

# Environmental Assessment: Alta Ski Lifts Master Development Plan Improvement Projects



US Department of Agriculture – Forest Service  
Uinta-Wasatch-Cache National Forest  
Salt Lake Ranger District  
Salt Lake City, Utah



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# **CHAPTER 1: PURPOSE AND NEED**

## **1.1 INTRODUCTION**

On December 5, 2015, the Salt Lake Ranger District, Uinta-Wasatch-Cache National Forest (UWCNF) received a proposal from Alta Ski Lifts (Alta) to authorize a number of improvement projects that the ski area proposes to complete over the next several years. As the projects are included in Alta's accepted master development plan (MDP), are within the ski area's special use permit (SUP) area, and are consistent with UWCNF screening criteria, the Forest Service agreed to review Alta's proposal.

MDPs are a requirement of USDA-Forest Service (Forest Service) ski area special use permits (SUPs) and serve as a conceptual planning tool to outline the operators' vision as to how ski areas will evolve over a 10-to-15-year planning horizon. They are intended to be dynamic documents, amended or revised periodically to reflect changes in operational opportunities and constraints, skier market demands, or agency administrative requirements. Acceptance of an MDP does not authorize implementation of the plan. Decisions regarding authorization are based on review required by the National Environmental Policy Act (NEPA) addressing projects that are ripe for decision and capital investment, generally within the next 5 years.

The proposed projects may affect the human environment, so the Forest Service must analyze and disclose potential impacts in accordance with NEPA. The UWCNF has decided that the appropriate level of review for this proposal is an environmental assessment (EA).

The UWCNF has prepared this EA in compliance with NEPA and Forest Service regulations regarding its implementation (36 CFR 220). This EA discloses the direct, indirect, and cumulative environmental impacts that would result from implementing the proposed action and required no-action alternative, in support of an agency decision regarding Alta's requested authorization.

The ski area operates under a Special Use Permit (SUP) issued by the Forest Service. The current SUP was issued in 2002 and is administered by the UWCNF. It has a term of 40 years. All proposed projects fall within the current SUP boundary.

## **1.2 ORGANIZATION OF THE DOCUMENT**

This EA is organized as follows:

- **Chapter 1 – Purpose and Need:** Includes background information on this EA process, outlines the organization of the document, describes the project area, summarizes the proposed action and the purpose and need it addresses, defines the decision to be made on the basis of this EA, identifies relevant higher level Forest Service plans, describes how the UWCNF informed the public of the proposed action and how the public responded, then lists other permits and authorizations that may be necessary to implement the proposed action.
- **Chapter 2 – Proposed Action and Alternatives:** Provides a detailed description of the proposed action, the alternative formulation process, and the no-action alternative. Concludes with a comparative summary of the anticipated environmental effects of the proposed action and no-action alternative.
- **Chapter 3 – Affected Environment and Environmental Consequences:** Describes the existing resource conditions and the direct, indirect, and cumulative environmental effects of implementing the proposed action and no-action alternative. Discussion is organized by resource and addresses the specific issues associated with each resource identified through public scoping and internal, interdisciplinary review.

- Chapter 4 – Consultation and Coordination: Identifies the agencies and other entities consulted during the preparation of this EA.
- Chapter 5 – List of Preparers: Identifies the UWCNF and contractor personnel involved in preparation of this EA.
- Chapter 6 – References: Lists the references cited in the text of this EA.
- Appendices: Provide more detailed information supporting the analyses presented in this EA.

Documentation of this EA process is available in the project record located at the Salt Lake Ranger District, 6944 South 3000 East, Salt Lake City, UT 84121.

## 1.3 PROJECT AREA

The project area is defined as Alta's approximately 1,800-acre SUP area. It is generally bounded by State Route 210 (SR 210) on the north, the ridgeline separating Big and Little Cottonwood canyons on the east, the Salt Lake County/Utah County line on the south, and Snowbird Ski and Summer Resort on the west. Access is from the Salt Lake Valley, about 13 miles up SR 210. Elevations range from 8,530 feet to 11,051 feet, and exposures are generally north. The project area is in the UWCNF's Central Wasatch Management Area.

## 1.4 PROPOSED ACTION

A description of the proposed action was provided to individuals, groups, and organizations during the agency-designated scoping period starting in April 2016. Public scoping was used to gain feedback on preliminary issues, identify new issues, and possibly identify alternatives to consider. Scoping and public involvement are discussed in Section 1.8 and the proposed action is described in detail in Chapter 2.

Scoping of this proposed action included three projects that were subsequently dropped from this analysis. The Supreme lift replacement and associated Cecret lift removal were analyzed separately and authorized in February 2017. On the basis of scoping comments, the decision was made to remove the restoration of Lake Flora, at the top Glory Hole, from this analysis and investigate water-storage alternatives, including the potential for expanding Cecret Lake. The Lake Flora project will remain in Alta's MDP until an acceptable alternative is identified. The proposal to remove Albion lift was dropped due to concern over losing redundant lift capacity out of the Albion base area.

In November 2017, the WCNF published a Notice of Proposed Action, initiating a second opportunity to comment, this time on a draft of the EA. On the basis of the comments received, the proposed addition to Alf's restaurant was shortened so that it would not extend as far to the southeast of the existing building in order to increase the buffer distance between the building and the drainage to the south. The reduction in area may be offset by a second story over a portion of the existing building.

The final change to the proposed action since scoping involves the Albion parking lot expansion. Construction of a new Snowpine Lodge immediately west of the parking lot began in 2017. This, coupled with Utah Transit Authority (UTA) using additional parking spots in the lot as a waiting area for buses, requires adjustment of Alta's planning for the parking lot project. Increased flexibility in final planning for the parking expansion is needed to address public comments on the need to separate SR 210 traffic from Albion parking lot traffic, the Snowpine Lodge construction, and additional public transportation needs. As a result, the expansion footprint has been changed to include 30 feet of widening along the northern edge of the lot, opposite the Albion Grill, in addition to the originally proposed fill along the lower, southern edge of the existing access road and parking lot.

The remaining projects were unchanged and constitute the proposed action, which includes the following (see section 2.4 for a detailed description of each project):

1. Albion/Wildcat base parking.
2. Tram from Germania Pass to the top of Mt. Baldy.
3. Gazex or other equivalent technologies to replace artillery and Avalaunchers.
4. Sunnyside lift replacement.
5. Wildcat lift replacement.
6. Flora lift construction from bottom of Sugarbowl to the top of Collins lift.
7. Supreme summer ski run work.
8. Alf's restaurant building addition.
9. Watson Shelter building addition.
10. Equipment storage facility construction.

## 1.5 PURPOSE AND NEED

The purpose of this action is to review and process the applicant's proposal to make improvements within the project area. The Forest Service follows laws, regulations, and guidance specific to ski areas, while preventing unnecessary or undue degradation of public land. The need for the proposed action is to respond to Alta's proposal. The proposed projects occur on lands administered by the UWCNF.

The Forest Service Manual provides the following direction for management of privately provided recreation opportunities: "To provide, under special-use authorization, sufficient, suitable facilities and services that supplement or complement those provided by the private sector, State and local government on private land and the Forest Service on National Forest System land to meet public needs, as determined through land and resource management planning. To facilitate the use, enjoyment, understanding and appreciation of natural resource settings in National Forests" (FSM 2340.2). In addition, the Forest Service now operates under the directive to implement the *Ski Area Recreational Opportunity Enhancement Act of 2011*, which provides long-awaited direction on the types of summer activities the Forest Service should consider authorizing to round out the range of opportunities provided to the public at permitted mountain resorts.

The *2003 Revised Forest Plan for the Wasatch-Cache National Forest* (Forest Plan) provides overarching direction, goals, standards and guidelines, and desired future conditions for all management activities on the National Forest (Forest Service 2003). The project area is located within the Central Wasatch Management Area (Forest Plan, p. 4-152), where we have identified developed recreation areas, which include ski areas. The applicant's proposal is consistent with the Forest-wide goal of providing a diverse range of recreation opportunities to a wide segment of the population (Forest Plan, p. 4-11).

Alta's purpose for their proposal is to make more efficient and safe use of the resources within the permit area by replacing outdated equipment, upgrading service facilities, and taking advantage of new technology.

Specific needs to be resolved in order to achieve Alta's purpose include:

1. Improving economic and environmental sustainability.
2. Improving visitor parking.
3. Enhancing avalanche control methods.
4. Upgrading lift service while reducing visual and land impacts.
5. Taking advantage of emerging lift technology to streamline service.
6. Increasing efficiency of access to popular terrain.
7. Upgrading skier services and opportunities while improving skier distribution and circulation.

Project-specific rationales are provided in section 2.4 and explain how these needs would be met.

## 1.6 DECISION TO BE MADE

In consideration of the stated purpose and need and this analysis of environmental effects, the responsible official, the UWCNF Forest Supervisor, will review the proposed action to make the following decisions:

1. Whether to authorize it, all or in part;
2. What design criteria and mitigation measures to require for the actions authorized; and
3. What evaluation methods and documentation to require for monitoring project implementation and mitigation effectiveness.

## 1.7 PLANNING GUIDANCE

### 1.7.1 FOREST PLAN

The Forest Plan provides primary guidance for management of the land and resources on the UWCNF, including portions of Alta on NFS land. The Forest Plan indicates that Alta's SUP boundary falls within the Central Wasatch Management Area and is subject to both Forest-wide and management area-specific standards and guidelines pertinent to this type of activity.

The Forest Plan provides management prescriptions that define the primary land use allocation for a given land area. Management prescription categories provide a general sense of the management or treatment of the land intended to result in a particular condition being achieved or set of values being maintained or restored. Each management prescription includes a set of standards and guidelines identifying activities that are not allowed and parameters within which activities that are allowed should be conducted. Management prescriptions for each category identify management emphasis and focus, highlighting considerations for harmonious and coordinated multiple-use management, maintenance of productivity, and the relative values of various resources.

Alta is primarily located within management prescription 4.5 (Developed Recreation Areas), though small portions around the perimeter are also in 3.1W (Watershed). These management prescriptions are as follows:

4.5 Developed Recreation Areas: These areas include developed facilities such as campgrounds, trailheads, boat docks, and resorts under special use permit as well as adjacent areas associated with these sites. High levels of visitor interaction can be expected where sights and sounds of others are noticeable and there are moderate to high opportunities for social interaction. Access to these areas is primarily by motorized roads with some trails. Visitors can expect higher levels of regulation. Signs and visitor information are noticeable throughout the area. Site development tends toward the Roaded Natural to Rural end of the Recreation Opportunity Spectrum (ROS). Facilities vary from rustic using native materials to facilities designed primarily for visitor comfort or convenience and built using synthetic materials. Visitor impacts can be noticeable. Impacts to natural resources are dealt with through various management techniques and regulations. Management visibility is high with managers focusing on public safety, service, education, user ethics, and enforcement. Americans with Disabilities Act (ADA) level development is encouraged. Because of the large capital investments in these areas, site protection is paramount (Forest Plan, pp. 4-73–74).

3.1W Watershed: Emphasis is on maintaining or improving the quality of watershed conditions and aquatic habitats. Watershed function and aquatic habitat values are recognized as important and may require restoration to reach desired conditions. Areas of

municipal watershed and public drinking water sources will be managed to maintain or improve soil processes and watershed conditions. Where improvement is needed, it is achieved by implementing watershed improvement projects, and by applying soil and water conservation practices to land-disturbing activities (Forest Plan, p. 4-69).

The 3.1W management prescription consists of uplands identified as important watersheds.

- (S3.1W) Timber harvest, road construction and new recreation facility development are not allowed.
- (G3.1W-1) Vegetation/fuel treatment, prescribed fire, and wildland fire use are allowed for the purposes of maintaining, improving or restoring watersheds to desired conditions, and to protect property in the wildland urban interface.
- (G3.1W-3) New trail construction is allowed with consideration of existing road/trail densities.

## **1.7.2 OTHER PLANNING GUIDANCE**

CEQ guidance (question 23a, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations) stipulates that the Forest Service should inquire of other agencies whether there are any potential conflicts that could arise from the proposed action. If so, this EA must acknowledge and describe the extent of those conflicts. It is Forest Service policy to work with local governments and make every effort to comply with local land use plans and regulations, even though the agency may not be legally required to do so. In this case, applicable plans include Salt Lake County's Wasatch Canyons Master Plan and the Salt Lake City Watershed Management Plan. Local ordinances and regulations that may apply include the Salt Lake County Foothills and Canyons Overlay Zone (FCOZ), Salt Lake Valley Health Department Regulations, Salt Lake City Title 17, Chapter 17.04 (Watershed Areas), and the Town of Alta General Plan.

### **1.7.2.1 Wasatch Canyons Master Plan**

Salt Lake County's Wasatch Canyons Master Plan (Salt Lake County 1989) is intended to guide and coordinate land use and development in the seven major Wasatch Canyons, including Little Cottonwood Canyon. This plan is being revised, but relevant points from the current version can be summarized as follows.

Regarding water quality, the plan notes that "All stream segments within the plan area have been designated by the state under the Clean Water Act for antidegradation, which means canyon policies must prevent any water quality degradation... All uses will be carefully reviewed by Salt Lake County with an initial determination of whether the activity after mitigation measures would adversely impact the watershed." (p. 27)

With specific reference to ski areas and Alta, the plan states that:

- "The ski resorts must be able to adapt to changes in market size and composition and to innovations in equipment and physical facilities in order to compete in the national market." (p. 36)
- The largest use in Little Cottonwood Canyon is alpine skiing, including Alta and Snowbird ski areas. "The plan provides for existing Canyon roles to continue." (p. 74)
- For Little Cottonwood Canyon: "Ski resorts will be required to evaluate and mitigate project traffic impacts associated with proposals which would increase their use capacities." (p. 77)



The plan also lists issues that “are considered to be requisite components of the review process to determine the short- and long-term effect of a development:

1. Water quality, with primary attention to municipal watershed management;
2. Transportation, with assessments of predominant modes, qualification of impacts, and traffic mitigation strategies;
3. Vegetation, including mountain wetlands;
4. Wildlife;
5. Other users of Canyon resources, including public recreation;
6. Visual impacts including signs;
7. Public health and safety;
8. Public infrastructure;
9. Cultural and historical impacts;
10. Other factors deemed important.”(pp. 101-102)

#### **1.7.2.2 Salt Lake City Watershed Management Plan**

Salt Lake City, a municipal public water supplier as defined by the Federal and State Safe Drinking Water Act, obtains a significant proportion of its culinary water from streams originating in the Wasatch Canyons, including Little Cottonwood Canyon. The purpose of the Salt Lake City Watershed Management Plan (Salt Lake City Department of Public Utilities 1999) is to protect this valuable watershed (p. 1). The Salt Lake City Department of Public Utilities is mandated to monitor and regulate any activities that may threaten water quality (p. 11). This plan is being revised, but relevant points from the current version can be summarized as follows.

Under Desired Future Conditions (p. 3), the plan states that:

Successful implementation of the '99 Watershed Plan will achieve a desired future condition in the Wasatch Canyons that maintains excellent water quality and continues to strive for superior water quality. The management emphasis prioritizes water quality first and multiple use of the watershed second. The Wasatch Canyons are protected to maintain a healthy ecological balance with stable environmental conditions, healthy streams and riparian areas, and minimal sources of pollution. Existing and potential uses that could lead to the deterioration of water quality are limited, mitigated, or eliminated. To the extent that, in the reasonable judgment of the City, a proposed development or activity, either individually or collectively, poses an actual or potential impact to the watershed or water quality, Salt Lake City will either oppose, or seek to modify, manage, control, regulate or otherwise influence such proposed development or activity so as to eliminate or mitigate potential impacts.

This means that any impact on water quality as a result of the proposed action or other alternatives should be avoided or mitigated.

#### **1.7.2.3 Salt Lake Valley Health Department Regulations**

The Salt Lake Valley Health Department (SLVHD) provides public health services, including environmental health, to the Salt Lake Valley community. SLVHD regulations applicable to development and use in the Wasatch Canyons, including Little Cottonwood Canyon, include Regulation No. 11, concerning water systems, Regulation No.12 concerning subdivisions, Regulation No.13 concerning wastewater, and Regulation No.14, concerning watershed health. Salt Lake City and the SLVHD have joint decision-making authority under Regulation No. 14.

#### **1.7.2.4 Salt Lake City Title 17, Chapter 17.04, Watershed Areas**

Salt Lake City has authority to protect its municipal watersheds outside of its municipal boundaries under the Utah Constitution (Article XI, Section VI) and state statute (Utah Code Ann. 10-8-15). Federal legislation was enacted in 1914 and 1934 (Public Laws 199 and 259) that recognized Salt Lake City's authority. Salt Lake City has implemented state statutory authority for watershed protection through the adoption of ordinances under Title 17 of the Salt Lake City Code. Title 17 includes all ordinances under the jurisdiction of Salt Lake City Department of Public Utilities. Chapter 17.04 contains ordinances for Salt Lake City's watershed areas. Relative to ski area management in the watershed, Article IV governs water use and sanitary facilities. Article IV include rules and regulations (17.04.180), sanitary sewage disposal system requirements (17.04.210), garbage or human waste disposal - permit required (17.04.230), chemical toilets or privies (17.04.250), hauling of human waste required (17.04.280), and prohibited locations of toilet vaults (17.04.290).

#### **1.7.2.5 Town of Alta General Plan**

The 2005 *Town of Alta General Plan* (Town of Alta 2005, revised 2013 and 2016) includes a vision statement (p. 1) that summarizes the desired balance between growth and development of the community and maintenance of the natural resources that sustain it:

Alta's residents, employees, and business-owners strive for responsible and sustainable growth and development. We celebrate the winter sports activities that are fundamental to our town and we support expansion of Alta's summer economy. We are committed to protecting Alta's scenic and natural resources, especially its critical watershed. While emphasizing responsible environmental awareness and stewardship, we welcome the thousands of people who visit Alta for its recreational opportunities, and we invite them to share our vision for Alta...

...Albion Basin will be sustained with minimal development. We will carefully consider the effects on the environment, including the watershed, wildflowers, and wildlife; public safety; and traffic in evaluating transportation options within Little Cottonwood Canyon and for transportation and skier connections to Big Cottonwood Canyon and the eastern side of the Wasatch Range.

The plan goes on to describe how protection of resources and ecological functions including water quality and watershed protection; wetlands; slopes, erosion, and soil stability; construction and avalanche hazard; vegetation; and visual impact are to be managed. Compliance and support of the laws, regulations, and policies of the pertinent regulatory and land-management agencies is the emphasis.

## **1.8 SCOPING AND IDENTIFICATION OF ISSUES**

All opportunities for public involvement in this NEPA process are described in Chapter 4. The purpose of the first solicitation was to receive public input on the "scope" of the EA—the issues and concerns to address, and the means to avoid or minimize adverse impacts (i.e., alternatives, design criteria, and mitigation measures). On April 22, 2016, the UWCNF issued a public scoping notice summarizing the proposed action and inviting comments regarding the scope of the associated NEPA review. The notice was mailed to the agencies, organizations, and individuals on the UWCNF mailing list. It was also posted on the UWCNF website and made available on CD or hard copy to anyone requesting it.

The scoping period formally began on April 26, 2016, with publication of a legal notice in the *Salt Lake Tribune* and closed on May 26, 2016. Comments were received from one agency, three organizations, and 123 individuals. A scoping report was prepared that identified commenters, listed the comments received, and noted the disposition of those comments in this NEPA process. The scoping notice, comments, and scoping report are included in the project record.

The proposed action and scoping results were reviewed by a UWCNF interdisciplinary team (ID Team) to help determine what environmental issues the EA would address (40 CFR 1508.25). Issue statements were formulated, organized by resource discipline, then reviewed and approved by the Responsible Official. They include issues to be analyzed in depth and those dropped from in-depth analysis for various reasons (e.g., because they were beyond the scope of this environmental analysis, expressed opinions rather than raising issues, involved matters covered by other laws or regulations, or were too speculative to analyze effectively). The two categories of issues are discussed in the following sections.

### **1.8.1 ISSUES SUBJECT TO IN-DEPTH ANALYSIS**

Scoping and internal, interdisciplinary review identified the following issues which guide the EA's analysis of direct, indirect, and cumulative effects. The paragraph following each issue statement identifies the potentially affected resources and how they might be affected. It does not describe actual impacts.

#### **Soil, Water, and Watershed Resources**

- *How would the proposed infrastructural development affect soils, erosion, sedimentation, water quality, and overall watershed function?*

The project area is characterized by steep slopes, erosive soils and, in many areas, sparse ground cover. Construction-related disturbance and subsequent use could result in decreased permeability and productivity, and increased erosion and sediment transport to streams. Since the ski area is in Salt Lake City's municipal watershed, maintaining water quality is of concern.

- *Could potential leaks and spills of fuels and other chemicals impact water quality?*

Construction, maintenance, and use of the proposed facilities would involve the use of fuel and other chemicals. Leaks or spills could adversely affect water quality in Little Cottonwood Creek.

- *How would the proposed infrastructure affect wetlands and riparian areas?*

The project area includes several types of wetlands, riparian areas, intermittent and perennial streams, and associated riparian habitat conservation areas (RHCAs). Construction and subsequent use could decrease the functioning and the extent of these valuable, aquatic habitats. The wetlands adjacent to the Albion parking lot are a particular concern.

#### **Vegetation**

- *How would the proposed infrastructure affect special-status plant species?*

No federally listed plant species are known to occur at Alta, but several Forest Service Region 4 sensitive species and UWCNF watch-list species may occur in potentially disturbed areas. Clearing, grading, excavation, or subsequent use could adversely affect plants of these species.

- *How would the Baldy tram, in conjunction with climate change, affect the alpine ecosystem on Mt. Baldy?*

Constructing, maintaining, and operating the Baldy tram could adversely impact alpine vegetation on the peak, and warming trends could exacerbate that impact.

## **Wildlife**

- *How would the proposed infrastructural development affect special-status terrestrial and aquatic wildlife species and other species of interest or concern?*

There is no potential habitat for federally listed wildlife species in the project area, but potential habitat for several Forest Service Region 4 sensitive species is present. Other species of concern to the public or agencies are also present, such as migratory birds and big game species. These species could be affected through habitat alteration resulting from clearing, grading, excavation, changed patterns of human activity, or the impacts of Gazex avalanche control.

## **Cultural Resources**

- *How would the proposed infrastructure affect Cultural Concerns, Traditional Cultural Places (TCPs), or Native American Sacred Sites?*

Section 3.4.1.1 of Alta's 1997 Master Development Plan Final Environmental Impact Statement (FEIS) states that "prior to European settlement the ski area was used by Native Peoples for both hunting and plant gathering in a lifeway that was otherwise tied to the more abundant resources of the adjacent Salt Lake Valley. This short-term use leaves little archaeological imprint, and few examples of Native sites remain anywhere in the canyon." Nevertheless, the project area could hold values for Native Peoples that may be affected by the proposed action.

- *How would the proposed infrastructure affect historic properties?*

The clearing, grading, and excavation associated with construction of the proposed facilities could affect other historic properties (any cultural resource deemed eligible to the National Register of Historic Places, both prehistoric and historic) in or around the project area.

- *How would the proposed infrastructure affect the historic integrity of the ski area?*

Alta was the site of intensive mining activity from the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, and it is also one of the oldest continuously operating ski areas in the nation, with the first tow installed in 1939. While most of the historic infrastructure has been removed or replaced, the clearing, grading, and excavation associated with construction of the proposed facilities could further affect the ski area's historic integrity.

## **Scenic Resources**

- *How would the proposed infrastructure affect the scenic integrity of the project area?*

The project area viewscape has been affected by intensive mining activity from the late 19<sup>th</sup> and early 20<sup>th</sup> centuries followed by 77 years of ski-area development, but at this point its visual character is generally natural. Additional infrastructure such as the proposed Baldy tram and Gazex installations could alter that character and detract from the area's scenic integrity.

## **Recreation**

- *How would the proposed infrastructural development affect skier density and circulation?*

Changing the types and configurations of lifts could adversely affect skiers' experience at Alta. Specific concerns noted by commenters are:

- Higher-capacity lift upgrades may increase crowding on ski runs.
- Eliminating the hike to Mt. Baldy with the tram may reduce its attraction.
- The Baldy tram's lift line and the top terminal of Flora lift may interrupt skier traffic at Germania Pass.

## **Safety**

- *Does lift access to Mt. Baldy pose a safety risk?*

Some of the runs on Mt. Baldy, such as the Baldy Chutes, are experts-only terrain that must be hiked to now, which limits use. The tram may result in skiers without the requisite skills attempting to ski this terrain and being injured.

- *Would sympathetic avalanche releases from proposed Patsey Marley Gazex installations pose a safety risk for backcountry skiers in Wolverine Cirque?*

Wolverine Cirque lies on the other side of Patsey Marley ridge from Alta. It is one of the more heavily used backcountry skiing venues in the Wasatch due to its easy access from Alta and Brighton. The proposed Gazex installations on the Alta side of Patsey Marley could potentially trigger avalanches on the other side, posing a risk to backcountry skiers.

## **1.8.2 ISSUES CONSIDERED BUT NOT ANALYZED IN DEPTH**

### **Growth-Related Effects**

The intent of the proposed action, as outlined in EA section 1.5, is to replace outdated equipment, upgrade service facilities, and take advantage of new technology. The proposed action does not open any new terrain; it simply updates the infrastructure serving existing terrain. The new lifts are not designed to add capacity. The Flora lift would replace East Baldy Traverse's transfer function, not provide ski access. The Mt. Baldy tram would have a very low capacity and would serve primarily to transport ski patrol personnel. Public use would involve primarily those expert skiers who currently hike Mt. Baldy. The Wildcat and Sunnyside lift replacements would have somewhat higher capacities than the existing lifts, but increasing skier capacity is not the rationale for the replacement. As outlined in sections 2.4.3.1 and 2.4.3.2, the upgrades are to replace old, less reliable lift systems, provide redundant capacity when other lifts are down, and meet the current skier market's desire for high-speed lifts. Sections 3.5.3.2 and 3.5.3.3 describe Alta's well-established program of maintaining low skier density by adjusting the operating speeds of their lifts and rarely operating them at design capacity. As discussed in sections 2.4.6.1 and 2.4.6.2, the proposed additions to Alf's restaurant and Watson Shelter are mostly to replace space lost to new retail functions – another adaptation to changing skier demands.

In short, the intent of the proposed action is not to increase visitation but to maintain numbers by meeting the needs and expectations of today's skier market and changing patterns of skier use at Alta. Overall ski area capacity would not change appreciably, and the cap on new parking would remain in place. As a result, this EA focuses on the resource impacts of infrastructural development under the proposed action and alternatives, and not the impact of more visitors to Alta. Impacts in the following areas are not addressed further in this EA:

1. Air Quality
2. Transportation and Parking
3. Utilities
4. Socio-economics

## **1.9 REQUIRED PERMITS AND AUTHORIZATIONS**

Table 1-1 describes other permits, approvals, and consultations that Alta may be required to obtain prior to implementation of any projects approved by the UWCNF on the basis of this analysis.

<b>Table 1-1. Other permits, approvals, and consultations that may be required for implementation of the proposed action or an action alternative.</b>		
<b>Agency</b>	<b>Type of Action</b>	<b>Description of Permit or Action</b>
<b>Federal</b>		
USDA-Forest Service	American National Standards Institute, Architectural Barriers Act, Americans with Disabilities Act, and other code compliance review for lifts and structures.	Final designs for approved lifts and structures go through Regional-level engineering review to ensure compliance with applicable codes and agency standards. Lifts also require post-construction testing and approvals.
US Army Corps of Engineers (COE)	Issuance of Clean Water Act, Section 404 Permit.	The COE issues permits required for the discharge of dredged or fill materials into Waters of the US, including wetlands. Nationwide or individual permits may be needed.
Environmental Protection Agency (EPA)	Review and comment regarding: Clean Air Act, as amended, 42 USCA Section 7410-762 (PL 95-604, PL 95-95). Federal Water Pollution Control Act, as amended by the Clean Water Act, 33 USCA Section 1251-1376 (PL 92-500, PL 95-217). Safe Drinking Water Act, 452 USCA. Section 300F-300J-10 (PL 93-523). Clean Water Act, Section 404 Permit.	Under NEPA, the EPA is required to review and comment on “major federal actions that have a substantial impact on the human environment.” The EPA’s responsibility and role is to provide scoping comments, review EISs, and provide information and appropriate technical assistance during and following the environmental analysis process. Specific environmental legislation for which the EPA is responsible and which may be applicable to this proposed action is shown to the left. Administrative and enforcement responsibilities have been delegated to the State of Utah for these acts. The EPA may be involved in 404 permitting in association with the COE.
Fish and Wildlife Service (FWS)	Endangered Species Act, Section 7 Consultation. Fish and Wildlife Coordination Act consultation. Migratory Bird Treaty Act Bald and Golden Eagle Protection Act Section 404 Permit consultation.	If impacts on federally listed species are possible, the FWS will consult with the Forest Service, review a Biological Assessment (BA), and issue a Biological Opinion. The FWS also coordinates with the Forest Service in accordance with the Fish and Wildlife Coordination Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and reviews Section 404 permit applications to avoid adverse impacts to federally listed species.
<b>State of Utah</b>		
Department of Environmental Quality: - Air Quality Division - Water Quality	Review and Comment Issuance of Approval Orders. Section 401 certification. Issuance of a construction permit.	The Air Quality Division’s review ensures that state and federal air quality standards are not exceeded. Approval Orders are required for certain stationary emissions sources. The Water Quality Division’s review ensures that state and federal water quality standards are not exceeded. Section 401 certification would be required for any point-source

<b>Table 1-1 (cont'd). Other permits, approvals, and consultations that may be required for implementation of the proposed action or an action alternative.</b>		
<b>Agency</b>	<b>Type of Action</b>	<b>Description of Permit or Action</b>
Division		discharge and is obtained in conjunction with a Section 404 permit. Preparation of a Storm Water Pollution Prevention Plan (SWPPP) is a requirement for a construction permit.
Department of Natural Resources - Division of Wildlife Resources - Division of Water Resources	Review and comment  Issuance of Stream Alteration Permit.	The Division of Wildlife Resources is responsible for management and protection of state wildlife and fish resources.  The Division of Water Resources is responsible for determining adequacy of water supply and cumulative impacts on water supply. They also review plans and issue stream alteration permits for projects which alter streams and/or streambeds.
State History Division	Consultation on National Historic Preservation Act, Section 106 compliance process.	The Division is responsible for protection of cultural resources.
<b>Salt Lake County</b>		
Salt Lake Valley Health Department, Environmental Health	Approval of site plans, sanitary facilities, other water uses, and revegetation and erosion control plans pursuant to regulations 11, 12, 13, and 14.	Site plans, sanitary facilities, other water usage, and revegetation and erosion control plans must be approved prior to construction.
<b>Salt Lake City</b>		
Public Utilities Department	Approval of culinary water supply and sewage facilities.  Approval of site plans and revegetation and erosion control plans.	The Department is responsible for determining whether proposed projects fall within Salt Lake City's surplus water supply agreement areas. Salt Lake City's ordinance (Title 17, Chapter 17.04) prohibits the expansion of water supply agreements within the municipal watershed and requires adequate sanitary facilities. Stream setback requirements, site plans and revegetation and erosion control plans must be approved prior to construction.
<b>Town of Alta</b>		
Building Department	Approval of building permits.	The Building Department is responsible for building permits and approvals.
Building Inspector	Issuance of building permits.	The building inspector is responsible for issuance of building permits.



## **CHAPTER 2: PROPOSED ACTION**

### **2.1 INTRODUCTION**

This chapter provides a detailed description of the proposed action, the alternative formulation process, and the no-action alternative. It concludes with a comparative summary of the anticipated environmental effects of the proposed action and alternatives.

### **2.2 ALTERNATIVE FORMULATION**

Analysis of the no-action alternative provides a baseline for assessing the impacts of the proposed action and any action alternatives. In this case, no action would mean that the improvements comprised by the proposed action, described below in section 2.4, were not approved.

Action alternatives are different courses of action by which the purpose and need addressed by a proposed action could reasonably be achieved. Scoping comments for this analysis suggested alternatives to several, individual elements of the proposed action but no broad, comprehensive alternatives. None of the element-specific alternatives were carried into in-depth analysis for reasons outlined in section 2.6 below.

### **2.3 ALTERNATIVE 1 – NO-ACTION**

Under the no-action alternative, the proposed action would not be authorized. Ongoing ski area operations would continue in accordance with the current SUP, and Alta would not make the proposed improvements to the permitted ski area. As a result:

- The Albion parking lot would continue to fill on busy days, forcing visitors to park in the Snowpine lot and alongside the road, then negotiate the steep hill, often icy conditions, and passing traffic to reach the Albion base area. Space for public transit, skier drop-off, and carpooling would remain limited at the Wildcat lot.
- Artillery, Avalaunchers, and helicopter-delivered explosives would remain the primary avalanche-control options on Mt. Baldy, Sugarloaf Mountain, East Devil's Castle, and Patsey Marley, retaining the associated staff and public safety issues and weather constraints on helicopter operations.
- The age and design of the Sunnyside and Wildcat lifts would continue to jeopardize vital out-of-base lift capacity. Lift failures would become more frequent, resulting in long waits, shortened ski days, and reduced skier experiences due to circulation bottlenecks at either or both of Alta's base areas.
- East Baldy Traverse would remain the only connection between the top of Sugarloaf lift and the top of Collins lift, posing high demands on slope-maintenance and avalanche-control resources and an often uncomfortable skier experience.
- Lack of a summer-groomed, easier route down would continue to hamper safe, efficient use of the Supreme pod.
- Alf's restaurant would continue to be a crowded venue for guests, an impediment to circulation, and difficult snow-grooming issue.

- Sufficient storage, circulation, and food-service seating would be ongoing issues at Watson Shelter.
- Off-site storage of supplies and equipment would continue to cause increased traffic and vehicle emissions on SR 210 and overall inefficiency.

## **2.4 ALTERNATIVE 2 – PROPOSED ACTION**

Figure 2-1 shows the projects comprised by the proposed action. They are each described below.

### **2.4.1 PARKING**

#### **2.4.1.1 Albion/Wildcat Base Parking**

Project Description: Modify and expand the Albion and Snowpine parking lots and the roadway connecting them to replace parking spaces lost to transit development at Alta, balance parking capacity between the Wildcat and Albion base areas, and improve visitor access and safety. The Albion and Snowpine lots would be expanded by filling an area of about 1.3 acres below (south of) the existing lots and access road, and cutting into the bank about 0.4 acres on the opposite (north) side of the Albion lot, across from the ticket office and Albion Grill (see Figure 2-2). The access roadway between the lots would be regraded to reduce the steepness of the transition. Widening along the south side would accommodate a snow-covered bench where skiers could put on their gear and ski down to the ticket office and lift terminals. The Wildcat lot would remain the same size.

The exact increase in parking capacity within this space would reflect the number of spaces lost to past and reasonably foreseeable transit development in all three lots. The UWCNF would specify the authorized number prior to commencement of the project. Regardless, the expansion would fall within the proposed footprint. There would be no net increase in parking capacity, since these modifications would only replace parking spaces that have been, or will be, lost to accommodate mass transit.

The three existing culverts that carry runoff and stream discharge beneath the existing Albion parking lot would be extended (the current combined 362 feet of culvert would increase to 592 feet). The oil/water separator and pollution control measures already in place in the Albion parking lot would either be maintained or rebuilt as part of the project. These parking improvements would occupy approximately 1.7 acres of NFS land.

Project Rationale: In recent years, Alta has allocated space in the Wildcat and Albion lots previously used for parking to facilitate transit. Specifically, the entry to the Wildcat lot has been modified to accommodate UTA buses, passenger drop-off/loading zones have been created, and space has been designated for carpooling. At present, the figures are 50 spaces lost in the Wildcat lot and 48 spaces lost in the Albion lot. Recently, UTA has begun parking idle buses in the Snowpine lot rather than running them down the canyon empty, and other transit options requiring space in the base areas are under discussion. The expanded parking footprint at the Albion and Snowpine lots would allow Alta to maintain parking capacity, in accordance with the best estimate of lost space when the project was finalized.

In addition, an imbalance between the capacities of the Albion and Wildcat parking areas has developed. The Albion parking lot has become the lot of choice for intermediate skiers and for summer visitors. Most days the Albion lot fills and skiers' cars then overflow into the Snowpine lot, resulting in a long walk with a hill to get to and from the ticket office and lift terminals. Increasing use of these lots by backcountry skiers bound for Grizzly Gulch or Cardiff Pass exacerbates the problem. This project would address this imbalance by consolidating replacement of parking lost to transit into the Albion and Snowpine lots.

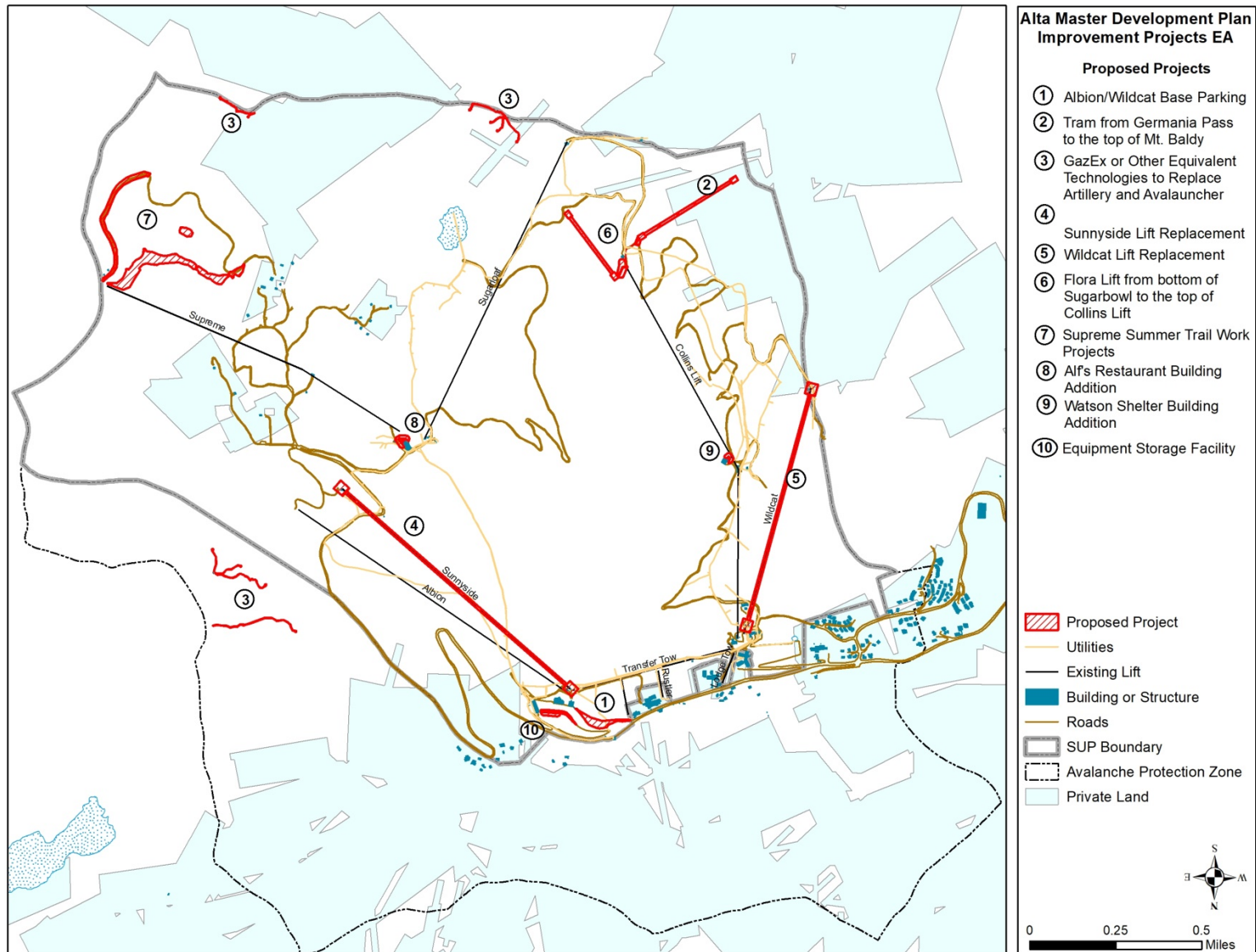


Figure 2-1. Overview of the proposed action.



**Figure 2-2. Proposed redesign plan area for Albion base parking lot.**

Finally, the roadway to the Albion lot from the Snowpine lot is steep and narrow, and it can be slick and difficult for kids or those carrying equipment. This poses safety issues by mixing pedestrian and vehicle traffic and creates an undesirable skier experience. Slip-and-fall accidents have occurred. This project would provide easier and safer access in two ways. First, it would regrade the transitions area between the lots to reduce steepness. Second, it would allow space for a bench along the lower edge of the parking lots and transition area that could readily be covered with snow – either natural snow or snow plowed from the road and parking lot –providing visitors a safe area to put on their equipment and ski down to the ticket office and lifts rather than walking along the road.

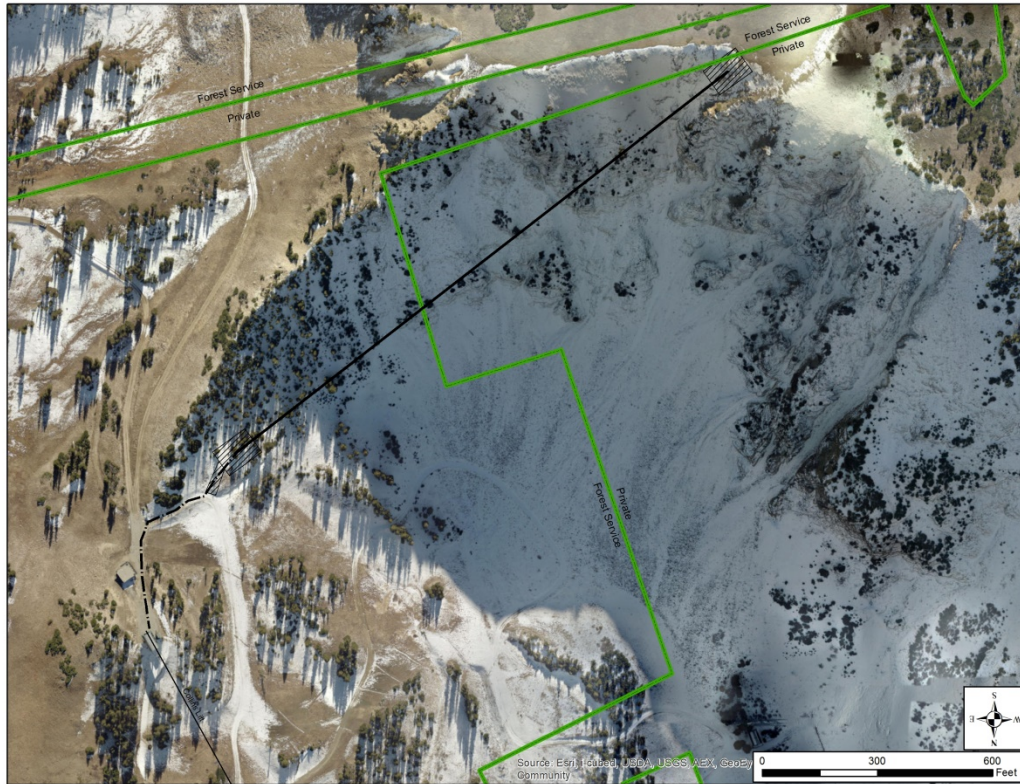
## **2.4.2 AVALANCHE CONTROL**

Alta has traditionally used conventional avalanche control methods in areas accessible via ski patrol routes and military artillery or Avalaunchers in inaccessible areas. Consistent with the ski industry's efforts to reduce use of military weapons where feasible, and to prepare for unanticipated loss of either military weapons or Avalaunchers, the Forest Service proposes to authorize the following alternative approaches to avalanche control.

### **2.4.2.1 Tram from Germania Pass to the top of Mt. Baldy**

**Project Description:** Install a small (roughly 150 p/h) tram from Germania Pass to a point 90 vertical feet and 340 horizontal feet below the top of Mt. Baldy, above the Perla's area (Figure 2-3) on the north face of the peak. The site is a sheltered pocket, below both the main ridge and the sub-ridge to the east. The lift would be approximately 1,900 feet long and require top and bottom terminals. No intermediate lift towers would be needed. The bottom terminal and one third of the tram line would be on NFS land, with the remainder of the alignment and upper terminal on Alta's private land.





**Figure 2-3. Proposed new tram from Germania Pass to the top of Mt. Baldy.**

The terminal would be a simple structure, basically a bull wheel and landing platform with associated rigging, similar to the Allen Peak tram at Snowbasin. There would be no building associated with the terminal, and the materials would be concrete and steel. Galvanizing is standard practice at Alta, so the structure would blend with the natural setting.

The Baldy tram would be bottom driven, and power would not likely be needed at the upper terminal. An access road approximately 50 feet long and 20 feet wide would be constructed from the existing summer road to the location of the lower terminal. Power for the Baldy tram would be provided by a trenched line running from the top terminal of Collins lift to the lower tram terminal. The trench would be excavated in the running surface or shoulder of the existing Collin's lift access road, westward down the summer road, and then up the new Baldy tram access road. There would be no access road to the top terminal. All construction materials for the top terminal would be delivered by helicopter, and any earth work would be performed using hand tools.

This area of control on the north face is different than the East Baldy Remote Avalanche Mitigation Project, a cumulative action described in section 3.3. That project would install Obell'X or Gazex avalanche control devices on the east face of Mt. Baldy above the East Baldy Traverse.

The Peruvian Ridge gun and building would remain in place as the building belongs to the Utah Department of Transportation and the gun is used to control side paths across the canyon that threaten SR 210.

**Project Rationale:** Avalanche control on Mt. Baldy is necessary for Alta to provide skiing not only in the Baldy Chutes but also on Main Street, the Ballroom area, and the Baldy Shoulder area, all of which are popular terrain. There are 23 avalanche-starting zones on the north face of Baldy, and they are currently controlled using a 105mm Howitzer and two Avalaunchers to deliver explosive charges. Both of these

technologies generate safety and other concerns that are driving an industry-wide shift to alternative technologies. Beyond that, the explosive projectiles penetrate deep into the snowpack, where the explosions are less effective in releasing unstable snowpacks and the potential for damage to soil, vegetation, and habitat is high.

Several alternative technologies were assessed as replacements (see section 2.6), including Gazex or similar remotely controlled equipment and helicopter bombing. The other alternative is a lift to transport ski patrollers to a location high enough on Mt. Baldy to allow avalanche control using hand charges, ski cutting, and skier compaction. Three alignments were considered.

The proposed lift was identified as the best alternative – in terms of both function and environmental impact – to maintaining the avalanche control necessary to keep key ski terrain on the north side of Mt. Baldy open for safe, public recreation. Hand charges are triggered above or at the snowpack surface, making them more effective at releasing instabilities and less damaging to resources under the snow. The lift could also be used for skier access to the chutes below the tram or to the east and west Baldy areas when conditions allowed, increasing the stabilizing effect of skier compaction.

Replacing artillery and Avalaunchers with ski patrol control routes would result in more effective avalanche control and more days when Mt. Baldy and the terrain below were open to the public. The number of explosive charges used would increase, but the net amount of explosives probably would not, due to the smaller size of hand charges (i.e., 2 pounds vs. roughly 10 pounds for a howitzer round).

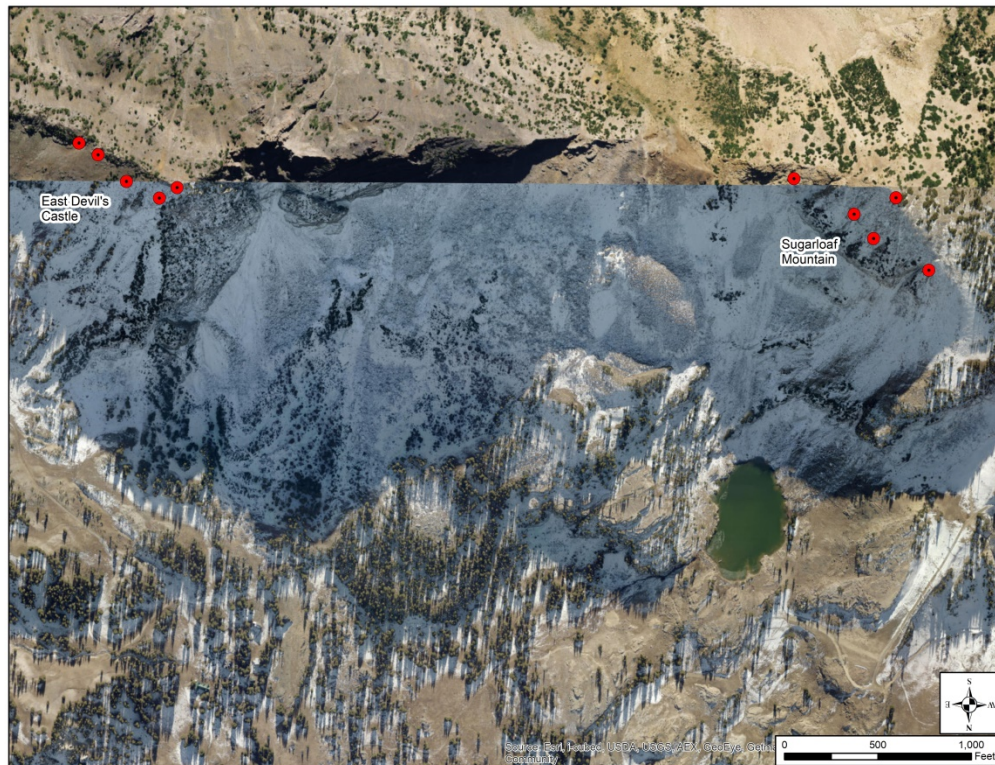
#### **2.4.2.2 Gazex or Other Equivalent Technologies to Reduce Artillery and Avalauncher Dependency**

Project Description: Reduce dependency on the use of artillery, Avalaunchers, and helicopter bombing with modernized avalanche control methods such as Gazex or other equivalent avalanche control technologies on Sugarloaf Mountain, East Devil's Castle (Figure 2-4), and Patsey Marley (Figure 2-5). If current technology Gazex exploders were used, all three locations would have four to eight exploders. An 8-foot-by-8-foot gas storage unit would be needed for every four exploders. Gas lines connecting each exploder to the storage unit would be buried in shallow, hand-excavated trenches. All installations would be on NFS land within Alta's current permit boundary.

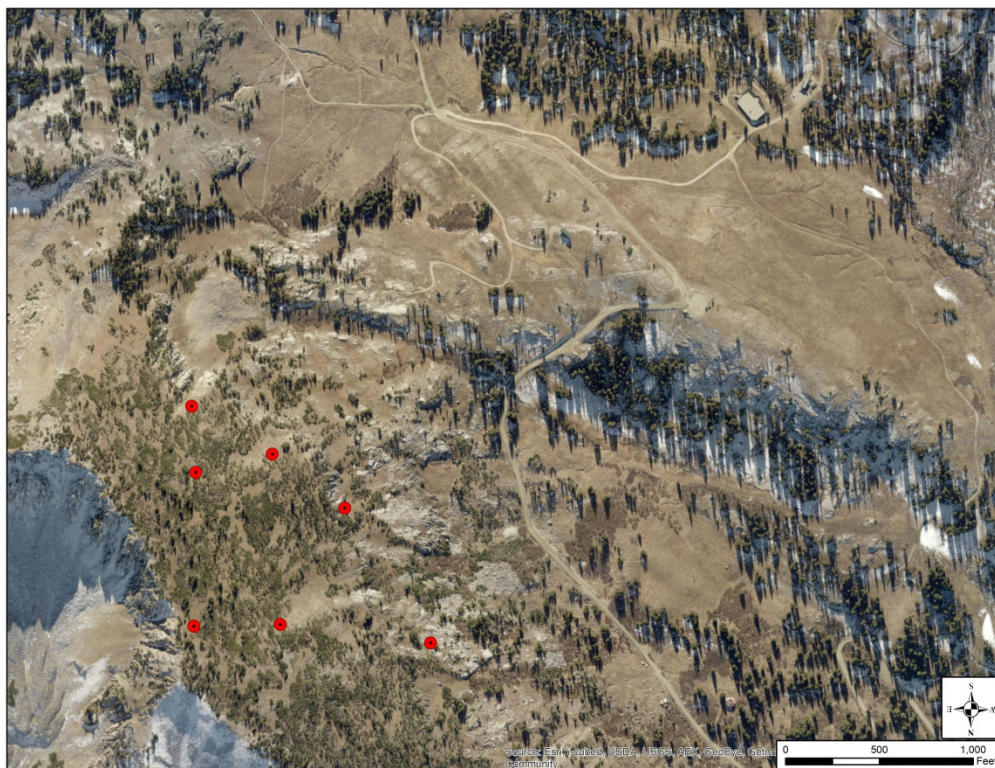
Note that the Sugarloaf Mountain installation may entail gas lines crossing a private parcel. If an agreement allowing this were not reached with the landowner, a similar alternative technology such as Obell'X would be used.

Project Rationale: Avalanche paths on Sugarloaf Mountain, East Devil's Castle, and Patsey Marley are now controlled with Avalaunchers or with helicopter-deployed explosives. Changing to Gazex or other equivalent technologies could allow for safer, unmanned, avalanche control. These technologies would allow Alta to minimize the use of three Avalaunchers, hopefully minimizing dependency on explosives and rental helicopter services.





**Figure 2-4. East Devil's Castle and Sugarloaf Mountain with proposed Gazex locations.**



**Figure 2-5. Patsey Marley with proposed Gazex locations.**



## 2.4.3 REPLACEMENT OF LIFTS

Alta is an original ski area in the Central Wasatch, and as its lift systems age it can affect the level of service they provide, their reliability, and their repair costs. The Forest Service proposes to authorize the replacement of existing lifts as described below.

Detachable lift technology has proven to be an effective tool for adjusting skier distribution by varying lift capacity to match conditions and thus providing a desirable skier experience. For example, lift speeds can be slowed when skier density is too high, thus alleviating crowding in the terrain served by a given lift. As Alta replaces lifts or builds new lifts, they design and operate lift systems with a range of capacities to accommodate demand and provide redundancy. Reflecting these considerations, the figures provided below represent design capacity for replacement lifts and generally overestimate the capacities at which they would normally be operated.

### 2.4.3.1 Sunnyside Lift Replacement

**Project Description:** Replace the existing Sunnyside lift with a chondola (i.e., a mix of chairs and gondola or cabriolet cabins), gondola, or detachable chair, using the current lift alignment and upper and lower terminal locations (Figure 2-6). Many of the existing towers and tower foundations would be used for the new lift, though some new ones may be required. New towers and cement for the foundations would be flown on site by helicopter, and any new foundations would be excavated by hand crews or spider hoe. As a result, no new tower access roads would be constructed. Old towers would be removed by helicopter, and foundations that were not used would be shortened to 2 feet below the ground surface then covered with soil and revegetated. The determination of which towers would be reused would be made when the lift was designed.



Figure 2-6. Existing Albion and Sunnyside lifts with proposed replacement of Sunnyside lift.

The alignment of the new Sunnyside lift would be approximately 40-feet wide, following the existing Sunnyside alignment. Due to the clumped distribution of forest stands at Alta, minimal tree clearing would be needed to widen and maintain portions of the new alignment. The alignment is entirely on NFS land.

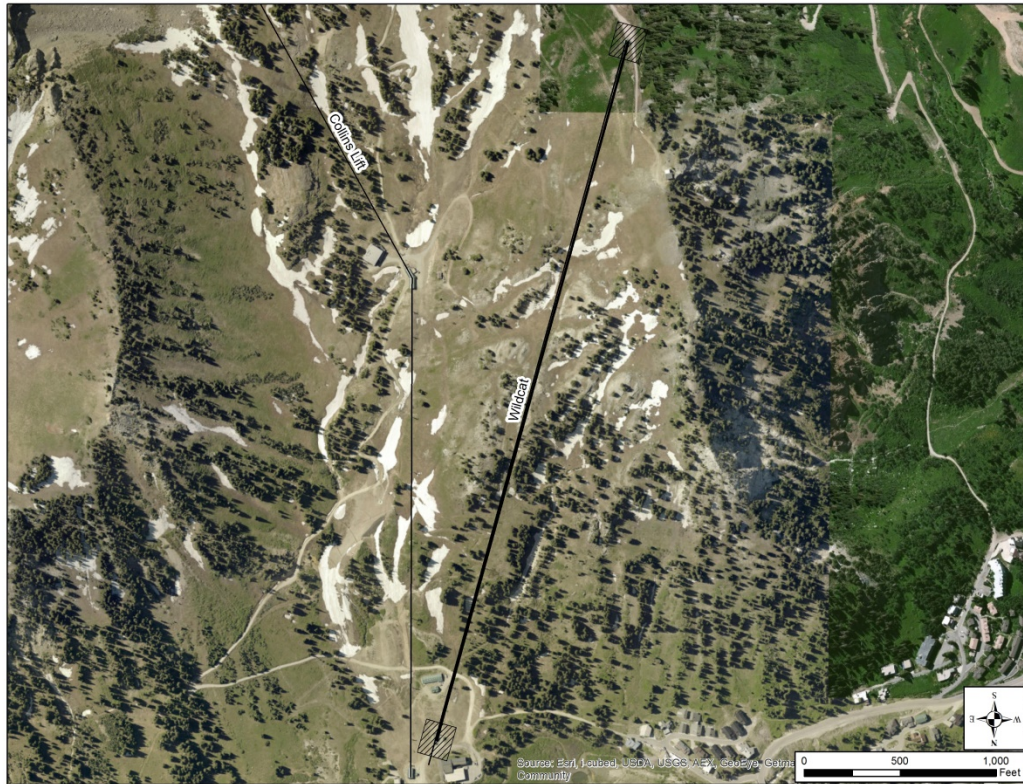
The chondola option would allow cabins and chairs to be used on the same lift line. It would allow flexibility as rider demand, weather conditions, and seasons change. To accommodate different types of users, the chondola would use different loading stations which would resemble a gondola station followed by a chairlift station, or vice versa. Typically, there are more chairs than cabins on a chondola. This type of lift allows for greater versatility throughout the year, and in particular, improves opportunities for summertime guests.

Project Rationale: The Sunnyside lift is a detachable triple chair lift that often cannot meet the demand on busy days. A new lift with 2,400-person-per-hour (pph) capacity would meet demand and the expectations of today's skier market. The new lift would accommodate summer users, beginning skiers, and skiers accessing all upper-mountain lifts. The capability for summer use would provide an option to shuttle buses as a means of reducing vehicle traffic in Albion Basin.

#### **2.4.3.2 Wildcat Lift Replacement**

Project Description: Replace the Wildcat lift, a fixed-grip double (1,200 pph), with either a fixed-grip or a detachable quad lift (estimated design capacity up to 2,400 pph), using the same top and bottom terminal sites and lift alignment (Figure 2-7). The new lift would be able to reuse some of the existing towers and tower foundations, though new towers and foundations would also be needed. No access roads would be constructed; rather new towers and cement for the foundations would be flown on site, and foundations would be excavated by hand crews or spider hoe. Old towers would also be removed over the snow or flown off site by helicopter, and the foundations would be shortened to 2 feet below the ground surface then covered and revegetated. Though the alignment of a quad lift is wider than that of a double (40 feet vs. 30 feet), only minimal clearing would be necessary because the existing alignment is generally 50- to 70- feet wide in forest stands, with the exception of a few trees. The alignment lies entirely on NFS land.

Project Rationale: Wildcat lift is a 33-year-old lift with diminishing parts availability. While reliability and comfort are more important issues than capacity, replacing Wildcat with a higher-capacity lift would provide lift redundancy, allowing Alta to increase Wildcat lift's operating speed if Collins lift were non-operational or if much of Collins terrain were closed due to avalanche conditions. The two lift pods overlap considerably, so a higher-capacity Wildcat lift could serve as a back-up to Collins as well as making the Wildcat area more attractive to skiers.



**Figure 2-7. Existing Wildcat lift with proposed lift replacement.**

## **2.4.4 NEW LIFT**

In addition to replacing aged, existing lifts, the Forest Service proposes to authorize the following new lift to make more efficient use of ski terrain within the current ski area boundary.

### **2.4.4.1 Flora Lift Construction from the Bottom of Sugarbowl to the Top of Collins Lift**

**Project Description:** Install a new, roughly 1,200 pph, fixed-grip, top-driven, double chairlift from the flats north of the bottom of Sugarbowl to a point approximately 100 yards north of the ski patrol dispatch building at the top of Collins lift (Figure 2-8). The lift would be approximately 985 feet long and require about four towers in addition to the top and bottom terminals.

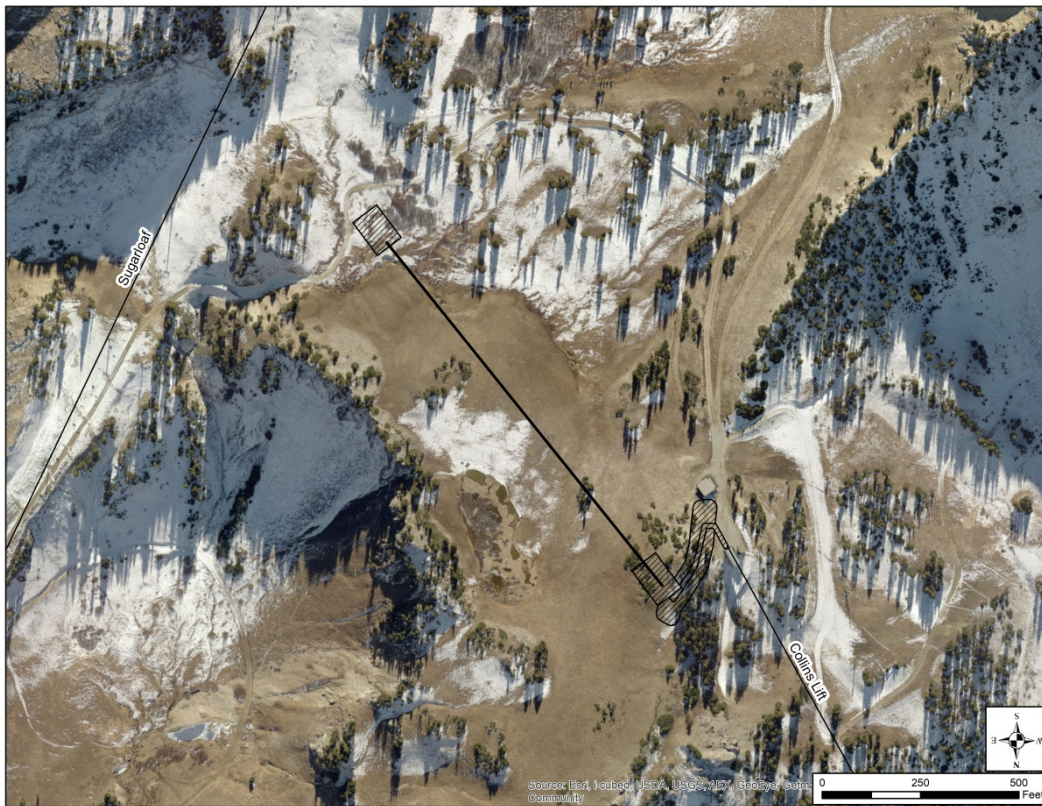
The upper terminal would be constructed on the east shoulder of the ridge near a topographic saddle and would require some flattening and filling for skier unloading. The lower terminal site would not require contouring outside of the disturbance footprint, and the existing terrain is suitable for the loading maze. The disturbance footprint for both terminals of this smaller fixed-grip lift would be approximately 110 feet long and 75 feet wide.

As discussed above for the replacement lifts, the four towers and the cement needed for the foundations would be flown on site by helicopter. The foundations would be excavated by hand crews or spider hoe, and no new access roads would be constructed for the towers. However, an access road approximately 290 feet long and 20 feet wide would be constructed from near the top of the Mambo run to the upper lift terminal. Temporary impacts may occur in an additional 20-foot-wide buffer upslope and downslope from the access road as shown in Figure 2-8. This access road would require some earthwork on the west shoulder of the ridge up to and crossing the topographic saddle, but would largely leave the ridgeline



intact. Power would be provided from the top terminal of the Collins lift, and would be installed in a trench along the new access road. The new lift would lie entirely on NFS land.

Project Rationale: Maintaining the East Baldy Traverse between the top of Sugarloaf lift and the top of Collins lift is a drain on snowcat and avalanche control resources. Rapidly building avalanche hazard due to wind often causes Alta to close the East Baldy Traverse. The closure creates a poor skier experience and disrupts the skier balance by forcing traffic from Sugarloaf that would have gone across the East Baldy Traverse and into Collin's Gulch onto Devil's Elbow, which increases skier density on Devil's Elbow. Even when the East Baldy Traverse is open, the experience for skiers is, more often than not, unpleasant because of wind and blowing snow. Additionally, when Mt. Baldy is open for skiing, the East Baldy Traverse cuts across the lower end of an expert ski run. This lift would allow traffic to consistently flow both ways between Collins Gulch and upper Albion Basin without using the traverse.



**Figure 2-8. Proposed new Flora Lift from the bottom of Sugarloaf to the top of Collins lift.**

## **2.4.5 SKI RUN WORK**

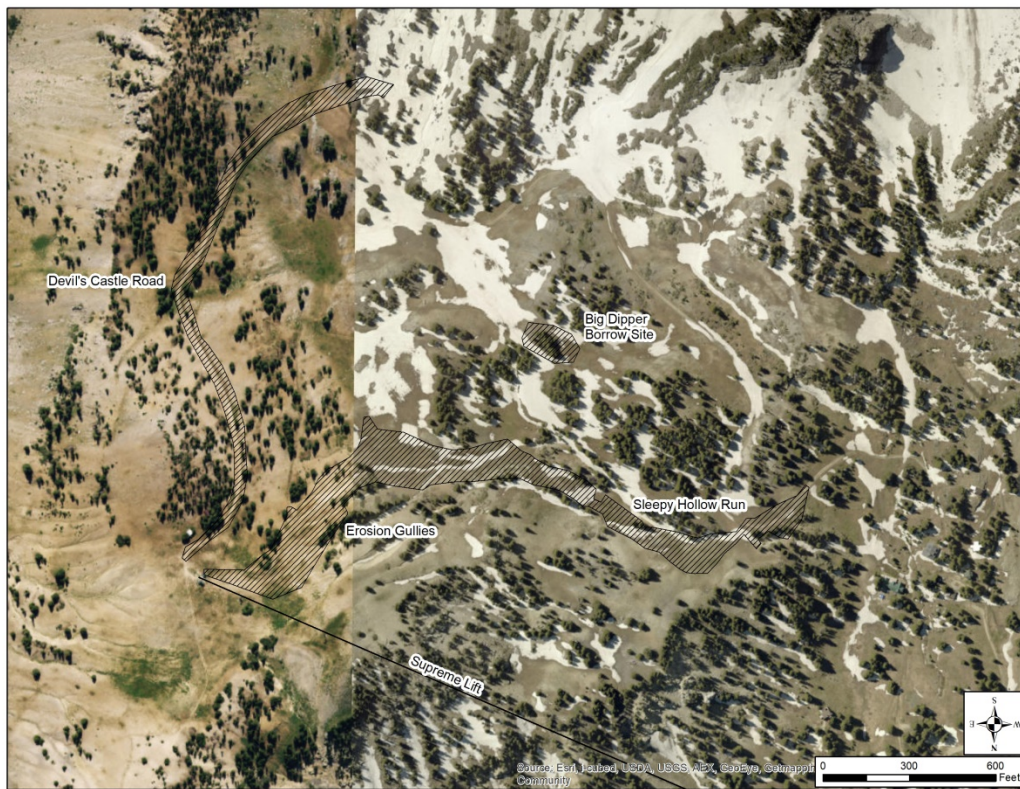
As lift systems evolve and patterns of skier use change, a ski area's run system must be modified to avoid congestion and provide for smooth skier circulation. The Forest Service is proposing to authorize the following run improvement projects.

### **2.4.5.1 Supreme Summer Ski Run Work**

Project Description: Two projects exist to create a groomed run from the top of the Supreme lift. The first is to widen and improve the grade on the existing Devil's Castle Road and tie that in with Lower Rock

and Roll run (Figure 2-9). This involves cutting trees and excavating the inside bank of the road to improve the width and pitch to become a dual purpose road/ski run. The second project is to begin at the top of Challenger Run and proceed to the skiers left to the Erosion Gullies run, then connect to the Sleepy Hollow run. Some vegetation would be cleared, and two of the four gullies would be re-contoured using fill material imported from the Big Dipper run. Minor vegetation clearing and slope re-contouring would also be needed on the lower segment of Big Dipper to complete the run.

**Project Rationale:** Both projects would create summer groomed runs (a long-term alternative to snowmaking) that would easily open on a normal snow year and provide an intermediate ski option. The second project would provide more of a buffer away from the Devil's Castle area, and keep skiers further from avalanche run-out zones. It would also repair two of the four erosion gullies. These gullies are steep, deeply rutted relics from early mining, timber removal, and sheep grazing activities.



**Figure 2-9. Proposed Supreme summer run work.**

## 2.4.6 BUILDINGS

Provision of skier services at dispersed locations continues to be an important aspect of meeting the demands of today's skier market. The Forest Service proposes to authorize the following upgrades of existing on-mountain facilities and an additional new facility.

### 2.4.6.1 Alf's Restaurant Building Addition

**Project Description:** Construct an approximately 2,000-square-foot building addition with a 550-square-foot deck on the south end of the Alf's restaurant, providing space for additional food-service seating and relocation of the stand-alone Ski Demo Center into the main building (Figure 2-10). The small container building currently housing the demo center would be removed. A second story over a portion of the



existing building may be added to meet the space requirement. The building addition would lie entirely on NFS land. A 50-foot buffer from the drainage channel to the south would be maintained.

**Project Rationale:** Alf's restaurant is Alta's oldest mid-mountain restaurant and was not designed to have a ski shop and demo center. Currently, circulation around the south end of Alf's functions poorly, in part because of the temporary building housing the ski demo center, a crowded entrance, and a building footprint that makes snow plowing and grading difficult. The small ski shop inside Alf's has proven very popular in providing basic skier needs for Sugarloaf, Sunnyside, and Supreme skiers. That shop has displaced six tables from the cafeteria seating that could be regained with the additional space.

Experience also shows that the facility should have a straighter building line on the southeast facing entrance. Nightly snowcat grooming of the area has proven difficult in maintaining a good ingress/egress height and ski rack area.

The proposed improvements would allow for the addition of extra cafeteria tables to help meet the demand for food-service seating and ski shop space. Removal of the container building would improve access, maintenance of the skier entrance, and the aesthetics of the area.



**Figure 2-10. Existing Alf's restaurant building with proposed addition.**

#### **2.4.6.2 Watson Shelter Building Addition**

**Project Description:** Construct a small 550-square-foot addition under the existing structure's deck and a 1,000-square-foot expansion on the west side of the building between the lower and upper entrances (Figure 2-11). The space under the expansion would be enclosed. The building addition would lie entirely on NFS land.

**Project Rationale:** Overall storage needs at Watson Shelter have increased. Skier demand for retail and drinks on the lower level has grown to a point that the addition is needed. Half of the space would provide storage and half would be used for skier seating in the coffee shop and skier flow area in the retail shop. Additionally, the top of the addition could provide additional deck space for the cafeteria. The deck space on the north and east side of the building was originally designed to use for customer seating. However, tables placed on the deck in those locations are rarely used by guests since they are typically in the shade. Expanding the deck off the southwest corner of the building would increase seating on the warmer, sunnier side of the building.



**Figure 2-11. Existing Watson Shelter building with proposed addition area.**

#### **2.4.6.3 Equipment Storage Facility Construction**

**Project Description:** Construct a single-story 6,000-square-foot storage facility to the northwest of the existing vehicle maintenance building along the northern edge of the Albion Base parking lot (Figure 2-12). The building would be built on NFS land.

**Project Rationale:** Seasonal storage needs have exceeded Alta's current on-mountain and off-site facilities. Much of the ski area equipment and emergency repair parts are currently stored in a warehouse in west Salt Lake Valley. SR 210 road conditions, transportation costs, and vehicle emissions associated with maintaining a warehouse an hour away make an on-site storage facility the most feasible way to increase storage capacity.





### *Vegetation Management*

3. Soil disturbance will be minimized, and existing topsoil will be conserved for replacement.
4. Where possible, native vegetation will be retained.
5. In cleared and graded areas, mechanized equipment may be used to fell and remove trees. When possible, trees will be removed over snow to protect the ground surface. Disposal will be in accordance with applicable Forest Service permit requirements.
6. Slash created by tree removal will be disposed of either through utilization, burning, chipping, mastication, lopping and scattering, or removal from the site within a specified timeframe. Disposal will be in accordance with applicable Forest Service and state permit requirements.
7. Alta will follow Forest Service policy (FSM 2070) and use genetically appropriate native materials for rehabilitation and restoration. A qualified Forest Service botanist will be involved in development, review, and/or approval of plant materials selected for use in site rehabilitation and restoration.
8. Any areas of native vegetation that would be disturbed and have not been previously surveyed for special-status plants will be surveyed prior to construction. Results will be reported to the Forest Service permit administrator, and appropriate measures to mitigate impacts will be implemented.
9. All construction equipment and vehicles used will be cleaned and certified free of noxious weeds and their seeds prior to entrance onto the UWCNF. This restriction will include equipment and vehicles intended for both on- and off-road use, whether they are owned, leased, or borrowed by either contractors or subcontractors.
10. Any fill material proposed for the project, including any topsoil, will come from an on-site or in-canyon location.
11. Any straw bales, chips, or other imported mulch used in conjunction with the proposed action will come from a certified weed-free source.

### *Wildlife Protection*

12. Construction and refueling helicopters operating during the nesting season (April–June) must approach, and depart, cliff areas from behind and above the cliffs to avoid flushing nesting falcons.
13. Do not clear, cut, burn, drive on, or park equipment on vegetation that may harbor nesting birds during the breeding season (May 15–July 15). If this is not possible, survey for nesting birds no more than 10 days prior to commencing work. If no nests are found, project activities may proceed. If nests are found, contact the Forest Service permit administrator.

### *Scenic Integrity*

14. Permanent structures will be designed and built in compliance with the *Built Environment Image Guide for the National Forests and Grasslands* (Forest Service 2001, FS-710). Ensuring that architectural style, building materials, size, and color are consistent and meet the adopted scenery objectives. Compliance will be confirmed through Forest Service engineering review prior to construction.
15. The edges of cleared ski runs will be feathered to appear more like natural openings in forest cover, flowing with the topography and blending with the natural vegetation.

### *Accessibility*

16. All buildings will be designed and constructed in accordance with the *Accessibility Guidebook for Ski Areas Operating on Public Lands – 2012 Update* (Forest Service 2012b). Compliance will be confirmed through Forest Service engineering review prior to construction.

### *Undiscovered Heritage Resources*

17. If any previously unidentified prehistoric or historic cultural resources are identified or encountered at any time during construction, efforts shall be made to protect the resource(s) until the Forest Service Permit Administrator is notified and the Forest Service fulfills its consultation requirements, including consultation with the appropriate Tribal representatives.
18. If unmarked human remains are encountered at any time during construction, all work in the vicinity of the find shall cease, with the remains covered and protected in place, and the Forest Service permit administrator notified immediately to begin proper notification and consultation procedures with the Utah State Historic Preservation Office, Native American Tribes, and other local officials as needed (e.g., county coroner) to determine to what time period and ethnic group the skeletal material may be ascribed and the appropriate treatment.
19. If any previously unidentified Traditional Cultural Places or sacred sites are identified or encountered at any time during construction, efforts shall be made to protect the resource until the Forest Service permit administrator is notified and the Forest Service fulfills its consultation requirements, including consultation with the appropriate Tribal representatives.

### *Wetland Resources*

20. Placement of lift towers in wetland areas will be avoided, the amount of wetland area disturbed will be avoided and minimized. Disturbances will be mitigated when avoidance is not practical.
21. Trench breakers will be used when snowmaking or other utility lines cross sloped wetland areas. Trench breakers will be placed at the lower wetland boundary so that groundwater is not drained through the trench and out of the wetland.
22. Any tree removal from wetlands will be done either over the snow or after the ground has frozen to protect soil resources.
23. When constructing buildings and lift terminals, equipment will not operate in adjacent wetlands and stream channels.

## **2.6 ALTERNATIVES CONSIDERED BUT NOT CARRIED INTO IN-DEPTH ANALYSIS**

Several alternatives were considered in development of the proposed action or raised in scoping comments. However, the alternatives were limited to single elements of the proposed action. No comments were raised that suggested a separate unique, alternative. The following paragraphs discuss each suggested single-element alternative and explain why it was not carried into in-depth analysis.

### **2.6.1 BALDY TRAM ALTERNATIVES**

Most alternatives considered involved the proposed Baldy tram. Several technologies other than a lift providing ski patrol access for conventional avalanche control were considered but not carried into in-depth analysis. These included:

- Continued use of the Howitzer and Avalaunchers, but this would perpetuate safety concerns including over-shoots, dud rounds, and premature detonations. Since these methods can only be used when Alta and Snowbird are closed to the public, relying on them would result in continued terrain closures during storm and wind cycles. Alternative technologies would reduce closures.
- Helicopter bombing, but this technology requires clear, calm weather, which is not the norm when avalanche control action is needed.

- Obell'X, Gazex, or similar remotely controlled installations such as those currently proposed for other locations at Alta (i.e., East Baldy, Sugarloaf Mountain, East Devil's Castle, and Patsey Marley – see section 2.4.2.2). However, based on the number and spatial extent of starting zones on the north face of Mt. Baldy, it would take an estimated 23 Gazex installations to control the area – an area heavily used by skiers. This concentration of installations would disturb a substantial proportion of the area's alpine habitat during construction and would permanently degrade its scenic character.
- Completing avalanche work on Mt. Baldy from the Snowbird side of the mountain, but this option would not eliminate the need for an extended hike through avalanche-prone terrain for ski patrollers to access the starting zones. This option would also require that Snowbird's tram be operational, which is dependent on weather on Hidden Peak and other Snowbird operational considerations beyond Alta's control.

Once a lift was identified as the best alternative, three lift alignment options were considered. Two were on Alta's private land – one from the bottom of Sugarbowl and the other from the Wildcat area. Neither of these would require Forest Service authorization. However, both would end on or near the peak of Mt. Baldy. This location would not only be visible from all directions but would also be subject to high winds that would frequently make the lift inoperable. These alignments would also require intermediate lift towers, increasing both their ground disturbance and their visual impact.

The proposed alignment was the third alignment option. As noted above, it would start on NFS land near Germania Pass and end on private land at the top of Alta Chutes, in a sheltered pocket well below the summit. This alignment would provide the needed ski patrol access while dramatically reducing the area from which the lift and top terminal were visible, and it would shield the terminal from the peak's high winds, allowing more reliable operations. The lift would be a single, unsupported span with no towers between the terminals, reducing construction impacts. This option was identified as the only feasible alternative to effectively maintain avalanche control operations on the north face of Mt. Baldy in a safe and environmentally sound manner. This analysis addresses its potential environmental effects.

One commenter suggested that a lift from Gold Miner's to top of Eagle's Nest should be constructed instead of the Baldy tram. The suggested lift would not meet the purpose and need to address avalanche control on Mt. Baldy and thus was not carried into in-depth analysis.

## **2.6.2 FLORA LIFT ALTERNATIVES**

To accomplish the purpose of replacing East Baldy Traverse as the way for upper mountain for skiers to get from the Albion side of the ski area to the Wildcat side, this lift faced complex and, in some cases, conflicting design considerations. The bottom terminal must be readily and safely accessible to skiers leaving the top of Sugarloaf lift and coming down Little Dipper, the easier way down, or Sugarbowl, the more advanced route. The terminal and routes to it also must not impede skier flow from the top of Collins lift to Sugarloaf lift via Devil's Way or the cat track.

Those imperatives leave little leeway in siting the terminal. To the north and west, the terrain slopes upward. To the south, the topography becomes steep and broken up by forest patches, rocky outcrops, and incised channels. Steep, forested slopes rise immediately east. The low-lying portions between these steep or off-pitch areas that would accommodate the purpose of this lift support wetlands.

Considering skier-circulation issues in conjunction with these natural limitations further complicates terminal siting. The location should allow skiers from Sugarloaf lift to access the site in a natural flow that provides adequate pitch to reach the new terminal at a safe and comfortable speed. It should also provide sufficient visibility of other Sugarloaf-lift skiers who are not accessing the Flora lift and Collins-lift skiers who are crossing to Sugarloaf. Forested rock outcrops separate Sugarbowl and Gravy Boat from Little Dipper, and Little Dipper from the cat track, blocking views of crossing skier traffic. Skiers

continuing down Sugarloaf are often carrying speed out of Sugarbowl, or trying to maintain speed on Little Dipper, to carry over the rise under the Sugarloaf lift line. The proposed site is down in the open basin, allowing sufficient space, lower gradients, and long enough sight lines to safely accommodate this changing circulation pattern.

One alternative location, on the lower end of a rock outcrop about 200 feet west of the proposed site, was seriously considered because it met some of the physical criteria and was an upland site. However, this site would require skiers on Sugarbowl to cross skier traffic on Little Dipper at almost a 90 degree angle and with limited visibility. Then skiers from both Sugarbowl and Little Dipper would have to cross the cat track, again with limited visibility, at high enough speed to carry them to the elevated location. This site would avoid wetland impacts, but it would not provide the necessary visibility or sufficient outrun space to reduce the speed of skiers.

Based on these considerations, the best location for the bottom terminal in terms of traffic flow and skier safety is at the open, low point in the bowl, which contains wetlands. All alternative locations would either require skiers to climb – not practical for downhill skiers – or mix skier traffic in unsafe ways, or involve construction on steep, rock slopes where disturbance would be far greater. As a result, no alternative locations were carried into in-depth analysis, and this EA thoroughly addresses and discloses the wetland impacts of the proposed terminal site.

### 2.6.3 GAZEX INSTALLATION ALTERNATIVES

Regarding the proposed avalanche-control installations on East Baldy, Sugarloaf Mountain, East Devil's Castle, and Patsey Marley (section 2.4.2.2), a commenter suggested Obell'X instead of Gazex installations to reduce visual impacts in the summer. Obell'X installations are removed during the snow-free season, leaving only mounting pedestals. However, these systems are better suited to smaller starting zones and are a less developed technology than Gazex. Potential impacts on visual resources due to the use of Gazex are addressed in this analysis.

## 2.7 SUMMARY AND COMPARISON OF ENVIRONMENTAL EFFECTS

Table 2-1 summarizes and compares the direct and indirect environmental effects of the proposed action and alternatives.

Table 2-1. Summary and comparison of environmental effects.		
Issue	No-Action Alternative	Proposed Action
<b>Soil, Water, and Watershed Resources:</b>		
How would the proposed infrastructural development affect soils, erosion, sedimentation, water quality, and overall watershed function?	No change from current situation. Soil productivity is limited by about 46 acres of impermeable surfaces. Established design criteria and BMPs effectively minimize erosion and sedimentation in the watershed.	The proposed action would result in temporary loss of soil productivity from compaction due to construction of access roads to terminals for the Baldy tram and Flora lift, affecting about 0.8 acres. There would be a permanent productivity loss on about 2.5 acres due to paving the expanded Albion parking lot and building footprints. Total impact would be about 3.3 acres, an increase of 6.7%.  About 18.9 acres of soil disturbance through grading and excavation would occur. The risk of erosion and sediment delivery to streams would be reduced by implementation of identified BMPs.

<b>Table 2-1 (cont'd). Summary and comparison of environmental effects.</b>		
<b>Issue</b>	<b>No-Action Alternative</b>	<b>Proposed Action</b>
Could potential leaks and spills of fuels and other chemicals impact water quality?	No change. The Spill Prevention Control and Countermeasure (SPCC) currently in place minimizes the risk of fuel or other chemical contamination.	The existing SPCC plan would remain in place to identify, isolate, and remove any environmental contamination as quickly as possible. All above-ground and below-ground storage tanks would continue to be inspected as required by state and federal regulations.
How would the proposed infrastructure affect wetlands and riparian areas?	No change. Approximately 42 acres of wetland and riparian areas, and 468 acres of Riparian Habitat Conservation Areas (RHCA), are generally functioning in accordance with management objectives.	About 0.23 acres of direct wetland impacts subject to COE and other permitting requirements would occur; no net loss. About 675 feet of intermittent stream crossings, 506 feet of perennial stream crossings and disturbance of about 5.34 acres of RHCA would be consistent with management objectives following implementation of identified BMPs.
<b>Vegetation:</b>		
How would the proposed infrastructure affect special-status plant species?	No habitat for federally listed or candidate species exists in the project area, and field surveys did not detect any. Potential habitat for 14 Forest Service sensitive species and three watch list species occurs in the project area, and Burke's draba has been documented. Ongoing recreational use may impact both individuals and potential habitat of these species. The potential for that impact would be unchanged from current conditions.	The proposed action would have no effect on Utah angelica, Brownie lady's slipper, Wasatch shooting star, slender moonwort, Wasatch fitweed, Wasatch draba, Burke's draba, rockcress draba, Garrett's fleabane, Utah ivesia, Wasatch jamesia, Wasatch pepperwort, Garrett's bladderpod, Barneby's wood aster, tower rockcress, sand fleabane, or broadleaf beardtongue individuals, populations, or habitat. The proposed action is not likely to cause a trend toward federal listing or a loss of viability of these Forest Service sensitive species.
How would the Baldy tram, in conjunction with climate change, affect the alpine ecosystem on Mt. Baldy?	The alpine ecosystem on Mt. Baldy would continue to experience winter and summer recreation use. Winter use would continue to occur over a layer of snow and would not impact the vegetation component of the alpine ecosystem. The impact of summer use would not change from the existing pattern – concentrated along the trails and dispersed off of the trails.	Construction, maintenance, and operation of the Baldy tram would directly affect the alpine ecosystem on Mt. Baldy only within the disturbance footprint of the upper tram terminal. Indirect effects would be limited since tram operation would occur on the north side of the summit where the snowpack is less affected by wind scour and sunlight, and during winter months when plants were dormant and snow covered, and wildlife were not active on the surface.
How would the proposed infrastructure affect noxious and non-native invasive plant species?	The ongoing operations would not increase the risk of noxious and non-native invasive species becoming established or spreading. Monitoring and treating past ground disturbances for noxious and non-native	Two of the proposed projects overlay known infestations of two noxious weeds that are present in trace amounts, and account for less than 1 percent of ground cover. No other infestations of noxious weeds occur in the proposed action disturbance footprint.  A number of the projects overlay known

<b>Table 2-1 (cont'd). Summary and comparison of environmental effects.</b>		
<b>Issue</b>	<b>No-Action Alternative</b>	<b>Proposed Action</b>
	invasive plant species would continue. Existing infestations would be expected to decrease.	infestations of Kentucky bluegrass, smooth brome, yellow sweet clover, and wand mullein, all of which are non-native invasive plants. Some were included in past revegetation and erosion control seed mixes.  Monitoring and treating past ground disturbances for noxious and non-native invasive plant species would continue. Existing infestations would be expected to decrease.
<b>Wildlife:</b>		
How would the proposed infrastructural development affect special-status terrestrial and aquatic wildlife species and other species of interest or concern?	No threatened or endangered species occur in the project area, but seven Forest Service sensitive species and a number of migratory birds have been documented. Past ski area operations have shaped the wildlife community that exists in the project area and the habitat for special-status species. Not implementing the proposed action would have no impacts on any special-status species as proposed action does not address any current problems with populations of these species.	The proposed action would have a very slight detrimental impact on three-toed woodpecker, flammulated owl, boreal toad, and northern goshawk due to habitat loss. It would not affect the peregrine falcon, spotted bat, Townsend's western big-eared bat, or Bonneville cutthroat trout.
<b>Cultural Resources:</b>		
How would the proposed infrastructure affect Cultural Concerns, Traditional Cultural Places (TCPs), or Native American Sacred Sites?	No Native American concerns have been identified at Alta through past consultation, so no impacts are anticipated.	No Native American concerns were identified through consultation on this proposed action, and design criteria include measures to protect any cultural resources discovered during construction. No impacts are anticipated.
How would the proposed infrastructure affect any historic properties?	Past review of projects indicated either no historic properties present or no adverse effects.	One proposed element, expansion of the Albion parking lot, would affect the historic Alta Townsite. However, the affect would be covering a portion of the site with fill material, effectively protecting any artifacts that might exist.
How would the proposed infrastructure affect the historic integrity of the ski area?	While the ski area is one of the country's oldest, its historic integrity is low due to removal or replacement of original infrastructure.	The proposed action would not further alter the ski area's historic integrity.

<b>Table 2-1 (cont'd). Summary and comparison of environmental effects.</b>		
<b>Issue</b>	<b>No-Action Alternative</b>	<b>Proposed Action</b>
<b>Scenic Resources:</b>		
How would the proposed infrastructure affect the scenic integrity of the project area?	Not implementing the proposed action would have some minor adverse effects on landscape character at Alta. Overall, the Resort Natural Setting landscape character would remain largely intact, with visible deviations due to the variety of architectural styles dating back to the 1950s and the rectangular, undivided Wildcat parking lot. Scenic integrity would continue to be managed for a High SIO as a desired condition.	Generally, implementation of the proposed action would affect the area's landscape character in ways similar to the ski area development that has occurred over the past 78 years. Some projects would maintain the more natural aspects of the landscape character. Some would have negligible visual effects, and some would increase the built aspect of the landscape character.  Overall, the proposed action is consistent with the Resort Natural Setting. It would not alter either the architectural variety at the ski area or the visual impact of the Wildcat parking lot, so the Resort Natural Setting landscape character would remain reasonably intact, and scenic integrity would continue to be managed for a High SIO as a desired condition.
<b>Recreation:</b>		
How would the proposed infrastructural development affect skier density and circulation?	Under this alternative, lift capacities and skier densities remain unchanged. As older lifts become less reliable, down time will likely increase. As a result, skiers will either wait longer in line for stopped lifts or move to other lifts, increasing density in those alternative pods.  Mt. Baldy access continues to involve hiking, limiting use and preserving that aspect of the experience.  Skiers coming to Germania Pass from the Albion side continue to use East Baldy Traverse, merging head-on with skiers getting off the Collins lift and creating congestion on the pass.	Lift upgrades and additions would make skier dispersal more efficient, leading to more uniform use of available terrain. While skier densities could increase somewhat in localized areas, the overall effect would be more efficient management of skier density. Alta would continue to adjust lift operating speeds to balance uphill with downhill capacity.  Installation of Baldy tram may decrease the attraction of that terrain to those seeking more isolation and adventure.  Circulation space on Germania pass is limited, but two facts mitigate the potential constraint posed by the Baldy tram lift maze: the tram will often not be open to public use, so no maze will normally be necessary, and with a capacity of 150 pph, the lift will not require a large maze when it is open to the public.  Flora lift should improve skier circulation on the pass: the terminal would be out of the way; skiers wishing to move from Sugarloaf pod to the Wildcat side would cross the pass in any case; and skiers unloading from the Flora lift would merge with skiers getting off Collins lift rather than approaching from the opposite direction as is the case with skiers coming off East Baldy Traverse.
<b>Safety:</b>		
Does lift access to Mt. Baldy pose a safety risk?	Safety issues on Mt. Baldy would not change. The lack of efficient ski patrol access to the	With even limited lift access, public use of the inherently dangerous Baldy Chutes would increase. This is a safety management issue with



**Table 2-1 (cont'd). Summary and comparison of environmental effects.**

Issue	No-Action Alternative	Proposed Action
	<p>top continues to slow avalanche control operations necessary to open Baldy Chutes and the rest of the mountain. Once control work was done, skier safety depends on skier education, rope lines, and signage. Skiers capable of hiking up Mt. Baldy continue to face the inherent risk associate with that type of terrain.</p>	<p>which Alta has decades of experience. Skier education, closures, rope lines, and signage have all been incorporated into an effective risk-management system at Alta, and lift access to Mt. Baldy would not be a qualitative change in the demands on that system.</p> <p>Overall, the increase in injury risk posed by the Baldy tram would be minor and manageable, and it would be offset by the greater speed and efficiency of avalanche control operations made possible by the tram.</p>
<p>Would sympathetic avalanche releases from proposed Patsey Marley Gazex installations pose a safety risk for backcountry skiers in Wolverine Cirque?</p>	<p>Avalanche-control activities on Patsey Marley and the effect they have on the safety of Wolverine Cirque skiers will remain unchanged. Alta continues to use explosives delivered by Avalaunchers or helicopters. Given the distance from Patsey Marley starting zones to those in the cirque, the intervening ridge, and the nature of the explosives use, impact on Wolverine Cirque from Patsey Marley avalanche control is minimal.</p>	<p>The Gazex installations would function in much the same way as the Avalaunchers and helicopter-delivered explosives currently in use; all of these methods deliver similar amounts of tightly focused explosive energy to the snow surface in defined avalanche starting zones. As a result, the new, higher-tech systems should not differ in their potential effects on snow stability in the cirque.</p> <p>If either the current or proposed avalanche control methods on Patsey Marley were to trigger a release in the cirque, it would be under conditions of extreme instability when skier use of the cirque was highly unlikely.</p> <p>Based on these considerations, the proposed Gazex installations on Patsey Marley would pose no increased risk to backcountry skiers in Wolverine Cirque.</p>

## **CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

### **3.1 INTRODUCTION**

This chapter describes the existing resource conditions and the direct, indirect, and cumulative environmental effects of implementing the proposed action and no-action alternative. Discussion is organized by resource and addresses the specific issues associated with each resource identified through public scoping and internal, interdisciplinary review (see section 1.8, Scoping and Identification of Issues).

### **3.2 DISTURBANCE TYPES AND AREAS**

Table 3-1 provides the basic dimensions of disturbance associated with various projects. These dimensions were used in calculating the project-specific disturbance areas shown in consecutive tables. Table 3-2 shows disturbances associated with the proposed action. Disturbance types, from least intensive to most intensive, are as follows:

- Clearing – removal of all trees and tall shrubs.
- Grading – re-contouring and smoothing the soil surface.
- Excavation – subsurface soil work, including foundations, trenches, and cut and fill.

All three disturbance categories may involve anything from hand work to heavy equipment. Three additional points help put these disturbance-area estimates in context.

First, the construction buffers included in these calculations of disturbed areas are generally restored and revegetated when the project is complete (section 3.4.1.3). However, lift terminals typically receive different treatment due to skier circulation and maintenance requirements. Bottom terminal sites include maze and loading areas, and top terminals require off-loading ramps and access to the skiways and runs they serve. All require summer access for maintenance. As a result, terminal areas are typically not restored and revegetated in the way other disturbance buffers are and tend to remain compacted with sparse vegetation.

Second, the disturbance areas for the proposed Flora lift and Baldy Tram terminals is considerably less than for the Sunnyside and Wildcat lift replacements. The Flora lift would be a fixed-grip double chair, requiring significantly smaller terminals than the detachable lifts replacing Sunnyside and Wildcat, and with significantly fewer riders, requiring less maze, loading, and off-loading space. Skier numbers using the tram would be even lower, and terminal requirements for a small, jig-back tram are minimal. These differences are reflected in the figures reported in Table 3-2 below.

Third, the construction buffers applied for this analysis can be changed on a site-specific basis for resource protection or other reasons. For example, if a wetland fell within an arbitrary construction buffer, permitting requirements and standard BMPs would include all reasonable efforts to avoid disturbing it.

**Table 3-1. Typical disturbance dimensions<sup>1</sup> by project type.**

Project Type	Disturbance Dimensions	Disturbance Type <sup>2</sup>
Parking Areas	Footprint size plus 20-foot construction buffer	Excavation
Chairlifts/Replacements		
Terminals	As designated by footprint	Grading/Excavation
Towers	25 feet x 25 feet	Excavation
Alignment Clearing	40-foot width	Clearing
Access Roads	Footprint size plus 20-foot construction buffer	Excavation
Gazex or Other Technologies		
Gas storage unit	8 feet x 8 feet	Excavation
Transmission line	4-foot width	Excavation
Exploders	Upper Footing 15 feet x 15 feet Lower Footing 7 feet x 7 feet	Excavation
Summer Ski Run Work	Actual acreage of planned disturbance	Grading/Excavation
Buildings and Other Infrastructure	Footprint size plus 50-foot construction buffer	Excavation/Grading
Snowmaking and Utility Lines	12-foot width	Excavation
<sup>1</sup> These are the dimensions of construction-related disturbance, not the finished dimensions of projects. <sup>2</sup> Indicates maximum disturbance intensity (e.g. excavation disturbance also includes grading).		

**Table 3-2. Disturbance types and acres disturbed under the proposed action.**

Project Name	Disturbance Category and Acres Disturbed <sup>1</sup>			
	Clearing <sup>2</sup>	Grading	Excavation	Project Total
Albion/Wildcat Base Parking (Albion lot)	-	-	2.81	2.81
Tram from Germania Pass to the top of Mt. Baldy	-	-	0.51	0.51
Access Road	-	-	0.15	-
Lift Corridor	-	-	-	-
Terminals	-	-	0.36	-
GazEx or Other Equivalent Technologies to Replace Artillery and Avalauncher	-	-	0.59	0.59
Exploders	-	-	0.08	-
Storage Building	-	-	0.01	-
Trench	-	-	0.50	-
Sunnyside Lift Replacement	1.03	-	1.62	2.65
Lift Corridor	1.03	-	-	-
Terminals	-	-	1.62	-
Wildcat Lift Replacement	0.82	-	1.62	2.44
Lift Corridor	0.82	-	-	-

**Table 3-2 (cont'd). Disturbance types and acres disturbed under the proposed action.**

Project Name	Disturbance Category and Acres Disturbed <sup>1</sup>			
	Clearing <sup>2</sup>	Grading	Excavation	Project Total
Terminals	-	-	1.62	-
Flora Lift Construction from the Bottom of Sugarbowl to the Top of Collins Lift	0.99	0.63	0.52	2.14
Access Road	-	0.63	-	-
Lift Corridor	0.99	-	-	-
Power Line	-	-	0.06	-
Terminals	-	-	0.46	-
Supreme Summer Ski Run Work	-	-	9.20	9.20
Widen existing Devil's Castle Road	-	-	2.64	-
Big Dipper Borrow Site	-	-	0.45	-
Re-contouring Erosion Gullies/ Widen Sleepy Hollow Run	-	-	6.11	-
Alf's Restaurant Building Addition	-	0.42	0.09	0.51
Watson Shelter Building Addition	-	0.25	0.02	0.27
Equipment Storage Facility Construction	-	0.43	0.14	0.57
<b>GRAND TOTAL</b>	<b>2.84</b>	<b>1.74</b>	<b>17.12</b>	<b>21.70</b>
<sup>1</sup> Project disturbance that overlapped other projects was only counted once. Priority was given to the project with the most intense disturbance (e.g. excavation had a higher priority than grading). <sup>2</sup> Represents the cleared width if the entire area were forested. Since the alignments are already largely cleared, and are only partially forested, actual clearing will be much less.				

### 3.3 CUMULATIVE ACTIONS

The cumulative actions considered in this analysis are those projects identified by the Forest Service that would have temporally and spatially overlapping impacts on the resources affected directly or indirectly by this proposed action or alternatives, in the past, present, or reasonably foreseeable future. Accordingly, the cumulative effects analysis area varies by resource. Table 3-3 describes the cumulative actions considered in this analysis. Note that the effects of other past projects are taken into consideration in the description of the affected environment under each resource discipline.

**Table 3-3. Cumulative actions considered in this analysis.**

Project Name	Project Description
<b>Past Projects</b>	
Supreme Lift Replacement and Cecret Lift Removal	<p>Location: Alta, Utah</p> <p>Description: Supreme lift was realigned to start southeast of Alf's restaurant, continue upslope to the bottom terminal of the existing Supreme lift, and then bend slightly to follow the existing alignment to the top terminal. Cecret lift was removed, with towers in wetlands flush cut and pulled out over the snow. In total, this project resulted in approximately 2.6 acres of ground disturbance and 1.6 acres of clearing of graded ski run and various vegetation types.</p> <p>Implementation Date: 2017.</p>
Quincy Mine Water Tank Replacement	<p><u>Location: Alta, Utah.</u></p> <p><u>Description:</u> This project entailed installing a 72-inch culvert, bedded in 12 inches of gravel and then buried, through the existing closed mine portal and extending to a new concrete portal with a steel gate. A 10-inch HDPE (plastic) pipe runs through the new portal to a low bulkhead 200 feet back in the mine to supply water to the new 40-foot-diameter concrete tank plumbed into the existing snowmaking supply line. Only vent and overflow pipes extend above the ground surface. About 0.5 acre of primarily graded ski run was disturbed.</p> <p>Implementation Date: 2016–2017</p>
Snowbird Gad Valley Improvements	<p>Location: Snowbird, Utah.</p> <p>Description: Completing projects within the current SUP boundary, including: Baby Thunder beginner facilities, lift maintenance shop relocation to expanded vehicle maintenance shop, Creekside Lodge expansion, conveyor lift to support Mountain School and Wasatch Adaptive Sports, expanding the mountain bike trail system in Gad Valley only, night skiing on Big Emma, Lunch Run summer road relocation, Mid Gad Restaurant remodel, Gad 2 lift upgrade and two trail modification. Excavation and grading affected about 30 acres, across a range of vegetation types, which were subsequently rehabilitated except for infrastructure footprints.</p> <p>Implementation Date: 2013–2018</p>
Corkscrew Project	<p>Location: Alta, Utah.</p> <p>Description: Corkscrew trail was widened to approximately 150 feet. Nina's Curve was filled in and merged into the skier's left side of Corkscrew. A portion of the ridge between Nina's and Corkscrew was re-contoured to achieve the width. A culvert was installed in Nina's Curve gully and buried. 4.7 acres of graded ski run and a mix of vegetation types was disturbed then rehabilitated.</p> <p>Implementation Date: 2014.</p>
Ballroom Traverse	<p>Location: Alta, Utah.</p> <p>Description: Removal of a few trees and excavation to build a narrow bench, improving access to the Ballroom area (225 feet by 8 feet). About 3.3 acres of primarily graded ski run, access road, and terminal site were disturbed. All but traverse prism was rehabilitated.</p> <p>Implementation Date: 2015</p>

<b>Table 3-3 (cont'd). Cumulative actions considered in this analysis.</b>	
<b>Project Name</b>	<b>Project Description</b>
<b>Present Projects</b>	
Albion Meadows Trail Reroute	<p>Location: Alta, Utah</p> <p>Description: Proposal to reroute the Albion Meadows trail from private property onto National Forest System lands. The rerouted section will be approximately 0.3 miles long and 3 feet wide. The old trail will be scarified and revegetated.</p> <p>Implementation Date: Anticipated 2018.</p>
Wildcat and Buckhorn Parking Lot Improvements	<p>Location: Alta, Utah.</p> <p>Description: Increasing the size of the roundabout and private-vehicle drop-off area, moving the entry to the parking lot approximately 100 feet to the west, and moving the snowmaking water-cooling tower in the Buckhorn lot. About 0.1 acre of previously disturbed ground will be affected.</p> <p>Implementation Date: 2018.</p>
Rollercoaster Snowmaking Loop	<p>Location: Alta, Utah.</p> <p>Description: Replace a dead-end snowmaking line with a 900-foot loop and three hydrants, increasing efficiency and preventing freeze-ups. It will include about 900 feet of buried snowmaking line supporting three hydrants, disturbing about 0.6 acres in an existing, graded ski run.</p> <p>Implementation Date: 2018.</p>
<b>Reasonably Foreseeable Projects</b>	
Patsey Marley Shrontz Utility Right-of-Way	<p>Location: Alta, Utah.</p> <p>Description: Construct a 400-foot utility right-of-way and widen 710 feet of the existing Albion Basin Road (National Forest System Route 028) to improve access to the proposed Patsey Marley Hill Property and subdivision.</p> <p>Expected Implementation: 2018</p>
Snowbird Zip Line Project	<p>Location: Snowbird, Utah.</p> <p>Description: Installation of a 2.75-mile, three-segment Zip Tour starting on Hidden Peak and ending at the northwest corner of Lot 1. Launch and land towers would disturb 0.9 acres of graded ski run and forested land.</p> <p>Expected Implementation: 2018.</p>
Alta Ski Area East Baldy Remote Avalanche Mitigation Project	<p>Location: Alta Ski Area, Salt Lake County</p> <p>Description: Installation of pedestals to place Obell'X Avalanche Control Devices on Mt. Baldy above the East Baldy Traverse.</p> <p>Expected Implementation: 2018.</p>

## 3.4 PHYSICAL AND BIOLOGICAL ENVIRONMENT

### 3.4.1 SOIL, WATER, AND WATERSHED RESOURCES

#### 3.4.1.1 Scope of Analysis

- *How would the proposed infrastructural development affect soils, erosion, sedimentation, water quality, and overall watershed function?*

The project area is characterized by steep slopes, erosive soils and, in many areas, sparse ground cover. Construction-related disturbance and subsequent use could result in decreased permeability and productivity, and increased erosion and sediment transport to streams. Since the ski area is in Salt Lake City's municipal watershed, maintaining water quality is of concern.

Indicators: For soil productivity, calculation of the change in the extent of impermeable surfaces. For erosion, sedimentation, and water quality, a risk rating for each project, calculated using the connected disturbed area (CDA; Furniss et al 2000; Forest Service 2006a) approach that incorporates soil type, disturbance area, intensity of disturbance, slope, presence of a runoff pathway, distance to a water body, and efficacy of proposed design criteria and mitigation. Water quality is the primary indicator of watershed functioning.

- *Could potential leaks and spills of fuels and other chemicals impact water quality?*

Construction, maintenance, and use of the proposed facilities would involve the use of fuel and other chemicals. Leaks or spills could adversely affect water quality in the watershed.

Indicators: A qualitative assessment of the likelihood of contaminant releases and the efficacy of measures in place to manage them.

- *How would the proposed infrastructure affect wetlands and riparian areas?*

The project area includes several types of wetlands, riparian areas, intermittent and perennial streams, and associated riparian habitat conservation areas (RHCAs). Construction and subsequent use could decrease the functioning and the extent of these valuable, aquatic habitats. The wetlands adjacent to the Albion parking lot are a particular concern.

Indicators: Calculation of the acreage of these habitats lying within disturbance footprints, and discussion of the resulting direct, indirect, and cumulative effects on the extent and function of these habitats within the watershed boundary.

Forest Plan guidance regarding RHCAs states that "This designation still allows for a full range of activities but it emphasizes the achievement of riparian management objectives that are identified on a site-by-site basis" (p. GL-32 Forest Service 2003). This review identified several considerations that should be accounted for by objectives: Riparian Class I streams (Little Cottonwood Creek), populations of Bonneville cutthroat trout in Little Cottonwood Creek below the project area, and landslide prone areas. The resulting objectives for project-area RHCAs are:

1. Maintain functions that filter pollution, prevent sedimentation, and support existing levels of water quality in municipal watersheds.
2. Maintain 80 percent bank stability. A stable bank is one that is not sloughing into the channel.
3. Increase woody riparian vegetation adjacent to streams such as willows and sedges to at least 60 percent of the stream reach.
4. Enhance upland soil and vegetation conditions that will reduce pollution and sediment movement to streams.
5. Maintain wildlife habitat and corridors for wildlife.

Several of these objectives are based on riparian management objectives in the *Inland Native Fish Strategy* (INFISH; Forest Service 1995a, 2004) and indices from *Habitat Suitability Index* (HSI) models (Raleigh et al. 1984) for cold water fish species. Analysis was conducted at a spatial scale defined by the project area boundary.

### **3.4.1.2 Affected Environment**

The project area is defined by two primary watersheds including Albion Basin and Collins Gulch. Albion Basin comprises a majority of the ski area, including the headwaters of Little Cottonwood Creek and Cecret Lake, and extends outside of the project area to the north and east. Snowmelt runoff and shallow groundwater in Albion Basin are captured by intermittent and perennial stream channels that flow into the Little Cottonwood Creek during spring and early summer. The creek is primarily a perennial stream in the project area. Discharge from Cecret Lake occurs when water levels are above the outlet elevation.

Collins Gulch is located to the west of Albion Basin and begins above 11,000 feet at Mt. Baldy. Several intermittent stream channels flow into Collins Gulch and provide seasonal discharge to an intermittent tributary of Little Cottonwood Creek near Alta Lodge.

#### ***Erosion, Sedimentation, and Water Quality***

Soil, water, and wetland resources were described in the 1997 EIS (Forest Service 1997; incorporated by reference). This section summarizes and updates that information as necessary. Three primary sources of information were used to update a description of the affected environment. First, aerial photos and soil survey information was reviewed and summarized to identify compacted or impervious surfaces and the potential for soil erosion. Second, water quality in Little Cottonwood Canyon is regularly monitored by the Utah Division of Water Quality (DWQ) to insure standards are met and existing levels of quality do not degrade. Results of this monitoring were reviewed. Third, site visits to the proposed project locations were conducted in 2016 and 2017.

There are areas of low ground cover in the project area which have an elevated erosion potential. Those areas correspond to alpine areas above the tree line, waste rock piles associated with relic mines, and some of the steep hillslopes. Erosion in some areas is naturally occurring, but in others it may be affected by past mining, timber harvesting, and livestock grazing practices. One such area is located near the appropriately named Erosion Gullies ski run west of the upper terminal of the Supreme lift. A series of erosion gullies have formed that terminate near the headwaters of an intermittent stream, likely having a negative effect on water quality.

Soil productivity in the project area was not addressed in the 1996 EIS. For this analysis, the amount of compacted or impervious surface created by buildings and roads was selected as an appropriate measure, as these are the productivity parameters most likely to be affected. Impervious surfaces constitute a permanent, or at least a long term, loss of soil productivity. Paved roads and buildings are a complete loss, and the unpaved, compacted surfaces of roads and trails may be a partial loss, as some functions remain (e.g., some infiltration and vegetation production). Paved surfaces in the project area include parking lots and roads and cover 13.69 acres. Buildings in the project area house lift terminals, equipment storage, and snowmaking infrastructure, and they constitute 2.54 acres of lost soil productivity. Lift towers contribute a negligible amount of impervious surface. Unpaved roads and trails contribute 27.41 acres and 2.23 acres, respectively, of lost soil productivity in the project area. The total loss of soil productivity due to soil compaction and impermeability in the project area is 45.87 acres.

Soil resource information in the project area was obtained from the national Soil Survey Geographic Database (NRCS 2017) and a 1973 soil survey completed for the Alta-Little Cottonwood area (Woodward et al. 1974). Additional soil information was found in a more recent soil survey completed for Albion Basin (Jensen 1993) and in the 1996 FEIS for the Alta MDP update (Forest Service 1997).

A total of five soil associations are found in the project area (Table 3-4) and the proposed projects are sited on four of these soils. Soil map units in the project area are shown in Figure 3-1. Soils in the project area occur in various combinations based upon slope, glacial geology/landform, and micro-climate.

Soil resources in Albion Basin are generally deeper, more consistently developed, and strongly influenced by moisture content (Jensen 1993) in comparison to Collins Gulch. Jensen (1993) estimated that hydric soil characteristics indicative of wetlands were found in many locations in Albion Basin.



<b>Table 3-4. Soil units in the project area.</b>		
<b>Map Unit ID</b>	<b>Mapping Unit Name</b>	<b>Area (acre)</b>
118	Dromedary-Rock outcrop complex, 30 to 70 percent slopes, parent material is colluvium and till derived from sandstone, shale and conglomerate. Rock outcrop comprises 15 percent of this unit.	139
159	Parkcity-Dromedary gravelly loams, 15 to 30 percent slopes, parent material is slope alluvium and colluvium derived from sandstone, limestone and quartzite. Rock outcrop comprises 5 percent of this unit.	458
160	Parkcity-Dromedary gravelly loams, 30 to 70 percent slopes, parent material is colluvium derived from sandstone, limestone and quartzite. Rock outcrop comprises 5 percent of this unit.	<0.1
164	Rock Outcrop, soil associations (including Agassiz, Starley family, Hades, and Parkcity associations) comprise only 10 percent of this unit and the remaining 90 percent consists of rock outcropping.	457
165	Rock outcrop-Starley family complex, 30 to 70 percent slopes, parent material is colluvium derived from limestone, quartzite and sandstone. Rock outcrop comprises 50 percent of this unit.	1,004

Collins Gulch contains well-drained, gravelly loam soils at lower elevations that decrease in depth with elevation. Shallow drainages that flow into Collins Gulch include hydric soil in isolated areas where seasonal runoff collects. The upper third of Collins Gulch is comprised of 50–90 percent rock outcrop in the form of glacial cirques, talus slopes, and sharp crested ridges. Cirque basins found at upper elevations in Albion Basin and Collins Gulch contain eroded material and shallow residual deposits of soil.

Soils in the project area are generally in good condition. Most base area facilities are located near Little Cottonwood Creek on stream banks and terraces composed of coarse glacial deposits of cobble and boulder (Forest Service 1997). Impacts on riparian soils have been stabilized with native vegetation and other nonpoint source controls (Jensen 1993, Forest Service 1997). Limited erosion has occurred due to unsuccessful revegetation following construction projects (Forest Service 1997). Erosion also occurred when a culvert in the bottom of Collins Gulch was completely blocked during peak flows in early summer 2011 (Forest Service 2011). The diverted stream created a small mudflow that travelled downslope to the lift terminal area. Ski area personnel quickly restored flow to the culvert and stabilized the area the following day, resulting in short-term sediment impacts on Little Cottonwood Creek (Forest Service 2011).

Water quality in Little Cottonwood Creek is monitored closely by the DWQ and Salt Lake City because the creek is a significant water source for Salt Lake City, supports native aquatic species, and is important for recreation. Little Cottonwood Creek above the National Forest boundary is classified as an antidegradation segment (High Quality Water - Category 1). This classification indicates that existing water quality is higher than state standards, and that the state is required by regulation to maintain this condition. Numeric water quality standards for all beneficial uses assigned to Little Cottonwood Creek are found in Section R317-2, Utah Administrative Code, *Standards of Quality of Waters of the State* (State of Utah 2016). Little Cottonwood Creek and its tributaries in Little Cottonwood Canyon are assigned the following beneficial uses: secondary contact recreation, cold water aquatic life, and drinking water prior to treatment for culinary use.

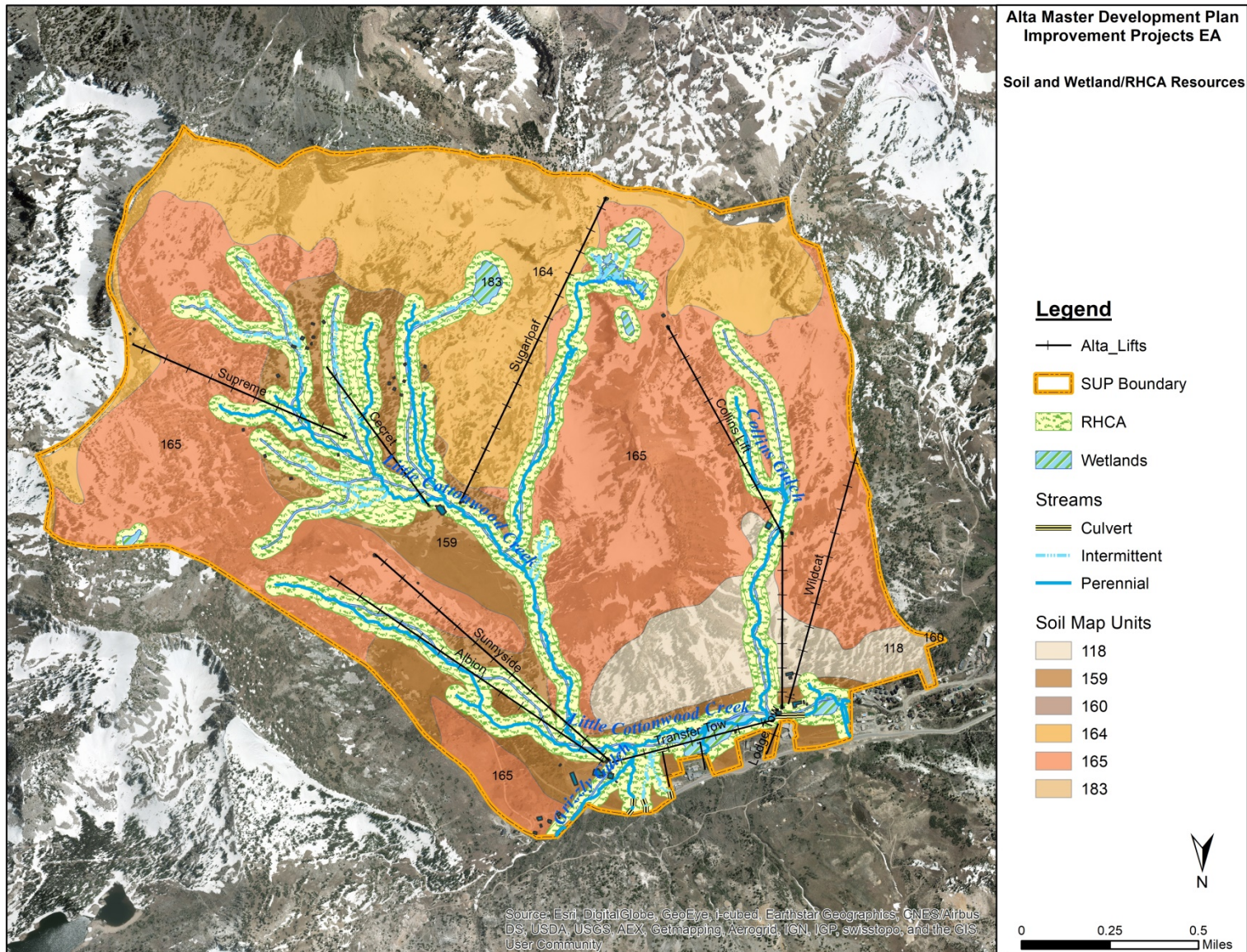


Figure 3-1. Watershed resources map including soils, wetland, and RHCAs.

The DWQ is required by the Clean Water Act to publish an integrated water quality report (IR) every other year that describes the health of waters of the state. This report compares available monitoring data (i.e., chemical, biological, and physical parameters) to numeric standards, indicators, and narrative descriptions. If standards are not met, the water body is included on a list of impaired waters (303[d] list), requiring DWQ to define a Total Maximum Daily Load (TMDL) and develop a plan to restore water quality. The 1998 IR indicated that Little Cottonwood Creek was impaired due to elevated levels of zinc, and the necessary assessment and restoration plan were completed in 2002 (DWQ 2002). Based on additional monitoring data and review, the 2014 IR identified other water quality parameters in Little Cottonwood Creek that exceed water quality standards including copper, cadmium, and pH (DWQ 2014). These parameters have a low priority for completing a TMDL, and additional monitoring and review by DWQ will determine if further action is needed.

### ***Potential Leaks and Spills of Fuels and Other Chemicals***

Maintenance and use of existing facilities at Alta involve machinery and equipment that require fuel, oil (including motor and hydraulic oil), and petroleum-based lubricants. These fluids are a potential source of environmental contamination and are regulated under the Code of Federal Regulations (CFR) 112.1 through 112.8. The regulations require a Spill Prevention Control and Countermeasure (SPCC) plan that defines operating procedures, provides measures to prevent spills, and prevents pollution from entering navigable waters of the US through drains and other paths. The regulations include specific requirements for a SPCC plan based on potential to discharge oil and facility storage capacity. Alta is required to have a SPCC plan due to the potential to discharge oil and an above-ground storage capacity that exceeds 1,320 total gallons.

Alta has recently updated their SPCC plan for the base area (Sage Environmental 2016). The vehicle maintenance shop currently has the capacity to store approximately 1,500 gallons of new and used oil, kerosene, and diesel fuel. These fluids are used for vehicle maintenance and to fuel an emergency generator. An additional 1,000 gallons of storage is located outside the Wildcat administration and lift maintenance building for a second emergency generator and two electrical transformers. Small amounts of fuel and oil are also found in ski area vehicles and machinery across the project area. In regard to underground storage, three storage tanks are buried near the maintenance shop.

Potential spills and leaks could occur from any source at Alta, and plans are currently in place to identify, isolate, and remove any contamination as quickly as possible. All above-ground bulk storage containers are located inside the vehicle maintenance shop, which has a secondary containment system equal to the capacity of the largest container. All bulk storage containers are monitored for integrity and signs of leaks on a regular basis. Any spills in the shop would be observed immediately, and drains in the shop are connected to an oil/water separator. Outflow from this separator goes to the Salt Lake County District #3 water treatment system.

Leaks from smaller containers and equipment in the shop would also be identified quickly due to the visible location of these sources and frequent presence of shop personnel. Leaks from emergency generators would be contained inside of the generator housing. The potential for leaks from electrical transformers is low due to their design, and these sources are constantly monitored as part of routine operations.

Vehicles and machinery used to operate the ski area are maintained on a regular schedule which minimizes the potential for leaks to occur. Underground storage tanks at Alta are double walled, monitored with leak detection sensors, and compliant with all underground storage tank regulations. Routine inspections of the underground tanks have not identified leaks (Aussereressus 2017).

The SPCC requires monthly inspection of all sources at the vehicle maintenance shop, and records of these inspections are kept in the facility SPCC file. Shop personnel receive annual training on spill response, and all employees at Alta are instructed to report any spill or potential spill situation immediately. The Utah Department of Environmental Quality routinely monitors Alta inspection records

and completes periodic on-site monitoring to ensure that above and below ground storage containers are properly maintained. No surface spills have occurred at Alta that delivered water to Little Cottonwood Creek or its tributaries (Aussereruss 2017).

### ***Wetland and Riparian Resources***

This analysis uses RHCAs as an efficient basis for addressing potential impacts on riparian areas and aquatic habitats other than wetlands. RHCAs are defined by the following parameters included in the Forest Plan: 300 feet either side of fish-bearing perennial streams; 150 feet either side of perennial non-fish bearing streams and wetlands greater than 1 acre; and 50 feet either side of intermittent streams, wetlands less than 1 acre, and landslides and landslide-prone areas. The 50-foot buffer is increased to 100 feet for water features located in watersheds that contain Bonneville or Colorado River cutthroat trout. As noted previously, Little Cottonwood Creek does contain Bonneville cutthroat trout below the project area and, as a result, RHCAs for intermittent streams have a 100-foot buffer. The extent of the RHCA is based on the digitally-corrected stream locations visible on aerial imagery, and on the National Wetlands Inventory (NWI) data set. NWI is discussed further below.

Figure 3-1 shows the extent of RHCAs within the project area. The total RHCA acreage in the project area is 432.77 acres, comprising 422.52 acres associated with aquatic features and 10.25 acres associated with a historic landslide.

Overall, the condition of riparian zones in the project area has improved relative to historic conditions and is being maintained in an ecologically sound manner. This improvement in riparian zone condition is contributing to meeting RHCA management objectives (section 3.4.1.1). Remaining water quality concerns are associated with mining, specifically with discharge from mine portals.

To address wetlands, this analysis uses the NWI for a broad characterization of wetland resources in the project area, then shifts to actual field-verified delineations of wetlands that would be affected by the proposed action. The NWI underestimates project-area wetlands and is not accurate at finer scales, but it provides the best overview available.

A broad-scale inventory was completed in Albion Basin to identify areas with hydric soil conditions and corresponding wetland vegetation (Crowley 1992, Jensen 1993). This inventory classified 485 acres of plant communities in Albion Basin, including 237 acres that could potentially meet wetland soil and vegetation criteria. The third criterion, hydrology, was not assessed. The resulting report identified the maximum extent of potential wetlands in Albion Basin. It has been used as a means of screening potential development for more detailed wetland delineation. Site-specific surveys, including formal wetland delineation if potential wetlands are present, are required prior to construction activities on any public or private land in Little Cottonwood Canyon.

Approximately 42 acres of wetland and riparian vegetation were mapped in the project area by the NWI. Table 3-5 shows the acreage of each type of wetland identified. Based on this information, most of the wetland acreage at Alta is defined as riparian wetlands. The remaining wetland resources at Alta are comprised of shrub/scrub wetlands, ponds, and meadow wetlands.

Following the broad-scale, NWI-based review of wetland resources, three additional steps were taken to verify the presence or absence of potential wetland areas within the disturbance footprint of proposed projects. First, pedestrian surveys were completed in the disturbance footprints to identify which projects had wetland habitats. Those projects comprised only of upland habitats were not considered further. Second, the boundaries of wetland habitats in the remaining project footprints were digitally delineated from both aerial and color infrared imagery taken in 2006, 2009, and 2012. And third, site investigations were conducted to verify whether wetland vegetation, soils, and hydrology were present in the digitally-delineated wetland habitats. The results of those surveys are provided below in section 3.4.1.3 and provide a more accurate representation of wetland resources that may be impacted by the proposed action.



<b>Table 3-5. Wetland resources in the project area.</b>	
<b>Type</b>	<b>Area (acre)</b>
Meadow Wetlands	1.13
Shrub/Scrub Wetlands	12.22
Riparian Communities	24.44
Ponds	4.43
<b>TOTAL</b>	<b>42.22</b>

In regard to riparian wetlands, most stream channels are constricted in the project area, with narrow bands of vegetation bordering rocky stream channels. Larger stream channels are located in mid-to-lower elevations and fed by small first-order streams. Shallow groundwater flow supports wider riparian corridors at lower elevations including Little Cottonwood Creek as it exits the project area.

The riparian corridor of Little Cottonwood Creek is designated as a Class I riparian area based on rating criteria for riparian resource values (Forest Plan, Appendix VII) and high ratings for Water Quality and Special Administrative Designations categories. The less disturbed portions of the Little Cottonwood Creek riparian zone are dominated by a combination of upland and wetland plants, depending on the topography of the specific site and the elevation of the stream.

### **3.4.1.3 Direct and Indirect Effects**

Section 3.4.1, Scope of Analysis, identifies the indicators for this analysis. Most are straightforward, but, the risk rating for erosion and sedimentation, needs explanation.

Erosion and transport of sediment to receiving water bodies are focal points in this analysis. Natural erosion processes are part of natural soil development. However, prior to stabilization, erosion from areas disturbed by construction can occur at an accelerated rate. The method used here to assess erosion and sedimentation hazard resulting from proposed development is the connected disturbed area (CDA) approach (Furness et al. 2000; Forest Service 2006a). It involves the following steps for each project:

1. Determining the pre-mitigation erosion potential based on the erosion hazard of the affected soil types, the size of disturbance, the intensity of disturbance (i.e., clearing through excavation), the slope of the disturbed area, and the distance to the closest drainage channel or other runoff pathway (road or trail) and nearest receiving water body (stream or wetland).
2. Identifying appropriate BMPs to mitigate erosion and sedimentation hazard.
3. Assessing the post-mitigation erosion risk based on the efficacy of the identified BMPs.

Based on the factors listed in point 1, projects are assigned a pre-mitigation risk rating of high, medium, or low for erosion and sedimentation. Generally, project elements are assigned a high risk rating if they have two or more of the following attributes: large disturbance area (greater than 1 acre), proximity to a runoff pathway or receiving water body, and steep slopes (greater than 50 percent). Projects are assigned a moderate risk rating if they have one of these attributes and a low risk rating if they have none. Other factors, such as the shape and type of disturbance and the amount of disturbance inside stream and wetland buffers are also considered when assigning risk ratings.

The CDA approach prescribes “disconnecting” disturbed areas. If sediment sources are disconnected from the “easy pathways” down the mountain, the total sediment yield to major streams can be greatly reduced (Furniss et al. 2000).

Specific BMPs to reduce erosion, disconnect disturbed areas, and minimize the watershed and water quality impacts of each project are identified in the CDA analysis for the proposed action. These measures are described in more detail in section 3.4.1.5, following the discussion of direct and indirect effects, and in Section 2.5. Most of these BMPs are core measures recommended by the Forest Service for ski area development. A more detailed discussion of these measures is available in *Volume 1: National Core BMP Technical Guide* (Forest Service 2012a).

#### ***Alternative 1 – No Action***

##### **Soil, Erosion, Sedimentation, and Water Quality**

If the proposed action were not implemented, ongoing ski area operations would continue without further development in the project area. Soil quality and erosion, sedimentation, and water quality dynamics would remain similar to existing conditions as described in section 3.4.1.2. None of the proposed projects would resolve any such issues.

##### **Potential leaks and spills of fuels and other chemicals**

If the proposed action were not implemented, the potential risk for leaks and spills of fuels and other chemicals in the project area would remain at existing levels as described in section 3.4.1.2. The existing SPCC plan would remain in place to identify, isolate, and remove any environmental contamination as quickly as possible. All above-ground and below-ground storage tanks would continue to be inspected by Alta on a regular basis. State inspections would also continue as required by state and federal regulations. Based on the history of previous inspections, no spills or contamination are anticipated. No contamination issues would remain unresolved as a result of not implementing the proposed action.

##### **Wetland and Riparian Resources**

If the proposed action were not implemented, ongoing ski area operations would continue without further development in the project area. The condition of wetland and riparian resources would remain similar to existing conditions as described above in section 3.4.2.2. The total acreage of RHCAs in the project area would remain at 468 acres, and wetlands and stream channels would remain as they are. None of the proposed action projects would resolve wetland or riparian issues.

#### ***Alternative 2 – Proposed Action***

##### **Soil, Erosion, Sedimentation, and Water Quality**

In regard to soil quality, the proposed action would result in a loss of productivity from compaction due to construction of access roads to terminals for the Baldy tram and Flora lift. As shown in Table 3-2, these projects would include 0.15 acres of excavation and 0.63 acres of grading, respectively. As a result, the proposed action would reduce soil productivity on a total of 0.78 acres through compaction.

Loss of soil productivity under the proposed action would also result from development of any structure that would cover soil with a hardened surface. These projects would include: the Albion parking lot expansion; upper and lower terminals for the Baldy tram, Sunnyside, Wildcat and Flora lifts; building additions for Alf's restaurant and Watson Shelter, and construction of the equipment storage facility. Installation of lift towers and Gazex units (i.e. exploders, and gas storage units) would result in a minor amount of impervious surface. Based on disturbance areas shown in Table 3-2, the total disturbance resulting from these projects would be 7.20 acres. However, the actual loss of soil productivity would be 2.55 acres and only include areas covered by paved surfaces and building footprints. The remaining disturbance areas would be rehabilitated following construction.

Based on these numbers, there would be a total increase of 3.33 acres of compacted soils and impermeable surface. This would be a 7 percent increase over the 45.87 acres of compacted or impermeable surface currently in the project area. Given the extent of undeveloped acreage in the project area, this loss of productivity due to compaction and paving would not be a notable impact on soil quality.

The results of the CDA analysis are presented in Table 3-6. Most projects would be located on well-drained colluvium soils in the Starley family association with a severe erosion potential. However, these soil types (mostly 164 and 165; see Table 3-4 above) include 50–90 percent rock outcrop, which is not susceptible to erosion. This substantially reduces the overall erosion and sedimentation potential.

The Supreme Summer Ski Run Work project would take place in a previously disturbed area (i.e., adjacent to an existing road and on a steep hill slope where ongoing erosion has created the gullies that the project would be filling). The 1.57 acres of disturbance would involve an RHCA defined by distance from a channel, not “aquatic features.” The 347 feet of intermittent stream channel are located at the downslope end of the disturbance footprint and would not be filled or relocated. After the recontouring, the then-filled erosion gullies would be seeded with appropriate species, and erosion control measures would be implemented. This project would decrease the amount of erosion taking place within the project area, decrease sediment delivery to an intermittent stream channel, and thus improve water quality.

Disturbance from individual projects would range from 0.01 acres (Gazex gas storage unit) to 6.11 acres (widening Sleepy Hollow trail). The proposed action would disturb a total of 18.86 acres. This does not include clearing, which generally would not disturb the soil surface, based on design criteria and BMPs (section 2.5 and Appendix A).

Most projects associated with the proposed action include excavation, for lift terminals and tower footings, building footprints, utility trenches, and widening ski trails. A total of 17.12 acres would be excavated. Grading disturbance would be less extensive at 1.74 acres, occurring during construction of the Flora lift access road, Alf’s restaurant expansion, Watson Shelter expansion, and the equipment storage facility. Clearing would affect 2.84 acres but would have minimal impact on erosion and sedimentation as surface disturbance would not generally be involved.

Project elements that involve very steep areas (i.e., maximum slope within project footprint > 100 percent) for even short distances would include the Baldy tram, Gazex installations, Sunnyside lift replacement, Wildcat lift replacement, Flora lift, and Sleepy Hollow trail. Across projects, maximum slopes range from 50 to 152 percent.

All stream crossings (permanent and temporary) and their distance from projects are noted in Table 3-6. Clearing activities for lift corridors cross some stream channels, but no lift towers would be installed in stream channels or floodplains. Widening the Sleepy Hollow Trail would also involve excavation and contouring slopes around an intermittent stream channel segment. Finally, the south edge of the disturbance buffer surrounding the Alf’s restaurant addition spans a perennial segment of Little Cottonwood Creek.

Temporary crossings could occur during construction of these projects if equipment were required to cross a channel in order to access a remote location (e.g., lift tower locations). This situation would be unlikely in regard to the Alf’s restaurant addition, where the channel would easily be avoided.

Permanent crossings would occur over intermittent and perennial stream segments during construction of the Albion parking lot. Flow in stream channels is currently routed beneath the existing parking lot in several locations. Under the proposed action, two existing culverts would be extended to the south and one to the north in order to accommodate the Albion parking lot expansion.

Any disturbance to, or fill of, stream channels would require permitting through the COE and the Utah Division of Water Rights. A stormwater settling basin located near the edge of the Albion parking lot would be moved as part of this project, but it is a manmade water feature and federal regulations pertaining to waters of the US are not applicable.

Table 3-6 includes BMPs that address permanent stream crossings. These BMPs are designed to minimize the potential risk of sediment delivery to stream channels, ensure stability in channel crossings, and maintain proper stream function in channel segments above and below each crossing.

Under the proposed action, all project elements are associated with a high or medium risk rating for erosion and sedimentation prior to mitigation. This rating indicates the potential for individual projects to contribute sediment, during or following construction, to intermittent and perennial stream channels and ponds/wetlands in the project area. Projects such as lift corridors get high risk ratings due to the disturbance size and stream crossings. However, these ratings are exaggerated because lifts span stream channels but lift towers would not be located in stream channels of floodplains. Minimal surface disturbance would occur from clearing lift corridors because trees would be felled in place or removed when snow cover is present and soil surfaces are typically frozen.

Table 3-6 also identifies BMPs that would minimize or eliminate the potential for erosion and sedimentation for construction aspects other than stream crossings. Some of the more important BMPs used include FAC-2, FAC-9, FAC-10, ROAD-3, ROAD-8, REC-10, REC-12, VEG-1, and VEG-2. These are discussed in section 2.5 and listed in Appendix A.

With these mitigation measures in place, the erosion and sedimentation risk ratings for all projects under the proposed action would fall to low. As a result, the proposed action would generate no substantial water quality impacts on stream segments in or downstream of the project area. This conclusion is supported by past experience with implementing similar BMPs in the project area and at other resorts on the UWCNF (Forest Service 1997; Forest Service 2012a).

#### **Potential leaks and spills of fuels and other chemicals**

The proposed action would include Gazex avalanche control equipment that uses a pressurized oxygen/propane mixture to power controlled explosions to set off snow avalanches. Exploders are connected to storage tanks with enough capacity to fuel each system for an entire winter season. Leaks from individual exploders or storage tanks would vaporize and not contaminate soil or water.

The proposed equipment storage facility would house mechanical equipment used in routine operations at the ski area. Some of this equipment could include fuel tanks, and motor and hydraulic oil. Similar to existing practices, this equipment would be used in the project area to maintain ski area activities during the winter and summer visitor seasons. As described above, Alta services their equipment on a regular schedule which minimizes the potential for leaks and spills. As a result, routine maintenance activities would continue to pose little threat of contamination.

Construction of projects under the proposed action would require use of heavy equipment for excavation and grading. As shown in Table 3-6, some project elements are located near stream and wetland features, and these projects would have relatively greater potential for water quality impacts.

Existing practices outlined in the SPCC plan would minimize or prevent spills and leaks from machinery used during construction activities under the proposed action. The potential for leaks occurring would be limited to periods of construction and to the volume of fluids and fuel included in the equipment used at each project site. In the event of spills or leaks, and consistent with the SPCC plan, Alta would quickly identify, isolate, and remove any environmental contamination. BMPs that reduce or eliminate potential spills or leaks include Road-10 and Fac-6 (Appendix A). Additional design criteria are found in section 2.5.



<b>Table 3-6. CDA analysis of the Proposed Action.</b>							
<b>Name and project</b>	<b>Soil unit<sup>1</sup> / Erosion Hazard<sup>2</sup></b>	<b>Project Disturbance Area (acres)</b>	<b>Intensity</b>	<b>Max Slope (%)</b>	<b>Proximity to Runoff Pathway<sup>3</sup></b>	<b>Pre-Mitigation Sedimentation Potential</b>	<b>BMPs</b>
<b>Albion/Wildcat Base Parking (Albion lot)</b>	159 / Moderate	2.81	Excavation	81	Crosses stream, <50 ft. to road.	High	AqEco-2, Fac-2, Rec-12, Road-7, Road-8, Road-9, Road-10.
<b>Baldy Tram</b>							
Access Road	164 / Not rated	0.15	Excavation	53	>1,000 ft. to stream, road crossing.	High	Fac-2, Rec-10, Road-3, Veg-2.
Terminal	164 / Not rated	0.36	Excavation	152	>1000 ft. to stream, <50 ft. to road.	High	
<b>Subtotal</b>		0.51					
<b>Gazex Installations</b>							
Exploders	164 / Not rated	0.08	Excavation	128	<700 ft. to stream, <800 ft. to road.	Moderate	Rec-12, Fac-2, Fac-9.
Gas storage unit	164 / Not rated	0.01	Excavation	86	<1,000 ft. to stream, >1,000 ft. to road.	Moderate	
Trenches	165 / Severe	0.50	Excavation	133	<700 ft. to stream, <800 ft. to road.	Moderate	
<b>Subtotal</b>		0.58					
<b>Sunnyside Lift Replacement</b>							
Lift Corridor	165 / Severe	1.03	Clearing	150	Crosses Little Cottonwood Creek (LCC) and road.	High	Fac-2, Fac-10, Rec-10, Veg-2.
Terminal	165 / Severe	1.62	Excavation	50	<100 ft. to LCC, road crossing.	High	
<b>Subtotal</b>		2.65					

<b>Table 3-6 (cont'd). CDA analysis of the Proposed Action.</b>							
<b>Name and project</b>	<b>Soil unit<sup>1</sup> / Erosion Hazard<sup>2</sup></b>	<b>Project Disturbance Area (acres)</b>	<b>Intensity</b>	<b>Max Slope (%)</b>	<b>Proximity to Runoff Pathway<sup>3</sup></b>	<b>Pre-Mitigation Sedimentation Potential</b>	<b>BMPs</b>
<b>Wildcat Lift Replacement</b>							
Lift Corridor	165 / Severe	0.82	Clearing	145	Crosses stream (in culvert), road crossing.	High	Fac-2, Fac-10, Rec-10, Veg-1, Veg-2.
Terminal	165 / Severe	1.62	Excavation	101	<200 ft. to LCC, <300 ft. to wetland, road crossing.	High	
<b>Subtotal</b>		2.44					
<b>Flora Lift</b>							
Access Road	165 / Severe	0.63	Grading	103	>1,000 ft. to stream, <900 ft. to wetland, road crossing.	High	Fac-2, Fac-9, Rec-10, Road-3, Road-7, Veg-1, Veg-2.
Lift Corridor	165 / Severe	0.99	Clearing	102	Stream crossing, <200 ft. to road.	High	
Power Line	165 / Severe	0.06	Excavation	104	>1,000 ft. to stream, <900 ft. to wetland, road crossing.	High	
Terminal	165 / Severe	0.46	Excavation	108	<50 ft. stream, wetland crossing, <200 ft. to road.	High	
<b>Subtotal</b>		2.15					
<b>Supreme Summer Ski Run Work</b>							
Widen Devil's Castle Road	165 / Severe	2.64	Excavation	97	<1,000 ft. to stream, <600 ft. to wetland, road crossing.	High	Fac-2, Rec-10, Road-3, Veg-2.
Big Dipper Borrow Site	165 / Severe	0.45	Excavation	52	<100 ft. to stream, >700 ft. to road.	High	Fac-2, Rec-10, Veg-2, Road-7.
Re-contouring Erosion Gullies/Widen Sleepy Hollow run	165 / Severe	6.11	Excavation	129	Crosses LCC headwater (intermittent) and road.	High	
<b>Subtotal</b>		9.20					

<b>Table 3-6 (cont'd). CDA analysis of the Proposed Action.</b>							
<b>Name and project</b>	<b>Soil unit<sup>1</sup> / Erosion Hazard<sup>2</sup></b>	<b>Project Disturbance Area (acres)</b>	<b>Intensity</b>	<b>Max Slope (%)</b>	<b>Proximity to Runoff Pathway<sup>3</sup></b>	<b>Pre-Mitigation Sedimentation Potential</b>	<b>BMPs</b>
<b>Alf's Restaurant Building Addition</b>	159 / Moderate	0.51	Excavation <sup>4</sup>	99	Crosses LCC (buffer only) and road.	High	Fac-2, Rec-12, Veg- 2.
<b>Watson Shelter Building Addition</b>	165 / Severe	0.27	Excavation <sup>4</sup>	56	<50 ft. to stream and wetland, road crossing.	High	Fac-2, Rec-12, Veg- 2.
<b>Equipment Storage Facility</b>	159 / Moderate	0.57	Excavation <sup>4</sup>	77	Crosses wetland (buffer only), <50 ft. to stream, road crossing.	High	Fac-2, Rec-12, Road 8, Veg-2.
<b>Total</b>		21.70					
<sup>1</sup> Dominant soil type for a project element; other types are present. <sup>2</sup> Erosion hazard Not rated (soil type 164) is 90 percent rock outcrop and soil type 165 is 50 percent rock outcrop. <sup>3</sup> LCC = Little Cottonwood Creek <sup>4</sup> The intensity rating for this project includes primarily grading and about 0.1 ac or less of excavation for building footprints.							

### **Wetland and Riparian Resources**

Methodologically, project elements are first assessed in terms of the acreage and percentage of RHCA that they would affect, and then on their consistence with the management objectives established for these RHCAs. The RHCA management objectives are listed above in section 3.4.1.1. Each project is evaluated according to whether it prevents, detracts, or enhances meeting those objectives.

Several objectives involve water quality, and that issue is addressed in detail above under the discussion of erosion and sedimentation impacts, with the CDA approach as the main analytical tool. Several conclusions can be drawn from that analysis in regard to projects that lie within RHCAs. These conclusions are interpreted in the discussion of impacts and how they relate to RHCA objectives. The main indicator is the acreage of disturbance occurring within RHCAs, which correlates with the potential for sedimentation and thus with the potential for nonpoint-source contributions to receiving water bodies in the project area.

Other RHCA objectives are intended to protect in-stream aquatic features, adjacent riparian habitat, and landslide prone areas. These objectives can likewise be addressed based on the amount of disturbance occurring in RHCAs, stream channels, and wetlands and the subsequent potential impacts on stream shading, woody debris, bank stability, riparian cover, and slope stability.

As discussed above (section 3.4.1.2), the NWI was used to broadly characterize wetlands and stream channels in the project area, but any wetlands or channels actually within project disturbance footprints were identified and delineated in the field. Disturbances of these resources are defined for each project element and summarized for the proposed action.

As to results, Table 3-7 summarizes potential impacts on RHCAs associated with aquatic features and a historic landslide as well as direct impacts on wetlands and intermittent and perennial stream channels. RHCA impacts associated with aquatic features would result from several projects under the proposed action including expansion of the Albion parking lot (1.42 acres), replacement of the Sunnyside lift (1.18 acres), construction of the Flora lift (0.31 acres), the Supreme summer ski run work (1.57 acres), the Alf's restaurant building addition (0.47 acres), the Watson Shelter addition (0.23 acres), and the equipment storage facility (0.16 acres). No impacts on landslide-prone RHCA acreage would occur under the proposed action.

Total impacts on RHCAs associated with aquatic features under the proposed action would be 5.34 acres, or 1.23 percent of the total RHCA acreage in the project area. The site characteristics, design criteria, and mitigation measures discussed below would reduce the intensity and duration of those impacts and allow accurate interpretation of the disturbance percentages in terms of the established RHCA management objectives.

The Albion parking lot expansion would permanently impact RHCAs surrounding perennial and intermittent streams. RHCAs in the disturbance footprint would be overlain by fill material and a paved surface. BMPs that would protect RHCAs downstream of this project and stream channels in and downstream of this project include AqEco-2, Fac-2 Road-7, Road-9, and Road-10. These BMPs would maintain or restore the function of healthy riparian corridors and stream channels during and after construction activities.

<b>Table 3-7. RHCA and Wetland Table.</b>				
<b>Project Element</b>	<b>RHCA – Aquatic Features<sup>1</sup> (acres)</b>	<b>Wetlands<sup>1</sup> (acres)</b>	<b>Intermittent Stream Length (feet)</b>	<b>Perennial Stream Length (feet)</b>
<b>Albion/Wildcat Base Parking (Albion lot)</b>	1.42	0	155	214
<b>Sunnyside Lift Replacement</b>				
Lift Corridor	0.86	0		130
Terminal	0.32	0		
<b>Flora Lift</b>				
Lift Corridor	0.31	0.05	67	97
Terminal	<0.01	0.18	106	
<b>Supreme Summer Ski Run Work</b>				
Widening Sleepy Hollow trail	1.57	0	347	
<b>Alf's Restaurant Addition</b>	0.47	0		65
<b>Watson Shelter Addition</b>	0.23	0		
<b>Equipment Storage Facility</b>	0.16	0		
<b>TOTAL</b>	<b>5.34</b>	<b>0.23</b>	<b>675</b>	<b>506</b>
<sup>1</sup> RHCA and wetland acres in this table are based on the site investigations, and not the NWI data.				

The Sunnyside Lift Replacement would impact RHCAs by clearing the lift corridor and by construction activities in the disturbance buffer surrounding the terminal footprint. Impacts in the disturbance buffer rather than in the structure's footprint would be rehabilitated following construction, but the actual terminal and tower footprints would be permanently impacted. The site is currently occupied by the existing lift terminal, so these impacts would not be new. Similar but fewer impacts on RHCAs would occur from installing the lift corridor and bottom terminal of Flora lift (wetland impacts of the terminal are discussed below).

Disturbance in lift corridors would remove any trees and tall shrubs that prevent safe operation and maintenance of ski lifts. Trees would be felled in place or removed when snow cover was present and soils were typically frozen. Terminals require excavation for footings and some trenching for utility lines. Buffers surrounding terminals would be used preferentially (i.e., disturbance would be confined to non-RHCA portions of the construction buffer to the extent practical) to avoid or minimize impacts on RHCAs and protect surface vegetation that filters runoff and prevents sedimentation in receiving water bodies. BMPs that reduce or eliminate impacts to RHCAs from these projects include Fac-2, Fac-10, Rec-10, Veg-1, and Veg-2.

The Supreme summer trail work would impact RHCAs along an intermittent stream channel that passes through the Sleepy Hollow Trail. Areas upslope of the stream channel (including some RHCAs) would be graded and contoured to create the ski run. All disturbed areas would then be revegetated to promote stability and prevent future erosion. BMPs that would restore RHCAs and prevent sedimentation in the intermittent channel segment include Fac-2 and Veg-2. As described above, this project would decrease the amount of erosion taking place within the project area and decrease sediment delivery to an intermittent stream channel.

The building additions at Alf's restaurant and Watson Shelter and construction of the equipment storage facility would impact RHCAs near each project site. Disturbance buffers surrounding the footprint of each structure overlap RHCAs. Construction activities inside these buffers would utilize heavy equipment and disturb vegetation and soil surfaces in some areas. Construction activities would be planned to avoid RHCAs in disturbance buffers when possible. BMPs that would minimize impacts on RHCAs for these projects include Fac-2, Rec-12, and Veg-2.

Overall, the BMPs listed in Table 3-6 and described in more detail below in section 3.4.1.5 and in Appendix A would minimize or eliminate potential adverse impacts on RHCAs. Some key measures include Fac-2, Rec-10, Rec-12, and Veg-2. Direct impacts on RHCAs under the proposed action would include temporary disturbance (e.g., lift contours, graded ski trails, and disturbance buffers surrounding building footprints that would be revegetated) and permanent disturbance (e.g., culverts and fill material over RHCAs). Based on this analysis and the past effectiveness of these BMPs at Alta, adverse impacts on RHCAs would be minimized or eliminated, and overall progress towards RHCA objectives would continue in the project area.

The extent of NWI-identified wetlands within the project footprints differs from the extent identified during the site investigation. Although the NWI shows wetlands in the footprint of the Sunnyside lift replacement, Supreme summer trail work, Alf's Restaurant addition, and the equipment storage facility projects, no wetlands were observed in those locations during the site investigation. Potential wetland areas were identified from aerial and color infrared imagery in the footprints of the Albion parking lot expansion, a different area of the Sunnyside lift replacement, and Flora lift projects. However, the potential wetlands in the Albion parking lot and Sunnyside lift alignment lacked hydric soil conditions or wetland hydrology, and therefore are not wetlands.

The potential wetlands visible in the aerial and color infrared imagery at the lower Flora lift terminal are dominated by hydrophytic vegetation and have hydric soils. Although wetland hydrology was not present during the site investigation, it has been observed during the growing season. Construction of the Flora lift would impact 0.23 acres of palustrine emergent and shrub/scrub wetlands. The lower terminal accounts for 0.18 acres of those impacts. The remaining 0.05 acres are located in the lift alignment and may or may not be impacted by lift towers, depending on tower placement.

Though there is a pond in the footprint of the Albion parking lot project, that pond is man-made and is part of the existing non-point stormwater treatment system constructed in the late 1980s. Parking lot runoff flows first into a cement separator at the edge of the Albion lot to remove oil, sediment, and litter. The treated runoff is then discharged into the man-made pond through a culvert where it undergoes a second settling process. Both the cement separator and the pond are cleaned periodically, and the contaminated material is removed for further treatment in the Salt Lake valley. Impacts on this pond would not require COE or Utah Division of Water Rights permits.

The remaining projects associated with the proposed action would not impact wetlands.

While disturbance buffers around the footprints of the terminal overlap with wetlands and indicate potential for direct disturbance, these buffers are arbitrary, and wetlands within them will be avoided to the extent practicable, in accordance with design criteria in section 2.5. Any disturbance of, or fill to, wetlands under the proposed action would require permitting through the COE and the Utah Division of Water Rights and compensatory mitigation. Those permits must be obtained prior to ground disturbing activities in jurisdictional waters of the U.S. Compensatory mitigation would be implemented at a minimum 5:1 ratio (e.g., every acre of wetland impact would require 5 acres of mitigation). Adherence to that ratio would more than ensure compliance with Executive Order 11990 which mandated a no-net-loss of wetlands.

All stream channel crossings (permanent and temporary) under the proposed action are identified in the CDA analysis, and length of disturbance is accounted for in Table 3-7. These crossings would impact

approximately 675 feet of intermittent stream channel and 506 feet of perennial stream channel resulting from the Albion parking lot expansion, Supreme summer trail work (widening Sleepy Hollow run), Sunnyside lift replacement, Flora lift construction, and the Alf's restaurant addition.

Expanding the Albion parking lot would directly impact approximately 155 feet total of two intermittent stream channels and 214 feet of a perennial channel. All channels are first order, non-fish-bearing streams. These three channels pass beneath the existing Albion parking lot in 255 feet of culverts (intermittent channels) and a 107-foot culvert (perennial channel). These three culverts would be extended to carry flows beneath the proposed expansion, too. The existing channels would be abandoned and filled. Again, these channels are not associated with wetlands. The parking lot project would require permitting through the COE and Utah Division of Water Rights.

Constructing the lower Flora lift terminal would directly impact approximately 106 feet of intermittent stream channel. The channel would be rerouted to the north and east around the terminal footprint. Depending on the location of lift towers, the construction of the Flora lift may impact an additional 67 feet of intermittent stream channels and 97 feet of perennial stream channel. Channel rerouting would require permitting through the COE and Utah Division of Water Rights and compensatory mitigation, but could be covered under the same permit for placing fill material into the impacted wetlands discussed above.

All other impacts on stream channels shown in Table 3-7 are considered temporary indirect impacts. The Supreme summer trail work incorporates about approximately 347 feet of intermittent stream channel, but no direct disturbance would occur in stream channels. Corridors for the Sunnyside and Flora lifts would span stream channels. The disturbance buffer surrounding the Alf's restaurant addition footprint crosses a perennial segment of Little Cottonwood Creek, but in accordance with design criteria in section 2.5, no equipment and construction material would enter the stream channel.

BMPs listed in Table 3-6, particularly FAC-2, ROAD-7, and VEG-2, would be employed at stream crossings to maintain stability and proper hydrologic function. The recommended BMPs would limit the extent of impacts, restore disturbed areas, and continue progress towards RHCA objectives.

#### **3.4.1.4 Cumulative Effects**

The cumulative effects analysis area is defined as Little Cottonwood Canyon above White Pine Canyon, where project impacts on wetland and riparian resources could be additive. The time frame for this analysis is 10 years, the period necessary for vegetation to recover.

##### ***Soil, Erosion, Sedimentation, and Water Quality***

All of the cumulative actions listed in section 3.3 have the potential to interact with the proposed action in regard to soil, erosion, sedimentation, and water quality. Factors that influence the potential for sediment delivery to water bodies (e.g., slope, soil erosion hazard, disturbance intensity) for each of the cumulative actions are similar to the proposed action. All projects are located in subwatersheds that drain to upper segments of Little Cottonwood Creek. As a result, without BMPs and effective mitigation, these projects would cumulatively contribute to water quality degradation.

As discussed in the preceding section, the potential for direct and indirect impacts under the proposed action would be minimized or eliminated with the use of BMPs listed in Table 3-6. Similar mitigation requirements have been, or will be, in place for the cumulative actions. These standard BMPs and mitigation measures have proven to be effective in reducing erosion and sedimentation in the analysis area; previous projects at Alta and Snowbird ski areas have had little impact on these resources. As a result, very little cumulative effect on soil and water resources is expected.

***Potential leaks and spills of fuels and other chemicals***

Cumulative actions listed in section 3.3 that involve use of heavy equipment and machinery (along with fuel, motor oil, and other fluids) have the potential to interact cumulatively with similar projects under the proposed action. The potential for leaks and spills of fuels and other chemicals at Alta is managed by the most recent SPCC plan, as discussed above.

Within the past 10 years, two chemical leaks have been recorded by the Utah Department of Environmental Quality (DEQ). The first involved leaking underground fuel tanks at the Alta Peruvian Lodge. The tanks were removed in 1997, remediation was completed, and the file was closed in 2014. The second incident was a leaking electrical transformer struck by a snowplow on Alta Bypass Road in 2014. Cleanup was completed within days, and no further action was required by DEQ.

Although the potential for leaks and spills will increase in a cumulative way as more development occurs, the risk remains small due to training and implementation of plans that address this potential under the proposed action and cumulative actions. The low incidence of spills and successful remediation when they have occurred bears this out. Accordingly, the likelihood of notable cumulative effects due to leaks and spills is low.

***Wetland and Riparian Resources***

Two of the cumulative actions listed in section 3.3 directly impacted wetland resources and interact cumulatively with the proposed action. These are the Snowbird Gad Valley Improvements and the Supreme Lift Replacement project. These two projects directly affected 2.7 acres of wetlands.

Direct impacts on wetland resources are permitted through the COE and Utah Division of Water Rights. Mitigation measures are required as part of this permitting process, including creating or restoring wetlands (if necessary) to insure that no net loss of wetlands occurs. This was the case for both of the noted projects, and mitigation requirements exceeded the area impacted. Based on these considerations, the cumulative effect on wetlands would be no decrease in wetland acreage or function in upper Little Cottonwood Canyon.

**3.4.1.5 Mitigation**

Section 2.5 contains a summary of general design criteria and BMPs that would be followed in the implementation of the proposed action. This analysis identified additional resource-specific mitigation measures. If the proposed action were implemented, these design criteria and mitigation measures would be applied to maintain soil quality, minimize sedimentation, protect water quality, minimize or eliminate spills and leaks, and sustain riparian and wetland vegetation. With these practices in place, erosion and sedimentation would be minimized, no substantial water quality impacts on stream segments in or downstream of the project area would occur, risk of spills and leaks would be minimized, progress toward RHCA objectives for the project area would continue, impacts on wetlands would be avoided, and effects on stream channels would be negligible.

The mitigation measures indicated by this analysis are summarized as follows:

WAT-1: Implement the BMPs listed in Appendix A.

WAT-2: Obtain appropriate COE, Utah Division of Water Rights, Salt Lake County Health Department, and Salt Lake City Department of Public Utilities permits and authorizations prior to disturbing wetlands or altering stream channels.

WAT-3: Mitigate wetland and stream channel impacts in accordance with the permits and authorizations noted above and avoid any net loss of wetlands.



## 3.4.2 VEGETATION

### **3.4.2.1 Scope of Analysis**

- *How would the proposed infrastructure affect special-status plant species?*

No federally listed plant species are known to occur at Alta, but 17 Forest Service Region 4 sensitive species and four UWCNF watch-list species may occur in potentially disturbed areas. Clearing, grading, excavation, or subsequent use could adversely affect plants of these species.

Indicators: Species-specific determinations of the potential individual- and population-level impacts, based primarily on past surveys, surveys completed for this analysis, published information on the species' distribution and population status, and efficacy of proposed design criteria and mitigation.

- *How would the Baldy tram, in conjunction with climate change, affect the alpine ecosystem on Mt. Baldy?*

Constructing, maintaining, and operating the Baldy tram could potentially exacerbate the adverse impact of warming trends on the peak's alpine vegetation.

Indicators: A qualitative assessment of the direct, indirect, and cumulative effects of the Baldy tram on the alpine ecosystem.

- *How would the proposed infrastructure affect noxious and non-native invasive plant species?*

A number of noxious and non-native invasive species are known to occur in upper Little Cottonwood Canyon. Clearing, grading, excavation or subsequent use could result in new infestations or spread of existing infestations.

Indicators: A risk assessment for whether noxious and non-native invasive species would become established or spread.

### **3.4.2.2 Affected Environment**

The project area is located in the upper extent of Little Cottonwood Canyon in the Wasatch Range. The Wildcat base area is at an elevation of 8,540 feet, and the summit of Mt. Baldy is at 11,068 feet. The project area has a predominantly north aspect. The area consists of alpine and montane forest and meadow communities. Due to both natural variation and previous resort development, the habitats are relatively segmented. For example, the evergreen forest communities are divided by rock outcroppings, talus slopes, and cliff areas, especially at higher elevations. Ski runs and roads have further segmented forests. As a result, forest stands resemble islands or patches rather than large contiguous blocks. Riparian communities are also present near streams and springs (see section 3.4.1.2).

Within the project area, the forested habitat includes spruce-fir evergreen stands and mixed fir-aspen stands. Forest stands are largely comprised of subalpine fir (*Abies lasiocarpa*) and aspen (*Populus tremuloides*). At the higher elevations on the east side of the project area (Patsey Marley) many of the fir trees have a krummholz growth form. The forest stands have thick mountain shrub/tall forb communities in the understory dominated by snowberry (*Symphoricarpos oreophilus*), currant (*Ribes* sp.), western mountain ash (*Sorbus scopulina*), Woods' rose (*Rosa woodsii*), gray aster (*Eurybia glauca*), nettleleaf giant hyssop (*Agastache urticifolia*), and western coneflower (*Rudbeckia occidentalis*). Willow (*Salix* sp.) stands are also common along the margins of riparian areas in Albion Basin. The meadow habitats correspond largely with ski runs, and the vegetation consists of a mixture of native and introduced grasses and forbs including such species as smooth brome (*Bromus inermis*), mountain brome (*Bromus marginatus*), meadow foxtail (*Alopecurus pratensis*), nettleleaf giant hysop, oneflower helianthella (*Helianthella uniflora*), and silvery lupine (*Lupinus argenteus*).

Albion Basin is a popular wildflower viewing destination. As a result, the Albion Basin portion of the project area supports a high number of summer visitors relative to the lesser developed Wildcat portion. Summer hiking occurs both on developed trails and dispersed across the landscape, including in riparian and alpine plant communities.

### ***Special Status Species***

#### **Threatened, Endangered, and Candidate Species**

One federally listed species, Ute ladies'-tresses (*Spiranthes diluvialis*), is listed by the US Fish and Wildlife Service (FWS) as potentially occurring in Salt Lake County. It is addressed in the Biological Assessment (BA) prepared for this project (Forest Service 2017a). In summary, the elevation range for this species is generally 4,200 to 5,900 feet, though it has been observed at 7,000 feet. Thus, this species would not occur in the project area based on elevation limitation, and there would be no effect on this species. Furthermore, Ute ladies'-tresses was not observed during the 2015 and 2016 surveys. Therefore, federally listed species are not discussed further in this analysis.

#### **Forest Service Sensitive Species**

A Biological Evaluation (BE) was also prepared for this project (Forest Service 2017b). This document assessed the presence of Forest Service Intermountain Region sensitive species in the project area and analyzed potential impacts on these species from project-related activities. A total of 17 Forest Service sensitive species are known or suspected to occur on the Salt Lake Ranger District, and four additional species are included on the watch list (Table 3-8). Surveys were conducted in 2015 and 2016 on all disturbance sites within the project area to determine if any of these species, or potential suitable habitat, were present. Additional surveys have been completed for other projects during the past two decades, including projects that were categorically excluded. The results of surveys conducted for this analysis and for other projects are incorporated in the species descriptions below and were used in analyzing the environmental consequences of the proposed action.

Potential suitable habitat is present in the project area for 17 of the 21 combined sensitive and watch species. Those species are addressed further below. The four sensitive and watch species for which there is no potential suitable habitat are not addressed further in this analysis.

**Table 3-8. Sensitive and watch-list plant species occurring or suspected to occur on the Salt Lake Ranger District, Uinta-Wasatch-Cache National Forest and their level of analysis for this project.**

Species	Status and Rank <sup>1</sup>	Carried into Detailed Analysis?	Comments <sup>2,3</sup>
Utah angelica ( <i>Angelica wheeleri</i> )	Sensitive G2, S2	Yes	Suitable habitat exists in the project area.
Crenulate moonwort ( <i>Botrychium crenulatum</i> )	Sensitive G3, S1	No	Suitable habitat includes saturated soils near seeps and along streams with dense herbaceous vegetation at 3,000 to 6,000 feet in elevation. Project area is outside of known distribution.
Slender moonwort ( <i>Botrychium lineare</i> )	Sensitive	Yes	Suitable habitat exists in the project area.
Wasatch fitweed ( <i>Corydalis caseana</i> spp. <i>brachycarpa</i> )	Sensitive G5, S2	Yes	Suitable habitat exists in the project area.

<b>Table 3-8 (cont'd). Sensitive and watch-list plant species occurring or suspected to occur on the Salt Lake Ranger District, Uinta-Wasatch-Cache National Forest and their level of analysis for this project.</b>			
<b>Species</b>	<b>Status and Rank<sup>1</sup></b>	<b>Carried into Detailed Analysis?</b>	<b>Comments<sup>2,3</sup></b>
Brownie lady's slipper ( <i>Cypripedium fasciculatum</i> )	Sensitive G4, S1	Yes	Poor quality habitat exists in the project area.
Lesser yellow lady's slipper ( <i>Cypripedium calceolus</i> var. <i>parviflorum</i> )	Sensitive G5, SNR	No	Suitable habitat includes shady, moist soils at 4,400 to 5,280 feet in elevation. Outside of known distribution.
Wasatch shooting star ( <i>Dodecatheon utahense</i> )	Sensitive G4, S1	Yes	Suitable habitat exists in the project area.
Wasatch draba ( <i>Draba brachystylis</i> )	Sensitive G1, S1	Yes	Suitable habitat exists in the project area.
Burke's draba ( <i>Draba burkei</i> )	Sensitive G3, S2	Yes	Suitable habitat exists in the project area.
Rockcress draba ( <i>Draba globosa</i> )	Sensitive G3, S2	Yes	Suitable habitat exists in the project area. Species observed during field surveys.
Garrett's fleabane ( <i>Erigeron garrettii</i> )	Sensitive G2, S2	Yes	Suitable habitat exists in the project area.
Utah ivesia ( <i>Ivesia utahensis</i> )	Sensitive G2, S2	Yes	Suitable habitat exists in the project area.
Wasatch jamesia ( <i>Jamesia americana</i> var. <i>macrocalyx</i> )	Sensitive G5, S2	Yes	Suitable habitat exists in the project area.
Wasatch pepperwort ( <i>Lepidium montanum</i> var. <i>alpinum</i> )	Sensitive G5, S1	Yes	Suitable habitat exists in the project area.
Garrett's bladderpod ( <i>Lesquerella garrettii</i> )	Sensitive G2, S2	Yes	Suitable habitat exists in the project area.
Cottam cinquefoil ( <i>Potentilla cottamii</i> )	Sensitive G1, S1	No	Suitable habitat includes cracks and crevices in quartzite outcrops, often shaded from direct midday sunlight, at 7,500-10,400 feet in elevation in Box Elder and Tooele counties. Project area is outside of known distribution.
Barneby's Wood aster ( <i>Tonestus kingii</i> var. <i>barnebyana</i> or <i>Aster kingii</i> var. <i>barnebyana</i> or <i>Herrickia kingii</i> var. <i>barnebyana</i> )	Sensitive G3, S1	Yes	Suitable habitat exists in the project area.
Tower rockcress ( <i>Arabis glabra</i> var. <i>furcatipilis</i> )	Watch List G5, SNR	Yes	Suitable habitat exists in the project area.

**Table 3-8 (cont'd). Sensitive and watch-list plant species occurring or suspected to occur on the Salt Lake Ranger District, Uinta-Wasatch-Cache National Forest and their level of analysis for this project.**

Species	Status and Rank <sup>1</sup>	Carried into Detailed Analysis?	Comments <sup>2,3</sup>
Spruce wormwood ( <i>Artemisia norvegica</i> )	Watch List G5, SNR	No	Suitable habitat includes spruce-fir, lodgepole pine, and alpine tundra communities between 10,700 and 12,000 feet in Summit and Duchesne county. Project area is outside of known distribution.
Sand fleabane ( <i>Erigeron arenarioides</i> )	Watch List G3, S3	Yes	Suitable habitat exists in the project area.
Broadleaf beardtongue ( <i>Penstemon platyphyllus</i> )	Watch List G3, S3	Yes	Suitable habitat exists in the project area.
<sup>1</sup> Conservation rank: G = Global, S = State. 1 = Critically imperiled, 2 = Imperiled, 3 = Vulnerable, 4 = Apparently secure, 5 = Secure, NR = Not ranked. <sup>2</sup> Utah Rare Plant Guide, Utah Native Plant Society <a href="http://www.utahrareplants.org/rpg_species.html">http://www.utahrareplants.org/rpg_species.html</a> <sup>3</sup> Welsh et al. 2015.			

*Utah Angelica*

Utah angelica is a tall forb in the parsley family. It typically grows in boggy or very wet areas, often in riparian communities, seeps, and springs, typically at elevations between 5,600 and 6,800 feet (up to 10,000 feet). It is endemic to Utah and is distributed primarily along the Wasatch Front in Cache, Juab, Piute, Salt Lake, Sevier, Tooele, and Utah counties (Welsh et al. 2015, UNPS 2017). No individuals were observed during 2015 and 2016 field surveys.

*Slender Moonwort*

Slender moonwort is a small forb that grows in marsh or spring areas at elevations of around 8,000 feet (UNPS 2017). It is only known from two historic collections in Utah; the population on the Salt Lake Ranger District has not been relocated. However, the UWNCF considers potential habitat to include all riparian areas above elevations of 9,000 feet. A moonwort species similar to slender moonwort was observed on the top of Hidden Peak, approximately 0.6 mile southwest of the project area, and another species was observed near the Devil's Castle Road in the southern part of the project area. No slender moonwort plants were observed during the 2015 and 2016 plant surveys.

*Wasatch Fitweed*

Wasatch fitweed is a conspicuous flowering forb that grows in or along streams or near drainages in montane settings at elevations between 7,500 and 8,500 feet, though it has been observed at elevations up to 10,100 feet. It is endemic to Utah and occurs in Salt Lake, Summit, Utah, Wasatch, and Weber counties (UNPS 2017). Wasatch fitweed is known to occur in Albion Basin, along the banks of a perennial stream. No Wasatch fitweed was observed during the 2015 and 2016 field surveys.

*Brownie Lady's Slipper*

Brownie lady's slipper is an orchid that inhabits the duff layer in highly-shaded spruce-fir or lodgepole pine forests (Welsh et al. 2015) and along shaded streams (UNPS 2017) between 8,000 and 9,600 feet in elevation. It is known to occur in Cache, Daggett, Salt Lake, Uintah, and perhaps Summit counties (UNPS 2017). There are no expansive stands of spruce-fir in the project area, but there are small spruce-fir islands. Rather than having a duff layer beneath the tree canopy, these tree islands have rock, scree, or

tall forb understories. As a result, the potential habitat in the project area is considered poor quality. No brownie lady's slipper was observed during the 2015 or 2016 plant surveys.

*Wasatch Shooting Star*

Wasatch shooting star is a wildflower that inhabits shady, moist crevices of rock outcrops, often in the spray of waterfalls. Suitable habitat exists between the elevations of 6,600 and 9,500 feet. Occurrences are known from Big Cottonwood Canyon in Salt Lake County (Welsh et al. 2015). No Wasatch shooting star was observed during the 2015 or 2016 plant surveys.

*Wasatch Draba*

Wasatch draba is a small, short-lived annual mustard plant. It is found in shady, moist soils or rock pockets and talus areas, and along stream banks in aspen-fir communities between 5,495 and 9,810 feet in elevation. Wasatch draba is known to occur in Duchesne, Juab, Salt Lake, and Utah counties (Welsh et al. 2015), and has been observed in Albion Basin. Wasatch draba was not observed during the 2015 or 2016 plant surveys.

*Burke's Draba*

Suitable habitat for Burke's draba includes talus slopes and rocky outcrops of quartzite, limestone, or calcareous shale, in mixed conifer and maple/oak communities at 5,500 to 9,700 feet in elevation. Burke's draba is endemic to the Wellsville Mountains and northern Wasatch Range (UNPS 2017, Welsh et al. 2015). There is some question as to whether Burke's draba occurs on the Salt Lake Ranger District. As a conservative measure, it was included as a target species in the 2015 and 2016 plant surveys.

*Rockcress Draba*

Rockcress draba is a small, low-growing plant. It occurs in alpine tundra and meadows in the Uinta Mountains and in both Little and Big Cottonwood Canyons in Salt Lake County. Suitable habitat is typically located between 11,000 and 12,500 feet in elevation. Rockcress draba was observed on the summit of Sugarloaf Mountain during the 2015 plant survey and on the ridge dividing the north and east faces of Mt. Baldy during a survey for an un-related project in 2017.

*Garrett's Fleabane*

Garrett's fleabane is a small, showy daisy that grows on moist, limestone cliff faces and crevices between 8,950 and 12,400 feet in elevation. It is endemic to the Wasatch Mountains in Salt Lake, Utah, and Wasatch counties (Welsh et al. 2015). Garrett's fleabane is known to occur in Albion Basin but was not observed during the 2015 or 2016 plant surveys.

*Utah Ivesia*

Suitable Utah ivesia habitat includes alpine tundra and krummholz communities, often in quartzite talus, at 10,500 to 11,800 feet in elevation in Salt Lake, Summit, Utah, and Wasatch counties. Utah ivesia has been observed on a number of occasions within the Alta SUP boundary, most commonly in the area between Sugarloaf Mountain and Cecret Lake at the top of Albion Basin. It was not observed in the disturbance area of projects associated with the proposed action.

*Wasatch Jamesia*

Wasatch jamesia is a flowering shrub found in mountain brush and spruce-fir communities, most commonly on cliffs and rock outcroppings. It is found at elevations between 5,690 to 9,005 feet. Wasatch jamesia occurs in Juab, Salt Lake, Utah, and Wasatch counties. It was observed growing on the steep, rocky, west-facing slopes of Peruvian Ridge, just west of the project area, during a survey for an un-related project in 2016. Wasatch jamesia was not observed in the disturbance footprint of the proposed action during the 2015 or 2016 plant surveys.

*Wasatch Pepperwort*

Wasatch pepperwort is a mustard plant inhabiting damp, rocky crevices in mountain brush and spruce-fir communities at elevations between 5,000 and 10,000 feet (Welsh et al. 2015). It is endemic to Little and Big Cottonwood Canyons in Salt Lake County and was historically known from the Oquirrh Mountains in Tooele County (UNPS 2017). A single population was identified on the east face of Mt. Baldy during surveys for an un-related project in 2010. Based on the 2015 and 2016 plant surveys, Wasatch pepperwort does not occur in the footprints or disturbance areas of any projects in the proposed action.

*Garrett's Bladderpod*

Garrett's bladderpod is a small, rosette-forming wildflower that inhabits alpine tundra and spruce-fir communities on limestone, quartzite, or granite talus and rock outcroppings. Suitable habitat is found between elevations of 10,000 and 12,000 feet in Davis, Salt Lake, Utah, and Wasatch counties (Welsh et al. 2015). Garrett's bladderpod is known to exist in Albion Basin, though it was not observed during the 2015 and 2016 plant surveys.

*Barneby's Wood Aster*

Barneby's wood aster is a short, white, daisy found in Douglas-fir, mountain brush, and cottonwood communities between the elevations of 6,000 and 10,000 feet. It is endemic to the Canyon Mountains in Millard and Juab counties, where it occurs in mountain mahogany and oak communities on Precambrian quartzite outcrops (UNPS 2017, NatureServe 2017). However, potential habitat exists in the Bear River and Wasatch ranges. Wood aster has been observed in Albion Basin, though perhaps not the *barnebyana* variety. Because of that observation, this species was included in the analysis. However, Barneby's wood aster was not observed during the 2015 or 2016 plant surveys.

*Tower Rockcress*

Tower rockcress is a slender mustard that grows in a number of communities including sagebrush, pinyon-juniper, mountain brush, aspen, and spruce-fir, ranging in elevations from 5,000 feet to 9,600 feet (UNPS 2017, Welsh et al. 2015). Tower rockcress was not observed during the 2015 or 2016 field surveys.

*Sand Fleabane*

Sand fleabane is a small, narrow-leaved daisy that grows in crevices in limestone and quartzite outcrops in the maple, oak, limber pine, and ivesia-erigonum communities at 4,265 to 9,215 feet in elevation (Welsh et al. 2015). Sand fleabane has been observed on Peruvian Ridge, just west of the project area for an unrelated project. No sand fleabane plants were observed during the 2015 or 2016 field surveys.

*Broadleaf Beardtongue*

Broadleaf beardtongue is a penstemon with blue to lavender petals that grows in mountain brush communities between 5,000 and 8,875 feet in elevation (Welsh et al. 2015). It is distributed through the Wasatch Mountains in Salt Lake, Utah, and Weber counties. Broadleaf beardtongue is known to occur in Albion Basin. Broadleaf beardtongue was not observed during 2015 or 2016 field surveys.

***Alpine Ecosystem on Mt. Baldy***

Alpine ecosystems are considered sensitive areas due to their limited abundance. As a result, the plants and animals that solely inhabit those ecosystems may also be sensitive. Changing patterns in temperature and precipitation have been observed to influence plant distributions, with plants generally moving upslope or towards the poles (Parmesan and Yohe 2003). Subsequent research across western North America has found that changes in distribution are not uniform. Within the elevation range occupied by a given species, the average elevation went upward for 51 percent of studied species and down for 45 percent of studied species (Harsch and Hille Ris Lambers 2016). These results suggested that both low



temperature and water availability limit upward shifts at the upper elevation limits, and increased water stress may drive upward shifts at lower elevation limits.

The alpine vegetation on the summit of Mt. Baldy consists primarily of low-statured grasses and wildflowers. These plants are growing in a bed of thin soil and small, flakey talus. Plant distribution becomes increasingly sparse toward the summit. The dominant species include bluegrass (*Poa* sp.), bottlebrush squirreltail (*Elymus elymoides*), spiny phlox (*Phlox hoodii*), cutleaf daisy (*Erigeron compositus*), Ross' avens (*Geum rossii*), and sulphur-flower buckwheat (*Eriogonum umbellatum*). No special-status plant species were observed on the surveyed portion of Mt. Baldy. East of the summit, the ground falls away quickly and transitions to eroded cliffs and talus slopes.

The wildlife species that inhabit the Mt. Baldy summit include small mammals such as pika (*Ochotona princeps*) and Uinta chipmunk (*Eutamias umbrinus*), big game including mule deer (*Odocoileus hemionus*) and mountain goat (*Oreamnos americanus*), and occasional songbirds such as gray-headed junco (*Junco caniceps caniceps*) and mountain chickadee (*Parus gambeli*) (Harper and Petersen 1990). These species are most likely to be present or active during the summer and fall but either leave, hibernate, or adopt a subnivean/subterranean lifestyle during the winter and spring (NatureServe 2017).

The depth and persistence of the winter snowpack on Mt. Baldy is affected by temperature, sunlight, wind, skier traffic, and the amount and timing of snowfall. Sunlight and wind-scour may remove snowpack from the south and west sides of the summit between storm events. As a result, and when the summit is open, skiers hiking up the boot-pack and accessing the chutes may come in contact with the ground surface or exposed plants, rather than walking on snow. That foot traffic may also compact and reduce the snowpack. The snowpack on the north side of the summit typically persists until July, though snow may be present in north-facing chutes until late August. Skier traffic in those areas largely occurs when plants are both dormant and covered by snow, which likely minimizes the impacts on alpine vegetation. An estimated 200 people hike from Alta and Snowbird to the summit on days when Mt. Baldy is open.

The growing season on the summit lasts from July through October, though year-to-year fluctuations are common depending on weather patterns. In the absence of snow-depth data for Mt. Baldy from Alta, UWCNF, or other sources, the NRCS SNOTEL network was used to provide an estimate of the date when the snowpack may melt, and to better understand the year-to-year variability in that date. The nearest SNOTEL site is located near the Mid-Gad Restaurant at Snowbird, 1.1 miles to the west and 1,765 feet lower in elevation. Snow depth has only been recorded there since the end of the 2002 water year. Data from that site indicate that the winter snowpack completely melts away as early as May 30 (2012) and as late as July 10 (2011), with mean and median melt date of June 14 and June 9, respectively (NRCS 2016).

Summer hiking trails also access the summit from both Alta and Snowbird. And although the summit is not as popular a destination as areas such as Albion Meadow, it is impacted by those summer hikers. Off of the trails, there is no evidence of notable impact on alpine plants from hiking use.

### ***Noxious and Non-Native Invasive Plants***

Noxious weeds are considered harmful to agriculture, the general public, and the environment because they tend to displace native plants, degrade wildlife habitat, alter nutrient cycle and fire behavior, contribute to soil erosion, and potentially reduce recreational values. They have developed many characteristics, such as rapid growth rates, high seed production, and extended growing period, that give them competitive advantages over native plants. Weeds may be introduced during ground disturbing activities if the equipment used has been previously used in an area with infestations. Disturbing soil adjacent to existing infestations may facilitate the growth of the infestation. Landowners with noxious weed infestations are required to implement control measures (Utah Code 4-17-109[2][a]).

Non-native invasive plants are also aggressive species capable of degrading environmental quality or causing economic harm. Invasive plants are undesirable in forest ecosystems for reasons similar to noxious weeds.

Management direction regarding noxious weeds and invasive species includes Executive Order 13112, issued in February 1999, which directs federal agencies to “...prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause...” One of the goals of the National Forest Management Act (NFMA) is to provide a diversity of plant and animal communities. NFMA also includes a disclosure requirement for proposed noxious weed control activities on NFS lands. The Forest Service Manual (FSM) section on invasive species management sets objectives, policies, and responsibilities for weed management on NFS lands, and specifies the use of an integrated approach including prevention, control, cooperation, and education. And finally, Forest-specific guidance for detecting, monitoring, and treating noxious weeds is provided in the *Wasatch-Cache National Forest Noxious Weed Strategy* (Forest Service 2005) and the *Wasatch-Cache National Forest Noxious Weed Treatment Program* (Forest Service 2006b).

Forest Service data indicate that a number of noxious and non-native invasive species are present in upper Little Cottonwood Canyon. Four species are documented to occur within the project area: Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), Dalmatian toadflax (*Linaria dalmatica*), and Scotch thistle (*Onopordum acanthium*). These species are considered noxious by the Utah Department of Agriculture and Food. Most infestations occur near roads, parking lots, and other disturbed sites in the base area.

Alta ski area is part of the Cottonwood Canyons Foundation (CCF), a collective group of entities that monitors and treats noxious and non-native invasive species throughout the Wasatch Front canyons. As part of that group, Alta’s Environmental Center has established a pro-active protocol for dealing with noxious and non-native invasive plants. That protocol includes identifying zones where ground disturbance would occur, planting desirable native species, monitoring and treating weeds for 3 consecutive years following the disturbance, and then monitoring every 5 years to ensure that native vegetation seedings have been successful. The zones exist indefinitely and can be monitored and treated as needed beyond this time period. New zones are created that correspond with subsequent disturbances. Most weed infestations are controlled by hand-pulling, rather than herbicide applications to minimize potential impacts to desired vegetation.

This system has successfully reduced weed infestations on past projects. For example, non-native invasive plants comprised 54 percent of ground cover on the Corkscrew project (Zone 34) in 2015, and as a result of monitoring and treatment, non-native plants only comprised 0 and 1 percent ground cover in 2016 and 2017. Similar results have been observed in the other zones; overall weed coverage decreased from 15 percent in 2015 to 5 percent in 2016.

The CCF data identifies four additional Utah State noxious weeds not recorded by the Forest Service within the project area: musk thistle (*Carduus nutans*), spotted knapweed (*Centaurea maculosa*), houndstongue (*Cynoglossum officinale*), and perennial pepperweed (*Lepidium latifolium*). Those species have been documented at some point since 2012. As with the Forest Service data, most of the infestations identified by the CCF are located in disturbed sites in the base area. The monitoring data collected by the CCF was incorporated into this analysis. Other non-native invasive plants in the project area include curlycup gumweed (*Grindelia squarrosa*), curly dock (*Rumex crispus*), yellow sweet clover (*Melilotus officinalis*), common knotweed (*Polygonum plebeium*), and wand mullein (*Verbascum verbatim*).

Surveys were also completed for noxious and non-native invasive plant species in the disturbance area associated with the proposed action. No additional federal or Utah State noxious weeds were observed in the areas surveyed. However, two non-native invasive species were observed: Kentucky bluegrass (*Poa pratensis*) and smooth brome. These species may have been intentionally planted as past revegetation efforts, or may have spread during past ground-disturbing activities.

### **3.4.2.3 Direct and Indirect Effects**

#### ***Alternative 1 – No Action***

##### **Forest Service Sensitive Species**

Potential habitat for 17 Forest Service sensitive species and four watch list species occurs in the project area. While there would be no development with the potential to affect these species or their habitats, ongoing recreational use may impact both individuals and potential habitat. The likelihood of that impact would be unchanged from existing conditions.

##### **Alpine Ecosystem on Mt. Baldy**

Under ongoing operations, the alpine ecosystem on Mt. Baldy would continue to experience both winter and summer recreation use, as discussed above under Affected Environment. Winter use on the south may occur over either snowpack or the ground surface depending on conditions, and any exposed plants may be damaged. Both wind scour and skier traffic can remove snowcover in localized areas. Winter use on the north side of the summit and in the chutes would continue to occur over more intact snow cover and would generally not impact the vegetation component of the alpine ecosystem. On days when Mt. Baldy is open, skier use would continue as it has in the past (roughly 200 people). The impact of summer use on the alpine ecosystem would not change from the existing pattern – concentrated along the trails and dispersed off of the trails.

Under this alternative, avalanche control would continue to involve artillery-type technology. As discussed above (section 2.4.2.1), these explosive projectiles generally detonate on contact with the ground surface rather than the snow cover, resulting in more damage to soil and vegetation. As a result, control activities would continue to pose a localized threat to alpine vegetation on Mt. Baldy as well as other high-elevation avalanche starting zones targeted by artillery.

In regard to the effects of climate change on Mt. Baldy's alpine ecosystem, the Resources Planning Act April 2007 (Interim Update of the 2000 Renewable Resources Planning Act Assessment, Publication #FS-874) acknowledges and addresses climate change. It also indicates that climate variability makes predictions about drought, rainfall, and temperature extremes highly uncertain. Based on the best available science, it would be too remote and speculative to factor any specific ecological trends or substantial changes in climate into the analysis of environmental impacts of this project. Although there is a consensus that global warming is occurring, there is still much uncertainty about subsequent ecological interactions and trends at the local or site-specific scale. The best available science concerning climate change is not yet adequate to support reliable predictions about ecological interactions and trends at this site-specific scale.

As a result, only a general conclusion can be drawn regarding how climate change might interact with the effects of the no-action alternative. The ongoing, adverse effects of ongoing recreational use could be exacerbated to the degree that Mt. Baldy became warmer, placing additional stress on the alpine ecosystem.

##### **Noxious and Non-Native Invasive Plants**

The ongoing operations would not increase the risk of noxious and non-native invasive species becoming established or spreading. In coordination with the CCF and the Forest Service, the Alta Environmental Center would continue to monitor and treat past ground disturbances for noxious and non-native invasive plant species. Existing infestations would be expected to decrease.

***Alternative 2 – Proposed Action***

**Forest Service Sensitive Species**

*Utah Angelica*

Construction of the proposed Sunnyside lift and Flora lift would disturb areas supporting boggy, wet, or riparian communities. These communities are all potential habitat for Utah angelica. The proposed Sunnyside lift would cross over two riparian areas near the lower terminal. Lift towers would be built outside of these riparian areas, similar to the current design. As a result, the lift would span riparian areas without impacting unoccupied potential Utah angelica habitat.

The proposed Flora lift alignment would cross over one riparian area and would require excavation in one wet meadow for construction of the lower terminal. However, the Flora lift project area is located above the elevation range inhabited by Utah angelica, and no Utah angelica were observed during pedestrian surveys. Adherence to the riparian area BMPs listed in Appendix A would minimize the potential for erosion or sedimentation in unoccupied riparian habitat adjacent disturbances, and thus would minimize indirect effects.

The proposed action would have no impact on Utah angelica individuals or populations.

*Slender Moonwort*

The proposed Sunnyside and Flora lifts cross, or are located in, marsh and spring areas that are potential slender moonwort habitat. As described above in the Utah angelica discussion, the Sunnyside lift project spans the riparian areas, and thus would not directly impact slender moonwort habitat. The Flora lift would require excavation in riparian or marsh areas for the construction of the lower lift terminal.

Since slender moonwort was not observed in the footprint of any of these projects during the pedestrian surveys, the proposed action would have no impact on slender moonwort. Adherence to the riparian area BMPs listed in Appendix A would minimize the potential for erosion or sedimentation in unoccupied riparian habitat adjacent disturbances, and thus would minimize indirect effects.

*Wasatch Fitweed*

The proposed Sunnyside lift alignment includes riparian areas and is within the elevation range of Wasatch fitweed. The alignment spans riparian areas but would not require any excavation or other ground disturbances in Wasatch fitweed habitat.

Wasatch fitweed was not observed in the Sunnyside lift disturbance area. Adherence to the riparian area BMPs listed in Appendix A would minimize the potential for erosion or sedimentation in unoccupied riparian habitat adjacent to the Sunnyside lift, and thus would minimize indirect effects.

The proposed action would have no impact on Wasatch fitweed individuals or populations.

*Brownie Lady's Slipper*

None of the proposed projects would impact spruce-fir or lodgepole pine forest stands that have a duff layer beneath the canopy. As described in section 3.4.2.2, the forest stands in the project area are segmented and have understories comprised of rock, scree, or tall forbs. Although the proposed Sunnyside lift alignment spans marginally shaded stream segments, construction would not result in any ground disturbance. No brownie lady's slipper plants were observed in the project area during the pedestrian surveys.

The proposed action would have no impact on brownie lady's slipper individuals or populations.

*Wasatch Shooting Star*

None of the proposed projects would impact crevices in the spray of waterfalls. However, the Sunnyside lift project alignment does span a riparian area with some exposed rock crevices that are marginal

potential habitat. Constructing the lift would not result in any ground disturbances in the riparian area. Other projects located in or adjacent to riparian areas would occur above the elevation inhabited by this species. Wasatch shooting star was not observed during the pedestrian surveys.

The proposed action would have no impact on Wasatch shooting star individuals or populations. Adhering to the riparian area BMPs listed in Appendix A would minimize the potential for erosion or sedimentation in unoccupied riparian habitats, and thus would minimize indirect effects.

#### *Wasatch Draba*

The Sunnyside lift replacement, Wildcat lift replacement, and Gazex projects all include areas with either shady or moist soils, rock pockets, or talus areas within the elevation range of Wasatch draba. The Sunnyside lift alignment also crosses stream banks in aspen-fir communities that may be habitat.

Excavation for new lift towers and to remove old towers would result in ground disturbance within the Sunnyside and Wildcat alignments. The Sunnyside alignment crosses riparian areas but would not result in ground disturbances on stream banks. Excavation for two of the Gazex exploder sites on Patsey Marley would disturb potential Wasatch draba habitat, but the remainder of the exploder sites would be above the species' elevation range. The lift alignments and Gazex sites were included in the pedestrian surveys, and no Wasatch draba was observed.

The proposed action would have no impact on Wasatch draba individuals or populations.

#### *Burke's Draba*

The proposed Sunnyside and Wildcat lift replacement alignments pass over rock outcroppings within forested areas considered potential Burke's draba habitat. In those alignments, impacts would be limited to excavation for tower construction. The Watson Shelter and Alf's restaurant are within the elevation range, but excavation associated with those projects would occur on previously disturbed ground. Burke's draba was not observed growing in the disturbance footprints of any projects associated with the proposed action.

The proposed action would have no impact on Burke's draba individuals or populations.

#### *Rockcress Draba*

The proposed Gazex installations near the summit of Sugarloaf Mountain are within alpine tundra and the elevation range of rockcress draba, and when the summit was surveyed, a new population of rockcress draba was located. The proposed gas storage unit site is approximately 50 feet east of one part of the population and 50 feet northwest of another part. No rockcress draba were observed at the site itself. Flagging the boundaries of these nearby groups of plants prior to construction would minimize the potential to negatively impact rockcress draba (mitigation measure VEG-1). The Gazex installations on Patsey Marley and Devil's Castle would be below the rockcress draba elevation zone.

The top terminal of the proposed Baldy tram would be constructed in potential rockcress draba habitat. However, no individuals were observed on Mt. Baldy during the pedestrian surveys.

The proposed action would have no impact on rockcress draba individuals or populations.

#### *Garrett's Fleabane*

The proposed Sunnyside lift and Wildcat lift replacement alignments include segments with moist crevices and limestone outcroppings that are potential Garrett's fleabane habitat. The lift terminals are not in areas of suitable habitat, but some of the tower locations may be. The terminal sites are within the elevational range of Garrett's fleabane. No individuals of this species were observed within these alignments during the pedestrian surveys.

The proposed action would have no impact on Garrett's fleabane individuals or populations.

*Utah Ivesia*

The proposed Gazex installations on Sugarloaf Mountain would be constructed approximately 1,100 feet upslope from the nearest known populations of Utah ivesia. The Gazex system would be constructed in unoccupied, potential habitat. The Flora lift project would be constructed on the opposite side of a small drainage and 800 feet away from the same population of Utah ivesia, and just below the species' elevation range.

The proposed action would have no impact on Utah ivesia individuals or populations.

*Wasatch Jamesia*

Tower construction or removal associated with the proposed Sunnyside and Wildcat lift replacement projects would result in ground disturbances in marginal potential Wasatch jamesia habitat. This habitat has a north aspect (as opposed to west), is less steep, has less exposed rock, and has a higher grass and forb cover than the habitat occupied by the Peruvian Ridge population west of the project area. Pedestrian surveys in the marginal habitat within the disturbance footprint of the Wildcat and Sunnyside lifts did not identify any Wasatch jamesia.

The proposed action would have no impact on Wasatch jamesia individuals or populations.

*Wasatch Pepperwort*

The disturbance footprints of the proposed Sunnyside and Wildcat lift replacements and the Gazex installations on Patsey Marley would all include areas with damp, rocky crevices in mountain brush and spruce-fir communities within the elevation range of Wasatch pepperwort. Potential habitat within the lift alignments is limited to isolated rock outcroppings where excavation for tower construction and removal could result in ground disturbance. There is no habitat at the terminal locations. No Wasatch pepperwort individuals were observed in those areas during pedestrian surveys.

The proposed action would have no impact on Wasatch pepperwort individuals or populations.

*Garrett's Bladderpod*

The proposed Flora lift, Baldy tram, Gazex, and Supreme summer trail work projects would occur in alpine tundra and spruce-fir communities on talus and rock outcroppings within the appropriate elevation range of Garrett's bladderpod. Excavation and grading associated with these projects would disturb the ground surface within that habitat. As mentioned above, no Garrett's bladderpod individuals were observed during the 2015 and 2016 pedestrian surveys.

The proposed action would have no impact on Garrett's bladderpod individuals or populations.

*Barneby's Wood Aster*

The Sunnyside and Wildcat lift replacement, Albion base parking lot, and equipment storage facility projects occur in mountain brush communities that are broadly considered Barneby's wood aster habitat. All of these projects include excavation or grading that would disturb the ground surface. The Watson Shelter and Alf's restaurant are within the elevation range, but those projects would largely occur in the areas disturbed when those buildings were constructed. The disturbance footprint of each project was included in the pedestrian surveys and no Barneby's wood aster was observed.

The proposed action would have no impact on Barneby's wood aster individuals or populations.

*Tower Rockcress*

The Sunnyside and Wildcat lift replacement, Albion base parking lot, and equipment storage facility projects occur in mountain brush, aspen, and spruce-fir communities within the elevation range of tower rockcress. Excavation and grading disturbances would occur in each of these four projects. The Watson Shelter and Alf's restaurant are within the elevation range, but those projects would occur on ground



disturbed during the original construction of those buildings. Tower rockcress was not observed during the pedestrian surveys.

The proposed action would have no impact on tower rockcress individuals or populations.

*Sand Fleabane*

The Sunnyside and Wildcat lift replacement, and Albion base parking projects are located in communities that have components of eriogonum and ivesia, and isolated limber pine and maple trees within the elevation range of sand fleabane. No sand fleabane plants were observed in the footprint of these projects during pedestrian surveys. Of the three projects, the Wildcat lift replacement is closest to the known populations on the far side of Peruvian Ridge. Additional eriogonum and ivesia communities are present within the project area, but are above the 9,215-foot-elevation habitat threshold.

The proposed action would have no impact on sand fleabane individuals or populations.

*Broadleaf Beardtongue*

Lower portions of the Sunnyside and Wildcat lift replacement, the Albion base parking, and the equipment storage facility project areas have components of mountain brush plant communities that are habitat for broadleaf beardtongue within the elevation range of broadleaf beardtongue. The species was not observed during the pedestrian surveys.

The proposed action would have no impact on broadleaf beardtongue individuals or populations.

*Summary*

The proposed action would have no impact on any Forest Service sensitive plant species or its habitat as long as the design criteria listed in section 2.5 and the riparian area BMPs listed in Appendix A were adhered to. The proposed action is not likely to cause a trend toward federal listing or a loss of viability of any of these species.

**Alpine Ecosystem on Mt. Baldy**

The upper terminal of the proposed Baldy tram would be located in the alpine ecosystem on Mt. Baldy described above under Affected Environment. Construction of the terminal would include excavation and grading within the 0.18-acre disturbance footprint. Any animals using that footprint would be displaced, and plant species present would be permanently removed. Maintenance of the terminal would include inspections, cable load testing, and completing any necessary repairs. Those activities would involve having personnel on-site during annual maintenance in the summer and on an as-needed basis in the winter. These activities would maintain a low level of disturbance in the localized area of the terminal.

The avalanche mitigation activities supported by the tram would not substantially impact the alpine ecosystem because the starting zones of concern are on the north side of the peak and avalanche control would take place during the winter months, when the plants were dormant and snow covered, and when wildlife had either left the area, entered hibernation, or adopted a subnivean/subterranean lifestyle.

The change in avalanche-control methods resulting from tram installation would have a positive effect. Smaller, hand-delivered explosives would replace the high-explosive artillery and Avalauncher rounds currently in use, resulting in less physical impact and debris. In addition, hand charges are deployed either over or on the surface of the snowpack, rather than deep in the snowpack or on the underlying ground surface, as occurs with artillery and Avalauncher rounds. While more individual charges would be used, the net amount of explosives involved would not change significantly due to smaller charge sizes and the intensity of their force at the ground surface would decrease. As a result, the impact of avalanche control activities on the alpine ecosystem on Mt. Baldy would decrease. Similar benefits would result from the switch to Gazex installations at other high-elevation locations currently controlled with artillery.

The change in skier use of Mt. Baldy resulting from the tram installation may have minor impacts on the alpine ecosystem. As discussed in section 3.5.3.3, skier numbers on days when Mt. Baldy was open would probably increase somewhat, but the mountain would be open considerably more days per season. The ecosystem effects would be limited since that use would also occur primarily on the north side of the summit where plants were dormant and snow covered, and wildlife were absent, hibernating, or had adopted subnivean or subterranean lifestyles. However, some skiers would undoubtedly hike to the summit to ski other aspects of the mountain, so increased skier numbers could result in more areas scraped clear of snow where the impact of skis or ski boots on unprotected soil surfaces could damage vegetation and the soil surface. This would add to the effect of current use.

To mitigate the impact of recreational use on Mt. Baldy, the ski area should work with the UWCNF to develop and provide educational signage and other interpretive material to inform the public about the importance of alpine ecosystems and the need to protecting them by staying on trails or on snow cover when that is not possible.

The tram would not be used during summer months and is not expected to affect recreation use on Mt. Baldy. Therefore, the impact of summer use on the alpine ecosystem would not change from the existing pattern – concentrated along the trails and dispersed off of the trails.

In summary, construction, maintenance, and operation of the Baldy tram would directly affect the alpine ecosystem on Mt. Baldy within the disturbance footprint of the upper tram terminal. Indirect effects would be limited since tram operation would occur on the north side of the summit where the snowpack is less affected by wind scour and sunlight, and during winter months when plants were dormant and snow covered, and wildlife were not active on the surface.

As discussed in more detail above under the no-action alternative, the degree to which these effects might interact with climate change cannot be objectively assessed. These effects could be exacerbated to the degree that Mt. Baldy became warmer, placing additional stress on the alpine ecosystem.

### **Noxious and Non-Native Invasive Plants**

The proposed projects overlay known infestations of two noxious weeds: Dalmatian toadflax (Sunnyside lift replacement) and field bindweed (Albion parking lot). Both species are present in trace amounts, and account for less than 1 percent of ground cover. No other infestations of noxious weeds occur in the proposed action disturbance footprint.

Kentucky bluegrass occurs within the disturbance footprint of the Baldy tram, Sunnyside and Wildcat lift replacements, Flora lift, and Devil's Castle portion of the Supreme summer ski run project. Smooth brome occurs in the disturbance footprint of the Albion parking lot, Sunnyside and Wildcat lift replacements, Devil's Castle portion of the Supreme summer ski run project, Watson Shelter addition, Alf's Restaurant addition, and equipment storage facility projects. Sweet yellow clover occurs in the disturbance footprint of the Albion parking lot, Sunnyside lift replacement, and Flora lift projects. Wand mullein occurs in the Albion parking lot expansion, Wildcat lift replacement, and equipment storage facility projects.

The CCF would create new noxious and non-native invasive plant monitoring and treatment zones for each proposed action project. For three years following project construction, the Alta Environmental Center would coordinate with the CCF to monitor and treat any such plant species. Disturbed areas would also be seeded/planted with approved native species. Five years after project construction, the zones would be monitored to determine whether past treatments were successful and if the desired native vegetation is established. If necessary, additional treatments would be prescribed. BMPs would be employed to prevent the introduction of additional noxious and non-native invasive plants, or the spread of existing infestations, and would reduce impacts from competition and habitat alteration on residual desired species.

#### **3.4.2.4 Cumulative Effects**

##### ***Forest Service Sensitive Species***

All of the cumulative actions listed in section 3.3 have the potential to interact cumulatively with the proposed action on Forest Service sensitive species. With the exception of the Patsey Marley Shrontz Utility Right-of-Way, the footprints of the cumulative actions listed in section 3.3 were also surveyed for Forest Service sensitive species and habitat prior to authorization. No individuals or populations of sensitive species were observed during the surveys, similar to the proposed action; therefore, there is no potential for cumulative effects.

##### ***Alpine Ecosystem on Mt. Baldy***

None of the actions listed in section 3.3 would directly or indirectly affect the alpine ecosystem on Mt. Baldy; therefore, there is no potential for cumulative effects.

##### ***Noxious and Non-Native Invasive Plants***

All of the cumulative actions listed in section 3.3 have the potential to interact cumulatively with the proposed action's effects on noxious and non-native invasive plants. Each of the cumulative actions includes an aspect of ground disturbance which could create opportunities for either new infestations or the spread of existing infestations. Those actions include weed BMPs as part of their design criteria or as mitigation measures, and adherence to the WCNF noxious weed strategy and noxious weed treatment direction (Forest Service 2005 and Forest Service 2006b), which would minimize potential adverse effects. As a result, there is potential for cumulative effects, though they are anticipated to be minimal.

#### **3.4.2.5 Mitigation**

VEG-1: Delineate the boundaries of nearby rockcress draba populations on Sugarloaf Mountain using pin flags prior to construction of the Gazex system. Avoid any activity near the delineated boundary.

VEG-2: Monitor and treat noxious and non-native invasive plant infestations at all areas disturbed by the proposed action for a period of at least three years following construction.

VEG-3: Provide educational signage and other interpretive material to inform the public about the importance of alpine ecosystems and the need to protect them by staying on trails or on snow cover when that is not possible.

### **3.4.3 WILDLIFE**

#### **3.4.3.1 Scope of Analysis**

- *How would the proposed infrastructural development affect special-status terrestrial and aquatic wildlife species and other species of interest or concern?*

There is no suitable habitat for federally listed wildlife species in the project area, but potential habitat for several Forest Service Region 4 sensitive species is present. Other species of concern to the public or agencies are also present, such as migratory birds. These species could be affected through habitat alteration resulting from clearing, grading, excavation, changed patterns of human activity, or the impacts of Gazex avalanche control.

**Indicators:** Species-specific determinations of the potential individual- and population-level impacts, based primarily on past surveys, surveys completed for this analysis, published information on the species' habitat distribution and population status, and efficacy of proposed design criteria and mitigation.

### 3.4.3.2 Affected Environment

#### *Threatened, Endangered, and Candidate Species*

The U.S. Fish and Wildlife Service (FWS) identified three species protected by the Endangered Species Act (ESA) that may occur in the project area and/or may be affected by the project (FWS 2017a). These species are listed in Table 3-9 below. Since suitable habitat for these species is not present within the project area, none are carried into detailed analysis.

**Table 3-9. Threatened, endangered, and candidate species identified by FWS that may occur in the project area and/or may be affected by the project.**

Species	Status	Carried into Detailed Analysis?	Comments
<b>Birds</b>			
Yellow-billed cuckoo <i>Coccyzus americanus</i>	Threatened	No	This species requires large riparian areas dominated by cottonwoods. <sup>1</sup> There is no such habitat within or near the project area. No critical habitat or proposed critical habitat exists within the project area. <sup>2</sup>
<b>Fishes</b>			
June sucker <i>Chasmistes liorus</i>	Endangered	No	This species is found in Utah Lake and the Provo River. <sup>3</sup> There is no downstream hydrologic connection between the project area and these water bodies.
<b>Mammals</b>			
Canada lynx <i>Lynx canadensis</i>	Threatened	No	This species requires old-growth forests for all aspects of its life history. <sup>3</sup> A previous Forest Service assessment mapped potential lynx habitat at Alta, but this habitat currently lacks characteristics necessary for use by lynx (e.g., large woody debris, thick understory brush, low snow compaction). The FWS identifies no critical habitat or proposed critical habitat within the project area. <sup>2</sup>
<sup>1</sup> Birds of North America, <a href="http://bna.birds.cornell.edu/bna">http://bna.birds.cornell.edu/bna</a> <sup>2</sup> (FWS 2017a) <sup>3</sup> NatureServe Explorer, <a href="http://www.explorer.natureserve.org">www.explorer.natureserve.org</a>			

#### *Forest Service Sensitive Species*

Several species identified by the Forest Service as sensitive are known or suspected to occur on the UWCNF. They are listed below in Table 3-10 (Forest Service 2016). Habitat for seven of these species is found in the project area, and these seven are carried into detailed analysis.

**Table 3-10. Special-status species occurring or suspected to occur on the Uinta-Wasatch-Cache National Forest and their level of analysis for this project.**

Species	Status	Carried into Detailed Analysis?	Comments
<b>Amphibians</b>			
Columbia spotted frog <i>Rana luteiventris</i>	Sensitive	No	This species has been documented in the project area, but no suitable habitat exists in potentially disturbed areas. <sup>1 5</sup>
Boreal toad <i>Bufo boreas</i>	Sensitive	Yes	There is suitable habitat, and there are records of this species in the project area. <sup>1 5</sup>
<b>Birds</b>			
American Three-toed woodpecker <i>Picoides tridactylus</i>	Sensitive	Yes	There is suitable habitat, and there are records of this species in the project area. <sup>3 4</sup>
Bald eagle <i>Haliaeetus leucocephalus</i>	Sensitive	No	There is no suitable habitat in the project area. <sup>4</sup>
Boreal owl <i>Aegolius funereus</i>	Sensitive	No	The project area is outside the historic range of this species. <sup>4</sup>
Columbian sharp-tailed grouse <i>Tympanuchus phasianellus columbianus</i>	Sensitive	No	There is no suitable habitat in the project area. <sup>4</sup>
Flammulated owl <i>Psiloscops flammeolus</i>	Sensitive	Yes	There is suitable habitat in the project area, and there are records of this species in the vicinity. <sup>3 4</sup>
Great gray owl <i>Strix nebulosa</i>	Sensitive	No	The project area is outside the historic range of this species. <sup>4</sup>
Greater sage-grouse <i>Centrocercus urophasianus</i>	Sensitive	No	There is no suitable habitat in the project area. <sup>4</sup>
Northern goshawk <i>Accipiter gentilis</i>	Sensitive	Yes	There is suitable habitat, and there are records of this species in the project area. <sup>3 4 5</sup>
Peregrine falcon <i>Falco peregrinus</i>	Sensitive	Yes	There is suitable habitat, and there are records of this species in the project area. <sup>3 4 5</sup>
<b>Mammals</b>			
Gray wolf <i>Canis lupus</i>	Sensitive	No	The project area represents extremely poor quality habitat for this species due to human presence. No wolf packs or individuals are known to occur in the area. <sup>1 5</sup>
Rocky Mountain bighorn sheep <i>Ovis canadensis canadensis</i>	Sensitive	No	There is suitable habitat in the project area, but there are no bighorn sheep herds in the vicinity.

**Table 3-10 (cont'd). Special-status species occurring or suspected to occur on the Uinta-Wasatch-Cache National Forest and their level of analysis for this project.**

Species	Status	Carried into Detailed Analysis?	Comments
Spotted bat <i>Euderma maculatum</i>	Sensitive	Yes	There is suitable habitat in the project area.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	Sensitive	Yes	There is suitable habitat in the project area, and this species has been documented in the vicinity. <sup>5</sup>
Wolverine <i>Gulo gulo</i>	Proposed Threatened/ Sensitive	No	This species generally avoids areas with high levels of human disturbance. <sup>6</sup> There are no recent records of this species in the vicinity. <sup>5</sup>
<b>Fish</b>			
Bonneville cutthroat trout <i>Oncorhynchus clarki utah</i>	Sensitive	Yes	This species occurs in Little Cottonwood Creek, downstream from the project area.
Colorado River cutthroat trout <i>Oncorhynchus clarki pleuriticus</i>	Sensitive	No	The project area is outside the range of this species.
Northern leatherside chub <i>Lepidomeda copei</i>	Sensitive	No	The project area is outside the range of this species. <sup>7</sup>
Southern leatherside chub <i>Lepidomeda aliciae</i>	Sensitive	No	The project area is outside the range of this species. <sup>8</sup>
<sup>1</sup> NatureServe, <a href="http://www.natureserve.org">www.natureserve.org</a> <sup>2</sup> (UDWR 2007) <sup>3</sup> eBird, <a href="http://www.ebird.org">www.ebird.org</a> <sup>4</sup> Birds of North America, <a href="http://bna.birds.cornell.edu/bna">http://bna.birds.cornell.edu/bna</a> <sup>5</sup> Utah Natural Heritage Database <sup>6</sup> Heinemeyer and Squires 2014 <sup>7</sup> Northern Leatherside Fact Sheet, <a href="http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=651">http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=651</a> <sup>8</sup> Southern Leatherside Conservation Agreement, <a href="http://wildlife.utah.gov/habitat/pdf/southern_leatherside.pdf">http://wildlife.utah.gov/habitat/pdf/southern_leatherside.pdf</a>			

**Boreal Toad**

Boreal toads are found in western North America, from Alaska to Baja California, with their range extending as far east as Colorado. They are found at a wide range of elevations from sea level to more than 11,000 feet. Boreal toads can occur around any slow moving or still water in their range. They use shallow, slow moving portions of these habitats for egg laying which occurs in late spring or early summer, following snow melt in high elevation habitats. Eggs hatch in 3–12 days and metamorphose in 1–3 months, with shorter durations in warmer habitats and longer durations in colder habitats. While boreal toads are dependent on water, they can travel several kilometers away from water to find new habitats (NatureServe 2017).

The major threat to boreal toads is *Batrachochytrium dendrobatidis*, a fungus in the phylum Chytridiomycota. This fungus, commonly referred to as “chytrid” fungus, has been documented in at least 287 amphibian species worldwide (Kriger and Hero 2009). Symptoms of chytrid fungus include: lethargy,

reluctance to flee, skin abnormalities, loss of righting reflexes, and extended back legs. Minor threats include habitat loss and alteration, drought, grazing, and roads (UDWR 2005).

There is one record of one or more boreal toads in Little Cottonwood Creek, near the wildcat base area, dating from 1985. This species has not been documented in the project area since that time. However, there is a substantial amount of potential habitat in the project area, including potential breeding habitat in the disturbance area.

### **Three-toed Woodpecker**

The American three-toed woodpecker occurs in high-elevation coniferous forests (usually above 8,000 feet in Utah), wherever bark beetles and other wood-boring insects are abundant. Aspen can provide nesting sites when intermixed with or adjacent to coniferous forests (Parish et al. 2002). Three-toed woodpeckers forage mainly on larvae of bark beetles and wood-boring beetles, and are most abundant in years and locations where trees have high insect populations. They are attracted to stands affected by wildfire, insect outbreaks, disease, blow-down, or other die-offs generating high densities of snags since these areas often have an abundance of beetle larvae. They generally excavate nest cavities in soft snags but may occasionally excavate live trees. They are not considered migratory, but insect outbreaks may cause irruptive movements. (Leonard 2001)

Three-toed woodpeckers are detrimentally impacted by fire suppression, salvage logging, pest control, and harvest of old-growth coniferous forests. All of these activities reduce the prey base and nesting habitat available for the species. (Leonard 2001)

There are several reported observations of three-toed woodpeckers at Alta, including one detected during wildlife surveys for this project in 2013. There is suitable habitat in the area, although snags at the ski area are often removed for skier safety reasons. Due to the irruptive nature of three-toed woodpeckers, a disturbance event could bring them into the area at any time.

### **Flammulated Owl**

Flammulated owls are generally associated with open, xeric, ponderosa pine forests. In northern Utah, this species is known to occur in areas without ponderosa pine, such as Douglas fir and aspen stands. This species is insectivorous and feeds primarily on moths, beetles, crickets, and grasshoppers captured on the wing or gleaned off trees or the ground. Flammulated owls are secondary cavity nesters and expel woodpeckers and other cavity-nesting species from occupied sites. (Linkhart and McCallum 2013)

The primary threat to flammulated owls is habitat loss. These owls require mature trees with cavities for nesting and are more abundant in mature forest. Loss of mature forest occurs through wildfire and timber harvest. (Linkhart and McCallum 2013)

There are no reported sightings of flammulated owls at Alta. However, there is some habitat at Alta, and this species has been reported in the vicinity.

### **Northern Goshawk**

Goshawks are generally found in old-growth coniferous, mixed, and deciduous forests. Nesting occurs in high canopy closure (> 70 percent) forest patches 25 to 250 acres in size. Goshawks hunt in a variety of habitats including forests, riparian areas, and sagebrush communities. Prey species vary widely by region, season, and availability, but squirrels, lagomorphs, grouse, and other large birds are common prey groups. (Squires and Reynolds 1997)

The primary threat to northern goshawks is habitat destruction and degradation through timber harvest. Clear-cutting results in obvious loss of habitat, but goshawks also avoid nesting in forest stands that have been selectively logged, or thinned. (Squires and Reynolds 1997, NatureServe 2014a)

There are reported sightings of goshawks at Alta. Nesting habitat in the project area is suboptimal due to the small size of forest patches and low tree density at the ski area, but there is good nesting habitat in the



vicinity. The project area does not overlap with any 30-acre buffers around goshawk nests mentioned in the Forest Plan (Forest Service 2003).

### **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 15 miles from the nest site to hunt for ducks, shorebirds, or songbirds. However a 5-mile radius around the nest is an average hunting area, with 60 percent of foraging occurring within this distance. (White et al. 2002)

Peregrine falcons are resilient to most forms of human disturbance, and current threats to this species are minimal. Helicopter activity can cause disruption at nest sites by flushing adults and causing eggs or nestlings to be dislodged from the nest area. (White et al. 2002)

There are reported sightings of peregrine falcons at Alta. The entire project area could be considered foraging habitat, and the cliffs could provide nesting habitat.

### **Spotted Bat**

Spotted bats are found throughout the West in a wide variety of habitats. In Utah they are most often found in the southern two thirds of the state, in low-elevation canyons where they roost in caves and rock crevices. However, this species has been recorded at elevations up to 10,600 feet in New Mexico (Luce and Keinath 2007). In general, spotted bats are found within 6 miles of cliffs with nearby permanent water. (Priday and Luce 1999)

The biggest threat to bats worldwide is white nose syndrome (WNS). WNS is caused by the fungus *Pseudogymnoascus destructans* and prevents bats from hibernating through the winter by causing irritation that wakes them from hibernation. Once awakened, bats expend calories at a higher rate than during hibernation. If enough calories are expended in this manner, the bats have insufficient reserves to last through the winter and they die. WNS has not reached most of the western US yet but has been spreading west steadily since at least 2006 (FWS 2017b). WNS has not been documented in this species (FWS 2017b), likely because the range of WNS and the spotted bat do not overlap.

Other threats to this species are alteration of wet meadows and other foraging areas, scientific collection, pesticide use, and roost disturbance (Luce and Keinath 2007). Scientific collection and pesticide use are not likely threats in the project area. However, habitat alteration and roost disturbance could be issues.

There are no records for this species in the Utah Natural Heritage Database near the project area, and no bat-specific surveys have been conducted at Alta. Suitable mines and caves exist in the project area, and for the purposes of this analysis we assume this species is present.

### **Townsend's Western Big-eared Bat**

During spring, summer, and fall Townsend's big-eared bats roost in buildings, mines, and caves at elevations up to 11,000 feet. Hibernacula used in winter are almost exclusively mines or caves and can be up to 20 miles away from summer-use sites. Townsend's big-eared bats eat moths and other flying insects that they take on the wing, generally at the margins of forest patches. (Kunz and Martin 1982)

The fungus that causes WNS has been documented in Townsend's big-eared bats but not in Utah (FWS 2017b). Other threats to this species include human disturbance of roost sites (IUCN 2017).

There is one record for this species in the Utah Natural Heritage Database approximately 3 miles from the project area. No bat-specific surveys have been conducted at Alta. Suitable mines and caves exist in the project area, and for the purposes of this analysis we assume this species is present.

### **Bonneville Cutthroat Trout**

Bonneville cutthroat trout generally occupy small, cold, headwater streams with water temperatures around 55 degrees Fahrenheit. These trout spawn in clean sand or gravel substrates with flowing water. (NatureServe 2014b)

Threats to this species are primarily related to hybridization with non-native trout species and habitat fragmentation through barrier construction on small streams. (NatureServe 2014b)

Bonneville cutthroat trout occur in Little Cottonwood Creek downstream from the project area.

### **Migratory Birds**

Migratory birds are protected under the Migratory Bird Treaty Act of 1918. Executive Order 13186 (66 FR 3853, January 17, 2001) details the responsibilities of federal agencies to protect bald and golden eagles and other migratory birds. Each agency was encouraged to immediately develop a memorandum of understanding with the FWS and to begin implementing the conservation measures specified in Sec. 3 (e) of the Executive Order, as appropriate and practicable.

Table 3-11 lists all Partners in Flight Priority Species, FWS Birds of Conservation Concern and species listed on the FWS Information for Planning and Conservation (IPAC) website with potential to occur in the vicinity. There are habitat and records for 17 of these species in the project area. Three of these 17 are also Region 4 sensitive species and are discussed at their higher level of protection above in section 3.6.2.2, Forest Service Sensitive Species. The remaining 14 species are carried into detailed analysis under this category.

<b>Table 3-11. Partners in Flight Priority species for Utah, FWS Birds of Conservation Concern of Region 16, and species listed on the FWS IPAC website with potential to occur in the vicinity.</b>			
<b>Species</b>	<b>PIF or BCC?</b>	<b>Carried into Detailed Analysis?</b>	<b>Comments</b>
American white pelican <i>Pelecanus erythrorhynchos</i>	PIF	No	There is no habitat for this species in the project area, and while individuals have been observed soaring over the project area, none have been observed to use habitats in the vicinity. <sup>1 2</sup>
Bald Eagle <i>Haliaeetus leucocephalus</i>	BCC	No	This species occasionally winters in the vicinity <sup>1</sup> , but no breeding habitat exists within the project area. <sup>2</sup>
Black rosy-finch <i>Leucosticte atrata</i>	PIF, BCC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2 3</sup>
Black swift <i>Cypseloides niger</i>	PIF	No	There is no habitat for this species in the project area, and no individuals have been observed. <sup>1 2</sup> Individuals have been observed soaring further downcanyon. <sup>1</sup>
Black-throated gray warbler <i>Dendroica nigrescens</i>	PIF	Yes	There is suitable habitat, and individuals have been documented in the vicinity. <sup>1 2</sup>
Brewer's sparrow <i>Spizella breweri</i>	PIF, BCC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>

**Table 3-11 (cont'd). Partners in Flight Priority species for Utah, FWS Birds of Conservation Concern of Region 16, and species listed on the FWS IPAC website with potential to occur in the vicinity.**

Species	PIF or BCC?	Carried into Detailed Analysis?	Comments
Broad-tailed hummingbird <i>Selasphorus platycercus</i>	PIF	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Brown-capped rosy finch <i>Leucosticte australis</i>	BCC	No	The project area is out of the historic range of this species. <sup>2</sup> There are records for this species nearby at the town of Alta, but given the historic range of this species, these were likely transient individuals. <sup>1</sup>
Calliope hummingbird <i>Selasphorus calliope</i>	IPAC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Cassin's finch <i>Haemorhous cassinii</i>	BCC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Ferruginous hawk <i>Buteo regalis</i>	PIF, BCC	No	The project area is too high in elevation for this species to use as breeding habitat. <sup>2</sup> A few individuals have been observed foraging in the vicinity; however, this species normally forages at much lower elevations. <sup>1 2</sup>
Flammulated owl <i>Psiloscops flammeolus</i>	BCC	Yes (as R4 sensitive species)	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Fox sparrow <i>Passerella iliaca</i>	IPAC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Golden eagle <i>Aquila chrysaetos</i>	BCC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Juniper titmouse <i>Baeolophus ridgwayi</i>	BCC	No	There is no habitat for this species in the project area. <sup>2</sup> There is one record of this species in the project area but, given the lack of habitat, this was likely a misidentification or transient individual. <sup>1</sup>
Lewis's woodpecker <i>Melanerpes lewis</i>	PIF, BCC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Peregrine falcon <i>Falco peregrinus</i>	BCC	Yes (as R4 sensitive species)	There is suitable habitat, and individuals have been documented in the vicinity. <sup>1 2</sup>
Prairie falcon <i>Falco mexicanus</i>	BCC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Rufous hummingbird <i>Selasphorus rufus</i>	IPAC	Yes	The project area is outside of breeding habitat but there is suitable foraging habitat in the project area, and individuals have been documented at the ski area. <sup>1 2</sup>

**Table 3-11 (cont'd). Partners in Flight Priority species for Utah, FWS Birds of Conservation Concern of Region 16, and species listed on the FWS IPAC website with potential to occur in the vicinity.**

Species	PIF or BCC?	Carried into Detailed Analysis?	Comments
Swainson's hawk	IPAC	No	There is no habitat for this species in the project area. <sup>2</sup> Individuals have been documented at the ski area; however, those were likely transient individuals moving from one area to another. <sup>1</sup>
Three-toed woodpecker <i>Picoides tridactylus</i>	PIF	Yes (as R4 sensitive species)	There is minimal habitat for this species in the project area <sup>2</sup> , and individuals have been observed in the vicinity.
Virginia's warbler <i>Oreothlypis virginiae</i>	PIF	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Williamson's sapsucker <i>Sphyrapicus thyroideus</i>	IPAC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
Willow flycatcher <i>Empidonax traillii</i>	BCC	Yes	There is suitable habitat, and individuals have been documented in the project area. <sup>1 2</sup>
<sup>1</sup> eBird, www.ebird.org <sup>2</sup> Birds of North America, <a href="http://bna.birds.cornell.edu/bna">http://bna.birds.cornell.edu/bna</a> <sup>3</sup> Utah Natural Heritage Database			

**Black Rosy-finch**

Black rosy-finches are common at Alta (eBird 2017). In summer, this species is found in a variety of open alpine habitats where individuals forage on seeds and insects. Black rosy-finches nest on the ground or on cliffs at high elevations. (Johnson 2002)

**Black-throated Gray Warbler**

Black-throated gray warblers have not been reported at Alta, and they are rarely reported in the vicinity (eBird 2017). This species is found in open coniferous or mixed forest habitats with brushy understory. Black-throated gray warblers are tree nesters, and they eat primarily insects. (Guzy and Lowther 2012)

**Brewer's Sparrow**

Brewer's sparrows are somewhat commonly reported at Alta (eBird 2017). The Brewer's sparrow subspecies that is found at Alta may be the timberline sparrow subspecies (*Spizella breweri taverneri*). The timberline subspecies occurs in krumholtz-subalpine habitats with low vegetation whereas the nominate subspecies generally occurs in shrub steppe areas. (Rotenberry et al. 2012)

**Broad-tailed Hummingbird**

Broad-tailed hummingbirds are common at Alta (eBird 2017). They nest in aspen and coniferous forests at elevations up to 10,600 feet, where small nests are built on branches shielded from view and weather by foliage. Like most hummingbirds they primarily nectar feeders and require flowering plants from which to gather nectar. (Camfield et al. 2013)

### **Calliope Hummingbird**

Calliope hummingbirds are common at Alta (eBird 2017). They nest in coniferous forests at elevations up to 11,100 feet, where small nests are built on branches shielded from view and weather by foliage. Like most hummingbirds they primarily nectar feeders and require flowering plants from which to gather nectar. (Calder and Calder 1994)

### **Cassin's Finch**

Cassin's finches are common at Alta (eBird 2017). They are found in coniferous forests up to timberline in summer and lower-elevation, mixed forest habitats or even urban areas during the winter. Nests are built in conifers, with the nest usually placed near the end of a large limb. This species feeds on buds, berries, and conifer seeds (Hahn 1996).

### **Fox Sparrow**

Fox sparrows are common at Alta (eBird 2017). They are found most often in riparian habitats, where they nest in thick brush. This species feeds on arthropods as well as seeds, fruit, and other plant matter. (Weckstein et al. 2002)

### **Golden Eagle**

Golden eagles are common at Alta (eBird 2017). Golden eagles nest on cliffs and hunt in open areas. Suitable nesting habitat is available on cliffs in the area. (Kochert et al. 2002)

### **Lewis's Woodpecker**

Lewis's woodpeckers are rare at Alta. This species is found in a variety of forested habitats where they forage on insects, nuts, and fruit. Lewis's woodpeckers nest mostly in existing tree cavities but will sometimes excavate their own cavities. (Vierling et al. 2014)

### **Prairie Falcon**

Prairie falcons are rare at Alta (eBird 2017). They nest on cliffs and hunt in open areas. Suitable nesting habitat is available on cliffs in the area. (Steenhof 2013)

### **Rufous Hummingbird**

Rufous hummingbirds are common at Alta (eBird 2017). This species nests further north than Utah but is commonly seen in meadow and recently disturbed habitat at Alta during migration. Like most hummingbirds, they primarily nectar feeders and require flowering plants from which to gather nectar. (Healy and Calder 2006)

### **Virginia's Warbler**

Virginia's warblers are rare at Alta (eBird 2017). They are found in brushy mixed or deciduous forests but never strictly coniferous forests. This species is entirely insectivorous and nests in open canopy forests. (Olson and Martin 1999)

### **Williamson's Sapsucker**

Williamson's sapsuckers are rare at Alta (eBird 2017). This species is found in middle- to high-elevation conifer and mixed conifer forests. They are cavity nesters, generally excavating a new cavity each year. This species eats primarily tree sap but also takes ants and beetles opportunistically. (Gyug et al. 2012)

### **Willow Flycatcher**

Willow flycatchers are rare at Alta (eBird 2017). They are most often found in shrubby riparian areas up to 8,200 feet. Nests are built in shrubs or small trees near water. (Sedgwick 2000)

### **3.4.3.3 Direct and Indirect Effects**

#### ***Alternative 1 – No Action Alternative***

Under this alternative ski area operations would continue as they have in the past. Past operations have largely shaped the species community that exists in the project area and the habitat for special-status species. Not implementing the proposed action would have no impacts on any special-status species as there are no current problems with populations of these species that the proposed action addresses.

#### ***Alternative 2 – Proposed Action***

##### **Threatened and Endangered Species**

No threatened or endangered species occur in the project area; therefore, there would be no impact on threatened or endangered species under this alternative.

##### **Forest Service Sensitive Species**

###### ***Boreal Toad***

Almost all of the area impacted could provide boreal toad foraging or dispersal habitat. However, almost the entire ski area provides this kind of habitat so only a very small fraction of the available habitat would be impacted. Impacted habitat that is not in the footprint of a structure (e.g., lift tower, building, or parking lot) would remain suitable habitat following revegetation.

Approximately 0.23 acres of palustrine emergent and shrub/scrub wetlands would be impacted by the proposed action. These wetlands are mostly moist ground with wetland vegetation, but in some years there could be enough standing water for breeding. The proposed action would also impact 506 feet of perennial stream channel that could provide breeding habitat in slow-moving pools, if present. A large amount of reliably suitable breeding habitat exists in the project area and this habitat is likely not limiting.

Given their small size and camouflage, it is possible that some boreal toads could be inadvertently crushed by construction equipment. It is anticipated that this would be a rare occurrence since there is a large amount of habitat and that habitat is not known to be densely occupied.

Based on these considerations, the proposed action would have a very slight detrimental impact on this species due to habitat loss and the potential for crushing of individuals.

###### ***Three-toed Woodpecker, Flammulated Owl, and Northern Goshawk***

The proposed action would impact a total of 2.5 acres of non-contiguous aspen, conifer, or mixed conifer/aspen habitat, spread across the entire ski area, where these habitat types are common. The largest contiguous patch would be roughly 0.16 acres (associated with the Supreme summer run) and only one other patch would be over 0.1 acres (also associated with the Supreme summer run). None of this habitat is unique in the area or of substantial value to populations of these species in the area. The overall 2.5 acres of disturbance would constitute a very small fraction of the existing habitat for these species in the area.

Based on these considerations, the proposed action would have a very slight detrimental impact on these species due to habitat loss.

###### ***Peregrine Falcon***

While Gazex systems would be installed near some potential peregrine falcon nesting habitat, these installations would be constructed by hand with a very limited disturbance footprint. As a result, no peregrine falcon nesting habitat would be directly impacted by the proposed action.

Helicopter flights during construction of the Gazex systems and for carrying in replacement gas canisters have the potential to impact any nesting peregrine falcons in the area (White et al. 2002). Mitigation measure WIL-1 would require helicopters operating during the nesting season (April–June) to approach

and depart cliff areas from behind and above the cliffs to avoid flushing nesting falcons. This mitigation measure would eliminate potential impacts from helicopter flights associated with the Gazex installations.

Changes that would occur elsewhere at Alta would not affect the value of the ski area as peregrine falcon foraging habitat. Therefore, with mitigation measure WIL-1 in place, this alternative would have no impact on peregrine falcons.

*Spotted Bat and Townsend's Western Big-eared Bat*

While Gazex systems would be installed near some potential bat roosting or hibernating sites, these installations would be constructed by hand with a very limited disturbance footprint. No potential for the spread of WNS would occur since construction would not involve entering any mines or caves. As a result, no bat roosting or hibernating habitat would be directly impacted by the proposed action.

There are several mines in the vicinity of the Gazex systems that could potentially serve as hibernacula. The areas where the Gazex systems would be installed are currently shelled using artillery or Avalaunchers for avalanche control, so shifting to Gazex under this alternative would not alter the potential effect on hibernacula.

The changes that would occur elsewhere at Alta would not alter the value of the ski area as foraging habitat for these species. Therefore, this alternative would have no impact on these species.

*Bonneville Cutthroat Trout*

Under this alternative, no effects on water quality would occur (see section 3.4.1); therefore, there would be no impact on populations of Bonneville cutthroat trout downstream from the project area.

**Migratory Birds**

*Black Rosy-finch*

This alternative would have no impact on black rosy-finches. There would be no effect on potential cliff-nesting sites, and this alternative would not detrimentally impact foraging areas. This species is often observed at ski resorts in Utah (Snowbird and Alta), and skiing is a compatible use of black rosy-finch foraging habitat (Johnson 2002, eBird 2017).

*Black-throated Gray Warbler, Cassin's Finch, and Williamson's Sapsucker*

The proposed action would impact a total of 2.5 acres of non-contiguous aspen, conifer, or mixed conifer/aspen habitat, spread across the entire ski area, where these habitat types are common. The largest contiguous patch would be roughly 0.16 acres (associated with the Supreme summer run) and only one other patch would be over 0.1 acres (also associated with the Supreme summer run). None of this habitat is unique in the area or of substantial value to populations of these species in the area. The overall 2.5 acres of disturbance would constitute a very small fraction of the existing habitat for these species in the area.

Based on these considerations, the proposed action could have a detrimental impact on these species, primarily due to habitat loss. The impact would likely be small considering the small fraction of potential nesting habitat affected and mitigation measure WIL-2. This measure would prohibit cutting of trees during the migratory bird nesting season unless surveys were conducted prior to construction and the affected trees were free of nesting birds.

*Broad-tailed Hummingbird, Calliope Hummingbird, and Rufous Hummingbird*

Hummingbirds are common at Alta, and most of the ski area supports trees and forbs that provide nectar or potential nest sites for these species. Only a small fraction of the suitable habitat at the ski area would be affected by this alternative, and those effects would generally not reduce habitat value once remediation was done. Based on these considerations, this alternative would constitute an immeasurable impact on populations of these species in the area.



### *Brewer's Sparrow*

The proposed action would impact a total of less than 0.02 acres of non-contiguous krumholtz habitat. This habitat type is common in high-elevation portions of the ski area. Fifteen very small (less than 0.01 acres) patches of krumholtz habitat would be impacted by the Gazex installations. None of this habitat is unique in the area or of substantial value to populations of this species in the area. The overall 0.02 acres of disturbance would constitute a very small fraction of the existing habitat in the area for this species.

Based on these considerations, the proposed action could have a detrimental impact on this species, primarily due to habitat loss. The impact would likely be small considering the small fraction of potential nesting habitat affected and mitigation measure WIL-2. This measure would prohibit cutting of trees during the migratory bird nesting season unless surveys were conducted prior to construction and the affected trees were free of nesting birds.

### *Golden Eagle*

While Gazex systems would be installed near some potential golden eagle nesting habitat, these installations would be constructed by hand with a very limited disturbance footprint. As a result, no golden eagle nesting habitat would be directly impacted by the proposed action.

Helicopter overflights are generally not disruptive to nesting golden eagles (Kochert et al. 2002). However, mitigation measure WIL-1 would afford protections to golden eagle nesting habitat as well as peregrine falcon nesting habitat.

The changes that would occur elsewhere at Alta would not alter the value of the ski area as golden eagle foraging habitat. Therefore, this alternative would have no impact on golden eagles.

### *Lewis's Woodpecker*

The proposed action would impact a total of 2.5 acres of non-contiguous aspen, conifer, or mixed conifer/aspen habitat, spread across the entire ski area, where these habitat types are common. The largest contiguous patch would be roughly 0.16 acres (associated with the Supreme summer run) and only one other patch would be over 0.1 acres (also associated with the Supreme summer run). None of this habitat is unique in the area or of substantial value to populations of this species in the area. The overall 2.5 acres of disturbance would constitute a very small fraction of the existing habitat for this species in the area.

Based on these considerations, the proposed action could have a detrimental impact on this species, primarily due to habitat loss. The impact would likely be small considering the small fraction of potential nesting habitat affected and mitigation measure WIL-2. This measure would prohibit cutting of trees during the migratory bird nesting season unless surveys were conducted prior to construction and the affected trees were free of nesting birds.

### *Prairie Falcon*

While Gazex systems would be installed near some potential prairie falcon nesting habitat, these installations would be constructed by hand with a very limited disturbance footprint. As a result, no prairie falcon nesting habitat would be directly impacted by the proposed action.

Helicopter flights during construction of the Gazex systems and for restocking gas canisters have the potential to impact any nesting prairie falcons in the area (Craig and Craig 1984). Mitigation measure WIL-1 would require helicopters operating during the nesting season (April–June) to approach and depart cliff areas from behind and above the cliffs to avoid flushing nesting falcons. This mitigation measure would eliminate potential impacts from helicopter flights associated with the Gazex installations.

The changes that would occur elsewhere at Alta would not alter the value of the ski area as peregrine falcon foraging habitat. Therefore, with mitigation measure WIL-1 in place, this alternative would have no impact on prairie falcons.

*Virginia's Warbler*

The proposed action would impact a total of 0.76 acres of non-contiguous aspen, willow, or mixed conifer/aspen habitat, spread across the entire ski area, where these habitat types are common. The largest contiguous patch would be roughly 0.41 acres (associated with the Albion base parking lot) and no other patch would be over 0.1 acres. None of this habitat is unique in the area or of substantial value to populations of this species in the area. The overall 0.76 acres of disturbance would constitute a very small fraction of the existing habitat in the area for this species.

Based on these considerations, the proposed action could have a detrimental impact on this species, primarily due to habitat loss. The impact would likely be small considering the small fraction of potential nesting habitat affected and mitigation measure WIL-2. This measure would prohibit cutting of trees during the migratory bird nesting season unless surveys were conducted prior to construction and the affected trees were free of nesting birds.

*Willow Flycatcher and Fox Sparrow*

The proposed action would impact a total of 0.4 acres of non-contiguous riparian/willow habitat. The largest contiguous patch would be roughly 0.4 acres (associated with the Albion base parking lot), and no other patch would be over 0.1 acres. None of this habitat is unique in the area or of substantial value to populations of these species in the area. The overall 0.4 acres of disturbance would constitute a small fraction of the existing habitat in the area for these species.

Based on these considerations, the proposed action could have a detrimental impact on these species, primarily due to habitat loss. The impact would likely be small considering the small fraction of potential nesting habitat affected and mitigation measure WIL-2. This measure would prohibit cutting of trees during the migratory bird nesting season unless surveys were conducted prior to construction and the affected trees were free of nesting birds.

### **3.4.3.4 Cumulative Effects**

The cumulative actions listed in section 3.3 are any projects that would have temporally and spatially overlapping impacts on the same resources affected directly or indirectly by these alternatives. Table 3-12 identifies these projects and summarizes their cumulative effects on wildlife. Only wildlife species that would be impacted by the proposed action are discussed in Table 3-12 since there can be no cumulative effects if no direct or indirect effects are projected to occur.

<b>Table 3-12. Special-status wildlife cumulative effects.</b>	
<b>Action</b>	<b>Cumulative Effects</b>
<b>Boreal Toad</b>	
Snowbird Gad Valley Improvements	Various elements of this project impacted a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.
Corkscrew Project	Various elements of this project impacted a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.

<b>Table 3-12 (cont'd). Special-status wildlife cumulative effects.</b>	
<b>Action</b>	<b>Cumulative Effects</b>
Ballroom Traverse	Various elements of this project impacted a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.
Supreme Lift Replacement and Secret Lift Removal	Various elements of this project impacted a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.
Quincy Mine Water Tank Replacement	This project did not impact any boreal toad habitat.
Albion Meadows Trail Reroute	Various elements of this project may impact a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.
Wildcat and Buckhorn Parking Lot Improvements	This project does not impact any boreal toad habitat.
Rollercoaster Snowmaking Loop	Various elements of this project may impact a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.
Patsey Marley Shrontz Utility Right-of-Way	Various elements of this project may impact a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.
Snowbird Zip Line Project	Various elements of this project may impact a small amount of boreal toad habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact boreal toad populations in the area.
<b>Three-toed Woodpecker</b>	
Snowbird Gad Valley Improvements	Various elements of this project impacted a small amount of three-toed woodpecker habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact three-toed woodpecker populations in the area.
Corkscrew Project	Tree removal associated with this project impacted a small amount of three-toed woodpecker habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact three-toed woodpecker populations in the area.

<b>Table 3-12 (cont'd). Special-status wildlife cumulative effects.</b>	
<b>Action</b>	<b>Cumulative Effects</b>
Ballroom Traverse	Tree removal associated with this project impacted a small amount of three-toed woodpecker habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact three-toed woodpecker populations in the area.
Supreme Lift Replacement and Cecret Lift Removal	Tree removal associated with this project impacted a small amount of three-toed woodpecker habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact three-toed woodpecker populations in the area.
Quincy Mine Water Tank Replacement	This project did not impact any three-toed woodpecker habitat.
Albion Meadows Trail Reroute	This project does not impact any three-toed woodpecker habitat.
Wildcat and Buckhorn Parking Lot Improvements	This project does not impact any three-toed woodpecker habitat.
Rollercoaster Snowmaking Loop	This project does not impact any three-toed woodpecker habitat.
Patsey Marley Shrontz Utility Right-of-Way	This project has the potential to impact a very small amount of three-toed woodpecker habitat along the existing Albion Basin Road. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact three-toed woodpecker populations in the area.
Snowbird Zip Line Project	This project has the potential to impact a very small amount of three-toed woodpecker habitat along the cable alignments and launch and landing towers. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact three-toed woodpecker populations in the area.
<b>Flammulated Owl</b>	
Snowbird Gad Valley Improvements	Various elements of this project have the potential to impact a small amount of flammulated owl habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact flammulated owl populations in the area.
Corkscrew Project	Tree removal associated with this project impacted a small amount of flammulated owl habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact flammulated owl populations in the area.
Ballroom Traverse	Tree removal associated with this project impacted a small amount of flammulated owl habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact flammulated owl populations in the area.

<b>Table 3-12 (cont'd). Special-status wildlife cumulative effects.</b>	
<b>Action</b>	<b>Cumulative Effects</b>
Supreme Lift Replacement and Cecret Lift Removal	Tree removal associated with this project impacted a small amount of flammulated owl habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact flammulated owl populations in the area.
Quincy Mine Water Tank Replacement	This project did not impact any flammulated owl habitat.
Albion Meadows Trail Reroute	This project does not impact any flammulated owl habitat.
Wildcat and Buckhorn Parking Lot Improvements	This project does not impact any flammulated owl habitat.
Rollercoaster Snowmaking Loop	This project does not impact any flammulated owl habitat.
Patsey Marley Shrontz Utility Right-of-Way	This project has the potential to impact a very small amount of flammulated owl habitat along the existing Albion Basin Road. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact flammulated owl populations in the area.
Snowbird Zip Line Project	This project has the potential to impact a very small amount of flammulated owl habitat along the cable alignments and launch and landing towers. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact flammulated owl populations in the area.
<b>Northern Goshawk</b>	
Snowbird Gad Valley Improvements	Various elements of this project have the potential to impact a small amount of northern goshawk habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact northern goshawk populations in the area.
Corkscrew Project	Tree removal associated with this project impacted a small amount of northern goshawk habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact northern goshawk populations in the area.
Ballroom Traverse	Tree removal associated with this project impacted a small amount of northern goshawk habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact northern goshawk populations in the area.
Supreme Lift Replacement and Cecret Lift Removal	Tree removal associated with this project impacted a small amount of northern goshawk habitat. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact northern goshawk populations in the area.

<b>Table 3-12 (cont'd). Special-status wildlife cumulative effects.</b>	
<b>Action</b>	<b>Cumulative Effects</b>
Quincy Mine Water Tank Replacement	This project did not impact any northern goshawk habitat.
Albion Meadows Trail Reroute	This project does not impact any northern goshawk habitat.
Wildcat and Buckhorn Parking Lot Improvements	This project does not impact any northern goshawk habitat.
Rollercoaster Snowmaking Loop	This project does not impact any northern goshawk habitat.
Patsey Marley Shrontz Utility Right-of-Way	This project has the potential to impact a very small amount of northern goshawk habitat along the existing Albion Basin Road. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact northern goshawk populations in the area.
Snowbird Zip Line Project	This project has the potential to impact a very small amount of northern goshawk habitat along the cable alignments and launch and landing towers. Given the small amount of habitat impacted and the availability habitat in the area, the effects of this cumulative action would not interact cumulatively with the minor impacts of this project in any way that would substantially impact northern goshawk populations in the area.

### **3.4.3.5 Mitigation**

WIL-1: Construction and refueling helicopters operating during the nesting season (April–June) must approach, and depart, cliff areas from behind and above the cliffs to avoid flushing nesting falcons.

WIL-2: Do not clear, cut, burn, drive on, or park equipment on vegetation that may harbor nesting birds during the breeding season (May 15–July 15). If this is not possible, survey for nesting birds no more than 10 days prior to commencing work. If no nests are found, project activities may proceed. If nests are found, contact the Forest Service permit administrator.

## **3.5 HUMAN ENVIRONMENT**

### **3.5.1 CULTURAL RESOURCES**

#### **3.5.1.1 Scope of Analysis**

- *How would the proposed infrastructure affect Cultural Concerns, Traditional Cultural Places (TCPs), or Native American Sacred Sites?*

Section 3.4.1.1 of Alta's 1997 Master Development Plan Final Environmental Impact Statement (FEIS) states that "prior to European settlement the ski area was used by Native Peoples for both hunting and plant gathering in a lifeway that was otherwise tied to the more abundant resources of the adjacent Salt Lake Valley. This short-term use leaves little archaeological imprint, and few examples of Native sites remain anywhere in the canyon." Nevertheless, the project area could hold values for Native Peoples that may be affected by the proposed action.

Indicators: Government-to-government consultation with Native American Tribes of concern regarding this proposed action. Any concerns identified by the Tribes has been taken into account in analyzing the

potential of the proposed development to affect cultural concerns, TCPs, or Native American Sacred Sites.

- *How would the proposed infrastructure affect historic properties?*

The clearing, grading, and excavation associated with construction of the proposed facilities could affect other historic properties (any cultural resource deemed eligible to the National Register of Historic Places, both prehistoric and historic) in or around the project area.

**Indicators:** Assessment of the potential for any ground disturbing activity to affect Historic Properties (i.e., any cultural resource deemed eligible for the National Register of Historic Places, both prehistoric and historic).

- *How would the proposed infrastructure affect the historic integrity of the ski area?*

Alta was the site of intensive mining activity from the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, and it is also one of the oldest continuously operating ski areas in the nation, with the first tow installed in 1939. While most of the historic infrastructure has been removed or replaced, the clearing, grading, and excavation associated with construction of the proposed facilities could further affect the resort's historic integrity.

**Indicators:** Assessment of how well the ski area currently reflects its long history and how the proposed development would affect its historical integrity.

### **3.5.1.2 Affected Environment**

In 2015 and 2016, the proposed action was reviewed in accordance with Forest Service procedures for compliance with section 106 of the National Historic Preservation Act (NHPA). A review of past records was conducted, and areas potentially affected were surveyed on the ground. Reports were prepared and submitted to the SHPO for review, and the SHPO provided letters of concurrence with the reported findings. This analysis summarizes the finding of those reports (USU Archaeological Services 2015, 2016a, and 2016b).

#### ***Native American Concerns***

The project area lies within the traditional homeland of the Ute and Western Shoshone. Locally, the area was the traditional home range of the Cumumba, or Weber Ute, who settled the Weber River Valley and south to present day Salt Lake City. Further south was the home range of the Tūmpanogots who settled the Wasatch Range centered around Mount Timpanogos and along the shores of Utah Lake, including the river canyons of the Spanish Fork, Diamond Fork, Hobble Creek, American Fork and Provo Rivers. North and west were the Western Shoshone bands of the Hukundūka ("fish eaters") and Tubadūka ("pine nut eaters"), respectively.

The home ranges during the contact period likely had been in place for generations, with home ranges (or districts) defined in large part by kinship and band affiliation. It was also quite fluid based upon season of the year and who was living with whom.

The introduction of the horse and access to Euroamerican trade items probably had the greatest influence on mobility and subsistence. Prior to the adoption of the horse, transportation of people and goods occurred on foot and was likely more restrictive. Mobility and subsistence were intricately meshed to seasonal availability of plant and animal resources. Diets in the Great Basin and Colorado Plateau were diverse ranging from insects, such as grasshoppers, to bison. Over 150 vegetable foods have also been identified.

Beginning in the 1840s with emigrant travel to the west coast and settlement by members of the Church of Jesus Christ of Latter Day Saints (Mormons), the traditional home ranges and lifeways of the Shoshone, Utes, and other western tribes came under assault. The introduction of grazing cattle and horses put increasing pressure on a fragile ecosystem that often resulted in violence against native groups



and emigrants. Two decades of persistent violence culminated with the massacre of over 250 Shoshone on 29 January 1863 with the Bear River Massacre. In all practical ways, this brought an end to the traditional lifeways of these western tribes.

### ***Historic Properties***

Little Cottonwood Canyon played an important role in the historic development of the Salt Lake Valley. Economic resources including lumber, stone, and mineral resources first drew Euroamerican exploration and use of the canyon beginning in the early 1850s. For example, granite quarried from Little Cottonwood Canyon went to build both Salt Lake City's Mormon Temple and the Utah Capitol Building. Additionally, lumber resources from the canyon were instrumental in the construction of buildings in Salt Lake City and the surrounding communities.

Mining and prospecting in the Little Cottonwood Canyon began during the early 1860s. Following the discovery of ore in Big and Little Cottonwood Canyons, miners organized into mining districts. These districts changed shape and size through the early years as prospectors located new ore deposits. The districts included the Wasatch Mountain Mining District (1863 to circa 1864), Mountain Lakes Mining District (1864 to 1871), Cottonwood Lakes Mining District (1868 to 1869), and finally Little Cottonwood Canyon Mining District (1869 to present).

By 1871, the community of Alta was formed at the location of steam sawmill owned by the Emma Silver Mining Company. Alta attained a population of 5,000 with stores, hotels, three breweries, six sawmills, one newspaper, and a mule-drawn railroad. The town quickly became notorious for violence, prostitution, drinking, gambling, as well as for the numerous avalanche and mining disasters that plagued the community.

Mining activities expanded in Little Cottonwood Canyon in 1871 when the Utah Central Railroad (between Ogden and Salt Lake City) built the Sandy Terminal. The following year the Wasatch and Jordan Valley Railroad Company began constructing a narrow-gauge railroad line connecting the Sandy Station to Little Cottonwood Canyon, specifically the Wasatch area. In 1873, the first locomotive use of the line began to transport granite from Little Cottonwood Canyon to the construction site of the Mormon Temple. In 1875, eastern investors purchased the Wasatch and Jordan Valley Railroad with the goal of continuing locomotive rail service to Alta.

However, the route from Wasatch to Alta was too steep for locomotives of the day. The last leg of the rail line to Alta required the use of carts pulled by packhorses and mules. The railroad soon became so important to mining operations and the occupants at Alta that, beginning in 1876, a series of resilient wood snow sheds were built covering the tramway to protect the route from damages caused by the frequent avalanches.

By 1913, the railroad from the Sandy Station to Wasatch was replaced by the Salt Lake and Alta Railroad Company's line. The purpose of this new railroad was to transport granite for the Utah Capitol Building. In 1915, the Alta-Cottonwood Railroad Company began to replace the narrow-gauge railroad from Wasatch to Alta. This newly constructed railroad could handle locomotives but not heavy freight carts due to steep grades and sharp turns. By 1928, the Alta-Cottonwood Railroad was out of service. Soon thereafter (1934), the Salt Lake and Alta Railroad Company's railroad was abandoned. Abandonment of railroad service coupled with the Great Depression mining activities effectively signaled the decline of the mining industry in the Little Cottonwood Canyon.

Alta Townsite almost became a ghost town when mining activities ended in Little Cottonwood Canyon. At the same time, public interest in winter time recreational activities began to increase and was promoted by local recreational groups and various government entities (e.g., Chambers of Commerce, city and county governments) as a means to stimulate the economy. By 1936, enough interest developed that the Salt Lake City Winter Sports Association (later named Alta Ski Lifts Company) was formed through a

collaboration with skiers, tourists, businessmen, and investors to support and promote local winter sports. In the 1930s, a large portion of Alta was converted into the base facilities for the ski area complex.

Most of the original buildings have been destroyed for development of new facilities within both the ski area and the town of Alta. Nevertheless, the Forest Service has made the determination that the Alta Townsite is eligible for the National Register of Historic Places. The Utah SHPO concurred with this determination in 2016. Substantial archaeological research on the site has not been conducted, but cursory research and pedestrian archaeological survey to date suggests that there are likely buried artifacts and features of Alta's mining history within the site that could add to the historic era knowledge of the area.

### ***Ski Area's Historic Integrity***

The first ski lift (Collins Lift) was built at Alta for the 1938-39 winter ski season, though frequent delays and malfunctions hampered its use. The ski area continued to grow, and by the end of WWII, facilities included the Rustler lift, Peruvian lift, Collins lift, and various buildings including the Watson Shelter, Rock Shelter, and the Alta Lodge.

Though it maintains its reputation as a no-frills skiers' mountain, Alta has continued to develop and upgrade its basic infrastructure. The only structure dating back beyond 50 years now is the Old Watson Shelter. It was determined to be eligible for the National Register of Historic Places in 2015. No other eligible structures remain. As a result, despite its long history, Alta's historic integrity is low.

### **3.5.1.3 Direct and Indirect Effects**

#### ***No-Action Alternative***

##### **Native American Concerns**

Under this alternative, the current situation regarding Native American concerns would be unchanged. The UWCNF consulted with representatives of area Native American Tribes, the Ute and Western Shoshone, in the course of previous NEPA reviews to ensure that no Tribal concerns were overlooked. No Tribal concerns about TCPs, sacred sites, Tribal resource gathering areas, or prehistoric archeological sites were identified.

##### **Historic Properties**

The situation would also be unchanged in terms of historic properties. Section 106 processes completed for past development identified only the historic Alta Townsite as an historic property. The townsite would not be affected under this alternative. As a result, no impact on historic properties is anticipated.

##### **Ski Area's Historic Integrity**

As noted above, the historic integrity of the ski area is currently low. Older facilities have been replaced or upgraded, and little remains of early days of Alta skiing. The no-action scenario would be more of the same – basic operation and maintenance of the ski area infrastructure that has developed over time. The ski area's historic integrity would not be affected.

#### ***Proposed Action***

##### **Native American Concerns**

As discussed above for the no-action alternative, no concerns have been identified by the Tribes, and representatives of these Tribes were notified again of this proposed action. No concerns were identified. As a result, no impact on these resources is anticipated. In accordance with design criteria 16, 17, and 18 (section 2.5), if any cultural resources, TCPs, sacred sites, or other resources of Tribal concern are encountered at the ski area, any action that could adversely affect them must cease, and the Forest Archaeologist must report the find to appropriate Tribal representatives and fulfill consultation requirements. These requirements would effectively mitigate any adverse effect on these resources.

### **Other Historic Properties**

One element of the proposed action would be sited within the historic Alta Townsite – the Wildcat/Albion base area parking improvements. Work on the Wildcat parking lot would involve modified areas largely within the built lot or on a heavily disturbed adjacent area. As a result, it is unlikely to have any impact on the historic townsite. However, the proposed expansion of the Albion parking lot would involve some less disturbed areas (see Figure 2-2). These areas lie downslope from the existing parking lot and access road, and as a result they would be subject fill rather than excavation. “Burying the site” was identified as one way of “avoiding adverse effects” on the historic townsite in the SHPO concurrence letter (SHPO 2016). Accordingly, placement of fill material over a small, less-disturbed portion of the townsite should have no adverse effect. As no other adverse effects were identified, the same conclusion would apply to the proposed action as a whole.

Design criterion 16 (section 2.5) calls for efforts to protect any buried resources encountered during construction until the Forest Service Permit Administrator is notified and the Forest Service fulfills its consultation requirements. However, in that this is a known, National Register-eligible site, monitoring by a qualified archaeologist during all ground-disturbing activities associated with expansion of the Albion parking lot would further mitigate potential adverse effects (section 3.5.1.5).

### **Resort’s Historic Integrity**

As noted above, little remains from the early days of Alta skiing, and the ski area’s current historic integrity is low. Proposed action elements would not replace or alter any historic aspects of the resort, but would simply maintain and improve the infrastructure, as it has evolved to this point, in much the same way as the no-action alternative. The ski area’s historic integrity would not be affected.

### **3.5.1.4 Cumulative Effects**

Based on completed section 106 compliance processes, one of the cumulative actions listed in section 3.3 has the potential to cumulatively affect cultural resources in the project area. The relocated portion of the Albion Meadows hiking trail would pass through a new, eligible for listing mine site (Hecla Mine) discovered during the NHPA section 106 process addressing that project (USU Archaeological Services 2016c). That process reached the conclusion that as long as the new trail followed the existing user-created trail, any adverse effect could be avoided. However, the trail to be decommissioned passes through the Alta Townsite, creating the potential for adverse effects. Mitigation in the form of archaeological monitoring during trail construction through the site was suggested, and the SHPO concurred that this would provide added assurance.

In regard to the other cumulative actions, the EA prepared for the Snowbird Gad Valley Improvements concluded that all elements of the selected alternative had been relocated to avoid any adverse effects on cultural resources (Forest Service 2013a; p. 126). The Patsey Marley Shrontz Utility Right-of-Way project is currently under analysis, but it lies outside the currently identified boundary of the Alta Townsite and thus would not affect any cultural resources directly or indirectly impacted by this proposed action. Section 106 processes have been completed for the Snowbird Zip Tour (USU Archaeological Services 2016d), the Corkscrew project (Forest Service 2015), the Ballroom Traverse (Forest Service 2013b), the Wildcat and Buckhorn parking lot project (USU Archaeological Services 2015), the Supreme lift replacement and Cecret lift removal (USU Archaeological Services 2015), the Quincy Mine project (USU Archaeological Services 2016c), and the Roller Coaster snowmaking loop (USU Archaeological Services 2016e). These concluded that either historic properties were not present or would not be affected. As a result, these projects pose no apparent potential for cumulative effects on cultural resources.

### **3.5.1.5 Mitigation**

This analysis indicated the need for one mitigation measure:

CUL-1: A qualified archaeologist will monitor all surface disturbing activities during all ground-disturbing activities associated with expansion of the Albion parking lot to avoid potential effects on the historic Alta Townsite.

## **3.5.2 SCENIC RESOURCES**

### **3.5.2.1 Scope of Analysis**

- *How would the proposed infrastructure affect the scenic integrity of the project area?*

The SUP area viewscape has been affected by intensive mining activity from the late 19<sup>th</sup> and early 20<sup>th</sup> centuries followed by 77 years of ski-area development, but at this point its visual character is generally natural. Additional infrastructure such as the proposed Baldy tram and Gazex installations could alter that character and detract from the area's scenic integrity.

Indicators: Analysis of effects using the method prescribed in the Forest Service Scenery Management System (SMS; Forest Service 1995b). Indicators are the degree of intactness of the landscape character and the resulting level of scenic integrity. The Forest Plan assigns Alta's permit area the landscape character theme of Resort Natural Setting and the scenic integrity objective (SIO) of High. The analysis area is upper Little Cottonwood Canyon, beyond Hellgate on SR 210 and extending to the surrounding ridgelines to the north, east, and south. Key viewpoints from which effects are analyzed include SR 210, and the Wildcat and Albion base areas, the primary areas of concentrated use.

### **3.5.2.2 Forest Plan Direction**

Management direction in the 2003 Forest Plan includes the following Desired Future Condition regarding scenery management for Alta:

Development will be designed with a high level of attention to scenic integrity, within the context of overall resort development. Facilities will be designed and constructed to harmonize with the natural setting, rather than to contrast with that setting. While developments in base areas will be visually dominant, that dominance will decline on the mountainsides and new development on ridgelines, beyond the levels approved at the time of plan revision, will be minimal. Special attention will be given to the scenic integrity of views from backcountry and wilderness trails. Non-winter recreational opportunities provided in base areas will rely more heavily on constructed facilities, while those higher on the mountain will become increasingly oriented toward the natural setting. (P. 4-161.)

The Forest Plan describes five landscape character themes, including landscape character descriptions and SIOs applied to the WCNF. These allocations are applied using the SMS framework and criteria in conjunction with adjustments for local management direction. For Management Prescription 4.5 – Developed Recreation Area, the landscape character theme is “Resort Natural Setting”:

This landscape character theme is characteristic of developed recreation facilities such as ski resorts and recreation resort communities. In these areas, recreation amenities are the main attraction for people and why they come to an area. Facilities are designed and constructed to harmonize with the natural setting. While the form of the base area facilities dominate the foreground views, it declines as it transitions into the mountain and becomes subordinate in the middleground and background views. Likewise, recreational opportunities provided in base areas rely more heavily on constructed facilities, while those higher on the mountain become increasingly oriented toward the

natural setting. This landscape character is adjacent to Natural Evolving, Natural Appearing and Developed Natural Appearing landscape character themes and should draw from, complement and harmonize with these themes. (P. 4-99.)

Within this theme, recreational amenities are an expected and desired landscape component. The SIO is High at ski resorts because architectural amenities are designed and maintained to complement and harmonize with the natural-appearing landscape. The Forest Plan describes the desired conditions within resort boundaries emphasizing how the dominance of the built environment in the base area should decline and become more subordinate in the middleground and background views as the scene transitions up the mountain.

### **3.5.2.3 Built Environment Image Guide**

The Forest Service *Built Environment Image Guide for National Forest and Grasslands* (BEIG; Forest Service 2001) provides direction to help ensure that buildings, other structures, and all constructed infrastructure installed, operated, or authorized by the Forest Service “incorporate[s] the principles of sustainability, reflect their place within the natural and cultural landscape, and provide optimal service to our customers and cooperators.” It employs the natural setting of specified geographic provinces to outline architectural guidelines for design and construction within each province.

Alta lies in the Rocky Mountain province. Guidelines are summarized as, “include overscaled building elements, such as oversized doors and windows, heavy timber structures, and boulders incorporated into the building base...” to “help humans relate to the overpowering scale of the landscape,” and “make the scale, color, and texture of materials correspond to the setting.” Any given developed site should reflect a consistent architectural theme.

Alta created its own site specific BEIG, tiered to the FS BEIG for the Rocky Mountain Province, to guide development of the future built environment within the Alta permit area. The site-specific BEIG incorporates practical elements of the overall direction but tailors them to meet Alta’s conditions.

Alta’s area-specific BEIG (Forest Service 2012c) provides design guidelines outlining specific materials and design practices typical of Alta architecture to be incorporated in future facilities, ensuring a more consistent theme over time. The BEIG notes that Alta “is changing from the architectural character of the existing facilities constructed between the 1950’s and 1990’s with the wood siding and sloped roofs to a more functional, durable and modern architectural style which includes flat roofs, concrete, stone and glass facade elements.” The following effects analysis cites area-specific BEIG guidance, along with Forest Plan direction, as appropriate.

### **3.5.2.4 Affected Environment**

Alta’s viewshed is limited. The ski area lies at the top of Little Cottonwood Canyon, just beyond the point that the east-west oriented canyon turns south. From Salt Lake Valley, the canyon bottom, and SR 210, Alta is screened by terrain until visitors round the corner at Hellgate, between Snowbird and Alta. Portions of the ski area are visible from higher elevations on the ridge separating Little and Big Cottonwood canyons. A small portion of the ski area’s upper elevation is visible from Mt. Superior, in the Twin Peaks Wilderness, but beyond that other wildernesses are not affected. In practical terms, Alta is visible only to people visiting Alta and Albion Basin.

In terms of assessing Alta’s scenic character, the UWCNF adopted SMS in the 2003 Forest Plan. SMS accommodates human elements into the viewscape, particularly in the Resort Natural Setting landscape character theme assigned to the resort. Development at the resort to date has been designed in consideration of the site’s scenic resources and the landscape character is reasonably intact (Figure 3-2).

The natural setting is characterized by the steep and rocky peaks over 11,000 feet and jagged, connecting ridgelines typical to the Central Wasatch. Mining and grazing peaked roughly a century ago, leaving the

slopes bare of trees for the most part. Forest vegetation has recovered to a degree, but trees are generally restricted to lower slopes and deep-soiled draws. Bare rock cliffs, outcrops, and the scree fields below them dominate the high elevations. Snow dominates the natural landscape during winter and is present in the viewscape much of the remainder of the year.

Ski area facilities are concentrated in the two base areas and dominate the foreground view from those vantage points. Buildings for food and other skier services, administration, and maintenance were designed and built over several decades, resulting in a variety of architectural styles rather than a consistent theme. Development since 2012 has followed the area-specific BEIG, resulting in a more consistent theme since that date. Parking lots may be the most visually striking features, looking down on them from SR 210. The Wildcat lot does not follow natural contours or include vegetated strips to break up its geometry.

Private-land residential and commercial development – the Town of Alta – connects the base areas but is concentrated around the Wildcat base, particularly to the west of it. There is little consistence in architecture or materials in the private-land development. While private-land development is not subject to Forest Service management direction or part of the base line for this analysis, it is an important component of Alta's landscape character and provides visual context for the permit area.



**Figure 3-2. Alta ski area.**

Constructed facilities on the mountain are more dispersed. The two on-mountain lodges, the Watson Shelter and Alf's restaurant, are screened from all but nearby vantage points by topography or vegetation, and their siting, scale, design, and materials make them blend effectively. As evident in Figure 3-2, ski

runs and lift corridors were generally laid out and cleared in a manner that blends with avalanche paths and other elements of the natural setting. Upper lift terminals are mostly below the skyline, though the tops of Sugarloaf and Supreme lifts are on ridgelines. Their distance, placement, and color make them visually subordinate in the middleground and background from the base area vantage points and SR 210.

Overall, to the casual observer, the ski area infrastructure generally blends with the natural setting in terms of form, line, color, texture, and pattern. The Resort Natural Setting landscape character is reasonably intact, but the diverse architecture and the rectangular Wildcat parking lot deviate from it. However, the entire ski area is being managed to have a High SIO as a desired condition.

### **3.5.2.5 Direct and Indirect Effects**

#### ***No-Action Alternative***

Not implementing the proposed action would have some minor effects on landscape character at Alta. Without the proposed parking lot improvements, parking on busy days would continue to be less orderly than desired, particularly in the Albion area. Curbing and paint lines would not be in place, so once the main lots were full, visitors would continue to park wherever and however they could, including along lot edges and road shoulders. This would result in a jumbled appearance and would damage adjacent vegetation. These effects would be generated by lower skier numbers at the Albion base area without the additional spaces shifted from Wildcat.

Alf's restaurant would continue to have a more cluttered appearance due to the temporary building housing the ski demo center, entryway crowding, and obstacles to snowcat grooming around the facility.

Overall, the Resort Natural Setting landscape character would remain largely intact, with visible deviations due to the variety of architectural styles dating back to the 1950s and the rectangular, undivided Wildcat parking lot. Scenic integrity would continue to be managed for a High SIO as a desired condition.

#### ***Proposed Action***

Generally, implementation of the proposed action would affect the area's landscape character in ways similar to the ski area development that has occurred over the past 78 years. Some projects would maintain the more natural aspects of the landscape character (e.g., consolidating functions in the Alf's restaurant addition). Some would have negligible visual effects (e.g., the Flora lift, summer trail work, lift replacements, and the Watson Shelter addition), and some would increase the built aspect of the landscape character. These projects include:

- The Albion base parking lot changes.
- The Baldy tram.
- The Flora lift.
- Gazex installations on Sugarloaf Mountain, East Devil's Castle, and Patsey Marley.
- The equipment storage facility at the Albion base area.

As discussed under Affected Environment, the base area parking lots, viewed from above on SR 210, are visually dominant features, particularly the Wildcat lot. Expansion of the Albion lot by about 1.3 acres, or 29 percent, would increase the visual impact of that lot. However, the Albion lot currently conforms to natural contours, and the proposed expansion would not alter that. It would continue to harmonize reasonably well with the natural landscape. Beyond that, the lot is in a base area, where the Resort Natural Setting landscape character theme recognizes that facilities are visually dominant.

The Baldy tram, or specifically the top terminal, would not be visible from either base area, but it would be seen from SR 210 through the Town of Alta at a distance of 1.5 miles. It would be clearly visible only from the mid to upper reaches of the Collins and Wildcat pods. Siting the terminal 90 vertical feet (340 horizontal feet) below the ridgeline, north of the peak of Mt. Baldy just above the Perla's area of Baldy



Chutes, would shield it from view from western vantage points, including Hidden Peak at Snowbird and down-canyon locations, as well as from the south (i.e., American Fork Canyon) and the east, including Albion Basin and beyond. Despite the tram terminal's limited viewshed, it would likely be visible from Mt. Superior, in the Twin Peaks Wilderness, a visually sensitive viewpoint according to the Forest Plan. That would be a distance of 2.4 miles. While it would not be visible from the popular Albion Meadows trail, it would be visible from the Cecret Lake and Catherine's Pass trails above their Albion Basin trailheads.

The terminal would be a simple structure, basically a bull wheel and landing platform with associated rigging. There would be no building associated with it, and the materials would be concrete and steel. Galvanizing is standard practice at Alta, so the structure would blend with the natural setting.

Overall, based on the terminal's siting, form, and colors, it would be consistent with the landscape character theme's criteria for infrastructure high on the mountain, in the background.

The top terminal of the proposed Flora lift would be near the ridgeline between Collins Gulch and Albion Basin, roughly 500 feet north of Germania Pass. While this location is near a ridgeline, it is a secondary ridge about 650 feet below Mt. Baldy. As a result, the terminal would not be visible from either base area or from SR 210 due to topographic screening. It would be visible from Mt. Superior, in the Twin Peaks Wilderness, at a distance greater than 2 miles. The Forest Plan directs that ridgeline development be "minimal." Based on the limited viewshed of this terminal and the fact that only the Supreme and Sugarloaf top terminals are on ridgelines, this project would be consistent with that direction.

The Gazex project calls for four to eight exploder installations at each of three sites: Sugarloaf Mountain, East Devil's Castle, and Patsey Marley. Each exploder is a 24-inch diameter, J-shaped, galvanized steel tube about 16 feet long extending at roughly a right angle from the rock face, with a support leg on a 4-foot-by-4-foot concrete base. One small gas storage unit (about 8 feet by 8 feet) would be installed for every four exploders. Buried lines would convey gas from the gas storage units to the exploders.

The Sugarloaf and Patsey Marley installations would be within the field of view from the Albion base area, and the Patsey Marley installations would be in the field of view from the Wildcat base. All three would be in the viewshed from various places on the Albion Basin road, and extension of SR 210. Several factors would make them blend with the natural landscape:

- Distance. The installations would be from 0.75 to 1.75 miles from the nearest base area. This alone would make objects of this size difficult for the human eye to discern.
- Color and texture. The exploder tubes and gas storage units would be acid etched to blend with the natural background.
- Form and line. The installations would exhibit a mixture of tubular and rounded rectilinear forms and straight lines, curves, and angles that, given their variety and relative size in the natural landscape, would blend in sufficiently.
- Location: The gas storage unit for the Sugarloaf installation would be on the opposite side of the ridge, above Mineral Basin, where it would be indistinguishable from the rocky background.

Based on these considerations, the Gazex installations would be consistent with the landscape character theme's criteria for infrastructure high on the mountain as they are intended to blend into the background.

The equipment storage building would be constructed in the maintenance area adjacent to the Albion base area, just off the northwest corner of the shop in a cleared area currently used to store snow plowed from the parking lot. The Albion Grill is nearby, and roads bracket both sites.

The 6,000-square-foot structure would be architecturally basic but would comply with Alta's emerging architectural character and reflect pertinent area-specific BEIG design guidelines. It would be angular and

flat roofed, incorporating stone and metal fascia, and its colors would be earth tones – gray, brown, or green. Within these BEIG parameters, it would blend with the adjacent vehicle maintenance shop.

It would comply with the BEIG siting recommendation to locate buildings on previously developed sites and would be consistent with adjacent buildings. It would be consistent with the Resort Natural Setting theme where visually dominant structures are an anticipated base-area feature but should harmonize with the natural setting.

Overall, based on this analysis, the proposed action is consistent with the Resort Natural Setting. It would not alter either the architectural variety at the ski area or the visual impact of the Wildcat parking lot, so the Resort Natural Setting landscape character would remain reasonably intact, and scenic integrity would continue to be managed for a High SIO as a desired condition.

### **3.5.2.6 Cumulative Effects**

All of the projects described in section 3.3 have some potential to interact cumulatively with the scenic effects of the proposed action. The Wildcat and Buckhorn parking lot project, Albion Meadows trail re-route, and several of Snowbird's Gad Valley improvement projects would contribute to developed character of upper Little Cottonwood Canyon's resort base areas. The Corkscrew project, Supreme replacement and Cecret removal, Quincy Mine project, some Snowbird Gad Valley improvements, and the Snowbird Zip Tour would affect middleground views. The Ballroom Traverse, Roller Coaster snowmaking, and the higher elevation Gad Valley improvements at Snowbird would fall in background views. All would add to the effects of ski area development that began in the 1940s, as the visual impact of decades of mining was beginning to heal.

These cumulative effects must be assessed in the same terms as direct and indirect scenic effects – in accordance with Forest Plan direction. Structures in base areas would become marginally more dominant, as anticipated in the Resort Natural Setting theme, but they would continue through design, siting, and material selection to harmonize with the mountain setting. The on-mountain effects would remain less visually dominant, blending more with the natural setting. Overall, the cumulative effects would be consistent with the landscape character theme and the scenic integrity of upper Little Cottonwood Canyon ski areas.

### **3.5.2.7 Mitigation**

This analysis suggested the following mitigation for the Gazex installations:

SCE-1: Acid etch the exploder tubes and gas storage units to blend with the natural background.

Beyond that, no needs for additional mitigation of scenic effects were identified as long as the projects are completed as described in Chapter 2, with the listed design criteria in place (section 2.5).

## **3.5.3 RECREATION**

### **3.5.3.1 Scope of Analysis**

- *How would the proposed infrastructural development affect skier density and circulation?*

Changing the types and configurations of lifts could adversely affect skiers' experience at Alta. Specific concerns noted by commenters are:

- Higher-capacity lift upgrades may increase crowding on ski runs.
- Eliminating the hike to Mt. Baldy with the tram may reduce its attraction.
- The Baldy tram's lift line and the top terminal of Flora lift may interrupt skier traffic at Germania Pass.

Indicators: Case-by-case assessment of the proposed infrastructural development will address these specific concerns.

### **3.5.3.2 Affected Environment**

#### ***Lift Upgrades and Skier Density***

Alta's hallmark is uncrowded skiing on minimally developed terrain. Skier density is generally significantly lower than industry standards. One important tool the ski area uses to maintain low density is adjustment of the speed at which they operate lifts. For instance, when there is sufficient snowpack, and avalanche control work has been completed, or when avalanche activity is minimal, most of the permit-area terrain is in skiable. Under these conditions, running the lifts at higher speed puts more skiers on the mountain faster, and the ample terrain accommodates them without crowding.

At the other extreme, when there is insufficient snowpack, or when there are extensive terrain closures, lift speed is dropped to avoid higher density. Skiers wait in line longer but get a less crowded experience in return. Due to their easy loading and unloading, modern detachable lifts provide much more flexibility to balance uphill and downhill capacity in this way.

Two specific areas at Alta have been identified as routinely having higher skier densities: the last steep drop to Wildcat base area from Collins Gulch, and the skiway off the main run on Sugarloaf formerly known as Glory Hole cat track. The Corkscrew grading project, completed 2 years ago, substantially alleviated the first problem. Widening of the cat track – now known as Wide Track – reduced but did not eliminate high skier densities at the second problem area.

#### ***Attraction of Mt. Baldy***

Mt. Baldy lies on the Alta/Snowbird boundary and offers primarily hike-to terrain from both ski areas. Due to high avalanche hazard and limited options for avalanche control, Mt. Baldy is rarely open to the public. On the Alta side, this terrain ranges from the experts-only Mt. Baldy Chutes to quality intermediate terrain like East Baldy and Livin' the Dream. When the peak is open, up to several hundred people per day hike to the top to ski the chutes or other runs, but because of the prevailing avalanche closure, Mt. Baldy is lightly used. Undoubtedly, the rare hike to the top limits use and is part of Mt. Baldy's attraction to some skiers.

#### ***Germania Pass Circulation***

Germania Pass is the on-mountain crossover point between the Albion and Wildcat sides of ski area, and it can be a congested place. The main lift from Wildcat base area, Collins lift, delivers skiers to the pass, as does East Baldy Traverse from the top of Sugarloaf lift. From the pass, skiers staying on the Wildcat side drop onto Ballroom Traverse, High Main Street, Mambo, and the High Traverse. To go to the Albion side of the pass, skiers can take Devil's Way. The pass is about 450 feet wide. Collins lift and entries to each of the noted runs and traverses are spaced along it.

### **3.5.3.3 Direct and Indirect Effects**

#### ***No-Action Alternative***

#### **Lift Upgrades and Skier Density**

Under this alternative, lift capacities would remain unchanged, as would skier densities in general. However, as older lifts became less reliable, down time would likely increase. As a result, skiers would either wait longer in line for stopped lifts or move to other lifts and terrain, increasing density in those alternative pods.

### **Attraction of Mt. Baldy**

Under this alternative, no lift would be installed on Mt. Baldy. Avalanche control would continue to be difficult, so closure would remain the norm. On days when the peak was open, those willing to make the hike to the summit would enjoy a unique, backcountry-type experience skiing extreme terrain within 1,500 feet of a chairlift.

### **Germania Pass Circulation**

Without the Flora lift, skiers coming to the pass from the Albion side would continue to use East Baldy Traverse. Skier traffic on the traverse merges head-on with skiers getting off the Collins lift. This would continue to create congestion on the pass.

### ***Proposed Action***

#### **Lift Upgrades and Skier Density**

Under this alternative, the Sunnyside lift would be upgraded to a chondola (i.e., both chairs and gondola cabins) or alternative, more modern design, allowing for summer/non-skier use. Design capacity of the existing lifts is about 2,500 pph, while the chondola is slated for 2,400 pph. In light of the discussion above about adjusting lift speed to match terrain availability, this difference does not translate to a notable change either way in uphill capacity or a threat of crowding on the slopes.

The other lift upgrade would be more substantial. Wildcat lift would be upgraded from a fixed-grip double rated at 1,200 pph to a fixed-grip or detachable quad with design capacity of up to 2,400 pph. The comfort and convenience of a detachable lift could result in more people riding Wildcat. However, given the degree of overlap between the Wildcat and Collins pods, many of these riders would simply be choosing to use Wildcat rather than Collins, which would not affect skier density in the combined pods. Wildcat also provides redundancy, allowing use of the Wildcat area when Collins is not operating for mechanical reasons or because of high avalanche hazard in the upper reaches of the Collins pod. In either case, Alta would continue to adjust operating speeds to ensure desired skier densities. The new higher-capacity lift would give them increased flexibility to keep the Wildcat area in use and to manage skier density ski-area wide.

Another new lift, the Flora lift, would be a 1,200-pph fixed-grip double used primarily as a transit lift rather than a skiing lift. It would replace the difficult-to-maintain East Baldy Traverse as the main way to cross from the Albion area to the Wildcat area. This could marginally increase the number of skiers making this shift, which in turn would decrease density in the more heavily used Albion area.

The last new lift would be the Baldy tram. While its primary function is to transport snow safety personnel to the top to conduct avalanche control activities, the tram could be opened for public use when snow and weather conditions were appropriate. It would be a low-capacity lift – about 150 pph – but it would provide the first lift access to Mt. Baldy terrain. As noted above, this is popular hike-to terrain that gets tracked up quickly on powder days. Public use of the tram would hasten that process, but given the lift capacity and the amount of terrain available, crowding would not be a serious threat.

In addition to lift upgrades and new lifts, this alternative includes a trail project that would alleviate the potential for increased skier density on Big Dipper run once the Supreme lift upgrade was complete. This project, referred to as the Supreme summer trail work, includes two projects for creating summer-groomable, intermediate runs down from Supreme. The first project is widening the existing Devil's Castle service road. The second is to develop a new graded ski run starting in the Challenger area, moving skier's left through the re-contoured erosion gullies, and hence down Sleepy Hollow to lower Big Dipper. This would alleviate crowding on upper Big Dipper and make the Supreme pod more functional overall.

Collectively, these lift upgrades and additions would make skier dispersal more efficient, leading to more uniform use of available terrain. While skier densities could increase somewhat in localized areas, such as

Mt. Baldy and the runs off Peruvian Ridge that are accessed most easily by Wildcat lift, the overall effect would be more efficient management of skier density ski-area wide.

#### **Attraction of Mt. Baldy**

It is uncertain under what circumstances the tram from Germania Pass to the top of Mt. Baldy would be open to the public, or how often those circumstances might occur. With the tram providing ski patrol access for much improved avalanche control, Mt. Baldy would open more frequently. Once ski patrol access needs were met and the peak was open, the tram would probably be opened to the public. Despite its low capacity (proposed 150 pph), the tram would likely add to the number of skiers on the mountain on open days. The combination of more open days, more skiers on the mountain when it was open, and the option of lift access rather than a hike would undoubtedly detract from the experience of those who have appreciated the rare opportunity to hike and ski the peak in the past.

#### **Germania Pass Circulation**

The bottom terminal of the Baldy tram would be at the southern end of Germania Pass, south of the lower end of East Baldy Traverse, and south of the upper ends of Main Street and Ballroom Traverse. Circulation space would be limited, so the loading maze would need to be kept close to the terminal and out of the way. This is an operational issue of the type that ski areas deal with routinely, but several facts mitigate the potential constraint. First, the tram will often not be open to public use, so no maze will be necessary. Second, with a capacity of 150 pph, the lift will not require a large maze when it is open to the public. Third, managing such circulation issues are a routine aspect of ski area operations, and signage and rope lines should be sufficient to maintain adequate circulation.

The top terminal of the Flora lift would be beyond the other end of the pass, about 300 feet north and up the ridge from the Collins lift top terminal. Overall, this arrangement should improve rather detract from skier circulation at Germania Pass. First, the lift terminal would be out of the way. Second, the lift would add redundancy to the East Baldy Traverse in conveying skiers from the Sugarloaf pod to the Wildcat side. Skiers wishing to make that shift would cross Germania Pass in any case. Third, skiers unloading from the Flora lift and heading for the Wildcat side would merge with the flow of skiers getting off Collins rather than approaching from the opposite direction as is the case with skiers coming off East Baldy Traverse.

Overall, the tram maze could be managed to have little or no effect on circulation at Germania Pass, and the Flora lift should improve it somewhat.

### **3.5.3.4 Cumulative Effects**

#### ***Lift Upgrades and Skier Density***

Several of the projects discussed in section 3.3 would have positive cumulative effects in terms of skier density. The Corkscrew project increases skier flow through a typically congested area above the steeper drop into the Wildcat base area. Similarly, the Ballroom Traverse improvements reduce congestion on Germania Pass and improve access to another underutilized area. The Supreme lift replacement project increased lift access to an underutilized portion of the ski area, reducing density elsewhere on the mountain. Rollercoaster snowmaking will improve skier circulation and distribution through an existing bottleneck when natural snow cover is lacking.

#### ***Attraction of Mt. Baldy***

None of the actions described in section 3.3 would have any discernable effect on this issue, so there is no potential for a cumulative impact.

### ***Germania Pass Circulation***

The only project in section 3.3 with the potential to interact cumulatively with the proposed action in terms of this issue is the Ballroom Traverse improvements. Making it easier for skiers to access the Ballroom area from Germania Pass reduces congestion on the pass, a positive cumulative effect.

### **3.5.3.5 Mitigation**

This analysis suggested the following mitigation for potential skier density increases:

REC-1: Alta will continue to operate lifts at speeds that are appropriate for the conditional capacity of the terrain, regardless of the design capacity of the lifts.

## **3.5.4 SAFETY**

### **3.5.4.1 Scope of Analysis**

- *Does lift access to Mt. Baldy pose a safety risk?*

Some of the runs on Mt. Baldy, such as the Baldy Chutes, are experts-only terrain that must be hiked to now, which limits use. The tram may result in skiers without the requisite skills attempting to ski this terrain and being injured.

Indicators: Qualitative assessment of conditions under which the tram would be open for public use and the practices Alta would implement to limit access to hazardous terrain.

- *Would sympathetic avalanche releases from proposed Patsey Marley Gazex installations pose a safety risk for backcountry skiers in Wolverine Cirque?*

Wolverine Cirque lies on the other side of Patsey Marley ridge from Alta. It is one of the more heavily used backcountry skiing venues in the Wasatch due to its easy access from Alta and Brighton. The proposed Gazex installations on the Alta side of Patsey Marley could potentially trigger avalanches on the other side, posing a risk to backcountry skiers.

Indicators: Qualitative assessment of the risk of Gazex installations triggering sympathetic releases across the ridge.

### **3.5.4.2 Affected Environment**

#### ***Mt. Baldy***

Mt. Baldy offers popular hike-to terrain, accessible primarily via a boot-pack track up the east ridge from Sugarloaf lift at Alta and Baldy Express at Snowbird. Another track up the southwest ridge provides access from Snowbird's tram. The north-facing Baldy Chutes are expert terrain. After snowstorms, Alta's first focus on Mt. Baldy is opening the chutes to protect popular lower-angle terrain below, and lines of skiers form in anticipation. Subsequent control efforts allow the rest of Baldy to be opened, and the entire peak is skied. As discussed above (sections 2.4.2.1 and 2.6), dependence on artillery and Avalaunchers makes avalanche control difficult and time consuming, so Mt. Baldy is generally closed for much of the season. Nevertheless, demand for Mt. Baldy's experts-only terrain is high.

#### ***Wolverine Cirque***

Wolverine Cirque is a large, steep bowl on the north side of Mount Wolverine. Backcountry skiers most often access the peak from Brighton's Millicent lift or up Grizzly Gulch from Alta. The cirque's high angle chutes provide some of the most technically difficult and hazardous terrain in this popular touring area. High avalanche hazard further limits its use until the snowpack becomes stable. Spring conditions initiate an increase in use.

The western side of the cirque is across the ridge from the Patsey Marley area where Gazex avalanche control systems are proposed. Currently, Alta conducts conventional avalanche-control activities on Patsey Marley under a special-use permit specifically for this purpose. Avalaunchers and occasionally helicopter-delivered explosives are used to target defined starting zones. This provides protection primarily for Alta's most extensive beginner terrain, the Crooked Mile run, and the Sunnyside and Albion lifts that serve it.

### **3.5.4.3 Direct and Indirect Effects**

#### ***No-Action Alternative***

##### **Mt. Baldy**

Under this alternative, safety issues on Mt. Baldy would not change. The lack of efficient ski patrol access to the top would continue to slow avalanche control operations necessary to open Baldy Chutes and the rest of the mountain. Once control work was done, skier safety would depend, as it does now, on skier education, rope lines, and signage. Skiers capable of hiking up Mt. Baldy would continue to face the inherent risk associated with that type of terrain.

##### **Wolverine Cirque**

Avalanche-control activities on Patsey Marley and the effect they have on the safety of Wolverine Cirque skiers will remain unchanged. The cirque's inherently high avalanche hazard will limit use until conditions stabilize naturally. In order to hasten the natural stabilizing process on Patsey Marley, Alta will continue to use explosives delivered by Avalaunchers or helicopters. Given the distance from Patsey Marley starting zones to those in the cirque, the intervening ridge, and the nature of the explosives use (i.e., energy applied to the snow surface), impact on Wolverine Cirque from Patsey Marley avalanche control is currently minimal.

#### ***Proposed Action***

##### **Mt. Baldy**

The proposed project of concern is the Baldy tram. While the purpose of this low-capacity (i.e., roughly 150 pph) lift is to transport ski patrol personnel conducting avalanche control operations, it will be used by the public when 1) Baldy terrain is open, and 2) there is capacity available beyond ski patrol demands. As a result, public use of the inherently dangerous Baldy Chutes could increase, with a corresponding increase in the likelihood of injuries.

This is a safety management issue with which Alta has decades of experience. Skier education, closures, rope lines, and signage have all been incorporated into an effective risk-management system at Alta, and lift access to Mt. Baldy would not be a qualitative change in the demands on that system. Skiers are always instructed to follow the Skier Responsibility Code, and the terrain on Mt. Baldy would be managed the same way other "most difficult" terrain is.

The tram would also have download capability, providing a way down for skiers who reach the summit and change their minds. That option does not currently exist.

Overall, the increase in injury risk posed by the Baldy tram would be minor and manageable, and it would be offset by the greater speed and efficiency of avalanche control operations made possible by the tram.

##### **Wolverine Cirque**

The issue here is whether the proposed Gazex avalanche control systems would increase the avalanche risk to skiers in Wolverine Cirque. As discussed above under Affected Environment, Alta has undertaken avalanche control operations on Patsey Marley for decades with no notable effect on snow safety in the cirque. The Gazex installations would function in much the same way as the Avalaunchers and helicopter-delivered explosives currently in use; all of these methods deliver similar amounts of tightly focused

explosive energy to the snow surface in defined avalanche starting zones. As a result, the new, higher-tech systems should not differ in their potential effects on snow stability in the cirque.

As discussed above, Wolverine Cirque is inherently avalanche prone, which limits skier use to periods of stable snowpack. If either the current or proposed avalanche control methods on Patsey Marley were to trigger a release in the cirque, it would be under conditions of extreme instability when skier use of the cirque was highly unlikely.

Based on these considerations, the proposed Gazex installations on Patsey Marley would pose no increased risk to backcountry skiers in Wolverine Cirque.

#### **3.5.4.4 Cumulative Effects**

Of the cumulative actions identified in section 3.3, only the Shrontz Utility Right-of-Way project has the potential for cumulative safety impacts. While the proposed Gazex installations on Patsey Marley would be further up the ridge and east of the Patsey Marley Hill subdivision, the more timely and efficient avalanche control provided by the installations could reduce avalanche risk to the subdivision. Reducing the risk to a larger number of people would be a positive cumulative effect.

The Supreme lift replacement could marginally increase the number of skiers in Wolverine Cirque. While Supreme is not a major access point for the cirque, some skiers do hike north then west from Supreme to Mount Wolverine. The upgraded lift could increase the number of skiers choosing this option to access the cirque, but no notable change is likely.

#### **3.5.4.5 Mitigation**

This analysis did not indicate the need to mitigate any safety impacts.



## **CHAPTER 4: CONSULTATION AND COORDINATION**

### **4.1 INTRODUCTION**

This chapter identifies the agencies and other entities consulted during the preparation of this EA.

### **4.2 PUBLIC SCOPING AND NOTICE AND COMMENT ON THE PROPOSED ACTION**

This proposed action would implement a land management plan and is not authorized under the Healthy Forest Restoration Act. As a result, it is subject to subparts A and B of the Project-level Predecisional Administrative Review Process (36 CFR 218).

The UWCNF issued a public scoping notice summarizing Alta's proposed improvement projects (the proposed action) and inviting comments regarding the scope of the associated NEPA review. The improvement projects included in the proposed action were described in detail in the *Description of the Proposed Action: Alta MDP Improvements Projects* which accompanied the scoping notice. The proposed action included 12 projects which Alta proposed to implement within the next five years. Three of the projects reflect relatively minor changes from the master development plan update (MDP update).

The scoping notice was mailed to the agencies, organizations, and individuals on the UWCNF mailing list. The notice was also posted on the UWCNF website and made available on CD or in hard-copy form to anyone requesting it.

The scoping period formally began on April 26, 2016, when the UWCNF's legal notice was published in the *Salt Lake Tribune* (Newspaper of Record), and closed on May 26, 2016. Responses were received from 1 agency, 3 organizations, and 123 individuals. The scoping notice and responses are included in the project record.

On January 10, 2017, the UWCNF issued a public scoping notice for the proposed replacement of the Supreme lift and associated removal of the Cecret lift and invited comments regarding the scope of the associated NEPA review. Two changes were made to this project in response to scoping comments received on the larger proposal and further field review of the lift site. First, Alta revised the alignment of the new Supreme lift to avoid potential wetland impacts and circulation concerns. Second, the UWCNF withdrew the project from the proposed action to authorize it separately. The Forest Service authorized this portion of the project under a categorical exclusion (CE), precluding it from more detailed NEPA review. The Forest Service concluded that there were no extraordinary circumstances relating to this portion of the project. The Decision Memo was signed on February 6, 2017.

In accordance with the Forest Service's Pre-Decisional Administrative Review Process (36 CFR 218), the UWCNF issued a Notice of Opportunity to Comment on the proposed action. The full-text preliminary EA was released for review and comment. The Notice of Opportunity to Comment was mailed to the agencies, organizations, and individuals on the UWCNF mailing list. It was also posted on the UWCNF project website and made available on CD or in hard-copy form to anyone requesting it.

The 30-day comment period began on October 20, 2017, when a legal notice was published in the *Salt Lake Tribune*, and closed on November 20, 2017. A total of 214 responses were received, including two from agencies, three from organization, and 209 from individuals. A report was prepared listing the name, address, response number, and comment topics for each response, then responding how each comment would be addressed in this NEPA process. The Notice of Opportunity to Comment, all responses, and the report are included in the project record.

## **4.3 OTHER CONSULTATION**

Other consultation, completed in compliance with regulations and agreements currently in place, included:

- Consultation with the Utah SHPO, in accordance with section 106 of the National Historic Preservation Act.
- Government-to-government consultation with area Native American Tribes.
- Coordination with Salt Lake City Department of Public Utilities per the memorandum of understanding for joint management of the municipal watershed.

## **CHAPTER 5: LIST OF PREPARERS**

Table 5-1 identifies the UWCNF and contractor personnel involved in preparation of this EA.

<b>Table 5-1 List of preparers associated with this document.</b>		
<b>Name</b>	<b>Position</b>	<b>Contribution</b>
<b>Forest Service Team</b>		
Bekee Hotze	District Ranger	Project oversight.
Shawnee Hinman	Project Manager/Winter Sports	Project management; ID team coordination.
Pete Gomben	Environmental Coordinator	Project oversight and QA/QC review.
Karen Hartman	Wildlife Biologist	Review of wildlife analysis.
Tom Flanigan	Archaeologist	Review of heritage resources analysis.
Stacey Weems	Soil Scientist	Review of watershed analysis.
Justin Robinson	Fisheries Biologist	Review of analysis pertaining to fisheries and aquatic organisms.
Charlie Condrat	Hydrologist	Review of watershed analysis.
Brendan Waterman	Hydrologist	Review of watershed analysis.
Dave Hatch	Landscape Architect	Review of scenic resources analysis.
Michael Duncan	Botanist	Review of vegetation analysis.
<b>Cirrus Ecological Solutions, LC Team</b>		
Scott Evans	Project Manager	Project management, NEPA oversight, and QA/QC review.
Neal Artz	NEPA Specialist	NEPA oversight and QA/QC review. Preparation of recreation, safety, and scenic resources analyses.
Eric Duffin	Hydrologist	Preparation of watershed analysis.
Tim Royer	Botanist and Wetland Specialist	Preparation of vegetation analysis.
Matt Westover	Wildlife Biologist	Preparation of wildlife and transportation analysis.
Ken Cannon	Director, USU Archaeological Services	Preparation of heritage resources analysis.
Judy Seamons	Document Production	Document production and 508 compliance.

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## **APPENDIX A – MITIGATION MEASURES**

Mitigation measures identified through this analysis include the following:

WAT-1: Implement the BMPs listed in Table A-1.

WAT-2: Obtain appropriate COE, Utah Division of Water Rights, Salt Lake County Health Department, and Salt Lake City Department of Public Utilities permits and authorizations prior to disturbing wetlands or altering stream channels.

WAT-3: Mitigate wetland and stream channel impacts in accordance with the permits and authorizations noted above and avoid any net loss of wetlands.

VEG-1: Delineate the boundaries of nearby rockcress draba populations on Sugarloaf Mountain using pin flags prior to construction of the Gazex system. Avoid any activity near the delineated boundary.

VEG-2: Monitor and treat noxious and non-native invasive plant infestations at all areas disturbed by the proposed action for a period of at least three years following construction.

VEG-3: Provide educational signage or other material to the public about minimizing disturbances in alpine ecosystems and the need to protect them by staying on trails or on snow cover when that is not possible.

WIL-1: Construction and refueling helicopters operating during the nesting season (April–June) must approach, and depart, cliff areas from behind and above the cliffs to avoid flushing nesting falcons.

WIL-2: Do not clear, cut, burn, drive on, or park equipment on vegetation that may harbor nesting birds during the breeding season (May 15–July 15). If this is not possible, survey for nesting birds no more than 10 days prior to commencing work. If no nests are found, project activities may proceed. If nests are found, contact the Forest Service permit administrator.

CUL-1: A qualified archaeologist will monitor all surface disturbing activities during all ground-disturbing activities associated with expansion of the Albion parking lot to avoid potential effects on the historic Alta Townsite.

SCE-1: Acid etch the exploder tubes and gas storage units to blend with the natural background.

REC-1: Alta will continue to operate lifts at speeds that are appropriate for the conditional capacity of the terrain, regardless of the design capacity of the lifts.

**Table A-1. Best Management Practices that would be followed under the proposed action.<sup>1</sup>**

<b>FS National Core BMP Code and Name</b>	<b>Practice Description</b>
<b>AQECO-2: Operations in Aquatic Ecosystems</b>	<ul style="list-style-type: none"> <li>• Coordinate stream channel, shoreline, lake, pond, and wetland activities with appropriate Federal, State, County, and City agencies.</li> <li>• Incorporate Clean Water Act (CWA) 404 permit requirements and other Federal, State, and local permits or requirements into the project design and plan.</li> <li>• Locate access and staging areas near the project site but outside of work area boundaries, AMZs, wetlands, and sensitive soil areas.</li> </ul>

**Table A-1 (cont'd). Best Management Practices that would be followed under the proposed action.<sup>1</sup>**

<b>FS National Core BMP Code and Name</b>	<b>Practice Description</b>
	<ul style="list-style-type: none"> <li>• Refuel and service equipment only in designated staging areas.</li> <li>• Schedule construction or maintenance operations in waterbodies to occur in the least critical periods to avoid or minimize adverse effects to sensitive aquatic and aquatic-dependent species that live in or near the waterbody.</li> <li>• Promptly install and appropriately maintain spill prevention and containment measures.</li> <li>• Conduct operations during dry periods.</li> <li>• Return clean flows to channel or waterbody downstream of the activity.</li> </ul>
<b>FAC-2: Facility Construction and Stormwater Control</b>	<ul style="list-style-type: none"> <li>• Obtain Clean Water Act (CWA) 402 stormwater discharge permit coverage from the appropriate State agency or the U.S. Environmental Protection Agency (EPA) when more than 1 acre of land will be disturbed through construction activities.</li> <li>• Control, collect, detain, treat, and disperse stormwater runoff from the site.</li> </ul>
<b>FAC-6: Hazardous Materials</b>	<ul style="list-style-type: none"> <li>• Manage the use, storage, discharge, or disposal of pollutants and hazardous or toxic substances generated by the facility in compliance with applicable regulations and requirements.</li> <li>• Respond to hazardous materials releases or spills using the established site-specific contingency plan for incidental releases and the Emergency Response Plan for larger releases.</li> <li>• Ensure that hazardous spill kits are adequately stocked with necessary supplies and are maintained in accessible locations.</li> </ul>
<b>FAC-9: Pipelines, Transmission Facilities, and Rights-of-Way</b>	<ul style="list-style-type: none"> <li>• Co-locate pipelines and transmission lines with roads or their rights-of-way where practicable.</li> </ul>
	<ul style="list-style-type: none"> <li>• Require suitable and regular inspections, testing, and leak detection systems to identify and mitigate pipeline deformities and leaks.</li> </ul>
<b>FAC-10: Facility Site Reclamation.</b>	<ul style="list-style-type: none"> <li>• Remove unneeded structures.</li> <li>• Establish effective ground cover on disturbed sites to avoid or minimize accelerated erosion and soil loss.</li> </ul>
<b>REC-10: Ski Runs and Lifts</b>	<ul style="list-style-type: none"> <li>• Avoid wetlands and riparian areas when locating ski runs and lifts wherever practicable.</li> <li>• Locate ski runs and lifts on stable geology and soils to minimize risk of slope failures.</li> <li>• Use yarding equipment suitable to the steepness of the terrain to avoid or minimize adverse effects to soil and water quality.</li> </ul>

**Table A-1 (cont'd). Best Management Practices that would be followed under the proposed action.<sup>1</sup>**

<b>FS National Core BMP Code and Name</b>	<b>Practice Description</b>
	<ul style="list-style-type: none"> <li>• Clear and construct ski runs and lift lines in sections to limit the area of exposed disturbed soil at any one time.</li> <li>• Minimize grading or re-contouring of hill slopes to maintain intact soil horizons and infiltrative properties.</li> <li>• Cut stumps flush with soil surface or grind in place instead of grubbing when clearing trees from ski runs wherever practicable.</li> <li>• Use low-pressure construction and maintenance equipment whenever practicable to reduce surface impact on steep slopes.</li> <li>• Stockpile biologically active topsoil removed during excavation for use in reclamation. Store stockpiled topsoil separately from other vegetative slash, soil, or rock and protect from wind and water erosion, unnecessary compaction, and contaminants.</li> <li>• Use suitable measures to direct overland flow on slopes into areas with intact soil horizons to encourage infiltration and disconnect overland flow from waterbodies.</li> <li>• Prohibit traffic on disturbed areas during periods of excessive soil moisture, precipitation, or runoff.</li> <li>• Perform additional revegetation or erosion control as needed to protect water quality and soil integrity.</li> </ul>
<b>REC-12: Ski Area Facilities</b>	<ul style="list-style-type: none"> <li>• Avoid wetlands and riparian areas to the extent practicable when locating ski area facilities.</li> <li>• Locate ski area facilities on stable geology and soils to minimize risk of slope failures.</li> <li>• Avoid contaminating return water with chemicals or other pollutants.</li> </ul>
	<ul style="list-style-type: none"> <li>• Use applicable practices of BMP Road-2 (Road Location and Design), BMP Road-3 (Road Construction and Reconstruction), BMP Road-4 (Road Operations and Maintenance), BMP Road-8 (Snow Storage and Removal), and BMP Road-9 (Parking Sites and Staging Areas) for designing, constructing, maintaining, and operating roads and parking areas at ski area facilities.</li> </ul>
<b>ROAD-3: Road Construction and Reconstruction</b>	<ul style="list-style-type: none"> <li>• Do not place such materials on slopes with a risk of excessive erosion, sediment delivery to waterbodies, mass failure, or within the AMZ.</li> <li>• Do not permit sidecasting within the AMZ, avoid or minimize excavated materials from entering waterbodies or AMZs.</li> </ul>
<b>ROAD-7: Stream Crossings</b>	<ul style="list-style-type: none"> <li>• Design the crossing to pass a normal range of flows for the site.</li> </ul>

<b>Table A-1 (cont'd). Best Management Practices that would be followed under the proposed action.<sup>1</sup></b>	
<b>FS National Core BMP Code and Name</b>	<b>Practice Description</b>
	<ul style="list-style-type: none"> <li>• Use suitable measures to avoid or minimize culvert plugging from transported bedload and debris.</li> <li>• Construct at or near natural elevation of the streambed to avoid or minimize potential flooding upstream of the crossing and erosion below the outlet.</li> </ul>
<b>ROAD-8: Snow Removal and Storage</b>	<ul style="list-style-type: none"> <li>• Develop a snow removal plan for roads plowed for recreation, administrative, or other access to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.</li> <li>• Store snow in clearly delineated pre-approved areas where snowmelt runoff will not cause erosion or deliver snow, road de-icers, or traction-enhancing materials directly into surface waters.</li> </ul>
<b>ROAD-9: Parking and Staging Areas</b>	<ul style="list-style-type: none"> <li>• Use applicable practices of BMP Fac-2 (Facility Construction and Stormwater Control) for stormwater management and erosion control when designing, constructing, reconstructing, or maintaining parking or staging areas.</li> <li>• Use and maintain suitable measures to collect and contain oil and grease in larger parking lots with high use and where drainage discharges directly to streams.</li> </ul>
<b>ROAD-10: Equipment Refueling and Servicing.</b>	<ul style="list-style-type: none"> <li>• Use suitable measures to avoid spilling fuels, lubricants, cleaners, and other chemicals during handling and transporting.</li> <li>• Remove service residues, used oil, and other hazardous or undesirable materials from NFS land and properly dispose them as needed during and after completion of the project.</li> <li>• Report spills and initiate suitable cleanup action in accordance with applicable State and Federal laws, rules, and regulations.</li> </ul>
<b>VEG-1: Vegetation Management Planning</b>	<ul style="list-style-type: none"> <li>• Evaluate and field verify site conditions in the project area to design a transportation plan associated with the mechanical vegetation treatments to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources.</li> </ul>
<b>VEG-2: Erosion Prevention and Control</b>	<ul style="list-style-type: none"> <li>• Maintain the natural drainage pattern of the area wherever practicable.</li> <li>• Control, collect, detain, treat, and disperse stormwater runoff from disturbed areas.</li> <li>• Divert surface runoff around bare areas with appropriate energy dissipation and sediment filters.</li> <li>• Stabilize steep excavated slopes.</li> </ul>

**Table A-1 (cont'd). Best Management Practices that would be followed under the proposed action.<sup>1</sup>**

<b>FS National Core BMP Code and Name</b>	<b>Practice Description</b>
<b>REC-12: Ski Area Facilities</b>	<ul style="list-style-type: none"> <li>• Use applicable practices of BMP Road-3 (Road Construction and Reconstruction), BMP Road-4 (Road Operations and Maintenance), BMP Road-8 (Snow Storage and Removal), and BMP Road-9 (Parking Sites and Staging Areas) for designing, constructing, maintaining, and operating roads and parking areas at ski area facilities.</li> </ul>
<sup>1</sup> Selected from the <i>National Best Management Practices for Water Quality Management on National Forest System Lands</i> (Forest Service 2012a).	