

Western Ecosystems, Inc.

Ecological Consultants

905 West Coach Road, Boulder, Colorado 80302 (303) 442-6144

August 10, 2017

Dominic F. Mauriello
Mauriello Planning Group, LLC
PO Box 4777
2205 Eagle Ranch Road
Eagle, Colorado 81631

email transmittal to dominic@mpgvail.com

Re: Rezoning wildlife assessment of Vail Resort's East Vail Workforce Housing parcel, Town of Vail.

Dear Dominic,

Vail Resorts owns the \pm 23.3-acre East Vail Workforce Housing parcel and is interested in the preliminary planning step of rezoning it for future residential development on a portion of the parcel. Wildlife issues will be a concern in the Town approval process. At your request, this document considers the more important wildlife issues associated with the parcel. A site visit specifically for this project was conducted on August 4, 2017 and I am familiar with the habitats present and the general wildlife issues from working on projects in the valley dating back to 1977.

1.0 LOCATION

Figure 1 is an October 9, 2015 Google Earth image showing the parcel's location between Pitkin Creek, on the east, and Booth Creek, on the west. The parcel is located contiguous to the north of I-70's East Vail interchange whose 24/7/365 traffic influences the effectiveness¹ of the parcel's wildlife habitat. The Pitkin Creek townhomes are partly surrounded by the southeast portion of the parcel. Booth Creek residential development and school are located below Booth Creek Cliffs and the Booth Falls rockfall mitigation berm. The western end of East Vail occurs on the opposite side of the interstate. Because the image was taken in October, after leaf fall, the aspen-dominated hillside on the parcel is not apparent.

2.0 POTENTIAL DEVELOPMENT

At this time it is unknown where and how much development could occur on the parcel. Steep slopes and rockfall hazard are two significant considerations. However, to evaluate the significance of wildlife issues, preliminary results of an analysis prepared by Mauriello Planning Group utilizing Town of Vail GIS mapping were considered. Mauriello Planning Group (2017) identified a 5.4-acre area (25% of the entire parcel) in the far western portion of the property as the most likely developable area.

¹ Habitat effectiveness is the ability of animals to use a certain area of habitat compared to its maximum possible use.



Figure 1. Location and approximate boundary (red line) of the East Vail parcel (on an Oct. 9, 2015 Google Earth base image).

3.0 HABITATS PRESENT

The south-facing parcel is dominated by relatively young, pole-stage aspen with a mountain shrub understory. Figures 2 and 3 show habitat on the east and west sides of the property, respectively.

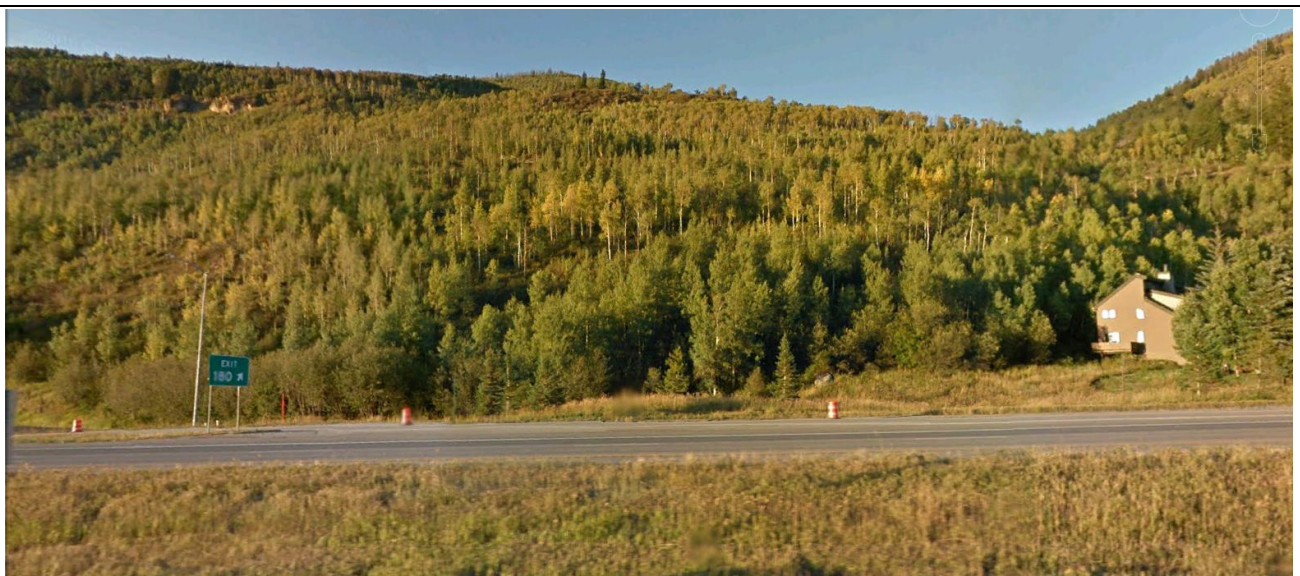


Figure 2. View northeast of the East Vail parcel from the east-bound lane of I-70 across the widest (south-north) part of the parcel just west of the Pitkin Creek townhomes (western-most townhome at right). September, 2015 ground-level Google Earth image.

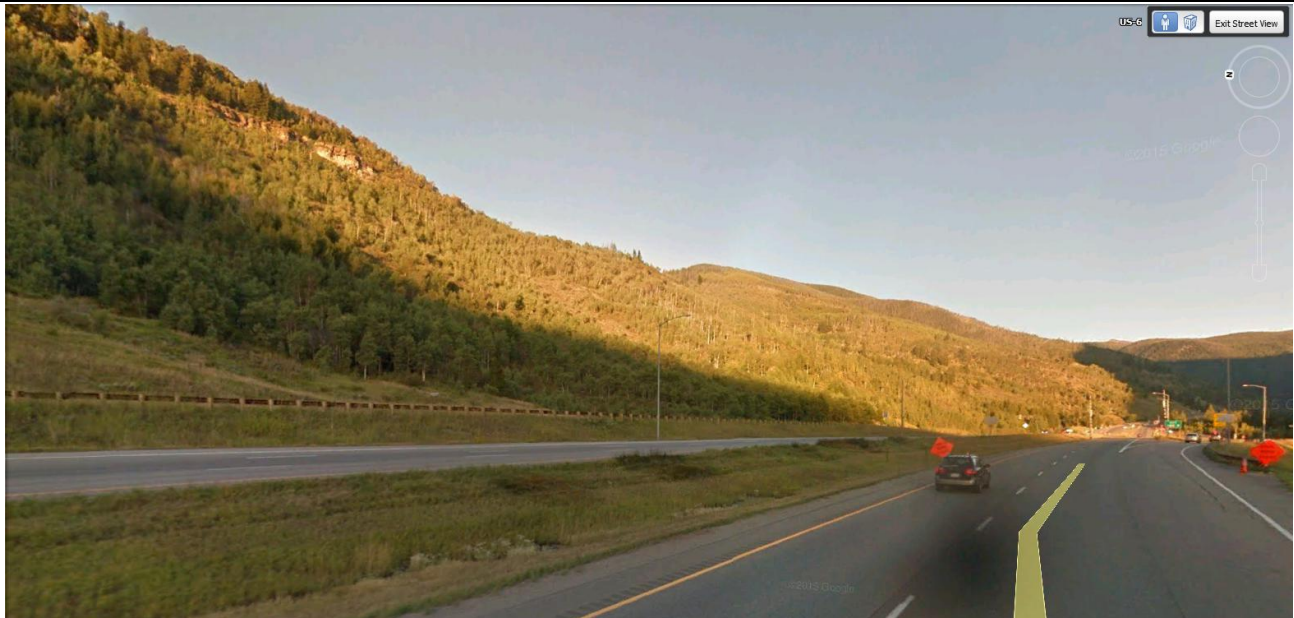


Figure 3. View east of the East Vail parcel from the east-bound lane of I-70 along the northern parcel boundary. Tall grasses along the start (proximal end) of the Booth Falls rockfall mitigation berm road are visible at left. September, 2015 ground-level Google Earth image.

4.0 KEY WILDLIFE ISSUES

The Town and Colorado Parks and Wildlife (CPW), may have several wildlife concerns associated with future development and habitation of residences on the subject parcel, however the current proposal to rezone the property would have no effect on wildlife. Engagement with CPW, as an advisory agency, should occur with any development application that is submitted in the future and considered in a more extensive Environmental Impact Report, as defined by the Town Code. These issues are discussed below, based, in part, on current (November 21, 2016) seasonal range files downloaded from the CPW website. The mapping is part of CPW's database, which provides information on wildlife distributions to public and private agencies and individuals, for environmental assessment, proprietary land management resource planning, and general scientific reference. The disclaimer associated with all CPW mapping is footnoted.² Polygons are defined by the observations of animal distributions over many years.

4.1 Bighorn Sheep

Figure 4 shows six bighorn sheep seasonal ranges mapped by CPW in the vicinity of the East Vail parcel. Bighorn sheep winter range and severe winter range cover the same area and overlap most (\pm

² NDIS [CPW kmz] mapping was derived from field personnel and is updated periodically [currently every 5 years]. A variety of data capture techniques were used including drawing on mylar overlays at 1:50,000 scale USGS county mapsheets and implementation of the SmartBoard Interactive Whiteboard using stand-up, real-time digitizing at various scales.

Information depicted on NDIS maps is for reference purposes only and is compiled from best available sources. Reasonable efforts have been made to ensure the accuracy of this data. Colorado Parks and Wildlife expressly disclaims responsibility for damages or liability that may arise from the use of this data.

The wildlife distribution maps are products and property of CPW, a division of the Colorado Department of Natural Resources. Care should be taken in interpreting these data. Written documents may accompany these maps and should be referenced. The information portrayed on these maps should not replace field studies necessary for more localized planning efforts. The data are gathered at a variety of scales; discrepancies may become apparent at larger scales. The areas portrayed are graphic representations of phenomena that are difficult to reduce to two dimensions. Animal distributions are fluid; animal populations and their habitats are dynamic.

75%) of the parcel. **Winter range** is that part of the overall range where 90% of the individuals are located during the average five winters out of ten, from the first heavy snowfall to spring green-up. **Severe winter range (SWR)** is that part of the winter range where 90% of the individual animals are located when the annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten. The amounts, quality, and effectiveness of winter range are generally what limit big game populations. The polygon boundary is not accurate. It likely extends southeast to the treeline along Pitkin Creek, down to the interchange on/off ramps, and down to the north side of the frontage road. There is no I-70 game fencing in the area. Sheep likely used the habitat in what is now the Booth Creek residential area and it is unlikely that they continue to enter that development. The winter range and SWR overlapping the entire subject parcel is approximately 1.2% of the overall winter range and SWR polygons (approx. 1,880 ac.) that extends west along the north side of I-70 nearly to I-70's Vail exit. This is the only sheep winter range polygon mapped on either side of the Gore Range. High concentrations of winter sheep pellets were located along the top of the Booth Falls rockfall mitigation berm during the site visit. Two homes located 107-177 feet below the berm give some indication of residential compatibility with sheep winter range.



Figure 4. Bighorn sheep seasonal ranges mapped by CPW in the vicinity of the East Vail parcel (red outline). See text for range definitions. Bighorn sheep winter range and severe winter range cover the same largest area and are shaded light blue. Winter concentration area is shown in the higher elevation, darker blue polygon. The southern edge of a lambing area above the Booth Creek cliffs is outlined in green. Bighorn sheep migration pattern is shown as a red line. A mineral lick is shown as a rusty circle.

Winter concentration area is a subset of the winter range where animal densities are at least 200% greater than the surrounding winter range density during the same period used to define the winter range, in the average five winters out of ten. That polygon does not overlap the East Vail parcel, but habitat effectiveness of that polygon could be influenced by residential development and habitation on the parcel.

Bighorn sheep **production area** is where sheep lamb. Production areas are defined as that part of the overall range occupied by pregnant females during a specific time period in the spring (May 1 to June 30). The polygon occurs above the Booth Creek cliffs, extends 1.6 miles to the north, and is topographically buffered from residential development below. Based on ewes selecting cliff-like terrain inaccessible to terrestrial predators, it is unlikely that any of the forested terrain shown in Figure 4 is actually used for lambing. The effectiveness of production areas could be affected by free-ranging dogs and recreation originating from residences below.

Bighorn sheep **migration pattern** is a subjective indication of the general direction taken by migratory ungulate herds. The line's location is irrelevant. What it indicates is that bighorns move downhill in this area during fall towards their winter range, then move uphill in spring to their summer range.

A bighorn **mineral lick** is defined as a natural site known to be utilized by bighorn sheep for obtaining minerals to meet basic nutritional needs. Whether natural or otherwise, such licks are particularly important for pregnant and lactating ewes.

Potential residential development on the subject parcel will be of concern because of the net loss of winter habitat ($\pm 0.24\%$ of the overall winter range polygon) associated with residential development, further impaired effectiveness of habitat within the influence of the development, and other potential habitation-related effects (e.g., free-ranging dogs and dispersed recreation originating from residences). However, sheep habitat use in this area has adapted and habituated³ somewhat to I-70 and frontage road activity, Booth Creek neighborhood and The Falls at Vail townhome residential developments and activities, Vail Mountain School, and dispersed recreational activity along the Pitkin Creek and Booth Creek trails. The relatively small (5.4-acre) potential East Vail development would result in a further loss of winter range, but its location in an area whose habitat effectiveness has been reduced by existing human disturbance and development should have minimal effects on sheep habitat use and should not affect herd size. Approximately 75% of the parcel would remain available for continued sheep use on a preserved and protected tract associated with the proposed rezoning and platting of the parcel.

4.2 Elk

Figure 5 shows one elk seasonal range mapped by CPW in the vicinity of the East Vail parcel that warrants consideration. The **elk winter range** definition follows that provided for sheep, above. No elk winter range is shown overlapping the subject parcel, but that mapping is likely wrong. The winter range polygon boundary along the north side of I-70 appears to follow an assumed land ownership boundary. At the time of CPW mapping the County's and the Town's mapping assumed this parcel was likely in CDOT ownership.

Colorado Parks and Wildlife appears to have adopted the Town's position and extended the polygon along the U.S. Forest Service property line, rather than bringing it down to the north edge of the frontage road where it probably should be.

The elk winter range on the subject parcel is part of a polygon containing the highest elevation elk winter range in the Gore Creek Valley and some of the highest winter range in the Eagle Valley. This higher elevation winter range is used more during the early part of winters and during milder winters when excessive snow depths have not yet pushed animals to lower elevations down valley. Nevertheless, these winter ranges are valuable because they support animals during portions of the winter when animals would otherwise be further down valley on increasingly small and more crowded winter range.

³ A learned behavioral change exhibited by greater tolerance of, and reduced avoidance to, benign human activities as a result of chronic exposure. The extent of habituation is generally reduced in hunted herds.



Figure 5. Elk winter range (outlined and shaded light blue) mapped by CPW in the vicinity of the East Vail parcel (red outline). It is likely that the entire parcel is elk winter range.

Over the past 50 years there has been a considerable loss of big game winter range to secondary ski area development in the Eagle Valley. Winter ranges generally occur at lower elevations along valley bottoms that are dominated by private lands. Development of those lands has pushed elk further west down valley. In recent years, CPW have increased their hunting permits to increase harvest and reduce the elk and deer populations to levels that the smaller winter range acreage can support.

Potential residential development on the subject parcel will be of concern for elk for the same reasons described for bighorn sheep (the net loss of elk winter range, further impaired effectiveness of habitat within the influence of the development, and other potential habitation-related effects [e.g., free-ranging dogs and dispersed recreation originating from residences]). However, as described for sheep, elk habitat use in this area has adapted and habituated to I-70 activity, nearby subdivisions, and dispersed recreational activity. Similar to sheep, the relatively small (5.4-acre) potential East Vail development would result in a further loss of winter range, but its location in an area whose habitat effectiveness has been reduced by existing human disturbance and development should not result in any measurable change in elk habitat use or herd size. Approximately 75% of the parcel would remain available for continued elk use.

4.3 Peregrine Falcon

Peregrine falcons are a sensitive species monitored by CPW and the U.S. Forest Service. There is an active peregrine falcon nesting cliff on the opposite side of the Gore Creek valley in the vicinity of the East Vail parcel (Fig. 6). The nesting area polygon is defined as the area which includes good nesting sites and contains one or more active or inactive nest locations. The boundaries are drawn based on professional judgment to include most known nesting habitat in the vicinity. Usually these areas are mapped as polygons around cliffs and include a 0.5 mile buffer surrounding the cliffs.

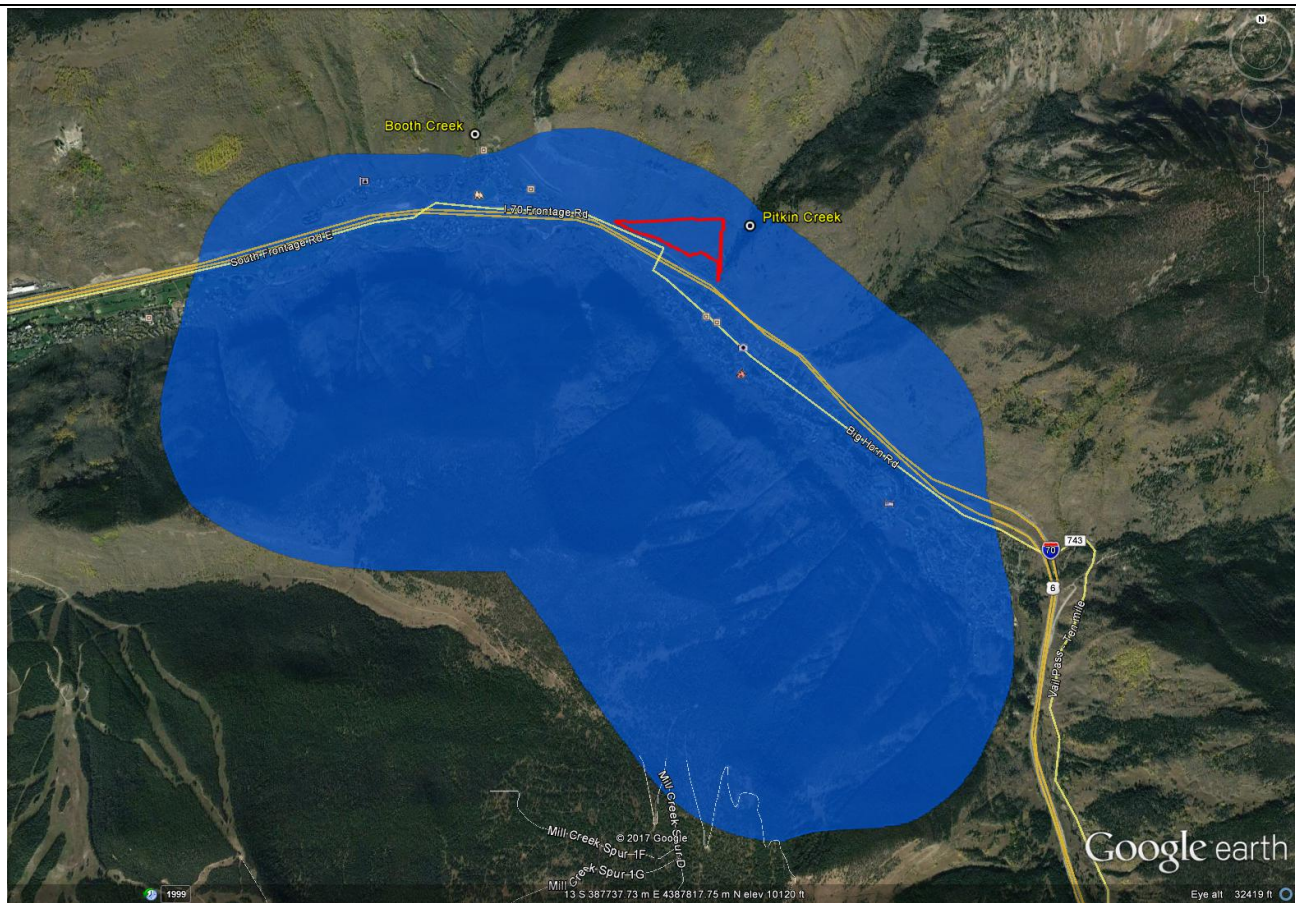


Figure 6. Active peregrine falcon nesting cliff complex (shaded blue) mapped by CPW in the vicinity of the East Vail parcel (red outline).

Viable peregrine falcon nesting sites possess two components: (1) adequate nesting habitat and (2) extensive hunting habitat with an adequate prey base to support the adults and their offspring (Craig 1978). Nesting sites are located on precipitous cliffs ranging in height from 40 to 2,100 feet, averaging 200 to 400 feet tall. Several ledges, potholes, or small caves must be present in the cliff face to function as a suitable nest site. A breeding pair will frequently alternate their nesting activities to different ledges on a cliff face between years, and they will often relocate to adjacent cliff faces. As a result, protective measures must address an entire cliff complex (and potential nesting areas) rather than an individual cliff.

Nesting peregrines will not tolerate excessive human encroachment or prolonged disturbance in the vicinity of the nesting cliff. Any activity or development above the nesting cliff will likely cause abandonment. Breeding peregrines become extremely agitated and may abandon the nest site if disturbance occurs during courtship, prior to the initiation of egg laying. One explanation regarding why some sites are occupied in spite of excessive human activity in the vicinity of the nesting cliff is that the falcons occupied the site early in the nesting season prior to spring increases in human activity and had eggs or young when the disturbance occurred. Once birds have eggs or young, they have a strong fidelity to their invested resources. Such birds were, therefore, attached to the site and would not abandon it at that time. The East Vail peregrines are examples of how wildlife, in general, can habituate to chronic, but benign, human activities, although residential and golf course development along the valley bottom has reduced their prey base.

In Colorado, peregrines usually return to nesting cliffs in late February or early March and initiate courtship activities, which continue to mid- or late April when eggs are laid. The young hatch from mid- to late May and fledge (i.e., leave the eyrie) in mid- to late June. The young and adults remain in the vicinity of the nesting cliff up to several months after fledging.

Extensive hunting habitat is a second key component of a viable peregrine nest site. Peregrines will frequently travel at least 10 miles from their eyrie to procure prey and they have been documented hunting up to 30 miles away from nest sites (G. Craig, CDOW, pers. comm.). It is, therefore, important to maintain the integrity of important hunting areas within at least 10 miles of the nesting cliff. All habitats within the 10-mile radius need not be considered essential habitat, since only those areas that attract or support peregrine prey need be protected. The primary prey captured by nesting Colorado peregrines are small to moderately-sized birds, such as blackbirds, doves, robins, flickers, jays, nutcrackers, meadowlarks, and pigeons, but prey as large as waterfowl are also taken. Any habitat that supports or concentrates birds should be considered essential to locally nesting peregrines.

Key hunting areas fall into two categories: (1) those habitats that concentrate or support important prey species, and (2) those habitats that expose prey and make them vulnerable to peregrine attack. Peregrines capture their prey through precipitous dives from considerable height above their quarry. Peregrines must, therefore, frequent habitats permitting this type of pursuit. Peregrines do not hunt below the forest canopy, but capture birds flying above forests or across open expanses. Larger prey are raked (with talons) or knocked out of the air and peregrines need open areas on the ground to recover them. Nesting cliffs, are generally situated at considerable heights above the surrounding terrain, so peregrines have a broad panorama from favorite hunting perches near the cliff top.

The East Vail pair's 2017 nest site was within 0.5 miles of the East Vail parcel and 590 vertical feet above it. It is unknown where peregrines from this cliff complex hunt, but hunting is likely concentrated over the Gore Creek valley. The wetland and riparian complex immediately below the cliff is likely heavily used as those habitats concentrate and support higher prey densities, expose that prey base to peregrine attack more so than other local habitats, while the cliff provides a convenient hunting perch. The subject parcel contributes to the avian prey base, but unless those birds leave the parcel they are not vulnerable to peregrine attack. The air space above the parcel is likely more important hunting habitat, as it is along the entire Gore Creek Valley, as birds flying above the valley are exposed to peregrine attack.

Potential residential development on the subject parcel will be of concern for peregrine falcons because of the small, but additional net loss of foraging habitat, further impaired effectiveness of habitat above and around the development, and the additive human development across from the nesting cliff. The current nesting pair has habituated to current levels of human activity and development. These include the 24/7/365 disturbance associated with I-70, the East Vail interchange and the frontage road, the Vail Pass-Tenmile bike path (immediately below the nesting cliff), and residences associated with East Vail, Booth Creek, and the Pitkin County Townhomes. Future construction and habitation of the subject parcel, buffered from the nesting cliff by distance, elevation, and more acute intervening disturbances/ activities would be more of the same type of structures and activities that should not negatively affect the nesting pair. It is also likely, with an increasing peregrine population and competition for nest cliffs, that future pairs of peregrines would also find the cliff complex viable with future development of the proposed as currently considered. That assumes that the valley's prey base remains adequate, which is likely given the avoidance of wetland and riparian habitats supporting higher prey densities and the limited amount of further development potential. The subject parcel's airspace would remain available for peregrine hunting and approximately 75% of the parcel would remain available to support potential peregrine prey.

4.4 Black Bear

Colorado Parks and Wildlife have mapped two black bear seasonal ranges in the vicinity of the East Vail parcel that warrant consideration (Fig. 7). **Black bear summer concentration** areas are defined as those parts of the overall range where activity is greater than the surrounding overall range during that period from June 15 to August 15. This polygon extends along and above the valley bottom from east of East Vail to west of West Vail. This designation has merit overlapping the subject parcel.

During the August 4 field survey, the young, open-canopy aspen stands on the west end of the property supported a moderate density of berry-rich serviceberry shrubs that represent important summer forage for bears. A **human/bear conflict area** is represented by the same polygon along the Gore Creek valley bottom. Such areas are defined as that portion of the overall range where two or more confirmed black bear complaints per season were received which resulted in CPW investigation, damage to persons or property (cabins, tents, vehicles, etc.), and/or the removal of the problem bear(s). This does not include damage caused by bears to livestock.

Potential residential development on the subject parcel will be of concern for bears because of the small, but additional net loss of summer forage habitat, further impaired effectiveness of habitat within the influence of the development, and other potential habitation-related effects [e.g., potential garbage-handling issues]. Approximately 75% of the parcel would remain available for continued bear use.

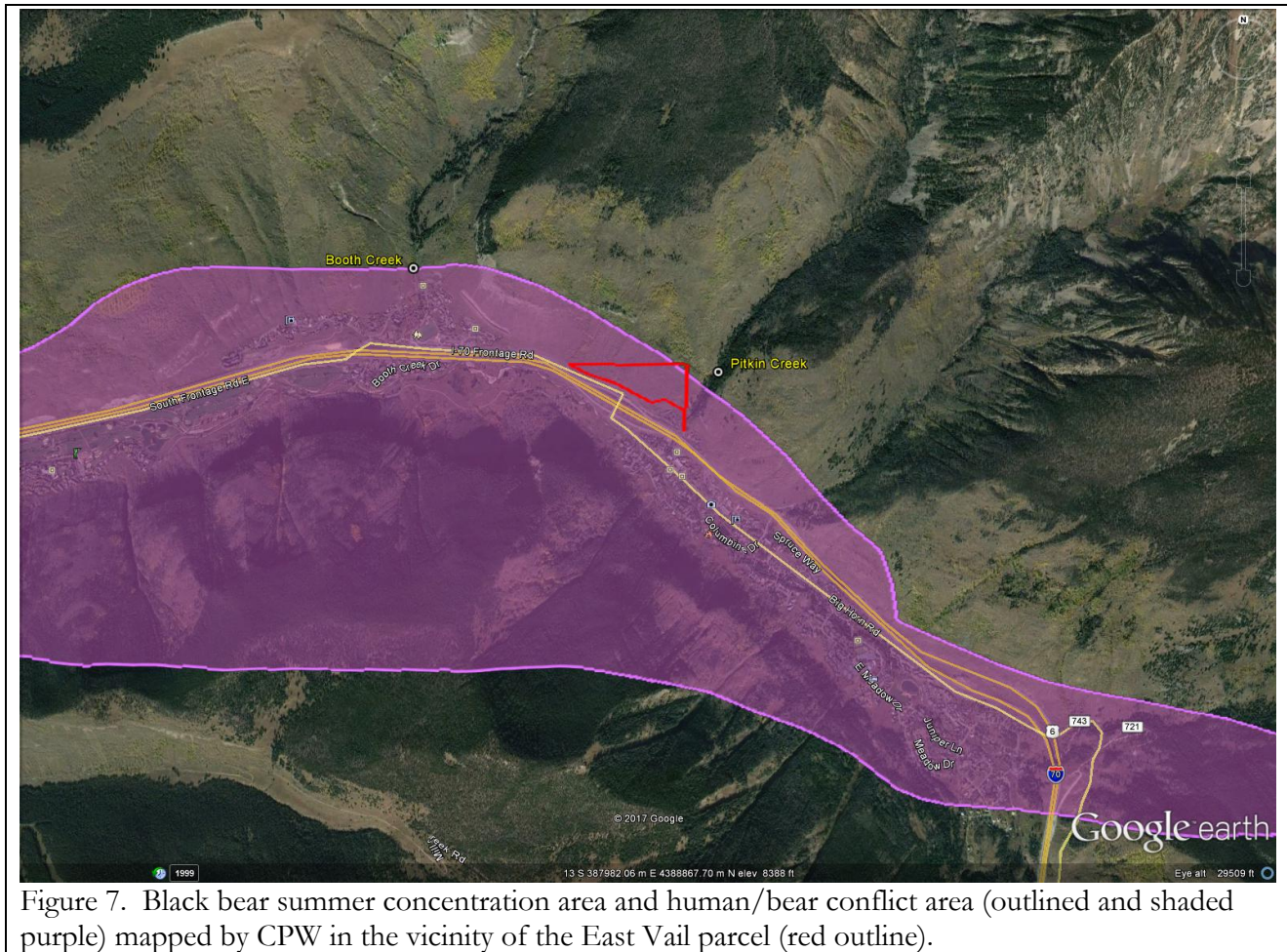


Figure 7. Black bear summer concentration area and human/bear conflict area (outlined and shaded purple) mapped by CPW in the vicinity of the East Vail parcel (red outline).

5.0 SUMMARY

Several important wildlife species occur on or in the vicinity of the East Vail parcel. Proposed rezoning and platting would have no negative effects on those species. Future residential development, as currently considered, would preserve approximately 75% of the parcel, but development would remove habitat values in a 5.4-acre area and affect, to some extent, adjacent habitat effectiveness that is not already impaired by disturbances along I-70, its frontage road, and adjacent residential developments. When future residential development is proposed, it is recommended that a wildlife mitigation plan be developed to minimize wildlife conflicts and consultation with CPW occur at that time.

Please call or email me if you or others on the team have any questions.

Sincerely,

Rick Thompson

Certified Wildlife Biologist, Western Ecosystems, Inc., 905 West Coach Road, Boulder, CO 80302
(303) 442-6144; weiwild@aol.com

6.0 LITERATURE CITED

Craig, G.R. 1978. American peregrine falcon, *Falco peregrinus anatum*. Pages 40-45 in Essential habitat for threatened or endangered wildlife in Colorado. CDOW, Denver. 84 pp.