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COMMERCIAL AND RECREATIONAL NAVIGATION
EXECUTIVE SUMMARY

April, 1978

Foreword

The information presented in this summary document has been based on the comprehensive, "Task Force Report on Commercial and Recreational Navigation", prepared by and filed with the Iowa Natural Resources Council. The reader should refer to the task force document for more detailed information.

INTRODUCTION

Iowa is fortunate that it is bordered by two major rivers, the Mississippi and the Missouri. These two rivers provide water for many beneficial uses including navigation, commercial river transportation, and recreational boating. This report examines the needs and conflicts associated with these two navigation uses. The overall goals of this important beneficial-use category are (1) to enhance economic development by using commercial river transportation for economic efficiency and, (2) to enhance the quality of the border river corridors for recreational boating and other uses, by the management, conservation, restoration, or improvement of the quality of natural and cultural resources and ecological systems.

This report examines the Mississippi and Missouri Rivers where navigation for commercial and recreational purposes interface. Because there are both physical differences and variation in traffic volumes, this report on navigation on the Mississippi and Missouri Rivers is divided into two parts.

MISSISSIPPI RIVER

THE RESOURCE

The Upper Mississippi River navigation project (St. Louis to Minneapolis) made possible low-cost water transportation to and from Iowa's eastern border. The navigational system, constructed and maintained by the U.S. Army Corps of Engineers, consists of a series of locks and dams, wing-dams and levees.

Iowa has 11 locks and dams along its eastern border (Figure 8-1), beginning with Lock and Dam No. 9 near Harper's Ferry and ending with Lock and Dam No. 19 at Keokuk. The locks and dams are located in fairly straight stretches of the river at irregular intervals varying from 5.5 to 49.2 miles. The average pool length is 25 miles. The dams provide more stable pool levels and associated depths of flow for commercial navigation, and offer year-round slack water pools for pleasure boating, fishing, swimming, and waterfowl hunting. The authorized nine-foot channel for navigation is maintained by the Corps through the dredging of shallow areas; the shoaling is caused by the river as it deposits silt and sand in undesired areas in the main channel.

There are 63 barge terminals operating on the Mississippi River along Iowa's border (Figure 8-2). Grain, coal, and petroleum are the principal commodities shipped and received at Iowa terminals. Most grain is collected from interior Iowa

Figure 8-1 LOCKS AND DAMS ON UPPER MISSISSIPPI RIVER

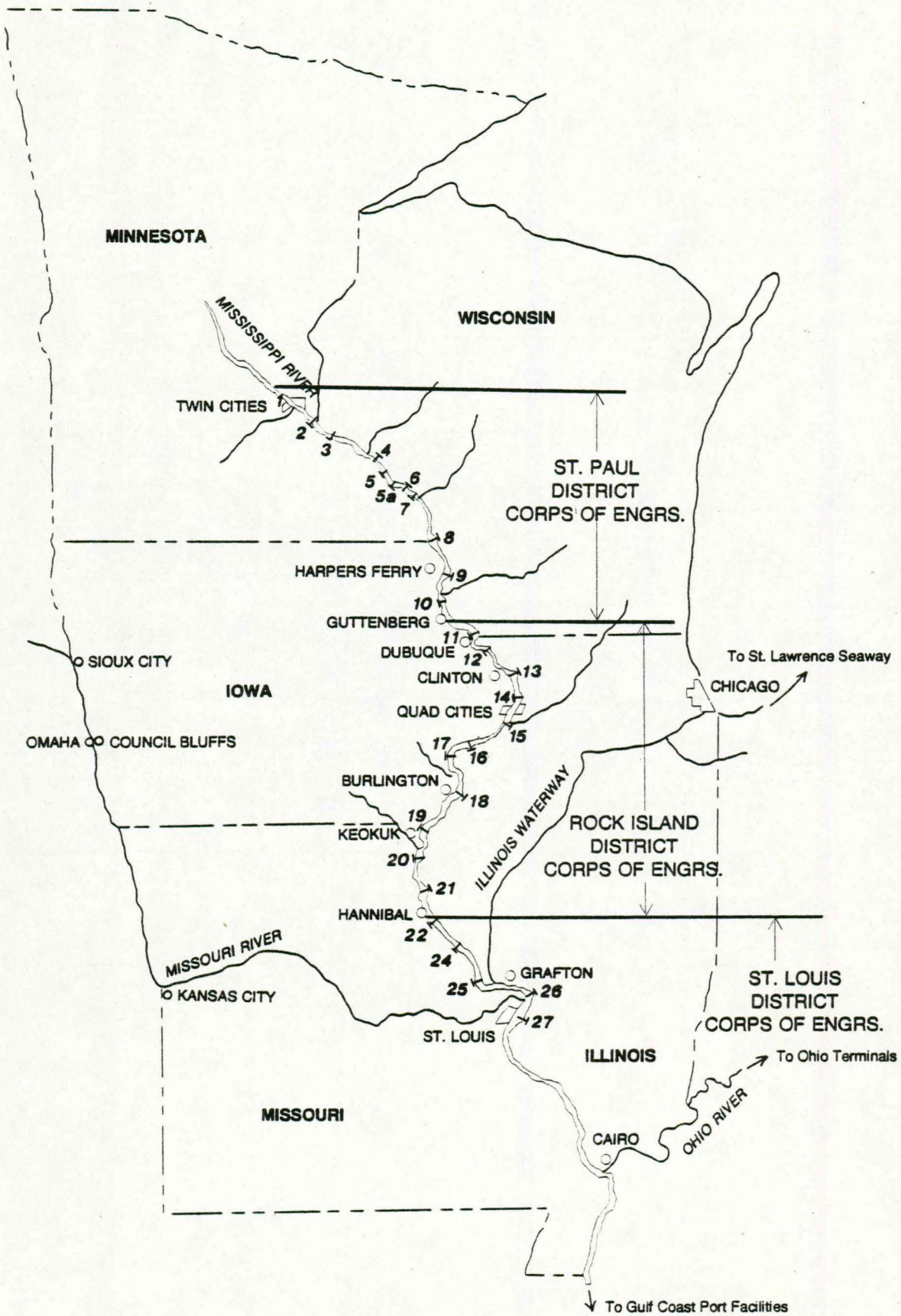
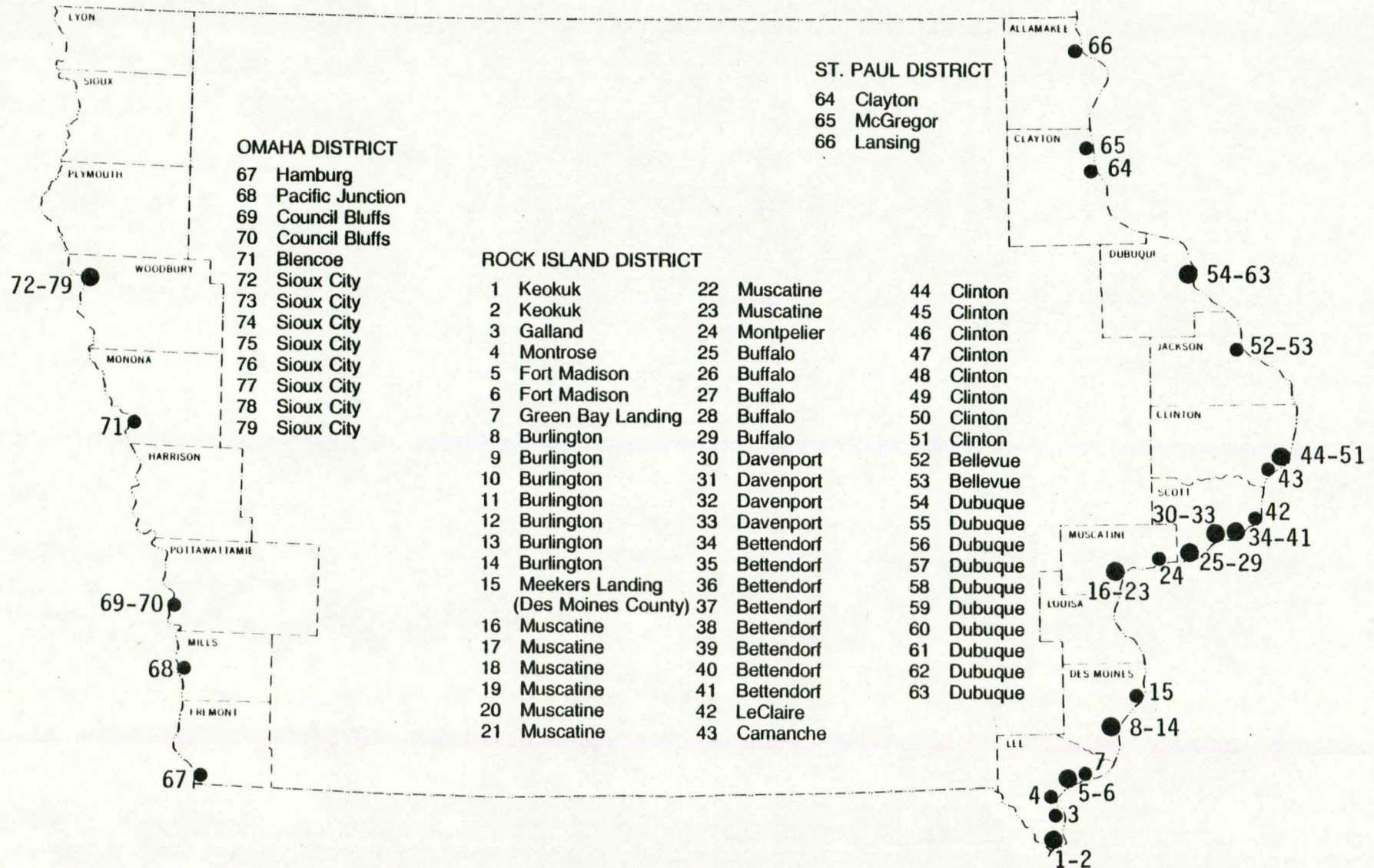


Figure 8-2 LOCATIONS OF THE BARGE TERMINALS ALONG THE BORDER STREAMS



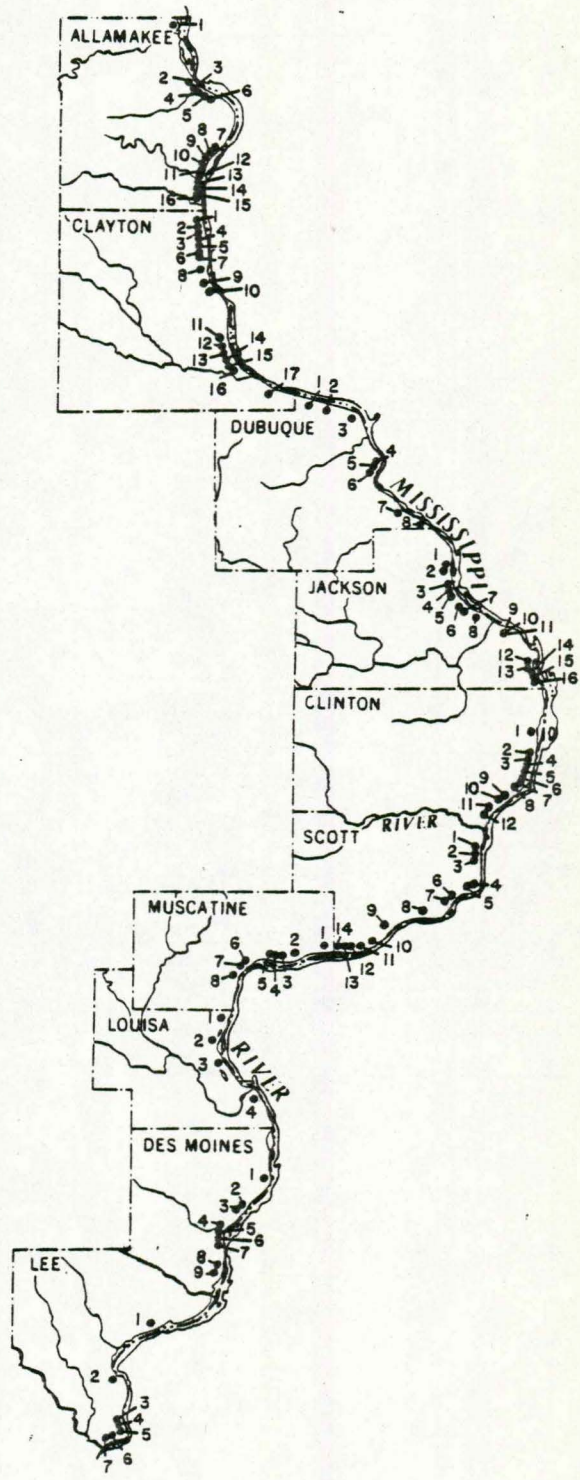
shipping points and barged to New Orleans. The majority of the coal is inbound and received by power plants adjacent to the Mississippi. The terminals handling inbound petroleum are located mainly in the metropolitan areas of the Quad Cities.

Besides the benefits to commercial interests, the federal land acquired for the project and the construction of the locks and dams have provided a vast resource base for recreation and fish and wildlife interests. There are eight federal fish and game refuges and 16 state game management areas totaling 226,000 acres along the Upper Mississippi River. Along the Iowa shoreline, there are 58 public boating access areas available to make the 184,000 acres of water area accessible to Iowans for boating and recreational use (Figure 8-3). A side benefit of the Corps' dredging operations is the creation of sandy islands that form some of the most widely used recreation areas along the river. However, detriments include sedimentation and loss of backwater areas essential to fish and wildlife.

Figure 8-3 MISSISSIPPI RIVER ACCESS AREAS

Map No.	Name of Area	Public Access	Private Access
ALLAMAKEE COUNTY			
1	New Albin	●	
2	Lansing Harbor		●
3	Sweeney's Livery		●
4	Public Ramp	●	
5	Verdon's Boat Rental		●
6	S & S Rentals		●
7	Water Patrol Station	●	
8	Babes		●
9	Delpey's Marina	●	
10	Riverview	●	
11	Doc's Dok	●	
12	Boardman Marina	●	
13	Taylor's	●	
14	Wine's Cabins	●	
15	Hartman's	●	
16	Nobles Island	●	
CLAYTON COUNTY			
1	Marquette Dock		●
2	Marquette Ramp	●	
3	Pink Elephant	●	
4	Boatels	●	
5	Mississippi Marina	●	
6	McGregor City Ramp	●	
7	Art's Landing	●	
8	Sny Magill	●	
9	Public Ramp	●	
10	Bill's Landing	●	
11	Public Ramps (2)	●	
12	Winegar's	●	
13	Fisheries Man. Station	●	
14	Kenney's	●	
15	Benskin	●	
16	Camp Hide-A-Way	●	
17	Earthhams	●	
DUBUQUE COUNTY			
1	Anthony's—Wahpeton	●	
2	Finley's Landing	●	
3	Mud Lake	●	
4	Dubuque Dock Comm.	●	
5	Dubuque Marina	●	
6	River View Park	●	
7	Massey Slough	●	
8	Nita-Ho Valley	●	
JACKSON COUNTY			
1	Spruce Creek Harbor	●	
2	Doc's Marina	●	
3	Ike's Landing	●	
4	Bellevue	●	
5	Point Pleasant	●	
6	Shady Haven	●	
7	Waters Station	●	
8	Pleasant Creek	●	
9	Fish Lane Landing	●	
10	Ditch Landing	●	
11	Smith Creek Landing	●	
12	Pipeline Landing	●	
13	Esmay Slough	●	
14	Sabula Public Use	●	
15	Ehis Harbor		●
16	Lower Sabula	●	

Map No.	Name of Area	Public Access	Private Access
CLINTON COUNTY			
1	Bulger's Hollow	●	
2	Boyd's Marina		●
3	Clinton Mun. Boat Ramp	●	
4	Star's Marina		●
5	Latika Marina		●
6	Riverview	●	
7	Anchorage	●	
8	Clinton Mun. Boat Ramp	●	
9	Camanche Harbor		●
10	Camanche	●	
11	Rock Creek	●	
12	Hansen's Dock	●	
SCOTT COUNTY			
1	State Conservation Com.	●	
2	Al's Boat Dock		●
3	Princeton Public Area	●	
4	LeClaire Legion	●	
5	LeClaire Public Access	●	
6	Green Gables		●
7	Lock No. 14 Access	●	
8	Bettendorf Access	●	
9	Davenport Public Ramp	●	
10	Credit Island	●	
11	West Lake	●	
12	Grantville Marina		●
13	Buffalo Public Access	●	
14	Buffalo Shores Access	●	
MUSCATINE COUNTY			
1	Montpelier	●	
2	Shady Creek	●	
3	Fairport Landing		●
4	Ikes	●	
5	Water Patrol Station	●	
6	Muscatine Boat Harbor	●	
7	Muscatine Pow. Bt. Club	●	
8	Muscatine Public Ramp	●	
LOUISA COUNTY			
1	Kilpeck	●	
2	Big Timber Access	●	
3	Toolesboro	●	
4	Ferry Landing	●	
DES MOINES COUNTY			
1	Public Ramp (4th Pump. Sta.)	●	
2	Coleman Marina		●
3	Tama Beach	●	
4	Meyers Marina		●
5	Yetter Marina	●	
6	Burningtong Boat Storage	●	
7	Municipal Dock (N.)	●	
8	Municipal Dock (S.)	●	
9	Cascade Boat Club		●
LEE COUNTY			
1	River View Marina	●	
2	Riverview Park	●	
3	Keokuk Boat Launch	●	
4	Langford's Marina	●	
5	Keokuk Yacht Club		●
6	Art's Gas Dock		●
7	Keokuk Municipal	●	



RESOURCE CONSIDERATIONS AND PROBLEMS

Commercial Use

The Upper Mississippi River has long been one of the nation's leading waterways in terms of annual traffic and importance to the surrounding area. Between 1955 and 1975, freight traffic in the Rock Island District (which extends from Guttenburg, Iowa, to Hannibal, Missouri,) grew from 7.7 to 24.5 million tons, representing a 3.3 percent average annual growth rate (Table 8-1). Grain and related commodities are becoming the largest commodity group on the river, attributable for the most part, to growing U.S. exports of agricultural commodities and the establishment of post-war government food programs. Waterborne movement of coal also experienced a steady increase and is expected to increase even more in the future because of national energy policies. Although petroleum tonnage doubled during this period, it did not keep pace with other commodities.

In 1975, 8.6 million tons of commodities were handled at Iowa terminals (Table 8-2). Most commercial users of the Mississippi River are located within 150 miles of the river and two-thirds of this volume is transported by truck. Approximately 47 percent of the total tonnage through Iowa barge terminals is grain or grain products. Coal and petroleum

Table 8-1

Summary of Barge Commodity 1955-1975
Rock Island District

Year	Coal	Petroleum	Grain	All Others	Total
1955	2,161,943	2,800,230	1,248,541	1,513,131	7,723,845
1960	3,542,159	3,021,800	2,235,042	1,764,535	10,653,536
1965	4,606,210	2,720,880	4,907,250	2,128,265	14,362,605
1970	6,401,355	2,708,721	9,022,300	4,278,094	22,410,470
1975	4,932,500	2,100,053	12,054,324	5,418,246	24,505,123

Table 8-2

1975 Summary of Barge Commodity
Mississippi River Volume and
Distribution at Iowa's Barge Terminals

COMMODITY	VOLUME		DISTRIBUTION (%)		
	Tons	Percentage Of River Movement	Transported By Truck	Transported By Rail	Produced or Consumed at Terminal
Grain	4,135,500	48	79.7	20.0	0.3
Coal	1,225,000	14	3.7	0	96.3
Petroleum	1,076,400	13	96.2	0	3.8
Other	2,116,500	25	58.0	11.0	31.0
TOTAL	8,553,400	100	65.5	12.4	22.1

accounted for about 25 percent of the total tonnage originating and terminating at Iowa barge terminals during 1974 and 1975.

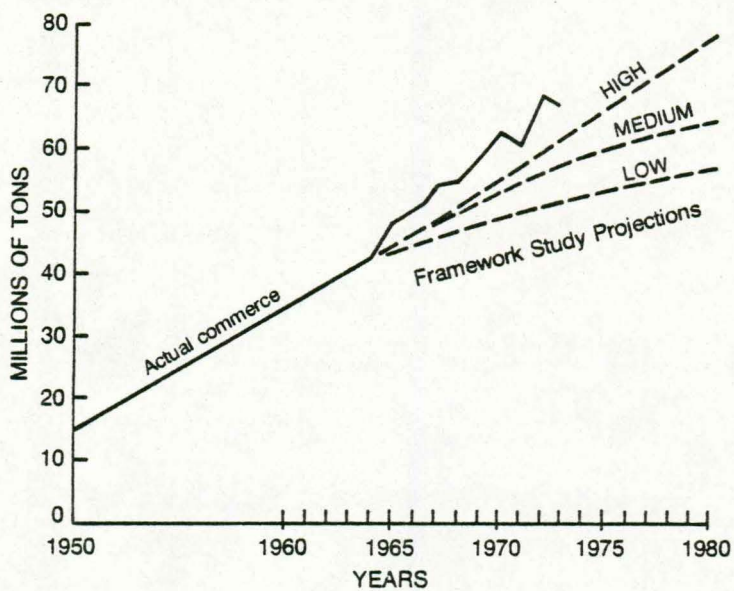
Prospective Traffic

The Upper Mississippi River Comprehensive Basin Study (UMRCBS) developed low, medium, and high range projections of total commerce for 1980, 2000, and 2020. The projections include the section of the Mississippi from Cairo, Illinois to Minneapolis, Minnesota. Figure (8-4) shows that actual waterborne commerce has exceeded even the high growth range of the UMRCBS projections from 1965 to the present, and that grain is projected to be the most important commodity shipped by barge.

The future of bulk commodity movements on the Upper Mississippi is difficult to predict since national policy and regional marketing patterns will affect commodities handled by barge. Export demand for gains will significantly affect transportation needs. The U.S. exports about 20 percent of its corn, 50 percent of its soybeans, and two-thirds of its wheat. It appears that downstream movement of western coal will increase. The complex system of rates and costs between transportation modes will be important in determining how commodities move.

The Mid-America Ports Study, funded by 17 states (including Iowa) and the Maritime Administration, reports river traffic will double by the year 2000. The study will provide traffic predictions for river segments when it's completed later in 1978.

Figure 8-4 TOTAL WATERBORNE COMMERCE-
UPPER MISSISSIPPI RIVER



Source: Upper Mississippi River Basin Commission. 1975.
Decision Oriented Information Base, p. 45.

Commodity	1960-64 Average	1980 High	2000 High	2020 High
Selected Grains	10.1	25.0	45.0	75.0
Bituminous Coal	6.3	10.5	13.5	15.0
Petroleum and Petroleum Products	11.6	10.7	19.3	28.7
Cement, Stone, Sand and Gravel	4.2	7.6	11.2	13.9
Industrial Chemicals and Sulphur	2.2	6.3	15.5	31.5
Agricultural Chemicals	1.2	8.0	17.5	28.0
Iron Ore and Iron and Steel	2.6	5.6	10.1	15.0
Other and Miscellaneous	2.0	4.3	7.9	12.9
Total	40.2	78.0	140.0	220.0

Source: U.S. Army Engineer Division, North Central. 1970. Upper Mississippi River Comprehensive Basin Study, Appendix J.

Lock and Dam Maintenance

The present system of locks and dams must be maintained in quality operational condition because of their tremendous economic importance to Iowa. The U.S. Army Corps of Engineers operates and maintains the 9-foot channel on the Upper Mississippi River. A breakdown at one lock could cause traffic delays along the entire waterway; therefore, they must be kept in quality operational condition.

Channel Maintenance

Dredging is necessary at problem areas to maintain the authorized 9-foot channel. However, recent dredging and dredge disposal practices have been criticized because of their adverse effect on the surrounding natural environment. The loss of productive fish and wildlife habitat can be partially attributed to both effects of initial dredge material placement and indirect effects resulting from secondary movement of the material. The Great River Environmental Action Team (GREAT) has been studying the impacts of navigation channel maintenance on the resources of the Upper Mississippi River. GREAT is studying the possible beneficial uses of dredged material. Through implementing GREAT's recommendations, the Corps of Engineers has been minimizing the adverse environmental impacts of dredging.

Increasing the Capacity of the Waterways System

Commercial navigation growth places demands on the Upper Mississippi 9-foot channel project in addition to system maintenance. The continuing trend toward larger, more efficient tows and increased traffic requires continuing waterway improvements.

To accommodate future increases in the capacity of the waterways system, a number of nonstructural and structural alternatives should be considered. Improved efficiency at the locks would increase the capacity of the system. Efficiency methods to be analyzed include: traffic control scheduling, use of helper boats at locks, and improved scheduling of equipment to avoid movement of empty barges. Extension of the navigation season, another nonstructural alternative, also would increase the capacity of the system. However, there are problems associated with winter navigation related to the natural ecosystem, the activities of man, and equipment problems with breaking ice. The Corps of Engineers is restudying some possible alternatives and the environmental impacts of an extended season.

Replacement of locks with improved facilities has been cited as a means of accommodating future increases in traffic. One important prospect, Locks and Dam 26, has been disputed. The Inter-Agency Resource Council, made up of the heads of various Iowa agencies dealing with natural resources and members

of the Governor's staff, investigated and studies the Locks and Dam 26 project and concluded that:

The proposed replacement of Locks and Dam No. 26 is in the best interest of Iowa and that a recommendation should be made to Congress for authorization and funding, and wishes to add further that it is opposed to increasing the navigation channel depth from 9 to 12 feet.

This represents Iowa's position, and it was distributed through the Governor's office to appropriate state and federal agencies and to Iowa's Congressional delegation.

Environmental Concerns of Increasing Waterways Systems

There is a need to document the adverse environmental effects of increased traffic. For example, the detrimental effects of increased channel usage on aquatic life due to pollutants may be less than previously believed because of aeration resulting from barge movement, and the fact that many pollution problems may have been caused by industrial wastes that are now being treated before discharge to the river. Any decision to support or oppose a project that might increase traffic should be based on both sound environmental and economic considerations.

Terminal and Fleeting Areas

Mississippi River commerce projections indicate a need for improved harbor facilities and fleeting areas. The Iowa Department of Transportation recognizes the need to assist local,

private, and governmental organizations in formulating plans for ports, terminals, and other river related facilities that should reduce overall shipping costs. The criteria for selecting port development areas include: 1) Present economic effect on the area, 2) accessibility to supporting transportation systems, 3) efforts already undertaken in attaining financing or viability studies, 4) environmental impact, and 5) physical characteristics of the river.

Adequate fleeting areas and terminals are important to commercial navigation; hopefully, with proper planning, new facilities can be accommodated. One alternative is to keep certain areas free for commercial development and retain others for recreational and fish and wildlife purposes. Another alternative is to make a coordinated effort to shift non-river businesses from riverfront land to provide those businesses needing terminal and fleeting space with river access or to shift this land into recreational use.

User Fees

The National Water Commission pointed out that the present cost-sharing policy is one of the major deficiencies in the inland waterway program. Waterway improvements, operation, and maintenance costs traditionally have been borne by the Federal government. However, many people feel that the policy should be adjusted so those who directly benefit from low cost transportation facilities pay.

The Iowa Department of Transportation investigated the question of user fees. They reviewed the Corps of Engineers accounting records to determine the costs of operating and maintaining a 300-mile section of the Mississippi River. The DOT analyzed the accounts and separated costs into channel and lock maintenance components. They concluded that a system of user charges based on a fuel tax and locking fee, computed from actual Corps data is realistic.

There is some real concern over the possible adverse effects of a user charge on Iowa. The Iowa Development Commission feels that a user charge should be opposed because it might increase barge rates. Higher transportation rates may be reflected in lower crop prices and higher fertilizer costs to Iowa farmers. Higher coal, oil, and utility prices also may be experienced. A balanced transportation system including associated, equitable rate schedules and/or appropriate user fees for all modes is needed.

Any decision on user fees for navigation will ultimately be made by the United States Congress. Studies, like the Iowa Department of Transportation's, will provide the information necessary to make an informed decision.

River Tolerance Index

To assist in managing our rivers and related resources, the feasibility of developing a simulation model should be

investigated. Such a model would continually examine the rivers' numerous uses, their interaction, and their effects. The system could consider levels of commercial and recreational traffic, other beneficial uses of water, water and air quality standards, and economic factors, such as costs of lock delays for commercial tows. This would permit a river tolerance index to be assigned to a specific reach, as an indication of the amount of commercial and recreational navigation growth that could be allowed if selected environmental impact levels are not to be exceeded. The Department of Transportation envisions that this system would alert Iowa to potential river navigation and environmental problems and conflicts.

Recreational Use

The Mississippi River is probably Iowa's single largest water oriented recreational asset. In 1976, over 11 million user days were recorded in the 11 pools that border Iowa. Pool No. 13 in the Clinton-Quad Cities area experienced the heaviest use pressure in 1976 with more than three million user days. Previous to 1976, Pool No. 19 in the Burlington-Ft. Madison-Keokuk area experienced the heaviest use pressure of all Iowa pools. The pools with the least use were numbers 10 and 15, the latter being in the heavily industrialized Quad City vicinity.

Besides supporting heavy use for recreational boating, the river attracts many other outdoor enthusiasts. Camping was

the favorite activity of most (55 percent) of the users. Fishing (50 percent) was the second most participated-in activity and boating and waterskiing were third (32 percent). Minor activities include picnicking, swimming, sightseeing, and both waterfowl and wildlife hunting.

A Corps of Engineers' survey showed that 45 percent of the users travel less than 25 miles to use a pool; 15 percent travel between 26 and 50 miles. According to the 1970 Participation Survey of Iowans, 55 percent of the people boating on the Mississippi River are on their vacations, while 40 percent are on a 1-day outing and about 5 percent are on an overnight trip.

In 1976, 57,000 pleasure craft locked through the 11 locks which border Iowa, which is 32 percent of the total lockages. Lockage trends are not well established for the entire river or at individual facilities. Lack of established trends probably indicate a number of factors are involved in determining recreation lockage. Over two-fifths of all recreation craft using the locks are of the runabout class; about one-third are some type of cruiser with overnight facilities; and nearly 16 percent are of the houseboat class. Few fishing boats (3 percent) are presently using the locks; most put in at a local access and fish within that specific pool.

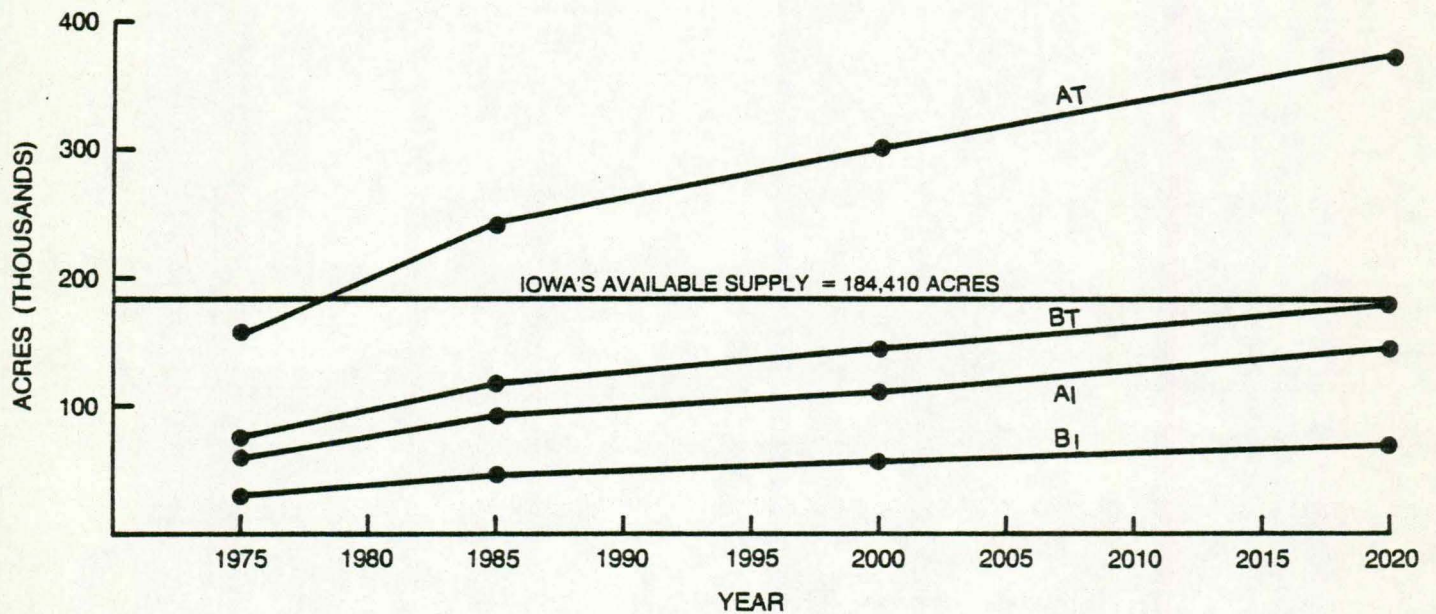
Prospective Traffic

The vast recreation boating potential (184,410 acres along Iowa's eastern border) of the Mississippi must be shared with residents of the bordering states. Projections of the demand for both Iowa and the total region are shown in Figure 8-5. Iowans represent approximately 39 percent of the total boating demand. On a peak day in 1975, Iowans needed between 30 and 62 thousand acres for boating on the Mississippi River. The total region's demand for boating acres could equal the supply by 1979, according to GREAT space standards. If the Iowa Conservation Commission (ICC) space standards are used, then the supply will not be fully utilized until after 2020. The realistic demand for boating acres will probably be somewhere between these two sets of projections. There undoubtedly will be tremendous pressure on specific segments of the river, especially those reaches of the river near urban areas.

Recreational Boating Access

The lack of adequate recreational access is creating a bottleneck in meeting increased boating demand. The river manager can either distribute use by providing more access points or by enlarging and improving existing access sites. The ICC is looking toward the provision of a combination of high-density and low-density recreational use would be located near urban areas and would be designed to accommodate high-use pressure while the more environmentally fragile areas would be designed to accommodate only limited use.

Figure 8-5 PROJECTED DEMAND FOR BOATING ON THE MISSISSIPPI RIVER



KEY

- AT Total Demand Based on Great River Environmental Action Team's Outdoor Recreation Space Standards
- BT Total Demand Based on Iowa Conservation Commissions' Outdoor Recreation Space Standards
- AI Iowa's Demand Based on Great River Environmental Action Team's Outdoor Recreation Space Standards
- BI Iowa's Demand Based on Iowa Conservation Commission's Space Standards

Note: Total Demand is based on U.S. Army Corp of Engineers Statistics and includes recreational boaters from the entire region. Iowa's demand is based on Iowa Conservation Commission Survey of recreational use by Iowans.

Private boating sites (access ramps, harbors, marinas, etc.) open for public use should be encouraged to meet a portion of the demand. But, private development should be coordinated with a total resource management plan so as to protect environmentally fragile areas. These private operations provide both a service to the recreational user and income to the state in the form of taxes. Small Business Administration loans, guidance and informational services from public recreation agencies, and prudent business management techniques are methods to increase the viability of private operations. The public sector must thoroughly explore the implications of the expansion of public facilities and not jeopardize a viable private operation that is currently serving access needs in a satisfactory manner.

Navigation and Recreational Boating Support Facilities

Another public need is for a system of sanitary sewage dumping stations, for both commercial and recreational traffic along the river. Currently, there is a definite lack of dumping stations which encourages dumping of wastes in the river. The Corps of Engineers' authorization does not include recreation enhancement solely for recreational needs. This prevents it from doing certain activities solely for recreation. Its authorization should be expanded to include recreation enhancement such as replenishing beaches, active management of recreation sites, dredging access sites, and side-channel openings for recreational boating and for enhancing the fisheries of backwater areas.

Commercial-Recreational Conflicts

Direct conflicts between recreational and commercial vehicles are not presently a serious problem on the Upper Mississippi River. Because the navigational pools are large and sufficient, water is available for recreational boating outside of the main channel marked for commercial barge traffic. The one area on each pool where this does not hold true is near the locking facility at each dam. All traffic locking through is funneled into a confined area where maneuvering time and space are limited. The recreational boat must respect the operational requirements of the cumbersome commercial tows. In turn, the tows must respect the prime recreational use areas and operate their craft in a safe and prudent manner.

The respect for smooth traffic flows derives from experience on the river. A void exists for the novice to the river. This knowledge can best be disseminated to the recreationalist through education. Some states are now implementing mandatory boat operator's safety certification for boat operation within their state. Iowa should investigate these programs and develop a mandatory boat operator's safety certification to address these educational needs for safe boating operation.

A Congressional Resolution adopted April 1974 authorized the Upper Mississippi River Recreational Craft Locks Study to explore this conflict and recommend alternative modes of

providing pool-to-pool access for recreation boats. Both structural and nonstructural alternatives will be considered in providing more efficient lockages. The lack of established trends indicates that a number of factors affect recreation lockage on the Upper Mississippi River. Each pool and each lock and dam have a specific character that calls for individual solutions.

CONCLUSIONS AND RECOMMENDATIONS

The Future of Commercial Navigation

Conclusions

Using water transportation to move bulk commodities benefits Iowa. River transport is particularly beneficial for hauling grain, petroleum, coal, and other bulk commodities. However, river transport must mesh with other modes. The Iowa Department of Transportation's goal is a balanced transportation system, using the best advantages of rail, highway, water, air, and pipelines. It must be recognized that the Mississippi River is a multipurpose river, interstate in character, and serves many people in many ways. The feasibility of developing a simulation model to examine the river's numerous uses, their interaction, and their efforts should be investigated.

Recommendations

Iowa should continue to depend on the Federal Government to finance the maintenance of the navigation routes on the Mississippi River. These routes include both the Upper and Lower Mississippi River and the interconnected waterways leading to the Great Lakes, the Ohio River, and other tributary streams, and to the intra-coastal waterway system. In Iowa, a reasonable, coordinated interagency approach to planning

should be supported. All agencies concerned with water and related resources must be actively represented in all regional planning efforts affecting the state. Iowa agencies, with interagency framework, should consider and evaluate all Federal proposals so the state's interests are cared for.

The Iowa Department of Transportation should develop a river tolerance index to assist in managing the river and related resources. This index should serve as a guide in solving conflicts and establishing planning priorities.

Twelve-Foot Channel

Conclusion

The Corps' 1973 12-foot channel study concluded that the costs of a 12-foot channel on the Mississippi River upstream of Grafton, Illinois, would exceed the benefits based upon current traffic projections. The study recommended there be no further study of a 12-foot channel at this time, and that the 9-foot navigation channel be continued.

Recommendation

Due to the tremendous and unassessed environmental impact and the unsound economics of a 12-foot channel on the Upper Mississippi, Iowa should oppose any proposal to increase the channel depth from 9 to 12 feet on the Upper Mississippi River. The state should continue to lend its support to the maintenance

of the 9-foot channel, by the Federal Government. Maintenance should include the replacement of specific locks and dams when physical conditions indicate they have aged and deteriorated beyond normal repair capability. Also, replacement should be carried out only after comprehensive analysis is made of all needs, problems associated with that facility.

Extended Navigation Season

Conclusions

The U.S. Army Corps of Engineers' Phase I report on navigation concluded in September 1973 that an extension of the navigation season to 52 weeks to Burlington, Iowa and 40 weeks to Cassville, Wisconsin warranted further study. The Corps has reactivated the year-round navigation study and is using the Phase I report as their starting point. Their current work effort will concentrate on environmental concerns that cannot be answered with existing information. There are problems associated with winter navigation related to both the natural ecosystems and to the activities of man. During winter, ice jams can cause water level fluctuations which might freeze furbearers out of their dens or block the head of a slough causing deoxygenation. Year-round navigation would mean an open channel which would prohibit the movement of wildlife across natural ice bridges. The commercial and recreational fisherman could, however, experience unsafe shelf ice and limited access to some areas.

Recommendation

There are some serious, unanswered environmental and engineering questions about extending the navigation season; therefore, Iowa should insist that the environmental and economic impacts be carefully evaluated and reviewed before the proposed extensions are presented to the state for its approval.

Channel Maintenance

Conclusions

Dredging is necessary to maintain adequate depths for navigation. The dredged material disposal sites created by the placement of dredged material consist of more than 95 percent sand from some of the most widely used recreation areas along the shores of the Upper Mississippi River. Recently, dredging and dredged material disposal practices have been criticized because of their adverse effect on the surrounding natural environment. The loss of productive fish and wildlife habitat can be partially attributed to both the effects of initial dredge material placement and indirect effects resulting from secondary movement of the material causing sedimentation of the backwater sloughs and wildlife areas. Currently, the Corps cannot consider recreation or fish and wildlife enhancement as a project purpose. Getting

this authorization would allow the Corps to consider the recreation potential of dredged material disposal sites and also give them the responsibility for protecting and improving fish and wildlife habitat.

The Great River Environment Action Team (GREAT) is developing a plan to help maintain the river's future multi-purpose qualities. One of the major objectives of the study is to minimize the impacts of navigation channel maintenance on the resources of the Mississippi River. Recommendations for upcoming dredging seasons are developed by the Team. These recommendations are then approved by the Upper Mississippi River Basin Commission and sent to the appropriate Army Corps District Engineer for consideration and implementation.

Recommendation

A program for achieving improved dredging and dredge disposal practices should be developed so that a nine-foot channel depth can be maintained while minimizing adverse environmental impacts. Iowa should support and encourage the U.S. Coast Guard efforts to shift markers to allow the navigation channel to shift naturally. Iowa should insist that the U.S. Army Corps of Engineers dredge according to GREAT's recommendations, wherever and whenever possible. The state's resource agencies should expand their participation in GREAT so that GREAT's results will better reflect Iowa's interest. Cities and counties located along the river and the public in general

should be encouraged to become involved in GREAT. Iowa should push to get the Corps' authorization changed so that recreation and fish and wildlife enhancement also become project purposes.

Resource Use

Conclusions

Future projections of commerce on the Mississippi River waterway system indicate improved harbor and fleeting areas will be needed. However, there are concerns over the adverse effects to fish and wildlife and to the visual appreciation of the river.

Wise land use would prohibit use of the corridor, especially the portion susceptible to flooding, for noncompatible development. Land use regulations may minimize one person's adverse impact on another. Key recreation, fish and wildlife areas should be acquired, but Iowa will have to depend on land use regulations to protect the open space views for the major portion along the river.

Recommendations

An overall total river development plan is needed. This would include identifying sites suitable for fleeting areas and terminal development ahead of time and incorporating them into a total river development plan so that site selection and review will not be on a piecemeal basis.

One alternative to the problem of increased riverfront development that should be explored is to shift nonriver business from riverfront land to provide those businesses needing terminal and fleeting space with river access.

As part of developing a detailed plan, the state should conduct a resource analysis of the Mississippi River Corridor. This would include identification of such things as fragile environmental areas, and other areas that can accommodate certain types and degrees of development. With this type of information available, the state would be able to take the lead in developing and implementing an overall river plan to guide the growth, use, and development of the river corridor. Land use regulations will have to be an integral part of such a plan.

The feasibility of developing a simulation model (as explained previously) that would continually examine the numerous uses of the river, their interaction and their effects, needs to be investigated in the immediate future. Its implementation is considered to be a key part of developing a river plan for the future.

Recreation Boating Access

Conclusions

Many areas along the Mississippi River have the capacity for absorbing large amounts of increased recreational activity. The vast expanses of public land and water join together to form the basis for those activities. Currently, the problem of failing to meet a portion of the increased water-based recreation demands is attributed to the lack of access and supportive parking areas. Much of the projected increase for boating and recreation activities can be accommodated with renovation and expansion of existing access areas. The expansion and renovation of the public areas may be more easily accomplished than improving the private sector facilities due to the fact that no operational profit must be realized to construct the facility. But, it must be recognized that the private sector provide both a service to the public and income to the state in the form of taxes. The public sector should not expand into an areas where there is a viable private operation serving public access needs.

Recommendations

An access development program is needed, beginning with studies to show where new access sites are needed and where existing sites should be expanded or renovated.

Encouragement in the form of guidance and information from the Iowa Conservation Commission, and financial assistance from the Small Business Administration (SBA) program, should be provided to the private sector for promoting private recreational development along the Mississippi River.

Recreational Boating Support Facilities

Conclusion

Along the Mississippi River, adequate facilities are deficient at many boating access sites. Adequate facilities make the recreational experience more enjoyable. These support facilities include camping, picnicking, sanitation areas (pump-out stations), potable water, and trash collection points. This type of recreational development would be practical where access is available for a maintenance vehicle. The Corps of Engineer's authority to actively manage recreational areas and provide facilities is limited. It can only provide a 50-50 cost share if a project is sponsored by a state or local agency. This does not include any funds for operation and maintenance which is the responsibility of the sponsoring agency.

Recommendation

The state should give high priority to providing improved access with adequate support facilities above Locks Nos. 9 and 13 and below Lock and Dam No. 10. Recreational facilities are deficient and should be provided in Pools 9, mid-10, near Clinton, near Davenport, below Muscatine, in Pool 18, and in Pool 19. A system of sanitary sewage dumping stations are needed for both commercial and recreational traffic along the entire river. Also, the state should recommend to Congress that the Corps of Engineers be given the authority to provide recreation enhancement such as replenishing beaches, active management and maintenance of recreation sites, dredging access sites, and opening of side channels for recreation boating and habitat restoration.

Commercial-Recreation Conflict

Conclusions

The size of the river makes it a place where all can navigate in relative safety. The towboats run only in the deep water channel while the recreational boater has water available outside of the marked channel. Congestion which causes delays in locking is the major conflict between recreation and commercial boats. Delays cause lost time and unsafe boating conditions. Most of the problems result from poor communication, inexperienced boaters, excessive drinking, and poor or non-existent tie-up facilities. The Recreational Craft Locks Study by the Corps of Engineers is to determine where an independent means of moving recreational boats from pool to pool is desired, needed, and can be justified.

Recommendations

The state should cooperate in the Recreation Crafts Locks Study and should support reasonable alternatives which are best for each pool.

The state should develop a mandatory boating certification program that addresses the educational needs for safe boating operation. This program would particularly apply to the border streams, but is also needed statewide. The state needs more Water Officers to provide better patrol, enforcement, assistance, and public relations for the Mississippi River.

THE MISSOURI RIVER

THE RESOURCE

The Missouri River Stabilization and Navigation Project, authorized by the River and Harbor Act of 1945, provides for a continuous nine-foot navigation channel, 300 feet wide, from Sioux City, Iowa, to its confluence with the Mississippi. This is a distance of 735 miles, 179 miles of which are along the western boundary of Iowa (approximately 14,000 surface water acres). This project is an open river regulation project which uses the energy of the flowing water to maintain the channel in an alignment fixed by means of dikes and revetments. With the river banks permanently secured in the desired alignment, the scouring action of the flowing water on the riverbed rather than on the banks is expected to maintain the desired channel width and depth. The main stem dams on the Missouri River are part of the total system, providing as part of the multipurpose benefits the provision for maintaining navigational flows by water releases from the six main stem reservoirs in Montana, North Dakota, South Dakota, and Nebraska.

In addition to providing for navigation, this project was designed to stop bank erosion and meandering. The completed stabilization works will prevent the annual destruction of more than 9,000 acres of farmland and eventually will open up an additional 188,000 acres of new land to agriculture. The project has also provided flood protection to urban communities.

The economic value of the land adjoining the river has increased as a result of the project, thus, gaining tax revenues for local governments.

Unfortunately, these construction efforts to provide a nine-foot navigation channel have left the Missouri River with about half of its original water surface and half of the mixture of aquatic and wildlife habitats it once contained. Within Iowa, the length of the river has been reduced 35 miles since stabilization and navigation work was begun. The average current velocities of three to six feet per second make the river treacherous for boating, swimming, and water-skiing. The project has created a bottom of fine shifting sand which leaves the habitat impoverished; few feed resources other than microinvertebrate drift remain. The most fertile areas for fishing now occur near the tips of the channel dikes where deep eddies and adjacent shallow water form resting and feeding areas for fish. This project has resulted in the riverbed degrading anywhere from two to six feet from Sioux City to Council Bluffs, causing many problems with low water levels in the oxbow lakes and damage to foundations of bridges.

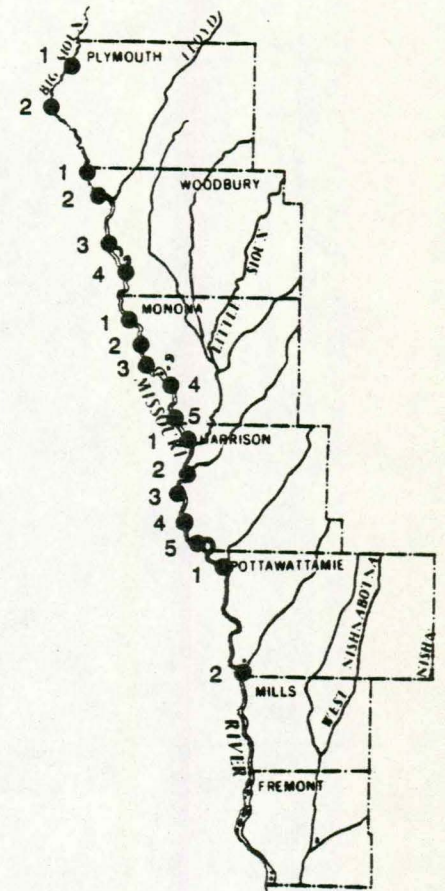
The Fish and Wildlife Coordination Act of 1958 and Section 207 of the Flood Control Act of 1962 authorized the Corps of Engineers to plan and develop recreation areas and access points. Recreation development in Iowa has been proposed at eight public use areas, three of which have been completed, on

a cost-sharing basis. There are 14 public boating access sites along Iowa's 179 Missouri River miles (Figure 8-6).

Grain and fertilizer products are the principal commodities shipped and received at Iowa barge terminals along the Missouri River (Figure 8-2). Most of the grain is exported to New Orleans while fertilizer products are imported. During 1975, seven barge terminals operated along Iowa's western border; six of these are located in Council Bluffs and Sioux City.

Figure 8-6 MISSOURI RIVER ACCESS AREAS

County	Map No.	Name of Area	State Access	County Access	Private Access
FREMONT		None			
MILLS		None			
POTTAWATTAMIE	1	Longs Landing		●	
	2	Wilson Island	●		
HARRISON	1	Western Iowa Fish & Wildlife Club			●
	2	Tyson Bend	●		
	3	Remington Boat Launch		●	
	4	Little Sioux Delta	●		
	5	Deer Island	●		
MONONA	1	Huff Access		●	
	2	Middle Decatur Bend		●	
	3	Louisville Bend	●		
	4	Sunset Island	●		
	5	Lighthouse Marina			●
WOODBURY	1	Synder Bend		●	
	2	Weedland Access	●		
	3	Chris Larsen, Jr. Marina			●
	4	Sioux City Boat Club			●
PLYMOUTH	1	Millsite Access	●		
	2	Big Sioux Park		●	



RESOURCE CONSIDERATIONS AND PROBLEMS

Commercial Use

Navigation on the Missouri is still in its infancy as compared to other inland waterways. In 1974, traffic generated by the Missouri River accounted for only 2.3 percent of the total tonnage on the Mississippi River system.

Table 8-3 summarizes all waterborne traffic movement on the Missouri River for selected years between 1955 and 1974. While navigation was available west of Kansas City by 1955, it was 1965 before traffic achieved full initial development. Farm products are the most important in terms of tonnages; however, the overall pattern shows little, if any, change suggestive of growth. The most notable characteristic is the easily apparent wide variety of change in the historical record. In 1972, corn shipments totaled only 21.7 thousand tons but two years later, they reached 313.5 thousand tons. More than a million tons of wheat were shipped in 1966 and 1967 compared to only 450 thousand tons in 1973.

The reasons for these variations may, in large part, be due to forces external to the transportation savings available on the water. This would include price shifts, production levels, shifts in domestic and export demands, and changes in costs of alternative modes of transportation.

Table 8-3

MISSOURI RIVER NAVIGATION AND BANK STABILIZATION PROJECT
 FREIGHT TRAFFIC FOR SELECTED YEARS 1955-1974
 (1,000's of short tons)

Code	Commodity Group	1955	1960	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
01	Farm Products	121.2	1,150.6	1,399.9	1,670.8	1,553.1	1,145.6	857.0	1,059.0	1,247.9	1,115.2	816.5	1,215.4
	Corn	12.7	59.5	107.1	79.9	55.7	3.4	104.7	143.8	83.8	21.7	230.4	313.5
	Wheat	90.2	649.1	929.3	1,154.5	1,103.8	801.7	510.4	669.0	885.9	764.6	452.4	761.7
	Sorghum Grains	1.5	216.9	83.7	247.8	344.8	274.9	162.8	33.0	119.5	233.5	0	6.7
14	Nonmetallic Minerals	417.5	1,487.2	2,585.1	2,181.8	2,400.7	2,930.3	3,199.1	2,869.5	2,990.4	2,544.1	2,911.7	3,430.2
20	Food and Kindred	74.7	46.2	295.3	270.3	291.5	350.4	332.2	370.3	474.0	482.0	253.3	429.0
	Molasses	74.7	46.2	113.3	139.6	144.7	181.2	184.2	169.0	197.2	228.5	102.3	140.5
26	Pulp and Paper	0	0	2.4	5.2	6.2	8.2	13.8	16.7	15.4	18.4	5.0	6.2
28	Chemicals	1.4	29.4	79.8	167.1	254.8	347.2	432.1	526.2	586.3	491.5	307.6	452.7
29	Petroleum	7.6	17.2	119.8	106.7	103.3	69.2	46.9	50.4	59.3	78.0	78.6	83.6
32	Stone, Clay, and Glass	0	0	97.2	133.8	122.4	133.1	145.3	157.7	162.5	184.4	138.4	161.6
33	Primary Metals	188.8	164.0	58.5	90.5	80.4	62.3	70.9	57.8	79.3	46.6	52.7	55.8
41	Waterway Materials	2,290.7	4,045.8	3,005.5	3,312.8	1,836.5	1,660.0	1,880.8	2,377.2	1,855.9	2,178.2	1,802.0	1,831.1
	All Other Freight	37.8	8.5	82.3	9.2	10.3	18.2	23.1	34.4	12.6	44.3	4.9	7.3
	TOTAL	3,139.7	6,948.9	7,725.9	7,948.2	6,659.2	6,724.6	7,001.1	7,519.2	7,483.7	7,182.8	6,370.8	7,673.1
	Total without sand and gravel and waterway materials	435.5	1,440.9	2,271.6	2,453.6	2,566.5	2,257.3	2,127.3	2,462.5	2,791.9	2,654.4	1,817.4	2,576.1

Source: Waterborne Commercial Statistics, various years.

In 1975, 306,600 tons of freight were handled at Iowa barge terminals which was only 3.5 percent of the total handled at all Iowa barge terminals (Table 8-4). The largest percentage (88.4 percent) of the total volume shipped by barge along the Missouri is transported to the river by truck while the remaining volume (11.4 percent) is transported by rail.

On a ton-mile basis, approximately 71 percent of the movement takes place between Kansas City and the Mouth, 26 percent between Kansas City and Omaha, and 3 percent between Sioux City and Omaha. The low ton miles of movements along Iowa is due to the short haul between Sioux City and Omaha. In 1977, this segment handled 15.8 percent of the Missouri River tonnages.

Prospective Traffic

The Missouri River Basin Commission points out that long-range projections on this waterway are risky and subject to considerable change as the future unfolds.

A consulting report, prepared for the Corps of Engineers, reviewed all the previous shipment projections to determine their accuracy. While each set of projections used different methodologies and historical data bases, they all exhibit a bias toward change and growth which is inherent in any projection effort. It is doubtful that any of the techniques used could have been made sufficiently sensitive to incorporate those

Table 8-4

1974 and 1975 Tonnage Through All Iowa Barge Terminals
 Located Along the Missouri River

YEAR	COMMODITIES (TONS)				ORIGINATE (TONS)	TERMINATE (TONS)	TOTAL (TONS)
	GRAIN	COAL	PETROLEUM	OTHER			
1974	207,778	0	8,000	172,274	226,066	161,986	388,052
1975	78,405	0	0	228,200	104,366	202,239	306,605
+ % Change	-62.3%	0.0%	-100.0%	+32.5%	-53.8%	+24.9%	-21.0%

Source: Iowa Department of Transportation. Iowa Barge Terminal Study, 1975, p. 15.

factors that have in reality resulted in an overall limited growth record over the past 10 years.

The study came up with two alternatives that they consider as a reasonable basis for future economic estimates. Table 8-5 displays the projection for 1985 for each scenario by major commodity groups. The "No Growth" alternative is projected to be 2.67 million tons while the "Constant Share" alternative is projected to be 3.61 million tons annually. The Iowa DOT supports the "Constant Share" scenario as the most likely projection. The Missouri River Basin Commission projects a growth of over five million tons by year 2000. The problem is that industry has not yet fully utilized the present capacity of the system.

Water Use-Main Stem Reservoirs

In the future (it is not known when), the capacity of the system may be reduced because upstream water demands from the main stem reservoirs will deplete downstream releases. The Missouri River Basin Commission has stated that increased industrial and agricultural use of water from the upstream reservoirs could adversely affect downstream water users and shorten the navigation season. The state of Iowa should maintain a strong interest in the allocation of the water resources of the Missouri River Basin so that the state receives its proportionate share for its own water supply needs and instream uses.

Table 8-5

MISSOURI RIVER NAVIGATION AND BANK STABILIZATION PROJECT

PROJECTED 1985 COMMODITY FLOWS

(1,000 tons)

<u>Code</u>	<u>Commodity Group</u>	<u>"No Growth"</u>	<u>"Constant Share"</u>
01	Farm products	1190	1540
14	Non-metallic minerals (other than sand & gravel)	175	220
20	Food and kindred	460	530
26	Pulp and paper	15	30
28	Chemicals	510	850
29	Petroleum	75	100
32	Stone, clay, and glass	170	210
33	Primary metals	60	100
	All other freight	<u>20</u>	<u>30</u>
	TOTAL	2675	3610

Dredging

Dredging of the navigation channel may have adverse environmental effects; however, since 1964, all requirements for dredging have been below St. Joseph, Missouri. Thus, Iowa has not had to contend with dredging and dredge disposal problems along its western border.

Environmental Effects

There are attempts being made to mitigate some of the environmental effects of the project. In 1975, both the Kansas City and Omaha District office of the Corps of Engineers initiated construction of notches in a number of existing dikes that will permit an amount of water to flow behind the dikes. The purpose of the openings is to reduce the adverse effects of reduced water surface area and to increase the diversity of aquatic habitat in the Missouri River. An interagency task force is monitoring the effects of this project.

Under the authority of the Fish and Wildlife Coordination Act of 1958, the Corps of Engineers have initiated an investigation of the fish and wildlife impact that has accrued since 1954 due to the construction of the bank stabilization and navigation project. Losses of recreation potential are not in the authorization. Also, degradation of the riverbed is not being considered because it was not in the authorization.

The Fish and Wildlife Service, in cooperation with the adjoining states' fish and wildlife agencies, is making a similar investigation and will furnish the Corps of Engineers a report of their investigation and their recommendations for mitigative measures. The report of the Missouri River Division of the Corps is scheduled to be completed in 1978. It will be processed to Congress if the Corps' recommendations include the need for acquisition of lands, or to the Office of the Chief of Engineers if measures which do not require acquisition of additional land are recommended. The compensation efforts will concentrate on minimizing the adverse effects of reduced water surface, loss of diversity of aquatic habitat, and the loss of riverine vegetation.

According to the Iowa Governor's Inter-Agency Resources Council, the number one priority of Iowa is the initiation of the necessary hydrological modeling studies on the entire river to determine both the aggradation and degradation rates (future river hydrology) with a subsequent program for problem resolution, whether it be for allowing continued change, stabilizing change, or reversing the trends. The number two priority is the documentation of the natural resource losses (both land and water-oriented) to the states adjoining the river beginning with the earliest manipulations by the Corps of Engineers on the Missouri River. Iowa's Inter-Agency Resources Council strongly feels that unless the present study efforts on mitigation and the Metropolitan Sioux City and

Missouri River Study include an interim report on degradation that it will be an inadequate effort and a disservice to the public. The study efforts spent on other elements may tend to be premature and possibly misdirected. The state's position on fish and wildlife losses and general mitigation efforts cannot be determined until the results of the degradation study are known.

Recreational Use and Prospective Recreation Boat Traffic

The Missouri River Basin Commission has developed a set of recreation projections for Aggregated SubArea-09 which is composed of 11 counties in Nebraska, five in Missouri, four in Kansas, and 22 in Iowa. This includes all counties along the state's western border except Lyon and Sioux. Demand projections for six recreational activities for the years 1975, 1985, and 2000 were estimated (Table 8-6).

In this area, picnicking was the most popular recreational activity in 1975 and it is projected to remain the most participated-in activity. In 1975, swimming was the second most popular activity along the Missouri and it was closely followed by fishing and camping. By 2000, days spent camping are projected to surpass days spent swimming. This demand pattern may reflect the actual recreational preferences of this geographic area, or it may only reflect the current availability of recreational opportunities, now limited for fishing, waterskiing, swimming, and camping.

Table 8-6
 Missouri River
 Water-Related Recreation Demand (ASA 09)
 (100's of activity days)

<u>Activity</u>	<u>1975</u>	<u>1985</u>	<u>2000</u>
Camping	2,484.6	2,989.5	3,669.6
Picnicking	5,047.7	5,483.2	6,048.9
Fishing	2,693.8	2,829.1	3,083.1
Swimming	3,099.2	3,281.2	3,585.8
Power Boating	1,673.8	1,822.9	2,027.5
Water-Skiing	431.5	539.6	686.9
Canoeing and Sailing	-	-	-
TOTAL	15,403.3	16,945.5	19,101.8

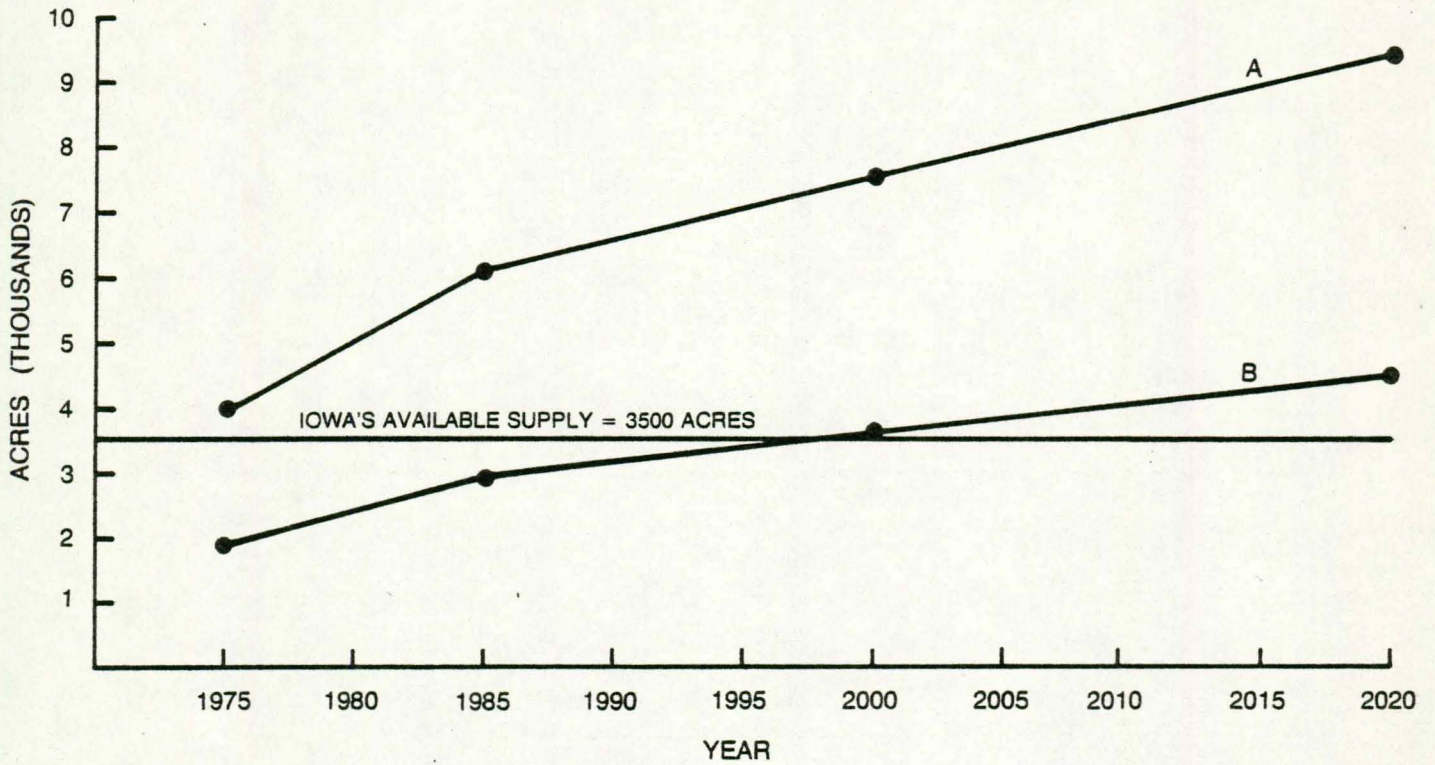
Source: Missouri River Basin Commission. 1975. Water and Related Resources in the Missouri River Basin.

Table 8-8 shows a demand increase of 48 percent for camping, 20 percent for picnicking, 14 percent for fishing, 16 percent for swimming, 21 percent for power-boating and 59 percent for waterskiing from the year 1975 to 2000.

A 1975 Participation Survey of Iowans showed that Iowans enjoyed boating on the Missouri River 97,131 user days in 1975. Fishing was the second most popular water-oriented activity as Iowans spent 46,724 user days on the Missouri River in 1975. More than 16,000 Iowans went swimming in the Missouri River in 1975.

Along Iowa there are approximately 14,000 acres of surface water available for use by Iowans but only half of these are deemed usable for recreation analysis because of treacherous current. Only half of this usable supply is realistically Iowans' supply because Nebraska potentially exerts an equal demand. This leaves about 3,500 acres of boating water for Iowans. On a peak day in 1975, Iowans needed between 2,000 and 4,000 acres (the difference depends on which standards are used) for boating on the Missouri River (Figure 8-7). Boating demand is projected to increase 55 percent by 1985 to between 3,000 and 6,200 acres. The GREAT Outdoor Recreation space standards show that demand has already exceeded supply in 1975, but according to the ICC's space standards, the supply will not be exceeded until after 1997. The actual demand for boating acres will probably be somewhere between these two sets of projections.

Figure 8-7 PROJECTED DEMAND FOR BOATING ON THE MISSOURI RIVER ALONG THE IOWA BORDER



KEY

- A. Iowa's Demand based on Great River Environmental Action Team's Outdoor Recreation Space Standards
- B. Iowa's Demand Based on Iowa Conservation Commission Outdoor Recreation Space Standards

Recreational Boating Access

There are several ways to meet the demand for boating. The most obvious ways are to increase both available supply and access. Public access should be increased in the most recreationally deficient areas of Council Bluffs, Sioux City, and south of Council Bluffs to the Missouri border, by using a combination of acquisition of sites, purchase of easements, and expansion and renovation of existing public access sites. Another way to increase access is to encourage the private sector by providing guidance, informational assistance, and loans. Along with this, the public sector should not expand into an area that already has a viable private operation.

The amount of available supply could be increased by widening the channel and slowing down the current, making the river safer for recreation. Other alternatives include the construction of low-head dams, the construction of new off-channel impoundment structures, or pumping of additional water supplies into, or dredging, oxbows. Currently, an oxbow lake study sponsored by the Conservation Commission is addressing the relationship of the oxbow lakes to the river's alluvial aquifer to help determine the feasibility of dredging and supplemental pumping. The state should look into the possibility of reclaiming some old oxbow lakes presently unusable for recreation. This approach could be used by the Corps of Engineers in mitigating some of the recreation/fish and wildlife losses.

Resource Use

The largest impact on the recreationalist who travels the river corridor is the visual land use changes. The recreationalist prefers natural open space as a backdrop for resource based recreation pursuits. A river corridor composed of natural vegetation, islands, rock, outcrops, sandbars, and tree-lined bluffs forms the visual "spirit" that should be retained where still present. Essential uses of the corridor would not be curtailed if the uses are planned judiciously, with resource conservation foremost in the minds of the land use authorities. Wise land use should not permit the utilization of the corridor for noncompatible structures and noncompatible development. As with any resource with finite limits, the importance of leaving options open for future generations cannot be over-stressed.

Land use planning is one method to protect and wisely use the resources Iowans want to see conserved. Those that abuse land ownership and use rights do not do so in a vacuum. Many people may be adversely affected. Land use restrictions and regulations are one method of minimizing one person's adverse impact on another. Currently, Iowa cannot afford to acquire in fee title or easement all of the open space along the river, so it will have to depend upon land use restrictions to protect the critical areas.

CONCLUSIONS AND RECOMMENDATIONS

The Future of Commercial Navigation

Conclusions

Using water transportation to move bulk commodities benefits Iowa. River transport is particularly beneficial for hauling grain, petroleum, coal, and other bulk commodities. However, river transport must mesh with other modes. The Iowa Department of Transportation's goal is a balanced transportation system, using the best advantages of rail, highway, water, air, and pipelines. It must be recognized that the Missouri River is a multipurpose river, interstate in character, serving many people in many ways.

Recommendations

Iowa should continue to depend on the Federal Government to finance the maintenance of the navigation routes on the Missouri River, as was stated previously for the Mississippi River. A reasonable, coordinated inter-agency approach to planning and development should be supported. All agencies concerned with water and related resources must be actively represented in all regional planning efforts affecting Iowa. Iowa should consider and evaluate all Federal proposals so our interests are cared for. Iowa supports the continuance of the

nine-foot navigation channel on the Mississippi River, provided the channel degradation problems now occurring upstream of Omaha can be resolved satisfactorily.

Water Use-Main Stem Reservoirs

Conclusions

Commercial navigation is not a consumptive user of water but it does require a minimum flow in order to provide a satisfactory nine-foot channel with nominal dredging. With present stream flow depletions, inflows to the reservoir system are sufficient to support these minimum navigation flows in about three out of four years without any loss of storage water. The Missouri River Basin Commission stated that increased industrial and agricultural use of water from the upstream reservoirs could adversely affect downstream water users and shorten the navigation season.

Recommendations

The State of Iowa should maintain a strong interest in the allocation of the water resource of the Missouri River Basin so that we receive our proportionate share for our own water supply needs and instream uses including navigation. Development of an allocation plan may be needed, and should receive attention by the Missouri River Basin Commission and its member states and federal agencies.

Iowa should also support multiagency efforts to determine the effects of reservoir management and channel modification on the river alluvial aquifer system and adjacent land use implications. Reasonable mitigation measures should be implemented.

Commercial-Recreational Impacts

Conclusions

The Missouri riverbed has degraded from two to six feet from Sioux City to Council Bluffs. The Corps indicates the riverbed may drop another four to six feet in the Sioux City area. This degradation causes problems with surface water intakes and low water levels in the oxbow cutoff lakes. Lower water levels result in a smaller area being available to boating, and boats no longer get into and out of the river during low flows. Lowering of groundwater levels will also adversely affect irrigation and municipal withdrawal from wells. Lower water levels, channel straightening, and the stabilization structures have reduced habitat for both fish and wildlife.

Recommendations

Support should be given to multi-agency efforts to determine the effects of reservoir management and channel modification on the alluvial aquifer and adjacent land use implications, and to implement mitigation measures.

Methods to improve recreational navigation use of the Missouri oxbow lakes should be developed and implemented, to reduce the user dependency on the river with its attendant swift current and boat safety problems.

River Corridor

Conclusions

The impact of unrestricted land use along the Missouri Corridor has serious implications for the recreationalist. Land use planning may be necessary to protect the open spaces and natural areas compatible to outdoor recreation along the Missouri.

Recommendations

A comprehensive, detailed resource plan for the Missouri River Corridor is needed. The state should conduct a resource analysis of the Missouri River Corridor, which would include identification of such things as fragile environmental areas, and areas that can accommodate certain types and degrees of development. With this type of information available, the state would be able to take the lead in developing an overall river plan to guide the growth, use, and development of the river corridor. Land use policies and use restrictions will have to be an integral part of such a plan.

Recreational Boating Access

Conclusions

The Missouri River bottom land is extensively farmed. Because of the farming value of this land, there is almost no public land adjoining the river. This creates a significant barrier to public use. Currently, there are only 14 public and 4 private access sites along Iowa's 179 river miles. To date, private ventures have not faired well but they may have future potential. These private operations provide both a service to the recreational user and tax income to Iowa. The public sector should not expand into an area where there is a viable private operation serving public access needs.

Recommendations

As part of the state's outdoor recreation program, access and facilities should be provided in recreationally deficient areas. The metropolitan areas of Council Bluffs and Sioux City and the counties south of Council Bluffs to the Missouri border are the most critical areas and should be given top priority. Increased recreational boating demand should be met by using a combination of acquisition of sites, purchase of easements, and expansion and renovation of existing access sites. New, flat areas may ultimately be needed to satisfy the demand for water-oriented recreational facilities.

Encouragement in the form of guidance and information from the Iowa Conservation Commission and financial assistance from the Small Business Administration (SBA) program should be provided to the private sector for private recreation development along the Missouri River.

Commercial-Recreational Conflicts

Conclusions

Direct conflicts between recreational and commercial vehicles are minute due to the low volumes of commercial and recreational traffic on the Missouri River. The educational process concerning the maneuvering time and space of commercial tows is needed for all recreational boaters to gain a respect for their limitations.

Recommendations

The state should develop a mandatory boating certification program that addresses the educational needs for safe boating operations.

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