2009 Vegetation Impacts Assessment of Proposed Trail Additions in Mount Spokane State Park

Pacific Biodiversity Institute

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Executive Summary

Pacific Biodiversity Institute biologists and ecologists performed field surveys of eight proposed trail segments in Mt. Spokane State Park and prepared a technical report discussing the results of the survey work. We also prepared a section of an Environmental Impact Statement (EIS) discussing the affected environment, potential environmental impacts from the proposed trails on vegetation resources and possible mitigation measures. This EIS section is included in this report as Appendix A.

Seventeen plant associations referenced in scientific and/or technical literature occur within the routes of the proposed trail developments. Twelve of these plant associations possess state and global sensitivity ranks of either imperiled or rare.

No listed plant species were found along the proposed trail routes. Botanical surveys identified approximately 160 vascular plant taxa along the proposed trail routes. Three noxious species tracked by the WA State Noxious Weed Control Board were found along portions of the proposed trails. These included orange hawkweed (Class B), Dalmatian toadflax (Class B), and common St. Johnswort (Class C). Trail development activities have the potential to increase the spread and further establishment of these and other exotic plants along certain proposed trail segments.

General descriptions and maps of the proposed trail locations and impacted plant communities are given. Information about probable vegetation impacts based on the likely development scenarios are included.

Introduction

Pacific Biodiversity Institute (PBI) was contracted by Washington State Parks and Recreation Commission (WSPRC) to assess the impacts of proposed new or reconstructed trail segments on vegetation and wildlife resources within Mt. Spokane State Park (MSSP), and to map the locations of the proposed trails. The wildlife impact assessment is reported in a separate document (Romain-Bondi 2009).

The vegetation assessment was based on a vascular plant field inventory that surveyed vegetation communities, rare plants, and noxious weeds potentially impacted by the proposed trails. This technical report describes the findings of our field inventory and some limited GIS analysis of proposed trail characteristics. The environmental impacts to vegetation resources are described in the EIS section attached to this report as Appendix A. Figure 1 provides an overview of the location and names of the proposed trails assessed under contract AE 709-191. Note that one of the proposed trails originally planned for PBI to inventory was dropped from the trail development plan and is not mapped or discussed in this report.

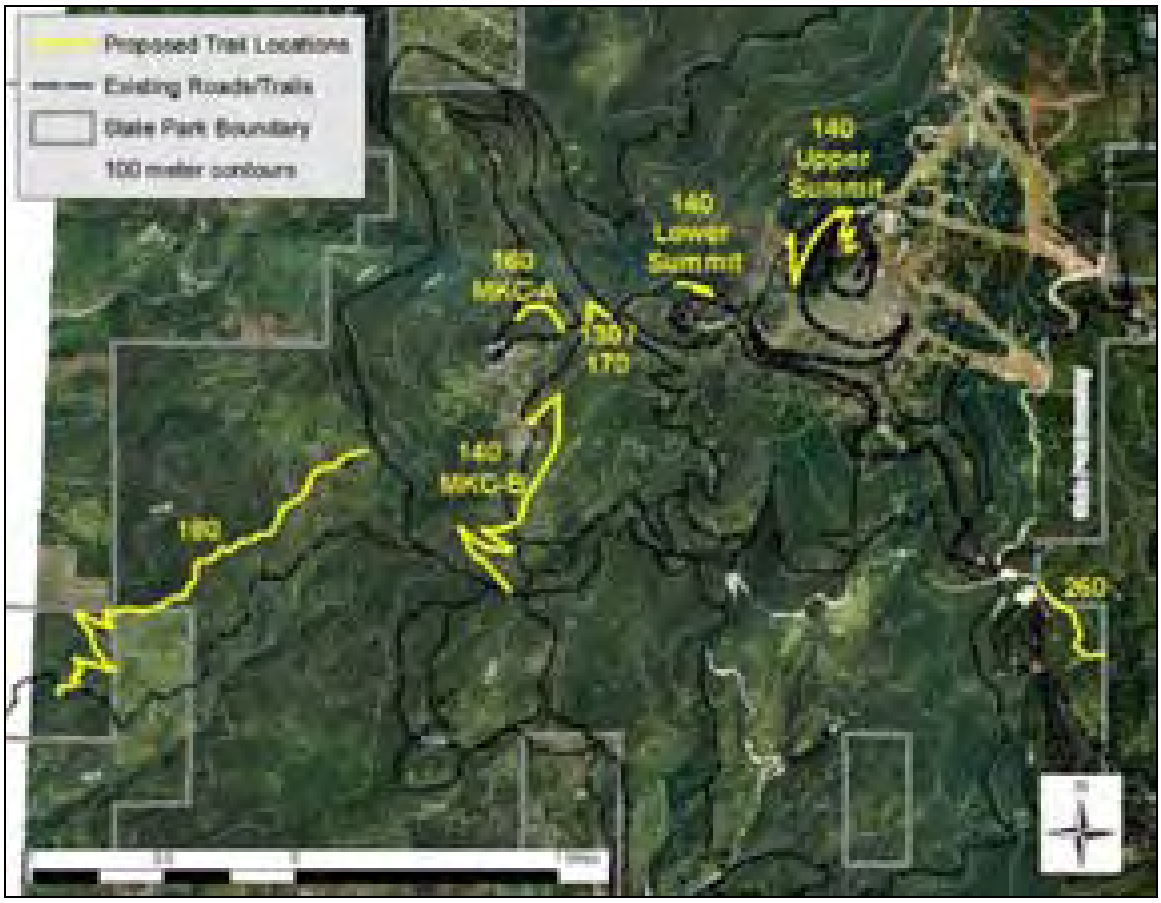

Figure 1. Location of the proposed trails in Mt. Spokane State Park.

Provision of safe, accessible, and environmentally benign recreational trails are a key managerial focus in MSSP. The current trail system in the park provides opportunities for hiking, biking, equestrian use, snowshoeing, and snowmobiling. The proposed trail additions serve a number of perceived needs that can be broken into three general categories: 1) expansion of the trail system into currently inaccessible areas of the park, 2) rerouting of steep and/or eroding trails to make access easier for different mountain biking skill levels and reduce the erosion potential, and 3) reduced user conflicts between skiers and snowmobiles by providing snowmobiles a new access route. Trail 180 fits into the first category, trail 260 fits into the third category, and the rest of the trails fit into the second category. Table 1 provides the trail uses designated for each proposed trail according to Park Ranger S. Christiansen.

Table 1. Types of use permitted for the proposed recreational trails.

Trail #	Hike	Equestrian	Bike	BC Ski	Snowshoe	Snowmobile
130 / 170	X	X	X	X	X	
140 Summit Upper	X	X	X	X	X	
140 Summit Lower	X	X	X	X	X	
140 KC-B	X	X	X	X	X	
160 KC-A	X	X	X	X	X	
180	X	X	X	X	X	
260	X	X	X	X	X	X

All of the proposed trails pass through mostly forested vegetation communities. Some small patches of meadow, shrubland, and woodland occur within the proposed trail routes, but these patches are very few and represent only a small fraction of these land cover types within the park. The proposed trails occur within an elevation range from 3200 feet (bottom of trail 180) to 5810 feet (top of 140 Upper Summit trail). This elevation range in the southern Selkirk Mountains includes the Douglas-fir – ponderosa pine forest series, the grand fir forest series, the western hemlock forest series, and the subalpine fir forest series (Cooper et al. 1991). All of these forest series are represented along various segments of the proposed trails. The proposed trails pass through a rich assortment of forest patches in various stages of succession. Disturbance elements such as fire, logging, root-rot, wind throw, fire exclusion and park infrastructure development have affected many of the forest stands through which the proposed trails pass. The forest patches are a result of normal successional processes following natural disturbance events.

Methods

Pre-field literature and GIS-data reviews were conducted to determine the likelihood of rare and/or imperiled plants and plant associations occurring along the proposed trail routes. We reviewed existing literature and GIS datasets about the vegetation and trail impacts in the Mt. Spokane area and surrounding region (Smith and Morrison 2009, Snetsinger and White 2009, NatureServe 2009, Morrison et al. 2007, Williams et al. 1995, Crawford 1993, Cooper et al. 1991).

GIS data layers were provided by WSPRC depicting rough locations of the proposed trails. These layers were examined in ArcMap (ArcGIS 9.3.1) and were viewed along with several data layers depicting locations of roads, buildings and infrastructure, the Park boundary, 10-meter topographic lines, power lines, existing trails, and any known locations of state or federally endangered, threatened or sensitive vascular plant species and/or plant associations tracked by the Washington State Department of Natural Resources Natural Heritage Program (WNHP).

Field work was conducted from June 26-29, 2009 by G. Wooten (botanist), and H. Smith (botanist). A secondary field survey was completed by H. Smith from July 28-31, 2009.

During the June 26-29 field sessions, Park Ranger S. Christiansen met with the field team to discuss the proposed trails and to lead the survey crew in finding the location of the proposed trails on the ground. Proposed trails had been previously marked with survey flagging by MSSP personnel. In some cases we flagged the proposed trail routes as we walked. Orange flagging was used to mark proposed trail locations. Double flagging was used by MSSP personnel to designate a switchback along the trail. Some areas encountered had insufficient flagging (especially the upper part of the proposed 180 trail) to mark where the trail was likely to occur if developed.

All plant species were identified along each proposed trail sufficient to determine their conservation status. Species that could not be identified in the field were collected for further identification. Rare plant data forms were available in the event of locating a listed species.

We used Garmin GPS units and ArcPad 8.0 GPS enabled mobile computers to map the locations of the proposed trails across the landscape, and to take notes and record spatially explicit field observations regarding vegetation and plant community conditions. We mapped the trails into sections based on the changes in plant community and/or vegetation conditions experienced along the proposed routes. For a given section, we recorded the plant association encountered; the relative effect the trail development would have on snags, course woody debris, forest sub-canopy vegetation cover, forest sub-canopy tree regeneration, and live trees that are part of the main forest canopy; and other general notes. We used a relative scale to record the level of potential impact the proposed trail would have on a particular plant community condition: 1) represents little or no impact, 2) represents moderate impact with a noticeable departure from surrounding and/or existing conditions, and 3) represents a high impact that would effect the overall character of the vegetation community patch through which the proposed trail would pass. While we provide an estimate of the level of potential impact ascribed to any particular section of trail, it is important to note that the higher levels of impact could, in many cases, be largely avoided by careful trail construction. All of this data was embedded into the attribute tables of the GIS deliverables provided in association with this report.

To analyze trail impacts, we acquired information regarding the proposed uses for each trail. Impacts from trails were assessed based on the proposed types of use and potential types of development techniques that would be required to create safe and accessible trails for those uses. The trail use designations were defined to us by Park Ranger S. Christensen.

Following the field surveys we further analyzed the impacts of the proposed trails and their corresponding uses on vegetation and vegetation communities. Much of this analysis was conducted through literature review and review of field derived data stored in an ArcMap project with ancillary information. The analysis was used to write an EIS document for the MSSP Master Facilities Plan. The EIS discusses the impacts of the proposal on plants and plant habitats.

Results

Rare Plants

No rare or threatened vascular plant species were encountered during our field surveys or pre-field reviews. No state or federally listed vascular plant species are known to occur within Mt. Spokane State Park.

Plant List

Approximately 160 plant species were found along the proposed trail routes during our field surveys. Table 2 lists these species by their assigned national four-letter code (USDA 2009), their current scientific name, national common name, family, and their state noxious weed status.

Table 2. Vascular plant species encountered along the proposed trail routes in MSSP.

Symbol	Scientific Name with Author	National Common Name	Family	Noxious Status
ABGR	Abies grandis (Douglas ex D. Don) Lindl.	grand fir	Pinaceae	
ABLA	Abies lasiocarpa (Hook.) Nutt.	subalpine fir	Pinaceae	
ACGL	Acer glabrum Torr.	Rocky Mountain maple	Aceraceae	
ACMI2	Achillea millefolium L.	common yarrow	Asteraceae	
ACRU2	Actaea rubra (Aiton) Willd.	red baneberry	Ranunculaceae	
ADBI	Adenocaulon bicolor Hook.	American trailplant	Asteraceae	
ALVIS	Alnus viridis (Chaix) DC. ssp. sinuata (Regel) A. Löve & D. Löve	Sitka alder	Betulaceae	
AMAL2	Amelanchier alnifolia (Nutt.) Nutt. ex M. Roem.	Saskatoon serviceberry	Rosaceae	
ANMA	Anaphalis margaritacea (L.) Benth.	western pearly everlasting	Asteraceae	
ANPI	Anemone piperi Britton ex Rydb.	Piper's anemone	Ranunculaceae	
ANMI3	Antennaria microphylla Rydb.	littleleaf pussytoes	Asteraceae	
APAN2	Apocynum androsaemifolium L.	spreading dogbane	Apocynaceae	
ARCA7	Arenaria capillaris Poir.	slender mountain sandwort	Caryophyllaceae	
ARCO9	Arnica cordifolia Hook.	heartleaf arnica	Asteraceae	
ASCA2	Asarum caudatum Lindl.	British Columbia wildginger	Aristolochiaceae	
ATFI	Athyrium filix-femina (L.) Roth	common ladyfern	Dryopteridaceae	
BEOC2	Betula occidentalis Hook.	water birch	Betulaceae	
BRIN2	Bromus inermis Leyss.	smooth brome	Poaceae	
BRVU	Bromus vulgaris (Hook.) Shear	Columbia brome	Poaceae	
CACA4	Calamagrostis canadensis (Michx.) P. Beauv.	bluejoint	Poaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Noxious Status
CARU	Calamagrostis rubescens Buckley	pinegrass	Poaceae	
CARO2	Campanula rotundifolia L.	bluebell bellflower	Campanulaceae	
CABE2	Carex bebbii Olney ex Fernald	Bebb's sedge	Cyperaceae	
CACR4	Carex crawfordii Fernald	Crawford's sedge	Cyperaceae	
CADE9	Carex deweyana Schwein.	Dewey sedge	Cyperaceae	
CAGE2	Carex geyeri Boott	Geyer's sedge	Cyperaceae	
CAHO5	Carex hoodii Boott	Hood's sedge	Cyperaceae	
CARO5	Carex rossii Boott	Ross' sedge	Cyperaceae	
CEST8	Centaurea stoebe L.	spotted knapweed	Asteraceae	
CENU2	Cerastium nutans Raf.	nodding chickweed	Caryophyllaceae	
CHAN9	Chamerion angustifolium (L.) Holub	fireweed	Onagraceae	
CHUM	Chimaphila umbellata (L.) W. Bartram	pipsissewa	Pyrolaceae	
CIAL	Circaea alpina L.	small enchanter's nightshade	Onagraceae	
CIAR4	Cirsium arvense (L.) Scop.	Canada thistle	Asteraceae	
CLRH	Clarkia rhomboidea Douglas ex Hook.	diamond clarkia	Onagraceae	
CLSIS	Claytonia sibirica L. var. sibirica	Siberian springbeauty	Portulacaceae	
CLUN2	Clintonia uniflora (Menzies ex Schult. & Schult. f.) Kunth	bride's bonnet	Liliaceae	
COPA3	Collinsia parviflora Lindl.	maiden blue eyed Mary	Scrophulariaceae	
COMA25	Corallorhiza maculata (Raf.) Raf.	summer coralroot	Orchidaceae	
COME17	Corallorhiza mertensiana Bong.	Pacific coralroot	Orchidaceae	
COST19	Corallorhiza striata Lindl.	hooded coralroot	Orchidaceae	
COTR18	Corallorhiza trifida Chatelain	yellow coralroot	Orchidaceae	
CYMO2	Cypripedium montanum Douglas ex Lindl.	mountain lady's slipper	Orchidaceae	
CYFR2	Cystopteris fragilis (L.) Bernh.	brittle bladderfern	Dryopteridaceae	
DOPUC	Dodecatheon pulchellum (Raf.) Merr. ssp. cusickii (Greene) Calder & Roy L. Taylor	Cusick's shootingstar	Primulaceae	
ELGL	Elymus glaucus Buckley	blue wildrye	Poaceae	
ELRE4	Elymus repens (L.) Gould	quackgrass	Poaceae	
EPLA3	Epilobium lactiflorum Hausskn.	milkflower willowherb	Onagraceae	
ERUMM	Eriogonum umbellatum Torr. var. majus Hook.	sulphur-flower buckwheat	Polygonaceae	
ERGR9	Erythronium grandiflorum Pursh	yellow avalanche-lily	Liliaceae	
EUCO36	Eurybia conspicua (Lindl.) G.L. Nesom	western showy aster	Asteraceae	
FEID	Festuca idahoensis Elmer	Idaho fescue	Poaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Noxious Status
FEOC	Festuca occidentalis Hook.	western fescue	Poaceae	
FEVI	Festuca viridula Vasey	greenleaf fescue	Poaceae	
FRVE	Fragaria vesca L.	woodland strawberry	Rosaceae	
GATR3	Galium triflorum Michx.	fragrant bedstraw	Rubiaceae	
GEMA4	Geum macrophyllum Willd.	largeleaf avens	Rosaceae	
GNAPH	Gnaphalium L.	cudweed	Asteraceae	
GOOB2	Goodyera oblongifolia Raf.	western rattlesnake plantain	Orchidaceae	
GYDR	Gymnocarpium dryopteris (L.) Newman	western oakfern	Dryopteridaceae	
HESU	Hedysarum sulphurescens Rydb.	white sweetvetch	Fabaceae	
HEMA80	Heracleum maximum Bartram	common cowparsnip	Apiaceae	
HECY2	Heuchera cylindrica Douglas ex Hook.	roundleaf alumroot	Saxifragaceae	
HIAL2	Hieracium albiflorum Hook.	white hawkweed	Asteraceae	
HIAU	Hieracium aurantiacum L.	orange hawkweed	Asteraceae	B
HICA10	Hieracium caespitosum Dumort.	meadow hawkweed	Asteraceae	
HISC2	Hieracium scouleri Hook.	Scouler's woollyweed	Asteraceae	
HODI	Holodiscus discolor (Pursh) Maxim.	oceanspray	Rosaceae	
HYPE	Hypericum perforatum L.	common St. Johnswort	Clusiaceae	C
IOST	Ionactis stenomeres (A. Gray) Greene	Rocky Mountain aster	Asteraceae	
JUPA	Juncus parryi Engelm.	Parry's rush	Juncaceae	
LAOC	Larix occidentalis Nutt.	western larch	Pinaceae	
LIDA	Linaria dalmatica (L.) Mill.	Dalmatian toadflax	Scrophulariaceae	B
LICO5	Listera convallarioides (Sw.) Nutt. ex Elliot	broadlipped twayblade	Orchidaceae	
LODI	Lomatium dissectum (Nutt.) Mathias & Constance	fernleaf biscuitroot	Apiaceae	
LOCI3	Lonicera ciliosa (Pursh) Poir. ex DC.	orange honeysuckle	Caprifoliaceae	
LOIN5	Lonicera involucrata (Richardson) Banks ex Spreng.	twinberry honeysuckle	Caprifoliaceae	
LONIC	Lonicera L.	honeysuckle	Caprifoliaceae	
LOUT2	Lonicera utahensis S. Watson	Utah honeysuckle	Caprifoliaceae	
LUBIS	Lupinus bingenensis Suksd. var. subsaccatus Suksd.	Bingen lupine	Fabaceae	
LUZUL	Luzula DC. (multiflora/comosa/campestris)	woodrush	Juncaceae	
LUGLH	Luzula glabrata (Hoppe ex Rostk.) Desv. var. hitchcockii (Hämet-Ahti) Dorn	Hitchcock's smooth woodrush	Juncaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Noxious Status
MAAQ2	Mahonia aquifolium (Pursh) Nutt.	hollyleaved barberry	Berberidaceae	
MARE11	Mahonia repens (Lindl.) G. Don	creeping barberry	Berberidaceae	
MARAA	Maianthemum racemosum (L.) Link ssp. amplexicaule (Nutt.) LaFrankie	feathery false lily of the valley	Liliaceae	
MAST4	Maianthemum stellatum (L.) Link	starry false lily of the valley	Liliaceae	
MESP	Melica spectabilis Scribn.	purple oniongrass	Poaceae	
MESU	Melica subulata (Griseb.) Scribn.	Alaska oniongrass	Poaceae	
MEFE	Menziesia ferruginea Sm.	rusty menziesia	Ericaceae	
MEPA	Mertensia paniculata (Aiton) G. Don	tall bluebells	Boraginaceae	
MINU	Microseris nutans (Hook.) Sch. Bip.	nodding microseris	Asteraceae	
MIBR6	Mitella breweri A. Gray	Brewer's miterwort	Saxifragaceae	
MIST3	Mitella stauropetala Piper	smallflower miterwort	Saxifragaceae	
MOMA3	Moehringia macrophylla (Hook.) Fenzl	largeleaf sandwort	Caryophyllaceae	
MOUN3	Monotropa uniflora L.	Indianpipe	Monotropaceae	
MYMU	Mycelis muralis (L.) Dumort.	wall-lettuce	Asteraceae	
ORLU	Orobanche ludoviciana Nutt.	Louisiana broomrape	Orobanchaceae	
ORSE	Orthilia secunda (L.) House	sidebells wintergreen	Pyrolaceae	
OSBE	Osmorhiza berteroi DC.	sweetcicely	Apiaceae	
OSOC	Osmorhiza occidentalis (Nutt. ex Torr. & A. Gray) Torr.	western sweetroot	Apiaceae	
OSPU	Osmorhiza purpurea (J.M. Coult. & Rose) Suksd.	purple sweetroot	Apiaceae	
PEBR	Pedicularis bracteosa Benth.	bracted lousewort	Scrophulariaceae	
PERAA	Pedicularis racemosa Douglas ex Benth. ssp. alba Pennell	sickletop lousewort	Scrophulariaceae	
PECO6	Penstemon confertus Douglas ex Lindl.	yellow penstemon	Scrophulariaceae	
PEFR3	Penstemon fruticosus (Pursh) Greene	bush penstemon	Scrophulariaceae	
PHHE2	Phacelia heterophylla Pursh	varileaf phacelia	Hydrophyllaceae	
PHDI3	Phlox diffusa Benth.	spreading phlox	Polemoniaceae	
PHMA5	Physocarpus malvaceus (Greene) Kuntze	mallow ninebark	Rosaceae	
PIEN	Picea engelmannii Parry ex Engelm.	Engelmann spruce	Pinaceae	
PICO	Pinus contorta Douglas ex Louden	lodgepole pine	Pinaceae	
PIMO3	Pinus monticola Douglas ex D. Don	western white pine	Pinaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Noxious Status
PIPO	Pinus ponderosa C. Lawson	ponderosa pine	Pinaceae	
	Piperia elegans (Lindl.) Rydb.	elegant piperia	Orchidaceae	
PLMA2	Plantago major L.	common plantain	Plantaginaceae	
POBU	Poa bulbosa L.	bulbous bluegrass	Poaceae	
POCO	Poa compressa L.	Canada bluegrass	Poaceae	
POPR	Poa pratensis L.	Kentucky bluegrass	Poaceae	
POMU	Polystichum munitum (Kaulf.) C. Presl	western swordfern	Dryopteridaceae	
POBAT	Populus balsamifera L. ssp. trichocarpa (Torr. & A. Gray ex Hook.) Brayshaw	black cottonwood	Salicaceae	
POTR5	Populus tremuloides Michx.	quaking aspen	Salicaceae	
POARC	Potentilla arguta Pursh ssp. convallaria (Rydb.) D.D. Keck	cream cinquefoil	Rosaceae	
PREM	Prunus emarginata (Douglas ex Hook.) D. Dietr.	bitter cherry	Rosaceae	
PSME	Pseudotsuga menziesii (Mirb.) Franco	Douglas-fir	Pinaceae	
PTAQ	Pteridium aquilinum (L.) Kuhn	western brackenfern	Dennstaedtiaceae	
PTAN2	Pterospora andromedea Nutt.	woodland pinedrops	Monotropaceae	
PYAS	Pyrola asarifolia Michx.	liverleaf wintergreen	Pyrolaceae	
PYCH	Pyrola chlorantha Sw.	greenflowered wintergreen	Pyrolaceae	
PYPI2	Pyrola picta Sm.	whiteveined wintergreen	Pyrolaceae	
RAUN	Ranunculus uncinatus D. Don ex G. Don	woodland buttercup	Ranunculaceae	
RILA	Ribes lacustre (Pers.) Poir.	prickly currant	Grossulariaceae	
RIVI3	Ribes viscosissimum Pursh	sticky currant	Grossulariaceae	
ROGY	Rosa gymnocarpa Nutt.	dwarf rose	Rosaceae	
RUPA	Rubus parviflorus Nutt.	thimbleberry	Rosaceae	
RUAC2	Rumex acetosa L.	garden sorrel	Polygonaceae	
RUAC3	Rumex acetosella L.	common sheep sorrel	Polygonaceae	
SAGIN	Sagina L.	pearlwort	Caryophyllaceae	
SALIX	Salix L.	willow	Salicaceae	
SASC	Salix scouleriana Barratt ex Hook.	Scouler's willow	Salicaceae	
SARA2	Sambucus racemosa L.	red elderberry	Caprifoliaceae	
SCLA	Scrophularia lanceolata Pursh	lanceleaf figwort	Scrophulariaceae	
SELA	Sedum lanceolatum Torr.	spearleaf stonecrop	Crassulaceae	
SEIN2	Senecio integerrimus Nutt.	lambstongue ragwort	Asteraceae	
SIME	Silene menziesii Hook.	Menzies' campion	Caryophyllaceae	
SOSC2	Sorbus scopulina Greene	Greene's mountain ash	Rosaceae	
SPBE2	Spiraea betulifolia Pall.	white spirea	Rosaceae	
STAM2	Streptopus amplexifolius (L.) DC.	claspleaf twistedstalk	Liliaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Noxious Status
SYAL	Symphoricarpos albus (L.) S.F. Blake	common snowberry	Caprifoliaceae	
TAOF	Taraxacum officinale F.H. Wigg.	common dandelion	Asteraceae	
THOC	Thalictrum occidentale A. Gray	western meadow-rue	Ranunculaceae	
THPL	Thuja plicata Donn ex D. Don	western redcedar	Cupressaceae	
TITRU	Tiarella trifoliata L. var. unifoliata (Hook.) Kurtz	oneleaf foamflower	Saxifragaceae	
TRDU	Tragopogon dubius Scop.	yellow salsify	Asteraceae	
TRCA	Trautvetteria caroliniensis (Walter) Vail	Carolina bugbane	Ranunculaceae	
TRRE3	Trifolium repens L.	white clover	Fabaceae	
TROV2	Trillium ovatum Pursh	Pacific trillium	Liliaceae	
TSHE	Tsuga heterophylla (Raf.) Sarg.	western hemlock	Pinaceae	
VAME	Vaccinium membranaceum Douglas ex Torr.	thinleaf huckleberry	Ericaceae	
VESE	Veronica serpyllifolia L.	thymeleaf speedwell	Scrophulariaceae	
VIGL	Viola glabella Nutt.	pioneer violet	Violaceae	
XETE	Xerophyllum tenax (Pursh) Nutt.	common beargrass	Liliaceae	

Noxious Plants

Three species tracked by the Washington State Noxious Weed Control Board were found along some of the more disturbed trail segments of the proposed 180 trail during our 2009 surveys. These species were orange hawkweed (*Agoseris aurantiaca*; class B), Dalmatian toadflax (*Linaria dalmatica*; class B) and common St. John's wort (*Hypericum perforatum*; Class C). No noxious weeds were encountered along the other proposed trails.

Figure 2. Clockwise from upper left: orange hawkweed, Dalmatian toadflax, and common St. Johnswort.

Plant Associations

Our surveys identified 17 plant associations occurring within the routes of the proposed trail developments (Table 3). A number of plant associations with state and global status ranks of imperiled to rare (S2, S3, G2, and/or G3) were found within the proposed trail routes (see Appendix 2 for a definition of rank codes).

Table 3. Plant associations occurring along the proposed trail routes. Plant communities with a rare or imperiled status rank are bold in column 1. (See Appendix B for definition of conservation status codes).

Code	Scientific Name	Common Name	Status
ABGR/ACGL	Abies grandis / Acer glabrum	grand fir / Rocky Mountain maple	S2 G3
ABGR/PHMA5	Abies grandis / Physocarpus malvaceus	grand fir / mallow ninebark	S2 G3
ABGR/VAME	Abies grandis / Vaccinium membranaceum	grand fir / thinleaf huckleberry	S3 G3 G4
ABLA/CAGE2	Abies lasiocarpa / Carex geyeri	Subalpine fir / Geyer's sedge	SNA G4
ABLA-(PSME)/CAGE2	Abies lasiocarpa - (Pseudotsuga menziesii) / Carex geyeri	subalpine fir - (Douglas-fir) / Geyer's sedge	SNA G4
ABLA/LUGLH	Abies lasiocarpa / Luzula glabrata var. hitchcockii	subalpine fir / Hitchcock's smooth woodrush	S3 G5
ABLA/VAME	Abies lasiocarpa / Vaccinium membranaceum	subalpine fir / thinleaf huckleberry	S4 G4
ABLA/XETE	Abies lasiocarpa / Xerophyllum tenax	subalpine fir / common beargrass	S3 G5
ABLA-PIEN/MEFE/CLUN2	Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Clintonia uniflora	subalpine fir - Engelmann spruce / rusty menziesia / bride's bonnet	SNA G4 G5
ABLA-PIEN/VAME/XETE	Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax	subalpine fir - Engelmann spruce / thinleaf huckleberry / common beargrass	S3 GNR
ALVIS/forbs	Alnus viridis ssp. sinuata / Mesic Forbs	Sitka alder / mesic forbs	S3 S4 G3 G4
FEVI-FEID	Festuca viridula - Festuca idahoensis	green fescue - Idaho fescue	S2Q G2Q
PIPO-PSME/CARU	Pinus ponderosa - Pseudotsuga menziesii / Calamagrostis rubescens	Ponderosa pine - Douglas-fir / pinegrass	S2 G2Q
PIPO-PSME/PHMA5	Pinus ponderosa - Pseudotsuga menziesii / Physocarpus malvaceus	ponderosa pine - Douglas-fir / mallow ninebark	S2 GNRQ
TSHE/CLUN2	Tsuga heterophylla / Clintonia uniflora	western hemlock / bride's bonnet	S4 G4
TSHE/GYDR	Tsuga heterophylla / Gymnocarpium dryopteris	western hemlock / western oakfern	S3 G3 G4
TSHE/VAME/XETE	Tsuga heterophylla / Vaccinium membranaceum / Xerophyllum tenax	western hemlock / thinleaf huckleberry / common beargrass	S2 G3

Figure 3 provides a map of the forest series or land cover types attributed to each trail segment. Maps depicting the plant associations and further discussion on the plant associations encountered along specific proposed trail routes are discussed in the following section (Individual Trail Discussions). Impacts associated with trail development and recreational uses are discussed in the EIS text provided in Appendix A.

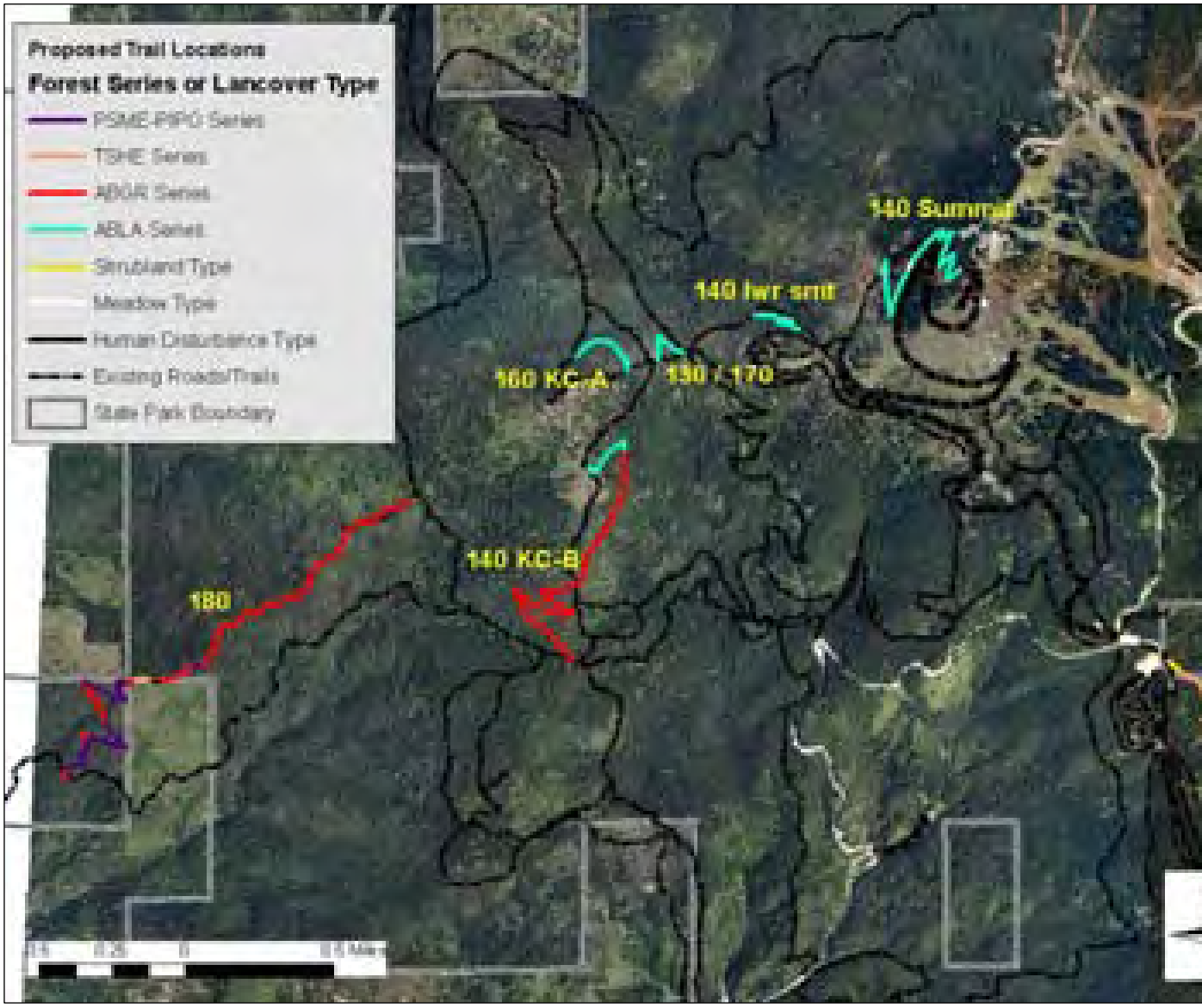

Figure 3. Forest series and land cover types ascribed to various sections of the proposed trails.

Individual Trail Discussions

This section describes findings specific to individual proposed trails. A general location description is given for each trail. Notes about rare plant associations encountered and/or likely vegetation impacts are included. GIS-based maps are included to show the location of the proposed trail, plant associations mapped along the trail route, GIS derived gradients of the proposed trail, and GIS-derived hillslope gradient of the area the trail crosses. Each trail description includes a table listing the plant associations found and how much of the trail runs through those plant associations. Likewise, a table depicting the likely level of impact to vegetation community elements (such as snags, overstory trees, regenerating trees, and the general sub-canopy cover [includes herbs layer, shrub layer, and regenerating tree layer]) due to development activities by distance along the trail is also provided.

Trail 130 / 170

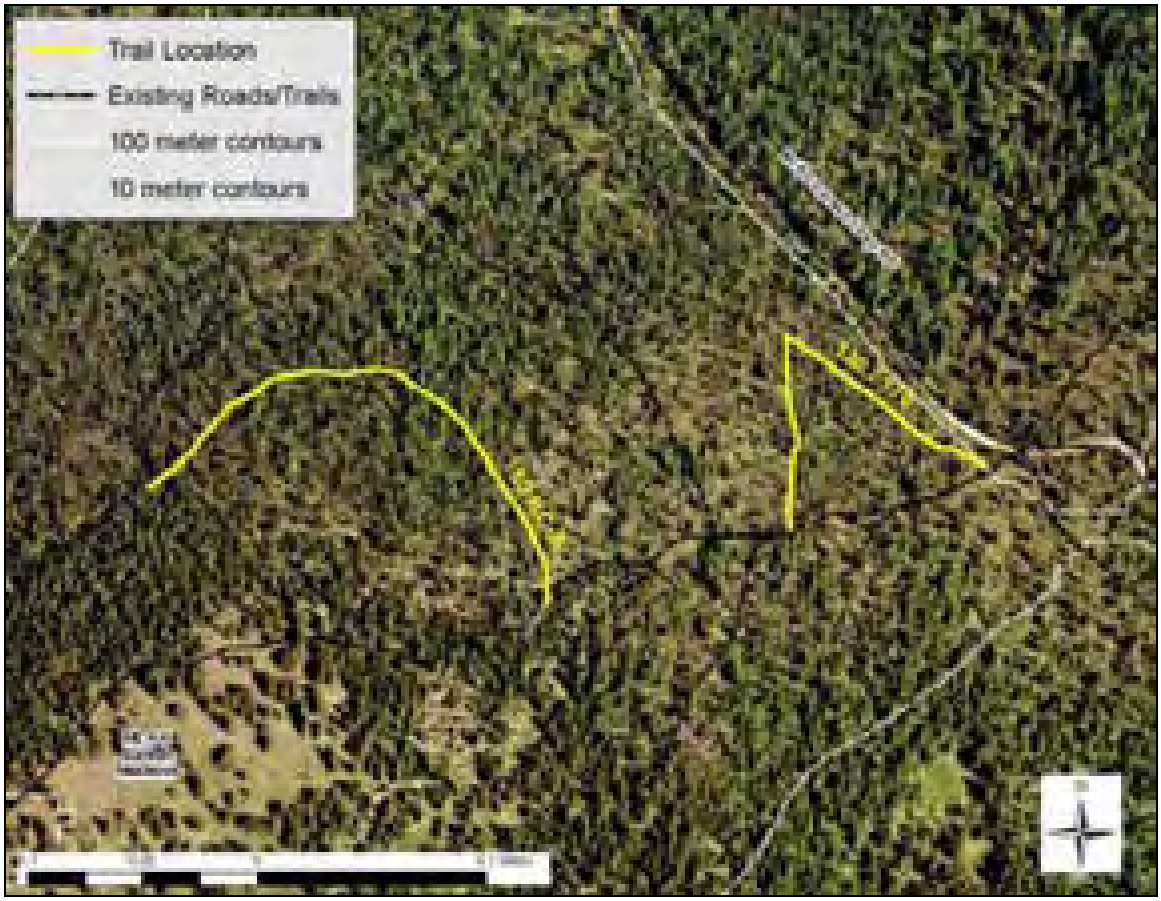

Figure 4. Map depicting the location of proposed Trail 130 / 170 (trail on the right).

The proposed trail 130 / 170 occurs just above the saddle between Mt. Kit Carson and Mt. Spokane on the west side of Mt. Spokane (Figure 4). The purpose of this proposed trail is to reduce the trail gradient of the existing trails, thereby reducing erosion issues and improving access conditions for a host of user groups including more novice

mountain bikers. The trail makes one switchback and travels mostly through a forest of subalpine fir - Engelmann spruce / rusty menziesia /bride's bonnet (G4G5) (Figure 5). There are no globally rare vegetation communities along this proposed trail, although the State Conservation Status is not known for these communities. Table 4 describes the plant associations and their relative abundance along the proposed trail route.

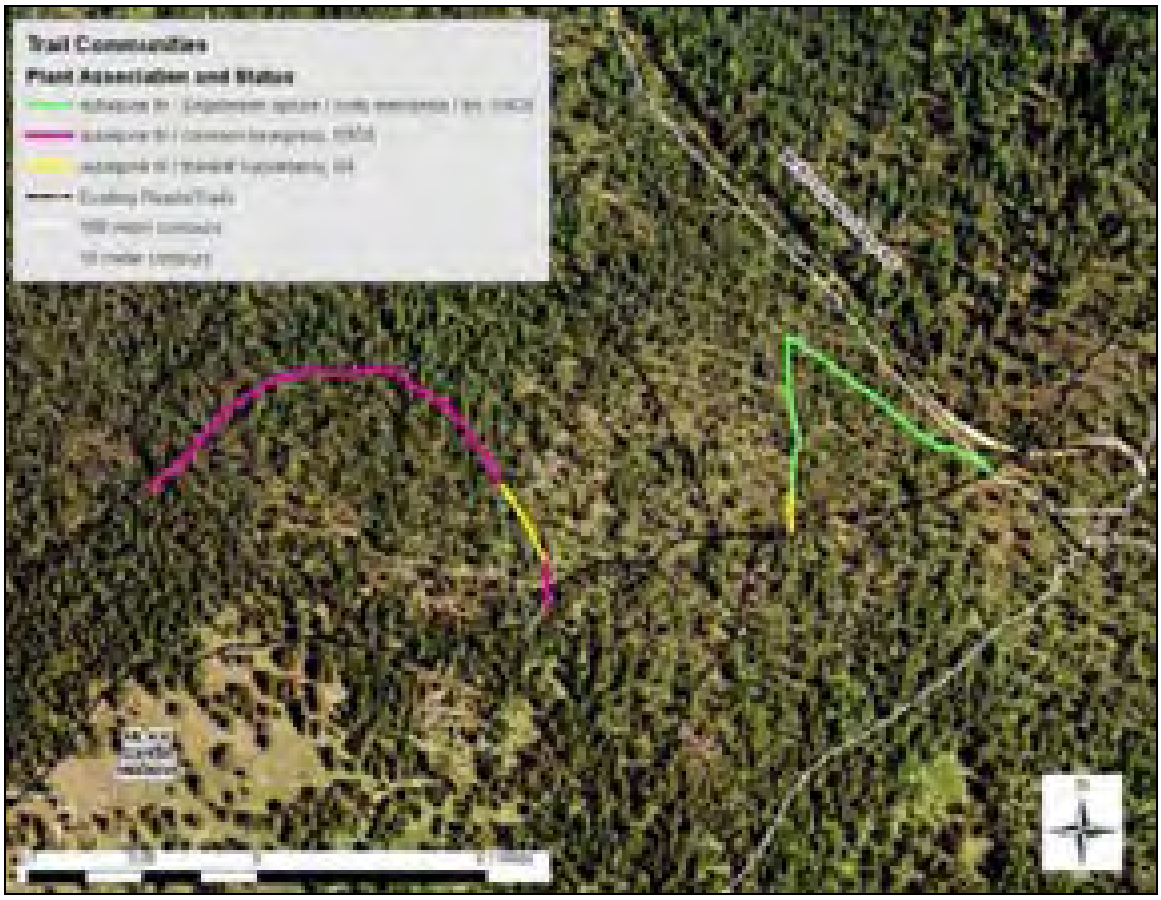

Figure 5. Map depicting the plant associations and their conservation status occurring along the proposed Trail 130 / 170 (trail on the right).

Table 4. Plant associations and their relative abundance along the proposed route of Trail 130 / 170.

Trail	Code	Common Name	Conservation Status	Length in feet	Percent of Trail
130 / 170	ABLA/VAME	subalpine fir / thinleaf huckleberry	S4 G4	100	10%
	ABLA-PIEN/MEFE/CLUN2	subalpine fir - Engelmann spruce / rusty menziesia / bride's bonnet	SNA G4G5	912	90%
	Total			**1,012**	

Figures 6 and 7 illustrate the GIS derived gradients and the GIS-derived hillslope gradients of proposed Trail 130 / 170.

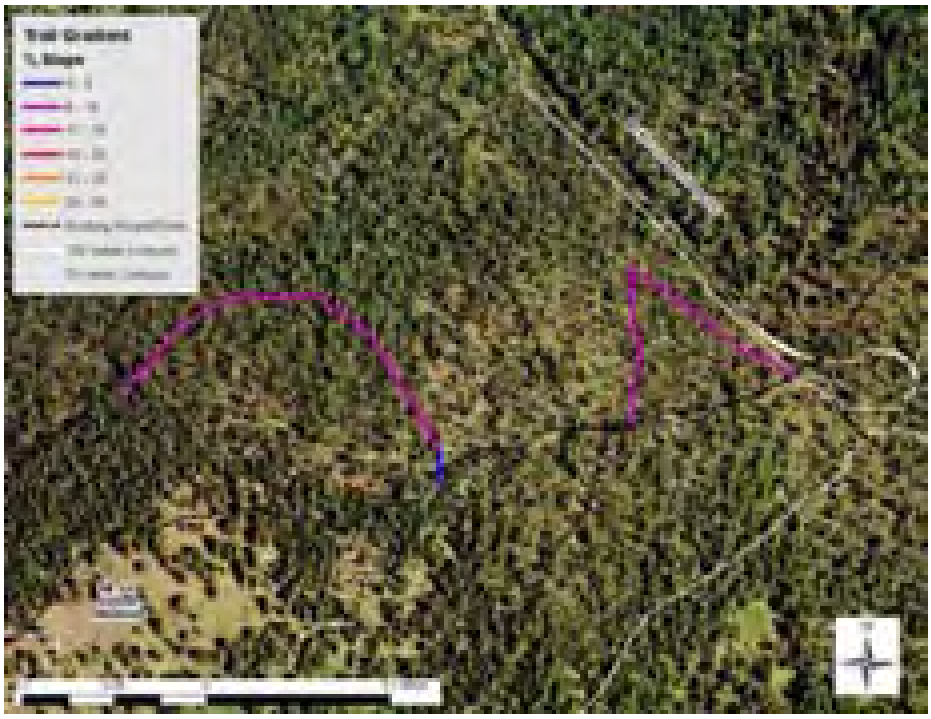

Figure 6. Map depicting the percent gradient of proposed Trail 130 / 170 (trail on the right).

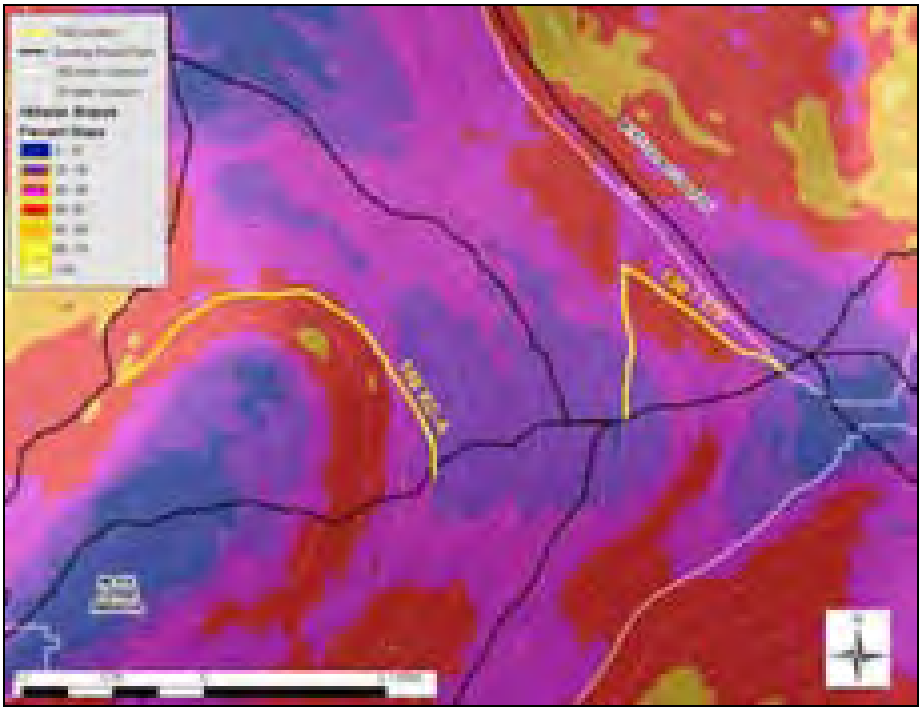

Figure 7. Map depicting the hillside slope in the area of proposed Trail 130 / 170 (trail on the right).

Based on our field notes, proposed Trail 130 / 170 will not have a high level impact on vegetation elements within the area, although it will likely have moderate impacts on understory vegetation cover and understory tree regeneration. The moderate impacts will occur during trail construction because the understory vegetation cover is highly dense and provides a seamless cover over the ground. It would be impossible to create a trail in the flagged area without removing large amounts of regenerating trees and live shrubs. Such elements are abundant in the area, but the new trail would create a non-natural condition within the vegetation patch due to interruption of the continuous shrub canopy. Table 5 provides the statistics regarding trail development impact levels by vegetation element category. The percentage statistics depict the proportion of the proposed trail by length instigating a particular impact level.

Table 5. Trail development impacts to vegetation community elements by impact level and percent length of Trail 130/170.

		% of trail length at each impact level (low, moderate, high) affecting each element				
Trail	Potential Impact Level	Snags	Coarse Woody Debris	Understory Vegetation Cover	Understory Tree Regeneration	Main Canopy Trees
130 / 170	Low Impact	100%	90%	0%	0%	100%
	Moderate Impact	0%	10%	100%	100%	0%
	High Impact	0%	0%	0%	0%	0%

Figure 8 provides a representative photograph of the general vegetation conditions along proposed Trail 130 / 170. Note the continuous cover of the shrub canopy and the abundance of understory tree regeneration.

Figure 8. Representative photograph of the vegetation community conditions along proposed Trail 130 / 170.

Trail 140 Summit Upper

Figure 9. Map depicting the location of proposed Trail 140 Summit Upper.

The proposed Trail 140 Summit Upper starts just to the west of the summit of Mt. Spokane (Figure 9) and switchbacks down the western mountainside, mostly through a forest of closed-canopy subalpine fir. The purpose of this proposed trail is to reduce the trail gradient of the existing trails, thereby reducing erosion issues and improving access conditions for a host of user groups including more novice mountain bikers. As illustrated in Figure 10, the proposed route travels mostly through subalpine fir / Hitchcock's smooth woodrush forest (S2 G5), although ~30% of the trail passes through subalpine fir / common beargrass forest (S3 G5). A small patch of young successional subalpine fir / Geyer's sedge forest (SNA G4) is impacted near the bottom of the trail, as are some small green fescue / Idaho fescue meadow patches (S2Q G2Q) and some deciduous shrub patches. Table 6 describes the plant associations and their relative abundance along the proposed trail route.

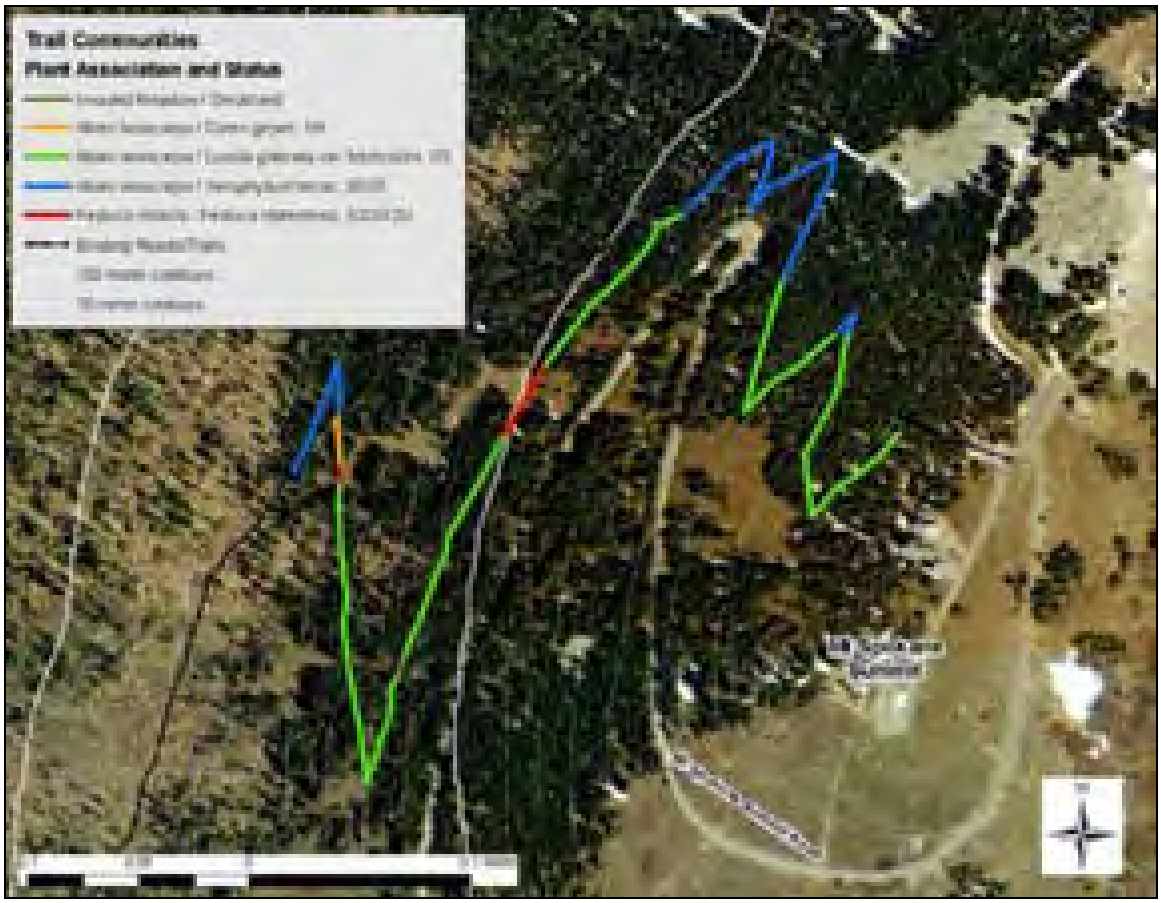

Figure 10. Map depicting the plant associations and their conservation status occurring along the proposed Trail 140 Summit Upper.

Table 6. Plant associations and their relative abundance along the proposed route of Trail 140 Summit Upper.

Trail	Code	Common Name	Conservation Status	Length in feet	Percent of Trail
140 Upper Summit	ABLA/CAGE2	subalpine fir / Geyer's sedge	SNA G4	126	2%
	ABLA/LUGLH	subalpine fir / Hitchcock's smooth woodrush	S2 G5	3,408	64%
	ABLA/XETE	subalpine fir / common beargrass	S3 G5	1,546	29%
	FEVI-FEID	green fescue - Idaho fescue	S2Q G2Q	226	4%
	Invaded meadow / shrubland			58	1%
	Total			**5,364**	

Figures 11 and 12 illustrate the GIS derived gradients and the GIS-derived hillslope gradients of proposed Trail 140 Summit Upper.

Figure 11. Map depicting the percent gradient of proposed Trail 140 Summit Upper.

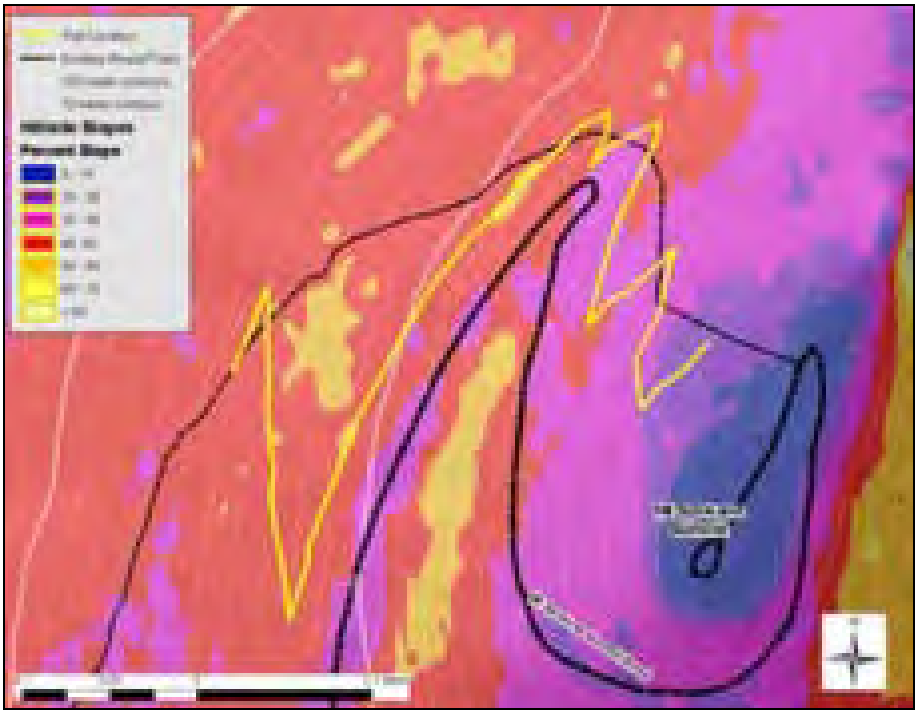

Figure 12. Map depicting the hillside slope in the area of proposed Trail 140 Summit Upper.

The subalpine fir forests around proposed Trail 140 Summit Upper are mostly even-aged closed canopy stands with a simplified forest understory consisting mostly of a few dominant species: Hitchcock's smooth woodrush, Geyer's sedge, and common beargrass. Figures 13 and 14 provide representative examples of the forest conditions throughout much of the proposed trail route.

Figure 13. Representative photo of the subalpine fir/Hitchcock's woodrush forest community along proposed Trail 140 Summit Upper.

Figure 14. Representative photo of the subalpine fir/common beargrass forest community along proposed Trail 140 Summit Upper.

In two separate areas the trail crosses through some undisturbed portions of a green fescue / Idaho fescue meadow (S2Q G2Q) that is being invaded upon by the surrounding forest communities. Figure 15 shows some of the young subalpine fir invading the meadow system near where the proposed Trail 140 Summit Upper crosses the meadow system. This meadow patch is a narrow linear feature that used to be part of a much larger meadow system on the west side of Mt. Spokane. Forest encroachment over hundreds of years has replaced much of this meadow system with the subalpine fir / Hitchcock's smooth woodrush forest community in this area, a process that is still continuing.

Figure 15. Photo of the narrow green fescue / Idaho fescue meadow patch through which proposed Trail 140 Summit Upper passes twice.

In a few places the route of proposed Trail 140 Summit Upper crosses through dense and diverse deciduous shrub patches, with a high cover of Greene's mountain ash (*Sorbus scopulina*). These shrubland patches are not abundant within the closed canopy subalpine fir forests in this area, however they are not a published plant association in the literature. The proposed trail could alter the vegetation cover characteristics of these small patch shrublands but the significance cannot be determined at this time.

Figure 16. Photo of a small deciduous shrubland patch through which proposed Trail 140 Summit Upper trail would pass.

Based on our field notes, some small portions of the proposed Trail 140 Summit Upper could have a localized impact on snags, coarse woody debris and organic detritus, depending on how the trail is developed. Near the tight switchback turn of the Mt. Spokane Summit Road, where the proposed trail does multiple switchbacks within a

limited area, the compounded effects of the multiple new switchbacks and short new trail segments, combined with the existing trail segments and development impacts of the Mt. Spokane Summit Road, would have more of a localized cumulative effect on vegetation community element conditions in this area than what is likely to occur along other portions of the proposed trail route. In other cases, some small unique patches with high large snag densities and large coarse woody debris piles exist, making it possible that trail construction would have to remove or manipulate these elements to create a safe and accessible trail corridor.

Much of the proposed Trail 140 Summit Upper route will likely have moderate impacts to at least one of the vegetation community elements we took notes on in the field, but these impacts would be localized and could be greatly reduced through careful trail construction and conscientious final route planning. Table 7 provides the statistics regarding trail development impact levels by vegetation element category for the 140 Upper Summit trail. The percentage statistics depict the proportion of the proposed trail by length instigating a particular impact level.

Table 7. Trail development impacts to vegetation community elements by impact level and percent length of Trail 140 Summit Upper.

Trail	Impact Level	Snags	Coarse Woody Debris	Understory Vegetation Cover	Understory Tree Regeneration	Main Canopy Trees
140 Upper Summit	Low	55%	31%	30%	78%	82%
	Moderate	25%	56%	67%	22%	18%
	Significant	20%	13%	2%	0%	0%

Trail 140 Summit Lower

Figure 17. Map depicting the location of proposed Trail 140 Summit Lower.

The proposed Trail 140 Summit Lower lies just to the north of the CCC lodge along the Mt. Kit Carson Loop Road (Figure 17), along the north facing slope below the ridgeline saddle between Mt. Spokane and Mt. Kit Carson. The purpose of this proposed trail is to reduce the trail gradient of the existing trails, thereby reducing erosion issues and improving access conditions for a host of user groups including more novice mountain bikers. The proposed route switchbacks down the north-facing slope just above the old trail, mostly through a forest of closed-canopy subalpine fir - Englemann spruce / rusty menziesia / bride's bonnet (G4G5 – Figure 18 and Table 8). The trail rejoins the existing 140 trail within a stand of subalpine fir - Engelmann spruce / thinleaf huckleberry / common beargrass (S3 GNR).

Figure18. Map depicting the plant associations and their conservation status occurring along the proposed Trail 140 Summit Lower.

Table 8. Plant associations and their relative abundance along the proposed route of Trail 140 Summit Lower.

Trail	Code	Common Name	Conservation Status	Length in feet	Percent of Trail
140 Lower Summit	ABLA-PIEN/VAME/XETE	subalpine fir - Engelmann spruce / thinleaf huckleberry / common beargrass	S3 GNR	266	19%
	ABLA-PIEN/MEFE/CLUN2	subalpine fir - Engelmann spruce / rusty menziesia / bride's bonnet	SNA G4G5	1,114	81%
	Total			**1,380**	

Figures 19 and 20 provide representative photos of the proposed route of Trail 140 Summit Lower through the two plant associations encountered.

Figure 19. Representative photo of the subalpine fir – Engleman spruce / rusty menziesia / bride's bonnet plant association most of the proposed Trail 140 Summit Lower goes through.

Figure 20. Representative photo of the subalpine fir – Englemann spruce / thinleaf huckleberry / common beargrass plant association a small portion of the proposed Trail 140 Summit Lower goes through.

Figures 21 and 22 illustrate the GIS derived gradients and the GIS-derived hillslope gradients of proposed Trail 140 Summit Lower.

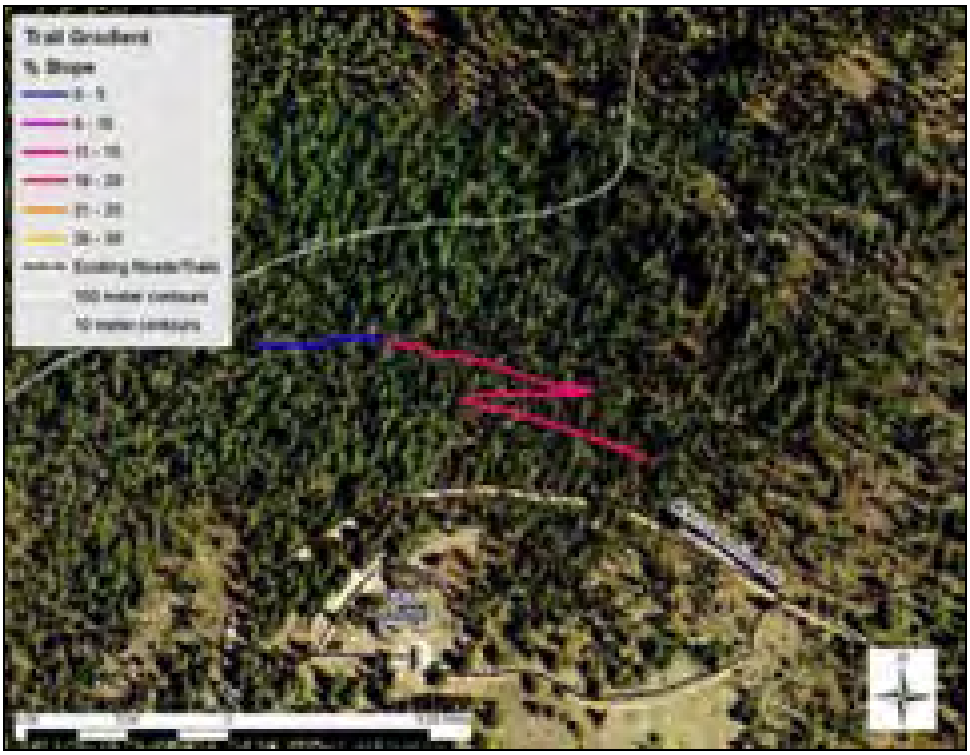

Figure 21. Map depicting the percent gradient of proposed Trail 140 Summit Lower.

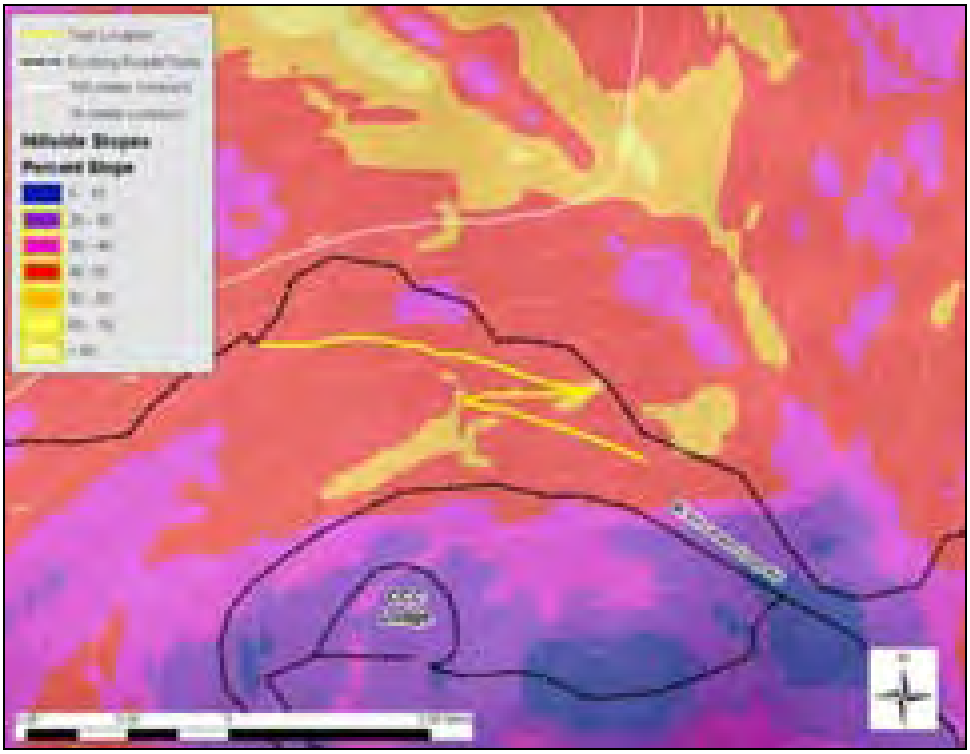

Figure 22. Map depicting the hillside slope in the area of proposed Trail 140 Summit Lower.

Based on our field notes, the construction of proposed Trail 140 Summit Lower should not have a high level of impact on vegetation community elements. Because of the high level of shrub cover within the forest communities through which the trail would pass, the entire trail would have a moderate localized impact on understory vegetation cover. The potential for impacts to snags, coarse woody debris, and understory tree regeneration could likely be avoided and reduced given careful trail construction techniques and conscientious final route planning. Table 9 provides the statistics regarding trail development impact levels by vegetation element category for the 140 Summit Lower trail. The percentage statistics depict the proportion of the proposed trail by length instigating a particular impact level.

Table 9. Trail development impacts to vegetation community elements by impact level and percent length of proposed Trail 140 Summit Lower.

Trail	Impact Level	Snags	Coarse Woody Debris	Understory Vegetation Cover	Understory Tree Regeneration	Main Canopy Trees
140 Lower Summit	Low	81%	81%	0%	81%	100%
	Moderate	19%	19%	100%	19%	0%
	Significant	0%	0%	0%	0%	0%

Trail 140 KC-B

Figure 23. Map depicting the location of proposed Trail 140 KC-B.

The proposed Trail 140 KC-B begins near the lower southernmost meadow system on Mt. Kit Carson and continues down the south facing hillsides of Mt. Kit Carson to Smith Gap (Figure 23). The purpose of this proposed trail is to reduce the trail gradient of the existing trails, thereby reducing erosion issues and improving access conditions for a host of user groups including more novice mountain bikers.

As is evident in Figure 24, the beginning of the trail near the Mt. Kit Carson meadows passes through a woodland of subalpine fir – (Douglas-fir) / Geyer's sedge (SNA G4) and continues into excellent condition subalpine fir – Englemann spruce / thinleaf huckleberry forest (S3 GNR). The trail then switches back to a southern heading and the plant communities shift into the grand fir series forests that include grand fir / Rocky Mountain maple (S2 G3), grand fir / mallow ninebark (S2 G3), and grand fir / thinleaf huckleberry (S3 G3G4) forests. A large part of the trail section in the grand fir forest series was severely burned nearly a century ago and currently the dominant tree species is lodgepole pine with grand fir the dominant regenerating tree species. Shrub cover along the lower half of the trail is very high, consisting of mostly mallow ninebark and thinleaf huckleberry. Table 10 describes the plant associations and their relative abundance along the proposed trail route.

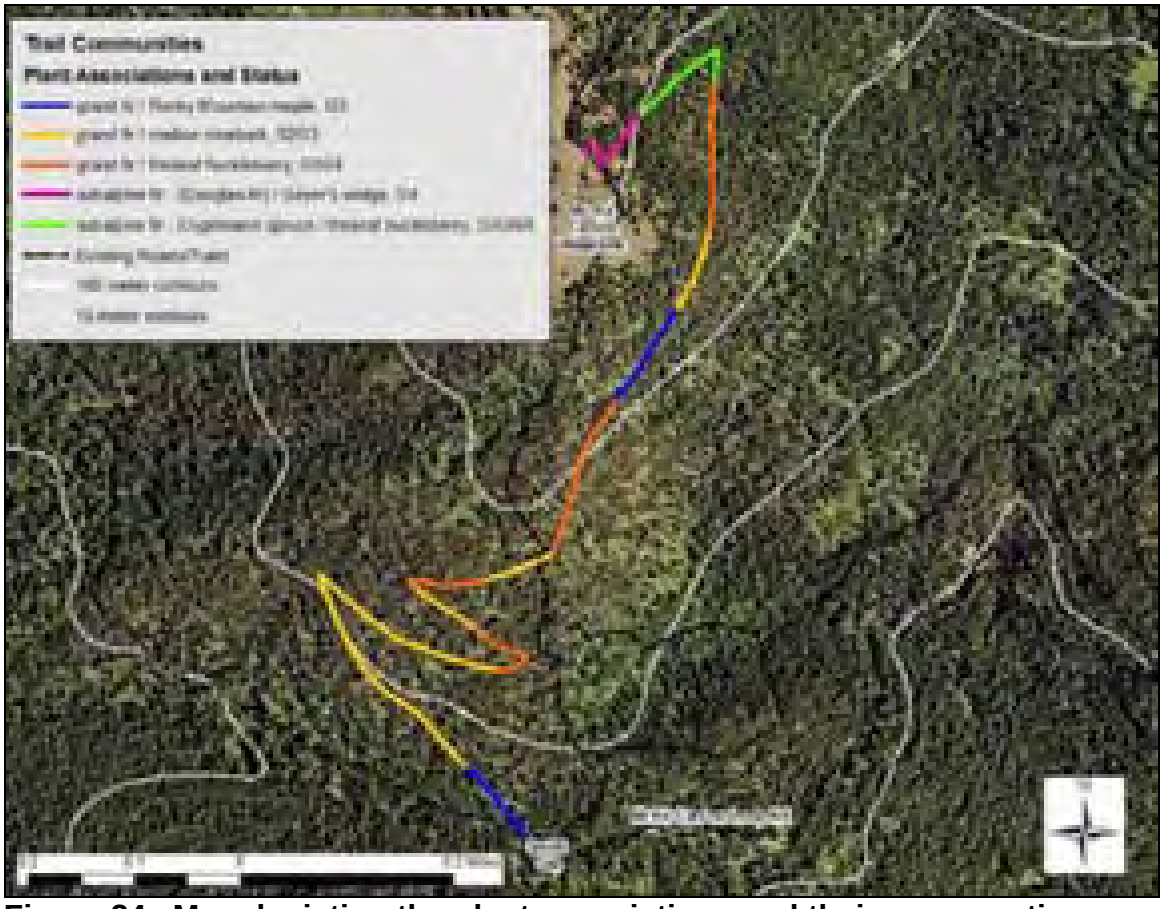

Figure 24. Map depicting the plant associations and their conservation status occurring along the proposed Trail 140 KC-B.

Table 10. Plant associations and their relative abundance along the proposed route of Trail 140 KC-B.

Trail	Code	Common Name	Conservation Status	Length in feet	Percent of Trail
140 KC-B	ABGR/ACGL	grand fir / Rocky Mountain maple	S2 G3	1,018	13%
	ABGR/PHMA5	grand fir / mallow ninebark	S2 G3	3,362	42%
	ABGR/VAME	grand fir / thinleaf huckleberry	G3 G4	2,473	31%
	ABLA-(PSME)/CAGE2	subalpine fir - (Douglas-fir) / Geyer's sedge	G4	458	6%
	ABLA-PIEN/VAME/XETE	subalpine fir - Engelmann spruce / thinleaf huckleberry / common beargrass	S3 GNR	676	8%
				7,986	

Figures 25 – 29 provide representative photos of the plant associations types encountered in this area.

Figure 25. Representative photo of the subalpine fir – (Douglas-fir) / Geyer's sedge plant association found along proposed Trail 140 KC-B.

Figure 26. Representative photo of the subalpine fir – Engleman spruce / thinleaf huckleberry / common beargrass plant association found along proposed Trail 140 KC-B.

Figure 27. Representative photo of the grand fir / mallow ninebark plant association found along proposed Trail 140 KC-B.

Figure 28. Representative photo of the grand fir / mallow ninebark plant association found along proposed Trail 140 KC-B.

Figure 29. Representative photo of the grand fir / Rocky Mountain maple plant association found along Trail 140 KC-B.

Figures 30 and 31 illustrate the GIS derived gradients and the GIS-derived hillslope gradients of proposed Trail 140 KC-B.

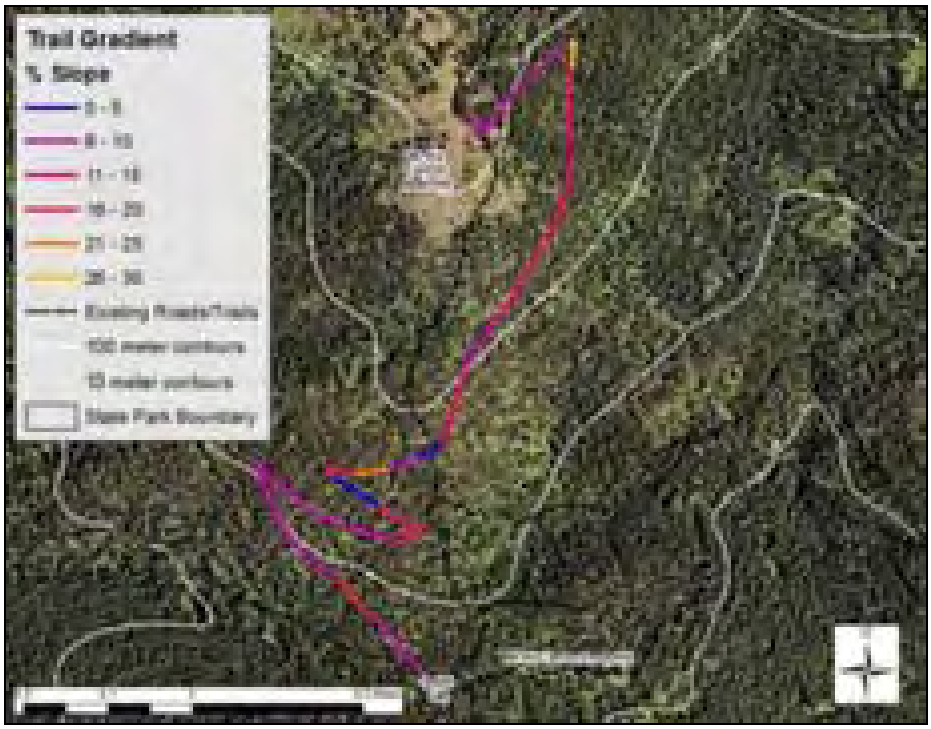

Figure 30. Map depicting the percent gradient of proposed Trail 140 KC-B.

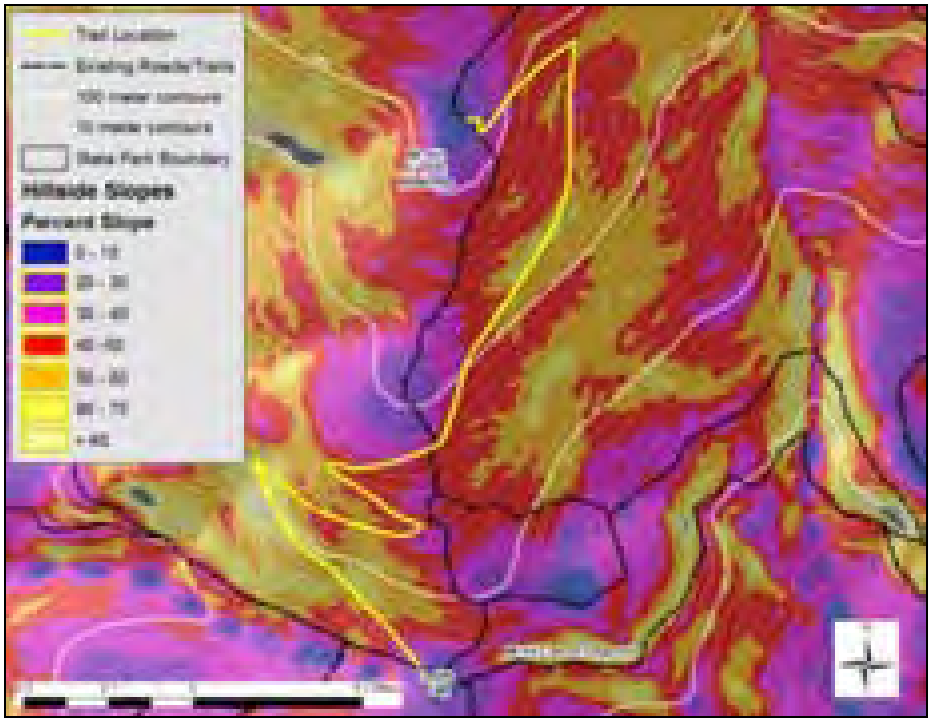

Figure 31. Map depicting the hillside slope in the area of proposed Trail 140 KC-B.

Based on our field notes, the construction of proposed Trail 140 KC-B should not have a high level of impact on vegetation community elements. Because of the high level of shrub cover within the forest communities through which the trail would pass, the entire trail would have a moderate impact on understory vegetation cover. The likely moderate impact to understory vegetation cover, coarse woody debris, and understory tree regeneration could likely be avoided and reduced give careful trail construction techniques and conscientious final route planning. The last switchback from the bottom is on a steep slope that will require a wider clearing to make the turn. Construction of the switchback will require additional time and attention to protect the soil from erosion.

Table 11 provides the statistics regarding trail development impact levels by vegetation element category for Trail 140 KC-B. The percentage statistics depict the proportion of the proposed trail by length instigating a particular impact level.

Table 11. Trail development impacts to vegetation community elements by impact level and percent length of proposed Trail 140 KC-B.

Trail	Impact Level	Snags	Coarse Woody Debris	Understory Vegetation Cover	Understory Tree Regeneration	Main Canopy Trees
140 KC-B	Low	94%	54%	0%	29%	100%
	Moderate	6%	46%	100%	71%	0%
	Significant	0%	0%	0%	0%	0%

Trail 160 KC-A

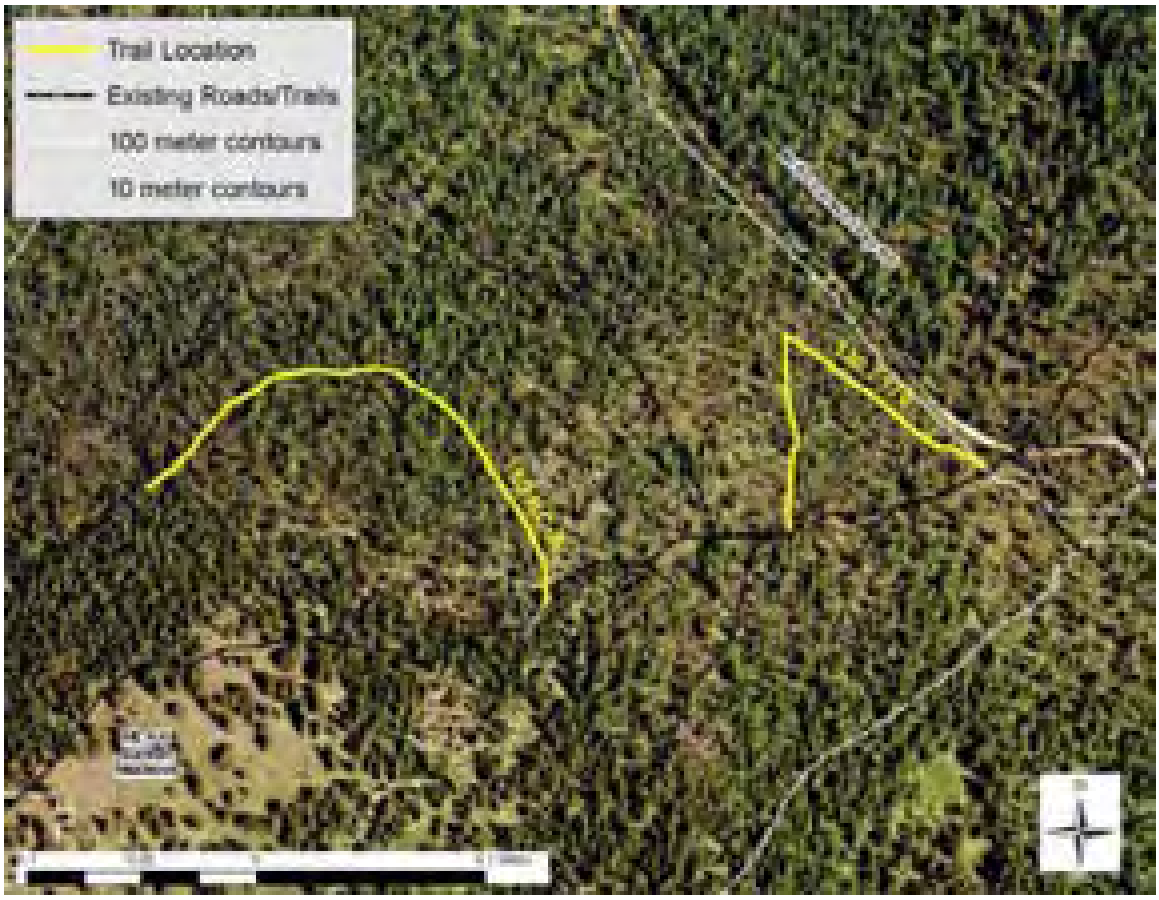

Figure 31. Map depicting the location of proposed trail 160 KC-A (on left).

Trail 160 KC-A is proposed to be constructed around the east- to north-facing slopes of Mt. Kit Carson, just west of the proposed Trail 130 / 170 (Figure 31). The purpose of this proposed trail is to reduce the trail gradient of the existing trails, thereby reducing erosion issues and improving access conditions for a host of user groups including more novice mountain bikers. As can be seen in Figure 32, the proposed trail goes mostly through a forest of subalpine fir / common beargrass (S3 G5), with a small patch of subalpine fir / thinleaf huckleberry encountered on the eastern flank of the mountain (S4 G4). The forest one the eastern flank was formerly dominated by lodgepole pine that is now naturally dying off and being replaced by younger subalpine firs in the forest understory. Table 12 describes the plant associations and their relative abundance along the proposed trail route.

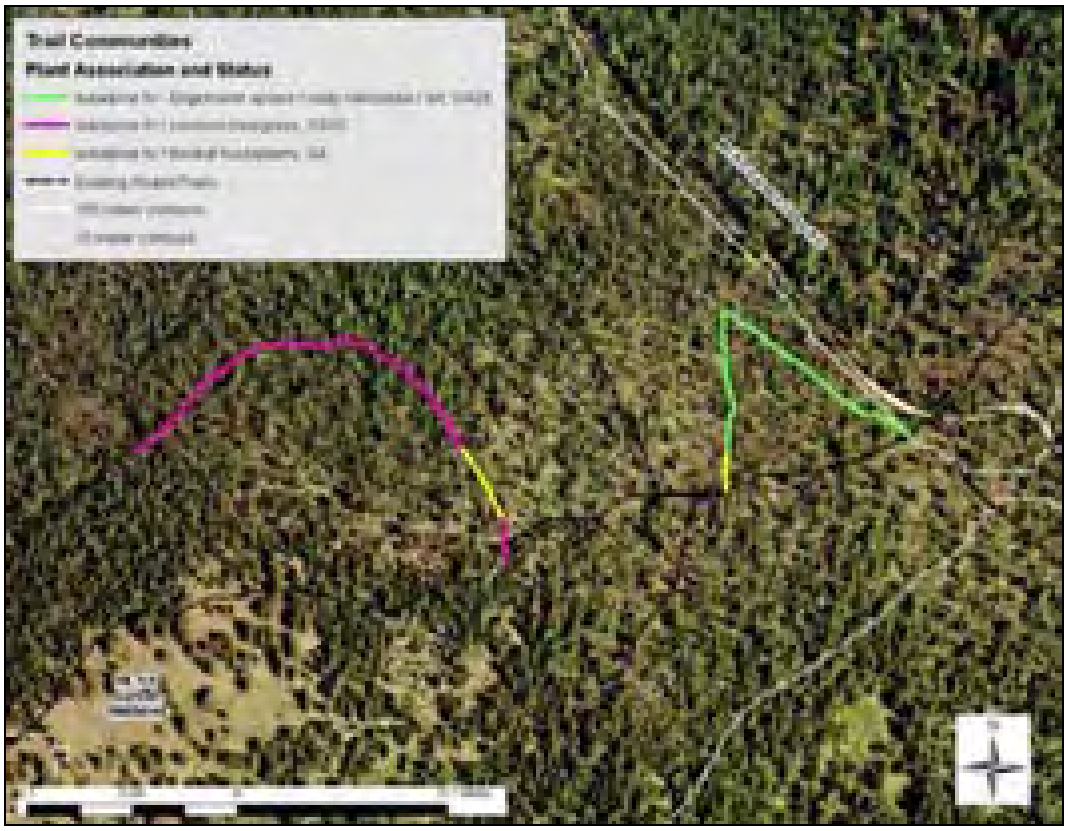

Figure 32. Map depicting the plant associations and their conservation status occurring along the proposed Trail 160 KC-A (left).

Table 12. Plant associations and their relative abundance along the proposed route of Trail 160 KC-A.

Trail	Code	Common Name	Conservation Status	Length in feet	Percent of Trail
160 KC-A	ABLA/VAME	subalpine fir / thinleaf huckleberry	S3 G3G4	207	15%
	ABLA/XETE	subalpine fir / common beargrass	S3 G5	1,137	85%
	Total			**1,344**	

Figure 33 provides a representative photo of the subalpine fir / common beargrass plant association that occurs along most of the proposed trail route in this area.

Figure 33. Example of the subalpine fir / common beargrass plant association along Trail 160 KC-A.

Figures 34 and 35 illustrate the GIS derived gradients and the GIS-derived hillslope gradients of proposed Trail 160 KC-A.

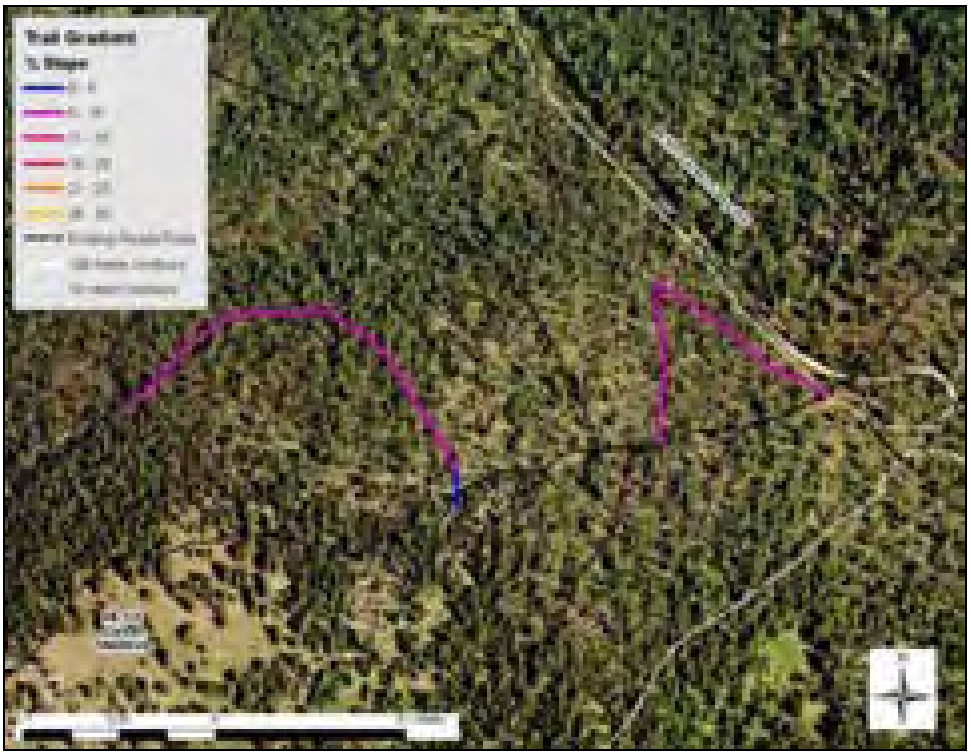

Figure 34. Map depicting the percent gradient of proposed Trail 160 KC-A (left).

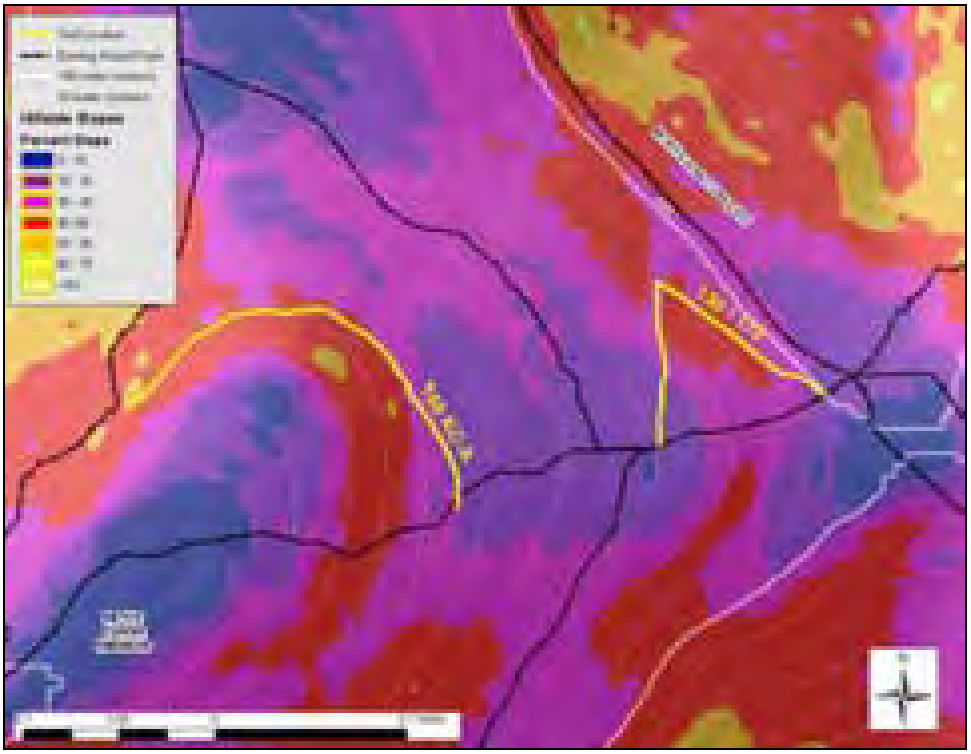

Figure 35. Map depicting the hillside slope in the area of proposed Trail 160 KC-A (left).

Based on our field notes, the construction of proposed Trail 160 KC-A should not have a high level of impact on vegetation community elements. Because of the high level of shrub and herbaceous cover within the forest communities through which the trail would pass, the entire trail would have a moderate impact on understory vegetation cover. The likely moderate impact to understory vegetation cover, coarse woody debris, and understory tree regeneration could likely be avoided and reduced give careful trail construction techniques and conscientious final route planning.

Table 13 provides the statistics regarding trail development impact levels by vegetation element category for Trail 160 KC-A. The percentage statistics depict the proportion of the proposed trail by length instigating a particular impact level.

Table 13. Trail development impacts to vegetation community elements by impact level and percent length of proposed Trail 160 KC-A.

Trail	Impact Level	Snags	Coarse Woody Debris	Understory Vegetation Cover	Understory Tree Regeneration	Main Canopy Trees
160 KC-A	Low	85%	85%	0%	85%	100%
	Moderate	15%	15%	100%	15%	0%
	Significant	0%	0%	0%	0%	0%

Trail 180

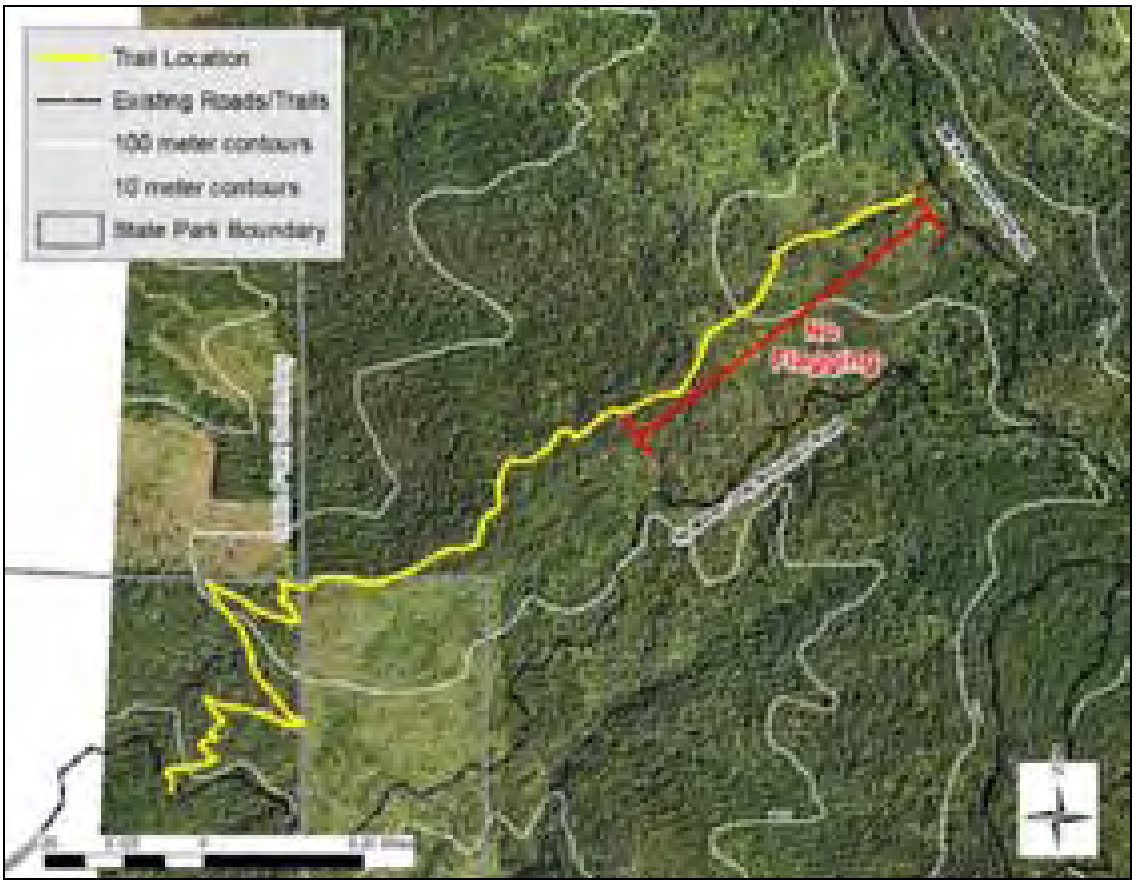

Figure 36. Map depicting the location of proposed Trail 180.

Proposed Trail 180 lies on the far western side of the park, following the major ridge line running parallel above the Spokane – Day Mountain Road a couple of miles (Figure 36) This trail is being proposed as an expansion of the trail system into currently inaccessible areas of the park.

As illustrated in Figure 37, the eastern end of the trail passes through a long stretch of grand fir / mallow ninebark forest (S2 G3). The section labeled on Figure 37 as "No Flagging" was not marked by state park staff with surveyor flagging to represent the trail location. In this area, the proposed trail is meant to follow the footprint of an old, overgrown, logging road for approximately 1 mile. The forest around this old road is mostly dominated by lodgepole pine in the forest overstory, and a thick understory of tall deciduous shrubs young grand fir regeneration. The dense understory makes walking along the proposed trail route in this section difficult to impossible in some places. It is also hard to follow the footprint of the overgrown logging road in places. At the beginning of the trail a large patch of orange hawkweed is present. Some small infestations also occur in a few sections along the old road where the forest canopy opens up.

Figure 37. Map depicting the plant associations and their conservation status occurring along proposed Trail 180.

At the end of the "No Flagging" portion of proposed Trail 180, the trail gets off the old logging road and begins to follow a narrow ridgeline where the surveyor flagging is

adequately marked to follow the proposed trail route. Along this ridgeline, the proposed trail follows a small existing foot trail through a mature stand of grand fir / mallow ninebark, with high tree species diversity and a complex multi-canopy forest structure. This ridgeline community also goes through a small stand of ponderosa pine-Douglas fir/pinegrass (Figure 40), considered state and globally imperiled (S2 G2Q). The ridgeline community is dominated by Douglas-fir, and contains high value functional forest structures that are lacking in adjacent forests. Features include multiple canopies of gallery trees and large logs and snags. Understory species in this stand are exceptionally diverse and contain a large number of late-seral mycorrhizal species. For instance, all four species of Washington's coral root orchids (*Corallorhiza* spp.) were found here, along with large numbers of mountain lady's slipper orchids (*Cypripedium montanum*), Indianpipe (*Monotropa uniflora*) and pinesap (*Hypopitys monotropa*). The vegetation communities on the ridgeline are undergoing transition to dominance by late-seral species.

From here the trail goes between clear-cuts on private lands adjacent to the park boundary, and the proposed route follows right along the logged edge, weaving in and out of the clear-cut landscape and the adjacent park forests. Along the clear-cut boundary orange hawkweed, Dalmatian toadflax, and common St. Johnswort can be found. This area is the only portion of the trail where the western hemlock / bride's bonnet forest community (S4 G4) occurs, which is a mid-successional stand on a north facing slope with little vegetation in the understory. It is more common to the north of the trail.

At this point the trail drops off of the ridgeline into a large patch of mid-successional ponderosa pine - Douglas-fir / mallow ninebark forest (S2 GNRQ) that mosaics with grand fir / mallow ninebark (where grand fir is present as a regenerating tree species in the understory). In areas where the forest canopy is open along the upper stretch of this section of trail, large infestations of Dalmatian toadflax and common St. Johnswort occur. The trail eventually ends within the mosaic of ponderosa pine - Douglas-fir / mallow ninebark and grand fir / mallow ninebark forest along the Spokane – Day Mountain Road. Table 14 describes the plant associations and their relative abundance along the proposed trail route.

Table 14. Plant associations and their relative abundance along the proposed route of Trail 180.

Trail	Code	Common Name	Conservation Status	Length in feet	Percent of Trail
180	ABGR/PHMA5	grand fir / mallow ninebark	S2 G3	7,284	61%
	PIPO-PSME/CARU	ponderosa pine - Douglas-fir / pinegrass	S2 G2Q	187	2%
	PIPO-PSME/PHMA5	ponderosa pine - Douglas-fir / mallow ninebark	S2 GNRQ	3,918	33%
	TSHE/CLUN2	western hemlock / bride's bonnet	S4 G4	322	3%
	Clear-cut			176	1%
	Total			**11,887**	

Figures 38 – 42 provide representative photos of the plant associations types encountered in this area.

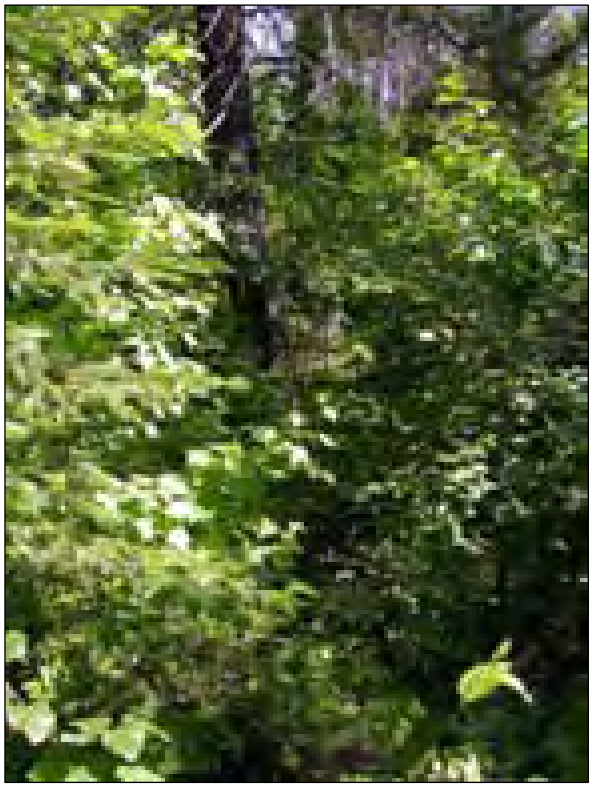

Figure 38. A representative photo of the young lodgepole pine dominated grand fir / mallow ninebark forest occurring along the eastern portion of proposed Trail 180.

Figure 39. A representative photo of the mature grand fir / mallow ninebark ridgeline forest along proposed Trail 180.

Figure 40. A representative photo of the ponderosa pine – Douglas-fir / pinegrass community occurring along proposed Trail 180.

Figure 41. An example of a portion of the old clear cut adjoining the park boundary, where the proposed Trail 180 weaves through.

Figure 42. An example of the ponderosa pine – Douglas-fir / mallow ninebark forest community through which much of the lower section of the proposed Trail 180 passes.

Figures 43 and 44 illustrate the GIS derived gradients and the GIS-derived hillslope gradients of proposed Trail 180.

Figure 43. Map depicting the percent gradient of proposed Trail 180.

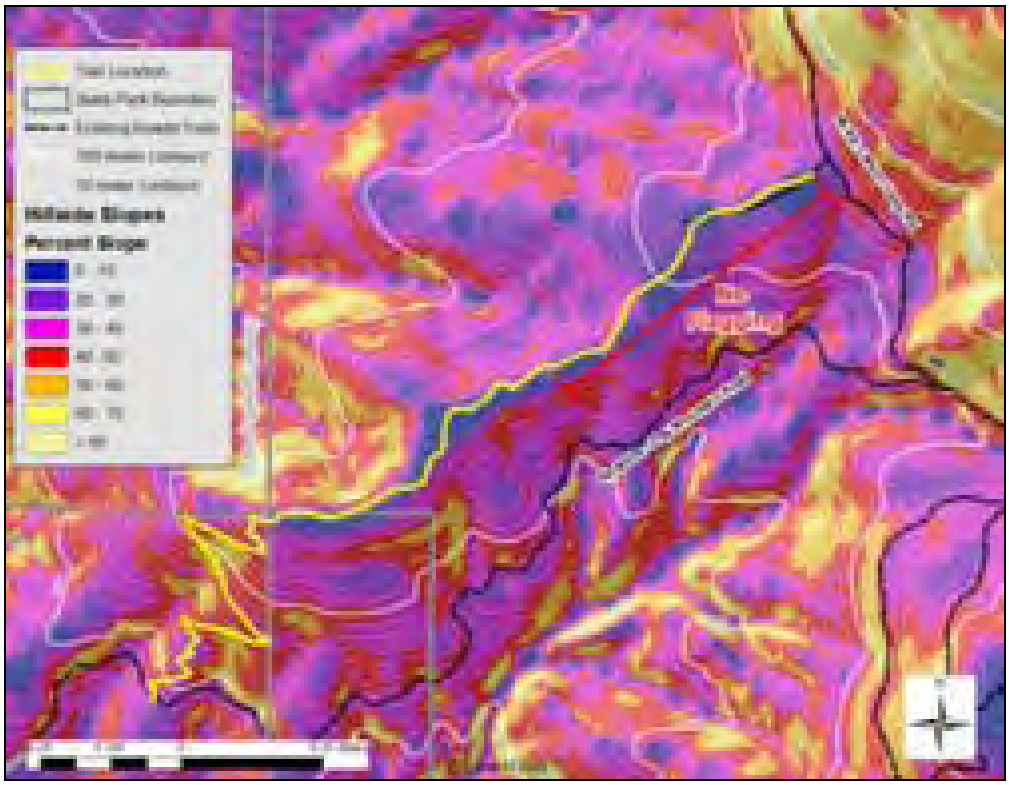

Figure 44. Map depicting the hillside slope in the area of proposed trail 180.

Table 15 provides the statistics regarding trail development impact levels by vegetation element category for proposed Trail 180. The percentage statistics depict the proportion of the proposed trail by length instigating a particular impact level.

Table 15. Trail development impacts to vegetation community elements by impact level and percent length of proposed Trail 180.

Trail	Impact Level	Snags	Coarse Woody Debris	Understory Vegetation Cover	Understory Tree Regeneration	Main Canopy Trees
180	Low	100%	72%	33%	79%	100%
	Moderate	0%	27%	67%	21%	0%
	Significant	0%	0%	0%	0%	0%

Trail 260

Figure 45. Map depicting the GPS location of proposed Trail 260.

Proposed Trail 260 follows an old logging skid road through a forest of western hemlock/thinleaf huckleberry/common beargrass (S2 G3). The trail crosses a perennial stream and two springs and goes through patches of Sitka alder/mesic forbs (S3S4 G3G4). At the end of the trail where it enters a recent clearcut on private land, the plant association is western hemlock/western oakfern (S3 G3G4). Figure 45 shows the location of the trail and Figure 46 shows the plant associations located along the trail. Table 16 describes the plant associations and their relative abundance along the proposed trail route.

Figure 46. Map depicting the plant associations and their conservation status occurring along the proposed Trail 260.

Table 16. Plant associations and their relative abundance along the route of proposed Trail 260.

Trail	Code	Common Name	Conservation Status	Length in feet	Percent of Trail
260	ALVIS/forbs	Sitka alder / mesic forbs	S3S4G3G4	300	13%
	TSHE/GYDR	western hemlock / western oakfern	S3G3G4	417	14%
	TSHE/VAME/XETE	western hemlock / thinleaf huckleberry / common beargrass	S2G3	1,481	68%
	Roadside thicket			117	5%
	Total			**2,316**	

Representative photos of plant associations occurring along proposed Trail 260 are illustrated in Figures 47 – 49.

The western hemlock/thinleaf huckleberry/beargrass community is ranked globally rare and state imperiled. However, the impact of the trail on this community type is probably insignificant since the old skid road that the trail follows already cleared the road of vegetation half a century ago.

Figure 47. A representative photo of the western hemlock//thinleaf huckleberry beargrass plant association along proposed Trail 260.

Figure 48. A representative photo of the western Sitka alder/mesic forb plant association along proposed Trail 260.

Figure 49. A representative photo of the western hemlock/western oakfern plant association along proposed Trail 260.

Figures 48 and 49 illustrate the GIS derived gradients and the GIS-derived hillslope gradients of proposed Trail 260.

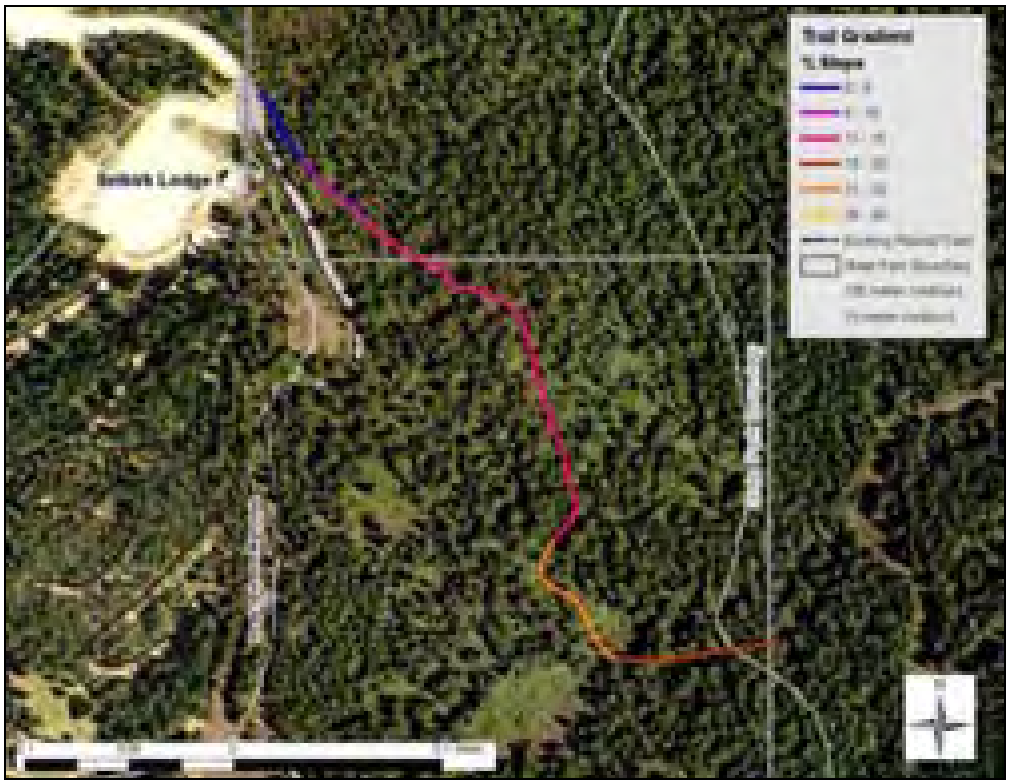

Figure 48. Map depicting the percent gradient of proposed Trail 260.

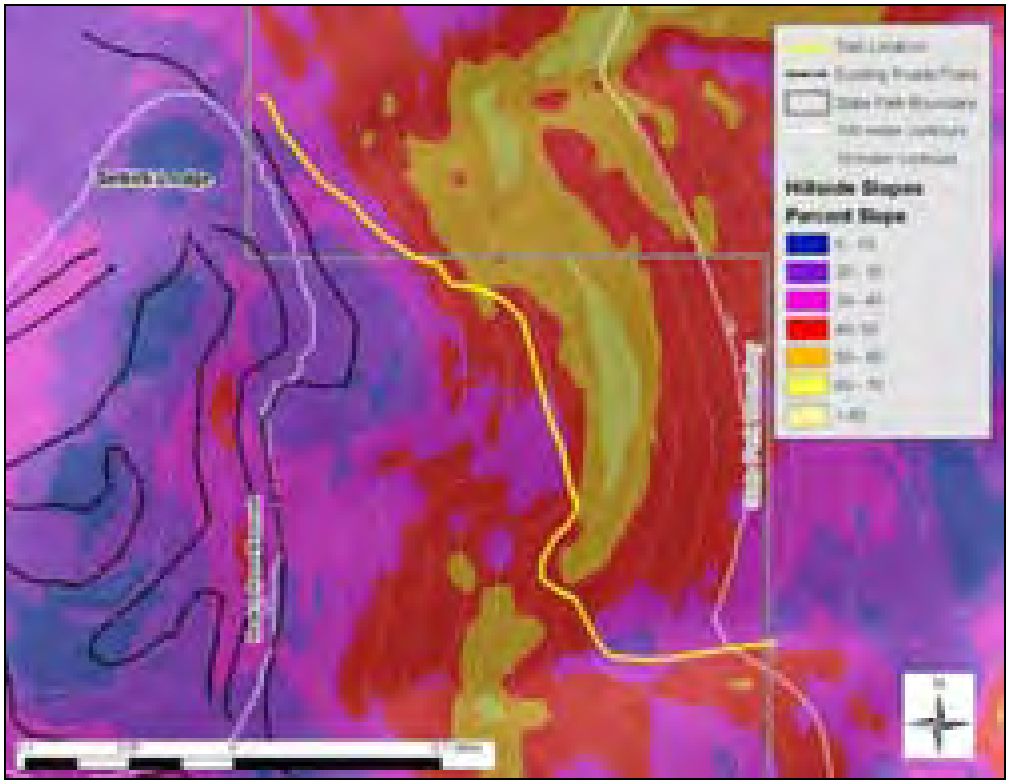

Figure 49. Map depicting the hillside slope in the area of proposed Trail 260.

Table 17 provides the statistics regarding trail development impact levels by vegetation element category for proposed Trail 260. The percentage statistics depict the proportion of the proposed trail by length instigating a particular impact level.

The riparian habitats could be impacted unless bridges or culverts are built to prevent sedimentation and erosion into the riparian system. This trail will potentially create more habitat for tansy (*Tanacetum vulgare*), a noxious weed which is spreading rapidly in the road above.

Table 17. Trail development impacts to vegetation community elements by impact level and percent length of proposed Trail 260.

Trail	Impact Level	Snags	Coarse Woody Debris	Understory Vegetation Cover	Understory Tree Regeneration	Main Canopy Trees
260	Low	100%	53%	18%	45%	92%
	Moderate	0%	47%	64%	55%	3%
	Significant	0%	0%	18%	0%	5%

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Appendix A – MSSP EIS Section on Vegetation Impacts

AFFECTED ENVIRONMENT

The Mount Spokane State Park (MSSP) project area has a range of elevation, slopes, aspects and soil types. Soils in the project area vary from rocky talus to deeper loams with volcanic ash-derived deposits. Some steep areas with slopes over 55% occur in areas proposed for trail construction.

Forest communities dominate most of the project area. However, sections of the proposed trails go into or close to shrublands, meadows, balds and talus. Snowmelt varies by topography and forest cover, providing a range of seasonal habitats across the landscape.

MSSP has a variety of unique vegetation communities and ecosystem types that are considered rare or imperiled on a state and global level, and that provide potential habitat for rare plant species (Smith and Morrison 2009, Wooten and Smith 2009, NatureServe 2009, Morrison et al. 2007, Williams et al. 1995, Crawford 1993, Cooper et al. 1991). Table 1 lists the plant associations the proposed trails along with their state and global conservation status.

Table 1. Plant associations in trail impact zones.

The following plant communities occur along sections of trail proposed for construction (Rank codes: S = State, G = Global, 2=imperiled; 3=rare and local, 4 & 5=widespread, Q = under review; NA = not assessed; NR = not ranked).

Code	Scientific Name	Common Name	Status
ABGR/ACGL	*Abies grandis / Acer glabrum*	grand fir / Rocky Mountain maple	S2 G3
ABGR/PHMA5	*Abies grandis / Physocarpus malvaceus*	grand fir / mallow ninebark	S2 G3
ABGR/VAME	*Abies grandis / Vaccinium membranaceum*	grand fir / thinleaf huckleberry	S3 G3 G4
ABLA/CAGE2	*Abies lasiocarpa / Carex geyeri*	subalpine fir / Geyer's sedge	SNA G4
ABLA-(PSME)/CAGE2	*Abies lasiocarpa - (Pseudotsuga menziesii) / Carex geyeri*	subalpine fir - (Douglas-fir) / Geyer's sedge	SNA G4
ABLA/LUGLH	*Abies lasiocarpa / Luzula glabrata var. hitchcockii*	subalpine fir / Hitchcock's smooth woodrush	S2 G5
ABLA/VAME	*Abies lasiocarpa / Vaccinium membranaceum*	subalpine fir / thinleaf huckleberry	S4 G4
ABLA/XETE	*Abies lasiocarpa / Xerophyllum tenax*	subalpine fir / common beargrass	S3 G5
ABLA-PIEN/MEFE/CLUN2	*Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Clintonia uniflora*	subalpine fir - Engelmann spruce / rusty menziesia / bride's bonnet	SNA G4 G5
ABLA-PIEN/VAME/XETE	*Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax*	subalpine fir - Engelmann spruce / thinleaf huckleberry / common beargrass	S3 GNR
ALVIS/forbs	*Alnus viridis ssp. sinuata / Mesic Forbs*	Sitka alder / mesic forbs	S3 S4 G3 G4
FEVI-FEID	*Festuca viridula - Festuca idahoensis*	green fescue - Idaho fescue	S2Q G2Q
PIPO-PSME/CARU	*Pinus ponderosa - Pseudotsuga menziesii / Calamagrostis rubescens*	ponderosa pine - Douglas-fir / pinegrass	S2 G2Q
PIPO-PSME/PHMA5	*Pinus ponderosa - Pseudotsuga menziesii / Physocarpus malvaceus*	ponderosa pine - Douglas-fir / mallow ninebark	S2 GNRQ
TSHE/CLUN2	*Tsuga heterophylla / Clintonia uniflora*	western hemlock / bride's bonnet	S4 G4
TSHE/GYDR	*Tsuga heterophylla / Gymnocarpium dryopteris*	western hemlock / western oakfern	S3 G3 G4
TSHE/VAME/XETE	*Tsuga heterophylla / Vaccinium membranaceum / Xerophyllum tenax*	western hemlock / thinleaf huckleberry / common beargrass	S2 G3

The botany survey report documented approximately 160 different vascular plant species along the proposed trail routes (Wooten and Smith 2009). No Endangered, Threatened or Sensitive plants tracked by the Washington Natural Heritage Program of the Department of Natural Resources occur along the proposed trail systems.

Most of these species are native, however three noxious species tracked by the Washington State Noxious Weed Control Board were found along some proposed trail routes. These species were orange hawkweed (*Agoseris aurantiaca*; class B), Dalmatian toadflax (*Linaria dalmatica*; class B) and common St. John's wort (*Hypericum perforatum*; Class C).

Several rare or imperiled plant communities were identified in the proposed project area. Potential impacts to imperiled plant communities (ranked S2 or G2) are discussed. Plant communities ranked rare (S3 or G3) are noted.

ENVIRONMENTAL CONSEQUENCES

a. No Action

The No Action alternative would not directly affect vegetation along existing roadways, trails and facilities other than ongoing maintenance activities. There would be limited or no ground-disturbing activities along the proposed routes. There are no state or federally listed plant species known to occur within the Park, therefore the No Action alternative would not affect those species. The No Action alternative would not directly affect vegetation communities of conservation significance because no new ground-disturbing actions would occur.

Noxious weeds could spread unobserved into areas lacking trails, however this is unlikely at present since most noxious weeds known in this area are associated with soil and canopy disturbance.

Erosion would continue to occur on some existing trails planned for improved erosion controls and constructed switchbacks. This would have a negligible effect on plant species composition and on plant communities.

Indirect effects of unregulated access and off-trail use could occur due to lack of trail facilities in some areas.

Areas of MSSP that are currently relatively free of human visitor impacts would continue to be seldom visited.

b. Proposed Action

Effects considered

Trail impacts in MSSP were assessed based on the proposed types of use and required construction methods for each use. Proposed trail multi-use recreation activities common to all trails include hiking, horseback riding, mountain biking, snowshoeing and back country skiing. In addition, snowmobiling is proposed on Trail 260.

The types of use for each trail dictate the width and type of clearing associated with each trail. Mountain bike, hike, ski and snowshoe trails require a 1-2 foot trail width, with a 1 -2 foot off-trail maintenance area alongside the trail. Equestrian trails require similar trail size and maintenance widths; however this may be larger due to the size of the animals using the trails, especially in forested areas. Snowmobile trails require a 10 to 12 foot wide trail, with an additional 2 feet for off-trail maintenance. Trail 260 is the only new snowmobile-use designated trail in the Proposed Action. This trail will not be maintained for summer motorized recreation; however non-motorized use can occur on the trail during this season.

Impacts from trail construction, trail use or ongoing maintenance that were considered here include the following (Snetsinger and White 2009; Duryea and Hermansen 2003; Potito 2000; Cole and Landres 1995; Harper et al. 1965):

- impacts to rare plants and their habitats;

- direct harm to plants providing ecosystem services;
- loss or alteration of plant habitats;
- altered ecosystem function;
- increased spread of invasive species;
- displacement of native plants by non-natives;
- increased soil disturbance favoring invasive species establishment;
- soil compaction and associated changes in hydrology and plant growth;
- human, pet and wildlife travel leading to the spread of invasive species;
- changed vegetation community composition or function;
- changes in animal browsing patterns or trampling of vegetation;
- increased risk of wildfire.

Impacts to non-listed plants and plant communities can occur as a result of trail construction, maintenance and use. Vegetation removal affects plant communities by changing the availability of water, nutrients and sunlight, while selectively removing existing individuals and the habitat they provide.

In addition to direct effects to live vegetation, trail construction activities involve indirect effects such as cutting trees and roots out of the path of the trail, digging soil to provide a hard and level surface, and allowing for drainage of rain and meltwater. Trail construction and maintenance may also involve planting, seeding and weed control activities that can impact the community composition.

Trail-based recreation and trail construction and maintenance can alter soil characteristics that affect the germination, establishment, growth, and reproduction of plants. Altered soil characteristics include compaction that can reduce successful germination (Harper et al. 1965). Loss or disturbance of organic soil horizons can disrupt ecosystems through impaired decomposition, nutrient cycling, oxygen exchange and water availability (Cole and Landres 1995).

Effects on rare plants

There will be no direct impacts to state or federally listed plant species, since no listed species occur within areas proposed for trail construction. No state or federally listed vascular plant species are known to occur within Mt. Spokane State Park.

Effects specific to proposed trails

Trail 130/170

The proposed trail makes a switchback through a forest composed mostly of subalpine fir-Engelmann spruce/rusty menziesia/bride’s bonnet. A small amount of subalpine fir / thinleaf huckleberry occurs at the west end of the trail. The forest communities are not expected to be extensively altered by a new trail, as the trail does not require significant removal of understory vegetation or snag or tree removal. There are no rare vegetation communities along this trail segment.

Trail 140 Summit Upper

The proposed trail switchbacks through a steep forest of closed-canopy subalpine fir/Hitchcock's woodrush (S2 G5) at the top and then it transitions into a subalpine fir/beargrass community (S3 G5) as it passes near the highway switchback. Small patches of subalpine fir/thinleaf huckleberry become more prominent at the bottom of the trail without becoming dominant. Small patches of subalpine fir / Geyer's sedge and of green fescue - Idaho fescue meadow (S2Q G2Q) occur along the lower parts of the trail. The lowest part of the trail is adjacent to a large forest opening where laminated root-rot (*Phellinus weirii*) has killed most of the canopy and left behind a woodland/shrubland.

The green fescue – Idaho fescue meadow is ranked globally imperiled. This community is gradually losing area to tree invasion on Mt. Spokane. The proposed trail would have an insignificant impact on this plant community. Indirectly, a trail could contribute to soil erosion into the meadows that could then alter the habitat to be more favorable to tree or invasive species establishment. Mitigation measures were made that would help protect the integrity of meadows from tree encroachment.

The subalpine fir/Hitchcock's woodrush plant association is state imperiled (S2 G5). This plant association is normally found at high elevations. The proposed trail would have an insignificant impact on this plant community because it does not involve significant disturbance of trees, understory species or soils.

In a few places the route of proposed Trail 140 Summit Upper crosses through dense and diverse deciduous shrub patches, with a high cover of Greene's mountain ash (*Sorbus scopulina*). These shrubland patches are not abundant within the closed canopy subalpine fir forests in this area, however they are not a published plant association in the literature.

The forested plant associations will not be impacted by the proposed trail other than insignificant clearing of snags and woody debris. The lowest part of the trail is very brushy and may require more frequent maintenance clearing.

Trail 140 Summit Lower

The proposed trail switchbacks through a steep north-facing forest composed of closed canopy subalpine fir–Engelmann spruce/thinleaf huckleberry/beargrass (S3 GNR) and subalpine fir – Engelmann spruce/rusty menziesia/bride's bonnet plant communities. The trail rejoins the existing 140 trail within a stand of subalpine fir - Engelmann spruce / thinleaf huckleberry / beargrass. The forest communities are not expected to be extensively altered by a new trail, as the trail does not require significant removal of trees, understory vegetation, woody debris or soils.

Trail 140 KC-B

The proposed trail begins in a forest of subalpine fir/Geyer's sedge adjacent to an open green fescue-Idaho fescue meadow. The trail does not go directly through the meadow to avoid potential impacts to that community. Further from the meadow, the plant community changes to subalpine fir-Engelmann spruce/thinleaf huckleberry (S3 GNR).

These communities are not expected to be extensively altered by a new trail, as the trail does not require significant removal of understory vegetation or snag or tree removal.

As the slope steepens, the trail then goes across a steep, rocky slope of mid-seral forest composed of grand fir/mallow ninebark (S2 G3), grand fir/thinleaf huckleberry (S3 G3G4) and grand fir/Rocky mountain maple (S2 G3). Shrub cover is very high. Northwest of the trail the forest grades into a draw dominated by grand fir/thinleaf huckleberry/bride's bonnet, however the trail avoids entering this community because of its high wildlife value.

Both grand fir/Rocky mountain maple and grand fir/mallow ninebark are ranked S2 G3, state imperiled and globally rare. The proposed trail would have an insignificant impact on these plant communities because it does not involve significant disturbance of trees, understory species or soils. There would be a slight increase in the risk of wildfire. The last switchback from the bottom is on a steep slope that will require a wider clearing to make the turn. Construction of the switchback will require additional time and attention to protect the soil from erosion.

Trail 160 KC-A

The proposed trail goes through a forest of subalpine fir/beargrass (S3 G5) with small patches of subalpine fir/thinleaf huckleberry. This forest was formerly dominated by lodgepole pine that is now approximately 70% dead. These forest communities are not expected to be significantly impacted by a new trail, as the trail does not require significant removal of understory vegetation or snag or tree removal.

Trail 180

The proposed trail begins on an old road that is overgrown with tall shrubs. The plant community is grand fir/mallow ninebark (S2 G3). The middle section of trail follows a ridgeline through a forest of large Douglas-fir, grand fir and western larch (*Larix occidentalis*) growing in a mid- to late-seral forest. This part of the trail crosses a small stand of ponderosa pine-Douglas fir/pinegrass (S2 G2Q). The trail then follows the ridge westward through two clearcuts. North of the trail, forests are dominated by western hemlock/bride's bonnet, which barely intersects the trail. The last part of the trail drops off the ridge and goes through a mixture of grand fir/mallow ninebark (S2G3) and ponderosa pine-Douglas fir/mallow ninebark (S2 GNRQ).

The grand fir / mallow ninebark community and the ponderosa pine-Douglas fir/pinegrass plant community are both ranked state imperiled, and the latter is also ranked state imperiled. The ponderosa pine-Douglas fir/pinegrass occurs in a small stand on a well-drained, rocky, narrow ridgeline near the middle of the trail. The ridgeline community is dominated by Douglas-fir, and contains high value functional forest structures that are lacking in adjacent forests. Features include multiple canopies of gallery trees and large logs and snags. Understory species in this stand are exceptionally diverse and contain a large number of late-seral mycorrhizal species. For instance, all four species of Washington's coral root orchids (*Corallorhiza* spp.) were found here, along with large numbers of mountain lady's slipper orchids (*Cypripedium montanum*),

Indianpipe (*Monotropa uniflora*) and pinesap (*Hypopitys monotropa*). Both plant communities are undergoing transition to dominance by late-seral species.

Soil disturbance and loss of organic soil matter could result in loss of habitat for mycorrhizal species that currently grow along this ridgeline corridor. These species typically prefer higher soil moisture and prefer partial or deep shade. Specific mitigation measures for this trail were designed to protect these stand attributes.

An existing wildlife trail along the ridgeline currently receives a high amount of wildlife use. Increased human presence will have complex effects on the habitat, possibly modifying existing wildlife behavior, which in turn may affect the nature of grazing impacts to plants or invasive species along the trail.

The grand fir/mallow ninebark and ponderosa pine-Douglas fir/mallow ninebark plant associations on the lower part of the trail are both state imperiled. The proposed trail would have an insignificant impact on these plant communities because it does not involve significant disturbance of trees, understory species or soils.

Noxious weeds may increase along disturbed areas such as roads and trails, using humans and animals as vectors for their spread. Several species of noxious weeds were found including Class B orange hawkweed (*Hieracium aurantiacum*) growing in at in several spots between the beginning and the clearcut areas along the proposed trail. The clearcut areas also supported Dalmatian toadflax and common St. John's wort.

Trail 260

Proposed trail 260 follows an old logging skid road through a forest of western hemlock/thinleaf huckleberry/beargrass (S2 G3) with patches of Sitka alder/mesic forbs (S3S4 G3G4). Along the way the proposed trail crosses an intermittent stream and two springs with riparian vegetation. At the end of the trail where the trail enters a recent clearcut on private land, the plant association is western hemlock/western oakfern (S3 G3G4).

The western hemlock/thinleaf huckleberry/beargrass community is ranked globally rare and state imperiled. The proposed trail would have an insignificant impact on this plant community because it does not involve significant disturbance of trees, understory species or soils. Also, the old skid road that the trail follows previously cleared the road of vegetation half a century ago.

The riparian habitats will require bridges or culverts to prevent sedimentation and erosion from impacting the riparian system. This trail would create habitat for tansy (Tanacetum vulgare), a noxious weed which is spreading rapidly in the road above. It is extremely important to monitor for tansy and control it manually before it establishes, because aquatic herbicides are limited and aquatic herbicide control is ineffective unless used so heavily that it kills an unacceptable level of non-target species.

MITIGATION MEASURES

General mitigation measures

The following mitigation measures apply to the Proposed Action.

- Minimize vegetation disturbance and clearly delineate areas to be cleared to avoid unnecessary vegetation disturbance during construction (e.g., construction fencing, flags, stakes, etc.).
- Harden trailheads with soil protection measures (gravel, culverts, grass plantings, mulch, etc.).
- On trailheads and heavily disturbed areas where it is necessary to use revegetation, use certified weed-free native or non-invasive vegetation. Certified weed-free seed is not certified until it has been confirmed free of noxious weeds by the Washington State Department of Agriculture.
- Delineate trails clearly to minimize use of off-trail sensitive areas.
- Do not allow beargrass harvesting.
- Retain all woody debris and organic detritus on the site.
- Take advantage of increased opportunities for education and nature awareness through interpretive signing, particularly along Trails 180 and 260.

Mitigation measures specific to invasive species

To prevent the introduction of and to minimize the spread of invasive species and noxious weeds, the following measures need to be implemented:

- Minimize soil disturbance.
- Minimize canopy removal.
- Where possible, use mowing and brush trimming to maintain trail widths, and avoid unnecessary digging that disturbs soils and can create new habitats for weeds.
- Limit vehicles to existing roads, parking lots, and travel routes where they are allowed.
- Obtain all fill material on-site from weed-free project cuts.
- Require all equipment to be thoroughly cleaned before being used on the site.
- Specify certified weed-free native or non-invasive vegetation for reseeding. Certified weed-free seed is not certified until it has been confirmed free of noxious weeds by the Washington State Department of Agriculture.
- Regularly monitor all trails to identify early invaders before they become established.
- Control Class-A and Class B weeds before seeds mature. Replant denuded areas with certified noxious-weed free seed after all weeds and seed sources are gone.

Mitigation measures specific to Trail 140 Summit Upper

- Where the trail goes through a green fescue-Idaho fescue meadow, minimize disturbance of the turf and do not place water bars where they will direct runoff into the meadows.

- Where the trail goes through a green fescue-Idaho fescue meadow, cut out (no digging) invading young confers adjacent to the trail.

Mitigation measures specific to Trail 180

- Where trails go through forested areas, retain all large diameter trees and snags, and avoid placing the trail beneath trees that are likely to fall in the near future.
- Where trails go through forested areas, retain all forest canopy for shading.
- Retain all coarse woody debris and organic detritus along trails.
- Take advantage of increased opportunities for education and nature awareness through interpretive signing.

Mitigation measures specific to Trail 260

- Avoid wetland habitat and wetland vegetation and span wet areas with bridges or properly sized culverts.
- Take advantage of increased opportunities for education and nature awareness through interpretive signing.

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Appendix B – Definitions of Vegetation Community Conservation Status

The following table defines the ranking system for plants and plant communities used by the Washington State Natural Heritage Program.

Code	Definition
G1	Critically imperiled throughout its range; extremely rare with five or fewer occurrences or very few remaining acres.
G2	Imperiled throughout its range; rare with six to 20 occurrences or few remaining acres.
G3	Either very rare and local throughout its range or found locally in a restricted range; uncommon with 21 to 100 occurrences.
G4	Apparently secure throughout its range, though it may be quite rare in some parts of its range, especially at the periphery; many occurrences.
G5	Demonstrably secure in its range, though it may be quite rare in some parts of its range, especially at the periphery; ineradicable under present conditions.
S1	Critically imperiled in Oregon; extremely rare with five or fewer occurrences or very few remaining acres.
S2	Imperiled in Oregon; rare with six to 20 occurrences or few remaining acres.
S3	Either very rare and local in Oregon or found locally in a restricted range; uncommon with 21 to 100 occurrences.
S4	Apparently secure in Oregon, though it may be quite rare in some parts; many occurrences.
S5	Demonstrably secure in Oregon, though it may be quite rare in some parts; ineradicable under present conditions.
U	Unknown
NA	Natural Heritage Rank not available or not assessed
NR	Not Ranked