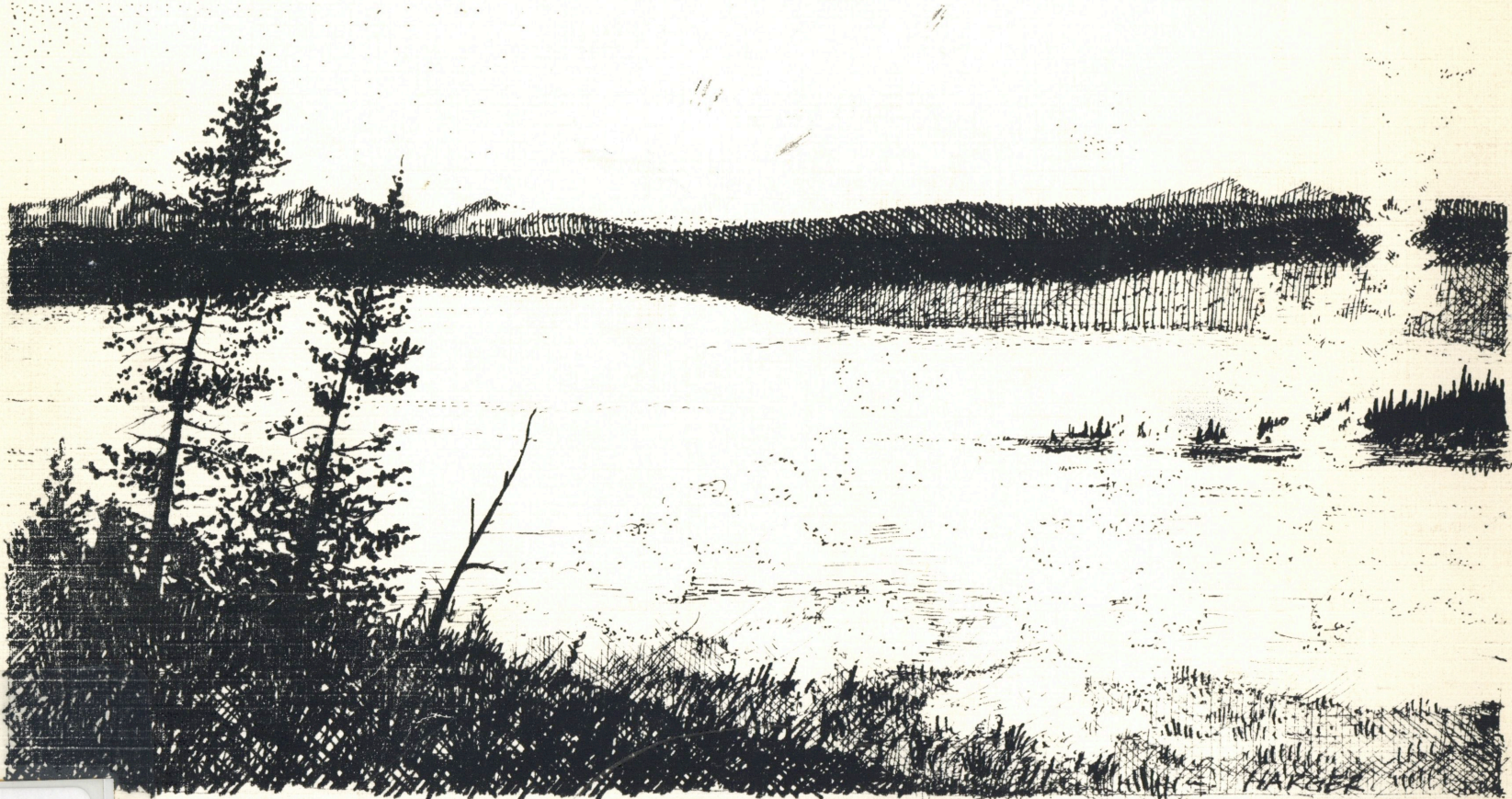


# AN INTERPRETIVE CENTER FOR THE GREATER YELLOWSTONE ECOSYSTEM



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## ARCHITECTURAL PROPOSAL



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# **An Interpretive Center**

For The

## **Greater Yellowstone Ecosystem**

*Keith Harger*

Part 3 of a 3 part professional publication,  
submitted in partial fulfillment  
of the requirements for the degree of

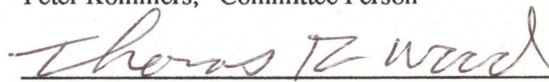
*Bachelor of Architecture*

Montana State University  
School Of Architecture  
June 1991

Approved:

  
Henry Sorenson, Advisor

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Thomas R. Wood, Director



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## **Acknowledgements**

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Special thanks to the following persons and organizations for their enthusiasm and support of this project. It is through their dreams that the vision of the *Greater Yellowstone Ecosystem Interpretive Centers* was created. It is through their efforts and ideas that the project will some day be realized.

**Stuart Coleman**  
District Ranger  
Yellowstone National Park

**Elizabeth Laden**  
Bozeman Chronicle  
West Yellowstone, Montana

**Robert Peña**  
Professor - Environmental Systems  
M.S.U. School of Architecture

**Randy Davis**  
Soil Scientist  
Bridger-Teton National Forest

**Susan Marsh**  
Recreation Staff Officer  
Bridger-Teton National Forest

**John Turner**  
Director - U.S. Fish and Wildlife  
United States Government

**Marshall Gingery**  
Assistant Superintendent  
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**Georgia McAdams**  
Resource Management & Visitor Protection  
Yellowstone National Park

**John Wilbrecht**  
Director - Retired  
National Elk Refuge

**Robin Gregory**  
Landscape Architect  
Grand Teton National Park

**Lis Novak**  
Landscape Architect  
Bridger-Teton National Forest

**Louisa Willcox**  
Program Director  
Greater Yellowstone Coalition



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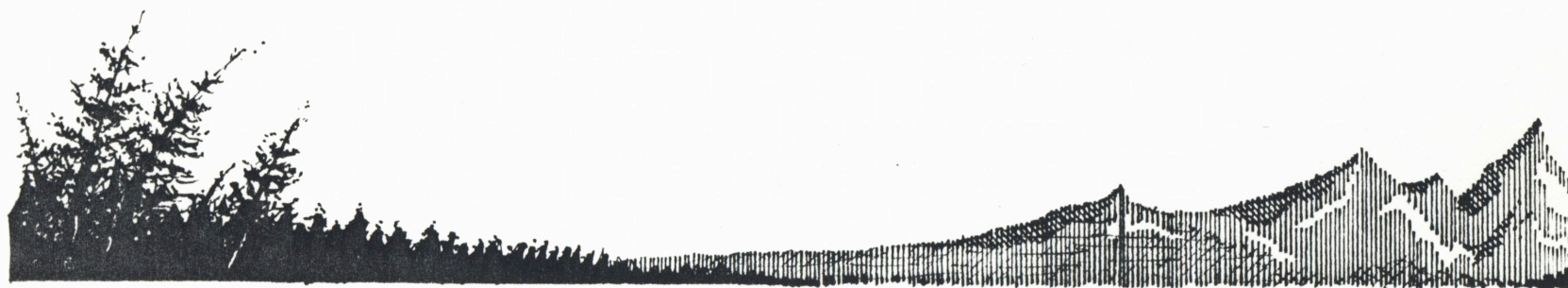
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# I N T R O D U C T I O N

### Defining the Ecosystem...

Yellowstone, the world's first National Park was created by an act of congress in 1872. Since then, its 2.2 million acres of protected land have been recognized, enjoyed, and relished by Americans and people the world over. Accordingly, Yellowstone has been designated a World Biosphere Reserve by UNESCO and inscribed on the World Heritage List under the World Heritage Foundation. Currently, Yellowstone enjoys visits from over two million of the world's tourists annually.<sup>1</sup> What few of these casual visitors realize, however, is that Yellowstone National Park is only one part of a much larger environmental community, or *ecosystem*. Without the interaction of the rest of the ecosystem, the park is incapable of maintaining its own ecological integrity.

By definition, an ecosystem is a "unit made up of all the living and non living components of a particular area that share materials with each other."<sup>2</sup> The process of *sharing* is the important part of this definition. Throughout an ecosystem is a constant exchange of biologic material via the movement and reproductive patterns of various plant and animal species, the progression of the food chain, and through the effects of elemental forces such as wind and

water movement. As one part of the ecosystem becomes impacted, so too does the remainder. What this means is that an ecosystem becomes defined by the minimum area that is required to perpetuate a healthy existence of all the biotic species indigenous to that area. It must, in effect, contain a completely self-sustaining environment.

Trying to completely or accurately recognize the parameters of any one ecosystem is at best a vague science. An ecosystem may be mapped out according to areas of similar climate and weather patterns, ground and surface water drainage patterns, or according to the extent of certain constituent plant species. A geologist might use major land forms and soil types as a criteria, while a biologist would use the migration routes, and seasonal ranges of a particular animal species. In practice, the most accurate definition would be a combination of all these considerations.<sup>3</sup>

Realistically, we could construct a scenario whereby the entire world is broken down into various ecosystems. In North America, for example, the various deserts, plains, tidal belts, river deltas, and marshes would all compose some of its individual constituent ecosystems. The unfortunate fact is that many of these ecosystems have been damaged or altered to the point that they can never be



regenerated. Virtually all others need means of human assistance to maintain their integrity.

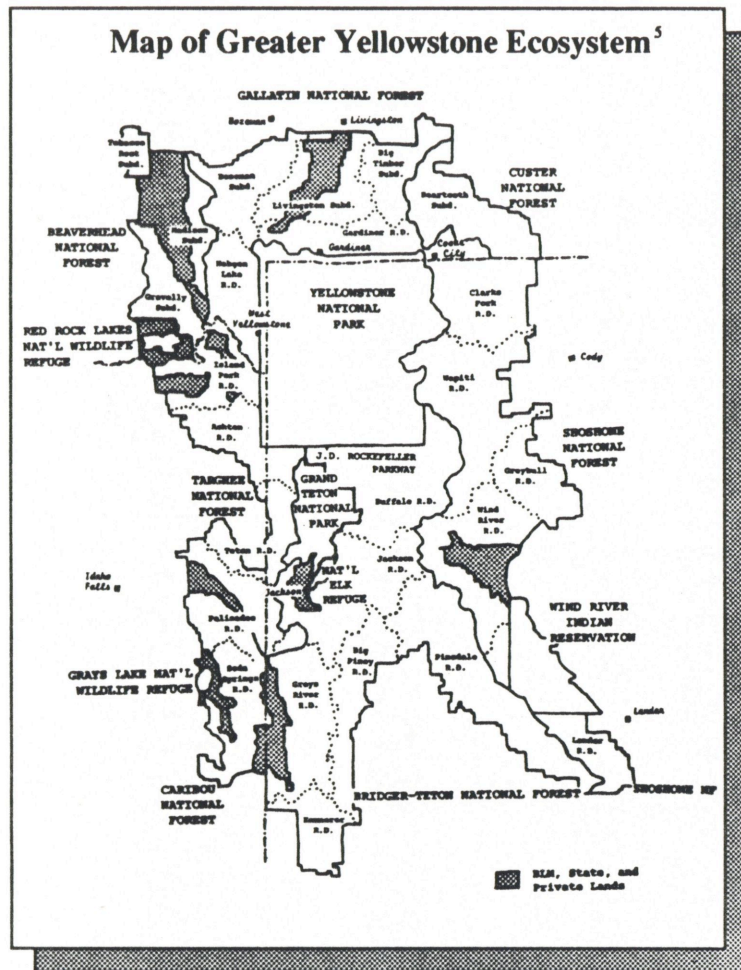
Yellowstone, on the other hand, has the distinction of being the largest essentially intact ecosystem in the lower 48 states, and for that matter, in the temperate zones of the earth.<sup>4</sup> This is due in large part to the ruggedness and inaccessibility of the area and by the protection afforded Yellowstone when it became a National Park. Despite what federal preservation has meant for the Park, however, the future well being of the region is far from being secured. The legal boundaries that enclose Yellowstone National Park are simply that. Generated arbitrarily, they have no meaning to migrating animals or to the spread of disease. While they may help to promote a natural state within, it must be realized that the soundness of Yellowstone proper is affected by the health of the rest of the ecosystem.

Prior to 1986, the concept of a Greater Yellowstone Ecosystem was understood by those members of the scientific community most associated with the area, but its parameters were referred to and defined in rather loose terms. During that year, however, a congressional subcommittee was organized for the specific purpose of finding out exactly what was known about the ecosystem. A research committee

then set about to compile relevant data from the various land management agencies in the area. Although no new data was created for the purpose of the report, the fact that such a large, previously unorganized body of knowledge was for the first time put together in a coherent manner represented a milestone in the effort to understand the region. This was the first formal attempt to define the constraints of the Greater Yellowstone Ecosystem.

One of the first tasks of the committee was to devise a map of the area. Of course, by definition, an ecosystem is a scientific construct and not a political one. A map, then, being an abstract concept can serve only limited function and its implied boundaries can never completely or accurately reflect the entire scope of the ecosystem. In the construction of a map of the area, existing administrative boundaries were often used when convenient. It must be recognized that this map represents only an approximation designed to aid in understanding the area. The committee's map is illustrated below:





### ...Recognizing Its Problems...

Because the purpose of the committee and its report was to inventory all known ecological data on the region, much information was for the first time viewed simultaneously. In the course of compiling this information and devising an overview of the area, many observations were made regarding what were seen as shortfalls in the current system of information and resource management. Virtually all the recognized problems stem from the manner in which jurisdiction of the area is distributed between a number of independent, and often non-associated administrative groups. Currently, the lands of the Greater Yellowstone are controlled by two National Parks, seven National Forests, three wildlife refuges, a large number of state and private landholders, and is distributed over 22 counties in three different states. Each of these groups is responsible not only for making independent land management decisions, but also for researching and obtaining any information that may lead to those decisions.

This lack of coordination between agencies often leads to problems such as the needless duplication of data. In other cases, it means that planning decisions are made without the benefit of all that is known about the subject. As a result, the



Greater Yellowstone Ecosystem is regulated as a series of fragmented and separate entities rather than as a single cohesive unit.



*A logging clearcut on the western boundary of the park near the town of West Yellowstone, Montana shows the arbitrary nature of existing political boundaries*<sup>6</sup>

The dangers implied by this style of management should be self-evident. Development decisions are often made in one district with little consideration for the potential impact on adjacent areas. In other cases, neighboring sites may be targeted for simultaneous development with no knowledge of the other's intentions. In these cases, completed impact studies become irrelevant. When a certain activity, such as mining, logging, or building development is proposed for a single area, its effects and impacts should be considered as they apply to the entire ecosystem - not just the immediate vicinity. Based on its findings, this was precisely one of the recommendations made by the legislative committee in its report.

The following tables illustrate the diverse range of groups currently involved in the management of the Greater Yellowstone Area's Resources. The first table lists actual administrative groups, while the second breaks the region down according to its various constituent landholders:



### Agencies Involved in Resource Management Of the Greater Yellowstone Ecosystem<sup>7</sup>

#### Department of Agriculture

U.S. Forest Service

Animal and Plant Health Inspection Service

#### Department of the Interior

National Park Service

Bureau of Land Management

U.S. Fish and Wildlife Service

U.S. Geological Survey

Bureau Of Indian Affairs

Bureau of Reclamation

Office of Surface Mining

Bureau of Mines

#### Other Federal Agencies

Advisory Council On Historic Preservation

Department of Energy - Bonneville Power Administration,

Federal Energy Regulatory Commission

Department of Commerce - National Oceanic and

Atmospheric Administration

Department of Defense - Army Corps of Engineers

Environmental Protection Agency

**Historic Preservation Offices** - States of MT, ID, and WY.

Idaho Department of Fish and Game

Montana Department of Fish, Parks, and Wildlife

Wyoming Department of Game and Fish

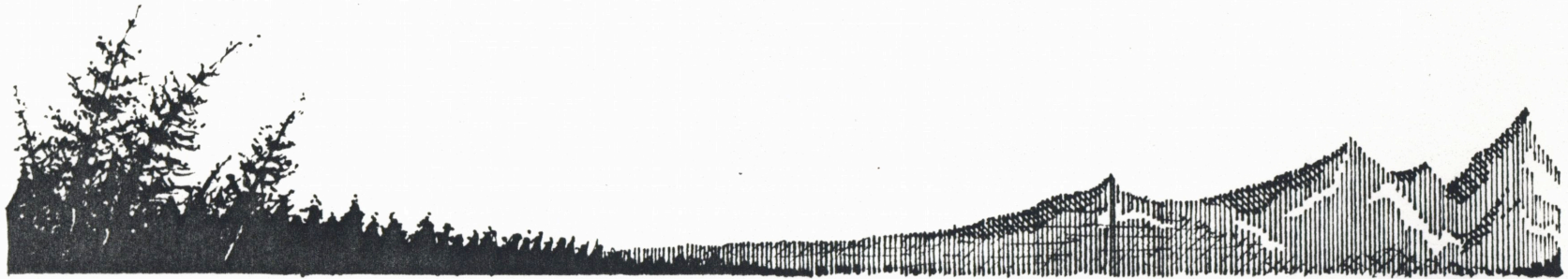
### Estimated Land Ownership in the Greater Yellowstone Ecosystem<sup>8</sup>

| Landowner or Manager                    | Acreage           |
|-----------------------------------------|-------------------|
| Yellowstone National Park               | 2,219,803         |
| Grand Teton National Park               | 306,865           |
| John D. Rockefeller Parkway             | 27,777            |
| National Elk Refuge                     | 24,247            |
| Red Rocks Lake National Wildlife Refuge | 32,467            |
| Gray's Lake National Wildlife Refuge    | 16,153            |
| Beaverhead National Forest              | 473,250           |
| Gallatin National Forest                | 1,550,100         |
| Custer National Forest                  | 509,500           |
| Shoshone National Forest                | 2,433,029         |
| Bridger-Teton National Forest           | 3,400,110         |
| Caribou National Forest                 | 628,250           |
| Targhee National Forest                 | 1,193,900         |
| Idaho BLM Lands                         | 4,500             |
| Montana BLM Lands                       | 76,500            |
| Wyoming BLM Lands                       | 45,000            |
| Idaho State Lands                       | 44,600            |
| Montana State Lands                     | 69,250            |
| Wyoming State Lands                     | 3,000             |
| Champion Timberlands                    | 142,000           |
| Other Private Landowners                | 800,000           |
| <b>Total Estimated Land in GYE</b>      | <b>14,000,000</b> |



**...And a Means to Alleviate Them.**

In the years since the congressional committee filed its report (and to some extent before that) there has been widening acknowledgement of the shortfalls of the present management arrangement and of the need to improve it. Recently, enthusiasm has grown for the generation of a long-term, comprehensive plan that would alleviate many of the problems we have mentioned. To that end, this is a proposal for a facility built specifically to accommodate the functions associated with that plan. More accurately, it is conceived as one of a *series* of outposts located around the periphery of Yellowstone National Park, functioning together to comprise a unified network. These units will be known as the *Greater Yellowstone Area Interpretive Centers*.



# THE INTERPRETIVE CENTER CHALLENGE



## The Vision Statement: A Plan for the Greater Yellowstone's Future

Despite the many problems that exist within the Greater Yellowstone's administrative structure, there has nonetheless been some recognition for the value of coordinated management efforts. A number of agencies, which have been formed specifically for that purpose, are illustrated in the following table. The focuses of their cooperative efforts range from the study of individual wildlife species, to the monitoring of stream sediment levels, to the impact of various recreation activities. Although these groups have done much to unite the efforts of the regions administration, they still lack the direction of a common goal or governing plan. It is also significant to note that as of yet, none of them have a "home base" or regular facility in which to hold their meetings.

Of the alliances shown in the following table, the most important would undoubtedly be the Greater Yellowstone Coordinating Committee. Formed in the mid 1960's by a number of leading Park and Forest Service managers, their energy has lately been devoted to developing a comprehensive plan for the future of the Greater Yellowstone Ecosystem. Perhaps the best opportunity to realize the dream of

## Coordinating Committees in the Greater Yellowstone Area <sup>9</sup>

|                                                           | Meeting frequency | Yellowstone NP | Grand Teton NP | USFS Other/Unspecified | Beverly NP | Gallatin NP | Greater NP | Briggs NP | Caribou NP | Highway NP | USFS Other/Unspecified | National Elk Refuge | Grays Lake NM | Yellowstone/Unspecified | Idaho NM | Montana NM | Wyoming NM | Idaho Fish & Game | Montana Fish & Wildlife | Wyoming Game & Fish | State NM Unspecified |
|-----------------------------------------------------------|-------------------|----------------|----------------|------------------------|------------|-------------|------------|-----------|------------|------------|------------------------|---------------------|---------------|-------------------------|----------|------------|------------|-------------------|-------------------------|---------------------|----------------------|
| Greater Yellowstone Coordinating Committee                | 2/yr              | .x             | .x             | .x                     | .x         | .x          | .x         | .x        | .x         | .x         | .x                     | .x                  | .x            | .x                      | .x       | .x         | .x         | .x                | .x                      | .x                  | .x                   |
| Interagency Grizzly Bear Cate                             |                   |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| -Greater Yellowstone Ecosystem Grizzly Bear Mgmt Subc     | 2/yr              | .x             | .x             | .x                     | .x         | .x          | .x         | .x        | .x         | .x         | .x                     | .x                  | .x            | .x                      | .x       | .x         | .x         | .x                | .x                      | .x                  | .x                   |
| -Grizzly Bear Research Subc                               | n/r               |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| -Yellowstone Ecosystem Commulative Effects Task Force     | n/r               | .x             |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Greater Yellowstone Ecosystem Bald Eagle Working Group    | 2/yr              | .x             | .x             | .x                     | .x         | .x          | .x         | .x        | .x         | .x         | .x                     | .x                  | .x            | .x                      | .x       | .x         | .x         | .x                | .x                      | .x                  | .x                   |
| Tri-State Bald Eagle Working Group                        | n/r               |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Montana Bald Eagle Working Group                          | n/r               |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Jackson Hole Cooperative Elk Studies Group                | 4/yr              | .x             | .x             |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Northern Yellowstone Elk Management Working Group         | 4/yr              | .x             |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Tri-State Trumpeter Swan Committee (or Working Group)     | n/r               | .x             | .x             |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Trumpeter Swan Subcommittee of the Pacific Flyway Council | n/r               |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Cooperative Rocky Mountain Trumpeter Swan Project         | 1/yr              | .x             |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Tri-State Peregrine Falcon Working Group (Recovery Team)  | 2/yr              | .x             |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Interagency Peregrine Cate                                | 1/yr              |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Montana Peregrine Falcon Coordinating Committee           | 1/yr              |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Tri-State Whooping Crane Working Group                    | n/r               |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Northern Rocky Mountain Wolf Recovery Team                | n/r               | .x             |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Cooperative Rocky Mountain Canada Goose Project           | 1/yr              | .x             |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Greater Yellowstone Ecosystem Cate on Outfitters & Guides | n/r               |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Interagency Travel Plan Cate                              | 2/yr              |                |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Recreation Action (ReAct) Team                            | 2/yr              | .x             | .x             |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |
| Yellowstone River Turbidity-Sedimentation Committee       | 2/yr              | .x             |                |                        |            |             |            |           |            |            |                        |                     |               |                         |          |            |            |                   |                         |                     |                      |

(x) participant; (.) participation identified by meeting participants; n/r = not reported

coordinated ecosystem management came in August of 1990 when the committee released the rough draft for its management plan, dubbed "A Vision for the Future." This 59 page document, which sought to provide channels for education, cooperation and integration in multiple use resource management, was the culmination of five years of thought and research by some of the country's foremost Park and Forest Service administrators, biologists, and naturalists. Most importantly, while it attempted to make no specific land management decisions, it did recognize a commitment to a new, responsible and forward thinking future for the management of our public lands.

Unfortunately, the fate of the Vision Document was sealed in a different mentality. During the process of public review, timber and mining companies, along with other resource dependant industries who feared for their future profitability, launched an all-out assault on the vision document. In an extensive campaign, marked by misinterpretations, disinformation, and scare tactics, the industries struck fear into the hearts of their employees. Public hearings were inundated by workers and their families. Intended to draw constructive criticism, the meetings were transformed into arenas of threats, name-calling, and paranoid accusations by people who believed that the Vi-

sion was part of a communist plot to lock up federal land and put them out of work. By the time the Greater Yellowstone Coordinating Committee released the final draft of their plan, it had been chiseled down to 11 pages of what critics commonly call a "miracle of bureaucratic mediocrity."

While this region may not yet be ready for such revolutionary thinking, the ill-fated Vision has left us with the legacy of a valuable lesson. Reaffirmed by the fact that public education of the ecosystem concept is needed, it is in the spirit of the original draft that this interpretive center project has been conceived. An outline of the Vision for the Future document, as it was originally proposed, is listed below:<sup>10</sup>



*Conserve the sense of naturalness and maintain ecosystem integrity.*

- ☐ Maintain or improve air, water and soils in the Greater Yellowstone Area.
- ☐ Maintain or improve biological diversity.
- ☐ Manage the historic, cultural and archeological resources to enhance their role in the visitor experience and for their scientific value.
- ☐ Retain the world-renowned fish and wildlife resources.
- ☐ Ensure the integrity of the geothermal features.
- ☐ Protect wilderness values and resolve remaining wilderness classification issues in the Greater Yellowstone.

*Encourage opportunities that are biologically and economically sustainable.*

- ☐ Work in partnership with local communities.
- ☐ Improve range conditions while providing sustainable economy for grazing and agriculture.
- ☐ Provide opportunities for a variety of high-quality recreation experiences.
- ☐ Provide opportunities for a sustainable timber industry.

*Improve coordination.*

- ☐ Improve mechanisms to cooperate and coordinate with federal agencies, state and local governments, and private landowners.
- ☐ Promote research and education.

### **The Interpretive Center Project: An Opportunity to Realize the Plan**

The function of the Greater Yellowstone Area Interpretive Centers is primarily concerned with the later of the three above-mentioned goals (To improve coordination and to promote research and education). Since the project was conceived directly as a means to impliment this goal, its objectives should be fundamentally the same as those of the vision. Those ambitions, worded in a manner geared more to the planning of an interpretive facility might sound like this:



Provide an inclusive and accessible information source.

One of the primary goals of the Interpretive Centers would be to house a more uniform and obtainable data base for information pertaining to the management of the Greater Yellowstone Ecosystem. This will be accomplished by the provision of research facilities, record storage, archive space, and various meeting chambers. These services will be available to each of the many land management agencies, conservation groups, federal and state governments, and the various private landowners who have interests in the region. Facilities should also be made accessible for independent

study by private parties. In the interest of improving efficiency and reducing the duplication of data, this information should be presented in a manner that encourages resource sharing and exchange.

- ☐ Provide channels for improved cooperation in the management of the Greater Yellowstone Ecosystem.

By providing a common, more accessible reference point for these groups, which are often times at odds with each other over conflicting interests, it is hoped that a spirit of camaraderie may be facilitated. By encouraging the sharing of resources, many disputes and misunderstandings may be resolved before they have a chance to materialize. More importantly, as has been illustrated, it will be possible to make individual administrative decisions with the advantage of a broader and more thorough understanding of their potential implications. Furthermore, as the process of policy making becomes increasingly effective and efficient, other regions may follow suit and initiate similar programs, thereby adding to the network of information.



- ❑ Promote education and understanding of wilderness management systems through public and private interaction.

Due to the administrative nature of some of the proceedings that will occur at the centers, the aforementioned functions constitute what is basically a non-public role for the facility. There is to be another use, however, that is chiefly a public one. This, perhaps the most important goal of all, is to serve as a mechanism to promote public awareness of the ecosystem concept. The Interpretive Centers will serve as both a resource for the public and as an instrument through which it may be reached. Making the services of the Interpretive Centers universally accessible will not only encourage participation in the planning process, but will provide built-in channels for feedback to gauge public sentiment.

Through the implementation of various services and educational programs, such as nature walks, media presentations, exhibits, and literature distribution, the Interpretive Centers will reach many visitors. Along with introducing the concept of a Greater Yellowstone Ecosystem, the effort will be to provide an understanding of the resources the area has to offer, and to teach the value of their conservation. This element of the program will see manifestation in a form

similar to that of a park visitor's center, but will not be limited to the same functions. By offering occasional classes, live presentations, and public seminars, influence will extend to people far beyond the typical tourist.



### **The Interpretive Center Curriculum: A Strategy for Achieving the Objectives**

The purpose of the Interpretive Centers has now been established. Namely, it is to serve the multiple functions of an *administrative complex*, a *research facility*, and an *educational tool*. In many respects, however, the educational aspect of this function is the most critical, so it will be integrated into every part of the project. The hopes of this project are to educate not only the public, but the region's administration as well.

By definition, an interpretive facility is used as a vehicle for advancing a particular message or lesson. The Greater Yellowstone Area Interpretive Centers will be no exception. An important step in the planning of the centers, then, is clearly defining that message, identifying who is targeted to receive it, and deciding how it will be taught. Included in Appendix A is a copy of a current *Interpretive Facility Planning Guide* used by the National Forest Service in planning such programs of their own. It provides a good illustration of the need for the questions and concerns that are being addressed in this proposal.

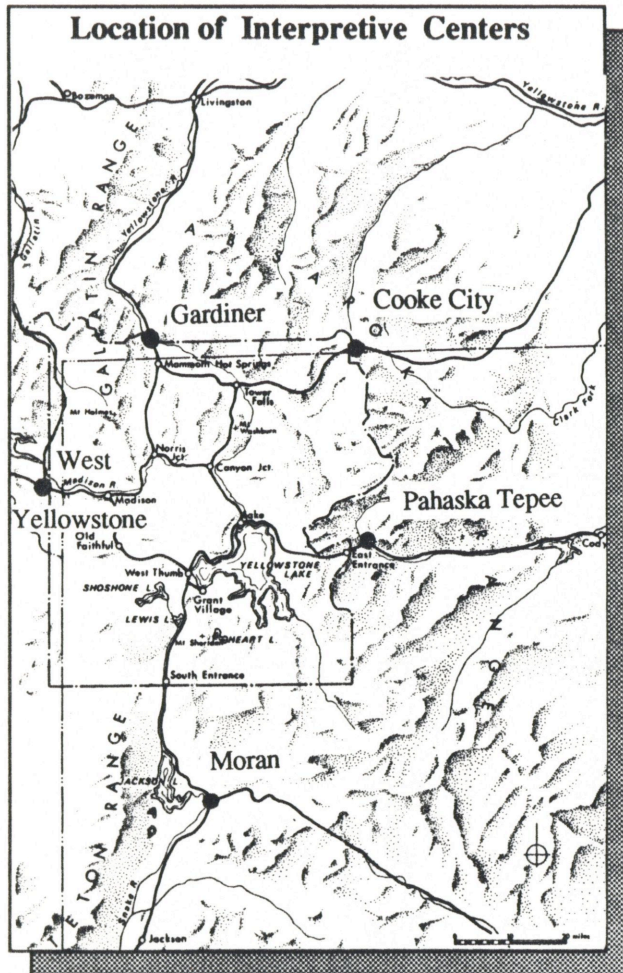
In fundamental terms, the Greater Yellowstone Area Inter-

pretive Centers are trying to "promote a conscious awareness of the broader context, or ecosystem, of which Yellowstone Park is only a part." Recognizing this, the hard task becomes that of devising a game plan, or *curriculum*, for teaching this message. In the context of a region as vast as the Greater Yellowstone, this is a task of significant undertaking.

The Greater Yellowstone Ecosystem occupies what is inarguably one of the most important ecological positions in North America. Located atop the Continental Divide, it both contributes to and is symptomatic of the entire continent's health. Vastly untouched, Yellowstone has the capacity to serve as a "great natural laboratory" or indicator of the entire continent's environmental fitness. By extension, then, the program becomes even broader, conceptually encompassing parts of all North America

The physical and biological features found in this area alone are diverse enough, however. Geographically, the Greater Yellowstone is comprised of three major regions. Dominated by a high volcanic plateau, Yellowstone Park is surrounded by a series of higher mountains. These mountains, which then extend in two "fingers" to the south and southeast, are in turn surrounded by lower, more arid plains.





In addition to the many unique thermal, geologic, plant, and animal resources found in the Greater Yellowstone Ecosystem, there are a number of historically significant archeological sites. Yellowstone is also birthplace to the headwaters of three of the country's great rivers: the Yellowstone-Missouri, the Snake-Columbia, and the Green-Colorado.

A facility that presumes to adequately represent such a broad range of resources should also reflect this diversity in its organization. The best way to accomplish this is to provide not one, but a number of centers, located strategically throughout the ecosystem. In selecting locations for these centers, the five major entrances to Yellowstone National Park serve as an ideal starting point. Relatively evenly separated, and outside of the Park itself, each of these entrances benefit uniquely in their proximity to various land management headquarters and to certain natural amenities. In most cases these attractions are of significant enough interest and complexity to warrant their own interpretive facility. Consequently, the duties of each Interpretive Center will revolve around an individual theme structured within the common underlying message that has already been established. More specifically, an individual theme might include the celebration of an instance of combined management efforts, an illustration of a particular threat to the integrity of the ecosystem, or the value of a significant resource found in the vicinity. In addition, different centers may utilize entirely different educa-



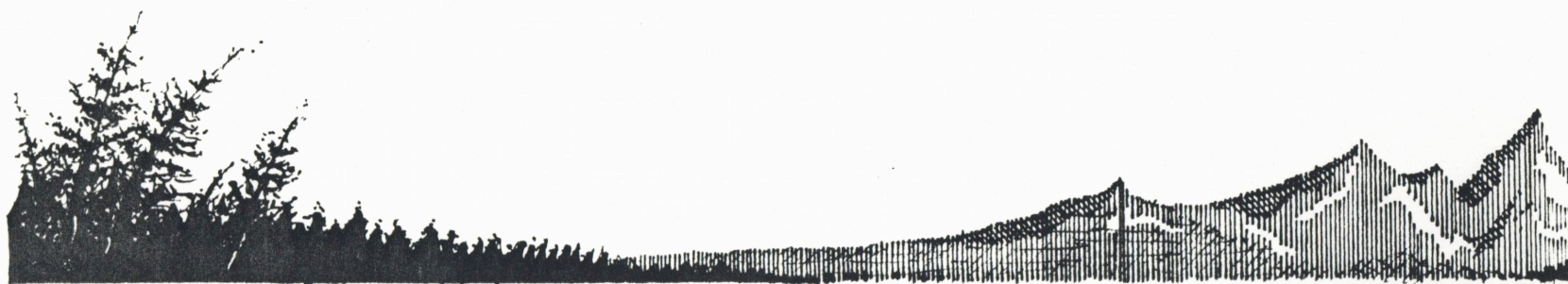
tional devices to communicate their messages. Audio-visual displays, museums, galleries, self-guided field trips, and live presentations are all proven methods of educating the public while maintaining or stimulating their interest. The decision of which media to use will be a function of its appropriateness and potential effectiveness given the subject at hand. The final selection of themes, as they will be developed at the various locations, will be made as part of the planning process for that center.

Since the Greater Yellowstone Interpretive Center project has been conceived in response to the needs of many different individuals and organizations, the program for its administrative design should further reflect this diversity. Although the requirements of any one group may not be completely satisfied through the services offered at any one interpretive center, the entire network should represent a more complete solution. The idea that each facility can "pick up where the others leave off" affords a perfect opportunity to resolve a complex set of needs without over-complicating the facility itself.

In the same manner that each center specializes on an *educational* theme, their individual *executive* duties should also differ. In any one building, for instance, emphasis might

be placed on the ability to house large group meetings, while others are geared towards field research, and yet others towards archive management and data storage. Like the ecosystem itself, the individual centers will rely upon interaction within a greater network in order to satisfy a complete range of functions. In this proposal we will illustrate the interpretive center concept by discussing the operation of a single hypothetical facility.





AN INTERPRETIVE CENTER AT MORAN

The preceding sections of this proposal were intended to introduce the notion of a Greater Yellowstone Ecosystem, recognize the unique value of the region, and discuss some of the goals and future directions for its management. The Interpretive Centers were then proposed and justified as a means by which these goals may be achieved. We have also developed a scenario for the operation of these centers in hopes of illustrating how they would accomplish this task. This has represented the *programmatic* challenge of the interpretive center project and leads us to another topic - that of defining the *architectural* challenge. In other words we now need to discuss the practical responsibilities of the project as they apply to an actual design.

Although many of the architectural and philosophical goals of this project are relevant to all of the proposed interpretive centers, the remainder of this proposal will address the goals specifically as they apply to the facility to be built at Moran, Wyoming. For reasons we shall discuss, the Interpretive Center built here will be the primary, or nucleus facility. The requirements for any of the other Centers then, can be considered merely a derivation of its program. Hence, the Moran project serves as the best example through which to illustrate the intended design principles.

### Moran and the Greater Yellowstone Ecosystem

Geographically, Moran benefits from a unique proximity to several major administrative headquarters: the National Elk Refuge, Grand Teton National Park, and Bridger-Teton National Forest. With a view of the Grand Tetons and the Snake River, it is also the most dramatically scenic of the five proposed Interpretive Center sites. What is perhaps most significant about the location, however, is that on a year-round basis it witnesses a larger volume of traffic than any of the other park entrances. As a result, an Interpretive Center here would have the potential to capture the greatest number of visitors. According to statistics provided by Grand Teton and Yellowstone National Parks and the Wyoming Highway Patrol, approximately 21% of all visitors entering, and 22% of those leaving the Ecosystem will pass through Moran.<sup>11</sup> The only location responsible for larger percentages (24% and 33% ) is that of Jackson, Wyoming which already has a major visitor facility at the Chamber of Commerce Building. Likewise, the town of Moose, Wyoming, which accounts for the difference in these figures, also has a visitor's center of its own in the Grand Teton National Park Headquarters. From the records of these two visitor's facilities, and from various typical traffic counts, we can more accurately predict a use pattern for Moran:



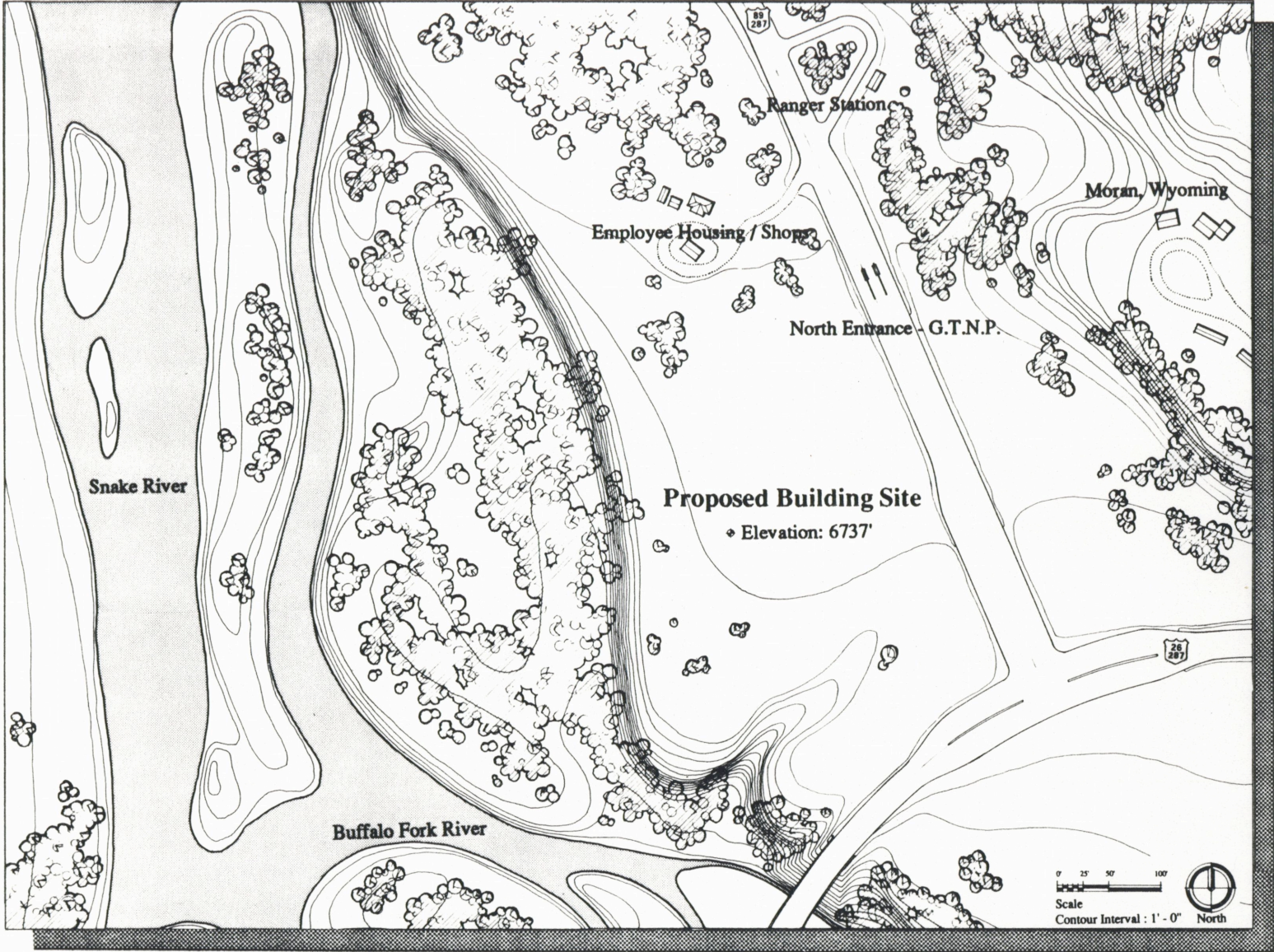
- ❑ 1988 Peak Traffic Counts for U.S. Hwy. 26 (8 hr. day):  
North of Jackson: 4,600  
East of Moran: 1,278
- ❑ 1986 Annual Count for Visitors to G.T.N.P.:  
From Yellowstone: 788,800 (26%)  
Via Moran from Duboise: 608,500 (19%)  
To Moose from Jackson: 626,000 (21%)  
To Moran from Jackson: 1,407,000 (34%)

Using simple ratios, and allowing for error, these numbers tell us that Moran may see up to 3,500 vehicles in an average work day. Furthermore, from the experiences at Moose Visitor's Center, we know that:

- ❑ Of the passing vehicles, 48% will stop.
- ❑ Of these vehicles:  
70% are cars  
24% are R.V.s  
6% are busses
- ❑ The average number of passengers is 3.
- ❑ The average length of stay is .5 hours.

Due to these substantial figures, and because Moran is accessible to both visitors and administrators on a year-round basis, it will serve as the *headquarters* of the Greater Yellowstone Interpretive Center network. As a result, it will serve not only to unify local agencies, but to coordinate the entire network of Interpretive Centers. In addition to its standard duties, this increased responsibility will be manifested in the need for more office space and in the ability to house the meetings of region-wide coalitions.







### Moran the Site

The area that comprises Moran, Wyoming, the junction of highways 26 and 89, and the north entrance gate to Grand Teton National Park is built on a series of high terraces above the junction of the Main and Buffalo Forks of the Snake River. The building site for this project is below the actual town, south and west of the junction, on a large, almost flat sage meadow overlooking the junction of the two rivers. The eastern edge of the meadow is bordered by a straight section of U.S. Highway 89 as it passes through the Park's entrance gate. The western edge of the meadow is defined by an abrupt 12 foot drop down to another terrace. This lowest shelf is dominated by a dense riparian forest that lines the banks of the rivers. At the end of this chapter is a map of the Moran vicinity. To further help explain the building site, a series of images are also provided. The accompanying map indicates their orientation. The various resources of the site, the forces they provide, and their potential architectural implications are discussed here:

#### ☐ Climate

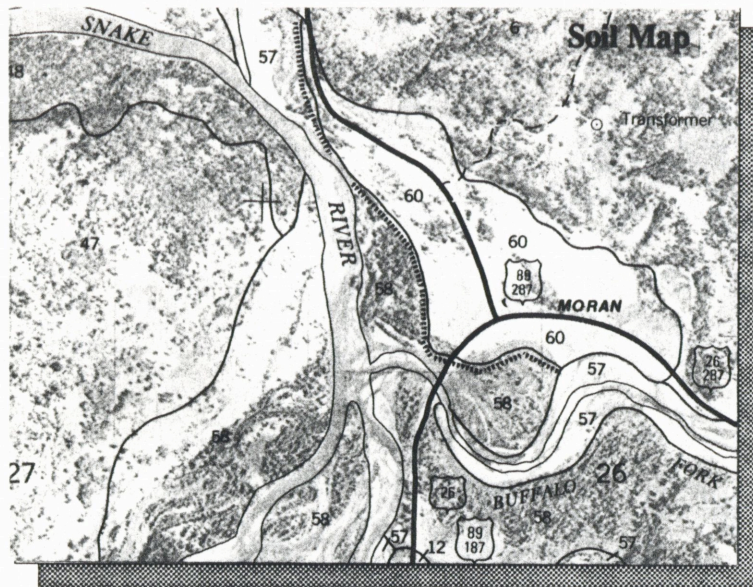
The climate of Grand Teton National Park is characterized by short, cool summers and cold harsh winters. July is the

warmest month of the year, while January is usually responsible for the coldest temperatures. At an elevation of 6737 feet, it has a mean annual temperature of 35° F and a mean annual precipitation of about 17 inches. Approximately three quarters of that precipitation falls as snow. Midwinter accumulation commonly reaches depths of between 3 1/2 to 4 1/2 feet. The growing season is very short. Final spring frosts are common in June, and autumn frosts frequently first occur in early September. Wind on the site comes predominantly from the north, following the Snake River as it is funneled through a shallow valley. Drifting is a potential problem, so all site improvements should be designed to eliminate accumulation, or to accommodate frequent plowing. The building's environmental systems should also reflect a response to the wind. Solar access on the site and more detailed meteorological data are provided in appendices C and D.<sup>12</sup>

#### ☐ Soils

The following illustration is an excerpt from the *Teton County Soil Survey* showing the distribution of soil types in the Moran vicinity. From the map we can see that there are two types of soils that will immediately affect the proposed Interpretive Center. The lower portion of the site, adjacent





to the river, is classified as "Tetonville-Wilsonville Fine Sandy Loam" (number 58), while the upper portion of the site is classified as "Tineman Gravelly Loam" (number 60). Complete descriptions of these soils are provided in appendix E. Contained in the descriptions is valuable technical information about the soil's ability to withstand construction disturbance, its suitability for bearing loads, its most successful vegetation types, and its adaptability to use for waste treatment.

For construction purposes we see that the number 60 soil is perfectly suitable, but the number 58 soil, due to wetness and low strength, is not.

For sanitary facilities, the number 60 soil will support septic and leech field systems with "slight" danger. Anything of larger scale is unfeasible due to potential for leakage. The fact that there is any danger at all, combined with the heavy use that the public rest rooms at the center will see is cause for us to consider conservation techniques of some sort. Composting is one alternative, but requires a considerable amount of service and upkeep. Since there is no sewage treatment plant anywhere in the vicinity of Moran or Buffalo Valley, a pre-treatment method should be researched.

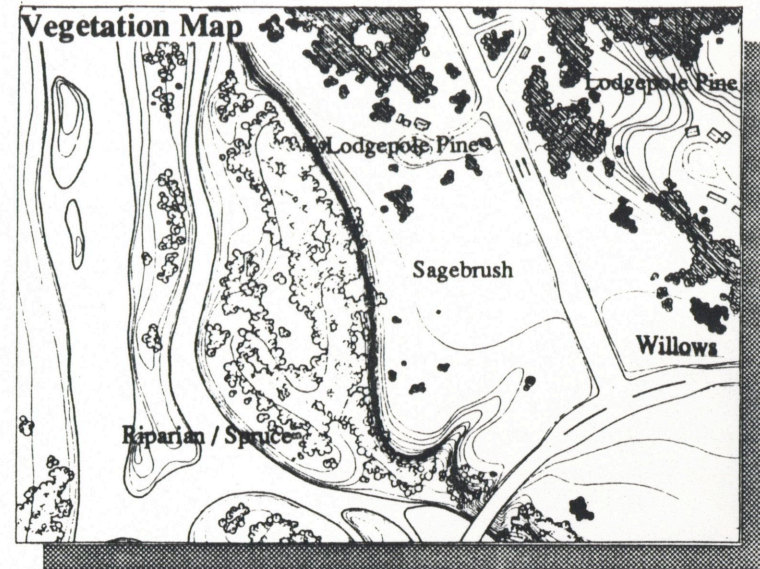
Perhaps the greatest danger that the soils will propose is in their tendency towards erosion. The number 60 soil, which comprises the steep slope at the edge of the site is particularly prone to cave-ins if it becomes saturated. Removal of protective topsoil or vegetative cover will accelerate this process. The best strategy for preserving the hillside may be to use the building or some other device to retain the slope where it will see heavy use. Foot traffic is commonly the greatest problem, so it should be given special consideration.



### □ Vegetation

The building at Moran may potentially affect three different plant communities: sage/grassland, riparian/spruce forest, and lodgepole pine forest. The accompanying map shows the distribution of each of these ecosystems, and appendix F lists some of their important characteristics. Each community has distinct values, strengths, and vulnerabilities, and will therefore require different design and building responses.

The upper terrace, which will probably contain most of the facility, is characterized by sagebrush and arid grasses. In this area, post-construction regenerative ability is slow due to nutrient poor topsoil. Due to a slight shift in soil composition and density, the ground will be somewhat affected in its ability to hold moisture immediately after construction. This, coupled with an inevitable change in the type and amount of nutrients introduced by leeching, will probably produce a temporary shift from native species to more aggressive, quick spreading perennials. Although accelerated revegetative techniques such as transplanting and soil enhancement are possible, their success depends on the ability to prevent future disturbance. Here again, foot traffic is the greatest danger, and it must be restricted to a



hardened trail system if we ever wish to approximate a natural appearance. This is particularly true at the edge of the terrace, where continued trampling and soil compaction will cause total loss of ground cover. The resulting erosion will remove topsoil, pollute the fragile riparian area below, and possibly undermine the building itself.

The area below the actual building site is characterized as a riparian community with willows, succulent long grasses, and spruce being the dominant species. Although regenera-



tion processes are rapid, minimal construction will occur at this elevation because of danger from 100 and 500 year floods. The significance of this ecosystem is in its value as a food source for wildlife. Because of its extreme diversity, this area is an excellent location for an arboretum or nature trail. Traffic should once again be restricted to a designated trail system to avoid polluting the soil and to minimize disturbance of wildlife.

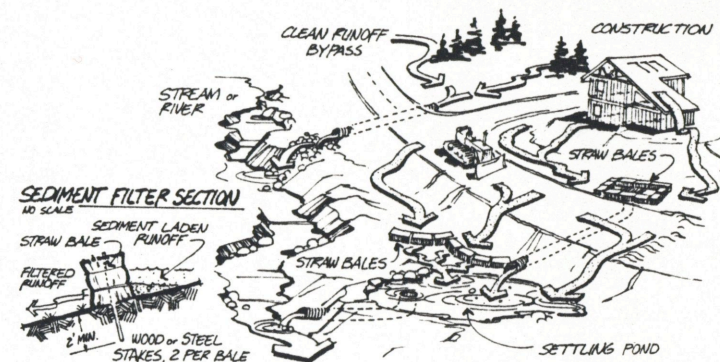
The lodgepole pine forest at the northern edge of the site will probably not be affected by this project. The significance of these trees is the fact that they are supported by the same climatic and soil conditions as those found nearer the actual building location. In an effort to mimic natural conditions, lodgepole should be used for all screening and landscape applications. Growth rate is relatively slow, however, so larger saplings may be required.

#### ❑ Water Resources.

For human uses, studies indicate that groundwater is of exceptionally high quality. According to the *Teton County Soil Survey*, however, the water capacity of the upper terrace is low. Although there should be ample supply for the long term needs of the Interpretive Center, appropriate conser-

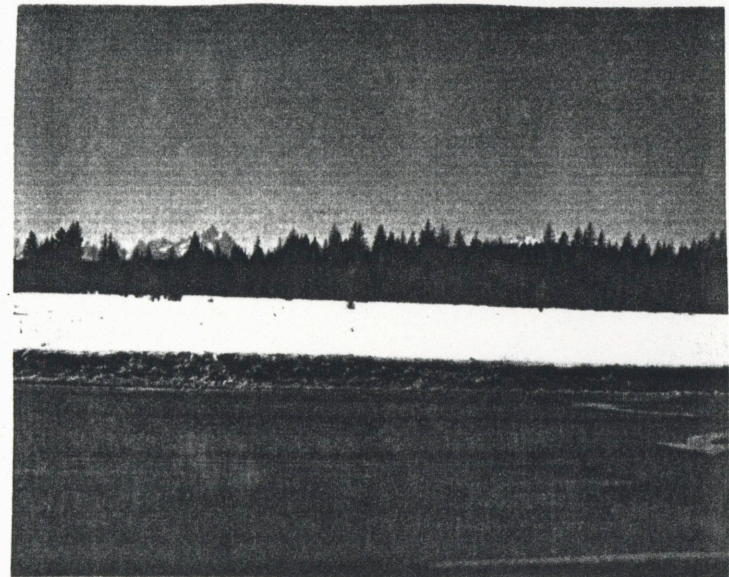
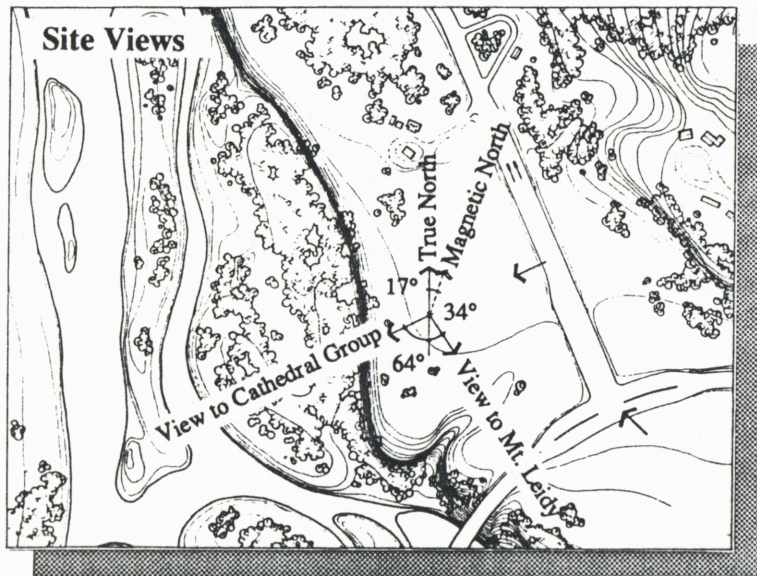
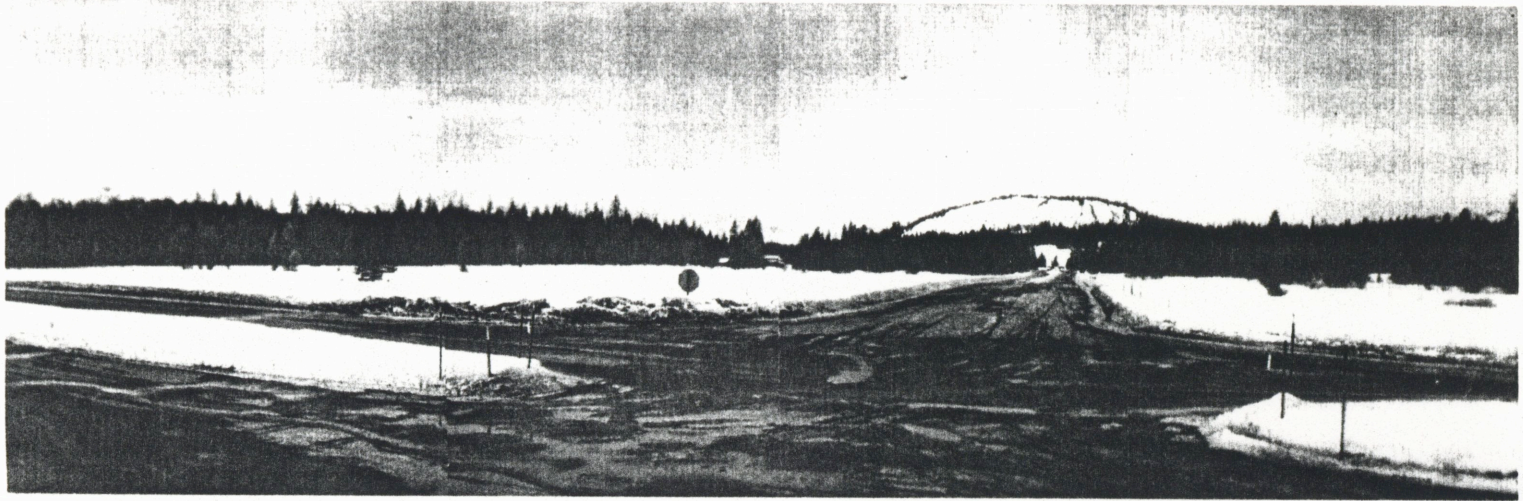
vation techniques should be used to minimize changes in the natural watershed.

Below the site, in the riparian area, there is a potential for damaging groundwater aquifers due to the high permeability of the soil. Although no wetlands exist, every effort should be made to protect this area for its value as a productive food source. The single greatest danger to the area will come in the form of polluted runoff from the site during the construction phase of the project. By implementing simple drainage filtering techniques during this period, however, much of the damage can be eliminated.



Temporary erosion and pollution control methods.<sup>13</sup>









# THE ARCHITECTURAL PROGRAM



We have now answered the questions of *what* type of facility we are proposing, *why* it needs to be built, and *where* it should be located. Following this, the next question is deciding *how* the building should be designed. By answering this question, we are actually defining the Architectural Program.

For all practicalities, we can discuss the architectural program in terms of two types of goals. The first - *functional goals* - is simply a listing of spaces and equipment required for the operation of the Interpretive Center. These goals may be characterized as a concrete framework within which we must work. The second category, which for lack of a better term we will call *philosophical goals*, deals with how those required elements are arranged or structured. Since these goals are primarily concerned with the character of the Interpretive Centers, they are in effect defining an architectural style. Due to their abstract nature, and in contrast to the more rigid functional parameters, evaluating the success of these goals is a task of considerable difficulty. Nonetheless, defining them is the first step toward achieving them.

### Administrative Office Space Requirements

- ☐ Resident Naturalist  
(Located for easy public contact; needs own storage space, waiting room, coat rack, etc...)
- ☐ Resident Administrator  
(Coordination officer for entire Interpretive Center network; access to both public and administrative sectors.)
- ☐ National Park Service  
(A permanent office to be used periodically by members of any National Park Service organization.)
- ☐ U.S.D.A. Forest Service  
(Periodic / Multi-district.)
- ☐ Bureau of Land Management  
(Periodic / Multi-district.)
- ☐ U.S. Fish and Wildlife  
(Periodic / Multi-district.)
- ☐ Office Pool / Common Space  
(A multi-functional space to house various additional "cubicles" and conference areas. Should be accessible to all administrators and conducive to cooperative atmosphere.)

**Administrative Support Space Requirements: 2025-2275**

- ☐ Two Research Laboratories 600-800  
(Provide facilities to accomodate basic lab experiments/ demonstrations in hydrology, biology, geology, entomology... Include work and storage space, power supply with backup generator, refrigeration, sinks, scales, propane supply.)
- ☐ Media Room 150-200  
(Provide Storage for slides, photos, maps, drawings, viewing tables, photocopy and diazo machines.)
- ☐ Radio / Dispatch Room 100-150  
(For transmitting and receiving signals from weather, seismic, and river monitoring stations, other facilities, and research vehicles.)
- ☐ Document Vault 100-150
- ☐ Book Shelves (400-500 linear feet)
- ☐ Artifact Archives 300-500
- ☐ Display and Demonstration Equipment 300-500
- ☐ Kitchenette / Employee Lounge 75-100
- ☐ Employee Restrooms 400-450

**Multiple Use Space Requirements:**

(Public & Administrative Uses)

**5875-6825**

- ☐ Reception / Secraterial 175-225  
(Directive to administrative spaces as well as interpretive and naturalist facilities.)
- ☐ Classroom(s) 1000-1200  
(A flexible space for smaller conferences, lectures, and classes; for use by public as well as administration when chartered; should contain storage for display / presentation materials, partitions.)
- ☐ Auditorium 3200-3500  
(For larger conferences, and public hearings as well as interpretive presentations [slides / movies]; provide seating for 250-300 people.)
- ☐ Library 1000-1200  
(Consistent with goal of promoting public research and knoweledge of ecosystem - should contain stacks, map storage, and reproduction equipment. Will require part-time librarian or special checkout procedure at main desk)
- ☐ Lounge / Study Area 500-700  
(For quiet discussions, reading, and reception of special meetings.)



**Visitor (Interpretive) Space Requirements: 3130-3875**

- ☐ Lobby 1000-1200  
(Centrally located, containing information desk and  
directive to administrative spaces, library, naturalist,  
exhibits, and restrooms.)
- ☐ Book Sales / Literature Distribution 80-100  
(Should be in view of, or adjacent to, information desk)
- ☐ Public Restrooms 800-1000
- ☐ Public Pay Phones 50-75
- ☐ Exhibit Spaces 1200-1500  
(See descriptions on pages 29-33.)
- ☐ Billboard for Public Notices

**Support Spaces / Equipment**

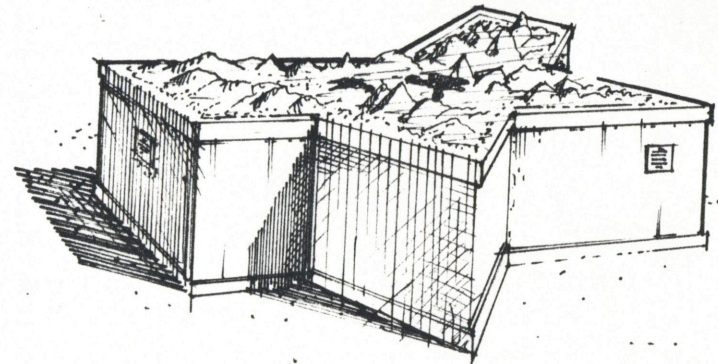
- ☐ Mechanical (Approximately 4% of total square footage)  
(Heating, ventilation, air conditioning, water, sewage;  
should incorporate passive solar , water conservation,  
and other energy saving features; should express these  
features as part of "educational experience"; should be  
zoned for partial seasonal closures.)
- ☐ Electrical
- ☐ Parking for: 150 cars  
30 Busses and R.V.s  
25 Employees
- ☐ Housing for Resident Employees  
(Will be incorporated into existing development at Moran  
or Buffalo dorms.)
- ☐ Circulation to Above-mentioned Developments  
(Sidewalks, paths)
- ☐ Circulation Within Facility  
(Approximately 25% of total square footage for hall-  
ways, corridors, etc.)
- ☐ Highway Signage

### Exhibits

In the earlier discussion of interpretive curriculums, it was indicated that the message of each center would be best related through the elaboration of a particular *theme*. These themes, which must be specific examples of the principles of ecosystem interaction, will offer practical, comprehensible illustrations for introducing such concepts to the area's visitors. Because the interpretive centers will in many cases be the only place where we are able to communicate the ecosystem message, the themes developed at each location need to be selected in order to thoroughly capitalize on the resources found there. Due to both its geographic location, and to its function as a coordination headquarters, Moran is given several excellent opportunities for developing such themes. The three that we will concentrate on are: *Geologic Processes* as an originating and unifying force in the ecosystem; *Animal Migration Patterns* as an indicator of ecosystem breadth; and *Water and Riparian Resources* as a networking element and a direct link to other ecosystems. The following list of exhibits and presentations will be incorporated in the Moran Interpretive Center to help expand on these themes:

### ❑ Relief Model of Ecosystem

The centerpiece of the interpretive program will be a large, detailed relief map of the entire ecosystem - useful for showing its distinct contrast with surrounding regions and the arbitrary nature of existing political boundaries. Incorporated with the model might be a short audio presentation that depicts the various resources or threats in the ecosystem. As the recording plays, back-lighting may be used to highlight the portion of the map being discussed.



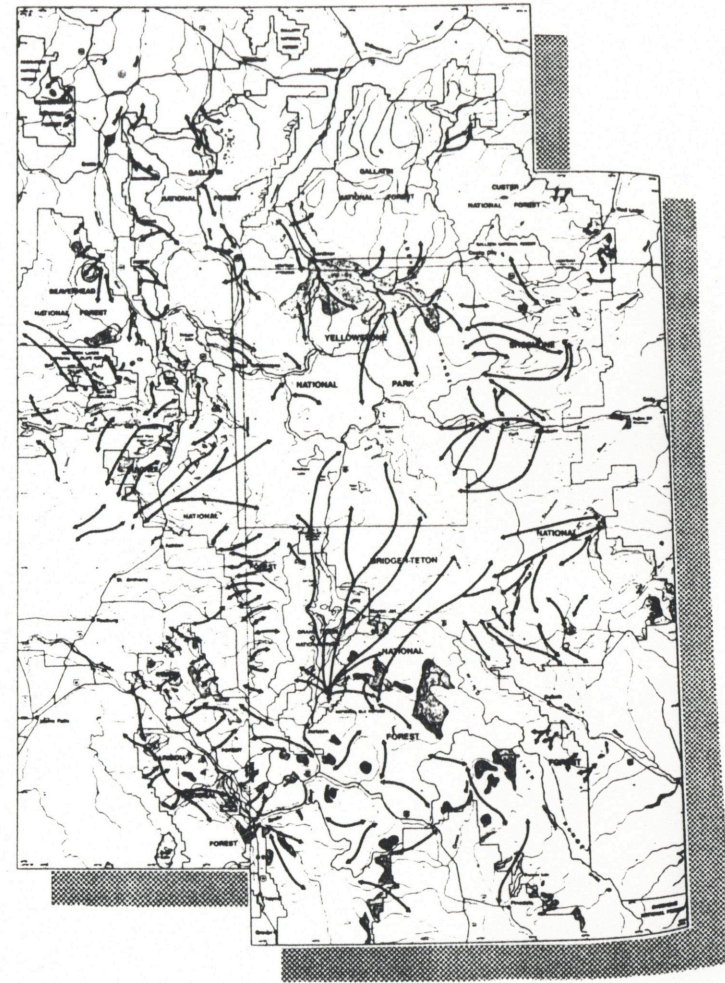


## ❑ Audio-Visual Presentation

Scheduled to run at frequent intervals, a slide show or movie offers a dramatic way to introduce the ecosystem to visitors who are more attentive or have extra time to spend at the center. By automating the process, large numbers of people may be accommodated without requiring personal attention. On the other hand, the presentation may be used simply as an introduction prior to speeches or question and answer sessions with the resident naturalist. During the off-season, the presentation may be suspended, scheduled to run less frequently, or altered to correspond to the current seasonal conditions. Equipment and space requirements will be met entirely by the planned auditorium.

## ❑ Story Board no. 1 - Elk Migration Routes

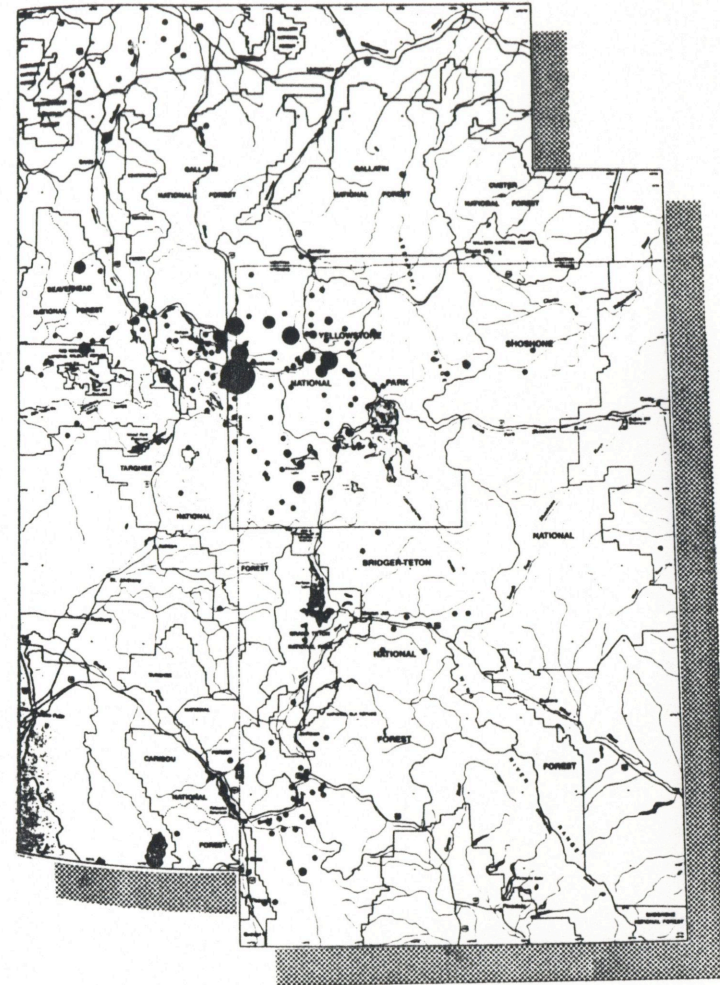
Moran happens to fall directly in the path of one of Yellowstone's largest elk herds as they make their way south to their winter range on the National Elk Refuge. At the right time of the year, visitors are likely to see the animals and hear them bugle - if not near Moran its self, then on the Refuge 30 miles south. The story board is to be comprised simply of a map and accompanying text that explains the migration patterns of these elk, their specific routes, and their dependency on the whole ecosystem.





❑ Story Board no. 2 - Seismic Activity

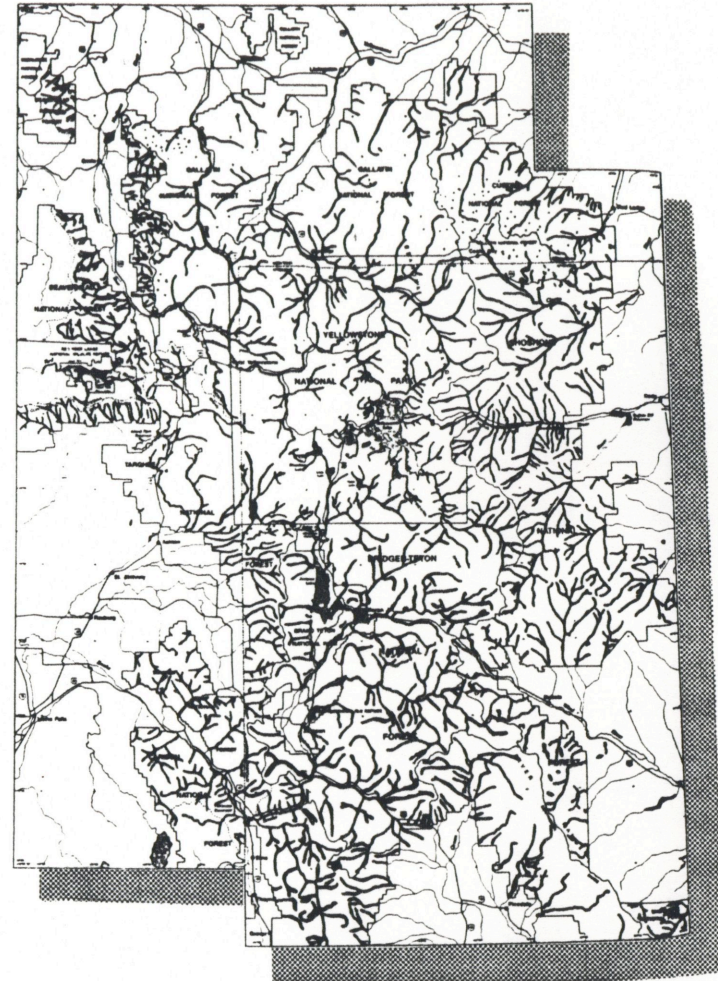
One of the best ways to define the parameters of an ecosystem is to recognize areas of similar landform and topography. With the Grand Tetons as backdrop, Moran is an ideal location for discussing the geologic forces of uplift and volcanism that are continuously creating the Greater Yellowstone. In addition to the regular activity that occurs along the Teton Fault, one of three "hot spots" of extreme seismic activity in the ecosystem lies just east of Moran near Togwotee Pass. The story board will consist of a map of the ecosystem showing seismic occurrences and their historical frequency. Linked by radio to remote monitoring stations, an actual seismograph will show activity as it occurs and the map will light to indicate approximate origin. In addition, a computerized display will offer a simulated time-lapse view of the complete millennial process.





❑ Story Board no. 3 - Riparian and Water Resources

We have already discussed the fact that Yellowstone contains the headwaters of the Colorado, the Missouri, and the Columbia Rivers. Understanding the far-reaching values of these waters gives us a new appreciation for the value of the Greater Yellowstone in an ecologically intact state. Understanding the dynamics of rivers, streams, and aquifers, and their tendency to move both into and out of the ecosystem is also important. Water can carry disease, organisms, or chemicals. Moran, located at the junction of three major waterways (The Main and Buffalo Forks of the Snake River and Pacific Creek), offers a first hand look at these resources. The story board will be a map of the ecosystem highlighting all the major waterways, wetlands, and riparian areas. From there, one can see the interlacing between the Park and the rest of the ecosystem. It will also show Yellowstone in the context of the entire continent's river system.





### ❑ Riparian Area Nature Trail and Arboretum

Further expanding on the theme of water resources, visitors may follow a self-guided nature trail originating at the Interpretive Center. On hardened, handicap-accessible paths, people may explore the riparian zone below the building site where they will be shown the various rivers, soils, and vegetation that constitute the area, as well as the wildlife that depends on it. On frequent occasions, muledeer, moose, coyotes, sandhill cranes, pelicans, canadian geese, bald eagles, and osprey can be seen.



### Defining an appropriate building character

The first, and easiest to discuss of the philosophical goals deals simply with the overall attitude that the buildings will assume - in effect, how the users will feel about the buildings and respond to them. To begin with, the administrative and research aspects of the project dictate the need for a straightforward, professional, and efficient layout to its buildings. This might also be useful in lending a "convincing" atmosphere to the educational portion of the program. Many of the visitors who will be experiencing the Interpretive Centers will have little or no previous knowledge of the ecosystem concept. While these are precisely the individuals we wish to reach, it is safe to assume that many will engage the new information with some level of reluctance and skepticism. Backed by the presence of an authoritative building, however, the ideas communicated may come across as more believable. The danger here will be in the tendency to produce a quality that is too polished or sterile. Imposing such a feeling on sites of this nature would not only be out of context, but out of step with the principles of environmental respect that we are trying to promote.

Organizational strategies will also play a role in determining the effectiveness of the facilities in their ability to function



as administrative pools. Since a major goal of the project is to improve relations between the various managerial coalitions, who in the past have had little opportunity to cooperate, establishing an ideal working environment could involve a delicate balance of agreements and understandings. On one hand, if the groups are forced into too collaborative of a relationship, then the result may be counterproductive. Many may feel pressured or over-administered and consequently be discouraged from using the facility. On the other hand, if the organization is too decentralized, then it will defeat the purpose of consolidating informational resources. What further complicates the issue is the diverse nature of groups who will be using the facility. Since each will have a different perception of ideal working arrangements, the resolution of these issues will inevitably be a compromise in some areas. By soliciting and responding to ideas from as many sources as possible, during the design phase of this project, an acceptable and effective solution is well within reach.

#### **Responding to the theme of cohesive administration**

As we have established, one of the goals for the future of the Greater Yellowstone Area is to promote the feeling of a more cohesive and cooperative administration. It stands to

reason then, that by achieving a common *aesthetic theme* to the various buildings which represent the area, this attitude could be advanced in a visual sense. The best way to arrive at this theme will be through the creation of a unique building design vocabulary, specifically for use with these Interpretive Centers.

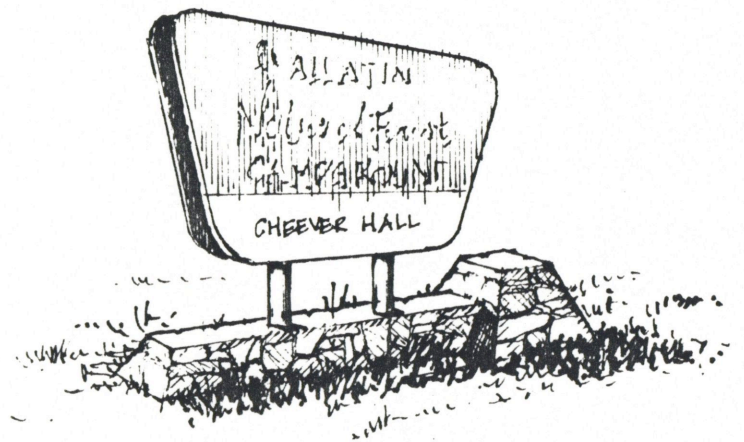
By giving the individual centers a common appearance, it will be possible to make them read as elements of a broader series - despite the fact that site and functional differences will cause variations in their overall designs. The "part of a larger whole" scheme is a metaphor for the ecosystem concept as it is defined, but the real value of such an accomplishment would be the example that it sets. As the Greater Yellowstone Interpretive Center program expands, and as other areas adopt similar ones, the architecture established here will be able to serve as precedent for the design of future required buildings.

The ability to realize an appearance that is at once unique, identifiable, and functional will be an effect due largely to the creation of, and the treatment of details. How the buildings are put together, rather than what ornament is applied or what forms are used, will be the key to conceiving a new architectural quality. The technical nature of the



Interpretive Centers, with their many specialized functions, provide several ideal design opportunities to exploit some of the requisite, but otherwise mundane, equipment that will be necessary for operation. Specific examples might include exterior billboards for public notices, radio towers for relay and tracking antennas, seasonal closure hardware, and highway signage.

The National Forest Service provides a good illustration of this potential with the signage motif that they have developed. This symbol, used to denote ranger stations, campgrounds, and recreational areas, has nearly acquired the

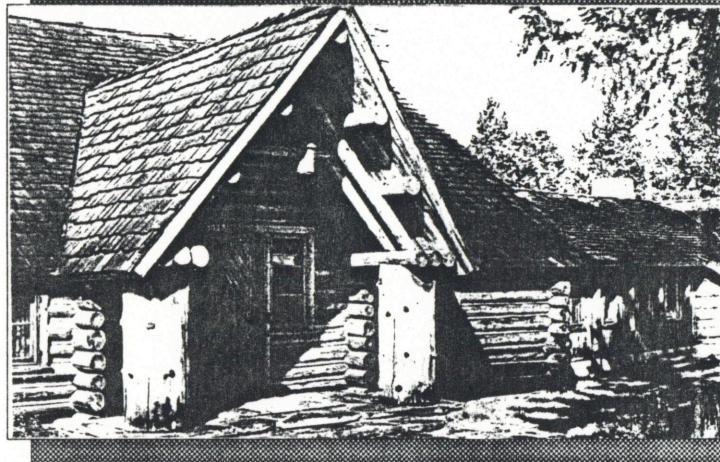
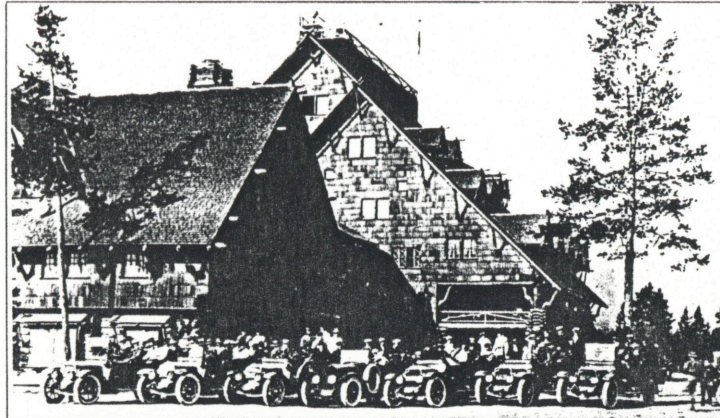


status of "cultural icon," and is recognized by travelers throughout the country. The prospect of being able to produce equally recognizable devices represents one of the more exciting design challenges of this project. Successfully doing so will greatly aid the task of devising a distinctive and identifiable architecture.

For the Interpretive Center Project, the generation of these "trademark" elements will in part be a derivation of such previously established motifs. In other cases, valid sources of inspiration might be the metaphorical qualities of the region's topography, the architectural traditions of the region's indigenous peoples, and the more recent "local" architecture styles.

Yellowstone, as is the case with many of the country's recreation areas, has a history of architecture that is as much associated with the experience of the Park as are its natural features. Largely due to the efforts of architect Robert Reemer, Yellowstone is home to several grand hotels, landmarks, bridges and other engineering masterpieces. These structures have not only been successful in complying with the park services policy of using indigenous materials, but they have done so in an innovative manner. The knotty pine structure of Old Faithful Inn and the battered





*Yellowstone's Old Faithfull Inn (top) and Grand Teton's AMK Ranch: two examples of structurally innovative uses for indigenous materials.  
(Architects: Reemer / Unknown)*

stone piers of Gardiner's Roosevelt Arch, as instances, have given birth to important vernacular styles. The challenge of this project is to respect these styles while trying to meet the unique demands of this program. In this case, the resource-exhaustive techniques of whole log construction (usually used for park structures) may be totally inappropriate. Instead, logs may be used more effectively and efficiently as occasional structural or aesthetic highlights. This same approach should be considered for all scarce or valuable building resources.

Despite the obvious advantage of well developed details, there are some other strategies available that will help to tie the individual centers together. Along with the incidental likenesses that will occur as a result of the similar programs, the manner in which each Interpretive Center addresses its site can be used to develop a general theme:

## Illustrating an awareness and respect for the natural environment

Another foundation of the Interpretive Center Project is the desire to convey the fundamentals of environmental responsibility to the people who will visit the centers. Care must be taken, then, not to demonstrate any contradictory ex-



amples. This is particularly true of the way that the buildings address their sites, since this is the design aspect visitors will notice most. They are here, after all, chiefly to celebrate the aesthetics of the land.

In the effort to arrive at an architecture that is harmonious with its site, it would be too easy to conclude that construction must be achieved without disturbance to the natural landscape. In most cases, due to climatic forces, previous site alterations, a particular unbuildable aspect of a site, or certain technical requirements of a building, such methods are not feasible.

For the purpose of this project, a better way to think of a building site, as Yellowstone Park is to its ecosystem, is as a part of a greater composition. Building and ground plane, indoor and out, should continuously relate and derive form from each other. Similarly, the localized building site should be an extension of *its* broader surroundings in the same compositional manner. Also implied, then, is that the Interpretive Centers must each be derived from their own individual sites and can not merely be duplicated and transplanted.

### **Architecture as commentary on the natural environment and its processes**

In the preceding discussion of building-site relations, we have seen one of the ways that abstract concepts can be used as a metaphor and embodied in a built form. We can use an understanding of the region's environmental systems in a similar manner. Defining "Standards of Naturalness," and the principles they suggest, has been a major philosophical task for the Park and Forest Services since they were created. Where past management utilized the practices of suppressing change, current policies stress the idea of letting nature run its course. The "let burn" policy, where naturally started fires are allowed to either burn indefinitely or extinguish themselves, is an example with which we are all familiar. Architecture can assume this same dynamic, or actively changing quality in several ways.

Compositionally, buildings should be "verbal phrases" rather than a collection of single static "words" or "notes." They should demand active participation from their users. In other words, one should not be able to completely grasp the meaning, or overall message, from any one vantage point or perspective. By delineating a necessary and proper experiential route through a building, an architect can effectively



direct a users learning process - both of the building itself, and of the message contained therein. If carried out successfully, these devices will prove to be an obvious benefit for the Interpretive Centers as their users become excited by the learning process and interested in continuing it.

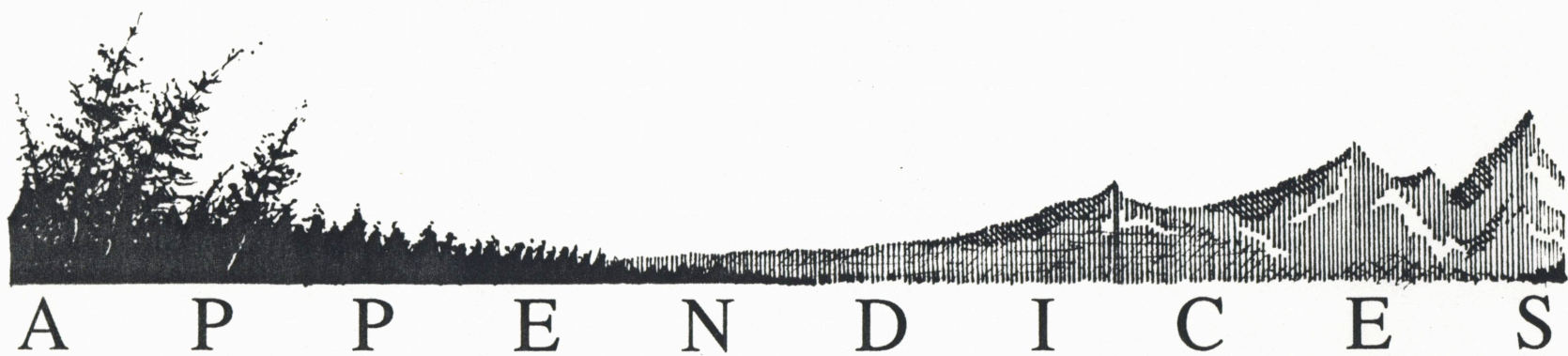
Finally, a building may be dynamic in a *chronologic* sense. The seasonal cycles, daily sun paths, and the aging or weathering qualities of the building materials can all work collectively in defiance of a static architectural quality.

### Defining a design process

With so many special design aspirations, it might well be appropriate to adopt a special approach towards achieving them. To this point, the concentration has been on gaining a thorough and sympathetic understanding of the need for, and the goals of the Interpretive Center Project. This has not been merely a formality, but in fact is a major part of the design process as we will define it. The belief here is that such a clear vision of the programmatic needs will in turn produce a set of subconscious, yet equally clear images of the built project. This imagery will then be sounded against, and imposed over the simultaneous development of an appropriate building plan. While some may interpret this process as one

of beginning with intuitive preconceptions, the argument would be that there is, in fact, no such thing as intuition - that all design decisions are based on a subconscious understanding of the program's requirements, whether they be specific technical needs, site issues, or the rules of architectural composition. By concentrating on the generation of the project's program, we are simply trying to direct an imagination process. Furthermore, the imagery developed in this phase will serve only as a starting point. Throughout the design process, it will be continuously re-evaluated against the needs of the program - particularly on the issues of site response and environmental impact.







### R-4 INTERPRETIVE PROJECT PLANNING GUIDE

May 1990

ORGANIZATION UNIT AND LOCATION:

DATE:

OPPORTUNITY:

#### A. DATA COLLECTION/ANALYSIS

1. **WHY?** Objective (What do you want the audience(s) to do with the information received?):

2. **WHO?** Audience (customer profile):

a. Numbers expected:

- (1) First-time customers:
- (2) Repeat customers:

b. Age/group makeup (children, young adults, adults, seniors/individually, families, tour groups, etc.):

c. Education levels:

d. Background (urban or rural):

2

e. Origin (local, in-state, regional, national, foreign):

f. Time available (amount of time customers have to receive message):

3. **WHAT?** Message (What are the key ideas to be communicated?):

a. Information customers are expecting (place first priority on customer needs):

b. Information you (Forest Service) want customers to have:

c. Theme (One sentence describing the dominant idea customers should leave with.):

4. **WHERE & WHAT?** Location and timing:

a. Best location(s) for presenting message:

3

b. Best time(s) for presenting (When are customers most available or receptive?):

## 5. HOW? Media:

a. Select most effective media for the project. This list may help you. Add other ideas. Number in order of priority.

- ☐ Audiovisual presentation
  - ☐ Personal
  - ☐ Slide tape
  - ☐ Video tape
  - ☐ Movie
- ☐ Auto or float tour
  - ☐ Guided
  - ☐ Self-guided (signs, brochure, or cassette tape)
- ☐ Brochure
- ☐ Demonstration (resource management, living history)
- ☐ Environmental education investigation
- ☐ Exhibit
  - ☐ Outdoor (roadside, trailhead, Forest entrance, office, etc.)
  - ☐ Indoor (reception area, visitor bureau, etc.)
  - ☐ Traveling (fairs, malls, conventions, etc.)
- ☐ Interpretive sign (points of interest)
- ☐ Staffed information point (office, visitor center, overlook, temporary roadside stop, trailhead)
- ☐ Nature trail
  - ☐ Guided
  - ☐ Self-guided (signs, brochure or cassette tape)

4

- ☐ Newsletter
- ☐ News Media short or feature
  - ☐ Magazine
  - ☐ Newspaper
  - ☐ Radio
  - ☐ Television
- ☐ Poster
- ☐ Short-range radio transmitter (auto AM or exhibit)
- ☐ Symposium
- ☐ Workshop
- ☐ Other

b. If several media are selected, how will their use be coordinated to effectively and economically reach the audience(s)?

6. Special needs (handicapped access, secretarial needs in reception areas, fragile site protection, interpretive association sales, etc.):



5

7. Evaluation (Design, into the project, a means for assessing its effectiveness.):

- Degree to which objective is achieved:

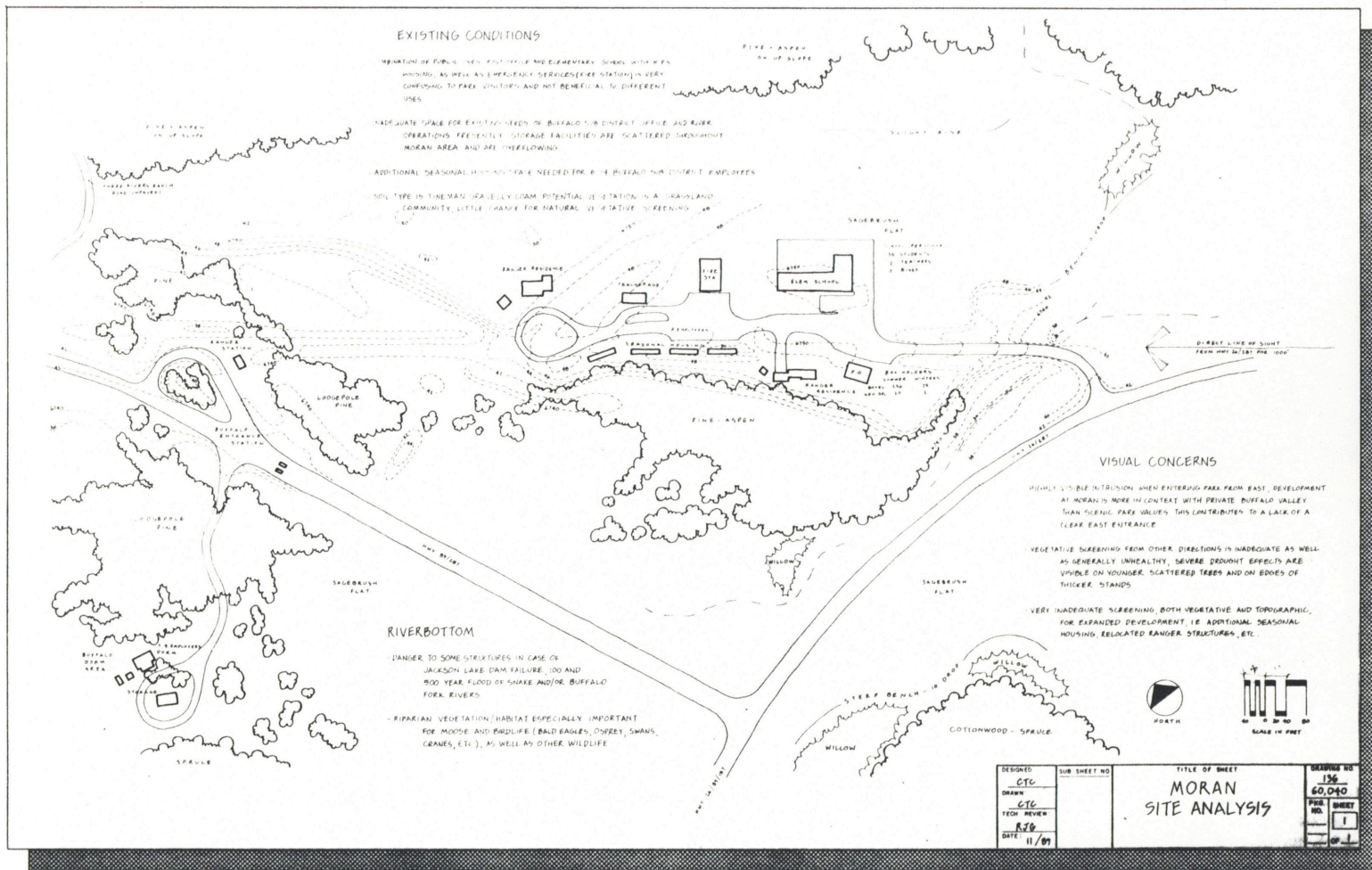
- Numbers of customers contacted:

- Overall customer reaction:

- Modifications needed to achieve "Standard Service Level" (or discontinue): See FSM 2390 and R-4 Supp 85 - 12/88

8. Approvals:

|       |       |       |
|-------|-------|-------|
| Name  | Title | Date  |
| _____ | _____ | _____ |
| Name  | Title | Date  |
| _____ | _____ | _____ |
| Name  | Title | Date  |
| _____ | _____ | _____ |





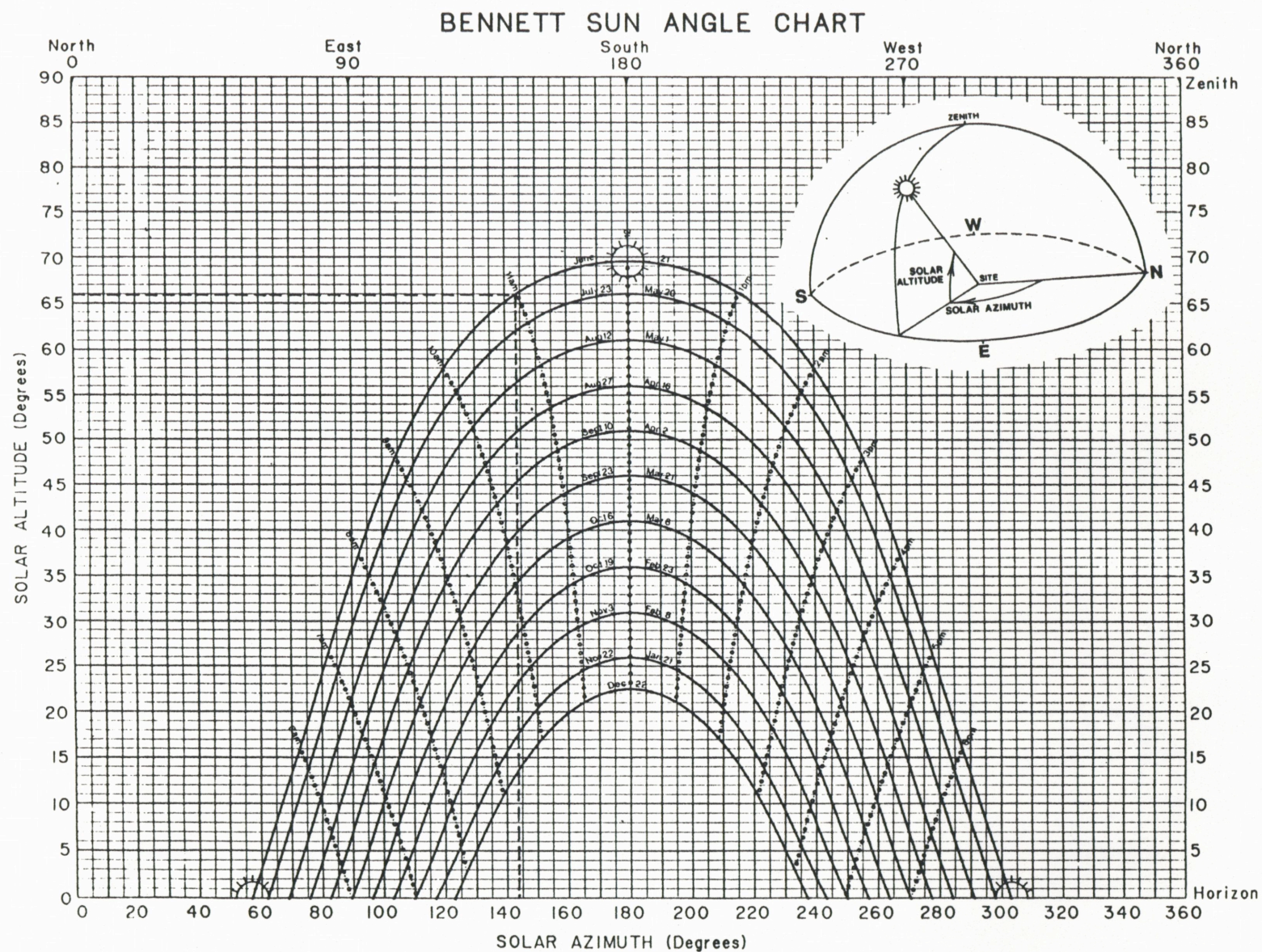
# Appendix C: Meteorological Data

45

| Month      | Temperature   |               |           |                |               |                                       |                | Precipitation |                |             |                |                                               |
|------------|---------------|---------------|-----------|----------------|---------------|---------------------------------------|----------------|---------------|----------------|-------------|----------------|-----------------------------------------------|
|            | Means         |               |           | Extremes       |               | Mean number of days with minimum of-- |                | Mean          | Greatest daily | Snow, Sleet |                | Average number of days with 0.10 inch or more |
|            | Daily maximum | Daily minimum | Monthly   | Record highest | Record lowest |                                       |                |               |                | Mean        | Greatest daily |                                               |
|            |               |               |           |                |               | 32° F and below                       | 0° F and below |               |                |             |                |                                               |
|            | <u>°F</u>     | <u>°F</u>     | <u>°F</u> | <u>°F</u>      | <u>°F</u>     |                                       |                | <u>In</u>     | <u>In</u>      | <u>In</u>   | <u>In</u>      |                                               |
| January--- | 25.5          | 2.9           | 14.2      | 55             | -44           | 31                                    | 14             | 1.43          | 1.15           | 15.7        | 10.0           | 5                                             |
| February-- | 31.1          | 5.9           | 18.5      | 58             | -48           | 28                                    | 11             | 1.32          | 0.80           | 15.2        | 9.3            | 5                                             |
| March----- | 38.9          | 13.3          | 26.1      | 63             | -29           | 30                                    | 6              | 1.20          | 0.75           | 11.7        | 8.3            | 4                                             |
| April----- | 52.5          | 24.3          | 38.4      | 76             | -5            | 26                                    | *              | 1.20          | 1.05           | 4.0         | 7.0            | 4                                             |
| May-----   | 63.2          | 30.4          | 46.8      | 86             | 13            | 20                                    | 0              | 1.50          | 0.88           | 1.2         | 7.0            | 5                                             |
| June-----  | 71.8          | 36.1          | 54.0      | 94             | 18            | 8                                     | 0              | 1.51          | 0.95           | **          | 0.6            | 5                                             |
| July-----  | 81.7          | 40.1          | 60.9      | 101            | 24            | 3                                     | 0              | 0.75          | 0.60           | 0.0         | 0.0            | 2                                             |
| August---- | 80.1          | 37.8          | 59.0      | 95             | 18            | 7                                     | 0              | 1.12          | 1.13           | 0.0         | 0.0            | 3                                             |
| September- | 72.0          | 31.0          | 51.5      | 93             | 13            | 19                                    | 0              | 1.04          | 0.92           | 0.5         | 3.0            | 3                                             |
| October--- | 60.0          | 23.6          | 41.8      | 79             | 1             | 26                                    | 0              | 1.11          | 0.84           | 2.1         | 11.0           | 3                                             |
| November-- | 39.8          | 14.0          | 26.9      | 65             | -27           | 28                                    | 6              | 1.11          | 1.12           | 9.2         | 12.0           | 4                                             |
| December-- | 29.3          | 6.9           | 18.1      | 58             | -36           | 30                                    | 11             | 1.54          | 1.17           | 16.0        | 19.0           | 5                                             |
| Year-----  | 53.8          | 22.2          | 38.0      | 101            | -48           | 256                                   | 48             | 14.83         | 1.17           | 75.6        | 19.0           | 48                                            |

\* Less than one half.  
\*\* Trace, an amount too small to measure.







**58—Tetonville-Wilsonville fine sandy loams.** These nearly level soils are in old braided stream channels in flood plains along the Snake River. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

This map unit is about 40 percent Tetonville fine sandy loam and 40 percent Wilsonville fine sandy loam. Areas of these soils are too intermixed to be mapped separately.

Tetonville very gravelly sandy loam and a soil that is poorly drained but is otherwise similar to the Tetonville soil are included in mapping. They make up 20 percent of the unit.

The very deep, somewhat poorly drained Tetonville soil formed in alluvium. In a typical profile the surface layer is grayish brown fine sandy loam 8 inches thick. The upper 9 inches of the underlying material is light brownish gray fine sandy loam. The lower part to 60 inches or more is light brownish gray extremely gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. The seasonal high water table is at a depth of 1 to 3 feet during May to July. The soil is subject to occasional brief to long periods of flooding in May and June. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, somewhat poorly drained Wilsonville soil formed in alluvium. In a typical profile the surface layer is grayish brown fine sandy loam 7 inches thick. The upper 22 inches of the underlying material is light brownish gray fine sandy loam and very fine sandy loam.

The next 25 inches is light brownish gray loamy coarse sand. The lower part to 60 inches or more is light brownish gray extremely gravelly loamy coarse sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight. The seasonal high water table is at a depth of 1 to 3 feet during May to July. The soil is subject to rare flooding for brief periods during May and June.

Both soils are used for irrigated hay and pasture and for homesites, recreation, and wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support about 4 animal units per month.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hay and pasture. The amount of red clover in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Red clover responds to phosphate.

The potential vegetation of these soils is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheat-



grass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Wetness is a hazard to basements in dwellings and to onsite sewage disposal. Flooding also is a hazard.

Campgrounds and trails are the main recreation facilities. Sometimes they are muddy.

These soils provide food and cover for moose, elk, deer, small mammals, and birds.

The capability subclass is IVws irrigated and IVws dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

**60—Tineman gravelly loam.** This very deep, well drained soil is along the Snake River throughout the central part of the survey area. It formed in gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent, but the slope is mainly about 2 percent.

Small areas of Bearmouth and Charlos soils are included in mapping.

In a typical profile the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum

is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

Most areas of this soil are rangeland and are used for recreation, wildlife habitat, and grazing. A small acreage is used for irrigated hay and pasture. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 3 1/2 animal units per month.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain brome grass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition.

Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

This soil provides some food for antelope, sage grouse, deer, elk, small mammals, and birds.

Orchardgrass, Regar brome grass, smooth brome grass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats



is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications of water are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate fertilizer.

The capability subclass is IVs irrigated and IVs dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

| Community:                         |                                                                                                                                                                                                    | Sagebrush Ecosystem |                                                                                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Found:</b>                      | Dry slopes.                                                                                                                                                                                        | <b>Soil:</b>        | Best growth on deep, loamy soils. Usually free of alkali. Some sage species indicate heavy clay with high shrink-swell potential.                      |
| <b>Dominant Plants:</b>            | Over 20 percent sagebrush ( <i>Artemisia</i> ); also rabbitbrush ( <i>Chrysothamnus</i> ), bitterbrush ( <i>Purshia tridentata</i> ), and saltbush ( <i>Atriplex</i> ). Various grasses and forbs. | <b>Aesthetics:</b>  | Usually monotonous. Can partially screen low structures that are similar in color.                                                                     |
| <b>Interspersed with:</b>          | Pinyon-juniper and aspen ecosystems.                                                                                                                                                               | <b>Problems:</b>    | Vulnerable to gully erosion from concentrated runoff. Change to other vegetation types limited by low moisture levels. Sage burns readily. High winds. |
| <b>Growth:</b>                     | Moderate, stable.                                                                                                                                                                                  | <b>Benefits:</b>    | Excellent food and cover for wildlife. Regenerates after disturbance.                                                                                  |
| <b>Diversity and Productivity:</b> | Low.                                                                                                                                                                                               |                     |                                                                                                                                                        |
| <b>Sensitivity to Disturbance:</b> | Low.                                                                                                                                                                                               |                     |                                                                                                                                                        |
| <b>Water:</b>                      | Water tables very deep; low precipitation (6 to 20 inches annually, half as snow). High evaporation rates.                                                                                         |                     |                                                                                                                                                        |

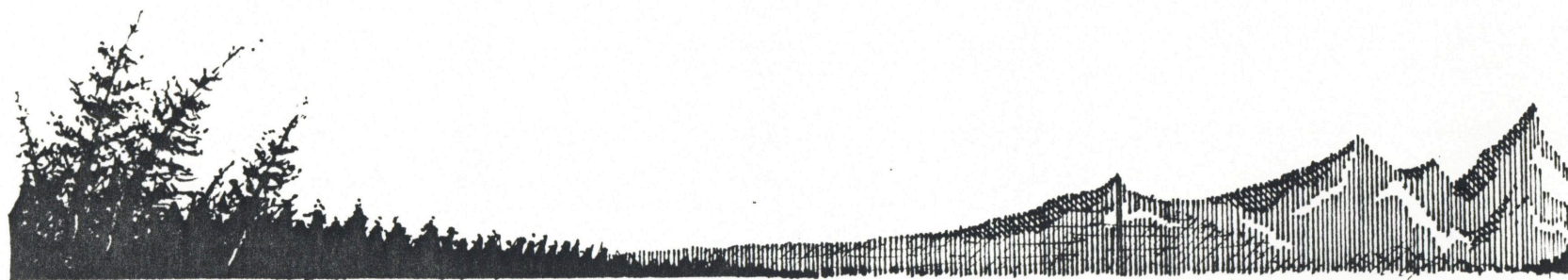


| Community:                         | Riparian                                                                                                                                                                                                 |                    |                                                                                                                                                                           |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Found:</b>                      | Adjacent to aquatic ecosystems in streams and some lakes. Transects wide elevational range.                                                                                                              | <b>Water:</b>      | Very shallow water table, abundant soil moisture.                                                                                                                         |
| <b>Dominant Plants:</b>            | Willow ( <i>Salix</i> ), cottonwood ( <i>Populus</i> ), alder ( <i>Alnus tenuifolia</i> ), aspen ( <i>Populus tremuloides</i> ), blue spruce ( <i>Picea pungens</i> ); variety of rushes, sedges, forbs. | <b>Soil:</b>       | Highly organic and fine-textured surface soils over alluvial subsoils, which act as aquifers and filters to trap soil erosion from adjacent slopes.                       |
| <b>Growth:</b>                     | Rapid; short life span, regenerates by sprouting.                                                                                                                                                        | <b>Aesthetics:</b> | High visual interest within and at water's edge. Summer screening, fall color. Lots of deadwood.                                                                          |
| <b>Diversity and Productivity:</b> | Highly diverse and productive.                                                                                                                                                                           | <b>Problems:</b>   | Poorly suited for any development of structures or underground utilities. High flood hazard; cold air drainage follows stream gradient.                                   |
| <b>Sensitivity to Disturbance:</b> | Moderate unless moisture regime is changed. Soil disturbance affects water quality.                                                                                                                      | <b>Benefits:</b>   | Root mat stabilizes stream banks. Vegetation has positive influence on surface and subsurface water quality. Important food producer for wildlife and fish. Fire barrier. |

| Community:                         |                                                                                                                                    | Lodgepole Pine Forest |                                                                                                                                                                                                                                        |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Found:</b>                      | South- and west-facing slopes, 8000 to 10,500 feet. Best growth 9000 to 10,000 feet. Needs full sun.                               | <b>Water:</b>         | Needs well-drained sites. Water table typically deep. Requires more moisture than do lower-elevation trees (ponderosa, Douglas fir) but more sun and warmth than higher-elevation trees (spruce, aspen). Can withstand summer drought. |
| <b>Dominant Plants:</b>            | Lodgepole pine ( <i>Pinus contorta</i> ).                                                                                          | <b>Soil:</b>          | Many types. Takes to dry, rocky, light-textured soil better than do associated species.                                                                                                                                                |
| <b>Associated with:</b>            | Most often in pure stands but found (rarely) with ponderosa pine ( <i>Pinus ponderosa</i> ), aspen ( <i>Populus tremuloides</i> ). | <b>Aesthetics:</b>    | Good screen; uniform color and texture. Cuts obvious.                                                                                                                                                                                  |
| <b>Growth:</b>                     | Slow, long lived; subclimax species (may be climax species where there are no other seed sources).                                 | <b>Problems:</b>      | High wildfire hazard. Needs fire and sun to reseed. Disease and windfall possible where clearings are cut. Indicates heavy snowfall; avalanche danger on slopes.                                                                       |
| <b>Diversity and Productivity:</b> | Very limited diversity; low to moderate productivity.                                                                              | <b>Benefits:</b>      | Controlled revegetation with lodgepole has been very successful in many areas.                                                                                                                                                         |
| <b>Sensitivity to Disturbance:</b> | Very low; can withstand considerable disturbance by clear-cutting or fire.                                                         |                       |                                                                                                                                                                                                                                        |







R E F E R E N C E S



<sup>1</sup> Act of March 1, 1872; ch. 24, 17 stat. 32  
16 U.S.C. Chapter 1, Subchapter V.

<sup>2</sup> U.S. Department of the Interior, National Park Service.

<sup>3</sup> Dainth, John, and Elizabeth Tootill. A Dictionary of Biology. Intercontinental Book Productions, Ltd., Berkshire, 1980.

<sup>4</sup> Committee on Interior and Insular Affairs, U.S. House of Representatives, Subcommittee on Public Lands, 99 U.S.C., 2nd Session, Print no. 6, Greater Yellowstone Ecosystem, 1986. pg.7.

<sup>5</sup> Ibid., pg. 34.

<sup>6</sup> Photo by Rick Graetz

<sup>7</sup> Committee on Interior and Insular Affairs, pg. 32.

<sup>8</sup> Ibid., pg. 167.

<sup>9</sup> Ibid., pg. 33.

<sup>10</sup> Greater Yellowstone Coordinating Committee, A Vision For The Future, Yellowstone National Park, 1990.

<sup>11</sup> Grand Teton National Park Service, Teton Corridor Development Plan, Jackson, WY: 1990, pp. 22-25.

<sup>12</sup> Ibid., pp. 19.

<sup>13</sup> Dorward, Sherry, Design for Mountain Communities, New York: Van Norstrand Reinhold, 1990, pp. 140.

<sup>14</sup> Ibid., pp. 374-379.

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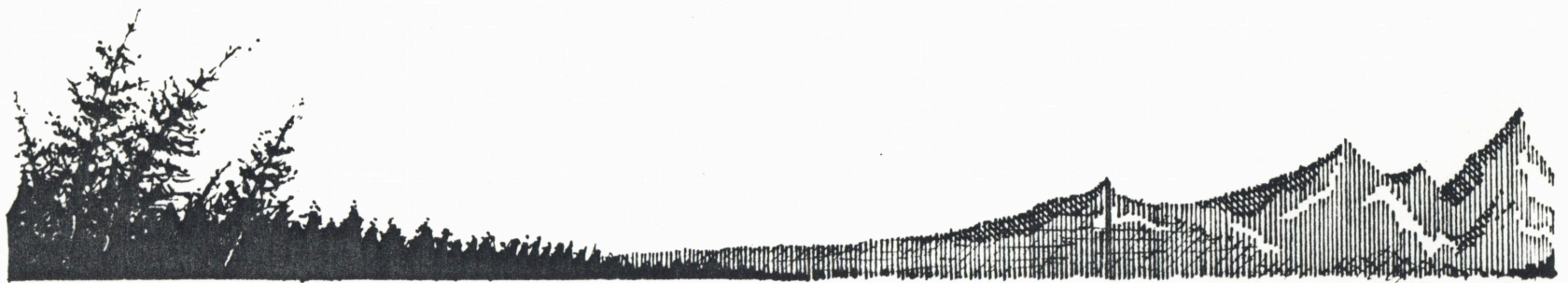
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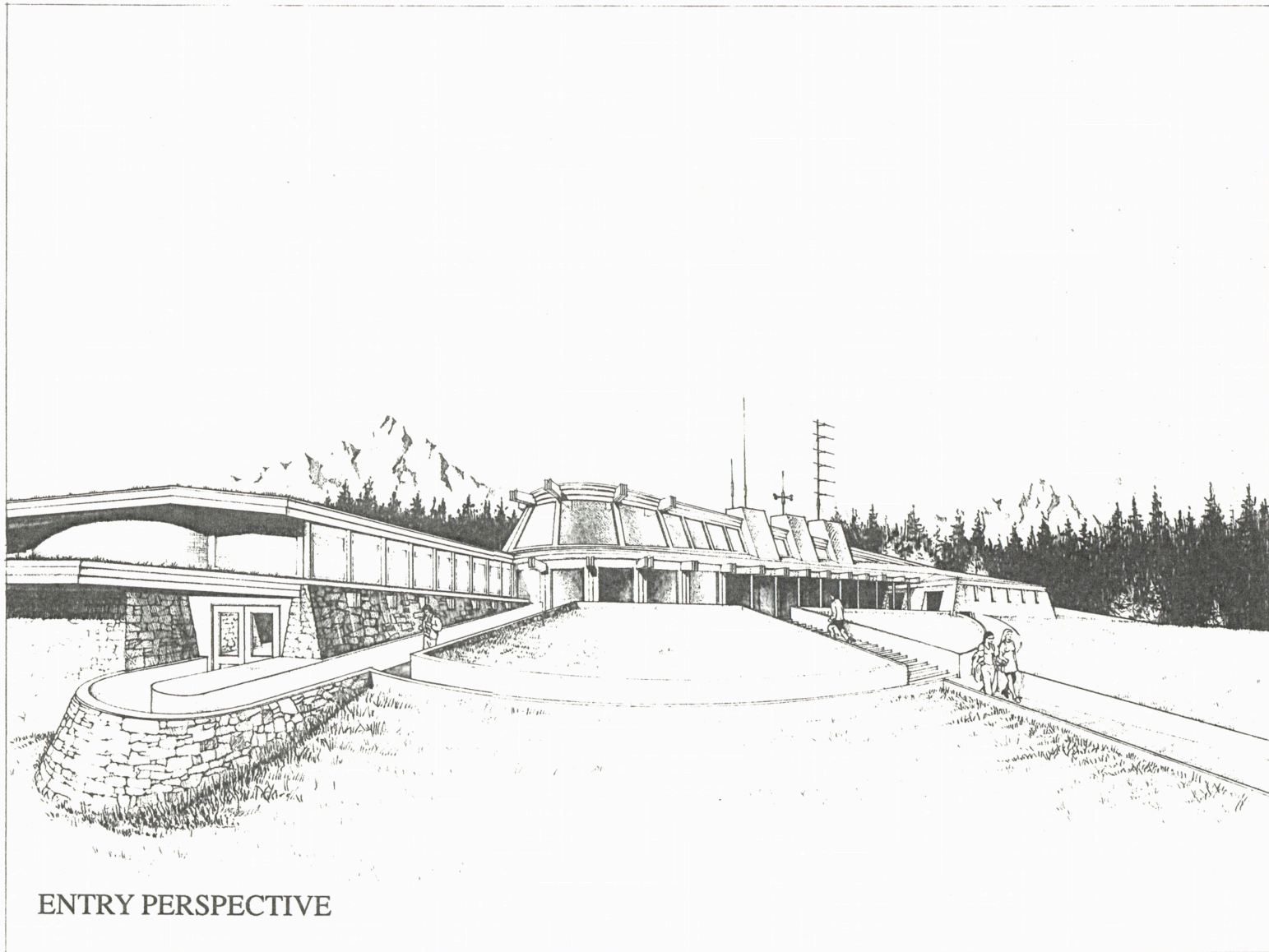
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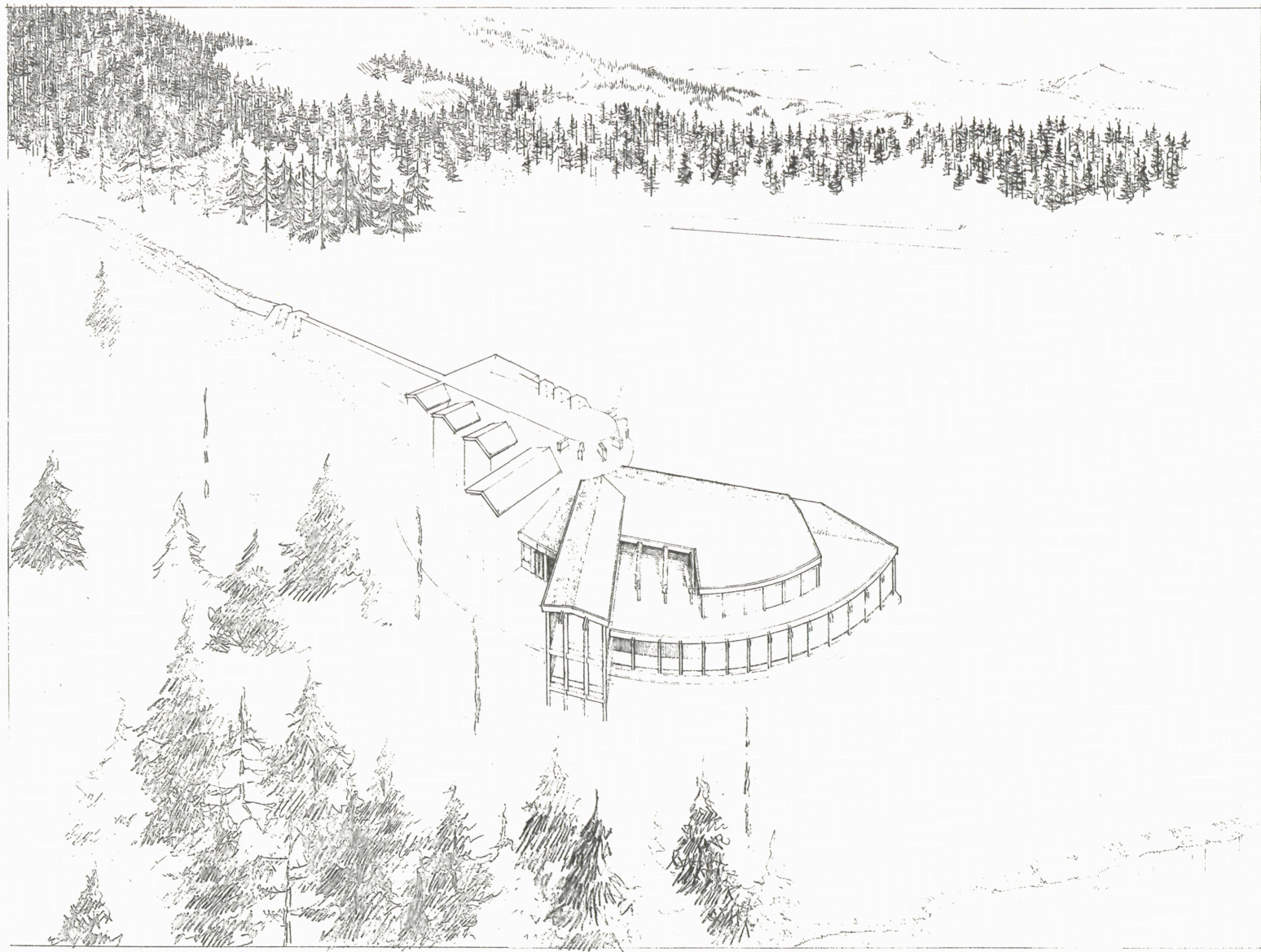


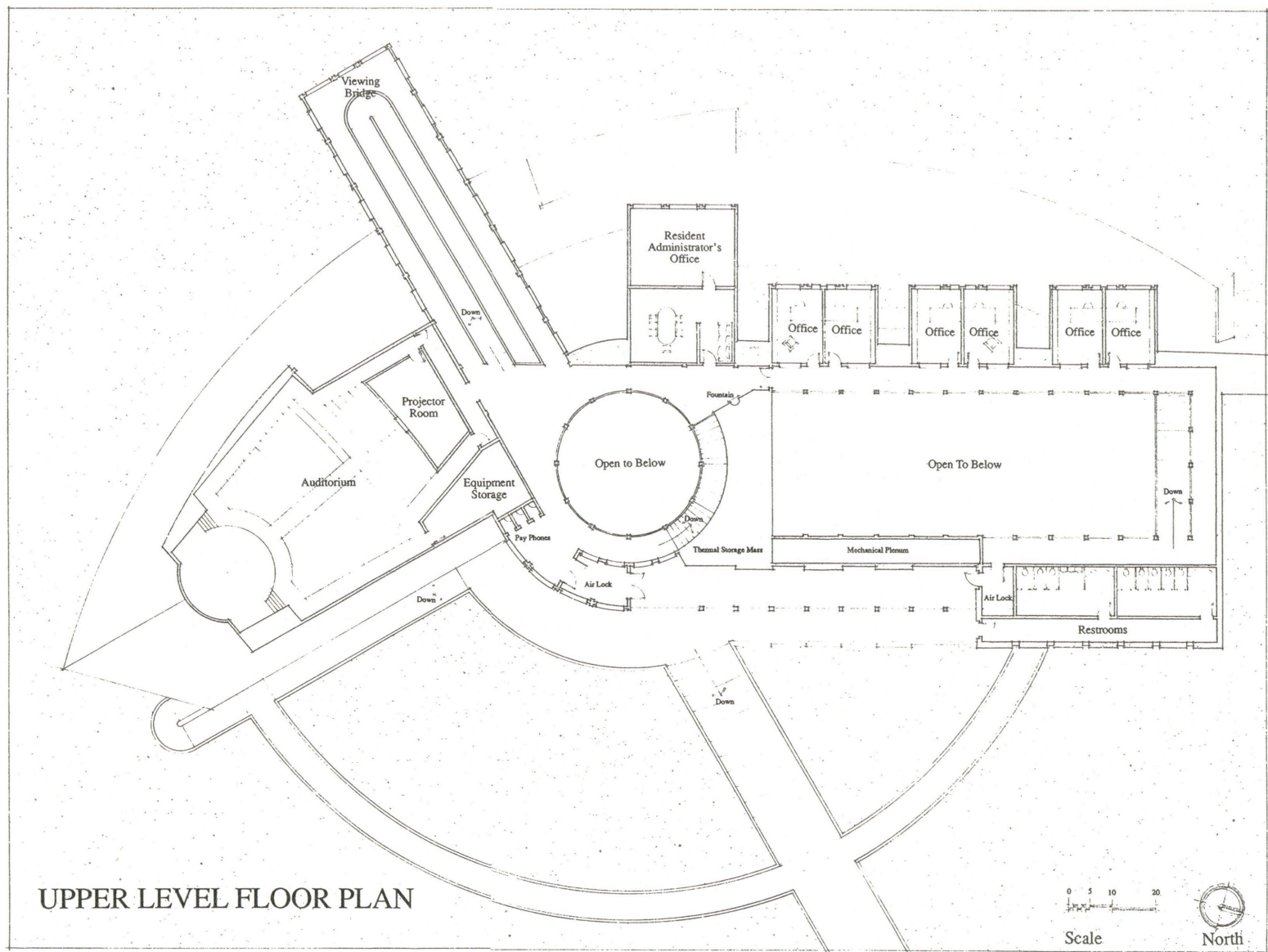
A DESIGN SOLUTION



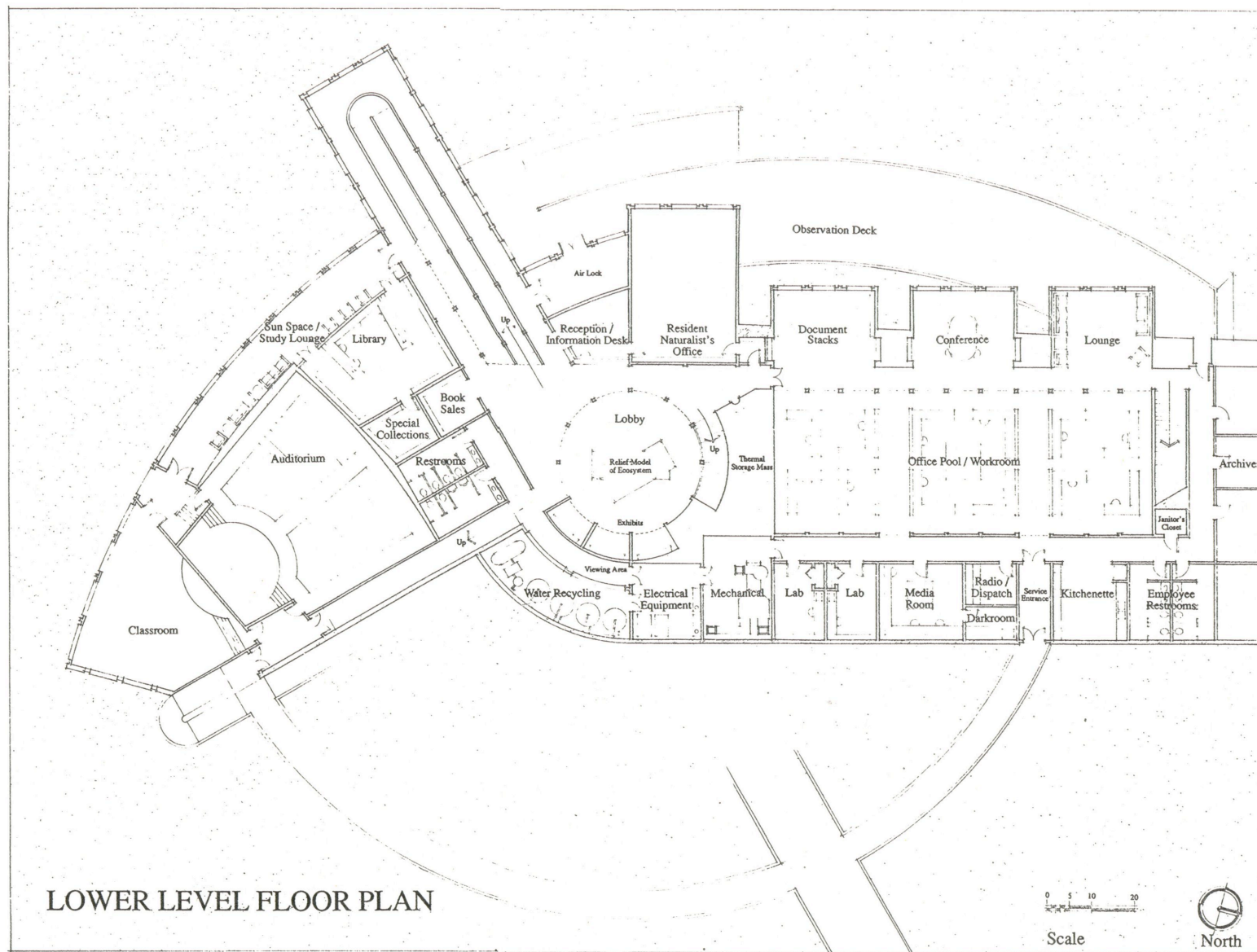
ENTRY PERSPECTIVE







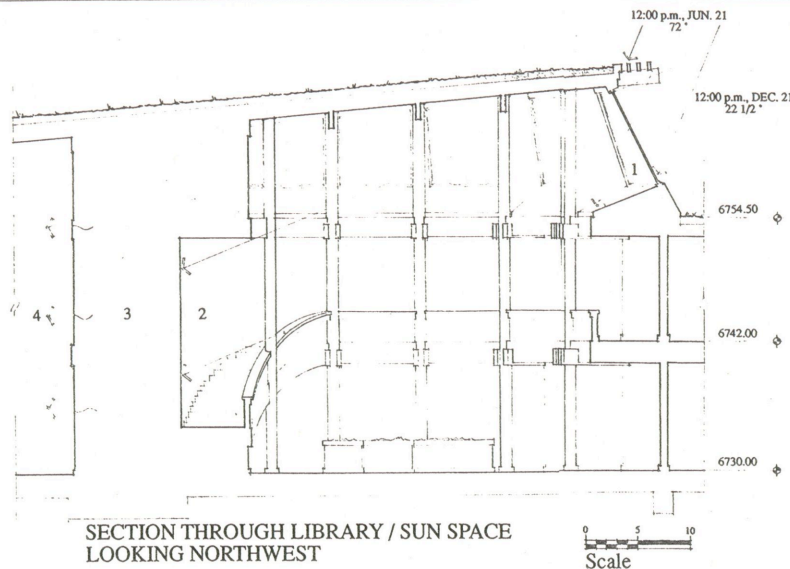






SECTION THROUGH  
ADMINISTRATIVE WING





Passive solar heating is used elsewhere in the Interpretive Center as well. A large curved reading lounge, which flanks the library, classroom, and auditorium spaces, doubles as a direct gain sun space. Dark granite floor tiles absorb solar energy and transfer it to a rock storage bed below (5). Solar panels located below the windows (6) add to the solar gain and provide the convection currents necessary to drive the "thermosiphon" loop which moves heat to the internal spaces (7).

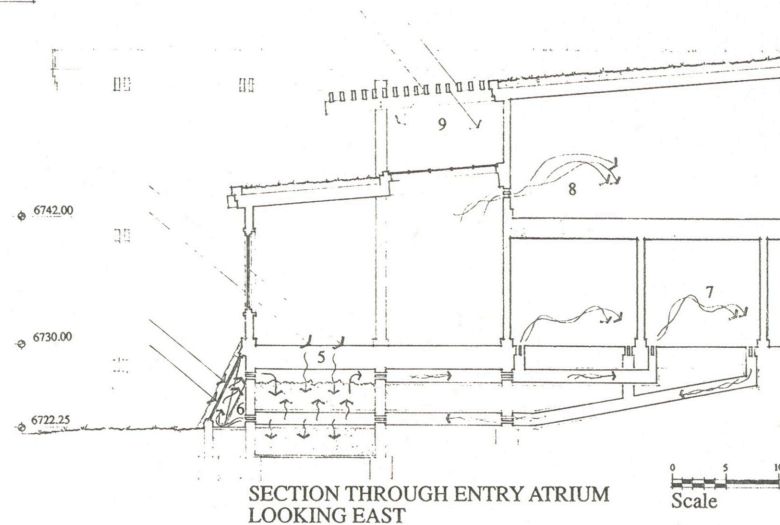
The auditorium extracts heat directly from the sun space or vents it through a system of sound-isolating louvers (8).

Diffused natural light is allowed to enter the formal library through a large structural skylight and a louvered trellis (9).

## SOLAR OPERATION

The volumes of a building should not be mere static enclosures, but should provide their occupants a constant sensory awareness of the external environment. The central lobby and entry atrium of the Greater Yellowstone Interpretive Center does exactly this. It celebrates not only the natural surroundings, but the constant cycles of change that they undergo. A high band of clerestory windows provides a glimpse of the sky and animates the space with a dynamic display of shadows and changing light qualities as it tracks the sun through its daily arc.

The windows are designed to permit direct sunlight into the space only when it is most needed or when it is least severe. At mid-day during the summer months, only reflected light is allowed to enter, thanks to shading devices and sloped glazing (1). In the morning, evening, and during the winter months, light rays are able to penetrate directly into the atrium (2) where they supply heat gain for a large thermal storage mass at the north side of the space (3). This mass collects solar energy to be radiated back into the building as heat during the night (4).









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