SNOWCREEK GOLF COURSE EXPANSION PROJECT

Revised Environmental Assessment

USDA - Forest Service
Pacific Southwest Region
Inyo National Forest
Mammoth Lakes Ranger District

AUGUST 1993

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Mammoth Lakes Ranger District
Mono County, California

Revised Environmental Assessment

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Responsible Agency: USDA - Forest Service

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CHAPTER I

PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

This Revised Environmental Assessment documents the analysis of the potential effects of construction and operation of a 9-hole expansion of the Snowcreek Golf Course on National Forest System lands. The original Environment Assessment and Decision Notice/Finding of No Significant Impact were issued by the Forest Supervisor on February 1, 1991. That decision was appealed pursuant to regulations at 36 CFR 217. During the appeals process it became apparent that the Forest Supervisor did not have the authority to approve the construction of a golf course on National Forest System lands, as that authority is reserved by the Chief of the Forest Service. Thus, the original decision was withdrawn by the Forest Supervisor on November 3, 1992 and the appeal dismissed by the Reviewing Officer on November 5th, 1992.

PROPOSED ACTION

Dempsey Construction has applied for a special use permit from the Inyo National Forest to accommodate expansion of the Snowcreek Golf Course. The proposed site occupies approximately 130 acres, and is located adjacent to the existing 9-hole golf course on private lands (Figure 1). The proposal includes construction and maintenance of clubhouse facilities, parking areas, practice range, playing areas, water hazards, and irrigation systems. The proposed action is more fully described by Alternative A in Chapter II of this assessment.

PURPOSE AND NEED

The proponent's purpose is to enhance the summer recreation opportunities available to the public in the Town of Mammoth Lakes by expanding the existing 9-hole golf course to provide a full size 18-hole course. The proponent states that National Forest System lands are needed because suitable private land is not available. To be suitable, land would have to be adjacent to the existing course, be large enough to accommodate 9-holes (approximately 60 to 75 acres), and be available to the proponent for recreational development.

The market demand for golf within the Mammoth Lakes area was established by a "Report on the Economic Feasibility of a Proposed Regional Municipal Golf Course" commissioned by the Town of Mammoth Lakes and prepared by Peat Marwick Main &Co in 1989. The report demonstrated sufficient market demand, primarily from southern California visitors, to support two 18-hole courses.

The need for National Forest System lands was supported by the "Evaluation Study of Potential Golf Course Development in the Mammoth Creek Meadow" prepared by Triad Engineering. The study looked at development of a site on private property adjacent to the Snowcreek Resort as well as identifying five other sites within the Mammoth Lakes area that could potentially be developed into 9 or 18-hole golf courses.

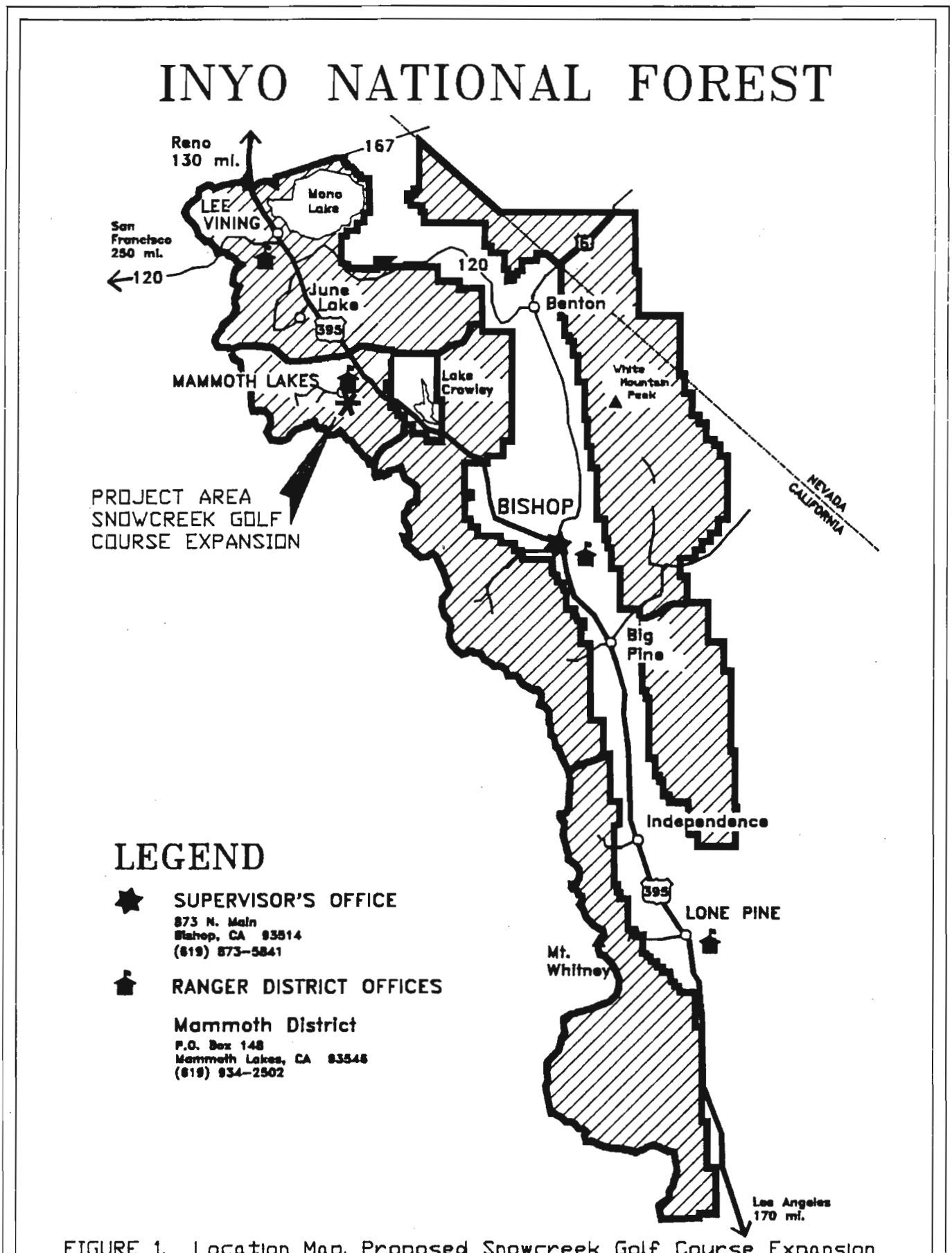

FIGURE 1. Location Map, Proposed Snowcreek Golf Course Expansion, Mammoth Lakes, California.

DECISION NEEDED AND RESPONSIBLE OFFICIAL

The decision to be made is whether the Forest Service should authorize Dempsey Construction to expand the Snow Creek Golf Course onto National Forest System lands as proposed. If so, under what terms and conditions should this use be allowed. The responsible official is the Chief of the Forest Service.

RELATIONSHIP TO THE FOREST PLAN AND AGENCY POLICY

In accepting the application for this special use, the Forest Service acknowledges that expansion of the golf course is consistent with the Forest Land and Resource Management Plan (LMP) direction, as well as agency policy and statutory mission. If the use had not been consistent with the LMP or agency policy, then the application could have been denied in accordance with 36 CFR 251.54(i), the proposal modified to conform with the LMP, or the LMP amended to allow the use. Acceptance of the application is not an indication that the use will be approved, but this screening step avoids unnecessary analysis of proposals that don't conform to LMP direction or agency policy. The following discussion summarizes the items considered in making this determination.

The LMP allocated the proposed expansion area to prescription 12, "Concentrated Recreation Area". The emphasis is on providing a broad range of facilities and opportunities that will accommodate large numbers of people safely, conveniently, and with little resource damage. A golf course would be consistent with this prescription, subject to a site specific analysis that examined resource impacts.

The proposal is also consistent with LMP goals, which state, in part, that the "Forest is managed in an economically efficient and cost-effective manner while responding to the economic and social needs of the public and local communities"(LMP, pg 66). The Town of Mammoth Lakes (TML) has consistently supported development of recreation facilities, and has specifically recognized expansion of the Snowcreek Golf Course in the General Plan (GP). TML policy as stated in the General Plan, approved in 1987, states, in part, "The Town shall encourage year-round visitors by providing incentives in the Development Code for recreation and visitor housing developments to provide resort amenities and recreation activities such as tennis courts, athletic clubs, skating rinks, golf courses, riding and hiking trails, etc"(GP, pg 71) and "The Town shall encourage the Forest Service to permit active recreational uses, including ice skating rinks, golf courses and similar community recreational facilities when those facilities cannot reasonably be located on the private land base" (GP, pg 73). Given the LMP goals of responding to local community needs, as well as existing Town policies for encouraging active recreational uses where appropriate, a golf course would be consistent with the broader goals of the LMP.

Forest Service policy on golf courses states "Do not provide facilities for urban-type sports, such as swimming pools, tennis courts, ... and golf courses on National Forest lands with public funds. Occasionally the private sector may receive approval to provide such facilities on NFS lands if they are a minor part of an overall complex"(FSM 2303). Nationally there are less than 10

golf courses on National Forest System land, with permitted areas ranging from portions of single holes to 11 of 18 holes. Most are also part of a resort or support a resort community. The proposed use is both a minor part of the Snowcreek Resort complex (2,300 residential units approved), and a minor part of the overall resort community of Mammoth Lakes (2,400 acres of private land, approved build-out to approximately 52,000 people-at-one-time capacity).

Forest Service policy also states "Deny applications by the private sector to construct or provide outdoor recreation facilities and services on NFS lands if these facilities and services are reasonably available or could be provided elsewhere in the general vicinity"(FSM 2340.3(3)). Besides the existing 9-hole Snowcreek Golf Course, the nearest golf course is located approximately 40 miles south of Mammoth Lakes in Bishop. The approved Lodestar resort has plans for an 18-hole executive length course in the TML, but the anticipated completion date of the course is not known.

Forest Service Special Use policy states, in part, "Do not approve applications for private use of National Forest System land if location or development on non-National Forest land is reasonably possible. Do not grant special-use authorizations primarily to afford the applicant a lower cost or less restrictive location as compared to other reasonable alternative locations. Ascertain evidence of a valid public service need or other justification"(FSM 2703). The proponent has stated that NFS lands are needed because other suitable lands are not available. The information supplied for the application supports the need, however, the analysis completed for this EA will examine that need in greater detail.

Finally, Forest Service policy on Rural Resource Conservation and Development states, in part, "The objectives of rural development are to utilize Forest Service programs and authorities to provide more jobs and income opportunities to improve rural living conditions, to enrich the cultural life of rural America, and to maintain and protect the environment and natural resources or rural areas. Rural development is the utilization, protection, and development of natural and human resources which affect the economic vitality, social well-being, or local management capacities of small towns, villages, and the country-side; also included are larger communities whose economic base depends on mining, forestry, agriculture, fishing, or recreation."(FSM 3602, 3605) Development of an active recreation facility such as a golf course adjacent to a resort community that has an economy based to a large degree on use of National Forest System lands for recreation would fit this policy.

The analysis in this EA will consider several of the elements common to the LMP and policy standards, particularly factors related to resources and community economics.

BACKGROUND

The Snowcreek Golf Course expansion was first proposed to the Forest Service in 1984, following the submittal of the Environmental Impact Report for Dempsey Construction Corporation's 9-hole golf course (Triad, 1984). This course has been constructed and was ready for play in 1991. It is located on private property adjacent to the proposed project site.

The establishment of Mammoth Lakes as a major year-round recreation resort has been a goal of local planners for many years. The Mammoth Lakes General Plan recognizes the importance of an 18-hole golf course as a critical element in the development of the recreation potential of the Town. The Town of Mammoth Lakes General Plan discusses the need to develop a professionally recognized golf course as a feasible alternative to increase summer use of the Town's businesses and services (Town of Mammoth Lakes, 1987).

An Evaluation Study of Potential Golf Course Development in the Mammoth Creek Meadow was completed in 1985 by Triad Engineering for Dempsey Construction Corporation. Six possible sites in the vicinity of Mammoth Lakes which could support golf course facilities were identified and analyzed in the study. The proposed site, identified in the 1985 study as the Sherwin Creek Road Site, was determined to be the most feasible development alternative, dependent on Forest Service approval (Triad, 1985a).

The proposed Sherwin Ski Area extends into the southern portion of the proposed golf course (Inyo National Forest, 1990). A Special Use Permit has been issued to Dempsey Construction for the purpose of preparing a Master Development Plan for the ski area. A decision on the Master Development Plan is not expected until 1995.

Sierra Meadows Ranch, owned by Gail Fetherstone and Robert Autry dba A&F Ranch Enterprises, Inc, is the current special use permit on a portion of the proposed project site. The Forest Service also uses a portion of the area for tack storage and the grazing of pack stock.

SCOPING AND ISSUE IDENTIFICATION

Specific areas of environmental concern were identified by an interdisciplinary team of specialists. Team members included staff from the Mammoth Ranger District and the Inyo National Forest Supervisor's Office.

Public involvement was encouraged in the scoping process. Invitations for public comments were published in the local newspaper, and a public information and scoping meeting was held to identify general concerns and issues of other agencies and individuals. Written and verbal comments were received over a period of four weeks.

This revised EA was prepared using the information gathered during the scoping of the original EA, information revealed during the appeals process, and information developed as a result of internal scoping after the appeal.

The following summary describes those issues and concerns which are considered significant with regards to the proposed golf course expansion. Public issues and concerns are designated by (P), those by management (M). Headings utilized below are consistent with those used in the Affected Environment and Environmental Consequences chapters which follow.

Air Quality

1. What impacts to the air quality will be realized during construction of the project? (M)

Hydrology-Water Quantity and Quality

1. How will the proposed project affect the location of Bodle Ditch and current water rights? (M)

2. Is there sufficient water to develop and maintain the proposed golf course? (M)

3. How will the use of secondary treated wastewater affect public health and safety? (M)

4. Is there enough treated wastewater to support the golf course and other uses, and what is the cumulative effect of these uses? (P & M)

5. Should all water used on the project be furnished by Mammoth County Water District? Should the drilling of a well be allowed at the project? (M)

6. How will water quality be affected with the use of chemicals (fertilizers, herbicides, etc.)? (P & M)

Vegetation

1. What are the potential impacts to riparian/wetland vegetation in the proposed project area? (M)

2. What impacts will the proposed project have on Threatened, Endangered or Sensitive plant species? (M)

3. Is the use of chemical fertilizers, pesticides and herbicides consistent with management practices of the Forest Service? (M)

Wildlife

1. How will reduced wastewater flows affect Laurel Pond and its wildlife population? Can water level determinations be implemented? (P & M)

2. What impacts will the proposed project have on Threatened, Endangered or Sensitive animal species? In particular, what impacts will occur with water quantity and quality as it applies to the Owens tui chub? (M)

3. What will the impacts to Forest Service management indicator species be? Specifically, how will the proposed project affect mule deer migration routes and holding areas? (P & M)

4. How will wildlife be managed on the golf course? (M)

Cultural Resources

1. How will construction of the proposed golf course impact the two cultural resource sites found at the project site? (M)

Visual Resources

1. What impacts to visual quality will occur with the loss of natural vegetation at the site? (M)

2. Will visual values be compromised with construction of the golf course? (M)

Land Uses and Ownership

1. Will this action contribute to the urbanization of National Forest System (NFS) lands? (P & M)

2. Are NFS lands necessary to meet the need for a golf course? Could the golf course be constructed on private lands? (P & M)

3. How will construction of additional golf courses in the area affect this project? (P)

4. Can the golf course be redesigned using the requested 130 acres, or redesigned with less acreage? (P & M)

5. What would the impacts to the current users of the land be? (P & M)

6. Can impacts to the environment be minimized by restricting the proposed project to areas within the proposed Sherwin Ski Area? (M)

7. What are the impacts of loss of pasture for grazing Forest Service livestock? (P & M)

Recreation

1. Will the proposed project provide new dispersed recreation use (i.e. biking, jogging, ice skating, skiing)? Will dispersed recreation be allowed on the golf course? (M)

2. How can impacts to Sierra Meadow Equestrian and Ski Touring Center operations be minimized? (P & M)

CHAPTER II

ALTERNATIVES, INCLUDING PROPOSED ACTION

ALTERNATIVE DEVELOPMENT PROCESS

All golf courses have certain basic characteristics. Full-size courses require from 60 to 75 acres of land for each nine holes. They require graded tee areas and precisely groomed greens with maintained grass fairway areas in between. Although golf courses vary in design and arrangement, the degree of difficulty and interest is either provided by natural topographic features or is artificially created by contour grading, massive earthwork and landscaping. Regardless of climatic conditions, golf courses require irrigation systems to maintain the condition of the grass playing surfaces.

ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Nine action alternatives were considered, representing a range of possibilities for golf course development in the area of Snowcreek Resort. Seven action alternatives were chosen for detailed study on the basis of their response to Forest Service objectives and significant issues, and the potential for development of mitigation measures.

The two alternatives eliminated from detailed study and the primary reasons for their elimination are discussed below. Alternatives studied in detail are described later in this chapter.

ALTERNATIVE I: DEVELOPMENT ON MINIMUM ACREAGE

This alternative would develop the proposed expansion of the Snowcreek Golf Course on the minimum 65 acres needed to establish a full-size course. The 65 acres would be on National Forest System lands adjacent to the existing 9-hole course. This alternative would maximize earth movement and vegetation disturbance would cover the entire 65 acres. This would result in more significant affects to the resource environment. Visually, this alternative would also contribute to an urban park-like atmosphere for the area.

The minimum acreage available for the expansion of Snowcreek Golf Course would cause the course design to be relatively simple with no unique qualities. As stated in Chapter I in this document, the Town of Mammoth Lakes General Plan discusses the need to develop a professionally recognized golf course as a feasible alternative to increase summer use of the Town's businesses and services (Town of Mammoth Lakes, 1987). The design of the golf course in this alternative would not meet this need. For these reasons the alternative was eliminated from detailed analysis.

ALTERNATIVE J: DEVELOPMENT ON ADJACENT PRIVATE PROPERTY

This alternative would expand the golf course on adjacent private property other than lands within the resort. The only open space adjacent to the existing 9-hole golf course other than the resort property is 49 acres along Mammoth Creek under multiple ownership. This site was studied by the proponent at the request of the Forest Service in 1984. Triad Engineering completed the "Evaluation study of potential golf course development in the Mammoth Creek meadow" in January, 1985.

The site consists of a corridor approximately 4,800 feet long, with an average width of 400 feet. It is bisected by Mammoth Creek, and generally situated within the floodplain of the creek. Vegetation is primarily montane riparian meadow in the eastern portion, changing to montane riparian woodland in the western section of the site. The Town of Mammoth Lakes General Plan has the area zoned as "Open Space, Stream Corridor".

Development of the site would be accomplished by constructing two parallel rows of holes. With the limited space available, playing area would be crowded, and several holes would have to be shorter and narrower than standard for a full size golf course.

This alternative was not considered in detail for the following reasons:

1. The area available is not large enough to accomodate a full size 9-hole golf course.

2. Development of the site would conflict with the Town of Mammoth Lakes Open Space, Stream Corridor zoning.

3. Development of the site would result in undesireable impacts to the Mammoth Creek riparian area.

ALTERNATIVES CONSIDERED IN DETAIL

This section provides a description of each alternative selected for detailed study. Seven action alternatives and a no action alternative are considered. The seven action alternatives were developed more thoroughly in order to address specific issues. They differ from one another in terms of issues addressed, outputs produced, and the impact each has on the environment. Acreage values expressed in this section are approximations based on conceptional layouts of each alternative.

ALTERNATIVE A: PROPONENTS PROPOSAL

Alternative A is the original design proposal from the proponent. This alternative would cover approximately 130 acres with a special use permit. The layout with the existing nine holes is a circular pattern with Snowcreek Village/Resort in the center. Figure 2 displays the preliminary golf course design concept for this Alternative.

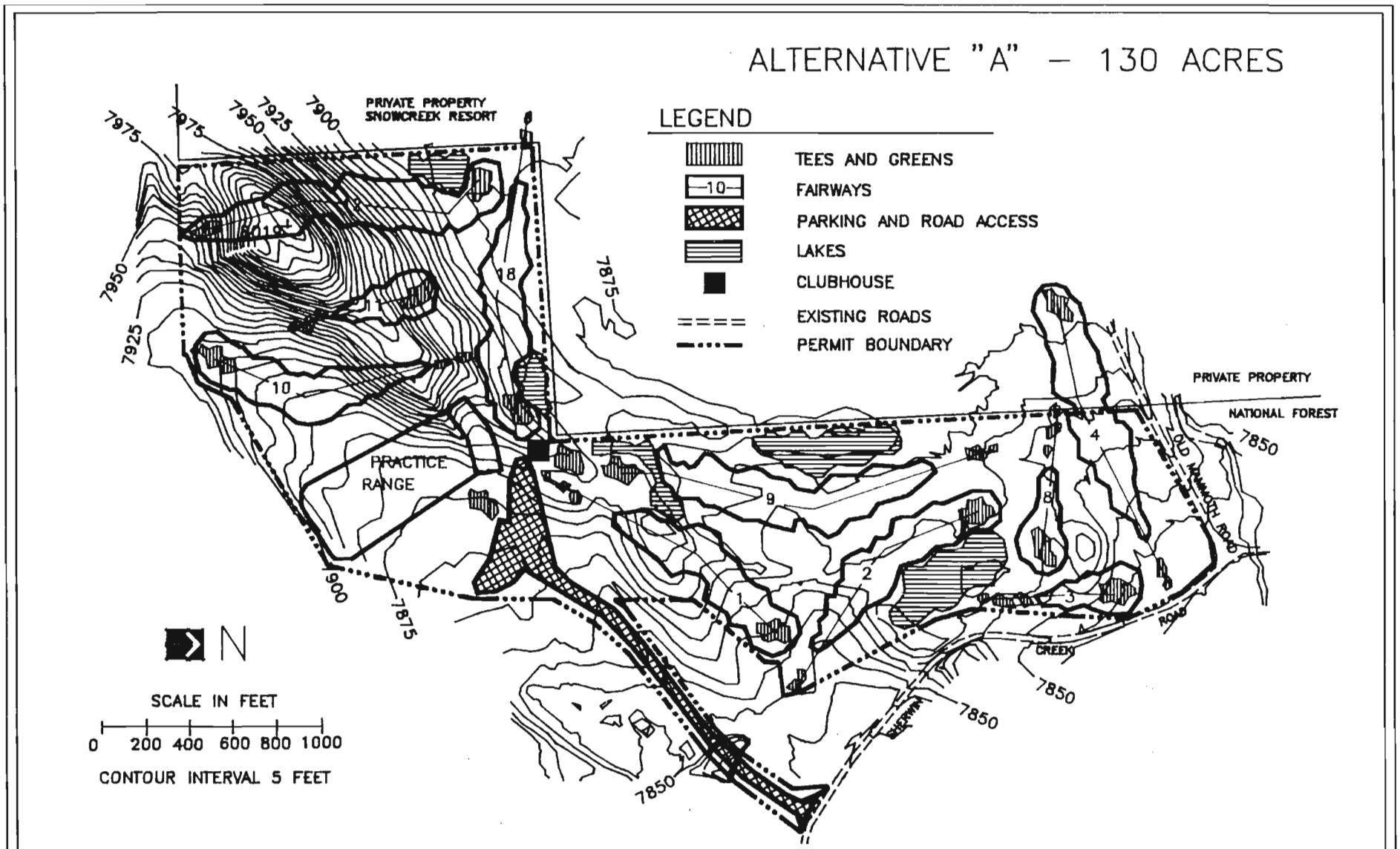

FIGURE 2. Alternative A – Proposed Snowcreek Golf Course Expansion, Inyo National Forest.

In this alternative, 69 acres would actually be disturbed. The disturbed area would include 1.5 acres of tees, 49.5 acres of fairways, 2.0 acres of greens, 7.0 acres for a driving range, 7.6 acres of lakes and ponds, and 0.8 acres of parking (includes the clubhouse). There would be approximately 0.9 miles (0.9 acres) of cart paths to interconnect the holes. This path would be used for maintenance and user access.

The design of the course would try to utilize existing topography with the layout of the holes. The amount of ground disturbance from the project is estimated at 235,000 cubic yards of earth movement. Projected irrigation water demands for the course would be approximately 130 acre feet per year and domestic water uses would be approximately 4 acre feet per year.

The design layout would locate the clubhouse adjacent to the proposed Snowcreek Village/Resort development and would compliment future facilities for the proposed Sherwin Ski Area. Access would add 0.35 miles (1 acre) of new road construction and 0.5 miles of paving of the existing Sherwin Creek Road.

ALTERNATIVE B: PROPONENTS PROPOSAL AS MODIFIED BY THE FOREST SERVICE

This alternative (Figure 3) is similar to Alternative A, but avoids a portion of the moraine on the southern boundary of the project site. The area on National Forest System lands for a special use permit would be 115 acres.

The amount of area needed for tees, fairways, greens, driving range, lakes and ponds, pathways, and parking would be 72 acres. Fairway acreage varies by alternative, all other acres of disturbance from each alternative are the same. In this alternative, 52.5 acres are needed for fairways. As with Alternative A, design and layout of holes tries to utilize existing terrain. Ground disturbance would involve an estimated 200,000 cubic yards of earthwork. Predicted irrigation water demands would be 130 acre feet per year. Domestic water consumption is estimated at 4 acre feet per year.

As with Alternative A, clubhouse and parking facilities would be located adjacent to the proposed Snowcreek resort.

ALTERNATIVE C: MINIMUM NATIONAL FOREST LAND PROPOSAL

Alternative C minimizes the amount of land use by locating holes in a closer, compact design (Figure 3). This alternative would utilize 85 acres of National Forest System lands through a special use permit. Course design would not be able to utilize as much natural topography because less land is available. Due to this, earth movement is calculated at approximately 275,000 cubic feet. Acreage for tees, fairways, greens, driving range, pathways, parking and clubhouse, and lakes and ponds would be 68 acres. The difference in acres disturbed from other alternatives is for 48.5 fairway acres. Approximately 0.8 miles(0.8 acres) of cart paths would provide access between holes. Irrigation water demand is estimated at 130 acre feet per year and domestic water demand is estimated at 4 acre feet per year.

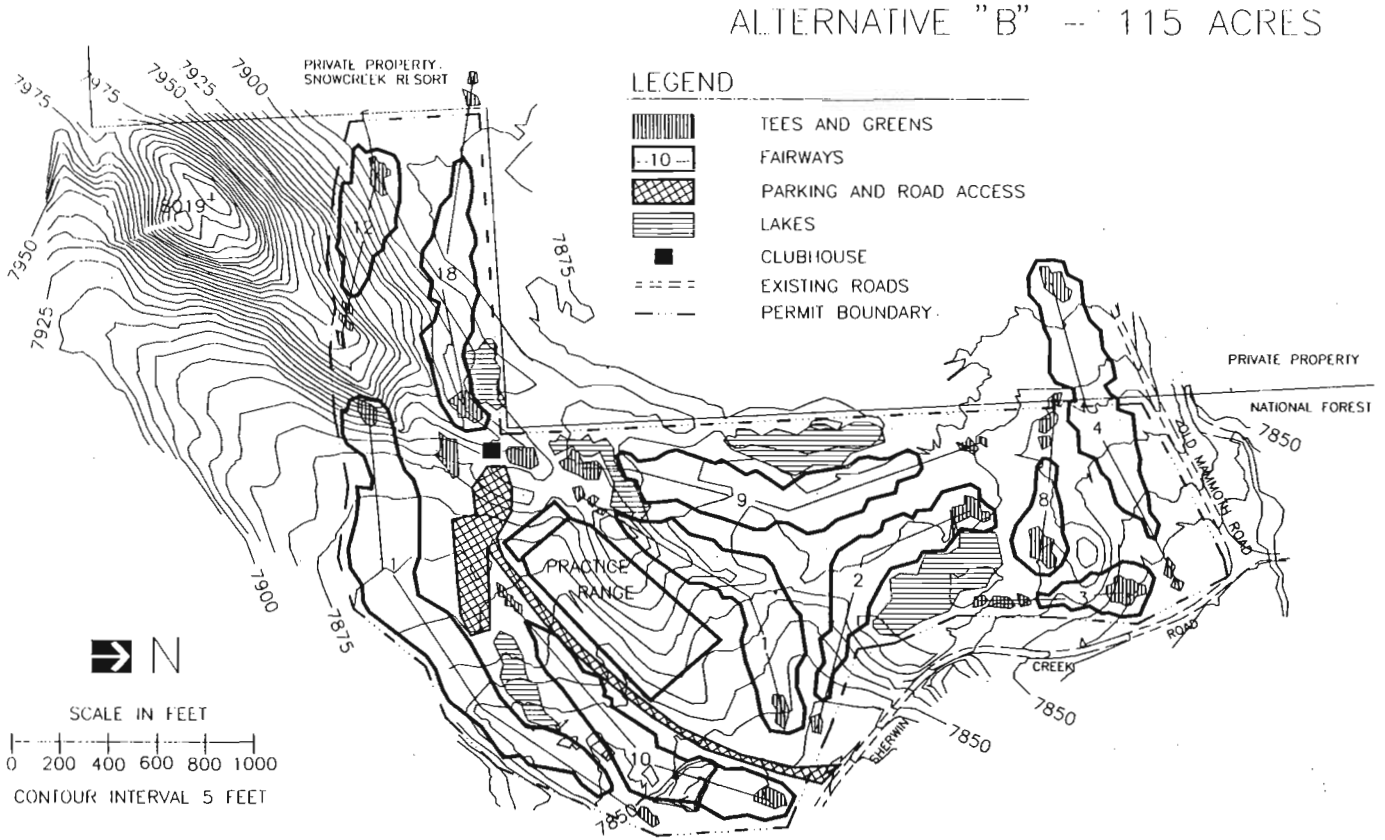

FIGURE 3. Alternative B – Proposed Snowcreek Golf Course Expansion, Inyo National Forest.

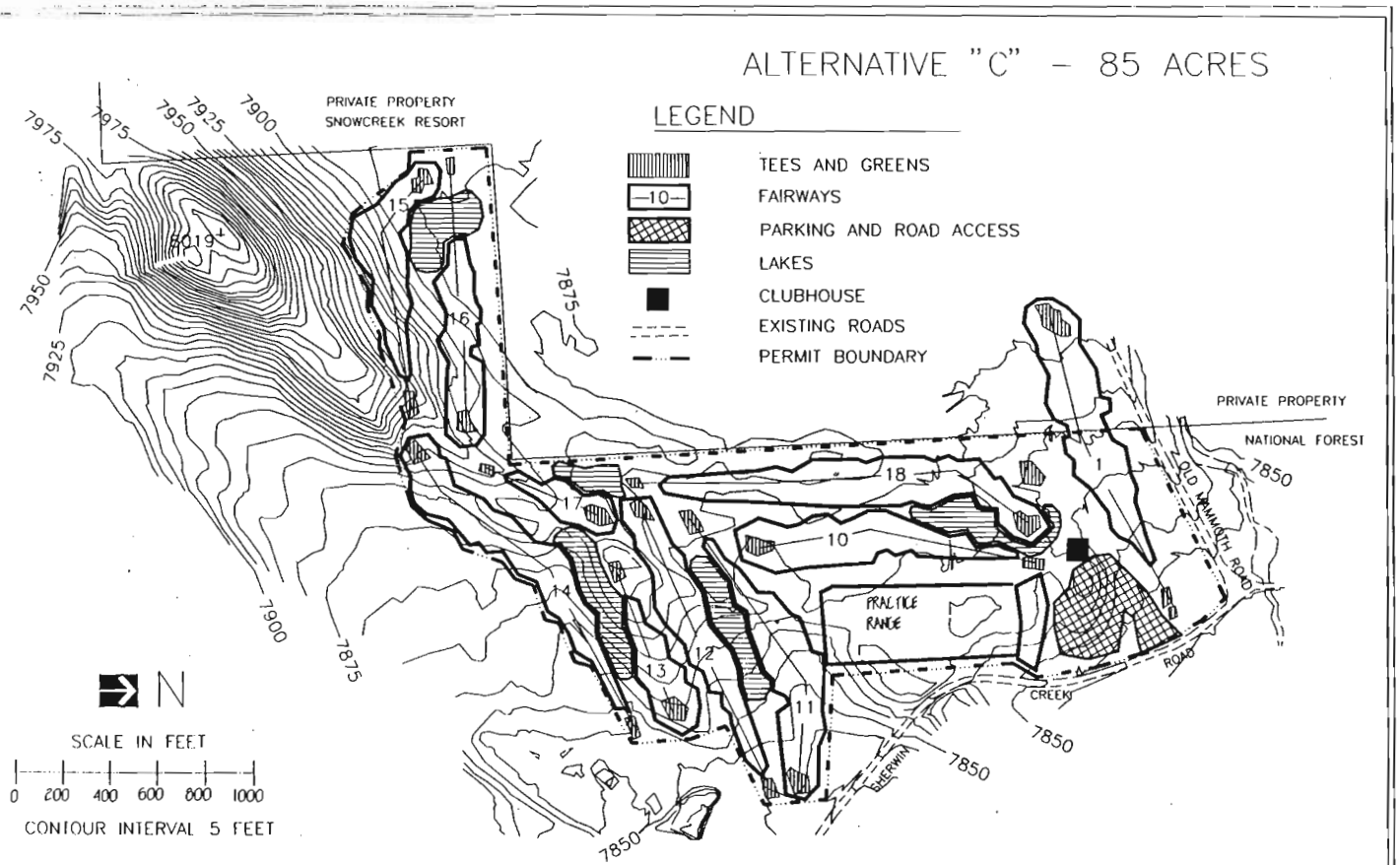

FIGURE 4. Alternative C -- Proposed Snowcreek Golf Course Expansion, Inyo National Forest.

Clubhouse and parking facilities would be located adjacent to Old Mammoth Road and Sherwin Creek Road in this alternative. This location would not complement Snowcreek's plans for centralized resort facilities. Road construction would be 0.1 mile (0.3 acres), and 0.1 mile of Sherwin Creek Road would need to be paved.

ALTERNATIVE D: CONCENTRATED EASTWARD EXPANSION

This alternative concentrates all of the proposed golf course development east of the future Snowcreek Village area and along Sherwin Creek Road. Figure 5 displays the alternative's preliminary design concept. The amount of National Forest System lands needed for a special use permit would be 95 acres. This alternative would have the greatest amount of earth movement because layout of the holes would restrict the ability to utilize existing topography and the topography within this alternative is relatively flat. Earth movement is calculated at 325,000 cubic yards. Including tees, fairways, greens, driving range, lakes and ponds, pathways, and parking the amount of area disturbed would be a minimum of 69 acres. Approximately 50 acres would be disturbed for fairways. Irrigation needs would be 130 acre feet per year and domestic water usage is estimated at 4 acre feet per year.

Clubhouse facilities, including the parking area, would be in the same location as shown in Alternative C. Like Alternative C, road construction would be 0.1 mile, and 0.1 mile of Sherwin Creek Road would need paving.

ALTERNATIVE E: NO ACTION

Under this alternative, the proposed project would be denied and the project area would remain in its present condition. There would be no new impacts to the existing resources in the project area.

The Town of Mammoth Lakes, Mono County, and Snowcreek Resort would not benefit from any additional revenue which could be generated by the project. The Forest Service would not receive receipts for fees from a Special Use Permit.

ALTERNATIVE F: DEVELOPMENT ON SNOWCREEK PRIVATE PROPERTY

Under this alternative, shown in Figure 6, the proponent would be expected to build the additional 9-holes on private lands within the Snowcreek Resort complex. There would be no permitted use of National Forest lands for the purpose of golf course expansion. This alternative is not based on any existing proposal and was therefore created using assumptions and comparisons to actual projects.

The entire Snowcreek Resort complex in located on approximately 345 acres of private land. Snowcreek is a planned resort community originally approved in 1974 and is under a Development Agreement with the Town of Mammoth Lakes. The existing complex includes residential units, lodging, commercial facilities and recreational facilities such as the 9-hole golf course. The master plan for Snowcreek reserved over 128 acres (37% of the property) as permanent open

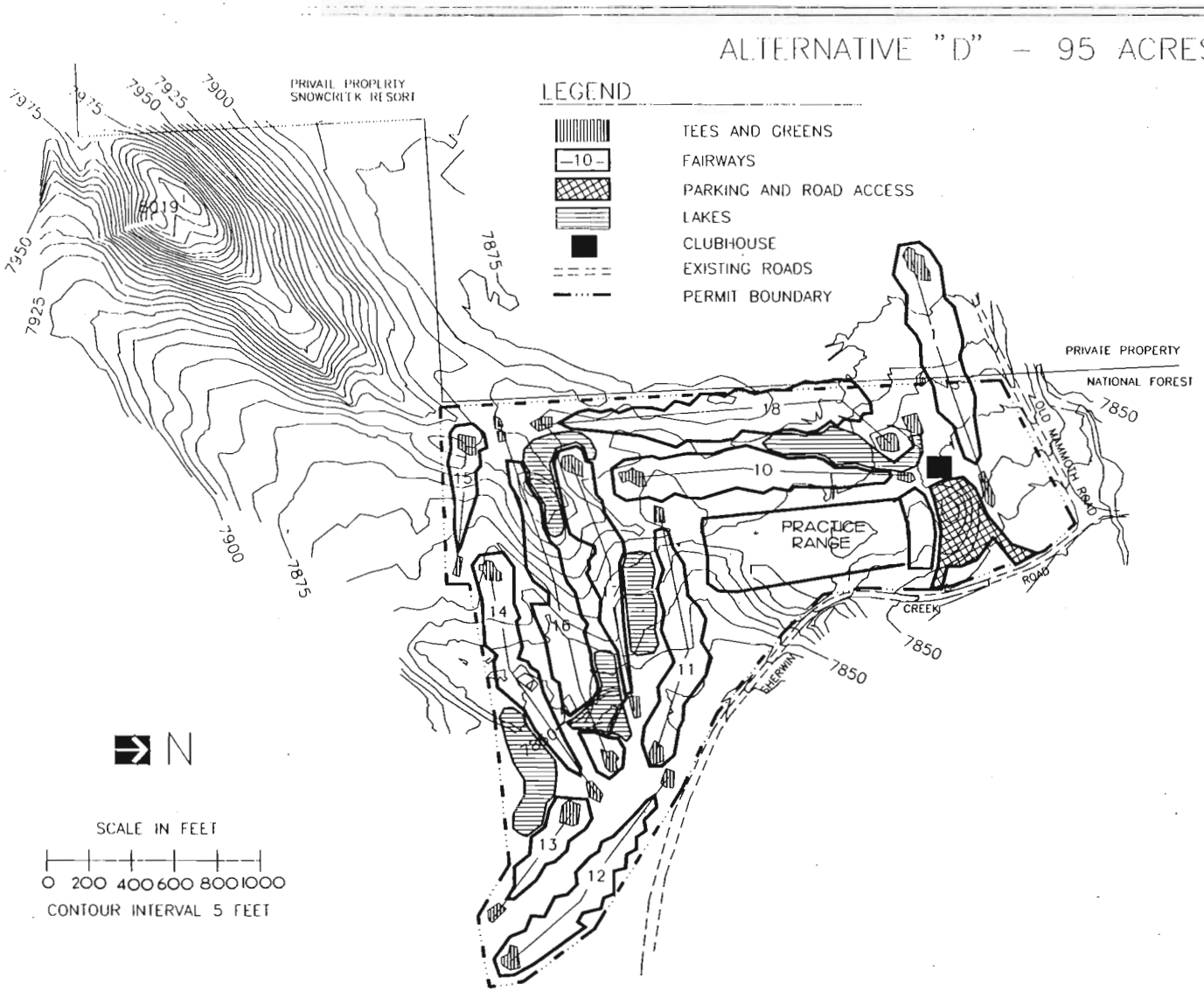

FIGURE 5. Alternative D – Proposed Snowcreek Golf Course Expansion, Inyo National Forest

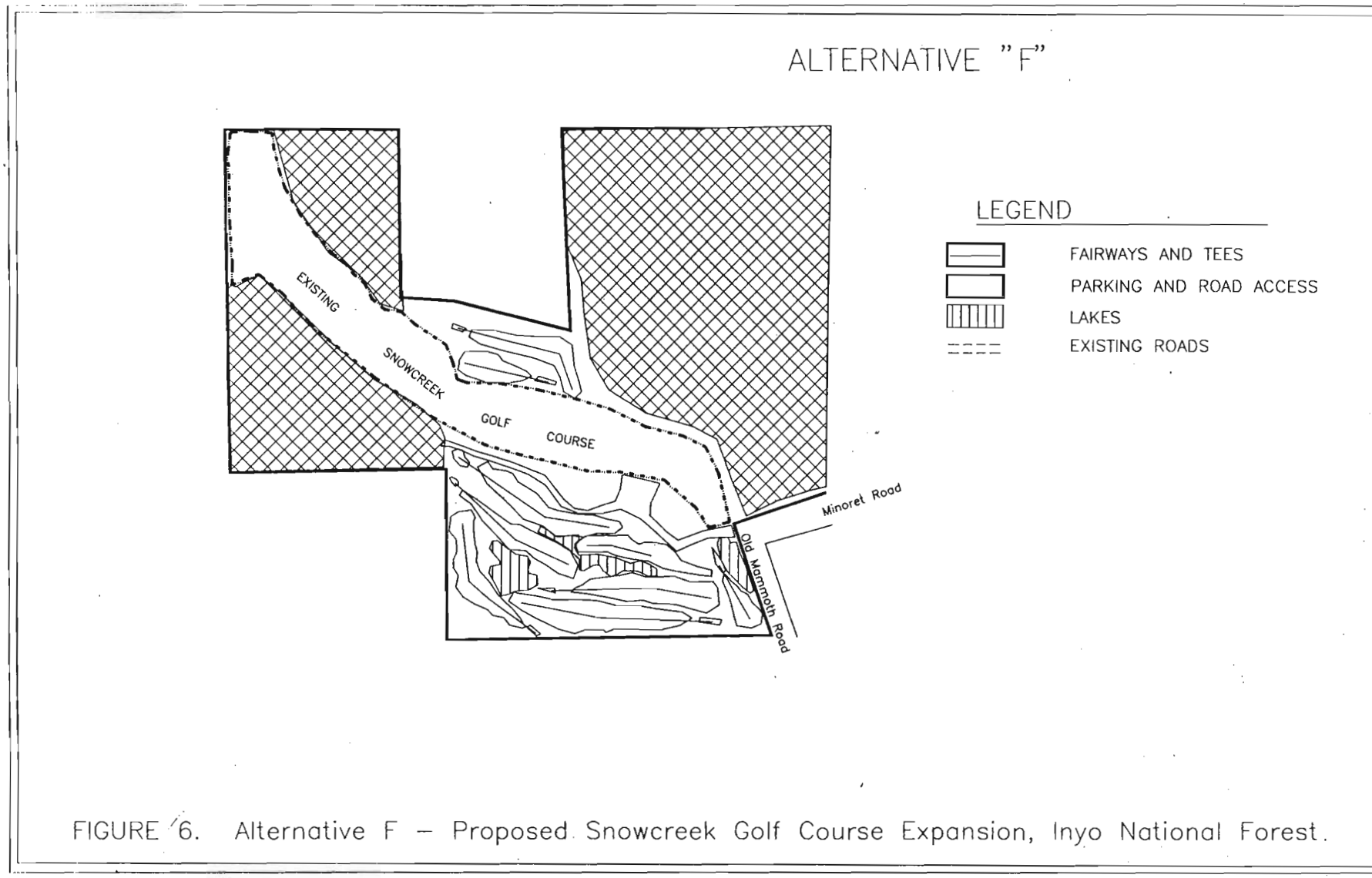

FIGURE 6. Alternative F – Proposed Snowcreek Golf Course Expansion, Inyo National Forest.

space. The existing 9-hole golf course occupies 65 acres of this open space in the southerly portion of the complex. The remaining permanent open space is located in the northerly portion of the development along the Mammoth Creek drainage corridor. The floodplane area was considered for development but eliminated from detailed study. Refer to the discussion of Alternative J earlier in this chapter for more detail. Of the 217 acres suitable for development, over 50% is developed and only 88 acres of land suitable and designated for development remains vacant at the present time.

Under this alternative, the proposed golf course expansion would utilize approximately 71 acres of the vacant 88 acres of suitable land within the Snowcreek Resort. These 71 acres are currently allocated to residential and commercial land uses, 38 acres and 33 acres, respectively. The remaining 17 acres would be available to the proponent to develop in its current residential land use allocation.

In this alternative, 65 acres would be disturbed. This is a relatively small and flat area. The disturbed area would include 1.5 acres of tees, 47.4 acres of fairways, 2.0 acres of greens, 6.0 acres for a driving range, 7.6 acres of lakes and ponds, and 0.5 acres of parking and clubhouse. There would be approximately 0.8 miles of cart paths to interconnect the holes. This path would be used for maintenance and user access.

The design of the course would try to utilize existing topography with the layout of the holes, but extensive earth movement and vegetation disturbance would still be needed. The amount of ground disturbance from the project is estimated at 275,000 cubic yards of earth movement. Projected irrigation water demands for the course would be approximately 130 acre feet per year and domestic water uses would be approximately 4 acre feet per year. The expanded portion of the golf course would be landscaped with the same of similar plant species as the existing 9-hole golf course. Access to the golf course clubhouse would require the construction of an approximate 0.1 mile spur road off of the existing network, including paving.

ALTERNATIVE G: DELAYED LAND EXCHANGE

This alternative (Figure 7) would use a design similar to Alternative B but use a smaller boundary configuration for a total of xxx acres of NFS lands. Construction of the golf course would be administered under a special use permit. When the golf course and associated mitigation was completed, the land would be exchanged for suitable private property provided by Dempsey Construction Corporation. The boundary shown in Figure 9 reflects the land exchange boundary.

The amount of area needed for tees, fairways, greens, driving range, lakes and ponds, pathways, and parking would be approximately 70 acres. Ground disturbance would involve an estimated 275,000 cubic yards of earthwork. Predicted irrigation demands would be 130 acre feet per year. Domestic water consumption is estimated at 4 acre feet per year.

As with several of the alternatives, clubhouse and parking facilities would be located adjacent to resort development.

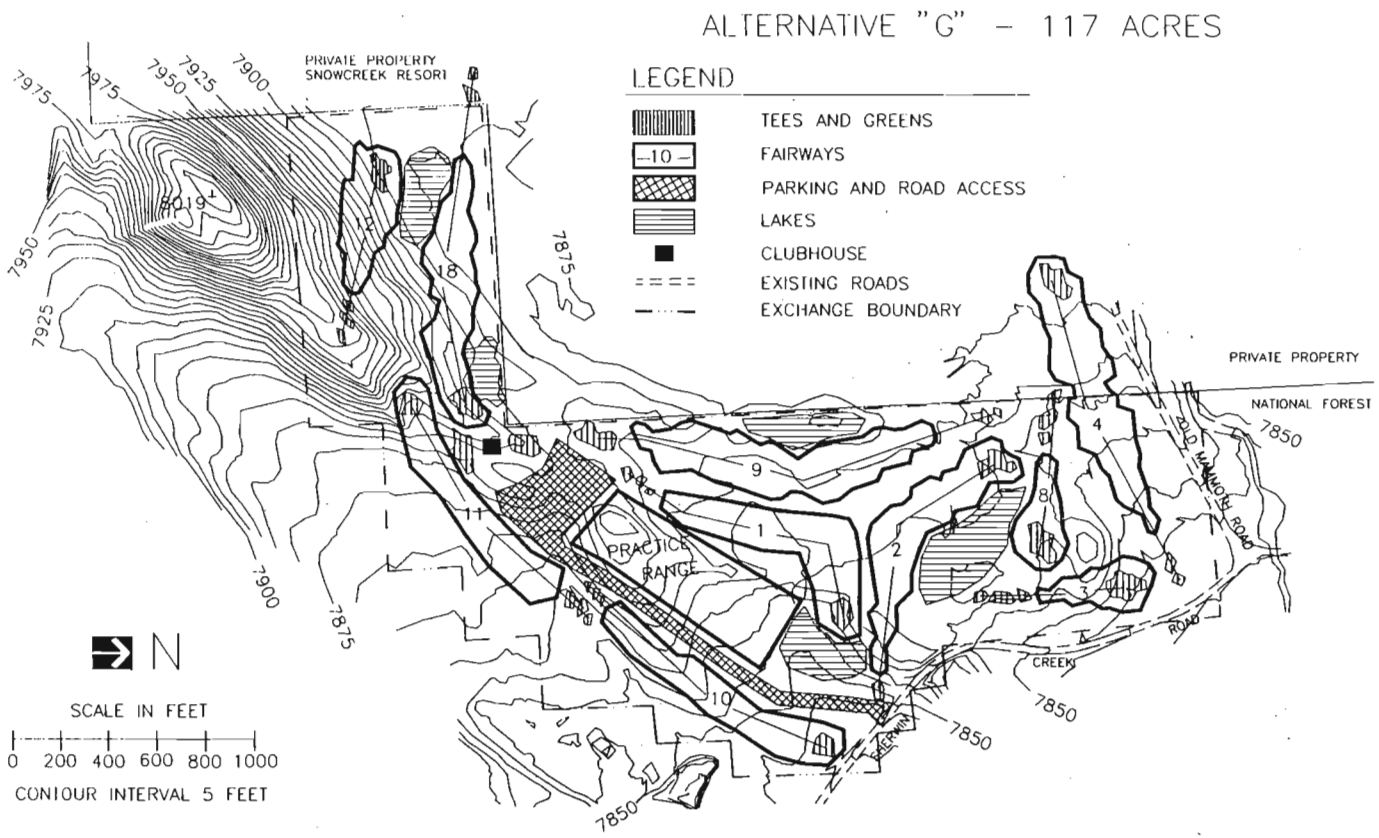

FIGURE 7. Alternative G – Proposed Snowcreek Golf Course Expansion, Inyo National Forest

ALTERNATIVE H: LAND EXCHANGE

This alternative would exchange an area of NFS land (Figure 10) with the intent that it be used for expansion of the Snowcreek Golf Course. Actual development of the land would not be subject to Forest Service oversight. The design of Alternative G is used as a basis for describing the development that is most likely to occur.

The amount of area needed for tees, fairways, greens, driving range, lakes and ponds, pathways, and parking would be approximately 70 acres. Ground disturbance would involve an estimated 275,000 cubic yards of earthwork. Predicted irrigation demands would be 130 acre feet per year. Domestic water consumption is estimated at 4 acre feet per year.

As with several of the alternatives, clubhouse and parking facilities would be located adjacent to resort development.

FACTORS COMMON TO ALL ACTION ALTERNATIVES

The season of play will be the same for all action alternatives and will be dependent on climate. The proponent predicts a four month, 120-day playing season from June 10 to October 10. The maximum number of players per season will be 25,000. Estimated fees for the course will be $40-$50 per 18-holes or $20-$25 per 9-holes.

The proposed project on National Forest System lands (Alternatives A - D) will contain 9.5 holes. The original 9-hole golf course on private lands presently shares an area for two holes. This project will allow the proponent to relocate and adjoin one hole on the existing course with the partial hole on National Forest land, and expand the other.

The proposed clubhouse will include a bar/lounge, food service, retail store and locker room facilities. Maintenance facilities are proposed in all action alternatives.

In all proposed action alternatives, 7.6 acres of lakes and ponds will be created. The proposed lakes and ponds will have a maximum depth of 10-12 feet with an average depth of 4.5 feet. This depth is necessary to control proliferation of rooted aquatic vegetation throughout the lakes and to control algae. Total volume from the proposed lakes and ponds is estimated at 12,000,000 gallons (36 acre feet). All proposed lakes and ponds will be interconnected by a system of artificial surface streams to provide circulation and for aesthetic purposes. Water supply for these lakes will be reclaimed waste water originating from the Mammoth County Water District Wastewater Treatment Plant. No new production wells will be drilled on National Forest System lands.

Irrigation for this project will be with reclaimed wastewater. A back-up system will be the reclaimed water from the ponds/lakes. The water storage capacity in the lakes would allow enough time to repair the system during

breakdowns. Estimated irrigation water demand for this project is 390,000 gallons per day (0.60 cfs) during the peak summer growing season.

For those alternatives proposing the use of National Forest Systems lands (A - D), only those areas designated for development will be landscaped and revegetated with grass species. Native trees and shrubs will be planted on the periphery of fairways and greens. Greens will be seeded with specifically selected grass species providing a low, dense, even-playing surface, while fairways and roughs will consist of low maintenance, climate adapted species. It is anticipated plant species utilized for revegetation will be similar to those utilized on the original 9-hole Snowcreek Golf Course (Table 1).

Table 1. Proposed Plant Species for Landscaping and Revegetating the Proposed Golf Course (National Forest System lands only)

DEVELOPMENT AREAS	PLANT SPECIES
Fairways and Roughs	Perennial rye (Lolium perenne) & fescue (Festuca sp.) mix, bluegrass (Poa sp.) added
Tees	Perennial rye, fescue & bluegrass mix
Greens	Creeping bentgrass (Agrostis sp.)
Landscaping Trees	aspen (Populus tremuloides), willow (Salix spp.), Jeffrey pine (Pinus jefferyi)

The proponent intends to use the same turf management products, such as fertilizers and pesticides, on the expansion area as are used on the existing 9-holes. The use of chemicals is regulated by the Regional Water Quality Control Board, and use of pesticides is regulated by the State Department of Food and Agriculture. The proponent has the required approval for the operations on the existing 9-hole course, including approvals for the use of fertilizers and pesticides.

A comparison of alternatives by various characteristics are displayed in Table 2.

Table 2. Comparison of Alternatives Considered in Detail.

CHARACTERISTIC	ALTERNATIVES A	B	C	D	E	F	G/H
Expansion Area(acres)	130	115	85	95	0	71	117
Permit Area(acres)	130	115	85	95	0	0	117
Disturbed Area(acres)	69	72	68	69	0	65	70
Earth Movement(1,000cuyds)	235	200	275	325	0	275	275
Reclaimed Water Needs(acft/yr)[1]	130	130	130	130	0	130[2]	130
Domestic Water Needs(acft/yr)	4	4	4	4	0	4	4
Artificial Lakes (acres)	7.6	7.6	7.6	7.6	0	7.6	7.6
Road Construction (feet)[3]	1,800	1,800	500	500	0	500	1,800
(acres)	1.0	1.0	0.3	0.3	0	0.3	1
Cart paths (feet)[4]	4,700	4,700	4,200	4,200	0	4,200	4,200
(acres)	0.9	0.9	0.8	0.8	0	0.8	0.8

1 Assuming an average of a 120-day irrigation season

2 Proximity to the MCWD wells may reduce the amount of reclaimed water than can be used under Alternative F.

3 Assumes 24 foot wide road surface

4 Assumes 8 foot wide cart path surface

CHAPTER III

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter establishes the baseline conditions against which expected environmental impacts are measured. The existing environment and the current management of the resources within and in the vicinity of the proposed Snowcreek Golf Course are described in full in this chapter.

Site specific investigations of the proposed project area were conducted by Forest Service and privately contracted specialists who provided written and oral information about the affected environment. In addition, other information sources such as published literature and communication with persons, organizations and agencies familiar with the specific area were consulted. Environmental documents prepared for the Snowcreek development were also referenced. These sources served to verify and supplement the specialists' reports incorporated in this chapter.

RESOURCE ENVIRONMENT

CLIMATE

The proposed project site is located within Mammoth Basin where climate is typified by hot dry summers and cold snowy winters. Precipitation averages 25 inches per year, with over 70 percent falling as snow from November through March. Average daily temperatures for the anticipated four-month playing season of June 10 to October 10 range from 49 to 64 degrees Fahrenheit. Daily highs often reach into the low-70's in September and October, and high-70's during June, July and August. Winds, generally from the southwest, can be locally gusty.

AIR QUALITY

The project area is situated within the Great Basin Unified Air Pollution Control District (APCD) which encompasses all major valleys of the Eastern Sierra Nevada in Inyo, Mono, and Alpine Counties. General air quality of the region is excellent, but is subject to periodic degradation. During summer months, orographic effects cause gusty local winds almost daily. The arid climate, sparsely vegetated soil surfaces, and frequent high winds contribute to dust storms which carry suspended particulates and visibility-reducing particles for considerable distances. During winter months, clear skies, low humidity, extreme elevation, and wide diurnal temperature changes produce strong radiation and temperature inversions, particularly in confined valley areas. The prevalent use of wood-burning stoves and fireplaces for domestic heating contributes to excessive airborne particulate matter. Radiation inversions occur during periods of clear, cold weather when domestic heating is at a maximum, aggravating winter air quality problems in developed communities. Usually, such inversions dissipate by mid-day, but under extreme conditions, can last for a three or four day period.

The Great Basin APCD has monitored suspended particulate concentrations in the Mammoth Basin since 1979. Total suspended particulate concentrations within the urbanized area of the Mammoth Lakes community have occasionally exceeded federal air quality standards during winter months. The APCD also monitors carbon monoxide levels within the Town of Mammoth Lakes. Although general carbon monoxide concentrations are low in most community areas, numerous violations of state and federal standards have been recorded adjacent to high volume roadways and intersections. This can be attributed, in part, to use of road cinders. In general, the Great Basin APCD has noted a decline in air quality in the Mammoth Basin in conjunction with population growth and increases in vehicular traffic.

SOILS

Soils of the project area are derived primarily from glacial till and outwash and recent alluvium. Surface soils are almost exclusively silty sands with high fractions of gravel, cobbles, and poorly sorted medium to large sized boulders. Glacial till lithology is a composite of all rock types ranging from volcanic to granitic clasts.

Soils within the project area are generally low in fertility and have water holding capacities of 3-4 inches. They are relatively young and are poorly developed. Although accumulations of organic debris are sparse, organic layers up to 9 inches thick can be found in lower lying meadow areas (Gallegos, pers. comm.).

Soils are generally cohesionless and free-draining and exhibit a low potential for erosion. Soils on the moraines to the south of the project area have a moderate erosion potential when undisturbed. All soils have potential for high erosion where road construction, slope modification and compaction disturb the soil.

Topography of the eastern and northern portions of the site is undulating and rolling with a general northeasterly slope of less than 5%. The southwestern portion of the site is dominated by a glacial ridge or moraine which rises 150 feet above the flatter surroundings. Side slopes of the ridge range from 10% to 25%.

GEOLOGY

The project area is located on the eastern flank of the Sierra Nevada. The bedrock of the Mammoth Lakes Basin is complex and consists of Paleozoic metasediments, Mesozoic metavolcanics and Cretaceous granitic rocks. The area is characterized by geologically recent volcanism and seismic activity.

At least four major active or potentially active faults are within a 25 mile radius of the Mammoth Lakes area. All are capable of producing significant earthquakes (6.0 to 7.0 in magnitude). Earthquake swarms occurred in 1980-81 and began again in 1989-90. Recent swarms have centered under Mammoth Mountain and the vicinity of Casa Diablo Hotsprings. A portion of Mammoth Meadow is

inventoried as having a high potential for seismologically induced soil liquefaction (Miller, et al, 1982; Merrill & Seeley, 1981).

The region has a long history of volcanic activity. There are strong indications ground swelling in the area of the resurgent dome is associated with injection of magma into a chamber under the western portion of the Long Valley Caldera. The project area is within an area inventoried as having a high risk from pyroclastic flows, ash falls, volcanic flows, volcanic earthquakes and ground deformations (Miller, et al, 1982; Merrill & Seeley, 1981).

HYDROLOGY - WATER QUANTITY

The project area is within the Mammoth Creek Basin. Within the Basin, mean annual precipitation ranges from 18 inches at lower elevations to 60 inches at higher elevations. These values are highly variable and depart from the mean as much as 50 percent. Although streamflow quantities are also variable, flows exhibit a consistent seasonal pattern. Maximum flows occur during spring and summer snow melt, average flows occur during fall and minimum flows occur during winter months.

Surface streamflow records for Mammoth Creek have been kept for many years. Los Angeles Department of Water and Power (DWP) has records for Mammoth Creek Gorge since 1923 and Mammoth Creek at Old U.S. Highway 395 since 1933. Surface water discharge rates for the Mammoth Creek watershed at Old U.S. Highway 395 have varied between 3,000 and 40,000 acre feet per year (Thomas and Feldmeth, 1987). Existing data strongly suggests Mammoth Creek is losing water (approximately 3 cubic feet per second) to the groundwater system in the stretch above Old U.S. Highway 395 (MCWD, 1988). This loss appears to occur also in tributary drainages with either intermittent or no organized stream flow. As a result of this loss, groundwater flows in the area appear to be greater than surface flows.

A study completed in 1973 by the California Department of Water Resources (DWR) concluded approximately 103,250 acre feet of precipitation falls within Mammoth Creek Basin per year. At the time of this study, consumption within the Basin accounted for approximately 62,530 acre feet, outflow through Hot Creek Gorge accounted for approximately 40,540 acre feet and subsurface flow was estimated to account for approximately 100 acre feet (Ca. Dept. of Water Res., 1973). Subsequent measurements, mainly by the United States Geologic Survey (USGS), indicated 6,000-6,500 acre feet of surface outflow result from hot spring discharge in Hot Creek, 19,000-20,000 acre feet of outflow result from discharge at the Hot Creek headwater springs and the remaining 12,000-14,000 acre feet result from surface flows of Mammoth Creek (Farrar, pers. comm.).

The Mammoth County Water District (MCWD), which was formed in 1958, is the purveyor of both water and sewer service to the Town of Mammoth Lakes. There are currently two sources of water for the MCWD system. The oldest source is surface water diversion from Lake Mary. A more recent source is development of groundwater extractions from several different areas. Water is distributed within the MCWD service area through a system of water lines, pressure reducing stations, storage tanks and pumps.

In 1987, the Town of Mammoth Lakes adopted the Town of Mammoth Lakes General Plan. The General Plan estimates maximum population of Mammoth Lakes to be 52,000 persons at one time (PAOT). This estimate is predicated on development of all private land at zoned capacity. Cumulative water volume needed to support this PAOT level is 5,946 acre feet (MCWD, 1986). MCWD currently has adequate supplies to meet equivalent annual demands of a peak 30-day period population of 30,000 people per day.

Surface Water

Total amount of surface water available to the MCWD is 2,760 acre feet (899,350 million gallons) annually, at a rate not to exceed 5.0 cubic feet per second (Inyo NF, 1983). MCWD has entered into several agreements that impose numerous constraints on use of surface water. Management constraints include:

1. Maintaining a minimum flow of 4.0 cubic feet per second in Mammoth Creek and recording specific mean monthly flows between Lake Mary and the weir at Old U.S. Highway 395.

2. Maintenance of these flows depends on MCWD control authority, the creek's natural flow, lake drawdown levels and timetables, in addition to individual lake storage capacities in the Lakes Basin.

As a result of these constraints, MCWD has only 1,100 acre feet available from the Lakes Basin during years of maximum drought.

The maximum amount of water extracted from the Basin was 2,451 acre feet in 1984 (Kuykendall, pers. comm.). Recent surface diversions have decreased due to increased groundwater extraction, conservation measures and water restrictions. MCWD records demonstrate variable monthly water use patterns, with summer months of June through August representing the peak period of use.

There are no perennial drainages which flow through the project area. THe ephemeral drainages that occur in the suthern two-thirds of the project area are tributary to Mammoth Creek, which is approximately 1000 feet below the project area. Bodle Ditch carries water which originates in the Mammoth Lakes Basin and from the Old Mammoth Mine. It is used to irrigate pasture land which surrounds and is within the project area. Water flows in Bodle Ditch between May 1 and November 1 are controlled by the MCWD under the Master Operating Agreement (1983). Mandatory water flows which must be released during this period is indicated in Table 3.

Table 3. Mammoth County Water District Master Operating Agreement on Required Flows in Bodle Ditch Between May 1 and November 1*.

DATES	REQUIRED FLOWS
May 1 to Jun 30	2.4 cfs
Jul 1 to Jul 30	1.4 cfs
Aug 1 to Aug 15	0.9 cfs
Aug 16 to Sep 15	0.5 cfs
Sep 15 to Nov 1	0.2 cfs

* all flows include 0.1 cfs diversion for Sherwin Creek Campground as per agreement (2/6/90) between MCWD, State Water Resources Board and the Inyo National Forest

Groundwater

The groundwater system in the vicinity of the Town of Mammoth Lakes is confined within basalt flows and tuffs. Fractures within these basalt flows provide the main path for groundwater movement (Sorey et al, 1978 and Lipshie, 1974). Drilling and geophysical studies in the area have identified a cold groundwater system and a thermal water system between the surface and 1000 feet depth, and a thermal water system below 1000 feet.

Well logs completed for water wells east of the existing Snowcreek Golf Course provide a description of the subsurface lithology in the project area. The upper 100 feet of the subsurface is comprised of unconsolidated alluvial and lacustrine deposits consisting of predominantly interbedded silty sand and gravel and sand silt. Ground water was first encountered at 55 feet in a sandy gravel bed. Between 100 and 200 feet the deposits were non-water bearing interbedded basaltic flows and scoria beds. From 200 to 275 feet deposits are unconsolidated silty and gravelly sand and sandy gravel beds, with groundwater occuring at 240 feet. The pattern of non-water bearing volcanic beds is repeated from 275 to 480 feet, which then becomes gravelly sand and sandy gravel beds interrupted by three basaltic flows. Water was found in the sedimentary beds below 525 feet.(Kleinfelder, 1991) Subsequent development of the well extracts water from the beds between 190 and 270 feet, and also 590 and 700 feet. The subsurface logs support the general description of a ground water system that is comprised of water bearing strata confined between volcanic flows.

MCWD has aggressively pursued development of groundwater wells to meet the increasing water demand and future planned buildout of their service area. More than 35 wells have been drilled since 1976. The wells have been drilled in search of new sources or as a means of monitoring characteristics of proven sources. Initial drilling proved to be frustrating with only minimal success obtained. Drilling since 1987 has proven to be more effective and has resulted in the addition of approximately 2,300 acre feet.

MCWD is continuing its exploration for additional sources of water. An application has been submitted to include another well (330 acre feet) into the Mammoth Meadow well system. This project is currently being evaluated, but

will not occur before Summer 1991. MCWD has also drilled test wells in the Dry Creek area and early indications show promising results (Kuykendall, pers. comm.).

Water use from surface and groundwater sources for the Mammoth County Water District is shown in Table 4. As demand for water increased between 1983-89, increasing amounts of groundwater were used to supplement surface diversions.

Table 4. Mammoth County Water District Water Use Data for 1982-89 in Acre Feet (Kuykendall, pers. comm.)*

Year	Total Use	Surface Diversion	Groundwater Withdrawal
1982	2108	1884	224
1983	2268	2220	48
1984	2607	2450	157
1985	2509	2195	314
1986	2425	2161	264
1987	2108	1542	566
1988	2199	1605	594
1989	2745	1790	966*

* This amount includes a small amount of untreated water that was provided to the first nine-holes of the Snowcreek Golf Course.

Wastewater

Use of wastewater is becoming increasingly more important to the community of Mammoth Lakes. Approximately 70% of water utilized for domestic purposes (1.5 million gallons per day) is conveyed as sewage to the wastewater treatment system (Kuykendall, pers. comm.). The majority of treated effluent is subsequently discharged into Laurel Pond with a small amount of effluent being utilized for dust control and landscape irrigation.

Laurel Pond is a depression which serves as a holding area for treated effluent, allowing for groundwater recharge and evaporation. Flooding the depression with effluent has also created wildlife habitat. The MCWD is allowed to use the depression for discharge of effluent under the authority of a Memorandum of Agreement with the Forest Service (MCWD, 1983). Although one of the conditions of the Memorandum specifies that the two agencies agree on a baseline water level, a baseline level has not been established. As a consequence, water levels and usable habitat area vary depending on effluent discharge and natural precipitation.

Laurel Pond is not lined or sealed and is located in alluvial gravels overlying fractured volcanics into which water percolates. This water aids to increase osmotic pressure in the vicinity of the pond, but it is uncertain whether this water resurfaces at Hot Creek Hatchery or Hot Creek Gorge.

HYDROLOGY - WATER QUALITY

Surface Water

Water quality in the upper Mammoth Basin, as determined by an analysis of lakes and streams, is excellent. Surface water exceeds water quality standards for pH, total dissolved solids content and limits on specific mineral constituents. It is generally suitable for all beneficial uses (Triad, 1985b).

Analysis of water samples taken from surface sources downstream from the Town of Mammoth Lakes indicates a degradation of water quality resulting from the presence of the community. The greatest change in water quality occurs with levels of total dissolved solids, turbidity and suspended sediment load. Increased sediment transport and turbidity result from increased erosion of sensitive soils exposed during construction of roads and facilities (Triad, 1985b).

Groundwater

Quality of groundwater varies with depth and location. MCWD uses some groundwater directly from the ground with little treatment. Other water is treated to remove iron and manganese which are in quantities above allowable levels. Mineral quality is good, and total dissolved solids are within acceptable ranges.

Wastewater

The wastewater facility operated by MCWD generates secondary filtered and disinfected effluent that has a median number of coliform organisms in the effluent that does not exceed 2.2 per 100 milliliters. The California Administrative Code, Title 22, Division 4, Wastewater Reclamation Criteria, Article 4, section 60313 specifies that reclaimed water used for the irrigation of golf courses shall be considered adequately disinfected if the median number of coliform organisms in the effluent does not exceed 23 per 100 milliliters(on a seven day average), and does not exceed 240 per 100 milliliters in any two consecutive samples. The effluent generated by the MCWD exceeds State Health Department standards for landscape irrigation.

HYDROLOGY - FUTURE WATER NEEDS

MCWD anticipates a cumulative need of 6,366 acre feet of water to accommodate the Town of Mammoth Lakes at buildout. This value is based on potential maximum development of all private lands within the town boundary (52,000 persons at one time), approved development for Mammoth Mountain Ski Area to 24,000 skiers at one time, and the development of Sherwin Ski Area to 8,000 skiers at one time. This projection also include 165 acre feet of water allotted for the first nine holes of the Snowcreek Golf Course.

VEGETATION

Plant Communities

Vegetation within and adjacent to the proposed golf course consists of four basic plant communities: sagebrush scrub, irrigated pasture, wetlands, and coniferous forest (Figure 8). Photographs in Appendix D provide an overview of the project area. Elevation, local topography and soils delineate the vegetation types.

Sagebrush shrub communities dominate the proposed golf course site on the National Forest. Approximately 90% of the total area is covered by brush species associated with big basin sagebrush (Artemisia tridentata). These include antelope bitterbrush (Purshia tridentata), green rabbitbrush (Chrysothamnus viscidiflorus) and snowberry (Symphoricarpos sp).

Vegetation on the moraine is dominated by brush with scattered Jeffrey pine (Pinus jefferyi). Green manzanita (Arctostaphylos patula) is dominant on the southeast aspect (8 acres) and sagebrush scrub to the north and west.

Irrigated pasture currently occupies approximately 11 acres of the project site on the National Forest. Grasslands on formerly irrigated pastures occupy the majority of the land considered in Alternative F. All grasses and forbs have been heavily grazed in the pasture areas. Historically, the sagebrush community was converted (via Bodle Ditch) to irrigated grassland by the Arcularius family for private livestock forage. Grasses and grasslike plants that dominate this area are Carex sp., squirrel tail (Sitanion sp.), Cheatgrass Brome (Bromus tectorum) and barley (Hordeum sp.).

Riparian vegetation is associated with Bodle Ditch. No riparian areas exist in the project area at this time, as the ditch has been sporadically wet and dry throughout the past few seasons. A portion of Bodle Ditch was relocated in 1989 to accommodate construction of Snowcreek V.

Portions within and around the project area, both on National Forest and private property, contain wetland characteristics. A survey conducted by D.R. Sanders and Associates, Inc. for the proponent was completed to determine whether these areas were natural or due to irrigation. Results of this study (Appendix A) were submitted to the Department of the Army, Corps of Engineers for verification. A 0.51 acre parcel (NW 1/4, SW 1/4, Sec 2, T4S, R27E, MDB&M) was determined to meet technical criteria for wetland in the absence of irrigation (Sanders, 1990). This area qualifies as wetland due to evidence of hydrophytic vegetation, hydric soil and wetland hydrology conditions. Vegetation is dominated by Carex nebrascensis and Juncus balticus. D.R. Sanders did not survey the entire project area. There is an area (1.1 acre) surveyed by Forest Service personnel that is being considered potential wetland habitat (NE 1/4, SW 1/4, Sec 2, T4S, R27E, MDB&M) and a 3.7 acre area that is designated wetland habitat in the southern boundary of the project area (SW 1/4, SW 1/4, Sec 2, T4S, R27E, MDB&M). Figure 8 displays the locations of these areas.

A mixed conifer vegetation association is adjacent to the project site. It occurs at the base of the slopes to the south at elevations above 8,000 feet.

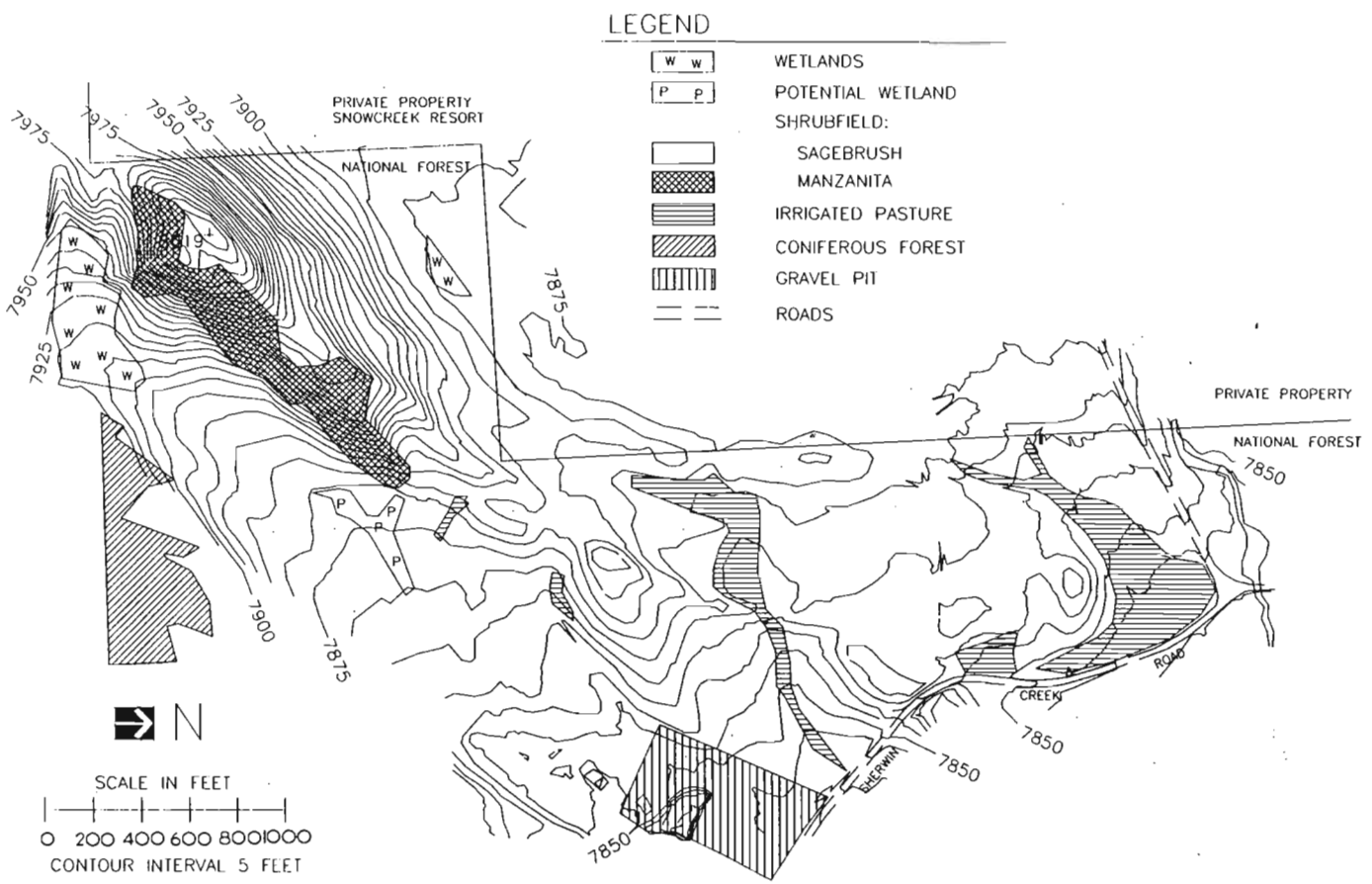

FIGURE 8. Plant Communities Within the Proposed Snowcreek Golf Course Expansion, Inyo National Forest.

Dominant trees include red fir (Abies concolor) and lodgepole pine (Pinus contorta var. murrayana). Jeffrey pine and western juniper (Juniperus occidentalis) are also found in this conifer association. The understory of this open-canopied group consists of green manzanita and tobacco brush (Ceanothus velutinus).

Threatened, Endangered and Sensitive Species

Direction for management of sensitive species is to maintain or improve populations of these species so that protection under the Endangered Species Act is not warranted (Inyo NF, 1988).

On-site investigations were conducted in Fall, 1989. Although it was late in the season, ground reconnaissance was thorough. No threatened, endangered or sensitive plants were found (Inyo NF, 1989b).

WILDLIFE AND FISH

Management Indicator Species

Management indicator species are considered of high significance for hunting, and as ecological indicators for assessing habitat quality and quantity. Changes in habitat capability for these species are assumed to have proportionate changes for other species using similar habitats.

The alternatives that use National Forest System lands lie within portions of the holding area and migration route of the Sherwin Grade/Buttermilk deer herd. Survey work completed in 1993 has better defined the use of the study area by deer. The use patterns, combined with migration corridor ssurveys completed as part of the Sherwin Ski Area analysis, are shown in Figure 9. The relation of the proposed golf course to the holding area is shown in Figure 10. This herd has historically accounted for one third of the Forest's deer population.

This holding area is the most intensely used habitat within the herd's home range. Deer population using the 11,250 acre holding area have historically been estimated as high as 3,500 to 4,000 head, although current use is lower due to decline in overall herd numbers. Total herd levels have dropped from almost 6,000 in 1986 to less that 1000 in 1992. This decline is attributed primarily to lack of forage on the winter range during the extended drought (pers.comm. Vern Bleich, CDF&G). Deer use within the study area ranges from none to high.

Habitat quality is limited by forage quality and human disturbance. Deer use densities based on historic herd numbers in the portion of the holding area range from one deer for every 2.2 acres to one deer for every 0.8 acres.

Habitat type in the study area is dominated by the sagebrush shrub community. Habitat condition is considered fair. Based on work by Muegglar and Stewart (1980), and Stevens et al (1974), sagebrush shrub habitat in fair condition produces 350 lbs. of forage per acre.

Two migration routes, Solitude/Duck Pass and Mammoth Rock, are used by an estimated 3,000 deer from mid-May through the end of June. The majority of

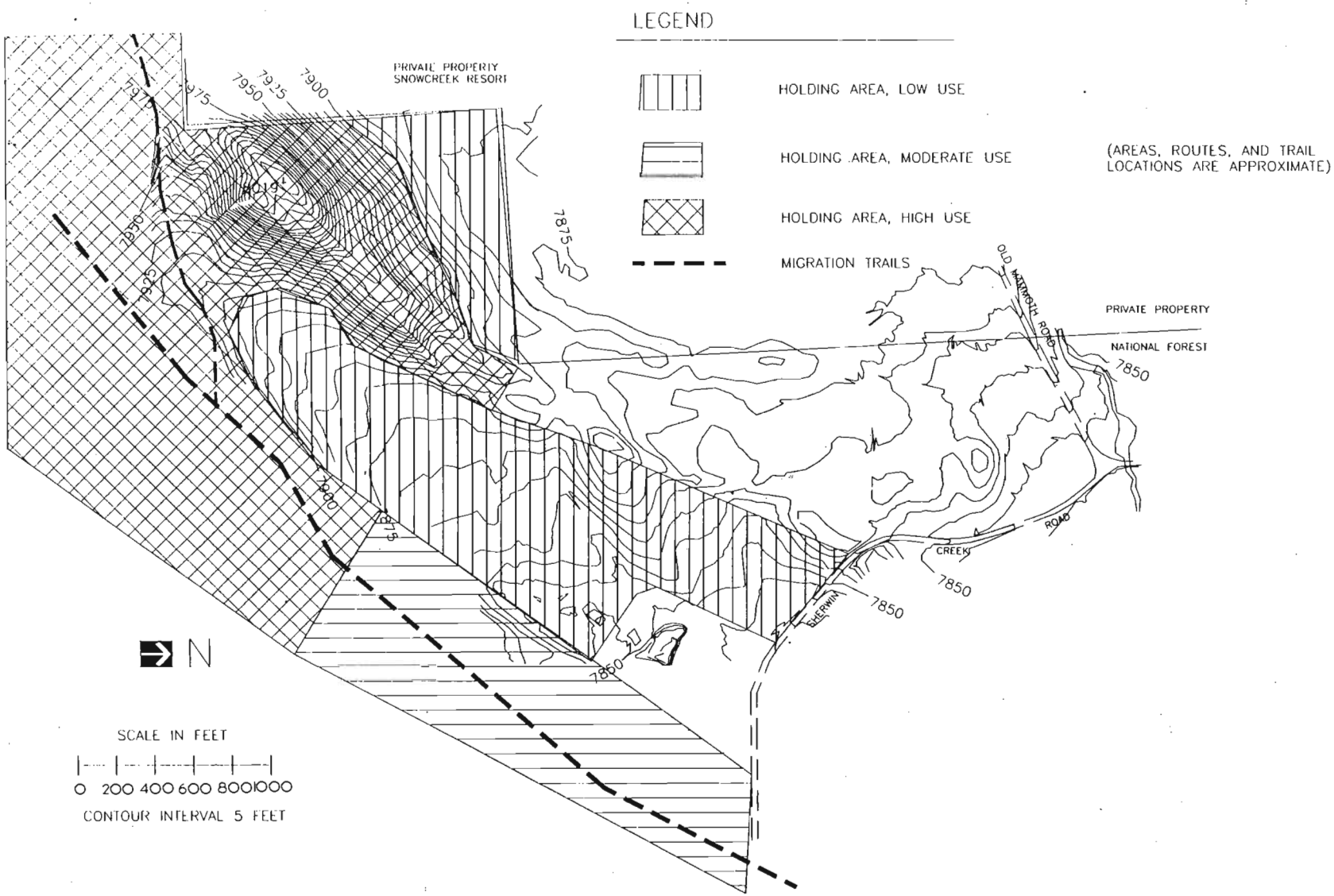

FIGURE 9. Mule Deer Habitat Within and Adjacent To The Proposed Snowcreek Golf Course Expansion, Inyo National Forest.

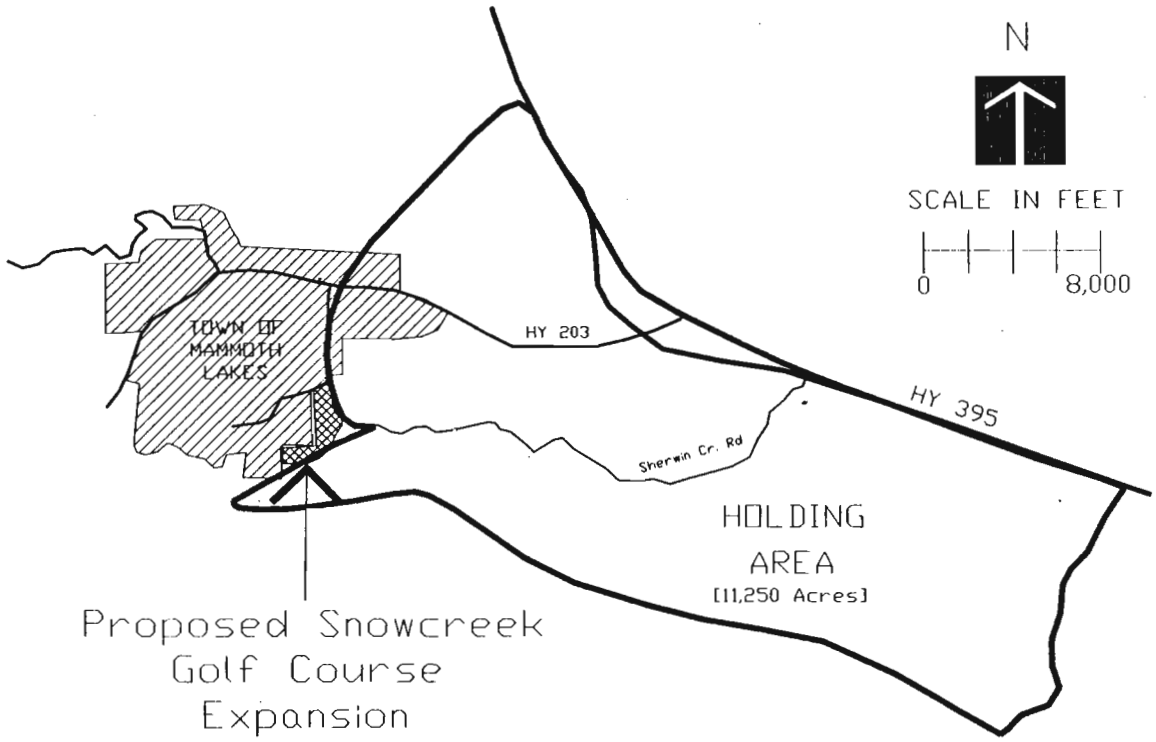

FIGURE 10. Mule deer holding area.

deer use the Solitude/Duck Pass route. The proposed golf course is located on the north west edge of the holding area where some of the migration routes exit for the Mammoth Rock route. Approximately 7 percent of the herd (385 deer at historic population levels) uses the Mammoth Rock route.

Deer are more likely to be in poor nutritional condition during spring holding and migration periods. Metabolism and energy demand are increased at this time. Pregnant does are entering their last trimester when nutritional needs increase due to accelerated fetal development.

Some deer remain in the Mammoth Meadow for the summer with some fawning occurring in the Mammoth Rock area. These fawning areas are potentially threatened by continued development within the Town of Mammoth Lakes.

Additional use of reclaimed wastewater for the golf course could affect wildlife habitat values at Laurel Pond, located approximately four miles southeast of the project site. This wastewater pond was developed through an agreement with Mammoth County Water District (see Hydrology section), with habitat quality improved using State of California Duck Stamp funds. This pond attracts a variety of migratory and resident shorebirds and waterfowl through spring, summer and fall periods, and has become an important stopover area for migratory birds. Habitat improvements have not been fully usable due to lower than anticipated pond water elevations.

Threatened or Endangered Species

No listed threatened or endangered species are known to inhabit the proposed Snowcreek Golf Course expansion area. Refer to the Biological Evaluation completed for the proposal in Appendix ? for more detail. A population of the Federally listed Endangered (USDI-Fish and Wildlife Service, 1985) Owens tui chub (Gila bicolor snyderi) and its critical habitat is located 5 miles downstream from the proposed golf course (USDA-FS, 1990). This is one of only four populations of Owens tui chub considered to be genetically pure.

Occupied habitat comprises the headwater springs and adjacent riparian zones of Hot Creek in the vicinity of the Hot Creek Fish Hatchery. Management concerns focuses on maintenance of adequate spring flows, water quality and aquatic vegetation in the headwater springs of Hot Creek (USDI-FWS, 1990). Spring flow at Hot Creek Hatchery is related to the groundwater percolation of Mammoth Basin. Present hydrological models suggest wastewater in Laurel Pond does not re-emerge at the Hot Creek Headsprings, but further down slope or into another drainage (Kuykendall, pers. comm.).

Sensitive Species

Sensitive species are identified by the Forest Service as being of limited distribution, small populations and/or are susceptible to management activities. No sensitive species are known to occur in the proposed golf course site.

Fisheries

The proposed project area is located in the Mammoth Creek drainage which is drained by two surface waterways, Bodle Ditch and Mammoth Creek. Bodle Ditch, which passes through the project area, is regulated by the Forest Service and is used for irrigation of pastures south, east and within the proposed golf course expansion area. Mammoth Creek, which is adjacent to the north end of the project, and approximately 1000 feet below most of the project area, is an important fishery, biologically and recreationally. Part of the creek is currently considered a priority candidate for classification as a wild trout stream.

Mammoth Creek originates at Lake Mary, where flows are regulated by MCWD. The creek flows in an easterly direction for approximately 4.0 miles and terminates at its junction with the Hot Creek headwater springs near the Hot Creek Fish Hatchery, east of U.S. Highway 395. Mammoth Creek averages 15 feet in width and 1.0 feet in depth with an average flow of 15 cfs annually.

Mammoth Creek is classified by the Forest Service as a Class I stream (USDA-FS, 1987). Its channels are of good to moderate stability. Historically, sedimentation and turbidity have been problems, but recently, lower water flows and community watershed projects have lessened sediment loads. Riffles are abundant and are composed mainly of rubble and gravel. Pools are common along all reaches of the creek and average 12 to 15 feet in width. Riparian vegetation including willow (Salix sp.), alder (Alnus sp.) and rose, provides a dense shade canopy which maintains cool water temperatures and provides cover from predators. Quaking aspen (Populus tremuloides), lodgepole and Jeffrey pines also occupy the riparian zone.

Based on habitat features, Mammoth Creek is considered a "high capability" stream for fish production. Field surveys (California Dept. of Fish and Game, 1986) indicate actual fish output is moderate (80-160 lbs/acre), suggesting low water flows or other physical parameters may be limiting fisheries production.

Resident brown trout (Salmo trutta) are present at 50-150 pounds per acre and constitute 80 to 95% of the fish biomass available during the mid-summer months. Rainbow trout (Salmo gairdnerii) is frequently stocked throughout the fishing season by Fish and Game. Stocked fish are subject to high angling mortality and a rapid population turn-over.

Mammoth Creek is a significant fishery due to its easy accessibility and high angling success rates. Trophy size fish are not found in this creek, but its proximity to the Town of Mammoth Lakes and ease with which fish are caught makes it a significant recreational opportunity.

RANGE RESOURCES

There is currently a term grazing permit issued to Joe F. Echinique of Bakersfield, California (Mammoth RD, 1984). He is authorized to graze 3,000 sheep between July 1 and September 15 in the Deadman/Sherwin Allotment which encompasses an area bordered on the south by the Sherwin Escarpment; east by the junction of U.S. Highway 395 and State Route 203; and north by the Bald

Mountain Lookout Road. Sheep graze adjacent to the Sierra Meadow Equestrian and Ski Touring Center (Sierra Meadow), the western border, early in the season, during July, for a period of one to two weeks. The boundary of the permit generally follows a line adjacent to the special use permit boundary of Sierra Meadows. The sheep are watered via truck and no range improvements exist in the vicinity of the proposed Snowcreek Golf Course Expansion Project.

CULTURAL RESOURCES

The resources of the Mammoth Creek drainage basin have been exploited by human populations for at least 6,000 years. The area has a high density of archaeological sites, some of which have yielded evidence for seasonal residence, obsidian quarrying and biface production, and trade during prehistoric times. Historic use began in 1875 with gold prospecting and the strike three years later, creating the Mammoth City boom. After 1879, cattle ranching, lumber production, and eventually, recreation replaced mining as dominant industries.

The Area of Potential Effect was inventoried for cultural resources in December, 1989 by Trans-Sierran Archaeological Research, under contract with Dempsey Construction Corporation (Burton, 1990). The inventory included a review of previous survey work by Forest Service and private consultants from 1974 to 1990.

Two cultural properties have been recorded in the proposed project area. CA-Mno-770 is an ephemeral prehistoric site consisting of a very sparse but extensive surface deposit of obsidian waste flakes. CA-Mno-895-H is a portion of Bodle Ditch, constructed in 1879 to divert water from a feeder of Lake Mary to supply the mining town of Mill City.

VISUAL RESOURCES

The proposed Snowcreek Golf Course Expansion Project is located at the base of Sherwin Bowl in an area of undulating brush covered hills and moraines. The northern portion is located on the east side of what is known as Mammoth Meadow. The landform is one of low flat ridges with shallow swales. The southern portion, at the base of Sherwin Bowl, features a 150 foot high ridge or moraine which has patches of timber on the upper slopes.

The project area has been part of a very scenic panoramic view across the meadow area towards the 3,000 foot escarpment of the Sherwin Bowl area. These views are part of the spectacular scenery available to those that drive out Old Mammoth and Sherwin Creek Roads. These views have been heavily modified by the recent development of the initial 9-hole golf course and residential development surrounding the golf course. Future planned residential and commercial developments have been approved for various phases of the Snowcreek Resort.

The open views and vistas across the meadow to the base of the Sherwins will cease to exist when construction is completed. Instead a tightly massed grouping of structures, roads and highly modified natural landscapes will dominate the foreground and middle ground views. The viewscape will be urban

oriented. Low vegetation on the site will do little to soften visual effects of this development. The landscape character of the project area, as part of a much larger natural viewing area, will be lost. It will simply appear to be a brush covered edge to community development.

Existing developments include the Forest Service administrative site, a pack station complex and a former borrow pit.

The following narrative includes a description of inventoried visual resource components and management direction for visual resources in the project area as found in current management plans.

Variety Class

Quality of the scenic resource is expressed in terms of variety class. The project area has been classified as Variety Class B, or of common variety. This is due to the somewhat gentle terrain and brush type vegetation that exists in the project area. Much of the surrounding area is inventoried as Variety Class A because of the outstanding topographic features and distinctive vegetative types that attract attention and become focal points in the landscape.

Key Viewpoints

The key viewpoints from which the project area is viewed are listed below:

1. Sherwin Creek Road, (east). Project area would be viewed directly ahead for west bound travelers (Figure 11). Impacted areas would be seen in the foreground and middle ground views.

2. Sherwin Lakes Trailhead, (southeast). The project area would be seen in the middle ground and from viewpoints considerably higher than any of the development.

3. Mammoth Rock Trail, (south). View of the proposed golf course would include middle ground views.

4. Lake Mary Road, (west). Project area would be seen in the middle ground and from viewpoints considerably higher than the development.

Old Mammoth Road was considered a key viewpoint in the past when all areas south of the road were undeveloped. Presently, major construction south of the road has changed the view from one of a natural setting, to one of development and community landscapes. This road should no longer be considered as a key viewpoint of natural appearing landscapes.

Sensitivity Level

The key viewpoints identified above are inventoried as Sensitivity Level 1 viewpoints. This indicates a high amount of users with a concern for the scenic resource are able to view the project area from these viewpoints. The sensitivity of a landscape is related to the distance from which a portion of the landscape is seen from the critical viewpoint.

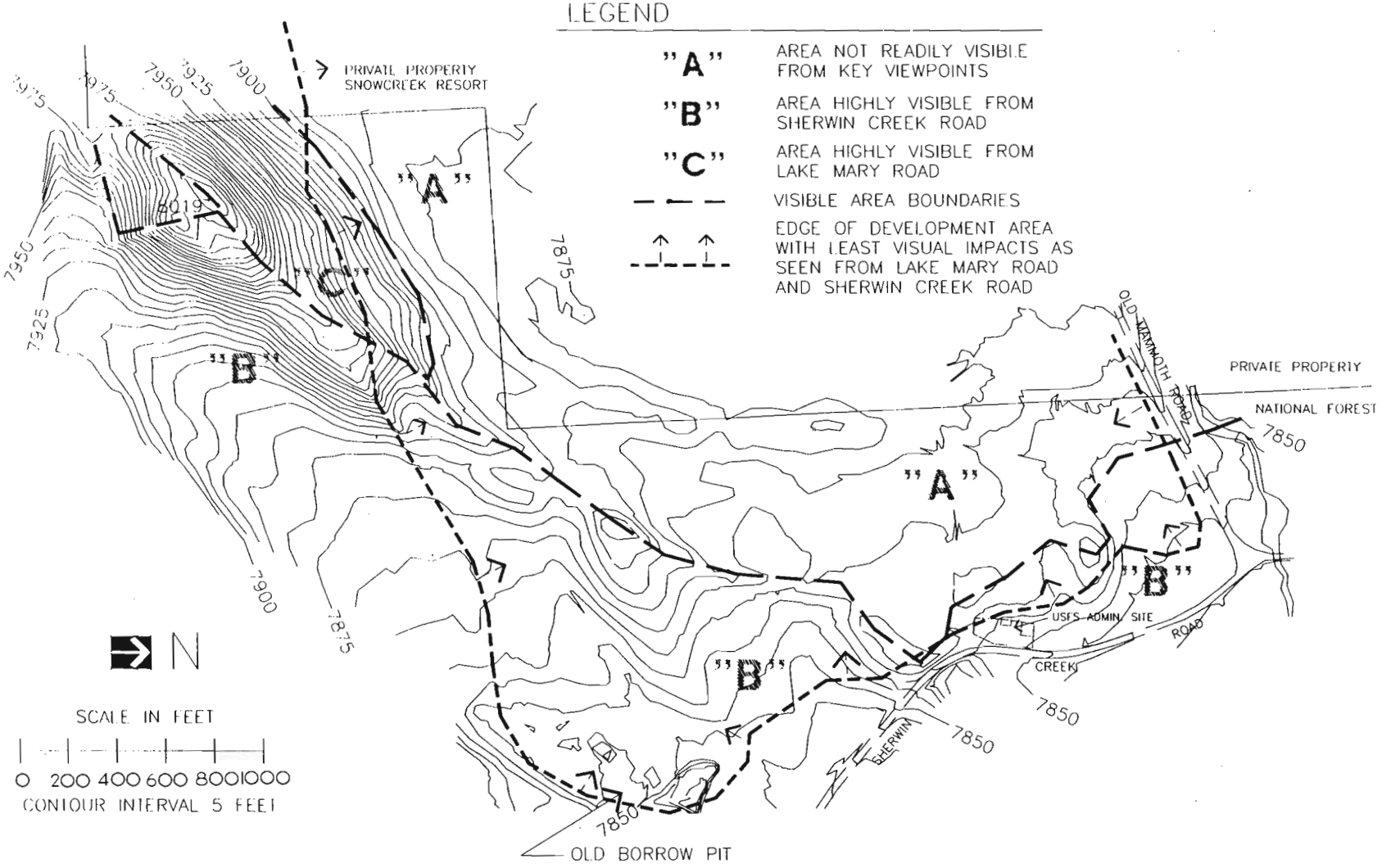

FIGURE 11. Visual Impact Areas From Key Viewpoints, Proposed Snowcreek Golf Course Expansion, Inyo National Forest.

Visual Absorption Capability (VAC)

Ability of the project area to absorb modification while retaining its visual character is called Visual Absorption Capability. The VAC for the project area is determined by slope, distance zone seen and screening ability of on-site vegetation. The following values apply to the proposed project:

Low VAC: This includes area located in the steeper south section on the large moraine. Due to steep slopes, low vegetation and foreground zone visibility, it would be very difficult to absorb any modification that would appear as part of the natural landscape. This also includes the foreground zones along Sherwin Creek Road and Old Mammoth Road due to the moderate slopes and very low vegetation.

Moderate VAC: Most of the area is inventoried as having a moderate VAC. This includes the areas with lower lying slopes. These areas also have low vegetation and foreground zone visibility. This landscape is not capable of absorbing modifications as extensive and land modifying as the proposed golf course development despite its moderate classification.

High VAC: No portion of the proposed project site has a High Visual Absorption Capability.

Existing Visual Condition (EVC)

The Existing Visual Condition describes the degree to which natural appearing landscape appears to be modified from an aerial perspective. The project area has had relatively low levels of disturbance. Most of the area is categorized to depict minor modifications.

Disturbances to the area classified as moderate include Old Mammoth Road, the Forest Service administrative site and the former borrow pit.

These disturbances are even less visible from ground level because they are non-structural in nature. By contrast, adjacent private land exhibits a level of drastic disturbances.

Visual Quality Objectives (VQO)

Visual Quality Objectives are the measure of acceptable modification allowed under current management direction that would provide the desired level of protection of the visual resource. As delineated in the Inyo National Forest Land and Resource Management Plan (Forest Plan), the proposed project area falls into two prescription and management areas (Inyo NF, 1988). The visual objectives for these are:

Prescription Area #12, Management Area #9 (Concentrated Recreation Area): Meet Retention VQO for all new, non-recreation-oriented facilities and Partial Retention VQO for all other facilities, including recreation sites.

Prescription Area #13, Management Area #8 (Alpine Ski Area, Existing and Under Study): Meet or exceed Partial Retention VQO for runs, lifts and base areas as seen at middle ground distances from Sensitivity Level 1 routes and occupancy sites.

By direction, the golf course proposal would have to meet Partial Retention VQO's as seen from the key viewpoints. Any part of the proposal that is located within Prescription Area #13, Management Area #8, would have to meet the VQO's that were initially inventoried. This would be a VQO of Retention since the proposal is not ski oriented.

LAND USE AND OWNERSHIP

Proposed expansion of Snowcreek Golf Course would occur in possibly up to two Forest Management Areas (Management Areas #8 and 9), depending on alternative chosen (Inyo NF, 1988). Management Prescriptions within these areas are Concentrated Recreation and Alpine Ski Area, Existing and Under Study. Management Prescriptions specify how all forest resources will be managed to emphasize a specific resource.

Land ownerships and existing land uses in the vicinity of the proposed site are shown on Figure 12. The most significant existing development is Snowcreek Resort which encompasses 345 acres of land. Within the 345 acres of land is an existing 9-hole golf course that opened in 1991. This existing 9-holes is adjacent to the project area.

The proposed Sherwin Ski Area covers approximately 3100 acres southwest of the Town of Mammoth Lakes. A portion of the golf course expansion project is within the boundaries of the proposed ski area. The proponent of the ski area was issued a special use permit in October of 1992 to begin the Master Development Plan. A decision on construction of the ski area will not be made until the Master Plan has been subject to environmental review.

Included in the vicinity of the project area is approximately 13.2 acres of land currently under a Forest Service Term Special Use Permit to Sierra Meadows Ranch for use as an equestrian center and ski touring-winter sports center resort for the purpose of ski rentals and instruction (Mammoth RD, 1980). The same permittee also has an annual special use permit issued by the Forest Service for the development and operation of a nordic ski trail system within and surrounding Mammoth Meadow. In and around the project area is a Special Use Pasture Permit issued to Lou Roeser for grazing rights on 404 acres of National Forest System land; 20 of these acres are within the project area. Approximately 125 horses are grazed during spring and late fall months. Both Mammoth Lakes Pack Outfit and Sierra Meadows Ranch need the pasture for the economic stability of their operations (Roeser, pers. comm.).

The Town of Mammoth Lakes is currently processing an Environmental Assessment for improvements on the Town Park adjacent to Mammoth Creek at the intersection of Sherwin Creek Road and Old Mammoth Road. The site occupies a total of 20 acres, of which 15 acres are on National Forest System lands.

The northern section of the project area is within a Forest Service administrative site. The site has several functions. Most important is the pasture and tack room provided for district stock animals. Approximately 14 horses and mules are pastured on approximately 25 acres of meadow area. Irrigation for the pasture is provided by Bodle Ditch.

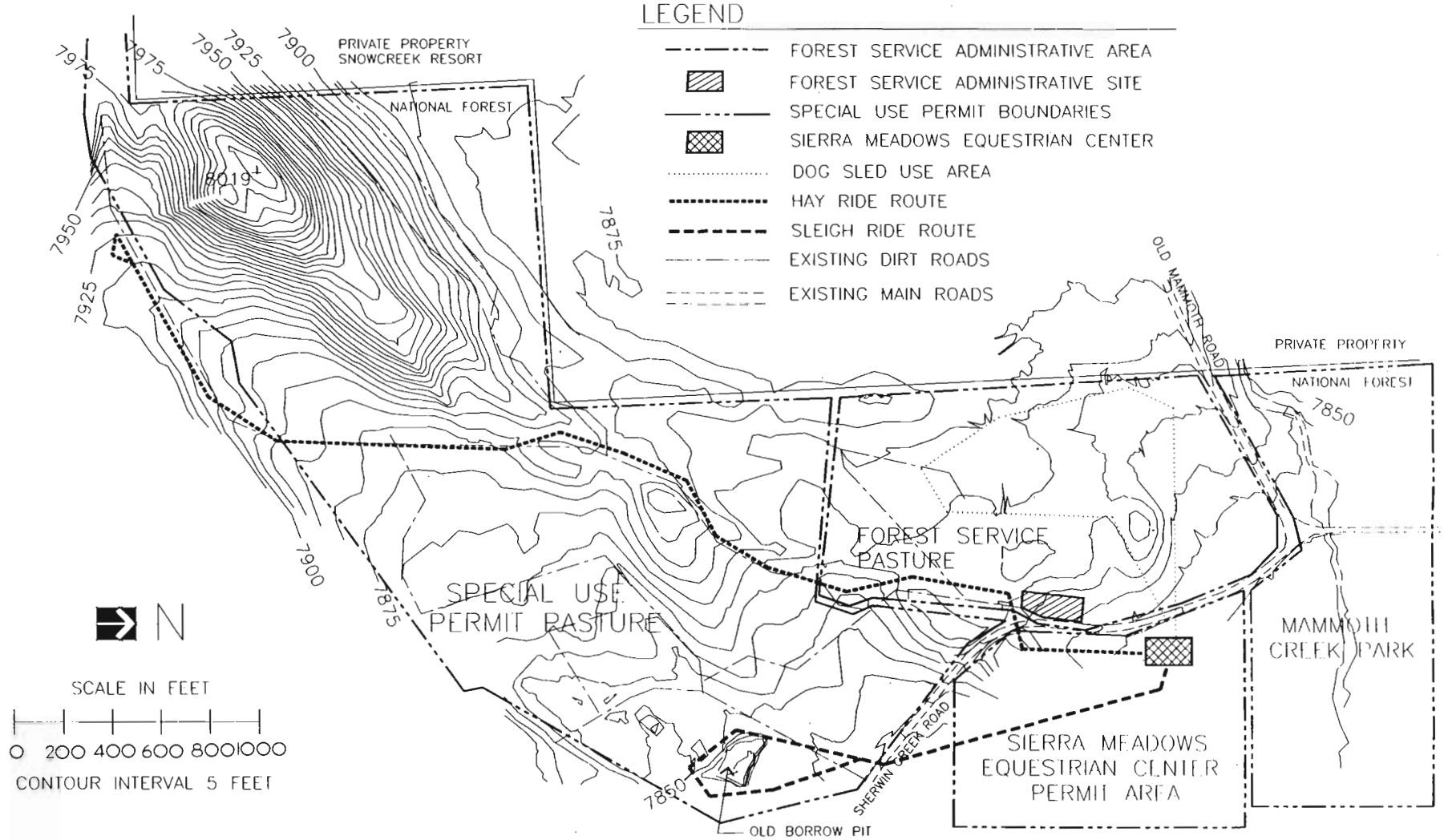

FIGURE 12. Land Ownership and Current Uses, Proposed Snowcreek Golf Course Expansion Area, Inyo National Forest.

The wilderness program also operates out of the tack room. It serves as a base of operations for wilderness rangers, trail crews and wilderness study groups. The tack room and adjacent corrals also serve as a base of operations for the Construction and Maintenance program and storage site for equipment used to administer roads and developed sites on the district.

A small shed (magazine) has been placed out in the meadow, approximately a quarter of a mile south of the tack room, to house Class A explosives. There is a small blasting cap magazine approximately 100 feet from this shed.

A special use permittee has an existing borrow pit located on Sherwin Creek Road on the east boundary of the proposed golf course site. The 10 acre site has been filled in at this time with non-wood products (i.e. rocks, dirt, etc.). Final reclamation work should be completed Spring, 1991.

RECREATION

Outdoor recreation is one of the most important resources for both the Inyo National Forest and Town of Mammoth Lakes. Winter activities accounted for 24.4% of all recreational uses between October 1, 1987 and September 30, 1988 (USDA-FS, 1989).

Walking, horseback and mountain bike riding, jogging and sight-seeing are common summer and fall dispersed activities in undeveloped areas of the proposed project site. The Mammoth Rock Trail passes along the base of the moraines to the south. It is approximately 2.5 miles long and provides livestock access to the Mammoth Lakes Basin for the Forest Service, Sierra Meadows Equestrian Center, Mammoth Lakes Pack Outfit and private horse owners. It is also used by day hikers. Mountain bikes and motorized use is prohibited. Use in 1985 was an estimated 160 Recreation Visitor Days (Wood, pers. comm.), and current use is probably greater (Roeser, pers. comm.).

Sierra Meadows Ranch

This special use permittee operates on a year-round basis. An estimated 1,500 recreation visitor days (RVD) of summer use and 1,600 RVD of winter use occurred at the Sierra Meadows Ranch base facility in 1986 (DeGraff, pers. comm.). Summer use includes full horse boarding facilities, horseback riding, hay rides and barbecue dinners. In winter, the center provides cross-country skiing, skiing lessons, and sleigh rides.

Several Sierra Meadows Ranch activities occur on the proposed project land. During snow free months, horseback riding and hay rides travel across the moraine area. A barbecue and picnic area for the hay rides is located at the base of the moraines in the south section of the project area. Winter activities include approximately 30 kilometers (19 miles) of groomed cross-country ski trails in the southern moraine area, Mammoth Meadow, and along Sherwin Creek Road to the southeast. A portion of the proposed project site is used for sleigh rides.

Dog Sled Rides

Dog Sled Adventures has a Special Use Permit and is authorized to give dog sled powered tours on National Forest System lands. They operate in designated areas and on lands under Special Use Permit to others, including Sierra Meadows Ranch. At this time, the agreement between these two permittees is verbal.

SOCIAL AND ECONOMIC ENVIRONMENT

"Mammoth Lakes is a year-round destination resort community which depends primarily on the ski industry and summer activity visitors for its economic survival" (Town of Mammoth Lakes, 1987). With a permanent population of 5,000, it includes within its boundaries the Mammoth Mountain Ski Area with a capacity of 19,000 skiers and the Lakes Basin area, both on National Forest System land. The Lakes Basin consists of a series of lakes leading up to the boundary of the John Muir Wilderness and is a popular area for hiking, camping and fishing in the spring through fall months. During a good winter, over one million skiers visit Mammoth Mountain Ski Area while summer use averages well over a million and a half visits to various Forest Service recreation areas within the Town boundaries.

The Town's economy is heavily dependent upon the ski industry. The majority of the community's work force is based on servicing winter tourism. There is a limited summer economy since many of the summer visitors are camping or backpacking in nearby National Forest campgrounds or wilderness. This, in conjunction with the Town's dependence on good winter weather and the erratic nature of the tourism industry, the economy of the Town fluctuates widely. The Town's goals are to reinforce winter tourism and encourage development of summer recreational activities and light industrial development in order to develop a more stable economic climate (Town of M.L., 1987).

A study of use patterns for the Town found that while there are usually more summer visitors than winter visitors to the area, significant vacancy rates during summer months and reported reductions in purchases compared to winter, indicate summer visitors are not staying or making major purchases in Mammoth Lakes. "Most summer visitors are predominantly interested in activities such as camping, backpacking, hiking, fishing and boating rather than residing in and using established lodging and commercial facilities in Town" (Town of M.L., 1987). The Town is therefore supportive of summer recreation development that would correct this imbalance.

Snowcreek is listed as one of the Town's Significant Development Projects. The Town encouraged development of the project, while acknowledging that expansion of the existing nine-hole course with an additional nine holes on National Forest System land will require an assessment of use of private lands first (Town of M.L., 1987).

Golf courses are acknowledged as desirable attractions for a year-round resort community. At present there are no regulation size golf courses in the Mammoth Lakes area. An 18-hole course was proposed for the Doe Ridge area outside Town boundaries on National Forest System land, but this application was denied by the Forest Service. The closest golf course is located in Bishop, 40 miles

away. The 9-hole Snowcreek course was constructed in 1989/90 and opend to the public in 1991. The first year of use saw approximately 9,000 rounds of golf played and in 1992, approximately 20,000 rounds were played on the existing 9 holes. The course hosted 12 charity tournaments in 1992.

The proposed Lodestar development within the Town will include an 18-hole Executive golf course. Executive courses are generally shorter length holes with lower par values. They are often known as "par 3" courses. The 114 acre course would be built as part of an overall destination resort situated on 210 acres of private land. Plans for Lodestar have been approved, and some site clearing was completed in 1992. Construction of the golf course or other improvements has not begun.

Two other 18-hole golf courses are being proposed in Mono County. The Town has expressed interest in developing an 18-hole golf course on National Forest System lands in the vicinity of Shady Rest, but a specific proposal has not been submitted. The location of this proposed course falls within the Mammoth to June study area, which is the Inyo National Forest pilot ecosystem management project. The project will not be identifying specific management practices, such as a golf course, until 1994. The proposed golf course is one possible management practice that will be considered during this phase of the project. The Conway Summit Development is proposing an 18-hole Regulation golf course north of Mono Lake at the base of Conway Summit (35 miles from Town). This project has completed the initial planning stage, but has not submitted site specific plans to the County.

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes environmental consequences of implementing the various alternatives. It also provides the scientific and analytical basis for the comparative discussion of alternatives in Chapter II.

The following sections consider the potential environmental effects and consequences of the proposed action and its alternatives. For convenience of evaluation, the assessment of each area of environmental consequence includes an analysis of the potential environmental impacts common to all action alternatives and evaluation of the relative impacts which vary by alternative. Potential cumulative impacts are addressed at the end of this chapter.

Mitigation measures that would be needed to implement alternatives are addressed at the end of each resource section and cover those components where environmental effects would likely occur. For alternatives A through D, and G, the mitigation measures would be incorporated into the special use permit preparation and administration processes. For Alternatives F and H the mitigation measures should be considered recommendations, as actual mitigation measures would be determined through the CEQA process. All mitigation measures will be performed and/or funded by the proponent unless otherwise specified.

Should an action alternative proposing occupancy of National Forest System lands be chosen, a fully detailed development plan which includes all site features, improvements, grading, landscaping, and facilities will be prepared by the proponent and approved by the Forest Service prior to construction.

RESOURCE ENVIRONMENT

AIR QUALITY

Consequences Common to Action Alternatives

Potential air pollution impacts associated with the proposed Snowcreek Golf Course expansion would include temporary short-term emissions during construction activities and long-term emissions arising from increased automobile traffic as well as industrial and residential land uses.

General construction activities and heavy equipment operations would generate significant amounts of dust and noxious fumes and odors within individual project sites. Construction vehicles and equipment are generally powered by internal combustion (usually diesel) engines which can cumulatively produce significant exhaust emissions.

Consequences Which Vary by Alternative

There would be minor differences in air quality between any of the development alternatives. Short-term impacts to air quality may be slightly greater in Alternatives C, D, F, G, and H due to increased amounts of earthwork and grading needed in these alternatives.

Under Alternative E, No Action, air quality would remain unchanged from present conditions.

Mitigation Measures

Project grading and construction permits will contain the following provisions:

1. Disturbed sites will be adequately watered (with non-potable or reclaimed water) to control nuisance dust. Watering trucks or pump systems shall be of sufficient numbers and shall be maintained on the site. Should violations to air quality occur, construction will cease until the problem is resolved.

2. All construction equipment shall be equipped with required exhaust systems and mufflers.

3. Burning of waste materials and stripped vegetation will be prohibited.

4. Piles of soil during construction will be covered to minimize wind erosion.

SOILS

Consequences Common to Action Alternatives

Project development would require significant earthwork operations including clearing vegetation, topsoil removal and stockpiling, trenching, excavation, landfill and other land disturbances in association with site grading, road grading, underground utility installation and building construction. Maximum excavation depth would be approximately 15 feet, occurring primarily in proposed lake areas. Contoured fill areas for elevated tees and greens will probably average six feet, with maximum fills approaching 15 feet. Approximately two feet of topsoil is expected to be stripped off and stockpiled for later spreading. Disturbed, exposed soil surfaces would be subject to erosional forces. This could result in direct loss of valuable topsoil material. Secondary water quality impacts could result from eventual discharge of silt-laden runoff to adjacent surface streams, primarily Mammoth Creek.

Erosion hazards and water quality impacts could occur if disturbed soils are not stabilized prior to onset of winter weather conditions. Snowmelt runoff from exposed, uncompacted surfaces or loose stockpiles could result in on-site soil loss and downstream siltation/sedimentation problems.

Encroachment of grading activities on adjacent lands not slated for development could result in vegetative removals and an increase in potential long-term

erosion hazards. These impacts can be reduced by appropriate soil stabilization and revegetation efforts.

Potential adverse effects associated with land transformations include: visual impacts, if disturbed soils are not properly stabilized and revegetated; increased soil loss arising from the concentration of surface runoff; and reduction of wildlife populations due to loss of habitat.

Consequences Which Vary by Alternative

All action alternatives have varied, but unavoidable impacts on soil and land transformation. Implementation of mitigation measures could reduce short-term impacts to reasonable or acceptable levels. Alternatives differ mainly in design, amount of disturbed area and amount of estimated earth movement needed.

Golf course design for Alternative A would utilize the moraine at the south end of the permit area for all or part of four holes. There would be a high potential for erosion in disturbed areas on the moraine.

Alternatives B, C, G and H are similar in that all utilize the lower half of the northern aspect of the moraine. Due to positioning of holes, potential erosion would be less than Alternative A. According to the proponent, Alternatives C, G and H would require more earthwork than Alternative B. This is due to a closer, compact design that would allow less freedom to use natural features.

Alternative D, located on flatter terrain, would require the greatest amount of earth movement to alter natural topography to create a championship-quality golf course.

Under Alternative E, no construction would occur; therefore, no site disturbances are expected.

Alternative F, is located on relatively flat terrain and utilizes a fairly compact design. It thus would require a large amount of earthwork to alter the natural topography in a confined area that would allow less freedom to use natural features.

Mitigation Measures

Potential long-term impacts associated with soil disturbances and land transformation can be significantly mitigated by appropriate design, construction, and stabilization considerations. These specific mitigation measures shall be implemented for the proposed golf course expansion:

1. All grading and earthwork activities must be conducted in accordance with a construction grading plan approved by the District Ranger. The grading plan must include the following provisions:

    a. Limits of construction work shall be clearly delineated and disturbances of adjacent soil and vegetation shall be strictly avoided. Where considered necessary, temporary fencing shall be erected to delineate the work area.

b. All earthwork must be conducted in accordance with a detailed project schedule submitted with the grading plan. The schedule shall provide for completion of earthwork in a single construction season.

c. Existing drainage patterns shall not be significantly modified and drainage concentrations shall be avoided.

d. All loose piles of earthwork materials shall be protected with hay bales and filter fences to avoid discharges of silt-laden runoff.

e. Dust control measures (watering trucks or pump systems) in sufficient numbers shall be maintained on site and continuously implemented throughout the construction period and until vegetation is established to mitigate potential wind erosion.

f. All exposed soil areas shall be stabilized and reseeded in accordance with an approved landscape/revegetation plan prior to winter weather conditions in order to avoid erosion caused by snowmelt runoff. Stockpiles of unsuitable soil materials (boulders and stripped vegetation) shall be removed and disposed of at approved sites designated by the Forest Service.

g. Bonds or other security shall be required to guarantee completion of site stabilization and revegetation measures within time periods delineated in the project schedule.

2. A drainage and erosion control plan which conforms with Best Management Practices (BMP) specified in the current Water Quality Management for National Forest Systems Lands in California (USDA-FS, 1983) shall be submitted to the District Ranger and approved prior to any land disturbance. The plan shall include the following provisions:

a. Interim erosion control measures shall be implemented during construction, including such facilities as temporary dikes, filter fences, hay bales and retention basins as necessary.

b. No discharge of silt, waste materials, toxic substances or other deleterious matter to surface waters shall be permitted.

c. Permanent drainage collection, retention and infiltration facilities shall be constructed and maintained to prevent waste discharges from the completed site.

d. All drainage retention facilities shall be designed to retain and infiltrate all runoff from 100-year, one-hour design storm event.

e. Revegetated areas shall be maintained in order to insure adequate establishment and growth. All permanent drainage and erosion control facilities shall be periodically inspected and maintained as required.

f. All interim drainage and sediment control facilities shall remain in place until permanent vegetative cover is established.

GEOLOGY

Consequences Which Vary by Alternatives

Clubhouse location in Alternatives C, D, G and H is within an area inventoried as having a high potential for ground failure (including liquefaction).

Because of the large area that would be impacted by volcanic activity, potential volcanic hazards would be similar for all action alternatives.

Alternative E, No Action, will not affect geologic resources in the area.

Mitigation Measures

The following mitigation measures are necessary to reduce potential impacts arising from seismic and volcanic hazards:

1. Should Alternative C, D, G or H be selected, the proponent will have an intensive geological survey done on the clubhouse location to further delineate the area inventoried as high potential for ground failure. Should the site be within this inventoried area, design of the structure will ensure minimal impact from seismic activity.

2. Plans for all proposed building structures shall be submitted for Forest Service approval and shall incorporate the following design provisions:

   a. All structures must be designed in accordance with the Uniform Building Code, incorporating lateral force requirements for Seismic Zone 4 (maximum seismic loads).

   b. A lateral force (seismic) analysis must be submitted by a licensed structural or civil engineer for all public and commercial structures.

   c. All structures must be designed for seismic forces under maximum snow loading conditions (presently 80 pounds per square foot).

HYDROLOGY - WATER QUANTITY

Consequences Common to Action Alternatives

Two different water systems are required for the project. A domestic system will provide four acre feet of water for clubhouse, restaurant, and infrastructure needs (i.e. drinking fountains, maintenance building, etc.). A

reclaimed wastewater system will be required for turf irrigation needs and for the lakes. Although this project is not within the boundary of Mammoth County Water District (MCWD), the area could be either annexed or water service could be provided by contract. MCWD may elect to provide all or portions of the domestic water from within the meadow area or import it from other outside sources.

Water demand is estimated to be the same (130 acre feet for irrigation, 4 acre feet for domestic use) for each alternative. Due to infiltration, and except for evaporation/transpiration, virtually all water utilized for irrigation is expected to be returned to Mammoth Basin. A conservative infiltration rate for this project is estimated at 50 percent.

The analysis does not "double count" the use of reclaimed water as the initial use is figured into the buildout needs of the Town (5946 acre feet). The use of wastewater could indirectly effect available habitat at Laurel Pond by reducing the amount of water reaching the area from the treatment facility. The amount of wastewater required for this project would not pose a threat to the wetted area at the pond, but without mitigation measures, cumulative demands could effect overall habitat quality. There will be increases in flows of wastewater as a result of the continued development of the community.

A network of lakes/ponds with a capacity of approximately 12 million gallons (36 acre feet) is proposed to be located on 7.6 acres. The lakes/ponds serve several functions including: hazards for the golf course, siltation basins during construction, retention basins for irrigation runoff and peak storm events, and as storage facilities for the irrigation system. The stored water provides the proponent with a back-up source should the reclaimed pipeline or pump system fail. The course will require approximately 390,000 gallons per day (gpd) during summer months (350,000 gpd for irrigation, 40,000 gpd for evaporative losses). Utilizing the lakes/ponds in this nature provides several days of back-up irrigation water should the need arise.

The MCWD has expressed intent to service projects which are irrigation intensive, with reclaimed water. At this point, current uses for this water are primarily dust abatement associated with construction projects and landscape irrigation for the Town. The first nine holes are not irrigated with reclaimed wastewater due to the proximity of the MCWD production wells. The necessity to use reclaimed water is based primarily upon limited available developed sources, water use patterns in the community, and the arid environmental setting in which the Town of Mammoth Lakes is located.

Consequences Which Vary by Alternative

Implementing Alternative E would have no effect on water resource quantities. Portions of the course proposed in Alternative F would not be able to use reclaimed water for irrigation due to the proximity to the water supply wells. This would increase the need for water that would otherwise be used for the town potable water supply.

Mitigation Measures

The following mitigation measures will reduce or eliminate adverse impacts which may affect water resource quantities:

1. Reclaimed water will be used for irrigation of the turf. In the event of a reclaimed water system failure, pond water will be used. Only after that water has been exhausted will untreated water from the Mammoth Meadow well field be used. In this event, Dempsey Corporation will have to abide by the same outside irrigation restrictions that the community is being managed under. Use of reclaimed water for Alternative F is subject to proximity to water supply wells.

2. The Memorandum of Agreement between MCWD and the Forest Service will be modified to either establish a minimum water level for Laurel Pond or establish a minimum size in acres for available habitat before reclaimed water is used to irrigate the golf course. At a minimum, this agreement will maintain the current mean levels of water or habitat. The proponent will work with MCWD and the Forest Service to provide for additional productive wildlife habitat at Laurel Pond equivalent to the amount of wastewater being extracted for irrigation of the project. This will include any or all of the following: development of islands, improvement of fringe habitat, sealing a portion of the Pond bottom, and/or planting vegetation.

   This measure is intended to reduce or eliminate the potential for cumulative impacts on Laurel Pond due to increased use of reclaimed wastewater. Wastewater would only be available to the extent it is surplus to the habitat levels specified in the agreement.

3. All use of reclaimed water will be in conjunction with requirements established by the State Health Department and Lahontan Regional Water Quality Control Board (LRWQCB).

4. Should a substitute tackroom and pasture be located to the east of the present site, the proponent will be responsible to provide an adequate non-potable irrigation system. This can be accomplished by either rerouting Bodle Ditch or providing a reclaimed water irrigation system. If the ditch is utilized, the proponent must ensure that flows are maintained throughout any rerouted portions.

HYDROLOGY- WATER QUALITY

Consequences Common to Action Alternatives

All action alternatives will have the same approximate impacts to water quality within the Mammoth Basin. These impacts can be grouped by the two primary sources of potential impacts, sediment and chemicals.

Sediment would be produced as a result of vegetation removal, soil manipulation and compaction, and road/facility construction. The most critical period for adverse drainage impacts is during construction. Drainage control measures will be implemented prior to construction and maintained throughout the life of

the project. Permanent stabilization and revegetation measures will be implemented as soon as practical before any disturbance, whether or not the entire project is completed. Some short-term effects will probably be seen, but with mitigation measures implemented prior to and in conjunction with terrain modifications, areas of erosion should be localized, with sediment deposits remaining on the site.

Potential chemical contaminents include hydrocarbons and heavy metals from parking lot and road runoff, nutrients from fertilizer and reclaimed water, and various chemicals from pesticides. The mitigation measures required focus on keeping surface runoff on the site, by using drainage control, settling ponds, and gravity traps. These mitigation measures will be very effective in containing potential contaminents on the site. There is little chance that any chemical contaminents will ever reach the surface waters of Mammoth Creek.

Fertilizers and pesticides will be used during the playing season to manage turf conditions. If they are applied according to label instructions, there is little chance that chemicals associated with these products will enter surface waters of Mammoth Creek. There is a potential for fertilizers, pesticides, and nutrients from reclaimed waste water to enter the ground water below the site.

A ground water monitoring study for pesticides and nitrates associated with golf courses on Cape Cod (Cohen et al, unpublished manuscript) provides a good indication on the impacts of fertilizer and pesticide use on water quality. Cape Cod is comprised of a thick deposit of unconsolidated glacial sediments that overlie bedrock. The pattern of sandy glacial till mixed with stratified sand and gravel in Cape Cod is similar to the subsurface deposits that underlie the proposed golf course. Depth to ground water in the Cape Cod study ranged from 5 to 50 feet. Depth to ground water under the proposed golf course is unknown, but based on adjacent wells, is probably in the vicinity of 30 feet.

The Cape Cod study monitored four golf courses that were determined to have a high risk for ground water contamination. To have a high risk, the golf course would have sandy soil subsurface deposits, have a record of high pesticide and fertilizer use, and be in existence for over 30 years. The study monitored for a range of pesticides, including dicamba, 2,4-D, iprodione, and chlorpyrifos. Water samples were collected from monitoring wells located near tees, greens, and fairways. Samples were collected four times during a 1.5 year period beginning in April of 1986.

The study found that eight pesticides and pesticide metabolites and two pesticide impurities were found in ground water at the study sites. Only chlordane/heptachlor, a banned pesticide formulation, was found in toxicologically significant concentrations. The authors concluded that use of turf pesticides by four golf courses with vulnerable hydrogeology was found to have minimum impact on ground water quality. Nitrate-N levels above background were detected in almost all samples collected. The rate of application as well as the type of fertilizer used appear to be significant factors in ground water nitrate-nitrogen concentrations beneath managed areas.

Based on this study it is likely that some low but detectable level of pesticides and fertilizers will reach the shallow ground water below the golf course. Monitoring wells and water sampling as required by mitigation will ensure that unacceptable levels of pesticides or fertilizers occur.

Consequences Which Vary by Alternative

Alternative E will have no impact to water quality in the area.

Mitigation Measures

The following mitigation measures will reduce or eliminate adverse impacts which may affect water quality from the proposed expansion of the Snowcreek Golf Course:

1. Those measures listed as mitigation measures for impacts to the soil and vegetation resources would also be effective in maintaining water quality.

2. The proponent will obtain and comply with a waste discharge permit from the LRWQCB. Use of reclaimed water will be in compliance with the Board's publications "Wastewater Reclamation Criteria" and "Guidelines for Use of Reclaimed Water". Signing will be required for the lakes/ponds and areas being irrigated with reclaimed water.

3. The project will be designed to control all surface flows, with the objective of removing sediment and other contaminants from any surface flows before discharge into Mammoth Creek. The level of treatment will be in accordance with the water discharge permit, and will be accomplished primarily through the use of settling basins, infiltration trenches, and gravity traps. Concentrated drainage from paved or impervious surfaces will be treated in the same manner.

4. All areas of compaction will be ripped to a depth of at least eight inches prior to application of topsoil or revegetation.

5. Fertilizers and pesticides will be applied in accordance with Best Management Practices (USDA-FS, 1983) guidelines to ensure no surface runoff is created. Fertilizer and pesticide applications should be avoided during peak precipitation periods when the danger of washing contaminents into ponds is the greatest. All disturbed areas will be designed so any resulting runoff will flow into the lakes/ponds, but such that there will be no intermixing with water in lakes/ponds on the existing nine holes.

6. To ensure that all surface flows remain within the project area, it is the responsibility of the proponent to design the course so that the perimeter areas are the highest elevation areas. The existing access road that leads into Snowcreek V project needs to be the highest point on the west side of the area serviced with reclaimed water. In Alternatives A and B the access road to the parking area and clubhouse, in conjunction with the topography to the south of the project area, would be the highest point on that side of the course. For Alternatives C and D, the course would need to be raised in this location to provide for the required containment.

7. The proponent will be required to drill three shallow groundwater monitoring wells at locations determined by the Forest Service, in consultation with the Lahontan Regional Water Quality Control. This will need to be accomplished immediately upon starting the project so that some baseline data can be obtained. There will also be a need for a deep groundwater monitoring well drilled to a depth of at least 350 feet at a location selected by the Forest Service. These wells will be used for monitoring water quality including the migration of any fertilizer or pesticide components off-site. The proponent will fund a Forest Service selected third party consultant to perform this work. This monitoring will continue for the life of the project. If monitoring detects pesticides or fertilizers at levels exceeding 0.1% of the EPA allowable levels for drinking water, approval for use of those materials will be revoked.

8. The lakes and ponds shall be designed to function as drainage retention basins for sediment control during initial construction as well as long-term runoff control.. The perimeter of all disturbed areas will be protected with hay bales and filter fences to avoid discharges of silt-laden runoff.

9. Existing drainage patterns will not be significantly modified and drainage concentrations will be avoided.

10. Pesticides will be used in accordance with label instructions and all applicable state and federal laws. Conditions imposed by the Lahontan Regional Water Quality Control Board will also apply.

VEGETATION

Consequences Common to Action Alternatives

Development of a golf course in the proposed site would result in removal and replacement of approximately 70 acres of mostly native shrub vegetation with trees and artificially maintained grassland. This will constitute a significant change in visual and vegetative characteristics of the area. Vegetation within the proposed project area consists of sagebrush scrub, meadow grassland and mixed conifer/manzanita communities. Although the sagebrush community is widespread and dominates the project area, its removal represents a loss of both native vegetation and wildlife habitat.

Stripping of native vegetation during construction may lead to increased erosion in previously vegetated areas. Potential for adverse impacts such as soil erosion and downstream water quality degradation could increase if vegetation is stripped far in advance of construction. Remaining natural vegetation may be subject to increased competition if plants introduced from landscaping spread from developed areas. Irrigation and fertilization activities could affect native vegetation in open areas between holes by favoring introduced species.

The conversion of the sagebrush community to turf represents a vegetation type conversion. Appendix B discusses the relationship between the type conversion and the natural changes that would occur in the area.

Consequences Which Vary by Alternative

Action alternatives vary in the amount and location of disturbed area in relation to golf course design. Approximatley 70 acres will be disturbed in all action alternatives. However, the percentage of land which is disturbed will vary by alternative. Alternative E, No Action, would have no effect on existing vegetation characteristics.

A survey for wetlands was completed and reviewed by the Department of the Army, Corps of Engineers (Army Corps of Engineers, 1990) . Under regulations in the Federal Register (Section 330.5 (a)(26)(i)), construction in 0.51 acres of wetland meadow area would be allowed (Environmental Protection Agency, 1986). Alternatives A, B, C, G and H would impact this area. A potential wetland exists to the east of the moraine. Holes #11 and 14 of Alternatives B and C respectively could be adjusted to avoid this area if necessary. Alternative A would impact this and another wetland to the south with Holes #10, 12 and the practice range. These areas could be mitigated as above. Figure 6 displays the locations of these wetland and potential wetland areas.

Since Alternative F is located completely on private lands, the landscape vegetation to be reestablished would be under the discretion of the developer, although it is expected to be the same or similar to that on the existing 9-hole golf course. The lands considered under Alternative F would be cleared regardless of whether this alternative is implemented, as these lands are presently allocated to residential and commercial land uses.

Mitigation Measures

Adoption of the following mitigation measures will help reduce or eliminate potential adverse effects on the vegetation and wildlife habitat:

1. Threatened, Endangered, and Sensitive plant species clearance work was completed during a time period when all possible plant species could not be expected to be readily identifiable. As a consequence, prior to construction activities, the area will be reinspected by a botanist to assess occurrence of Threatened, Endangered, or Sensitive plant species. Sensitive plant inventories will be conducted during the season when potentially occurring species can be most readily observed. If these species are located, measures will be undertaken to protect any populations or key habitats as approved by the Forest Service.

2. A project construction schedule shall be developed to closely coordinate activities such as clearing, grading and reseeding, to ensure areas are not prematurely stripped of native vegetation and revegetation activities be conducted as soon as possible following development.

3. Vegetation disturbances shall be limited to those areas identified in the construction plans as needed for development or construction support. Areas of native vegetation outside these disturbance zones will be identified on the ground and protected during construction.

4. Access and maintenance roads shall be designed to follow existing dirt road alignments to avoid unnecessary removal of additional vegetation.

5. In the event the golf course is found to be not economically viable and is subsequently abandoned, the developer shall revegetate the project area with native species.

6. Species native to the Eastern Sierra shall be used for revegetation in areas where trees will be planted for shade and aesthetic purposes. Suitable species include red fir, willow, aspen, juniper, lodgepole and Jeffrey pine.

7. Any loss in wetland habitat attributed to project development will be replaced in kind and maintained. Development of 0.5 acre of wetland at Hidden Lake (N1/2, Sec 10, T3S, R27E, MDB&M) will be required as replacement for the impacted wetland in the project area.

WILDLIFE AND FISH

Consequences Common to Action Alternatives

Wildlife populations will fluctuate regardless of golf course expansion due to natural and man-caused actions. No Threatened, Endangered, or Sensitive species will be affected from implementation of any action alternative. Refer to the Biological Evaluation completed for the project for more detail (Appendix C).

The availability of irrigated pasture, riparian and wetland habitat associated with Bodle Ditch will likely decline in all action alternatives within the project site. However, construction of ponds and inter-connecting streams would increase the amount of riparian habitat available. While some shorebirds and waterfowl can be expected to use these sites, overall habitat quality would be limited for some species due to concentrated human activities and a lack of suitable nest sites. The 4-12 foot depth of the one acre ponds would limit habitat primarily to "diving" ducks, which are adapted to deeper bodies of water.

Construction and operation of a golf course with associated concentrated human use would alter wildlife communities using the site. Species adapted to inhabiting grassland environments and tolerant of human activities would increase in abundance, while those associated with shrubland communities would decline or be displaced from the site. Many of the more generalist species expected to increase may cause declines in native species through increased competition and parasitism. Fossorial mammals (i.e. pocket gophers, ground squirrels, etc.) would likely be controlled when their activities conflict with golf course management.

On a long-term basis, development of a golf course would have neutral effects on deer habitat values. Based on work by Longhurst et al (1969), and Plummer et al (1966), greens and fairways would provide a palatable source of forage. These studies have found that deer will use grass as part of their diet. This change is occuring on a very small portion of the 11,250 acre holding area.

The deer in the Sherwin herd have shown a willingness to use forage and browse in and adjacent to the Swall Meadows housing development. Based on this observed behavior, it is likely that deer will take advantage of the forage provided by the vegetation on the golf course. Although intensive human use or maintenance of these sites may limit their availability to deer during daylight hours, deer could readily use these sites at night or during periods of low human use.

Deer will be exposed to pesticides by consuming foliage treated with herbicides. Based on work completed for the Vegetation Management for Reforestation EIS (USFS, 1988), deer could experience doses of 1.5 mg/kg per pound of active ingredient sprayed. With the lowest lethal dose level of 400 mg/kg for deer for the herbicides proposed (USFS, 1988), there is little chance of any direct mortality from exposure to herbicides.

Increased demand for wastewater could indirectly influence available habitat for wildlife species using Laurel Pond by reducing the amount of water reaching the site from the wastewater treatment plant. The estimated amount of wastewater required for the golf course would not, in of itself, threaten overall habitat quality in Laurel Pond. Without implementing the proposed mitigation, cumulative demand of this and other projects could result in lowering of the water level, thereby reducing area capacity to support shorebirds and waterfowl. This effect would be similar for all action alternatives that use reclaimed water. Adopting mitigation measures for hydrology and wildlife would eliminate this adverse consequence.

While none of the mixed conifer forest would be impacted directly, productivity of these sites for species such as woodpeckers and foliage nesting species would likely decline, due to increased populations of nest parasites and competitors. Despite the protection of nesting substrates, species abundance would likely decline.

All action alternatives will have approximately the same level of impacts to the fisheries of Mammoth Creek. As outlined in this chapter, all alternatives could adversely affect downstream water quality without proper mitigation measures. With mitigation, impacts to surface water quality are unlikely.

Consequences Which Vary by Alternative

Short-term adverse effects could occur from a temporary loss in existing habitat and from concentrated human activities which could alter habitat use patterns. All the proposed alternatives except Alternatives E and F would impact the edge of the holding area along the south and east edge of the proposed golf course with a temporary loss of habitat during construction. These losses would continue until reestablishment of vegetation (approximately one year).

Action alternatives have a high potential to partially block the Mammoth Rock migration corridor if golf course construction and intensive maintenance activities occur during migration periods. Alternative D has the greatest potential, since this alternative would construct two fairways directly in a migration route in the Eastern portion of the permit area.

Kucera (1989) documented the use patterns of deer migrating through the holding area. If construction results in complete blockage of the Mammoth Rock

corridor, approximately 7% of the deer herd would be effected. These deer would either be displaced to other corridors or be forced to summer east of the sierra crest. If adequate summer habitat was not available, total loss of that 7% could occur. Total blockage of the corridor is extremely unlikely, even in Alternative D, because of other migration routes located south of the project. Deer have continued to use the Mammoth Rock Corridor throughout the construction of the first 9 holes and the associated homes within the Snowcreek development. Those developments are closer to migration corridors than all alternatives except D.

Attractiveness of greens and fairways to deer, particularly during holding and migratory periods, could result in damage to fairways, greens, and landscaping. This situation could force depredation requests or construction of deer-proof fencing. Fencing in Alternative D would result in complete blockage of a major migration trail. Alternate trails that provide access to the Mammoth Rock corridor are available.

A permanent reduction in suitable habitat would occur from construction of roads, parking lots, and buildings. Of the 11,250 acres of deer holding area, implementation of Alternatives A, B, G, and H would result in the permanent loss of approximately 3 acres of holding area habitat. These losses are associated with construction of roads and parking lots. Each action alternative except F would also construct about 4 acres of ponds within the holding area, for an additional loss of habitat. Losses may be offset by creation of high quality forage.

Under Alternative F, there would be no loss of wildlife habitat on National Forest System lands. The habitat on the private lands would be removed whether or not this alternative is implemented--as these lands are presently allocated to residential and commercial land uses and would thus are scheduled for eventual clearing and development.

Of the action alternatives proposing use of National Forest lands, Alternative C would have the least impact. Under Alternative C the amount of permanent habitat loss in migratory/holding areas is minimized, and facilities associated with high human disturbance factors (i.e. parking lot, buildings, access road) are located outside of these habitats. Alternatives A and B are less responsive, since major facilities and a more habitat loss occurs in high use areas of the holding area. Alternative D has the potential to conflict with migratory habitat needs and holding habitat quality. Alternative E, while not allowing the advantage of increasing forage quality, would be the most responsive as it minimizes amount of concentrated human activities within deer habitats. Alternatives G and H avoid locating facilities in high use areas.

Mitigation Measures

Adoption of the following mitigation measures will reduce or eliminate potential adverse consequences to wildlife resources from Snowcreek Golf Course expansion:

1. Construction of the expanded golf course will be prohibited prior to June 15 each year, unless deer herd monitoring information by Forest Service personnel indicates these restrictions are not necessary.

2. Areas disturbed and not used as playing surfaces will be reseeded with a grass, forb, and shrub mix palatable to wildlife species which emphasizes the use of native species. All disturbed sites will be revegetated in the shortest period of time possible to minimize short-term losses in wildlife habitat.

3. The Forest Service will approve or disapprove wildlife depredation requests in the project area prior to application to other agencies with jurisdiction.

4. The proponent will not request depredation permits for controlling mule deer. The proponent recognizes development of lands within deer habitat contains an associated risk of damage which is acceptable.

5. Mitigation measure 2 in the water quantity section of this EA will be implemented to eliminate the potential for adverse cumulative effects on habitat associated with Laurel Pond.

6. Fences or other impediments to mule deer migration shall be minimized and installed only with approval from the Forest Service. Deer exclosure fences will not be permitted.

7. The proponent will establish screening adjacent to parking areas and buildings to help minimize adverse effects on deer habitat quality.

8. Water quality and fisheries production for Mammoth Creek will be maintained through the mitigation measures and Best Management Practices outlined in the Water Quality section of this chapter.

9. The proponent will monitor deer migration along the Mammoth Rock corridor to determine if use changes in response to the golf course development.

RANGE RESOURCES

Consequences Common to Action Alternatives

There are effects to the range resource with regards to livestock grazing. Development of the proposed project would not directly result in loss of land from the Deadman/Sherwin Range Allotment. Herding of sheep involves mass movement of the flock, sometimes creating large amounts of dust and unfavorable odors. Because of these negative aspects and close proximity of the allotment, it is possible livestock grazing will not be compatible with golf course operations.

Consequences Which Vary by Alternative

Clubhouse location in Alternatives A and B may be more impacted by the sheep than the location of the clubhouse in Alternatives C, D, G and H. This is mostly related to the area used to bed the sheep.

Selection of Alternative E (No Action) or F would have no effect on livestock grazing in the Deadman/Sherwin Range Allotment.

Mitigation Measures

The following measure will need to be implemented for the expansion of Snowcreek Golf Course should a conflict arise:

1. Deadman/Sherwin Range Allotment boundary will need to be relocated to the south, at a distance which livestock grazing will not affect golf course operation. Any loss in allotment acreage will need to be replaced in kind in another location adjacent to the existing allotment boundaries.

CULTURAL RESOURCES

Consequences Common to Action Alternatives

Implementation of any action alternative for the Snowcreek Golf Course Expansion Project will have no effect on significant cultural resources in the proposed project area. Prehistoric cultural properties potentially eligible to the National Register of Historic Places are not likely to yield important information, and therefore are not considered significant resources. Lower Bodle Ditch, which has played a significant role in historic times, lacks the integrity to be a contributing property and is also ineligible. These were the findings of the State Historic Preservation Officer (SHPO), who reviewed documentation and an archeological inventory of the area (Appendix D).

Golf course construction will further obliterate Bodle Ditch and disturb the prehistoric site, but neither site is considered significant and according to the National Historic Preservation Act, the protection of these sites is not required.

Consequences Which Vary by Alternative

Cultural resources on National Forest System lands would not be impacted by golf course construction under Alternative E or F.

Mitigation Measures

Adoption of the following mitigation measures will reduce or eliminate potential adverse consequences to cultural resources:

1. The entire Bodle Ditch system as a whole has enough integrity to qualify as a site or contributing feature on the National Register, lower Bodle Ditch by itself does not. In order to preserve the

significance this water system held in local history, the following measures shall be implemented:

a. Sketches and photographs of distinctive and typical sections of the side ditches will be made and keyed to a detailed map. Sketches shall be incorporated into a display at either the Hayden Museum or the golf course to tell the story of the water ditch system and how it nourished Old Mammoth.

b. A distinctive portion of the ditch with weirs will be preserved in place and integrated into golf course design.

c. An interpretive sign will be placed at the preserved section of the ditch with appropriate fencing or landscaping to protect the segment during golf course use.

2. Should archaeological resources be discovered during construction of the golf course expansion, work will be halted until the area can be evaluated by the Forest Archaeologist. The project design will allow flexibility to move developed areas should a significant archaeological site be identified.

VISUAL RESOURCES

Consequences Common to Action Alternatives

The characteristic landscape would be modified in each action alternative from naturally appearing sagebrush to an urban park-like setting with grass, ponds, trees, and facilities. Depending on the alternative chosen, 60-75 acres would appear to be heavily modified, especially during the initial construction stage and the time it takes for planted trees to provide screening. All action alternatives have varying degrees of existing brush strips between greens, fairways, and parking/clubhouse facilities. These brush strips would contrast in color and texture with adjacent greens and fairways and would accentuate them. Eventually these strips would become less visible and would change in composition as trees grow and native vegetation reacts to additional water and changed drainage patterns throughout the site.

Location of parking and clubhouse facilities would not be a major visual consideration as both can be softened considerably by topography and planted vegetation. Both primary locations site the clubhouse within the course and would effectively be surrounded by landscaped terrain.

The Variety Class would change in developed areas from Variety Class B to Variety Class A. There would be a much higher degree of visual variety throughout the permit area relating to vegetation, landform, and water. This increased variety and taller planted vegetation (trees) would act as a transition to screen, soften, and create a more acceptable visual setting against the intensive structural elements being built and proposed throughout the meadow area. This would be true for all action alternatives as seen from the Key Viewpoints.

All action alternatives as seen from Sherwin Lakes Trail and Mammoth Rock Trail would look similar with the sequence being golf course, intensive development, and Mammoth Mountain in the background. Because of the distance viewed, differences between alternatives would not be readily apparent. Differences in action alternatives as seen from the Old Mammoth Road would not be readily apparent to the viewer as views would be consistent with elements of golf course, intensive structural development, parking, roads and ponds.

The degree and intensity of development is basically the same for all action alternatives, only the configuration and orientation of facilities changes. Visual Absorption Capability (VAC) would also be the same. Views of the site are wide open from key viewpoints and the ability of existing vegetation to screen modifications is limited. Ability to absorb modifications would be low for all action alternatives.

The Existing Visual Condition would change from one of minor disturbance to major disturbance on 60-75 acres depending on alternative chosen. The golf course would appear as heavily modified compared to natural landscapes to the south and east in all alternatives.

Development of a golf course with its heavy land modifications and changed vegetative patterns contrasting with the existing landscape would not meet Retention or Partial Retention Visual Quality Objectives (VQO) in any action alternative. Normally VQO's are a relative measure of impacts as they relate to the natural-appearing landscape. In all action alternatives, the natural landscape would be replaced by an urban, park-like landscape. Since adjacent landscape to the west of the proposal is being drastically changed to an intensive structured development, the golf course would soften and create a transition between this urban development and adjacent brush covered slopes. The VQO system was not developed to apply to urban or residential landscapes and probably should not be applied here. The Forest Plan allows the Forest Supervisor to approve deviations from assigned VQO's after evaluation through the environmental analysis process (Inyo NF, 1988). Through this analysis, the VQO was determined not to be a critical factor.

Consequences Which Vary by Alternative

The amount of modification would vary by alternative as seen from Lake Mary Road and Sherwin Creek Road. All action alternatives would basically be visible from Lake Mary Road, but due to contrasts with the existing landscape, Alternatives A, B, C, G and H, which occupy the moraine to the south, would be a visual concern. Alternative A would be the most visible, having 6.0 acres of greens and fairways (Holes 11 and 12) running perpendicular to the contour. Alternatives B, C, G and H create a minor amount of visual impact with one hole on the lower slope of this moraine. Visible are 3.5 acres in Alternative B and 3.0 acres in Alternatives C, G and H.

The most critical views of the golf course would be from westbound travelers on Sherwin Creek Road. The amount of golf course acres visible varies between alternatives. Location, orientation and closeness to the road would determine how visually obtrusive or pleasing the golf course would appear. Impacts to visual resources in the area from Sherwin Creek Road and Lake Mary Road and the areas not visible from key viewpoints are displayed in Table 5 and Figure 8.

Table 5. Visual Impacts From the Proposed Project.

	ALTERNATIVES					
	A	B	C/G/H	D	E	F
Disturbed Acres Not Readily Visible From Key Viewpoints	34.5	30.5	36.5	27.0	0.0	0.0
Disturbed Acres Highly Visible From Sherwin Creek Road	29.5	42.0	28.0	39.5	0.0	0.0
Disturbed Acres Highly Visible From Lake Mary Road (moraine)	6.0	3.5	3.0	0.0	0.0	0.0

Alternative F, which is located completely on private lands, would not be readily visible from the Sherwin Creek Road. The remainder of the discussion presented below concerns those alternatives that would allow occupancy of National Forest System lands (Alternatives A - D, G, H).

Alternative A would have the second lowest acres (29.5) visible from Sherwin Creek Road; however, modified acres visible are spread over the widest area. The viewer would perceive the area impacted as much larger than other action alternatives. Alternative A does not utilize already disturbed areas around the reclaimed borrow pit, but Hole #10 and the practice range would disturb unimpacted areas at the upper end of that particular drainage. The golf course would front approximately 1/4 mile of Sherwin Creek Road.

Alternative B would have the most acres visible, but better concentrated than Alternative A. Acreage is located in areas already disturbed (the reclaimed borrow pit). The golf course would appear to come up to the road for approximately 1/3 mile.

Alternatives C, G, and H would have the least amount of acres visible from Sherwin Creek Road. The golf course would appear to be confined to the low ridge directly ahead of the viewer. It is visually the most acceptable of the action alternatives as seen from Sherwin Creek Road and would have the least amount of visual impact. It would appear to front Sherwin Creek Road for approximately 1/4 mile.

Alternative D would have the second highest acres of modifications visible from Sherwin Creek Road and would create the greatest visual impacts from this viewpoint. It would appear to viewers the golf course runs along the road for approximately 3/4 mile. Natural views of the Sherwin Bowl escarpment would most likely be obscured by this alternative.

The ability of the site to absorb visual modifications would differ for the portions of the site located on the southern moraine in Alternative A and along Sherwin Creek Road in each of the alternatives. The moraine is a focal point

and important backdrop for the structural development taking place. These two zones would be difficult to develop without changes being highly visible.

Alternatives A and D are the most visually disturbing action alternatives. Alternative A has a visual impact and disregard for the moraine and would be perceived as the alternative with the greatest visibly impacted area. Alternative D does not take advantage of the topography and appears to unnaturally crowd Sherwin Creek Road. Alternatives B, C, G and H are designed to better fit the terrain. Alternative B utilizes the reclaimed borrow pit area, but appears to intrude more into the swale than Alternatives C, G, and H. Alternatives A and B are also move visually obtrusive because of the entrance road to the clubhouse and parking area off Sherwin Creek Road than having the clubhouse and parking area adjacent to Old Mammoth Road and Sherwin Creek Road.

Mitigation Measures

The following measures would mitigate consequences to visual resources caused by proposed expansion of the Snowcreek Golf Course:

1. Where possible, leave a strip of native vegetation 100-400 feet wide along Sherwin Creek Road that will merge with the strips between fairways. Where possible, develop the golf course's eastern and southern boundaries to minimize impacts as seen from Lake Mary and Sherwin Creek Roads (see Figure 8).

2. In the final design of the golf course, ensure native vegetation strips are no wider than the width of greens and fairways.

3. With Alternative B, redesign Holes #10 and 11 by not allowing them to cross to the east side of the swale.

4. During development of the specific site plan, design the golf course to better integrate with the community development to the west and north by incorporating some features onto private land and reducing the straight development line shown in preliminary golf course designs.

5. Use vegetation within the project area native to the Mammoth Lakes area, rather than exotic species, to reduce the visual impact of the course and make for a better vegetative transition.

6. Reduce visibility of water features along the Sherwin Creek Road corridor so landscape features that look out of character with adjacent natural-appearing landscape will not be visible.

7. In the specific site plan, design the project to minimize visibility of parking and clubhouse facilities from Sherwin Creek Road.

LAND USES AND OWNERSHIP

Consequences Common to Action Alternatives

Expansion of the proposed Snowcreek Golf Course onto National Forest System lands (Alternatives A - D, G, H) would impact an existing Forest Service administrative site. This site is presently being used as a base of operation for the wilderness, construction and maintenance programs on the Mammoth Ranger District. Although every alternative would not require removal of the tack room facilities, conversion of the Forest Service pasture to golf course would occur. All action alternatives would impact the explosive and small blasting cap magazines at their current location.

Mitigation measures have been made to minimize impacts to the pasture land under special use permit to Sierra Meadow Ranch. These mitigation measures are documented in an Agreement between Louis B. and Mary E. Roeser, Dempsey Construction Corporation (Dempsey Corporation) and Snow Lode Group, Inc. (Appendix E).

No impacts are expected to occur on the Mammoth Creek Town Park.

All action alternatives would have a beneficial impact to the adjacent Snowcreek Resort. The proposed expansion of the existing golf course would increase the value of the land and increase the number of golf course users on the Snowcreek Golf Course. The expansion of the golf course would also help meet the goal of the Resort and the community of becoming a year-round destination resort.

Consequences Which Vary by Alternative

According to preliminary plans submitted by the proponent, tack room facilities at the Forest Service administrative site would interfere with golf course design in Alternatives C, D, G and H. In Alternatives A and B, these facilities would be adjacent to Hole #3. Alternatives A and B would not displace the existing buildings and corral, but would impact the pasture area. Operating the tack room under these conditions would not sufficiently meet the needs of the Forest Service. Loss of the pasture would create a situation which would not allow adequate grazing and exercise for the livestock. Corralled stock have a greater chance for injuries or permanent damage. Additional corrals would need to be built to handle sick or injured stock. Alternatives A or B would not leave sufficient space for corrals, hay storage, grain bin, livestock supplies, signs, lumber, horse trailers, hitching rails, construction and maintenance supplies and vehicles which are currently being stored or used on site during the operating season. Therefore, development of the golf course would displace this entire operation.

According to the proponent, Alternatives A and F are the only alternatives that will impact the proposed Sherwin Ski Area, should construction of the ski area be approved. When the runs and chairs are constructed, Holes #10, 11, and 12 of Alternative A will need to be relocated to be compatible with the ski area. Alternative F uses private land that is currently allocated for base area development in support of the proposed Sherwin Ski area. Use of private land for development of ski area facilities was a key factor in selecting the preferred alternative in the Sherwin Ski Area EIS. Sherwin Ski Area will

utilize four acres within the project area for parking. A portion of the 0.8 acre golf course parking area in Alternatives A, B, G and H can be utilized for this use. In Alternatives C and D, parking is not located to allow dual use, and another four acres near the ski area base facility within the project area will need to be constructed.

Alternatives A, B and D would utilize the borrow pit area in the development of the golf course. No conflicts are expected to occur and these alternatives would compliment the reclamation of this area.

Under Alternative E (No Action) and F present use of the National Forest System lands would continue.

Both land exchange alternatives would result in lost revenue to the government because of elimination of land use fees. With land exchange, the use of the area as a golf course is not assured, since once the land is in private ownership, land use is out of federal government control.

Mitigation Measures

The following mitigation measures will be implemented to eliminate or reduce the potential effects of expansion of the Snowcreek Golf Course:

1. Appendix E, Agreement between Roeser, Dempsey Corporation, and Snow Lode Group discusses the mitigation measures to minimize impacts to the pasture lands.

2. Proponent shall be required to locate and develop an alternative Forest Service administrative site for the displaced tack room and pasture within 15 miles of the current site. Facilities will be of a like nature to those on the existing site, including 20 acres of pasture land. The new location may require a non-potable irrigation system since the current pasture is irrigated by Bodle Ditch. Utilities shall be placed at the new location (i.e. telephone, electricity, water, gas and rest room). An additional facility will possibly have to be constructed for security reasons should the new location be remote and susceptible to vandalism. At the present location, facilities are monitored by the Mammoth Lakes Police Department (under a co-operative agreement) and Sierra Meadow Ranch. The site and facilities must be acceptable and approved by the Forest Service.

3. The proponent will relocate the explosive magazine and small blasting cap magazine to Forest Service and State of California regulations. The new site must be approved by the Forest Service prior to relocation.

RECREATION

Consequences Common To Action Alternatives

For Alternatives A - D, G and H, golf course development on National Forest System lands would impact spring through fall dispersed recreation

opportunities currently existing (i.e. walking, jogging, sightseeing and bike riding) in the area. This type of recreation within the project area would be a conflict during golf course use but the proponent feels during non-golf course use (early morning and late evening) the project area could be utilized for these uses. Horseback riding would be eliminated within the project area. The current dispersed use level or 150 RVD's would be eliminated, and users would be displaced to adjacent areas.

Most effects of Snowcreek Golf Course expansion on operations at Sierra Meadow Ranch have been mitigated in an agreement between Louis B. and Mary E. Roeser, former owners of Sierra Meadow with Dempsey Construction Corporation (Appendix E). These mitigation measures minimize impacts to the nordic ski trails, sleigh and hay rides, and riding trails. The Roeser family sold Sierra Meadows this past year. According to the proponent, the agreement can be transferred and would continue between the new purchaser and Dempsey Corporation. The 1,500 RVD's of summer use associated with Sierra Meadows would remain unchanged.

Alternatives A through D, G and H, which allow use of National Forest System lands, could displace the dog sled rides within the project area. Permission for this use would have to be agreed upon by the proponent. It is possible that this use within the project area could be moved to another location.

Expansion of the Snowcreek Golf Course will create an opportunity for the public to play on an 18-hole championship-quality course in the Mammoth Lakes area. The golf course will support approximatly 160 People-At-One-Time (PAOT), with an average lenght of stay around 6 hrs. Each golfer would generate .5 RVD's. With a 120 season, and an expected use of 25,000 rounds of golf, the golf course will increase PAOT capacity by 19,000 PAOT-days, and generate an additional 6,250 RVD's.

Consequences Which Vary by Alternative

The clubhouse and parking area location will need access on Sherwin Creek Road past the Sierra Meadow Ranch development in Alternatives A, B, G and H. The additional traffic from the golf course users may impact dispersed recreation users on the road and may impact business at Sierra Meadow Ranch.

Alternative E (No Action) and F would have no affect on National Forest System lands. Dispersed and Sierra Meadow Ranch recreational activities would continue as it exists today and may increase with time. The existing dog sled rides within the project area would not be impacted, but because use is a verbal agreement between the permittees, continued use is not guaranteed with this alternative.

Mitigation Measures

The following agreement has been adopted to mitigate possible impacts to organized recreation in the project area due to Snowcreek Golf Course expansion:

1. Appendix E, Agreement between Roeser, Dempsey Corporation, and Snow Lode Group discusses mitigation measures to minimize impacts to the Sierra Meadows Equestrian and Ski Touring Center's operation.

SOCIAL AND ECONOMIC ENVIRONMENT

Consequences Common to Action Alternatives

Overall impact to Mono County and the Town of Mammoth Lakes resulting from the expansion of Snowcreek Golf Course would be economically beneficial. The increased capacity for an active recreation center associated with the Town would assist in fulfilling the County Overall Economic Development Plan goal to create a year-round resort image for Mammoth Lakes. The golf course, in combination with other amenities located in town, would attract visitors more likely to stay in existing lodging, and use the existing commercial facilities. Increased use of existing facilities during the summer would help balance an economy dominated by winter use.

The expansion of the golf course would directly generate county revenues for schools and roads in the form of fees from a Special Use Permit. Additional revenues would be generated from Transient Occupancy Tax, Sales Tax, and County Possessory Interest Tax, as well as from increased summer use of the Town's businesses and services.

Further expansion of the Snowcreek Golf Course would increase the expected numbers of urban-type recreationists a golf course attracts. There are no expected increases in the permanent population.

Estimated construction cost of the golf course expansion project is $2.6 million. Annual operating and maintenance expenses for the 18-hole course are estimated at $500,000 for a 120-day playing season. If capital recovery of the initial construction cost over a 20-year period is included, the total annual costs for operating an 18-hole golf course is $1.1 million. To break even managing the facility, with an estimated maximum of 25,000 rounds of play per year, the fee to play the 18-hole course will be a minimum of $44.00.

Impacts to human health and safety from use of pesticides in all action alternatives would be the same. Based on the Human Health Risk Assessment (Appendix F), the public would be exposed to minimal residual amounts of pesticides. Risk is displayed by dividing the lowest No Observable Effect Level (NOEL) dose, which is the highest dose that did not cause any effect on the test animals, by the expected exposure dose to produce a margin of safety (MOS). The MOS gives an indication of how close the expected exposure is to the NOEL. MOS numbers greater than one mean that the expected dose is less than the NOEL dose. MOS's less than one indicate that the expected dose is greater than the NOEL dose. The MOS values for public exposure ranged from 83 to over 1 million. All proposed uses of pesticides are consistent with products that are used on golf courses around the country.

Consequences Which Vary by Alternative

The developed access road, clubhouse and parking area locations in Alternatives A, B, G and H may encourage future development along Sherwin Creek Road. The clubhouse and parking area facilities location in Alternatives C and D would concentrate human activity on the boundary between Town and National Forest System lands.

The expansion of the existing 9-hole golf course onto National Forest System lands under Alternatives A through D would help Snowcreek Resort's plan to become a complete destination resort development.

Under Alternative E (No Action) potential economic impacts due to the golf course expansion would not be achieved. Increased revenues generated by the championship-quality golf course would not be realized. Visitors to the area seeking an 18-hole golf course to play would be required to drive 40 miles to Bishop until the Lodestar development of an Executive (non-regulation length) golf course is completed. The area will remain in its natural state, providing those intangible benefits associated with open space adjacent to a community.

Under Alternative F (development on Snowcreek Resort private lands) the proponent must forego the residential and commercial development of approximately 71 acres. All indications are that these 71 acres can produce higher rates of income if developed as presently planned (residential and commercial) than as proposed under this alternative. Rather than producing higher rates of income that support the overall recreation complex (including the golf course), the private lands would produce less income for a smaller resort complex (as compared to Alternatives A - D). The cost of an opportunity lost under Alternative F may result in the proponent charging a green fee more than the $44.00 fee described above, thus making the golf course available to less people. It is questionable whether golf course expansion is economically feasible without some type of support or offsetting land costs.

Additionally under Alternative F, the potential for year-round recreational opportunities and economic stability of the Town of Mammoth as guided by its General Plan (1987) would be impacted by the loss of 71 acres of residential and commercial development. A Development Agreement with the Town of Mammoth Lakes would have to be modified as this alternative does not conform with that agreement. Approximately 90% of the Town's private lands are already developed, subdivided or have master plans for development. With such a limited private landbase the Town and the Forest Service have been put into a symbiotic relationship wherein the welfare and purpose of one is highly related if not dependent upon the other. Implementation of this alternative would not further the Inyo National Forests policy of allowing developments on National Forest System lands that clearly can be supported by a community and benefits outweigh adverse impacts (Inyo LRMP, p. 194).

Alternatives G and H would both result in a land exchange. In both cases the proponent would have to find suitable property of equal value for the exchange. In Alternative G, the value of the National Forest System would be appraised as open space, recreational use, because a golf course would be located on the site. Using the highest and best use concept of appraisal, the value of the property would be significantly lower than if it was appraised as residential or commercial property. With Alternative H, the National Forest System land would be vacant, and would typically be appraised at the maximum value, which is currently averaging around $200,000 per acre in the Town of Mammoth Lakes area. Dempsey Construction would have to exchange a parcel of land worth approximately $23,000,000 to meet the equal value condition for land exchange. It is unlikely that a golf course could be built on land appraised

as if it was going to be developed for residential use because of the high capitalization costs and subsequent high greens fees required to pay off the debt.

By operating on public lands (Alternatives A - D), the proponent would be required to make this a public golf course and allow equal access to all persons regardless of race, religion, sex or disability. This could not be guaranteed under implementation of Alternatives F, G, and H.

With both land exchange alternatives, the Forest Service would not be able to enforce any mitigation measures designed to minimize the impacts on water and deer. For example, the requirement to use reclaimed water could not be enforced. The proponent could drill a well and use ground water for irrigation at significantly reduced costs. The proponent would be free to install deer proof fencing, increasing the permanent habitat loss. The proponent could also ask for zoning changes and develop residential units in the vacant areas between the holes.

Implementation of an alternative that allows the golf course to expand onto National Forest System lands (Alternatives A -D) would provide an economic benefit to the proponent in terms of not having to carry costs for the land value. The proponent would be required to pay a Special Use Permit fee to the Forest Service, which would be based on the fair market value of the rights and privileges authorized.

Mitigation Measures

The proponent shall comply with the following measure:

1. This facility shall be accessible as provided for in the Forest Plan and the Americans with Disabilities Act.

2. All earthwork activities shall be limited to normal daylight hours to minimize the noise impact in the surrounding area.

CUMULATIVE IMPACTS

The following describes cumulative impacts associated with the proposed expansion of Snowcreek Golf Course. These are impacts to the environment which result from incremental impacts of the proposed action when added to past, present and foreseeable future actions regardless of agency or individuals undertaking such actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over time. The cumulative impacts described represent the maximum amount of impact to resources.

While the degree of impact is similar among alternatives, their cumulative impact is considered minor when compared to existing and planned development for this general area. This proposed development would be a major change in land use.

HYDROLOGY

Water Quantity

Mammoth County Water District has sufficient domestic and reclaimed water capacity to accommodate the development of this project. The projected cumulative consumption of water within the basin is 6,366 acre feet per year. Included within that total is the anticipated MCWD buildout demand of 5,946 acre feet per year (MCWD, 1986), 255 acre feet per year for Sherwin Ski Area (Inyo NF, 1990) and 165 acre feet per year for the irrigation of the first nine holes of the Snowcreek Golf Course using untreated groundwater. The Water District is in the process of investigating new and/or additional sources for water to satisfy the buildout potential needs.

Water Quality

The continued development of the Town of Mammoth Lakes is providing additional impervious areas that are generating additional runoff. With this runoff, there are additional contaminates that are being transported into the stream channels and then flushed through the Basin. The development of the private land base associated with the project will add to the increased runoff. The Final Environmental Impact Report (Final EIR) for the Town of Mammoth Lakes General Plan discusses this impact in greater detail. The Town of Mammoth Lakes and the Lahontan Regional Water Quality Control Board both have authority to regulate development and both agencies do require mitigation measures. The Final EIR predicts that urbanization of the Town of Mammoth Lakes will result in unavoidable impacts to streams and water quality, primarily attributed to existing problems and increased surface runoff.

WILDLIFE AND FISHERIES

Cumulative impacts on wildlife species could be substantial, but are related to development of the town and construction of the proposed Sherwin Ski area. With development of the town, wildlife communities are expected to shift to include a greater abundance of generalist species adapted to grassland environments and human activities. Increased Town population could indirectly increase road kills and poaching, as well as domestic dog harassment. If the proposed Sherwin Ski Area is developed, transitional deer habitat would be altered by construction of lifts, runs, access roads, and facilities. Alterations would occur within the holding area and migration routes. The proposed ski area is still in the planning phase and many of these impacts will vary depending on the final design. Approval of the ski area is discretionary for the Forest Supervisor, and the cumulative effects of ski area construction will be documented through the NEPA process before that decision is made. Since the golf course is expected to have neutral impact on deer herds, the contribution of the golf course to the cumulative impacts on deer is not significant.

Continued community development, when coupled with the resulting unavoidable impacts to water quality and quantity, will place additional stress on fish populations in Mammoth Creek. While the impacts of all action alternatives can be mitigated to non-significance through application of the stipulated

mitigation measures, the indirect cumulative impacts of further community development inevitably will impact fish and fish habitat.

Threatened and Endangered Species

Continued community development, much of which is inevitable regardless of the outcome of this project, will likely lead to further cumulative impacts to the endangered Owens tui chub in the Hot Creek headsprings. The increased use of reclaimed wastewater as planned for this, and possibly other future projects, may be able to off-set rising demands for groundwater from Mammoth Basin and allow additional water to recharge aquifers which feed the springs. A detailed discussion on water issues of Mammoth Basin and the Owens tui chub is included in the "Biological Assessment" associated with County Well #11 (USDA-FS, 1990b).

RANGE RESOURCE

Cumulative effects of increasing development could gradually reduce the Deadman/Sherwin Sheep Allotment in the vicinity of Mammoth Lakes. Grazing by livestock may not be compatible with concentrated human activities. The effect may result in a gradual reduction in numbers of animals permitted to graze within the allotment or elimination of grazing in the area. Actual reductions cannot be determined without specific knowledge of total acreage and type of forage lost due to each project.

VISUAL RESOURCE

Development in the Mammoth Meadow area has increasingly modified the land to an urban-type setting. What was once a visually pristine natural landscape, has now been heavily modified. Development of the proposed Sherwin Ski Area will further visually modify the landscape. Golf course development may act as a visual transition between present and planned structures, and adjacent lands. This transition would have positive visual benefits by creating an acceptable transition between an urban-like environment to brushland.

RECREATION

Cumulative impacts to recreation would be affected by golf course expansion in two ways. Development of a golf course and Sherwin Ski Area would limit and possibly displace the variety of dispersed recreational opportunities currently in the area. Users within this area, which is predominantly local, dispersed recreation users, will change to more urban and non-local recreation users. Secondly, an increased demand for this type of activity may be placed on National Forest System (NFS) lands. An inquiry as to the availability of forest lands has already occurred. NFS lands have traditionally been utilized for non-urban type recreation activities. The cumulative impact could be an increase in usage and demand for NFS land for urban-type recreational activities.

SOCIAL AND ECONOMIC ENVIRONMENT

A possible decrease in unemployment rates at the end of each ski season would be a positive impact of this project. Projects which promote increased summer tourism would ease the seasonal summer unemployment period. Restaurants, lodging, shops and other amenities traditionally more heavily used by winter visitors, would increase. This would result in generating dollars for local businesses and county tax revenues.

Developments in Mammoth Meadow have significantly changed the social environment of the area. Local residents and visitors once utilized the area for dispersed recreation pursuits. Planned developments will continue to urbanize the character of the area.

Summer visitors to the area are mainly campers, hikers, recreationists and tourists, generally preferring less developed facilities and a natural environment. More highly developed recreation facilities would attract a different type of user. These users are more likely to stay in existing facilities located within the Town of Mammoth Lakes. It is unlikely that any new development will be proposed as a result of this increased visitation.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Development of this project on National Forest System land would not be considered for short-term use. Long-term productivity of the land would mainly impact vegetation. Conversion of native vegetation to a golf course will favor non-native species adapted to grassland environments. The ponds and lakes, newly paved roads, parking area, and other structural facilities will remove biomass production within these areas. The change in vegetation type may make up for these losses. Availability of this new forage-type and water provided by the golf course may be beneficial to the mule deer population.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible soil losses from wind and water erosion, along with lowered soil fertility, could occur during the construction phase of the project. Mitigation measures would minimize these losses. With the high cost of the capital improvements, mineral exploration and removal would not be likely; therefore, commitment of the mineral resource would be irreversible.

There would be an irretrievable commitment of visual, dispersed recreation, wildlife, reclaimed water, and range resources.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

CONSTRUCTION IMPACTS

Construction impacts, although temporary and mitigative, are essentially unavoidable. Noise, vibrations and dust associated with movement of heavy equipment and construction work could be controlled, but not eliminated. Adverse impacts would include disturbances to human and wildlife activities in

the vicinity and visual impacts. Control measures can be implemented to reduce silt and sedimentation from disturbed soils, but local water quality impacts would be difficult to control during severe weather.

LAND TRANSFORMATION IMPACTS

The requirements of golf course design makes land transformation impacts unavoidable. In addition to the course itself, development of buildings, and paved areas will change wildlife habitat and activity patterns as well as land use. Disturbance and development will impact approximately 70 acres of sagebrush shrub, pasture and wetland, transforming it into a maintained grassland.

VISUAL IMPACTS

Expansion of Snowcreek Golf Course will further alter the existing viewshed. Potential adverse visual impacts can be mitigated to some degree through course design, but modification to existing visual character of the area cannot be avoided.

CHAPTER V

INTERDISCIPLINARY TEAM AND PERSONS CONSULTED

Interdisciplinary Team of Specialists

The following people participated in the analysis of alternatives and subsequent preparation of the original EA in 1991:

Ray Porter - Resource Officer/Team Leader / Mammoth Ranger District

Heather Harvey - Land Management Planner/Social and Economic / Supervisor's Office

Thom Heller - Hydrologist/Lands Officer / Mammoth Ranger District

Michael Morse - Wilderness Supervisor/Recreation / Mammoth Ranger District

Edward Rickford - Landscape Architect/Cartography / Supervisor's Office

Charles Vandemoer - Wildlife Biologist / Supervisor's Office

Wallace Woolfenden - Zone Archeologist / Mammoth/Mono Ranger Districts

Marian Kadota - Timber Assistant/Document Editor / Mammoth Ranger District

Scott Kusumoto - Forester Trainee/Editor / Mammoth Ranger District

Other contributing specialists:

Juan Gallegos - Soil Scientist / Supervisor's Office

Randy Karstaedt - Realty Specialist / Supervisor's Office

Vern McLean - Geologist / Supervisor's Office

Sara Chubb - Fisheries Biologist / Supervisor's Office

Revised EA

The following people participated in the revision of the 1991 EA:

Sara Chubb - Fish and Wildlife Program Manager / Supervisor's Office

Bob Hawkins - Acting Recreation Staff Officer / Supervisor's Office

Richard Perloff - District Wildlife Biologist / Mammoth Ranger District

John Schuyler - Forest Planner / Supervisor's Office

Richard Warren - Recreation Planner / Supervisor's Office

John Borrecco - Regional Pesticide Use Coordinator / Regional Office

CHAPTER VI

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PERSONAL COMMUNICATIONS

Bleich, Vernon Ca. DFG, 407 W. Line St., Bishop, CA 93514

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Roeser, L. P.O. Box D-4, Mammoth Lakes, CA 93546

Wood, R. Mammoth Ranger District, P.O. Box 148, Mammoth Lakes, CA 93546

APPENDICES

APPENDIX A

WETLAND DOCUMENTS FOR A PORTION OF THE SNOWCREEK GOLF COURSE

MAMMOTH LAKES, CALIFORNIA

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF

October 22, 1990

Office of the Chief
Regulatory Branch

Dempsey Construction Company
Attention: James Ognisty
c/o Mountain Environmental Group
P.O. Box 384
Mammoth Lakes, CA 93546

File No. 91-026-EV

Gentlemen:

This is in reply to your application and/or letter dated October 5, 1990 for Department of the Army authorization to place fill in 0.51 acres of wetlands in a meadow south of Old Mammoth Road for the proposed expansion of the Snowcreek Golf Course in Mammoth Lakes, Mono County.

Regulations for our permit program, published in the Federal Register, include Part 330 - Nationwide Permits (see the enclosure). The Corps of Engineers has determined that your proposed activity is covered under the nationwide permit for discharges of dredged or fill material into non-tidal rivers, streams and their lakes and impoundments, including adjacent wetlands, that are located above the headwaters, which would cause the loss or substantial adverse modification of less than one acre of such waters (Section 330.5 (a)(26)(i)).

As long as you comply with the nationwide permit conditions (Section 330.5 (b)), an individual permit is not required. This Nationwide Permit verification is valid until the nationwide permit is modified, reissued, or revoked. All nationwide permits are scheduled to be modified, reissued or revoked prior to January 13, 1992. It is incumbent upon the permittee to remain informed of any changes to Nationwide Permits. We will issue a public notice announcing the changes when they occur. Furthermore, if you commence or are under contract to commence this activity before the date the Nationwide Permit is modified or revoked, you will have twelve months from the date of the modification or revocation to complete the activity under the present terms and conditions of this nationwide permit.

This letter does not convey any property rights, either in real estate or material, or any exclusive privileges. Also, it does not authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations, nor does it obviate the requirement to obtain State or local assent required by law for the activity.

If you have any questions please call Liz Varnhagen, Regulatory Branch, at (213) 894-5606 any workday. Please refer to the file number 91-026-EV in any future correspondence.

Sincerely,

David J. Castanon

David J. Castanon
Chief, Northern Section

Enclosure

D. R. SANDERS AND ASSOCIATES, INC.

Route 2, Box 142 • Utica, MS 39175 • Bus: (601) 885-6135 • Res: (601) 885-6131

10 September 1990

Mr. James N. Ognisty
Dempsey Construction Company
P.O. Box 657
Mammoth Lakes, California 93546

RE: Wetlands Survey of Portions of the Snow Creek Golf Course, Mammoth Lakes, California

Dear Mr. Ognisty:

This letter constitutes my report of findings on a wetlands survey of the above-referenced area. The field work was conducted during 7-9 August 1990.

Background

1. Dempsey Construction Company is constructing a golf course on property in Mammoth Lakes, Mono County, California (Figure 1). Although most of the property is clearly nonwetlands, a portion of the property has some wetland characteristics. A question has arisen as to whether any of the property is a natural wetlands or simply has some wetland features due to irrigation. Dempsey Construction Company retained D. R. SANDERS AND ASSOCIATES, INC. to conduct a survey for wetlands on the subject property.

Purpose

2. The purpose of this study was to identify, delineate, and map portions of the subject property that qualify as wetlands or other categories of "Waters of the United States" for purposes of Section 404 of the Clean Water Act of 1977 (as amended).

Methods

3. The entire property was surveyed during 7-9 August 1990. Routine wetland delineation procedures described in "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (Federal Interagency Committee for Wetland Delineation, (1989) were used in the survey. In addition, procedures for wetland

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determinations in altered areas were used due to a long history of irrigation in portions of the study area.

4. According to the above-referenced wetland delineation manual, three mandatory technical criteria (i. e., hydrophytic vegetation, hydric soil, and wetland hydrology) must be met for an area to qualify as a wetland for purposes of Section 404. The manual also states that one or more wetland criteria might not be met in highly altered wetlands. Although not specifically stated in the manual, the inference is clear that areas temporarily having wetland features due to human activities (e. g., irrigation) should not be considered to be wetlands. Moreover, current Corps of Engineers policy regarding areas having hydrophytic vegetation due to irrigation is that irrigated areas having some characteristics of wetlands will not be considered to be subject to Section 404 jurisdiction if the irrigation can be terminated and the areas lose their wetland characteristics. If the irrigation cannot be terminated, or if the areas would retain their wetland characteristics after termination of irrigation, the irrigated areas will be subject to Section 404 jurisdiction.

5. Considering the above, a primary objective of the survey was to determine the potential sources of water reaching the site and determine the extent to which irrigation water has influenced the site.

6. Hydrophytic Vegetation. Hydrophytic vegetation refers to vegetation that may occur in wetlands. Many species contributing to hydrophytic vegetation have adaptations that allow them to grow in areas where soil oxygen is at least temporarily deficient. An area is considered to have hydrophytic vegetation when more than 50 percent of the dominant plant species have a wetland indicator status of OBLIGATE PLANT (OBL), FACULTATIVE WETLAND PLANT (FACW), and/or FACULTATIVE PLANT (FAC) (see Table 1). Dominant plant species are those which contribute most to the nature of the plant community, and are determined by the size, number, and distribution of plants in the community.

7. Hydric Soil. A hydric soil is a soil that has developed under anaerobic (without oxygen) conditions. Under conditions of prolonged anaerobic conditions, soils develop physical characteristics that are indicative of wetlands. The most commonly observed indicator of hydric soils are soils having a matrix chroma of 1, or of 2 when accompanied by bright mottles. The soil matrix is the greatest portion of the soil having a given color. Mottles are splotches of colors that contrast with

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TABLE 1

WETLAND PLANT INDICATOR STATUS CATEGORIES
(Reed, 1988)

Indicator Category*	Definition
OBLIGATE PLANT (OBL)	Plant species whose estimated probability of occurrence in wetlands is >99%, under natural conditions.
FACULTATIVE WETLAND PLANT (FACW)	Plant species whose estimated probability of occurrence in wetlands is >66%-99%, under natural conditions.
FACULTATIVE PLANT (FAC)	Plant species whose estimated probability of occurrence in wetlands is >33%-66%, under natural conditions.
FACULTATIVE UPLAND (FACU)	Plant species whose estimated probability of occurrence in wetlands is >1%-33%, under natural conditions.

* Species having an indicator status of UPLAND PLANT (UPL) occur 0-1% of the time in wetlands. Species not included on the "National List of Plant Species That Occur in Wetlands" (Reed, 1988) are considered to be UPL species unless some other information indicates that the species should be considered to occur in wetlands.

the soil matrix. Chroma is one of three qualities of color, and is measured by comparing a soil sample to standard color chips in Munsell Color (1975). Other indicators of hydric soil include visual observation of soil saturation or evidence of long duration of soil saturation. A soil is considered to be saturated if the water table rises to within 6 inches of the soil surface when soils are somewhat poorly drained, 12 inches in poorly or very poorly drained soils having a permeability of greater than 6 inches/hour, or 18 inches for poorly or very

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poorly drained soils having a permeability of less than 6 inches/hour.

8. Wetland Hydrology. Wetland hydrology refers to wetness of an area of sufficient frequency and duration to produce anaerobic soil conditions. For an area to have wetland hydrology, the area must be saturated for a minimum of 7 days during the growing season more often than every other year (on average). An area is considered to meet this criterion when the water table rises to within 6, 12, or 18 inches of the soil surface (see paragraph 7). Other important indicators of wetland hydrology include observed inundation and/or soil saturation for long duration, and the presence of oxidized root channels. Oxidized root channels are concentrations of oxidized iron around the roots of plants adapted for life in anaerobic soil conditions. Such plant species are capable of diffusing atmospheric oxygen into the area around their roots, which enables the roots to continue to grow in an otherwise anaerobic soil. When the oxygen diffuses out of the plant roots, reduced iron in the soil (due to anaerobic conditions) becomes oxidized (rusts). The presence of oxidized root channels on live plant roots indicates recent soil saturation for long duration.

9. The above-described indicators of hydrophytic vegetation, hydric soil, and wetland hydrology were sought in portions of areas that had some general features of wetlands. In most instances, these general features consisted of either hydrophytic vegetation or some species that contribute to hydrophytic vegetation. In all instances, the possibility of irrigation-induced wetland features was considered.

Results

10. Data sheets for sampled locations are provided in Appendix A. Sampling station locations and areas considered to be wetlands are shown on Figure 1.

11. Wetlands. The only portion of the study area found to meet the technical criteria for wetlands in the absence of irrigation is the 0.51-acre area shown on Figure 1 (see location of sampling station 2). This area qualifies as a natural wetland due to a combination of the following:

a. The vegetation is dominated by Carex nebrascensis (OBL) and Juncus balticus (OBL), and clearly is hydrophytic.

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b. The soil has a matrix chroma of 1 and a 7-inch layer of organic material, both of which are indicative of long duration of soil saturation.

c. Oxidized root channels are present to depth of the soil profile, which indicates long duration of soil saturation due to natural wetness.

12. Irrigated Land. A considerably larger area in the vicinity of the wetlands area has hydrophytic vegetation dominated by Carex nebrascensis and/or Juncus balticus. However, the presence of hydrophytic vegetation was found to be due to effects of flood irrigation. This conclusion was based on the presence of only a thin layer (<3 inches) of surface organic matter and the absence of oxidized root channels or their occurrence only in the upper few inches of soil. Soils in most of these areas have a matrix chroma of 2, but lack bright mottles. A network of irrigation channels is present in the area. Since they no longer convey irrigation water, they are functional drainage ditches that effect more rapid movement of surface water out of the area. The soils are not saturated by ground water, as evidenced by the lack of oxidized root channels or bright mottles below the surface soil layers. Moreover, upland species (e. g., Artemisia tridentata) are colonizing some formerly irrigated areas, and Carex nebrascensis and/or Juncus balticus are depauperate in some areas.

13. The source of irrigation water to the study area formerly was Bodle Ditch, a man-made diversion of Mammoth Creek. Bodle Ditch follows the hillside to the south of the study area, and numerous outlet ditches enter the study area. Based on onsite evidence, it appears that water passed from Bodle Ditch into the depressional area that qualifies as wetland and eventually flowed northward through irrigation ditches when the depression filled with water. By blocking the irrigation ditches at strategic points, water then flowed across the land surface. Oxidized root channels found in nonwetland areas resulted from the flood irrigation. Oxidized root channels may exist for many years after the roots die, especially if the soil is no longer saturated for long duration. Oxidized root channels were not found associated with live roots in the irrigated land. Bodle Ditch is no longer in use and the area is no longer irrigated. The thin layer of organic material on the soil surface in irrigated land resulted from long duration of flood irrigation.

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Conclusions

14. Conclusions of this wetland study are:

a. The total area of wetlands on the subject property is 0.51 acres (see Figure 1).

b. All other portions of the site are nonwetlands, but portions of the area have hydrophytic vegetation due to the long history of flood irrigation from Bodle Ditch.

c. Considering that Bodle Ditch no longer conveys water, the irrigation that produced the hydrophytic vegetation can and has been terminated. The site is becoming progressively drier since the former irrigation channels now act as drainage ditches.

References

Federal Interagency Committee for Wetland Delineation. 1989. "Federal Manual for Identifying and Delineating Jurisdictional Wetlands," U. S. Army Corps of Engineers, U. S. Environmental Protection Agency, U. S. Fish and Wildlife Service, and U. S. Soil Conservation Service, Washington, D. C. Cooperative Technical Publication.

Munsell Color. 1975. "Munsell Soil Color Charts," Kollmorgen Corporation, Baltimore, MD.

Reed, P. B., Jr. 1988. "National List of Plant Species That Occur in Wetlands, Region 0: California," U. S. Fish and Wildlife Service, National Wetland Inventory, Washington, D. C.

15. If you have questions or comments regarding this letter report, please contact me at (601) 885-6135.

Sincerely,

Dana R. Sanders, Sr.

Dana R. Sanders, Sr., PhD.

APPENDIX A (Attached)

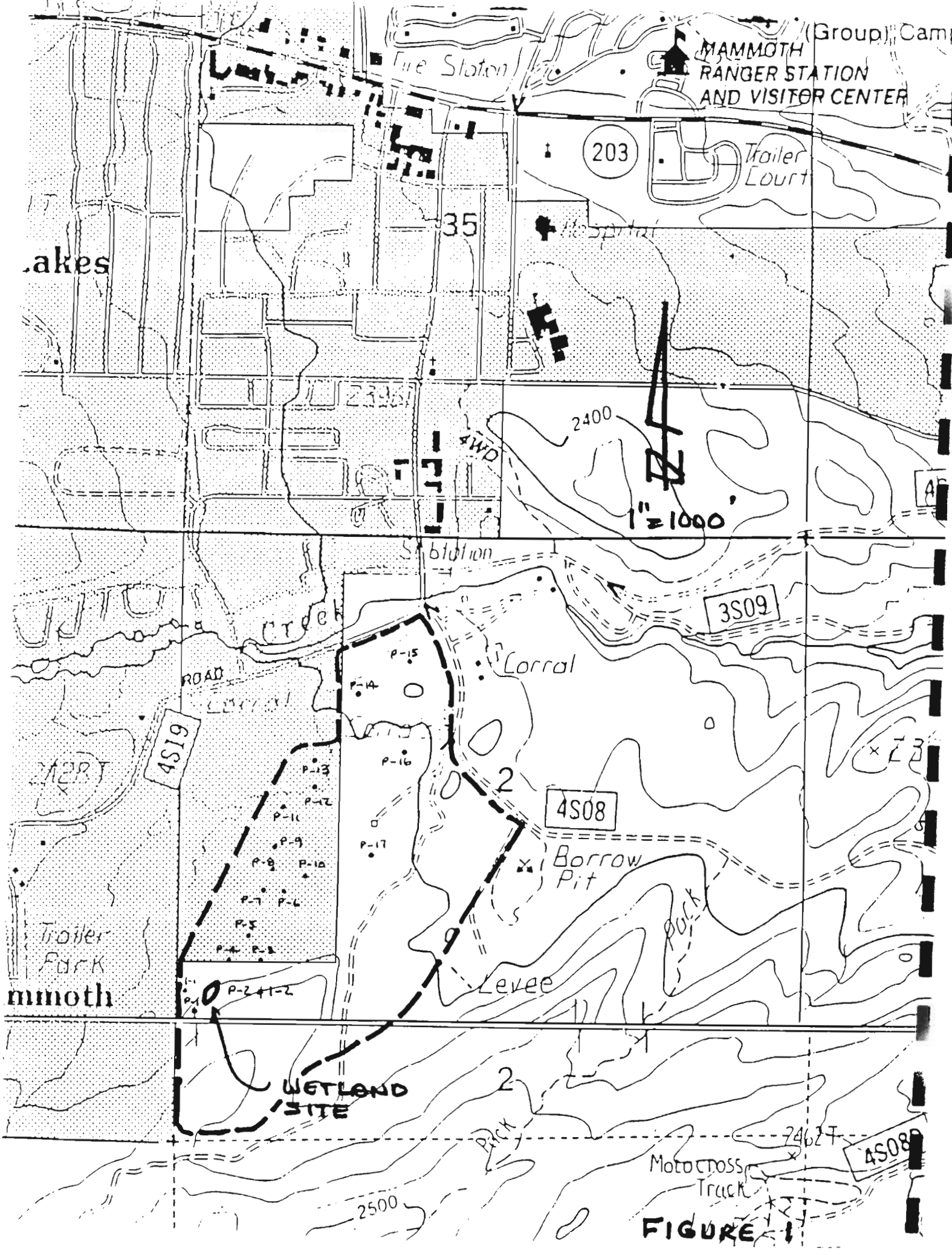
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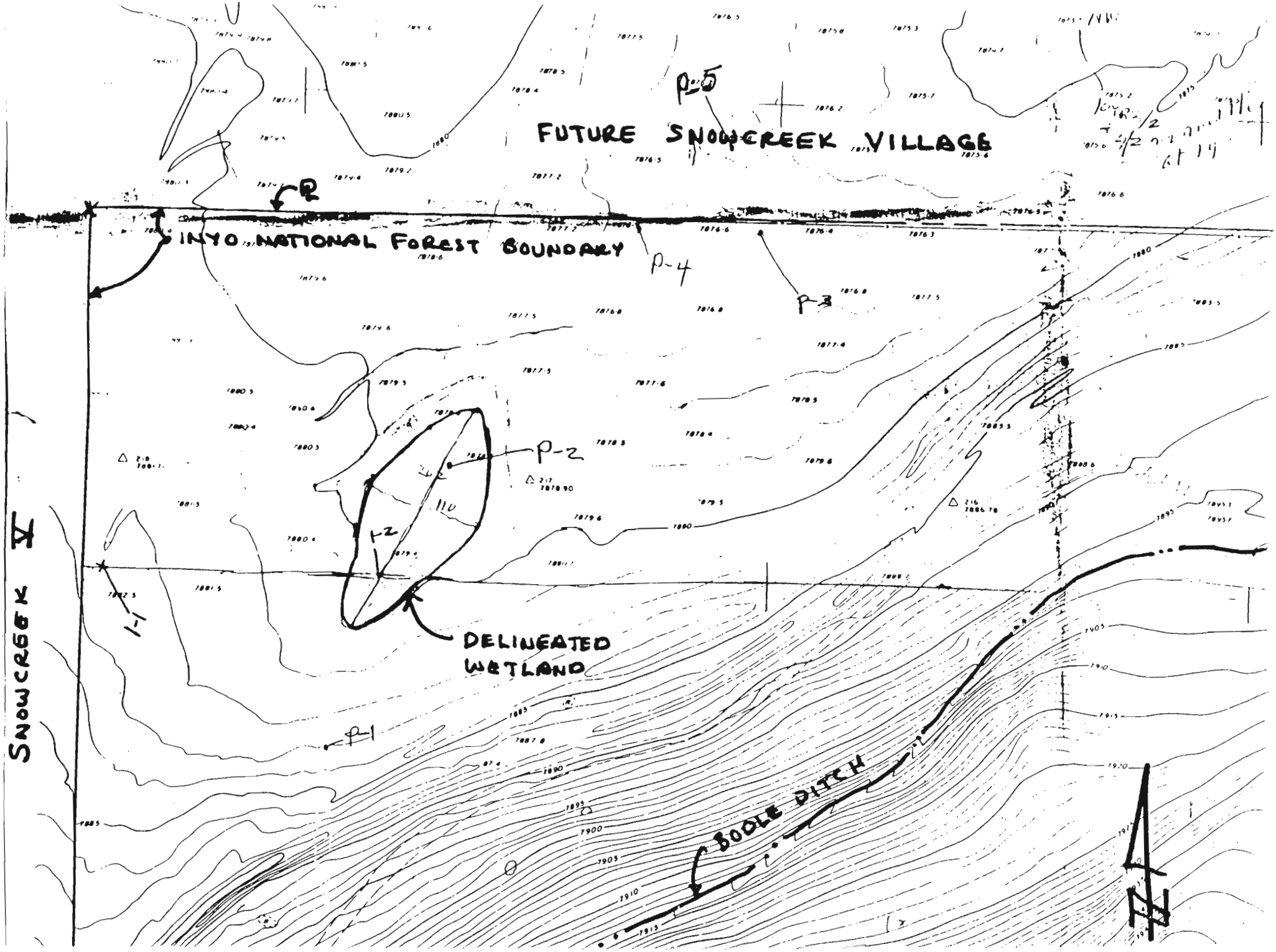
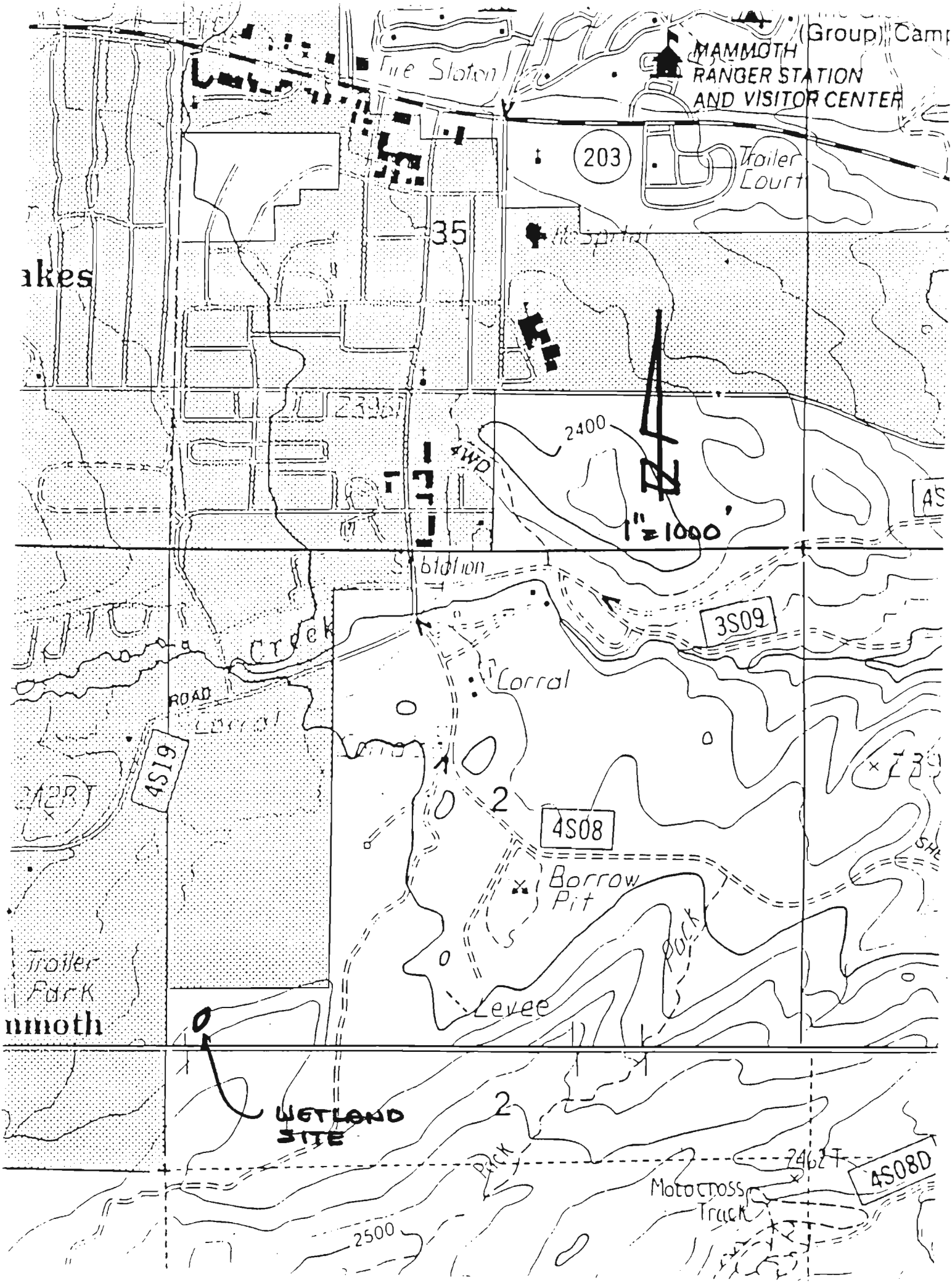
FIGURE 1


FUTURE SNOWCREEK VILLAGE
INYO NATIONAL FOREST BOUNDARY
P-1
P-2
P-3
P-4
P-5
1-1
1-2
DELINEATED WETLAND
BOOLE DITCH
SNOWCREEK V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APPENDIX B

TYPE CONVERSION ANALYSIS

As per 36 CFR 219.27(g), a planned type conversion will be justified by an analysis showing biological, economic, social, and environmental design consequences and the relation of such conversions to the process of natural change. The regulations also state the type conversions will only be used where needed to meet the overall multiple-use objectives. The vegetative change from sage to a landscaped woodland, turf, and wetland setting that would result from implementation of the Snowcreek Golf Expansion Project is considered a type conversion. This appendix summarizes information contained in the Environmental Assessment (EA) entitled "Snowcreek Golf Course Expansion Project" and presents it in the context of a type conversion analysis. This analysis only presents information, any finding or justification of a decision would be made in the Decision Notice associated with the EA.

EXISTING CONDITION

Vegetation diversity - The proposed golf course expansion is located primarily in the shrub ecotype, which is composed of big basin sage brush, antelope bitterbrush, rabbitbrush, and snowberry. This ecotype is closely associated with the Pinyon-Juniper ecotype, which is composed of scattered Pinyon-Juniper trees with a shrub understory. Forestwide, the shrub and Pinyon-Juniper ecotypes cover over 800,000 acres. The proposed expansion area also includes approximately 11 acres of irrigated pasture, which represents an existing conversion from shrub to grass.

The existing management practices of fire suppression and livestock grazing have influenced the characteristics of these ecotypes. Both of these practices favor shrub invasion and reduce the herbaceous component within these stands. This is true of the project area which has a long history of grazing and fire protection. These practices have resulted in a shrub community of the late seral stage.

Under natural conditions, shrub ecotypes mature until they reach the climax or subclimax stage. Wildfires periodically reduce the ecotype to an earlier seral stage. The mosaic of fire-driven seral-stage diversity within the ecotype, in turn, fosters diversity of plant species. Because of fire suppression and grazing, which interfere with the process of natural change, this ecotype has changed over the last 100 years from a mosaic of shrub-steppe type with well developed herbaceous understories to predominantly shrub-dominated stands with little or no understory.

Wildlife diversity - The proposed expansion area provides habitat for small mammals, birds, and migratory deer. Mule deer are the only Management Indicator Species that occur on the site. There are no known Threatened, Endangered, Candidate, or Sensitive (TEC&S) species in the area proposed for type conversion.

FUTURE CONDITION - NO ACTION

If the golf course was not expanded, the site would continue to be managed under current direction. Vegetation would remain at late seral stages, with a low herbaceous component. The small area of irrigated pasture would also remain. Fires would continue to be suppressed at this site, primarily due to the close proximity to an urban area.

FUTURE CONDITION - EXPANSION ALTERNATIVES

The consequences of expansion are similar for all the alternatives that would develop NFS lands, with the main difference being the amount of area being developed. The consequences will be discussed by the categories established in the CFR's.

Biological - Expansion of the golf course will result in conversion of shrub ecotype to a landscaped woodland, turf, and wetland setting. The overall amount of riparian and open water habitat will increase with the addition of water hazards (ponds) and interconnecting streams. The open water habitat would be used primarily by waterfowl. Wildlife species composition would shift to favor species adapted to grassland habitat. Use by migratory deer would continue. No TEC&S species would be effected.

Economic - Expansion of the golf course would increase revenue for the proponent, and local government through increases in green fees and associated taxes. Revenue to the Federal Government would increase due to collection of permit fees.

Social - With expansion, use of the area would shift from low level dispersed recreation to intensively managed developed recreation. Use levels would increase during the summer months, but remain the same during the winter.

Environmental Design - Expansion of the golf course would require modification of the site to create terrain suitable for the course design, resulting in reshaping the ground surface for most of the playing area and water hazards. In terms of setting, the golf course is immediately adjacent to a developed urban area, with paved streets, housing developments, and commercial centers. The golf course would soften and create a transition between the urban development and adjacent shrub covered slopes.

Relation to natural change - Natural change at the proposed expansion site continues to be altered by management activities, primarily fire suppression. Expansion of the golf course represents a departure from natural change by creating and maintaining an ecotype not naturally found in this area. If the expanded site was to stop being managed as a golf course, shrubs would invade the site over time, and the original ecotype would become re-established. The wetlands would dry-up, and planted trees would be able to survive under stressed conditions.

MULTIPLE-USE OBJECTIVES

The Inyo National Forest Land and Resource Management Plan (LMP) defines the multiple-use objectives for the proposed expansion site. Specifically, the LMP provides multiple-use management goals that describe the desired future condition of the Inyo National Forest. For economic/social issues, the LMP states "The Forest is managed in an economically efficient and cost-effective manner while responding to the economic and social needs of the public and local communities" (LMP pg 66). For diversity, the LMP states "The Forest has achieved diversity of plant and animal communities by providing a threshold level of vegetation types and seral stages" (LMP pg. 66). For recreation, the LMP states "A broad range of developed and dispersed recreation opportunities in balance with identified existing and future demand is provided" (LMP pg. 68). Finally, for wildlife the LMP states "Wildlife habitat is managed to provide species diversity, to ensure that viable populations of existing native vertebrates and invertebrates are maintained, and that the habitats of management emphasis species are maintained or improved" (LMP pg. 69).

The proposed expansion site is allocated to prescription 12, "Concentrated Recreation Area", and prescription 13, "Alpine Ski Area, Existing and Under Study". The purpose of prescription 12 "...is to manage concentrated recreation areas to maintain or enhance major recreational values and opportunities. The emphasis is on providing a broad range of facilities and opportunities that will accommodate large numbers of people safely, conveniently, and with little resource damage (LMP pg. 136)." Direction for diversity states "Maintain a high level of diversity by allowing for vegetation management activities compatible with recreation objectives" (LMP pg.136). Direction for recreation states in part "Maintain Roaded Natural and Rural ROS classes" (LMP pg. 136). Finally, direction for wildlife states "Avoid critical or significant wildlife habitats such as key winter deer range, migration routes, holding areas and fawning areas when developing recreation facilities" (LMP pg. 137).

The purpose of prescription 13 is "...to maintain and manage existing downhill ski areas for public use and to complete ski area studies currently in progress(LMP pg. 138)." Direction for recreation states, in part, "Allow the recreation activities appropriate in the Rural ROS class (LMP pg. 138).

The proposed expansion is located in Management Area #8 (Mammoth Escarpment), and #9 (Mammoth). There is no management area direction for diversity beyond the forest-wide and management prescription direction, however, direction for recreation states in part "Maintain open-space areas adjacent to the Town of Mammoth Lakes for passive recreation use" (LMP pg. 194). Direction for wildlife states in part "Maintain the integrity of key winter ranges, holding areas, migration routes, and fawning areas for mule deer" (LMP pg. 195).

APPENDIX C

BIOLOGICAL EVALUATION

INYO NATIONAL FOREST
MAMMOTH RANGER DISTRICT

BIOLOGICAL EVALUATION
FOR
SNOWCREEK GOLF COURSE EXPANSION

Prepared By: _____ Date: 1-6-93
Richard Perloff
Wildlife Biologist

Reviewed By: _____ Date: 1/7/93
Sara Lee Chubb
Forest Fish Biologist

I. INTRODUCTION

The purpose of this Biological Evaluation (BE) is to determine the effects of the proposed expansion of Snowcreek Golf Course on species listed as threatened or endangered or proposed for listing by the U.S. Fish and Wildlife Service (USFWS) and species designated as sensitive by the Regional Forester. The BE process (Forest Service Manual (FSM) 2672.42) is intended to determine the effects of projects on federally listed species in compliance with requirements of the Endangered Species Act (ESA). It also provides a process and standard through which proposed, endangered, threatened, and sensitive species receive full consideration in the decision making process to maintain species viability and meet recovery goals. For sensitive species, this document will evaluate whether the proposed action will result in a trend towards federal listing as threatened or endangered by USFWS.

II. CURRENT MANAGEMENT DIRECTION

A. Management Area

Pertinent management direction is provided in Prescription #12 (Concentrated Recreation) and Management Area #9 (Mammoth) sections of the Inyo National Forest Land and Resource Management Plan (LRMP) (USFS 1988). The purpose of Prescription #12 is to manage concentrated recreation areas to maintain or enhance major recreational values and opportunities. The emphasis is on providing a broad range of facilities and opportunities that will accommodate large numbers of people safely, conveniently, and with little resource damage.

Proposed expansion of Snowcreek Golf Course is consistent with direction for both Management Area #9 and Prescription #12.

B. Threatened, Endangered, and Proposed Species

Current direction is to manage National Forest System habitats and activities for threatened and endangered species to achieve recovery objectives so that special protection measures provided under the ESA are no longer necessary (FSM 2670.21). Section 7 of the ESA directs Federal departments and agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

The Inyo National Forest Land and Resource Management Plan further requires that populations of threatened and endangered species be considered as below viability until recovery is achieved. Emphasis will be placed on the protection and improvement of historic and potential habitat as necessary to meet recovery levels in cooperation with USFWS and California Department of Fish and Game.

C. Sensitive Species

United States Department of Agriculture Regulation 9500-4 directs the Forest Service to avoid actions which may cause a sensitive species to become threatened or endangered (FSM 2670.12). Populations of all sensitive species of wildlife, fish, and plants must be maintained at viable levels in habitats distributed throughout their geographic range on National Forest System lands (FSM 2670.22). Standards and Guidelines of the Inyo National Forest require the development and implementation of a consistent, systematic, biologically sound strategy to manage sensitive species and their habitats so that federal listing does not occur.

III. DESCRIPTION OF PROPOSED PROJECT

This document will only analyze the potential effects of the preferred alternative (Alternative B). Three other action Alternatives (A,B,C) and the No Action Alternative (E) are discussed in detail in the Draft Environmental Assessment of the Snowcreek Golf Course Expansion Project (USFS 1991d).

The preferred alternative (as modified) involves issuance of a Special Use Permit to Dempsey Construction Corporation for construction and operation of a nine hole golf course on 95 acres of National Forest System land. Within the permit boundaries 72 acres of native vegetation would be replaced with 1.5 acres of tees, 52.5 acres of fairways, 2.0 acres of greens, 7.0 acres for a driving range, 7.6 acres of lakes and ponds, and 0.8 acres of parking and structures. Access would involve 0.35 miles of new road construction and paving 0.5 miles of the existing Sherwin Creek Road. Design and layout of holes would attempt to utilize existing terrain. Ground disturbance would involve an estimated 200,000 cubic yards of earthwork.

The proposed 7.6 acres of lakes and ponds would have a maximum depth of 10-12 feet and an average depth of 4.5 feet. Total volume of the lakes/ponds is estimated to be 12,000,000 gallons (36 acre feet). Water supply for these wetted areas would be reclaimed waste water originating from the Mammoth County Water District Wastewater Treatment Plant. No new production wells would be drilled on National Forest System Lands.

Predicted irrigation water demands would be 130 acre feet per year. Domestic water consumption is estimated at 4 acre feet per year. Irrigation would occur with reclaimed wastewater. The water stored in the proposed lakes/ponds would act as a back-up in case of system failure. Domestic water needs would be met from existing Mammoth County Water District systems.

Areas designated for development would be landscaped and revegetated with non-native, climate adapted grass species. Native trees and shrubs would be planted on the periphery of fairways and greens. Areas not required for playing surfaces or other facilities would be left in an undisturbed state. No chemicals other than fertilizers would be used to maintain the golf course unless appropriate environmental analyis is completed by the Forest Service and approval is received from Lahontan Water Quality Control Board.

IV. SPECIES EVALUATED

Species considered in this analysis were identified from: 1) a list of endangered, threatened, and sensitive species in the Forest Service Pacific Southwest Region (FSM 2672.11 R-5 supp. 42), and; 2) the Inyo National Forest Sensitive Plant List (USFS 1991a). On 9/6/90 a letter was sent to USFWS requesting information on federally listed threatened or endangered species known or suspected to occur within or adjacent to the project area. In a letter dated 10/3/90, USFWS indicated that no federally listed species or their habitat are known to be present (Appendix A). USFWS suggested that two "candidate" species, Astragalus monoensis and Lupinus duranii, be considered during the planning process for this project.

Habitat within and adjacent to the proposed project area was analyzed for suitability for all threatened, endangered, proposed, and sensitive (TEPS) species potentially occurring on the Inyo National Forest. Initial evaluation was accomplished through review of aerial photographs of the analysis area and examination of Mammoth Ranger District vegetation maps and wildlife sighting records. A field reconnaissance was conducted by a Forest Service Wildlife Biologist on 11/22/89 and again on 8/3/92 to confirm initial vegetation type classifications, further assess suitability of habitat for TEPS species, and to survey for the two plant species identified by USFWS.

Habitat requirement parameters for TEPS species were determined from a variety of sources, including: USFWS Recovery Plans for bald eagle, peregrine falcon, Owens pupfish, and Paiute cutthroat trout (USFWS 1986, 1982, 1984, 1985); Biological Assessments of Sherwin Bowl Ski Area and Proposed Groundwater Pumping from Well #11 on the Owens Tui Chub and Hot Creek Headsprings Habitat (USFS 1989, 1990); Habitat Evaluation Criteria for Management Indicator Species on the Inyo National Forest (USFS 1984); Wildlife Habitat Capability Models and Habitat Quality Criteria for the Western Sierra Nevada (USFS 1981); California Statewide Wildlife Habitat Relationships System (California Department of Fish and Game 1990); A Literature Review for Management of the Marten and Fisher an National Forests in California (USFS 1991b); Management Recommendations for the Northern Goshawk in the Southwestern United States (USFS 1991c), and; mammalian, avian, herpetological, and botanical field guides.

After reviewing all available information and incorporating the findings of field reconnaissance, I determined that no threatened, endangered, proposed, or sensitive species currently occur within the analysis area, nor is there suitable unoccupied habitat for any of these species within or adjacent to the proposed project boundaries. Furthermore, given the existing vegetative community, slope, aspect, and elevation, the project area does not have potential to become suitable habitat for any TEPS species in the forseeable future.

V. EXISTING ENVIRONMENT

A. General Area

The project site is located in the Mammoth Basin in the west half of Section 2 and the northwest corner of Section 11, Township 4 South, Range 27 East, Mount Diablo Baseline and Meridian (Figure 1). It is bordered on the west by the

INYO NATIONAL FOREST

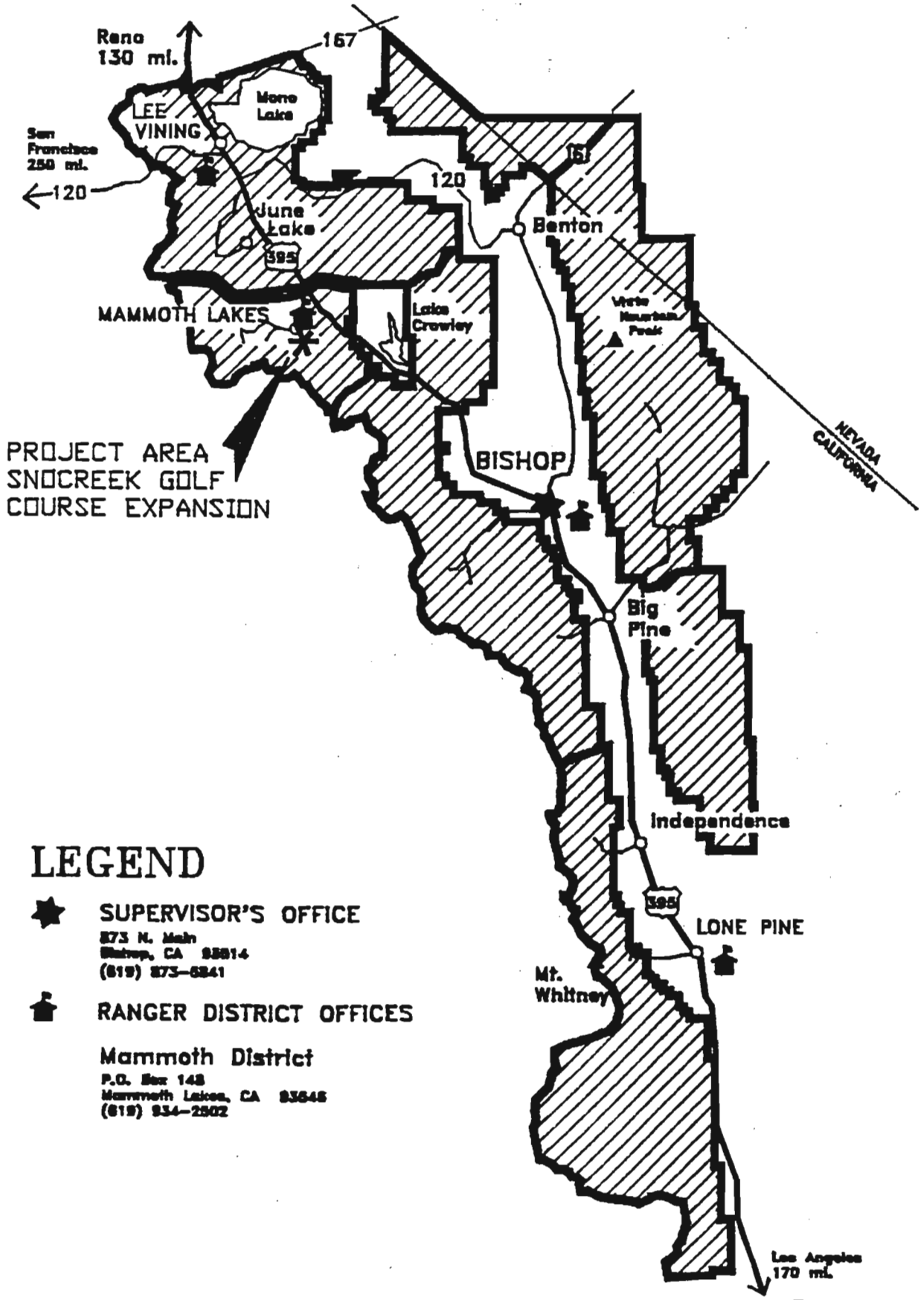

FIGURE 1. Location Map, Proposed Snowcreek Golf Course Expansion
Mammoth Lakes, California

Snowcreek Resort development, on the north by the Town of Mammoth Lakes and on the east and south by National Forest System lands. Climate is typified by hot dry summers and cold snowy winters. Precipitation averages 25 inches per year, with over 70 percent falling as snow from November through March.

Vegetation is representative of the junction between two vegetative provinces. Lower elevations are generally characterized by plants of the Great Basin, including: sagebrush (Artemesia tridentata), bitterbrush (Purshia tridentata), and various grasses and forbs. Higher elevations display vegetation characteristic of the Sierra Nevada province, dominated by coniferous forests of jeffrey pine (Pinus jeffreyi), red fir (Abies magnifica), and lodgepole pine (Pinus contorta). Also present are small areas of high montane chaparral, dominated by manzanita (Arctostaphylos patula) and tobacco brush (Ceanothus velutinus).

B. Analysis Area

For this project, wildlife habitat was analyzed within the area defined by California spotted owl survey protocol (USFS memo 4/23/92). All habitat within 0.25 miles of the proposed action was assessed. In addition, potential impact to down-stream water availability as it relates to Owens tui chub habitat was examined. This latter inclusion was primarily focused on whether a reduction in wastewater flows to Laurel Pond would impact critical habitat for this species at the California Department of Fish and Game Hatchery headsprings. The resulting analysis area encompasses approximately 495 acres within and adjacent to the proposed project boundaries and the 40 acre Laurel Pond (Figure 2).

The analysis area includes approximately 170 acres of privately owned land. This includes 124 acres of the existing nine hole Snowcreek Golf course which is currently planted with non-native grass species on the playing surfaces and mostly native shrub and tree species in other landscaped areas. The other 46 acres is owned by various private individuals and corporations within the Town of Mammoth Lakes. This block of land is largely developed (condominiums and a town park), with the exception of a small (< 1 acre) area of riparian vegetation along Mammoth Creek.

The remaining 325 acres, which includes the proposed project area lies on National Forest System (NFS) lands. Elevations range from 7840 to 8019 feet. Topography is mostly flat or rolling hills with the exception of a glacial moraine near the southern boundary of the analysis area.

Mammoth Creek forms the northern perimeter of those portions of the analysis area which lie on NFS lands. Mammoth Creek originates at Lake Mary (west of project site) and flows approximately 10 miles to the confluence with Hot Creek. The creek averages 15 feet in width and 1.0 feet in depth with an average flow of 15 cfs annually. Brown trout (Salmo trouta) are present at 50-150 pounds per acre and constitute 80 to 95% of the fish biomass during mid-summer months. No TEPS aquatic species are known to inhabit the creek or associated riparian vegetation.

Sagebrush shrub communities cover 295 acres. This vegetation type is largely composed of big sagebrush, bitterbrush, and rabbit brush (Chrysothamus viscidiflorus), with assorted grasses and forbs in the understory. Also

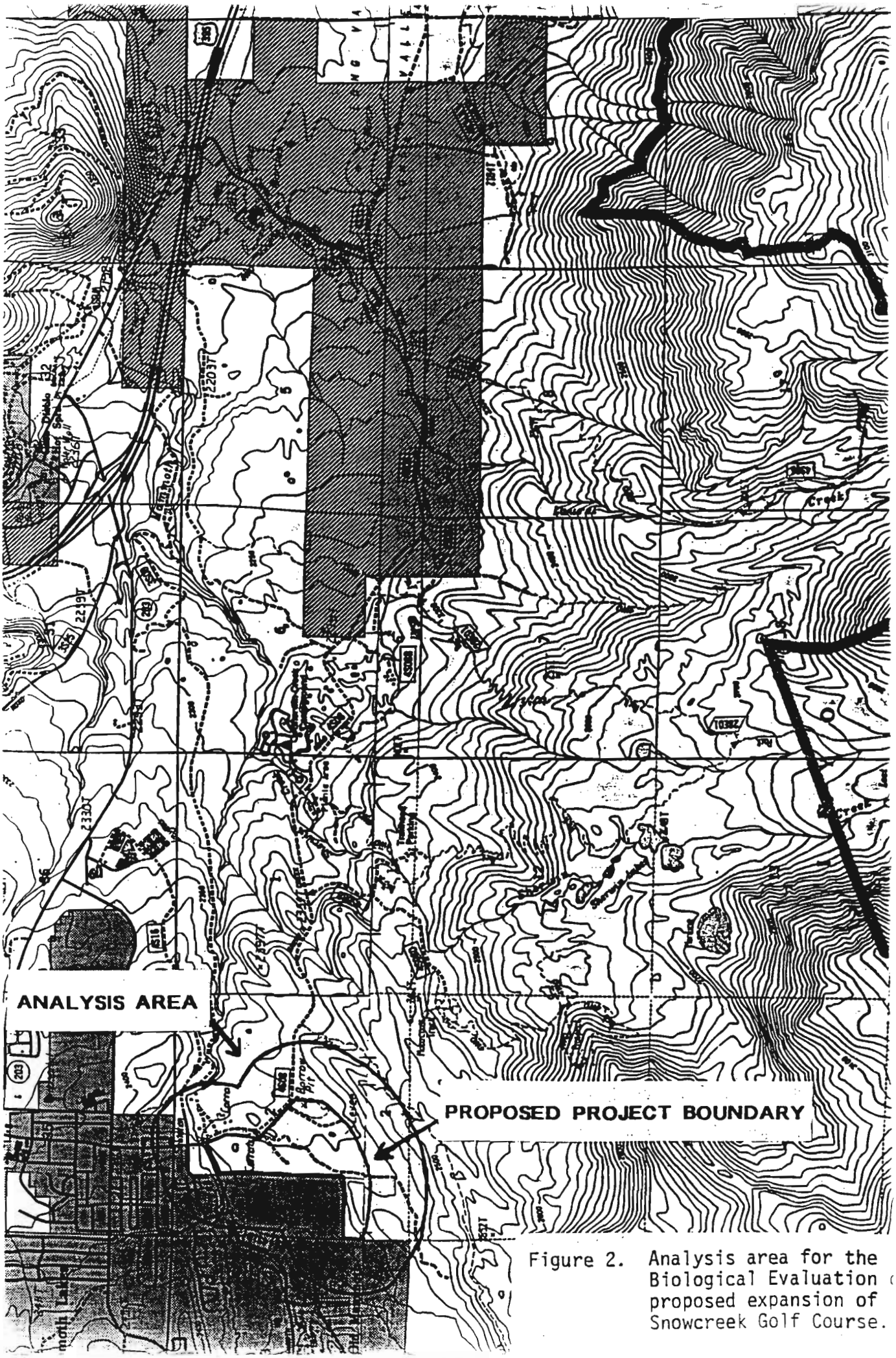

Figure 2. Analysis area for the Biological Evaluation of proposed expansion of Snowcreek Golf Course.

present are 8 acres of high montane chaparral, restricted to those portions of the glacial moraine with a southeast aspect. Eleven acres near the eastern boundary of the analysis area are used as a gravel pit. These acres are virtually devoid of vegetation.

In previous years approximately 11 acres of irrigated pastures were scattered within the analysis area. These were composed of grasses and grass like plants such as squirrel tail (Sitanion spp.), Carex spp., cheatgrass brome (Bromus tectorum), and barley (Hordeum spp.). Recently, due primarily to the extended drought within the region, sagebrush and associated plants have begun encroaching on these pastures. Currently it is difficult to differentiate the majority of these areas from the surrounding sagebrush shrub community.

None of the habitat types listed above currently represent suitable habitat for any threatened, endangered, proposed, or sensitive species of animals or plants. Historic records show no indication that any TEPS species utilized any portion of the analysis area as either transitory or primary range.
As no suitable California spotted owl habitat would be affected by this project and none is located within 0.25 miles of project boundaries, no surveys for this species were required (USFS memo 4/23/92).

Laurel Pond is located approximately 5 miles east of the proposed Snowcreek Golf Course expansion project. Prior to 1984 Laurel Pond was an ephemeral water body. Inflow came primarily from snowmelt run-off and flows from a spring located one mile to the west. The pond would generally reach a peak size of approximately 11 acres, then dry up by the end of May. In years of exceptional snowpack the pond might persist until fall.

In 1984 a pipeline was installed, connecting the Mammoth County Water District's wastewater treatment plant with the pond. This served to increase the capacity of the water district's treatment facility as well as providing a perennial water body for wildlife habitat. Present hydrologic models suggest wastewater which percolates from Laurel Pond does not re-emerge at the Hot Creek Headsprings (critical habitat for Owens tui chub), but further down slope or into another drainage (Kuykendall, pers. comm.).

Laurel Pond currently fluctuates between 40-50 acres in size. The pond is situated in a sagebrush flat with a narrow band of riparian vegetation along the periphery. The only vertebrate species know to inhabit the pond is the introduced tiger salamander (Ambystoma tigrinum), which occurs in extremely high densities. This was confirmed with inventory efforts conducted jointly by USFS and California Department of Fish and Game personnel during summer 1992.

VI. DETERMINATION

It is my determination that implementation of Alternative B as modified (expansion of the Snowcreek Golf Course on 72 acres of NFS land) will have no effect on any threatened, endangered, proposed, candidate, or sensitive species or their habitat. As none of these species are currently present and no suitable habitat exists within the analysis area, there is no potential for direct, indirect or cumulative impacts. This determination of "no effect" also negates the need for formal Consultation or Conference between the USFS and USFWS as described under Section 7 of the Endangered Species Act.

VII. LITERATURE CITED

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----------. 1984. Recovery Plan for the Owens Pupfish, Cyprinidon Radiosus. Portland, Or: USFWS. 47pp.

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----------. 1991b. A Literature Review for Management of the Marten and Fisher on National Forests in California. Santa Barbara, Ca: USFS. 22pp.

----------. 1991c. Management Recommendations for the Northern Goshawk in the Southwestern United States. Southwestern Regional Office: USFS. 184pp.

----------. 1991d. Snowcreek Golf Course Expansion Project Environmental Assessment. Bishop, Ca: USFS.

PERSONAL COMMUNICATIONS

Kuykendall, J. Mammoth County Water District, Mammoth Lakes, Ca. 93546

APPENDIX A

CORRESPONDENCE BETWEEN USFS AND USFWS

United States Department of Agriculture | Forest Service | Inyo National Forest | 873 N. Main St. Bishop, CA 93514 (619) 873-5841

Reply to: 2670

Date: September 6, 1990

Mr. Gail Kobetich
Field Supervisor
USDI Fish and Wildlife Service
2880 Cottage Way, Room E-1823
Sacramento, CA 95825

Mr. Kobetich:

The Inyo National Forest, Mammoth Ranger District is considering permit issuance for a proposed Snowcreek Golf Course located near the Town of Mammoth Lakes, California (See attached map). Alternatives considered will include No Action, and several modifications of a golf course design.

Pursuant to Section 7 of the Endangered Species Act (as amended), we request the Fish and Wildlife Service provide a list of Threatened, Endangered or Proposed Listed Species and Critical Habitats within this project area shown in the attached map.

Sincerely,

JUDIE L. TARTAGLIA
Acting District Ranger

Enclosure (1)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
SOUTHERN CALIFORNIA FIELD STATION
Ventura Office
2140 Eastman Avenue, Suite 100
Ventura, California 93003

October 3, 1990

Judie L. Tartaglia, Acting District Ranger
Inyo National Forest
873 N. Main Street
Bishop, California 93514

Dear Ms. Tartaglia:

This is in response to your letter, dated September 6, 1990, and received by us on September 17, 1990, requesting information on listed and proposed endangered and threatened species which may be present on the site of the proposed Snowcreek Golf Course, near the Town of Mammoth Lakes, Mono County, California.

To the best of our present knowledge, there are no listed or proposed species occurring within the area of the subject project. I have enclosed a list of candidate species presently under review by the Fish and Wildlife Service (Service) for consideration as endangered or threatened. Only listed species receive protection under the Act. However, candidate species should be considered in the planning process in the event they become listed or proposed for listing prior to project completion. Preparation of a biological assessment, as described in Section 7(c) of the Act, is not required. If the Forest Service determines that this project is likely to affect a candidate species, you may wish to request technical assistance from this office.

If you have any questions, please contact Cat Brown of my staff at FTS 983-6040 or 714/644-1766.

Sincerely,

Carl T. Benz
Acting Field Supervisor

Enclosure

CANDIDATE SPECIES THAT MAY OCCUR
ON THE SITE PROPOSED FOR THE SNOW CREEK GOLFCOURSE
MONO COUNTY, CALIFORNIA
1-6-90-SP-V286

Candidate Species

Plants		
Mono milk vetch	*Astragalus monoensis*	(1)
Mono Lake lupine	*Lupinus duranii*	(2)

(E) -Endangered (T) -Threatened (CH) -Critical Habitat
(1) -Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.
(2) -Category 2: Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.
(3) -Category 3(c): Taxa more common than previously thought, no longer being considered for a listing proposal at this time.

APPENDIX D

ARCHAELOGICAL DOCUMENTS

United States Department of Agriculture | Forest Service | Inyo National Forest | 873 N. Main St. Bishop, CA 93514 (619) 873-5841

Reply to: 2360

Date: 11 October 1990

Ms. Kathryn Gualtieri
State Historic Preservation Officer
Office of Historic Preservation
P. O. Box 942896
Sacramento, CA 94296-0001

RE: National Register of Historic Places Evaluation of the Bodle Ditch (Ca MNO 893 H), Determination of Effect, and Recommendations for Mitigation of Adverse Effects

Dear Ms. Gualtieri:

Enclosed for your review are the documents relating to the National Register of Historic Places evaluation of the Bodle Ditch and an assessment of the effects of a proposed golf course on it.

Dempsey Construction Company, Inc., proposes to expand the nine hole golf course currently located on its property at Snowcreek in the Town of Mammoth Lakes, California. The plan calls for an additional nine holes to be place on 140 acres of National Forest lands. Bisecting the 140 acres are a number of irrigation ditches once used to water the existing meadows, including what is known locally as part of the Bodle Ditch (CA Mno 893 H).

As you will see from the enclosed report, the evaluation situation is somewhat complex. The so-called Bodle Ditch is a system of ditches, dams, flumes, and weirs located in the vicinity of the Town of Mammoth Lakes. The actual Bodle Ditch is a portion of that. The entire system is probably an eligible site, certainly it would be considered part of an historic district in the Mammoth area. The actual Bodle Ditch by itself probably would not be considered eligible, but it would constitute a contributing feature of the larger system. This being the case, we have chosen to treat it as if it were eligible and mitigate the potential impacts of the proposed golf course.

If have any questions please contact Linda Reynolds, at the above listed telephone number or Wally Woolfenden at (619) 647 6525. Thank you in advance for your prompt consideration.

Sincerely,

JOHN RUOPP
Recreation Staff Officer

cc: Woolfenden, Mono
Tartaglia, Mammoth
Porter, Mammoth
Reynolds, SO

A NATIONAL REGISTER OF HISTORIC PLACES EVALUATION OF THE BODLE DITCH (CA MNO 893 H), MONO COUNTY, CALIFORNIA

by
Emilie Martin,
Historian
Inyo National Forest
1990

Introduction

Dempsey Construction Company, Inc. of Mammoth Lakes, California, proposes to expand the nine hole golf course currently located on its property at Snowcreek in Mammoth Lakes. The plan calls for an additional nine holes to be placed on 140 acres of National Forest lands. Bisecting the 140 acres are a number of irrigation ditches once used to water the existing meadows, including what is known locally as part of the Bodle Ditch (CA Mno 893 H). The Bodle Ditch took its name from a twentieth century rancher who owned the portion of it which will be impacted by the proposed undertaking. In toto, it comprises an extensive water system related to earlier mining activities and domestic water supply as well as range improvement.

HISTORICAL CONTEXT

Background

Mining activity in the Lakes Basin dates from 1875 when gold and silver were discovered near Lake Mary by four prospectors trying to relocate the legendary Lost Cement Mine. This started a flurry of interest in mining on the east side of the Sierra.

> During 1877 in this harsh, nameless land, high on the Sierra's eastern slope, eager prospectors staked claims and organized Lake District. Its camps lay at altitudes close to 9,000 feet; surrounding ridges rise more than 2,000 feet higher. The center of the mining excitement in 1877, '78, and '79 was a ridge (Mineral Hill, now called Red Mountain) with its bare, sweeping talus slopes sandwiched in by majestic but barren Mammoth Mountain and the Long Valley caldera to the east. (Caldwell 1990:xiv.)

In 1878, four communities existed around Mineral Hill. The entire complex

was known as the Lakes District. The communities were:

(1) Pine City on the west slope of Mineral Hill facing Lake Mary. The Monte Cristo and the Lisbon mines were here.

(2) Mill City where the offices and mill for Mammoth Mining Company was located.

(3) Mineral Park, which furnished the lumber needed for the mines, and

(4) Mammoth City, by far the largest town of the four. By 1879 it had 22 saloons, 13 stores, 2 breweries, 2 stables, 5 eating places, 2 newspapers, 2 druggists, 2 doctors, and 2 lawyers. (Debry n.d.)

Water was sent along its natural course from Lake Mary to Lake Mamie and Twin Lakes into a flume to power the mill at Mill City. On June 3, 1878, General Dodge formed Mammoth Mining Company and bought all of the mines in the District except the Alpha on the north face of Mineral Hill. By 1879, Mammoth was Mono County's second largest community and taxpayer; the mining town of Bodie was number one. (Derby n.d.)

During the peak of mining activity in 1879, 20 stamps and a steam-powered engine were added to the mill at Mill City. In 1880, over 200 women and children lived in the Lake District. Citizens met at the Magnolia Opera House to discuss means of fighting taxes and methods of raising funds for civic use and a school was part of the community. The mining frenzy, however, was short-lived. A decline in amount of gold produced, problems with transportation to the mill site, heavy snowfall (28 feet by December of 1879), discontent on the part of the stockholders, and a big fire on November 10, 1881, which burned half the town, led to the closing of the mill and the demise of the town. At the end of 1881, only a few prospectors remained to work the area. (Derby n.d.)

In the 1880s, cattle ranching, lumbering and shingle mills replaced the mines as the main economic stay of the region, but mining continued on a small

scale. In 1895, major work was again started at the Mammoth mines. In 1898, D. C. Albright tried his luck at finding gold and constructed a ten stamp mill at Mammoth City, using the old water wheel from Mill City. Again, the mine did not pay off, and was closed the same year. (Caldwell 1990:47)

At the turn of the century and for the next two decades only intermittent explorations for the elusive gold occurred. Ranching in the Owens and Long Valleys became more stabilized.

> During the summers, Valley people and their visitors began camping out in the Mammoth area. Between 1920 and 1930 tent cabins were built at Lake Mary, Lake Mamie, and Twin Lakes to accommodate paying guests...fishing, hunting and family camping soon became the major industry of what was to be known as Sierra East. (Clark and Clark 1978:157.)

Water for the Mill

As the miners set up the mill to separate the gold from the ore and organized the machinery, water was the key and accessible source of power. Records do not tell who had the idea or how it came about, but remnants of a flume and a dam do tell us that the natural course of water flowing from Lake Mary to Lake Mamie to Twin Lakes was channeled into a flume at the lower end of Twin Lakes and sent downhill to Mill City.

A pre-emption claim filed by James Cross, Superintendent of Mammoth Mining Company, on April 29, 1879, describes the plan of the miners. It tells how the company intended to build a dam:

> To the height of 25 feet, and to thereby form a reservoir above the surface of said Lake [Summit, now known as Lake Mary] in which waters of the South Fork of Owens River [Mammoth Creek] are to be impounded to the depth of said 25 feet....It is intended to use this water for furnishing power to drive milling and mining machinery and for collateral purposes. (Pre-emption claim B-278)

The force generated by falling water was harnessed to provide power for a six foot Knight water wheel, which in turn drove a 20-foot flywheel. While physical evidence tells us Lake Mary was dammed as planned, on the ground inspection

found that the lake was dammed perhaps six to eight feet higher, but nothing like 25 feet. Gary Caldwell, an historian who has studied the Lake District mining for 20 years, describes the water system thusly:

> The Knight wheel was selected because it was designed for water of high pressure but low volume. The Twin Lakes flume delivered just such water. That a flume had to be built at all tells us something about where water was not in 1878. Despite the many lakes in the area, no water flowed naturally near the mines or the mill. The flume was initially constructed as an open ditch, carrying water from the outlet of Twin Lakes around the northern slope of Panorama Dome to the mill. (Caldwell 1990:16.)

In tracing back the engineering specifics, Caldwell learned that:

> With a 175 foot head of water coming out of the chain of lakes, a drop of 400 foot is needed. And that is exactly what we find. The thing is, it has to be a steady flow of water. If for any reason there was any fluctuation in it, they have to make some alterations. They can't do it at Twin Lake and they can't do it at Lake Mamie. They...have to go back to the source for both Mamie and Twin, they have to go back to Lake Mary. (Caldwell n.d.)

Domestic Water for the City of Mammoth

While water from the lakes provided the power to turn the water wheel at the mill site, a separate water system was needed to supply Mammoth City. Genny Smith, an area historian with extensive knowledge of historical maps, points out that none show any water flowing to Mammoth City, which has grown from 1878 on.

Headlines for an article in the September 3, 1879 edition of the Mammoth City Herald stated "Mammoth Water Situation Now At Critical Point". It reads:

> The question where to get water for domestic purposes is one that is going to bother the people of Mammoth in a week or two if the present dry weather continues...Every well in town has to be sunk deeper and deeper each day to keep pace with the receding water level.

Spring boxes lined with rocks dating from this period can still be seen in various locations. The same article goes on to state that "Mr. Perry, who has the contract for supplying the town with water from the upper lake, only began work on his enterprise last Monday." Perry and the Mammoth City Water Company

> ...are proceeding rapidly with the undertaking of supplying this city with water, which is to be done by a ditch one and one-half miles in length, already cut from the Easterly main feeder of Lake Mary to a reservoir of a capacity of about twenty-five thousand gallons...

These dimensions describe the physical attributes of the ditch referred to in many Forest Service records as the Bodle Ditch. One can see that ditch today on the ground. It begins at the creek at camp site , Coldwater Campground. To keep it very clear, it would be best to be more precise with the names. This second ditch for water supply to the towns should be called Mammoth City Water Ditch instead of Bodle Ditch.

County records show that in 1927, Alvin Bodle, called Alvie Bodle in Arelene Reed's book Old Mammoth, acquired a dairy and a ditch to better water the meadow called Windy Flat, later called Old Mammoth. Reed based her book on the memories she and others had of the early days when they lived at Mammoth. She did little cross checking, but she clearly recalls primary events directly related to her life at Mammoth. Adele and her husband Bill lived at Old Mammoth where Bill operated a garage for many years.

> Water was ditched from Lake Mary downhill to Mammoth City. It continued down the draw, with a side ditch taking water easterly. This side ditch, later known as the Bodle Ditch, irrigated Windy Flat and the meadow where oxen and other stock (and later, diary cows) grazed. The main ditch continued down to Mill City. (Reed 1987:14)

Careful analysis of the ditches on the ground and the written records shows Reed to be correct, except that the water was ditched from Mammoth Creek, or that easterly stream feeding into Lake Mary. Otherwise, Reed's description of the side ditch is very important to sorting out the maze of ditches. It is this side ditch which should be called Bodle Ditch, not the entire ditch system. This point is important to make clear, because legal questions and much research at the Forest Service headquarters speak of the Bodle Ditch as the entire water system that carried water high up from Mammoth Creek down to

Mammoth City and into the lower meadows.

The Side Ditch Named Bodle

Douglas Robinson's (1933:17) Statement of Early Organization of the Inyo mentions an Alvin Bodle who worked part time in 1911 on surveys of the White Mountains for A. H. Hogue, the first Forest Supervisor of the Inyo National Forest. It is logical to assume this is the same Alvin Bodle who

> ...had bought the meadowland known as Windy Flat from Tom Williams and built a log cabin near the Nadeau cabin. [The location of both is best described today as being just back (west) of the Arcularius home, left of the Old Mammoth Road.] The lower end of Windy Flat soon became known as Bodle Meadow and supported a small herd of milk cows. Alvie delivered milk to residents and to the hotel. (Reed 1987:90)

In 1970, when Forest and District personnel traced the origin of the ditch, they discovered a listing of water filings from the State of California showing that on September 29, 1926, Alvin Bodle and Lloyd Summers made an agreement for Summers to use water from the Ditch, probably for his subdivided Mammoth Camp Tract. (Anoymous n.d.)

In 1927, on July 18, the same files state:

> Lloyd Summers tries to appropriate water from Mammoth Tunnel (water flows out of 4 tunnels of the mine near Mammoth City). Protested by Bodle and helped by T. Williams to substantiate that fact that it (the ditch) has been used for more than 40 years. (Since 18977)

Another cryptic note states "...1922 Bodle and father ran dairy and supplied Summers Hotel." This was based on a conversation with a Clarke Keely of Mammoth, no date given. It also states "Summers started pipeline from the tunnel. In 1922 and 1923, Hidden Lake had water running in it." (Keely n.d.)

The current undertaking is planned for a parcel south of Old Mammoth Road in Sections 3 and 10, Township 4 South, Range 27 East. It was originally sold by J. J. Maxwell to G. W. Reynolds on August 8, 1888. The recording of that sale in no manner specifically mentioned water. On August 19, 1889, the property was resold by Reynolds to Tom Williams. The deed for this sale

contains the first mention of water being associated with this parcel: "With all my right, title and interest in and to 100 inches of water conveyed to and running on said land," found in volume L, page 322. (Harmening n.d.) That change in wording and specific wording about "100 inches of water" indicates conclusively that the irrigation ditch, later to be called Bodle Ditch, was constructed during that year from August, 1888 to 1889.

On October 4, 1927, the land was sold to A. Bodle. The deed reads: "Together with all water and water rights, ditches and ditch rights, rights of way and easements there-unto belonging or in anywise appertaining. Found in Book B, page 457. (Harmening n.d.)

Portions of the Bodle Ditch system associated with Bodle's meadow and Windy Flats are used today (1990) by the Forest Service and its permittee. From the hairpin turn on Old Mammoth Road, the water flows under the road in an easterly direction and then drops down a steep hillside and flows towards Hidden Lake. Today all that water is channeled across the hillside, paralleling the route of the Mammoth Rock trail, and watering government stock pasture near the Sierra Meadows Ski Touring and Pack Station. A gate prevents that water from following its historic course into the Windy Flats, sometimes called Old Mammoth Meadow. The dry ditch can still be followed across the northwest quarter of Section 10, as can be seen in the accompanying pictures.

The Bodle Ditch was recorded by archaeologist Mary Farrell in 1981. She found that

> A dirt road crosses the ditches, a former road or jeep trail parallels the southern ditch, a trough, cattle (?) area has crossed the path of the north ditch, 5 inch beams from ditch are buried in the road...At the Northeast end of the meadow, there is a low dam, either a recent part of irrigation or part of the borrow pit to the NE. [Artifacts found include] A few tin cans...some so rusted as to be unidentifiable fragments...Also, there are pipe and 'tee'-shaped sheet metal diversion channels. In some places, the ditches were reinforced with wood, 2x6 inch or 2x4 inch stake uprights with 1x6 inch walls. Some stakes are still in the ground,

> but walls are fallen. Also, there is a pile of mortared adobe bricks in an area about 5 by 10 feet, apparently "in situ"...The south ditch has some remains of some rock check dams. At the division of the south and north ditches is a pile of concrete."

The route of the Bodle Ditch coming down off the limestone cliffs and above Hidden Lake (in Section 10) is easy to find on the ground. The ditch flows out of the northeast corner of Hidden Lake and continues east. It watered a nearby meadow, then branched to flow directly toward the site of Old Mammoth with another branch going toward the vicinity of the present barrow pit and Forest Service tack room. Where the original ditch intersects the Dempsey property the company put in an underground culvert to carry the water to the other side of the private property. From there the original channel again carries water.

Just east and below that section the ditch branches again. One junction flows downhill toward the meadow and the pack station, another junction veers south, contours around a hill, and heads to a wetland next to an unnamed dirt road, at the NW corner of section 11. The branch going downhill toward the pack station and meadow again branches at the lower meadow, now very close to the main Old Mammoth Road. One branch goes west for a short distance, another lets water down into the meadow toward Old Mammoth Road and a third, and longer branch continues in an easterly direction. A succession of weirs can be found along this section in the lower meadow. The weirs appear to have been built around the turn of the century and direct water or control its flow into the meadows. Taken in total, these unused ditches attest to a complete system to bring water to the sprawling meadow, or Windy Flats.

Summary and Conclusion

Starting at Lake Mary, there is an extensive water system that was begun in the early mining days of Mammoth basin. Over the years, it has been elaborated by additions made for domestic water supply and for range

improvement. Locally, the system is known of as the Bodle Ditch after the dairyman Alvin Bodle who owned it from 1927 to 1944. As proposed, the golf course will overrun the longer branch heading easterly with the succession of wooden weirs to control the water. It is a testimonial to the pioneers of Mammoth Meadows who gathered and husbanded water to benefit their activities which contributed to the sustenance of the area.

ASSESSMENT OF SIGNIFICANCE

National Register of Historic Places Criteria

Legal guidelines for the evaluation of archaeological sites for listing in National Register of Historic Places on federal lands are specified in the Code of Federal Regulations, Title 36, Section 60.6 which states:

> The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, building, structures, and objects that possesess integrity of location, design, setting, materials, workmanship, feeling, and associations, and;
> a.) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> b.) that are associated with the lives of persons significant in our past; or
> c.) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> d) that have yielded, or may be likely to yield, information important in prehistory or history.

Integrity

The whole ditch system today (1990) retains enough integrity to qualify as a site or a contributing feature of National Register district. Taken by itself, the lower Bodle Ditch (i.e. the irrigation system in the lower meadow) has been used in places and lost in places. Two short sections of it have been obliterated, somewhat compromising its integrity; however, the system can still be traced. By itself, it would probably not be significant. Taken as a contributing feature of the larger ditch system or of a district which

encompassed more than the ditch system, it would.

Period of Significance

If the ditch system were to be considered in toto the period of significance would begin with construction of the upper ditch in 1879; however, a property cannot have a period of significance that predates its existence. Therefore, the period of significance of the Bodle Ditch is set between ca. 1889 to 1944. County property records indicate that the ditch later known as the Bodle Ditch was in use by 1889. Many historical sources mention the drought years in the later 1880s and it seems likely that these ditches were built to during this dry period to better irrigate the large meadows at the base of Mammoth Rock known of as Windy Flats or Mammoth Meadows. In 1844, Alvin Bodle sold his property to the Arcularius family.

Evaluation of Significance.

The entire length of the Mammoth City Domestic Water Ditch and the lower Bodle Ditch, taken as an entity, appear to be eligible for listing on the National Register under criteria a and c. The theme of hyrological developement is an important one throughout the Desert West and especially so in the eastern Sierra. This ditch system was begun as an adjunct to the mining activity that brought Euro-americans to the area, expanded to supply domestic water to Old Mammoth, and expanded yet again when the ranchers came in to irrigate pastures.

Use and delivery of the at-the-time abundant water of the Sierra Nevada was critical to early mining and agriculture. The story of the ditch system embodies the distinctive characteristics of the first and second chapters of history in the Mammoth region. The ditches taken in the largest context are definitely tied to events in the Lake District and Mammoth Basin that explain the broad patterns of our history.

Preservation of the remains of these historical events is vital to an

understanding of our cultural resources. People reared in our large southern Californian megatropolis need to be able to see and feel and touch the dry ditch and imagine a hardy pioneer digging it out to get water to thirsty animals or to grow grasses for feed.

Ideally, the ditch should be considered as one part of a larger district, which would include all those material elements that remain from the early chapters of Mammoth's history such as the Knight Wheel now located next to Old Mammoth Road, the Wildasinn cabin, Mammoth City and the historic site at Mill City, along with remnants of Pine City and the route of the flume to Mill City.

DETERMINATION OF EFFECT

The proposed golf course will alter the lower end of the Bodle Ditch. Currently, four different proposals are being considered so it is not known which specific sections will be impacted. Depending on the alternative chosen, it could be changed dramatically.

RECOMMENDED MITIGATION MEASURES

Dispite the uncertainity of the specific boundaries of the golf course, and how it will impinge on the side ditch called Bodle, it is felt that the following actions will mitigate the effects of any future construction:

1) Sketches and photographs of distinctive and typical sections of the side ditches be made and keyed to a detailed map. The sketches shall then incorporated into a display at either the Hayden Museum along Mammoth Creek or the golf course itself to tell the story of the water ditch system and how it nourished Old Mammoth.

2) A distinctive portion of the ditch with weirs be preserved in place and integrated into the design of the golf course.

3) An interpretive sign be placed at the preserved section of the ditch and appropriate fencing or landscaping be used to protect the segment during use of the golf course.

4) The proponent will set aside some part of the fees earned by the golf course to fund a National Register of Historic Places Nomination.

REFERENCES

Anonymous
n.d. Pre-empton Claim B-278, on file at Mono County Courthouse

Anonymous
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AN ARCHAEOLOGICAL SURVEY OF THE SNOWCREEK GOLF COURSE EXPANSION MAMMOTH LAKES, CALIFORNIA

JEFFERY F. BURTON

Trans-Sierran Archaeological Research
Contributions to Trans-sierran Archaeology No. 21
March 1990

AN ARCHAEOLOGICAL SURVEY OF THE SNOWCREEK GOLF COURSE EXPANSION MAMMOTH LAKES, CALIFORNIA

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TSAR Project No. 27
Contributions to Trans-sierran Archaeology No. 21
March 1990

Management Summary

Trans-Sierran Archaeological Research has conducted an archaeological survey o the proposed Snowcreek Golf Course Expansion, within the town of Mammoth Lakes California. Most of the project area had been surveyed previously. One prehistoric site (CA-Mno-770) and one historic site (CA-Mno-893-H, Bodle Ditch), both previously recorded, were relocated within the approximately 160-acre project area. No other sites were located during the survey. The prehistoric site does not appear significant based on surface evidence. No further archaeological work is recommended for that site. The historic site appears significant based on its association with the growth and development of Mammoth Lakes area. Preservation and interpretation of a portion of the site is recommended.

ARCHAEOLOGICAL BACKGROUND

Archaeological work in the region has been summarized in several major overviews, especially those of Bettinger (1982a), prepared for the Forest Service, and Busby *et al.* (1979), prepared for the Bureau of Land Management. Jackson (1985) included a discussion of current archaeological work in the area in his survey report. Several surveys have been undertaken within and near the project area. E. L. Davis conducted an extensive survey in the region, recorded numerous sites, and developed a site typology (Davis 1964). In 1975, Kuhn and Jersey surveyed a sample of the Long Valley "Known Geothermal Resource Area" (KGRA) for the Inyo National Forest. Bettinger conducted a systematic stratified random sample of the KGRA in 1977. His survey encompassed lands administered by the Inyo National Forest adjacent to the project area. Through his work, Bettinger was able to develop a model to predict site density and site taxonomy based on the presence of nine types of cultural material. In addition, Bettinger discussed subsistence and settlement patterns and apparent changes through time. Most apparent from survey data from Long Valley is the ubiquity of archaeological sites near the Casa Diablo obsidian quarries.

Most of the archaeological work conducted in Long Valley has concentrated on the Mammoth Lakes area. Excavation at sites in the Mammoth Lakes area has revealed a variety of subsistence, residence, and exchange activities through time. Notable among these excavations are those conducted at rockshelters such as CA-Mno-455 and -472 (Davis 1964), Mammoth Creek Cave (Enfield and Enfield 1964), Little Hot Creek (CA-Mno-615), and Little Antelope Valley (CA-Mno-616; Jackson 1985; Basgall n.d.); at temporary hunting camps such as those at Doe Ridge (Burton 1986b); at temporary camps where both obsidian reduction and subsistence activities occurred, such as Triple R (CA-Mno-714; Bettinger 1980; Jackson 1986); at large sites with middens where a variety of activities occurred, such as the Chance Well Site (CA-Mno-458; Burton 1983, 1986a), Snowcreek (CA-Mno-3; Burton and Farrell n.d.), the Hot Creek Hatchery Site (CA-Mno-611; Tadlock and Tadlock 1972), the Mammoth Junction Site (CA-Mno-382; Burton 1985; Michels 1964; Sterud 1965), or multi-purpose sites without middens, such as CA-Mno-1878 (Jackson personal communication); and at an early site, the Komodo Site (CA-Mno-617; Basgall 1984a, Bettinger 1977). However, most work has focused on sites that are predominately

stoneworking with only minor evidence of subsistence activities. These sites include: Forest Service Forty (CA-Mno-[illegible], Basgall [illegible]), CA-Mno-[illegible] (Hall [illegible]), Camp High Sierra (CA-Mno-1529; Basgall 1984b), CA-Mno-11, -823, -1644, and -1645 (Bouscaren and Wilke 1987), CA-Mno-1654 (Weaver *et al.* 1984), Big Springs (CA-Mno-819; Jackson 1985), Casa Diablo Hot Springs (CA-Mno-2183; Hall 1987), and CA-Mno-574, -577, -578, and -833 (Adams 1986; Goldberg *et al.* n.d.; Mone 1986).

<u>Chronology</u>

The following chronology, based on time-sensitive projectile points, has been proposed by Bettinger (1982a:89-92) for the Inyo-Mono region:

Pre-Medithermal

> Mohave complex (pre-3500 B.C.) -- indicated by Mohave, Silver Lake, and Great Basin Transverse point assemblages.

Medithermal

> Little Lake Period (3500-1200 B.C.) -- indicated by Little Lake and Pinto series points and Humboldt Concave-base bifaces.
>
> Newberry Period (1200 B.C. - A.D. 600) -- indicated by Elko Series points.
>
> Haiwee Period (A.D. 600-1300) -- indicated by Eastgate and Rose Spring Series points and Humboldt Basal Notched bifaces.
>
> Marana period (A.D. 1300 - historic) -- indicated by Cottonwood and Desert Side-notched points.

Information compiled from the various excavations and surveys provides a glimpse of lifeways during these periods. The pre-Newberry occupation of Long Valley may have been sporadic. During the Newberry period, obsidian quarrying and biface production, apparently for trade, appears to have become intensive. During the Haiwee and Marana periods, biface production diminished, and there is evidence of increasing direct subsistence activity. Long Valley has lacked evidence of the shifts in direct subsistence that appear to have occurred in Owens Valley, to the south. For example, occupation sites are almost always associated with riparian settings and were utilized throughout the Medithermal (Bettinger 1982a:112-114). However, there is some evidence that pinyon exploitation did not begin on any intensive scale in Long Valley until the Haiwee period (after A.D. 600),

and there may have been a partial abandonment or reduction in the use of upland and desert scrub areas after ca. A.D. 1000 (Bettinger 1977).

ETHNOGRAPHY

Ethnographic information on the inhabitants of Long Valley is limited, with most of the available data contained in works by Steward (1930, 1933, 1934, 1938), Davis (1964), and Stewart (1939, 1941). There are several excellent reviews of what is known about the ethnography of Long Valley, extracted from these and other works (*e.g.* Bettinger 1982a; Busby *et al.* 1979; Basgall 1983; Hall 1983; and Jackson 1985). No attempt is made here to recapitulate all known ethnographic information, but rather follows an outline of a few ideas that seem especially pertinent.

Not ascribed to any one particular group's territory, Long Valley is near the intersection of several ethnic groups: the Mono Lake Paiute to the north, the Owens Valley Paiute to the south, Benton and Round Valley Paiute to the east, Monache to the west, and Southern Sierra Miwok to the northwest. The Paiute and Monache are Numic speakers, of the Uto-Aztecan language family, while the Southern Sierra Miwok are a branch of the Utian language family.

Hall (1983:49) cites evidence that Northern Paiute generally regarded their borders as fluid, which may have precluded exclusive use of Long Valley by a single group (*cf.* evidence of territoriality among Paiute in Owens Valley, Bettinger 1982b). Territories of the Monache and Southern Sierra Miwok were centered on the west slope of the Sierra Nevada, but due to friendly relations with the Paiute, small groups of Monache or Miwok might spend extended visits on the east side (*cf.* Gifford 1932; Cain 1961:94), and inter-group marriage did occur.

It is not clear whether Long Valley was used solely for seasonal resource exploitation or was in addition occupied year round by an autochthonous (indigenous) population. Sterud (1965:9) cites unpublished material collected by Davis that the Mammoth Junction Site was used by Mono Lake Paiute in ethnographic times. However, there is some evidence of more indigenous inhabitants: Steward mentions two or three Northern Paiute who claimed to have come from a village on Hot Creek, *Panwihumadu* ("fish creek place") (Hall 1983:49). Doyle reported a large "fandango" on Hot Creek in the 1880s, which was attended by local

Paiute as well as Washo, Shoshone, and Indians from Tulare (Doyle 1934:203). Hall discusses other evidence for permanent occupation of Long Valley (*cf.* Merriam 1955) and comments, "in all likelihood, there were probably some Paiute who spent the better part of their lives in and around Long Valley" (Hall 1983:51).

More specific information is available about the sociopolitical organization of some of the groups that may have frequented Long Valley (see, for example, Bettinger 1982a; Bettinger and Baumhoff 1982; Basgall 1983; Hall 1983; Jackson 1985). The Mono Lake Paiute were organized around the nuclear family, with perhaps one or two additional relatives completing the household. Most subsistence activities were performed by these independent small groups; families would come together in the winter, but composition of these larger aggregations was fluid, varying from year to year depending on resources. While an individual might be designated a group leader for individual events, leadership was ascribed, based upon talent, and temporary.

In Owens Valley, on the other hand, the population was more sedentary, with year-round occupation in permanent villages and short-term visits to temporary camps for resource procurement. Leadership was hereditary, and headmen were responsible for organizing communal work projects, such as irrigation, and festivals which may have served to redistribute resource surpluses as well as other social functions (for more complete discussions, the reader is referred to Jackson 1985; Hall 1983; Basgall 1983; Bettinger and King 1971). As for the other groups utilizing Long Valley, the Monache and the Southern Sierra Miwok groups were probably similar in their social organization to the Owens Valley Paiute, with at least some hereditary rulers and semi-permanent villages (Levy 1978; Spier 1978; Theodoratus Cultural Research 1984: 32-39). Some researchers have postulated that any autochthonous Long Valley group that may have existed would have followed a pattern closer to that of the Mono Lake Paiute (and other Great Basin groups) than that of Owens Valley Paiute, due to similarities in environmental constraints (Jackson 1985:21; Basgall 1983:10). However, Long Valley residents may have been closely tied to the Owens Valley Paiute (see Bettinger and King 1971).

In the spring, Tui chub, specked dace, and Owens sucker may have been fished from creeks, while roots and greens along creeks and meadows might have replenished dwindling winter stores. Small game, deer, and antelope may have been hunted nearby. In the

summer, grass seeds may have been collected from meadows and drier upland areas. Fall subsistence activities of both the Mono Lake and Owens Valley Paiute revolved around the collection of pinyon.

In addition, much of the trade and travel likely occurred during the summer months, when the high Sierran passes were free of deep snow. Inter- and intra-regional trade may have had extensive ramifications for subsistence and settlement systems of the Owens Valley and Long Valley areas. Bettinger and King (1971) proposed that an elaborate redistributive exchange system might account for the relatively complex sociopolitical organization of Owens Valley.

There is ethnographic evidence of many items traded: Owens Valley Paiute traded salt, pinyon pine nuts, seeds, obsidian, sinew-backed bows, rabbitskin blankets, deerskins, moccasins, mountain sheepskins, foxskin leggings, balls of tobacco, baskets, basketry water bottles waterproofed with pitch, wooden hot rock lifters, and red and white pigments, in exchange for shell money (*e.g.* disc beads, tubular clam beads, and more recently white glass beads), acorns and acorn meal, finely-constructed Yokuts baskets, cane for arrows, manzanita berries, squaw berries, and elderberries from the Monache (Hall 1983:56-57). The Mono Lake Paiute traded salt, pinyon pine nuts, piuga, brine fly larvae, rabbitskin blankets, baskets, pumice stones, and red and white pigments to the Sierra Miwok, in exchange for shell money, acorns, baskets, arrows, a fungus used in paints, manzanita berries, elderberries, and squaw berries (Hall 1983:57-58).

HISTORY BACKGROUND

Owens Valley, south of Mammoth Lakes, was traversed by Euroamericans as early as 1830 and later became an occasionally-used immigrant trail (Busby *et al.*, 1979:37-39). Prospecting and mining east of the Sierra Nevada began in the 1850s; the Lost Cement Mine, near Mammoth Lakes, was purportedly discovered in 1857. In 1855, Von Schmidt was commissioned to survey lands east of the Sierra, which included Long Valley.

The first permanent herds of cattle were brought into Owens Valley in 1861 to supply the growing mining camps of the Inyo-Mono region. The grazing, along with the cutting of pinyon for lumber and firewood by the miners and ranchers, reduced the Paiute's food supply greatly by the winter of 1862. Descriptions of the ensuing battles between the

Paiute and the new settlers are given in numerous accounts (*e.g.* Chalfant 1922, Wright 1879). The main fighting was over by 1863 and most of the Paiute in the region were removed to a reservation at Fort Tejon, south of Owens Valley. Over the next few years most of the displaced Paiute returned; however, they were then largely dependent on the Anglo economy. Some of the Indians that remained after the forced removal continued attacks into 1864. One of these was "Joaquin Jim," a Paiute(?) chief, who lived in Long Valley, near Deadman Creek and the North Obsidian Mountain (Wright 1879). Hostilities ended after the death of Joaquin Jim at Casa Diablo hot springs in the winter of 1865-66.

With the ending of hostilities, settlement of the region continued unabated. Mining activity in Long Valley itself dates from 1875 when gold and silver were discovered near Lake Mary by four prospectors trying to relocate the Lost Cement Mine. Four townsites were subsequently built in the area, Pine City, Mill City, Mammoth City and Mineral Park. Roads and trails were constructed to connect the towns with Bodie, Bishop, and Fresno. Water was brought in through ditches and flumes to power the mill and arrastres, and to irrigate nearby meadows for grazing. During the peak of mining activity, in 1879, twenty stamps and a steam-powered engine were added to the mill at Mill City. However, a decline in productivity, severe winter weather, discontent of the stockholders, and a fire that destroyed half of Mammoth City led to the closing of the mill and the eventual abandonment of the towns. By 1881 only a few prospectors worked in the area (Doyle 1934:108-194).

In the 1880s cattle ranching and lumber production replaced mining as the main enterprise, although small scale mining still continued. In 1895 major work was again started at the Mammoth mines. In 1898 a ten stamp mill was constructed at Mammoth City, using the old water wheel from Mill City. Again the mine did not pay off, and was closed the same year.

In the early 1900s "Old" Mammoth was promoted as a resort community and recreation and tourism became a dominant industry in the region. The Los Angeles Department of Power and Water (LADWP) began acquiring water rights in Inyo County, to the south, early in the twentieth century. By the 1930s LADWP began buying water rights on streams north of Owens Valley.

METHODS

Archival research was conducted at the Eastern Information Center of the California Archaeological Inventory (CAI), located at the University of California, Riverside. During work undertaken for a variety of projects (*e.g.* Basgall and Jobson 1986; Burton 1982a, b, 1990; Farrell 1981; Hall 1983; Leonard 1974; Taylor 1979a, b), two sites had been previously recorded within the project area and numerous others have been recorded in the immediate vicinity. The prehistoric sites in the vicinity are characterized by lithic scatters, some with associated bedrock milling features or midden. The two previously recorded sites within the project area, one a prehistoric lithic scatter and the other a historic irrigation ditch, are discussed below.

Fieldwork was conducted on December 16-17, 1989, by the author and one other archaeologist. The 45 acres of the project area that had not been previously surveyed were traversed by walking parallel zig-zag transects at 15-meter intervals. Ground visibility was good, with vegetative cover limited to sparse shrubs and short meadow grasses. Very small patches of snow occasionally occurred under shrubs and on north-facing slopes, but over 90 percent of the survey area was free of snow. The 115 acres previously surveyed were also checked, although less intensively. The two previously-recorded sites within the project area were relocated and inspected. No subsurface testing or surface collection was conducted for this project.

RESULTS

Site locations are depicted in Figure 3. Archaeological site records are included as Appendix A; the sites are summarized below.

CA-Mno-770

This site, previously recorded by Taylor (1979a), is located

. The site was recorded as a lithic scatter covering an area of over 50,000 square meters. No artifact count or density was given. A later survey (Farrell 1981) located a large-stemmed (Elko?) projectile point within the site boundary. The lithic scatter is extremely sparse; less than 20 obsidian flakes could be found within the site boundary, despite intensive examination and good ground visibility.

There were no apparent concentrations of material, suggesting the flakes are remnants of ephemeral use. Given the level of disturbance in the site area (ditches, buildings, and roads), surface artifacts would be more abundant if a substantial subsurface deposit were present. The original site recording predates CAI criteria; the flakes would currently be considered isolates (cf. Taylor 1979b).

CA-Mno-895-H

This site, recorded by Farrell (1981), is a portion of the Bodle Ditch, constructed in 1879. The ditch originates at Coldwater Creek above Lake Mary, and supplied water and power to Mill City for both mining and domestic use. A side ditch brought water to the project area to irrigate pasture (Reed 1982:14). The ditch takes it name from Alvie Bodle, who purchased the land, ditch, and water rights in 1927. Bodle sold the pasture to Frank H. Arcularius in 1944. Portions of the ditch were in use up until the 1980s, when the Mammoth County Water District purchased the water rights and discontinued use of the ditch. In some areas the ditch has been reinforced with wood or rocks, and includes rock check dams. Tin cans and a possible building foundation occur near the ditch alignment. Farrell recorded only a portion of the entire ditch system; that portion had been abandoned at the time of her survey.

DISCUSSION

Evaluation of significance

Legal guidelines for evaluation and management of archaeological sites on public land are outlined by the *National Historic Preservation Act*, as amended, and specified in the Code of Federal Regulations, Title 36, Section 60.6 which states:

> The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, building, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> (A) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (B) that are associated with the lives of persons significant in our past; or

(C) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(D) that have yielded, or may be likely to yield, information important in prehistory or history.

It is important to note here that the evaluations and recommendations made in this report are the author's professional opinion only; the Keeper of the National Register makes the actual determination of eligibility, in consultation with the land-managing agency official and the State Historic Preservation Officer.

In order to interpret criteria A or C of the National Register, properties are often evaluated within the context of regional historical themes. Archaeological sites on public land are usually evaluated against National Register criterion D: the ability to provide information in important in prehistory or history.

Based on surface indications the prehistoric site does not constitute a significant resource. Cultural material at CA-Mno-770 is too sparse to effectively yield information beyond that already recovered; in addition the site has lost much integrity through past ground-disturbing activities. This site lacks the diversity and quantity of cultural material necessary to provide further significant information pertaining to regional research questions. There is no apparent depth of cultural deposit at the site.

CA-Mno-895-H appears eligible for listing on the National Register under criteria A and C, for its association with the early development of mining and ranching in the region. The efficient use of the abundant water of the Sierra Nevada was critical to early industry and agriculture, and hence to historic development of the region. Ideally, the ditch should be considered as one part of a thematic group, including other features and sites (such as the nearby Pelton Wheel, the Wildasinn cabin, and Mammoth City). Criteria B and D do not appear applicable. The ditch is not associated with the lives of persons significant in history, and does not appear to have data potential beyond that already recorded. Further field work would not likely yield additional data significant to the history of the area.

Recommendations

As discussed under Significance, above, the prehistoric site does not meet the National Register criteria for a significant cultural resources; it will require no further archaeological work.

For the historic site (CA-Mno-895-H), the following steps are recommended to mitigate the effects of the golf course construction:

1) Sketches and photographs of distinctive and typical sections of the ditch should be made and keyed to a detailed map.

2) A distinctive portion of the ditch should be preserved in place, and integrated into the golf course design.

4) An interpretive sign (such as the example in Figure 4) should be placed at the preserved section of the ditch. An appropriate fence (such as split-rail) or landscaping could be used to protect the persevered segment during use of the golf course.

While preservation in place is often the preferred management strategy for cultural resources, complete preservation of the ditch within the project area appears neither feasible nor necessary. Preservation and interpretation of a portion of the ditch could enhance its association with the historic development of the Mammoth Lakes area. If these recommendations are followed, it is believed that the proposed golf course expansion would have no adverse effect on the qualities that make site CA-Mno-895-H eligible for listing on the National Register.

MAMMOTH LAKES

SIGNS OF THE PAST

THE BODLE DITCH

Before you is a portion of the Bodle ditch system, constructed in 1879. Originating at Coldwater Creek above Lake Mary, the ditch supplied water and power to Mill City for both mining and domestic use. A side ditch brought water to this area, once called Windy Flat, to irrigate pasture. The pasture supplied feed for both local cattle destined for Mill City and Mammoth City, and large herds on route to Reno from the Owens Valley. The ditch takes it name from Alvie Bodle, who purchased the land, ditch, and water rights in 1927. Bodle grazed dairy cows on the irrigated pasture to supply milk to local residents and hotels. Bodle sold the pasture to Frank H. Arcularius in 1944. By that time, sheep had largely replaced the cattle. Portions of the ditch were in use up until the 1980s, when the Mammoth County Water District purchased the water rights and discontinued use of the ditch.

[map of ditch system]

Figure 4. Example of possible interpretive sign for the Bodle ditch.

APPENDIX E

AGREEMENT BETWEEN THE ROSER'S AND DEMPSEY CONSTRUCTION

AGREEMENT

THIS AGREEMENT is made this 15th day of April, 1989, at the Town of Mammoth Lakes, County of Mono, California, by and among LOUIS B. ROESER and MARY E. ROESER, husband and wife, each individually and doing business as MAMMOTH LAKES PACK OUTFIT (all hereinafter referred to as "ROESER"), and MAMMOTH OUTFITTERS, INC., a California corporation, doing business as SIERRA MEADOWS EQUESTRIAN AND SKI TOURING CENTER (said corporation is hereinafter referred to as "SIERRA MEADOWS"), SNOWCREEK SKI AREA, a general partnership (hereinafter referred to as the "Joint Venture"), and DEMPSEY CONSTRUCTION CORPORATION, a California corporation (hereinafter referred to as "DEMPSEY"), and SNOW LODE GROUP, INC., a California corporation (hereinafter referred to as "SNOW LODE").

Recitals

A. ROESER is the sole shareholder of all of the issued and outstanding shares of MAMMOTH OUTFITTERS, INC.

B. ROESER is the United States Forest Service (hereinafter referred to as "USFS") permittee for approximately 564 acres of pasture land located in the "meadow area" within the Town of Mammoth Lakes. The 564 acres are hereinafter referred to as the "Pasture Land." The Pasture Land is more particularly described in USFS Use Permit No. 5934. The terms of the USFS Use Permit are incorporated herein by this reference. The Pasture Land is more particularly described on Exhibit "A" attached hereto and incorporated herein by this reference. The Pasture Land is made up of Areas (A), (B), and (C) on Exhibit "A".

C. SIERRA MEADOWS is the USFS permittee for approximately 13.2 acres of land located in the "meadows area." The use of said land is for an equestrian center and Nordic center, together with certain Nordic trails and Nordic teaching areas. SIERRA MEADOWS' Use Permit also encompasses additional USFS permit areas outside the 13.2 acres, including a Nordic track trail system which lies partly on the lands shown in Exhibit "A". This 13.2 acre area is included herein for reference only and is not a part of this Agreement.

D. DEMPSEY and SNOW LODE have formed a joint venture (hereinafter referred to as the "Joint Venture") to develop a ski area encompassing the Sherwin Bowl and a portion of the meadows area of Mammoth Lakes. The Joint Venture is seeking to obtain a USFS Use Permit for the ski area, which is to be called the "Snowcreek Ski Area." The Joint Venture desires to incorporate Areas (B) and (C) of the Pasture Land as a part of the Snowcreek Ski Area development.

E. DEMPSEY, as a USFS permittee, desires to incorporate a portion of Area (C) of the Pasture Land as part of its Snowcreek Development Master Plan. Area (C) is also intended to be part of a golf course.

F. By viture of this Agreement, ROESER, the Joint Venture, and DEMPSEY intend to work together and cooperate with each other to accomplish the objectives recited herein. This effort requires working with the USFS to accomplish these objectives. It is acknowledged and understood by the parties that USFS Use Permits are not transferable, rather

that such Use Permits must be relinquished by the current permittee to the USFS and reissued by the USFS after qualification to a prospective permittee.

G. It is the intent of the parties to mutually and jointly work with USFS to terminate the USFS Use Permit rights of ROESER in and to Areas (B) and (C) of the Pasture Land and to simultaneously enable the Joint Venture (with respect to the Snowcreek Ski Area) and DEMPSEY (wit respect to the proposed golf course), respectively, to become the permittees for said areas, all in accordance with the terms and objectives of this Agreement.

H. It is the intent of the parties to enable ROESER to retain a Use Permit for Area (A) of the Pasture Land for pasture use, and to enal ROESER to retain a Use Permit for Areas (B) and (C) for wagon and sleigl routes, riding trails and Nordic trails, consistent with the terms and conditions of this Agreement as herein set forth.

I. ROESER nad SIERRA MEADOWS have additional USFS Permits for use of lands in the meadows area for Nordic skiing and Nordic trails. These lands are more particularly described as follows: Portions of Sections 1, 2, 9, 10, 11, 12, 13, 14, and 15, Township 4, Range 27 East, and portions of Sections 6, 7, and 18, Township 4, Range 28 East; said lands hereinafter referred to as the "Nordic Permits Area."

J. Based upon the possibility that the USFS may require a land exchange or outright purchase of the lands needed for any of the uses contemplated herein, in lieu of issuance of permits for such uses, in order to effectuate the intent of this Agreement, whereever the obtaining of a use by USFS permit is referenced, it shall include and be interpreted as meaning the obtaining of such use by purchase or exchange.

Agreement

NOW, THEREFORE, IN CONSIDERATION OF THE MUTUAL COVENANTS AND CONDITIONS CONTAINED HEREIN, THE PARTIES AGREE AS FOLLOWS:

I.

Pasture Land

1. In consideration of the sums to be paid by DEMPSEY to ROESER under the terms of this Agreement, ROESER shall take all actions and perform all acts necessary to work and cooperate with the Joint Venture and DEMPSEY to assist the Joint Venture and DEMPSEY in working with the USFS to obtain a USFS Use Permit(s) to Areas (B) and (C) of the Pasture Land as outlined in the Recitals above.

2. DEMPSEY and the Joint Venture shall use their respective best efforts to obtain the USFS Permit or Permits to Areas (B) and (C) within the sicty (60) month period outlined below.

3. The parties hereto mutually understand and agree that the USFS Permit(s) for the ski area ("USFS Ski Area Permit") and the golf course ("USFS Golf Course Permit") may be obtained separately and that both the USFS Ski Area Permit and the USFS Golf Course Permit are to be treated independently for purposes of the Agreement. Failure to obtain either of these Permits will not relieve DEMPSEY and the Joint Venture from their obligations to make the required payment based upon obtaining the other permit.

4. Within sixty (60) months of the date of this Agreement, the Joint Venture and DEMPSEY intend to accomplish all or a portion of the following in obtaining the USFS Ski Area Permit in the name of the Joint Venture and the USFS Golf Course Permit in the name of DEMPSEY:

A. USFS approval for construction of a nine-hole golf course on approximately between sixty (60) and eighty (80) acres of Area (C) of the Pasture Land; and

B. USFS approval for construction of the Snowcreek Ski Area base lodge, parking areas, and ski lifts on Area (B) of the Pasture Land and part of Area (C); and

C. USFS approval for use rights of ROESER in Area (B) of the Pasture Land as set forth in paragraph 8 below; and

D. USFS approval for retention of a Use Permit by ROESER of Area (A) of the Pasture Land for pasture use.

5. In the event that the USFS Ski Area Permit is issued to the Joint Venture within the sixty (60) month period, the Joint Venture shall pay to ROESER by cashier's check the sum of as follows: within sixty (60) days after issuance of the USFS Ski Area Permit, within one hundred twenty (120) days after issuance of the USFS Ski Area Permit and within one hundred eighty (180) days after issuance of the USFS Ski Area Permit. Notwithstanding the foregoing, the entire shall be paid in full prior to the commencement of construction of any of the facilities permitted in the USFS Ski Area Permit.

6. In the event that the USFS Golf Course Permit is issued to DEMPSEY within the sixty (60) month period, DEMPSEY shall pay to ROESER by cashier's check the sum of as follows: within sixty (60) days after issuance of the USFS Golf Course Permit, , within one hundred twenty (120) days after issuance of the USFS Golf Course Permit and Twenty-five Thousand Dollars within one hundred eighty (180) days after issuance of the USFS Golf Course Permit. Notwithstanding the foregoing, the entire shall be paid in full prior to the commence-emtn of construction of any of the facilities permitted in the USFS Golf Course Permit.

7. Failure to obtain either or both of the USFS Ski Area Permit and the USFS Golf Course Permit within the sixty (60) month period shall terminate without liability any further obligation(s) of the parties to this Agreement with respect to the Permit or Permits not obtained.

A. In the event that either or both of the approvals set forth in Paragraphs 5 and 6 of this Agreement are not obtained within the first twenty-four (24) months of the requisite sixty (60) month period, DEMPSEY and/or the Joint Venture shall pay to ROESER the sum of per month for each month that the approvals are not obtained. This obligation shall commence on the twenty-fifth (25th) month and continue through the sixtieth (60th) month or until (at the option of DEMPSEY and/or the Joint Venture) either or both of the Permits are issued or until the obligations of the parties are terminated pursuant to the terms of this Agreement. These monthly payments of shall accrue without interest and be paid to ROESER at the time of the initial payment set forth in either Paragraph 5 or Paragraph 6 above. In no event shall the term of this Agreement extend beyond the sixtieth (60th) month. (See Paragraph 7 above.)

8. The parties shall take all actions necessary to enable ROESER to retain grazing use rights akin to a sublease in and to the land areas of Area (B) of the Pasture Land. These use rights shall be limited to times when Snowcreek Ski Area daily ski operations are closed for the season and when any Snowcreek Ski Area construction and maintenance operations have been completed and terminated.

9. Should the Joint Venture and/or DEMPSEY be successful in accomplishing the relevant objectives of Paragraph 4, the Joint Venture and/or DEMPSEY shall provide to ROESER the following relevant items as mitigation measures resulting from the change in land use of the Pasture Land:

A. ROESER and SIERRA MEADOWS will be provided horse trails, sleigh ride and hay ride routes for SIERRA MEADOWS operations. These areas are generally delineated on Exhibit "A" and referred to in the legend on Exhibit "A". These areas will be deemed "outdoor facilities," and ROESER and SIERRA MEADOWS shall have no right to the use of any buildings of either the Joint Venture or DEMPSEY. Neither DEMPSEY nor the Joint Venture shall have the obligation to or be required to provide additional roads or trails other than the alignment delineated on Exhibit "A."

B. If the USFS Golf Course Permit is issued and/or the USFS Ski Area Permit is issued, then DEMPSEY and the Joint Venture will provide to ROESER and SIERRA MEADOWS use of land for a Nordic skiing area, the general area of which is designated as Area (E) on Exhibit "A." Such rights shall be limited to times when there is adequate snow coverage to prevent damage to the golf course grounds. In the event such Nordic activities result in damage to the gold course grounds for any reason whatsoever, ROESER and SIERRA MEADOWS shall reimburse DEMPSEY for all repair costs.

C. DEMPSEY with respect to the area within its Snowcreek Master Plan Development in the meadows area, which area includes the golf course and Snowcreek Ski Area, and the Joint Venture with respect to its portions of the Snowcreek Ski Area, and each of them, will include horse trails and hayride and sleigh routes for the benefit of SIERRA MEADOWS, including access to pasture locations across lands used by the Joint Venture or DEMPSEY. These routes are generally delineated in Exhibit "A" and on the legend of Exhibit "A" as Area (F).

D. From time to time, DEMPSEY will promote and specifically list and detail SIERRA MEADOWS and MAMMOTH LAKES PACK OUTFIT in advertising literature and promotional materials for both winter and summer activities.

10. Should DEMPSEY and the Joint Venture elect at any time to terminate or abandon their efforts or attempts to obtain the USFS Use Permit(as outlined herein, neither DEMPSEY nor the Joint Venture shall have any further payment obligation to ROESER as set forth in this Agreement other than for accrued but unpaid liability for Permit(s) actually issued. In such an event, ROESER shall be relieved from any further performance under the unexecuted terms of this Agreement. All monies previously paid to ROESER by DEMPSEY or the Joint Venture shall be retained by ROESER and be deemed compensation for those services rendered as described herein. In the event ROESER needs the cooperation of DEMPSEY or the Joint Venture for ROESER to reapply for or reacquire any of the USFS Permits referred to herein, then DEMPSEY and the Joint Venture shall fully cooperate and assist ROESER in such efforts. Any monies needed to be expended in reapplying or reacquiring such Permits shall be the sole obligation and responsibility of ROESER, and DEMPSEY and the Joint Venture shall have no responsibility or obligation to financially contribute thereto. DEMPSE and the Joint Venture agree that ROESER will retain USFS Grazing Use Permit in Area (B) until USFS Ski Area Permit is issued, and also in Area (C) until USFS Golf Course Permit is issued. Issuance of USFS Use Permits to DEMPSEY and the Joint Venture and relinquishment of USFS Use Permits by ROESER will occur simultaneously. If one or both USFS Use Permits are denied to DEMPSEY and/or the Joint Venture, ROESER's USFS Grazing Use Permits will remain in force in the denied areas.

II.

Nordic Permit Areas

11. In the event that the USFS Ski Area Permit is issued to the Joint Venture as set forth in Part I. of this Agreement, DEMPSEY and/or the Joint Venture, in mitigation of the impact to ROESER and SIERRA MEADOW Nordic track trail system within Exhibit "A" due to the development of roads, parking, facilities and alpine ski activities, shall pay to ROESER and SIERRA MEADOWS the sum of
fully amortized over three (3) years, with interest at the prime rate of Security Pacific National Bank plus one percent (1%) per annum, payments quarterly commencing sixty (60) days after the USFS Ski Area Permit is issued. It is the intent of the parties involved to enable ROESER and SIERRA MEADOWS to retain Nordic track trail through Area (B) and into Areas (A) and (E) of Exhibit "A".

III.

Miscellaneous Provisions

12. This Agreement shall inure to the benefit of and be binding upon the respective heirs, successors, assigns, and personal representatives of the parties hereto.

13. Any obligation of this Agreement may be assigned by the party to be charged with that obligation. Such assignment shall be valid only upon obtaining the prior written consent of the party in whose favor said obligation has been made. Such consent shall not be unreasonably withheld.

14. ROESER and SIERRA MEADOWS, and each of them, hereby covenant with DEMPSEY, SNOW LODE GROUP and the Joint Venture that neither party either jointly or separately, directly or indirectly, will carry on or engage in, either as an owner, part owner, manager, operator, employee, sales person, agent, independent contractor, or other participant, in the business of the other as detailed in this Agreement within the area delineated on Exhibit "A" for a period of ten (10) years from the date of this Agreement.

15. Should any litigation be commenced between the parties to this Agreement concerning this Agreement or the rights and duties of either party in relation thereto, the party prevailing in such litigation shall be entitled, in addition to such other relief as may be granted, to a reasonable sum as and for its attorney's fees in such litigation, which shall be determined by the court in such litigation or in a separate action brought for that purpose.

IN WITNESS WHEREOF, this Agreement is executed as of the day and year first above written.

Louis B. Roeser

LOUIS B. ROESER, individually and doing busines
as MAMMOTH LAKES PACK OUTFIT

Mary E. Roeser

MARY E. ROESER, individually and doing business
as MAMMOTH LAKES PACK OUTFIT

MAMMOTH OUTFITTERS, INC., a California corporatic
doing business as
SIERRA MEADOWS EQUESTRIAN AND SKI TOURING CENTER

By: Louis B. Roeser
LOUIS B. ROESER

DEMPSEY CONSTRUCTION CORPORATION,
a California corporation

By: _____

SNOW LODE GROUP, INC.,
A California corporation,

By: _____
ALLAN O'CONNOR, President

SNOWCREEK SKI AREA,
A General Partnership,

By: _____
THOMAS J. DEMPSEY, President of
Dempsey Construction Corporation

By: _____
ALLAN O'CONNOR, President of
Snow Lode Group, Inc.

APPROVED AS TO FORM AND CONTENT:

_____
NEIL G. McCARROLL II
Attorney for ROESER

LAW OFFICES OF DAVID S. BAUMWOHL

By: _____
DAVID S. BAUMWOHL
Attorneys for DEMPSEY

LOEB & LOEB

By: _____
MICHAEL LANGS
Attorneys for SNOW LODE

NOTATION: In the event the Ski Area is not approved, the existing Sierra Meadows hayride barbeque site located in the meadows at the base of the moraines will remain a part of Roeser's Pasture Permit, (See Area B) as will pasture area not affected by the golf course.

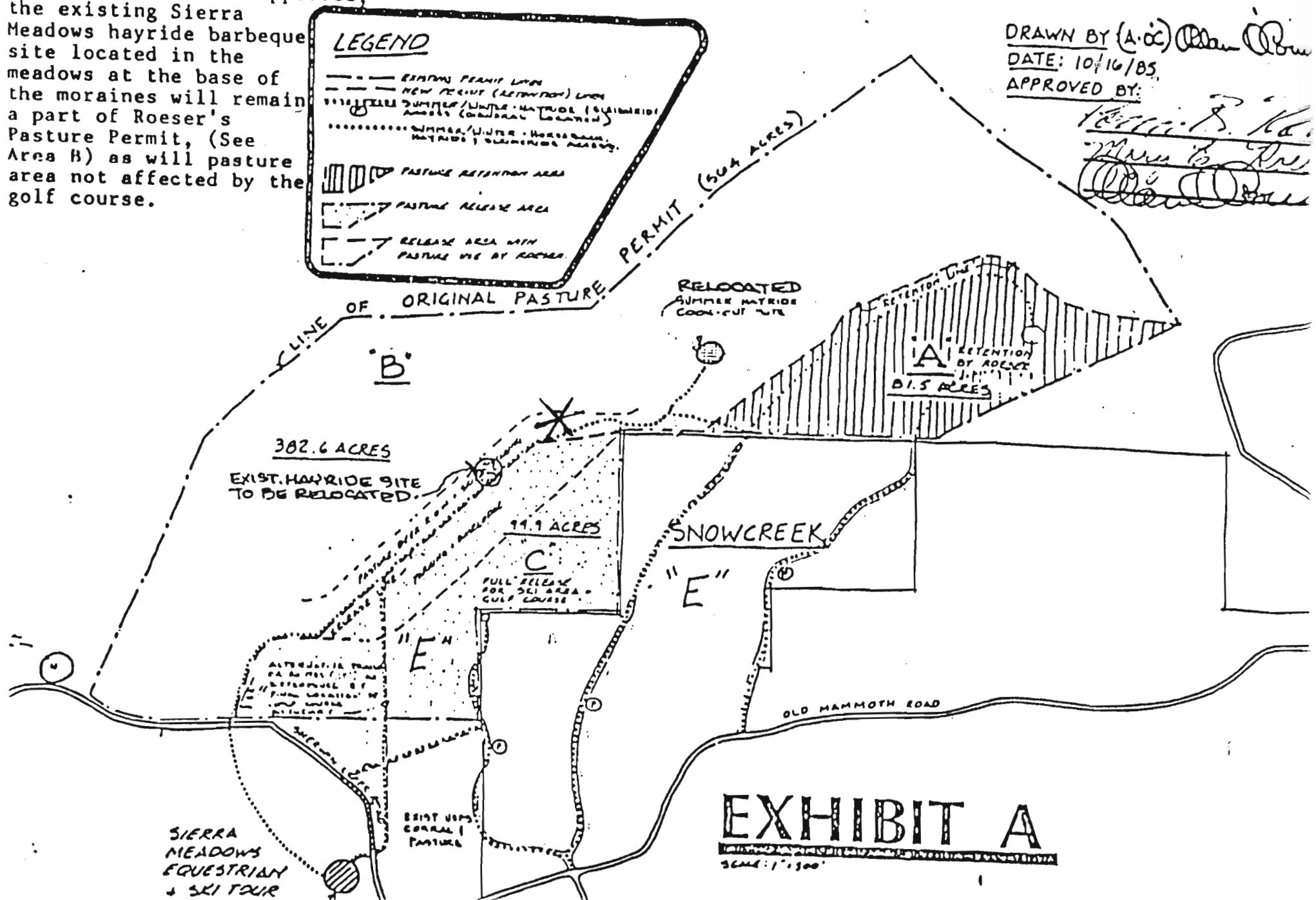
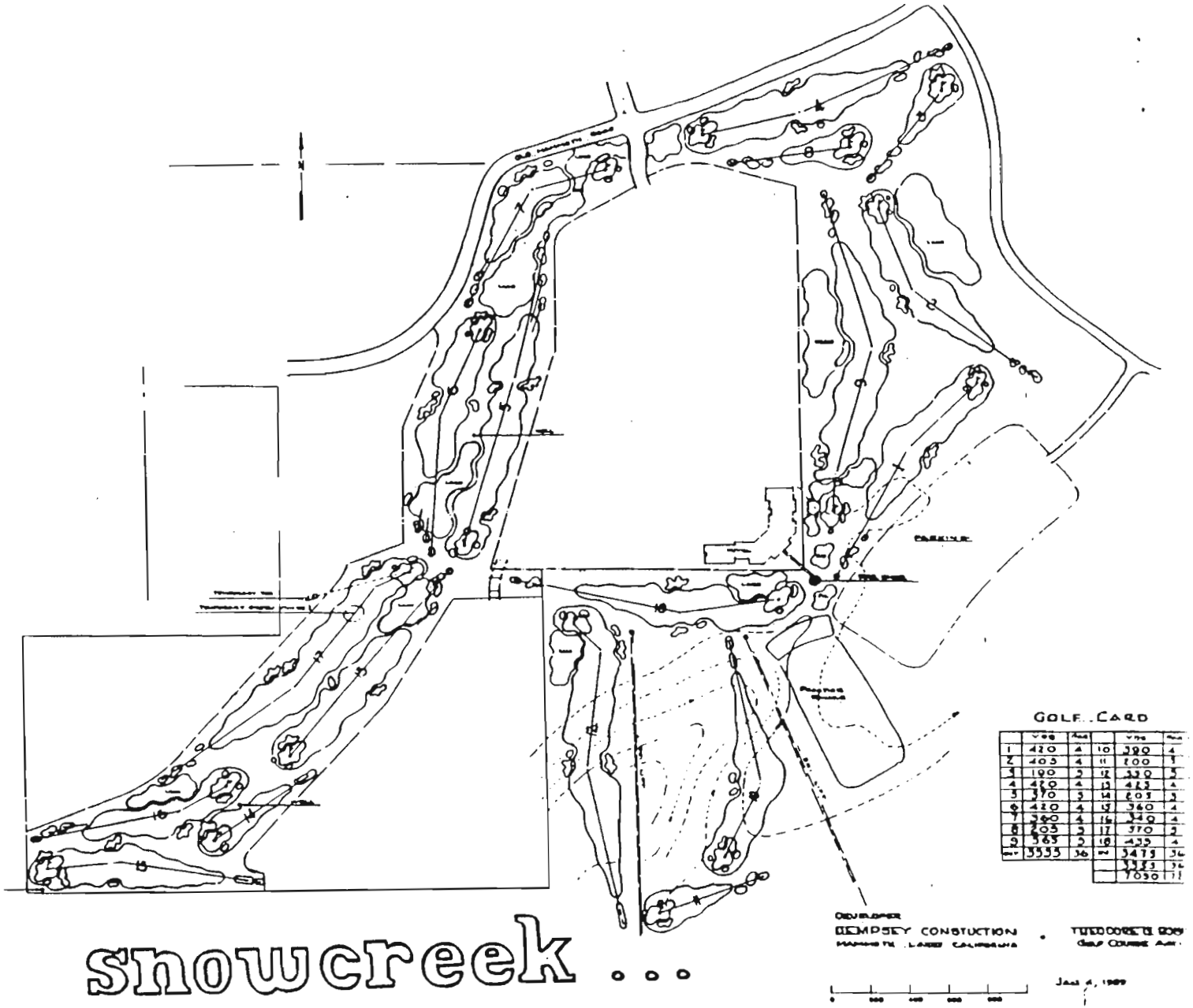
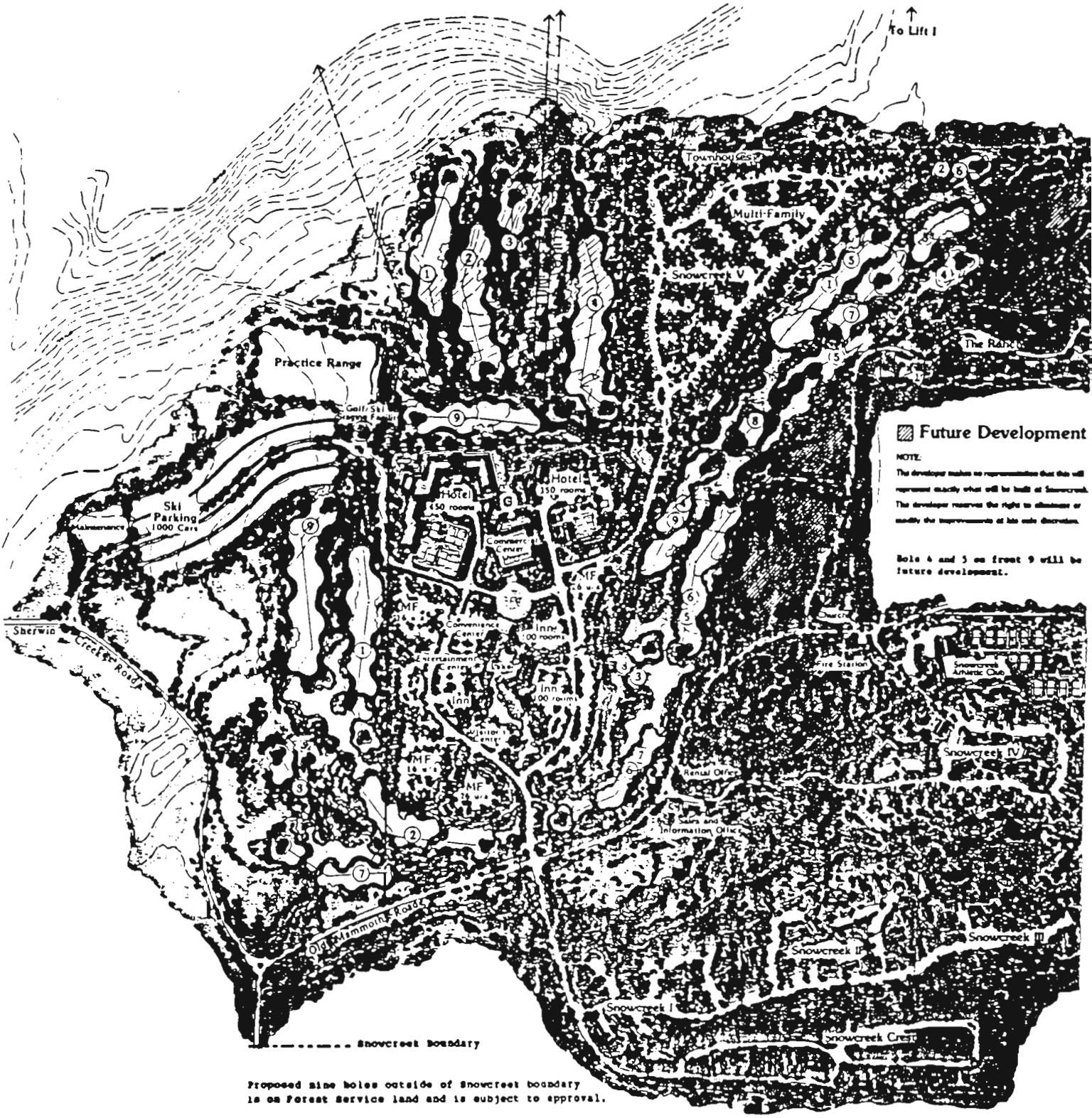


EXHIBIT A

SCALE: 1" = 500'



snowcreek ...

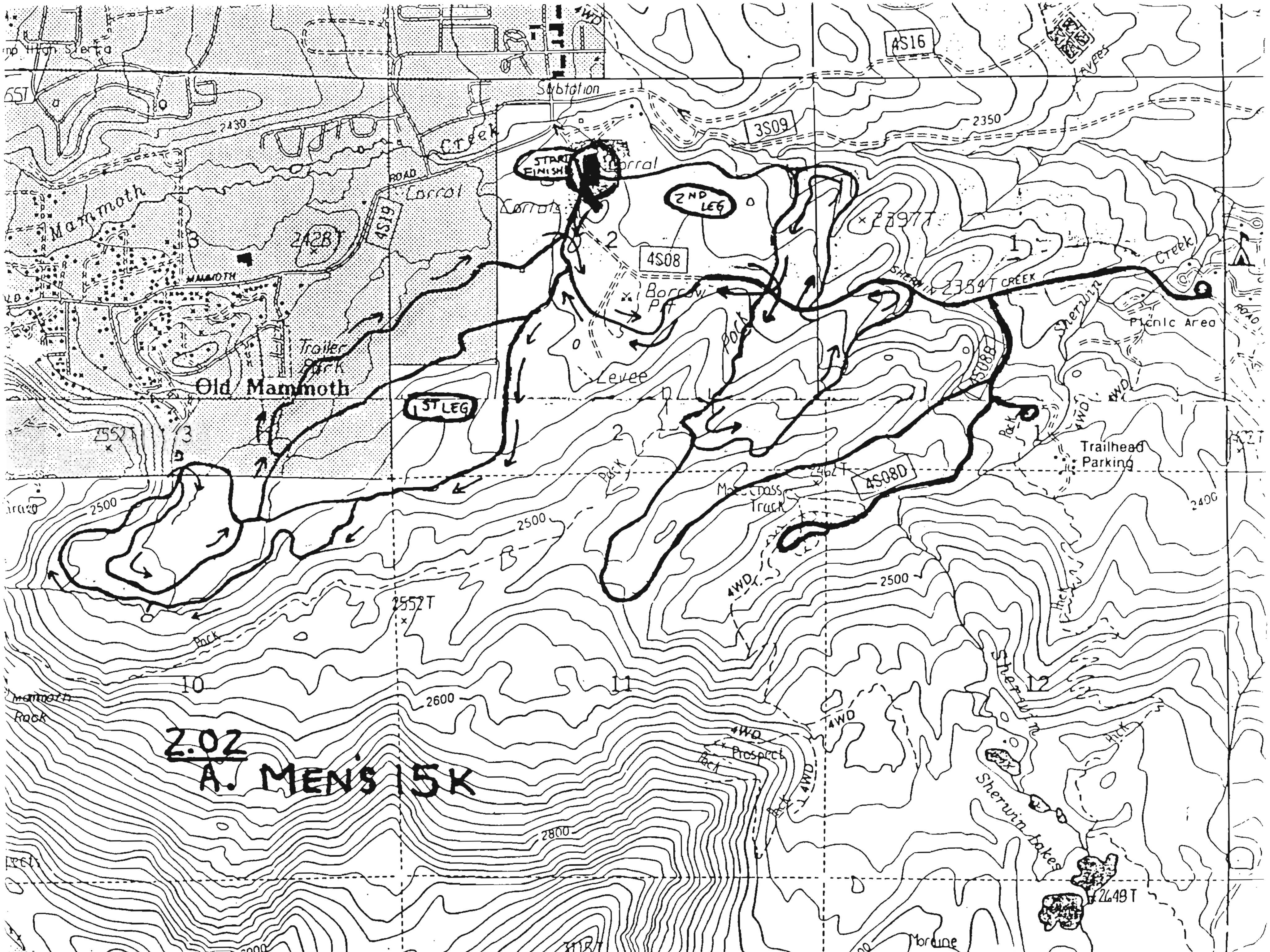


Proposed Master Plan

Snowcreek Village

Mammoth Lakes, California

ROBERT LAMB HART • Planners & Architects • San Francisco • New York


START FINISH
2ND LEG
1ST LEG
Old Mammoth
Mammoth
Trailer Park
Substation
Corral
Creek
Borrow Pit
Levee
Sherwin Creek
Picnic Area
Trailhead Parking
Motocross Track
Prospect
Sherwin Lakes
Moraine
Mammoth Rock
4S16
3S09
4S08
4S19
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APPENDIX F

HUMAN HEALTH RISK ASSESSMENT

USE OF PESTICIDES AT THE PROPOSED SNOWCREEK GOLF COURSE

INTRODUCTION - The purpose of this analysis is to assess the risks to human health of using pesticides as part of the Integrated Pest Management program at the proposed Snowcreek Golf Course. The Risk Assessment is composed of three parts. The first section is the **Hazard Analysis**, which looks at the general toxic properties of the individual pesticides proposed for use. The second section is the **Exposure Analysis**, which evaluates possibile sources and amounts of exposure that individuals are likely to recieve from the pesticide use. The final section is the **Risk Analysis**, which combines the information from the Hazard and Exposure Analysis to predict the health effects to individuals from the given condition of exposure.

Pesticides are one component of the Integrated Pest Management program proposed by Dempsey Construction Corporation for the operation and maintenance of the Snowcreek Golf Course. All the proposed products are EPA certified for the intended use. Application of pesticides is subject to regulation by the California Department of Food and Agriculture, as well as the Lahontan Regional Water Quality Control Board. All label requirements must be followed, and all applicators must be qualified. The assessment of risk is based on implementation of these requirements, as well as other mitigation as specified in the Environmental Assessment.

Information on the proposed use of pesticides is summarized in Table 1.

Table 1. Summary of proposed pesticide use.

Product	*Active Ingredient*	*Expected Date of Application*	*Location of Application*	*Purpose*	*Rate of Application*	*Method of Application*
Aluminum Phosphide	Aluminum Phosphide	4/15 to 11/1	Fairways	Rodenticide	1 Tablet/ tunnel	Hand apply
Round-up	Glyphosate	5/15	Fairways	Herbicide	<1 lb/ac	Hand Spray
Insecticide III	Chlorpyrifos	7/15 to 8/15	Greens	Insecticide	0.5 lbs/ac	Manual Rotary
Trimec	2,4-D Dicamba	7/15 to 8/15	Fairways	Herbicide	1.2 lbs/ac 2,4-D, 0.1 lbs/ac Dicamba	Mobile Spray
PCNB	Pentachloronitrobenzene	10/13 to 11/1	Tees & Greens	Fungicide	43 lbs/ac	Manual Drop Spreader
Chipco 26019	Iprodione	10/15 to 11/1	Greens	Fungicide	2.7 lbs/ac	Mobile Spray

Table 1. Summary of proposed pesticide use. (continued)

Product	*Active Ingredient*	*Expected Date of Application*	*Location of Application*	*Purpose*	*Rate of Application*	*Method of Application*
Bayleton	Triademefon	10/15 to 11/1	Greens	Fungicide	13.75 lbs/ac	Mobile Spray

HAZARD ANALYSIS - This analysis presents the results of a review of the information on the toxicity of the eight active ingredients proposed for use. The toxicity information comes from a variety of sources, including manufacturers, the US Environmental Protection Agency, the State of California Department of Food and Agriculture, and the State of California Environmental Protection Agency Department of Pesticide Regulation. This information is compiled in Appendix 1 of this report, and in Appendix F of the Final Environmental Impact Statement for the Vegetation Management for Reforestation proposal (USFS, 1988a). Both Appendix 1 and Appendix F are kept in the project files, Inyo National Forest.

Toxicity is discussed in terms of the dose that kills 50 percent of the test animals, either by oral ingestion, dermal absorbtion, or inhalation. The dose is classified according to a system developed by the EPA and used by the Forest Service (USFS, 1988a, p.F-10) for the Vegetation Management proposal. Information on the potential for the chemicals to cause cancer, gene mutation, chromosome effects, or DNA damage is also considered. Finally, the lowest no-observed effect levels (NOEL's) are presented. The information complied for the hazard analysis is summarized in Table 2.

Table 2. Summary of toxicity data.

Active Ingredient	*Toxicity*	*Cancer/gene Damage*	*Lowest NOEL (chronic or systemic)*
Aluminum Phosphide [1]	Severe		0.3 ppm OHSA PEL [4]
Glyphosate [2]	Slight	No	31(mg/kg/day)rat
Chlorpyrifos [3]	Slight	Possible DNA	0.1(mg/kg/day)rat
2,4 D [2]	Moderate	Possible	1(mg/gg/day)rat
Dicamba [2]	Slight	No	15.8(mg/kg/day)rat
Pentachloronitroben-zene [3]	Slight	Yes	1(mg/kg/day)rat
Iprodione [3]	Moderate	No	2.5(mg/kg/day)dog
Triademefon [3]	Moderate	Possible	2.5(mg/kg/day)rat

[1] Source - Baker, 1992
[2] Source - USFS, 1988
[3] Source - Appendix 1
[4] OHSA Permissible Exposure Limit to phosphine gas

EXPOSURE ANALYSIS - The exposure analysis evaluates possible pesticide exposures to workers and the public from the proposed use of pesticides. The public is also divided into two groups, golfers who would be using the course, and public who would be using adjacent National Forest or private lands.

Exposure can come from various sources, including oral ingestion of the material or of contaminated food, dermal absorbtion, and inhalation of dust or fumes. Workers have the highest level of exposure because they are working directly with the materials, however, they also have the benifit of protective clothing and other saftey equipment that helps minimize the exposure. All sources of exposure apply to workers. Of the proposed pesticides, the liquid concentrates offer the greatest potential for exposure for workers, because they are formulated as a concentrated liquid diluted by water and applied with a power sprayer. Backpack sprayers would have the greatest exposure, followed by operators of tractor powered spray units. Several studies listed in the references have modeled worker exposure to the pesticides proposed for use. The expected exposures to workers based on those studies is summarized in Table 3.

Table 3. Worker Exposure doses.

Active Ingredient	***Application rate***	***Expected Exposure Dose***
Aluminum Phosphide	1 Tablet/tunnel	<.1 ppm [1]
Glyphosate	< 1 lb/ac	0.029mg/kg/day [2]
Chlorpyrifos	0.5 lbs/ac	0.024mg/kg/day [3]
2,4-D	1.2 lbs/ac	0.0045mg/kg/day [4]
Dicamba	0.1 lbs/ac	0.00058mg/kg/day [2]
PCNB	43 lbs/ac	[5]
Iprodione	2.7 lbs/ac	0.0043mg/kg/day [2]
Triademefon	13.75 lbs/ac	30.75mg/kg/day [3]

[1] Baker, 1992
[2] From USFS, 1988a, 2,4-D model
[3] From Appendix 1
[4] From USFS, 1988b
[5] No estimates of exposure for this product are available.

Worker exposure can be significantly reduced in some cases by proper use of personal protective equipment (PPE), such as gloves, eye protection, and other items. The models used for the exposure to the herbicides as well as iprodione and triademefon involved minimal use of PPE. A California study of triademefon application to wheat, at 3.6 oz ai/ac, using closed cab tractors and proper use of PPE, especially gloves, documented exposure at 0.013mg/kg/day. Multiplying the exposure in the wheat study to account for the increased application rate used on turf (13.75 lbs ai/ac) would yield an exposure rate of 0.80mg/kg/day for turf applicators using

closed tractor mounted spray rigs. This is significantly less than the 30.75mg/kg/day expected under normal use, and demonstrates the effectiveness of using PPE.

Although worker exposure to PCNB could not be estimated, the formulation used to apply the pesticide helps minimize exposure. Scotts ProTurf FFII (#8533) uses a paper pulp base material that is impregnated with PCNB. The material is packaged in 35 pound sacks and is applied with a drop spreader. Worker exposure is limited to opening the bag and filling the hopper for the drop spreader, along with equipment cleanup. Proper use of PPE will minimize worker exposure to the PCNB.

Golfers exposure would be limited to contact with treated foliage. Several of the pesticides are applied at times or in areas when golfer contact will not occur. These include the rodenticide Aluminum Phosphide, which is inserted in tablet form into rodent tunnels. This method of application reduces the likelyhood of exposure to negligible levels. The three fungicides are applied to the greens and tees after the course has closed for the winter. Golfer exposure would be limited to residual traces the following spring. Exposure from this source is also considered negligible. Golfers will be primarily exposed to the three herbicides and one insecticide used during the operating season. The exposure pathways are primarily dermal absorbtion of residues on treated foliage. Based on work compiled for the Vegetation Management project indicates that the daily dose for someone walking through foliage, treated at the rate of 1 lb ai/ac, after the herbicide has dried is 0.0014 mg/kg/day.

Public exposure would be limited to drift from application and oral consumption of game or food contaminated with pesticides. As in the case with exposure to golfers, several pesticides are applied in such a manner that exposure to drift in negligible. These are primarily the granular fomulations of the insecticide and PCNB, as well as the Aluminum Phosphide tablets. Based on timing and location, it is unlikely that game will be contaminated by the rodenticide or fungicide applications. Exposure to contaminated game is limited to consumption of deer that may eat foliage in the fairways that has been treated with the three herbicides and one insecticide. The potential public exposures are summarized in Table 4.

Table 4. Summary of potential golfer and public exposure.

Active Ingredient	*Method of Application*	*Potential for Dermal Contact*	*Potential for Drift*	*Potential to contaminate game*
Aluminum Phosphide	Tablet	No	No	No
Glyphosate	Hand Spray	Yes	Yes	Yes
Chlorpyrifos	Manual Rotary	Yes	No	Yes
2,4-D	Mobile Spray	Yes	Yes	Yes
Dicamba	Mobile Spray	Yes	Yes	Yes
PCNB	Drop Spreader	No	No	No
Iprodione	Mobile Spray	No	Yes	No
Triademefon	Mobile Spray	No	Yes	No

Dermal exposure to pesticide drift was modeled for the Vegetation Management proposal and determined to be 0.00015 mg/kg/day (USFS, 1988a, pF-80), again using a rate of 1 lb ai/ac treatment. Exposure by eating game that fed on treated foliage was also modeled, and for deer, the daily dose would be 0.0024 mg/kg/day(USFS, 1988a, pF-86). Table 5 Summarizes the public exposure doses.

Table 5. Summary of public and golfer exposure doses, per pound of active ingredient per acre.

Dose for Dermal Contact	*Dose for Dermal Contact with Drift*	*Dose for consumption of contaminated game*
0.0014mg/kd/day	0.00015mg/kg/day	0.0024mg/kg/day

RISK ANALYSIS - The risk analysis combines the information from the hazard and exposure anlysis to determine the relative risk to workers and the public. The risk is displayed by dividing the lowest NOEL by the expected exposure dose to produce a margin of safety (MOS). Worker MOS values are summarized in Table 6, and Public MOS values are summarized in Table 7.

Table 6. Worker MOS Values.

Active Ingredient	*Expected exposure dose*	*Margin of Safety*
Aluminum Phosphide	<.1 ppm	NA
Glyphosate	0.029mg/kg/day	1,068
Chlorpyrifos	0.024mg/kg/day	4.1
2,4-D	0.0045mg/kg/day	222
Dicamba	0.00058mg/kg/day	27,241
PCNB	Not Available	NA
Iprodione	0.0043mg/kg/day	581
Triademefon	30.75mg/kg/day	0.08

Table 7. Public MOS values.

Active Ingredient	*MOS Dermal*	*MOS Drift*	*MOS Game*
Aluminum Phosphide	NA	NA	NA
Glyphosate	22,142	206,666	12,916
Chlorpyrifos	142	1,250	83
2,4-D	595	5,555	357

Table 7. Public MOS values. (continued)

Active Ingredient	*MOS Dermal*	*MOS Drift*	*MOS Game*
Dicamba	112,857	1,053,333	65,833
PCNB	NA	NA	NA
Iprodione	NA	6,172	NA
Triademefon	NA	555	NA

NA - for those pesticides where the Exposure Analysis determined that the likelyhood of exposure was negligible.

The larger the margin of safety (the smaller the estimated human dose compared to the animal NOEL), the lower the probability that the actual human threshold is exceeded. As the estimated dose to humans approaches the animal NOEL (as the MOS approaches 1), the probability of exceeding the threshold increases.

In general, when the MOS is less than 100, members of the public, primarily sensitive individuals (those who may have low threshold values compared to the population norm), may be at risk. Conversely, when the human dose is small compared to the animal NOEL (giving an MOS greater than 100), the probability of effects on humans can be judged to be low.

Of the proposed pesticides, chlorpyrifos has a worker exposure MOS level of less than 100, and triademefon has an MOS of less than 1. Use of PPE and closed cab tractors could improve the MOS for triademefon to greater than 1. With doses approaching the animal NOEL's, workers could experience symptoms associated with chronic exposure to the products, however, the number of exposures that a worker will have to either chemical is limited to a few days per year when the products are applied.

Public and golfer MOS is over 100 for all cases with the exception of exposure to game(deer) that may have consumed foliage treated with chlorpyrifos.

REFERENCES

Baker, R.O. 1992. Exposure of persons to phosphine gas from aluminum phosphide application to rodent burrows. Proc. 15th Vertebrate Pest Conf. (J.E. Borrecco & R.E. March, Editors) Published at UC Davis.

USFS. 1988a. Final Environmental Impact Statement, Vegetation Management for Reforestation. Pacific Southwest Region, San Francisco, California.

USFS. 1988b. Final Environmental Impact Statement, Vegetation Management for Costal Plain/Peidmont. Southern Region, Atlanta, Georgia.