

**SNOWCREEK GOLF COURSE  
IMPACT ASSESSMENT FOR MIGRATORY MULE DEER**

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## AFFECTED ENVIRONMENT

### WILDLIFE AND FISH

#### Management Indicator Species

**a) Mule deer.** The alternatives that use National Forest Service lands lie within and adjacent to a major holding area and migration corridor of the Sherwin Grade and Buttermilk deer herds, which have historically accounted for approximately one-third of the Forest's deer population. The Sherwin Grade and Buttermilk herds winter on adjacent ranges in Round Valley, located some 25 miles southwest of the proposed golf course. These deer herds have recently experienced dramatic declines in population numbers. The number of deer counted on the Round Valley winter range declined approximately 85% from 5,877 deer in 1985 to 939 deer in 1991 (DFG, unpubl. data). Winter range counts increased to 1,334 deer in 1993 and then decreased to 1,170 deer in 1994 (CDFG Unpubl. data).

The recent decline in the deer herd population has been attributed to poor forage conditions on the winter range as a result of drought-induced changes in habitat quality. Additionally, livestock grazing, plant succession, predation, road kills, and residential development on the winter range and in the migration corridor are other factors which may adversely affect deer population numbers.

The proposed golf course is situated in the extreme southwest corner of the deer holding area, which comprises approximately 11,250 acres at elevations ranging from 7,200 to 8,000 feet (Figure 9). Approximate boundaries of the holding area are the Mammoth Knolls on the north, Highway 395 on the east, Convict Creek on the south, and the Town of Mammoth Lakes (TML) on the west (Taylor 1995). Vegetation on the holding area is dominated by a mixture of Great Basin sagebrush shrub and Jeffrey pine (*Pinus jeffreyi*) forest.

Radio-telemetry studies completed from 1993-1995 as part of the Snowcreek Ski Area (SSA) analysis has provided information on deer abundance, and patterns of deer habitat use and distribution in the holding area and migration corridor. These studies indicate that snow conditions along the migration route, in conjunction with the availability of succulent, herbaceous forage, influence the timing of deer migration from the winter range. Deer migration from the winter range typically begins in early April following winters of normal to below normal snowfall. The majority of deer migrate from mid to late April and deer densities on the holding area are highest during the first week of May. Deer will delay migration from the winter range until late April or early May following winters of above normal snowfall. Peak migration during these wetter years typically occurs during mid May and deer densities on the holding area are highest in late May and early June.

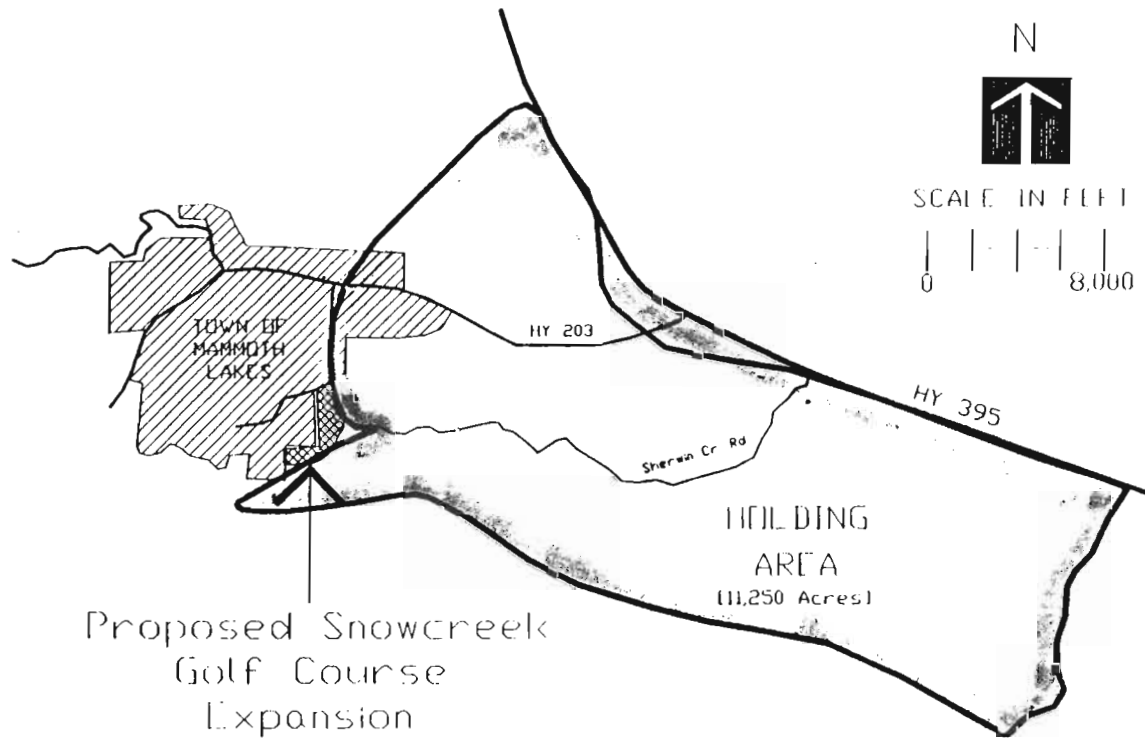


FIGURE 9. Mule deer holding area.

The holding area is considered to be a critical component of the deer life cycle because it has certain nutritional and thermal advantages over the winter range. It provides deer with an abundance of succulent, high quality forage at a time when metabolic requirements are the highest. Nutrients derived from this diet enables deer to satisfy productive functions such as recovery from overwinter weight loss, antler growth, pregnancy and body growth.

During 1984 and 1985, an estimated 3,500-4,000 deer delayed migration on the 11,250 holding area (Kucera 1985). Deer use of the holding area is currently much lower due to the decline in overall herd numbers. An estimated 800 and 1,100 deer delayed migration on the holding area during the 1994 and 1995 spring migrations, respectively (Taylor 1995, Taylor Unpubl.). Two areas of concentrated deer use have been identified in the holding area. The area of most concentrated use occurs in the lower eastern portion of the holding area, from approximately Mammoth Creek south to the top of the Laurel Mountain burn, and from Laurel Creek east to the Cold Springs campground area. Another area of concentrated deer use occurs east of the proposed golf course in the vicinity of Sherwin Campground and the Mammoth motocross (Taylor 1995).

Patterns of deer use within and immediately adjacent to the proposed golf course are shown in Figure 10. Deer use patterns were determined from data collected during weekly deer count surveys performed in the vicinity of the proposed golf course (Taylor 1993). Surveys were conducted on foot and all counts began as soon as light was sufficient to discern deer. A total of 175 deer were observed during the surveys. Of these 175 observations, 37 (21%) were made within the boundaries of the proposed golf course. All of the 37 deer were observed on the moraine in green-leaf manzanita (*Arctostaphylos patula*) vegetation. The remaining 148 observations occurred in the vicinity of the Mammoth motocross and the Mammoth Rock Trail, primarily in sagebrush shrub, montane chaparral and mixed conifer habitat.

Deer typically delay spring migration on the holding area for a period of 4 to 8 weeks. During the 1994 spring migration, 51 radio-collared deer used the holding area for an average of 31 days, with some deer remaining for as many as 60 days (Taylor 1995). However, because deer arrived on the holding area at different times, the entire holding period of migration lasted for about 10 weeks, from approximately early April to mid June.

Habitat use on the holding area is closely related to the temporal availability and phenological development of herbaceous spring forage. In 1993 and 1994, sagebrush shrub and montane chaparral habitats on the holding area received approximately 54% and 26% of deer use, respectively. Approximately 10% of deer use occurred in perennial grassland habitat on the Laurel Mountain burn and 10% occurred in Jeffrey pine forest. Deer used sagebrush shrub, Jeffrey pine forest and perennial grassland habitats in proportion to their availability, while montane chaparral habitat was used in greater proportions than available (Taylor 1995).



Vegetation in the proposed golf course is dominated by sagebrush shrub and habitat condition is considered to be fair. Based on work by Muegglar and Stewart (1980) and Stevens et al. (1974), sagebrush shrub habitat in fair condition will produce approximately 350 lbs. of forage per acre.

Radio-telemetry data indicates that approximately 60% of the deer that delay migration on the holding area migrate to summer ranges located on the west slope of the Sierra Nevada (Taylor 1995). Deer migrating to west slope summer ranges exit the holding area along three migration routes, Solitude/Duck Pass, Mammoth Rock and San Joaquin Ridge. The proposed golf course is located on the northern periphery of the Mammoth Rock migration route (Figure 10). This route was used by an estimated 150 deer (13% of the 1994 Round Valley population) during the 1994 spring migration (Taylor 1995). An estimated 160 deer used the Solitude Pass migration route and 80 deer migrated over San Joaquin Ridge. During the mid 1980's, when deer population levels were highest, an estimated 385 deer (7% of the Round Valley population) used the Mammoth Rock migration route.

Approximately 40% of deer that use the holding area summer east of the Sierra crest and of these, about 6% summer in the vicinity of the proposed golf course, from Sherwin Creek west to the Mammoth Lakes Basin. Suitable deer fawning habitat occurs along the south and east peripheries of the proposed golf course, where coniferous forest and montane chaparral habitats interface with sagebrush shrub vegetation. The dense, multilayered structure of the vegetation within these habitats provides important thermal and hiding cover for deer. These habitats also support a wide variety of plant species that provide a diverse, high quality diet for deer. A high quality diet resulting from a diversity of forage types is important to pregnant does because it enables deer to select the most nutritious foods (Swift 1948) and quickly regain condition lost over the winter (Short 1981, Garrott et al. 1987).

The timing of fall migration is more rapid than that of spring and is usually triggered by the first heavy snow storm. Fall migration through the proposed Snowcreek Ski Area has been monitored as early as late September and as late as early December, with peak migration typically occurring during the last two weeks of October. During the fall migration, deer follow the same migration routes used in the spring, but do not delay migration on the holding area. Instead, deer move directly to lower elevation winter ranges where snowcover is less and forage is readily available.

## ENVIRONMENTAL CONSEQUENCES

### WILDLIFE AND FISH

*a) Mule Deer.* The proposed golf course will have a profound effect on existing site vegetation because it has the potential to replace sagebrush shrub, manzanita, and irrigated pasture habitat with an artificially maintained grassland. After project completion, vegetation on the site would likely favor those wildlife species with the ability to adapt to a grassland environment and human activity. One such species is the mule deer, which was considered by Poole (1976) to be “the most adaptable and widespread western ungulate”. Succulent grasses on fairways and greens could provide an irresistible source of high quality forage for holdover and summer resident mule deer. The attractiveness of this forage could result in heavy deer use on the golf course during peak migration periods, and some damage to the playing greens could occur. It is important to note, however, that any increase in the number of holdover deer on the site would reflect a shift in geographic distribution rather than an increase in population size. Any damage resulting from deer use of the golf course could be repaired using normal landscape maintenance procedures. Because mule deer are crepuscular animals, active primarily at dawn and dusk, their presence on the golf course should not affect the quality of play.

The construction phase of the proposed golf course would result in a temporary loss (approximately 1 year) of existing habitat and an increase in human activity, noise, traffic, and dust. Construction activities would temporarily displace holdover and summer resident mule deer that currently use the site as a foraging and resting area. In addition, construction activities could diminish the suitability of adjacent undisturbed habitat. Displaced animals would likely locate new forage and cover resources on adjacent, undisturbed natural areas. However, this could create overcrowding and increased competition among individuals, and eventually result in overutilization of these areas. Under this impact, the amount of summer resident deer use in the area would be expected to decline due to a net loss of summer range habitat and a corresponding decrease in fawn survival. There would also be a shift in the habitat use patterns of holdover deer to include undisturbed habitats outside the project’s zone of influence.

Following construction, the loss of holding area deer habitat from development of the proposed golf course could be partially offset by the nutritional benefits derived from golf course vegetation, assuming that deer are provided free access to the site. Moreover, open access to the golf course could enhance the quality of deer summer range by providing pregnant and lactating does with a permanent supply of water and succulent forage. Under these circumstances, fawn survival among summer resident does would be expected to increase, eventually resulting in growth of the summer resident deer population. Because winter range conditions currently limit deer population size, an increase in the number of summer resident deer would not result in a net population increase among the Sherwin Grade and Buttermilk herds.

The attractiveness of golf course vegetation to deer could lead to depredation requests or the construction of deer-proof fences. Fencing would have adverse impacts on deer by interfering with movement patterns and eliminating potential nutritional benefits derived from golf course vegetation. Under this impact, the amount of holdover and summer resident deer use in the area would be expected to decline due to a net loss of habitat and a corresponding shift in deer distribution patterns.

Mule deer require movement corridors to enable individuals to move between two areas in discrete events of brief duration (e.g., seasonal migrations or moving between parts of a large home range) (Beier and Loe 1992). The loss and fragmentation of plant communities on the site from roads, parking lots and buildings could alter the migratory patterns of the Mammoth Rock herd segment. Development of the proposed golf course could force those deer that currently migrate through the project site to use migration routes located south of the area. However, it would not result in blockage of the Mammoth Rock corridor since most deer already migrate to the south of the proposed golf course. Development of the golf course could further constrict this already narrow corridor and diminish the amount of quality habitat currently available to the Mammoth Rock herd segment. Quality deer habitat within this migration corridor is limited due to steep topography and development of the TML area.

Bormann (1976) and Smith and Conner (1989) reported that human intrusion impacts associated with residential and recreational developments could extend well beyond the actual boundaries of the area developed. Human intrusion impacts associated with the operation phase of the project could indirectly affect deer use in migrations routes located on adjacent Forest Service lands. Under this impact, deer could abandon use of traditional travel routes in favor of routes located in undisturbed habitats. However, given the nature of the proposed development, deer should continue to use existing trails within the Mammoth Rock migration corridor as long as they remain available.

### **Mitigation Measures**

Adoption of the following mitigation measure will reduce or eliminate potential adverse consequences to mule deer from expansion of the Snowcreek golf course:

1. Construction of the expanded golf course should be limited to the interim period between spring and fall migrations (approximately June 1-October 1), with the actual dates of closure determined by the monitoring of radio-collared deer in conjunction with the Snowcreek Ski Area deer study.
2. The proponent should be prohibited from requesting depredation permits for controlling mule deer. The proponent should recognize and accept the risk of damage to fairways, greens and landscaping when constructing a golf course on mule deer range.



3. Disturbed areas not used for playing surfaces should be reseeded with a grass, forb and shrub mix that emphasizes the use of native plant species palatable to deer and other wildlife. All disturbed sites should be revegetated in the shortest time period possible to minimize short-term losses in wildlife habitat and to prevent erosion. At the project site, the spread of weeds can be deterred by revegetating disturbed sites as soon as possible, using mulches free of weed seeds, and covering stockpiled topsoil.
4. Impacts from night lighting should be minimized by adequately screening lights which could potentially illuminate deer use areas located within and adjacent to the project area. The proponent will aim, shield, and direct lighting to provide illumination of target areas with minimal offsite visibility.
5. Control of dust generated during site clearing and movement of heavy machinery should be controlled through watering or other acceptable measures.
6. The proponent should establish vegetative screening adjacent to parking areas and buildings to minimize human intrusion impacts (e.g., noise, lights, human activity) on resident and migratory deer.
7. Fences or other impediments to mule deer should be minimized and installed only with approval of the Forest Service. Deer enclosure fences should be prohibited. Any fences erected on the site should be constructed in accordance with Forest Service guidelines to permit passage of deer. According to U.S. Forest Service guidelines, fences should consist of 3 single strand wires placed 20, 30 and 42 inches from the ground with the bottom wire a smooth strand.
8. Dogs should be prohibited in the project area during the construction and operation phases of development.
9. No structures of any kind should be constructed along the southern perimeter of the proposed golf course.
10. In conjunction with the Snowcreek Ski Area deer study, the proponent should monitor deer migration along the Mammoth Rock corridor to determine changes in deer distribution patterns in response to the golf course development.

## CUMULATIVE IMPACTS

### WILDLIFE AND FISH

*a) Mule Deer.* Substantial cumulative impacts to mule deer could arise from the development of the TML, construction of the proposed Snowcreek Ski Area, and development in the holding area, along the migration corridor and on the winter range. Of greatest concern to the Sherwin Grade and Buttermilk deer herds are existing and proposed developments located in the westerly portion of the holding area, including the Snowcreek Ski Area, the motocross track, Sherwin campground, the college, and the Gateway Industrial Park. These and other local projects, including expansion of the Mammoth-June Lakes Airport and the Lodestar development, could have growth-inducing impacts on the TML which would increase the amount of habitat removal, habitat alteration, human intrusion and direct mortality in the deer holding area and migration routes.

Habitat removal, from past, present and future development projects, represents a permanent physical reduction in the amount of available habitat because food and shelter resources previously provided by the vegetation are no longer available. Habitat alteration represents changes in plant species composition and structural characteristics, which can have either beneficial or adverse impacts on mule deer. Human intrusion is typically an adverse impact on mule deer resulting from increased noise, motion, visual stimulus, harassment from domestic dogs, and harassment associated with construction activities. Direct mortality of deer resulting from increased road-kills and poaching is an adverse impact that reduces deer numbers and ultimately the amount of prey available to predators of deer.

Ski area facilities (e.g., lift towers, buildings, access roads, etc.) in the adjacent Snowcreek Ski Area should be situated and designed to reduce disturbance to important deer habitat and to insure no barriers to deer migration (SSA-MDP, 2-24). Nevertheless, construction of these facilities will remove and alter traditional deer habitat located within the Mammoth Rock corridor. Therefore, when considered collectively, the golf course and the ski area have a greater potential to adversely affect deer migration in the Mammoth Rock corridor through a net reduction in the amount of available habitat. Even with this reduction, however, many of the deer trails within the Mammoth Rock corridor would remain passable. Deer use of these existing trails would likely continue since they are the most energy efficient routes available to deer.

Operating, maintenance and construction activities associated with the proposed ski area will be terminated upon the spring arrival of significant numbers of deer in the holding area. During fall migration, all ski area activities which could adversely affect deer will be terminated when significant numbers of deer approach Duck Pass (SSA-MDP, 2-25). Therefore, any human disturbance to mule deer resulting from the proposed ski area would likely occur during the summer from construction and maintenance activities. Similarly, human intrusion impacts from construction and maintenance activities related to

the proposed golf course would also occur during the summer months. Therefore, when considered cumulatively, these projects could pose a substantial threat to the welfare of the summer resident deer population, especially during the construction phase of development. Construction activities would temporarily displace holdover and summer resident mule deer that currently use the site as a foraging and resting area. Displaced animals would likely locate new forage and cover resources on adjacent, undisturbed areas. However, this could create overcrowding and increased competition among individuals, and eventually result in overutilization of these areas. Under these circumstances, the amount of summer resident deer use in the area would be expected to decline due to decreased fawn survival and a corresponding shift in deer distribution patterns.

After construction of the proposed ski area, improvement and maintenance of forage and forage cover including revegetation of ski trails and avoidance of removal of existing cover would be conducted (SSA-MDP, 2-25). These improvements in conjunction with forage provided by the proposed golf course could greatly enhance the nutritional quality of deer summer range by providing pregnant and lactating does with a permanent supply of succulent forage. Under these circumstances, fawn survival among resident does would be expected to increase, eventually resulting in growth of the summer resident deer population. This potential positive benefit of the golf course, ski area complex could, however, be negated by the cumulative effect of increased habitat loss, alteration, human activity, and direct mortality resulting from all projects located on ranges occupied by the Sherwin Grade and Buttermilk deer herds.

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