

LIBRARY
Montana State University
BOZEMAN

NEW SKI FACILITIES FOR BRIDGER BOWL

by Jonathan E. Coxwell

441

An under-graduate thesis report
prepared as a requirement for graduation.

March 9, 1967

P378
C8397

~~720.6~~
~~M76~~ ~~MA6340~~
C839

TABLE OF CONTENTS

TABLE OF CHARTS AND ILLUSTRATIONS:	3
INTRODUCTION:	4
CONDITIONS CREATING A NEED:	6
Crowded Conditions at Bridger Bowl; National Trends; Bridger Bowl; Footnotes.	
LOCAL CONDITIONS:	13
Geographical Conditions; Climatic Conditions; Economic Conditions; Social Conditions; History of Skiing in Bozeman; Footnotes.	
SITE CONDITIONS:	23
General Conditions; Existing Problems; Solutions; Footnotes.	
FUNCTIONS OF THE BUILDINGS:	32
The Lodge; Registration Area; Manager's Office; Lobby; Lounge; Cocktail Lounge; Restaurant and Lunch Cafeteria; Kitchen; Pro-shop; Nursery; Warming Area; First Aid Station; Ticket Office; Small Lecture Room; Other Areas; Overnight Guest and Personnel Accommodations; Employee Apart- ments; Employee Suites; Employee Lounge; Dormitory Areas; Individual Guest Units; Maintenance and Storage Complex.	
AESTHETIC CONSIDERATIONS:	41
The Setting; Aesthetics and the Site; Aesthetics and the People; Conclusions.	
ECONOMIC CONSIDERATIONS:	47
Bridger Bowl Ski Association; Future Expansion; Financial Capabilities of Bridger Bowl; Footnotes.	
CONCLUSION:	
BIBLIOGRAPHY:	

TABLE OF CHARTS AND ILLUSTRATIONS:

Map of Montana:	5
Riblet Double-Chair Lift:	7
Chart Number 1 - Total Skiers Served at Bridger Bowl:	8
Crowded Conditions in the Chalet:	10
Photo of Bozeman:	14
2400 Foot T-bar and 5000 Foot Chair Lift:	19
40 Meter Jump and Rope Tow Serving the Jump:	20
Congestion Around the Chalet, Ticket Office and Bottom of T-bar:	24
Existing Parking and First Aid Station:	26
Ski Association Proposal for Relocation of Facilities:	28
Map of Site:	30
The Setting:	42
Chart Number 2 - Comparison of Lift Fees:	48
Chart Number 3 - Gross Income at Bridger Bowl:	50
Chart Number 4 - Operation Costs at Bridger Bowl:	51
Chart Number 5 - Net Income at Bridger Bowl:	52
Chart Number 6 - Preliminary Cost Estimate:	55

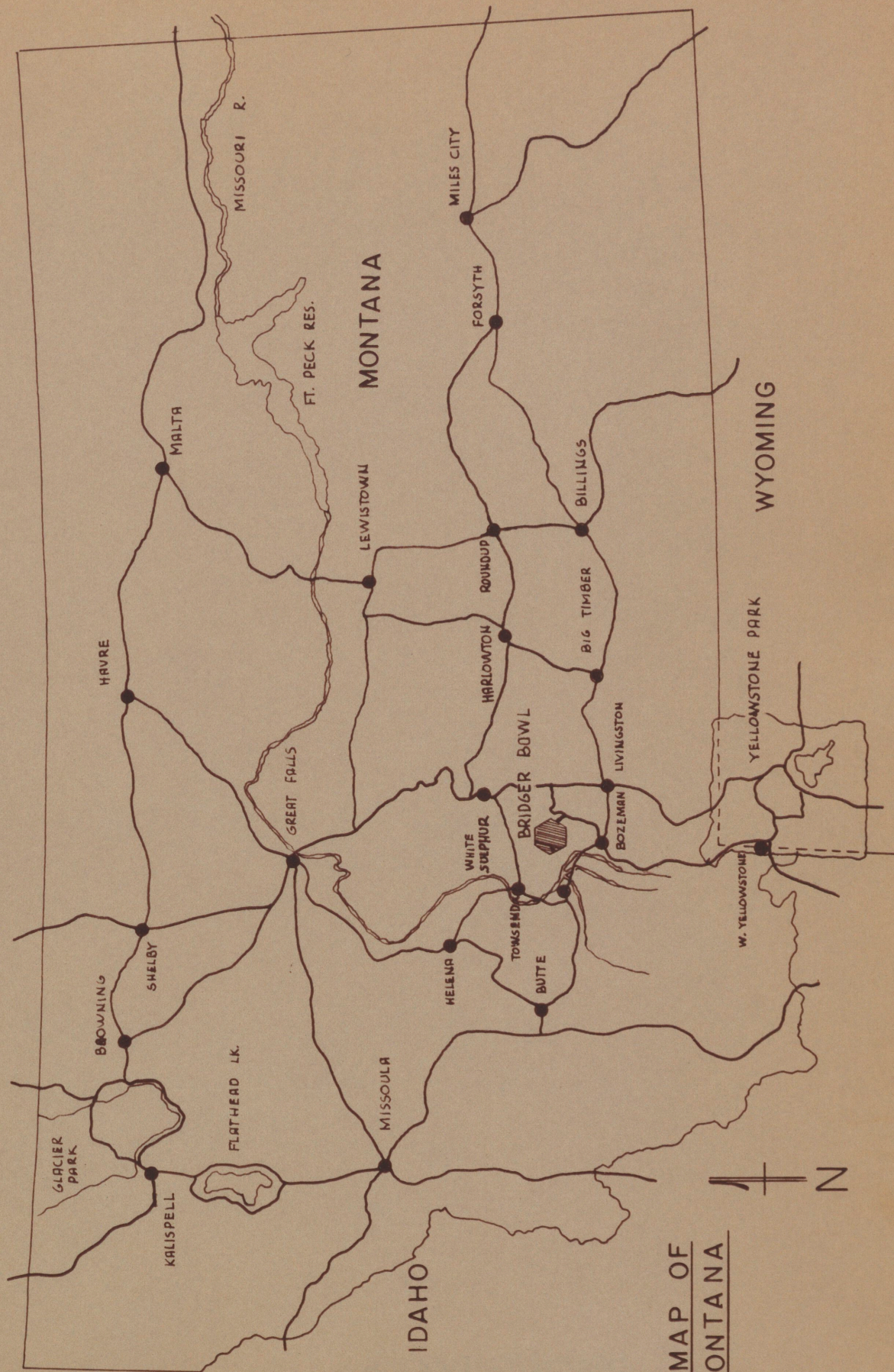
INTRODUCTION:

The tourist industry in Montana has proved to be one of the largest. Montana has superb hunting and fishing areas, breathtaking mountains, and a number of excellent summer and winter recreation areas. The state is scattered with deserted mining towns steeped in western history, and it contains parts of two spectacular national parks. At the present time some Montana communities, such as West Yellowstone, are almost completely supported by the tourist dollar.

Bozeman, located in southwestern Montana, receives a major portion of Montana's summer and winter tourist trade. This Montana city lies on a major route to Yellowstone National Park. The near-by mountain ranges offer hunting and fishing opportunities. An excellent winter recreation area, called the "Bridger Bowl", exists only 20 miles from Bozeman.

The Bridger Bowl is presently one of the best ski areas in Montana. It has a potential of becoming one of the best winter recreation areas in the western United States. This report, prepared as part of an undergraduate thesis in architecture, is concerned with the future development of facilities at the Bridger Bowl. This development would enable Bozeman to attract an even greater portion of the winter tourist business.

CANADA



MAP OF
MONTANA

CONDITIONS

CREATING A NEED

CONDITIONS CREATING A NEED:

Crowded Conditions at Bridger Bowl:

The Bridger Bowl ski area is located 20 miles north-east of Bozeman in the scenic Bridger Canyon.

This area, first opened in 1954, has proved its potential as a top winter recreation area. A high annual snow fall and excellent snow conditions during the months of December through April insure long skiing seasons.

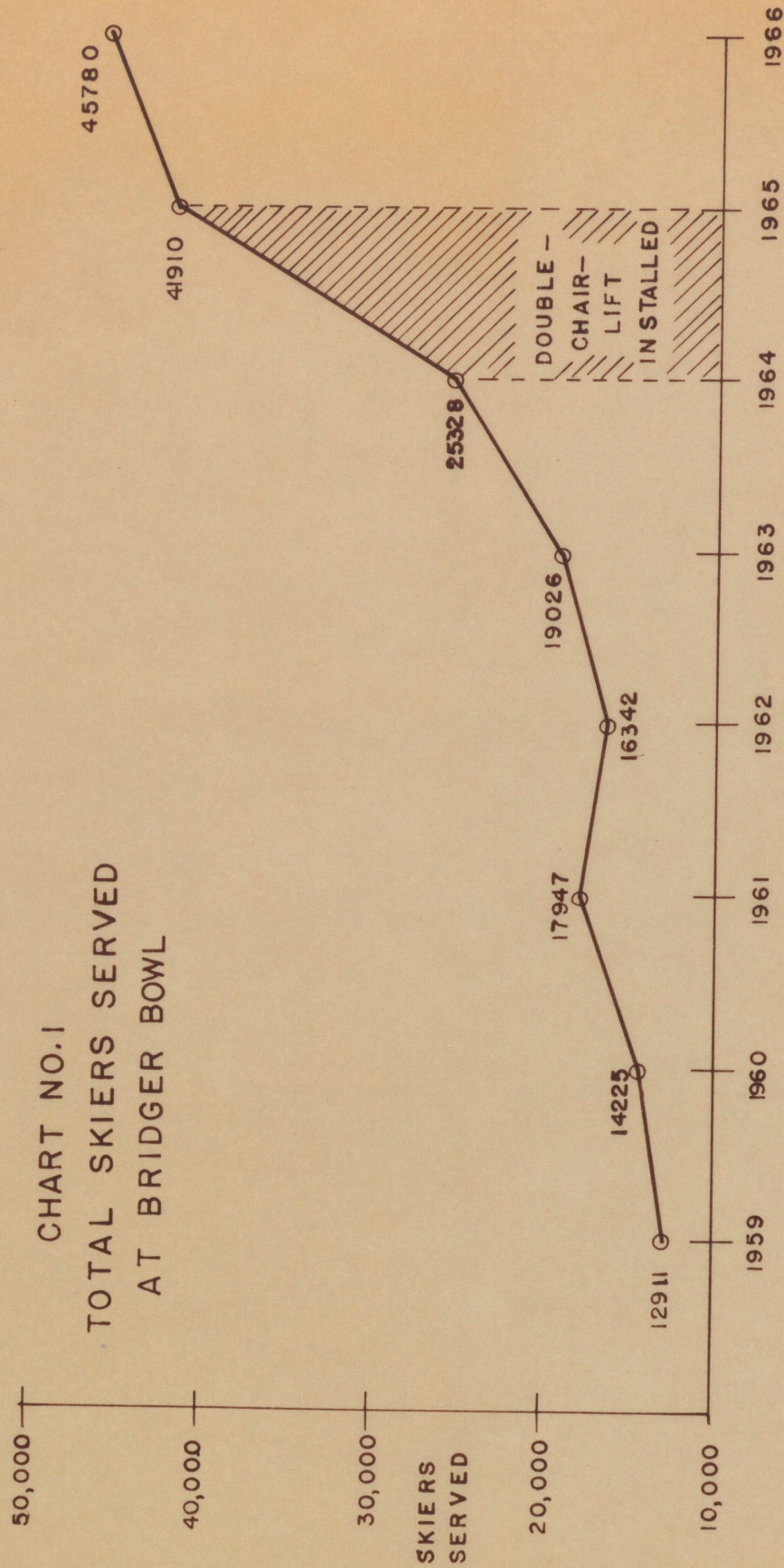
Since the opening of the Bridger Bowl, this area has steadily increased in popularity. In 1962, 8 years after the area opened, the Bridger Bowl was serving 75 to 100 weekday skiers daily and 400 to 450 weekend skiers daily.¹ The total number of skiers served in 1962 was 16,342.** In 1966 the Bridger Bowl was serving 250 to 300 weekday skiers daily and 900 to 1000 weekend skiers daily.² The total number of skiers served in 1966 was 45,780.** An interesting fact to note is the increase in total skiers served between 1964, before the installation of a double-chair lift, and 1965, after the installation. In 1964 the Bridger Bowl served 25,328 skiers, and in 1965 the area served 41,910 skiers. This one-year increase of 16,582 skiers was almost equal to

**See Chart Number 1.



RIBLET DOUBLE-CHAIR LIFT
INSTALLED IN 1964





COURTESY OF OSWALD BERG, ARCHITECT
BOZEMAN, MONTANA

the total skiers served in 1962. However, the same buildings, which served the area since 1959, are still the only buildings which serve the Bridger Bowl today.

A building program at Bridger Bowl is long overdue. Arthur Nordling in his 1962 thesis report, entitled Redevelopment of the Bridger Bowl, said, "Although the lodge is relatively new, weekend crowds are almost cramped within its spaces."³ One can easily understand the present very-cramped conditions that exist with over twice the weekend crowds which were experienced in 1962.

National Ski Trends:

Increased winter recreation activities are not only evident at Bridger Bowl, but an increase may be seen all over the United States. A survey of the 1965-1966 Vermont ski market stated:

This 1965-66 survey indicates a considerable growth of the Vermont ski market on both the demand and supply side. The demand side has been growing both in terms of the number of skiers and definitely in terms of average expenditures per skier-day.⁴

The report indicated that the primary means of transportation to and from areas was by automobile. It also indicated a trend toward longer stays at areas, more ski vacations, and more apres-ski activities. Snow conditions, ski facilities, and lodges were listed respectively as the three most important factors which draw people to an area.⁵



CROWDED CONDITIONS IN THE CHALET



Another report, prepared in 1964, entitled Ski Resorts in the Ninth District**, contains some information which can more easily be related to Bridger Bowl. This report indicates that a large majority of skiers are willing to pay premiums for chair-lift facilities and shorter lift lines.⁶ The report indicates that Montana and North Dakota have higher capacity-utilization percentages than most other areas within the district.⁷ The report says, "Judging from the number of lift tickets sold, ski slopes of the district were utilized 20% more each year in the last two seasons than in the previous three."⁸

Bridger Bowl:

Chart Number 1 and the above mentioned reports indicate that the Bridger Bowl will probably have a market for increased and added facilities in the future. The board of directors of the Bridger Bowl Ski Association have estimated an annual increase of skiers of 10%. The board is presently discussing a long-range plan for enlargement of the existing facilities. This enlargement would include the addition of two chair-lifts, which would more than double the present 1100 persons-per-hour capacity, and relocation of the base buildings to a site lower on the mountain.⁹ My thesis proposal is the design of the new base buildings and the immediate area around them.

**The Ninth District includes Montana, North and South Dakota, Minnesota, Wisconsin, and northern Michigan.

The new buildings will include a warming area, a cafeteria, a restaurant, an equipment sales and rental shop, a cocktail lounge, a nursery, overnight guest accommodations, personnel accommodations, and maintenance equipment storage areas. These facilities will enable the Bridger Bowl to meet its present skier demands more adequately, as well as to attract more skiers and ski vacationers. The facilities will also offer entertainment opportunities for non-skiers and a possible summertime convention center for the Bozeman area.

Footnotes:

1. Arthur A. Nordling, Redevelopment of the Bridger Bowl, pp. 4.
2. Gib Widmer, interview on 12 Jan. 1967.
3. Nordling, Op. cit., pp. 21.
4. Herbert Gebelein and Phillip Willis, The Vermont Ski Market 1965-66, pp. 24.
5. Ibid., pp. 4, 5, 11.
6. Richard F. Budolfson, Ski Resorts in the Ninth District, pp. 7.
7. Ibid., pp. 14.
8. Ibid., pp. 1.
9. Widmer, Op. cit.

LOCAL CONDITIONS:

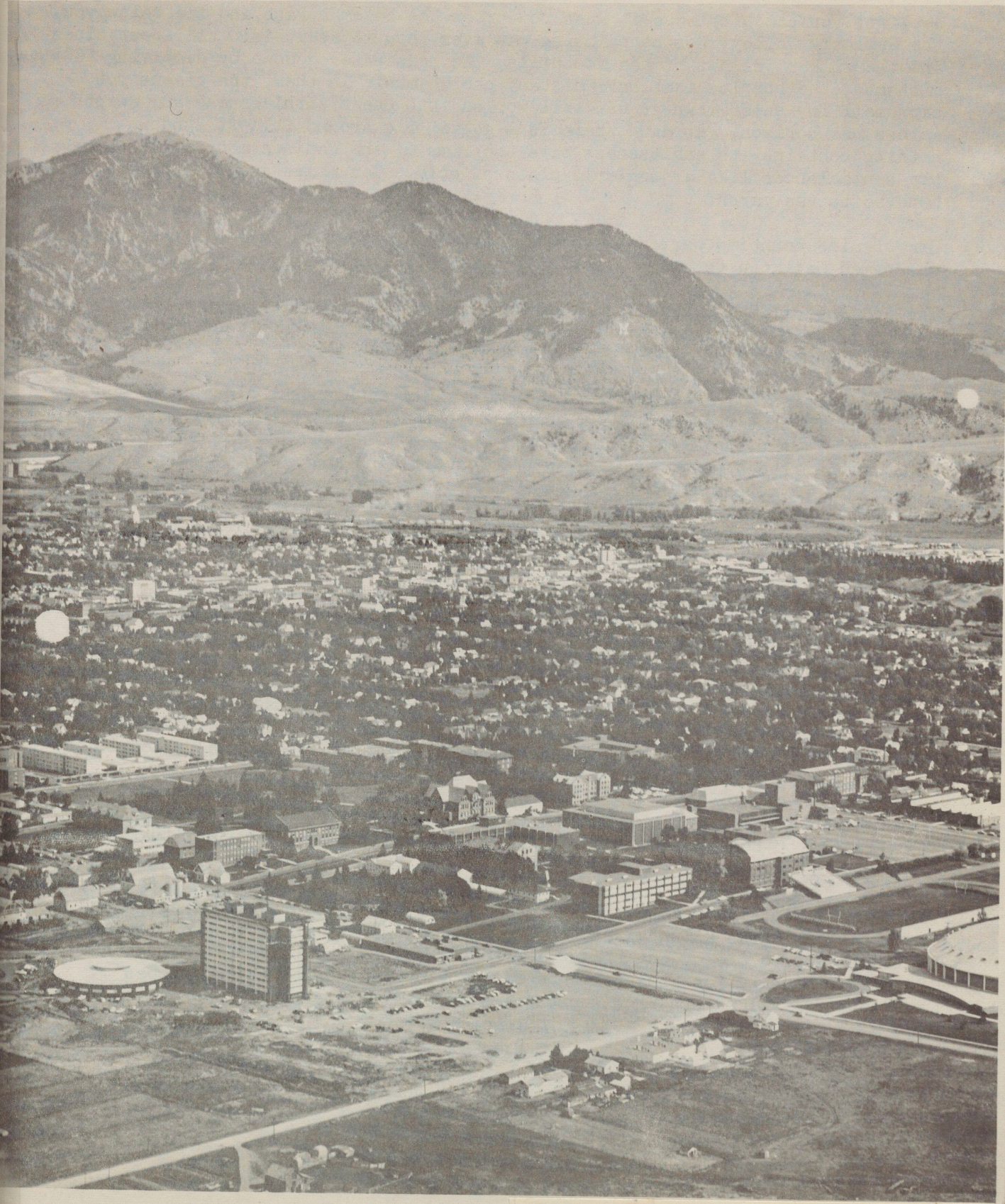
Geographical Conditions:

Bozeman is located in the Gallatin Valley, in the southwest portion of Montana. The estimated population of greater Bozeman is presently 18,000, not including single students at Montana State University.¹ The Northern Pacific Railroad, Northwest Orient Airlines, Greyhound Bus Lines, Belt Mountain Transportation Company and Karst Stage offer passenger transportation to and from Bozeman in all directions.¹ Freight is carried in and out of Bozeman by means of the Northern Pacific Railroad, Milwaukee Railroad, Northern Pacific Transport Company and Garrett Freight Lines, Incorporated.¹ Two main highway systems, U.S. Highway 10, or Interstate 90 east and west, and U.S. Highway 191 south serve Bozeman with connections to U.S. Highway 89 north and Montana highway 287 north.¹

Bozeman is 140 miles west of Billings, 90 miles east of Butte, 190 miles south of Great Falls, and 90 miles north of Yellowstone National Park. Its exact geographical location is 45° 42' north latitude and 111° 3' west longitude at an elevation of 4950 feet above sea level.² Mountains rise up on three sides of Bozeman with the west slope of the Bridger Range extending nearly into the city.

PHOTO OF BOZEMAN

Mountains rise up on three sides of Bozeman with the west slope of the Bridger Range extending nearly into the city.



The Bridger Bowl Ski Area is located just 20 miles northwest of Bozeman in the Bridger Range. It lies on an east slope at an elevation of about 6500 feet above sea level. The area is served by Montana Highway 293, a combination oil and improved gravel highway.

Climatic Conditions:

The climate of the Gallatin Valley is rather cool and dry. The annual mean summer temperature is 66.5° F., and the annual mean winter temperature is 24.3° F. The average precipitation in the area is 17.6 inches of moisture, and the average snow fall is 40 inches.³ The humidity very seldom reaches an uncomfortable level, however, extreme cold spells with temperatures below 0° F. are common for short periods of time.

Being on the east slope, the Bridger Bowl is protected from the prevailing southwesterly winds and direct sunshine during the warmest parts of the day. These conditions mean maximum retention of snow to insure longer skiing seasons.

Economic Conditions:

Gallatin County and Bozeman are supported by three main economic activities--Montana State University, agriculture in the form of wheat and cattle, and

tourism. Montana State University is the largest single business in the area. The university was founded in 1893 as a land-grant institution.⁴ It has since grown to a size of about 6000 students and is expected to nearly double in the next 30 years. The economic impact of the institution has given the Bozeman area a real boost. The university not only draws state and federal funds to Bozeman, but it also draws people and their money to the area in connection with various campus activities, entertainment features, and conventions. Montana State University officials estimate that the school contributes \$22 million annually to the economy of Bozeman.⁵ The university is also important to the development of the ski area. Besides a goodly number of students and faculty who ski during their free time, Montana State University supplies about 100 skiers daily to the area in the form of health and physical education classes.

The largest economic activities of the Gallatin Valley, the activities responsible for the founding of Bozeman, are the various agricultural industries. Most of Montana's early communities were formed as mining communities, however, some early pioneers realized the need for a supply depot for the mining communities and settled in the rich Gallatin Valley. The valley became the granary for such communities as Bannack, Virginia

City, Diamond City, Castle, Helena, and Butte; the valley became known as "the Egypt of America".⁶ Bozeman, founded in 1864 by John Bozeman, W. J. Beall, and D. E. Rouse, became the main supply center for the Gallatin Valley.⁶ Since that time agriculture has remained the Gallatin Valley's and Bozeman's largest source of economic growth.

Bozeman's third major economic income is tourism. The area is just beginning to feel the real impact of this industry. Bozeman and the Gallatin Valley offer wildlife and excellent trout streams to attract the hunter and fisherman. The area offers magnificent mountain scenery and historical points of interest, such as the three forks of the Missouri, for the enjoyment of the sight-seers. The nearby Bridger Mountains offer a winter recreation area with an excellent potential, and the Gallatin Canyon offers an entrance to Yellowstone National Park. Tourism is gradually growing in importance. With increases of leisure time among the citizens of our country, it will continue to grow in economic importance in Montana and in Bozeman.

There are other industries such as mining and lumbering which add to the Gallatin Valley's economy, but the university, agriculture, and tourism are the three great contributors.

Social Conditions:

There are two main social communities in the Gallatin Valley, the rather conservative, rural, agricultural community which makes up the rural areas around Bozeman and the more liberal urban Bozeman community composed of professional people, business men, and a labor force. National trends indicate new methods and machinery will cause a decrease in the proportion of rural population to urban and suburban population. This is an important factor when considering the future development of recreational areas. Simply stated, the proportion of people with more leisure time is increasing. Future facilities of all sorts must be built to accommodate these people and their leisure time.

History of Skiing in Bozeman:

The first organized ski run in the Bozeman area was located in Bear Canyon, 10 miles southeast of the city. This run, organized in 1939 and sponsored by the local Kiwanis Club, was quite small and consisted of a very steep rope tow.⁷ Gib Widmer and other interested skiers felt the need for a better area which would offer better snow conditions, a longer ski season, and better possibilities for future expansion. In 1946 a search began for a possible area. A natural



2400' T-BAR AND

5000' CHAIR LIFT





40 METER JUMP AND

ROPE TOW SERVING THE JUMP



bowl was discovered in the Bridger Mountains which would require little clearing and offered a good orientation for a ski area. However, little development occurred in this area until 1954.⁸ At that time a non-profit corporation was formed and with contributions from interested citizens, a road was cut into the area and a 2400 foot tow was constructed by volunteer labor. Since that time a new 5000 foot chair lift, a chalet, and a 40 meter jump have been added. Future plans for the area include the addition of two more chair lifts and a new chalet. The Bridger Bowl area now boasts one of the finest ski schools in the northwest and is host to several state competitions each year. In 1968 the area will host the Junior National Ski Competitions.

Footnotes:

1. Bozeman Chamber of Commerce, Basic Information for Bozeman, Montana, Gallatin County and Trade Area, pp. 2.
2. Arthur A. Nordling, Redevelopment of the Bridger Bowl, pp. 5.
3. E. K. Hoover, Preliminary Research for New Married Student's Housing for Montana State College, Bozeman, Montana, pp. 16.
4. Robert G. Dunbar, "The Economic Development of the Gallatin Valley".
5. Chamber of Commerce, Op. cit. pp. 3.
6. Ibid. pp. (back of cover sheet).

7. Professor David Wessel, Professor of Architecture,
Montana State University, personal interview 12 Jan. 1967.

8. Nordling, *Op. cit.*, pp. 19.

SITE CONDITIONS

SITE CONDITIONS:

General Conditions:

The Bridger Bowl Ski Area is located on the east slope of the scenic Bridger Range. This area is extremely fortunate because of the excellent snow conditions which exist throughout the winter. As the prevailing west winds crossing wide Gallatin Valley strike the Bridger Mountain Range, they are forced upward and cooled. Any moisture present is precipitated and dumped on the east slope of the range.¹ In the winter this moisture is precipitated in the form of snow. The Bridger Bowl receives approximately 6 to 8 feet of snow annually.¹

The high west wall of Bridger Canyon, on which the ski area is located, offers a great deal of protection from the sun or wind. This is an important factor to consider as it insures better quality of snow. The lower slopes of the canyon are quite gentle and are rather heavily timbered. As the canyon wall rises the slope becomes steeper and less timbered, ending in a knife-blade ridge. The top part of the wall is quite hazardous due to avalanches in the winter months. This hazard has been reduced in the vicinity of the ski area by careful avalanche control carried out by the U. S. Forest Service and Montana State University. The site of the existing buildings is low enough on



CONGESTION AROUND THE CHALET,

TICKET OFFICE AND BOTTOM OF T-BAR



the mountain to avoid any avalanche danger;² however, other problems do exist at the present site.

Existing Problems:

The most immediate problem is a lack of suitable terrain for the expansion of parking facilities. At the present time parking is extremely crowded. The present parking lots are situated such that entering and exiting are awkward. The only areas flat enough for expansion have soil conditions which would render them unusable during early and late seasons.²

Another problem closely related to the parking is access to the ski area from Montana Highway 293. The road up the mountain is steep, winding, and usually icy in the winter time. Considerable winter time maintenance is required at a great expense to the corporation. The road often becomes clogged on crowded weekends with automobiles unable to climb the hill or negotiate the icy turns.

Still another problem is the location of the chalet and other buildings with reference to the T-bar tow and the chair lift. The buildings are rather cramped together near the bottom of the original T-bar. Skiers using this tow must buck incoming traffic to the chalet, people purchasing tickets, and people putting on skis. There is very little run-off area to allow skiers to reduce their speed



EXISTING PARKING AND

FIRST AID STATION



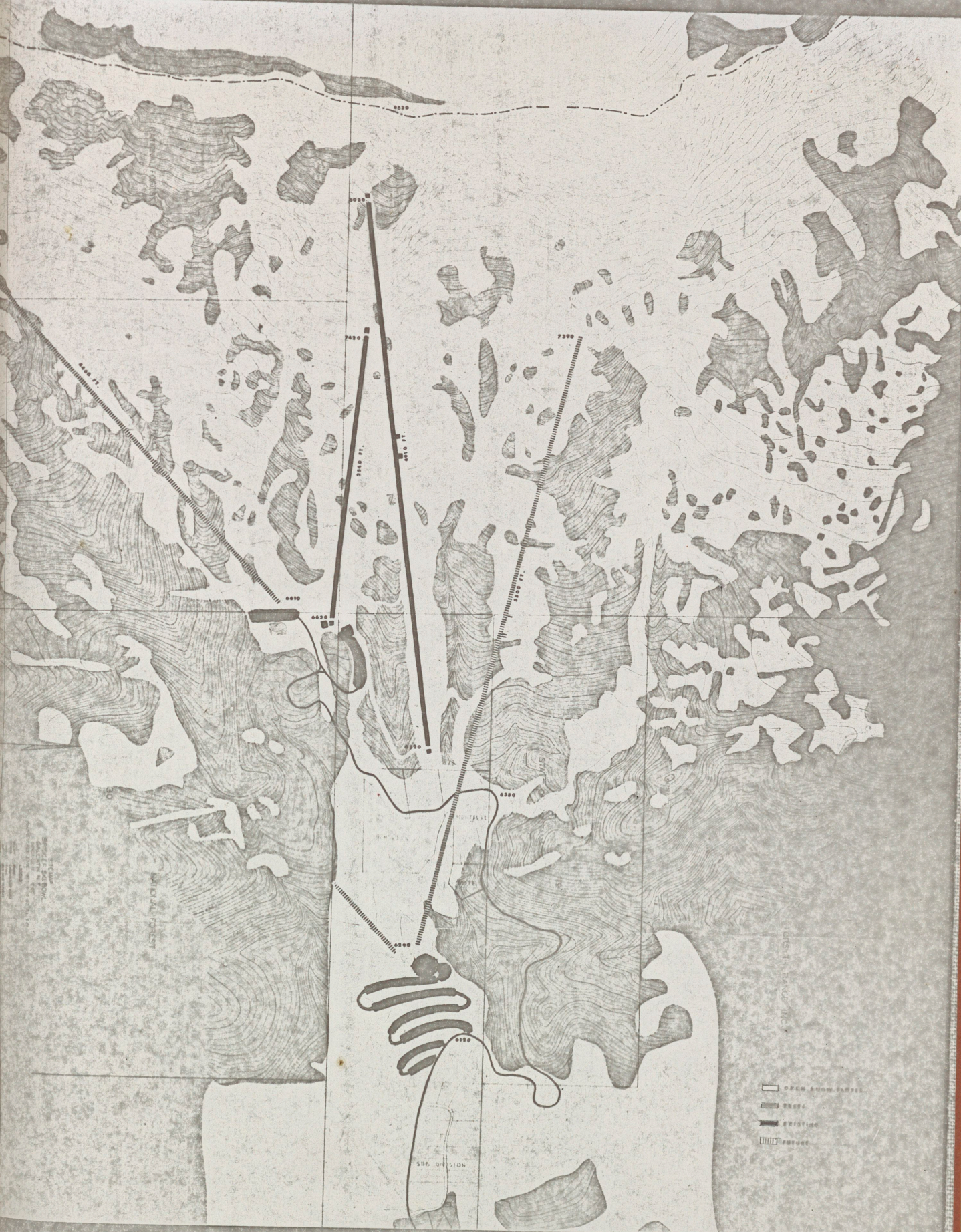
before entering this congestion. There is no direct access to first-aid facilities except through tow lines. The chair is well removed from the chalet. This does not hinder the skier, but it does discourage the non-skiing sight-seer from using this facility.

The last problem considered is the relationship of the present buildings to the entire area. The view of surrounding country is an important factor to popularity of a ski area. A spectacular view of the mountains and the area being skied attracts both skiers and non-skiers. This view can be an area's main source of advertising. The present chalet offers a view of only a small portion of the skiable hill and no view of the surrounding country.

Solutions:

These problems have induced the Bridger Bowl Ski Association to enlist the advice of the U. S. Forest Service and other people connected with winter recreation areas. Recommendations from these sources indicate that additional buildings and lifts be added to the area. Also, that the base buildings or facilities be located lower on the mountain.³ This location would offer several advantages.

One--There is much more area available for the



SKI ASSOCIATION PROPOSAL FOR RELOCATION OF FACILITIES

Courtesy of Oswald Berg, Architect, Bozeman, Mont.

construction of parking facilities than exists at the present site. Two--Most of the steep portions of the existing access road would be eliminated. Three--More room would be available for circulation around the buildings and lifts. The main chair lifts would begin near the chalet yet there is enough gently sloping area to allow lifts lines to form away from other traffic. Four--Proper location of the chalet would offer a view of nearly the entire ski area as well as the canyon floor below. Five--The lower location of the base facilities would open a new area primarily for beginning skiers. (At the present time beginning and intermediate skiers use the same slope. Some portions of this slope are too steep for beginners.) Six--A lower location offers a good beginning point for two new chair lifts which would open up more skiable area. These two lifts would primarily serve the intermediate skiers. It is the feeling of the association that these people make up the majority of the paying skiers. Seven--An easier access to the base facilities would encourage more non-skiing patrons to visit the area and to use eating and sight-seeing facilities. Eight--Location of base facilities lower on the mountain would be an enlargement rather than a replacement. The existing chalet would become a midway warming and eating facility relieving crowds at the base facilities.

Because of these advantages I have chosen a lower



MAP OF PROPOSED SITE

SCALE 1" = 300'

ROADS
PROPERTY LINES
CONTOURS
TIMBERED AREAS

site for my thesis design.

Footnotes:

1. Dr. John Montagne, M.S.U. Snow Studies, interview on March 2, 1967.
2. Ed Hastings, District Ranger, U.S. Forest Service, interview on Jan. 26, 1967.
3. Gib Widmer, Board of Directors, Bridger Bowl Ski Association, interview Jan. 12, 1967.

FUNCTIONS
OF THE BUILDINGS

FUNCTIONS OF THE BUILDINGS:

At the present the Bridger Bowl is primarily an area for skiers. On a Sunday the area will presently serve over 1000 skiers. The present facilities offer no real enjoyment for the non-skier. My thesis proposal is to design new facilities for the skiers, as well as facilities for spectators and sight-seers. These facilities should be designed not for the present needs of the area, but for its future needs after expansion. My thesis assumes that the lift facilities will be expanded by the Bridger Bowl Ski Association and the area will become more popular. The new facilities will provide for more skiing enjoyment, overnight stays, dining enjoyment for the public, and a relaxed apres-ski atmosphere where friends may meet and talk over the day's skiing.

The Lodge:

The lodge will be a focal point for the area. This building will dominate the base facilities, setting the character of the complex. It will contain a registration area, lobby, lounge, manager's office, cocktail lounge, restaurant and lunch cafeteria, kitchen, pro-shop, nursery, warming area, first aid station, ticket sales area, small lecture room, and restrooms. The lodge will be oriented to provide views of the ski slopes and the canyon floor below. The main entrance will be

easily accessible from parking areas. Other entrances and exits will provide access to and from the ski hill.

Registration Area:

Near the main entrance of the lodge will be located the registration area. This area will provide information and registration for overnight accommodations. The registration area will be close to the manager's office.

Manager's Office:

The manager's office will serve as a small conference area and business office. This office should be large enough for a desk, small conference table, and several chairs. It should be near the registration area and kitchen.

Lobby:

The primary circulation to the lounge, cocktail lounge, and restaurant will be through the lobby. This area will be near the entrance and registration area.

Lounge:

The lounge area will be a place for the day-time spectators to relax and watch the skiers on the slopes, as well as for the general relaxation of all in

the evenings. This area will provide comfortable seating, tables for cards, writing tables, a fireplace, and a good view of the ski slopes.

Cocktail Lounge:

A cocktail lounge will be provided for those who wish to partake of alcoholic beverages. This area will be near the restaurant so waitresses may easily serve drinks to people with their meals. The cocktail lounge should be large enough for 30 people seated at a bar and tables.

Restaurant and Lunch Cafeteria:

The restaurant and lunch cafeteria will actually be two distinct areas but will be served by the same kitchen. The restaurant will be large enough to serve about 80 people at one time, while the lunch cafeteria will serve several hundred in a short period of time. The restaurant will be located off the lobby, commanding a view of either the ski slopes or the canyon floor. This eating area will be primarily for overnight guests or non-skiing spectators. Three meals a day will be served and table service will be provided.

The lunch cafeteria will be primarily for the skiers. Only the noon meal will be served to guests, but employees will eat all of their meals in this area.

Because of the volume of people eating in this area, food will be served cafeteria style with no table service. The lunch cafeteria should be easily reached directly from the ski hill. This area will include tables, chairs, a food service counter, and vending machines for such products as cigarets, candy and soft drinks.

Kitchen:

The kitchen will serve both the restaurant and the cafeteria, and therefore be connected to both of them. It is important that this area have a direct outside service entry. The kitchen will contain the necessary equipment for both the kitchen and cafeteria operations, storage for non-perishable foods, and cold storage.

Pro-shop:

There is a demand for a certain number of small articles such as boot laces, goggles, hats, gloves, wax, and repair items. The pro-shop will provide a place for the skier to purchase these items and rent full ski outfits. There will also be a small repair shop and a display area in connection with the pro-shop. These areas should easily be reached from the lobby and from the ski slopes.

Nursery:

A welcomed service at an area such as Bridger Bowl would be a **nursery**. Many families with small children do not ski as much as they would like to because of the inconvenience and expense of hiring a baby-sitter. The nursery would be operated by the ski association as a service of the ski area. One or more responsible people would be hired to handle the children while the parents enjoyed themselves. This service should be located near the main entrance but out of the main flow of traffic.

Warming Area:

The warming area is an essential area to all ski resorts. At Bridger Bowl this area will serve several purposes. This area will be a place for skiers to put on their boots and store small equipment. This area will serve as a place for short rests during the day. The warming area will also serve as a sack lunch room for those who wish to bring their own lunch rather than purchasing a meal at the ski area. This will be the only area in the complex where sack lunches will be allowed.

The warming area will be a part of the main lodge complex. It should be easily reached from the parking areas and from the ski hill. The warming area should be given an outside view, preferably of the ski hill. It will have in it such equipment as

vending machines, lockers, benches, and a fireplace. The warming area should be finished with durable materials as it receives much punishment.

First Aid Station:

The first aid station will serve as headquarters for the ski-patrol. The station will be for the storage of ski-patrol equipment and administration of first aid to skiers. This area should be easily accessible from the ski hill and parking.

Ticket Office:

The ticket sales office should be near the warming area. This will be the place where all lift tickets and ski class tickets are sold. Several sales windows will be provided for fast service to the public.

Small Lecture Room:

A small room will be provided for use as a conference room or a lecture room. This room will be used by the manager, ski-patrol, and ski instructors.

Other Areas:

Some other areas, such as rest rooms, janitor facilities, and storage closets will be located throughout the lodge. Rest rooms will be located near the warming

area and the restaurant. Special rest rooms will be provided for employees. The janitor and storage areas will be located where they are needed.

The Overnight Guest and Personnel Quarters:

The overnight guest and personnel quarters will be a different complex of areas. This complex may or may not be physically connected with the lodge, but it will be easily accessible from the lodge.

Guest and personnel accommodations have been grouped together because these areas have things in common. They all demand some privacy; they all have similar functions. The building which houses these facilities should relate in character to the main lodge, but it need not have exactly the same mood. The different areas to be housed within this complex are two 2-bedroom employee apartments, three 3-man employee suites, a small lounge area for employees, two dormitory areas for guests, and 30 guest units for families.

Employee Apartments:

Two apartments will be provided for full time employees and their families. Each apartment will include two bedrooms, a kitchen, a living room and a bath. They will be located near the employee suites.

Employee Suites:

Three 3-man suites will be provided for winter employees. Each suite will provide sleeping quarters, storage for personal belongings and a bath.

Employee Lounge:

A lounge will be provided for the rest and relaxation of the employees. This lounge area will contain card tables, seating, a television set, ping-pong table and a fireplace.

Dormitory Areas:

There will be two dormitory areas designed into the complex, one for men and one for women. Each of the dormitories will sleep 20 guests and provide storage for their baggage and ski equipment. Toilet and shower facilities will also serve each of the dormitory areas.

The dorms will provide economical accommodations for visiting groups, college students, or other skiers. Dormitory accommodations are usually an attractive feature at ski resorts. This type of accommodation encourages the group sponsored ski trips.

Individual Guest Units:

The individual units will cater to the visiting families. These units will be much the same as a normal motel unit. Each unit will have a private bath, sleeping area, equipment storage area, clothes rack, writing table, and lounge furniture. The units will provide a cheerful place in which to retire after a day's skiing.

The Maintenance and Storage Complex:

Garages will be provided for the storage of snow removal equipment, snow cats, and other maintenance equipment. A maintenance shop will be located with the garages. This shop will be used for general servicing of equipment and repair work. These areas will be removed from the rest of the complex; however, the design will be harmonious with the rest of the buildings.

AESTHETIC
CONSIDERATIONS

AESTHETIC CONSIDERATIONS:

The Setting:

The setting of Bridger Bowl, as was previously mentioned, is in the Bridger Mountains. This majestic range with its razor-sharp peaks and timbered lower slope winds its way north and south. The mountains form an effective barrier isolating a fertile canyon from the urban Bozeman which lies only a few miles to the west.

The Bridger Canyon is a very beautiful place. It provides a home year round for deer, elk, and bear. It also provides recreation areas for the population of Bozeman, and for tourists. In the summer the canyon becomes a place where one may relax in a magnificent, lush, restful environment.

In the winter time the canyon offers a different type of environment. When a fresh blanket of snow covers the canyon floor, when large cornices of snow cantilever out from the high ridges, when the winter sun shines through the blowing snow which often veils the uppermost peaks, this fertile canyon becomes a fierce and awesome place. The untouched blanket of snow offers an exciting challenge to man's curiosity. It is for this setting that the new facilities will be designed.



THE SETTING



Aesthetics and the Site:

As a designer of facilities for Bridger Bowl, I feel I have two responsibilities. First, I must consider the mountains and the characteristics of the site. The Bridger Mountains are so large and spectacular that one should not hope to design a building which would compete with them. By this statement I do not mean to exclude contrast. Contrast is a very useful and practical design tool. I do mean that one should not ignore the character and scale of this area. The designer should remember that the buildings will not be a major point of interest with respect to the whole area, but only a small feature against the mountains. The U. S. Airforce Academy is existing proof of the abilities of rugged mountains to dwarf even large scale structures. This huge complex consisting of large 4-story buildings appears as small single story structures when viewed against the background of the rampart range of the Rockies.

The site for the buildings of Bridger Bowl is primarily an open area with timber on two sides. The site can be viewed in its entirety by people approaching on the road and by people skiing on the slopes above. Any buildings placed on the site will be easily seen. This will give me a chance to express, to people approaching the area, the function of various portions of the buildings.

through the exterior appearance. This can be achieved by varied massing and exterior wall treatment. It is my intention to provide the approaching visitor to Bridger Bowl an awareness of the location of the overnight accommodations, the main entry to the lodge and the location of the skier oriented facilities such as the ticket office and warming area.

The fact that the buildings will be placed lower on the mountain with the ski slopes above poses an interesting problem. Skiers on the slopes will have what is called a plan view or aerial view of the complex. Many buildings are never viewed except from the plane on which they are built and undesirable proportions in the plan view do not always become apparent. At Bridger Bowl, however, people will see the complex from above. This will require considerable attention to be placed on the plan view proportions.

Aesthetics and People:

The second responsibility I have as a designer is to consider the people who will use the building. I would like to give to the users a sense of excitement in the daytime for skiing is an exciting sport. This feeling can be achieved in different ways. Bright colors contrasting against the pure white snow, playing bright sunlit surfaces against deep shadows, and the use of dynamic shapes

and lines (shapes and lines which cause the eye to move) are some of the ways to create excitement in buildings.

I would also like to create a sense of shelter within the buildings. A mere roof and walls offer protection from the elements, but if the enclosed space feels and appears warm and protective it will be a more comfortable space. The use of intimate spaces, warm colors, warm lighting, solid textures, and plays of dark and light are ways of creating comfortable and interesting spaces.

Conclusion:

In conclusion I would like to clarify a few points made earlier in the chapter. In the first part of the chapter I spoke primarily about function or a feeling of function. One might conclude that this portion belongs in the chapter entitled "Functions of the Buildings". I do not feel, however, that one can easily separate aesthetics from function. In fact, function may well be one of the most important considerations of the designer. I hope I will be able to give those people who move in and out, about and through the spaces I design a real awareness of where they are going and what is happening in each area.

I have not thus far expanded on the particular

feeling I would like to achieve in each area or how I would achieve it. I do not believe I can, at this time because many of these will grow out of the basic design concept. I can only say that the general spacial feelings which I have indicated above should be present.throughout the complex. It is my hope to design a complex with an individual character and personality which can be enjoyed by all who use it.

ECONOMIC CONSIDERATIONS:

Bridger Bowl Ski Association:

The Bridger Bowl Ski Association is a non-profit organization which owns and manages the ski facilities at Bridger Bowl. The main objectives of the Association are to attract people to the Bozeman area in the winter time and also to offer Bozeman residents skiing facilities at as low a rate as possible.¹ Because it is a non-profit organization, all net incomes realized annually are put back into the ski area in the form of improvements and expansion. The Association is not paying dividends nor does it sell stock. Consequently prices are lower than those at most other areas.** What effect will this have on future expansion?

At the present time all facilities at Bridger Bowl, other than the actual skiing facilities are leased out to private firms. It is beyond the scope of this report to determine if this is the best situation for future operation. I will assume that the present type of management will continue to exist. The Bridger Bowl Ski Association will continue to control all the functions and facilities, and it will be responsible for the construction costs of new facilities.

**See Chart number 2

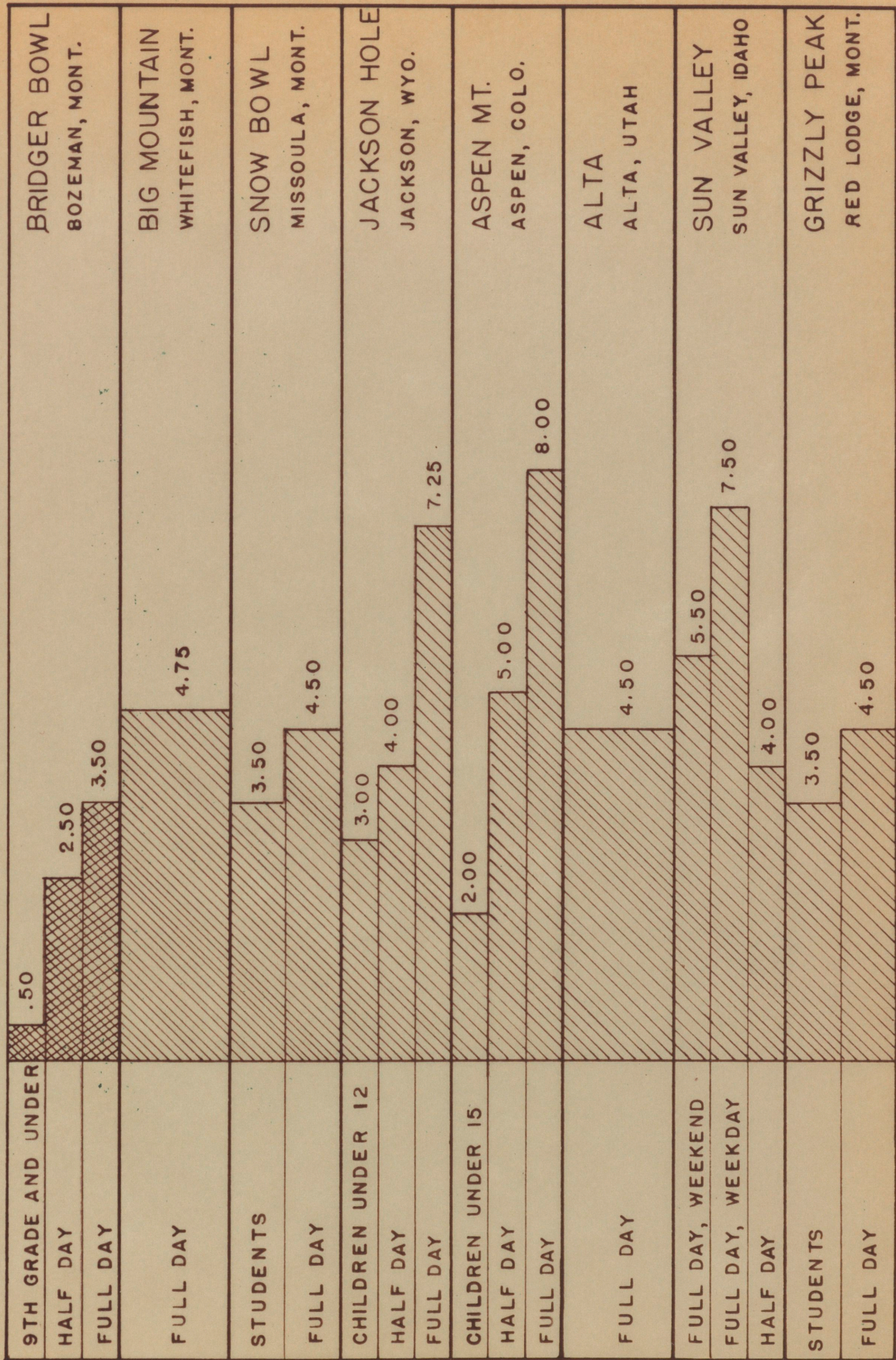


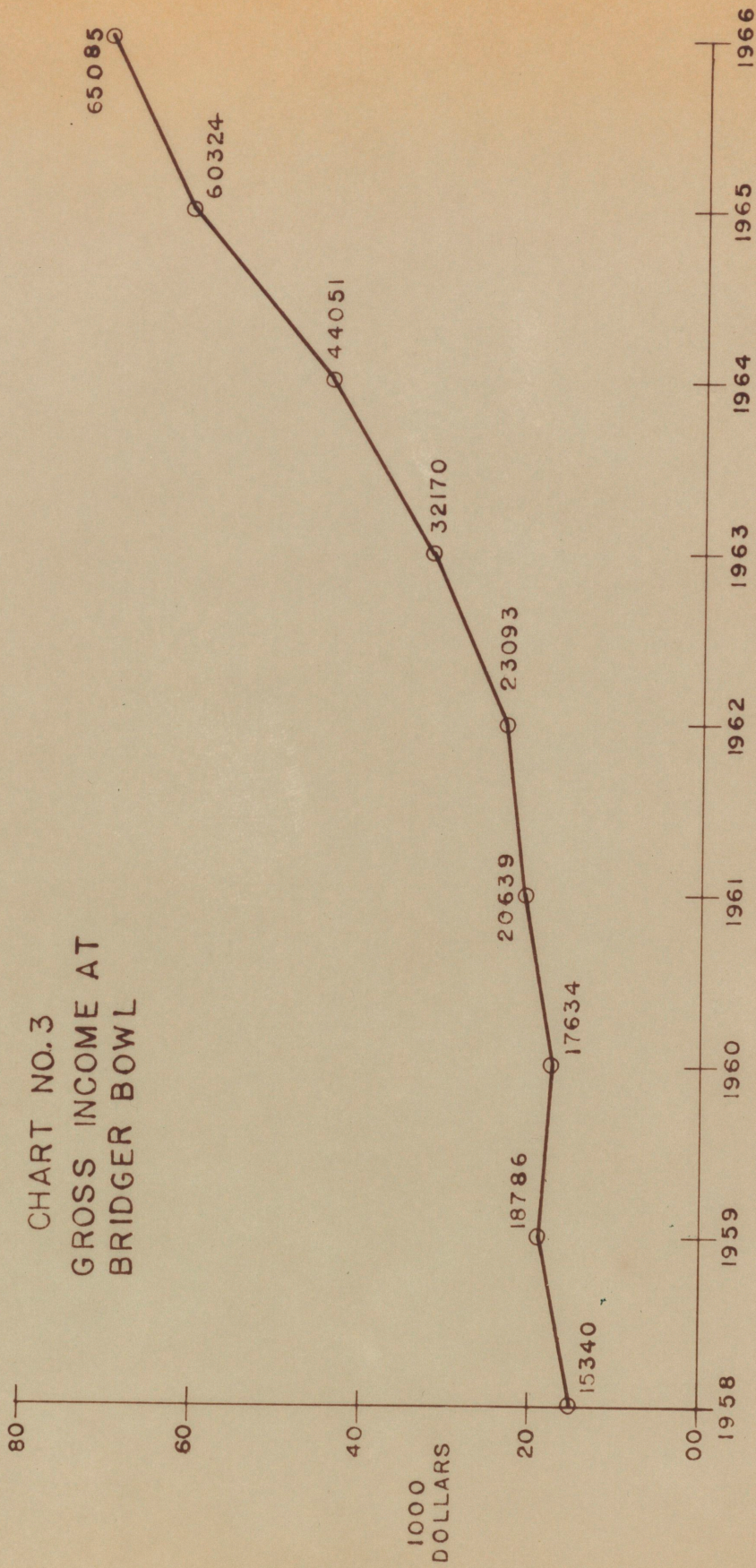
CHART NO. 2 — COMPARISON OF LIFT FEES

Future Expansion:

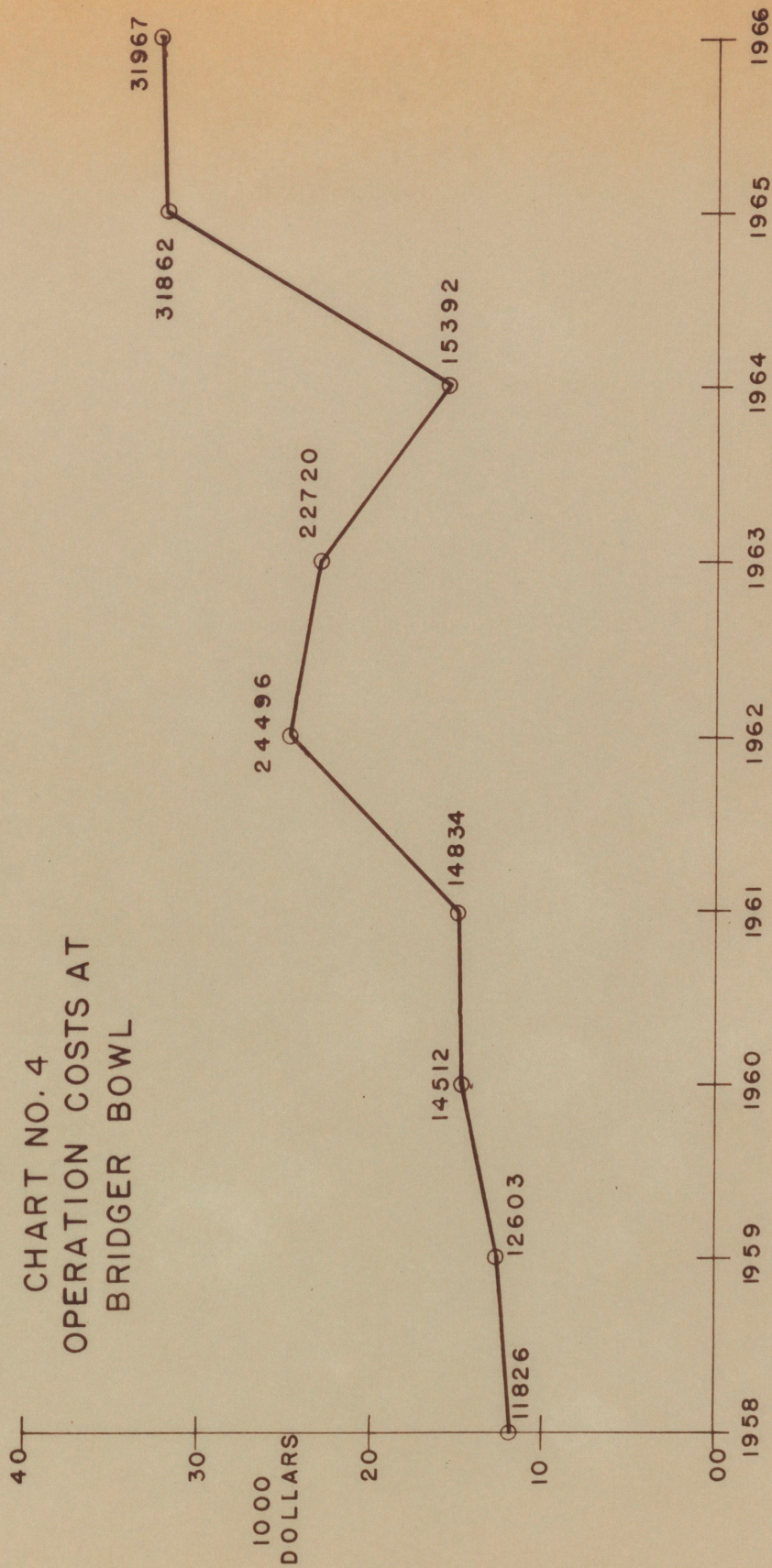
Before any business begins expanding, there should be an indication of an increasing market. Charts 1, 3, 4, and 5 show the growth of skiing at Bridger Bowl. These charts indicate that the present trend is toward an increasing ski market and economic base. In order to meet future market demands the Bridger Bowl Ski Association should and is planning to expand facilities. The Association probably would not be able to afford the total complex which I have outlined in this report; however, it could afford to build the complex in several stages as money is available.

The Bridger Bowl is rather unique in respect to its geography. This area if expanded continually into the future must rely on lateral expansion of lift facilities rather than vertical expansion. This presents a problem for the location of buildings.

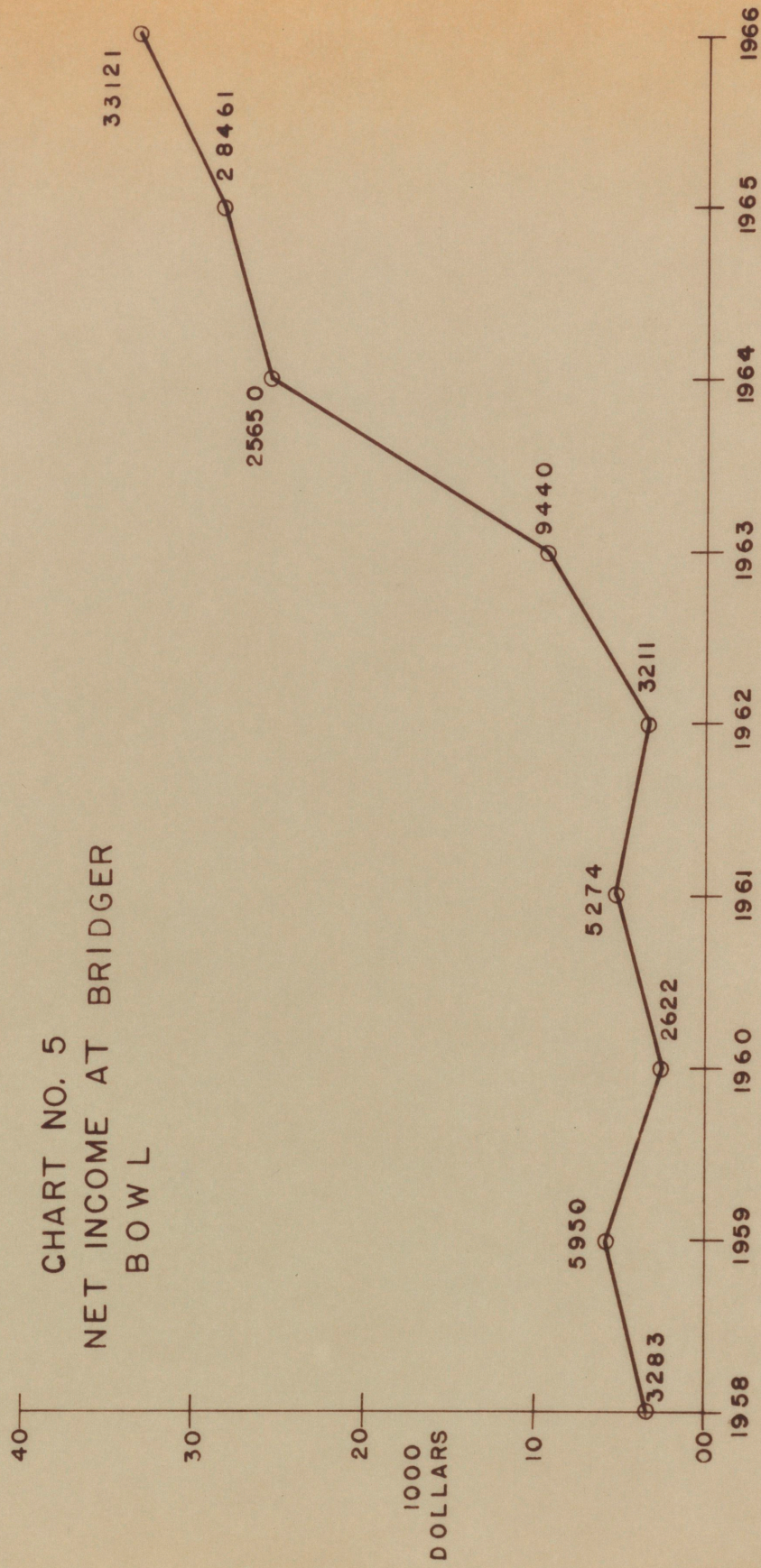
If the present area were to expand one or two miles on either side of the present facilities, the present or proposed buildings would not be adequate strictly from a location standpoint. For this reason I will assume that the proposed facilities, when completed, will serve and depend economically only on a particular area. As new areas are opened at Bridger Bowl, new facilities will be developed to serve them. My proposal will function as an entity and will not



COURTESY OF OSWALD BERG, ARCHITECT
BOZEMAN, MONTANA



COURTESY OF OSWALD BERG, ARCHITECT
BOZEMAN, MONTANA



COURTESY OF OSWALD BERG, ARCHITECT
BOZEMAN, MONTANA

be designed for expansion.

Some attention should be directed toward summer time use of the Bridger Bowl. At the present time the Bridger Bowl is only a winter recreation area. This will continue to be the primary function of the area; however, expansion of facilities would enable the area to realize some use during the summer months.

Montana Highway 293 is presently being surveyed for paving. Eventually the entire Bridger Canyon road (Montana 293) will be paved, creating a short, scenic route between Glacier and Yellowstone National Parks.² This would bring a considerable amount of traffic within a few miles of the Bridger Bowl. The area could then operate as a summer and winter resort, and develop its facilities for summer and winter use. With new facilities the Bridger Bowl could also function as a summer time convention center. If facilities were available Bozeman could bid for conventions which cannot meet here now, particularly those connected with Montana State University.

Something should be said about the economics of the individual parts of the complex. A survey of ski areas in Vermont indicates that the average daily expenditure of a skier is \$24.47. Of this amount \$6.86 is spent for lifts and lessons; the remainder is spent for food, lodging, and other entertainment.³

The actual amount may not be the same in Montana, but these figures give an indication of the proportions spent for services other than skiing.

Function of space	Square feet
Motels or resorts realize most of their profit from the buildings. The tourist, whether winter or summer, requires three things--food, lodging, and entertainment. The F. W. Dodge Corporation lists the average profit for facilities similar to those proposed for Bridger Bowl as follows: 70% of income from lodging is profit; 50% of income from liquor is profit; and there is no profit realized from food service. ⁴ At the present time the lunch cafeteria at Bridger Bowl realizes 13-15% profit. ⁵ If more complete and elaborate eating facilities were available, including a restaurant with table service and cafeteria service, the margin of profit would probably drop because of the increase in personnel and equipment necessary. ⁵ At a resort of this type 65% of the cost is for public services, and 35% of the cost is for lodging. ⁵	

Financial Capabilities of Bridger Bowl:

The Bridger Bowl Ski Association presently operates on a budget of \$73,000 annually. Its estimated income for this season is \$80,000.⁶ The Association must meet an annual \$23,856 mortgage payment on the new Riblet chair lift which was installed in 1964.⁶ A total of \$200,000 was borrowed to finance this

** Taken from Developing and Financing Private Outdoor Recreation in The Upper Midwest, pp. 58. (see bibliography)

TOTAL COSTS = \$180,000

CHART NO. 6 — PRELIMINARY COST ESTIMATE

Function of space		Square feet
LODGE		
REGISTRATION AND RECREATION AREA	250	
LOUNGE AREA	500	
MANAGER'S OFFICE	200	
COCKTAIL LOUNGE	500	
RESTAURANT, KITCHEN, AND CAFETERIA	8000	
PRO-SHOP	400	
LECTURE ROOM	400	
WARMING AREA	1000	
FIRST-AID STATION	300	
TICKET OFFICE	150	
RESTROOMS	300	
	<u>total 12000</u>	X \$15/sf**
		= \$180,000
GUEST AND PERSONNEL ACCOMMODATIONS		
TWO DORMS	1000	
THIRTY GUEST UNITS	7500	
THREE EMPLOYEE SUITES	1200	
TWO EMPLOYEE APARTMENTS	1500	
	<u>total 11200</u>	X \$15/sf**
		= \$168,000
** Taken from Developing and Financing Private Outdoor Recreation In The Upper Midwest, pp 56. (see bibliography)		
TOTAL COSTS		= 348,000

lift (\$125,000 from local banks and \$75,000 from private individuals) on a 12-year basis.⁶ Mr. Gib Widmer, a member of the Association Board of Directors, estimated that the Association could at the present time finance \$350-400,000 on a 25 year basis for facilities such as I have proposed.⁶ This, however, is only an estimate. Chart 6 shows a rough estimate and approximate cost of facilities proposed.

Financing for such a project would probably be similar to the financing for the chair built in 1964, (primarily through private banks). Other methods of financing, which may result in lower interest rates, open to resorts and recreational developments such as Bridger Bowl are through three government agencies, the Small Business Administration, the Farmers' Home Administration or the Economic Development Administration. Further details of the eligibility and interest rates are discussed in Chapter 3 of Developing and Financing Private Outdoor Recreation in the Upper Midwest, published by the Federal Reserve System.⁷

Footnotes:

1. Mr. Gib Widmer, Board of Directors, Bridger Bowl Ski Association, personal interview on March 1, 1967.
2. S. R. DeBoer and Company, City Plan for Bozeman, Montana, pp. 29.
3. Herbert Gebelein and Phillip Willis, The Vermont Ski Market 1965-66, pp. 8.

4. F. W. Dodge Corporation, Motels, Hotels, Restaurants and Bars.

5. Mr. Jack Rosenthal (Jack's Drive-in), personal interview on Feb. 9, 1967.

6. Widmer, Op. cit.

7. North Star Research and Development Council, Developing and Financing Private Outdoor Recreation in the Upper Midwest, pp. 35.

CONCLUSION

CONCLUSION

The final portion of my thesis involved the design of the complex which was outlined in the previous chapters. This portion has now been completed and warrants explanation.

The most difficult part of the design phase involved handling the parking of 700 cars. This single aspect dictated the final choice of site. The site was chosen so that the parking could be laid out basically following the contours that exist.

The building is located on a portion of the site which has differences in elevation of 30 feet. This lent itself to a split level design with entrancing from ground level onto several different building levels.

The traffic in and around the building has been separated into two basic functions: the traffic of the day skier; the traffic of the over-night guest. Attention was given to keeping skier traffic in and out of the cafeteria separated from the main lodge. The cafeteria is located directly adjacent to the kitchen while the restaurant is located directly above the kitchen. This enables direct food service to the cafeteria which will handle a large volume of service. Separation of the restaurant from the kitchen with vertical food traffic provided allows a certain amount of privacy from the kitchen.

Guest accommodations are located on the three floors above the restaurant area.

A breakdown of building capacities ~~is~~ as follows:

cafeteria-----180 people

restaurant-----80 people

guest accommodations

private rooms---44 beds

dormitories-----40 beds

As mentioned previously in this report the aesthetics of the building when viewed from above were very important. Equally important are the aesthetics of the building as seen from below, approaching from the parking area. Certain parts of the building when covered with snow will appear as walls set into the mountainside, while the main central building will rise up as the focal point of the complex. From above the total shape of the complex is quite interesting and works well with the slopes of the ground.

No attempt was made to design in detail certain equipment storage buildings and employee accommodations. These areas were, however, positioned on the site. The greatest attention was given to the main complex offering services to the public. The complex is designed primarily of concrete with heavy wood beams and other wood details to give the area a rustic look.

BIBLIOGRAPHY

BIBLIOGRAPHY;

Books and Magazines;

Bozeman Chamber of Commerce, Basic Information for Bozeman, Montana, Gallatin County and Trade Area, prepared by Bozeman Chamber of Commerce, 1966.

Budolfson, Richard F., Ski Resorts in the Ninth District, Federal Reserve Bank of Minneapolis, Business Report No. 1, November, 1964.

DeBoer, S.R., City Plan for Bozeman, Montana, prepared by DeBoer Consultants.

Dodge, F.W., Corporation, Motels, Hotels, Restaurants and Bars, cited in A Ski Lodge for Pidgeon Mountain by Arthur Finlayson, an undergraduate thesis report, Montana State University.

Dunbar, Robert G., "The Economic Development of the Gallatin Valley", Pacific Northwest Quarterly, volume 47, no. 4, October 1956.

Gebelein, Herbert and Willis, Phillip, The Vermont Ski Market 1965--66, Vermont Development Department, September 1966.

Hoover, E.K., Preliminary Research for New Married Students' Housing for Montana State College, Bozeman, Montana, undergraduate thesis, Montana State University.

Nordling, Arthur A., Redevelopment of Bridger Bowl, undergraduate thesis, Montana State University.

North Star Research and Development Council, Developing and Financing Private Outdoor Recreation in the Upper Midwest, Upper Midwest Research and Development Council, October, 1966.

Interviews:

Berg, Oswald, Architect and member of the Board of Directors, Bridger Bowl Ski Association, Bozeman, Montana, January 20, 1967.

BIBLIOGRAPHY CONTINUED:

Gnehm, Gus, Owner and operator of the Sport Chalet,
Bozeman, Montana, February 9, 1967.

Haggarty, Tom, Contractor and member of the Board of
Directors, Bridger Bowl Ski Association,
Bozeman, Montana, March 2, 1967.

Hastings, Ed, District Ranger, US National Forest,
Bozeman, Montana, January 26, 1967.

Montagne, John, Professor Earth Science Dept., and
head of Montana State University snow research
project, Bozeman, Montana, March 2, 1967.

Rosenthal, Jack, Operator of the cafeteria at Bridger
Bowl, Bozeman, Montana, February 9, 1967.

Wessel, David, Professor Architecture Dept., Montana
State University, Bozeman, Montana, January 12, 1967.

Widmer, Gib, Member of the Board of Directors, Bridger
Bowl Ski Association, Bozeman, Montana January 18
and March 1, 1967.

MONTANA STATE UNIVERSITY LIBRARIES CA
stks 720.6.M76C839
New ski facilities for Bridger Bowl /

3 1762 00154990 4

~~NA 2540~~

~~720.6~~
~~M76~~
~~C839~~

~~LIB. USE ONLY~~

