan, which is incorporated under the terms and conditions of the grazing permit. Satisfactory rangeland management and livestock permitting requires prescribed levels of AMP development, management implementation, monitoring, permit administration, rangeland inventory, analysis, and compliance inspection. The critical element influencing effects of grazing is the implementation, monitoring, and enforcement of management prescriptions, including forage utilization standards.

Forage utilization criteria for upland and riparian areas are currently incorporated in Part 3 of the grazing permit and prescribe allowable use levels for both upland and riparian sites. The prescription for riparian areas is a uniform 4" stubble height. Reaching the 4" stubble height triggers the time to move livestock, either between units or off the allotment. This criteria allows no manipulation to plan use of expected regrowth—once the 4" stubble height is reached, livestock are moved, without the opportunity for twice-over use. Allowable upland forage utilization ranges from 40-60 percent on grass/forb types. Livestock are moved to the next pasture or removed from the allotment when any utilization threshold (upland forage utilization, streambank alteration, riparian forage utilization, riparian vegetation stubble height, or riparian woody browse utilization) is reached. Livestock are moved when a shift in preference from herbaceous to woody species is noted. Meeting or exceeding one of these threshold levels initiates a move of livestock (either to the next pasture or off the allotment). See Table 1-2.

TABLE 1-2 Maximum Allowable Forage Use Criteria		
Vegetation Type	**Stubble Height/Use**	**Comments**
Riparian Hydric Species	4"	Triggers the time to move livestock between units or off the allotment
Riparian Emphasis Management Areas	6"	Triggers the time to move livestock between units or off the allotment
Non-hydric Sod-Forming Grass Species in Riparian Areas	1 ½ "	Primarily Kentucky bluegrass--Triggers the time to move livestock between units or off the allotment
Wheatgrass Seedings	60%	Management option to exceed 60% use to maintain healthy seedings
Riparian/Upland Browse Sprouts and Young-Aged Plants	≤40%	# of current year's available twigs removed
Riparian/Upland Mature Browse	≤50%	# of current year's available twigs removed
Upland Grass/Forb	40-60% of key species; varies by grazing sys & desired condition	% of current year's growth
Riparian Ground Cover	Maintain ground cover of at least 70% within riparian areas	

The proposal also focuses on the use of existing AMP's to prescribe the manner by which livestock operations would be conducted. The current AMP's are old and even though changes to grazing strategies, boundaries, and permitted numbers have been refined over time through administrative procedures, revisions may be necessary to ensure proper use of the resource and to evaluate progress toward meeting desired conditions through attainment of interim resource management objectives.

TABLE 1-3
ALLOTMENT AMP REVISION NEEDS ANALYSIS

Allotment	AMP Year	TEPS Fish Present	Elk Critical Habitat	Potential Elk Conflicts	Fragile Riparian Areas	Noxious Weeds Present (Acres)	Current Capacity Partly Dependant On Vegetation Treatments
North Indian	1981	X	yes		X	518	X
Marysvale	1994		**yes**	X	X	288	X
Ten Mile	1975	X	**yes**	X	X		X
Circleville	1985	X	**yes**		X	97	X
Pine Creek/Sulphurdale	1986	X	**yes**	X	X	2431	X
Junction	1978		**yes**		X		
South Beaver	1987	X	**yes**	X	X	71	X
Cottonwood	1987		**yes**	X	X		X

Proposed management actions common to all eight allotments included in AMP revisions are:

1. Implement allotment specific objectives that will direct livestock management to either maintain desired conditions or improve rangelands to desired conditions within prescribed timeframes.
2. Authorize management of livestock and construction or maintenance of improvements that will eliminate or minimize conflicts between livestock and other uses and result in meeting objectives.
3. Develop action plans to meet resource goals, objectives, and management requirements for a wide array of rangeland resources and uses concurrent with livestock grazing.
4. Incorporate Forest Plan standards and guidelines (as amended) for forage utilization and riparian area management.
5. Develop a monitoring plan that describes a measurable means of determining whether goals and objectives are being met.

III. CUMULATIVE EFFECTS AREA

The cumulative effects area for all species analyzed in this report includes the entire Beaver Ranger District (see Map 1 – Allotments and District Boundary). This area was selected on the basis of continuity and adjacency with habitats on the Fishlake National Forest for the species being analyzed. Cumulative effects will be based on species' use during spring, summer and fall time periods. Where winter use areas are known, they will be addressed; however, winter areas are unknown for the majority of these species and thus will not be addressed.

IV. DESCRIPTION OF AFFECTED SPECIES

Information concerning life histories, suitable habitats, threats, and ecology of the sensitive vertebrate species that are known or suspected to occur on the Fishlake National Forest can be found within the *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and*

Management Indicator Species of the Fishlake National Forest, Version 4.0 (Rodriguez 2005). This paper is located in the Fishlake National Forest Supervisor's Office in Richfield, UT.

V. EFFECTS OF THE PROPOSED ACTION—ALT. A

The proposal focuses on authorization of cattle grazing at proper use levels under prescribed utilization levels identified in the Fishlake Forest Plan (USDA 1986) and described in the proposed action. Within this Wildlife Report, effects of the proposed action (grazing at proper use levels) are disclosed. The Dixie National Forest developed a comprehensive literature review of the effects of livestock grazing of natural resources in 1995 (USDA 1995). This was prepared as a reference document for reviewing accumulated research literature describing the effects of livestock grazing at proper use and no grazing. The proper use criteria referenced in this Dixie 1995 document are similar (with some alterations) to the proper use criteria outlined in this proposed action. The wildlife habitats found on the Dixie National Forest (analyzed in the 1995 document) and in the analysis area for this project are also similar. Therefore, this document was reviewed to help assess general effects of grazing at proper use to wildlife species and wildlife habitats found in common.

Direct, indirect, and cumulative effects common to threatened, endangered, candidate, sensitive, and management indicator species and migratory birds analyzed in this report have been disclosed in the following two subheadings. Additional effects, if any, relevant to each species have been disclosed under the species headings in this section. This approach was taken because many of the effects of implementing this proposed action were common to all species analyzed. Effects (resulting from the proposed action) to threatened, endangered, or candidate species are also included and disclosed in the Biological Assessment wheras, the Forest Service sensistive species are covered in the Biological Evaluations specifically prepared for this project.

Direct and Indirect Effects Common to All Species (Rydberg's milkvetch excepted) and/or Habitats and Migatory Birds Analyzed in this Report to the Proposed Action

Changes in riparian vegetation and the introduction of noxious weeds from permitting cattle grazing will effect aquatic systems that provide habitat for aquatic species, MIS, and migratory bird species that use these habitats. Flow reduction of streams and springs within watersheds and centralizing the water into stock ponds and troughs also may effect watershed effectiveness through changes in vegetation and water availability. This may reduce the availability of suitable water sources in some locations while providing water in other locations. The results from an Australian study indicate that consistent and substantial changes in plant composition are most likely related to accumulated long-term impacts of water-centered grazing (Landsberg et al. 2003). The best local information relating to this, are the findings of the The Beaver River Watershed Assessment completed in 2002-2003.

The Beaver River Watershed Assessment completed in 2002-2003 for the Beaver River Watershed includes the Pine Creek/Sulphurdale, North Indian, and South Beaver Allotments. These allotments comprise approximately 110,000 acres which equates to 63% of the project area. The Beaver River Watershed Assessment (hereafter referred to as BRWA) describes, in

detail, existing condition of various ecological resources on the landscape. The BRWA documents major vegetation changes in certain cover types. Much of this change can be attributed to wildfire suppression. However, the BRWA also attributes some of this vegetation change to grazing by domestic livestock. The BRWA concludes that vegetation changes that have occurred over the past 150 years has substantially reduced the carrying capacity for grazing and browsing ungulates (hooved mammals), and perhaps may be partially responsible for concentrating use in riparian areas. As a result, the BRWA concludes that proper use thresholds for bank stability, riparian stubble heights, or browse use are typically exceeded before upland slopes are fully utilized. "The grazing indices suggest that some watersheds and streams may be incurring excess use even if upland slopes are not being adversely affected" (BRWA 2002-2003). This statement suggests that riparian areas may be more heavily impacted by current grazing management practices than the uplands in some areas. Several smaller watersheds within the Greater Beaver River Watershed area (includes part of the analysis area) document overstocking rates in reference to livestock stocking rates in comparison to suitable watershed area and AUM stocking in comparison to riparian AUM production (BRWA 2002-2003). This would indicate that current grazing management practices may be exceeding watershed and riparian capabilities in some areas.

Fishlake National Forest Level II Riparian Inventories were completed in 2003 for the west side of the Beaver Ranger District (2003 Level II Riparian Inventory). These inventories support the BRWA conclusion and document problems with current grazing management, overgrazing, and/or heavy grazing on Little North Creek, Pine Creek, North Wildcat Creek, Wildcat Creek, North Fork of North Creek, Pole Creek, South Fork of North Creek, South Birch Creek, and Big Twist Creek. These creeks all occur on the Pine Creek/Sulphur Beds, North-Indian Creek, and South Beaver Allotments within the analysis area. The Level II Riparian Inventory for the Big Twist Creek Area (South Beaver Allotment) concludes:

"The conditions seen on these watersheds do not meet the objectives of healthy watersheds and riparian systems. This is primarily due to livestock and recreation management, which can be changed for the betterment for the land...There has been such deterioration in plant production that the amount of forage currently growing on these rangelands does not sustain the stocking rates."

These inventories document overutilization in these streamcourses. This overutilization is a direct result of non-compliance with the proper use criteria. When proper use criteria are not adhered to, as documented by these Riparian Level II Inventories, resource damage occurs. When adequate vegetation monitoring is not performed on the ground and livestock are not removed, proper use thresholds are exceeded. Strict adherence to the proper use criteria, as outlined in this proposed action, would protect riparian areas from the kind of degradation described above. The maximum allowable forage use criteria described in Table 1-2 of the proposed action outlines an upland grass/forb utilization of 40-60% and maintaining ground cover of at least 70% in riparian areas. Current year's growth would be retained at 40% or greater on upland sites and riparian species would be retained at 1 1/2"- 6" depending on management area and/or species. Riparian areas would retain a minimum of 70% ground cover. Riparian upland browse

would be retained at a minimum of 40-50% depending on age class. These proper use criteria are intended to retain the character and proper functioning condition of healthy riparian areas and improve conditions in unhealthy riparian areas like those described above. These riparian habitats often provide suitable habitat (i.e. foraging, nesting, roosting, or breeding) for the species listed above that may be affected by re-issuing term grazing permits in these 8 allotments on the Beaver Ranger District. Therefore, this proposed action may impact some of these vertebrate and migratory bird individuals and their habitat, however this proposed action would not adversely impact the viability of these populations when implemented as designed.

Cumulative Effects Common to All Species (Rydberg's milkvetch excepted) and/or Habitats and Migratory Birds Analyzed in this Report to the Proposed Action

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Re-issuing grazing permits in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control have and continue to alter riparian and upland vegetation composition and densities, which may reduce potentially suitable habitat for these TEC, MIS and migratory bird species and their prey in some cases while creating or enhancing habitat in others. For example, maintenance of vegetation-type conversions as specified in the proposed action will increase forage for big game and some small mammal species in pinyon-juniper and sagebrush cover types. However, the proposed action of re-issuing grazing permits would likewise reduce the forage and cover available in these conversions to these species due to grazing. Re-issuance of grazing permits in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) due to increased erosion and changes in vegetation. Re-issuing grazing permits in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to TEC, MIS and migratory bird habitat fragmentation, habitat loss, alteration of travel corridors, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/human interactions. Also, erosion from grazing in combination with recreational activities may cause sediment loss and further degradation of riparian systems. However, strict adherence to proper use criteria for grazing, as outlined in the proposed action, would eliminate many of these impacts by maintaining vegetation diversity, composition, structure, and density. Through proper management of livestock, adequate habitat would be maintained to support viable populations of all species discussed in this report within

the analysis area. Therefore, this proposed action in combination with these past, present, and reasonably foreseeable activities listed above may impact some TEC, MIS and migratory bird individuals and their habitat, however this proposed action would not adversely impact the viability of these populations.

Effects analysis for Threatened, Endangered, and Candidate wildlife species as listed in Table 2:

Bald Eagle

Existing Condition

Bald eagles can typically be found on the Fishlake National Forest during the late fall, winter, and early spring months. The Northern States Bald Eagle Recovery Plan states that the primary characteristic of winter habitat is abundant and available food supply in conjunction with one or more suitable night roost sites. At winter areas, bald eagles commonly roost in large groups. In the Pacific Northwest, these communal roosts are usually located in mature multi-layered forest stands with mean tree diameters ranging from 20-24 inches and heights between 81-91 feet (Rodriguez 2005). Bald eagles migrate back to their breeding grounds in other areas during the late spring, summer, and early fall months. Bald eagle observations have been recorded around lakes and the lower elevational fringes of the Beaver Mountain Tushar Range analysis area during the winter months. Periodic winter bald eagle surveys performed between 1979-2003 have never documented a roosting site anywhere on the Beaver Ranger District. The nearest known historic roosting site is located in Kanosh Canyon on the Fillmore Ranger District approximately 20 air miles to the north of the analysis area. No critical habitat for the bald eagle has been designated on the Fishlake National Forest (Rodriguez 2005).

Direct and Indirect Effects

During the winter months when migrating bald eagles may be found in the analysis area, is when livestock are generally not present. The exception to this is in the Junction allotment where winter cattle use is allowed from November 1 through February 15. In this 6,172 acre allotment, there are currently 35 cow-calf pairs permitted for winter use. Direct effects from permitting grazing cattle to individual wintering bald eagles would not occur. However, direct and indirect effects to bald eagle foraging habitat and, consequently, prey species for the bald eagle would occur as a result of the proposed action. Reduced forage and cover for prey species as a result of permitting cattle grazing in these eight allotments may reduce the productivity of small prey animals that provide an energy base for wintering bald eagles. The reduction in cover in these allotments would increase the bald eagles' ability to locate and capture individual prey species. The proposed action requires adherence to proper use criteria. Under these criteria (outlined in in Table 1-2 above), stubble heights (or % use) specified in riparian and upland environments would not allow overutilization of the vegetation resource. Therefore, habitat effectiveness for prey species of the bald eagle would not be substantially compromised as adequate habitat for these species would be maintained.

Changes in riparian vegetation from permitting cattle grazing and the introduction of noxious weeds by permitting cattle use may also have effects to aquatic systems that provide habitats for aquatic prey species that wintering bald eagles feed on. Flow reductions of streams and springs within watersheds and centralizing the water into stock ponds and troughs also may effect watershed effectiveness. This may further reduce the availability of suitable water sources for bald eagle prey species. The Beaver River Watershed Assessment completed in 2002-2003 for the Beaver River Watershed includes the Pine Creek/Sulphurdale, North Indian, and South Beaver Allotments. These allotments comprise approximately 110,000 acres which equates to 63% of the project area. The Beaver River Watershed Assessment (hereafter referred to as BRWA) describes, in detail, existing condition of various ecological resources on the landscape. The BRWA documents major vegetation changes in certain cover types. Much of this change can be attributed to wildfire suppression. However, the BRWA also attributes some of this vegetation change to grazing by domestic livestock. The BRWA concludes that vegetation changes that have occurred over the past 150 years has substantially reduced the carrying capacity for grazing and browsing ungulates (hooved mammals), and perhaps may be partially responsible for concentrating use in riparian areas. As a result, the BRWA concludes that proper use thresholds for bank stability, riparian stubble heights, or browse use are typically exceeded before upland slopes are fully utilized. "The grazing indices suggest that some watersheds and streams may be incurring excess use even if upland slopes are not being adversely affected" (BRWA 2002-2003). This statement suggests that riparian areas may be more heavily impacted by current grazing management practices than the uplands in some areas. Bald eagle foraging habitat and prey species may be affected by these impacts in riparian areas.

However, the maximum allowable forage use criteria described in Table 1-2 of the proposed action outlines an upland grass/forb utilization of 40-60% and maintaining ground cover of at least 70% in riparian areas. Under this proposed action, there would still be reduced forage and cover but within acceptable limits. Current year's growth would be retained at 40% or greater on upland sites and riparian species would be retained at 1 1/2"- 6" depending on management area and/or species. Riparian areas would retain a minimum of 70% ground cover. Riparian upland browse would be retained at a minimum of 40-50% depending on age class. These proper use criteria would retain enough vegetation cover to keep prey species for bald eagles from declining both in riparian and upland areas. These criteria would also allow for vegetation to rebound from this utilization. Furthermore, bald eagles use the analysis area in late fall or winter when vegetation is not actively growing and prey species may not be as heavily dependent on active vegetative growth. Critical habitat has never been identified on the Fishlake National Forest and no winter roost sites have ever been found within the analysis area. Therefore, the proposed action may affect but is not likely to adversely affect the bald eagle and/or its habitat.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation,

timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Reissuing grazing permits in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control have and will continue to alter riparian and upland vegetation composition and densities, which may reduce winter foraging habitat for bald eagles, small mammals (prey), and aquatic species (prey) in some cases and create habitat in others. For example, maintenance of vegetation-type conversions as specified in the proposed action will decrease available habitat for pinyon-juniper woodland adapted species but would conversely increase forage and grass/forb cover potential for other small mammal prey species. However, the action of reissuing grazing permits would then reduce the forage and cover available in these conversions to these prey species but through proper livestock use adequate habitat would be maintained. Re-issuance of grazing permits in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) from increased erosion and changes in vegetation. Reissuing grazing permits in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to bald eagle winter foraging habitat fragmentation, habitat loss, creation of travel corridors, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. Also, increased erosion from grazing in combination with recreational activities may cause sediment loss and further degradation of riparian aquatic systems. However, grazing at proper use levels as described in the proposed action would offset many of these impacts. By retaining a standard for vegetation structure, density, and composition as allowed for by these proper use criteria, many of these impacts would be alleviated.

Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may affect but is not likely to adversely affect the bald eagle and/or its habitat.

Utah Prairie Dog

Existing Condition

Basic habitat requirements considered for the Utah prairie dog are deep well-drained soils , vegetation low enough so that prairie dogs can see over or through, and suitable forage (Spahr et al. 1991). Moist forage available throughout the summer is also needed (Rodriguez 2005). The Utah prairie dog's range is limited to five counties in south-central Utah (Iron, Garfield, Piute, Wayne, Sevier) (Rodriguez 2005). Of these, the Utah prairie dog presently occurs in three areas, as described in the Utah Prairie Dog Recovery

Plan (USFWS 1991): The Awapa Plateau, the Paunsaugunt region along the East Fork of the Sevier, and the West Desert region of east Iron County (Rodriguez 2005). This proposed action analysis area is not included in any of these regions. Presently, there are no known prairie dogs in the analysis area or on the Fishlake National Forest. Historically, there was a transplant site in the Rocky Reservoir area of the Beaver Ranger District (Rodriguez 2005). This area is located within the South Beaver Allotment of the analysis area. To date, these transplants have been considered unsuccessful with low reproductive rates following the transplant and no dogs currently occupying the site (Rodriguez 2005). Five acres of habitat have been designated for the Utah prairie dog on the Fishlake National Forest on the Beaver Ranger District in the attempted translocation site near Rocky Reservoir mentioned previously (Rodriguez 2005).

Direct and Indirect Effects

With the exception of the Junction Allotment which is grazed during the winter months, this proposed action would issue grazing permits for a range of time periods from late spring to early fall (Proposed Action Section V – Table 1-1). Since there are no Utah prairie dogs known to occur within the analysis area, direct and indirect effects of reissuing grazing permits to Utah prairie dog individuals would not occur. However, effects to potentially suitable habitat within the analysis area may occur. At a Utah Prairie Dog Recovery Team Meeting in Springville, UT on 2/3/2004, Dr. Mark Richie disclosed findings that the shorter the vegetation, the better the vigilance (feeding) of Utah prairie dogs because they are able to more effectively watch for predators. The reissuance of grazing permits on these 8 allotments may affect potentially suitable Utah prairie dog habitat by creating shortened stubble heights (shorter vegetation) and increase the ability of the Utah prairie dog to watch for predators. This effect to habitat would reduce the risk of predation for Utah prairie dogs.

The reissuance of grazing permits on these eight allotments may affect Utah prairie dog weights. At a Utah Prairie Dog Recovery Team Meeting in Springville, UT on 2/3/2004, Dr. Mark Richie disclosed findings that spring grazing (by the end of May) increased Utah prairie dog weights while summer grazing reduced weights. Fall grazing had no effect on prairie dog weights. Since grazing authorized in this proposed action is post June 1 (Junction Allotment excepted) into the late summer/early fall, prairie dog weights would be reduced or stay the same. It is assumed that these findings are a result of forage and cover availability during different periods of grazing use. Reissuance of grazing permits in these 8 allotments would result in reduced forage and cover on potentially suitable habitat that may affect Utah prairie dog weights. Other effects from reissuing grazing permits to potentially suitable habitat within the analysis area are soil compaction from trampling cattle and irrigation diversion/water displacement and development from maintaining stock ponds and troughs for livestock use. McDonald 1992 found that colonies lacking moist vegetation are decimated by drought because prairie dogs are unable to obtain sufficient water and nutrients (Rodriguez 2005). The displacement of water through these water developments (maintained under this proposed action) may reduce potentially suitable habitat for Utah prairie dogs in some cases, and create habitat in others.

The Beaver River Watershed Assessment completed in 2002-2003 for the Beaver River Watershed includes the Pine Creek/Sulphurdale, North Indian, and South Beaver Allotments. These allotments comprise approximately 110,000 acres which equates to 63% of the project area. The Beaver River Watershed Assessment (BRWA) describes, in detail, existing condition of various ecological resources on the landscape. The BRWA documents major vegetation changes in certain cover types. Much of this change can be attributed to wildfire suppression. However, the BRWA also attributes some of this vegetation change to grazing by domestic livestock. The BRWA concludes that vegetation changes that have occurred over the past 150 years has substantially reduced the carrying capacity for grazing and browsing ungulates (hooved mammals). These vegetation changes, where they have occurred, in Utah prairie dog potentially suitable habitat may affect this habitat. The Utah Prairie Dog Recovery Plan (USFWS 1991) states that the vegetative height within the colony must be low enough to allow standing prairie dogs to scan their environment for predators. For this reason, controlled grazing is compatible with prairie dog colonies (USFWS 1991). Grazing at proper use levels, as described in the proposed action, would maintain vegetation needed for potentially suitable Utah prairie dog habitats. Currently, no prairie dogs are known to occur within the analysis area and proposed grazing will proceed accordig to proper use criteria maintaining adequate vegetation for prairie dogs, therefore, the proposed action may affect but is not likely to adversely affect the Utah prairie dog and/or its habitat.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Reissuing grazing permits in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control may alter low gradient riparian and upland vegetation composition and densities, which may reduce potentially suitable Utah prairie dog habitat, in some cases, and create habitat in others. Maintenance of vegetation-type conversions as specified in the proposed action may increase colony-building and forage potential in pinyon-juniper and sagebrush cover types. The proposed action of reissuing grazing permits would then reduce the forage and cover available in these conversions which, in turn, increases vigilance (feeding) (Utah Prairie Dog Recovery Team Meeting - Richie 2/3/2004). Reissuance of grazing permits in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) due to increased erosion and changes in vegetation. Reissuing grazing permits in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground

development) may contribute to potentially suitable Utah prairie dog habitat fragmentation, habitat loss, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. Grazing at proper use levels, as described in the proposed action, would help to mitigate vegetation changes that contribute to these impacts. The effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may affect but is not likely to adversely affect the Utah prairie dog and/or its habitat.

Western yellow-billed cuckoo

Existing Condition

There are approximately 2,664 acres of potentially suitable western yellow-billed cuckoo habitat on the Fishlake National Forest. Potentially suitable habitat includes riparian habitats below 7,000 feet, with a cottonwood/willow overstory, dense brushy understories, and slopes less than 10% (Rodriguez 2005). The proposed action analysis area contains a total of 188 acres of potentially suitable habitat. Portions of City Creek, Clear Creek, Fish Creek, and Mill Creek below 7,000 feet were surveyed for western yellow-billed cuckoos in 2003. All of these areas had an apparent lack of extensive dense brushy understories preferred by the western yellow-billed cuckoo; thus, no western yellow-billed cuckoos were found during these surveys. Additional surveys on other riparian streamcourses throughout the Beaver Ranger District were performed in 2002. No western yellow-billed cuckoos were detected during these surveys. To date, there have been no western yellow-billed cuckoos found in the analysis area nor on the Fishlake National Forest (Rodriguez 2005).

Direct and Indirect Effects

Since there are no western yellow-billed cuckoos known to exist in the proposed action analysis area, there will be no direct or indirect effects to western yellow-billed cukoo individuals. However, since there is potentially suitable habitat for this species, reissuing grazing permits may effect potentially suitable habitat.

Changes in riparian vegetation from permitting cattle grazing and the introduction of noxious weeds by permitting cattle use may also have effects to aquatic systems that provide habitats for the western yellow-billed cuckoo. Flow reduction of streams and springs within watersheds and centralizing the water into stock ponds and troughs also may effect watershed effectiveness. The Beaver River Watershed Assessment completed in 2002-2003 for the Beaver River Watershed includes the Pine Creek/Sulphurdale, North Indian, and South Beaver Allotments. These allotments comprise approximately 110,000 acres which equates to 63% of the project area. The Beaver River Watershed Assessment (BRWA) describes, in detail, existing condition of various ecological resources on the landscape. The BRWA documents major vegetation changes in certain cover types. Much of this change can be attributed to wildfire suppression. However, the BRWA also attributes some of this vegetation change to grazing by domestic livestock. The BRWA concludes that vegetation changes that have occurred over the past 150 years

has substantially reduced the carrying capacity for grazing and browsing ungulates (hooved mammals), and perhaps may be partially responsible for concentrating use in riparian areas. As a result, the BRWA concludes that proper use thresholds for bank stability, riparian stubble heights, or browse use are typically exceeded before upland slopes are fully utilized. "The grazing indices suggest that some watersheds and streams may be incurring excess use even if upland slopes are not being adversely affected" (BRWA 2002-2003). This statement suggests that riparian areas may be more heavily impacted by current grazing management practices in some areas than the uplands. Potentially suitable western yellow-billed cuckoo habitat may be affected by these impacts in riparian areas through lack of willow or othery woody vegetation growth. These types of vegetation changes may contribute to a loss of multi-layered woody understories in these lower elevation low gradient streamcourses. These changes may effect the overall suitablilty of riparian habitats for the western yellow-billed cuckoo. Several smaller watersheds within the Greater Beaver River Watershed area document overstocking rates in reference to livestock stocking rates in comparison to suitable watershed area and AUM stocking in comparison to riparian AUM production (BRWA 2002-2003). This would indicate that current grazing management practices may be exceeding watershed and riparian capabilities in some areas. This may affect potentially suitable western yellow-billed cuckoo habitats. However, the maximum allowable forage use criteria described in Table 1-2 of the proposed action outlines an upland grass/forb utilization of 40-60% and maintaining ground cover of at least 70% in riparian areas. Under this proposed action, there would still be reduced vegetation from grazing livestock, but within acceptable limits. Current year's growth would be retained at 40% or greater on upland sites and riparian species would be retained at 1 1/2"- 6" depending on management area and/or species. Riparian areas would retain a minimum of 70% ground cover. Riparian upland browse would be retained at a minimum of 40-50% depending on age class. The implementation of these proper use criteria would improve vegetation structure, composition, and density in riparian areas. These criteria would also allow for vegetation to rebound from past overutilization. This will improve, or at the very least, stop degradation to vegetation in riparian areas.

Approximately 75% of the western yellow-billed cuckoo diet is comprised of grasshoppers and catepillars (Rodriguez 2005). The other 25% is a myriad of insect species. These prey base populations could possibly be affected by changes in the riparian aquatic corridors. Sediment loading into the stream from increased erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and increased organic matter (i.e. cattle manure) are just a few factors that may alter aquatic biota and, consequently, composition and density of various insect populations. Some types of insects may increase while others decline.

Western yellow-billed cuckoos are not known to occur on the Fishlake National Forest and much of the surveyed potentially suitable habitat within the analysis area lacks the preferred dense brushy understories for the cuckoo. Some western yellow-billed cuckoo potentially suitable habitats within the analysis area do posess these components but no birds have been detected. Strict adherence to proper use criteria will minimize woody vegetation loss and will contribute to improving potential habitat effectiveness for this

species. Therefore, the proposed action may affect but is not likely to adversely affect the western yellow-billed cuckoo and/or its habitat.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Reissuing grazing permits in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control continue to alter riparian vegetation composition and densities. Proper use grazing will improve potentially suitable habitat for the western yellow-billed cuckoo through riparian woody vegetation improvement while also improving aquatic insects (prey) habitat conditions by leaving more riparian vegetation. Reissuance of grazing permits in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) from increased erosion and changes in vegetation. Reissuing grazing permits in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to western yellow-billed cuckoo habitat fragmentation, habitat loss, creation of travel corridors, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. Also, erosion from grazing in combination with recreational activities may cause sediment loss and further degradation of riparian aquatic systems. However, grazing at proper use levels as described in the proposed action would offset many of these impacts. By retaining a standard for vegetation structure, density, and composition as allowed for by these proper use criteria, many of these impacts would be alleviated.

Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may affect but is not likely to adversely effect the western yellow-billed cuckoo and/or its habitat.

Effects analysis for Forest Service Region IV Sensitive wildlife as listed in Table 3:

Spotted bat and Townsend's Big-eared bat

Existing Condition

The spotted and Townsend's Big-eared bats will be evaluated for effects in tandem because of their similarity in life history and habitat requirements. The spotted bat is only suspected to occur on the Fishlake National Forest. The Townsend's Big-eared bat is only known to occur in abandoned mines of the Fillmore Ranger District outside of the proposed action analysis area. Abandoned mine bat surveys were completed in 1994 and 1996 within analysis area. Neither of these sensitive bats were found during any of these surveys. Neither of these bats are known to occur within the analysis area or anywhere on the Beaver Ranger District (Rodriguez 2005). However, 1,126 acres of potentially suitable roosting bat habitat does occur within the analysis area comprising an estimated 52% of that on the District and 10% of that estimated on the Forest Rodriguez 2005).

Direct and Indirect Effects

Since neither of these bat species are known to occur within the analysis area or on the Beaver Ranger District, direct and indirect effects to individuals would not occur as a result of this proposed action. Direct and indirect effects to potentially suitable habitat would be limited. Since these bats require caves, mines, rock crevices, abandoned buildings, and other largely undisturbed places; effects to potential roosting habitat from this proposed action would be minimal, if any. Grazing cattle would not disturb these areas because of their inaccessability to grazing livestock. Ecological resources in these inaccessible potential roosting sites would not be disturbed. However, foraging habitat and prey species (insects) may be affected by the re-issuance of term grazing permits in these 8 allotments.

Both of these bats are insectivorous. The Townsend's Big-eared bats diet is comprised largely of moths (Rodriguez 2005). The spotted bat usually feeds on larger insects such as Lepidoptera and grasshoppers. These prey base populations could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from increased erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and increased organic matter (i.e. cattle manure), forage reduction, vegetational composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline.

Therefore, this proposed action may impact spotted bat and Townsend's Big-eared bat individuals and/or their habitat but is not likely to cause a trend to federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic

use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

The Abandoned Mine Closures Project on the Beaver Ranger District that occurred in the late 1990's and early 2000's eliminated numerous potentially suitable roosting sites for these bats throughout the cumulative effects area. Re-isssuance of term grazing permits on these 8 allotments may affect potentially suitable foraging habitat for these bats but will not affect potentially suitable roosting habitat. Therefore, this proposed action in combination with the specific past action listed above may impact some spotted bat and Townsend's Big-eared bat individuals and/or their habitats but is not likely to cause a trend toward federal listing or a loss of viability.

Northern Goshawk

Existing Condition

There are approximatley 75,112 acres of potentially suitable goshawk nesting habitat in the analysis area which equates to 59% of the habitat on the Beaver Ranger District and 19% of that estimated for the entire Forest (Rodriguez 2005). There are 14 known goshawk territories on the Fishlake National Forest (Rodriguez 2005). Northern goshawk surveys have been conducted in 2002 and 2003 in much of the Beaver River Watershed and in other various parts of the analysis area. There are only three confirmed goshawk territories found on the Beaver Ranger District. Two of these territories are located within the Beaver River Watershed. These three nests occur on the North Beaver, South Beaver, and Circleville Allotments. The South Beaver and Circleville Allotments fall within the scope of this proposed action. Further observation records of the northern goshawk have also been documented on the North-Indian Creek and the Pine Creek-Sulphur Beds Allotments.

Direct and Indirect Effects

Direct effects to goshawk territories and nesting habitat may occur as a result of the proposed action, but these impacts would be minimal in closed conifer forests. Studies of nesting habitat show that goshawks nest in older age forest with variable tree species and high percent canopy closure (Rodriguez 2005). Studies on habitat characteristics at goshawk nest sites have reported average canopy closure measurements ranging from 60% to 94% (Rodriguez 2005). Understory forage production for livestock drops considerably in closed canopy conifer forests. Thus, livestock will not often be present foraging in closed canopy conifer forests because of the general lack of available forage unless water is present. Open meadows, aspen, sagebrush, oakbrush, mahogany, and other cover types where more livestock forage is available will be visted more frequently by livestock.

Many of the goshawk nests in Utah do occur in aspen stands. The Beaver River Watershed Assessment (BRWA) references a study on the response to aspen restoration treatments near the Beaver River Watershed in part of the analysis area. Thirty three sites were surveyed to monitor the success of aspen regeneration following a variety of treatments. This study states : "In most cases, sites fenced to preclude all cattle and wildlife browsing produced the greatest number of

aspen suckers compared to adjacent, unfenced, or cattle-excluded sites...it is also important for terminal shoots of the young aspen to grow beyond the reach of browsing ungulates before treatments can be deemed successful. Research would indicate that re-issuing term grazing permits for these 8 allotments may have an impact on aspen vegetation types in some areas. A decline in aspen resulting from the proposed action may impact goshawk nesting habitat over a long period of time. However, strict adherence to proper use criteria (a minimum of 40-50% on upland browse species such as aspen), as specified in the proposed action would alleviate much of this impact on aspen within the analysis area and maintain sufficient aspen regeneration to provide effective habitat for goshawks.

Furthermore, it has been documented by Reynolds et al. 1992 that livestock grazing may affect forage and cover recources for goshawk prey. Thus, implementation of the proposed action may affect habitat for some mammalian and avian prey species. These effects would however, also be dependent upon other factors like precipitation levels, and not just ungulate use on grasses, forbs and shrubs. As riparian and upland vegetative health and vigor change (BRWA), resulting from the proposed action, habitat for goshawk prey may fluctuate. At proper use grazing levels, these effects would be minimized within the analysis area and maintain effective goshawk prey abundance and availability.

Therefore, this proposed action may impact some northern goshawk individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

This proposed action in combination with past, present, and reasonably forseeable future actions may effect habitat conditions for goshawks and their prey. Past actions have had various effects to vegetation across the cumulative effects area. In many areas where livestock grazing was permitted in riparian habitat, horizontal and vertical structure has been significantly altered and structure is minimal. Past actions such as timber harvest and thinning has led to a decline of habitat quality and quantity, through the immediate loss of nesting and foraging habitat, as well as decreased habitat for prey species. While some of these past timber harvest and thinning actions have also improved goshawk habitat by aiding in the reestablishment of aspen as the dominant cover type. Past, present, and reasonably forseeable livestock grazing may impact the goshawk and their prey populations through continued modification of habitats but grazing according to proper use under the proposed action will move these habitat variables towards improvement for goshawks and their prey. Therefore, this proposed action in combination with

past, present, and reasonably forseeable future actions may impact some northern goshawk individuals and/or their habitat but are not likely to cause a trend toward federal listing or a loss of viability.

Flammulated Owl

Existing Condition

The flammulated owl is known to occur on the Beaver Ranger District within the analysis area. Surveys performed in 2003 for this species revealed presence on the North-Indian Creek Allotment, the South Beaver Allotment, and the Circleville Allotment. Flammulated owls appear to be associated with mature pine and mixed conifer habitat types (Rodriguez 2005). There are approximatley 75,112 acres of potentially suitable flammulated owl habitat in the analysis area which equates to 59% of the habitat on the Beaver Ranger District and 19% of that estimated for the entire Forest (Rodriguez 2005).

Direct and Indirect Effects

Flammulated owls are nocturnal obligate cavity nesters that typically nest in the hollows of trees and perform much of their foraging at night. Having grazing livestock, that are most active during the day, in their nesting and foraging areas would not cause direct conflicts with flammulated owl individuals. However, indirect effects to individuals from fluctuations in insect populations and effects to potentially suitable habitat would have minimal direct effects to this species.

Flammulated owls are almost exclusively insectivorous and feed on small to medium-sized insects such as moths, beetles, caterpillars, crickets, spiders, and other arachnids (Rodriguez 2005). These prey base populations could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and organic matter (i.e. cattle manure), forage reduction, vegetational composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline but grazing according to proper use will increase habitat effectiveness for owls and their prey.

Therefore, this proposed action may impact some flammulated owl individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and

irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

This proposed action in combination with past, present and reasonably forseeable future actions may cause changes in riparian and upland vegetation composition and vigor. As the vertical and horizontal vegetation diversity of riparian and upland areas change, insect populations, distribution, and species diversity fluctuate. These dynamics effect prey species compositon and abundance for flammulated owls within the forested landscape where these owls forage. Past actions along with grazing have had long-term impacts on vegetation across the analysis area and habitat conditions will move towards improvement under proper use grazing. Therefore, this proposed action in combination with past, present, and reasonably forseeable future actions may impact some flammulated owl individuals and/or their habitats but are not likely to cause a trend toward federal listing or a loss of viability.

Three-toed Woodpecker

Existing Condition

The three-toed woodpecker is known to occur on the Beaver Ranger District within the analysis area. There have been numerous recent (summarized in 2002, 2003, 2005) project level surveys, studies, detections, and nest locations of three-toed woodpeckers which depict a broad distribution of this species in the Engelmann spruce and mixed conifer vegetation types within the Beaver River Watershed. Three-toed woodpecker habitat consists of northern coniferous and mixed forest types located at elevations up to 9,000 feet and composed of Engelmann spruce, sub-alpine fir, Douglas fir, grand fir, ponderosa pine, tamarack, and lodgepole pine. This species is attracted to areas where there are numerous dead trees due to fire, insect infestations, blow-down, or other die-off (Rodriguez 2005). There are approximatley 75,112 acres of potentially suitable three-toed woodpecker habitat in the analysis area which equates to 59% of the habitat on the Beaver Ranger District and 19% of that estimated for the entire Forest (Rodriguez 2005).

Direct and Indirect Effects

Direct effects of the proposed action to three-toed woodpecker individuals would be minimal in coniferous forest vegetation types. Three-toed woodpecker habitat requirements on the Beaver Ranger District are higher elevation spruce-fir, mixed conifer, and aspen vegetation types with snags available for foraging. Three-toed woodpeckers are largely dependent on down logs, snags, and stumps for feeding and nesting opportunities. Down logs, snags, and stumps would not be affected by livestock grazing.

Understory forage production for livestock drops considerably in closed canopy conifer. The livestock will not often be present foraging in closed canopy conifer forest because of the general lack of available forage unless there is water available. Open meadows, aspen, sagebrush, oakbrush, mahogany, and other cover types where more livestock forage is available will be visited more frequently by livestock. Direct conflicts between three-toed woodpeckers and grazing livestock would not occur.

There are nest locations and detection records of three-toed woodpeckers in aspen stands. The Beaver River Watershed Assessment (BRWA) references a study on the response to aspen restoration treatments near the Beaver River Watershed in part of the analysis area. Thirty three sites were surveyed to monitor the success of aspen regeneration following a variety of treatments. This sudy states : "In most cases, sites fenced to preclude all cattle and wildlife browsing produced the greatest number of aspen suckers compared to adjacent, unfenced, or cattle-excluded sites...it is also important for terminal shoots of the young aspen to grow beyond the reach of browsing ungulates before treatments can be deemed successful. This research would indicate that re-issuing term grazing permits for these 8 allotments may have an impact on aspen vegetation types in some areas. A decline in aspen resulting from the proposed action may impact three-toed woodpecker habitat in some areas over a long period of time. However, strict adherence to proper use criteria (a minimum of 40-50% on upland browse species such as aspen), as specified in the proposed action would alleviate some of this impact on aspen within the analysis area and move three-toed woodpecker habitat toward improvement.

Three-toed woodpeckers feed on wood-boring insect larvae, beetles, moth larvae and ocassionally sap at sapsucker pits. They are major predators of spruce bark beetle and may contribute to its control (Rodriguez 2005). These prey base populations are minimally affected by changes in the riparian aquatic corridors and grass/forb vegetation as they are chiefly forest dwelling species. Grazing will contribute to sediment loading into streams from erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and organic matter (i.e. cattle manure), forage reduction, vegetational composition change, and vegetation conversions are many of the factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline. However, indirect effects to individuals from fluctuations in insect populations and effects to potentially suitable habitat would have minimal impacts to this species because of their focus in forested habitats while cattle typically graze in more open terrain.

Therefore, this proposed action may impact some three-toed woodpecker individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Refer to "Cumulative Effects Common to All Sensitive Vertebrate Species and/or Habitats Analyzed" at the beginning of this section.

Peregrine Falcon

Existing Condition

Peregrine falcons are known to occur on the Beaver Ranger District within the analysis area. There is one known peregrine falcon territory (not active for several years) on the North-Indian Creek Allotment. There have also been sightings of peregrine falcons on the South Beaver Allotment, Cottonwood Allotment, and the Joe Lott Fish Creek Allotment. Of these, the North-Indian Creek Allotment and the South Beaver Allotment fall within the scope of the proposed action. Approximately 1,300 acres of potentially suitable nesting habitat occurs throughout the

analysis area, which equates to 48% of the habitat on the District and 10% of the potential suitable habitat on the Forest. Their presence is suspected on all allotments within the analysis area.

Direct and Indirect Effects

Suitable habitat for peregrine falcons may be divided into three parts: 1) cliff or substrata upon which nesting occurs, 2) surrounding territory that serve as hunting sites, and 3) migration and wintering areas (Rodriguez 2005). Most peregrine eyries (nest sites) in Utah are situated on high ledges on mountain cliff faces and river gorges. As a result, direct and indirect effects to peregrine falcon nesting habitat would not occur from this proposed action. Direct conflicts between grazing livestock and nesting peregrine falcons would not occur.

Direct and indirect effects to foraging, migration, and wintering habitat may occur as a result of implementing this proposed action. Prey species include primarily small to medium-sized terrestrial birds and waterfowl that are normally found within 10 miles of the eyrie (Rodriguez 2005). Implementation of the proposed action may affect habitat for some mammalian and avian prey species. These effects would however be dependent upon other factors, and not just ungulate use on grasses forbs and shrubs. Other factors such as precipitaion can be an important influence on peregrine falcon prey. As riparian and upland vegetative health and vigor changes (BRWA), resulting from the proposed action, habitat for peregrine falcon prey may fluctuate.

Peregrines are most susceptible to disturbance during the courtship and nest establishment period (March – mid May) with susceptibility decreasing as the young are raised (Rodriguez 2005). Under current grazing strategies (as described in this proposed action) livestock would not be present in the analysis area during this susceptible period for peregrines. Therefore, disturbance from grazing livestock within foraging areas would be minimized.

Therefore, this proposed action may impact some peregrine falcon individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Refer to “Cumulative Effects Common to All Sensitive Vertebrate Species and/or Habitats Analyzed” at the beginning of this section.

Greater Sage Grouse

Existing Condition

There are known populations of sage grouse on the Richfield and Loa Ranger Districts of the Fishlake National Forest, using Forest lands much of the year with one documented lek. Also, there is some documentation of sage grouse use on the Beaver Ranger District within the analysis area. In 1983, there were historic observation records of sage grouse in the Rocky Pond area of the South Beaver Allotment (within analysis area). Since then, no known occurrences were documented until Sept. of 2004 when 8 individuals were observed in this same area. No

known lekking behavior takes place in this area with use being considered as summer or brood-rearing. Sage grouse are solely dependent on sagebrush dominated habitats (Rodriguez 2005). An estimated 43,966 acres of potentially suitable habitat for sage grouse does exist on sagebrush-dominated cover types scattered throughout the analysis area. This comprises 56% of the total estimated potential habitat on the District and just 8% of that on the Forest.

Direct and Indirect Effects

Since known sage grouse use is very limited in the analysis area, effects to sage grouse individuals would be minimal from this proposed action. Additionally, potentially suitable habitat may also be affected by the implementation of this proposed action. Maintenance of range improvements and vegetation conversions may contribute to effects on potentially suitable sage grouse habitat. Reduction of forage and cover by the re-issuance of term grazing permits may contribute to sage grouse lek habitat. Open areas such as swales, irrigated fields, meadows, burns, roadsides, and areas of low, sparse sagebrush cover are used as leks. Leks are usually surrounded by areas with 20-50% sagebrush cover, with sagebrush no more than 1 foot (Rodriguez 2005). Sage grouse use sagebrush and perennial bunchgrasses for food. Reduction of this type of forage through livestock grazing may affect the food base of sage grouse. This may, in turn, reduce the overall productivity on a given site.

Range improvements such as existing fences, watering troughs, ponds, and spring/seep developments may alter sage grouse movement or provide free water for sage grouse use. Sage grouse do not require open water for day-to-day survival if succulent vegetation is available but, they will utilize free water if it is available.

Forage and cover reduction through this proposed action may also affect sage grouse nesting success. Nest success is related to herbaceous cover near the nest site. Lack of adequate nesting and brooding cover may account for high juvenile losses in many regions (Rodriguez 2005). Taller, denser, herbaceous cover apparently reduces nest predation and increases early brood survival (Rodriguez 2005). However, strict adherence to proper use criteria, as provided for in this proposed action, would retain stubble heights on upland sites (where sage grouse occur) of a minimum of 40%. This would prevent overutilization of herbaceous cover and alleviate some of this impact to nesting success.

Maintenance of vegetation conversions (as described in this proposed action) can imprve potentially suitable habitat in some cases and cause it to decline in others. Vegetation conversions from an original disclimax pinyon-juniper cover type to early seral grass and subsequent late seral sagebrush may create potential habitat for sage grouse. Vegetation conversion from sagebrush to early seral or monocultured grass may decrease potential habitat for sage grouse.

Sage grouse have declined primarily because of loss of habitat due to overgrazing, elimination of sagebrush, and land development (Rodriguez 2005). Therefore, this proposed action may impact some sage grouse individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Past, present, and reasonably forseeable actions that may effect potentially suitable sage grouse habitat in combination with this proposed action are chaining maintenance in pinyon-juniper disclimax cover types. Juniper encroachment into previously chained areas (vegetation conversions) is slowly converting these cover types back to their original pinyon-juniper dominance. Past, present, and future hand and mechanical treatments including Dixie Harrow, Brush Hog, hand thinning, and others will improve potentially suitable sage grouse habitat within the analysis area. These treatments, in combination with the proposed action, in decadent sagebrush cover types may reduce nesting habitat by reducing cover values and/or improve sagebrush diversity and subsequent forage value for sage grouse.

Therefore, this proposed action in combination with past, present, and reasonably foresee-able future actions as specified above may impact some sage grouse individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Pygmy Rabbit

Existing Condition

There are two documented occurrences of pygmy rabbits on the Fishlake National Forest. One population is on the Richfield Ranger District and the other is on the Loa Ranger District. To date, this species has no recorded presence on the Beaver Ranger District or within the analysis area. However, little is known about presence of this species on the Fishlake National Forest. Extensive and systematic formal surveys have not been conducted by the Fishlake National Forest to ascertain this species' presence across the entire analysis area. Other surveys for especially sage grouse, conducted in potential pygmy rabbit habitat have not resulted in any detection of pygmy rabbits. Potentially suitable habitat for pygmy rabbits consists of areas of deep soils with tall, dense sagebrush, which they use for cover and food (Rodriguez 2005). Potentially suitable habitat scattered throughout the analysis area is estimated at 4,756 acres which is approximately 61% of that on the District and 9% of that estimated on the entire Forest (Rodriguez 2005).

Direct and Indirect Effects

Reduction of forage and cover resulting from this proposed action may directly affect the pygmy rabbit and/or its habitat. Pygmy rabbits are seldom found in areas of sparse vegetative cover and seem to be reluctant to cross open space (Rodriguez 2005). A reduction of forage and cover may reduce the pygmy rabbits' ability to forage and feed productively. It may also increase the risk of predation to pygmy rabbits. However, strict adherence to proper use criteria, as provided for in this proposed action, would retain stubble heights on upland sites (where pygmy rabbits occur) of a minimum of 40%. This would prevent over utilization of herbaceous cover and alleviate some of this impact to pygmy rabbit forage and cover availability. Disturbance caused by permitting livestock use on these allotments may affect how much time pygmy rabbits spend outside of burrows foraging and will equate to a reduction in feeding and overall productivity thus lowering habitat effectiveness.

Maintenance of vegetation conversions (specified in this proposed action) may also have effects on pygmy rabbit disturbance and potentially suitable habitat. Maintenance through the use of Dixie Harrow, Brush Hogs, hand thinning, and others may cause destruction of underground burrows. These mechanical treatments may also cause alterations in the tall, decadent nature of sagebrush needed by pygmy rabbits. While this may provide more vegetation diversity (more early seral grasses) for pygmy rabbit feeding, it may also result in a sagebrush structure that doesn't provide enough cover for pygmy rabbits. However, these conversions that maintain sagebrush-steppe habitats rather than pinyon-juniper dominated landscapes will increase habitat effectiveness. Therefore, this proposed action may impact pygmy rabbit individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Past, present, and reasonably forseeable actions that may effect pygmy rabbits and/or their habitat in combination with this proposed action are cross-country motorized travel and vegetation treatement that alter sagebrush communities. Those treatment activities that promote diverse sagebrush communities with interspersed old growth sage in lieu of pinyon-juniper will benefit this species while those activities that favor conversion to grass will decrease habitat effectiveness. Chaining maintenance activities that remove encroaching conifers are currently being conducted and along with the proposed action will increase habitat effectiveness for pygmy rabbits. Past, present, and future hand and mechanical treatments including Dixie

Harrow, Brush Hog, hand thinning, and others may effect pygmy rabbits and their habitats within the analysis area. These treatments presently consider pygmy rabbit habitat and involve presence/absence surveys.

Therefore, this proposed action in combination with past, present, and reasonably foreseeable future actions as specified above may impact some pygmy rabbit individuals and/or their habitats but are not likely to cause a trend toward federal listing or a loss of viability.

Colorado River Cutthroat & Bonneville Cutthroat Trout
(This portion regarding Colorado River and Bonneville Cutthroat Trout was provided by Jim Whelan, Fisheries Biologist on the Fishlake National Forest on 6-1-2004)

Species Information

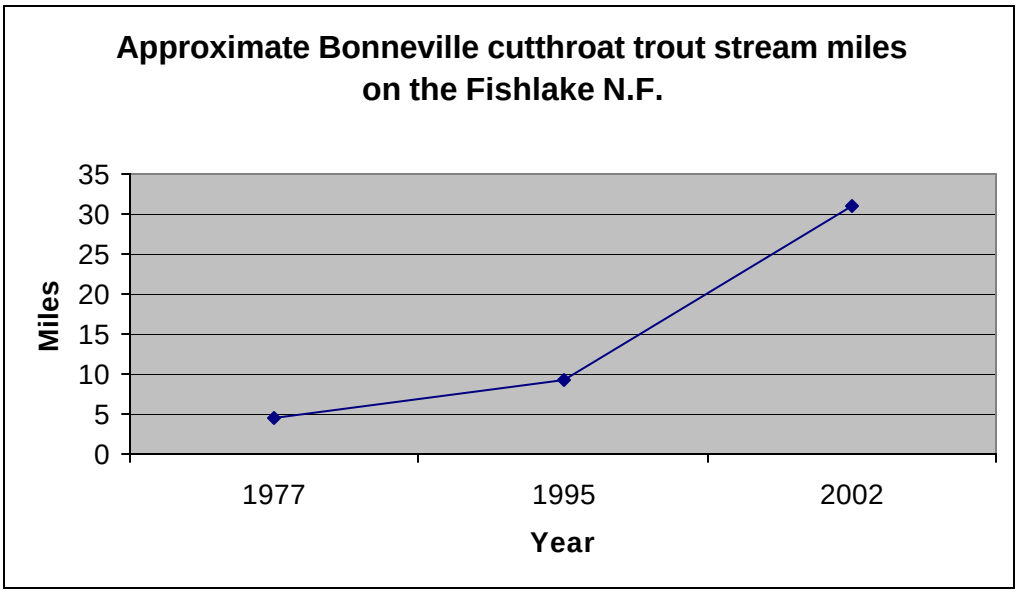
Bonneville cutthroat trout (BCT) are a unique subspecies of the western cutthroat trout complex, native to pluvial Lake Bonneville, which covered parts of Utah, Idaho, Nevada, and Wyoming up to 10,000 years ago. With desiccation of Lake Bonneville they became restricted to headwater streams and remnant lakes with suitable trout habitat. Bonneville cutthroat trout generally range in size from 2-9 inches in streams with lake populations reaching 30 inches. The back is yellow-brown to steel-gray with the sides lighter and the belly yellow to off-white. The tail, back, and the sides are marked with large, round spots. A bright red stripe or "cutthroat" mark is present under each side of the lower jaw. Bonneville cutthroat trout mainly eat insects, but larger sized fish also feed on small fish. Bonneville cutthroat trout spawn in spring from May-June. Young fish reach sexual maturity at 2-3 years (Rodriguez 2004, Spahr et al. 1991).

They require cool, clear water with an appropriate pool to riffle ratio and slow, deep water with vegetated streambanks for shade, bank stability, and cover. They prefer summer water temperature of about 55 degrees F, but can survive in water up to 70 degree F. Limitations to this species include loss of habitat from man-made causes such as water diversions, overgrazing of riparian areas, timber harvest and water pollution, although the greatest impact has been the loss of genetic purity as a result of hybridization and competition from non-native trout (Rodriguez 2004, Spahr et al. 1991).

Members of the Bonneville cutthroat trout technical team established by the Conservation Agreement put together a White Paper on the Proposed Aquatic Habitat Language for the Bonneville cutthroat trout Conservation Agreement Renewal, which was presented to the Technical Team at the March 23, 2004 meeting. While not yet finalized it represents a compilation of the best available science and research on cutthroat trout needs adapted for Bonneville cutthroat trout. It provides optimal habitat criteria for a variety of habitat variables such as percent fines, stream bottom embeddedness, percent stable stream banks, percent shade, large wood debris, pool frequencies, etc.

Bonneville cutthroat trout are considered a "high interest Management Indicator Species (MIS)" on the Fishlake National Forest. The Conservation Agreement and Strategy for Bonneville cutthroat trout in the State of Utah guides current recovery actions (Lentesch et al. 1997).

Chart 1: Bonneville cutthroat trout stream miles on the Fishlake N.F. (Hepworth et al. 2003)



Note: Does not include potential remnant populations that have not been genetically tested or remnant populations that have not yet been found.

Known stream miles of Bonneville cutthroat trout have increased on the Fishlake N.F. since 1977 due to their reintroduction to several new Forest streams (although yet unknown remnant populations were likely becoming more restricted at the same time). The graph above shows the number of known stream miles of Bonneville cutthroat trout on the Fishlake N.F. from 1977-2002. This figure increased slightly by 2004 as they become established into two streams with recent reintroductions. There are now known populations of pure strain Bonneville cutthroat trout inhabiting approximately 38 miles of stream habitat on the Fishlake National Forest (Rodriguez 2005). It should be noted that Bonneville cutthroat trout occupied streams still represent a small minority of the total stream miles on the Forest. Populations on the Beaver Ranger District include Pine Creek, North Fork of North Creek and its tributary Pole Creek, Briggs Creek, Birch Creek West, Birch Creek East, and Ten Mile Creek. These populations of Bonneville cutthroat trout occur in streams on the Circleville, Ten Mile, South Beaver, North-Indian Creek, and PineCreek/Sulphur Beds Allotments within the analysis area. Therefore, direct and indirect effects to Bonneville cutthroat trout may occur because they are present in the analysis area

The only known populations of Colorado River cutthroat trout on the Fishlake National Forest occur in streams on the Loa Ranger District (Rodriguez 2005). There are no Colorado River cutthroat trout known to occur within the analysis area. The analysis area is outside of the native range of the Colorado River cutthroat trout. Direct and indirect effects to Colorado River cutthroat trout individuals would not occur because they are not found in the analysis area. Normally streams outside of the native range of a species/sub-species are not considered for or counted for recovery objectives.

<u>Existing Condition</u>

Background information for Bonneville cutthroat trout biomass and aquatic macroinvertebrate BCI index levels is provided first, followed by more detailed descriptions of conditions by stream.

Biomass - The standing crop biomass of fish in Bonneville cutthroat trout streams can provide an index of the productivity of the stream, and repeated measurements over time can provide trend data. Table 1 shows the summarized data for the Fishlake N.F. from 1977-2002. Dashes represent no data or a stream that harbored other trout species. The 1994-95 data (and presumably the 1977 data) was taken using a single pass using an electroshocker, also counting fish that were known to be missed. The 2001-2002 data represents a population estimate developed from 2-pass data. It is likely that a 2-pass population estimate would be slightly higher than the one pass data counting known misses. In other words, if the actual biomass were static, one would expect that the 2002 data would have shown a slight increase. Note that information from Platts and McHenry (1988) and the UDWR indicate that 50-60 lbs/acre is an average biomass for streams on the Fishlake N.F. In general these BCT creeks are all considerably below average.

Table 1: Biomass (lbs/acre) trend of BCT in streams on the Fishlake N.F. (Hepworth et al. 2003)

Stream	**1977**	**1994-1995**	**2001-2002**	**2004-2005**
Birch Cr (W)	25.9	37.5	12.3	-
Briggs Cr	-	32.1	32.6	-
N.F.North Cr.	Unk.	32.1	31.2	-
Trib-Pole Cr.	-	-	0	-
Pine Cr.	-	24.1	23.8	31.6
Ten Mile Cr.	-	-	>0	37.2
Birch Cr. (E)	-	-	>0	-

Note: Does not include potential remnant populations that have not been genetically tested or remnant populations that have not yet been found. Table information for 2004-2005 is from Fishlake N.F. file data, not yet published.

Aquatic Macroinvertebrates - Many of the streams monitored for aquatic macroinvertebrates were BCT streams. Table 5 summarizes the results for BCT streams in relationship to the Forest Plan standard of a Biotic Condition Index (BCI) of 75 or above. The BCI compares the tolerance levels of aquatic macroinvertebrates in the sample to the predicted tolerance level given water quality and habitat conditions. The result is a percentage, similar to a test result. Sample BCI scores at or above the standard are shown in bold. Note that at the time of some of the monitoring dates either native cutthroat trout had not yet been reintroduced into the stream by the UDWR, or native cutthroat trout were not yet located in the drainage.

Table 2: Aqauatic macroinvertebrate monitoring of BCT streams on the Beaver R.D.

Stream	Year											
	1987	1988	1989	1990	1993	1994	1995	1997	1998	1999	2000	2001
BirchCr(W)2									66	68		
BirchCr(W)1	**75/85**	74/**85**	**82**						63	69		
BirchCr(E)2												70

BirchCr(E)1												**76**
NforkNCr2									73	71		
NforkNCr1									68	68		
Pine Creek 2										71		
Pine Creek1									62	71		
TenMileupp											**81**	
TenMilelow											**94**	

Note: Stations that are at or above the Forest Plan standard are shown in **bold**. BCI data for the table is found in Mangum (various dates) and Vinson (various dates). These reports are on file at the Fishlake N.F. Supervisor's Office.

Pine Creek – Reintroduction – mixed stock. The majority of the fish bearing portion of this stream is on the National Forest, the lower portion is on private lands. The forest portion of this stream is in Management Area 4A – Fish Habitat Emphasis, although the upper-most portion is in Management Area 6B. This population has exhibited a relatively stable trend in occupied stream length of about 5.0 km (Hepworth et al. 2003, Hepworth et al. 1997). Multiplying estimated occupied stream length by average stream widths at sampled stations gives a rough idea of habitat area. The Pine Creek population occupies a very limited habitat of about 2.26 acres. It is important to realize that all water transported sediment produced in the much larger watershed is funneled into and through this restricted fisheries habitat. It is easy to see that it would take only a small increase in sediment production across a watershed to increase sediment levels in the stream.

Population estimates also show a relatively stable population which has ranged from about 453 fish/mile in 1988 to 366 fish/mile in 1994 after fish were removed for reintroduction into a broodstock reservoir to 414 fish/mile in 2001. Fish biomass (see Table 1 above) has also been relatively stable (Hepworth et al. 2003, Hepworth et al. 1997). Aquatic macroinvertebrate samples (see Table 2 above) were slightly below but near Forest Plan standards in 1999.

The portion of this stream on the National Forest had a riparian evaluation done in 2003. Stream stability rating was generally good. Forage trend [apparent trend from a one time observation] was observed to be down on about 20.7% of the riparian length and stable on 79.3% of the riparian length. Management recommendations were that "Better grazing management is needed to enable the stream and vegetation conditions to improve. Livestock grazing is lowering plant vigor and density , as well as altering species composition,…" (Petty 2003).

South Fork of Pine Creek only supports a fishery at the very bottom end, but riparian evalutions showed this fork to be impacted. Apparent trend was down on 94.5% of the creek and stable on 5.5% (Petty 2003).

Impacts include grazing and roads that may be impacting habitat and depressing this population. Pine Creek was visited by Forest fisheries personnel in 2001 and 2002. Based on observations made during these visits, limiting factors on Pine Creek are low flows, habitat problems such as excessive width to depth ratios, lack of overhanging banks, and limited pool size/number. The latter of these conditions are believed to be primarily due to livestock use. Exclosure maintenance has been conducted by the district in recent years. Sedimentation impacts are also occurring from the road, which crosses the creek in several places and parallels it for the

majority of the fish occupied portion of the stream. Temperatures also appeared to be excessive on lower Pine Creek and in the lower portion of the South Fork of Pine Creek. Population monitoring was conducted in summer 2005. The population was up slightly, probably due to increased water flows, despite about 11% of the watershed being burned in 2004 by prescribed fire vegetation treatment projects. Two growing seasons of grazing rest did occur with the vegetation treatments (Fishlake N.F. file information).

In summary, Pine Creek appears to be affected by the current drought with the effects exacerbated by ongoing land management activities.

North Fork of North Creek – Native remnant population that is slightly introgressed genetically. The Bonneville cutthroat trout bearing portion of this stream is entirely on the National Forest within Management Area 4A – Fish Habitat Emphasis. This population has exhibited a upward trend in occupied stream length from 3.2 km in 1994 to 12.3 km in 2001 due to the population rebuilding after treatment to eliminate nonnative trout (Hepworth et al. 2003, Hepworth et al. 1997). Multiplying estimated occupied stream length by average stream widths at sampled stations gives a rough idea of habitat area. The North Fork of North Creek population expanded from occupied a very limited habitat of about 3.3 acres in 1994 to 7.8 acres in 2001.

Population estimates also show a slight decline in the upper reaches from 344 fish/mile in 1994 to 280 fish/mile in 2002 but averaged 659 fish/mile in 2002 when all stations were considered. Fish biomass (see Table 1 above) has generally been static at sampled locations (Hepworth et al. 2003, Hepworth et al. 1997). Aquatic macroinvertebrate samples (see Table 2 above) from 1998-1999 had BCIs ranging from 68-73, near Forest Plan standards.

This stream had a riparian evaluation done in 2003. Stream stability rating was generally good but was rated poor in reaches A26-1 and A26-3 due to the road and livestock grazing. Grazing was noted to be affecting reaches A26-1 through 5. Forage trend was observed to be down on about 12% of the riparian length and stable on about 88% of the riparian length.. Management recommendations were that better livestock grazing management is needed to increase riparian vegetation vigor, total cover, and improve species composition, and that a riparian exclosure should be considered on the lower portion of the creek for a riparian reference area (Petty 2003). Limiting factors were noted to be [a lack of] shade, the large substrate, and a lack of deep pools.

This is a cobblely drainage from flood events. Forest fisheries personnel have visited North Fork of North Creek from 1999-2002. The most interesting aspect of this creek is the readily apparent unbalanced pool to riffle ratio. This creek lacks quality pools and exhibits an abundance of large gravel/cobble riffles. This would seem to be a symptom of past watershed disturbance (including the 1983 and 1984 flooding) and loss of large riparian woody vegetation with root masses or boles that serve to stabilize stream banks and create pools, and livestock grazing. The road is also likely having an effect on the creek due to numerous ford type stream crossings and by reducing the amount of functioning riparian vegetation due to its close proximity to the creek. The artificial pool structures installed low in the creek seem to be beneficial.

One item to note is that the North Fork of North Creek population of BCT is protected by a constructed barrier habitat structure on the Forest. Recent testing shows that there is some

genetic introgression problems in the lower portion of this population that may require additional action by the UDWR. To fully eliminate the potential for new genetic introgression problems, it will be necessary to renovate the South Fork of North Creek.

Pole Creek (North Fork of North Creek tributary) – re-introduction in the mid 1990's. The Pole Creek tributary was severely affected by the drought. Only two fish could be found in the drainage in 2002 due to low water flows. This population has probably been lost by now (Hepworth et al. 2003). This drainage may need to be considered ephemeral/temporary habitat, especially during dry cycles. It should be noted that temporary habitat is still important for trout populations.

This stream had a riparian evaluation done in 2003. Stream stability rating was generally good. Forage trend was observed to be down on about 14% of the riparian length and stable on about 86% of the riparian length. Management recommendations were that the lower half of this stream was overgrazed (Petty 2003).

Briggs Creek – re-introduction. The majority of the fish bearing portion of this stream is on the National Forest, the upper portion is on State administered lands. The forest portion of this stream is in Management Area 3A – nonmotorized recreation emphasis. This population has exhibited a stable trend in occupied stream length of .9 km (Hepworth et al. 2003, Hepworth et al. 1997). Multiplying estimated occupied stream length by average stream widths at sampled stations gives a rough idea of habitat area. The Briggs Creek population occupies a very limited habitat of about .38 acres in 1994 which declined slightly to .3 acres in 2002 due to decreased stream width.

Population number trend is unknown but the 2002 data was 217 fish/mile. Fish biomass (see Table 1 above) has been stable at about 32 lbs/acre between 1994 and 2002 (Hepworth et al. 2003, Hepworth et al. 1997). There are no aquatic macroinvertebrate samples data for Briggs Creek.

The portion of this stream on the National Forest had a riparian evaluation done in 2003. Stream stability rating was generally good. Forage trend was observed to be stable on 100% of the riparian length (Petty 2003).

In summary Briggs Creek has a stable population. Sampling in 2002 showed that Briggs Creek is a somewhat marginal creek due to its small size and low water flows. It has interesting water quality, with a deep rust color due to iron levels. Basic water quality parameters that were monitored (pH and conductivity) did not exhibit anything unusual but there may be other chemicals or metals that would be less than ideal. Due to its remote location, Briggs Creek did not appear to be impacted by land uses.

Birch Creek West – Pure strain native remnant population. The majority of the fish bearing portion of this stream is on the National Forest, the lower portion is on BLM administered lands. The forest portion of this stream is in Management Area 4A – Fish Habitat Emphasis. This population has exhibited a downward trend in occupied stream length from 6.8 km in 1994 to 5.6 km in 2001, probably due mainly to drought (Hepworth et al. 2003, Hepworth et al. 1997).

Multiplying estimated occupied stream length by average stream widths at sampled stations gives a rough idea of habitat area. The Birch Creek West population occupied a very limited habitat of about 2.0 acres in 1994 which declined to 1.66 acres in 2001. It is important to realize that all water transported sediment produced in the much larger watershed is funneled into and through this restricted fisheries habitat. It is easy to see that it would take only a small increase in sediment production across a watershed to increase sediment levels in the stream.

Population estimates also show a dramatic decline from 259 fish/mile in 1980 to 256 fish/mile in 1994 to 80 fish/mile in 2001. Fish biomass (see Table 1 above) has also declined dramatically from 37.5 lbs/acre in 1994 to 12.3 lbs/acre in 2001 (Hepworth et al. 2003, Hepworth et al. 1997). Aquatic macroinvertebrate samples (see Table 2 above) have declined from above Forest Plan standards in the late 1980s to below in 1998-1999. Reasons for the apparent drop from the late 1980s higher BCI levels are unknown. Potential reasons are a buildup of fines after streambeds were flushed in the early 1980 floods, and drier long-term weather patterns in the 1990s that has concentrated livestock use along streambanks and reduced the number and duration of high flows that flush sediment.

The portion of this stream on the National Forest had a riparian evaluation done in 2003. Stream stability rating was generally good. Forage trend was observed to be down on about 46% of the riparian length, up on 14.8% of the riparian length, and stable on the remainder. Management recommendations were that "Better livestock grazing management is needed to increase riparian vegetation vigor, total cover, and improve species composition, or a riparian exclosure with water gaps should be considered for the entire creek,…" (Petty 2003). Noxious weeds were also noted on the stream during the inventory.

Marginal stream habitat, drought, low stream flows, grazing, and lack of exclosure maintenance are all factors contributing to this decline. This population is one of only a few pure strain native remnant populations on the Fishlake National Forest. Replication for this population has occurred in Sam Stowe Creek (Fillmore Ranger District) and Briggs Creek (Beaver Ranger District) thereby reducing the risk of genetic loss. This population is highly susceptible to decline. Regular exclosure maintenance and frequent monitoring of livestock use needs to be insured to prevent further population declines due to grazing.

Forest fisheries personnel have visited Birch Creek yearly from 1999 to 2002 for aquatic macro invertebrate sampling, fish population sampling, general observations, and placement and retrieving of temperature monitors. Based on these visits, the limiting factors on Birch Creek are low stream flows and poor quality pools (both due to the absence of flushing flows and increased sediment from bank damage areas). Much of the BCT habitat on the Forest within Birch Creek is within exclosures. These exclosures were found to be generally non-functional in 1999-2000. Some protection has allowed aspen regeneration in the past, but it appeared that enough use was occurring to allow aquatic impacts. The exclosures were maintained in 2001, and by 2002 the upper exclosure was again protecting the stream.

Above the exclosures there are two small water gaps, which are contributing sediment to the stream. Above this the stream is in a conifer overstory habitat for about 0.5 mile. This area had good looking pools and shading. Conifer shading has reduced riparian forage production in parts

of this upper creek, but livestock use levels along the stream did not seem too excessive in 2001. Surveys in 2003, however, noted higher use levels and rated this reach as in downward trend. There is not an established fish population monitoring station in this reach.

High water temperatures are of concern on the lower habitat administered by the BLM despite the fact that it is in better condition. This is probably partially due to low elevation and low stream flows and thus high water heating with low thermal mass. This may be reducing trout numbers in these lower reaches.

To summarize, Birch Creek appears to have undergone a major decline in fish biomass and a slight reduction is stream occupied length due to effects of drought exacerbated by ongoing land management activities. An increase in land use administration and exclosure maintenance will be necessary to protect the remaining habitat. A future wet cycle may help restore habitat and the Bonneville cutthroat trout population.

Birch Creek East – re-introduced in 2001. This population has marginal stream habitat at best. It does not have an exclosure and receives livestock use. Forest fisheries personnel visited Birch Creek (E) in 2001. Based on these visits, the primary limiting factor on this creek is low flows and poor pool quality. The existing non-native brook trout population was extirpated by a wildfire and after fire effects in 1996. The stream was rested following the fire and looked good during summer 2001, although livestock use levels were high by late summer. A new user created ATV trail was found into the upper canyon in the fall of 2001, which diverted much of the stream flow down the trail, reducing channel flows available for fish and creating new erosion concerns. The district constructed barriers to close the trail to ATV use in 2002, which had been breeched in 2003. Spot electroshocking in the summer of 2003 verified survival of Bonneville cutthroat trout in the stream from the fall 2001 plant. Population monitoring will be conducted in the future on this population. Riparian evaluation was conducted in summer 2004.

Ten Mile Creek – re-introduced 2002 from Deep Creek on the Dixie NF. This population has not been monitored since its reintroduction. This population is not generally impacted heavily by grazing except near Bumblebee Springs and some isolated open meadows downstream. Forest fisheries personnel have visited Ten Mile Creek in 2000, 2001, and 2002. Based on these visits, the primary limiting factor on this creek is low flows and poor pool quality. The best habitat is in the middle canyon, where flows are higher and there are quality pools. Habitat at the upper and lower portions of the creek is marginal. This is an interesting system that appears to occupy erosive coarse sand and small gravel soil types. The majority of the creek has downcut 5-7 feet and has lost its access to the floodplain. Much of the upper creek has a conifer (white fir) overstory with limited understory. Willows and herbaceous streambank vegetation such as *Carex* are limited. This is the one Forest creek where sulfates have been detected during field water chemistry sampling. The lower station was 150 mg/l. Despite these above concerns, aquatic macroinvertebrate samples were above standards. Ten Mile Creek is serving as refugia for this genetic stock until Deep Creek recovers from the Sanford Fire and they can be reintroduced. After fish are reintroduced to Deep Creek, this drainage should be looked at for riparian treatments to reduce conifers, increase willows and sedge vegetation, and help the stream restore a floodplain. Population monitoring and riparian evaluation was conducted in

summer 2004. Population levels increased from the fish numbers planted from Deep Creek in 2002 (Fishlake N.F. file information).

Direct and Indirect Effects

The Action Alternative includes livestock grazing and associated activities within current Forest Plan grazing standards and guidelines as outlined in the "Description of the Proposed Action" (Section III above).

Direct Effects

Direct effects to Bonneville cutthroat trout from the action alternative will be generally unlikely but may occur in uncommon situations. The most likely example of direct effects would include direct injury of eggs in spawning redds by livestock in the stream for watering or trailing across the creek. Other direct effects are very unlikely and would occur only from trampling of spawning eggs during herding operations or accidental introduction of toxic materials such as gasoline into the stream from an OHV upset during allotment operations.

Indirect Effects

Indirect effects to Bonneville cutthroat trout would be those effects that impact water quality. The primary potential for indirectly impacting fish, aquatic macroinvertebrates, or aquatic habitats would be from the introduction of fine sediment to the streams. Fine sediment can change the species composition, diversity, and abundance of macroinvertebrates as well as suffocate trout eggs and fry. It also can reduce pool volume, reducing suitable habitat for adults during low flow stream periods, as well as reducing wintering habitat carrying capacity. Finally, it can carry harmful nutrients and chemicals into the streams.

Watershed and riparian vulnerabilities caused by overstocking are documented in some areas of the Beaver River Watershed (BRWA) and in the 2003 Fishlake National Forest Level II Riparian Inventories. Some of these areas occur on the North-Indian Creek, Pine Creek/Sulphur Beds, and South Beaver Allotments within the same riparian areas where Bonneville cutthroat trout are known to occur. These populations may be impacted because these vulnerabilities indicate that current grazing management practices may be exceeding watershed and riparian capabilities. These aquatic riparian habitats provide suitable habitat for known Bonneville cutthroat trout populations that may be affected by re-issuing term grazing permits in these 8 allotments on the Beaver Ranger District.

The re-issuance of grazing permits on these 8 allotments may result in a reduction of vegetation (especially desirable species i.e. sedges, willows) along the stream channel. Alterations in riparian plant composition resulting from overuse (as described in the BWRA) may cause vegetation conversions to less desirable species such as Kentucky bluegrass and redtop. Continued overutilization and reduction of stubble heights may also change rooting depths that affect bank stability. A reduction in vegetation and an increased concentration of livestock use in these riparian areas would have several indirect effects on the aquatic habitat. These effects include damage to streambanks from trampling, soil compaction, and shearing which often leads

to increased width/depth ratios and a loss of undercut banks. Undercut banks provide cover for Bonneville cutthroat trout. Damage to streambanks also cause increased sediment in the stream that decrease pool volume and cover spawning gravels. Increased width/depth ratios and a loss of stabilizing vegetation such as willows could lead to changes in stream shading. Both of these factors contribute to increased water temperatures. Furthermore, increased organic matter in the stream from livestock manure and direct effects such as cattle trampling spawned eggs may impact Bonneville cutthroat trout individuals and potentially suitable habitat for both sensitive fish species.

These effects may cause changes to aquatic biota diversity in these habitats. Fluctuations in water temperature and macro-invertebrate composition and density may impact Bonneville cutthroat trout individuals feeding and spawning success. Bonneville cutthroat trout require relatively cool, well oxygenated, water and the presence of clean, well-sorted gravels with minimal fine sediments for successful spawning (Rodriguez 2005). These effects may also impact potentially suitable habitat spread throughout the analysis area.

The two Bonneville cutthroat trout populations most heavily impacted by the proposed action will be Pine Creek and Birch Creek West (personal comm. with Jim Whelan). Grazing (the proposed action) and roads in Pine Creek may be impacting habitat and depressing populations but are not likely causing a trend to federal listing or a loss of viability.

A combination of prolonged drought, low flows, marginal habitat, and grazing (proposed action) have caused the Birch Creek West population to decline substantially since 1994. Maintenance of range improvements (as provided for in this proposed action) will be critical on exclosures that exclude livestock from parts of this drainage where the Bonneville cutthroat trout occurs.

Riparian exclosures can serve to improve water quality in streams by protecting the streambank from livestock grazing reducing sediment inputs and creating a vegetative buffer between grazed areas and the water to trap overland flow of sediment and nutrients. Small riparian exclosures exist on Pine Creek. A large percentage of Birch Creek West is within livestock exclosures. Maintenance levels were generally inadequate in the late 1990s and exclosures were only partially functional, but maintenance levels have increased in recent years.

Observations of riparian conditions by fisheries personnel and riparian contractors (see Petty 2003) are that riparian grazing standards were often exceeded on portions of these creeks. Coordinated and continued diligent effort to manage livestock appropriately and provide proper administration of livestock use so that grazing standards are met could result in reduced impacts from grazing compared to the current situation and a gradual improvement of habitat conditions on some portions of these streams.

Therefore, this proposed action may impact the Bonneville cutthroat trout individuals and/or their habitat but is not likely to cause a trend to federal listing or a loss of viability.

Cumulative Effects

The cumulative effects analysis area for Bonneville cutthroat trout in the project area is the Beaver Ranger District or each BCT watershed from pour points upstream. Past, present, and reasonably foreseeable activities within the cumulative effects area include introduction of native and non-native fish species, fish stocking, private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native plant species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, fishing, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development. The introduction of non-native fish, fish diseases, stocking of hatchery fish, grazing, fires, fire management activities (drafting water from streams/lakes), timber/thinning operations, hydroelectric development, irrigation diversion/development, and noxious weed control has altered riparian and upland vegetation composition and densities and riparian environments, which has reduced habitat for Bonneville cutthroat trout in some cases.

Water manipulation, drought, hydroelectric/municipal water development, mining activities, fishing, introduction of non-native fish, fish stocking, and the accidental introduction of fish diseases within the cumulative effects area has likely affected these sensitive fish populations. A few drainages within the analysis area are infected with whirling disease (i.e. Beaver River). These kinds of fish diseases along with competition from non-native fish species and water manipulation are major factors affecting potentially suitable habitats for Bonneville cutthroat trout populations. Water manipulation from the maintenance of range improvements (specified in the proposed action) may contribute to these major factors within the cumulative effects area. Other management activities listed above that contribute to erosion and sediment loading into streams (i.e. thinning/timber operations, mining, recreation, fire, etc.) may affect these sensitive fish species and/or habitat when coupled with this proposed action. Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may impact Bonneville cutthroat trout individuals and/or their habitats but is not likely to cause a trend toward federal listing or a loss of viability.

Reasonably foreseeable future activities – There are two classes of reasonably foreseeable future activities that are likely in the cumulative effects area for this project. First is an increased level of upland vegetation treatments to reduce fire fuel loading, sanitize spruce bark beetle infestations, salvage dying timber, and restore a more natural fire regime. These projects are part of the national Healthy Forests Initiative. Increased vegetation treatment levels could increase sedimentation impacts to these streams in the short-term, further reducing carrying capacity. Use of Best Management Practices (BMPs) should minimize impacts from these activities. The Forest Plan General Direction of "special protection and management" within 100 feet of a stream should further reduce impacts. Long-term this project work may reduce the risk of catastrophic fire, reducing the risk of loss of these populations from wildfire.

The second reasonably foreseeable future activity is continued Bonneville cutthroat trout reintroductions within the project area as a cooperative project between the Utah Division of Wildlife Resources and the Fishlake National Forest. Additional reintroduction work could put the Birch Creek West stock in much better habitat, reducing the risk to this genetic stock while at the same time facilitating necessary vegetation treatments in the Birch Creek watershed. In fact, future vegetation treatments and reintroductions may go hand in hand to reduce fire risk before reintroductions, while new introductions reduce the risk of vegetation treatments to established populations.

Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may impact Bonneville cutthroat trout individuals and/or their habitats but is not likely to cause a trend toward federal listing or a loss of viability.

Risks to Persistence

Rieman et al. (1993) reviews processes that contribute to local and regional extinctions of salmonids. Planning and assessments need to consider habitat disruption and population response at the local and regional scale and replication, dispersion, and connections among populations. They note that extinction risks for salmonids are influenced by complex interacting factors that are difficult to quantify. Quantitative viability analysis models have been developed for use in situations such as anadromous salmon populations where extensive data collection and passage counts at dams have allowed estimation of fecundity and survival parameters for different life stages. This data is not available for Bonneville cutthroat trout populations on the Fishlake National Forest, nor is it reasonable to obtain (due to cost and sampling impacts to the population being monitored). Given the lack of data, Rieman et al. (1993) provides a useful understanding of the nature of extinction process that can be used to formulate management prescriptions that minimize risks to individual populations.

Risks to local populations can be described as deterministic, stochastic, and genetic. Deterministic processes are a change in the environment that result in a sustained decreased birth rate or increased death rate. Examples for trout would be elimination of large wood decreasing the number of large pools needed during low summer flows of overwinter habitat, increase in fine sediments that degrade spawning habitat, and increased competition or predation with introduction of exotic fish. Rieman et al. (1993, p. 2) notes that "Any habitat change that irreversibly reduces survival or growth at any life stage increases the risk of deterministic extinction" and that "Much, if not most, of the loss of salmonid populations probably results from habitat change and other actions…..that induce deterministic responses".

Stochastic processes are chance events. They can be further categorized as environmental and demographic. Environmental stochastic processes include drought and catastrophic fire events. Catastrophic fire events have lead to the loss of 4 Bonneville cutthroat trout populations in southern Utah in 2001-2002. Drought has become an increasing concern in recent years. Demographic stochastic processes – small random variations in birth and survival rates – can also lead to extinction and is most of concern in very small populations. Some important points raised by Rieman et al. (1993) regarding stochastic events are that the risk increases sharply as

populations drop below 1,000-2,000 individuals, and that loss of habitat (quality and quantity, i.e. smaller less complex habitats) increases the risks from stochastic events.

Genetic risks are more theoretical, but are based on modeling that indicate minimum population sizes are needed to maintain the genetic diversity of a population and prevent genetic drift or inbreeding depression. One suggested population level for maintaining genetic diversity in closed populations is the 50/500 rule, where 50 is the minimum needed to prevent inbreeding and 500 is needed to maintain genetic variation (Rieman et al. 1993). This is effective (breeding animals) population size, which is less than the total population. Recent experience suggests that genetic risks are a secondary concern compared to environmental stochastic processes. These processes can work together to increase the risks to populations. Habitat changes, for example, that isolate, simplify, or reduce the amount of habitat can increase the risk to a population from environmental stochastic events.

Rieman et al. (1993) goes on to note that local extinctions were and still are part of a natural part of regional population dynamics. Connected populations that form a "metapopulation" allow for dispersal, emigration, and recolonization that help regional populations survive. Land management has also disrupted metapopulation processes by water diversions, dams, habitat changes, and introductions of exotic species. Rieman et al. (1993, p. 7) conclude that "We believe maintaining strong populations in the best possible habitats throughout the landscape and preserving metapopulation structure and function are the best hedges against extinction". [Note - there have also been some benefits to local populations from isolation. This has primarily been protection from non-native trout species that allowed pure remnant genetic stocks to survive. Where local populations are isolated fisheries biologist must take the role of the dispersal and recolonization agent.]

Based on the above discussion, the Bonneville cutthroat trout streams within the project area have been individually rated using the professional opinion of James Whelan, based on existing population and habitat data, and entered into tables below derived from *Table 1: Relative risk of extinction for local populations* found in Rieman et al. (1993, p. 8). It is important to understand that the action alternative – livestock grazing - affects primarily the growth and survival category rated as a deterministic risk. In other words, it affects one variable within the larger suite of risk elements, many of which are fixed regardless of the effects of this proposed action. The tables below describe the current management conditions. The no action/no grazing alternative change is shown in blue. If the action alternative is selected and implemented as designed, conditions would be between current and no action conditions.

Pine Creek

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Temporal Variability	Stochastic			X	
Population Size	Stochastic		X		
Growth/Survival	Deterministic	X---------*	X		
Isolation	Stochastic				X

*Effects from roads and trails would still impact the population.

North Fork of North Creek

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Temporal Variability	Stochastic			X	
Population Size	Stochastic	X			
Growth/Survival	Deterministic	X---------*	X		
Isolation	Stochastic				X**

*Effects from roads and trails would still impact the population.
**Potential to lower this risk with a future reintroduction project and elimination of a barrier.

Briggs Creek

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Temporal Variability	Stochastic			X	
Population Size	Stochastic		X----------	X	
Growth/Survival	Deterministic	X+			
Isolation	Stochastic				X

+Habitat has some natural water quality limitations even in pristine conditions.

Birch Creek West

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Temporal Variability	Stochastic			X	
Population Size	Stochastic		X----------	X	
Growth/Survival	Deterministic	X----------	----------++		X++
Isolation	Stochastic				X

++Effects are more likely on this stream due to a combination of naturally marginal habitat quality, grazing impacts, and environmental stochastic events (drought).

Birch Creek East

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Temporal Variability	Stochastic			X	
Population Size	Stochastic		X?		
Growth/Survival	Deterministic	X----------	X?		
Isolation	Stochastic				X

This stream was rested from grazing for 5 years from 1996-2001 following a wildfire, which allowed some riparian recovery. [field visits have showed some concerns since grazing resumed]

Ten Mile Creek

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Temporal Variability	Stochastic			X	
Population Size	Stochastic		X?		

Growth/Survival	Deterministic	X---X?			
Isolation	Stochastic				X

Grazing impacts are relatively localized and minor in extent on this stream.

One of the major objectives of fisheries managers is to maintain each pure remnant genetic stock of Bonneville cutthroat trout. Relatively few pure stocks have been identified in southern Utah. These stocks are more secure if they form a metapopulation, as described above, or at least if they are replicated to several streams dispersed across the landscape in cases where metapopulation potential is limited for habitat, biological, or social reasons. Metapopulation potential is limited on the Fishlake National Forest, so replication has been used to date. Based on the above discussion, the Bonneville cutthroat trout genetic stocks within the project area have been rated using the professional opinion of James Whelan, based on existing conditions, and entered into tables below derived from *Table 2. Relative risk of extinction for regional populations* found in Rieman et al. (1993, p. 9). These tables provide background information to help assess the concerns related to local populations shown in above tables.

Pine Creek (mixed) Stock

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Replication	Stochastic	X----------	X		
Synchrony	Stochastic	X----------	X		

North Fork of North Creek (somewhat introgressed) Stock

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Replication	Stochastic				X
Synchrony	Stochastic				X

Birch Creek Stock

Population Characteristics	Nature of Risk - Primary	Risk of Local Population Extinction			
		Low	Moderate	High	Extreme
Replication	Stochastic			X*-----	X
Synchrony	Stochastic		X----------	X	

*****Potential to lower this risk with a future reintroduction project into high quality habitat.

<u>Southern Bonneville Geographic Management Unit Overview</u>

To help put the project cumulative effects in context it is helpful to look at them within the context of a larger regional perspective. An appropriate large area for discussion is the Southern Bonneville Geographic Management Unit (SBGMU). This is a planning unit in the Utah Conservation Agreement and Strategy for Bonneville cutthroat trout.

The Utah Conservation Agreement and Strategy lists past, present, and potential threats to this subspecies as habitat degradation, detrimental interactions (hybridization, disease, and competition), overutilization, inadequate regulation, and other natural or human factors (Lentsch et al. 1997).

Within the Southern Bonneville GMU (and the subspecies range in general) certainly the greatest past impact that reduced the distribution of Bonneville cutthroat trout was hybridization with nonnative rainbow trout and nonnative subspecies of cutthroat trout. Stocking of nonnative rainbow and cutthroat trout is no longer being conducted in Bonneville cutthroat trout habitat in the SBGMU. There is still risk in some streams that nonnative trout could get past a fish barrier or be illegally planted, however. Competition with brook and brown trout likely occurred in the past, but is not currently a factor in the SBGMU. Again, there is a potential risk of future contamination, but this threat is far less serious than hybridization. Whirling disease has not been documented in any SBGMU Bonneville cutthroat trout waters, but there is a threat it could spread to them in the future.

Probably the second greatest impact in the past to SBGMU Bonneville cutthroat trout waters was habitat degradation from heavy grazing, timber management, low standard roads, etc. Land management has improved in recent years, and while some Bonneville watersheds do still have habitat impacts, these have not been enough to threaten the persistence of any of the populations in the SBGMU, with the possible exception of Birch Creek West.

Inadequate regulation may have been a factor in the past, but is not considered a current threat. Overutilization was not known to be a factor in Bonneville cutthroat trout declines or the current situation. Current Bonneville streams do not have excessive recreational fishing pressure that would impact the populations. Natural flood events, compounded by degraded habitat less able to withstand floods, impacted some Bonneville habitat in 1983. Socio-political factors are still factors reducing recovery potential, and could increase if Bonneville cutthroat trout are actually listed as a threatened species.

The overall impact of these factors, primarily hybridization due to past/historic stocking of nonnative trout and secondarily past habitat degradation, was that Bonneville cutthroat trout were reduced to very few miles of creek in the SBGMU by the 1970s. Some of this habitat was heavily impacted by land uses such as trailing of livestock. In southwestern Utah only three local populations of Bonneville cutthroat trout were known to exist in 1977 when conservation efforts to protect them and expand their distribution began (Hepworth et al. 1997). Their distribution has expanded dramatically during the 1980s and 1990s through renovation treatments and reintroductions, so that by 1997 there were 14 pure populations occupying 36 miles of stream and 58 surface acres of lake habitat in the SBGMU (Lentsch et al. 1997). In addition, habitat management and protection has improved with the fencing of some creeks, grazing exclosures, designation of habitat as "fish management emphasis" in management plans, designation of the Pine Valley Mountains Wilderness, and purchase of stream water rights, thus improving habitat quality.

There was a short-term decrease in the total number of stream miles of Bonneville cutthroat trout in the SBGMU as 4 populations were lost from fire in 2002. Two populations (one remnant and one reintroduction) were lost from a prescribed fire that escaped prescription on Mount Dutton. Two populations were lost on the Pine Valley Mountains from a naturally started wildfire. In 2003 one of two very limited populations on the west side of the Pine Valley Mountains was lost due to drought, possibly exacerbated my management impacts. Plans are to reintroduce

Bonneville cutthroat trout from replicant streams as soon as habitat conditions in affected streams allow. Hepworth et al. (2003) discusses the 2002 fire losses, recovery plans, and the need for dispersed replications of core populations.

Effects analysis for Forest Service Region IV Sensitive plants as listed in Table 4:

Tushar Paintbrush

Existing Condition

Tushar Paintbrush is endemic to the Tushar mountain range in south-central Utah. It can be found in high elevation alpine areas on igneous gravels and outcrops between 10,000 and 12,100 feet elevation. This species is only known to occur on the Beaver Ranger District of the Fishlake National Forest (Madsen 2003). There are 45 known discrete locations of Tushar Paintbrush on the Beaver Ranger District (Madsen 2003). This species is only distributed in Beaver and Piute Counties. This plant species is distributed at high elevations in the Joe Lott Fish Creek, Cottonwood, North Beaver, North-Indian Creek, Marysvale, Ten Mile, and Circleville Allotments. Potentially suitable habitat for this plant species only occurs at high elevations within these seven allotments.

Direct and Indirect Effects

The Utah Division of Wildlife Resources Big Game Range Trend Studies Program has established two monitoring transects for Tushar paintbrush on the Beaver Ranger District. These transects were established as part of an introduction program for mountain goats on the Tushar Mountain Range. Past data on these transects show that Tushar paintbrush is palatable and being eaten by grazing animals (possibly mountain goats). However, this would indicate that this species does have palatability and could be grazed by livestock. Therefore, direct effects to the Tushar paintbrush from this proposed action may include grazing, trampling, and other direct disturbances associated with grazing activities. Indirect effects to the Tushar paintbrush from this proposed action could result from accelerated erosion and displacement of soil. This may result from the reduction of forage and cover vegetation from implementing the proposed action. The proposed action may also affect the vegetative composition and diversity in potentially suitable habitat for Tushar paintbrush. The proposed action may change vegetation patterns that may result in effects to the Tushar paintbrush and their habitats.

The re-issuance of term grazing permits on these 8 allotments (proposed action) may contribute to problems related to noxious weeds. Livestock operations and their associated activities can result in the spread of noxious weeds. Disturbance from livestock can create a seedbed for noxious weeds to colonize. Livestock may also transport noxious weed seeds from adjacent land ownerships onto the Fishlake National Forest, which may establish new weed infestations. Because livestock are sometimes transported long distances for various reasons, there is also an increased risk of introducing new noxious weeds into the area that do not currently exist on the Fishlake National Forest. Finally, livestock grazing may reduce the dominance of grass and forb

species on rangelands that may, in turn, reduce the competition to noxious weeds attempting to establish on the Fishlake National Forest. The proposed action may increase the risk of further noxious weed invasion, proliferation, and spread. This may indirectly affect the Tushar paintbrush by allowing these aggressive noxious species to compete for resources in these suitable habitats. This may reduce populations of the Tushar paintbrush in each of the allotments where it occurs.

These effects would be minimized because Tushar paintbrush grows at high elevations (10,000 + feet) in rocky, lower forage production capability, environments where livestock generally are not present in great numbers. Livestock utilization in these upland alpine environments is not as prevalent as they would be in lower elevation riparian areas. Furthermore, the maximum allowable forage use criteria described in Table 1-2 of the proposed action outlines an upland grass/forb utilization of 40-60%. Since Tushar paintbrush is a high alpine upland forb, even if it were grazed by livestock at proper use levels, it would sustain a maximum 60% reduction of the stem. Tushar paintbrush is a perennial species with a stout woody caudex root mass (Atwood et al. 1991) that would resist uprooting from grazing. These proper use criteria would retain vegetation attributes within these high alpine communities at sustainable levels. Therefore, this proposed action may impact these Tushar paintbrush individuals and/or their habitat but is not likely to cause a trend to federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, animal re-introductions, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Re-issuing grazing permits in combination with animal re-introductions, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control may alter alpine vegetation composition and densities, which may reduce potentially suitable habitat for Tushar paintbrush and may affect individuals. Re-issuance of grazing permits in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities (BRWA 2002-2003) from increased erosion and changes in vegetation. These changes may contribute to population and potentially suitable habitat declines for the Tushar paintbrush. Re-issuing grazing permits in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to Tushar paintbrush habitat degradation and loss. Also, increased erosion from grazing in combination with recreational activities may cause sediment loss and further degradation of potentially suitable Tushar paintbrush habitats. With the exception of recreation and mining, many of these past, present, and reasonably forseeable activities

are less prevalent at high elevation alpine sites where the Tushar paintbrush occurs. Grazing at proper use levels, as described in the proposed action, would mitigate many of these potential impacts. Therefore, this proposed action in combination with these past, present, and reasonably foreseeable activities listed above may impact Tushar paintbrush individuals and/or their habitats but are not likely to cause a trend to federal listing or a loss of viability.

Creeping Draba

Existing Conditions

Creeping draba is found in alpine tundra and high elevation spruce/fir communities in igneous gravels and talus on the Tushar mountain range of the Fishlake National Forest. It only occurs on the Beaver Ranger District of the Fishlake National Forest (Madsen 2003). There are 24 known locations for this species on the Beaver Ranger District (Madsen 2003). These populations occur in the Joe Lott Fish Creek, Cottonwood, and North-Indian Creek Allotments of the analysis area. The North-Indian Creek Allotment is included in the scope of the proposed action. Potentially suitable habitat for creeping draba also occurs on the Ten Mile, Circleville, and Marysvale Allotments. Potentially suitable habitat for creeping draba is characterized by high elevation (10,000 + feet) open igneous gravels and talus with little vegetation cover. This species also occurs in krummholtz-like spruce-fir open talus communities.

Direct, Indirect, and Cumulative Effects

Since grazing livestock will not occur on open talus and gravel substrates with little vegetation cover or in spruce-fir krummholtz open talus communities, there will be no direct, indirect, and/or cumulative effects to creeping draba individuals and/or its habitat as a result of this proposed action.

Elsinore Buckwheat

Existing Condition

Elsinore Buckwheat is found in shadscale, mixed desert shrub, sagebrush, juniper and ponderosa pine communities on igneous gravels between 5,200 and 6,650 feet elevation (Madsen 2003). Joel Tuhy and the Utah Natural Heritage Program performed an exhaustive survey of all known locations and habitat for this species in the 1990's (Tuhy 1992). There are four populations that occur on the Beaver Ranger District. These occur on the Joe Lott Fish Creek Allotment at the northeast corner of the Beaver District (Madsen 2003). Potential habitats for this species are found on the periphery of the Sevier Valley. Elsinore buckwheat is not known to exist anywhere within the proposed action area, however, populations near the district boundary near Piute Reservoir would indicate potentially suitable habitat on the Junction Allotment. Therefore, potentially suitable habitat for Elsinore Buckwheat is only found on the Junction and Joe Lott Fish Creek Allotments. The proposed action will only have direct and indirect effects to potentially suitable habitat on the Junction Allotment.

Direct and Indirect Effects

Since there are no known populations anywhere within the proposed action area, there will be no direct and indirect effects to Elsinore buckwheat individuals resulting from the proposed action. Potentially suitable habitat for Elsinore buckwheat in the Junction Allotment may be affected by implementation of the proposed action.

These effects to potentially suitable habitat may result from the reduction of forage and cover vegetation from implementing the proposed action. The proposed action may also affect the vegetative composition and diversity in potentially suitable habitat for Elsinore buckwheat. The proposed action may change vegetation patterns that may result in effects to Elsinore buckwheat and their habitats.

The re-issuance of term grazing permits on these 8 allotments (proposed action) may contribute to problems related to noxious weeds. Livestock operations and their associated activities can result in the spread of noxious weeds. Disturbance from livestock can create a seedbed for noxious weeds to colonize. Livestock may also transport noxious weed seeds from adjacent land ownerships onto the Fishlake National Forest, which may establish new weed infestations. Because livestock are sometimes transported long distances for various reasons, there is also an increased risk of introducing new noxious weeds into the area that do not currently exist on the Fishlake National Forest. Finally, livestock grazing may reduce the dominance of grass and forb species on rangelands that may, in turn, reduce the competition to noxious weeds attempting to establish on the Fishlake National Forest. The proposed action may increase the risk of further noxious weed invasion, proliferation, and spread. This may indirectly affect potentially suitable habitats by allowing these aggressive noxious species to compete for resources.

The maximum allowable forage use criteria described in Table 1-2 of the proposed action outlines an upland grass/forb utilization of 40-60%. These proper use criteria levels would maintain vegetation attributes in these potentially suitable habitats that would foster plant composition stability and competition thwarting the success of invading noxious weeds. Therefore, this proposed action may impact Elsinore buckwheat individuals and/or their habitat but is not likely to cause a trend to federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, animal re-introductions, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Re-issuing grazing permits in combination with chaining/mechanical treatments, seeding, fires, irrigation diversion/development, and noxious weed control may alter upland vegetation composition and densities, which may reduce potentially suitable habitat for Elsinore buckwheat. Re-issuance of grazing permits in combination with p/j thinning, mechanical treatments, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities (BRWA 2002-2003) due to from increased erosion and changes in vegetation. These changes may contribute to potentially suitable habitat degradation for Elsinore buckwheat. Re-issuing grazing permits in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to Elsinore buckwheat habitat degradation and loss. Also, increased erosion from grazing in combination with recreational activities may cause sediment loss and further degradation of potentially suitable Elsinore buckwheat habitats. Grazing at proper use criteria levels, as described in the proposed action, would mitigate some of these impacts by preserving structure, density, composition, and vigor of vegetation resources in these habitats. This proposed action in combination with these past, present, and reasonably foreseeable activities listed above may impact Elsinore buckwheat individuals and/or their habitat but are not likely to cause a trend to federal listing or a loss of viability.

Ward's Beardtongue

Existing Condition

Ward's beardtongue is found in desert shrub, pinyon/juniper, sagebrush, shadscale, and greasewood communities on the Bald Knoll, Arapien Shale, and Colton Formations between 5,200 and 8,400 feet elevation. Ward's beardtongue is one of the most widely distributed sensitive plant species on the Forest occurring on the Fillmore, Beaver, and Richfield, and Loa Ranger Districts (Madsen 2003). However, there are only 4 populations found on the Beaver Ranger District (Madsen 2003). All of these populations occur in the northeast corner of the Joe Lott Fish Creek Allotment where these geologic substrates occur. This Allotment is not in the proposed action area. There is no other known locations or potentially suitable habitat for Ward's Beardtongue in the proposed action area.

Direct, Indirect, and Cumulative Effects

Since there is no presence of individuals or potentially suitable habitat within the proposed action area, there will be no direct, indirect, and/or cumulative effects to Ward's beardtongue individuals and/or its habitat as a result of this proposed action.

Arizona Willow

Existing Condition

Arizona willow is found on wet meadows, streamsides, seeps and springs in saturated soils near perennial water between 8,300 and 10,800 feet elevation (Madsen 2003). There are 23 populations of Arizona willow on the Loa and Richfield Ranger Districts of the Fishlake

National Forest (Madsen 2003). These populations consist of 55 separate sites of Arizona willow that contain between 4,400 and 14,300 individual plants (Rodriguez 2005). Recent surveys for this species have expanded its Forest range considerably in the past few years (Rodriguez 2005). An interagency Conservation Agreement and Strategy was completed for this species in 1995. There are no known populations of Arizona willow in the analysis area for this proposed action. However, potentially suitable habitats for Arizona willow do occur at elevations above 8,300 feet in the all of the allotments that meet this criterion.

Direct and Indirect Effects

Since Arizona willow is not known to occur within the analysis area, there will be no direct or indirect effects to individuals from the implementation of this proposed action. There is potentially suitable habitat that may occur in the analysis area. Changes in riparian vegetation and the introduction of noxious weeds from permitting cattle grazing may also have effects to wet meadow and riparian aquatic systems that provide Arizona willow habitat. Flow reduction of streams and springs within watersheds and centralizing the water into stock ponds and troughs also may effect watershed effectiveness. This may further reduce the availability of potentially suitable habitat for Arizona willow.

The Beaver River Watershed Assessment completed in 2002-2003 for the Beaver River Watershed includes the Pine Creek/Sulphurdale, North Indian, and South Beaver Allotments. These allotments comprise approximately 110,000 acres which equates to 63% of the project area. The Beaver River Watershed Assessment (hereafter referred to as BRWA) describes, in detail, existing condition of various ecological resources on the landscape. The BRWA documents major vegetation changes in certain cover types. Much of this change can be attributed to wildfire suppression. However, the BRWA also attributes some of this vegetation change to grazing by domestic livestock and wildlife. The BRWA concludes that vegetation changes that have occurred over the past 150 years has substantially reduced the carrying capacity for grazing and browsing ungulates (hooved mammals), and perhaps may be partially responsible for concentrating use in riparian areas. As a result, the BRWA concludes that proper use thresholds for bank stability, riparian stubble heights, or browse use are typically exceeded before upland slopes are fully utilized. "The grazing indices suggest that some watersheds and streams may be incurring excess use even if upland slopes are not being adversely affected" (BRWA 2002-2003). This statement suggests that riparian areas may be more heavily impacted by current grazing management practices than the uplands in some areas. Several smaller watersheds within the Greater Beaver River Watershed area (includes part of the analysis area) document overstocking rates in reference to livestock stocking rates in comparison to suitable watershed area and AUM stocking in comparison to riparian AUM production (BRWA 2002-2003). This would indicate that current grazing management practices may be exceeding watershed and riparian capabilities in some areas.

Fishlake National Forest Level II Riparian Inventories were completed in 2003 for the west side of the Beaver Ranger District (2003 Level II Riparian Inventory in draft). These inventories support the BRWA conclusion and document problems with current

grazing management, overgrazing, and/or heavy grazing on Little North Creek, Pine Creek, North Wildcat Creek, Wildcat Creek, North Fork of North Creek, Pole Creek, South Fork of North Creek, South Birch Creek, and Big Twist Creek. These creeks all occur on the Pine Creek/Sulphur Beds, North-Indian Creek, and South Beaver Allotments within the analysis area where potentially suitable habitat for Arizona willow may occur. The Level II Riparian Inventory summarizes its' conclusion for the Big Twist Creek Area (South Beaver Allotment):

"The conditions seen on these watersheds do not meet the objectives of healthy watersheds and riparian systems. This is primarily due to livestock and recreation management, which can be changed for the betterment for the land...There has been such deterioration in plant production that the amount of forage currently growing on these rangelands does not sustain the stocking rates."

These inventories document overutilization in these streamcourses. This overutilization is a direct result of non-compliance with the proper use criteria. When proper use criteria are not adhered to, as documented by these Riparian Level II Inventories, resource damage occurs. When adequate vegetation monitoring is not performed on the ground and livestock is not removed, proper use thresholds are crossed. Strict adherence to the proper use criteria, as outlined in this proposed action, would protect riparian areas from the kind of degradation described above. The maximum allowable forage use criteria described in Table 1-2 of the proposed action outlines an upland grass/forb utilization of 40-60% and maintaining ground cover of at least 70% in riparian areas. Under this proposed action, there would still be reduced vegetation but within recoverable limits. Current year's growth would be retained at 40% or greater on upland sites and riparian species would be retained at 1 1/2"- 6" depending on management area and/or species. Riparian areas would retain a minimum of 70% ground cover. Riparian upland browse would be retained at a minimum of 40-50% depending on age class. These proper use criteria would retain the character and proper functioning condition of healthy riparian areas and improve conditions in unhealthy riparian areas like those described above.

Some of these riparian habitats provide potentially suitable habitats for Arizona willow that may be affected by re-issuing term grazing permits in these 8 allotments on the Beaver Ranger District. Therefore, this proposed action may impact Arizona willow individuals and/or their habitat but is not likely to cause a trend to federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native plant species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, fishing, camping, day/picnic use, hiking, horseback riding, all-terrain

vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development. Grazing, fires, fire management activities (drafting water from streams/lakes), timber/thinning operations, hydroelectric development, irrigation diversion/development, and noxious weed control has altered riparian and upland vegetation composition and densities and riparian environments, which has reduced habitat for Arizona willow in some cases and created habitat in others.

Water manipulation, draught, hydroelectric/municipal water development, and mining activities within the cumulative effects area may have affected potential habitat for Arizona willow. Water manipulation from the maintenance of range improvements (specified in the proposed action) may contribute to these major factors within the cumulative effects area. Other management activities listed above that contribute to erosion and sediment loading into streams (i.e. thinning/timber operations, mining, recreation, fire, etc.) may affect potential habitat for Arizona willow when coupled with this proposed action. However, strict adherence to the proper use criteria, as outlined in the proposed action, will mitigate some of these impacts. Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may impact Arizona willow individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Beaver Mountain Groundsel

Existing Condition

Beaver mountain groundsel is found on alpine tundra and high elevation spruce/fir communities on open igneous gravels and talus on the Tushar Mountain Range of the Fishlake National Forest. It only occurs on the Beaver Ranger District of the Fishlake National Forest above 10,800 feet elevation (Madsen 2003). There are 9 known locations for this species on the Beaver Ranger District all of which occur on the Joe Lott Fish Creek, North-Indian Creek, and Cottonwood Creek Allotments (Madsen 2003). The North-Indian Creek Allotment is included in the scope of this proposed action. Potentially suitable habitat for Beaver Mountain groundsel also occurs on the Ten Mile, Circleville, and Marysvale Allotments. Potentially suitable habitat for creeping draba is characterized by high elevation (10,800 + feet) open igneous gravels and talus with little vegetation cover. This species also occurs in krummholtz-like spruce-fir open talus communities.

Direct, Indirect, and Cumulative Effects

Since grazing livestock will not occur on open talus and gravel substrates with little vegetation cover or in spruce-fir krummholtz open talus communities, there will be no direct, indirect, and/or cumulative effects to Beaver Mountain groundsel individuals and/or its habitat as a result of this proposed action.

Effects analysis for Management Indicator Species as listed in Table 1:

Elk and Mule Deer

Existing Condition

Population status and Winter Range
The Forest comprises parts of five of UDWR's 30 Wildlife Management Units, sometimes referred to as hunt units; this analysis area is fully contained within Unit #22 Beaver. Elk and mule deer are found within the analysis area year round. However few elk, and even fewer deer, remain at the higher elevations during winter and typically migrate to other public or even private land. Big Game herd unit objectives and current status along with the percentage of winter range on National Forest System lands on the Beaver District are included in Table A. From this table, one can see that the Forest manages a larger proportion of elk winter range compared to the relatively small amount of deer winter range within the Beaver Herd Unit. This said, there are approximately 64,243 acres of deer winter range within the analysis area, which makes up 77% of that on the District and 14% of that on the Forest as a whole (Rodriguez 2005).

Winter range for elk is more plentiful with 57,687 acres estimated within the analysis area, which equates to 82% of the District and 11% of the winter range estimated on the entire Forest.

Table A. Shown is the status of deer and elk populations in Utah Division of Wildlife Resource's Beaver herd unit along with the proportion of winter habitat in the herd unit encompassed within the Forest boundary.

	DEER		ELK	
Unit	Status (% of herd objective)	% of winter Range USFS	Status (% of herd objective)	% of winter Range USFS
Beaver	86	14	95	34

Source: *The UDWR has delineated and classified by value, deer and elk wintering habitat on the Fishlake National Forest. Deer habitat shapefiles (dated 11/2004) were obtained from the UDWR's website and both "high value" and "critical" winter range polygons were combined for this analysis. Likewise, elk habitat shapefiles (dated 11/2004) were also obtained from the UDWR's website and both "high value", "yearlong substantial" and "critical" winter range polygons were combined for this analysis. There are approximately 475,109 acres of deer winter range and approximately 545,711 acres of elk winter range on the Fishlake Forest.*

Population estimates of deer throughout the Utah Division of Wildlife Resources (UDWR) Southern region, including the Beaver Unit have trended down since 2001 until last year. The lack of fawn recruitment was attributed to multi-year drought conditions and degrading winter ranges. This trend improved with 2004 population estimates up some 24% across the units mentioned previously from 57,300 in 2003 to 70,825 in 2004 (Rodriguez 2005). For the Beaver Deer Herd Unit specifically, the population was estimated at 86% of objective or 10,320.

Elk herds on the Forest are actively managed by antlerless hunts in an attempt to maintain them at herd objective levels. Within the same Southern Region referenced above, elk herds have increased some 26% since 2002 to 13,730 estimated for 2004. The antlerless permits have likewise increased from 1,250 to 2,145 during this same time period (Rodriguez 2005). For the

Beaver Elk Herd Unit specifically, the population increased from approximately 350 elk in 2002 to 921 elk in 2005, some 95% of objective, based on recent aerial survey data (Rodriguez 2005). These data also suggest that elk are well distributed across the District and the analysis area.

Summer Use—Fawning/Calving Areas

Again, shapefiles were obtained from UDWR's website and critical and high value deer summer habitat areas were combined for analysis. Because fawn parturition and rearing takes place at a range of elevations and in a variety of habitat types, the DWR has delineated these classes of habitat based on observational data and in some cases limited amounts of radio-telemetry data. Important site specific variables typical of key fawning areas in the West are slopes less than 15%, and forest community types with heavier ground cover--like those with shrub-sapling structural classes found below 9,400 feet in elevation, and close proximity to water (de Vos et al 2003). There are approximately 109,230 acres of deer fawning/summer habitat in the analysis area which is roughly 51% of that on the District and 11% of that estimated on the Forest.

Elk calving habitat was also delineated in conjunction with UDWR biologists based on radio-telemetry data from research in the past decade coupled with pre-season herd classification observations. There is a strong tie to aspen community features in relationship to elk calving in the West, especially on the Fishlake Forest (Flinders 1996). There are approximately 49,676 acres of elk calving habitat in the analysis area, which represents 74% of that on the District and 25% of that estimated on the Forest.

Direct and Indirect Effects

Implementation of this proposed action would reduce forage and cover for elk and mule deer within the analysis area through livestock use. Permitting grazing livestock on these allotments would cause competiton for forage resources, especially on winter forage availability for elk. Further effects on elk and mule deer include a change in vegetation composition/structure, introduction of noxious weeds which may out compete local floras, the flow reduction of streams/seeps/springs into troughs and stock ponds, trampling of vegetation and compaction of soils all of which may effect elk and mule deer habitat. Direct audio/visual disturbance from grazing livestock on summer range and winter range (Junction Allotment) may result in elk and mule deer not utilizing suitable habitat, habitat fragmentation, and disruption of travel corridors.

Furthermore, the Beaver River Watershed Assessment (BRWA) references a study on the response to aspen restoration treatments near the Beaver River Watershed in part of the analysis area. Thirty three sites were surveyed to monitor the success of aspen regeneration following a variety of treatments. This sudy states : "In most cases, sites fenced to preclude all cattle and wildlife browsing produced the greatest number of aspen suckers compared to adjacent, unfenced, or cattle-excluded sites...it is also important for terminal shoots of the young aspen to grow beyond the reach of browsing ungulates before treatments can be deemed successful. This research would indicate that re-issuing term grazing permits for these 8 allotments may have an impact on aspen vegetation types in some areas. A decline in high forage value aspen vegetation types resulting from the proposed action may impact elk and mule deer habitat where these vegetation types occur in the analysis area. The BRWA estimates that there has been an 85%

decline in aspen vegetation types during the past 125 years in the Beaver River Watershed (BRWA 2002-2003). This decline has reduced foraging habitats for both domestic livestock and mule deer and elk throughout the analysis area. However, strict adherence to proper use criteria (a minimum of 40-50% on upland browse species such as aspen), as specified in the proposed action, would alleviate some of this impact on aspen within the analysis area and actually move habitat conditions to be more effective.

Maintenance of vegetation conversions (included as range improvements) provided for in the proposed action would increase forage values and pallatable vegetation in sagebrush and pinyon-juniper dominated cover types. This increase in vegetation forage productivity on these rangelands may affect the availability of suitable forage for elk and mule deer and increase their productivity and numbers. Maintenance of these vegetation conversions, in many cases, have improved habitat for mule deer and elk in the analysis area. All this being said, it is important to note that as was stated above, elk numbers have increased to 95% of objective despite the recent drought conditions and with the current grazing system. Deer have also increased recently to 86% of objective with the State focusing on winter range improvement and predator removal to increase survival. Though grazing can affect deer summer range and fawning habitat effectiveness, this kind of competition is not currently considered limiting to deer populations on the west side of the Fishlake National Forest (Sean Kelly, DWR -Pers. Comm.). Impacts from grazing to critical winter ranges is much more worrysome, yet elk are nearly at carrying capacity and only 7% of the winter range identified for deer is on the Forest. Therefore, some individual elk and mule deer and their habitat may be impacted, however this proposed action would not adversely impact the viability of these populations.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include big game management, private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and aerial seeding of burned areas, chaining, seeding of native and non-native species, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as small mine claims, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Big game management by the Utah Division of Wildlife Resources is the primary factor affecting elk and mule deer population numbers throughout the analysis area. Grazing, chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control has altered riparian and upland vegetation composition and densities, which has reduced habitat for elk and mule deer in some cases and created habitat in others. Habitat improvement projects (i.e. seeding, pinyon/juniper chainings and thinnings, prescribed burning, and water developments) across the Forest have helped to double the estimated elk population since 1986 (Rodriguez 2005). Recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to elk and mule deer habitat fragmentation, habitat loss, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public

interactions. These roads and trails may also create travel corridors for mule deer and elk that improve connectivity within and between habitats.

The effects of the past, present, and reasonably foreseeable activities listed above in combination with the proposed action may impact some elk and mule deer individuals but these cumulative effects would not adversely impact the viability of these populations.

Northern Goshawk

For a full disclosure and analysis of existing condition and effects to the goshawk from implementing the proposed action, refer to the previous discussion for Forest Service Sensitive Wildlife species.

Cavity Nesters (Hairy Woodpecker, Western Bluebird, & Mountain Bluebird)

Existing Condition

All of these species occur throughout the analysis area. Hairy woodpecker is common in closed canopy forest and mountain bluebirds frequent open areas and meadow edges. The western bluebird is not especially common in the analysis area but it does occur. Rodriguez (2004) states the hairy woodpecker and western bluebird populations are stable and viable on the Fishlake National Forest. The mountain bluebird population is also stable to slightly up in trend and viable on the Fishlake National Forest (Rodriguez 2005). Approximately 85,929 acres of potentially suitable nesting habitat occurs throughout the analysis area, which equates to 61% of the habitat on the District and 16% of the potential suitable habitat on the Forest. For more information regarding monitoring information, trends, ecology, threats, etc. for these species, refer to *Life History and Analysis of Endangered, Threatened, Candidate, sensitive, and Management Indicator Species of the Fishlake National Forest, Version 4.0* (Rodriguez 2005).

Direct and Indirect Effects

Direct effects of the proposed action to hairy woodpecker, western bluebird, and mountain bluebird individuals would be minimal. These species are cavity nesters that build their nest sites in the hollows of trees, branches, stumps, or logs. The hairy woodpecker often excavates its own nest site. The mountain bluebird occasionally will nest in rocks and crevices (Rodriguez 2005). Individuals of these species forage primarily on insects. The hairy woodpecker also eats mast, sap, and cambium (Rodriguez 2005). Direct effects to individuals from grazing livestock would be minimal. Foraging opportunities would be the same around livestock. Range improvements such as stock ponds and troughs may even benefit these species by offering an available water source where there may be no other. However, indirect effects to individuals from fluctuations in insect populations and effects to vegetation composition and structure of suitable habitat may affect these species.

All of these species are largely insectivorous. This prey base population could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from erosion (i.e. compaction from trampling), percent of stream shading (i.e.

understory vegetation loss), and organic matter (i.e. cattle manure), forage reduction, vegetation composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline. Grazing at proper use levels under this proposed action would move toward more effective habitat for these species.

Changes brought on by alterations in vegetation composition and density as a result of the proposed action may increase foraging opportunities and nest sites in some cases and reduce it in others. A change in composition in the understory of forested landscapes may alter structure, cover, and nest site availablity for these bird species while largely not affecting any nests themselves. Therefore, some individual hairy woodpeckers, western bluebirds, mountain bluebirds and their habitats may be impacted, however this proposed action would not adversely impact the viability of these populations.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

This proposed action in combination with past, present and reasonably forseeable future actions may cause changes in riparian and upland health and vigor. As the vertical and horizontal vegetation diversity of riparian and upland areas change, insect populations, distribution, and species diversity would fluctuate. This may alter prey species for the hairy woodpecker, western bluebird, and mountain bluebird on the uplands and riparian areas where these species forage. Past actions have had long-term effects to vegetation across the analysis area. In most areas where grazing was permitted in riparian and uplands, habitat conditions vary as to their suitabilty for prey species for cavity nesters such as these. Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with the proposed action may impact hairy woodpecker, western bluebird, and mountain bluebird individuals and their habitats, however this proposed action would not adversely impact the viability of these populations.

Sage Nesters (Brewer's Sparrow, Vesper Sparrow, Sage Thrasher)

Existing Condition

The Brewer's sparrow, vesper sparrow, and sage thrasher occur primarily in sagebrush habitats throughout the analysis area. Between 2002 and 2003, there were 14 detections of sage thrasher on the Fishlake National Forest (Rodriguez 2005). Rodriguez (2004) states the Brewer's and Vesper sparrow populations are stable to slightly up in trend, and likely viable on the Fishlake

National Forest. Approximately 68,066 acres of potentially suitable nesting habitat occurs throughout the analysis area, which equates to 58% of the habitat on the District and 10% of the potential suitable habitat on the Forest. For more information regarding monitoring information, trends, ecology, threats, etc. for these species, refer to *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake National Forest, Version 4.0* (Rodriguez 2005).

Direct and Indirect Effects

All three of these MIS birds nest either on or low to the ground under some kind of foilage cover (Rodriguez 2005). Direct effects to nest sites from trampling livestock may lower nest success and productivity of these MIS birds. Reduction of forage and cover resulting from this proposed action may directly affect these MIS sage nester birds and their habitat. Maintenance of vegetation conversions (specified in this proposed action) may also have effects on Brewer's sparrow, vesper sparrow, and sage thrasher disturbance and potentially suitable habitat. Maintenance through the use of Dixie Harrow, Brush Hogs, hand thinning, and others may cause destruction of nests yet maintain sagebrush on a given site rather than allow exchroachmnet by pinyon/juniper. These mechanical treatments may also cause alterations in the tall, decadent nature of sagebrush which may reduce suitable habitat in some cases and increase it in others. These MIS birds feed on insects and fruits/seed (i.e. grass/forb seed and berries) (Rodriguez 2005). The vegetation conversion maintenance may provide more vegetation diversity (more early seral grasses) for feeding needs of these MIS birds and maintain sagebrush-steppe habitats on the landscape rather than pinyon/juniper dominated. Various treatments may also help to maintain needed sage structure and age diversity to meet the needs of these various species. For example, the sage thrasher requires some foilage for cover above the nest (ground nests are common where shrub canopy is low) (Rodriguez 2005). Vesper sparrows also often nest on the ground beneath the cover of shrubs, grasses or forbs (Rodriguez 2005). The Brewer's sparrow forages on the ground and builds its' nest in shrubs or a low tree (Rodriguez 2005).

All of these species are partly insectivorous. Theses prey base populations could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and organic matter (i.e. cattle manure), forage reduction, vegetation composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline. These fluctuations in insect populations may affect these MIS sage nesters' prey availability and overall energy base. Strict adherence to proper use criteria, as specified in the proposed action, would help to preserve vegetation composition, density, structure, and diversity. The adherence to these standards would offset the impacts to vegetation and, subsequently, soils. Therefore, some individual Brewer's sparrows, vesper sparrows, and sage thrashers and their habitats may be impacted, however this proposed action would not adversely impact the viability of these populations.

Cumulative Effects

Refer to "Cumulative Effects Common to All Management Indicator Species (Rydberg's milkvetch excepted) and/or Habitats and Migratory Birds Analyzed in this Report" at the beginning of this section.

Riparian Guild (Lincoln's Sparrow, Song Sparrow, Yellow Warbler, and MacGillivray's Warbler)

Existing Condition

All four of these management indicator species (MIS) are known to occur within the analysis area and are strongly associated with riparian habitats (Rodriguez 2005). Rodriguez (2004) states the Lincoln's sparrow population is stable and likely viable on the Fishlake National Forest. The yellow warbler population is in an upward trend and likely viable on the Fishlake National Forest (Rodriguez 2005). The song sparrow population is likely stable or in a slightly downward trend, however, it is still likely viable on the Fishlake National Forest (Rodriguez 2005). The MacGillivray's warbler trend is considered stable or perhaps, upward on the Fishlake National Forest (Rodriguez 2005). Approximately 1,281 acres of potentially suitable nesting habitat occurs throughout the analysis area, which equates to 44% of the habitat on the District and 7% of the potential suitable habitat on the Forest. For more information regarding monitoring information, trends, ecology, threats, etc. for these species, refer to *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake National Forest, Version 4.0* (Rodriguez 2005).

Direct and Indirect Effects

Direct effects to Lincoln's sparrow, song sparrow, yellow warbler, and MacGillivray's warbler resulting from the proposed action would be limited to audio and visual disturbance and possible trampling of ground nests by grazing livestock in riparian areas. This may affect the nesting success and productivity of some or all of these MIS birds.

Utilization by livestock and wildlife, coupled with the tendency of cattle to concentrate in riparian areas, may cause declines in desireable species in riparian areas such as willow. These types of vegetation changes may contribute to a loss of multi-layered riparian understories the loss of access to the floodplain, which concerntrates flood energies and reduces riparian area. These changes may effect the overall suitablilty of riparian habitats for these four MIS birds. Several smaller watersheds within the Greater Beaver River Watershed area document overstocking rates in reference to livestock stocking rates in comparison to suitable watershed area and AUM stocking in comparison to riparian AUM production (BRWA 2002-2003). This would indicate that current grazing management practices may be exceeding watershed and riparian capabilities in some areas. This may affect suitable habitats for these four MIS birds.

All of these MIS riparian bird species commonly feed on insects (Rodriguez 2005). This prey base population could possibly be affected by changes in the riparian aquatic corridors. Sediment loading into the stream from increased erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and increased

organic matter (i.e. cattle manure) are just a few factors that may alter aquatic biota and, consequently, composition and density of various insect populations. Some types of insects may increase while others decline. However, strict adherence to proper use criteria guidelines, as specified in the proposed action, would halt these trends and move towards more eefective habitat for these bird species and their prey. Therefore, some individual Lincoln's sparrows, song sparrows, yellow warblers, and MacGillivray's warblers and their habitats may be impacted, however this proposed action would not adversely impact the viability of these populations.

Cumulative Effects

Refer to "Cumulative Effects Common to All Management Indicator Species (Rydberg's milkvetch excepted) and/or Habitats and Migratory Birds Analyzed in this Report" at the beginning of this section.

Bonneville Cutthroat Trout

For a full disclosure and analysis of existing condition and effects to the Bonneville cutthroat trout from implementing the proposed action, refer to the previous discussion for Sensitive Wildlife Species.

Resident Trout (Rainbow, Brown, Brook, Cutthroat, and Lake) and Macroinvertebrates

Existing Condition

These resident trout species and aquatic macroinvertebrates are present in perennial riparian stream corridors throughout the analysis area. They are being analyzed simultaneously because they share similar habitats. Effects of the proposed action will be discussed in terms of water quality and the quality of the aquatic environment. Rodriguez (2004) states that populations of rainbow, brown, brook, and cutthroat trout are stable and viable on the Fishlake National Forest. Lake trout numbers have also remained relatively stable on the Fishlake National Forest however, a reduced number become larger (>22-26 inch) trophy lake trout (Rodriguez 2005). Aquatic macroinvertebrate Biotic Condition Index (BCI) trend (1986-2002) for the entire Fishlake National Forest is down slightly after peaking in the late 1980's, with a generally static trend since the early 1990's (Rodriguez 2005). The Beaver Ranger District watersheds (that have been adequately sampled) peaked in the late 1980's, and have declined slightly since, but generally remain at or above Forest Plan standards (Rodriguez 2005). The exception to this is in the Birch Creek West drainage (South Beaver Allotment) that declined to slightly below standards by the late 1990's (Rodriguez 2005). This Biotic Condition Index (BCI) provides a quantitative measure of aquatic health due to overall watershed condition, land management activities, and natural disturbances. For more information regarding monitoring information, trends, ecology, threats, etc. for these species, refer to *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake National Forest, Version 4.0* (Rodriguez 2005).

Direct and Indirect Effects

Watershed and riparian vulnerabilities caused by overstocking are documented in some areas of the Beaver River Watershed (BRWA) and in the 2003 Fishlake National Forest Level II Riparian Inventories. Populations of resident trout and macroinvertebrates may be impacted because these vulnerabilities indicate that current grazing management practices may be exceeding watershed and riparian capabilities. These aquatic riparian habitats provide suitable habitat for resident trout and macroinvertebrate populations that may be affected by re-issuing term grazing permits in these 8 allotments on the Beaver Ranger District.

The re-issuance of grazing permits on these 8 allotments may result in a reduction of vegetation (especially desirable species i.e. sedges, willows) along the stream channel. Alterations in riparian plant composition resulting from overuse (as described in the BWRA) may cause vegetation conversions to less desirable species such as Kentucky bluegrass and redtop. Continued overutilization and reduction of stubble heights may also change plant rooting depths that affect bank stability. A reduction in vegetation and an increased concentration of livestock use in these riparian areas would have several indirect effects on the aquatic habitat. These effects include damage to streambanks from trampling, soil compaction, and shearing which often leads to increased width/depth ratios and a loss of undercut banks. Undercut banks provide cover for resident trout. Damage to streambanks also cause increased sediment in the stream that decrease pool volume and cover spawning gravels. Increased width/depth ratios and a loss of stabilizing vegetation such as willows could lead to changes in stream shading. Both of these factors contribute to increased water temperatures. Furthermore, increased organic matter in the stream from livestock manure and direct effects such as cattle trampling spawned eggs may impact resident trout and macroinvertebrate populations throughout the analysis area.

These effects may cause changes to aquatic biota diversity in these habitats. In some cases, fluctuations in water temperature may cause changes in macroinvertebrate composition and density. This may affect macroinvertebrate populations and resident trout. Since resident trout are dependent upon macroinvertebrates for feeding, an increase or decrease in macroinvertebrate populations would affect resident trout populations accordingly. However, strict adherence to proper use criteria guidelines, as specified in the proposed action, would minimize alterations in vegetation and a change in the character of aquatic environments that would contribute to some of these impacts. Therefore, individual resident trout (rainbow, brown, brook, cutthroat, lake) and macroinvertebrates and their habitats may be impacted, however this proposed action would not adversely impact the viability of these populations.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include introduction of native and non-native fish species, fish stocking, private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native plant species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include

hunting, fishing, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development. The introduction of non-native fish, fish diseases, stocking of hatchery fish, grazing, fires, fire management activities (drafting water from streams/lakes), timber/thinning operations, hydroelectric development, irrigation diversion/development, and noxious weed control has altered riparian and upland vegetation composition and densities and riparian environments, which has reduced habitat for resident trout and macroinvertebrates in some cases and created habitat in others.

Water manipulation, drought, hydroelectric/municipal water development, mining activities, fishing, introduction of non-native fish, fish stocking, and the accidental introduction of fish diseases within the cumulative effects area may have affected these resident trout and macroinvertebrate populations. A few drainages within the analysis area are infected with whirling disease (i.e. Beaver River). These kinds of fish diseases along with competition from non-native fish species and water manipulation are major factors affecting resident trout and macroinvertebrate populations. Water manipulation from the maintenance of range improvements (specified in the proposed action) may contribute to these major factors within the cumulative effects area. Other management activities listed above that contribute to erosion and sediment loading into streams (i.e. thinning/timber operations, mining, recreation, fire, etc.) may affect these resident trout and macroinvertebrate species and/or habitat when coupled with this proposed action. However, adherence to proper use criteria, as outlined in the proposed action would help to minimize effects to vegetation, soils, and watersheds surrounding aquatic environments. Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with the proposed action may impact resident trout and macroinvertebrate individuals and their habitats, however this proposed action would not adversely impact the viability of these populations.

Rydberg's Milkvetch

Existing Condition

There are 31 known locations containing 95,000+ individuals of Rydberg's milkvetch on the Fishlake National Forest (Rodriguez 2005). Rydberg's milkvetch is stable and viable across the Forest (Rodriguez 2005). There are three monitoring transects that have been established for this species in the Tushar Mountains of the Beaver Ranger District. This species is not known to occur in the proposed action area. Rydberg's milkvetch is only known to occur on the Cottonwood and North Beaver Allotments (Madsen 2003). Neither of these allotments is included within the scope of this proposed action area. Suitable habitat for this species in the Tushar Mountains is high elevation (8,000+ feet), igneous intrusive gravels on open barren hillsides with little vegetation cover. Hillsides where this species is usually found are generally gentle sloping. There may be potentially suitable habitat for Rydberg's milkvetch on North-Indian Creek, Circleville, and Ten Mile Allotments. These allotments are included in the proposed action area.

Direct, Indirect, and Cumulative Effects

Since grazing livestock will not occur on open, barren, volcanic hillsides with little vegetation cover, there will be no direct, indirect, and/or cumulative effects to Rydberg's milkvetch individuals and/or its habitat as a result of this proposed action.

Migratory Birds

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts are fully protected. This Act is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protected selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle).

Under the Act it is unlawful to take, import, export, possess, buy, sell, purchase, or barter any migratory bird. Feathers or other parts, nests, eggs, and products made from migratory birds are also covered by the Act. Take is defined as pursuing, hunting, capturing, trapping, or collecting.

Under the direction of Executive Order 13186 signed on January 10, 2001, Federal agencies are directed to evaluate effects of actions and agency plans on migratory birds, with emphasis on species of concern. A recent list of migratory bird species of concern was delineated by the FWS in Birds of Conservation Concern 2002 (USFWS 2002). The proposed action described in this report will occur on lands administered by the Fishlake National Forest. In Birds of Conservation Concern 2002 (USFWS 2002), the migratory bird species of concern are delineated within separate Bird Conservation Regions (BCR's) in the United States. The lands administered by the Fishlake National Forest fall within 2 separate BCR's. These include BCR 9 (Great Basin) and BCR 16 (Southern Rockies/Colorado Plateau). Both species lists have been reviewed. The BCR 9 (Great Basin) and BCR 16 (Southern Rockies/Colorado Plateau) lists have 39 migratory bird species of concern. Five of these species have already been analyzed for effects within this report and within the Biological Assessment (BA) and Biological Evaluation (BE) written for this project. These include the peregrine falcon, yellow-billed cuckoo, the flammulated owl, Brewer's sparrow, and sage sparrow. The effects and determination of this proposed action to the additional 34 migratory bird species of concern will be the same as those effects and determination disclosed for cavity nester, sage nester, riparian guild bird species in this report if foraging, nesting, and/or breeding habitat occur in the project area for these migratory species.

VI. DESCRIPTION OF ALT. B-- NO ACTION/ NO GRAZING ALTERNATIVE

For this analysis, "no action" is synonymous with "no grazing". This alternative means that livestock grazing would not be authorized within the project area. Essentially, this alternative states that livestock grazing would be phased out on this 173,000-acre area; new term grazing permits would not be issued as current permits expire.

VII. EFFECTS OF ALT. B-- NO ACTION/ NO GRAZING ALTERNATIVE

The Dixie National Forest developed a comprehensive literature review of the effects of livestock grazing of natural resources in 1995 (USDA 1995). This was prepared as a reference document for reviewing accumulated research literature describing the effects of livestock grazing at proper use and no grazing. The wildlife habitats found on the Dixie National Forest (analyzed in the 1995 document) and in the analysis area for this project are also similar. Therefore, this document was reviewed to help assess general effects of no grazing to wildlife species and wildlife habitats.

Direct, indirect, and cumulative effects common to all vertebrate and macroinvertebrate species listed in Tables 1,2, and 3 in this report have been disclosed in the following two subheadings. Additional effects, if any, relevant to each species has been disclosed under the species headings in this section. This was done because many of the effects of implementing this no action – no grazing alternative were common to all vertebrate and macroinvertebrate species analyzed. Existing condition for all species in this document has already been described previously in this report, the Biological Assessment, and Biological Evaluations prepared specifically for this project. Refer to these documents for existing condition.

Direct and indirect effects of the no action – no grazing alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I

Under implementation of the no action – no grazing alternative, forage availability and cover for many of the terrestrial wildlife species listed in this report would increase. Vegetation densities and plant vigor for many species in these eight allotments would increase. This increase in vegetation would contribute to increased organic material and soil-building capabilities and increase water retention of these watersheds. As a result, there would be less potential for erosion and sediment loading into aquatic systems. Vegetation composition may change. Plant species that are decreasers under grazing pressure would stabilize and may increase. Invasive species that have a tendancy to pioneer into areas disturbed by grazing would receive more competition from the local pallatable flora that is usually reduced to a stubble height by grazing. These plant species may be more vigorous and productive throughout their life cycles. Vegetation and soil trampling and compaction from grazing livestock would cease. This would also contribute to increased plant vigor and water retention in the soil. In riparian areas, these changes would lead to improved bank stabilities, undercut banks, decreased sedimentation into the stream channels, increased pool volume, decreased width/depth ratios, decreased water temperatures, and an increase in desireable bank stabilizing vegetation such as willows and sedges.

Under implementation of the no action – no grazing alternative, range improvements such as stock ponds, troughs, pipelines, fences, cattle guards, and vegetation conversions would not be maintained. Deterioration of stock ponds, troughs, and pipelines may lead to effects on the species analyzed in this report. Stock ponds and troughs provide catchments for many wildlife vertebrate species to use as a water source. These catchments and pipelines also de-water streams, seeps, and springs that are critical to the wildlife species analyzed in this report. This water would eventually return to its native streamcourse if these improvements are allowed to deteriorate over a long enough period of time. These streamcourses often have natural catchment basins and pools that would still be available for wildlife use. These natural

catchments may only be available as an ephemeral water source in some cases, and a perennial water source in others. If water from seeps and springs were allowed to return to its natural stream channel, watershed function and dynamics would improve for these stream channels. This available water would also reach further down into the lower elevational fringes of the analysis area where it would further enhance and improve habitat for the wildlife species analyzed in this report, and possibly, their prey.

A deterioration of livestock fences and cattleguards would probably have little effect on the wildlife species analyzed in this report. Generally, livestock fences are not high enough to impede wildlife (i.e. birds, mule deer, elk, etc.) movement throughout the analysis area. Habitat fragmentation is probably not occuring as a result of fences for the species analyzed in this report.

Maintenance of vegetation conversions in some vegetation types, such as pinyon-juniper and sagebrush may enhance habitat for some species and eliminate it for others. Pinyon-juniper encroachment and decadent sagebrush and other disclimax and late seral species may evetually dominate sites where vegetation conversions have been done and maintained in these cover types. A lack of maintenance of these vegetation conversions in this alternative may cause the early seral seeded grass sites to revert to the later seral cover types. This would cause a decline in forage values for some species analyzed in this report (i.e. elk and mule deer) and an increase in forage and cover values for others (i.e. pygmy rabbit and sage grouse). In heavily dominated pinyon-juniper woodlands, there would also be an increased susceptibility for erosion resulting from a generally depauperate understory. The productivity of the sites is often low. Site capability of these areas may be increased through vegetation conversion, however productivity may still be stifled because of terrain, poor soil conditions, and geologic features of the substrata.

The 85% decline of aspen (BRWA 2002-2003) within the Beaver River Watershed Assessment portion of the analysis area may improve with implementation of this no action – no grazing alternative. Conifer enroachment into aspen stands has been documented and defined as a substantial ecological change in the Beaver River Watershed from historical times (BRWA 2002-2003). Much of this change can be attributed to fire suppression. However, aspen regeneration projects involving prescribed fire and timber/thinning operations have been affected by grazing livestock and wildlife (BRWA 2002-2003). The Beaver River Watershed Assessment identifies a local study regarding aspen regeneration treatment success. Thirty three sites were surveyed to monitor the success of aspen regeneration following a variety of treatments. This study states : “In most cases, sites fenced to preclude all cattle and wildlife browsing produced the greatest number of aspen suckers compared to adjacent, unfenced, or cattle-excluded sites...it is also important for terminal shoots of the young aspen to grow beyond the reach of browsing ungulates before treatments can be deemed successful. Further analysis showed that under low densities of elk, deer, and cattle, their cumulative utilization may ultimately doom restoration efforts to failure unless relief from excessive browsing can be guaranteed.” Implementation of this alternative would decrease the impacts to regenerating aspen by eliminating browsing livestock from the analysis area. Therefore, this alternative would improve aspen growth and more diverse vegetation understories often associated with it. This would improve habitats for all the terrestrial wildlife species (analyzed in this report) that use this habitat during some portion of their life cycle.

Riparian vegetation that grazing cattle have a greater tendancy to overutilize (as demonstrated in the BRWA and Level II Riparain Inventories) would improve in all streamscourses and drainages in the analysis area. David Krueper, Jonathan Bart, and Terrell D. Rich performed a study down on the San Pedro River of Arizona (Krueper et al. 2003). They found that the density of herbaceous vegetation in riparian areas had a four to six fold increase following the removal of grazing livestock from the San Pedro Riparian National Conservation Area. A potential increase such as this for native and naturalized vegetation in riparian areas within these eight allotments would improve riparian habitats that are used by all species analyzed in this document. This kind of increase would contribute to increased bank stability and decreased sedimentation into these aquatic systems.

Under current grazing management strategies, the Riparian Level II Inventories (2003) document that the upland slopes in some riparian areas (i.e. South Creek – South Beaver Allotment) have poor herbaceous species composition and low ground cover. Annuals dominate the uplands adjacent to the lower reaches, which lowers the soils ability to resist erosion. This increases sediment delivery into the stream and shortens the storm response time and increases peak flows, which have more erosive power on the stream channel. Therefore, a a drastic change in livestock grazing as described in this no action – no grazing alternative, may affect vegetation composition on the uplands by providing for perennial, soil-stabilizing, vegetation. This kind of vegetation change in the uplands may prevent further degradation in the aquatic systems.

Generally, the implementation of this alternative would cause riparian and upland habitats to improve for all vertebrate and macroinvertebrate species with suitable habitat in the analysis area. Therefore, implementation of the no action – no grazing alternative will have beneficial effects to all vertebrate and macroinvertebrate species and/or their habitats analyzed in this report (Utah prairie dog, mule deer, elk excepted – see further analysis below).

Cumulative effects of the no action – no grazing alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Implementation of the no action – no grazing alternative in combination with the activities listed above would not contribute to incremental impacts resulting from this list. This alternative specifies that no action of permit re-issuance on these eight allotments would be taken and grazing permits would be allowed to expire. Therefore, the no action – no grazing alternative, in combination with these activities listed above, would have no

impact on any of the vertebrate and macroinvertebrate species analyzed in this report (mule deer and elk excepted).

Elk and Mule Deer

Direct and Indirect Effects

Under this alternative, vegetation conversions aimed at providing livestock forage may not be maintained. Many of these vegetation conversions provide suitable foraging habitat (high forage value) for elk and mule deer. During recent years, many conversions have been maintained and others created with hazardous fuels reduction revenue and/or wildlife habitat improvement cost share money from conservation organizations. If these habitats are not maintained in early seral grass/sagebrush communities, much of their forage value may be lost. However, the forage usually consumed by domestic livestock throughout the analysis area would be available for elk and mule deer use throughout the year. This would also increase forage on usable winter range which is limiting for both of these species. Furthermore, wintering elk and mule deer would distribute themselves more evenly over the landscape and acheive a more even utilization of the vegetation resource. Big game numbers would likely be allowed to increase beyond current popuation objective levels as carrying capacity would allow. Therefore, individual elk and mule deer and their habitats may be impacted, however this alternative would not adversely impact the viability of these populations.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include big game management, private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and aerial seeding of burned areas, chaining, seeding of native and non-native species, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as small mine claims, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Big game management by the Utah Division of Wildlife Resources is the primary factor affecting elk and mule deer population numbers throughout the analysis area. Implementation of this no action – no grazing alternative in combination with big game management may increase mule deer and elk numbers in some cases, and decrease them in others. Implementation of this alternative may increase habitat suitability and forage potential and possibly, population numbers, in the analysis area. This may, in turn, lead to adjustments in big game management objectives. These changes may lead to population increases in some cases, and decreases in others. Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with the proposed action may impact elk and mule deer individuals and their habitats, however this alternative would not adversely impact the viability of these populations.

Utah Prairie Dog

Direct and Indirect Effects

The Utah prairie dog often benefits from having reduced stubble heights within their colonies. Reduced stubble heights allow them to forage more vigorously and reduce their risk of predation (See "Effects of the Proposed Action" section in the Biological Assessment prepared specifically for this project). The no action – no grazing alternative may increase plant vigor and create a situation where tall stubble heights would be common on vegetation within the analysis area. However, under this alternative, there would be more suitable forage available to them near their colony burrows. Therefore, they may not have to travel as far to forage. This may also decrease their risk of predation. Since no Utah Prairie dogs are known to occur within the analysis area, these direct and indirect effects would only apply to potentially suitable habitat. Therefore, this no action – no grazing alternative may affect but is not likely to adversely affect Utah prairie dogs and/or their habitat.

Cumulative Effects

Refer to the "Cumulative effects of the no action – no grazing alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I" analyzed above.

Breeding Birds: Migratory Birds, Northern goshawk, Cavity Nesters (hairy woodpecker, mountain bluebird, western bluebird), Sage Nesters (Brewer's sparrow, vesper sparrow, sage thrasher), Riparian Guild (Lincoln's sparrow, song sparrow, yellow warbler, MacGillivray's warbler), Flammulated Owl, Three-toed Woodpecker, Peregrine Falcon, Greater Sage Grouse, Bald Eagle, and Western Yellow-Billed Cuckoo

Direct and Indirect Effects

A study on the San Pedro Riparian National Consevation Area in Arizona suggest that removing cattle from riparian areas can benefit breeding bird populations (Krueper et al. 2003). The number of individuals of all avian species detected on surveys increased each year from 103/km in 1986 (1 year before grazing removal) to 221/km in 1991 (4 years after grazing removal) (Krueper et al. 2003). This is an average annual increase of 23% (Krueper et al. 2003). The largest increases occurred in riparian species, open-cup nesters, Neotropical migrants, and insectivores (Krueper et al. 2003). This study suggests that these increases in breeding bird populations were caused by a change in local conditions (livestock removal), not by regional effects. This study suggests that factors influenced by livestock grazing depress breeding bird populations. Therefore, the removal of livestock grazing within the analysis area will have beneficial effects to breeding bird individuals and/or their habitat analyzed in this report.

Cumulative Effects

Refer to the "Cumulative effects of the no action – no grazing alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I" analyzed above.

Spotted Bat and Western-Big Eared Bat

Direct and Indirect Effects

Since neither of these bat species are known to occur within the analysis area, direct and indirect effects to individuals would not occur as a result of this no action –no grazing alternative. Direct and indirect effects to potentially suitable habitat would be limited. Since these bats require caves, mines, rock crevices, abandoned buildings, and other largely undisturbed places, the would be no effects to potential roosting habitat from this alternative. However, foraging habitat and prey species (insects) may be affected by the removal of livestock in these allotments.

Both of these bats are insectivorous. The Townsend's Big-eared bats' diet is comprised largely of moths (Rodriguez 2005). The spotted bat usually feeds on larger insect such as Lepidoptera and grasshoppers. This prey base population could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Overall, these effects would be beneficial. Krueper et al. 2003 states that one of the largest avian increases for the San Pedro Riparian National Conservation Area was in insectivores. This may indicate that changes in vegetation and riparian improvement from the removal of livestock may lead to an increase in the diversity and density of insects (prey base). A factor in this avian insectivore increase was at least partial result of increased food source (insects). Therefore, these sensitive insectivorous bat species may benefit from implementation of this alternative. This alternative may have beneficial effects on spotted bat and Townsend's Big-eared bat individuals and/or their habitat.

Cumulative Effects

Refer to the "Cumulative effects of the no action – no grazing alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I" analyzed above.

Pygmy Rabbit

Direct and Indirect Effects

An increase in forage and cover resulting from the implementation of this alternative may have beneficial effects to the Pygmy rabbit. Pygmy rabbits are seldom found in areas of sparse vegetative cover and seem to be reluctant to cross open space (Rodriguez 2005). Pygmy rabbits typically use habitat in taller, more decadent stands of sagebrush. An increase in forage and cover may augment the pygmy rabbits' ability to forage and feed productively. It may also reduce the risk of predation to pygmy rabbits.

The deterioration of vegetation conversions under this alternative may also have beneficial effects on potentially suitable habitat for the pygmy rabbit. A lack of maintenance through the

use of Dixie Harrow, Brush Hogs, hand thinning, and others would mean that Pygmy rabbit underground burrows would not be disturbed. If these mechanical treatments are removed, the tall, decadent nature of sagebrush needed by the pygmy rabbit would be maintained in a late seral state. This alternative may also push other sagebrush sites toward late seral conditions where pygmy rabbit feeding and cover are optimal. Therefore, this alternative will have beneficial effects to pygmy rabbit individuals and/or their habitat.

Cumulative Effects

Refer to the "Cumulative effects of the no action – no grazing alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I" analyzed above.

Aquatic Species: Bonneville Cutthroat Trout, Colorado River Cutthroat Trout, Resident Trout (rainbow, brown, brook, cutthroat, lake) and Macroinvertebrates

Direct and Indirect Effects

Riparian vegetation that grazing cattle have a greater tendancy to overutilize (as demonstrated in the BRWA and Level II Riparain Inventories) would improve in all streamscourses and drainages in the analysis area. David Krueper, Jonathan Bart, and Terrell D. Rich performed a study down on the San Pedro River of Arizona (Krueper et al. 2003). They found that the density of herbaceous vegetation in riparian areas had a four to six fold increase following the removal of grazing livestock from the San Pedro Riparian National Conservation Area. A potential increase such as this for native and naturalized vegetation in riparian areas within these eight allotments would improve riparian habitats that are used by all species analyzed in this document. This kind of increase would contribute to increased bank stability and decreased sedimentation into these aquatic systems.

Under current grazing management strategies, the Riparian Level II Inventories (2003) document that the upland slopes in some riparian areas (i.e. South Creek – South Beaver Allotment) have poor herbaceous species composition and low ground cover. Annuals dominate the uplands adjacent to the lower reaches, which lowers the soils ability to resist erosion. This increases sediment delivery into the stream and shortens the storm response time and increases peak flows, which have more erosive power on the stream channel. Therefore, a a drastic change in livestock grazing as described in this no action – no grazing alternative, may affect vegetation composition on the uplands by providing for perennial, soil-tabilizing, vegetation. This kind of vegetation change in the uplands may prevent further degradation in the aquatic systems.

Under this alternative, vegetation densities and plant vigor for many species in these eight allotments would increase. This increase in vegetation would contribute to increased organic material and soil-building capabilities and increase water retention of these watersheds. As a result, there would be less potential for erosion and sediment loading into aquatic systems. Vegetation composition may change. Plant species that are decreasers under grazing pressure would stabilize and may increase. Invasive species that have a tendancy to pioneer into areas disturbed by grazing would receive more competition from the local pallotable flora that is

usually reduced to a stubble height by grazing. These plant species may be more vigorous and productive throughout their life cycles. Vegetation and soil trampling and compaction from grazing livestock would cease. This would also contribute to increased plant vigor and water retention in the soil. In riparian areas, these changes would lead to improved bank stabilities, undercut banks, decreased sedimentation into the stream channels, increased pool volume, decreased width/depth ratios, decreased water temperatures, and an increase in desireable bank stabilizing vegetation such as willows and sedges.

Furthermore, the deterioration and reduction of range improvements that manipulate spring, seep, and stream flows in the analysis area (a result of this alternative) may also benefit these aquatic sensitive and management indicator species. This would provide potentially suitable habitat in drainages where it did not previously occur.

The implementation of this no action – no grazing alternative, would have beneficial effects on Bonneville cutthroat trout, resident trout, and macroinvertebrate individuals and/or their habitats.

Cumulative Effects

Refer to the "Cumulative effects of the no action – no grazing alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I" analyzed above.

Tushar Paintbrush, Elsinore Buckwheat, and Arizona Willow

Direct and Indirect Effects

Implementation of the no action – no grazing alternative would allow grazing permits to expire resulting in the elimination of livestock grazing use in these eight allotments. This alternative would release vegetation resources in the proposed action area from livestock grazing pressure. As a result, native and naturalized vegetation would increase in vigor and density, and noxious weed/undesirable species populations may be reduced in numbers and distribution through competition. Grazing livestock would also cease to be a source of seed spread for both desirable and undesirable species. Direct effects to Tushar paintbrush from livestock grazing and trampling would be eliminated. Potentially suitable habitats for Elsinore buckwheat, Arizona willow, and Tushar paintbrush would be enhanced by improved vegetation diversity and watershed capability in both riparian areas and the uplands. These factors would have beneficial effects to sensitive plant species such as Tushar paintbrush, Elsinore buckwheat, and Arizona Willow individuals and/or their habitats.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining,

hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Implementation of the no action – no grazing alternative in combination with the activities listed above would not contribute to incremental impacts resulting from this list. This alternative specifies that no action of permit re-issuance on these eight allotments would be taken and grazing permits would be allowed to expire. Therefore, the no action – no grazing alternative, in combination with these activities listed above, would have no impact on Tushar paintbrush, Elsinore Buckwheat, and Arizona willow and/or their habitats.

Rydberg's milkvetch, Creeping Draba, Ward's Beardtongue, and Beaver Mountain Groundsel

Direct, Indirect, and Cumulative Effects

Since grazing livestock will not occur on open, barren plant comunities with little vegetation cover and geologic substrata where these plant species occur, there will be no direct, indirect, and/or cumulative impacts to Rydberg's milkvetch, creeping draba, and Ward's beardtongue individuals and/or their habitats as a result of this no action no grazing alternative.

VIII. DESCRIPTION OF ALT. C—SUSTAINED MULTIPLE USE GRAZING

While taking "sustainable multiple use" as its basic premise, this alternative focuses on five management features: 1) extensive modifications to allowable forage utilization, 2) rangeland suitability, including forage production requisites, 3) consideration of a lengthy list of threatened, endangered, candidate, and sensitive (TECS) plant and animal species, many for which there are potential habitat but no known occurrences, 4) loss of key ecosystem components, including mule deer fawning habitat, beaver populations, aspen regeneration, goshawk habitat, non-native forage species, and 5) monitoring.

The SMU-G Alternative proposes cattle grazing as one among many multiple uses of the Forest's vegetation, and emphasizes 1) the long-term health and recovery of understory native grasses, forbs, and shrubs, 2) the health and recovery of populations of all native, sensitive animals and plants, 3) protection and recovery of aquatic and riparian vegetation and systems, 4) prevention of invasive species, 5) proportionally reduced forage utilization during drought, 6) protection of plant growth and reproduction in light of cumulative "take" of plant vegetation and reproductive parts by both wildlife and cattle. Under this alternative, permitted livestock will be reduced as emphasis is placed on classifying some lands as unsuitable for livestock grazing, determining stocking rates based on actual rather than potential forage production, and including more limiting forage utilization criteria.

Objectives:

1. Maintain and restore native biodiversity and ecosystem complexity while continuing to allow cattle grazing as one multiple-use.
2. Allow all endangered, threatened, and sensitive terrestrial and aquatic animal and plant species on the Forest to thrive or recover.
3. Improve habitat for management indicator species and species of special concern to meet their reproductive, structural, and/or functional needs.
4. Determine grazing stocking levels, seasons of use, and management practices on an ecologically-based range capacity analysis. Such an analysis includes excluding from grazing capacity certain sensitive habitats.
5. Mitigate the potential introduction of invasive non-native species.

IX. EFFECTS OF ALT. C—SUSTAINED MULTIPLE USE GRAZING (SMU-G)

This alternative essentially reduces suitable rangeland and associated stocking capacity by 50-70% when compared to the proposed action. This dramtaic reduction is largely due to the requirement that grazing capacities be re-calculated based on only 25% use of actual production of desirable and intermediate plant species and goes further to deem various rangelends unsuitable for grazing.

Direct, indirect, and cumulative effects common to all vertebrate and macroinvertebrate species listed in Tables 1,2, and 3 in this report have been disclosed in the following two subheadings. Additional effects, if any, relevant to each species has been disclosed under the species headings in this section. This was done because many of the effects of implementing this SMU-G grazing alternative were common to all vertebrate and macroinvertebrate species analyzed. Existing conditions for all species in this document have already been described previously in this report.

Direct and indirect effects of the SMU-G alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I

Under implementation of the SMU-G alternative, forage availability and cover for many of the terrestrial wildlife species listed in this report would likely increase proportional to the reduction in livestock use. However, negative impacts associated with livesock grazing like noxious weed introduction/spread and riparian vegetation changes would continue but would likely be reduced and overall riparian function should improve over time. Grazing impacts in areas of concentrated use, like those around key feeding and bedding areas, water sources, and mineral licks would also continue. All range improvements including stock ponds, troughs, pipelines, fences, cattle guards, and vegetation conversions would still need to be maintained to mitigate and manage cattle use. All parameters of this alternative relating to grazing levels and vegetational use criteria are still dependent on AMP and permittee compliance.

Vegetation structure may change as the balance between grazing pressure decreasers, invaders, and increasers change to this new level of use. Aspen regeneration problems and ripairian issues documented and discussed earlier from the BRWA and Riparian Level II Inventories may be somewhat improved under this alternative; however, many aspen regeneration projects are very small in scale (<50 acres) and can tolerate little cumulative grazing. Only a handful of cattle

and/or big game may be suppressing aspen sprouts from reaching the height necessary to avoid browsers in relativley small treatments, so these effects may continue under this alternative.

Vegetation and soil trampling and compaction from grazing livestock would decrease proportional to the reduction in numbers. This would also contribute to increased plant vigor and water retention in the soil. In riparian areas, these changes would lead to improved bank stabilities, less undercut banks, decreased sedimentation into the stream channels, increased pool volume, decreased width/depth ratios, decreased water temperatures, and an increase in desireable bank stabilizing vegetation such as willows and sedges.

Generally, the implementation of this alternative would cause riparian and upland habitats to improve over time for all vertebrate and macroinvertebrate species with suitable habitat in the analysis area. Therefore, implementation of the SMU-G alternative will increase habitat effectiveness for all vertebrate and macroinvertebrate species and/or their habitats analyzed in this report.

Cumulative effects of the SMU-G alternative common to all vertebrate and macroinvertebrate species listed in Tables 1, 2, and 3 of Section I

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Grazing in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control have and continue to alter riparian and upland vegetation composition and densities, which may reduce potentially suitable habitat for these MIS and migratory bird species and their prey in some cases and create habitat in others. Maintenance of vegetation-type conversions may increase forage and cover potential for some big game and small mammal species in pinyon-juniper and sagebrush cover types. However, grazing would then reduce the forage and cover available in these conversions to these species. Re-issuance of grazing permits in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) due to increased erosion and changes in vegetation. Re-issuing grazing permits in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to MIS and migratory bird habitat fragmentation, habitat loss, creation of travel corridors, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. Also, increased erosion from grazing in combination with recreational activities may cause sediment loss and degradation of riparian aquatic systems. Strict adherence to proper use criteria for grazing, as outlined in the alternative, would mitigate some of these impacts by maintaining vegetation diversity, composition, structure, and density.

Implementation of the SMU-G alternative in combination with these past, present, and reasonably foreseeable activities listed above may impact these vertebrate TECS, MIS and migratory bird individuals and their habitat, however this proposed action would not adversely impact the viability of these populations. Habitat conditions will improve over time and lead to an increase in habitat effectiveness.

SMU-G Alternative effects analysis for Threatened, Endangered, or Candidate Species from Table 2 in Section I.

Bald Eagle

Direct and Indirect Effects

During the winter months when migrating bald eagles may be found in the analysis area, livestock are generally not present. The exception to this is in the Junction allotment where winter cattle use is allowed from November 1 through February 15. In this 6,172 acre allotment, there are currently 35 cow-calf pairs permitted for winter use (this would likely be adjusted under SMU-G). Direct effects from permitting grazing cattle to individual wintering bald eagles would not occur. However, direct and indirect effects to bald eagle foraging habitat and, consequently, prey species for the bald eagle would occur as a result of the SMU-G alternative but likley to a lesser degree than the proposed action due to the reduction in cattle use. Reduced forage and cover for prey species as a result of permitting cattle grazing in these eight allotments may reduce the productivity of small prey animals that provide an energy base for wintering bald eagles. The SMU-G alternative allows for less use of the vegetative resources than the proposed action and therefore, habitat effectiveness for prey species of the bald eagle would not be compromised substantially.

Changes in riparian vegetation from permitting cattle grazing and the introduction of noxious weeds by permitting cattle use may also have effects to aquatic systems that provide habitats for aquatic prey species that wintering bald eagles feed on. Flow reductions of streams and springs within watersheds and centralizing the water into stock ponds and troughs also may effect watershed effectiveness. This may further reduce the availability of suitable water sources for bald eagle prey species. The Beaver River Watershed Assessment completed in 2002-2003 for the Beaver River Watershed includes the Pine Creek/Sulphurdale, North Indian, and South Beaver Allotments. These allotments comprise approximately 110,000 acres which equates to 63% of the project area. The Beaver River Watershed Assessment (hereafter referred to as BRWA) describes, in detail, existing condition of various ecological resources on the landscape. The BRWA documents major vegetation changes in certain cover types. Much of this change can be attributed to wildfire suppression. However, the BRWA also attributes some of this vegetation change to grazing by domestic livestock and wildlife. The BRWA concludes that vegetation changes that have occurred over the past 150 years has substantially reduced the carrying capacity for grazing and browsing ungulates (hooved mammals), and perhaps may be partially responsible for concentrating use in riparian areas. As a result, the BRWA concludes that proper use thresholds for bank stability, riparian stubble heights, or browse use are typically

exceeded before upland slopes are fully utilized. "The grazing indices suggest that some watersheds and streams may be incurring excess use even if upland slopes are not being adversely affected" (BRWA 2002-2003). This statement suggests that riparian areas may be more heavily impacted by current grazing management practices than the uplands in some areas. The SMU-G alternative may or may not go far enough to correct or reverse some of these grazing impacts. SMU-G also will rely on proper cattle management through allotment structure maintenance and herding when use thresholds are met. Bald eagle foraging habitat and prey species may be affected by these impacts in riparian areas.

However, the utilization indicators under SMU-G would allow for acceptable retension of cover and sufficient forage for prey. These criteria would retain enough vegetation cover to keep prey species for bald eagles from declining both in riparian and upland areas. These criteria would also allow for vegetation to rebound from this utilization. Furthermore, bald eagles generally use the analysis area in the winter when vegetation is not actively growing and prey species may not be as heavily dependent on active vegetative growth. Critical habitat has never been identified on the Fishlake National Forest and no winter roost sites have ever been found within the analysis area. Therefore, implementation of the SMU-G alternative may affect but is not likely to adversely affect the bald eagle and/or its habitat.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Grazing in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control have and will continue to alter riparian and upland vegetation composition and densities, which may reduce winter foraging habitat for bald eagles, small mammals (prey), and aquatic species (prey) in some cases and create habitat in others. Maintenance of vegetation-type conversions as specified in the proposed action may increase forage and cover potential for some small mammal prey species in pinyon-juniper and sagebrush cover types. However, the action of grazing would then reduce the forage and cover available in these conversions to prey species. Grazing in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) from increased erosion and changes in vegetation. Grazing in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to bald eagle winter foraging habitat fragmentation, habitat loss, creation of travel corridors, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. Also, erosion from grazing in combination with recreational activities may cause sediment loss and further degradation of riparian aquatic systems. However, grazing at SMU-G

utilization levels as described in the alternative would offset many of these impacts. By retaining a standard for vegetation structure, density, and composition as allowed for by these criteria, many of these impacts will be avoided.

Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with this SMU-G alternative may affect but is not likely to adversely affect the bald eagle and/or its habitat.

Utah Prairie Dog

Direct and Indirect Effects

Since there are no Utah prairie dogs known to occur within the analysis area, direct and indirect effects of reissuing grazing permits to Utah prairie dog individuals would not occur. However, effects to potentially suitable habitat within the analysis area may occur. Grazing in these 8 allotments would result in reduced forage and cover on potentially suitable habitat, lowering its effectiveness. Other effects from grazing to potentially suitable habitat within the analysis area are soil compaction from trampling cattle and irrigation diversion/water displacement and development from maintaining stock ponds and troughs for livestock use. McDonald 1992 found that colonies lacking moist vegetation are decimated by drought because prairie dogs are unable to obtain sufficient water and nutrients (Rodriguez 2005). The displacement of water through these water developments (needed to manage cattle distribution) may reduce potentially suitable habitat for Utah prairie dogs in some cases, and create habitat in others.

The Utah Prairie Dog Recovery Plan (USFWS 1991) states that the vegetative height within the colony must be low enough to allow standing prairie dogs to scan their environment for predators. For this reason, controlled grazing is compatible with prairie dog colonies (USFWS 1991). Grazing at proper use levels, as described in the SMU-G alternative would maintain vegetation needed for potentially suitable Utah prairie dog habitats. Currently, there is 5 acres of habitat designated on the South Beaver Allotment with sagebrush and bare rock dominating the site with no prairie dogs known to occur since shortly after the transplant attempt. Therefore, the proposed action may affect but is not likely to adversely affect the Utah prairie dog and/or its habitat.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Grazing in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control may alter low gradient riparian and upland vegetation composition and densities, which may reduce potentially suitable Utah prairie dog habitat, in some cases, and create habitat in others. Maintenance of vegetation-type conversions may increase colony-building and forage potential in pinyon-juniper and sagebrush cover types. Grazing would then reduce the forage and cover available in these conversions which, in turn, increases vigilance (feeding) (Utah Prairie Dog Recovery Team Meeting - Richie 2/3/2004). Grazing in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) from increased erosion and changes in vegetation. Grazing in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to potentially suitable Utah prairie dog habitat fragmentation, habitat loss, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. Grazing at proper use levels would help to mitigate vegetation changes that contribute to these impacts. The effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may affect but is not likely to adversely affect the Utah prairie dog and/or its habitat.

Western Yellow-billed Cuckoo

Direct and Indirect Effects

Since there are no western yellow-billed cuckoos known to exist in the analysis area, there will be no direct or indirect effects to western yellow-billed cukoo individuals. However, since there is potentially suitable habitat for this species, grazing may effect potentially suitable habitat.

Changes in riparian vegetation from permitting cattle grazing and the introduction of noxious weeds by permitting cattle use may also have effects to aquatic systems that provide habitats for the western yellow-billed cuckoo. Flow reduction of streams and springs within watersheds and centralizing the water into stock ponds and troughs also may effect watershed effectiveness. The Beaver River Watershed Assessment completed in 2002-2003 for the Beaver River Watershed includes the Pine Creek/Sulphurdale, North Indian, and South Beaver Allotments. These allotments comprise approximately 110,000 acres which equates to 63% of the project area. The Beaver River Watershed Assessment (BRWA) describes, in detail, existing condition of various ecological resources on the landscape. The BRWA documents major vegetation changes in certain cover types. Much of this change can be attributed to wildfire suppression. However, the BRWA also attributes some of this vegetation change to grazing by domestic livestock and wildlife. The BRWA concludes that vegetation changes that have occurred over the past 150 years has substantially reduced the carrying capacity for grazing and browsing ungulates (hooved mammals), and perhaps may be partially responsible for concentrating use in riparian areas. As a result, the BRWA concludes that proper use thresholds for bank stability, riparian stubble heights, or browse use are typically exceeded before

upland slopes are fully utilized. "The grazing indices suggest that some watersheds and streams may be incurring excess use even if upland slopes are not being adversely affected" (BRWA 2002-2003). This statement suggests that riparian areas may be more heavily impacted by current grazing management practices in some areas than the uplands. Reduced use by cattle under the SMU-G alternative would improve the riparian function of potentially suitable habitat over time.

Utilization by livestock and wildlife coupled with the tendency of cattle to concentrate in riparian areas may cause declines in desireable species for the western yellow-billed cuckoo such as willow. These types of vegetation changes may contribute to a loss of multi-layered brushy understories in these lower elevation low gradient streamcourses. These changes may effect the overall suitablilty of riparian habitats for the western yellow-blled cuckoo. Under the SMU-G alternative there would still be reduced vegetation from grazing livestock, but within acceptable limits. These criteria would also allow for vegetation to rebound from past overutilization. This will improve, or at the very least, stop degradation to vegetation in riparian areas. Potentially suitable western yellow-billed cuckoo habitat in these riparian areas will increase in effectiveness.

Approximately 75% of the western yellow-billed cuckoo diet is comprised of grasshoppers and catepillars (Rodriguez 2005). The other 25% is a myriad of insect species. These prey base populations could possibly be affected by changes in the riparian/aquatic corridors. Sediment loading into the stream from erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and organic matter (i.e. cattle manure) are just a few factors that may alter aquatic biota and, consequently, composition and density of various insect populations. Some types of insects may increase while others decline. Western yellow-billed cuckoos are not known to occur on the Fishlake National Forest and much of the surveyed habitat within the analysis area fails to posess dense brushy understories for the cuckoo. Strict adherence to use criteria will minimize vegetation changes that may contribute to these impacts on these habitats. Therefore, the SMU-G alternative may affect but is not likely to adversely affect the western yellow-billed cuckoo and/or its habitat and will lead to increased potential habitat effectiveness over time.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Grazing in combination with chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control have and continue to alter riparian vegetation composition and densities, which may reduce potentially suitable habitat for the western yellow-billed cuckoo and aquatic insects (prey) in some cases and create habitat in others. Grazing in combination with timber/thinning operations, fire suppression/wildfire/prescribed fire, firewood and post cutting, and mining have affected watershed capabilities and stream corridors (BRWA 2002-2003) from increased erosion and changes in vegetation. Grazing in combination with recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to western yellow-billed cuckoo habitat fragmentation, habitat loss, creation of travel corridors, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. Also, increased erosion from grazing in combination with recreational activities may cause sediment loss and further degradation of riparian aquatic systems. However, grazing at use levels as described in the SMU-G alternative would offset many of these impacts. By retaining vegetation structure, density, and composition many of these impacts will be alleviated.

Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with this proposed action may affect but is not likely to adversely affect the western yellow-billed cuckoo and/or its habitat.

SMU-G Alternative effects analysis for Region IV Sensitive Vertebrate Species from Table 3 in Section I.

Spotted & Townsend's Big-eared Bat

Direct and Indirect Effects

Since neither of these bat species are known to occur within the analysis area or on the Beaver Ranger District, direct and indirect effects to individuals would not occur as a result of this proposed action. Direct and indirect effects to potentially suitable habitat would be limited. Since these bats require caves, mines, rock crevices, abandoned buildings, and other largely undisturbed places, effects to potential roosting habitat from this proposed action would be minimal, if any. Grazing cattle would not disturb these areas because of their inaccessability to grazing livestock. Ecological resources in these inaccessible potential roosting sites would not be disturbed. However, foraging habitat and prey species (insects) may be affected by grazing in these 8 allotments.

Both of these bats are insectivorous. The Townsend's Big-eared bats diet is comprised largely of moths (Rodriguez 2005). The spotted bat usually feeds on larger insect such as Lepidoptera and grasshoppers. This prey base population could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from increased erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and increased organic matter (i.e. cattle manure), forage reduction, vegetational composition change, and vegetation conversions are just a few factors that may alter the

composition and density of various insect populations. Some types of insects may increase while others decline.

Therefore, this SMU-G alternative may impact spotted bat and Townsend's Big-eared bat individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

The Abandoned Mine Closures Project on the Beaver Ranger District that occurred in the late 1990's and early 2000's eliminated numerous potentially suitable roosting sites for these bats throughout the cumulative effects area. Re-isssuance of term grazing permits on these 8 allotments may affect potentially suitable foraging habitat for these bats but will not affect potentially suitable roosting habitat. Therefore, this SMU-G alternative in combination with this specific past action listed above may impact spotted bat and Townsend's Big-eared bat individuals and/or their habitats but is not likely to cause a trend toward federal listing or a loss of viability.

Northern Goshawk

Direct and Indirect Effects

Direct effects to goshawk territories and nesting habitat may occur as a result of the SMUG alternative, but these impacts would be minimal in closed conifer forests and at the stocking rates recommended. Studies of nesting habitat show that goshawks nest in older age forest with variable tree species and high percent canopy closure (Rodriguez 2005). Studies on habitat characteristics at goshawk nest sites have reported average canopy closure measurements ranging from 60% to 94% (Rodriguez 2005). Understory forage production for livestock use drops considerably in closed canopy conifer. The livestock will not often be present foraging in closed canopy conifer forest because of the general lack of available forage unless water is present. Open meadows, aspen, sagebrush, oakbrush, mahogany, and other cover types where more livestock forage is available will be visted more frequently by livestock.

Many of the goshawk nests in Utah do occur in aspen stands. The Beaver River Watershed Assessment (BRWA) references a study on the response to aspen restoration treatments near the Beaver River Watershed in part of the analysis area. Thirty three sites were surveyed to monitor

the success of aspen regeneration following a variety of treatments. This study states : "In most cases, sites fenced to preclude all cattle and wildlife browsing produced the greatest number of aspen suckers compared to adjacent, unfenced, or cattle-excluded sites...it is also important for terminal shoots of the young aspen to grow beyond the reach of browsing ungulates before treatments can be deemed successful. Continued grazing, but at far reduced levels under SMUG, may improve aspen regeneration in some areas but impacts to small treatments and by other grazers would likely continue.

Furthermore, it has been documented by Reynolds et al. 1992 that livestock grazing may affect forage and cover recources for goshawk prey. Implementation of the proposed action may affect habitat for some mammalian and avian prey species. These effects would however be dependent upon other factors, and not just ungulate use on grasses, forbs and shrubs. Other factors such as precipitaion can be an important influence on goshawk prey. As riparian and upland vegetative health and vigor improves, resulting from the SMU-G alternative, habitat for goshawk prey may fluctuate but should improve in effectiveness over time.

Therefore, this SMU-G alternative may impact some northern goshawk individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

This SMU-G alternative in combination with past, present, and reasonably forseeable future actions may effect habitat conditions for some goshawk prey species. Past actions have had various effects to vegetation across the cumulative effects area. In most areas where livestock grazing was permitted in riparian habitat, horizontal and vertical structure has been significantly altered and structure is minimal. Past actions such as timber harvest, fire suppression and thinning has led to a decline of habitat quality and quantity, through the loss of nesting and foraging habitat, as well as decreased habitat for prey species. Past, present, and reasonably forseeable livestock grazing may impact the goshawk and their prey. Therefore, this SMU-G alternative in combination with past, present, and reasonably forseeable future actions may impact Northern goshawk individuals and/or their habitats but is not likely to cause a trend toward federal listing or a loss of viability.

Flammulated Owl

Direct and Indirect Effects

Direct effects from grazing under the SMU-G alternative to flammulated owl individuals would be minimal. Flammulated owls are nocturnal obligate cavity nesters that nest in the hollows of trees and perform much of their foraging at night. Having grazing livestock, that are most active during the day, in their nesting and foraging areas would not cause direct conflicts with the flammulated owl individuals. However, indirect effects to individuals from fluctuations in insect populations and effects to potentially suitable habitat may affect this species.

Flammulated owls are almost exclusively insectivorous. They feed on small to medium-sized insects such as moths, beetles, caterpillars, crickets, spiders, and other arachnids (Rodriguez 2005). This prey base population could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and organic matter (i.e. cattle manure), forage reduction, vegetational composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline. SMU-G will allow for increased habitat effectiveness for these prey base populations.

Therefore, this SMU-G alternative may impact some flammulated owl individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

The implementation of the SMU-G alternative in combination with past, present and reasonably forseeable future actions may cause changes in riparian and upland health and vigor. As the vertical and horizontal vegetation diversity of riparian and upland areas change, insect populations, distribution, and species diversity would fluctuate. This may alter prey species for the flammulated owl in the small riparian areas that occur within openings in the forested landscape where these owls forage. Past actions have had long-term effects to vegetation across the analysis area. In most areas where grazing was permitted in riparian and uplands, habitat conditions vary as to their suitabilty for prey species for flammulated owls. Therefore, this action in combination with past, present, and reasonably forseeable future actions may impact flammualted owl individuals and/or their habitats but are not likely to cause a trend to federal listing or a loss of viability.

Three-toed Woodpecker

Direct and Indirect Effects

Direct effects of the SMU-G alternative to three-toed woodpecker individuals would be minimal in coniferous forest vegetation types. Three-toed woodpecker habitat requirements on the Beaver Ranger District are higher elevation spruce-fir, mixed conifer, and aspen vegetation types with snags available for foraging. Three-toed woodpeckers are largely dependent on down logs, snags, and stumps for feeding and nesting opportunities. Down logs, snags, and stumps would not be affected by livestock grazing.

Understory forage production for livestock use drops considerably in closed canopy conifer. The livestock will not often be present foraging in closed canopy conifer forest because of the general lack of available forage. Open meadows, aspen, sagebrush, oakbrush, mahogany, and other cover types where more livestock forage is available will be visted more frequently by livestock. Direct conflicts between three-toed woodpeckers and grazing livestock would not occur.

There are nest locations and detection records of the three-toed woodpecker in aspen stands. The Beaver River Watershed Assessment (BRWA) references a study on the response to aspen restoration treatments near the Beaver River Watershed in part of the analysis area. Thirty three sites were surveyed to monitor the success of aspen regeneration following a variety of treatments. This sudy states : "In most cases, sites fenced to preclude all cattle and wildlife browsing produced the greatest number of aspen suckers compared to adjacent, unfenced, or cattle-excluded sites...it is also important for terminal shoots of the young aspen to grow beyond the reach of browsing ungulates before treatments can be deemed successful. This research would indicate that grazing on these 8 allotments may have an impact on aspen vegetation types in some areas. SMU-G classifies areas containing young aspen sprouts susceptible to grazing as unsuitable for livestock use and thus would help to improve past aspen utilization problems. However, aspen sprouts will still be impacted by big game.

Three-toed woodpeckers feed on wood-boring insect larvae, beetles, moth larvae and ocassionally sap at sapsucker pits. They are major predators of spruce bark beetle and may contribute to its control (Rodriguez 2005). This prey base population could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and organic matter (i.e. cattle manure), forage reduction, vegetational composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline. SMU-G will allow for increased habitat effectiveness for these prey base populations.

Therefore, the implementation of this SMU-G alternative may impact three-toed woodpecker individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Refer to "Cumulative effects of the SMU-G alternative common to all vertebrate and macroinvertebrate species…"at the beginning of this section.

Peregrine Falcon

Direct and Indirect Effects

Suitable habitat for peregrine falcons may be divided into three parts: 1) cliff or substrata upon which nesting occurs, 2) surrounding territory that serve as hunting sites, and 3) migration and wintering areas (Rodriguez 2005). Most peregrine eyries (nest sites) in Utah are situated on high ledges on mountain cliff faces and river gorges. As a result, direct and indirect effects to peregrine falcon nesting habitat would not occur from this proposed action. Direct conflicts between grazing livestock and nesting peregrine falcons would not occur.

However, direct and indirect effects to foraging, migration, and wintering habitat may occur as a result of implementing this SMU-G alternative. Prey species include primarily small to medium-sized terrestrial birds and waterfowl that are normally found within 10 miles of the eyrie (Rodriguez 2005). Implementation of the proposed action may affect habitat for some mammalian and avian prey species. These effects would however be dependent upon other factors, and not just ungulate use on grasses forbs and shrubs. Other factors such as precipitaion can be an important influence on peregrine falcon prey. As riparian and upland vegetative health and vigor changes (BRWA), resulting from grazing, habitat for peregrine falcon prey may fluctuate. SMU-G utilization criteria will allow for increased habitat effectiveness for these prey base populations.

This alternative may impact some peregrine falcon individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Refer to "Cumulative effects of the SMU-G alternative common to all vertebrate and macroinvertebrate species…"at the beginning of this section.

Greater Sage Grouse

Direct and Indirect Effects

Since known sage grouse use is very limited in the analysis area and the SMU-G alternative directly addresses ensuring adequate grass height in potential grouse habitat, effects to sage grouse individuals would be minimal from implementation of this alternative. Maintenance of range improvements and vegetation conversions may contribute to effects on potentially suitable sage grouse habitat by increasing effectiveness through pinyon/juniper reduction. Reduction of forage and cover by grazing contributes to sage grouse lek habitat, but no lekking behavior is known to occur on Forest System lands but is believed to occur on adjacent BLM lands. Sage grouse use sagebrush, forbs and grasses as forage and cover(Rodriguez 2005). Reductions of this vegetation through livestock grazing may affect the food base and thriftiness of sage grouse.

Range improvements such as existing fences, watering troughs, ponds, and spring/seep developments may alter sage grouse movement and/or provide free water for sage grouse use. Sage grouse do not require open water for day-to-day survival if succulent vegetation is available but, they will utilize free water if it is available (Rodriguez 2005). Forage and cover reduction from grazing also may affect sage grouse nesting success. Nest success is related to herbaceous cover near the nest site. Lack of adequate nesting and brooding cover may account for high juvenile losses in many regions (Rodriguez 2005). Taller, denser, herbaceous cover apparently reduces nest predation and increases early brood survival (Rodriguez 2005). However, strict adherence to criteria listed in the SMU-G would prevent overutilization of herbaceous cover and avoid some of this impact to nesting success.

Maintenance of vegetation conversions can improve potentially suitable habitat in some cases and cause it to decline in others. Vegetation conversions from an original disclimax pinyon-juniper cover type to early seral grass and subsequent late seral sagebrush may create potential habitat for sage grouse. Vegetation conversion from sagebrush to early seral or monocultured grass decrease potential habitat for sage grouse.

Sage grouse have declined primarily because of loss of habitat due to overgrazing, elimination of sagebrush and interspersed wet meadows, and land development (Rodriguez 2005). Grazing under SMU-G contributes to habitat effectiveness in areas of known sage grouse occupation. Therefore, this alternative may impact some sage grouse individuals and/or their habitat but is not likely to cause a trend to federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development

Past, present, and reasonably forseeable actions that may effect potentially suitable sage grouse habitat in combination with this SMU-G alternative are chaining maintenance in pinyon-juniper dominated cover types. Juniper encroachment into previously chained areas (vegetation conversions) and suspected historic shrub-steppe communities which are converting to climax pinyon-juniper types. Past, present, and future hand and mechanical treatments including Dixie Harrow, Brush Hog, hand thinning, and others will improve potentially suitable sage grouse habitat within the analysis area by removing pinyon/juniper and promoting age and structural diversity in sagebrush dominated sites. These treatments, in combination with grazing may reduce nesting success by reducing cover values and/or through proper desgn improving sagebrush habitat effectiveness and subsequent forage value for the sage grouse.

Therefore, this SMU-G alternative in combination with past, present, and reasonably foresee-able future actions as specified above may impact some sage grouse individuals and/or their habitats but are not likely to cause a trend towards federal listing or a loss of viability.

Pygmy Rabbit

Direct and Indirect Effects

Reduction of forage and cover resulting from grazing may directly affect pygmy rabbits and/or their habitat. Pygmy rabbits are seldom found in areas of sparse vegetative cover and seem to be reluctant to cross open space (Rodriguez 2005). A reduction of forage and cover may reduce the pygmy rabbits' ability to forage and feed productively. It may also increase the risk of predation to pygmy rabbits. However, the SMU-G alternative proposes far less grazing pressure, which would prevent over utilization of herbaceous cover and avoid some of this impact to pygmy rabbit forage and cover availability. Disturbance caused by permitting livestock use on these allotments may affect how much time pygmy rabbits spend outside of burrows foraging. Reduction of foraging time will equate to a reduction in feeding and overall thriftiness.

Maintenance of vegetation conversions may also have effects on pygmy rabbit disturbance and potentially suitable habitat. Maintenance through the use of Dixie Harrow, Brush Hogs, hand thinning, and others may cause destruction of underground burrows. These mechanical treatments may also cause alterations in the tall, decadent nature of sagebrush needed by the pygmy rabbit. While this may provide more vegetation diversity (more early seral grasses) for pygmy rabbit feeding, it may also result in a sagebrush structure that doesn't provide enough cover for the pygmy rabbit. However, these treatments will also provide and maintain habitat by controlling pinyon/juniper encroachment in areas of historic sagebrush-steppe. Therefore, this SMU-G alternative may impact pygmy rabbit individuals and/or their habitat but is not likely to cause a trend toward federal listing or a loss of viability.

Cumulative Effects

Past, present, and reasonably forseeable actions that may effect potentially suitable pygmy rabbit habitat in combination with this SMU-G alternative are chaining maintenance in pinyon-juniper dominated cover types. Juniper encroachment into previously chained areas (vegetation conversions) and suspected historic shrub-steppe communities are converting to climax pinyon-juniper types. Past, present, and future hand and mechanical treatments including Dixie Harrow, Brush Hog, hand thinning, and others will improve potentially suitable habitat within the analysis area. These treatments, in combination with grazing may reduce nesting success by reducing cover values and/or improve sagebrush diversity and subsequent forage value for pygmy rabbits.

Therefore, this SMU-G alternative, in combination with past, present, and reasonably foresee-able future actions as specified above, may impact some pygmy rabbit

individuals and/or their habitats but are not likely to cause a trend to federal listing or a loss of viability.

Bonneville & Colorado River Cutthroat Trout

The only known populations of Colorado River cutthroat trout on the Fishlake National Forest occur in streams on the Loa Ranger District (Rodriguez 2005). There are no Colorado River cutthroat trout known to occur within the analysis area. The analysis area is outside of the native range of the Colorado River cutthroat trout. Direct and indirect effects to Colorado River cutthroat trout individuals would not occur because they are not found in the analysis area. Normally streams outside of the native range of a species/sub-species are not considered for or counted for recovery objectives.

Direct and Indirect Effects

Direct effects to Bonneville cutthroat trout from the SMU-G alternative will be generally unlikely but may occur in uncommon situations. The most likely example of direct effects would include direct injury of eggs in spawning redds by livestock in the stream for watering or trailing across the creek. Other direct effects are very unlikely and would occur only from trampling of spawning eggs during herding operations or accidental introduction of toxic materials such as gasoline into the stream from an OHV upset during allotment operations.

Indirect effects to Bonneville cutthroat trout would be those effects that impact water quality. The primary potential for indirectly impacting fish, aquatic macroinvertebrates, or aquatic habitats would be from the introduction of fine sediment to the streams. Fine sediment can change the species composition, diversity, and abundance of macroinvertebrates as well as suffocate trout eggs and fry. It also can reduce pool volume, reducing suitable habitat for adults during low flow stream periods, as well as reducing wintering habitat carrying capacity. Finally, it can carry harmful nutrients and chemicals into the streams.

Watershed and riparian vulnerabilities caused by overstocking are documented in some areas of the Beaver River Watershed (BRWA) and in the 2003 Fishlake National Forest Level II Riparian Inventories. Some of these areas occur on the North-Indian Creek, Pine Creek/Sulphur Beds, and South Beaver Allotments within the same riparian areas where Bonneville cutthroat trout are known to occur. These populations may be impacted because these vulnerabilities indicate that current grazing management practices may be exceeding watershed and riparian capabilities. Impacts from grazing under the SMU-G alternative should be lessened due largely to the reduction in stocking rates across the analysis area and riparian exclusion provision. However, these aquatic riparian habitats provide suitable habitat for known Bonneville cutthroat trout populations that may be affected by grazing in these 8 allotments on the Beaver Ranger District.

Grazing on these 8 allotments may result in a reduction of vegetation (especially desirable species i.e. sedges, willows) along the stream channel. Alterations in riparian plant composition resulting from overuse (as described in the BWRA) may cause vegetation conversions to less desirable species such as Kentucky bluegrass and redtop. Continued overutilization and reduction of stubble heights may also change rooting depths that affect bank stability. A

reduction in vegetation and an increased concentration of livestock use in these riparian areas would have several indirect effects on the aquatic habitat. These effects include damage to streambanks from trampling, soil compaction, and shearing which often leads to increased width/depth ratios and a loss of undercut banks. Undercut banks provide cover for Bonneville trout. Damage to streambanks also cause increased sediment in the stream that decrease pool volume and cover spawning gravels. Increased width/depth ratios and a loss of stabilizing vegetation such as willows could lead to changes in stream shading. Both of these factors contribute to increased water temperatures. Furthermore, increased organic matter in the stream from livestock manure may impact Bonneville cutthroat trout individuals and potentially suitable habitat for this sensitive fish species.

These effects may cause changes to aquatic biota diversity in these habitats. Fluctuations in water temperature and macro-invertebrate composition and density may impact Bonneville cutthroat trout individuals feeding and spawning success. Bonneville cutthroat trout require relatively cool, well oxygenated, water and the presence of clean, well-sorted gravels with minimal fine sediments for successful spawning (Rodriguez 2005). These effects may also impact potentially suitable habitat spread throughout the analysis area.

The two likely Bonneville cutthroat trout populations most heavily impacted by grazing the analysis area are the Pine Creek and Birch Creek West (personal comm. with Jim Whelan). Past grazing and roads in Pine Creek may be impacting habitat and depressing populations but are not likely causing a trend to federal listing or a loss of viability.

A combination of prolonged drought, low flows, marginal habitat, and past grazing have caused the Birch Creek West population to decline substantially since 1994. Maintenance of range improvements (fencing) as provided for under the SMU-G alternative to protect this sensitive species' habitat will minimize impacts to Bonnevilles in this area.

Riparian exclosures can serve to improve water quality in streams by protecting the streambank from livestock grazing, reducing sediment inputs and creating a vegetative buffer between grazed areas and the water to trap overland flow of sediment and nutrients. Small riparian exclosures exist on Pine Creek and a large percentage of Birch Creek West is within livestock exclosures. Maintenance levels were generally inadequate in the late 1990s and exclosures were only partially functional, but maintenance levels have increased in recent years.

Observations of riparian conditions by fisheries personnel and riparian contractors (see Petty 2003) are that riparian grazing standards were often exceeded on portions of these creeks. Coordinated and continued diligent effort to manage livestock appropriately and provide proper administration of livestock use so that SMU-G grazing standards are met could result in reduced impacts from grazing compared to the current situation and a gradual improvement of habitat conditions on some portions of these streams. There will still be some impacts, however – SMU-G would likely reduce upland impacts more than riparian due to cattle use patterns. The effects of this alternative on deterministic risks to these populations would be between those shown for the proposed action and no action/no grazing alternatives in the tables on pages 44-45.

Therefore, this proposed action may impact the Bonneville cutthroat trout individuals and/or their habitat but is not likely to cause a trend to federal listing or a loss of viability.

Cumulative Effects

The cumulative effects analysis area for Bonneville cutthroat trout in the project area is the Beaver Ranger District or each BCT watershed from pour points upstream. Past, present, and reasonably foreseeable activities within the cumulative effects area include introduction of native and non-native fish species, fish stocking, private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native plant species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, fishing, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development. The introduction of non-native fish, fish diseases, stocking of hatchery fish, grazing, fires, fire management activities (drafting water from streams/lakes), timber/thinning operations, hydroelectric development, irrigation diversion/development, and noxious weed control has altered riparian and upland vegetation composition and densities and riparian environments, which has reduced habitat for Bonneville cutthroat trout in some cases.

Water manipulation, drought, hydroelectric/municipal water development, mining activities, fishing, introduction of non-native fish, fish stocking, and the accidental introduction of fish diseases within the cumulative effects area has likely affected these sensitive fish populations. A few drainages within the analysis area are infected with whirling disease (i.e. Beaver River). These kinds of fish diseases along with competition from non-native fish species and water manipulation are major factors affecting potentially suitable habitats for Bonneville cutthroat trout populations. Water manipulation from the maintenance of range improvements (required under SMU-G to manage livestock) may contribute to these major factors within the cumulative effects area. Other management activities listed above that contribute to erosion and sediment loading into streams (i.e. thinning/timber operations, mining, recreation, fire, etc.) may affect these sensitive fish species and/or habitat when coupled with grazing. Riparian conditions and water quality related to grazing impacts will improve over time as result of the implementation of the SMU-G alternative. Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with the SMU-G alternative may impact Bonneville cutthroat trout individuals and/or their habitats but is not likely to cause a trend toward federal listing or a loss of viability.

Reasonably foreseeable future activities – There are two classes of reasonably foreseeable future activities that are likely in the cumulative effects area for this project. First is an increased level of upland vegetation treatments to reduce fire fuel loading, sanitize spruce bark beetle infestations, salvage dying timber, and restore a more natural fire regime. These projects are part of the national Healthy Forests Initiative. Increased vegetation treatment levels could increase sedimentation impacts to these streams in the short-term, further reducing carrying capacity. Use of Best Management Practices (BMPs) should minimize impacts from these activities. The

Forest Plan General Direction of "special protection and management" within 100 feet of a stream should further reduce impacts. Long-term this project work may reduce the risk of catastrophic fire, reducing the risk of loss of these populations from wildfire.

The second reasonably foreseeable future activity is continued Bonneville cutthroat trout reintroductions within the project area as a cooperative project between the Utah Division of Wildlife Resources and the Fishlake National Forest. Additional reintroduction work could put the Birch Creek West stock in much better habitat, reducing the risk to this genetic stock while at the same time facilitating necessary vegetation treatments in the Birch Creek watershed. In fact, future vegetation treatments and reintroductions may go hand in hand to reduce fire risk before reintroductions, while new introductions reduce the risk of vegetation treatments to established populations.

Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with the SMU-G alternative may impact Bonneville cutthroat trout individuals and/or their habitats but is not likely to cause a trend toward federal listing or a loss of viability.

SMU-G Alternative effects analysis for Region IV Sensitive Plant Species from Table 4 in Section I.

{Text provided by Dave Tait, 3/16/06}

Direct/Indirect Effects

For the 4 sensitive species known to occur on the Fishlake National Forest, Beaver Ranger District (Elsinore buckwheat, Tushar paintbrush, creeping draba, and beaver Mountain groundsel), the determination of "no impact" was made for creeping draba and Beaver Mountain groundsel. For Elsinore buckwheat and Tushar paintbrush a determination of "may impact but not likely to cause a trend to federal listing" was made. Livestock grazing activities (consumption and/or trampling) may impact individual sensitive plants or their habitats, but will not likely contribute to a trend towards federal listing or loss of viability to any population or species.

The Biological Evaluation suggested the presence of Arizona willow habitat within the 8 allotments. Currently Arizona willow is not known to occur on the Beaver district. The reduction of cattle pressure in the riparian areas as suggested in the SMU-G alternative may promote willow establishment. However, there is no way of knowing if this will promote this species specifically as there is no indication of its presence currently or historically.

Sensitive Plant Species Cumulative Effects

Under all three alternatives, recreational impacts and uses will likely remain the same or increase, given current recreational use trends. Thus, recreational impacts including ORV use, trail use, and riparian degradation, may be or may continue to be exacerbated under all alternatives given that potential sensitive plant species habitat conditions may already be degraded through livestock use and associated impacts.

Indirect impacts from livestock, recreational, and other authorized land uses may increase conditions for noxious weed establishment and spread within sensitive plant species populations. Current management practices attempt to eradicate or contain such infestations. Herbicide applications could also threaten known populations of these species if coordination with range management is not ensured to prevent accidental application or drift. Such impacts can also affect pollinators within these areas. The risk of spread from vectors such as livestock, vehicles and ORVs for these aggressive and invasive species under the grazing alternatives may be high.

Past mining activities and fire suppression within the analysis area has occurred for the past 100 years, but no information is available on how sensitive plant species responds to these types of activities. Although historical mining sites have been closed and old mining sites are recovering, local populations could have been impacted in past years if they occurred within the influence zones of mining projects.

No foreseeable mining activities have been identified at this time. However, activities associated with mining reclamation may have downstream impacts for potential sensitive plant species habitats. Although these restoration efforts may be beneficial in the long-term, short-term (3 to 5 years) impacts may pose threats to habitats.

The cumulative effects described above have or will occur in the future regardless of which alternative of this grazing proposal is implemented. As discussed in the direct and indirect effects section above for two of the sensitive plant species, implementation of any of the alternatives in this proposal may impact individuals or their habitat, but would not have significant adverse effects on populations, and thus would not add significant, adverse cumulative effects to those that already exist as a result of other projects that have or will occur within the analysis area.

SMU-G Alternative effects analysis for Management Indicator Species from Table 1 in Section I.

Elk and Mule Deer

Direct and Indirect Effects

The SMU-G alternative is a dramatic departure from the current grazing scheme within these 8 allotments. Following the parameters of this alternative results in an estimated 50-70% reduction in grazing capacity. Part of this reduction is due to a provision for deeming “core” mule deer fawning habitat as unsuitable for grazing. Core mule deer habitat has not been delineated within the analysis area nor on the Forest as such. Rather, the Utah Division of Wildlife Resources has placed more importance on delineating winter habitats for both deer and elk as an attempt to recognize an important limiting factor of endemic big game populations—winter survival and subsequent recruitment of young (UDWR 2003). Mule deer fawn and elk calf rearing areas are important, but are not as limiting to big game populations on the Fishlake National Forest as winter range is. Mule deer use a variety of habitats at a variety of elevations for fawning and rearing, a fact that would make delineating “core” fawning habitat very difficult. This is demonstrated in the statewide deer mangement plan developed for Utah and adopted by the Utah Wildlife Board in November of 2003 where such importance is put on winter range that a map of

“critical mule deer winter ranges in need of improvement” is included in the plan and nearly all references to carrying capacities are in relation to winter range trends.

Implementation of SMU-G alternative would reduce forage and cover for elk and mule deer within the analysis area but these reductions would be in lower proportions due to reduced grazing. Grazing livestock on these allotments would cause competiton for forage resources, especially on winter forage availability for elk. Further effects on elk and mule deer include a change in vegetation composition/structure, introduction of noxious weeds which may out compete local floras, the flow reduction of streams/seeps/springs into troughs and stock ponds, trampling of vegetation and compaction of soils all of which may effect elk and mule deer habitat. Direct audio/visual disturbance from grazing livestock on summer range and winter range (Junction Allotment) may result in elk and mule deer not utilizing suitable habitat, habitat fragmentation, and disruption of travel corridors

Furthermore, the Beaver River Watershed Assessment (BRWA) references a study on the response to aspen restoration treatments near the Beaver River Watershed in part of the analysis area. Thirty three sites were surveyed to monitor the success of aspen regeneration following a variety of treatments. This sudy states : “In most cases, sites fenced to preclude all cattle and wildlife browsing produced the greatest number of aspen suckers compared to adjacent, unfenced, or cattle-excluded sites...it is also important for terminal shoots of the young aspen to grow beyond the reach of browsing ungulates before treatments can be deemed successful. The BRWA estimates that there has been an 85% decline in aspen vegetation types during the past 125 years in the Beaver River Watershed (BRWA 2002-2003). This decline has reduced foraging habitats for both domestic livestock and mule deer and elk throughout the analysis area. However, strict adherence to the SMU-G alternative relating to avoiding areas with young aspen sprouts would avoid some of this impact on aspen within the analysis area but aspen regeneration would still be impacted by big game use.

Maintenance of vegetation conversions would increase forage values and pallatable vegetation in sagebrush and pinyon-juniper dominated cover types. This increase in vegetation forage productivity on these rangelands may affect the availability of suitable forage for elk and mule deer and increase their productivity and numbers. Maintenance of these vegetation conversions, in many cases, have improved habitat for mule deer and elk in the analysis area. With this in mnd, it is important to note that as was stated above, elk numbers have increased to 95% of objective despite the recent drought conditions and with the current grazing system. Deer have also increased in recent years to 86% of objective with the State focusing on winter range habitat improvement and predator removal to increase survival. Though grazing can affect deer summer range and fawning habitat effectiveness, this kind of competition is not currently considered limiting to deer populations on the west side of the Fishlake National Forest (Sean Kelly, DWR - Pers. Comm.). Impacts from grazing to critical winter ranges is much more worrysome, yet elk are nearly at carrying capacity and only 7% of the winter range identified for deer is on the Forest. Therefore, individual elk and mule deer and their habitat may be impacted, however the implementation of the SMU-G alternative would not adversely impact the viability of these populations. Elk and mule deer habitat effectiveness would improve over time under decreased grazing pressure from domestic livestock and result in increased forage availability.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include big game management, private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and aerial seeding of burned areas, chaining, seeding of native and non-native species, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as small mine claims, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development.

Big game management by the Utah Division of Wildlife Resources is the primary factor affecting elk and mule deer population numbers throughout the analysis area. Grazing, chaining, seeding, fires, timber operations, irrigation diversion/development, and noxious weed control has altered riparian and upland vegetation composition and densities, which has reduced habitat for elk and mule deer in some cases and created habitat in others. Habitat improvement projects (i.e. seeding, pinyon/juniper chainings and thinnings, prescribed burning, and water developments) across the Forest have helped to double the estimated elk population since 1986 (Rodriguez 2005). Recreational activities and recreational infrastructure (roads, trails, structures, and campground development) may contribute to elk and mule deer habitat fragmentation, habitat loss, air pollution, audio and visual disturbance, and other disturbances caused by wildlife/public interactions. These roads and trails may also create travel corridors for mule deer and elk that improve connectivity within and between habitats.

The effects of the past, present, and reasonably foreseeable activities listed above in combination with the SMU-G alternative may impact elk and mule deer individuals but these cumulative effects would not adversely impact the viability of these populations and would likely result in an increase in habitat effectiveness.

Northern Goshawk

For a full disclosure and analysis of existing condition and effects to the goshawk from implementing the SMU-G alternative, see the disclosure of effects under the Region IV sensitive species section.

Cavity Nesters (Hairy Woodpecker, Western Bluebird, & Mountain Bluebird)

Direct and Indirect Effects

Direct effects of the SMU-G alternative to hairy woodpecker, western bluebird, and mountain bluebird individuals would be minimal. These species are cavity nesters that build their nest sites in the hollows of trees, branches, stumps, or logs. The hairy woodpecker often excavates its own nest site. The mountain bluebird occasionally will nest in rocks and crevices (Rodriguez 2005). Individuals of these species forage primarily on insects. The hairy woodpecker also eats mast, sap, and cambium (Rodriguez 2005). Direct effects to individuals from grazing livestock would be minimal astheir nests are often inaccessible. Range improvements such as stock ponds

and troughs may even benefit these species by offering an available water source where there may be no other. However, indirect effects to individuals from fluctuations in insect populations and effects to vegetation composition and structure of suitable habitat may affect these species.

All of these species are largely insectivorous. This prey base population could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and organic matter (i.e. cattle manure), forage reduction, vegetation composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline. Changes brought on by alterations in vegetation composition and density as a result of grazing may increase foraging opportunities and nest sites in some cases and reduce it in others. A change in composition in the understory of forested landscapes may alter structure, cover, and nest site availability for these bird species. Reduced domestic livestock grazing pressure to Forest vegetation under SMU-G would result in increased habitat effectiveness for these species.

Cumulative Effects

This SMU-G alternative in combination with past, present and reasonably foreseeable future actions may cause changes in riparian and upland health and vigor. As the vertical and horizontal vegetation diversity of riparian and upland areas change, insect populations, distribution, and species diversity would fluctuate. This may alter prey species for the hairy woodpecker, western bluebird, and mountain bluebird on the uplands and riparian areas where these species forage. Past actions have had long-term effects to vegetation across the analysis area. Reduced grazing under SMU-G should increase habitat effectiveness for these species by subjecting fewer areas to over utilization. Therefore, the effects of the past, present, and reasonably foreseeable activities listed above in combination with the SMU-G alternative may impact hairy woodpecker, western bluebird, and mountain bluebird individuals and their habitats, however this proposed action would not adversely impact the viability of these populations. Reduced domestic livestock grazing pressure to Forest vegetation under SMU-G would result in increased habitat effectiveness for these species.

Sage Nesters (Brewer's Sparrow, Vesper Sparrow, Sage Thrasher)

Direct and Indirect Effects

All three of these MIS birds nest either on or low to the ground under some kind of vegetative cover (Rodriguez 2005). Direct effects to nest sites from trampling livestock may lower nest success and productivity of these MIS birds. Reduction of forage and cover resulting from grazing may directly affect these MIS sage nester birds and their habitat. Maintenance of vegetation conversions may also have effects on Brewer's sparrow, vesper sparrow, and sage thrasher disturbance and potentially suitable habitat. Mechanical treatments may also cause alterations in the tall, decadent nature of sagebrush which may reduce suitable habitat in some cases and increase it in others. These MIS birds feed on insects and fruits/seed (i.e. grass/forb

seed and berries) (Rodriguez 2005). The vegetation conversion maintenance may provide more vegetation diversity (more early seral grasses) for feeding needs of these MIS birds however, these treatments may also result in a sagebrush structure that doesn't provide enough cover for nesting. For example, the sage thrasher requires some foilage for cover above the nest (ground nests are common where shrub canopy is low) (Rodriguez 2005). Vesper sparrows also often nest on the ground beneath the cover of shrubs, grasses or forbs (Rodriguez 2005). The Brewer's sparrow forages on the ground and builds its' nest in shrubs or a low tree (Rodriguez 2005).

All of these species are partly insectivorous. Prey base populations could possibly be affected by changes in the riparian aquatic corridors and upland vegetation. Sediment loading into the stream from increased erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and increased organic matter (i.e. cattle manure), forage reduction, vegetation composition change, and vegetation conversions are just a few factors that may alter the composition and density of various insect populations. Some types of insects may increase while others decline. These fluctuations in insect populations may affect these MIS sage nesters' prey availability and overall energy base. Reduced livestock grazing pressure under SMU-G would help to preserve vegetation composition, density, structure, and diversity resulting in an increase in habitat effectiveness. .

Cumulative Effects

Refer to "Cumulative effects of the SMU-G alternative common to all vertebrate and macroinvertebrate species…"at the beginning of this section.

Riparian Guild (Lincoln's Sparrow, Song Sparrow, Yellow Warbler, and MacGillivray's Warbler)

Direct and Indirect Effects

Direct effects to Lincoln's sparrow, song sparrow, yellow warbler, and MacGillivray's warbler resulting from the SMU-G alternative would be limited to audio and visual disturbance and possible trampling of ground nests by grazing livestock in riparian areas. This may affect the nesting success and productivity of some or all of these MIS birds.

Utilization by livestock and wildlife coupled with the tendency of cattle to concentrate in riparian areas may cause declines in desireable species in riparian areas such as willow. These types of vegetation changes may contribute to a loss of multi-layered riparian understories. These changes may effect the overall suitablilty of riparian habitats for these four MIS birds. Several smaller watersheds within the Greater Beaver River Watershed area document overstocking rates in reference to livestock stocking rates in comparison to suitable watershed area and AUM stocking in comparison to riparian AUM production (BRWA 2002-2003). The dramatic reduction in stocking rates under SMU-G and riparian avoidance criteria would help to reverse these riparian trends and may benefit suitable habitats for these four MIS birds.

All of these MIS riparian bird species commonly feed on insects (Rodriguez 2005). Prey base populations could possibly be affected by changes in the riparian aquatic corridors. Sediment loading into the stream from increased erosion (i.e. compaction from trampling), percent of stream shading (i.e. understory vegetation loss), and increased organic matter (i.e. cattle manure) are just a few factors that may alter aquatic biota and, consequently, composition and density of various insect populations. Some types of insects may increase while others decline. However, reduced grazing under SMU-G would contribute to better functioning riparian areas and increased habitat effectiveness for these species.

Cumulative Effects

Refer to "Cumulative effects of the SMU-G alternative common to all vertebrate and macroinvertebrate species…"at the beginning of this section.

Bonneville Cutthroat Trout

For a full disclosure and analysis of existing condition and effects to the Bonneville Cutthroat Trout from implementing the SMU-G alternative, see the disclosure of effects under the Region IV sensitive species section.

Resident Trout (Rainbow, Brown, Brook, Cutthroat, and Lake) and Macroinvertebrates

Direct and Indirect Effects

Watershed and riparian vulnerabilities caused by overstocking are documented in some areas of the Beaver River Watershed (BRWA) and in the 2003 Fishlake National Forest Level II Riparian Inventories. Populations of resident trout and macroinvertebrates may be impacted because these vulnerabilities indicate that current grazing management practices may be exceeding watershed and riparian capabilities. These aquatic riparian habitats provide suitable habitat for resident trout and macroinvertebrate populations that may be affected by grazing at nearly any level in these 8 allotments on the Beaver Ranger District.

Grazing on these 8 allotments may result in a reduction of vegetation (especially desirable species i.e. sedges, willows) along the stream channel. Alterations in riparian plant composition resulting from overuse (as described in the BWRA) may cause vegetation conversions to less desirable species such as Kentucky bluegrass and redtop. Continued overutilization and reduction of stubble heights may also change plant rooting depths that affect bank stability. A reduction in vegetation and an increased concentration of livestock use in these riparian areas would have several indirect effects on the aquatic habitat. These effects include damage to streambanks from trampling, soil compaction, and shearing which often leads to increased width/depth ratios and a loss of undercut banks. Undercut banks provide cover for resident trout. Damage to streambanks also cause increased sediment in the stream that decrease pool volume and cover spawning gravels. Increased width/depth ratios and a loss of stabilizing vegetation such as willows could lead to changes in stream shading. Both of these factors contribute to

increased water temperatures. Furthermore, increased organic matter in the stream from livestock manure and direct effects such as cattle trampling spawned eggs may impact resident trout and macroinvertebrate populations throughout the analysis area.

These effects may cause changes to aquatic biota diversity in these habitats. In some cases, fluctuations in water temperature may cause changes in macroinvertebrate composition and density. This may affect macroinvertebrate populations and resident trout. Since resident trout are dependent upon macroinvertebrates for feeding, an increase or decrease in macroinvertebrate populations would affect resident trout populations accordingly. However, reduced grazing pressure under the SMU-G alternative should help to reduce or even negate some of these impacts mentioned above and improve riparian conditions and eventually water quality. Therefore, individual resident trout (rainbow, brown, brook, cutthroat, lake) and macroinvertebrates and their habitats may be impacted, however this SMU-G alternative would not adversely impact the viability of these populations and should improve habitat effectiveness over time.

Cumulative Effects

Past, present, and reasonably foreseeable activities within the cumulative effects area include introduction of native and non-native fish species, fish stocking, private land ownership (subdivision construction activities), grazing, recreation, timber and thinning operations, reforestation and seeding of burned areas, chaining, seeding of native and non-native plant species, fire suppression, natural and prescribed fire, pesticide application, noxious weed control, and other special uses such as mining, hydroelectric operations, firewood and post cutting, municipal water developments, and irrigation diversion. Recreation-related activities include hunting, fishing, camping, day/picnic use, hiking, horseback riding, all-terrain vehicle (ATV & OHV) use, and campground/roads/trails maintenance and development. The introduction of non-native fish, fish diseases, stocking of hatchery fish, grazing, fires, fire management activities (drafting water from streams/lakes), timber/thinning operations, hydroelectric development, irrigation diversion/development, and noxious weed control has altered riparian and upland vegetation composition and densities and riparian environments, which has reduced habitat for resident trout and macroinvertebrates in some cases and created habitat in others.

Water manipulation, drought, hydroelectric/municipal water development, mining activities, fishing, introduction of non-native fish, fish stocking, and the accidental introduction of fish diseases within the cumulative effects area may have affected these resident trout and macroinvertebrate populations. A few drainages within the analysis area are infected with whirling disease (i.e. Beaver River). These kinds of fish diseases along with competition from non-native fish species and water manipulation are major factors affecting resident trout and macroinvertebrate populations. Water manipulation from the maintenance of range improvements (specified in the proposed action) may contribute to these major factors within the cumulative effects area. Other management activities listed above that contribute to erosion and sediment loading into streams (i.e. thinning/timber operations, mining, recreation, fire, etc.) may affect these resident trout and macroinvertebrate species and/or habitat when coupled with grazing under SMU-G. Therefore, the effects of the past, present, and reasonably foreseeable activities listed

above in combination with the SMU-G alternative may impact resident trout and macroinvertebrate individuals and their habitats, however this proposed action would not adversely impact the viability of these populations but should instead improve habitat effectiveness over time.

Rydberg's Milkvetch

Direct, Indirect, and Cumulative Effects

Since grazing livestock will not occur on open, barren, volcanic hillsides with little vegetation cover, there will be no direct, indirect, and/or cumulative effects to Rydberg's milkvetch individuals and/or its habitat as a result of this proposed action.

Migratory Birds

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts are fully protected. This Act is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protected selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle).

Under the Act it is unlawful to take, import, export, possess, buy, sell, purchase, or barter any migratory bird. Feathers or other parts, nests, eggs, and products made from migratory birds are also covered by the Act. Take is defined as pursuing, hunting, capturing, trapping, or collecting.

Under the direction of Executive Order 13186 signed on January 10, 2001, Federal agencies are directed to evaluate effects of actions and agency plans on migratory birds, with emphasis on species of concern. A recent list of migratory bird species of concern was delineated by the FWS in Birds of Conservation Concern 2002 (USFWS 2002). The proposed action described in this report will occur on lands administered by the Fishlake National Forest. In Birds of Conservation Concern 2002 (USFWS 2002), the migratory bird species of concern are delineated within separate Bird Conservation Regions (BCR's) in the United States. The lands administered by the Fishlake National Forest fall within 2 separate BCR's. These include BCR 9 (Great Basin) and BCR 16 (Southern Rockies/Colorado Plateau). Both species lists have been reviewed. The BCR 9 (Great Basin) and BCR 16 (Southern Rockies/Colorado Plateau) lists have 39 migratory bird species of concern. Five of these species have already been analyzed for effects within this report and within the Biological Assessment (BA) and Biological Evaluation (BE) written for this project. These include the peregrine falcon, yellow-billed cuckoo, the flammulated owl, Brewer's sparrow, and sage sparrow. The effects and determination of the SMU-G alternative to the additional 34 migratory bird species of concern will be the same as those effects and determination disclosed for cavity nester, sage nester, riparian guild bird species in this report if foraging, nesting, and/or breeding habitat occur in the project area for these migratory species.

X. DETERMINATIONS

Our professional determinations for implementation of Alternative A--the proposed action (Re-issuance of Term Grazing Permits on Eight Cattle Allotments on the Beaver Mountain-Tushar Range), Alternative B--no action/no grazing, and for Alternative C-- the Sustained Multiple Use Grazing alternative are summarized below (refer to Table 5). These determinations were made considering Alternative A, largely as a continuation or re-issuance of current conditions, while the other alternatives are made in reference to Alternative A considering effects to species discussed herein.

Table 5. Shown are the determinations for effects of the proposed action (**Re-issuance** of Term Grazing Permits on Eight Cattle Allotments-Beaver Mountain Tushar Range), the no action – no grazing alternative, and the Sustained Multiple Use Grazing alternative.

Key: MIS = Management Indicator Species for the Fishlake National Forest; BA = Biological Assessment for Threatened, Endangered, Proposed, and Candidate Species prepared specifically for this project; BE VS = Biological Evaluation for Sensitive Vertebrate Species prepared specifically for this project; BE PS = Biological Evaluation for Sensitive Plant Species prepared specifically for this project.

Species	**Status**	**Alternative A (Proposed Action)**	**Alternative B (No grazing)**	**Alternative C (SMU-G)**
Elk	MIS	may impact individuals and habitat but will not adversely impact viability of this population	may impact individuals and habitat but will not adversely impact viability of this population	Increased habitat effectiveness
Mule Deer	MIS	may impact individuals and habitat but will not adversely impact viability of this population	may impact individuals and habitat but will not adversely impact viability of this population	Increased habitat effectiveness

Table 5 Continued…

Species	Status	Alternative A (Proposed Action)	Alternative B (No grazing)	Alternative C (SMU-G)
Northern Goshawk	MIS / Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	Increased habitat effectiveness
Cavity Nesters (hairy woodpecker, mountain bluebird, western bluebird)	MIS	may impact individuals and habitat but will not adversely impact viability of these populations	Beneficial Effect	Increased habitat effectiveness
Sage Nesters (Brewer's sparrow, vesper sparrow, sage thrasher)	MIS	may impact individuals and habitat but will not adversely impact viability of these populations	Beneficial Effect	Increased habitat effectiveness
Riparian Guild (Lincoln's sparrow, song sparrow, yellow warbler, MacGillivray's warbler	MIS	may impact individuals and habitat but will not adversely impact viability of these populations	Beneficial Effect	Increased habitat effectiveness
Bonneville Cutthroat Trout	MIS / Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	Increased habitat effectiveness
Resident Trout (rainbow, brown, brook, cutthroat, lake)	MIS	may impact individuals and habitat but will not adversely impact viability of these populations	Beneficial Effect	Increased habitat effectiveness
Macroinvertebrates	MIS	may impact individuals and habitat but will not adversely impact viability of these populations	Beneficial Effect	Increased habitat effectiveness
Rydberg's Milkvetch	MIS	No Impact	No Impact	No Impact

Table 5 Continued...

Species	Status	Alternative A (Proposed Action)	Alternative B (No grazing)	Alternative C (SMU-G)
Migratory Birds	NA	may impact individuals and habitat but will not adversely impact viability of these populations	Beneficial Effect	Increased habitat effectiveness
Bald Eagle	Threatened	may affect but is not likely to adversely affect (Refer to BA)	Beneficial Effect	may affect but is not likely to adversely affect
Utah Prairie Dog	Threatened	may affect but is not likely to adversely affect (Refer to BA)	may affect but is not likely to adversely affect	may affect but is not likely to adversely affect
Western Yellow-Billed Cuckoo	Candidate	may affect but is not likely to adversely affect (Refer to BA)	Beneficial Effect	may affect but is not likely to adversely affect
Spotted Bat	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability
Townsend's Big-Eared Bat	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability
Flammulated Owl	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability
Three-Toed Woodpecker	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability
Peregrine Falcon	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability

Table 5 Continued...

Species	Status	Alternative A (Proposed Action)	Alternative B (No grazing)	Alternative C (SMU-G)
Greater Sage Grouse	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	Increased habitat effectiveness
Pygmy Rabbit	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE VS)	Beneficial Effect	Increased habitat effectiveness
Colorado River Cutthroat Trout	Sensitive	No Impact (Refer to BE VS)	No Impact	No Impact
Tushar Paintbrush	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE PS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability
Creeping Draba	Sensitive	No Impact (Refer to BE PS)	No Impact	No Impact
Elsinore Buckwheat	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE PS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability
Ward's Beardtongue	Sensitive	No Impact (Refer to BE PS)	No Impact	No Impact
Arizona Willow	Sensitive	may impact but not likely to cause a trend to federal listing or a loss of viability (Refer to BE PS)	Beneficial Effect	may impact but not likely to cause a trend to federal listing or a loss of viability
Beaver Mountain Groundsel	Sensitive	No Impact (Refer to BE PS)	No Impact	No Impact

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