Miller|Wihry|Lee Inc. Louisville, Kentucky

The Design Collaborative at Ames Ames, Iowa

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Master Plan Report

Volga River State Recreation Area

Prepared for:
Iowa Conservation Commission
May 1980

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FOREWORD

This report presents the results of more than a year's study of the Volga River State Recreation Area. The size of the area and the significance of its resources emphasize the need for a long range master plan to assure systematic approaches to its conservation, use and management.

The consulting planning team included:

MILLER/WIHRY/LEE INC.	Campbell E. Miller William H. Ray Joseph H. Ballard Glen A. Early Charles B. Eilerman Woodrow W. Smither Benjamin S. Wihry Philip F. Wood J. P. Courtney Yartz
DESIGN COLLABORATIVE AT AMES	David L. Dahlquist William J. Grundmann James B. Sinatra Mary Clarke John Eckardt Patrick Avelman Margaret Whitehill
SCRUGGS AND HAMMOND	Donald Luebbe

The planners are indebted to the chairman and members of the Iowa Conservation Commission Staff Task Force for their construction contributions and critical assistance.

SECTION I

Introduction and Historical Background

I

INTRODUCTION AND HISTORICAL BACKGROUND

A. AREA HISTORY

In the late 1950's, the Iowa Conservation Commission purchased the 333-acre Big Rock Wildlife Area using Pittman-Robertson Federal Wildlife Funds. This area, located northeast of Fayette along the Volga River, has been and is being managed for wildlife purposes. Funding stipulations require that this area continue to be used primarily for wildlife purposes.

In the early 1960's, considerable local interest grew around the idea of creating a major state recreation area in northeast Iowa near the Big Rock area north of Fayette. The recreation area was envisioned with a large lake as a primary feature. Several lake proposals ranging in size from 800 to 1,140 acres were considered. Feasibility studies showed, however, that leakage would occur due to the high transmissibility of the limestone valley walls which would have contained the lake.

Meanwhile, the Iowa Conservation Commission undertook a major land acquisition effort which resulted in over 5,000 acres of public land being acquired for the purpose of being developed and managed as a state recreation area. A total of 5,400 acres including the 333-acre Big Rock area has been acquired to date. The majority of the land acquisition occurred during a period from 1968 to 1971.

In the early 1970's, the Iowa Conservation Commission proposed to seek an alternative site for a large lake on the site. Frog Hollow Creek, a tributary of the Volga River, was considered a possibly good location for such a feature. A 560 acre lake was proposed. Engineering feasibility study of the 560 acre lake proposal indicated that the lake bed probably would leak due to subsurface soil and geological conditions; and the entire bed would require sealing with an impervious clay blanket. The cost of such an improvement proved prohibitive.

Next, the Commission studied an alternative of building three small "finger lakes". These lakes varied in size from 45 acres to 55 acres to 135 acres and all three would have required a clay blanket liner to prevent seepage. In 1977, the State Legislature appropriated funds and directed the Commission to construct the proposed 135-acre lake which was shown to provide the best cost benefit ratio of the three "finger lake" proposals. Construction began in 1978 and is near completion at this writing.

B. PURPOSE OF MASTER PLAN STUDY

The master plan is a comprehensive guide for the development, use and management of a state recreation area, state park or, state fish and wildlife area, or other state conservation recreation areas. Generally speaking, intensive master plan studies are conducted of large scale projects which involve potential for high levels of public usage on sites with

unique, significant, richly diverse features. The Volga River State Recreation Area, due to its location, natural features and size, merits such a study. The master plan study is the highest level of planning effort available for state conservation recreation areas.

The master plan serves not only as a tool for the Commission staff during development but also provides a long-range capital project budget program for use by Commission administration in preparation of the legislative budget request. A master plan brings together in a logical and comprehensive manner all elements and expertise which must interact to provide an effective and quality public facility; not only in the sense of physical construction but also in operation, maintenance and future programming.

Since the early 1970's, when much of the Volga River State Recreation Area was purchased, it has been managed according to interim plans developed by various Commission operating sections, notably the Parks Section and Wildlife Section. With the eminent completion of Frog Hollow Lake and an anticipated increase in both public awareness and usage of the site, the need for conducting a comprehensive master plan study for the area has been recognized. In the most recent five year planning program for Iowa Conservation Commission property, published in July 1978, the Volga River State Recreation Area was identified as a high priority planning project.

C. MASTER PLANNING PROCESS

The master plan study as structured by the Iowa Conservation Commission seeks sound conservation recreation planning decisions through a rational planning process. This process includes systematic periodic review with the public review committee and the Iowa Conservation Commission Staff Task Force. The emphasis of the planning process is on analytical approaches, examination of alternative solutions, concept selection, and plan preparation. The final product of the master plan study is a plan for achieving the selected alternative concept. The final product is a combination of graphic plans (maps, drawings) and written text (implementation procedures, schedules, development requirements, and cost).

1. Analysis

The initial phase of the master planning process is two-fold, including: (1) an analysis of recreation needs, supplies and demands, and (2) an analysis of site conditions, limitations, and suitability. Recreation needs, supplies, and demands are determined by studying population demographics, existing recreational opportunities, anticipated or realized recreation demand, and projected facility needs. Public input is important in determining these needs. Site conditions, limitations, and suitability are determined by studying such factors as location and access, surrounding land-uses, historic and archeological features, geology, topography, soils, vegetation, wildlife, aquatic life, and visual characteristics. Environmental studies of the Volga River State Recreation Area have been recently completed by a team of scientists from Luther College in Decorah, Iowa. These studies have been used extensively in the Volga River Recreation planning process to guide development decisions and to suggest plans and programs for assuring that users appreciate the area and learn from their visits.

2. Alternative Approaches

Following the analysis stage of the planning process, various alternative approaches for developing, using, and managing the site are considered. Iowa Conservation Commission procedures require that at least three alternative approaches be considered in the master planning process. The exact number of alternatives will vary from project to project. The alternative concepts are studied for feasibility based on such factors as functions, economy, environmental impact, public desires, and compatibility with established Commission goals and objectives. Public involvement in the review of alternatives is crucial to the success of the process.

3. Concept Selection

Following the feasibility study of proposed alternative approaches, the one alternative concept which has been shown to be most feasible and desirable is chosen as the project plan. Again, public review of this selection is an integral part of the master planning process.

4. Plan Preparation

Following selection of a concept for development use and management of the project area, refinement and detailing of the plan progresses. Elements of the plan include: recreation program (what facilities and uses are needed and in what quantity); land-use plan (where use areas are to be located); siting and space requirement of proposed facilities; delineation of pedestrian and vehicular routes and parking or staging areas; utility systems (sewage collection and treatment, water treatment and distribution, electricity, lighting and other utilities); grading and drainage concepts; landscaping concepts; land management programs; architectural styles; operational plans; staff requirements; phasing for implementation and cost estimates. Following completion of the plan, public hearings are held and the Iowa Conservation Commission takes final action on the plan. Once the plan has received Commission approval, engineering drawings are prepared, the necessary funds are appropriated, and the facilities and programs are implemented in orderly development phases.

The planning concepts stated above have been structured into a 14-step process which has been utilized for this project (see figure 1.)

At critical decision making points in the process, reviews were scheduled with a staff task force, a public review committee, and the Iowa Conservation Commissioners.

The staff task force is composed of Iowa Conservation Commission staff members representing the various divisions and sections which make up the Commission. The staff task force members bear the responsibility of assisting in preparation of the master plan. Staff task force members provide technical review and input data for incorporation into the final plan. The following staff persons served on the Volga River State Recreation Area Task Force:

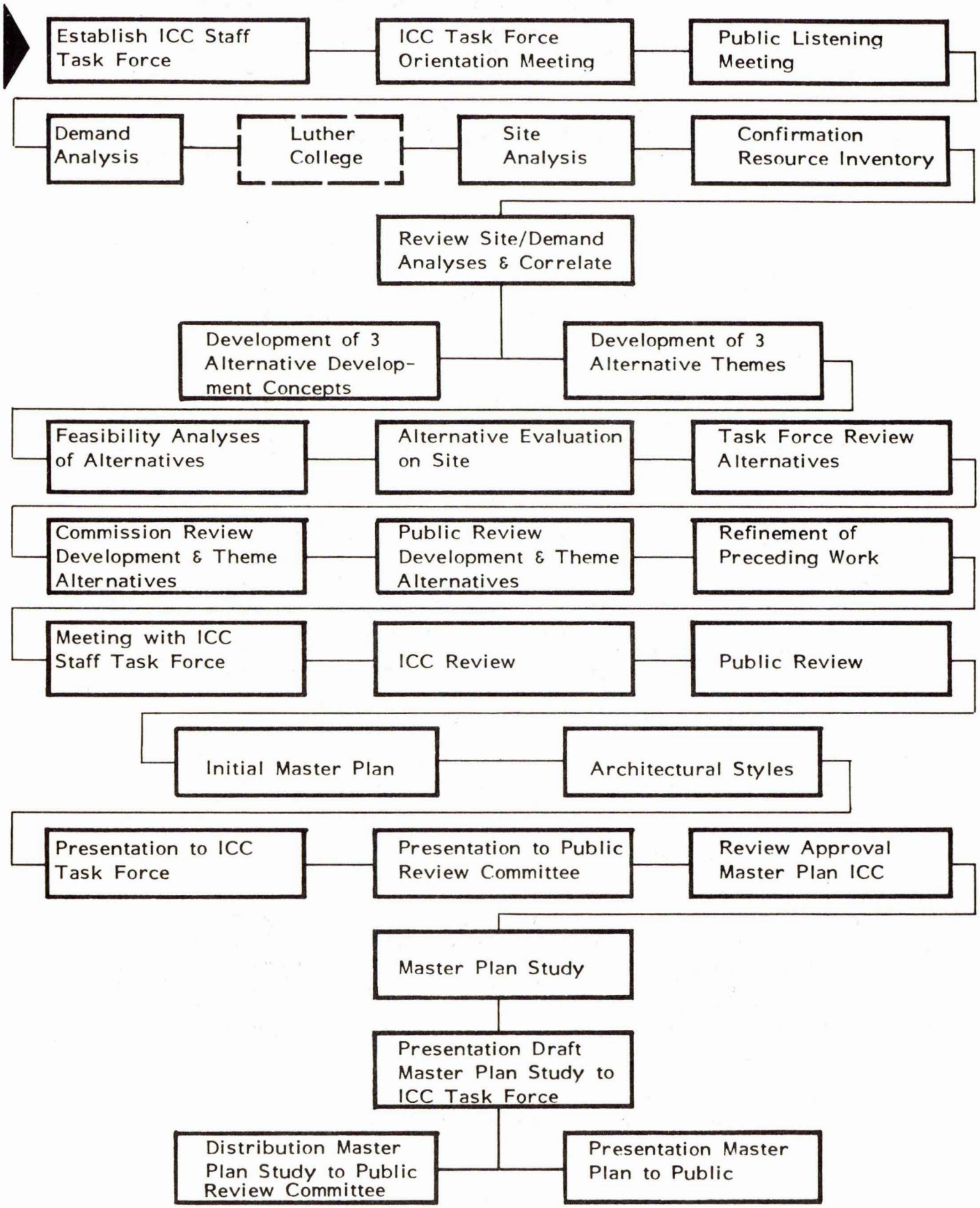
Gary Beyer, Forestry Section
Dave Moeller and Gaige Wunder, Fisheries Section

Figure No. 1

PROJECT PROCESS

Master Plan Report

Volga River
State Recreation Area



Dean Dalziel and Jim Zohrer, Wildlife Section
Roy Downing and Nancy Exline, Waters Section
Jim Scheffler, Jack Galliart, and Jerry Reisinger, Parks Section
Tom Albright, Engineering Section
John Beamer, Land Management Section
Arnie Sohn and Everett Pierce, Planning Section
Dean Roosa, State Ecologist
Stan Kuhn, Administration Division
Ken Smith, Planning Section and Staff Task Force Chairman

Additionally, the following persons served as technical advisors to the staff task force:

Lyle Jackson, Fayette County Soil Conservation Service
Stan Riggle, Division of Historic Preservation
Dave Roslein, Richard Kellogg, Jean Young, James Eckblad, and Roger Knudsen, Luther College Researchers
Members of the Iowa Preserves Board

The public review committee for the Volga River State Recreation Area Master Plan Study was an ad hoc advisory committee composed of citizens, public officials, and representatives of relevant interest groups affected by the master plan. The public review committee is responsible for providing a linkage between the Iowa Conservation Commission and the affected community(ies). Serving on the Volga River public review committee were:

-- Regional and Local State Legislators
-- Representatives from Regional Councils of Governments
-- County Officials
-- Regional and Local County Conservation Boards
-- Municipal Officials
-- Other Governmental Agencies
-- Regional and Local Conservation/Recreation Groups
-- Regional and Local Civic and Service Groups
-- Local Educational Institutions
-- Individuals Who Expressed Interest in the Project
-- Regional and Local News Media

In all, over two hundred persons were contacted and included on the public review committee mailing list.

The Iowa Conservation Commissioners are Governor-appointed citizens who oversee the operation at the Iowa Conservation Commission. The Commissioners have exclusive authority to approve a master plan. The following persons served as Iowa Conservation Commissioners:

John C. Brophy, Chairman, Lansing
Thomas A. Bates, Bellevue
John D. Fields, Hamburg
Richard W. Kemler, Marshalltown
Donald E. Knudsen, Eagle Grove
Carolyn T. Lumbard, Des Moines
Marian Pike, Whiting

D. GOALS AND OBJECTIVES

The Volga River State Recreation Area from its inception has been envisioned as a major regional, multi-use, year-round conservation/recreation area. Implicit in its designation as a state recreation area is the concept of a multi-purpose area offering a variety of year-round outdoor recreation opportunities as well as scenic, interpretative, and scientific values. Such areas differ from areas traditionally designated state parks in management philosophy and in the total range of opportunities provided; for example, a recreation area is likely to have 24-hour access to all or portions of the area and public hunting on a zoned basis. The following site specific goal has been adopted to guide the master plan study for the Volga River State Recreation Area:

TO PROTECT, CONSERVE AND ENHANCE THE INHERENT CHARACTER INCLUDING NATURAL, CULTURAL/HISTORIC, AESTHETIC AND RECREATIONAL RESOURCES OF THE VOLGA RIVER STATE RECREATION AREA AND TO PROVIDE APPROPRIATE, DIVERSE, MULTI-USE, YEAR-ROUND RECREATIONAL OPPORTUNITIES TO THE DEGREE WHICH THE PHYSICAL ENVIRONMENT CAN SUSTAIN ON A CONTINUAL BASIS WITHOUT INCURRING DETERIORATION OF THE SITE'S NATURAL ENVIRONMENTAL QUALITY.

SECTION II

Recreation Demand

II
RECREATION DEMAND

A. SUMMARY OF DEMAND ANALYSIS

An analysis of recreation demand around the Volga River site was carried out in order to develop a concept of the type, character and magnitude of recreational development which would be appropriate there. This was done while realizing that the ultimate design of the area would also be influenced by determinations made through careful analysis of this particular site and its capabilities as well as by the area management objectives which would be determined to be appropriate. The demand analysis involved a review of population trends, local transportation patterns, existing recreational facilities, and State and local plans. The plans include analyses of regional and State recreational behavior and the adequacy of existing facilities to meet current and forecasted demands. The determined facility needs of the Iowa State Comprehensive Outdoor Recreation Plan (SCORP) in particular were weighed along with the specifically stated desires of local residents to develop a working list of priority facility needs.

1. Local Conditions

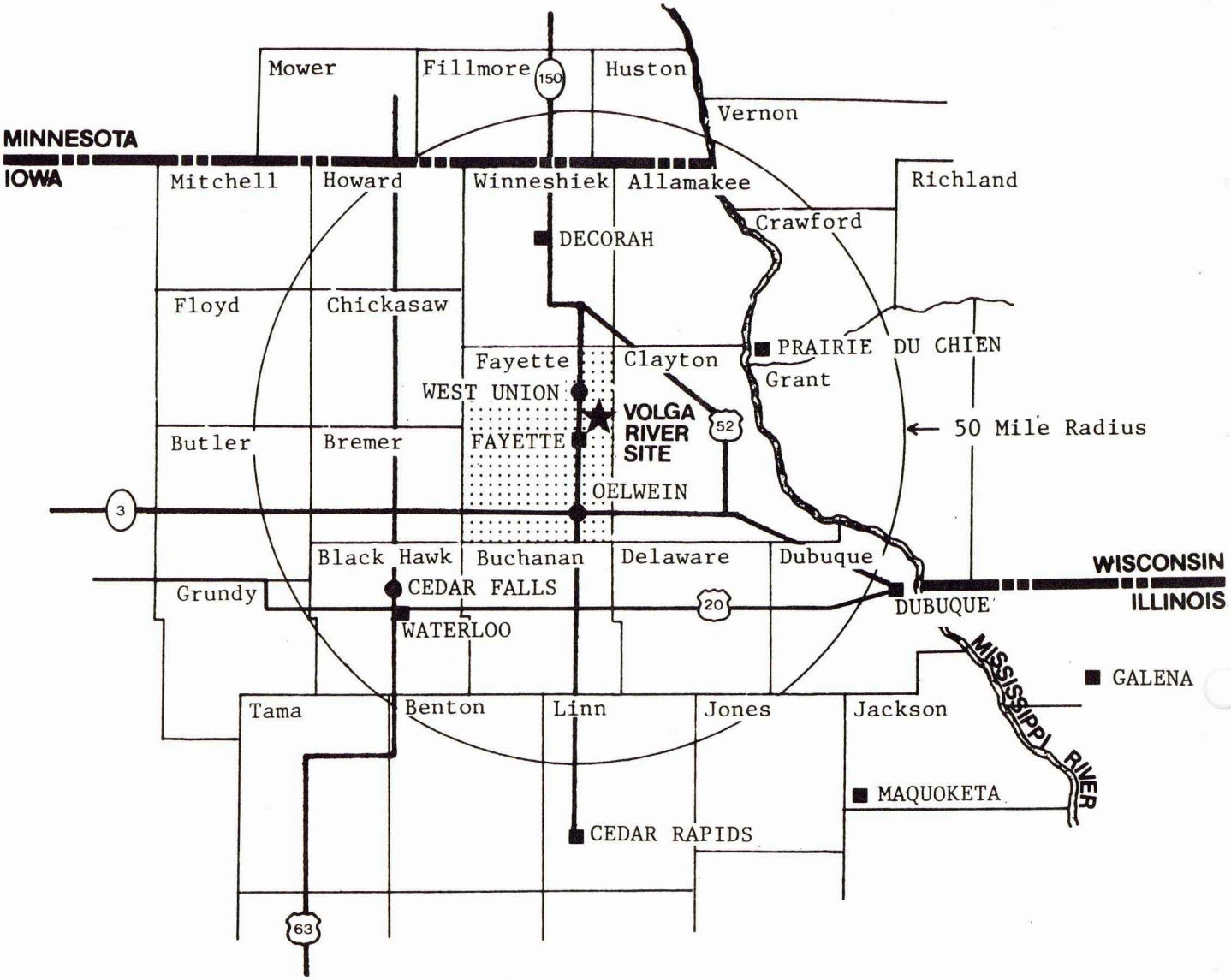
As may be seen on Map No. 1, the Volga River State Recreation Area is located in Fayette County just northeast of the community of Fayette. Fayette County is approximately 150 miles northeast of Des Moines and 70 miles north of Cedar Rapids. With the exception of the town of Waterloo, the general area around the site can be characterized as predominantly rural. The area is considered by many visitors as the most scenic part of the State.

Approximately 600,000 people live in the counties which lie predominantly within a 50-mile radius of Fayette County. Recent population growth has been modest, with Fayette County itself experiencing a 5.9 percent drop in population from 1960 to 1970. There has been a general shift of rural to urban population, with larger counties with major cities experiencing the strongest rate of growth.

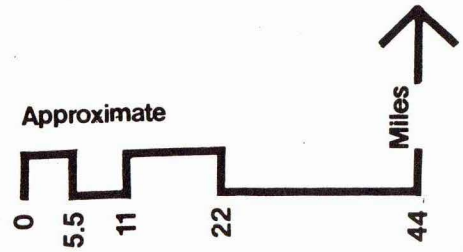
Fayette County is serviced by three primary arterial highways. U.S. Highway 18 provides east-west movement through the northern part of the County. State Highway 150 provides northsouth movement generally through the center of the County and State Highway 3 provides east-west movement in the southern end of the County. The closest Interstate Highways are Interstate 35, a north-south road approximately 82 miles west of the site, and Interstate 80, thirteen miles south of Cedar Rapids.

2. Existing Facilities

There are 56 recreation areas of various sizes and ownership classification within approximately 50 miles of the site. Twenty of these, including 4 State areas, 5 County areas and 11 community parks, representing almost 6400 acres, are within Fayette County. The Volga area is by far the largest accounting for over 86 percent of the total acreage. The major recreational opportunities offered generally include camping, fishing, hiking and picnicking.



Source: Fayette County Recreation Plan



LOCATION MAP

MAP No. 1

There are 36 recreational facilities within a fifty mile radius outside of the County. They represent an additional 22,000 acres of recreational land within Iowa alone. Major areas include Effigy Mounds National Monument and Pikes Peak State Park in Clayton County, the Yellow River State Forest in Allamakee County, the Sweet Marsh Wildlife Area in Bremer County, Backbone State Park in Delaware County and George Wythe State Park in Black Hawk County.

3. Priority Facility Needs

The determination of specific types of recreational opportunities which would be appropriate in the Volga River involved an analysis of information from the Iowa State Comprehensive Outdoor Recreation Plan in conjunction with the expressed desires of local residents.

Fayette County is in Iowa's State Recreation Region 1. The State Plan contains information on the recreational participation patterns of the residents of each region (whether within their region or not) and on the recreational activities patterns within each region (whether by residents or by outsiders). The Plan also includes estimates of facility needs by region. The picture which emerges for Region 1 is relatively complex. While the Region is considered to have a surplus of key facilities such as picnic tables and campsites, it also shows net outflow of recreational activity. That is, the participation of Region residents anywhere exceeds us by all Iowans of facilities within this Region. In this sense, at least, the Region emerges as relatively weak in terms of overall perception as an attractive location for outdoor recreation. The data suggests that, while numerically adequate, existing facilities are perceived as deficient due to factors such as location, design or maintenance.

Quantitative data from the SCORP was viewed against resident input in arriving at ultimate facility needs. A good deal of input was derived from a public "listening" session which the Iowa Conservation Commission held at Upper Iowa University in May 1979. A common thread running through the remarks was that the Volga River area was uniquely important because of its size, which could enable it to satisfy a great variety of interests and concerns through a plan which mitigated the possibility of spatial conflicts between incompatible uses.

Residents were asked to express their priorities relative to several major categories of development types as well as particular types of facilities needed. The final listing of priority facilities needs, which incorporates SCORP data, resident input, and comments of local and State recreation officials, is shown in Figure No. 2.

Figure No. 2

IDENTIFIED PRIORITY FACILITY NEEDS

DEVELOPMENT TYPE	PRIORITY FACILITY NEEDS
Non-Intensive	Scenic Drives Primitive Camping Sites Hiking Trails Canoe Access Points Horseback Trails
Intensive	Picnic Facilities Campsites - Recreational Vehicle - Group Snowmobile Trails Boating Facilities Bicycle Routes Swimming Facilities
Natural Resource Conservation and Wildlife Management	Timber Protection and Management Plant and Wildlife Areas
Consumptive	Hunting Areas Fishing Sites
Nature Appreciation	Interpretive Trails for Schools/Scouts

SECTION III

Site Analysis

III

SITE ANALYSIS

A. PREFACE

The 5,400 acre site of the Volga River Recreation Area exhibits many of the natural and man-influenced characteristics that are predominant in northeastern Iowa. Located on the extreme western edge of the Paleozoic Plateau more popularly referred to as Iowa's "Little Switerzerland", the Volga River site presents the unexpected contrast of rugged topography, rock outcrops, high bluffs, and substantial timber cover compared to the vast majority of the State's rolling hills, farmland and scattered stands of timber. The settlement patterns of farmsteads, roads, railroads, and towns in northeast Iowa have clearly been directed by the surface form of the landscape and the Volga River site offers numerous examples of man's struggles to achieve useful and productive companionship with the land.

In the preparation of the master plan for the Volga River site, the site inventory and analysis sought to provide useful information in two areas. First, a clear understanding of the existing natural and cultural resource base of the site was needed to identify what opportunities exist to provide for the recreational demands projected for this region of the state. Simply, how could this site reasonably provide needed recreational opportunities for the citizens of northeastern Iowa? Secondly, the site presents a variety of constraints which restrict development and usage of recreational facilities to some extent. The extent to which natural resources of the site limit facility development and the extent to which they would be impacted by various degrees and types of facility development and use were studied in order to determine the site's acceptable recreational carrying capacity.

A series of separate but complementary site inventory and analysis studies were undertaken by faculty members of Luther College, Decorah, Iowa, and the master plan consultants in 1978 and 1979. The works completed by Luther College are summarized as follows:

(1) SURFACE AND SUBSURFACE GEOLOGIC FEATURES OF THE VOLGA RIVER RECREATION AREA. R. L. Kellogg, Luther College and J. N. Young, Great Bear Consulting and Operating Works, September 1979.

Includes discussion of previously published information, glacial history, role of the bedrock in shaping the land forms of the region, structural features, features associated with Karst topography, features related to the regional hydrology stream related features, paleontology, and summary of areas of scientific interest or interpretive value.

(2) NATURAL RESOURCES INVENTORY OF THE AQUATIC HABITATS OF THE VOLGA RIVER RECREATION AREA. Dr. James W. Eckblad, Associate Professor of Biology, Luther College, August 1979.

Report includes stream habitats, pond habitats, interpretive discussions, and pre-impoundment predictions for the Frog Hollow Lake.

(3) ENVIRONMENTAL ASSESSMENT OF CLIMATE, SOILS AND TETRAPOD VERTERBRATES OF THE VOLGA RIVER STATE RECREATION AREA. David Roslien, PhD, Biology Department, Luther College, September 1979.

Report contains climate information for the area, soils, vertebrates including threatened, rare, or unusual species, natural history of common species, recommendations for management of amphibians, reptiles, birds and mammals.

(4) ASSESSMENT OF TERRESTRIAL VEGETATION OF THE VOLGA RIVER RECREATION AREA. Roger M. Knutson, Department of Biology, Luther College, September 1979.

Report includes inventory, analysis and recommendations for upland forest, south and west facing upland forest, floodplain forests, prairie vegetation, and exotic or unusual forest species or patterns.

(Copies of these studies are under separate publication and available from the Iowa Conservation Commission.)

Since the majority of the work undertaken by the Luther College staff was completed prior to the involvement of the consultants for this report, the information gathered by Luther College provided a basis for complementary types of site studies conducted by the master plan consultants. All of the site studies were coordinated and the data evaluated to determine the potential for development and the impact on the resources. The consultant studies were concentrated at three geographic levels: regional, vicinity and site specific and were directed specifically toward investigating conditions that related to the recreation planning for the Volga River Recreation Area. The site study process involved research of available documented information, extensive on-site investigations by consultant staff, photographic reconnaissance, and finally graphic mapping of pertinent site conditions. The mapping served as a reference base for making planning decisions as well as a means to inform the Commission's Task Force and the public of site conditions that affected the formation of the master plan for the site. Copies of the site analysis mapping are available from the Iowa Conservation Commission. The remaining portion of this section contains a narrative discussion of each of the site analysis subjects and the related mapping.

B. REGIONAL STUDIES

The regional studies were completed primarily to assess recreational demands but they also provided necessary information relevant to other aspects of the master planning process. By studying the site's physical relationship to other recreational opportunities, to regional transportation networks and to concentrations of population, basis was laid for assessment of recreational demands for the area. This study also provided an understanding of the site's relationship to the region's natural landscape characteristics.

The unusual landscape characteristics of northeastern Iowa make it one of the most scenic regions in the state. High bluffs, deep valleys, abundant rock outcrops, caves, crevices and sinkholes are products of the area's underlying bedrock and geologic history. This region, referred to as the Paleozoic Plateau, exhibits its most striking appearance in the portion adjacent to the Mississippi River. As one travels westward in the region, land forms give way to a more rolling terrain, but one still dominated by bedrock patterns. The Volga River site is located on the western edge of Paleozoic Plateau, and thus provides an important first or last exposure (depending upon one's direction of travel) to this unique landscape region. In this respect, the Volga River site can be considered an introduction of "things to come" for many Iowans traveling to this corner of the state.

The four major rivers of this region, the Upper Iowa, the Yellow, the Turkey, and the Volga and their tributaries have cut deeply into the sedimentary rock layers thus providing the region's distinctive landscape and its attendant linear vegetation patterns. The Volga River, as it passes through the site, has formed a deep, sharp-angled valley so characteristic of the region's topography and major drainageways.

Immediately west of the site, the landscape is characteristic of much of Iowa: open with level to gently rolling land surface with tree masses in linear patterns. Settlement of this area to the west easily followed the one mile grid pattern which subsequently formed agricultural, town, and transportation patterns present today. Land patterns east of the site reflect the constraints the rugged terrain imposed upon original settlement and development of the region. The settlement and cultural patterns witnessed on the Volga River site principally display the constraints that the land had on the early inhabitants of the site and later on large scale mechanized agricultural operations.

C. VICINITY STUDIES

The Volga River site is located immediately to the northeast of the community of Fayette and several miles southeast of West Union. State Highway 150 connects these two towns and the western edge of the site is located approximately one mile to the east of Iowa 150. State Highway 56 is located approximately one and one-half miles north of the site. All county roads leading to the site and in its immediate surroundings are considered "farm to market" or "local" roads and have a gravel surface. The site was previously connected to surrounding areas by eleven gravel roads, of which seven have been, or are being dead-ended. Roads within the site abandoned by Fayette County are being absorbed by the Iowa Conservation Commission. Primary access to the site is currently identified several miles north of Fayette on Highway 150.

Land use within 4000 feet adjoining the site is principally agricultural and timberland. Exceptions are the Fayette Golf Course, an auto salvage yard to the south, and the Lima Church and Cemetery on the east. Approximately fifty percent of the developed portion of the town of Fayette exists within 4000 feet of the southwest portion of the site. Fayette County places a zoning classification of "Conservation and Floodplain" on the entire Volga River site, on the general Volga River corridor to the east of the site, and on approximately 200 acres of land west of the site containing a portion of one of the watersheds draining to Frog Hollow Lake. Current zoning on the lower west side of the site is "Agricultural Residential", however, the property is presently in agricultural or timber land use.

All existing and active farmsteads within 4000 feet of the site were identified and all county roads and land areas surrounding the site were visually surveyed from the ground and by airplane during several site visits by the master plan consultants in 1979.

The Allamakee Rural Electric Cooperative maintains electrical distribution lines on the east side of the site and a primary service line through the central portion of the site to provide closed loop service to customers west of the Volga site. Continental Telephone Company is currently improving service in this portion of the county and is in the process of burying many of the telephone service lines as well as providing telephone service lines to the Volga River site.

To the casual observer, the natural characteristics of the surrounding vicinity vary considerably from that of the site itself. The principally traveled route of Iowa 150 offers a brief indication of the rugged characteristics of the site as it passes over the Volga River on the west side of the town of Fayette. However, within a mile north of Fayette and extending to West Union the landscape is principally rolling and comprised mainly of agricultural land use. The forested drainage ways to the east of Iowa 150 offer but a hint of the site's relatively larger forested areas. The site itself is actually only visible from short sections of Iowa 150 and Iowa 56 and even then it is difficult to distinguish the site from its background surroundings to the east.

Viewed from the air, the site presents strong visual contrasts to its surroundings, principally due to the relative concentration of forest on the west, south, and east portions of the site compared to the predominant agricultural patterns for several miles to the north, west and south. To the east, a greater amount of forest exists due to the more rugged topography related to the Volga River.

On-site observations of view lines from within the Volga River Recreation Area have established the limits of the area which can be seen outside of the site. For the most part, the topography and vegetation limit the view to within 500 feet of the site boundary. Exceptions occur on southern, northeastern and eastern sides where views extend as much as 4000 to 8000 feet. A portion of the town of Fayette, the Fayette Golf Course, the auto salvage yard, a downstream portion of the Volga River valley and a variety of agricultural lands are visible from the site.

The total of watersheds draining to the site from outside the boundary, excluding the extensive Volga River watershed upstream, is approximately 9050 acres, of which approximately 5100 acres drain to the Frog Hollow Lake. Except in isolated minor areas, land use in all of these watersheds is principally pasture and cultivated land with less than 10% being in forest land. The 5100 acre portion of the Frog Hollow Creek outside of the site is of primary significance due to reported soil losses on a number of fields which are thought to be in excess of recommended minimum levels established by the Soil Conservation Service. In addition to the 5100 acre watershed outside the Volga River site, 480 acres drain to Frog Hollow Lake from within the site.

The studies completed by Dr. James Eckblad in Natural Resource Inventory of the Aquatic Habitats of the Volga River Recreation Area identify various aquatic species and stream habitats located on the Volga River site. A number of these locations are at the fringes of the site and are directly subject to adverse impacts occurring or which could occur in the watersheds outside of the site boundary.

D. SITE SPECIFIC STUDIES

The inventory and analysis of the existing conditions on the Volga River site were completed to provide a basis for many of the later planning decisions regarding recreational use and facility development for the site. The results of these investigations are portrayed on ten separate maps, copies of which are available from the Iowa Conservation Commission. The ten maps are entitled:

(1) Physiography
(2) Surface Drainage Patterns
(3) Slope Orientation
(4) Slope Steepness
(5) Soil Groupings
(6) Soil Suitability for Crops
(7) Vegetation and Croplands
(8) Presettlement Vegetation Patterns
(9) Existing Manmade Features
(10) Visual Aspects

A summary of each map follows:

1. Physiography

The most predominant and distinct landform features of the site are the two valleys created by the Volga River and Frog Hollow Creek which join south of the center of the site. In the southern one-third of the site, the Volga River has cut a sharply meandering and narrow channel 150 to 200 feet deep into the surrounding higher land. In contrast, Frog Hollow Creek has formed a relatively straight and broad valley running from the northern edge of the site south to the creek's confluence with the Volga River. The new 135 acre Frog Hollow Lake is located in the extreme northern portion of the site where Frog Hollow Creek is joined by three minor streams. Abstractly, the land forms created by the Volga River and Frog Hollow Creek can be seen as the two upper arms of a "Y" with the lower arm being the broader valley of the Volga River after it is joined by Frog Hollow Creek. The valley floors formed by this "Y" consume approximately one-third of the total site.

The second third of the site is comprised of the relatively steep valley walls of the Volga River and Frog Hollow Creek. These are the walls, rising 150 to 200 feet above the valley floor, most visible structural element of the site as well as forming discrete visual and physical barriers. The visual appearance of elevation change is accentuated by the forests that cover the upper portions of the walls. The expanse of this landform, coupled with its steepness and forest cover, often prohibits easy negotiation by pedestrians and vehicles.

The remaining one-third of the site is the relatively level and higher ground adjacent to the site's boundary. With the exception of the points where the Volga River and other drainageways intersect the site boundary, the elevations generally correspond with those that surround the site for several miles in all directions.

Figure No. 3

SCHEDULE OF VARIOUS MEAN SEA LEVEL SITE ELEVATIONS

High Point of site (southeast Portion of site at county road)	1185 ft.
Higher ground at perimeter of site	1140 ft.± to 1120 ft.±
Valley walls (top to bottom)	1120 ft.± to 950 ft.±
Normal water level of Frog Hollow Lake	998 ft.
Emergency spillway	1003 ft.
Low point of site (Volga River at east boundary of site)	903 ft.

2. Surface Drainage Patterns

Exclusive of the large upstream watershed of the Volga River, a total of 9050 acres of land surrounding the site boundary drain to the Volga site from 18 identifiable watersheds, varying in size from several acres to more than 2000 acres. Within the Volga River site, Frog Hollow Creek and Frog Hollow Lake are the major runoff collectors. Two year-round streams drain to the Volga River and three permanent streams flow to Frog Hollow Creek below the lake. In addition to Frog Hollow Creek, two other streams feed the lake. At least 16 intermittent streams have been also identified on the site. Approximately 95% of the site drains inwardly to the Volga River, Frog Hollow Creek, or the lake. Seven active springs have been identified in the Luther College staff studies. Six manmade ponds are found in the western portion of the site and their aquatic habitats have been studied by the Luther College staff.

The extent of potential flooding by the Volga River, Frog Hollow Creek and their tributaries has not been precisely determined. However, it may reasonably be assumed that a 100-year flood on the Volga River could generally inundate the area between the two steep valley walls upstream from the former town of Albany. Downstream from this point the valley widens and here flooding potential is more difficult to predict. During the spring and fall, and after significant upstream rainfall, the Volga

River provides desirable rates of flow for canoeing. During low flow periods the river forms a series of quiet pools separated by gentle riffles.

Since Frog Hollow Lake will provide a measure of storm water detention, the potential for headwater flooding downstream on Frog Hollow Creek should be reduced. Localized storms can produce rapid rises in the permanent streams and the larger intermittent streams, particularly due to the steeper stream gradients and the generally confined valleys. This condition should be taken into account when locating structural stream crossings for pedestrians and vehicular use.

3. Slope Orientation

Slope orientation, or the direction to which sloping ground faces, has important implications regarding the location and types of recreational uses and facilities. The quality of seasonal recreation activities relies heavily on a proper degree of exposure to local climatic conditions and the sun. Additionally, increased energy conservation can be achieved by properly positioning facilities in accordance with exposure to the sun and seasonal winds. Natural plant communities have a strong relationship to slope orientation and a better understanding of the existing vegetation components is achieved through an awareness of slope direction. Likewise, any proposed plantings should respect the slope orientation where they are to be placed.

On a topographic map, North, East, South and West orientations were delineated for ground slopes of over 5% gradient. The pattern which emerged from this study illustrates the dissected character of the topography and shows that the site has a complex arrangement of slope orientations, with no single large area of the site having a predominant slope orientation.

4. Slope Steepness

The steepness of the existing topography is an important characteristic relative to proposed uses of the site and the location of facilities particularly roads, trails and parking areas. On the Volga River site, the relatively rugged topography adds to the highly scenic quality of the site but directly controls the placement of uses, facilities, and utilities.

The Soil Conservation Service Soil Survey of Fayette County, Iowa (1978) classified all soils on the site according to steepness as expressed in percentage of slope. Seven increments ranging from 0% to 25%+ were adopted from the Soil Survey to plot slope steepness for the Volga River site.

The Frog Hollow Creek valley and several of its tributaries along with portions of the Volga River floodplain are the only areas of the site with shallow slopes of 0-2%. In the vicinity of the Volga River, the topography abruptly changes to slopes in excess of 25% and in several localized areas, the slopes approach a near vertical gradient. The valley walls of Frog Hollow Creek and its tributaries also have slopes of 18 to 25% with some portions being greater than 25%.

In any portion of the site with greater than 18% slope the soils are quite thin and rock outcroppings are likely to be present. The higher ground at the edges of the site have slopes of 2 to 9%.

5. Soil Groupings

The site's physiography, drainage patterns, and slope steepness are characteristics of a very complex pattern of soil distribution on the site. According to the mapping illustrated in the Soil Survey of Fayette County, Iowa, over eighty individual soil types are found on the site. For purposes of the master planning for the Volga River Recreation Area, all soil types found on the site were classified in the following seven categories relative to overall limitations on facility development and recreational usage:

SOIL NAME	CHARACTERISTICS
LEAST RESTRICTIVE	
Bassett	Loam/Glacial Till
Coggon	Loam/Glacial Till
Kenyon	Loam/Glacial Till
Olin	Sandy Loam/Glacial Till
Festina	Alluvium Silt/Well Drained
Saude	Alluvium Silt/Well Drained
Wapsie	Alluvium Silt/Well Drained
Waukee	Alluvium Silt/Well Drained
FEW RESTRICTIONS	
Sandy Escarpments	Sandy
Lamont	Sandy Loam
Downs	Loess
Fayette 0-14%	Loess
Orwood	Loess
Bixby	Alluvium Silt/Well Drained
Camden	Alluvium Silt/Well Drained
Hanlon	Alluvium Silt/Well Drained
Canoe	Alluvium Silt/Somewhat Poorly Drained

SOIL NAME	CHARACTERISTICS
MODERATELY FEW RESTRICTIONS	
Burkhardt	Loamy Sand/sand Gravel
Sparta	Sandy Alluvium
Flagler	Loamy Sand
Dickinson	Loess
Hayfield	Alluvial Loam/Somewhat Poorly Drained
Lawler	Alluvial Loam/Poorly Drained
MODERATE RESTRICTIONS	
Chelsea	Loess
Exette	Loess
Huntsville	Silty Alluvium/Well Drained
Goss	Loam/Limestone
Winneshiek	Loam/Limestone
MODERATELY SEVERE RESTRICTIONS	
Backbone	Windblown Sediment/Limestone
Rockton	Loam/Limestone
Spillville	Alluvial Loam/Somewhat Poorly Drained
Chaseburg	Alluvial/Moderately Well Drained
Dorchester	Alluvial/Moderately Well Drained
Dorchester/Volney Complex	Alluvial/Moderately Well DRained
Loam Alluvial	Recent Alluvial Deposit
MOST RESTRICTIVE	
Dubuque	Loess/Limestone
Nordness	Loam/Limestone
Fayette (15+%)	Loess
Calamine	Silty Clay Shale/Poorly Drained
Jacwin	Silty Clay Shale/Poorly Drained
Caneed	Silty Alluvium
Donnan	Loam/Clay/Poorly Drained
Otter Huntsville	Silty Alluvium/Poorly Drained
ROCK OUTCROP	
Nordness Complex	Exposed limestone bedrock

These seven groupings were determined after a thorough review of each soil's degree of restriction or limitation relative to the following categories.

Soil depth
Erosion and shrink/swell factors
Recreation development potentials
Vegetation management concerns
Potential for habitat elements
Sanitary facilities potentials
Usable construction materials potential

During the planning for locations of use areas and facilities, soil types were evaluated more specifically to assess the implications the soils would have on each proposed use and feature.

6. Soil Suitability for Crops

Since a considerable portion of the site is currently in some form of agricultural production, a specific study of soil suitability for crop production was completed to determine suitable and feasible areas for future wildlife food plots and the potential for other croplands. Using information supplied in the Soil Survey of Fayette County, Iowa, these four general crop suitability classes were established and mapped.

PRIMARY - few to some limitations for crop production.

SECONDARY - severe limitations which would require special conservation practices

POOR - very severe limitations which would require very careful management

UNSUITED - unsuited for cultivation

The majority of the relatively level ground of the Frog Hollow Creek valley has soil conditions which are considered "PRIMARY". Soils in the vicinity of the sand borrow, however, are determined to be "POOR", due to their slope and sandy characteristics. There are some areas, ten acres or less, in the Volga River valley upstream from its confluence with Frog Hollow Creek which are considered "PRIMARY", but for the most part this area is considered "POOR". The upland areas at the edges of the site range from "SECONDARY" to "POOR". Most areas of the site which are now covered by forest are found to be "UNSUITED" for crop production.

7. Vegetation and Croplands

The existing vegetative cover of the Volga River site is comprised of three distinctive types: deciduous forest, unmown fields, and crop or pastured fields. These three vegetation types are somewhat equally represented on the site, however, the actual patterns of distribution are rather complex and vary in concentration from one location to the next. The forested areas generally occupy the steeper slopes of the site whereas the crop fields are found principally in the Frog Hollow Creek valley, the wider portions of the Volga River valley and at random locations at the edges of the site. The unmown fields which exist primarily on the intermediate slopes of the site were generally crop and pasture fields prior to acquisition of the property by the Conservation Commission.

Management of forest areas is currently limited to maintenance on, and adjacent to, existing recreation trails, and this includes such activities as mowing and fallen tree removal. The large forested areas are principally composed of deciduous trees as described in the Luther College studies. Approximately ten years ago, the Conservation Commission planted conifer seedlings in the east-central and west-central portion of the site. These introduced species along with the increased infiltration of native eastern red cedar are the most significant evergreen varieties found on the site.

The crop fields are those which the Conservation Commission currently leases to local farmers under a three year lease arrangement. This program specifies a crop type, rotation schedule involving corn, oats, and hay and directs the farmer to incorporate soil conservation practices acceptable to Soil Conservation Service. This program varies from field to field depending upon soil and slope conditions. Among other conditions, farmers are required to leave 10% of the crop standing in the field after harvest to provide a food source for wildlife. In a number of areas, switchgrass has been planted in narrow strips separating crop fields. The current crop lease program affects approximately 1300 acres of the site.

The majority of the unmown fields appear to be areas taken out of agricultural production or grazing when the Conservation Commission acquired the property ten to fifteen years ago. Management has been limited to a minor amount of mowing of the old pasture cover. For the most part, these areas are being infiltrated with natural tree and shrub successions. Many of the soils in areas of unmown fields are found to be "POOR" or "UNSUITED" for crop production.

8. Presettlement Vegetation Patterns

The soils of the site reveal a history of the forest, savanna and prairie vegetation patterns that covered the area prior to settlement impacts. Deciduous forest occupied approximately seventy-five percent of the site principally on the steepest slopes and the higher ground. Savanna, a composition of individual trees and prairie, was found in several minor areas along the edges of the site and more significantly in the northeast section of the site. Prairie occurred on the sandy and droughty soils of the Frog Hollow Creek and Volga River valleys. Immediately adjacent to the major drainageways, floodplain forests were found to exist and these areas were subject to removal and re-establishment due to the changing alignments of the water courses.

Much of the original forest was removed by early settlers as a source of lumber and firewood and to provide area for croplands. The savanna and prairie areas were most easily cleared and most suitable for croplands. Only remnant stands of these vegetation types exist today.

9. Existing Man-made Features

Considerable evidence exists on the site of previous agricultural and farmstead activities. Additionally, two small towns, Albany and Lima, were established in close proximity to the Volga River. While only several farm structures remain today, other tangible features such as homestead plantings, roads and trails, fence rows and foundation ruins suggest that at least 35 individual farmsteads and their attendant structures have existed on the site. These sites are found principally near the abandoned county roads and many are quite noticeable due to the remaining ornamental, horticultural, and windbreak plantings. The several structures that remain on the site include the barn, the out buildings and the house of the Park Ranger's residence, a silo and barn foundation east of the lake, and the barn, house, and out buildings of the life tenancy estate located in the southeast portion of the site. Other minor structures and foundations exist throughout the site including several spring houses.

The abandoned county gravel road system provides the primary vehicular circulation system inside the site at the present time. County roads enter the site at eleven locations, however, access at five locations has been physically blocked and "Road Closed" signs placed at four other locations. Maintenance of the roads within the site varies from none on most roads to periodic blading and snow removal on the road leading to the Park Ranger's residence from the west. In the early 1900's, overhead steel truss bridges were constructed throughout this part of the state to cross rivers and major streams. Two of these typical bridges are found over the Volga River south of the former towns of Albany and Lima.

Emanating from many of the old farmsteads are trails which provided access to fields and pastures. Many of these are still open and are currently used as hiking, equestrian, snowmobile, and cross-country ski trails, as well as access routes to the existing crop fields.

10. Visual Aspects

The scenic qualities of the site are numerous and range in scale from long panoramic views of the open landscape to detailed views of features such as rock outcroppings, unusual plants and wildlife. On-site observations have revealed several important factors regarding the visual qualities of the site.

There are certain areas of the site which are likely to be viewed more often than others primarily due to the physiography of the area. During any visit to the site the visitor will see the east and west hillsides that form Frog Hollow Creek valley, a portion of the Volga River valley, and Frog Hollow Lake more than any other major feature of the site.

Areas of secondary visibility, or those "moderately often seen", are the Frog Hollow Creek valley floor and a portion of the Volga River valley in the vicinity of the old town of Albany. Only portions of the valleys can be perceived at one time from within the valley itself, but larger expanses are open to observation from vantage points on the hillsides. The view of the valley becomes more restricted the further one moves east or west of the hilltops into the relatively level and higher ground.

Relative to the two areas described above, the remaining larger portions of the site may be considered as "least often seen" areas. This is due to the confining nature of the forests which exist in the minor drainageways and in scattered plots on the higher ground. From the open fields and pastures, relatively short viewing distances exist of no more than several thousand feet and are visually terminated by adjoining forests. Inside the forested areas, sight lines range from less than fifty feet to no more than five hundred feet.

From the top of the major valley hillsides, a number of long and panoramic viewing opportunities exist, particularly in northerly and southerly directions generally parallel to Frog Hollow Creek. In most cases, the view orientation is inward toward the site as opposed to an outward direction.

There does not appear to be any single visual feature of the site that demands one's attention above all others; however, the combination of attractive natural features of cliffs, rock outcroppings and deep secluded valleys combined with the unusually large tree masses create a setting unique to the region. There are a number of natural and manmade features that are quite pleasing and noticeable depending upon one's mood, vantage point, and the season of the year. These include the larger farm structures, the old steel bridges, several of the farmstead windbreak plantings, some of the larger rock outcroppings, and the waters of the lake and the Volga River.

The changes of season provide interesting contrasts in the visual qualities of the site. During the winter, the view of the deciduous forests is open, while coniferous trees and a considerable number of rock outcroppings present vivid contrast to snow cover. In the spring, the blooming native vegetation, the weeping willows and other farmstead plants, and the bare soil of the crop fields offer good color contrasts. During summer, the site becomes somewhat confining due to the full foliage of the forests. And in autumn the deciduous forest trees and shrubs turn to vivid foliage colors, considered by many to be the most spectacular scene of the year.

E. ENVIRONMENTAL CAPACITY ZONES

Since the previous studies were essentially "single topic" investigations, i.e., soils, vegetation, slope, etc., a synthesis of these and other relevant studies was necessary to generally determine the interrelationships among these "single topic" studies and to determine overriding implications which would influence the generation of development plan concepts. The synthesis of the broad range of information established five distinct environmental capacity zones that generally identify the range of conditions found on the site; reflect the overall scope of restrictions, and potentials which the site possesses relative to possible recreation activites; and also describe the need for general levels of natural resource conservation. Map 2 illustrates the five zones in relationship to the Volga River Site. These five environmental capacity zones and their descriptions are outlined as follows:

ZONE A: FRAGILE AND UNIQUE AREAS

"A" zones include:

1. Environmental features identified by Luther College Staff as being unique to the Volga River site and worthy of some type of protection with limited or no development.

2. Environmental features identified by the master plan consultants as being fragile and sensitive to recreational use. Areas added by the consultants include primarily the streams and related stream valley environment.

General Descriptions

1. Resource unique to the site and/or region.

2. Environmental resource would be of prime interest for study and extensive observation.

3. Contains species which are "threatened" or "endangered."

4. Resource contains high risk of negative impact due to most types of recreation activity.

ZONE B: PHYSICAL BARRIERS

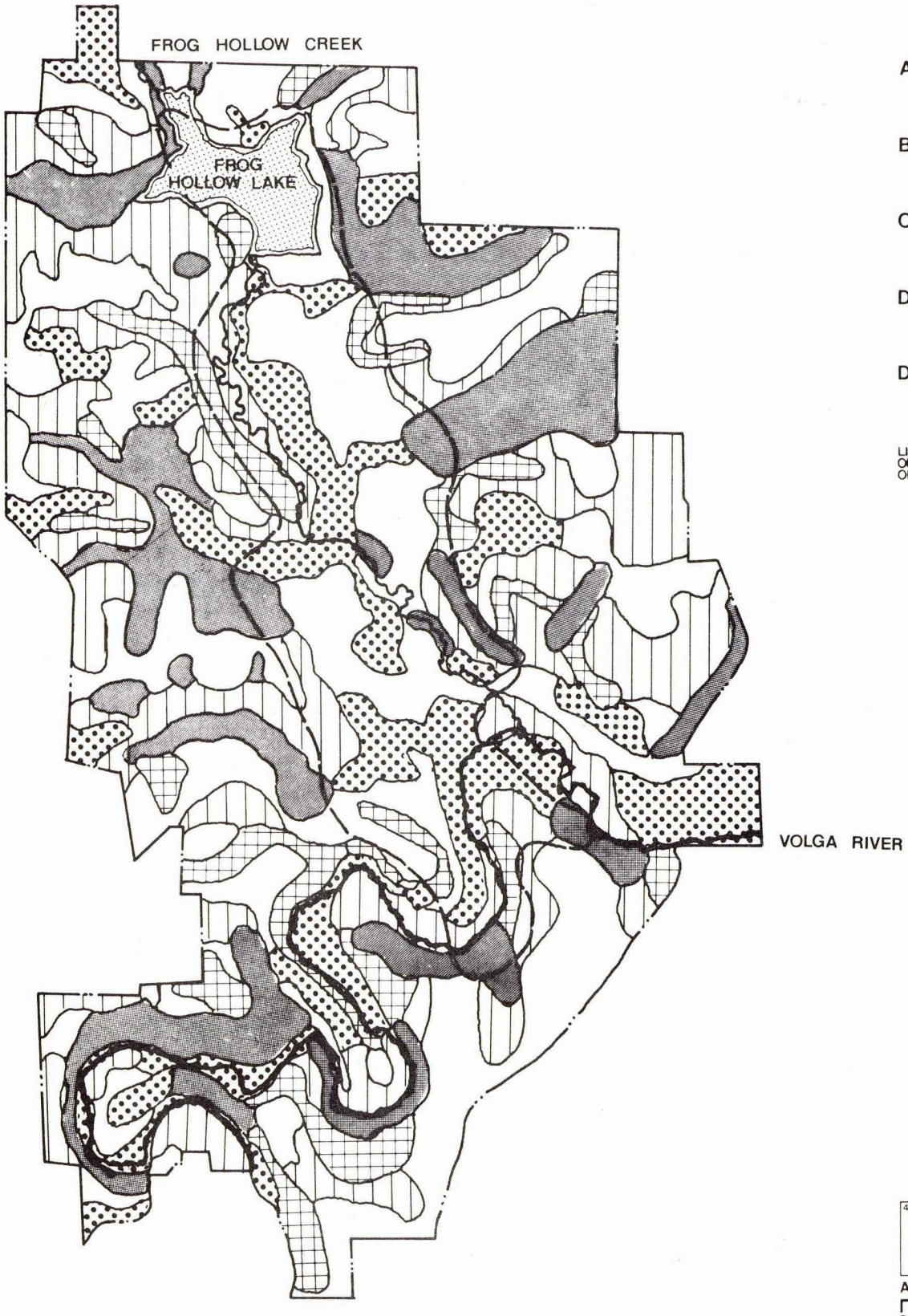
"B" zones include:

1. Areas of extensively steep topography and/or limestone bluffs, i.e., slopes of 25% or greater.

2. Soil areas of extensive Nordness Rock Outcrop.

Map No. 2

ENVIRONMENTAL CAPACITY ZONES



A. FRAGILE AND UNIQUE AREAS

B. PHYSICAL BARRIERS

C. SUPPORTIVE OF NON-INTENSIVE "NATURAL" RECREATIONAL USES

D. SUPPORTIVE OF HIGHLY INTENSIVE RECREATIONAL USES

D_1. INTENSIVE USES CONDITIONED BY FLOODING AND RESTRICTIVE SOILS

LIMITS OF "MOST OFTEN" AND "MOD. OFTEN" SEEN AREAS

40
10
ACRES

NORTH

0 100 200 500 915 meters

0 250 500 1000 2000 3000 feet

DATE: 5-23-7[illegible]

General Descriptions

1. Topography, bluffs, etc. prohibit any extended occupation of the area, i.e., topography and rock outcrops prohibit virtually all facility development.

2. Presents a physical barrier in terms of major trail and road development. Primitive hiking trails are possible in some areas of "B" zones.

ZONE C: AREAS SUPPORTIVE OF NON-INTENSIVE "NATURAL" RECREATIONAL USES

"C" zones include:

1. Slopes 14% to 25%

2. Major areas of forest

General Description

1. Environmental resource provides characteristics supportive of "natural" recreation experiences, i.e., moderately steep topography, relatively complex vegetation patterns, and wildlife habitat.

2. Because of environmental qualities, facility development would likely be secondary to the natural resources.

3. Capable of supporting limited non-intensive use.

ZONE D: AREAS SUPPORTIVE OF HIGHLY INTENSIVE RECREATIONAL USES

"D" zones include:

1. Non-forested areas, open fields and croplands

2. Slopes 0% to 14%

3. Soils - "least restrictions" to and including "moderately" few restrictions.

General Descriptions

1. Environmental resources are most permissive of any on site for high impact and intensive recreational development and support facilities.

2. Because of environmental qualities, facility development would likely dominate the natural resources of the zone.

ZONE D_1: AREAS WHERE INTENSIVE USES WOULD BE CONDITIONED BY FLOODING AND RESTRICTIVE SOILS

"D_1" zones include:

1. Non-forested areas, open fields and croplands.

2. Slopes 0% to 14%

3. Soils - most restrictive

4. Potential flood areas of the Volga River

General Descriptions

1. Same as "D" zone but facility development would be conditioned according to specific restrictions of soils and flooding potential of Volga River.

The Capacity Zones described above provided guidelines for formulation of concepts. As the Master Plan was refined, reference was made to specific information provided on the ten detailed Site Analysis maps, and in the Luther College reports cited. It may be noted that this data provides a base line record of site resource information which should be useful for monitoring future changes to the site.

SECTION IV

The Master Plan and Design Criteria

IV

THE MASTER PLAN AND DESIGN CRITERIA

A. THE PLANNING PROCESS OVERVIEW AND CONCLUSION

The Master Recreation Development Plan was developed from correlated input from the citizens task force, the Volga River State Recreation Area Staff Task Force and recommendations from the master planning consultants. After detailed site analysis, alternative development concepts were formulated.

1. Formulation of Alternative Concepts

Iowa Conservation Commission planning policies require evaluation of alternative concepts and themes as steps in the planning process. Such alternatives should identify and differentiate significant conceptual directions for using and managing the resources involved.

The approach employed in developing conceptual alternatives, therefore, provides for systematic examination of a full range of options available and identification of the concepts which justify more detailed consideration.

Furtherance of this approach follows a logical sequence built upon three fundamental action courses the Commission could pursue in relation to the Volga River Recreation Area:

- To develop the area for recreational usage responsive to demand to the extent possible without excessive adverse impacts on the natural resources and site environment.

- To continue present management practices, maintaining the area in its present condition or, in this case, as it will when the lake is complete while making recreational use appropriate to that state.

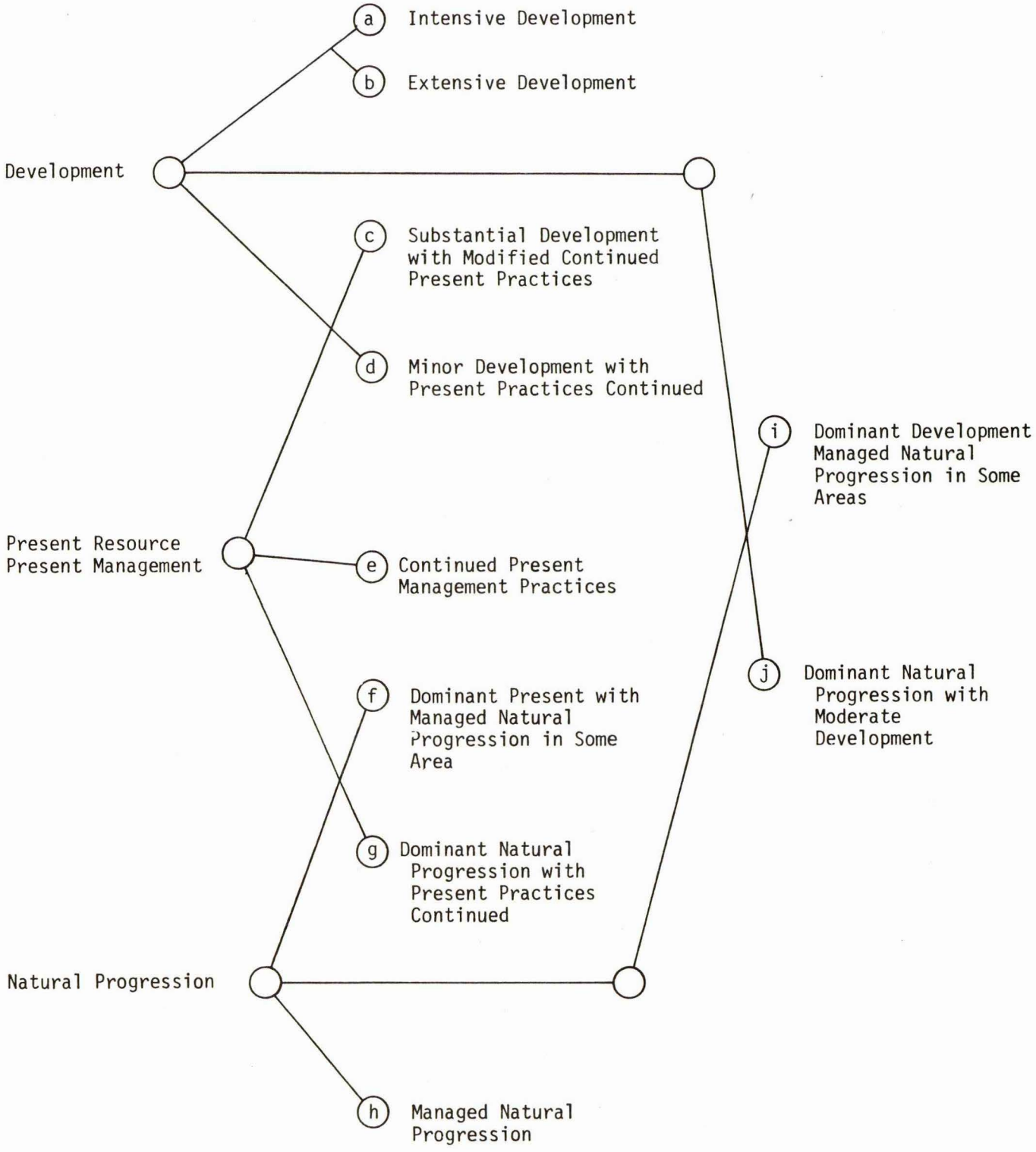
- To allow managed recovery of the site through natural progression while making such recreational use as possible and appropriate in that context.

These fundamental alternatives may be combined to produce a number of variations modeled in figure 4.

At the same time, it is necessary to establish criteria for use in framing viable concepts and discarding ideas that do not merit further consideration. Taking cognizance of the factors which brought the Volga River Recreation Area into being - demographics and demand on the one hand, and unusual and significant resources on the other - certain guidelines emerge for formulating valid concepts for use and management of the area.

Figure No. 4

RECREATION DEVELOPMENT MODEL



- The concept should be founded on the natural and cultural resources and take advantage of the recreational values offered by the site's geology, soils, climate, topography, hydrology, and indigenous vegetative and biological communities.

- The concept must recognize and accept the ecological constraints imposed by the site's geology, soils, climate, topography, hydrology and indigenous vegetative and biological communities.

- The concept should serve those human recreational needs presently identifiable or reasonably foreseeable which are appropriate for the Iowa Conservation Commission facility to serve, as differentiated from those which might be served more effectively or economically by other public agencies or private entities.

- The concept should conserve the resources in a healthful condition for this and future generations.

- Finally, the concept should be sufficiently flexible to allow response to demographic and social change and adventitious natural occurrences.

The alternatives identified by the model were placed in a matrix with recreational demands and significant site factors in order to test their validity and establish the parameters of individual concepts, as shown in figure 5.

The Conceptual alternatives identified on the model may be described as follows:

a. Intensive Development connotes relatively high land use intensity with provision for organized or programmed activities and facilities for activities requiring supervision and/or high usage levels.

   It could be expected to generate high visitation, if demand is sufficient, and to attract visitation from a supra-regional service area because of the facilities provided.

b. Extensive Development implies provision for less organized activities and less sophisticated facilities; and would place more reliance upon recreational use of natural resources than of man-made facilities. It would possibly attract visitation from a larger than regional service area, but the visitor profile would differ from that of visitors attracted by intensive development.

Figure No. 5

RECREATION DEMAND, SITE FACTORS AND DEVELOPMENT ALTERNATIVES

DEVELOPMENTAL ALTERNATIVES: DEVELOPMENT (1–2); PRESENT RESOURCE/MGT (3–5); NATURAL PROGRESSION (6–10)

RECREATIONAL EXPERIENCE VALUE (DEMAND + A + B + C = R.E.V.): A: PRESUMED PARTICIPATION RANGE; B: OTHER POSSIBLE OPPORTUNITIES; C: POTENTIAL FOR POSITIVE RELATIONSHIP TO VOLGA SITE

DEMAND: STATED	DEMAND: DOCUMENTED	DEMAND: MGT. NEED	ACTIVITY / USE	ENVIRONMENTAL ZONES: A	B	C	D	REC. EXP. VALUE: A	B	C	TOTAL VALUE	REMARKS	1 INTENSIVE DEVELOPMENT	2 EXTENSIVE DEVELOPMENT	3 SUBSTANTIAL DEVELOPMENT WITH MODIFIED CONTINUED PRESENT PRACTICES	4 MINOR DEVELOPMENT WITH CONTINUE PRESENT PRACTICES	5 CONTINUED PRESENT PRACTICES	6 DOMINANT CONTINUATION OF PRESENT PRACTICES WITH MANAGED NATURAL PROGRESSION IN SOME AREAS	7 DOMINANT MANAGED NATURAL PROGRESSION WITH SOME PRESENT PRACTICES CONTINUED	8 MANAGED NATURAL PROGRESSION	9 DOMINANT DEVELOPMENT WITH MANAGED NATURAL PROGRESSION IN SOME AREAS	10 DOMINANT NATURAL PROGRESSION WITH MODERATE DEVELOPMENT
			I. INTENSIVE USES																			
			1. AMUSEMENT THEMELAND				x					ADVENTURELAND, DISNEYLAND, STORYBOOK VILLAGE, ETC.										
			2. ANIMAL THEME				x					BUFFALO PARK, ETC.										
			3. HISTORIC THEME				x					OLD TOWN ALBANY, ETC.										
	x		4. RESORT				x	1	3	1	5	SELF CONTAINED RESORT COMPLEX	5								5	
x	x	x	5. CABINS			x	x	1	3	2	18	SOPHISTICATED VS RUSTIC	18	18	18	18		18			18	18
	x		6. GOLF COURSE			x	x	2	2	2	6	REGULATION OR PAR	6									
	x		7. MINIATURE GOLF COURSE			x	x	2	2	2	6		6	6							6	
	x		8. LODGE			x	x	2	3	2	7	RUSTIC MOTEL W/SLEEPING ROOMS AND DINING ROOM	7	7	7						7	
			II. RECREATION USE / PLAY USE																			
	x		1. TENNIS				x	3	2	2	7	PAVED COURTS, FENCE ENCLOSURES	7	7								
	x		2. BADMINTON				x	1	1	3	5	CASUAL ACTIVITY - NO REFINED COURTS	5	5								
	x		3. VOLLEYBALL				x	1	1	3	5	PERMANENT NET AND COURT	5	5	5							
x	x		4. SOFTBALL				x	3	1	2	12	REFINED, NO ELECTRIC OR PERMANENT BLEACHERS	12	12								
x	x		5. BASEBALL				x	3	1	2	12	REFINED, NO ELECTRIC OR PERMANENT BLEACHERS	12	12								
	x	x	6. FRISBIE COURSE			x	x	2	1	3	12	ORGANIZED W/GOALS	12	12	12						12	
x	x		7. BASKETBALL				x	2	1	2	10	REFINED PAVED VS DIRT COURT	10	10	10						10	
		x	8. LAWN BOWLING				x	1	2	3	6	REFINED LEVEL LAWN	6	6	6						6	
		x	9. SHUFFLEBOARD				x	1	2	3	6	CONCRETE COURT	6	6	6						6	
x	x	x	10. BICYCLING			x	x	3	2	2	21	ON PAVED ROADS	21	21	21	21					21	21
x	x	x	11. HIKING TRAILS		x	x	x	3	2	3	24	MARKED AND ORGANIZED LOOP SYSTEMS	24	24	24	24	24	24	24	24	24	24
		x	12. BALOONING				x	1	1	3	5	CASUAL, OPEN FIELD	5	5	5	5	5	5	5		5	5
		x	13. KITING				x	2	1	3	6	CASUAL, OPEN FIELD	6	6	6	6	6	6	6		6	6
		x	14. HANG GLIDING		x			1	2	2	5	CASUAL, OPEN CLIFF AREAS	5	5	5	5	5	5	5		5	5
x			15. ROCK CLIMBING		x			1	1	1	3	MANAGEMENT INTENSIVE		3	3						3	3
x	x		16. MOTORCYCLE TRAILS		x	x	x	2	2	2	12	MANAGEMENT INTENSIVE	12	12								
			17. OFF ROAD VEHICLES TRAILS (ORV)		x	x	x															
x	x	x	18. HORSE TRAILS			x	x	2	2	2	18	MARKED AND ORGANIZED	18	18	18	18	18	18	18		18	18
x		x	19. STABLE				x	1	3	2	12	FOR CLUB AND GROUP USE	12	12	12	12					12	12
x	x	x	20. DRIVING FOR PLEASURE			x	x	3	1	2	18	PAVED ROADS	18	18	18	18					18	18
x	x	x	21. SIGHTSEEING			x	x	3	2	3	24	FROM ORGANIZED OVERLOOKS NEAR PAVED ROADS	24	24	24	24					24	24
x	x	x	22. PICNICKING			x	x	3	1	3	21		21	21	21	21	21	21	21		21	21
x	x	x	23. PICNICKING - GROUP				x	2	2	2	18	FACILITIES CLUSTERED	18	18	18	18	18	18	18		18	18
x	x	x	24. GROUP SHELTERS				x	2	2	2	18	OPEN SHELTER W/FIREPLACES AND REST ROOMS	18	18	18	18	18	18	18		18	18
x		x	25. GROUP SHELTER W/KITCHEN				x	1	2	2	10	RUSTIC MEETING ROOM / DINNING ROOM W/REST ROOMS, UTILITIES, HOT WATER	10	10	10						10	
x	x	x	26. HORSESHOES				x	2	2	3	21		21	21	21						21	21
x	x	x	27. UNORGANIZED SPORTS				x	2	2	3	21	INFORMAL GAMES AREAS OPEN MEADOWS	21	21	21							
			III. OVERNIGHT USES																			
x	x	x	1. CAMPING - UNDESIGNATED W/ PRIMITIVE SANITARY FACILITIES		x	x		1	1	3	15	BURY OWN TRASH AND GARBAGE, DESIGNATED TRAILS, OPEN SITES, PACK IN - PACK OUT			15	15	15	15	15	15	15	15
x	x	x	2. CAMPING - DESIGNATED PRIMITIVE W/PIT LATRINE			x		1	2	3	18	DESIGNATED SITES		18	18	18	18	18	18		18	18
x	x	x	3. CAMPING - TENT			x	x	2	2	2	18		18	18	18	18	18	18	18		18	18
x	x	x	4. CAMPING - TRAILER				x	2	2	2	18	POP-UP	18	18	18	18	18	18	18		18	18
x	x	x	5. CAMPING - SELF CONTAINED				x	2	2	2	18	MOBILEHOME, MOTORHOME	18	18	18						18	
x	x	x	6. CAMPING - GROUP				x	2	2	2	18	CLUSTERED, LESS PRIVACY, REGULAR CAMPGROUND	18	18	18						18	
x	x	x	7. CAMPING - GROUP-SPECIALITY				x	1	2	2	15	HORSE CLUBS, SCOUTS, BAND CLUBS, ETC.	15	15	15	15					15	15
	x	x	8. CAMPING - GROUP LODGE / CAMPGROUND				x	1	3	2	12	ENCLOSED KITCHEN / DINING / MEETING, FLUSH FACILITIES / SEPTIC TANK	12	12	12						12	
x	x	x	9. CAMPING - BOAT ACCESS CAMPING			x	x	1	2	3	18	CANOE, THRU SITE TRIPS	18	18	18	18	18	18	18		18	18
			IV. WATER ORIENTED USES																			
x	x	x	1. SWIMMING - POOL				x	3	2	2	21		21	21							21	
x	x	x	2. SWIMMING - BEACH				x	3	2	2	21	NATURAL, ON RIVER	21	21							21	
x	x	x	3. FISHING - SHORELINE			x	x	3	1	3	21		21	21	21	21	21	21	21		21	21
x	x	x	4. FISHING - BOAT			x		2	2	2	18		18	18	18	18	18				18	
x	x	x	5. CANOEING			x	x	2	2	3	21		21	21	21	21	21	21	21	21	21	21
x	x	x	6. BOATING - SMALL HORSEPOWER / ELECTRIC			x	x	2	2	2	18	6.5 HORSEPOWER OR LESS	18	18	18	18	18				18	
x	x	x	7. BOATING - ROW BOATING			x	x	1	2	2	15		15	15	15	15	15	15	15		15	15
	x	x	8. KAYAKING			x	x	1	2	2	10	SEASONAL	10	10	10	10	10	10	10		10	10
	x	x	9. TUBING			x	x	2	2	3	14		14	14	14	14	14	14	14		14	14
			V. SPORTSMAN USES																			
x	x	x	1. HUNTING - BIG GAME		x	x	x	2	2	3	21	DEER				21	21	21	21	21		21
x	x	x	2. HUNTING - SMALL GAME		x	x	x	3	2	3	24	FOX, COYOTE, BEAVER, RABBIT, SQUIRREL, RACCOON				24	24	24	24	24		24
x	x	x	3. HUNTING - GAME BIRDS		x	x	x	3	2	3	24	TURKEY, PHEASANT, QUAIL, DUCKS, GEESE				24	24	24	24	24		24
x	x	x	4. TRAP AND SKEET FIELDS				x	1	2	2	15	NOISY	15	15	15							
x	x	x	5. ARCHERY RANGE AND COURSE			x	x	1	2	2	15	TARGETS, HAZARDS	15	15	15	15	15	15	15		15	
			6. PISTOL / RIFLE RANGE									CONTROLS, SAFETY AND NOISY										
x		x	7. DOG TRIALS		x	x	x	1	1	2	8	COMPETITIVE SKILL COURSE				8	8	8	8	8	8	8
x		x	8. EQUESTRIAN TRIALS			x	x	2	2	2	12	COMPETITIVE SKILL COURSE			12	12	12	12	12		12	
			VI. WINTER ACTIVITIES																			
x	x	x	1. ICE SKATING				x	2	2	2	18		18	18	18	18	18	18	18		18	
		x	ICE BOATING				x	1	3	2	6		6	6	6	6	6	6	6		6	
x	x	x	3. ICE FISHING			x	x	2	2	1	15		15	15	15	15	15	15	15		15	
	x	x	4. SLEDDING AND TOBOGGANING		x	x	x	2	2	2	12	DOWNHILL DESIGNATED AREAS	12	12	12	12	12	12	12		12	
x	x	x	5. SKIING - CROSS COUNTRY TRAILS			x	x	2	2	3	21		21	21	21	21	21	21	21		21	21
	x		6. SKIING - DOWNHILL		x	x		2	2	2	6	MECHANIZED TOW	6	6	6						6	
x	x	x	7. SNOWMOBILE TRAILS			x	x	2	2	2	18		18	18	18	18	18	18			18	18
		x	8. TOBOGGAN RUNS		x	x		1	3	2	6	MECHANIZED TOW	6	6								
			VII. HISTORIC / ARCHAEOLOGIC																			
x		x	1. INDIVIDUAL SITES RESTORATION			x	x	1	2	2	10	SPRING HOUSE, BRIDGE, BARN, SILO	10	10	10	10					10	10
x		x	2. GROUP SITES / TOWNS RESTORATION				x	1	2	2	10	ALBANY, LIMA	10	10	10						10	
x	x	x	3. INDIAN CULTURE RESTORATION	x	x	x		1	2	2	15		15	15	15	15					15	15
x	x	x	4. FARM CULTURE RESTORATION			x	x	1	2	2	15	HISTORIC	15	15	15	15					15	15
x	x	x	5. INTERPRETATION CENTER TRAILS	x	x	x	x	2	3	3	24		24	24	24	24					24	24
x	x	x	6. HISTORIC/ARCHAEOLOGIC INTERPRETATION TRAILS		x	x	x	2	2	3	21		21	21	21	21					21	21
x		x	7. STUDY CENTER			x	x	1	3	2	12	SPECIALIZED RESEARCH AND STUDY	12	12	12	12					12	12
			VIII. NATURE ORIENTED																			
x	x	x	1. RESOURCE INTERPRETATION CENTER			x	x	2	2	3	21		21	21	21	21				21	21	21
x	x		2. SPELUNKING	x	x			1	2	1	8	LIMITED OPPORTUNITY AND RESOURCE QUALITY	8	8	8	8				8	8	8
x	x	x	3. NATURE OBSERVATION / PHOTOGRAPHY	x	x	x	x	3	2	3	24				24	24	24	24	24	24	24	24
x	x	x	4. AMPHITHEATER			x	x	1	3	2	18	RUSTIC	18	18	18	18					18	18
x	x	x	5. FIRECIRCLE			x	x	2	2	2	18		18	18	18	18			18		18	18
x	x	x	6. NATURE INTERPRETATION TRAILS	x	x	x		2	2	3	21		21	21	21	21				21	21	21
x	x	x	7. MUSHROOM HUNTING			x	x	3	2	3	24		24	24	24	24	24	24	24	24	24	24
			IX. ADVENTITIOUS OPPORTUNITIES																			
		x	1. UNDEFINED	x	x	x	x															
x		x	2. MONITOR AREAS	x	x	x																
												TOTALS	[illegible]96	1006	955	852	561	543	513	235	975	762

c. Substantial Development with Modified Present Practices would propose an enlarged range of activities permitting more active pursuits with more numerous and substantial facilities for them, while maintaining current land use and wildlife management practices on a major portion of the land area.

d. Minor Development with Continued Present Practices would involve development required to provide for some expansion of the present activity range to include activities for which there is a clear need in the near vicinity; facilities for such new activities and to support moderately increased visitation; and maintenance of present land use and wildlife management practices on most of the land area.

e. Continued Present Management Practices would imply a low range of activities similar to those already carried on with simple facilities providing for needs of the present visitor profile; and continued emphasis on wildlife management. The area would continue to be managed for low visitation from a subregional service area.

f. Dominant Continuation of Present Practices with Managed Natural Progression in Some Areas would mainly involve employment of management techniques to mitigate human impacts on natural areas and protect those most sensitive and significant, while maintaining present land use and wildlife management practices on most of the land area. Activities would be similar to those presently carried on and visitation levels might increase at a moderate rate; while simple facilities would be provided for the needs of a visitor profile similar to the present one.

g. Dominant Managed Natural Progression with Some Present Practices Continued implies managed return of most of the area to natural ecological climax state, which would involve significant changes in land use management while continuing wildlife management with somewhat reduced emphasis. Activities range and visitation levels would be similar to those presently carried on; and minimal facilities provided for maintenance of management practices and basic visitor needs.

h. Managed Natural Progression conceptualizes employment of land use and wildlife management practices calculated to produce return of the area on a managed, controlled and somewhat accelerated basis to natural ecological climax stage. Activities would be similar to the present range and visitation somewhat diminished; and minimal facilities provided for maintenance of management practices and basic visitor needs.

i. Dominant Development with Managed Natural Progression in Some Areas would involve major development approaching the levels described for Concept a - although wide variations are possible within this frame - to produce a wide range of activities and accommodate relatively high visitation with appropriate facilities; some enhancement of aesthetic values; and protection of sensitive areas.

j. Dominant Natural Progression with Moderate Development would involve development approaching the levels described in Concept b. - although many variations would be possible - to allow a considerable activity range and visitation with appropriate facilities; while placing major emphasis on the aesthetic and ecological qualities of the natural setting. Although major revisions in land use and wildlife management practices would be involved, it probably would be possible to carry on a significant wildlife management program within the framework of this policy.

Many of the distinctions drawn between concepts described are matters of degree: Intensive development should not disregard aesthetic and ecological considerations, nor should managed natural progression disregard human recreational use and enjoyment; but the distinctive character of each concept would emerge from the emphasis placed on each idea. Many of the conceptual distinctions also would derive from management plans and policies as well as from physical forms and facilities. Thus, it proved desirable to meld ideas defined in various different concepts into one cohesive plan.

2. Evaluation of Concepts

The ten concepts were developed into schematic plans to determine their adaptability and to evaluate the capability of the site to support them. From the ten alternatives, three were selected and refined into complete balanced development concepts to serve as many as possible of the identified public recreation needs keeping aware of the degree within acceptable impacts on the natural resource base.

These three refined development concepts were reviewed with the public review committee in a public meeting near the site and with the Volga River State Recreation Area Staff Task Force and the Iowa Conservation Commission. The three concept plans are available for review at the Commission's Central Offices. These concepts are described and the effects of each on the environment were evaluated as follows:

a. Dominant Development With Managed Natural Progression in Some Areas

This alternative will involve intensive development with a wide range of outdoor recreation activities and relatively high levels of visitation. Specific facilities that will be provided include a nature/historical

interpretation center; visitor center; a swimming pool and accompanying shelter facilities; cabins, a campground (200-300 tent and trailer units); a specialty group camp with a recreation/meeting/dining shelter with fireplace, restrooms, corral, ramps and bridle trails; and various other trails, i.e., hiking, snowmobile, and crosscountry ski), overlooks, picnic areas, fishing docks, game courts, and canoe access points. In addition to this development, sufficient areas will be designated for agriculture to support game and wildlife management objectives, and some areas will be managed for natural vegetative progression.

Activities permitted under this alternative will include: court games and sports, fishing, hunting, swimming, hiking, camping, canoeing, picnicking, horseback riding, nature/historical interpreation, and skiing, tobogganing and snowmobiling in winter.

(1) Environmental Consequences of the Proposed Action

With the new facilities and wide range of activities provided by this alternative, relatively high levels of visitation may be expected. The increased visitation would require an intensification of land management practices and maintenance procedures and, therefore, proportionately increased costs.

Site analysis studies conducted during the planning process were compiled into development guidelines identifying five environmental zones according to the degree of restriction or sensitivity to development. Development plans were guided by these environmental zones. Anticipated impacts of development were mitigated, in part, through careful selection of development sites within these zones. For example, only previously disturbed sites and/or sites with slopes less than 14%, with slight to moderate soil limitations, and lacking unique or environmentally sensistive plant or animal communities, were selected for intensive development. Areas with moderately steep to steep slopes, or other features identified as fragile or sensitive to intensive recreational use were designated for limited, non-intensive use such as primitive hiking trails, for example. Finally areas identified as having environmental features unique to the site and/or the region, or containing threatened or endangered species of plants or animals were designated for preservation, study and observation. No development was proposed for any areas designated for preservation because of the high risk of adverse environmental impact that would result from almost any type of recreation activity permitted therein.

Short-term adverse affects associated with this alternative will be derived mainly from construction activity including clearing and grading for new road construction, camp-grounds, visitor and interpretive centers, game courts, shelters, and swimming pool.

Clearing of vegetation for facilities such as trails is generally minimal, and associated environmental impacts negligible. In fact, guided trails can minimize impacts of casual hiking occuring in fragile areas. Short-term impacts of clearing for the larger faci-

lities named above include soil and vegetation disturbance and removal, and subsequent vulnerability of the exposed soil to erosion by wind and water. Some erosion before revegetation is inevitable in any construction activity lasting more than a few days and results in minor sedimentation and/or generation of fugitive dust. These short-term impacts may be partially mitigated through measures to control erosion, minimize sedimentation, and to reestablish ground cover as soon as possible following completion.

Other impacts would include modification of existing circulation within the area; and intensification of effects associated with public use, including soil compaction and disturbance of vegetation and wildlife by recreationists.

b. Substantial Development With Modified Present Practices

In this alternative, the range of activities currently offered at the Volga River Recreation Area would be enlarged. More numerous and substantial facilities such as developed campsites would be provided, while maintaing current land use and wildlife management practices on a significant percentage of the area. Farming operations would be modified to follow natural contours in leased areas.

Facilities to be provided in this alternative would include a nature/historical interpretation center; visitor center; swimming pool; 24-48 cabins; campground with 100-150 tent/trailer pads; amphitheater; specialty group camp; several canoe access points; recreation shelters; fishing docks; game courts and fields; some open meadows without facilities designated as play areas; and various trails and overlooks. In addition, there would be agricultural acreage and managed natural progression areas sufficient to support wildlife management objectives. Some areas would be designated for prairie and vegetative restoration.

Recreation activities would include nature/historical interpretation, fishing, hunting, hiking, swimming, camping, picnicking, cross-country skiing, tobogganing, snowmobiling, camping, various court games and field sports.

(1) Environmental Consequences of the Proposed Action

This alternative, like the intensive development alternative, would probably attract visitors from an approximately 50-mile regional service area, but the typical visitor profile would be different. Revisions in land use and wildlife management practices would be similar to those the intensive development alternative would necessitate, but they would be more responsive to protection and enhancement of the resource. This alternative holds more potential for a significant wildlife management program than does the intensive development alternative.

Management and maintenance costs would be long-term effects of this alternative. Other long-term effects would include changes in existing circulation within the area and impacts on soils, vegetation and wildlife associated with increased levels of public use. Paving unsurfaced roads would increase runoff; however, parking areas would remain unpaved, allowing percolation to occur.

Short-term effects would consist mainly of vegetation removal and soil disturbance associated with construction and increased usage. During construction, there would be some erosion and sedimentation during wet periods, and production of dust and particulate pollution during dry periods. Diurnal wildlife activities would also be disturbed. Planned distribution of facilities, however, would allow some areas to be rested in alternating seasons to keep the resource healthy.

Environmentally sensitive areas having features unique to the site or region, or containing threatened or endangered species of plants or animals were specifically excluded from development by the "environmental zones" guidelines. Such areas would be managed for study and observation.

c. Dominant Natural Progression with Moderate Development

This alternative would provide a wide range of outdoor recreation activities while placing emphasis on the aesthetic and ecological qualities of the natural setting. The types of recreation provided by this alternative would be less intense, less organized, than those of the "Dominant Development with Managed Natural Progression in Some Areas" alternative. Activities would place reliance upon use of natural resources rather than man-made facilities.

Specific facilities would include a nature/historical interpretation center and associated trails; a visitor center in an existing structure renovated for the purpose; a campground with approximately 100 tent/trailer sites; 24-36 cabins; a specialty group campground, a day-use area with picnic grounds; ski/toboggan lift, game fields, shelters and restrooms; canoe and fishing access points; and trails and overlooks.

Recreation activities provided by this alternative include nature/historic interpretation, hunting, fishing, canoeing, and selected court and field games and open field sports.

A majority of the acreage would be committed to managed natural progression and agriculture (following contours) for wildlife management purposes.

(1) Environmental Consequences of the Proposed Actions

Implementation of this alternative will attract visitors from a smaller service area than either of the others, and the facilities and activities provided will appeal primarily to outdoorsmen; that is, recreationists seeking natural surroundings, comparative solitude, minimal facilities, and few fellows in the vicinity. Consequently it would involve the fewest construction and public use related impacts, either short or long-term and the lowest costs for development and maintenance. Environmentally sensitive areas would be protected by this alternative also and the wildlife management program maximized.

As in the other alternatives, there would be changes in the traffic circulation within the site, and soil disturbance and removal of vegetation to establish new facilities. Construction activities would temporarily disturb resident wildlife; and there would be dust, erosion and sedimentation associated with exposed soils caused by construction. The facilities would be designed to fit onto existing contours, causing minimal effects to the natural landscape.

3. Refinement of Final Development Theme and Layout Plans

The three development alternatives discussed above were presented to the citizens task force, the Iowa Conservation Commission staff task force and the Iowa Conservation Commissioners. Comments and recommendations were solicited, evaluated and responses reported and/or plan layout adjustments accommodated. Based on inputs from these groups, one development theme was then developed with the best elements of the three concepts which would fulfill as much as possible the public needs and the Iowa Conservation Commission management objectives without adverse effects on the natural resource base. This refined plan was then reviewed by the citizens task force, the Iowa Conservation Commission staff force and the Iowa Conservation Commissioners.

The development theme selected for use as the basis for the Master Plan may be described as: Modified Natural Progression with Moderate Development.

B. THE MASTER PLAN

The physical layout of the facilities and activity areas reflects the conscious conservation of the natural resource with managed natural areas dominating the development theme: Moderate development for public usage in a manner to provide for a high quality recreational experience which interrelates compatability with the natural flora and fauna of the site. Development will follow a theme or design character carefully selected to assure the on-going natural processes of the resource base, consciously encouraging a vegetative character indigenous to the site and supportive of habitat for the many small game animals, birds, mammals and fish now present and desirable for the future. The carrying capacity of the land dictates the degree of development and strongly influences the standards by which activity areas and developments will be laid out, and directs the relationships between elements. The layout resource base - the geology, the soils, waters and vegetation patterns, while providing facilities to allow for and encourage human usage of the site. The approved plan is the Master Plan shown on the accompanying exhibit.

1. Facility Siting And Spacing Requirements

a. Details of the development and facilities to be provided are described as follows:

(1) Entrance and Orientation Station

The entrance to the Area will be identified by an appropriate sign. The orientation station is located on a promontory at the entrance to the site to allow development of an overlook platform or structure with display panels for general visitor orientation and circulation facts. The orientation map could be displayed horizontally on a panel oriented to the view of the valley. Good quality visual graphic displays and printed brochures will serve to orient the visitors, and the orientation center should be operable without staffing. Printed brochures for each new visitor would enrich the experience of the visit and provide a reference for orientation throughout the duration of the visit and a souvenir to take home. A public pay telephone will be provided at this location.

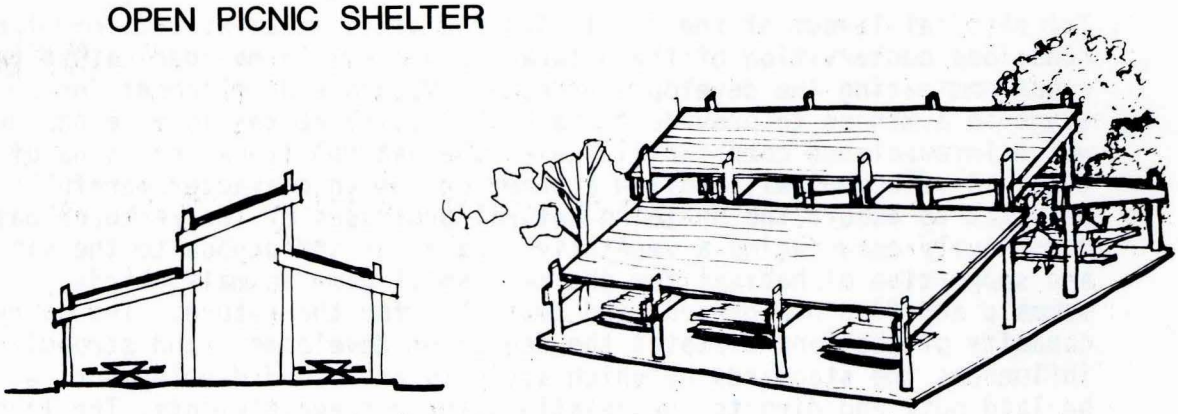
(2) Ridge Top Day Use Area

This area will provide space and facilities for day use activities including picnicking; field games; selected court games such as horseshoes, volleyball, and badminton; and some single basketball goals. Rustic wooden play apparatus will be provided for younger children near clusters of picnic tables.

Picnic sites will be clustered in savannah (open meadow with spaced trees) areas of vegetation accessible to parking areas and hear ski and toboggan slopes. Open picnic shelters (capacity 6-8 picnic tables) will focus activities on sites spaced approximately 200 feet apart. The size of picnic groups will vary with available space and site features; however, planners recognize that most park visitors like to share a space and experience with other visitors.

Figure No. 6

OPEN PICNIC SHELTER



In picnic areas, units (2 tables, 1 grill and 1 trash receptacle) would be 20 - 30 feet apart, in loosely structured groups of 6-10 tables each, with no more than twenty-five units clustered about a single parking lot. Picnic units should be placed in areas where strong grasses will be easily maintained to reduce the need for pavements or mulches. In heavily used areas, a mulch of wood chips generated from selected clearings on the site would be compatible and recycle a natural material.

Recreation facilities will include an open plan meadow of two or more acres; a rustic tot lot play equipment groupings; a volleyball court; several horseshoe pits; and one basketball goal with paved court for the four larger clusters of picnic shelters. An outdoor amphitheater will also be provided.

Restrooms will be provided in each major use area; those serving winter visitors (half or more of them) will be built and equipped for year-round usage. A drinking fountain will be located on the wall of each restroom building. One large group picnic shelter (capacity 10-12 tables) with a large fireplace will be provided and utilized as a warming shelter for winter sports enthusiasts.

Downhill ski and toboggan slopes will be provided on a north-northeast slope in locations each providing 10-14% slope with a length of 1200 to 1500 feet and a width of each slope of 150 to 200 feet. The runs will end at the bottom of the hill in the Meadow Day Use Area where another warming/group shelter and a restroom will be provided. The runs are placed to avoid removal of large quantities of trees and where the natural topography is easily adaptable to these winter activities. A tow rope for return up the slope will be provided on a nearby slope with a consistent gradient allowing smooth and safe traverse for participants.

(3) Developed Campground

The heavily impacted clay borrow site will be reclaimed for 150 developed campsites. The layout will provide loop-roads with one-way traffic where possible. Cul-de-sac spurs with two-way traffic will utilize existing linear clearings in the vegetation. Size restroom buildings, with showers in three of them, will be sited so that one will be within 400 feet of each campsite. These buildings will be insulated and provided with hot water, heated dressing areas, and airtrap entrance chambers in cold weather usage.

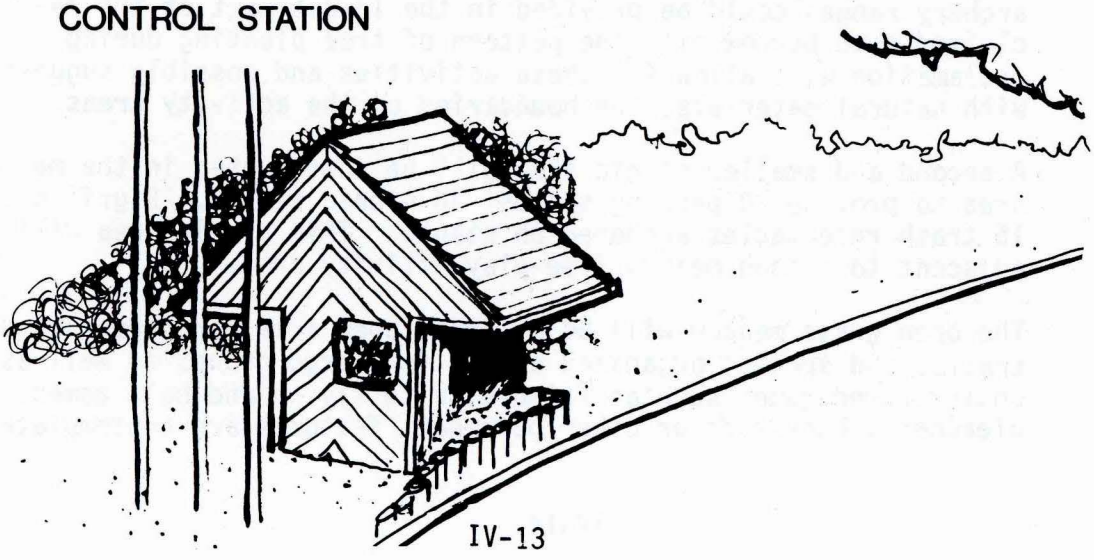
Each camping spur will be 12 feet wide by 55 feet long or 25 feet wide by 25 feet deep, depending on the grade, with an adjacent pad 12 feet x 20 feet. This pad will be designed for interchangeable trailer or tent use. The spur and pad will be surfaced with compacted fine gravel or with wood chips recycled from the selective site clearing. Individual campsites will be sited approximately 75 feet apart. On one side of the pull-off, a selectively cleared and leveled area of about 600 square feet will be provided. Each campsite will contain two picnic tables, 1 grill and 2 lantern poles. A vehicle bumper block will be installed at the end of each spur. Centrally located bulk waste containers will be provided, or two anchored trash receptacles will be located near the access road at the ratio of one for each two campsites, plus four at each restroom. Electricity shall be supplied throughout with a two-way weatherproof outlet located at each campsite. Water hydrants with self closing taps will be located within 300 feet of each campsite.

Two free play areas of one to two acres each will be provided as mown meadow space for semi-organized games such as softball, football, soccer, frisbee, kite flying, etc. No permanent features such as backstops, goals, markers or nets are contemplated.

There will be permanently installed swings, slides, parallel bars complex, on volleyball court, several horseshoe courts, one basketball goal and one rustic tot lot exerciser/playground equipment complex in each of two centrally located areas.

Figure No. 7

CONTROL STATION



A check-in control station (See figure No. 7) will be provided at the entrance. A sanitary dumping station will be provided near and inside the entrance. An outdoor amphitheater will be provided in a natural valley. Paths and walkways of wood chip or gravel surface will be provided where necessary to serve washhouses and heavy use activity areas and discourage trampling of vegetation.

The entire clay borrow area will be reforested. As camping sites are developed in phases, at least four larger trees of 2-4 inch caliper will be planted per campsite, if the reforested plants are not large enough to provide shade. Natural groupings of indigenous varieties of shrubs will be planted between campsites and along the roads as needed for buffer and moderate privacy.

(4) Lower Meadow Day Use Area

In the grass meadow area below the dam, open meadows will be defined by naturally massed trees. One large group picnic/warming shelter with a large fireplace will be provided for bottom-of-the slope winter sports enthusiasts. One winterized restroom with roomy dressing areas will be provided, with a wall mounted drinking fountain. An administrative telephone for emergencies will be provided. Two wooden floored bridge-like structures, each 150-200 feet wide will span the creek to allow skiiers and sledders to travel a safe distance from the toe of the slopes to stop. The bridge would be 2" x 8" planks secured to creosoted utility-like poles approximately 30 feet long to span the creek. Heavy timbered side rails will identify the crossing limits for safety.

The reclaimed sand borrow pit will be partially filled with spoil from the dam and lake construction and will be reshaped into contours which reflect the natural contours of the immediately surrounding area. The side slopes will be laid back and interior mounds created with varying degrees of slope to allow for use as beginners sledding and ski slopes. A route through the reclaimed pit for cross country skiiers could add a challenge and unique feature to the course. The shortness and relative flatness of the slopes naturally would provide continuous usage and interest for only the very young and inexperienced skiiers. In the summertime archery ranges could be provided in the lowest part of the reclaimed sand borrow pit. The pattern of tree planting during reclamation will allow for these activities and possibly suggest with natural materials, the boundaries of the activity areas.

A second and smaller picnic area will be constructed in the meadow area to provide 20 parking spaces, 30 picnic tables, 15 grills and 15 trash receptacles anchored on stands. This picnic area will be adjacent to a mown meadow free-play activity area.

The open grass meadow will be an ideal open area for horse and dog trails, and special organized events for large groups as well as unstructured games such as frisbie, kite flying and ball games. No bleachers, backstops or other permanent features are contemplated.

A group of rustic heavy timbered play equipment will provide for the active youngsters, with selected active exercise facilities for recreation near the picnic tables.

(5) Beach Hilltop Area

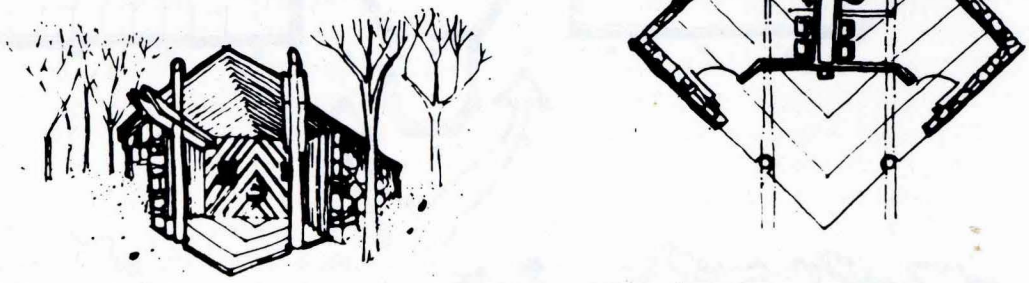
The nearby picnic area on the top of the hill will provide 30 picnic tables, 15 grills and 15 anchored trash receptacles. Three picnic shelters, one group shelter, and one overlook platform will be provided.

An open meadow area one to two acres in size will be provided for unstructured games and field play, such as football, soccer, softball, frisbee, kite flying, etc. Selected court games for volleyball, badminton and horseshoes will be provided near the top of the hill group.

One restroom building with a drinking fountain will be provided. Loop trails will connect these areas to the lakeside trail and other trails on the site. Shade trees, evergreen trees and flowering trees will be planted as needed to provide shade and visual enhancement the area.

Figure No. 8

RESTROOM BUILDING



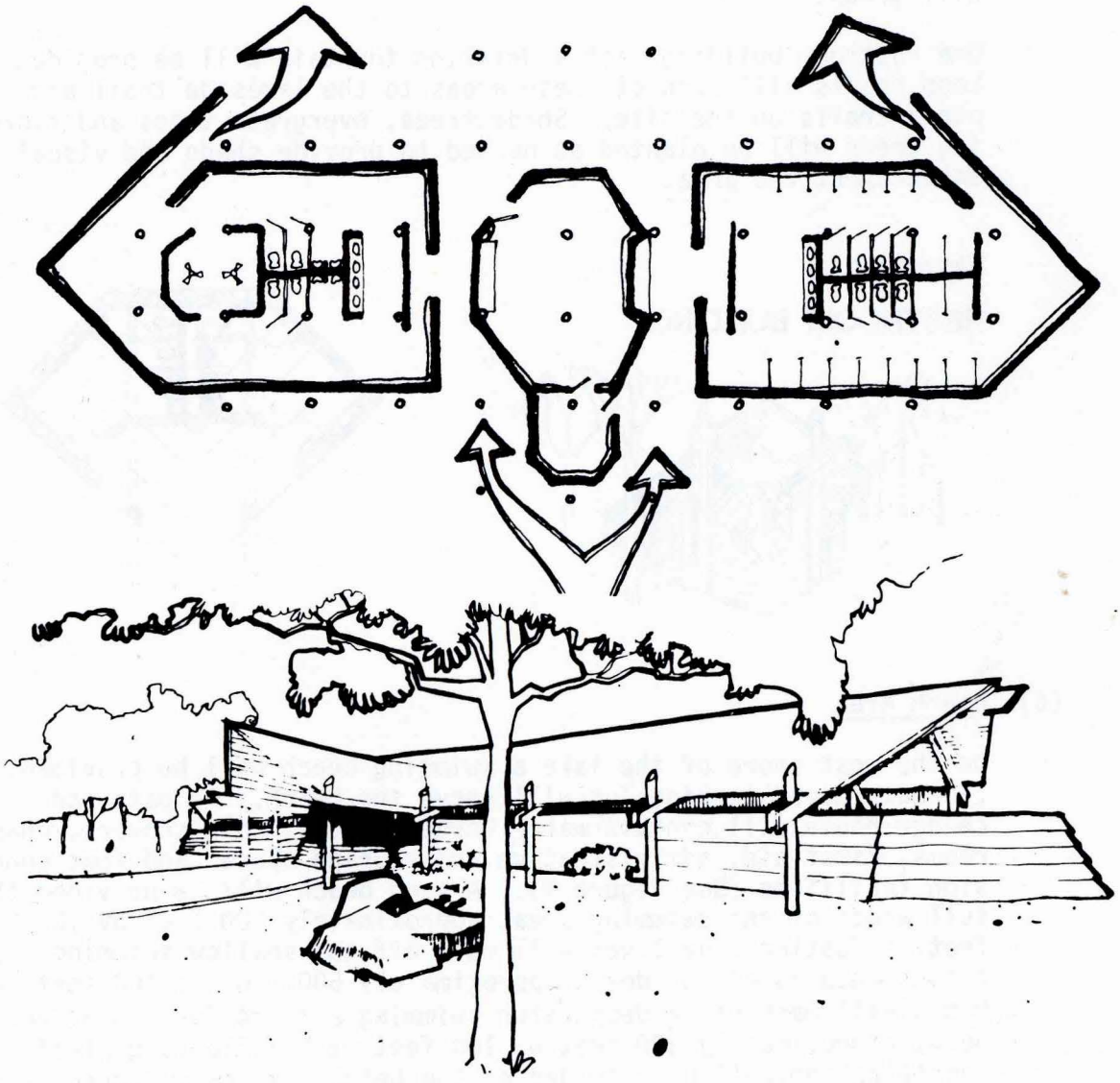
(6) Beach Area

On the west shore of the lake a swimming beach will be provided. A 130-auto paved parking lot will serve the beach. A bath and change house will contain water borne toilets, cold showers, change rooms, first aid, administrative and storage space, and food concession facilities (See Figure 9). A sand beach will be provided the full width of the swimming area, approximately 500 feet by 100 feet. Floating buoy lines will mark off the shallow swimming area 1 foot deep to 4 feet deep, approximately 500 feet by 100 feet and buoys will mark off a deep water swimming area, 4 feet to 8 feet deep, approximately 300 feet by 100 feet with a floating platform. One telephone will be provided at the bathhouse for emergency and administrative purposes.

The adjacent picnic area will contain 3 picnic shelters 20 to 30 feet apart, and 100 picnic tables, clustered in groups of no more than 8 tables. Each 2 picnic tables will have one grill and one anchored trash receptacle and holder. The area will be planted with large shade trees for summer comfort and setting. Active play and exercise equipment of rustic design will be provided for children and active adults convenient to the beach and picnic area and will include a children's spacenet climber and one "muscleman" parallel bar complex.

Figure No. 9

BATHHOUSE BUILDING



(7) East Lake Day Use Area

On the east shore of the lake, adjacent to the dam will be a 40-car and trailer and 10-car parking lot with a two-lane boat launching ramp, and tie up dock. Viewing and fishing platforms will be provided. A ramp to the shore line will provide access for the handicapped. Lake overlook areas at this parking lot will enhance the experience of the sightseers and accommodate the visitors in this interesting activity area. Shoreline fishing platforms for the elderly and handicapped will also be provided.

A turn-around loop located on the lake access road will serve sightseers and provide access to restrooms to serve the boat dock users. An auxiliary parking lot for 30 vehicles will be built adjacent to the turn-around loop for overflow parking for the dam and boat dock areas as well as to accommodate trail users.

A maintenance trail and a shoreline trail will serve fishermen and hikers and provide access from the parking lot to the East Lake Day Use Area, a picnic area located at the site of an old farmstead. This picnic area will be more remote from parking areas than others on the site, and will allow facilities for trail users and the more hardy visitors who venture beyond the normal roadside developed areas. An interpretation and/or play feature will be developed in the existing concrete and native stone barn foundation. A nearby silo will be developed as a valley and lake overlook and photographic vantage point. Facilities on this site will include 3 picnic shelters (capacity 6-8 picnic tables each), 40 picnic tables, 20 grills, and 20 anchored trash receptacles. The farm type well will be equipped with a hand pump to provide drinking water. Standard pit vault latrines will be provided at this site.

Loop trails will emanate from this site to circulate around the lake, overlooking, but safely away from the beaver colony on the streams flowing into the lake, and along the rock cliffs and will connect to longer trails leading through the total park site. An unpaved path will provide maintenance access to this site from the boat launching parking lot at the dam. Large shade trees near the shoreline will visually expand this old farmstead site and functionally tie it into the lakeside activities.

(8) Cabin Area

The location of the 36 cabins on a ridge top in the northeastern portion of the site, provides easy access to the lake yet remoteness on the site from other intensive-use areas. The rustic, solar heated and energy conserving one and two room cabins will provide accommodations for familes, groups and sports enthusiasts, with supplemental conventional heating systems and possibly fireplaces or wood burning stoves, cabins may be made suitable for winter use. Each cabin will have a spacious deck overlooking the interesting valleys, woodlands and meadows. The cabins will be at least 50 feet apart yet clustered along the existing tree line to gain shade in the summer from the deciduous trees, yet allowing for active solar heating in winter. Each cabin will have 2 picnic tables, one grill and one anchored trash receptacle for outdoor activities, and two parking spaces. A small fishing pond in the area and mown open meadows for free-play will provide recreation facilities in the immediate area. Rustic heavy timbered playground equipment and selected active recreation facilities will be provided in two locations. Two tennis courts will also serve family and adult groups and help to assure usage of facilities year round by active recreation enthusiasts.

(9) Maintenance Area

A maintenance compound, U-shaped with a paved central courtyard 150 feet by 150 feet, and parking for 16 employee and staff vehicles will be provided. The buildings will be built into the hillside and oriented southward for energy considerations. One half of the building will be enclosed and winterized for offices, slips and storage area. The other half will be unheated pole type structure and will not be heated. The area will be visually screened from the main park roads and activity areas by evergreen and deciduous trees. Outdoor storage will be provided only in areas effectively screened year round.

(10) Visitor/Nature/Historical Interpretation Center

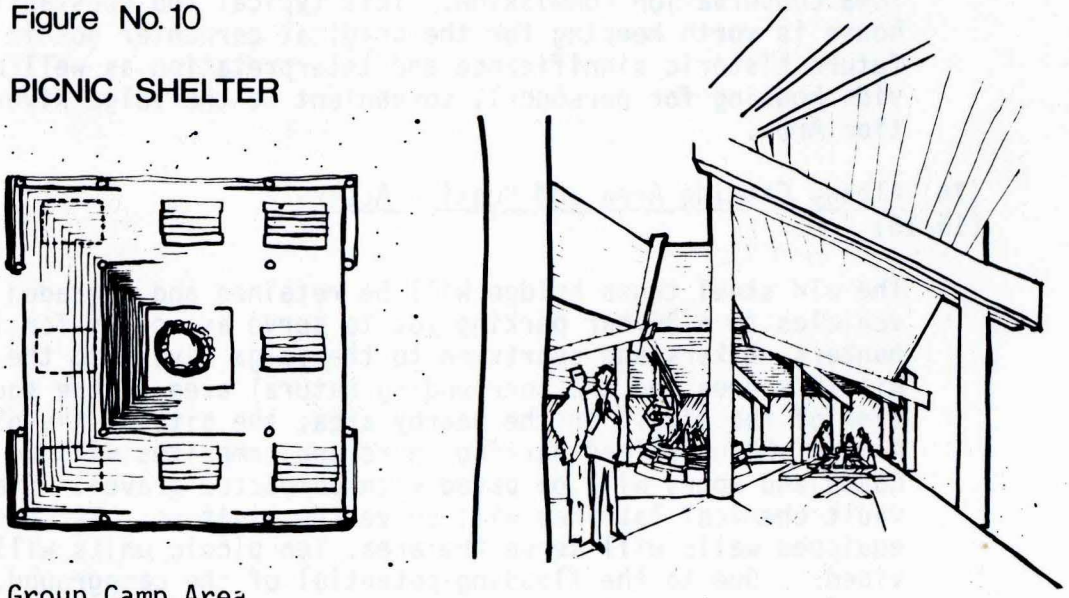
This facility will be developed in the existing large barn located in the center of the park. Administrative offices will also be located in this building. This focal point for visitors will provide educational and entertaining information on the area, the geology and natural forces of nature, the wildlife, vegetation and historical aspects of the sociological development of the valley prior to development. An auditorium, restrooms, gallery and display areas will provide for both individual and group access to the informational aspects of the program. Site facilities will include 20 parking spaces. Loop trails will emanate from this site. One public pay telephone will be provided at this location. The adjoining silo will be adapted for use as an observation tower for photography, astronomy, and nature study.

(11) Lima Day Use Area

This major activity area will provide parking for 50 cars and 100 vehicles with trailers. Walls for unloading will be provided for vehicles and animals as part of the parking lot development. Winter sports trails for snowmobiles and cross country skiiers will originate from this site. In the summer, horseback riders and hikers can utilize the trail access facilities. Two warming/group picnic shelters with fireplaces or firepits and one roomy winterized restroom will serve the trail users. Three picnic shelters, a playground with rustic, heavy timbered play equipment and nearby open play meadows and selected playground and game court facilities will provide balanced facilities for summer visitors, which includes the canoers from the nearby Lima Canoe Access. The natural savannah tree growth will be supplemented as needed to provide evergreen winter windbreaks and supplemental summer shade and visual enhancement. The existing steel truss "Old Lima Bridge" over the Volga River is to be maintained for pedestrian traffic and trail users.

Figure No. 10

PICNIC SHELTER



(12) Group Camp Area

The western hilltop location near the old scout camp will be developed as a group camp for organized special interest groups such as church groups, scouts, 4-H clubs, youth groups, band camps, football camps, historic groups, nature study groups, and sportsmen such as horseback riders, snowmobilers or hunt club groups. Each group will be responsibile for organizing and administering their activities; with reservations, payment of fees, maintenance, security, etc. being the responsibility of the group leader. Facilities will include five (5) rustic bunkhouses to accommodate a maximum of 100 campers, and 50 campsites developed similarly to the public campground. A winterized central kitchen/dining/meeting

lodge shelter will provide a focal facility activities. A barn and corral will be provided for animals and machines. The barn would accommodate use as a meeting place, and storage for vehicles and equipment as well as for animals. One winterized restroom/shower building and facilities will provide for year round usage. Game courts and freeplay mown meadows will provide semiorganized active game facilities. An outdoor ampitheater and a large group fire circle will be provided. Loop trails will serve this area but will be separated from parkwide trails for security of the campers.

(13) Staff Residences

Two staff residences will be located on the park entrance road on a prominent landform to gain exposure and vantage views down interior roads. Private outdoor areas will be provided for off-duty separation for use of the staff families.

Area or personnel will utilize the life estate residence located south of Lima on the county road when it becomes available to the Iowa Conservation Commission. This typical and substantial farmhouse is worth keeping for the original carpenter gothic style for future historic significance and interpretation as well as to provide housing for personnel, convenient to the Volga River Recreation Area.

(14) Albany Camping Area and Hunting Access
(15/16)

The old steel truss bridge will be retained and upgraded to carry vehicles to a 36-car parking lot to serve as access for fishermen, hunters, hikers and sportsmen to the Volga River, to the Big Rock Wildlife Area and the surrounding natural area of the southern portion of the site. In the nearby area, the site of the old town of Albany, 50 unrefined parking spurs and campsites will be provided. Roads and spurs will be paved with compacted gravel. Standard pit vault chemical latrines will serve the visitors. Two handpump equipped wells will serve the area. Ten picnic units will be provided. Due to the flooding potential of the campground, no extensive permanent development will be provided. If the water from the newly drilled wells is not potable, a central supply for drinking water will be provided. The existing steel truss bridge needs to be repaired and continual maintenance provided to assure access to this parking area.

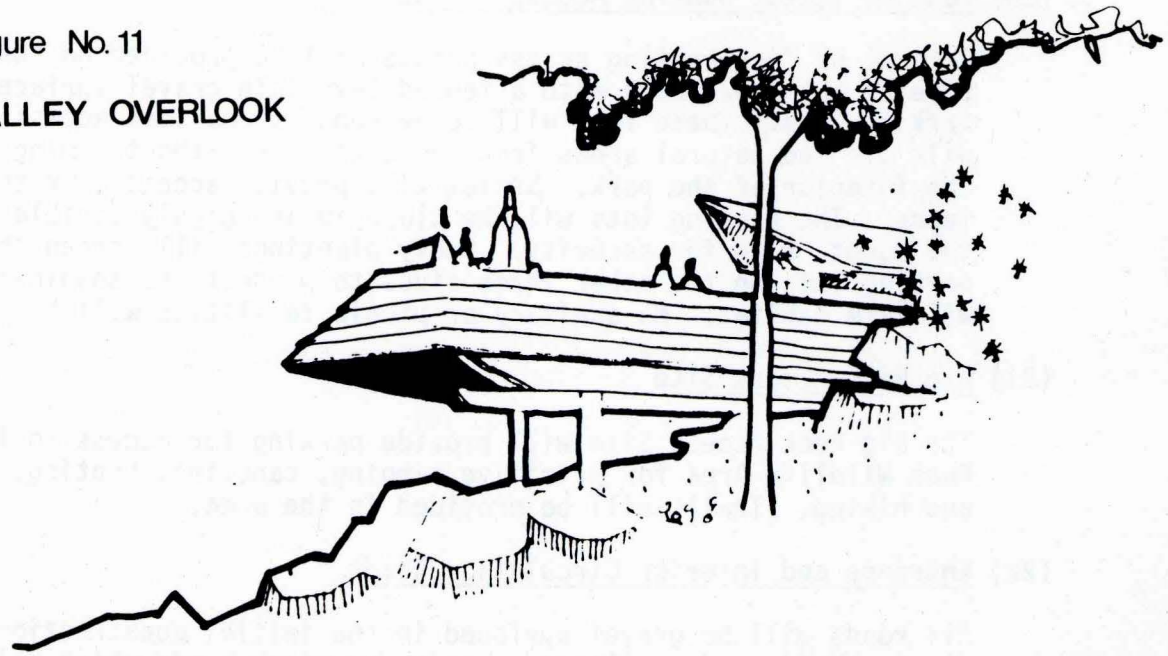
Rehabilitation of the Albany Bridge will provide access for hunting/canoe access. In the vicinity of the Albany Bridge trail access to the hunting area and canoe access to the Volga River will be provided. A canoe access to the Volga River will also be provided east of the Lima Bridge, with appropriate parking.

(17) Lima Canoe Access

Vehicle parking will be provided for canoers at the Lima Canoe Access Point. The access point is located south of the Lima Day Use Area which provides picnic shelters, playground and game court facilities for the canoers.

Figure No. 11

VALLEY OVERLOOK



(18) Valley Overlook

At the location of a particularly fine panoramic view of the valley, an overlook will be developed on the road serving access to the Group Camp Area. A 20-vehicle parking lot, an overlook platform, 20 picnic tables, 10 grills and 10 anchored trash receptacles will be provided. Selective clearing of existing trees and planting additional trees will enhance and frame the views and provide shade for visitor comfort. Standard pit toilets will be provided.

(19) Langerman's Ford Access

Access to the Volga River from an exterior county road is provided at the Langerman's Ford site at the southern-most tip of the park for boats, canoes and fishermen. A gravel surfaced parking lot for 14 vehicles and a launching ramp will serve visitors. No picnic, sanitary or water facilities will be provided.

At the present time, launching is occurring below the dam. Additional study of this activity and the site access is needed. Fayette County is developing plans to reroute the county road adjacent to this launching site, which could provide some excess right-of-way for addition to it to provide improved parking and launching.

(20) East Perimeter Hunting Access Points

A total of five hunting access points will be provided on the east side of the area, each with a fenced 8-vehicle gravel surfaced parking lots. These lots will serve hunters who seek access to the wildlife and natural areas from the east side without coming into the interior of the park. Stiles will provide access over the fence. The parking lots will be close to and highly visible from the county road for security. Heavy plantings will screen the parking lots on the other three sides to protect the adjoining wildlife habitat. No sanitary or picnic facilities will be provided.

(21) Big Rock Access Site

The Big Rock Access Site will provide parking for access to the Big Rock Wildlife Area for primitive camping, canoeing, hunting, fishing and hiking. Trails will be provided in the area.

(22) Entrance and Interior Circulation Roads

All roads will be gravel surfaced in the initial construction phase. Main roads, collector roads and minor roads which will carry trailer traffic will be designed for 30 MPH traffic if gravel surfaced, and 35 MPH when hard surfaced. The interior roads of the intensive public use areas will be auxiliary roads and will be designed for 25 MPH traffic if gravel surfaced, and 30 MPH when hard surfaced. Side roads, camping spurs, individual service roads, parking areas and roads in the flood plain near the Volga River (Albany Bridge primitive camping area and canoe access sites) will be gravel surfaced. Hard surface is needed for dust control and to facilitate winter clearing and movement of visitor traffic and administrative vehicles. Hard surfacing is expected to be blacktop, however, the Fayette County Engineer is experimenting with a specialized gravel composition road bed which appears stable and shows promise for secondary roads which receive a lot of traffic, yet not enough to justify hard pavement.

The design criteria for roads will conform to the established policy of the Iowa Conservation Commission where topography allows. Due to the uniqueness of this site, such as the steeply rolling land, which strongly varies from the usual Iowa landscape, and the presence of troublesome Brainard Shale, some design criteria may have to be varied to meet special site conditions. The access road to the beach may not be useable in winter due to drifting snow accumulation in the cut area. This area can be shut down when the road becomes unusable in the winter without affecting use of other public facilities.

Bike paths will be designated on existing roads, or on paved shoulders. Due to the closeness of bikes to vehicular traffic, a stable pavement is needed. No separated bike paths are to be built due to expense, shortness of season, and potential environmental impact. A two-way path 6 feet to 8 feet wide is needed for bike traffic bikes.

(23) Lake Facilities

In the vicinity of the East Lake Day Use Area 2 boat docks with 30 finger docks; bait and storage building; four shoreline fishing platforms; and appropriate parking and utilities will be provided.

(24) Trails

An extensive network of trails will be developed throughout the site. Loop trains of various lengths will serve each area, emanating from parking lots and convenient points of access. The hiking trails will have two distinct levels of improvement. "Hiking 1" trails will serve the Ridge Top Day Use Area, the developed Campground, the Beach Area and its attendant overlooks, the East Lake Day Use Area and the Cabin Area. This trail system would be the most developed and the most intensively used of all the trails. Alignment of the "Hiking 1" trails would be on relatively shallow slopes to provide for easy walking and reasonable accessibility for the handicapped. "Hiking 2" trails are intended for pedestrian access to the more remote areas of the site particularly on the east and south portions of the area. Trail grades would be steeper and the width limited to 3 to 4 feet. "Hiking 2" trails would service portions of the site where primitive, or backpack camping is intended.

A system of equestrian trails would connect the Group Camp area, the Lima Day Use Area, the Meadow Day Use Area and portions of the site designated as Modified Natural Progression and Wildlife Habitat Areas. The majority of the new equestrian trails would follow existing abandoned county roads and old farm trails. The equestrian system would provide a separate course from that of the "Hiking 1 and 2" trails.

For the most part, the snowmobile trail system would use the same route as the equestrian trails as well as a portion of the "Hiking 1" trail system that would not be used by pedestrians during the winter months. Portions of the snowmobile and equestrian system would be designated as one-way thus providing for increased safety and narrower trail width.

Cross country skiing would be provided for on much of the "Hiking 2" trail system, as well as part of the "Hiking 1" trails in the Campground and Ridge Top Day Use Area. The trail system would be classified and designated for beginner, intermediate, and advanced level use. Cross country skiing and snowmobiling would be on separate trails throughout the site.

Recommended design criteria for trails are as follows:

High-use hiking trails: 4' width in 8' corridor; 10' vertical clearance; 4" gravel or wood chip surface.
Remote hiking and cross country skiing: 3' width in 6' corridor; 7' vertical clearance; turf surface in open areas, 4" wood chips in forested areas.
Equestrian and snowmobile: 6-8' width in 8-10' corridor; 12-14' vertical clearence; turf surface in open areas, 4" wood chips in forested areas.

Figure No. 12

SCHEDULE OF TRAIL MILEAGE

Hiking 1	High Use	11 miles
Hiking 2	Remote Use	19 miles
Equestrian		12 miles
Snowmobile		16 miles
Cross Country Skiing		17 miles

A minimum of 17 trail bridges would be required to cross the various streams of the site. Additional intermittent stream crossings may be required based on actual site conditions. All trail routes will be selected and cleared carefully to avoid major impacts - initial and future - on the resource base: soil, vegetation, or wildlife.

Bridges for trails will be built of wood and assembled on site. Due to remote locations of most bridge sites, it would be difficult, expensive and create a hard impact on the site to deliver and erect prefabricated bridges for trails. All trail bridges will be one-lane. Pedestrian bridges, horse and snowmobile bridges will be 6-10 feet wide to facilitate maintenance access.

b. Grading Concepts

Cuts, fills and site grading will be naturalized as much as possible to visually fit into the natural landscape of the site. Side slopes and grades in public use areas, such as adjoining camping pull offs and tent sites will be 4:1 where possible to allow for ease of maintenance and pedestrian access; where such gradients cannot be used, slopes will be designed to blend with existing natural topography.

Drainage ways will be planted to prevent excessive soil erosion. In areas of extreme runoff, flow-baffles will be considered in addition to vegetation.

A soil erosion prevention program must be implemented in the drainage basin of Frog Hollow Lake to protect the water quality of the lake, to assure a high quality of recreation experience for visitors and to prevent excessive siltation from reducing the life of the lake.

c. Landscape Concepts

Landscape plantings will be simple, functional and economical to maintain. No formalized planting is contemplated for major structures or relatively more developed areas. Hardy and indegenous species will be used individually and in naturalized groups to reflect the natural vegetation pattern on the site, for continuity. The edge of plant groupings will be naturalized with understory and edge tree, shrub and grass com-

munities. Planting design will seek to diversify plant communities naturally, and to strengthen wildlife and visitor/people habitats. Visual barriers will be planted around facilities, such as the maintenance area and sewage facilities. Campsites will be interplanted with naturalized visual barriers, with heavier plantings occurring along the access roads.

Prairie communities and other specialized vegetation areas require special design considerations. Naturalized plantings will be used to harmonize structures and the restoration of the disturbed areas with the natural environment, to stablize soils and reduce maintenance. New windbreaks will be planted and existing windbreaks reinforced to provide winter wind control on sites usable in cold weather. Selective clearing and thinning of branches for opening views and air circulation where needed will be done judiciously. For instance, planting around the sewage lagoons will not limit exposure to the sun and breezes but will limit visible to the visitors.

2. Utility Layout and Facility Design Concept

a. Introduction

The Master Plan includes a general plan for provision of water supply and distribution; wastewater collection and treatment; and electricity supply and distribution as required to serve the needs of visitors and staff of the Volga River Recreation Area. These systems are delineated on the Utilities Master Plan, Map 4, and they are described, along with estimated costs, in paragraphs b, c, d, e and f following. Water usage and wastewater generation at each development site were estimated on the basis of anticipated visitation and seasonal utilization in order to determine water supply and wastewater treatment requirements. These estimates are presented in Figure 13, Estimated Water Usage and Wastewater Generation.

b. Water Supply

Available hydrologic and geologic data from the Iowa Conservation Commission (ICC), Iowa Geological Survey, and the Iowa Department of Environmental Quality indicate that there should be an adequate water supply for the entire area. These data also indicate that the quality of the water is very good, although slightly hard (about 300 parts per million). It is estimated that only minor chlorination will be sufficient treatment. Chlorination facilities as well as pressure tanks are considered incidental to the cost of all wells. Electric power supply requirements for water supply wells and sewage pumps are described in paragraphs B-2-e and f of this section.

Well tests made on the site have yielded 7 to 8 gallons per minute (gpm) with some wells as high as 25 gpm. Sufficient supplies of water for the demands indicated should be available in the Silurian Dolomite Limestone and Ordovician Maquoketa Formation overlying the Brainard Shale which acts as an aquaclude. The Brainard Shale formation is at approximate elevation 975 throughout the area. The general geology of the area is considered to be Karst, and water may not be available due to seepage

Figure No. 13

ESTIMATED SEWER AND WATER USE

Site	Facility Capacity	Population	Turnover Rate	Daily Total Population	Water Demand per Capita	Max. Water gpd	Facility Utilization	Max. Daily gpd Sewage Flow	Wastewater Disposal Method	Estimated Total Yearly Wastewater Volume (gals.)
1. Entrance and Orientation Station	10	35	10.0	350	0	0	1.5 mo.full	0	None	0
2. Ridgetop Day Use Area	200	700	1.5	1050	2	2100	1.5 mo.full 4.5 mo. ½ 6 mo. ¼	1890	Lagoon	151,000
3. Developed Campground	150	525	1.0	525	20	10500	3 mo.full 3 mo. ½ 6 mo. ¼	9450	Lagoon	1,720,000
4. Meadow Day Use Area	50	280	1.5	420	3	1260	2 mo.full 5 mo. ½ 2 mo. ¼ 3 mo. 0	1134	Lagoon	173,000
5. Beach Hilltop Area	30	105	1.5	158	2	316	1.5 mo.full 6.5 mo. ¼ 4 mo. 0	285	Lagoon	27,100
6. Beach Area	130	455	1.5	683	5	3415	1.5 mo.full 4.5 mo. ½ 6 mo. 0	3074	Lagoon	224,600
7. East Lake Day Use Area Boat Dock Area Lake Road Turnaround	32 A/BT* 26 Auto** 20 Auto**	64 91 70	2.0 2.0 4.0	590	5	2950	3 mo. ½ 3 mo. ¼ 6 mo. 0	2655	Lagoon/ Pit Vault Latrines	182,000
8. Cabin Area	72	252	1.0	252	30	7560	3 mo.full 3 mo. ½ 6 mo. ¼	6804	Lagoon	1,239,000
9. Maintenance Area	20	20	1.0	20	10	200	1.5 mo.full 4.5 mo. ½ 6 mo. ¼	180	Septic Tank/ Lateral Field	28,800
10. Visitor/Nature/Historical Interpretation Center	20	70	3.0	210	2	420	1.5 mo.full 4.5 mo. ½ 6 mo. ¼	378	Septic Tank/ Lateral Field	60,500
11. Lima Day Use Area	125	438	1.5	657	2	1314	2 mo.full 5 mo. ½ 2 mo. ¼ 3 mo. 0	1183	Lagoon	180,000
12. Group Camp	50	175	1.0	175	20	3500	1.5 mo.full 4.5 mo. ½ 6 mo. ¼	3150	Lagoon	503,100
13. Staff Residences (2)	8	8	1.0	8	50	400	Full year round	360	Septic Tank/ Lateral Field	131,400
14. Albany Camping Area	50	175	3.0	525	3	1575	1.5 mo.full 2 mo. ½ 5.5 mo. ¼ 3 mo. 0	78	Pit Vault Latrines	9,200
15. Albany Hunting Accesses	30	105	1.0	105	0	0	1.5 mo.full 2 mo. ½ 5.5 mo. ¼ 3 mo. 0	16 ***	Pit Vault Latrines	2,000
16. Albany Canoe Access	10	35	1.0	35	0	0		0	None	0
17. Lima Canoe Access	6 *	12	3.0	36	0	0	1.5 mo.full 2 mo. ½ 5.5 mo. ¼ 3 mo. 0	0	None	0
18. Valley Overlook	20	70	5.0	210	0	0	1.5 mo.full 2 mo. ½ 5.5 mo. ¼ 3 mo. 0	0	None	0
19. Langerman's Ford	15 *	30	3.0	90	0	0		0	None	0
20. East Perimeter Hunting Accesses (5)	30 *	60	1.0	60	0	0		0	None	0
21. Big Rock Access	6	21	1.0	21	0	0		0	None	0

* Auto with boat trailer, 2 persons per auto.
** 3.5 persons per vehicle.
*** Wastewater will be generated even though no water supply is planned.

into fissures. Well tests should be conducted to confirm the expected availability. Water can also be obtained below the Brainard Shale in the Fort Atkinson Limestone.

Rather than a central water treatment facility and distribution system, it is recommended that each site should have its own well or wells and its own interior distribution system, as the sites are too dispersed to permit a cost-effective distribution system.

c. Wastewater Treatment

Wastewater treatment will be by one of the following methods:

1. Containment Lagoons (No discharge)
2. Septic Tank with Lateral Field
3. Pit Vault Latrines

Containment lagoons should be constructed so as to prevent seepage or entrance of surface water run-off. Evaporation will control the liquid volume, and solids will be digested and liquified. Lagoons will be lined with plastic liners. They will be designed as self-contained bodies without discharge.

Because the area is in a Karst formation, septic tanks and lateral fields are planned only in remote areas and for low wastewater flows.

Pit vault latrines will be used to serve sites producing low flows which are not suitable for septic tanks and lateral fields. Maintenance operations will consist of pumping out the faults as necessary, but at least annually.

It is difficult to forecast accurately the quantities of wastewater generated by recreational facilities. ICC personnel have indicated that containment lagoons have been overdesigned in the past. Since construction of these lagoons is relatively simple and rapid, it is recommended that the estimated volumes be divided into fourths and constructed in stages as volumes experienced indicate necessary. For each lagoon mentioned in the following, the total volume will be considered for costing purposes, but only one-fourth to one-half of the lagoon cost should be incurred initially.

d. Water and Wastewater Treatment Facilities by Site

(1) Entrance and Orientation Station

This site will be unmanned and consist of display boards for people to locate the Recreational Area Facilities. This site will have no running water or sanitary facilities.

(2) Ridgetop Day Use Area

One well and approximately 3,500 linear feet of water main should be adequate for this site, and cost approximately $54,000.

(6) Beach Area

Water supply for this site will consist of a well and miscellaneous piping. The cost of this water system is estimated at $9,000.

The beach area is located in a pristine valley that is subject to flooding. It is therefore recommended that wastewater from the beach house be pumped (grinderpump) up the road leading to the campground area where a lagoon will be constructed. This system will consist of the following:

Duplex Pump Station	$ 6,000
1500 L.F. 1½-inch PVC Force Main	8,000
Lagoon	24,800
	$ 39,700

(7) East Lake Day Use, Boat Dock Area, Lake Road Turnaround

The boat dock will be located at the southeast corner of the lake. The day use area is located approxiamately 1800-feet to the north of the boat dock, and the turnaround is approximately 1200-feet to the south of the boat dock.

The day use area will have water supplied by a hand pump, and no running water for sanitary facilities. A pit vault latrine is recommended.

No running water or sanitary facilities are to be provided at the boat dock, but will be provided at the Lake Road Turnaround. The water system will consist of a well and miscellaneous piping and is estimated at $8,000. A lagoon should be constructed about 300 feet southeast of the turnaround. The estimate for sanitary facilities (including the pit vault latrine) is $83,300.

(8) Cabin Area

The Cabin Area will consist of nine clusters of cabins ranging from three to five cabins in a cluster. One well and about 7,000-feet of water line should be sufficient for this site and cost about $98,000.

The wastewater collection system will include seven pump stations (some may flow by gravity) and approximately 7,000 feet of force main and gravity sewer. The estimated cost for this, including lagoon, will be about $143,000.

(9) Maintenance Area

This facility will have a very low water demand and low sewage flow. A septic tank and laterial field is recommended for wastewater disposal as the soils are suitable. The cost of this, including a water well should be about $12,000.

(10) Visitor/Nature/Historical Interpretation Center

This small site can be served by a well water supply and septic tank with lateral field for wastewater disposal. The estimated cost for both systems is $12,000.

(11) Lima Day Use Area

Well and water supply and related water facilities should cost $9,000. This area may be served by approximately 600-feet of gravity sewer to a lagoon. This is estimated at about $28,300.

(12) Group Camp

Well water supply will serve the Group Camp, and should cost about $9,000.

This site will have two sources of wastewater flow: a restroom-shower building and kitchen-dining hall building. Approximately 500-feet of gravity sewer and a lagoon will be required at an estimated cost of $63,000.

(13) Staff Residences

These two homes will be occupied year-round by families. The water system should consist of one well at each residence and the approximate cost of this is $13,000. Each house will be served by septic tank and lateral field estimated to cost $4,000 for both.

(14) Albany Camping Area

This is an undeveloped, primitive camping site where the water will be supplied by existing hand pumps. There will be no bath facilities of running water for toilets. Therefore, pit vault latrines will be used. Two pit vault latrines should be located in the old village of Albany. The estimated cost of these facilities is $12,000.

(15) Albany Hunting Access

This site will have no water supply, but it will use a pit vault latrine. The estimated cost for this is $7,000.

(16) through (21)

These sites will have no running water, and no sanitary facilities.

e. Electric Utilities

Electric service will be supplied by the Allamakee-Clayton Rural Electric Cooperative. This utility has existing electric service around the boundaries of the Recreational Area, and some lines through the middle of the area.

The best available information from Allamakee-Clayton RECC personnel and other sources indicated that the following costs could be used for estimating the impact of providing electric service to the above water and sewer utilities.

- Meters should cost approximately $200 each. A meter will be required at every use point. At some sites, one meter could serve a well and sewage pump.

- Buried cable should cost about $3.25 per foot. This is assuming that a backhoe will be used for trenching due to the terrain. In some areas a trenching machine may be used which would reduce the estimate.

f. Electrical Facilities by Site

The following is a list of the facilities required and estimated cost to supply electric power to the individual sites:

(1) Entrance and Orientation Station - None

(2) Ridgetop Day Use Area - This site will require four meters and approximately 4750-feet of cable, at an estimated cost of $16,300.

(3) Developed Campground Area - This site will require eight meters and 5500-feet of cable, at an estimated cost of $22,500.

(4) Meadow Day Use Area - This site will require one meter and 2250-feet of cable, at an estimated cost of $7,600. To this cost should be added the prorated cost of burying 6000-feet of cable as described under subparagraph (7) below, bringing the total cost to $14,100.

(5) Beach Area - This will require one meter for both the well and wastewater pump station and 4500 feet of cable, at an estimated cost of $14,900.

(6) Beach Hilltop Area - This site will require one meter and 12500-feet of cable, at an estimated cost of $4,300.

(7) East Lake Day Use, Boat Dock Area, and Lake Turnaround - This will require three meters and 6000-feet of cable. There is an existing aerial line serving this area. The 6000-feet reflects burying this cable which will serve this site and also the Meadow Day Use (4) and Maintenance Areas (9) at an estimated cost of $19,500.

(8) Cabin Area - This site will require 9 meters and 9500-feet of cable, at an estimated cost of $38,700.

(9) Maintenance Area - This will require one meter, 300-feet of cable, and the prorated cost of the 6000-feet of cable mentioned under (7) above, at an estimated cost of $7,400.

(10) Visitor/Nature/Historical Interpretation Center - This site will require one meter and about 300-feet of cable, at an estimated cost of $4,200.

(11) Lima Day Use Area - This site will require one meter and about 300-feet of cable, at an estimated cost of $4,200.

(12) Group Camp Area - This site will require an extension of 6500-feet of cable and one meter, at an estimated cost of $27,400.

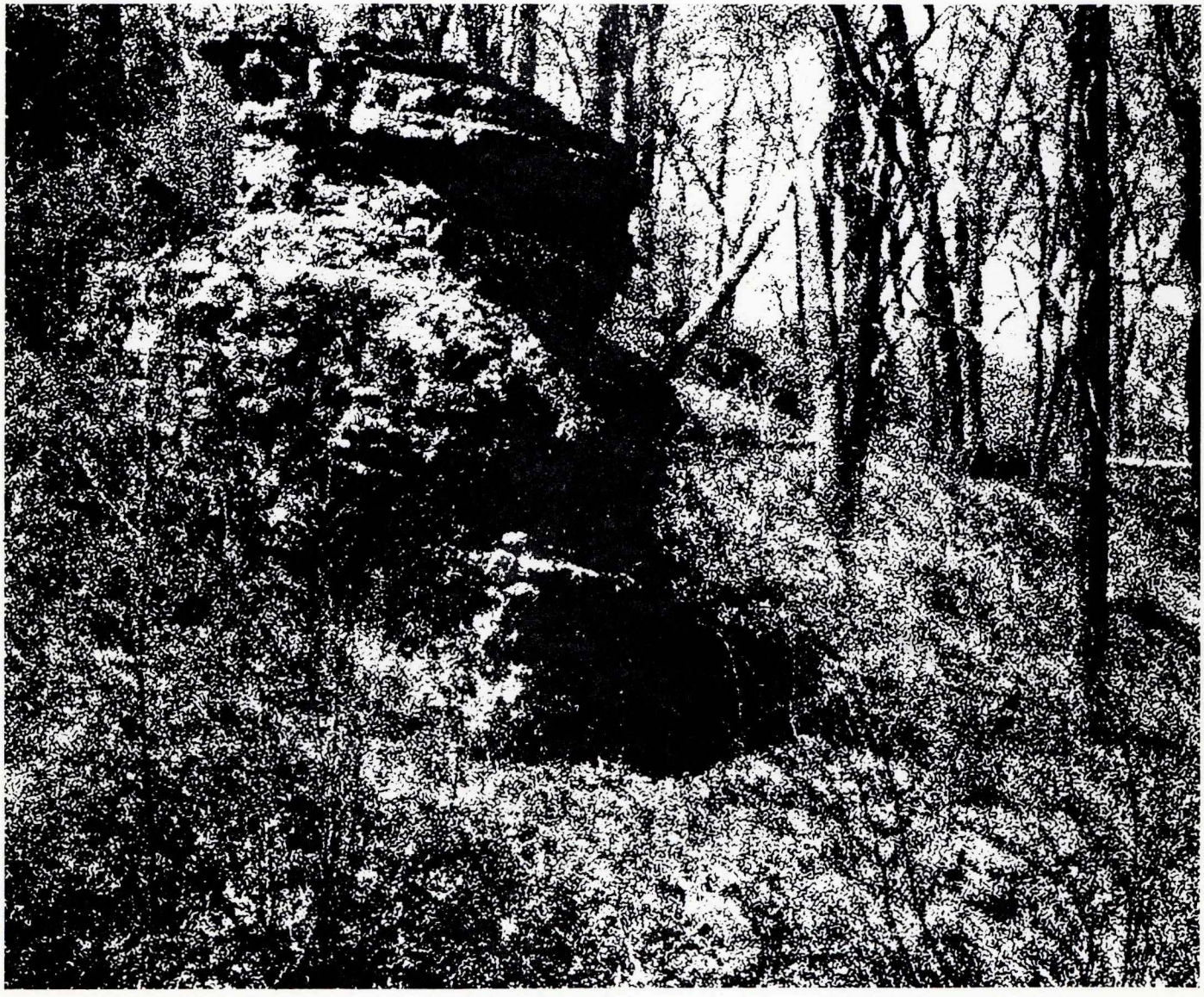
(13) Staff Residences - These residences will require one meter each and 500-feet of cable, at an estimated cost of $8,100.

(14) through (21) - Do not require electric service.

g. Note Concerning Cost Estimates - All above estimates are based on November 1979 cost data. These estimates are carried forward to Section XII without contingency factors.

SECTION V

Land Management Program



V

LAND MANAGEMENT PROGRAM

A. INTRODUCTION

The Land Management Program for the Volga River State Recreation Area has two fundamental and compatible purposes. First, to provide necessary guidance for the proper modification of the site's existing character in a way that will accommodate the intended multi-use orientation of the proposed recreational facilities; Second, and equally important, to achieve and maintain conservation and enhancement of the site's natural resource base. Realization of the Land Management Program should supply many segments of the public with excellent opportunities for fulfilling their liesure time pursuits and at the same time provide for modified natural ecological progression of the site's dynamic resources of vegetation and wildlife; and for preservation of the integrity and vigor of the area's static elements such as landforms, soils, and rock formations; and waters.

The formation of these general purposes is a result of careful review and synthesis of observed and documented information pertaining to the site and its surroundings as well as incorporation of the approved conceptual master plan, its attendent features and the anticipated recreational uses. The following is a listing of the sources of input used to formulate the Land Management Program:

1. The Luther College Natural Resource Studies and direct input provided by the Luther College Staff.
2. Site anaylsis studies completed by the master plan consultants.
3. S.C.S. Soil Survey of Fayette County, Iowa dated December 1978.
4. The existing crop lease program for the Volga River Recreation Area.
5. Direct input provided by the members of the Iowa Conservation Commission Volga River Task Force regarding identified problems pertaining to existing conditions and current management needs and activities.

B. OBJECTIVES

A number of objectives were identified as required for implementation of the two overriding purposes of land management. These are:

1. To retain and maintain the natural resource base of the site in a healthy condition; preserving rare species and protecting the supportive communities which are part of the area's ecosystem.

2. To restore natural ecological progression with certain modifications to allow moderate development of the site for recreational use.

3. To provide a variety of habitats and food sources for the game and nongame wildlife species which are native or have been introduced to the site.

4. To provide users of the site with opportunities for casual as well as scientific interpretation, study, and research of the site's natural resources.

5. To use hardy and indigenous plant materials to mitigate negative factors of Iowa's climate and accentuate its positive characteristics; and to create visual charter resembling presettlement vegetation patterns.

6. To provide soil conservation practices which would main tain soil loss within acceptable limits, and control storm water runoff rates.

7. To preserve and enhance the site's visual quality, and to provide identification of various recreational use areas and user orientation.

8. To employ management techniques readily available to the I.C.C. or which are needed to provide optimal recreation experience with conservation of the resource for this and future generations.

9. To implement the management program in such a way as to achieve maximum overall benefit at minimal cost.

C. ACTIONS

A wide range of actions or management functions may be used to implement these objectives (see the accompanying chart Figure No. 14). All actions would fall into one of three general categories:

Initial or Single Occurrence Actions; Repetitive or Ongoing Actions; and No Action. These categories may be described as follows:

1. Initial or Single Occurrence Actions

A one time management function, which, when it occurs and is completed, need not occur again.

2. Repetitive or On-going Actions

Actions required on a routine or periodic basis in order to assure that the desired objectives are being implemented. Certain actions in this category would be phased out over time while others would continue to be performed for an indefinite period of time.

a. Static State Management

This implies that once a vegetation component has reached its desired level, a routine action is undertaken to maintain that desired level. Examples include:

(1) mowing turf areas
(2) mowing meadows
(3) replanting, cultivation, and partial harvesting of wildlife food plots.
(4) replanting, cultivation, and partial harvesting of wildlife food plots
(5) prairie burning and or mowing
(6) edge maintenance
(7) selective timber removal
(8) on going erosion control

b. Dynamic State Management

These types of actions are employed to change the vegetation characteristics of an area from the existing state to some future desired condition, i.e., modified natural progression. In some situations it may be appropriate to phase out "managed dynamic" and instigate "managed stability" or no management activity at all. Included in Managed Dynamic Actions are:

(1) selective species or individual plant removal to allow other species to fluorish.
(2) introduction of seed source plants
(3) overseeding.

3. No Action

A "No Action" management function is a planned decision to avoid any operational intervention with the natural sequence or competition of the existing conditions which make up the area. Periodic observation would be necessary to note any adverse or detrimental efforts which a "No Action" area might be imposing onto an adjacent area for which some other action is being implemented. For appropriate reasons, a "No Action" area of the site may be redesignated to receive one of the other two types of action.

a. Installation and Initial Establishment of Vegetation

This action group is characterized by planting activities intended for:

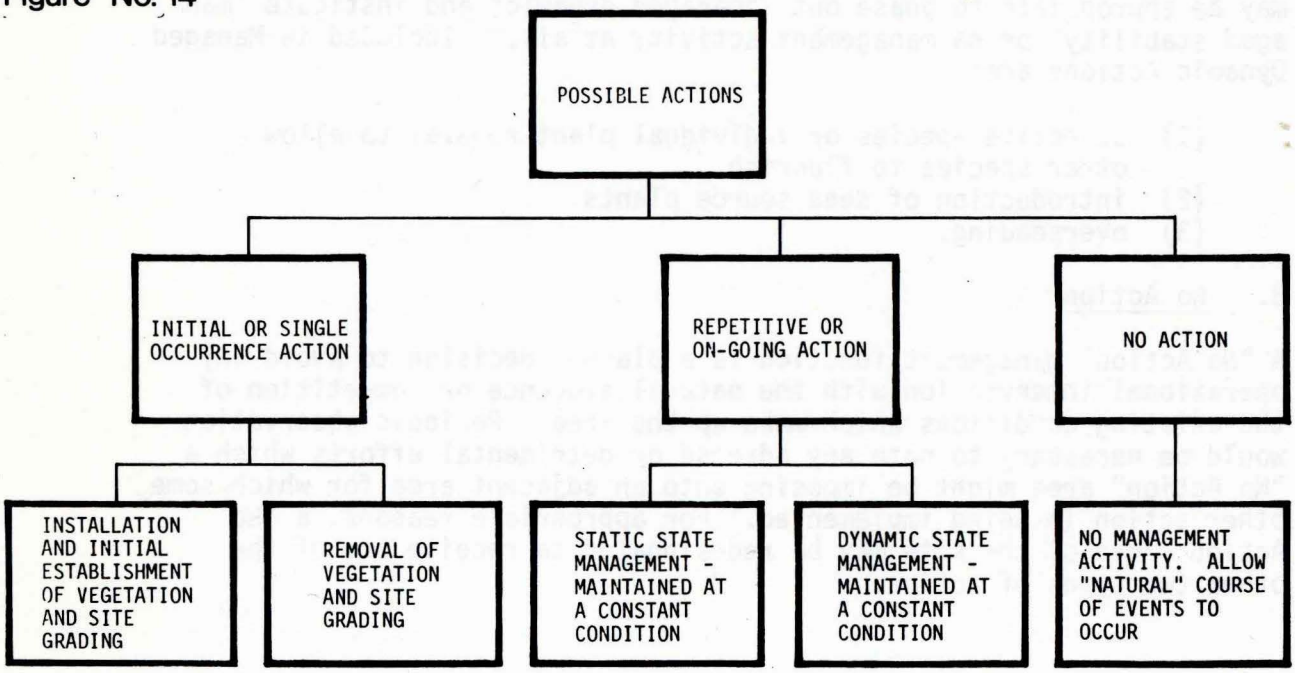
(1) View Enhancement
(2) Visual screening
(3) Privacy control
(4) Shade
(5) Windbreaks
(6) Noise control
)7) Physical barriers
(8) Traffic movement and Control
(9) Erosion Control

b. Removal of Vegetation

Removal of vegetation would be necessary for the establishment of:

(1) recreational facilities such as campgrounds, cabins, picnic shelters, etc.
(2) recreational use areas such as playfields, ski slopes, equestrian courses, etc.
(3) support facilities including latrines, maintenance building and yards, staff residences, etc.
(4) trails
(5) roads and parking areas
(6) view enhancement
(7) areas where site grading is required.

Figure No. 14



D. LAND MANAGEMENT PROGRAM COMPONENTS

The Land Management Program illustrates a projected future status of the Volga River State Recreation Area which would fulfill the stated Land Management Objectives. This plan is expressed in terms of the basic and tangible components as listed below. These components can be considered to be the products of land management actions as they are appropriately applied to the site. Each component of the plan is located and sized according to existing site conditions and in respect to the planned recreation uses and facilities.

A variety of possible actions can be taken to implement any one type of component. Conservation Commission staff would decide the most appropriate action for any one area based on an indepth analysis of the existing conditions of the area, the intended recreational use of the area, the phasing schedule requirements, and methods and funds available for implementation.

For example, woodland is proposed for establishment at a number of locations throughout the site. In the camping area it is appropriate to consider transplanting selected large trees to this area to supplement the young reforested trees (an initial or single occurence action. In other areas it is appropriate to allow certain existing seed source plants to provide the origin of the proposed woodland and to "weed-out" unwanted invaders (a managed dynamic action). Yet in other locations it would be proper to let the woodland develop from whatever seed source might be available.

1. Land Management Program Components

All land management program components are fully delineated in color on the Master Plan for the entire Area. The specific components of the program are as follows:

a. Controlled Natural Progression in Existing Areas

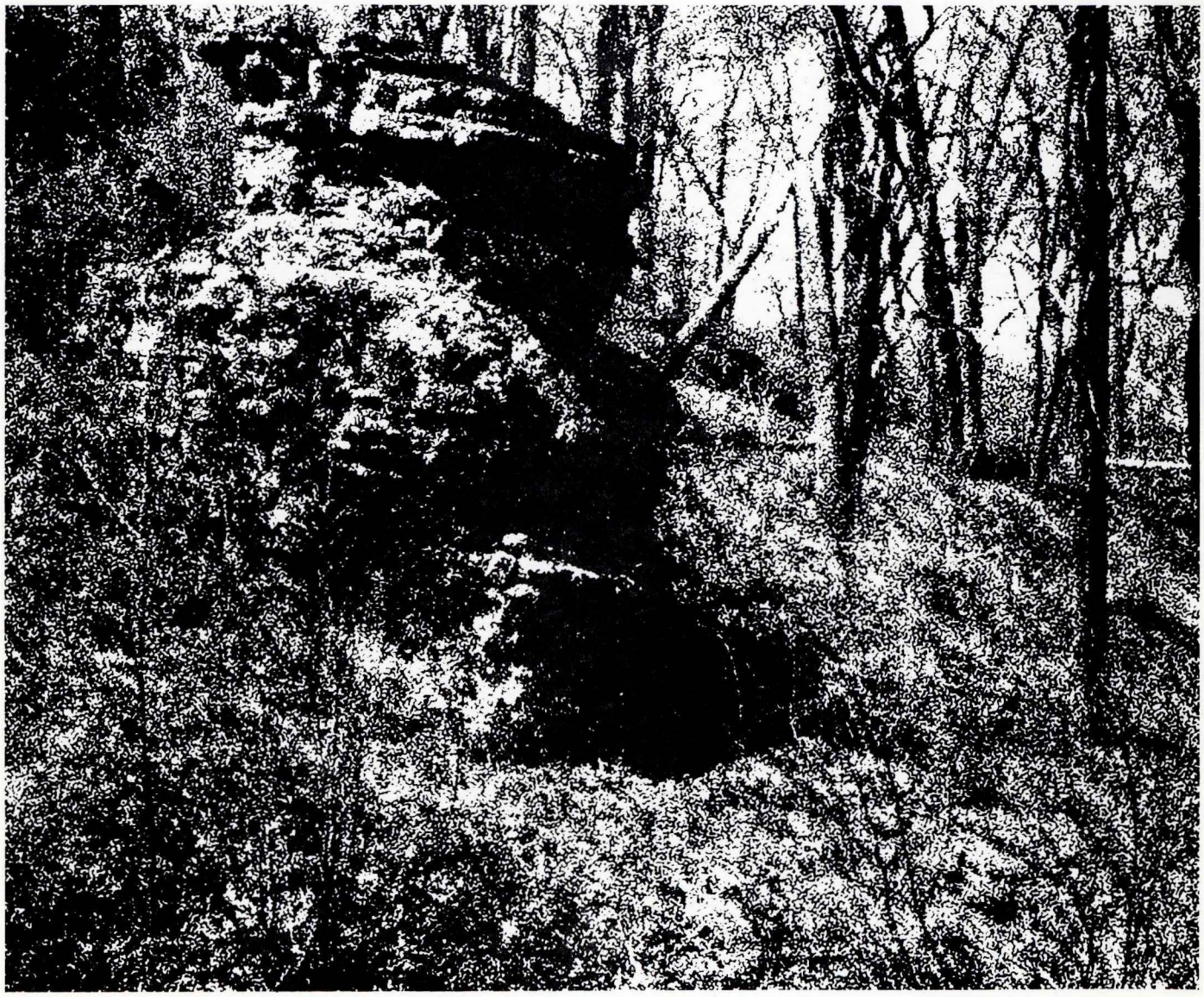
(1) Woodlands
(2) Prairie
(3) Wetlands

b. Proposed Establishment

(1) Woodlands
(2) Savannah
(3) Prairie
(4) Woodland Edge
(5) Wildlife and food plots
(6) Short grass meadows
(7) Long grass meadows
(8) Ponds

SECTION VI

Environmental Impact Considerations



VI

ENVIRONMENTAL IMPACT CONSIDERATIONS

A. INTRODUCTION

A program of Modified Natural Progression with Moderate Development implies managed return of a significant percentage of the area to a highly progressed ecological stage combined with selected agricultural uses which would produce significant wildlife communities, foodstuffs and habitat, while development would allow for considerable activity range and visitation. Development would place emphasis on the aesthetic and ecological qualities of the natural setting. This would involve employment of construction and management techniques to mitigate human impacts on the natural areas and to protect those which are most sensitive and significant. There will be continued emphasis on wildlife management to provide diversified locations for food plots and habitat to achieve strong and diversified wildlife communities throughout the site. Small wildlife ponds will be constructed throughout the site in remote areas and will have minor effect on the environment.

B. ACTIVITIES AND FACILITIES

Moderate development would provide for selected intensive activities for which there is a clear need in the region, to be located in ecologically tolerant and supportive areas. The thrust of development will place more reliance upon recreational use of natural resources than man-made facilities.

1. Intensive Activities

Would include picnicking, camping, and swimming and their associated day-use play areas, trails and winter sports areas. Space for less organized and intensive activities will be provided throughout the day-use and overnight accommodation areas of the site. Trails are included as relatively intensive activities due to the concentration of users along predetermined paths through rather sensitive areas.

2. Facilities

Year round cabins and extended season developed camping facilities will be provided for visitors, hunters and fishermen. Fishing and hunting will be provided and encouraged in season, managed to accommodate and balance with the park recreational activities. Accesses and trails will be provided in the wildlife management areas which will be dispersed throughout the site.

3. Water and Sanitary Facilities

Will be provided at all areas within the site where intensive use is planned. These sites are too dispersed to permit a cost-effective central water treatment facility and distribution system. Therefore, each site will have its own well or wells, its own water distribution system, and its own wastewater disposal system.

4. Wastewater Facilities

Different methods of wastewater disposal will be employed within the Volga River Recreation Area. Most day use recreation sites, campgrounds, the picnic area, beach, and the cabin area will be served by containment lagoons (no discharge). Other sites, such as the Visitor/Nature/ Historical Interpretation Center, and the staff residences, will be served by septic tank and lateral field systems due to low flow discharge and compatibility of soils in the immediate area for septic tank construction. Finally, areas intended for less intensive use, such as primitive camping, will be served by pit vault latrines. Areas such as these will not be furnished with running water.

5. Roads

A new road will be constructed to provide motorized access to the beach area. Construction of this new roadway will necessitate a cut and fill operation on one hillside in the site. It will be necessary to cut a bench into the hillside on which to construct the roadway. The depth of the cut will be no more than eight feet, maximum, and only small amounts of fill will be required. The benching operation will be necessary in order to maintain a maximum grade of no more than 10 percent. To intercept water seepage through the poorly indurated shale underlying the road bed and prevent erosion of the road or slumping of the hillside, perforated drain pipe will be set in a trench on the uphill side of the roadway with crossdrains provided every few hundred feet.

C. IMPACTS

Impacts of the proposed plan of development may be grouped into two categories: (1) recreation-related impacts, and (2) construction-related.

1. Recreation-related Impacts

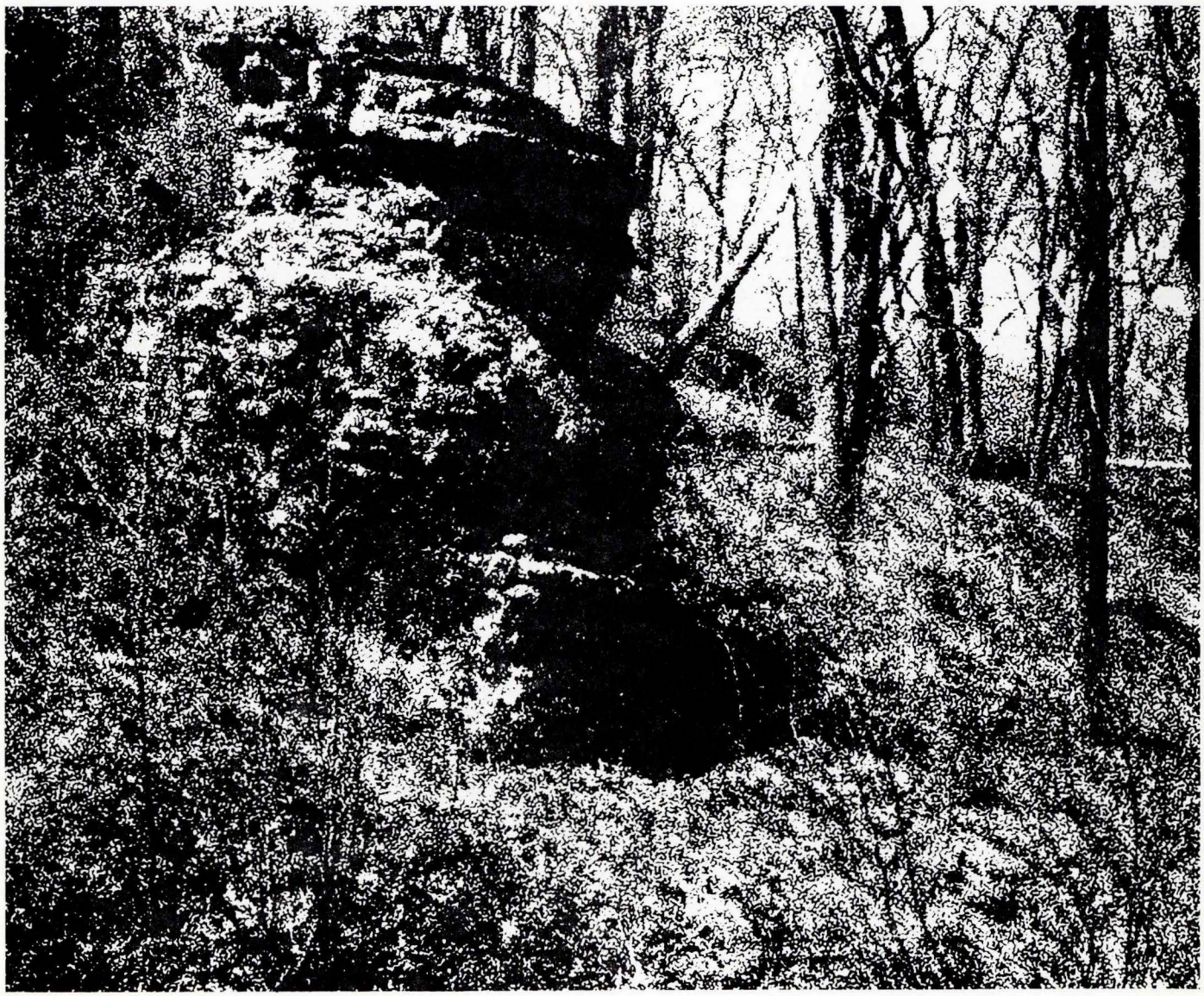
Recreation-related impacts will include such effects as soil compaction resulting from new trails and increased use of existing trails, modification of existing land uses within the site, and changes in use of the area by wildlife due to the increased presence of people. Measures have been taken throughout the planning process to direct intensive use to the site most capable of supporting it, and to protect the cultural features and outstanding elements of natural diversity within the Area. There should be no significant air or water quality impacts associated with uses proposed for the area.

2. Construction-related Impacts

Will consist primarily of cut and fill operations for the beach access road, and relatively minor clearing of vegetation for trails, campgrounds, cabins and other new facilties. Short-term impacts related to construction will include minor air and water quality impacts associated with the necessity of creating exposed soil conditions during construction. Until construction is completed and exposed soils revegetated, there may be minor amounts of erosion and siltation in drainageways and/or generation of fugitive dust from construction sites. These short-term impacts can be mitigated through use of appropriate erosion control measures including siltcheck dams in swales and temporary silt holding ponds.

SECTION VII

Recreation Programs



VII

RECREATION PROGRAMS

A. INTRODUCTION

The Recreation Program identifies activities relative to facilities and the management of the resource base of the Volga River Recreation Area. This information interfaces with other Sections of this report that present information on specific sites and specific use areas. Major recreational activities anticipated within the Volga River site have been grouped into five main categories, identified here by geographical characteristic:

1. Moving Water Activities: The Volga River

2. Waterbody Activities: The Frog Hollow Lake

3. Natural Landscape Activities: Big Rock Wildlife Area and other wildlife habit areas.

4. Unique and Preserved Landscape Activities: The unique and preserve areas.

5. Intensive Public Use Activities: The developed public use areas.

B. DESCRIPTION OF ACTIVITIES

The activity areas overlap both geographically and functionally. With the exception of the beach area and adjoining hilltop picnic area, all areas will provide for year-round public usage.

1. Moving Water Activities

Primary recreation activities on the Volga River will include canoeing, boating, boat access, primitive camping and fishing. The river banks will also provide access for hunting, primitive camping and hiking in the Volga River valley.

2. Waterbody Activities

The Frog Hollow Lake primary activities include fishing, boating with nowake (motors limited to 6.0 horsepower) and swimming. Some small sailboats may use the lake. In the winter ice fishing and perhaps ice skating and ice boating will be accommodated. Scuba diving can be accommodated.

3. Natural Landscape Activities

The managed natural areas will include the Big Rock Wildlife Area and other areas throughout the site which will be purposefully developed to provide wildlife habitat in order to diversify and sustain the fauna. Activities will include hunting, hiking, horseback riding, nature study and interpretation, and mushroom and berry picking, snowmobiling, and cross country skiing.

4. Unique and Preserved Landscape Activities

The unique and preserved areas will contain geological and terrestrial formations, endangered to rare flora and fauna. These areas will be restricted to public activities of observation and study, photography and audio-recording. These areas will have limited access to the general public but will assure the long lasting quality and enhance the overall natural recreation experience for the visitors.

5. Intensive Public Use Activities

The developed public use areas are self-identifying by their primary uses, i.e., picnicking, camping, fishing, swimming, nature study, winter sports, hunting, etc. These primary activities oriented to the natural resource will be supplemented with limited family and group oriented court and field game facilities such as horseshoes, volleyball and badminton courts and individually placed basketball goals only in the intensively developed over-night and day-use areas. Wooden play equipment for tots and preschoolers will be provided. These play and exercise equipment groupings are not expected to be large or complete playgrounds, but only to help the younger visitors make the transition from hometown or backyard scale to a comfortable relationship with the larger scale Volga River site. The active young adult exercise equipment and court game facilities are intended to utilize and direct energies in healthy, familiar sports activities in stimulating landscape, a reflection of the heritage of healthy, active people in the area.

6. Recreation Activities Common to All Areas

Such activities may include hiking, bicycling, nature study and resource interpretation, photography, audio-recording, sight seeing, etc. Meadows will allow for free play and sports activities. Overlook areas will be provided with platforms or shelters and selective tree clearing or planting to frame and enhance the short vistas and longer views.

C. INTERPRETATION

The many nature oriented recreational activities can be strengthened and enhanced by leadership exercised through a strong interpretation program. The Visitor Center in the adapted barn will provide a place for a unique happening. A nature, historical and resource interpretation program presented in the Center will strengthen the appreciation for the qualities of the site and its uniqueness in the northeast area of Iowa. By proper management and development of appreciation through interpretation of the land, the heritage of the early settlers and recent farm based societies in the area, and the facilities provided for public use, vandalism will be discouraged and public support for the facility will result.

Figure No. 15

RECREATION USER CAPACITY CHART

Recreation Activity Area	Parking Spaces	Daily Turn Over Rate	Number of Visitors Instant Capacity	Primary Recreational Activity
Entrance Orientation Station	10	10.0	35 *	Visitor orientation, sightseeing
Ridgetop Day Use Area	200	1.5	700 *	Picnicking, downhill ski and toboggan runs, field and open play activities, picnic shelters, warming shelters w/fireplaces, outdoor ampitheater, hiking
Meadow Day Use Area	80	1.5	280 *	Picnicking, bottom of ski and toboggan slopes, warming shelter with fireplace, field and open plan activities, hiking, nature study
Beach Area	130	1.5	455 *	Swimming, beach games, shoreline fishing, field and open play activities, exercise equipment
Beach Hilltop Picnic Area	30	1.5	105 *	Picnicking, field and open play activities, hiking
Campground Area	150 C/T	1.0	525 *	Camping, outdoor ampitheater, hiking, semi-organized games
Boat Dock Area	34 C/T	2.0	68 **	Boat launching, boat launching and rental, boat and shore fishing
	26 autos	4.0	91 *	Sightseeing, fishing
Boat Dock Turnaround	20 autos	4.0	70 *	Sightseeing, overflow parking for fishing, hiking
East Lake Day Use Area	-	2.0	105 *	Picnicking, children's play equipment, hiking
Hilltop Overlook	20	4.0	70 *	Sightseeing, picnicking, children's play areas
Cabin Area (2 per cabin)	72	1.0	252 *	Rustic camping, horseshoes, limitec court games, field and open play activities
Visitor/Historical/Nature Interpretation Center	20	3.0	70 *	Orientation, campground rental, education and interpretation activities
Lima Day Use	125	1.5	437 *	Start and end of trails for snowmobiles, cross country skiiers, warming shelter, picnic areas, summer horseback riding trails
Group Camp Area	50 C/T 5 bus	1.0 1.0	175 * 100***	Group camping for special interest groups, i.e., church, scouts, 4-H, band camp, football camp, nature groups, etc.
Valley Overlook Area	20	5.0	70 *	Sightseeing, picnicking, hiking, nature study
Canoe - 4 sites	39	3.0	78 **	Canoeing and boating, fishing, hunting
Albany Camping Area	50	1.0	100 **	Camping, hiking, fishing, etc.
Albany Hunting Access Area	30 C/T	1.0	105 **	Camping, hiking, fishing, etc.
East Perimeter Hunting Access (5 sites)	40(8 ea.)	1.0	80 **	Hunting, hiking, nature study
Big Rock Access Site	6	1.0	12 **	Hunting, hiking, nature study, primitive camping
		Total	3,983	

* Assume 3.5 persons per vehicle
** Assume 2.0 persons per vehicle
*** Assume 20 persons per bus

D. OPERATIONS

The physical layout of facilities permits individual side roads to be closed or access restricted during selected seasons, in order to rest an area for vegetative recovery from damage which might result from overuse or misuse. Selected areas of the campground, picnic areas, or other activity areas can be closed during winter or other periods of low usage.

Activities and facilities will also be designed to attract and encourage use by handicapped visitors.

Certain active court game and exercise facilities are recommended for this site in recognition of the physical and psychological needs of the average visitor to a site of this size and character. The natural hardiness and vigor of the people of the region necessitates provision of selected active game facilities in the intensively developed use areas to complement the natural experiences offered by the site.

SECTION VIII

Architectural Themes and Energy Considerations

VIII

ARCHITECTURAL THEMES AND ENERGY CONSIDERATIONS

A. GENERAL

The recommended design character of the facilities reflects selection of an architectural design theme to set standards for the more visible elements. Although there is always latitude for refinement at later, more definitive design stages, the intent of the layout and design character of the elements is described herein for general guidance. Evaluation of what is "best" for the Volga River State Recreation Area has not been generated lightly nor arbitrarily, but developed directly from the unique natural character of the site with careful consideration for climate, energy aspects, activity needs, and the desires of visitors. The desired theme for the architectural will be unified and clearly recognizable, yet will not be of a high technology design which dominates the landscape or subverts the character of natural materials. The economics of construction, administration, energy and maintenance procedures have been carefully considered.

The style can best be described as indigenously rustic. Rustic as applied herein is defined as native, natural, rough (though more refined where necessary for function and maintenance) and blending with the environment in color, texture, and mass. Rustic means conservative by design and built of indigenous materials such as stone and timbers; requiring neither high maintenance nor manicured polish. Structurally, rustic as applied herein denotes a direct and visually legible structural solution: where walls bear upon foundations, columns on supports, and spans and cantilevers are not stretched to the limits of technology as a design tour-de-force.

B. THEMES AND ANALYSIS

Structures for the Volga River Recreation Area have been analyzed and for purposes of comparison, three diverse types of construction have been studied. In the final analysis it may be wise to incorporate the best features of these types to develop a new vocabulary to express a rustic character while employing energy conserving techniques. The three types of construction considered are: (1) Log, (2) Pole, and (3) Berm. The following detailed discussion is intended to portray an image which will convey the rustic relaxed atmosphere desired in recreational architecture.

1. Log

Log structures have been used in most wooded areas in the United States. They convey a strong romantic, rugged, rustic notion in people's minds - especially when used with the word cabin, i.e., log cabin. Hand hewn logs add to the charm of cabins as shown in Figure 16, but it is not economically reasonable to build, maintain and heat them in the climate of the site.

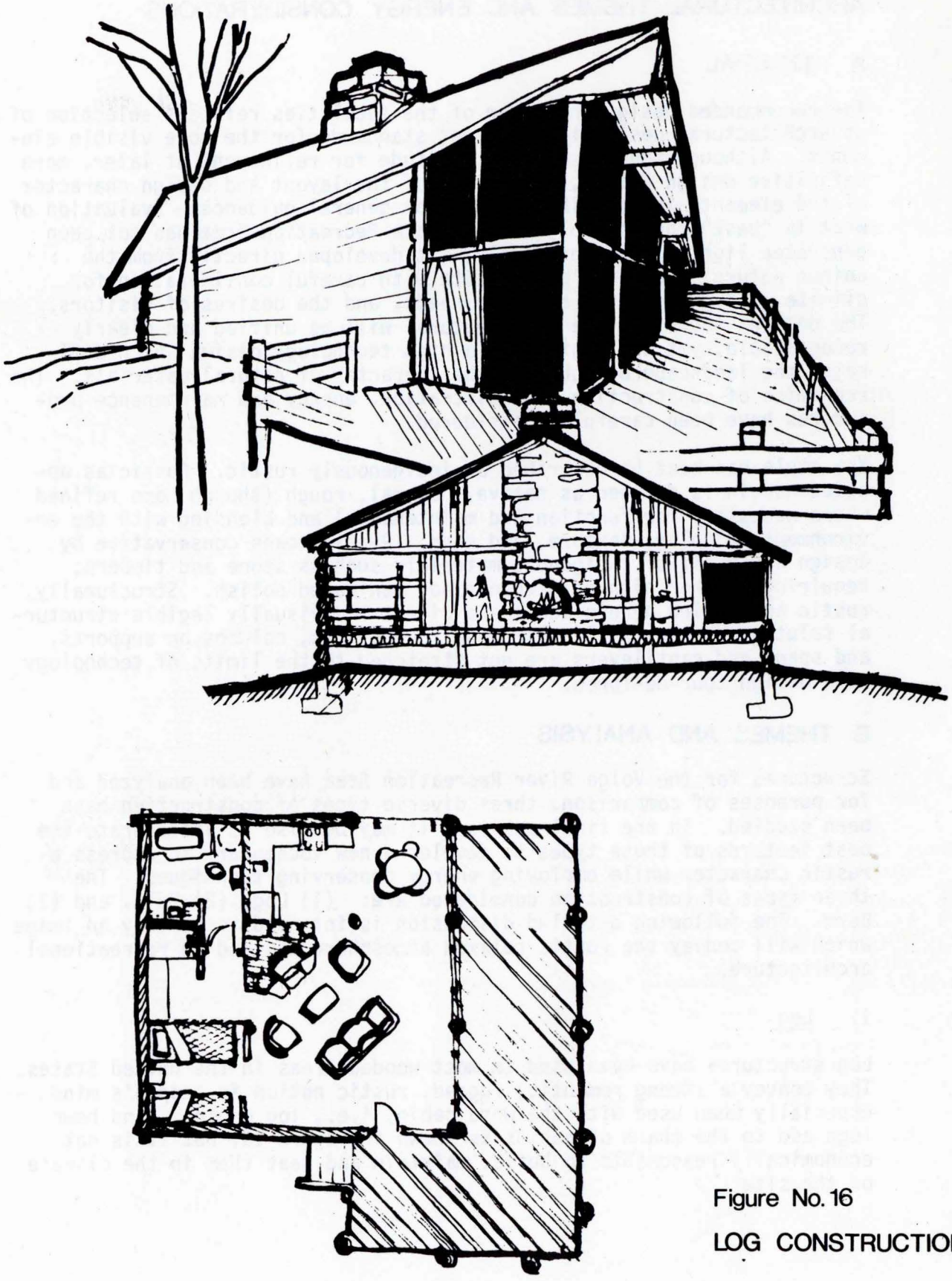


Figure No. 16

LOG CONSTRUCTION

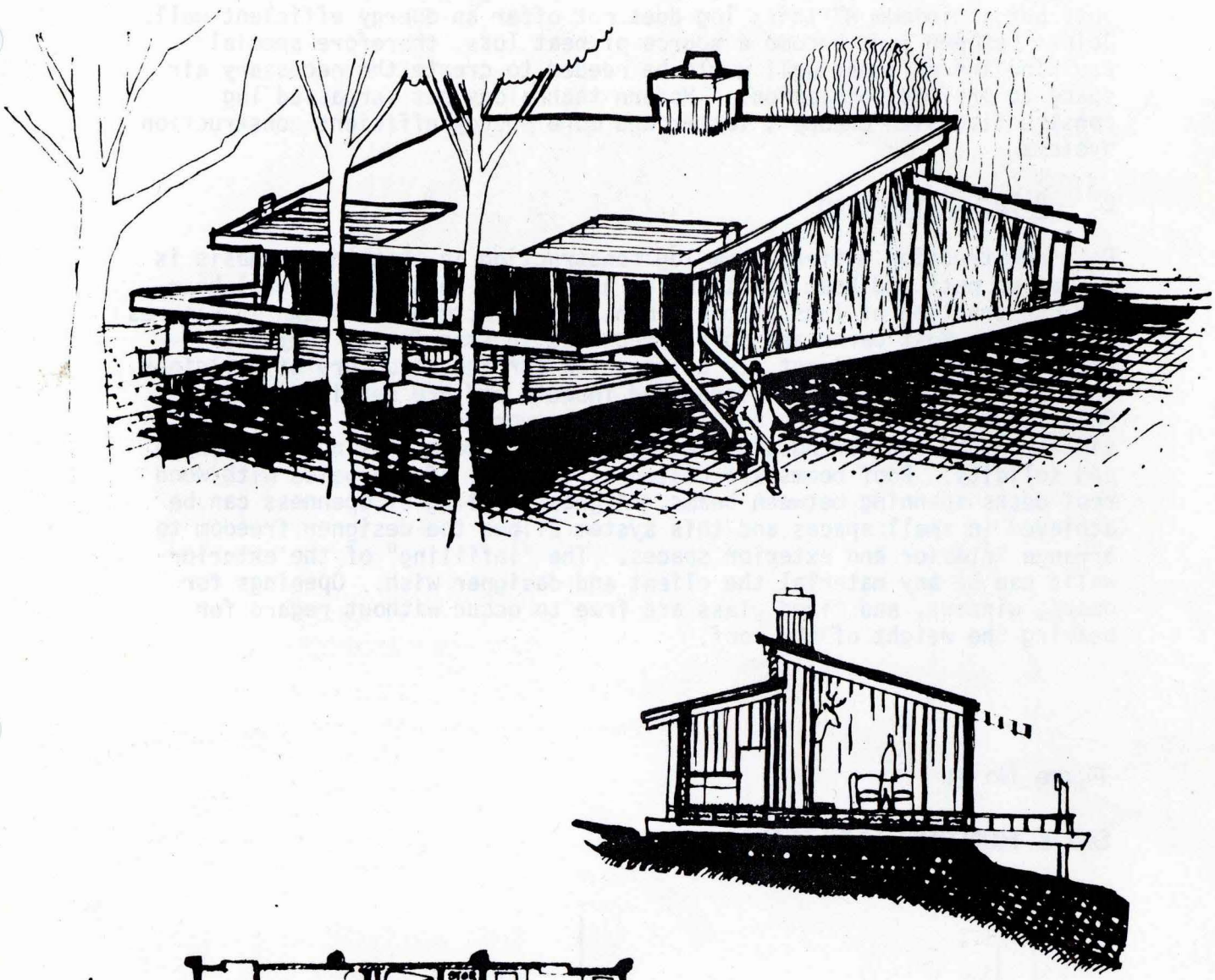


Figure No. 17

POLE CONSTRUCTION

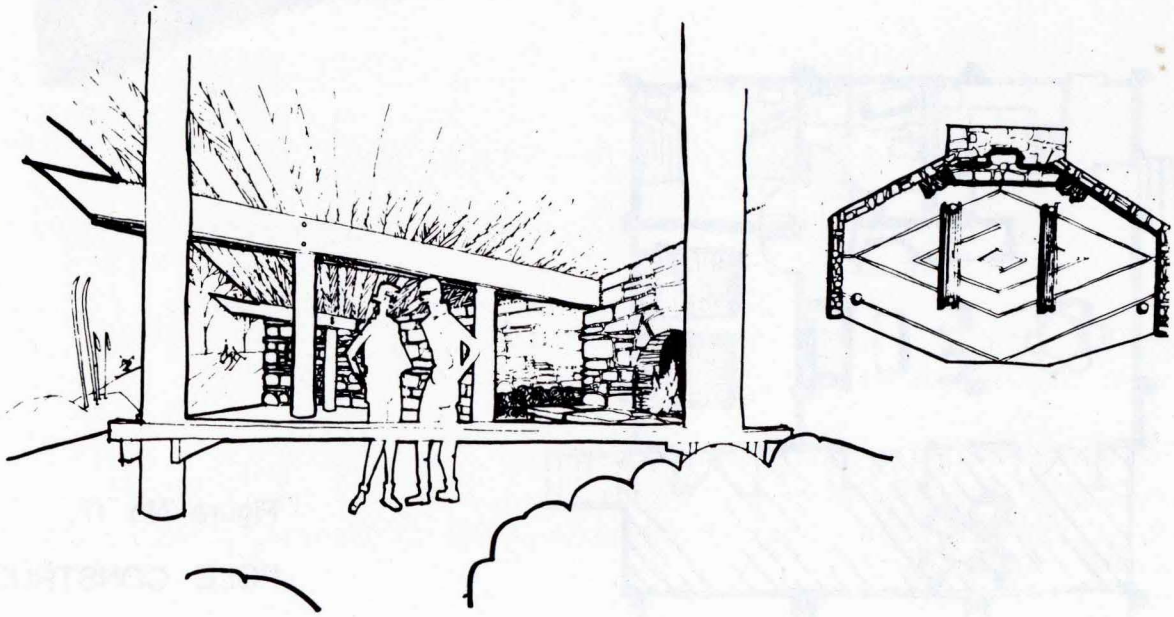
To retain and utilize their natural beauty, logs are exposed inside and out, but a minimum 8" thick log does not offer an energy efficient wall. Joints between logs become a source of heat loss, therefore special caulking and an inner wall would be needed to create the necessary air space to provide insulation. Modern technology has surpassed log construction with cheaper, faster and more energy efficient construction systems.

2. Pole Construction

Pole construction differs from log construction in that the emphasis is placed on post and beam construction as opposed to the heavy wall bearing construction of logs. Poles emphasize structure, as shown in Figures 17 and 18. Most barns are pole structures in some form. They are simple, honest and direct. In using poles for the structure of buildings, they are treated to resist decay and insects and are set in concrete. Pole structures have been built all of the world and have withstood violent winds and earthquake tremors. They exude a feeling of strength and solidity. Roof beams are bolted at the tops of the poles with wood roof decks spanning between beams. A great feeling of openness can be achieved in small spaces and this system allows the designer freedom to arrange interior and exterior spaces. The "infilling" of the exterior walls can be any material the client and designer wish. Openings for doors, windows, and fixed glass are free to occur without regard for bearing the weight of the roof.

Figure No. 18

SKI & HUNTING SHELTER



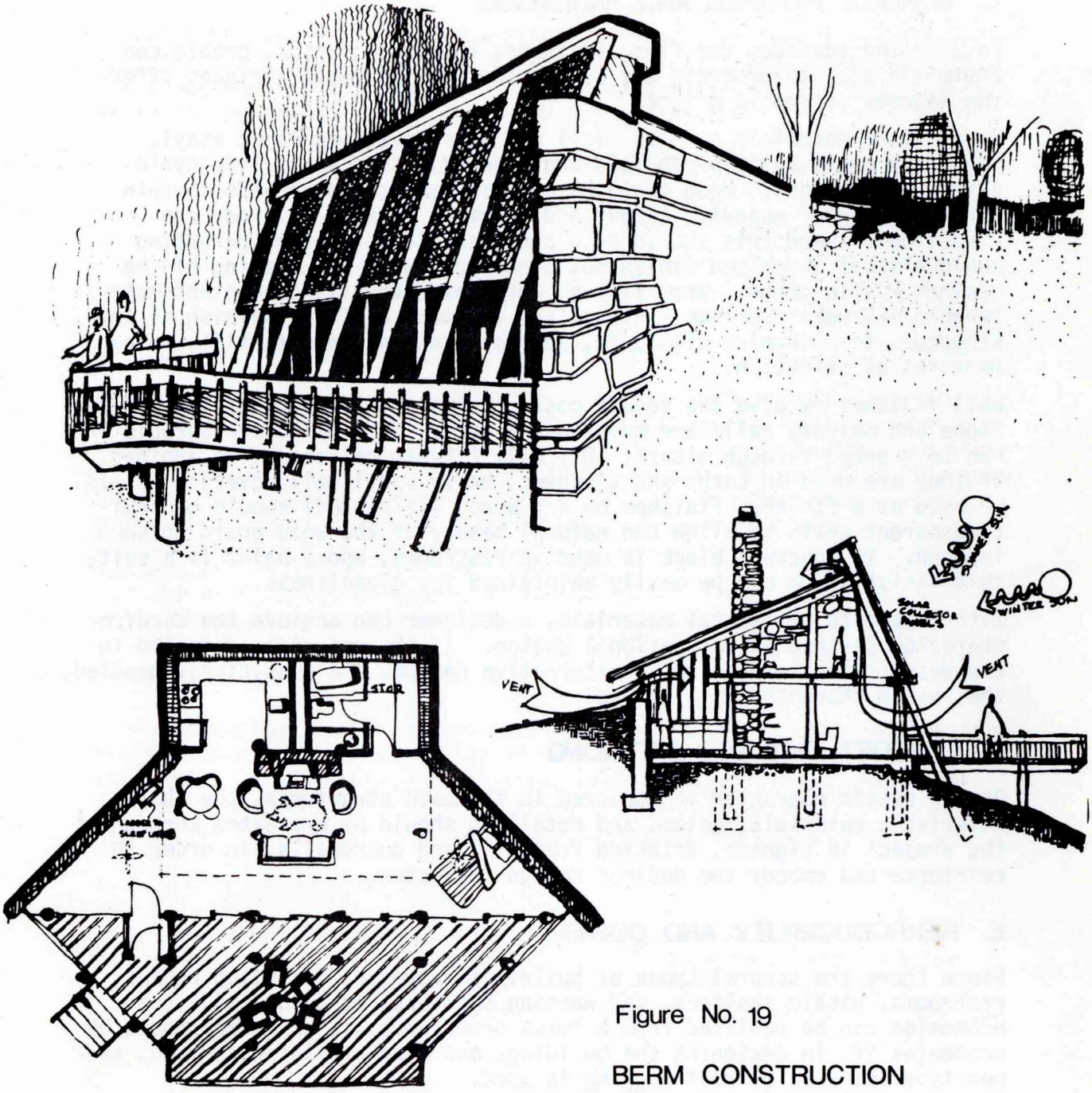


Figure No. 19

BERM CONSTRUCTION

3. Berm Construction

Using berms with structures; as shown in Figure 19, employs earth as an insulator. By itself earth is not a good insulator; however, with proper below grade insulation and waterproofing, earth can act as an insulator and, when properly oriented, result in offering a low building profile to winter winds.

C. SURFACE FINISHES AND VANDALISM

In choosing surfaces for floor finishes, flagstone, brick, pebble concrete and stained concrete may be considered as durable surfaces offering degrees of rustic effect.

Other floor materials such as vinyl asbestos tile, and sheet vinyl, generally would be inappropriate and have maintenance and life cycle cost disadvanrages. Wood could be used in cabins and provide certain natural material appeal. Carpet adds warmth, if slab-on-grade construction is used this should be a consideration; however, carpeting would present a refined finish not compatible with the feeling of the desired rustic theme. Wood floors, which have appeal, do present maintenance and wear problems. Floors are the most difficult finish of any structure to determine with cost, appropriateness and durability being measures of selection.

Wall finishes receive the second most abusive treatment in the structure. Stone and masonry walls are maintenance free. Wood walls are durable but can be scarred through misuse. Dry wall (sheetrock) should be avoided. If they are used in baths and kitchens, heavy vinyl wall covering should be used as a finish. Finishes on any wood, (if needed) should be semi-transparent stain to allow the natural beauty of the wood grain to show through. If concrete block is used in restrooms, epoxy paint is a suitable finish which may be easily maintained for cleanliness.

With a palette of natural materials, a designer can achieve the carefree character desired in recreational design. If the materials detailed in the descriptions of the three alternative designs are sensitively handled, the rustic character will emerge.

D. SUPPORT FACILITIES DETAILING

Once a rustic character is achieved in the main structures, the characteristic materials, colors and detailing should be repreated throughout the project in signage, drinking fountains and guardrails, in order to reinforce and embody the desired design character.

E. REPRODUCIBILITY AND COSTS

Since there are several types of buildings proposed, including cabins, restrooms, picnic shelters, and warming shelters, it is doubtful that economies can be realized from a "mass produced basis". There should be economies if, in designing the buildings one type of siding is used, and one type and size of roof decking is used.

Many cost factors must be taken into consideration in planning a construction project. The Volga River site is remote from a metropolitan area; therefore, work forces and materials must travel some distance to the site. Buildings will be located throughout the site, which will make it difficult to coordinate simultaneous construction to a degree sufficient to produce major economies. Site utilities will be relatively expensive since they will service buildings remote from each other. Yet another factor affecting costs is the relatively small size of all the buildings. Previous studies have shown that the cost of recreational buildings vary widely from $40 to $80 per square foot depending on factors such as detailing, utilities, finishes and location of the project.

So many divergent factors affect a specific project that it is difficult to predict the costs of a project accurately until more definitive plans are prepared; however, the following guidelines for design are suggested in the interest of both economy and aesthetics.

(1) Architectural design should be simple and straightforward, with minimal decorative detail or applique.
(2) Both exterior and interior finishes should be simple, durable, and easily renewed.
(3) A limited palette of materials and finishes should be selected for use in all buildings in order to ensure reproducibility as well as aesthetic unity.

F. ENERGY CONSIDERATIONS

The price and availability of energy today has made everyone sharply aware of the long-term operating cost implications of building construction of any kind. Life cycle projections, energy audits, and other studies are new methods for assessing the on-going financial obligations an agency faces when planning a new facility. In response to awareness of limited energy resources, new design approaches are emerging across the country which place high priority on energy consciousness and conservation.

The operation and desirability of recreation structures, enclosed or open, can be greatly improved through incorporating certain principles relative to energy conservation.

Energy conscious design begins with choosing the right site and locating the structure to take advantage of sun and wind and continues through thoughtful consideration of the structure's configuration, plan, construction, materials, exterior features, interior characteristics and many other items which may contribute to saving energy.

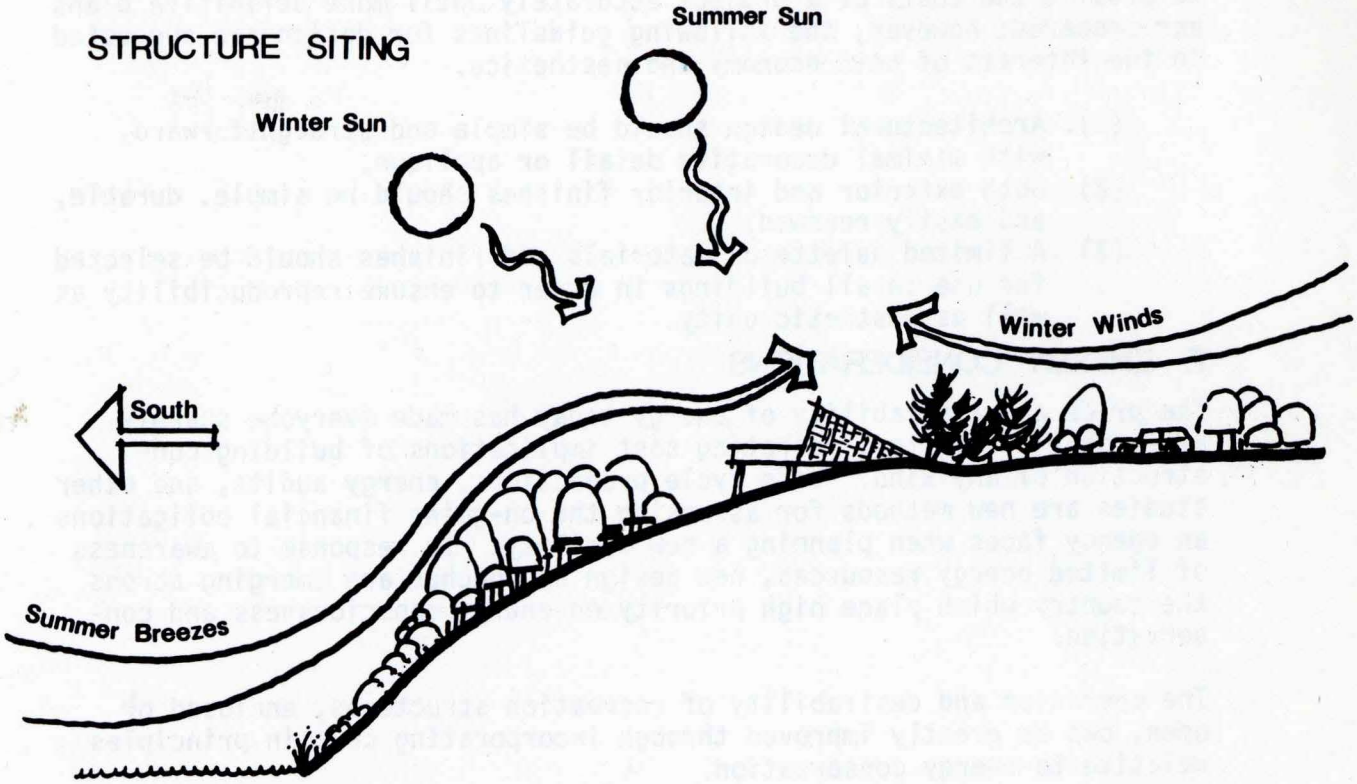
1. Siting and Orientation

These are prime considerations in the energy conscious design. Key energy related objectives in site planning relate to orientation for maximum winter solar gain to capture needed thermal energy and orientation for prevailing summer breezes to provide natural ventilation. Features to include are:

- placement on south facing slope
- extensive earth berming on the north
- evergreen trees on the north and west in windbreak formation with sufficient space to permit deciduous trees between structure and evergreen trees
- deciduous trees on the southwest and east, open spaced
- open to the prevailing south summer breezes
- open water on the south or downslope if possible
- vegetative growth on or near the north and west walls
- open side of the building to the south
- restrictive side of the building to the north and west
- use the mild east side to maximum advantage

Figure No. 20

STRUCTURE SITING



2. Building Configuration and Plan

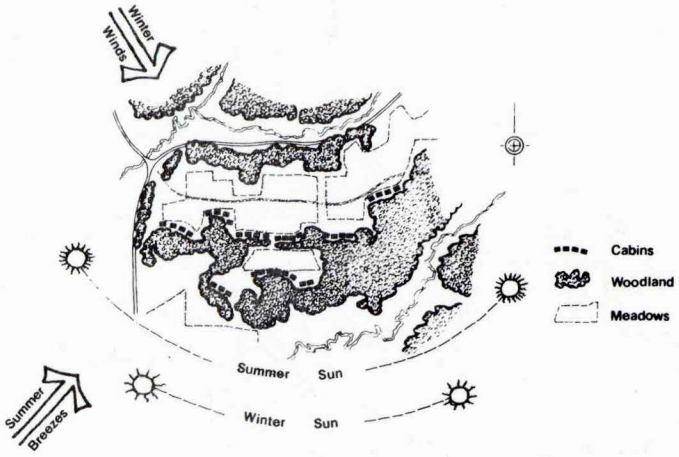
These are important contributors to energy design and require careful evaluation in terms of energy consumption. The structure design must make efficient use of the sun's energy and also serve as controller of the energy gathered. Overall building configuration will impact energy usage in various ways. Volume of the space to be heated, the amount of exterior surface area, and the room characteristics and placement, all contribute to the energy requirements. Features to consider are:

- minimize exposed surface area
- minimize the wall area to floor area ratio (or utilize multiple layered walls)
- use square floor plan, or
- use rectangular floor plan oriented long axis east-west
- south facing glass = 1/3 of the floor area
- north facing glass only as needed for ventilation
- provide window shading devices to eliminate unwanted sun
- provide adequate roof overhangs to protect wall from unwanted heat
- locate the garage or unheated space on the north or west
- place closet and utility spaces on exterior walls when possible
- include thermal mass for heat storage
- lower ceiling heights
- use an interior entry air lock system at entrances

In designing a structure, it is vitally important to determine configuration and plan according to the building's thermal needs. This alone can achieve significant energy savings, but major savings are possible if the design directly relates to site features and orientation.

Figure No. 21

STRUCTURE ORIENTATION



3. Building Envelope

This is another important element in the energy conscious structure. Its design, materials and construction type control the major energy variables of conduction, convection, radiation and infiltration. Dramatic savings can be realized by minimizing these factors to reduce heat loss and the heat gain. Some significant contributing features include:

- place as much of the building as possible below grade
- use materials with good insulation properties (high R value)
- minimize glazing area on the north and west
- provide means of insulation for all windows
- shading devices on the south should be horizontal
- reduce wall penetrations of all types
- use air tight construction details and methods (i.e., windows/doors)
- must have some thermal mass for heat storage
- insulate any floor, wall or foundation less than 4' below grade
- use double glazed openings on the south
- use triple glazed openings on the north and west

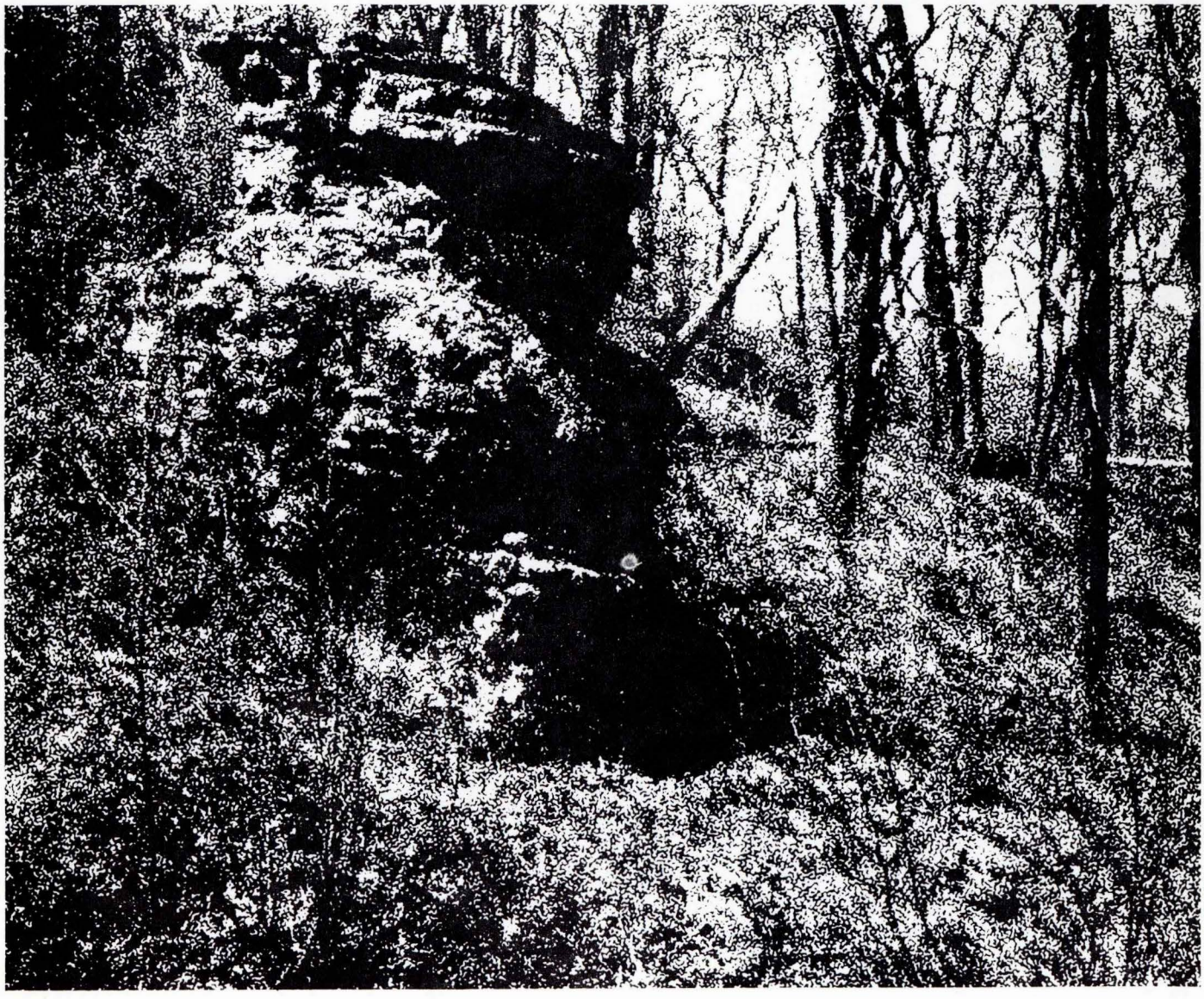
These construction requirements are extremely important for energy efficiency and directly affect the amount of building envelope heat loss.

4. Summary

The above principles can be translated through a range of building types and become qualities inherent in the building's construction and operation. Building location, siting, orientation, configuration, plan, construction, and building systems must be carefully evaluated in terms of their contribution to energy conservation.

SECTION IX

Operational Plans



IX

OPERATIONAL PLANS

A. SEASONAL HOURS AND PROCEDURES OF OPERATION

The Volga River State Recreation Area will be operated year round. Access to Frog Hollow Lake and Volga River for fishing will be allowed twenty four hours a day. Continual access will also be allowed to certain other minor portions of the Area. The road system has been designed for closure of side roads when necessary while permitting access to the lake and river for round-the-clock fishing. Side access roads to day use areas and beach and cabin areas may have control gates installed at their junction with the main road. The developed campground area will have control gates that may be closed at night and opened in the morning for security of campers.

Summer activities will attract more visitors as facilities are developed. Seasonal visitation variations will cause variations in demand for some interpretation programs. Ultimately, the Visitor Center should be open year-round and offer interpretive programs for area users as well as nearby school and special interest groups.

Because of its unusual rolling terrain in a colder climatic region of the State, the Area should become a strong winter playground as the public becomes aware of it. Although no sophisticated downhill ski runs are possible, short downhill runs and cross-country skiing and other good winter sports opportunities will attract many visitors. Winter visitors will require many of the same services as the summer visitors with logical accommodations to weather.

B. SIGNING

A policy of minimal signing and marking of activity areas and trails will be adopted. Signs mainly will be used to help people move smoothly into specialized activity areas from the roads. Signs will be used on trails only to assure the safety of the trail user and to avoid confusion. More frequent direction and interpretive signs will be appropriate on shorter trails, especially those loop hiking trails which emanate from day use areas. Users of the winter trails and longer summer trails that traverse the larger area and perimeter of the park will be expected to obtain trail maps which will contain information on trail lengths, usages, and directions to supplement the signing. Signs will be inspected regularly and promptly replaced should they be vandalized. Stock piles of frequently used signs should be maintained to facilitate replacement.

Signs used to identify the Area or situated in prominent locations are important aids in establishing and maintaining its visual character. Specialized signage such as those shown in Figure 22 will be appropriate to these locations. It may be noted that such signs are available in the commercial market. For routine purposes and less exposed locations, standard signage used by the Commission will be appropriate.

C. PATROLLING AND MAINTENANCE

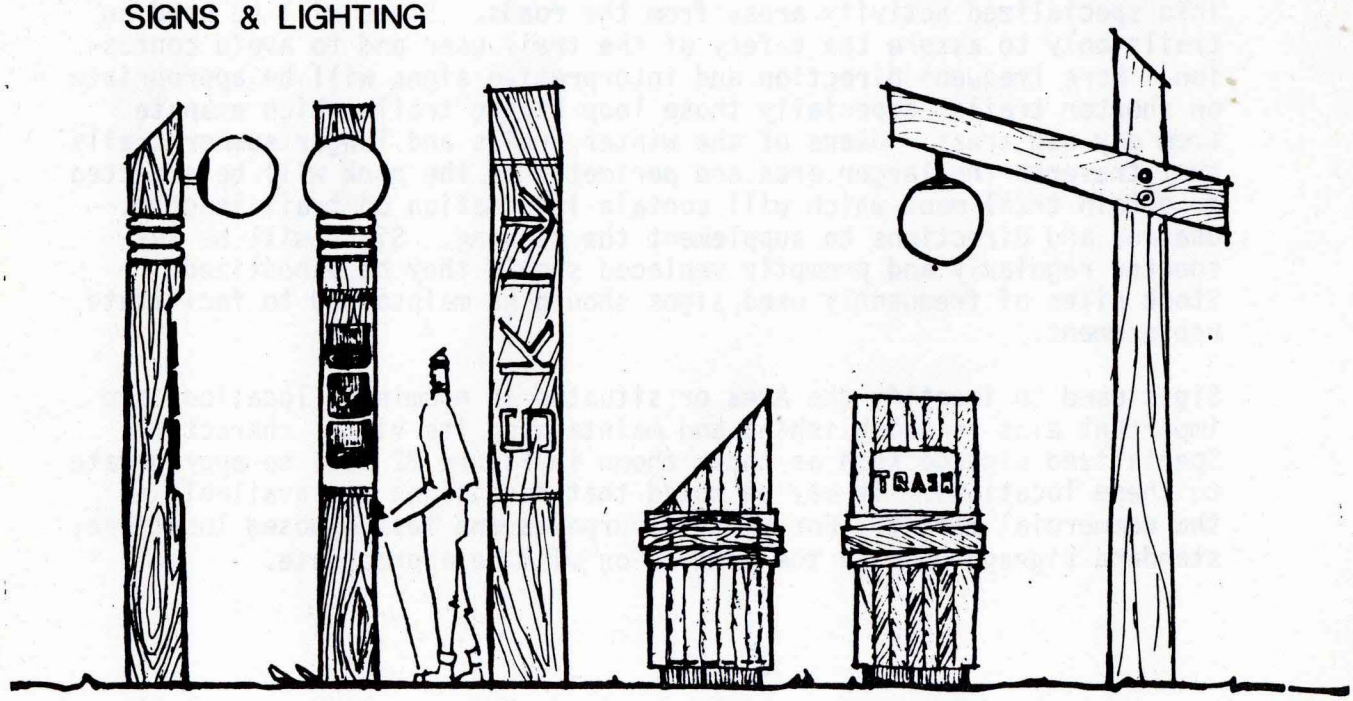
Patrol and maintenance personnel will be in uniform and utilize clearly marked vehicles for identification and security purposes. Visibility of park personnel is one of the best deterrents to vandalism in a recreation area. Roads, trails, beach and wildlife habitats should be inspected at frequent intervals to identify problems and guide scheduling of maintenance work. Thorough clean-up and maintenance of public use areas will be conducted to protect the Volga River Recreation Area resource base and visitors to the site. Maintenance activities will be conducted as needed with special emphasis on control of erosion, littering, and overuse of sensitive areas. Good maintenance is another key deterrent to vandalism.

D. SPECIALIZED STAFFING

Due to the unusual quality and large size of the Volga River Park site, and the resulting demands on the numbers and skills of the regular staff rangers, security and maintenance attendants, a highly skilled and experienced Resource Specialist will be needed. This specialist would have the responsibility to ensure the quality and vigor of the resource base, to direct preventive and remedial maintenance measures and to provide leadership in the nature interpretation program and activities. This person would also coordinate, instigate and assist in implementation of programs instituted on the site by the area wildlife, forestry, fish and water personnel. This position would be assigned to the Lands and Waters division. Presence of these management skills on the staff would allow other staff members to have more time to concentrate on serving visitors and supervising activites.

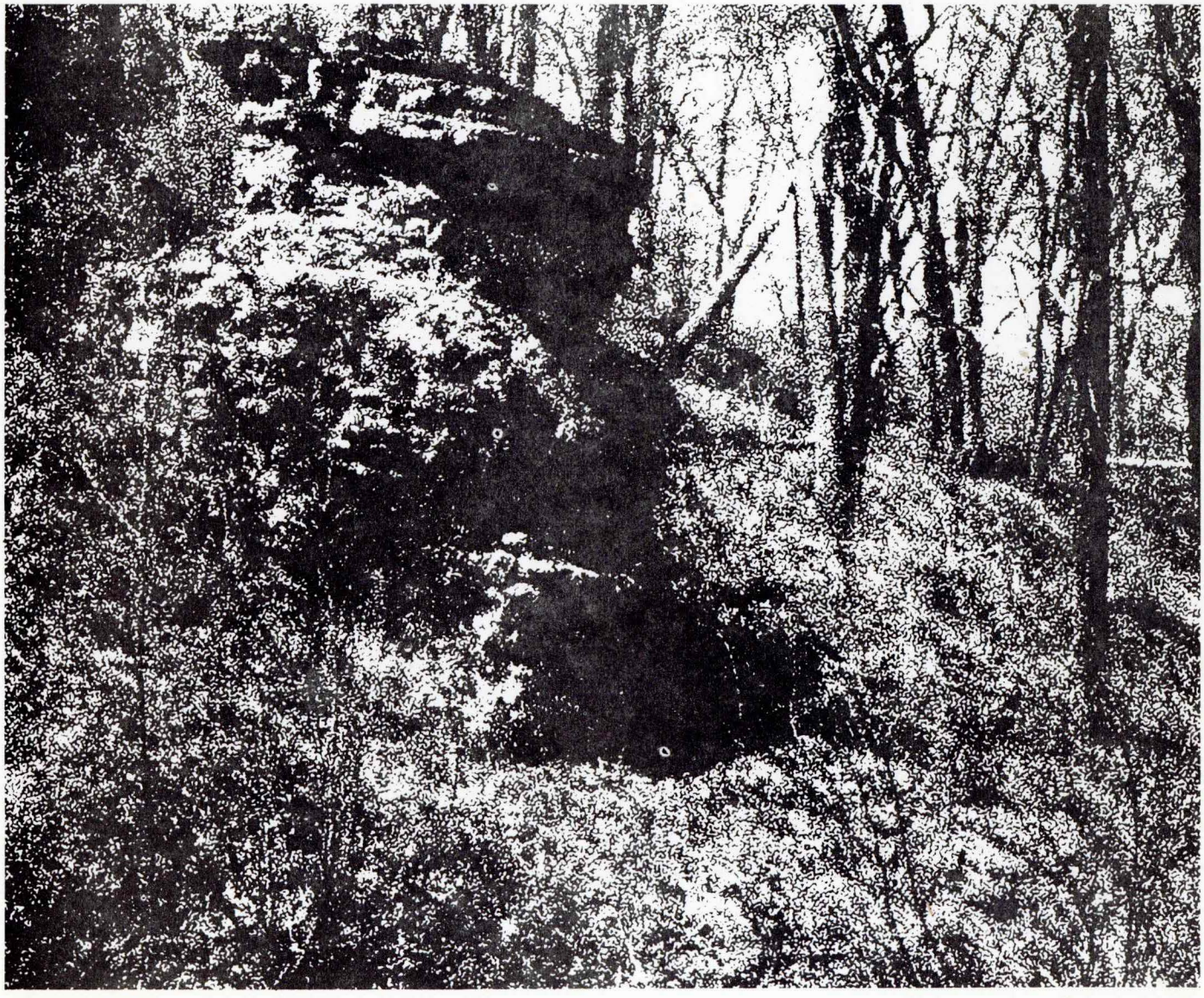
Figure No. 22

SIGNS & LIGHTING



SECTION X

Staff Requirements



X

STAFF REQUIREMENTS

A. INTRODUCTION

To determine the personnel needs and management implications of the Master Plan, consideration must be given to the seasonal fluctuations in intensity of visition, demand for facilities, required levels of service by the staff to maintain the character of the resource, the quality of the facilities and the quality of the recreation experience desired for the visitor. The needs of the visitor vary according to their recreation activity and awareness, and to the respect and use the visitors have for the facilities and the resource. Their attitudes are formed in part by the quality of the facilities as well as the quality of management. Therefore, the level of training, skill and commitment of the staff become salient factors in the formulation of management needs.

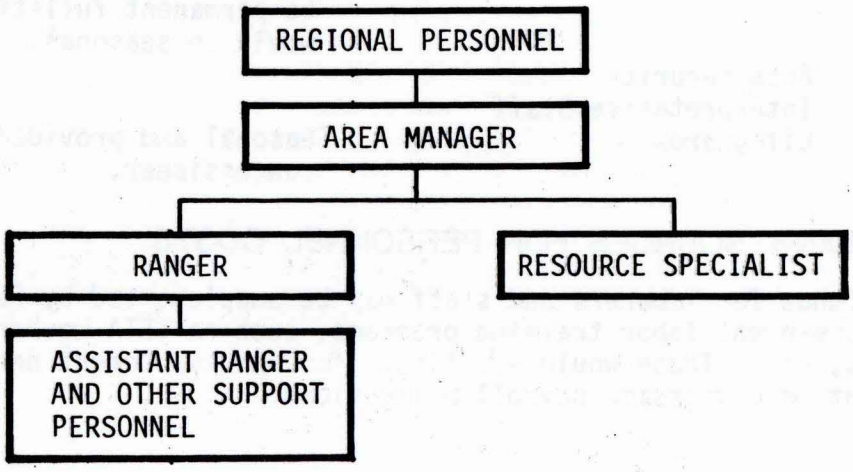
A well rounded program of activities with spirited leadership will encourage participation in group activities such as nature and historical interpretation programs and sports and recreation activities on a site as rich in unusual natural resources, diversity and beauty as the Volga River Recreation Area. Thus visitors' interest may be focussed and their respect for the resources and facilities engendered.

Operational, maintenance and enforcement needs are also determined by the number of operating facilities, their thoroughness of design, their dispersion on site, the travel time between activity nodes and the quality of maintenance necessary and desired. Manpower needs in the first phases obviously will be less than would be required at full development.

Efficient management and effective staff response will require thoughtful organization of staff personnel. A suggested organization is portrayed in Figure 23 below:

Figure No. 23

STAFF ORGANIZATION CHART



B. PERSONNEL REQUIREMENTS

To assure efficient use and management of the full range of facilities proposed in all development phases, it is anticipated that the following personnel will be required when full development of the Area has been attained:

1. Regional Personnel (currently on Commission staff in northeast Iowa)

1	District Park Supervisor
1	District Forester
1	District Fisheries Supervisor
1	District Wildlife Supervisor
1	District Waters Supervisor
1	District Engineering Inspector

2. Area Leadership/Supervisory Personnel

Ultimate Quantity	Category	Description
1	Area Manager	Top Area Facility and Visitor Activity Manager and Administrator
1	Resource Specialist	Resident Environmentalist and Resource Manager (see Section IX, "Specialized Staffing")
1	Ranger	Law Enforcement (people control) and Facility Manager

3. Support Personnel (more than half would be seasonal)

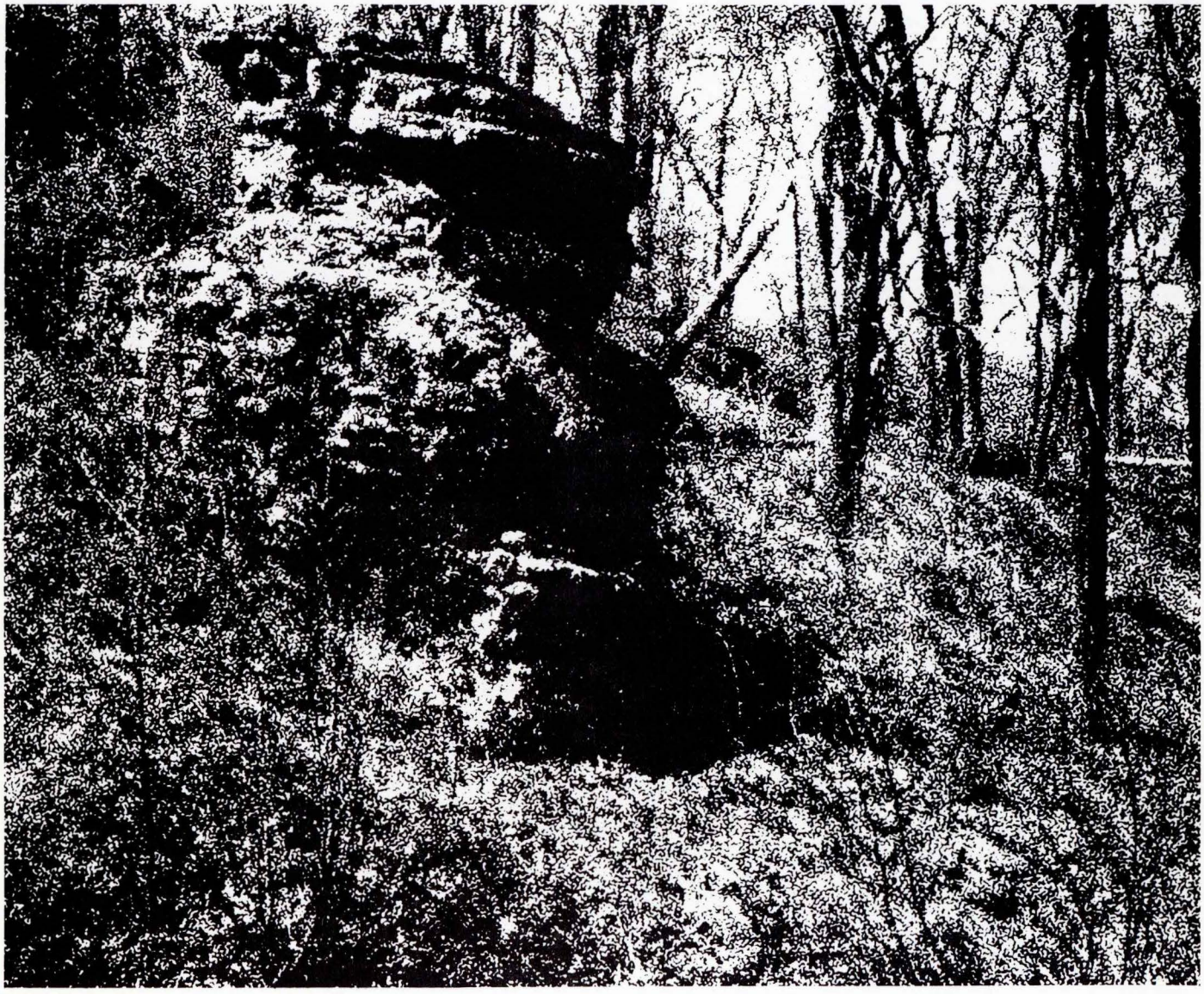
2	Assistant Rangers (Park Attendants)	Full time posisions. Duties of one position would be generally directed toward law enforcement and the other would be related to facility management.
2	Registration/Administrative Assistants	Seasonal or permanent part-time
10-15	Maintenance Personnel	A foreman and a core crew would be permanent full-time, others would be seasonal.
3	Area Security	
2	Interpretative Staff	
6	Lifeguards	Seasonal and provided by beach concessioner.

C. FUNDING SOURCES FOR PERSONNEL COSTS

Normal funds for laborers and staff may be supplemented by Federal and State government labor training programs, such as CETA workers, YACC programs, etc. These would substitute for and supplement normal Iowa Conservation Commission payroll obligations.

SECTION XI

Facility List And Cost Estimates And Implementation Phasing



XI

FACILITY LIST AND COST ESTIMATES AND IMPLEMENTATION PHASING

A. FACILITY LIST AND COST ESTIMATE

The detailed list of facilities and estimate of costs presented has been prepared for development of the Volga River Recreation Area in accordance with this master plan. The estimates have been calculated for work accomplished by private contractors, based upon recent experience in the market area. Readers and users of this estimate must remember that it is based upon 1979 constant dollar costs and the estimate must be revised at each using to reflect increases in the costs of materials and construction.

B. IMPLEMENTATION PHASING

Construction of the facilities must be phased in recognition of budgetary, administrative and resource limitations. The quality and integrity of the resource must be protected from the impacts of an overly aggressive or disorganized construction program. The most pressing needs of visitors must be equated with the administrative and budgetary capabilities of the Iowa Conservation Commission to allow establishment of development priorities.

Initial development must recognize the existence of a major attractor, Fog Hollow Lake, with a boat launching ramp and parking area. The need for additional and more refined day use and camping facilities will become evident as the lake becomes a reality with impoundment of water and availability of keeper sizes of game fish in the lake.

The present undeveloped campsites in the Albany area will be a permanent feature of the park. Due to the quality and location of the Albany Campground, many sportsmen will continue to use this area for convenient access to the Volga River, the Big Rock Area and the southern natural area of the park. As no refined sanitary facilities are recommended since the area is in the Volga River floodplain, continued use presents no special problems and requires no immediate expenditure.

The following recommended phasing does not necessarily correspond to annual increments since certain phases may require several years for completion, depending upon construction scope, user demand and funding availability. It is based upon a correlation of anticipated needs with the order in which certain elements of development should occur in order to provide guidelines for planning and budgeting. Actual usage during development, however, may indicate needed changes in phasing as implementation proceeds. A soil stabilization program within the Frog Hollow Lake Watershed, which may require some state funding for incentives, must be undertaken at the earliest time possible.

FACILITY LIST AND COST ESTIMATES

AREA/FACILITY

Item	Unit	Number of Units	Unit Price	Extended	15% Contingency	Item Total
1. ENTRANCE AND ORIENTATION STATION						
1. Access from St. Hwy. 150 Improve existing roadway	L.F.	5,300	15	79,500	11,925	91,425
2. West Boundary Road and Int'n Improve existing road	L.F.	3,000	15	45,000	6,750	51,750
3. Interior Road (new gravel)	L.F.	1,250	30	37,500	5,625	43,125
4. Surfacing 1,2,3 above	L.F.	9,500	10	95,500	14,325	109,825
5. Parking	Space	20	250	5,000	750	5,750
6. Orientation Facilities	L.S.	1	25,000	25,000	3,750	28,750
7. Site Development	L.S.	1	25,000	25,000	3,750	28,750
8. Buffer and Site Planting	L.S.	1	50,000	50,000	7,500	57,500
Subtotal						$ 416,875
2. RIDGE TOP DAY-USE AREA						
1. Access Road (new gravel)	L.F.	5,625	30	168,750	25,312	194,062
2. Access Road (finish surface)	L.F.	5,625	10	56,250	8,448	64,698
3. Parking:						
(a) Lot "A"	Space	15	250	3,750	563	4,313
Parking Lot Access Road	L.F.	90	30	2,700	405	3,105
(b) Lot "B"	Space	20	250	5,000	750	5,750
Parking Lot Access Road	L.F.	90	30	2,700	405	3,105
(c) Lot "C"	Space	10	250	2,500	375	2,875
Parking Lot Access Road	L.F.	875	30	26,250	3,938	24,813
(d) Lot "D"	Space	50	250	12,500	1,875	14,375
Parking Lot Access Road	L.F.	500	30	15,000	2,250	17,250
(e) Lot "E"	Space	20	250	5,000	750	5,750
Parking Lot Access Road	L.F.	90	30	2,700	450	3,105
(f) Lot "F"	Space	50	250	12,500	1,875	14,375
Parking Lot Access Road	L.F.	500	30	15,000	2,250	17,250
(g) Lot "G"	Space	20	250	5,000	750	5,750
Parking Lot Access Road	L.F.	90	30	2,700	405	3,105
(h) Lot "H"	Space	15	250	3,750	563	4,313
4. Picnic Units	Ea.	100	600	60,000	9,000	69,000
5. Picnic Shelters	Ea.	6	20,000	120,000	18,000	138,000
6. Group Picnic Shelters (Large)	Ea.	1	50,000*	50,000	7,500	57,500
7. Ski & Toboggan Facilities	Ea.	1	100,000	100,000	15,000	115,000
8. Ski & Toboggan Tow Lift	Ea.	1	50,000	50,000	7,500	57,500
9. Game Courts	L.S.	16	1,500	24,000	3,600	27,600
10. Playgrounds	L.S.	4	8,000	32,000	4,800	36,800
11. Restroom	Ea.	2	50,000	100,000	15,000	115,000
12. Site Development	L.S.	1	200,000	200,000	30,000	230,000
13. Pond - 3 acre	L.S.	2	25,000	50,000	7,500	57,500
14. Overlook Platform	L.S.	1	8,000	8,000	1,200	9,200
15. Amphitheater	L.S.	1	15,000	15,000	2,250	17,250
16. Utilities: Water and Sewer	L.S.	1	105,600	105,600	15,840	121,440
Electric	L.S.	1	16,300	16,300	2,445	18,745
Subtotal						$1,458,529
3. DEVELOPED CAMPGROUND						
1. Access Road (new gravel)	L.F.	12,000	30	360,000	54,000	414,000
2. Access Road (finish surface)	L.F.	12,000	10	120,000	18,000	138,000
3. Pulloffs (122. SY)	Ea.	150	1,000	150,000	22,500	172,500
4. Tent/Trailer Pads	Ea.	150	500	75,000	11,250	86,250
5. Picnic Units	Ea.	150	600	90,000	13,500	103,500
6. Restrooms	Ea.	4	40,000	160,000	24,000	184,000
7. Restroom - Shower Building	Ea.	3	60,000	180,000	27,000	207,000
8. Playgrounds	Ea.	2	8,000	16,000	2,400	18,400
9. Game Courts & Play Field Groups	Ea.	2	10,000	20,000	3,000	23,000
10. Site Development & Reforestation	L.S.		200,000	200,000	30,000	230,000
11. Pond - 3 acre	L.S.	2	25,000	50,000	7,500	57,500
12. Control Station	L.S.	1	10,000	10,000	1,500	11,500
13. Sewage Dump Station	L.S.		3,000	3,000	450	3,450
14. Utilities: Water & Sewage	L.S.		338,300	338,300	50,745	389,045
Electric	L.S.		22,500	22,500	3,375	25,875
Subtotal						$2,064,020

* Cost Source Iowa Conservation Commission

AREA/FACILITY

	Item	Unit	Number of Units	Unit Price	Extended	15% Contingency	Item Total
4.	MEADOW DAY-USE AREA						
	1. Access Road (new gravel)	L.F.	2,000	30	60,000	9,000	69,000
	2. Access Road (upgrade ex. gravel)	L.F.	1,100	15	16,500	2,475	18,975
	3. Access Road (finish surface)	L.F.	3,100	10	31,000	4,650	35,650
	4. Parking Lot "A"	Space	50	250	12,500	1,875	14,375
	5. Parking Lot "B"	Space	20	250	5,000	750	5,750
	6. Parking Lot "B" Access Road	L.F.	200	30	6,000	900	6,900
	7. Picnic Units	Ea.	30	600	18,000	2,700	20,700
	8. Picnic Shelters	Ea.	3	20,000	60,000	9,000	69,000
	9. Group Picnic Shelter	Ea.	1	50,000*	50,000	7,500	57,500
	10. Game Courts - Fields	L.S.			10,000	1,500	11,500
	11. Playground	Ea.	1	8,000	8,000	1,200	9,200
	12. Restroom	Ea.	1	50,000	50,000	7,500	57,500
	13. Sand Pit Reclamation	L.S.	1	20,000	20,000	3,000	23,000
	14. Site Development	L.S.	1		100,000	15,000	115,000
	15. Utilities: Water & Sewer	L.S.	1	43,000	43,000	6,450	49,450
	Electric	L.S.	1	14,100	14,100	2,115	16,215
	Subtotal						$ 579,715
5.	BEACH HILLTOP AREA						
	1. Access Road (new gravel)	L.F.	1,100	30	33,000	4,950	37,950
	2. Access Road (upgrade ex. gravel)	L.F.	1,500	15	22,500	3,375	25,875
	3. Access Road (finish surface)	L.S.	2,600	10	26,000	3,900	29,900
	4. Parking	Space	30	250	7,500	1,125	8,625
	5. Parking Lot Access Road	L.F.	90	30	2,700	405	3,105
	6. Picnic Units	Ea.	15	600	9,000	1,350	10,350
	7. Picnic Shelters	Ea.	3	20,000	60,000	9,000	69,000
	8. Group Picnic Shelter	Ea.	1	50,000*	50,000	7,500	57,500
	9. Overlook Platform	Ea.	1	8,000	8,000	1,200	9,200
	10. Game Court - Field Game Area	L.S.		10,000	10,000	1,500	11,500
	11. Playground	Ea.	1	8,000	8,000	1,200	9,200
	12. Restrooms	Ea.	1	40,000	40,000	6,000	46,000
	13. Site Development	L.S.	1	100,000	100,000	15,000	115,000
	14. Utilities: Water, Sewer	L.S.	1	14,750	14,750	2,213	16,963
	Electricity	L.S.	1	4,300	4,300	645	4,945
	Subtotal						$ 455,113
6.	BEACH AREA						
	1. Access Road (new gravel)	L.S.	4,850	30	145,500	21,825	167,325
	2. Access Road (finish surface)	L.S.	4,850	10	48,500	7,275	55,775
	3. Bridge on Access Road	L.S.	1	100,000	100,000	15,000	115,000
	4. Parking	Space	130	250	32,500	4,875	37,375
	5. Parking Lot Access Road	L.S.	180	30	5,400	810	6,210
	6. Bathhouse	Ea.	1	200,000	200,000	30,000	230,000
	7. Beach Facilities	Ea.	1	100,000	100,000	15,000	115,000
	8. Picnic Units	Ea.	50	600	30,000	4,500	34,500
	9. Picnic Shelters	Ea.	3	20,000	60,000	9,000	69,000
	10. Exercise and Play Equipment	L.S.		25,000	25,000	3,750	28,750
	11. Playground	L.S.	1	8,000	8,000	1,200	9,200
	12. Site Development	L.S.	1	100,000	100,000	15,000	115,000
	13. Utilities - Water & Sewer	L.S.	1	48,700	48,700	7,305	56,005
	Electric-buried cable	L.S.	1	14,900	14,900	2,235	17,135
	Subtotal						$1,056,275
7.	EAST LAKE DAY-USE AREA						
	1. Access Rd. (upgrade ex. gravel)	L.F.	1,500	15	22,500	3,375	25,875
	2. Access Road (finish surface)	L.F.	1,500	10	15,000	2,250	17,250
	3. Picnic Units	Ea.	20	600	12,000	1,800	13,800
	4. Picnic Shelters	Ea.	3	20,000	60,000	9,000	69,000
	5. Group Picnic Shelter	Ea.	1	50,000	50,000	7,500	57,500
	6. Overlook Silo/Platform	L.S.	1	20,000	20,000	3,000	23,000
	7. Foundation/Barn Structure	L.S.	1	20,000	20,000	3,000	23,000
	8. Site Development	L.S.		50,000	50,000	7,500	57,500
	9. Bridge	L.S.	1	50,000	50,000	7,500	57,500
	10. Parking	Space	40 A/BT	Existing			Existing
			10 Auto	Existing			Existing
	11. Loop Turnaround	L.F.	1,000	30	30,000	4,500	34,500
	12. Restroom	L.S.		50,000	50,000	7,500	57,500
	13. Site Development	L.S.		20,000	20,000	3,000	23,000
	14. Utilities: Water & Latrines	L.S.		67,000	67,000	10,500	77,050
	Electricity	L.S.		18,600	18,600	2,790	21,390
	Subtotal						$ 557,865

* Cost Source - Iowa Conservation Commission

AREA/FACILITY

	Item	Unit	Number of Units	Unit Price	Extended	15% Contingency	Item Total
8.	CABIN AREA						
	1. Access Road (new gravel)	L.F.	7,500	30	225,000	33,750	258,750
	2. Access Road (upgrade ex. gravel)	L.F.	2,350	15	35,250	5,288	40,538
	3. Access Road (finish surface)	L.F.	9,850	10	98,500	14,775	113,275
	4. Parking (2 spaces per cabin)	Space	72	250	18,000	2,700	20,700
	5. Cabins ($55 per sq. ft.)	Ea.	36	45,000	1,620,000	243,000	1,863,000
	6. Picnic Units	Ea.	36	600	21,600	3,240	24,840
	7. Playground	Ea.	2	8,000	16,000	2,400	18,400
	8. Game Courts and Play Field	L.S.		20,000	20,000	3,000	23,000
	9. Site Development	L.S.		100,000	100,000	15,000	115,000
	10. Pond - 3 acre	L.S.	1	25,000	25,000	3,750	28,750
	11. Tennis Courts	Ea.	2	16,000	32,000	4,800	36,800
	12. Utilities: Water and Sewage	L.S.		241,000	241,000	36,150	277,150
	Electricity	L.S.		38,700	38,700	5,805	44,505
	Subtotal						$2,864,708
9.	MAINTENANCE AREA						
	1. Workshop-Office Bldg. (Heated)	L.S.		70,000	70,000	10,500	80,500
	2. Vehicle-Material Storage Bldg.	L.S.		30,000	30,000	4,500	34,500
	3. Access Road & Hardstand 150' x 150'	S.F.	2,500	5	12,500	1,875	14,375
	4. Parking (employees)	Space	16	250	4,000	600	4,600
	5. Site Dvmt. & Screen Planting	L.S.		20,000	20,000	3,000	23,000
	6. Utilities: Water and Sewage	L.S.		12,000	12,000	1,800	13,800
	Electric and Telephone	L.S.		7,400	7,400	1,100	8,510
	Subtotal						$ 179,285
10.	VISITOR/NATURE/HISTORICAL INTERPRETATION CENTER						
	1. Parking Lot Ac. Rd. (new gravel)	L.F.	200	30	6,000	900	6,900
	2. Parking Access (finish surface)	L.F.	200	10	2,000	300	2,300
	3. Parking	Space	20	250	5,000	750	5,750
	4. Bldg. Renovation & Conversion	L.S.		200,000	200,000	30,000	230,000
	5. Site Development	L.S.		50,000	50,000	7,500	57,500
	6. Utilities: Water and Sewage	L.S.		12,000	12,000	1,800	13,800
	Electric and Telephone	L.S.		4,200	4,200	630	4,830
	Subtotal						$ 321,080
11.	LIMA DAY-USE AREA						
	1. Access Road (new gravel)	L.F.	3,700	30	110,000	16,650	126,650
	2. Access Road (finish surface)	L.F.	3,700	10	37,000	5,550	42,550
	3. Parking C/T	Space	100	500	50,000	7,500	57,500
	4. Parking	Space	50	250	12,500	1,875	14,375
	5. Parking Lot Access Road	L.F.	300	30	9,000	1,350	10,350
	6. Parking Lot Access Road (upgrade existing gravel)	L.F.	600	15	9,000	1,350	10,350
	7. Picnic Units	Ea.	30	600	18,000	2,700	20,700
	8. Picnic Shelter	Ea.	3	20,000	60,000	9,000	69,000
	9. Group Picnic/Warming Shelter	Ea.	2	50,000*	100,000	15,000	115,000
	10. Restroom (4/4 Roomy)	Ea.	1	50,000	50,000	7,500	57,500
	11. Pond - 3 acre	Ea.	1	50,000	50,000	7,500	57,500
	12. Playground and Game Courts	L.S.		15,000	15,000	2,250	17,250
	13. Site Development	L.S.		40,000	40,000	6,000	46,000
	14. Bridge - Upgrade Existing	Ea.	1	100,000	100,000	15,000	115,000
	15. Utilities: Water and Sewage	L.S.		37,300	37,300	5,595	42,895
	Electrical	L.S.		4,200	4,200	630	4,830
	Subtotal						$ 807,450
12.	GROUP CAMP						
	1. Access Road (new gravel)	L.F.	4,200	30	126,000	18,900	144,900
	2. Access Road (upgrade ex. gravel)	L.F.	5,200	15	78,000	11,700	89,700
	3. Access Road (finish surface)	L.F.	9,400	10	94,000	14,100	108,100
	4. Parking (Buses & Trailers)	Space	3	500	1,500	225	1,725
	5. Parking Lot Access Road	L.F.	90	30	1,700	405	3,105
	6. Tent-Trailer Pulloffs	Ea.	50	1,000	50,000	7,500	57,500
	7. Camp Pads	Ea.	50	500	25,000	3,750	28,750
	8. Picnic Units	Ea.	50	600	30,000	4,500	34,500
	9. Kitchen-Dining-Shelter	L.S.		150,000	150,000	22,500	172,500
	10. Restrooms-Shower Building	Ea.	2	60,000	120,000	18,000	138,000
	11. Game Courts - Fields	L.S.		15,000	15,000	2,250	17,250
	12. Site Development	L.S.		40,000	40,000	6,000	46,000
	13. Corral - Loadramp	L.S.		10,000	10,000	1,500	11,500
	14. Barn	L.S.	1	20,000	20,000	3,000	23,000
	15. Dormitory Cabins ($20 S.F.)	L.S.	5	20,000	100,000	15,000	115,000
	16. Amphitheater/Fire Circle	L.S.	1	15,000	15,000	2,250	17,250
	17. Utilities: Water and Sewage	L.S.		72,000	72,000	10,800	82,800
	Electrical	L.S.		27,400	27,400	4,110	31,510
	Subtotal						$ 829,340

* Cost Source - Iowa Conservation Commission

AREA/FACILITY

Item	Unit	Number of Units	Unit Price	Extended	15% Contingency	Item Total
13. STAFF RESIDENCES						
1. 2 houses and 1 V-Garages		2	70,000	140,000	21,000	161,000
2. Access Road	L.F.	1,500	30	45,000	6,750	51,750
3. Site Development	L.S.		20,000	20,000	3,000	23,000
4. Utilities: Water and Sewer	L.S.		17,000	17,000	2,550	19,550
Electrical	L.S.		8,100	8,100	1,215	9,315
Subtotal						$ 264,615
14/15/						
16. ALBANY CAMPING AREA AND HUNTING ACCESS						
1. Access Road (upgrade ex. gravel)	L.F.	9,000	15	135,000	20,250	155,250
2. Access Road (finish surface)	L.F.	9,000	10	90,000	13,500	103,500
3. Parking	Space	36	250	9,000	1,350	10,350
4. Parking Lot Access Road	L.F.	270	30	8,100	1,215	9,315
5. Canoe Livery Ramp & Parking	L.S.		10,000	10,000	1,500	11,500
6. Picnic Units	Ea.	10	600	6,000	600	6,900
7. Pit Vault Latrine	Ea.	2	15,000*	30,000	4,500	34,500
8. Bridge Repair (upgrade existing trestle)	L.S.		100,000	100,000	15,000	115,000
9. Site Development	L.S.		50,000	50,000	7,500	57,500
10. Utilities: Water & PV Latrine	L.S.		19,000	2,850	2,850	21,850
Subtotal						$ 525,665
17. LIMA CANOE ACCESS						
1. Access Road (new gravel)	L.F.	600	30	18,000	2,700	20,700
2. Access Road (upgrade ex. gravel)	L.F.	1,965	15	29,475	4,421	33,896
3. Access Road (finish surface)	L.F.	2,565	10	26,650	3,848	30,498
4. Parking	Space	20	250	5,000	750	5,750
5. Canoe - Boat Ramp	L.S.		5,000	5,000	750	5.750
6. Site Development	L.S.		20,000	20,000	3,000	20,000
Subtotal						$ 119,594
18. VALLEY OVERLOOK						
1. Access Road (upgrade ex. gravel)	L.F.	2,350	15	35,250	5,288	40,538
2. Access Road (finish surface)	L.F.	2,350	10	23,500	3,525	27,025
3. Parking	Space	20	250	5,000	750	5,750
4. Parking Lot Rd. & Turnaround	L.F.	450	30	13,500	2,025	15,525
5. Overlook Platform	Ea.	1	8,000	8,000	1,200	9,200
6. Picnic Units	Ea.	10	600	6,000	900	6,900
7. Site Development	L.S.		20,000	20,000	3,000	23,000
Subtotal						$ 127,938
19. LANGERMAN'S FORD						
1. Parking	Space	14	250	3,500	525	4,025
2. Parking Lot Access Road	L.F.	250	30	7,500	1,125	8,625
3. Ramp	Lanes	2	500	1,000	150	1,150
4. Site Development	L.S.		15,000	15,000	2,250	17,250
Subtotal						$ 31,050
20. EAST PERIMETER HUNTING ACCESSES (5)						
1. Parking (8 autos each)	Ea.	40	250	10,000	1,500	11,500
2. Parking Access Road (5 @ 50')	L.F.	250	30	7,500	1,125	8,625
3. Site Development	L.S.	5	3,000	15,000	2,250	17,250
Subtotal						$ 37,375
21. BIG ROCK ACCESS						
1. Parking	Space	8	250	2,000	300	2,300
2. Parking Access Road	L.F.	50	30	1,500	225	1,725
3. Site Development	L.S.	1	3,000	3,000	450	3,450
Subtotal						$ 7,475
22. ENTRANCE AND INTERIOR CIRCULATION ROADS						
1. Road "A" (upgrade ex. gravel)	L.F.	7,100	15	106,500	15,975	122,475
2. Road "B" (upgrade ex. gravel)	L.F.	5,300	15	79,500	11,925	91,425
3. Road "C" (upgrade ex. gravel)	L.F.	4,200	15	63,000	9,450	72,450
4. Road "C" (new gravel)	L.F.	4,200	30	126,000	18,900	144,900
5. Roads A, B, C, (finish surface)	L.F.	20,800	10	208,000	31,200	239,200
6. Remove Existing Road (onsite)	L.F.	4,795	5	23,975	3,596	27,571
7. Remove Existing Road (offsite)	L.F.	1,000	5	5,000	750	5,760
Subtotal						$ 703,781

* Cost Source - Iowa Conservation Commission

AREA/FACILITY

	Item	Unit	Number of Units	Unit Price	Extended	15% Contingency	Item Total
23.	LAKE FACILITIES						
	1. Fixed Hd. dock, ramp, walks & Overlook Area	L.S.		50,000	50,000	7,500	57,500
	2. Fingerdocks (30)	Ea.	2	4,000	8,000	1,200	9,200
	3. Bait/Storage Building	S.F.	50	10	500	75	575
	4. Site Development	L.S.		20,000	20,000	3,000	23,000
	5. Shoreline Fishing Platforms (6' x 12')	Ea.	4	500	2,000	300	2,300
	6. Parking (overflow)	Space	30	250	7,500	1,125	8,625
	7. Parking Lot Access Road	L.F.	80	30	2,400	360	2,760
	8. Utilities: Elec. and Water	L.S.		9,300	9,300	1,395	10,695
	Subtotal						$ 114,655
24.	TRAILS						
A.	High-use hiking						
	1. Clearing through forested area	L.F.	15,840	.46	7,286	1,093	8,379
	2. Grading	L.F.	53,328	1.20	63,994	9,599	73,593
	3. Existing trails, no improvement	L.F.	4,752	--	--	--	--
	4. Surface preparation, gravel	L.F.	29,040	2.75	79,860	11,979	91,839
	5. Surface preparation, wood chip	L.F.	29,040	.50	14,520	2,178	16,698
	6. Foot trail bridges (4' wide)	Ea.	1	4,010.00	4,010	602	4,612
						Subtotal Item 24A	$ 195,121
B.	Remote use hiking/cross-country skiing						
	1. Clearing through forested area	L.F.	39,600	.35	13,860	2,079	15,939
	2. Grading	L.F.	80,256	.90	72,230	10,835	83,065
	3. Existing trails (no improvement)	L.F.	20,064	--	--	--	--
	4. Wood chip surface	L.F.	11,880	.38	4,514	677	5,191
	5. Turf surface	L.F.	80,256	.27	21,669	3,250	24,919
	6. Ski bridges (10' wide)	Ea.	13	6,310.00	82,030	12,305	94,335
						Subtotal Item 24B	$ 223,449
C.	Equestrian/snowmobile						
	1. Clearing through forested area	L.F.	5,280	.575	3,036	455	3,491
	2. Grading	L.F.	48,048	1.25	60,060	9,009	69,069
	3. Existing trails (no improvement)	L.F.	44,352	--	--	--	--
	4. Wood chip surface	L.F.	2,112	.875	1,848	277	2,125
	5. Turf surface	L.F.	42,768	.41	17,535	2,630	20,165
	6. Equestrian & Snowmobile bridges (10' wide w/special decking)	Ea.	3	6,760.00	20,280	3,042	23,322
						Subtotal Item 24C	$ 118,172
	Subtotal						$ 536,742
25.	OTHER FACILITIES & IMPROVEMENTS						
	1. Sand borrow area shaping and revegetation	L.S.	1	30,000	30,000	4,500	34,500
	2. Wildlife habitat enhancement	L.S.	3	10,000	30,000	4,500	34,500
	3. Identification sign on Hwy 180	Ea.	1	800	800	120	920
	4. Entrance sign	Ea.	1	800	800	120	920
	5. Activity signs	Ea.	10	450	4,500	675	5,175
	6. Lighted activity signs	Ea.	4	675	2,700	405	3,105
	7. Directional signs	Ea.	14	250	3,500	525	4,025
	8. Miscellaneous signs and graphics	L.S.	1	2,700	2,700	405	3,105
	Subtotal						$ 86,250
26.	DETAILED DESIGN & CONSTRUCTION PLANS						
	1. Allowance @ 7.5 of cost	L.S.	1	1,060,904		NA	1,060,904
	Subtotal						$ 1,060,904
GRAND TOTAL							$15,206,199

IMPLEMENTATION PHASING

AREA/FACILITY OR IMPROVEMENT	PHASES I	II	III	IV	V	VI
1. ENTRANCE AND ORIENTATION STATION						
Offsite Access and Boundary Roads		143,175				
			273,700			
2. RIDGE TOP DAY USE AREA						
First half w/ski, toboggan slopes			810,520			
Completion				648,009		
3. DEVELOPED CAMPGROUND						
Borrow reclamation and reforestation	230,000					
Access road, pond, basic utilities		597,375				
One half camping facilities			594,370			
To completion				642,275		
4. MEADOW DAY USE AREA						
30 picnic units, parking, basic water and sewer	91,525					
To completion				488,190		
5. BEACH HILLTOP AREA						
Complete					455,113	
6. BEACH AREA						
Beach access road, beach, parking, utilities		646,300				
Bathhouse and complete development			409,975			
7. EAST LAKE DAY USE AREA						
Access, 20 picnic units, water, pit latrines	79,675					
To completion					478,190	
8. CABIN AREA						
Improve existing road, access, 8 cabins, utilities				906,113		
Access, 14 cabins, utilities, playground					931,860	
Access, 14 cabins, utilities, pave roads						1,026,735
9. MAINTENANCE AREA						
Access and hardstand, shop-office bldg.		94,875				
To completion			84,410			
10. VISITOR/NATURE/HISTORICAL/INTERPRETATION CENTER						
Office facilities in existing barn			100,000			
To completion				221,080		
11. LIMA DAY-USE AREA						
Access, parking, bridge improvement, utilities		394,600				
To completion			412,850			
12. GROUP CAMP						
Access, parking, utilities, barn			422,740			
To completion				406,600		
13. STAFF RESIDENCES						
2 residence units complete		264,615				
14/15						
16. ALBANY CAMPING AREA AND HUNTING ACCESS						
Bridge repair, utilities	136,850					
To completion			388,815			
17. LIMA CANOE ACCESS						
Access, parking, ramp; complete		119,594				
18. VALLEY OVERLOOK						
Access, parking, overlook; complete		127,938				
19. LANGERMAN'S FORD						
Access, parking, ramp; complete	31,050					
20. EAST PERIMETER HUNTING ACCESSES (5)						
Access, parking; complete	37,375					
21. BIG ROCK ACCESS						
Access, parking; complete	7,475					

AREA/FACILITY OR IMPROVEMENT	PHASES I	II	III	IV	V	VI
22. ENTRANCE AND INTERIOR CIRCULATION ROADS						
Improve Roads A and B	213,900					
Improve Road C		217,350				
Remove existing roads (onsite)		27,571				
Remove existing roads (offsite)		5,760				
Finish surface Roads A, B, & C				239,200		
23. LAKE FACILITIES						
Parking, docks, fishing platforms, utilities; complete		114,655				
24. TRAILS						
High use hiking trails (1st third)		65,040				
(2nd third)			65,040			
(completion)				65,041		
Remote use hiking/skiing trails (1st third)	74,483					
(2nd third)		74,483				
(completion)			74,483			
Equestrian/snowmobile trails (1st third)			39,391			
(2nd third)				39,391		
(completion)					39,390	
25. OTHER FACILITIES & IMPROVEMENTS						
Sand borrow area shaping & revegetation	34,500					
Wildlife habitat enhancement (1st third)	11,500					
(2nd third)			11,500			
(completion)					11,500	
Identification and entrance signs	1,840					
Activity, directional, miscellaneous signs		3,410				
Activity, directional, miscellaneous signs			3,000			
Activity, directional, miscellaneous signs				3,000		
Activity, directional, miscellaneous signs					3,000	
26. DETAILED DESIGN & CONSTRUCTION PLANS						
Phase I	71,263					
Phase II	217,256					
Phase III		276,809				
Phase IV			274,417			
Phase V				143,929		
Phase VI					77,230	
TOTAL EACH PHASE	1,238,692	3,173,550	3,965,211	3,802,828	1,996,283	1,029,735
GRAND TOTAL	$15,206,299					

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