



# Department of Health and Environmental Sciences

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APR - 8 1979

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Ski Yellowstone EIS

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Ski Yellowstone EIS

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Ski Yellowstone EIS

This environmental impact statement has been prepared for the proposed Ski Yellowstone development in Gallatin County, and is being submitted to you for your consideration. Comments and questions will be accepted for 30 days after the date of this publication. The Department of Health and Environmental Sciences will forward any comments to the developers. All comments should be sent to:

Subdivision Bureau  
Environmental Sciences Division  
Department of Health and Environmental Sciences  
Helena, MT 59601

Sincerely,

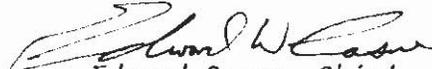
  
Edward Casne, Chief  
Subdivision Bureau

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MONTANA DEPARTMENT OF HEALTH  
AND  
ENVIRONMENTAL SCIENCES  
DRAFT  
ENVIRONMENTAL IMPACT STATEMENT

SKI YELLOWSTONE

GALLATIN COUNTY

Pursuant to the Montana Environmental Policy Act, Section 69-6504(b)(3), the act controlling both public and private water supply and sewage disposal for subdivisions, Section 69-5001; and the act to control water pollution, Section 69-4801, the following environmental impact statement (EIS) was prepared by the Montana Department of Health and Environmental Sciences (DHES), Environmental Sciences Division, concerning the request for administrative approval of Ski Yellowstone, a proposed subdivision near West Yellowstone, Montana.

INTRODUCTION

This EIS is prepared pursuant to an opinion of the Montana Supreme Court which addresses the responsibilities of the DHES to review subdivisions under the Sanitation in Subdivisions Act, Title 69, Chapter 50, R.C.M., 1947, and the Montana Environmental Policy Act (MEPA), Title 69, Chapter 65, R.C.M., 1947. That case, The Montana Wilderness Association et al. vs. The Board of Health and Environmental Sciences of the State of Montana et al., 33 St. Rep. 1320, (hereinafter referred to as the "Beaver Creek South" case), indicates that the department's substantive decision-making authority to approve or deny subdivisions is limited to a consideration of whether proposed water supply, sewage disposal and solid waste disposal systems are adequate to protect public health and prevent water pollution.

The Beaver Creek South opinion does not indicate that the department is relieved of its responsibilities to prepare an EIS which, "to the fullest extent possible," satisfies the requirements of MEPA and the rules adopted by the DHES and the Board of Health and Environmental Sciences implementing MEPA (rules ARM 16-2.2(2)-P2000 through P2080). Therefore, although the Beaver Creek South opinion indicates that the department may only base final approval or disapproval of a subdivision on the criteria and statutory authority contained in the Sanitation in Subdivisions Act, the DHES does believe that it still has MEPA responsibilities. The MEPA analysis contained in this EIS attempts to analyze in detail the three statutory criteria upon which the department may make a substantive decision--water supply, sewage and solid waste disposal--while still addressing the basic land use and environmental impacts that the Montana Supreme Court has indicated are a part of a local government's substantive decision-making authority under the Subdivision and Platting Act, Title 11, Chapter 38, R.C.M. 1947.

It must be emphasized that the DHES fully appreciates the fact that the Beaver Creek South opinion does not address the substantive questions concerning the scope of review required under MEPA when specific legislative limitations and directives have been imposed pursuant to other statutes. Therefore, to the extent that the DHES must interpret what MEPA responsibilities must be performed in light of the specific limitations on the department's final decision-making authority under the Sanitation in Subdivisions Act, this EIS has been prepared in conformity with the requirement of Section 69-6504, R.C.M. 1947, that the analysis comply with MEPA.

#### DESCRIPTION

Ski Yellowstone, Inc., proposes an integrated recreational development in the Mount Hebgen area, six miles west of Yellowstone National Park and 12 miles northwest of West Yellowstone, Montana (Reference Map # 1). The development would extend from the summit of the mountain to the shore of Grayling Arm (a bay that flows into Hebgen Lake). A ski village would be built at the base of Mount Hebgen in Red Canyon, north of U.S. Highway 287 (U.S. 287) and a lake village south of the highway (Reference Map # 2).

The ski area would be on Gallatin National Forest land and encompass most of the east face of Mount Hebgen. The ski and lake villages would be built in four phases (or filings) on land owned by the corporation.

A U.S. Forest Service (USFS) special use permit will be required for development of the ski slopes on 1,880 acres of national forest land. Ski Yellowstone owns 980 acres in the Red Canyon area.

Development of the ski slopes would also be in phases. When completed, there would be an 8,300 foot gondola and 10 double chair lifts. From the base of the gondola to the summit, the vertical difference is 2,000 feet.

Skier capacity estimates vary according to sources: 5,270 skiers (Brandenberger, USFS, 1973), 6,500 (Ski Yellowstone, Inc.) and 8,200 (Snow Engineering).

The tentative construction schedule for the ski lifts is as follows:

- Phase I - Gondola, Lifts B,C,D
- Phase II - Lifts E,G and perhaps A and I
- Phase III - Lifts J,H and perhaps A and I
- Phase IV - Lift K

(Reference Map # 2)

The ski village would include a 400-room lodge, 225 condominium units and 89 single family dwellings, for a total capacity of 2,250 visitor beds. There would be commercial facilities, a fire station and a maintenance site. Development of the ski village would cover a total of 59 acres.

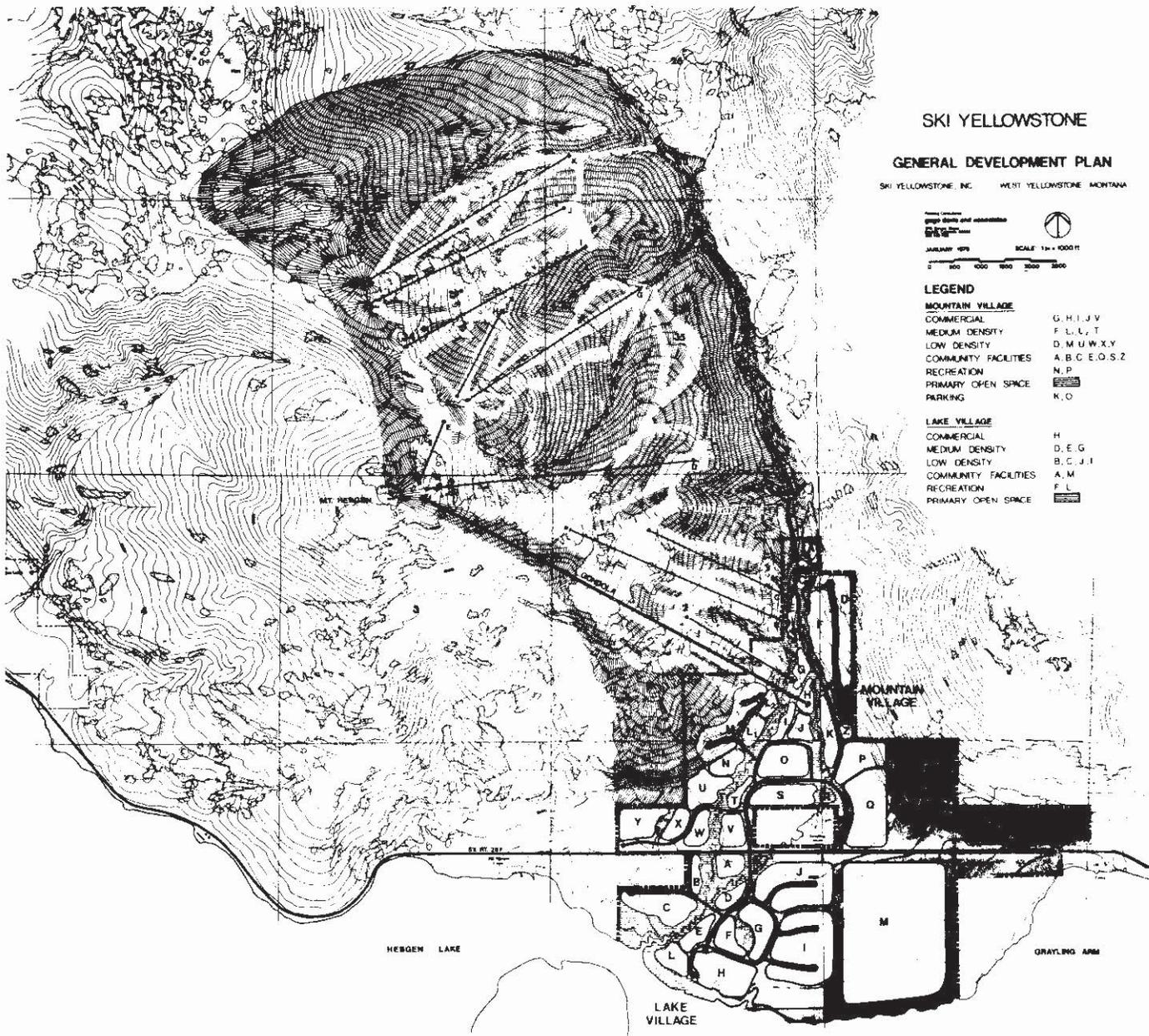
-3-  
Map # 1



Figure 2.  
VICINITY MAP  
SCALE 1/2" = 1 MILE  
LEGEND

-  NATIONAL FOREST LAND
-  PRIVATE LAND
-  WEATHER STATIONS

Map # 2



### SKI YELLOWSTONE

#### GENERAL DEVELOPMENT PLAN

SKI YELLOWSTONE, INC. WEST YELLOWSTONE, MONTANA

DATE: JANUARY 1978  
SCALE: 1" = 1000'  
N

#### LEGEND

- |                         |                     |
|-------------------------|---------------------|
| <b>MOUNTAIN VILLAGE</b> |                     |
| COMMERCIAL              | G, H, I, J, V       |
| MEDIUM DENSITY          | F, L, U, T          |
| LOW DENSITY             | D, M, W, X, Y       |
| COMMUNITY FACILITIES    | A, B, C, E, O, S, Z |
| RECREATION              | N, P                |
| PRIMARY OPEN SPACE      | [Symbol]            |
| PARKING                 | K, Q                |
| <b>LAKE VILLAGE</b>     |                     |
| COMMERCIAL              | H                   |
| MEDIUM DENSITY          | D, E, G             |
| LOW DENSITY             | B, C, J, I          |
| COMMUNITY FACILITIES    | A, M                |
| RECREATION              | F, L                |
| PRIMARY OPEN SPACE      | [Symbol]            |

The lake village would include 200 lodge rooms, 268 condominium units and 135 single family dwellings and 225 units of employee housing, for a total capacity of 2,220 beds and 450 employee beds. The lake village would also have commercial facilities and cover 55 acres.

In addition to the villages, the corporation plans to construct a restaurant and a "remote facility" on Mount Hebgen. The restaurant would be near the terminal of the gondola at the top of the mountain and be the headquarters for ski-related activities on the mountain. The remote facility would be at the base of lifts I and J, and include eating facilities, ski patrol quarters and rest rooms.

This EIS will assess the potential impacts of the entire development; however, in terms of approval, the DHES will only be considering Filing No. 1, which includes the ski village. Filings 2-4--which include the lake village plans-- have been submitted to Gallatin County for review, but have not been sent to the DHES for its analysis. When the filings are submitted they will be reviewed.

The projected permanent population for Ski Yellowstone is 390 persons. It is estimated that 70 to 80 school-aged children would attend school in West Yellowstone. At full development, developers anticipate an annual occupancy rate of 649,215 persons.

The development will rely on West Yellowstone for primary and secondary education, retail shopping and medical and professional services. According to the corporation, the commercial facilities at Ski Yellowstone will be aimed at providing short-term visitor needs and speciality items.

#### CURRENT ENVIRONMENTAL CONDITIONS

There are a few homes, ranch buildings and a lodge in the area of the proposed Ski Yellowstone resort, but generally the land is either forested or used for agricultural purposes.

Mount Hebgen (elevation 9,721 feet) is bounded on the south and west by Hebgen Lake, on the north by Kirkwood Ridge (9,785 feet), and on the east by Greycroft Ridge (8,529 feet).

The canyon is drained by Red Canyon Creek which flows along the east side of Mount Hebgen to Grayling Arm. It is five miles long and drains an area of 12.2 square miles. The alluvial fan formed by the creek is a mile long and two miles wide.

The Red Canyon campground in the upper part of the drainage is not used a great deal by campers. Hunters do frequent the area during the hunting season, and fishing is popular in Hebgen Lake. Even though it is close to Yellowstone Park, it does not attract many tourists.

#### PHYSICAL ENVIRONMENT

##### Terrestrial and Aquatic Life and Habitats

A diverse array of wildlife inhabits the land<sup>1</sup> and waters<sup>2</sup> of the proposed development, but the primary concern centers on the impact Ski Yellowstone will have on grizzly bears.

Grizzlies are the only threatened or endangered species known to live in the vicinity of Mount Hebgen. Considerable effort has gone into predicting what effect the proposed development will have on the grizzly. In addition to information from the development corporation, the Montana Department of Fish and Game, Gallatin National Forest and Yellowstone Interagency Grizzly Bear Research Team (a group of researchers from the National Park Service, U.S. Fish and Wildlife Service, U.S. Forest Service and the states of Montana, Idaho and Wyoming cooperating in research on the grizzly bear in the Yellowstone ecosystem) have studied and discussed the situation.

The grizzly's unpredictable, independent disposition, combined with a preference for certain types of food, leads to its far ranging nature.

Habitat, or what a grizzly needs to exist in a natural state (essentially food, water, cover and space), appears to be a major point of discussion.

Like most animals, the grizzly responds to a variety of instincts, such as sleeping, eating, hibernating, mating, bearing young, traveling, etc. Together instincts create an animal's behavioral pattern; however, some occur more often than others, such as eating and sleeping as opposed to mating and hibernating.

Since finding food is a daily occurrence, it becomes a major motivating force in how a grizzly acts and where it roams. Being a large, vigorous animal, it looks for areas that can provide the kind and amount of food necessary to sustain its active life. Consequently, in a dry year when vegetation is sparse, a grizzly might range much further for food than in a normal or wet year when vegetation is more abundant.

According to researchers, feeding habits vary from region to region. In the Yellowstone Park area, the general feeding cycle is as follows:

During the pre-growing season, April to the last of May, many grizzlies appear to be primarily meat eaters. They congregate on ruminant wintering areas and take any animal material available as carrion and kill vulnerable individuals. In addition, corms and roots in the

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<sup>1</sup>U.S. Forest Service, Gallatin National Forest, Mount Hebgen Management Alternatives, Final Environmental Impact Statement, May 13, 1977, P.30. Wildlife species identified near Mount Hebgen by B. Haglund in 1973 include ruffed and blue grouse, bald and golden eagles, 10 other birds of prey, 12 shore birds, 53 song birds, 16 non-game mammals, 3 predators, 4 furbearers, black bear, elk, mule deer, moose, 1 reptile, and 2 amphibians (Montagne et al. 1973).

<sup>2</sup>Ibid., P.36. Hebgen Lake and its main tributaries support excellent populations of brown trout, rainbow trout, whitefish, brook trout and Utah chubs. Occasionally a cutthroat trout is caught in the lake. Grayling Creek has grayling and cutthroat trout. Red Canyon Creek does not support fishable populations of trout, primarily because of extreme turbidity during spring run-off, and because during low flow periods it develops a dense growth of filamentous algae on its lower reaches. This algae growth apparently discourages fish migration from Hebgen Lake into Red Canyon Creek. Upper Red Canyon Creek supports normal midge fly larvae and may fly nymphal populations that are usually found in clear cold mountain streams.

valley/plateau grassland/herblands, and pine nuts in habitat types with whitebark pine are eaten prior to and during early green-up. During the growing season, in late May, June, July and August, grasses, sedges, forbs and rodents are used almost exclusively as food.<sup>3</sup>

The question of whether Mount Hebgen--particularly the area of the proposed ski slopes--is critical grizzly habitat remains unresolved. The Montana Department of Fish and Game feels the area is critical habitat; the USFS and developers don't think it is, and the U.S. Fish and Wildlife Service has tentatively labeled the area critical habitat, but wants more time to study the matter before making a final recommendation to the Secretary of Interior.

According to the Forest Service's final EIS (FEIS), the Red Canyon Creek area is considered to be the primary impact area related to development on Mount Hebgen...a small portion (five percent) of the Upper Red Canyon Creek drainage has been identified as important grizzly habitat. The remainder of the Red Canyon drainage and Mount Hebgen itself appears to have little significance to grizzlies as a real or potential source of food or as a feeding area, the EIS states.

The Department of Fish and Game disagrees with the Forest Service. It feels food is only one of the factors involved in identifying critical habitat and a drastic increase in human activity will have a significant influence on some, if not most, of the grizzlies in the area.

Prior to 1977, information from the Interagency Research Team revealed no grizzly sightings on the land proposed for development; however, on July 11, 1977, a sow and a cub were spotted in the area of the proposed ski slopes. Ten days later a sow and cub were sighted further down the slope and northeast of the first sighting.

In addition to the sightings on the east slope of Mount Hebgen, there were 10 other confirmed sightings and locations of radio-collared grizzlies on Greycroft Ridge, which forms the east side of Red Canyon. On July 20, 1977, seven grizzlies were spotted in four separate sightings in the Graycroft Ridge area (Reference Map # 3).

Since grizzlies have been sighted on Hebgen Mountain--specifically on a portion of the proposed development--and in the Graycroft Ridge area, it must be assumed, considering the natural instincts of the bear and uncertainties of future environmental conditions (such as the effects of wet and dry years on feeding patterns), the grizzly bear will continue to use the Red Canyon area.

Studies reveal in nearly all instances where there is a human-grizzly confrontation, the bear is the ultimate loser. In such instances the bear is either transplanted or destroyed, thus permanently removing it from the area.

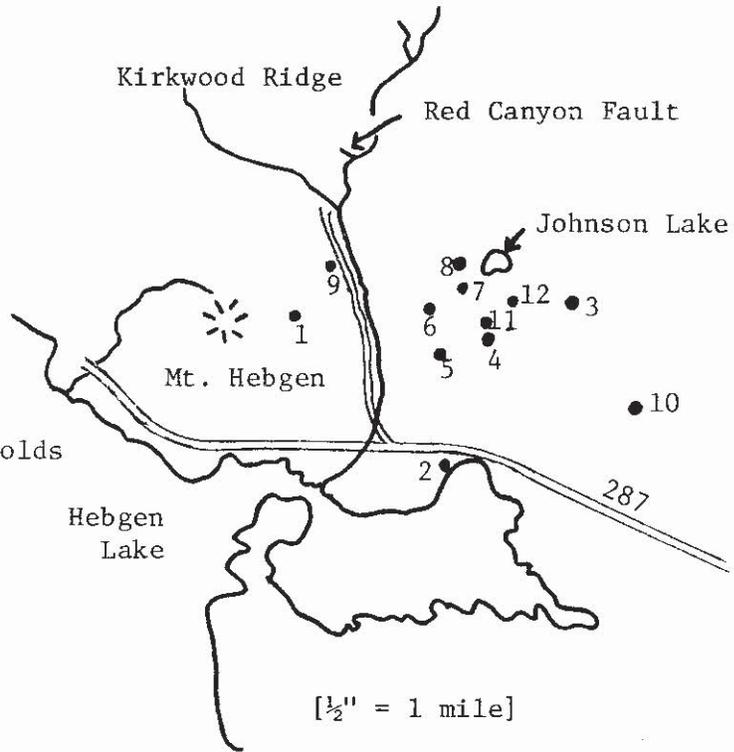
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<sup>3</sup>Mealey, Stephen P., Bozeman, Montana, Method for Determining Grizzly Bear Habitat Quality and Estimating Consequences of Impacts on Grizzly Habitat Quality, March 1977, P. 23.

Yellowstone Interagency Grizzly Bear Research Team

Map # 3

<u>1977</u>	<u>No. Grizzlies</u>
1 - July 11	Sow & 1 Cub
2 - July 11	One
3 - July 14	Sow & 1 Cub
4 - July 18	Sow & 1 Cub
5 - July 20	Sow & 2 two-year-olds
6 - July 20	One
7 - July 20	Sow & 1 Cub
8 - July 20	One
9 - July 22	Sow & 1 Cub
10 - July 27	Sow & 1 Cub
11 - Aug. 8	Sow & 1 Cub
12 - Aug. 22	One



CONFIRMED GRIZZLY BEAR LOCATIONS  
DURING 1977 - INCLUDES SIGHTINGS  
AND LOCATIONS OF RADIO-COLLARED  
GRIZZLIES

It seems inevitable there will be confrontations if Ski Yellowstone's projected summer residence figure of 1,776 persons occurs. Since many of the spring, summer and fall attractions to the proposed resort--such as horseback trips, cross-country skiing and backpacking--involve use of the upper Red Canyon area and adjacent Hebgen Mountain and Greycroft Ridge areas, there is a strong likelihood of confrontations occurring. Suggestions have been made on ways to reduce the chance of human-grizzly encounters, but it is questionable how successfully such suggestions could be implemented or enforced.

The developers said they intend to work with the Forest Service to prevent human-bear confrontations. Certainly precautions can be taken to decrease any attractions the development might have to grizzlies, such as restricting visitor use of the area and properly handling garbage. However, it's possible the proposed development will promote the growth of other developments in the area which will not be as concerned about preventing confrontations.

In addition to the grizzly bear, the proposed resort will effect elk and moose in the area. According to the USFS:<sup>4</sup>

Up to 20 elk winter along the north shore of Hebgen Lake between Grayling Creek and Kirkwood Creek. They utilize the south facing slopes of Mount Hebgen and Greycroft Ridge (Montagne et al. 1973). Elk use the Red Canyon drainage for spring, summer, and fall range, but are not concentrated in one area, nor are they confined to the drainage. They occasionally use the sagebrush-grass meadows on the east slope of Mount Hebgen as a calving area. The open meadows along the summit ridge of Mount Hebgen seem to be a migration path to the Cabin Creek Basin summering area.

Use of Mount Hebgen will be reduced and elk that do use the area will be bothered by skiers, gondola and lift operations, and construction. Lifts planned for Mount Hebgen Ridge will disturb elk migrating through the area. Other elk wintering east of Red Canyon will be disturbed by the main development as well as satellite developments on private land. Depending on mitigation achieved, from 10 to 25 elk may be affected.

Moose use the entire area for summer range, and a few moose sometimes spend a portion of the winter in Red Canyon and on the lower slopes of Mount Hebgen. The willow swamp at the mouth of Grayling Creek, two miles east of Red Canyon, is excellent moose winter range.

Approximately three to five moose winter on the area proposed for ski runs and developments. These animals would likely be displaced. About 25 to 35 moose winter on the Grayling Creek willow delta. If the private lands in the bottoms are developed, some of the moose will be displaced. Again, depending on the mitigation achieved, from three to 35 moose may be displaced from key habitat. It should be noted this displacement may occur as a result of various other planned and unplanned developments in any of the alternatives.

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<sup>4</sup>U.S. Forest Service, Gallatin National Forest, FEIS, *op.cit.*, P.35 and P.104.

## Water Quality, Quantity and Distribution

Hebgen Lake, a 12,670 acre impoundment of the Madison River is used by the Montana Power Company as a water storage reservoir for downstream generation of electricity. The Federal Power Commission requires the reservoir to be within four feet of full pool by June 1, then full in July and August for recreation purposes.

Red Canyon Creek drains about 12.2 square miles. The hydrologic cycle, in an average year consists of about 20,000 acre-feet of precipitation; 7,000 acre-feet of water leaving as streamflow; 7,000 acre-feet leaving as evaporation or transpiration; and the remaining 6,000 acre-feet entering the groundwater reserves, ultimately reaching Hebgen Lake. Corey Springs, on the eastern edge of Red Canyon Creek's large alluvial fan, flows 700 gallons/minute (11,300 acre-feet/year) according to a U.S. Geological Survey estimate (Alford in Montagne et al. 1973).

Red Canyon Creek and Hebgen Lake waters are classified as B-D<sub>1</sub> by the state. Waters classed as B-D<sub>1</sub> are for coldwater fisheries and other beneficial uses. This standard does not allow increases above naturally occurring concentrations of sediment, settleable solids or residues which would adversely effect coldwater fisheries and associated aquatic life.

In a 1976 inventory of water quality for lakes and reservoirs, the Environmental Protection Agency (EPA) classified Hebgen Reservoir as being mesotrophic-eutrophic.\* It ranked 34th out of 115 lakes and reservoirs sampled for water quality by the agency in Region VIII (Montana, Colorado, Wyoming, Utah, North Dakota and South Dakota).

The basin's groundwater reserves are in the surficial alluvial fill and the limestone bedrock. Streamflow measurements for Red Canyon Creek made in May and June 1976 showed a net loss of four to seven cubic feet per second (cfs), from the forest boundary to U.S. 287, as the creek flowed through one and a half miles of alluvial fan. The lower portions of the fan contain water from the Grayling Arm of Hebgen Lake.

Red Canyon Creek flows range from one cfs or less in mid-winter to about 100 cfs during peak run-off in an average year. Average daily flow is about 10 cfs. Summer rainstorms cause insignificant increases in flow, but it is possible to have serious flooding from a severe rainstorm. A combination of warm winds and two-three inches of rain during the melting of above-normal snowpack in May or June would likely produce peak flows on the order of 1,000 cfs. Saturated snow has little or no holding capacity for the additional moisture. Dr. D. Alford believes this type of flood has occurred in this watershed and probably caused channel shifts on the alluvial fan. Beside the present master channel, he identified four older master channels. The present channel cut, in some places, up to 15 feet in the alluvial fan (Montagne et al. 1973).

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\* *Mesotrophic-eutrophic: Mesotrophic refers to the middle phase of a lake's evolution from a lake to a bog or marsh. The eutrophic phase describes a lake in the later stages of evolution. Such lakes usually have high concentrations of dissolved nutrients; are shallow, and have periods of oxygen deficiency.*

Water quality of Hebgen Reservoir or its tributaries, including Red Canyon Creek, has been studied extensively.

Hebgen Lake has been described as a sodium bicarbonate waterbody with phosphate unusually high and nitrogen probably being the limiting factor to primary production. The reservoir is in a steady-state of nutrient depletion because the nutrient rich water from the hypolimnion (below the zones of rapid water temperature change and abundant aquatic life in a lake) is constantly being released downstream. Chlorophyll "a" concentrations from June through September 1965 ranged from about 1 to 4.5, with 3.2 microgram per liter average. Light penetration is lower in Grayling Arm than in the rest of the reservoir (Martin 1967).

Dr. J. C. Wright, Montana State University, studied the water quality and biotic conditions in Grayling Arm and its major tributaries--Grayling, Duck and Red Canyon creeks, as part of the Ski Yellowstone Environmental Study (Montagne et al. 1973). He said the water in Grayling Arm was derived from streams during the run-off period until July, when westerly winds tend to push surface waters from the main body of Hebgen Lake into the bay, which in turn creates a subsurface westerly counter-current flow. This circulation is important in exchange of nutrients (nitrates and phosphates) between the main lake, fed by the phosphate rich waters of the South Fork of the Madison River, and Grayling Arm, rich in nitrogen from ammonification and nitrification of flooded organic matter.

Red Canyon Creek adds the highest concentrations of sediment and dissolved chemicals to the lake, according to Dr. Wright. Its water is classified as a calcium-sulfate-bicarbonate type (being rich in these chemicals), whereas Duck and Grayling Creeks are a calcium-bicarbonate type. Mayfly nymphal and midgefly larvae populations, indicative of clean cold mountain streams, were present in Red Canyon Creek above the alluvial fan, while silt-tolerant midgefly larvae were present in low numbers in the alluvial fan portion. This indicates activities on the alluvial fan potentially pose a greater hazard to water quality degradation, particularly turbidity and sediment, than do activities in the upstream areas.

Additional baseline information on Red Canyon, Duck, and Grayling creeks, Hebgen Lake, and groundwater quality was developed by Dr. J.J. Jeseski and G. Bissonnette in 1973 (Montagne et al. 1973). They concluded that Red Canyon Creek water was very hard (400-700 milligrams/liter(mg/l) of  $\text{CaCO}_3$ ); very high in sulfates (300-500 mg/l); and low in nitrate, phosphate, and chloride.

Above the fan, total and fecal coliform levels were typical of wildlife-caused conditions (total coliform less than 50 and fecal coliform counts less than 10 organisms per 100 ml). When 500 cattle were present on the lower fan, counts increased to 3,000 total and about 1,500 fecal coliforms per 100 ml.

Jeseski and Bissonnette found the Grayling Arm had very low coliform bacteria counts and that no serious pollution sources were present at several lakeside resorts.

Dr. Abe Horpestad, Water Quality Bureau, DHES, found Red Canyon Creek was high in dissolved solids (calcium and sulfate). The low bacteria counts were of animal origin, and the creek was low in trace metals. Additionally, his analysis revealed that suspended sediment concentrations increased by 40-50 percent from the forest boundary to the highway bridge, while streamflow was decreasing by

four to seven cfs at the same time as flow infiltrated the stream bottom and banks on the alluvial fan.

Other significant water quality information presented by Horpestad indicated:

- (1) Bacteria numbers are very low throughout Hebgen Lake.
- (2) Natural fluoride concentrations exceed National Interim Primary Drinking Water Standards (NIPDWS) in the South Fork of the Madison River and in the Madison above and below Hebgen Reservoir.
- (3) Arsenic concentration in the Madison River above and below the reservoir also exceeds the NIPDWS due to natural conditions.
- (4) Dissolved oxygen levels dipped to two mg/l, which is harmful to trout, in the narrows portion of Grayling Arm in March 1976.

Horpestad concluded that Grayling Arm's water does not mix freely with the rest of the reservoir; it has a mean retention time of about three months (based on an assumed capacity of 30,000 acre-feet and annual inflows of 116,000 acre-feet); and it is phosphorous limited in the fall and nitrogen limited in the spring on the basis of algal assays. He stated further that "...an increase in nitrogen will probably lead to greater algal growth in the spring while increases in phosphorous will permit greater growth in the later summer-early fall period when blue-green algae blooms usually occur." Horpestad's algal bioassays tests on Red Canyon Creek showed nitrogen increases in the creek during May could triple its early season algae growth, already heavy in midsummer in lower portions of the stream.

Grayling Arm's susceptibility to blue-green algae blooms attracted a great deal of attention during the summer of 1977 when a toxic form of blue-green algae (Anabaena flos-aquae) resulted in the deaths of a number of dogs and cattle.

Dr. Loren Bahls, Water Quality Bureau, DHES, said according to the EPA<sup>5</sup> more than 99 percent of the total phosphorus input to Hebgen Lake is attributed to non-point sources; un-gaged minor tributaries (including Red Canyon Creek) and immediate drainages are estimated to contribute 19.9 percent of the total.

He said the existing phosphorus contribution of the Red Canyon Creek drainage is very small-approximately one percent of inputs from all sources. Proposed changes in land use resulting from the Ski Yellowstone development will not cause appreciably more phosphorus to find its way to Hebgen Lake. Grayling Arm is already eutrophic and will continue to have algae blooms with or without Ski Yellowstone, he added.

According to the corporation's development plans, the subdivision will be served by a centralized water system with water obtained from wells. A well was drilled at the proposed site of the ski village and has been tested. The well

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<sup>5</sup>U.S. Environmental Protection Agency, Preliminary Report on Hebgen Lake, Gallatin County, Montana, National Eutrophication Survey, Corvallis, Oregon. 1976.

and adjacent wells indicate the aquifer can supply the proposed subdivision with an adequate quantity of water for domestic use, irrigation and fire protection.

The design of the distribution system is nearly complete with only information on actual production well capacities needed to complete the design for the wells, pumps, etc. Water taken from the test well and other wells in the area indicate that the water quality meets the DHES primary drinking water standards and is suitable for drinking. It should be noted, however, that the water is very hard (450 mg/l).

The sulfate concentration is listed as 230 mg/l. (Sulfate concentrations should not exceed 250 mg/l because of the laxative effects.)

The dissolve solids concentration of 631 mg/l exceeds the DHES recommended amount. The public water supply rules ARM 16-2.14(10)-S14381 specifies that special tests may be required for water supplies in which the total dissolved solids exceeds 500 mg/l.

Ski Yellowstone will be served by a central sewage treatment system consisting of an aerated lagoon, lagoon cells for storing effluent during the winter and a spray irrigation system. The treatment system is designed to handle the anticipated flows from both the ski village and for future lake village. The developer's engineers said construction of the lagoons and the spray irrigation system will be in stages to coincide with development.

Soils testing and groundwater monitoring in the area proposed for spray irrigation indicates the site is suitable for this type of sewage treatment, with no anticipated adverse affects to the groundwater or Grayling Arm.

Procedures for monitoring the sewage treatment system will be set up in an operations manual. Monitoring will provide the information needed to properly control the system and forecast possible problem areas. The developer would be required to monitor groundwater quality, fluctuations in groundwater level, soil permeability and soil moisture content at the irrigation site. These items will be included in the operations manual along with monitoring other aspects of the system as outlined in EPA Technical Bulletin 430/9-75-001.

Engineers for the corporation have also made an analysis of potential flood and storm runoff erosion. The most critical problems will be encountered during the construction phases and some precautions will be necessary to avoid unnecessary sediment runoff into the lake.

The developers propose to shape an old channel of Red Canyon Creek into a holding pond. They calculated the pond capacity would have to be 31 cubic feet per second using flow figures from a five year - 24 hour storm. The pond site would be approximately five acres. To handle sedimentation the pond will have to be a 16 foot deep pond.

In addition to the settling basins, a construction erosion control plan will be required to describe construction procedures, including any construction affecting stream channels or limiting construction at certain times of the year. The engineers have indicated that construction procedures will be covered in the final plans for the erosion control structures. (Pg. D-15 Morrison-Maierle Design Analysis)

The criteria for stormwater runoff allows exceptions to the state's turbidity standard at the discretion of the DHES:

...short-term activities necessary to accommodate essential dredging, channel or bank alterations, stream diversions or other construction where turbidities in excess of the criteria are avoidable. (Montana State Department of Health and Environmental Sciences 1973.)

The clearing of 315 acres of trees for ski runs will increase water yields by up to 300 acre-feet per year (5 percent) over present levels, according to the Forest Service. This increase is expected to occur largely during the five to eight-week runoff of snowmelt in Red Canyon. Daily flows will increase about five cfs at the forest boundary and will cause some streambank erosion. A stream channel stability evaluation of Red Canyon Creek in this reach indicated poor streambank stability, which means the banks are susceptible to erosion from higher than normal streamflows resulting from the ski trail clearing.

The Forest Service believes the project will induce streambank erosion on national forest lands during high flow periods (five to eight weeks) for several years, causing turbidity and suspended sediment to exceed state water quality standards. The effect of this increase will not be significant in the lower portions of Red Canyon because it is not a coldwater fishery, the USFS said.

According to the Forest Service, a more significant effect could develop in the Grayling Arm if the sediment particles contain nitrate ions, thus favoring blue-green algae blooms in the bay. However, the chance of this occurring is small if fertilizer is carefully controlled, the Forest Service said.

The USFS felt that clearing ski trails would slightly increase concentrations of calcium, potassium, manganese, organic matter and phosphate in the creek, but there would be a negligible effect on aquatic life in the stream or Hebgen Lake.

#### Geology and Soil Quality, Stability and Moisture

##### Geology:

The Red Canyon area consists of alternating layers of shale and limestone resting on metamorphosed Precambrian material with the Madison limestone formation topping the stratigraphic column. Glaciation and stream activity are the two most evident geomorphic forces. The terraced topography results from this stratigraphy and geomorphology. The most important structural feature of the geology in the Red Canyon area is warping and displacement from faulting with activity occurring as recently as 1959.<sup>6</sup>

On August 17, 1959 an eight-state area felt the jolt of the Hebgen Lake earthquake. With a magnitude of 7.1 on the Richter Scale, it was the strongest ever recorded in Montana, and one of the strongest in the United States. The center of the strongest shock was about 20 miles underground near Red Canyon Creek. Two large blocks of the earth's crust were broken and tilted toward the north. Hebgen Lake occupies part of the larger of these two blocks.<sup>7</sup>

<sup>6</sup>U.S. Forest Service, *Gallatin National Forest FEIS*, *op.cit.*, P.19.

<sup>7</sup>*Ibid.* P.19.

Surface damage extended from near Old Faithful Geyser in Yellowstone National Park westward for about 50 miles. The area of heaviest visible damage was near the two largest faults--the Red Canyon fault and the Hebgen Lake fault. The greatest vertical displacement was in Red Canyon where the fault scarp is 21 feet high. From U.S. 287 the 15-mile long Red Canyon fault scarp is clearly visible on Greycroft and Kirkwood Ridges. The Greycroft Ridge scarp passes adjacent to the north-eastern edges of the Ski Yellowstone property on the Red Canyon fan, crosses Red Canyon two miles north of the private land, and continues westward along Kirkwood Ridge.<sup>8</sup>

According to the U.S. Geological Survey (USGS), shaking on deposits other than solid rock could be two to three times greater, thus in earthquake-prone regions, buildings must be designed to prevent or reduce substantial property damage and loss of life. Maps in the Ski Yellowstone Environmental Study indicate the proposed development will be built on alluvial deposits.

The principal areas of geologic sensitivities include: (1) damage to structures due to seismic shaking, (2) danger from fault offset, (3) danger from rock fall due to shaking or human influence, (4) danger from landslides triggered by natural or human causes, (5) danger from snow avalanches on off-site areas and on a limited few on-site areas, (6) danger from flooding caused by a seiche in Hebgen Lake and (7) danger from solution collapse within a very limited zone on the east summit of Mount Hebgen.

In a letter to the DHES (May 31, 1977) updating the geologic section of the original Ski Yellowstone, Inc. report, Dr. John Montagne, professor of geology at Montana State University, said:

- A. Seismic shaking should be considered a prime hazard in the Red Canyon area.
- B. In light of new seismic and geophysical work in the Hebgen Basin and Yellowstone Park areas, earthquakes could occur more often than his first estimate of 100,000 years:

...the area is underlain by an active magmatic body which is mobile enough to cause strain in the earth's crust at any time, and which was probably responsible for the 1959 earthquake event. Such immediate mobility in the lower crust or upper mantle increases the odds for continued movement and earthquakes during the life of any project in the Red Canyon area and must be reckoned with in any planning that takes place in that vicinity. I do not wish to give the impression that more faulting and earthquake activity is unlikely at the present or on into the foreseeable future.

In evaluating the Forest Service's draft EIS, University of Montana Seismologist Anthony Qamar said:

...I think that the Forest Service evaluation of the geologic hazards in the Hebgen Lake area was inadequate, especially

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<sup>8</sup>Ibid. P.22.

with respect to the risk due to earthquakes. In fact, there appeared to be no Forest Service consideration of this risk since the information supplied by Ski Yellowstone Inc. seemed to be the only material used in the evaluation. This is somewhat ironic in view of the fact that the region lies within the 38,000 acre Madison River Canyon Earthquake Area, an area so designated by the U.S. Forest Service. In addition, the Yellowstone-Hebgen area is one of the few in the United States, outside of the San Andreas Fault area in California, that the U.S. Geological Survey is intensively studying with a permanent, high density network of seismograph stations.

The earthquake risk in the Hebgen region is high. If earthquake risk should ever be seriously considered in land use planning, then it should be considered there. The U.S. Geological Survey Open File Report 76-416 (1976) indicates that no other area in the United States has as high a risk of earthquake shaking, except some portions of California and Nevada. The study made by the USGS suggests, for example, that structures with a 50 year life expectancy should be designed to withstand ground accelerations of 42 percent g in the Hebgen area.

The Hebgen-Yellowstone area has a history of strong earthquakes. Though the historical record is poor before 1959, we know that there is evidence of major faulting in the Madison Range in the late 1700's. Strong shocks were reported by Hayden's expedition of 1871, and at least 79 earthquakes large enough to be felt were reported up to 1959. Notable damaging earthquakes in the region include those of 1947 (Magnitude  $6\frac{1}{4}$ ), 1959 (M=7.1, with several aftershocks exceeding M=6), 1964 (M=5.8) and 1975 (M=6). Trimble and Smith (1975) have shown that the region is still very active with earthquakes occurring whose focal mechanisms are similar to that of the 1959 earthquake. In addition, their work and that of Dewey (1972), indicate that the activity is not directly associated with the Yellowstone thermal features but is, in fact, associated with an east-west system of faults with Hebgen Lake at its center. The point is that the 1959 Hebgen quake, which was felt over 600,000 square miles, and which produced damage throughout southern Montana, northeastern Idaho, and northern Wyoming, is probably not a once-in-a-lifetime event.

I wish to make a few comments about the Hebgen Mountain project specifically. If this area were in California, such a development would not be considered at this time. California state law (Alquist-Priolo Act) prohibits any kind of development so near to an active fault without a thorough assessment of risk by state agencies. The Hebgen Mountain complex is within 2 miles of the Red Canyon Fault which had displacements of up to 21 feet during the 1959 quake. The Hebgen Lake Fault, which probably extends under the Red Canyon alluvial fan, upon which the ski resort is to be developed, also had large displacements

farther to the west in 1959. It is important to understand that most of the damage due to earthquakes is not due to fault displacement at all, but is due to ground shaking (99 percent in California). I consider that, in the case of the Hebgen resort, future damage due directly to faulting is a definite possibility. However, the far more important effect of ground shaking must be realized. It has been virtually ignored by the Forest Service in land use evaluation of this region. We should remember that San Francisco and Los Angeles do not lie on the San Andreas Fault, yet both have suffered considerable damage in the past from the shaking of San Andreas earthquakes. Geologic studies indicate that stress is again building up in both the Los Angeles and San Francisco areas. Such studies have not been made in the Hebgen Lake area.

As a scientist I am not suggesting that the earthquake risk in the Hebgen area should necessarily preclude development. This is a political question. Man can live with disastrous earthquakes as evidenced by the many large cities in earthquake areas. In fact many cities in Central America, South America, China, Yugoslavia, and the Middle East have been virtually leveled several times by earthquakes. Yet those cities are rebuilt. In the Hebgen region, however, we have a chance to look critically at the earthquake risk problem using information and methods which have been developed largely in the last decade. I am surprised that the Forest Service would ignore such an important problem.

#### Soils:

The soil mantle is residual (weathered in place), colluvial (slope debris) or alluvial (stream deposited), and varies from depths of about 60 inches to 8-10 inches. Bedrock from the Meagher limestone group is exposed in several places about midway up the Mount Hebgen slopes. The outcrops do not form cliffs, but are areas of steep slopes.

The residual soils are found only on top of Mount Hebgen on the gently sloping areas over the Madison limestone group. On the higher land above the swales is found a very coarse mixture of limestone fragments, limestone outcrops and fine-grained clayey soil.

The colluvial deposits are the most common soils on the east face of Mount Hebgen. They represent mixtures of limestone and shale, limestone and sandstone derived from the interbedded bedrock units of Mount Hebgen. The sandstone results in a sandy colluvium, and the shale results in a clayey colluvium. The sandy colluviums are stable, structurally, but are subject to surface erosion if the vegetative cover is removed. The clayey colluviums may be stable or unstable, depending upon the steepness of slope.

There are small active landslide areas on the east face of Mount Hebgen and other areas that have the potential for mass failure if improperly managed. The colluvial deposits formed in part from the Park shale formation are the most subject to mass failure hazards.

The alluvium found in the bottom of Red Canyon, and in the fan at the mouth of Red Canyon, are very deep (90"+) loam and clay loam textured soils. The depth of the alluvium is deeper at the mouth of Red Canyon. Structurally, the alluvial soils are very stable, but have definite limitations because of frost heave, shrink-swell aspects, and a very low rate of permeability. These clay loams support abundant vegetative growth, considering the climate of the area.

The soils of the upper Red Canyon area are composed of fine-grained, soft red clay which is highly erosive. The erosion from this area undoubtedly gave rise to the name "Red" Canyon. The deep loam and clay loam textured soils on the Red Canyon alluvial fan are deposits from this area.

Areas of slope instability exist in the project area. An area of active and inactive landslide exists near the base of lift D, and an inactive landslide exists at the northeastern edge of the alluvial fan. Instability in these areas could be initiated by construction, near the proposed sewage treatment plant. The instability hazard can be mitigated if severely unstable zones are examined jointly by a stability expert and the construction engineer so that proper precautions are taken (Montagne et al. 1973).

Some soil erosion from clearing ski trails may occur. This may be minimal due to the estimated high permeability of the dry sandy alluvial soils and the high percentage of understory ground cover observed on the fine-grained soil sites. Where ski trails are cleared, an understory vegetation should be left as intact as possible. Steep denuded areas should be reseeded and mulched. Diversion ditches may be necessary in some cases (Montagne et al. 1973).

The central theme of minimizing erosion depends on protecting the existing understory vegetation and keeping the fertile topsoil in place. Where clearing is necessary for ski trails, the natural understory vegetation should be left intact as much as possible. Therefore, the method of clearing may require hand techniques where mechanized equipment cannot ensure adequate site protection. Where mechanized equipment is required for clearing, and the natural understory vegetation will be destroyed, the fertile topsoil should be protected. These denuded areas should not be left up to natural revegetation. Some of the logs and debris from the clearing can be placed perpendicular to the slope to help prevent severe surface washing and help reduce soil moisture losses. These logs and debris are rock cribbed into place as part of the seedbed preparations (Stadler et al. 1976).<sup>9</sup>

### Vegetation

Vegetation in the Mount Hebgen area is typical of plant life in mountainous terrain, according to the USFS. The upper third of the slopes and summit are sagebrush-grass meadows, with small clumps of trees (subalpine fir and Douglas fir).

The mid-slope areas are timber covered, with Douglas fir on the drier slopes, and lodgepole pine on the more moist sites. Alpine fir and Engelmann spruce can be found along streams and other wet areas.

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<sup>9</sup>Ibid. P.23 and P.116.

The shoreline of Hebgen Lake has a narrow band of rushes and sedges and an occasional willow bush. The Red Canyon alluvial fan is a sagebrush-Idaho fescue community. Sagebrush, willow, aspen, spruce and Douglas fir are found in the bottom along Red Canyon Creek. The foothills are savannah type with scattered clumps of Douglas fir, aspen and sagebrush.<sup>10</sup>

In an effort to discuss different types of vegetation and how they relate to each other, the USFS developed a series of classifications based on dominant plant species. These classifications are called Ecological Land Units (ELU).

The largest ELU for the Forest Service land on Mount Hebgen is in the Douglas fir series, 35 percent, with lands susceptible to erosion making up only eight percent of the 1,880 acres.<sup>11</sup> Most of Ski Yellowstone's land is tied up in alluvial fan-terrace land, 77 percent, with 16 percent of its land having high surface erosion hazards.

The east face of Mount Hebgen contains stands of mature sawtimber. The age of the timber is 120+ years. The understory varies from seedlings to sawtimber. The dominate timber species on the dry southern slopes is the Douglas fir, and on the moist north and east slopes the main timber species is subalpine fir.

Old skid roads and stumps still remain from early selective logging in the northeast part of Mount Hebgen.

A 1963 timber sale in Red Canyon included three clearcut blocks on the east slope. Between 1963 and 1966, 1,085,000 board feet (BF) of timber (mostly Douglas fir and lodgepole pine) were removed from the 111 acres in the three blocks. The clearcuts reproduced naturally.

Presently, another sale, the Red Canyon timber sale, has been prepared (but not advertised and sold) on the east face of Mount Hebgen. This sale is not a clearcut, rather it is aimed at removing mature trees larger than 12 inches DBH (diameter breast height).

The sale is comprised of three blocks of timber adjacent to the 1963-1966 clearcuts. Ski Yellowstone plans to put development phases II, III and IV in the same area, however, the sale plan considers the possible development of a winter sports complex on Mount Hebgen and would prevent any conflict with such a development, according to the Forest Service.

The proposed sale would encompass about 314 acres. Approximately 2.1 million BF of Douglas fir and .4 million BF of lodgepole pine, subalpine fir and spruce would be selectively harvested. The market value of lumber cut from that sale is about \$500,000.

If the ski area is developed, an additional 1.9 million BF of timber would be harvested which would have a market value of about \$380,000 for the lumber produced. Between clearing for ski runs and the Red Canyon timber sale, approximately 50 percent of the merchantable timber would be removed from Mount Hebgen.<sup>12</sup>

The proposed development would "encumber" the potential production of about

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<sup>10</sup>Ibid., P.24.

<sup>11</sup>Ibid. P.25.

<sup>12</sup>Ibid. P.36-37.

8 million BF of timber on 1,334 acres on the east face of Mount Hebgen, the USFS draft EIS said.

More than 4 million BF of over half of the timber would be removed due to the sale and clearing for ski runs. The remaining timber would be essentially removed from sustained production for the life of the project (200 years).

Even though the land would not be committed to normal timber production the Forest Service said some selective cutting could occur.<sup>13</sup>

During the construction, vegetation may be severely effected by the use of construction equipment on wet soil. According to the USFS, potential damage is greatest in the forest understory and shallow soil areas where revegetation occurs slowly.

Other possible impacts include: a) a change in plant species due to the clearing of native vegetation, b) changing the type of vegetation in inhabited areas from native to turf grasses and c) an increase in windfalls where ski trails wind through stands of shallow rooted lodgepole pine.

According to persons hired by the development corporation and the Forest Service, possible damage done during construction can be mitigated or prevented by: a) using large rubber wheeled equipment, b) avoiding the use of vehicles in the early summer or after heavy rains, c) use native plants and grasses in areas which are to retain a native atmosphere and d) minimize the construction of trails through lodgepole pine.

#### Aesthetics

The Forest Service conducted a visual management system analysis for the proposed Ski Yellowstone in 1976. The study revealed that two visual quality objectives should be met on Mount Hebgen and near by areas:

The "retention" objective provides for management activities which are not visually evident. The areas for which this objective applies are the lower slopes of the hills along Highway 287 and the shore of Hebgen Lake. Under retention, activities should only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., should not be made evident.

The remaining area, those upper slopes and the alluvial fan, has what is called a partial retention visual management objective. Management activities on this area should remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape. Activities may also introduce elements which are found infrequently or not at all in the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape (USDA 1974c).<sup>14</sup>

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<sup>13</sup>Ibid. P.166.

<sup>14</sup>Ibid. P.28.

## Air Quality

There are two official National Weather Service stations in the West Yellowstone basin. One is at Hebgen Dam (elevation 6,489 feet), seven miles northwest of Mount Hebgen, and the other is in West Yellowstone (elevation 6,662 feet), 12 miles southeast of Mount Hebgen. There are also seven snow courses and a fire weather station in the basin where information is collected seasonally by the Soil Conservation Service and the Forest Service.

National Weather Service records indicate between 1941-70 Hebgen Dam had an average annual temperature of 36 degrees Fahrenheit (°F), while West Yellowstone averaged 35°F. Mean daily temperatures are typically below 32°F from November to April. Consequently, heating requirements for homes in this area are high.

Winter temperatures can be very cold, occasionally reaching -40° or colder. Nighttime cold air flow is produced by mountains on all sides, and air outflow from the basin is restricted to a narrow canyon in the Hebgen Dam area.

Temperature inversions are common, with warm air along mountainsides overlying colder air on the valley floor during winter months. These inversions tend to trap air pollutants from motor vehicles and fireplaces. Dr. V.L. Mitchell (Montagne et al. 1973) believes these inversions are of one to three days' duration, with durations of four days or longer when maximum temperatures at Hebgen Dam are 0°F or below. These have occurred on five occasions from January 1938 to February 1973. Using data presented by Dr. Mitchell and assuming that a temperature inversion condition exists when daily minimum air temperature is 0°F, there are a total of 36 such days during an average winter in this area when this condition could occur. Therefore, air pollution can occur in the basin.<sup>15</sup>

Annual precipitation from 1941-70 averaged 27.8 inches at Hebgen Dam and 22.7 inches at West Yellowstone (U.S. Department of Commerce 1973). Precipitation is fairly well distributed throughout the year, varying from a low of 1.41 inches in July to highs of 3.35 inches in June and 3 inches in January at the Hebgen Lake.

Dr. Mitchell estimated mean annual precipitation to be 27.4 ± 5.1 inches for the Red Canyon fan area, and there would be 129 days a year when daily precipitation was 0.01 inches or more, based upon Hebgen Dam's 1931-70 record.

Precipitation amounts on the ski runs and summit of Mount Hebgen are unknown but would be greater than for the valley floor. Annual precipitation estimates for the ski area are in the 30-35 inch range (USDA Soil Conservation Service 1976).

Based on the correlation of snow data between a short-term (1970-73) snow course in Red Canyon and several nearby long-term (1930's-73) snow courses and snow pillow records, the Soil Conservation Service estimated that "skiing at this (the base) area could begin by Thanksgiving in approximately 6 out of 20 years, and by the Christmas holiday season in approximately 16 out of 20 years...it should be stressed that these data are for areas not subject to wind action and where slopes are not facing the sun during the snow season." (USDA Soil Conservation Service 1973.) Skiing could begin earlier on some of the upper slopes during most years if lift development permits use of those areas.<sup>16</sup>

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<sup>15</sup>Ibid. P. 17.

<sup>16</sup>Ibid. P. 19.

Prevailing wind on top of Mount Hebgen is probably southwest. While snow-drifts behind trees are common on the upper slopes of the mountain, no cornices are known to exist on the area proposed for skiing. The knife-like steep ridges, which produce cornices, are absent. Wind speeds on the mountain have not been measured except for a few rough observations by ranger district personnel.

According to Dr. Mitchell, winds in Red Canyon and on the fan would be 5-10 miles per hour (mph) up-canyon (southeasterly to southwesterly) during daylight hours in good weather. Down-canyon winds (northerly) prevail during night time hours at similar velocities. With the passage of cold fronts, winds on the fan will shift from south or southwesterly to westerly and may gust to 50 mph, although sustained winds will probably be under 25 mph. Thunderstorms commonly have peak gusts of 50 mph or more. The chief potential for wind damage is for small boats caught unexpectedly on exposed areas of Hebgen Lake.<sup>17</sup>

Although the Ski Yellowstone development will use electric heat, fireplaces and wood burning stoves will be installed in some of the units.

The use of fireplaces and stoves will produce particulate matter (smoke, ash and unburned carbon), carbon monoxide, hydrocarbons and possibly small amounts of nitrogen oxides, depending on the degree of heat obtained.

According to the corporation's planners, it is unknown how many fireplaces and stoves will be installed. Without that and such information as thickness of insulation, room size, types of windows, etc., it is difficult to determine if there will be a serious impact on air quality.

Since the possibility of air quality problems does exist from the concentrated use of wood burning devices, the developers should recognize the potential problem and take it into consideration when designing its own facilities and discuss the matter with the persons and corporations that will buy the single family and condominium lots.

#### Unique, Endangered, Fragile or Limited Environmental Resources

The creation of Ski Yellowstone will permanently alter the aesthetics of the area, changing it from a rural to a more suburban setting.

The change in land use will likely include the replacement of native vegetation with plants more commonly found in urban areas, such as domestic grasses, flowers, trees and shrubs. The change also poses the possibility of impacts on air and water quality. The development corporation has plans for controlling stormwater runoff, sewage disposal and a safe drinking water system. However, the question of possible pollution from fireplaces has not been answered.

The proposed resort is in an area frequented by grizzly bears. Although steps have been discussed to lessen the impact of Ski Yellowstone on the ranging patterns of this threatened species, it is questionable how effective these measures will be in reducing human-bear confrontations.

In addition to grizzly bears, there will be impacts to elk and moose in the area. The change in habitat will probably force these animals to seek other areas for wintering and calving.

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<sup>17</sup>Ibid. P. 19.

## Demands on Environmental Resources of Land, Water, Air and Energy

Ski Yellowstone will create demands on land and energy, and possibly on water and air quality. The landscape will be permanently altered, and if proposed plans are not followed there could be water quality problems. Additionally, due to geographic and climatic conditions it might be necessary to limit fireplaces to avoid air pollution.

Electricity will be used for both power and heating. This adds to the necessity for the utility to upgrade the delivery system to the area.

Since the proposed resort is aimed at attracting persons from outside the immediate area, bus, auto and airplane fuel will be expended to transport the people. Although the fuel and electricity used by the resort will probably not directly alter the country's energy problems, the increased use adds to the cumulative effect, which does hinder attempts to control energy consumption.

### HUMAN ENVIRONMENT

#### Social Structures and Characteristics

At times, the West Yellowstone area is rural, and at other times it is urban. While some agricultural crops and livestock are raised in the Hebgen Lake area, the community of West Yellowstone revolves almost exclusively around the tourist industry. It is a community whose permanent population of under 800 expands by several thousand each summer. While West Yellowstone accommodates thousands of overnight visitors to nearby Yellowstone National Park, the Hebgen Lake area is an attractive tourist site in its own right. Summer homes dot the south shore of the lake; the north shore, along U.S. 287, has motels, campgrounds and trailer parks. Below Hebgen Dam, the USFS maintains a series of campgrounds along U.S. 287, which follows the Madison River west through a narrow canyon.

In short, the area is a tourist hub. Its permanent residents cater to and, for the most part, are dependent on the tourist trade.

Until recently, West Yellowstone was strictly a seasonal community, serving park visitors only during the summer months. With the arrival of the snowmobile, however, West Yellowstone has become a year-round recreation community. (The city's official letterhead bills West Yellowstone as the "snowmobile capital of the world.") According to the Forest Service's final EIS (FEIS): "It (West Yellowstone) now accomodates persons visiting Yellowstone National Park in the winter, as it has done for decades in the summer. Even so, winter visits do not equal the summer visits. The airport does not operate in the winter, and many businesses still close down in the winter."<sup>18</sup> As could be expected, unemployment is high during the winter months.

According to the USFS, only three percent of the population of Gallatin County lives in the southern half of the county, where West Yellowstone is situated.<sup>19</sup> The latest population estimate for West Yellowstone (July 1, 1975) is 774, according to the U.S. Bureau of the Census. That's 18 more people, or a 2.4 percent increase over the 1970 population of 756. While the population of West Yellowstone has remained stable in recent years, the City of Bozeman, 80

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<sup>18</sup>Ibid. P. 52.

<sup>19</sup>Ibid. P. 51.

miles away, is one of the fastest-growing communities in the state.

According to Ski Yellowstone, Inc., the mountain development will accommodate 6,500 skiers a day. It is anticipated that 10 years into the life of the project, Ski Yellowstone will be receiving 720,000 visitors (winter and summer) annually.<sup>20</sup>

An influx of these proportions is bound to have an impact on lifestyles in the West Yellowstone area. This influx would be felt far more in the winter than in the summer, when the tourist trade traditionally runs high.

According to an economic study done for the DHES, the most important market area for Ski Yellowstone is the "destination" or vacation skier. The report states: "...because Ski Yellowstone lacks access to a large metropolitan market, it will have to draw vacation visitors from distant markets."<sup>21</sup>

According to a skier survey conducted by the State Advertising Unit during the 1972-73 season, non-resident skiers who visit Montana are young and somewhat more affluent than resident skiers. The average non-resident skier is at least in his or her mid-twenties, likely to be a professional, is a college graduate or has had some college education and enjoys an upper-middle income.<sup>22</sup>

The Forest Service has concluded: "The increase in population and the change in population composition will alter present lifestyles of the West Yellowstone Basin. This impact may be considered adverse or beneficial depending on each individual's preference."<sup>23</sup>

Since West Yellowstone developed largely around the tourist industry, this additional influx is not expected to have as great a social impact on the area as a development that would bring a new tourist market into an otherwise undeveloped area.

The major population center in the area is West Yellowstone. The town has a permanent population of about 750, with a summer population that swells to several thousand. According to the developers, housing for permanent residents consists primarily of house trailers and converted summer homes. Other structures in the town include several retail shops, 14 gas stations, 25 restaurants and 71 motels and hotels with about 3,500 beds. West Yellowstone covers about 250 acres.<sup>24</sup>

Land in the Hebgen Lake District is primarily public land. Of the 211,200 acres, 10,860 are privately owned. This land is being subdivided, with a steady increase of homes, cabins and lodges. As of 1973, according to information from the developers, 13 subdivisions had split (or proposed to split) 538 acres of this private land into 619 lots.<sup>25</sup>

As of 1977, the USFS recorded 149 summer homes, seven marinas-resorts-campgrounds and four campgrounds with two National Forest boat ramps on Hebgen Lake, for a combined total capacity of about 2,480 persons.<sup>26</sup>

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<sup>20</sup>Ibid. Pp. 71 and 80.

<sup>21</sup>James H. Nybo, *Ski Yellowstone: Marlut and Economic Impact*, January 1978, P.20.

<sup>22</sup>U.S. Forest Service, *Gallatin National Forest, FEIS*, op. cit., Appendix X.

<sup>23</sup>Ibid. P.164.

<sup>24</sup>Ski Yellowstone, Inc., *Ski Yellowstone Environmental Study*, October 1973, P.5-21.

<sup>25</sup>Ibid. P.5-220.

<sup>26</sup>U.S. Forest Service, *Gallatin National Forest, FEIS*, op. cit., P.41.

Most of the privately owned lakeshore properties are on the Grayling Arm of Hebgen Lake, according to the USFS. This area currently receives the heaviest use.

Ski Yellowstone would bring substantially more development to the Grayling Arm area. Ski Yellowstone, Inc., anticipates an annual occupancy of 649,215 persons or 1,958 persons a day at full development.<sup>27</sup>

### Taxes

Throughout the projected 200-year life of the project, it is likely the taxes generated by Ski Yellowstone would pay for government services, however, the greatest period of need might not coincide with the most profitable period for tax revenues.

In many cases, construction is a time when a number of government services are needed, often due to the influx of temporary workers and their families. If a development, such as Ski Yellowstone, is built in phases, the maximum tax potential will not be reached until the entire development is completed.

It is also difficult to make projected speculations about tax revenues since no one knows what the market value of the lots will be until they are sold.

### Quantity and Distribution of Employment and Income

The West Yellowstone economy is not representative of the economic forces that govern the rest of Gallatin County. As previously mentioned, West Yellowstone's economy depends almost exclusively on the seasonal tourist trade generated by nearby Yellowstone National Park.

Agriculture and government (including Montana State University in Bozeman) dominate the economy in the county. Retailing is the third largest employer in Gallatin County.<sup>28</sup>

According to the USFS, there are no statistics available on numbers of employees or occupations in the West Yellowstone area. The Forest Service estimates, however, that 90 percent of the employed people work in tourist-related jobs. At the time the USFS released its final EIS on Ski Yellowstone (May 1977), a sawmill in the area employed 10 full-time and 30 part-time workers.<sup>29</sup> The national forest in the Hebgen Lake basin also provides employment for area workers, according to the USFS. As of 1977, there were 10 Forest Service workers, 20 wood products employees and 15 miscellaneous construction and maintenance workers. The USFS set indirect employment at 500, representing the workers who provide services to people who visit the national forest and Yellowstone National Park.<sup>30</sup>

As in most seasonal communities, West Yellowstone's unemployment rate is high during the winter months.

<sup>27</sup>Ski Yellowstone, Inc., *op. cit.*, P.79.

<sup>28</sup>U.S. Forest Service, *Gallatin National Forest, FEIS, op. cit.*, P.50.

<sup>29</sup>*Ibid.*, P.50.

<sup>30</sup>*Ibid.*, P.51.

According to the developers, about 200 people are employed in the winter, compared with about 250 unemployed.<sup>31</sup>

The permanent, year-round population of Ski Yellowstone is ultimately projected to be 390, 70 to 80 of whom would be students.<sup>32</sup> It is presumed the year-round employment generated by Ski Yellowstone would absorb some of the available workers living in West Yellowstone. Total Montana employment associated both directly and indirectly with Ski Yellowstone is projected by the USFS to grow from 180 at the end of the first year of development to 1,324 by the end of the 10th year.<sup>33</sup>

Income generated by Ski Yellowstone would likely benefit the West Yellowstone economy. According to the developer's environmental study, total income from the development would be around \$1,842,000 the first year (at that time 1975/76) and increase to \$9,647,500 by the end of the 10th year.<sup>34</sup> The developers inserted those figures into county-wide economic projections and concluded the projected 1975/76 (first-year) income would amount to two percent of total county income in 1970.

The USFS points out that changing property values will also affect income in the West Yellowstone area. "Historically, land values have raised appreciably as major ski resorts develop in an area," according to the agency. "Incomes will be increased as landowners continue to subdivide and sell at higher prices."<sup>35</sup>

Depending on the success of the project, Ski Yellowstone presumably would have a positive impact on employment and income in the area. However, as the USFS points out in its FEIS, Ski Yellowstone would be sharing an already developed summer tourist market, not adding to it. "Thus," the agency states, "the employment and personal income associated with summer tourist expenditures should be considered as a redistribution of employment and income within the local and state economies rather than an addition to it."<sup>36</sup>

On the other hand, winter visitor expenditures would be "new" or "export" revenue for West Yellowstone, according to the Forest Service. However, it is likely that some of the visitors to Ski Yellowstone would be coming from other Montana ski resorts. Again, these skiers would constitute a redistribution of income in the economy. In its FEIS, the USFS states: "To the extent that the winter visitor expenditures at the proposed Ski Yellowstone development would have been spent elsewhere in the Montana economy, they constitute a redistribution of economic activity within the economy and not an addition to it."<sup>37</sup>

#### Cultural, Historical and Archaeological Resources

Several historical and archaeological sites exist in the vicinity of Ski Yellowstone. Some have been discovered recently, in conjunction with the environmental assessment process; others are well-established sites.

<sup>31</sup>Ski Yellowstone, Inc., *op. cit.*, P.5-31.

<sup>32</sup>U.S. Forest Service, *Gallatin National Forest, FEIS, op. cit.*, P.76.

<sup>33</sup>*Ibid.*, P.149.

<sup>34</sup>Ski Yellowstone, Inc., *op. cit.*, P.5-18.

<sup>35</sup>U.S. Forest Service, *Gallatin National Forest, FEIS, op. cit.*, P.148.

<sup>36</sup>*Ibid.*, P.139.

<sup>37</sup>*Ibid.*, P.139.

Both Ski Yellowstone, Inc., and the Forest Service have documented the existence of eight prehistoric sites and four sites of recent historic value. Three of the historic sites are old cabin and barn remains that may have significance as examples of early agricultural developments. One of these sites is on national forest land; two are on private lands. The fourth historic site is the town of Grayling, which was designated a post office in 1908. Buildings at the Grayling site are in good condition and are considered to be of National Register significance.

Of the eight prehistoric sites, three are on national forest land and five are on private land controlled by Ski Yellowstone, Inc. Archaeological studies of these sites indicate use of the area for the past 11 to 12 thousand years.

Both the developers and the Forest Service have recommended further study of the sites by a professional archaeologist. According to the Forest Service, more intensive evaluation would determine whether monitoring by a professional archaeologist will be necessary during the construction phase of the development.

The developers and the Forest Service further conclude that developments like Ski Yellowstone can have a positive impact on cultural resources by unearthing new knowledge about the resource.

#### Access to and Quality of Recreational and Wilderness Activities

Ski Yellowstone lies in the heart of one of the most popular recreation areas in the nation. Hunting, fishing, hiking, camping, backpacking, mountain-climbing, snow-skiing, water-skiing, boating, swimming, horseback riding, snow-shoeing, snowmobiling and unlimited sightseeing--all are available within the immediate vicinity of the proposed, all-season resort.

Six miles east of Mount Hebgen and the Red Canyon alluvial fan is the western boundary of Yellowstone National Park. The park's summer season extends each year from May 1 to October 31; it is open to winter visitors from December to March. More than 2.48 million tourists visited the park in 1977. About a third of these visitors entered the park through its west entrance at West Yellowstone. A study done for the National Park Service revealed the average park visitor to Yellowstone and Grand Teton National parks contributed \$18.89 per day or \$154 million in 1977 to local economies.<sup>38</sup> So important is this recreational/tourist base that the National Park Service (NPS) states in its Yellowstone National Park 1973 Master Plan: "Today recreation surpasses the agricultural and livestock industries as the economic base of the region...(recreation) is leading to a stable year-round tourist economy."<sup>39</sup>

Ski Yellowstone is accessible from the north, south and west by two scenic highways, U.S. 287 and U.S. 191. U.S. 287 follows the Madison River northwest toward Ennis. The Madison, one of the three major forks of the Missouri River, is best known for its trout fishery. Every year fishing enthusiasts from all over the country travel to Montana to try their luck on the Madison.

<sup>38</sup>National Park Service, Greater Yellowstone Cooperative Regional Transportation Study. Volume I, Davidson, Peterson, Asso., New York, NY, April 1978.

<sup>39</sup>U.S. Forest Service, Gallatin National Forest, FEIS, op. cit., P.53.

In a letter to Gallatin National Forest Supervisor Lewis Hawkes, the Montana Department of Fish and Game had this to say about the fishing situation on the Madison River:

Currently, fisherman use in the Madison River-Hebgen Lake area is high. In 1975-76, our mail questionnaire (sic) survey estimated over 73,000 fisherman days use on the Madison River from the park boundary to Ennis Lake. This indicates considerable use of these fisheries. Pressures on the upper Madison River are reaching levels where conflicts are occurring because of the number of people using the river. One has to philosophically question whether or not we should be encouraging more people to fish an area that already has high levels of use. It is inevitable that additional use may lead to pressure restrictions on the Madison.

This may occur without Ski Yellowstone or as is the case in the park, the pressure may distribute to other periods. It is without question though, that if a summer development is encouraged this conflict will occur more frequently and additional regulation will be necessary. With the current high level of summer fishing on the Madison River, we do not believe it desirable to encourage considerably more fisherman use.<sup>40</sup>

It should be noted that special regulations were put into effect on the upper Madison last year by the Fish and Game Department. Based on a three-year creel study, the department completely closed off one stretch, from Squaw Creek to Wolf Creek. Limits and equipment were restricted on other portions of the river.

The Madison follows a course just east of the Beaverhead National Forest. The Forest Service maintains a series of campgrounds along the upper Madison.

U. S. 191, to the east, follows another trout stream--the Gallatin River--north toward Bozeman. The Gallatin is another major tributary of the Missouri. Although the Gallatin does not receive as much fishing pressure as the Madison, its scenic attractions draw many tourists traveling to the park from the north. Also located along U.S. 191 is the Big Sky ski resort (about 40 miles north of Ski Yellowstone) and the Spanish Peaks Primitive Area. Both offer a wide range of recreational opportunities for tourists along the route.

Another important recreational resource in the immediate area is the 289,000 acre Taylor-Hilgard tract now under study for possible wilderness designation. The Taylor-Hilgard is one of 10 Montana areas included in the recently passed Montana Wilderness Study Act (S 393), sponsored by the late Senator Lee Metcalf.

The Taylor-Hilgard Wilderness Study Area covers portions of both the Beaverhead and Gallatin national forests. From the western boundary of Yellowstone National Park, it extends 21 miles west to the Madison River Valley. From Hebgen and Earthquake lakes on the south, it extends 32 miles north to Lone Mountain in Gallatin National Forest and Fan Mountain in Beaverhead National Forest. The study area excludes the east and south face of Mount Hebgen and lower Red Canyon and, according to the Forest Service, the Ski Yellowstone special use permit area has been excluded from the wilderness study area.<sup>41</sup>

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<sup>40</sup>Ibid., P.E-35.

<sup>41</sup>Ibid., P.14.

In the immediate vicinity of Ski Yellowstone is Hebgen Lake, which is formed by an earthfill dam--Hebgen Dam--located at the entrance to the narrow Madison River Canyon. The lake offers the full range of water sports and recreational opportunities. Forest Service records show 113,800 visitor-days use on Hebgen Lake for 1972. (A visitor day is defined as 12 hours of recreation use.)

A small campground with a capacity of 15 persons is located in Red Canyon. One of the attractions at the campground is its proximity to the Red Canyon fault scarp, which was formed during the 1959 earthquake. The Red Canyon Scarp Viewpoint on U.S. 287 is also a popular tourist stop.

It can be expected that an influx of about 650,000 persons a year will have a dramatic impact on the quality of recreational experiences in this area.

Several individuals, organizations and agencies, including the Forest Service, commented that increased pressure of the magnitude proposed by Ski Yellowstone, Inc., will degrade the quality of the recreational experience. The developers, on the other hand, have taken the position that it makes more sense to expand on existing recreation areas, like Hebgen Lake basin, than to create major, new recreation facilities in remote areas.

In its summary of probable adverse environmental impacts caused by development of Ski Yellowstone, the USFS said: "Hunting and fishing pressure will increase, resulting in more crowded conditions and possible additional restrictions on bag limits, seasons and the number of permits issued."<sup>42</sup> The Forest Service also noted that Ski Yellowstone would also create a negative visual impact to recreationists on and around Hebgen Lake.

The agency also stated that fishing and hunting opportunities can be expected to deteriorate in quality: "Potential crowding and over-harvest problems can be overcome only by additional management constraints such as shorter seasons, reduced bag limits, restrictions on fishing equipment or limited uses through a permit system. On the other hand, more people will be able to enjoy the hunting and fishing opportunities, although the type of experience may change due to increased use."<sup>43</sup>

Although there is something to be said for the exposure of more persons to the kind of recreational opportunities available in the Hebgen Lake area, the nature of those opportunities will be altered dramatically by increased use. The quality of the recreational experience can be expected to decline proportionately with increased use of the recreational resource.

In 1973, the Park Service made a statement that seems applicable to this discussion of increased pressure on recreational resources. In discussing limits on the park's ability to accommodate overnight use, NPS officials said in their Yellowstone National Park 1973 Master Plan: "Ultimately, the public must recognize that unlimited development signals eventual destruction."

Another recreational issue critical to a discussion of the proposed downhill ski resort is the availability of and the need for additional downhill ski facilities in the area.

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<sup>42</sup>Ibid., P.165.

<sup>43</sup>Ibid., P.136.

The Ski Yellowstone site lies about midway in a chain of four major ski resorts: Bridger Bowl, north of Bozeman; Big Sky, about midway between Bozeman and Ski Yellowstone; Grand Targhee, in eastern Idaho, and Jackson Hole, south of Yellowstone and Teton national parks in Wyoming. The USFS points out in its final EIS that all four are within three hours' driving time of Mount Hebgen.

Both Bridger Bowl and Big Sky have gone on record supporting Ski Yellowstone. "Written opposition or serious questions of need for another ski area..." was submitted by Grand Targhee, according to the Forest Service.<sup>44</sup> Bruce Nurse, president of the Jackson Hole Ski Corporation, suggested "...a most serious analysis should be made of the regional market, which in my opinion at the present time will not support additional ski developments such as Mt. Hebgen."<sup>45</sup> Nurse added, however, that Mount Hebgen is a feasible winter/summer resort site and, "in the long range future," can be maintained by the USFS for eventual development. He acknowledged that competition now exists among ski resorts in the area and that it would continue. According to Nurse, it is the "well-thought-out and well-managed areas" that will succeed in this market. The Forest Service repeated this principle: "The economic success of a venture of the Ski Yellowstone type depends greatly on how it is financed, developed, promoted and managed."

It should be noted that Mount Hebgen's potential for winter sports was recognized long before Ski Yellowstone, Inc., submitted its proposal in 1973. The Forest Service states in its Final EIS: "The potential of Mount Hebgen as a winter sports area was first officially recognized by the Forest Service during the Recreation Resource Inventory of 1959-1960." A consultant for Ski Yellowstone, Inc., quotes the following statement made by the USFS in 1967: "West Yellowstone has the snow, the terrain, the accommodations, the atmosphere and, if Yellowstone Airport opens, the transportation to make this community a major winter sports center."<sup>46</sup> (The state-owned airport is open for use only during the summer--from June through September.)

According to a market study conducted for the DHES by economist James H. Nybo, Ski Yellowstone has the potential to succeed as an all-season recreation resort. However, financial success may be a longtime coming and will depend, ultimately, on the quality of the development.

Nybo, along with other experts who have analyzed the Ski Yellowstone proposal, concluded that Ski Yellowstone will have to attract destination, or vacation skiers in order to survive financially. Studies of resident skiers show that most Montanans (80 percent) do not travel more than 75 miles for a day or week-end of skiing (Nybo, P.14). Therefore, because Ski Yellowstone is remote and cannot draw from a local metropolitan market, it will have to rely on vacation skiers who ordinarily spend about a week at a ski resort.

Nybo uses the Jackson Hole experience to illustrate the financial investment necessary to the success of a destination ski resort. According to Jackson Hole Corporation President Nurse, the corporation lost money for ten years before it finally reached a level of development adequate to satisfy the destination skier for one week. Nurse estimates the replacement cost of Teton Village at between \$50 and \$75 million at present construction costs. He further estimates Ski

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<sup>44</sup>Ibid., P.156.

<sup>45</sup>Ibid., P.1-88.

<sup>46</sup>Ski Yellowstone., Inc., *op. cit.*, P.5-25.

Yellowstone developers would have to invest \$100 million over the next ten years to achieve their estimated \$12 million annual revenue figure.<sup>47</sup>

Nybo points out that in many cases, a strong local market has provided the base for survival during the early, lean years of new destination resorts. He adds, however, that "the local market does not hold great promise for Ski Yellowstone. It (Ski Yellowstone) can expect to garner some share of the market, although it does not hold an advantage over any of its competitors for a local population center of any significance."<sup>48</sup>

There are two ways a new ski resort may impact existing resorts in an area or region. By adding to the overall quantity and variety of skiing, it can exercise a complimentary or strengthening influence on other resorts in the area. Or, it can compete with existing resorts, eating in the existing market. In a comparative examination of Ski Yellowstone's expected role in the local area market with respect to other resorts, Nybo concludes it is doubtful Ski Yellowstone will significantly increase the amount of skiing by residents in the local market area.

As far as the local market is concerned, Nybo predicts Ski Yellowstone will not significantly erode Bridger Bowl's share of the Bozeman market. He continues: "In the case of people traveling from Billings, the additional mileage to Big Sky and Ski Yellowstone does not seem quite such an obstacle. For those skiers from Butte who choose to travel a greater distance than Discovery Basin, Ski Yellowstone appears to be in a position to capture over one-fourth of the market, as is nearly the case with both the Billings and Helena skiers. While Ski Yellowstone can hope to get fifteen percent of the Idaho Falls trade, Targhee and Jackson Hole can hope for twenty-seven and forty-five percent, respectively, of that market."<sup>49</sup>(Reference Map #4)

Concerning the larger and more important destination skier market, Nybo states: "While the destination skier market is perhaps the most lucrative, as it does not have the great variation between week day and weed-end use, it also must provide superb skiing for all levels in an outstanding physical setting, excellent snow conditions and varied and exciting ski runs, and apres-ski activities that rival those available in the city." (Nybo, p.20)

Nybo points out that upon entering the destination skier market, Ski Yellowstone will be in competition not only with Big Sky and Jackson Hole, but also with the highly developed and well known resorts, like Vail, Aspen, Sun Valley, Taos, Alta, Snowmass and Snowbird. A comparison of the Ski Yellowstone proposal with the characteristics of successful destination ski resorts (skiable acres, vertical elevation, length of longest run and miles of slopes, runs and trails) puts Ski Yellowstone "clearly at the low end of this class of resorts," according to Nybo. (Table #1)

In spite of some of the physical characteristics and market conditions working against Ski Yellowstone, Nybo believes there is a demand for more downhill ski facilities and, depending on how far the developers are willing to go financially, Ski Yellowstone could succeed over the long run.

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<sup>47</sup>Nybo, *op. cit.*, P.23.

<sup>48</sup>*Ibid.*, *op. cit.*, P.19.

<sup>49</sup>*Ibid.*, *op. cit.*, P.18.

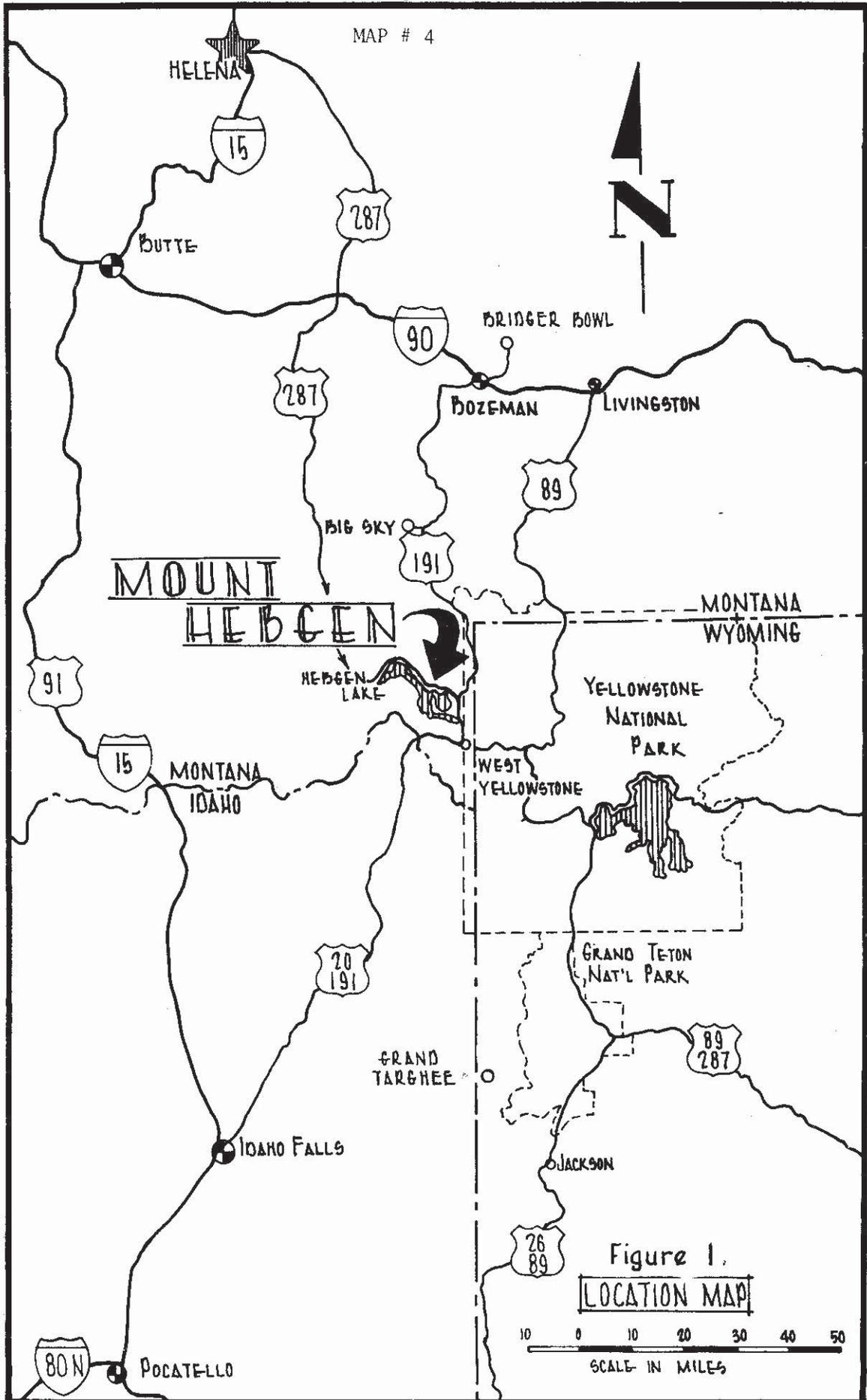
TABLE # 1

COMPARISON OF THE QUANTITY OF SLOPES, RUNS, and TRAILS  
OF VARIOUS WESTERN U.S. DESTINATION SKI RESORTS

Resort	SKIABLE ACRES	VERTICAL ELEVATION (feet)	LONGEST RUN (miles)	MILES OF SLOPES, RUNS and TRAILS
Aspen Highlands	NA	3,800	2	56
Aspen Mountain	500+	3,300	2+	NA
Vail	10 sq. miles	3,050	4.5	NA
Snowmass	13,000	3,500	4	NA
Grand Targhee	NA	2,200	3	NA
Jackson Hole	3,200	4,139	7.5	100
Big Sky	NA	2,274	2.5	30
Alta	NA	2,000	3	NA
Snowbird	NA	2,900	2.5	NA
Park City	2,200	3,000	3.5	NA
Taos	1,000+	2,612	5¼	NA
Sun Valley	1,050	3,380	3	NA
Ski Yellowstone	640	2,000	2	NA

Source: Enzel, Robert G. and John R. Urciolo, The White Book of U.S. Ski Areas, Chicago: Rand McNally and Company, 1977. Ski Yellowstone Information from Gallatin National Forest, Environmental Statement - FINAL. (Mount Hebgen Management Alternatives). U.S. Department of Agriculture Forest Service. Montana: 1976

MAP # 4



Ski Yellowstone is designed not just as a winter sports area, but as a year-round recreational resort. With property fronting on Grayling Arm, Ski Yellowstone Inc., hopes to attract summer visitors, as well as winter visitors. The proposal also includes a real estate operation which, according to one of the developers' consultants, "...will be responsible for the promotion and sale of approximately 250 acres of fee owned land at the base of the lift facilities and adjacent to Hebgen Lake...The policy of Ski Yellowstone will be to sell parcels of land to qualified developers who will construct and operate or sell the lodges and condominiums. The single family lots will be developed and sold by Ski Yellowstone."<sup>50</sup>

One of Ski Yellowstone's consultants has taken the position that the development "must be oriented to both the winter and summer markets in order to be viable." This position is based on the following considerations: (1) The quality of skiing available at Mount Hebgen cannot match the skiing at other, nearby resorts; (2) West Yellowstone is remote and has no nearby metropolitan center to draw from; (3) The development will be located only eight miles from Yellowstone National Park, which attracts more than two million visitors each summer, and (4) Ski Yellowstone will be located on Hebgen Lake, thus providing a variety of summer recreational opportunities.<sup>51</sup>

In addition to ski facilities, plus lodging and restaurants, Ski Yellowstone plans also call for construction of a shopping mall, hotels, lounges, a day nursery, a swimming club, stables, marina, tennis courts and "other recreation use opportunities." The Forest Service has included, as an appendix to its Final EIS, several studies under the title of "Skier Vacation Patterns and Economics." One of the studies, entitled "Economic Analysis of North American Ski Areas" (Goeldner and Dicke, 1974), concludes that "...the most profitable areas tended to offer relatively few other recreational activities...Of those areas reporting a loss, 50 percent were engaged in real estate operations while only 12 percent of the top profit areas engaged in this activity. The most profitable areas also had fewer recreational amenities such as golf, tennis, etc."<sup>52</sup>

In his economic report, Nybo points out that Ski Yellowstone might have an advantage in its proposed real estate operations because of the scarcity of private land in the area. West Yellowstone is surrounded on all sides by public land, and has no room to grow. Local realtors report a heavy demand, tight housing, high prices--in short, a seller's market--in the West Yellowstone area. Another factor that would contribute significantly to the success of real estate sales as Ski Yellowstone would be a policy change by Yellowstone Park officials that would restrict the number of overnight accommodations in the park. An overflow of park visitors, "combined with significant limitations in the size of West Yellowstone because of the surrounding public lands, would have a major effect on the demand for summer accommodations at Ski Yellowstone," according to Nybo.

Some Montanans have become skeptical of large-scale real estate operations associated with ski resorts as a result of financial problems at Big Sky, about 40 miles north of Ski Yellowstone. Here is how Nybo described these problems: "From all appearances, the developers badly overestimated the strength of the

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<sup>50</sup>U.S. Forest Service, Gallatin National Forest, FEIS, *op. cit.*, P.76.

<sup>51</sup>Ski Yellowstone, Inc., *op. cit.*, P.5-10.

<sup>52</sup>U.S. Forest Service, Gallatin National Forest, FEIS, *op. cit.*, Pp. A-12,13.

demand for condominiums. As a result, Big Sky Realty, Inc. (the firm remaining after the Big Sky ski resort was sold to Boyne USA), sold some 150 condominium units at a public auction in the summer of 1977. Following this sale, they sold nearly all of their remaining assets to Boyne USA, the developer who purchased the floundering resort. The general manager of Big Sky of Montana for Boyne USA stated that he feels the real estate market at Big Sky is over-saturated. He further stated that the company purchased the real estate operation more to be able to exercise control over the pace of development in the area of their resort than to get into real estate.<sup>53</sup>

"If permission is granted and the development flounders financially," Nybo adds, "it should be expected that the experience of Big Sky could be repeated. The original owners could take their losses, assets would be revalued, and new owners would try again. In the face of the experiences of Big Sky, Jackson Hole, and others, it should not be expected that an immediate profitable situation would occur."<sup>54</sup>

Nybo mentions two other factors that could work against the success of Ski Yellowstone. One is its proximity to a major, recent earthquake area and the other is the susceptibility of the Grayling Arm of Hebgen Lake to toxic algal growth. (Both of these liabilities are discussed in depth elsewhere in this EIS.) Both could affect the decisions of potential investors and visitors.

After evaluating all the factors working for and against a development like Ski Yellowstone, Nybo reached the same conclusion as the Forest Service: "The ultimate success (of Ski Yellowstone) will depend on the quality of the development, its level of management and promotion, and ultimately on the degree to which it pleases the skiing and spending public."<sup>55</sup>

### Demands for Energy

In a time of short supplies and high prices, energy has become an important issue in the proposed Ski Yellowstone development. Plans call for an all-electric recreation and second-home resort. There is no natural gas supply in the West Yellowstone-Hebgen Lake area. Another factor that figures heavily into the Ski Yellowstone energy formula is transportation to and from the remote vacation resort.

Electricity from the Fall River Rural Electric Cooperative in Idaho would supply energy for operation of the ski lifts and heating. The estimated power load, when development is complete, is 18,000 KW (Kilowatt). This compares with a peak load of 25,300 KW for the entire Fall River system (4,731 customers) as of 1975.<sup>56</sup> Fall River has applied to the Forest Service to build a new 115 KV (Kilovolt) power transmission line from Macks Inn, Idaho, to West Yellowstone. Currently the area is served by a 44 KV line that was built in 1947. In its Final EIS, the USFS notes the Teton dam, which collapsed in 1976, was one of the planned sources of electricity for Fall River.

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<sup>53</sup>Nybo, *op. cit.*, P.42.

<sup>54</sup>*Ibid.*, P.57.

<sup>55</sup>*Ibid.*, P.56.

<sup>56</sup>U.S. Forest Service, *Gallatin National Forest, FEIS, op. cit.*, P.122.

Fall River depends entirely on the Bonneville Power Administration (BPA) for more than 75 percent of its power with the remainder being purchased from Washington Public Power. The rural electric cooperative is one of BPA's "preference" customers. Preference customers are publicly owned utilities, including public utility districts, municipalities and cooperatives.

In a June 20, 1978 letter to the DHES, Fall River General Manager Calvin Wichham stated there is "no lack of ability to provide Ski Yellowstone reliable power." Future energy supplies in the Pacific Northwest remain questionable, however.

In testimony presented last year before the Senate Energy and Natural Resources Committee, Montana Senator Max Baucus (then a congressman) stated: "About half the (Pacific Northwest) region's electrical energy is generated by BPA. The demand for electricity in the region has grown beyond the level of assured hydro-electric energy. And growing demands by BPA's preference customers led it to withdraw firm energy sales from the region's investor-owned utilities in 1973 and to consider withdrawal of firm federal power sales from BPA's direct service industry customers as their contracts with BPA expire in the early 1980's."

Senator Baucus went on to say: "Moreover, BPA has notified preference customers that it may not be able to meet preference customers load growth after 1983."<sup>57</sup>

BPA's energy conservation officer, Don Davey, confirmed that statement to the DHES on July 31, 1978. Davey said energy consumption in the region has been increasing by about five percent annually and BPA cannot guarantee further increases to its preference customers beyond 1983.

In its letter to the DHES, Fall River added: "If it becomes law to restrict or discriminate according to class of consumer in the Northwest, Fall River will have to restrict those consumers on its system in this category (preference customers). Until this happens, it is Fall River's policy to serve all consumers in its service area without discrimination."

In commenting on the Forest Service's draft EIS, the Federal Energy Administration (FEA) said: "...it is highly probable that the hydroelectric capacity of the area will not be able to supply the increased demands for many years to come, especially with the loss of the Teton Dam. Gas and oil for power generation should be considered out of the question, and geothermal is too far into the future to depend upon as a viable source. This leaves coal as the only logical choice and the Forest Service should consider the availability locally in making a decision."

In its final EIS, the USFS declined to "...solve the problem of electricity supplies for the Pacific Northwest." The agency conceded its obligation, however, "to point out that energy will become increasingly expensive and scarce and that this may have an effect on the success of this project."

The Federal Energy Administration's (FEA) response to the final EIS said: "Either the cost or availability of energy will make or break the project."

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<sup>57</sup>Sen. Max Baucus' statement before the Senate Energy and Natural Resources Committee, Billings, Mt. May 19, 1978.

The FEA is also critical of energy projections made by the developers. According to the federal agency, "the 18,000 KW figure for operation of the facility is only a small portion when taken in context with the petroleum fuels for transportation and the demands for housing, sewage treatment, services, goods, etc., created by a new community and tourist development."<sup>58</sup>

The FEA called attention to a statement made by the Forest Service in its draft EIS: "Dependence on automotive travel will make tourism especially susceptible to fuel shortages and accompanying gasoline price increases."

The statement was made by Dr. Robert Lovegrove, regional economist for the USFS, Northern Region, who also said he feels the country is "...on the threshold of significant economic and social changes, i.e., the shortages of so many products, especially energy. The accelerating rate of inflation, along with these other factors may be expected to significantly alter the relative demand for distant recreation opportunities and second homes. The market for these types of developments is rapidly reaching the saturation point and projections based on historical trends are very suspect. It may be expected that trend patterns of the last 25 years will not be very representative of the next 25 years as productivity patterns and social values change noticeably. Consequently, economic analyses based on previous growth patterns, such as this, may be appreciably in error with the passage of time." (USFS Draft EIS, p.91) The authors of the draft EIS concede the national economy "has not been good" since 1974 and "an energy shortage with higher gas prices continues." The agency concludes, however, that skiing continues to grow in popularity and that "even if economic problems occur in this country, people will continue to ski for recreation."<sup>59</sup>

The DHES concurs with one conclusion reached by the Forest Service in its final EIS: "At the present time electricity is available for the proposed resort..." However, the evidence of future energy supplies is inconclusive.

#### Demands For Government Services

Since West Yellowstone already accommodates a swollen summer population, existing facilities and services should be able to handle the influx created by Ski Yellowstone, particularly during the winter months. The West Yellowstone Chamber of Commerce has stated its interest in promoting growth that better utilizes existing facilities "without changing the lifestyle of the residents." Although a large-scale, all-season resort is likely to generate more complete utilization of facilities and services, the Forest Service was quick to acknowledge that "...with the importation of several thousand people into the West Yellowstone basin, a change in the lifestyle of the area is quite likely."<sup>60</sup>

For some services, the proposed resort will rely entirely on West Yellowstone; in other cases, the developers plan to supplement existing services by providing their own on-site services.

Schools are generally among the first public services to feel the impacts of growth. However, since Ski Yellowstone will be a vacation resort, it is expected that only the children of year-round employees will be enrolling in West

<sup>58</sup>U.S. Forest Service, Gallatin National Forest, FEIS, op. cit., P.E-7.

<sup>59</sup>U.S. Forest Service, Gallatin National Forest, Mount Hebgen Management Alternatives, Draft Environmental Impact Statement, September 21, 1976, P.42.

<sup>60</sup>U.S. Forest Service, Gallatin National Forest, FEIS, op. cit., P.135.

Yellowstone's school system. The permanent population of Ski Yellowstone is ultimately projected to be 390, 70 to 80 of whom would be students. <sup>61</sup>

The trustees of West Yellowstone School District 69 have gone on record in support of the Ski Yellowstone proposal. It is the position of the school superintendent and other West Yellowstone officials that the increased tax base generated by Ski Yellowstone will compensate for any increased costs of additional enrollment.

In its FEIS, the USFS states that successful recreational complexes are largely export industries that cater to out-of-state visitors. According to the Forest Service, these enterprises can be expected to generate tax revenues "...substantially in excess of additional public service costs resulting directly from them."

Annual tax revenues generated by Ski Yellowstone are projected to reach \$1,688,000 upon completion of the project.<sup>62</sup> The USFS points out, however, there could be a tax lag during the first few years of development. The agency explains: "Property first appears on the tax rolls in March after a structure is completed, and is available for the next school year's levy. However, the construction workers may well send children to school while the structures are being built."

As of 1973, 190 students were enrolled in the West Yellowstone school system (140 students in elementary grades 1 through 8, and 50 students in high school, grades 9 through 12). Since then the enrollment has grown, with the 1978 enrollment totaling 235 students (164 elementary students and 71 high school students). According to the developers, the school system "could absorb an estimated 50 percent more elementary pupils and 100 percent more high school pupils."<sup>63</sup> The Forest Service agrees that the West Yellowstone school system has excess capacity and that, therefore, "...in the short run, additional enrollment resulting from the presence of Ski Yellowstone employees will add little or no cost to the schools." The USFS adds: "As enrollment increases, bottlenecks would appear requiring additional financing. As the enrollment approaches capacity, a good round figure, given present prices, for estimating costs per additional student is \$1,000 per student per year. Obviously, the increased tax base would more than cover this sort of expense."<sup>64</sup>

The developers plan to rely largely on their own resources for police and fire protection. However, as the Forest Service points out: "As the tax base increases, there might well be pressure for more public expenditures in this area."<sup>65</sup>

As of 1978, the West Yellowstone police force consisted of four fulltime policemen and two county deputy sheriffs. Its volunteer fire protection organization operated with two fire trucks. Ski Yellowstone plans to have its own security force, "augmented by the county sheriff," and its own fire truck and volunteer fire protection organization.

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<sup>61</sup>Ibid., P.76.

<sup>62</sup>Ibid., P.151.

<sup>63</sup>Ski Yellowstone, Inc., *op. cit.*, P.5-24.

<sup>64</sup>U.S. Forest Service, *Gallatin National Forest, FEIS*, P.154.

<sup>65</sup>Ibid. P.155.

It is expected Ski Yellowstone will benefit Yellowstone National Park by relieving the park of some of its overnight visitors. According to the developers, the park is looking to outside developments "...to provide overnight space for the increasing numbers of visitors who will continue to visit the area." The developers quote from the park's current master plan, which states: "Every encouragement and assistance should be given to the development of visitor overnight accommodations outside and within an hour's driving distance of the park." Conversely, Ski Yellowstone may draw visitors to the park that might not otherwise make the trip.

As far as general government services are concerned, both the West Yellowstone City Council and the Gallatin County Board of Commissioners have gone on record in support of Ski Yellowstone.

The impacts of Ski Yellowstone on other government services, such as streets and highways, sewerage and sanitation and health and welfare, are discussed elsewhere in this EIS.

#### Transportation Networks and Traffic Flows

The Mount Hebgen area is served year-round by two highways--U.S. 287 and U.S. 191. In the summer and early fall, U.S. 20 feeds into the area from the east through Yellowstone Park.

The area is also accessible by air, but only during the summer. A year-round, full-service airport is 86 miles north near Belgrade, Montana.

Seasonal service is also available by bus. During the summer and part of the winter, when Yellowstone Park is open, the Yellowstone Park Company provides daily bus service from Bozeman to West Yellowstone. When the park is closed, service is limited to about three trips a week. Also during the summer daily bus service is available from Idaho Falls, Idaho.

Car is by far the most common means of travel to the West Yellowstone area. Traffic on the roads that feed the Mount Hebgen-West Yellowstone area peaks in July and August.

Ski Yellowstone is situated north of U.S. 287, just a few miles west of the point where U.S. 287 meets U.S. 191 at the Duck Creek "Y." Highway 191 has considerably more traffic than U.S. 287, according to traffic counts compiled for the developers. It is the position of the developers and the Forest Service that with reasonable provision for leaving and entering the highway at the site of the proposed development, U.S. 287 "...should be quite adequate for foreseeable traffic needs with increased tourist traffic and the development planned by Ski Yellowstone."<sup>66</sup> The Montana Department of Highways (DOH) is deferring action on an approach permit application until all public involvement and environmental requirements have been satisfied.

Although traffic on U.S. 191, south of the "Y" has not reached capacity, according to the developers, traffic does become snarled during peak periods. At these times, traffic moves slower than 50 miles an hour. Between West Yellowstone and the Duck Creek "Y," however, U.S. 191 has "...very good capacity for

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<sup>66</sup>*Ibid.*, P. 56.

7,200 vehicles per day. This is about 2½ times current summer travel and many times present winter travel."

According to a USFS transportation analysis of U.S. 191, a major portion of the highway will be inadequate to handle future traffic needs. The study makes reference to a DOH report which projects a 240 percent traffic increase on the highway by 1996. This projection does not include a 30 percent traffic increase that is anticipated if Ski Yellowstone is developed. The Forest Service said portions of U.S. 191 "...are already approaching the critical category. Reconstruction to a higher standard may be required even at the present traffic loads. With a 240 percent projected increase in traffic, reconstruction of major portions of U.S. 191 is inevitable."<sup>67</sup>

Air service, which economist James Nybo describes in his market study as "extremely important to a destination resort," is provided year-round by Gallatin Field, 86 miles north of Ski Yellowstone. The nearby West Yellowstone Airport operates only four months out of the year, from late May to mid-September.

Gallatin Field is well equipped with all-weather facilities, including an instrument landing system, snow removal equipment and a new passenger terminal completed early last year. It is served by Northwest and Frontier airlines, as well as by charter and general aviation. Transportation from Gallatin Field south to Big Sky or West Yellowstone is available by private auto, rental car or bus. The airport has no data to estimate the numbers of passengers deplaning at Bozeman and traveling on to Big Sky or West Yellowstone.

To the south, there is also regular commercial jet airline service available at Idaho Falls, Idaho, and Jackson Hole, Wyoming.

The West Yellowstone Airport was completed in 1965. The \$1,284,000 jet airport was built on national forest land that was deeded to the state. It was jointly financed by the National Park Service and the Federal Aviation Administration. When neither the City of West Yellowstone nor Gallatin County would accept the responsibility for maintaining and operating the new airport, the State of Montana agreed to do so, signing a 20-year agreement that ends in 1985. Currently both Western and Frontier airlines serve the airport. The West Yellowstone Airport is the only state-operated airport in Montana that receives commercial airlines.

The 790-acre facility is two miles northwest of West Yellowstone. It is equipped with a full Instrument Landing System (ILS) on runway one and high-intensity runway lights. Soon it will receive lead-in lights. Year-round use of the airport would require snow removal equipment, construction of additional maintenance buildings and winterization of the terminal or construction of a new terminal, all at an estimated cost of \$2,787,000. The estimate, made in 1976 by the State Aeronautics Division, set yearly operational costs for an all-season airport at \$555,000. Annual airport user fees would amount to an estimated \$184,629.<sup>68</sup> The state will soon undertake a feasibility study to determine whether the airport should be converted to year-round use.

The Developers have not based their use projections and feasibility studies on the availability of a year-round airport. However, it is the opinion of at

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<sup>67</sup>Ibid., P. 57.

<sup>68</sup>Ibid., P. 55.

least one Forest Service economist that the "lack of air travel as a source of skier transport could be a limitation in the potential use of Ski Yellowstone. Dependence on automotive travel will make tourism especially susceptible to fuel shortages and accompanying gasoline price increases."<sup>69</sup>

In their environmental assessment, the developers attributed the "tremendous growth in the national skier market" during the 1960s, in part, to "improved air travel and highway networks significantly decreasing travel time to ski resorts." The developers concede accessibility to their project would be improved by winter operation of the Yellowstone Airport. But they believe the effect would be limited. They back their belief by this statement: "Analysis of the winter operation of the Jackson Hole airport revealed less than 10 percent of persons skiing at Jackson Hole travelled by air through the Jackson Hole airport. Because of the snow removal and weather problems at West Yellowstone airport, no consideration was given to the potential benefit of winter operation of its facilities."<sup>70</sup>

#### Locally Adopted Environmental Plans and Goals

Gallatin County has no comprehensive plan to guide growth and development in the county. In early 1975, subdivision regulations were adopted by the county. The Gallatin County Subdivision Regulations provide for subdivision regulation in accordance with the Montana Subdivision and Platting Act, Sections 11-3859 through 11-3876, R.C.M., and the State of Montana's Minimum Requirements for local Subdivision Regulations (ARM 22-2.4B(1)-S4100).

Without a planning staff or board, the county relies on a Subdivision Review Office, which acts in an advisory capacity to the Board of County Commissioners.

At the time Ski Yellowstone was proposed, no zoning existed in the Hebgen Lake area. Just last year (December 1977) the Hebgen Lake Final Development Plan and Zoning Ordinance went into effect. According to Gallatin County planners, the study was conducted as a basis for creating a zoning district in the area. The zoning ordinance, which covers the private land around Hebgen Lake, is based on the physical capabilities of the land. The intent of the landowners in creating the zoning district, according to local planners, was to maintain the aesthetic value of the area by promoting an orderly well-planned development.

Apparently, the planned unit development (PUD) proposed by Ski Yellowstone, Inc., meets the standard set by the Hebgen Lake landowners. Among the goals they set in their draft ordinance was "...the desirability of planned unit development for future subdivisions."

Although the Forest Service acknowledged the "importance and desirability of zoning to mitigate adverse impacts," the agency added: "...the denial or approval of a permit for Ski Yellowstone, Inc. will not hinge on the completion or adequacy of a zoning ordinance."<sup>71</sup>

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<sup>69</sup>Ibid., P.156.

<sup>70</sup>Ski Yellowstone, Inc., op. cit., P.5-30.

<sup>71</sup>U.S. Forest Service, Gallatin National Forest, FEIS, op. cit., P.135.

Outside of two other isolated zoning districts in the county, plus the zoning that exists in incorporated cities and towns, there are no countywide zoning standards in Gallatin County.

A major issue that has surfaced during the Ski Yellowstone review process is the prospect of secondary, spin-off development that might occur in conjunction with development of the resort.

In its draft EIS, the USFS stated: "Developments on private land stimulated by ski area construction on National Forest land have created the unexpected need for new water and sewer systems and other impacts on local governments, especially where private developments are not closely controlled by zoning." Borrowing from experiences elsewhere, the Forest Service added: "In Colorado's Pitkin, Eagle and Summit counties, where the renowned ski resorts of Aspen, Vail and Breckenridge are located, recent years have seen a shift from a ranching socio-economic base to a resort socio-economic base. In these counties there is a strong feeling among county commissioners that growth in the absence of zoning usually leads to a lowering of the quality of the area." The USFS concludes that the "...most vital consideration facing these counties is regulation of such growth to ensure retention of these natural scenic and outdoor recreation amenities which encourage the growth, a consideration equally important to all of the people there."<sup>72</sup>

The NPS reached a similar conclusion in its 1973 master plan for Yellowstone National Park: "...if recreation is to evolve into a permanent economic asset without damaging the environment, regional and local planning and subsequent zoning must be established and rigorously enforced."

It is the position of the Gallatin County commissioners that the Hebgen Lake zoning ordinance will control any spin-off development associated with Ski Yellowstone. In their findings of fact and order, the commissioners said creation of the zoning district, which would include "...not only the proposed subdivision but virtually all private land within the vicinity of Hebgen Lake," would "add immeasurably to the control and development of the entire area in the southern end of Gallatin County."<sup>73</sup>

Local planners agree that the land around Hebgen Lake is protected by the zoning ordinance, but add that a bloc of land west of West Yellowstone, on U.S. 191 to Idaho, is not included in the zoning district and could be impacted by secondary development.

Before the ordinance was passed, one of the corporate stockholders predicted that if the Forest Service denied the special use permit the corporation's land would be quickly disposed of, increasing the possibility of haphazard development. In his letter to the USFS, Pennsylvania stockholder John P. Hall said:

"I have looked among our shareholders and seen the psychic exhaustion caused by this long waiting process and can assure you that should this company not receive its permit for a ski area, there would be nearly no desire on the part of its shareholders to spend the substantial

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<sup>72</sup>U.S. Forest Service, *Gallatin National Forest, DEIS, op. cit.*, P.56.

<sup>73</sup>Gallatin County Commission's *Findings of Fact and Order*, Oct. 15, 1975, P.12.

additional funds to carry through a first-rate, low density, planned unit development in the professional sense of the word. Rather, I feel it is unfortunately true that my fellow investors, under such an adverse decision by the Forest Service, would try to recoup their investment dollars as quickly as they could with a minimum of consideration for the long-term impact of their land disposition. Obviously, this would result in a continued hodge podge development which characterized the village of West Yellowstone and much of the developments in the area."

The land now designated for planned unit development is zoned R-20 (one residential dwelling per 20 acres) under the new ordinance. Although local planners favor planned unit development as a sound planning concept, they regard the R-20 zone as a relatively safe alternative should the corporation withdraw its plans for development. The PUD classification gives local planners more authority over the actual design and construction of a development than other classifications, like R-20. According to the planners, private land around the lake is zoned for 5-, 10- and 20-acre tracts under the new ordinance.

The only other formal planning in the county has been conducted by the Forest Service. In 1975, the agency issued its final EIS on the Hebgen Lake Planning Unit. Mount Hebgen and the Red Canyon alluvial fan are in the planning unit, which covers 128,554 acres including West Yellowstone and the West Yellowstone Airport. The USFS drew up a 20-year management plan for the Hebgen Lake unit. Among the objectives of the plan were: to adhere to national forest policies and laws; to manage the land under a "fully integrated total land management concept;" to continue providing the public with quality recreation opportunities; to continue a level of timber production compatible with other land use capabilities, and to protect animal habitat "with a special emphasis on protection of threatened, endangered or unique species."<sup>74</sup>

The Hebgen Lake EIS had this to say about winter sports in the area: "Winter sports use in the planning unit will be permitted if the use is compatible with other important resources such as wildlife and a clean environment. Winter sports development proposals will be considered on a case-by-case basis. Their impacts on the environment and their worth in meeting objectives in the Hebgen Lake Unit Plan will be determinants in deciding whether they will be allowed."

The Hebgen Lake study was conducted largely with Ski Yellowstone in mind, according to the Forest Service. In its final impact statement, the agency said: "It is both necessary and desirable to judge localized land allocations in the light of long term direction for adjacent lands. Therefore, the Hebgen Lake Planning Unit Draft Environmental Statement, prepared and submitted in accordance with the National Environmental Policy Act of 1969, was judged to be the first step in the processing of Ski Yellowstone's application for a special use permit."

In 1958, at the request of local dude ranchers, sportsmen and other interested citizens, the USFS set aside a 224,000 wild area called the Hilgard Hold Area. The Southern boundary of the Hilgard Hold Area is three miles north of Mount Hebgen. The area is not a primitive or wilderness area. It has no legal classification. After four years of public hearings on the citizen request for this hold area, the Forest Service decided simply to "...stay out of the area with

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<sup>74</sup>U.S. Forest Service, *Gallatin National Forest, Hebgen Lake Planning Unit, Final Environmental Impact Statement*, Nov. 12, 1975, P.4.

roads and logging, except as they might be dictated by some emergency situation such as fire or serious insect infestation, so that a free hand may be taken after the facts are in, making the most of this area from a recreation and multiple-use standpoint."<sup>75</sup>

The USFS is also reviewing two areas in the Mount Hebgen vicinity for possible inclusion in the National Wilderness Preservation System. The Hilgard New Study Area, which covers 79,000 acres, lies 10 miles northwest of Mount Hebgen. The Lionhead New Study Area contains 18,000 acres on the Gallatin National Forest and adjoins the 13,900-acre Lionhead candidate area on the Targhee National Forest in Idaho.

The Taylor-Hilgard Wilderness Study Area is one of 10 Montana areas included in the Montana Wilderness Study Act of 1977. This area, which lies in the immediate vicinity of Mount Hebgen but which excludes the Ski Yellowstone special use permit application area, has been discussed elsewhere in this EIS.

The recognition of these special study areas by Congress and the public is a strong indication of the prime recreation resource that exists in this part of the State. Responsible planning will be essential to the protection and preservation of this valuable natural resource and economic asset.

#### Agricultural, Industrial and Commercial Activity

Although some livestock and timber production occurs in the Hebgen Basin, the recreation and tourist industry anchors the economic base. While Yellowstone National Park is the main attraction, Hebgen Lake and the Madison River Canyon Earthquake Area also attract a sizable number of visitors each year.

In its 1973 Master Plan, the NPS said: "Today recreation surpasses the agricultural and livestock industries as the economic base of the region. Visitors to Yellowstone National Park contributed an estimated \$57.7 million in gross expenditures to the surrounding economy in 1968...although summer recreation has been the traditional pattern, the increasing popularity of winter sports is leading to a stable year-round tourist economy."

The Forest Service estimated in the Mount Hebgen final EIS that about 90 percent of the working people living in West Yellowstone are employed in tourist-oriented jobs. As has been discussed elsewhere in this EIS, this tourist activity peaks during the height of the summer season. In their 1973 environmental study, the developers said there were approximately 200 people employed in West Yellowstone during the winter, compared with 250 unemployed.

In describing the economy of West Yellowstone, the developers stated: "The town owes its continued existence to the presence of the west entrance of Yellowstone National Park, which is located less than a mile east of town. For the last few years, the west entrance has been used by approximately 650,000 automobile visitors (about 30 percent of the park's total) yearly, and by around 80 percent of the over-snow vehicles entering the park (about 22,000 in 1972). All of these travelers must pass through West Yellowstone."<sup>76</sup>

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<sup>75</sup>U.S. Forest Service, *Gallatin National Forest, FEIS, op. cit.*, P.13.

<sup>76</sup>Ski Yellowstone, Inc., *op. cit.*, P.5-25.

It is the position of the developers that Ski Yellowstone would lend year-round economic stability to West Yellowstone's now seasonal tourist trade. In their socio-economic study, they say that although the increase in snowmobiling is beginning to provide the town with some winter activity, a large disparity between summer and winter activities still exists, and the Ski Yellowstone development would help provide greater year-round economic stability.

The USFS agrees that development of Ski Yellowstone would enhance the West Yellowstone economy. The agency adds, however, that "from the viewpoint of Gallatin County and Montana, only that part from outside the county or state can be considered to be 'new' money. For example, part of the visitors to Ski Yellowstone may come from other Montana ski developments such as Big Sky. To the extent that the winter visitor expenditures at the proposed Ski Yellowstone development would have been spent elsewhere in the Montana economy, they constitute a redistribution of economic activity within the economy and not an addition to it." (FEIS, p. 139)

The Forest Service does not attribute any of the anticipated summer business activity to Ski Yellowstone. The agency believes "...Ski Yellowstone would be sharing an already developed summer tourist market, not adding to it."<sup>77</sup>

Commercial timber and livestock production make up the balance of the economy in the West Yellowstone-Mount Hebgen area. Referring specifically to the Ski Yellowstone site, the USFS said in its Mount Hebgen Final EIS: "The development of Ski Yellowstone will produce recreational use of the site, replacing primarily its use for the production of wood fiber and red meat."

A sawmill in the area employs about 10 full-time and 30-part time employees. The mill manufactures 2 x 4s and 1 x 4s and chips the residues for shipment to wood products manufacturers. The sawmill cuts about 15 million board feet a year, purchasing timber from the Targhee, Beaverhead and Gallatin national forests.

There are no cattle or sheep grazing allotments on national forest land on Mount Hebgen or in Red Canyon, according to the USFS. However, about 500 head of cattle graze the private land on the Red Canyon alluvial fan during the summer.

Since cattle grazing on similar areas nearby require 2.8 acres per animal unit month (AUM), the USFS estimates the corporation's 980 acres has an approximate carrying capacity of 350 AUMs. "Therefore," the agency adds, "use of the Red Canyon alluvial fan by Ski Yellowstone would eliminate three months of summer grazing for 117 cattle."<sup>78</sup>

It is the position of the Gallatin County commissioners that the Ski Yellowstone spray irrigation plan will enhance the agricultural value of the land, however, future plans call for turning the hay field into a golf course.

There is no active mining in the area. However, traces of several minerals have been located. Mining is generally regarded to be economically unfeasible.

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<sup>77</sup>U.S. Forest Service, *Gallatin National Forest, FEIS, op. cit., P.139.*  
<sup>78</sup>*Ibid., P.167.*

It is unknown whether coal and oil exist in commercial quantities beneath the Red Canyon fan, according to the Forest Service. The agency adds, however, that it is "within the realm of speculation to consider that they may." There has been some interest expressed in leasing National Forest lands for oil exploration on the Horse Butte peninsula, just south of the alluvial fan.

The USFS reports that in 1910, it was "apparently deemed that coal could exist beneath the northern part of the Red Canyon alluvial fan." At that time, coal ownership was reserved by the United States. Phosphate was also reserved by the federal government in an area "...just northeast of the national forest land requested for a special use permit by Ski Yellowstone." (FEIS, P.168)

"It may be unlikely that there would ever be extraction of oil, coal, phosphate, or other minerals on the 1,880 acres of National Forest land and the 980 acres of private land involved in the Ski Yellowstone proposal," the Forest Service said. "Nevertheless, if mineral extraction were ever desired, construction of Ski Yellowstone would largely preclude this option during the foreseeable future. Although its use would likely be limited for aesthetic reasons, directional drilling for oil could possibly reduce the magnitude of the irretrievable commitment of this resource."<sup>79</sup>

#### Human Health

There is a consensus among those individuals and agencies that have reviewed the Ski Yellowstone proposal that development of the resort would improve medical services in the area. In reviewing the proposal, Dr. John Anderson, head of the Health Services Division, DHES said: "This is a rare instance in which a proposed recreational facility would probably improve medical care for the residents in the area. The increased population would be more uniformly distributed year-round providing a satisfactory economic basis for a resident physician at West Yellowstone."

Currently, West Yellowstone has a clinic that is owned by the city. It is 12 miles from the Ski Yellowstone site, and has two doctors. According to DHES health planners, the clinic appears large enough to handle "...any increase in workload brought about by routine health care to employees of Ski Yellowstone and injuries to skiers." The clinic has a large waiting room, three exam rooms, a private office, a room for lab equipment and X-ray, a storage room and rest rooms. It is equipped with laboratory equipment for routine lab tests, a portable X-ray unit, a defibrillator and an EKG (electrocardiogram) machine, plus exam tables and other furniture necessary for clinic functions.

Also available in West Yellowstone is a "well equipped and well staffed" volunteer ambulance organization, according to health planners. They reported that members of the organization are willing and able to provide the additional service that would be needed if Ski Yellowstone were developed.

The developers intend to build and maintain a first aid station at the ski hill, and will own and maintain an ambulance based at the hill. The ambulance would be used primarily to transport injured skiers from the hill to the clinic in West Yellowstone. If further transportation is needed, it would be provided by the West Yellowstone ambulance.

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<sup>79</sup>Ibid., P. 168.

If an injury cannot be handled by the West Yellowstone clinic, the most likely alternative would be the hospital in Bozeman, 89 miles away. Other medical facilities are available in Ennis, Ashton, Idaho, and Idaho Falls, Idaho. These locations require roughly from 2½ to 4 hours, round trip. It is the position of the DHES that because of this travel time, it is important that the ambulance operated by Ski Yellowstone restrict its runs from the hill to the West Yellowstone clinic, except in cases where it is needed as a backup.

The health planners also reported that the Madison Valley Hospital in Ennis is the nearest hospital facility to Ski Yellowstone and that, because of terrain and weather conditions, the highway to Ennis often has the best winter road conditions. Ennis' two physicians have stated they are both willing to provide emergency and routine health services in Ennis for patients from Ski Yellowstone.

Any dental care or dental emergencies would have to be taken care of in Bozeman, since the population of West Yellowstone is too small to keep a dentist busy full time. Dr. Arthur J. Terrill, chief of the Dental Health Bureau, DHES, adds, however, that "...the addition of the summer and winter visitors at Ski Yellowstone and the permanent staff that would be required to run the facility to the population of the area may attract a dentist into the community of West Yellowstone."

Another important public health consideration is the disposal of solid waste that will be generated by the Ski Yellowstone development. The developers plan to use the West Yellowstone sanitary landfill for solid waste disposal. Both the refuse hauler for the area and the landfill operator have agreed to haul and accept solid waste generated by the development. This plan has been approved by the state Solid Waste Management Bureau, DHES.

The West Yellowstone landfill is situated on national forest land about three miles north of West Yellowstone. A special use permit for 10 acres has been issued to the city, which in turn leases the site to a private contractor.

The state has been working with the Forest Service to investigate a leachate problem stemming from the landfill operation. USFS tests concluded that leachate from the landfill is contaminating the upper portion of groundwater in the area.<sup>80</sup> According to the study, concentrations of carbon dioxide, iron, manganese and lead have been found in test wells. There is also evidence that these contaminants are moving toward the Madison River. The soil within about a 20-mile radius of the site is a porous, permeable, obsidian sand that, according to the USFS, "...is not very effective in removing chemical contaminants from the groundwater."

The state Water Quality Bureau, DHES, acknowledges the leachate problem, but has concluded that, to date, it does not constitute a significant degradation of the water. The Forest Service is still monitoring groundwater in the area.

According to a spokesman from the Gallatin County Health Department, most officials agree the West Yellowstone landfill will ultimately be closed because of the leachate problem. A study is now being done in Madison County to consider

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<sup>80</sup>Harry Kringler, U.S. Forest Service, Gallatin National Forest, Engineering Report: Water Quality of Groundwater Near the West Yellowstone Sanitary Landfill, November 1977, P.8.

the feasibility of hauling solid waste from the West Yellowstone area to Madison County or, possibly, to the Bozeman area. Both the city of West Yellowstone and the National Park Service are participating in the study. The county health department spokesman said estimated volumes of solid waste from Ski Yellowstone will be included in the study to determine costs of hauling solid waste away from West Yellowstone.

#### PRIMARY, SECONDARY AND CUMULATIVE IMPACTS

The primary impacts associated with Ski Yellowstone will be the change in land use and loss of wildlife habitat.

The resort will change the land use in the Red Canyon area from primarily agricultural to recreational. Boating and fishing are popular on Grayling Arm and Hebgen Lake in the summer, but recreational activities drop sharply during the winter. Recreational use in the canyon is light now, but that will change with the advent of the ski and lake villages.

The concentrated recreational use will in turn effect wildlife habitat. In the villages, native vegetation will likely be replaced by more turf grasses and other domestic vegetation. Big game animals will probably leave and re-establish in more secluded areas. Small mammals and birds will likely stay, and in some cases, possibly become more numerous.

The secondary impacts created by the resort will include an increase in demands for local government services, possible alteration of air quality, use of energy and more year around use of recreational areas in and adjacent to Red Canyon.

The creation of Ski Yellowstone will create a need for more fire and police protection, and increase school enrollment.

Since electricity will be the power source for the resort, the amount of electricity for the West Yellowstone area will have to be increased. Some people will want to supplement electrical heating with a fireplace. Due to the geographic location of the resort and the weather, it might be necessary to limit the number of fireplaces to prevent air pollution problems.

The proximity of the resort to wilderness and primitive lands will increase the use of those areas.

Cumulative impacts include the potential increase of spin-off development and more recreation during the winter months.

In an attempt to control development generated by the creation of Ski Yellowstone a special zoning district has been created. This will enable local residents to control the type and direction of growth in the Hebgen Lake area.

The West Yellowstone and Yellowstone Park are popular spots for snowmobilers, and, more recently, cross country skiers, but the winter provides much less attraction than the summer. The addition of a ski resort will probably not generate the tourist interest experienced in the summer, but it will create more of a year-round recreational center.

## POTENTIAL GROWTH INDUCING OR INHIBITING IMPACTS

Ski Yellowstone will be a major growth inducing influence in the Hebgen Lake basin. It will attract many people who otherwise would not visit the area, especially in the winter.

If Ski Yellowstone is successful the land near the proposed resort will be attractive for development. This adjacent development could cause serious problems if it weren't for the special zoning district created in the Hebgen Lake area. This planning district will enable local people to determine the type and direction of growth for the area.

## IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL RESOURCES

Land use, aesthetics and wildlife habitat will be permanently changed. If care isn't taken to strictly adhere to plans, maintenance and monitoring, water quality might be degraded.

## ECONOMIC AND ENVIRONMENTAL COSTS AND BENEFITS

### Economic

- Benefits:
1. Tax revenues for Gallatin County will increase.
  2. There will be greater demands for local goods and services.
  3. Construction will create a short-term increase in jobs, and operation of the resort will create longer-term employment.
  4. The winter recreational opportunities will provide more stability to West Yellowstone's local economy.
  5. A more stable economy will improve community medical services.

- Costs:
1. There will be a need for more local government and human services, such as schools, law enforcement, fire protection, etc.
  2. There will be a loss of agricultural production.
  3. Although electrical power will be increased, the added consumption leads to more uncertainty for future guaranteed supplies of electricity.
  4. The cost of building and living will probably be higher than if the proposed project were situated near a major urban center.

### Environmental

- Benefits:
1. The removal of livestock from the Grayling Arm fan area may benefit water quality.
  2. The precautions taken by the developers to mitigate the degradation of natural resources will result in fewer problems than if little or no prior planning had taken place.
  3. There may be a lessening of public pressure for more development in Yellowstone National Park.

- Costs:
1. Development will cause a permanent change in aesthetics and land use.
  2. The character of the area will change from rural to suburban.
  3. Vegetation will change from native to more domestic types.
  4. Large mammals, such as grizzly bears, elk, moose and deer, will probably avoid the area in favor of more secluded areas.
  5. Ski Yellowstone will increase the chances of human/grizzly confrontations.
  6. Unless properly controlled, domestic pets will harass wildlife.
  7. The development is in an area which is prone to earthquakes.
  8. The utility servicing the development cannot guarantee electrical power for the life of the project.
  9. Travelers will have to depend on petroleum fueled transportation to get to the resort.
  10. The development will attract more people to the area who might not have the same lifestyles as the people living in the area.
  11. Taxes might not cover immediate demands placed on local government services.
  12. Historical and archaeological sites might be disturbed or destroyed.
  13. More pressure might be placed on the recreational resources in the area.
  14. Air quality might be effected.
  15. The resort will add to the problems of proper future solid waste disposal.

Short-term vs. Long-term Environmental Costs and Benefits

Short-term

Costs: There will be some degradation and disruption of land during construction of the ski village and the ski trails.

Benefits: Planning and construction will be done in such a manner to reduce the impact of the resort to the surrounding landscape.

Long-term

Costs: There will be a loss of wildlife habitat and the area will change in terms of character and aesthetics.

Benefits: The elimination of cattle from the Grayling Arm fan may benefit water quality.

## ALTERNATIVES

### 1. Disapprove Ski Yellowstone:

The area might remain as it is, or the development corporation might divide the land into 20-acre parcels, thus avoiding the state's review process.

### 2. Unconditional Approval:

Ski Yellowstone would be approved without any additional requirements.

### 3. Conditional Approval:

The DHES must receive and approve the following items before a certificate of plat approval will be issued:

- a. Final plans and specifications for the water supply and sewerage system including a time schedule for each phase of construction,
- b. Operation and maintenance plans for the water supply and sewerage systems that include descriptions of how ground water monitoring information will be utilized in the operation of the sewage treatment plant,
- c. Groundwater monitoring plans showing well locations, depths, sampling procedure and parameters to be monitored,
- d. Sediment control plans to include design details or control structures, streambank preservation and construction constraints, especially in areas effecting stream channel, and
- e. Legal documents establishing ownership and responsibility for construction, monitoring and maintenance of the water supply and sewerage systems.

The DHES also recommends that the developer seriously consider treating the water to reduce hardness, sulfates and dissolved solids.

## RECOMMENDATION

Based on the information in this EIS, the DHES recommends alternative three, conditional approval of Ski Yellowstone.

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