

Graded Runs

Grading of ski runs is necessary where a substantial slope across the trail exists. To the extent possible, designs avoid situations where the run is “off-slope”, but they are sometimes required for interconnection in and between ski pods providing necessary skier access, safety, and circulation. Graded sections of runs range in extent from a slight correction to a portion of the run’s width to grading of the full width of the ski trail. Narrow catwalk type runs and full graded run designs attempt to achieve a balanced cut and fill slope and where feasible, utilize and improve existing logging roads. Within graded areas, vegetation is removed and the soil surface is disturbed. These areas require erosion control and revegetation measures. (Erosion control and revegetation practices are described in *Ski Runs and Associated Facilities Practices*).

Some sections of graded runs will be necessary in Zones A–D to facilitate skier access and circulation.

Traditional Ski Runs

For traditional runs, the entire run is typically cleared from edge to edge, although island or individual trees may be retained to add character to the ski trail. This type of run provides clear passage for the skier, but limits the number of islands or individual trees. Traditional runs are primarily in Zones A, B, and C, but there is an allowance for two traditional ski runs in Zone D3.

Tree Island Runs

Tree island runs (i.e., interconnected runs) contain large individual trees and/or groupings of trees left as islands within the ski run primarily to enhance visual quality and add interest for the skier. The tree islands vary in size, location, and shape depending on the density of existing trees. Tree island runs may be groomed with spaces between individual trees or tree islands being wider than 25 feet.

Decisions regarding which trees or islands of trees to retain will be based on location, aesthetics, ecological value, density, and ability to utilize the ski run. Efforts will be made to retain junipers, sugar pines, Jeffrey pines, and trees greater than 30 inches in DBH, as well as groupings of trees that distinguish themselves as viable islands. To the extent possible, existing natural clearings will be incorporated into trail designs, and designs will also be influenced by patterns of adjacent natural vegetation. The run width will vary and edges will be softened with feathering, scalloping, or both. Grading and surface smoothing may be required at some locations along these runs, but runs will be designed to minimize the need for earth disturbance.

Tree island runs may be proposed in Zones C and D1–D3.

Tree Skiing

CDF silviculture practices implemented throughout the resort to achieve forest health and fuels management are compatible with thinning requirements for tree skiing. The thinning and selection prescriptions will remove trees and increase average spacing among trees being retained. The primary objective of these silvicultural prescriptions will be to improve forest health and productivity. Consequently, decisions regarding which trees to retain will be based on the silviculture needs of each forest stand. Retention criteria include species, crown position, tree vigor and health, tree size, crown size, spacing needs to improve growth rates, and ecological value; efforts will be made to retain junipers, sugar pines, Jeffrey pines, and trees greater than 30 inches in DBH. Zones D2 and E2 contain late-seral forests, and these late-seral stands will generally be left untreated with the primary exception of 10–20 acres of understory treatment every 5 years for fuels management.

These forest treatments are proposed for Zones A–E, and will be the predominant design approach in Zones D2 and E2.

Construction-related Practices

Construction activities may result in specific effects on natural resources that are different from those of the operations and maintenance of roads, or ski facilities, and developed areas. Many of these effects stem from ground disturbance or the disruption of natural areas that sensitive species may be using. Therefore, Northstar incorporates into its projects a set of measures to avoid and/or minimize construction-related effects. Most of these measures rely on minimizing the area disturbed, controlling the movement of soil and runoff, and timing disturbances to cause less disruption of natural systems.

Most construction-related management is the same in all zones of the resort (Table 4-1), and includes the following practices:

- ▶ Prior to construction, obtain required authorizations for projects that would affect jurisdictional waters of the United States, waters of the State, or riparian vegetation. These may include authorizations from:
 - USACE (through the Section 404 permitting process),
 - Lahontan Regional Water Quality Control Board (through the Section 401 permitting process), and
 - California Department of Fish and Game (through a 1602 Streambed alteration agreement).
- ▶ Implement pre-project surveys to determine if construction activities could affect sensitive species. Table 4-3 lists biological surveys that may be necessary prior to construction projects on the resort.
- ▶ Based on the results of these surveys, implement applicable and feasible measures to avoid and/or minimize effects on sensitive species. Tables 4-4 and 4-5 provide such measures that may be applicable to projects at the resort.
- ▶ Prepare a Stormwater Pollution Prevention Plan (SWPPP). This plan will include feasible and effective BMPs for:
 - temporary erosion control,
 - sediment control,
 - soil stabilization,
 - non-storm water management,
 - post-construction storm water management, and
 - BMP maintenance, inspection, and repair.
- ▶ Avoid construction-related ground disturbance between October 15 and May 1 unless it is not practicable and a grading variance is obtained from Lahontan RWQCB and/or Placer County.
- ▶ To the extent feasible, during the nesting season (March 1 through September 1), avoid removing vegetation that could support nesting birds.
- ▶ To the extent feasible, minimize disturbance of vegetation during construction activities.
- ▶ Fence or flag project boundaries as necessary and fence sensitive resources to reduce disturbance.
- ▶ Conduct environmental sensitivity training for construction personnel prior to initiating work.
- ▶ Conduct all ground disturbing activities in accordance with the *Lahontan Region Project Guidelines for Erosion Control*.
- ▶ Fulfill all relevant terms and conditions of permits and approvals prior to and during construction.

**Table 4-3
Pre-Project Survey Guidelines**

Species	Timing ¹	Summary ²
Northern Goshawk	June 1–August 15 (broadcast acoustical surveys or intensive surveys/stand searches); or approximately March 1–April 15 (dawn acoustical surveys) ³	Pre-project surveys will be conducted in suitable nesting habitat within 0.25 mile of vegetation removal, construction, and development activities. Surveys for Northern Goshawks will follow the <i>Northern Goshawk Inventory and Monitoring Technical Guide</i> (Woodbridge and Hargis 2006) ² , or another appropriate method determined by the appropriate regulatory agency. Suitable habitat is preliminarily defined here as Class 2 (moderate breeding value) and 3 (high breeding value) areas shown in Exhibit 3-7. However, these areas were mapped primarily from GIS data, and they may overestimate the amount of suitable breeding habitat (particularly in the “moderate” category). Final determination of suitability, and whether a pre-project protocol survey is required, should be based on a reconnaissance field assessment of habitat conditions by a qualified avian biologist before initiating projects in these areas. For efficiency, this assessment could be conducted as part of the pre-project survey, as follows: if suitable habitat is present, continue by implementing the protocol survey; if suitable habitat is not present, no further (protocol) survey would be required.
California Spotted Owl	March 1–August 31 ⁴	Pre-project surveys will be conducted in suitable nesting habitat within 0.25 mile of vegetation removal, construction, and development activities. Surveys for California Spotted Owl will follow the <i>Protocol for Surveying for Spotted Owl in Proposed Management Activity Areas and Habitat Conservation Areas</i> (USFS 1993) ³ , or another appropriate method determined by the appropriate regulatory agency. Suitable habitat is preliminarily defined here as Class 2 (moderate breeding value) and 3 (high breeding value), and portions of Class 1 (low to moderate breeding value), areas shown in Exhibit 3-8. Final determination of suitability, and whether a pre-project protocol survey is required, should be based on a reconnaissance field assessment of habitat conditions by a qualified avian biologist before initiating projects in these areas. For efficiency, this assessment could be conducted as part of the pre-project survey, as follows: if suitable habitat is present, continue by implementing the protocol survey; if suitable habitat is not present, no further (protocol) survey would be required.
Other Raptor Species (e.g., Cooper’s Hawk, Red-tailed Hawk)	April 15–June 30	Pre-project surveys for other nesting raptors will be conducted in suitable nesting habitat within 500 feet of vegetation removal, construction, and development activities. Visual surveys of trees larger than approximately 11 inches in diameter-at-breast height (dbh) and taller than 30 feet will be conducted. Determination of habitat suitability, and whether a pre-project survey is required, should be based on a reconnaissance field assessment of habitat conditions before initiating projects in these areas.
Willow Flycatcher	June 1–July 15	Pre-project surveys will be conducted in suitable nesting habitat within 500 feet of vegetation removal, construction, and development activities. The surveys will follow <i>A Willow Flycatcher Survey Protocol for California, June 6, 2000</i> (Bombay et al. 2003), or another appropriate method determined by the appropriate regulatory agency. The protocol requires a minimum of two survey visits to determine presence or absence of Willow Flycatcher. Surveys will be conducted during Survey Period 1 (June 1–14) and 2 (June 15–25). Determination of habitat suitability, and whether a pre-project survey is required, should be based on a reconnaissance field assessment of habitat conditions before initiating projects in these areas.

**Table 4-3
Pre-Project Survey Guidelines**

Species	Timing ¹	Summary ²
Mule Deer (fawning)	Approximately April 15–July 31 (These dates are only guidelines. Appropriate survey dates should be determined by a qualified biologist during the year of the survey, based on snowpack conditions and deer activity).	Pre-project surveys will be conducted in suitable fawning habitat within 500 feet of vegetation removal, construction, and development activities. Suitable habitat is preliminarily defined here as moderate- and high-potential areas shown in Exhibit 3-11; however, these were mapped primarily from GIS data. Final determination of suitability, and whether a pre-project focused survey is required, should be based on a reconnaissance field assessment of habitat conditions by a qualified wildlife biologist before initiating projects in these areas. For efficiency, this assessment could be conducted as part of the pre-project survey, as follows: if suitable habitat is present, continue by implementing the focused survey; if suitable habitat is not present, no further (focused) survey would be required. (Note: riparian vegetation along Schaffer Creek is mapped on Exhibit 3-11 as high-potential; however, it is not easily seen on Exhibit 3-11 because of overlap with stream and trail features.)
American Marten	April 1–July 31	Pre-project surveys for American marten den sites will be conducted in suitable denning habitat within 0.25 mile of vegetation removal, construction, and development activities. If a potential den is located, an appropriate method will be used to determine whether the site is occupied by marten. Suitable denning habitat is preliminarily defined here as Class 2 (moderate breeding value) and 3 (high breeding value) areas shown in Exhibit 3-9. However, these areas were mapped primarily from GIS data, and they may overestimate the amount of suitable denning habitat (particularly in the “moderate” category). Final determination of suitability, and whether a pre-project survey is required, should be based on a reconnaissance field assessment of habitat conditions before initiating projects in these areas.

Note: Additional pre-project surveys (e.g., for other special-status species) may be required as part of the forthcoming OMMP EIR.

¹Timing indicates when surveys are most appropriate based on the species’ life history or required by an established protocol, and generally corresponds with the core sensitive breeding (e.g., nesting, denning) period. These surveys are primarily intended to determine whether measures to minimize or avoid project effects on active breeding sites of these species are required during implementation (see Table 4-4). For all of these species except Northern Goshawk, project activities occurring outside of these periods would not require a pre-project survey for this purpose. For Northern Goshawk, the sensitive period is March 15–August 15, based on California Forest Practice Rules guidelines and definition of “Critical Period”; however, this sensitive period does not correspond exactly with the appropriate survey timing in this table. For project activities occurring during the sensitive period (March 15–August 15), surveys should be conducted during the periods indicated in this table (approximately March 1–April 15 or June 1–August 15) and before project activities begin.

²Vegetation removal includes removal associated with forest management/thinning, and habitat enhancement described in Chapter 5.

³See footnote #1 for discussion of timing. For goshawk, the dawn acoustical method requires at least two visits in one year; the intensive survey/stand search method requires at least one visit in one year; and the broadcast acoustical method requires two visits per year for two consecutive years. See the protocol (Woodbridge and Hargis 2006) for survey details, advantages, and appropriateness of each method, located at: http://www.fs.fed.us/biology/wildecology/goshawk_monitoring.html. Also, California Department of Fish and Game provides a summary of the full protocol at: <https://r1.dfg.ca.gov/Portal/Portals/12/NOGO&Osprey/Types%20of%20Survey%20Protocol.doc>

⁴See footnote #1 for discussion of timing. The Spotted Owl protocol requires six visits: either six visits in one year, or three visits in each of two consecutive years. See the protocol for survey details, advantages, and appropriateness of each method. The specific timing of survey visits within the general survey timeframe depends on which option is selected.

**Table 4-4
Measures to Avoid or Minimize Project Effects on Sensitive Wildlife Species and Habitats**

Species	Summary
Northern Goshawk	Northern Goshawk nesting has been documented on the north side of Sawtooth Ridge in Zone E2, and the species has been observed at other locations on the Northstar property (e.g., flying near the boundary of Zones A and C1). An active goshawk nest was located in Zone E2 in 2007 (see Chapter 3, Exhibit 3-7). If an active Northern Goshawk nest is located during pre-project surveys (see Table 4-3) or otherwise, notify the county and DFG. To avoid disturbances to or loss of active nest sites, between March 15 and August 15, delay project activities within 0.25 mile of (or at a distance directed by the appropriate regulatory agency) the nest to avoid disturbance until the nest is no longer active. Project activities include vegetation removal, earth moving, and construction. This buffer may be reduced through consultation with the county and/or DFG. This timeframe is based on the California Forest Practice Rules guidelines and definition of “Critical Period” for Northern Goshawk.
California Spotted Owl	A California Spotted Owl pair occurs on the north side of Sawtooth Ridge, in Zones D2 and E2 (see Chapter 3, Table 3-5 and Exhibit 3-8). If an active Spotted Owl nest is located during the pre-project surveys (see Table 4-3) or otherwise, notify the county and DFG. To avoid disturbances to or loss of active nest sites, between March 1 and August 31, delay project activities within 0.25 mile of (or at a distance directed by the appropriate regulatory agency) the nest to avoid disturbance until the nest is no longer active. Project activities include vegetation removal, earth moving, and construction. This buffer may be reduced through consultation with the county and/or DFG.
Other Raptor Species (e.g., Cooper’s Hawk, Red-tailed Hawk)	If an active raptor nest is located during the pre-project surveys (see Table 4-3), notify the county and DFG. To avoid disturbances to or loss of active nest sites, between March 1 and August 31, delay project activities within 0.25 mile of (or at a distance directed by the appropriate regulatory agency) the nest to avoid disturbance until the nest is no longer active. Project activities include vegetation removal, earth moving, and construction. The 0.25-mile buffer may be reduced through consultation with the county and/or DFG.
Willow Flycatcher	If an area is determined to be occupied by Willow Flycatcher during pre-project surveys (see Table 4-3) or otherwise, notify the county and DFG. Between June 1 and July 31, delay project activities within 500 feet of (or at a distance directed by the appropriate regulatory agency) of the site until the nest is no longer active. Project activities include vegetation removal, earth moving, and construction.
Mule Deer (fawning)	Mule deer fawning on Northstar property was recently documented. If mule deer fawning is confirmed during pre-project surveys (see Table 4-3) or otherwise, notify the county and DFG. During the fawning and fawn-rearing period (typically sometime between mid-April and late July, depending on snowpack/weather), delay project activities within 0.25 mile of (or at a distance directed by the appropriate regulatory agency) the area. Project activities include vegetation removal, earth moving, and construction. Appropriate dates within this period should be determined by a qualified biologist during the year of project activity, based on snowpack conditions and deer reproductive activity.
American Marten	If an active marten den site is located during the pre-project surveys (see Table 4-3) or otherwise, notify the county and DFG. Delay project activities within 500 feet of the den during the sensitive denning season when activities could disturb rearing of young (April 1 through July 31). (Note: although martens are active and can be surveyed year-round, this is considered the sensitive reproductive period that could overlap with timing of project activities. Generally, young are born in March–April, emerge from the den at about 50 days, and leave their mother in late summer [see Buskirk and Ruggiero 1994]).

Note: These measures do not include mitigation or compensation for remaining impacts, which may be required as part of the OMMP EIR.

**Table 4-5
Access and Seasonal Use Restrictions**

Species	Timing	Description	Zone				
			A	B	C	D	E
Northern Goshawk	March 15 – August 15 (based on California Forest Practice Rules guidelines and definition of “Critical Period.”)	Where pre-project surveys (see Table 4-3) or other monitoring (see Chapter 6) have identified nesting by Northern Goshawk, the following will be restricted: <ul style="list-style-type: none"> ▶ Motorized vehicle use not related to the necessary maintenance of facilities or resource protection, within 0.25 mile of the nest. ▶ Bicycling and snowmobiling, within 0.25 mile of the nest. 				•	•
California Spotted Owl	March 1–August 31	Where pre-project surveys (see Table 4-3) or other monitoring (see Chapter 6) have identified nesting by California Spotted Owl, the following will be restricted: <ul style="list-style-type: none"> ▶ Motorized vehicle use not related to the necessary maintenance of facilities or resource protection, within 0.25 mile of the nest. ▶ Bicycling and snowmobiling, within 0.25 mile of the nest. 				•	•
American Marten	April 1–July 31	Where pre-project surveys (see Table 4-3) or other monitoring have identified denning or concentrated use by American marten, the following will be restricted: <ul style="list-style-type: none"> ▶ Motorized vehicle use not related to the necessary maintenance of facilities or resource protection, within 0.25 mile of the den or activity center. 				•	•
Mule Deer	Approximately April 15–July 31 (Appropriate dates within this period should be determined by a qualified biologist during each year, based on snowpack conditions and deer reproductive activity.)	To allow deer access to fawning grounds and avoid disturbances to fawning activities, the following will be restricted: <ul style="list-style-type: none"> ▶ Recreation activities (including snowmobiling and bicycling), motorized vehicle use not related to the necessary maintenance of facilities or resource protection, and other unnecessary operational uses within a seasonal closure area during the deer fawning season. This closure area is introduced and shown (as Exhibit 4-1) below under <i>Management Practices for Access and Use</i> for Zones B, D, and E. ▶ Pets within moderate-potential, high-potential, or occupied fawning habitat. 	•			•	•
			•	•	•	•	•

Additional practices that are specific to particular zones are listed in Table 4-1, and described under the applicable zones in the section *Objectives, Targets, and Practices by Zone*.

Road and Trail System Practices

Road and trail systems can substantially alter the movement of sediment and water into watercourses. Northstar maintains the resort’s road surfaces, stream crossings, and associated drainage structures to minimize this alteration. This maintenance slows and reduces runoff, stabilizes soil surfaces, and minimizes direct runoff into

watercourses (or their floodplains). Road and trail maintenance in all zones of the resort includes the following practices:

- ▶ Conduct annual monitoring and maintenance of the road and trail system.
- ▶ Implement dust control measures such as road watering during construction projects.
- ▶ Maintain all culverts, waterbars, and other drainage structures in a fully functional condition.
- ▶ Implement additional, feasible drainage and erosion control measures as needed to prevent discharge of runoff and sediment from the road directly into the active floodplain of watercourses.
- ▶ Reshape the road surface as needed to maintain proper surface drainage.
- ▶ Establish native vegetation on slopes where grading and/or smoothing has taken place along roads or where trails have been established.

Additional practices that are specific to particular zones are listed in Table 4-1, and described under the applicable zones in the section *Objectives, Targets, and Practices by Zone*.

Ski Runs and Associated Facilities Practices

Ski runs and facilities can affect adjacent habitats by altering erosion and hydrology. Management practices for ski runs are based on the approach that maintaining native vegetation cover, and minimizing exposed soil and soil compaction will reduce erosion and the concentration of overland flow, and thus prevent ski runs and associated facilities from adversely affecting natural resources. Management of ski runs and associated facilities in all zones of the resort includes the following practices:

- ▶ Minimize vegetation removal to the extent practicable.
- ▶ Minimize soil compaction to the extent practicable.
- ▶ After tree removal, on those areas where grading or smoothing is not required, chip or masticate slash onto the ski run to protect the soil surface.
- ▶ Revegetate areas where the soil profile has been disturbed by grading or smoothing.
- ▶ Install and maintain water bars on ski trails.
- ▶ Prepare a SWPPP for projects with more than 1 acre of soil disturbance.
- ▶ Following ground-disturbing activities, attain success criteria (for soil attributes and cover of native vegetation and mulch) required by Placer County and the Lahontan RWQCB using approaches recommended by the California Alpine Resort Environmental Cooperative (CAREC) in the current draft of its *Sediment Source Control Handbook* or superseding document, or by a qualified professional.
- ▶ Manage ski runs and associated facilities to maintain, or to move towards the appropriate standards recommended by CAREC, qualified professionals, and/or required by Placer County and the Lahontan RWQCB.
- ▶ Minimize fertilizer applications to the extent practicable.
- ▶ Annually inspect ski trails for signs of erosion, and implement erosion control treatments as necessary.

- ▶ During rain events and spring runoff, monitor runoff, and implement BMPs as necessary to reduce erosion and protect water quality.
- ▶ Participate in the development of more effective techniques for minimizing runoff and erosion.

These practices emphasize the minimization of disturbance and the treatment of recently disturbed areas because even though these areas are small in acreage they can account for most of the effects on adjacent habitats. In undisturbed areas, rainfall typically infiltrates rapidly; when runoff does occur, vegetation slows the flow of water (which reduces its erosive force), and binds soil particles (which increases the soil's resistance to erosion). In contrast, recently disturbed areas often have reduced infiltration because of soil compaction or crusting of the soil surface, and the effects of the resulting runoff are little affected by the sparse cover of recently disturbed vegetation (which can remain sparse on compacted soils). Consequently, much greater erosion occurs in disturbed areas.

The *Sediment Source Control Handbook* produced by CAREC includes recommendations for treating recently disturbed areas. Participants in CAREC include the Lahontan RWQCB, Tahoe Regional Planning Agency, Sierra Business Council, U.S. Forest Service (USFS), Alpine Meadows Ski Area, Heavenly Lake Tahoe, Mammoth Mountain, and Northstar. Specific success criteria with percentages for plant cover and soil variables are not included in this HMP, because Placer County and Lahontan standards are likely to undergo changes during the duration of the HMP. Nonetheless, Northstar's practice is to attain success criteria and standards required by regulatory agencies (such as Placer County and the Lahontan RWQCB) and to follow applicable guidance, such as the guidance under development by CAREC or other guidance from qualified professionals.

Forest Management Practices

Many aspects of Northstar's forest management practices are regulated by the State of California. Northstar's timber operations, like all timber operations on private lands in California, are regulated by the state's Forest Practice Rules, which are enforced by the California Department of Forestry and Fire Protection (CDF). The California Forest Practice Rules address:

- ▶ harvest practices and erosion control,
- ▶ protection of natural resources during site preparation,
- ▶ water course and lake protection (including water course and lake protection zones [WLPZ]),
- ▶ hazard reduction,
- ▶ fire protection, and
- ▶ wildlife protection practices.

These rules are implemented through the preparation of timber harvest plans. Timber harvest plans describe timber operations and how they conform to these rules, and provide information and direction to timber operators so that they comply with the rules.

In all zones of the resort, Northstar implements forest management practices, consistent with the California Forest Practice Rules, to increase fire safety and to sustain or enhance habitat values. These practices are also compatible with the resort's goals of offering skiing opportunities in a forested mountain environment. For example, silvicultural prescriptions such as thinning and selection that increase tree growth rates and improve overall forest productivity, can also improve conditions for activities such as tree skiing. The pre-project survey requirements listed in Table 4-3 and minimization/avoidance measures listed in Table 4-4 apply to forest management activities in all zones, including forest thinning and enhancement projects described in Chapter 5.

These practices are listed in Table 4-1, and described under the applicable zones in the section *Objectives, Targets, and Practices by Zone*.

Invasive Plant Control Practices

The spread of invasive, nonnative plants degrades ecosystems by reducing the abundance and variety of native plant species, altering or eliminating wildlife habitats, and in some cases by altering hydrology or increasing fire frequency. Currently, there are few infestations of invasive plants on Northstar properties; thus, Northstar implements a set of management practices to prevent their establishment and spread, and the resulting degradation of natural resources (Table 4-1). In all zones of the resort, invasive plant control includes the following practices:

- ▶ Clean vehicles and clothing after leaving infested areas and before entering uninfested habitats.
- ▶ Wash earthmoving equipment to remove vegetative material before bringing equipment onto Northstar properties.
- ▶ For erosion control, use certified weed-free materials or materials produced on-site (e.g., wood chips produced at the resort).
- ▶ Monitor hot spots of introduction on Northstar properties to enable early detection and rapid eradication of invasives (e.g., roadsides, parking areas, construction sites, and disturbed areas).
- ▶ Eradicate detected infestations of invasive plants on Northstar properties while infestations are still small and control is feasible.
- ▶ Periodically evaluate effectiveness of monitoring and control methods and adjust methods as needed.
- ▶ Coordinate with and support regional control efforts, in particular control efforts by the Placer County Department of Agriculture.

Additional practices that are specific to particular zones are listed in Table 4-1, and described under the applicable zones in the section *Objectives, Targets, and Practices by Zone*.

Access and Use Practices

In sensitive areas, the disturbances that are often associated with human activities (e.g., ground disturbance, noise) can damage vegetation and/or can reduce or even preclude wildlife use of an area that otherwise provides suitable habitat. Therefore, Northstar's management of its lands includes practices to avoid or reduce these adverse effects on natural resources.

In all zones of the resort, it is a practice to park vehicles and equipment on existing roads or previously disturbed areas (to the extent practicable), and to enforce the use restrictions applicable to that zone. Northstar also has additional access and use practices that are specific to particular zones; these practices are listed in Table 4-1, and described under the applicable zones in the section *Objectives, Targets, and Practices by Zone*.

The public will be informed of access and use restrictions (e.g., seasonal recreation restrictions and pet restrictions) by notifications and signage. Access and use restrictions will be posted at Employee housing, NCS D, and NPOA, and will be provided in units rented by Northstar. Notification also will be provided to other rental agencies at the resort. Northstar also will request that NCS D and NPOA place notice of pet restrictions in publications for homeowners.

Signs regarding access and use restrictions will be posted and maintained along roads and trails entering zones with restrictions. Signage will be inspected and maintained by Northstar mountain crews on a seasonal basis.

Gates on Northstar property are operated and maintained to ensure that access is limited appropriately. Generally, all gates on the Northstar property are locked at all times. Keys are administered by Northstar security which

tracks all issued keys by number. The locks are changed periodically as a security measure. Northstar crews inspect gates on a bi-monthly basis during routine operations. Gates are fixed immediately upon discovery of required maintenance. Rock barriers are in place adjacent to gates, and additional rock barriers are placed if there is evidence of access around the gate.

Northstar operations staff and employees (including the mountain bike patrol, mountain crew, and ski patrol) will enforce access and use restrictions as needed and practicable during routine operations. Individuals found violating these restrictions will be asked to leave the property immediately. Northstar security is available at all times to immediately address property access and use violations.

Additional information regarding maintenance of signs and gates, and enforcement of use restrictions is provided in Chapter 6 *Monitoring and Adaptive Management Framework*.

Management Practices for Trash and Litter Removal

Trash and litter removal at the resort is a joint effort among all property owners and visitors. For example, NCSO and TTSD coordinate courtesy dumpsters that allow homeowners and visitors to dispose of their trash upon leaving the resort rather than leaving the trash outside overnight. In all zones, Northstar's trash and litter removal includes the following practices:

- ▶ Provide and maintain necessary trash receptacles in the Village and mountain facilities to manage trash and litter removal.
- ▶ Install bear-proof trash cans at new residential and commercial construction at the resort.

In addition, in Zones B–E, Northstar mountain crews remove trash as necessary during routine inspections of mountain terrain.

OBJECTIVES, TARGETS, AND PRACTICES BY ZONE

ZONE A – DEVELOPED COMMUNITY

Zone A is the most developed zone of the resort. Land uses include commercial and residential development, ski operations, other recreational facilities, and open space. The west fork of West Martis Creek flows through Zone A. The predominant vegetation consists of white fir and Jeffrey pine forests; much of this forest is intermixed with developed land uses, and none is dominated by larger trees (i.e., in CWHR tree size categories 5 or 6). In large part, Zone A is controlled by others, such as Northstar Property Owners Association and Northstar Community Services District. Given this mosaic of ownership, Northstar is only accountable for the lands under its control. Northstar will, however, share with the other owners the intent of the HMP and provide them with the standards and practices of the plan.

OBJECTIVE

The objective for Zone A is to:

- ▶ minimize and mitigate adverse effects on, and potential threats to, biological resources in adjacent areas, with a particular emphasis on controlling and minimizing the adverse effects of storm water runoff into downstream water bodies.

RESOURCE MANAGEMENT TARGETS

Water Quality Target

The water quality target for Zone A is:

- ▶ conformance with all applicable narrative or numerical water quality objectives established by the Lahontan RWQCB and Placer County.

In Zone A, developed land uses are extensive. For permit compliance, monitoring of water quality constituents is on-going; and, this monitoring is anticipated to continue during implementation of the HMP. These water quality constituents indicate the condition of aquatic habitats. Thus, the water quality target for Zone A is based on conformance with the standards for the water quality constituents established by the Lahontan RWQCB.

Stream and Riparian Condition Target

The stream and riparian condition target for Zone A is:

- ▶ stable or improved channel, bank, and riparian area conditions along perennial (i.e., Class I and II) and intermittent (i.e., Class III) streams as quantified by a stream and riparian area assessment procedure.

The stream and riparian area assessment procedure developed for this HMP is described in the section entitled *Monitoring for Stream and Riparian Area Condition Targets* in Chapter 6. In Zone A, West Martis Creek would be assessed. Tributaries to West Martis Creek would be monitored if monitoring of West Martis Creek determined that they were adversely affecting attainment of this target.

There is a mosaic of ownership in Zone A, and Northstar is only accountable for the lands under its control. Thus, the stream and riparian condition target for Zone A would apply only to those bank and riparian conditions that are the result of activities on the resort and under the control of Northstar (and not to conditions influenced by other off-site land uses or property owners). Northstar will, however, share with the Northstar Properties Owner Association (NPOA) the intent of this HMP and provide them with the plan's objectives, targets, and practices that are applicable to Zone A.

DESIGN AND MANAGEMENT PRACTICES

Each of the design and management practices applied in Zone A are listed in Table 4-1; the following text provides a brief synopsis of these practices and of the reasons they are applied in this zone.

Design Practices

Because more extensive and varied development is planned in Zone A than in other zones of the resort, design practices can more strongly influence habitats in Zone A than in the other zones. A comprehensive set of design practices are implemented in Zone A that are intended both to reduce appreciable effects on natural resources and to support the coexistence of human uses and habitat values. They are applied to the design of residential and commercial development, landscaping, roads, trails, and other infrastructure. In addition to the generally applicable practices listed in Table 4-1 (and that were described in *Rationale for Design and Management Practices*), these include the following practices:

- ▶ Site trails, roads, and buildings to minimize alterations to the site's hydrology.
- ▶ Minimize the extent of impermeable surfaces.
- ▶ Prepare a Tree Protection, Retention and Replacement Plan for development projects.

- ▶ Based on wetland delineations verified by the U.S. Army Corps of Engineers (USACE), revise designs to avoid and/or minimize adverse effects on riparian vegetation, jurisdictional waters of the United States (including wetlands), and waters of the State to the maximum extent practicable.
- ▶ Design stormwater and irrigation systems so that no unnatural runoff is delivered to surrounding lands, and discharges to streams mimic the natural pattern of runoff into these systems. Such designs may include:
 - infiltration structures,
 - detention/retention basins,
 - storm water treatment vaults,
 - biofilter BMPs (typically vegetated swales, strips, and buffers),
 - energy dissipation devices (structures designed to prevent erosion and slow water velocity associated with conveyance systems),
 - using efficient irrigation systems,
 - minimizing the use of turf in landscaping, and
 - using drip irrigation, and native-appearing, non-invasive, drought-tolerant species in non-turf areas.

Construction-related Management Practices

Construction activity is most frequent and varied in Zone A. These construction projects implement numerous measures to reduce effects on habitats; many of these measures are project-specific and are developed in consultation with Placer County and state agencies. In addition to project-specific measures, Northstar implements a set of widely applicable management practices that is an effective approach for reducing appreciable effects of construction. This set of generally applicable management practices is listed in Table 4-1 and was previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for the Road and Trail System

In Zone A, most of the road system is paved, but unpaved roads and trails also are present. Thus, in this zone management practices include those specific to unpaved roads and trails. These practices are applied throughout the resort; they are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for Ski Runs and Associated Facilities

Zone A contains some ski runs and associated facilities. Northstar will continue to work towards the management of all ski runs and associated facilities to sustain a high cover of natural vegetation and to minimize soil compaction. Its management practices for ski runs and associated facilities are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

Forest Management Practices

Although Zone A contains extensive development, a high cover of trees and forest has been retained. Because most of this forest is in close proximity to development, reduction of fire risk is particularly important. Also, because of proximity to roads and structures, and relatively high levels of human use, tree falls are a risk to human safety in much of this zone. Consequently, the Northstar Community Services District ordinance No. 4-00

(included as Appendix D) contains detailed prescriptions for forest management in this zone. This ordinance together with the California Forest Practice Rules guides timber harvest operations in this zone with the primary goals of minimizing fire risk and maximizing human safety. In conformance with the California Forest Practice Rules, timber harvest operations also implement a comprehensive set of measures to avoid and/or minimize effects on habitat values and water quality.

Management Practices for Invasive Plant Control

In Zone A, invasive plant control is an important challenge to habitat management. This zone contains almost all of the landscaping at the resort, and almost all movement of vehicles, people, and pets onto the resort passes through this zone. It also has a high level of human activity. Consequently, invasive plants are more likely to establish and spread in Zone A than any other zone of the resort. Yet, this zone also contains large areas of private property that are not under Northstar control, which limits Northstar’s ability to manage invasive plants. Consequently, in addition to a broadly applicable set of control practices (listed in Table 4-1), management in this zone includes the following practices:

- ▶ Discourage or prohibit the use in landscaping of plant species with the potential to invade natural vegetation.
- ▶ Provide outreach regarding Northstar’s control efforts.
- ▶ Monitor the interface of Zone A with other zones to enable early detection and rapid eradication of invasives.

To discourage landscaping with potentially invasive species, Northstar will share relevant sections of this HMP with NPOA and NCSD and encourage their development of materials, programs, and practices that discourage or prohibit landscaping with potentially invasive species.

Management Practices for Access and Use

Zone A includes private property that is not under the control of Northstar; the road system provides access to these private properties as well as Northstar properties. For these reasons, management practices for access and use are limited to Northstar properties and do not include restrictions on seasonal use or pets. On Northstar properties, however, it is a management practice to avoid the disturbance of previously undisturbed ground by parking vehicles and equipment on pavement or areas that have already been disturbed (e.g., graded construction sites).

Management Practices for Trash and Litter Removal

Northstar ensures that necessary trash receptacles are provided and maintained at the resort’s facilities. Its management practices for trash and litter removal are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

ZONE B – INTENSIVE SKI AREA DEVELOPMENT

Zone B is an area designated for intensive ski area development. This zone already contains an extensive network of unpaved roads, ski runs, trails, and associated facilities including nine existing and approximately six proposed ski lifts. Schaffer Creek and the west fork of West Martis Creek flow through this zone. Zone B contains extensive areas of red fir and white fir forest (and a variety of other vegetation types); approximately 1% of these forests are dominated by larger trees (i.e., in CWHR tree size category 5).

OBJECTIVES

The objectives for Zone B are to:

- ▶ minimize and/or mitigate adverse effects on, and potential sources of threats to, natural resources; and
- ▶ design development and other land uses to avoid or minimize adverse biological effects within Zone B and in adjacent Zones C, D, and E.

RESOURCE MANAGEMENT TARGETS

Water Quality Target

The water quality target for Zone B is:

- ▶ conformance with all applicable narrative or numerical water quality objectives established by the Lahontan RWQCB.

In Zone B, for permit compliance, monitoring of water quality constituents is on-going; and, this monitoring is anticipated to continue during implementation of the HMP. These water quality constituents indicate the condition of aquatic habitats. Thus, the water quality target for Zone B is based on conformance with the standards for these water quality constituents established by the Lahontan RWQCB.

Stream and Riparian Condition Target

The stream and riparian condition target for Zone B is:

- ▶ stable or improved channel, bank, and riparian area conditions along perennial (i.e., Class I and II) and intermittent (i.e., Class III) streams as quantified by a stream and riparian area assessment procedure.

The stream and riparian area assessment procedure developed for this HMP is described in the section entitled *Monitoring for Stream and Riparian Area Condition Targets* in Chapter 6. In Zone B, Schaffer Creek and West Martis Creek would be assessed. Tributaries to Schaffer Creek and West Martis Creek would be monitored if monitoring of these streams determined that tributaries were adversely affecting attainment of this target.

DESIGN AND MANAGEMENT PRACTICES

Design Practices

Various facilities exist or are being planned to support the recreational uses that predominate in Zone B. In designing these facilities, Northstar applies a comprehensive set of design practices both to reduce appreciable effects on natural resources and to support the coexistence of human uses and habitat values. They are applied to the design of recreational facilities, roads, trails, and other infrastructure. In addition to the generally applicable practices listed in Table 4-1 (and that were described in *Rationale for Design and Management Practices*), these include the following practices:

- ▶ Site trails, roads, and buildings to minimize alterations to the site's hydrology.
- ▶ Based on wetland delineations verified by the U.S. Army Corps of Engineers (USACE), revise designs to avoid and/or minimize adverse effects on riparian vegetation, jurisdictional Waters of the U.S. (including wetlands), and Waters of the State to the extent practicable.
- ▶ Protect mule deer access to fawning grounds and minimize loss of fawning habitat by implementing the following measures:
 - Implement recreation and development designs that emphasize protection of occupied and high-potential mule deer fawning habitats. To the extent practicable, design trails and structures to avoid locations

mapped as high-potential or occupied mule deer fawning habitat, and minimize impacts on locations mapped as moderate-potential fawning habitat.

- Within physical design constraints, locate ski lifts, towers, and terminals to avoid or minimize removal of high-potential or occupied fawning habitat, particularly riparian and shrub vegetation.
- Where moderate-potential, high-potential, or occupied fawning habitat cannot be avoided, design development and trails to retain habitat elements important for mule deer fawning (shrub cover, tree cover, riparian vegetation) to the extent practicable and appropriate.

Construction-related Management Practices

Construction activity in Zone B is primarily recreation-related (e.g., ski lifts, runs, associated facilities). These construction projects implement numerous measures to reduce effects on habitats; many of these measures are project-specific and are developed in consultation with Placer County and state agencies. In addition to project-specific measures, Northstar implements a set of generally applicable management practices that is an effective approach for reducing appreciable effects of construction. This set of generally applicable management practices is listed in Table 4-1 and was previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for the Road and Trail System

In Zone B, the roads and trails are not paved; Northstar's management practices provide for the regular maintenance of unpaved roads and trails. Such maintenance is particularly important for supporting human uses and minimizing appreciable effects on habitats. These practices are applied throughout the resort; they are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for Ski Runs and Associated Facilities

Zone B contains an extensive system of ski runs and associated facilities. Northstar will continue to work towards the management of all ski runs and associated facilities to sustain a high cover of natural vegetation and minimal soil compaction. These practices are applied throughout the resort and are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition, where deer fawning is confirmed, construction of lifts, runs, or associated facilities are not to be performed during the fawning and fawn-rearing period (typically sometime between mid-April and late July, depending on snowpack/weather). Appropriate dates within this period would be determined by a qualified biologist during the year of project activity, based on snowpack conditions and deer reproductive activity.

Forest Management Practices

Forests in Zone B are managed for the protection of human safety and forest health, and to maintain and enhance natural resources to the extent practicable (without compromising human safety or forest health). Management practices conform to all applicable California Forest Practice Rules, and the specific terms and conditions of Timber Harvest Plans (THPs) for timber operations in this zone. These THPs contain numerous measures to sustain forest productivity and to avoid and/or minimize adverse effects on habitats including measures that address harvesting practices and erosion control, water course protection, and wildlife protection.

Management Practices for Invasive Plant Control

Despite recreational development, and a high level of human activities, Zone B has remained largely free of invasive plant species. However, known populations of whitetop (*Lepidium latifolium*) and Canada thistle (*Cirsium arvense*) located at Mt. Pluto, Beginner Bowl, Arrow Lift, and Woods Run Bridge are monitored and

treated on an annual basis consistent with HMP management practices to prevent the establishment and spread of invasive plants. These practices are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition, the interface between Zone B and Zone A will be monitored for infestations of invasive plants to enable early detection of invasive plants spreading from Zone A, which is a potential source of invasives.

Management Practices for Access and Use

In Zone B, summer motorized recreational uses are prohibited, and seasonal use restrictions may be necessary if monitoring determines that sensitive wildlife species are using this zone (Table 4-4). Access and seasonal use restrictions to protect sensitive wildlife species are summarized in Table 4-5. Northstar informs the public of these restrictions and enforces these restrictions. Additional access- and use-related practices include road speed limits of 20 mph and parking vehicles on roads and existing disturbed areas to the extent practicable.

Recreational uses (e.g., snowmobiling and bicycling), motorized vehicle use not related to the necessary maintenance of facilities or resource protection, and other unnecessary operational uses will be prohibited in a seasonal closure area during deer fawning season. This area is shown on Exhibit 4-1; it is located in the west-southwest portion of the property and includes much of Zones D and E, and a small portion of Zone B near Schaffer Creek. From the west side of the property, the closure area follows the 710A Road east to the 700 Road, south to the 704 Road, and south to the southwestern boundary of the property. This area was delineated to include most of the suitable deer fawning habitat on the property, particularly within Zones D and E, while allowing Northstar to access the western reaches of the property and facilitate some recreational connectivity (e.g., mountain biking and hiking) to Forest Service lands on these existing roads.

Management Practices for Trash and Litter Removal

Northstar's management practices for trash and litter removal are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition to practices applicable to all zones, in Zone B, Northstar mountain crews remove trash as necessary during routine inspections.

ZONE C – INTENSIVE RECREATION USE AREA

Zone C contains numerous recreational trails and backcountry roads that are used for a variety of activities including cross country skiing, hiking, horseback riding, fishing, mountain biking, and off-road vehicle driving. West Martis Creek flows through Sawmill Flats reservoir in Zone C. White fir and red fir forests are the predominant vegetation; none of these forests are dominated by larger trees (i.e., CWHR tree size categories 5 or 6).

OBJECTIVE

The objective for Zone C is to:

- ▶ minimize and/or mitigate adverse effects on, and potential threats to, natural resources.

RESOURCE MANAGEMENT TARGETS

Water Quality Target

In Zone C, the water quality target is:

- ▶ conformance with all applicable narrative or numerical water quality objectives established by the Lahontan RWQCB.

In Zone C, monitoring of water quality constituents for regulatory compliance could provide appropriate indicators of the condition of the aquatic ecosystem. These monitoring data could be collected by Northstar or may become available from other sources. Long-term, intensive monitoring of water quality constituents may not be required for regulatory compliance because human activities in this zone are primarily recreational, and development will be limited in extent. If monitoring of water quality constituents is not required because no development or intensive use is on-going, and if monitoring data have indicated stable or improving, non-degraded conditions for a 3–5 year period, then this objective would be attained, and additional monitoring would not be performed.

Stream and Riparian Condition Target

The stream and riparian condition target for Zone C is:

- ▶ stable or improved channel, bank, and riparian area conditions along perennial (i.e., Class I and II) and intermittent (i.e., Class III) streams as quantified by a stream and riparian area assessment procedure.

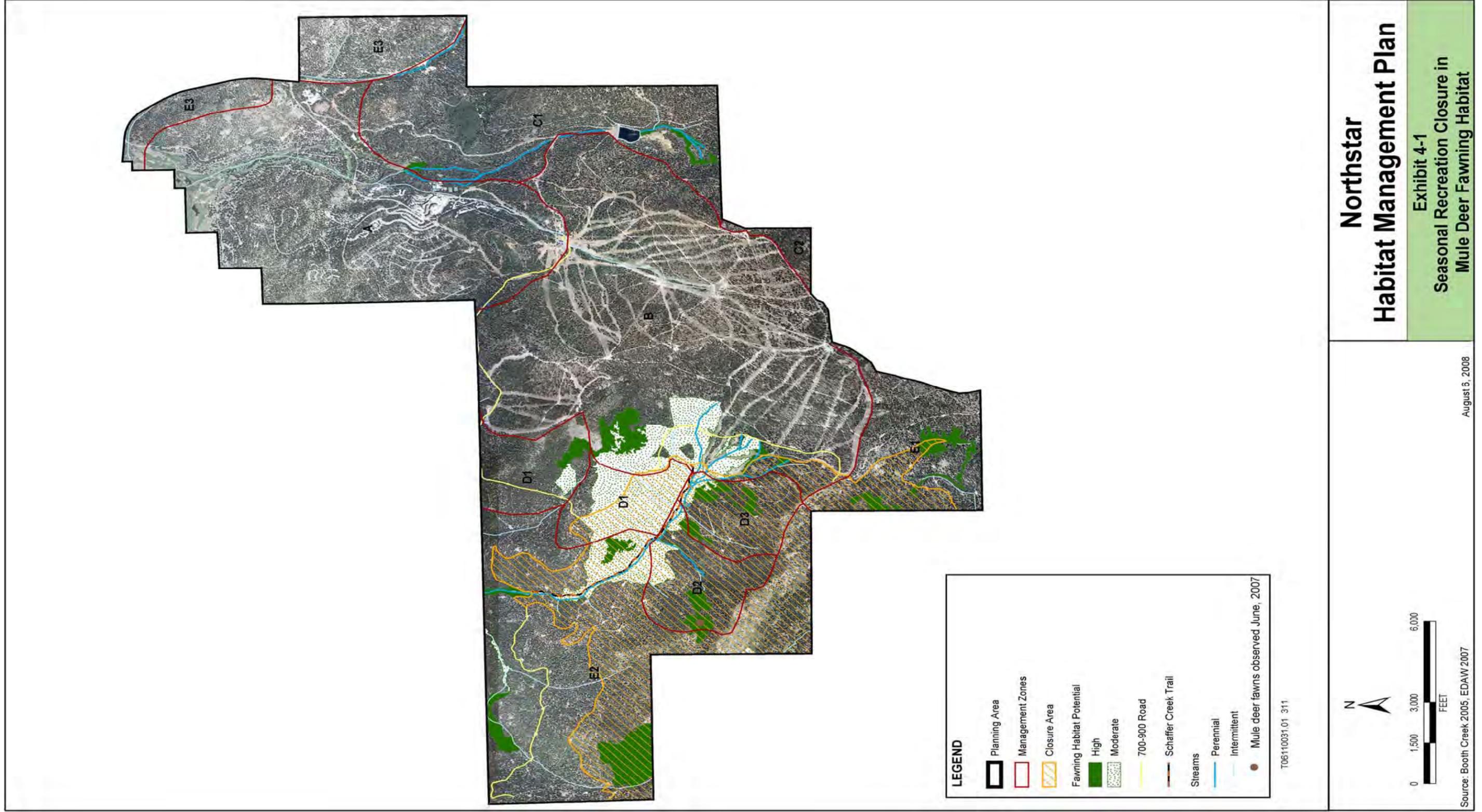
The stream and riparian area assessment procedure developed for this HMP is described in the section entitled *Monitoring for Stream and Riparian Area Condition Targets* in Chapter 6. In Zone C, West Martis Creek would be assessed. Tributaries to West Martis Creek would be monitored if monitoring of West Martis Creek determined that they were adversely affecting attainment of this target.

DESIGN AND MANAGEMENT PRACTICES

Design Practices

Zone C is a recreational use area; roads, trails, ski runs, and a ski lift exist or are being planned to support these uses. In designing these facilities, Northstar applies a comprehensive set of design practices both to reduce appreciable effects on natural resources and to support the coexistence of human uses and habitat values. They are applied to the design of recreational facilities, roads, trails, and other infrastructure. In addition to the generally applicable practices listed in Table 4-1 (and that were described in *Rationale for Design and Management Practices*), these include the following practices:

- ▶ Site trails, roads, and buildings to minimize alterations to the site's hydrology.
- ▶ Based on wetland delineations verified by the U.S. Army Corps of Engineers (USACE), revise designs to avoid and/or minimize adverse effects on riparian vegetation, jurisdictional Waters of the U.S. (including wetlands), and Waters of the State to the maximum extent practicable.
- ▶ Design ski trail alignments to consider adverse effects on visual resources and to be consistent with the existing surrounding areas to the extent feasible.
- ▶ Protect mule deer access to fawning grounds and minimize loss of fawning habitat by implementing the following measures:
 - Implement recreation and development designs that emphasize protection of occupied and high-potential mule deer fawning habitats. To the extent practicable, design trails and structures to avoid locations mapped as high-potential or occupied mule deer fawning habitat, and minimize impacts on locations mapped as moderate-potential fawning habitat.
 - Within physical design constraints, locate ski lifts, towers, and terminals to avoid or minimize removal of high-potential or occupied fawning habitat, particularly riparian and shrub vegetation.



- Where moderate-potential, high-potential, or occupied fawning habitat cannot be avoided, design development and trails to retain habitat elements important for mule deer fawning (shrub cover, tree cover, riparian vegetation) to the extent practicable and appropriate.

Construction-related Management Practices

Recreation-related construction occurs in Zone C (e.g., construction of roads, ski runs, trails, and ski lifts). These construction projects implement numerous measures to reduce effects on habitats; many of these measures are project-specific and are developed in consultation with Placer County and state agencies. In addition to project-specific measures, Northstar implements a set of generally applicable management practices that is an effective approach for reducing appreciable effects of construction. This set of generally applicable management practices is listed in Table 4-1 and was previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for the Road and Trail System

In Zone C, the roads and trails are not paved, except for Highland View Drive; Northstar's management practices provide for the regular maintenance of unpaved roads and trails. Such maintenance is particularly important for supporting human uses and minimizing appreciable effects on habitats. These practices are applied to unpaved roads and trails throughout the resort; they are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for Ski Runs and Associated Facilities

Ski runs and associated facilities are planned for Zone C. Northstar will continue to work towards the management of all ski runs and associated facilities to sustain a high cover of natural vegetation and to minimize soil compaction. In addition, where deer fawning is confirmed, construction of lifts, runs, or associated facilities are not to be performed during the fawning and fawn-rearing period (typically sometime between mid-April and late July, depending on snowpack/weather). These practices are applied throughout the resort and are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

Forest Management Practices

Forests in Zone C are managed for the protection of human safety and forest health, and to maintain and enhance natural resources to the extent practicable (without compromising human safety or forest health). Management practices conform to all applicable California Forest Practice Rules, and the specific terms and conditions of Timber Harvest Plans (THPs) for timber operations in this zone. These THPs contain numerous measures to sustain forest productivity and to avoid and/or minimize adverse effects on habitats including measures that address harvesting practices and erosion control, water course protection, and wildlife protection.

Management Practices for Invasive Plant Control

Despite a high level of human activity, Zone C has remained largely free of invasive plant species. Consequently, in this zone, Northstar implements its generally applicable practices to prevent the establishment and spread of invasive plants. These practices are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition, the interface between Zone C and Zone A will be monitored for infestations of invasive plants to enable early detection of invasive plants spreading from Zone A, which is a potential source of invasives.

Management Practices for Access and Use

Summertime motorized recreation can only occur in Zone C; seasonal use restrictions, however, may be necessary if monitoring determines that sensitive wildlife species are using this zone (Table 4-4). Access and seasonal use

restrictions to protect sensitive wildlife species are summarized in Table 4-5. If seasonal use restrictions become necessary, Northstar will inform the public of these restrictions and enforce these restrictions. Additional access- and use-related practices include road speed limits of 20 mph and parking vehicles on roads and existing disturbed areas to the extent practicable.

Management Practices for Trash and Litter Removal

Northstar's management practices for trash and litter removal are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition to practices applicable to all zones, in Zone C, Northstar mountain crews remove trash as necessary during routine inspections.

ZONE D – RECREATION USE/HABITAT TRANSITION AREA

Zone D is a recreational use and habitat transition area that provides a transition area from intensive recreational uses of Zones A, B, and C to the Zone E Habitat Conservation Area. Zone D is separated into three subzones that differ in recreational uses and habitats as described below.

Subzone D1 is the northern portion of Zone D (Exhibit 2-2) and contains the western slopes of Lookout Mountain. Its vegetation consists primarily of white fir-Jeffrey pine forests (Exhibit 3-4), and these forests are primarily in CWHR class 4M (Exhibit 3-5). There is no late-seral forest in Subzone D1. Although no perennial streams flow through Subzone D1, the perennial Schaffer Creek is near the boundary between Subzone D1 and Subzones D2 and D3 (Exhibit 3-6). The OMMP proposes environmental camp and two ski lift pods (R and Q) in this subzone (Exhibit 3-3). There will not be traditional ski runs in Subzone D1, rather there will be tree island runs and tree skiing (Table 4-2).

Subzone D2 is the southwestern portion of Zone D (Exhibit 2-2) and extends from Sawtooth Ridge to Schaffer Creek. Its vegetation consists primarily of white fir and red fir forests (Exhibit 3-4), and these forests are quite varied in their stand structure (Exhibit 3-5): together 4P, 4M, and 4D account for 136 acres of forest (over 50% of forest in Subzone D2), and there are also 56 acres of late-seral stands (32% of forest in Subzone D2). An unnamed perennial stream flows through this subzone and the perennial Schaffer Creek flows through the subzone near its northern border. The OMMP proposes a ski pod (W) in this subzone. Traditional ski runs will not be constructed, rather there will be a tree island run and tree skiing. Minimizing and/or avoiding potential effects on the late-seral forests in this subzone has been a focus of the design process for this lift, ski run, and tree skiing area.

Subzone D3 is the southeastern portion of Zone D (Exhibit 2-2), and like Subzone D2, it extends from Sawtooth Ridge to Schaffer Creek. Its vegetation consists primarily of white fir and red fir forests (Exhibit 3-4), and these forests are primarily in CWHR size class 4 (25, 115, 25, and 25 acres in CWHR classes 4D, 4M, 4P, and 4S, respectively). Approximately 10 acres of late-seral forest are also present (9 acres in CWHR class 5P and 1 acre in 5S). (However, unlike CWHR classes 5M, 5D, and 6, the 5P and 5S classes do not provide higher quality habitat for the target species associated with late-seral forests.) Schaffer Creek and several perennial and intermittent tributaries of Schaffer Creek flow through the northern-most portion of this subzone. The OMMP proposes a ski pod (V) in this subzone (Exhibit 3-3), and unlike Subzones D1 and D2, there will be two traditional ski runs in this subzone, as well as tree island runs, and tree skiing. As in Subzone D2, minimizing and/or avoiding potential effects on the late-seral forests in this subzone has been a focus of the design process for this lift, ski run, and tree skiing area.

Numerous design and management practices are being implemented to minimize and/or avoid potential effects of recreational uses on habitats in each of these subzones of Zone D. These practices are described in Table 4-1 (which summarizes the design and management practices applied in Zone D), Table 4-2 (which describes the ski improvement prescriptions in Subzones D1, D2, and D3), and in the following text.

OBJECTIVES

The objectives for Zone D are to:

- ▶ avoid and/or minimize adverse effects on, and potential threats to, natural resources; and
- ▶ maintain natural resources values, particularly wildlife habitat.

The maintenance of wildlife habitat values is an important objective in Zone D. In support of this objective, the targets include maintaining or enhancing habitats through forest management, and numerous design and management practices that will reduce effects of existing and planned uses on wildlife habitats.

RESOURCE MANAGEMENT TARGETS

Water Quality Target

The water quality target for Zone D is:

- ▶ conformance with all applicable narrative or numerical water quality objectives established by the Lahontan RWQCB and Placer County, or
- ▶ maintenance of the existing quality of water as indicated by a stable or increasing trend in Index of Biological Integrity (IBI) scores based on data collected through the California Stream Bioassessment Procedure and using the regional IBI developed by Herbst (2001).

These monitoring data could be collected by Northstar or may become available from other sources. Currently, for permit compliance, monitoring of water quality constituents is on-going in Zone D. These water quality constituents indicate the condition of aquatic habitats. Thus, while this monitoring is being performed, or while comparable data are otherwise available, the water quality target for Zone D is based on conformance with the Lahontan RWQCB standards for these water quality constituents.

Human activities in this zone, however, will not be intensive, and development will be limited in extent. Therefore, long-term, intensive monitoring of water quality constituents may not be required for regulatory compliance, and this information may not be otherwise available. In this case, monitoring of aquatic invertebrate assemblages at 3–5 year intervals could provide an appropriate measure of aquatic ecosystem condition. If no development or intensive use is on-going, and monitoring data have indicated stable or improving, non-degraded conditions for a 3–5 year period, then this objective would be attained, and additional monitoring would not be performed.

Stream and Riparian Condition Target

In Zone D, the target for stream and riparian condition is:

- ▶ stable or improved channel, bank, and riparian area conditions along perennial (i.e., Class I and II) and intermittent (i.e., Class III) streams as quantified by a stream and riparian area assessment procedure; and
- ▶ retention of at least 90% of the acreage of conifer forests within 200 feet of the centerline of Schaffer Creek, and in these retained forests:
 - stable or increased acreage in CWHR 5M, 5D, or 6 stand structure classes; and
 - conifer cover in aspen stands at or below 2006 levels.

This target allows for up to 10% conversion of conifer forest within this management zone. At locations where a single centerline is not obvious (e.g., where multiple stream channels or braids are present, such as

the wide meadow area near the intersection of Zones B, D1, and D3), the management zone will be measured 200 feet outward (toward the upland) from the centerlines of the two outer-most channels.

The stream and riparian area assessment procedure developed for this HMP is described in the section entitled *Monitoring for Stream and Riparian Area Condition Targets* in Chapter 6. In Zone D, Schaffer Creek would be assessed. Tributaries to Schaffer Creek would be monitored if monitoring of Schaffer Creek determined that they were adversely affecting attainment of this target.

Retention of conifer forests along most of a stream's length limits the extent of adjacent land converted to nonforested cover, and thus limits potential effects on aquatic and terrestrial habitats. For example, it ensures that there will not be a substantial increase in light and stream temperatures that could alter aquatic habitats. It also minimizes effects on riparian and adjacent upland wildlife habitats. (Along Schaffer Creek, riparian and adjacent uplands provide habitat for Sierra Nevada mountain beaver, mule deer, and numerous bird species [See Chapter 3].)

Within retained forests along Schaffer Creek, habitat values would be conserved by the design and management practices of this HMP, and by applicable laws and regulations. In particular, requirements of the California Forest Practice Rules and Northstar's forest management practices both strongly support the maintenance and conservation of habitat values along Schaffer Creek. The California Forest Practice Rules contain measures for protecting watercourses that are applicable to Schaffer Creek, including retention of at least 50% of overstory and understory trees (CDF 2008). Northstar also implements additional practices along Schaffer Creek (and elsewhere in Zones D and E) to support the maintenance and enhancement of aquatic, riparian, and upland habitats. These practices are described in the section entitled *Forest Management Practices*.

This target also includes forest structure attributes to support the objective for maintaining habitat functions. This additional component of the target ensures that adequate shade, large woody debris, snags, and required upland habitat elements will continue to exist along streams. While timber harvest operations remove trees within this zone, these removals are limited and/or designed to support a long-term increase in CWHR 5M, 5D, or 6 stand structure classes in this zone. For example, harvests may remove insect-infested trees during major insect outbreaks, or may "thin from below" by primarily removing trees in the suppressed or intermediate crown classes and leaving the largest trees.

Zone D contains montane riparian vegetation with aspen, which has both habitat and aesthetic values. Conifer encroachment is occurring within these stands, and without human intervention, conifers will probably replace these aspen. Therefore, the riparian and stream condition target for this zone includes the maintenance of conifer cover in aspen stands at or below 2006 levels.

Forest Structure Target

The long-term target for forest structure in Zone D is:

- ▶ at least 45 acres in CWHR Class 5M, 5D, or 6, with at least 6 snags per acre (except within 100 feet of roads, or if felling of snags is required for disease or insect control, or there is a threat to human health or safety), at least 10–20 tons per acre of down coarse woody debris wood (>12 inches in diameter at midpoint) that is sound or rotten (except within 100 feet of roads);
- ▶ at least 30 acres in CWHR Class 5S (with 3–6 snags per acre and at least 5–10 tons per acre of large woody debris) or 5P (with 6 snags per acre [except within 100 feet of roads, facilities and ridgelines] and at least 8–10 tons per acre of large woody debris);
- ▶ 533–667 acres in CWHR Size Class 4 with stands in Canopy Closure Class S having at least 3 snags per acre and at least 2–6 tons per acre of large woody debris on average, stands in Canopy Closure Classes P, M, or D

having at least 3–6 snags per acre (except within 100 feet of roads, facilities and ridgelines) and 4–8 tons per acre of large woody debris, on average; and

- ▶ less than 150 and 325 acres in dense (D) and moderate (M) cover classes, respectively.

Table 4-6 summarizes current, likely short-term, and long-term target acreages. In Zone D, the acreages in forest structure categories are affected by conversion of forest to other land cover types to support planned uses, and by forest management to maintain public safety, reduce fire risk, maintain or enhance habitat values, and other timber harvest operations. To reduce fire risk, some stands with dense or moderate cover will be managed to reduce canopy closure. Although timber harvest operations may reduce the percentage of forest in CWHR Size Class 4, most forest acreage will remain in CWHR Size Class 4. Some conversion of forest to ski runs and associated facilities (e.g., lifts) will occur, which will reduce the total acreage of forest.

Although balanced with the requirements of existing and planned uses, the maintenance, and where feasible enhancement, of wildlife habitat values is an important objective of forest management in Zone D, particularly for species associated with late-seral stage forests. Consequently, forest management in this zone includes practices to sustain the large trees, snags, and woody debris that are integral components of these species’ habitats; and descriptions of these habitat features have been included in the target for forest structure.

The numbers of snags and quantity of woody debris, although stated on a per acre basis in the target, are meant as typical or desired values. Due to safety considerations, snags and hazard trees are removed near roads and ski runs, and less woody debris is retained in those locations as well. Similarly, reduced levels of woody debris are often necessary in stands being treated for forest fuel hazard reduction, and in medium and dense stands (including Classes 5M, 5D, and 6), ladder fuels are removed to reduce fire risks. In and near riparian areas and patches of late-seral forest, however, forest management emphasizes maintaining greater numbers of snags and more woody debris where feasible.

Chapter 5 (*Habitat Enhancement Plan*) describes how enhancement of forest stands supports attainment of the Zone D forest structure target, enhances wildlife habitat, and maintains or expands existing late-seral stands. Chapter 5 also identifies the areas within Zone D where forest enhancement is proposed.

Stand Type	Existing	Anticipated Change 2008-2015		Anticipated in 2015 ⁴	Long-term Target ⁵
		Conversion to Non-forest for Planned Uses ²	Thinning for Fuel Reduction & Habitat Enhancement ³		
Late-seral stands					
6	7	0	0	7	7
5D	38	-1	-4	32	38
5M	0	0	0	0	0
5P	27	-1	4	31	27
5S	30	0	0	30	30
<i>Sum of Late-seral</i>	<i>102</i>	<i>-2</i>	<i>0</i>	<i>100</i>	<i>102</i>
Class 4 Stands					
4D	127	-10	-12	106	-
4M	464	-22	-159	299	-
4P	68	-7	170	217	-
4S	51	-4	0	47	-
<i>Sum of Class 4</i>	<i>710</i>	<i>-43</i>	<i>0</i>	<i>667</i>	<i>533–666</i>

**Table 4-6
Existing, Anticipated in 2015, and Long-Term Target Forest Acreages for Zone D by CWHR Classes¹**

Stand Type	Existing	Anticipated Change 2008-2015		Anticipated in 2015 ⁴	Long-term Target ⁵
		Conversion to Non-forest for Planned Uses ²	Thinning for Fuel Reduction & Habitat Enhancement ³		
Class 2 & 3 Stands					
3D	24	-1	-5	18	-
3M	12	0	-7	5	-
3P	12	0	12	24	-
3S	13	0	0	13	-
2D	12	0	-3	9	-
2M	1	0	0	1	-
2P	0	0	3	3	-
2S	0	0	0	0	-
<i>Sum of Classes 2 & 3</i>	<i>74</i>	<i>-1</i>	<i>0</i>	<i>73</i>	<i>-</i>
Total	886	-46	0	839	-
Totals by Canopy Closure Class					
D	201	-13	-24	165	< 150
M	477	-22	-165	305	< 325
P	107	-8	189	274	-
S	94	-4	0	90	-
Notes:					
¹ Acreages do not all total exactly because of round-off error.					
² Based on clearing/timber conversion for uses planned in MIP and OMMP, and assumes that MIP and OMMP will be fully implemented by 2015, but does not include Timber Harvest Plans for thinning for forest stand improvements.					
³ Assumes 820 acres of silvicultural treatments for fuel reduction and/or habitat enhancement will be implemented at the resort during 2008–2015, primarily in high priority locations identified in Chapter 5; acreage of treatments for fuel reduction will be contingent on funding availability.					
⁴ Equals existing conditions minus anticipated changes during 2008–2015.					
⁵ Long-term targets are for forest structure 30–50 years after implementation of HMP. See text for complete description of targets which also may include targets for snags and woody debris. The general basis for targets is described in <i>Rationale for Resource Management Targets</i> .					

DESIGN AND MANAGEMENT PRACTICES

Design Practices

Zone D is a recreational use/habitat transition area that contains roads, trails, ski runs, and ski lifts that support recreational uses, and additional such facilities are planned for Zone D. This zone also contains important habitats and borders Zone E, which is primarily a habitat conservation area. Therefore, in Zone D, Northstar not only applies its broadly applicable design practices, but also applies additional practices to further reduce appreciable effects on natural resources and maximize the coexistence of human uses and habitat values. These practices are applied to the design of roads, trails, ski runs, and ski lifts. In addition to the generally applicable practices listed in Table 4-1 (and that were described in *Rationale for Design and Management Practices*), these include the following practices:

- ▶ Design no new permanent roads, except where necessary to comply with fuel management regulations and to protect human safety and forest health.

- ▶ Design development of ski pods to use and improve existing roads, open areas, or areas of disturbance for circulation of skiers, where feasible.
- ▶ Design the W pod in Zone D2 to predominantly use tree skiing.
- ▶ Design trails and structures to minimize impacts of crossings of stream channels and active floodplains, including consideration of seasonal crossings over snow if practicable.
- ▶ Design ski trail alignments to consider adverse effects on visual resources and to be consistent with the existing surrounding areas to the extent feasible.
- ▶ Design ski trails with treatments (e.g., feathering and islands) to improve visual quality.
- ▶ Protect late-seral forest species and their habitats by implementing the following measures:
 - Implement designs that avoid and/or minimize disturbance to forests with late-seral habitat (CWHR stand structure classes 5M, 5D, 6), with a priority on areas occupied by sensitive species.
 - Avoid removal of vegetation that would adversely affect late-seral forest structure.
 - Design island ski runs to avoid and/or minimize impacts to late-seral forest (which is present in Zone D2).
 - Avoid degradation of occupied breeding habitat (e.g., stands that support active nest or den sites).
 - Design trails and structures to avoid and/or minimize bisecting or fragmenting areas identified as high-value or occupied habitat for late-seral forest focal species.
 - Within physical design constraints, locate ski lifts, towers, and terminals to avoid and/or minimize removal of vegetation and other impacts on late-seral forest.
 - Avoid snowmobile, hiking, and biking trail development in late-seral forest.
- ▶ Protect mule deer access to fawning grounds and minimize loss of fawning habitat by implementing the following measures:
 - Implement recreation and development designs that emphasize protection of occupied and high-potential mule deer fawning habitats. To the extent practicable, design trails and structures to avoid locations mapped as high-potential or occupied mule deer fawning habitat, and minimize impacts to locations mapped as moderate-potential fawning habitat.
 - Within physical design constraints, locate ski lifts, towers, and terminals to avoid or minimize removal of high-potential or occupied fawning habitat, particularly riparian and shrub vegetation.
 - Where moderate-potential, high-potential, or occupied fawning habitat cannot be avoided, design development and trails to retain habitat elements important for mule deer fawning (shrubs cover, tree cover, riparian vegetation) to the extent practicable and appropriate.
- ▶ Based on wetland delineations verified by the U.S. Army Corps of Engineers (USACE), revise designs to avoid and/or minimize adverse effects on riparian vegetation, jurisdictional Waters of the U.S. (including wetlands), and Waters of the State to the extent practicable.

Construction-related Management Practices

Recreation-related construction occurs in Zone D (e.g., construction of roads, ski runs, trails, and ski lifts). These construction projects implement numerous measures to reduce effects on habitats; many of these measures are project-specific and are developed in consultation with Placer County and state agencies. In addition to project-specific measures, Northstar implements a set of generally applicable management practices that is an effective approach for reducing appreciable effects of construction. This set of generally applicable management practices is listed in Table 4-1 and was previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for the Road and Trail System

In Zone D, the roads and trails are not paved; Northstar's management practices provide for the regular maintenance of unpaved roads and trails. Such maintenance is particularly important for supporting human uses and minimizing appreciable effects on habitats. These practices are applied to unpaved roads and trails throughout the resort; they are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

In Zone D, Northstar will also restore unnecessary roads to native vegetation, and is closing the bike trail adjacent to Schaffer Creek.

Management Practices for Ski Runs and Associated Facilities

Zone D contains ski runs and associated facilities. Northstar manages all of these ski runs and associated facilities to sustain a high cover of natural vegetation and to minimize soil compaction. These practices are applied throughout the resort and are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition, in Zone D, where deer fawning is confirmed, construction of lifts, runs, or associated facilities are not to be performed during the fawning and fawn-rearing period (typically sometime between mid-April and late July, depending on snowpack/weather).

Forest Management Practices

Forests in Zone D are managed for the protection of human safety and forest health, and to maintain and enhance natural resources to the extent practicable (without compromising human safety or forest health). Management practices conform to all applicable California Forest Practice Rules, and the specific terms and conditions of Timber Harvest Plans (THPs) for timber operations in this zone. These THPs contain numerous measures to sustain forest productivity and to avoid and/or minimize adverse effects on habitats including measures that address harvesting practices and erosion control, water course protection, and wildlife protection.

In addition to measures required by the California Forest Practice Rules and included in THPs, Northstar has forest management practices in Zone D that further support the objective of maintaining and/or enhancing natural resources. These management practices include the following:

- ▶ Implement CDF silviculture practices for forest health and fuels management that are compatible with tree skiing.
- ▶ Although the proposed W lift would be developed in late-seral forest, minimize tree removal within and additional fragmentation of late-seral forest stands classified as high or moderate habitat value.
- ▶ In stands that are CWHR class 5M with canopy closure greater than 50%, retain a minimum of 50% canopy cover.

- ▶ For timber harvests not associated with development projects, in stands that are CWHR class 5D, 5M, or 6, and within a 328-foot (100-meter) wide buffer, do not reduce existing canopy cover values of dominant and co-dominant trees by more than 10% across a stand.
- ▶ Maintain or enhance forest floor complexity by retaining down logs: beginning with the largest down logs, sequentially retain pieces of down wood (> 12 inches in diameter at midpoint) until at least the following quantities are retained on average: 10–20 tons per acre in CWHR classes 5M, 5D, or 6; 10 tons per acre in 5P; 5–10 tons per acre in 5S; 4–8 tons per acre in 4P, M, and D; and 3–7 tons per acre in 4S.
- ▶ Retain 3–6 of the largest snags per acre (with 6 per acre in CWHR Class 5M, 5D, and 6; and with 3 per acre in 4S), and all snags \geq 15 inches in DBH, except within 100 feet of roads, or where felling of snags is required for disease or insect control, or there is a threat to human health or safety.
- ▶ Retain the largest live trees, particularly dying or defective trees (broken tops, insect infestations [except during high risk periods for insect outbreaks]); retain trees \geq 30 inches in DBH to the extent practicable.

This combination of forest management practices supports the maintenance and enhancement of the habitat values of existing late-seral stands in Zone D. (However, late-seral habitat is not present in Zone D3.) As described in Chapter 5, Northstar also plans to substantially increase the extent of late-seral forest at the resort in Zone E.

Management Practices for Invasive Plant Control

Zone D has remained largely free of invasive plant species. Consequently, in this zone, Northstar implements its generally applicable management practices to prevent the establishment and spread of invasive plants. These practices are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for Access and Use

In general, use of Zone D will be managed to minimize effects on sensitive wildlife species and habitats (e.g., late-seral forest stands, mule deer fawning habitat). As part of this minimization, pets are excluded from Zone D, and motorized recreational uses are prohibited (except for winter-time guided snowmobile tours) (Table 4-1). Additional access and seasonal use restrictions to protect sensitive wildlife species are summarized in Table 4-5.

Recreational uses (e.g., snowmobiling and bicycling), motorized vehicle use not related to the necessary maintenance of facilities or resource protection, and other unnecessary operational uses will be prohibited in a seasonal closure area during deer fawning season. This area is shown on Exhibit 4-1; it is located in the west-southwest portion of the property and includes much of Zones D and E, and a small portion of Zone B near Schaffer Creek. From the west side of the property, the closure area follows the 710A Road east to the 700 Road, south to the 704 Road, and south to the southwestern boundary of the property. This area was delineated to include most of the suitable deer fawning habitat on the property, particularly within Zones D and E, while allowing Northstar to access the western reaches of the property and facilitate some recreational connectivity (e.g., mountain biking and hiking) to Forest Service lands on these existing roads.

The bike trail adjacent to Schaffer Creek will be closed permanently.

The enforcement of use restrictions and the maintenance of locked gates and signs are further described in the section entitled *Rationale for Design and Management Practices* and in Chapter 6 *Monitoring and Adaptive Management Framework*. Additional access- and use-related practices include road speed limits of 20 mph and parking vehicles on roads and existing disturbed areas to the extent practicable, and limiting recreation-related access during the breeding period of sensitive wildlife species.

Management Practices for Trash and Litter Removal

Northstar's management practices for trash and litter removal are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition to practices applicable to all zones, in Zone D, Northstar mountain crews remove trash as necessary during routine inspections.

ZONE E – HABITAT CONSERVATION AREA

Zone E is designated as a Habitat Conservation Area. However, land uses also include a ski lift (Surface Lift Z) planned in Subzone E2. This zone is divided into three subzones that differ in their habitats, land uses, and in surrounding land uses as described below.

Subzone E1 is located at the southerly portion of the Northstar property (Exhibit 2-2) and is surrounded by USFS land (Exhibit 3-1). It consists primarily of a south-facing slope, and includes a portion of a tributary of Martis Creek. The vegetation is primarily white fir, white fir-Jeffrey pine, and red fir forests, but several other vegetation types are also present, including Jeffrey pine-juniper forest. It contains about 15 acres of open-canopied forest (CWHR 5S) (3% of its forest acreage) but no other late-seral forest. The USFS has designated much of Subzone E1 and adjacent USFS land to the south and west as an Old Forest Emphasis Area. There are no existing recreational facilities in this subzone, and no additional facilities are proposed in the OMMP (Exhibit 3-3). However, this subzone is crossed by USFS Road FSR O6 (the "Fiberboard Freeway"), and therefore, motorized uses occur within this subzone in the right-of-way of this road.

Subzone E2 is located in the western portion of the Northstar property (Exhibit 2-2). It includes portions of the southern slope of Sawtooth Ridge, the northern portion of Schaffer Creek, and segments of Martis Creek. This subzone's vegetation consists primarily of white fir-Jeffrey pine and red fir forests, but also includes large areas of white fir-montane chaparral and lodgepole pine, and a wet meadow (Exhibit 3-4). These forests contain approximately 239 acres of late-seral stands (about 16% of the subzone). Approximately 92 acres of these late-seral stands provide high quality habitat for target species associated with late-seral forests. Like Subzone E1, most of Subzone E2 is bordered by USFS land and is considered an Old Forest Emphasis Area (Exhibit 3-1). However, a portion of Subzone E2 is bordered by private land to the north. The USFS has also designated a California Spotted Owl PAC on USFS land adjacent to Subzone E2. As part of the Agreement, a surface lift is an allowed use in Subzone E2 (Surface Lift Z) (Exhibit 3-3).

Minimizing and/or avoiding potential effects on late-seral forests has been a major focus of the design process for this surface lift, and numerous design and management practices are being implemented to minimize and/or avoid effects. These practices are described in Table 4-1 (which summarizes the design and management practices applied in Zone E), Table 4-2 (which describes the ski improvement prescriptions in Subzones E2), and in the following text.

Subzone E3 is located at the northeasterly portion of the Northstar property. It is bordered on the west and south by Highway 267 and on the north and east by private land. Middle Martis Creek flows along its eastern and northern boundary. Its vegetation is primarily white fir-Jeffrey pine, and it does not contain stands of late-seral forest. This subzone includes a 500-foot wide open space corridor along the eastern side of the Highway 267 right-of-way that was provided for in the MVCP. There are no existing recreational facilities in Subzone E3 and none are proposed in the OMMP. In addition, Northstar also has agreed to record a conservation easement or other instrument that agrees not to grant additional road or utility easements, subdivide the land, or seek entitlements to construct residential units.

Numerous design and management practices are being implemented to minimize and/or avoid potential effects of recreational uses on habitats in each of these subzones of Zone E and also to maintain and/or enhance habitat functions. These practices are described in Table 4-1 (which summarizes the design and management practices

applied in Zone E), Table 4-2 (which describes the ski improvement prescriptions in Subzones E2), and in the following text. Furthermore, enhancements are planned to improve habitat functions, and in particular to maximize the habitat functions of late-seral forests. For example, a core area of over 360 acres has been designated for the development of additional late-seral habitat. These enhancements are described in Chapter 5 *Habitat Enhancement Plan*.

OBJECTIVES

The objectives for Zone E are to:

- ▶ maintain and/or enhance habitat functions, particularly those associated with late-seral stage forests and riparian and aquatic resources; and
- ▶ manage forests to maximize habitat functions of late-seral stage forests to the extent practicable in conformance with the California Forest Practice Rules and for the protection of human safety and forest health.

RESOURCE MANAGEMENT TARGETS

Water Quality Target

The water quality target for Zone E is:

- ▶ conformance with all applicable narrative or numerical water quality objectives established by the Lahontan RWQCB and Placer County, or
- ▶ maintenance of the existing quality of water as indicated by a stable or increasing trend in Index of Biological Integrity (IBI) scores based on data collected through the California Stream Bioassessment Procedure and using the regional IBI developed by Herbst (2001).

In Zone E, water quality monitoring of either water quality constituents or aquatic invertebrate assemblages would provide an appropriate indicator of the condition of the aquatic ecosystem. These monitoring data could be collected by Northstar or may become available from other sources. However, human activities in this zone will not be intensive and development will be limited in extent; therefore, long-term, intensive monitoring of water quality constituents may not be required for regulatory compliance. In this case, monitoring of aquatic invertebrate assemblages at 3–5 year intervals would provide an appropriate measure of aquatic ecosystem condition. If monitoring data indicate stable or improving, non-degraded conditions for a 3–5 year period, then this objective would be attained, and additional monitoring would not be performed.

Stream and Riparian Condition Target

The target for stream and riparian corridor condition in Zone E is:

- ▶ stable or improved channel, bank, and riparian area conditions along perennial (i.e., Class I and II) and intermittent (i.e., Class III) streams as quantified by a stream and riparian area assessment procedure;
- ▶ stable or increased acreage in CWHR 5M, 5D, or 6 stand structure classes forests within 200 feet of the centerline of perennial streams and 100 feet of the centerline of intermittent streams.

The stream and riparian area assessment procedure developed for this HMP is described in the section entitled *Monitoring for Stream and Riparian Area Condition Targets* in Chapter 6. In Zone E, Schaffer Creek and Martis Creek would be assessed. Tributaries to Schaffer Creek and Martis Creek would be monitored if monitoring of these streams determined that tributaries were adversely affecting attainment of this target.

This target includes forest structure attributes to support the objective for maintaining habitat functions. This additional component of the target ensures that adequate shade, large woody debris, snags, and required upland habitat elements will continue to exist along streams.

While timber harvest operations remove trees within this zone, these removals are limited and/or designed so as to support a long-term increase in CWHR 5M, 5D, or 6 stand structure classes in this zone. For example, harvests may remove insect-infested trees during major insect outbreaks, or may “thin from below” removing primarily trees in the suppressed or intermediate crown classes, and leaving the largest trees.

Forest Structure Target

The long-term target for forest structure is:

- ▶ at least 417 acres in CWHR Class 5M, 5D or 6 with at least 6 snags per acre (except within 100 feet of roads, facilities, or ridgelines), at least 10–20 tons per acre of down coarse woody debris wood (>12 inches in diameter at midpoint) that is sound or rotten (except within 100 feet of roads, facilities, or ridgelines);
- ▶ at least 198 acres in CWHR Class 5S (with 3–6 snags per acre and at least 5–10 tons per acre of large woody debris) or 5P (with 6 snags per acre [except within 100 feet of roads, facilities and ridgelines] and at least 8–10 tons per acre of large woody debris);
- ▶ 1,170–1,550 acres in CWHR Size Class 4 with stands in CWHR Canopy Closure Class S having 3–6 snags per acre and at least 2–6 tons per acre of large woody debris on average, and CWHR Canopy Closure Classes P, M, or D having at least 6 snags per acre (except within 100 feet of roads, facilities and ridgelines) and 5–10 tons per acre of large woody debris on average; and
- ▶ less than 400 and 1200 acres in dense (D) and moderate (M) cover classes, respectively.

Table 4-7 summarizes current, likely short-term, and long-term target acreages. In Zone E, in addition to management for habitat values, the acreages in forest structure categories will be affected by forest management to maintain public safety and reduce fire risk, other timber harvest operations, and by some conversion of forest to other land cover types to support planned uses. To reduce fire risk, some stands with dense or moderate cover will be managed to reduce canopy closure. Although timber harvest operations may reduce the percentage of forest in CWHR Size Class 4, most forest acreage will remain in CWHR Size Class 4. For Surface Lift Z, some conversion of forest to ski run will occur, which will reduce the total acreage of forest in Zone E.

Although balanced with the requirements of existing and planned uses, the maintenance, and where feasible the enhancement, of wildlife habitat values, particularly for species associated with late-seral stage forests, is an important objective of forest management in Zone E. Consequently, a core area has been designated in Zone E where the development of late-seral habitats will be facilitated (as described in Chapter 5). The long-term target for forest structure includes the development of this entire core area into CWHR classes 5 and 6, which would substantially increase the extent of late-seral habitat at the resort. (The additional late-seral habitat would be developed from existing class 4 stands in this core area.)

Forest management in Zone E includes practices to sustain the large trees, snags, and woody debris that are integral components of these species’ habitats; and these habitat features have been included in the target for forest structure.

**Table 4-7
Existing, Anticipated in 2015, and Long-Term Target Forest Acreages for Zone E by CWHR Classes¹**

Stand Type	Existing	Anticipated Change 2008-2015		Anticipated in 2015 ⁴	Long-term Target ⁵
		Conversion to Non-forest for Planned Uses ²	Thinning for Fuel Reduction & Habitat Enhancement ³		
Late-seral stands					
6	0	0	0	0	180
5D	41	0	0	41	117
5M	0	0	0	0	120
5P	155	-1	0	154	140
5S	58	0	0	58	58
<i>Sum of Late-seral</i>	<i>254</i>	<i>-1</i>	<i>0</i>	<i>253</i>	<i>615</i>
Class 4 Stands					
4D	132	0	-27	105	-
4M	1,503	-3	-295	1,205	-
4P	275	0	322	598	-
4S	28	0	0	28	-
<i>Sum of Class 4</i>	<i>1,938</i>	<i>-3</i>	<i>0</i>	<i>1,935</i>	<i>1,170-1,550</i>
Class 2 & 3 Stands					
3D	45	0	-16	29	-
3M	38	0	0	38	-
3P	12	0	16	28	-
3S	5	0	0	5	-
2D	11	0	0	11	-
2M	0	0	0	0	-
2P	6	0	0	6	-
2S	0	0	0	0	-
<i>Sum of Classes 2 & 3</i>	<i>117</i>	<i>0</i>	<i>0</i>	<i>117</i>	<i>-</i>
Total	2,307	-4	0	2,264	-
Totals by Canopy Closure Class					
D	229	0	-43	186	< 400
M	1,541	-3	-295	1,243	< 1,200
P	448	-1	338	785	-
S	91	0	0	91	-
Notes:					
¹ Acreages do not all total exactly because of round-off error.					
² Based on clearing/timber conversion and thinning for uses planned in MIP and OMMP, and assumes that MIP and OMMP will be fully implemented by 2015, but does not include Timber Harvest Plans for thinning for forest stand improvements.					
³ Assumes 820 acres of silvicultural treatments for fuel reduction and/or habitat enhancement will be implemented at the resort during 2008–2015, at high priority locations identified in Chapter 5; acreage of treatments for fuel reduction will be contingent on funding availability.					
⁴ Equals existing conditions minus anticipated changes during 2008–2015.					
⁵ Long-term targets are for forest structure 30–50 years after implementation of HMP. Includes development of 362 acres of late-seral forest from existing class 4 stands in the core area designated for development of late-seral forest. See text for complete description of targets, which may also include targets for snags and woody debris. The general basis for targets is described in <i>Rationale for Resource Management Targets</i> .					

The numbers of snags and quantity of woody debris in the target, although described on a per acre basis, are meant as typical or desired values. Due to safety considerations, snags and hazard trees are removed near roads and ski trails, and less woody debris is retained in those locations as well. Similarly, reduced levels of woody debris are often necessary in stands being treated for forest fuel hazard reduction, and in medium and dense stands (including 5M, 5D, and 6), ladder fuels may be removed to reduce fire risks. In and near riparian areas and patches of late-seral forest, however, management emphasizes maintaining greater numbers of snags and more woody debris where ever feasible.

Chapter 5 (*Habitat Enhancement Plan*) describes how enhancement of forest stands supports attainment of the Zone E forest structure target, enhances wildlife habitat, and maintains or expands existing late-seral stands. Chapter 5 also identifies the areas within Zone E where forest enhancement is proposed.

DESIGN AND MANAGEMENT PRACTICES

Design Practices

Zone E is primarily a habitat conservation area. The only facility that is planned in this zone is Surface Lift Z. Zone E contains important habitats; therefore, in designing Surface Lift Z, Northstar not only will apply all of its design practices that are applicable, but also additional practices to further reduce appreciable effects on natural resources and maximize the coexistence of human uses and habitat values. In addition to the generally applicable practices listed in Table 4-1 (and that were described in *Rationale for Design and Management Practices*), these include the following practices:

- ▶ Design no new permanent roads, except where necessary to comply with fuel management regulations and to protect human safety and forest health.
- ▶ Design development of ski pods to use and improve existing roads, open areas, or areas of disturbance, where feasible.
- ▶ Design trails and structures to minimize impacts of crossings of stream channels and active floodplains, including consideration of seasonal crossings over snow if practicable.
- ▶ Design ski trail alignments to consider adverse effects on visual resources and to be consistent with the existing surrounding areas to the extent feasible.
- ▶ Protect late-seral forest species and their habitats by implementing the following measures:
 - Implement designs that avoid and/or minimize disturbance to forests with late-seral habitats (CWHR stand structure classes 5M, 5D, 6), with a priority on areas occupied by sensitive species
 - Avoid removal of vegetation that would adversely affect late-seral forest structure.
 - Avoid degradation of occupied breeding habitat (e.g., stands that support active nest or den sites).
 - Design trails and structures to avoid and/or minimize bisecting or fragmenting areas identified as high-value or occupied habitat for late-seral forest focal species.
 - Within physical design constraints, locate ski lifts, towers, and terminals to avoid and/or minimize removal of vegetation and other impacts to late-seral forest.
 - Avoid hiking and biking trail development in late-seral forest (recreational snowmobiling is prohibited in Zone E).

- ▶ Minimize planned uses within core area for development of late-seral forest
- ▶ Protect mule deer access to fawning grounds and minimize loss of fawning habitat by implementing the following measures:
 - Implement recreation and development designs that emphasize protection of occupied and high-potential mule deer fawning habitats. To the maximum extent practicable, design trails and structures to avoid locations mapped as high-potential or occupied mule deer fawning habitat, and minimize impacts on locations mapped as moderate-potential fawning habitat.
 - Within physical design constraints, locate ski lifts, towers, and terminals to avoid or minimize removal of high-potential or occupied fawning habitat, particularly riparian and shrub vegetation.
 - Where moderate-potential, high-potential, or occupied fawning habitat cannot be avoided, design development and trails to maximize the retention of habitat elements important for mule deer fawning (shrub cover, tree cover, riparian vegetation) to the extent practicable and appropriate.
- ▶ Develop no new facilities except for Surface Lift Z.
- ▶ Design alignment of Lift Z to avoid impacts on late-seral forest and drainages.

Construction-related Management Practices

Construction of Surface Lift Z is planned in Zone E. This project would implement numerous measures to reduce construction-related effects on habitats; for this project, Northstar would implement its set of general management practices for reducing construction-related effects. This set of generally applicable management practices is listed in Table 4-1 and was previously described in the section entitled *Rationale for Design and Management Practices*.

Management Practices for the Road and Trail System

In Zone E, there is a system of unpaved, permanent roads that support timber management, and there is a USFS maintained road (FSR O6) in subzone E1. For its road system, Northstar's management practices for its road system provides regular maintenance that minimizes appreciable effects on habitats. These practices are applied to unpaved roads and trails throughout the resort; they are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.

In Zone E, Northstar also has management practices for restoring unnecessary roads to native vegetation and for supporting USFS maintenance of FSR O6 and associated stream crossings (Table 4-1). Northstar is also closing the bike trail adjacent to Schaffer Creek.

Management Practices for Ski Runs and Associated Facilities

A ski lift is planned for Zone E. Northstar would manage these ski facilities to sustain a high cover of natural vegetation. Forest management practices compatible with forest health objectives and tree skiing would be implemented and would retain much of the forest canopy. Practices to prevent ski runs or areas where skiing may take place, from adversely affecting natural resources are applied throughout the resort. (These practices are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*.) In addition, in Zone E, where deer fawning is confirmed, construction of lifts, runs, or associated facilities are not to be performed during the fawning and fawn-rearing period (typically sometime between mid-April and late July, depending on snowpack/weather).

Forest Management Practices

Forests in Zone E are managed for the protection of human safety and forest health, and to maintain and enhance natural resources to the extent practicable (without compromising human safety or forest health). Management practices conform to all applicable California Forest Practice Rules, and the specific terms and conditions of Timber Harvest Plans (THPs) for timber operations in this zone. These THPs contain numerous measures to sustain forest productivity and to avoid and/or minimize adverse effects on habitats including measures that address harvesting practices and erosion control, water course protection, and wildlife protection.

In addition to measures required by the California Forest Practice Rules and included in THPs, Northstar has forest management practices in Zone E that further support the objective of maintaining and/or enhancing natural resources. These management practices include the following:

- ▶ Minimize tree removal within and fragmentation of late-seral forest polygons classified as high or moderate habitat value.
- ▶ In stands that are CWHR class 5M with canopy closure between 50% and 59%, retain a minimum of 50% canopy cover.
- ▶ For timber harvests not associated with development projects, in stands that are CWHR class 5D, 5M, or 6, and within a 328-foot (100-meter) wide buffer, do not reduce existing canopy cover values in dominant and co-dominant trees by more than 10% across a stand.
- ▶ Maintain or enhance forest floor complexity by retaining down logs: beginning with the largest down logs, sequentially retain pieces of down wood (> 12 inches in diameter at midpoint) until at least the following quantities are retained on average: 10–20 tons per acre in CWHR classes 5M, 5D, or 6; 10 tons per acre in 5P; 5–10 tons per acre in 5S, 4P, 4M, and 4D; and 4–8 tons per acre in 4S.
- ▶ Retain six of the largest snags per acre (3–6 per acre in CWHR Classes 4S and 5S), and all snags \geq 15 inches in DBH, except within 100 feet of roads, or where felling of snags is required for disease or insect control, or there is a threat to human health or safety.
- ▶ Retain the largest live trees, particularly dying or defective trees (broken tops, insect infestations [except during high risk periods for insect outbreaks]); retain trees \geq 30 inches in DBH to the extent practicable.
- ▶ Manage forests to facilitate development and maintenance of late-seral stands throughout the core area designated for late-seral forest.

This combination of forest management practices supports the maintenance of the habitat values of existing late-seral stands, and the development of additional late-seral habitat in Zone E. (As described in Chapter 5, Northstar plans to substantially increase the extent of late-seral forest in Zone E.)

Management Practices for Invasive Plant Control

Zone E has remained largely free of invasive plant species. Consequently, in this zone, Northstar implements its generally applicable management practices to prevent the establishment and spread of invasive plants. These practices are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition, the interface between Zone C and Zone A will be monitored for infestations of invasive plants to enable early detection of invasive plants spreading from Zone A, which is a potential source of invasives.

Management Practices for Access and Use

Zone E is managed to minimize effects on sensitive habitats (e.g., late-seral forest stands) and maximize their functions. As part of this minimization, outside of the right-of-way for FSR O6, only non-mechanized recreational activities (e.g., hiking, cross-country skiing, biking) and timber management and operational maintenance occurs in Zone E. Pets are excluded from this zone, and on roads providing access from outside of Northstar properties, locked gates, and signs identifying Northstar ownership, are maintained (Table 4-1). Additional access and seasonal use restrictions to protect sensitive wildlife species are summarized in Table 4-5.

Recreational uses (e.g., snowmobiling and bicycling), motorized vehicle use not related to the necessary maintenance of facilities or resource protection, and other unnecessary operational uses will be prohibited in a seasonal closure area during deer fawning season. This area is shown on Exhibit 4-1; it is located in the west-southwest portion of the property and includes much of Zones D and E, and a small portion of Zone B near Schaffer Creek. From the west side of the property, the closure area follows the 710A Road east to the 700 Road, south to the 704 Road, and south to the southwestern boundary of the property. This area was delineated to include most of the suitable deer fawning habitat on the property, particularly within Zones D and E, while allowing Northstar to access the western reaches of the property and facilitate some recreational connectivity (e.g., mountain biking and hiking) to Forest Service lands on these existing roads.

The bike trail adjacent to Schaffer Creek will be closed permanently.

The enforcement of use restrictions and maintenance of locked gates and signs is further described in the section entitled *Rationale for Design and Management Practices* and in Chapter 6 *Monitoring and Adaptive Management Framework*. Additional access- and use-related practices include road speed limits of 20 mph and parking vehicles on roads and existing disturbed areas to the extent practicable.

Management Practices for Trash and Litter Removal

Northstar's management practices for trash and litter removal are listed in Table 4-1 and were previously described in the section entitled *Rationale for Design and Management Practices*. In addition to practices applicable to all zones, in Zone E, Northstar mountain crews remove trash as necessary during routine inspections.

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
Design Practices					
Design development to limit-overall land disturbance.	●	●	●	●	●
Design development to minimize the removal of trees greater than 30 inches in diameter at breast height, particularly in Zones D and E.	●	●	●	●	●
Prepare a Tree Protection, Retention, and Replacement Plan for development projects.	●				
Design no new permanent roads, except where necessary to comply with fuel management regulations and to protect human safety and forest health.				●	●
Design development of ski pods to use and improve existing roads, open areas, or areas of disturbance for circulation of skiers, where feasible.				●	
Design the W pod in Zone D2 to predominantly use tree skiing.				●	
Design trails and structures to minimize impacts of crossings of stream channels and active floodplains, including consideration of seasonal crossings over snow if practicable.	●	●	●	●	●
Design ski trail alignments to consider adverse effects on visual resources and to be consistent with the existing, surrounding areas to the extent feasible.			●	●	●
Design ski trails with treatments (e.g., feathering, islands, and gladding) to improve visual quality.				●	
Utilize silvicultural treatments for forest management that are compatible with tree skiing at the resort. The thinning and selection silviculture prescriptions will remove trees and increase average spacing among the residual trees. These prescriptions create improved forest health and are compatible with tree skiing. Decisions regarding which trees to retain shall be based on the silviculture needs of each stand. Retention criteria include species, crown position, tree vigor and health, tree size, crown size, spacing needs to improve growth rates, and ecological value.	●	●	●	●	●
Reduce the visual contrast of ski facilities with the surrounding landscape by using architectural treatments and natural materials or non-reflective paint.	●	●	●	●	●

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
<p>Protect late-seral forest species and their habitats by implementing the following measures:</p> <ul style="list-style-type: none"> ▶ Implement designs that avoid and/or minimize disturbance to forests with late-seral habitat (CWHR stand structure classes 5M, 5D, 6), with a priority on areas occupied by sensitive species; avoid removal of vegetation that would adversely affect late-seral forest structure. ▶ Avoid degradation of occupied breeding habitat (e.g., stands that support active nest or den sites). ▶ Design island ski runs to avoid and/or minimize impacts to late-seral forest (which is present in Zone D2). ▶ Design trails and structures to avoid and/or minimize bisecting or fragmenting areas identified as high-value or occupied habitat for late-seral forest focal species. ▶ Within physical design constraints, locate ski lifts, towers, and terminals to avoid and/or minimize removal of vegetation and other impacts on late-seral forest. ▶ If ski runs will be developed adjacent to late-seral forest, implement designs that emphasize tree retention (e.g., tree islands). ▶ Avoid snowmobile, hiking, and biking trail development in late-seral forest. 				•	•
<p>Protect mule deer access to fawning grounds and minimize loss of fawning habitat by implementing the following measures:</p> <ul style="list-style-type: none"> ▶ Implement recreation and development designs that emphasize protection of occupied and high-potential mule deer fawning habitats. To the extent practicable, design trails and structures to avoid locations mapped as high-potential or occupied mule deer fawning habitat, and minimize impacts on locations mapped as moderate-potential fawning habitat. ▶ Within physical design constraints, locate ski lifts, towers, and terminals to avoid or minimize removal of high-potential or occupied fawning habitat, particularly riparian and shrub vegetation. ▶ Where moderate-potential, high-potential, or occupied fawning habitat cannot be avoided, design development and trails to retain habitat elements important for mule deer fawning (shrub cover, tree cover, riparian vegetation) to the extent practicable and appropriate. 		•	•	•	•
<p>Protect riparian, aquatic, and meadow focal species and their habitats by implementing the following measures:</p> <ul style="list-style-type: none"> ▶ To the extent feasible, implement project designs and land uses that would minimize removal of riparian habitat, with an emphasis on the Schaffer Creek watershed, due to its high resource value. ▶ To the extent feasible, design trails and structures to avoid and/or minimize disturbance or fragmentation of riparian and meadow habitats. 	•	•	•	•	•
Site trails, roads, and buildings to minimize alterations to the site's hydrology.	•	•	•		
Minimize the extent of impermeable surfaces.	•				

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
Based on wetland delineations verified by the U.S. Army Corps of Engineers (USACE), revise designs to avoid and/or minimize adverse effects on riparian vegetation, jurisdictional Waters of the U.S. (including wetlands), and Waters of the State to the extent practicable.	●	●	●	●	
Design stormwater and irrigation systems so that no unnatural runoff is delivered to surrounding lands, and discharges to streams mimic the natural pattern of runoff into these systems. Such designs may include: <ul style="list-style-type: none"> ▶ infiltration structures, ▶ detention/retention basins, ▶ storm water treatment vaults, ▶ biofilter BMPs (typically vegetated swales, strips, and buffers), and ▶ energy dissipation devices (structures designed to prevent erosion and slow water velocity associated with conveyance systems). 	●				
Use efficient irrigation systems.	●				
Minimize the use of turf in landscaping.	●				
Use drip irrigation, and native-appearing, non-invasive, drought-tolerant species in non-turf areas.	●				
Use barriers, signage, and trail locations to discourage human and pet disturbance of adjacent natural vegetation.	●	●	●	●	●
Design lighting to minimize glare and the escape of light into areas of natural vegetation.	●	●	●	●	●
In the design process, fulfill all relevant terms and conditions of permits and approvals.	●	●	●	●	●
Minimize planned uses within core area for development of late-seral forest.					●
Design development of ski pods to use and improve existing roads, open areas, or areas of disturbance, where feasible.				●	●
Develop no new facilities except for Surface Lift Z.					●
Design alignment of Surface Lift Z to avoid impacts to late-seral forest and drainages.					●
Construction-Related Management Practices					
Prior to construction, obtain required authorizations for projects that would affect jurisdictional Waters of the U.S., Waters of the State, or riparian vegetation. These may include authorizations from: <ul style="list-style-type: none"> ▶ USACE (through the Section 404 permitting process), ▶ Lahontan Regional Water Quality Control Board (through the Section 401 permitting process), and ▶ California Department of Fish and Game (through a 1602 Streambed alteration agreement). 	●	●	●	●	●

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
Implement pre-project surveys to determine if construction activities could affect sensitive species. Table 4-3 lists biological surveys that may be necessary prior to construction projects on Northstar properties.	●	●	●	●	●
Based on the results of these surveys, implement applicable and feasible measures to avoid and/or minimize project effects on sensitive species. Tables 4-4 and 4-5 provide such measures that may be applicable to projects at the resort.	●	●	●	●	●
Prepare a Stormwater Pollution Prevention Plan (SWPPP). This plan will include feasible and effective BMPs for: <ul style="list-style-type: none"> ▶ temporary erosion control, ▶ sediment control, ▶ soil stabilization, ▶ non-storm water management, ▶ post-construction storm water management, and ▶ BMP maintenance, inspection, and repair. 	●	●	●	●	●
Avoid construction-related ground disturbance between October 15 and May 1 unless it is not practicable and a grading variance is obtained from Lahontan RWQCB and/or Placer County.	●	●	●	●	●
To the extent feasible, during the nesting season (March 1 through September 1), avoid removing vegetation that could support nesting birds.	●	●	●	●	●
To the extent feasible, minimize disturbance of vegetation during construction activities.	●	●	●	●	●
Flag project boundaries as necessary and fence sensitive resources to reduce disturbance.	●	●	●	●	●
Conduct environmental sensitivity training for construction personnel prior to initiating work.	●	●	●	●	●
Conduct all ground disturbing activities in accordance with the <i>Lahontan Region Project Guidelines for Erosion Control</i> .	●	●	●	●	●
Fulfill all relevant terms and conditions of permits and approvals prior to and during construction.	●	●	●	●	●
Management Practices for the Road and Trail System					
Conduct annual monitoring and maintenance of the road and trail system.	●	●	●	●	●
Implement dust control measures such as road watering during construction projects.	●	●	●	●	●
Maintain all culverts, waterbars, and other drainage structures in a fully functional condition.	●	●	●	●	●
Implement additional, feasible drainage and erosion control measures as needed to prevent discharge of runoff and sediment from the road directly into the active floodplain of watercourses.	●	●	●	●	●
Reshape the road surface as needed to maintain proper surface drainage.	●	●	●	●	●
Restore roads that are not necessary for forest management to native vegetation.				●	●

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
Establish native vegetation on slopes where grading and/or smoothing has taken place along roads or where trails have been established.	●	●	●	●	●
Support USFS efforts to maintain and improve FSR O6 and associated stream crossings.					●
Management Practices for Ski Runs and Associated Facilities					
Minimize vegetation removal to the extent practicable.	●	●	●	●	●
Minimize soil compaction to the extent practicable.	●	●	●	●	●
Following ground-disturbing activities, attain success criteria (for soil attributes and cover of native vegetation and mulch) required by Placer County and the Lahontan RWQCB using approaches recommended by the California Alpine Resort Environmental Cooperative (CAREC) in the current draft of its <i>Sediment Source Control Handbook</i> or superseding document or by a qualified professional.	●	●	●	●	●
Manage ski runs and associated facilities to maintain, or to move towards attainment of the appropriate standards recommended by CAREC, qualified professionals, and/or required by Placer County and the Lahontan RWQCB.	●	●	●	●	●
For construction of trails and lift towers and terminals, use existing roads, or use a helicopter where existing road access is unavailable.				●	●
After tree removal, on those areas where grading or smoothing is not required, chip or masticate slash onto the ski run to protect the soil surface.	●	●	●	●	●
Minimize fertilizer applications to the extent practicable.	●	●	●	●	●
Revegetate areas where the soil profile has been disturbed by grading or smoothing.	●	●	●	●	●
Prepare a SWPPP for projects with more than 1 acre of soil disturbance.	●	●	●	●	●
Install and maintain water bars on ski trails.	●	●	●	●	
Annually inspect ski trails for signs of erosion, and implement erosion control treatments as necessary.	●	●	●	●	
During rain events and spring runoff, monitor runoff, and implement BMPs as necessary to reduce erosion and protect water quality.	●	●	●	●	●
Participate in the development of more effective techniques for minimizing runoff and erosion.	●	●	●	●	●
Where deer fawning is confirmed, construction of lifts, runs, or associated facilities are not to be performed during the fawning and fawn-rearing period (typically sometime between mid-April and late July, depending on snowpack/weather).		●	●	●	●
Management Practices for Timber Harvest Operations					

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
Manage forested areas in accordance with California Forest Practice Rules Title 14, Natural Resources, Division 1.5 Department of Forestry and Fire Protection, and with the Northstar Community Service District (NCSD) fuel silviculture prescriptions for the protection of human safety and forest health and, to the extent practicable given these objectives, maintain and enhance natural resources to the extent practicable (without compromising human safety or forest health).	●				
Manage forests for the protection of human safety and forest health, and to maintain and enhance natural resources to the extent practicable (without compromising human safety or forest health).		●	●	●	
Manage forested areas in conformance with CA Forest Practice Rules for the protection of forest and human health and, to the extent practicable with these objectives, maximize natural resource values for late-seral stage forest associated wildlife species.					●
Manage forested areas employing silvicultural prescriptions, as defined in the California Forest Practice Rules, including: Selection, Group Selection, Commercial Thinning, Sanitation-Salvage, Fuelbreak/Defensible Space, Alternative prescriptions consistent with the Fuelbreak/Defensible Space, and Alternative prescriptions to deal with insect and disease problems.	●	●	●	●	●
Comply with all applicable California Forest Practice Rules as determined by CDF, and all terms and conditions of THPs for timber operations.	●	●	●	●	●
Implement CDF silviculture practices for forest health and fuels management that are compatible with tree skiing.				●	
Although the proposed W Lift would be developed in late-seral forest (in Zone D2), minimize tree removal within and additional fragmentation of late-seral forest polygons classified as high or moderate habitat value.				●	●
In stands that are CWHR class 5M with canopy closure greater than 50%, retain a minimum of 50% canopy cover.				●	●
For timber harvests not associated with development projects, in stands that are CWHR class 5D, 5M, or 6, and within a 328-foot (100-meter) wide buffer, do not reduce existing canopy cover values of dominant and co-dominant trees by more than 10% across a stand.				●	●
Maintain or enhance forest floor complexity by retaining down logs: beginning with the largest down logs, sequentially retain pieces of down wood (> 12 inches in diameter at midpoint) until at least the following quantities are retained on average: 10–20 tons per acre in CWHR classes 5M, 5D, or 6; 5–10 tons per acre in 5P and 5S; 4–8 tons per acre in 4P, 4M, and 4D; and 3–7 tons per acre in 4S.				●	

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
Maintain or enhance forest floor complexity by retaining down logs: beginning with the largest down logs, sequentially retain pieces of down wood (> 12 inches in diameter at midpoint) until at least the following quantities are retained on average: 10–20 tons per acre in CWHR classes 5M, 5D, or 6; 10 tons per acre in 5P; 5–10 tons per acre in 5S, 4P, 4M, and 4D; and 4–8 tons per acre in 4S.					●
Retain 3–6 of the largest snags per acre (with 6 per acre in CWHR classes 5M, 5D, and 6; and with 3 per acre in 4S and 5S), and all snags ≥ 15 inches in DBH, except within 100 feet of roads, or where felling of snags is required for disease or insect control, or there is a threat to human health or safety.				●	
Retain 6 of the largest snags per acre (with 3–6 per acre in 4S and 5S), and all snags ≥ 15 inches in DBH, except within 100 feet of roads, or where felling of snags is required for disease or insect control, or there is a threat to human health or safety.					●
Retain the largest live trees, particularly dying or defective trees (broken tops, insect infestations [except during high risk periods for insect outbreaks]); retain trees ≥ 30 inches in DBH to the extent practicable.				●	●
Implement pre-project surveys to determine if forest management activities, including enhancement, could affect sensitive species (see Table 4-3). Implement avoidance and minimization measures listed in Table 4-4.	●	●	●	●	●
Manage forests to facilitate the maintenance and development of late-seral stands throughout the core area designated for late-seral forest.					●
Management Practices for Invasive Plant Control					
Discourage or prohibit the use in landscaping of plant species with the potential to invade natural vegetation.	●				
Provide outreach regarding control efforts.	●				
Clean vehicles and clothing after leaving infested areas and before entering uninfested habitats.	●	●	●	●	●
Wash earthmoving equipment to remove vegetative material before bringing equipment onto Northstar properties.	●	●	●	●	●
For erosion control, use certified weed-free materials or materials produced on-site (e.g., wood chips produced at the resort).	●	●	●	●	●
Monitor hot spots of introduction on Northstar properties to enable early detection and rapid eradication of invasives (e.g., roadsides, parking areas, construction sites, and disturbed areas).	●	●	●	●	●
Monitor the interface of Zone A with other zones to enable early detection and rapid eradication of invasives.	●	●	●		●
Eradicate detected infestations of invasive plants on Northstar properties while infestations are still small and control is feasible.	●	●	●	●	●

Table 4-1 Design and Management Practices by Zone					
	Zone A	Zone B	Zone C	Zone D	Zone E
Periodically evaluate effectiveness of monitoring and control methods and adjust methods as needed.	●	●	●	●	●
Coordinate with and support regional control efforts in particular control efforts by the Placer County Department of Agriculture.	●	●	●	●	●
Management Practices for Access and Use					
Park vehicles and equipment on existing roads, and previously disturbed areas to the extent practicable.	●	●	●	●	●
Limit vehicle speeds to 20 mph.		●	●	●	●
Exclude pets from this zone.				●	●
Prohibit motorized recreational uses (e.g., ATVs, motorcycles, snowmobiles) within this zone, except for winter-time guided snowmobile tours. Recreational snowmobile use is prohibited in Zone E.		●		●	●
Implement the applicable seasonal use restrictions to protect sensitive wildlife resources from Table 4-5.		●	●	●	●
Inform the public of use restrictions within the zone by including these restrictions in relevant materials distributed by Northstar, and through signage posted and maintained at the major access points to this zone.		●	●	●	●
Close the bike trail adjacent to Schaffer Creek.				●	●
Prohibit recreational and other operational uses in the restricted use zone during deer fawning season (Exhibit 4-1).		●		●	●
Enforce use restrictions as needed and practicable.	●	●	●	●	●
Manage use to minimize effects on sensitive habitats (e.g., late-seral forest stands).				●	●
Outside of FSR O6 right-of-way, restrict use of zone to non-mechanized recreational use (e.g., cross-country skiing, alpine skiing in the vicinity of surface lift Z, hiking, biking).					●
Maintain locked gates and signs (identifying Northstar ownership) on Northstar-maintained roads at the major access points into this zone from outside of Northstar properties.					●
Identify locations where illegal uses of Northstar property (e.g., unauthorized ORV use, dumping) are occurring or have occurred, and implement measures (e.g., patrols, signage, barriers) to reduce future illegal uses.					●
Management Practices for Trash and Litter Removal					
Provide and maintain necessary trash receptacles in the Village and mountain facilities to manage trash and litter removal; install bear-proof trash cans at new residential and commercial construction at the resort.	●	●	●	●	●
Remove trash as necessary during routine inspections.		●	●	●	●

5 HABITAT ENHANCEMENT PLAN

This habitat enhancement plan describes how the functions and values provided by the resort's forests, and riparian and stream corridors, could be enhanced through management practices. It addresses the major issues that affect ecological functions (particularly the provision of wildlife habitat) at the resort, and in turn can be affected by management. These issues are:

- ▶ risk of catastrophic disturbance by fire or insect outbreaks,
- ▶ provision of late-seral forest habitat,
- ▶ human disturbance of wildlife,
- ▶ alteration of water and sediment movement by roads,
- ▶ spread of invasive plants,
- ▶ provision of wildlife habitat by riparian and adjacent upland vegetation,
- ▶ effects of riparian and adjacent upland vegetation on stream ecosystems, and
- ▶ conifer encroachment of aspen stands.

For each of these issues, the enhancement plan provides relevant background, and describes potential enhancement techniques, where these techniques could be implemented at the resort, and the criteria guiding their implementation. These enhancement techniques include some management practices previously described in Chapter 4, and thus this enhancement plan explains the basis for and implementation of relevant management practices.

The implementation of enhancement actions will be adaptively managed as described in Chapter 6 for the HMP as a whole, and thus the enhancement techniques, locations, and implementation described in this chapter are subject to change in response to monitoring results, regulatory requirements, and natural events (e.g., catastrophic fire). Also, some enhancements could be implemented in conjunction with future projects.

ENHANCEMENT APPROACH

The approaches to conifer forest and riparian corridor enhancement are described separately, although some of the same treatments will be applied to both ecosystems. There are two reasons for this organization. First, conifer forest and riparian corridor enhancement support the attainment of different targets of this HMP: enhancement of conifer forests primarily supports attainment of forest structure targets, while enhancement of riparian corridors primarily supports riparian habitat quality and water quality targets. Second, the approaches to enhancing these ecosystems differ in their emphasis, such as the treatment of the tree canopy in forest ecosystems and treatment of understory vegetation and the soil surface in riparian corridors (e.g., at disturbed bank and adjacent floodplain locations).

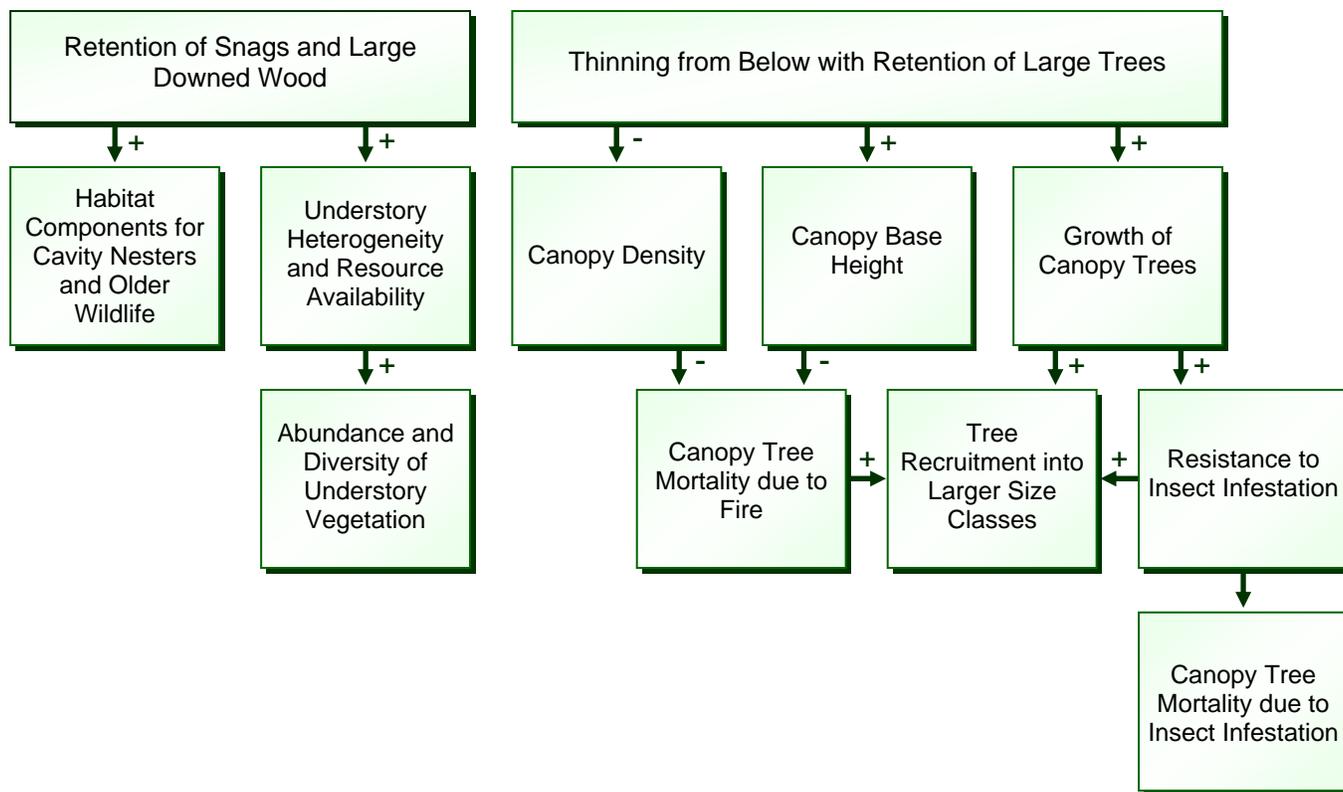
CONIFER FOREST ENHANCEMENT

At the resort, conifer forests are being enhanced by:

- ▶ reducing the likelihood of catastrophic fire,
- ▶ reducing the likelihood of insect outbreaks,
- ▶ facilitating development of late-seral habitat,
- ▶ limiting human disturbance of wildlife, and
- ▶ controlling invasive plants.

This approach to enhancement relies, in large part, on carefully-prescribed silvicultural treatments (primarily thinning from below, selection, group selection, and sanitation and salvage) to reduce the risk of catastrophic disturbances, and to facilitate the development of late-seral habitat. Similar thinning-based plans to restore forests have been implemented in southwestern pine forests to reduce fire hazards and improve wildlife habitat (Arno and

Fiedler 2005), and in northwestern Douglas-fir forests to recreate spatial heterogeneity and facilitate development of late-seral attributes (Garman et al. 2003, LeBarge et al. 2005). The ecological basis for enhancement through thinning is summarized below and in Exhibit 5-1.



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Source: EDAW 2006

Ecological Basis for Forest Enhancement Treatments

Exhibit 5-1

Thinning treatments can enhance forest habitats because they can reverse some undesirable consequences of past management. As a result of historic timber harvests and fire suppression, many forest stands, including stands at the resort, have relatively dense canopies with large numbers of trees. In such stands, a wildfire could be intense, readily enter and spread through the canopy, and be difficult to control. The slow-growing trees of such stands are vulnerable to insect attack and take longer to reach larger size classes and thus provide components of late-seral habitats. Thinning enhances these stands by reducing both continuity of fuels (live and dead) and by concentrating resources on the growth of a smaller number of trees.

In conjunction with these thinning treatments, management practices will be implemented to avoid or minimize potential adverse effects of silviculture and of operation of the resort on wildlife and other resource values (as described in Chapter 4), and additional enhancement treatments will be implemented to enhance habitat by limiting human disturbance in important habitat areas and controlling the spread of invasive plants.

REDUCE RISK OF CATASTROPHIC DISTURBANCE

In this context, catastrophic disturbances of forests are events that cause extensive mortality of canopy trees, and thus may adversely affect the functions and values of forest ecosystems for a prolonged period of time. Such disturbances also affect recreational and aesthetic values, and can affect the operation and maintenance of facilities. Both fire and insect outbreaks could cause catastrophic disturbances at the resort.

REDUCE LIKELIHOOD OF CATASTROPHIC FIRE

Issue

High levels of surface fuels, ladder fuels, and a dense contiguous canopy layer increase the risk of fire causing extensive tree mortality, and thus adversely affecting forest and stream ecosystems. These conditions exist in some forest stands at the resort.

Background

Frequent fire has historically exerted a strong influence on forest structure in the Sierra Nevada. Historically, fires generally occurred at intervals of 2–20 years in Sierran conifer forests, with shorter average intervals in pine-dominated forests and longer intervals in fir forests and at higher elevations (Roy and Vankat 1999, Taylor and Beaty 2005). For example, in the nearby Lake Tahoe Basin, mixed conifer forests often burned at intervals of 10–15 years (Beaty 2003), and these were fires of low to moderate intensity, which many larger trees survived. Annual variations in climate strongly influenced the likelihood of these fires (Taylor and Beaty 2005).

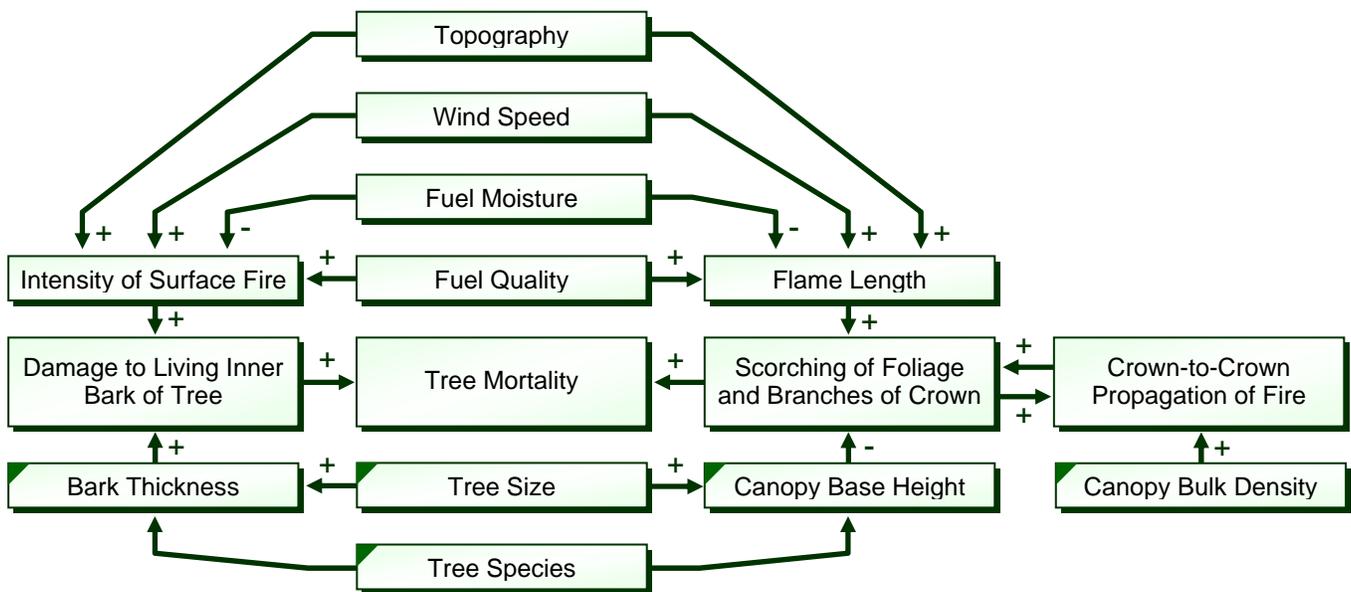
During the 20th century, however, policies of fire exclusion were implemented throughout the region, reducing fire frequency and allowing the recruitment of large numbers of trees that would have been removed as saplings under a regime of frequent fire. As a result, many forest stands have become denser, and have relatively high loads of surface fuels. This change in stand structure has increased fire hazards because more intense fires, which may spread through the canopy and cause substantial tree mortality, are now much more likely. Mechanical treatments (e.g., thinning from below) and prescribed fire could reduce fuel loads and canopy density, and thus reduce these fire hazards.

Fire behavior (e.g., rate of spread, surface versus crown fires) and the magnitude of fire effects (e.g., the extent of tree mortality) are a function of fuel and vegetation structure, weather, and topography (Exhibit 5-2). Fires move as a series of ignitions that occur when heat is transferred from burning fuel to adjacent potential fuel and raise the potential fuel's temperature to the temperature at which ignition occurs. Thus, both the transfer of heat to adjacent fuel and the amount of heat required to raise the fuel's temperature to ignition affect fire behavior (and the magnitude of fire effects). For example, on steeper slopes more heat is transferred to adjacent fuel by convection and radiation, and when fuel contains more moisture, it requires more heat to raise its temperature.

Fire behavior and the severity of fire effects are products of:

- ▶ spatial continuity and density of tree crowns;
- ▶ distance of base of tree crowns to ground surface;
- ▶ quantity, size, and arrangement of surface fuels;
- ▶ fuel moisture;
- ▶ wind speed; and
- ▶ topography.

The relationships among these variables are diagrammed in Exhibit 5-2.



Tree & Stand Attributes
 G 06110031.01 001 B
 Source: EDAW 2006

Conceptual Model of Fire Behavior and Resulting Tree Mortality

Exhibit 5-2

Enhancement Treatment

Fuel reduction can reduce fire severity and rate of spread under a given set of weather conditions by reducing the quantity of and increasing the distance between fuels. Effective techniques for reducing the likelihood that wildfire would cause extensive tree mortality, and for reducing the severity of fire effects in general, include:

- ▶ increasing canopy base height (i.e., height from ground to lowest branches and foliage),
- ▶ reducing canopy bulk density,
- ▶ reducing forest canopy continuity, and
- ▶ reducing the quantity of surface fuels.

Thinning treatments would likely reduce fire hazards in these stands at the resort. Thinning treatments have effectively reduced fire hazards in a wide variety of western forests. In assessments of potential fire behavior in Sierra Nevada mixed conifer forests, prescribed fire, thinning from below, and thinning from below followed by prescribed fire, all were effective at reducing tree mortality and rate of fire spread (Stephens and Moghaddas 2005a, b); thinning from below combined with prescribed fire was most effective, and the next most effective treatment was prescribed fire. In assessed stands, under severe fire weather (97.5th percentile conditions), predicted mortality of trees greater than 30 inches in DBH was 77% in untreated stands but less than 10% in stands that had been treated by prescribed fire, thinning from below, or thinning with prescribed fire. In Arizona, in ponderosa pine forests with some similarities to eastside Jeffrey pine forests, fire intensity and crown damage were lower in thinned than untreated stands (Cram et al. 2006). The most effective treatments were thinning followed by prescribed fire and thinning followed by slash being lopped, piled, and burned; stands that had received these treatments experienced one-quarter to half the crown damage that occurred in similar untreated stands. Thinning followed by slash being lopped and scattered was much less effective in reducing fire intensity and crown damage.

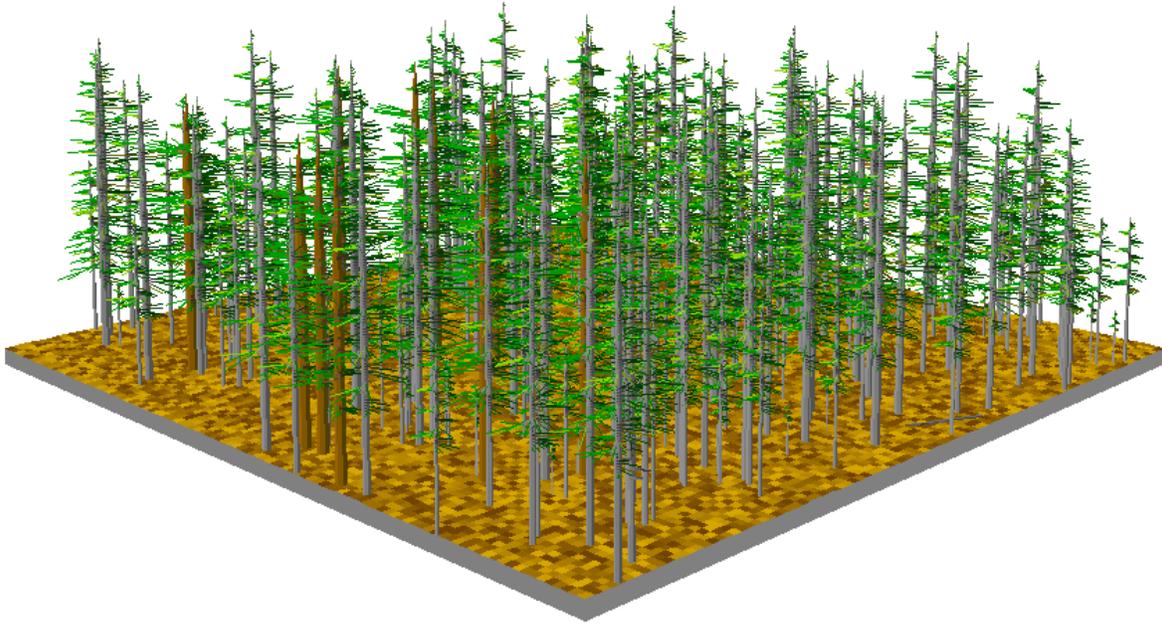
In general, the effectiveness of treatments results from reductions in surface fuels and canopy bulk density, and an increase in canopy base height. The relationships among these variables are diagrammed in Exhibit 5-2.

Prescribed fire reduces surface fuels more than thinning treatments (some of which may even increase surface fuels), and may also increase canopy base height by scorching lower branches, and thus treatments that include prescribed fire are more effective at reducing the risk of catastrophic fire than those which do not. At the resort, however, prescribed fire is not used because of risks to public safety and infrastructure.

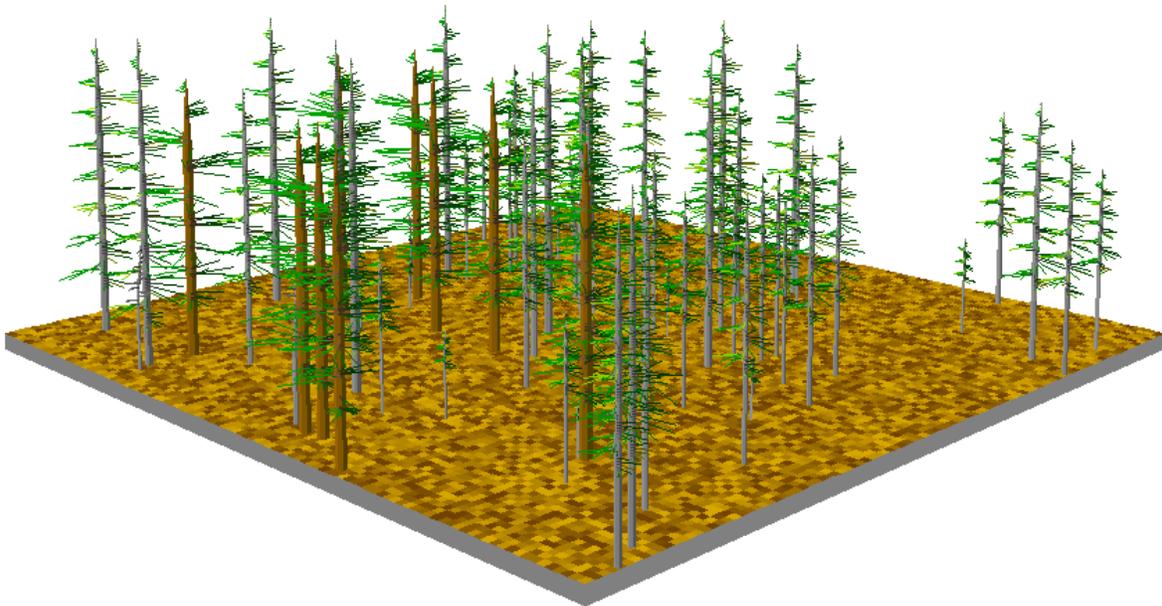
Fire hazards are reduced at the resort through fuel break/defensible space, alternative prescriptions consistent with the fuel break/defensible space prescription, selection, sanitation-salvage, and thinning treatments. These treatments remove 30–80% of the trees > 1 inch in DBH to space tree crowns (reducing canopy density), and eliminate smaller trees that reduce the distance between surface fuels and tree crowns (effectively increasing canopy base height). Snags and large pieces of woody debris are generally left in place, except within 100 feet of roads, or where felling of snags is required for disease or insect control, or there is a threat to human health or safety. Slash is generally either piled and burned, or chipped and hauled away. As part of these treatments, numerous measures are implemented to reduce potential effects on natural resources; measures include applicable measures in the California Forest Practice Rules, additional site specific measures incorporated into Timber Harvest Plans (THPs), and relevant Northstar management practices (described in Chapter 4).

Prior to receiving these treatments, moderate to dense forest stands (primarily CWHR categories 3M, 3D, 4M, and 4D), are at risk of experiencing catastrophic fire and extensive tree mortality. For example, for four plots representative of conditions in the western portion of the property, potential fire effects were simulated with the USFS's Forest Vegetation Simulator (FVS) (Dixon 2003), Behave (Andrews et al. 2005), and First Order Fire Effects Model (FOFEM; Reinhardt et al. 1997), using data from Northstar THPs (Banka 1997, 1999). (While this modeling provides only a general indication of possible fire hazards and fire effects, it is useful for general planning of land use and forest management.) In these plots, under severe fire weather (20 mph wind, 70°F air temperature, and fine fuel moisture <5%), fires could be moderately intense ground fires, or passive or active crown fires; flame lengths would likely be above 6 feet and would be comparable to canopy base height (EDAW unpublished data). Such fires would be dangerous and probably would cause substantial tree mortality (i.e., >50% of trees).

Treated stands are at less risk of experiencing catastrophic fire. For example, in the simulations of treatment and fire effects described previously, tree mortality resulting from simulated fires (during severe fire weather) was reduced by treatments of thinning from below that removed approximately 25–40% of tree basal area (as illustrated in Exhibit 5-3). Thinning shifted stands from the moderate and dense CWHR cover categories to the open category (25–39% cover), increased canopy base height, and reduced fine surface fuels (i.e., fuel < 3 inches in diameter, which make the greatest contribution to fire intensity, flame length, and rate of spread). As a result, simulated fires were more likely to be ground fires that were less intense and had shorter flame lengths (typically 2–3 feet) than fires in unthinned stands. Such fires are much less likely to cause substantial tree mortality than the more intense fires that could occur in untreated stands. Nonetheless, more substantial thinning to further reduce fire hazards is desirable within a quarter mile of residential and commercial development. (For example, see prescriptions for the wildland urban interface in C. G. Celio & Sons et al. 2004.)



A) Structure of Representative CWHR Dense Stand at Northstar — Untreated



B) Structure of Representative Stand —Thinned

Simulation of Treated Stands

Exhibit 5-3

Potential Enhancement Locations

At the resort, most forest stands classified in CWHR cover categories M (moderate, 40–59%) or D (dense, >60%) are at risk of catastrophic fire, and this risk could be reduced by treatments to reduce surface fuels, remove ladder fuels, and reduce the continuity and density of the tree canopy. Currently, however, the acreage of these stands greatly exceeds the acreage that Northstar can feasibly treat. Therefore, stands are prioritized for treatment to maximize the reduction in fire hazards that can be obtained with available resources. Several factors are considered in prioritizing stands for treatment to reduce the risk of catastrophic fire. These factors include:

- ▶ *Stand canopy structure.* In general, stands in CWHR “dense” and moderate” categories are at greater risk of catastrophic disturbance than other stands because of their greater accumulations of fuel (particularly “ladder” fuels) and closer spacing of tree crowns in the canopy, which makes a fire that would destroy the tree canopy more likely.
- ▶ *Known fuel accumulations.* Some stands on the resort have high accumulations of fuel (e.g., brush) in the understory, which would cause hotter, faster spreading fires that would be more likely to enter the canopy.
- ▶ *Topography.* Topography affects the rate of fire spread, and thus, the difficulty of control.
- ▶ *Proximity to roads.* Roads are a potential source of ignitions, and thus, stands along roads are more likely to experience fire. Proximity to roads also affects treatment costs.
- ▶ *Sensitivity of stands to adverse effects of treatment.* Montane riparian forest and late-seral stands (i.e., stands in CWHR size classes 5 and 6) provide ecological functions that could be adversely affected by thinning of the forest canopy. Thus, these stands would receive only limited treatments (e.g., removal of hazard trees along roads, removal of understory ladder fuels).
- ▶ *Location.* Location affects the potential for a stand to be exposed to fire originating in other stands. It also affects the reduction in risk to other stands and to development that will result from treating a stand.

Stands that are currently a high priority for fuel reduction treatments are shown in Exhibit 5-4. These stands represent only a portion of the stands that could be treated to reduce the risk of catastrophic fire. However, treatment of these stands would provide greater benefits than treatment of other stands in the CWHR dense and moderate categories.

Over time, other stands will develop greater densities of trees, and forest management and forest conversion to non-forest land cover will reduce tree density in some stands that currently have moderate or dense cover. Consequently, the location of relatively dense forest stands will continually change at the resort.

Implementation

There are a number of constraints that could affect the implementation of fuel reduction treatments. Fuel reduction treatments are contingent upon availability of staff and funding. In addition, topography, hydrology, soils, and the distribution of existing roads strongly influence the feasibility, cost, and environmental impacts of silviculture. Portions of the resort (such as the south side of Sawtooth Ridge) have steep slopes, limited existing road access, and soils with high erosion hazards.

Stream corridors and late-seral forests also may constrain silvicultural treatments. Within and near streams, restrictions include the measures for water course and lake protection in Article 6 of the California Forest Practice Rules, and measures required by the Lahontan Regional Water Quality Control Board, and stream and riparian-related policies in the Martis Valley Community Plan. Fuel reduction treatments also could affect other biological resources and cultural resources. Special-status animal and plant species could occur in or adjacent to any forest

stand at the resort, as could cultural resources. The management practices described in Chapter 4 would avoid and/or minimize potential effects, and so would additional measures required by THPs.

Silvicultural treatments to reduce fuels also can reduce the likelihood of insect outbreaks and will be designed to do so. In some stands, thinning treatments to reduce fire hazards and risks of bark beetle outbreaks, also may be designed to enhance late-seral habitats; these treatments are described in *Facilitate Development of Late-seral Habitat*.

Contingent on funding availability, approximately 100 acres per year (on average) may receive fuel reduction treatments during 2008–2015. Potential funding sources could include external resources (i.e., grants), internal resources, or both. Roughly 300 of these acres could be in Zone E. Treated areas will include some stands that both are a high priority for fuel reduction and have moderate or high potential for enhancement of late-seral characteristics. Treatments in these stands will be designed to both reduce the risk of catastrophic fire affecting existing late-seral stands in Zone E and to facilitate the development of additional late-seral stands. Treatments to enhance late seral characteristics are described in *Facilitate Development of Late-Seral Habitat*.

REDUCE LIKELIHOOD OF INSECT OUTBREAKS

Issue

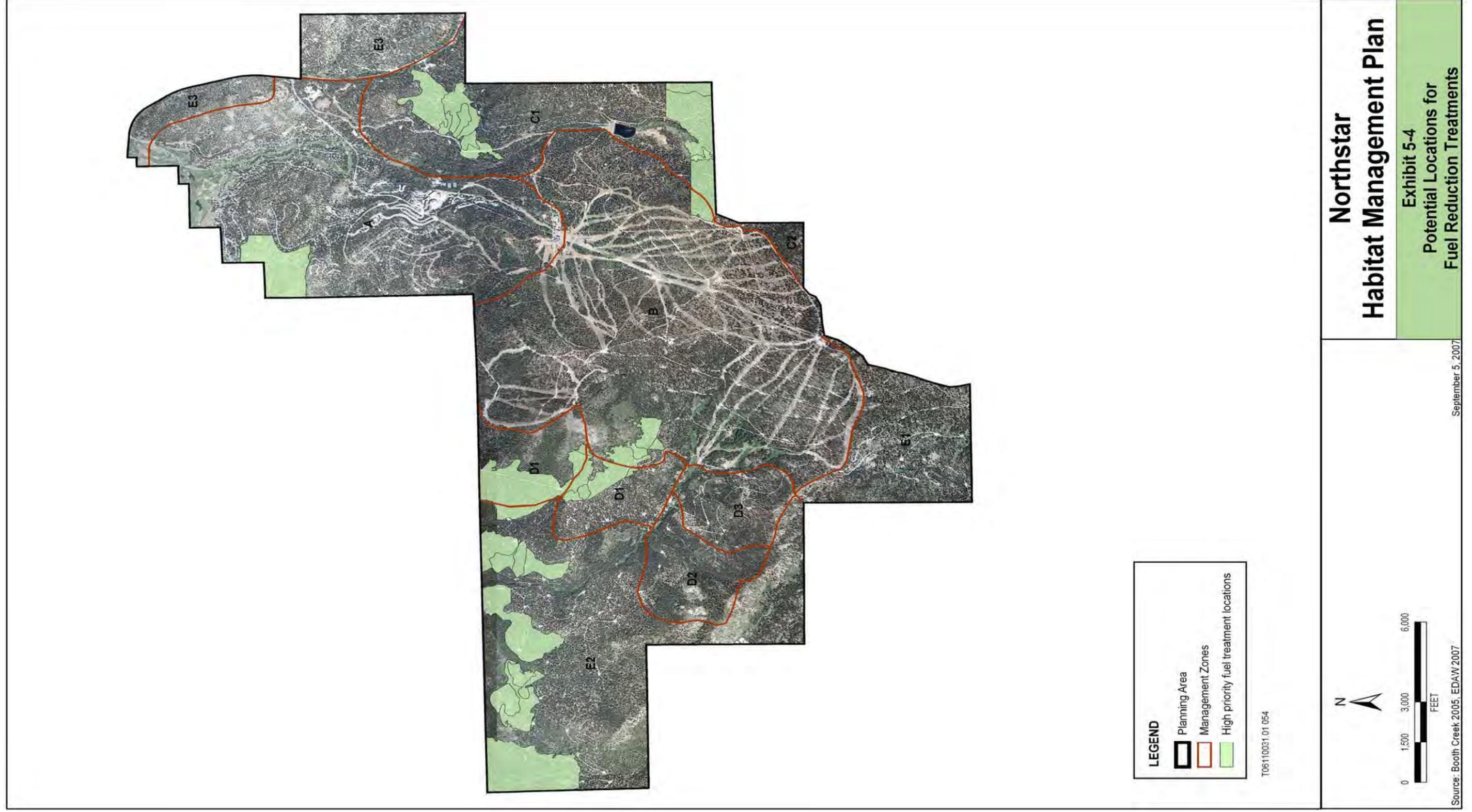
Insect-caused damage and mortality of trees is an important component of many ecological functions in coniferous forests. But, insect infestations that cause extensive tree mortality, such as bark beetle outbreaks, can adversely affect ecological functions and values, in particular by increasing fire hazards, reducing aesthetic values, creating safety hazards near roads and facilities, and by killing healthy, vigorously growing larger trees. Forest stands vulnerable to bark beetle outbreaks exist at the resort.

Background

Bark beetles are a major cause of tree mortality in conifer forests. Each species of bark beetle feeds on only one or a few tree species. At the resort, these beetles include fir engraver (*Scolytus ventralis*) and Jeffrey pine beetle (*Dendroctonus jeffreyi*). Adult bark beetles bore into a tree to lay eggs; eggs hatch to larvae that feed on the living inner bark of the tree (i.e., phloem and vascular cambium) for several weeks; the larvae pupate and become adults that continue to feed and mature in the tree. Adults may emerge during the same season or after over-wintering in the host tree.

As they feed, bark beetles excavate tunnels in the phloem, introduce fungi that also damage tree tissues, and produce aggregation pheromones that attract additional beetles (Byers 1995). By damaging the phloem, they impede the movement of sugars and hormones from foliage to the roots. The fungi further damage the phloem and thus further impede that movement of sugars and hormones to the roots. (The beetles may subsequently feed on the fungi as well as the tree.) If its feeding is not deterred or prevented by the tree, the bark beetle will produce an aggregation pheromone. As additional beetles arrive in response to the aggregation hormone, extensive areas of phloem may be destroyed and the tree killed.

Trees defend against beetle feeding by producing resins, producing compounds that are toxic to insects or that reduce the nutritional quality of tree tissues, and by a hypersensitive response that compartmentalizes infected tissues (as diagrammed by Exhibit 5-5) (Byers 1995). In conifers, the inner bark contains resin ducts that exude resin that impedes the movement of beetles, and may even completely encase them. This resin and the living tissues of the inner bark contain compounds (i.e., types of secondary metabolites) that are toxic to insects or reduce the nutritional quality of tree tissues. Consequently, these compounds reduce the colonization, growth, and survival of beetles. In response to beetle feeding and fungal infection, trees initiate a hypersensitive response, which involves the self-destruction of adjacent cells, isolating beetles and fungi within a compartment of dead cells that have lower nutritional value and higher concentrations of toxic compounds.



Northstar Habitat Management Plan

Exhibit 5-4
Potential Locations for
Fuel Reduction Treatments

Source: Booth Creek 2005, EDAW 2007

September 5, 2007