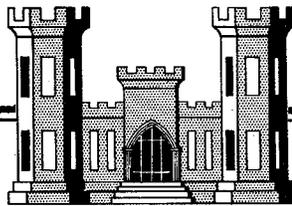


**REVISION OF
MASTER PLAN
FOR
RESOURCE MANAGEMENT**

**POOLS 11-22
9-FOOT CHANNEL NAVIGATION PROJECT**



**CHAPTER X
THE MISSISSIPPI RIVER
POOL 19**

**U. S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS
JANUARY 1970**

NCDPD-ER (20 Oct 71) 2d Ind
SUBJECT: Revision of Master Plan for Resource Management, Upper
Mississippi River, Pools 11-22, Nine-Foot Channel Navigation
Project

DA, North Central Div., CE, Chicago, Illinois 5 January 1972

TO: District Engineer, Rock Island

Forwarded for appropriate action.

FOR THE DIVISION ENGINEER:

James W. Gilland
JAMES W. GILLAND
Colonel, Corps of Engineers
Deputy Division Engineer for
Civil Functions



DEPARTMENT OF THE ARMY
NORTH CENTRAL DIVISION, CORPS OF ENGINEERS
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605

NCDPD-ER

20 October 1971

SUBJECT: Revision of Master Plan for Resource Management, Upper
Mississippi River, Pools 11-22, Nine-Foot Channel
Navigation Project

HQDA (DAEN-CWP-V)
WASH D.C. 20314

1. Chapters IX and X of the subject master plan (Pools 18 and 19) are forwarded, recommending approval, subject to the following comments.
2. The land use zoning and forestry management objectives indicated on the plastic overlays with the base maps are important features of this master plan. These overlays provide guides for achieving rational long range resource management on project lands and waters. Preparation of these land use zoning and forestry management overlays involved detailed analysis of resources and extensive coordination efforts which warrant special mention in the narrative portion of the plan. As indicated in Chapter I, General Information, the last chapter of the master plan, Chapter XIV, will contain a summary of the complete master plan. Chapter XIV should contain a section to emphasize the fact that the most significant long range value of this master plan can be realized through appropriate implementation of the land use zoning and forestry management features of the plan.
3. The chapters of the master plan covering the individual pools do not present sufficient data on recommended recreational facility expansion. It is suggested, therefore, that Chapter XIV should provide a consolidated detailed analysis of all works specifically recommended in Pools 11 thru 22, to include the following:
 - a. Existing Facilities Operated by the Corps.
 - (1) Provide site plans indicating expansion needed to meet increased demand, or modifications needed to improve site design or user control.

NCDPD-ER

20 October 1971

SUBJECT: Revision of Master Plan for Resource Management, Upper
Mississippi River, Pools 11-22; Nine-Foot Channel Navigation
Project

(2) Provide detailed cost estimates including costs of site preparation, landscaping and signs.

b. Dredging.

(1) Identify by pool and river mile all dredging proposed in support of recreational boating.

(2) Provide detailed information on length, width and depth of channel that should be provided and explain if dredge spoil can be used beneficially.

(3) Provide cost estimates for each site.

c. New Sites.

This master plan contains specific recommendations for development of new sites even though at this time no local agencies have indicated an intent to cost share. For these new sites, provide detailed cost estimates including special items of cost associated with development such as bridges, railroad crossings and fencing.

d. Programming.

Establish priorities for recommended improvement of existing facilities. Indicate which improvements will be programmed for development under current policy prior to 30 June 1976. (See OCE letter ENGOW-Y dated 5 August 1965, subject: Implementation of the Federal Water Project Recreation Act (P.L. 89-72) in Previously Authorized Projects.)

4. Items discussed or proposed in this master plan do not in any way conflict with the current concept of a National Recreation Area for the Upper Mississippi River. In fact, this master plan and the related resource maps could very well serve as the framework for a more elaborate development and management plan should the National Recreation Area become a reality.

FOR THE DIVISION ENGINEER:

2 Incl (trip)
as fwd sep

James W. Gilland
JAMES W. GILLAND
Colonel, Corps of Engineers
Deputy Division Engineer for
Civil Functions

DAEN-CWP-V (20 Oct 71) 1st Ind

SUBJECT: Revision of Master Plan for Resource Management, Upper Mississippi
River, Pools 11-22, Nine-Foot Channel Navigation Project

DA, Office of the Chief of Engineers, Washington, D. C. 20314 16 Dec 71

TO: Division Engineer, North Central

Chapters IX and X of the Master Plan, Pools 18 and 19, respectively, are
approved subject to comments contained in the basic letter.

FOR THE CHIEF OF ENGINEERS:

wd all incl


IRWIN REISLER
Acting Chief, Planning Division
Directorate of Civil Works



DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

IN REPLY REFER TO
NCRED-PB

15 December 1970

SUBJECT: Revision of Master Plan for Resource Management,
Upper Mississippi River, Pools 11-22, Nine-Foot
Channel Navigation Project

Division Engineer, North Central

1. Chapter X, Pool 19, of the subject master plan is submitted in accordance with Engineer Manual 1130-2-302.
2. This chapter of the master plan contains specific information concerning the administration and development of the resources within the pool.
3. It is recommended that chapter X of the master plan for resource management of the Mississippi River 9-foot channel navigation pools be approved.

2 Incls (6 cys)

1. Miss. R., Master Plan,
Chapter X, Pool 19
2. Miss. R., Master Plan,
Pool 19, Maps

JAMES E. BUNCH
Colonel, Corps of Engineers
District Engineer

cc: District File w/o incls
Engrg Div w/o incls
✓ Environ. Res. Sect. w/incls

REVISION OF MASTER PLAN
FOR
RESOURCE MANAGEMENT

POOLS 11 - 22
NINE-FOOT CHANNEL NAVIGATION PROJECT

CHAPTER X
THE MISSISSIPPI RIVER, POOL 19

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REVISION OF MASTER PLAN
FOR
RESOURCE MANAGEMENT

POOLS 11 - 22
NINE-FOOT CHANNEL NAVIGATION PROJECT

CHAPTER X
THE MISSISSIPPI RIVER, POOL 19

SECTION I

INTRODUCTION

As noted in chapter I, a Master Plan is developed to provide a sound instrument of guidance for the administration and operation of land and water resource projects; to assure sound resource management; and to coordinate activities with interested Federal, State, and local agencies. Pool 19, one of the series of navigation pools on the Upper Mississippi River, and within the limits of the Rock Island District, is treated under such master planning requirements. Plate I-1.1 locates the pool with reference to others of the navigational system in the Rock Island District, U. S. Army Corps of Engineers.



**MISSISSIPPI RIVER
9-FT. CHANNEL PROJECT
ROCK ISLAND DISTRICT**

IN 1 SHEET SHEET NO. 1
0 5 10 20
SCALE IN MILES

CORPS OF ENGINEERS, U.S. ARMY ROCK ISLAND DISTRICT
ROCK ISLAND, ILLINOIS JANUARY 1959

SECTION II

DESCRIPTION OF PROJECT

1. General. In a downstream sequence of navigation pools on the Mississippi River, pool 19 is the ninth of the 12 such units located in the Rock Island District of the Corps of Engineers. Although a segment of the navigation system on the upper river, the pool cannot be considered as part of the 9-foot channel construction project of the 1930's. Pool 19 was formed in 1913 by the construction of a privately-owned power dam at Keokuk, Iowa. At the same time private interests were required to construct the first lock at this site in order to pass river traffic. Ownership of the lock was transferred to the Federal Government free. In 1952, the Federal Government constructed a new 1200-foot lock at this site. The original pool extended upstream to Keithsburg, Illinois, a distance of 63 river miles. The construction of Lock and Dam No. 18, some 17 miles below Keithsburg, reduced the length of pool 19 to 46.3 river miles. Pool 19, therefore, can be considered as having been incorporated into the 9-foot channel navigation system rather than as a separate construction project. No land was acquired either in fee or easement by the Federal Government within the existing pool limits.

Beginning at Dam No. 19, river mile 364.2 at Keokuk, Iowa, the present pool extends to river mile 410.5, Dam No. 18, some 6½ miles upstream of Burlington, Iowa. Portions of Des Moines and Lee Counties border the Iowa shore and parts of Henderson and Hancock Counties represent the Illinois boundary.

2. Topography and geology. The upper portion of the pool is bordered by a broad flood plain which is protected by levees. At Burlington, Iowa, the western bank rises sharply, the river narrows considerably, and the levee-protected flood plain lies entirely in Illinois. Below Burlington the river again widens to reach a breadth of a full two miles in the vicinity of Nauvoo, Illinois. In this stretch the topography varies between highlands on both shores to highlands on one bank and a levee-protected flood plain on the opposite shore. In the reach of the pool from Nauvoo in Illinois, and Montrose in Iowa, and extending downstream to Keokuk, Iowa, and Dam No. 19, the stream enters the former Des Moines rapids. The valley is narrow and bordered by prominent steep bluffs.

In the upper 35 miles of the pool the river follows a course of a channel excavated in preglacial time. Deposits from glacial action partially filled the valley, raising the present river bed more than 100 feet above the preglacial channel bottom. Loess and decayed vegetable matter, leached from the highlands over the centuries and deposited on the bottomlands by periodic high water have established fertile soils on the flood plain.

A change in the river in the lower part of the pool dates from recent geologic time, similar to that noted in the upstream pool 15. The last ice sheet to cover the upper Mississippi Valley began to recede some 25,000 years ago, and had completely dissipated 12,000 years ago. The preglacial channel lay several miles west of the present valley between Montrose, Iowa, and Keokuk, Iowa. Deposits of the earlier glacial periods completely blocked this channel, forcing the main drainage to cut a new channel, which is the present valley. Thus, the new channel, from Montrose to the mouth of the present Des Moines River, became a "young" stretch of river. Known as the "Des Moines Rapids" to early navigators, the 15 mile extent was impassable even to boats of the shallow draft of that period in times of low flows.

Twenty-eight minor creeks in both Iowa and Illinois discharge into the pool. These creeks, while having rapid response to heavy rainfall and runoff, have little effect on pool levels in general. Major tributary streams, entering the pool, are the Henderson River in Illinois, and Flint Creek and Skunk River in Iowa. Tributary inflow from these streams, with the exception of Skunk River, results in only minor fluctuation of the pool level. Recurrent high water stages on any entering stream, however, may create localized siltation problems for resource management.

Numerous and sizeable islands are present within pool limits, nearly all of which are located within the upper third of the pool. None, however, are owned by the Federal Government.

Underlying rock strata throughout the pool are the cherty limestone of the Keokuk-Burlington formation.

3. Locks and Dam No. 19. The original 110-foot by 358-foot navigation lock at river mile 364.2, the dry dock, the powerhouse, and the dam were constructed by the Mississippi River Power Company, and completed on 12 June 1913.

Pursuant to the Act of Congress, Public--No. 65, approved 9 February 1905, said lock, drydock, and their appurtenances became the property of the United States in lieu of three locks, drydock and appurtenances owned and operated by the United States at the Des Moines Rapids Canal. All other structures remained under private control and operation, subject to certain regulations of the Secretary of the Army. 33CFR 207.310. The Corps of Engineers administered and operated the lock and drydock for navigation purposes and later established a repair and storage yard and an engineer depot on the adjacent shore.

A new lock, 110 feet wide, by 1200 feet long, constructed between the drydock and Iowa shore was completed in May of 1957. "New Lock 19", as the facility is known, replaced the small and totally inadequate original lock which is no longer in service. Construction of the new lock required the relocation of the storage yard and engineer depot. The repair facilities were abandoned and the storage yard and engineer depot were moved upstream adjacent to the LeClaire (Iowa) lock and canal near Lock and Dam No. 14. The drydock remains in use.

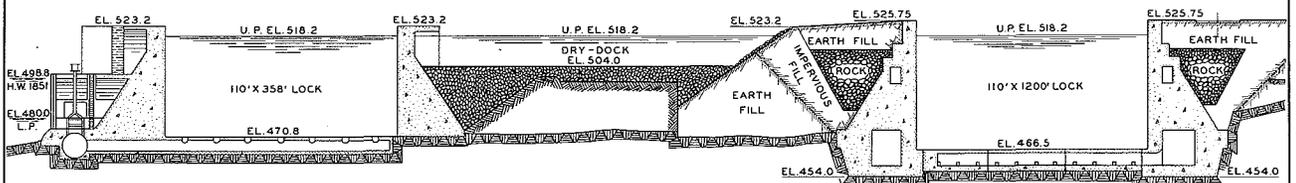
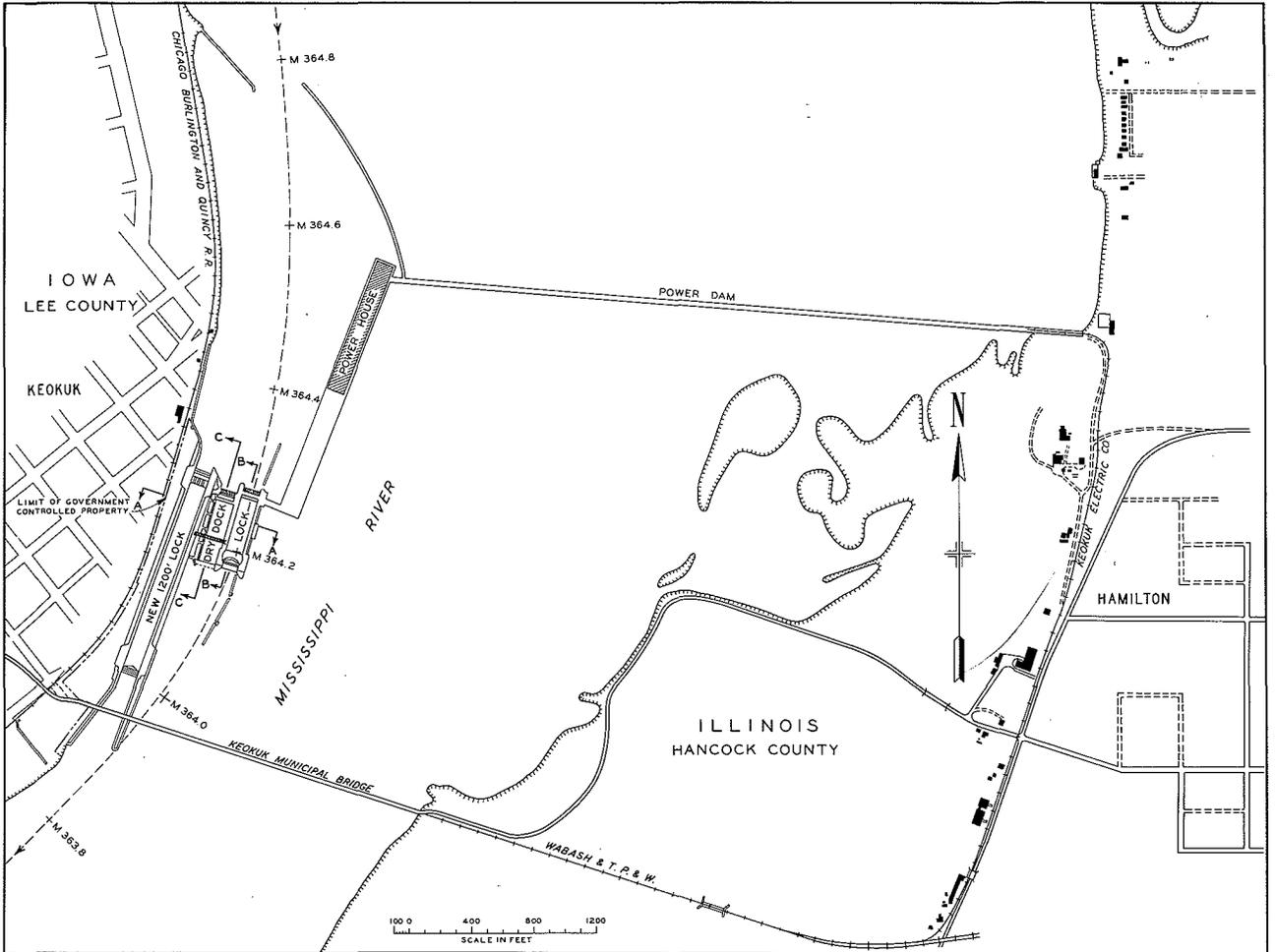
The control section of the dam, consists of 119 lift gates which are operated by the power company. The gates are opened to pass excess river flow at times when the flow exceeds the capacity of the water turbines which operate for power generation. The dam and appurtenant structures are now part of several power generating installations located in Iowa and Missouri owned by the Union Electric Power Company.

A plan and location of the navigation, drydock, and power installations appears on plate II-4.1, and on chart No. 65 of the Upper Mississippi River navigation charts, a part of this Master Plan.

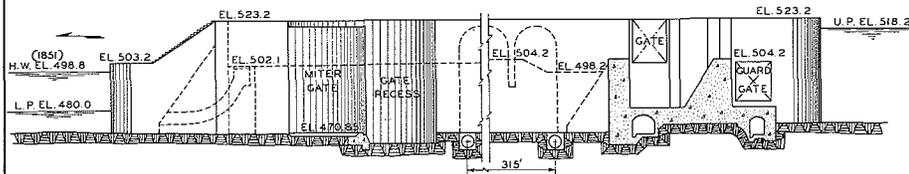
4. Pool 19. The pool is 46.3 river miles in length and is the longest pool of the entire 9-foot channel navigation system on the Upper Mississippi River. At flat pool elevations the head of the dam is 38.2 feet. This head differential is the greatest in the Rock Island District, and is exceeded only by the 49.2 foot head differential existing at the Upper St. Anthony's Falls lock in the St. Paul District. The drainage area at Dam 19 is 119,000 square miles. The pool varies in width from 2,000 to 11,000 feet under normal flow conditions. The water surface elevation (flat pool) at the dam has been established by the power company at 518.2 feet above mean sea level (1912 adj.). Low water of record,

since the dam became operable, was recorded in 1915 at elevation 512.4, or 5.8 feet below the established elevation. Highwater of record at the dam was reached on 16 April 1921 with an elevation of 518.79, or 0.59 feet above the established flat pool.

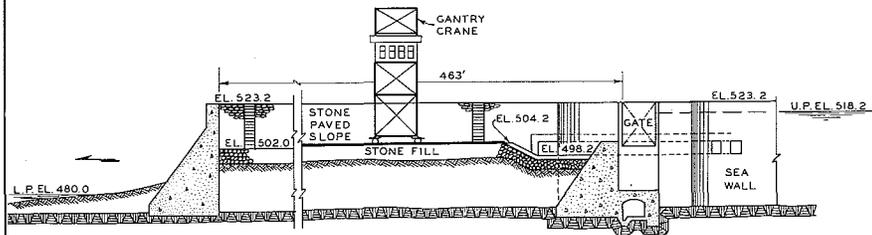
Maintenance dredging, all in the upper fourth of the pool, has amounted to 5,851,000 cubic yards of material since the pool was incorporated into the navigation chain. Spoil disposal could not be placed to enhance or create Federal recreational sites since no Federally-owned land exists within the pool limits except for the small tract associated with the lock and an area on the Illinois shore associated with Lock and Dam No. 18.



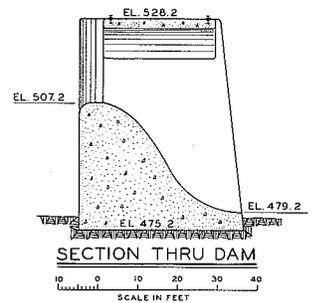
SECTION A-A



SECTION B-B



SECTION C-C



SECTION THRU DAM
SCALE IN FEET

- REFERENCES:
1. ELEVATIONS BASED ON MEAN SEA LEVEL DATUM 1912 ADJUSTMENT.
 2. RIVER MILEAGE ORIGINATES AT MOUTH OF OHIO RIVER.

**MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK, DRY-DOCK,
& POWER DAM NO. 19
AT KEOKUK, IOWA**

SCALE AS SHOWN
ROCK ISLAND DISTRICT
30 JUNE 1953

SECTION III

POOL RESOURCES

1. General. The existing physical resources of the pool are examined and analysed on only a limited basis since no land is owned in fee by the Federal Government within the pool except for a small area associated with the lock structure at the lower limits.

2. Water. As with all other pools of the Upper Mississippi River navigation chain, pool 19 contains the general characteristics of both a river and a shallow lake. At the established flat pool elevation pool 19 contains 30,845 surface acres.

The navigation channel within pool 19 contains 2,224 surface acres, or 7% of the pool area. The off-channel waters, amounting to 28,621 surface acres, or 93%, may present navigation hazards to pleasure craft in the extreme upper reaches. Substantial sedimentation throughout the pool has occurred.

3. Land. The only Government owned land in pool No. 19 consists of a narrow strip containing 2.88 acres located along the right bank of the river in the city of Keokuk, Iowa. This land was acquired as part of the lock site for New Lock No. 19. The Corps of Engineers administers this land. Non-Federal interests control 150 miles of mainland and 96 miles of island shoreline. The 102 islands located within pool waters are all under private ownership.

4. Vegetation. Islands are generally covered with dense growth, while shore lands vary between open, sparse, and dense stands. No tree specie associations have been defined since the Federal Government owns no land within the pool area except for the minor tract previously noted. Timber associations and species, however, are likely much the same as described in previous pools.

5. Wildlife. A wide variety of wildlife is attracted to and supported by the pool and its environs. No wildlife sanctuaries, however, have been established by either Federal or State agencies or organizations.

a. Birds. The pool area, as part of the "Mississippi Flyway", is host to some 19 species of ducks and 4 species of geese during the spring and fall migratory periods.

The vast water areas with an abundance of freshwater finger-nail clam are especially attractive to diving ducks and large flocks can often be observed from the highway at the bend in the river immediately below Nauvoo, Illinois. The wood duck finds ideal nesting habitat in the timber stands, especially on the islands, and occasionally a few pair of other species will nest in the area. The grebe, coot, American egret, bittern, gull, gray partridge, and numerous other shore and song birds are either resident or migratory visitors. Owls and red-tailed hawks are fairly common and the bald eagle is often observed.

b. Animals. The most common animal species are represented by raccoon, squirrel, weasel, skunk, opossum, woodchuck, rabbit, fox, beaver, mink, muskrat, and white-tailed deer. Otter and badger are a rarity and a coyote may occasionally be reported.

Pool 19 has the most stable water elevation of any pool within the Rock Island District because of the 38.2-foot head differential at the dam. Animal populations, therefore, are not so much affected by extremes in highwater stages as in other pools and so remain more stable in numbers. Most animal populations are relatively high in comparison with other pools because of the much larger area involved. Fire and the availability of food can, in some years, act to decimate certain species. Deer, occupying the timbered bottomlands of the river and its tributaries, are widely distributed but are not considered to be numerous.

Several species of harmless watersnakes are common and widely distributed in the pool area. Although now rarely encountered, the massasauga, timber, and canebrake rattlesnakes, and the copperhead were poisonous species fairly common to the area in the days of the early settlers.

6. Fish. Species taken from pool waters include walleye, northern, sauger, perch, bluegill, freshwater drum, crappie, white bass, channel catfish, bullhead, carp, buffalo, and paddlefish. No creel census is available in the sport fisheries classification to indicate the species most often taken by fishermen. Statistics for 1968 show a catch of 50,000 pounds in the sport fishery category and a take of 364,000 pounds in the commercial endeavor.

Both the sport and commercial catch are considered low in view of the pool size and the number of urban population centers located along the shores. While the reasons for this have not been examined, the lack of access points to pool waters, except at urban centers may be partly responsible.

No recreation areas, or launching ramps, are located on pool shores except at such city and town sites. The age of the pool may be a factor in low fish populations. There is a belief among some biologists that the larger fluctuations in pool levels, common to the other navigation pools, may be beneficial rather than detrimental to fish habitat conditions.

7. Recreation. No recreational areas have been established by the Corps of Engineers on the land associated with Lock No. 19.

8. Historical and archaeological. The settlement known as Flint Hills, later to become Burlington, Iowa, was neutral ground where Indians of many tribes came to secure flint for arrow and spear heads. The present Black Hawk Rock is the vantage point from which Black Hawk, great war chief of the Sauk and Fox tribes, is said to have exhorted his Indian people to follow him in the ill-fated war of 1832. Black Hawk is known to have traveled widely from his home village of Saukenuk (Rock Island) in his efforts to arouse the people of the various Indian villages along the river to take to the war path and drive out the white intruders. Possibly Chief Keokuk, Indian diplomat and Black Hawk's rival who realized the futility of the war chief's plan, was present to voice his opposition as he did in his own village when Black Hawk arrived seeking warriors.

The land area which later became the State of Iowa was a part of the District of Louisiana in 1804, following the Louisiana Purchase of 1803; a part of the Territory of Louisiana in 1805; a part of the Missouri Territory in 1812; and in 1821 was left unorganized when Missouri was admitted to the Union. The first time the American flag was officially raised on the soil of the future 29th state was in 1805 when Lt. Zebulon Pike arrived at the site of Burlington on an expedition to locate suitable fort sites along the Mississippi River. In 1806, Pike began his westward trek of exploration of the Louisiana Purchase and discovered the Colorado mountain peak now named for him.

The Iowa area became a part of the Michigan Territory in 1834, a part of the newly-created territory of Wisconsin in 1836, and in 1838 the Territory of Iowa was organized. Statehood, however, was not accomplished until 28 December 1846. Burlington was the site of the second assembly meeting of the Territory of Wisconsin. The Blue Grass trail, leading westward from Burlington, became the route of the Chicago, Burlington and Quincy Railroad in the 1840's.

Chief Black Hawk could not escape his white enemies even after his death in 1839. His body was stolen from the grave near Iowaville and the bones were later surrendered by a Quincy, Illinois, dentist who said he had acquired them in St. Louis. The mortal remains of the great war chief were placed in a Burlington museum and were destroyed when the building burned in 1855.

Fossils of sea animals known as crinoids are found in Burlington limestone beds which were deposited in the Cambrian period of some 550,000,000 years ago when much of the world's present land area lay under shallow seas.

The Skunk River takes its name from the Indian term "Chiquaqua" which has the same meaning. The name Chicago is also derived from this word.

The original Fort Madison, for which the present city is named, was the first military outpost to be located on the west bank of the Mississippi River north of St. Louis. The fort, named for President James Madison, was constructed in 1808 to protect a trading post under the provisions of the 1804 treaty negotiated by William Henry Harrison. Attacked many times by Black Hawk and his warriors, the fort was abandoned and burned by its garrison in 1813 leaving the entire upper Mississippi region without defense. Commercial excavations in 1965 located foundations of the original structure.

Devils Creek (river mile 377.5), with a drainage area of only 145 square miles, was the locale of one of the most intense rain storms ever experienced in the State of Iowa. Discharge has been estimated by the U. S. Geological Survey at approximately 80,000 cubic feet of water per second from the 10 June 1905 storm. Some 32 important bridges were destroyed and serious land erosion resulted.

One of the largest Sauk and Fox Indian villages was Quashquema located on the Illinois shore at a wide, scenic bend on the great river. In 1823 Captain James White arrived and purchased the site from the Indians for 200 bags of corn. Other settlers were attracted and, in 1830, the town of Venus and a post office were established. The town of Commerce was founded in 1834 adjacent to Venus and soon absorbed the original settlement.

Also in 1830 a new town was being established in Missouri, some 140 miles southwest of Venus. Called Adamondi-Ahman by Joseph Smith, its founder, the residents of the new settlement followed the teachings of the Book of

Mormon written by an alleged prophet of the 4th century A.D. The unorthodox beliefs and practices of the new movement earned the animosity and mistrust of other citizens and in 1838 the Mormons, as they came to be known, were ordered to leave Missouri.

The exiles arrived in Commerce, Illinois, in 1839 and bought several hundred acres of adjoining land. A year later the name of the thriving town was changed once again and became Nauvoo, a supposed Hebrew term meaning "Beautiful Place" according to Mormon authorities. The Mormon movement and Nauvoo grew rapidly and within a few years the population of 15,000 was more than double that of a settlement on the marshes of Lake Michigan called Chicago.

In 1841 a great temple was begun, an architectural marvel for its day. Completed for use in 1842, the temple was not dedicated until 1846. The edifice was destroyed by an arsonist in 1848 and a tornado in 1850 leveled what had remained standing of the ruins.

The turbulent times bred outlawry on a large scale and Nauvoo became a rendezvous for the criminal element. The Mormons were unjustly blamed for much of the crime and the prophet Joseph Smith and his brother Hyrum were arrested and taken to nearby Carthage, Illinois. Here, while supposedly under the protection of State troopers, both men were murdered by a mob which stormed the jail in June 1844.

Open conflict between Mormons and Gentiles - as the Mormons called non-believers - followed, and in 1846 the people of the prophet Joseph Smith were expelled from Illinois. Led by Brigham Young, who had 70 wives and 56 children and who had become leader of the movement after the death of Smith, the Mormons crossed the Mississippi River and moved across the Territory of Iowa and the western prairies to finally find their promised land on the shores of Great Salt Lake in the future State of Utah.

A French society known as the Icarians, hearing of the all but deserted city of the Mormons, migrated to Nauvoo to develop a communal plan of living. Finding the communistic ideology impractical, the Icarians divided the property and settled to a democratic type of existence.

Rumors that gold was left secreted in the walls of homes in the all but deserted city led to the destruction of many fine buildings in the years that followed. However, the historic area is now in the process of restoration by

cooperative efforts of present day Mormon church bodies, the State of Illinois, and other interested groups.

Brigham Young became the first governor of the State of Utah and is also known as the Father of Irrigation. His full-length statue stands in the Hall of Fame in Washington, D. C.

Another citizen of Mormon Nauvoo was Jonathan Browning, gunsmith, who invented the repeating rifle. His son, John M., became famous as the inventor of the Browning automatic rifle.

Opposite Nauvoo, on the Iowa shore, lies the town of Montrose. At this point the original channel of the Mississippi River continued to the southwest and the present Des Moines River valley. The last ice sheet of some 25,000 years ago blocked the channel at this point forcing the river to find a new path to the south. The new and shallow stretch of turbulent river water became known as the Des Moines rapids to early settlers and boatmen.

A young West Point graduate Lt. Robert E. Lee, accompanied by 2nd Lt. Montgomery C. Meigs, made a survey on the Des Moines rapids in 1837. In 1838 the first rock excavation for channel improvement on the Upper Mississippi River was performed on the Des Moines rapids under the supervision of Lt. Lee.

In 1866-67 a 7.6-mile lateral canal with three locks was constructed in the river along the Iowa shore to bypass the rapids which were impassable in periods of low flows. The canal and rapids were obliterated when Lake Keokuk was created above the lock and power dam in 1913.

Burial mounds of prehistoric peoples are located on high grounds of the pool area and are classified as the Hopewell, Oneota, and Effigy Mound Builder cultures. Evidence of these early inhabitants is found along the Mississippi River from St. Paul, Minnesota, to Baton Rouge, Louisiana, as well as in the Ohio River valley. Indians of historic times along the river are referred to as the Woodland or Canoe people as compared to those of western interior lands, or Plains Indians. These tribes included the Sauk, Fox, Mascoutin, Illinois, Chippewa, Miami, Ottawa, and Potawatomi members of the Algonquian linguistic stock.

SECTION IV

FACTORS AFFECTING RESOURCE USE

1. General. Pool 19 differs from other pools in the system inasmuch as it existed prior to the construction of the 9-foot channel project. The major portion of the pool was incorporated into the canalization project and the upper limits became a part of pool 18. The lower area follows a "new" stretch of channel formed when the river was forced into another course in the prehistoric times of the last glacial period. The resulting rapids existed until deeper water was created by the power dam.

Plate IV-2.1 graphically portrays the commercial activities at the locks over a period of nearly two decades. Passages prior to 1957 reflect the use of the original lock, and since that time traffic through the new 1200-foot lock, the largest in the Rock Island District. The original lock has not been in commercial use since completion of the new and longer lock.

2. Zone of influence. The primary zone of influence is assumed to be an area two counties in width, extending inland approximately 50 miles, and following both sides of the river the length of the Rock Island District. The total 1960 census population for all counties contained within this zone has been tabulated in chapter I. It is considered as impractical, however, to attempt a population calculation by pools since a given pool spans portions of several counties.

Three population centers of significance with light industry are located on the shores of the pool - Burlington, Iowa, population 33,285 (1960 census); Ft. Madison, Iowa, population 15,247; and Keokuk, Iowa, population 16,316. Other urban centers within the pool limits include: Dallas City, Illinois - 1,276; Pontoosuc, Illinois - 210; Nauvoo, Illinois - 1,039; Montrose, Iowa - 632; and Hamilton, Illinois - 2,516.

3. Economic conditions. Lands bordering the pool are given entirely to agricultural pursuits except at the several areas of population concentration and in the lower reach of former rapids where a very narrow flood plain exists. Commercial docking facilities are located at river miles 405.2, 404.5, 404.4, 404.1, 403.6, and 399.4 - Burlington, Iowa; river mile 404.25 - Gulfport, Illinois; river mile 390.4 - Dallas City, Illinois; river mile 390.0 - on the Iowa shore;

river mile 389.0 and 381.0 - Ft. Madison, Iowa; river mile 385.1 - Niota, Illinois; river mile 376.4 - Nauvoo, Illinois; river mile 374.9 - Montrose, Iowa; and at river mile 371.1 - Galland, Iowa. At river mile 379.5 - Ft. Madison, Iowa, an authorized commercial harbor is presently in the pre-construction planning stage.

The pool area is extremely deficient in recreational offerings, the only developments being within the limits of the several urban concentrations. The State of Illinois Highway Department has placed a few picnic tables along the narrow and scenic strip of land between State Highway 96 and the water's edge in the old rapids stretch, but no other rural use has been made of the vast potential existing.

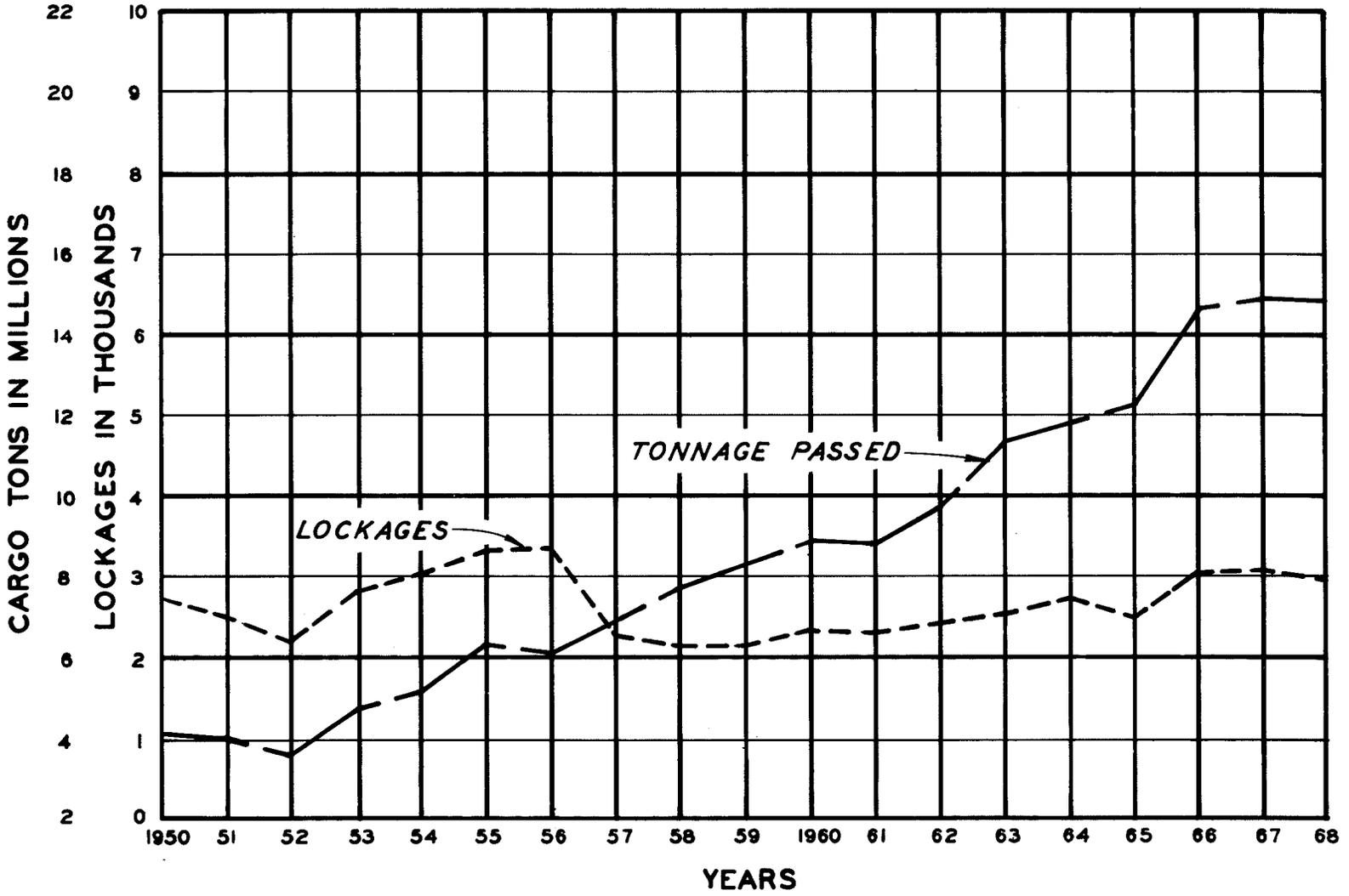
Since the Federal Government owns no shore or island lands within the pool limits, except for a minor tract associated with the lock, there is a possibility that scenic values may eventually be destroyed by industrial developments. The possibility of a full 12-month navigation season, presently under study, may generate further industrial interest.

4. Accessibility. Scheduled railroad passenger service is available to Burlington, Iowa; Dallas City, Illinois; and Ft. Madison, Iowa. Service in Illinois is on east-west lines and in Iowa from north-south as well as east-west points. Scheduled bus transportation serves only the major cities on the Iowa shore.

The three major cities - Burlington, Ft. Madison, and Keokuk in Iowa - have scheduled air passenger and freight service at uncontrolled-traffic airports. No private landing fields exist on either side of the pool. Private flying and air taxi services use existing facilities at the established airport locations.

Road access to the river exists at 8 points in Illinois and at 6 locations in Iowa. In addition, unimproved or graveled roads and highways closely follow pool shores in several stretches and provide ready access to the water in numerous places. Levees in some areas, largely in the upper half of the pool, are a barrier to shoreline access by automotive transportation.

An excursion boat, berthed on the Illinois shore between Nauvoo and Hamilton, operates during the summer season on Lake Keokuk.



LOCK NO. 19

Three bridges span pool waters - a high-level highway bridge and a draw-span railroad bridge at Burlington, Iowa, and a draw-span combination highway and railroad bridge at Ft. Madison, Iowa.

The Great River Road, being planned to eventually follow both sides of the river from near Canada to the Gulf of Mexico, closely follows the shore along much of pool 19 affording some of the most scenic driving on the upper river. In other areas, especially the leveed sections, the road is far removed from the shore and no view of the river is possible. The future may see the levees widened to accommodate the road and other segments constructed and relocated to realize the scenic purpose throughout the length of the pool.

5. Existing recreational facilities.

a. The Corps of Engineers has established and maintained 25 recreational areas on Federal lands throughout the Rock Island District. None, however, are located within the limits of pool 19 since no Federally-owned land exists except for the minor area associated with the lock.

b. Non-Federal recreational facilities are located on the Burlington, Iowa, riverfront at: river mile 404.7 - a marina; river mile 404.6 - a boat club; river mile 404.5 - a boat house; river mile 404.2 - an outboard motor club; river mile 404.1 a public use area; and also at river mile 404.1 - a boat house. Two public parks overlook the river in the downstream portion of the city.

A municipal boat launching ramp is located on the riverfront of Dallas City, Illinois, at river mile 390.6.

Two recreational boat harbors are located within the city limits of Ft. Madison, Iowa - one at river mile 383.8 and another at river mile 382.0. Two parks - one on the riverfront - are maintained by the city.

A boat harbor is located at Montrose, Iowa, and a yacht club at the upper limits of Keokuk, Iowa. No rural sites have been developed within the pool limits as complete recreational areas. The several picnic tables placed along State Highway 96 by the Illinois Highway Commission between Nauvoo and Hamilton, Illinois, are the only facilities to be found outside city and town limits.

6. Water quality. While the waters of the pool are subjected to excess siltation and both municipal and industrial waste, the quality of the water is still considered satisfactory for most forms of water-oriented recreation. Drainage from natural tributaries, man-made drainage ditches, and levee district pumping stations will continue to add considerable quantities of agricultural pollutants. Without adequate controls future industrial development may also contribute to deterioration of the water quality.

7. Climatic conditions. The pool area receives an average annual precipitation of 35 inches and has a normal growing season of 183 days extending from early April to mid-October. The mean annual temperature is 51° with a summer average of 74° and a winter average of 27°. Temperature extremes of 111° (1936) and -27° (1905) have been recorded through the observation period ending in 1964. The prevailing winds in summer are from the south and southwest shifting to northwest during the winter months. Navigation was normally halted by ice in late December and resumed in early March. Increasingly powerful towboats in recent years, however, have tended to extend navigational activities. Studies are presently being conducted towards ways and means of providing a full 12-month navigation season.

SECTION V

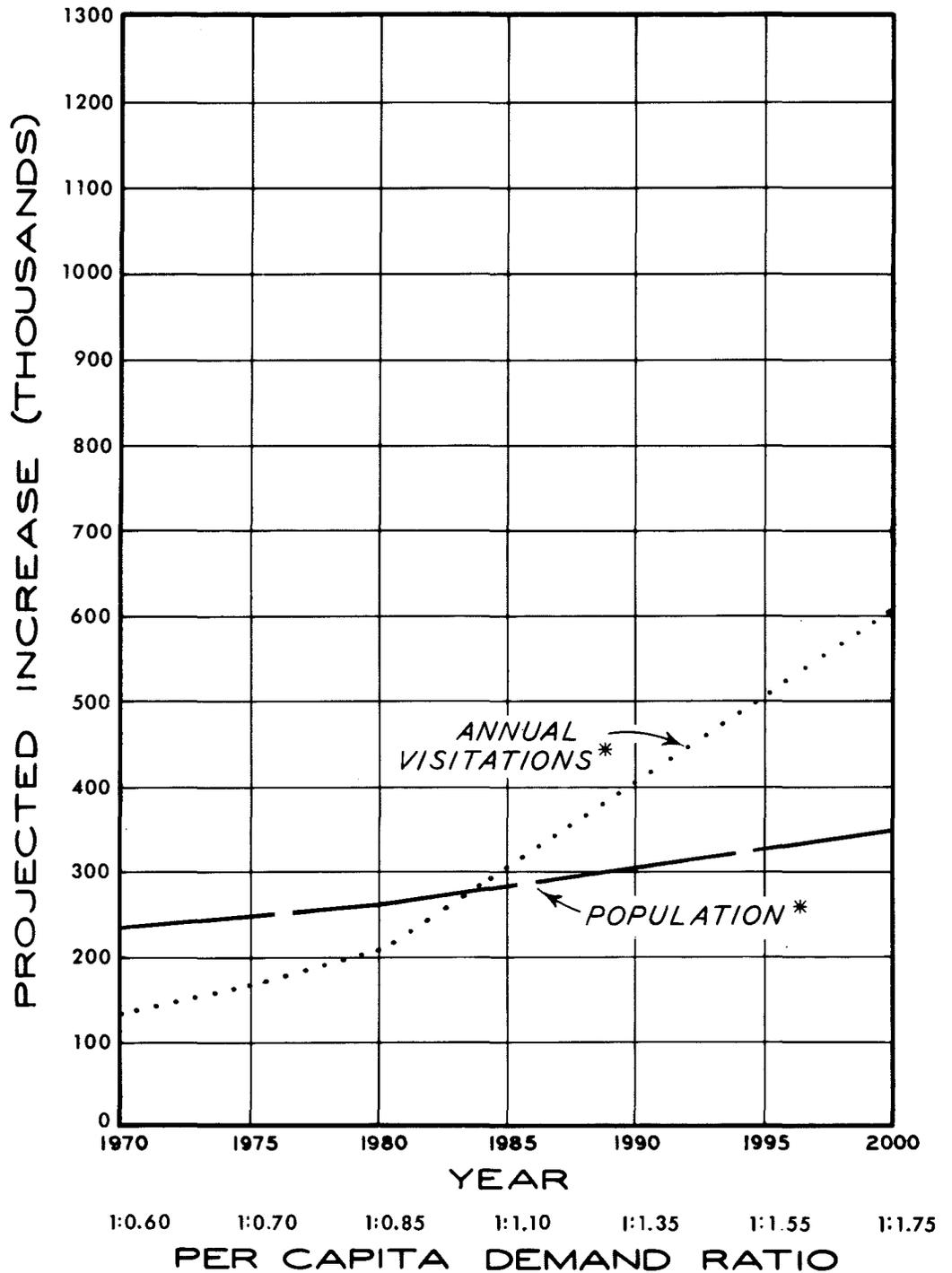
CURRENT AND ANTICIPATED RECREATIONAL USE

Pool 19, the longest of the 12 navigation pools within the limits of the Rock Island District, Corps of Engineers, ranks 11th in terms of public recreational attendance. 1968 visitations totaled 140,000 and ranged from a high of 22,400 in the summer months of July and August to a low of 4,400 during the winter months of December through March. Peak day attendance was 6,500.

Plate V-1.1 graphically presents anticipated population increases and expected corresponding recreational demand within the primary zone of influence - an area two counties in width (approximately 50 miles) extending inland on each side of the pool. The per capita use ratio is calculated on past reported visitations and projected 1970 population and is expected to hold relatively constant for the immediate future. The ratio increase, following the year 1985, is based on the assumption of additional recreational development.

Plate V-1.2 tabulates facilities developed and maintained by non-Federal entities such as States, Counties, municipalities, or private individuals. Non-Federal installations considered are only those located immediately adjacent to the river.

Future facility requirements are based on anticipated population increases and expected public demand and participation, and are calculated from criteria established in ER 1130-2-312. On this basis all requirements are not presently being satisfied. Since no Federal land is available within the pool limits, future demand can only be satisfied by increased non-Federal developments and expansions.



* PRIMARY ZONE - AREA TWO COUNTIES IN WIDTH (APPROX. 50 MILES) EXTENDING INLAND ON EACH SIDE OF POOL.

POOL 19
MISSISSIPPI RIVER
PROJECTED
POPULATION & VISITATIONS

POOL 19
1969 EXISTING AND PROPOSED FACILITY DATA

	EXISTING FEDERAL FACILITIES	EXISTING NON-FEDERAL FACILITIES	TOTAL EXISTING FACILITIES	RECOMMENDED FEDERAL FACILITIES	PROPOSED NON-FEDERAL FACILITIES	TOTAL PROJECTED FACILITIES	* TOTAL REQUIREMENTS FOR ANTICIPATED DEMAND			
							1970	1980	1990	2000
<u>DAY - USE</u>										
PARKING (UNITS)		15	15				35	54	102	151
PICNIC TABLES		15	15				35	54	102	151
FIREPLACES		0	0				17	27	51	75
POTABLE WATER		1	1				1	2	3	5
SHELTERS		0	0				10	16	30	44
<u>BOAT LAUNCHING</u>										
PARKING (UNITS)		150	150				30	50	100	150
RAMPS		6	6				3	5	10	15
CONCESSIONS, FUEL, ETC.		6	6							
<u>SANITATION</u>										
PIT TOILETS		0	0				2	2	4	6
FLUSH TOILETS		12	12							
TRAILER STATIONS		0	0							
<u>CAMPING</u>										
PARKING SPURS (GRAVEL)		0	0				18	29	54	80
PICNIC TABLES		0	0				18	29	54	80
FIREPLACES		0	0				18	29	54	80

NOTES:*** BASED ON ER 1130-2-312 CRITERIA:**

- 1 PICNIC TABLE PER 4000 ANNUAL VISITORS
- 1 PARKING SPACE PER TABLE
- 1 FIREPLACE PER 2 DAY-USE PICNIC TABLES
- 1 FIREPLACE PER CAMP SPUR
- 1 SHELTER PER 225 WEEK-END DAY VISITORS
- 1 LAUNCHING RAMP PER 40,000 ANNUAL VISITORS
- 10 CAR-TRAILER PARKING SPACES PER RAMP
- 2 PIT TOILETS PER 3000 WEEK-END DAY VISITORS
- 1 CAMP SPUR PER 7500 ANNUAL VISITORS

1. No Federal land exists within the pool limits except minor areas associated with the lock.
2. No supervised river swimming areas are in operation.
3. Road access to the river exists at 14 rural locations within the 150.3 miles of mainland shoreline.

SECTION VI

POOL RESOURCE MANAGEMENT

1. General. The stated purpose of a Master Plan requires analysis and examination of the existing physical features of the pool as well as proposals for the utilization and development of the scenic, biologic, and recreational potential. A management program is based on orderly and controlled protection and development of the existing resource.

In pool 19, however, practically no application of such criteria can be made since Federally-owned lands are all but non-existent. Protection of aesthetic values at present is the responsibility of the States and counties bordering the pool shores.

2. Land use zoning. Section VI, chapter I, describes and outlines the land use classifications established to meet the criteria of a Master Plan development.

The 2.88 acres of Federal land associated with New Lock No. 19 is considered as recreation-developed since large numbers of spectators gather to watch locking activities. No transparent overlay sheet is provided in the Master Plan for this minor area.

3. Water zoning. Detailed water zoning is not a matter of consideration in the Master Plans for any of the pools at the present time. Although the Federal Government, through the Corps of Engineers, owns practically no mainland property within the pool limits, control of water areas is properly under the jurisdiction of the Corps. While regulatory measures may become necessary at some future date, the recreational use of pool waters at the present time is very low even though the pool stretch is the longest on the upper river.

The 30,845 surface acres of the pool are considered in terms of channel and off-channel waters, the channel being an area 400 feet in width, having a minimum depth of 9 feet, and following a meandering course the length of the pool. Off-channel waters, comprising 93% of the surface area, vary in depth and may present navigational hazards to small boats in the upper pool reaches of shallow cover over submerged wing dams and stump fields. Published water depths in such areas would not hold constant because of constantly changing physical conditions.

4. Timber management. There is no Government timber involved in pool 19.

5. Wildlife management. Inasmuch as neither the Corps of Engineers nor the Bureau of Sport Fisheries and Wildlife owns or manages any lands through the main body of the pool, wildlife management is the responsibility of the bordering States and counties.

6. Shoreline ownership. Of the 246.3 miles of shoreline contained within the pool limits, approximately 0.3 mile is owned and controlled by the Federal Government and administered by the Corps of Engineers. No other Federal agency is concerned with shoreline, mainland or island, within the pool area. Non-Federal interests control 150 miles of mainland and 96 miles of island shoreline.

7. Additional recreational developments.

a. Corps of Engineers. No recreational sites are planned or recommended on the minor Federal tract existing within the pool.

b. Bureau of Sport Fisheries and Wildlife. No fee land is administered by the Bureau or operated under out-grant from the Corps of Engineers.

c. States.

(1) Iowa. The Iowa Conservation Commission has no present plans to locate and develop recreational facilities within the pool confines.

(2) Illinois. The Department of Conservation has no present plans to locate sites within the pool limits. The Highway Department has placed a number of picnic tables along the river shore between Nauvoo and Hamilton, Illinois. No additional developments are presently planned.

d. Counties.

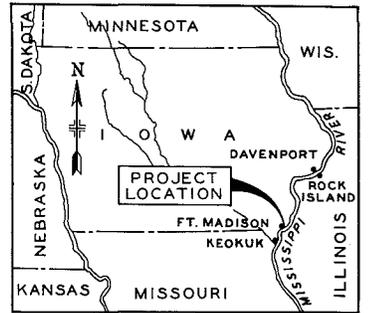
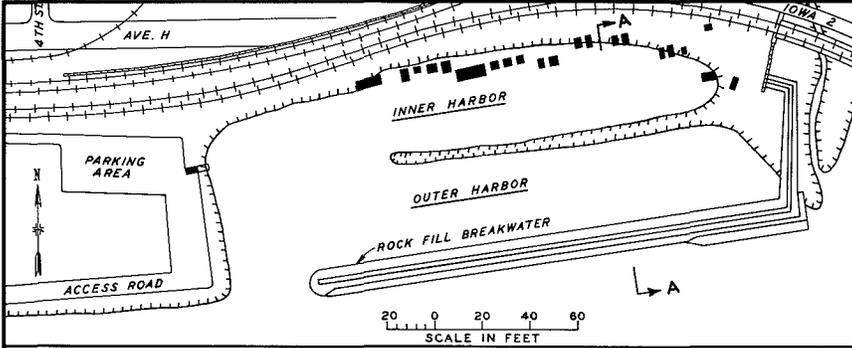
(1) Des Moines and Lee (Iowa). The County Conservation Boards have no present plans to locate and develop recreational areas on pool shores within their respective boundaries.

(2) Henderson and Hancock (Illinois). Although State law permits the formulation of county conservation boards, neither of these counties have organized such an entity.

Union Elect

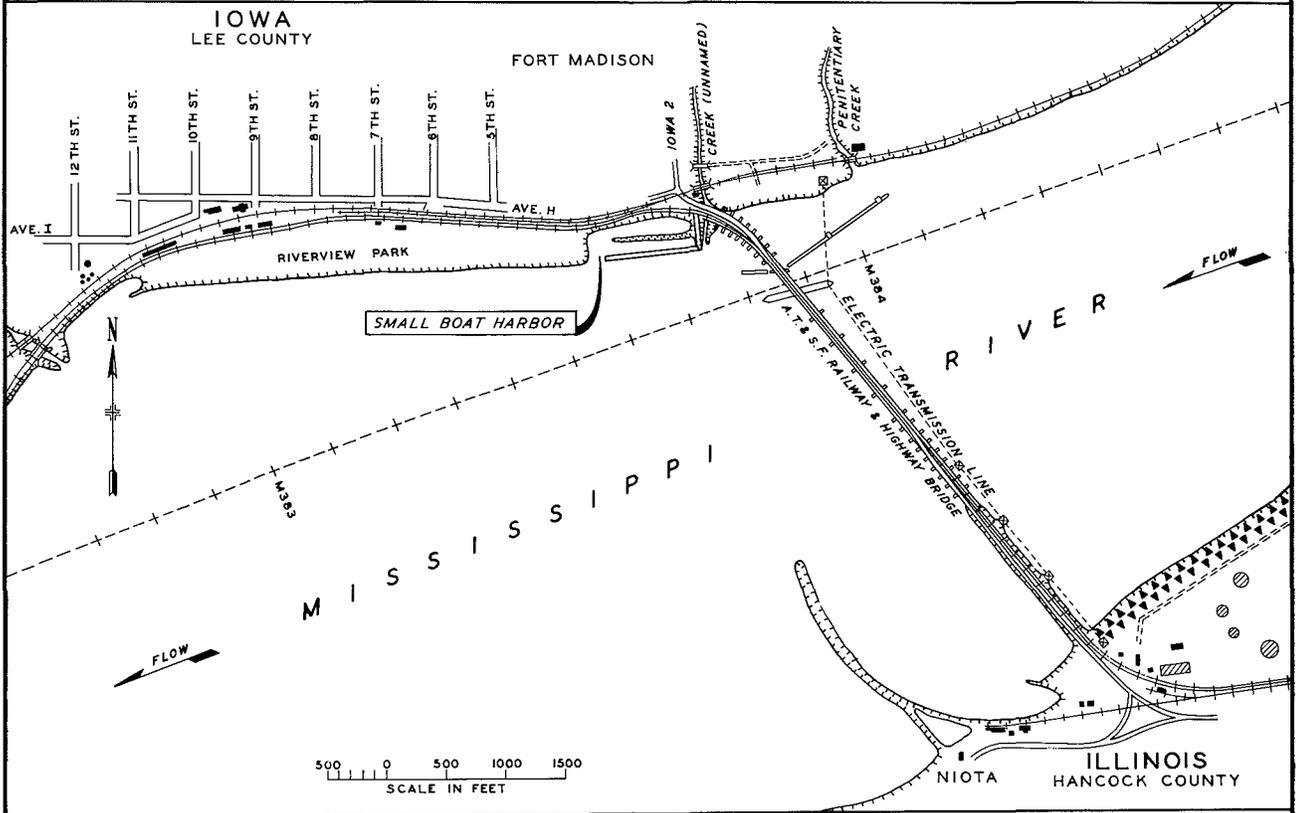
e. Municipal. Riverfront recreational areas exist at Burlington, Ft. Madison, Montrose, and Keokuk in Iowa, and at Dallas City and Hamilton in Illinois. No additional recreational areas are known to be underway or planned by the several municipalities.

Included at Ft. Madison is a small-boat harbor, plate No. VI-3.1, authorized by the Federal River and Harbor Act approved 30 June 1948. Construction was completed in May 1961.

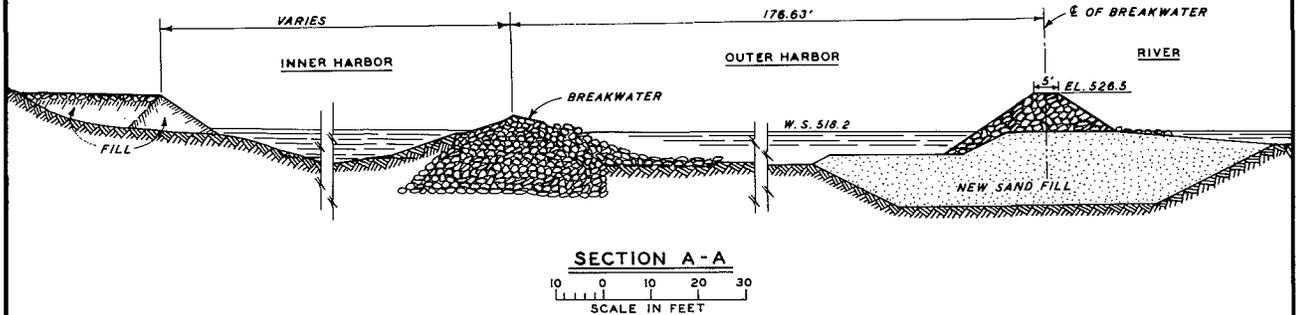


PLAN

VICINITY MAP



LOCATION MAP



NOTES:

1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL DATUM (1912 ADJUSTMENT).
2. RIVER MILEAGE IS MEASURED FROM THE MOUTH OF THE OHIO RIVER.
3. AN AUTHORIZED COMMERCIAL HARBOR AT THE WEST END OF RIVERVIEW PARK IS IN INACTIVE STATUS.

MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
FORT MADISON, IOWA

SMALL BOAT HARBOR

SCALE AS SHOWN

ROCK ISLAND DISTRICT

30 JUNE 1961

SECTION VII

OPERATION AND MAINTENANCE

1. Manager-Ranger. The need for and suggested duties of Manager-Rangers to patrol and supervise the various pools is outlined in chapter I, section IX, paragraph 2. The services of such a specialized position may not be indicated in pool 19 since Federal land and timber are practically non-existent and recreational boating activities are relatively low. Periodic examinations to control unauthorized use of shoreline docks and to locate potential navigational hazards and pollution areas could be of value, however. The upper half of the pool area might be assigned a Ranger operating primarily in pool 18 and the lower half made the responsibility of a Ranger charged with similar duties in pool 20.

2. Recreational facilities maintenance. No construction or maintenance responsibilities apply since no facilities are maintained on Federal property by the Corps of Engineers.

SECTION VIII

SUMMARY AND RECOMMENDATIONS

1. General summary. Pool 19, although the longest on the upper river and with some of the greatest potential, is very deficient in recreational development. The only established facilities are located on the riverfronts of seven of the eight cities and towns located on pool shores. The only rural facilities are the few picnic tables placed by the Illinois Highway Department along the shore between Nauvoo and Hamilton, Illinois. The pool ranks in second place on the upper river in terms of water area and approximately 70% of the shores are unencumbered by a levee system, a recreational problem in some of the upper pools.

2. Recommendations.

a. The value of a Manager-Ranger, as discussed in the previous section, should receive study and consideration. While the need for such services is not as great as in the upper pools of the Rock Island District system, the growing importance of water pollution abatement may warrant the establishment of such a position for pool 19.

b. With the constant growth of population and the industrial economy in the United States, the shores of pool 19 may, in the future, become as heavily industrialized as upstream pool 15. The potential exists in the form of broad water expanses, established urban communities, a relatively long navigation season possibly to be extended to full 12-month activity, and suitable land features. The ecological and scenic values and the recreational potential of pool 19 should be preserved for the use of future generations.

(1) The Federal Government should acquire especially scenic tracts along the shores and encourage the States and counties to provide road access to such locations.

(2) The Federal Government should acquire certain island and sand bar properties for future spoil disposal areas and it should develop and create future recreational areas.

(3) The States or counties should be encouraged, with the cooperation of the Corps of Engineers, to develop master plans within their respective boundaries to control and insure an orderly balance between industry and the growing need and demand of the public for recreational space.

SECTION IX
REVIEW OF PLAN

1. Real Estate Division.

Pursuant to paragraph 5b of ER 405-2-835, the Master Plan was submitted for review and the Real Estate Division concurs that the material was prepared in accordance with sound real estate management and utilization practices.


C. E. KELLEY, Attorney
Chief, Real Estate Division

2. Operations Division.

Sections of this Master Plan, which have a direct or indirect bearing upon the operation and maintenance of the Mississippi River, have been coordinated with the Operations Division.


ROBERT E. CLEVENSTINE
Chief, Operations Division