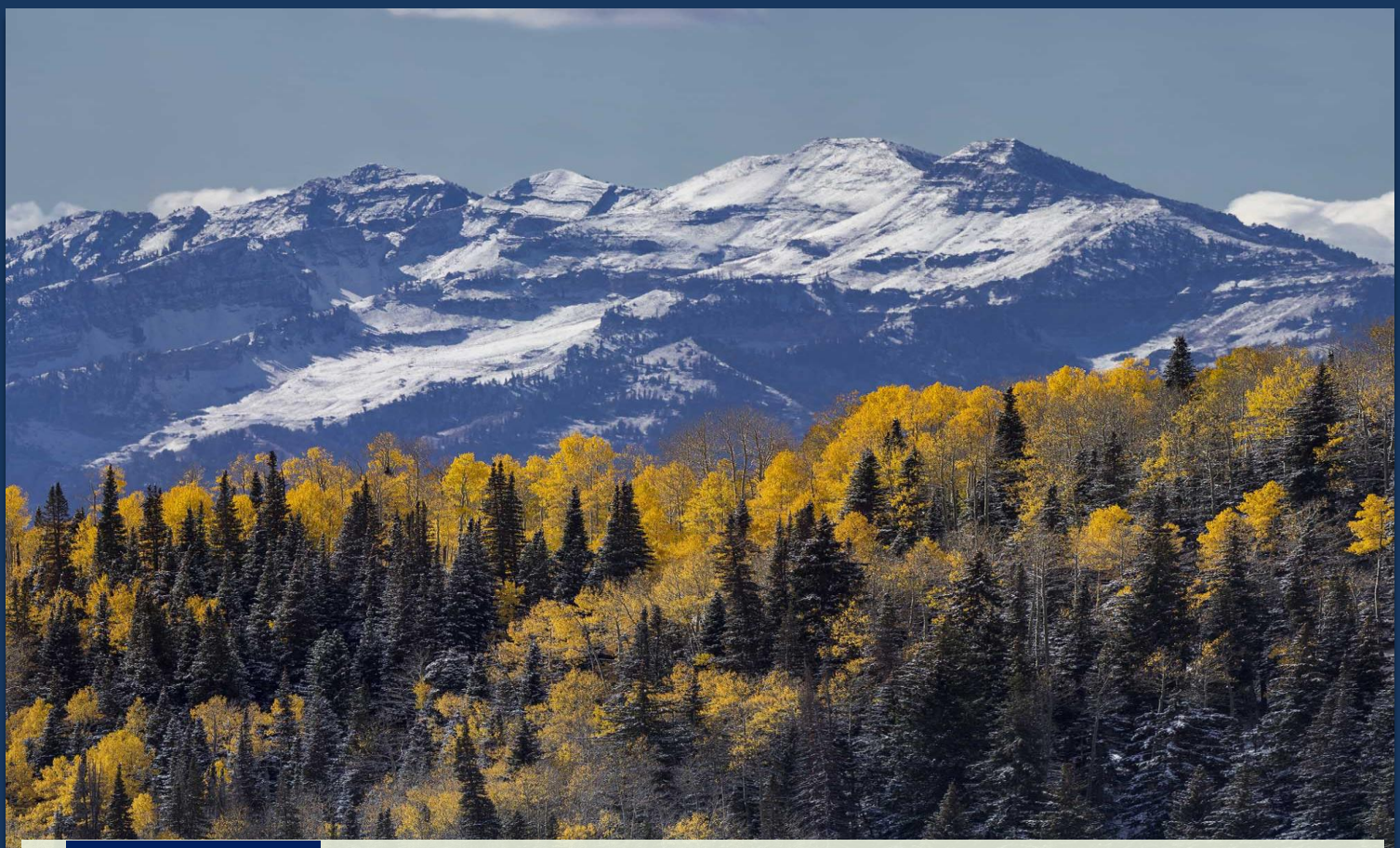


UTAH OPEN LANDS

BONANZA FLAT CONSERVATION AREA

RESOURCE INVENTORY

Table of Contents

Introduction……3

Vegetative Analysis……..4

Wildlife Analysis……17

Recreational Analysis……29

Scenic Analysis……37

Mining Heritage & Hazards……39

Water Resources……41

Human Welfare & Safety……48

Appendix
Fact Sheets
Plant List
Winter Summary

Introduction

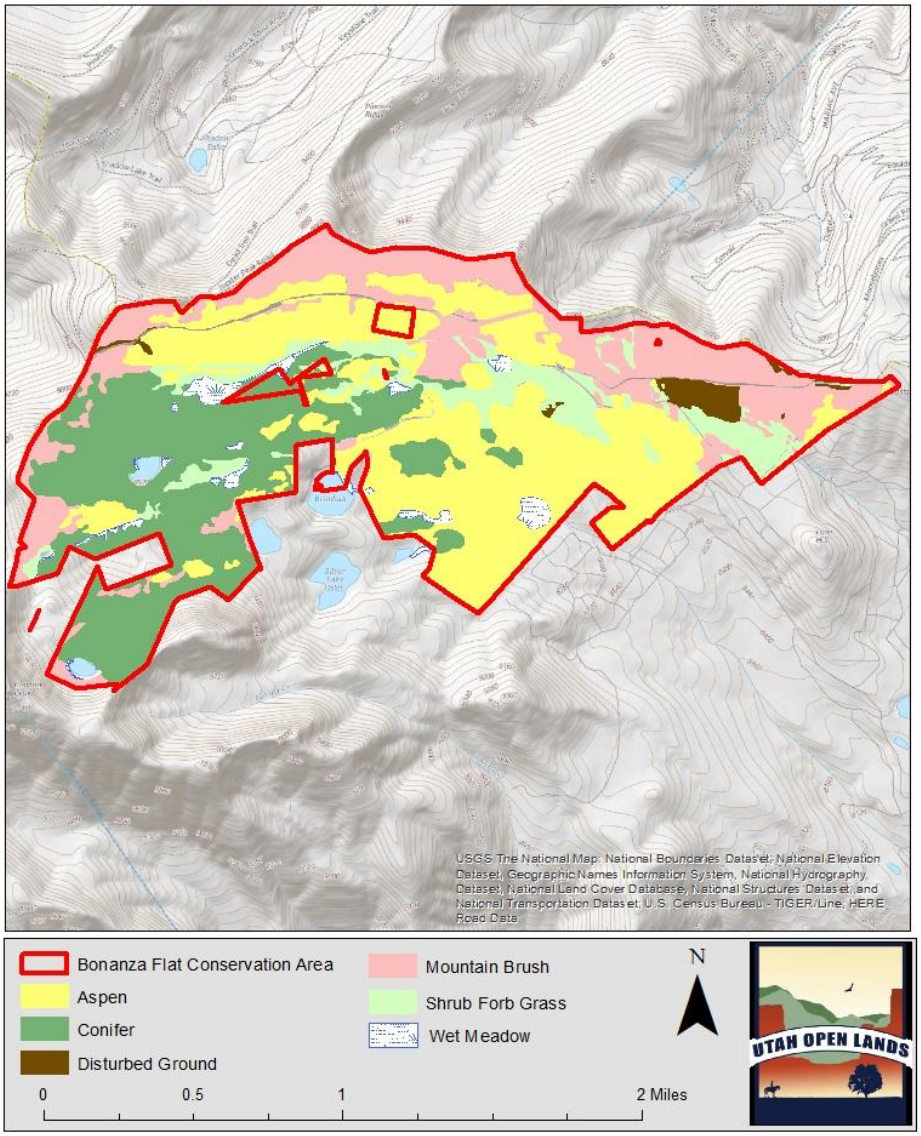
The Bonanza Flat Conservation Area Resource Inventory (Inventory) consists of 8 sections that provide information regarding current uses, historic uses, and scientific analysis of the conservation values found on Bonanza Flat. The Inventory provides sets of data which allow for a greater understanding of the current conditions on the property and the potential trajectory of the conservation values based on those conditions. Beyond aiding in establishing a baseline of data that can be utilized as applied to the baseline documentation that will accompany the conservation easement, the Inventory provides basic building blocks for decision making. The Inventory provides a rudimentary explanation of what is taking place on the property and the existing affects. Understanding the effects is a critical component of determining permitted and restricted uses for the conservation easement and guidance for the adaptive management plan and its eventual framework. Its function is to aid the City Council, staff and identified stakeholders in making the aforementioned decisions.

Bonanza Flat Conservation Area is already a beloved landscape as evidenced by the fundraising effort that brought communities and jurisdictional entities together. As much as it is beloved, it is in danger of becoming overly loved. Achieving parity on balance of the conservation values may be more a function of identifying distinct resource areas rather than ensuring that all uses, and all conditions remain constant for all areas. An overarching value of Bonanza Flat is its unique characterization as a watershed area. It is a locally significant value. The ability to store snowpack and the flat nature of the property allows for natural ponding and both intermittent and perennial water features. From this fact stems an initial conservation value conflict. Certain recreational uses will be in conflict with watershed protection. Determining whether certain recreational uses should be restricted where resource protection would be impaired by allowing these uses to occur or occur in the same unregulated manner will be an important component of conservation easement planning and adaptive management plan decisions. Solution based decisions like shifting recreational access points and providing increased recreational infrastructure (i.e. trailhead facilities) will accommodate recreational uses through a higher level of management and will ensure that cumulative impacts and increasing conflicts with other conservation values will be lessened. Fundamentally, together with PC staff, UOL and the identified stakeholders the City will need to determine the degree of use beyond simply the type of use to sustain a healthy carrying capacity for Bonanza Flat and the protection of all conservation values.

Vegetative Analysis

The vegetation provides a basic value for each conservation value from recreation to scenic to heritage values. Although many smaller plant natural communities exist within the Property, five clearly distinguishable natural communities occur throughout the Property: Aspen, Conifer, Mountain Brush, Wet Meadow, and a mixture of Shrubs, Forbs, and Grasses, each containing its own unique species diversity. A large area of Disturbed Ground also exists on the eastern edge of the property. The vegetation on the property varies greatly due to the various substrate types, changes in elevation, slope, aspect and steepness, and available moisture.

Landcover Map
Bonanza Flat Conservation Area



Aspen Forest Natural Community

The Aspen (*Populus tremuloides*) Forest community is generally found bordering Mountain Brush and Conifer communities. Its understory generally consists of shrubs and forbs that thrive in the shade, such as Gooseberry Currant (*Ribes montigenum*), Sweetcicely (*Osmorhiza berteroi*), Aspen Bluebells (*Mertensia arizonica*), and Giant Red Indian Paintbrush (*Castilleja miniata*).

From left to right: Quaking Aspen (*Populus tremuloides*), Gooseberry Currant (*Ribes montigenum*), Giant Red Indian Paintbrush (*Castilleja miniata*).

Conifer Forest Natural Community

This community is easily distinguished from the rest of the property by a dominant over-story of Douglas fir (*Pseudotsuga menziesii*), Subalpine Fir (*Abies lasiocarpa*), and Engelmann Spruce (*Picea engelmannii*). The interior of the conifer community is mostly bare ground with a few small shrubs such as Creeping Oregon Grape (*Mahonia repens*) and Mountain-lover (*Pachystima myrsinites*), and fewer forbs due low light penetration. These forests exist in a climax successional state.

From left to right: Douglas Fir (*Pseudotsuga*) *menziesii*), Subalpine Fir (*Abies lasiocarpa*), Engelmann Spruce (*Picea engelmannii*), Oregon Grape (*Mahonia repens*).

Mountain Brush Natural Community

This diverse community is typically dominated by Mountain Big Sagebrush (*Artemisia tridentata* ssp. *vaseyana*) or Western Snowberry (*Symphoricarpos oreophilus*). The interspaces between shrubs is filled with various grasses and forbs.

From left to right: Mountain Big Sagebrush (*Artemisia tridentata* ssp *vaseyana*) Western Snowberry (*Symphoricarpos oreophilus*).

Shrubs-Forbs-Grasses Natural Community

The low-lying, gradually sloping areas of the Property consists of areas dominated by low-growing shrubs such as Parsnipflower Buckwheat (*Eriogonum heracleoides*), Mountain Snowberry (*Symphoricarpos oreophilus*), forbs such as Sticky Geranium (*Geranium viscosissimum*), Manyflower Stickseed (*Hackelia floribunda*), and grasses such as Lettermann's Needlegrass (*Stipa lettermannii*), and Prairie Junegrass (*Koeleria macrantha*).

From left to right: Sticky Geranium (*Geranium viscosissimum*), Manyflower Stickseed (*Hackelia floribunda*), Whorled buckwheat (*Eriogonum heracleoides)*.

Wet Meadow Natural Community

These areas are the moist or riparian areas that exist on the Property along the streams, surrounding the lakes and in areas where spring snowmelt accumulates into shallow ponds and wet meadows. Areas such as these rank with wetlands as the highest priority habitats for conservation. They are the areas that are sensitive to human activity and can be quickly and unintentionally altered or destroyed by regular visitation and especially by fragmentation. They are comprised of many species of Sedge (*Carex* spp.), forb species such as Marsh Violet (*Viola palustris*), Neckweed (*Veronica peregrina*) and Threeleaf Lewisia (*Lewisia triphylla*), and various species of Willow (*Salix* spp.) and Currant (*Ribes* spp.).

From left to right: California False Hellebore (*Veratrum californicum*), Marsh violet (*Viola palustris).*

False Hellebore

False Hellebore, sometimes referred to as Wild Corn or Cow Cabbage, grows in damp areas on meadows and hillsides at high elevations and is present on the Bonanza Flat property. It emerges in the spring after snow melt and reaches a height of 1.5 to 2 meters. Leaves may measure 20 to 30 cm long and 7 to 15 cm broad. Cream-colored flowers grow in clusters at the top of a single unbranched stalk that resembles corn in July and August, followed by seed production in September. False hellebore is poisonous from the time it starts to grow until after it is killed by freezing, but toxicity decreases as plants mature. The roots are 5 to 10 times as poisonous as leaves or stems.

Although seen as a worthless invasive weed targeted for eradication by ranchers, the toxic roots of the native plant hold compounds that could help combat cancer. It is currently being tested for future use as a treatment for a highly malignant skin cancer called basal cell nevus syndrome, or Gorlin syndrome. As false hellebore is tough to grow in an agricultural setting, it is currently being obtained for testing from its wild environments.

Disturbed Ground & Invasive Weeds

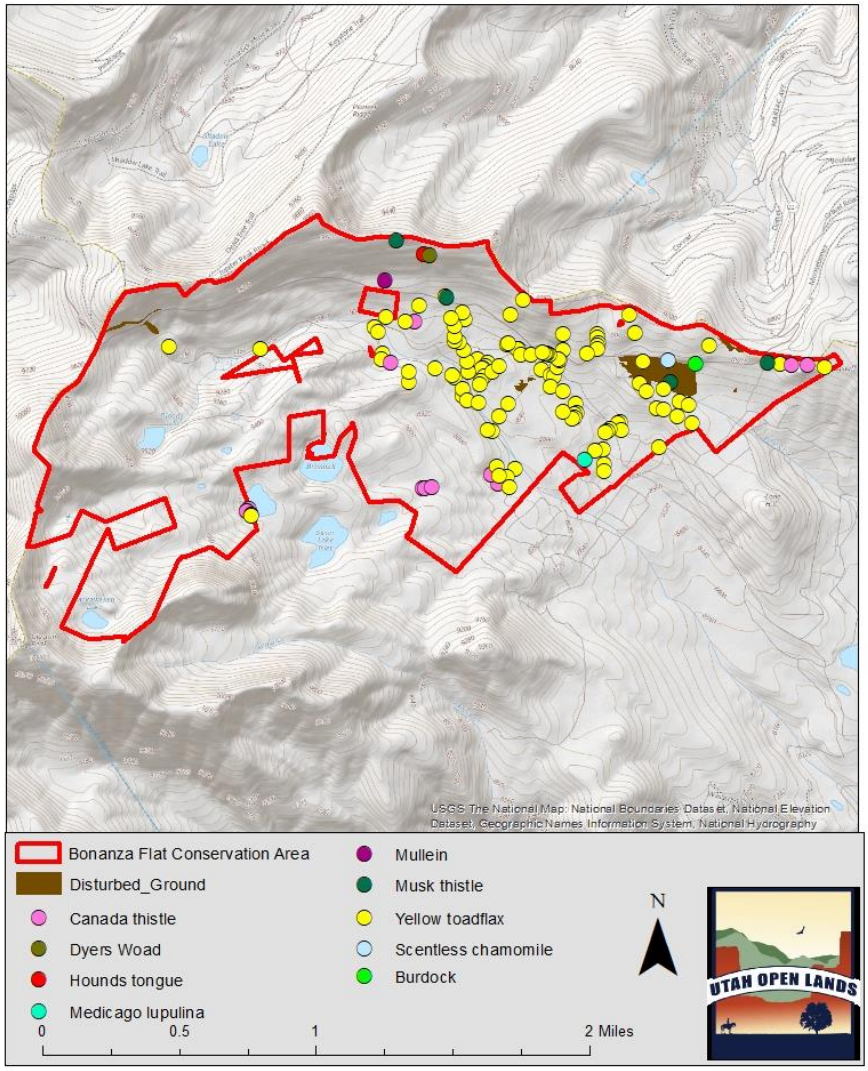
The presence of invasive weeds though harmful to the native vegetation, competing for resources like moisture also allow for community engagement. Some weeds can be eradicated entirely from just a few seasons of pulling such as Musk Thistle (*Carduus nutans*), and Common Mullein (*Verbascum thapsus*), while others such as Canada Thistle (*Cirsium arvense*) and Butter and Eggs (*Linaria vulgaris*) will take a bit more effort which could include spraying before flowering and multiple pulls throughout the year.

Other invasive species are also scattered throughout especially in the lower elevations such as Common Mullein (*Verbascum thapsus*), Yellow Sweetclover (*Melilotus officinalis*), Sainfoin (*Onobrychis viciifolia*). Burdock (*Arctium lappa*), Dyers woad (*Isatis tinctoria*), Black medic (*Medicago lupulina*), hounds tongue (*Cynoglossum officinale*) and scentless chamomile (*Tripleurospermum inodorum*).

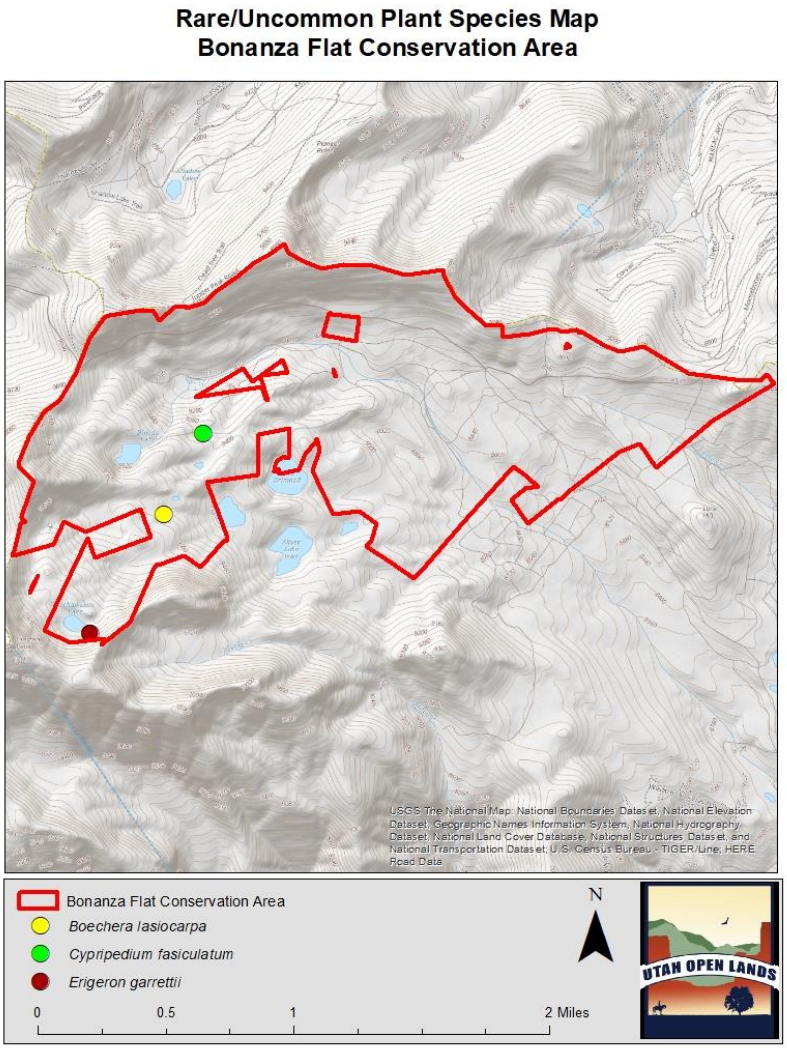
In areas directly affected by and those adjacent to human activity, many non-native species have integrated with native populations. Areas that are disturbed provide invasive species ample opportunity become established including the large area of disturbance where the West Quincy Shaft previously was, which was filled in and never properly seeded with native species. Roadsides and trails also often provide travel corridors for invasive species to infiltrate natural communities. Some invasive plant species have been found on the property including Yellow Toadflax (*Linaria vulgaris*), Musk thistle (*Carduus nutans*) and Canada thistle (*Cirsium arvense*) as being the most abundant.

From left to right: Yellow toadflax (*Linaria vulgaris*), Musk thistle (*Carduus nutans*).

Invasive Plant Species Map
Bonanza Flat Conservation Area



Rare Plants



Of significance in UOLs vegetative analysis three uncommon/rare species were noted: clustered ladyslipper (*Cypripedium fasiculatum*), Garrett's fleabane (*Erigeron garrettii*) and Wasatch rockcress (*Boechera lasiocarpa*).

For two of these species they exist in areas that are not likely to come into conflict with other conservation values. For the third species care should be taken when delineating trails or when doing restoration work to ensure its continued success. In particular, identifying a highly adaptive management strategy based on yearly monitoring will be a critical component in conservation easement planning for this species.

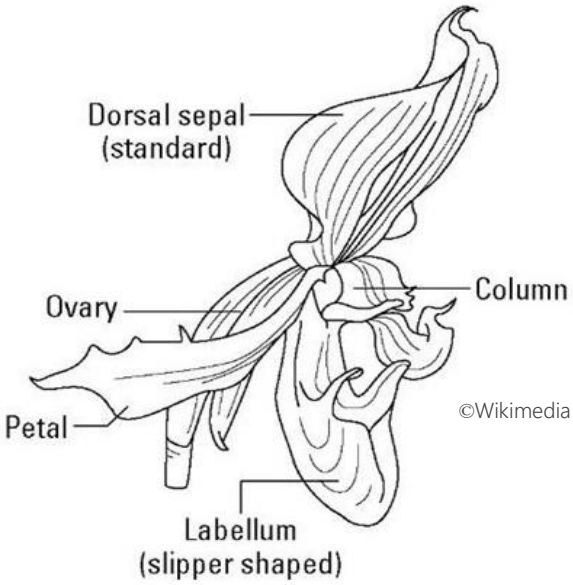
From left to right: Clustered Lady's Slipper (*Cypripedium fasiculatum*), Garrett's Fleabane (*Erigeron garrettii*), Wasatch Rockcress (*Boechera lasiocarpa*).

Clustered Lady's Slipper

The Clustered lady's slipper occurs in eight western states from the Pacific Northwest to California, north to Montana and east to Colorado and Wyoming.

Cypripedium fasciculatum is a small plant with two broad, opposing leaves. The flowering stem may bear one to nine flowers that droop. When the flower goes to seed a capsule forms and the stem becomes erect. The sepals are purple-green and the pouch yellow-green streaked with purple. The small flower is pollinated by a tiny wasp.

The Clustered lady's slipper is found near Conifer Forest.



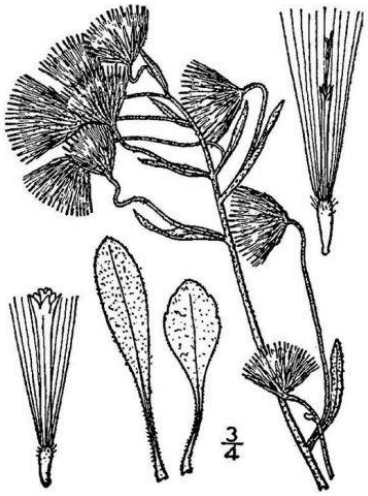
Garrett's Fleabane

Erigeron garrettii is a rare North American species of flowering plants in the daisy family known by the common name Garrett's fleabane.

The most widely used common name, fleabane, is shared with related plants in several other genera. It is derived from the belief that the dried plants repelled fleas. The generic name *Erigeron* is derived from the Greek (*eri* = early; *geron* = old man), a reference to the appearance of the white hairs of the fruit soon after flowering.

Erigeron garrettii has been found only in the north-central part of the State of Utah in the western United States. It grows in cracks in cliff faces and in rocky soil between boulders. It grows up to 23 cm (9 inches) tall, and produces a woody taproot. The plant produces only flower head per stem, the head containing golden yellow disc florets surrounded by as many as 25 white ray florets. Florets can sometimes appear pink or lavender in color (*see photographs, right*).

This plant blooms annually in the spring and reproduces by seed.



©USDA-NRCS

Wasatch Rockcress

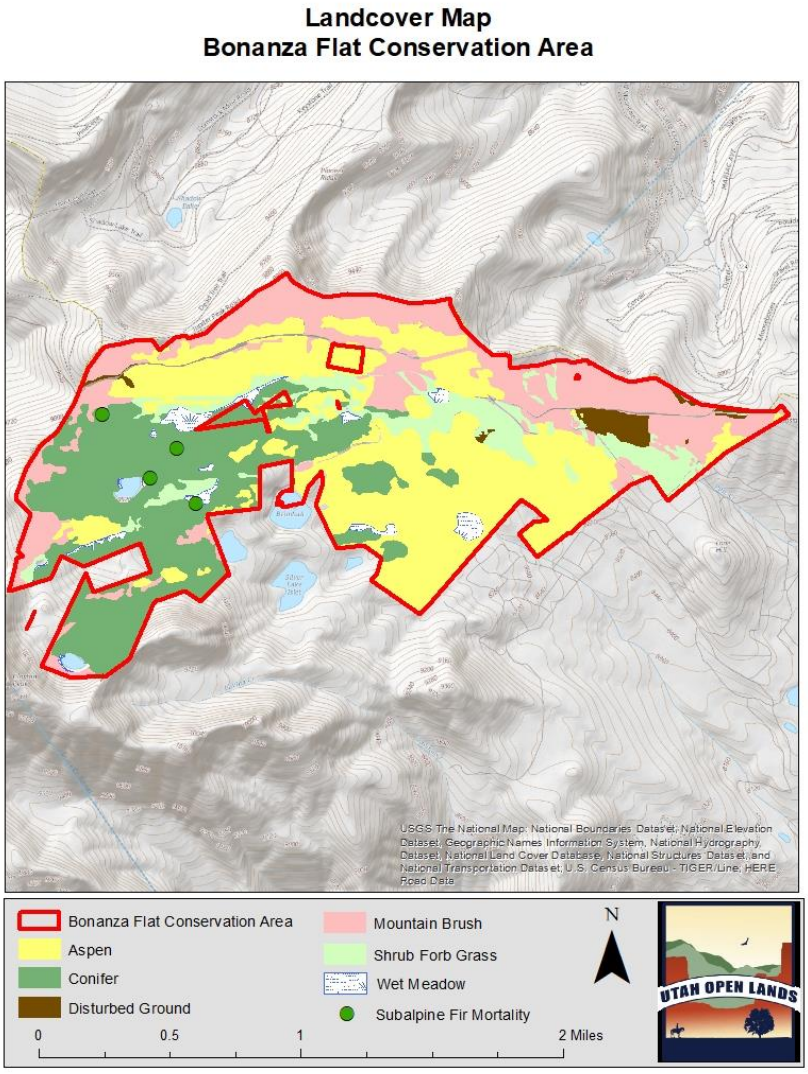
Wasatch rockcress is endemic to north-central Utah, found in several mountain ranges including the Bear River Range, the northern and central Wasatch Range, and the Wellsville Mountains. This plant, belonging to the mustard family, has a current known range that appears to be approximately 10,000-20,000 square km.

It is a long-lived perennial with tall branched elevated form woody caudex, often above the ground. The basal leaves are narrow, linear and erect, measuring approximately 2-4 cm long. In addition to this, siliques curve to straight upward pointing orientation and measure 2-5 cm long. The petals, lavender or purple in color, are the shortest part of Wasatch rockcress, 6-8mm in length.

This plant thrives in steep rocky hillsides as well as metamorphosed igneous chip-rock, whitish sedimentary rocks, quartzite sands, and exposed rocky areas. The optimal elevation for Wasatch rockcress are areas between 5,700 and 9,500 feet high, particularly throughout the months of mid-April through June.

This species is distinguished by its intricately branched aerial caudex with each branch terminated by a tuft of erect to linear-oblanceolate entire leaves.

Forest Health



Utah Open Lands contacted The U.S. Forest Service Forest Health Protection department for information regarding the status of forest health in the Bonanza Flat Conservation Area.

Based on draft 2017 Aerial Detection Survey data, biotic agents that impact tree health and persistence appear to be present within the boundaries of Bonanza Flat Conservation Area. Surveyors have mapped subalpine fir mortality complex affecting approximately 10-25 subalpine fir trees. This complex is often associated with a host of root disease fungi and secondary bark beetles.

Aerial detection surveyors also mapped Douglas-fir beetle, mountain pine beetle (limber pine), fir engraver beetle (white fir), subalpine fir mortality complex, balsam wooly adelgid, Marssonina blight and aspen decline in surrounding stands. Given their proximity, it is likely that Bonanza Flat Conservation Area may be hosting some of these species as well.

In 2018, Forest Health Protection staff have agreed to do field surveys on the Bonanza Flat Conservation Area to better understand the current and long-term impact on forest health which biotic agents may be causing.

Vegetative Conservation Value Trajectory

In general, the forests and vegetation throughout Bonanza Flat are sustainable and in varying degrees of moderate to good health. Aspens for example demonstrate good recruitment and regeneration indicating that wildlife browse is not impacting these forests as much as has been seen in other areas. Overtime this factor will need close monitoring. The herbaceous layer is robust and water regimes which contribute to the Aspen health should not be fragmented to the extent possible to maintain those water regimes overtime. Similarly, the water regimes on the property provide for the wet meadows and intermittent streams which result in substantial habitat value and biodiversity. Permanent versus temporary habitat for moose is one result of the wet meadow, ponds and riparian habitat present on the property. Of significance in UOLs vegetative analysis three uncommon/rare species were noted: clustered ladyslipper (*Cypripedium fasiculatum*), Garrett's fleabane (*Erigeron garrettii*) and Wasatch rockcress (*Boechera lasiocarpa*).

For two of these species they exist in areas that are not likely to come into conflict with other conservation values. For the third species care should be taken when delineating trails or when doing restoration work to ensure its continued success. In particular, identifying a highly adaptive management strategy based on yearly monitoring will be a critical component in conservation easement planning for this species. In addition, monitoring forest health will be important and Utah Open Lands has sought additional resources through the US Forest service to identify fire classifications and overall potential future threats to be evaluated in monitoring protocols.
Utah Open Lands has provided a plant list attached to this report.

Wildlife Analysis

The Bonanza Flat Conservation Area includes habitat for numerous species of concern and is considered high value habitat for Moose, Elk, Deer, Mountain Goat, Bear and Cougar.

Utah Division of Wildlife Resources has mapped habitat on the Property for nine key wildlife game species in Utah: Band-tailed Pigeon (*Patagioenas fasciata*), Black Bear (*Ursus americanus*), Blue Grouse *(Dendragapus obscurus)*, Shiras Moose (*Alces alces shirasi*), Rocky Mountain Goat (*Oreamnos americanus*), Mule Deer (*Odocoileus hemionus*), Rocky Mountain Elk (*Cervus canadensis nelsoni*), Ruffed Grouse (*Bonasa umbellus*) and Snowshoe Hare (*Lepus americanus*).

The Utah Natural Heritage Program notes that several species on the Utah Sensitive Species List occur within a two-mile radius of the property including American three-toed woodpecker (*Picoides dorsalis*), Bonneville cutthroat trout (*Oncorhynchus clarki utah*), northern goshawk (*Accipiter gentilis*), Townsend's big-eared bat (*Corynorhinus townsendii*) with historical occurrences for

ferruginous hawk (*Buteo regalis*) and western toad (*Bufo boreas)*. UNHP data also notes Utah Sensitive Species List occurrences of Bald eagle (*Haliaeetus leucocephalus)*, Lewis's woodpecker (*Melanerpes lewis*) and Short-eared owl (*Asio flammeus*) to be in the general location of Bonanza Flat as well.

In addition, within a two-mile radius there are recent records of occurrence for American pika (*Ochotona princeps*), evening grosbeak (*Coccothraustes vespertinus*), northern leopard frog (*Rana pipiens*) and Williamson's sapsucker (*Sphyrapicus thyroideus*) and historical records for American marten (*Martes americana)*, merlin (*Falco columbarius*), northern flying squirrel (*Glaucomys sabrinus*), water vole (*Microtus richardsoni*) and western heather vole (*Phenacomys intermedius*).

Our field visits to Bonanza Flat documented evidence of American pika, Beaver (*Castor canadensis*), Mountain Lion (*Puma concolor*) on the property. All wet meadows/lakes had sign of beaver. The majority of the sign was old when beaver were more prevalent in the area. It is likely that most of the wet meadows on the property have been expanded due to beaver activity in the past. Beaver dams increase the expanse of wet meadows as the impeded water spreads across the landscape. This allows for greater water storage, which in turn can provide for greater habitat diversity and species diversity. Increased habitat interspersion within the property increases the availability of resources necessary to support a greater diversity of wildlife. Amphibians, song birds, wild ungulates, fish and many other species benefit from beaver habitation. Further beaver dams can reduce erosion as well as decrease the turbidity that can be a limiting factor for much aquatic life. Beaver dams can also improve water quality, by enhancing the breakdown of toxins and the retention of silt by beaver dams. The Utah Beaver Management Plan allows for relocation of "nuisance" beaver to areas that could benefit from beaver in the future – provided data is gathered to assure sufficient food stores for beaver are available.

Hawkwatch International provided us with habitat information for flammulated owl (*Psiloscops flammeolus*) on a portion of the property as well. Invertebrate species noted during our vegetative surveys including the yellow-fronted bumble bee (*Bombus flavifrons*) and the wood tiger moth (*Parasemia plantaginis*). Additional field data provided specific information on numerous bird and wildlife species. Selected information is provided below.

Birds

Birds of prey potentially nesting or foraging in the area could include: northern goshawk, golden eagle and northern harrier. In addition, American Kestrel, Cooper's hawk, sharp-shinned hawk, red-tailed hawk, and Swainson's hawk could potentially occur in the area. Great horned, saw-whet and flammulated owls have been documented on site. The kestrel nests primarily in scattered trees or on rock ledges and hunts across open country while others species would be expected to nest in large trees and possibly on cliffs or stands of aspen or conifers.

Other migratory birds potentially nesting or foraging in the area are listed below by habitat type.

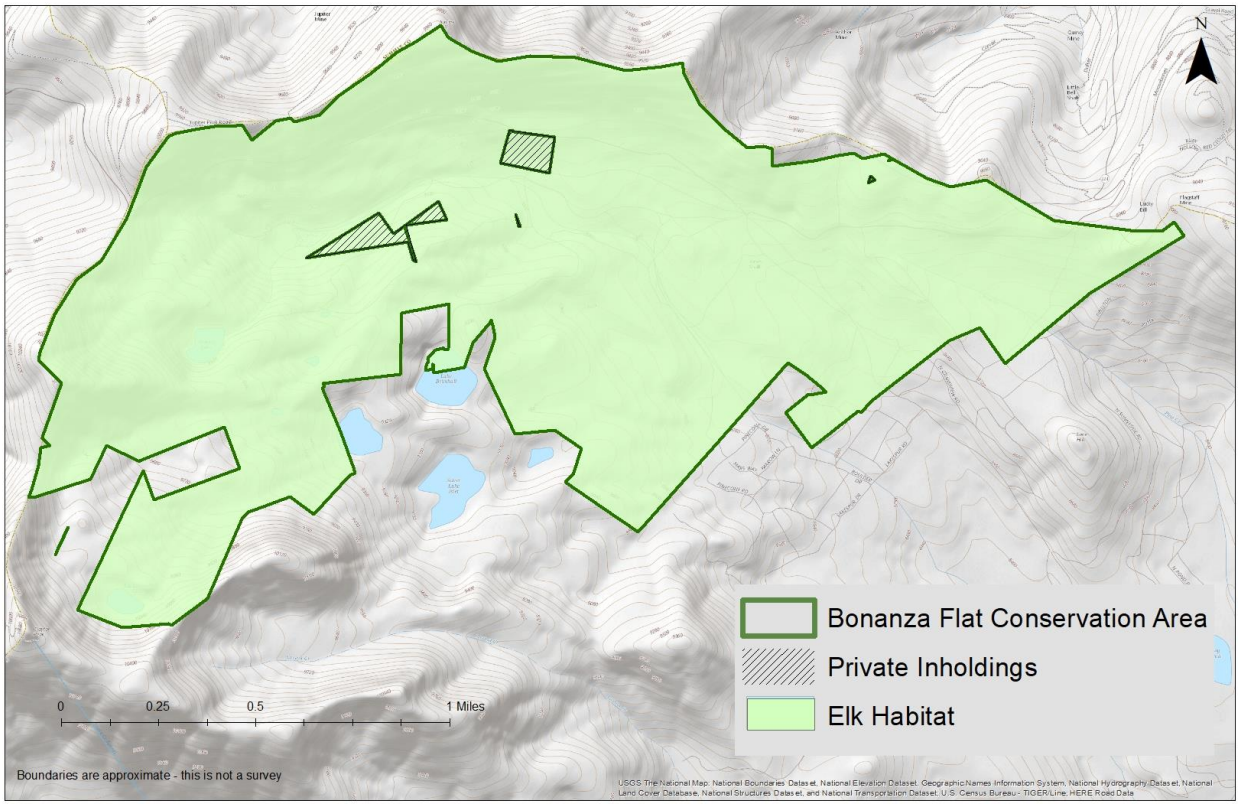
Sagebrush Shrublands. In addition to the Brewer's sparrow, areas dominated by sagebrush support other birds such as the western meadowlark, vesper sparrow and lark sparrow. Turkeys have also been observed as users of this area. These areas also provide hunting areas for other species.

Montane Meadows. A variety of species associated with other habitats may use meadows and grasslands for forage for invertebrate prey and seeds or other plant parts. Birds of prey, song birds and even the American peregrine falcon may use these areas to hunt.

Aspen Woodlands. Patches of aspen throughout the area provide habitat for a variety of bird species. These include the broad-tailed humming bird, northern flicker, hairy woodpecker, downy woodpecker, red-naped sapsucker, western wood-pewee, cordilleran flycatcher, plumbeous vireo, warbling vireo, tree swallow, hermit thrush, violet-green swallow, mountain chickadee, white-breasted nuthatch, house wren, American robin, mountain bluebird, western bluebird, western tanager, chipping sparrow, and dark-eyed junco.

Coniferous forests. Cassin's finch nests and forages almost exclusively in montane and subalpine conifers, such as the scattered clumps of stands of Douglas-fir within Bonanza Flat. The brown-capped rosy finch, may occur in winter as flocks moving from alpine cliffs to lower elevations in search for milder conditions and more available foods. There are also a variety of species potentially occurring in these habitats previously listed above as occurring stands of quaking aspen. Additional species primarily associated with conifers are the Hammond's flycatcher, brown creeper, red-breasted nuthatch, yellow-rumped warbler and red crossbill. Additional species probably limited to the highest and largest conifer stands include the olive-sided flycatcher and Steller's jay.

Rocky Mountain Elk



Bonanza Flat is considered critical year round habitat for elk, which are commonly spotted throughout mountainous regions in Utah. Mountain meadows and forests provide the foraging grounds and shelter necessary for the elk to successfully withstand seasonal changes. Elk are grazers with their diet typically consisting of grasses, forbs, woody plants and mushrooms. Elk are gregarious animals and, as such, often gather into large nursery bands of cows and calves in early summer. During this time, it is common to see groups of several hundred elk.

Within a few weeks those nursery bands disperse into smaller groups across the summer range. Breeding season follows in the fall, during which time males emit loud vocalizations, called bugles, which keep females in a group and warn other males to stay away. Females go on to seek solitude in the spring months to look after the calves. Despite elk having been one of the most common game animals in Utah prior to

settlement times unrestricted hunting had become a threat to them by 1900. Due to limits put in place, the elk population of Utah now rests at a healthy 81,000 statewide. However, new threats face the elk population. Uncontrolled use of ATV's can cause damage to elk habitat and disturbance to elk during critical phases of their life cycle. Shed antler gathering and the associated human disturbance on crucial winter ranges, especially with the use of ATV's and snowmobiles, can cause undue stress on elk during a time when they must conserve energy.

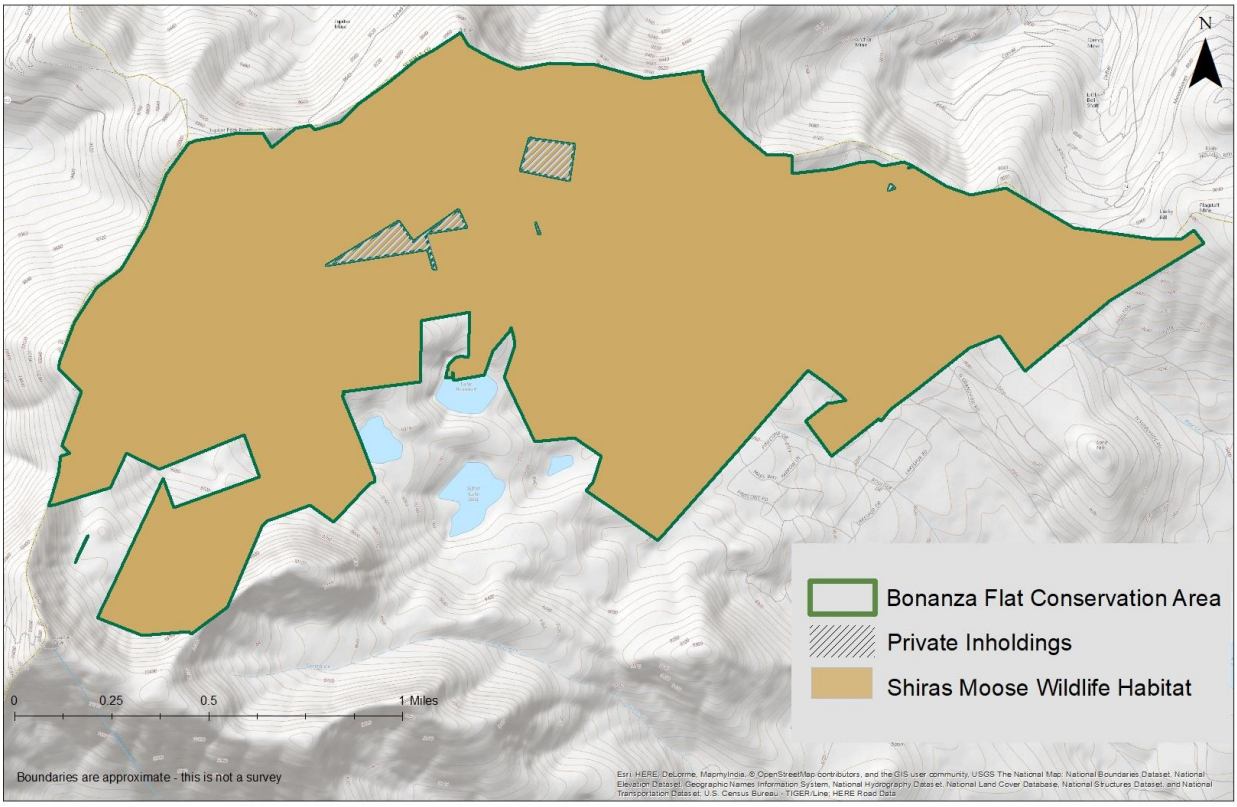
CONSERVATION VALUE THREATS

- Habitat Fragmentation
- Urbanization
- Invasive Weeds
- Fire Suppression
- Harassment through Human Pursuit;
  - Motorized Recreation
  - Hunting

HABITAT REQUIREMENTS

- Conifer Forests
- Aspen Forests
- Wet Meadows
- Mountain Brush
- Shrubs-Forms-Grasses Natural Communities

Shiras Moose

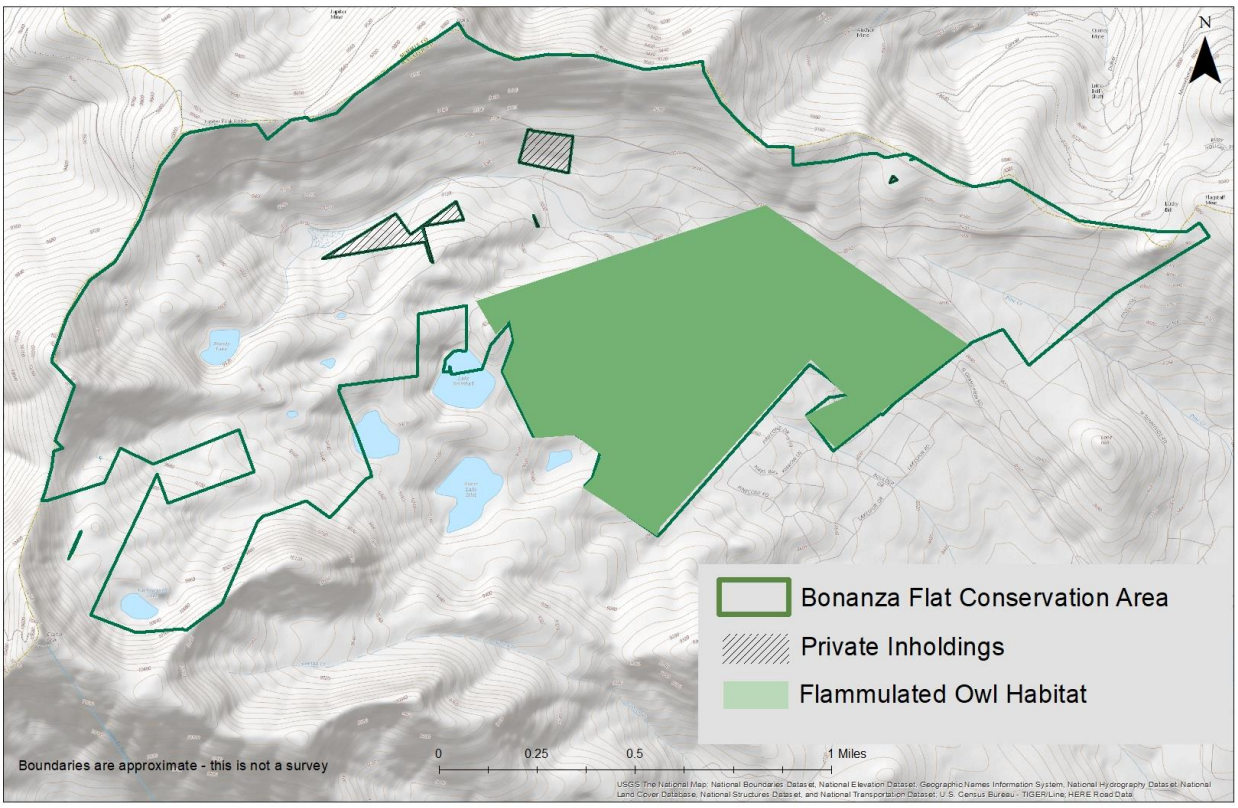


Bonanza Flat is considered critical year round habitat for the Shiras Moose, the subspecies of moose found in Utah. The primary limiting factor for moose in Utah and across their range is the availability of suitable habitat but the presence of ponds, wet meadows and riparian habitat found at Bonanza Flat is perfect for moose. Habitat fragmentation, the natural evolution of mid successional vegetative communities, and climate change present some of the greatest challenges to protecting this species in Utah. The diversity of vegetation found on Bonanza due in part to the watershed and snow shed value it serves, provides for both transient and permanent habitat for moose.

Moose rely on woody deciduous vegetation for much of their diet, but plants like Mountain mahogany which remains green throughout the winter months also provide for foraging. They tend to be found in the same areas as mule deer, elk, and to a lesser extent, the mountain goat.

Although moose are susceptible to a wide variety of viral, bacterial and parasitic diseases, predators such as Black Bear and Mountain Lion in addition to auto collisions causing their death, are also a major problem. There are numerous issues involved in the proper protection of moose including habitat loss, competition, disease, poaching, predators, human interactions, wilderness management, transplants, and hunting.

Flammulated Owl



Bonanza Flat is considered home to the flammulated Owl, a species whose population is declining in certain areas. These cavity nesters are migratory and insectivorous - a unique set of characteristics in a small forest owl, rendering its type sensitive to forest management and climate change impacts.

This species migrates from its wintering grounds in central Mexico, the highlands of Central America, and coastal California to its breeding grounds across western North America. Bonanza Flat is located in an area considered to be prime location for breeding of the flammulated owl, which are strictly nocturnal animals, due to its open pine forests in this mountainous region. This species prefers cool and fairly dry zones and in some cases favors groves of aspen.

The flammulated owl feeds almost entirely on insects, especially moths, beetles, and crickets but also eats spiders, centipedes, scorpions, and other arthropods.

As virtually nothing is known about its range, habitat, or diet in winter, Bonanza Flat offers the opportunity to gain more of an insight into how the flammulated owl behaves.

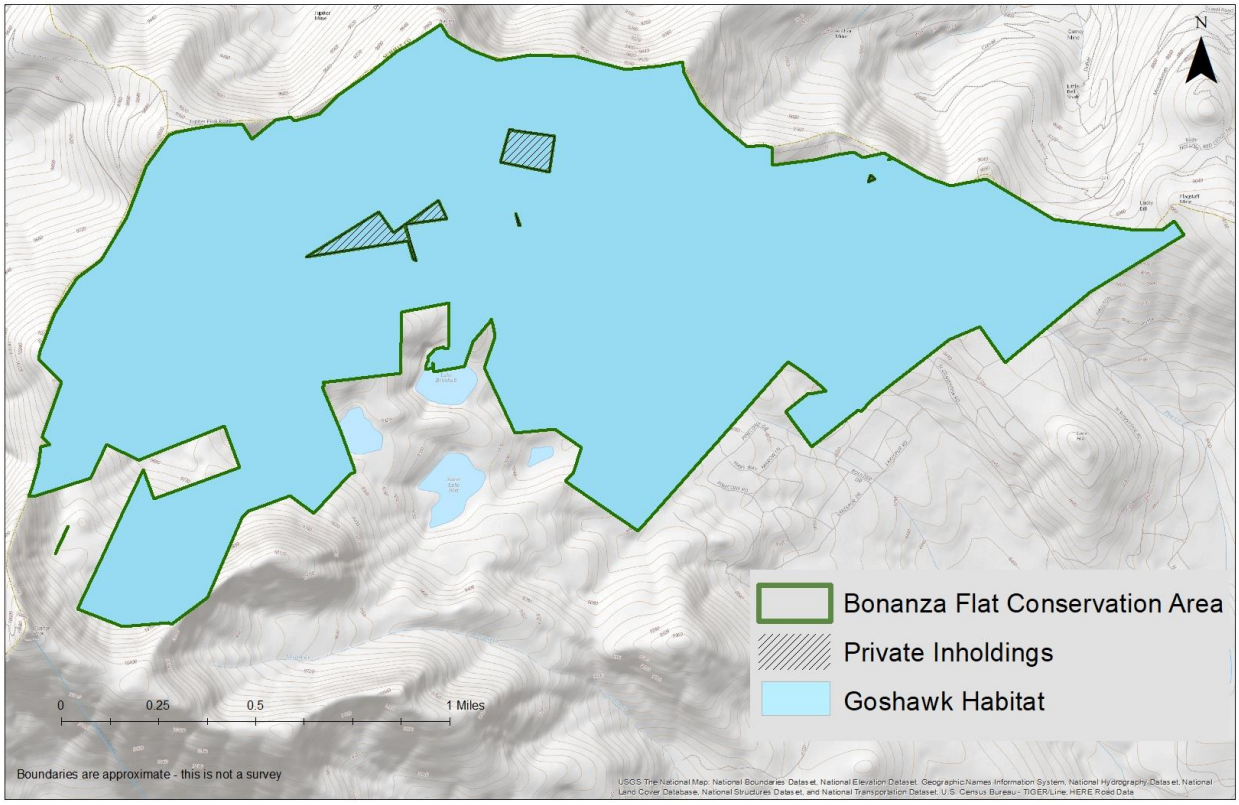
HABITAT VALUES

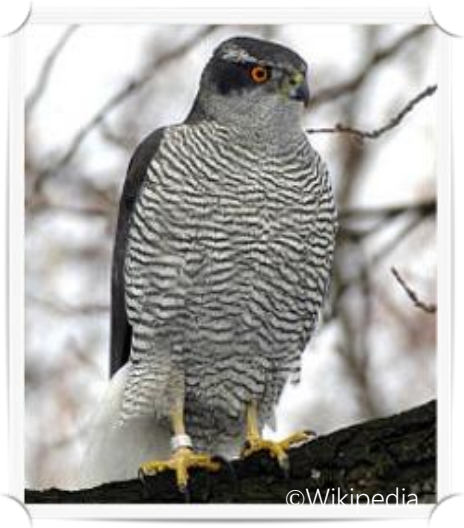
- Pine Forest
- Aspen Forest
- Grasslands
- Meadows

CONSERVATION VALUE THREATS

- Deforestation
- Climate Change
- Urbanization
- Habitat Fragmentation
- History of Conservation Effort

Northern Goshawk





Bonanza Flat is considered critical year round habitat for the northern goshawk despite occasionally heading south in winter months.

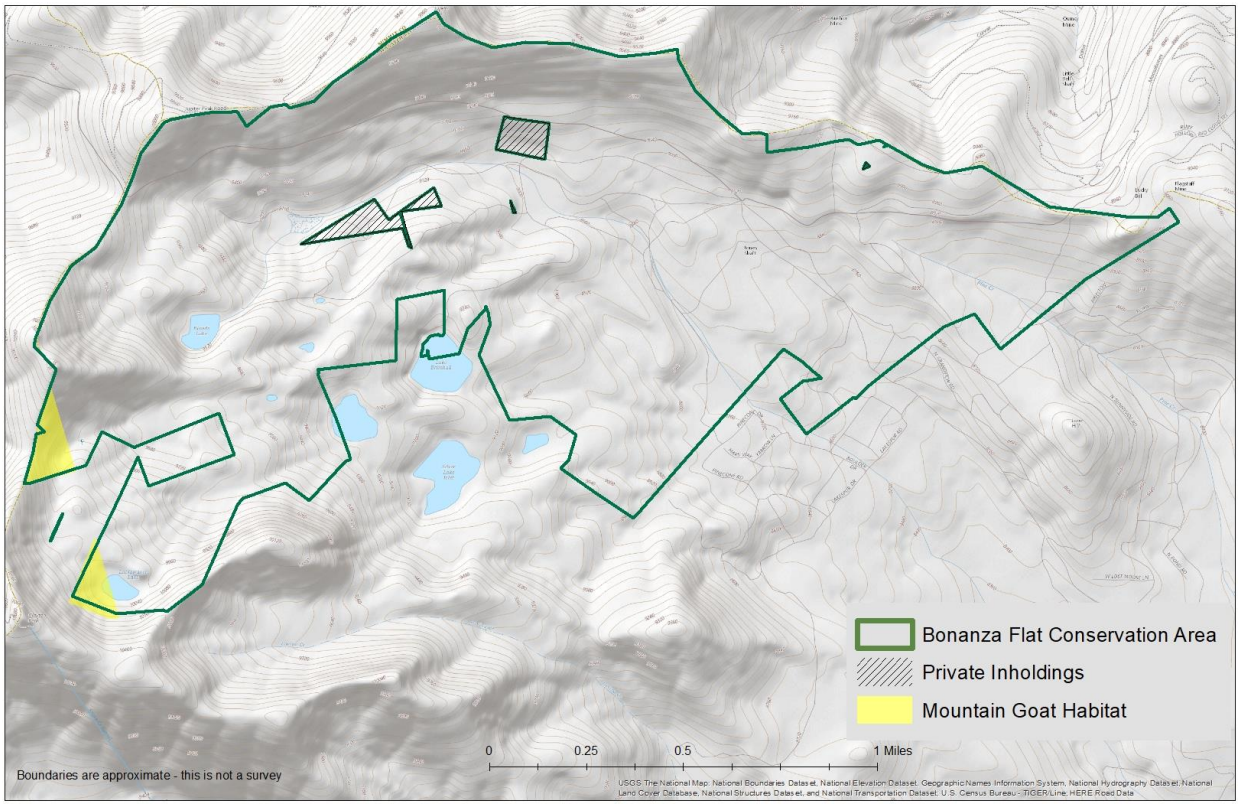
Early records indicate that the northern goshawk was an uncommon permanent resident in Utah, primarily found in montane conifer and quaking aspen throughout the state. Although now a permanent resident throughout the state of Utah, the northern goshawk remains uncommon here. The species is classified as CS, meaning it is a species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing.

The northern goshawk nests in a wide range of forested habitats and most of the 421 known nests located statewide occur in mid-elevation (6,000 ft.) to high-elevation (10,000 ft.) sites. Northern goshawks nest in mature to old forests with relatively large trees, high canopy closure, sparse ground cover and open understories. Nests are often located near the bottom of moderately steep slopes, close to water, and often adjacent to a canopy break.

Bonanza Flat provides prey for the northern goshawk as it cruises through low forest trees to hunt for rabbits, squirrels and birds such as woodpeckers, robins, grouse, or jays.

HABITAT VALUES	CONSERVATION VALUE THREATS
- Aspen Forest - Conifer Forest - Wet Meadows - Ponds	- Deforestation & Timer Harvest - Climate Change - Habitat Fragmentation - Fire Suppression - Insect & Disease Outbreak - Competition & Predation - History of Conservation Effort

Mountain Goat



The mountain goat was likely native to Utah in the past, but it did not occur in the state during recent times until the late 1960s, when the species was first re-introduced to the mouth of Little Cottonwood Canyon. Today, this species calls Bonanza Flat its home.

Mountain goats prefer extremely steep and rugged areas above the timberline, and are excellent rock climbers. They typically migrate to lower elevations in the winter, but can still be up to 12,000 feet - not too different to their preferred summer elevation of up to 13,000 feet.

In general, summer diets are typically dominated by succulent grasses and forbs. Like many ungulates, mountain goats put on weight and fat reserves during the spring and summer months for use during winter when their diets may include a much higher browse or shrub component, and may even include Ponderosa pine, lodgepole pine, or alpine fir.

Mountain goats are adapted to live in the highest, coldest, snowiest and most precipitous reaches of our classic western mountain ranges, which, Bonanza Flat offers throughout most seasons in Utah.

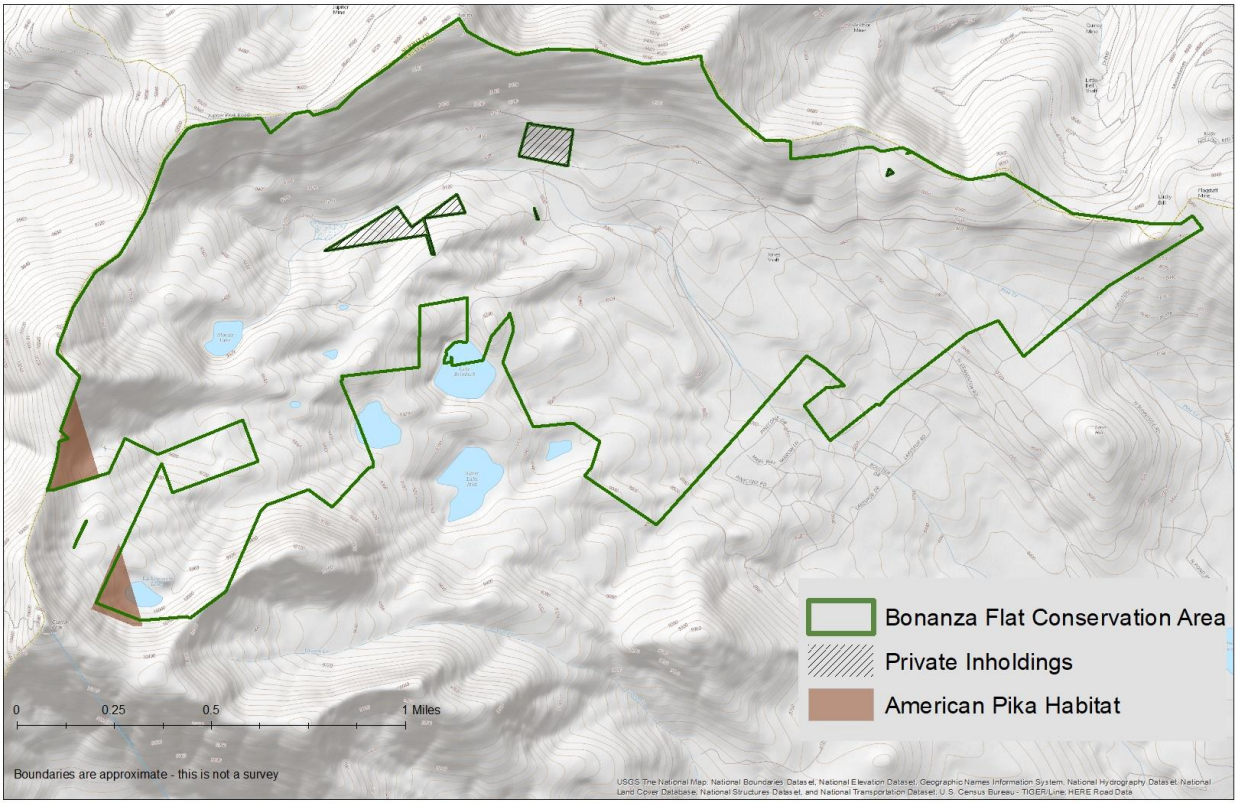
HABITAT VALUES

- High Elevation
- Alpine Environment
- Ridges & Cliffs
- Intermediate Slopes
- Mineral Licks

CONSERVATION VALUE THREATS

- Habitat Fragmentation
- Climate Change and Successional Vegetative Changes

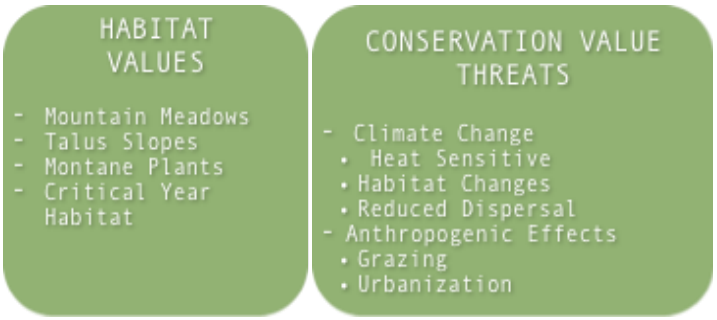
American Pika



As a high mountainous area of Utah, Bonanza Flat provides home to the American Pika, where it prefers to remain above the tree line on rocky slopes. Pikas are active during the day throughout the year, but may remain under cover during hot days. Although it is primarily found in talus fields, the American pika is occasionally found in piles of broken rock and man-made substrate such as mine tailings or piles of scrap lumber.

The American pika is an herbivore that eats grasses, sedges, and other types of vegetation. Food is often gathered during the summer and fall and stored for the winter. They meet most of their water needs through consumed plant material, but also use available drinking water.

Global warming is one of the biggest threats that the American Pika faces today. Rising temperatures prevent the species from being able to inhabit certain areas, prevent them from midday foraging therefore precluding them from gaining sufficient body mass, diminishing their much loved snow packs, altering precipitin and therefore changing surrounding vegetation, affecting meadows, reducing permafrost and making the pika more susceptible to predators. In addition to climate change, livestock grazing in the meadows that surround pika habitat may cause negative impacts by trampling vegetation important for the species and by facilitating the invasion of exotic plant species.

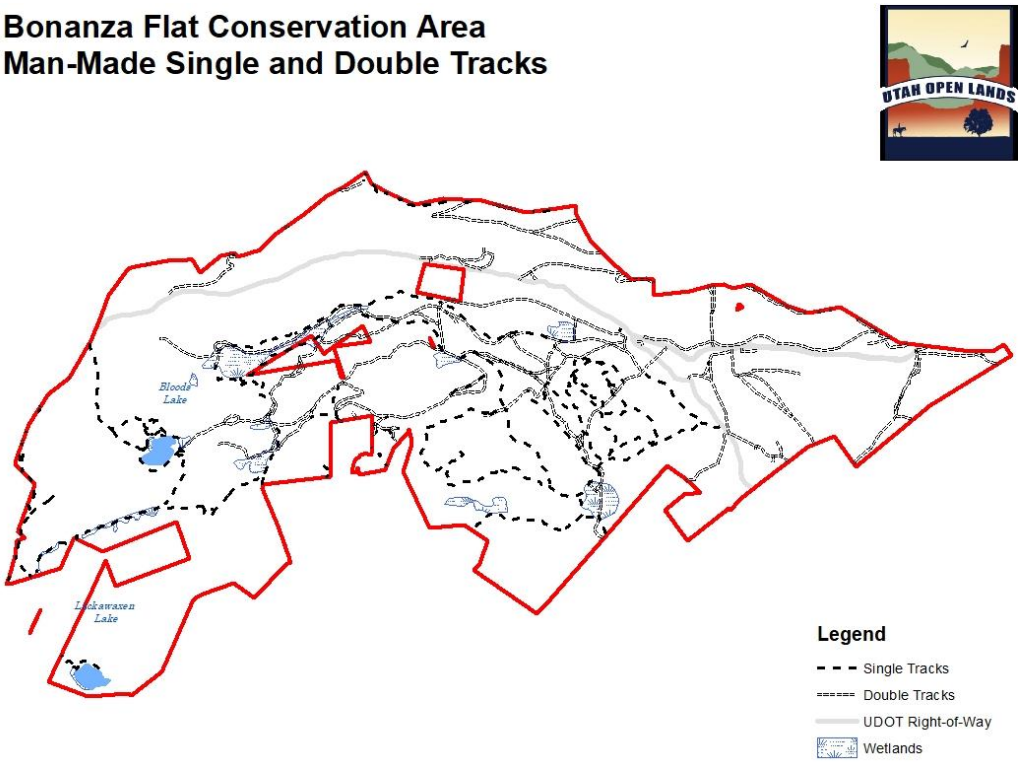


Wildlife Conservation Value Trajectory

Overall the Property likely provides resources for many other species of wildlife including songbirds and other migratory bird species and invertebrates. Invertebrates are important ecological elements on the Property as they support other wildlife species, interact with vegetation, link vegetation and wildlife, function in decomposition, and connect other ecological elements in nutrient cycles and energy transfers. In the Spring of 2018, Utah Open Lands will lead additional wildlife surveys of the Bonanza Flat area to continue further supplement ecological data collected on the property. Fracturing landscapes with additional roads or fragmenting the land through improper placement of trails and degrees of trail use and types of use will conflict with certain wildlife values. Providing long site lines for trails in areas of dense vegetation reduce human/wildlife conflicts.

Recreational Analysis

Empirical data collected on site demonstrates two high use areas and several lesser used areas as well as relatively pristine places on the property. In addition to empirical data, UOL also conducted a public survey. This public survey revealed supporting evidence with respect to uses and areas encountering the greatest density of use to the empirical data. High use areas are additionally impacted due to a lack of management, lack of adequate facilities, and un-functional, social single and double track trails. Continued use without management, adequate facilities and functional trail networks is unsustainable.



Hiking

According to survey responses, the land is primarily used for hiking, with over 82% of Bonanza Flat visitors using it currently for this purpose. Although a passive form of recreation, trails being established and utilized by the general public are not sustainably made and are plagued with erosion, such as those on the ridgeline leading up to peak 10,420.

Trails leading to Bloods' Lake are also continuing to widen due to large groups walking side by side. According to general observations performed by PCMC, webs of trails have become established from heavy use and new trails continue to spread out over the property due to high numbers in visitors throughout Summer 2017.

The recreation use most associated with Bonanza Flat is hiking. The hike to Bloods and Lackawaxen Lakes are popular with almost 300 visitors on any given day to Bloods Lake. The ability to access Clayton Peak and 10420 peak from Bonanza Flat is popular as well. All hiking trails to all destinations suffer from the social nature in which they were created and would benefit from trail design that is intentional. In some instances, cross jurisdictional planning will be necessary to create a hiking recreational experience to certain destinations, like Claytons Peak. Restroom facilities will be needed to accommodate this continued use without impacts to the watershed, recreational enjoyment and land health.

Times of visits ranged from an earliest recorded time of 4.35am and the latest recorded travel time on the road of 11.43pm.

ANSWER CHOICES	RESPONSES	
Hiking/Trail running	82.88%	1,026
Mountain biking	52.34%	648
Cross-country skiing	21.16%	262
Snowshoeing	19.14%	237
Camping	13.33%	165
Horseback riding	1.62%	20
Group events	5.01%	62
Hunting	3.88%	48
Riding motorized vehicles	9.77%	121
Dog walking	31.83%	394
Other (please specify)	21.81%	270
Total Respondents: 1,238		

Biking

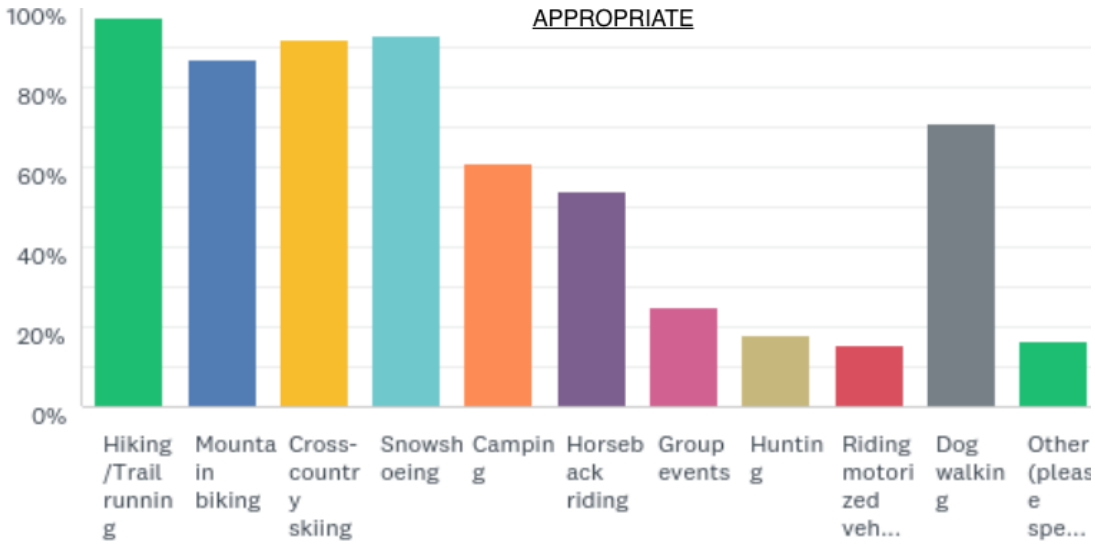
Approximately 50% of survey participants noted that they used the area for mountain biking. Fox n' Rox bike shuttle company has made observed trips to Guardsman Pass frequently in addition to other shuttle companies and private parties of mountain bikers.

Mountain biking, though accessed primarily from Guardsman's Pass and Empire Pass

is not found as extensively through the rest of the property and mountain biking use appears mainly as connection points though one area to another. There is an area with defined mountain biking trails on the east south east area of the property. Road biking is extremely popular, and this use too stems from connections off the property. Recreational access and in particular parking on road ways create significant safety issues for this recreational pursuit.

According to survey responses:

- Mountain biking was marked as an acceptable form of recreation on the land by 87% of survey participants
- Mountain biking also received some opposing comments on social media, such as, “By adding mountain biking to the list of uses you will be significantly disturbing the already stressed wild life.”



Dog Walking

According to survey responses and empirical data;
With three trail counters installed by the edge of the property, by 10,420 and by Bloods Lake, weekday usage averaged;

- 282 visitors
- 37 dogs

Weekends increased by almost 40 visitors and dogs remaining the same.
Survey results show that approximately 32% of respondents use the land to walk their dog.

- 49.5% are residents from Park City
- 33.2% are residents from Salt Lake County
- 12.7% are residents from Wasatch County

Dog walking and dog swimming are also high use activities observed on the property. Bloods lake is far and away the highest use destination for this activity. The health of this recreational activity in particular is in jeopardy and care needs to be taken to educate and ensure best use practices. Dog waste is already at unsustainable levels and is not being properly removed. Signage encouraging proper waste removal has been vandalized. Domestic dogs pose threats to the conservation values of the Property. Both on and off leash, they have the potential to diminish the natural value of the area. Dogs affect wild animals by flushing, chasing, trampling, killing, transmitting disease organisms, and reducing vegetation cover. They also make new trails and trample sensitive vegetation in wet meadows and riparian communities as well as the aquatic vegetation within ponds and streams. Designated areas for this popular recreational activity should be adopted and education regarding impacts from our canine friends is necessary, partnering with groups interested in maintaining access for dogs and especially off leash dogs to broaden educational outreach is critical.

Camping

We can see from the photograph below that even during the week, parking on Guardsman Pass indicates high numbers of people utilizing the land. On 8/5/17, the number of vehicles counted at Guardsman Pass were 46. Several cars parked in and around the area were observed to have set up camping chairs to enjoy the views. The Quarry area has also been noted to be an area of interest to campers, with evidence of cars spotted overnight and campfire pits having been constructed. Fire rings were not only spotted at the Quarry and Bloods Lake but also a limited amount were also found at Lake Lackawaxen. The latter area had been well preserved according to PCMC, with little trash left behind, however, scrap and burnt wood were left behind in other areas. It is of vital importance to note the fire hazard that campfire rings present in terms of wild fire potential and wildlife and vegetation types found on the property that are heat sensitive.

Camping is occurring on the property. Camping, similar to popular hiking destinations and dog walking destinations, is occurring in high use areas thereby exacerbating waste removal issues. Insufficient facilities for human waste treatment combined with a lack of awareness and user groups not practicing leave no trace principles renders this recreational use untenable for the area without proper recreational infrastructure. It is already at unsustainable rates. If camping is an allowed use designation of actual sites with waste facilities will need to be provided. Camping adjacent to waterways impacts watershed, wildlife and other recreational uses. Fires in unregulated areas pose extreme fire danger and several campfire rings were observed near Bloods Lake.

Horseback Riding

Horseback riding occurs in limited ways on the property and emanates mainly from the Wasatch Mountain State Park area although a horse trailer was observed in the quarry area. Steep, winding access roads are a primary limiting factor for this recreational use. Ideally to reduce the spread of noxious weeds horse owners utilizing weed free hay prior to entering the area would represent the best stewardship. The degree of this use is not substantial enough to create dramatic conflicts, however, trail design taking into account this recreational use would be a valuable component of any trail design. Wildlife conflicts are less than other types of recreational uses, but conflicts with other recreational user groups is possible.

Snowshoeing & Backcountry Skiing

Similar to hiking this winter recreational use is popular at Bonanza Flat. As a winter-time human powered activity, this use encounters the least amount of conflicts with other conservation values including other recreational user groups.

Bonanza Flat is an access point for backcountry skiing and also serves as a destination from adjacent commercial ski areas. Brighton and Alta and Vail Resorts all have designated backcountry gates which inform users of risks associated with avalanche danger outside of formal ski area boundaries. This use provides little conflict with other recreational uses, though lack of waste facilities impact watershed values.

Paragliding & Hang Gliding

Jupiter Peak is a known, but not extremely used destination for paragliders and hang gliders. Wind currents fluctuate more unpredictably than in similar spots that are popular destinations for this recreational use like the Point of the Mountain in the Salt Lake valley. Due to infrequent use of this area and the relative expertise needed for this non-motorized recreational use it is not seen as dramatically impactful, however unpredictable landing and subsequent bush-whacking through sensitive vegetative areas is possible and should be monitored to ensure that damage to sensitive species is mitigated and this use should be adjusted accordingly.

Snowmobiling:

Snowmobile use on Bonanza Flat was documented as the most substantial wintertime human use on the property. While there are gates in place to restrict rubber tire access to Bonanza Flat from all directions, individuals obtain gate keys which then provide access. Centrally located for snowmobilers from all over the Wasatch Front and the Wasatch Back, there is parking of trailers and motor vehicles along the roadways at Bonanza Flat. As of February 2018, snowmobile tracks cover over 75% (see map) of some of the flatter, more open areas (see photo).

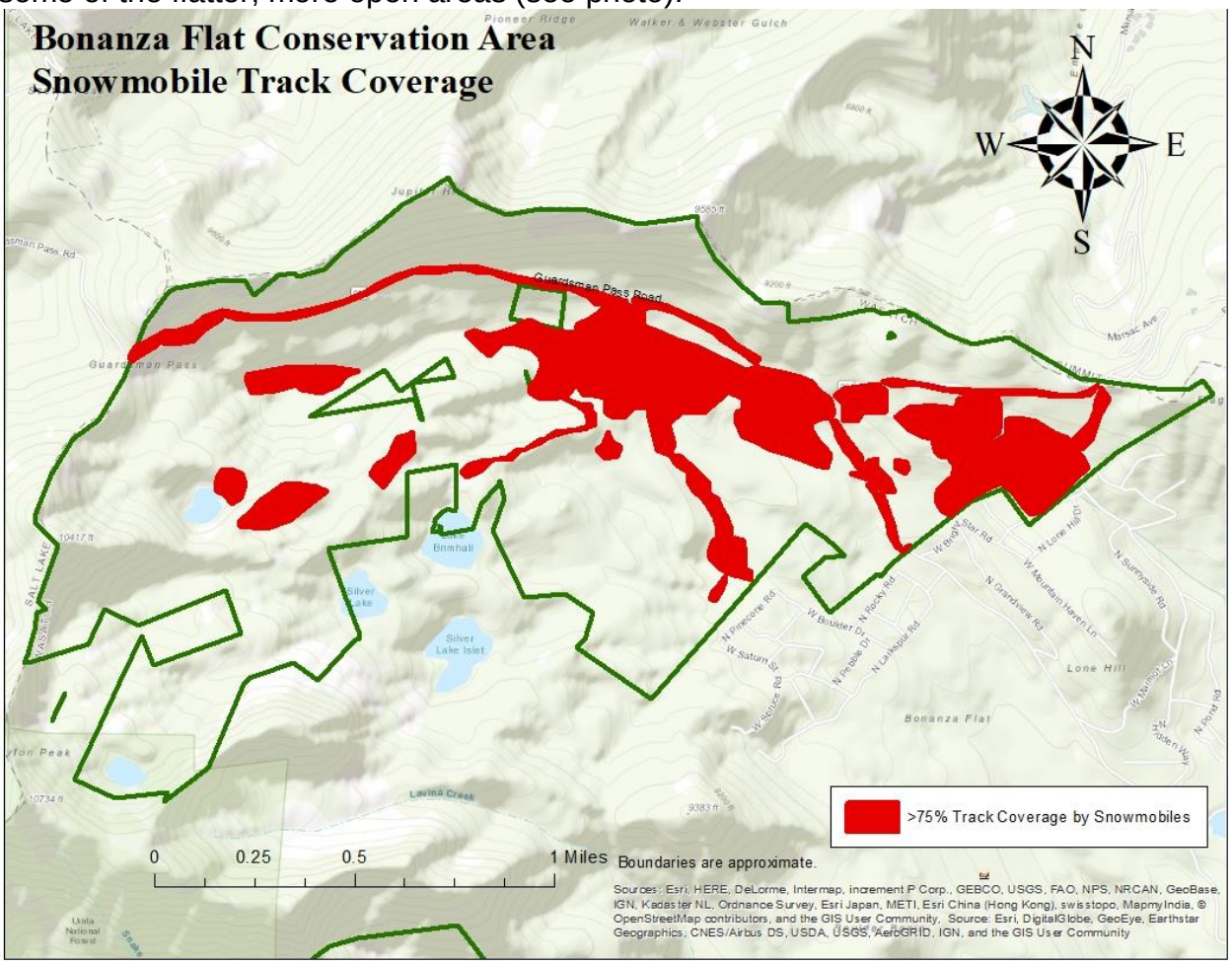


Photo: Wet Meadow area with over 90% Snowmobile Track Cover

In some locations, there is effectively no untracked snow by snowmobiles after a single weekend of use.

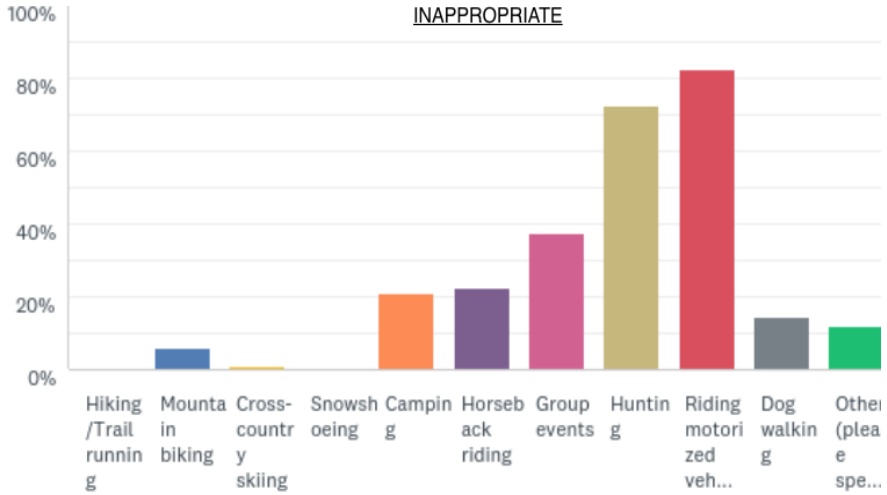
Snowmobiling is the only use that has been observed in consistent quantity and density on all property visits by UOL. Each visit has yielded more snowmobiles left on site than the last, and documented usage has increased in tandem. This increase has been tied to an increase in snowfall and base snowpack during the season. While there is certainly snowmobile use strictly as a means of access (particularly towards adjacent land), there is clear snowmobile use that is entirely recreational. The “travel” use occurs in select areas, directly linking from the center of Bonanza, where many vehicles park. High travel areas spread multi-directionally from the center of Bonanza towards adjacent, privately and publicly owned properties and also towards adjacent private properties to the southeast of Bonanza Flat. Recreational use encompasses a vast majority of the property in an undefined and unregulated manner. UOL visits have documented snowmobiles running up and down hillsides, on and off of right of ways from the southeastern corner of the property near adjacent properties through the northwestern areas near Guardsman pass, down to the Bloods Lake, and spread throughout numerous parts of the property. A low estimation model ((average

snowmobiles recorded / weeks recorded) x weeks) of use predicts that there has been over 1800 cumulative days of recorded individual snowmobile use (1 day of use = 1 snowmobile using property within a 24-hour period) on Bonanza Flat from the beginning of UOL winter monitoring on November 29, 2017, through February 2018. This brings us to an average of over 26 snowmobiles using Bonanza each day.

Snowmobiling thruway access on Bonanza Flat takes two forms. Access to Pine Canyon, within the jurisdiction of Wasatch Mountain State Park, and Snake Creek Canyon, within Wasatch Mountain State Park, are destination areas for recreational snowmobiling. The private property nature of Bonanza Flat indicates that snowmobiling in Bonanza is a byproduct of a lack of access to both Pine Canyon and Snake Creek Canyon from the Wasatch County side. Snowmobiles seeking to access Pine Canyon or Snake Creek Canyon must be shuttled up Big Cottonwood Canyon or S.R. 224 on the Park City side up towards Empire Pass to then access Pine Canyon. Though recreational snowmobiling does occur on Bonanza Flat the majority concern provided to Utah Open Lands is for travel routes to adjacent private lands, Pine Canyon and Snake Creek Canyon. Degrees and types of use become an important refinement when dealing with this use. Designated corridors an existing public roadways will lessen conflicts with other recreational uses, reduce watershed impacts to open water, riparian areas and wet meadows and reduce waste which is generated from lost parts, stuck vehicles that aren't retrieved until summer and machine parts which are never removed and remain after the snow melts. Machines that are not in sound working order create additional impacts, especially to water quality and should be prohibited. Conflicts also exist between recreational user groups and values of solitude and wildlife. Designating access corridors and restricting snowmobile use to designated right of ways will provide UOL with the ability to monitor this use through the winter providing a broader understanding of conditions. UOL met with the Utah Snowmobile Association to better understand their needs and current use of Bonanza Flat and were told their main consideration is to have access through the property.

On top of snowmobile use on the property, snowmobile storage has exceeded 88 documented weeks of "individual snowmobile" storage, at a minimum. There have been 26 individual snowmobiles noted on site, and this does not include the number of snowmobiles that are likely being stored in the 10 snowmobile trailers that have also been left on site. This on-site storage has resulted in documented access conflicts between users and the landowner. On numerous occasions landowner gate locks were cut and chains removed. Also a regularly locked gate was left open to allow unfettered access.

Nothing in this report should be misconstrued to imply that generally snowmobiles have a greater impact than other uses, as all uses have impacts. Also, Utah Open Lands has been a strong supporter of snowmobiles and ensured it was included as a permitted use in the Snake Creek Canyon conservation easements. However, based on observations throughout the winter it is clear that at Bonanza Flat snowmobiles not only are having the most impact, some users are causing significant conflicts such as the above noted lock cutting, snowmobile storage on the property and leaving gates open.



Recreational Conservation Value Trajectory

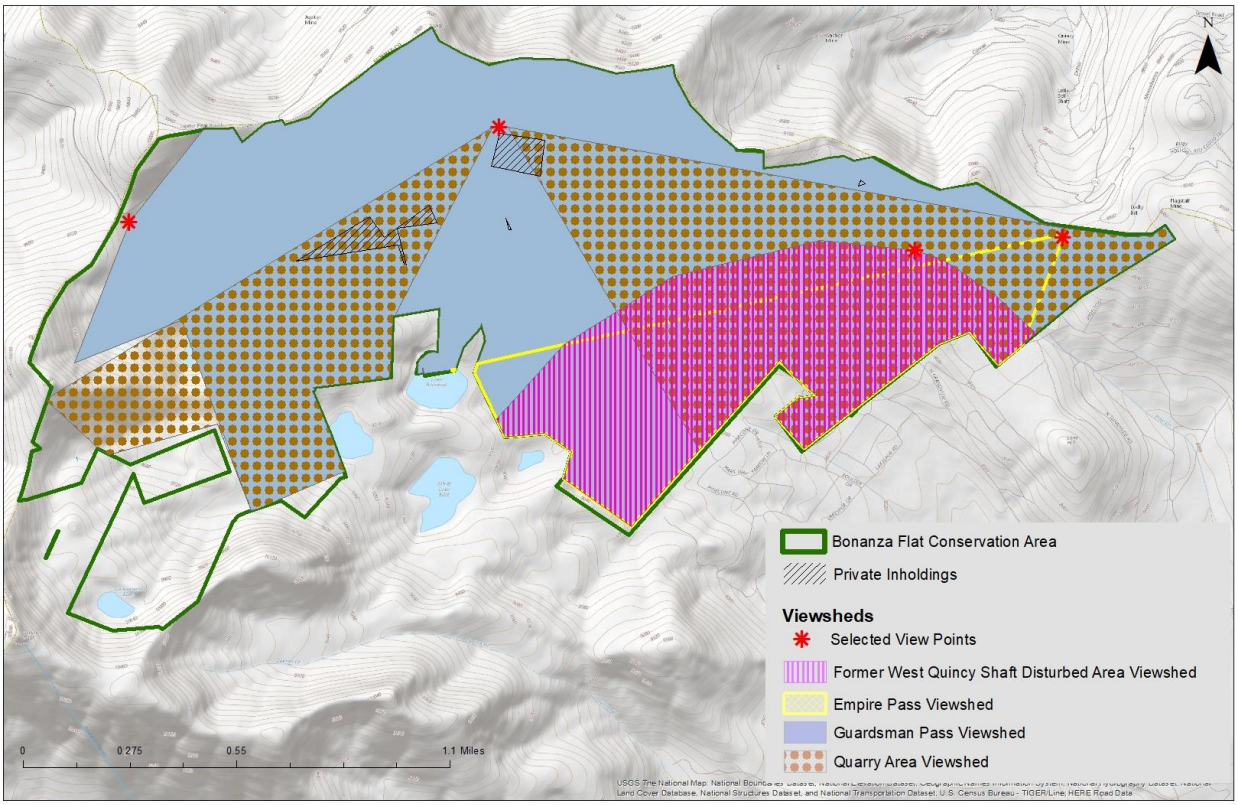
Some recreational users will have greater conflicts with other recreational users and other conservation values. Higher impact recreational uses include motorized use and dog walking. Mountain biking has the potential to affect wildlife and other user groups depending on trail design and designations. Trail connections to other jurisdictions and additional trailheads both on Bonanza Flat and on adjacent properties will aid significantly in increasing recreational values and experience. Overall, the sustainability for recreational uses is dependent upon moving the Guardsman pass and Empire pass social parking to a location, preferably the quarry area that is upgrades with restroom facilities and adequate parking. A comprehensive trail system which considers a relocation or rerouting of existing social paths that are currently functioning in a failed capacity will be necessary. Additionally, consideration should be given to wildlife viewing and scenic viewing as these passive recreational pursuits are particularly suited for Bonanza Flat.

Scenic Analysis

The expansive and unbroken views of the Property from designated state and local public roads are of high value. The property has a high degree of visual vulnerability due to the vegetative structure which includes wildflower meadows and aspen forests in close proximity to public roads. The Park City planning goals have long included the preservation of the City's entry corridors and this property is one of the more travelled scenic drives along the Wasatch front and back. These corridors serve to provide a sense of place and provide distinction for the mountain resort character.

The Property in its entirety is primarily viewed from travelers on S.R. 224 and S.R. 190 and Guardsman Pass. The property is also a primary viewshed from the adjacent Park City Mountain and Deer Valley Resorts. Views from various locations on the property itself provide unique mountain vista experiences that are unparalleled. A view of the Midway and Heber Valley and distant Deer Creek Reservoir is dramatic both at Empire Pass and the Quarry.

Scenic Quality



Scenic quality includes several factors many of which are subjective. Textures and tones, colors and unique features which constitute scenic quality can often vary depending on the beholder. Vegetative health is a marker for visual quality and is readily observable in the fall. Bonanza Flat's vegetative diversity contributes to a high degree of scenic quality. An objective measurement of scenic quality is an analysis of its visual vulnerability. Visual vulnerability is defined as the degree to which alterations of the landscape (i.e. road cuts and structures) can be seen. This determination is made in part by identifying the vantage points from which the public views the property; the steepness of slope; the variation of vegetation and the degree of ground cover.

Scenic Conservation Value Trajectory

Bonanza Flat's scenic vulnerability determinations vary based on the aforementioned values. Additionally, disturbed ground, trail cuts on steep slopes or structures placed in highly visible areas detract from the scenic character of the property.

Mining Heritage & Hazard Analysis

The lands in Bonanza Flat are mining lands which basically means that ownership of the land has its origin defined by mining claims. The Bonanza Flat Land consists of over 100 mining claims each of varying shapes and sizes. Generally, a mining claim consists of a rectangle 1,500 feet long and 600 feet wide. There is a place within the claim where a discovery has been made. This is the point at which any prudent man would spend money to further develop the claim to generate wealth. It is an improvement on the claim which helps solidify the ownership through the patent process with the federal government. These discovery points are generally what are now seen as mine features or hazards. They are generally shafts which are vertical "holes" in the ground of varying dimensions. There are also tunnels or declines into the ground. These are more or less horizontal features but serve the same purpose as discovery shafts.

Some of the claims were located and patented over 100 years ago. For the most part, due to the geology of the area there were no significant mining operations on or within the Bonanza Flat area. Two prominent historic features are located on Bonanza Flat. The Jones Shaft and the West Quincy Shaft.

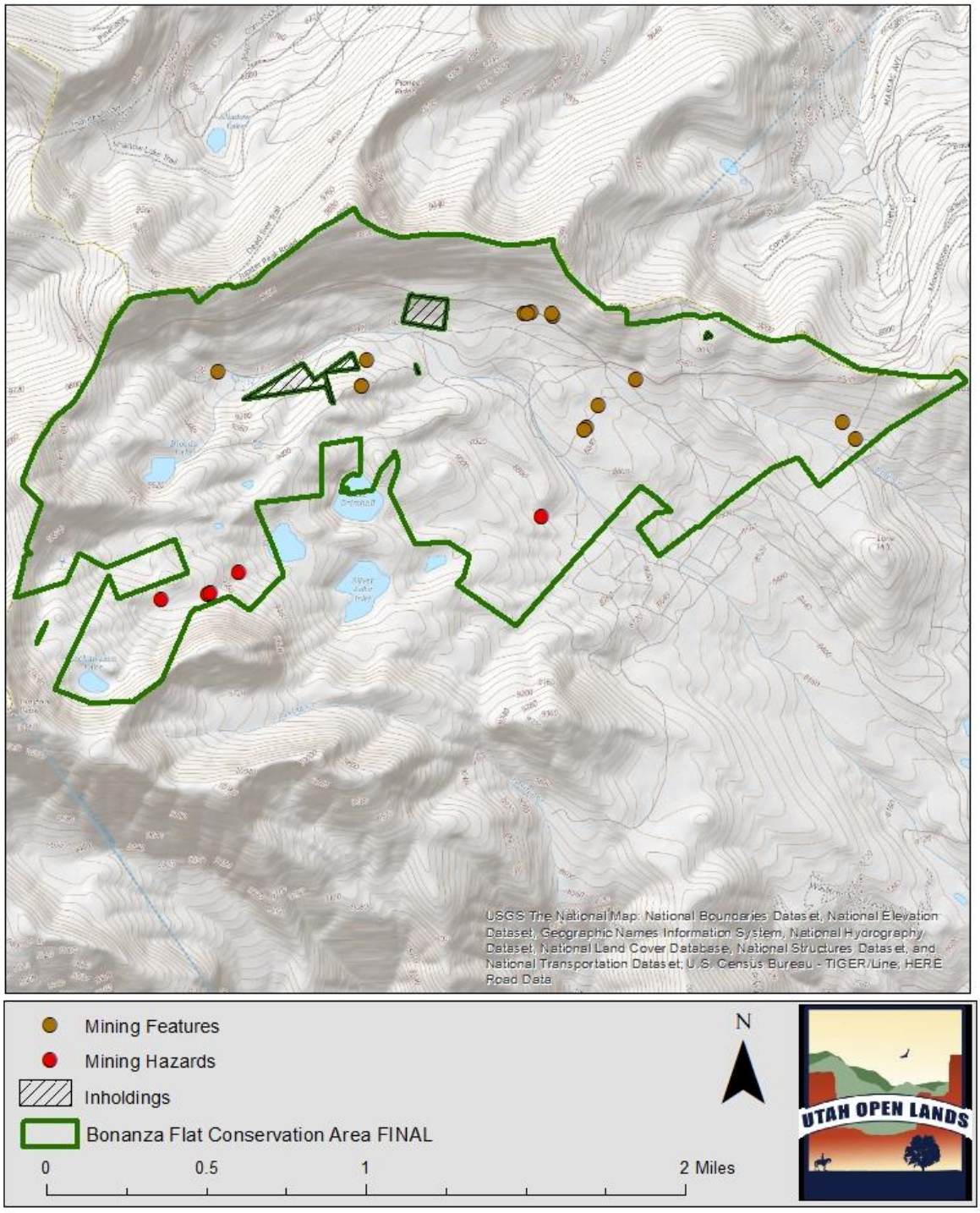
The Jones Shaft is located in the east-central and lower part of Bonanza Flat. The shaft was a prominent feature until about 2005 when it caved in. There was an open hole with vertical rock walls extending several hundred feet into the ground. It has been stated that the mineralization associated with this shaft was discovered during logging operations. A log became wedged against a rock and when freed from the rock revealed that the rock was solid galena. After caving it, the shaft was filled with the waste dump adjacent to the shaft. The site has since been developed into a recreation facility by the former owners. It should be noted that the area around the Jones Shaft, particularly downstream of the Jones Shaft has the potential to be contaminated with metal. This is due to the proximity of the metal bearing materials to the surface and the manner in which the shaft surface area was developed for use. There has not been a characterization study done on the area and no formal remediation efforts have been undertaken.

The West Quincy Shaft is located just over the ridge from Park City and close to the main highway 224. For decades it was nothing more than a mine dump. The shaft location was not noticeable. In about 2005, developers of the Flagstaff/Empire Pass Project in Park City needed a place to put their development waste. It was decided to use the already disturbed area around, over and adjacent to the West Quincy Shaft as a disposal area. It is not being used for this purpose at this time. It has undergone restoration work including re-contouring and revegetation. However, the efforts have fallen short of what would be required. Basically, what has been done is not adequate.

There are also other mining features on the property including dirt and debris piles, filled in tunnels and other disturbances.

Mining Hazards

Bonanza Flat Conservation Area
Mining Features and Hazards Map



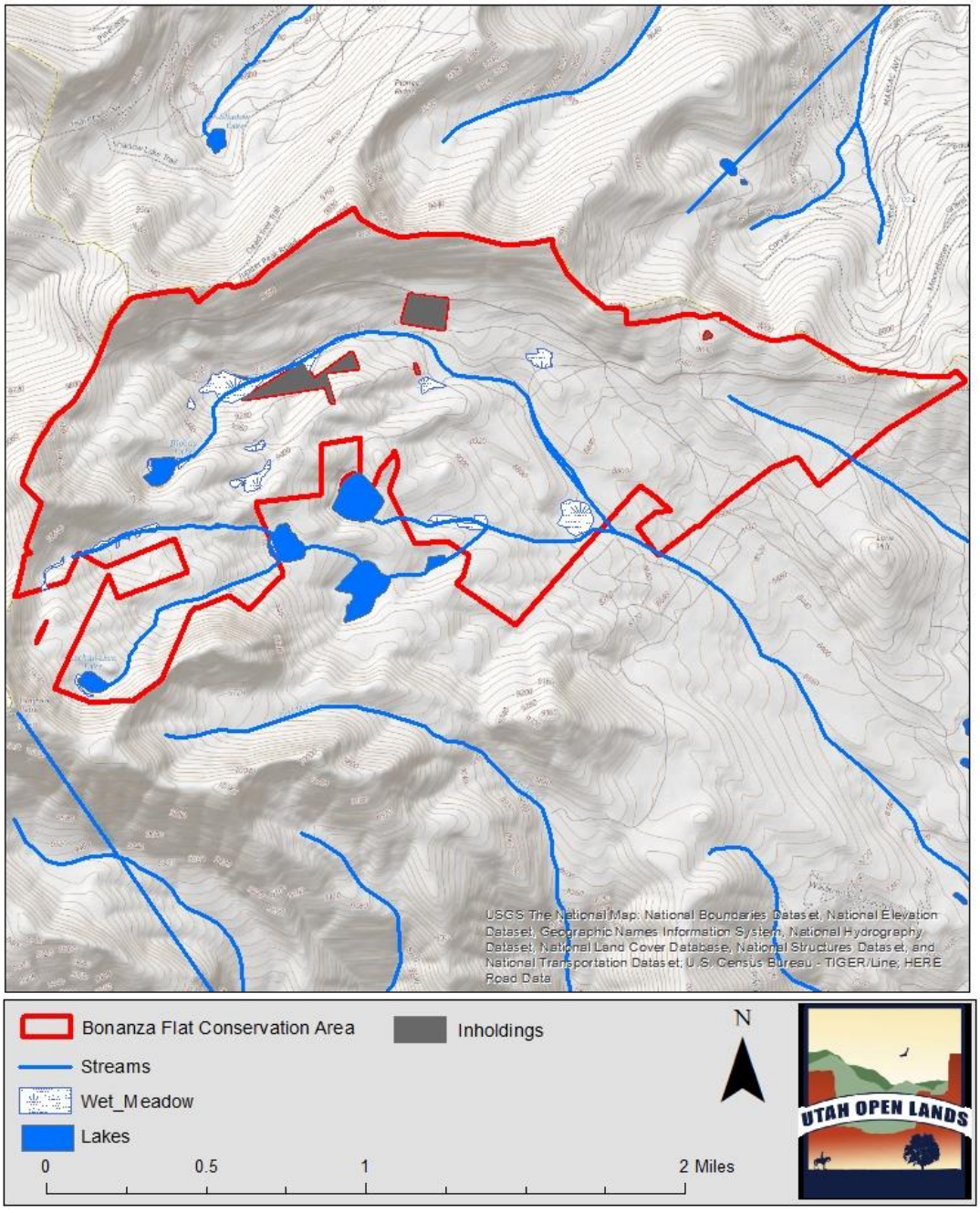
There were three known open shafts on the property that represent true mine hazards. Since these have been located Park City has been in the process of filling and closing them. There is another potential hazard near Guardsman's Pass road just up the road from the girl scout camp intersection. It appears to be an old mine shaft that has collapsed. The sides of the hole are steep. It is recommended that this be filled in. It could present a dangerous situation for someone that goes to the bottom of the hole and the added weight causes the shaft to cave in even more pulling the person into the ground.

From left to right: Mining hazard, mining feature above and adjacent to Guardsman Pass Road and feature next to the former Jones Shaft.

Water Resources

Bonanza Flat has abundant water resources including several prominent lakes which are popular scenic destinations including Bloods Lake and Lake Lackawaxen, numerous perennial and intermittent streams and wetlands.

Water Resources Map
Bonanza Flat Conservation Area



The accumulation of snow on Bonanza Flat during the winter is profound. Snow accumulation has been measured at 9 feet in March in the meadow below Lake Brimhall. All of the lakes in Bonanza Flat are glacial lakes. They would exist whether or not improvements had been made to the natural embankment structures to increase storage. Establishment of the dam structures has complicated the use of the water flowing from the lakes and detracts from the natural setting of the lakes.

There are no constructed waterways on Bonanza Flat. Water flows from every lake or wetland on Bonanza Flat in poorly defined channels or across the surface of the ground in features that lack definition. In the spring these features are abundantly full of water which rapidly decreases in flow and dissipates by mid-summer. Most of the water accumulates in a channel way along the south side of the property and flows through all the way to Midway.

A better study of the water flow on Bonanza may be made in the spring or as soon as access is possible. This may help define wetlands or wet areas that should be protected from hikers or mountain bikers.

Blood's Lake, formerly known as Judge's Lake, is located in the western edge of the property almost due west of Lake Brimhall. The lake has a dam in the drainage leading from the lake. For decades a pipeline has carried water from the lake to the Girl Scout camp, the Daly West and at times the Ontario mine on the Ontario mine bench. It currently only supplies water to the Girl Scout camp or the Talisker Club facility near the Jones Shaft. The pipeline travels down the drainage from the lake then along and down the ridge to the main road to the Girl Scout camp. In the road, there is a tee off of the pipeline with a small pipeline going to the Talisker Club facility near the Jones Shaft.

The pipe then travels along the road and up the ridge to the north through Anchor or Judge Gap. At this point it enters a cinder block structure that holds a small fiberglass basin where the piped water goes to atmospheric pressure. The water then flows into a pipeline where it then runs in the road adjacent to the Anchor mine dump then along the ridge south of the Daly West mine. At one time it filled small wooden tanks near Lady Morgan Lake which supplied water to the Daly West Mine. The pipeline left the Daly West area and travelled to a large wooden water tank behind the Ontario Mine which was the supply for that mine.

It is not known when the dam was constructed at Judge or Blood's lake. It is a low earthen structure with a small spillway. The pipeline is shallow and buried in the dam. The condition of this pipeline outlet structure is not known. The state of Utah considers this a low risk dam feature.

Lake Brimhall is located partially in the Bonanza Flat Conservation Area. There is a dam on this lake that was ordered to be breached in the late 1980's by the Dam Safety division of the State Engineers office. Water now fills the lake to the bottom of the dam and flows out the breached structure or through imperfections in the lower reaches of the dam. There is a pipeline from the lake (not operational) that runs through the dam. It is not known when the dam was constructed. It is believed to have been improved in the late 1920's or early 1930's by adding stacked rock on the upstream and downstream faces of the dam. The Mining Company had an arrangement with Midway Irrigation Company whereby the Mine Company would periodically release water from the dam on behalf of Midway Irrigation Company. This arrangement dates back to the early 1900's. The path the pipeline follows as it leaves Lake Brimhall is not known.

Bloods Lake

The accumulation of snow on Bonanza Flat during the winter is profound. Snow accumulation has been measured at 9 feet in March in the meadow below Lake Brimhall.

Due west from Brimhall you can locate Bloods Lake, another glacial lake, on the edge of the property. The lake has a dam in the drainage leading from the lake. For decades a pipeline has carried water from the lake to the Girl Scout camp, the Daly West and at times the Ontario mine on the Ontario mine bench. It currently only supplies water to the Girl Scout camp or the Talisker Club facility near the Jones Shaft.

The preservation of Bonanza Flat from development demonstrates how beyond contributing to trails, wildlife and the quality of life we enjoy, open space preservation is reducing our water and carbon footprint in addition to protecting snowsheds, watersheds and a natural carbon sink.

With prior development plans having already been approved, we know that between 200-300 different types of units could have depended on approximately 60,000,000 gallons of water and used a total annual energy use of up to 875,000 kWh, producing about 600 tons of CO2 as a result.

Water Quality Resources

Utah Open Lands has conducted water quality testing to date on both Blood's Lake and Lake Lackawaxen and efforts will continue on an ongoing basis. Measurements taken include water condition, water surface conditions, water clarity, water color, water odor,

presence of dead fish, dissolved oxygen, turbidity, algal bloom and the presence of E. coli bacteria.

Data sheets and photos from the most recent testing efforts are shown below. E. coli results from subsequent testing on both lakes on Oct 29 were negative.

UWW Tier I Lake Data Sheet

UtahStateUniversity
WATER QUALITY EXTENSION

certified monitor name(s) Brian Sedgwick Tracy Sedgwick UWW ID # _____

site name Lake Lackawaxen UWW site # _____

sample date 10-25-2017 sample time 13:00 (HH:MM military format)

Field Observations: mostly frozen

_____ **water condition** **1** – calm **2** – ripples **3** – waves **4** – white caps

_____ **water surface** **1** – clear **2** – scummy **3** – foamy **4** – natural debris **5** – trash **6** – sheen/oily

_____ **water clarity** **1** - clear **2** - cloudy/milky **3** - turbid

_____ **water color** Normal __ Abnormal **1**– Clear **2**– Brownish **3**– Greenish **4**– Reddish **5**– Blue **6**- Orange

_____ **water odor** **1** – none **2** – oil **3** – sewage **4** – rotten egg **5** – fishy **6** – musty **7** - chlorine

_____ **dead fish** **1** – none **2** – 1 to 3 **3** – 4 to 10 **4** - >10

_____ **24h weather** **1** – clear **2** – cloudy **3** – overcast **4** – light rain **5** – heavy rain **6** – snow

Comments: DO = 12 mg/L

Sampling *Location:* ✓ inshore __dock/ Pier __ boat

11.1 **air temperature** (°C) 3.0 **water temperature** (°C) 5.0 **pH**

turbidity: Secchi depth (>)/= 0.6 m **total depth** (>)/= 0.6 (m) easily see tube bottom

Users of turbidity tubes: be sure to convert to meters from centimeters by dividing by 100 e.g. 10cm = 0.10m

Community Fishing Information N/A

species caught (#): bluegill__ carp__ catfish__ bass__ wiper (hybrid)____rainbow trout___

other _____ **cormorants observed** Y/N **number of fisherpeople**___ **hours spent fishing**___

Harmful Algal Bloom Monitoring (bi-montly when possible)

algae observed in lake: Y/N **types oberseved**:___ **1** filamentous, **2** water collumn, **3** floating scum

harmful algae bloom suspected? Y/N **UWW contacted**? Y/N

comments, including areas surveyed just grassy vegetation in lake

***E. coli* bacteria – Coliscan Easygel Method** – Once a month May through Sept.

reading #1: [100 mL divided by sample size ____mL] X _____ (colonies counted) = _____ cfu/100mL

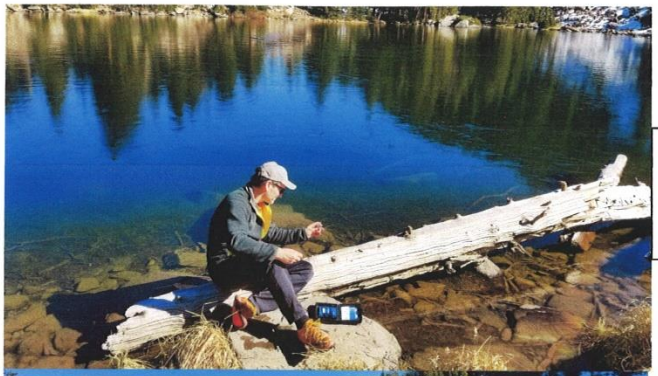
reading #2: [100 mL divided by sample size ____mL] X _____ (colonies counted) = _____ cfu/100mL

___incubation start Time ___ total hours ___ incubation temp

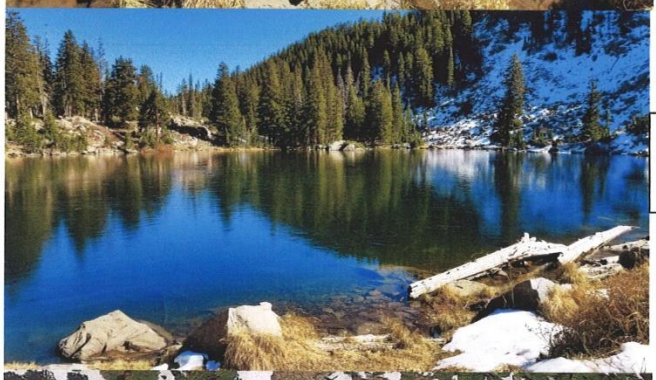
___ **average *E. coli*** cfu / 100mL (if greater than 400 contact UWW) iDEXX method used **Y/N**

_____ hours sampling and traveling ___ miles traveled ____ # of participants ___ decontamination

extension.usu.edu/utahwaterwatch **(435)797-2580** **waterquality@usu.edu**



Sampling at Lackawaxen Lake on 10/29/2017. Lake frozen about 10 feet from short



View from west side of Lackawaxen Lake looking east on 10/29/2017.

Blue arrow indicates approximate sample location at Lackawaxen Lake on 10/29/2017.

UWW Tier I Lake Data Sheet

UtahStateUniversity
WATER QUALITY EXTENSION

certified monitor name(s) Brian & Traq Sedgwick UWW ID # _____

site name Bloods Lake UWW site # _____

sample date 10/25/17 sample time 14 : 00 (HH:MM military format)

Field Observations:

_____ **water condition** (1) – calm **2** – ripples **3** – waves **4** – white caps

_____ **water surface** (1) – clear **2** – scummy **3** – foamy **4** – natural debris **5** – trash **6** – sheen/oily

_____ **water clarity** (1) - clear **2** - cloudy/milky **3** - turbid

_____ **water color** ✓ Normal __ Abnormal **1**– Clear **2**– Brownish **3**– Greenish **4**– Reddish **5**– Blue **6**- Orange

_____ **water odor** (1) – none **2** – oil **3** – sewage **4** – rotten egg **5** – fishy **6** – musty **7** - chlorine

_____ **dead fish** (1) – none **2** – 1 to 3 **3** – 4 to 10 **4** - >10

_____ **Current Weather** (1) – clear **2** – cloudy **3** – overcast **4** – light rain **5** – heavy rain **6** – snow

Comments: DO = 6 mg/L

Sampling *Location:* ✓ inshore __dock/ Pier __ boat

13.6 **air temperature** (°C) 4.9 **water temperature** (°C) 5.5 **pH**

turbidity: Secchi depth (>) = 0.6 m **total depth** (>) = 0.6 (m)

Users of turbidity tubes: be sure to convert to meters from centimeters by dividing by 100 e.g. 10cm = 0.10m

Community Fishing Information N/A

species caught (#): bluegill__ carp__ catfish__ bass__ wiper (hybrid)____rainbow trout___

other _____ **cormorants observed** Y/N **number of fisherpeople**___ **hours spent fishing**___

Harmful Algal Bloom Monitoring (bi-montly when possible)

algae observed in lake: (Y)/N **types oberseved**: (1) filamentous, **2** water collumn, **3** floating scum @ bottom

harmful algae bloom suspected? Y/N **UWW contacted**? Y/N

comments, including areas surveyed_____

***E. coli* bacteria – Coliscan Easygel Method** – Once a month May through Sept.

reading #1: [100 mL divided by sample size ____mL] X _____ (colonies counted) = _____ cfu/100mL

reading #2: [100 mL divided by sample size ____mL] X _____ (colonies counted) = _____ cfu/100mL

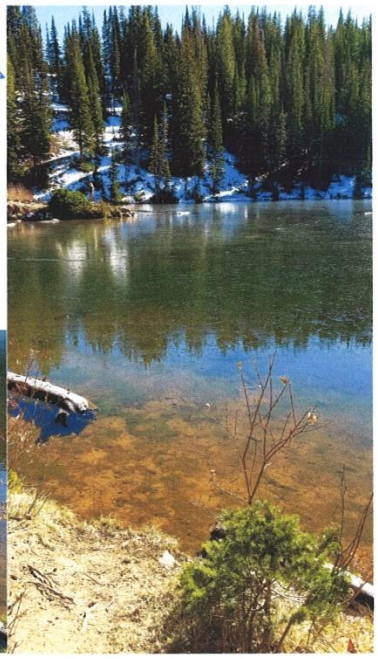
___incubation start Time ___ total hours ___ incubation temp

___ **average *E. coli*** cfu / 100mL (if greater than 400 contact UWW) iDEXX method used **Y/N**

_____ hours sampling and traveling ___ miles traveled ____ # of participants ___ decontamination

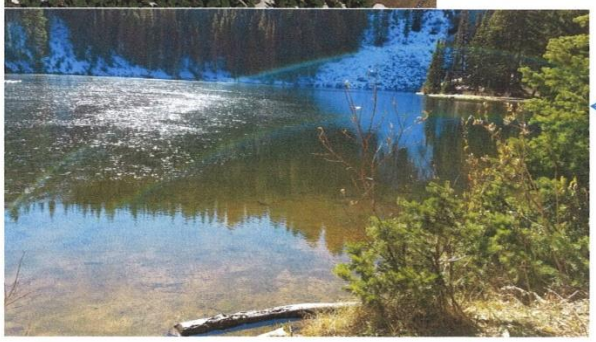
extension.usu.edu/utahwaterwatch **(435)797-2580** **waterquality@usu.edu**

View looking South from Bloods Lake Sampling Location on 10/29/2017



Sample Location Bloods Lake – the lake was frozen about 10 feet out from sample location.

Blue arrow indicates sample location for Bloods Lake. Much of the lake was frozen.



View to Southwest of Bloods Lake Sample Location

Jurisdictional Crossroads

Wildlife: Species found on Bonanza Flat truly know no property line distinctions and wildlife on Bonanza Flat benefit from the larger contiguous landscape that extends from adjacent protected lands in Big Cottonwood Canyon. In some instances, management practices on adjacent lands will affect the success of wildlife populations on Bonanza Flat. The typical range for Moose for example can range from 5 to 100 square miles, making connections with larger landscapes a valuable component to protecting this species. The abundant habitat and in particular the water resources on Bonanza Flat are high value targets for wildlife that both attract and sustain these populations. Ensuring protection of riparian areas, open water, intermittent and permanent streams on all adjacent properties will result in greater health for these species. Management practices ranging from invasive species removal, water quality protocols, limiting fragmentation of habitat are all critical inter-jurisdictional considerations as management on Bonanza Flat cannot occur in isolation.

Vegetation: The overall forest health of Bonanza Flat is good. There is a relatively low presence of invasive pests and the aspen forests are demonstrating good signs of recruitment and regeneration. How forests are managed on adjacent properties can have a dramatic impact on forest health. Data gathered in adjacent areas demonstrate that there is the potential for both garlic mustard and beetle infestation. To guard against these, proactive management from other jurisdictions, as well as constant monitoring of these threats, should aid in keeping them from infesting the Bonanza Flat property.

Recreation: In similar fashion to the wildlife, human visitors to Bonanza Flat do not recognize property line distinctions either. Inadequate recreational infrastructure, access points, parking, restrooms and limited allowed uses in adjacent jurisdictions and on adjacent public land cannot be accommodated on Bonanza Flat. Management practices ranging from better trail design, trailheads, parking and use related services are critical inter-jurisdictional considerations as management on Bonanza Flat cannot occur in isolation.

Human Welfare & Safety

Fire issues on Bonanza Flat are low in terms of the health of the vegetative communities and forests, but they are high when considering human caused fires. Even the healthiest ecosystem will be susceptible to campfires, target shooting, fireworks and any other manmade fire that gets out of control. Carelessness, wind, drought and other factors can exacerbate the danger of fire and it is recommended that fires be prohibited unless or until a designated camping area is established with appropriate fire ring infrastructure. Off road vehicle use has and will present safety issues as vehicles venture into areas of extreme terrain. Prohibition of these vehicles is recommended everywhere except on designated roads where local laws allow. The Guardsman Pass parking area is out of containment from a safety viewpoint and it is

recommended that this parking area be closed and provided for shuttle drop off-pick up only. This can only occur by providing parking elsewhere with appropriate facilities. Significantly Bonanza Flat carrying capacity is limited and it will be necessary to work with adjacent landowners and jurisdictions to increase recreational infrastructure in these areas.

Conclusion

In general Bonanza Flat is an area that can provide numerous values to the public in terms of conservation. Beyond taking into account issues provided in each of the sections under the Conservation Values Trajectory, recognizing that this landscape is dramatically connected to adjacent lands is critical to healthy management long term. Specific actions to restore disturbed areas, monitoring degrees of use and monitoring effects will be a critical component of the eventual adaptive management plan. These specific actions and monitoring protocols should accrue from the permitted and restricted uses ultimately determined through the conservation easement process. Further, consideration of delineating varied conservation areas within the Bonanza Flat Conservation Area and prioritizing conservation values within those areas can provide greater direction with in the conservation easement and for the management plan possible designations could include: high use, back country and resource protection conservation areas. Finally, existing encumbrances such as the Girl Scouts lease and Talisker club lease and associated structures will be incorporated as part of the Baseline Documentation, Conservation Easement and Adaptive Management plan.

Contributors

Contributors to this report included:

Wendy Fisher, Utah Open Lands
Michael Auger, Utah Open Lands
Ben Marolf, Utah Open Lands
Marie Lenihan-Clarke, Utah Open Lands
Logan Jones, Park City Municipal Corporation
Jason Baker, Botanical Consultant
Mindy Wheeler, Invasive Species Consultant
Kerry Gee, Mining Resources Consultant
Danielle Malesky, U.S. Forest Service Forest Health
Tracy and Brian Sedgewick, Water Quality Volunteers
Kezia Nakagawa, Water Quality Volunteer

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

VEGETATION:
ASPEN FOREST (*Populus tremuloides*)

OVERVIEW

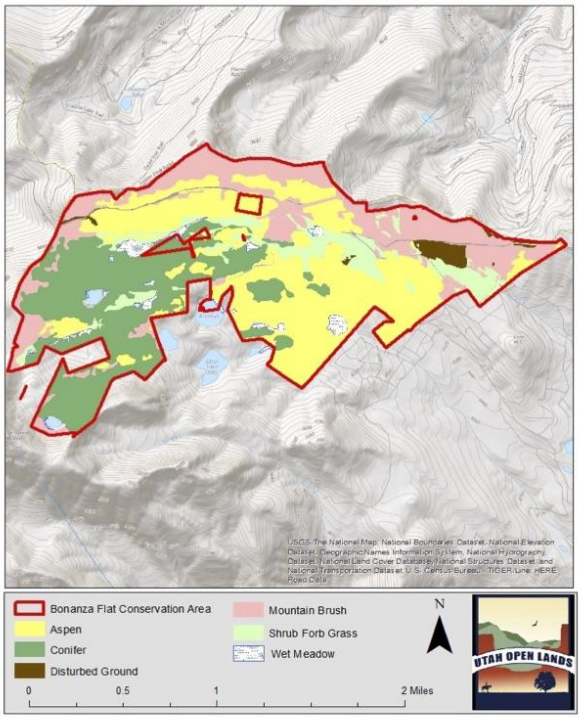
In certain areas of Utah, and many parts of the western U.S., Aspen is on the decline, but Bonanza Flat is home to a thriving community.

Aspen grows in a wide range of environmental and climate conditions. It is found in all mountain vegetational zones and therefore is associated with a diverse range of vegetation. Stable aspen communities are characterized by an uneven age structure, lack of successional change, and the absence of more shade tolerant trees.

The aspen forest type produces an abundance of forage, as much as many grasslands and more than 10 times that produced under associated conifers. Aspen is especially susceptible to gnawing or stripping of its bark by several species of mammals, such as elk, deer, rabbits and porcupines. Aspen buds provide an important winter food source for wildlife and their seedlings and saplings may also be trampled by livestock and large ungulates. Aspens may be effected by digging and feeding upon their roots by pocket gophers and other burrowing creatures.

Aspen reproduce primarily by sprouting from root systems, rather than spreading seeds. Each "clone" can live hundreds or even thousands of years. A stem may die, but beneath the soil, the root sends out fresh shoots, and the cycle begins again. F i r e appears to be necessary for the continued well-being of aspen on most sites. Many aspen stands are replaced by grass, forbs, shrubs, or conifers in the absence of fire.

Landcover Map
Bonanza Flat Conservation Area



CONSERVATION VALUE THREATS

- Fire Suppression
- Disease Caused By Insects
- Climate Change Causing Extreme Weather Conditions

Facts:

- A healthy grove includes sprouts, saplings and mature trees
- Damaging the bark, such as an animal stripping it or carving in it allows infections to occur, just like a cut in your skin
- Aspen's inner bark can be peeled and eaten. It is often bitter but more palatable in the spring.

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

VEGETATION:
WET MEADOW

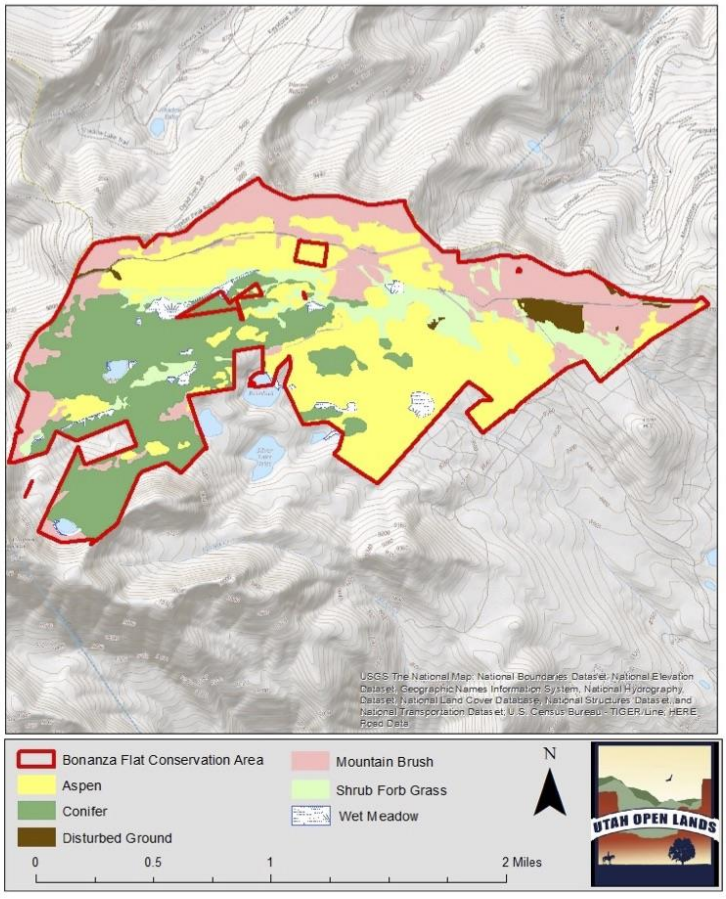
OVERVIEW

Wet Meadows are a type of wetland. Wetlands occupy a total of approximately 1% of the landscape in Utah and are relatively uncommon resources. Though wetlands constitute a minor component of the landscape, they provide diverse ecosystem services including flood attenuation, water-quality enhancement, sediment storage, and nutrient cycling, as well as providing critical habitat for wildlife and economic and aesthetic values for people.

The riparian zone found at Bonanza Flat, plays an imperative role for the quality of our watershed, filtering out pollution and silt form our drinking water.

Unlike a marsh or swamp, a wet meadow does not have standing water present except for brief to moderate periods during the growing season. Vegetation here usually includes a wide variety of herbaceous species including sedges, rushes, grasses and a wide diversity of other plant species. In areas with low frequencies of fire, or reduced water level fluctuations, plant diversity will decline.

Landcover Map
Bonanza Flat Conservation Area



Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

VEGETATION:
FALSE HELLEBORE (*Veratrum viride*)

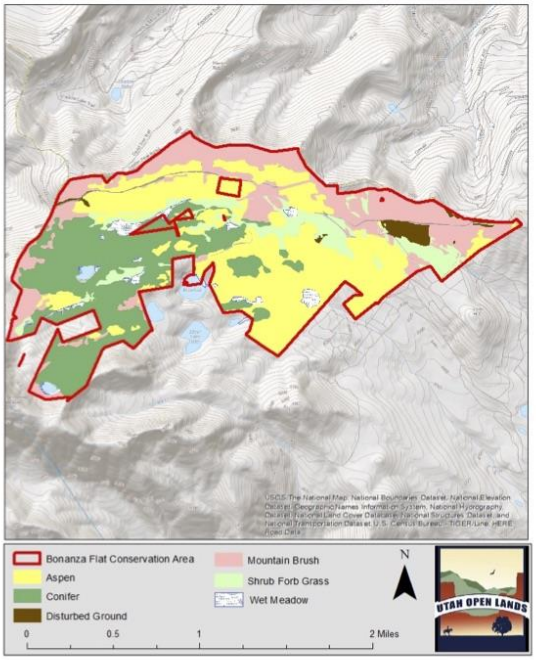
OVERVIEW

False Hellebore, sometimes referred to as Wild Corn or Cow Cabbage, grows in damp areas on meadows and hillsides at high elevations and is present on the Bonanza Flat property. It emerges in the spring after snow melt and reaches a height of 1.5 to 2 meters. Leaves may measure 20 to 30 cm long and 7 to 15 cm broad. Cream-colored flowers grow in clusters at the top of a single unbranched stalk that resembles corn in July and August, followed by seed production in September. False hellebore is poisonous from the time it starts to grow until after it is killed by freezing, but toxicity decreases as plants mature. The roots are 5 to 10 times as poisonous as leaves or stems.

Although seen as a worthless invasive weed targeted for eradication by ranchers, the toxic roots of the native plant holds compounds that could help combat cancer. It is currently being tested for future use as a treatment for a highly malignant skin cancer called basal cell nevus syndrome, or Gorlin syndrome. As false hellebore is tough to grow in an agricultural setting, it is currently being obtained for testing from its wild environments.

Right: False Hellebore would likely be found in the Wet Meadow regions displayed on the map.

Landcover Map
Bonanza Flat Conservation Area



Cultural History: Did You Know?

This plant was used by some tribes to elect a new leader. All the candidates would eat the root, and the last to start vomiting would become the new leader.

Signs of Poisoning:

- Excessive salivation with frothing
- Irregular gait
- Vomiting
- Fast, irregular heartbeat
- Slow, shallow breathing
- Coma
- Convulsions

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

RARE PLANTS:
CLUSTERED LADY'S SLIPPER
(*Cypripedium fasciculatum*)

OVERVIEW

The Clustered Lady's Slipper occurs in eight western states from the Pacific Northwest to California, north to Montana and east to Colorado and Wyoming.

Cypripedium fasciculatum is a small plant with two broad, opposing leaves. The flowering stem may bear one to nine flowers that droop. When the flower goes to seed a capsule forms and the stem becomes erect. The sepals are purple-green and the pouch yellow-green streaked with purple. The small flower is pollinated by a tiny wasp.

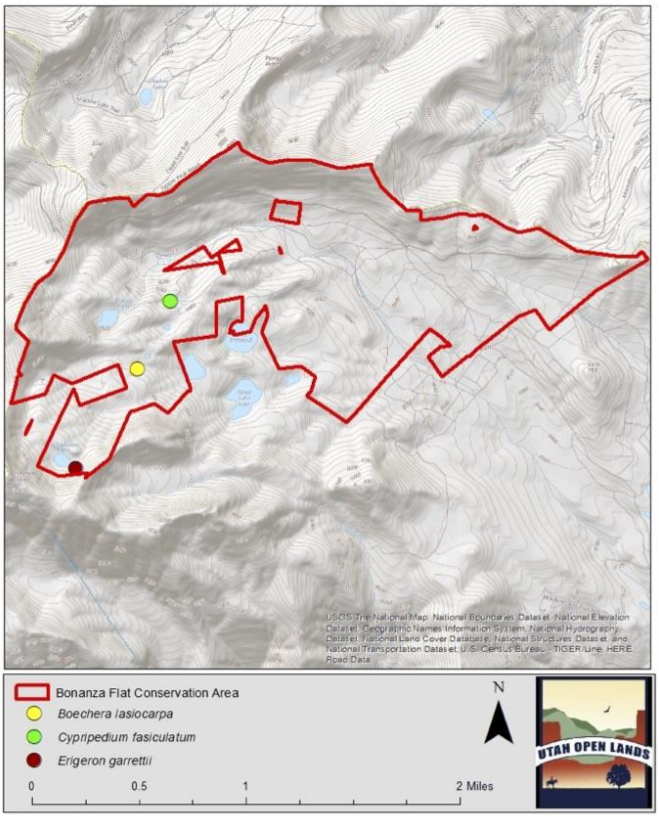
The vegetation on the Property provides a basic value for each conservation value from recreation to scenic to heritage values. Although many smaller natural plant communities exist within the Property over the various topography, five main, clearly distinguishable natural communities occur throughout: Aspen, Conifer, Mountain Brush, Wet Meadow, and a mixture of Shrubs, Forbs, and Grasses, each containing its own unique species diversity. The vegetation on the property varies greatly due to the various substrate types, changes in elevation, slope, aspect and steepness, and available moisture.

The Clustered lady's slipper is found near Conifer Forest.

Did You Know?

Cypripedium fasciculatum has a mushroom-like odor which is what attracts parasitoid wasps that parasitise fungus flies. Large hairy patches on the orchid's leaves resemble leaf mould infection and the flower releases a fungus-like odor.

Rare/Uncommon Plant Species Map
Bonanza Flat Conservation Area



Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

RARE PLANTS:
GARRETT'S FLEABANE (*Erigeron garrettii*)

OVERVIEW

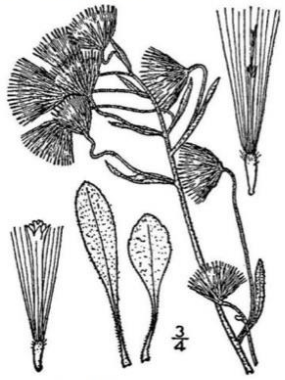
Erigeron garrettii is a rare North American species of flowering plants in the daisy family known by the common name Garrett's fleabane.

The most widely used common name, fleabane, is shared with related plants in several other genera. It is derived from the belief that the dried plants repelled fleas. The generic name *Erigeron* is derived from the Greek (*eri* = early; *geron* = old man), a reference to the appearance of the white hairs of the fruit soon after flowering.

Erigeron garrettii has been found only in the north-central part of the State of Utah in the western United States. It grows in cracks in cliff faces and in rocky soil between boulders. It grows up to 23 cm (9 inches) tall, and produces a woody taproot. The plant produces only flower head per stem, the head containing golden yellow disc florets surrounded by as many as 25 white ray florets. Florets can sometimes appear pink or lavender in color (*see photographs, right*).

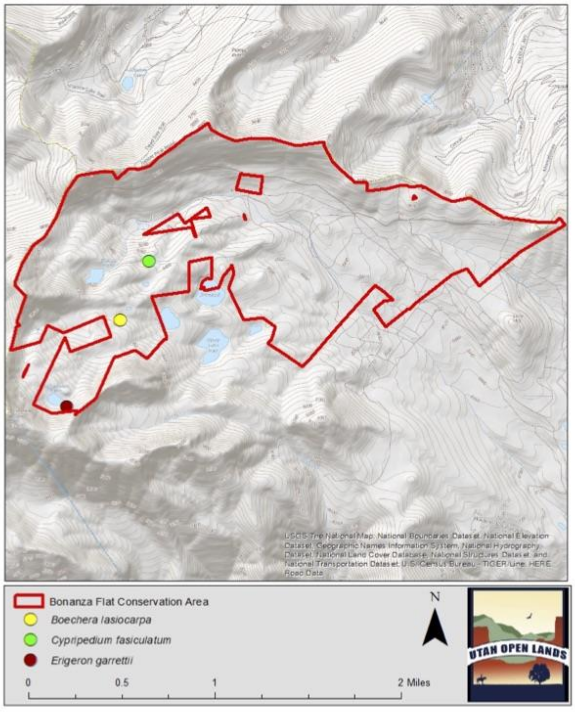
This plant blooms annually in the spring and reproduces by seed.

Diagram:



© USDA-NRCS

Rare/Uncommon Plant Species Map
Bonanza Flat Conservation Area



Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

RARE PLANTS:
WASATCH ROCKCRESS (*Boechera lasiocarpa*)

OVERVIEW

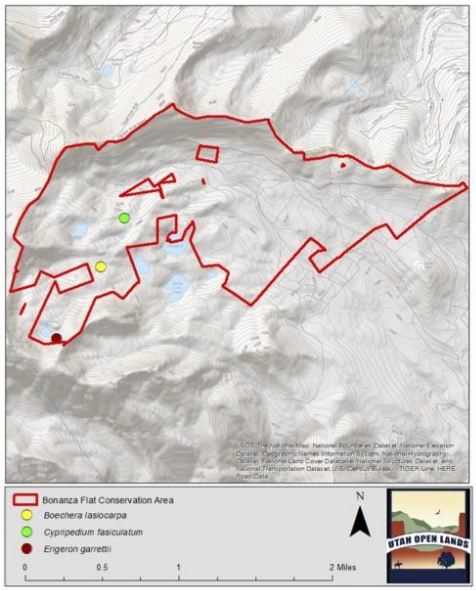
Wasatch rockcress is endemic to north-central Utah, found in several mountain ranges including the Bear River Range, the northern and central Wasatch Range, and the Wellsville Mountains. This plant, belonging to the mustard family, has a current known range that appears to be approximately 10,000-20,000 square km.

It is a long-llivid perennial with tall branched elevated form woody caudex, often above the ground. The basal leaves are narrow, linear and erect, measuring approximately 2-4 cm long. In addition to this, siliques curve to straight upward pointing orientation and measure 2-5 cm long. The petals, lavender or purple in color, are the shortest part of Wasatch rockcress, 6-8mm in length.

This plant thrives in steep rocky hillsides as well as metamorphosed igneous chip-rock, whitish sedimentary rocks, quartzite sands, and exposed rocky areas. The optimal elevation for Wasatch rockcress are areas between 5,700 ad 9,500 feet high, particularly throughout the months of mid-April through June.

This species is distinguished by its intricately branched aerial caudex with each branch terminated by a tuft of erect to linear-oblanceolate entire leaves.

Rare/Uncommon Plant Species Map
Bonanza Flat Conservation Area



Breaking it down:

Every species can be broken down from Kingdom to Genus. See *below* for the breakdown of the *Boechera lasiocarpa.*

Rank	Scientific Name and Common Name
Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Dilleniidae
Order	Capparales
Family	Brassicaceae / Cruciferae – Mustard family
Genus	*Arabis* L. – rockcress

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

WATERSHED:
BLOODS LAKE

OVERVIEW

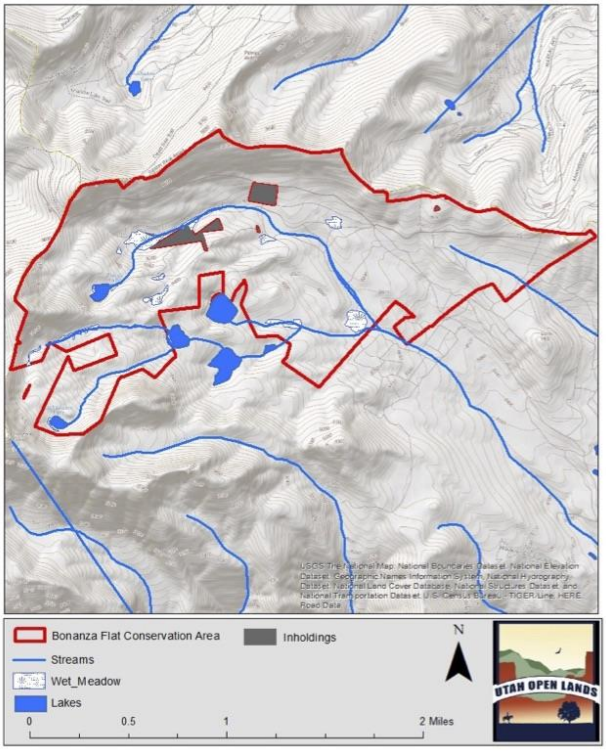
The accumulation of snow on Bonanza Flat during the winter is profound. Snow accumulation has been measured at 9 feet in March in the meadow below Lake Brimhall.

Due west from Brimhall you can locate Bloods Lake, another glacial lake, on the edge of the property. The lake has a dam in the drainage leading from the lake. For decades a pipeline has carried water from the lake to the Girl Scout camp, the Daly West and at times the Ontario mine on the Ontario mine bench. It currently only supplies water to the Girl Scout camp or the Talisker Club facility near the Jones Shaft.

The preservation of Bonanza Flat from development demonstrates how beyond contributing to trails, wildlife and the quality of life we enjoy, open space preservation is reducing our water and carbon footprint in addition to protecting snowsheds, watersheds and a natural carbon sink.

With prior development plans having already been approved, we know that between 200-300 different types of units could have depended on approximately 60,000,000 gallons of water and used a total annual energy use of up to 875,000 kWh, producing about 600 tons of CO2 as a result.

Water Resources Map
Bonanza Flat Conservation Area



Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

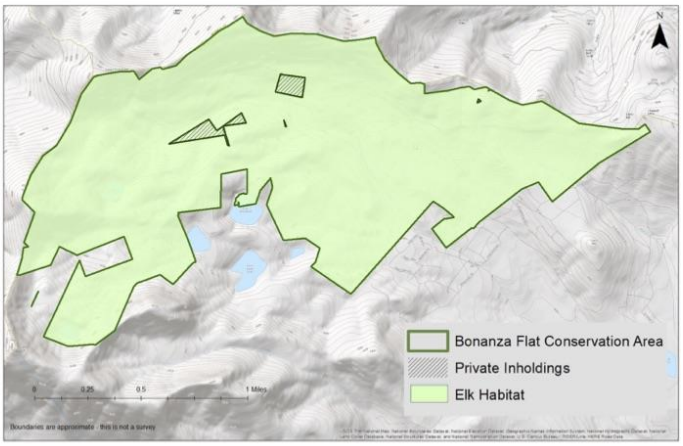
WILDLIFE:
ROCKY MOUNTAIN ELK (*Cervus canadensis*)

OVERVIEW

Bonanza Flat is considered critical year round habitat for elk, which are commonly spotted throughout mountainous regions in Utah. Mountain meadows and forests provide the foraging grounds and shelter necessary for the elk to successfully withstand seasonal changes. Elk are grazers with their diet typically consisting of grasses, forbs, woody plants and mushrooms.

Elk are gregarious animals and, as such, often gather into large nursery bands of cows and calves in early summer. During this time, it is common to see groups of several hundred elk. Within a few weeks those nursery bands disperse into smaller groups across the summer range. Breeding season follows in the fall, during which time males emit loud vocalizations, called bugles, which keep females in a group and warn other males to stay away. Females go on to seek solitude in the spring months to look after the calves.

Despite elk having been one of the most common game animals in Utah prior to settlement times , unrestricted hunting had become a threat to them by 1900. Due to limits put in place, the elk population of Utah now rests at a healthy 81,000 statewide. However, new threats face the elk population. Uncontrolled use of OHVs can cause damage to elk habitat and disturbance to elk during critical phases of their life cycle. Shed antler gathering and the associated human disturbance on crucial winter ranges, especially with the use of OHVs, can cause undue stress on elk during a time



Identification Tips:

- A bull can weight up to 700 lbs, measure 5ft tall and 8ft in length
- Coloring;
  - Summer: Copper Brown
  - Fall, Winter, Spring: Light Tan
  - Rump Patch: Light Beige
  - Legs and neck are often darker than body
- Antlers;
  - New antlers are covered in fuzzy skin, called velvet
  - Antlers harden by late summer and velvet peels away
  - By September, antlers are solid and weigh up to 40 pounds

HABITAT REQUIREMENTS

- Conifer Forests
- Aspen Forests
- Wet Meadows
- Mountain Brush
- Shrubs-Forms-Grasses Natural Communities

CONSERVATION VALUE THREATS

- Habitat Fragmentation
- Urbanization
- Invasive Weeds
- Fire Suppression
- Harassment through Human Pursuit;
  - Motorized Recreation
  - Hunting

Bonanza Flat Conservation Area

FACT SHEET

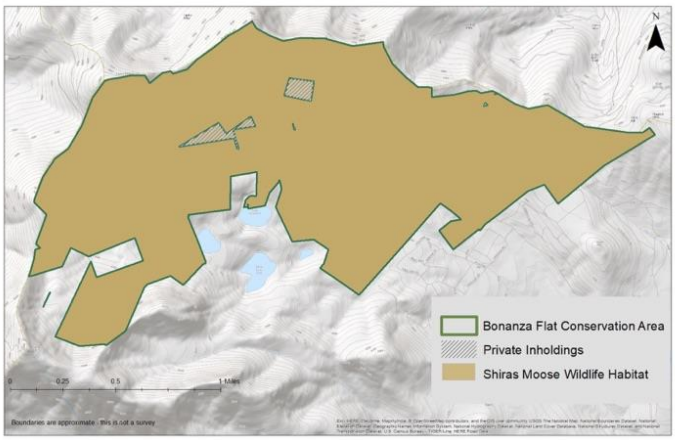
Resource Inventory & Management Plan

WILDLIFE:
SHIRAS MOOSE (*Alce, alces shiras*)

OVERVIEW

Bonanza Flat is considered critical year round habitat for the Shiras Moose, the subspecies of moose found in Utah. The primary limiting factor for moose in Utah and across their range is the availability of suitable habitat but the he presence of ponds, wet meadows and riparian habitat found at Bonanza Flat is perfect for moose. Habitat fragmentation, the natural evolution of mid successional vegetative communities, and climate change present some of the greatest challenges to protecting this species in Utah. The diversity of vegetation found on Bonanza due in part to the watershed and snowshed value it serves, provides for both transient and permanent habitat for moose.

Moose rely on woody deciduous vegetation for much of their diet, but plants like Mountain mahogany which remains green throughout the winter months also provide for foraging. They tend to be found in the same areas as mule deer, elk, and to a lesser extent, the mountain goat.



Although moose are susceptible to a wide variety of viral, bacterial and parasitic diseases, predators such as Black Bear and Mountain Lion in addition to auto collisions causing their death, are also a major problem. There are numerous issues involved in the proper protection of moose including habitat loss, competition, disease, poaching, predators, human interactions, wilderness management, transplants, and hunting.

HABITAT VALUES

- Wet Meadows & Ponds
- Riparian Habitat
- Conifer Forest, providing thermoregulation
- Transient & Permanent Habitat
- Critical Year Round

CONSERVATION VALUE THREATS

- Habitat Fragmentation
- Climate Change and Successional Vegetative Changes
- Harassment through Human Pursuit;
  - Dogs
  - Motorized Recreation

Identification Tips:

- Length: 10ft
- Height: 7ft
- Small body
- Palmate Antlers on the sides of the head
- Rusty yellow-brown body color
- Pale brown saddle
- Large shoulder hump

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

WILDLIFE:
FLAMMULATED OWL (*Otus flammeolus*)

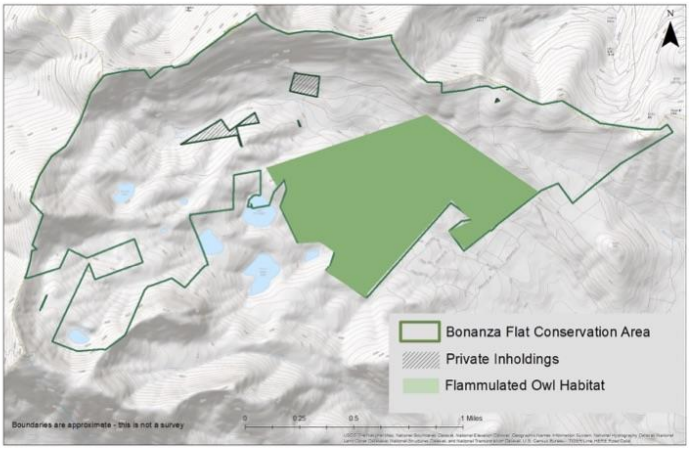
OVERVIEW

Bonanza Flat is considered home to the Flammulated Owl, a species whose population is declining in certain areas. These cavity nesters are migratory and insectivorous - a unique set of characteristics in a small forest owl, rendering its type sensitive to forest management and climate change impacts.

This species migrates from its wintering grounds in central Mexico, the highlands of Central America, and coastal California to its breeding grounds across western North America. Bonanza Flat is located in an area considered to be prime location for breeding of the flammulated owl, which are strictly nocturnal animals, due to its open pine forests in this mountainous region. This species prefers cool and fairly dry zones and in some cases favors groves of aspen. Large insects.

The flammulated owl feeds almost entirely on insects, especially moths, beetles, and crickets but also eats a spiders, centipedes, scorpions, and other arthropods.

As virtually nothing is known about its range, habitat, or diet in winter, Bonanza Flat offers the opportunity to gain more of an insight into how the flammulated owl behaves.



Bird Type:

The flammulated owl is a type of raptor, with a monotonous flat toot, which coupled with its small stature, makes it difficult to locate.

HABITAT VALUES

- Pine Forest
- Aspen Forest
- Grasslands
- Meadows

CONSERVATION VALUE THREATS

- Deforestation
- Climate Change
- Urbanization
- Habitat Fragmentation
- History of Conservation Effort

Identification Tips:

- Length: 6-7”
- Weight: 2oz
- Short feathered ear tufts, brownish gray and dark eyes
- Clutch size: 2-4 eggs
- Eggs are white with a faint creamy tint

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

WILDLIFE:
NORTHERN GOSHAWK (*Accipiter gentilis*)

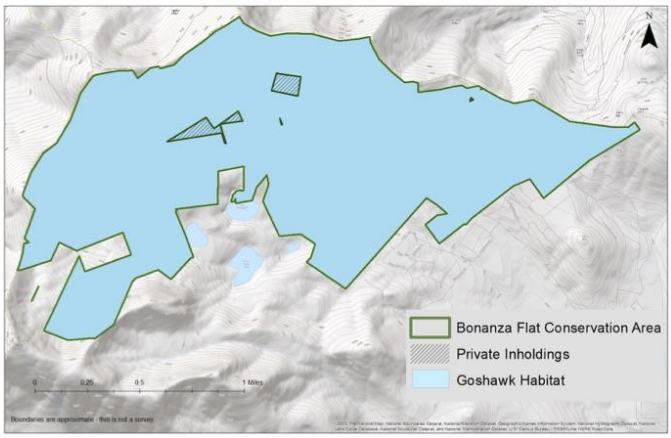
OVERVIEW

Bonanza Flat is considered critical year round habitat for the northern goshawk despite occasionally heading south in winter months.

Early records indicate that the northern goshawk was an uncommon permanent resident in Utah, primarily found in montane conifer and quaking aspen throughout the state. Although now a permanent resident throughout the state of Utah, the northern goshawk remains uncommon here. The species is classified as CS, meaning it is a species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing.

The northern goshawk nests in a wide range of forested habitats and most of the 421 known nests located statewide occur in mid-elevation (6,000 ft) to high-elevation (10,000 ft) sites. Northern goshawks nest in mature to old forests with relatively large trees, high canopy closure, sparse ground cover and open understories. Nests are often located near the bottom of moderately steep slopes, close to water, and often adjacent to a canopy break

Bonanza Flat provides prey for the northern goshawk as it cruises through low forest trees to hunt for rabbits, squirrels and birds such as woodpeckers, robins, grouse, or jays.



Bird Type:

The northern goshawk is a type of raptor, which, typically have a strong hooked beak and long curved talons.

HABITAT VALUES

- Aspen Forest
- Conifer Forest
- Wet Meadows
- Ponds

CONSERVATION VALUE THREATS

- Deforestation & Timer Harvest
- Climate Change
- Habitat Fragmentation
- Fire Suppression
- Insect & Disease Outbreak
- Competition & Predation
- History of Conservation Effort

Identification Tips:

- Length: 20–26"
- Large robust hawk with longish tail
- Adult: Crown and cheek blackish with broad white stripe over the eye. Immature (shown): Pale stripe over the eye; irregular tail-banding

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

WILDLIFE:
MOUNTAIN GOAT (*Oreamnos americanus*)

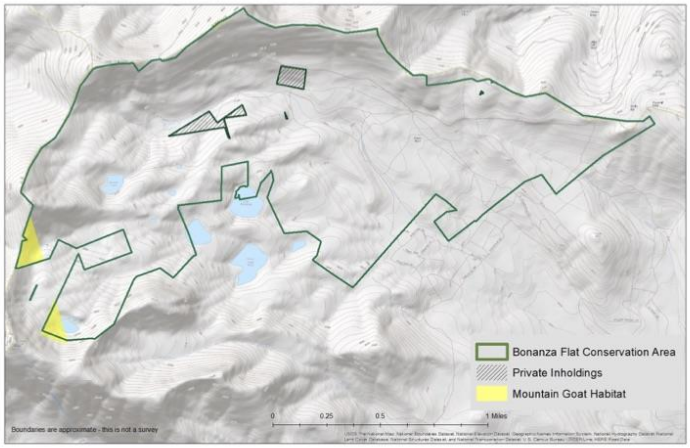
OVERVIEW

The mountain goat was likely native to Utah in the past, but it did not occur in the state during recent times until the late 1960s, when the species was first re-introduced to the mouth of Little Cottonwood Canyon. Today, this species calls Bonanza Flat its home.

Mountain goats prefer extremely steep and rugged areas above the timberline, and are excellent rock climbers. They typically migrate to lower elevations in the winter, but can still be up to 12,000 feet - not too different to their preferred summer elevation of up to 13,000 feet.

In general, summer diets are typically dominated by succulent grasses and forbs. Like many ungulates, mountain goats put on weight and fat reserves during the spring and summer months for use during winter when their diets may include a much higher browse or shrub component, and may even include Ponderosa pine, lodgepole pine, or alpine fir.

Mountain goats are adapted to live in the highest, coldest, snowiest and most precipitous reaches of our classic western mountain ranges, which, Bonanza Flat offers throughout most seasons in Utah.



HABITAT VALUES

- High Elevation
- Alpine Environment
- Ridges & Cliffs
- Intermediate Slopes
- Mineral Licks

CONSERVATION VALUE THREATS

- Habitat Fragmentation
- Climate Change and Successional Vegetative Changes

Facts:

- Lifespan: 9-12 years
- Jump distance: 12 ft

Identification Tips:

- Female: Thin horn with sharp curve
- Male: Wider horn base with gradual curve
- Height: 3-4 ft
- Weight: 100-300 lbs

Bonanza Flat Conservation Area

FACT SHEET

Resource Inventory & Management Plan

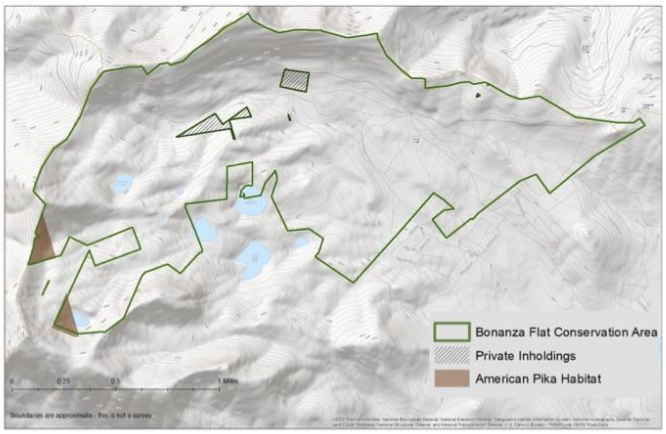
WILDLIFE:
PIKA (*Ochotona princeps*)

OVERVIEW

As a high mountainous area of Utah, Bonanza Flat provides home to the American Pika, where it prefers to remain above the treeline on rocky slopes. Pikas are active during the day throughout the year, but may remain under cover during hot days. Although it is primarily found in talus fields, the American pika is occasionally found in piles of broken rock and man-made substrate such as mine tailings or piles of scrap lumber.

The American pika is an herbivore that eats grasses, sedges, and other types of vegetation. Food is often gathered during the summer and fall and stored for the winter. They meet most of their water needs through consumed plant material, but also use available drinking water.

Global warming is one of the biggest threats that the American Pika faces today. Rising temperatures prevent the species from being able to inhabit certain areas, prevent them from midday foraging therefore precluding them from gaining sufficient body mass, diminishing their much loved snow packs, altering precipitin and therefore changing surrounding vegetation, affecting meadows, reducing permafrost and making the pika more susceptible to predators. In addition to climate change, livestock grazing in the meadows that surround pika habitat may cause negative impacts by trampling vegetation important for the species and by facilitating the invasion of exotic plant species.



Identification Tips:

- Length: 7-9”
- Weight: 2.5-10 oz
- Color: Black, Brown, Grey, White, Tan fur

HABITAT VALUES

- Mountain Meadows
- Talus Slopes
- Montane Plants
- Critical Year Habitat

CONSERVATION VALUE THREATS

- Climate Change
  - Heat Sensitive
  - Habitat Changes
  - Reduced Dispersal
- Anthropogenic Effects
  - Grazing
  - Urbanization

Facts:

Despite their rodent-like appearance, pikas are actually closely related to rabbits and hares.

- Speed: 15 mph
- Lifespan: 3-6 years
- Average Litter Size: 3
- Diet: Herbivore
- Predators: Weasels, Eagles and Dogs

Bonanza Flat Plant List			
Family	**Botanical Name**	**Common Name**	**Notes**
ACERACEAE			
	Acer grandidentatum	Rocky Mountain Maple	
ALISMATACEAE			
	Sagittaria cuneata	Arumleaf Arrowhead	
ASTERACEAE			
	Achillea millefolium	Common Yarrow	
	Agoseris aurantiaca	Orange Agoseris	
	Agoseris glauca	Pale Agoseris	
	Anaphalis margaritaceae	Western Pearly Everlasting	
	Antennaria microphylla	Littleleaf Pussytoes	
	Arctium minus	Lesser Burdock	INTRODUCED
	Arnica cordifolia	Heartleaf Arnica	
	Arnica latifolia	Broadleaf Arnica	
	Arnica longifolia	Spearleaf Arnica	
	Arnica parryi	Parry's Arnica	
	Artemisia frigida	Fringed Sage	SEEDED/NATIVE
	Artemisia michauxiana	Michaux's Wormwood	
	Artemisia spiciformis	Big Sagebrush	
	Artemisia tridentata ssp. *vaseyana*	Mountain Big Sagebrush	
	Aster ascendens	Everywhere Aster	
	Aster engelmanii	Engelmann's Aster	
	Aster perelegans	Elegant Aster	
	Brickellia grandiflora	Tassselflower Brickellbush	
	Carduus nutans	Musk Thistle	INTRODUCED

	Chaenactis douglasii	Douglas' Dustymaiden	
	Chrysothamnus viscidiflorus	Green Rabbitbrush	
	Cirsium arvensis	Canada Thistle	INTRODUCED
	Cirsium eatonii	Eaton's Thistle	
	Crepis acuminata	Tapertip Hawksbeard	
	Erigeron arenarioides	Wasatch Fleabane	
	Erigeron compositus	Cutleaf Daisy	
	Erigeron coulteri	Large Mountain Fleabane	
	Erigeron eatonii	Eaton's Fleabane	
	Erigeron garrettii	Garrett's Fleabane	UNCOMMON
	Erigeron speciosus var. *speciosus*	Threenerve Fleabane	
	Gaillardia pulchella	Indian Blanket	SEEDED
	Haplopappus macronema	Whitestem Goldenbush	
	Helianthella uniflora	Oneflower Helianthella	
	Heliomeris multiflora	Showy Goldeneye	
	Hieracium cynoglossoides	Houndstongue Hawkweed	
	Lactuca serriola	Prickly Lettuce	INTRODUCED
	Machaeranthera canescens	Hoary Tansyaster	
	Machaeranthera grindelioides	Rayless Tansyaster	
	Packera multilobata	Lobeleaf Groundsel	
	Rudbeckia occidentalis	Western Coneflower	
	Senecio fremontii	Dwarf Mountain Ragwort	
	Senecio integerrimus	Lambstongue Ragwort	
	Senecio serra	Tall Ragwort	
	Senecio sphaerocephalus	Ballhead Ragwort	
	Senecio streptanthifolius	Rocky Mountain Ragwort	
	Senecio triangularis	Arrowleaf Ragwort	
	Solidago velutina	Threenerve Goldenrod	
	Symphyotrichum foliaceum var. *canbyi*	Canby's Aster	

	Taraxacum officinale	Dandilion	INTRODUCED
	Tragopogon dubius	Yellow Salsify	INTRODUCED
	Tragopogon pratensis	Meadow Salsify	INTRODUCED
	Tripleurospermum inodorum	Scentless Chamomile	INTRODUCED
APIACEAE			
	Heracleum lanatum	Common Cowparsnip	
	Lomatium graveolens	King Desertparsley	
	Osmorhiza berteroi	Sweetcicely	
	Osmorhiza depauperata	Bluntseed Sweetroot	
	Osmorhiza occidentalis	Wester Sweetroot	
ARACEAE			
	Lemna gibba	Duckweed	
BERBERIDACEAE			
	Mahonia repens	Creeping Oregon Grape	
BETULACEAE			
	Alnus incana	Gray Alder	
BORAGINACEAE			
	Cynoglossum officinale	Houndstongue	INTRODUCED
	Hackelia floribunda	Manyflower Stickseed	
	Hackelia micrantha	Jessica Sticktight	
	Lappula occidentalis	Flatspine Stickseed	
	Mertensia arizonica	Aspen Bluebells	
	Mertensia ciliata	Tall Fringed Bluebells	
BRASSICACEAE			

	Arabis glabra	Tower Rockcress	
	Boechera lasiocarpa	Wasatch Rockcress	UNCOMMON
	Cardamine cordifolia	Heartleaf Bittercress	
	Chlorocrambe hastata	Spearhead	
	Descurainia californica	Sierra Tansymustard	
	Erysimum capitatum	Sanddune Wallflower	
	Isatis tinctoria	Dyer's Woad	INTRODUCED
	Lesquerella intermedia	Mid Bladderpod	
	Noccaea montana	Alpine Pennycress	
	Rorippa sylvestris	Creeping Yellowcress	
	Smelowskia calycina var. *americana*	Alpine False Candytuft	
CALLITRICHACEAE			
	Callitriche palustris	Vernal Water-starwort	
CAPRIFOLIACEAE			
	Lonicera involucrata	Twinberry Honeysuckle	
	Lonicera utahensis	Utah Honeysuckle	
	Sambucus caerulea	Blue Elderberry	
	Sambucus racemosa	Red Elderberry	
	Symphoricarpos oreophilus	Mountain Snowberry	
CARYOPHYLLACEAE			
	Pseudostellaria jamesiana	Tuber Starwort	
	Sagina saginoides	Arctic Pearlwort	
	Silene douglasii	Douglas's Catchfly	
	Silene menziesii	Menzies' Campion	
CELASTRACEAE			
	Pachystima myrsinites	Mountain Lover	

CHENOPODIACEAE			
	Chenopodium atrovirens	Pinyon Goosefoot	
	Monolepis nuttalliana	Nuttall's Povertyweed	
CRASSULACEAE			
	Sedum debile	Orpine Stonecrop	
CONVOLVULACEAE			
	Convolvulus arvensis	Field Bindweed	INTRODUCED
CYPERACEAE			
	Carex albonigra	Blackandwhite Sedge	
	Carex athrostachya	Slenderbeak Sedge	
	Carex ebenea	Ebony Sedge	
	Carex hoodii	Hood's Sedge	
	Carex lenticularis var. lipocarpa	Kellogg's Sedge	
	Carex microptera	Smallwing Sedge	
	Carex norvegica	Norway Sedge	
	Carex paysonis	Payson's Sedge	
	Carex raynoldsii	Raynolds' Sedge	
	Carex utriculata	Northwest Territory Sedge	
	Eleocharis palustris	Common Spikerush	
DRYOPTERIDACEAE			
	Cystopteris bulbifera	Bulblet Bladderfern	
EQUISETACEAE			
	Equisetum arvense	Field Horsetail	

ERICACEAE			
	Moneses uniflora	Single Delight	
	Vaccinium caespitosum	Dwarf Blueberry	
	Vaccinium scoparium	Grouse Wortleberry	
FABACEAE			
	Astragalus tenellus	Looseflower Milkvetch	
	Hedysarum boreale	Utah Sweetevetch	SEEDED/NATIVE
	Lathyrus lanszwertii	Nevada Pea	
	Lathyrus pauciflorus	Fewflower Pea	
	Lupinus argenteus	Silvery Lupine	
	Medicago lupulina	Black Medic	INTRODUCED
	Medicago sativa	Alfalfa	INTRODUCED
	Melilotus officinalis	Yellow Sweetclover	INTRODUCED
	Onobrychis viciifolia	Sainfoin	INTRODUCED
	Trifolium repens	White Clover	INTRODUCED
FAGACEAE			
	Quercus gambelii	Gambel Oak	
FUMARIACEAE			
	Corydalis aurea	Scrambled Eggs	
GENTIANACEAE			
	Frasera speciosa	Elkweed	
	Gentianella amarella	Autumn Dwarf Gentian	
GERANIACEAE			
	Geranium richardsonii	Richardson's Geranium	
	Geranium viscosissimum	Sticky Geranium	

GROSSULARIACEAE			
	Ribes cereum	Wax Currant	
	Ribes inerme	Whitestem Gooseberry	
	Ribes montigenum	Gooseberry Currant	
	Ribes wolfii	Wolf's Currant	
HALORAGACEAE			
	Myriophyllum sibiricum	Shortspike Watermilfoil	
HYDROPHYLLACEAE			
	Hydrophyllum capitatum	Ballhead Waterleaf	
	Phacelia hastata	Sliverleaf Phacelia	
IRIDACEAE			
	Iris missouriensis	Rocky Mountain Iris	Native/Seeded
JUNCACEAE			
	Juncus balticus	Baltic Rush	
	Juncus bufonius	Toad Rush	
	Juncus mertensianus	Mertens' Rush	
	Juncus parryi	Parry's Rush	
	Luzula spicata	Spiked Woodrush	
LAMIACEAE			
	Agastache urticifolia	Nettleleaf Giant Hyssop	
	Monardella odoratissima	Western Pennyroyal	
LILIACEAE			
	Calochortus nuttallii	Sego Lily	
	Maianthemum racemosum	Feathery False Lily of the Valley	

	Maianthemum stellatum	Starry False Lily of the Valley	
	Streptopus amplexifolius	Claspleaf Twistedstalk	
	Veratrum californicum	False Hellebore	
MALVACEAE			
	Illiamna rivularis	Mountain Hollyhock	
MENYANTHACEAE			
	Menyanthes trifoliata	Buckbean	
ONAGRACEAE			
	Epilobium ciliatum	Fringed Willowherb	
	Epilobium angustifolium	Fireweed	
	Gayophytum ramosissimum	Pinyon Groundsmoke	
	Oenothera coronopifolia	Crownleaf Evening Primrose	
	Oenothera flava	Yellow Evening Primrose	
ORCHIDACEAE			
	Corallorhiza maculata	Spotted Coralroot	
	Cypripedium fasciculatum	Clustered Lady's Slipper	UNCOMMON
	Goodyera oblongifolia	Western Rattlesnake Plantain	
	Platanthera dilatata	White Bog Orchid	
	Spiranthes romanzoffiana	Hooded Lady's Tresses	
OROBANCHACEAE			
	Castilleja angustifolia var. *dubia*	Northwestern Indian Paintbrush	
	Castilleja applegatei	Wavyleaf Indian Paintbrush	
	Castilleja linariifolia	Wyoming Indian Paintbrush	

	Castilleja miniata	Giant Red Indian Paintbrush	
	Castilleja rhexifolia	Rosy Indian Paintbrush	
	Orthocarpus tolmiei	Tolmie's Owl's-clover	
	Pedicularis groenlandica	Elephanthead Lousewort	
	Pedicularis racemosa	Sickletop Lousetop	
PINACEAE			
	Abies concolor	White Fir	
	Abies lasiocarpa	Subalpine Fir	
	Juniperus communis	Common Juniper	
	Picea engelmannii	Engelmann's Spruce	
	Picea pungens	Colorado Blue Spruce	
	Pinus flexilis	Limber Pine	
	Pseudotsuga menziesii	Douglas Fir	
PLANTAGINACEAE			
	Plantago tweedyi	Tweedy's Plantain	
POACEAE			
	Agropyron spicatum	Bluebunch Wheatgrass	
	Agrostis exarata	Spike Bentgrass	
	Alopecurus aequalis	Shortawn Foxtail	
	Bromus arvensis	Field Brome	INTRODUCED
	Bromus carinatus	California Brome	
	Bromus inermis	Smooth Brome	INTRODUCED
	Calamagrostis canadensis	Bluejoint	
	Dactylis glomerata	Orchardgrass	INTRODUCED
	Deschampsia cespitosa	Tufted Hairgrass	
	Elymus elymoides	Squirreltail	
	Festuca sororia	Ravine Fescue	

	Glyceria striata	Fowl Mannagrass	
	Glyceria grandis	American Mannagrass	
	Hordeum brachyantherum	Meadow Barley	
	Hordeum jubatum	Foxtail Barley	
	Koeleria macrantha	Prairie Junegrass	
	Leucopoa kingii	Spike Fescue	
	Melica bulbosa	Oniongrass	
	Phalaris arundinacea	Reed Canarygrass	
	Phleum alpinum	Alpine Timothy	
	Poa fendleriana	Muttongrass	
	Poa glauca	Glaucous Bluegrass	
	Poa reflexa	Nodding Bluegrass	
	Stipa lettermanii	Lettermann's Needlegrass	
	Stipa nelsonii	Columbia Needlegrass	
	Trisetum spicatum	Spike Trisetum	
POLEMONIACEAE			
	Collomia linearis	Tiny Trumpet	
	Ipomopsis aggregata	Scarlet Gilia	
	Linanthastrum nuttallii	Nuttall's Linanthus	
	Polemonium foliosissimum var. alpinum	Alpine Jacob's Ladder	
	Polemonium occidentale	Western Jacob's Ladder	
POLYGONACEAE			
	Bistorta bistortoides	American Bistort	
	Eriogonum heracleoides	Parsnipflower Buckwheat	
	Eriogonum racemosum	Redroot Buckwheat	
	Eriogonum umbellatum var. umbellatum	Sulfer-flower Buckwheat	
	Polygonum ramosissimum	Bushy Knotweed	
	Rumex acetosella	Common Sheep Sorrel	INTRODUCED

	Rumex salicifolia	Willow Dock	
	Rumex crispus	Curly Dock	INTRODUCED
PORTULACACEAE			
	Claytonia lanceolata	Lanceleaf Springbeauty	
	Montia linearis	Narrowleaf Minerslettuce	
	Lewisia triphylla	Threeleaf Lewisia	
POTAMOGETONACEAE			
	Potamogeton alpinus	Alpine Pondweed	
PRIMULACEAE			
	Primula parryi	Parry's Primrose	
PTERIDACEAE			
	Cryptogramma crispa	Parsley Fern	
PYROLACEAE			
	Pyrola asarifolia	Liverleaf Wintergreen	
	Pyrola chlorantha	Greenflowered Wintergreen	
	Pyrola secunda	Sidebells Wintergreen	
RANUNCULACEAE			
	Aconitum columbianum	Columbian Monkshood	
	Actaea rubra	Red Baneberry	
	Anemone multifida	Pacific Anemone	
	Aquilegia caerulea	Rocky Mountain Columbine	
	Caltha leptosepala	White Marsh Marigold	
	Clematis ligusticifolia	Western White Clematis	

	Delphinium nuttallianum	Twolobe Larkspur	
	Delphinium x occidentale	Western Larkspur	
	Ranunculus adoneus	Alpine Buttercup	
	Ranunculus alismifolius	Plantainleaf Buttercup	
	Ranunculus aquatilis	White Water Crowfoot	
	Ranunculus eschscholtzii	Eschscholtz's Buttercup	
	Ranunculus inamoenus	Graceful Buttercup	
	Ranunculus orthorhynchus	Straightbeak Buttercup	
	Thalictrum fendleri	Fendler's Meadow-rue	
ROSACEAE			
	Amelanchier alnifolia	Saskatoon Serviceberry	
	Amelanchier utahensis	Utah Serviceberry	
	Comarum palustre	Purple Marshlocks	
	Fragaria vesca	Wild Strawberry	
	Geum macrophyllum	Largeleaf Avens	
	Holodiscus dumosus	Rockspirea	
	Potentilla glandulosa	Sticky Cinquefoil	
	Potentilla gracilis	Slender Cinquefoil	
	Prunus virginiana	Chokecherry	
	Rosa nutkana	Nootka Rose	
	Rosa woodsii	Woods' Rose	
	Rubus idaeus	American Red Raspberry	
	Rubus parvifolia	Thimbleberry	
	Sanguisorba minor	Small Burnet	SEEDED/INTRODUCED
	Sibbaldia procumbens	Creeping Sibbaldia	
	Sorbus scopulina	Greene's Mountain Ash	
RUBIACEAE			
	Galium aparine	Stickywilly	
	Galium trifidum	Threepetal Bedstraw	

SALICACEAE			
	Populus tremuloides	Quaking Aspen	
	Salix drummondiana	Drummond's Willow	
	Salix exigua	Sandbar Willow	
	Salix geyeriana	Geyer Willow	
	Salix lasiandra	Pacific Willow	
	Salix lucida	Shining Willow	
	Salix wolfii	Wolf's Willow	
SAXIFRAGACEAE			
	Heuchera parvifolia	Littleleaf Alumroot	
	Saxifraga rhomboidea	Diamondleaf Saxifrage	
	Saxifraga odontoloma	Brook Saxifrage	
	Mitella pentandra	Fivestamen Miterwort	
	Mitella stauropetala	Smallflower Miterwort	
SCROPHULARIACEAE			
	Colllinsia parviflora	Blue Eyed Mary	
	Linaria vulgaris	Butter and Eggs	INTRODUCED
	Mimulus moschatus	Musk Monkeyflower	
	Pedicularis groenlandica	Elephant Lousewort	
	Penstemon cyananthus var. *cyananthus*	Wasatch Beardtongue	
	Penstemon eatonii	Firecracker Penstemon	SEEDED/NATIVE
	Penstemon humilis	Low Beardtongue	
	Penstemon procerus	Littleflower Penstemon	
	Penstemon strictus	Rocky Mountain Penstemon	SEEDED/NATIVE
	Penstemon whippleanus	Whipple's Penstemon	
	Scrophularia lanceolata	Lanceleaf Figwort	
	Verbascum thapsus	Common Mullein	INTRODUCED

	Veronica peregrina	Neckweed
SELAGINELLACEAE		
	Selaginella watsonii	Watson's Spikemoss
SOLANACEAE		
	Solanum triflorum	Cutleaf Nightshade
SPARGANIACEAE		
	Sparganium angustifolium	Narrowleaf Bur-reed
SPHAGNACEAE		
	Sphagnum squarrosum (?)	Sphagnum
URTICACEAE		
	Urtica dioica	Stinging Nettle
VALERIANACEAE		
	Valeriana acutiloba	Sharpleaf Valerian
	Valeriana edulis	Tobacco Root
	Valeriana occidentalis	Western Valerian
VERBENACEAE		
	Verbena bracteata	Bigbract Verbena
VIOLACEAE		
	Viola adunca	Hookedspur Violet
	Viola canadensis	Canadian White Violet
	Viola macloskeyi	Small White Violet
	Viola palustris	Marsh Violet
	Viola praemorsa	Canary Violet

Viola purpurea ssp. *venosa* Goosefoot Violet

Additional Sources:

Factsheet resources;

Aspen
http://hoodriverswcd.org/cms/wp-content/uploads/2013/01/PlantSale_QuakingAspen.pdf
https://www.fs.fed.us/wildflowers/beauty/aspen/ecology.shtml

Wet Meadow
https://geology.utah.gov/resources/wetlands/
https://sites.google.com/site/utahbiomesplantsanimals/wetlands
https://en.wikipedia.org/wiki/Wet_meadow

Hellebore
https://www.ars.usda.gov/pacific-west-area/logan-ut/poisonous-plant-research/docs/false-hellebore-veratrum-californicum/
http://poisoncontrol.utah.edu/plant-guide/false-hellebore.php
http://archive.sltrib.com/article.php?id=5169517&itype=CMSID
https://en.wikipedia.org/wiki/Veratrum_viride

Clustered Lady's Slipper
https://www.fs.fed.us/wildflowers/beauty/cypripedium/cypripedium_fasciculatum.shtml
http://cronodon.com/NatureTech/cypripedioideae.html
https://www.fs.fed.us/wildflowers/beauty/cypripedium/index.shtml

Garrett's Fleabane
https://en.wikipedia.org/wiki/Erigeron_garrettii
http://luirig.altervista.org/pics/index3.php?search=CÚspica+acre&page=1
https://extension.umd.edu/hgic/fleabane
http://eol.org/pages/37999/details#comprehensive_description

Wasatch Rockcress
http://eol.org/pages/596358/details
http://www.utahrareplants.org/rpg_species.html

Goshawk
https://dwrcdc.nr.utah.gov/rsgis2/search/Display.asp?FlNm=accigent
https://wildlife.utah.gov/diseases/wnv/bird_id.php
https://dwrcdc.nr.utah.gov/ucdc/viewreports/sscounty.pdf
http://www.arkive.org/northern-goshawk/accipiter-gentilis/
https://www.fs.fed.us/rm/pubs/rmrs_gtr022/2back.html

Moose
https://wildlife.utah.gov/hunting/biggame/pdf/moose_plan.pdf
http://www.superslam.org/know-your-game/shiras-moose

Elk
https://wildlife.utah.gov/hunting/biggame/pdf/elk_plan.pdf
https://elknetwork.com/elkfacts/

Mountain Goat
https://wildlife.utah.gov/hunting/biggame/pdf/mtn_goat_plan.pdf
http://www.nationalgeographic.com/animals/mammals/m/mountain-goat/

Pika
https://dwrcdc.nr.utah.gov/rsgis2/search/Display.asp?FlNm=ochoprin
https://a-z-animals.com/animals/pika/
https://www.biologicaldiversity.org/species/mammals/American_pika/pdfs/American-pika-federal-petition-10-01-2007.pdf

Flammulated owl
https://www.allaboutbirds.org/guide/Flammulated_Owl/lifehistory
https://hawkwatch.org/our-work/forestowls
https://birdsna.org/Species-Account/bna/species/flaowl/introduction
http://www.audubon.org/field-guide/bird/flammulated-owl