

Five Environmental Resources

(revised November 19, 1998)

Policies

The natural environment is our primary asset and is the reason why we remain a highly desirable resort. We support the conservation and preservation of unique lands, wildlife habitat, stream corridors, sensitive hillsides, and other significant natural features. The Town promotes long-term stewardship of clean water and air, energy efficiency, and ongoing opportunities for residents and visitors to explore, learn about and enjoy the natural beauty of the area.

Snowmass Village shall:

- ✍✍* Promote stewardship in the Town, Brush Creek and Owl Creek Valleys through alternative land use, regulatory process and conservation planning practices which reflect an understanding of the limitations of the environment.
- ✍✍* Protect and enhance the visual quality of open space and agricultural lands of the Town, Brush Creek and Owl Creek Valleys. Develop comprehensive environmental design standards to protect the rural characteristics of Brush Creek and Owl Creek Valleys, and the physical and natural setting of the Town.
- ✍✍* Protect riparian habitat. Ensure that riparian vegetation and streambeds are maintained in a naturally functioning state.
- ✍✍* Limit and/or prohibit development in critical wildlife habitat areas to maintain the integrity of the ecosystem and species biodiversity.
- ✍✍* Monitor, protect and enhance the quality of the air and water.
- ✍✍* Require that development proposals demonstrate a balance between the quality of the scenic and natural resources in the Town and the Brush Creek Valley. These resources are a keystone to the community.

The environmental resources of Snowmass Village and its influence areas have played a significant role in the Town's growth and development.

In 1993, "***A Road, A Creek, and A Community in Maturation***" (BTA Plan)¹, was endorsed by the Snowmass Village Town Council. The BTA Plan made recommendations for community improvements which strongly emphasize community values of environmental quality, environmental stewardship and visual integrity. The BTA plan includes methods to recapture the original integrity of resources that have been impacted by existing land development practices. It recommends incorporating environmental quality, environmental stewardship, visual integrity and accountability into proposed development review criteria.

A ***Inventory of Environmental Resources***

Effective development review incorporates environmental values and an understanding of the community's environmental resources. Environmental resources inventoried include: elevation, slope, aspect, geology/soils, vegetation, wildlife and hydrology.

1. Elevation

Brush Creek at State Highway 82 is 7,500 feet, the elevation rises along Lower Brush Creek Road until entering the Town limits at 7,900 feet. Wildcat Ranch, on the north side of Town, has a low elevation of 7,500 feet and peaks at 9,100 feet. To the south, the Snowmass Ski Area and White River National Forest begin at an elevation of about 9,000 feet and extend to over 12,000 feet at its peaks. Approximately 50% of the Town area is between 8,800 feet and 9,800 feet in elevation. Elevation affects vegetation, temperature, precipitation, oxygen and air pollution.

2. Slope

Slope steepness is one determinant of the development suitability of land, physical hazards, potential for revegetation and the difficulty in repairing disturbances. Steep slopes are vulnerable to erosion and soil slippage. The Municipal Code prohibits construction on natural slopes greater than 30% except for the construction of roads, driveways, ski trails and related ski improvements that are not intended for human occupancy.

Snowmass Village area slopes were mapped using the following five categories: 0 – 3%; 3% – 8%; 8% – 15%; 15% - 33%; and 33% +. Existing GIS data (Harrison Datasets) has 40 foot contours. The Town is collecting contour information at 10 foot intervals, the

¹ This plan was officially adopted by reference in Ordinance 4-1998 on August 17, 1998.

minimum required for development review, and the slope analysis map will be revised to show slopes of 30% or greater.

3. Aspect

Slope aspect is how a site is oriented to the sun – where it is warmest, driest, coolest and wettest. The majority of Snowmass Village has a cooler slope aspect, a situation which is typical of ski areas. Slopes south of Brush Creek Road have a northern aspect with denser vegetation, longer snowpack, moist soils and increased wildfire hazards. Slopes north of Brush Creek Road have a southern aspect with few trees, drier conditions and higher erosion potential. Wildcat Ranch, the northern half of the Town, has a majority of cooler slopes.

4. Geology/Soils²

Most of Snowmass Village's soils have high shrink-swell potential, low strength and slow permeability. A large portion of the surface geology is Mancos shale, which can present challenges to development. On specific sites, soil type should be analyzed for engineering qualities and limitations for construction, ability to support plant growth, stability on slopes, erosion potential and drainage characteristics.

5. Vegetation

Snowmass Village's diverse physical conditions create a complex distribution of plant communities. Vegetation distribution is influenced by elevation, slope aspect, soil and geology, moisture and wind. Changes in the landscape's plant species occur vertically. Major plant communities appear as irregular bands, often with very narrow transition bands between them.

The succession of plants, beginning with lichens and mosses in dry areas and water plants in the streams and ponds, has climaxed in the four major vegetation life "Zones" within Snowmass Village.

In Snowmass Village, solar radiation is a powerful influence on vegetation type. The ski area was built on north-facing slopes. In the middle of winter, snow can be several feet deep on north slopes while across the Creek, south-facing slopes might be barren. Consequently, north slopes have abundant streams and lush meadows while southern slopes are semi-arid.

Foothill Zone. The Foothill Zone extends from the edge of the Roaring Fork Valley to the entrance of the Snowmass Valley (Rodeo lot and golf course). Elevation ranges from

² *Geology and soils information was obtained from the United States Geological Survey (USGS) and the Soil Survey of the Aspen-Gypsum Area.*

7,500 feet to 8,500 feet on the northwest slopes to over 9,000 feet on southeast slopes. The Foothill Zone is primarily a shrub zone, with few trees except in riparian areas and in deep ravines with north exposure. Sagebrush dominates; coexisting with foxtail barley, slender wheatgrass, yarrow and vetch.

Montane Zone. This zone covers most of the former ranch land, now the golf course and residential development. It extends to lower elevations on eastern slopes and to some higher elevations on opposite slopes facing south and east. Mountain meadow and grassland communities are numerous in this zone. Turf-forming grasses such as red-top, timothy and native bluegrass cover moist meadows and the wetter and cooler areas. Douglas Fir is prevalent.

Watercourses in the Montane Zone have distinct riparian forest and shrub communities. Narrow leaf cottonwoods, mountain alder, river birches, Colorado blue spruce and several species of willow flourish on Montane streambanks.

Subalpine Zone. This region begins at 8,000 feet on north-facing slopes and is covered by dense forests of Engelmann Spruce and Subalpine Fir, with equally dense intrusions of aspen groves or an occasional lodge pole pine stand. In the Wilderness Area to the south, miles and miles of deep forest, broken only by steep watercourses, rock outcrops, fire scars, or lush mountain meadows, extend to timberline. In the winter, these dense forests protect snowfall from melting. Snow often remains until early July. Moisture-loving plants such as Fairy Slippers, Woodnymphs, and Dotted Saxifrage thrive in this woodland.

Alpine Zone or Tundra. Above timberline is the alpine zone. Like the Arctic Tundra, it is a treeless region of grassland and rock fields. Spring comes earlier in the Alpine Zone, snow melts sooner because trees do not shade the ground and the winds keep the snow layer thin. A short growing season erupts with a great display of alpine flowers.

Aspen forests deserve special mention in the Snowmass Village landscape. The aspen is the only deciduous tree commonly found in the Montane and Subalpine Zones of Snowmass Village. It is one of the few plant species that can grow in all life zones of Snowmass Village except the Alpine Zone. Spreading by root suckers, the aspen is often the first plant to cover burned areas where and when sufficient moisture is present. Aspens are found in large stands on north-facing slopes and in wide belts at the transition from open land to conifer forests. Aspen stands are found along Brush Creek's riparian corridors, along the edge of small meadows and scattered in small groves among condominium and single family developments.

6. Hydrology

Brush Creek is Snowmass Village's main watercourse and flows through Town from the Divide into the Roaring Fork River. Brush Creek Road parallels the creek. Historically, the creek and the road have vied for territory. The creek has usually been the loser, resulting in bank erosion and stream degradation. Brush Creek's two major tributaries, the West and East Forks, flow from the Snowmass Ski Area along Fanny Hill in the west and below the Two Creeks lift in the east.

Stream corridor stability and changes in annual runoff and water quality can be used to set a baseline for environmental quality analysis. This baseline can be used to judge potential environmental impacts of different types of development. If it is determined that a development's ecosystem impacts cannot be mitigated, the Town may make recommendations to amend a development plan or suggest that the project be denied.

Cumulative impacts resulting from a variety of development practices have impaired the stream channel's ability to function naturally. The degradation of Brush Creek not only affects Snowmass Village but also impacts the downstream water quality of the Roaring Fork River. Presently, sediment is the most significant impact on Brush Creek. These impacts can be avoided through careful planning, mitigation and implementation of stream corridor "Best Management Practices."

If water quality control mechanisms are integrated into land use practices, then development impacts can be reduced. Figure 5.3 shows the benefit of filtering storm water runoff. Filter 1 shows the volume of sediment (2,000 ppm) in untreated storm water runoff; Filter 2 shows a reduced sediment volume (150 ppm) from the same drainage after storm water treatment; Filter 3 shows an even greater reduction of sediment (20 ppm) after the same water was treated a second time by channeling water through a wetland treatment facility. Water was then released into the natural water system with a close to natural sediment content creating no impact to the natural ecosystem. Routing water through a wetland environment may actually enhance the natural ecosystem instead of compromising it.

Stream channel and water quality samples were extracted and tested and a database was established for stream restoration design criteria. It is important to develop careful and precise methodology to assure accurate and defensible analysis and design criteria. Evaluating a community's growth impact on the surrounding ecosystem could be a cutting-edge concept and may serve as an example for other mountain communities.

7. Wildlife

Comprehensive Plan wildlife maps show the habitat of elk, mule deer, raptors, big horn sheep and ptarmigan (see maps at end of Chapter). These mapped species were selected

from a broad range of mammals and birds because they have a high level of public interest or are an "indicator species"³ for the Burnt Mountain region. While the black bear attracts a high level of public interest, it was not mapped because its range covers the entire Town. The wildlife maps were created using the Colorado Division of Wildlife (CDOW) Wildlife Resource Information System (WRIS) data.

The United States Forest Service (USFS) has compiled a list of Management Indicator Species (MIS) for the Burnt Mountain area. These species are also of high public interest or are indicator species. The USFS list includes all amphibians, Cooper's hawk, hairy woodpecker, flammulated owl, golden-crowned kinglet, pine marten, mule deer, elk and southern red-backed vole. Additionally, the White River National Forest has also drafted a list of sensitive species that are likely to occur in forested and non-forested communities in the area (see Appendix E). The CDOW and USFS species list should be reviewed when making planning decisions to ensure that impacts to indicator species or local sensitive species are identified. Development can then incorporate appropriate mitigation and ecologically sound design that protects the wildlife in Snowmass Village.

a. Environmentally Sensitive Wildlife Areas

Elk Habitat Areas. Of all the indicator species, elk have received the most attention in Snowmass Village. Regulations to protect certain elk habitats are included in the Town Municipal Code. Town policy prohibits development in the elk calving, severe winter range and migration corridors mapped by the CDOW WRIS maps, unless certain conditions are met. A map showing the location of these three habitats is included at the end of this chapter (see Appendix F for habitat definitions).

The elk that use habitats in or adjacent to Snowmass Village are part of the Maroon Bells-Snowmass Wilderness (MB-SW) elk herd. This herd has approximately 350 elk. The MB-SW elk herd combines with other herds in the winter, forming a group of about 700 elk that use the surrounding winter range.

Areas used by the Burnt Mountain elk herd have been well documented over the past fifteen years. Elk are known to use mature and old growth Engelmann spruce/subalpine fir forests for cover in the summer and fall seasons. Aspen forests are used for feeding, resting, calving and breeding. Alpine meadows are used in the spring and summer for feeding and resting. Winter ranges are generally found on south-facing shrubby slopes of 15 – 40% grade.

The 1994 Snowmass Ski Area Final Environmental Impact Statement (FEIS) indicates that half of the elk habitat has been rendered unsuitable due to nearby development

³ Indicator Species are species whose habitat also meet the needs of an array of other species.

on both private and national forest land. Since 1966, calving habitat has been reduced by 54% and the migration corridor for the MB-SW herd has been reduced by 90%.

Because of habitat loss, protecting the remaining habitat should be a high priority if the herd is to remain viable. ***Elk Habitats*** vital for protection include:

- i. *Calving Habitat.* The aspen groves in the Owl Creek drainage east of Burnt Mountain. This includes areas such as Kelley Park, Mandalay Ranch and the USFS area prescribed as the future “4B” in the White River National Forest Plan.
- ii. *Migration Corridors.* The route between summer and winter range, including the three crossings on Brush Creek Road near the Droste and Seven Star properties and the crossings along Owl Creek Road.
- iii. *Winter Range.* Overall winter range extends north of Owl Creek Road, west of Highway 82, east of Wildcat Reservoir and Snowmass Creek Road, and south of Snowmass. During winters with deep snows, winter range availability is the most crucial factor in the survival of the herd. Severe winter range habitat in the Snowmass Village area is located on the south or west facing oakbrush or sage-covered hills of the Seven Star, Droste and Wildcat Ranch properties.

Areas of Ecological Significance. In addition to the elk habitat areas, there are three areas of ecological significance with elements that can support wildlife on a continuous basis and have a high biodiversity value:

- i. *Upper Eastern Section of the Snowmass Ski Area near Elk Camp*
- ii. *Sam’s Knob west to East Snowmass Creek and to the top of the Big Burn.* These areas contain mixed conifer-aspen habitat which are used throughout the year by deer, elk, bighorn sheep, neotropical birds, raptors, carnivores, small and medium-sized herbivores and ptarmigan. Land use decisions concerning the portions of the Snowmass Ski Area located within the Town’s boundaries should insure preservation of the richness of this wildlife mix.
- iii. *Habitat between Spring Creek and Owl Creek.* This is a core area of species diversity due vegetation, water and remoteness. It is of particular importance to elk and deer in the spring for calving/fawning and nursing.

Dedicated Open Space and Other Areas of Wildlife Importance. The Town owns two open space parcels that have high value for wildlife. Development of public

facilities and recreational uses should promote wildlife stewardship. These areas include:

- i. Open Space above Horse Ranch Subdivision - This 650 acres of open space has high value for wintering deer and elk. It is closed to all activity from September 15 – June 20th.
- ii. East Highline (Hidden Valley) - This 200 acre parcel was deeded to the Town from the Snowmass Land Company for wildlife habitat preservation. It is located in the draw near the Town cemetery and was intended for elk spring & fall migration and winter range.
- iii. Horse pastures between Brush Creek Road and Horse Ranch Drive - This area is an important deer and elk travel corridor between the dedicated open space parcels. Preserving this area also ensures an undeveloped link for big game moving between winter and summer ranges.

b. Current Wildlife Management and Mitigation Plans

The Town currently has a number of plans and documents to guide the management of wildlife, including:

- i. Two Creeks and the Pines Wildlife Enhancement and Management Plan. This plan was intended to alleviate the effects of human activities on wildlife and to improve wildlife habitat and diversity. It was approved as part of the Two Creeks and the Pines Subdivisions. Snowmass Land Company must implement the Plan through the year 2000 and make an annual progress report to the Town Council until the year 2001.
- ii. Snowmass Ski Area Wildlife Enhancement and Management Plan. This plan's intent is similar to the Two Creeks and the Pines Plan and was approved as part of the Snowmass Ski Area Master Plan. The Aspen Skiing Company must implement the Plan and report progress annually to the Town Council.
- iii. Snowmass Ski Area 1994 FEIS Mitigation and Monitoring Plan. Chapter II in the FEIS includes measures to manage and mitigate the environmental impacts of ski area improvements and expansion. The plan outlines required tasks and identifies what agency is responsible to carry them out.
- iv. Snowmass Wildlife Committee Report. A wildlife committee prepared a report in 1991 with recommendations for the management and protection of wildlife. The committee included members of the Town Council, Pitkin County, CDOW, USFS and concerned citizens.

- v. Pitkin County Wildlife Taskforce and Report. In 1989, a Taskforce was appointed by the Pitkin County Commissioners to reconcile issues affecting wildlife populations. This effort was inspired by the proposal to expand the Snowmass Ski Area. In 1991, the Taskforce made final recommendations to the Commissioners on strategies to protect wildlife.

In addition to the environmental resources already discussed, scenic view and air quality are important to Snowmass Village. Community input at workshops and in surveys indicates that many distant views and some foreground views should be preserved. Quality of view is one basic characteristics of the uniqueness and attractiveness of this valley and significantly contributes to the monetary value of local real estate. View quality has no direct influence on environmental carrying capacity; however, the human value placed upon view quality and subsequent valuing of property can influence the natural balance of the local ecosystem. A shift in the ecosystem's equilibrium may be perceived as a reduction of environmental quality. Air quality is an environmental resource that has not been measured in the Town for some time but remains important to maintain.

The majority of the data used to create the GIS (Geographical Information Systems) maps in this chapter came from Harrison Datasets, February 1997. The City of Aspen, Pitkin County and the Colorado Department of Wildlife provided additional information. Environmental Resource Maps mentioned in this chapter can be found in Appendix C. These maps are computer generated and have been used to create an overlay system. As additional environmental data is collected it should be incorporated into planning documents to further protect the integrity of the natural ecosystem.

B *Analysis of Environmental Resources*

The analysis of existing natural resources determined where environmentally sensitive lands are located. Environmentally sensitive areas emerge when the computer was used to "overlay" data for each sequence.

Environmental Sensitivity Map. The Environmental Sensitivity Map indicates all land that is markedly sensitive to environmental impacts from development. The Environmental Sensitivity Map indicates natural thresholds for the carrying capacity of the Town. The highest values have been placed on the protection of wildlife, stream corridors, steep slopes, open space and scenic views. Sensitivity is determined by the resource's historical ability to recover from development impacts and remain sustainable. Some environmental resources do not change significantly over time, others resources are dynamic and may need periodic impact assessment, evaluation and monitoring. These areas have physical and ecological features whose preservation is essential to the Town's ability to maintain a high quality

environment. The map covers the entire Town limits as well as the designated Influence Areas.

Physically sensitive features include slopes in excess of 30%. These steep slopes are often highly visible and development of them could have a major visual, safety and financial impact. Brush Creek is important both for its scenic value and for its ecological value as a wildlife, wetlands and riparian areas. Critical habitat areas for indicator species can be both ecologically and visually sensitive areas.

The Future Land use Plan (Chapter Seven) designates sensitive areas for preservation, conservation, open space, or low density residential. All proposed development and redevelopment will be evaluated against this map. Proposed development which appears to penetrate any part of designated sensitive lands will require a site-specific review prior to approval, regardless of the location.

C *Summary and Recommendations*

Snowmass Village's planning challenge is to maintain the integrity of its ecological system regardless of jurisdictional boundaries. Further research may be required outside the town limits of Snowmass Village.

The following recommendations are designed to protect, manage and mitigate impacts on environmental resources in the Town's vicinity.

1. Hydrology

- ES* Identify key locations to monitor the impact of land use practices on water quality.
- ES* Design water quality projects to mitigate water quality impacts. Incorporate community aesthetics into projects.
- ES* Develop water quality “best management practices” for the Development and Land Use Code. Require development and redevelopment applicants to incorporate best management practices into development plans to address runoff impacts. Mitigate impacts of existing development.
- ES* Form a partnership between the Town, Aspen Skiing Company, various homeowners’ associations, Snowmass Village Resort Association and development interests to address high priority hydrology and water quality issues. Some areas need immediate attention and may not be addressed within

development or re-development proposals. Those areas should be addressed by the Town's beautification program. The partners should contribute to the price of these projects.

LS Develop and adopt a watershed management master plan as an addendum to the comprehensive master plan. Recommend best management practices and identify key projects. Identify key players and establish a framework for partnerships. The Town may want create a watershed district to fund water quality and stream restoration projects similar to districts in Fort Collins, Boulder, Golden and Lakewood.

2. Wildlife

Protection of wildlife has long been a value in Snowmass Village. Development will be located so as not to diminish wildlife habitat or the existence and diversity of species. It is especially important to uphold this standard today because of the impacts of clearing for ski trail construction, timber cutting, road building and home development. Clearing decreases the forested community and has resulted in alteration of 18 percent of the habitat and loss of 10 percent of the wetlands.

Since the wildlife species listed in this chapter are dependant upon existing ecological conditions. Wetland and riparian communities are especially significant because they have the highest density and diversity of wildlife species. Development activities affecting wetland and riparian habitats will have the most impacts on wildlife.

The Town should continue to strengthen the parts of the Land Use and Development Code that address impacts to wildlife habitat and ecologically sensitive areas. Other plans and documents addressing environmental management and mitigation should be incorporated into land use review and approval.