CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This Chapter focuses on the physical, biological, social, and economic environments of the project area (affected environment) and the effects (environmental consequences) of implementing each alternative on that environment. It is arranged by Significant Issues identified in Chapter 1. It also presents the scientific and analytical basis for the comparison of alternatives table presented in the Chapter 2.

Direct effects are those that occur immediately in the area where the alternative is implemented, while indirect effects are those that occur later in time, or are spatially removed from the area where the alternative is implemented (40 CFR 1508.8). Cumulative effects are the incremental impacts of the alternatives in combination with past, present and reasonably foreseeable future actions (40 CFR 1508.7). Also included where they occur are discussions of adverse environmental effects that cannot be avoided, the relationship between short-term and long-term productivity, and any irreversible or irretrievable commitments of resources involved in each alternative.

3.0 Past, Present, and Reasonably Foreseeable Projects

Principle past, present/ongoing, and reasonably foreseeable projects or events must be considered to analyze cumulative effects. The following list was developed to facilitate this analysis. Not all projects or events on the list are applicable in order to analyze the cumulative effects of each resource. Only relevant projects or events will be discussed by resource.

Past Projects

Past projects such as tie hacking (in the early 1900s) are factored into the baseline of effects analysis.

Past National Forest (227 acres) and harvesting on private land (585 acres) occurred from 1950-2004 in the West Blacks watershed.

Implementation of the Travel Plan (Decision Notice and FONSI for Mountain View/Evanston Districts Travel Plan) closed to the public the upper 1.7 miles of the West Fork Blacks Fork Road #80063b.

The East Fork Fire in 2003 actually burned 1,723 acres in the WFBF. There are 2,592 acres of the East Fork Fire's perimeter in the WFBF Watershed.

Present and Reasonably Foreseeable Projects or Events
There are 28,616 acres of grazing allotments in WFBF watershed. Livestock grazing allotments within the Blacks Fork watershed include: Larson, Lyman Lake, Mt. Elizabeth #2, Little West Fork Blacks, Middle Fork Blacks Fork, Woodpile (inactive), Blacks Fork, and East Fork Blacks Fork.
Trailing by Ashley NF sheep band
Wilderness management – Fire closure
East Fork Timber Sale – Future timber harvest of 79 acres in 3 harvest units and 1.5 miles of temporary roads. Analyzed in the East Fork Fire Salvage ROD (June 2004).
Travel Plan implementation (Decision Notice and FONSI for Mountain View/Evanston Districts Travel Plan) – The upper 1.2 miles of the WFBF Road #80063a between the first ford and the Bear River Smiths Fork Trail will remain open to use, but will involve installation of adequate drainage and restoration of a road template. The approaches to a small stream ford about ¼ mile past the WFBF ford will be armored or have a culvert installed to reduce sedimentation. Side roads will be scarified and reseeded.
Road maintenance
Trail maintenance – WFBF Trail (8101), Highline Trail (8102), Bear River-Smiths Fork (8091)
Dispersed camping
Motorized recreation use – Snowmobiles, OHVs, etc. There are 1.8 miles of motorized trails in the WFBF. There are 17.8 miles of roads open to the public in the WFBF.
Non-motorized recreation – Hiking, horseback riding, hunting, pack stock. There are 18.3 miles of non-motorized trails in the WFBF.
Noxious weed treatments
Land acquisition – approximately 640 acres in 2006 and 1,500 acres in the future (1,280 acquired in 2003)
Private land development outside the allotment

3.1 Issue 1: Vegetation and Soil Conditions

There are concerns about the condition and trend of alpine vegetation and soils within the Allotment. Of concern specifically is the impact of livestock grazing on the types and amounts of plants present, the adequacy of ground cover for protecting soils from erosion, and the soil's condition for supporting productivity and proper functioning of watersheds. These concerns are especially focused on the high elevation alpine and riparian portions of the Allotment and whether these are meeting Forest Plan standards and desired conditions. There is concern that monitoring was not mentioned in the Proposed Action described in the Scoping Document. Given that a number of factors have influenced these conditions over time, questions about the degree to which livestock grazing is affecting current condition and trend have been raised both within and outside the Forest Service.

Vegetation and Soil Condition Indicators:

- Plant composition in alpine areas
- Ground cover (FP standards)
- Detrimental soil displacement (FP standards)
- Riparian vegetation meeting desired conditions (greenline studies)

The following discussion provides a description of current and reference conditions for both soils and vegetation in each of the grazed areas of the Allotment followed by projections of potential environmental effects on these soils and vegetation communities from each of the three Alternatives. These effects encompass important elements of long-term ecological processes of the area (watershed functioning, nutrient cycling and productivity, vegetation community and species diversity, and interactions with inherent geomorphic processes such as gophers) that affect natural integrity, a wilderness attribute. The areas discussed include the alpine benches, the non-alpine uplands, and the riparian areas of the Allotment.

3.1.1 Alpine Soils: Cirque Basins

Current Situation

The alpine portions of the Allotment are located at the head of the valley near the mountain headwalls. These cirque basins are formed by glaciation at the head of the West Fork of Blacks Fork (Unit 4b east side and Unit 4a west side). This landscape consists generally of a rolling topography formed by glacial till. The glacial till and windblown deposits of silts and clays are the main parent materials for the soils. Soils in the glaciated cirques or benches are young, thin soils as compared to the ridgetop soils that are relatively old and deep (Burns 1980; Lewis 1970). These ridgetop soils were protected from long periods of time under ice sheets or were exposed experiencing paraglacial processes.

The alpine benches show a pattern familiar to investigators working in alpine areas. Marr (1961) and Lewis (1970) have noted that the processes contributing to the small scale vegetation patterns and soil depth and development in the alpine are differences in the depth and duration of snow, the degree of disturbance by frost action, wind erosion, small mammals, the availability of fine-textured soil, timing of growing season moisture and past and present grazing practices. A well-vegetated site with a relatively developed soil may be separated from a shale barren almost devoid of vegetation by only several feet. The small-scale distribution pattern of alpine plant communities and their rather nebulous nature makes it difficult to assess the inherent ability of alpine soil to produce forage over large areas of range. Soil productivity can vary greatly between points separated by only a few meters. The most productive sites are those with high available moisture. The least productive are freely drained, rocky ridges or other terrain exposed to cold, desiccating wind (Marr 1961; Lewis 1970).

Pocket gopher activity occurs throughout the alpine benches activity area. They are considered a geomorphic agent that manipulates both physical and chemical characteristics of the soil. Because a clear correlation between pocket gophers and livestock grazing does not seem apparent in the Uinta Mountains (Goodrich 2006-PG), this analysis considers gophers to be an inherent and natural feature of the landscape. Their tunneling activities occur year round, and result in fresh deposits of loose soil on the ground surface that are susceptible to erosive forces. By inducing long-term erosion of soil mass, carbon and nitrogen, they modify the local micro topography and nutrient distribution (Sherrod, Seastedt 2000). They cause short- and long-term decreases in soil organic matter and a short-term increase but a long-term decrease in available nitrogen. (Sherrod 2001).

The implications of this kind of disturbance in these young thin soils are that depth is important for accumulations of organic matter (OM) and moisture retention in the surface horizons, contributing the main source of nutrients and physical stability to the plants. Small losses in surface soil can have a major effect on productivity. Shallow soils are generally less productive than deep soils because they store less water and plant nutrients (Baker and Jemison 1991). Deep soils with a thick "A" horizon (surface horizon) can "afford" to lose more surface soil, as there is more organic matter to draw on.

Soil depths sampled or observed on these benches typically ranged from 3 to 30 inches. Generally, where conditions have allowed for soil development, shallow soils are found on the shoulder slopes and edges of the till ridges, shallow to moderately deep soils are found on the tops of the ridges and the deepest soils are found in the wet meadow swales.

Areas observed and documented estimates made during field visits indicate an estimated 20 to 30 percent of the alpine benches exhibit soil disturbances such as of Pocket Gopher (*Thomomys talpoides*) perturbation, turf exfoliation and plant pedestaling or frost heaving. Soils are colder without vegetation and litter cover. The vegetative components protect the soil and vegetation from freeze-thaw processes such as needle ice. During a September 2004 field trip freeze-thaw patterns on the soil were common on the ridge tops and side slopes.

Some of the sites show a spatial progression from highly vegetated and litter covered to pedestaled plants (1-3 inch pedestals) to predominately rock substrate with less vegetation cover. The sizes of these areas vary can be as small as a few meters in size to an acre or more in size.

Qualitative soil condition assessments were conducted in 2003 at 17 separate locations within the alpine areas of the WFBF allotment. At each location, low intensity transects were used to investigate soil related site conditions indicative of biologic, hydrologic, and physical functions. A summary of the observed site conditions was used to qualitatively characterize the amount of detrimental soil disturbance at each location with a representative Soil Health Condition Class rating (USDA Forest Service 2003, Forest Service Handbook 2509.18.). The assessment protocol provides for three Soil Health Condition Classes: Functioning Properly, At Risk, or Impaired, and defines each class in terms of the approximate extent of detrimental soil disturbance related site conditions observed at each location. Essentially, a rating of Functioning Properly means that the site location being assessed has little or no detrimental soil disturbance (compaction, erosion, displacement or severely burned). A rating of At Risk means that the site has some detrimental soil disturbance but the amount does not exceed a threshold value of 15%, or that additional monitoring may be needed to determine this. A rating of Impaired means that the site has greater than 15% detrimental soil disturbance.

Revised Forest Plan (RFP) Forestwide Guideline G4 states: "At the end of an activity, allow no more than 15% of an activity area to have detrimental soil displacement, puddling, compaction and/or to be severely burned (RFP 2003, pg. 4-37)."

The qualitative soil condition assessments conducted in 2003 have limitations. The assessment did not include widespread survey of the alpine pastures of the allotment and hence cannot be used to represent the aerial extent of the various Soil Health Condition Classes in these areas.

Also, the assessments cannot be used to assess the trend of site conditions. Finally, the assessment is limited in its ability to distinguish between natural and management related causes to observed site conditions, particularly when the relationships are complex.

A summary of the qualitative assessments indicates that 8 of 17 sites (47%) sampled were Functioning Properly, 6 of 17 (36%) were At Risk, and 3 of 17 (17%) were Impaired Appendix B of the Soil Specialist Report for the FEIS (USDA Forest Service 2005, Oprandy and Flood) notes that at locations rated "impaired", the most commonly observed site conditions were low amount of vegetative ground cover and/or the presence of site conditions indicative of accelerated soil erosion. Because the observed conditions are a result of the complex interrelationships between geologically influenced low soil productivity, low vegetation production influenced by harsh climate or persistent snow beds, natural soil disturbance vectors such as gopher activity, or grazing related trailing/bedding/utilization, not all areas rated as "impaired" should be considered as detrimentally disturbed by management activities.

3.1.2 Alpine Plant Communities

Current Situation

Most of the alpine rangeland in this Allotment is located on Red Knob Bench and Dead Horse Bench in Unit 4 (A&B). There are approximately 1,110 capable acres of alpine vegetation. These acres were the total acres as determined by the 1960s Range Analysis. They include suitable and unsuitable acres as defined by the 1960s Range Analysis. These benches are located in cirque basins that were subject to intense glacial scouring as described above for soils. Both benches are snow catchment basins where moderate to long duration of snow cover is expected to have influence on vegetation and ground cover at least in certain slope shapes. Both benches show considerable exposed Precambrian shale that is in various stages of decomposition. This material has a high tendency to weather to semi barrens (Vegetation Specialist Report, Zobell and Goodrich 2004).

Alpine vegetation forms complex mosaic patterns (Baker 1983; Billings 1973; Bryant and Scheinberg 1970; Cox 1933; Douglas and Bliss 1977; Johnson and Billings1962; Lewis 1970; Marr 1961; Stanton et al. 1994; Walker et al. 1993; Willard 1979). The complex often includes micro-zonation of species and communities (Billings and Bliss 1959; Marr 1961) with gradual or sharp-narrow ecotones or rapid compositional changes occurring over short distances (Choate and Habeck 1967; Helm 1982; Osburn 1958). Uniform communities of large size are rare (Osburn 1958). Cooper et al. (1997) found it necessary, in some cases, to modify the shape of 30x30 m plots to accommodate the size and shape of stands.

Factors controlling the mosaic pattern are the subject of numerous papers including those cited above. Willard (1979) noted European workers recognized climate and substrate as basic controlling factors. The climate includes long, windy winters during which snow is removed from some areas and accumulated in other areas. On Trail Ridge, Rocky Mountain National Park, Willard (1979) considered the distribution of winter snow accumulation to be the primary controlling factor of vegetation patterns with pocket gopher (*Thomomys talpoides*) activity the second most important factor, and various frozen ground phenomena as the next important.

Other factors listed by Willard (1979) include: moisture, degree of soil development in snow-free areas, and type of parent material. Other researchers have listed these and other factors in various orders of importance.

Duration of snow cover is important not only to the distribution of alpine communities, but also to plant production and ground cover (Walker et al. 1994; Walker et al. 1995). The greater the persistence of snowbed cover, the more difficult it is for plants to establish and maintain cover. The bottoms of some snowbeds remain covered by snow in some years. In years that these areas are exposed, they show considerable bare soil, pavement, and larger coarse rock (Study Site A23-21). Certain lichens are also adapted to snowbeds. However, lichens also decrease as duration of snow cover increases (Benedict 1990; Flock 1978; Thompson 1954). Rocks devoid of lichen cover are common in late-melting snowbeds, and lichen-free zones can be neoglacial indicators (Edlund 1985).

Current patterns and distribution of alpine communities on this allotment strongly reflect the inherent influence of duration of snow cover which is a function of drifting snow in response to slope position and shape. They are also highly reflective of substrate, geomorphic setting, and pocket gopher selectivity. Three Study Sites on Dead Horse Bench (Studies W17-31A, W17-31B, and W17-31C) demonstrate an alpine mosaic in which strongly contrasting communities are found within close proximity.

3.1.2.1 Gordon Ivesia Community

Study site W17-31A within the West Fork Blacks Fork Allotment represents a wind-scoured community with a thin covering of plants where Gordon ivesia (*Ivesia gordonii*) is one of the more common plants. A slope that is transitional between alpine and subalpine areas on the west side of the drainage has been identified as an Erosional Glacier Valley Side (Unit 39 of Munroe et al. 1998) which consists of exposed bedrock, eroded by repeated valley glaciation during the Quaternary Period. This slope supports Gordon ivesia. Studies sites W16-11, and W16-17 in Amethysts Basin, where livestock grazing has not been permitted, were found to support this plant community in abundance on inherent erosional surfaces. The sites in the ungrazed Amethyst Basin provide a reference condition indicating that factors such as snow cover duration and parent materials may be the primary forces driving community dynamics and ground cover conditions on the Erosional Glacier Valley Side in West Fork Blacks Fork.

3.1.2.2 Parry Rush Community

Study site W17-31B within the West Fork Blacks Fork Allotment supports a Parry rush (*Juncus parryi*) snowbed community dominated by Parry rush, alpine pussytoes (*Antennaria alpina*) and sibbaldia (*Sibbaldia procumbens*). These plants are indicators of snowbed communities. Common features of these snowbed sites include: relatively high percent soil disturbance by pocket gophers, corresponding high percent bare soil, and abundance of Parry rush and other snowbed indicator species. This grazed Parry rush site had 37 percent bare soil and pavement.

Parry rush communities have been found at several other sites on the north slope of the Uinta Mountains. Ground cover was sampled at three snowbed sites dominated by Parry rush, alpine pussytoes, and sibbaldia in Amethysts Basin (W16-12, W16-14, and W16-19) where livestock

grazing has not been permitted. Bare soil and pavement on these sites ranged from 30 to 36 percent with an average of 33 percent. Photo record and ocular estimates of ground cover at an additional site in Amethyst Basin (W16-10) indicated 45% bare soil and pavement at that site. Also consistent with the mosaic of plant communities common to alpine areas, only 1% bare soil and pavement was found in a mesic meadow type at W16-13 in Amethysts Basin. This site is 41 m west and 26 m south of the Parry rush community at W16-12, which had 30% bare soil and pavement.

The similarities of site features in the grazed West Fork Blacks Fork and the ungrazed Amethyst Basin indicate that these conditions are the result of factors other than livestock grazing.

Photo records and estimates of ground cover at six other Parry rush sites on the north slope of the Uinta Mountains (W7-17A, W7-17B, W17-19, W18-14H, W18-33C, and W18-44) demonstrate the consistency of pocket gopher selectivity for these communities and high percent bare ground. Cooper et al. (1997) found bare ground and gravel covered 47 percent of the surface in a Parry rush community type in Montana. This was the most barren snowbed community of their study area.

Study site W17-6A (Parry rush community) in West Fork Blacks Fork has been the focus of past concerns about ground cover and trend. This site represents a case of relatively high percent pocket gopher disturbance and bare soil and gravel mulch. Point data (400 points 1997 and 100 points in 2002) indicated nearly 53 percent bare soil and pavement. Photo records for this site at the end of or after livestock grazing in 2000 and 2002 indicate low levels of livestock use at this site in recent years. Levels of livestock use in the past are less well documented. However, a series of ground cover estimates in 1965, 1966, 1967, and 1999 indicate stable or slightly improved conditions. These estimates were made in 0.96 ft square plots set at 1-chain (66 foot) intervals with the beginning point at the site where point data from a small area was taken in 1997 and 2002. Sites similar to this might represent some potential for increased ground cover. However, this will depend on the level of gopher disturbance. Data collected at this site in 2004 showed 63% ground cover or an increase of 10% over 1997.

Ocular utilization estimates indicate sheep use to be light on the alpine benches (Unit Examination Records 2210 Allotment File; Zobell 2004 Range Specialist Report).

3.1.2.3 Tufted Hairgrass Community

Study site W17-31C within the West Fork Blacks Fork Allotment supports a tufted hairgrass community. This site is located about 125 meters to the north and about 55 meters to the west of the Gordon Ivesia (W17-31A) and Parry rush (W17-31B) sites demonstrating the high variability common to alpine areas. Bare ground was measured at 1% at this site. Although point measurements at this site were limited to 100 points, other tufted hairgrass sites in West Fork Blacks Fork (W17-6B1, W17-6D, W17-10C, and W17-33) were measured at this intensity for a total of 500 points. Bare ground and pavement varied from 0 to 4% at these five sites with an average of about 2%. This is consistent with measurements and photo records at other tufted hairgrass sites in other parts of the Uinta Mountains including (A29-25, A35-18F, A35-20D), and within the range reported by Lewis (1970). These values are similar to reports from other alpine areas as shown in Table 3-1.

Table 3-1. Cover in alpine tufted hairgrass communities.

Reference	Plant and Litter	Bare Soil	Gravel	Rock
Cooper et al. (1997)	92	6	0.5	0.3
Eddleman & Ward (1984)	42	21	30	7
Johnson & Billings (1962)	85	15[1]	-	-
Willard (1979)[2]	92	6	1	3

[1]Includes rock.
[2]Data from Willard (1979) for an association including tufted hair grass was adapted to fit the above table.

The work of Eddleman and Ward (1984) is from Rocky Mountain National Park where livestock grazing has been absent or minor (Willard 1979). Pocket gophers were indicated to be a major factor in tufted hairgrass communities in their study in contrast to our findings in the Uinta Mountains. In August of 2005, Wasatch-Cache and Ashley National Forest Range Specialists visited tufted hairgrass sites in Rocky Mountain National Park sites for further data collection. Eddleman and Ward's study site RM5 (Rocky Mountain National Park) indicates 58% of the ground surface covered with current and deflated pocket gopher mounds and eskers in a tufted hairgrass site held at early seral condition by pocket gophers. The 58% gopher disturbance is similar to the findings of Eddleman and Ward where they found 51% bare soil and gravel.

On Study Site W17-33 on Red Knob Bench, bare soil was found to be 0 percent. This site is a tufted hairgrass dry meadow site that lies at the base of the steep slope along the trail to Red Knob Pass. Although sheep have been trailed through here annually for nearly 100 years, pocket gopher disturbance was absent or nearly so. Maintenance of high percent ground cover at this site indicates the capacity of tufted hairgrass sites to maintain high percent ground cover concurrent with livestock grazing and trailing.

Comparison of the Uinta Mountain tufted hairgrass sites with the Rocky Mountain National Park tufted hairgrass sites indicates that pocket gopher activity in the absence of livestock grazing results in relatively lower ground cover in the Park, while livestock grazing in the absence of pocket gophers results in relatively high ground cover in the Uinta Mountains.

The combination of forage production, species composition, slope, and proximity to water of tufted hairgrass communities results in sheep selecting these communities as much or more than other communities in the area. Lewis (1970) reported tufted hairgrass-geum communities to be favorites of grazing animals. Persistence of ground cover near potential in grazed tufted hairgrass sites of West Fork Blacks Fork can be interpreted to indicate that ground cover in other communities has also been maintained near potential.

3.1.2.4 Alpine Riparian Communities

Studies W17-32A (11,000 ft elevation), W27-1, and W27-2 (10,400 ft elevation) in the West Fork Blacks Fork Allotment represent alpine riparian communities in wet lake plains. The Greenline at 17-32A supports 90% late seral vegetation.

Study sites W16-16 (10,300 ft elevation) in Amethyst Basin where livestock have not been permitted and W21-2C3 (10,250 ft elevation) in Middle Fork Beaver Creek where livestock

grazing was discontinued in 1982, are comparable as ungrazed references because they occur on similar landforms and soil types. Vegetation at these sites was noted to be no taller or denser than similar sites in West Fork Blacks Fork. However, they are at lower elevations and thus could have greater potential for plant height.

The riparian sites at W17-32A and W27-2 in West Fork Blacks Fork compare very favorably with a riparian site at study site W16-20 at 10,750 ft elevation in Amethyst Basin that has no history of permitted livestock grazing. The wide and shallow stream at both sites appears to be a function of the low gradient and wet meadow vegetation that is highly resistant to cutting. Vigor of plants at the ungrazed Amethyst site appeared lower than at the sites in West Fork Blacks Fork.

Table 3-2. Alpine vegetation and ground cover.

Study No.	Plant Community	Existing Ground Cover	Ground Cover Range At Potential	*85% of Potential Ground Cover	Meet Forest Plan Standard?	References For Potential Ground Cover
W17-6A	Parry's Rush (*Juncus parryi*)	1997 47% 2004 63% 2005 65%	48-90	41-77	Yes	Amethyst Basin (W16-12, W16-14, and W16-19), Cooper et al. (1997)
W17-31B	"	63	48-90	41-77	Yes	"
W17-33	Tufted Hairgrass (*Deschampsia cespitosa*)	100	97-100	84	Yes	Cooper et al. (1997), Eddleman & Ward (1984), Johnson & Billings (1962), Willard (1979)
W17-31C	"	99	97-100	82-85	Yes	"
W17-6B1	"	97	97-100	82-85	Yes	"
W17-6D	"	97	97-100	82-85	Yes	"
W17-10C	"	96	97-100	82-85	Yes	"
W17-31A	Gordon's Ivesia (*Ivesia gordonii*)/ shale	64	33-85	28-72	Yes	Amethyst Basin (W16-11, W16-17)

* 85% of potential is determined by multiplying the potential ground cover by 0.85

Map 3-1 titled "Alpine Monitoring Studies" shows the location of alpine monitoring studies; they include nested frequency transects, riparian greenline transects, ocular crown cover, and camera points.

These studies indicate that ground cover conditions of the alpine benches of the West Fork Blacks Fork meet the Revised Forest Plan standard of ground cover at 85% of potential. They also indicate that pocket gophers are inherent to many sites *with and without* the influence of livestock grazing.

3.1.2.5 Summary

The mosaic of plant communities and soils in the alpine of West Fork Blacks Fork reflect geomorphology, geology, patterns of drainage, and snow persistence. Comparisons of plant communities between this basin and Amethyst Basin indicate influence of livestock grazing on ground cover and community patterns is minor compared to inherent features.

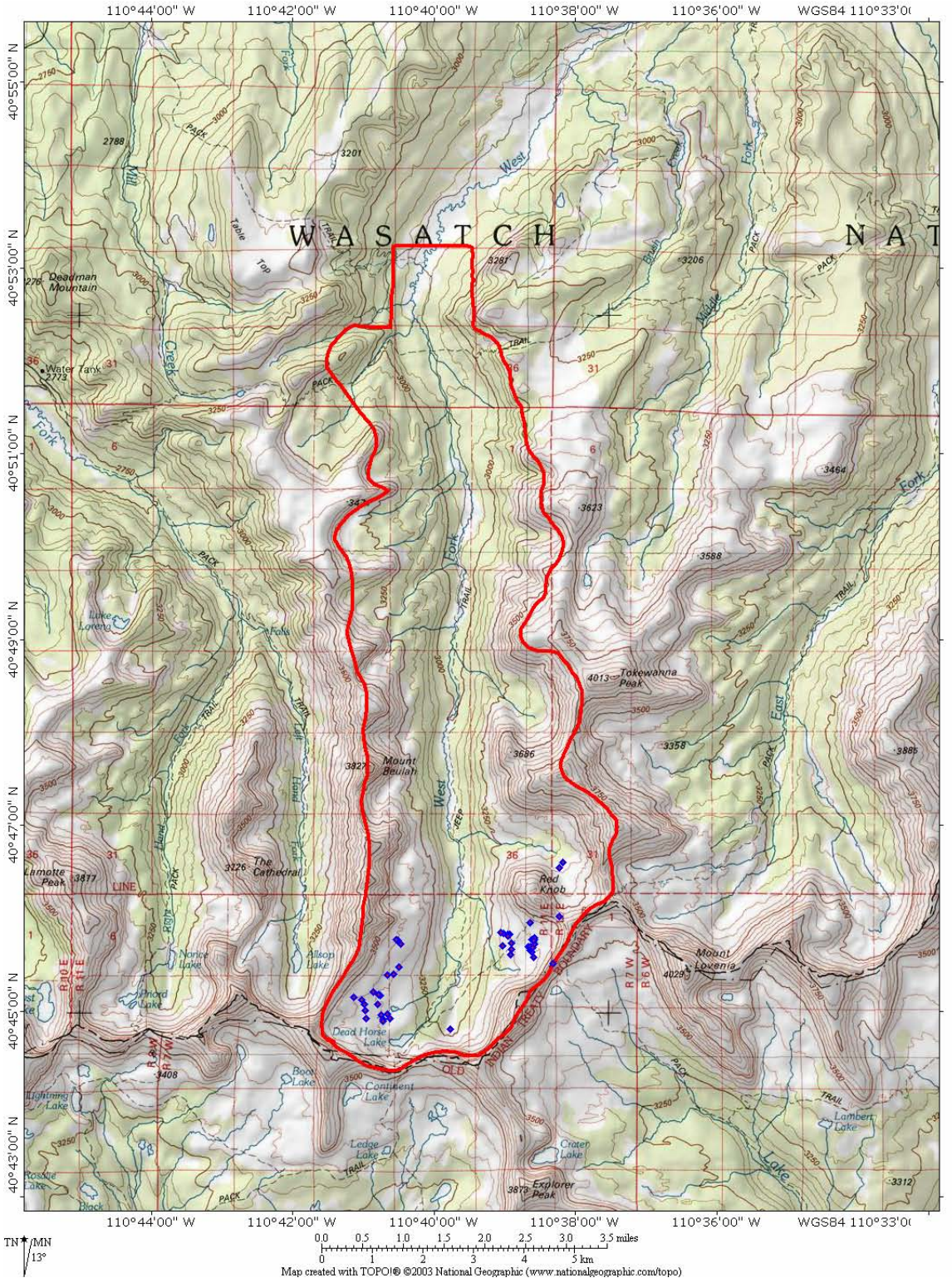
Salting Practices -Permanent salting grounds were established when sheep first started to graze this allotment at the turn of the century and until 1998, most of them remained in use. The prolonged use of these permanent salt grounds with the associated trampling and heavy use have caused an increase in bare soil in the immediate area, generally no larger than ¼ acre in size.

In 1998, the permittee cooperated with the Forest Service in the abandonment of permanent salt grounds. The permittee has agreed not to use rocks and hollowed out logs for the permanent placement of salt. Instead, salt is being placed in portable wood troughs and rotated to different locations along the edge of meadows each year.

Watering Spots – (Same as 3.1.6.3 under “upland plant communities”)

Camps – There are no herder camps located on the alpine plant communities.

Sheep Trailing – (Same as 3.1.6.4 under “upland plant communities”)



Map 3-1. Alpine Monitoring Studies (blue squares).

3.1.3 Effects on Alpine Soils

3.1.3.1 Alternatives A - No Grazing; and B - Discontinue Grazing in Unit 4

Direct and Indirect Effects

Direct and indirect effects will be analyzed for only the rangeland cover types and capable range acres within each of the individual pasture activity areas. The Revised Forest Plan directs that the potential soil detrimental disturbances associated with proposed management actions should be analyzed by activity area. Disclosure of effects will be done by a qualitative description and estimate of the extent of detrimental soil disturbances that have been, or could be, created by the relevant activities. This analysis assumes that potentially affected alpine soils will occur primarily in pastures 3, 4a and 4b.

Depending on the degree to which ground cover conditions are a result of grazing, a gradual reduction in erosion could result from increases in ground cover on those sites not currently meeting standards. However, it is important to note that inadequate ground cover "may be a result of low inherent site productivity from persistent snowbeds, natural soil disturbance vectors such as gopher activity, or from grazing related trailing/bedding/utilization…" (USDA Forest Service 2005, Oprandy and Flood). Areas across the benches already have irreversible soil losses. Because of inherent geomorphic processes such as gopher activity, wind erosion and frost, existing areas of soil disturbance may continue to enlarge (Willard and Marr 1971). These areas are not expected to regain former productivity for an indeterminate period of time under these alternatives. Revised Forest Plan soil quality guidelines (guideline G4) are being met, i.e., detrimental soil disturbances due to management activities do not occur on more than 15% of an activity area (Flood 2006).

Cumulative Effects

Analysis Area: The cumulative effect's analysis area is the same as the direct and indirect effect's analysis area.

The incremental effects of discontinuing livestock grazing combined with effects of other activities, past, present and reasonably foreseeable are expected to be small and occur very gradually. Because of geomorphic processes such as gopher "grazing"/burrowing and climatic factors such as wind scour, water runoff and snow amount and duration, some soil disturbance will continue, thereby limiting the amount of recovery to vegetation production and ground cover that would occur as a result of these alternatives. Historic (pre-1900) livestock overstocking and heavy grazing have also contributed to soil disturbance and erosion, although the degree of this historic effect is unknown. More recently recreation dispersed camping has contributed and will continue to contribute to small isolated areas of soil disturbance (compaction, erosion) around campsite core areas. Implementation of the fire closure for these pasture areas, would potentially reduce human caused wildfires and avoid severe soil burning detrimental effects. Future recreation impacts are expected to remain small and near the established trails because this drainage is not as popular as some others. Some recreation users commented that they no longer visit this drainage because of the effects of livestock grazing. Although these users might return

in the absence of grazing, it is impossible to predict whether there would be a net increase in recreation use and whether that use would add to net soil disturbance.

Trailing impacts (some short-term compaction from trampling, and removal of some forage resulting in lower available soil cover and organic matter) from the Ashley herd will continue to occur. Because the trailing activity is conducted in open areas, unconfined by topography, and on gently sloping terrain, the impacts are expected to be very small.

Under this alternative, soil disturbance from past, present, and future management activities in this activity area is expected to meet Revised Forest Plan Guideline G4.

3.1.3.2 Alternative C - Proposed Action

Direct and Indirect Effects

Direct and indirect effects will be analyzed for only the rangeland cover types and capable range acres within each of the individual pasture activity areas. The RFP directs that the potential soil detrimental disturbances associated with proposed management actions should be analyzed by activity area. Disclosure of effects will be done by a qualitative description and estimate of the extent of detrimental soil disturbances that have been, or could be, created by the relevant activities. This analysis assumes that potentially affected alpine soils will occur primarily in pastures 3, 4a and 4b.

Because livestock grazing and inherent processes are so intertwined, it is not possible to accurately determine how much of the soil disturbance reported for the alpine bench areas in Section 3.1.1 is detrimental (due to the present livestock grazing of the Wasatch-Cache herd) and how much is natural (due to geomorphic processes such as gopher “grazing” and burrowing; and climatic factors such as wind scour, water runoff and snow amount and duration). Livestock use monitoring indicates that sheep use is light on the alpine benches (Zobell 2005), and that end of season soil disturbance from grazing on Dead Horse bench ranged from 1 to 6% of the area (Zobell 2001). In addition to these studies, long term photo point monitoring on numerous alpine sheep allotment in the Uinta Mountains has indicated that areas of soil disturbance are stable and not growing under current levels of livestock grazing (Goodrich, Huber, and Zobell 2005).

Revised Forest Plan soil quality guidelines (guideline G4) are being met, i.e. detrimental soil disturbances due to management activities do not occur on more than 15% of an activity area (Flood 2006).

Under this alternative, livestock utilization of forage would slightly reduce the amount of available organic matter (OM) in the surface soil horizons. Surface soils contribute the main source of nutrients and physical stability to plants so the vegetation communities could be expected to have somewhat less available nutrients, and physical stability than in the absence of grazing. Areas with high vegetative ground cover and intact soils and in more moist sites are expected to remain in good condition under this alternative.

Cumulative Effects

Analysis Area: The cumulative effect's analysis area is the same as the direct and indirect effect's analysis area.

The incremental effects of continuing livestock grazing, combined with effects of other activities, past, present and reasonably foreseeable, will result in soil conditions that are similar to those described in the Current Situation section above. This is based on the fact that in these harsh alpine environments, geomorphic processes such as gopher "grazing" and burrowing; and climatic factors such as wind scour, water runoff and snow amount and duration (all elements of natural integrity), will continue to cause some soil disturbance and erosion. Historic (pre-1900) livestock overstocking and heavy grazing have also contributed to soil disturbance and erosion although the degree of this historic effect is unknown. More recently recreation dispersed camping has contributed and will continue to contribute to small isolated areas of soil disturbance (compaction, erosion) around campsite core areas. Implementation of the fire closure for these pasture areas, would potentially reduce human caused wildfires and avoid severe soil burning detrimental effects. Future recreation impacts are expected to remain small and near the established trails because this drainage is not as popular as others.

Areas across the benches already have irreversible soil losses. Because of inherent geomorphic processes such as gopher activity, wind erosion and frost, existing areas of soil disturbance may continue to enlarge (Willard and Marr 1971). These areas are not expected to regain former productivity for an indeterminate period of time under this alternative.

Under this alternative, detrimental soil disturbances from past, present, and future management activities in this activity area, are expected to meet Revised Forest Plan guideline G4.

3.1.4 Effects on Alpine Plant Communities

3.1.4.1 Alternative A - No Grazing

Direct and Indirect Effects

Although effects of recent past livestock grazing could be expected to persist for a few years, these effects can be expected to become negligible. Alpine studies on the south slope of the Uinta Mountains indicate recovery of ground cover to potential within 1-20 years. These studies include the Kidney Lake Exclosure (ANF 13-1), North Taylor Lake (ANF 14-22), and Blue Lake (ANF 15-1). On sites where ground cover is below potential, ground cover would be expected to recover to potential within 1 to 20 years thus restoring this element of natural integrity.

Cumulative Effects

Analysis Area: The analysis area is the West Fork Blacks Fork Allotment.

The factors of cumulative effects are listed in the table of 3.0 as past, present, and reasonably foreseeable projects or events. Some factors on that list such as motorized vehicle use have no effect on the alpine areas. All of factors on the list that do apply to the alpine have a rather long history. That history indicates potential for effect. The following discussion indicates minor effects.

There are several studies on alpine areas of West Fork Blacks Fork Allotment including those listed in 3.1.2 – Current Situation. These studies indicate patterns of plant communities are consistent with various geomorphic settings. Plant cover and plant species present in the various plant communities is consistent with slope, aspect, drainage patterns, persistence of snow cover into spring and summer, abundance of pocket gopher activity, and other inherent factors. The patterns of these communities, dominant species of these communities, and ground cover of these communities indicate inherent features are the controlling factors of community distribution and community composition and ground cover. This indicates no cumulative effects of the listed projects or events listed in the table of 3.0.

The incremental effects on alpine vegetation of discontinuing current livestock grazing, combined with effects of other activities, past, present and reasonably foreseeable, as well as inherent site factors are expected to be relatively small and gradual. Because the Ashley N.F. sheep herd would continue to trail across the allotment in the early summer and then again in the early fall, small areas along the trail would not be expected to return to their potential ground cover.

Potential human induced effects that are expected to continue are localized vegetation trampling associated with trail use along with use of alpine forage by recreation horse or other pack animals, and localized vegetation trampling by recreation use (hiking, back packing, camping). These would include localized, intense disturbance where trails cross streams and around highly favored camping spots. Where permitted livestock also impacted these areas in the recent past, there could be a gradual decrease in the area impacted depending on site-specific features of terrain and vegetation.

Wild ungulate use of forage and ground disturbance by gophers and other rodents with associated vegetation removal are expected to continue at or near current levels.

Overall, in consideration of cumulative effects above, ground cover conditions are expected to meet or exceed the Forest Plan Standard of 85% of potential with this Alternative.

3.1.4.2 Alternative B - Discontinue Grazing in Unit 4

Direct and Indirect Effects

Same as Alternative A.

Cumulative Effects

Same as Alternative A.

3.1.4.3 Alternative C - Proposed Action

Direct and Indirect Effects

This alternative provides for rest of alpine plants in two consecutive out of every four years. Lewis (1970) reported alpine allotments in the Uinta Mountains that were rested for two years in succession showed marked improvement in plant vigor. This offers a potential for maintaining higher percent ground cover (an element of natural integrity) on Dead Horse Bench and Red Knob Bench than grazing without rest might provide.

Under rest rotation grazing in similar glacial basins on the south slope of the Uinta Mountains ground cover has been measured at 80-95% (ANF 11-3A, ANF 11-4, ANF 12-4A, ANF 12-4B, ANF 24-11, ANF 24-11B). However, some of these sites are located on concave topography outside snowbed areas and none have the exposed Precambrian shale found on Red Knob and Dead Horse Bench. While these studies indicate potential for relatively high percent ground cover on the floors of glacial basins under rest rotation grazing, the sites are different enough from Red Knob Bench and Dead Horse Bench that values obtained from these sites should not be applied without qualification to the areas of low percent ground cover on the alpine benches of this Allotment. However, they do suggest that this alternative can be expected to maintain ground cover or increase ground cover where there is potential for increase. Given that this grazing system has been in effect since 1999, ground cover under this Alternative is expected to remain at 85% or more of potential.

Ocular utilization estimates indicate sheep use to be light on the alpine benches under current grazing management (Unit Examination Records 2210 Allotment File, Zobell 2004 Range Specialist Report). This level of utilization is expected to continue under this alternative. Light utilization is conducive to maintaining a desirable plant composition and maintaining/improving ground cover conditions. "…light to moderate grazing intensity levels generally have resulted in negligible increases in soil erosion over ungrazed plots." (Molinar et al. 2001).

Cumulative Effects

The factors of cumulative effects are listed in the table of 3.0 as past, present, and reasonably foreseeable projects or events. Some factors on that list such as motorized vehicle use have no effect on the alpine areas. All of factors on the list that do apply to the alpine have a rather long history. That history indicates potential for effect. The following discussion indicates minor effect.

There are several studies on alpine areas of West Fork Blacks Fork Allotment including those listed in 3.1.2 – Current Situation. These studies indicate patterns of plant communities are consistent with various geomorphic settings. Plant cover and plant species present in the various plant communities is consistent with slope, aspect, drainage patterns, persistence of snow cover into spring and summer, abundance of pocket gopher activity, and other inherent factors. The patterns of these communities, dominant species of these communities, and ground cover of these communities indicate inherent features are the controlling factors of community

distribution and community composition and ground cover. This indicates no cumulative effects of the listed projects or events listed in the table of 3.0.

The incremental effects of continuing current livestock grazing combined with effects of other activities, past, present and reasonably foreseeable, as well as inherent site factors are expected to result in maintaining or gradually improving vegetation conditions described in the Current Situation section above. Ground cover data from 2002 and 2004 on the site of most concern (W17-6A) showed an increase over 1997 measurements under the current grazing system along with impacts of other activities. If this trend continues, natural integrity of the area will be increased.

The Ashley N.F. sheep herd would continue to trail across the Allotment in the early summer and then again in the early fall. As a result, on small areas along the trail ground cover conditions would not be expected to improve.

Potential human induced effects that are expected to continue are localized vegetation trampling associated with trail use along with use of alpine forage by recreation horse or other pack animals, and localized vegetation trampling by recreation use (hiking, back packing, camping). These would include localized, intense disturbance where trails cross streams and around highly favored camping spots similar to current conditions.

Wild ungulate use of forage and ground disturbance by gophers and other rodents with associated vegetation removal are expected to continue at or near current levels.

There is potential for increasing ground cover on those sites not currently at potential with this alternative, which would increase natural integrity and reduce over all cumulative effects. Favorable results are indicated with rest treatments on the south slope of the Uinta Mountains at study sites listed above.

Overall, ground cover conditions are expected to continue to meet the Forest Plan Standard of 85% of potential.

3.1.5 Upland Soils

Current Situation

3.1.5.1 Dry Meadows

In the dry meadows there are small, widely scattered areas where soil ground cover is limited because of geomorphic properties of the sites (rocky and excessively drained soils resulting in droughty conditions) as well as pocket gopher activity. Pocket gopher disturbance appears consistently related to plant community type in the Uinta Mountains (Goodrich 2006-PG). Other factors conducive to pocket gophers include well-drained soils and adequate snow cover in winter (Willard 1979). These bare soil areas are a natural occurrence in these dry meadows.

Dry meadows are found mainly along the east side of the canyon standing above wet meadows. They are formed from well drained alluvial or colluvial fan deposits and small slide/slump deposits (Munroe et al. 1998). The textures and slopes of these deposits depend on the composition of the parent material and the height and steepness of the surrounding terrain

Other than the alpine benches, this Geomorphic Unit shows the most evidence of impacts from grazing, recreation and pocket gophers. There are dry open areas between the forest and the wet meadows that tend to have had the most bedding and trailing impacts. These dry meadow areas are found in patches all along the canyon bottom and have varying amounts of disturbance and bare ground. With trampling, surface soil aggregates are broken and become single grain. Bare ground with soil already loosened by pocket gopher activity is especially susceptible to movement by wind, water and livestock trampling.

3.1.5.2 Wet Meadows

Wet meadows are found in the alluvial stream bottom or upland areas that have plenty of water and associated wetland vegetation. Soils are generally fine textured or layered with alternating horizons of organic matter, coarse textured and fine textured materials. They are usually not considered well drained. Soil and vegetation in the wet meadows are not heavily impacted by use. There are small areas of livestock trampling at old salt stations and trailing to the stream but from observations during field trips these are small and localized. The large reserve of organic matter provides the soil some protection from compaction and gives the vegetation a steady supply of nutrients. Soil does not move far and the wet meadows are catchments for soil that moves down from the dry meadows. From observations during field visits no detrimental soil impacts were observed except for small areas where the established recreation trail and livestock cross over.

3.1.6 Upland Plant Communities

Current Situation

3.1.6.1 General Description of the Plant Community: Monitoring Activities

In 1997 a long-term trend study (W17-2 Buck Pasture Nested Frequency) was established in the Buck Pasture in Unit 2 on the West Fork-Blacks Fork Allotment. This study was established in a representative highly preferred sheep grazing area; it is located in a dry portion of the meadow and water is readily available. Ground cover was recorded at 96%. In another subalpine meadow, a 1997 retake of photos taken in 1965 (Study W17-12-D) indicated that ground cover and vegetation composition/production remained unchanged. Ground cover in those photos appears to be close to 100% and the willow component of the vegetation has not decreased. These two studies are located in Tufted Hairgrass (*Deschampsia cespitosa*) plant communities. The ground cover potential for this plant community is 99% (see Section 5.5, Appendix E: Revised Forest Plan Appendix VII). Ground cover conditions found at both sites meet the Forest Plan standard of 85% of potential.

Studies W7-18B, W7-18C, W7-18C2 are located in a dry meadow at the north end of the allotment. A high amount of bare soil was recorded in each of these studies, 50%, 50%, and 66% respectively. This well drained meadow is highly selected by pocket gophers. Nearly all of the bare soil can be attributed to current and past gopher activity. Within this same meadow, greenline study W7-18A recorded 97.5% late seral species on a small 1st order stream. This high amount late seral species indicates that sheep grazing is not the major factor for the high bare soil conditions found at studies W7-18B, W7-18C, and W7-18C2. If grazing was primary cause of the high bare soil conditions on the dry meadow, then it seems likely that grazing would have also degraded the greenline along the adjacent small 1st order stream. Study W17-1A is also located in a dry meadow near the wilderness boundary and also shows a high amount of bare soil; again, nearly all of the bare soil conditions at this site can be attributed to current and past gopher activity.

Heavy pocket gopher disturbance is common to some of the dry upland plant communities. Their mounds and eskers naturally increase the bare soil. Within the same meadow on equally accessible and palatable (to sheep) vegetation there are both highly disturbed areas and undisturbed areas. These vegetation patterns indicate sheep are a minor factor and gophers are a major factor in conditions found on many sites (Distribution and Abundance of Pocket Gophers in the Uinta Mountains in Context of Livestock Grazing and Other Factors, Goodrich 2004).

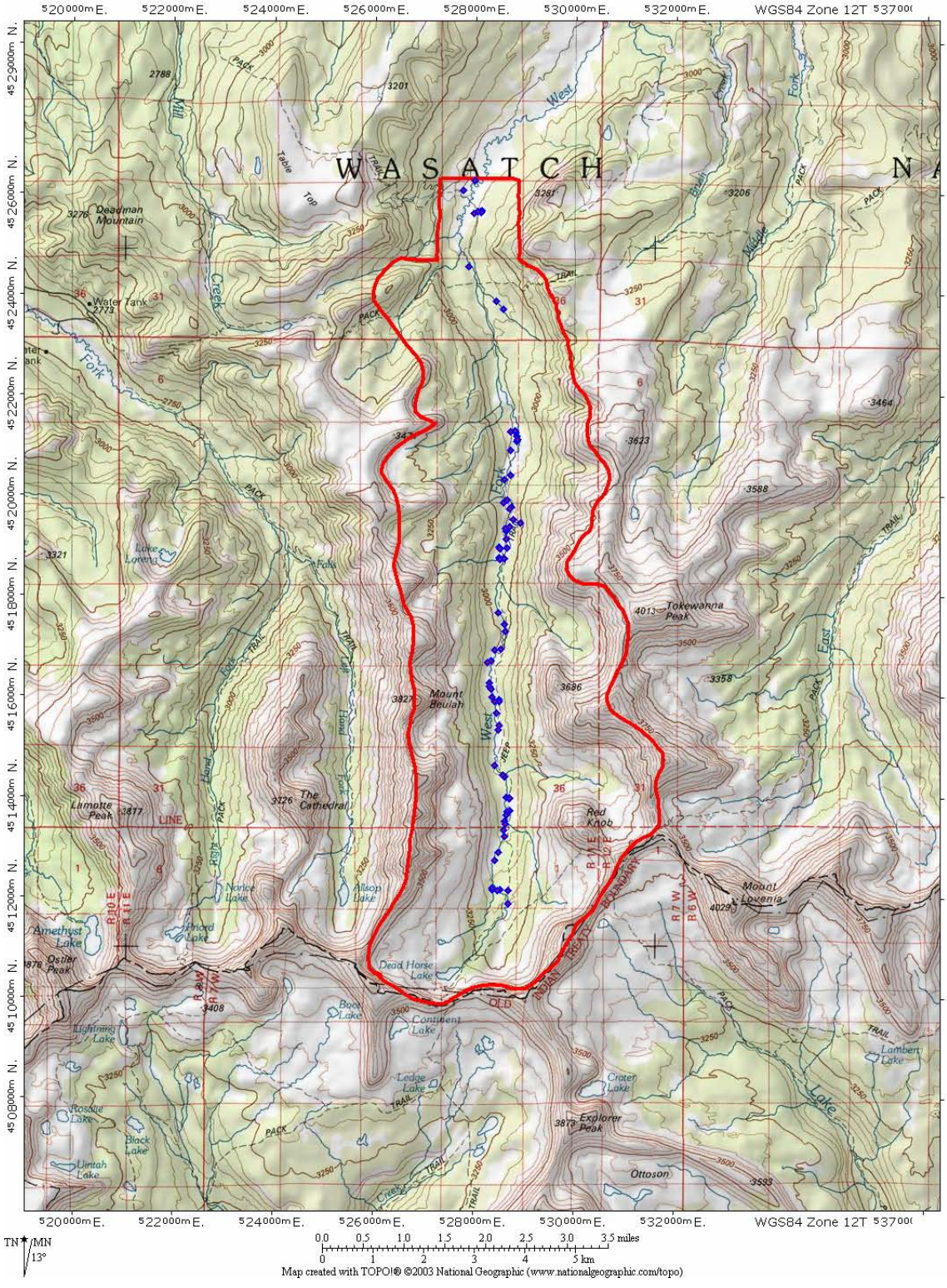
Potential ground cover has not been determined for the four sites discussed above because reference sites have not been located. In their absence, we are basing conclusions on observations of vegetation patterns, and it is readily apparent that high bare soil conditions will persist as long as gopher activity remains at current levels, even without livestock grazing.

Plant composition on upland dry meadow sites within the Allotment varies also with gopher activity. This activity prepares seed beds for annual forbs such as dandelion (*Taraxicum officinale*). It also appears that gophers are the primary factor influencing plant composition due to the fact that recent ocular estimates indicate light use by sheep. Upland plant composition data for a dry meadow is summarized in Table 3-3 (Zobell 2005).

Table 3-3. Upland plant composition.

Study Number	Year	Type of Study	% of Desirable Perennial Species
17-18 B	2001	Crown Cover	85%
17-18C	2001	Crown Cover	39%
17-18C2	2001	Crown Cover	32%
17-2	1997	Crown Cover	98%
A-8	1961	Site Analysis	96%
BM 2	1966	Site Analysis	96%
BM 3	1966	Site Analysis	91%

Utilization studies (see Appendix C, Utilization Studies Summary, W17-12A, W17-12-B, W17-12-C, W17-12D, Unit Examination Records 2210 Allotment Files; USDA Forest Service 2000 & 2004 Zobell Range Specialist Report) indicate that grazing pressure has been light to moderate on key species since 1997.



Map 3-2. Non-Alpine Studies (blue squares).

Map 3-2 shows the location of non-alpine monitoring studies; they include nested frequency transects, riparian greenline transects, utilization transects, ocular crown cover, and camera points.

3.1.6.2 Salting Practices

Permanent salting grounds were established when sheep first started to graze this allotment at the turn of the century and until 1998, most of them remained in use. The prolonged use of these permanent salt grounds with the associated trampling and heavy use have caused an increase in bare soil in the immediate area, generally no larger than 1/4 acre in size. In 1997 a re-take of 1962 and 1967 photos of an old trend study (17-1A) located in close proximity to an established salt ground indicated that the apparent trend on that site was down. It showed an increase in bare soil, but also showed an increase in pocket gopher activity that also contributed to increased bare soil conditions.

In 1998, the permittee cooperated with the Forest Service in the abandonment of permanent salt grounds. The permittee has agreed not to use rocks and hollowed out logs for the permanent placement of salt. Instead, salt is being placed in portable wood troughs and rotated to different locations along the edge of meadows each year. The moving of salting grounds to new non-permanent locations has recovered ground cover on many of the sites since 1998 (USDA Forest Service 2000 & 2004, Zobell Range Specialist Report).

3.1.6.3 Watering Spots

There are numerous places scattered throughout the allotment where the sheep water; some of these are located along the stream banks of the West Fork of Blacks Fork Creek, some are located along the small side tributaries to the West Fork of Blacks Fork Creek, and some are wet meadows where there is standing water available. Watering spots are numerous and well distributed throughout the subalpine meadows. As such, the sheep do not have to congregate and travel as one herd to water, but rather small groups of sheep naturally water next to areas where they are grazing. This practice has minimized trampling effects at watering spots. Watering spots receive some trampling resulting in exposure of some bare soil. If located next to live water, some sediment enters into streams, however this is minor compared to natural processes and historical management practices (Wasniewski 2000). Watering spots are generally quite small, usually less than a 1/10 of an acre in size and not all of these are located next to live streams.

3.1.6.4 Sheep Trailing

A sheep herd is permitted to trail across the allotment in the early summer as it travels to an allotment on the Ashley National Forest; this same herd trails across the allotment again in the fall as they travel home from the Ashley National Forest.

The West Fork Blacks Fork Allotment permittee has been managing his sheep to minimize trailing effects. The sheep are open herded with the minimum use of dogs. Trailing does occur as the sheep are moved from unit to unit as designated in the annual operating instructions. This trailing is minimized however by timing the move into the next unit with when the sheep have naturally grazed up to the unit boundary. Some trailing has to occur within the units themselves; the sheep are normally grazed on one side of the creek and then they have to be moved to the

other side of the creek to finish grazing the unit. This move involves some trailing to where the sheep can safely cross the West Fork of Blacks Fork Creek. The permittee also has to trail his sheep across the allotment when trailing home in the fall. Trailing causes those adverse effects at stream crossings as described above under "Watering Spots." Trailing across wet meadows knocks down the grasses and forbs, but does not have any long lasting detrimental effects on the plants. Experience has shown that the plants recover by the next year and evidence of sheep trailing through the wet meadow vegetation is not visible until the activity occurs again that year. Trailing across dry meadows has a more lasting effect; as long as the sheep continue to trail through these areas, there are visible trailing signs left over from year to year in the form of reduced ground cover on the trails. Many of these same sheep trails are used by recreation livestock and as such compound the reduction in ground cover. Where sheep trails are not also used by horses (recreation and sheepherder) erosion is not evident, but there are places along the main recreation trail where some erosion has been caused by a combination of recreational use, sheepherder horse use, and sheep trailing.

3.1.6.5 Bedding

Sheep are bedded on the driest portions of the meadows. Moderate to heavy forage utilization, trampling, and increased sheep droppings occur on these sites. The average size of these bed grounds is about ½ acre. Due to the restriction of bedding the sheep at one bed ground per night, ground cover at bed ground sites is generally adequate to protect soils. However, if care is not exercised, the ground cover at these sites can rapidly deteriorate.

3.1.6.6 Camps

Sheepherder camps were established when sheep first started to graze this allotment at the turn of the century; some of these same camps are still used today. During the past few years, the permittee has made a concerted effort to pack out all old accumulated garbage as well as any new garbage. The permittee has also cleaned up and packed out garbage left over from recreation use of these camps. Because most of these camps have been used annually over the past 80 to 100 years, some of them have areas of bare, compacted soil and look like a camp; these areas are generally less than a 1/4 acre in size and they have not expanded in size. These campsites do not have active soil erosion occurring.

3.1.7 Effects on Upland Soils

General Effects

The direct effects of livestock grazing are the removal of vegetation, trampling of vegetation, destruction of biological soil crusts, compaction of underlying soils, and redistribution of nutrients. The indirect effects are altered runoff, infiltration rates, and soil water-holding capacity; accelerated erosion; changes in vegetation structure, productivity and composition; altered stream channels; changes in water quality; and frequency and severity of fire (National Research Council 2002).

3.1.7.1 Alternative A - No Grazing

Direct and Indirect Effects

Direct and indirect effects will be analyzed for only the rangeland cover types and capable range acres within each of the individual pasture activity areas. The Revised Forest Plan directs that the potential soil detrimental disturbances associated with proposed management actions should be analyzed by activity area. Disclosure of effects will be done by a qualitative description and estimate of the extent of detrimental soil disturbances that have been, or could be, created by the relevant activities. This analysis assumes that potentially affected upland, non alpine soils will occur primarily in pastures 1 and 2.

Without the West Fork herd trailing and bedding, there should be some recovery of vegetation and litter away from the trail in the bedding areas. Soils should become more productive as the organic matter builds. This will add to the physical and chemical productivity of the soil. Freeze-thaw processes and plant roots are expected to break up areas of compaction. These elements of natural integrity will be positively affected in the areas currently impacted from trailing and grazing. Trailing impacts from the Ashley herd will still occur.

Cumulative Effects

Analysis Area: The cumulative effect's analysis area is the same as the direct and indirect effect's analysis area.

The incremental effects of discontinuing livestock grazing combined with effects of other activities, past, present and reasonably foreseeable, are expected to result in some areas of stabilization of soils because of increases in organic matter from ungrazed vegetation and litter. However, pocket gopher activity, the effects of past (historic) grazing, and the more recent impact of recreation traffic near the recreation trail is expected to continue to contribute to the loosening and movement of topsoil on the Dry Meadow GU. Because of the continuation of trailing the Ashley herd that crosses in the spring and fall, these portions of the activity area are expected to show little improvement in ground cover. Recreation traffic will also continue to affect areas off the trail with dispersed camping around campsite core areas and impacts (areas of bare compacted soils) from recreation livestock. Implementation of the fire closure for these pasture areas, would potentially reduce human caused wildfires and avoid severe soil burning detrimental effects.

To the extent that past land acquisitions have added capable range acres, livestock grazing impacts in the pastures has been reduced. This is because no increase in stocking rates has occurred in the past.

Past and present noxious weed treatments will have the effect of reducing bare soil, over the long term, associated with weed infestations. This effect is limited to pasture 1 since no weed treatments can occur in the wilderness.

The amount of the detrimental soil disturbance from past, present and foreseeable future management activities in this activity area is expected to meet Revised Forest Plan Guideline G4.

3.1.7.2 Alternatives B - Discontinue Grazing Unit 4; and C - Proposed Action

Direct and Indirect Effects

Direct and indirect effects will be analyzed for only the rangeland cover types and capable range acres within each of the individual pasture activity areas. The Revised Forest Plan directs that the potential soil detrimental disturbances associated with proposed management actions should be analyzed by activity area. Disclosure of effects will be done by a qualitative description and estimate of the extent of detrimental soil disturbances that have been, or could be, created by the relevant activities. This analysis assumes that potentially affected upland, non alpine soils will occur primarily in pastures 1 and 2.

Effects to the soils from sheep grazing are expected to continue on this upland activity area. In localized heavily used areas, soil movement by wind and water is expected to continue. "…light to moderate grazing intensity levels generally have resulted in negligible increases in soil erosion over ungrazed plots." (Molinar et al. 2001). Therefore minor effects on soil related elements of natural integrity are expected to continue with grazing of the uplands.

Cumulative Effects

Analysis Area: The cumulative effect's analysis area is the same as the direct and indirect effect's analysis area.

The incremental effects of continuing livestock grazing combined with effects of other activities, past, present and reasonably foreseeable are expected to result in soil conditions similar to those described above in "Current Situation".

Pocket gopher activity is expected to continue to cause soil disturbance on sites conducive to their activity. Recreation traffic will continue to cause localized soil disturbance, especially near the established trail and around campsite core areas. In the foreseeable future these activities in addition to on-going livestock grazing will continue to be agents of loosening dry surface soil over this activity area. Implementation of the fire closure for these pasture areas, would potentially reduce human caused wildfires and avoid severe soil burning detrimental effects.

To the extent that past and future land acquisitions have added, or will add, capable range acres, livestock grazing impacts in the pastures will be reduced. This is because no increase in stocking rates has occurred in the past, nor are any proposed for the future.

Past, present, and future noxious weed treatments will have the effect of reducing bare soil, over the long term, associated with weed infestations. This effect is limited to pasture 1 since no weed treatments can occur in the wilderness.

The amount of the detrimental soil disturbance from past, present and foreseeable future management activities in this activity area is expected to meet Revised Forest Plan Guideline G4.

3.1.8 Effects on Upland Plant Communities

3.1.8.1 Alternative A - No Grazing

Direct and Indirect Effects

Ground cover would be expected to increase to or be maintained at site potential with the Revised Forest Plan ground cover standard (85% of potential) continuing to be met or exceeded. Species composition would not be expected to change. Overall, utilization transects and Unit Examination records indicate sheep use has been light to moderate. Light to moderate use is amenable to maintaining desirable plant composition and plant vigor. Therefore plant composition is not expected to change significantly as a result of discontinuing livestock grazing.

Cumulative Effects

Analysis Area: The analysis area is the West Fork Blacks Fork Allotment.

The incremental effects on upland plant communities of discontinuing livestock grazing, combined with effects of other activities, past, present and reasonably foreseeable, are expected to be reflected in some increase in plant vigor of species preferred by sheep.

The Ashley N.F. sheep herd would continue to trail across the allotment in the early summer and then again in the early fall. As a result, small areas along the trail would not be expected to return to their potential ground cover.

Potential human induced effects that could continue are trail use and associated local areas of vegetation trampling, recreation horse or other pack animals use of forage, and localized vegetation trampling from recreation use (hiking, back packing, camping). These effects include localized, intense disturbance where trails cross streams and around highly favored camping spots. Where permitted livestock also impacted these areas in the recent past, there could be a gradual decrease in the area impacted depending on site-specific features of terrain and vegetation.

Wild ungulate use and ground disturbance by gophers and other rodents are expected to continue at or near current levels.

Only a small amount of noxious weeds are found on the allotment and outside of the allotment within the West Fork-Blacks Fork drainage. Only the extreme north end of the allotment has noxious weeds; the noxious weed species found here is Canada thistle (*Cirsium arvense*) and is only about a 1/10 of an acre. Increased weed infestation associated with the East Fork fire and future timber harvesting activities could occur and if left unchecked, could encourage the spread of those weeds within the upland plant communities. However, noxious weed treatment would

continue under all three alternatives to control the spread of noxious weeds. Therefore, no increased weed infestation is expected to occur under each alternative.

Overall, in consideration of cumulative effects, ground cover conditions are expected to continue to meet or exceed the Forest Plan Standard of 85% of potential

3.1.8.2 Alternative B - Discontinue Grazing Unit 4

Direct and Indirect Effects

Non-alpine Uplands in Unit 4

Ground cover would be expected to increase or be maintained at site potential with Revised Forest Plan ground cover standard (85% of potential) continuing to be met or exceeded.

Species composition would not be expected to change. Overall, utilization transects and Unit Examination records indicate sheep use has been light to moderate. Light to moderate use is amenable to maintaining desirable plant composition and plant vigor. Therefore plant composition is not expected to change significantly as a result of discontinuing livestock grazing.

Uplands in Units 1-3

Ground cover would be maintained at 85%-100% of site potential with Revised Forest Plan ground cover standard (85% of potential) continuing to be met or exceeded.

Species composition would not be expected to change from current. Overall, utilization transects and Unit Examination records indicate sheep use has been light to moderate. Light to moderate use is amenable to maintaining desirable plant composition and plant vigor.

Cumulative Effects

The incremental effects on upland plant communities of discontinuing livestock grazing in Unit 4, combined with effects of other activities, past, present and reasonably foreseeable, are expected to be reflected in some increase in plant vigor of species preferred by sheep within the non-alpine uplands of Unit 4. The Ashley N.F. sheep herd would continue to trail across the Allotment in the early summer and then again in the early fall. As a result, small areas along the trail would not be expected to return to their potential ground cover.

Potential human induced effects that could continue are trail use and associated local areas of vegetation trampling, recreation horse or other pack animals use of forage, and localized vegetation trampling from recreation use (hiking, back packing, camping). These effects include localized, intense disturbance where trails cross streams and around highly favored camping spots. Within the non-alpine uplands of Unit 4, where permitted sheep use coincided with these impacts in the past, there could be a gradual decrease in the area impacted depending on site-specific features of terrain and vegetation.

Wild ungulate use and ground disturbance by gophers and other rodents are expected to continue at or near current levels.

Only a small amount of noxious weeds are found on the allotment and outside of the allotment within the West Fork-Blacks Fork drainage. Only the extreme north end of the allotment has noxious weeds; the noxious weed species found here is Canada thistle (*Cirsium arvense*) and is only about a 1/10 of an acre. Increased weed infestation associated with the East Fork fire and future timber harvesting activities could occur and if left unchecked, could encourage the spread of those weeds within the upland plant communities. However, noxious weed treatment would continue under all three alternatives to control the spread of noxious weeds. Therefore, no increased weed infestation is expected to occur under each alternative.

Overall, in consideration of cumulative effects, ground cover conditions are expected to continue to meet or exceed the Revised Forest Plan Standard of 85% of potential.

3.1.8.3 Alternative C - Proposed Action

Direct and Indirect Effects

Ground cover is expected to be maintained at 85%-100% of site potential with Revised Forest Plan ground cover standard (85% of potential) continuing to be met or exceeded. Species composition would not be expected to change. Overall, utilization transects and Unit Examination records indicate sheep use has been light to moderate. Light to moderate use is amenable to maintaining desirable plant composition and plant vigor. Increases in ground cover resulting from movement of salting locations are expected to continue. Watering spots will continue to receive some trampling, resulting in exposure of bare soil. When these are located next to live water, some sediment enters into streams, however this is minor compared to natural processes and historical management practices (Wasniewski 2000). Watering spots are generally quite small, usually less than a 1/10 of an acre in size and not all of these are located next to live streams. Trailing across wet meadows knocks down the grasses and forbs, but does not have any long lasting detrimental effects on the plants. Experience has shown that the plants recover by the next year and evidence of sheep trailing through the wet meadow vegetation is not visible until the activity occurs again that year. Trailing across dry meadows has a more lasting effect; as long as the sheep continue to trail through these areas, there are visible trailing signs left over from year to year in the form of reduced ground cover on the trails. Effects from bedding and camps (areas of bare compacted soils) would continue as described under “Current Situation”.

Cumulative Effects

The incremental effects on upland plant communities of continuing current livestock grazing, combined with effects of other activities, past, present and reasonably foreseeable, are expected to be similar to those described in the Current Situation.

The Ashley N.F. sheep herd would continue to trail across the allotment in the early summer and then again in the early fall. As a result of this use combined with West Fork Blacks Fork permitted sheep, small areas along the trail would not be expected to return to their potential

ground cover. Many of the same sheep trails used by West Fork Blacks Fork permitted sheep are also used by recreation livestock and as such compound the effects including compacted bare soils and vegetation trampling. Where sheep trails are not also used by horses (recreation and sheepherder) erosion is not evident, but there are places along the main recreation trail where some erosion has been caused by a combination of recreational use, sheepherder horse use, and sheep trailing.

Only a small amount of noxious weeds are found on the allotment and outside of the allotment within the West Fork-Blacks Fork drainage. Only the extreme north end of the allotment has noxious weeds; the noxious weed species found here is Canada thistle (*Cirsium arvense*) and is only about a 1/10 of an acre. Increased weed infestation associated with the East Fork fire and future timber harvesting activities could occur and if left unchecked, could encourage the spread of those weeds within the upland plant communities. However, noxious weed treatment would continue under all three alternatives to control the spread of noxious weeds. Therefore, no increased weed infestation is expected to occur under each alternative.

Overall, in consideration of cumulative effects, ground cover conditions are expected to continue to meet or exceed the Forest Plan Standard of 85% of potential.

3.1.9 Riparian Plant Communities

Current Situation

3.1.9.1 General Description of Riparian Plant Communities

There are about 744 acres of riparian plant communities on the allotment. Water loving plants such as rushes, willows, and sedges dominate these plant communities.

3.1.9.2 Monitoring Activities – Greenline Study Sites

A greenline is the first perennial vegetation from the water's edge. Riparian areas that are in high seral status with stable stream banks will exhibit a continuous line of vegetation at the bankfull discharge level. Rocky stream types may have a significant amount of rock causing breaks in the vegetation. This rock is considered part of the greenline. Other breaks may occur in the first perennial band of vegetation (watercourses or bare ground).

A method of evaluating the condition of stream banks as it relates to livestock grazing is to compare the percent of late seral vegetation along the stream bank greenline above and below the avalanche, and along tributaries of the main stream.

The Revised Forest Plan Guideline (G7) states “Manage Class 1 Riparian Area Greenlines for 70% or more late-seral vegetation communities…”

Monitoring of riparian areas within the West Fork Blacks Fork Allotment is summarized as follows:

Percent Late Seral Vegetation at Greenline Studies
First Order Streams * (number of study sites =5) Average 96%
WFBF above avalanche (number of study sites =3) Average 91%
WFBF below avalanche (number of study sites =5) Average 58%
*Side streams or tributaries

High percent late seral vegetation at greenline studies above the avalanche (91%) and along first order streams (96%) indicate sheep have a minor influence on streambanks. Lower percent (58%) late seral vegetation at greenlines below the avalanche indicates floods associated with the avalanche path have a major influence on stream condition.

These results reflect the influence of avalanche debris scouring discussed in detail in Chapter 1 under Non-Significant Issues, Streambanks. In this case, natural integrity includes the ecological processes associated with avalanches. Permitted sheep are trailed across the allotment when moving within a grazing unit and when trailing home in the fall. Trailing causes small and localized effects (bare compacted soils) at stream crossings. Trailing across wet meadows knocks down the grasses and forbs, but does not have any long lasting detrimental effects on the plants. Experience has shown that the plants recover by the next year and evidence of sheep trailing through the wet meadow vegetation is not visible until the activity occurs again that year.

Sheep do not prefer to graze in riparian areas. Some use does occur, but the utilization of key riparian species is negligible to light (Unit Examination Records, Utilization Studies W17-2GL2, W17-2GL3). A 1997 retake of photos taken in 1965 (Study W17-12-D) indicated that the willow component of the vegetation has not decreased. Sheep use on willows has been observed as light (USDA Forest Service 2004, Zobell Range Specialist Report).

Sheep have had about equal access to each of the Greenline Study Sites referred to above. Sheep can be expected to have equal or greater impact to the first order streams compared to the main stream. As discussed in Chapter 1, factors other than livestock are strongly implicated in the lower presence of late seral vegetation below the avalanche path. Floods associated with the avalanche path and dry debris fans are factors of influence below the avalanche path. They are not factors above the avalanche path. (Goodrich and Zobell 2003, West Fk-Blacks Fk Stream Condition). The small tributary streams support 96% late seral vegetation indicating little effect from grazing sheep. There is very little sign of sheep grazing along the small tributary streams or along the main channel of the WFBF where sheep have affected only a few small areas of the stream (Unit Examination Records, Utilization Studies W17-2GL2, W17-2GL3). Therefore the 58% late seral below the avalanche path is assumed not to be management caused.

3.1.10 Effects on Riparian Plant Communities

3.1.10.1 Alternative A - No Grazing

Direct and Indirect Effects

Species composition would not be expected to change. Ecological processes associated with avalanches would continue to affect riparian plant communities as an element of natural

integrity. Overall, utilization transects and Unit Examination records indicate sheep use has been light to moderate. Light to moderate use is amenable to maintaining desirable plant composition and plant vigor.

Cumulative Effects

Analysis Area: The analysis area is the West Fork Blacks Fork Allotment.

The incremental effects of discontinuing grazing combined with other past, present, and reasonably foreseeable activities are expected to be limited in riparian plant communities. Avalanche debris delivery and channel scouring are expected to continue periodically reducing the potential for late seral vegetation in the sections of stream below that point. The Ashley N.F. sheep herd would continue to trail across the allotment in the early summer and then again in the early fall. As a result, some riparian areas along the trail would continue to be affected; riparian vegetation in wet meadows would continue to be knocked over and small areas at sheep stream crossings would continue to have early seral vegetation. Continued recreation livestock use would continue to affect vegetation at wet meadow crossings and at stream crossings. Overall, the Forest Plan guideline for riparian greenlines would continue to be met (Manage Class 1 Riparian Greenlines for 70% or more late-seral vegetation communities; manage Class 2 Riparian Greenlines for 60% or more late-seral vegetation communities).

3.1.10.2 Alternative B - Discontinue Grazing Unit 4

Direct and Indirect Effects

Species composition of riparian plant communities would not be expected to change. Overall, utilization transects and Unit Examination records indicate sheep use has been light to moderate. Light to moderate use is amenable to maintaining desirable plant composition and plant vigor. Riparian vegetation would continue to be knocked over by permitted sheep in Units 1-3. Ecological processes associated with avalanches would continue to affect riparian plant communities as an element of natural integrity.

Cumulative Effects

The incremental effects of discontinuing grazing in Unit 4 combined with other past, present, and reasonably foreseeable activities are expected to be limited for riparian plant communities. Avalanche debris delivery and channel scouring are expected to continue periodically reducing the potential for late seral vegetation in the sections of stream below that point. The Ashley N.F. trail herd's knocking over of vegetation would be in addition to that of the West Fork Blacks Fork sheep in units 1-3. Riparian vegetation would continue to be knocked over only by the Ashley N.F. trail herd in Unit 4.

Recreation livestock in addition to permitted sheep use would continue to affect vegetation at wet meadow crossings and at stream crossings. Small areas at stream crossings would continue to have early seral vegetation. Overall, the Forest Plan guideline for riparian greenlines is expected to be met (Manage Class 1 Riparian Greenlines for 70% or more late-seral vegetation

communities; manage Class 2 Riparian Greenlines for 60% or more late-seral vegetation communities).

3.1.10.3 Alternative C - Proposed Action

Direct and Indirect Effects

Species composition of riparian plant communities would not be expected to change from current. Overall, utilization transects and Unit Examination records indicate sheep use has been light to moderate. Light to moderate use is amenable to maintaining desirable plant composition and plant vigor. Ecological processes associated with avalanches would continue to affect riparian plant communities as an element of natural integrity.

Cumulative Effects

Same as Alternative B.

3.1.11 Effects on Wet Meadow Soils

3.1.11.1 Alternative A - No Grazing

Direct and Indirect Effects

Direct and indirect effects will be analyzed for only the rangeland cover types and capable range acres within each of the individual pasture activity areas. The Revised Forest Plan directs that the potential soil detrimental disturbances associated with proposed management actions should be analyzed by activity area. Disclosure of effects will be done by a qualitative description and estimate of the extent of detrimental soil disturbances that have been, or could be, created by the relevant activities. This analysis assumes that potentially affected wetland soils could occur in any of the pastures.

Wet meadow soils are expected to remain in properly functioning condition. Small areas would still have detrimental disturbance where the trails used by the Ashley N. F. herd cross the wet meadows. Because of the resilience of the wet meadows, the areas impacted by the West Fork herd are expected to recover relatively quickly.

Cumulative Effects

Analysis Area: The cumulative effect's analysis area is the same as the direct and indirect effect's analysis area.

The incremental effects of discontinuing grazing combined with the effects of past, present, and reasonably foreseeable activities on wet meadows are expected to result in continued proper functioning of these areas. The Ashley herd and recreation traffic are still expected to detrimentally impact small areas of wet meadow where they cross on the recreation trail. It is

also assumed that smaller areas of wet meadow will continue to be impacted when just the Ashley herd and recreation livestock cross wet meadows to water.

Impacts from dispersed camping are not anticipated since these wetland areas are not suited to camping. Implementation of the fire closure for these pasture areas, would have little effect on severe soil burning detrimental effects from human caused wildfires, since these wet meadows would be unlikely to burn in any event.

To the extent that past land acquisitions have added capable range acres, livestock grazing impacts in the pastures has been reduced. This is because no increase in stocking rates has occurred in the past.

Under this alternative, soil disturbance from management activities in this activity area is expected to continue meeting Revised Forest Plan Guideline G4.

3.1.11.2 Alternative B - Discontinue Grazing Unit 4, and C - Proposed Action

Direct and Indirect Effects

Direct and indirect effects will be analyzed for only the rangeland cover types and capable range acres within each of the individual pasture activity areas. The RFP directs that the potential soil detrimental disturbances associated with proposed management actions should be analyzed by activity area. Disclosure of effects will be done by a qualitative description and estimate of the extent of detrimental soil disturbances that have been, or could be, created by the relevant activities. This analysis assumes that potentially affected wetland soils could occur in any of the pastures.

Isolated areas of detrimental disturbance will continue adjacent to the recreation trail. Isolated areas of sheep trampling should recover from year to year with good herding management. Other small areas of disturbance are expected to continue as the herds cross wet meadows to water at streams or springs.

Cumulative Effects

Analysis Area: The cumulative effect's analysis area is the same as the direct and indirect effect's analysis area.

The incremental effects of continued livestock grazing combined with the effects of other past, present, and reasonably foreseeable activities are expected to result in conditions similar to those described in "Existing Situation" above. Sheep trailing from both the West Fork herd and the Ashley herd and recreation traffic (including horses) will continue to cause isolated pockets of detrimental disturbance adjacent to the recreation trail and near streams. Impacts from dispersed camping are not anticipated since these wetland areas are not suited to camping. Implementation of the fire closure for these pasture areas, would have little effect on severe soil burning detrimental effects from human caused wildfires, since these wet meadows would be unlikely to burn in any event.

To the extent that past and future land acquisitions have added, or will add, capable range acres, livestock grazing impacts in the pastures will be reduced. This is because no increase in stocking rates has occurred in the past, nor are any proposed for the future.

Wetland soils, because of their almost complete vegetative ground cover, are unlikely to be locations of weed infestations. For this reason, noxious weed treatments are not anticipated for these areas of the pastures. This effect is limited to pasture 1 since no weed treatments can occur in the wilderness.

Under these alternatives, detrimental soil disturbances from past, present, and foreseeable future management activities in this activity area, are expected to meet Revised Forest Plan Guideline G4.

3.2 Issue 2: Native Wildlife and Fish Habitats

There are concerns about the impacts of livestock grazing on native wildlife and fish populations and whether grazing is damaging their habitats. Damage mentioned included loss of vegetation, stream sedimentation, water temperature changes, nutrient loading and mortality on fish eggs and pre-emergent fry from livestock wading in streams. Specifically mentioned in public concerns were "big, small, avian, aquatic, and terrestrial wildlife"; bighorn sheep, wolf, native fisheries, Canada lynx, wolverine, and threatened, endangered, and sensitive species".

Native Wildlife and Fish Habitat Indicators:

- Available forage for big game
- Habitat available for MIS and Threatened Species
- Adherence to Conservation Strategies
- Condition of Fish Habitat
- Potential for predator control

3.2.1 Terrestrial Wildlife - Current Situation

3.2.1.1 Big Game

The West Fork Black's Fork Allotment falls within Hunt Unit 8 for deer, elk and moose. Population objectives and population estimates are displayed in Table 3-4. The Utah Division of Wildlife Resources determines population objectives and hunting units for big game.

Table 3-4. Population objectives and estimates in Hunt Unit 8.

Species	Population Objective	Population Estimate Post season 2002	Population Estimate Post season 2003	Population Estimate Post season 2004
Deer	5,300	4,500	4,400	4,700
Elk* (Summit)	300	120	270	270
Elk* (West Daggett)	1,300	1,400	950	1,000
Elk* (Total Summit and West Daggett)	1,600	1,520	1,220	1,270
Bighorn Sheep (Hoop Lake sub population)	25-50			15-20

* Elk Hunt Unit 8 is divided into three areas – Summit County portion, West Daggett County portion, and the 3 Corners portion. Animals in the 3 Corners portion, East of Flaming Gorge Reservoir, mix very little with the Summit and West Daggett units. In Summit and West Daggett there is mixing with some animals summering on one portion while wintering on the other. Post season counts are winter counts so with the mixing, the total of the two areas is more indicative of the total population than would be realized by separating them.

The lowest elevations on the West Fork Black's Fork Allotment are approximately 9,000 feet. In general, big game winter range is considered to be below 7,000 feet in elevation so the entire Allotment is in summer range for big game. Table 3-5 shows the total area of the West Fork Black's Fork Allotment in comparison to the entire North Slope Hunt Unit on National Forest System lands. Table 3-6 shows the total area of the Allotment in comparison to all land ownerships on the Hunt Unit. In all cases the Allotment is under 10% of the North Slope Hunt Unit.

Table 3-5. Total area of West Fork Black's Fork Allotment in comparison to the entire North Slope Hunt Unit on National Forest System lands.*

	Yearlong Range (on NF)		Winter Range (on NF)		Summer Range (on NF)		West Fork Black's Fork Allotment		
	Area (acres)	%	Area (acres)	%	Area (acres)	%	Area (acres)	% of Summer Range	% of total Hunt Unit
Elk	8,926	78	93,008	49	456,996	86	16,519	4	3
Deer	366	9	84,105	44	484,155	85	16,519	3	3

* From UDWR, 1998a and UDWR 1998b.

Table 3-6. Total area of West Fork Black's Fork Allotment in comparison to the entire North Slope Hunt Unit on all land ownerships.

	Yearlong Range (all land ownerships)	Winter Range (all land ownerships)	Summer Range (all land ownerships)	West Fork Black's Fork Allotment		
	Area (acres)	Area (acres)	Area (acres)	Area (acres)	% of Summer Range	% of total Hunt Unit
Elk	11,421	188,691	526,500	16,519	3	2
Deer	3,927	189,958	571,022	16,519	3	2

* From UDWR, 1998a and UDWR 1998b.

With the number of big game animals listed in Table 3-6 and the percentage of the summer range on the allotment compared to the entire hunt unit, big game animals are spread out to the point where competition with sheep for forage would not be a factor.

3.2.1.2 Small Game

Small game species include ruffed grouse (*Bonasa umbellus incana*), and blue grouse (*Dendragapus obscurus*). Snowshoe hares (*Lepus americanus*) are also considered small game but will be discussed with Management Indicator Species.

Ruffed grouse numbers have been fairly stable over the forest for several years. They prefer thickets of mixed hardwood, including aspen, and conifers. These habitats occur throughout the project area although ruffed grouse will be found mostly at the lower elevations of the allotment. In Northern Utah birds display some seasonal differences in diet. Important summer forage items consist of insects, fruits, forb seeds, and plant tissues. Fall foraging centers on rose hips and aspen leaves, while winter diets are almost exclusively deciduous plant buds, in particular aspen buds. Ruffed grouse thrive best in young seral stage forests where understory forbs and shrubs flourish.

Blue grouse are spread across the Wasatch-Cache National Forest but there are not great concentrations of them. They prefer subalpine habitats, which occur throughout much of the upper elevations. They forage heavily on conifer needles and buds of shrubs. Habitat selection generally consists of dense herbaceous cover and dense insect rich herbaceous plants near riparian zones for brood rearing.

3.2.1.3 Small Mammals

Small mammals that occur or are likely to occur on the Allotment include various squirrels, chipmunks, shrews, mice, voles, and gophers.

Ground squirrels are highly adaptable and use a variety of environments, mostly open non-forested areas with the exception of the golden-mantled squirrel, which uses open forests. Ground squirrels primarily use plant material for food. Chipmunks and tree squirrels primarily use seeds as food and are more common in forested environments. Shrews are primarily insectivores and usually are tied closely to moist habitats with higher amounts of vegetation cover such as riparian areas and meadows. Most mice use a variety of food resources such as insects, seeds, and plant material and use a variety of habitat types. Voles primarily use plant material for food and usually are tied closely to moist habitats with higher amounts of vegetation cover such as riparian areas and meadows. Gophers use a variety of environments in both forested and non-forest vegetation types. Gophers use plant material such as roots and tubers for food.

3.2.1.4 Neotropical Birds

The Forest Service reads a U.S. Geologic Survey Breeding Bird Survey (BBS) that begins at the Bear River Guard Station on Highway 150, turns onto the North Slope Road and ends east of the East Fork of Black's Fork. With this route the transect goes through the West Fork Black's Fork Allotment. Since the survey was begun in 1988, 61 species of birds have been identified during surveys.

Table 3-7 shows species listed on the Fish and Wildlife Service's Birds of Conservation Concern (BCC) and the State of Utah's Partner's in Flight Priority Species (PIF). The species are listed for the Utah Mountains and Wyoming Basin. Only species that are known to occur on the Allotment or that are possible or probable inhabitants are carried into the discussion following the table.

Table 3-7. BBC and PIF species listed for Utah Mountains and Wyoming Basin.

FWS BCC and PIF Priority Species	Utah Mountains	Wyoming Basin	Primary Breeding	Secondary Breeding	Winter Habitat	Present in Project Area
American avocet*		X	Wetland	Playa	Migrant	No
American white Pelican**		X	Water	Wetland	Migrant	No
Black rosy-finch**	X		Alpine	Alpine	Grassland	Possible
Black swift**	X		Lowland Riparian	Cliff	Migrant	No
Black-throated gray warbler*	X		Pinyon-juniper	Mountain shrub	Migrant	No
Brewer's sparrow**	X	X	Shrubsteppe	High desert shrub	Migrant	Probable
Broad-tailed hummingbird**	X		Lowland riparian	Mountain riparian	Migrant	Probable
Ferruginous hawk**		X	Pinyon Juniper	Shrubsteppe	Grassland	No
Flammulated owl***	X		Ponderosa pine	Sub-alpine conifer	Migrant	Possible
Golden eagle***	X	X	Cliff	High desert scrub	High desert scrub	Possible visitor
Grace's warbler***	X		Ponderosa pine	Mixed conifer	Migrant	W-C out of range
Gray vireo**	X		Pinyon Juniper	Northern oak	Migrant	No
Greater sage grouse**	X	X	Shrubsteppe	Shrubsteppe	Shrubsteppe	No
Lewis' woodpecker**	X	X	Ponderosa pine	Lowland riparian	Northern oak	Possible not probable
Loggerhead shrike**	X	X	High desert scrub	Pinyon Juniper	High desert Scrub	No
Long-billed curlew***		X	Grassland	Agriculture	Migrant	No
Northern harrier**	X	X	Wet meadow	High desert scrub	Agriculture	No
Peregrine falcon**	X		Cliff	Lowland riparian	Wetland	No
Pinyon jay***	X	X	Pinyon	Ponderosa	Pinyon	No

FWS BCC and PIF Priority Species	Utah Mountains	Wyoming Basin	Primary Breeding	Secondary Breeding	Winter Habitat	Present in Project Area
			Juniper	pine	Juniper	
Prairie falcon***	X	X	Cliff	High desert scrub	Agriculture	No
Pygmy nuthatch***	X		Ponderosa pine	Aspen	Ponderosa pine	No
Red-naped sapsucker***	X	X	Aspen	Mixed conifer	Mountain riparian	Possible at lower elevations of allotment
Sage sparrow**	X	X	Shrubsteppe	High desert scrub	Low desert scrub	No
Sharp-tailed grouse**	X		Shrubsteppe	Grassland	Grassland	No
Snowy plover***	X		Playa	Playa	Migrant	No
Swainson's hawk***	X	X	Agriculture	Aspen	Migrant	Lowest elevations of allotment at top end of known breeding
Three-toed woodpecker**	X		Sub-alpine conifer	Lodgepole pine	Sub-alpine conifer	Present
Virginia's warbler***	X		Northern oak	Pinyon Juniper	Migrant	No
Williamson sapsucker***	X		Sub-alpine conifer	Aspen	Migrant	Possible
Wilson's phalarope***		X	Wetland	Water	Migrant	No
Yellow-billed cuckoo***	X		Lowland riparian	Agriculture	Migrant	No

* On both lists (FWS BCC and State of Utah PIF)
** State of Utah PIF list only
*** FWS BCC list only

Black-rosy finch. This species is an altitudinal migrant that nests in the alpine tundra and winters in low elevation valleys. The black-rosy finch feeds primarily on seeds of alpine plants, with some insects. It nests in cliffs or rock talus slopes. (UDWR 2005)

Brewer's sparrow. The Brewer's sparrow is considered a shrub-steppe obligate that breeds throughout Utah in lowland areas. In the BBS that goes through the allotment the species has been detected 6 times between 1988 and 2000. The high detection was 7 records in the 1994 survey and the low was 1 detection in 1990, 1996, and 2001. The species is declining range wide but common and stable in Utah. Utah may be a source for other populations in the west. (UDWR 2005)

Broad-tailed hummingbird. BBS data indicate a stable population in the Uinta Mountains but state point count data indicate a downward trend throughout the state. From 1988 through 2000 the broad-tailed hummingbird was detected on the BBS survey in the area in 8 of the years. High count was 19 in 1994 and the low count was 9 in 1992 and 1996. They are dependent on nectar-bearing flowering plants. Lack of nectar-bearing plants will cause the female to abandon nesting. (UDWR 2005)

Flammulated owl. The flammulated owl is known to occur on the Wasatch-Cache National Forest, primarily using aspen and conifer stands with snags. It is an insectivore. (USFS 2003)

Golden eagles. Golden eagles are probable visitors to the West Fork Black's Fork allotment. Elevations where nesting habitat may occur are high elevation (most likely 10,000 foot plus in elevation) so nesting would be sporadic at best.

Lewis' woodpecker. This flycatching woodpecker is found in open ponderosa, riparian, and possibly aspen forests. Today, it is only occasionally seen in northern Utah. The probability of its being found in the project area is very low. (UDWR 2005)

Red-naped sapsucker. The red-naped sapsucker uses aspen, mixed conifer, and mountain riparian areas. If present on the West Fork Black's Fork allotment it would be at lower elevations. On the BBS the species has been detected in 4 years from 1988 to 2001.

Swainson's hawk. The species uses agricultural lands and aspen. If present on the project area it is only on the lower edges.

Three-toed woodpecker. The three-toed is found in sub-alpine conifer and lodgepole pine. It is a permanent resident above 8,000 feet and dependent on live and dead trees for foraging and nesting. It is considered common in Utah. (UDWR 2005)

Williamson sapsucker. Williamson sapsucker nests from 8,000 feet to timberline in Utah. The major vegetation types used are sub-alpine conifer and aspen. (UDWR 2005)

3.2.1.5 Predator Control

As of May 1995, (See Forest Service Manual, Chapter 2650), the Forest Service recognizes the Animal and Plant Health Inspection Service (APHIS) - Animal Damage Control (now entitled the Wildlife Services Agency (WS)) program and State agencies as having the authority and expertise to conduct predator control on National Forest System lands, to determine livestock losses, and to determine methodology for animal damage management. APHIS is the lead agency in preparing environmental documentation for predator control and other animal damage management activities initiated by APHIS on National Forest System lands.

The Table 3-7a displays the sheep losses reported by the permittee, sheep losses verified by the WS, and coyotes and other predators removed by the WS:

Table 3-7a. Sheep losses and predator control by Wildlife Services on the West Fork Blacks Fork Allotment.

Year	Reported Sheep Losses	Verified Sheep Losses	Coyotes Removed	Other Predators Removed
1994	Unknown	5	1	0
1995	Unknown	10	2	0

Year	Reported Sheep Losses	Verified Sheep Losses	Coyotes Removed	Other Predators Removed
1996	7	13	0	0
1997	6	7	0	0
1998*	19	4	3	0

* After 1998 Allotment specific information was no longer available from Wildlife Services

Specific data for the West Fork Blacks Fork Allotment from 1999 through 2003 is not available from the Wildlife Services, however, general data for the entire Forest and Evanston Ranger District is available for 2003. The Wildlife Services took sixty-one coyotes across the entire Forest; out of that sixty-one coyotes, 39 were taken on the Evanston Ranger District. In 2005 WS took 19 coyotes off of 6 different allotments on the Evanston Ranger District and none off of the Kamas or Mt. View Ranger District (the entire portion of the Wasatch-Cache National Forest on the Uinta Mountains). This constitutes 28% of all of the coyotes taken off of the Wasatch-Cache National Forest (total take of coyotes on the Forest was 66).

Population modeling studies have shown that coyote populations can sustain annual harvests of up to 70% of the maximum (post whelping) population (Connolly and Longhurst 1975). The annual harvest of coyotes from the Wasatch-Cache is considerably below that level, and also falls short of the number necessary to induce compensatory natality in coyote populations. The Wildlife Services harvest would not have any noticeable impact on overall coyote numbers compared to an unhunted population. (Population Monitoring, Wasatch-Cache National Forest, FY 2003; Wildlife Services Management Work Plan, Wasatch-Cache National Forest, 2004)

The permittee uses guard dogs to reduce the likelihood of predation. He also has two herders and their dogs with the sheep throughout the season that helps to discourage predation.

3.2.2 Management Indicator Species

Management indicator species (MIS) are species selected because changes in their numbers are believed to indicate the effects of management activities on a range of species. One of the factors considered when selecting MIS is their close tie to the communities they represent. The general guidance and criteria for selecting MIS are contained in 36 CFR 219.19(a) and in Forest Service Manual 2621.1.

Table 3-8 displays the wildlife species selected as Wasatch-Cache National Forest Management Indicator Species and their associated vegetation communities. In addition to these wildlife species, both Bonneville and Colorado cutthroat trout are defined as MIS for the Forest. Colorado River cutthroat trout are addressed in the section of this FEIS on Aquatic species. For more information on Forest MIS refer to Management Indicator Species of the Wasatch-Cache National Forest, 2005

Table 3-8. Wasatch-Cache National Forest wildlife Management Indicator Species.

Management Indicator Species	Associated Plant Community (Cover Type)
Goshawk (*Accipiter gentiles*)	Aspen, Conifer, Mixed Conifer
Snowshoe Hare (*Lepus americanus*)	Pole/Sapling Aspen, Conifer, and Mixed Conifer
Beaver (*Castor canadensis*)	Riparian

3.2.2.1 Northern goshawk – Aspen, conifer and mixed conifer

The range of the northern goshawk is circumpolar. In the West it is found from Alaska through the Rocky Mountains to New Mexico. The goshawk is a forest habitat generalist that uses a wide variety of forest ages, structural conditions, and successional stages. While all forested landscapes are used to some extent, certain forest cover types appear to be occupied by goshawks more than others (Graham et al. 1999). Cover types most often occupied by goshawks, based on sightings and nest locations, are: Engelmann spruce, subalpine fir, lodgepole pine and quaking aspen, in either single or mixed species forests. The WFBF Allotment includes approximately 7,354 acres of cover types expected to be used by Goshawk. In addition to being a Management Indicator Species, the goshawk is also a Forest Service Sensitive species.

Three components of a goshawk's home range have been identified including the nest area (approximately 30 acres), post fledging-family area (approximately 420 acres), and foraging area (approximately 5,400 acres). Goshawks nest in a wide variety of forest types including aspen, coniferous, and mixed conifer forests. It typically nests in mature and old forests.

The goshawk preys on large-to-medium-sized birds and mammals, which it captures on the ground, in trees, or in the air. Observations of foraging goshawks show that, in fact, they hunt in many forest conditions. This opportunism suggests that the choice of foraging habitat by goshawks may be as closely tied to prey availability as to habitat structure and composition.

Specific habitat attributes used by these species include snags, downed logs and woody debris, large trees, herbaceous and shrubby understories, and a mixture of various forest vegetation structural stages.

It was concluded in the Conservation Strategy and Agreement for the Management of Northern Goshawk Habitat in Utah that goshawk populations in Utah were viable. This conclusion was based on the findings of Graham et al. (1999) that good quality habitat is well distributed and connected throughout the state, the absence of evidence of a population decline on National Forest System lands since 1991, and conclusions of the U.S Fish and Wildlife Service in their decision to not list the northern goshawk under the Endangered Species Act (Federal Register 1998).

Monitoring Results and Trend

Territory occupancy has been monitored consistently on the Forest since 1999. This was the year the state wide Goshawk Amendment was released. Table 3-9 shows the results of that monitoring.

Table 3-9. Goshawk territories – Forest-wide.

Year	1999	2000	2001	2002	2003	2004
Known Territories						
Salt Lake	1	1	1	2	2	5
Kamas/Evanston/Mt. View	21	22	22	22	29	31
Ogden/Logan	7	8	11	11	14	15
TOTAL	29	31	34	35	45	51
Year	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Territories Monitored For Occupancy						
Salt Lake	1	1	1	2	2	7
Kamas/Evanston/Mt. View	12	22	11	20	28	17
Ogden/Logan	7	8	11	11	11	12
TOTAL	20	31	23	33	41	36
Occupied Territories						
Salt Lake	1	1	1	2	1	4
Kamas/Evanston/Mt. View	4	2	6	6	9	12
Ogden/Logan	2	4	4	6	6	6
TOTAL	7	7	11	14	16	22
% of Monitored Territories Active	0.35	0.23	0.48	0.42	0.35	0.61

Figure 3-1 shows territory occupancy from 1999 to 2004 (adjusted to 1999 occupied territories, based on the difference in numbers of territories monitored). The baseline used was the 1999 territory occupancy of 7 known occupied territories. Adjusting to the 1999 occupied territories there has been a high in 2001 of 9.76 occupied territories and a low of 4.33 in 2003. These differences in years are not statistically significant, showing a static trend in the goshawk population Forest-wide. Figure 3-1 shows the same numbers in chart form.

Figure 3-1. Territory occupancy, 1999-2004, adjusted to 1999 occupancy.

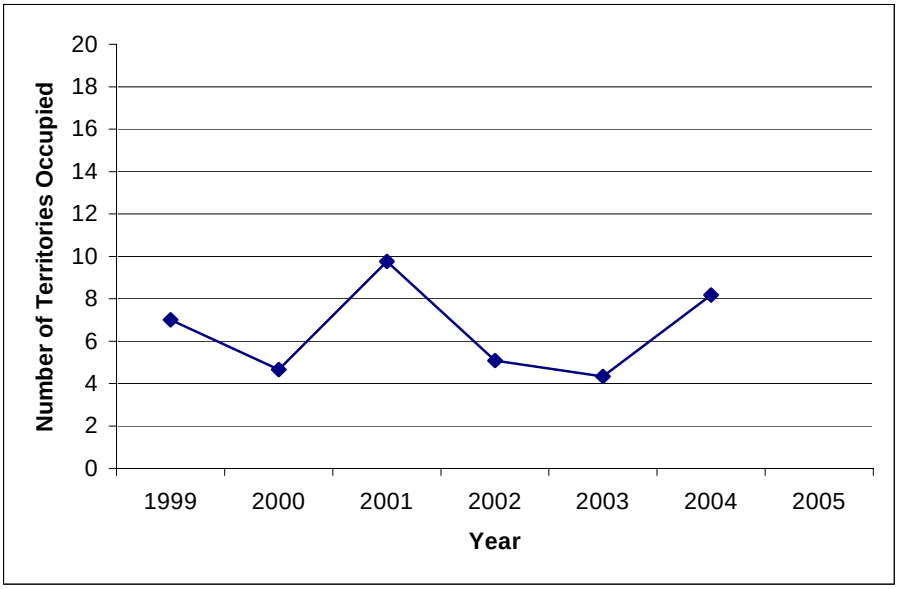


Table 3-10. Territory occupancy numbers from Figure 3-1 in table form.

Year	1999	2000	2001	2002	2003	2004
Total Occupied Territories[1]	7	4.66	9.76	5.09	4.33	8.18

[1]Sum of each District's territory occupancy.

3.2.2.2 Snowshoe Hare - Pole/sapling aspen, conifer and mixed conifer

The snowshoe hare is a valuable prey species to the lynx, goshawk, and to other predators. In the Rocky Mountains and westward, hares mainly use coniferous forests in the higher mountainous areas. They are predominately associated with forests that have a well-developed understory that provides protection from predation and supplies them with food. Such habitat structure is common in early seral stages but may also occur in coniferous forests with mature but relatively open overstories (Ruggiero 2000). Potential habitat for snowshoe hare within the WFBF Allotment based on cover types is approximately 7,354 acres. In summer, snowshoe hares eat forbs, grasses, leaves of shrubs, and some woody browse, while the winter diet is restricted to smaller-diameter twigs and some bark of shrubs and trees. In Alaska, for example, use of woody browse ranged from a high of 82% in winter, to 56% in spring, and 25% in summer (Wolff 1978).

On the Wasatch-Cache National Forest there are two populations of snowshoe hare. They are the Bear River/Wasatch Range population and the Uinta Mountains population. These two populations were identified because of the large habitat gap between these mountain ranges that essentially block genetic mixing. The West Fork Black's Fork allotment is a portion of the Uinta Mountains population.

Monitoring Results and Trend for the Uinta Mountains Population

Uinta Mountains Population: Bunnell (2004) has estimated 0.05 to 0.9 hares/hectare based on methods developed by Krebs et al. (2001). Bunnell's work on the Uinta Mountains from 2001 through 2003 shows an average of 0.33 hares per hectare over the three-year period within mature vegetation types. Bunnell's studies are our best indication that snowshoe hare were stable across the North Slope from fall 2000 thru summer 2003. In 2003, 61 transects (610 plots) were established across a variety of habitat types and age classes across the North Slope. A portion of Bunnell's transects were incorporated as part of the USFS Forest MIS monitoring effort. Tables 3-11 and 3-12 display results of monitoring in 2004.

Table 3-11. Snowshoe hare mean (mean of the transect means) pellet counts and hare density by "mature" vegetation cover type within the Uinta Mountains Population for 2004.

Vegetation Type	Total Pellet Counts	Pellet Counts Mean of the Transect Means	Hares/ha (Murray's Regression)
Douglas-fir	328 (20 plots/2 transects)	16.40	4.34-8.24
Spruce/Fir	806 (97 plots/10 transects)	8.21	2.12-4.02
Mixed Conifer	529 (78 plots/8 transects)	6.95	1.78-3.39
Aspen/Conifer	539 (99 plots/10 transects)	5.46	1.39-2.64
Lodgepole Pine-Mature	493 (106 plots/11 transects)	4.61	1.17-2.22

Table 3-12. Snowshoe hare mean (mean of the transect means) pellet counts and hare density by young-midaged vegetation cover type within the Uinta Mountain Population of the Wasatch-Cache NF for 2004.

Vegetation Type	Total Pellet Counts	Pellet Counts Mean of the Transect Means*	Hares/ha (Murray's Regression)
Aspen/Conifer – young/mid	1,074 (90 plots/9 transects)	11.93	3.12-5.92
Lodgepole Pine – young/mid	597 (99 plots/10 transects)	5.97	1.52-2.90

* The Kamas, Mountain View, and Evanston Ranger Districts utilized survey methodology similar to the extensive survey method developed by Murray et al. 2001.

Results and analysis of Bunnell's study and comparison to data collected in 2004 can be found in the MIS report (USDA Forest Service 2005). From the analysis completed in this Report the snowshoe hare population was stable or displayed very little change from the fall of 2000 to the summer of 2003 for the North Slope sub-population. From the summer/fall of 2003 to summer of 2004, the data suggests an increase in snowshoe hare numbers for the North Slope population.

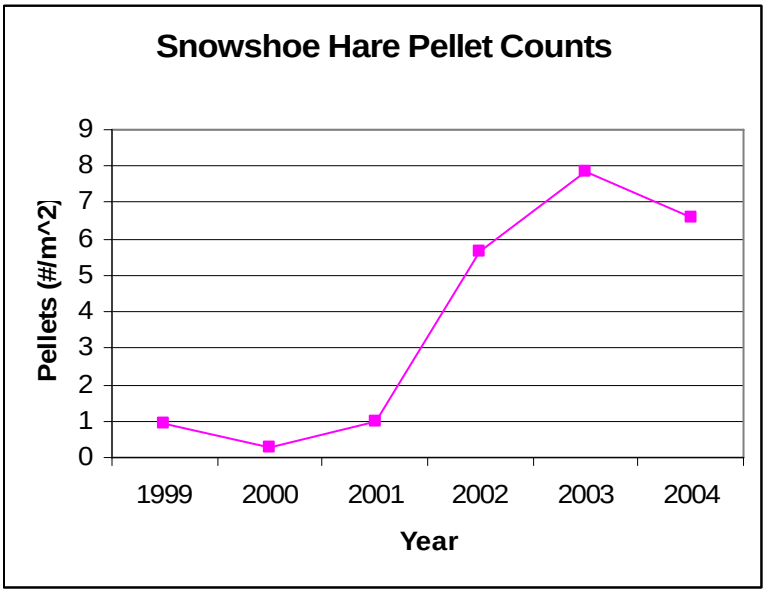
On the Wasatch/Bear River population that includes the Salt Lake, Ogden and Logan Ranger Districts snowshoe hare transects were established and swept in 2003 and read for the first time in 2004. Table 3-13 shows the vegetation type by District and data collected in 2004.

Table 3-13. Vegetation type, District, and results of 2004 pellet counts for snowshoe hare on the Wasatch/Bear River Population.

Vegetation Type and Location	Total Pellet Counts	Mean Pellet Counts(x) (1m2) *	Hares/ha (Murray's Regression)
OGDEN Douglas-fir	409	8.18	2.11-4.01
OGDEN Mixed Conifer	354	7.08	1.82-3.45
OGDEN Aspen/Conifer or Conifer/Aspen	313	6.26	1.60-3.04
SALTLAKE Mixed Conifer	252 (n=44)	5.73	1.46-.2.78
OGDEN Lodgepole Pine – Mature	216	4.32	1.10-2.08
LOGAN Douglas-fir	147	2.94	0.74-1.41
LOGAN Spruce/Fir	135	2.7	0.68-1.29
SALTLAKE Aspen/Conifer or Conifer/Asp	106	2.12	0.53-1.02
LOGAN Aspen/Conifer or Conifer/Aspen	96	1.92	0.48-0.92
LOGAN Mixed Conifer	53	1.06	0.27-0.52
LOGAN Lodgepole Pine – Mature	52	1.04	0.27-0.51
OGDEN Spruce/Fir	41	0.82	0.21-3.04
LOGAN Aspen	7 (n=48)	0.15	0.06-0.11
OGDEN Aspen	1 (n=49)	.02	0.03-0.05

The trend of a snowshoe hare transect established by a now retired Utah Division of Wildlife Resources Employee in North Amazon Basin in 1999 that has been read every year through 2004 are shown in Figure 3-2.

Figure 3-2. North Amazon Basin snowshoe hare trend.



Pellet count data (North Amazon Basin information) suggests that the snowshoe hare population was stable or displayed very little change from the summer of 1998 thru the summer of 2001. From the summer/fall of 2001 the data suggests an increase in snowshoe hare numbers with a possible peak between the summer/fall 2002 and summer 2003. Numbers for the period between summer/fall 2003 and the summer 2004 remained high but displayed a slight decrease from the prior year. A one year decrease, however, does not indicate a trend and 2004 numbers are still above the 1999 thru 2001 numbers

3.2.2.3 Beaver – Riparian

Beaver occur in permanent slow moving streams, ponds, small lakes, and reservoirs. They play an important role in maintaining and enhancing riparian and aquatic ecosystems (Olsen and Hubert 1994) and are important for the creation of habitat for several species of fish, big game, waterfowl, and neo-tropical birds.

In favorable habitat the density of beaver colonies ranges from 0.4 to 0.8 per km^2 (1.0 to 2.0 per/mi^2). Home range is greatly affected by the water system in which the colony lives with colonies in the best habitat occurring as close as 300 meters (328 yards) apart (Ministry of Environment, Lands and Parks Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee 1998).

A beaver colony is typically about 5 to 6 beavers and consists of an adult pair, the young of the year, and young of the previous year. There are two types of colonies: isolated, which occurs on small tributaries and seepages and possess a defined periphery of beaver activities, and multi-colony, in which generations of beavers have occupied an area and no clear boundaries exist.

Vegetation studies done in the West Fork Black's Fork Allotment (Goodrich & Zobell, 2004) indicate that willows are the only dam construction material since aspen is essentially lacking.

Beaver habitat is limited to low willow communities. Beaver dams are short lived in these habitats. The small diameter and short stems of the low willow do not provide material of sufficient quality to withstand the high spring flows.

Monitoring Results and Trend for Uinta Mountains Population

The baseline monitoring protocol is based upon sampling (as opposed to a complete census) to estimate beaver population at the spatial scale of the Forest. To achieve an unbiased, well-distributed sample, sample units are systematically selected sections (1 section = 1 m^2 = 640 acres). With a 10% sampling intensity, every 10^{th} section is sampled (the first section sampled was selected randomly, and then every 10^{th} section was systematically selected). Only complete sections of National Forest System lands are sampled. The number of active beaver colonies is determined within each sampled section, allowing estimated beaver population abundance to be expressed as *Number of Active Beaver Colonies/mile*^{2}. Number of colonies can then be converted into the number of beaver as described in Section 4.1.1 above. By counting the number of active dams and determining the number of colonies with the number of beaver per colony all aspects of the Forest Plan (monitoring section and RFP Appendix J) are met.

Table 3-14. Beaver monitoring Forest-wide.

Population/District	# of Sections
Wasatch/Bear River	
1 Salt Lake	14
6 Ogden	17
7 Logan	32
Total for population	**63**
Uinta Mountains	
3 Kamas	15
4 Evanston	10
5 Mountain View	12
Total for population	**37**
Total for entire Forest	**108**

At the present time the forest has established baseline information for beaver populations on the Salt Lake, Kamas, Evanston and Mountain View Districts. Because not all sections have been surveyed on the Ogden/Logan Districts, the estimated beavers/mi^2 displayed in Table 3-14 may not be a true estimate and the number is expected to change once survey efforts are complete. The Forest monitoring protocol for beaver calls for resurveying sections in 3-year intervals.

As indicated in Table 3-15, a beaver colony often has more than one dam. Hilfiker (1991) indicates that at least on secondary dam is built downstream to relieve pressure on the main dam and reduce water loss from the pond through seepage. He states, “that when a family of beaver live in an area for a number of years, it is not unusual for three quarters of a mile or more to be terraced with dams, ponds, and water impoundments.”

Table 3-15. Beaver population estimates.

Population	Active dams	# of colonies	Individuals	Estimated # of beavers/mi^2
Wasatch/Bear River	19	8	40	0.63*
Uinta Mountains / North Slope	16	7	35	0.95

*Because not all of the sections have been surveyed the initial determination may not represent a true estimate.

Currently there are not enough years of Forest Service monitoring population data on beaver to indicate a trend. However, there are three source documents provided by the Utah Division of Wildlife Resources that currently indicate a trend (U.S. Forest Service 2006). They are the1979-80 publication no. 80-12 (Provan 1980), the 1998-1999 Furbearer Harvest Reports publication no. 02-06 (Wolfe 2002), the 1971-1982 Beaver Distribution, and the Habitat and Population Survey (Blackwell 1993). The 1979-80 harvest and 1971-82 survey reports display beaver population estimations by units while the 1998-1999 Harvest report considers regions (Great Basin, Rocky Mtn., Uintah Basin, and Colorado Plateau). The 1993 survey merely restates the trend stated in the 1979-80 report.

For State beaver units that include National Forest System lands administered by the Wasatch-Cache National Forest the state has made the determination of status as displayed in Table 3-16.

Table 3-16. UDWR Units occurring, at least partially, on NFS Lands.

Unit	Unit Location	Status of beaver population 81'
Wasatch/Bear River Population		
2	North ½ Cache County	Static
3	Rich County	Static
5	South ½ Cache County	Static
6	West Weber County	Static
7	East Weber County	Static
8	Davis County	Static
9	Morgan County	Static
10	Northern ¾ Summit County	Static
11	Southern ¼ Summit County	Increasing
14	Southwest Salt Lake County	Static
15	Southeast Salt Lake County	Increasing
Uinta Mountains Population		
10	Northern 3/4 Summit County	Static
11	Southern ¼ Summit County	Increasing

Source: UDWR 1971-1982 Beaver Distribution, Habitat and Population Survey (Published 1993)

With the exception of a few specific locations, Forest Service management of suitable beaver habitat within National Forest boundaries has not changed significantly from 1980 to the present. Therefore, until Forest Service monitoring yields data for population trends, it is assumed that the determinations made in the State of Utah Survey Report remain valid for both populations on the Forest.