3.0 Affected Environment and Environmental Consequences

The analyses of Affected Environment and Environmental Consequences have been combined in this section to simplify the document. Relevant resource issues related to the Proposed Action are discussed below in Sections 3.1 through 3.10. Each resource discussion includes a(n):

- Introduction
- Summary of laws, regulations, and guidelines
- Description of affected environment
- Analysis of effects of the alternatives
- Analysis of the cumulative effects

Environmental consequences are discussed in terms of effects of the alternatives on the resource. Impacts and effects are used interchangeably throughout this document and have the same meaning. The following terms will be used to describe effects:

- **No Effect:** A change to a resource's condition, use, or value that is not measurable or perceptible.
- **Beneficial Effect:** An action that would improve the resource's condition, use, or value compared to its current condition, use, or value.
- **Minor Adverse Effect:** A measurable or perceptible, localized degradation of a resource's condition, use, or value that is of little consequence.
- **Moderate Adverse Effect:** A localized degradation of a resource's condition, use, or value that is measurable and of consequence.
- **High Adverse Effect:** A measurable degradation of a resource's condition, use, or value that is large and/or widespread and could have permanent consequences for the resource.

- **Short-term Effect:** An effect that would result in the change of a resource's condition, use, or value lasting less than one year.
- **Long-term Effect:** An effect that would result in the change of a resource's condition, use, or value lasting more than one year and probably much longer.

Effects will also be described in terms of indirect or direct effects:

- **Direct effects:** caused by the action and occur at the same time and place.
- **Indirect effects:** caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Cumulative effects were also analyzed for each resource. Cumulative effects are defined as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR § 1508.7).

Cumulative effects most likely arise when a relationship exists between the effects from a Proposed Action overlap with the effects of other actions in the same location during the same time period.

3.1 Vegetation

3.1.1 Introduction

The proposed alignments for the BST alternatives intersect a variety of foothill and lower montane vegetation types including grasslands, sagebrush and other shrublands, sparsely vegetated rock outcrops, Gambel's oak/mountain brush, white fir/Douglas-fir, and riparian communities along streams and drainages, primarily at mouths of canyons. Potential vegetation issues include impacts to Forest Service recommended Sensitive species, TES species, and introduction or spread of noxious weeds along the proposed alternatives. Riparian impacts are expected to be minimal, as stream crossings in the three main canyons would utilize existing roadway bridges. Additionally, all other ephemeral and perennial drainage (e.g., Heughs and Deaf Smith canyons) trail crossings would be bridged as well. Impacts to riparian vegetation resources are not analyzed as an issue for this resource. Riparian impacts are further discussed in Section 3.7, Water Resources.

Methodology

Element Occurrence records were obtained from the Utah Natural Heritage Program (UNHP) for potential rare plant species known to occur within one mile of the proposed alignments (UNHP 2006). Field reconnaissance was conducted during early October 2006 for preparation of this environmental assessment. Field reconnaissance consisted of walking large portions of the northern part of the proposed SL County alignment from Parley's Canyon to Big Cottonwood Canyon, with spot checks along convenient access points further to the south. Background research also included discussions with the WCNF Botanist, review of Forest Service rare plant occurrence records, noxious weed survey and mapping records (Salt Lake County 2006a-c), and discussions with Salt Lake County weed management personnel.

3.1.2 Forest Service Special Status Plant Species

Laws, Regulations, and Guidelines

For the remainder of this document, "special status plant species" refers to Forest Service recommended sensitive plant species and watch list species.

The following are taken from the WCNF Forest Plan (USDA 2003a):

Vegetation - Desired Condition (p 4-7)

The desired future condition is to improve or maintain stable watershed conditions by maintaining vegetation with healthy ground cover and plant communities dominated by desired perennial grasses, forbs, with a range of shrub cover. Important and distinctive values of riparian areas are considered when implementing management activities.

Botanical Resources - Desired Condition (p 4-9)

Management activities provide for ecological conditions that contribute to the recovery of Federally listed, proposed, or sensitive species.

Forest-wide Sub-goals: Biodiversity and Viability (p 4-19)

3i - Maintain **viability** of species-at-risk (including endangered, threatened and sensitive species and unique communities).

3j - Manage Forest Service **sensitive** species to prevent them from being classified as threatened or endangered and where possible provide for delisting as sensitive (FSM 2670).

Guidelines for Biodiversity and Viability (p 4-43):

(G21) For projects that may affect Forest Service Sensitive species, develop conservation measures and strategies to maintain, improve and/or minimize impacts to species and their habitats. Short-term deviations may be allowed as long as the action maintains or improves the habitat in the long term.

(G23) Avoid actions on the Forest that reduce the viability of any population of plant species classified as Threatened, Endangered, Sensitive or recommended sensitive. Use management actions to protect habitats of plant species at risk from adverse modification or destruction. For species that naturally occur in sites with some disturbance, maintain the appropriate level of disturbance.

Affected Environment: Special Status Plant Species

Three Forest Service recommended Sensitive species occur within 1 mile of proposed alignments, specifically, Wasatch draba (*Draba brachystylis*), Wasatch daisy (*Erigeron arenarioides*), and broadleaf penstemon (*Penstemon platyphyllus*) (UNHP 2006). Additionally, one "watch list" species, Beckwith violet or bird-foot violet *(Viola beckwithii*), reportedly occurs within 1 mile of proposed alignments (UNHP 2006). No Federally listed Threatened or Endangered plant species or Forest Service Sensitive species are known from the vicinity of the proposed alignments (UNHP 2006). Forest Service management objectives and practices for "recommended Sensitive species" are the same as for "Sensitive species", specifically to manage these species to prevent the need for future listing under the ESA (USDA 2003a). They are not afforded any special consideration or protection on non-Forest Service lands.

Two of the special status plant species, Wasatch daisy and broadleaf penstemon, were observed along portions of Alternative 2 during field reconnaissance. The other two special status plant species, Wasatch draba and Beckwith violet, would not have been evident during the fall reconnaissance, and were not observed.

Based on reconnaissance, Wasatch daisy (*Erigeron arenarioides*) is known to be present in several areas immediately adjacent to existing and proposed connecting portions along the Alternative 2 alignment from Parley's Canyon to Mill Creek Canyon, and in the vicinity of the intersection with the existing Mount Olympus Trail (Glisson 2006). Based on UNHP records, field reconnaissance, and habitat preferences, Wasatch daisy may be expected to occur along portions of all four segments of the alignment for Alternatives 2 and 3 from Parley's Canyon to Little Cottonwood Canyon (Segments 1, 2, 3, and 4).

Based on reconnaissance, broadleaf penstemon is known to be present along the Alternative 2 alignment in the vicinity of the Mount Olympus Trail (Glisson 2006) and is likely to be relatively widespread in the foothill mountain brush communities (Duncan 2006). Based on UNHP records and habitat preferences, broadleaf penstemon may also be expected to occur elsewhere along the alignment from Parley's Canyon to Little Cottonwood Canyon (Segments 1, 2, and 3).

Wasatch draba is known to exist in the area from historical accounts but was not observed, and likely not evident, during field reconnaissance work. The nearest known occurrence for this plant is approximately ½ mile east of where the proposed alignment crosses the mouth of Bells Canyon. The plant typically occurs on limestone in the aspen-white fir-Douglas-fir zone and at higher elevations (ca. 6000-8000 feet) (Windham 2006). Wasatch draba is a relatively diminutive species that is reportedly poorly known and rarely collected (Welsh et al 1993). Based on UNHP records and habitat preferences, Wasatch draba may potentially occur along the alignment along the north facing slopes of canyon mouths and Mount Olympus, and from Little Cottonwood Canyon to Corner Canyon (Segments 1, 2, 3, and 4).

Beckwith violet was not observed, but probably was not evident at the time of the field reconnaissance. While a rare plant, it may be locally common and there is a reasonable likelihood that the alignment may intersect populations along the foothills (Duncan 2006). Based on UNHP records and habitat preferences, Beckwith violet may be expected to occur along the alignment from Parley's Canyon to Little Cottonwood Canyon (Segments 1, 2, and 3). Beckwith violet is known to occur along the foothills of Mount Olympus (UNHP 2006a).

Effects of the Alternatives: Special Status Plant Species

Effects of Alternative 1: No-Action

Alternative 1 would have no effect on special status species as there would not be any additional physical disturbance or increased visitation/use resulting from trail construction and use. There would be no direct or indirect effects to special status species from this alternative.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

The Alternative 2 alignment passes through areas where special status plant species are known to occur. Although there is no detailed survey data available, this alternative is expected to result in minor adverse impacts to one or more of the special status plant species. The physical disturbance associated with construction and use of this trail is not expected to limit the viability of these species across their broader ranges or result in the need to formally list them under the Endangered Species Act. However, implementation of best management practices provides an important mitigation tool to minimize or possibly eliminate adverse impacts and ensure compliance with WCNF Forest Plan standards and guidelines for special status plant species (*Guidelines for Biodiversity and Viability, G21 and G23, p 4-43*).

Best management practice mitigation measures include pre-construction clearance surveys at a seasonally appropriate time for the various special status plant species and minor rerouting of the trail alignment to avoid populations as necessary. As an optional expanded mitigation measure, pre-construction surveys and adjustment of the trail alignment may be applied to non-FS portions of the trail to further minimize overall project impacts to populations of FS recommended special status plant species.

Expansion of invasive and noxious weed species (see discussion for vegetation issue #2) along the trail may pose an indirect threat to special status plant species.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

Alternative 3 is expected to have minor adverse effects due to loss of individuals of one or more special status plant species. The effects of this alternative would essentially be the same as for

Alternative 2 although impacts to FS resources may be greater since the entire alignment for Segment 3 is on FS lands. There is a greater potential for Wasatch draba to occur along this alignment since it includes terrain within the known elevational range for this special status plant species (i.e., 6000–8000 feet). Mitigation measures would be implemented as noted for Alternative 2.

3.1.3 Noxious Weeds and Invasive Species

Noxious weeds and invasive plant species have been identified as one of the four greatest threats to NFS lands.

Laws, Regulations, and Guidelines

The following are from the WCNF Forest Plan (USDA 2003a).

Non-Native Plants - Desired Condition (p 4-10)

Established noxious weed infestations are not increasing or reduced to low densities. New invader species are not becoming established. New infestations of species are contained or reduced. New populations of existing noxious weeds are eradicated or reduced in highly susceptible, often disturbed areas. Native plants dominate most landscapes that have been rehabilitated.

Forest-wide Sub-goal - Noxious Weed Control (p 4-20)

3s. Greatly reduce known infestations of noxious weeds and rigorously prevent their introduction and/or spread.

3t. **Improve** Forest user's **awareness** of what noxious weeds are and how they spread and **increase** Forest users' **active participation** in reducing and preventing infestations.

Guidelines for Biodiversity and Viability (p 4-43)

(G25) Integrated weed management should be used to maintain or restore habitats for threatened, endangered, proposed and sensitive plants and other native species of concern where they are threatened by noxious weeds or non-native plants. When treating noxious weeds comply with policy in Intermountain Region's Forest Service Manual 2080, Supplement #R4 2000-2001-1 (Appendix III).

Affected Environment: Noxious Weeds and Invasive Species

The foothill ecosystems on the east side of Salt Lake Valley provide a narrow buffer zone along the urban interface between developed land and FS land. Although there have been no comprehensive weed inventories along the east bench area or the proposed route alignments, a variety of noxious and invasive weeds are known to occur along the foothills in the vicinity of proposed trail alignments. These include dyer's woad, leafy spurge, spotted knapweed, musk thistle, Scotch thistle, Canada thistle, field bindweed, myrtle spurge, houndstongue, Dalmatian toadflax, white top (hoary cress), and common mullein (Salt Lake County, 2006a-c).

Many invasive species readily establish and thrive on physically disturbed soils. Most are also capable of invading otherwise intact ecosystems, especially once a sufficiently large seed source becomes established in an area. Myrtle spurge and Dalmatian toadflax are examples of two invasive species in the vicinity of the Project Area that do not appear to need disturbance to expand their range. Trails may serve as conduits for spread of invasive species into intact native

plant communities. Left unchecked, many of these species would multiply and expand their range across suitable habitat, out-competing and displacing native vegetation in the process. Existing surveys of the Mill Creek, Big and Little Cottonwood canyons provide some map data of areas in the general vicinity of where the proposed trail alignments cross the canyon entrances (Salt Lake County, 2006a-c).

During the course of field reconnaissance infestations of a variety of invasive/noxious weeds were evident in the vicinity of many areas of the proposed alignment, on and off FS lands. Dalmatian toadflax is on the verge of being naturalized along much of northern portion of the project alignment for Alternative 2 (Segments 1 and 2), and is already at the point where it would be difficult to control. Animal dispersed weeds such as houndstongue and burdock form dense infestations in areas of Mill Creek Canyon (i.e., Rattlesnake Gulch) which have historically been popular recreation areas for dog owners. Myrtle spurge has infested major areas of non-FS lands along Segment 1 and on FS lands along the pipeline trail along the north slope of Mill Creek Canyon (Glisson 2006). The extent of invasive species infestations in the vicinity of trail alignments along Segments 3 and 4 is less well known as these areas have not been mapped and were not investigated as extensively during the reconnaissance.

Effects of the Alternatives: Noxious Weeds and Invasive Species

Effects of Alternative 1: No-Action

Even without additional disturbance resulting from trail construction and use, invasive species on FS lands and in the vicinity of FS lands pose an ongoing threat to the ecological integrity of native plant communities along the east bench. Unless effective invasive species control efforts are broadly implemented along the foothills (i.e., on FS and non-FS lands) invasive species populations could continue to expand and the threat to FS lands and resources would increase.

Under the No-Action Alternative, with no additional trail construction or increased visitor use, existing infestations on FS land pose a direct threat, while infestations on non-FS land pose an indirect threat. Continued implementation of the Forest Plan and effective weed control efforts may reduce the overall threat posed by invasive species to minor adverse effects in the future.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

Regardless of whether or not any noxious weeds are now present along various portions of proposed route alignments, disturbance associated with trail construction may increase the potential for future infestations and facilitate expansion of existing infestations of invasive species. Considering the fairly extensive existing weed populations observed along, and in the general vicinity of, the proposed alignment on segments 1 and 2 during reconnaissance visits, implementation of a comprehensive weed management plan is an essential mitigation requirement for any Action Alternative associated with this project. A comprehensive weed management plan would help to achieve WCNF Forest Plan desired conditions and comply with forest-wide sub-goals, and guidelines. At a minimum, an effective weed control plan would include pre-construction surveys and control efforts for weeds within close proximity (e.g., 1/8 mile) of proposed alignments. The plan should also include measures for minimizing the potential spread of seeds and other propagules during trail construction, such as use of equipment wash stations when moving between areas. In order to be effective on a long-term basis, control efforts on the Forest would also need to be coordinated with activities on non-FS lands.

Under the Proposed Action, compliance with Forest Plan Standards and Guidelines and implementation of mitigation measures, such as a weed control plan and reclaiming disturbed areas with native plants, would reduce the overall effects of invasive species to minor adverse. Existing infestations on FS land would have direct effects, while infestations on non-FS land would have indirect effects. Implementation of an effective weed control program as a required project mitigation measure would reduce the severity of threats accordingly. Effective control efforts may reduce the overall threat posed by invasive species.

Construction of the proposed trail under the Proposed Action may offer potential beneficial effects in terms of opportunities to educate Forest user's about invasive species and through improved access for control efforts. Since ongoing natural expansion of existing occurrences into undisturbed areas is likely in the future anyway, the presence of a trail may allow for more effective access for weed control.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

Potential adverse impacts are greater for this alternative simply because it involves construction of an entirely new trail section through otherwise intact native vegetation from the southern end of Mount Olympus to Big Cottonwood Canyon. This would result in an increased amount of physical disturbance with an increased risk of weed infestation to native plant communities. The proposed alignment under this alternative is located further within the Forest boundary and penetrates deeper into native areas on steeper terrain. This provides a potential vector for weed infestations deeper into otherwise intact vegetation communities. The steeper access and generally more rugged terrain would make access for future weed control efforts more difficult across this alignment.

Implementation of a comprehensive weed management plan as described for the Proposed Action would also be an essential mitigation measure for this Alternative.

Under Alternative 3, effective control efforts may reduce the overall threat posed by invasive species to minor adverse effects in the future. Noxious weed control efforts are in keeping with Forest Plan goals and Implementation of an effective weed control program as a project mitigation measure would reduce the impacts from noxious weed infestation. Existing infestations on FS land pose a direct threat, while infestations on non-FS land pose an indirect threat.

3.1.4 Cumulative Effects

Special Status Plants

A large amount of the foothill ecosystems bordering the Salt Lake Valley and the northern Wasatch Front have already been lost to development. This trend is likely to continue. Implementation of mitigation measures (pre-surveys and rerouting) as described above should eliminate any significant impacts on FS lands to special status plant species as a result of this project. Extension of mitigation measures to non-FS lands would help to minimize additional project related adverse cumulative impacts to special status plant species. The cumulative effects of incremental development of foothill ecosystems on non-FS lands in northern Utah may eventually threaten the viability of Beckwith violet in particular across its range.

Invasive Species

A variety of invasive species are already established and continually expanding along the east bench/foothill areas. By requiring a comprehensive weed management plan as an integral component of the FS portion of the BST and requiring coordination with non-FS land weed control efforts, the BST project may provide the impetus for a meaningful reversal of invasive species expansion throughout the vicinity of the Project Area. Failure to link FS efforts with a similar aggressive effort on non-FS lands would guarantee the WCNF needs to pursue an ongoing aggressive weed management effort for an indefinitely extended timeframe across the Project Area, with questionable effectiveness in addressing the overall problem.

Past, Present, or Reasonably Foreseeable Future Actions

Special Status Plants

Ongoing loss of habitat to development encroachment on non-FS lands would continue to adversely affect special status plant species, and may be a particular concern for Beckwith violet as noted above. Encroachment of suitable habitat by noxious weeds and other invasive plants on FS and non-FS lands may also poses a serious threat to native foothill ecosystems and special status plant species if the weed problem is not controlled in the near future.

Invasive Species

There are no additional foreseeable actions that would directly impact invasive species populations across the Project Area. Recent FS outreach programs such as the myrtle spurge elimination program (USDA 2006a, 2007) are an important step in the right direction and may eventually help to reverse the expansion of that particular invasive species when coupled with on-the-ground control efforts. If weed control efforts on non-FS lands are implemented on an aggressive basis, the overall situation may be reversible on FS and non-FS lands across the east bench.

Cumulative Effects of the Alternatives

Special Status Plants

The cumulative effects of Alternatives 2 and 3 include potential loss of special status plants on non-FS land. Without field survey data for each alignment, it is not possible to determine if one alternative would more adversely impact sensitive status plants. Implementation of proposed mitigation measures (e.g., pre-project clearance survey within a prescribed corridor along the alignment and minor trail reroutes as necessary) should minimize impacts under either Action Alternative. Applying this mitigation approach to non-FS lands would help to mitigate cumulative losses of these special status plants under both of the Action Alternatives.

Invasive Species

Selection of one of the Action Alternatives in combination with an integral requirement for a comprehensive weed management plan as a required mitigation measure would greatly benefit the long-term integrity of east bench ecosystems and ensure compliance with the WCNF Forest Plan. Cumulative effects of each of the alternatives are listed below in table 10.

Table 10. Cumulative effects of alternatives.

Resource Issue	Alternative 1	Alternative 2	Alternative 3
Special status plant species	No direct effects. Indirect effects include disturbance of special status plant species through increased user-created trails.	Minor adverse effects to one or more species. Mitigation measures such as pre-surveys and minor re-routing of trail alignment as necessary would help to reduce impacts.	Same as for Alternative 2.
Invasive species	Lack of a formal project may allow status quo weed management to occur indefinitely. This would result in ongoing degradation of east bench/foothill ecosystems.	Both short- and long-term adverse effects would be reduced to minor by implementing a weed management plan as a required project mitigation measure.	Overall similar to Alternative 2, but higher potential for adverse impacts due to increased disturbance associated with developing new trail across otherwise intact native vegetation communities.

3.2 Wildlife and Fish Resources

3.2.1 Introduction

A priority in all management decisions within this management area is the restoration and maintenance of a healthy and sustainable, broad-scale north-south wildlife corridor, and the shorter east-west corridors that move wildlife up and down in elevation.

The terrestrial wildlife resources in the WCNF are as diverse as the plant communities, geologic features, and elevations in which they exist. Wildlife is dependent on all other resources that comprise and influence a species habitat. This is a complex resource since a land management activity may benefit some species or their habitat while harming other species.

The purpose of this report is to describe the current resource conditions for habitat, and for wildlife and fish resources in the BST Project Area in Salt Lake and Davis Counties on the Salt Lake Ranger District.

The report also provides analysis of effects for a range of alternatives on wildlife and fish resources as required by NEPA, NFMA, other applicable laws and regulations, Forest Service directives, and the Forest Plan.

Information for this report was gathered mainly from the following major sources:

- USDA Forest Service. 2003. Final Environmental Impact Statement Wasatch-Cache National Forest. Wasatch-Cache National Forest. Salt Lake City, Utah.
- Wasatch-Cache National Forest. 2006. Management Indicator Species of the Wasatch-Cache National Forest. Salt Lake City, Utah. Version 2006-1.

Other information sources used to describe the proposed actions, impacts, species, and habitat are referenced in the respective discussions and listed in Chapter 5: References Cited.

Methodology

The Project Area is defined by the consultation regulations (50 CFR 402.02) as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.”

Wildlife surveys and/or habitat assessments have been conducted by Forest Service biologists as directed in the Forest Plan. The objective is to monitor the status of the species of Federal, State and local interest and their habitat across the Forest, and to use the information to assist in the evaluation of the effects of proposed projects on the species and their habitat. Data has been collected for the following categories of terrestrial and aquatic wildlife: Federally listed threatened and endangered species (TEPS), Forest Service sensitive species (FSS), management indicator species (MIS), and other wildlife species such as big game animals and non-game birds.

Laws, Regulations, and Guidelines

There are many laws that pertain to and regulate wildlife management within the National Forests. A full review of these laws can be found in "The Principal Laws Relating to Forest Service Activities" (USDA 1993). Just a few of the important ones that apply to all wildlife resources include the following:

- **Bald and Golden Eagle Protection Act of June 8, 1940 (16 U.S.C. 688-668-d):** provides protection to bald and golden eagles.
- **Sikes Act of September 16, 1960 (16 U.S.C. 670a):** provides for carrying out wildlife and fish conservation programs on Federal lands, including authority for cooperative State-Federal plans, and authority to enter into agreements with States to collect fees to fund the programs identified in those plans.
- **Endangered Species Act of December 28, 1973 (87 Stat. 884 as amended; 16 U.S.C. 1531, 1532, 1533, 1536, 1540):** declares that "…all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."
- **The Migratory Bird Treaty Act of 1918 (MBTA) as amended:** established to protect migratory birds. This act makes it illegal to pursue, hunt, take, capture, kill, or possess migratory birds or any part, nest, or egg of any such bird (16 U.S.C. 703-7012). In January of 2001 Executive Order 13186 was issued on the Responsibilities of Federal Agencies to Protect Migratory Birds.
- **Knutson-Vandenberg Act of June 9, 1930 (16 U.S.C. 576, 576a-576b):** authorizes the use of funds collected from timber sales through this act to be used for "protecting and improving the future productivity of the renewable resources of the forest land on such sale area, including sale area improvement operation, maintenance and construction, restoration and wildlife habitat management."
- **The National Forest Management Act of 1976:** outlines policy and direction for wildlife and riparian and aquatic resources as can be found in Forest Service Manuals 2500 and 2600, and the Forest Service Handbooks.

Analysis Area

The analysis area contains a variety of terrestrial habitats, including sagebrush, pinyon-juniper, mahogany and mountain brush, grassland and forbland, aspen and aspen-mixed conifers, mixed conifers, and rock outcrops and barren areas.

The primary perennial streams in the analysis area are identified as those systems that may have fish species associated with them. These streams include Mill Creek, Big and Little Cottonwood Creeks, the North Fork and mainstem of Deaf Smith Canyon and Bell Canyon.

Intermittent systems with riparian habitat include Neffs Canyon, Tolcats Canyon, Heughs Canyon, Ferguson Canyon, forks of Dry Creek and Rocky Mouth, and Big and Little Willow Canyons.

The component of riparian habitat in the analysis area includes wetlands, riparian areas, and reservoirs. Springs and seeps are also present along existing water courses. Combined, these

habitats comprise less than 0.1 percent of the analysis area. However, these habitats are important for a variety of wildlife species, as most wildlife use riparian areas for at least some part of their life cycle.

Wildlife Issues

The Issues to be analyzed in this report have been identified from public meetings and reviews of the proposed project by Forest Service biologists familiar with the habitat and the species found on the WCNF. The issues include the following:

1. **Big Game Populations and Winter Range.** The foothill zone has been identified as providing critical winter habitat for mule deer and other wildlife species. Concerns were expressed about potential effects of construction and use of the trail on wildlife habitat, wildlife migration corridors, and wildlife in general.
   - Evaluation Criteria: Populations, migration corridors and habitat fragmentation.
2. **TES, FSS, and MIS.** There are concerns about potential effects on threatened and endangered species, Forest Service sensitive species, and management indicator species.
   - Evaluation Criteria: Presence/absence of species and suitable habitat.
3. **Migratory Birds.** The effect to migratory birds has been identified as an area of analysis.
   - Evaluation Criteria: Habitat available and type of change in available habitat.
4. **Domestic Dogs.** The potential presence of additional domestic dogs in the foothills due to trail development may have impacts on wildlife and will be analyzed.
   - Evaluation Criteria: Length of trail where dogs are permitted with and without leashes.

3.2.2 Big Game Populations and Winter Range

Affected Environment: Big Game Populations

There are 300 plus species on the Forest and it is impossible to track them all, so certain groups are carried forward through planning documents. Big game is carried forward due to the great interest of the public both for hunting and wildlife viewing. Changes in big game species composition have occurred in recent decades. Big game species that are found on the WCNF include moose, mountain goat, Rocky Mountain bighorn sheep, elk, and mule deer. Only mule deer and elk will be discussed in this report because the proposed Project Area is within the lower elevational reaches of the designated mule deer winter range. Elk winter range, for all practical purposes, is considered the same for this project.

Mule deer have declined from higher population levels in the 1960's. On the 8 hunting units that contain National Forest System lands administered by the WCNF, deer numbers are currently at or below herd objectives set by the Utah Division of Wildlife Resources. Mule deer winter range has been identified along the entire trail and is shown in figure 10. Elk winter range is essentially the same as for mule deer and issues considered and discussed for mule deer include elk.

Potential forage competition may occur among many species on winter ranges. These are comprised primarily of mountain brush community types including species such as Gambel oak,

sagebrush, serviceberry, mountain mahogany, and bitterbrush. Most critical winter range occurs outside the Forest, though the reduction in availability due to development has placed a higher value on the limited national forest winter range.

Winter range for deer and elk has been impacted through urban expansion along the Wasatch Front. This has involved a loss of habitat through development, and a reduction in the quality of habitat through the introduction of non-native grasses, forbs, and noxious weeds. In addition, fire cycles for these areas have been altered due to the larger composition of annual species that readily burn, and the high number of human caused ignitions. The proximity of elk and deer winter range to urban populations poses a potential concern of animal harassment from people. Deer and elk mortalities from being hit by vehicles are a threat to the animal populations where major highways pass through the canyons. The trail could provide additional avenues for big game to access the highways.

Winter range in the project area is mostly east and upslope of the forest boundary. Summer range conditions are not the limiting factor for big game populations.

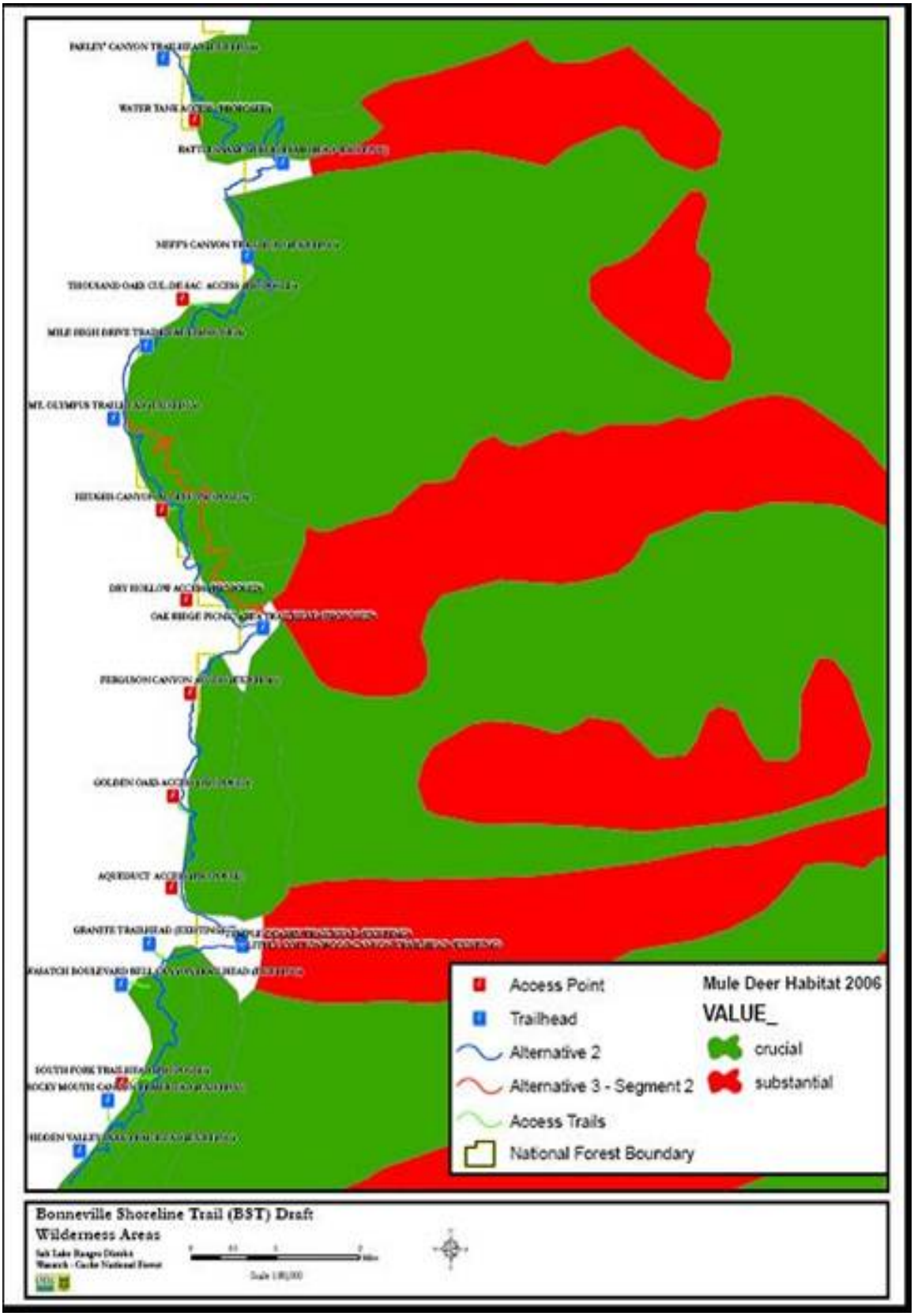

Figure 10. Mule deer winter range along the BST proposed route.

Effects of the Alternatives: Big Game Populations

Effects of Alternative 1: No-Action

The trail would not be built; however, anticipated use of the current trail would continue to increase as people are concentrated on the existing trail. This would lead to additional user-created trails and additional impacts to deer and elk. Impacts to the mule deer and elk winter range under this alternative would not be from the trail, but from increased housing development and subsequent increases in human use of the area. This would cause mule deer and elk to avoid the area in favor of areas with less human disturbances. Implementing this alternative would have no new effects on mule deer and elk winter range.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

Segment 1: Parley's Canyon to Mount Olympus Trailhead

The effects of implementing Alternative 2: Segment 1 would be minor, long-term adverse effects. The impact on mule deer and elk winter range by formalizing this segment of trail is viewed in the form of habitat loss by avoidance. Generally, mule deer and elk avoid areas of human activity and seek more secluded habitat when it is available. It is estimated that the trail would cause deer and elk to stay about 400 feet from the area during times when the trail is in use. This would mean approximately 48 acres of current habitat for each mile of trail would be avoided by mule deer and elk during time of human use.

The factor that cannot be accounted for is whether or not the deer and elk would become adapted to the area and continue to use it in spite of increased human use. Past patterns have shown that deer avoid the areas during daytime but move back into the areas at night.

The overall problem is the continued loss of existing habitat for these species. Housing developments and resulting increased human intrusion into the existing habitat is moving deer and elk higher up the mountains into less preferred habitat. Implementation and formal development of this segment of trail would add to the loss of habitat for mule deer and elk.

Segment 2: Mount Olympus Trailhead to Big Cottonwood Canyon

The effects on the habitat of big game populations in Segment 2 due to this project would be the same as for Segment 1.

Segment 3: Big Cottonwood Canyon to Little Cottonwood Canyon

The effects on the habitat of big game populations in Segment 3 due to this project would be the same as for Segment 1.

Segment 4: Little Cottonwood Canyon to Hidden Valley Park

The effects on the habitat of big game populations in Segment 4 due to this project would be the same as for Segment 1.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

The effects of Alternative 3 would be the same as for Alternative 2, except the entire route in Segment 2 would be on WCNF administered lands.

3.2.3 Threatened and Endangered Species, Forest Service Status Species, and Management Indicator Species

Threatened and Endangered Species:

The Utah Field Office of the U.S. Fish and Wildlife Service maintains and publishes a list of Federally Listed and Proposed (P), Endangered (E), Threatened (T), and Candidate (C) Species and Habitat in Utah by County (USFWS 2007). Federally listed species that are found on or having habitat on the Salt Lake Ranger District, WCNF and their relationship to the proposed project are shown in table 11.

Table 11. Federally Listed Species in Salt Lake County, Utah.

Species	Status	Habitat in Project Area	Comments
Bald Eagle Haliaeetus *leucocephalus*	T	No	Nesting around Great Salt Lake. No roosting or food sources in Project Area.
Canada Lynx *Lynx canadensis*	T	Yes	Linkage habitat only. Project Area in low density vegetation and high human use.
June Sucker *Chasmistes liorus*	E	No	Found in Utah Lake to the south of the project area and in Red Butte Reservoir north of the project area.
Slender Moonwort *Botrychium lineare*	C	No	No impact. No habitat in Project Area: elevation too low. Only specimen is historic at Brighton Ski Resort.
Yellow-billed Cuckoo *Coccyzus americanus*	C	Yes	Limited riparian habitat along canyon streams. Not quality habitat for species. Impacts very minimal to habitat.

Bald eagle. The bald eagle is mainly a winter visitor to Utah; however, it does nest in Salt Lake and Davis Counties at lower elevations in the wetlands around the Great Salt Lake. Bald eagles are occasionally seen on the Forest, but their main foraging and roost areas are at the lower elevations where there is abundant prey. Bald eagles are not documented as using the WCNF in the project analysis area.

Canada lynx. Historically lynx have been found in Utah in very low numbers. Between 1916 and 1991 there are 27 referenced occurrences with 10 being verified. Most are from the Uinta Mountains with others scattered in other locations including Summit (two specimens) and Cache (one specimen) Counties. There have been no verified records since 1991.

The analysis area is in designated linkage habitat for the species. Linkage habitat is also described as an area a lynx may travel through but would not spend any prolonged amount of time in due to lack of cover habitat and forage to maintain the species. Habitat in which this species may be found is much higher in elevation than the project analysis area.

June Sucker. The June sucker is endemic to Utah Lake and uses streams flowing into the lake for spawning. In modern times it has not been known to exist naturally on the WCNF, although they may have spawned in the Provo River in areas which are now part of the Uinta National Forest. There was one experimental population within Red Butte Research Natural Area. Red Butte Reservoir was transferred to the Central Utah Water Conservancy District and with it the habitat for June sucker on the WCNF. At this time there are no June suckers on the WCNF.

Slender Moonwart. The following is a brief summary of the species and is included for information purposes only. It has been determined there is no suitable habitat for the plant in the Project Area.

Slender moonwort is a small perennial fern with pale green leaves two to seven inches long. Leaf segments are typically linear and divided or forked at the ends. It is considered to be one of the more distinctive moonworts.

The plant grows in habitat such as meadows with tall grass and forbs, and in small openings within forests dominated by a variety of spruce, pine or fir species. This species was first described by scientists and given the name slender moonwort in 1994.

Western yellow-billed cuckoo. The cuckoo is a low-elevation riparian shrub inhabitant. Historically it has been observed close to the Forest along the Wasatch Front and in Cache Valley. The UDWR Natural Heritage Program indicates that the species is a historical breeder in the State. There are small patches of potential habitat for the species where the proposed trail would cross various perennial and intermittent streams.

Wasatch-Cache NF Sensitive Species

Sensitive species are those species identified by the Regional Forester for which population viability is a concern, as evidenced by a significant current or predicted downward trend in numbers or density, or a significant current or predicted downward trend in habitat capability that would reduce the species' existing distribution. On the Wasatch-Cache the Regional Forester has designated the terrestrial species shown in table 12 as Forest Service Sensitive.

Table 12. Sensitive Species on the WCNF.

Species	Habitat in Project Area	Comments
Spotted bat *Euderma maculatum*	Possible	No Impact. Has not been found in Salt Lake County. Habitat would not be modified.
Townsend's big-eared bat *Plecotus townsendii*	Possible	No Impact. Habitat would not be modified.
Wolverine *Gulo gulo*	No	No Impact. Has not been found in the area. No habitat in Project Area.
Boreal owl *Aegolius funereus*	Yes	No Impact. Has not been found in the area. Habitat conditions marginal to non-existent for this species.
Flammulated owl *Otus flammeolus*	Yes	No Impact. Has not been found in the area. Habitat conditions marginal to non-existent for this species.
Great gray owl *Strix nevulosa*	Yes	No Impact. Habitat modifications would be minimal. Habitat conditions marginal to non-existent for this species.
Northern goshawk *Accipiter gentiles*	Yes	No Impact. Habitat modifications would be minimal for this species. Possible foraging habitat only.
Peregrine falcon *Falco peregrinus*	Nesting: No Foraging: Yes	No Impact. Nesting habitat not present. Foraging habitat present, but there is minimal modification of foraging habitat.
Northern three-toed woodpecker *Picoides tridactytus*	Possible	No Impact. Habitat conditions marginal to non-existent. Habitat modifications would be minimal for this species
Columbian sharp-tailed grouse *Tympauchus phasianellus columbianus*	No	No Impact. No habitat present. Not found in Project Area.
Spotted frog *Rana luteiventris*	No	No Impact. Historically found in Salt Lake County. No habitat present in the project area. Species believed to be extirpated from Salt Lake County.
Bonneville Cutthroat Trout	Yes	If existing stream crossings are used and the trails leading to the crossings are well drained with minimal sediment production, there will be no impact to the species or the habitat.
Colorado River Cutthroat Trout	No	No Impact. Project area outside the historic range of the species.

Spotted bat. Spotted bats are found in a variety of habitats including open ponderosa pine, desert shrub, pinyon-juniper, and open pasture and hay fields. They roost alone in rock crevices high up on steep cliff faces. Cracks and crevices ranging in width from 0.8-2.2 inches in limestone or sandstone cliffs are critical roosting sites. There is some evidence that individuals

show fidelity to roost sites. They are territorial and avoid each other while foraging. Information on seasonal movements is scarce, though spotted bats are thought to migrate south for winter hibernation.

Spotted bats are rare and may be limited by suitable roosting sites. They are found in relatively remote, undisturbed areas, suggesting that they may be sensitive to human disturbance.

Although there is habitat present on the Forests, no spotted bats have been found. Historically the spotted bat has not been documented on the WCNF. In northern Utah the only historical record found by the Utah Natural Heritage Program is a female collected on a school in Salt Lake City in 1934.

Townsend's big-eared bat. Western big-eared bats use juniper/pine forests, shrub/steppe grasslands, deciduous forests, and mixed coniferous forests from sea level to 10,000 feet. During winter they roost singly or in small clusters in caves, mine shafts, at rocky outcrops, or occasionally in old buildings. They remain at these sites, called hibernacula, from October to February. They hang from ceilings with their ears curled in ram's horn fashion, possibly to help prevent heat loss. They do not migrate, but move to different roost locations within hibernacula and even move to different hibernacula during a winter. These movements are thought to be in response to temperature changes. In summer, females roost with their young in nursery roosts. Males and non-breeding females roost alone.

Big-eared bats are very sensitive to human disturbance and abandon roost sites if disturbed. Low reproductive rates and limited roost sites make this species vulnerable.

This bat is known from seven locations on the Logan, Ogden, and Salt Lake Ranger Districts. It is associated with caves and mines that it uses for nursery colonies and hibernacula.

Wolverine. The wolverine is essentially a Wilderness mammal. It inhabits tundra and coniferous forest zones, generally at higher altitudes during summer and mid to lower elevations during winter. Low elevation riparian areas may be important winter habitat. Wolverines reportedly prefer to hunt around small meadows, timbered thickets, cliffs, and riparian and ecotonal areas. However, except for an occasional direct crossing, they generally avoid large parks, meadows and clear cuts. They are mainly active at night, but hunt during the day. Wolverines are active year round and are nonmigratory. Densities are low (one wolverine per 25-80 square miles), even in the best habitats, and closely tied to diversity and availability of food.

Historically the wolverine was found throughout the WCNF. There has not been a confirmed sighting for at least ten years. In the early 1990s one was reported on the Logan Ranger District. Cameras placed over bait were unsuccessful in documenting presence. Wolverines prefer mature and old growth forest but do forage in meadows and talus slopes.

Boreal owl. Boreal owls are closely associated with high elevation spruce-fir forests due to their dependence on this forest type for foraging year round. Nesting habitat structure consists of forests with a relatively high density of large trees (12 inch dbh), open understory, and multi-layered canopy. Owls nest in cavities excavated by large woodpeckers in mixed coniferous, aspen, Douglas-fir, and spruce-fir stands. In winter, they may move down in elevation and roost in protected forested areas.

Utah is the southern edge of the boreal owl's range. The species occurs in very small numbers. It has been found in 2-3 locations on the WCNF.

Flammulated owl. Flammulated owls can be found in mixed pine forests, from pine mixed with oak and pinyon at lower elevations to pine mixed with spruce and fir at higher elevations. They have also been found in aspen and second growth ponderosa pine. However, they prefer mature ponderosa pine-Douglas-fir forests with open canopies. Large diameter (>20 inch) dead trees with cavities are important site characteristics. They avoid foraging in young dense stands where hunting is difficult. Flammulated owls are migratory in the northern part of their range. They move south in the fall to central Mexico and Central America to spend the winter where insects are available. Territory size varies from 20-59 acres and is determined by age and patchiness of overstory trees.

Flammulated owls are more common in the State then boreal owls but they are still rare. They have been documented in several locations on the Wasatch Range.

Great gray owl. Great gray owls use mixed coniferous and hardwood forests usually bordering small openings or meadows. They forage along edges of clearings. Semi-open areas, where small rodents are abundant, near dense coniferous forests, for roosting and nesting, is optimum habitat for great grays. During winter some birds stay on or near their breeding territories and others make irregular movements in search of prey and favorable snow conditions. In the Intermountain Region, great grays occur primarily in lodgepole pine/Douglas-fir/aspen zone and in ponderosa pine.

The great gray owl is considered a winter vagrant in Utah with one observation recorded by the Utah Natural Heritage Program on the Uinta National Forest.

Goshawk. In 1991, the goshawk was designated as a sensitive species in the Intermountain Region of the Forest Service. As a result of this designation, special management is emphasized to ensure the goshawk's viability (FSM 2670). In March of 1997 the Utah Division of Wildlife Resources classified the goshawk as a State sensitive species. The purpose of this designation was to identify species in the State that are most vulnerable to population declines or habitat loss and to stimulate management actions for the conservation of this species.

To address the issue of declining goshawk habitat in Utah, a technical team was assembled. They developed seven questions and attempted to answer them in "The Northern Goshawk in Utah: Habitat Assessment and Recommendations". The seven questions and a summary of the findings follow, as quoted from the report:

1. **Is there adequate nesting habitat available?** Presently there appears to be adequate nesting habitat in the State and on the WCNF to maintain a breeding population of goshawk.
2. **Is there adequate foraging habitat available?** Based on habitat features important to selected prey used by goshawks, it appears that foraging habitat is presently available throughout the State and on the Wasatch-Cache.
3. **Are northern goshawks able to move freely between habitat patches?** Goshawks appear to be able to move freely among habitat patches throughout Utah and the Forest.

(It is noted that satellite tracked birds captured on the Wasatch-Cache have wintered south of Delta, Utah and along the Utah/Arizona border.)

4. **Is the population viable at the State level?** This assessment could not answer the question of population viability directly because there are inadequate demographic data available. Most of the currently forested lands were rated as medium or high value for both nesting and foraging habitat. Where surveys have been conducted, goshawks are present and nesting successfully. Furthermore, all available habitat patches are connected, and no known population is isolated. In general, existing habitat appears to be capable of supporting a viable population of goshawks at the State and Forest spatial scales.
5. **Where is the high value habitat?** High value habitat is distributed throughout the State, with 60 percent controlled by the USDA Forest Service.
6. **How are current management policies affecting goshawks?** Current management policies are affecting northern goshawks in a variety of ways. On National Forest Service administered lands in Utah, 20 percent of the high value habitat is being managed with a timber emphasis, 35 percent with mixed uses, and 27 percent with a range emphasis. Each of these management categories allows for activities that either can degrade or improve goshawk habitat. The information in this assessment does not reveal any substantial deficiencies in habitat quality in any management category.
7. **What are the important habitat trends and their implications for goshawks?** The most obvious trend in Utah forests and woodlands is the lack of early and mid-seral species in all of the potential vegetation types. If forest management stresses properly functioning condition, importance of large trees, maintaining native processes, using adaptive management, and recognizing the role of fires, the habitat outlook could be favorable for the goshawk and its prey. This is true on the WCNF also.

Specific habitat attributes used by this species include the following:

- snags
- downed logs woody debris
- large trees
- herbaceous and shrubby understories
- a mixture of various forest vegetative structural stages

On the WCNF, vegetation types that are considered suitable habitat include lodgepole pine, fir, Douglas fir, spruce and aspen. Abundant prey populations within goshawk foraging areas occur when

1. the specific habitat attributes are provided,
2. forests contain large trees and have relatively open understories,
3. forest openings are small to medium in size,
4. patches of dense, mid-aged forests are scattered throughout, and
5. the majority of forests are in the mid-aged, matures, and old age classes.

Management recommendations include managing for a more open canopy (40 percent in mid-aged forests and 50-60 percent in mature and old forests) because the foraging area need not provide hiding cover for fledgling goshawks. Medium openings (less than 4 acres) for understory development and tree regeneration are desired in mixed-species forests; smaller openings are desired in spruce-fir forests.

Peregrine falcon. Peregrine falcons occupy a wide range of habitats. They are typically found in open country near rivers, marshes, and coasts. Cliffs are preferred nesting sites, although reintroduced birds now regularly nest on man-made structures such as towers and high-rise buildings. Peregrines may travel more than 18 miles from the nest site to hunt for food. However, a 10-mile radius around the nest is an average hunting area, with 80 percent of foraging occurring within a mile of the nest.

Peregrine falcons are tied to high cliffs or buildings for nesting in areas where there are abundant avian species for prey. Historically for the Wasatch-Cache this was along the Wasatch Front. The best habitats on National Forest System lands are located in Salt Lake, Box Elder, and portions of Weber Counties. There are known nesting pairs in Box Elder County.

Northern three-toed woodpecker. Three-toed woodpeckers are found in northern coniferous and mixed forest types up to 9,000 feet. Forests containing spruce, grand fir, ponderosa pine, tamarack, and lodgepole pine are used. Nests may be found in spruce, tamarack, pine, cedar, and aspen trees. They forage on a wide variety of tree species depending on location. Fire-killed trees are a major food source, and forest fires may lead to local increases in woodpecker numbers three to five years after the fire. In the northeastern United States, they were found to have territories of 74 acres, with a density of three pairs per 247 acres, although densities may increase during beetle outbreaks. They stay on their territories year round, though insect outbreaks may cause irregular movements.

This species is found in conifer and aspen vegetation types throughout the WCNF and Utah. It may presently be at some of its highest population levels on the Forest because of the quantity of mature and old growth forests types.

Columbian sharp-tailed grouse. Sharp-tails need large areas of undisturbed native shrub-grassland year round. Spring to fall habitat consists of mountain shrub patches and riparian shrub areas for escape cover and late summer-early fall food, and sagebrush cover types with a high diversity of shrubs, forbs, and grasses and high structural diversity. In winter, sharp-tails use clumps of trees or tall shrubs along hillsides or riparian areas which provide both food and cover. Serviceberry, chokecherry, bittercherry, and hawthorn are important species. Sharp-tails also snow-burrow to conserve energy and to roost relatively safe from predators.

The range of the sharp-tailed in Utah is in Box Elder, Weber, and Cache Counties. It is a sagebrush/grassland species that would be found at the lower elevations of the Forest.

Spotted frog. Spotted frogs are generally found in small springs, ponds or slough with a variety of herbaceous emergent, floating, and submergent vegetation. Spotted frogs emerge from hibernation in the spring. Primary prey for spotted frogs is insects. Historically spotted frogs were found in the Beaver Creek Drainage, Summit County. Spotted frogs were last found on the WCNF in May 2007 in the Prove River Drainage below Soapstone Creek. Prior to that a single

individual was found in July 1996 at Farmington Ponds in Davis County, which is outside of the project area.

Bonneville Cutthroat Trout. Bonneville cutthroat trout require cool, clear water throughout their lives. Optimum habitat characteristics include areas with a 1:1 pool to riffle ratio and slow, deep water with vegetated streambanks for shade, bank stability, and cover. They prefer summer water temperatures of about 59 degrees Fahrenheit (F), but can survive in water up to 70 degrees F. They may also inhabit lakes.

Cutthroat trout are found in Mill Creek, Big Cottonwood Creek, North Willow of Deaf Smith Canyon and Little Cottonwood Creek.

Effects of the Alternatives: Threatened and Endangered Species and Forest Service Status Species

Effects of Alternative 1: No-Action

The trail would not be built and use of the current trail would continue to increase. Impacts to the TES and FSS under this alternative would not be from the trail or use of the trail, but from increased housing development and subsequent increases in human use of the area. This would cause these species to avoid the area in favor of less occupied areas. Implementing this alternative would result in no effect to TES and FSS.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

The trail would have a 36-inch tread and 48-inch cut with a 10-foot clearing width for oak in non-Wilderness areas. In Wilderness areas the trail would have a 24-inch tread and 36-inch cut with an 8-foot clearing width for oak. This standard applies to all segments of the trail.

Only the Federally listed as threatened Canada lynx and candidate yellow-billed cuckoo are considered in this analysis (TES). The Project Area is on the fringe of Canada lynx designated linkage habitat and the riparian areas of the various streams are potential habitat for the yellow-billed cuckoo. The bald eagle, June sucker and slender moonwort do not have habitat in the Project Area and will not be considered further in this analysis.

Forest Service Sensitive (FSS) species that are not considered in this analysis because they are not present or do not have suitable habitat are the spotted bat, Townsend's big-eared bat, wolverine, sharp-tailed grouse, and spotted frog. Potential foraging habitat is present for the Northern goshawk and peregrine falcon. Habitat for the boreal owl, flammulated owl and great gray owl is marginal and is generally not used in preference to more suitable secluded habitat. However, they may be occasional visitants to the area.

Bonneville cutthroat trout are known to exist in Mill Creek, Big Cottonwood Creek, North Willow (of Deaf Smith Canyon) and Little Cottonwood Creek and have been stocked into Upper Bells Canyon Reservoir. Goshawk may have foraging habitat in the Project Area.

On WCNF segments of the trail where the trail crosses a stream or riparian area, Forest Service standards for Riparian Habitat Conservation Areas (RHCA) would be implemented to ensure protection of the habitat and the associated species. The riparian management objectives would be full retention of riparian vegetation. Instream habitat would include fish passable structures for all stream crossings with a minimal of bank or existing instream habitat. Hazard trees could

be removed to eliminate the threat to life. The RHCA and riparian guidelines are included in Appendix A.

Segment 1: Parley's Canyon to Mount Olympus Trailhead

The effects on the habitat for TES and FSS species due to this project would be long-term minor adverse. Effects, if measurable, would be in the form of monitoring and determination of use or nonuse. Such effects are hard to quantify, except on a site-specific basis, in a project with a footprint as small as this. This is especially true because of the existing trail segments, both official and user-created, and the stream crossings that are already in place.

Removal of some trees and the understory shrub and brush habitat would remove hiding cover for small mammals and birds. However, there is sufficient remaining habitat to support the species that may be displaced from the trail and associated buffer. The Canada lynx is not expected to use the general area. They prefer higher more secluded ridges with thicker stands of brush and undergrowth.

The open areas currently used by peregrine falcons and goshawk would not be reduced. The WCNF management objectives for these species would be supported on Forest Service managed lands.

Stream crossings would adhere to Forest Service RHCA and riparian standards throughout the length of the trail. The Mill Creek, Big and Little Cottonwood Creeks, and Bells Creek crossing below lower Bells Reservoir all have existing crossing and would not affect the Bonneville cutthroat trout or their habitat in the Project Area.

Segment 2: Mount Olympus Trailhead to Big Cottonwood Canyon

The effects on the habitat of TES and FSS species in Segment 2 due to this project would be the same as for Segment 1. The trail standards would be the same for all segments.

Segment 3: Big Cottonwood Canyon to Little Cottonwood Canyon

The effects on the habitat of TES and FSS species in Segment 3 due to this project would be the same as for Segment 1. The trail standards would be the same for all segments.

Segment 4: Little Cottonwood Canyon to Hidden Valley Park

The effects on the habitat of TES and FSS species in Segment 4 due to this project would be the same as for Segment 1. The trail standards would be the same for all segments.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

Changing the alignment for this segment of the trail would increase the amount of brush and shrub habitat that is impacted by the trail. The increase in the mileage of trail on Forest lands would mean there would be more of the trail subject to Forest Service Wilderness restrictions and the trail width would be reduced to a 24-inch tread with a 36-inch cut and an 8-foot clearing for oak. The increase would not be substantial because of the existing similar habitat above and below the trail.

Species such as the Canada lynx would still avoid the area because of the preference for more isolated ridge type habitat. Foraging habitat for the Peregrine falcon and goshawk would increase slightly as more habitat is opened up on the forest. This is not a significant factor because of the

better quality existing habitat in other locations away from the Project Area. There would be no changes to the effects to stream crossings as RHCA and riparian habitat guidelines would already be in place for these areas.

The amount of impact on the habitat for TES and FSS species due to this project would be minor.

3.2.4 Management Indicator Species

Management Indicator Species (MIS) are used to assess the effects of a management activity on wildlife (please see table 13). The general guidance and criteria for selecting MIS are contained in 36 CFR 219.19(a) and in the Forest Service Manual 2621.1. The following criteria were used in selecting MIS:

1. MIS must have a strong (but not exclusive) affinity for the habitat type.
2. The habitat type is key habitat in the life cycle of the MIS.
3. The MIS is sensitive to change.
4. The MIS is relatively easy to monitor, i.e., high visibility and in adequate numbers.
5. The MIS is somewhat representative of all species that use the habitat type.
6. The MIS is, for the most part, a year-round resident on the forest.

Table 13. Management Indicator Species on the WCNF.

Management Indicator Species	Associated Community	Comments
Cutthroat trout *Oncorhynchus clarki utah* *O.c. pleuriticus*	Aquatic	*O.c. utah*: suspected in 5 streams in Project Area *O.c. pleuriticus*: no Impact; outside of species historic range.
Beaver *Castor canadensis*	Riparian	No impact; not found in Project Area.
Goshawk *Accipiter gentilis*	Aspen, Conifer, Mixed Conifer	Minimal impact; footprint of trail on fringe of foraging habitat; no nesting habitat.
Snowshoe Hare *Lepus americanus*	Pole/sapling Aspen, Conifer, and Mixed Conifer	Minimal impact on habitat for species; suitable community types not found in the Project Area.

Five management indicator species were identified during the development of the Forest Plan (table 13). From a strict classification perspective the Bonneville and Colorado River cutthroat trout are recognized as separate subspecies and are addressed as separate species in this report. Information for the MIS species and associated communities and risk factors described below was obtained from the MIS Version 2006-1 document prepared by the WCNF biologists (USDA 2006b).

Bonneville and Colorado River cutthroat trout – aquatic. Bonneville cutthroat trout are found within the project area in Mill Creek and North Willow Creek. They are also found upstream in Big and Little Cottonwood creeks and Bell Canyon. Colorado River cutthroat trout exist in some streams in the Uinta Mountains that drain into the Colorado. This is outside of the project area.

Risks, those items imposed by the nature of the environment and population, include factors such as temporal variability, population size, growth and survival, and isolation of a population.

Threats that have the potential to impact fish populations include: non-native fish, roads, trails, motorized trails, grazing, timber harvest, oil and gas development, dams and diversions, developed recreation sites, and special uses authorized in riparian zones on National Forest System lands. These threats primarily affect habitat conditions which can affect population size, habitat for growth and survival, and population connectivity.

Beaver – riparian. The beaver occurs throughout most of North America and is fairly common in Utah. It is found in permanent slow moving streams, ponds, small lakes, and reservoirs. On the WCNF, the Uinta Mountains are classed as "substantial value" habitat and the rest of the Forest as "critical value" or "high value" habitat as indicated on Gap Analysis maps.

Risks and threats to beaver populations on the WCNF are predation and unnaturally high water flows from spring runoff (USDA 2006b). Except for unregulated, concentrated trapping, or wide-ranging removal of deciduous woody plants near permanent water sources, there are few threats to beaver populations. Improper livestock grazing can degrade riparian vegetation, degrade water quality, and increase erosion, thus impacting beaver and the riparian habitat they depend on.

Goshawk – aspen, conifer, and mixed conifer. The goshawk was designated a Forest Service Sensitive species in 1991 and is also discussed in the FSS section 3.2.3 above. The goshawk is a forest habitat generalist that uses a wide variety of forest ages, structural conditions, and successional stages. On the WCNF, vegetation types that are considered suitable habitat include lodgepole pine, fir, Douglas fir, spruce and aspen. The goshawk preys on large-to-medium-sized birds and mammals, which it captures on the ground, in trees, or in the air. Three components of a goshawk's home range have been identified: nest area (approximately 30 acres), post fledging-family area (approximately 420 acres), and foraging area (approximately 5,400 acres). The species nest in a wide variety of forest types including aspen, coniferous, and mixed conifer forests. It typically nests in mature and old growth forests.

Urbanization and more intensive uses of the forest by humans could degrade goshawk habitat, especially on private lands. Private lands in Utah continue to be developed, making the lands administered by Federal entities increasingly important for goshawks. This trend could also affect the connectivity of the habitat across the State.

Predation by great horned owls and martins and bacterial and fungal diseases have an impact on the species. Outbreaks of insect and tree disease can reduce nesting habitat. Habitat alteration, especially from logging, can remove nest trees and reduce stand density and canopy cover. This can result in long-term effects to the species. Nest failure due to disturbance from logging or other factors during the incubation period would be considered a short-term impact.

Snowshoe hare – pole/sapling aspen, conifer, and mixed conifer. In the Rockies and westward, hares mainly use coniferous forests. 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.

Predation is responsible for at least 90 percent of the mortalities in snowshoe hare populations. The populations of snowshoe hare vary in how they fluctuate, if they fluctuate, how often they fluctuate, and the magnitude of the fluctuation. On the WCNF the snowshoe hare population appears to fluctuate depending on weather conditions which in turn affect the food supply. Forest maturation can also reduce habitat quality. Activities such as extensive conifer timber harvesting, prescribed fire, or wildland fire affecting large areas of conifer forest can individually or in combination influence snowshoe hare habitat/populations.

Effects of the Alternatives: Management Indicator Species

Effects of Alternative 1: No-Action

The trail would not be built and use of the current trail would continue to increase. Impacts to the MIS under this alternative would not be from the trail or use of the trail but from increased housing development and subsequent increases in human use of the area. This would cause these species to avoid the area in favor of less occupied areas. Implementing this alternative would result in no effect to MIS.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

The trail would have a 36-inch tread and 48-inch cut with a 10-foot clearing width for oak in non-Wilderness areas. In Wilderness areas the trail would have a 24-inch tread and 36-inch cut with an 8-foot clearing width for oak. This standard applies to all segments of the trail.

Bonneville cutthroat trout are known to exist in Mill Creek, Big Cottonwood Creek, North Willow (of Deaf Smith Canyon) and Little Cottonwood Creek and have been stocked into Upper Bells Canyon Reservoir. Goshawk may have foraging habitat in the Project Area. Snowshoe hare and beavers are not to be found in the Project Area because of lack of habitat. These species are from the WCNF MIS list.

On WCNF segments of the trail where the trail crosses a stream or riparian area, Forest Service standards for RHCAs would be implemented to ensure protection of the habitat and the associated species. The riparian management objectives would be full retention of riparian vegetation. Instream habitat would include fish-passable structures for all stream crossings with a minimal of bank or existing instream habitat. Hazard trees could be removed to eliminate the threat to life. The RHCA and riparian guidelines are included in Appendix A.

Segment 1: Parley's Canyon to Mount Olympus Trailhead

The effects on the habitat for MIS species due to this project are measured on a forest-wide basis, and the effects, while long-term in duration, would not impact the MIS species on a forest-wide basis. Effects, if measurable, would be in the form of monitoring and determination of use or nonuse of habitat by individual MIS; those parameters are difficult to quantify, except on a site-specific basis, in a project with a footprint as small as this. This is especially true because of the existing trail segments, both official and user-created, and the stream crossings that are already in place.

Removal of some trees and the understory shrub and brush habitat would remove hiding cover for small mammals and birds. However, there is sufficient remaining habitat to support the species that may be displaced from the trail and associated buffer. The open areas currently used by goshawk would not be reduced. The WCNF management objectives for this species would be supported on Forest Service managed lands.

Stream crossings would adhere to Forest Service RHCA and riparian standards throughout the length of the trail. The Mill Creek, Big and Little Cottonwood Creeks and Bells Creek crossing below lower Bells Reservoir all have existing crossings and would not affect the Bonneville cutthroat trout or their habitat in the Project Area.

Segment 2: Mount Olympus Trailhead to Big Cottonwood Canyon

The effects on the habitat of MIS species in Segment 2 due to this project would be the same as for Segment 1. The trail standards would be the same for all segments.

Segment 3: Big Cottonwood Canyon to Little Cottonwood Canyon

The effects on the habitat of MIS species in Segment 3 due to this project would be the same as for Segment 1. The trail standards would be the same for all segments.

Segment 4: Little Cottonwood Canyon to Hidden Valley Park

The effects on the habitat of MIS species in Segment 4 due to this project would be the same as for Segment 1. The trail standards would be the same for all segments.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

Changing the alignment for this segment of the trail would increase the amount of brush and shrub habitat that is impacted by the trail. The increase in the mileage of trail on Forest lands would mean there would be more of the trail subject to Forest Service Wilderness restrictions and the trail width would be reduced to a 24-inch tread with a 36-inch cut and an 8-foot clearing for oak. The increase would not be substantial because of the existing similar habitat above and below the trail.

Foraging habitat for the goshawk would increase slightly as more habitat is opened up on the forest. This is not a significant factor because of the better-quality existing habitat in other locations away from the Project Area. There would be no changes to the effects to stream crossings as RHCA and riparian habitat guidelines would already be in place for these areas.

The amount of impact on the habitat for MIS species due to this project would be minor when compared to existing habitat on a forest-wide basis.

3.2.5 Migratory Birds

The Migratory Bird Treaty Act of 1918 (MBTA) as amended was established to protect migratory birds. This act makes it illegal to pursue, hunt, take, capture, kill, or possess migratory birds or any part, nest, or egg of any such bird (16 U.S.C. 703-7012). In January 2001, Executive Order 13186 was issued on the Responsibilities of Federal Agencies to Protect Migratory Birds. It specifies the need to avoid or minimize any adverse impacts on migratory birds. The order addressed the need to restore and enhance the habitat of migratory birds.

Affected Environment: Migratory Birds

Species of Federal and local interest have been identified for the Project Area along with their respective locations, primary and secondary breeding habitat, and winter habitat (table 14). The species in the list are generally found in habitat that may be associated with the Project Area. Species known for use of wetlands and open water have been eliminated from the list. Some of

the species such as peregrine falcon, flammulated owl, and the Northern three-toed woodpecker are discussed in more detail in the MIS and FSS sections of this report. The remaining species habitat types are summarized in the table.

The species were obtained from the WCNF list compiled for the Forest Plan. The list is composed of species from the Partners in Flight and Birds of Conservation Concern lists developed respectively by the Utah Important Bird Area Technical Team of the Audubon Society (Audubon Society 2007) and the U.S. Fish and Wildlife Service.

Table 14. Migratory Birds Found in the Salt Lake Basin and Wasatch Mountains.

FWS and PIF Species	Utah Mountains	Basin and Range	Primary/ Secondary Breeding	Winter Habitat
Bendire's Thrasher		x	Low desert/low desert shrub	Migrant
Black Rosy-Finch	x		Alpine/Alpine	Grassland
Black Swift	x		Lowland riparian/Cliff	Migrant
Black-chinned Sparrow		x	Low/high desert shrub	Migrant
Black-throated Gray Warbler	x	x	Pinyon-Juniper/Mountain Shrub	Migrant
Bobolink		x	Wet meadow/agriculture	Migrant
Brewer's Sparrow	x	x	Shrubsteppe/High desert shrub	Migrant
Broad-tailed Hummingbird	x	x	Lowland riparian/Mountain riparian	Migrant
Ferruginous Hawk		x	Pinyon-juniper/Shrubsteppe	Grassland
Flammulated Owl	x	x	Ponderosa pine/sub-alpine conifer	Migrant
Gamble's Quail			Low desert shrub/lowland riparian	Low desert shrub
Golden Eagle	x	x	Cliff/high desert shrub	High desert shrub
Grace's Warbler	x	x	Ponderosa pine/mixed conifer	Migrant
Gray Vireo	x	x	Pinyon-juniper/Northern oak	Migrant
Greater Sage Grouse	x	x	Shrubsteppe/shrubsteppe	Shrubsteppe
Lewis' Woodpecker	x	x	Ponderosa pine/lowland riparian	Northern oak
Loggerhead Shrike	x	x	High desert shrub/Pinyon-juniper	High desert shrub
Long-billed Curlew		x	Grassland/agriculture	Migrant
Northern Harrier	x	x	Wet meadow/high desert shrub	Agriculture
Peregrine Falcon	x	x	Cliff/lowland riparian	Wetland
Pinyon Jay	x	x	Pinyon-juniper/ponderosa pine	Pinyon-juniper
Prairie Falcon	x	x	Cliff/high desert shrub	Agriculture
Pygmy Nuthatch	x		Ponderosa pine/aspen	Ponderosa pine
Red-naped Sapsucker	x	x	Aspen/mixed conifer	Mountain riparian
Sage Sparrow	x	x	Shrubsteppe/high desert shrub	Low desert shrub
Sharp-tailed Grouse	x	x	Shrubsteppe/grassland	Grassland
Swainson's Hawk	x	x	Agriculture/aspen	Migrant
Three-toed Woodpecker	x		Sub-alpine conifer/lodgepole pine	Sub-alpine conifer
Virginia's Warbler	x	x	Northern oak/pinyon-juniper	Migrant
Wouldiamson Sapsucker	x	x	Sub-alpine conifer/aspen	Migrant
Yellow-billed Cuckoo	x	x	Lowland riparian/agriculture	Migrant

Effects of the Alternatives: Migratory Birds

Effects of Alternative 1: No-Action

The trail would not be built and use of the current trail would continue to increase. Impacts to the migratory bird species under this alternative would not be from the trail or use of the trail, but from increased housing development and subsequent increases in human use of the area. This would cause these species to avoid the area in favor of less occupied areas. No new effects would occur from implementing this Alternative.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

Implementing Alternative 2 would have no effects to minor adverse long-term effects on migratory birds. Based on existing conditions of the Project Area and proposed trail alignment, some species would be displaced to more suitable habitat as the trail is formalized and the access points are added. In general, however, migratory birds found in the area would still have sufficient habitat to maintain all life stages of their life cycle.

The trail standards would be the same for all segments. The trail would have a 36-inch tread and 48-inch cut with a 10-foot clearing width for oak in non-Wilderness areas. In Wilderness areas the trail would have a 24-inch tread and 36-inch cut with an 8-foot clearing width for oak.

Segment 1: Parley's Canyon to Mount Olympus Trailhead

The amount of habitat removed or modified in this segment would be minimal and not have a measurable effect on the migratory bird species that may use the area.

Segment 2: Mount Olympus Trailhead to Big Cottonwood Canyon

The effects on migratory bird species in Segment 2 due to this project would be the same as for Segment 1.

Segment 3: Big Cottonwood Canyon to Little Cottonwood Canyon

The effects on migratory bird species in Segment 3 due to this project would be the same as for Segment 1.

Segment 4: Little Cottonwood Canyon to Hidden Valley Park

The effects on migratory bird species in Segment 4 due to this project would be the same as for Segment 1.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

The effects of Alternative 3 would be the same as for Alternative 2. There would be a smaller footprint on the trail in Wilderness areas, and thus less of an impact on the surrounding habitat because of the increased length of trail that traverses Wilderness areas.

3.2.6 Domestic Dogs

Affected Environment: Domestic Dogs

The potential presence of additional domestic dogs in the foothills due to trail development may have impacts on wildlife. Existing regulations for Wilderness areas on the WCNF and city and county ordinances are specific in which areas dogs must be on leashes. The number of additional

domestic dogs that may be in the area cannot be quantified. However, potential impacts include interaction with wildlife species and their habitats, "scaring" and "chasing" species that have become habituated to human presence from habitat along and adjacent to the trail, and not being restrained on a leash and being able to roam into the brush to harass species in the area.

Effects of the Alternatives: Domestic Dogs

Effects of Alternative 1: No-Action

The trail would not be built and use of the current trail would continue to increase. Impacts to the mule deer, elk, TES, FSS, MIS and migratory bird species under this alternative would not be from the trail, but would come from increased concentration of use of the trail. The increased concentration of use would emanate from increased housing development. The subsequent increases in human use of the area would result in additional user-created trails in areas that would cause these species to avoid the area in favor of less occupied areas.

The No-Action Alternative would still require management agencies and governments to provide enforcement of the existing trail and area use regulations. No new regulations would be proposed or implemented. Domestic dogs would still roam as they please and the owners will either comply with the leash regulations or they won't.

Direct Effects. Direct adverse long-term effects of the No-Action Alternative would be for domestic dogs to continue to harass wildlife in and along the existing trail route including any new user-created trails.

Indirect Effects. Use of existing habitat by other species would continue to decline as domestic dogs are encountered in the Project Area.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

Under Alternative 2, there would be an increase in the number of miles on the WCNF that would come under Wilderness restrictions such as trail width, type of travel on the trail and the need to maintain domestic dogs on a leash.

The main problem that needs addressing is enforcement of the existing ordinances along with the Forest Service Wilderness restrictions on Forest Service managed portions of the trail. Without some enforcement presence on the trail, it would be difficult to ensure there would be no adverse impacts to the wildlife in the Project Area. Until this problem is addressed adequately, for the No-Action Alternative and Alternatives 2 and 3, minor adverse impacts to big game, migratory birds, and any other species currently occupying habitat in the Project Area would continue to occur due to unleashed domestic dogs.

Segment 1: Parley's Canyon to Mount Olympus Trailhead

Impacts are currently taking place and would continue as the trail is developed. The effects of implementation of Alternative 2 would be minor adverse and related to the problem of controlling domestic dogs in habitat used by the wildlife species described in this report.

Segment 2: Mount Olympus Trailhead to Big Cottonwood Canyon

The effects of domestic dogs on Segment 2 would be the same as for Segment 1.

Segment 3: Big Cottonwood Canyon to Little Cottonwood Canyon

The effects of domestic dogs on Segment 3 would be the same as for Segment 1.

Segment 4: Little Cottonwood Canyon to Hidden Valley Park

The effects of domestic dogs on Segment 4 would be the same as for Segment 1.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

Segment 2: Mount Olympus Trailhead to Big Cottonwood Canyon

Effects for Alternative 3 are the same as described in Alternative 2. The only difference is there would be more of the trail subject to Wilderness regulations which would provide a smaller trail width and regulate the type of use the trail can receive.

3.2.7 Riparian Areas

Riparian areas are located adjacent to streams and around natural springs, seeps, fens, and reservoirs. Due to the presence of water, riparian areas frequently receive a disproportionate amount of use from wildlife and humans. These areas are highly productive and biologically diverse, and provide habitat for a wide variety of terrestrial and aquatic wildlife.

Riparian areas are also discussed in the Section 3.2: Wildlife and Fish Resources. Discussion about riparian areas under those sections focuses on riparian vegetation and riparian areas as wildlife habitat. This discussion will focus on the physical characteristics of riparian areas, with emphasis on streambank stability.

Laws, Regulations, and Guidelines

The WCNF Forest Plan Guidelines that are applicable to riparian areas include the following:

Guidelines

(G6) In Riparian Habitat Conservation Areas (RHCAs) [defined in appendix A] when projects are implemented, [the riparian areas] retain natural and beneficial volumes of large woody debris.

RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading the stream, and (4) protecting water quality. This designation still allows for a full range of activities, but it emphasis the achievement of riparian management objectives that are identified on a site-by-site basis. These objectives should include riparian vegetation and instream habitat condition. The RHCAs, by condition, are defined in Appendix A. The Riparian management objective for these crossings is full retention. This does allow for the removal of hazard trees that may cause a safety concern.

3.2.8 Cumulative Effects

Big Game Populations and Winter Range

Deer and elk habitat does not stop at the Forest Service boundary; it formally extends into the foothills that are now being removed from accessible habitat by human developments. For mule deer and elk winter range, the increased housing developments in lower elevation habitat would

continue; the development will continue to force the deer and elk to use higher elevation lands. The winter range protection afforded by Forest Service land would remain unchanged. The long-term effect is expected to be minor and is the confinement of deer and elk to suitable habitat on the National Forest and control of the deer populations through Utah Department of Wildlife management efforts.

Threatened and Endangered Species, Forest Service Status Species, and Management Indicator Species

The increased housing developments in lower elevations would continue. These actions would bring changes to the area surrounding the trail as humans and domestic animals venture into existing occupied habitat normally used by the species listed in this section. The protection afforded to these species and their habitat on Forest Service land would remain unchanged. The long-term effect is expected to be movement of these species to suitable habitat on the National Forest or other available land away from the Project Area. Control of the human encroachment and additional impacts to the species and their habitat would have to come through local, county and Federal management regulations and efforts.

Management Indicator Species

The increased housing developments in lower elevations would continue. These actions would bring changes to the area surrounding the trail as humans and domestic animals venture into existing occupied habitat normally used by the species listed in this section. The protection afforded to these species and their habitat on Forest Service land would remain unchanged. The long-term effect is expected to be movement of these species to suitable habitat on the National Forest or other available land away from the Project Area. Control of the human encroachment and additional impacts to the species and their habitat would have to come through local, county, and Federal management regulations and efforts.

Migratory Birds

Cumulative effects will be the same as described for threatened and endangered species, Forest sensitive species and management indicator species, above.

Domestic Dogs

Cumulative effects will be the same as described for threatened and endangered species, Forest sensitive species and management indicator species, above.

Past, Present, or Reasonably Foreseeable Future Actions

There are no other actions related to this resource issue that may affect this project or the Project Area.

Cumulative Effects of the Alternatives

Cumulative effects of each of the alternatives are listed below in Table 15.

Table 15. Cumulative Effects of the Alternatives.

Issue	Alternative 1	Alternative 2	Alternative 3
Big Game and Big Game Winter Range	No effect to minor adverse effect. No loss of additional habitat; human use would continue to increase.	Minor adverse long-term effects. Habitat would be fragmented and 48 acres/mile of current habitat would not be used as it is now.	Minor adverse long-term effects. Very little difference from Alternative 3. This alternative leaves lower elevation winter range available, but reduces access for wildlife by increasing fragmentation.
TES, Forest Service Sensitive Species, and MIS	No direct effects. Indirect effects include potential change in available habitat or use by species through increased user-created trails.	Minor long-term adverse effects. Minimal changes in habitat type. Some habitat fragmentation would displace some individuals.	Minor long-term adverse effects. Effects would be less than Alternative 2. Smaller trail footprint on NF land and additional restrictive use in Wilderness segments.
Migratory Birds	No effects. No change in available habitat or use by species.	Minor long-term adverse effects. Minimal changes in habitat type. Some habitat fragmentation would displace some individuals.	Minor long-term adverse effects. These effects would be less than Alternative 2. Smaller trail footprint on NF land and additional restrictive use in Wilderness segments.

3.3 Recreation and Visitor Use

3.3.1 Introduction

Managing the WCNF for a variety of visitor use/recreation opportunities and settings is a priority in all management decisions. Visitor use in the Project Area is extremely high all year long. Common activities include hiking, biking, jogging, running, cross-country skiing and people recreating with their dogs. Horseback use does occur primarily in the Draper area and use is relatively low compared to other uses. Horses would not be permitted on any new section. Similarly, mountain bike use would only be permitted in sections that have viable trailhead or access points and the segments are entirely outside of Designated Wilderness. Such sections include Parley's to Mill Creek, Ferguson to Little Cottonwood Canyon TH, and possibly Bells to South Fork trailhead if feasible and consistent with Sandy City trails plan (see figure 11 for restrictions).

Demand for quality recreation opportunities is expected to grow as adjacent urban populations increase. Meeting this increased demand and managing conflicts between various user groups is important for balanced user growth for today and the future.

Issues to be analyzed in this report have been identified from public meetings, the public scoping process, from other agencies, and the Forest Service interdisciplinary team.

This section will provide a description of the affected recreation and visitor use issues in the Project Area, including:

- Recreation/Trail Experience
- Compatibility with BST concept
- User conflicts and types of use
- Trail proliferation
- Trail administration and maintenance

A discussion of recreation/trail experience will include a description of the existing conditions, a summary of applicable laws, regulations, and guidelines, and an analysis of the effects of each alternative. Cumulative impacts of the alternatives are summarized in Section 3.3.4: Cumulative Effects.

In general, recreation opportunities are protected by specific standards and guidelines as outlined in the WCNF 2003 Forest Plan. Forest Plan standards and guidelines applicable to each resource issue are listed under that issue.

The report also provides analysis of effects for a range of alternatives on recreation and traffic/parking issues as required by NEPA, NFMA, other applicable laws and regulations, Forest Service directives, and the Forest Plan.

Methodology

Best available information from a variety of sources was compiled for this report. Primary sources of information include:

- USDA Forest Service. 2003. Final Environmental Impact Statement Wasatch-Cache National Forest. Wasatch-Cache National Forest. Salt Lake City, Utah.

Geographic Information System (GIS) data was provided by WCNF and Utah Automated Geographic Reference Center (AGRC). Other information sources used to describe the proposed actions, impacts, and status are referenced in the respective discussions and listed in Chapter 5: References Cited.

Laws, Regulations, and Guidelines

The WCNF Forest Plan Standards and Guidelines that are applicable to recreation include the following:

Guidelines for Recreation Management

(G49) Manage recreation opportunities consistent with Management Prescriptions Categories (MPCs*),* Recreation Opportunity Spectrum (ROS) Classes, Landscape Character Themes (LCTs), Scenic Integrity Objectives (SIOs), and in accordance with Winter Recreation Maps as well as District Travel Management Plans.

(G50) Design, construct, and operate recreation facilities, trails and concentrated use areas to provide a beneficial recreation experience, reducing social conflicts and minimizing or avoiding adverse effects on watershed integrity, soil productivity, aquatic/riparian systems, terrestrial species and their habitats, and cultural resources.

(G51) In Semi-Primitive Non-Motorized areas, use of motorized equipment maybe approved for administrative purposes.

(G52) Explore opportunities for separation of conflicting uses in time (for example alternating days) as well as space (closure of area to specific uses) to resolve conflicts while continuing to offer varied recreation opportunities.

(G54) Use interpretation and environmental education to assist in improved understanding and ownership of forest stewardship needs.

Relevant Acts

Multiple-Use Sustained-Yield Act (1960): adds outdoor recreation as a use for which national forests were established.

Wilderness Act of 1964 and the Utah Wilderness Act of 1984: provides for establishing Wilderness for environmental preservation as well as recreation.

Land and Water Conservation Act (1964): provides continuing access to national forests and funding for recreation and defines admission and recreation fee collection guidelines.

National Trails System Act (1968): establishes that trails be provided to meet increasing recreation needs.

Executive Order 11644 (1972) and 11989 (1977) Off-Road Vehicles on Public Lands: provides for closing areas to off-road vehicles where resources would, or are, being negatively impacted. This is also covered under 36 CFR 295.

Forest and Rangeland Renewable Resources Planning Act (1974): includes recreation among resources for which forest planning is required.

Other Applicable Laws\Guidelines

Recreation Opportunity Spectrum (ROS): mapping and classification system used to distinguish between different types of recreation settings in the Forest.

3.3.2 Affected Environment: Recreation and Visitor Use

The project area is located adjacent to Salt Lake County and provides various recreation opportunities. Substantial use already occurs on the existing trails that occupy the bench in certain municipalities and on adjacent USFS land. These small and unconnected trails currently provide some visitor utility to hikers, mountain bikers, dog walkers, horseback riders, and others. Visitor use studies of urban proximate trails indicate that a large portion of users live in nearby neighborhoods. For instance, a survey on the BST section between Emigration Canyon and the University Complex found that 90 percent of users accessed local trails from a nearby location.

Completion of the preferred alignment may affect some locally important existing trails by increased use, recreation opportunities, etc. Some of the potentially affected trails are:

- Mormon Pioneer National Historic Trail: Emigration and Parley's Canyons
- Pony Express National Historic Trail: Parley's Canyon
- California National Historic Trail: Parley's Canyon
- Parley's Creek Corridor Trail: Parley's Canyon
- Grandeur Peak Trail: Parley's to Mill Creek Segment
- Pipeline Trail: Mill Creek Canyon
- Rattlesnake Gulch Trail: Mill Creek Canyon
- Neff Canyon Trail: Neff Canyon
- "Z" Trail: Mount Olympus Cove
- Mount Olympus Trail: Wasatch Boulevard
- Heughs Canyon Trail: Canyon Cove neighborhood
- Ferguson Canyon Trail: Ferguson Canyon
- Rocky Mouth Canyon Trail: Rocky Mouth Canyon
- Bell Canyon Trail: Bell Canyon

For the purpose of analysis, it is important to understand the potential levels and types of visitor use that may occur along the proposed alignments. From these data inferences about levels of use, kinds of use, and desired experiences sought can tentatively be made.

During September of 2005, a study of BST users conducted for the Utah Museum of Natural History EIS (NPS 2007b). Estimated use for the University of Utah section of the BST was approximately 6,000 users for September, 2005 alone. Ninety percent of trail users of that section came from the University, Research Park, the University dorms complex and other local neighborhoods. It should be acknowledged that the University complex serves as a magnet for potential trail users and since few such magnets exist along the proposed alignments (Mill Creek, Big Cottonwood, and Little Cottonwood canyons and proposed Sandy City connections might be exceptions), this figure may over-estimate use densities.

Although the proposed new sections of trail would serve their local communities, there is also potential that these new trailheads could serve a larger population once a significant potion of the trail network is completed, similar to the Jordan River Parkway. Also, the Mt. Olympus trailhead attracts a substantial number of users on a year-round basis. Other trailheads such as Big Cottonwood Canyon and Little Cottonwood Canyon trailheads would also likely serve as hubs for local and non-local community users.

The majority of BST users along the University complex were hikers, runners, or mountain bikers. It should be noted that the existing condition and proposed action in the project area do not and will not likely provide opportunities for mountain bikers, which is different from the SL City/U of U section.

Where permitted, dog use is likely to be popular. Approximately 1500 dogs were observed on the University section of the BST during September 2005. Nearly all were off leash. It was observed that along the University section of the trail, only about 4 percent of the users were children. In addition, family recreation was the least important among motives for using the trail. However, the university complex is designed to accommodate adult, working professionals. Many of the BST users of this section of the trail came during work, study, or lunch breaks, or used the trail before or after work. Conversely, the proposed alignments would pass close to residential neighborhoods where families predominate.

The proposed trail routes pass through a variety of jurisdictions (city, county, and Federal), each of which has certain constraints on user types. In particular, there are three designated Wilderness areas and three protected watersheds in the project area. Affected Wilderness areas are Mount Olympus, Twin Peaks, and Lone Peak.
Activities using any type of mechanized transport, such as mountain bikes, are prohibited in Wilderness areas. Affected protected watersheds include Big Cottonwood, Little Cottonwood, and Bell's Canyon. Under the **Salt Lake City - County Health Regulation #14 (watersheds),** dogs and horses are not allowed where the trail crosses the 'culinary' watershed boundaries that supply drinking water to the urban areas (see figure 11).

Restricted Recreation Uses:

- Mountain bikes: The Wilderness Act of 1964 prohibits any mechanical transport in Designated Wilderness Areas.
- Dogs and horses: not allowed where the trail crosses the 'culinary' watershed boundaries.

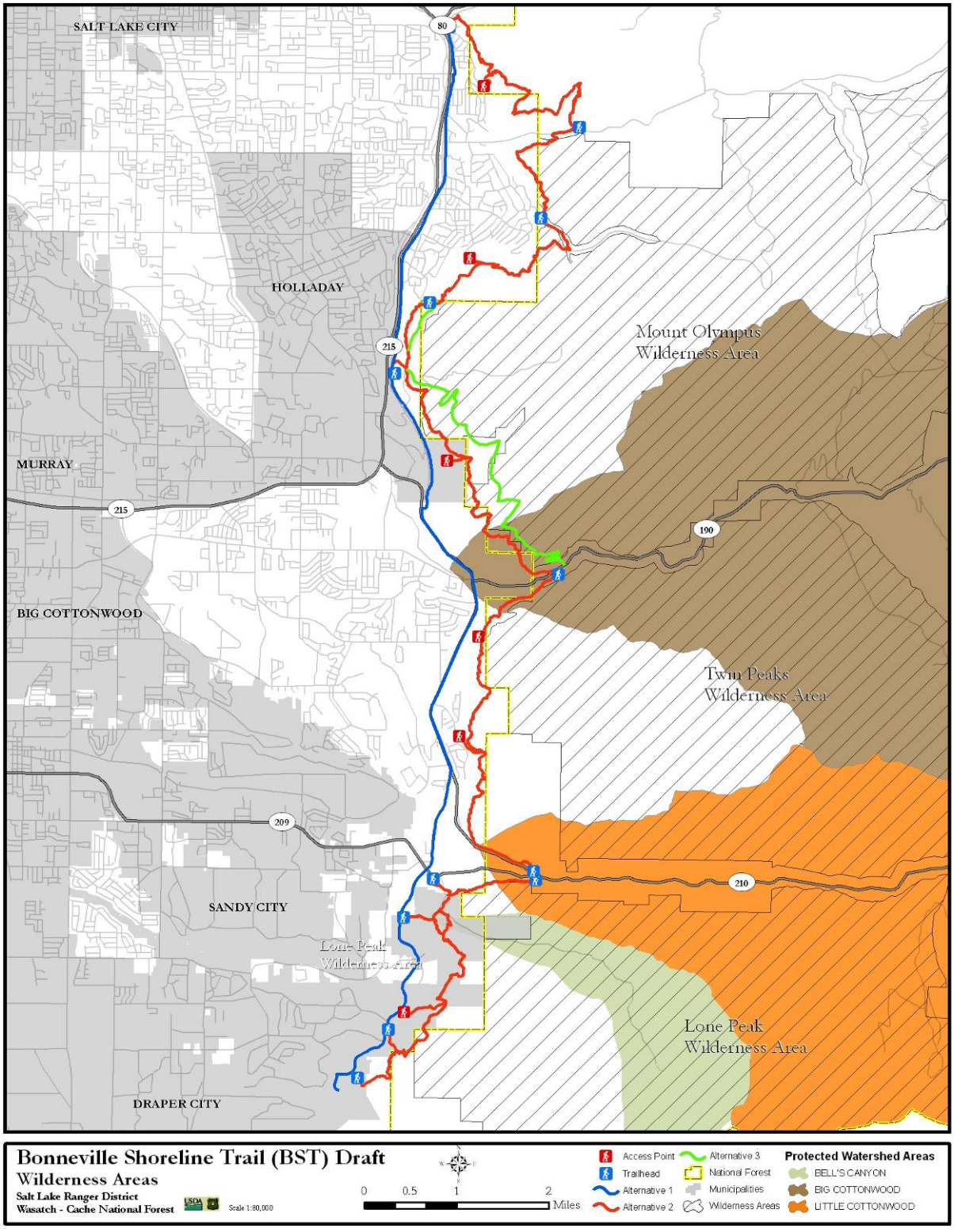

Figure 11. Map of Protected Watersheds and Designated Wilderness Areas in the Project Area.

The USFS uses the ROS as a management tool to describe and allocate outdoor recreation settings. In addition, the ROS system provides a way to help managers and recreation users understand what recreation experiences to expect through narrative descriptions and where these are available throughout the forest. Table 16 summarizes the ROS classes related to the project area.

Table 16. Recreation Opportunity Spectrum Classification System.

ROS Class	Description of Setting
Roaded Natural	Opportunity to be with other users in developed sites; little challenge or risk; predominantly natural appearing environment as viewed from sensitive roads and trails with moderate evidence of human sights and sounds; moderate concentration of users at campsites; some obvious user control; access and travel is standard motorized vehicles; resource modification and utilization practices are evident but are in harmony with the natural environment.
Semi-Primitive Non-Motorized	High probability of solitude, closeness to nature, challenge and risk; natural appearing environment; some evidence of others; minimum of subtle, on-site controls; access by non-motorized trails or non-motorized primitive roads or cross-country; has an area of primitive roads or trails that are not open to motorized use: vegetation alterations to enhance forest health are few and widely dispersed.
Wilderness\ Semi-Primitive Non-Motorized	Similar to Semi-Primitive Non-Motorized but occurs on designated Wilderness lands. Wilderness laws and guidelines are maintained.

3.3.3 Effects of the Alternatives: Recreation and Visitor Use

Effects of Alternative 1: No-Action

The No-Action Alternative (Wasatch Blvd.) would not result in direct effects to recreation and visitor use, as no new trail would be built on NFS lands. Conversely, a number of secondary indirect effects can be expected to occur as the population grows. Visitor use is expected to increase on built trails, existing user-created trails, as well as proliferation of user-created trails. Additionally, user conflicts and types of recreation uses are expected to increase. Since Wasatch Blvd. is a fairly busy and high-speed thoroughfare, it is unsuitable for attracting users other than road bikers, neighborhood walkers, and joggers. Users attracted to the kinds of recreation experiences offered by more traditional wildland trails are not observed using Wasatch Blvd. as a recreation resource today.

This alternative is not compatible with the BST Concept for a number of reasons, primarily because of location and the types of recreation opportunities available. The increased demand for recreation under this alternative, compared to Alternatives 2 and 3, would not be met. Additionally, Alternative 1 would likely produce more dispersed and unmanaged recreation activities and, therefore, increased user conflicts and conflicts with adjacent property owners would likely occur.

Effects of Alternative 2: Proposed Action (Salt Lake County Proposed Alignment)

Compliance with Forest Plan Standards and Guidelines would result in long-term beneficial effects to the forest, local communities, and the region. Alternative 2 is also compatible with the BST concept and overall objectives of the trail, and would result in the following benefits:

- Provide ready access to the Wasatch foothills public lands.
- Provide a place for people to pursue their recreational pursuits that are safe and aesthetically pleasing, trying where possible to accommodate a broad range of non-motorized uses.
- Provide a place for people to have an opportunity for quiet and scenic recreational use nearby, yet apart from the urban Wasatch Front.

Direct effects of Alternative 2 would include approximately 8 miles of new trail to be built on national forest land. Restrictions of certain user types would occur along the trail. Designated Wilderness Areas prohibit motorized and mechanized vehicles such as mountain bikes. Dogs are not allowed where the trail crosses the 'culinary' watershed boundaries. In addition, there may be other displacements or user restrictions as the trail enters or exits different jurisdictions. Trail signs would be used for boundary control, public safety, resource protection, and direction at trail junctions. Additionally, trail signs would show point-to-point restrictions/closures of certain uses, e.g., mountain bikes not allowed in Wilderness (see figure 11).

It is likely that the majority of users would come from neighborhoods located in close proximity to the trail. A preponderance of local neighborhood use also brings with it high-frequency users. Should this general principle of recreation use apply to the proposed alignments, the majority of users would be high-frequency users. Such a trend is held for the University section of the BST. Here, over half (57 percent), of the trail visitors used the trail over 40 times a year. Another 15 percent used the trail between 21 and 40 times per year. Conversely, only 15 percent of visitors used the trail 5 or fewer times per year. There are no compelling reasons to suspect that trail use frequency would not follow this pattern for the proposed alignments.

Frequent users also tend to be users of short duration. Likewise, this pattern was evident in the University section of the BST. Nearly three-quarters of visitors used the trail for 1 hour or less. Bikers were more likely to use the trail for longer durations than either runners or hikers/walkers. Although many midday users of the University section of the BST visited the trail for only brief periods necessitated by time constraints, before work, after work, and weekend users followed that same pattern. With the exception of through-users and endurance athletes using the trail for training purposes, short duration use is likely to be the most characteristic pattern of use along the proposed alignments.

Issues of concern on national forest land such as user conflicts, trail use, and trail proliferation would be addressed and managed according to Forest Plan Standards and Guidelines, forest-wide goals and objectives, desired future conditions, and other applicable laws and guidelines, i.e., Protected Watersheds and ROS. It should be noted that bikes would be prohibited in most sections and therefore result in less user conflict in those areas. These same issues would be addressed and managed by local government jurisdictions where the trail leaves national forest boundaries. Based on the multi-jurisdictional nature of the trail alignment, it would be essential for all involved authorities to plan and coordinate actions mutually.

Compared to other alternatives, Alternative 2 is the most compatible with the BST Concept, provides ways to manage user conflicts, offers a variety of managed and regulated recreation opportunities, and reduces user-created trails and trail proliferation.

Effects of Alternative 3: NFS right-of-way near Mile High Drive Trailhead in Segment 1; All NFS in Segment 2

Overall effects would be similar to Alternative 2. Direct effects of Alternative 3 would include approximately 10 miles of new trail to be built on NFS land, as compared with 8 miles of under Alternative 2. The proposed trail alignment is identical to Alternative 2 with the exception of a small area in Segment 1 and the entire length of Segment 2 which occurs all on national forest land. The south end of Segment 2 is rather steep (1,000 foot elevation change in less than one half mile).

Compared to the No-Action Alternative, Alternative 3 is more compatible with the BST Concept, provides ways to manage user conflicts, offers a variety of managed and regulated recreation opportunities, and reduces user-created trails and trail proliferation. Segment 2 under this alternative would provide more seclusion, however, would require additional elevation gain and steep sections that may not provide the same recreation benefits as the proposed action. Some hikers may not enjoy Segment 2, while may find it more enjoyable (more solitude, greater challenge/workout, further from urban area, views, etc.).

3.3.4 Cumulative Effects

As the WCNF continues to pursue the goal of managing for wide spectrum of recreation experiences, the cumulative effects of the BST are considered to benefit local communities and the region overall. The BST would be recognized and valued as a unique opportunity to provide a recreation corridor across multiple ownerships in the face of continuing urban development.

Past, Present, or Reasonably Foreseeable Future Actions

Past Actions

Past actions include various types of recreation activities (hiking, mountain biking, horseback riding, dog walking, and others) on short segments of designated and user-created trails.

Present Actions

Present actions in the project area include continuing recreational use on designated and user-created trails, current urban development in the foothills, a large construction project at the mouth of Big Cottonwood Canyon, a water tank project at the mouth of Little Cottonwood Canyon, and existing gravel mining near the mouth of Big Cottonwood Canyon.

Present actions as they are listed above all potentially impact recreation experience. Continued recreational use will likely lead to increased user-created trails and trail proliferation, increased user conflicts, illegal trespass onto private property, and illegal use on designated lands such as wilderness and protected watershed areas.

Reasonably Foreseeable Future Actions

Actions that may occur in the reasonably foreseeable future include increased demand for recreation opportunities, urban encroachment on NFS lands, and a potential Neff's Canyon detention basin.

The WCNF would continue to play an important role in meeting the demand for recreation opportunities. As recreation use continues to grow, conflict between users may escalate. Management of these user conflicts would be guided by Forest Plan Standards and Guidelines,

forest-wide goals and objectives, desired future conditions, and other applicable laws and guidelines, e.g., Protected Watersheds and ROS.

In addition, as recreation opportunities continue to grow, some visitors may be displaced to other locations and/or not be able to find the type of experience they are seeking. For example, Designated Wilderness Areas displace mountain bikers while Protected Watershed areas displace horseback riders and dog walkers. Other issues of concern such as trail proliferation, trail administration, and trail management are considered minor with the implementation of BMPs.

Cumulative Effects of the Alternatives

Cumulative effects of each of the alternatives are listed below in Table 17.

Table 17. Cumulative Effects of the Alternatives.

Resource Issue	Alternative 1	Alternative 2	Alternative 3
Recreation and Visitor Use	No new acres of disturbance. Potential short- and long-term adverse effects will likely occur as user-created trail proliferation and unmanaged recreation activities increase.	Impacts from implementing this trail would likely reduce adverse impacts already in place. Establishing a managed network of trails would likely result in long-term beneficial impacts for the local and regional recreation experience.	Long-term beneficial effects. More trail located on NFS and designated Wilderness would provide a more secluded experience for visitor use. Would require additional elevation gain and steep sections that may not provide the same recreation benefits as Alternative 2.