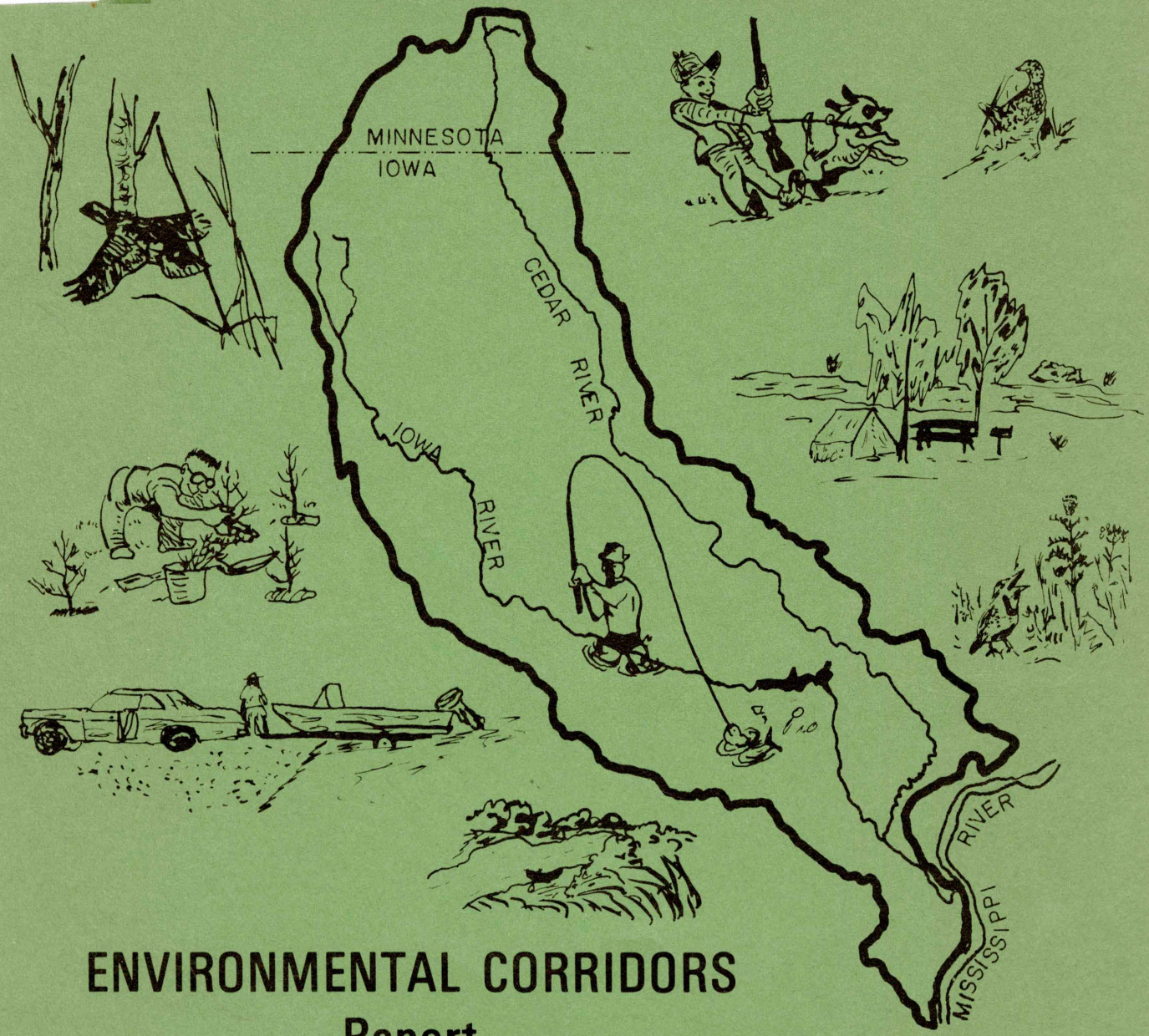
IOWA-CEDAR

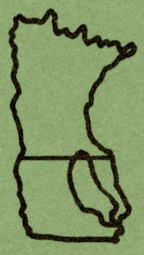
RIVERS BASIN STUDY



ENVIRONMENTAL CORRIDORS

Report

1975



U.S. DEPARTMENT OF AGRICULTURE

Forest Service
Soil Conservation Service
Economic Research Service

IOWA-CEDAR RIVERS BASIN STUDY

Iowa and Minnesota

Report on

ENVIRONMENTAL CORRIDORS

December 1975

Prepared by

U.S. DEPARTMENT OF AGRICULTURE

Forest Service
Soil Conservation Service
Economic Research Service

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I. FOREWORD

The purpose of this report is to provide resource information for land use decision makers within the Iowa-Cedar Rivers Basin. The report is directed to local, county and state governments, private landowners and others in land use decision making positions. This is a special report prepared as a supplement to the USDA Main Report of the Iowa-Cedar Rivers Basin Study.

Environmental corridors generally encompass the best remaining elements of the natural resource base. This resource base includes streams and lakes with associated shorelines and floodplains, wetlands, wildlife habitats, unique geologic formations and forest land. The best remaining sites for park and "open space" uses lie within the environmental corridors. Emphasis is placed on environmental corridors because they can provide multiple benefits for wildlife habitat, recreation areas and forestry in a developed or undeveloped state.

The environmental corridor study evolved through evaluation of the planning objectives of the Iowa Conservation Commission, Minnesota Department of Natural Resources, Iowa-Cedar River Conservancy District, involved Regional Planning Commissions, Iowa Department of Agriculture, Iowa Natural Resources Council and other sponsors and interested groups.

An open minded attitude of coordination and cooperation will be needed by all parties concerned, to attain the goal of preserving and protecting the rapidly disappearing wetlands, properly manage the remaining forest land, improve the streams and lakes and set aside lands for recreational and cultural enrichment for present and future generations.

II. INTRODUCTION

Environmental corridors may be developed in conjunction with other corridors such as--but not limited to--transportation corridors, utility corridors, stream floodway corridors, and historical/cultural corridors. Environmental corridors are not just for recreational uses. For the purposes of this report, however, environmental corridors are defined as follows:

> Linear water-oriented areas reserved for managed use and maintained, left in or developed to a condition that can enhance man's environment by maintaining or creating scenic beauty; wildlife habitat; natural areas; open space; recreational opportunities; flood hazard reduction; water quality improvement; and other desirable features in total or in any part.

Previous studies indicate that the most significant environmental resources are frequently concentrated in a lineal pattern, generally within and along the walls of stream valleys. These concentrations are termed "environmental corridors". This pattern occurs because generally such resources are now, or at one time were water related. As a result, watercourses, flood plains, steep slopes, poorly drained soils, wetlands, aquifer outcrops, important wildlife habitat, historic sites, and areas of scenic beauty may combine into a system with fairly distinct boundaries.

Such areas could be considered least tolerant to intensive development because of their ecological importance, scenic beauty, recreational value, and their long-term economic value in preserving the quantity and quality of the water supply and in reducing the risks and hazards of development.

Environmental corridors are important because of their ability to provide multiple and compatible benefits. Environmental corridors provide watershed values in the form of floodplain management for flood damage reduction, streambank erosion control, and natural sinks for nutrient and sediment deposition.

Corridors are important for wildlife values as they can provide a wide variety of habitat, contribute to an adequate population for harvesting, are important winter cover and serve as protected travel lanes.

Forest land in the corridors is the outstanding resource because of its importance as a multiple ecological and environmental resource. Forest land in the Iowa-Cedar Rivers Basin comprises 4% of the land use, 64% of the total forest land occurs within the environmental corridors.

Environmental corridors, for study purposes, were related to streams and lakes that have local or regional significance from an environmental and recreational standpoint. The streams and lakes included in the corridors were designated by the States of Iowa and Minnesota as having fishing, canoeing or boating significance.

The land in the corridors is the land within the view plain of a person on the stream. In most areas this is the flood plain area or from the stream to the high bank. A typical cross section of an environmental corridor is shown in Figure II-1. A clear view is the view plain considered in determination of the corridors. A partially obscured view is limited by vegetation or some other factor that may not always be in the line of sight.

Environmental Corridors, Figure II-2, indicates the location and extent of the Basin's corridors. As shown on the map, the exterior boundaries comprise a substantial area within the Basin.

The objectives of this report include the following:

(1) describe the existing environmental settings and conditions of the river corridors,

(2) identify and evaluate environmental problems and needs,

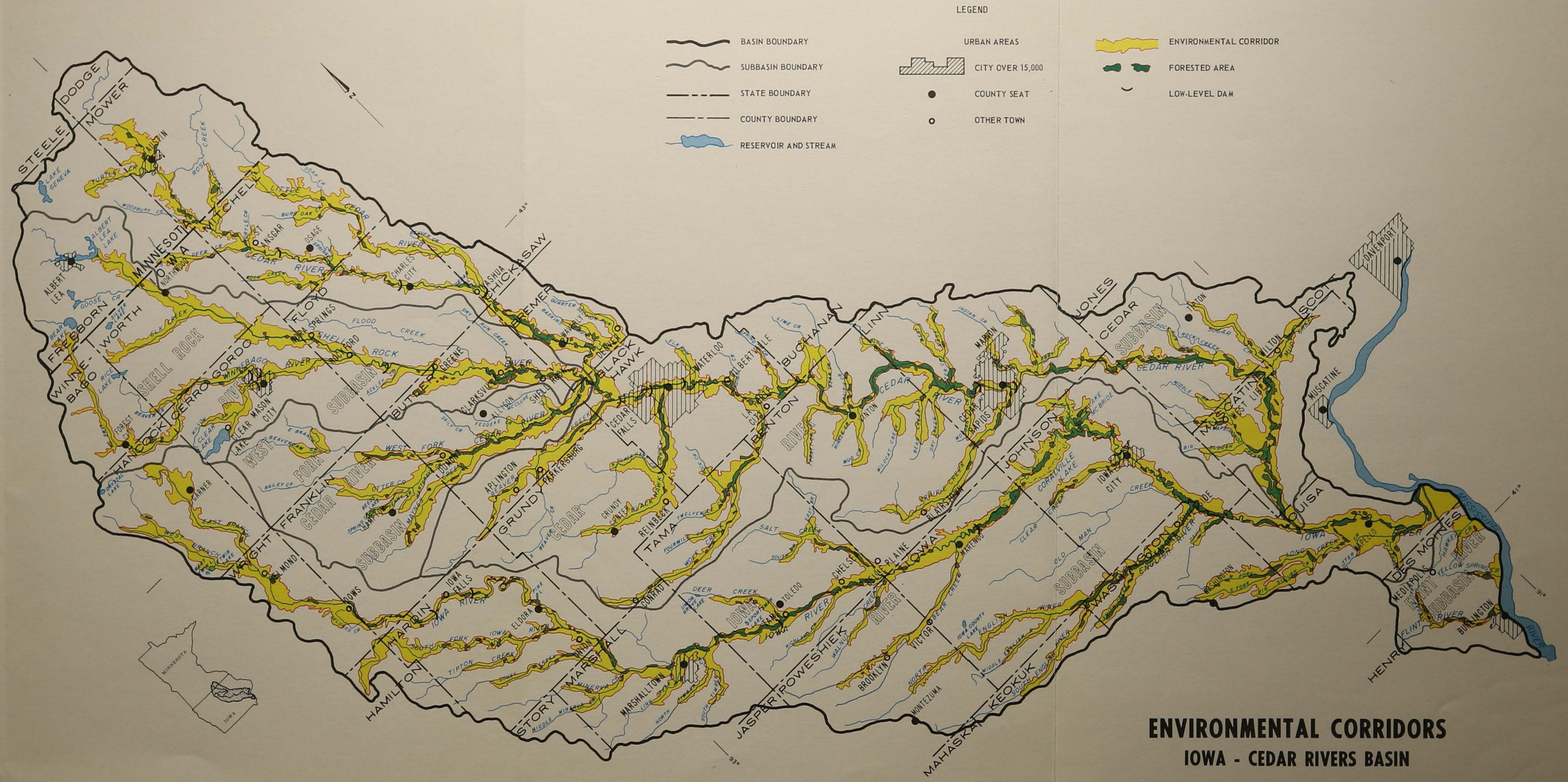
(3) describe opportunities for preservation, enhancement or development of resources, and

(4) evaluate courses of action deemed necessary or desirable to protect or enhance the corridors.

The environmental corridor concept should be useful to land use decision makers by helping optimize land use.

"Conservation proclaims the right and duty of the people to act for the benefit of the people."

Gifford Pinchot



ENVIRONMENTAL CORRIDORS

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA

FIGURE II-2

SOURCE: FAMILY OF MAPS SCS DRAWING NUMBER 5,S-32,382 (REV. 5-15-74) IOWA CONSERVATION COMMISSION, MINNESOTA DEPARTMENT OF NATURAL RESOURCES, IOWA NATURAL RESOURCES COUNCIL, USDA SOIL CONSERVATION SERVICE, AND USDA FOREST SERVICE.

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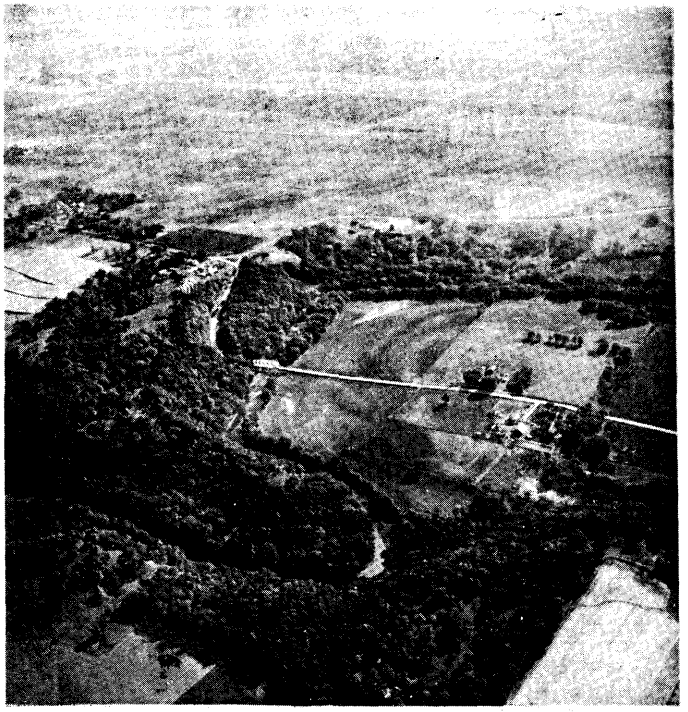
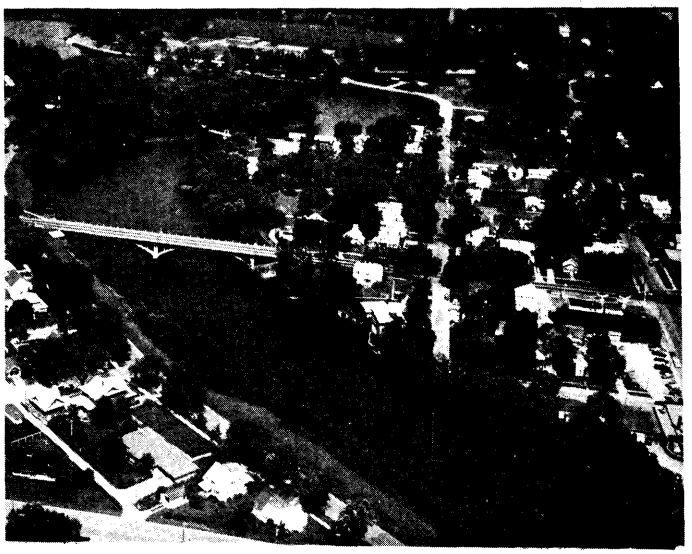
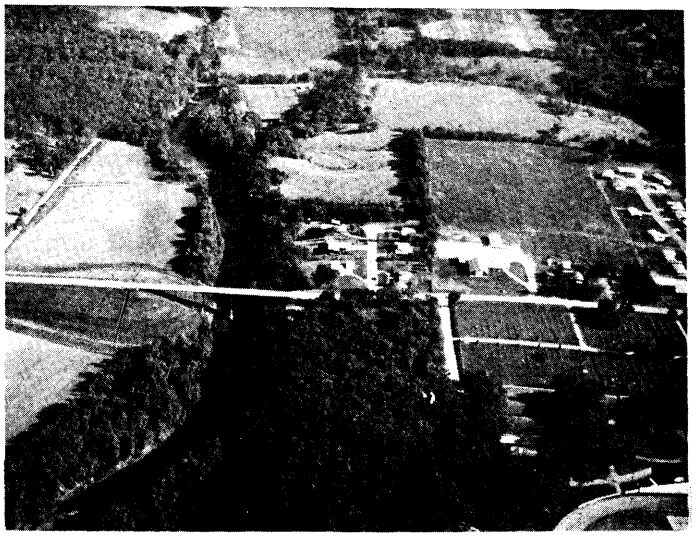


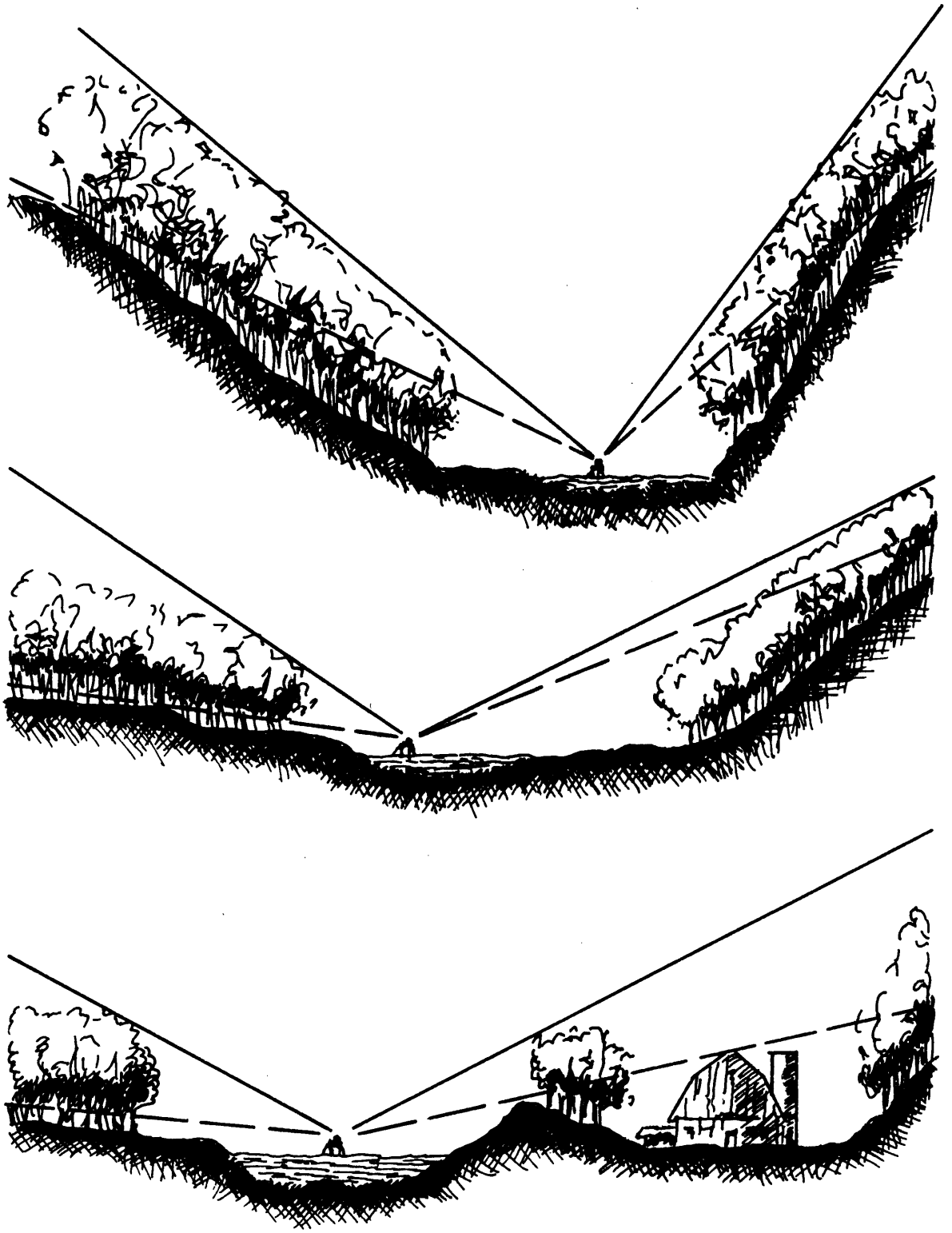




SCENIC CORRIDORS-

The Basin is bountifully endowed with scenic river corridors

Figure II-1 PERCEPTUAL RIVER CORRIDOR



Clear view

Partially obscured view

III. ENVIRONMENTAL SETTING

A. Physical Geography

The Iowa-Cedar Rivers Basin drains 12,971 square miles. Ninety-two percent of the Basin is in Iowa and includes about 23 percent of the land area of the state. The remaining 8 percent is in Minnesota. The Basin is about 250 miles long, and the average width is 60 miles.

The Cedar River rises in marshy depressions in the lake region of southern Minnesota. Draining 7,819 square miles, with 1,023 square miles in Minnesota, it flows in a southeasterly direction through east-central Iowa and joins the Iowa River at Columbus Junction in southeastern Iowa, about 30 miles from the Mississippi River. The Shell Rock River, which originates at Lake Albert Lea in Minnesota and drains 1,783 square miles, is the largest tributary of the Cedar River. The other tributaries are the West Fork Cedar River, draining 856 square miles, and Winnebago River, draining 700 square miles. Other streams that are direct tributaries to the Cedar River are Prairie Creek, Wolf Creek, Blackhawk Creek, Beaver Creek, and Little Cedar River.

The Iowa River rises in Hancock County, Iowa, and flows in a southeasterly direction to the Mississippi River. Above the confluence with the Cedar River, the drainage area is 4,375 square miles. The English River with a drainage area of 638 square miles is an Iowa River tributary. Other tributaries with drainage areas larger than 200 square miles are Old Man Creek, Bear Creek, and Salt Creek.

The Iowa-Cedar Basin is gently rolling prairie land, with surface elevations less than 200 feet above the streams. All the Basin is covered by deposits of the two earliest glacial sheets, the Nebraskan and Kansan. In the Southern part of the Basin, except in parts of Louisa and Muscatine Counties, the surface deposits are from the Kansan ice sheet, which cover those of the Nebraskan and provide a surface that is maturely drained and susceptible to erosion. The surface deposits in parts of Louisa and Muscatine Counties are from the Illinoian, the third ice sheet, and the topography is also mature. The streams have cut deeply into the Kansan and Illinoian deposits, and wide flood plains are common.

In the eastern part of the Basin, north of the Benton-Iowa County line, surface deposits are of the Wisconsin stage of glaciation. Although fairly wide flood plains are sometimes developed, the streams in this region are generally in steep valleys. Isolated lakes, swamps, and bogs are found in the upper reaches. In the upper western part of the Basin, which includes the northern part of the

Iowa River drainage, surface deposits are also from the Wisconsin. Morainic hills, marshes, and peat bogs characterize the topography. Streams flow in shallow channels in upstream reaches, but cut channels deeper into the glacial till and often into rock in down stream reaches.

The Iowa River has an average slope of 1.9 feet per mile; the Cedar River, 2.5 feet per mile. At Wapello, near its mouth, the Iowa River has a bankfull capacity of 29,000 cubic feet per second (cfs), a width of about 740 feet, and a mean depth of 10.7 feet. At Cedar Rapids near the mouth, the Cedar River has a bankfull capacity of 10,000 cfs, a width of 485 feet, and a mean depth of 5.1 feet.

B. Climate

The Iowa-Cedar Rivers Basin has a typical continental climate. At Waterloo, near the center of the north-south axis of the Basin, the average annual temperature is 48 degrees Fahrenheit, the average January temperature, 19 degrees, and the average July temperature, 74 degrees. The average frost-free season varies from 180 days in the southern portion of the Basin to 150 days in the upper third of the Basin.

The average annual rainfall varies from 34.6 inches at Wapello, Iowa, in the southern part of the Basin to 31.2 inches at Austin and 29.2 inches at Albert Lea, Minnesota, in the northern part. Basin-wide average annual rainfall is 31.8 inches, and annual snowfall is 29 inches. During most years, rainfall is adequate for satisfactory crop growth, with 71 percent of the total occurring during the growing season.

C. Navigation and Dams

Because of restrictive channel conditions, both natural and developed, neither the Iowa nor the Cedar River systems support commercial navigation. Boating on the streams is limited to small, private recreational vessels.

Historically, hydropower has been the major force behind water resource development in the Iowa-Cedar Rivers Basin, and is responsible for at least 123 development projects along the main stems and their tributaries. However, many of these projects have been abandoned as technology has improved, and there remain only ten hydroelectric power plants licensed by the State of Iowa within the Basin.

The single largest impoundment in the Basin is Coralville Reservoir on the Iowa River, about five miles above Iowa City in Johnson County. The Project, completed by the Corps of Engineers in 1958, controls drainage from approximately 3,084 square miles and provides flood control, recreation and water quality benefits.

D. Water Resources

Both surface and sub-surface water supplies throughout the Basin are affected by a combination of land use practices and aquifer characteristics, and existing water quantity and quality features are therefore difficult to ascribe to particular conditions within the Basin. However, certain general assumptions may be made based on empirical knowledge of similar situations.

Ground water in the Basin is derived from both shallow (less than 100 feet below the surface) aquifers consisting primarily of unconsolidated deposits of sand, gravel, silt and weathered glacial tills, and from deeper bedrock aquifers of porous and creviced limestone and dolomite.

The shallow, unconsolidated aquifers are incapable of supplying the large water volumes required by municipal and industrial users because they are not interconnected with the large aquifers which supply the major portion of base flow in the Basin, and thus must rely on infiltration for recharge. However, because they are shallow and inexpensive to develop, and because they are capable of supplying the low water volumes (10-40 gallons per minute) required for domestic use, these shallow aquifers are extensively mined for household supplies, particularly in the uplands. Thus the shallow aquifers are important to the Basin economically, but have little effect on stream regimen and the overall hydrologic balance of the Basin.

The deep bedrock and alluvial aquifers, however, are significant in the Basin's water cycle, receiving water from channel recharge as well as infiltration. Several major municipal and industrial water supplies originate in these deeper strata, and the volume of water pumped from these wells can have drastic and persistent effects on stream regimen if they are located within the flood plain. Heavy pumping, particularly in the permeable alluvium of the Iowa and Cedar River flood plains, lowers the prevailing water table which in turn reduces channel flow as water moves from the stream to replenish the ground water storage deficit. At certain times the flow volume may be reduced to levels which are detrimental to aquatic populations. Any reductions in flow reduce the recreation potential of the stream as aesthetic quality declines and fishing, boating and swimming possibilities deteriorate. This situation, while not critical at present, will become more serious as additional ground water yields (estimated to total 1.3 million additional gallons per day by 2000) are required to keep abreast of future municipal and industrial expansion in the Basin. A summary of historic flow data from 21 gaging stations throughout the Basin is presented in Table III-1.

TABLE III-1

FLOW DATA
Iowa-Cedar Rivers Basin

Location	Drainage Area Above (sq. mi.)	Station Years of Record	Average Discharge (cfs)	Instantaneous Flows From Station Years of Record		Years of Record Used to Compute Low Flows	7 Day Average 1 in 10 Years (cfs)	1 Day in 30 Years (cfs)
				Minimum Flow (cfs)	Maximum Flow (cfs)			
East Branch River near Klemme, Ia. . .	133	18	55.5	0.2	5,960	1947–66	0.5	0.1[a]
Iowa River near Rowan, Ia.	429	40	185	2.9	8,460	1940–66	5.0	3.2[a]
Iowa River at Marshalltown, Ia. . .	1,564	34	732	9.0	42,000	1932–66	20	9.5
Salt Creek near Elberon, Ia.	201	21	115	2.4	35,000	1945–66	2.7	2.4[a]
Iowa River at Marengo, Ia.	2,794	10	1,550	54	30,800	1956–66	60	47[a]
Iowa River at Iowa City, Ia.[b]	3,271	63	1,547	29	42,500	1933–66	50	29
English River at Kalona, Ia.	573	27	333	1.1	20,000	1943–66	1.7	1.0[a]
Iowa River near Lone Tree, Ia. . . .	4,293	10	2,486	75	31,200	1956–66	100	30[a]
Iowa River at Wapello, Ia.	12,499	52	6,253	300	94,000	1933–66	540	315
Cedar River near Austin, Minn. . . .	425	25	165	0	9,530	1944–65	28	25[a]
Cedar River at Janesville, Ia.	1,661	46	721	28	37,000	1948–66	70	40[a]
Little Cedar River near Ionia, Ia. . . .	306	12	124	3.0	10,800	1956–66	3.5	1.0[a]
West Fork Cedar River at Finchford, Ia. . . .	846	21	393	5.9	31,900	1945–66	8.4	1.0[a]
Shell Rock River near Northwood, Ia.	300	21	123	0.3	3,400	1948–66	3.1	0.0[a]
Winnebago River (Lime Creek) at Mason City, Ia. . . .	526	34	221	2.5	10,800	1933–66	7.0	2.8
Shell Rock River at Shell Rock, Ia. . . .	1,746	13	732	39	33,500	1953–66	55	23[a]
Beaver Creek at New Hartford, Ia. . .	347	21	172	2.3	18,000	1947–66	3.8	1.7[a]
Black Hawk Creek at Hudson, Ia. . . .	303	14	138	1.9	9,000	1951–66	3.2	1.7[a]
Cedar River at Waterloo, Ia.	5,146	26	2,554	152	76,700	1943–66	230	140[a]
Cedar River at Cedar Rapids, Ia. . .	6,510	64	3,094	212	73,000	1933–66	300	215
Cedar River near Conesville, Ia. . . .	7,785	27	4,050	250	70,800	1940–66	400	125[a]

[a] Flow estimated by extrapolating curve of available flow data to this recurrence interval.

[b] Flow regulated by Coralville Reservoir since 1958.

Source: Upper Mississippi River Comprehensive Basin Study, Volume IV.

(cfs) - cubic feet per second

Water quality also affects the potential uses of a given water resource. The mineral content, hence quality, of ground water is dependent upon the composition of both the surface materials through which it has percolated and the aquifer in which it is "stored". Because parent materials and bedrock composition are relatively uniform throughout the Basin, certain general factors are characteristic of the ground water supply. The first of these is hardness; calcium carbonate (C_aCO_3) is abundant because limestone is the predominant constituent of both aquifer systems. The second factor is iron, the concentrations of which have been found to be in excess of desirable levels at several points throughout the Basin. The analyses of several wells, taken as indicative of the Basin's ground water supplies in general, at Marengo, Vinton and Waterloo, Iowa is shown in Table III-2. The quality parameters generally measured to characterize both ground and surface water supplies, together with an indication of the maximum acceptable concentration of each parameter for drinking water is listed in Table III-3.

TABLE III-2

Analyses of Well Discharge at Marengo, Vinton and Waterloo, Iowa

Parameter	Test Range (milligrams/liter)
Dissolved Solids	273-321
Hardness (C_aCO_3)	236-244
Bicarbonate	222-288
Sulfate	15.6-43.3
Chloride	1-6
Iron	.06-2.46

TABLE III-3

Water Quality Parameters and Generally Acceptable Concentrations for Drinking Water*

Parameter	Concentration (milligrams/liter)
Biochemical Oxygen Demand (Monthly Mean)	2.5
Dissolved Oxygen (Monthly Mean)	4.5
Nitrogen	10
Phosphorous	Undefined
Iron	0.3
Sulfate	250
Hardness	250
Total Solids	1500
Dissolved Solids	500
Chloride	250

* This information included only for purposes of interpretation of accompanying tables.

The basic quality of surface waters reflects both the Basin's extensive agricultural economy and the discharges from municipal and industrial sources. In the period 1963-1965, the Iowa State Hygienic Laboratory made an extensive study of the water quality of the Iowa-Cedar Rivers system from Albert Lea, Minnesota, to the confluence of the Iowa and Mississippi Rivers. A summary of the data collected on six of the more important quality parameters measured at four primary sampling points throughout the system is shown in Table III-4.

TABLE III-4

Six Parameters Indicating Water Quality of the Iowa-Cedar Rivers System

Parameter	Measured Value			
	Maximum		Minimum	
	Amount	Location	Amount	Location
5-Day Biochemical Oxygen Demand (BOD_5) (mg/l)	15.2	Outlet of Lake Albert Lea on the Shell Rock River	4.5	Lime Creek (Winnebago River) above Mason City
Dissolved Oxygen (DO) (mg/l)	11.2	Cedar River above Waterloo	8.2	Cedar River at Rochester
Percent Saturation of Dissolved Oxygen (%)	122.1	Cedar River above Waterloo	88.6	Cedar River at Rochester
Ratio of Chemical Oxygen Demand to 5-day Biochemical Oxygen Demand (COD/BOD)	21.3	Outlet of Lake Albert Lea on the Shell Rock River	8.1	Cedar River at Palo above Cedar Rapids
Total Nitrogen (as nitrogen) (mg/l)	5.7	Outlet of Lake Albert Lea on the Shell Rock River	2.9	Cedar River above Waterloo
Total Phosphate (mg/l)	3.2	Outlet of Lake Albert Lea on the Shell Rock River	0.9	Cedar River above Waterloo

Surface water quality data (Table III-5) supplied by the Iowa Public Water Supply Commission was taken at three additional sample points on the rivers system.

TABLE III-5

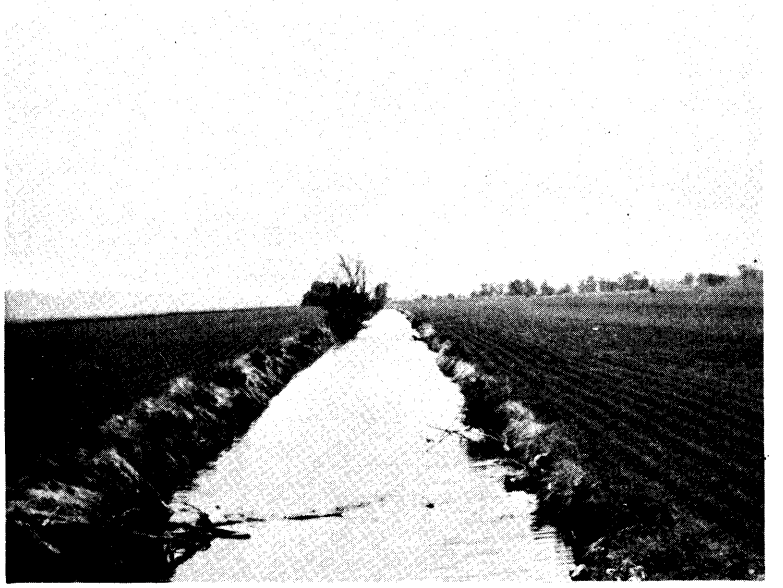
Surface Water Quality Data (Milligrams/liter) From Three Sources Within the Iowa-Cedar Rivers Basin

Parameter	Cedar Rapids on Cedar River	Clear Lake (Lime Creek)	Iowa City on Iowa River
Total solids	284-517	216-300	302-576
Dissolved solids	235-362	190-284	261-404
Total iron (Fe)	0.04-0.12	0.02-0.16	0.04-0.28
Nitrate (NO_3)	2.7-15.9	0.1-8.6	0.9-13
Sulfate (SO_4)	32.1-62.1	9.5-27.8	37.9-78.1
Hardness as C_aCO_3	180-284	150-208	212-332
Silicon dioxide(S_iO_2)	0.4-13.8	1.0-16.0	1.1-18.4
Total alkalinity	123-224	144-192	150-260

Together these measurements provide insight to the acceptability of the Basin's surface waters for various uses. Several of the water quality parameters given approach maximum recommended limits (Table III-2) indicating a need to carefully weigh river impacts from land use alternatives.

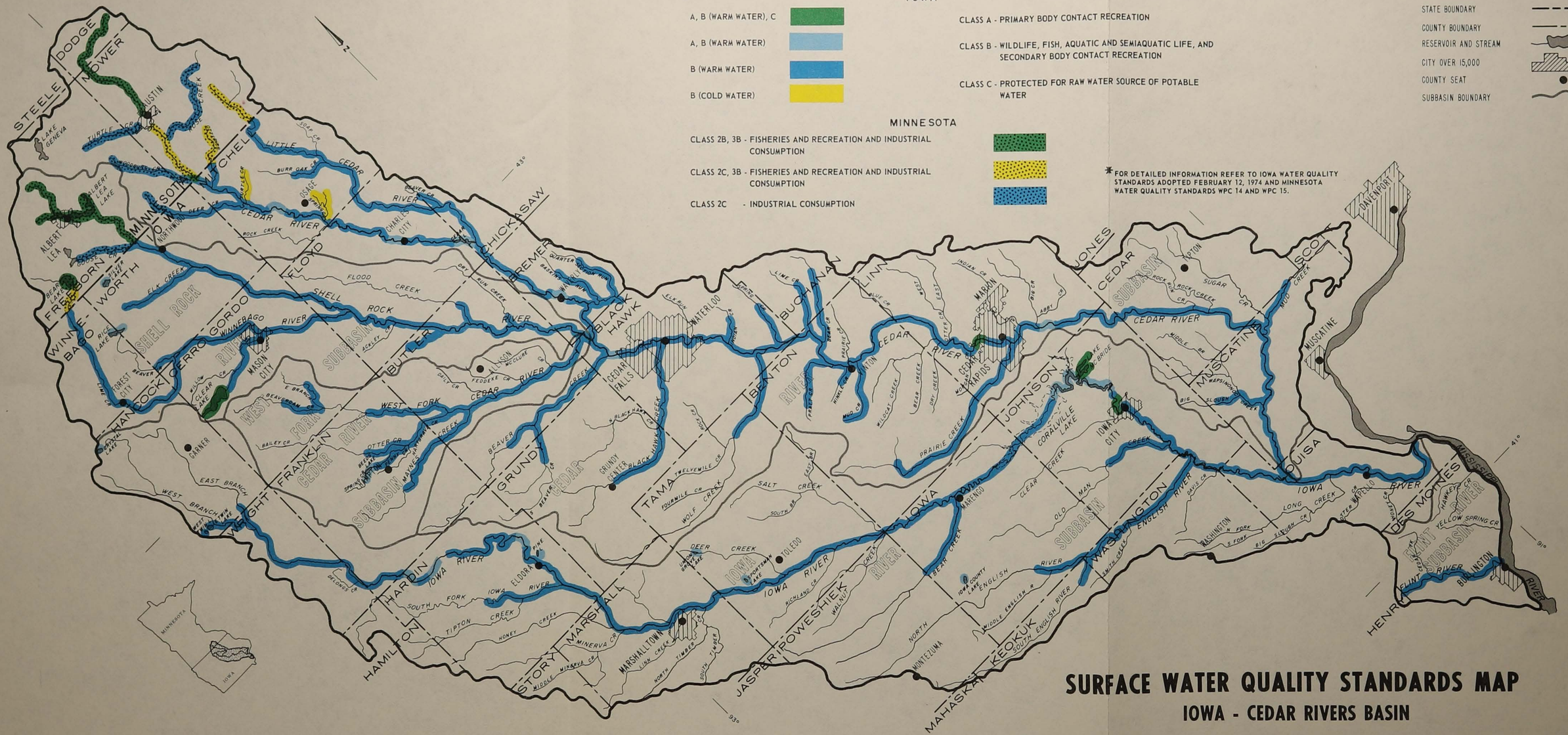
The high concentrations of nitrate-nitrogen, and total solids are indicative of fertile soils, intense agricultural land use, and biologically enriched municipal and industrial effluents. Whatever the source, however, these concentrated nutrients can decrease the streams' desirability for recreation by contributing to the formation of nuisance algae blooms under certain light conditions. Industrial effluents also contribute to the percentage of total biochemical oxygen demand (BOD) caused by inorganic chemicals (COD). As shown in Table III-4, total BOD at times may exceed the dissolved oxygen concentrations, thus indicating a detrimental loading of oxidizable materials in the system. Such over loading further hampers the establishment of desirable fish and other aquatic organisms. General surface water quality conditions throughout the Basin is indicated in Figure III-1.

The basic flow characteristics and background mineral content of the Iowa and Cedar Rivers are affected by land use practices and aquifer characteristics throughout the Basin, but activities immediately adjacent to the streams have much more immediate and apparent effects on the water resource.



Cropping to the edge of drainage ditches causes higher concentrations of solids, and agriculture chemicals in the major streams.

Stream water samples show that Iron, Nitrates and Hardness parameters exceed acceptable concentrations for drinking water.



SURFACE WATER QUALITY STANDARDS MAP

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA

Figure III-1

SOURCE: FAMILY OF MAPS SCS DRAWING NUMBER 5,S-32,382 (REV. 5-15-74), MINNESOTA POLLUTION CONTROL AGENCY, IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY, USDA SOIL CONSERVATION SERVICE, AND USDA FOREST SERVICE.

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E. Land Resources

1. Land Use

Land use within the corridors, was divided into three main categories of /forest land/urban land/and crop, pasture and other land/. Forest land in the corridors comprises approximately 200 thousand acres, urban land 54 thousand acres and crop, pasture, and other land 1.5 million acres. A summary of the broad land uses within the corridors and related stream mileages is shown in Table III-6.

The predominate land use of crop, pasture and other land is not expanded upon in this report because of the extensive coverage in the Iowa-Cedar Rivers Basin Main Report. Urban land acreage was delinated because of the environmental effects urban land has upon the natural resources. The expanding acreage of this land use causes irreversible and irretrievable effects to other lands. Forest land has a changing importance in the corridors. This land use and resource was once used primarily for forest products, but now is more of a scenic and ecological resource. Appendix A gives a specific breakdown of land use by stream corridor, while Appendix B shows a breakdown by county. Further breakdowns are in Appendix C & D. The Cedar Subbasin includes 41 corridors compared to three in the Flint Subbasin. Percent of forest land ranges from 48 in the Davis Creek corridor, Iowa Subbasin, to none in several subbasin corridors.

About 11% of the corridors are forest land.

TABLE III-6

ENVIRONMENTAL CORRIDOR LAND USE INVENTORY SUMMARY

Iowa-Cedar Rivers Basin

Subbasin	Total Subbasin Acres	Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban		Crop, Pasture, & Other Land	
					Acres	% of Corridor	Acres	% of Corridor	Acres	% of Corridor
Iowa	3,083,520	715	644,779	21	83,914	13	13,079	2	547,786	85
Cedar	3,315,200	940	782,188	24	88,115	11	33,159	4	660,914	85
Shell Rock	1,141,120	179	246,750	22	13,622	5	7,161	3	225,967	92
West Fork Cedar	547,840	88	104,644	19	11,365	11	468	1	92,811	88
Flint	213,760	25	24,648	12	2,491	10	---	-	22,157	90
TOTAL	8,301,440	1,947	1,803,009	22	199,507	11	53,867	3	1,549,635	86

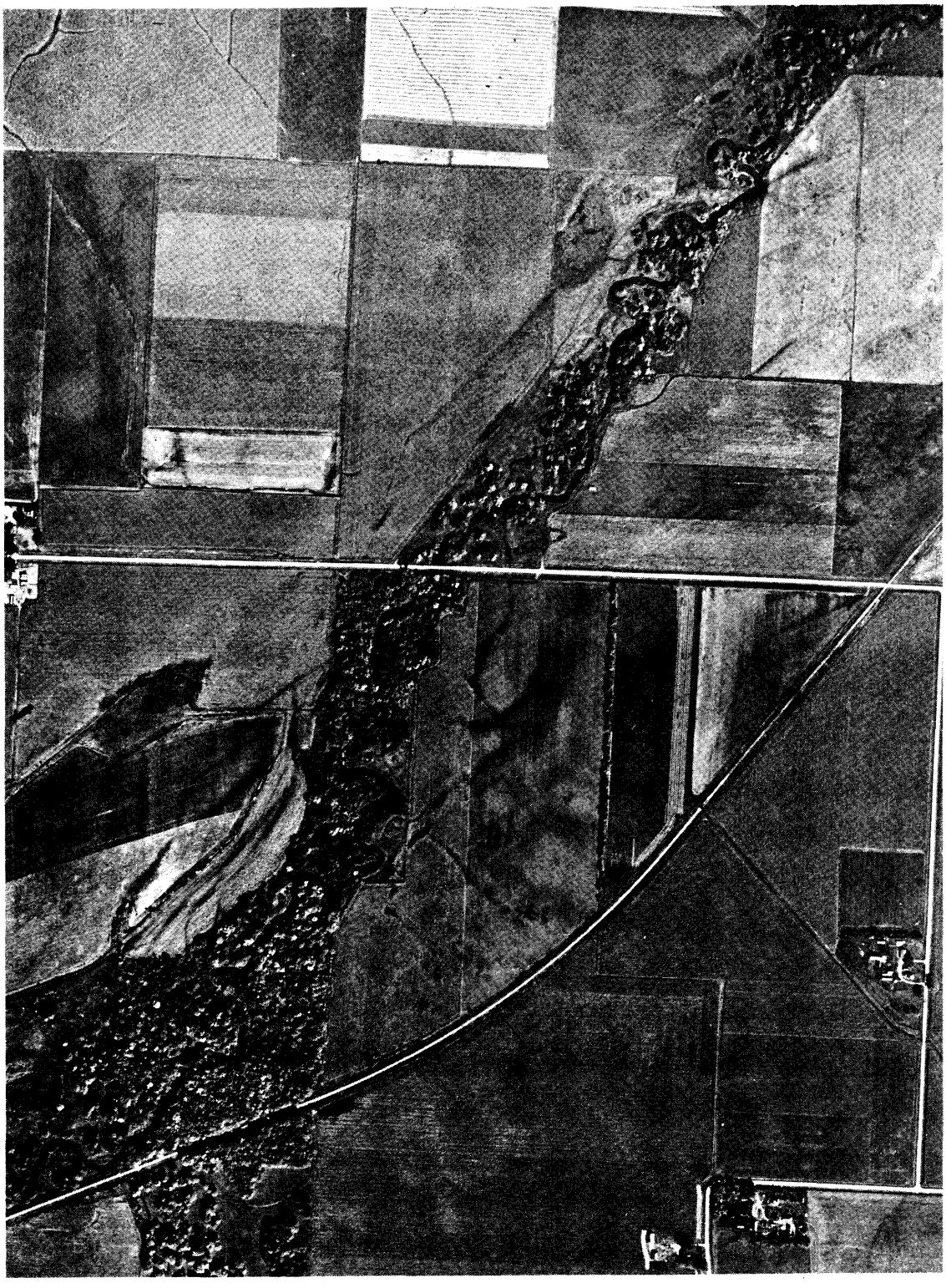
2. Forest Resources

The most valuable forest land in the Iowa-Cedar Rivers Basin, from a multiple-use standpoint, occurs within the environmental corridors. About 65 percent of the Basin's forest land occurs within the corridors. The corridors, as defined, comprise 22 perent of the total Basin area.

Recreation, grazing, wildlife, watershed protection, scenic and aesthetic values and wood production are the major multiple uses of the corridor forested areas. The forest land in the corridors exists today because the land is not suited for agricultural crop production. Generally, the soils in these bottomlands need draining to produce a crop, or the steep slopes along the streams make farming physically difficult. In Figure III-2, the remaining forest land along a stream in Grundy County is shown.

Two major forest types, oak-hickory and elm-ash-cottonwood, occur in the environmental corridors and adjacent areas. The elm-ash-cottonwood type is the most important in terms of area, volume of sawtimber, cubic volume, growth potential and value.

Veneer logs cut near Iowa City. Logs are mostly ash and elm.



Aerial view of an Environmental Corridor. The only remaining forest land is located along the streams.

Figure III-2

Numerous other hardwood species are found within these two major types. Eastern red cedar is the only native conifer and occurs as an occasional tree in association with the upland hardwood species. In general, the corridors are dominated by the elm-ash-cottonwood timber type.

The following tabulation indicates the percentage of commercial forest land by various size classes for bottomland in the Iowa-Cedar Rivers Basin.

SAWTIMBER (11" dbh & above)	POLETIMBER (5" to 9" dbh)	SEEDLINGS & SAPLINGS (less than 5" dbh)	NON-STOCKED (0-10% tree cover)	TOTAL
50	23	12	15	100

From a wood production standpoint, growth, quality and preferred species occur in the bottomlands and well-drained valley slopes. Wood production is a secondary use in comparison to recreation, wildlife, grazing and watershed protection. However, forest land is very important to individual landowners and those wood using industries who depend upon the resource.

Over 95% of the corridor forest land is privately owned. The remainder is administered by Federal (Department of Defense), State, County (conservation boards), and municipal agencies.

The largest concentrations of forest land are located in the southern portion of the Basin along the stream corridors. The combination of rivers and streams and adjacent forest land provides some of the best wildlife habitat in the Basin. The habitat diversity and value are highest where forest land is interspersed with cropland and pasture.

Managed properly, forested lands on the steeper valley slopes provide excellent watershed protection from erosion and subsequent sedimentation. Stream banks also benefit from good forest cover since the extensive root systems hold the banks intact. Fishery habitat is also improved with tree-lined banks by stabilizing pools and providing cover.

Most of the Basin-wide recreation use occurs within the forested lands of the corridors. Various recreational activities, including walking and driving for pleasure, fishing, hunting, camping and picnicking are enhanced when associated with forest cover.

Grazing of livestock--as shown in Table III-7 occurs on approximately 37 percent of the forest land in the corridors. Of the total forest land grazed, about 41 percent is considered moderate to heavy grazing. The Cedar River Subbasin has about two-thirds of the total moderate-heavy grazing acreage. Excessive grazing of forest land adversely affects wildlife habitat, soil, and wood production.

TABLE III-7

GRAZED VS. NON-GRAZED FOREST LAND WITHIN
ENVIRONMENTAL CORRIDORS*
IOWA-CEDAR RIVERS BASIN

SUBBASIN	FALL GRAZING TO SLIGHT GRAZING	MODERATE GRAZING	HEAVY GRAZING	TOTAL GRAZED FOREST LAND WITHIN CORRIDORS	% OF GRAZED AREA WITHIN CORRIDORS	NON-GRAZED FOREST LAND WITHIN CORRIDORS	% OF NON-GRAZED	TOTAL FORES LAND WITHIN CORRIDORS
	----------Acres----------					--Acres--		---Acres---
Cedar River	12,521	16,892	3,189	32,602	37	55,513	63	88,115
Iowa River	26,403	2,108	4,216	32,727	39	51,187	61	83,914
Shell Rock River	-	3,950	-	3,950	29	9,672	71	13,622
West Fork Cedar River	3,410	-	-	3,410	30	7,955	70	11,365
Flint River	573	-	-	573	23	1,918	77	2,491
TOTAL	42,907	22,950	7,405	73,262	37	126,244	63	199,507

* Data based on Wildlife Habitat Inventory and Evaluation, Iowa-Cedar Rivers Basin.

3. Crop, Pasture, and Other Land

About 86 percent of the total corridor area is in the crop, pasture and other land category. The Shell Rock Subbasin has the highest amount with 92 percent in crop and pasture. The bottomland soils are rich in nutrients and produce high crop yields. Bottomland pasture produces more forage than upland pasture areas because of the extra moisture in the soil. Other land is classified as land in other uses besides crop, pasture, forest or urban such as roads, idle, farmsteads, etc.

In addition to crop and forage production, these lands supply necessary wildlife habitat and recreational hunting use. The edge effects of forest land and cropland provide excellent wildlife habitat. Careful planning and cooperation of landowners can provide an interrelationship of quality agricultural products, recreation, wildlife and forestry.

Greater detail about extent and production of agricultural lands can be obtained in the Iowa-Cedar Rivers Basin Main Report.

4. Fish and Wildlife Resources

Fish and wildlife populations are regulated by the interactive ecological environment of man, land use, weather and many other factors. This interactive relation is very important in determination of future fish and wildlife in the Iowa-Cedar Rivers Basin.

a. Fish

Fish populations have been affected adversely through the years in most of the Basin as a result of poor water quality. Water quality has been reduced by pollution from a number of sources. Intensive cultivation, overpasturing, road construction, and other land use practices have resulted in serious sedimentation problems. Water runoff containing excessive nitrogen and phosphorus from farm fertilizers, plus livestock and human wastes, have produced problems of overenrichment in many lakes and streams. Toxic chemicals from industrial activities have also resulted in major water quality degradation.

As a result, those fish species needing relatively pure, unpolluted waters have been reduced or eliminated from some areas. Some of the waters where bass, trout, and certain panfish once flourished are now occupied by buffalo, carp and other species which are generally tolerant of poorer water quality. Game fishing along the stream corridors will continue to decrease without some water quality control. The location of the major fish species by stream reach in order of abundance and importance is shown in Figure III-3. Channel catfish is probably the most common and important game fish in the Basin, particularly in the southern half.

b. Wildlife

Many of the various wildlife species are concentrated within the corridors because of the higher quality habitat resulting from more edge effect and diversity of habitat types. Aldo Leopold, in his classic book Game Management (1) so aptly stated the importance of edge effects and the need for diversity in habitat types.

> "While we are only at the threshold of an understanding of the ecology of game species, it may be said that each species requires from one to four environmental types on each unit of habitable range and that most species require three or four . . . Game is a phenomenon of edges. It occurs where the types of food and cover which it needs come together, i.e., where their edges meet. We do not understand the reason for all of these edge effects, but in those cases where we can guess the reason, it usually harks back either to the desirability of simultaneous access to more than one environmental type, or the greater richness of border vegetation, or both."

Unfortunately, in some areas of the Basin, the edge effect has been reduced considerably. Hedgerows, fence rows, brush, and timber stringers have been removed in deference to using larger farming equipment and enlarging individual fields. For a number of game species, these practices effectively reduce or eliminate key habitat, resulting in population losses.

Waterfowl reproduction has also been reduced to a large degree because of past drainage practices on wetlands. Blue and snow geese which once migrated non-stop over the Basin during the fall are now providing an important hunting resource, primarily because of the use of mechanical corn harvesters with an increase in waste grain.

At the present time, the popular game species, are pheasant, cottontail rabbit, squirrel, quail, waterfowl, fox, coyote, and raccoon. Other species that provide hunting include crows, jack rabbit, deer, groundhogs, and Hungarian partridge. In addition to hunting, most species of wildlife, particularly waterfowl, song birds, and deer, provide considerable viewing pleasure for the public. Appendix E indicates the density of game birds and mammals in the Basin.

UNITED STATES DEPARTMENT OF AGRICULTURE

DISTRIBUTION OF FISH SPECIES MAP

IOWA-CEDAR RIVERS BASIN

IOWA AND MINNESOTA

Cs Cr
BH NP
Pe BG
Ca SF
Wa LMB
RH

CS Pe
SMB Wa
BH RB
Ca Cr
RH SF
BG LMB
NP

NP Wa
SMB BG
CC LMB
Cr FHC
Ca BH

NP
LMB
Ca
Wa
BH
Cr

NP
Ca
BH

CC BH
Ca BG
NP LMB
Wa Cr

NP BG
SMB Cr
CC LMB
Ca BH
Wa

BH
BG
LMB
Cr
NP

CC FHC
Wa LMB
SMB BG
Ca Cr
NP Bu

CC Cr
FHC BG
Wa BH
Ca SMB
SBC SS
NP

CC BG
BH Cr
Ca Bu
FHC

CC Cr
FHC NP
Wa LMB
BH SF

CC Wa
FHC Dr
BH NP
Ca

DODGE
STEELE
FREEBORN
MOWER
ALBERT LEA
AUSTIN
MINNESOTA
IOWA
WINNEBAGO
WORTH
MITCHELL
Northwood
Forest City
Osage
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
MASON CITY
Garner
Charles City
WRIGHT
FRANKLIN
BUTLER
BREMER
Hampton
Allison
Waverly
BLACK HAWK
BUCHANAN
CEDAR FALLS
HAMILTON
HARDIN
GRUNDY
WATERLOO
Eldora
Grundy Center
TAMA
BENTON
LINN
JONES
STORY
MARSHALL
Vinton
MARSHALLTOWN
Toledo
CEDAR RAPIDS
CEDAR
Tipton
SCOTT
JASPER
POWESHIEK
IOWA
JOHNSON
Marengo
IOWA CITY
Montezuma
MUSCATINE
DAVENPORT
MAHASKA
KEOKUK
WASHINGTON
Washington
LOUISA
Wapello
HENRY
DES MOINES
BURLINGTON
Cedar River
Iowa River
Skunk River
Mississippi River
Flint River
Coralville Lake
Rock River
Shell Rock River
West Fork Cedar River
Winnebago River

N

93°
94°
44°
43°
42°
41°
92°
91°

MINNESOTA
IOWA-CEDAR RIVERS BASIN
IOWA

SCALE 1:1,660,000
10 0 10 20 30
SCALE IN MILES

Fish species listed vertically by order of abundance and importance.

LEGEND

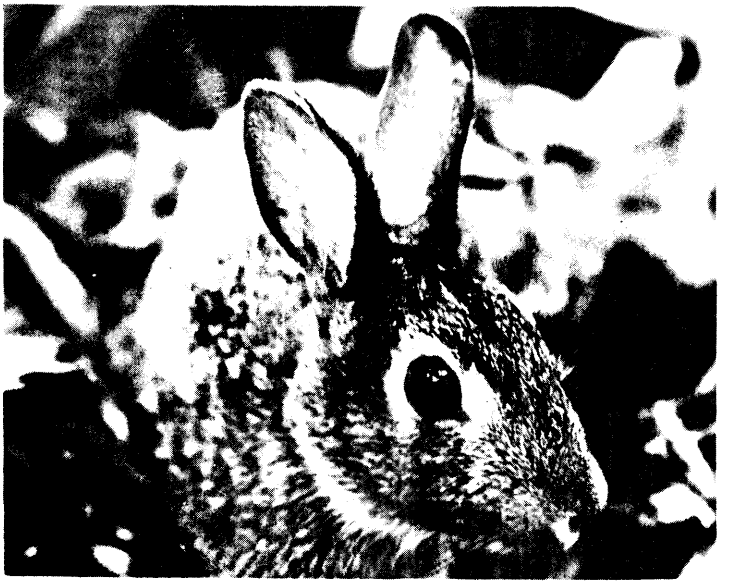
BASIN BOUNDARY
SUBBASIN BOUNDARY
STATE BOUNDARY
COUNTY BOUNDARY
RESERVOIR AND STREAM
TOWN OVER 15,000
COUNTY SEAT

COMMON NAME	
BLUEGILL	BG
BUFFALO	Bu
BULLHEAD	BH
CARP	Ca
CHANNEL CAT	CC
COMMON SUCKER	CS
CRAPPIE	Cr
DRUM	Dr
FLATHEAD CAT	FHC
LARGEMOUTH BASS	LMB
NORTHERN PIKE	NP
PERCH	Pe
RED HORSE	RH
ROCK BASS	RB
SAND STURGEON	SS
SMALLMOUTH BASS	SMB
SPOONBILL CAT	SBC
SUNFISH	SF
WALLEYE	Wa

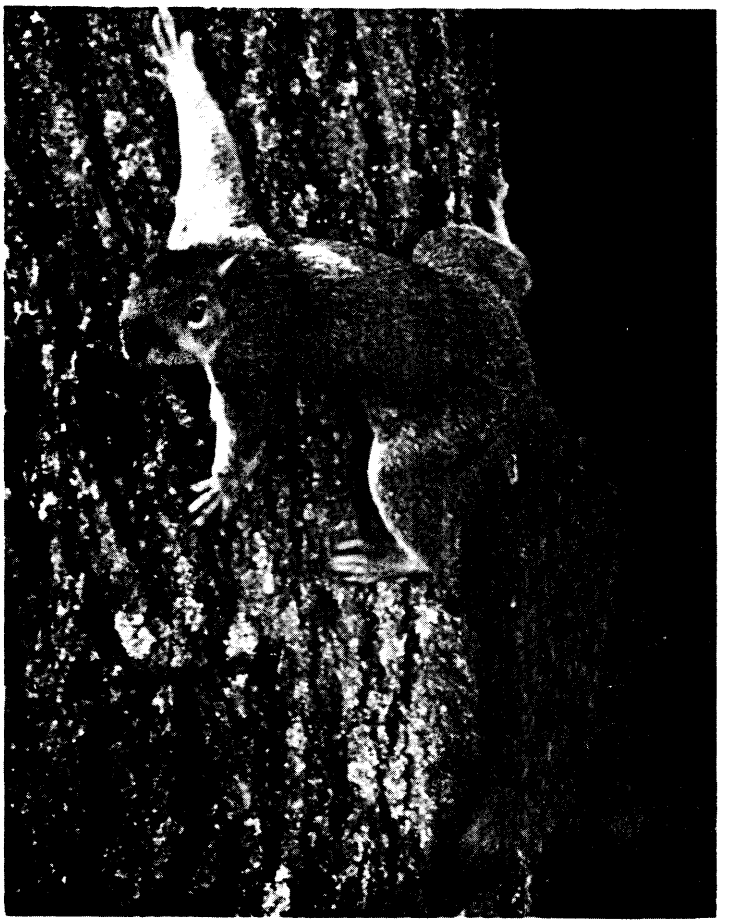
SOURCE:
SCS DRAWING NO. 5,O-28,270 (4-74); MINNESOTA DEPARTMENT OF NATURAL RESOURCES, IOWA CONSERVATION COMMISSION AND INFORMATION FROM FIELD TECHNICIANS. LAMBERT CONFORMAL CONIC PROJECTION.
USDA-SCS-LINCOLN, NEBR. 1975

Figure III-3

REV. 11/24/75
5,N-34,945



Cottontail rabbit



Fox squirrel

White tail deer (doe)

Corridor type recreation

5. Recreation Resources

Because of the diversity of landscapes within the corridors, the quality of the recreational experience is significantly enhanced. As a result of this diversity, recreational developments are, and will continue to be, concentrated within the corridor areas. Further, dispersed recreational uses, such as hunting, stream fishing, hiking, driving for pleasure, etc., are also concentrated along the Basin's rivers and streams. The location of existing public recreation areas in the Basin is indicated in Figure III-4.

Canoeing is enjoyed on many streams in the Iowa-Cedar Rivers Basin.

Stream corridors provide an environment for many types of recreation.

U. S. DEPARTMENT OF AGRICULTURE

LEGEND

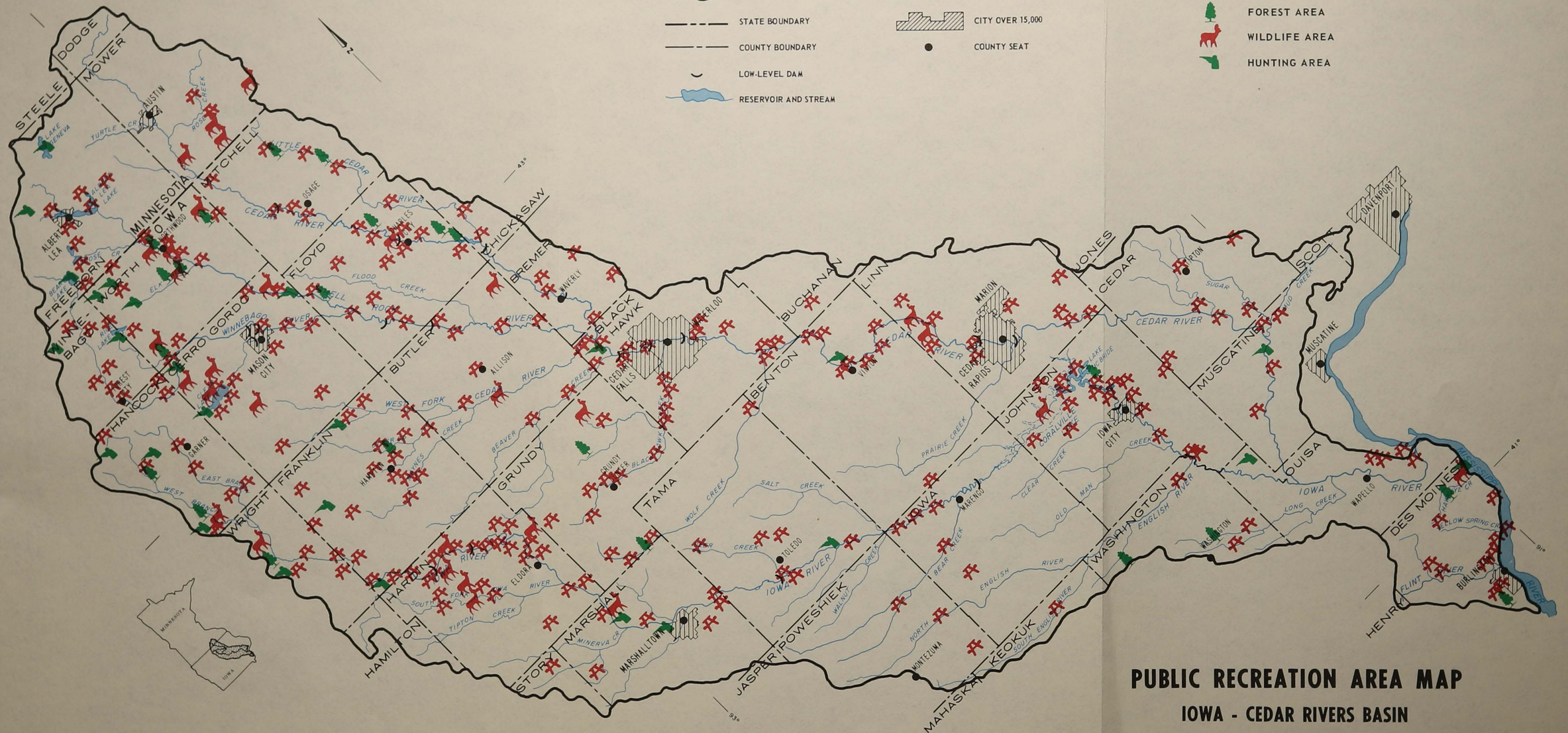
- BASIN BOUNDARY
- STATE BOUNDARY
- COUNTY BOUNDARY
- LOW-LEVEL DAM
- RESERVOIR AND STREAM

URBAN AREAS

- CITY OVER 15,000
- COUNTY SEAT

PUBLIC RECREATION AREAS LEGEND

- PARK AND ACCESS AREA
- FOREST AREA
- WILDLIFE AREA
- HUNTING AREA



SCALE 1/850,000

SCALE 10 0 10 20 30 40 MILES

PUBLIC RECREATION AREA MAP

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA

Figure III-4

SOURCE:

FAMILY OF MAPS SCS DRAWING NO. 5,S-32,382 (5-74), IOWA STATE HIGHWAY COMMISSION, IOWA STATE CONSERVATION COMMISSION, MINNESOTA DEPARTMENT OF NATURAL RESOURCES, U.S.D.A. FOREST SERVICE, AND SOIL CONSERVATION SERVICE. LAMBERT CONFORMAL CONIC PROJECTION.

USDA-SCS-LINCOLN, NEBR. 1975

2/20/75
5,S-34,950

Existing Public Recreational Areas Summary (Table III-8) compares the number of sites and related acreage that occurs inside the corridor areas to those outside. Basin-wide, 66 percent of the existing sites and 68 percent of the corresponding acreage occur within the corridors. The West Fork Cedar Subbasin is the highest, having 95 percent of the total existing recreational site acreage within the corridor areas. Because the Flint River Subbasin has a higher proportion of upland forested areas, only five percent of the existing site acreage is located inside the corridor areas.

Of the 225 recreational sites within the corridors, most of these are designated recreation areas. Existing Recreation Areas Inside the Environmental Corridors (Table III-9) summarizes the number of sites by subbasin. Four categories were used for describing the kind of sites--recreation, forest, wildlife refuge, and public hunting area. In some cases, more than one category applied to a given site. Therefore, they add up to more than the total number of sites in three of the subbasins. Existing Recreation Areas Within the Environmental Corridors by Subbasin and County, Appendix F, lists individual sites by name for each county in each subbasin, plus the agency administering the site.

It is estimated that 60 million recreation days--83 percent--occur within the corridors of the 72.2 million annual recreation days of use in the Basin at the present time. Per acre use is higher inside the corridors than the use outside since all of the water-related activities and uses, except those involving farm ponds, occur inside the corridors. Most of the corridor related recreation takes place on or near the streams. Figure III-5 shows the most popular types of stream recreation activities. These classifications depict general conditions for the individual streams.

Future recreational developments require planning so they provide the most good for the most people. An inventory was made of the proposed and future plans of the Iowa State Conservation Commission and the organized Regional Planning Commissions. The recreational developments planned by the Iowa State Conservation Commission is displayed in Appendix G. These plans are not final but only an indication of future emphasis. Appendix H displays the Regional Planning Commission's plans in Iowa. Many sites planned are indefinite and only a guide as to their efforts. These plans change periodically with budgets, community desires, and needs.

TABLE III-8
EXISTING PUBLIC RECREATIONAL AREAS SUMMARY
Iowa-Cedar Rivers Basin

Subbasin	Inside Environmental Corridors			Outside Environmental Corridors			Total	
	Number	Acres (Land & Water)	Acres %	Number	Acres (Land & Water)	Acres %	Number	Acres
Iowa River	94	25,742	88	28	3,458	12	122	29,200
Cedar River	77	10,887	71	26	4,355	29	103	15,242
West Fork Cedar River	14	4,030	95	11	190	5	25	4,220
Shell Rock River	39	3,904	24	43	12,329	76	82	16,233
Flint River	1	32	5	8	646	95	9	678
Minnesota Total	2	347	8	14	3,865	92	16	4,212
Iowa Total	223	44,248	72	102	17,113	28	325	61,361
GRAND TOTAL	225	44,595	68	116	20,978	32	341	65,573

Source: Outdoor Recreation in Iowa,
Iowa Conservation Commission & Minnesota Department of Natural Resources

TABLE III-9

EXISTING RECREATION AREAS INSIDE THE ENVIRONMENTAL CORRIDORS (SUMMARY)

Iowa-Cedar Rivers Basin Study

	Total Recreation Acres	Total No. of Sites	No. of Sites 1/ 2/			
			Rec.	For.	Refuge	Pub. Hunt
Iowa Subbasin	25,742	94	76	6	8	13
Cedar Subbasin	10,887	77	74	7	3	3
West Fork Cedar Subbasin	4,030	14	11	1	0	2
Shell Rock Subbasin	3,904	37	31	4	7	4
Flint Subbasin	32	1	0	0	1	0
Minnesota Total	347	2	2	0	0	0
Iowa Total	44,248	221	190	18	19	22
GRAND TOTAL	44,595	223	192	18	19	22

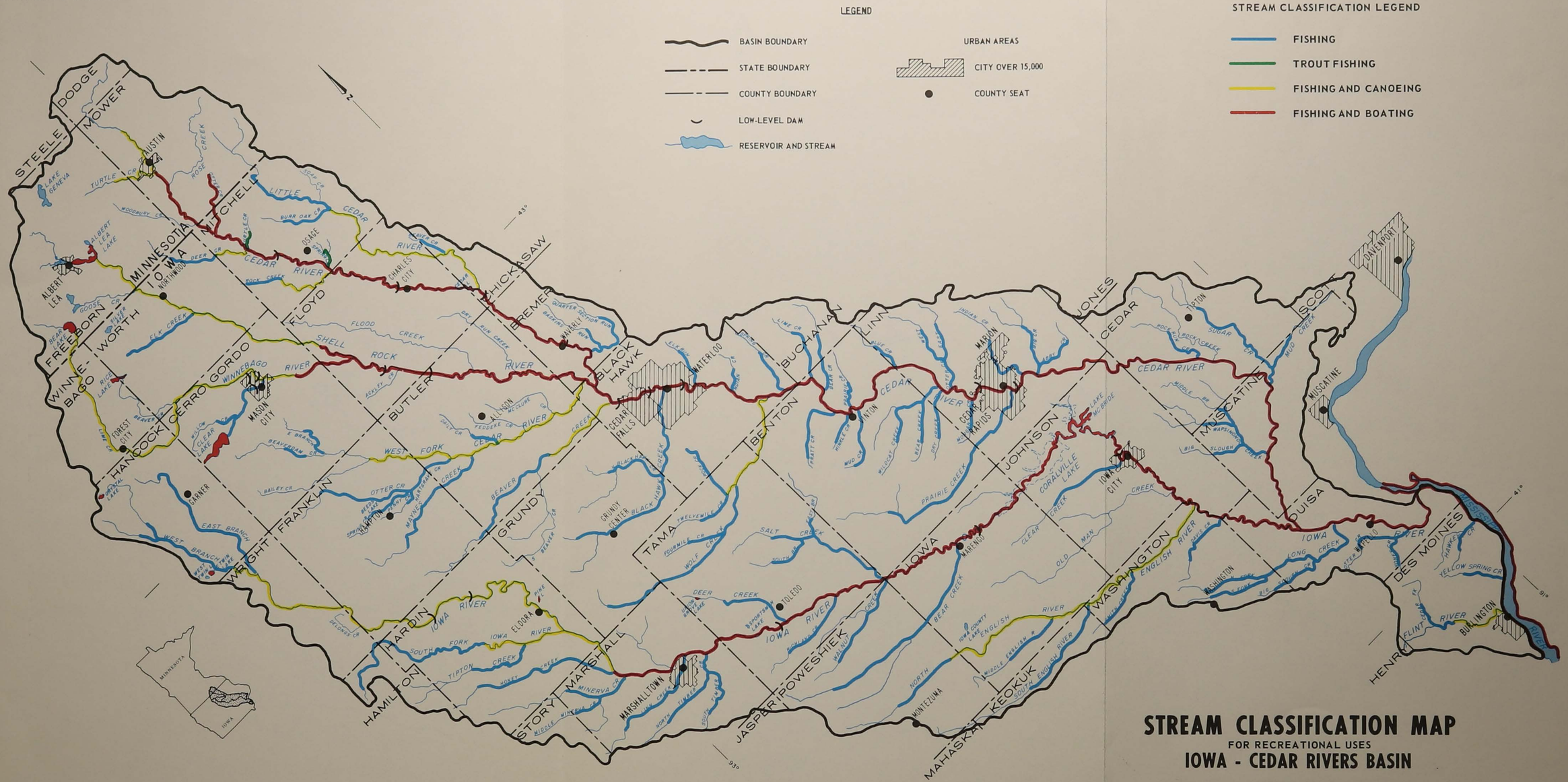
1/ Rec. (Recreation), For. (Forest), Pub. Hunt (Public Hunting Area)

2/ Individual sites exceed total sites because of more than one kind of area at the same location.

Bicycle trails are being developed along many of the streams.

Hiking has become a popular recreation activity of all ages.

U. S. DEPARTMENT OF AGRICULTURE



STREAM CLASSIFICATION MAP

FOR RECREATIONAL USES

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA

Figure III-5

SOURCE:

FAMILY OF MAPS SCS DRAWING NO. 5,S-32,382 (5/74),
IOWA STATE HIGHWAY COMMISSION, IOWA STATE CONSERVATION COMMISSION, MINNESOTA DEPARTMENT OF NATURAL RESOURCES, U.S.D.A. FOREST SERVICE AND SOIL CONSERVATION SERVICE.
LAMBERT CONFORMAL CONIC PROJECTION.

USDA-SCS-LINCOLN, NEBR. 1975

2/3/75
5,0-34,951

6. Natural Areas

Land use throughout the Basin is intensifying because of the needs of increasing populations. Urban-industrial and suburban areas are expanding, resulting in losses of crop, pasture, forest, and other land. Similarly, conversion of wetlands, forest, and pasture land to cropland is continuing.

Preserving remaining isolated pieces of natural vegetation and natural areas is desirable from the standpoint of education, research, and scarcity of natural areas suitable for preservation. The location, name, areal extent, and type of site for these areas both inside and outside the corridors are indicated in Figure III-6 and Table III-10, Natural Areas. These sites include remnants of virgin hardwood forest, prairies, and marsh lands. It is significant that 14 of the 18 sites in the Basin are found within the corridors.

7. Geologic Formations

Specific geologic formations offer the amateur geologist and the public the opportunity to test their knowledge and to increase their understanding of natural processes and the historical formation of the land. To professionals, many of these formations offer the key to understanding the origin and development of the world. In this regard, a number of sites have been delineated for having irreplaceable value as guides or keys to other similar formations wherever they may be found throughout the world.

The location and geologic type for areas both inside and outside the corridors are indicated in Figure III-6 and Table III-11. It is significant that the 16 of the 17 sites identified in the Basin are found within the corridors.

In addition to the above mentioned sites, fossil and mineral collecting sites have been identified for potential specimen collecting by the public. Twelve sites have been located within Iowa, three of these are in the Basin and two of the three are within the corridors. The location and type of fossil and mineral collection sites available are indicated in Figure III-6 and Table III-12.

TABLE III-10

June 1974

NATURAL AREAS
Iowa-Cedar Rivers Basin

IOWA SUBBASIN

Map Code	County	Approx. Location	Name	Approx. Acres	Type of Site
8	Hardin	Clay Township, Sec. 28, 29 & 32	Fallen Rock Area	---	Forest relic on sandstone bluff:
9	Hardin*	Grant Township, Sec. 33	Gogerty Pothole Prairie	3	Prairie pothole
10	Johnson	Oxford Township, Sec. 5	Williams Prairie	40	Mesic prairie with springs forming bogs
12	Marshall	Six miles east of Marshalltown near the Iowa River	"1000 Acre Woods"	1,000	Nearly virgin timber
13	Marshall	Along Iowa River	Mormon Ridge	100	Rich decidious woodland on high ridge and in flood plain
14	Marshall	County Road R, 2 miles west, 1 mile south of Albion	Aspen Bog	5	Aspen bogs on hillsides
15	Story*	Four miles west of McCallsburg	McCallsburg Railroad Prairie	---	Mesic prairie remnant on RR right of way
18	Wright	Just west of Rowan	Ihm Woodland	10	Hardwood forest

TABLE III-10

June 1974

NATURAL AREAS
Iowa-Cedar Rivers Basin

CEDAR SUBBASIN

Map Code	County	Approx. Location	Name	Approx. Acres	Type of Site
2	Benton	Benton Township, Sec. 15	Goose Pond	---	Natural vegetation, marsh & sandy prairie
3	Benton	Benton Township, Sec. 16	Mesic Forest	---	- - -
4	Black Hawk*	1/2 Sections 2 & 11 Mt. Vernon Township	Waterloo RR Prairie	---	Dry prairie to marsh woodland
5	Buchanan	Jefferson Township, Sec. 31	Flood Plain Woodland	100	Alluvial woodlan undisturbed
7	Grundy	South side of Highway 58, 1 1/2 miles west of Morrison	Aspen Bog	5	Willow marsh & sedge bog
11	Linn	Southwest of Cedar River on Zibo Road	Skunk Cabbage Bog	1	Boggy woods and skunk cabbage

SHELL ROCK SUBBASIN

1	Hancock	T97N, R23W, Sec. 3 & 4	Pilot Knob State Park	30	Upland forest
16	Winnebago*	T98N, R23W, Sec. 22	Native Woodland	25	Possible virgin forest
17	Worth	T98N, R22W, Sec. 26	Native Woodland	40	Hardwood forest

TABLE III-10

June 1974

NATURAL AREAS
Iowa-Cedar Rivers Basin

WEST FORK CEDAR

Map Code	County	Approx. Location	Name	Approx. Acres	Type of Site
6	Franklin	Northeast of Hampton	Dry Prairie	60	Rolling hillsid prairie in geod area

* Outside environmental corridors

Source: Outdoor Recreation in Iowa, Vol. 5b-6, Iowa Conservation Commission. 1972.

ENVIRONMENTAL CORRIDORS

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA

FIGURE III-6

SOURCE: FAMILY OF MAPS SCS DRAWING NUMBER 5,S-32,382 (REV. 5-15-74) IOWA CONSERVATION COMMISSION, MINNESOTA DEPARTMENT OF NATURAL RESOURCES, IOWA NATURAL RESOURCES COUNCIL, USDA SOIL CONSERVATION SERVICE, AND USDA FOREST SERVICE.

USDA-SCS-LINCOLN, NEBR. 1974

5-20-74
5,S-34,250.2

TABLE III-11

GEOLOGICAL TYPES AND EXPOSURE SITES
Iowa-Cedar Rivers Basin

IOWA RIVER SUBBASIN

Map No.	System	Type	County	Exposure Site Location
14	Devonian	Coralville Limestone Member	Johnson	River Products Co., quarry, NE 1/2 SW 1/4, Sec. 32, T80N, R6W
15	"	Rapid Limestone Formation	Johnson	(Same as above)
1	"	English River Siltstone Formation	Washington	Right bank of English River SE, NW SE Sec. 8, T77N, R8W.
2	"	Maple Mill Shale Formation	Washington	S 1/2 Sec. 17, T77N, R7W.

CEDAR RIVER SUBBASIN

3	Devonian	Aplington Dolomite Formation	Butler	In quarry W 1/2, NW Sec. 20, T90N, R17W.
17	Silurian*	Gower Dolomite Formation	Cedar	Named for exposure in Gower Townsh
16	Devonian	Bertram Dolomite Member	Linn	In quarry at center NE 1/4, Sec. 3, T83N, R6W.
13	Devonian	Cedar Valley Limestone Formation	--	Named for exposures in Cedar River Valley

* Outside environmental corridors

TABLE III-11

GEOLOGICAL TYPES AND EXPOSURE SITES
Iowa-Cedar Rivers Basin

SHELL ROCK RIVER SUBBASIN

Map No.	System	Type	County	Exposure Site Location
6	Devonian	Owen Limestone Member	Cerro Gordo	Along Owen Creek
7	"	Cerro Gordo Member	Cerro Gordo	Hackberry Grove, NW 1/4 Sec. 35, T96N, R19W.
5	"	Lime Creek Shale Formation	Floyd	On Winnebago River NW of Rockford
8	"	Juniper Hill Shale Member	Floyd	One mile NW of Rockford Brick & Ti Co., Sec. 8, T95N, R18W.
9	"	Shell Rock Formation	Floyd	Near Nora Springs, T96, R18W.
10	"	Nora Member	Floyd	Abandonedquarry at NE 1/4, NE 1/4 Sec. 17, T96N, R18W.
11	"	Rock Grove Member	Floyd	(Same as above)
12	"	Mason City Member	Floyd	East bank of Shell Rock River, T96N, R18W, Sec. 7.

WEST FORK CEDAR RIVER SUBBASIN

4	Devonian	Sheffield Shale Formation	Franklin	In Sheffield Brick & Tile Co. pit, NW, SE, SW Sec. 9, T93N, R20W.

FLINT RIVER SUBBASIN

N o n e

TABLE III-12

SITES SUITABLE FOR
FOSSIL AND MINERAL COLLECTING
Iowa-Cedar Rivers Basin

June 1974

SHELL ROCK SUBBASIN

Map No.	Collection Items	County	Location and Comments
1	Brachiopods	Floyd	Rockford Brick & Tile Co., Clay Pit, 1/2 mile west of Rockford, Iowa. Supply is unlimited.
2	Fossils *	Cerro Gordo	County blacktop road cut, 3 1/2 miles southwest of the Rockford Brick & Tile Co. pit, south side of road, NE 1/4 Sec. 24, T95N, R19W. Extremely abundant supply.

IOWA RIVER SUBBASIN

3	Coral	Johnson	Collection in Cedar Valley Limestone, west side of abandoned quarry, near center of north line SW 1/4 Sec. 22 T81N, R7W. Collect during low water stage at Coralville Reservoir.

* Outside environmental corridors.

8. Environmental Corridor Quality

A qualitative rating system for environmental corridors has been developed to rank individual corridor segments. This system was adapted from "Quantitative Comparison of Some Aesthetic Factors Among Rivers", by Luna Leopold, U.S.G.S. The system was adapted from northwestern conditions to fit midwestern conditions. The rating system was developed as a means of evaluating the environmental resources. It is merely a planning tool and points out general criteria of a segment of a stream. Any recommendations for development, enhancement, or preservation of a corridor could be based on the rating system summary.

Various mapped data such as forest land, recreational developments, wildlife populations and habitat, water quality standards, transportation, etc., were used to evaluate individual segments of corridors. In addition, first-hand information was supplied by regional planning commission representatives, county conservation board personnel, Soil Conservation Service district conservationists, SCS planning staff and others throughout the 39 counties of the Basin. The purpose was to collect the most accurate data possible so that a justifiable rating could be given to each stream.

Three categories were analyzed in evaluation of the stream corridors. One was the physical factors of the topography and river pattern. The second group was the biological and water quality factors; and the third was human use and interest factors. The criteria used for evaluation of the corridor segments is displayed in Table III-13. The rating system employs a numerical range from 1 (for poor environmental conditions) to 5 (for excellent or best environmental conditions) when compared to the prevailing region and state conditions of land and water.

The data were tabulated on field sheets shown in Figure III-7. Each stream was rated individually at 10 mile segments (sample plots). These segments collectively comprise a total rating for the entire stream.

Environmental Corridor Quality Rating Summary, Table III-14, displays the average ratings for the three main categories by subbasin. Figure III-8 graphically displays the summary ratings.

In relation to the three main categories of Physical, Biological, Human Use & Interest factors, planning efforts for improvement of the physical factors of a section of corridor would be way beyond reason. Biological and water quality can be improved with proper resource management and planning. Human Use and Interest factors, however, involve other facets of land and water conservation. Public demand for recreation and open space and the intrinsic attractiveness of the visual landscape play very important roles in these planning efforts. The individual range of ratings for all the corridors in the three main categories are shown in Figure III-9, III-10 and III-11.

"We make our greatest mistake when we believe that the world belongs to us. It does not--we belong to it!" - Keller

TABLE III-13

CRITERIA FOR EVALUATION OF AESTHETIC FACTORS ALONG MAJOR STREAMS

PHYSICAL FACTORS

1. Depth at low flow -
   - 5 = Deep enough to systain an adequate game fishery
   - 3 = Seasonal water levels
   - 1 = Too shallow for fish

2. Velocity and flow -
   - 5 = Rapid movement of water
   - 3 = Slow movement
   - 1 - Still or stagnated

3. River pattern -
   - 5 = Winding river pattern
   - 3 = Semi-Winding
   - 1 = Straight

4. Ratio of valley height to width -
   - 5 = Narrow stream with bluffs along the shore
   - 3 = Rolling hills and not too wide a stream
   - 1 = Wide stream with flat expanses

5. Stream order -
   - 5 = Low order stream
   - 3 = Medium order
   - 1 = High order stream

6. Bank erosion
   - 5 = None
   - 3 = Evident in places
   - 1 = Severe

BIOLOGICAL AND WATER QUALITY

7. Water quality -
   - 5 = Clear, no pollution
   - 4 = Seasonal pollution in winter
   - 3 = Pollution evident
   - 2 = Seasonal pollution spring-summer
   - 1 = Muddy, severe pollution

8. Point source pollution
   - 5 = No point source pollution
   - 3 = Point source pollution evident
   - 1 = High point source pollution

TABLE III-13

Criteria for Evaluation of Aesthetic Factors Along Major Streams

9. Land flora appeal -
   5 = Natural variation of flora
   3 = Flora present but all one species
   1 = None

10. Woodland: Open -
   5 = 50:50 (woodland to open)
   4 = 75% woodland
   3 = All woodland
   2 = 25% Woodland
   1 = Continuous crop or pasture

11. Fish and wildlife habitat -
   5 = Very favorable
   3 = Fair habitat
   1 = Poor or not existing

12. Unique vegetation -
   5 = Rare plant species (natural or set aside)
   3 = Normal species for the area
   1 = None

HUMAN USE AND INTEREST

13. Trash, litter and other visual pollution -
   5 = None
   3 = Occasional evidence
   1 = Offensive visual evidence

14. Vistas - Panorama
   5 = Pleasurable scenic view
   3 = Fair but open view
   1 = Confining view

15. Land use -
   5 = Natural area
   3 = Slight presence of man (crops, houses etc.)
   1 = Disturbed severely by man

16. Urban - Industrial -
   5 = No visual acreage
   4 = 10% visual urban acreage
   3 = 30% visual acreage from stream
   2 = 40% visual urban acreage
   1 = Over 50% visual acreage from stream

TABLE III-13

Criteria for Evaluation of Aesthetic Factors Along Major Streams

17. Special views -
    5 = Historic, archeologic, etc. within 10 miles
    3 = Historic, artheologic etc. within 40 miles
    1 = None

18. Stream accessibility -
    5 = Excellent access by road or trail (10 roads for 10 miles of stream)
    3 = Adequate access by road or trail (5 roads for 10 miles of stream)
    1 = Not accessible

19. Boating
    5 = Excellent boating stream
    3 = Fair boating
    1 = Boating impossible.

20. Canoeing -
    5 = Excellent canoeing
    3 = Fair canoeing
    1 = Canoeing impossible

21. Fishing -
    5 = Good fishing and available game fishery
    3 = Fair fishing
    1 = Poor fishing - rough fish

22. Swimming -
    5 = Water very suitable
    3 = Water suitable but not desirable
    1 = Water not suitable for body contact

23. Public land ownership
    5 = 100 acres or more of public land per 10 linear miles
    4 = 60-99
    3 = 31-60
    2 = 1-30
    1 = None per 10 linear miles

Figure III-7

ENVIRONMENTAL CORRIDOR RATING SYSTEM

Stream Name_____ Subbasin_____

Descriptive Categories	Sample Plots
PHYSICAL FACTORS	
1 .Depth at low flow	
2 .Velocity and flow	
3 .River pattern	
4 .Ratio of valley height to width	
5 .Stream order	
6 .Bank erosion	
Sum	
Average	
BIOLOGICAL & WATER QUALITY	
7 .Water quality	
8 .Point source pollution	
9 .Land flora appeal	
10 .Woodland: open	
11 .Fish and wildlife habitat	
12 .Unique vegetation	
Sum	
Average	
HUMAN USE AND INTEREST	
13 .Trash, litter, and other visual pollution	
14 .Vistas - Panorama	
15 .Land use	
16 .Urban - Industrial	
17 .Special views	
18 .Stream accessibility	
19 .Boating	
20 .Canoeing	
21 .Fishing	
22 .Swimming	
23 .Public land ownership	
Sum	
Average	
Grand Total	
Average	

TABLE III-14

ENVIRONMENTAL CORRIDOR QUALITY RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin Iowa River

Stream Name	Site No. 1/	Physical	Biological	Human Interest	Total
1. Iowa River	12	2.8	3.6	4.2	3.7
2. Iowa River	5	3.7	3.9	3.5	3.6
3. Iowa River	7	3.3	3.2	3.5	3.4
4. Iowa River	14	3.2	3.7	3.4	3.4
5. Iowa River	15	2.8	3.7	3.5	3.4
6. Iowa River	8	3.0	3.7	3.1	3.3
7. Iowa River	9	3.0	3.6	3.3	3.3
8. Iowa River	10	3.2	3.1	3.4	3.3
9. Iowa River	13	3.0	3.4	3.2	3.2
10. Iowa River	11	3.0	2.4	3.6	3.1
11. South Fork Iowa River	2	3.5	3.3	2.8	3.1
12. Tipton Creek	1	3.7	3.4	2.5	3.1
13. Iowa River	4	3.3	3.0	2.9	3.0
14. N. English River	2	3.2	3.1	2.7	3.0
15. North Fork Long Creek	1	3.2	3.1	2.7	3.0
16. North Fork Long Creek	2	3.0	3.3	2.5	2.9
17. N. English River	3	2.3	3.6	2.8	2.9
18. Clear Creek	1	3.7	3.1	2.4	2.9

TABLE III- 14

ENVIRONMENTAL CORRIDOR QUALITY RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin Iowa River

Stream Name	Site No.[1/]	Physical	Biological	Human Interest	Total
19. Iowa River	2	3.2	2.9	2.8	2.9
20. Iowa River	3	3.0	3.1	2.7	2.9
21. South Fork Long Cr.	1	2.8	2.9	2.7	2.8
22. Buff Creek	1	3.2	2.9	2.5	2.8
23. N. English River	1	3.2	2.7	2.5	2.8
24. Big Bear Creek	2	3.5	2.7	2.4	2.8
25. Salt Creek	1	3.5	3.0	2.3	2.8
26. Minerva Creek	1	3.2	2.6	2.6	2.8
27. Honey Creek	1	3.3	2.7	2.6	2.8
28. N&M Timber Cr.	1	3.7	2.6	2.2	2.7
29. Iowa River	1	3.5	2.7	2.3	2.7
30. Big Bear Creek	1	3.2	2.6	2.3	2.6
31. Iowa River	6	2.7	2.6	2.6	2.5
32. South Fork Iowa R.	1	3.3	2.0	2.3	2.5
33. Richland Creek	1	3.3	2.1	2.4	2.5
34. Linn Creek	1	3.0	2.3	2.0	2.3
35. West Branch Iowa River	1	2.8	2.0	2.1	2.3
36. Deer Creek	1	3.5	2.0	2.0	2.3
Total Average		114.5/3.2	106.6/3.0	99.3/2.8	105.4/3.0

TABLE III-14

ENVIRONMENTAL CORRIDOR QUALITY RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin Flint River

Stream Name	Site No. [1/]	Physical	Biological	Human Interest	Total
1. Flint River	1	4.3	3.6	2.5	3.3
2. Hawkeye Creek	1	2.7	3.9	3.1	3.2
3. Yellow Spring Cr.	1	3.2	3.7	2.5	2.9
Total/Average		10.2/3.4	11.2/3.7	8.1/2.7	9.4/3.1

TABLE III- 14

ENVIRONMENTAL CORRIDOR RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin Shell Rock

Stream Name	Site No.[1/]	Physical	Biological	Human Interest	Total
1. Shell Rock R.	4	3.3	3.6	3.5	3.5
2. Shell Rock R.	3	3.5	3.0	3.5	3.4
3. Elk Creek	1	3.0	4.0	3.2	3.4
4. Coldwater Cr.	1	3.2	3.6	3.1	3.3
5. Shell Rock R.	1	2.7	3.0	3.1	3.0
6. Shell Rock R.	2	2.8	2.7	3.3	3.0
7. Winnebago R.	1	3.3	2.4	3.0	2.9
8. Winnebago R.	2	3.3	2.6	2.9	2.9
9. Winnebago R.	3	3.7	2.3	2.9	2.9
10. Willow Cr.	1	3.3	2.6	2.6	2.8
Total/Average		32.1/3.2	29.8/3.0	31.1/3.1	31.1/3.1

TABLE III-14

ENVIRONMENTAL CORRIDOR QUALITY RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin-Cedar

Stream Name	Site No. 1/	Physical	Biological	Human Interest	Total
1. Cedar River	9	2.5	3.9	3.6	3.7
2. Cedar River	2	3.7	3.4	3.6	3.6
3. Cedar River	4	3.3	3.9	3.5	3.6
4. Cedar River	5	3.2	3.9	3.6	3.6
5. Cedar River	10	3.7	3.6	3.6	3.6
6. Cedar River	13	2.5	3.7	3.5	3.6
7. Cedar River	11	3.6	3.7	3.3	3.5
8. Cedar River	15	3.2	4.1	3.4	3.5
9. Cedar River	8	3.3	3.7	3.3	3.4
10. Turtle Creek (IA)	1	3.8	3.9	2.8	3.4
11. Little Cedar R.	1	3.7	3.7	3.1	3.4
12. Beaver Creek	2	3.2	3.7	3.1	3.3
13. Otter Creek Minn (Ia)	1	4.0	3.6	2.7	3.3
14. Baskins & Quarter Section Run	1	3.7	3.7	2.7	3.3
15. Little Cedar R.	2	3.5	3.6	3.1	3.3
16. Cedar River	3	2.7	3.6	3.4	3.3
17. Cedar River	6	3.3	2.7	3.5	3.3
18. Cedar River	14	3.2	3.3	3.5	3.3
19. Spring Creek	1	3.7	3.7	2.8	3.3

TABLE III-14

ENVIRONMENTAL CORRIDOR QUALITY RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin-Cedar Stream Name	Site No.[1/]	Physical	Biological	Human Interest	Total
20. Cedar River	16	3.0	4.1	3.0	3.3
21. Rock Creek	1	4.2	3.6	2.7	3.3
22. Cedar River	7	3.2	3.1	3.3	3.2
23. Wolf Creek	2	3.8	3.1	2.8	3.2
24. Cedar River	12	4.0	3.3	2.7	3.2
25. Turtle Cr. (Minn.)	1	3.3	3.4	2.9	3.2
26. Wolf Creek	3	3.3	3.3	3.0	3.2
27. Lime & Bear Cr.	1	3.3	3.9	2.7	3.2
28. Otter Creek	1	3.5	3.7	2.9	3.2
29. Rock Run	1	3.5	3.7	1.8	3.2
30. Little Cedar R.	3	3.5	3.1	2.9	3.1
31. Black Hawk Creek	2	3.0	3.7	3.1	3.1
32. Wolf Creek	1	4.2	3.0	2.6	3.1
33. Cedar River	1	3.0	3.4	2.8	3.0
34. Beaver Creek	1	3.2	3.4	2.7	3.0
35. Black Hawk Cr.	1	3.8	3.3	2.5	3.0
36. Wildcat	1	3.0	3.4	2.6	3.0
37. Apple-Big-Abbe Cr.	1	3.6	3.1	2.5	3.0
38. Little Bear	1	2.5	3.7	2.6	2.9
39. Dry	1	2.7	3.4	2.6	2.9

TABLE III-14

ENVIRONMENTAL CORRIDOR QUALITY RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin-Cedar

Stream Name	Site No. [1/]	Physical	Biological	Human Interest	Total
40. Deer Creek	1	3.3	2.4	2.7	2.8
41. West Blue	1	2.8	2.9	2.7	2.8
42. Morgan Creek	1	2.7	2.9	2.9	2.8
43. Prairie Creek	2	2.8	3.0	2.4	2.8
44. Indian	1	3.8	3.1	2.1	2.8
45. Big Slough-Wapasinoc Cr.	1	3.2	2.7	2.5	2.7
46. Mud-Sugar Cr.	1	3.3	2.7	2.4	2.7
47. Prairie Creek	1	3.5	2.3	2.5	2.7
48. Hinkle	1	3.3	3.4	2.3	2.7
49. Little Prairie	2	3.3	3.4	2.3	2.7
50. Pratt Creek	1	3.0	2.3	2.8	2.7
51. Mud Creek	1	3.2	2.1	2.5	2.5
Total/Average		169.3/3.3	170.3/3.3	147.1/3.0	160.3/3.1

TABLE III-14

ENVIRONMENTAL CORRIDOR QUALITY RATING SUMMARY

Iowa-Cedar Rivers Basin

Subbasin West Fork Cedar

Stream Name	Site No.[1/]	Physical	Biological	Human Interest	Total
1. West Fork Cedar River	2	3.5	4.6	3.4	3.8
2. West Fork Cedar River	1	3.5	4.1	3.4	3.6
3. Otter Creek	1	3.0	3.4	3.0	3.1
4. Penny-Hargrave Creek	1	3.2	3.1	2.6	2.9
5. Maynes Creek	1	3.0	3.0	2.8	2.9
6. Beaverdam Creek	1	3.3	2.0	3.1	2.8
Total/Average		19.5/3.3	20.2/3.4	18.3/3.1	19.1/3.2

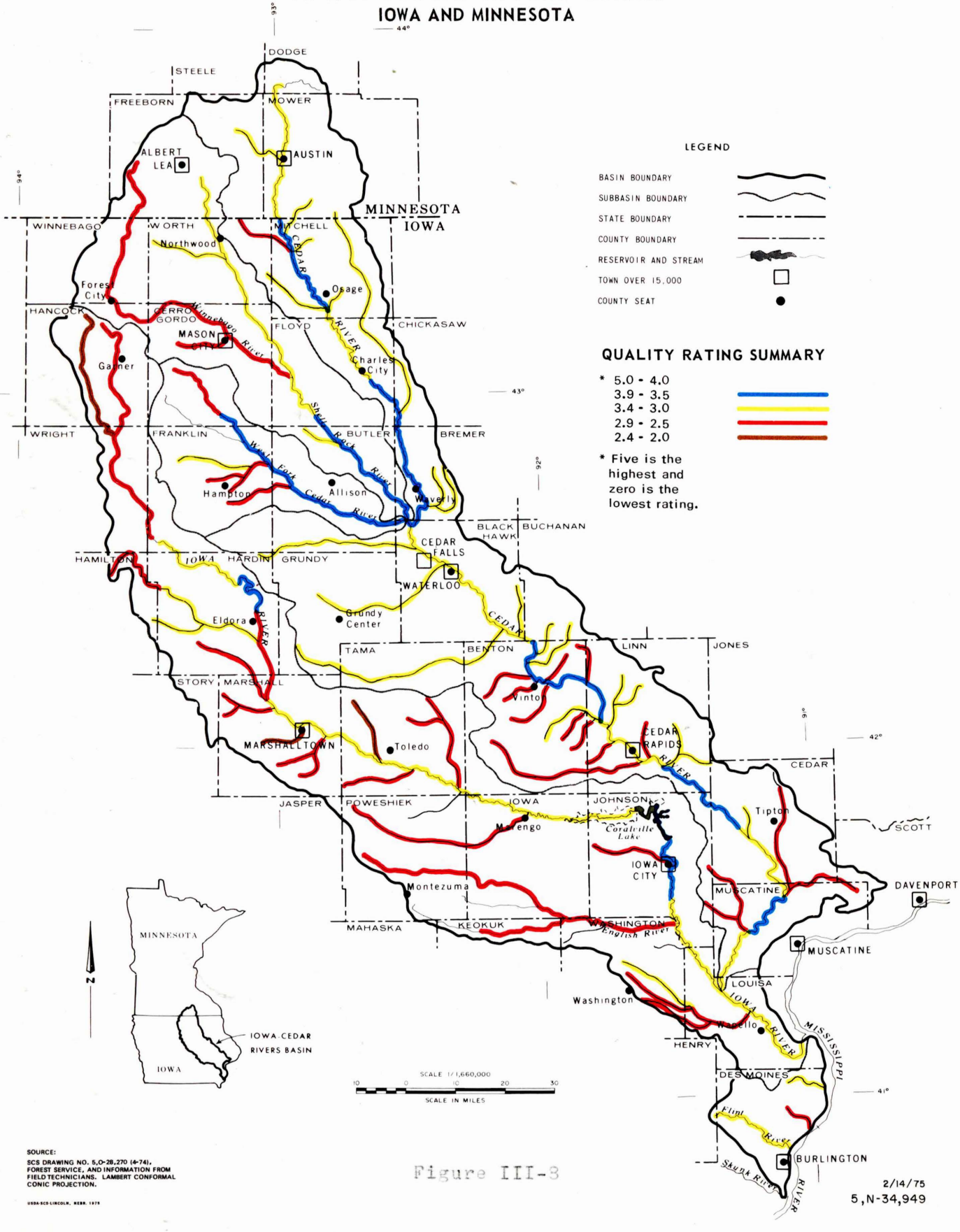
1/ For detailed evaluations, contact U.S. Forest Service, Northeastern Area State and Private Forestry, Upper Darby, Pennsylvania.

U. S. DEPARTMENT OF AGRICULTURE

ENVIRONMENTAL CORRIDOR EVALUATION MAP

IOWA-CEDAR RIVERS BASIN

IOWA AND MINNESOTA



SOURCE:
SCS DRAWING NO. 5,O-28,270 (4-74), FOREST SERVICE, AND INFORMATION FROM FIELD TECHNICIANS. LAMBERT CONFORMAL CONIC PROJECTION.

USDA-SCS-LINCOLN, NEBR. 1975

Figure III-3

2/14/75
5,N-34,949

U. S. DEPARTMENT OF AGRICULTURE

ENVIRONMENTAL CORRIDOR EVALUATION MAP

IOWA-CEDAR RIVERS BASIN

IOWA AND MINNESOTA

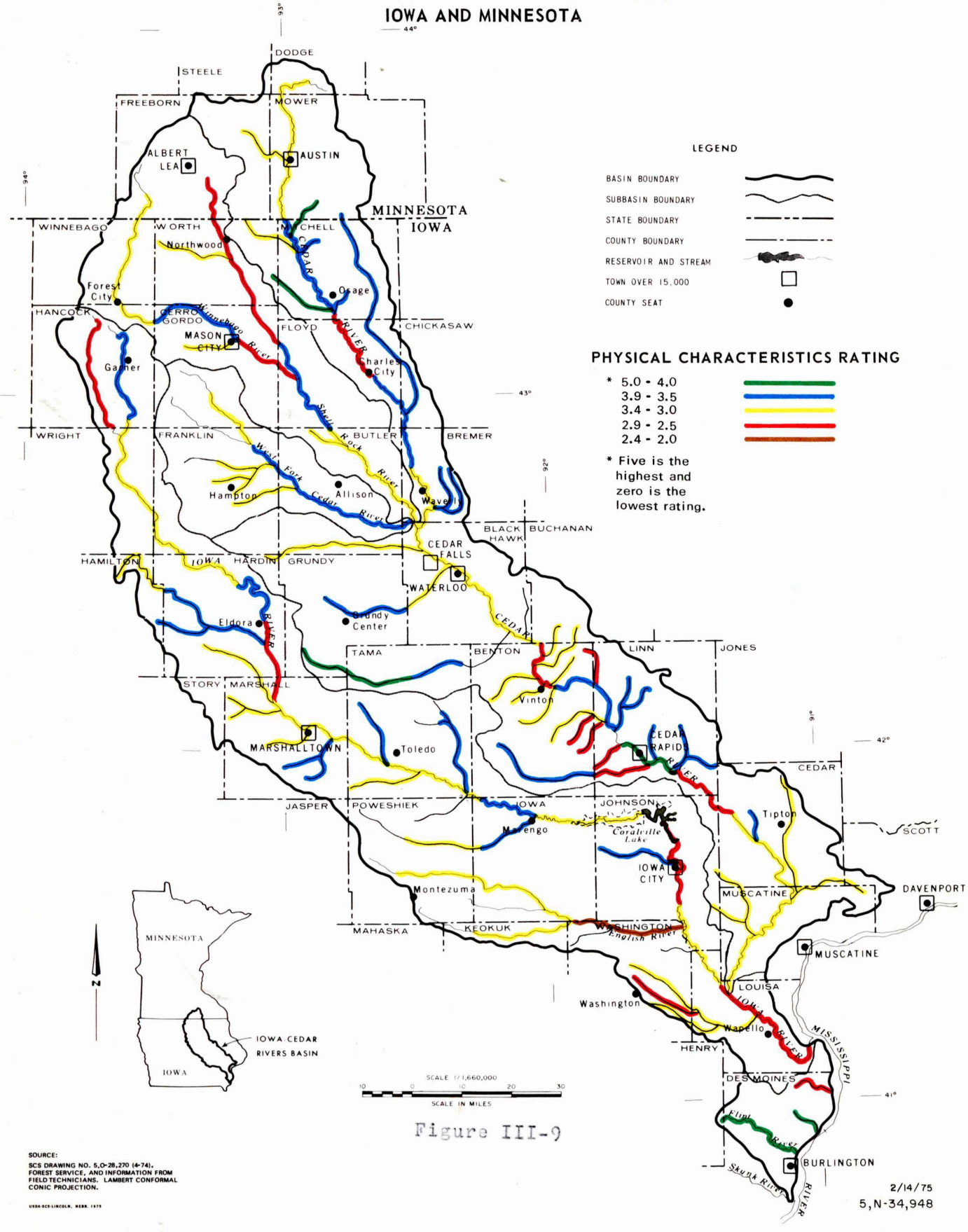


Figure III-9

SOURCE:
SCS DRAWING NO. 5,O-28,270 (4-74), FOREST SERVICE, AND INFORMATION FROM FIELD TECHNICIANS. LAMBERT CONFORMAL CONIC PROJECTION.

USDA-SCS-LINCOLN, NEBR. 1975

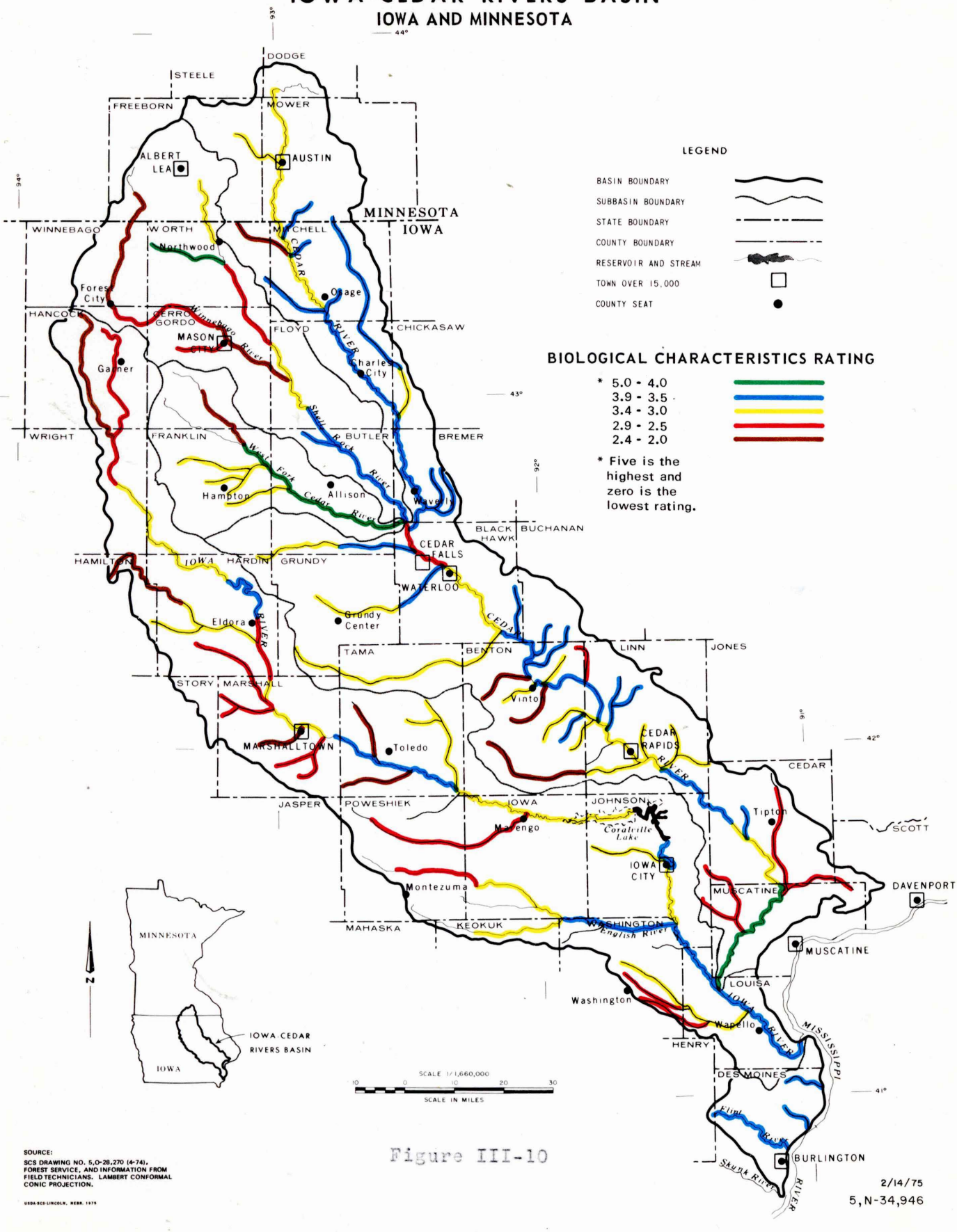
2/14/75
5,N-34,948

U. S. DEPARTMENT OF AGRICULTURE

ENVIRONMENTAL CORRIDOR EVALUATION MAP

IOWA-CEDAR RIVERS BASIN

IOWA AND MINNESOTA



SOURCE:
SCS DRAWING NO. 5,O-28,270 (4-74), FOREST SERVICE, AND INFORMATION FROM FIELD TECHNICIANS. LAMBERT CONFORMAL CONIC PROJECTION.

USDA-SCS-LINCOLN, NEBR. 1975

Figure III-10

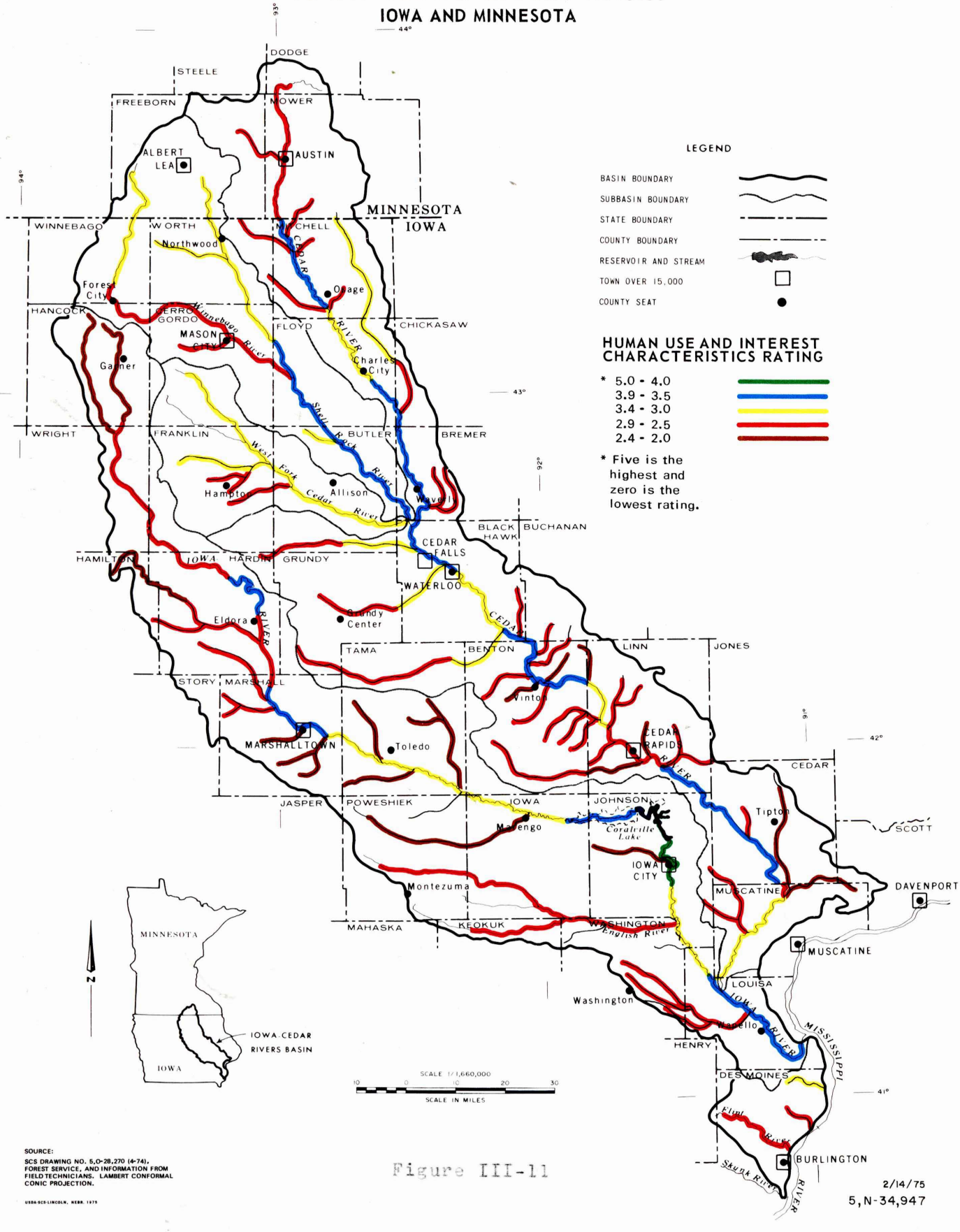
2/14/75
5,N-34,946

U. S. DEPARTMENT OF AGRICULTURE

ENVIRONMENTAL CORRIDOR EVALUATION MAP

IOWA-CEDAR RIVERS BASIN

IOWA AND MINNESOTA



SOURCE:
SCS DRAWING NO. 5,O-28,270 (4-74), FOREST SERVICE, AND INFORMATION FROM FIELD TECHNICIANS. LAMBERT CONFORMAL CONIC PROJECTION.

USDA-SCS-LINCOLN, NEBR. 1975

Figure III-11

2/14/75
5,N-34,947

IV. PROBLEMS AND NEEDS

Proper management of the corridor system is a difficult task. The resource base of each corridor segment is intimately related to that of the surrounding areas so that any use of the Basin's land, water or air resource affects the quality of the corridors to some degree. Each segment is also unique from each other segment, thus precluding generalized management of the system as a whole. Increasing competition for use of the corridors themselves by a variety of interests will further compound the problem of management in the future.

Indiscriminate use and neglect of the land and water resources have caused several problems with water, fish and wildlife, recreation, forest, soil and air resources. Some of these uses conflict by nature while others conflict because the intensity of one use limits another use.

A. Water Resources

The continued availability and quality of the water resource of the Iowa-Cedar Rivers Basin is important to the economic and social stability of the Basin. Municipal and industrial development is totally dependent upon accessible and abundant supplies of high quality water. Yearly crop production is contingent upon adequate rainfall while domestic water requirements must also be satisfied. Yet, most opportunities for necessary leisure time activities are localized along the flowing water areas within the Basin. The water resource must be protected and managed to maintain its stability and productivity. A system of environmental corridors is an excellent method of accomplishing these goals.

The activities and uses which most directly affect the water resource are those occurring in or immediately adjacent to the major stream channels. Because of the relatively shallow depths to good and abundant waters in the flood plains, the larger municipal and industrial wells are generally located here. In addition, several water supply intakes are located on the major streams themselves. The water volumes removed from both these sources reduce river stages, with resultant adverse effects on the aquatic habitat and recreation potentials of the stream. The corridor system will contribute to the control of this problem by facilitating the regulation of location and consumption rates at intake structures within the designated corridors.

While the intensity and immediacy of the water resource response to land use practices declines with the distance from the impacted site, all land use decisions are eventually reflected in the water resource, and thus the implications of each such decision should be carefully evaluated before implementation. Unfortunately, these

implications are often hard to define. In many cases, such as the decision to establish a particular cover type, the environmental impacts are unclear at the site itself. There is even less chance the off-site effects (i.e., at the stream) can be described since the impacts of all intervening land uses and practices have been integrated. Furthermore, the typical waterway ecosystem is so complex that an individual response cannot be segregated with any exactness, much less ascribed to a particular land use decision. Even if the cause-effect relationships of land use to the water resource were adequately represented, no system exists by which the public may hold the landowner accountable for the impacts of his land management programs on the water resource.

In these circumstances the only feasible management alternative is to minimize the adverse effects of poor land use practices on the stream regimen and composition by buffering the major stream arteries with contiguous strips of land maintained in native cover conditions. These strips tend to filter out the sediment and other pollutant materials before they reach the stream itself. A system of environmental corridors, established by whatever means, would properly insulate the streams.

The intensive stream-side developments, whether an industrial complex or a cropped field, require flood protection to insure existing and future investments. Unfortunately, contemporary means of providing this protection, i.e., dikes and impoundments, disturb the riverine environment by eliminating shallow backwater areas and displacing indigenous fish and wildlife species by reducing available habitat and converting moving water surfaces to slack water. These structural systems also confine the flow and consequently increase the stage associated with a particular discharge volume, thus increasing flood potentials downstream from the structures.

From the standpoints of aesthetics, quality fish and wildlife habitat and recreation, flood plain zoning would be preferable to these conventional measures. By regulating land use adjacent to the streams, valuable development can be kept out of zones of high flood hazard, thereby eliminating the need for structural flood control measures. The more natural environment therefore prevails, and in addition flood stages remain essentially constant for given discharges. The environmental corridor system could provide these benefits by regulating development in portions of the flood plain.

B. Fish and Wildlife

Habitat problems and needs are similar throughout the Basin; however, the magnitude varies considerably. As previously stated, the better habitat is usually associated with stream corridors. Some factors that have caused alarm and increased governmental conservation of fish and wildlife in the past are:

(1) Encroachment on wild-animal habitat by settlement, agriculture, successful drainage projects, industry, and transportation

(2) Unregulated hunting and fishing

(3) Water pollution

The corridors provide much of the woodland habitat used by most species of wildlife for winter cover. The intensive use of flood plain areas for row crops precludes the use of grassy type crops which are necessary for nesting by most game birds. Because cropping is intensive there is little "edge" where two habitat types meet. Fall plowing of cropland further reduces the amount of habitat available. As a result species which can adapt to this habitat are relatively plentiful while other species populations are restricted.

Heavy grazing of grassland and forest land reduces the quality of these habitat types. Heavy grazing of grassland usually removes vegetative cover needed for ground nesting wildlife. Nests and the young wildlife can also be damaged by trampling by the livestock. The understory of forest land is often destroyed by livestock grazing which reduces reproduction of trees and the habitat value of undergrowth.

Wetlands are continuing to be drained. This eliminates habitat for waterfowl and other water oriented wildlife such as muskrat, mink, etc.

Sediment entering lakes and ponds often has pesticides and nutrients adhering to the soil particles. Pesticides can become concentrated in predacious fish to an extent that it is not advisable to eat the fish. Excessive nutrients can cause a variety of problems harmful to fish and other aquatic organisms.

With each problem described there is a reciprocal need to prevent, eliminate, or solve the problem to improve fish and wildlife habitat. Corridor management could be a positive influence on the habitat quality and quanity.

C. Recreation

The need for recreation in the Iowa-Cedar Rivers Basin could be supplied by utilizing the environmental corridors. The recreational need is determined by comparing the supply of facilities currently available with the expected demand in the years 1980, 2000, and 2020. The 1970 recreational supply in the corridors was 44,595 acres. The increasing need for recreational areas is shown in Table IV-1 while Table IV-2 shows the comparison based on present supply.

TABLE IV-1

Required Resources for Peak Outdoor Recreation within the Environmental Corridors 1970-2020 without development. 1/

Activity	Required Resources in Acres			
	1970	1980	2000	2020
Picnicking	10,122	25,796	42,798	62,664
Fishing	38,149	50,186	83,490	124,182
Boating	19,031	19,812	43,622	75,696
Camping	839	1,126	2,480	4,303
Natural Environment Swimming	27	38	70	137
Nature Walks	21,190	29,900	67,808	132,392
Water Skiing	6,958	10,113	31,546	82,113
TOTAL	96,316	136,971	271,814	481,487

TABLE IV-2

Comparison of Required Resources for Peak Outdoor Recreation within the Environmental Corridors, 1970-2020.

Year	Requirements	1970 Corridor Supply	Difference (Need)
1970	96,316	44,595	51,721
1980	136,971	44,595	92,376
2000	271,814	44,595	227,219
2020	481,487	44,595	436,892

1/ Based on State Recreation Plans up to 1980.

Future recreation development in the corridors requires careful planning. Flooding in some areas can cause severe damage to facilities and the land. Standing water can kill grass and other vegetation over a period of time. Bank sloughing and debris pile-up can become an eyesore. Silt deposits on playfields, parking lots and picnic grounds is unpleasant.

Limitations for development of recreation areas are determined by the soil. Building foundations may crack or settle in some soils. Picnic areas may have severe limitations because the soil is either too wet or compacts too readily. Appendix I, Soil Limitations for Recreational Development, was adapted for use in this study.

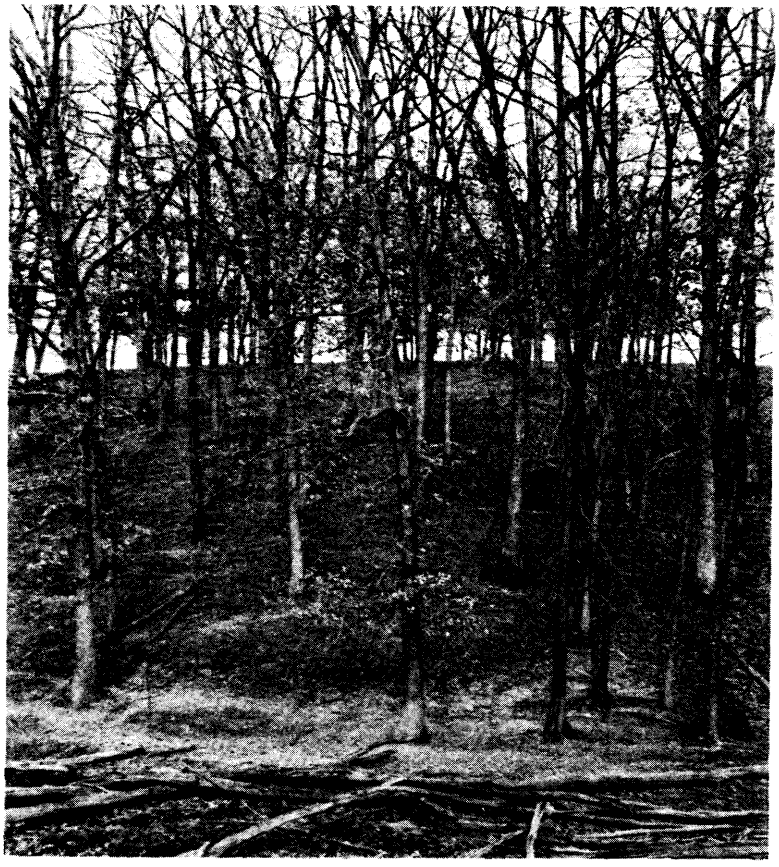
D. Forest Resource

Several environmental problems have been identified on forest land within the corridors. Higher prices for livestock and row crops in recent years have accelerated the conversion of bottomland and lower slope hardwood forests to pasture and cropland. These conversions have not always been successful because of excessive flooding and other factors; however, in most cases, the change in land use is a permanent one. Intensive land use has been the major factor in the conversion of forest land to other uses such as cropland, urban, transportation, utilities and water projects. Since it is desirable to have a balanced pattern of vegetative landscapes from the standpoint of scenic, aesthetic, recreation, fish, and wildlife resources, a net loss of even a small acreage of forest land in the corridors is undesirable.

Excessive grazing of forest land and pasture land has resulted in accelerated erosion on the slopes and sedimentation in the bottom lands and streams of the corridors. Excessive grazing has also destroyed the water infiltration and retarding capabilities of the forested portion of the watersheds. Since over half of the corridors are forested, grazing has a definite effect on water quality. The sediment build-up in the bottomlands has deteriorated the site quality for many recreational developments. The sticky sediment covers grassed playfields and picnic areas.

Poor water quality, as shown earlier, has resulted in deterioration of game fish habitat and changed into rough fish habitat in the southern portion of the Basin.

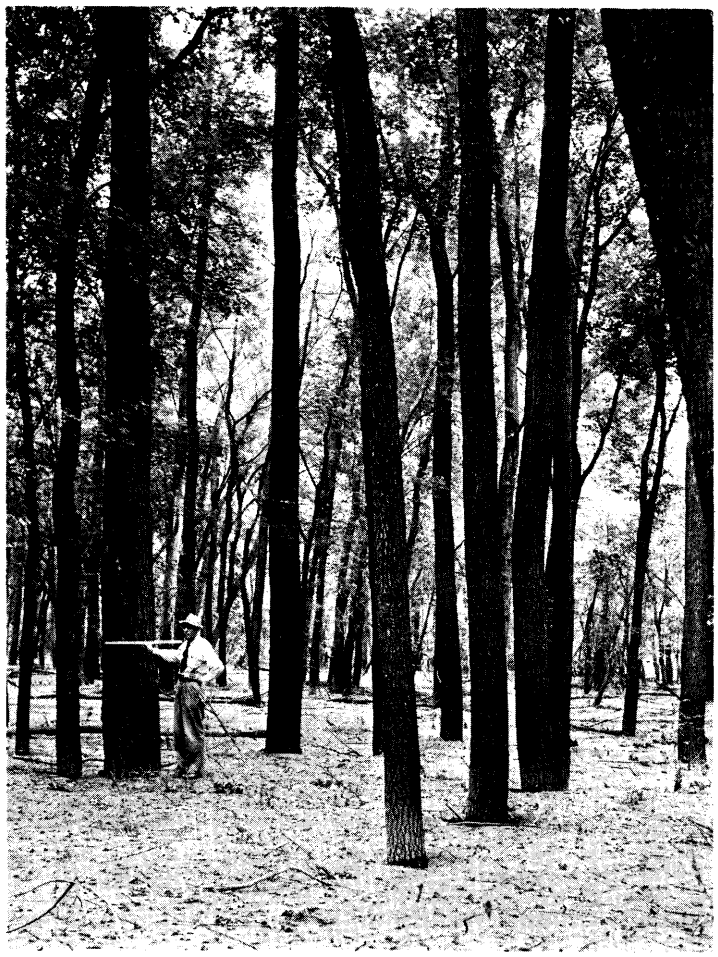
Grazing of forest land has caused erosion, as well as deteriorated many forest stands to a non-productive atmosphere of overmature, diseased, dead and dying trees. The demand for forest products is steadily increasing, but forest land owners frequently fail to realize the economic values of their small stands of timber.



Forest land grazing causes many problems.

Grazing and the loss of forest land has also decreased the necessary habitat for many species of game such as deer. These wild animals have either adapted to a different habitat or translocated to other parts of the country where forest land habitat exists.

There is a need for increased reforestation in the corridors. Establishment of desirable species can insure future forest products and other values such as recreation, wildlife, watershed protection and scenic beauty. There is also a need to increase profits from marginal cropland on wet sites. This need can be satisfied by converting to bottomland hardwood trees.



Wet bottomlands can produce valuable timber products.

Timber stand improvement on forest land is needed on approximately 12,900 acres of bottomland forest. Timber products in the future, even with accelerated forest land treatment, cannot fulfill the increasing demand. In addition, other considerations must be included in any plans for future use of this scattered, limited forest resource. Management of the forest lands in the future needs to be geared to optimizing wildlife habitat, recreation, aesthetic values and timber products.

E. Land Use Planning

There is a need for additional land use resource data so that wise land use decisions can be made. This report is an attempt to satisfy some of that need.

In the past, conflicting interests of adjacent land uses has stimulated some land use planning, as well as development of county zoning. The increasing population growth of the area has caused the number of conflicts to increase.

The use of land should follow logical methods for development, depending on limitations and capabilities of the land. Residential and commercial developments should not be built in flood-prone areas. Steep unprotected land should not be plowed, cleared of permanent vegetation, and planted in row crops. The short term economic gains often result in problems and needs in the long term, which far outweigh the early economic gains. The needs of future generations of society should receive equal or more attention than the short term needs of the land user.

The capabilities, hazards and limitations of land for multiple uses need further development. What may be good land use for one man may not be good for all, thus the cooperative efforts of all are needed for sound land use planning efforts. The status of zoning in the Basin is shown in Figure IV-1.

F. Air, Noise, and Visual Pollution

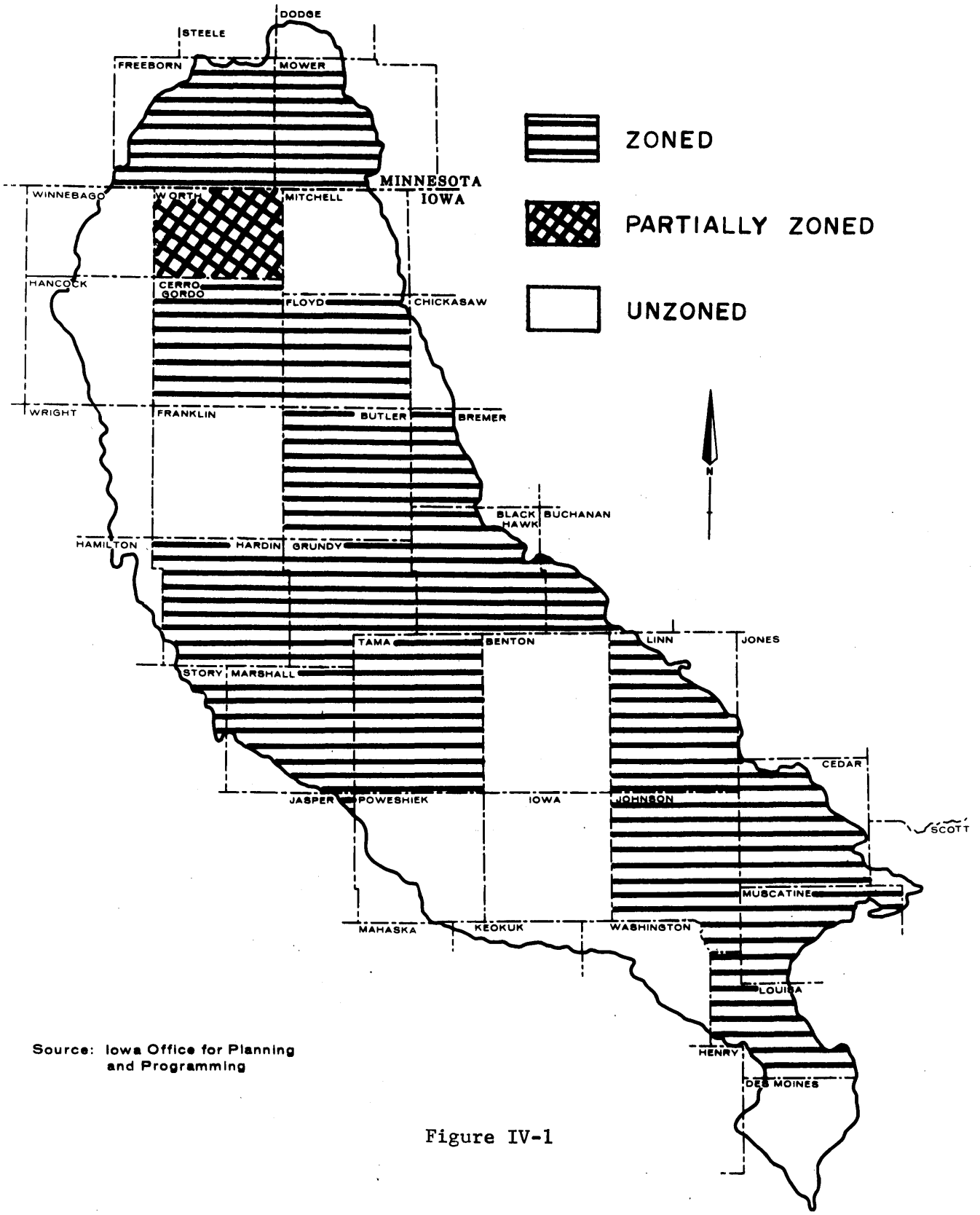
Recent studies indicate that trees and shrubs reduce both air and noise pollution as well as visual pollution. In one study, Trees and Shrubs for Noise Abatement, Cook and Haverbeke found that tree-shrub-grass screens properly located along busy thoroughfares in urban settings effectively reduce noise pollution. A reduction of 5 to 8 decibels would reduce a 72 decibel level (rather noisy) down to about 66 decibels (generally considered satisfactory for daytime out-of-doors environments).

A Russian study conducted by Kalyuzhnyi et al. shows an enormous effect of so-called sanitary clearance zones which are green areas surrounding factories. They found that a 500 meter wide green area reduces sulfur dioxide concentration by 70 percent and nitric oxide concentration by 67 percent.

In another study, Plants/People/and Environmental Quality, Robinette states that plants control air-polluting gases through oxygenation and dilution. He found that the minimum ratio of air contamination acceptable to man is one part polluted air to 3,000 parts of relatively pure air. Along many highways the ratio may be as low as 1:1,000. A one-half-mile-wide green belt, on either side of freeways and expressways, would readjust the air balance, since trees and other plants introduce excess oxygen into the atmosphere. As polluted air flows around trees and shrubs and through fresh air, oxygen-rich air is mixed with polluted air and is diluted. Plants--especially trees and shrubs--also remove from the air other impurities, such as air-borne dirt, sand, fly-ash, dust, pollen, smoke, odors and fumes.

STATUS OF ZONING

IOWA-CEDAR RIVERS BASIN



Source: Iowa Office for Planning and Programming

Figure IV-1

Skog, Koelling, and Bell reported in Forests and the Environment that forests are a very important part of man's environment. Their value for timber, wildlife, recreation, water, erosion control, and aesthetics has long been recognized. But, forests also screen dust from the air, suppress loud noises, dissipate unpleasant odors, produce atmospheric oxygen, reduce atmospheric pollutants, and temper the climate. They further found that properly designed windbreaks may reduce wind velocities on the leeward side for a distance approximately equal to forty times the height of the trees.

Most of the larger cities in the Basin could benefit from a shrub and tree planting program for pollution reduction. Specific cities have not been identified officially as having a serious problem of air pollution.

Do they not understand that as man subdues nature he subdues himself!

V. OPPORTUNITIES FOR PRESERVATION, ENHANCEMENT OR DEVELOPMENT

A. Local, County and Regional Levels

Local Park Commissions and Park Boards plan, purchase, maintain and administer public parks as provided in the Code of Iowa when a city exceeds a specified population.

The County Conservation Boards develop and manage parks and recreation areas. Plans are reviewed by the Iowa Conservation Commission and the Minnesota Department of Natural Resources depending on the state involved. Many recreational sites have been developed by them.

Many local and county school boards have acquisition funds to acquire lands for experimental and educational purposes. The area in and around Iowa City and the University of Iowa contains some of the best environmental and ecological corridors within the Basin and would be only a few miles away.

Comprehensive development plans have been made by many municipal and regional planning commissions in the Iowa-Cedar Rivers Basin. Most of these plans hold the corridor segments as prime land for public use and enjoyment. Each county and regional planning commission is unique as to the application and development of their plans. Many of the plans are in the development stage already. Future stream corridor development, enhancement or preservation can be made possible through the local, county, and regional planning agencies. See Figure V-1 for a list of the Regional Planning Groups and their territories.

B. State Levels

The State of Iowa, Conservation Commission and Department of Transportation, Highway Division; and the State of Minnesota, Department of Natural Resources; both have land and water acquisition programs for purposes of conservation, preservation and public service. In the northern portion of the Basin, the streams and shores already belong to the states. Expansion of state property would include most of the corridor segments. Proper management for multiple benefits would require land acquisition. The Iowa Conservation Commission and the Minnesota Department of Natural Resources have programs and personnel involved in the conservation and management of their natural resources of soil, water, wildlife, forests, archeologic and historic nature.

C. Federal Levels

1. U.S.D.A.

At present, there is only one program in the U. S. Department of Agriculture that would assist in acquisition of the environmental corridors. The Wild and Scenic Rivers Act, PL 90-542 declared by Congress states that: ". . . . certain selected rivers of the Nation which, with their immediate environments, possess outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

The Wild and Scenic Rivers System is administered by the Forest Service, U.S.D.A. and Bureau of Outdoor Recreation, U.S.D.I. No rivers in the Iowa-Cedar Rivers Basin have been designated as wild and scenic. There are two methods, however, for adding river areas to the national system: (a) Federal legislation, or (b) State legislation and approval by the Secretary of the Interior. For more detailed information on river classification see "Guidelines for Evaluating Wild, Scenic, and Recreational River Area . . ." adopted by the U.S.D.A. and the Department of the Interior, February 1970.

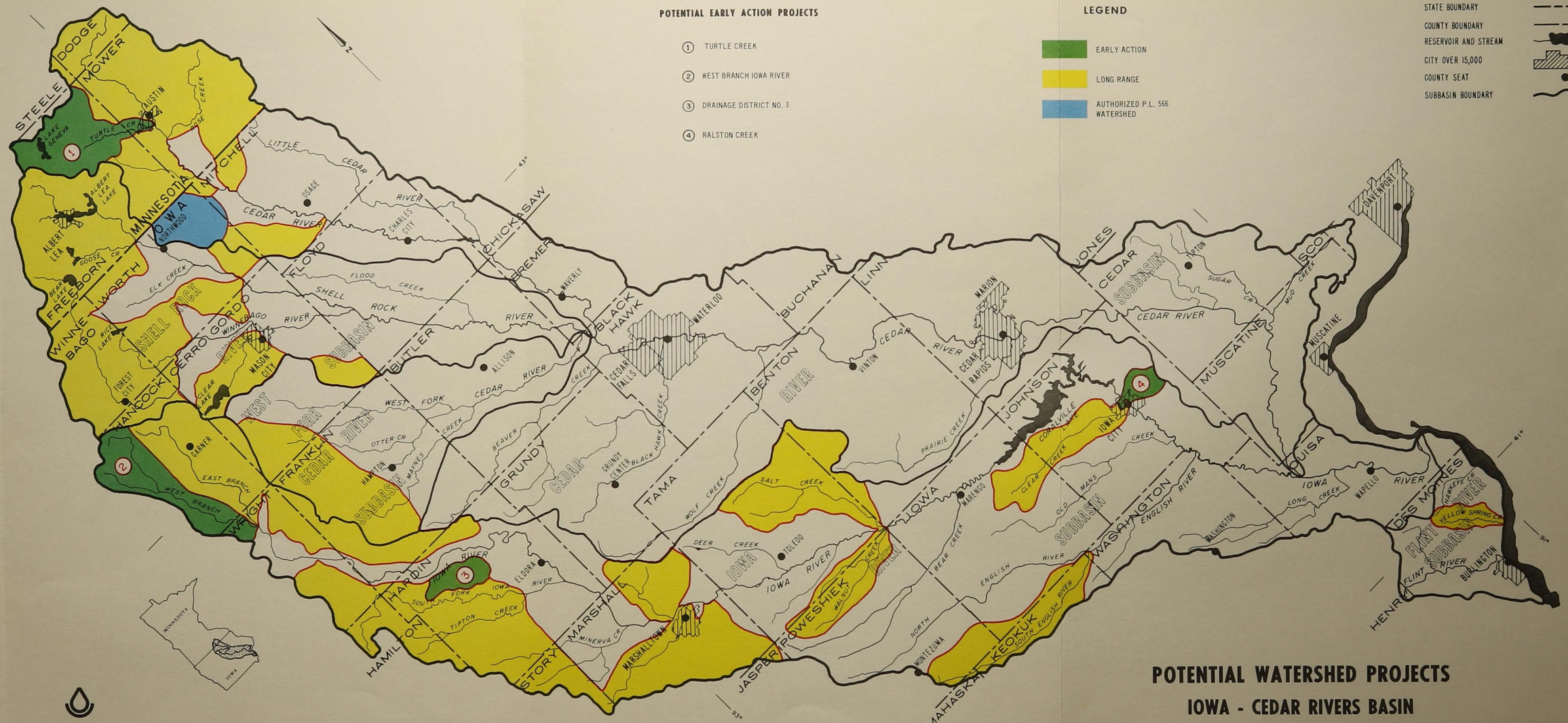
Portions of the environmental corridors would be included in many potential PL-566 watershed projects. These potential watershed projects are shown in Figure V-2. These projects are U.S.D.A. administered under the authority of the Watershed Protection and Flood Prevention Act of 1954 (PL-566).

The Resource Conservation and Development Program could aid in development of the corridors. Geode Wonderland RC&D area will include Louisa, Henry and Des Moines Counties if the application for federal assistance is approved. The Geode Wonderland RC&D plan states in its environmental considerations that "use and neglect" has pervaded in the area and attention should be given to the degradation of the environment.

Technical assistance in Soil and Water Conservation is available in each county through the U.S.D.A., Soil Conservation Service. The Agricultural Stabilization and Conservation Service provides cost share programs to landowners for installing conservation measures. The Forest Service provides several land treatment programs in cooperative forest management, tree planting, pest control and fire control, with landowners and the States of Iowa and Minnesota.

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



POTENTIAL WATERSHED PROJECTS

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA

FIGURE V-2

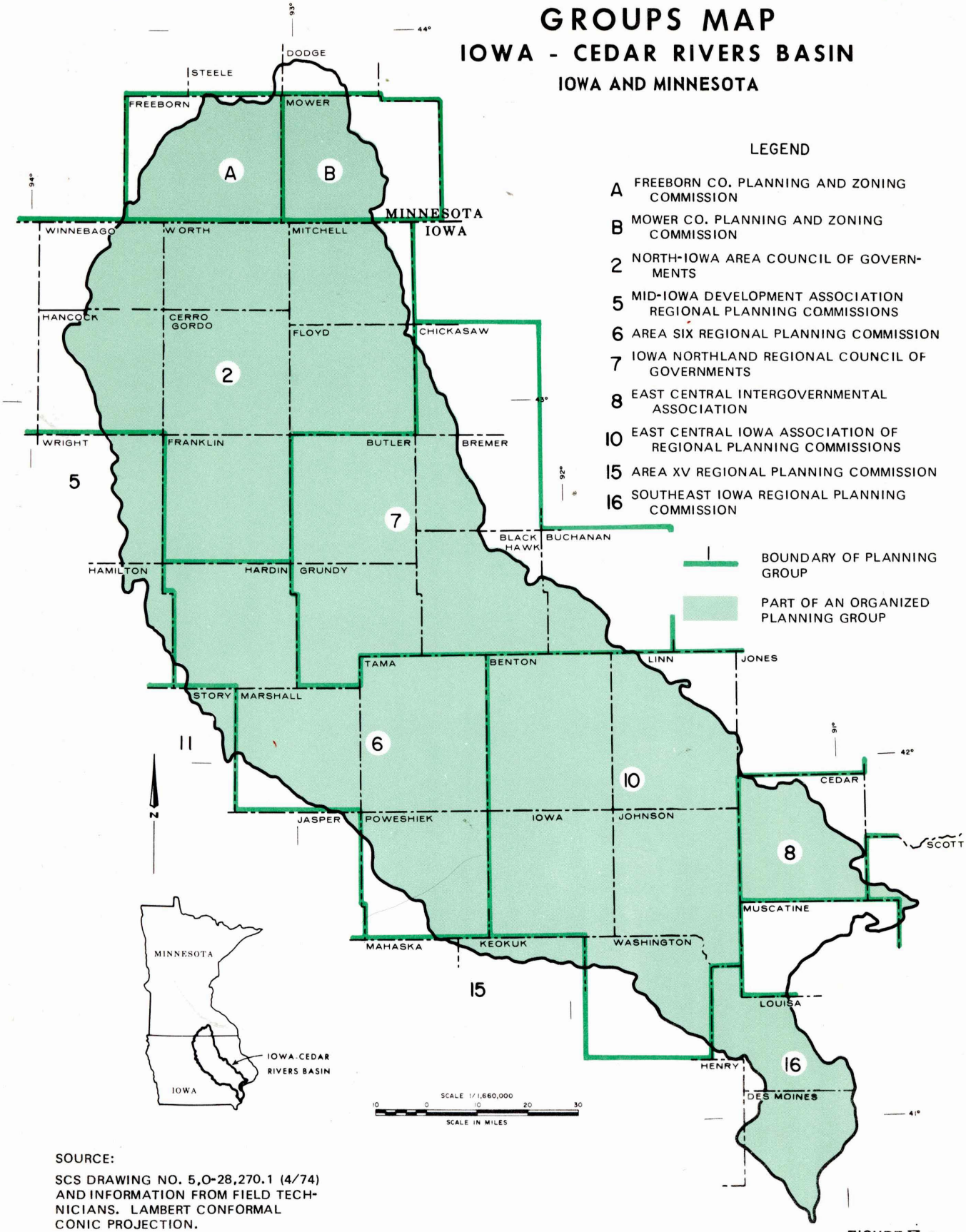
6-11-74
5,S-34,313

UNITED STATES DEPARTMENT OF AGRICULTURE

ORGANIZED REGIONAL PLANNING GROUPS MAP

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA



SOURCE:

SCS DRAWING NO. 5,O-28,270.1 (4/74) AND INFORMATION FROM FIELD TECHNICIANS. LAMBERT CONFORMAL CONIC PROJECTION.

FIGURE V-1
1/24/75
5,N-34,944

USDA-SCS-LINCOLN, NEBR. 1975

2. Bureau of Outdoor Recreation, U.S. Department of Interior

The Land and Water Conservation Fund Act of 1965 (PL 88-578) established a fund to increase outdoor recreation opportunities for the American people. The program provides for (1) acquisition of lands for federally administered recreation areas; and (2) matching grants for State recreation planning and State as well as local land acquisition and development. The Fund is administered by the Bureau of Outdoor Recreation (BOR) of the Department of Interior.

3. Department of Housing and Urban Development

The Community Development Act of 1974 (PL 93-383), Sec. 105 assists community development program activities in acquisition of real property (including air rights, water rights and other interests therein). This real property is either appropriate for (1) rehabilitation or conservation activities (2) the preservation or restoration of historic sites, the beautification of urban land, the conservation of open spaces, natural resources, and scenic areas, the provision of recreational opportunities or the guidance of urban development, or (3) to be used for other public purposes.

Section 104(h) of Title I of the Housing and Community Development Act of 1974 (PL 93-383) authorizes a procedure under which applicants with approved applications for assistance under Title I to consider.

(1) Historic properties

(2) Noise

(3) Flood Plain

(4) Coastal zones and wetlands

(5) Air quality

(6) Water quality

(7) Wildlife

The National Environmental Policy Act of 1969 (PL 91-190) established national policy, goals, and procedures for protecting and enhancing environmental quality.

4. Bureau of Sport Fisheries and Wildlife

The BSFW, U.S. Department of Interior has several programs with local governments; States, Federal and Interstate Agencies; Non-profit Organizations; Private Enterprises; and Individuals. Their primary purposes are to preserve and maintain wildlife habitats, establish systems of public use and promote recreational pursuits directly associated with wildlife and its natural habitat.

5. Federal Highway Administration

Many federal highways such as I 80, I 35, 30, 218, 69, 65, and 6 run parallel to or across the environmental corridors. The influence of the highways on many recreation activities can be a source of assistance for corridor development. The Federal Highway Administration, Esthetic Highway Development, encourages and promotes the development of esthetically pleasing highways. Specific attention is given to roadside rest developments, control of highway access, and improved highway location and design.

6. Corps of Engineers

Currently, the Corps of Engineers has identified twelve potential reservoir sites in the Basin--four in the northern part, four concentrated in the central part, and four in the south-central. All are located in Iowa. Both water-based and water-related recreational activities may be included, if any of these sites are developed. The average surface water area--based on ten reservoirs with acreage estimates--is about 7,900 acres. These reservoirs would be located within the corridors. Studies of these reservoirs have been deferred until studies of other critical problems in the Basin are completed.

D. Citizens Groups

1. Iowa

Several private groups and organizations are involved in environmental quality and ecology. One group is the State Chapter of the Izaak Walton League, Iowa City. One of their purposes is to promote the enjoyment and wholesome utilization of the soil, forest, water and other natural resources.

The Nature Conservancy, Des Moines, (Iowa Chapter) has an action program to acquire and manage natural areas for scientific, educational and environmental uses.

The Iowa Wildlife Federation, Burlington, is devoted to the wise use, preservation, aesthetical appreciation, and restoration of wildlife and other natural resources.

The Iowa Citizens for Environmental Quality, Inc., Ames, Iowa, undertakes legal and political action deemed necessary to the enhancement of the Iowa environment. Activities are closely coordinated with those of the Iowa Confederation of Environmental Organizations, as well as with other statewide citizens groups.

2. Minnesota

The Minnesota Conservation Federation, St. Paul, is a representative statewide organization. It is affiliated with the National Wildlife Federation and primarily devoted to the wise use, preservation, aesthetical appreciation, and restoration of wildlife and other natural resources.

Minnesota also has an Izaak Walton League of America, Inc. at Minneapolis. Their purpose is the same as all other state chapters.

The Minnesota Environmental Control Citizens Association, St.Paul, is a nonprofit organization concentrating on action to prevent environmental exploitation. It evaluates and publicizes problems and dangers of pollution; alerts the public to the necessity for active citizen participation in the protection of natural resources.

The Minnesota Chapter of the Nature Conservancy has an action program to acquire and manage natural areas for scientific, educational, and environmental uses.

The American Rivers Conservation Council, 324 C Street SE, Washington, D.C. 20003, is heavily involved in national legislative efforts to aid the environment in all states.

Public information and education about the environmental corridors are the keys to successful management and implementation. Private landowners along the streams must be informed of the environmental impacts their land use has upon the entire system. Public support is a must to control the irreversible and irretrievable effects of land conversion and abuse.

Man never really owns his own land, but only has the opportunity to live on it for a short time.

VI. EVALUATION AND INTERPRETATIONS

Environmental corridors could provide the resources to satisfy most of the various wildlife, forestry, scenic, water quality and recreational problems and needs of the Iowa-Cedar Rivers Basin and the region.

The environmental corridor rating system summary pointed out that some corridor segments have more to offer environmentally than others. From a practical standpoint, these highly valued corridor segments should be considered before the least valued areas.

All environmental corridors offer multiple use opportunities and have potential for establishment, preservation, enhancement or management. Nine large corridor segments were rated above average conditions making them most favorable for establishment. Not all corridor development is favorable, however, and all factors should be considered before action is taken.

The high value corridors and the effects the planning element has on the environment is displayed in Table VI-1. The approximate location of the high value corridors is shown in Figure VI-1.

Table VI-1

IOWA-CEDAR RIVERS BASIN

HIGH VALUE ENVIRONMENTAL CORRIDORS

Planning Element	Beneficial and Adverse Effects
A. Establish, preserve, enhance or manage approximately 20 miles, 9,173 acres of stream corridor on the Cedar River from two miles S. of Charles City to the confluence of the Shell Rock River in Black Hawk County.	A. 1. Protects and improves natural aesthetics. 2. Preserves natural, archeological and cultural sites and ecosystems. 3. Improves quality and use of water, land and air. 4. Preserves freedom of choice concerning irreversible effects. 5. Provides 9,173 acres of forest land, crop, pasture and other land for wildlife habitat management. 6. Increased recreation by 10 recreational visits/acre/year. 7. Accelerated erosion due to 91,730 additional recreation visits/year. 8. Disruption of tranquility of rural environment and stream frontage by 91,730 additional recreation visits/year.
B. Establish, preserve, enhance or manage approximately 10 miles, 2,816 acres of stream corridor on the Cedar River in Mitchell County.	B. 1. Same as 1-4 above. 2. Provides 2,816 acres of forest land, crop, pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/acre/year.

Table VI-1

IOWA-CEDAR RIVERS BASIN

HIGH VALUE ENVIRONMENTAL CORRIDORS

Planning Element	Beneficial and Adverse Effects
	(B. of pg 1 cont.) 4. Accelerated erosion due to 28,160 additional recreation visits/year. 5. Disruption of tranquility of rural environment and stream frontage by 28,160 additional recreation visits/year.
C. Establish, preserve, enhance or manage approximately 20 miles, 6,101 acres of stream corridor on the Cedar River from Buchanan Benton Co. line south to two miles north of Cedar Rapids.	C. 1. Same as 1 above 2. Provides 6,101 acres of forest land, crop pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/ acre/year. 4. Accelerated erosion due to 61,010 additional recreation visits/year. 5. Disruption of tranquility of rural environment and stream frontage by 61,010 additional recreation visits/year.
D. Establish, preserve, enhance or manage approximately 10 miles of stream corridor or 3,925 acres on the Cedar River in Linn, Johnson and Cedar Counties.	D. 1. Same as 1 above. 2. Provides 3,925 acres of forest land, crop pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/ acre/year. 4. Accelerated erosion due to 39,250 additional recreation visits/year.

Table VI-1
IOWA-CEDAR RIVERS BASIN

HIGH VALUE ENVIRONMENTAL CORRIDORS

Planning Element	Beneficial and Adverse Effects
	(d. of pg. 2 cont'd) 5. Disruption of tranquility of rural environment and stream frontage by 54,190 additional recreation visits/year.
E. Establish, preserve, enhance or manage approximately 10 miles, 5,419 acres of stream corridor on the Cedar River from the Cedar-Muscatine County line to confluence of Wapsinonoc Creek.	E. 1. Same as 1 above. 2. Provides 5,419 acres of forest land, crop pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/ acre/year. 4. Accelerated erosion due to 54,190 additional recreation visits/year. 5. Disruption of tranquility of rural environment and stream frontage by 54,190 additional recreation visits/year.
F. Establish, preserve, enhance or manage approximately 20 miles, 9,131 acres of stream corridor on the Shell Rock River from Floyd-Butler County line to confluence with Cedar River.	F. 1. Same as 1 above. 2. Provides 9,131 acres of forest land, crop pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/ acre/year. 4. Accelerated erosion due to 91,310 additional recreation visits/year. 5. Disruption of tranquility of rural environment and stream frontage by 91,310 additional recreation visits/year.

Table VI-1

IOWA-CEDAR RIVERS BASIN

HIGH VALUE ENVIRONMENTAL CORRIDORS

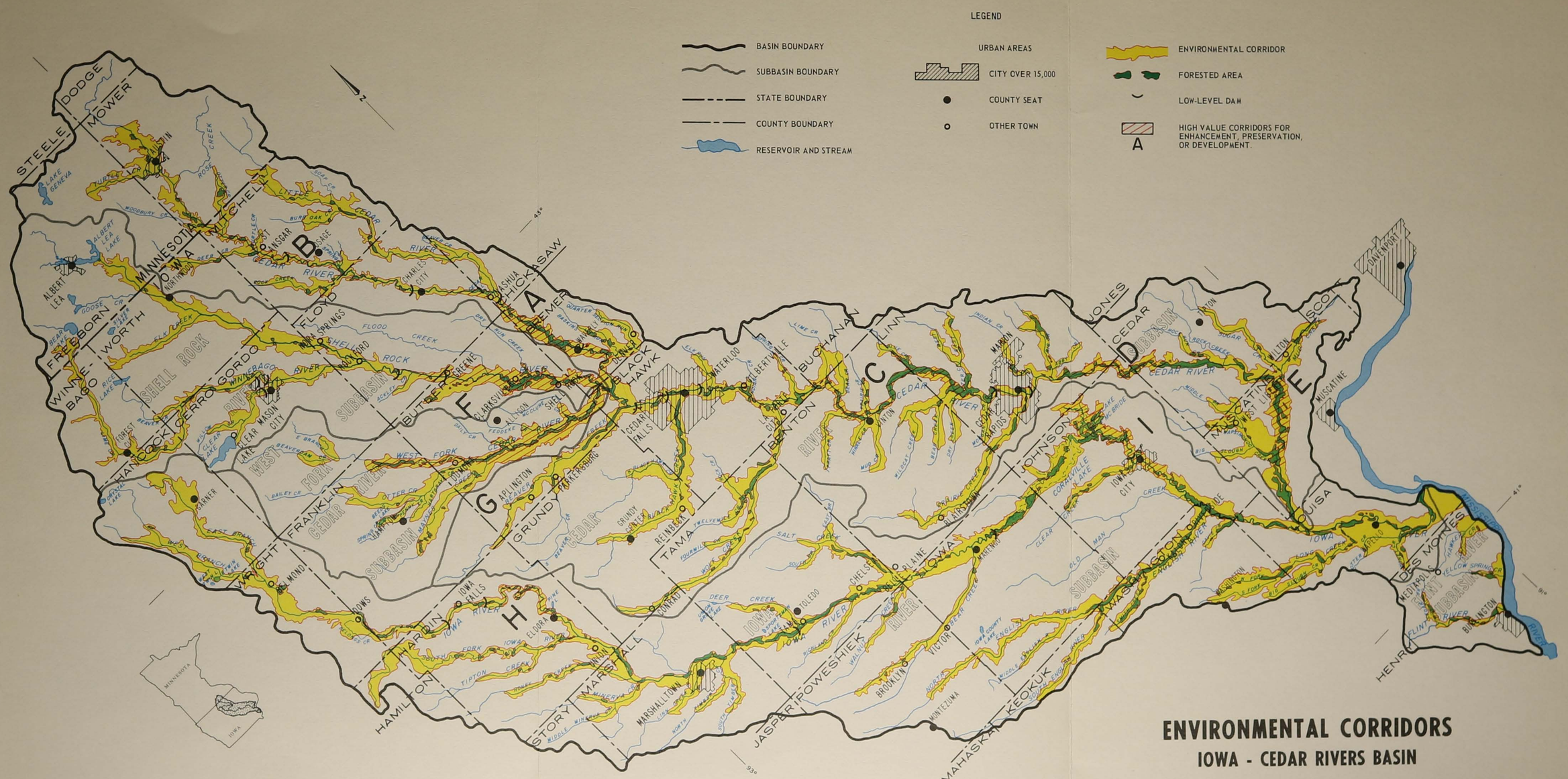
Planning Element	Beneficial and Adverse Effects
G. Establish, preserve, enhance or manage approximately 25 miles, 13,824 acres of stream corridor on the West Fork Cedar River from 1 mile south of Franklin County line to confluence with the Shell Rock River.	G. 1. Same as 1 above 2. Provides 13,824 acres of forest land, crop pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/acre/year. 4. Accelerated erosion due to 138,240 additional recreation visits/year. 5. Disruption of tranquility of rural environment and stream frontage by 138,240 additional recreation visits/year.
H. Establish, preserve, enhance or manage approximately 10 miles, 2,218 acres of stream corridor on the Iowa River, 4 miles south of Iowa Falls to Eldora.	H. 1. Same as 1 above. 2. Provides 2,218 acres of forest land crop pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/acre/year. 4. Accelerated erosion due to 22,180 additional recreation visits/year. 5. Disruption of tranquility of rural environment and stream frontage by 22,180 additional recreation visits/year.

Table VI-1

IOWA-CEDAR RIVERS BASIN

HIGH VALUE ENVIRONMENTAL CORRIDORS

Planning Element	Beneficial and Adverse Effects
I. Establish, preserve, enhance or manage approximately 10 miles, 8,107 acres of stream corridor on the Iowa River from the main body of Coralville Lake to one mile south of Iowa City.	I. 1. Same as 1 above. 2. Provides 8,107 acres of forest land, crop pasture and other land for wildlife habitat management. 3. Increased recreation by 10 recreational visits/ acre/year. 4. Accelerated erosion due to 81,070 additional recreation visits/year. 5. Disruption of tranquility of rural environment and stream frontage by 81,070 additional recreation visits/year.



ENVIRONMENTAL CORRIDORS

IOWA - CEDAR RIVERS BASIN

IOWA AND MINNESOTA

FIGURE VI-1

SOURCE: FAMILY OF MAPS SCS DRAWING NUMBER 5.S-32.382 (REV.- 5-15-74) IOWA CONSERVATION COMMISSION, MINNESOTA DEPARTMENT OF NATURAL RESOURCES, IOWA NATURAL RESOURCES COUNCIL, USDA SOIL CONSERVATION SERVICE, AND USDA FOREST SERVICE.

LAMBERT CONFORMAL CONIC PROJECTION

USDA-SCS-LINCOLN, NEBR. 1974

5-20-74
5,S-34,250.1

ENVIRONMENTAL CORRIDOR APPENDIXES

A. Land Use Inventory by Corridor

B. Land Use Inventory by County

C. Land Use Inventory Summary by Stream

D. Land Use Inventory Summary by County

E. Distribution and Density of Game Birds and Mammals in the Iowa-Cedar Rivers Basin

F. Existing Recreation Areas within the Environmental Corridors

G. Proposed Recreational Areas (Based on State Recreation Plans)

H. Proposed Recreational Areas (Based on Regional and County Plans)

I. Soil Limitations for Recreational Development

A P P E N D I X A

LAND USE INVENTORY

BY CORRIDOR

CEDAR SUBBASIN
3,315,200 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR								
			Miles	Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Land Acres	Urban Land % Corr.	Crop,Past.&Oth.Lnd Acres	Crop,Past.&Oth.Lnd % Corr.
Mower *	Cedar River		20	42,323	1.3	2,958	7	2,491	6	36,874	87
Mitchell			29	24,161	0.7	2,024	8	623	3	21,514	89
Floyd			29	11,027	0.3	1,713	16	1,868	17	7,446	67
Chickasaw			94	3,736	0.1	467	13	311	8	2,958	79
Bremer			129	35,512	1.1	4,982	14	623	2	29,907	84
Black Hawk			45	32,431	1.0	7,784	24	6,227	19	18,420	57
Benton			26	30,647	0.9	6,072	20	934	3	23,641	77
Linn			44	29,513	0.9	11,209	38	4,515	15	13,789	47
Johnson			5	3,892	0.1	1,557	40	-	-	2,335	60
Cedar			24	18,162	0.5	5,293	29	-	-	12,869	71
Muscatine			30	34,215	1.0	10,898	32	-	-	23,317	68
Louisa			4	3,081	0.1	934	30	-	-	2,147	70
	TOTAL	3,315,200	479	286,700	8	55,891	21	17,592	6	195,217	73
Mower *	Otter Creek	3,315,200	6	13,783	0.4	778	6	-	-	13,005	94
Mitchell			3	3,892	0.1	-	-	-	-	3,892	100
	TOTAL		9	17,675	0.5	778	4	-	-	16,897	96
Freeborn *	Turtle Creek	3,315,200	6	13,297	0.4	156	1	-	-	13,141	99
Mower *			4	4,359	0.1	-	-	623	14	3,736	86
	TOTAL		10	17,656	0.5	156	1	623	3	16,877	96
Worth	Deer Creek		6	10,540	0.3	311	3	-	-	10,229	97
Mitchell			6	3,113	0.1	623	20	-	-	2,490	80
	TOTAL		12	13,653	0.4	934	7	-	-	12,719	93
Mitchell	Rock Creek		12	12,293	0.4	934	8	-	-	11,359	92

* Minnesota Portion

CEDAR SUBBASIN
3,315,200 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR								
			Miles	Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Land Acres	Urban Land % Corr.	Crop,Past.&Oth.Lnd Acres	Crop,Past.&Oth.Lnd % Corr.
Mitchell	Little Cedar R.		23	24,287	0.7	2,024	8	-	-	22,263	92
Floyd			13	18,486	0.6	467	3	-	-	18,019	97
Chickasaw			11	8,736	0.3	-	-	-	-	8,736	100
		TOTAL	47	51,509	1.6	2,491	5	-	-	49,018	95
Mitchell	Burr Oak		6	6,227	0.2	234	4	-	-	5,993	67
Chickasaw	Basset Cr.		5	2,652	0.1	-	-	-	-	2,652	100
Bremer	Baskins Run		7	4,703	0.1	1,090	23	-	-	3,613	77
Bremer	1/4 Sec. Run		13	2,594	0.1	-	0	311	12	2,283	88
Franklin	Beaver Creek		3	1,297	-	-	-	-	-	1,297	100
Butler			27	28,215	0.9	2,335	8	1,246	4	24,634	88
Black Hawk			3	8,108	0.2	1,245	15	-	-	6,863	85
		TOTAL	33	37,620	1.1	3,580	10	1,246	3	32,794	87
Grundy	Blackhawk Cr.		18	28,864	0.9	467	2	467	2	27,930	96
Blackhawk			15	15,405	0.5	3,114	20	6,850	45	5,441	35
		TOTAL	33	44,269	1.3	3,581	8	7,317	17	33,371	75
Grundy	N. Fork Blackhawk Creek		8	8,874	0.3	-	-	-	-	8,874	100
Black Hawk	Elk Run		5	8,108	0.2	-	-	467	6	7,641	94
" "	Indian Creek		2	1,135	-	311	27	-	-	824	73
" "	Spring Creek		4	14,432	0.4	467	3	-	-	13,965	97
Grundy	Wolf Creek		8	3,567	0.1	156	4	311	9	3,100	87

CEDAR SUBBASIN
3,315,200 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR									
			Miles	Acres	% of Subbasin	Forest Land		Urban Land		Crop,Past.&Oth.Lnd	
						Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Tama	Wolf Creek		27	23,188	0.7	2,802	12	467	2	19,919	86
Benton			5	5,027	0.2	623	12	-	-	4,404	88
Black Hawk			3	5,676	0.2	156	3	311	6	5,209	91
		TOTAL	43	37,458	1.1	3,737	10	1,089	3	32,632	87
Tama	Four Mile		4	3,081	0.1	-	-	-	-	3,081	100
"	Twelve Mile		5	10,216	0.3	778	8	-	-	9,438	92
"	Rock Creek		4	6,694	0.2	234	4	-	-	6,460	96
Buchanan	Lime Creek		4	4,826	0.2	-	-	-	-	4,826	100
Benton	Bear Creek		6	5,916	0.2	156	3	-	-	5,760	97
"	Pratt Creek		7	10,846	0.3	-	-	-	-	10,846	100
"	Hinkle Creek		3	8,108	0.2	-	-	-	-	8,108	100
"	Small Prairie Creek		4	3,113	0.1	934	30	-	-	2,179	70
"	Mud Creek		11	5,189	0.2	-	-	-	-	5,189	100
Linn	West Blue Cr.		5	4,216	0.1	311	7	-	-	3,905	93
Benton	Wild Cat Cr.		7	9,567	0.3	156	2	-	-	9,411	98

CEDAR SUBBASIN
3,315,200 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR								
			Miles	Acres	% of Subbasin	Forest Land		Urban Land		Crop,Past.&Oth.Lnd	
						Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Benton	Little Bear Cr.		6	7,621	0.2	311	4	-	-	7,310	96
Linn			3	3,081	0.1	311	10	-	-	2,770	90
		TOTAL	9	10,702	0.3	622	6	-	-	10,080	94
Benton	Dry Creek		3	5,675	0.2	-	-	-	-	5,675	100
Linn			3	2,432	0.1	-	-	-	-	2,432	100
		TOTAL	6	8,107	0.2	-	-	-	-	8,107	100
Linn	East-West Otter Creek		14	11,675	0.4	1,868	16	-	-	9,807	84
	Morgan Creek		6	5,838	0.2	156	3	-	-	5,682	97
Benton	Prairie Creek		19	25,296	0.8	1,557	6	156	1	23,583	93
Linn			10	12,648	0.4	1,245	10	2,335	19	9,068	71
		TOTAL	29	37,944	1.1	2,802	7	2,491	7	32,651	86
Linn	Indian Creek		12	6,162	0.2	311	5	1,401	23	4,450	72
	Abbe Creek		4	5,838	0.2	156	3	-	-	5,682	97
	Big Creek		15	9,567	0.3	2,335	24	-	-	7,232	76
Cedar	Rock Run Cr.		8	4,216	0.1	467	11	-	-	3,749	89
Cedar	Sugar Creek		16	12,648	0.4	311	3	-	-	12,337	97
Muscatine			2	1,784	0.1	311	17	-	-	1,473	83
		TOTAL	18	14,432	0.4	622	4	-	-	13,810	96
Muscatine	Mud Creek		7	11,027	0.3	934	8	311	3	9,782	89
	Big Slough		4	9,891	0.3	-	-	-	-	9,891	100
	Wapasinonoc		20	25,459	0.8	1,089	4	311	1	24,059	95
MINNESOTA TOTAL			36	73,762	2.2	3,892	5	3,114	4	66,756	91
IOWA TOTAL			904	708,426	21.4	84,223	12	30,045	4	594,158	84
GRAND TOTAL			940	782,188	23.6	88,115	11	33,159	4	660,914	85

APPENDIX A

Dec. 1973

IOWA SUBBASIN
3,083,520 acres

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

County	Stream Corridor Name		Environmental Corridor									
			Miles	Acres	% of Subbasin	Forest Land		Urban Land		Crop, Past. &Oth. Lnd	
						Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Wright	Iowa River		3	31,458	1.0	2,802	9	934	3	27,722	88
Franklin			4	7,297	0.2	1,868	26	-	-	5,429	74
Hardin			55	22,864	0.7	5,916	26	778	3	16,170	71
Marshall			24	17,999	0.6	4,671	26	156	1	13,172	73
Tama			36	25,844	0.8	2,024	8	623	2	23,197	90
Iowa			34	25,621	0.8	6,539	26	623	2	18,459	72
Johnson			70	54,809	2.0	15,880	29	2,647	5	36,282	66
Louisa			78	40,215	0.1	10,586	26	467	1	29,162	73
	TOTAL	3,083,520	304	226,107	7	50,286	22	6,228	3	169,593	75
Hancock	E. Br. Iowa R.		22	25,134	0.8	467	2	623	3	24,044	95
Wright			4	17,189	0.6	156	1	-	-	17,033	99
	TOTAL		26	42,323	1.4	623	2	623	2	41,077	96
Hancock	W. Br. Iowa R.		18	26,107	0.8	467	2	-	-	25,640	98
Wright			6	24,238	0.8	311	1	-	-	23,927	99
	TOTAL		24	50,345	1.6	778	2	-	-	49,567	98
Hardin	Tipton Creek		12	7,946	0.3	623	8	-	-	7,323	92
Hamilton	Southfork Ia. R.		11	5,189	0.2	-	-	-	-	5,189	100
Hardin			35	20,756	0.7	3,114	15	-	-	17,642	85
	TOTAL		46	25,945	0.8	3,114	12	-	-	22,831	88
Hardin	Honey Creek		15	7,621	0.3	778	10	156	2	6,687	88
Marshall			5	811	-	311	38	-	-	500	62
	TOTAL		20	8,432	0.3	1,089	13	156	1	7,187	85
Marshall	Minerva Creek		16	8,756	0.3	1,090	12	-	-	7,666	88

IOWA SUBBASIN
3,083,520 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR								
			Miles	Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Land Acres	Urban Land % Corr.	Crop,Past.&Oth.Lnd Acres	Crop,Past.&Oth.Lnd % Cor..
Marshall	Linn Creek		9	12,324	0.4	156	1	4,515	37	7,653	62
Marshall	N. Timber Cr.		11	8,919	0.3	467	5	-	-	8,452	95
Marshall	S. Timber Cr.		8	16,702	0.5	311	2	-	-	16,391	98
Tama	Deer Creek		11	9,892	0.3	1,090	11	156	2	8,646	87
	Richland Cr.		9	4,216	0.1	-	-	-	-	4,216	100
Tama	Salt Creek		25	15,566	0.5	1,557	10	-	-	14,009	90
Benton			1	2,179	0.1	156	7	311	14	1,712	79
	TOTAL		26	17,745	0.6	1,713	9	311	2	15,721	89
Poweshiek	Walnut Creek		11	5,513	0.2	623	11	-	-	4,890	89
Poweshiek	Big Bear Cr.		16	7,297	0.2	623	9	311	4	6,363	87
Iowa			13	9,567	0.3	311	3	156	2	9,100	95
	TOTAL		29	16,864	0.5	934	6	467	3	15,463	91
Johnson	Knapp Creek		3	4,865	0.2	778	16	-	-	4,087	84
Johnson	Hoosier Cr.		4	10,216	0.4	1,090	11	-	-	9,126	89
Johnson	Clear Creek		14	10,864	0.4	2,335	22	-	-	8,529	78

IOWA SUBBASIN
3,083,520 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR									
			Miles	Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Land Acres	Urban Land % Corr.	Crop,Past.&Oth.Ln Acres	Crop,Past.&Oth.Ln % Corr
Poweshiek	N. English R.		8	5,837	0.2	-	-	-	-	5,837	100
Iowa			24	14,107	0.5	2,180	16	-	-	11,927	84
	TOTAL		32	19,944	0.6	2,180	11	-	-	17,764	89
Iowa	Middle Eng. R.		7	7,297	0.2	778	11	-	-	6,519	89
Keokuk	S. English R.		13	8,594	0.3	1,557	18	-	-	7,037	82
Washington	English R.		25	32,431	1.1	5,916	18	467	1	26,048	81
	Smith Creek		8	8,919	0.3	934	10	156	2	7,829	88
	Davis Creek		4	1,622	0.1	778	48	-	-	844	52
Washington	Long Creek		13	18,972	0.6	623	3	-	-	18,349	97
Louisa			11	17,672	0.6	2,180	12	-	-	15,495	88
		TOTAL	24	36,647	1.2	2,803	8	-	-	33,844	92
Washington	Buff Creek		3	4,703	0.2	-	-	-	-	4,703	100
Louisa			6	12,000	0.4	311	3	-	-	11,689	97
		TOTAL	9	16,703	0.5	311	2	-	-	16,392	98
Louisa	Otter Creek		7	16,054	0.5	156	1	-	-	15,898	99
Louisa	Honey Creek		3	8,594	0.3	1,401	16	-	-	7,193	84
	MINNESOTA TOTAL		0	-	-	-	-	-	-	-	-
	IOWA TOTAL		715	644,779	21	83,914	13	13,079	2	547,786	85
	GRAND TOTAL		715	644,779	21	83,914	13	13,079	2	547,786	85

WEST FORK CEDAR SUBBASIN
547,840 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR								
			Miles	Acres	% of Subbasin	Forest Land		Urban Land		Crop,Past.&Oth.LN	
						Acres	% Corr.	Acres	% Corr.	Acres	% Corr,
Franklin	W. Fork Cedar R.		8	11,351	2	2,024	18	-	0	9,327	82
Butler			31	42,485	8	6,695	16	156	0	35,634	84
		TOTAL	39	53,836	10	8,719	16	156	0.3	44,961	84
Franklin	Hartgrave-Otter Creek		25	21,080	4	311	2	156	1	20,613	97
Butler			4	2,595	1	467	18	156	6	1,972	76
		TOTAL	29	23,675	4	778	3	312	1	22,585	96
Franklin	Maynes		13	13,945	3	1,401	10	-	-	12,544	90
Butler			7	6,324	1	467	7	-	-	5,857	93
		TOTAL	20	20,269	4	1,868	9	-	-	18,401	91
Cerro Gordo	Beaverdam Cr.		6	6,864	-	-	-	-	-	6,864	100
GRAND TOTAL			94	104,644	19	11,365	11	468	1	92,811	88

SHELL ROCK SUBBASIN
1,141,120 acres

APPENDIX A
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY CORRIDOR
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
		Miles	Acres	% of Subbasin	Forest Land		Urban Land		Crop,Past.&Oth.Ln	
					Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Freeborn *	Shell Rock R.	8	12,648	1	311	2	-	-	12,337	98
Worth		18	19,621	2	311	2	311	2	18,999	96
Cerro Gordo		9	14,756	1	467	3	-	-	14,289	97
Floyd		23	33,404	3	1,245	4	1,090	3	31,069	93
Butler		25	34,539	3	7,473	22	1,401	4	25,665	74
Bremer		3	7,621	0.7	467	6	-	-	7,154	94
	TOTAL	86	122,589	11	10,274	9	2,802	2	109,513	89
Worth	Elk Creek	15	15,891	2	-	-	-	-	15,891	100
Freeborn *	Lime Creek	4	5,027	0.4	-	-	-	-	5,027	100
Winnebago		18	47,512	4	-	-	311	1	47,201	99
	TOTAL	22	52,539	5	-	-	311	1	52,228	99
Hancock	Winnebago R.	8	8,432	0.7	934	11	-	-	7,498	89
Cerro Gordo		32	19,297	2	1,246	7	1,557	8	16,494	85
Floyd		4	6,162	0.5	-	-	-	-	6,162	100
	TOTAL	44	33,891	3	2,180	6	1,557	5	30,154	89
Cerro Gordo	Willow Creek	3	12,810	1	-	-	2,491	19	10,319	81
Floyd	Ackley Creek	2	2,647	0.2	-	-	-	-	2,647	100
Butler	Coldwater Cr.	7	6,383	1	1,168	18	-	-	5,215	82
MINNESOTA TOTAL		12	17,675	1.6	311	2	0	-	17,364	98
IOWA TOTAL		167	229,075	20	13,311	6	7,161	3	208,603	91
GRAND TOTAL		179	246,750	22	13,622	5	7,161	3	225,967	92

A P P E N D I X B

LAND USE INVENTORY

BY COUNTY

APPENDIX B

Dec. 1973

CEDAR SUBBASIN
3,315,200 acres

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY
Iowa-Cedar Rivers Basin

County	Stream Corridor Name	ENVIRONMENTAL CORRIDOR Miles	Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Land Acres	Urban Land % Corr.	Crop,Past.&Oth.Lnd Acres	Crop,Past.&Oth.Lnd % Corr.
Mower *	Cedar River	20	42,323	1.3	2,958	7	2,491	6	36,874	87
	Otter Creek	6	13,783	0.4	778	6	-	-	13,005	94
	Turtle Creek	4	4,359	0.1	-	-	623	14	3,736	86
	TOTAL	30	60,465	1.8	3,736	6	3,114	5	53,615	89
Freeborn *	Turtle Creek	6	13,297	0.4	156	1	-	-	13,141	99
Worth	Deer Creek	6	10,540	0.3	311	3	-	-	10,229	97
Mitchell	Rock Creek	12	12,293	0.4	934	8	-	-	11,359	92
	Cedar River	29	24,161	0.7	2,024	8	623	3	21,514	89
	Otter Creek	3	3,892	0.1	-	-	-	-	3,892	100
	Deer Creek	6	3,113	0.1	623	20	-	-	2,490	80
	Little Cedar	23	24,287	0.7	2,024	8	-	-	22,263	92
	Burr Oak Cr.	6	6,227	0.2	234	4	-	-	5,993	96
	TOTAL	79	73,973	2.2	5,839	8	623	1	67,511	91
Floyd	Cedar River	29	11,027	0.3	1,713	16	1,868	17	7,446	67
	Little Cedar R.	13	18,486	0.6	467	3	-	-	18,019	97
	TOTAL	42	29,513	0.9	2,180	8	1,868	6	25,465	86
Bremer	Cedar River	129	35,512	1.1	4,982	14	623	2	29,907	84
	Baskins Run	7	4,703	0.1	1,090	23	-	-	3,613	77
	1/4 Sec. Run	13	2,594	0.1	-	-	311	12	2,283	88
	TOTAL	149	42,809	1.3	6,072	14	934	2	35,803	84
Chickasaw	Little Cedar	11	8,736	0.3	-	-	-	-	8,736	100
	Basset Creek	5	2,652	0.1	-	-	-	-	2,652	100
	Cedar River	94	3,736	0.1	467	13	311	8	2,958	79
	TOTAL	110	15,124	0.5	467	3	311	2	14,346	95
Franklin	Beaver Creek	3	1,297	0	-	-	-	-	1,297	100
Butler	Beaver Creek	27	28,215	0.9	2,335	8	1,246	4	24,634	88

* MINNESOTA PORTION

APPENDIX B

Dec. 1973

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY

Iowa-Cedar Rivers Basin

CEDAR SUBBASIN
3,315,200 acres

County	Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
		Miles	Acres	% of Subbasin	Forest Land		Urban Land		Crop,Past.&Oth.Lnd	
					Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Black Hawk	Cedar River	45	32,431	1.0	7,784	24	6,227	19	18,420	57
	Black Hawk Cr.	15	15,405	0.5	3,114	20	6,850	45	5,441	35
	Beaver Creek	3	8,108	0.2	1,245	15	-	-	6,863	85
	Elk Run	5	8,108	0.2	-	-	467	6	7,641	94
	Indian Creek	2	1,135	0	311	27	-	-	824	73
	Spring Creek	4	14,432	0.4	467	3	-	-	13,965	97
	Wolf Creek	3	5,676	0.2	156	3	311	6	5,209	91
	TOTAL	77	85,295	2.6	13,077	15	13,855	16	58,363	69
Grundy	Black Hawk Cr.	18	28,864	0.9	467	2	467	2	27,930	96
	Wolf Creek	8	3,567	0.1	156	4	311	9	3,100	87
	N. Fork Black Hawk Creek	8	8,874	0.3	-	-	-	-	8,874	100
	TOTAL	34	41,305	1.2	623	1	778	2	39,904	97
Tama	Wolf Creek	27	23,188	0.7	2,802	12	467	2	19,919	86
	Four Mile Cr.	4	3,081	0.1	-	-	-	-	3,081	100
	Twelve Mile Cr.	5	10,216	0.3	778	8	-	-	9,438	92
	Rock Creek	4	6,694	0.2	234	4	-	-	6,460	96
	TOTAL	40	43,179	1.3	3,814	9	467	1	38,898	90
Buchanan	Lime Creek	4	4,826	0.1	-	-	-	-	4,826	100
Benton	Cedar River	26	30,647	0.9	6,072	20	934	3	23,641	77
	Pratt Creek	7	10,846	0.3	-	-	-	-	10,846	100
	Hinkle Creek	3	8,108	0.2	-	-	-	-	8,108	100
	Mud Creek	11	5,189	0.2	-	-	-	-	5,189	100
	Wolf Creek	5	5,027	0.2	623	12	-	-	4,404	88
	Prairie Creek	19	25,296	0.8	1,557	6	156	1	23,583	93
	Prairie Creek	7	9,567	0.3	156	2	-	-	9,411	98
	Little Bear	6	7,621	0.2	311	4	-	-	7,310	96
	Dry Creek	3	5,675	0.2	-	-	-	-	5,675	100
	Bear Creek	6	5,916	0.2	156	3	-	-	5,760	97
	Sm. Prairie Cr.	4	3,113	0.1	934	30	-	-	2,179	70
	TOTAL	97	117,005	3.5	9,809	8	1,090	1	106,106	91

APPENDIX B

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY

Iowa-Cedar Rivers Basin

ec. 1973

CEDAR SUBBASIN
3,315,200 acres

County	Stream Corridor Name	ENVIRONMENTAL CORRIDOR Miles	Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Land Acres	Urban Land % Corr.	Crop,Past.&Oth. Lnd Acres	Crop,Past.&Oth. Lnd % Corr.
Linn	Dry Creek	3	2,432	0.1	-	-	-	-	2,432	100
	Little Bear Cr.	3	3,081	0.1	311	10	-	-	2,770	90
	West Blue Creek	5	4,216	0.1	311	7	-	-	3,905	93
	E. & W. Otter	14	11,675	0.4	1,868	16	-	-	9,807	84
	Morgan Creek	6	5,838	0.2	156	3	-	-	5,682	97
	Indian Creek	12	6,162	0.2	311	5	1,401	23	4,450	72
	Big Creek	15	9,567	0.3	2,335	24	-	-	7,232	76
	Abbe Creek	4	5,838	0.2	156	3	-	-	5,682	97
	Cedar River	44	29,513	0.9	11,209	38	4,515	15	13,789	47
	Prairie Creek	10	12,648	0.4	1,245	10	2,335	19	9,068	71
	TOTAL	116	90,970	2.7	17,902	20	8,251	9	64,817	71
Johnson	Cedar	5	3,892	0.1	1,557	40	-	-	2,335	60
Cedar	Cedar River	24	18,162	0.5	5,293	29	-	-	12,869	71
	Sugar Creek	16	12,648	0.4	311	3	-	-	12,337	97
	Rock Run Cr.	8	4,216	0.1	467	11	-	-	3,749	89
	TOTAL	48	35,026	1.1	6,071	17	-	-	28,955	83
Muscatine	Cedar River	30	34,215	1.0	10,898	32	-	-	23,317	68
	Big Slough Cr.	4	9,891	0.3	-	-	-	-	9,891	100
	Wapasinonoc Cr.	20	25,459	0.8	1,089	4	311	1	24,059	95
	Mud Creek	7	11,027	0.3	934	8	311	3	9,782	89
	Sugar Creek	2	1,784	0.1	311	17	-	-	1,473	83
	TOTAL	63	82,376	2.5	13,232	16	622	1	68,522	83
Louisa	Cedar River	4	3,081	0.1	934	30	-	-	2,147	70
MINNESOTA TOTAL		36	73,762	2.2	3,892	5	3,114	4	66,756	91
IOWA TOTAL		904	708,426	21	84,223	12	30,045	4	594,158	84
GRAND TOTAL		940	782,188	24	88,115	11	33,159	4	660,914	85

IOWA SUBBASIN
3,083,520 acres

APPENDIX B
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY
Iowa-Cedar Rivers Basin

DEC. 1973

COUNTY	Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
		Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban		Crop,past.,Oth.Lnd	
					Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Hancock	East Branch Iowa River	22	25,134	0.8	467	2	623	3	24,044	95
	West Branch Iowa River	18	26,107	0.8	467	2	-	-	25,640	98
	TOTAL	40	51,241	1.6	934	2	623	1	49,684	97
Wright	Iowa River	3	31,458	1.0	2,802	9	934	3	27,722	88
	E. Br. IA River	4	17,189	0.6	156	1	-	-	17,033	99
	W. Br. " "	6	24,238	0.8	311	1	-	-	23,927	99
	TOTAL	13	72,885	2	3,269	5	934	1	68,682	94
Franklin	Iowa River	4	7,297	0.2	1,868	26	-	-	5,429	74
Hamilton	S. Fork Iowa R.	11	5,189	0.2	-	-	-	-	5,189	100
Hardin	Iowa River	55	22,864	0.7	5,916	26	778	3	16,170	71
	S. Fork Iowa R.	35	20,756	0.7	3,114	15	-	-	17,642	85
	Honey Creek	15	7,621	0.3	778	10	156	2	6,687	88
	Tipton Creek	12	7,946	0.3	623	8	-	-	7,323	92
	TOTAL	117	59,187	2	10,431	18	934	2	47,822	80
Marshall	Iowa River	24	17,999	0.6	4,671	26	156	1	13,172	73
	Honey Creek	5	811	-	311	38	-	-	500	62
	Minerva Creek	16	8,756	0.3	1,090	12	-	-	7,666	88
	Lynn Creek	9	12,324	0.4	156	1	4,515	37	7,653	62
	N. Timber	11	8,919	0.3	467	5	-	-	8,452	95
	S. Timber	8	16,702	0.5	311	2	-	-	16,391	98
	TOTAL	73	65,511	2.1	9,006	11	4,671	7	53,834	82

Sht 4 of 8

APPENDIX B

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY

Iowa-Cedar Rivers Basin

Dec. 1973

IOWA SUBBASIN
3,083,520 acres

County	Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
		Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban Land		Crop,Past.&Oth.Lnd.	
					Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Tama	Iowa	36	25,844	0.8	2,024	8	623	2	23,197	90
	Deer Creek	11	9,892	0.3	1,090	11	156	2	8,646	87
	Salt Creek	25	15,566	0.5	1,557	10	-	-	14,009	90
	Richland Cr.	9	4,216	0.1	-	-	-	-	4,216	100
	TOTAL	81	55,518	1.8	4,671	9	779	1	50,068	90
Benton	Salt Creek	1	2,179	0.1	156	7	311	14	1,712	79
Poweshiek	Walnut Creek	11	5,513	0.2	623	11	-	-	4,890	89
	Big Bear Cr.	16	7,297	0.2	623	9	311	4	6,363	87
	N. English R.	8	5,837	0.2	-	-	-	-	5,837	100
	TOTAL	35	18,647	0.6	1,246	6	311	2	17,090	92
Keokuk	S. English R.	13	8,594	0.3	1,557	18	-	-	7,037	82
Iowa	Iowa River	34	25,621	0.8	6,539	26	623	2	18,459	72
	Big Bear Cr,	13	9,567	0.3	311	3	156	2	9,100	95
	N. English R.	24	14,107	0.5	2,180	16	-	-	11,927	84
	Mid English R.	7	7,297	0.2	778	11	-	-	6,519	89
	TOTAL	78	56,592	2	9,808	17	779	2	46,005	81
Johnson	Iowa River	70	54,809	2.0	15,880	29	2,647	5	36,282	66
	Clear Creek	14	10,864	0.4	2,335	22	-	-	8,529	78
	Hoosier Creek	4	10,216	0.4	1,090	11	-	-	9,126	89
	Knapp Creek	3	4,865	0.2	778	16	-	-	4,087	84
	TOTAL	91	80,754	3	20,083	25	2,647	3	58,024	72

APPENDIX B

Dec. 1973

IOWA SUBBASIN
3,083,520 acres

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY
Iowa-Cedar Rivers Basin

County	Stream Corridor Name		ENVIRONMENTAL CORRIDOR								
			Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban Land		Crop,Past.&Oth.Lnd	
						Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Washington	English River		25	32,431	1.1	5,916	18	467	1	26,048	81
	Davis Creek		4	1,622	0.1	778	48	-	-	844	52
	Long Creek		13	18,972	0.6	623	3	-	-	18,349	97
	Buff Creek		3	4,703	0.2	-	-	-	-	4,703	100
	Smith Creek		8	8,919	0.3	934	10	156	2	7,829	88
		TOTAL	53	66,647	2	8,251	12	623	1	57,773	87
Louisa	Iowa River		78	40,215	0.1	10,586	26	467	1	29,162	73
	Long Creek		11	17,675	0.6	2,180	12	-	-	15,495	88
	Otter Creek		7	16,054	0.5	156	1	-	-	15,898	99
	Honey Creek		3	8,594	0.3	1,401	16	-	-	7,193	84
	Buff Creek		6	12,000	0.4	311	3	-	-	11,689	97
		TOTAL	105	94,538	3	14,634	15	467	1	79,437	84
SUBBASIN TOTAL		3,083,520	715	644,779	21	83,914	13	13,079	2	547,786	85

APPENDIX B

Dec. 1973

WEST FORK CEDAR SUBBASIN
547,840 acres

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY
Iowa-Cedar Rivers Basin

County	Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
		Miles	Acres	% of Subbasin	Forest Land		Urban		Crop,Past.&Oth.Lnd	
					Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Franklin	W. Fork Cedar R	8	11,351	2	2,024	18	-	0	9,327	82
	Hartgrave-Otter Creek	25	21,080	4	311	2	156	1	20,613	97
	Maynes Creek	13	13,945	3	1,401	10	-	0	12,544	90
	TOTAL	46	46,376	8.5	3,736	8	156	-	42,484	92
Butler	W. Fork Cedar R.	31	42,485	8	6,695	16	156	0	35,634	84
	Maynes Creek	7	6,324	1	467	7	-	0	5.857	93
	Hartgrave-Otter Creek	4	2,595	1	467	18	156	6	1,972	76
	TOTAL	42	51,404	9.4	7,629	14	312	1	43,463	85
Cerro Gordo	Beaverdam Cr.	6	6,864	0	-	-	-	-	6,864	100
TOTAL	547,840	94	104,644	19	11,365	11	468	1	92,811	88

SHELL ROCK SUBBASIN
1,141,120 acres

APPENDIX B
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY BY COUNTY
Iowa-Cedar Rivers Basin

Dec. 1973

County	Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
		Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban		Crop,Past.&Oth.LND.	
					Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Freeborn *	Shell Rock R.	8	12,648	1	311	2	-	-	12,337	98
	Lime Creek	4	5,027	0.4	-	-	-	-	5,027	100
	TOTAL	12	17,675	1.5	311	2	-	-	17,364	98
Winnebago	Lime Creek	18	47,512	4	-	-	311	1	47,201	99
Worth	Shell Rock R.	18	19,621	2	311	2	311	2	18,999	96
	Elk Creek	15	15,891	2	-	-	-	-	15,891	100
	TOTAL	33	35,512	3.1	311	1	311	1	34,890	98
Hancock	Winnebago R.	8	8,432	0.7	934	11	-	-	7,498	89
Cerro Gordo	Winnebago R.	32	19,297	2	1,246	7	1,557	8	16,494	85
	Willow Creek	3	12,810	1	-	-	2,491	19	10,319	81
	Shell Rock R.	9	14,756	1	467	3	-	-	14,289	97
	TOTAL	44	46,863	4.1	1,713	3	4,048	9	41,102	88
Floyd	Shell Rock R.	23	33,404	3	1,245	4	1,090	3	31,069	93
	Winnebago R.	4	6,162	0.5	-	-	-	-	6,162	100
	Ackley Creek	2	2,647	0.2	-	-	-	-	2,647	100
	TOTAL	29	42,213	3.7	1,245	3	1,090	3	39,878	94
Butler	Shell Rock R.	25	34,539	3	7,473	22	1,401	4	25,665	74
	Coldwater Cr.	7	6,383	1	1,168	18	-	-	5,215	82
	TOTAL	32	40,922	3.6	8,641	21	1,401	3	30,880	76
Bremer	Shell Rock R.	3	7,621	0.7	467	6	-	-	7,154	94
MINNESOTA TOTAL		12	17,675	1.5	311	2	-	-	17,675	98
IOWA TOTAL		167	229,075	20	13,311	6	7,161	3	208,292	91
GRAND TOTAL		179	246,750	22	13,622	5	7,161	3	225,967	92

* Minnesota Portion

A P P E N D I X C

LAND USE INVENTORY

SUMMARY BY STREAM

APPENDIX C

CEDAR SUBBASIN — ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY STREAM — Dec. 1973

3,315,200 acres — Iowa-Cedar Rivers Basin

Stream Corridor Name	Stream Miles	Total Acres	% of Subbasin	ENVIRONMENTAL CORRIDOR Forest Land Acres	% Corr.	Urban Acres	% Corr.	Crop, Past. &OTH. LND Acres	% Corr.
Cedar River	479	268,700	8.0	55,891	21	17,592	6	195,217	73
Otter Creek	9	17,675	0.5	778	4	-	-	16,897	96
Turtle Creek	10	17,656	0.5	156	1	623	3	16,877	96
Deer Creek	12	13,653	0.4	934	7	-	-	12,719	93
Rock Creek 1	12	12,293	0.4	934	8	-	-	11,359	92
Little Cedar R.	47	51,509	1.6	2,491	5	-	-	49,018	95
Burr Oak Creek	6	6,227	0.2	234	4	-	-	5,993	67
Basset Creek	5	2,652	0.1	-	-	-	-	2,652	100
Baskins Run Cr.	7	4,703	0.1	1,090	23	-	-	3,613	77
1/4 Sec. Run Cr	13	2,594	0.1	-	-	311	12	2,283	88
Beaver Creek	33	37,620	1.1	3,580	10	1,246	3	32,794	87
Black Hawk Cr.	33	44,269	1.3	3,581	8	7,317	17	33,371	75
N. Fork Black Hawk Creek	8	8,874	0.3	-	-	-	-	8,874	100
Elk Run	5	8,108	0.2	-	-	467	6	7,641	94
Indian Creek 1	2	1,135	-	311	27	-	-	824	73
Spring Creek	4	14,432	0.4	467	3	-	-	13,965	97
Wolf Creek	43	37,458	1.1	3,737	10	1,089	3	32,632	87
Four Mile Cr.	4	3,081	0.1	-	-	-	-	3,081	100
Twelve Mile Cr.	5	10,216	0.3	778	8	-	-	9,438	92
Rock Creek 2	4	6,694	0.2	234	4	-	-	6,460	96
Lime Creek	4	4,826	0.2	-	-	-	-	4,826	100
Bear Creek	6	5,916	0.2	156	3	-	-	5,760	97
Pratt Creek	7	10,846	0.3	-	-	-	-	10,846	100
Hinkle Creek	3	8,108	0.2	-	-	-	-	8,108	100
Sm. Prairie Cr.	4	3,113	0.1	934	30	-	-	2,179	70
Mud Creek 1	11	5,189	0.2	-	-	-	-	5,189	100
West Blue Cr.	5	4,216	0.1	311	7	-	-	3,905	93
Wild Cat Creek	7	9,567	0.3	156	2	-	-	9,411	98
Little Bear Cr.	9	10,702	0.3	622	6	-	-	10,080	94
Dry Creek	6	8,107	0.2	-	-	-	-	8,107	100
E.&W. Otter Cr.	14	11,675	0.4	1,868	16	-	-	5,682	97
Prairie Creek	29	37,944	1.1	2,802	7	2,491	7	32,651	86
Indian Creek 2	12	6,162	0.2	311	5	1,401	23	4,450	72
Abbe Creek	4	5,838	0.2	156	3	-	-	5,682	97
Big Creek	15	9,567	0.3	2,335	24	-	-	7,232	76

APPENDIX C

CEDAR SUBBASIN — ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY STREAM — Dec. 1973

3,315,200 acres — Iowa-Cedar Rivers Basin

	Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
		Stream Miles	Total Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Acres	Urban % Corr.	Crop, Pasture & Other Land Acres	Crop, Pasture & Other Land % Corr.
	Rock Run Creek	8	4,216	0.1	467	11	-	-	3,749	89
	Sugar Creek	18	14,432	0.4	622	4	-	-	13,810	96
	Mud Creek 2	7	11,027	0.3	934	8	311	3	9,782	89
	Big Slough Cr.	4	9,891	0.3	-	-	-	-	9,891	100
	Wapasinonoc Cr	20	25,459	0.8	1,089	4	311	1	24,059	95
MINNESOTA TOTAL		36	73,762	2.2	3,892	5	3,114	4	66,756	91
IOWA TOTAL		904	708,426	21.4	84,223	12	30,045	4	594,158	84
GRAND TOTAL		940	782,188	23.6	88,115	11	33,159	4	660,914	85

APPENDIX C

IOWA SUBBASIN — ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY STREAM — Dec. 1973

3,083,520 acres — Iowa-Cedar Rivers Basin

Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
	Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban		Crop,Past.&Oth.Lnd	
				Acres	% of Corr	Acres	% Corr.	Acres	% Corr.
Iowa River	304	226,107	7	50,286	22	6,228	3	169,593	75
E. Br. Iowa R.	26	42,323	1.4	623	2	623	2	41,077	96
W. Br. Iowa R.	24	50,345	1.6	778	2	-	-	49,567	98
Tipton Creek	12	7,946	0.3	623	8	-	-	5,189	100
S. Fork Iowa R	46	25,945	0.8	3,114	12	-	-	22,831	88
Honey Creek	20	8,432	0.3	1,089	13	156	1	7,187	85
Minerva Creek	16	8,756	0.3	1,090	12	-	-	7,666	88
Linn Creek	9	12,324	0.4	156	1	4,515	37	7,653	62
N. Timber Cr.	11	8,919	0.3	467	5	-	-	8,452	95
S. Timber Cr.	8	16,702	0.5	311	2	-	-	16,391	98
Deer Creek	11	9,892	0.3	1,090	11	156	2	8,646	87
Richland Creek	9	4,216	0.1	-	-	-	-	4,216	100
Salt Creek	26	17,745	0.6	1,713	9	311	2	15,721	89
Walnut Creek	11	5,513	0.2	623	11	-	-	4,890	89
Big Bear Cr.	29	16,864	0.5	934	6	467	3	15,463	91
Knapp Cr.	3	4,865	0.2	778	16	-	-	4,087	84
Hoosier Creek	4	10,216	0.4	1,090	11	-	-	9,126	89
Clear Creek	14	10,864	0.4	2,335	22	-	-	8,529	78
N. English R.	32	19,944	0.6	2,180	11	-	-	17,764	89
Mid. English R	7	7,297	0.2	778	11	-	-	6,519	89
S. English R.	13	8,594	0.3	1,557	18	-	-	7,037	82
English R.	25	32,431	1.1	5,916	18	467	1	26,048	81
Smith Creek	8	8,919	0.3	934	10	156	2	7,829	88
Davis Creek	4	1,622	0.1	778	48	-	-	844	52
Long Creek	24	36,647	1.2	2,803	8	-	-	33,844	92
Buff Creek	9	16,703	0.5	311	2	-	-	16,392	98
Otter Creek	7	16,054	0.5	156	1	-	-	15,898	99
Honey Creek	3	8,594	0.3	1,401	16	-	-	7,193	84
TOTAL	715	644,779	21	83,914	13	13,097	2	547,786	85

(All in Iowa)

WEST FORK CEDAR SUBBASIN
547,840 acres

APPENDIX C
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY STREAM
Iowa-Cedar Rivers Basin

Dec. 1973

Stream Corridor Name	ENVIRONMENTAL CORRIDOR								
	Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban		Crop, Past. & Oth. Ln	
				Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
W. Fork Cedar River	39	53,836	10	8,719	16	156	0.3	44,961	84
Hartgrave-Otter Creek	29	23,675	4	778	3	312	1	22,585	96
Maynes Creek	20	20,269	4	1,868	9	-	-	18,401	91
Beaverdam Cr.	6	6,864	-	-	-	-	-	6,864	100
TOTAL	94	104,644	19	11,365	11	468	1	92,811	88

SHELL ROCK
SUBBASIN
1,141,120 acres

APPENDIX C
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY STREAM
Iowa-Cedar Rivers Basin

Dec. 1973

STREAM CORRIDOR NAME	ENVIRONMENTAL CORRIDOR								
	STREAM MILES	TOTAL ACRES	% OF SUBBASIN	FOREST LAND ACRES	FOREST LAND % CORR.	URBAN ACRES	URBAN % CORR.	CROP, PAST. OTH, LND ACRES	CROP, PAST. OTH, LND % CORR
SHELL ROCK RIVER	86	122,589	11	10,274	9	2,802	2	109,513	89
ELK CREEK	15	15,891	2	-	-	-	-	15,891	100
LIME CREEK	22	52,539	5	-	-	311	1	52,228	99
WINNEBAGO R.	44	33,891	3	2,180	6	1,557	5	30,154	89
WILLOW CR.	3	12,810	1	-	-	2,491	19	10,319	81
ACKLEY CR.	2	2,647	0.2	-	-	-	-	2,647	100
COLDWATER CR.	7	6,383	1	1,168	18	-	-	5,215	82
MINNESOTA TOTAL	12	17,675	1.6	311	2	-	-	17,364	98
IOWA TOTAL	167	229,075	20	13,311	6	7,161	3	208,603	91
GRAND TOTAL	179	246,750	22	13,622	5	7,161	3	225,967	92

APPENDIX C

FLINT SUBBASIN — ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY STREAM — Dec. 1973

213,760 acres — Iowa-Cedar Rivers Basin

STREAM CORRIDOR NAME	ENVIRONMENTAL CORRIDOR								
	STREAM MILES	TOTAL ACRES	% OF SUBBASIN	FOREST LAND ACRES	FOREST LAND % CORR.	URBAN ACRES	URBAN % CORR	CROP, PAST. OTH, LND ACRES	CROP, PAST. OTH, LND % CORR
FLINT RIVER	15	8,919	4	1,090	12	-	-	7,829	88
YELLOW SPRING	4	7,621	4	1,090	14	-	-	6.531	86
DOLBEE CREEK	6	8,108	4	311	4	-	-	7,797	96
TOTAL	25	24,648	12	2,491	10	-	-	22,157	90

APPENDIX D

LAND USE INVENTORY

SUMMARY BY COUNTY

APPENDIX D

CEDAR SUBBASIN
3,315,200 acres

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY COUNTY
Iowa-Cedar Rivers Basin

Dec. 1973

County	ENVIRONMENTAL CORRIDOR								
	Stream Miles	Total Acres	% of Subbasin	Forest Land Acres	Forest Land % Corr.	Urban Acres	Urban % Corr.	Crop, Past. & Oth. Lnd Acres	Crop, Past. & Oth. Lnd % Corr.
Freeborn *	6	13,297	0.4	156	1	-	-	13,141	99
Mower *	30	60,465	1.8	3,736	6	3,114	5	53,615	89
Worth	6	10,540	0.3	311	3	-	-	10,229	97
Mitchell	79	73,973	2.2	5,839	8	623	1	67,511	91
Floyd	42	29,513	0.9	2,180	8	1,868	6	25,465	86
Chickasaw	110	15,124	0.5	467	3	311	2	14,346	95
Bremer	149	42,809	1.3	6,072	14	934	2	35,803	84
Butler	27	28,215	0.9	2,335	8	1,246	4	24,634	88
Black Hawk	77	85,295	2.6	13,077	15	13,855	16	58,363	69
Franklin	3	1,297	-	-	-	-	-	1,297	100
Grundy	34	41,305	1.2	623	1	778	2	39,904	97
Tama	40	43,179	1.3	3,814	9	467	1	38,898	90
Buchanan	4	4,826	0.1	-	-	-	-	4,826	100
Benton	97	117,005	3.5	9,809	8	1,090	1	106,106	91
Linn	116	90,970	2.7	17,902	20	8,251	9	64,817	71
Johnson	5	3,892	0.1	1,557	40	-	-	2,335	60
Cedar	48	35,026	1.1	6,071	17	-	-	28,955	83
Muscatine	63	82,376	2.5	13,232	16	622	1	68,522	83
Louisa	4	3,081	0.1	934	30	-	-	2,147	70
* Minnesota County									
MINNESOTA TOTAL	36	73,762	2.2	3,892	5	3,114	4	66,756	91
IOWA TOTAL	904	708,426	21	84,223	12	30,045	4	594,158	84
GRAND TOTAL	940	782,188	24	88,115	11	33,159	4	660,914	85

APPENDIX D

IOWA SUBBASIN
3,083,520 acres

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY COUNTY
Iowa-Cedar Rivers Basin

Dec. 1973

COUNTY	Stream Miles	Total Acres	% of Subbasin	ENVIRONMENTAL CORRIDOR Forest Land Acres	Forest Land % of Cor	URBAN Acres	URBAN % Corr	Crop,Past.,Oth.Lnd Acres	Crop,Past.,Oth.Lnd % Corr.
Hancock	40	51,241	1.6	934	2	623	1	49,684	97
Wright	13	72,885	2	3,269	5	934	1	68,682	94
Franklin	4	7,297	0.2	1,868	26	-	-	5,429	74
Hamilton	11	5,189	0.2	-	-	-	-	5,189	100
Hardin	117	59,187	2	10,431	18	934	2	47,822	80
Marshall	73	65,511	2.1	7,006	11	4,671	7	53,834	82
Tama	81	55,518	1.8	4,671	9	779	1	50,068	90
Benton	1	2,179	0.1	156	7	311	14	1,712	79
Poweshiek	35	18,647	0.6	1,246	6	311	2	17,090	92
Keokuk	13	8,594	0.3	1,557	18	-	-	7,037	82
Iowa	78	56,592	2	9,808	17	779	2	46,005	81
Johnson	91	80,754	3	20,083	25	2,647	3	58,024	72
Washington	53	66,647	2	8,251	12	623	1	57,773	87
Louisa	105	94,538	3	14,634	15	467	1	79,437	84
TOTAL	715	644,779	21	83,914	13	13,079	2	547,786	85

WEST FORK CEDAR
SUBBASIN
547,840 acres

APPENDIX D
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY COUNTY
Iowa-Cedar Rivers Basin

Dec. 1973

County	ENVIRONMENTAL CORRIDOR								
	Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban		Crop, Past. & Oth. Lnd	
				Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Franklin	46	46,376	8.5	3,736	8	156	-	42,484	92
Butler	42	51,404	9.4	7,629	14	312	1	43,463	85
Cerro Gordo	6	6,864	-	0	-	0	-	6,864	-
TOTAL	94	104,644	19	11,365	11	468	-	92,811	88

SHELL ROCK
SUBBASIN
1,141,120 acres

APPENDIX D
ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY COUNTY
Iowa-Cedar Rivers Basin

Dec. 1973

County	ENVIRONMENTAL CORRIDOR								
	Stream Miles	Total Acres	% of Subbasin	Forest Land		Urban		Crop,Past.&Oth.Lnd	
				Acres	% Corr.	Acres	% Corr.	Acres	% Corr.
Freeborn *	12	17,675	1.5	311	2	-	-	17,364	98
Winnebago	18	47,512	4	-	-	311	1	47,201	99
Worth	33	35,512	3.1	311	1	311	1	34,890	98
Hancock	8	8,432	0.7	934	11	-	-	7,498	89
Cerro Gordo	44	46,863	4.1	1,713	3	4,048	9	41,102	88
Floyd	29	42,213	3.7	1,245	3	1,090	3	39,878	94
Butler	32	40,922	3.6	8,641	21	1,401	3	30,880	76
Bremer	3	7,621	0.7	467	6	-	-	7,154	94
MINNESOTA TOTAL	12	17,675	1.6	311	2	-	-	17,364	98
IOWA TOTAL	167	229,075	20	13,311	6	7,161	3	208,603	91
GRAND TOTAL	179	246,750	22	13,622	5	7,161	3	225,967	92

* Minnesota Portion

APPENDIX D

FLINT SUBBASIN
213,760 acres

ENVIRONMENTAL CORRIDOR STUDY - LAND USE INVENTORY SUMMARY BY COUNTY
Iowa-Cedar Rivers Basin

Dec. 1973

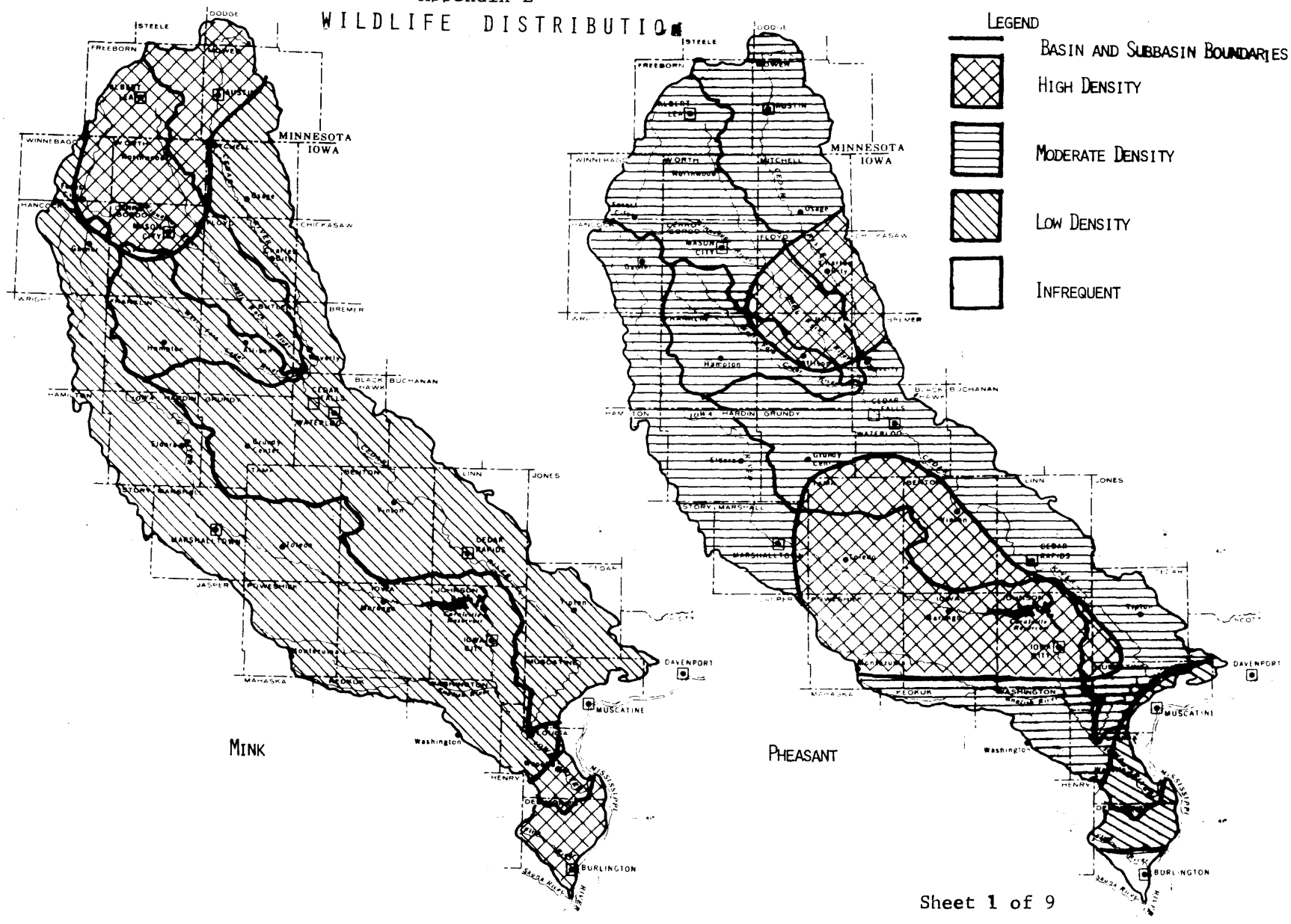
County	ENVIRONMENTAL CORRIDOR								
	STREAM MILES	TOTAL ACRES	% OF SUBBASIN	FOREST LAND ACRES	FOREST LAND % CORR	URBAN ACRES	URBAN % CPRR	CROP, PAST, OTH LND ACRES	CROP, PAST, OTH LND % CORR
Des Moines	25	24,648	12	2,491	10	-	-	22,157	90
TOTAL	25	24,648	12	2,491	10	- -	-	22,157	90

A P P E N D I X E

DISTRIBUTION AND DENSITY OF GAME BIRDS AND MAMMALS IN THE IOWA-CEDAR RIVERS BASIN

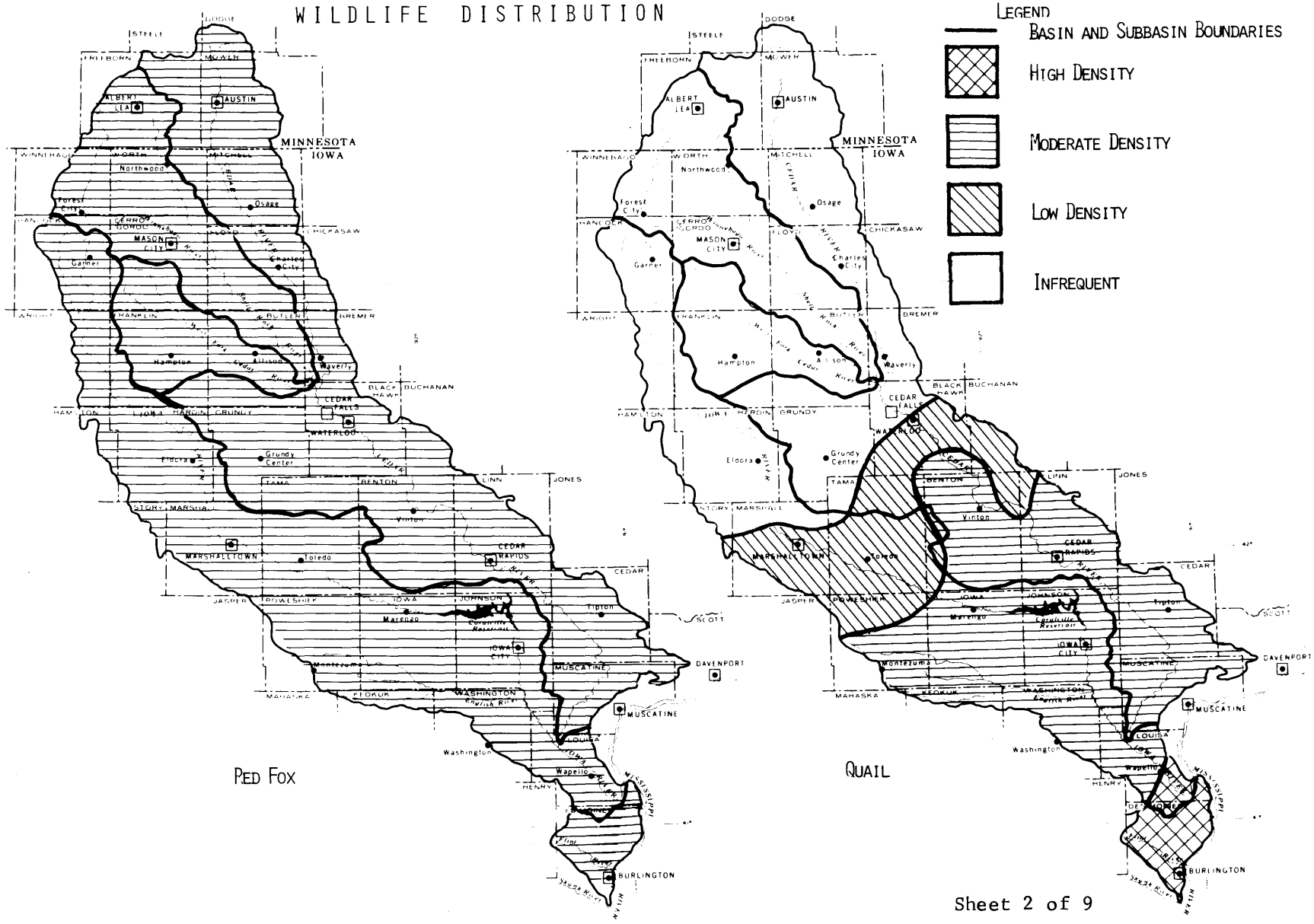
Appendix E

WILDLIFE DISTRIBUTION



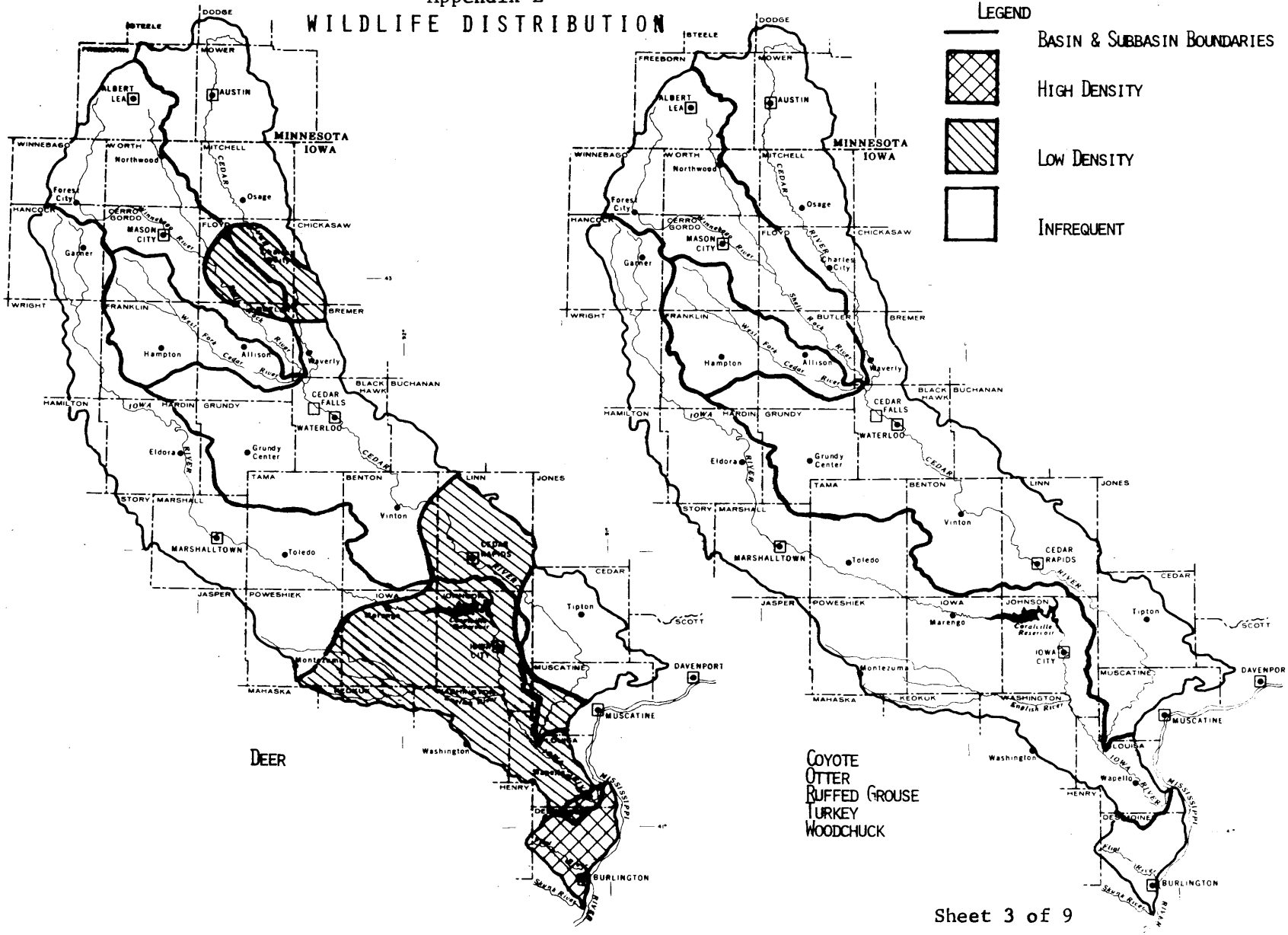
Appendix E

WILDLIFE DISTRIBUTION



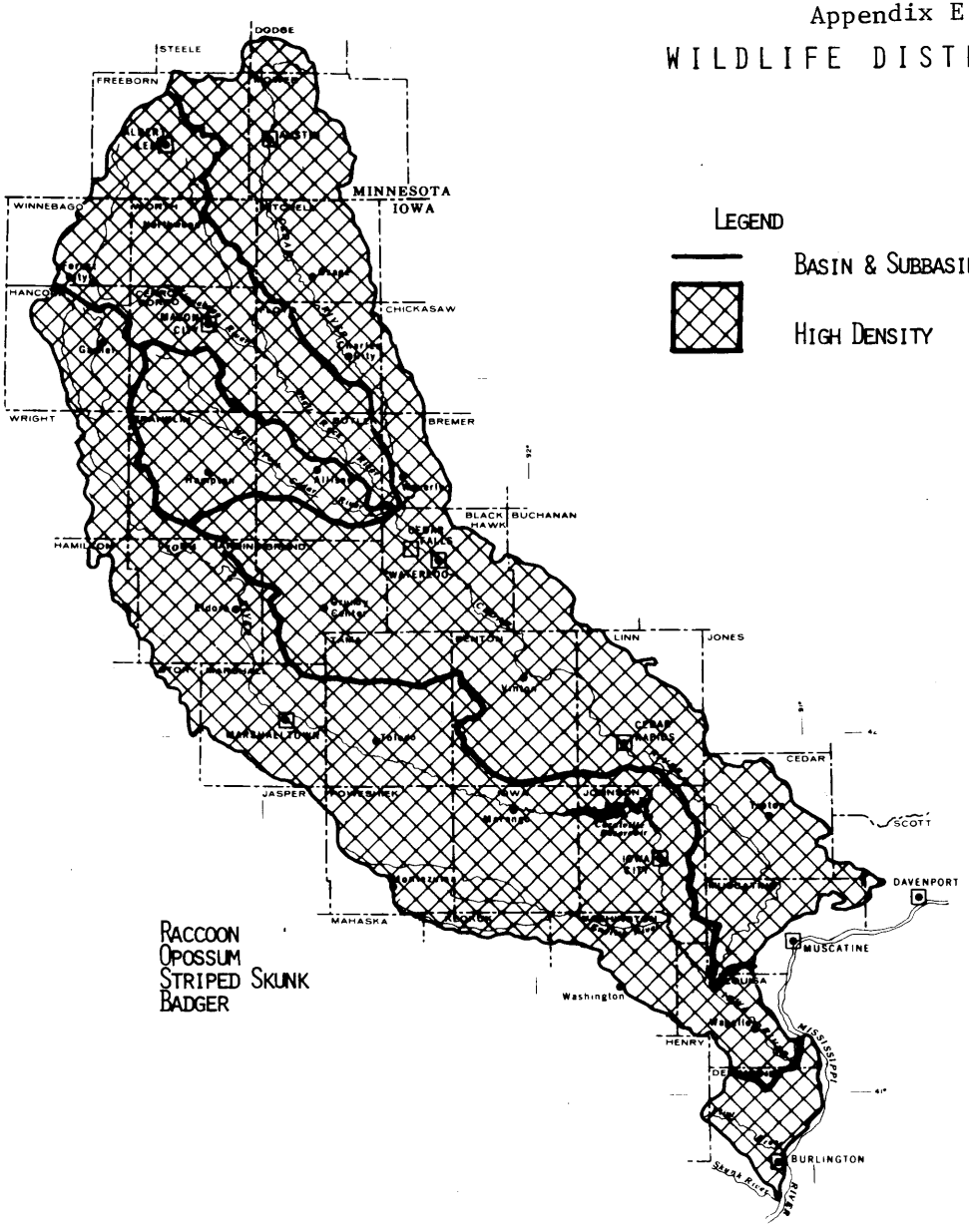
Appendix E

WILDLIFE DISTRIBUTION



Appendix E

WILDLIFE DISTRIBUTION



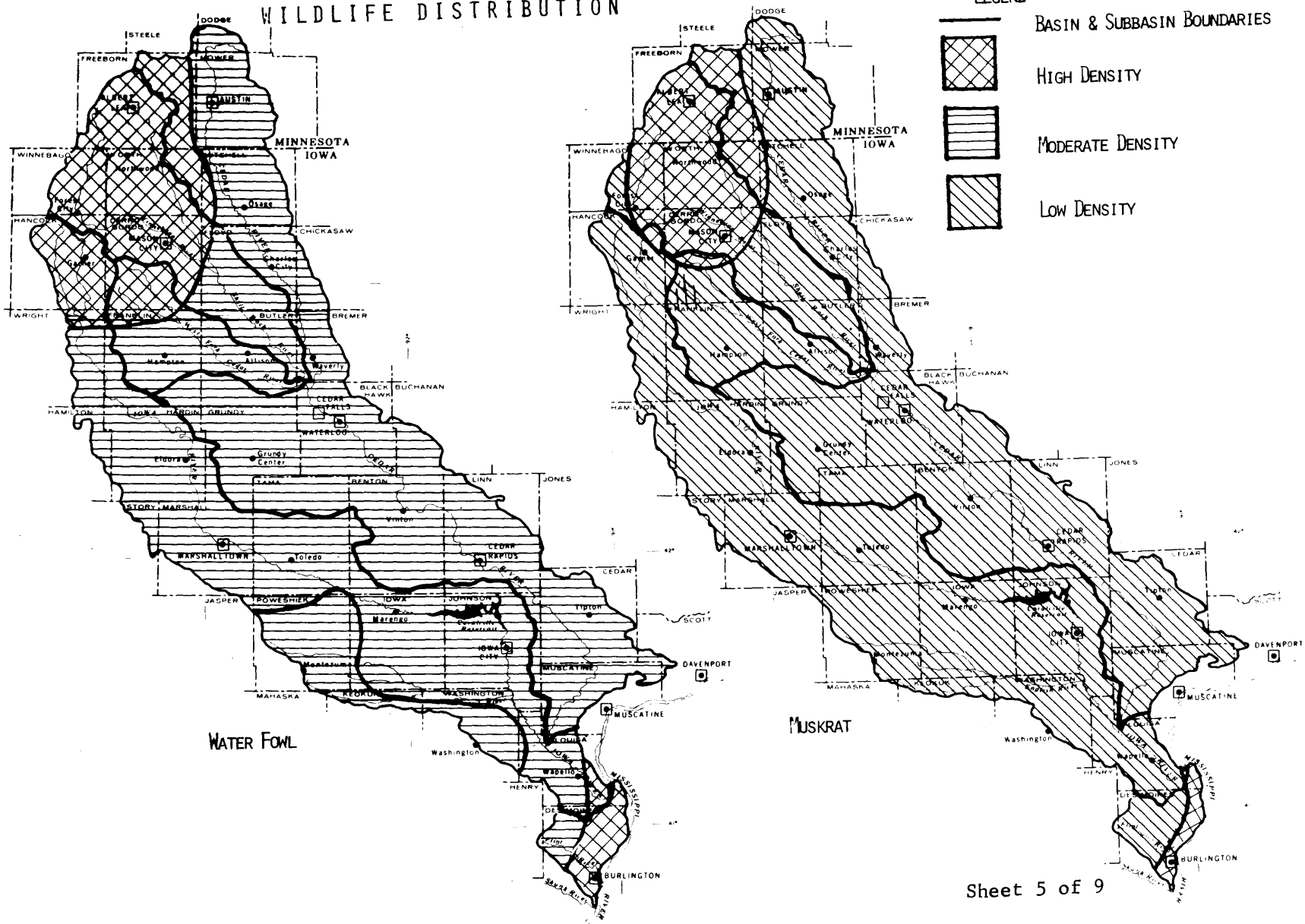
LEGEND

BASIN & SUBBASIN BOUNDARIES

HIGH DENSITY

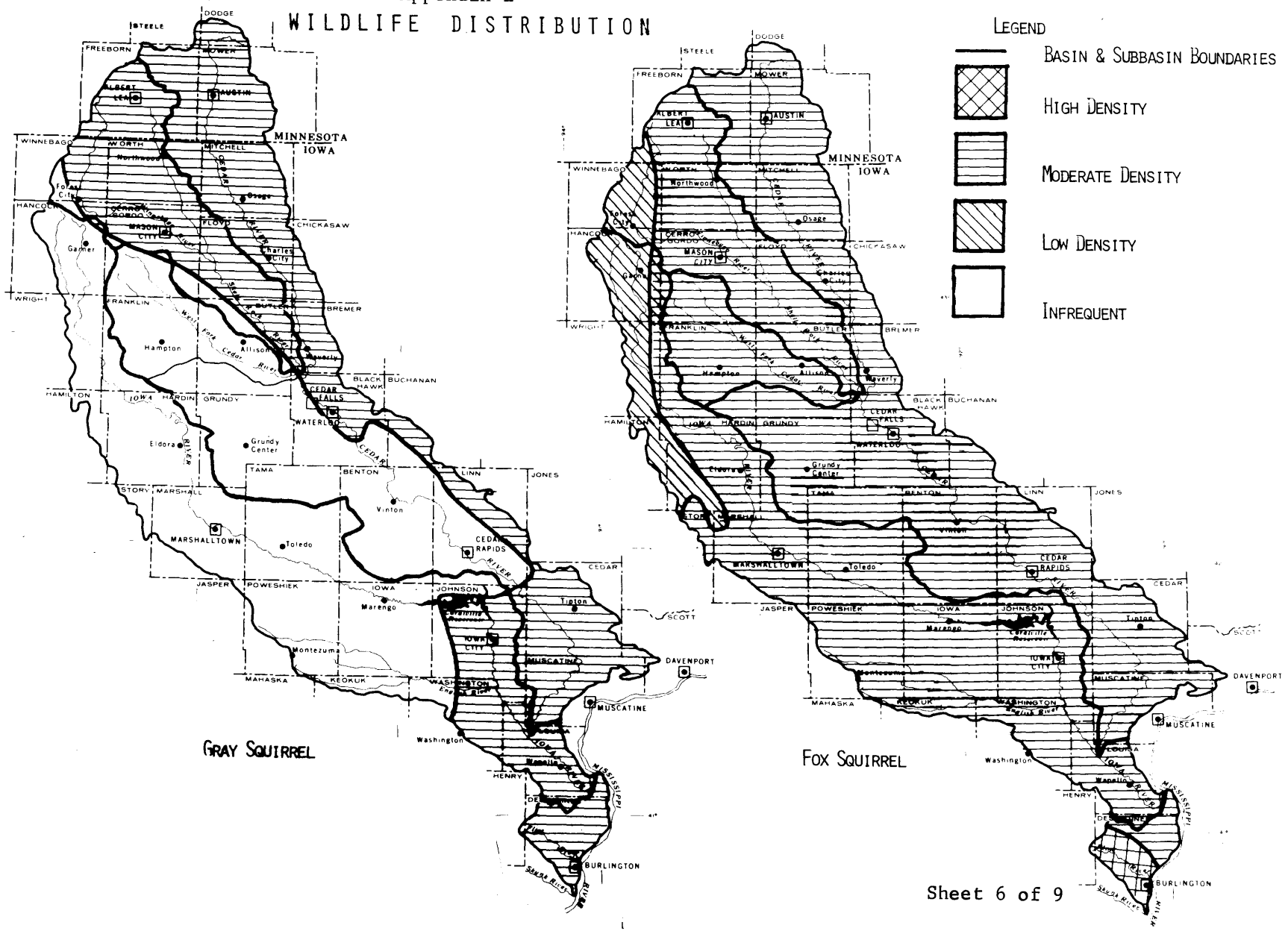
Appendix E

WILDLIFE DISTRIBUTION



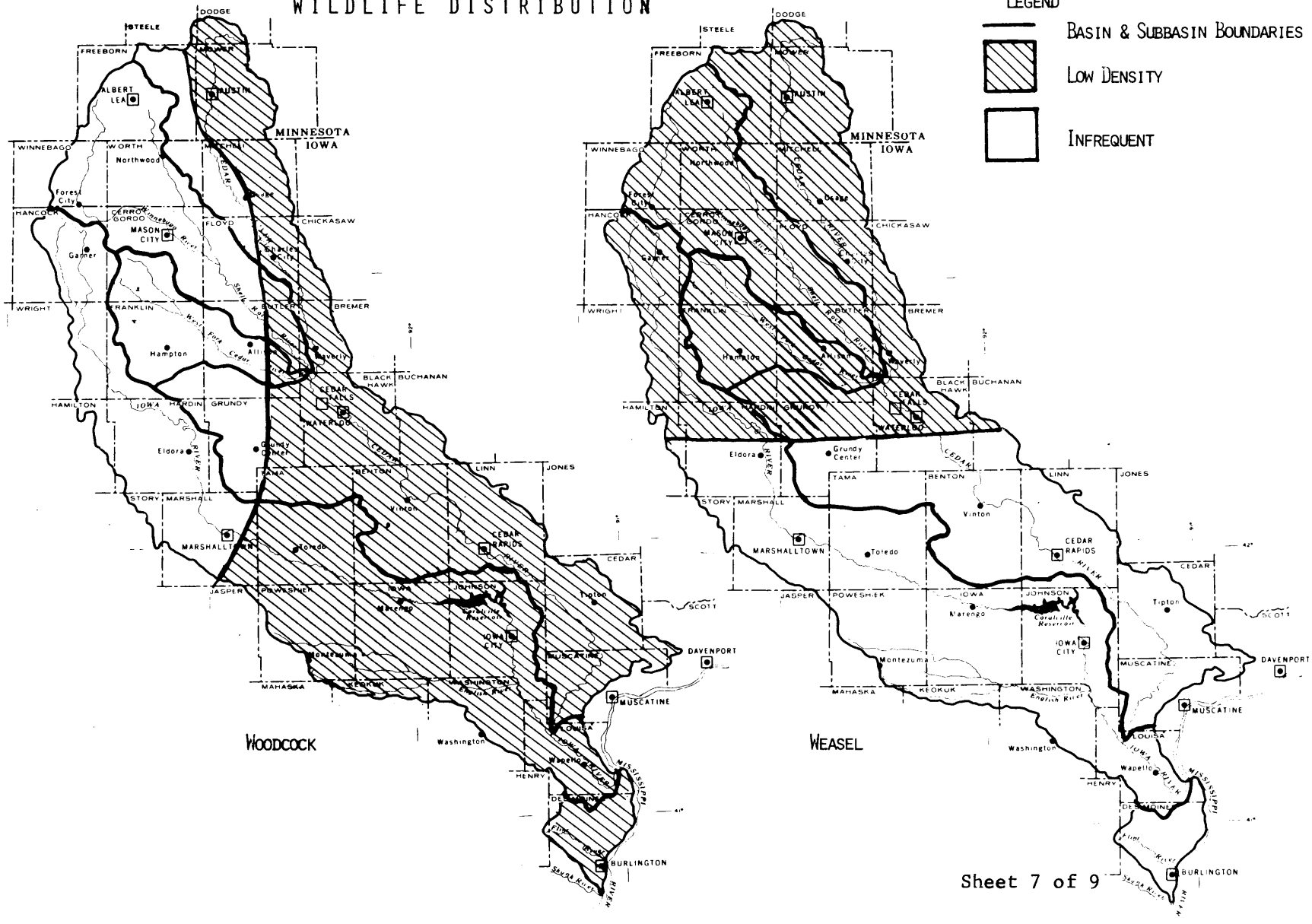
Appendix E

WILDLIFE DISTRIBUTION



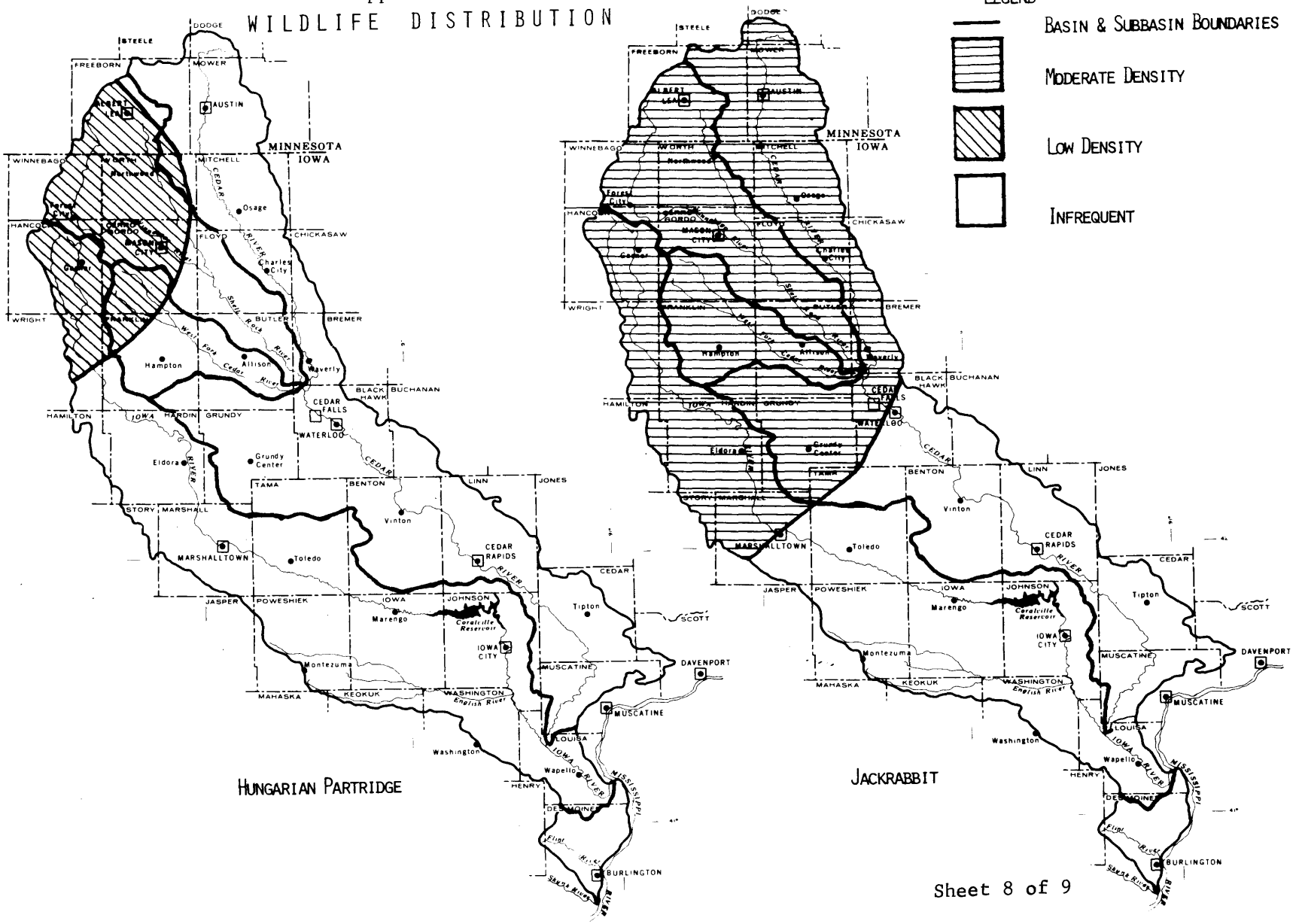
Appendix E

WILDLIFE DISTRIBUTION



Appendix E

WILDLIFE DISTRIBUTION



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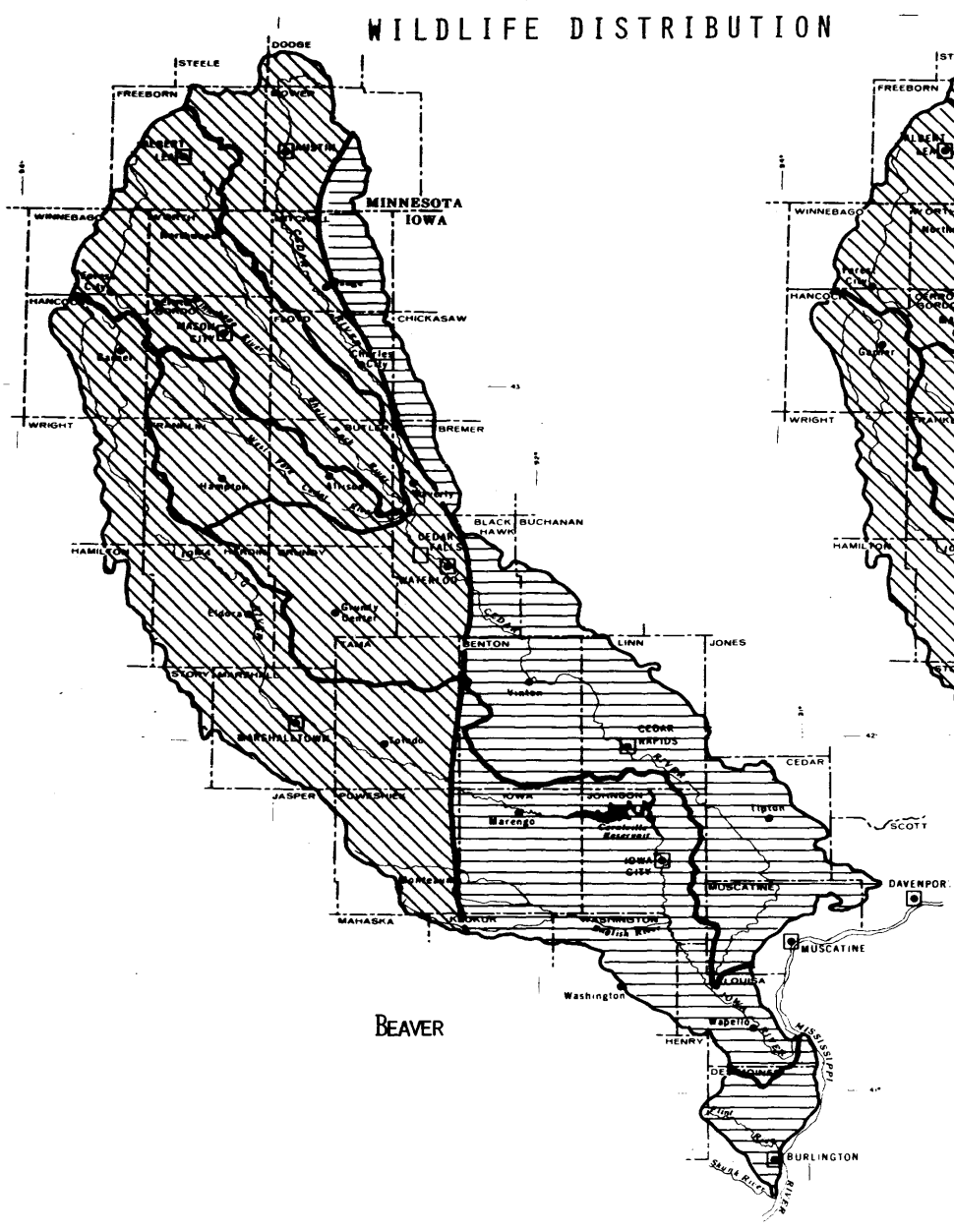
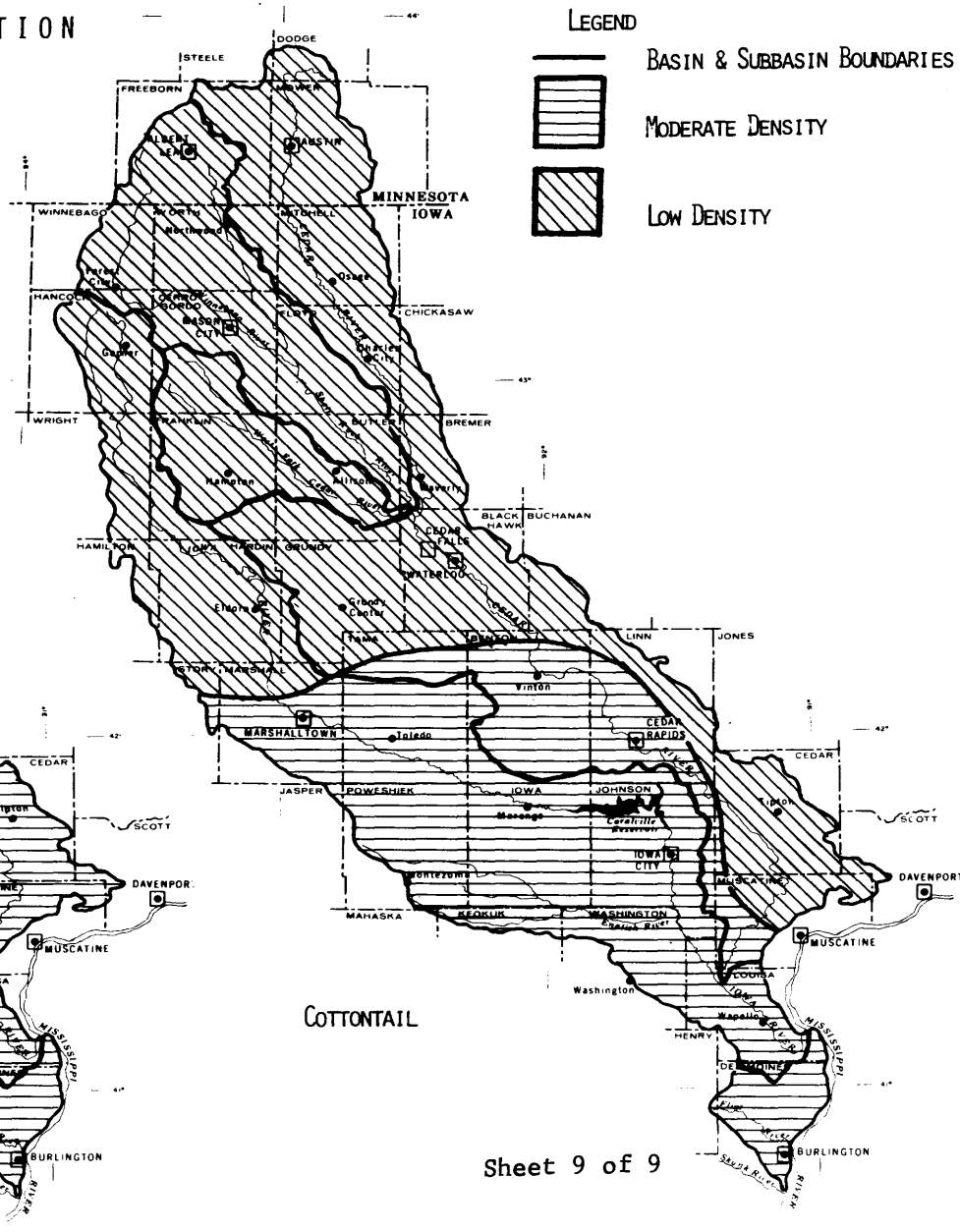
WILDLIFE DISTRIBUTION





APPENDIX F

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS

Appendix F

CEDAR SUBBASIN — EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site 1/ Rec.	Forest	Refuge	Pub. Hunt	Agency
Benton	Mt. Auburn Bridge	60	X				County
	Minne Estema	60	X				State-County
	Milroy Access	3	X				County
	Dudgeon Lake	1,257	X			X	State, Fish & Game
	Wildcat Bluff	119	X				County
	Benton City-Fry Access	39	X				County
	Hoefle-Dulin Access	52	X				County
	Kiwanis Wayside	4	X				State
	Roger's Park	170	X				County
	Subtotal	1,764	9	0	0	1	
Black Hawk	Ford River Access	1	X				County
	Falls Access	269	X			X	State, Fish & Game
	Cedar River Green Belt	250	X				County
	Black Hawk Park	1,095	X				County
	Perry Canfield Park	40	X				County
	George Wyth Memorial State Park	419	X				State, Land & Water
	Black Hawk Green Belt	351	X				County
	Sargent Memorial Hwy Rest Area	4	X				County
	Popp Access	69	X				County
	Seyfer Access	4	X				County
	Black Hawk County Access	60	X				County
	Indian Hills River Access	76	X				State-County
	Gilbertville Park	5	X				County
	Evansdale Cedar River Access	20	X				County
	Elk Run Park	26	X				County
	Casebeer Heights Access Area	20	X				County
	Highway #63 Wayside	2	X				County
	Subtotal	2,711	17	0	0	1	

1/ Rec. (Recreation), Pub. Hunt (Public Hunting Areas)

Appendix F

CEDAR SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Bremer	Cedar Bend Park	184	X				County
	Janeville Wayside	1	X				State
	Brandt Park	10	X				County
	Subtotal	195	3	0	0	0	
Buchanan	Lime Creek Area	38	X				County
	Subtotal	38	1	0	0	0	
Butler	Beaver Meadows	32	X				State, County
	Moore Recreation Area	35	X				
	Subtotal	67	2	0	0	0	
Cedar	Cedar Valley Green Belt	227	X				County
	Rochester Area	3	X				County
	Interstate 80 Wayside	10	X				State
	Subtotal	240	3	0	0	0	
Chickasaw	Chickasaw Mill	16	X				State, County
	Subtotal	16	1	0	0	0	
Floyd	Colwell Park	19	X				County
	Idlewild Access	136	X				State, County
	Charles City-Cedar River Dock	1	X				County
	Floyd Co. Museum	1	X				County
	Howard Woods	20		X			County
	US Hwy. 218 Rest Safety Area	2	X				County
	Flora Ellis Bird and Wildlife Sanctuary	10			X		County
	Rotary Park	17	X				County
	Subtotal	206	6	1	1	0	

Appendix F

CEDAR SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Grundy	Nason Rest Area	1	X				County
	Shearn Rest Area	1	X				County
	Reinbeck Rest Area	1	X				County
	Roadman Roadside Park	10	X				County
	Herbert Gutnecht Park	1	X				State-County
	Subtotal	14	5	0	0	0	
Linn	Lewis Wildlife & Timber Area	455		X	X		County
	Wickiup Hill	178	X				County
	Palo Marsh	144			X		County
	Chein Lakes	64	X				County
	Morgan Creek Park	104	X				County
	Palisades-Dows Area	162	X				County
	Palisades Access	89	X				State-County
	Palisades-Kepler	599	X				State, Land & Water
	Abbe Creek School Museum	2	X				County
	South Cedar Access	162	X				County
	Subtotal	1,959	8	1	2	0	
Mitchell	Ortranto Park	5	X				County
	Staceyville Park	7	X				County
	Gerbig's Woods	20		X			County
	Pioneer State Park	14	X				State, Land & Water
	Koon's Forest	8		X			County
	New Haven Potholes	165	X				County
	Interstate Park	25	X				County
	Halvorson Park	11	X				County
	Highway 9 Wayside	1	X				State
	Subtotal	256	7	2	0	0	

Appendix F

CEDAR SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Muscatine	Cedar River Access	733	X				State, Fish & Game
	Salisbury-Cedar River Access	477	X				County
	Wiese Slough	1,549				X	State, Fish & Game
	Moscow-Cedar River Access	4	X				County
	Subtotal	2,763	3	0	0	1	
Tama	T. F. Clark Park	24	X				County
	Hickory Hills Park	498	X				County
	Subtotal	522	2	0	0	0	
Worth	Gullikson Area	40	X				County
	Deer Creek Forest & Game Area	95	X	X			County
	Deer Creek Roadside Park	1	X				County
	Subtotal	136	3	1	0	0	
	SUBBASIN TOTAL	10,887	70	5	3	3	

IOWA SUBBASIN

Appendix F

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site 1/ Rec.	Forest	Refuge	Pub. Hunt	Agency
Franklin	Oakland-Iowa River Access	74	X				County
	PopeJoy Area	67	X				County
	Oakland Valley Game Mgt. Area	2				X	County
	Subtotal	143	2	0	0	1	
Hancock	Court House Square	2	X				County
	Ell Township Roadside Park	2	X				County
	East Twin Lake Forest Area	9		X			County
	Eldred Sherwood Park	100	X				County
	Goodell Area	73				X	State, Fish & Game
	East Twin Lake Park Game Area	1			X		County
	East Twin Lake	493	X			X	State-Sovereign, Fish & Game
	Eagle Lake Forest Preserve	46		X			County
	Eagle Lake State Park	919	X			X	State-Sovereign, Fish & Game
	Concord Park	2	X				County
	Eagle Lake Area	21	X				State-County
	Subtotal	1,668	7	2	1	3	
Hardin	Begelow Park	10	X				County
	Bessman-Kemp	10	X				County
	Alden River Dam	1	X				County
	Irvan Elms	4	X				County
	Flowing Well Park	6	X				County
	Gehrke Wildlife Area	6			X		County
	Boddy-Hunt Recreation Area	46	X				County
	Highway 20 Rest Area	4	X				County

1/ Rec. (Recreation), Pub. Hunt (Public Hunting Areas)

Appendix F

IOWA SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Hardin (continued)	Ira Nichols Bird & Wildlife Area	16			X		County
	Robb River Access	5	X				County
	Ferris Wilderness Unit	247			X		County
	Ox Bow Lake	20	X				County
	Sylvan Hill Park	61	X				State-County
	Steamboat Rock Tower	21	X				County
	Steamboat Rock Access	5	X				State-County
	Pine Lake-Iowa River Access	17	X				State-County
	Pine Lake State Park	542	X				State, Land & Water
	Reece Memorial Park	75	X				County
	Long Memorial Park	7	X				County
	Hardin City Access	25	X				State-County
	Iowa River Greenbelt	771	X			X	County
	Lepley Memorial Park	9	X				County
	Zilman Wildlife Area	10				X	County
	Highway #65 Wayside	1	X				State
	Subtotal	1,919	20	0	3	2	
Iowa	Randolph	389	X			X	State, Fish & Game
	Kozia	61	X			X	State, Fish & Game
	Highway 6 Wayside	1	X				State
	Subtotal	451	3	0	0	2	
Johnson	Hawkeye Wildlife Area	14,000	X		X	X	State & C. of E.
	Swan Lake	44	X			X	State-Sovereign
	Curtis Bridge	9	X				Corps Engineers
	Mid-River Park	13	X				Corps Engineers
	218 Marina	7	X				Commercial
	Sandy Beach	48	X				Corps Engineers
	Lake McBride	1,970	X				State, C. of E.

IOWA SUBBASIN

Appendix F

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Johnson (continued)	Coralville Docks	13	X				Commercial
	Green Castle Area	8	X				County
	Stainbrook St. Preser. & Old St. Quarry	32	X				County
	Sugar Bottom	780	X				Commercial
	Coralville Dam	5	X				Corps Engineers
	West Overlook	61	X				Corps Engineers
	Coral Marina	22	X				Commercial
	Turkey Creek Heights	41	X				Corps Engineers
	Linder Point	95	X				Corps Engineers
	Tailwater West	13	X				Corps Engineers
	Tailwater East	10	X				Corps Engineers
	Squire Point (undeveloped)	70	X				Corps Engineers
	Plum Grove	4	X				State, Land & Water
	FW Kent Park	217	X				County
	Highway 6 Rest Area	5	X				County
	Hills Access	40	X				County
	River Junction Access	12	X				County
	Walker Park	1	X				County
	Ten Corps Area	100	X				Federal
	Scott Church Wayside	23	X				State
	Highway 218 Wayside	1	X				State
	Subtotal	17,644	28	0	1	2	
Louisa	Ferry Landing Area	15	X				Federal
	Toolesboro Access	4	X				Federal-State
	Sand Run Access	3	X				Federal-State
	Subtotal	22	3	0	0	0	

Appendix F

IOWA SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site: Rec.	Forest	Refuge	Pub. Hunt	Agency
Marshall	Leise Forest & Wildlife Area	80		X	X		County
	Timmons Grove Park	198	X				County
	Grammer Grove Wildlife Area	120			X		County
	Nicholson Ford	107				X	State, Fish & Game
	Three Bridges Area	12	X				County
	Holland Access	80	X				County
	C.D. Coppock Park	9	X				County
	Subtotal	606	4	1	2	1	
Poweshiek	Brooklyn Rec. Area	7	X				County
	Guernsey Park	5				X	County
	Subtotal	12	1	0	0	1	
Tama	Manatt's Iowa River Access	6	X				County
	Otter Creek Marsh	3,009				X	State, Fish & Game
	Chelsea Boat Ramp	1	X				County
	Tama Wayside	1	X				State
	Subtotal	3,017	3	0	0	1	
Washington	Foster Timber Area	17		X			County
	Iowa Township Park	27	X				County
	Hayes Timber	34		X			County
	Marr Park	40	X				County
	Ainsworth Wayside	1	X				County
	Subtotal	119	3	2	0	0	
Wright	Benton Wildlife Area	80			X		County
	Pikes Timber Park	46		X			County
	Bingham Park	12	X				County
	Dows Park	3	X				County
	Subtotal	141	2	1	1	0	
	SUBBASIN TOTAL	25,742	76	6	8	13	

Appendix F

WEST FORK CEDAR SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site 1/ Rec.	Forest	Refuge	Pub. Hunt	Agency
Black Hawk	West Fork River Area	238	X				County
	Thunderwoman Park	96	X				County
	Washington Union Park	190				X	County
	Subtotal	524	2	0	0	1	
Butler	Lake Considine	90	X				County
	Big Marsh	2,813				X	State, Fish & Game
	Subtotal	2,903	1	0	0	1	
Cerro Gordo	Linn Grove Park	38	X				County
	Subtotal	38	1	0	0	0	
Franklin	Mallary Park	71	X				County
	Burkley Historical Area	6	X				County
	Reeds Lake State Park	319	X				State, Land & Water
	Robinson Park	30	X				County
	Mott Forest Area	54		X			County
	Handorf Park	4	X				County
	West Fork Fishing Access	80	X				State-County
	Highway 65 Wayside	1	X				County
	Subtotal	565	7	1	0	0	
	SUBBASIN TOTAL	4,030	11	1	0	2	

1/ Rec. (Recreation), Pub. Hunt (Public Hunting Areas)

Appendix F

SHELL ROCK SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site 1/				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Butler	Shell Rock Park	10	X				County
	Heery Woods	380		X			State, Land & Water
	Greene Recreational Park	1	X				County
	Camp Comfort	20	X				County
	Wayside #14	1	X				State
	Wayside #3	1	X				State
	Subtotal	413	5	1	0	0	
Cerro Gordo	Kuhn Wildlife Area	78			X		County
	Clay Banks Forest	56	X		X		County
	Averydale Access	6	X				County
	Shell Rock River Area	454	X		X		County
	Wilkinson Park	61	X				County
	White Wildlife Area	28			X	X	County
	Shell Rock River Green Belt Addition Shell	113	X				County
	Clear Lake Pond	41	X			X	State, Fish & Game
	Mason City Wayside	1	X				State
	Subtotal	838	7	0	4	2	
Floyd	Nora Springs Mill Dam Park	27	X				County
	Mathers' Forest Area	50		X			County
	Rockford Park	18	X				County
	Marble Rock Access	3	X				County
	Ackley Creek County Park	40	X				County
	Subtotal	138	4	1	0	0	

1/ Rec. (Recreation), Pub. Hunt (Public Hunting Areas)

Appendix F

SHELL ROCK SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Freeborn	Emmons Wayside Route 69	1	X				State
	Helmer Myre State Park	346	X				State
	Subtotal	347	2	0	0	0	
Hancock	Crystal Lake	283	X			X	State-Sovereign
	Ellsworth Park	130	X				State-County
	Wild Goose Park	62	X				County
	Subtotal	475	3	0	0	1	
Winnebago	Dahl Fishing Access	9	X				County
	Winnebago River Rec. Area	47	X				County
	Leland Wayside	1	X				State-County
	Ambroson Park	18	X				County
	Forest City Wayside	1	X				State
	Subtotal	76	5	0	0	0	
Worth	Highway 65 Wayside	1	X				State
	Worth County Lake	8	X				County
	Helgeland Wildlife Area	5			X		County
	Myre Wildlife Area	3			X		County
	Highway 9 Wayside	1	X				State
	Fertile Mill Dam	10	X				County
	Haugen Timber Area	12		X			County
	Brunsvold Forest & Wildlife Area	19		X	X		County
	Elk Creek	1,558	X			X	State, Fish & Game
	Subtotal	1,617	5	2	3	1	
	SUBBASIN TOTAL	3,904	31	4	7	4	

Appendix F

FLINT SUBBASIN

EXISTING RECREATION AREAS WITHIN THE ENVIRONMENTAL CORRIDORS BY SUBBASIN AND COUNTY
Iowa-Cedar Rivers Basin

County	Name of Site	Land & Water Acres	Type of Site 1/				Agency
			Rec.	Forest	Refuge	Pub. Hunt	
Des Moines	Lukenbill Woods	32	_	X	_	_	County
	Subtotal	32	0	1	0	0	
	SUBBASIN TOTAL	32	0	1	0	0	

1/ Rec. (Recreation), Pub. Hunt (Public Hunting Areas)

A P P E N D I X G

PROPOSED RECREATIONAL AREAS (BASED ON STATE RECREATION PLANS)

Appendix G

PROPOSED RECREATIONAL AREAS

(Based on State Recreation Plans)

IOWA SUBBASIN — Iowa-Cedar Rivers Basin

County	Name of Recreation Area	Land & Water Acreage	Type of Site			Cost ($)		Administering Agency
			Rec.	For.	Refuge & Pub. Hunting	Acquisition	Development	
Franklin	Taft Park Area	30	X			500	no est.	CCB
"	Iowa River Corridor	200	X			20,000	"	CCB
Hancock	Twin Lake	8	X			8,000	"	ICC(L&W)
Hardin	Iowa River Green Belt	3,019	X			654,850	"	CCB
"	Pine Lake	427	X			128,200	148,200	ICC(L&W)
	Begelow Park	10	X			2,000	no est.	CCB
	South Fork	100	X			20,000	"	CCB
	Hardin Co. Game Mgt. Area	500			X	100,000	10,000	ICC(F&G)
Iowa	Iowa Co. Park	133	X			42,000	13,375	CCB
	Game Mgt. Area, Iowa Co.	400			X	85,000	15,000	ICC(F&G)
Johnson	F.W. Kent Park	1,012	X			448,800	470,544	CCB
"	Lake McBride	58	X			91,000	454,500	ICC(L&W)
"	Scenic Easement	190	X			118,200	no est.	IHC
"	Iowa River Bottoms	500			X	75,000	"	ICC(F&G)
	Subbasin Total	6,587	11	-	3	1,793,550	1,111,419	

Number of sites in Subbasin = 14

Appendix G
PROPOSED RECREATIONAL AREAS
(Based on State Recreation Plans)
Iowa-Cedar Rivers Basin

CEDAR SUBBASIN

County	Name of Recreation Area	Land & Water Acreage	Type of Site			Cost ($)		Administering Agency
			Rec.	For.	Refuge & Pub. Hunting	Acquisition	Development	
Benton	Benton Co. Game Mgt. Area	500			X	50,000	5,000	ICC(F&G)
Blackhawk	Cedar River Green Belt	400	X			120,000	no est.	CCB
"	Hickory Hills Addition	500	X			300,000	"	CCB
"	Black Hawk Co. Game Area	500			X	100,000	87,575	ICC(F&G)
Bremer	Cedar Green Belt	40	X			4,000	no est.	CCB
"	Waverly Air Base	15	X			25,000	13,100	CCB
Linn	Pleasant Cr. Palo Res.	2,258	X			850,000	1,100,000	ICC(L&W)
"	Palisades Kepler	204	X			64,300	11,000	ICC(L&W)
"	Linn Co. Game Mgt. Area	500			X	50,000	5,000	ICC(F&G)
Muscatine	Salesburg Bridge Rec. Area	806	X			100,000	20,700	CCB
"	Wildcat Den	200	X			60,000	18,000	ICC(L&W)
Mitchell	Trout Stream	75	X			12,500	no est.	ICC(F&G)
"	Mitchell Co. Game Mgt. Area	1,000			X	20,000	20,000	ICC(F&G)
	Subbasin Total	6,998	9	-	4	1,755,800	1,280,375	

Number of sites in Subbasin = 13

Appendix G
PROPOSED RECREATIONAL AREAS
(Based on State Recreation Plans)
Iowa-Cedar Rivers Basin

SHELL ROCK SUBBASIN

County	Name of Recreation Area	Land & Water Acreage	Type of Site			Cost ($)		Administering Agency
			Rec.	For.	Refuge & Pub. Hunting	Acquisition	Development	
Bremer	Shell Rock Green Belt	100	X			10,000	no est.	CCB
Cerro Gordo	Clear Lake	45	X			119,537	26,000	ICC(L&W)
"	McIntosh Woods	327		X		348,800	35,000	ICC(F&G)
"	Mallard Marsh	8			X	3,200	1,300	CCB
"	Scenic Easement	336	X			78,225	no est.	IHC
"	Cerro Gordo Game Mgt. Area	1,000			X	500,000	50,000	ICC(F&G)
Hancock	Pilot Knob	455	X			136,500	51,182	ICC(L&W)
Winnebago	Lande River Cons. Area	160	X			24,000	no est.	CCB
	Winnebago Co. Game Mgt. Area	1,000			X	300,000	30,000	ICC(F&G)
Worth	Highway Rest Area	24	X			19,699	no est.	IHC
	Scenic Easement	88	X			12,000	"	IHC
	Worth Co. Game Mgt. Area	500			X	150,000	15,000	ICC(F&G)
	Subbasin Total	4,043	7	1	4	1,701,961	208,482	

Number of sites in subbasin = 12

Appendix G
PROPOSED RECREATIONAL AREAS
(Based on State Recreation Plans)
Iowa-Cedar Rivers Basin

WEST FORK CEDAR SUBBASIN

County	Name of Recreation Area	Land & Water Acreage	Type of Site			Cost ($)		Administering Agency
			Rec.	For.	Refuge & Pub. Hunting	Acquisition	Development	
Butler	Big Marsh	500			X	200,000	20,000	ICC(F&G)
"	Butler Co. Game Mgt. Area	500			X	200,000	20,000	ICC(F&G)
Cerro Gordo	Zirbel Slough	240			X	84,000	47,000	CCB
Franklin	Beeds Lake	420	X			176,000	131,000	ICC(L&W)
"	Robinson Park Area	30	X			1,000	700	CCB
	Subbasin Total	1,690	2	-	3	661,000	218,700	

Number of sites in subbasin = 5

Appendix G
PROPOSED RECREATIONAL AREAS
(Based on State Recreation Plans)
Iowa-Cedar Rivers Basin

FLINT SUBBASIN

County	Name of Recreation Area	Land & Water Acreage	Type of Site			Cost ($)		Administering Agency
			Rec.	For.	Refuge & Pub. Hunting	Acquisition	Development	
Des Moines	Chautauqua Park	5	X			2,500	no est.	CCB
"	Route 99 Rest Stop	30	X			7,500	"	CCB
"	Franklin Township Lake Site	855	X			261,200	750,000	CCB
	Subbasin Total	890	3	-	-	271,200	750,000	
Number of sites in subbasin = 3								
	BASIN TOTAL	20,208	32	1	14	6,183,511	3,568,976	
Total number of sites in Basin = 47								

A P P E N D I X H

PROPOSED RECREATIONAL AREAS (BASED ON REGIONAL AND COUNTY PLANS)

Appendix H
PROPOSED RECREATION AREAS
(Based on Regional & County Plans)
Iowa-Cedar Rivers Basin

Location		Name or	Acreage		
County	Stream or Road	Type of Site	Land	Water	Comments
Washington	English R.	County-Local Park	15	no est.	Recreational, also a rest stop
	Iowa R.	" -Specialized Pk.	no est	"	
	"	County-wide Park	"	"	Boat Access and Natural Area
	Hiway 92 & 218	Road Side Rest Stop	"	"	Plan to develop timbered areas
	Hiway 22 & 81	County-Wide Park	"	"	Plan to develop timbered areas
Tama	Bennett Creek	County Park 'B'	"	"	Boat launch, Camping, Picnicking
	Iowa R.	County Park 'A'	"	"	Boat Access, Camping, Picnicking
	Otter Creek	County Lake	280[land	& water]	
Franklin	Baileye Creek	Sheffield Game Mgt. Area	no est.	no est.	Shoreline Development
* [Expansion & Development]	Baileye "	Galvin Mem. Park	"	low level dam	Wooded area proposed for overflow
	Otter Creek	WKW Park	"	no est.	Expansion of facilities
	Cedar River	West Fork Access	100	"	Expanded Wildlife Habitat
	Maynes Creek	Mallory Mem. Park	70	"	Acquisition involves additional stream side property varying from open to dense woods
	Iowa River	Pope Joy Cons. Park	no est.	low level dam	
Hardin	Iowa R. & U.S.20	Possible Park Area	25	no est.	Roadside Park
	" & County F.	" Picnic Area	40	"	" "
	Iowa R.	Addition to Eagle City Park	40	"	camping, picnic playfields, hiking. swimming & fishing } 12% of County's wooded acreage will be included
	Iowa R. & Co. P.	Dev. of Abandoned Gravel Pit	10	"	

* Commercial expansion will be along highway 65 and new Interstate 35
New Industrial Park along highway #3 and I 35

Appendix H
PROPOSED RECREATION AREAS
(Based on Regional & County Plans)
Iowa-Cedar Rivers Basin

Location		Name or	Acreage		
County	Stream or Road	Type of Site	Land	Water	Comments
Hardin	Iowa R. & Co. A	Addition to Long Mem Park	25	no est.	Expansion
	S. Fk. Iowa R. & State 359	Addition to Flowing Well Park	165	"	"
	S. Fk. Iowa R. & County Road	Addition to Gehrke Marsh	145	"	"
	Honey Cr. & Co.M	Addition to Reece Memorial Park	25	"	"
	County-wide	Development of Scenic Drive	no est.	"	12 % of County's wooded acreage will be included
* Grundy	Wolf Cr. & Co. V	Wolf Cr. Rec. Area Addition	75	"	Additional parking shelters, landscaping
	Black Hawk Cr.	Co. Wide Parks Southeast	75	"	Water-related activities - wooded areas will be used for green belt
	Middle Fk. Beaver Creek	Vicinity of Buck Grove	100	"	Same as above
Linn Metropolitan Area Priority 'A' 1971 -1973	Cedar River	Squaw Cr. Green Belt	100	"	Proposed to be acquired & improved
	"	Vinton Ditch	49	"	" " " " "
	Indian Creek	Indian Cr. Green "	822	"	" " " " "
	Cedar R.	Cedar R. Green Belt	444	"	" " " " "
	-	St. Patricks	3	"	" " " " "
	Highway 150	Tucker	5	"	" " " " "

* County wants to develop green belts along wooded segments of the creeks.

Appendix H
PROPOSED RECREATION AREAS
(Based on Regional & County Plans)
Iowa-Cedar Rivers Basin

Location		Name or	Acreage		Comments
County	Stream or Road	Type of Site	Land	Water	
Linn (con'd)	Indian Creek	Boyson	42	no est.	Proposed to be acquired
	" "	Donnelly	1.5	"	" " " "
	" "	Lininger	12	"	" " " "
		Broderick	0.83	"	" " " "
	Indian "	Hennessey	3.5	"	" " " "
Metro Area Priority 'B' 1974 - 1976	North Central Co Around edge city limits	Dry Creek	1000	"	Proposed to be acquired & Improved
		5 unnamed areas	70	"	" " " " "
		Linn Mar	8	"	Proposed to be acquired
		Carriage Hills	10	"	" " " "
	Indian Creek	Indian Creek	25	"	" " " "
Rural Towns & Municipalities		2 unnamed areas	60	"	" " " " & Improved
Metro Area Priority 'C' 1977 - 1980		N. Cedar R. Green Belt	300	"	" " " " "
		3 unnamed areas	26	"	Proposed to be improved
	N. Central Co. Prairie Cr.	Dry Cr. Green Belt	115	"	" " " Acquired
		Prairie Cr. Green Belt	160	"	" " " "
	NE Corner of Co.	North Central	10	"	" " " "
		Granger's Pasture	45	"	" " " "
		Southwest	10	"	" " " "
	Off S. 11th St.	Grand Ave.	15	"	" " " "
Rural Towns		Unnamed	10	"	" " " " & Improved

Appendix H
PROPOSED RECREATION AREAS
(Based on Regional & County Plans)
Iowa-Cedar Rivers Basin

Location		Name or	Acreage		
County	Stream or Road	Type of Site	Land	Water	Comments
Johnson	Co. Rd. N.	Co. Park Graham Twp.	no est.	no est.	Wide variety, wooded area
	Old Mans Cr. & Highway 1	Co. Park Union Twp.	"	"	Variety & golf
	Iowa River	Co. Park Liberty Twp.	"	"	Variety & hunting
	River Junction & Iowa River	Co. Park Fremont Twp.	"	"	Variety & canoe landing point
	Hiway 1 & Old Mans Creek	Co. Park Washington"	"	"	Good stand of timber
	Iowa R. Crossing	Co. Park Hills Area	"	"	Good boating & possible hunting
	Cedar River	Co. Park Cedar Twp.	"	"	Access to River and Canoe route beginning Point
Mitchell		No new sites, but have a program to develop (6) and expand existing sites			
Cerro Gordo	Shell Rock R.	White Wildlife Area	90	no est.	Expansion of existing facilities
	" " "	Wikerson Pioneer Park	no est.	"	General recreation
	" " "	Rippen Park	"	"	Retain undeveloped as a preserve
	" " "	Shell Rock R. Pres.	160	"	Expansion of land area
	Winnebago R.	Clay Bank's Forest	1 mile trails	"	Expansion of land, retain in natural condition
	" "	Avery Park	20	"	Expansion of land for gen. recreation
	Road E & US 65	Linn Grove Park	no est.	"	Expansion of land for picnic & camping
	At Pleasant Valley	Ingebretson Park	"	"	Picnicking

Appendix H
PROPOSED RECREATION AREAS
(Based on Regional & County Plans)
Iowa-Cedar Rivers Basin

Location		Name or	Acreage		
County	Stream or Road	Type of Site	Land	Water	Comments
Cerro Gordo	Winnebago R.	Kuhn Area	40	no est.	Expansion for general recreation
	Willow Creek	Willow Cr. Preserve	200	"	Top priority for preserving natural environment
	N. Dougherty on J	Coldwater Cr. Pres.	no est.	"	Water & public land preservation
Freeborn (Minn)	Bear Lake	Bear Lake Park	400	400	Multiple use for County Park
	Freeborn Lake	Freeborn Lake Park	115	no est.	County Park development
	Geneva Lake	Geneva Lake,(West) Park	135	"	Can be developed for gen. recreation
	" "	Geneva Lake,(East)Pk.	45	"	Can be developed for County Park
	Lower Twin Lake	Lower Twin Lake Park	160	"	" " " " " "
	Pickerel Lake	Pickeral Lake Park	400	no est.	Future recreation development
	Albert Lea Lake	Shell Rock R. Park	275	"	Lake & River Access Areas
	Turtle	Turtle Cr. Park	80	"	Can be developed for Picnic Camp
	Bancroft Cr.	Bancroft	645	"	Potential Wildlife Areas
	US 69	Church-Twin Lakes	1,500	"	" " "
	Goose Cr.	Goose Creek	1,525	"	" " "
	Goose Lake	Goose Lake	310	"	" " "
		Shell Rock River	850	"	" " "
		Open Space Edgewater to Helmer Myre St.PK.	no est.	"	Preservation of shoreline Albert Lea Lake
		Access on Albert Lea Lake	"	"	In conjunction with Helmer Myre State Pk.
		Access on Bear Lake	"	"	Expansion
		Access " Fountain L.	"	"	W. Side of Lake near CSAH 13
		" " Freeborn L.	"	"	In conjunction with County Park
		" " Geneva Lake	"	"	" " " Geneva Co. Park
		" " Pickeral L.	"	"	Expansion of County Park

Appendix H
PROPOSED RECREATION AREAS
(Based on Regional & County Plans)
Iowa-Cedar Rivers Basin

Location		Name or	Acreage		
County	Stream or Road	Type of Site	Land	Water	Comments
Freeborn (cont'd)					
	Near US 69	Access on Stae Line Lake	no est.	no est.	Expansion of County Park
		Albert Lea Lake Overlook	9	"	South side of Lake off Co. Road 19
		Fountain Lake Overlook	no est.	"	Overlook, picnic & rest area
		Freeman Twp. Raodside Area	75	"	Rest & Picnic Area
		Minnesota Total	1,610		

APPENDIX I

SOIL LIMITATIONS FOR RECREATIONAL DEVELOPMENT

APPENDIX I

SOIL LIMITATIONS FOR RECREATIONAL DEVELOPMENT

Iowa-Cedar Rivers Basin

Soil Associations *	% Total Acres	Foundations for Low Buildings	Septic Tank Disposal Fields	Cottages & Utility Buildings	Intensive Camp Sites	Picnic Areas	Intensive Play Areas	Paths and Trails	Golf Fairways	Estimated Suitability for Trees		
										Upland Hardwoods	Conifers	Cottonwoods
#1 Colo	40	Severe	Severe	Severe	Severe	Moderate-Severe	Moderate-Severe	Moderate	Moderate	Low	Low	Moderate-High
Spillville	40	Severe	Severe	Moderate-Severe	Moderate-Severe	Moderate	Moderate-Severe	Moderate-Severe	Slight-Moderate	Low	Low	Moderately high-High
Waukee	20	Slight	Slight-Moderate	Slight	Slight-Moderate	Slight-Moderate	Slight-Severe	Slight	Slight	High	High	High
#2 Saudee	30	Slight	Slight-Moderate	Slight	Slight-Moderate	Slight-Severe	Slight-Severe	Slight	Slight	Moderately high	Moderately high	Moderately high
Marshan	30	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderately high
Lawler	30	Moderate	Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Moderately high	Moderately high	High
#3 Mahaska	50	Moderate	Moderate-Severe	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderately high	High	High
Taintor	30	Moderate	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderate-High
Otley	20	Moderate	Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Moderate-Severe	Slight-Moderate	Slight	Very high	Very high	Very high
#4 Otley	25	Moderate	Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Moderate-Severe	Slight Moderate	Slight	Very high	Very high	Very high
Ladoga	25	Moderate	Moderate	Slight-Moderate	Slight-Severe	Slight-Severe	Moderate-Severe	Slight-Moderate	Slight	Very high-High	Very high-High	Very high-High
Adair	25	Severe	Severe	Moderate	Moderate	Moderate	Severe	Moderate	Moderate	Low	Moderate	Moderate
Shelby	25	Slight	Severe	Slight-Severe	Slight-Severe	Slight-Severe	Severe	Slight-Moderate	Slight-Moderate	Moderate-High	Moderate-High	High

* The soil association numbers correspond with those on the Soil Association Map.

Soil Associations *	% Total Acres	Foundations for Low Buildings	Septic Tank Disposal Fields	Cottages & Utility Buildings	Intensive Camp Sites	Picnic Areas	Intensive Play Areas	Paths and Trails	Golf Fairways	Estimated Suitability for Trees		
										Upland Hardwoods	Conifers	Cottonwoods
#5												
Clinton	20	Moderate	Moderate-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Moderate-Severe	Slight-Moderate	Slight-Moderate	Very high	Very high	Very high
Lindley	30	Slight	Severe	Moderate-Severe	Slight-Severe	Slight-Severe	Severe	Slight-Severe	Slight-Moderate	Migh-Moderate	Very high-Moderately high	Very high-Moderately high
Ladoga	25	Moderate	Moderate	Slight-Moderate	Slight-Severe	Slight-Severe	Moderate-Severe	Slight-Moderate	Slight	Very high-High	Very high-High	Very high-High
Keswick	25	Severe	Severe	Moderate-Severe	Moderate-Severe	Moderate Severe	Severe	Moderate	Moderate	Low	Moderate	Moderate
#6												
Fayette	30	Moderate	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Moderate	Slight-Moderate	Very high	Very high	Very high
Downs	30	Moderate	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Moderate	Slight-Moderate	Very high-High	Very high-High	Very high-High
Lindley	30	Slight	Moderate-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Severe	Slight-Severe	Slight-Moderate	High-Moderate	Very high-Moderately high	Very high-Moderately high
#7												
Muscatine	50	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Moderate-High	Moderate-High	High
Atterberry	25	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate-High	Moderate-High	High
Tama	25	Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight	Slight	Very high	Very high	Very high
#8												
Klinger	30	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Slight-Moderate	Moderate-High	Moderate-High	High
Franklin	30	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Moderate-High	Moderate-High	High
Dinsdale	30	Slight	Slight	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight	Slight	Very high	Very high	Very high
#9												
Tama	30	Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight	Slight	Very high	Very high	Very high
Downs	30	Moderate	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Moderate	Slight-Severe	Slight-Moderate	Slight-Moderate	Very high-High	Very high-High	Very high-High
Shelby	20	Slight	Severe	Slight-Severe	Slight-Severe	Slight-Severe	Severe	Slight-Moderate	Slight-Moderate	Moderate-High	Moderate-High	High
Adair	20	Severe	Severe	Moderate	Moderate	Moderate	Severe	Moderate	Moderate	Low	Moderate	Moderate

* The soil association numbers correspond with those on the Soil Association Map.

Soil Associations*	% Total Acres	Foundations for Low Buildings	Septic Tank Disposal Fields	Cottages & Utility Buildings	Intensive Camp Sites	Picnic Areas	Intensive Play Areas	Paths and Trails	Golf Fairways	Estimated Suitability for Trees		
										Upland Hardwoods	Conifers	Cottonwoods
#10												
Tama	40	Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight	Slight	Very high	Very high	Very high
Dinsdale	30	Slight	Slight	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight	Slight	Very high	Very high	Very high
Kenyon	15	Slight	Moderate-Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Severe	Slight	Slight	High	High	Very high
Klinger	15	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Slight-Moderate	Moderate-High	Moderate-High	High
#11												
Dinsdale	25	Slight	Slight	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight	Slight	Very high	Very high	Very high
Aredale	25	Slight	Moderate	Slight	Slight	Slight	Slight	Slight	Slight	High	High	Very high
Kenyon	25	Slight	Moderate-Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight	Slight	High	High	Very high
Tama	25	Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight-Moderate	Slight-Severe	Slight	Slight	Very high	Very high	Very high
#12												
Readlyn	30	Moderate	Moderate-Severe	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Moderately high	Moderately high	High
Maxfield	20	Severe	Severe	Severe	Severe	Moderate-Severe	Moderate-Severe	Moderate	Moderate	Low	Low	Moderately high
Tripoli	30	Moderate	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderately high
Klinger	20	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Slight-Mod.	Moderately high	Moderately high	High
#13												
Kenyon	40	Slight	Moderate-Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Severe	Slight	Slight	High	High	Very high
Floyd	25	Moderate-Severe	Severe	Moderate	Moderate-Severe	Moderate-Severe	Moderate-Severe	Moderate	Moderate	Moderate-High	Moderately high	High
Clyde	20	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderately high
Schley	15	Moderate-Severe	Severe	Moderate	Moderate-Severe	Moderate-Severe	Moderate-Severe	Moderate	Moderate	Moderately high	Moderately high	High

* The soil association numbers correspond with those on the Soil Association Map.

Soil Associations*	% Total Acres	Foundations for Low Buildings	Septic Tank Disposal Fields	Cottages & Utility Buildings	Intensive Camp Sites	Picnic Areas	Intensive Play Areas	Paths and Trails	Golf Fairways	Estimated Suitability for Trees		
										Upland Hardwoods	Conifers	Cottonwoods
#14												
Kenyon	50	Slight	Moderate-Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Severe	Slight	Slight	High	High	Very high
Racine	25	Slight	Slight-Severe	Slight-Moderate	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Moderate	Slight-Moderate	High	High	Very high
Coggon	25	Slight	Moderate	Moderate-Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	High	High	Very high
#15												
Webster	50	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderate-High
Nicollet	25	Moderate	Moderate	Slight-Moderate	Moderate	Moderate	Moderate	Slight	Slight	Moderately high	Moderately high	High
Clarion	20	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	High	High	Very high
Harps	5	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderate-High
#16												
Clarion	50	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	High	High	Very high
Nicollet	25	Moderate	Moderate	Slight-Moderate	Moderate	Moderate	Moderate	Slight	Slight	Moderate-High	Moderately high	High
Lester	20	Slight	Slight	Slight-Severe	Slight-Severe	Slight-Severe	Moderate-Severe	Slight-Severe	Slight-Severe	High-Moderately high	High-Moderately high	Very high-High
Okoboji	5	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderate-High
#17												
Lester	50	Slight	Slight	Slight-Severe	Slight-Severe	Slight-Severe	Moderate-Severe	Slight-Severe	Slight-Severe	High-Moderately high	High-Moderately high	Very high-High
Clarion	10	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	High	High	Very high
Hayden	40	Slight	Slight	Slight-Severe	Slight-Severe	Slight-Severe	Moderate-Severe	Slight-Severe	Slight-Severe	High-Moderately high	High-Moderately high	High
Glencoe	10	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	-	-	Moderate

* The soil association numbers correspond with those on the Soil Association Map.

Appendix I (Continued)

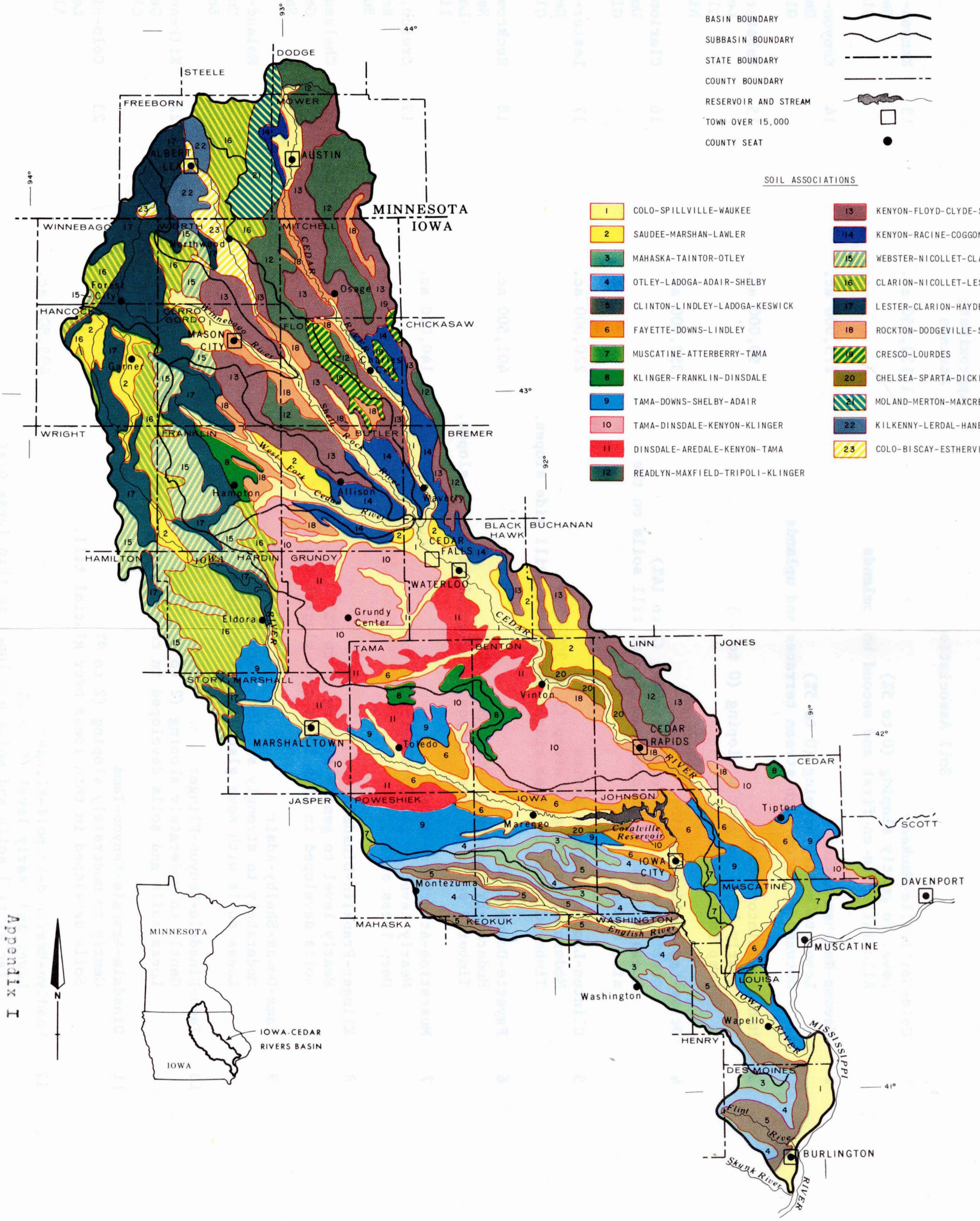
Soil Associations*	% Total Acres	Foundations for Low Buildings	Septic Tank Disposal Fields	Cottages & Utility Buildings	Intensive Camp Sites	Picnic Areas	Intensive Play Areas	Paths and Trails	Golf Fairways	Estimated Suitability for Trees		
										Upland Hardwoods	Conifers	Cottonwoods
#18												
Rockton	45	Slight	Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Moderate-Severe	Slight	Slight	Moderately high	Moderately high	Moderately high
Dodgeville	45	Slight	Moderate-Severe	Slight Moderate	Slight Moderate	Slight Moderate	Moderate Severe	Slight	Slight	High	High	High
Sogn	10	Slight	Very severe	Severe	Severe	Severe	Severe	Moderate-Severe	Severe	Low	Low	Low
#19												
Cresco	50	Slight	Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Severe	Slight-Moderate	Slight	Moderate	Moderate-High	High
Lourdes	50	Slight	Severe	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Severe	Slight	Slight	Moderately high	Moderately high	High
#20												
Chelsea	25	Slight	Slight	Slight	Moderate	Moderate	Severe	Severe	Severe	Moderate	Moderately high	Moderately high
Sparta	25	Slight	Slight	Slight-Severe	Moderate-Severe	Moderate-Severe	Moderate-Severe	Moderate-Severe	Severe	Moderate	Moderately high	Moderately high
Dickinson	25	Slight	Slight	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Moderate-High	Moderate-High	Moderate-High
Fayette	25	Moderate	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Severe	Slight-Moderate	Slight-Moderate	very high-High	Very high-High	Very high-High
#21												
Moland		Moderate	Moderate	Moderate	Slight	Slight	Moderate	Slight	Slight	-	-	-
Merton		Moderate	Moderate	Moderate	Slight	Slight	Slight	Slight	Slight	-	-	-
Maxcreek		Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	-	-	-
#22												
Kilkenny		Moderate	Severe	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	-	-	-
Lerdal		Moderate	Severe	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	-	-	-
Hanel		Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	-	-	-
#23												
Colo	30	Severe	Severe	Severe	Severe	Moderate-Severe	Moderate Severe	Moderate	Moderate	Low	Low	Moderate-High
Biscay	30	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Severe	Low	Low	Moderate-High
Estherville	30	Slight	Slight-Severe	Slight-Moderate	Slight-Severe	Slight-Moderate	Moderate-Severe	Slight-Moderate	Moderate	Moderate	Moderately high	Moderately high

* The soil association numbers correspond with those on the Soil Association Map.

SOIL ASSOCIATION MAP

IOWA-CEDAR RIVERS BASIN

IOWA AND MINNESOTA



SOURCE:
SCS DRAWING 5,0-28270 AND INFORMATION FROM FIELD TECHNICIANS.

USDA-SCS-LINCOLN, NEBR. 1971

7-8-71

5,P-28965

LEGEND

	Soil Association	Approximate Acreage
1	Colo-Spillville-Waukee Level to gently sloping (0 to 5%) Alluvial soils on first and second bottomlands	1,130,250 ac.
2	Saudee-Marshan-Lawler Level to gently sloping (0 to 5%) Outwash soils on high stream terraces and uplands	275,000 ac.
3	Mahaska-Taintor-Otley Nearly level to gently sloping (0 to 5%) Deep loess soils.	90,000 ac.
4	Otley-Ladoga-Adair-Shelby Gently sloping to strongly sloping (2 to 14%) Loess soils on the ridges and glacial till soils on the side slopes.	350,000 ac.
5	Clinton-Lindley-Ladoga-Keswick Moderately sloping to steep (5 to 30%) Timbered soils on loess ridges and glacial till side slopes.	220,000 ac.
6	Fayette-Downs-Lindley Moderately sloping to steep (5 to 40%) Timbered soils on loess ridges and glacial till side slopes.	401,500 ac.
7	Muscatine-Atterberry-Tama Nearly level to gently sloping (0 to 5%) Deep loess soils.	140,000 ac.
8	Klinger-Franklin-Dinsdale Nearly level to gently sloping (0 to 5%) Soils developed in thin loess over glacial till.	140,000 ac.
9	Tama-Downs-Shelby-Adair Moderately to strongly sloping (5 to 14%) Loess soils with some glacial till on the side slopes.	560,000 ac.
10	Tama-Dinsdale-Kenyon-Klinger Gently to moderately sloping (2 to 9%) Loess soils and soils developed in thin loess over glacial till.	940,000 ac.
11	Dinsdale-Aredale-Kenyon-Tama Gently to moderately sloping (2 to 9%) Soils developed in thin loess over glacial till.	320,000 ac.
12	Readlyn-Maxfield-Tripoli-Klinger Level and nearly level (0 to 2%) Glacial till soils and soils developed in thin loess over glacial till.	493,800 ac.
13	Kenyon-Floyd-Clyde-Schley Nearly level to undulating and gently rolling (0 to 9%) Glacial till and outwash over glacial till soils.	1,025,000 ac.
14	Kenyon-Racine-Coggon Undulating to rolling and hilly (2 to 18%) Glacial till soils.	291,250 ac.
15	Webster-Nicollet-Clarion-Harps Level to undulating (0 to 5%) Glacial drift soils. Characterized by ponded spots and high lime areas	440,000 ac.
16	Clarion-Nicollet-Lester-Okoboji Undulating to gently rolling (2 to 9%) Glacial drift soils.	520,500 ac.
17	Lester-Clarion-Hayden-Glencoe Gently rolling to hilly or steep (5 to 20%) Glacial drift soils.	505,000 ac.
18	Rockton-Dodgeville-Sogn Nearly level to very steep (2 to 40%) Loamy and silt loam soils, shallow to moderately deep to limestone.	182,750 ac.
19	Cresco, Lourdes Nearly level to undulating (0 to 5%) Soils developed in firm to very firm glacial till.	43,000 ac.
20	Chelsea-Sparta-Dickinson-Fayette Gently rolling to very steep (5 to 40%) Sandy soils and sand-loess complex areas.	18,000 ac.
21	Moland-Merton-Maxcreek Undulating to gently rolling (0 to 9%) Soils formed in a thin mantle of silts over friable drift.	88,000 ac.
22	Kilkenny-Lerdal-Hanel Gently rolling to hilly (5 to 20%) Clayey mantled glacial till.	50,250 ac.
23	Colo-Biscay-Estherville Level to gently sloping (0 to 5%) Alluvial soils on first and second bottomlands.	76,500 ac.
	Watershed Area	8,300,800 ac.