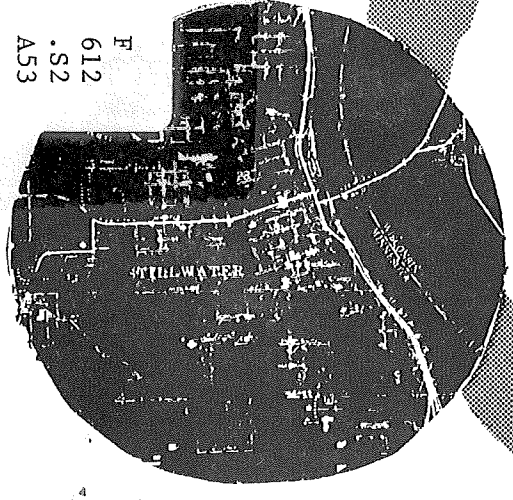

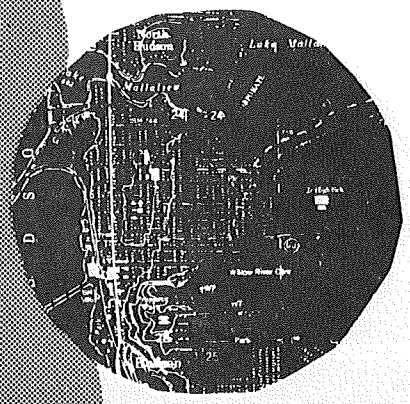

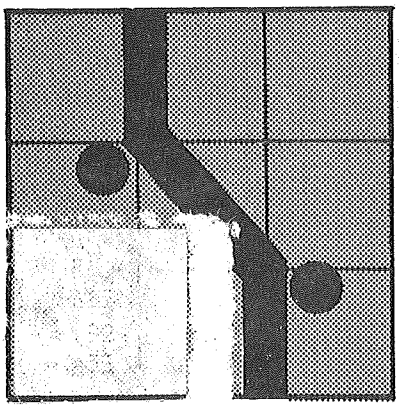

ANALYSIS OF THE LOWER ST. CROIX

stillwater - hudson

Analysis of the
Lower St. Croix River Valley
Hudson, Wi. - Stillwater, Mn.

PHASE I REPORT
RESEARCH AND ANALYSIS

Fall Quarter 1979

University of Minnesota
School of Architecture & Landscape Architecture
Collaborative Design Studio

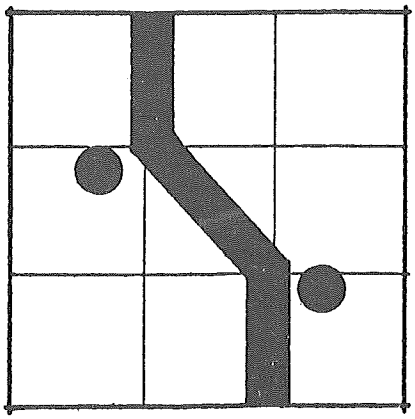

TABLE OF CONTENTS

introduction

Students and faculty at the University of Minnesota, School of Architecture and Landscape Architecture are engaged in a joint planning and design study of the lower St. Croix River Valley and the specific communities of Hudson, Wisconsin and Stillwater, Minnesota. The study identifies natural and cultural patterns in the area and develops ideas for preservation and enhancement. It provides a look at the constraints and opportunities in the region and suggests policy and physical design alternatives.

The study has been organized into several phases of which this document represents the first. Phase I, research and analysis of the environment, was undertaken by eight teams each concentrating on a different segment of the study. Within each study area existing conditions were identified and mapped. An analysis of these conditions lead to key issues which had potential for improvement or were identified as areas that should be protected. These key issues suggest design potentials and constraints for future development patterns which will be examined in Phase II of this study.

We wish to thank the city officials of Hudson and Stillwater; Dick Thompson, St. Croix County Planner; Robert Lockyear, Washington County Planner; Jim Harrison, Minnesota-Wisconsin Boundary Area Commission; and other public and private individuals and institutions too numerous to mention here, for their support in the gathering of information.

This report was paid for in part with the aid of a grant from the National Endowment for the Arts in Washington, D.C., a Federal Agency.

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4. Terry McDonald (LA)
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4. Mike Wilkens (Arch)
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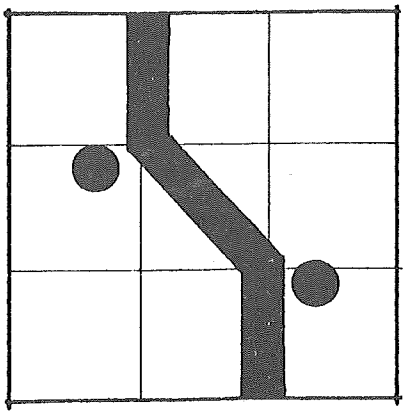


HISTORY

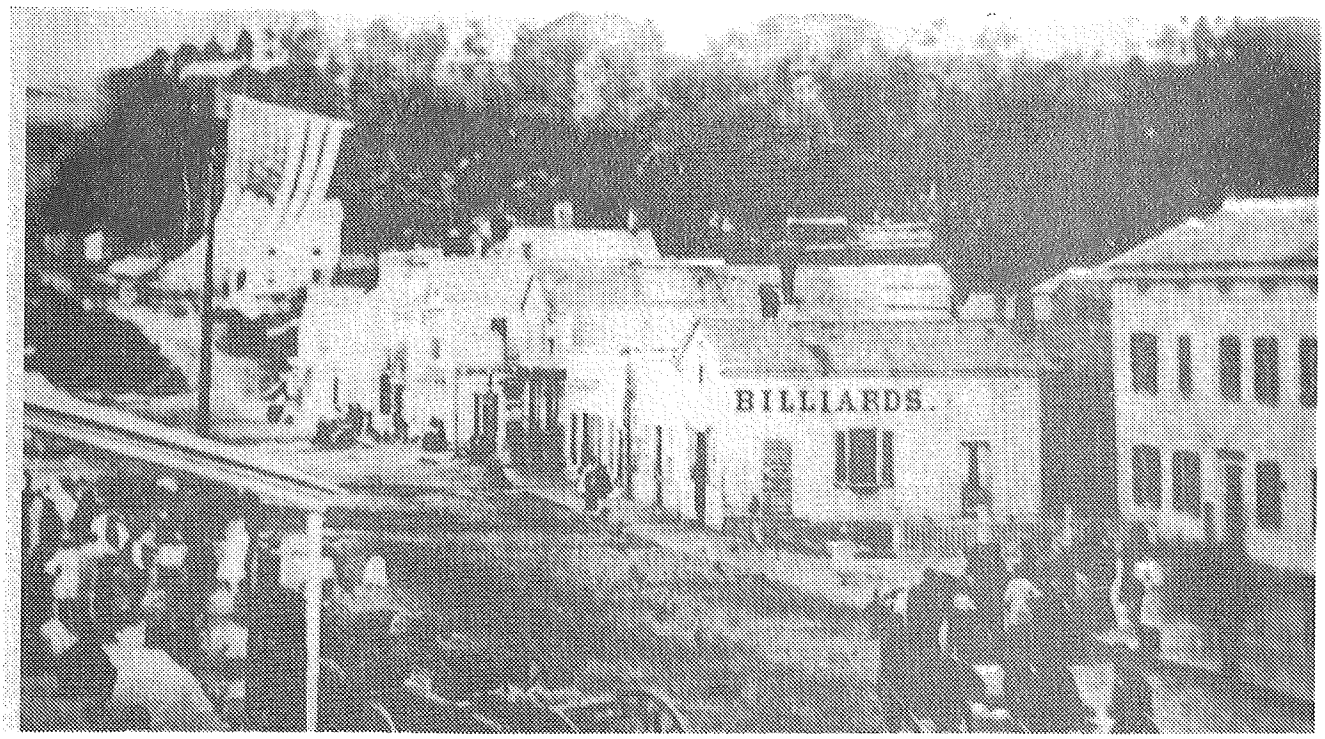
1

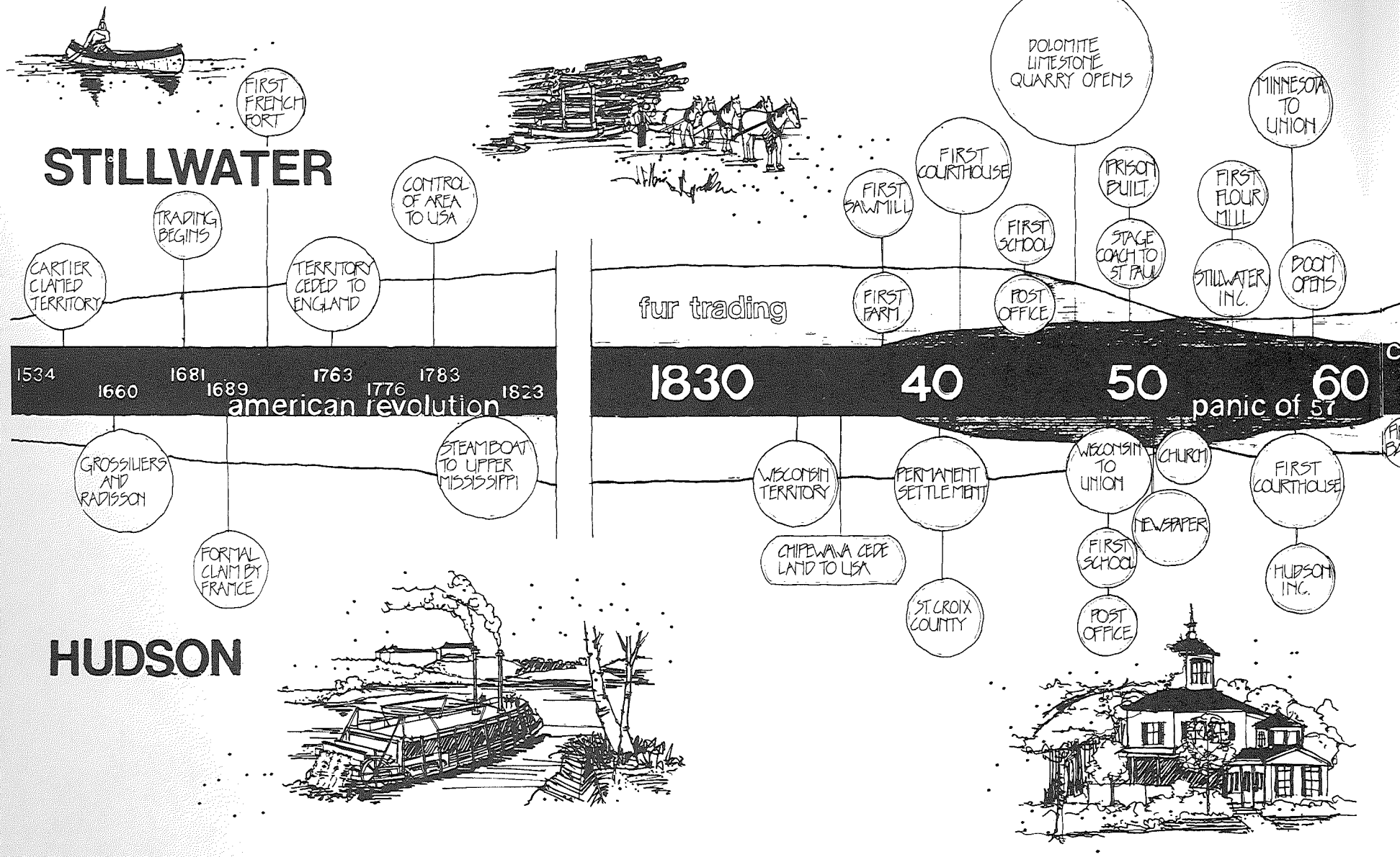
history

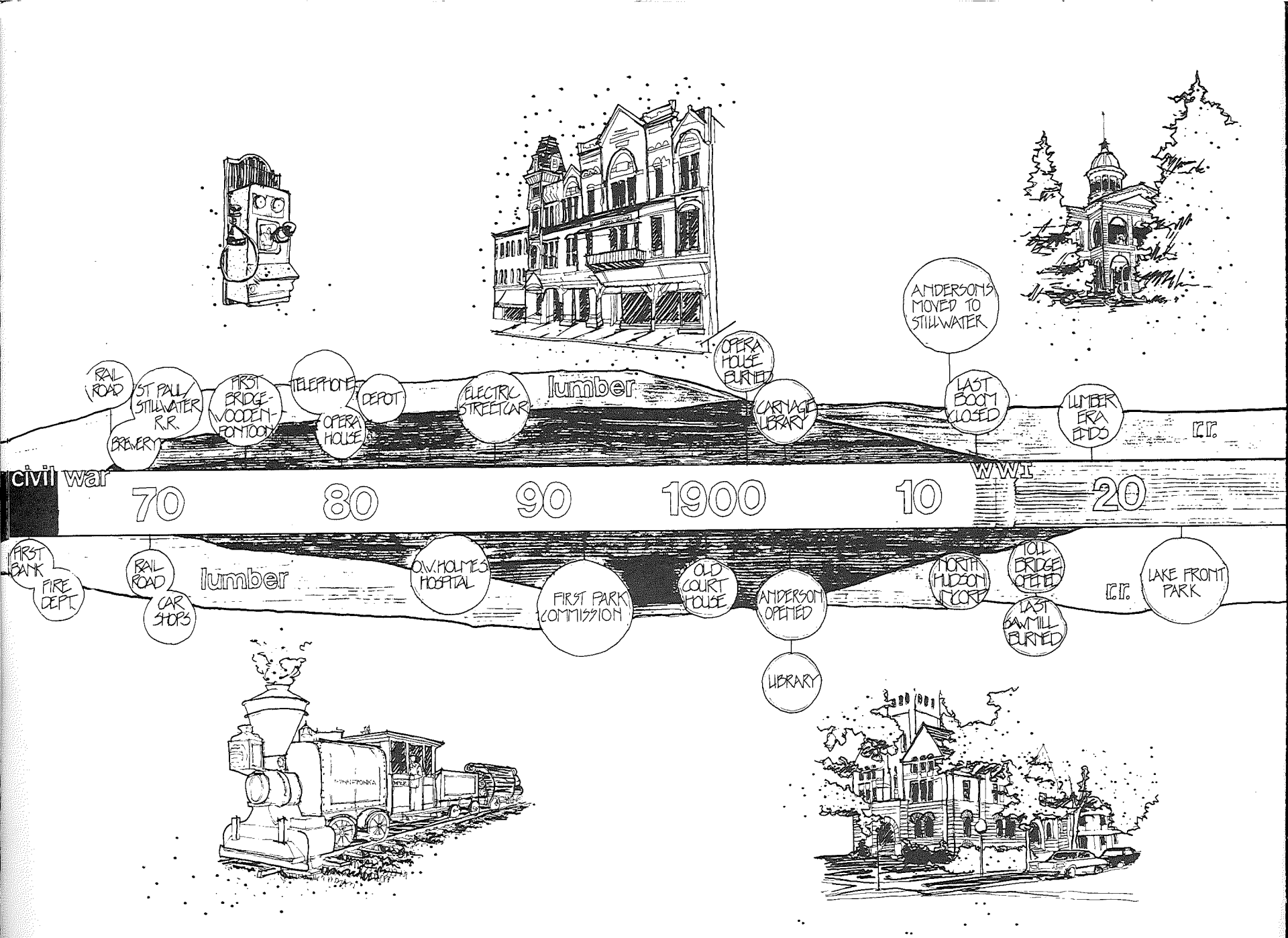
A city is a slowly evolving product of diverse forces, past and present. No matter how many sleepless nights architects, landscape architects, and planners apend at their drawing boards, the city cannot be manipulated to conform to an abstract vision of what it should be. The city cannot be severed from the past, nor can it ignore the forces directing it into the future. Any attempt to alter the city must recognize and act within this process of slow change.

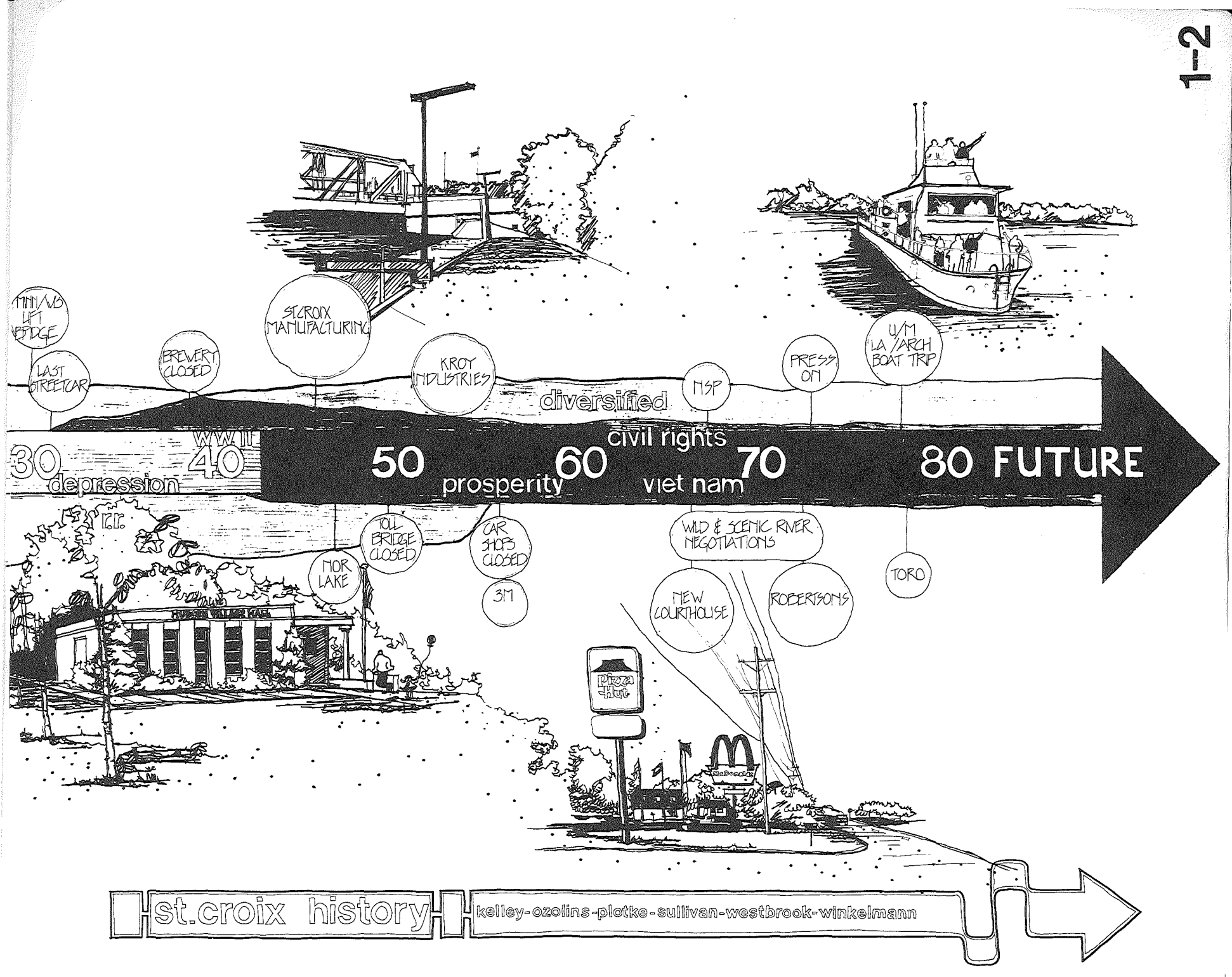
Evidence of this process abounds in both Stillwater and Hudson. The sense of place in each town is a sense of history. Any designer hoping to enrich the environment of Stillwater or Hudson must know his history.

Since the original settlements on the St. Croix, growth in these communities has been affected by several events, some local, some international. In response to these forces, the history committee has divided its' analysis into six major eras. Each of these eras has left its' mark on the cities of today.

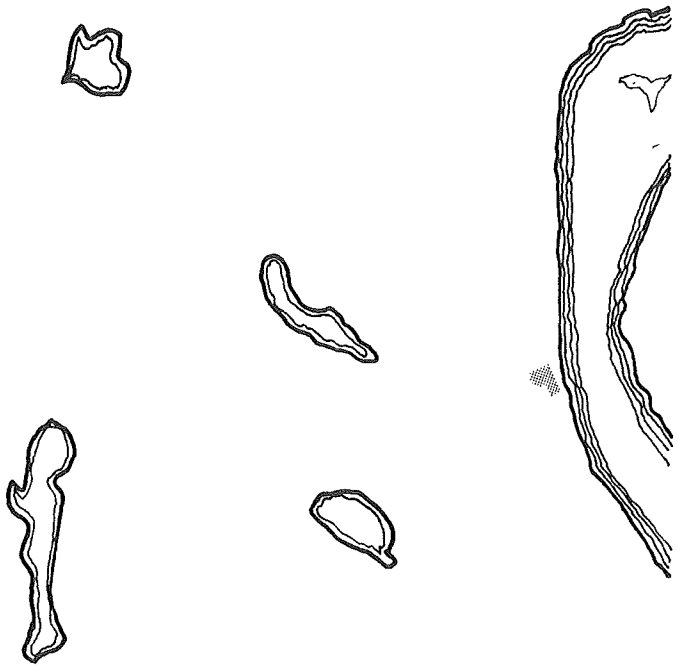



STILLWATER
FIRST FRENCH FORT
TRADING BEGINS
CONTROL OF AREA TO USA
CARTIER CLAIMED TERRITORY
TERRITORY CEDED TO ENGLAND
DOLOMITE LIMESTONE QUARRY OPENS
FIRST COURTHOUSE
FIRST SAWMILL
FIRST SCHOOL
PRISON BUILT
STAGE COACH TO ST PAUL
FIRST FLOUR MILL
MINNESOTA TO UNION
STILLWATER INC.
BOOM OPENS
fur trading
FIRST FARM
POST OFFICE
1534
1660
1681
1689
1763
1776
1783
1823
american revolution
1830
40
50
60
panic of 57
GROSSILIERS AND RADISSON
FORMAL CLAIM BY FRANCE
STEAMBOAT TO UPPER MISSISSIPPI
WISCONSIN TERRITORY
CHIPEWAWA CEDE LAND TO USA
PERMANENT SETTLEMENT
ST CROIX COUNTY
WISCONSIN TO UNION
CHURCH
NEWSPAPER
FIRST SCHOOL
POST OFFICE
FIRST COURTHOUSE
HUDSON INC.
HUDSON

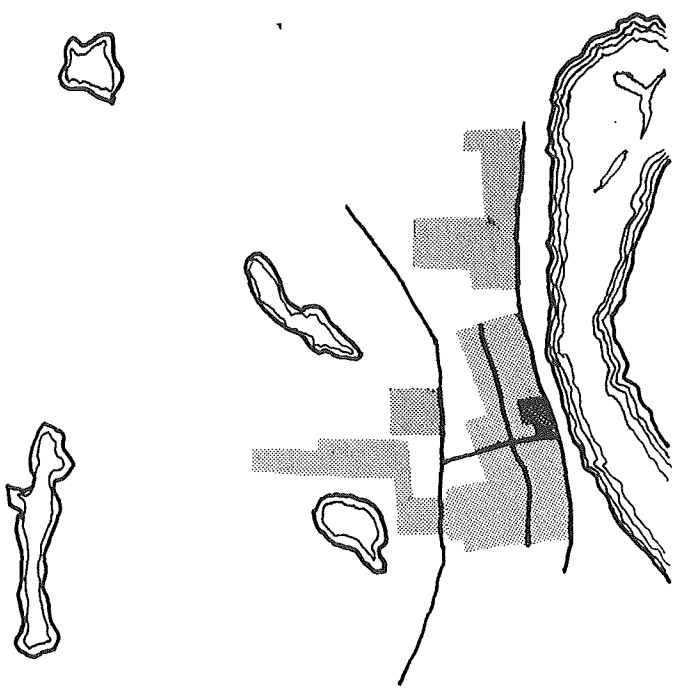

RAIL ROAD
ST PAUL/ STILLWATER R.R.
BREWERY
FIRST BRIDGE-WOODEN-PONTOON
TELEPHONES
OPERA HOUSE
DEPOT
ELECTRIC STREETCAR
lumber
OPERA HOUSE BURNED
CARNAGE LIBRARY
ANDERSONS MOVED TO STILLWATER
LAST BOOM CLOSED
LUMBER ERA ENDS
T.C.R.
civil war
70
80
90
1900
10
WWI
20
FIRST BANK
FIRE DEPT.
RAIL ROAD
CAR SHOPS
lumber
O.W. HOLMES HOSPITAL
FIRST PARK COMMISSION
OLD COURT HOUSE
ANDERSON OPENED
LIBRARY
NORTH HUDSON FLOAT
TOLL BRIDGE OPENED
LAST SAWMILL BURNED
T.C.R.
LAKE FRONT PARK


MINN/WIS LIFT BRIDGE
LAST STREETCAR
BREWERY CLOSED
ST.CROIX MANUFACTURING
KROY INDUSTRIES
diversified
MSP
PRESS ON
U/M LA/ARCH BOAT TRIP
30 depression
WW II
40
50 prosperity
60 civil rights
viet nam
70
80 FUTURE
TOLL BRIDGE CLOSED
CAR SHOPS CLOSED
3M
MOR LAKE
WILD & SCENIC RIVER NEGOTIATIONS
NEW COURTHOUSE
ROBERTSONS
TORO
Pizza Hut
st.croix history
kelley-ozolins-plotke-sullivan-westbrook-winkelmann

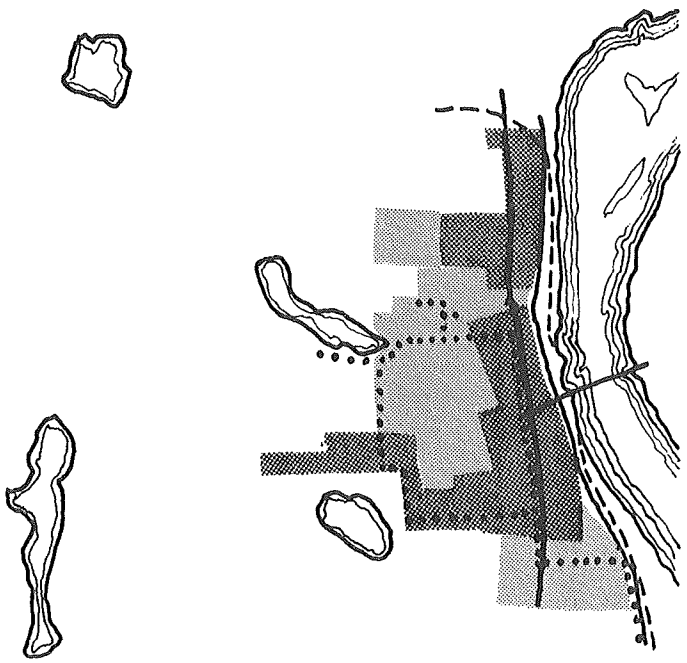
PRE 1845



1845 - 1865



1865 - 1915



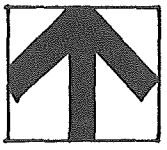
stillwater

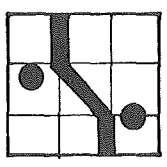
PRIMCIPLE ROADS

RAILROADS

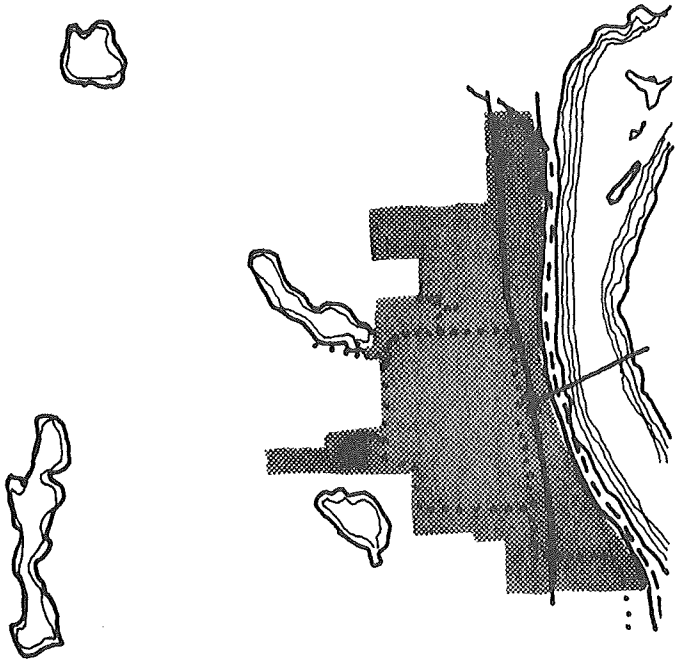
STREETCAR

0 1600 8000

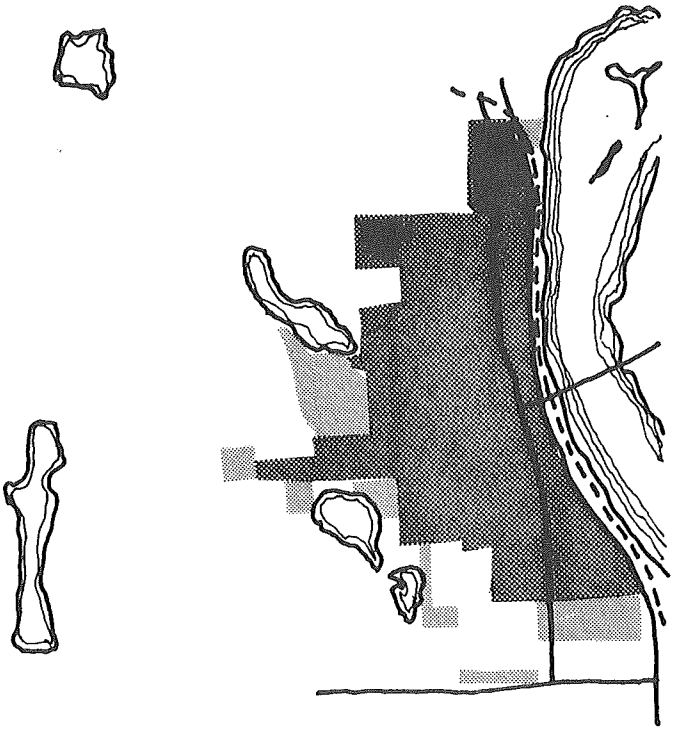




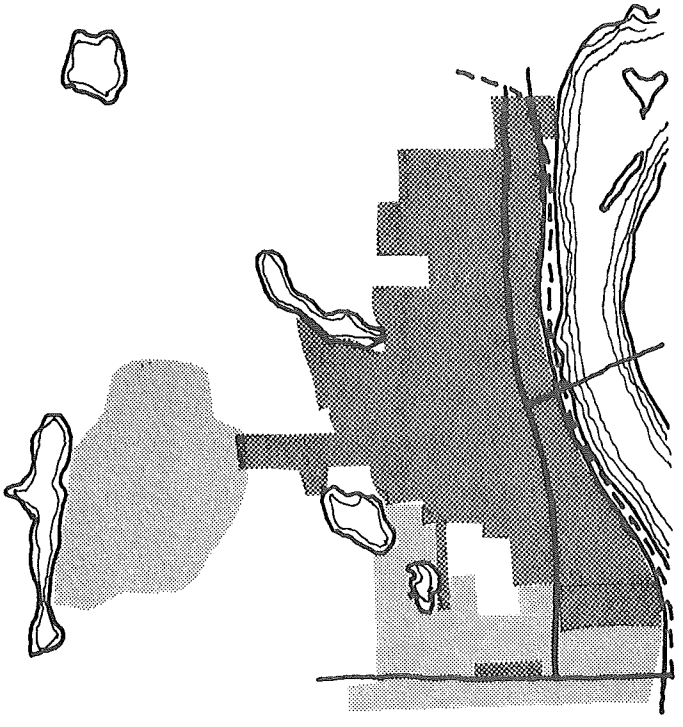
1915 - 1945



1945 - 1965



1965 - present



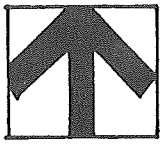
stillwater

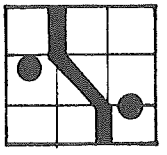
PRIMCIPLE ROADS

RAILROADS

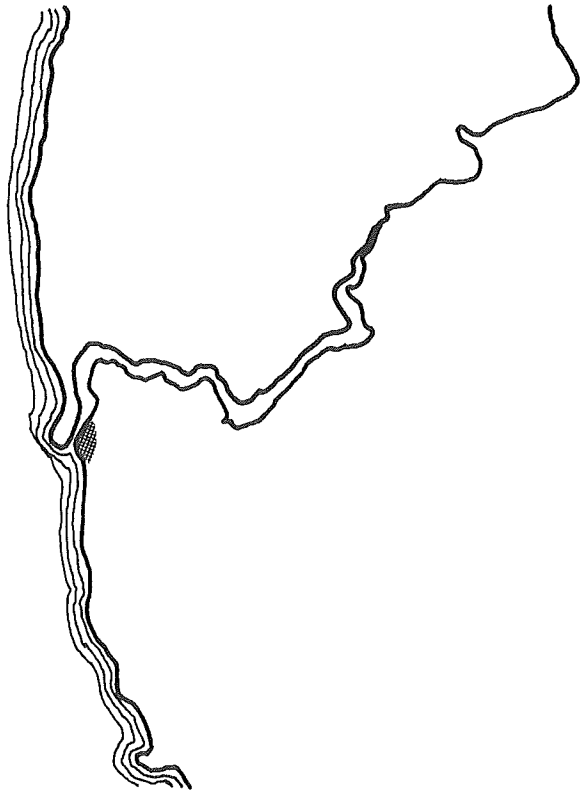
STREETCAR

0 1600 8000

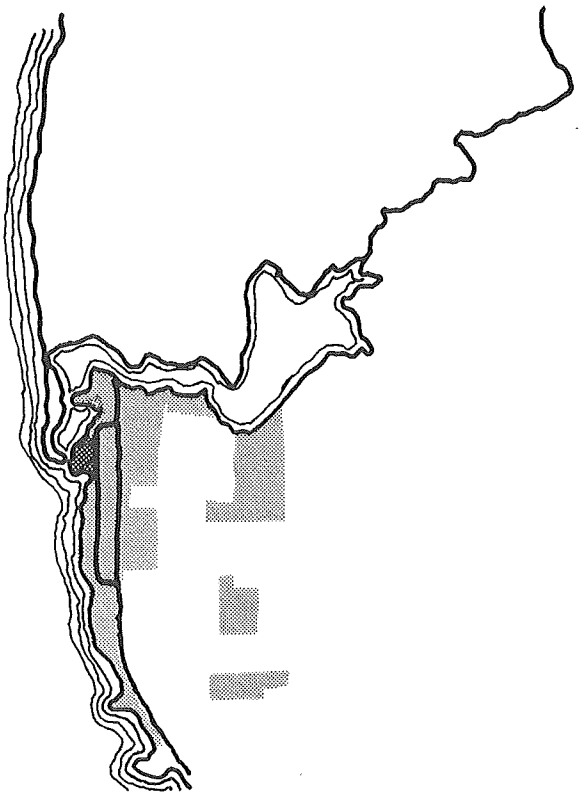




PRE-1845



1845 - 1865



1865- 1915

hudson

PRINCIPLE ROADS

RAILROADS

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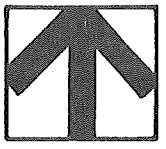

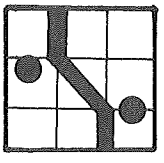

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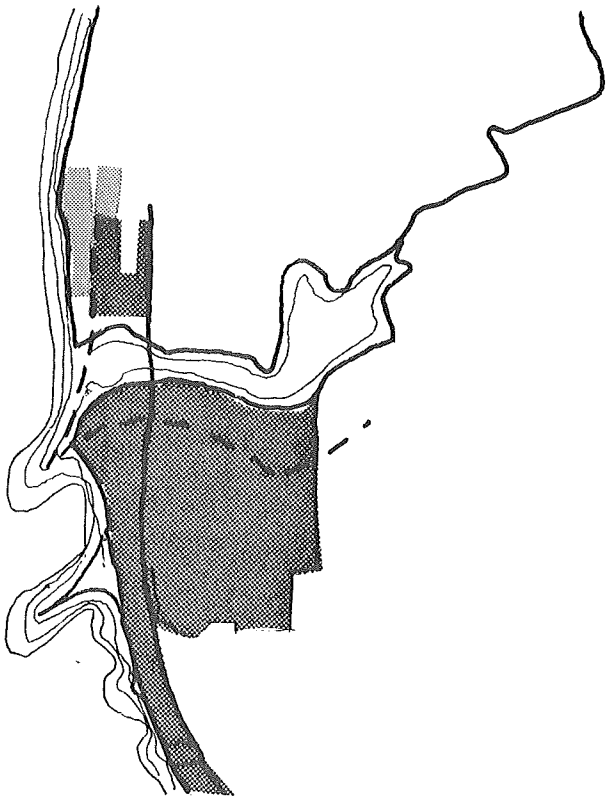

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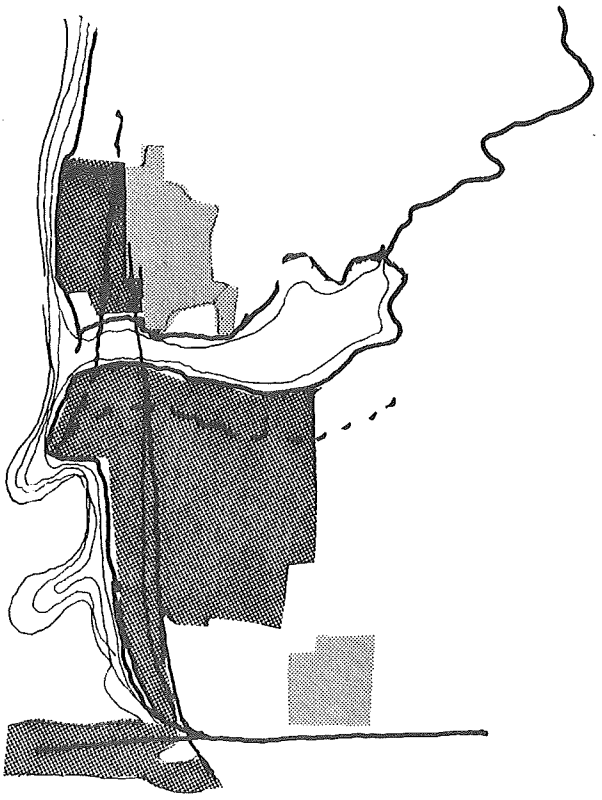
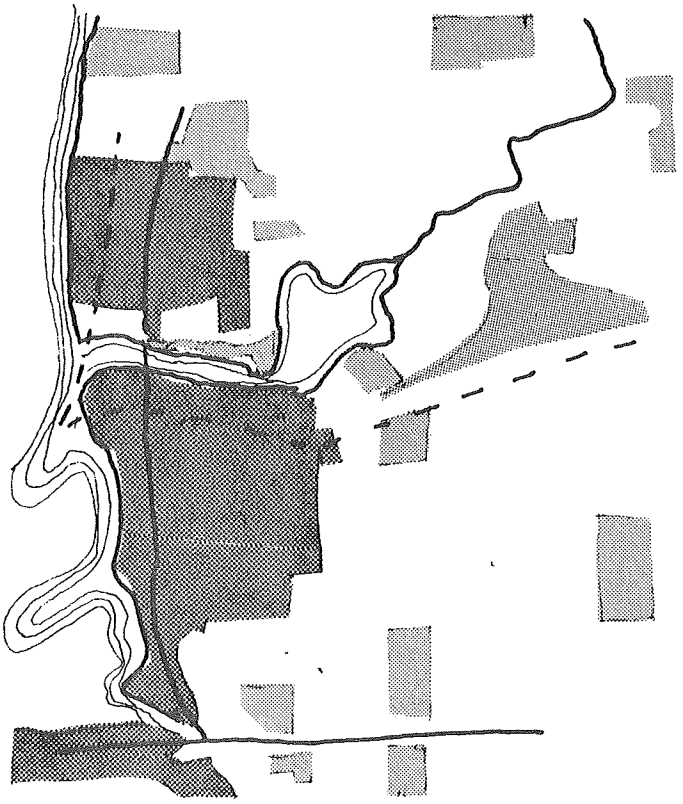


1965 - present



hudson

PRINCIPLE ROADS

RAILROADS

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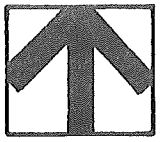
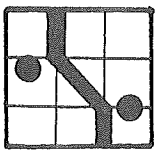




pre-1845

pre-settlement

EUROPEAN DEMAND FOR FUR

RIVER ACCESS AND CROSSING

MAJOR CANOE ROUTE FROM MISSISSIPPI TO SUPERIOR

BEGINNINGS OF LUMBERING

The Stillwater/Hudson area was originally inhabited by the Chippewa and Sioux Indians. In the 1600's, the first French trappers came to the area. Their principle interest was to supply the European demand for fur.

As a part of the Louisiana Purchase, the St. Croix Valley, was mapped and explored between 1804-06 by Lewis and Clark. In 1837, the region was made a U.S. Territory.

The native White Pine forests drew early settlers from New England. Sawmilling began on the St. Croix around 1840. Stillwater and Hudson are the direct results of that lumbering industry.

1845 - 1865

early settlement

LUMBER GENERATES SETTLEMENT

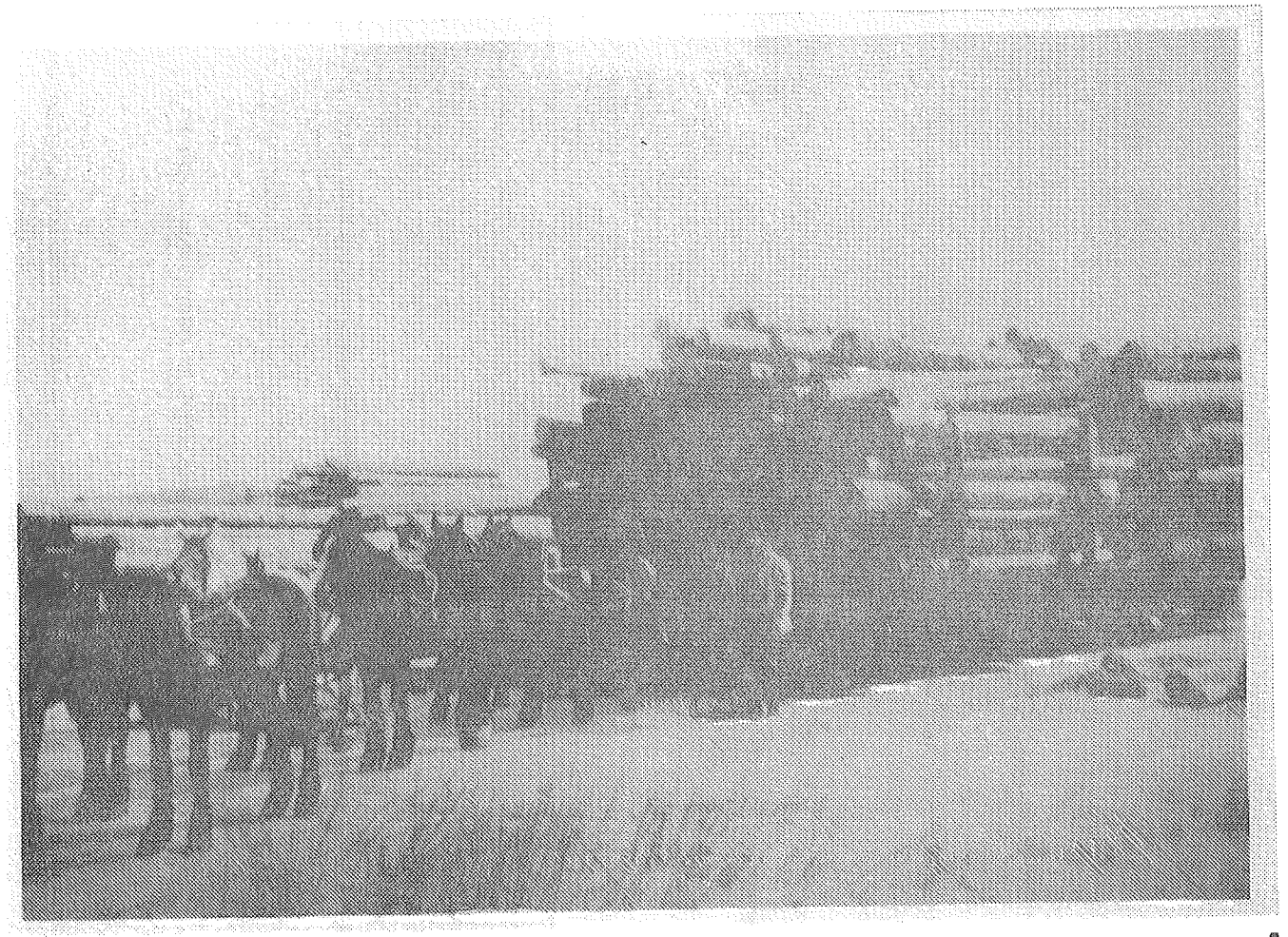
FERTILE & CHEAP FARMING LAND

ARRIVAL OF NEW ENGLANDERS & IMMIGRANTS

STATEHOOD

STATE PRISON IN STILLWATER

The lumbering industry flourished, and with its' prosperity, came settlement. European immigrants came to work in the mills, or to buy and farm the cheap lane opened up to encourage population of the area. With the influx of people, churches, schools, stores, banks and newspapers were founded. With this, the St. Croix was transformed into an industrial corridor.



1865-1915 major growth

RAILROADS

LUMBER PEAKS

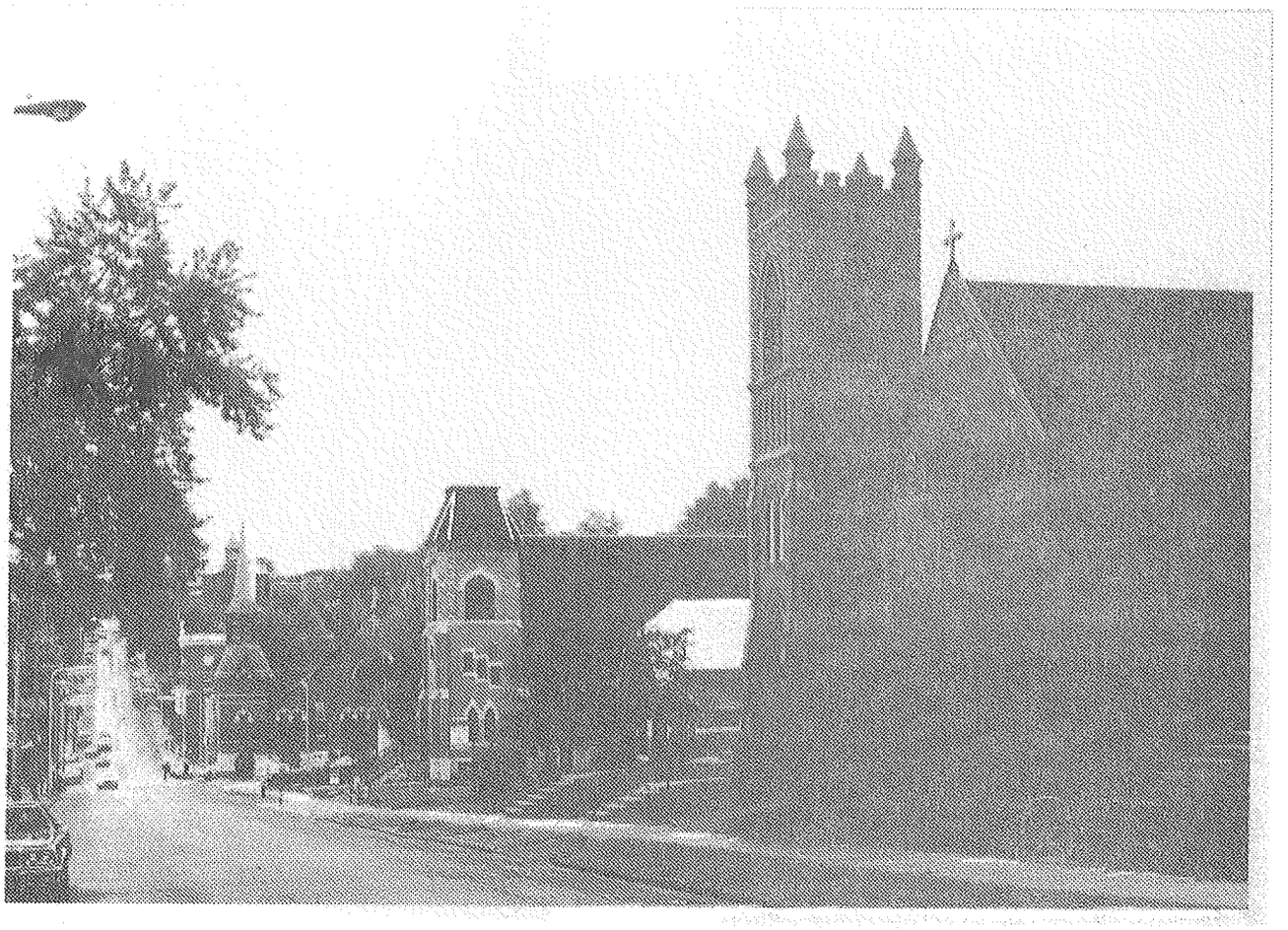
IMMIGRANTS

PROSPERITY; CULTURAL DEVELOPMENT

RAILROAD REPAIR SHOPS IN HUDSON

STILLWATER'S STREETCAR TO ST. PAUL

In the 1870's the arrival of the railroads spurred renewed settlement in both communities. Hudson became the site of the Omaha Railroads' car repair shops, and North Hudson was founded. The lumbering industry reached its' peak in the 1880's. with this continuing prosperity, the Opera House was built in Stillwater as a testimony to growing cultural interests; and public libraries were established in both towns. During this period, a direct tie between the St. Croix Valley and the Twin Cities was achieved via an extensive streetcar system from Stillwater and the railroad from Hudson.



1915 - 1945

limited growth

END OF LUMBER

GOVERNMENT CENTER

LIFT BRIDGE

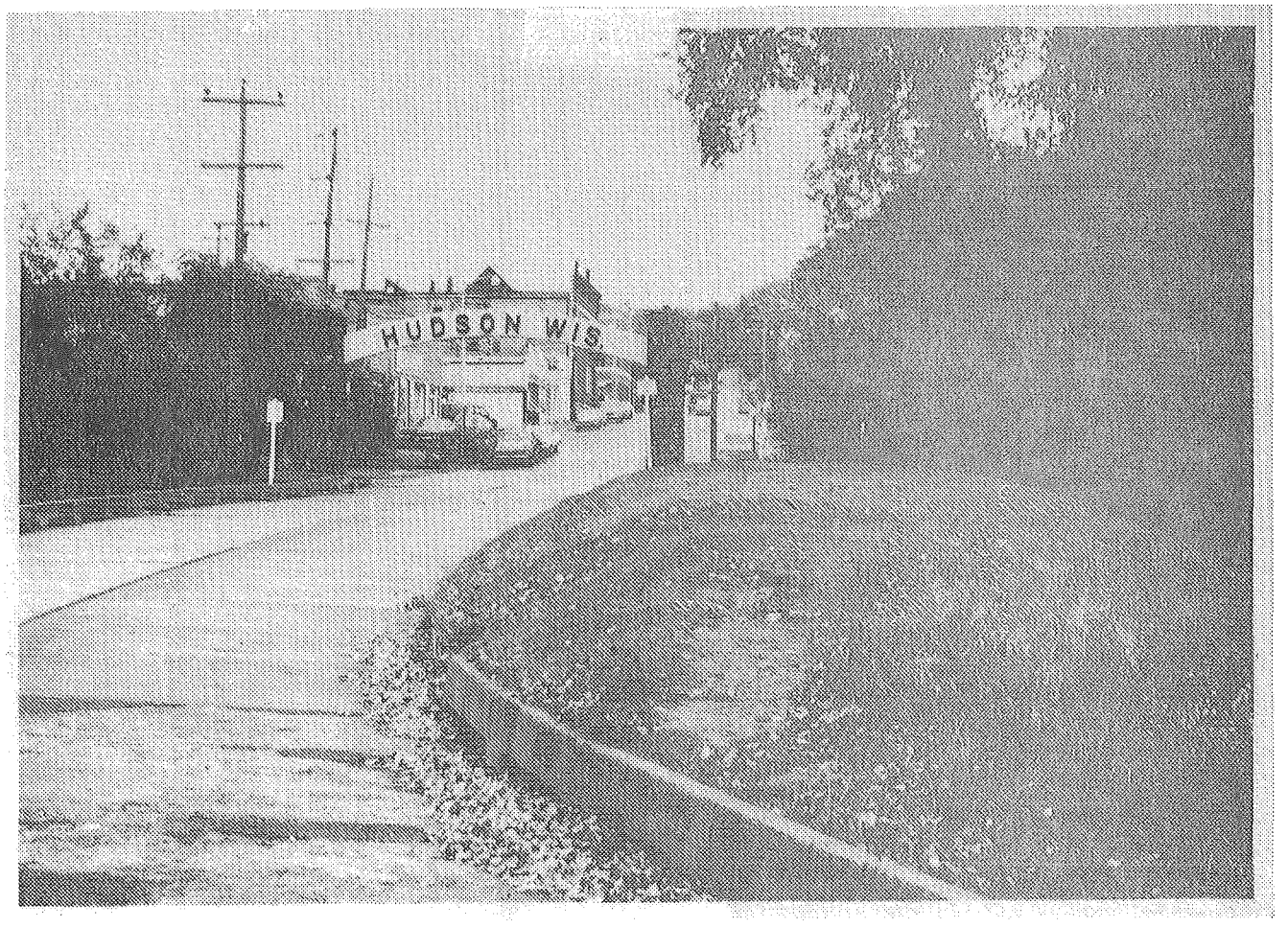
STREET CARS STOP

TOLL BRIDGE

RAILROAD REPAIR SHOPS PEAK

With the depletion of the White Pine forests, the lumber industry closed. In Stillwater, industry turned from lumber to manufacturing, and the St. Croix Manufacturing and Anderson Windows were founded.

The car repair shops continued in Hudson. A toll bridge was built across the St. Croix; income from the bridge took the place of property taxes. Hudson developed into a bedroom community that commuted daily by railroad to the Twin Cities. Also during the period, a program of extensive reforestation was completed.



1945-1965 post-war boom

COMMUTERS FROM TWIN CITIES

SUBURBAN-TYPE RESIDENTIAL EXPANSION

THRU TRAFFIC-MINN/WIS.

R.R. REPAIR SHOPS CLOSE

HWY 12 BRIDGE

TOLL BRIDGE CLOSED

STRIP DEVELOPMENT

POST WAR BOOM

WATER RECREATION

The post-World War II prosperity prompted renewed growth in both communities. The auto replaced streetcar and railroad, and extensive highway development made commuter living more convenient than ever before. The automobile oriented life style brought with it major changes in both communiti communities. Stillwater expanded westward. A commercial strip along the highway began to compete with the historic central business district. Old buildings in central Stillwater were abandoned or turned to different uses as new churches and government offices joined fast food chains in the suburban developments.

Hudson lost its' toll bridge and reverted to property taxes for funds. Suburban developments spread east into Wisconsin farmland and a limited commercial strip along Highway 94 began to compete with Hudson's central business district.

1965-present

suburban sprawl

COMMUTERS FROM TWIN CITIES

SUBURBAN-TYPE RESIDENTIAL EXPANSION

I-94

INDUSTRIAL PARK

LOCATION OF MAJOR CORPORATIONS BETWEEN ST. PAUL & HUDSON

THRU TRAFFIC-MINN/WIS.

STRIP DEVELOPMENT

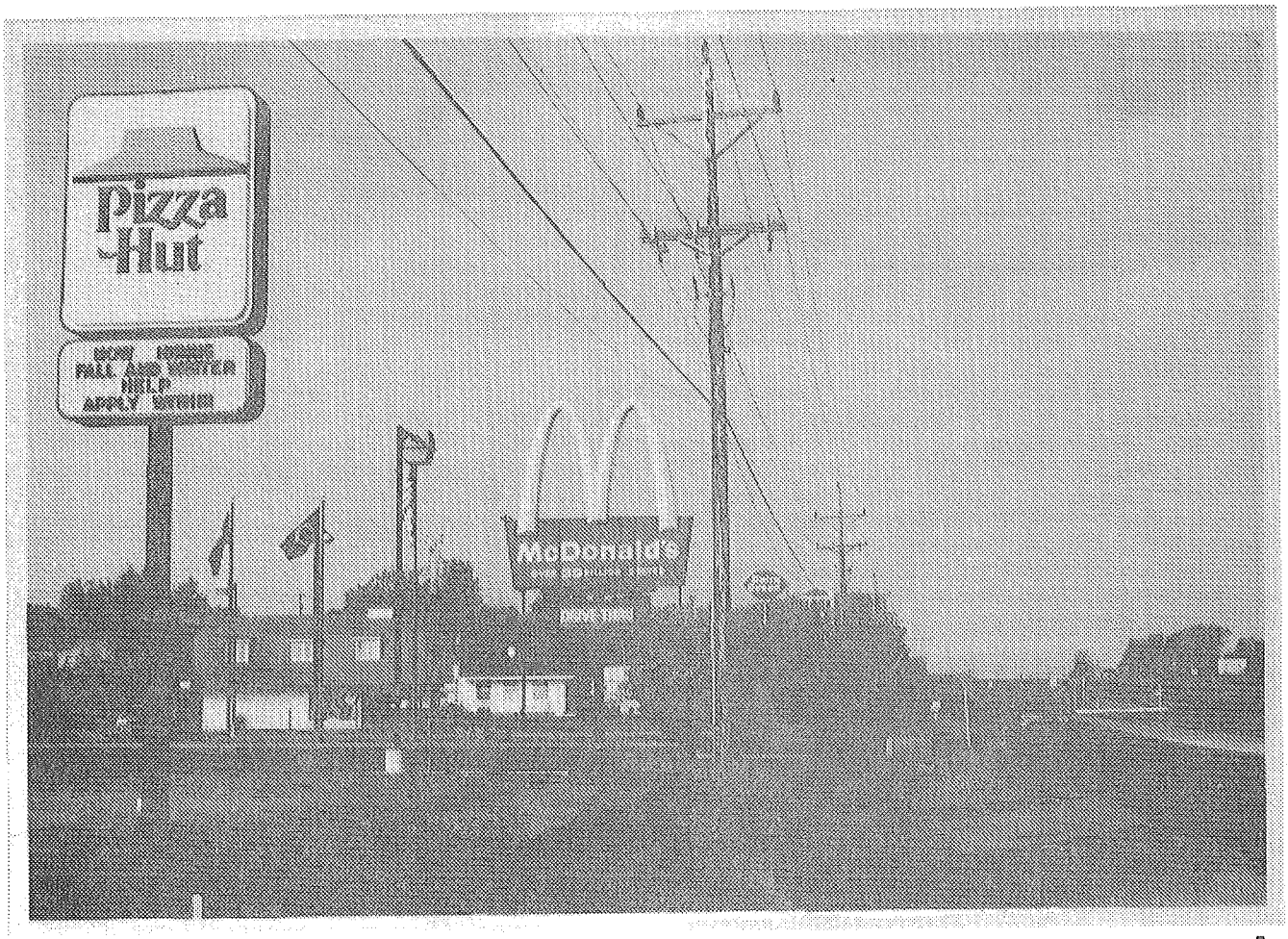
WILD & SCENIC WATER-WAYS LEGISLATION

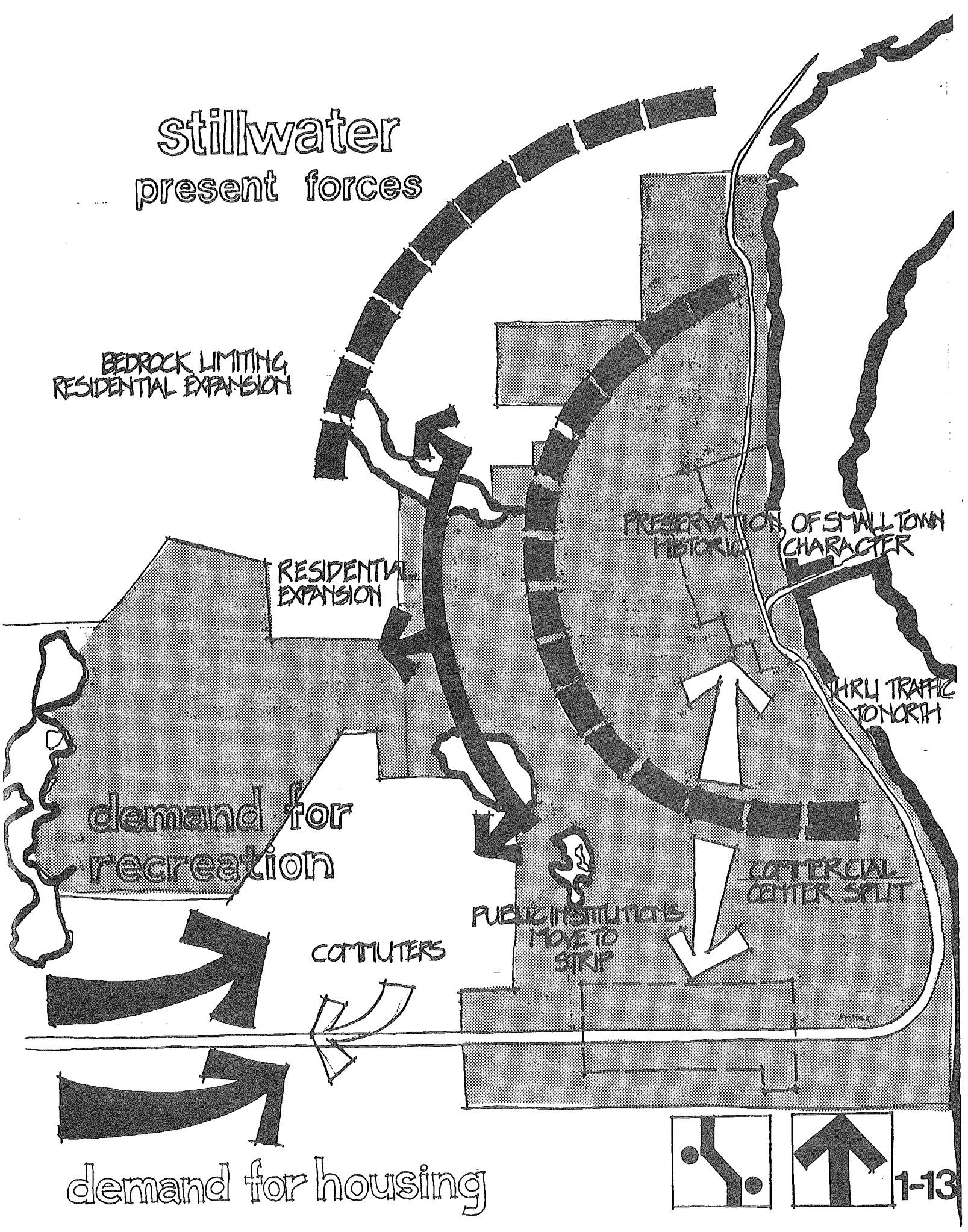
RESTORATION

As commuters continue to migrate to Stillwater and Hudson, suburban sprawl is altering the character of both communities. Perhaps because of this character change, interest is growing in preserving and restoring historic structures. Stillwater is well into a program of restoration, and Hudson is beginning one.

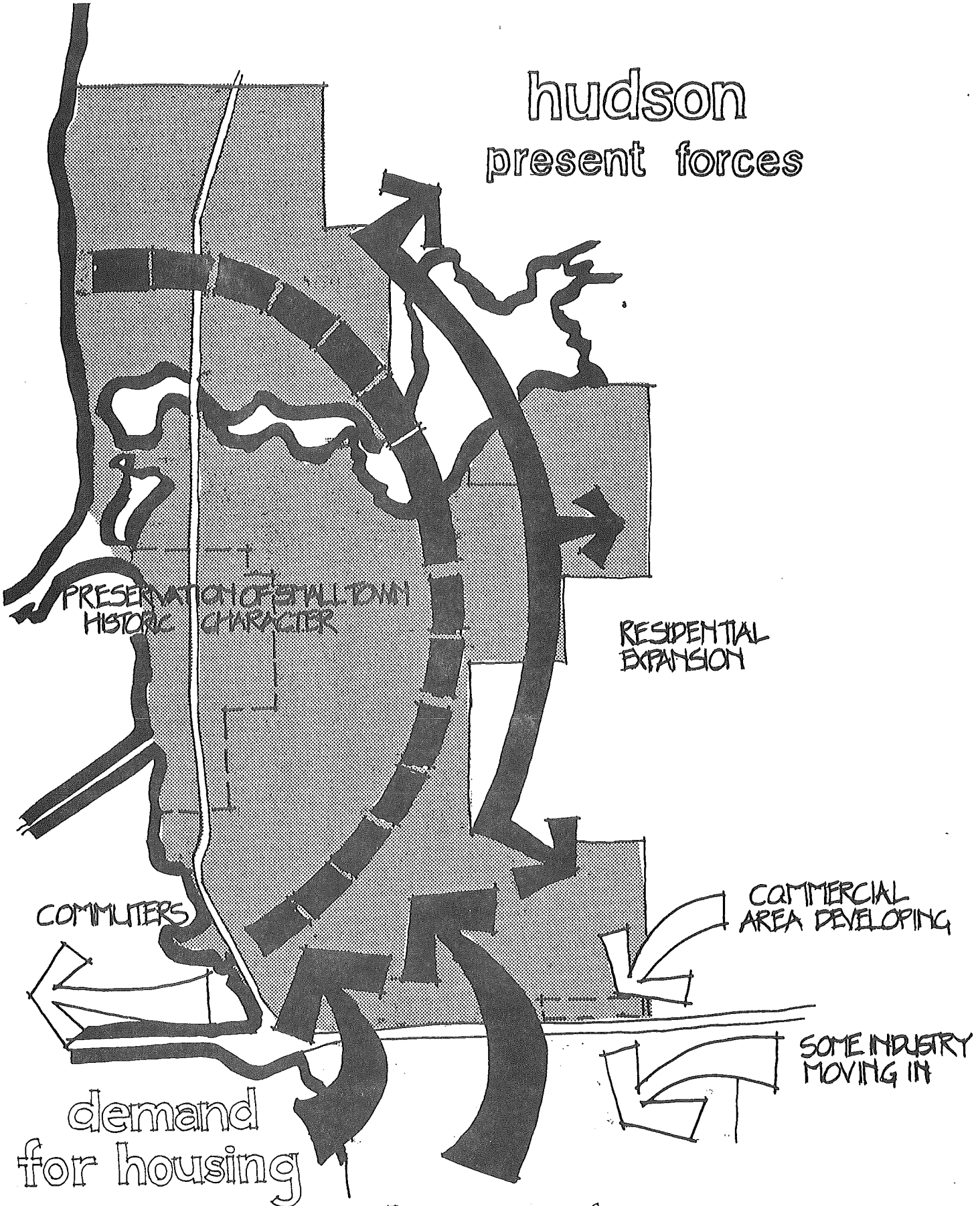
The high volume of automobile traffic through the towns spurs further development on the commercial strips and creates congestion of the central business district.

The St. Croix has changed from a commercial corridor to a recreation river. Concern for the protection of the river was manifested in the classification of the St. Croix as a Wild and Scenic River.




stillwater
present forces
BEDROCK LIMITING RESIDENTIAL EXPANSION
RESIDENTIAL EXPANSION
PRESERVATION OF SMALL TOWN HISTORIC CHARACTER
HRLY TRAFFIC TO NORTH
demand for recreation
COMMERCIAL CENTER SPLIT
PUBLIC INSTITUTIONS MOVE TO STRIP
COMMUTERS
demand for housing
1-13

hudson
present forces

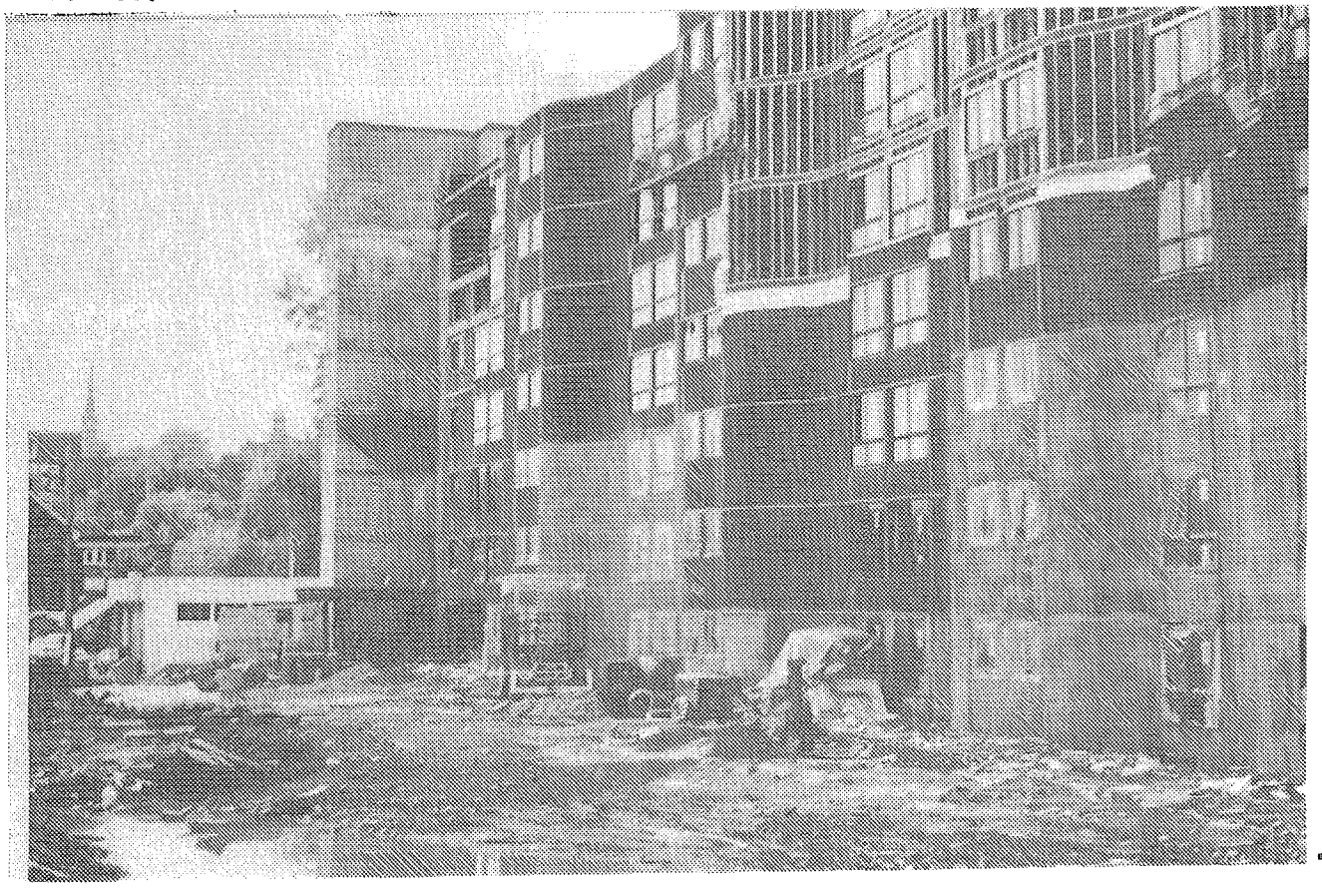


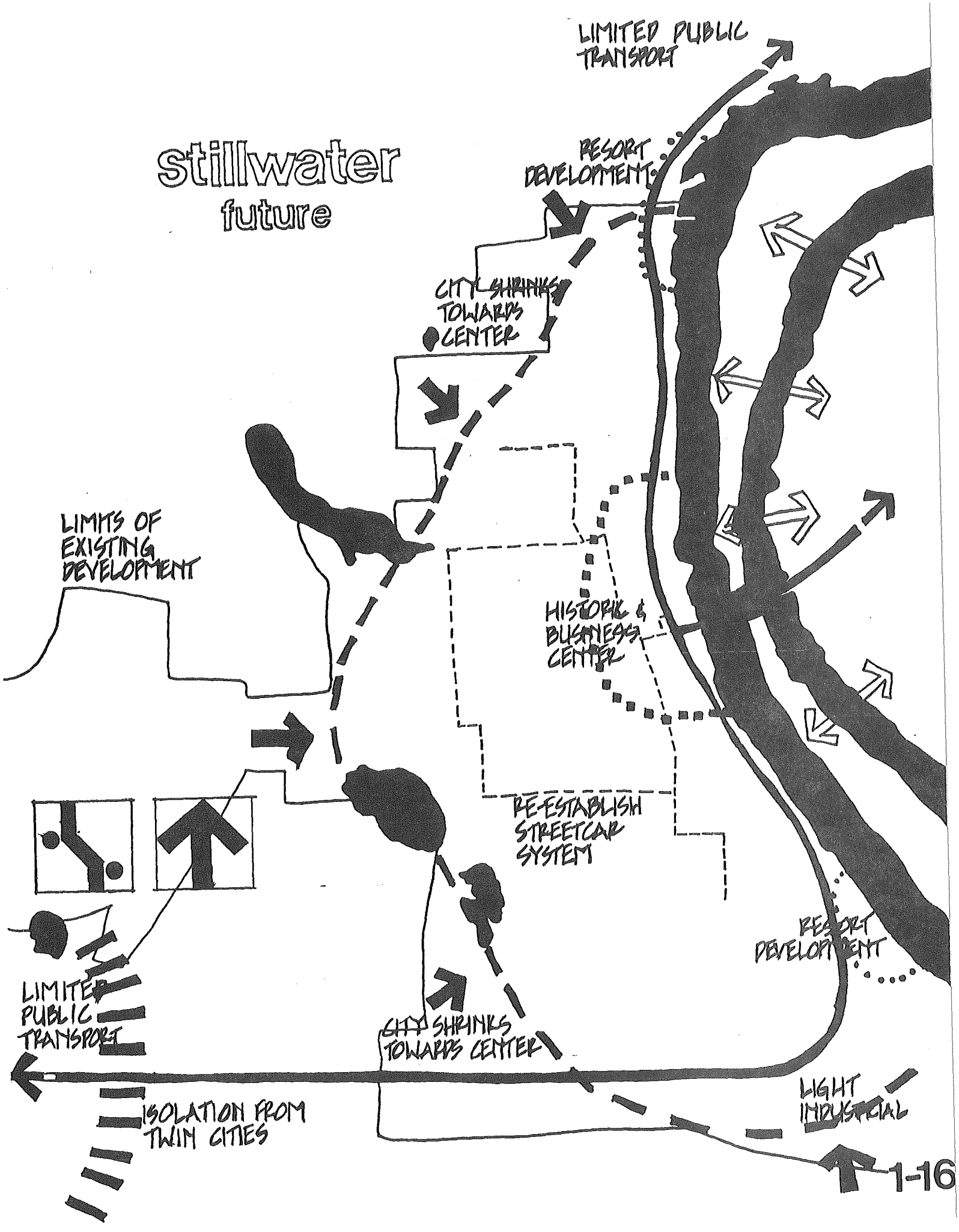
present forces

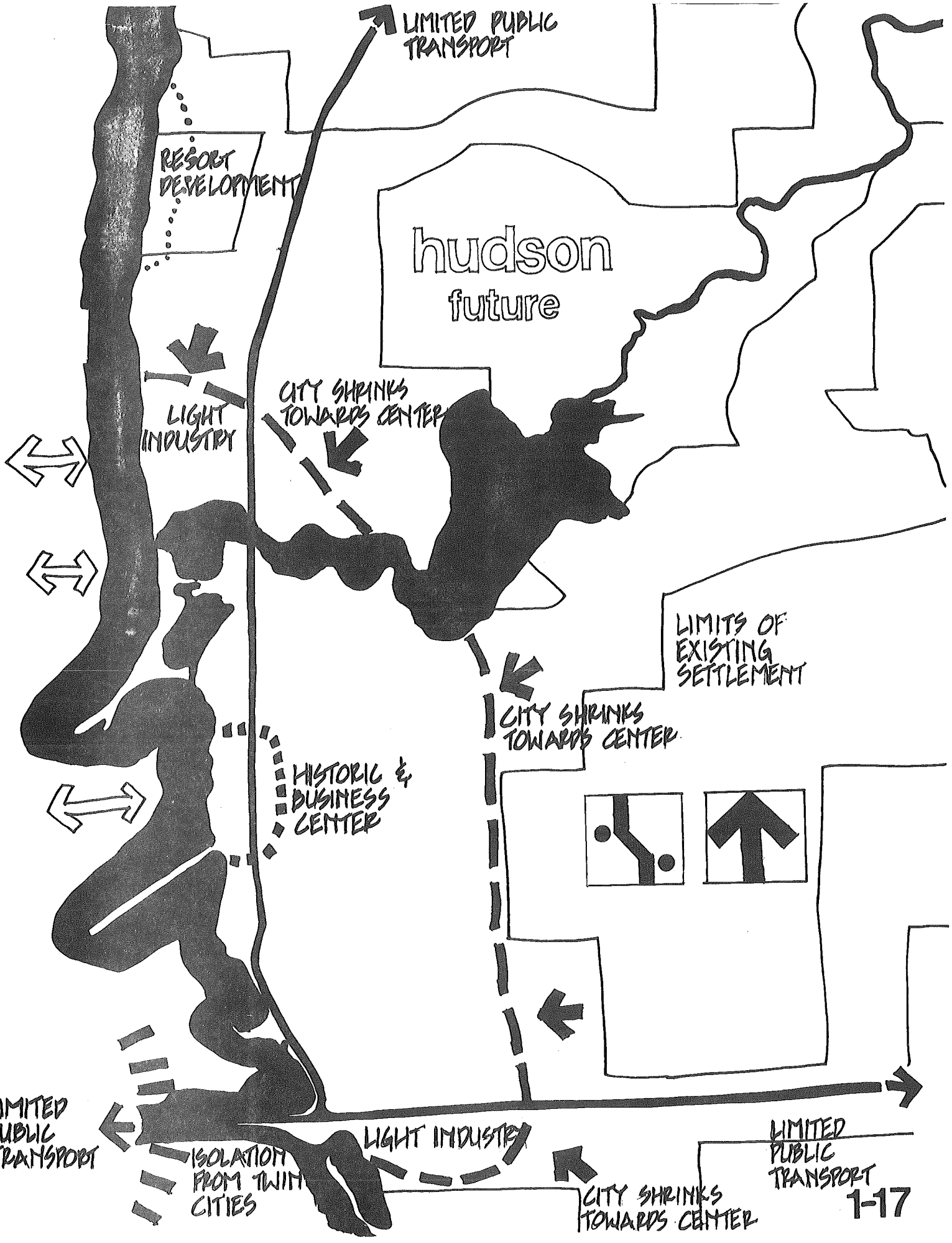
The St. Croix River gave life to the cities of Hudson and Stillwater. Today, the automobile sustains them. This shift in the major movement systems has begun to reorganize the two towns. In Stillwater especially, a second city center is developing along the highway and is competing with the old one along the river.

The sutomobile has placed Stillwater and Hudson within easy reach of the Twin Cities. This proximity has profoundly affected the two cities. People working in the Twin Cities, but wishing to live in a scenic, small town environment have created a huge demand for residential expansion in Stillwater and Hudson. Also, the Lower St. Croix Valley has become increasingly popular as a Twin Cities recreation area. These two external forces have set up a number of conflicting forces within thw two communities.

As long as the automobile continues to be heavily used, there appears to be no end to the sprawling residential expansion and the increasing use of the St. Croix Valley for recreation. Commercial areas will probably develop to serve these new suburbs, tending to decentralize the two communities. Attracting industry to Stillwater and Hudson will continue to be a problem if additional incentives are not provided. Yet in each town, the historic downtown area is being rejuvenated and should continue to be a vital part of the community.

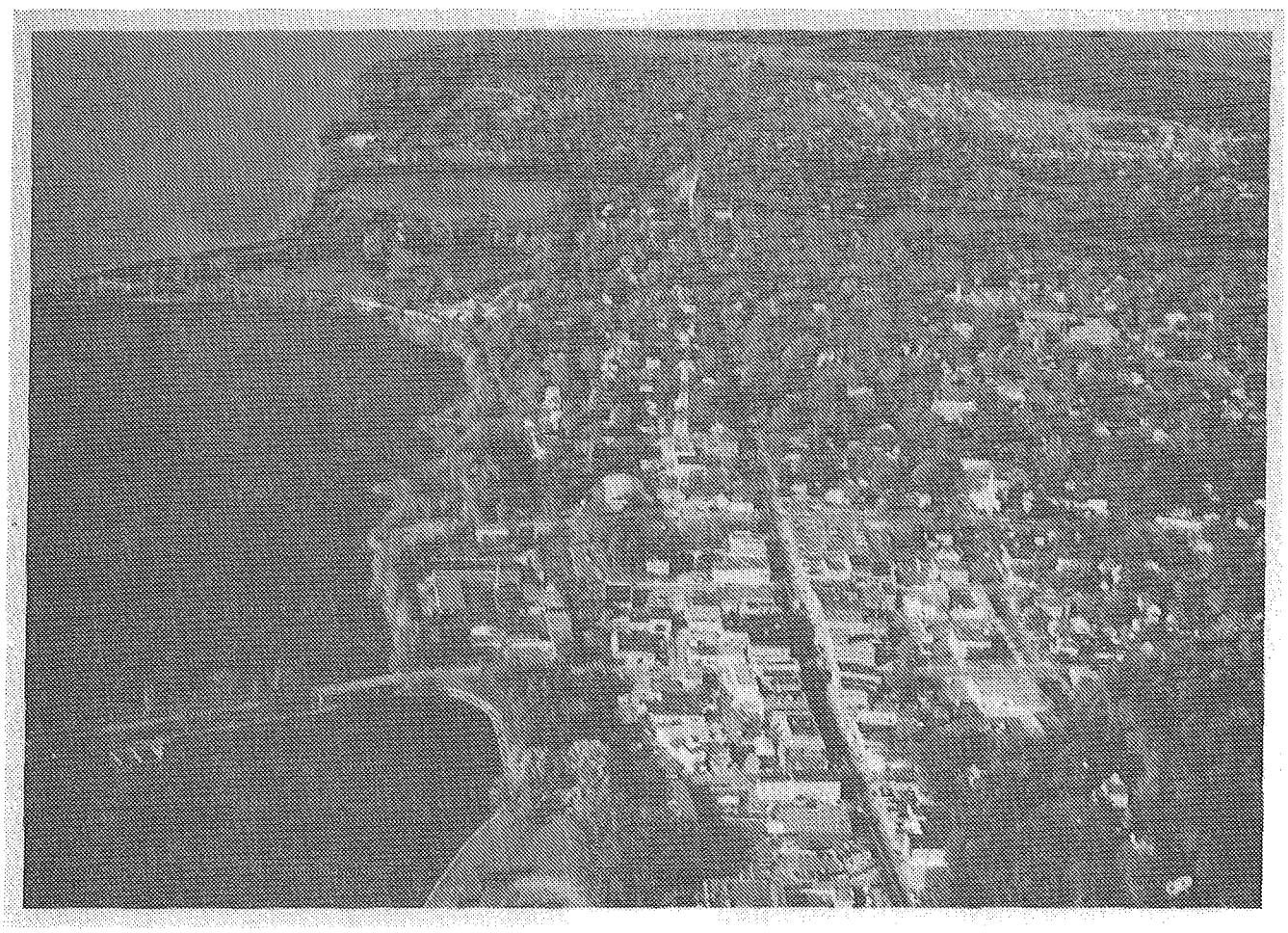



stillwater
future
LIMITED PUBLIC TRANSPORT
RESORT DEVELOPMENT
CITY SHRINKS TOWARDS CENTER
LIMITS OF EXISTING DEVELOPMENT
HISTORIC & BUSINESS CENTER
RE-ESTABLISH STREETCAR SYSTEM
RESORT DEVELOPMENT
LIMITED PUBLIC TRANSPORT
CITY SHRINKS TOWARDS CENTER
ISOLATION FROM TWIN CITIES
LIGHT INDUSTRIAL


LIMITED PUBLIC TRANSPORT
RESORT DEVELOPMENT
hudson
future
LIGHT INDUSTRY
CITY SHRINKS TOWARDS CENTER
LIMITS OF EXISTING SETTLEMENT
CITY SHRINKS TOWARDS CENTER
HISTORIC & BUSINESS CENTER
LIMITED PUBLIC TRANSPORT
ISOLATION FROM TWIN CITIES
LIGHT INDUSTRY
CITY SHRINKS TOWARDS CENTER
LIMITED PUBLIC TRANSPORT

future forces

If the energy situation continues to degenerate, with our dependency on fossil fuel increasing while supplies decrease, the reults will be dramatic for Hudson and Stillwater. Each city would lose a majority of their commuting population causing the cities to shrink toward their historic business centers. The cities would, of necessity, their dependence on larger urban centers. Industries would be encouraged to develop in the area. Resort-type areas adjacent to the towns could encourage tourism from distant cities like Minnespolis and St. Paul. Each community would have to develop greater social, cultural and financial ties with neighboring communities to pool resources.



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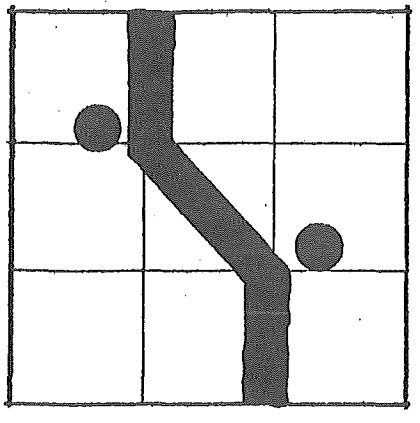
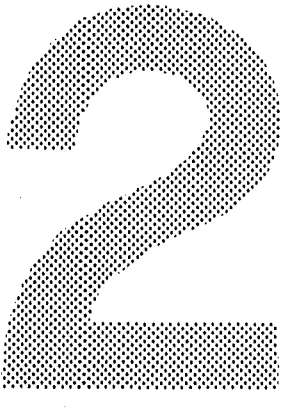


PHYSICAL CHARACTER



bedrock geology

The Bedrock Geology is primarily sandstone and Cambrian rock. This rock has retained its form as the river wore through the surficial glacial deposits and, where volcanic rock has been exposed is the cause of the river escarpment bluffs.

The St. Croix River bluffs contain some of the few faults in the metropolitan area.

In this area, Platteville Limestone, Decorah Shale, and St. Peter Sandstone have built up against the Prairie du Chien Limestone and the St. Peter Sandstone and against the St. Lawrence Dolomite Siltstone.

Much of the area has a heavy layer of pitted glacial outwash which accounts for its rough topographical features.

The drift is up to 550 feet thick.

C CAMBRIAN ROCKS, UNDIVIDED

Includes Sandstones of Jordan, St. Lawrence, Franconia, Ironton-Galesville, Eau Claire, and Mt. Simon formations. Large to very large well yields, good quality water.

Css SANDSTONE

0-800 feet thick. Includes Jordan, St. Lawrence, Franconia, Galesville, Eau Claire, and Mt. Simon Sandstones. Large well yields not subject to pollution. Commonly high in iron. Deep wells needed for large supplies. Good quality water.

O_1 ORDOVICIAN ROCKS, UNDIVIDED

0-180 feet. Dolomite, sandstone. Includes thick Platteville dolomitic limestone, Glenwood shale. Small to moderate quantities of water available. Occurs as caprock commonly above water table.

Ogp GALENA DOLOMITE

0-115 feet thick. Decorah and Platteville Foundation. Mostly dolomite. Not saturated, relatively poor well yields.

Opc PRAIRIE DU CHIEN GROUP

0-275 feet thick. Shakopee member - dolomite light brown to buff, commonly sandy and oolitic. 0-50 feet thick.

New Richmond member - Sandstone and sandy dolomite, buff; often missing, 0-40 feet

Oneota member - Dolomite, light brownish gray to buff. 50-120 feet thick.

The Prairie du Chien group has large quantities of high qhality water available. Locally subject to pollution.

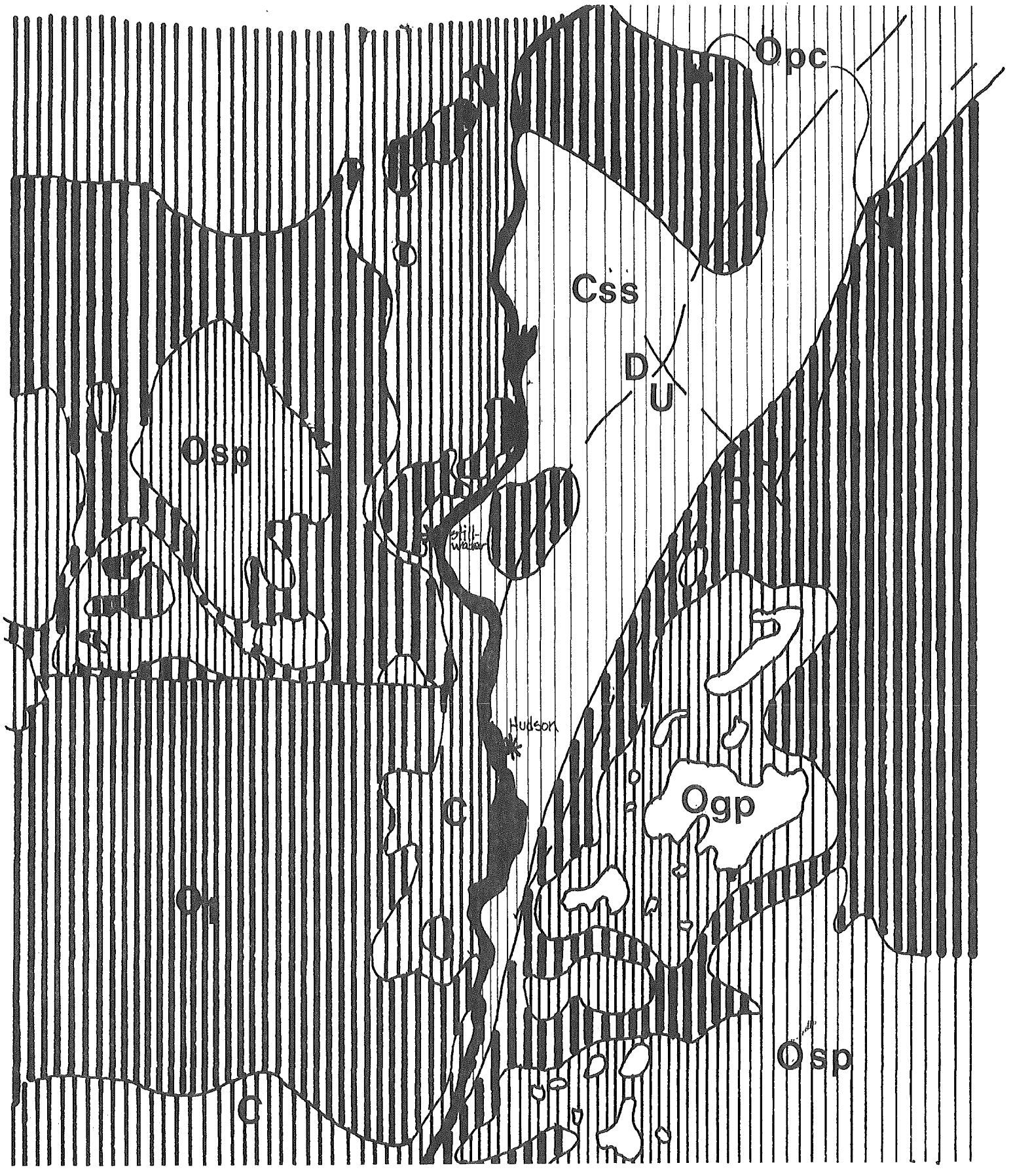
Osp ST PETER SANDSTONE

0-200 feet thick. Good quality water. Small to adequate well yields. Limited areal content. Very hard water, locally subject to pollution.

U UPTHROWN SIDE

D DOWNTHROWN SIDE

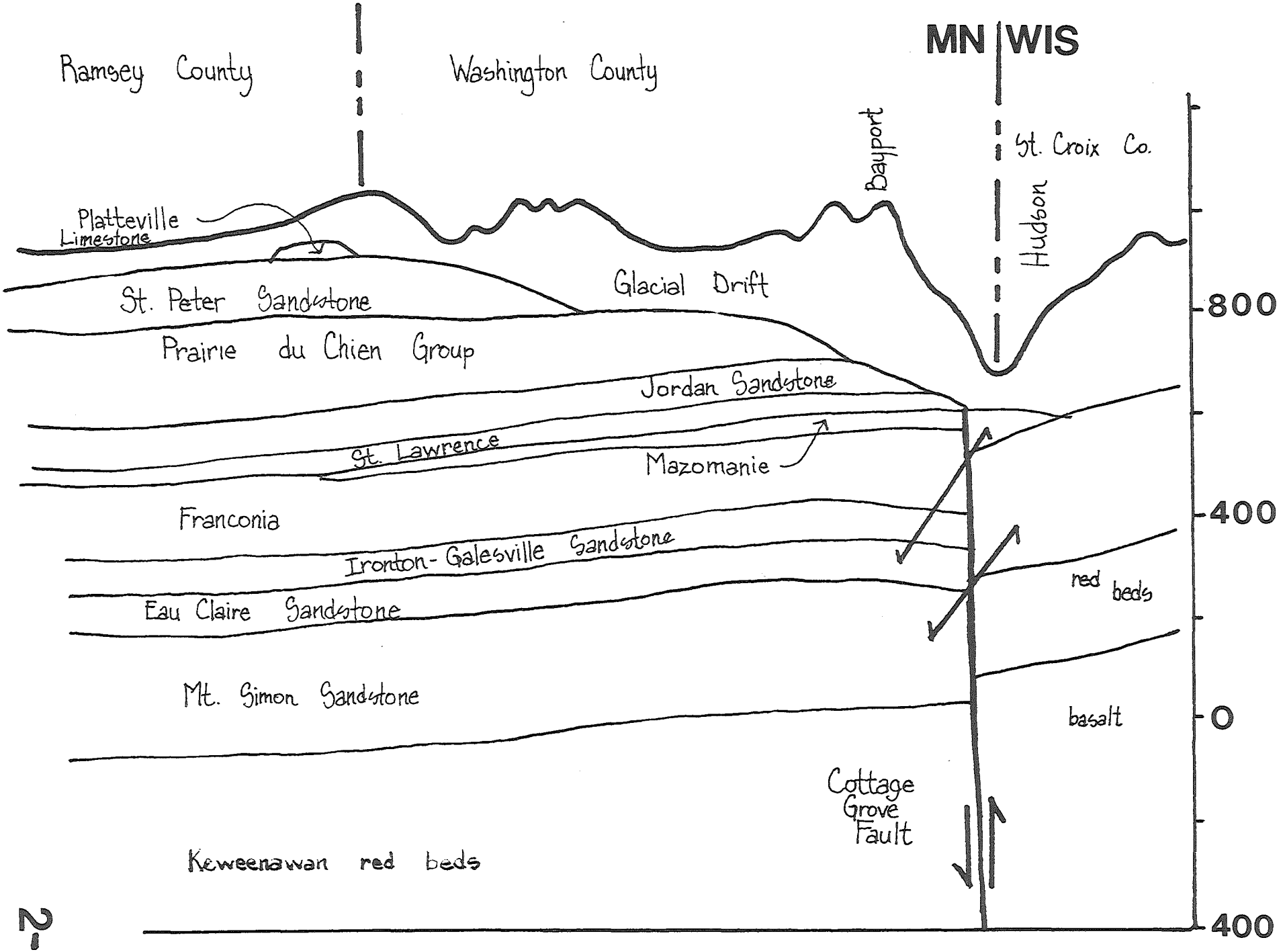
FAULT LINES



GEOLOGY
BEDROCK

2 1 0 4

1" = ± 4 miles



213

SECTION OF THE TWIN CITY BASIN

surficial geology

The surface geology of the region has been influenced by the presence of glaciation. However, only the two latest glacial advances and retreats are of importance to the soil formation process, since debris from these ice sheets have almost completely covered all earlier glacial deposits.

The earlier of the last two ice sheets, the Superior lobe, originated in the Lake Superior region. Ice that accumulated in the Lake Superior basin transported red sandstone and an admixture of igneous rocks from the northeastern portion of the state. The ice advance halted just south of the Minnesota River in Scott and Dakota counties and along the western edge of Hennepin County. The Superior lobe drift is reddish in hue and is non-calcareous.

Ice that advanced from the northwest Des Moines lobe carried materials entrained from limestone and dolomite of Manitoba and northwest Minnesota, producing buff colored calcareous drift.

The glacial process has resulted in basically five sources of parent material: glacial till, glaciolacustrine deposits (sediment deposited in lakes marginal to a glacier by glacial melt-water streams), glacial outwash, loess and recent alluvium. This difference in glacial activity has resulted in numerous soil landscapes and geomorphic regions.

Qg GROUND MORAINE

unstratified till: clay, silt, sand, gravel and boulders

Qe END MORAINE

stratified till: sand and gravel

Quo UNPITTED OUTWASH

stratified sand and gravel

Qpo PITTED OUTWASH

stratified sand and gravel

Ugd UNDIFFERENTIATED GRAY DRIFT

silty till

Urd UNDIFFERENTIETED RED DRIFT

primarily sand till/ unstratified clay, silt, gravel and boulders

Od OLDER DRIFT

primarily till with numerous bedrock outcroppings

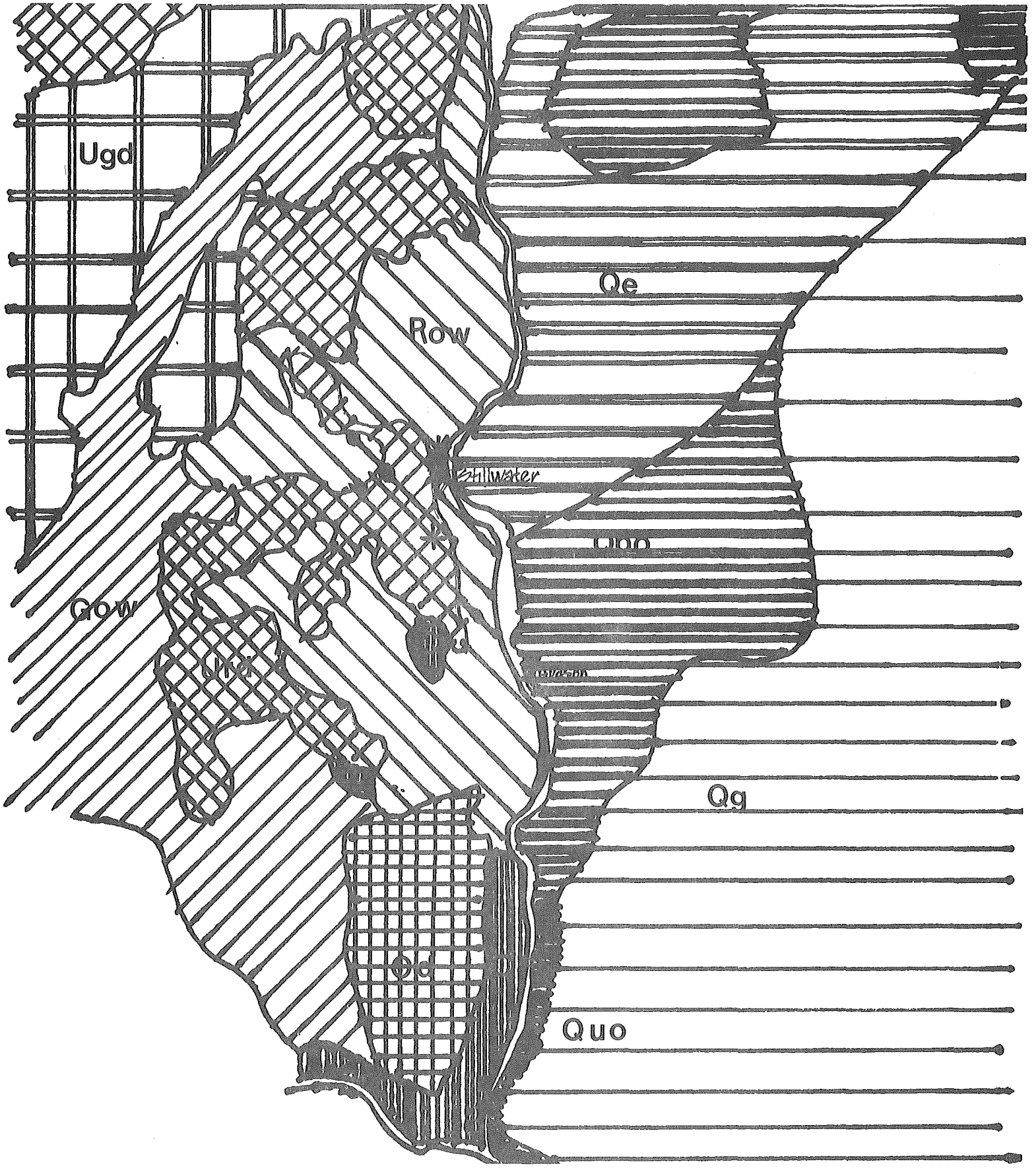
Gow GRAY-BROWN / GRAY OUTWASH

primarily sandy till with some locustrine deposits

Row RED OUTWASH

primarily stratified sand and gravel

C CAMBRIAN ROCK FORMATIONS



GEOLOGY
SURFICIAL

2 1 0 4

1" = ±4 miles

2 5

soil associations

Due to the regional aspect of this inventory specific soil types were not mapped. Instead soil associations provide a basic understanding of what is going on within the soil. Due to the glacial history and deposition which exists here the main problem is the rather rapid percolation which would cause ground water contamination. Also, due to the physical characteristics of the region, erosion is a hazard on most slopes above 15%, should the vegetation be damaged substancially.

wisconsin

Sattre-Pillot-Antigo association

Well drained, nearly level to steep, medium textured soils on outwash plains and streams terraces. There are silty soils underlain by sand and gravel at 20 to 40 inches. They have a moderate available water capacity. Erosion is the major factor for agricultural use on slopes above 2 %. Limitation for these soils are slight to moderate on 12 % of less slopes when used for light industry, residential, recreation, and transportation. Danger of ground water contamination is possible with septic tank filter fields.
Corn bu/ac. 70 to 90
Oats bu/ac. 70 to 80
Hay ton/ac. 3-4

Plainfield-Boone association

Excessively drained, gently sloping to moderately steep, coarse textured soils on outwash plains, stream terraces, and areas underlain by sandstone at a relatively shallow depth. These soils are sandy and have a low available water capacity. Production is quite limited due to droughtness The soils have slight to moderate limitations on zero to 12 % slopes for light industry, residential, and transportation. Limitations are moderate for recreational uses up to 6 % slope and severe on steeper slopes due to difficulty in maintaining sod. This is also a problem anytime the natural vegetation is disturbed regardless of use. This causes severe problems in controlling erosion on construction sites and preventing sedimentation on or off site.
Corn bu/ac. - 40 to 45
Oats bu/ac. -35
Hay ton/ac. - 2

Burkhardt-Chetek-Sattre association

Well drained to somewhat excessively drained, nearly level to steep, medium textured soils on outwash plains and stream terraces. The loamy topsoil is underlain by sand and gravel at 20 to 40 inches. Factors limiting agricultural production are droughtness on the nearly level areas. Erosion becomes the main problem as slopes increase over 2%. Limitations range from slight to moderate on slopes of 12 % or less when using these soils for light industry, residential, recreation, and transportation. Septic tank filter fields could cause danger of ground water contamination.
Corn bu/ac. - 55 to 80
Oats bu/ac. - 45 to 70
Hay ton/ac. 2½ to 3

Amery-Cromwell association

Well drained to somewhat excessively drained, gently sloping to steep, medium textured soils on till and outwash plains. These loamy soils are underlain by sandy glacial till or sand and gravel at depths ranging from 2 to 5 feet. Major problems affecting agriculture is erosion. Soil limitations are slight to moderate from zero to 12 % slope when used for development such as : urban, light industry, highways and recreation. There is a danger of ground water contamination with septic tank filter fields.
Corn bu/ac. - 55 to 65
Oats bu/ac. - 40 to 50
Alfalfa, brome, hay ton/ac. 2½

minnesota

SSWD Sandy over Sandy, well drained, dark-colored. Landscape position of nearly level to gently rolling outwash plain. Average rooting zone of loamy sand 1-3 " thick with a substratum of sand and gravel 3-20 feet thick. 3-6" if available water to 5 feet. Ph of between 5.1-6.5, low - medium phosphorus and low to medium potassium availability. Depending on the slope the hazard for sheet erosion is is slight to moderate. Cropland suitability is marginal.
Poor to fair suitability for lawns & gardens
Fair to droughty suitability for trees and shrubs.
Moderate development potential is apparent above 6% slopes.

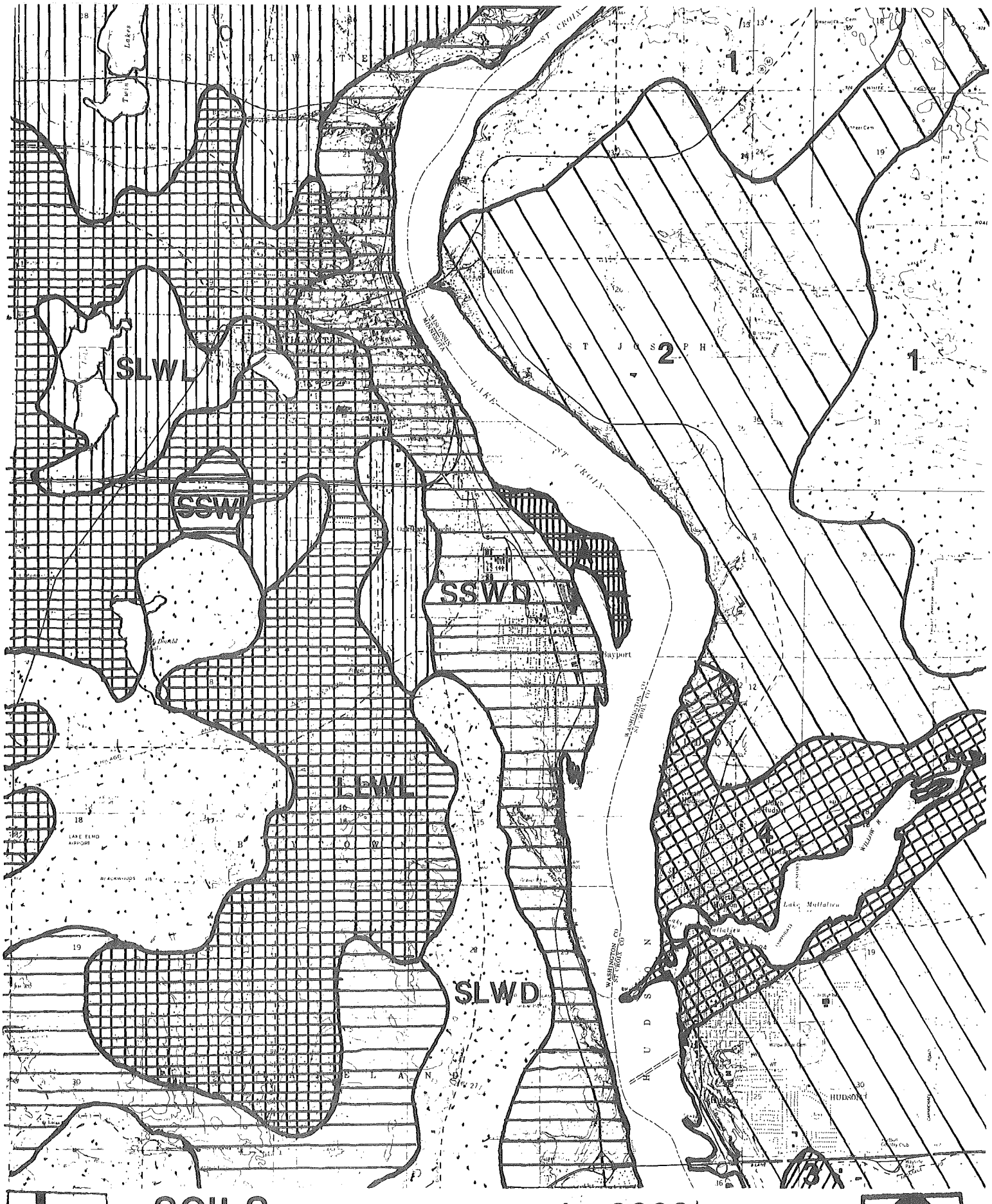
SLWD Loamy over sandy, will drained dark colored. Prime agricultural land, good suitability for lawns, gardens, trres and shrubs. Slight limitationsffor' community development, houses, roads and streets, septic systems and large park developments. Severe limitations for shallow excavations as cut banks will cave. Greater then 6' to the high water table

SLWL Loamy over sandy, well drained light-colored, 0-3 ' to the high water table. Moderate to severe hazard of sheet erosion. Marginal use as cropland, fair use for lawns and gardens, good use for trees and shrubs. Moderate to severe limitations for extensive man made development.

SSWL Sandy over Sandy, well to excessive drained, light color Landscape position rolling to steep hilly upland. Average rooting zone of loamy sand 1-3 feet thick. 3-6" available water to 5'. Ph of between 5.6 and 7.8; medium availability of phosphorous and potassium. Ph of between 5-6-78; medium availability of phosphorous and potassium. Moderate suitability for dropland. Fair suitability for lawns, gardens, trees and shrubs due to dr droughtiness. Slight limitations for houses, roads and streets, septic tank fiels (hazard of pollution) and community development. Severe limitations for excavations (cut banks cave)and doderate suitability gor large excavations (sut banks cave) and moderate suitability for large scale park development.

LLWL Deep silty or loamy, well drained, light colored. Greater than 6' to the high water table. Good suitability for plant growth, and moderate suitability for urbanized development. Due to a slow percing of water, septic systems have severe limitations. Moderate limitations exist foi shallow excavations and large scale park development.

A Alluvial land. 2-6' to the high water table with slight hazard o of sheet erosion. Considered prime agricultural land with fair to good suitability for other types of vegetation. Severe limitations exist however vor man systems due to the hazard of flooding.



SOILS ASSOCIATIONS

1 ≈ 2000

2 8

soil capability descriptions

SUMMARY

These land capability maps are not a land use plan in themselves, but a tool to aid in making land use decisions. They should not be used to prohibit a given land use without on-site inspection, but to indicate to the user that areas do exist within the townships which should be protected from alternative land uses. The highest or ultimate land use for a parcel of land may certainly change should economics dictate.

Because of the nature of the geology and the resultant soils much of the region has inherent management difficulties.

The substratum has moderate to very rapid permeability creating dangers throughout of ground water contamination via septic tank filter fields.

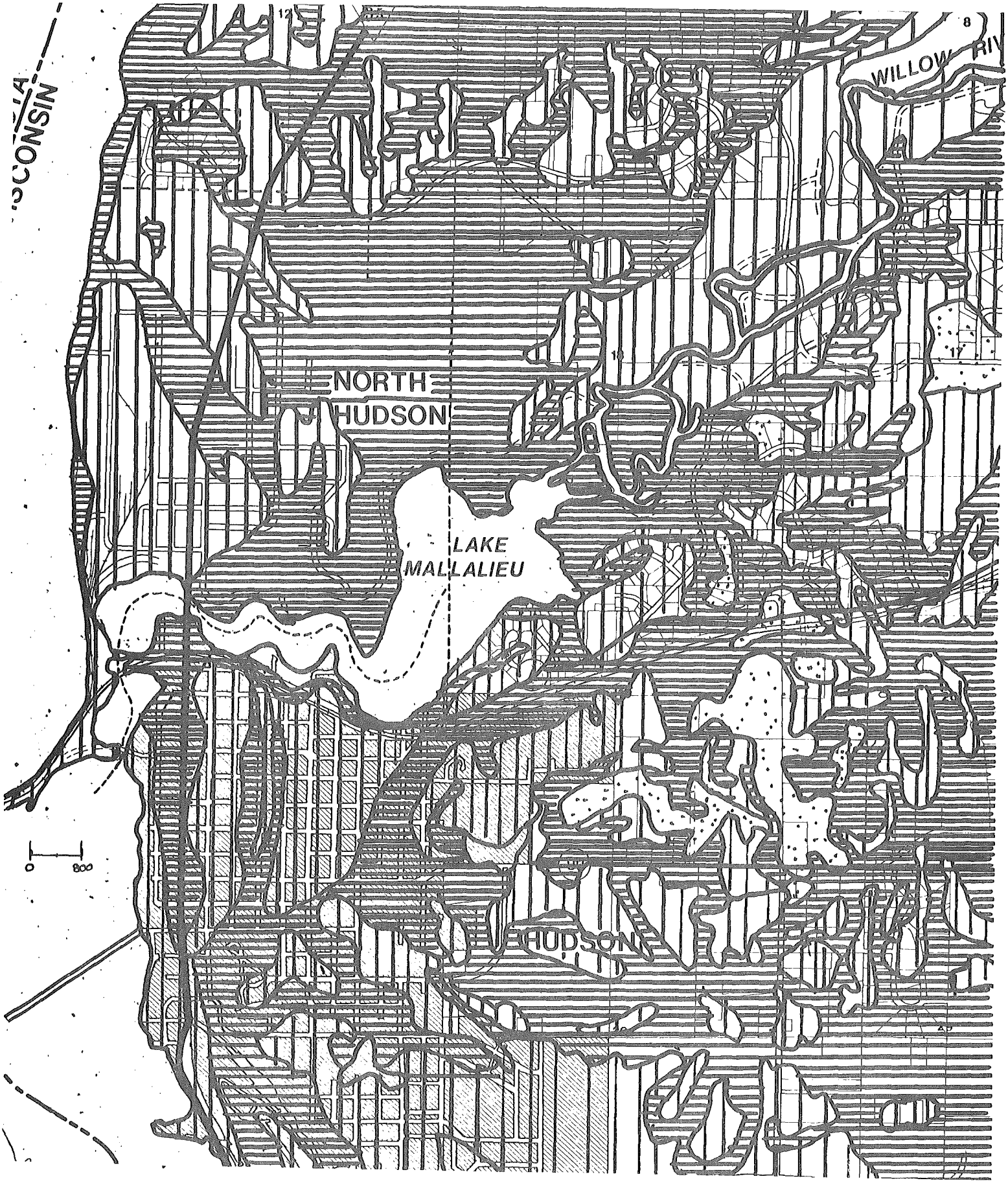
SOIL CAPABILITY FOR LIGHT INDUSTRIAL BUILDING

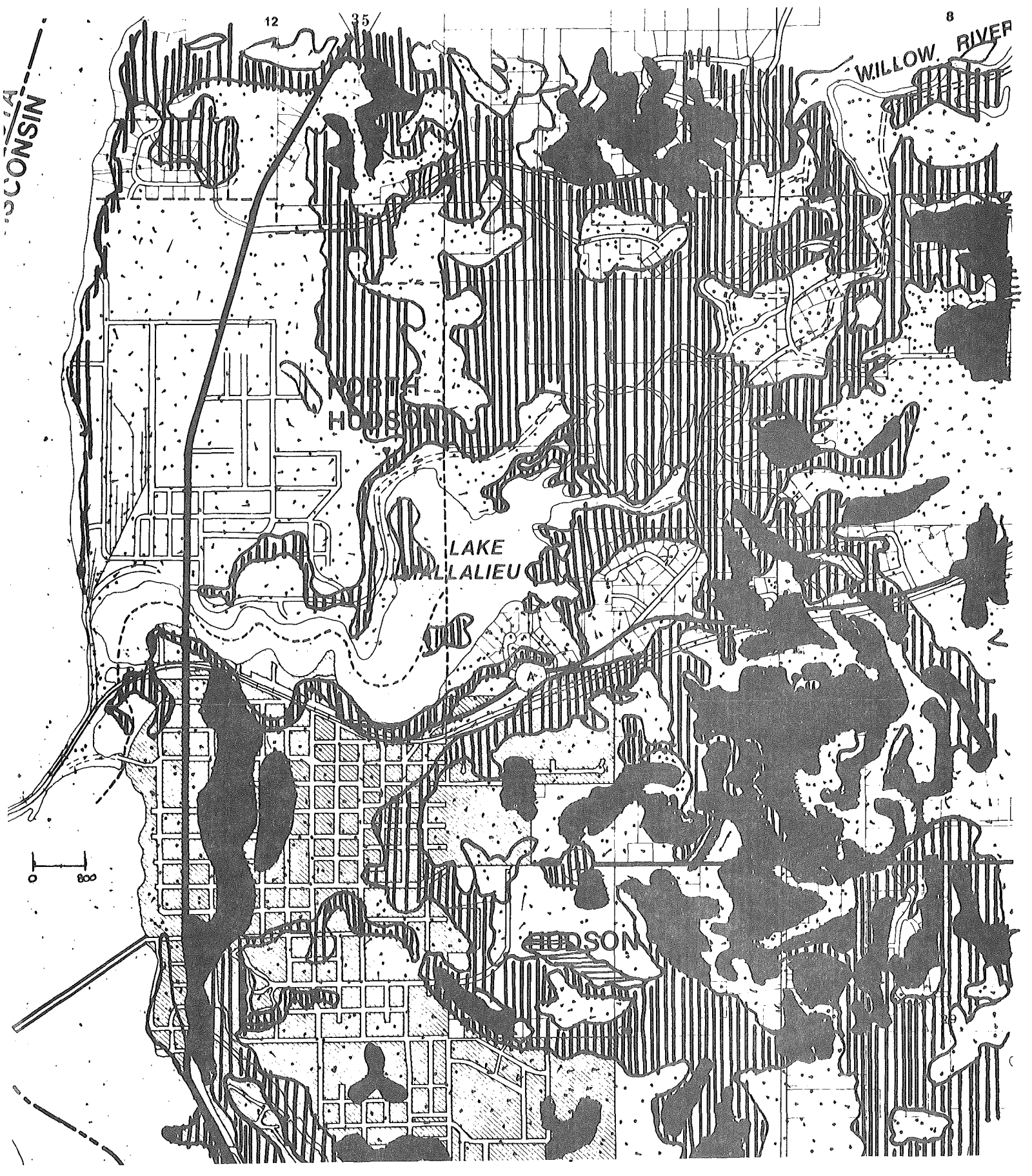
This map displays the distribution of soils possessing limitations for supporting building foundations in Hudson Township. The stipled areas suggest soils capable of supporting foundations with minimal chance of failure. The vertical hatched areas suggest moderate limitaions, and horizontal hatched areas suggest severe limitations exist to support foundations. Much of the township is underlain by glacial outwash sands and gravels which may settle significantly under the weight of a large building. Knowledge of soil type and proper engineering of the foundation is necessary to prevent costly damage to the finished structure. Certain soils may tend to liquify and flow when saturated with water or may be susceptable to frost heave in the early spring, resulting in structural damage. Other soils may expand when wetted and shrink when dry, which may result in significant structural damage over a longer period of time.

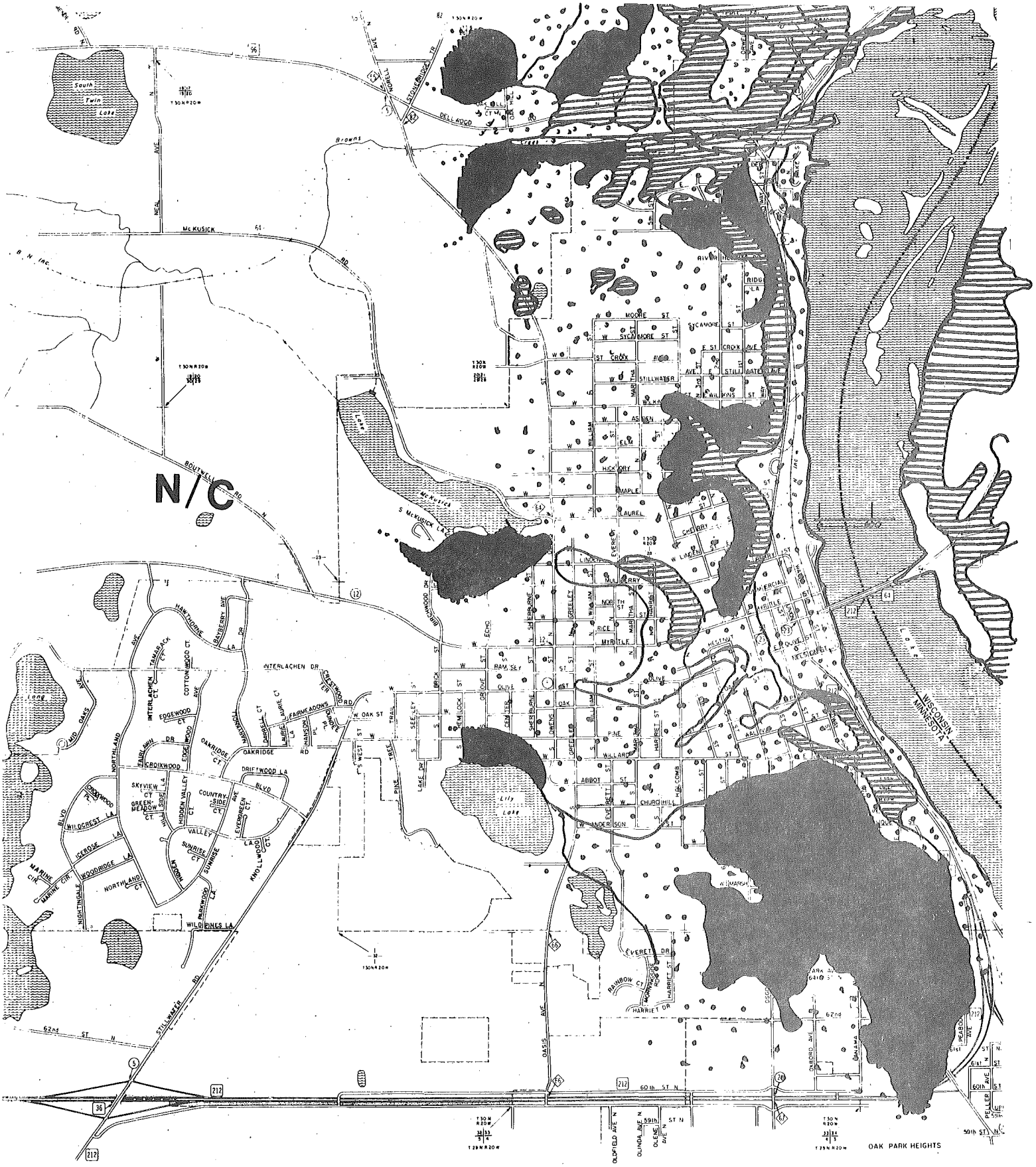
SOIL SUITABILITY COMPOSITES

The Hudson map displays the areas (solid) of land best suited for agricultural purposes and land (hatched) which cannot support a septic system. The stipled areas denote the land area which would be suited for development providing the costs of services do not become excessive if developed.

The soil suitability composite of Stillwater is a result of smaller soil groups and their individual characteristics. As in the hudson township, prime ag lands are in solid. Areas better suited for development are in the stiple pattern and the hatched areas are those which possess severe problems for development.
N/C not catalogued


WILLOW RIV
NORTH HUDSON
LAKE MALLALIEU
HUDSON
0 800
800 400 0 800 1600
SOILS
slight limitations
moderate limitations
severe limitations
CAPABILITY FOR LIGHT INDUSTRY
HUDSON
2 10


12
35
8
WILLOW RIVER
NORTH HUDSON
LAKE MALLALIEU
HUDSON
0
800
800 400 0 800 1600
SOILS
slight limitations
moderate limitations
severe limitations
CAPABILITY COMPOSITE
HUDSON
2
11



SOILS CAPABILITY

slight limitations

moderate limitations

severe limitations

800 400 0 800 1600

STILLWATER

2 12

topography

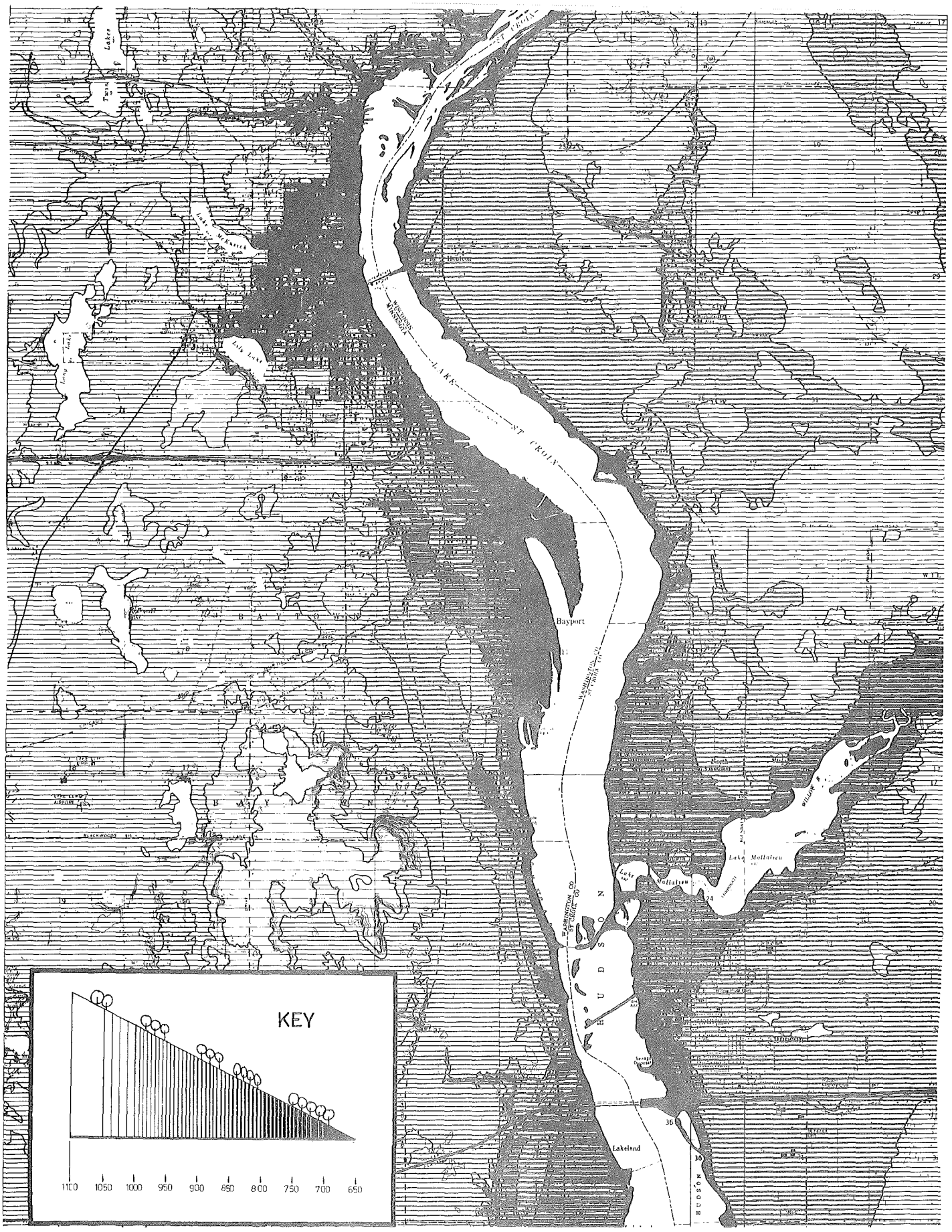
Topography is primarily sandstone and Cambrian escarpment with Various widths of sandbar banks along the St. Croix river channel. Most of thoe e are wooded areas and some are wetlands. A notable exception to this bluff line occurs just north of Hudson; Stillwater and south of Bayport, where the land tends to slope more gradually up from the river.

Special description of Hudson area:

The topography and drainage patterns in this area are reflections of Hudson's history. Hudson is centered upon a huge end moraine (terminal) that effects the charcter of so much of the West Central Wisconsin topography. The subsurface geology is that of upper Cambrian Sandstones and Ordovician Dollstones. The soils in the area are generally silty-loamy glacial tills.

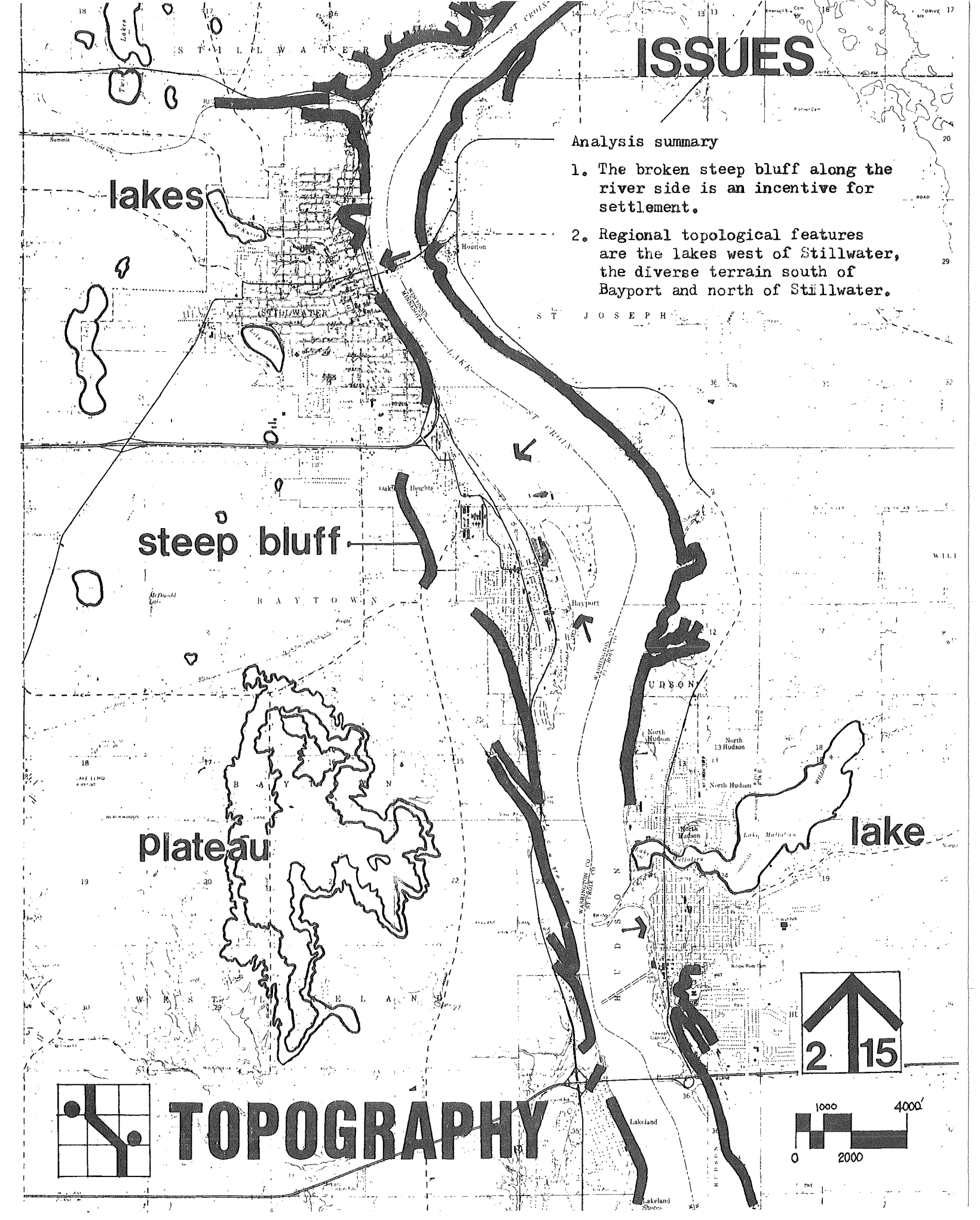
Analysis summary

1. The broken steep bluff along the river side is an incentive for settlement.
2. Regional topological features are the lakes west of Stillwater, the diverse terrain south of Bayport and north of Stillwater.



TOPOGRAPHY ELEVATIONS

2 14


ISSUES
Analysis summary
1. The broken steep bluff along the river side is an incentive for settlement.
2. Regional topological features are the lakes west of Stillwater, the diverse terrain south of Bayport and north of Stillwater.
lakes
steep bluff
plateau
lake
TOPOGRAPHY
2 15
1000
4000'
0
2000

slopes

Slope is a major impact of topography on the St. Croix River.
The slope of 25% and over to sheer cliffs are the result of geology.
Some islands and flat lands under 5% are located along river edge.
Most land under 5% is on top of escarpment.

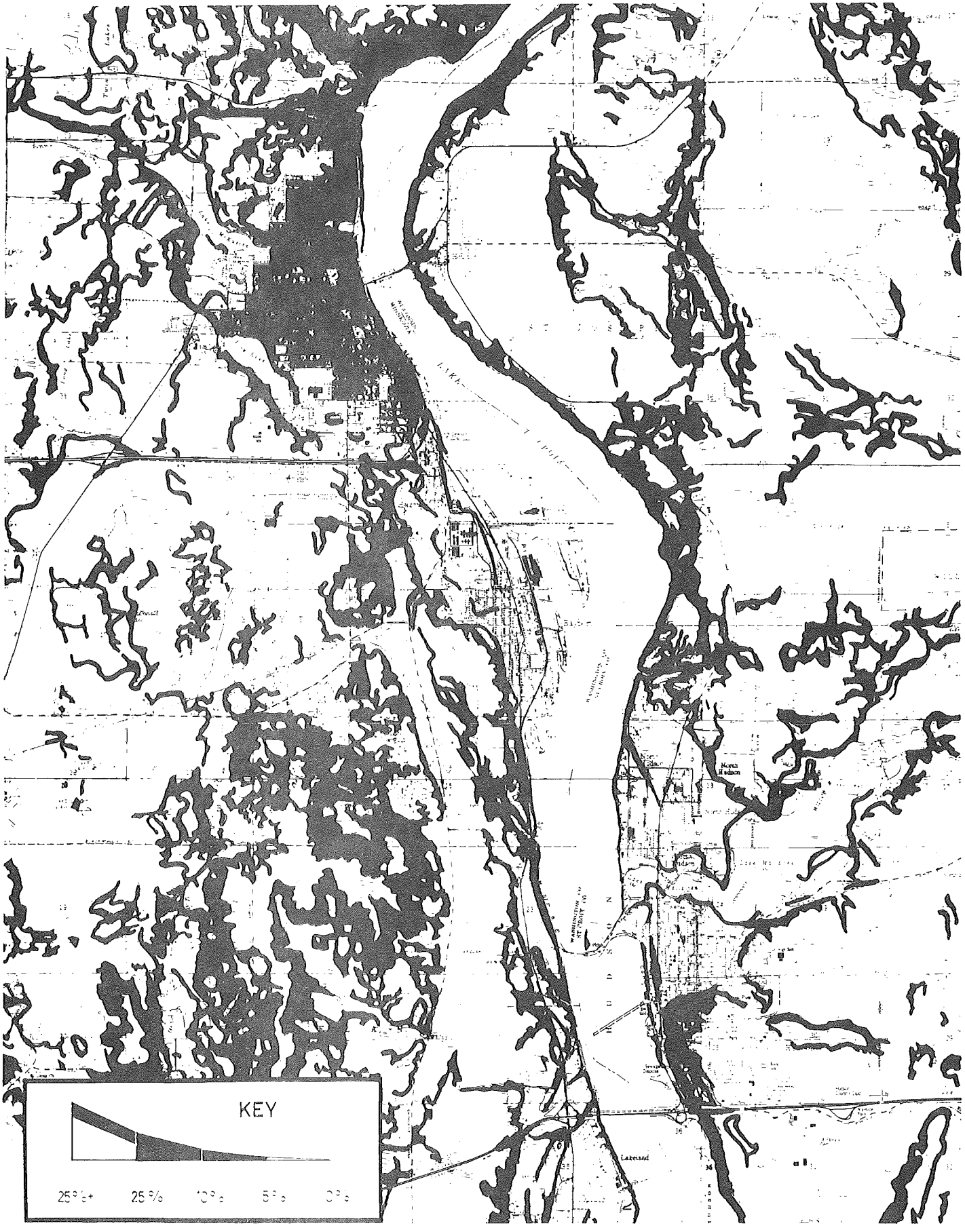
Slope classification for development

0% - 5% high suitability
5% - 10% moderate suitability
10% - 25% low suitability
25% above nonsuitability

Analysis summary

1. Accessibility
   By graphic symbol we mean:
   From the river: the first bluff is an isolation.
   From the edge of the region: the second bluff line is abother isolation.

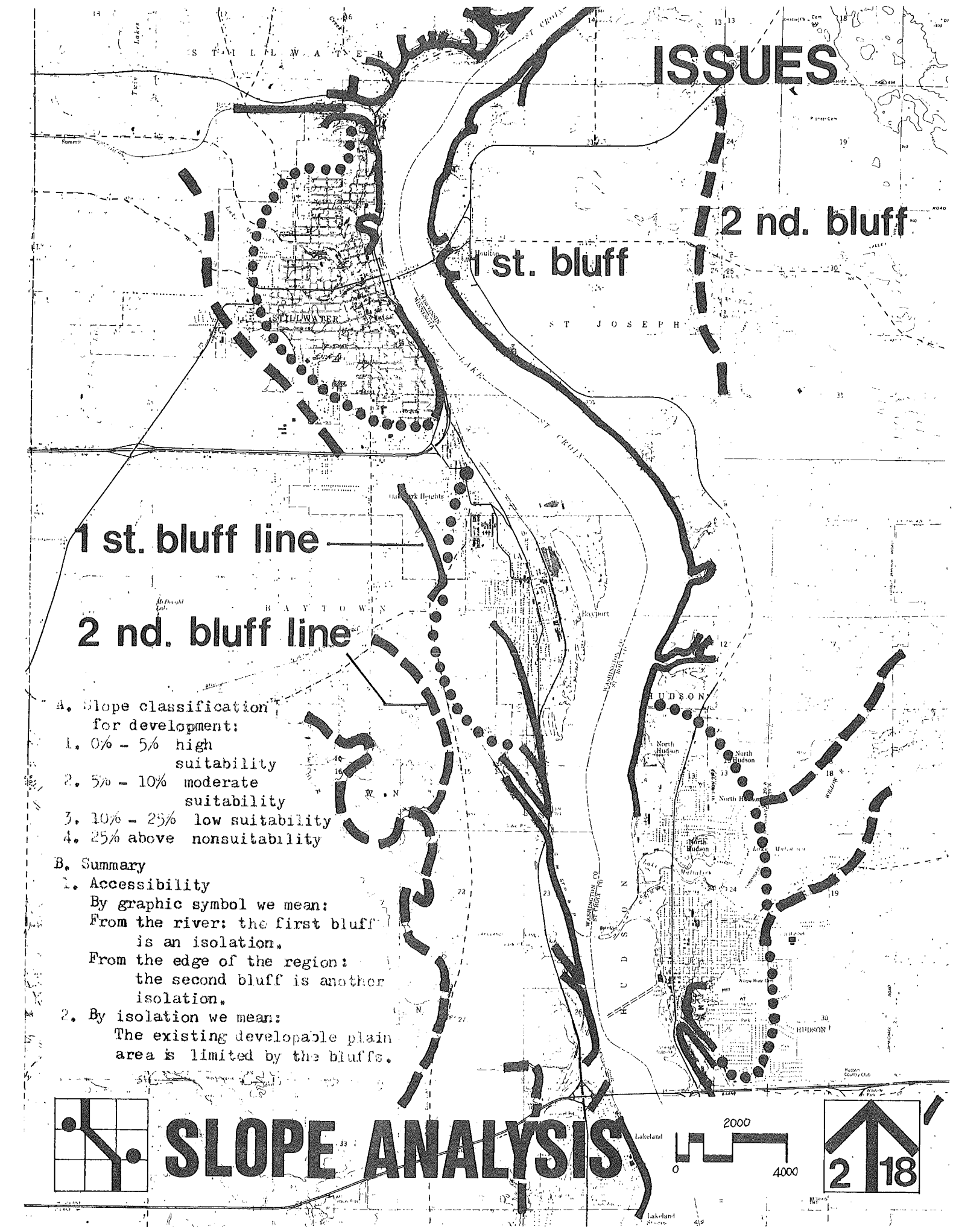
2. By isolation we mean:
   The existing developable plain area is limited by the bluffs.



SLOPE ANALYSIS

1000 4000
0 2000

2 17


ISSUES
2 nd. bluff
1 st. bluff
1 st. bluff line
2 nd. bluff line
A. Slope classification for development:
1. 0% - 5% high suitability
2. 5% - 10% moderate suitability
3. 10% - 25% low suitability
4. 25% above nonsuitability
B. Summary
1. Accessibility
By graphic symbol we mean:
From the river: the first bluff is an isolation.
From the edge of the region: the second bluff is another isolation.
2. By isolation we mean:
The existing developable plain area is limited by the bluffs.
SLOPE ANALYSIS
2000
0
4000
2
18

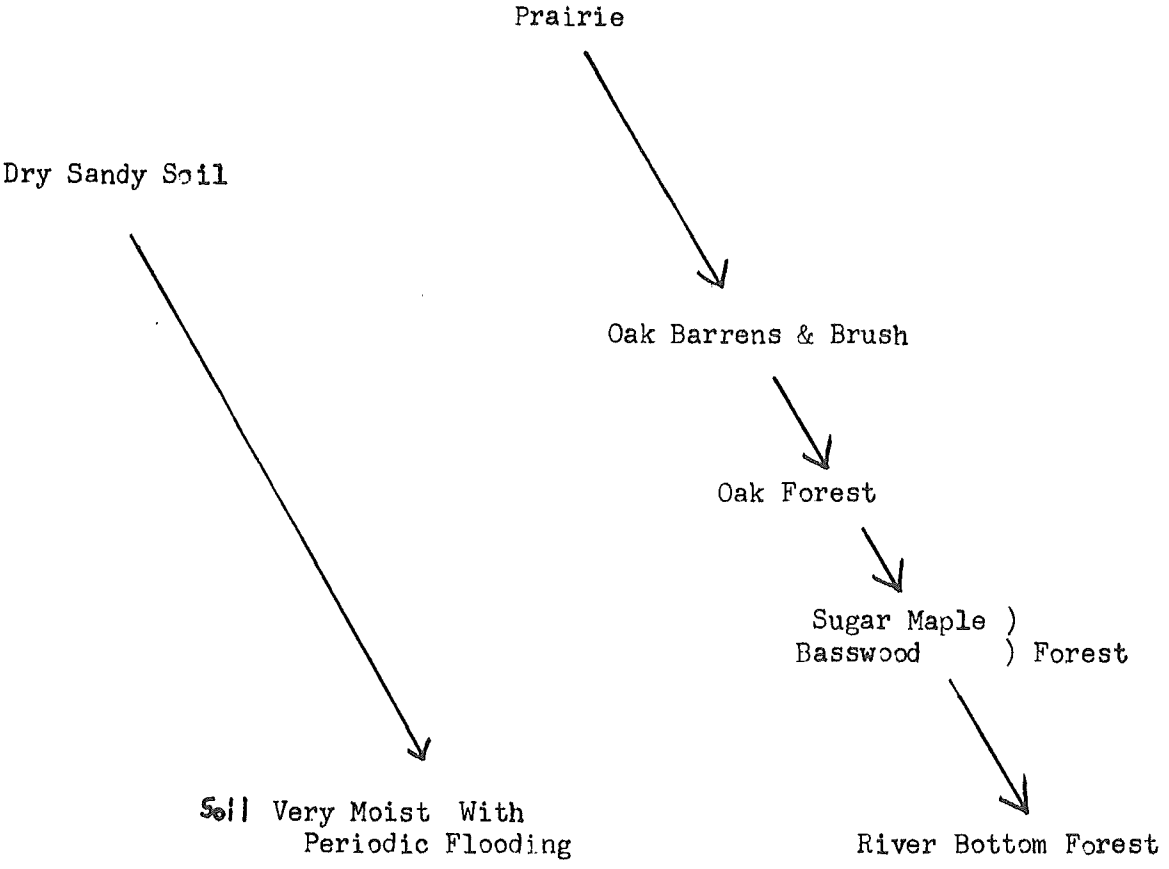
vegetation

Original Communities

"This part will be mainly based on the survey notes, descriptions, and maps of the original land surveys of Minnesota and Wisconsin made by the U.S. General Land Office between about 1830 and 1905. These surveys were usually made just ahead of settlement and thus represented the exhisting vegetation communities.

Actually, the naturnal vegetation was in a constant state of flux due to gradual plant migrations caused by climatic changes, succesional changes, fire windstorms or insect and plant disease outbreak."

theoretical successional pattern



natural vegetation

Deciduous Forest

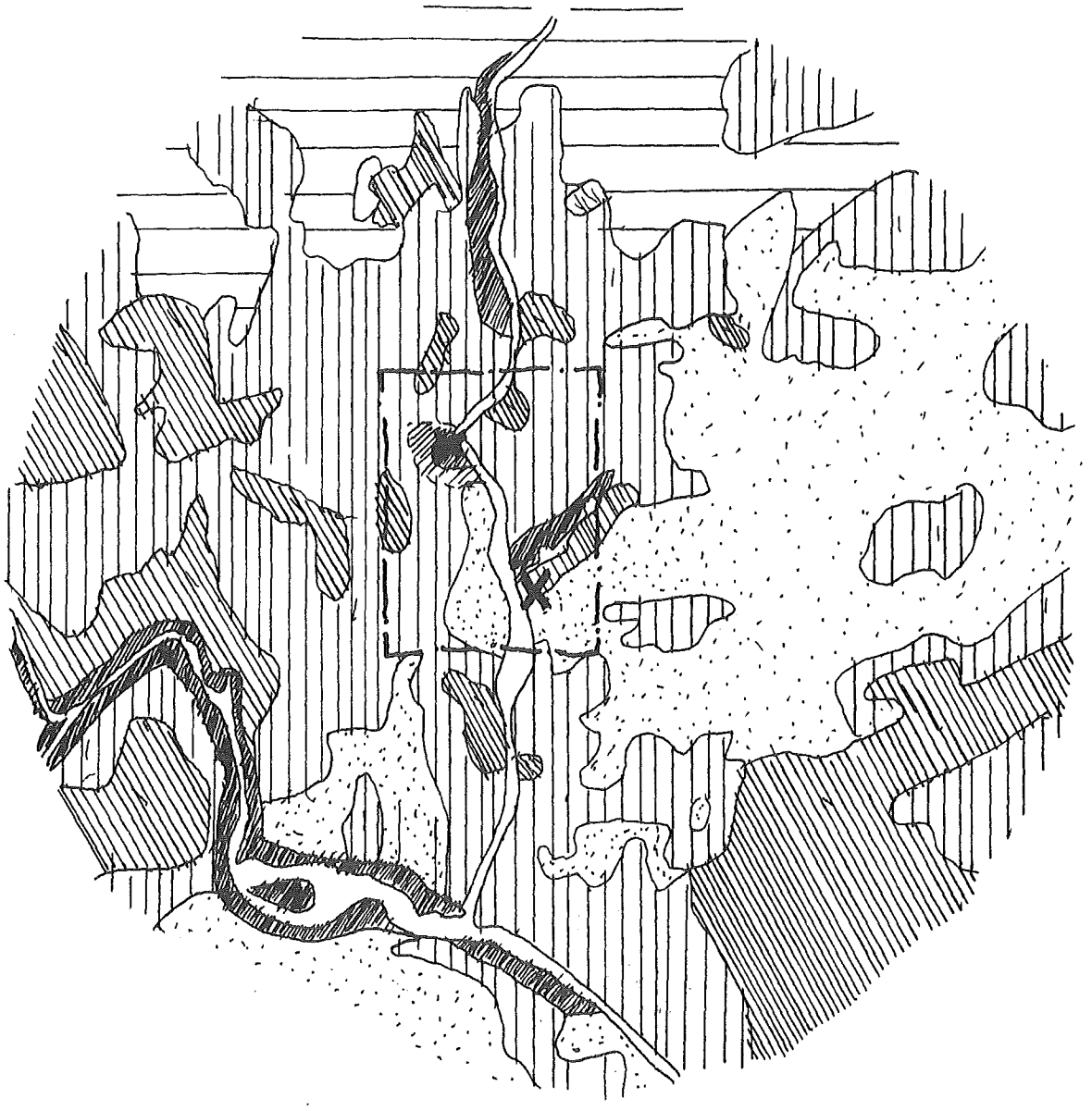
Upland Deciduous (Sugar Maple, Basswood,Elm)	Prefers steep slopes provided with adequate moisture thru seepage and shielded from wind and sun.Developed from prairie thru invasion of oaks.
Dry Deciduous (White Red & Bur Oaks, Brush)	Prefers moderate slopes and dry sandy soil. Usually acts as a buffer-transition zone between prairie and hardwoods. Also includes Oak Barrens, Aspen, Birch & Shrubs.
Lowland Deciduous(Silver Maple, Elm,Cottonwood)	Found along flood plains, islands and most of the shore line. Subjected to periodic flooding.

Mixed Coniferous Deciduous

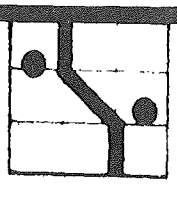
Upland Mixed (White Pine & Oak)	Found mostly on upper river in the transision zone. Prefers dry rocky areas.
Upland Dry Cedar(Red Cedar, Oak)	Mostly on lower river around sparsly forested areas on S to SW slopes in very dry areas.

Non Forest Vegetation.

Prairie(Grasses & other Hrbaceous Vegetation)	Was once found in wide ranges, but is now almost gone.Prefers very dry areas and steep SW slopes unfavorable to trees and maintained by frequent fires.
Sand Bars & Mud Flats(Sparse Vegetation)	Pioneer wet lands under constant disturbance from moving water.
Wet Lands (Submergent Aquatics, Sedge & Meadows)	Often Serve as Interface between open water and forest.
Cliffs (Fern, Basswood, Columbine)	Steep rock surfaces and outcropings; usually treeless, not as common below Stillwater.



lowland deciduous
upland deciduous
dry deciduous
upland mixed
prairie



original vegetation of
minnesota and wisconsin

N

2-21

1" = 50,000'

current conditions

"As of 1974 most of the presettlement vegetation of Minnesota and Wisconsin has been vastly altered or obliterated. Within the lifetimes of a few surviving pioneers. We have already replaced the complex and diverse natural ecosystems of at least two-thirds of the landscape with moncultures of a few nonative plants. ....with no understanding of what these changes will mean in the centuries ahead."

1977 Inventory
Major Forest types of Minnesota and Wisconsin

Except for the note worthy exception of a very narrow band of rich and diverse communities along the St. Croix River Corridor, the majority of land in Washington and St. Croix Counties is listed as "Non Forest Land or within built up and urban areas".

To Date; Fall 79

No extensive biological inventories have been undertaken for the St. Croix Valley below Stillwater. This can only be judged as a gross oversight. As a result the current vegetative conditions had to be interpreted from arial surveys and photos which clearly showed the river corridor and Willow river area as the most extensive vegetation communities.

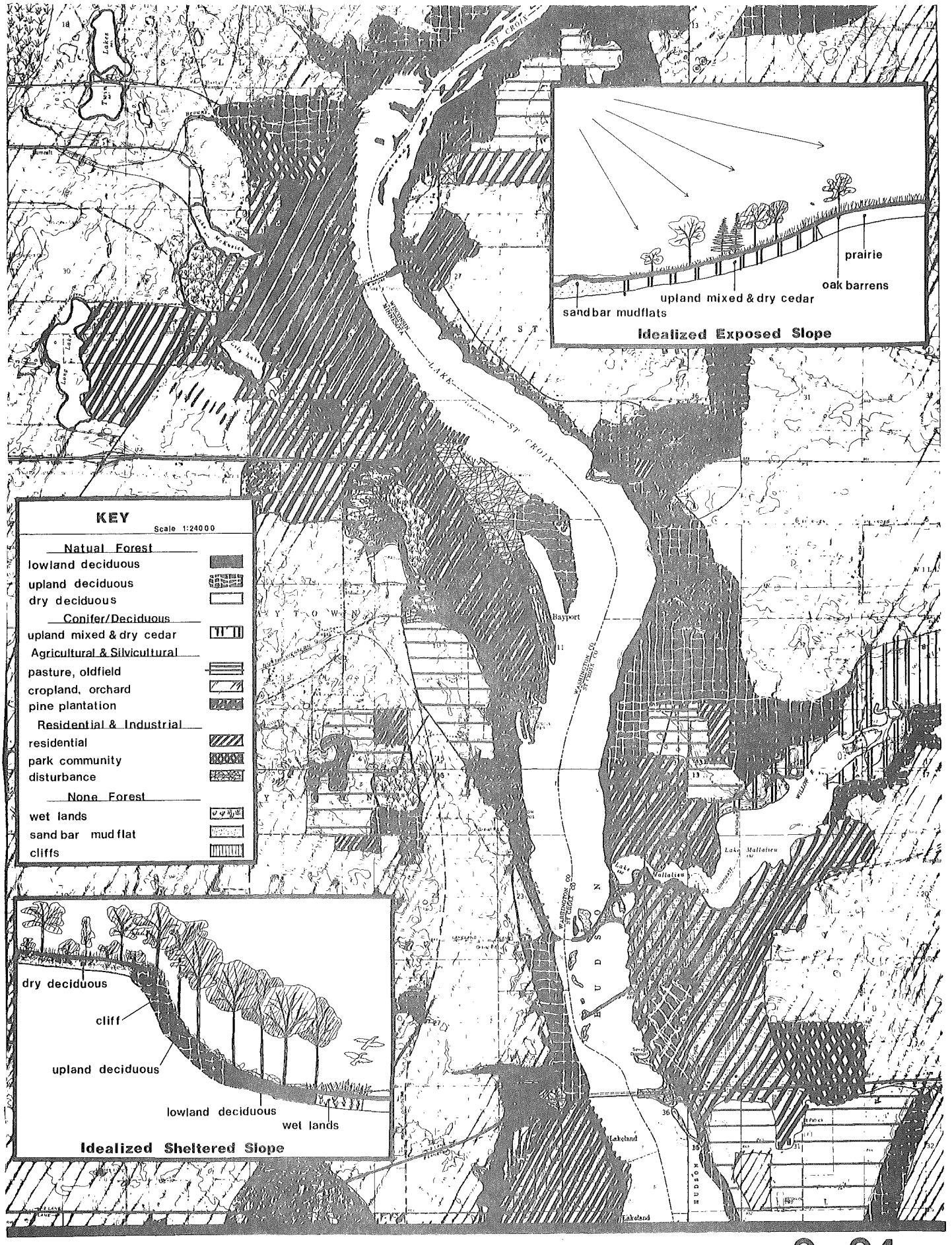
introduced vegetation

Agricultual & Sivicultural

Pine Plantation(Non Native Pine, Spruce & Fir.)	Human manipulated sivicultural commercial communities.
Pasture-Oldfield (Grasses & Not Native Weeds)	Abandoned or pastured land not actively being manipulated. Usually in a state of recovery.
Cropland-Orchards.	Communities that represent currently active attempts at Commercial Vegetation Manipulation.

Residential & Industrial Vegetation

Residential	Exstensively urbanized areas. A pottentially rich and complex vegetation community.
Recreation Communities	Land actively managed for Recreation.
Disturbance Communities (Exotic & Eurasian Weeds)	Usually the result of constant non commercial oriented manipulation (ie power line right of ways)

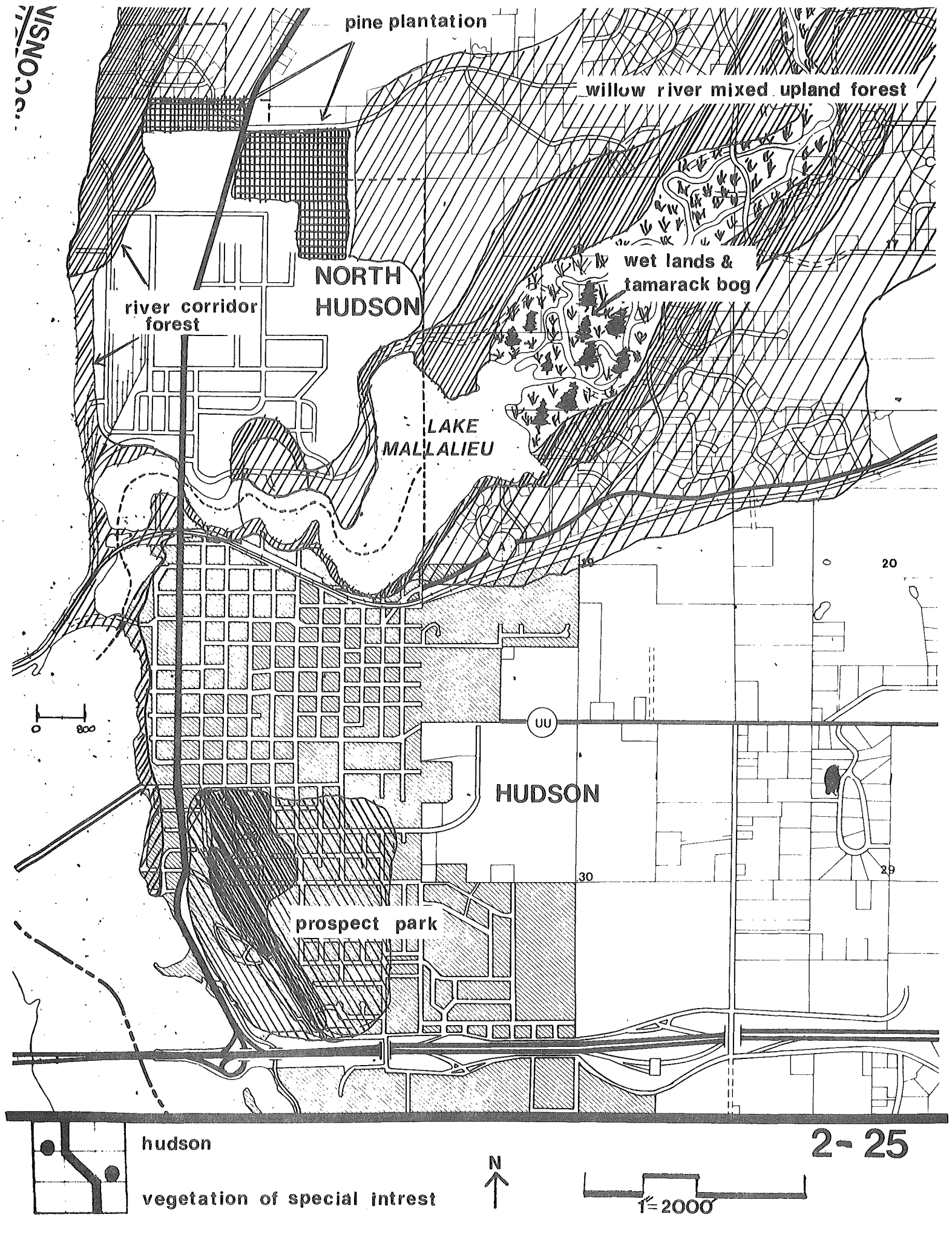


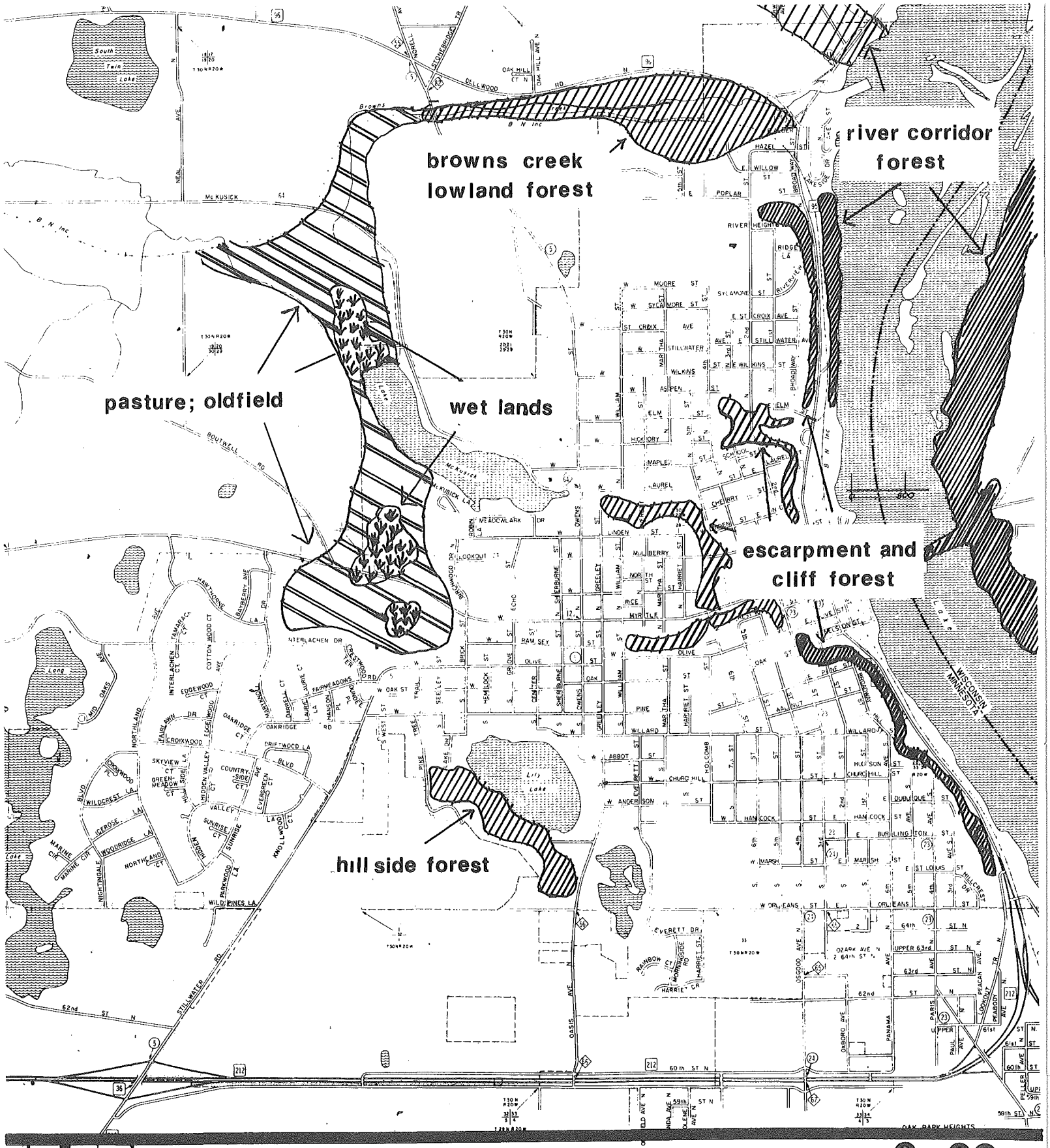
st croix valley

current vegetation communities

N

2-24


pine plantation
willow river mixed upland forest
wet lands &
tamarack bog
NORTH
HUDSON
river corridor
forest
LAKE
MALLALIEU
20
UU
HUDSON
30
29
prospect park
0
800
hudson
vegetation of special intrest
N
1"=2000'
2-25


river corridor forest
browns creek lowland forest
pasture; oldfield
wet lands
escarpment and cliff forest
hill side forest
stillwater
vegetation of special interest
N
1"=2000'
2-26

climatic conditions

THE METROPOLITAN AREA LIES IN THE HUMID MID-CONTINENTAL CLIMATIC REGION

The Twin Cities Metropolitan area lies in the humid mid-continental climatic region with temperature fluctuations from -40 F to 104 F. Often times changes of 50 to 60 degrees in 24 hours are not uncommon. The mean annual temperature varies from 41 to 46 degrees. Stillwater/Hudson are inbetween this range at 44 degrees. This temperature difference can be attributed to the St. Croix River and its widening at this particular region. The conclusion is that topography, among other factors creates a 3:1 temperature variation.

TEMPERATURE

Seasonally, temperature averages are shown on fig. 1-1. It is interesting to note how quickly the average temperature changes in the summer months the closer one gets to the river.

GROWING SEASON

The growing season for the Stillwater - Hudson region (days between 32 degrees at 4.5' above the ground) vary between 140 - 170 days due once again to the proximaty of the river.

PRECIPITATION

Locally the Stillwater / Hudson area receives between 28 and 29 inches of rain a year (this data, based on studies from 1959-72). However, the region itself has two areas of higher rainfall to the NE & SE. It is postulated that the wind currents of the river valley creates more turbulence at major bends in the valley, which, given the proper cloud cover, induce more rain. see fig 1-3 and 1-5 This is the theory as these figher average areas are not the result of freak high output storms.

INSOLATION

Insolation is the amount of energy received from the sun. In comparison with the rest of the U.S. the metro area receives 75% as much as the Mohave Desert (sunniest area). This occurs in July, wheras in Nov. & Dec. we receive about 45% of the corresponding sunniest area of the country, the Rio Grande Valley. Insolation is about 5 times greater in July than December.

PRECIPITATION
-FUTURE-

One other theory not yet bourne out by data (in a published form) is, that like St. Louis (data published), the metropolitan area core provides particles for rain droplets to form around. This coupled with the direction of the dominant storm pattern, SW to NE would provide higher amounts of rainfall, on the average, to the east of the metropolitan area. Stillwater and Hudson would be in this increased rainfall area.

WIND

Seasonally the wind shifts from a dominant NW direction during the winter months to S & SE during the summer. The St. Croix valley is aligned to accept these patterns and cause more microclimatic variation during the summer. During the winter it does not differ from the surrounding area very much. Microclimatically, the wind velocity is slower in the valley but greater on the bluffs. This is determined against the average speed measured at Twin Cities International Airport.

AIRFLOW

One other major microclimatic feature of significance in the Stillwater / Hudson area is airflow. Air, flows downhill when cooling and uphill when warming. This can effect design in regard to orientation and interior to exterior relationships.

WARM SLOPES

areas which receive direct sunlight during portions of the day. This would affect vegetation, building and winter uses.

COLD SLOPES

areas which do not receive direct sunlight.

SUMMER WINDS

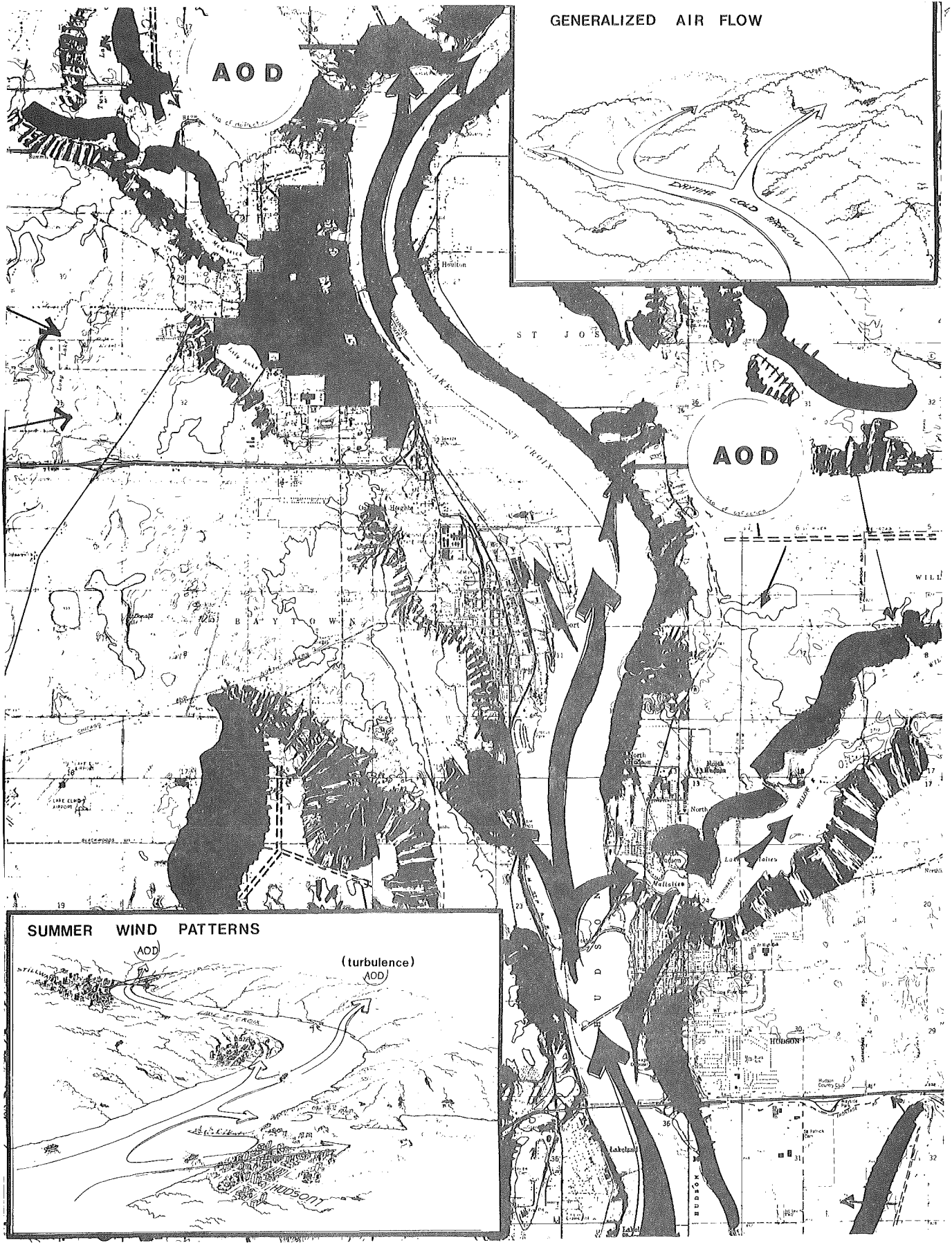
influence on cooling, and precipitation.

AREA OF DEFLECTION

areas receiveing turbulence due to wind and totography.

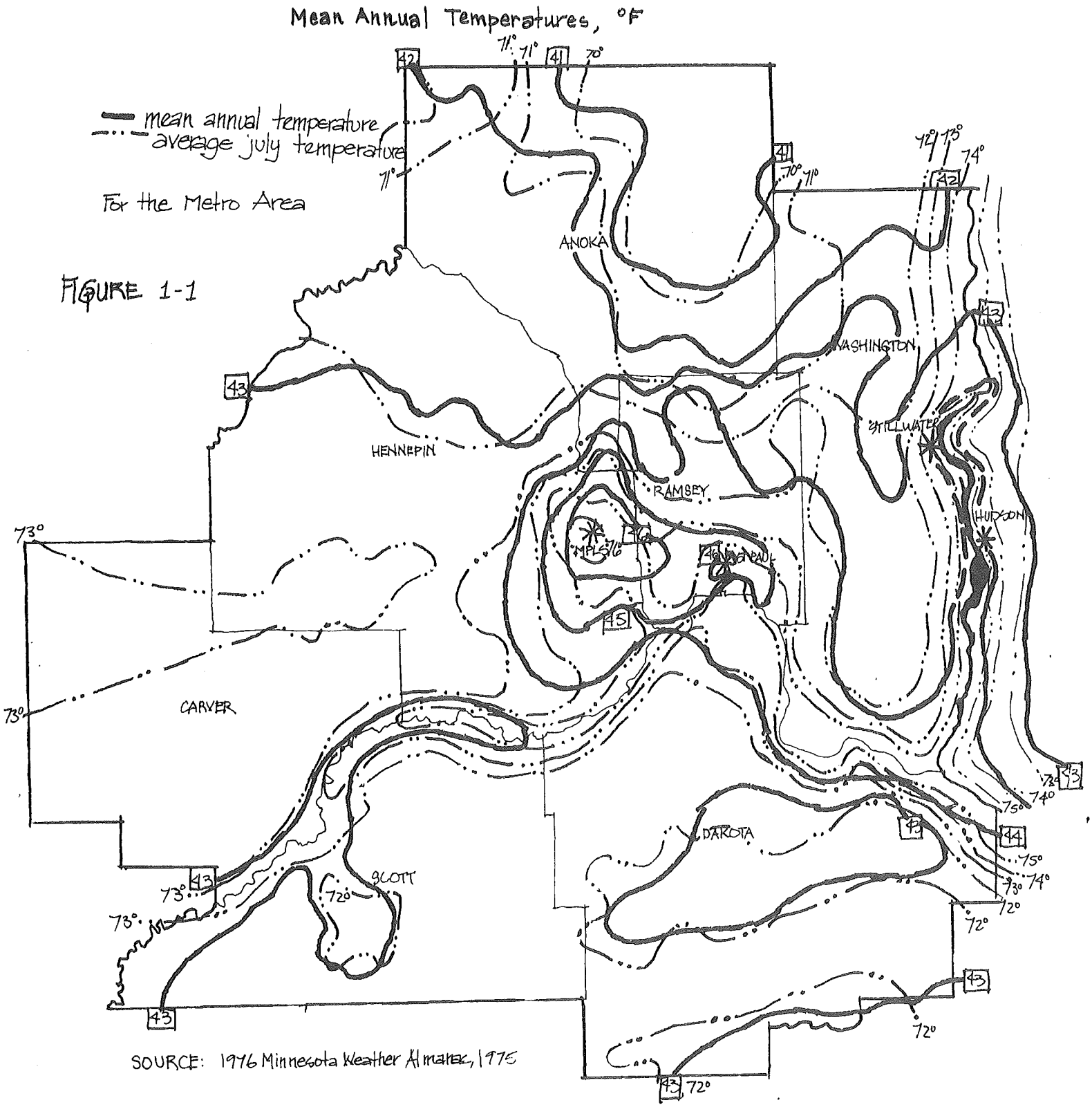
DRAINAGE DIRECTION

MINOR WATERSHED BOUNDARY



CLIMATE MICRO

warm slope
cold slope
area of deflection (AOD)



CLIMATE
TEMPERATURES

5 3 0 5 10

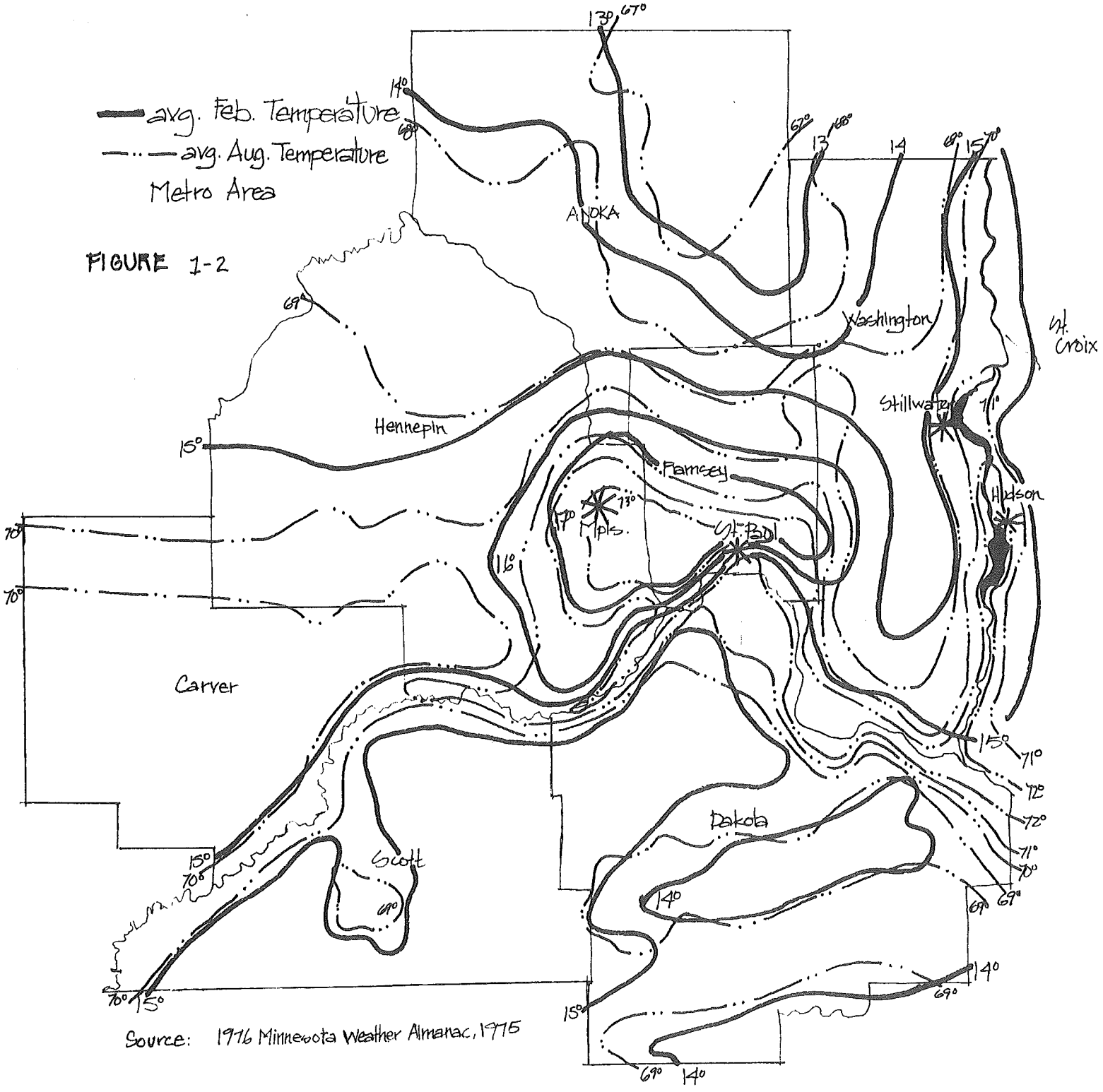


FIGURE 1-2

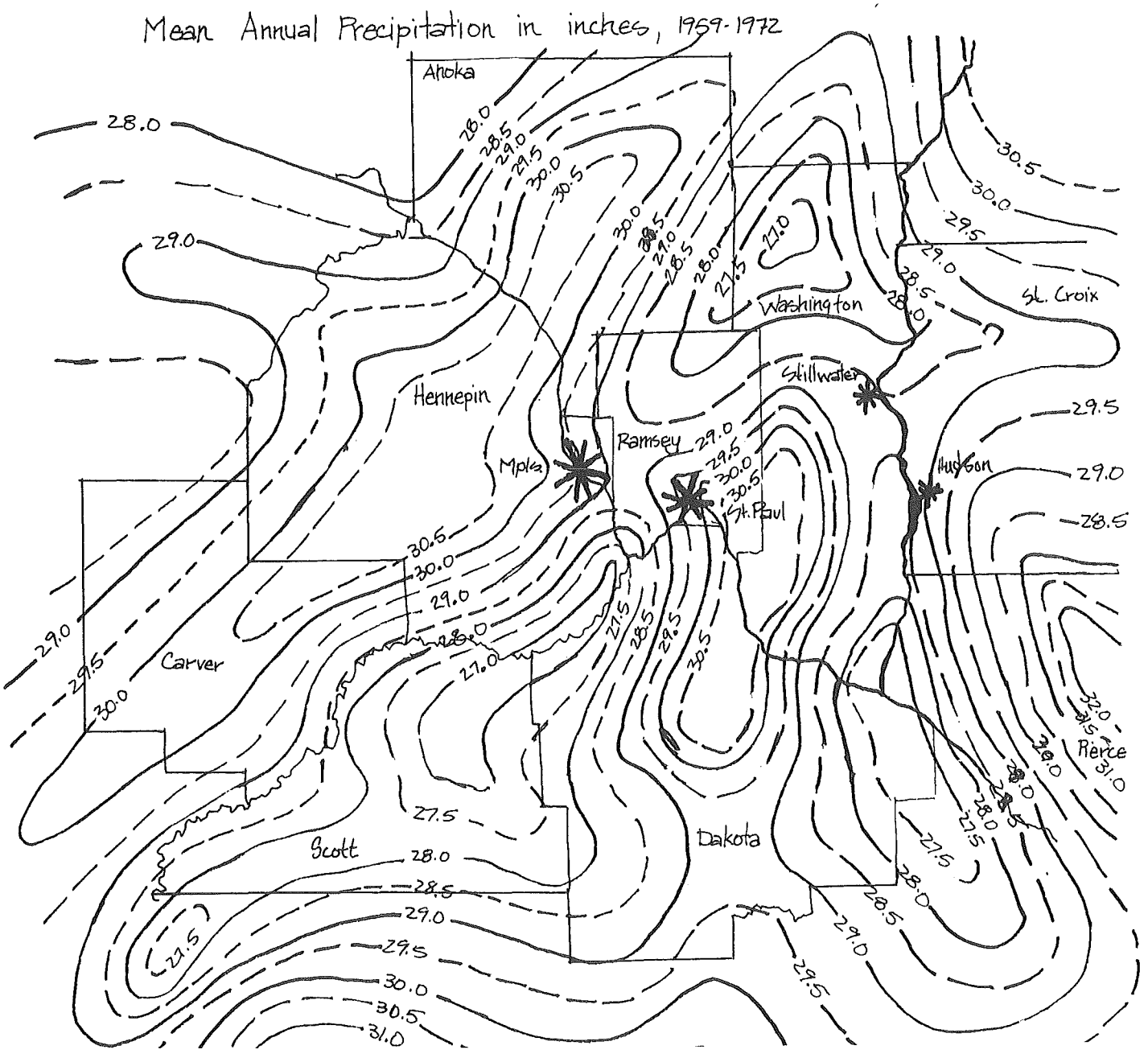
Source: 1976 Minnesota Weather Almanac, 1975

CLIMATE TEMPERATURES

5 3 0 5 10

FIGURE 1-3

Mean Annual Precipitation in inches, 1959-1972



CLIMATE
PRECIPITATION

5 3 0 5 10

MEAN ANNUAL TEMPERATURE AND PRECIPITATION
STILLWATER STATION / HUDSON

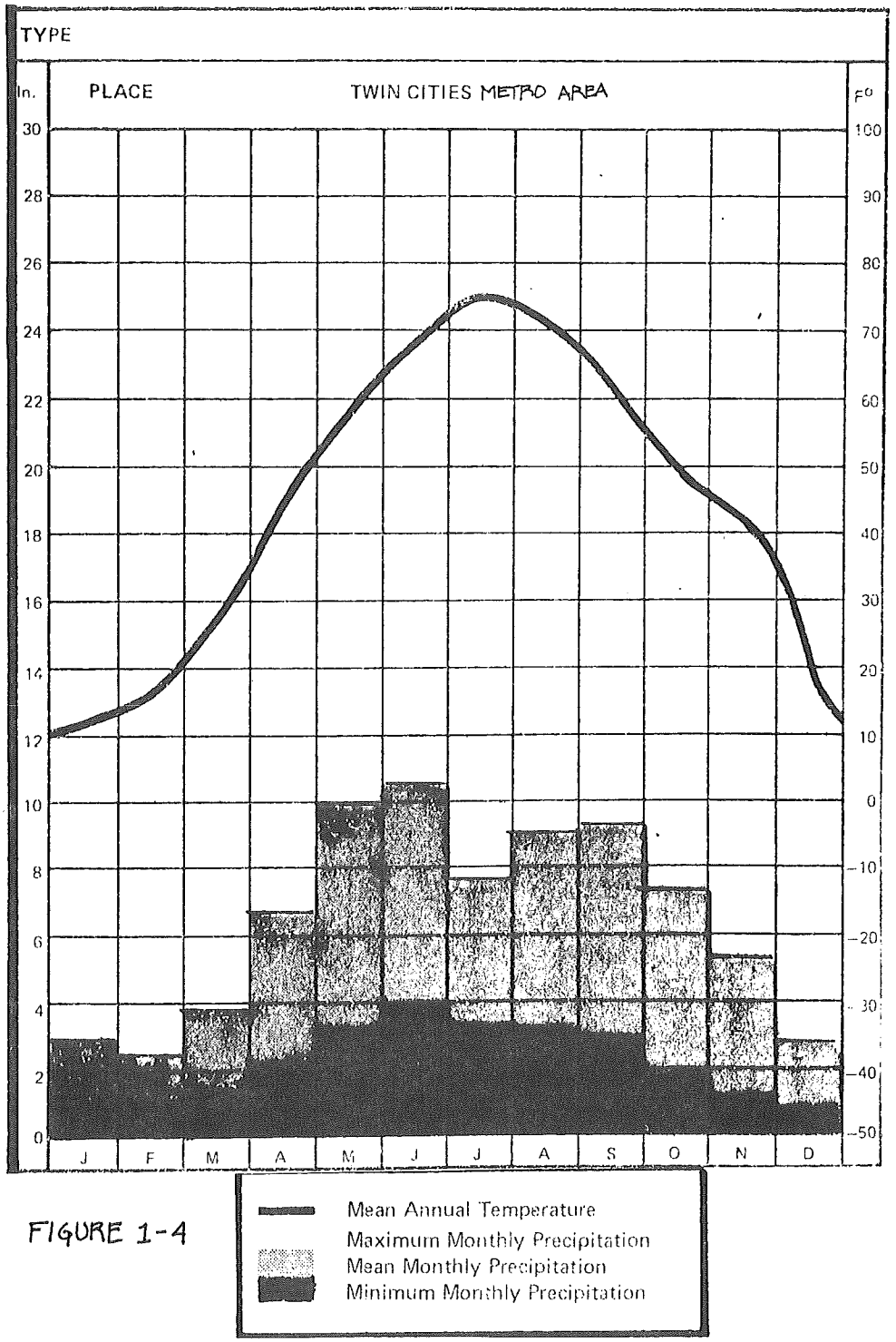
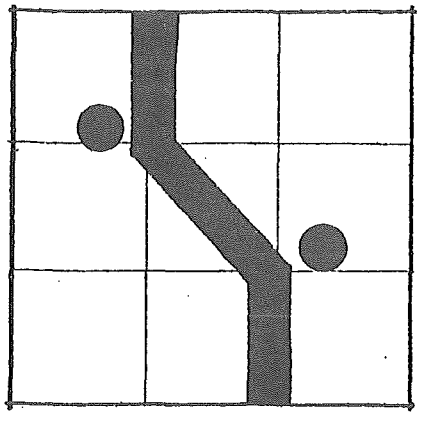


FIGURE 1-4

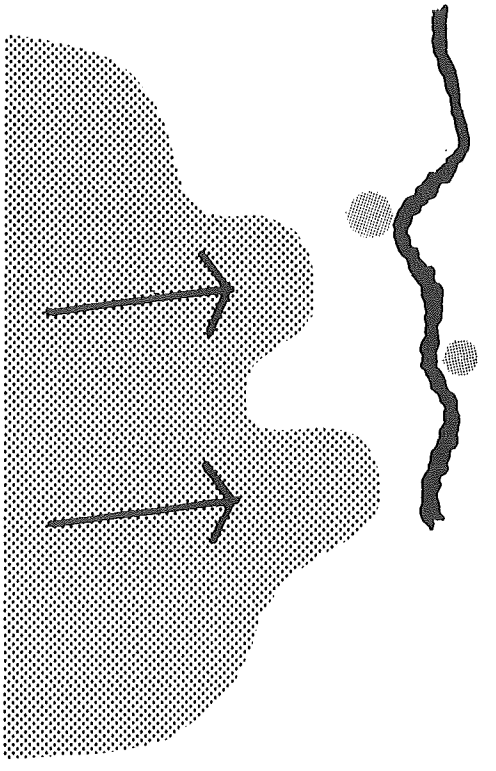


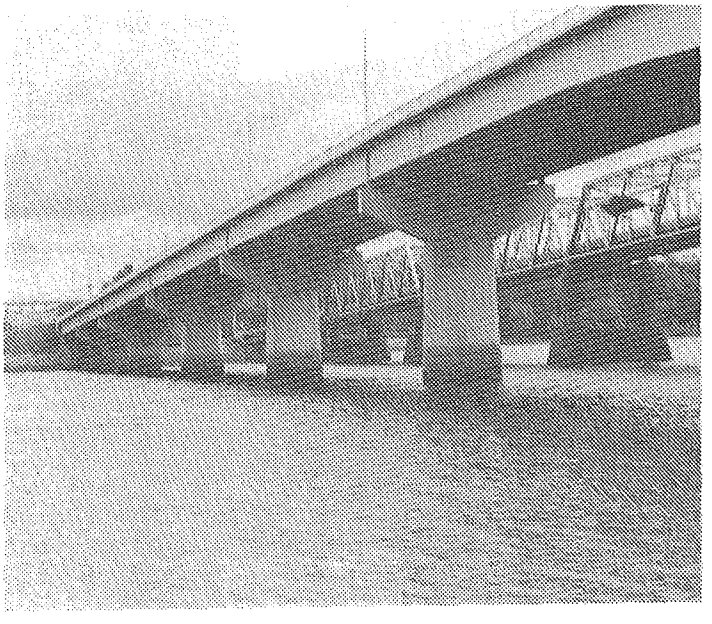
SOCIAL AND ECONOMIC

3

introduction

The roots of the early social and economic factors stem from the support services provided to the early fur trading and lumber industries of the Lower St. Croix Region. The socio-economic development of the Lower St. Croix, including our primary study areas of Hudson and Stillwater, fluctuated with the coming and going of various industries throughout the early 1900's. During this period, agriculture emerged as the stable base for both communities during the transition from one industry to another. In the early 1960's, the agricultural base began to be chipped away as the expanding Twin Cities Metropolitan Area began exerting pressures for growth on the Lower St. Croix Valley. Currently, the Metro Area is the dominate force in the social and economic sectors of the study communities.1



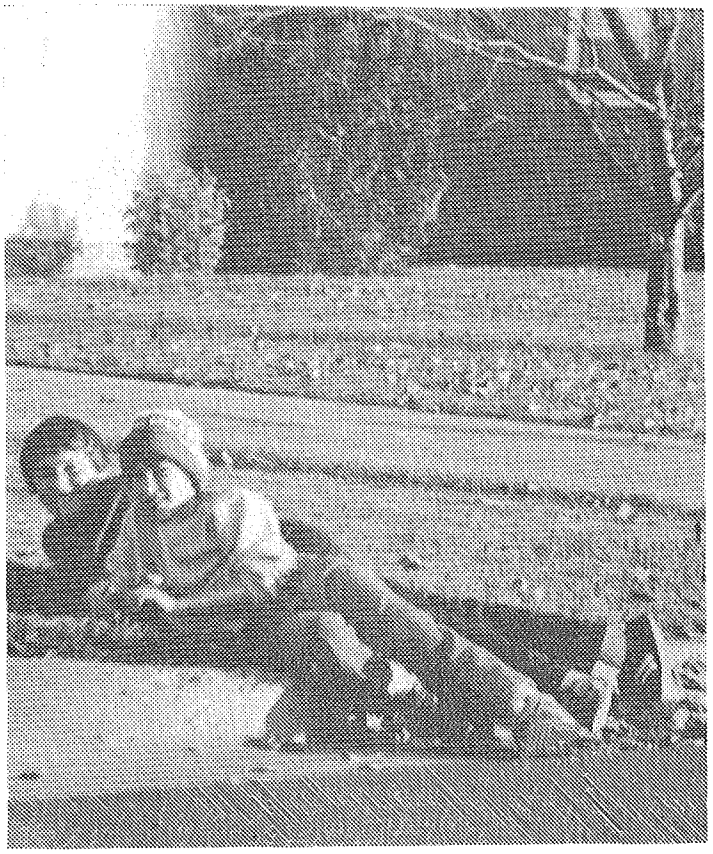


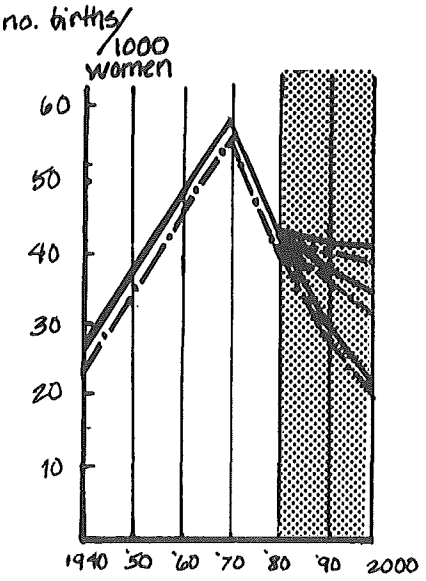
This report will analyze three major socio-economic topics within the two communities:

- demographic characteristics
- economic conditions
- community services

After analyzing these topics, major issues will be defined and discussed relative to three possible scenarios of the future.

demography

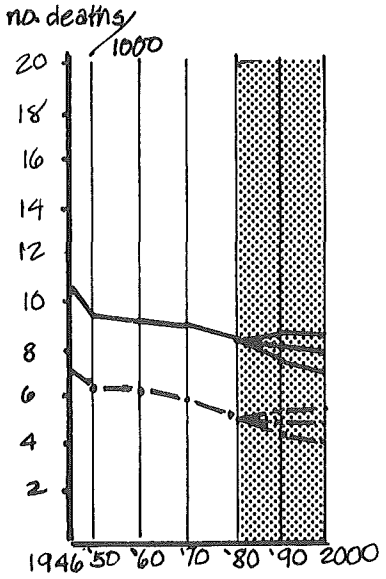




FERTILITY RATES[2]

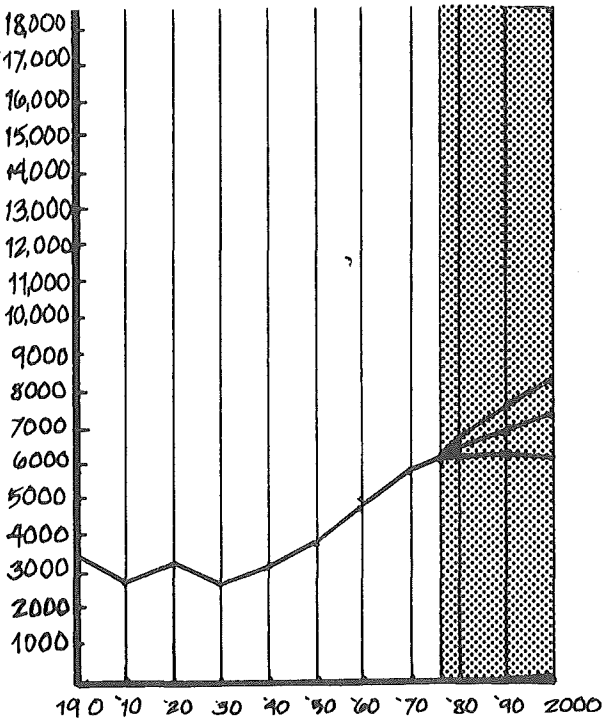
Population Trends

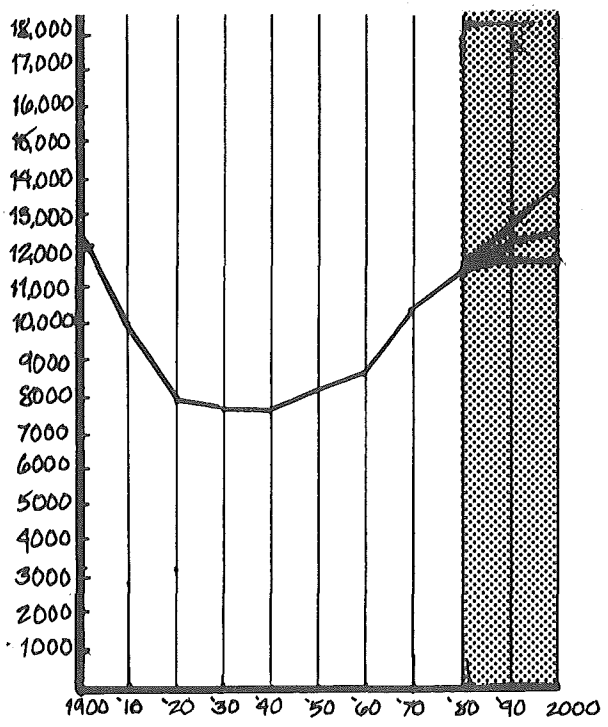
The populations of Stillwater and Hudson increased, gradually, from 1930 1960 and then rose sharply from 1960 on. The fertility rate increased correspondingly until 1960 when it dropped rapidly. The continuous increase in population can then only be explained by the rising in-migration rates in both communities. In Hudson, from 1960 to 1970, migration accounted for 24 % of the population gain. From 1970 to 1975, it accounted for 64 % of the gain. Stillwater experienced a similar phenomenon with a migration rate of over 60% in both the 1960-1970 and 1970-1980 time spans.



An examination of the death rates for five specific years, 1946, 1950, 1960 and 1970 shows a gradual decrease with a tendency to stabilize. The group of retirement-age people appears to be increasing which will probably continue the stabilization trend

DEATH RATES[3]





HUDSON:

POPULATION 1900-2000[5]

We can then both calculate and predict population using the factors given above: mortality, fertility and migration. They can be combined in the following way:

birth + pop. − death + mig = fut. pop.

Stillwater, from 1960 to 1970, for example,

1200 + 8310 − 596 + 1279 = 10,191

and from 1970 to 1978:

1607 + 10,191 − 478 + 1880 = 13,200

and Hudson, from 1960 to 1970:

1107 + 4325 − 506 + 123 = 5049

and from 1970 to 1975:

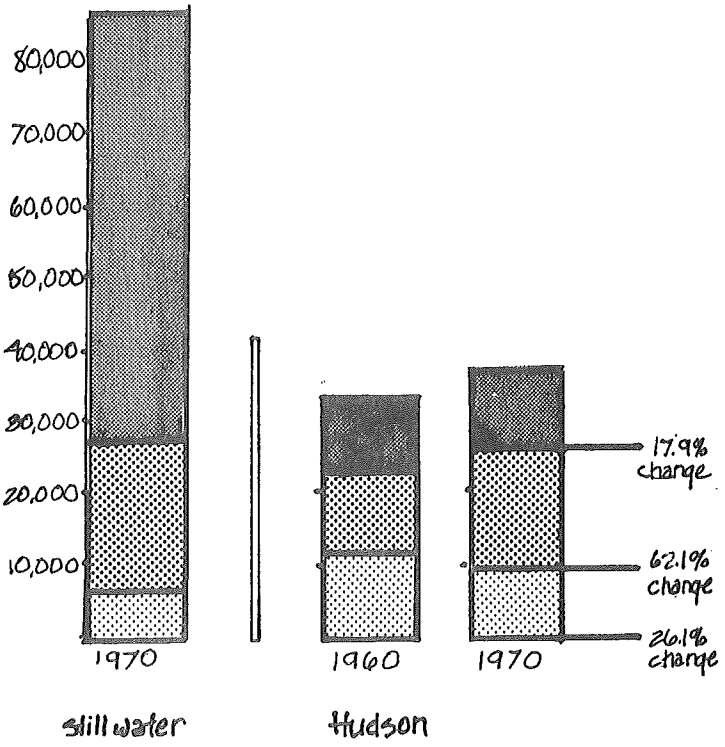
450 + 5049 − 192 + 459 = 5766

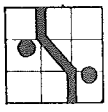
STILLWATER:

POPULATION 1900-2000[4]

The predictions made in the following graphs are based on these past tendencies and on three alternative assumptions regarding the future:

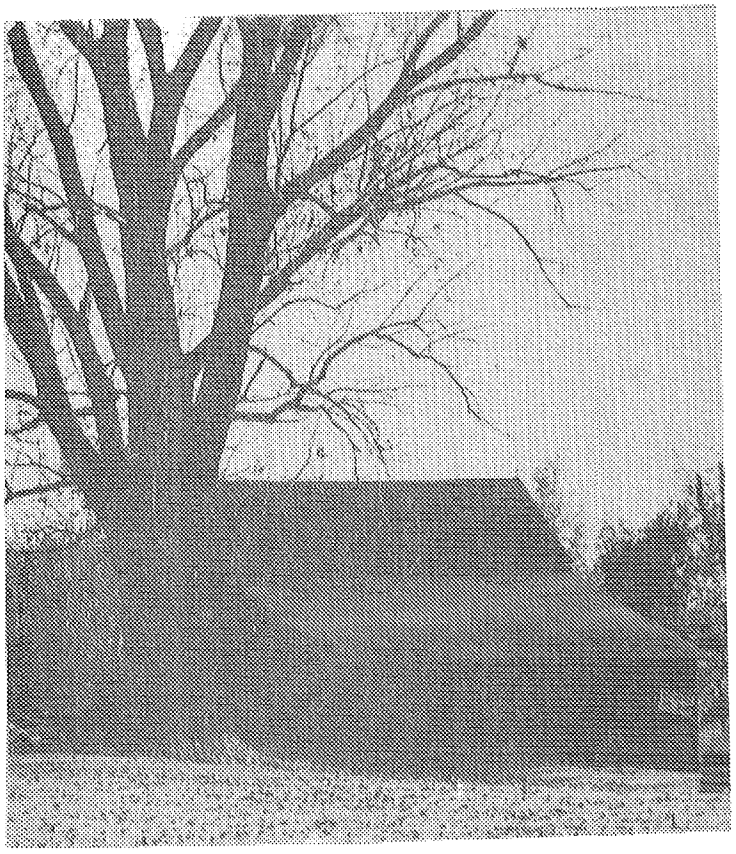
1. that a rapid growth economy will occur due to the introduction of some new fuel source resulting in stabilized mortality rates, gradually decreasing fertility rates and sharply increasing migration rates.
2. that a "steady state" growth level will be maintained with mortality continuing to increase slightly and perhaps stabilize around the year 2000, with fertility gradually decreasing and in-migration proportionately increasing.
3. that a severe energy crisis will result in a conservation society and that Hudson and Stillwater will be forced to break some of their ties with the metropolitan area. Such conditions might cause a stabilization of fertility rates, a gradual increase in mortality rates and a sharp decrease in migration.

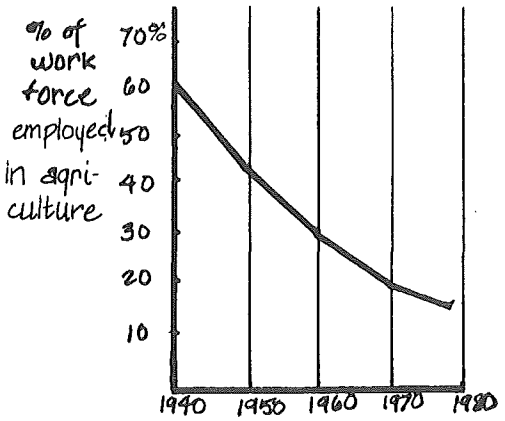


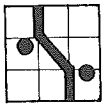


ST. CROIX CO.: LAND USE

rural farm
rural non-farm
urban

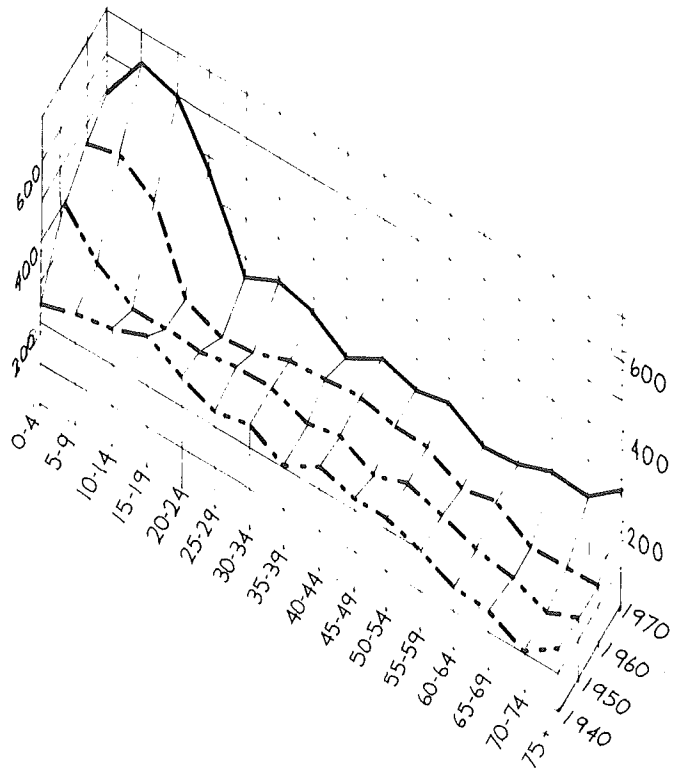






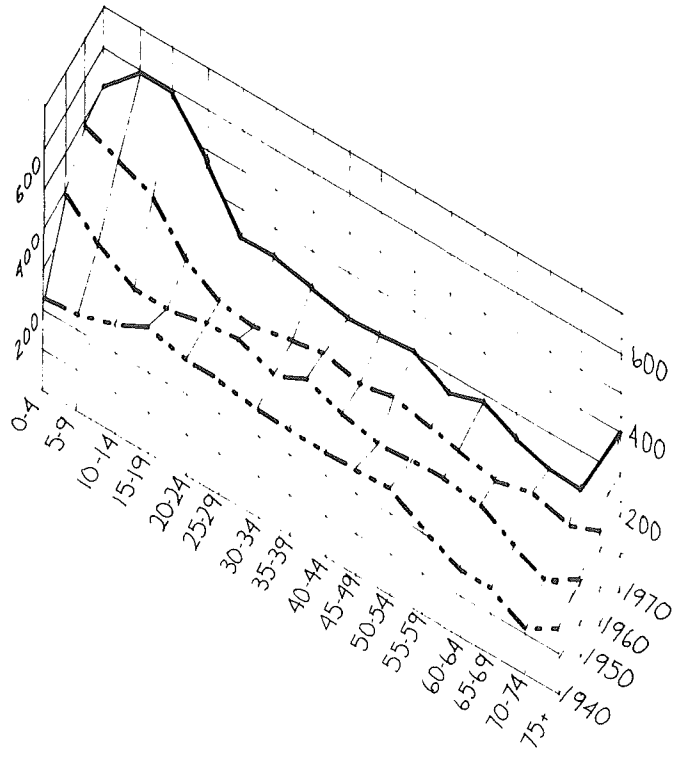
AGRICULTURE WORK FORCE

Hudson and Stillwater have both had to undergo identity crises in their transformation from rural environments to appendages of a metropolitan area. Stillwater's crisis seems to have been resolved in the early 60's; whereas Hudson is still torn between rural and metropolitan life styles. St. Croix County has experienced a drastic transformation in the past twenty years with much of its agricultural land being converted into hobby farms, residential and industrial development. In Hudson the transformation is almost complete although some land in the township of Hudson is still used for agriculture. Some people in the area would like to maintain that land, even to expand it, in hopes of an increased truck farming business. Agnes King, of the St. Croix Planning Office, states the problem in this way, "At present many staples, such as poultry, fruits and vegetables, and dairy products are consumed within a few hundred miles of their points of production in rural regions surrounding metropolitan areas. If the prime land in those regions is lost to urbanization the local supply of produce will probably decrease. Subsequently the dependence on 'imported' produce will increase and costs to the consumer will rise."6 In the eventuality of a severe energy crisis, such a dependency could harm the community. Ms. King goes on to say that all good planning in the county should balance development with adequate farmland preservation.7



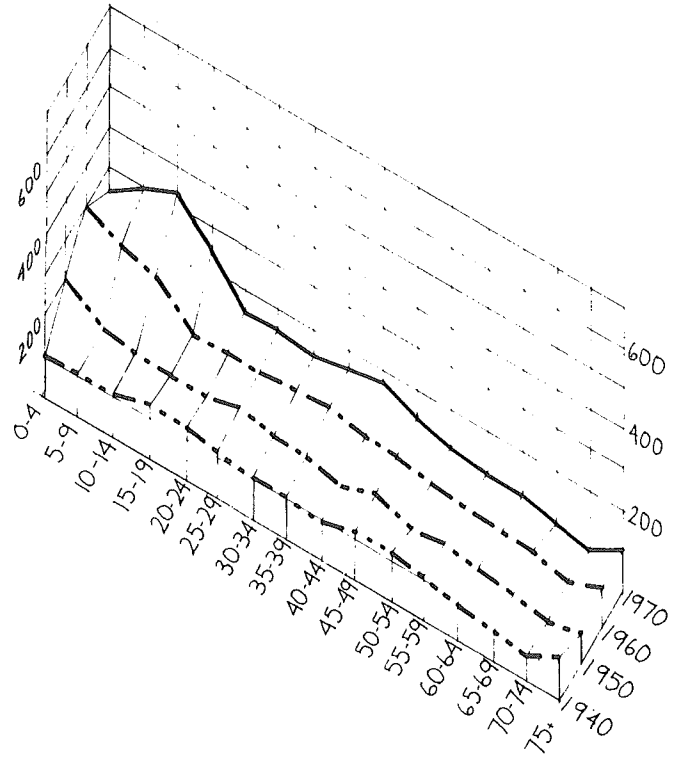
AGE DISTRIBUTION

STILLWATER-MALE



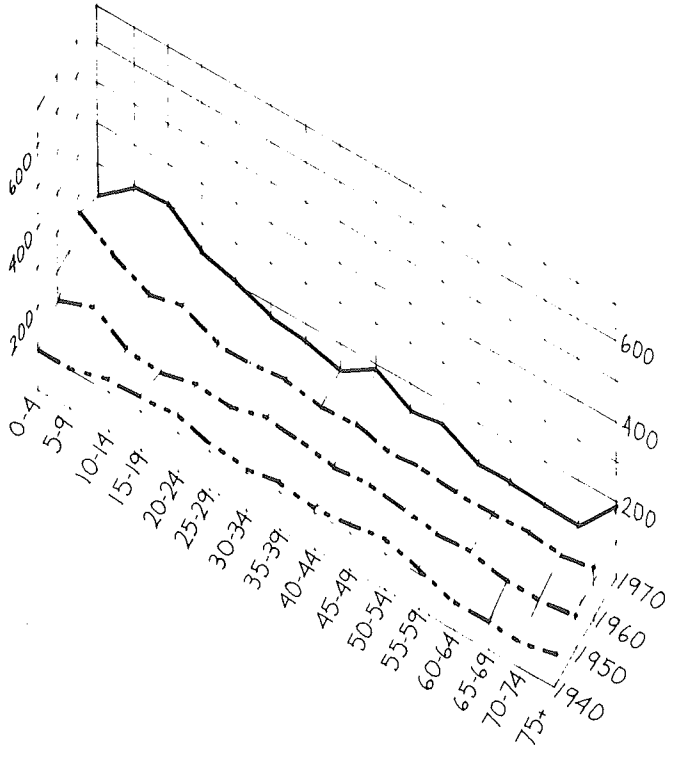
AGE DISTRIBUTITION

STILLWATER-FEMALE



AGE DISTRIBUTION

HUDSON-MALE

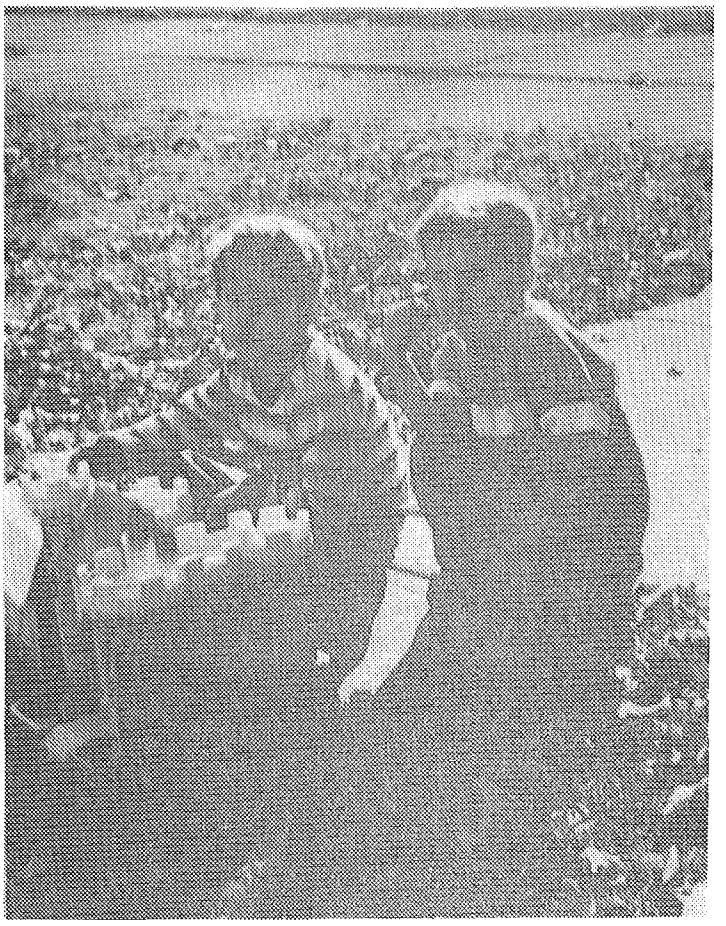


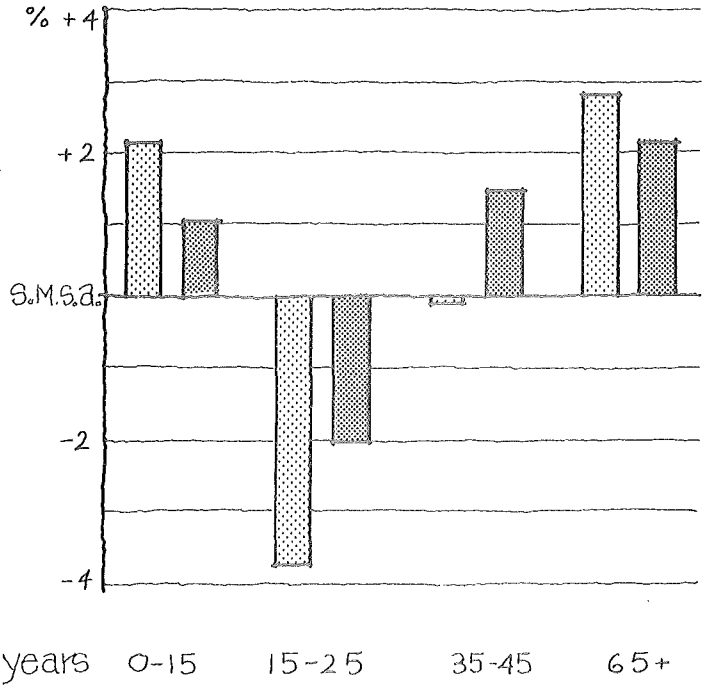
AGE DISTRIBUTION

HUDSON-FEMALE

In both towns, the age distributions of the population are similar. There are increasing numbers of children who have moved in with their young adult parents. Since the mid 1950's, adolescents have left small towns for larger cities.

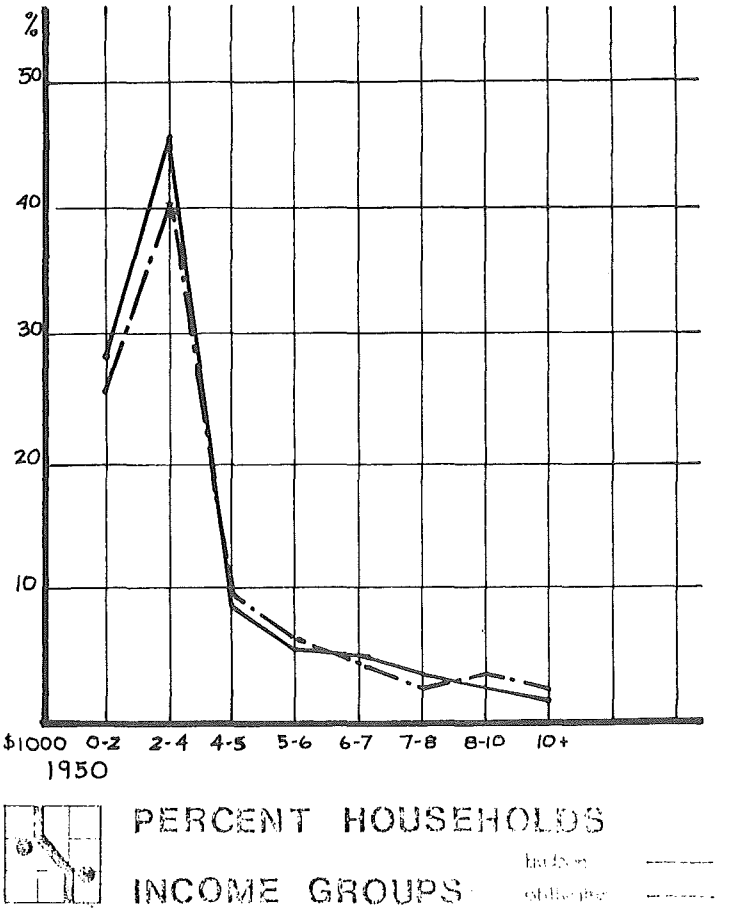
In the last decade, an increasing number of middle age(especially in Hudson) and retired persons have migrated to the two towns.8

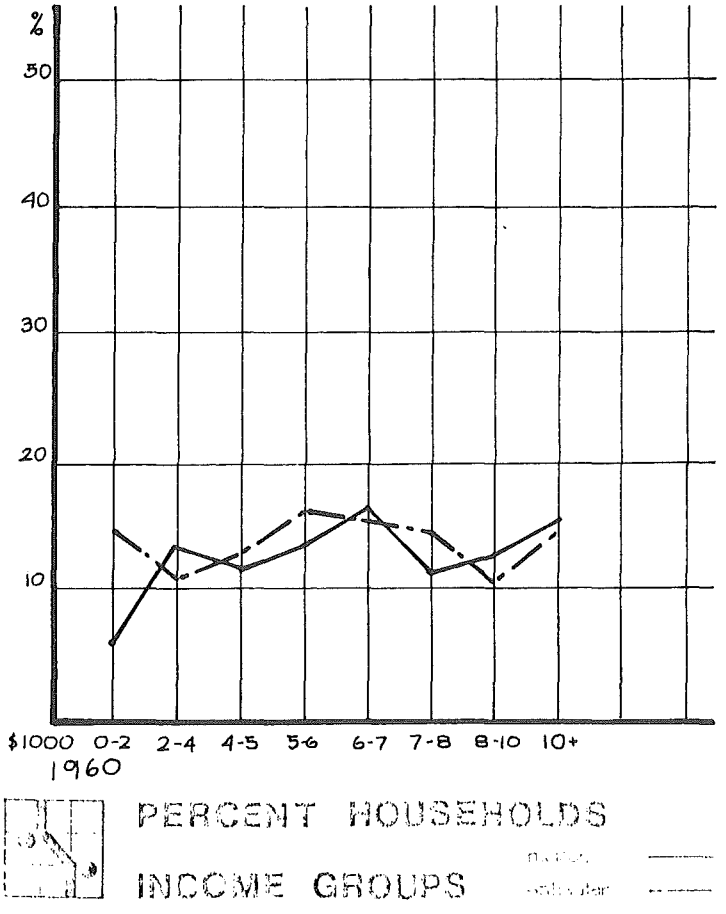


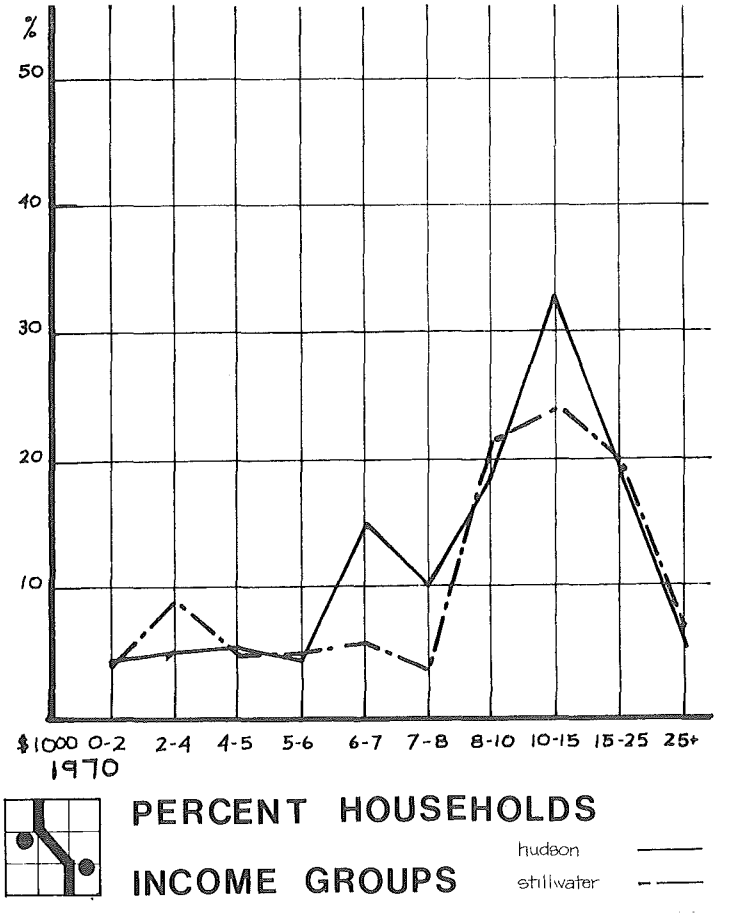


% IN AGE GROUPS
DEVIATION FROM SMSA

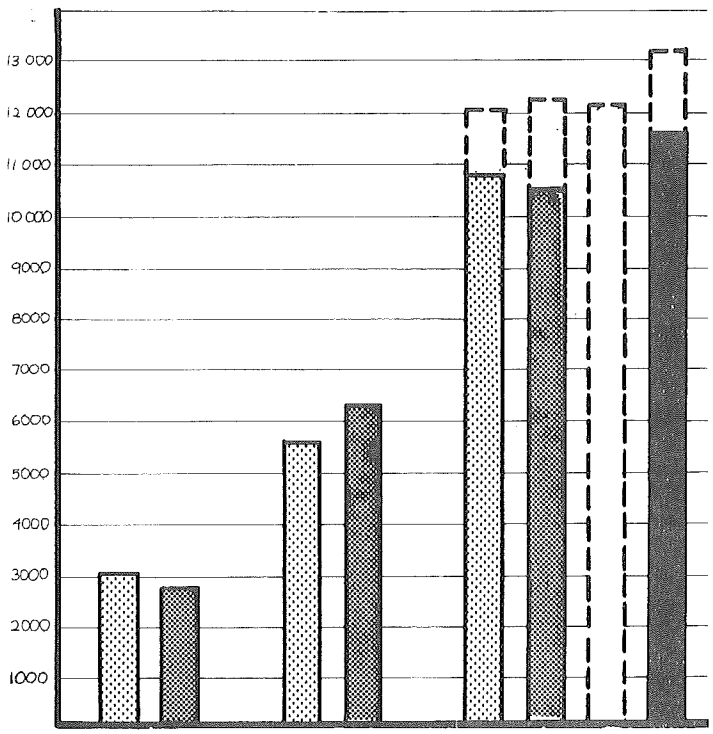
The distribution of income among the population has been similar in the two towns until the mid 60's when a larger number of families in Hudson earned $6000-7000 and $10000-15000.





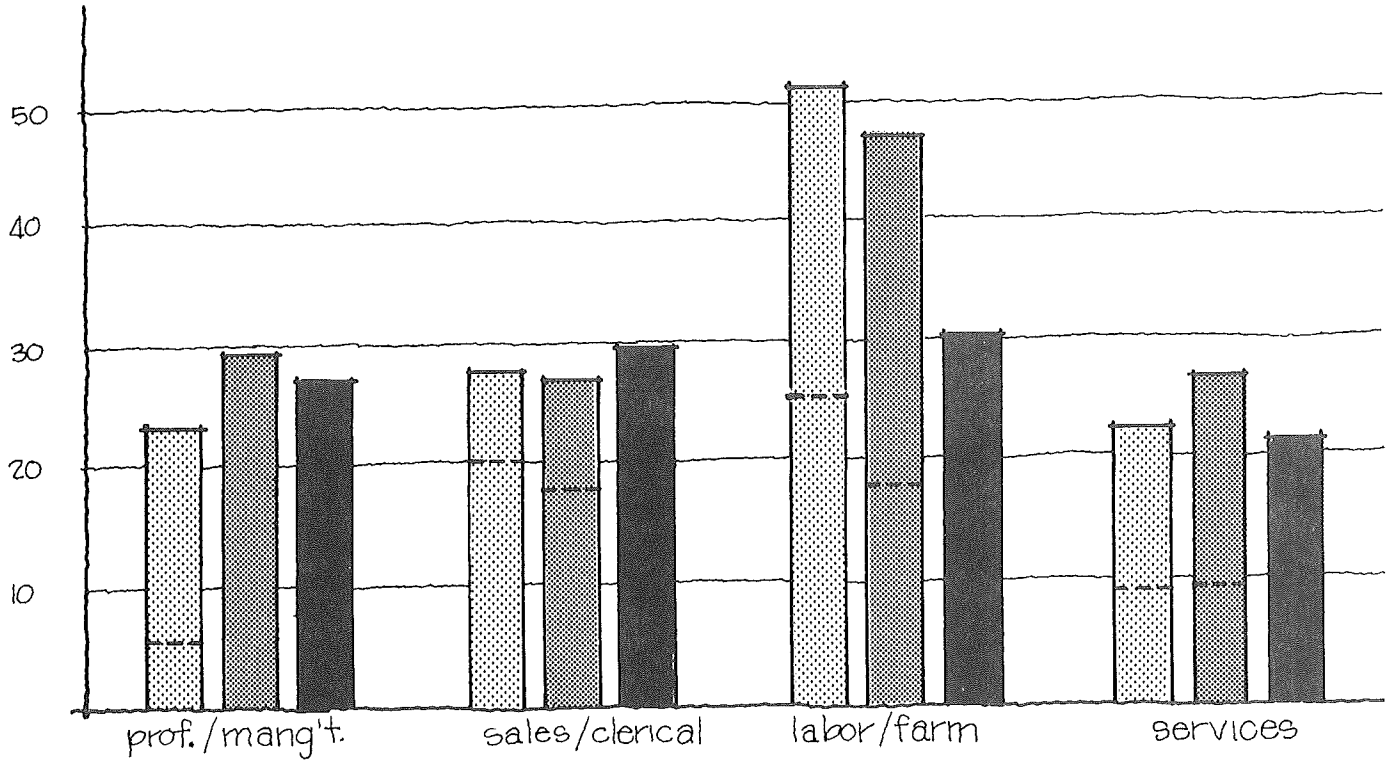


This correlates with the higher proportion of people in Hudson employed in services and professional and managerial positions. However, both towns have lower median incomes than the Twin Cities.



MEDIAN INCOME

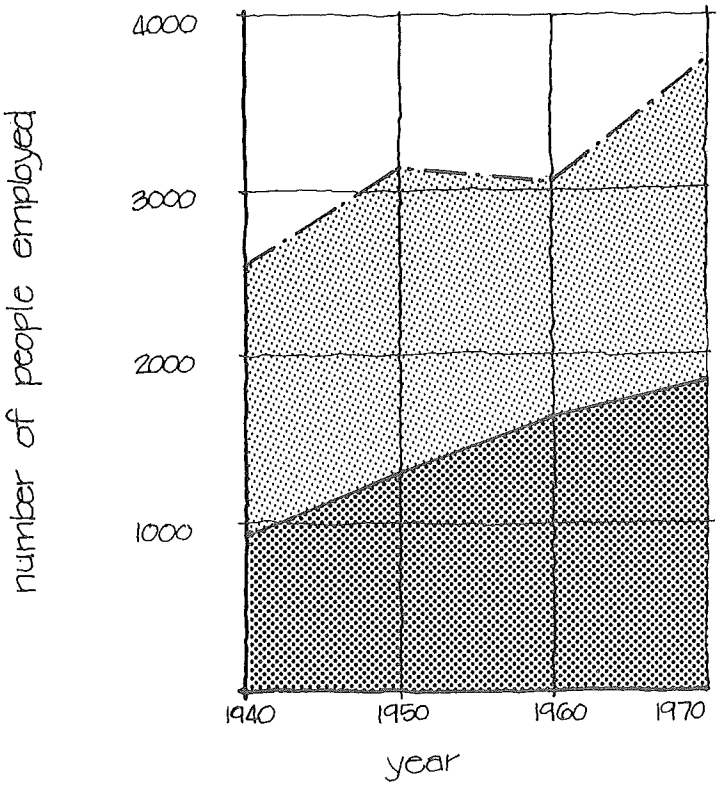
1950-1970



1970 OCCUPATION

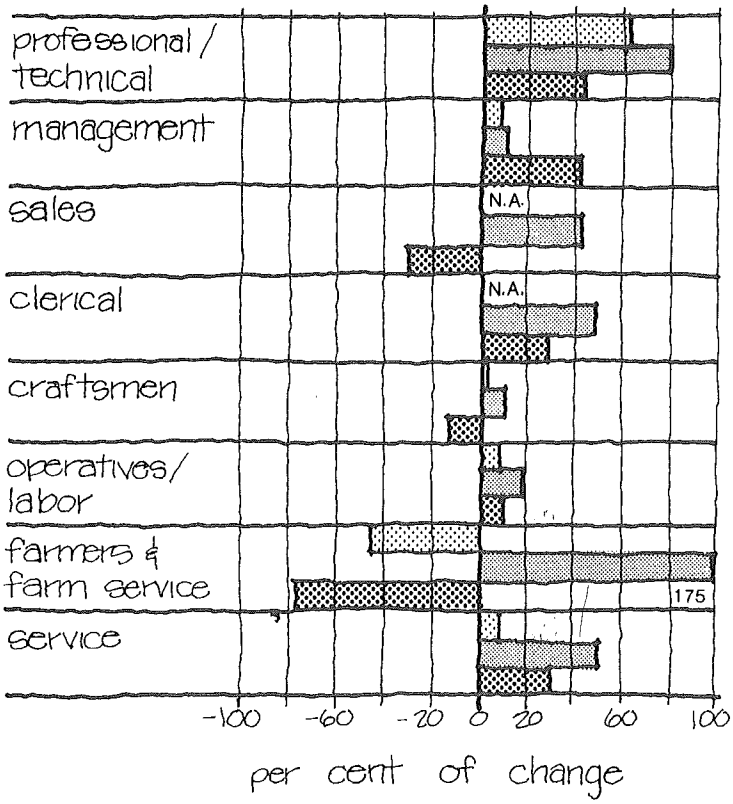
PERCENT

The occupations of residents in both communities has been on a steady upward drive. Stillwater's main growth has been in professionals, technical sales and clerical fields while Hudson's main growth has been in professional, technical, management, clerical and services occupations.



HUDSON & STILLWATER hudson —

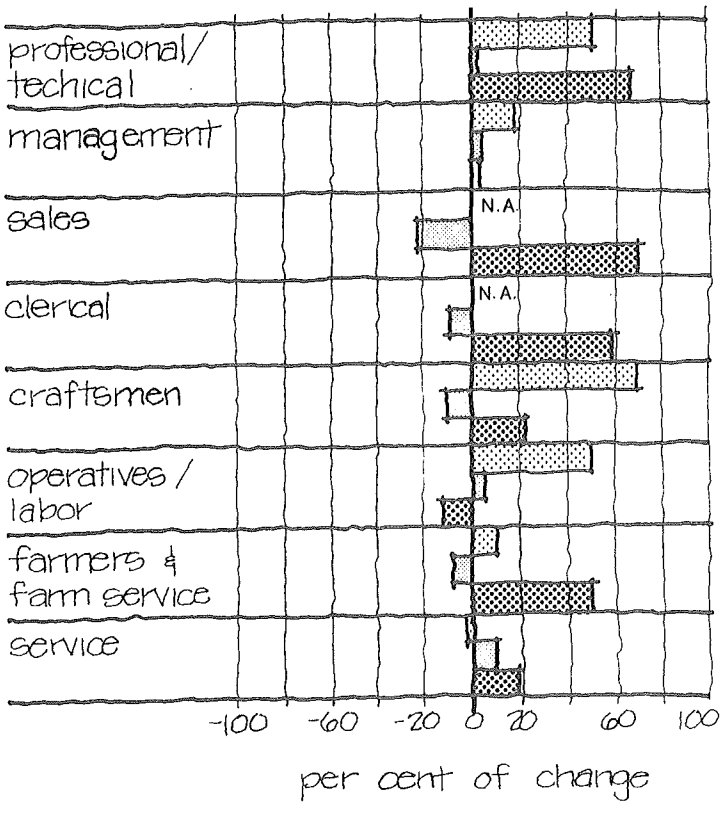
TOTAL EMPLOYMENT stillwater – –



HUDSON:

RESIDENTS' OCCUPATION

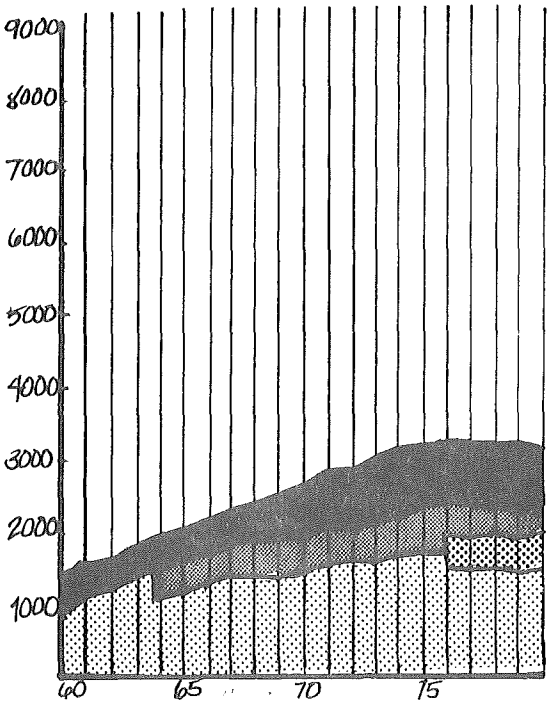
1950-40
1960-50
1970-60



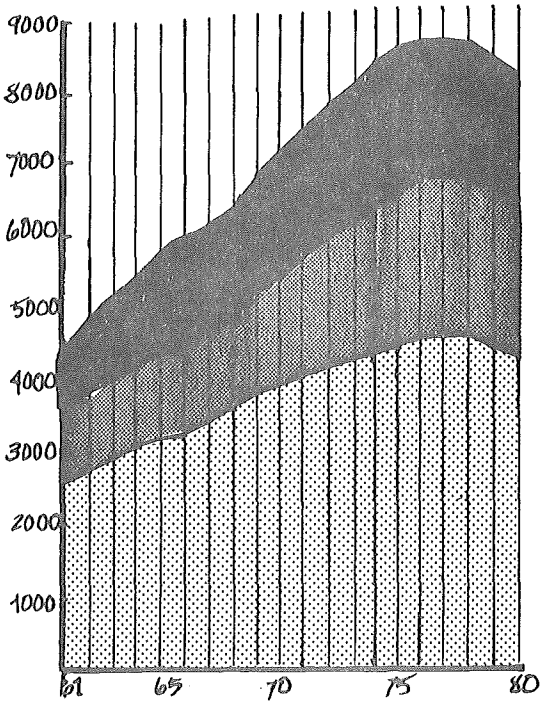
STILLWATER:

RESIDENTS' OCCUPATION

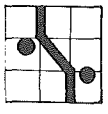
1950-40
1960-50
1970-60



hudson

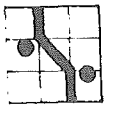


stillwater



SCHOOL ENROLLMENT[9]

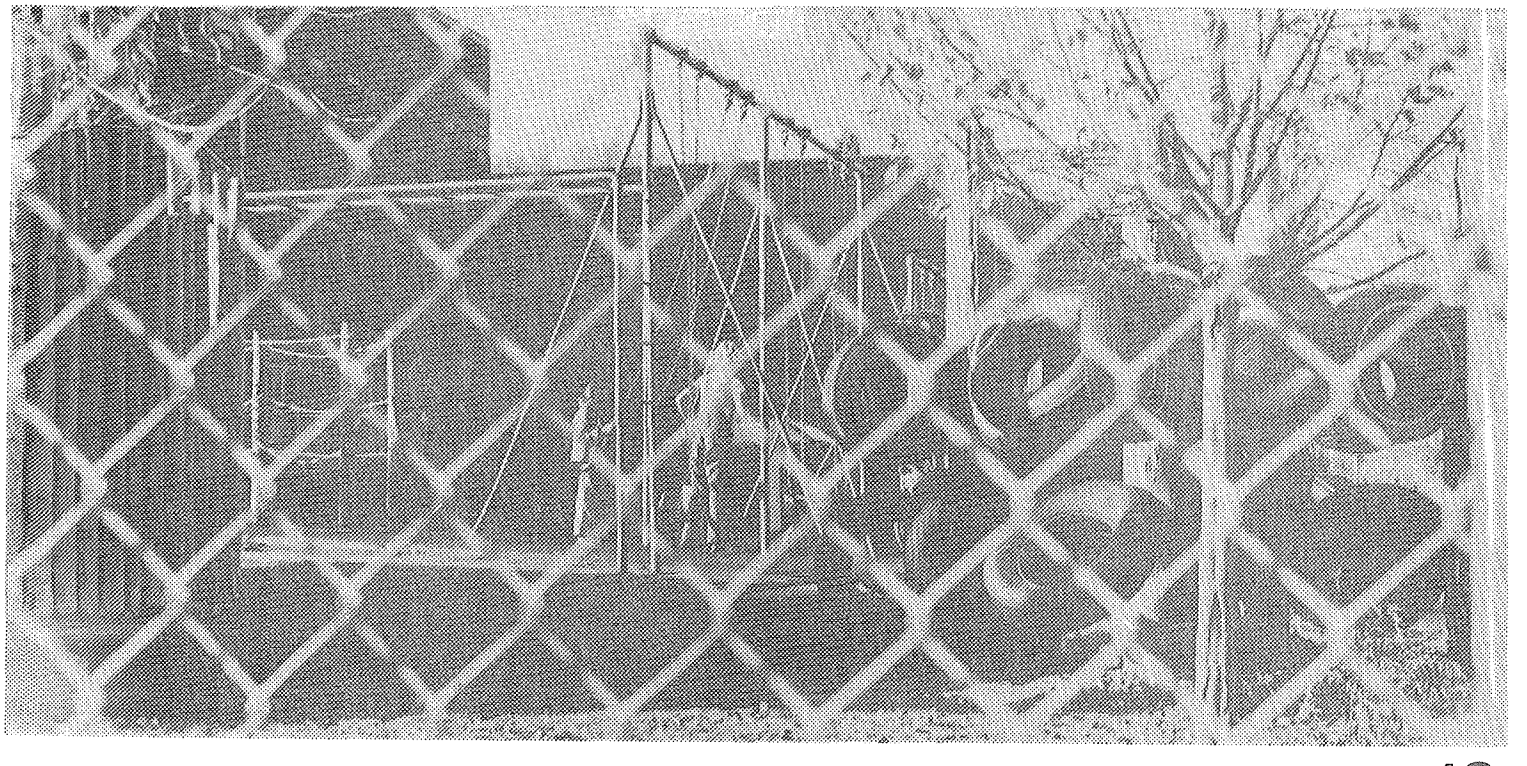
elementary
middle sch.
junior high
senior high



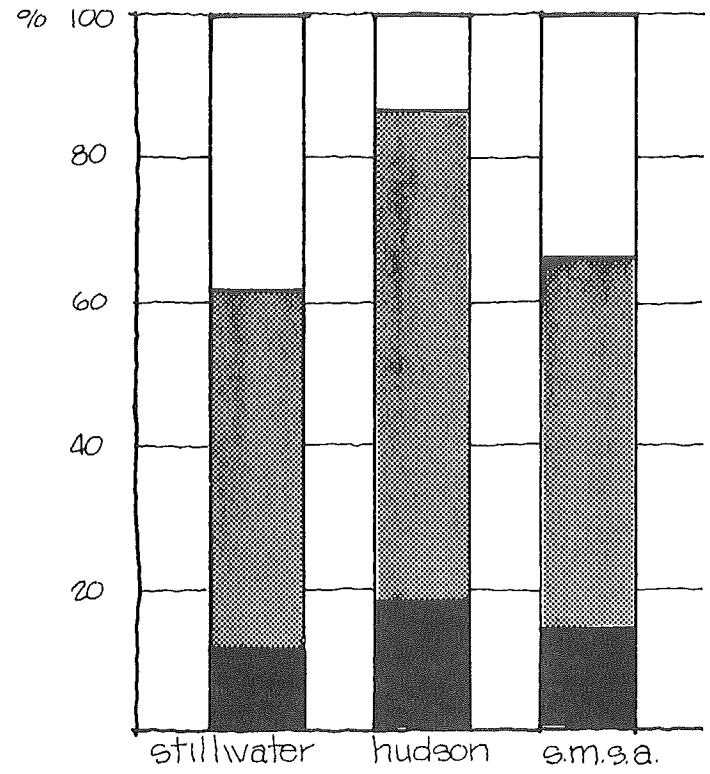
SCHOOL ENROLLMENT[10]

elementary
middle sch.
junior high
senior high

School enrollment, having greatly increased in the period from 1960 to 1975 in both Hudson and Stillwater, is now expected to stabilize.



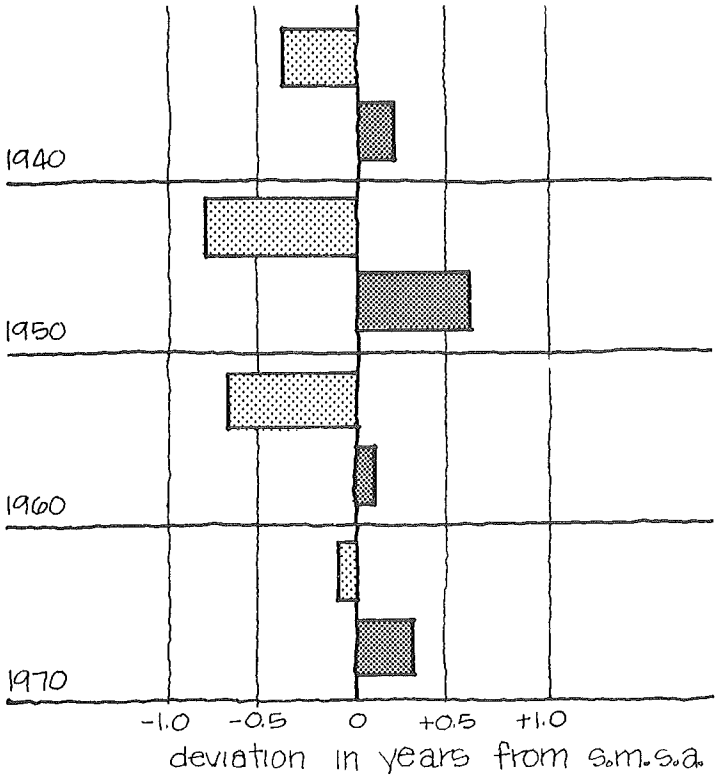
The higher income levels in Hudson may reflect the higher level of education in Hudson. In 1970, the median number of school years complete by Hudson residents was 12.7; for Stillwater residents it was 12.3.



% GRADUATES-1970

25+ YEARS

When compared to the Twin Cities, a higher percentage of Hudson residents have high school and college degress, whereas Stillwater has a lower percentage. Over the years, however, this gap has been decreasing.

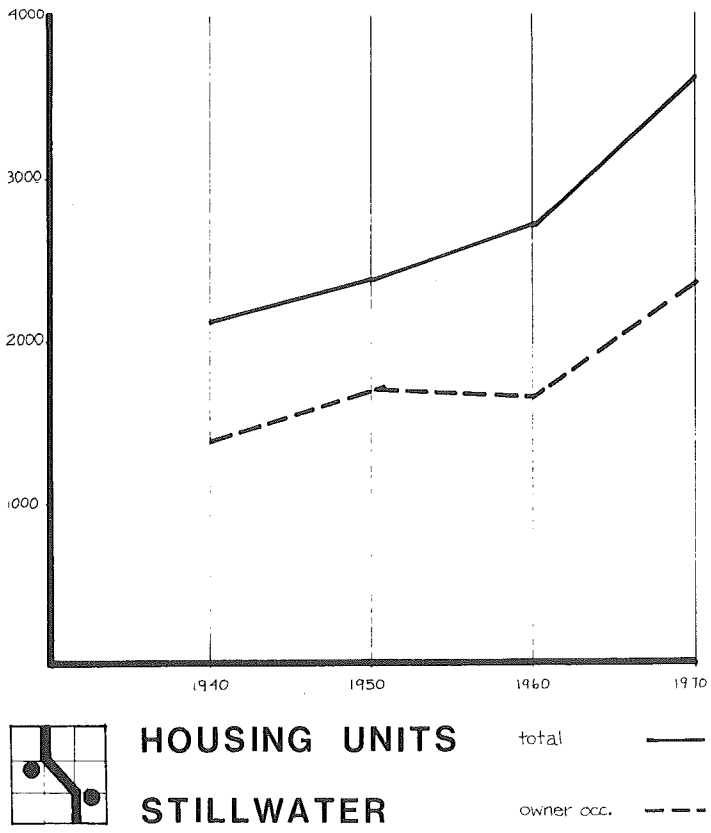


MEDIAN SCHOOL YEARS COMPLETED

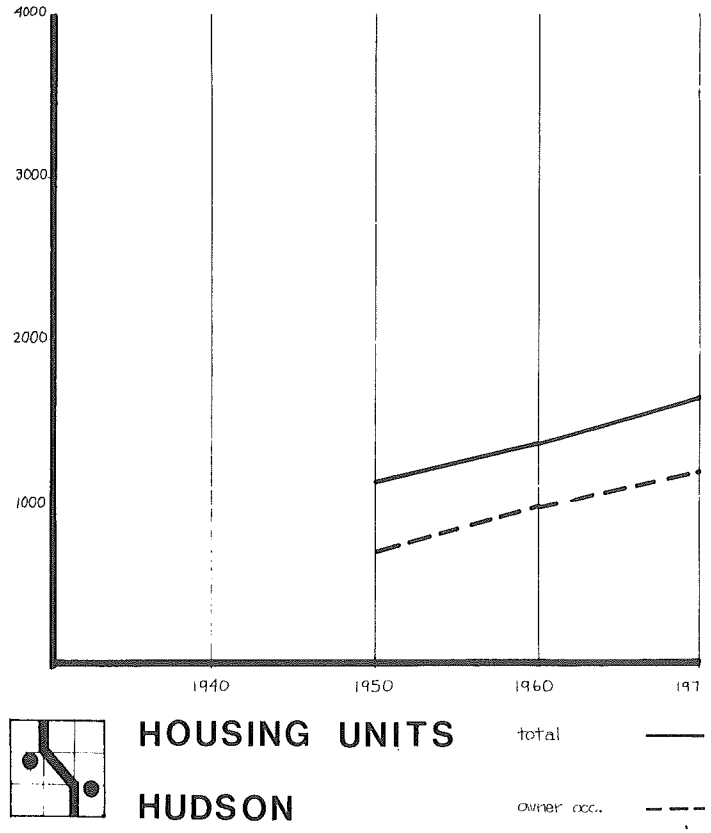
stillwater

hudson

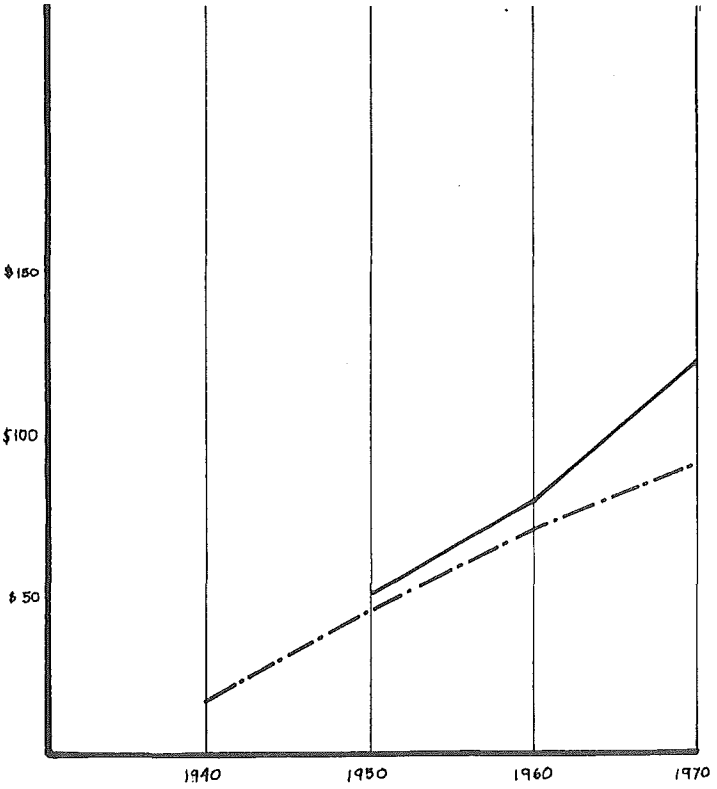
The median number of people per household has decreased slightly from 1940-1970 and does not differ much between the towns(from 3.4 to 3.29 in Stillwater and 3.27 in Hudson).[11] Household size has probably continued to decrease throughout the country as birth rates have declined and divorce rates have increased. Fewer people per household coupled with increased



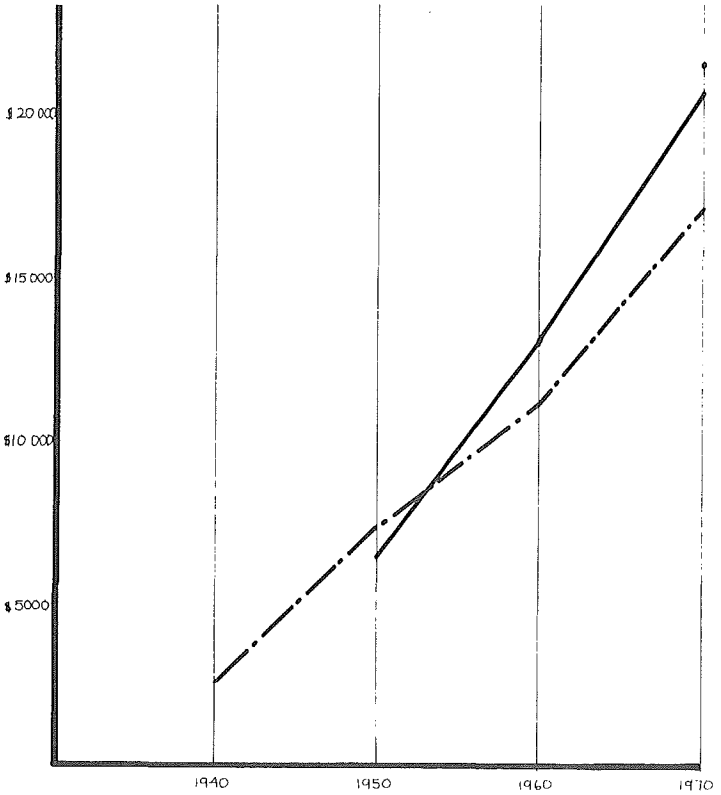
The number of housing units has increased steadily since 1940. Stillwater increased at a faster rate than Hudson between 1960 and 1970 probably because of an increasing proportion of rental units.



Rents have increased, but property values have increased at a faster pace. This is especially true in Hudson, perhaps because supply did not meet demand.



MEDIAN RENT HUDSON——
STILLWATER-—



MEDIAN VALUE: HUDSON——
STILLWATER-—

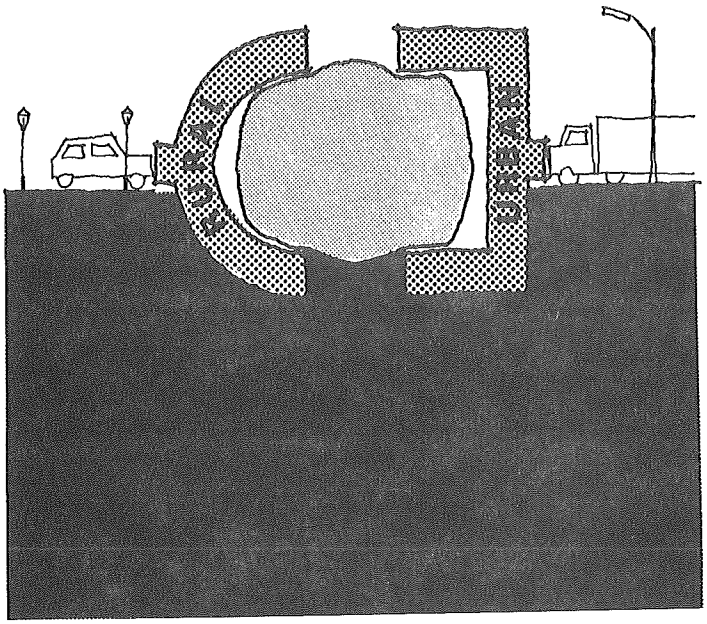
ISSUES:

As a result of the migration into Stillwater and Hudson, the general character of the people has taken on an increasingly urban nature. An increasing proportion of the labor force is white collar especially in Hudson. In Stillwater, however, blue collar workers still account for a larger proportion of employees. Over half of the labor forces of both towns works outside of the area. The new residents are primarily retired persons and young families with children. As a result school enrollments have not decreased as much as they have in other areas. property values have increased with the demand for housing. and the demand for services such as sewer has increased. Taxes have risen proportionately, making it more and more difficult for farmers to maintain agricultural land.

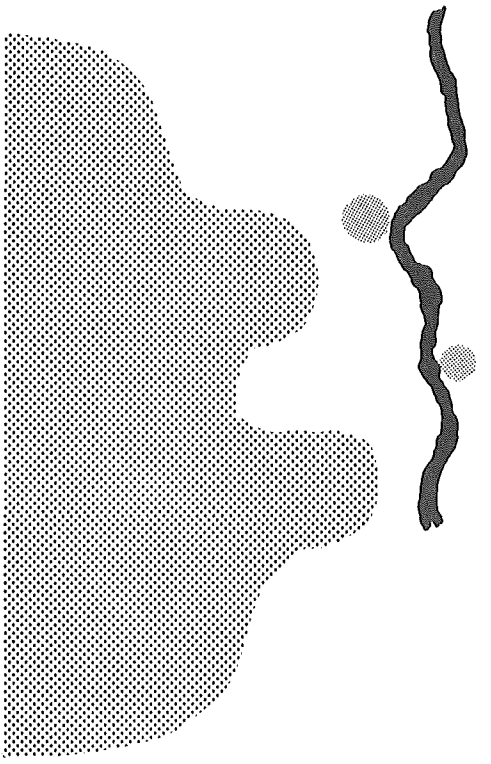
On the other hand the proximity to the Twin Cities causes Hudson and Stillwater to retain some of their small town character. Because of the large number of commuters and because government functions during business hours, the government is in the hands of the rural population. cultural needs encouraged by more education are satisfied in the Twin Cities. And Although the income level has risen, the money is not spent in Stillwater and Hudson.

COMMUTING

MIGRATION



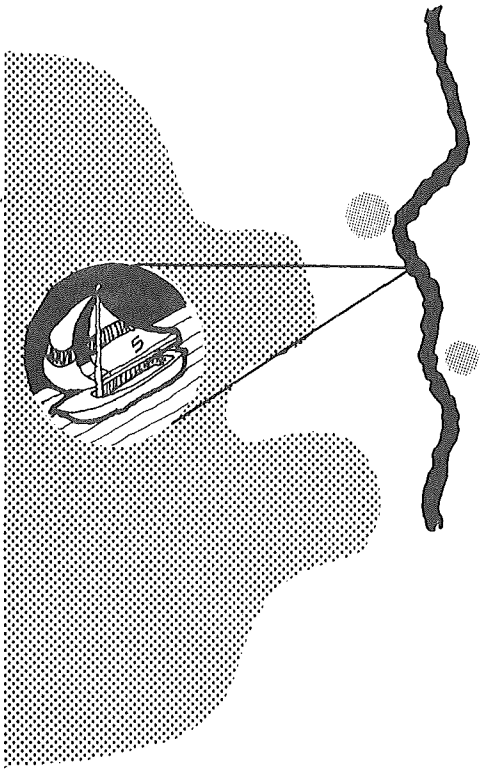
economy



OVERVIEW:

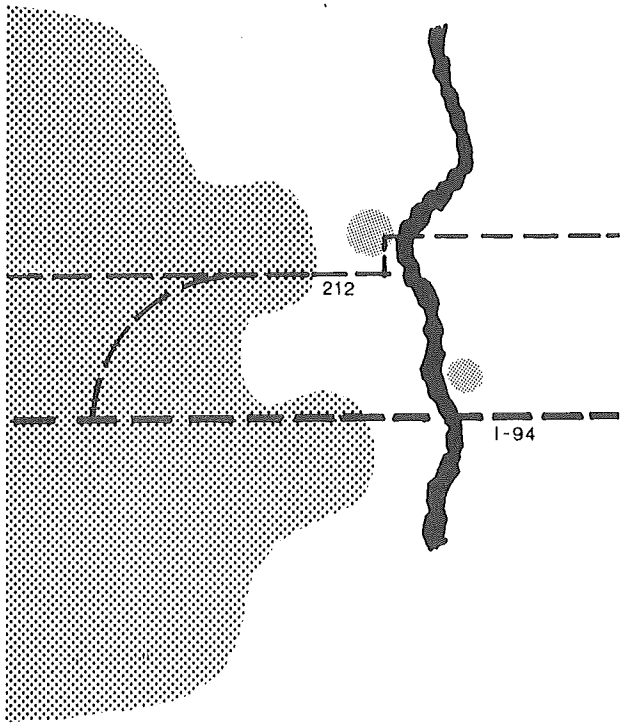
The economy of this region was originally based upon the harvesting of raw natural resources. As these resources became less plentiful, the economy turned to small industry and agriculture for the support through the early and middle 1900's. Currently, there are three major forces impacting the economy; proximity to the Twin Cities, proximity to the St. Croix recreational area and the east of accessibility via Interstate 94 and Minnesota State Highway 36.

The close proximity of the Twin Cities to the Hudson and Stillwater communities is the major force shaping the economy today. Both communities are feeling pressures for residential growth due to the expansion of the Twin Cities commercial and industrial fringes.[12] This residential growth also creates a need for more commercial and industrial growth for services, employment, personal income and tax revenue.



Since both communities are located on the main recreational section of the St. Croix River, they are feeling the pressures of tourists and vacationers; especially during the summer months. Stillwater is a primary attraction to tourists due to its colorful, historic river-town background. Hudson has not developed the tourist industry as much as Stillwater; but due to the number of marinas near Hudson, there are more weekend vacationers in the area.

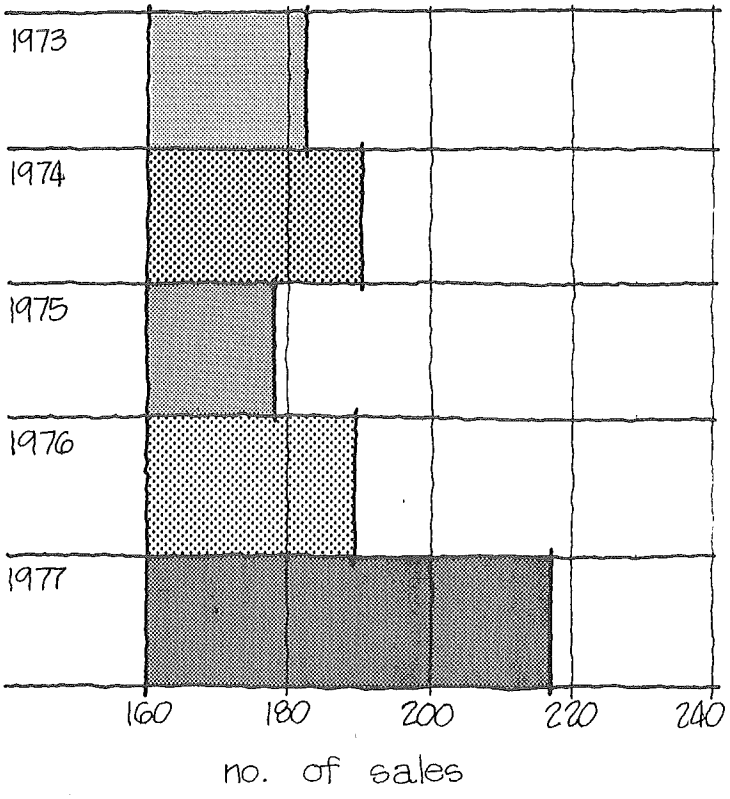
The third force shaping the economy is the east of access to Stillwater and Hudson via major auto routes. This ease of access promotes tourism, vacationing and commuter residences.



The main economic issues that will be investigated in this section of the analysis are land valuation, taxation, commercial development and industrial development.

LAND VALUATION:

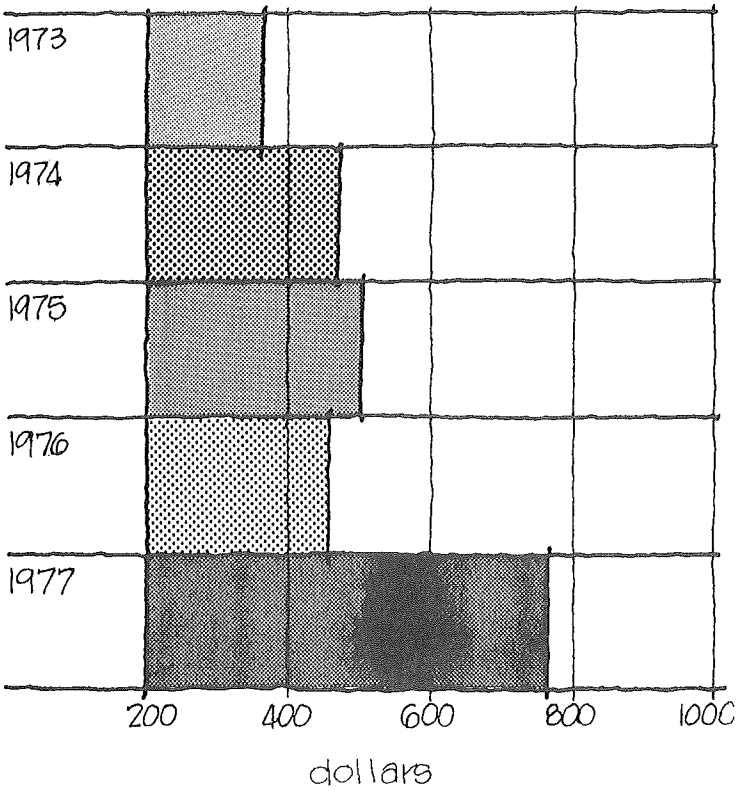
As with the trend throughout the nation, all of the land in the Lower St. Croix Region is becoming more expensive. The three graphs showing trends in the sale of agricultural land in St. Croix County(not available for Washington County) indicate increased vigorous activity in the real estate market. The number of land transactions has increased sharply and the mean value of the land involved in these transactions has doubled in five years.[13] These two items seem to indicate that there is an increase in the development of rural land for residential use. This vein of thoughts is supported by the Ag Land Value graph which indicates that the primary reason for the high ratio of increase in the mean value per acre is due to agricultural land which is sold for change in use. In summary, land is being purchased from farmers, divided into smaller units(accounting for the rise in the number of transactions) and sold at a higher unit price for residential and industrial sites. (Although these figures are from St. Croix County, the Washington County Planning Office agreed that these conditions existed in Washington County also)



ST. CROIX CO.:

AG. LAND VALUES

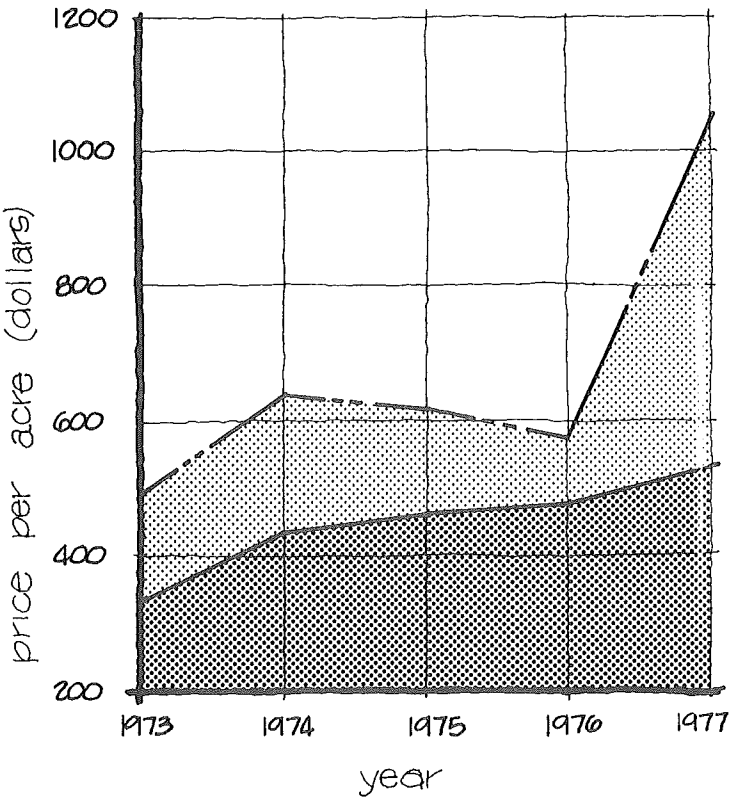
The value of land for retail development in the two communities has been increasing also. Due to the growth in the cultural business district, land and property in that area has become very expensive. Although Hudson has not experienced the revitalization of the central business district as Stillwater has, land and property values downtown are rising also.



ST. CROIX CO.:

MEAN VALUE / ACRE

In summary, inflation, high demand caused by growth from within and pressures from the Twin Cities are driving land values upward. This spiral will, and does, affect who can afford to live in the area.



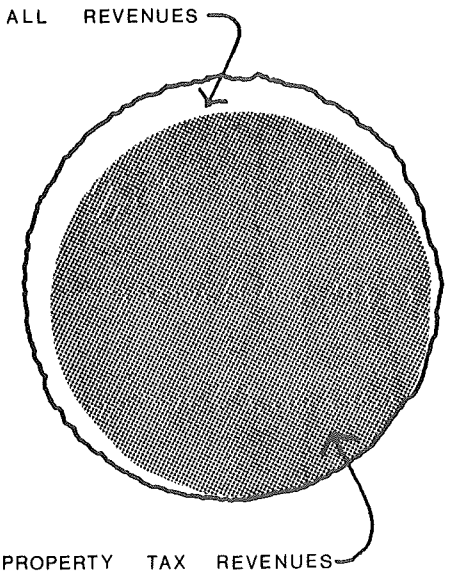
ST. CROIX CO.: ---change in use

AG. LAND SALES —— cont. ag.

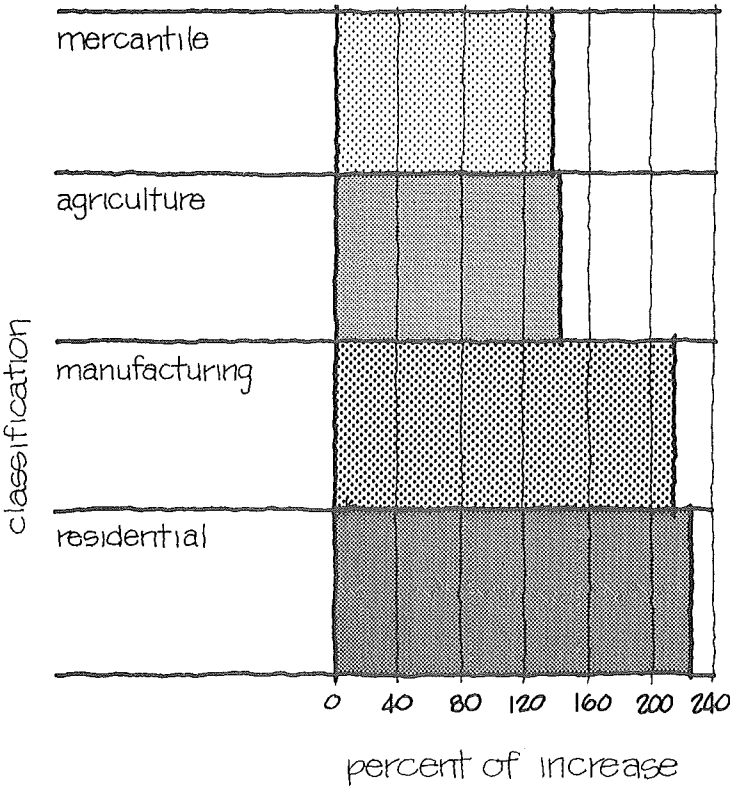
TAXATION:

Both communities rely primarily on property taxes to raise revenues. The graph showing the tax evaluation increases for St. Croix County from 1974-1978 indicate that total dollar figure for tax evaluation for residential and manufacturing properties had risen more than 200%. This rise was due to two factors; adjustment of assessed values and growth.

Currently, the corporate tax structure of Wisconsin makes it more lucrative for industries to locate on the Wisconsin side of the river instead of the Minnesota side.[14] Since there is only a couple of minutes driving difference to the Twin Cities, the tax issue may become the deciding factor for and industry seeking a home.



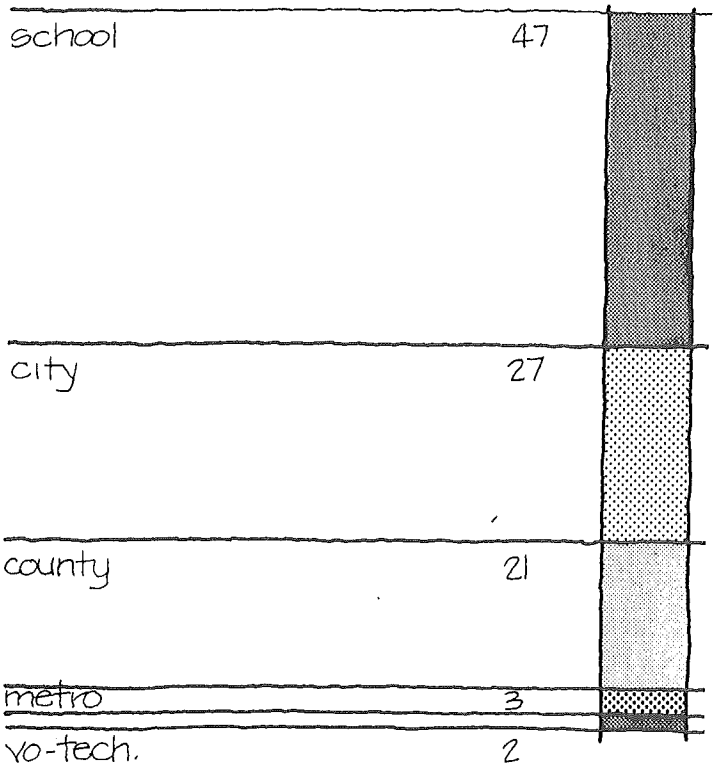
Property tax is based upon the market value of the land. In a pressure for growth situation such as Hudson and Stillwater are involved in; the market value of the agricultural land goes up. (See preceding pages). Eventually, the high taxes and the potential income from development of agricultural land entices farmers to sell their land for other uses and thus, fueling the sprawl of the community. Wisconsin has tried to curb this development with the Wisconsin Agricultural Tax relief program which gives farmers a break on taxes for not developing the land. Washington county would like to have some form of development control, but none is in sight in the near future.



ST. CROIX CO.:

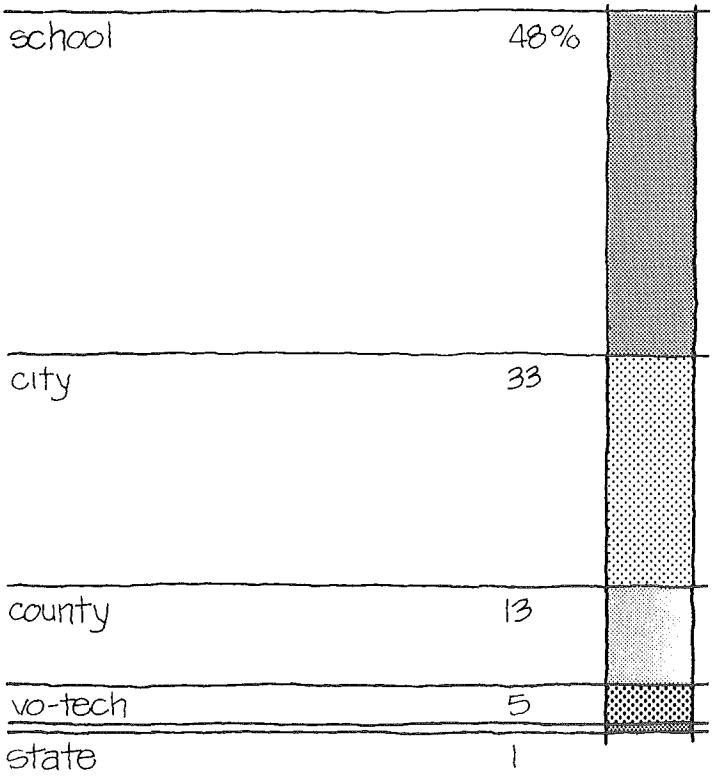
TAX EVAL. INCREASES 1974-78

Once the revenues have been collected, they are allocated as shown on the graphs for Hudson and Stillwater. Both communities channel majority of their monies into schools and the city government.



STILLWATER: ALLOCATION OF PROPERTY TAX REVENUES - 1978

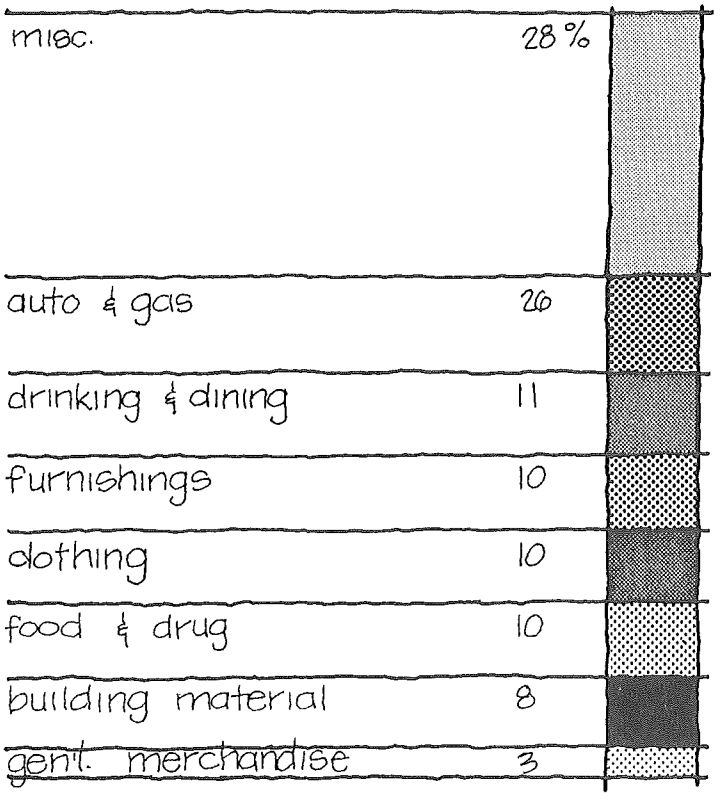
In conclusion, the brunt of the tax burden is borne by property taxes from residential and manufacturing interests, taxation of agricultural land at market value encourages development in Washingtor County and the schools in both cities receive the most of the revenue.



HUDSON: ALLOCATION OF PROPERTY TAX REVENUES - 1978

COMMERCIAL DEVELOPMENT:

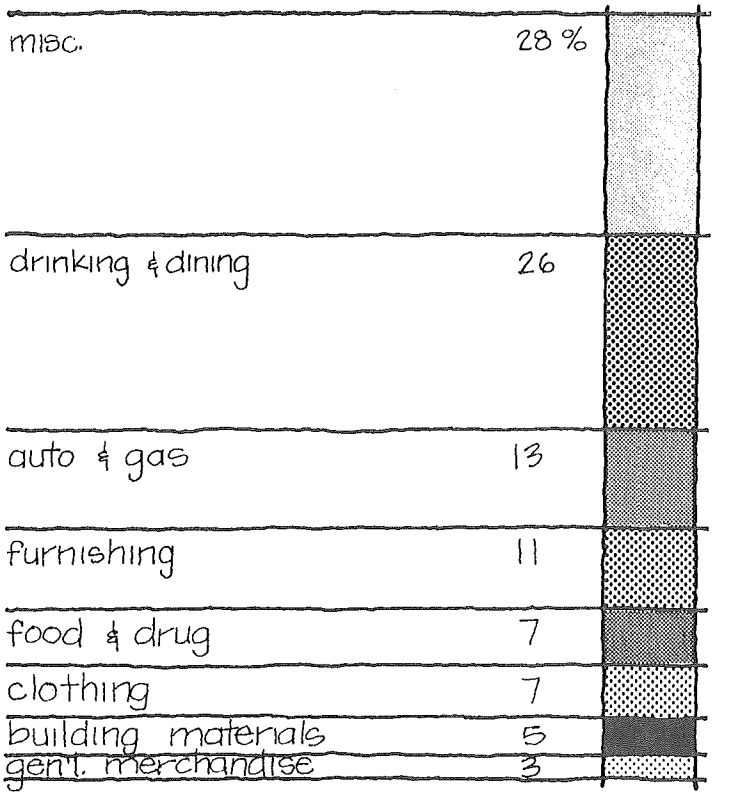
The development of commercial facilities has been different in both communities. Stillwater is characterized by a growing downtown, a growing commercial strip and a shopping mall. While Hudson has a stagnated downtown and a growing commercial strip. The growth of Stillwater's downtown into a viable town center was the result of private investment which is apparently lacking in Hudson. The Hudson Chamber of Commerce has had a proposal prepared for revitalizing the downtown, but has encountered nothing but apathy to date.[15]



STILLWATER: RETAIL ESTABLISHMENTS (TOTAL 135)

By looking at the Retail Establishments graphs for Hudson and Stillwater, one can see that the Stillwater breakdown is a well rounded group while Hudson is somewhat lower in the necessity categories of clothing, food and drug and higher in the drinking and dining category. (Primarily due to large number of bars).

In conclusion, Stillwater is experiencing growth along multiple commercial fronts while Hudson's downtown is stagnant and the commerical sector of Stillwater does a better job of meeting the needs of the people, as well as supporting specialty shops.

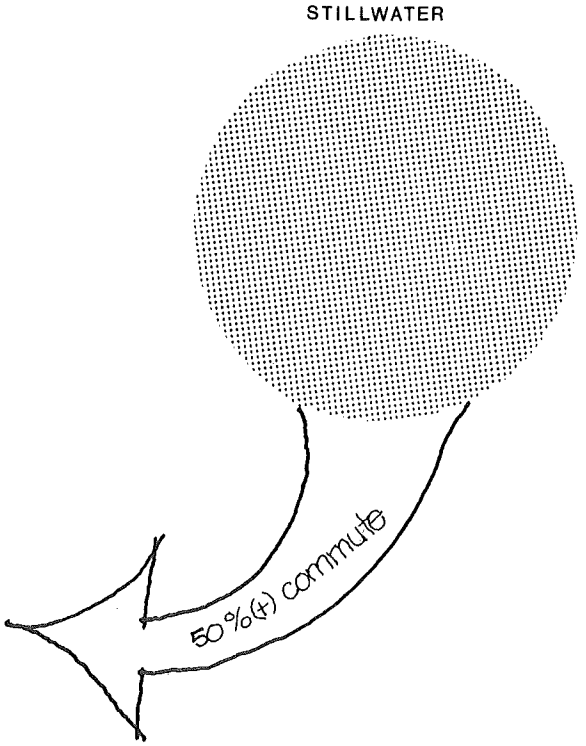


HUDSON: RETAIL ESTABLISHMENTS (TOTAL 82)

INDUSTRIAL DEVELOPMENT:

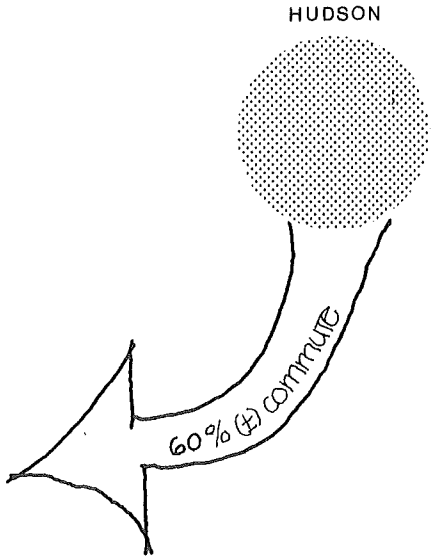
Both communities are trying to encourage industrial development. In recent years, Hudson has been more successful and will probably continue to be more successful due to the favorable corporate tax structure found in Wisconsin.

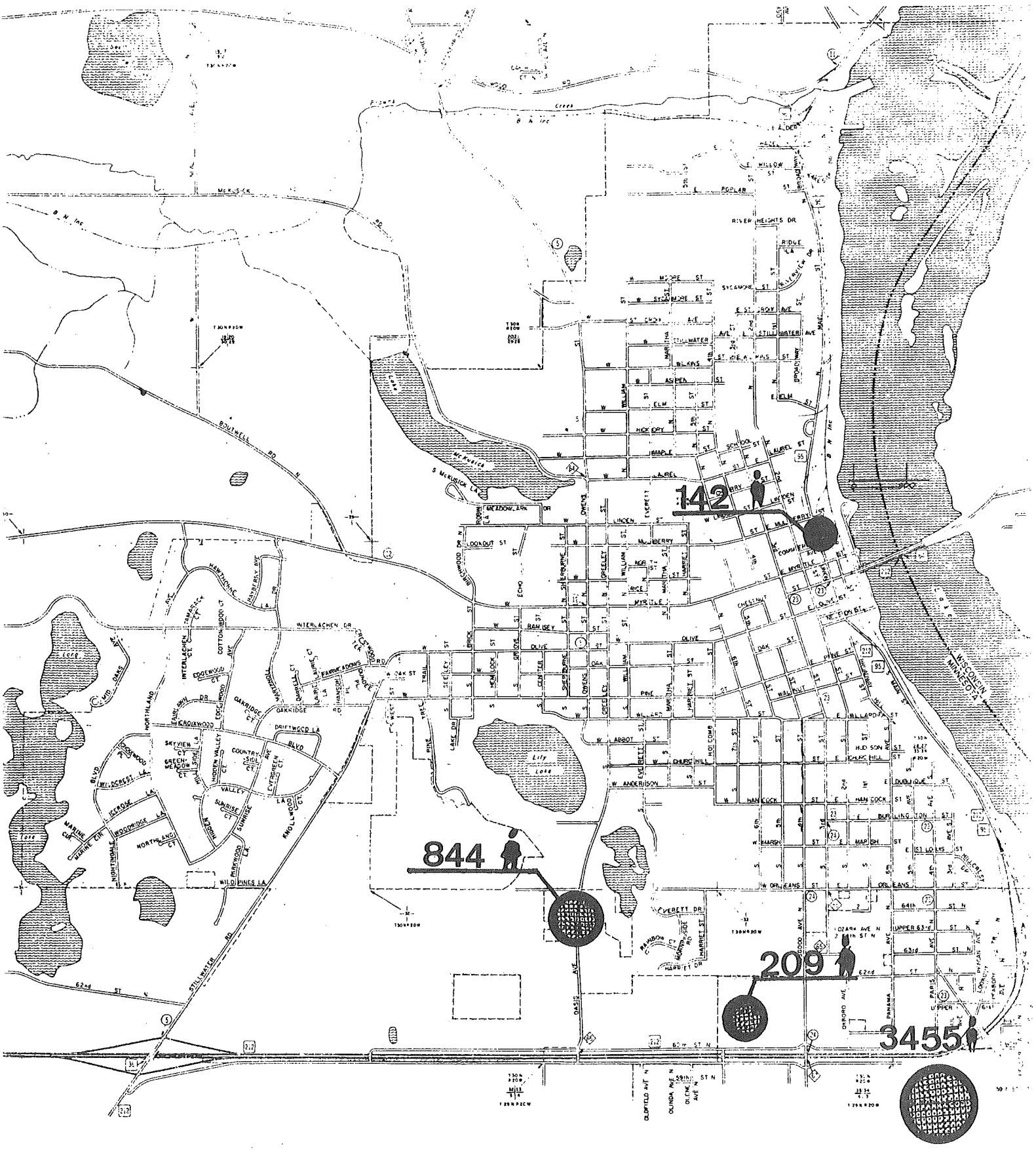
In the 1950's, Stillwater set up a Development Corporation with the idea of drawing in more industry and helping them onto their feet. An industrial park was built and set aside, but little response was generated. Currently the industrial park is idle and the sewer and electrical capacity originally reserved for the park has been used for the expanded residential growth. Hudson is currently actively involved in the process of attracting additional light industry to the area.



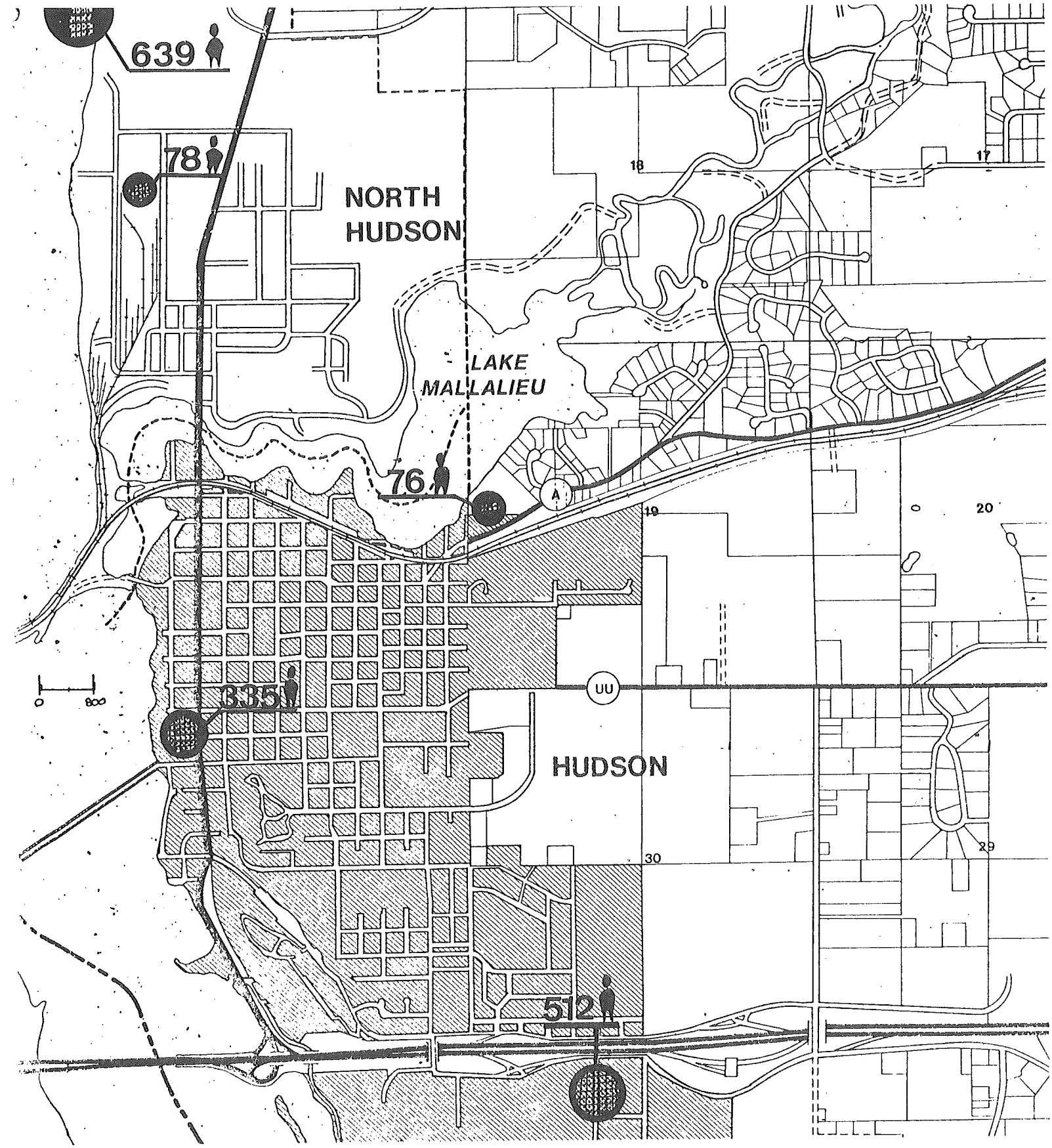
Industry is a key base in the employment of residents of both communities. Although a number of residents commute-50-60% from Stillwater and about 60% from Hudson-many of the jobs are related to industry. Some commuters are industrial workers or support technical and professional people. (See following two pages for major employers within the communities).

In conclusion, both communities are seeking to expand the industrial base to provide jobs within the community and to broaden the tax base.





STILLWATER
MAJOR EMPLOYER NODES



HUDSON
MAJOR EMPLOYER NODES

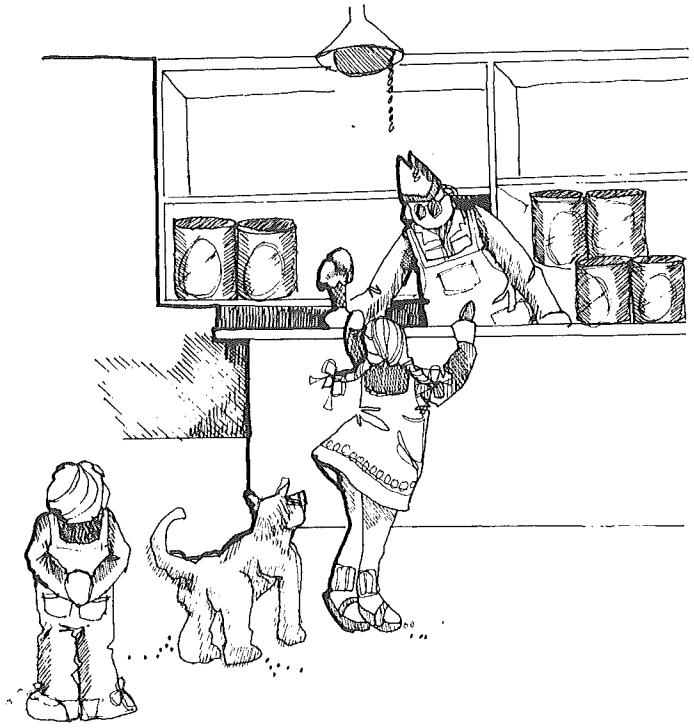
Issues:

In summary, the issues that face Hudson and Stillwater are the taxation of agricultural land to other uses; how to generate the tax revenues needed to provide services to the growing population; the strength of the commercial development and industrial development within the communities.

The first issues are primarily manifestations of rapid growth of the population while the last two items deal with the competition of the smaller communities with the Twin Cities for their share of retail and industrial activity to aid their tax base and overall economic structure.

issues:

- taxation of agricultural land
- generation of revenues
- commercial development
- industrial development

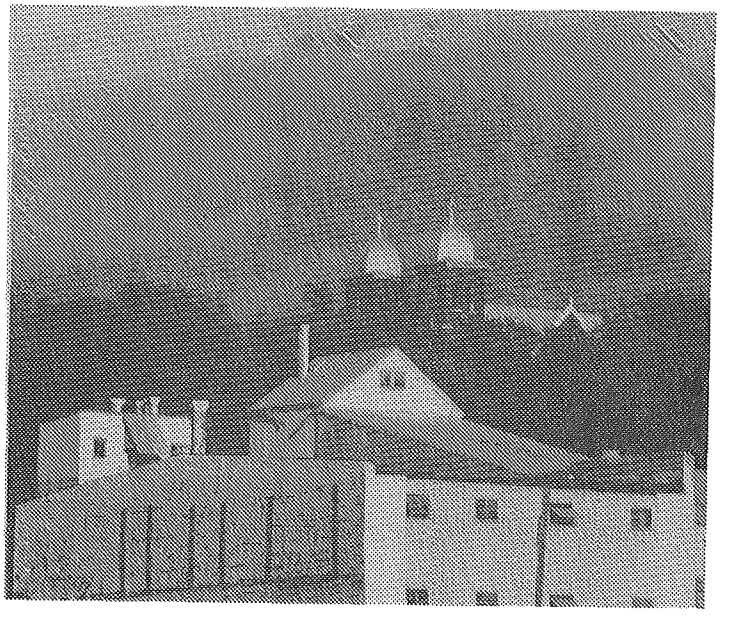


community services

There are three main areas of investigation regarding services in Stillwater and Hudson:

1. Educational, such as schools and public libraries.
2. Cultural and health facilities, such as theaters, art galleries, hospitals and nursing homes.
3. Government facilities, such as city offices, county offices, state offices, fire departments and police departments.

All of these facilities have been located on the accompanying maps.



Stillwater: Utilities

Water system: Municipal water source from wells.
Storage capacity: 1,600,000 gal.

Sewer: Capacity sewage treatment plant; 3,200,000 gal./day

Electricity: Electric service by Northern States Power Co.

Gas: Gas services by Northern States Power Co.

Telephone: Telephone company serving area is Northwestern Bell.

Newspapers: One daily, one weekly.

Radio Station: One AM.

TV Network Reception From: KTCA, KTCI KMSP, KSTP, WCCO, WTCN.

Hudson: Utilities

Water system: Municipal water source from wells.
Storage capacity: 600,000 gal.

Sewer: Capacity: 560,000 gal./day. Solid waste disposal; sanitary landfill.

Electricity: Electric service by Northern States Power Co.

Gas: Gas service by Northern States Power Co.

Telephone: Telephone company serving area is Northwestern Bell.

Newspapers: One weekly.

Radio Station: No.

TV Network Reception from: KTCA, WTCN, KSTP, WCCO, Independent.

Stillwater: Education

Elementary schools: 9

Junior high schools: 2

High schools: 1

(See map 1)

Hudson: Education

Elementary schools: 4

Middle schools:

Junior high schools: 1

High schools: 1

Churches:
Protestant 14
Catholic 4
Other 8

(See map 2)

Stillwater: Government

City, County, State

Police Force: 12 (regular)
14 (part-time)

Fire Department: 6 (regular)
30 (part-time)

(See map 3)

Stillwater: Social Aids

Hospitals: 1 (88 beds)

Nursing homes: 2 (120 beds)

Churches:
Protestant 9
Catholic 1

(See map 2)

Hudson: Government

City, County, State

Police Force: 5 (part-time)

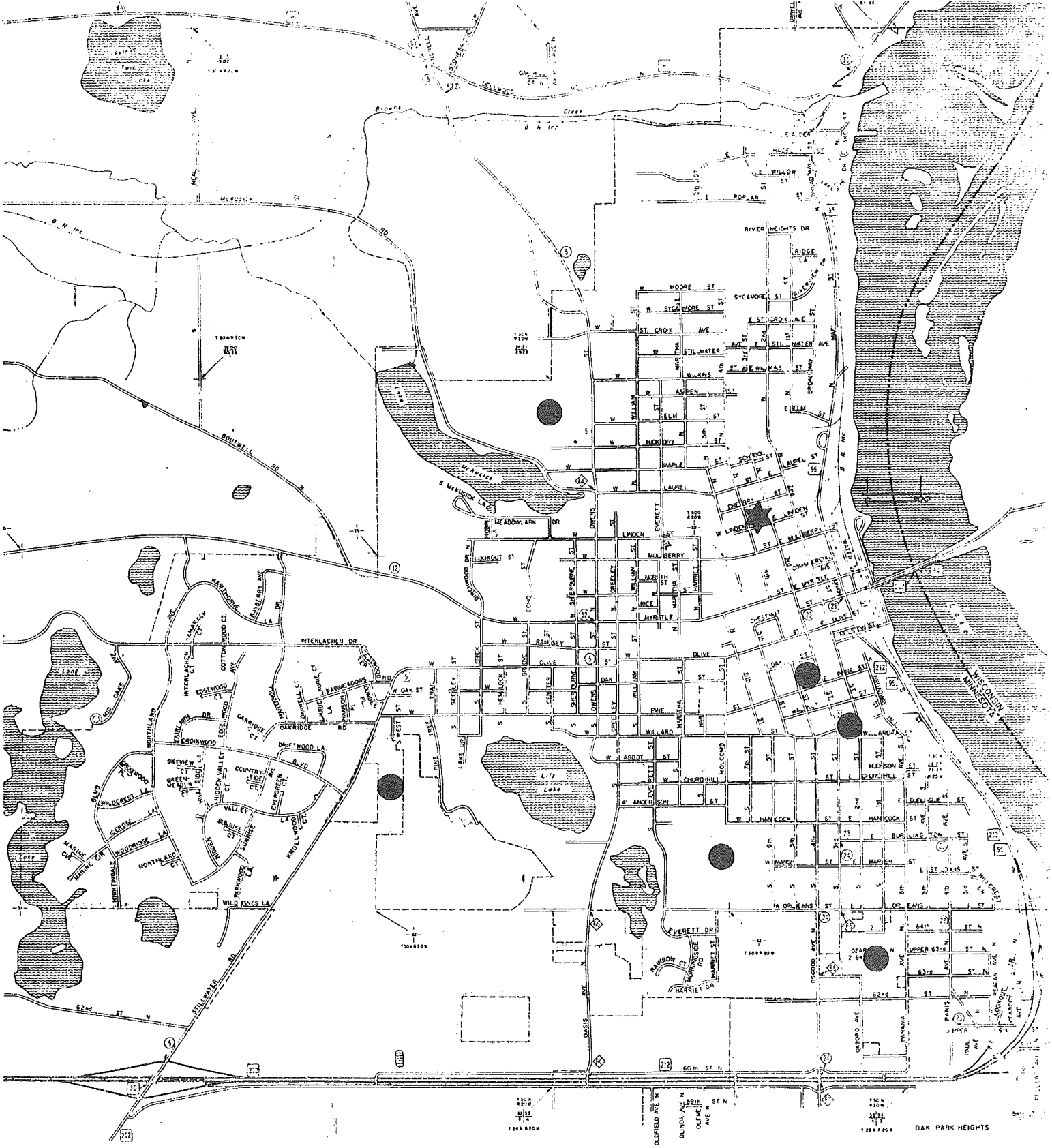
Fire Department: 27 (volunteers)

(See map 3)

Hudson: Social Aids

Hospitals: 1 (45 beds)

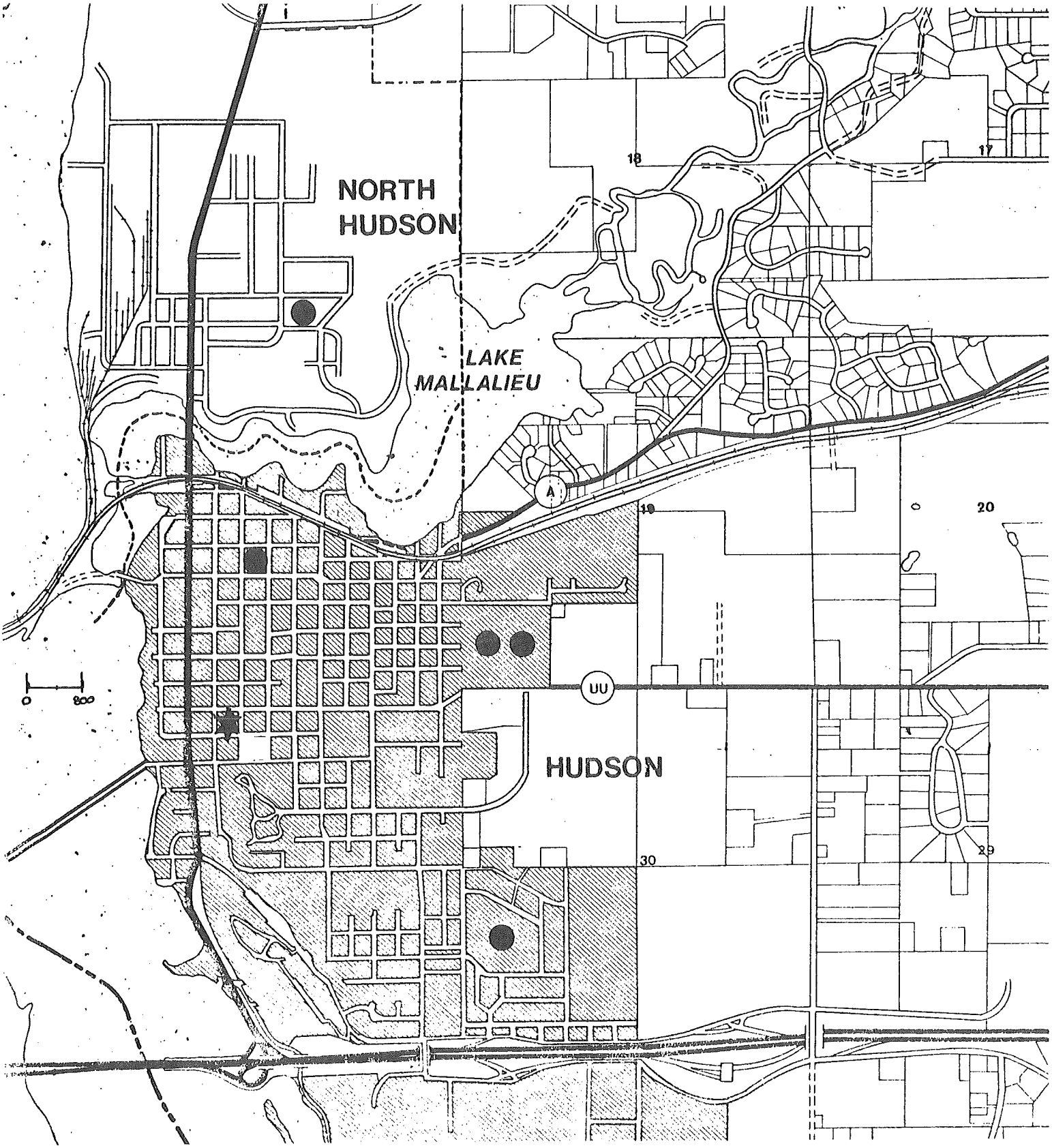
Nursing homes: 1 (60 beds)



STILLWATER EDUCATIONAL

● school

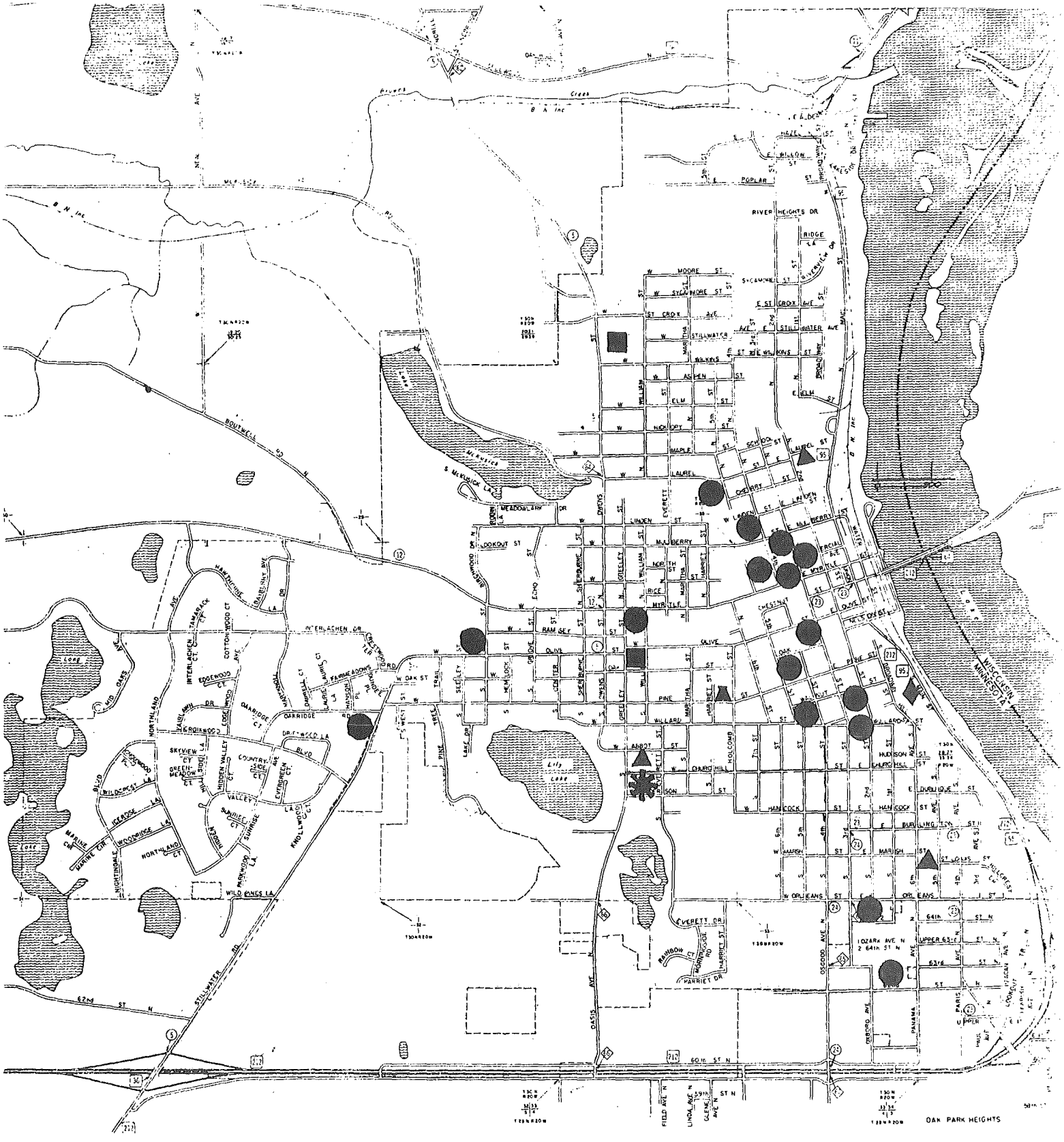
★ library



HUDSON EDUCATIONAL

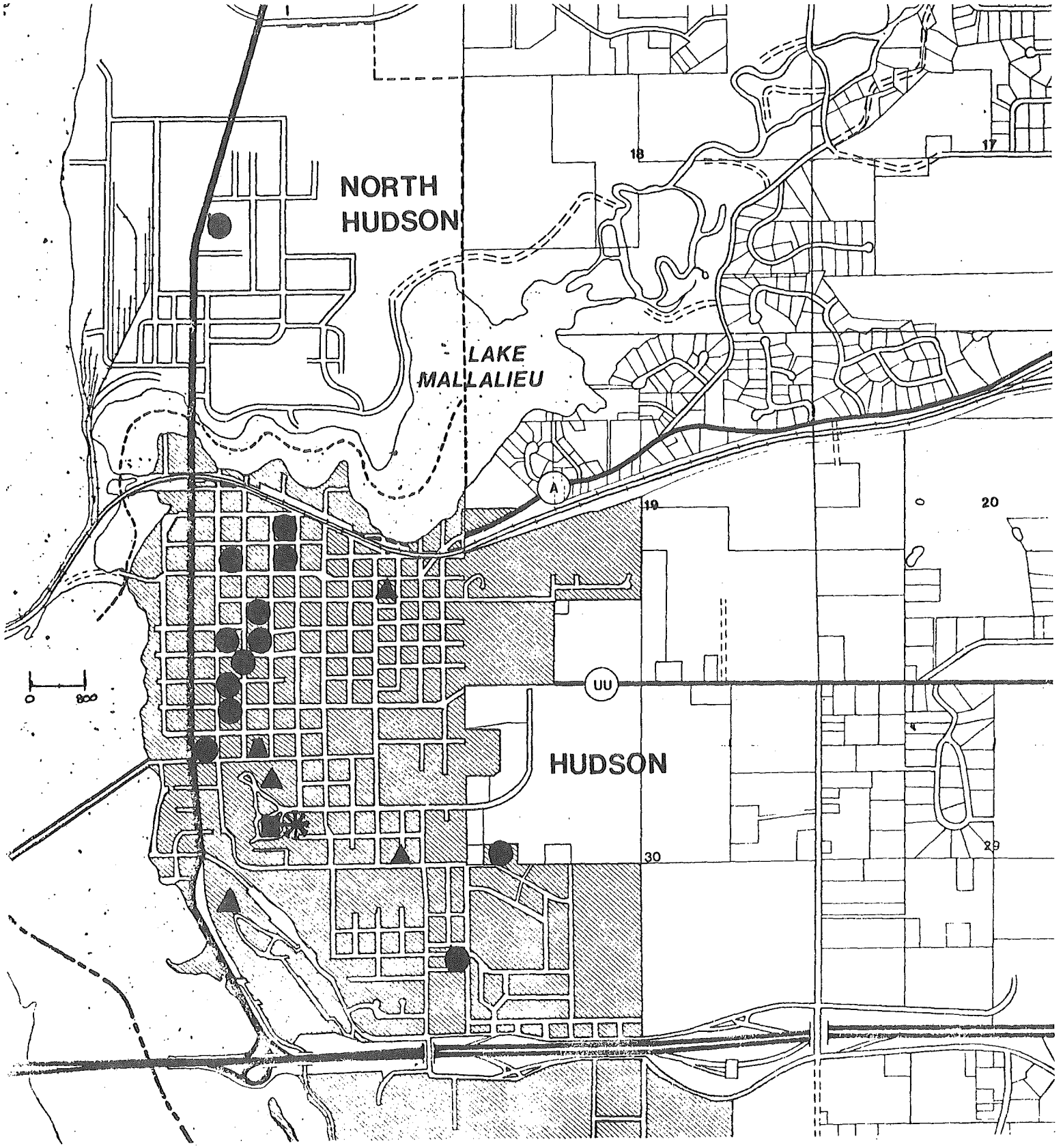
● school

★ library



STILLWATER CULTURAL

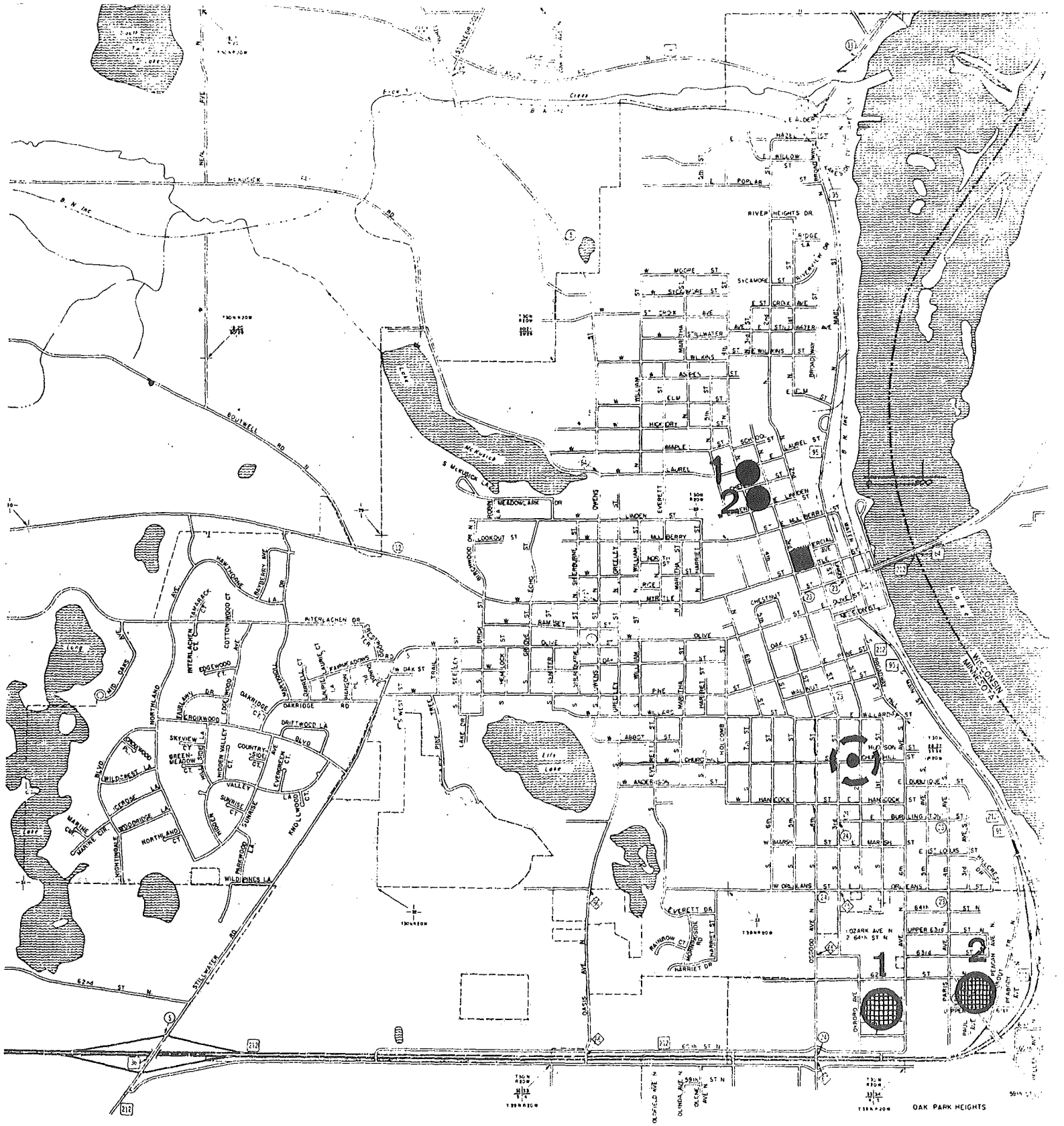
- church
- theater
- hospital
- park
- art gallery
- nursing home

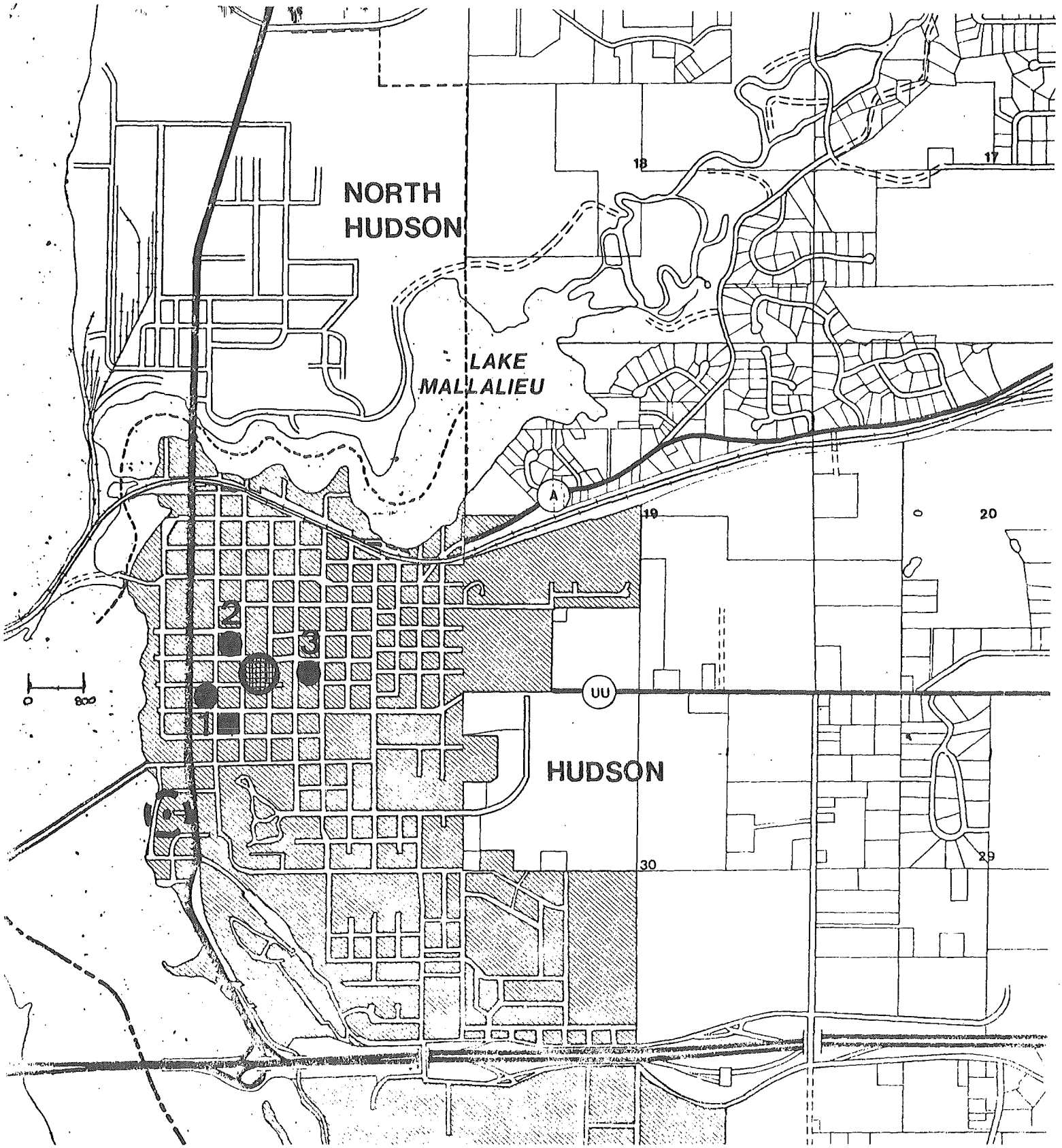


HUDSON
CULTURAL

church
park
theater
nursing home
hospital

3-30


STILLWATER
GOVERNMENT
city 1. office 2. fire department
county 1. court house 2. office
state
post office
OAK PARK HEIGHTS



HUDSON GOVERNMENT

● city 1. office 2. fire dept. 3. water dept.

◍ county

(•) state

■ post office

3-32

scenarios

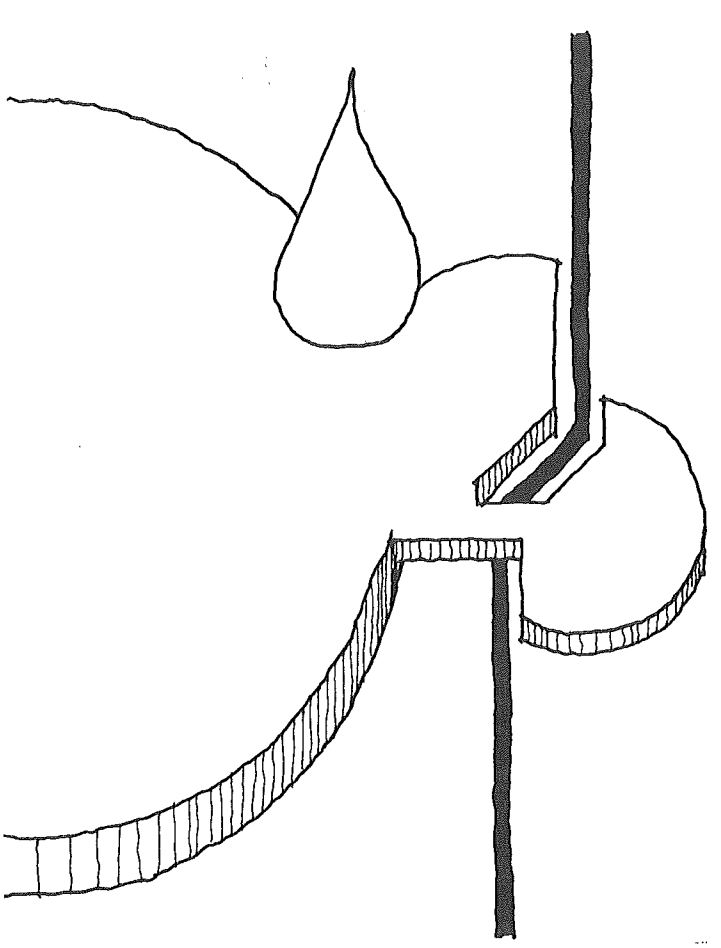
The assumption that energy sources are infinite underlies much of twentieth century development. Along with this has been the assumption that economic values take precedence over human and environmental values. As these issues begin to be recognized and acted upon, various possibilities for the future development of Stillwater and Hudson begin to emerge.

SCENARIO 1:

The first scenario assumes that people have difficulty changing their life style. Development of alternate energy sources are demanded. A cheap source of hydrogen fuel is discovered. Sunlight is used to extract hydrogen from water. The energy crisis is over. A hydrogen conversion plant is built along the river. The two towns grow at an increasing rate. Fertility rates have decreased, but migration increases, especially young families. The income levels and education levels continue to rise. Housing continues to sprawl although higher densities develop in town. The Twin Cities keep expanding as well until the river towns are part of the Metro Area. Auto traffice continues to increase causing development along highway corridors. Stillwater finally succumbs and builds a by-pass bridge.

Large industry is expanding and builds subsidiaries in the towns, especially in Hudson where the tax structure is more favorable. Tax revenues are generated by sharing with the Metro Area due to its embrace of the region. Commuters are still prevalent in the workforce.

Weekend recreation on the river continues to expand regardless of efforts to control it.



SCENARIO 2:

Another possible path in the development of the towns stems from a quick passage and construction of the Northern Tier pipeline. Also, a method of producing more killowatts from coal is discovered. The immediate danger of the fuel shortage is averted, but; awareness of energy conservation develops at a slow pace.

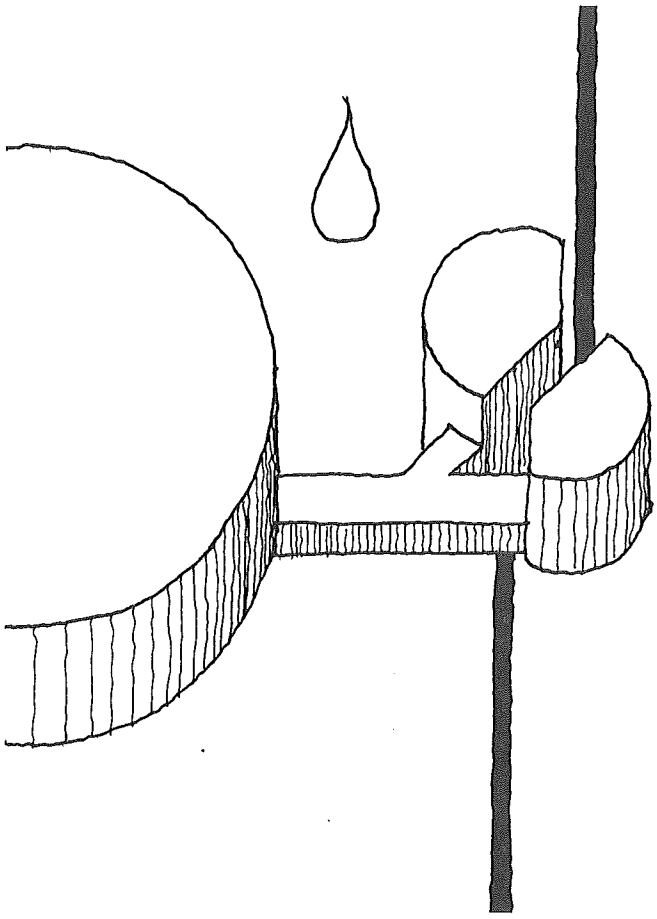
Public transporation expands and improves. Stillwater and Hudson remain as separate entities yet strongly linked to the Twin Cities. Development continues to some extent along transportation corridors. In town development goes up rather than out. Small industries locate in the towns creating more employment.

Twin Cities residents save energy by finding recreation close to home. So the recreation industry booms. Motels are built. The Scenic River Act prevents further development of the river banks, so development occurs on the bluff. Conflicts develop over the height of construction on uncontrolled land. Funiculars are built to carry tourists to the river.

Young adults continue to migrate in. Fertility rates level off. As a haven for the retired, the towns begin to lose their appeal. Housing becomes somewhat more dense in town. But, the appeal of the hobby farm remains.

Both communities experience steady growth in the retail sector while trying to improve the industrial base for additional tax revenues.

Taxation becomes a burden due to the increase in services for more people without a substantial broadening of the tax base.



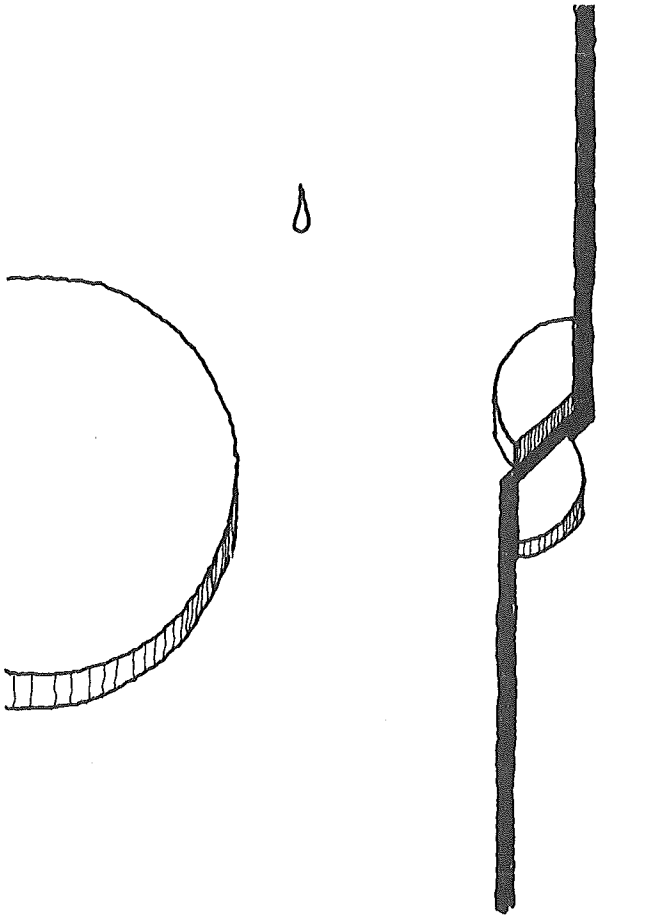
SCENARIO 3:

The third scenario assumes a radical change in attitude in America. Recognition of the finite nature of our present energy sources becomes nearly universal. Along with it, an increasing desire to return to the good old days when life was lead on a human scale.

Linkage to the Twin Cities decreases as travel increases. The towns develop inward, but growth is slower due to energy cut backs. Because of the tight economy, the fertility rates stabilize and migration decreases.

Agricultural production is reduced due to diesel and fertilizer shortages; so more land is needed for agriculture. Hobby farms on the outskirts of town become truck farms. Farm markets open in town. Beef becomes too expensive so fish farms are developed along the river. Agricultural wastes are funneled into production of ethanol. These new industries help to provide some of the needed jobs.

Population in the northern states as a whole decreases as people, especially young families, move to the sunbelt. The central business districts of both communities becomes more necessity oriented. Taxation is stable to cutbacks in some programs and refinements in others.



FOOTNOTES:

1. United States Department of Interior/National Park Service, Lower St. Croix National Scenic Riverway: Minnesota/Wisconsin; 1976, p. 10.
2. Census Tracts from the State of Minnesota and the State of Wisconsin, 1940-70.
3. Vital Statistics for the United States for the years 1946,1950,1960 and 1970.
4. Minnesota State Historical Society.
5. St. Croix County Planning Office, documentation.
6. Ms. Agnes Ring; "Rationale for Farmland Preservation" (rough draft), St. Croix County Planning Office; 1979.
7. Ms. Agnes Ring; "Ag Land Plan", St. Croix County Planning Office; 1979.
8. Census of Population, U.S. Dept. of Commerce, Bureau of the Census, Washington D.C., 1940,1950,1960 and 1970.
9. Hudson School District Office.
10. Stillwater School District Office.
11. Census of Housing, U.S. Dept. of Commerce, Bureau of the Census, Washington D.C., 1940,1950,1960 and 1970.
12. The Metropolitan Council of the Twin Cities Area; The State of the Region, Twin Cities Metropolitan Area; 1977, p.145.
13. L.A. Pyle; The Rural Real Estate Market in St. Croix County, Wisconsin 1973-79, 1979, p. 12b and 16b.
14. R. Lockyear; Washington County Planner, presented during discussion.
15. Government official wishing to remain anonymous.

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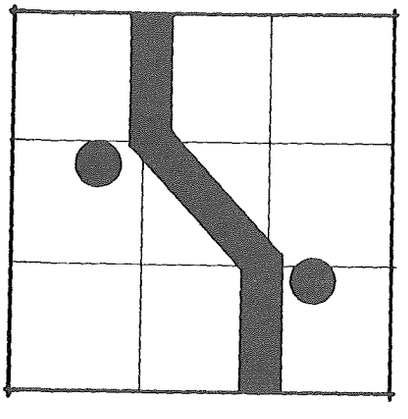


TRANSPORTATION 4

introduction

The purpose of this section is to document and evaluate existing transportation networks and service to the Stillwater-Hudson area. The goal is to determine the effectiveness of these systems, isolate problems and conflicts, and recommend directions for dealing with these problems. The methology used for organizing this material includes: analysis of existing conditions, determination of key issues and corresponding goals, and the development of scenarios for the future.

existing conditions

The role of the St. Croix River in the area's transportation system has changed dramatically. With the development of new technology and depletion of timber resources, the river's importance as a transportation mode has declined.

Railroads provided connections with areas not on the Mississippi River and lessened the area's dependence on slower river travel. Passenger rail service was initially popular but declined with the increase in auto use. The rail system now serves exclusively freight traffic.

Local, state, and interstate highway systems have been improved and the private auto is now the major transportation mode in the area. Interstate 94 runs east-west crossing the St. Croix River Valley just south of Hudson. The old bridge and highway through Hudson has been abandoned and commercial development has begun along the freeway corridor. Also, convenient access to I-94 and Wisconsin tax laws has resulted in the development of an industrial park along the freeway south of Hudson.

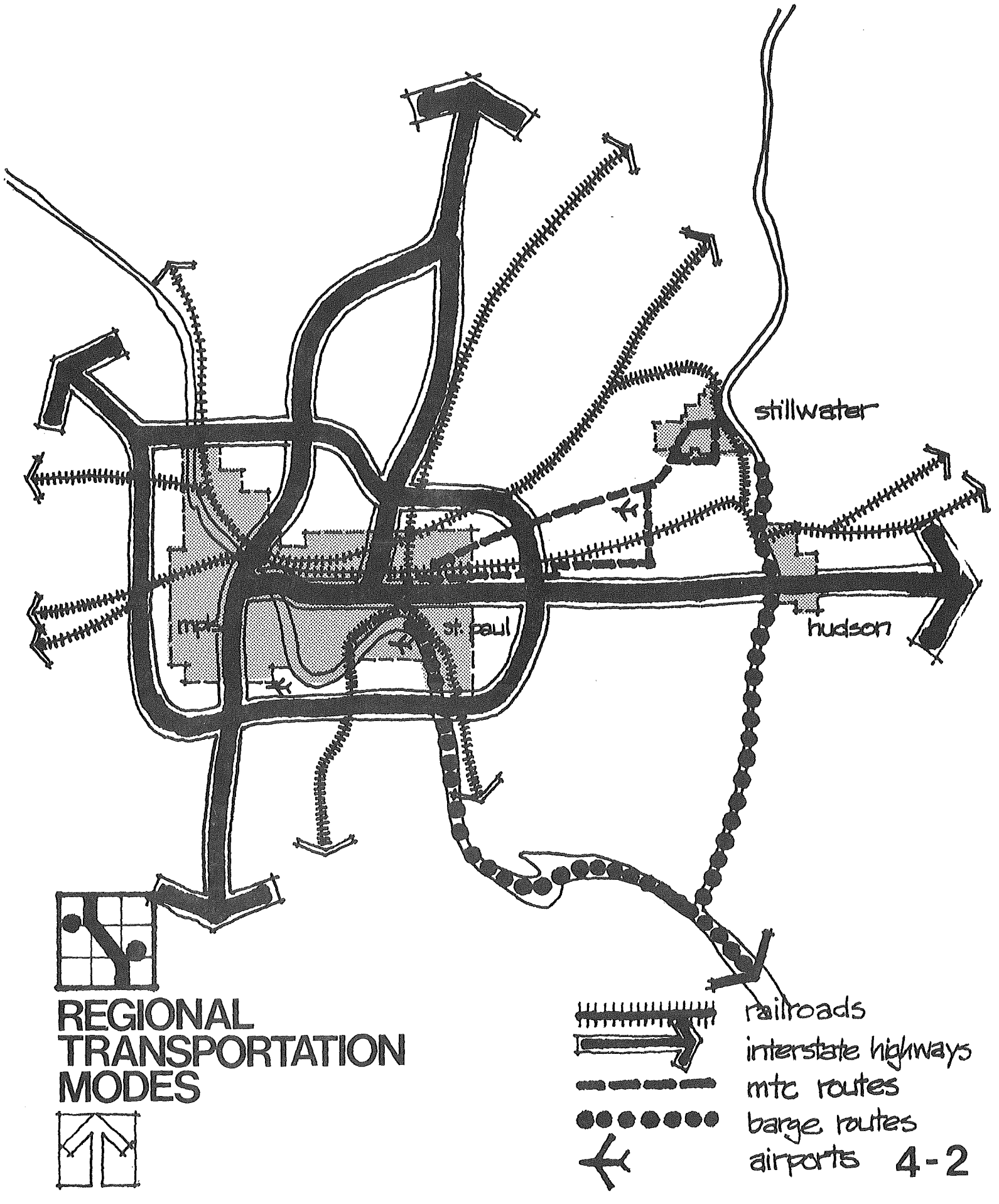
MTC provides two bus routes between St. Paul and Stillwater while a private company serves local Stillwater and Bayport. The Hudson area has no mass transit service.

Minneapolis-St. Paul International Airports provide commercial air service for the area. Lake Elmo Airport southwest of Stillwater serves local private aircraft.

Commercial truck service is available through several private firms.

Destination studies show a high degree of commuting to the metro area from both Stillwater and Hudson. These studies show demand for transportation to Minneapolis-St. Paul, outlying shopping centers, the University of Minnesota, and 3M. There is also high travel demand between the lower St. Croix River Valley and Stillwater. The primary commuter vehicle is the private auto.

Older residents of the area tend to work, shop, and use other services in the Stillwater and Hudson area. Relatively new residents tend to work, shop, and bank in the Twin Cities.



REGIONAL TRANSPORTATION MODES

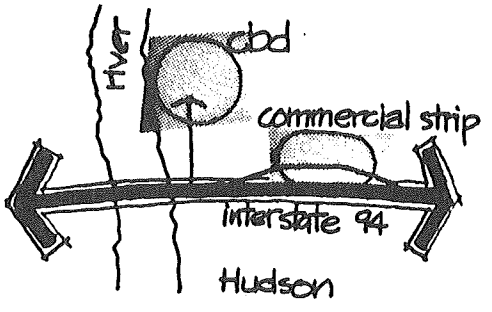
highways

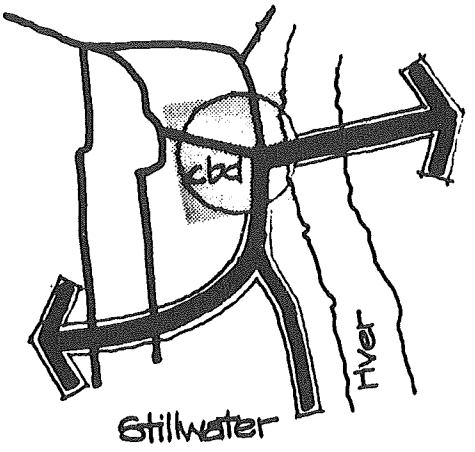
A system of federal, state, and local highways connect Stillwater and Hudson to the surrounding region. Four lane highways connect both towns to the metro area: Minnesota routes 212/36 connects stillwater and Interstate 94 connects Hudson.

Minnesota route 95 and Wisconsin route 35 are the main north-south routes in the St. Croix Valley. A system of county roads provides local access.

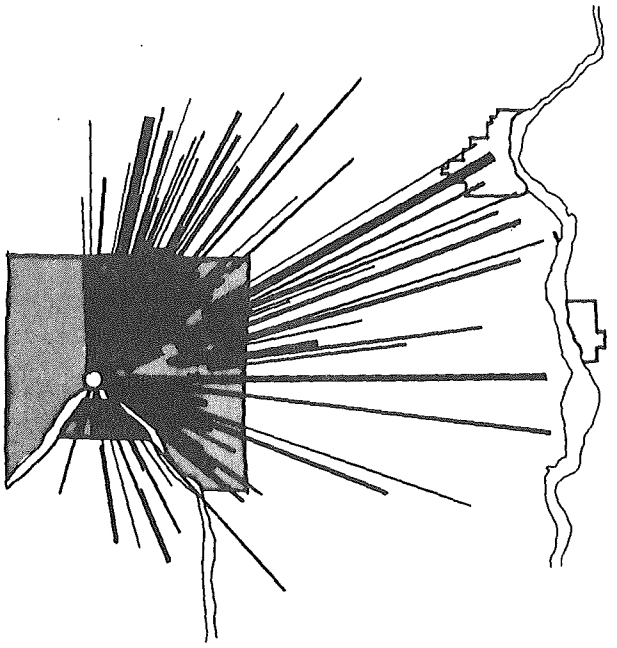
Two highway alterations are currently being studied. Interstate 94 is scheduled for upgrading between St. Paul and Wisconsin. A proposed new route runs one half mile north of existing Highway 12. Citizen objections have raised cause for considering alternative routes. A new bridge crossing the St. Croix River in the Stillwater area is also being considered though the exact location has not been determined. This project is rated as low priority.

Interstate 94 has the highest traffic volume in the area and provides the major access to Hudson. However, thru traffic is able to by-pass the city without mixing with local traffic or encountering the central business district. Movement to the CBD requires a deliberate turn off at the Wisconsin route 35 interchange. A strip type commercial zone has developed along the Interstate which takes advantage of visibility and physical access from the freeway.

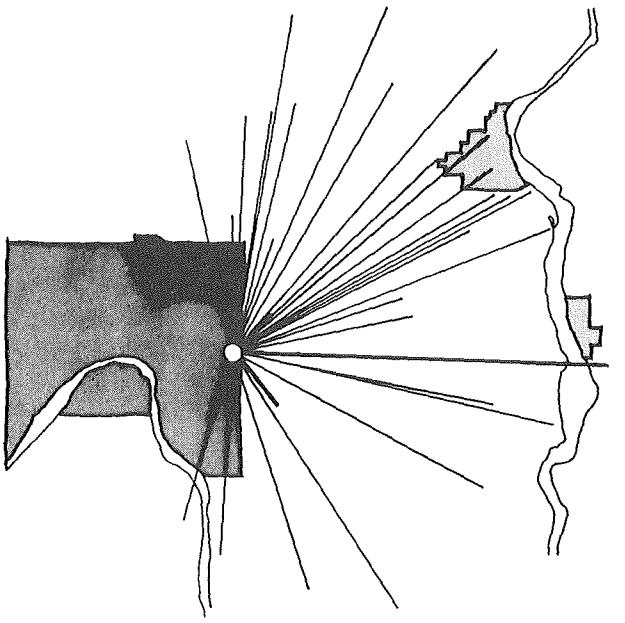




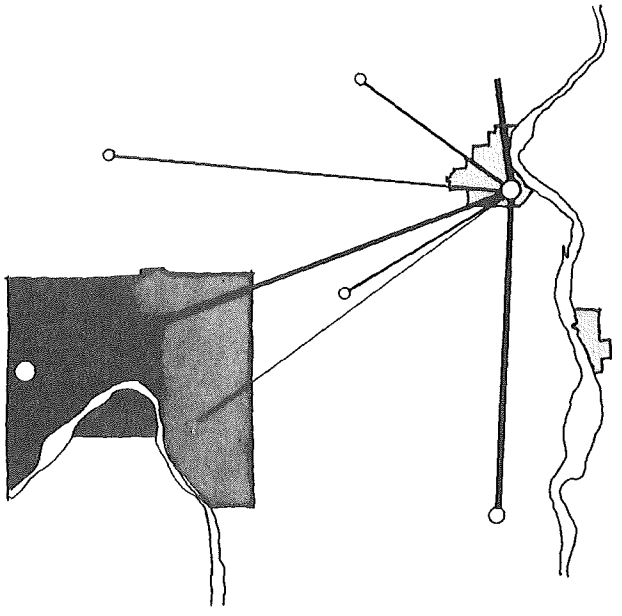
Stillwater has a more heavily used system of county roads and local collectors to compliment Highway 212. Traffic converges on Stillwater from several directions causing numerous conflicts. Quite different from Hudson, Stillwater's busiest route, Highway 212, joins Highway 95 to channel large volumes of traffic through the central business district. The lift bridge crossing the St. Croix causes congestion in Stillwater during rush hour.



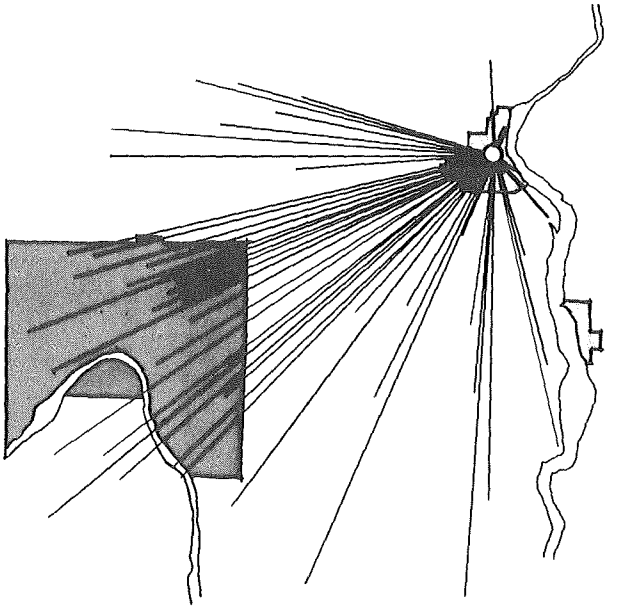
trips between st. paul c.b.d. & peripheral area



trips between 3m. company & st. croix valley



home to work desires from stillwater



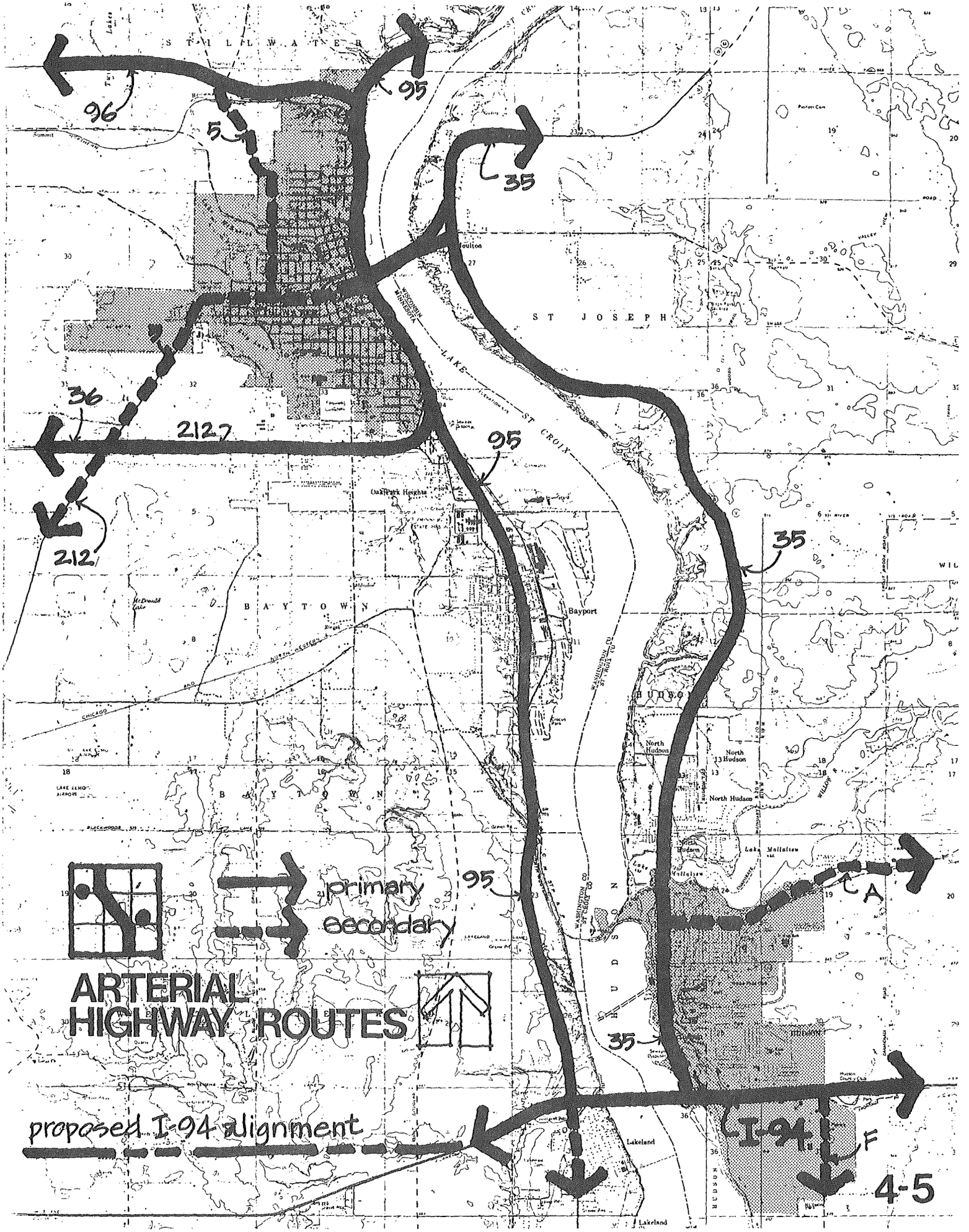
trips between stillwater & peripheral area

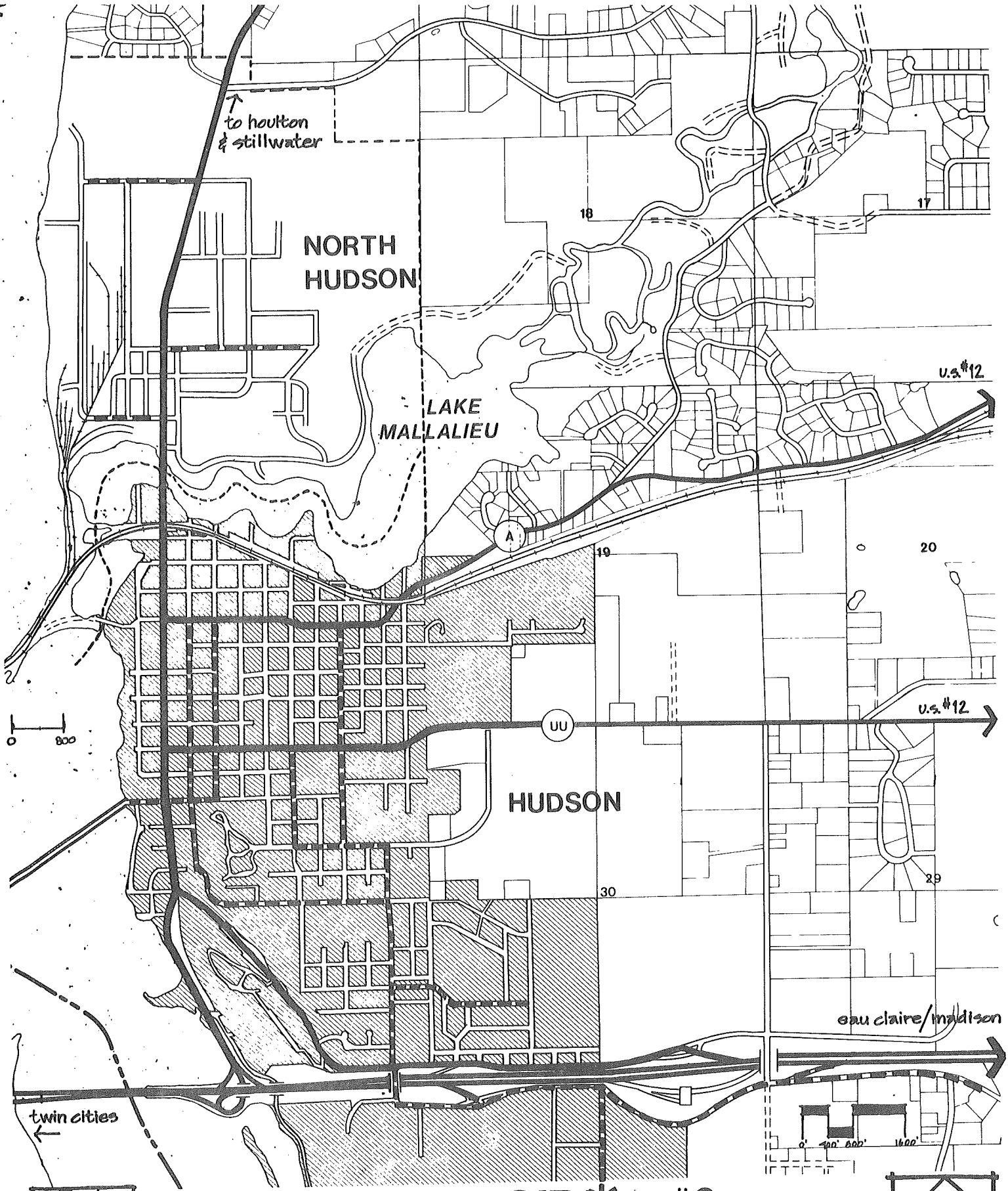
VOLUME STUDIES

daily trips
2000 800 1000 3000

0 1 2 3 miles

4-4

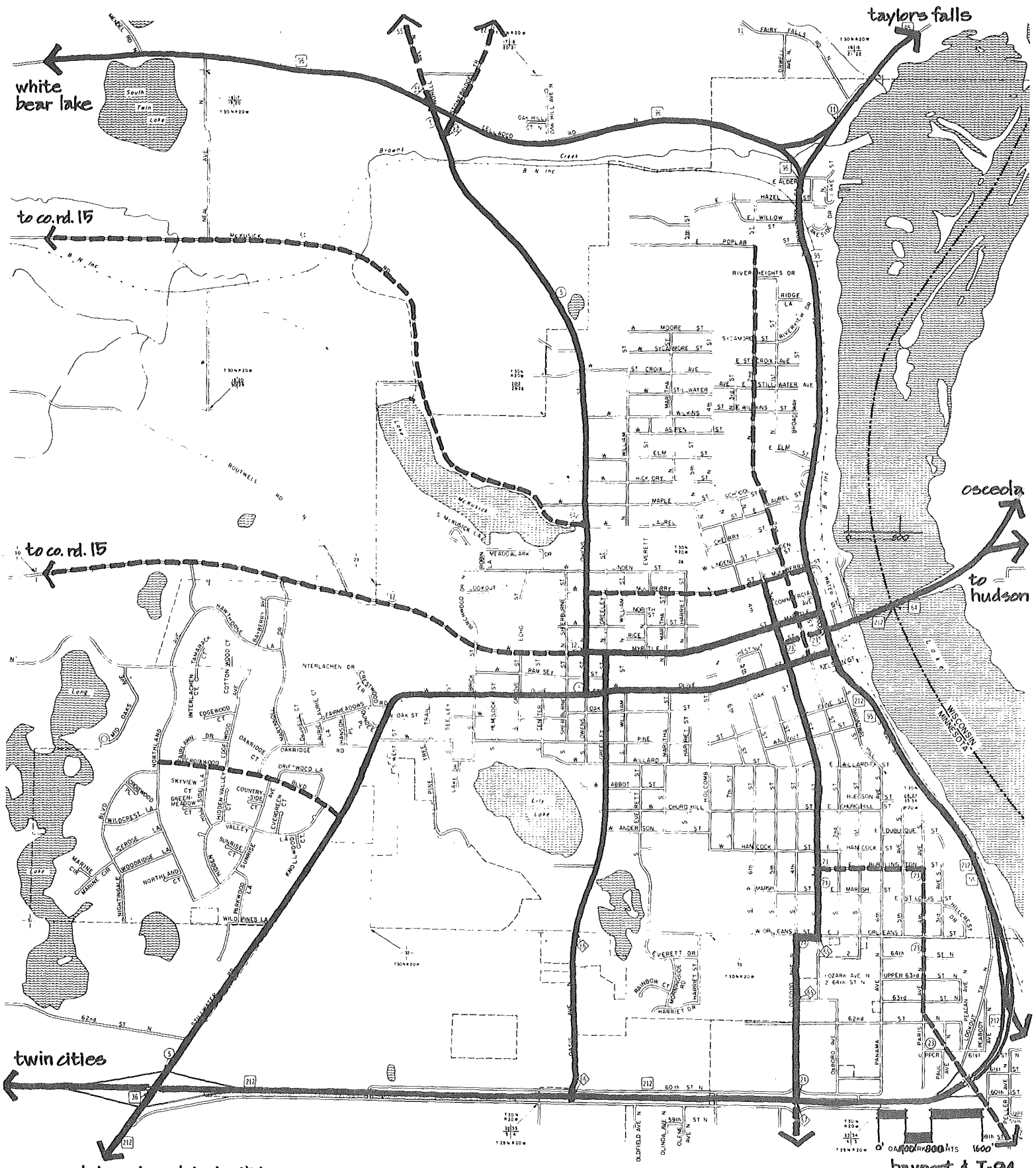

96
95
5
35
36
212
95
212
35
95
35
primary
secondary
ARTERIAL
HIGHWAY ROUTES
proposed I-94 alignment
I-94
A
F
4-5
ST JOSEPH
BAYTOWN
Bayport
North Hudson
Lakeland
LAKE ST CROIX



HUDSON- PRINCIPAL & INTERMEDIATE HWY. ROUTES

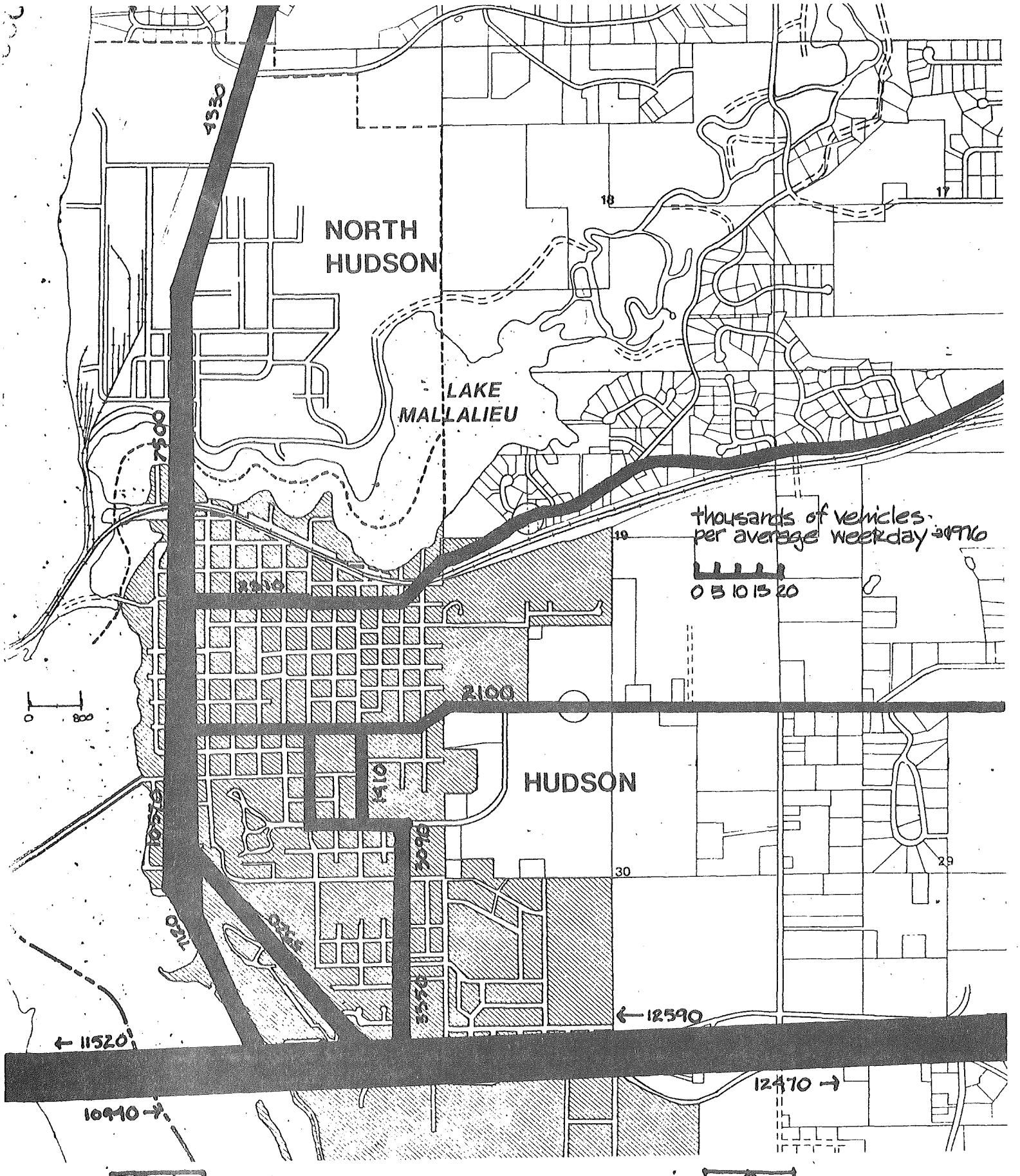
prescott

4-6



STILLWATER - PRINCIPAL & INTERMEDIATE HWY. ROUTES

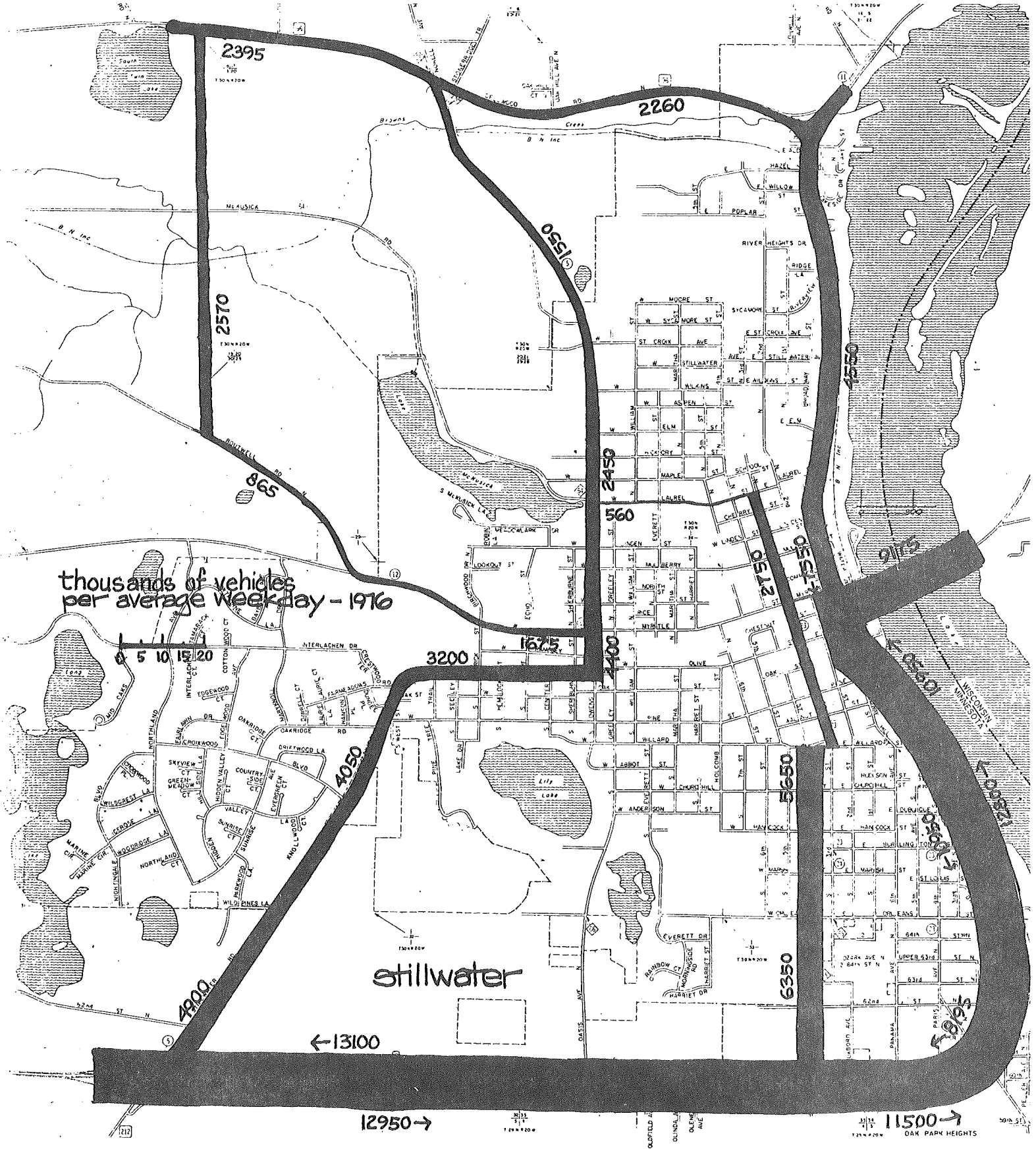
47



HIGHWAY TRAFFIC VOLUMES

0' 800' 1600'

4-8



HIGHWAY TRAFFIC VOLUMES

0 800' 1600'

public transportation

Background:

In 1889, Stillwater installed the first electric street car system in Minnesota. Ridership declined briefly during the first few months of the 1891 bicycle craze but recovered again at the onset of winter. Several years later the Stillwater and metro area street car systems were connected. Then in 1932 buses replaced the street car.

Today Stillwater and Hudson are both popular residence communities for people employed in the metro area. This large population of commuters presents a prime opportunity for mass transit. However, Hudson and most of the St. Croix Valley except for Stillwater lies outside the MTC service district.

Hudson:

There is no local or commuter bus service in Hudson. However, the following transportation services are available:

- Hudson Area Retired Persons Center provides dial-a-ride service three days a week for the elderly.
- St. Croix County provides a medical van once a week to metro area clinics.
- Hudson Women's Club sponsors two shopping vans a month to the metro area for the elderly.
- Zephyr and Greyhound provide daily round trip service from Hudson to the Twin Cities.
- Hudson Taxi.

Stillwater:

MTC service connects Stillwater to St. Paul with the following two routes:

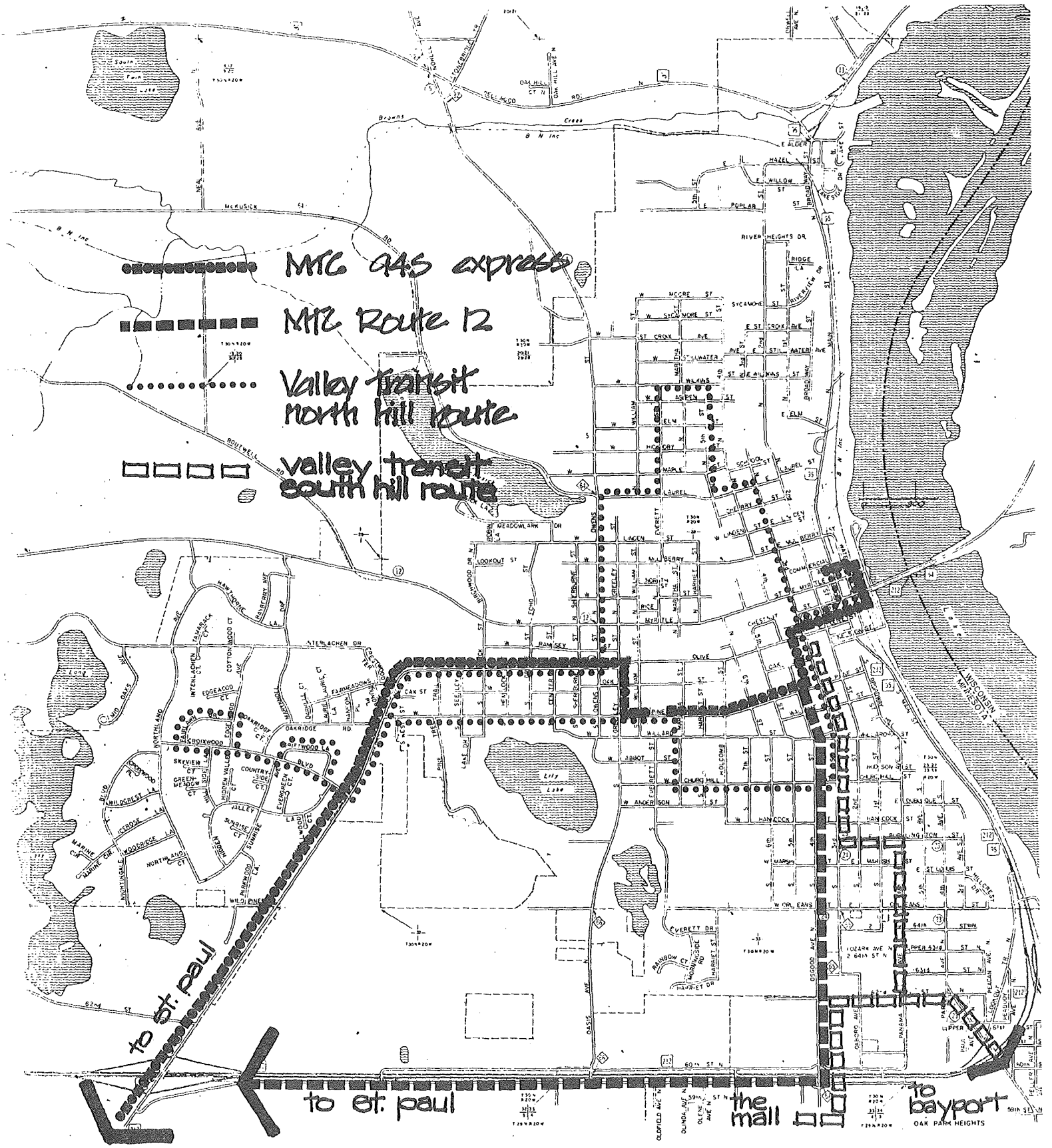
- Route 94S operates on week days only providing morning and evening rush hour service between downtown St. Paul and downtown Stillwater via I-94, 3M, and County Road 5. Ridership on Route 94S is 77% of available seats.
- Route 12 provides hourly service between Stillwater and St. Paul weekdays between 6:00 AM and 7:00 PM. Weekend and holiday buses run during the midday approximately every two hours. Ridership is 110% during rush hours and 21% during the midday.

Valley Transit serves local Stillwater with two routes, each providing nine hourly round trips a day. The North Hill Route originates downtown and serves the Croixwood development and north Stillwater. The South Hill Route connects Stillwater to Bayport via the St. Croix Mall.

Zephyr Bus Lines provides service to Stillwater on its daily run from the Twin Cities to Ashland, Wisconsin.

The Stillwater Taxi has been in business for over 40 years and continues to provide a viable service.

Washington County Welfare Agency provides emergency outreach transportation service to welfare recipients.



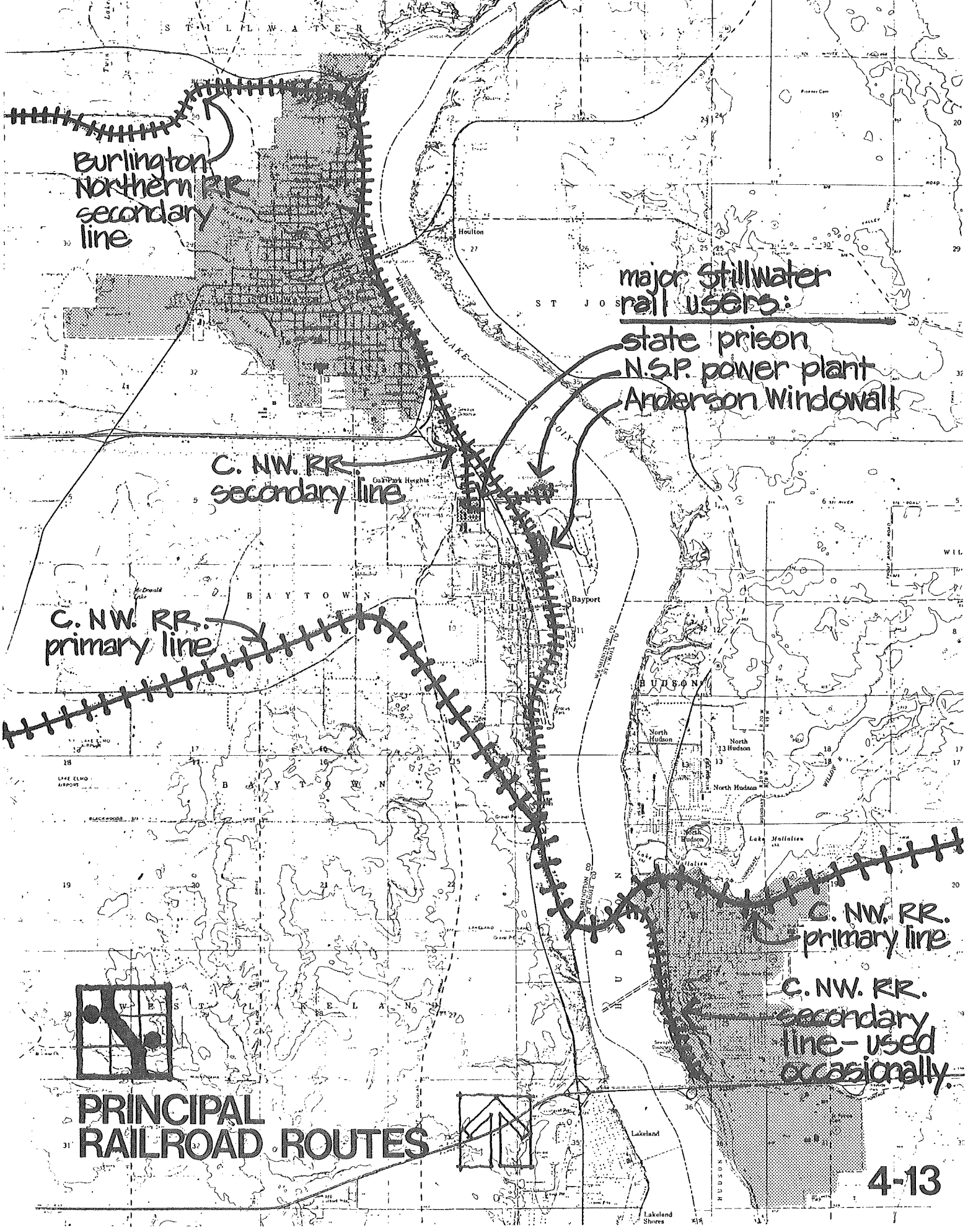
STILLWATER BUS ROUTES

railroads

Railroads were historically important to the development of the St. Croix Valley area. The Twin Cities are the center of area rail service with railroads radiating outward in all directions.

A major east-west rail line, between Minneapolis and Chicago, runs between Stillwater and Hudson. The line Crosses the St. Croix about three miles south of Stillwater and skirts the north edge of Hudson, separating it from North Hudson. Four freight trains run on this line in each direction daily. Grain hauling will be the major future rail use in this area. There is no current passenger service to this area and no plan to reinstate passenger service in the future. However, existing rail lines do run to the center of the Twin Cities so potential commuter reuse cannot be ruled out.

Both Stillwater and Hudson have spur lines running from the mainline to downtown. They were built on the flats near the river for ease of construction and access to industrial users located on the riverfront. In both cases, the decision to locate tracks at the river's edge has created a barrier limiting access to the river. The major rail users in Stillwater are Anderson Window, NSP, and the state prison, all to the south of downtown. The main use of the downtown tracks is for car storage and switching. One train assembles here daily, heading south to connect with the main line. The track northwest of Stillwater is seldom used. If the railyard could be relocated nearer rail users, the downtown line could be abandoned. Across the river the railyard is located in North Hudson. A spur line serves downtown Hudson. There is presently little use of this line and potential exists for abandonment of this spur as well.


Burlington Northern R.R. secondary line
major Stillwater rail users:
state prison
N.S.P. power plant
Anderson Windowall
C. NW. RR. secondary line
C. NW. RR. primary line
C. NW. RR. primary line
C. NW. RR. secondary line - used occasionally
PRINCIPAL RAILROAD ROUTES
4-13

central business district

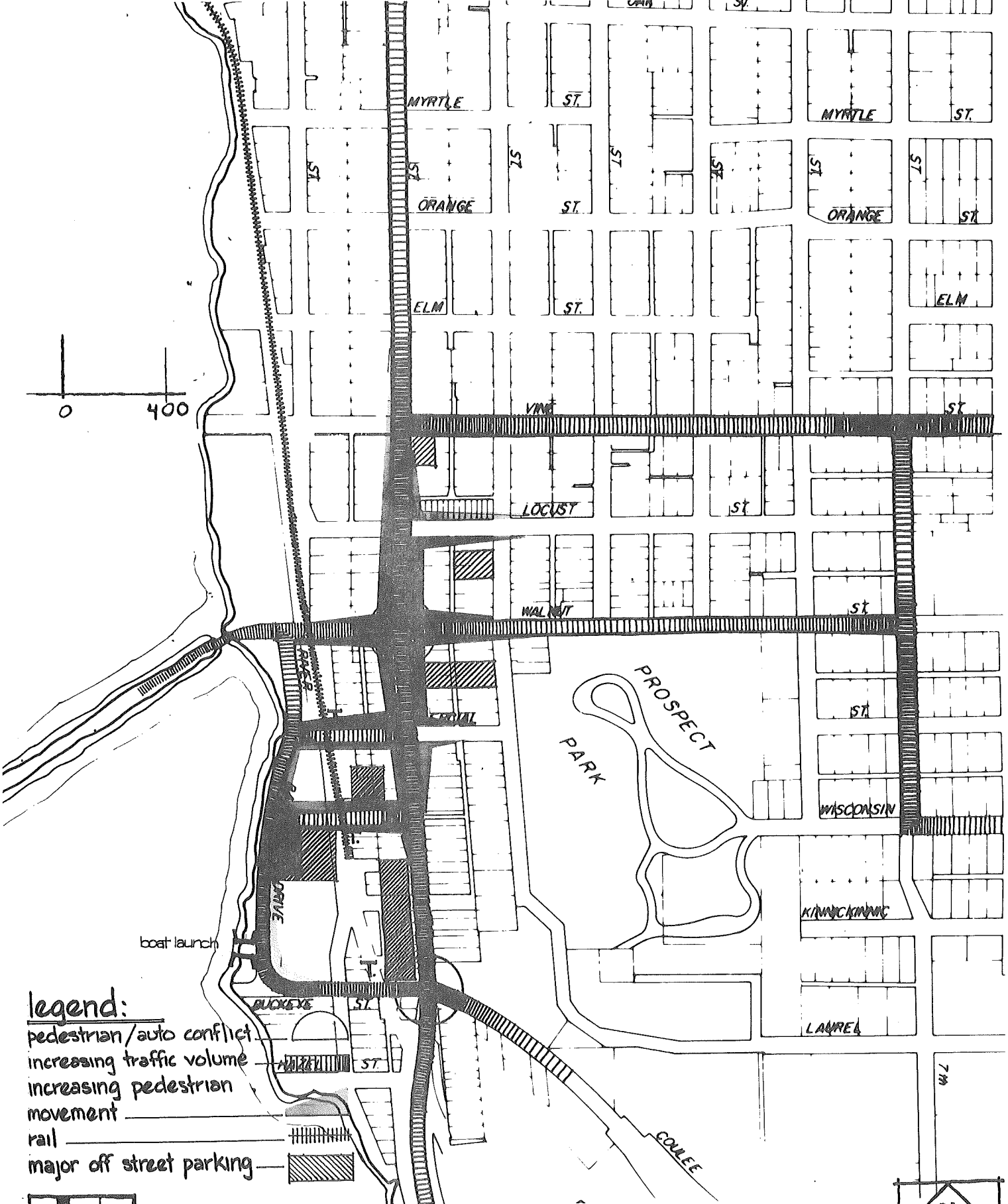
Transportation modes typically converge in a town's central business district. Problem areas and conflicts are more difficult to isolate and identify with a single transportation mode. Therefore, all modes have been analyzed collectively within the central business districts of Hudson and Stillwater.

Hudson's CBD is small and linear. Its orientation is north-south along 2nd Street which is also State Highway 35. This linearity is reinforced by the river on one side and the bluffs on the other. High volumes of local, commuter, and recreation traffic on 2nd St. set up a barrier to crossing transportation modes. Pedestrians and bicyclists are especially at a disadvantage at 2nd St. intersections. The situation is further complicated by recreation vehicles towing boat trailers attempting to turn off 2nd St. and backing up traffic. Several side streets provide limited access to the river, but connections to the riverfront from 2nd Street are weak. A railroad track running parallel to the river also hinders access.

In contrast to Hudson, Stillwater's CBD serves as a focus or collection point for transportation rather than a linear axis. Highways and local collector streets converge traffic at the lift bridge contributing to downtown congestion. The four lane highway approaching Stillwater from the south funnels down to a two lane street as it runs through town. This high volume of traffic creates conflicts with other transportation modes such as bicyclists and pedestrians.

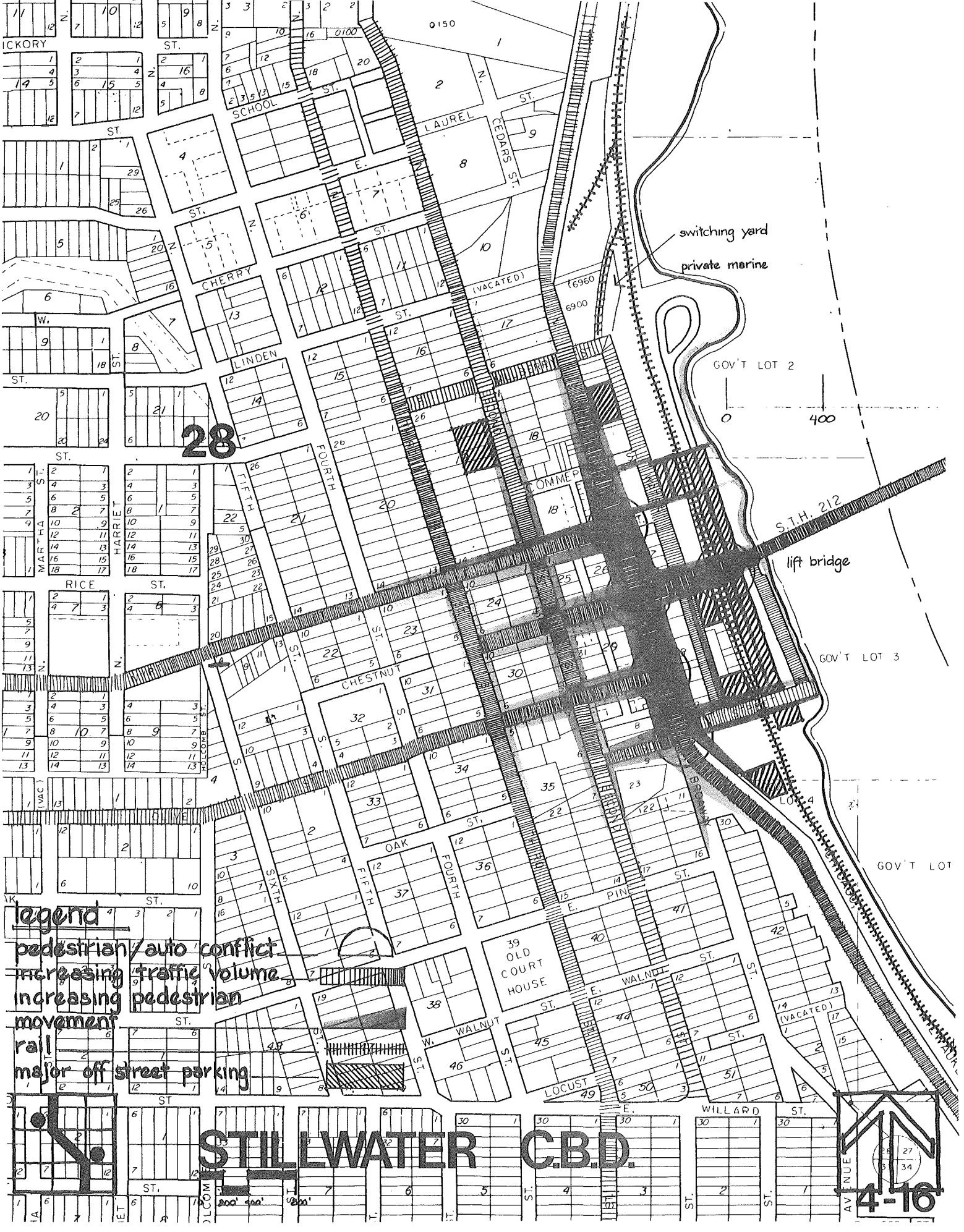
Parking in Stillwater appears to be inadequate. Off street parking lots are located near the river and negate visual and physical links to the riverfront. The act of parallel parking on Main Street also creates hazardous congestion.

When open for boats, the lift bridge backs up traffic into downtown. The railroad track in Stillwater, similar to Hudsons situation, parallels the river and along with the parking lots limits physical and visual linkage with the riverfront.



HUDSON C.B.D.

4-15


switching yard
private marine
lift bridge
S.T.H. 212
GOV'T LOT 2
GOV'T LOT 3
GOV'T LOT
0
400
28
legend
pedestrian / auto conflict
increasing traffic volume
increasing pedestrian movement
rail
major off street parking
STILLWATER C.B.D.
4-16

issues

After examining the existing conditions of the St. Croix valley transportation systems, it is possible to see conflicts and potentials within each mode. With the help of area planners, these small scale problems were focused into five broad issues facing both Stillwater and Hudson. These issues can then be used as a background on which to project goals, planning potentials, and possible future trends in transportation.

commuter volume

A large percentage of the work force commutes daily from the Stillwater-Hudson area to the Twin Cities

G O A L S

--provide commuters with economicaland attractive alternatives to the automobile

--broaden service base of existing transit system

--lessen the impact of commuter traffic in Stillwater and Hudson

A L T E R N A T I V E S

--continue existing and start new mass systems

*buses?

*light rail system?

*personal rapid transit?

--make mass transit systems convenient, fast, and cost effective

*provide enough capacity so everyone has a seat?

*increase frequency of buses?

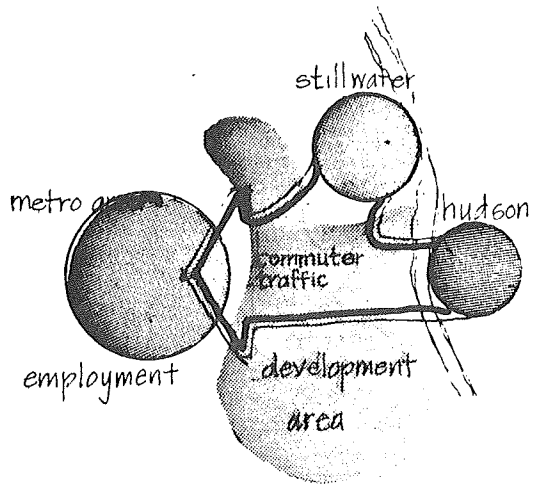
*widen services area?

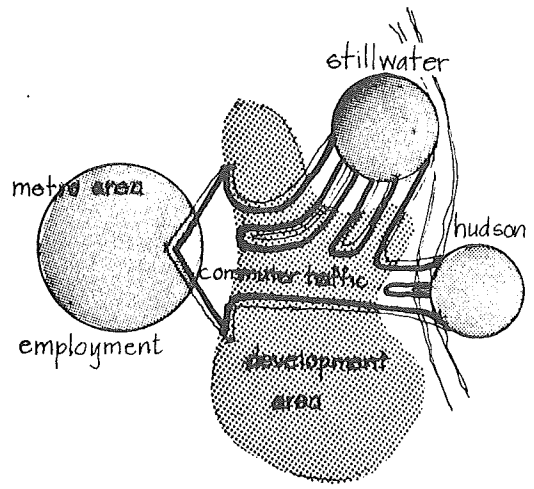
*increase use of express service?

--reduce traffic in downtown area

*re-route traffic to bypass city?

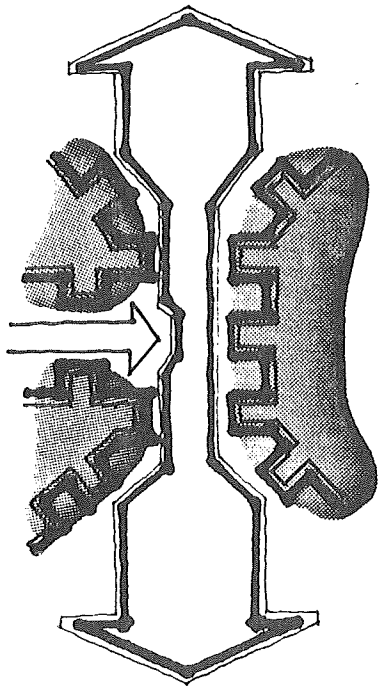
*encourage people to take mass transit?





downtown congestion

The high volume of traffic through Hudson and Stillwater downtowns-- although beneficial to commercial interests-- often exceeds capacity and causes conflicts.

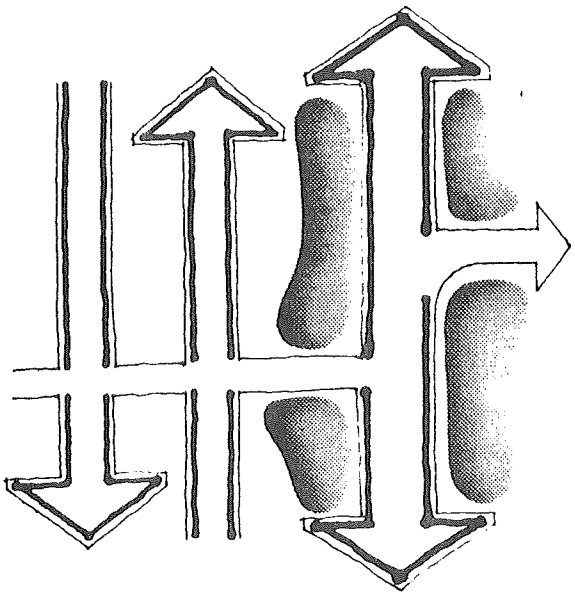


GOALS:

- Reduce main street congestion.
- Eliminate conflicts between transportation modes.
- Maintain commercial activity.
- Maintain existing character in Stillwater.

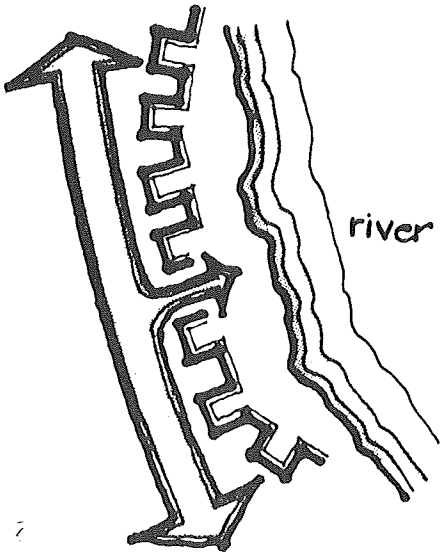
IMPLEMENTATION ALTERNATIVES:

- Provide alternative routes for through traffic:
  - -one ways downtown?
  - -town bypasses?
  - -new bridge (Stillwater)?
- Maintain an acceptable amount of traffic in central areas:
  - -maintain visual links to downtown from any bypass routes?
  - -provide convenient but inobtrusive parking?
- Distribute traffic congestion over a wider area:
  - -one ways?
  - -reduce on- street parking?



riverfront access

Potential riverfront access is limited by existing transportation and land use patterns.

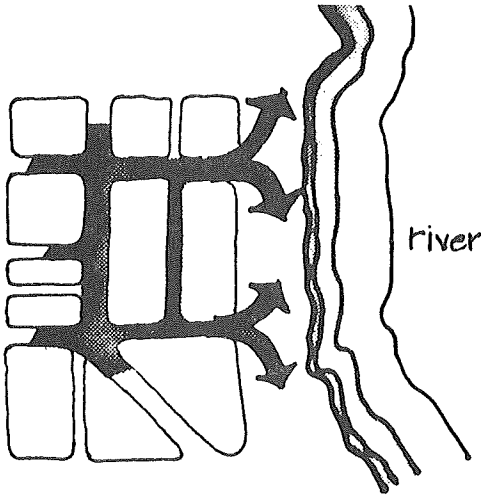


GOALS:

- Increase public access to riverfront.
- Eliminate existing barriers.
- Improve visual quality of approach.
- Decrease impact of vehicles on riverfront.

IMPLIMENTATION ALTERNATIVES:

- Provide safe pedestrian routes from downtowns to riverfronts?
- Provide visual links from downtowns to riverfronts?
- Move parking?
- Move railroads?



st. croix river & corridor link

Increased use and expansion of transportation systems in the valley may threaten the scenic character of the river

G O A L S

--maintain scenic quality of the river valley

--provide guidelines for expansion of transportation systems

A L T E R N A T I V E S

--minimize intrusion of any new bridges?

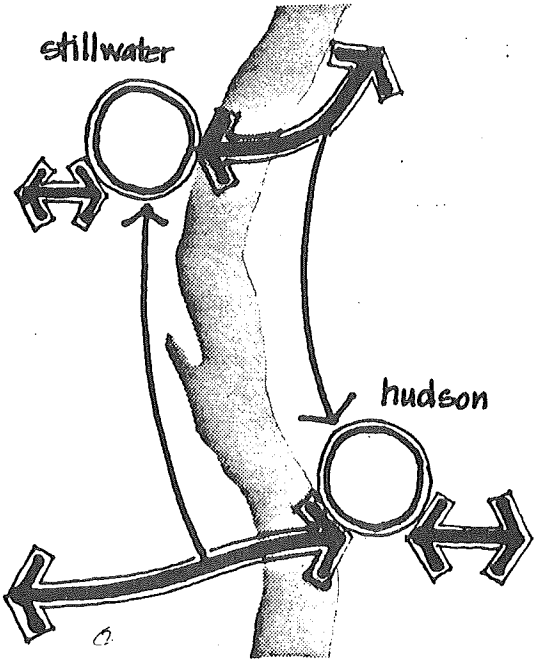
--increase bike/hike potential along river?

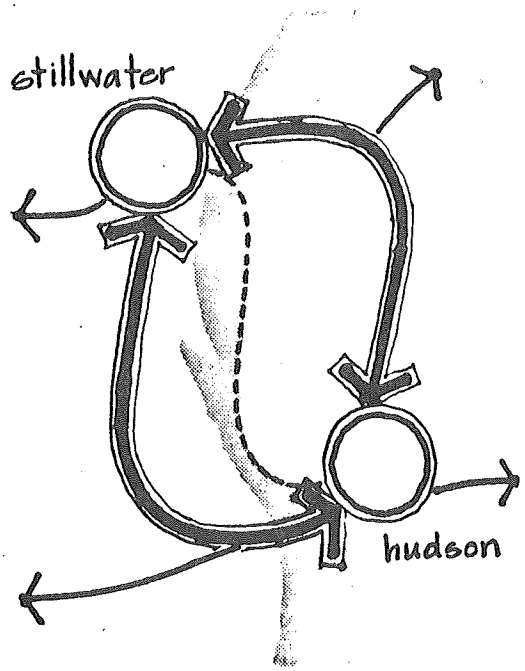
--continue management of marinas and boat launches?

--make efforts to buy back unneeded railroad right-of-ways?

--decrease visual evidence of river crowding along roadways and at marinas?

--provide Stillwater-Hudson boat ferry?





It is important to view the transportation issues in relation to the future. Toward that end, two scenarios were posed. For both scenarios it is assumed that

- area growth continues at its present rate
- energy resources continue to diminish

scenario 1

This scenario assumes that Stillwater and Hudson address the issues defined by this report and take steps toward meeting transportation goals.

scenario 2

This scenario assumes that Stillwater and Hudson rely on current transportation systems during the eighties and do not take steps to address the issues.

Each issue has been re-examined in light of the assumed action or inaction. A sequence of resulting circumstances has been proposed on the following pages.

scenarios

downtown congestion

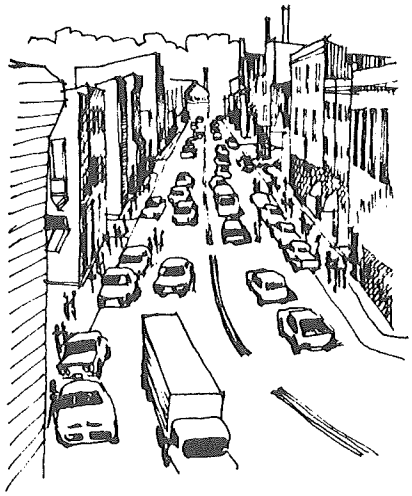
Downtown areas continue to be heavily used auto routes.

scenario 1

- Stillwater initially uses one way streets to decongest downtown.
- Hudson develops convenient off street parking to improve 2nd Street and "hold" some of the thru traffic.
- New bridge and rerouting of 212 reduces congestion in Stillwater, still providing an inviting view from bidge entrance.
- Bike paths and pedestrian routes are developed in both towns which recognize and accommodate them as viable local transportation alernatives.
- Commercial traffic stays at a profitable level. Congestion is reduced but vitality of river towns remains.

scenario 2

- Volume of thru traffic increases, adding to street congestion and destroying river town character.
- Parking demand increases. Parking lots intrude visually on main streets and riverfronts. On street parking is retained due to pressure from merchants.
- Pedestrians are confronted by hazardous street crossings, noise, and fumes. Cycling is unsafe.
- Decline in general quality of CBDs drives costomers and retailers to spacious outlying malls.

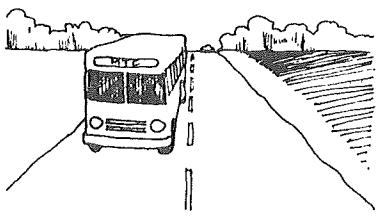


commuter volume

Commuter populations continue to grow in the Stillwater and Hudson area.

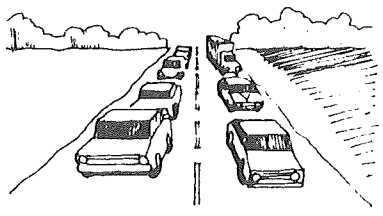
scenario 1

- I-94 auto traffic increases in spite of rising gas prices.
- MTC expands and improves service with subsidy from valley area. Improved efficiency increases ridership.
- Valley Transit expands to serve the river valley.
- Commuter service on e existing rail lines and new light rail systems to the metro area are considered.
- Cost effective public transportation is realized and auto commuting drops as a result.



scenario 2

- auto congestion increases as area development and commuter dependence on cars continues to grow.
- No attractive commuter alternative exists. MTC lacks capital to improve service.
- Road capacity in the valley is inadequate to handle increased volume of autos. Driving becomes more annoying and less convenient.
- Hudson still lack a commuter connection to the Twin Cities. I-94 congestion increases and commuting takes more time.
- Commuting consumes a higher percentage of the family budget. Trips to the Twin Cities for shopping and entertainment become luxuries.

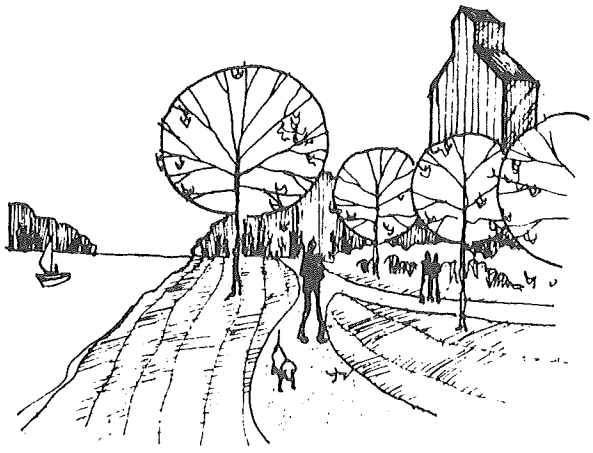


riverfront access

Increased activity in downtown areas has increased demands on riverfronts.

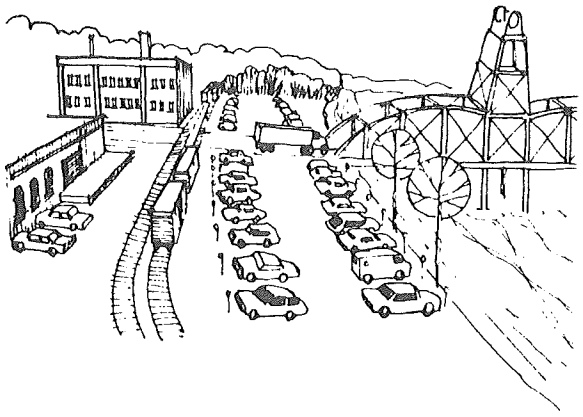
scenario 1

- Stillwater's old bridge is removed. Visual axis down Chestnut remainsbut traffic is reduced.
- Hudson improves Walnut St. as a pedestrian and bike access to the riverfront.
- Both towns limit vehicles near the river and integrate parking in the form of small lots.
- Both cities acquire riverfront railroad property and consider integration of uses: recreation with commuter rail service.



scenario 2

- Riverfont areas remain unimproved. Dangerous conflicts exist between transportation modes and recreational users.
- Access is indirect and unsightly. Rail yards, tracks, and parking lots still block access to the river, restricting visual linkage.
- Continued commercial and industrial development on and adjacent to the riverfront results in a lost opportunity to use a valuable resource.

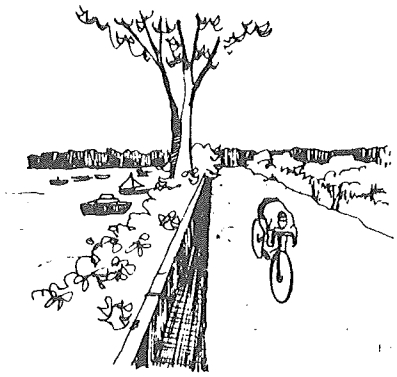


river valley link

Increased commercial and recreational activities continue to exert strong pressure for use of the river valley between Hudson and Stillwater.

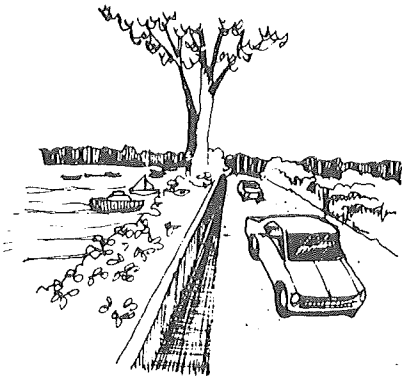
scenario 1

- Government agencies agree to regulate car and trailer parking on the waterfront to reduce overcrowding.
- Bike-hike parkway develops on riverfront land purchased from railroads.
- New ferry and boat rental service between Stillwater and Hudson enables people who do not own boats to enjoy the valley scenics from the river itself.



scenario 2

- Demand on the river increases. Marinas become overcrowded and the riverfront is overrun with parked cars and boat trailers.
- Auto sightseeing increases Highway crowding causes hazards for cyclists who lack segregated routes thru the valley.
- Lack of alternatives requires people to own their own boats to enjoy being on the river. This adds to the congestion and reduces the quality of the recreational experience.



scenario 1

In scenario one the quality of life has improved for the Valley area residents since they have taken steps to solve transportation related issues in the following ways:

- Encouraged economic growth by enabling workers to commute to jobs, and allowing shoppers from within and without the community good access to commercial areas.

- The unique river town characteristics of Stillwater and Hudson have been improved.

scenario 2

In scenario two the quality of life for Valley area residents has deteriorated for having neglected the transportation issues of the '80s. The following conditions might exist:

- Economic growth has been slowed by restricting the purchasing power of citizens who spend more on energy to commute, and by discouraging easy access to local business.

conclusions

bibliography

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Department of Transportation

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Consumer Information
MTC

Ken Elert
C & NW Railroad

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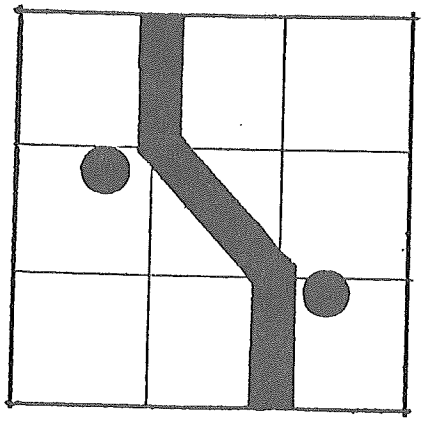
Washington County Planner

Jim Kolb
Valley Transit, owner

Bob Lockherdt
Washington County Planning Coordinator

Dick Thompson
St. Croix County Planner

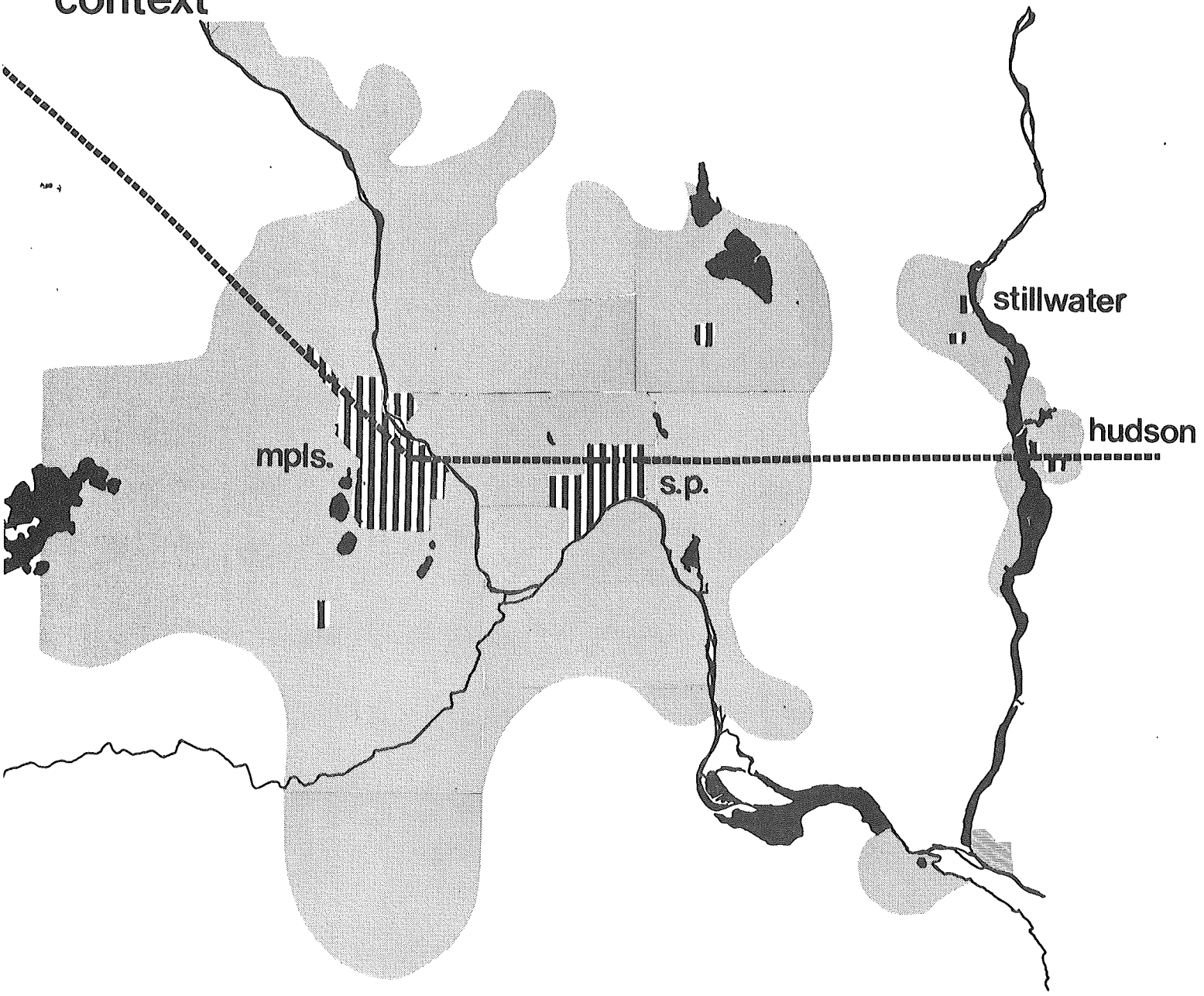
Mike Wallace
Hudson City Planner



LAND USE

5

context



The place has come to be as a result of the dynamism which is inherent to all natural processes. The place is a mute record of ancient seas and the deposition of sandstone, limestone and shale strata. Glaciers have advanced and retreated, leaving their signals in hills, kames, kettles, and a myriad of glacial lakes. But the seasons of the year, the hydrologic cycle, and the recycling of vital nutrients are still going on. Hills are eroded and the sediments follow gravitational paths, and rivers change their courses over time. It is important to recognize the dynamism of physical and biological processes, and more important, that these affect man and are affectedby his intervention.

from Ian McHarg, An Ecological Study of the Twin Cities Metropolitan Area.

introduction

METRO

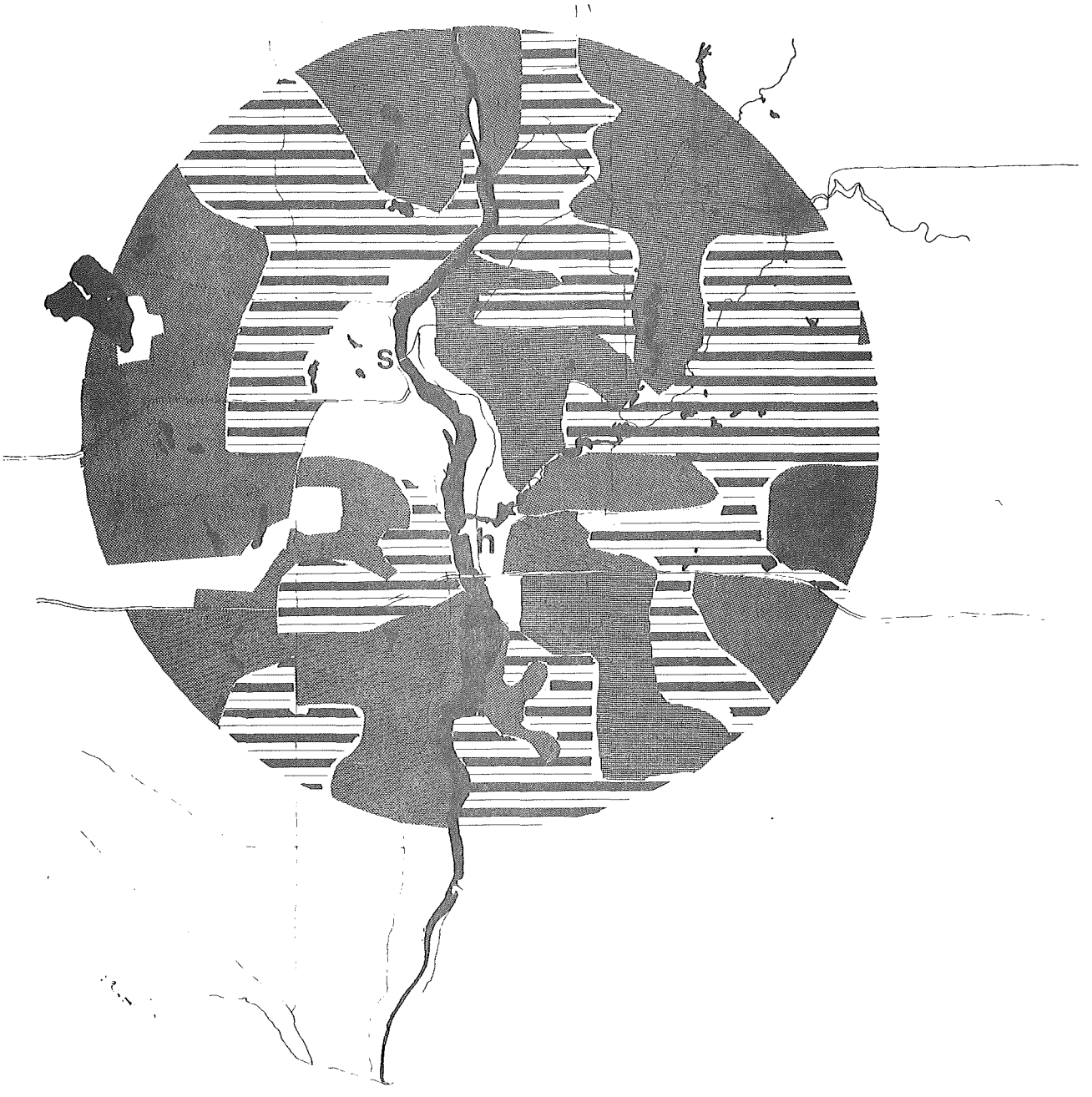
The towns of Stillwater and Hudson are located near the furthest navigable reaches of the St. Croix River.

The cities are contained in two counties: Washington County in Minnesota and Saint Croix County in Wisconsin. Both towns originally established themselves along the St. Croix River in response to historical transportation, trade and industrial developments. Today this settlement pattern is still very much in evidence. Clearly the most striking feature of an overall map of today's land use is the relationship of the river towns to the greater metropolitan Twin Cities Area. (see page 5-1)

DEVELOPMENT

There is only a narrow band of land separating St. Paul's spread of residential urbanization with that of Stillwater.

The search for cheap, rural amenities spreads out from the CBDs along the river and highway corridors, gradually filling in between. This pattern is only modified by regulatory devices (e.g. zoning or minimum lot sizes for septic systems), public or private ownership of large blocks of land. To some extent the better quality agricultural lands are being taken last. However, more and more farm land is being sold and divided into large-lot single-family parcels, creating rural non-agricultural pools that are evenly mixed with active farm land. (see page 5-3)



ST CROIX VALLEY
LAND USE

high density residential

low density

agricultural

regional

ST. CROIX VALLEY

Land use today reflects configurations of the Auto-Air-Amenity epoch, 1920 through the present. The influence of these factors have marked the land use patterns of Stillwater and Hudson.

The cities of Stillwater and Hudson are not independent entities, but rely upon the economic health and vigor of the entire metropolitan region. The Twin Cities have in this era grown and flourished in industries which are not solely agricultural or regionally based but national and world-wide. (see page 5-5)

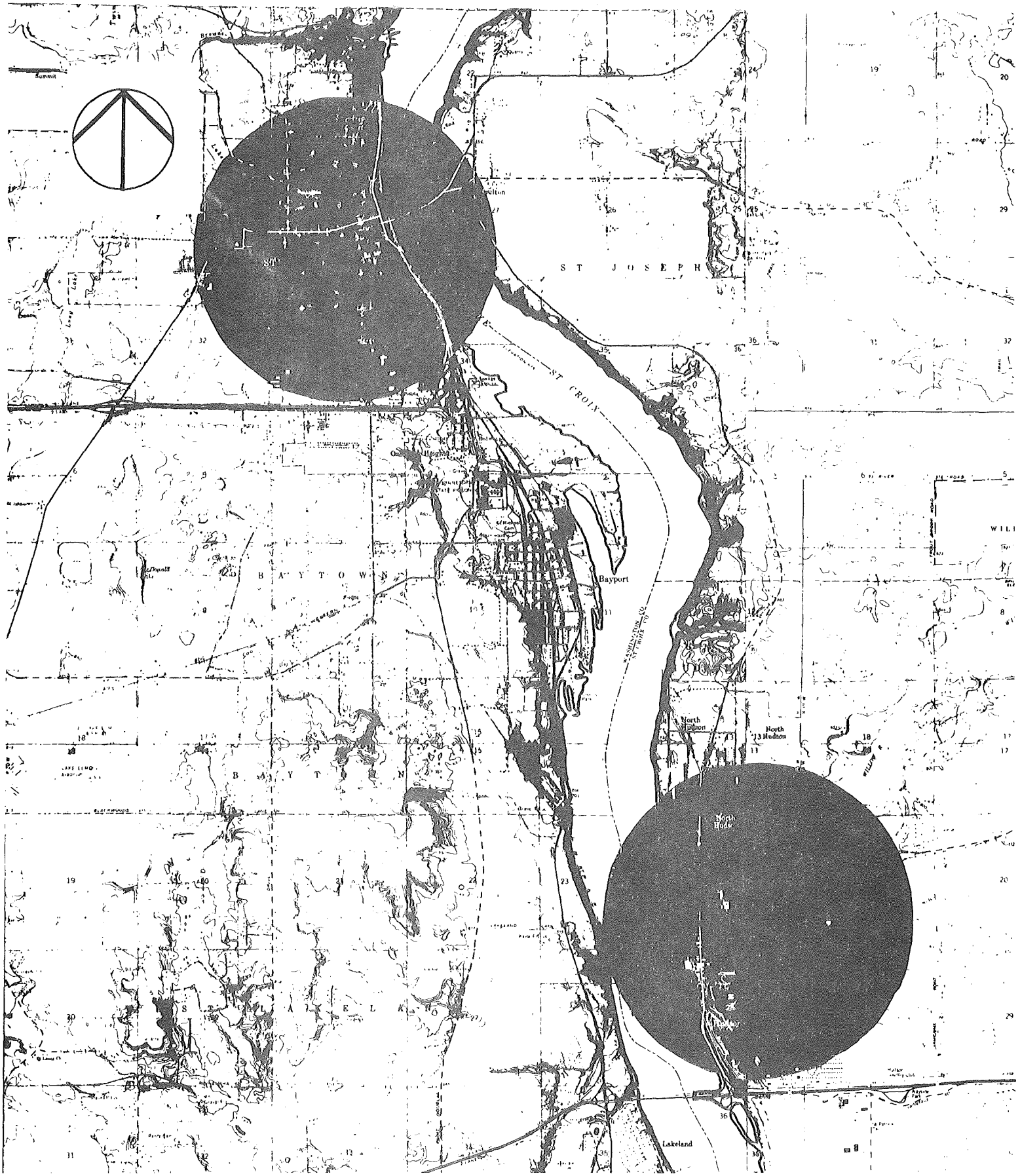
CONTEXT

Both river towns have become residences for Twin City commuters.

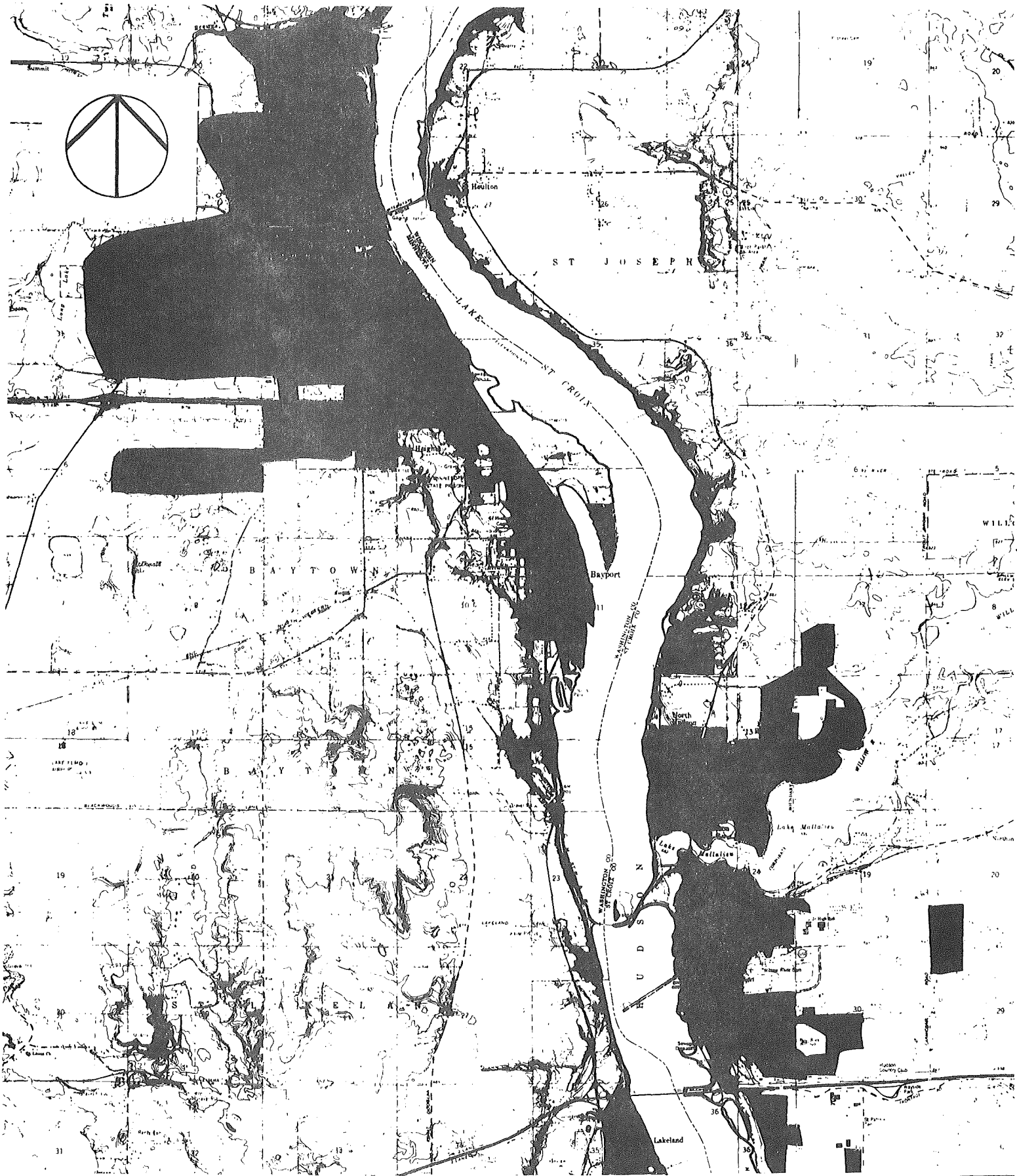
These residents drive cars daily to their jobs as either part of the network of services which the Twin Cities provides in its role of service center for the upper midwest or to manufacturing/agricultural processing. The commuters live close to and use the services of the local central business districts and local commercial strips on a day to day basis but also use the more complete facilities of the Twin Cities or their satellite shopping centers. (see pages 5-6, 6-7)

The close proximity and similar history of Stillwater and Hudson might suggest that the two enjoy some sort of symbiolic relationship--this is not the case.

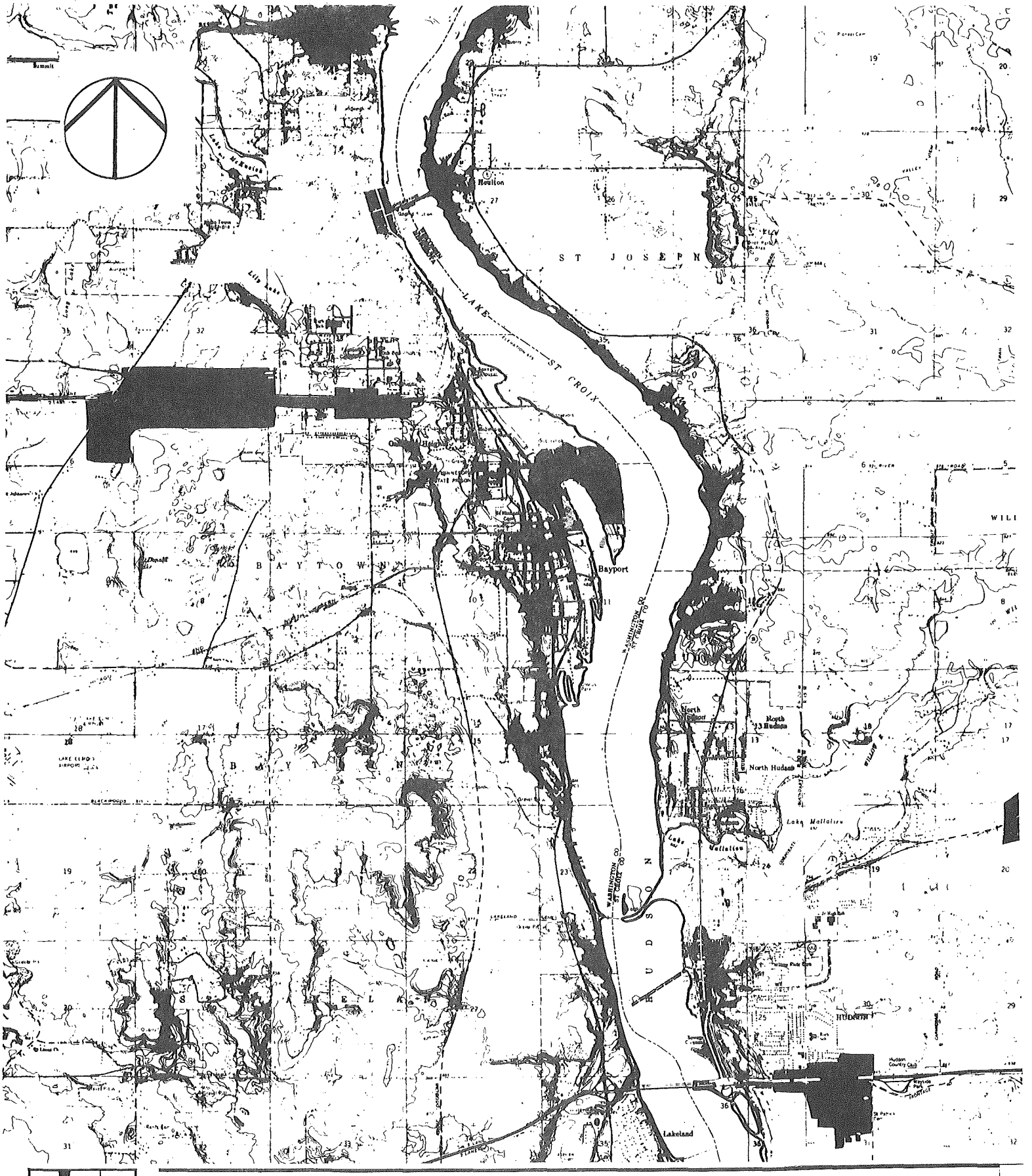
Though separated by a straight distance of about five miles, they could as well be fifty miles apart, for there is no apparent use of one another or direct linkage with the exception of the river. Stillwater and Hudson have in no sense developed as a "Twin Cities" of the St. Croix, or as dual centers of a spreading urbanized area. They act as independent moons of the same star.



ST. CROIX VALLEY
CONTEXT



ST. CROIX VALLEY
RESIDENTIAL



ST. CROIX VALLEY
COMMERCIAL

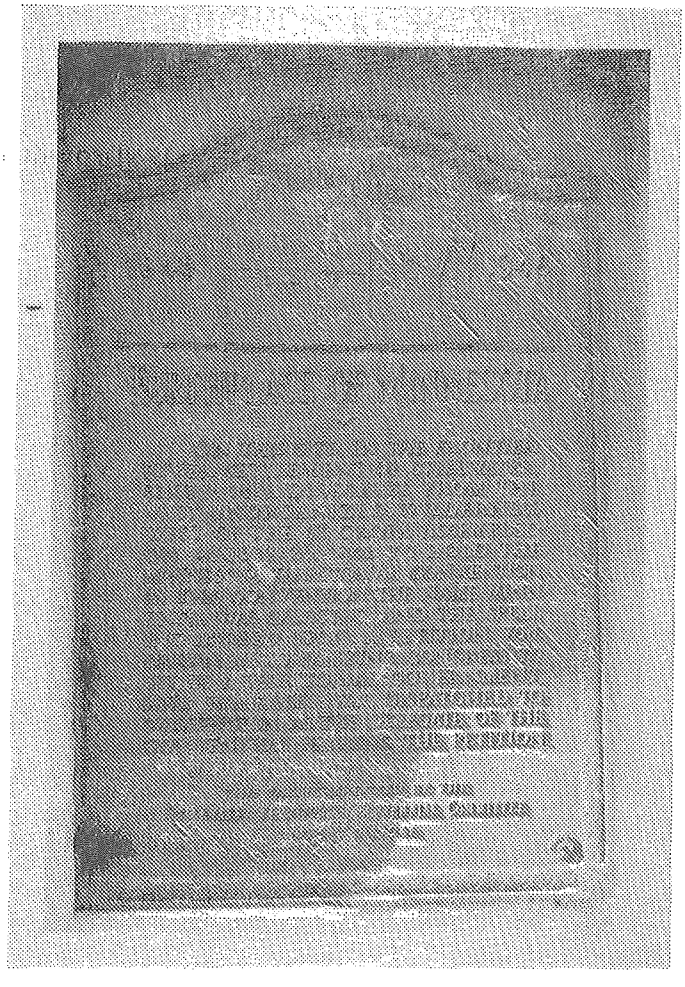
land use

Land use planning is only one part of over-all or comprehensive planning. Other parts include: utility planning, community facility planning, transportation planning, recreation planning and economic development planning. All the parts are related and it is difficult to plan for one without considering the others.[1]

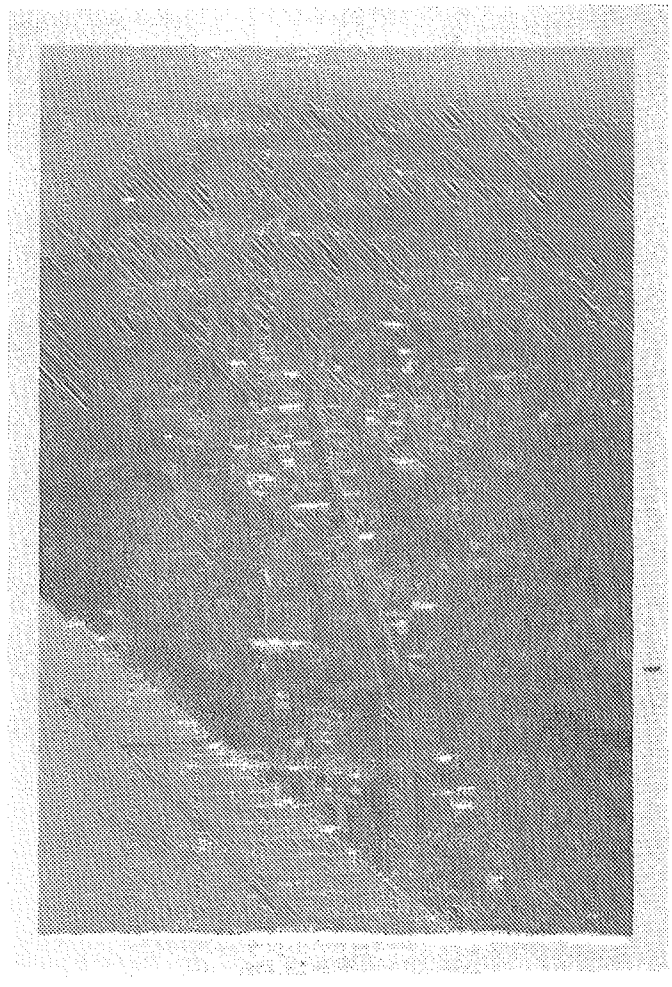
The emergence of Stillwater and Hudson have followed a typical development of a city. Patterns of development are evident in both cities that are general to many cities in the U.S. who have developed in the 19th century. Three observations about cities will lead us into an understanding of Stillwater's and Hudson's land use:

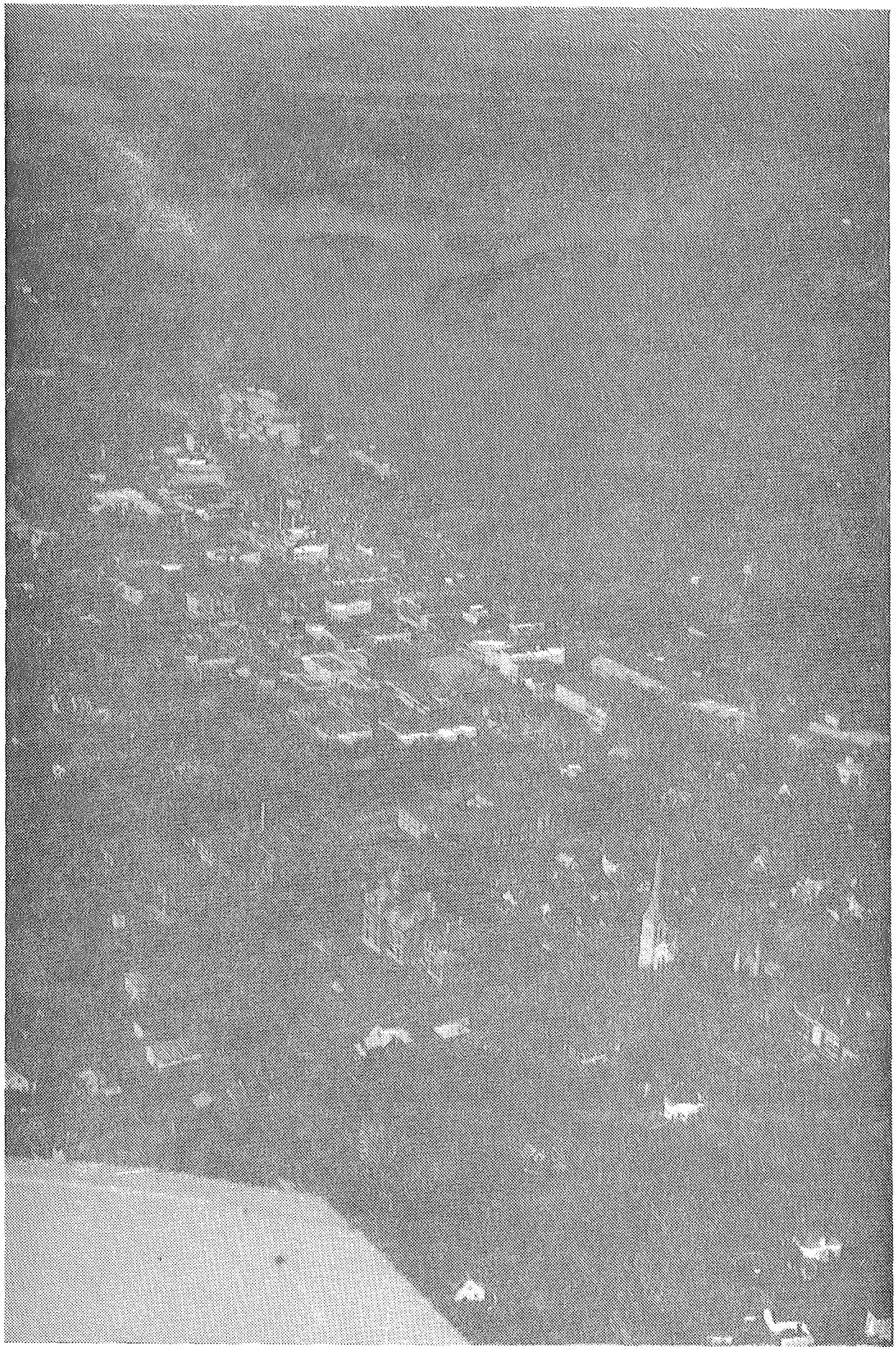
- The cities are a product of geographic, economic and technological forces
- Dicisions that shape the city were made mostly in the private sector
- The shape of cities is set early in their history.[2]

stillwater



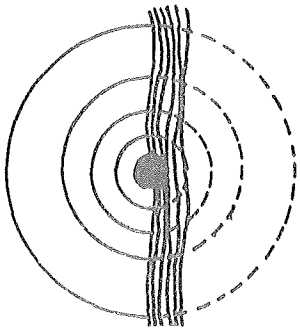
hudson



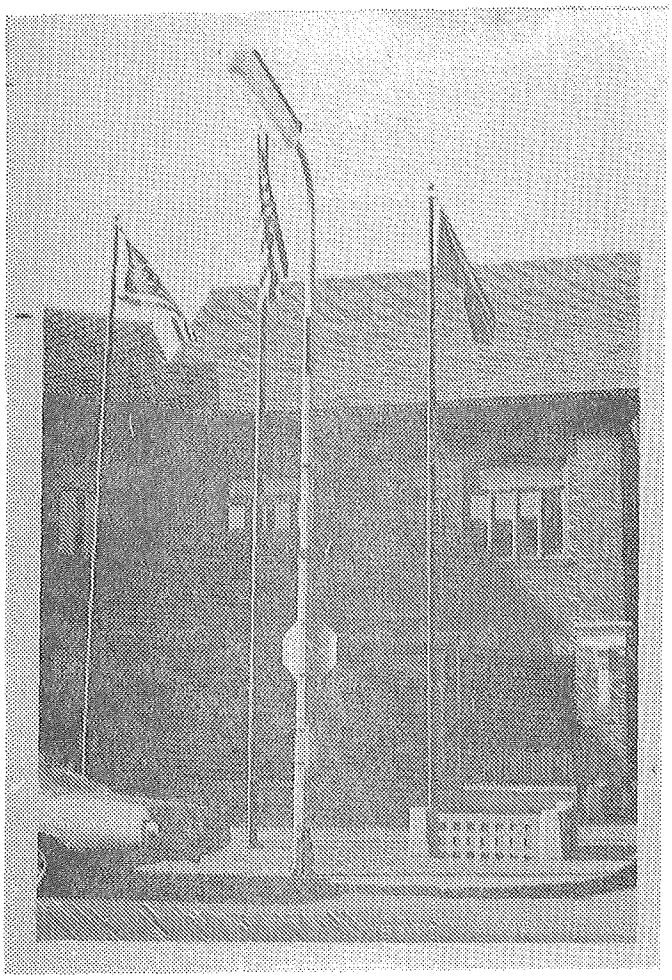


STILLWATER

Stillwater is no exception to these findings. The geographic location on the river in a low narrow break in the bluffs finds access to the river, which brings us in contact with other people (a place of transportation) and a source for potential technological advances. As one takes a closer look at Stillwater (see central city land use 5-11), we find evidence of the social organization that leads us to todays present day features.



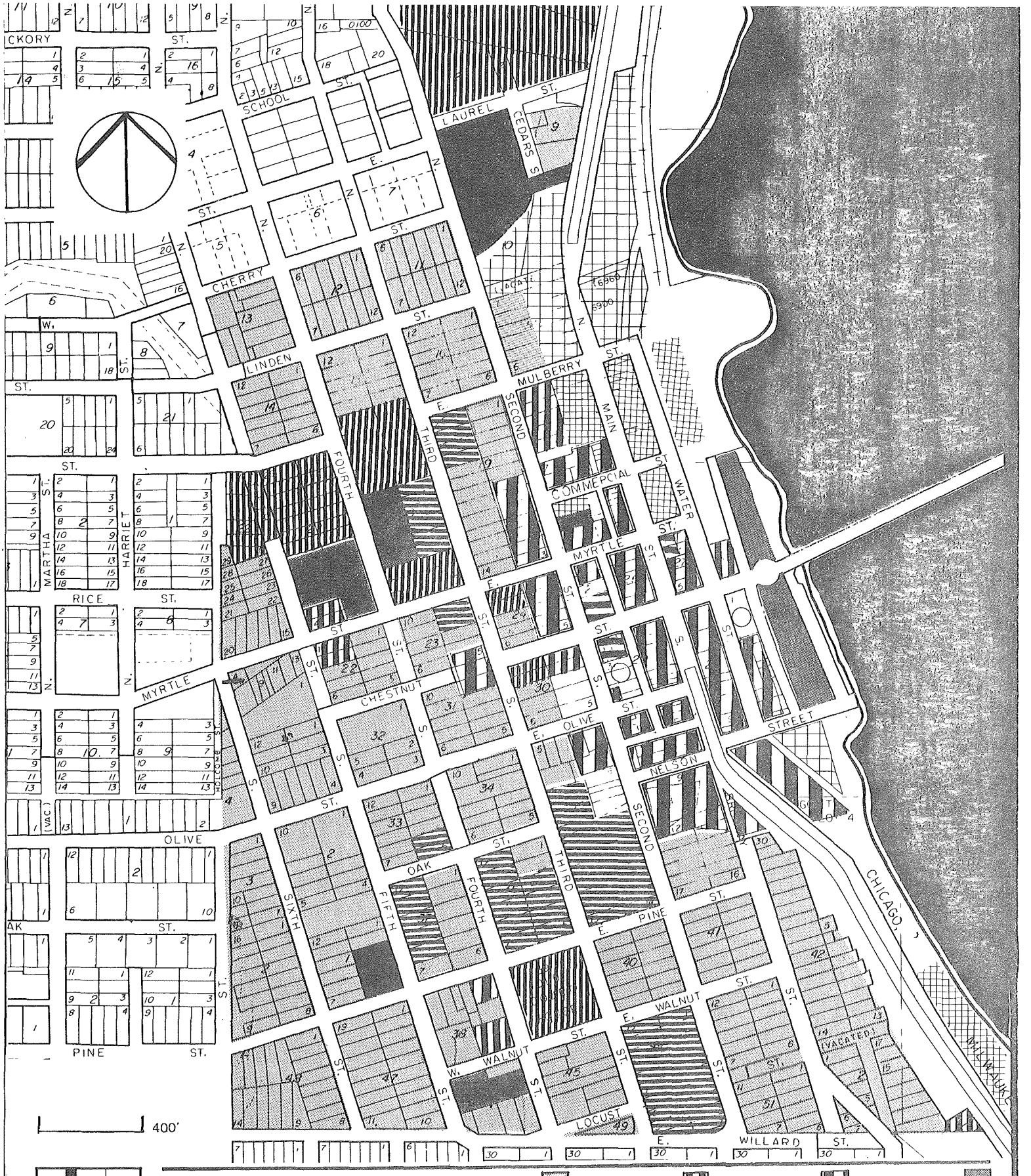
*Concentric Ring Theory



The "old" city (todays downtown) shows its existance directly related to the river. Major industrial and manufacturing areas have developed along the flat river banks. Mixed with this and moving inland, grew the central business district (CBD). This major zone is the heart of the city, it contains the major retail and commercial facilities to promote existence. This district is the central zones (zone 1 & 2) on what is known as the concentric ring theory* development of cities. As we move away from the main street commercial district, we emerge into the workingman homes and institution areas. In Stillwater, this division has a strong defination of the steeples along 3rd street with all its churches. The pattern of zones continue with the better residences located on the top of the bluffs overlooking the city. This zone pattern is still very evident in the central city. One of the prime reasons to this is the zoning patterns that have been placed on the central city (see central city zoning 5-12).

The current land use plan gives us a broad outline of future land use patterns, illustrating where major working and living areas should be; but we need to be more specific on what type of housing and work should go where. The issue of zoning in the central city have to date been a reflection of the land use patterns and not used as a planning device for future growth. The past-zones that have been established in Stillwater are still held intact with the zoning policy. A major development has been the wild river boundary that does limit growth along the river banks. In the city limits a set back of 100 feet is in existence and limitations on height, use, etc. are outlined in the Lower St. Croix Bluffland and Shoreline Management Ordinance*. Another factor which has major impact is the flood plain ordinance which restricts growth within the flood plain to above the flood level (695) and to waterproofing new buildings in the plain*.

*See River/Land Interface

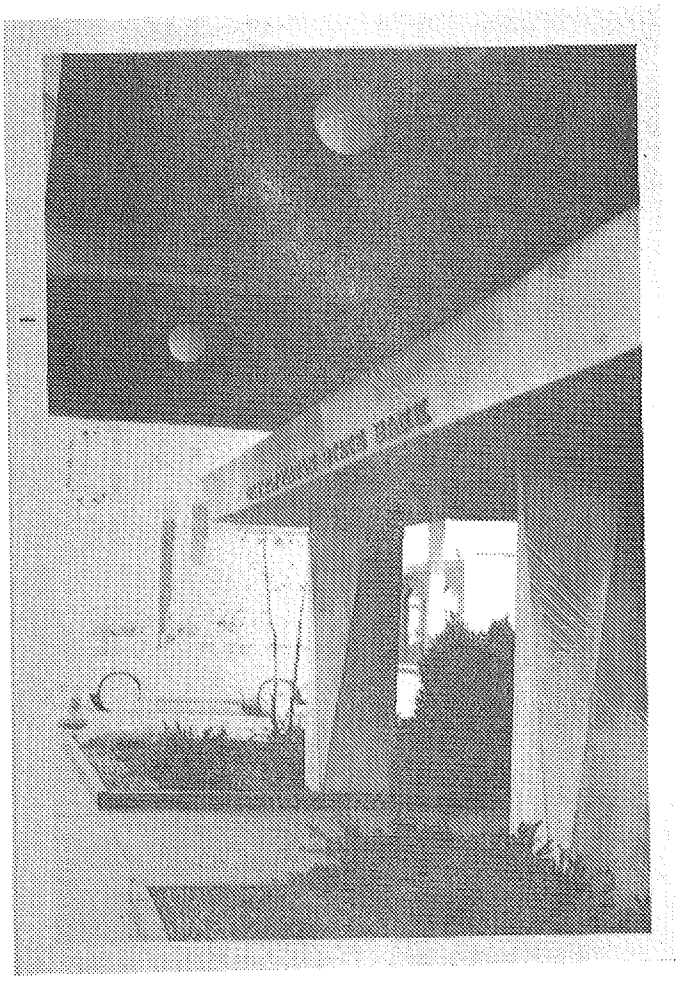

STILLWATER
CENTRAL CITY LAND USE
residential
office
retail
recreation
finance
institutional
industrial
government
400'
CHICAGO
LAUREL ST.
SCHOOL
CHERRY
LINDEN
MULBERRY
MYRTLE
CHESTNUT
OAK
PINE
WALNUT
OLIVE
NELSON
COMMERCIAL
MAIN
SECOND
THIRD
FOURTH
FIFTH
SIXTH
WATER
HARRIET
MARTHA
RICE
CEDARS
HOLCOMB
VACATED
LOCUST
WILLARD

STILLWATER
CENTRAL CITY ZONING

multi family | single family | high density | heavy ind.

commercial | light ind.

5.12



With the changing times of the 20th century, Stillwater slowly took on a new characteristic (see Stillwater landuse map 5-14). We now note the sprawling urban region, mainly due to the major use of the auto and highways, and decreased importance of the river. A new center of commerce and industry has developed on land adjacent to the major roads (HWY 212/36). Now, we see major sectors of land being developed for specific uses; i.e. Croixwood for residential, the strip for commercial and retail. These large tracts have greatly increased the size of the community and has placed many problems on it as well.

The further expansion of the area without specifice effort to change development and land use trends; the following
- less than desirable working and living enviroment
- economic hardship
- competion for the tax dollar[3]
is likely to occur. These new areas are being monitored more closely by the city through its zoning process (see zoning map 5-15). Development is being controlled to accompany the changing times.

Some goals and policies by Washington County have hit hard at land use policies[3]:

GOALS

-Provide a wide variety of living areas, ranging from low density rural to high density urban districts.

- Design new development areas consistent with the existing natural and energy resources.

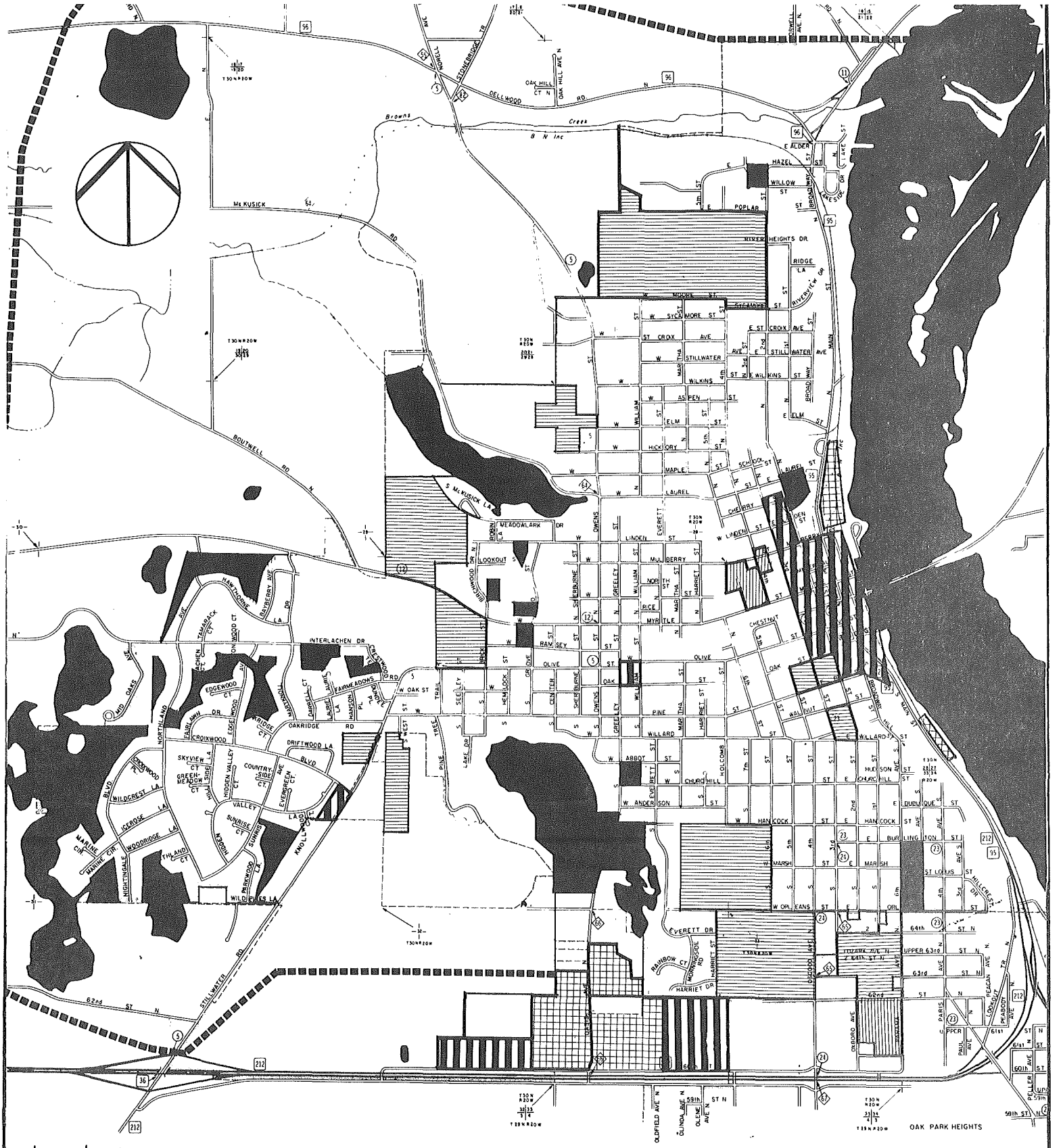
- The desires for rural housing and its life style must be weighed against the increased social and environmental costs. Encourage and plan for rural or low density housing in areas not capable of supporting long term, permanent commercial agriculture.

POLICIES

- Concentrate urban residential, commercial, and industrial land uses near exising primary transportation and utility facilities.

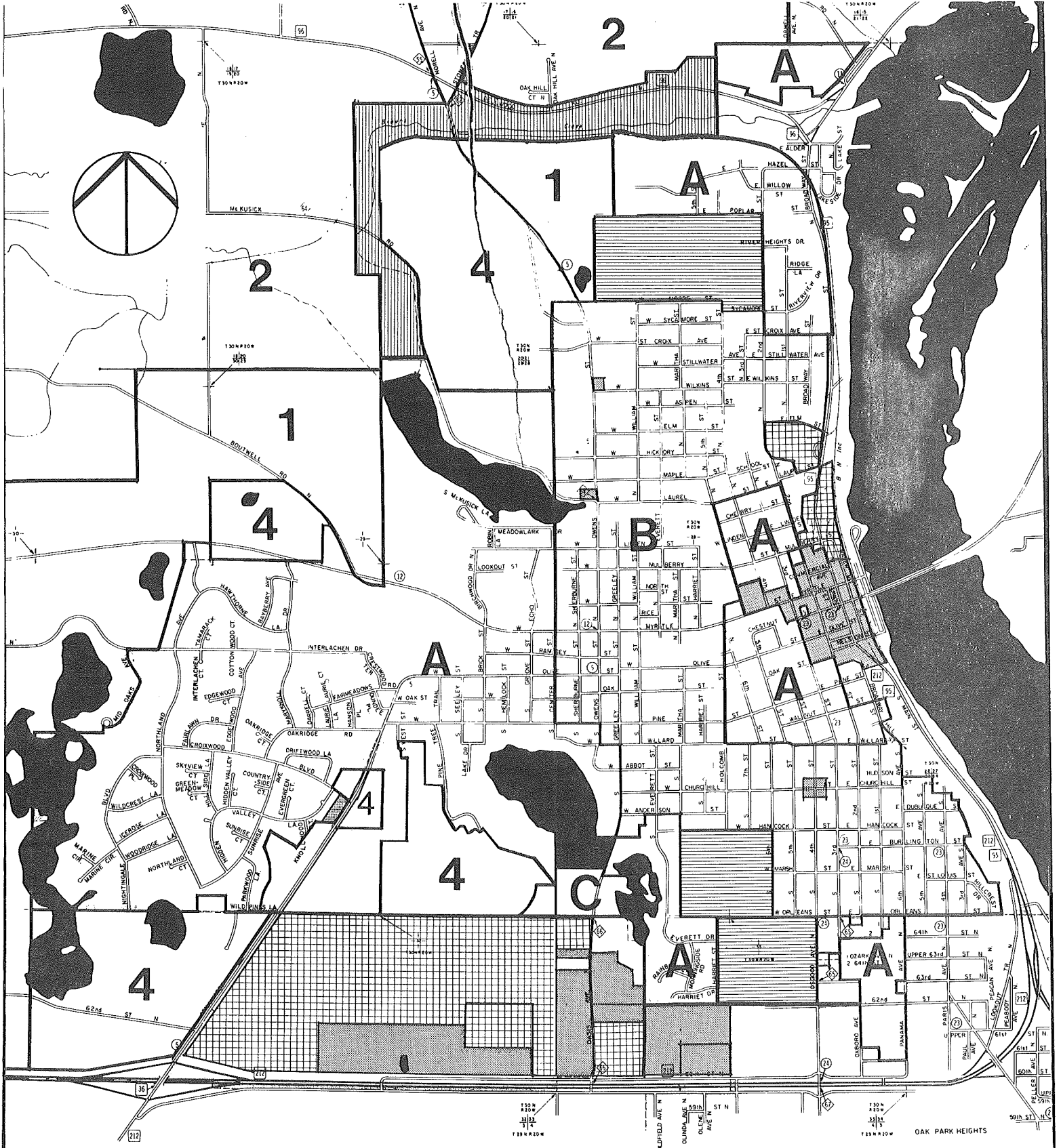
- Require that urban areas be initially developed to include all services (sanitary sewers, public water, paved streets, etc.) with phased developments to coincide with the extension of urban services.

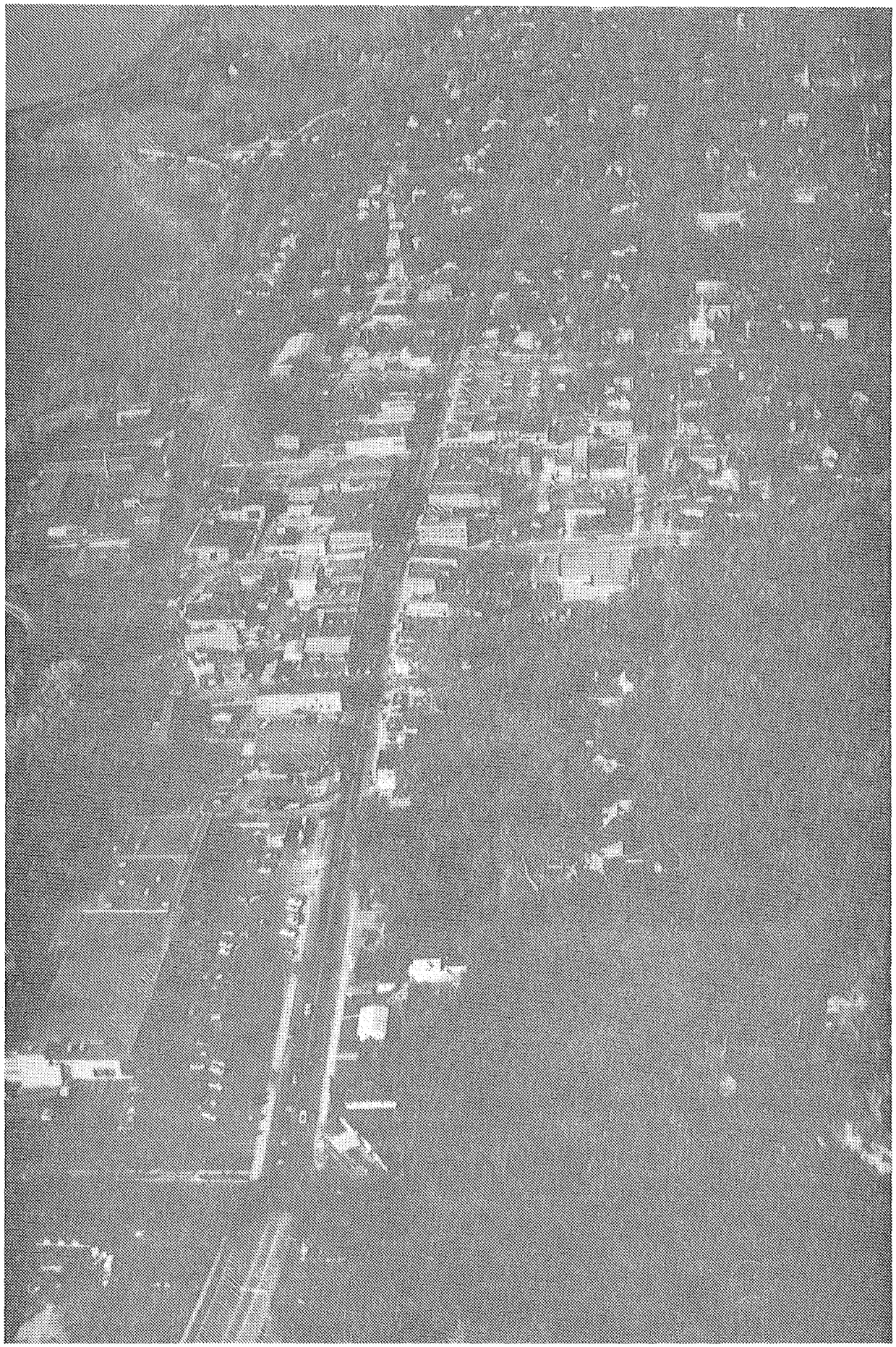
- All major zoning decisions and all subdivisions should be reviewed simultaneiouly by all interested governmental units prior to final action by local goverment units.



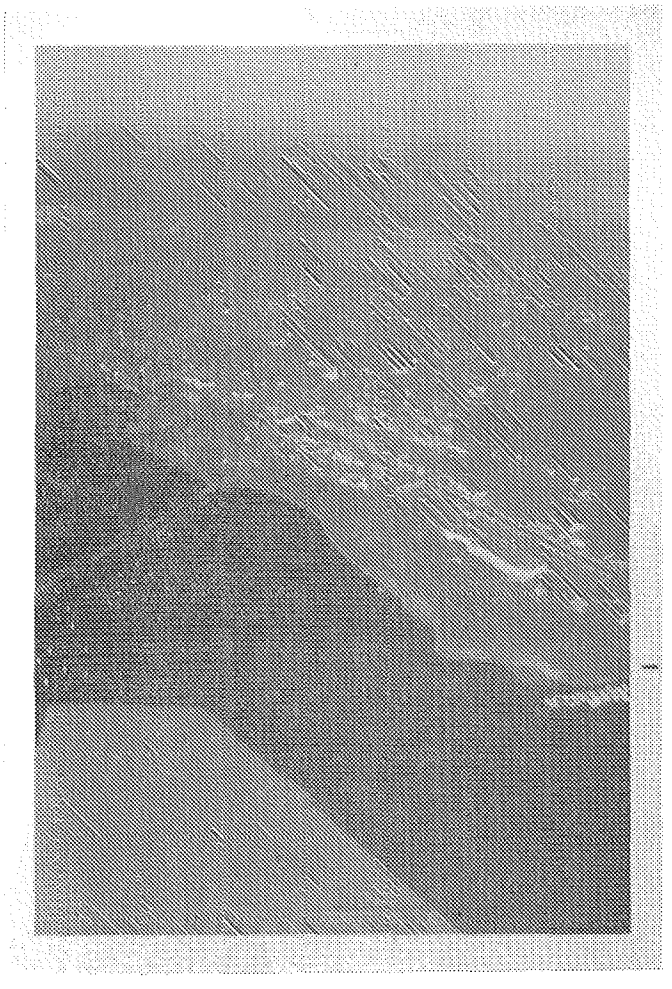
STILLWATER
LAND USE

residential
industrial
institutional
commercial
recreation
government


STILLWATER ZONING
single family A,1
two family B
multiple C,2,4
conservancy
institutional
recreation
commercial
industrial
800'
OAK PARK HEIGHTS
5-15



Hudson has a pattern of development that reflects many of the images of its past. The central city has a typical linear rivertown development. (see central city land use 5-18). The central city core (the downtown area) today is predominately retail, industrial and residential. The pattern of development is a direct result of the 19th century regional planning concept based on horizontal industrial development; the lumber industry. The river banks form an industrial zone, which is still evident in both the exising land use, as well as the zoning codes, reinforcing the old conditions even though the lumber industry declined as part of the economic base of the city.

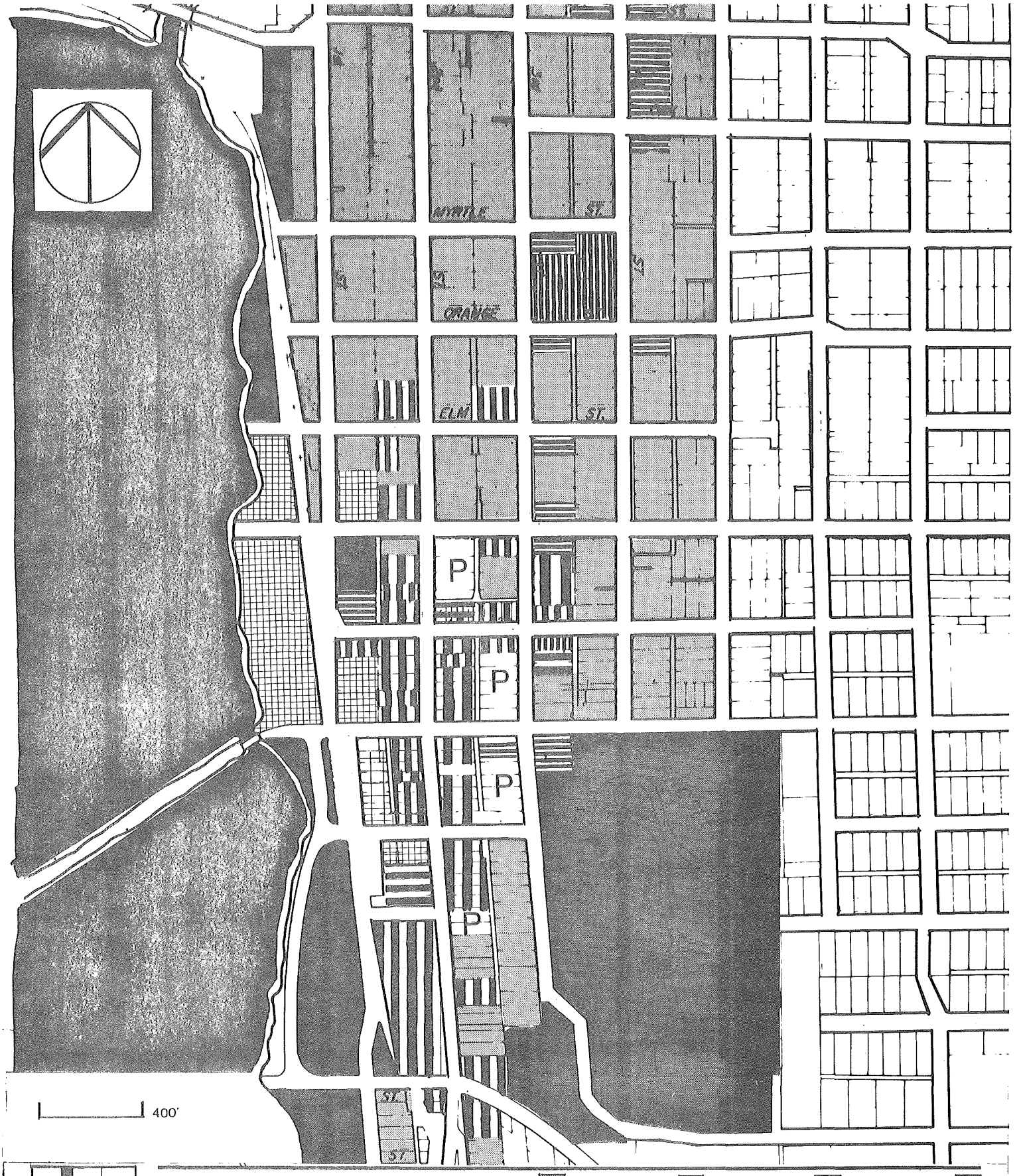


Hudson's development shows strong correlation to the development of cities. The river-front characteristics are greatly shaped by the river frontage and inland blufflands. These forces have greatly influenced the patterns of usage within the town and surrounding community.

The original retail-commercial core is expanding with the cities growth but not as a major core, because of the modern trends of visualizing Hudson as a bed-room community - a suburb of the twin cities and the increasing tendency of urban sprawl. Growth of downtown still shows its strongly established zones with the industry on the river, retail/commercial next and the residential sprawl around this. The residential area surrounding the commercial core is old single family units, usually oriented away from the river, a reminder of the days when the river was not a very pleasant site and the residents were less landscape oriented. Government and institutional uses are a small part of the central core. Although they occur over all the city, there is a high concentration north of the old east-west main road (the commercial concentration). Historically the industrial and commercial development occured along the St. Croix river edge, blocking the river from potential recreational use. Thus, parks are distributed throughout the city.

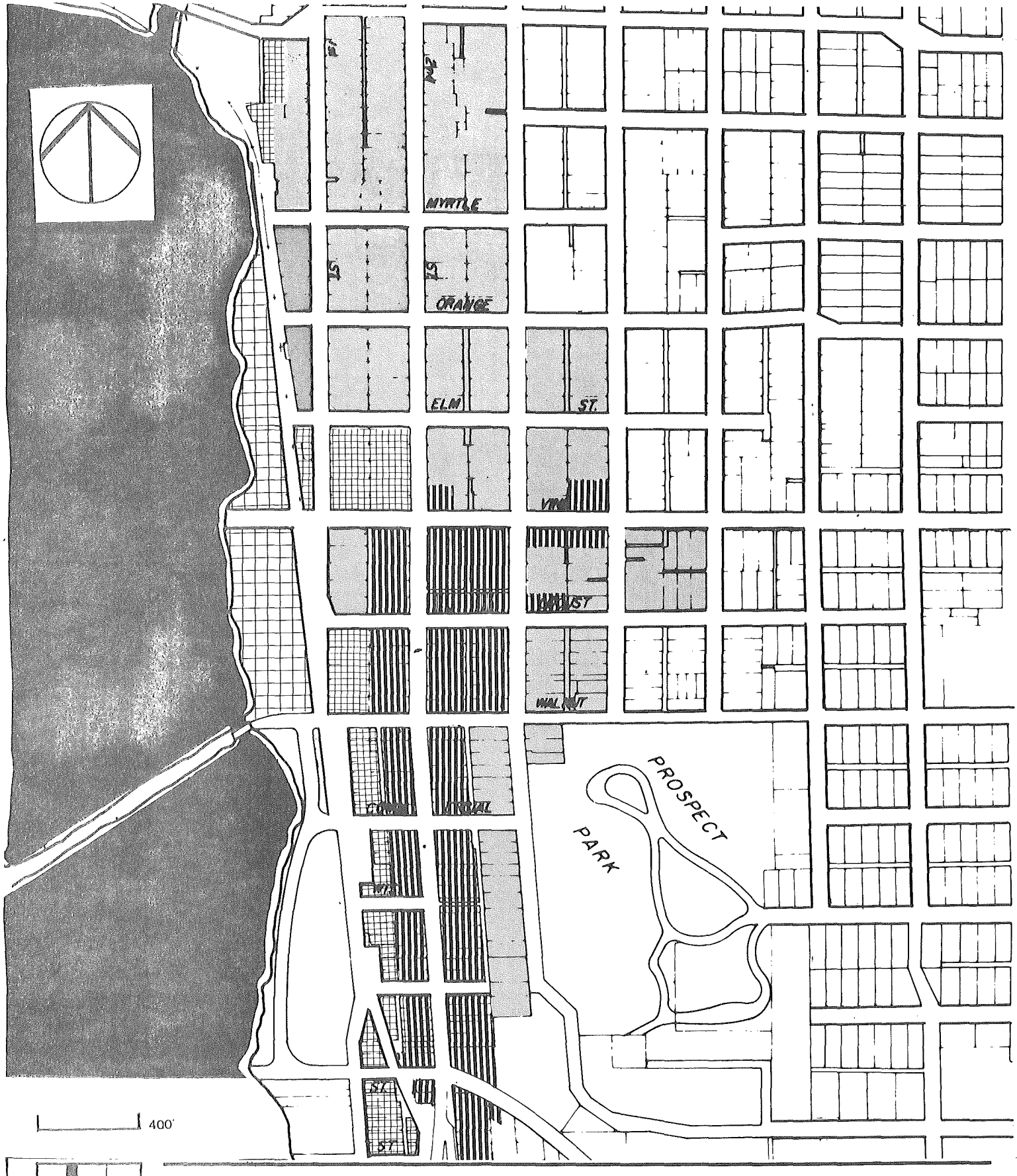
The existing zoning regulations reinforce the exising land-use conditions of the central city (see central city zoning 5-19), by being a super-imposed system. The major core of the downtown is broadly defined as commercial businesses and manufacturing, while the river bank is kept as an industrial zone. The first ring (zone) surrounding the commercial core is still single family residences with past zones kept in their place (historical pattern) new development has spread slowly in downtown and as a result it has moved outward. Flood plain zoning is in accordance with the flood insurance guidelines, with development restricted accordingly below flood level (693)*.

*See River/Land Interface



HUDSON
CENTRAL CITY LAND USE

residential
office
retail
recreation
finance
institutional
industrial
government

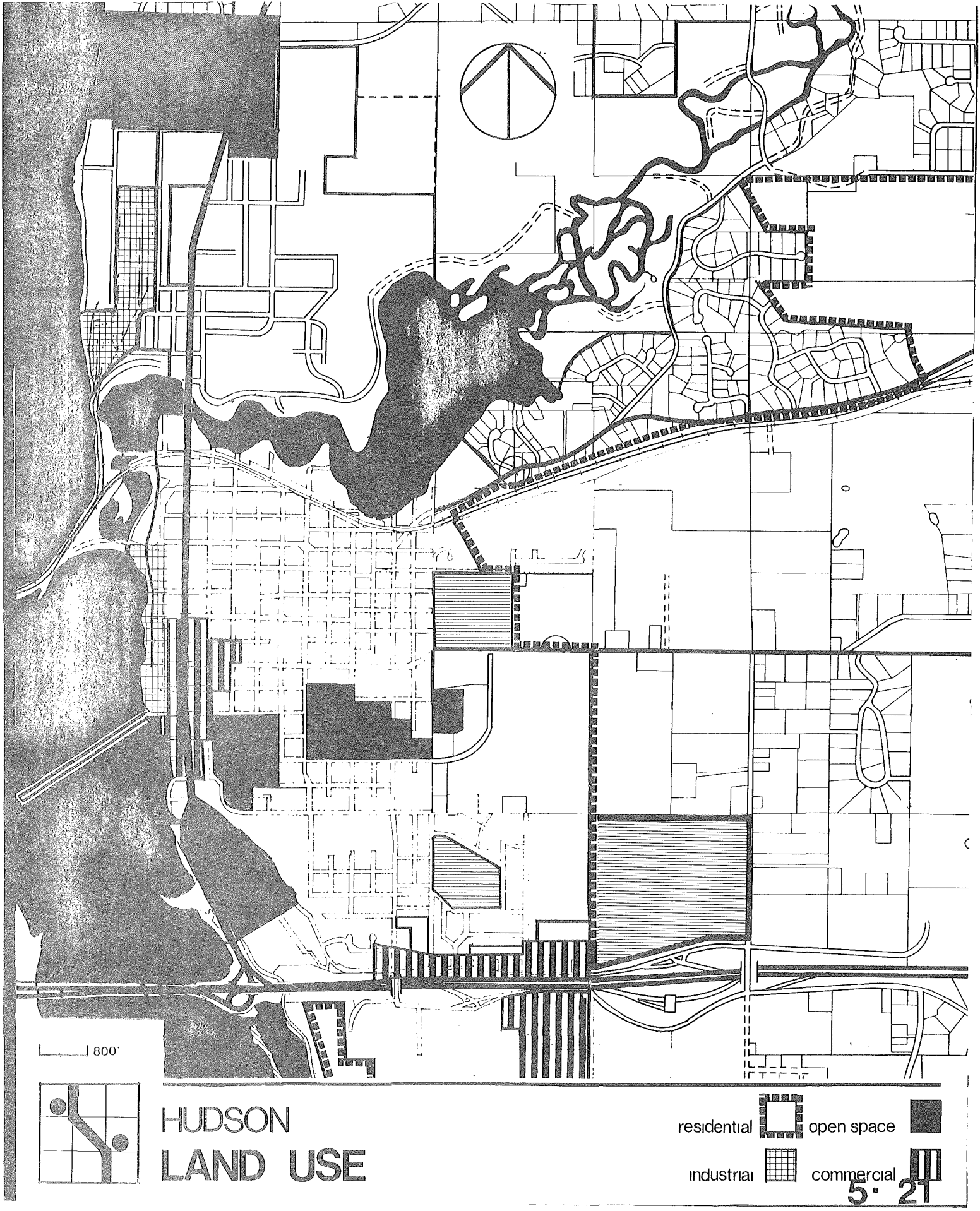


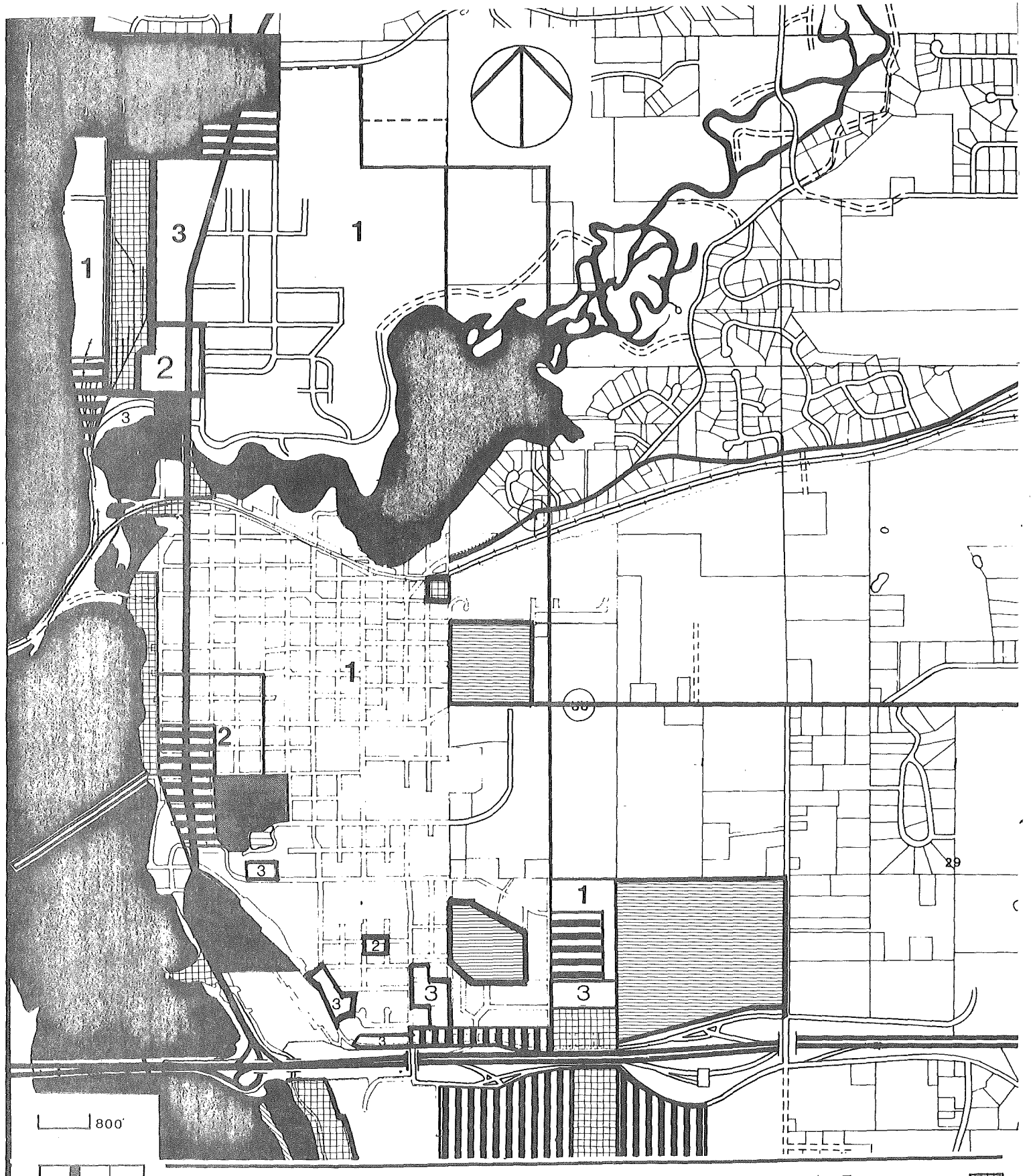
HUDSON
CENTRAL CITY ZONING

industrial
manufacture
cbd
residential

Due to new forces on Hudson, major changes have emerged in the city's land usage (see Hudson landuse map 5-21). Hudson is a predominatly residential community but an interesting aspect of its residential development is the tendency towards urban sprawl. A great amount of residential development has occurred outside the city limits while the city itself remained underdeveloped. Of all the residential units, single family are by far the most prevelant dwelling type representing about 95% of all dwellings within the area. The commercial development is living proof of the city's urban sprawl and a result of its proximity to the Twin Cities. The commercial strip development along Interstate 94 might be an important economic potential for the area. This assumes that the development will occur parallel to downtown commercial growth, thus not endangering the city itself in terms of its internal growth. Attention should be paid to the trend of development spreading out into the rural areas to service the residents of sprawl. The industrial development continues along the river's edge to this day, there are newly developed industrial parks along the highway also. The new industries which do not require railroad access are located south of the highway where the vehicle access is greatest. As sewer and water services are extended it is expected that more industries will locate there.

Zoning beyond the central core are a reflection of the land uses as listed above (see Hudson zoning map 5-22). This is similar to the situation in the central core where zoning appeared after the fact of the exising land use.


800'
HUDSON
LAND USE
residential
open space
industrial
commercial


800'
HUDSON
ZONING
one family 1
two family
multiple 3
institutional
commercial
hiway coml
industrial
recreation

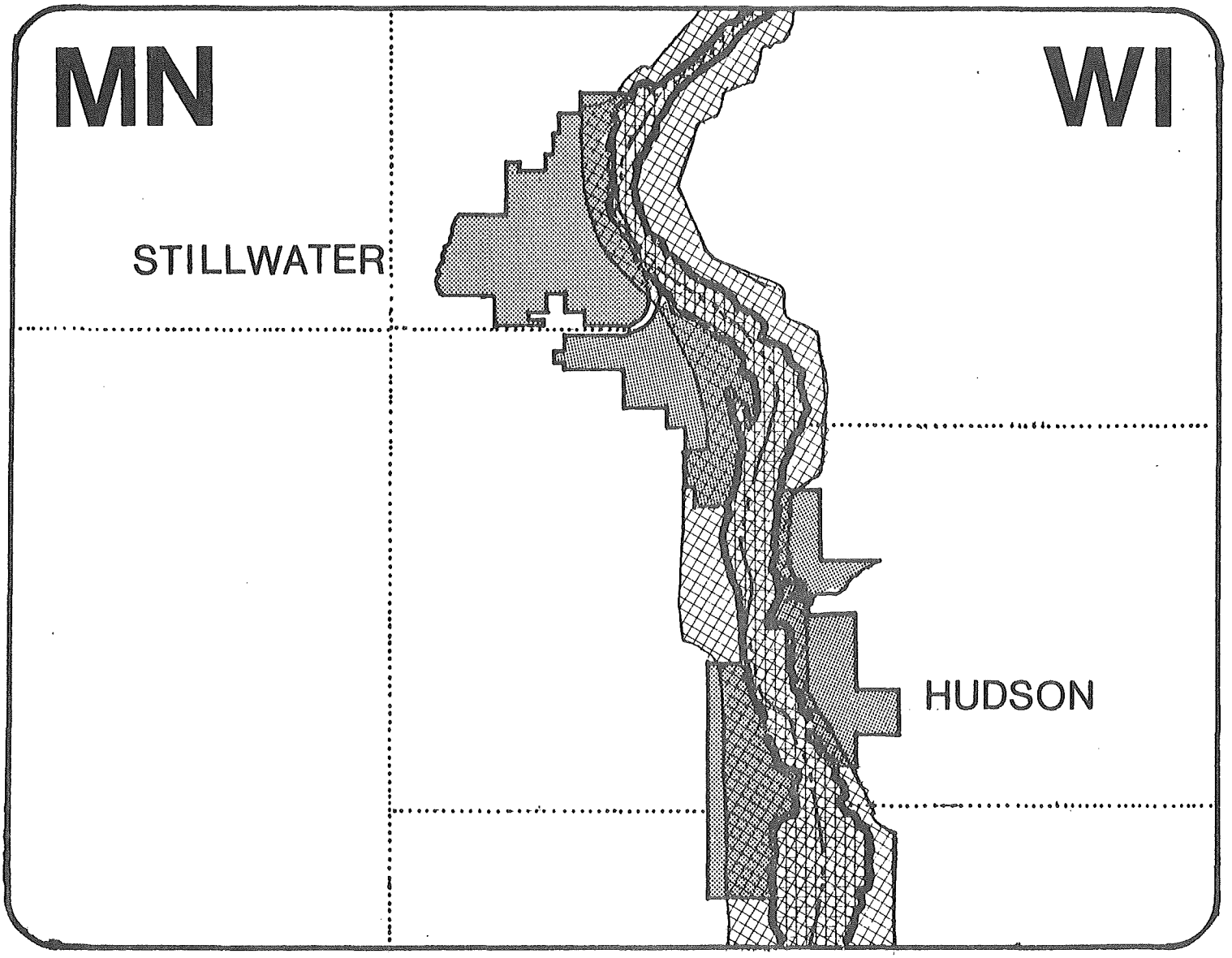
issues

POLITICAL

There are a number of additional factors to consider when developing an urban design framwork.

As with current land use and zoning, these factors must be recognized and respected but they do not dictate a specific future.

A primary consideration is one of control, or political power.

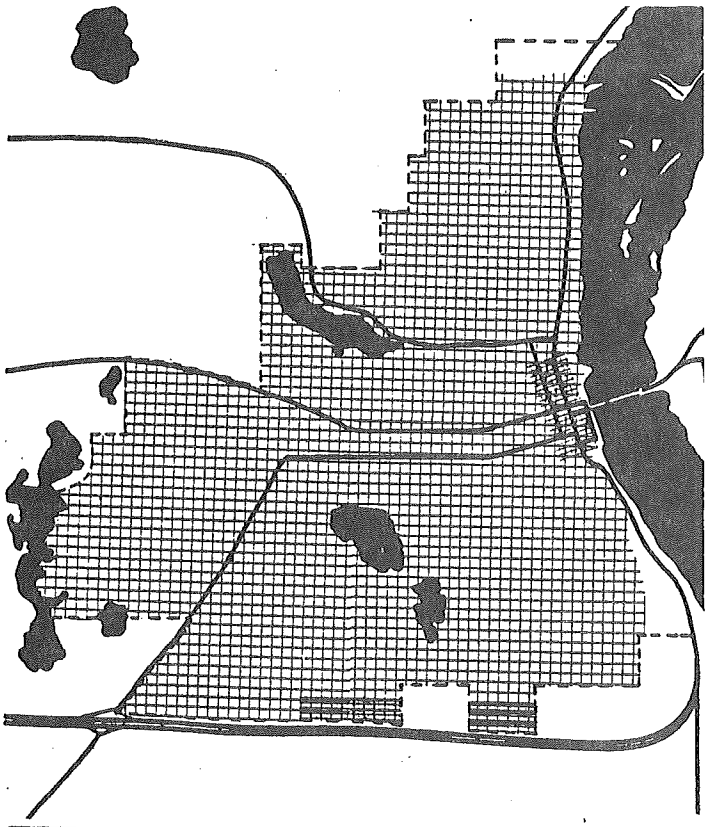


city
county
township
federal

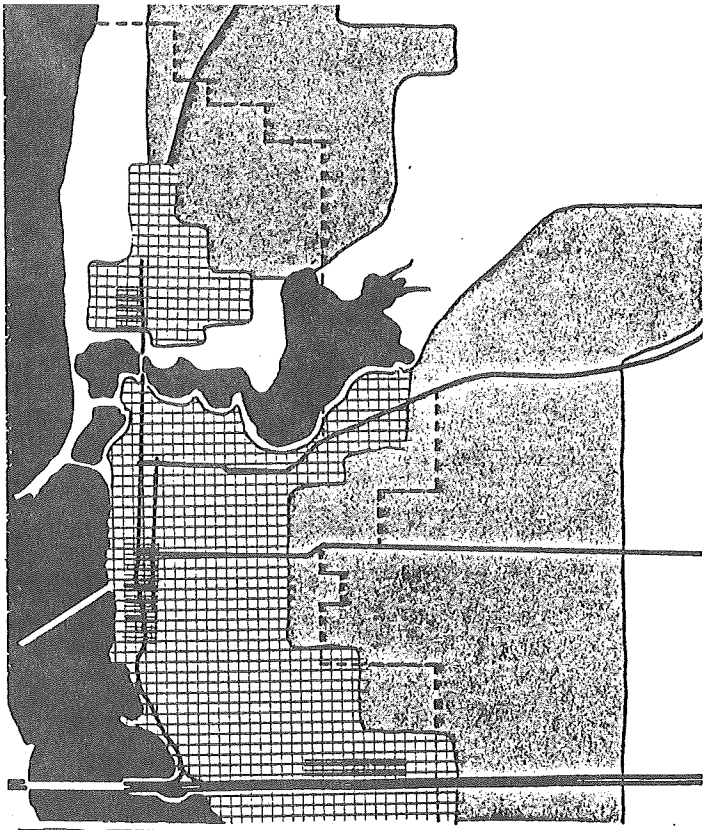
UTILITIES

Utility service is another important consideration.

The provision of public services is a very costly undertaking, and is fundamentally planned on a regional, state, or even national level. Alterations or additions to an existing system can involve an enormous amount of time and expense.

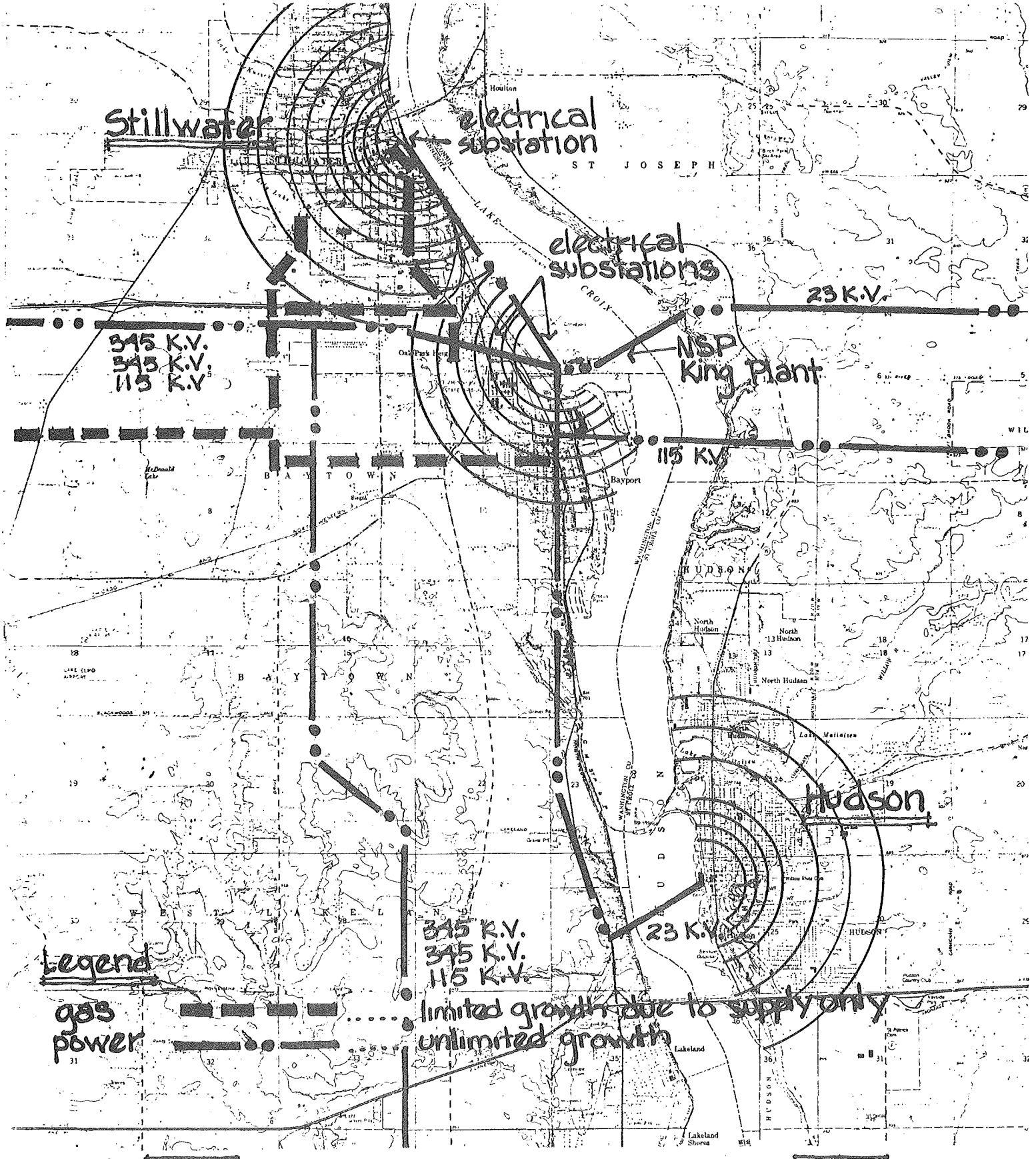


STILLWATER
SEWER SERVICE (no future expansion)



HUDSON
SEWER SERVICE

present
future

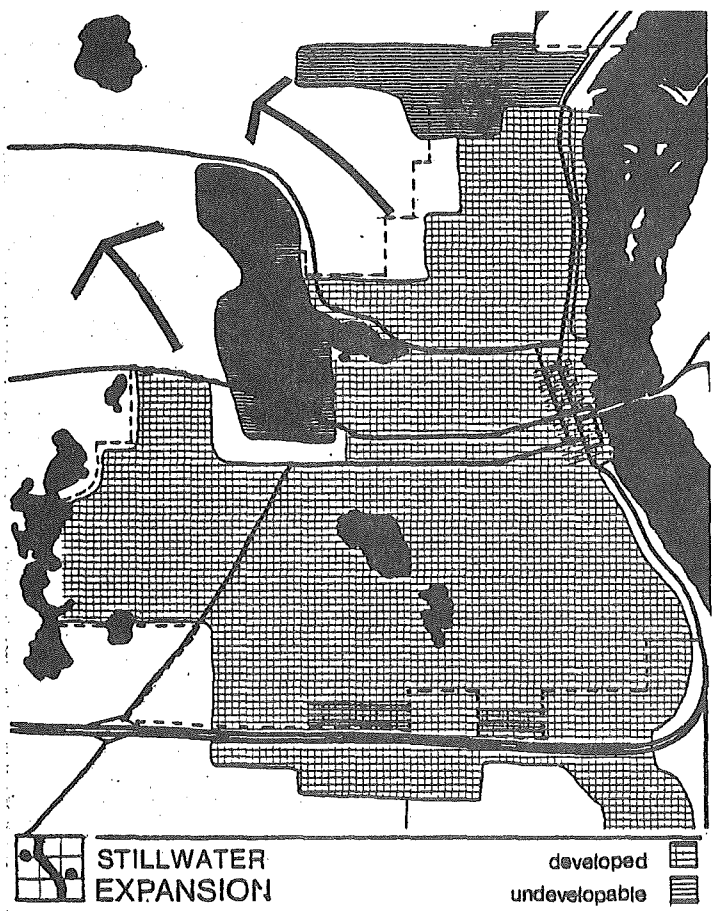

Stillwater
electrical substation
electrical substations
345 K.V.
345 K.V.
115 K.V.
23 K.V.
NSP King Plant
115 K.V.
Bayport
Hudson
345 K.V.
345 K.V.
115 K.V.
23 K.V.
Legend
gas
power
limited growth due to supply only
unlimited growth

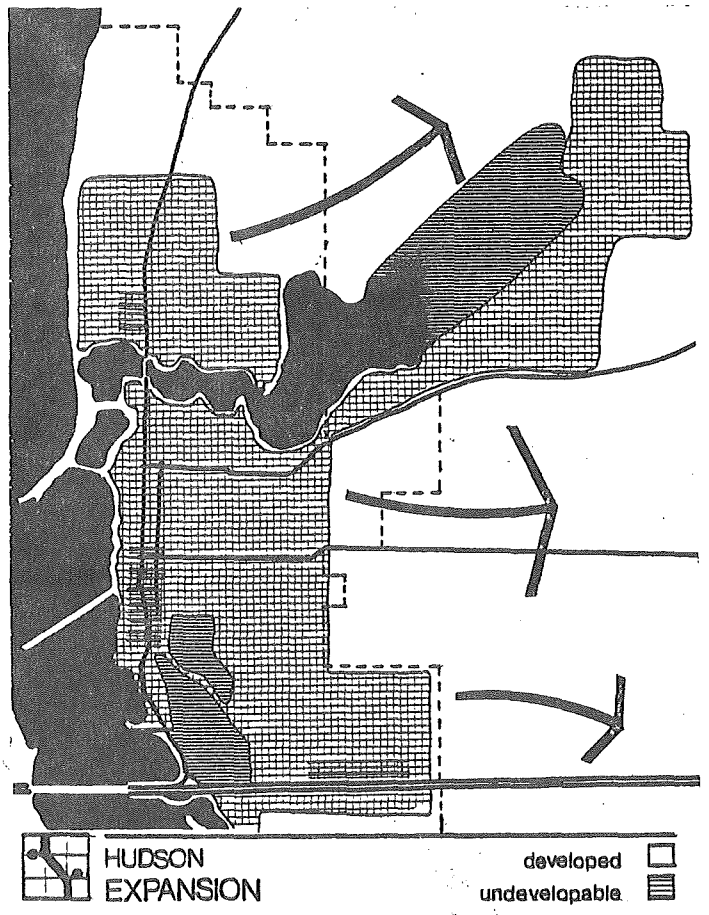
UTILITIES

TRENDS

Current growth trends are another important factor when developing an urban design framework.

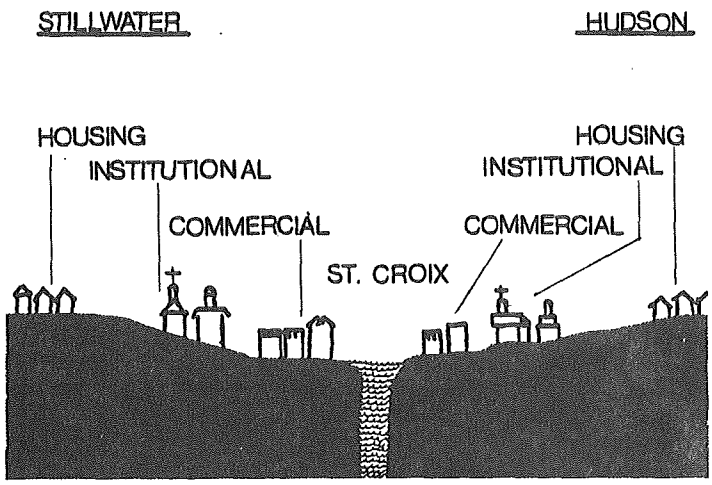
It is not necessary to accept these trends as given, but one should be aware of the forces which are shaping these trends. The primary forces for both of these cities are: 1) an in-migration of residents, and 2) land north and south of town on which the use is restricted by physical and legal limits, forcing growth away from the river.





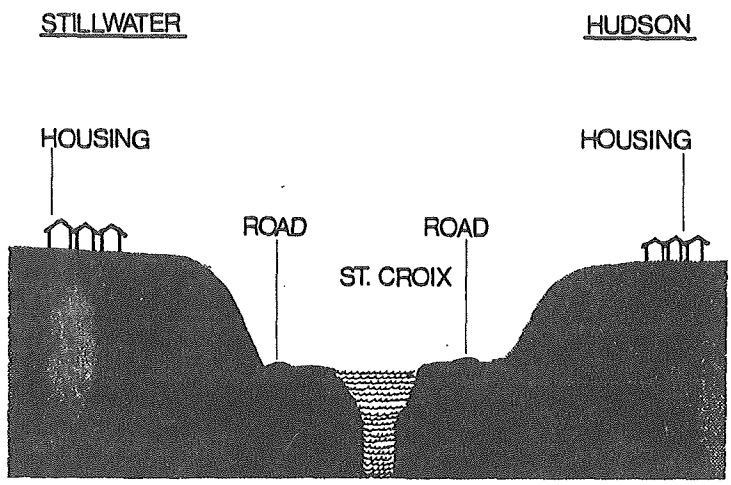
ORGANIZATION

Even though an urban design framework is fundamentally a physical or spatial system, it is ultimately suppose to help real people, by engineering a "better" place to live. Community attitudes should therefore be sympathetically analysed.



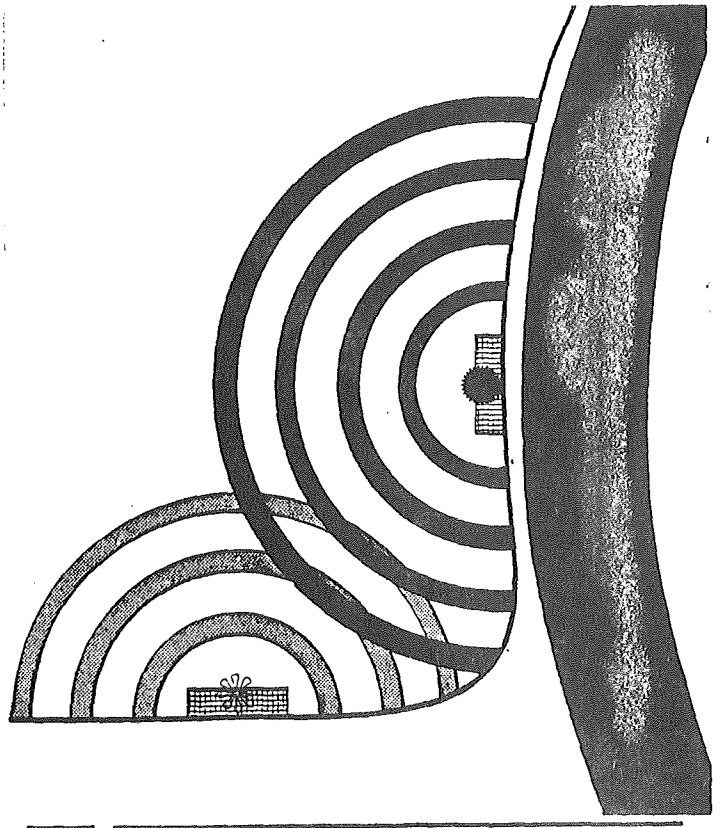
CITY CENTERS
LEVELS

There is a horizontal stratification or "zoning" of land use (i.e. activities) due to sheer shysical layering of the land itself.

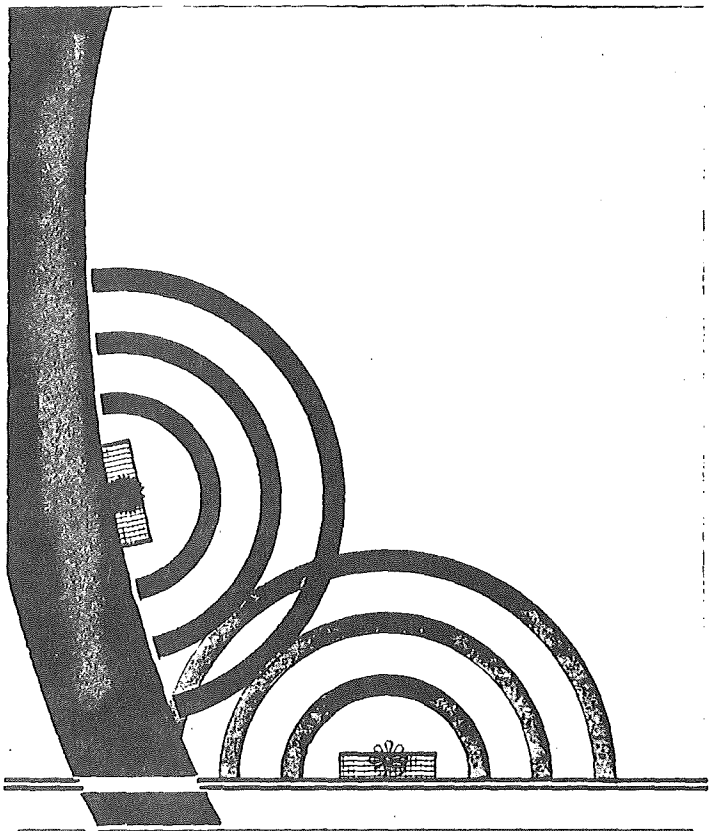


CITY APPROACHES
LEVELS

This is a carryover from the earliest settlement of the area. The historic pattern provides strong identity to the towns, vividly defines spatial experiences--especially those of entry and departure--and serves as an orientation mechanism.



STILLWATER
ESSENTIAL PATTERN

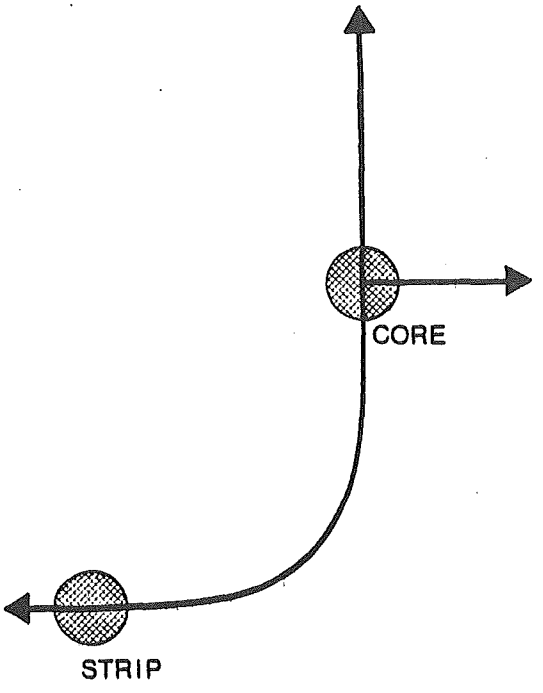


HUDSON
ESSENTIAL PATTERN

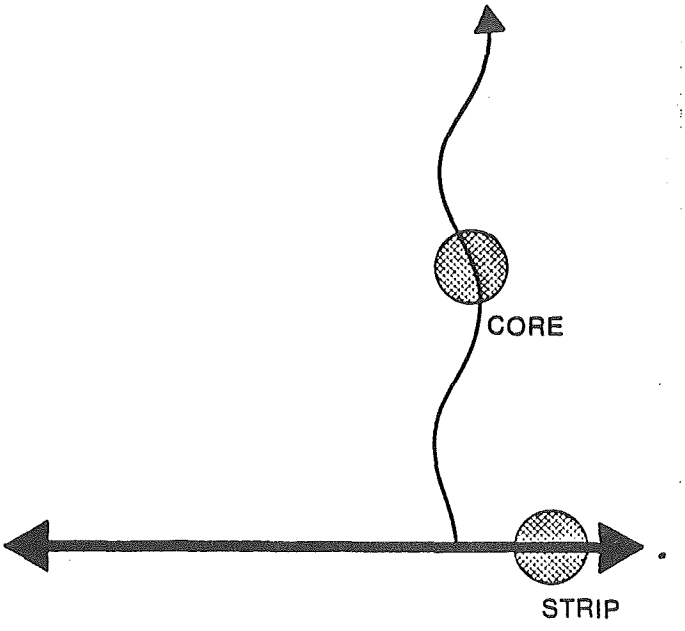
PATTERNS

Both towns are fundamentally the same in their land use patterns.

The arrangement is one of older growth focused along the river, or "old road" mixing with the newer growth focused along the new highways. Stillwater has some large tracts of land--a cemetery and schoolyard--that create a spatial separation between these two nodes, while Hudson has two large bluffs that provide the same sort of separation. These conditions reinforce the sense of "old town" and "new town" and suggest that a basic sense of separateness will continue to characterize the future development in both cities.



STILLWATER
CORE / STRIP RELATIONSHIP



HUDSON
CORE / STRIP RELATIONSHIP

RELATIONSHIPS

The fundamental difference between the two towns is the relationship between the new commercial areas and the old, established downtown centers.

Hudson's commercial development along I-94 is essentially an attempt to gain some economic benefit from the passing traffic, which used to flow through the core area. In Stillwater, however, the traffic on the new highway also flows through the downtown. The attempt here seems to be one of providing for the modern image and convenience of post World War II development without disrupting the downtown.

futures

EXPECTATIONS

The fundamental issue facing both cities today is that of growth--should it occur at all, and if so, where, when, and how.

The facts of an increasing population and a dynamic evolving network of services--schools, governments, stores, churches, etc.--require a determined analysis by Stillwater and Hudson of the options they enjoy.

Stillwater and Hudson are both old-fashioned towns experiencing modern urban pressures. There is the influence of freeways and new roads, pulling traffic into new patterns and spurring the creation of new retail areas; the over-loading of existing streets, eroding the old character of the neighborhoods; the question of where and how to create new housing, how to articulate it to avoid ugly and wasteful sprawl, and the tricky questions of how to plan, locate and operate the institutions to serve that future population. The significant difference, though, is that change in these towns is not due to internally generated forces: the new appeal of Hudson and Stillwater is due to 1) the auto-induced option of living here while retaining a functional relationship with the Twin Cities, and 2) the appealing character of an old town and the beauty of the river.

The dominance of the automobile as a means of travel and as a force in shaping cities, that has emerged since the second world war, has led to the creation of large-scale highways and freeways, with resulting appeal for commercial "strip" development, and a new interest in Stillwater and Hudson as places of residence, due to easy commutations to and from the Twin Cities.

This resulted in a slow but seemingly inevitable decline of the old downtown, due to obsolete provision of access, parking, climate control, and even in the nature of the stores and services available in a changing market. The future roles of the old downtowns and their relationships with the new commercial areas along the freeways, too often poorly coordinated is of prime importance.

It is possible to forsee a range of possibilities for Stillwater and Hudson in which we can identify numerous directions the cities might take. The alternate futures for Stillwater and Hudson are a result not only of the national and world economy, energy supplies or, socio-political forces, but also of the planning decisions made by the citizens of each town.

1) The towns might intensify their role as a bedroom community for the Twin Cities. The range of services would stabilize, perhaps shrink. New commercial growth would occur along the existing strip in response to commutation. The need for parks and schools serving local neighborhoods would be among the kind of services to grow. The strength of the functional relationship with the Twin Cities would cause the non-residential services to atrophy within the community.

2) The towns might consciously develop as a new node in a large metro pattern, as occurred when Southdale, a strictly retail development, stimulated, because of the traffic it generated, the creation of a hospital, a library, a YMCA, offices, new houses and apartments, in short an entire, semi-autonomous community. Stillwater and Hudson could similarly become outposts of service for a larger residential district. This strong planning on both a local and a regional scale. The essential difference between this possibility and the former is that the former strenghthens the functional relationship with the Twin Cities; this option mitigates it.

3) A third potential destiny for Stillwater and Hudson lies in the possibility of becoming a historical, Disneyesque community that survives through its economic success as a playground for non-residents. The recreation of Stillwater's Main Street, with numerous small restaurants, and shops selling non-essential goods is already and example of this principle. Elsewhere districts and entire towns have sustained economic life through this approach.

This suggests that the city centers may develop in ways different that the rest of the city.

The St. Croix river could play a significant role in such a development. Combining the recreational attraction of the St. Croix and ski resorts and State Parks, the areas could also choose to emphasize the role of recreation centers year round. There is currently great pressure for the lower St. Croix to respond to the need of Twin Citians for recreation.

Another possibility is that of Stillwater and Hudson developing as an Aspen-like setting that combines enlightened preservation of old buildings, carefully nurtured urban elegance, and striking natural beauty to create a unique place that attracts people who care about fine cities as well as natural environments. It could thus become an authentic/ cultural centers for the Midwest.

summary

The major land use issues in Hudson and Stillwater are related to population changes and relationship of the two with the Twin Cities. The river has changed from a transportation use to a recreational use.

Founded years ago as independant centers Stillwater and Hudson have come under increasing population pressure from the Twin Cities. After WWII the advent of the freeway opened the region to suburbanization. The existing CBDs were supplemented by new development along the freeways which are now significant "centers" in themselves. There has been an inclination towards increased residential development. The St. Croix river has become a significant attraction creating new demand for recreational development along the river.

A significant difference between the new and old or established residents, has arisen. This potential split is evidenced by the use of zoning land uses rather then as a desisive planning tool. There is not a consensus among residents.

Landuse planning and zoning can assume three basic natures or attitudes; reactive, retreating or initiating.

The future of the cities will be influenced by the role planning plays in the communities, the need for a base line consensus arises. A continuation of present land use planning and zoning would seek to recognize and define the status quo. This is a laissez-faire reaction. Yielding to the pressures of some residents planning could seek to retreat to an earlier state. This would attempt to recover the rural past of the communities and halt the urban character now developing. The final major strategy would invest significant power in the planning process. Land use planning and zoning would be used as tools to shape the communities, an initiating mode of operation.

The futures the different planning modes generate are many.

conclusions

Choose a future: GOAL

Outline a process to obtain that future: POLICY

Detail the means to serve that policy; PROCEDURE

Any of the options discussed would require a decision whether to recognize the status quo, to retreat to an earlier state or to initiate change.

Stillwater and Hudson cannot ignore the economic and social forces operating in the greater region and the world but, by setting a goal outside forces can be reconciled with the future/goal.

The trouble with each separate "destiny" lies in what it excludes; probably the real future of Stillwater and Hudson will be a synthesis of these and other possibilities. The citizens of both cities must honestly acknowlege all the forces that are pulling their communities in each of these directions, and make decisions of what they want to be. Specific developments, whether apartments complexes, new shopping facilities, libraries, or whatever, must be planned to enhance the decisions made. The use of the land must not be an accident, or a simplistic result of circumstantial convenience; it must reflect careful, deliberate decisions.

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FOOTNOTES

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Bob Lockherdt, Washington County Planning Coordinator.

John Sheldon, Public Works Director, Stillwater.

Dick Thompson, St. Croix County Planner.

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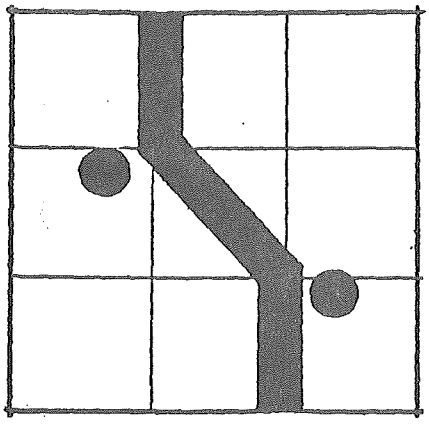
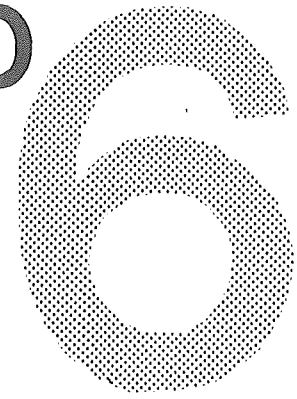
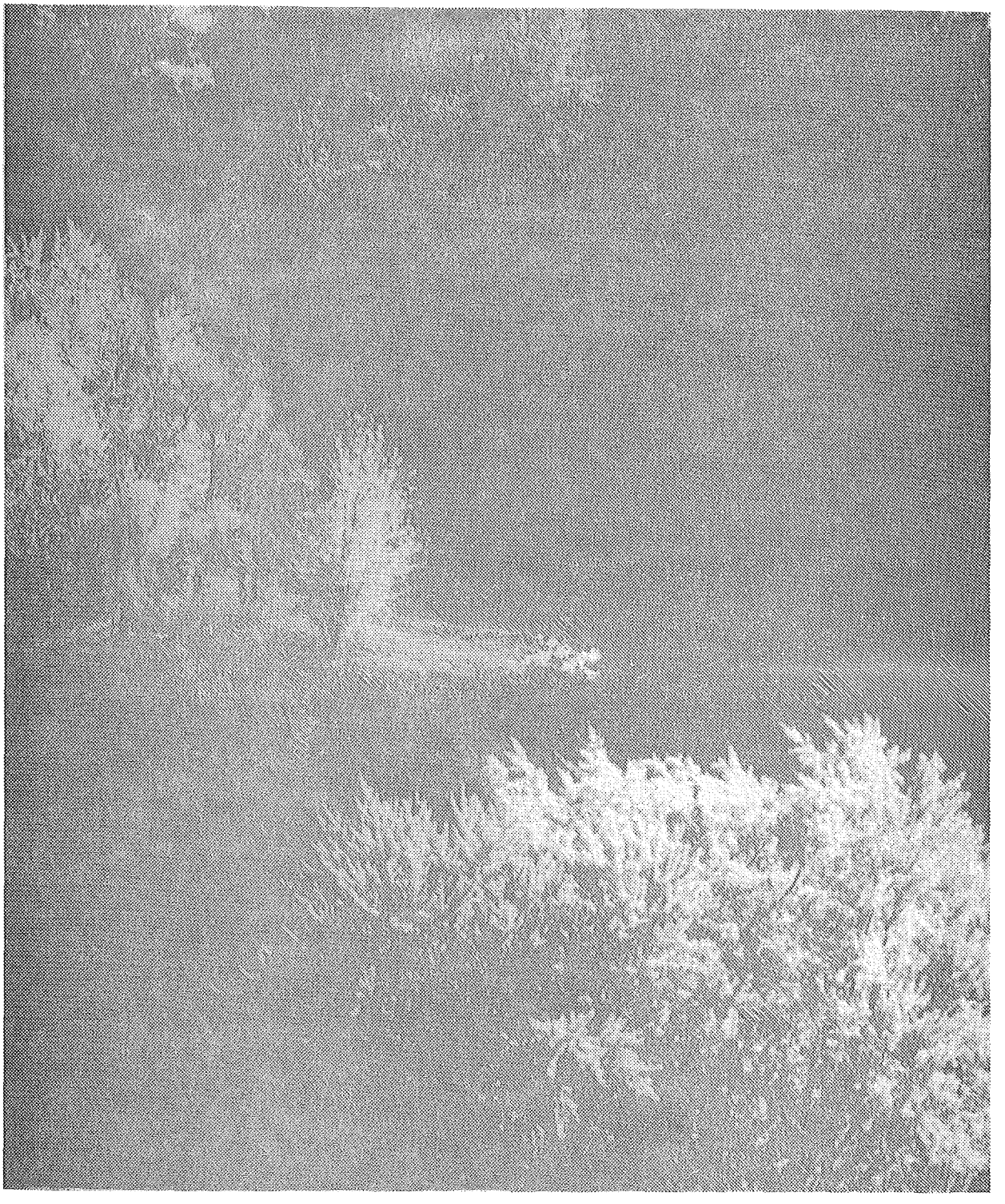


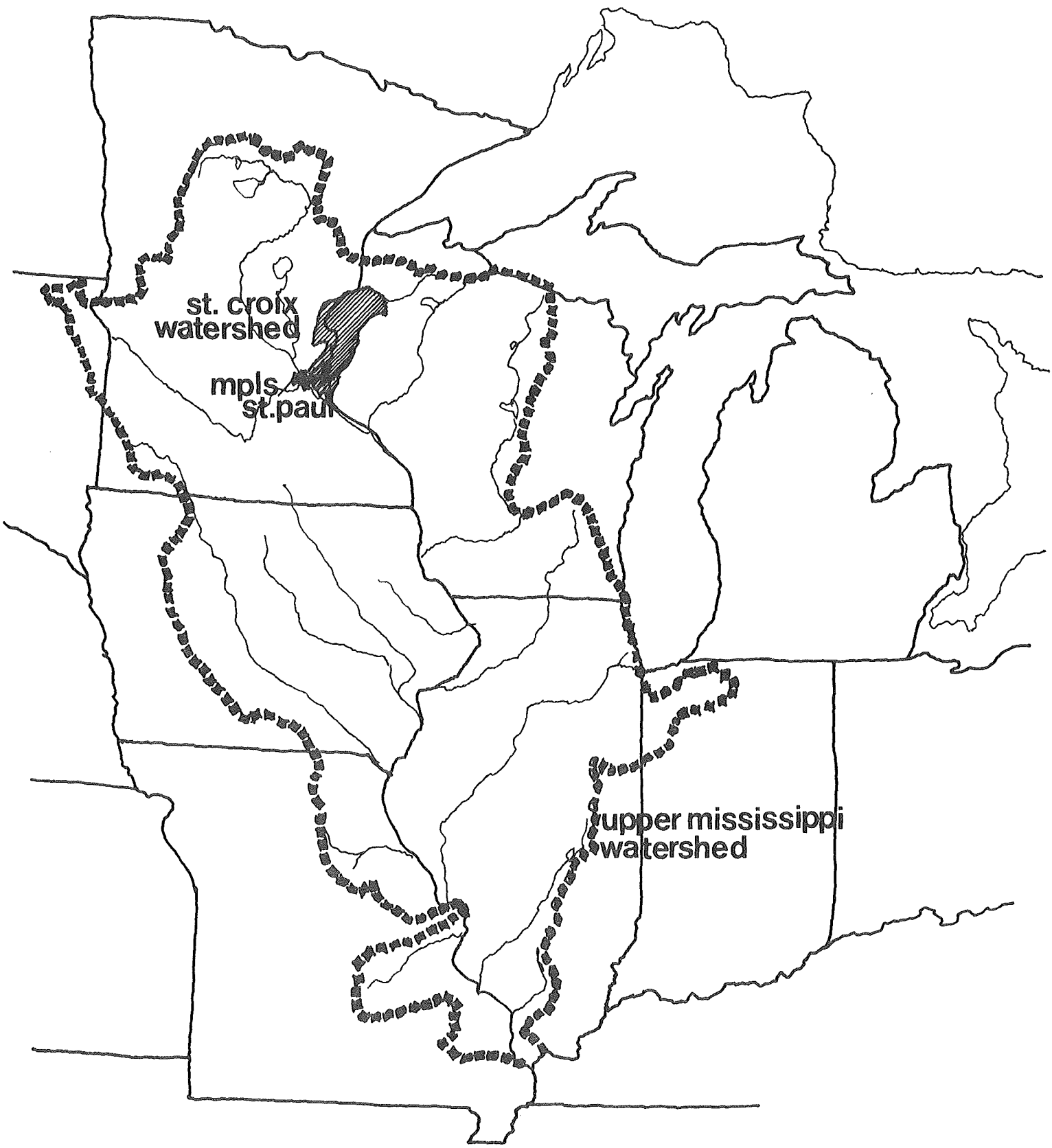
WATER / LAND INTERFACE





"It is necessary to understand nature as an interacting process that represents a relative value system; and that can be interpreted as proffering opportunities for human use--but also revealing constraints, and even prohibitions to certain of these."

Design with Nature
P. 127



REGIONAL CONTEXT

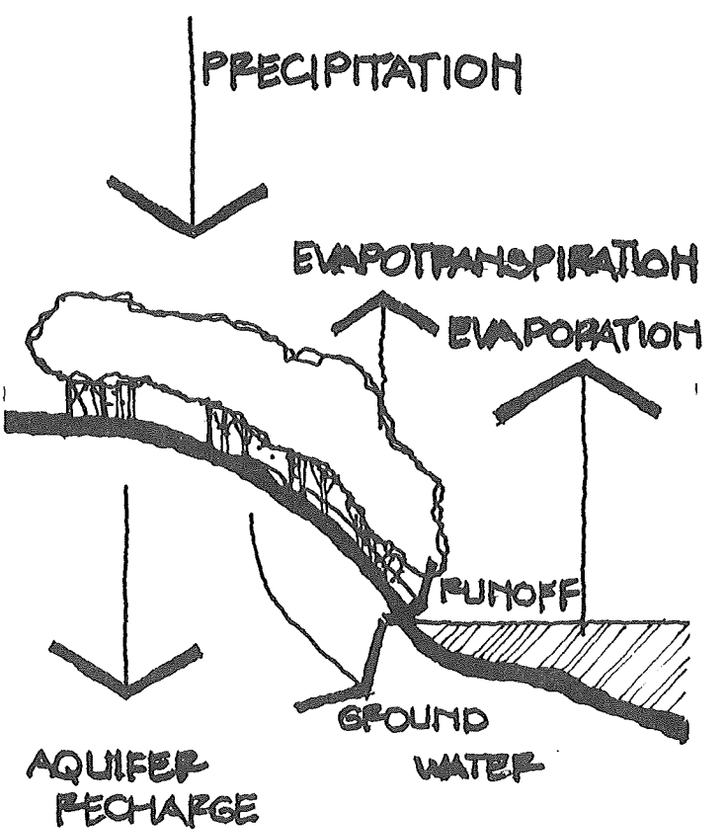
regional

The St. Croix watershed, contained within the Upper Mississippi Watershed, acts as an integrated system of water circulation.

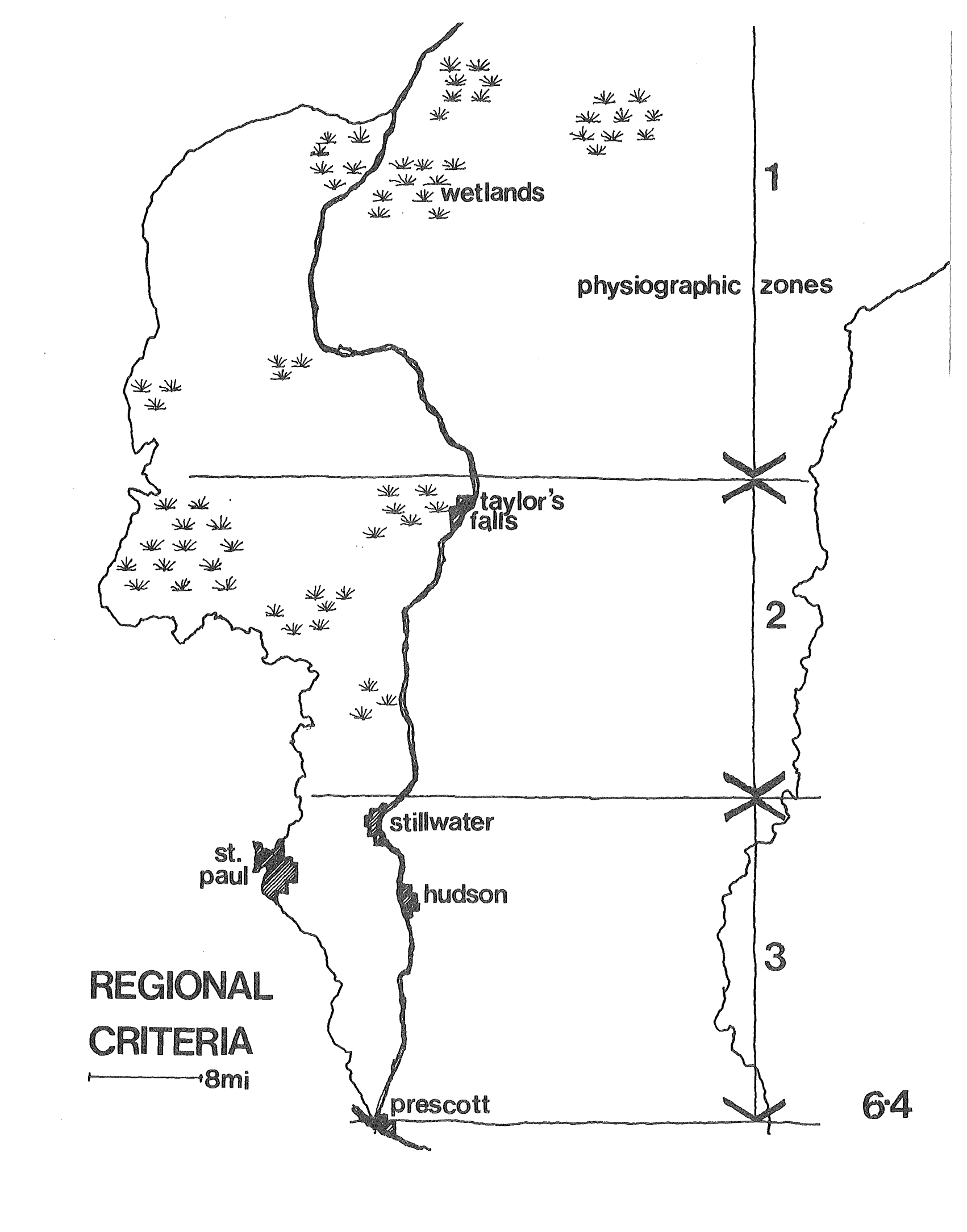
The superimposition of human activities onto the region has altered and rearranged many of the components in the hydrologic cycle.

At the regional scale certain primary factors are evident:

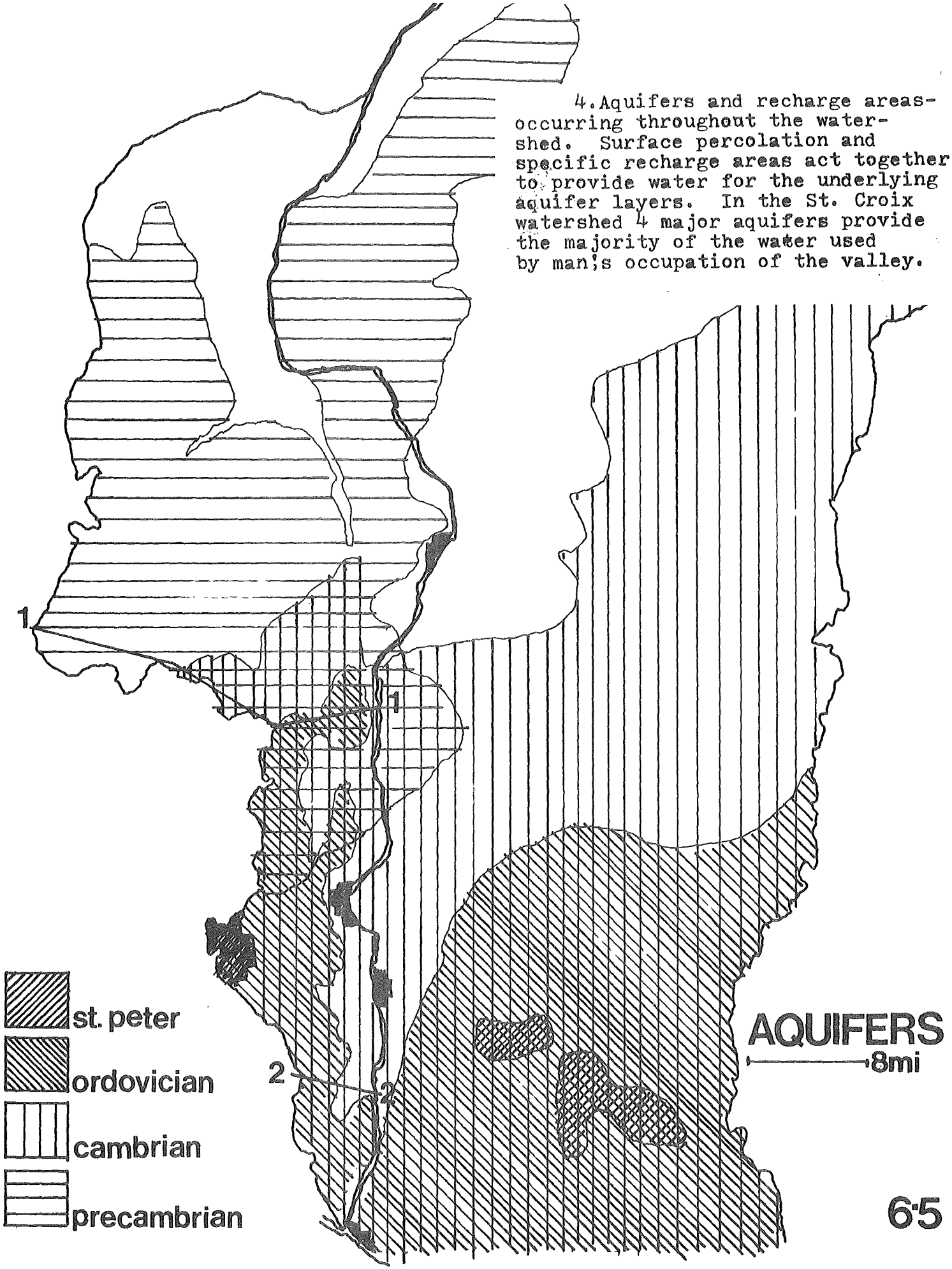
1. Watershed- indicating basin form.
2. Physiography- indicating variation in physical form of the river due to glaciation and subsequent runoff. In Physiographic Zone 1 the river flows through a flat, sandy area, the bed of glacial Lake Grantsburg. The river has low banks and lacks the definition of a distinct valley. In Zone 2 glacial runoff cut through the igneous rock, restricting river width and maintaining steep escarpments. In Zone 3 Lake St. Croix was formed by the damming of the St. Croix outlet by Mississippi River sedimentation, forming the lake.
3. Wetlands- areas collecting and filtering runoff, also potential aquifer recharge areas.



hydrology schematic

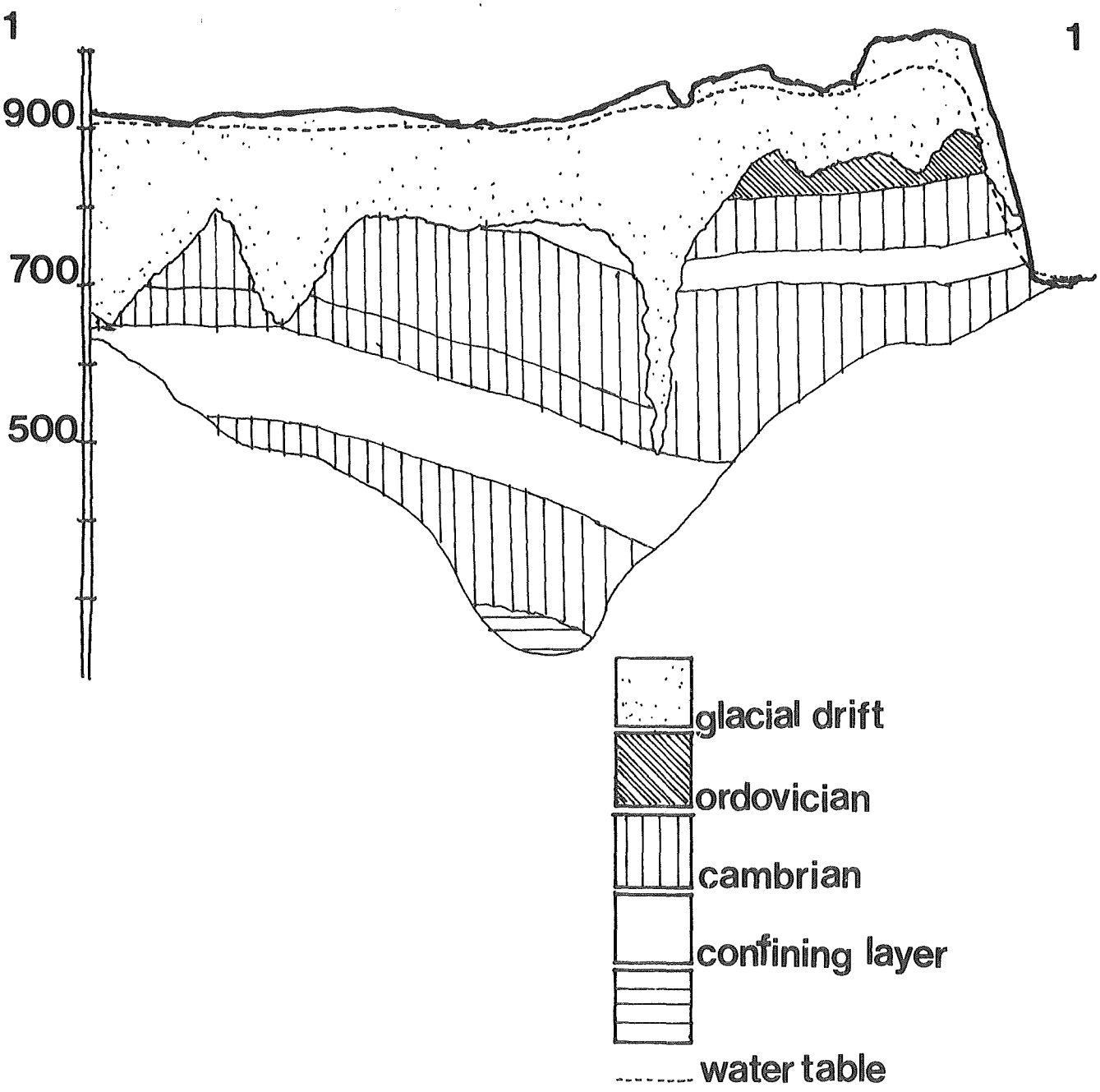

wetlands
1
physiographic zones
taylor's falls
2
stillwater
st. paul
hudson
3
REGIONAL CRITERIA
8mi
prescott
6·4

4. Aquifers and recharge areas- occurring throughout the water- shed. Surface percolation and specific recharge areas act together to provide water for the underlying aquifer layers. In the St. Croix watershed 4 major aquifers provide the majority of the water used by man's occupation of the valley.



Geologic profiles indicate aquifer positioning and relation to the riverbed. Aquifer recharge can occur as water percolates past confining beds in glacial outwash pockets, as ground water seeps directly into the underlying aquifer, and as permeable sections of the riverbed allow water to enter adjacent aquifers.

Aquifer water can also enter the river as springs or groundwater additions, continuing the cycling of water in the basin.



Although aquifer supply is adequate for current demand, and recharge potential is sufficient for future use, increases in aquifer use indicate increases in land use. (industrialization, urbanization, agricultural intensification)

With the increase in use is indicated an increased potential for aquifer misuse through contamination.

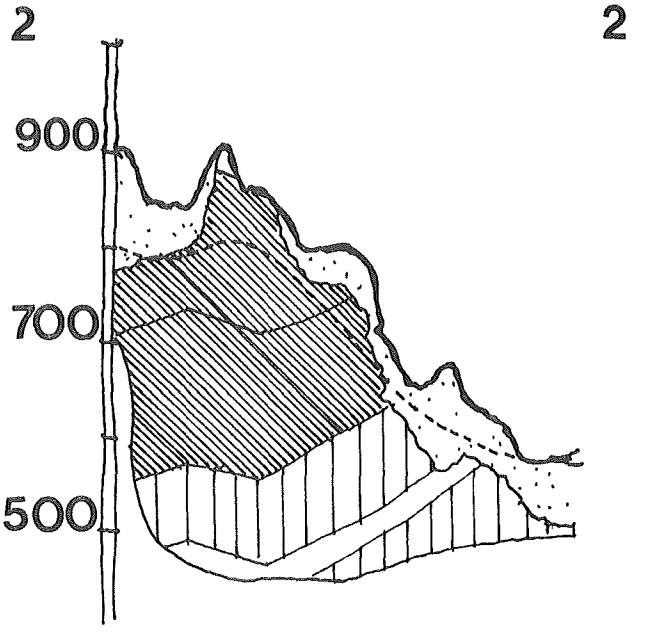
Althpugh aquifer characteristics are not considered critical criteria for design at the town scale, potential abuse of the aquifer should be considered at smaller scale investigations.

Factors in programming for aquifer abuse potential:

1. Quality and hazard level of effluents.
2. Soil conditions surrounding effluent pathways and systems.
3. Local geology and aquifer depths in relation to effluent system paths and depths.

It has been determined that the hyrologic cycle within the St. Croix watershed defines 4 critical design areas, each of which will be dealt with in this section.

1. Flooding and floodplain considerations.
2. Surface waters and the parameters for runoff.
3. Visibility and the relationship of hydrology and legislative policy.
4. Interface, the visual and physical relationships of man and nature within the river basin.



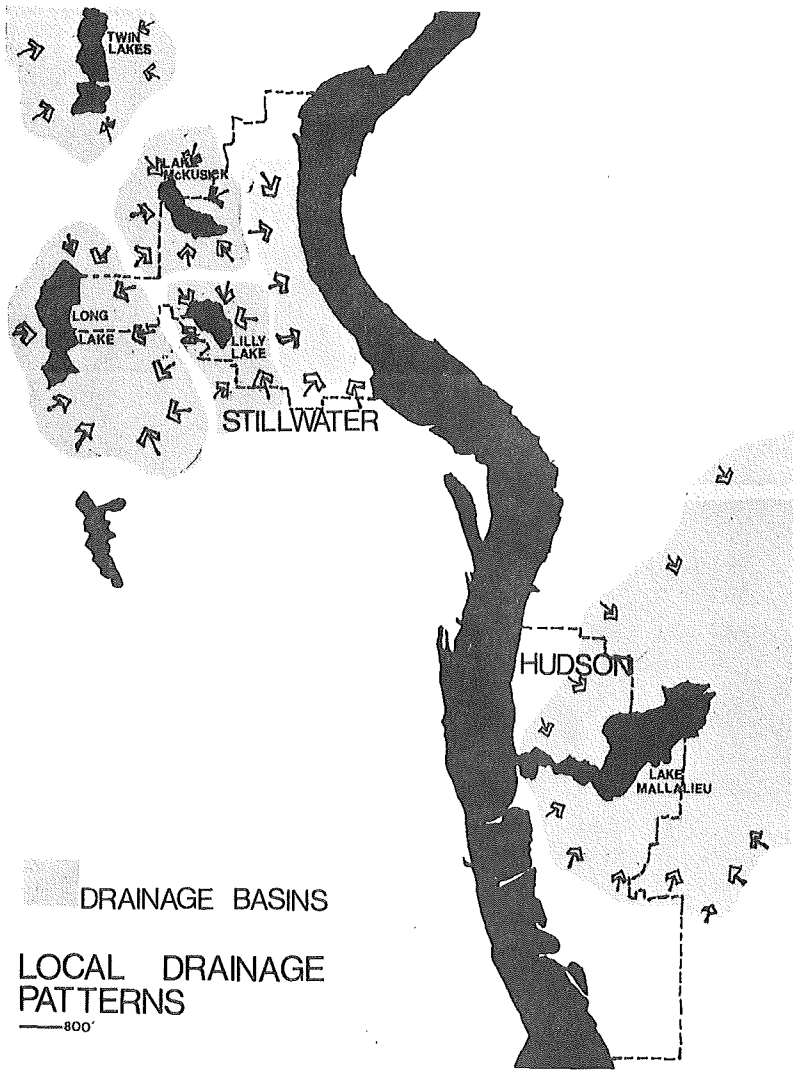
runoff

Runoff is a natural process in the hydrological cycle. Critical areas involve runoff basins and drainage paths. Other factors, such as slope, soil conditions and surface impermeability play an important role in drainage.

The cumulative effect of these factors play an important role in determining land use patterns.

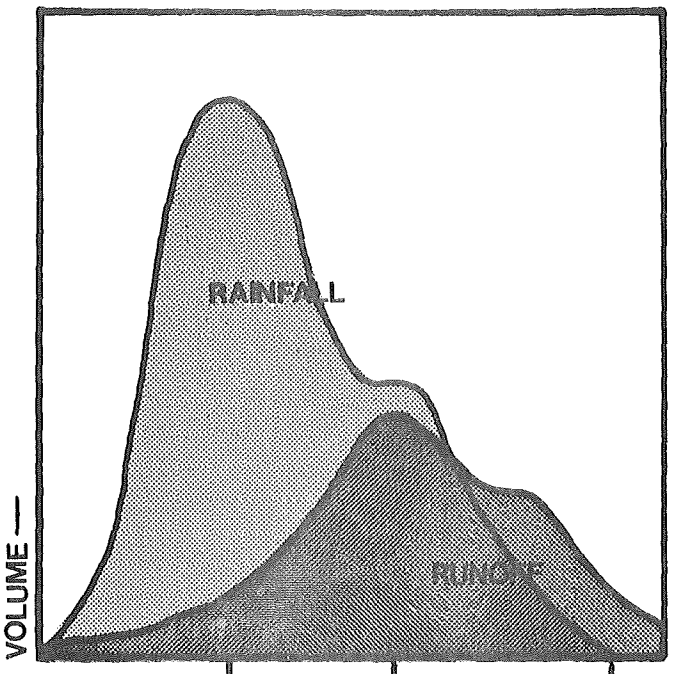
This map (below) delineates where the major drainage areas of Hudson and Stillwater are. Most of Hudson drains into Lake Mallilieu. Stillwater drains into Long Lake, Lilly Lake, Lake McKusick and the St. Croix River.

These basins become important because of the effect urban development places upon them.

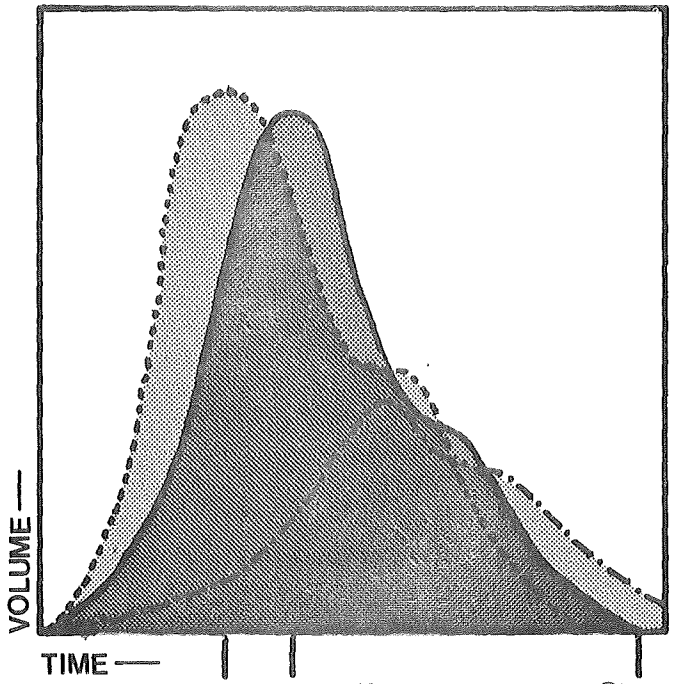


Algae bloom and lake eutrophication are accelerated by both urban and agricultural runoff. Runoff from agricultural land is rich in nutrients, silt and inorganic solvents. Much of the agricultural land above Hudson drains into the basin shown on the preceeding map. Urban runoff, in addition to being rich in these same nutrients, also contains various pollutants.

Urban development also causes an increase in the amount of impervious surface area. The result is increased runoff, with all of its harmful effects. This damage may include erosion, siltation, streambank damage and flash flooding.



RUNOFF HYDROGRAPH



RUNOFF HYDROGRAPH
IMPACT OF URBANIZATION

The runoff coefficient "C" expresses this portion of precipitation that runs off. As shown in the chart (below), a totally impermeable surface, such as a pitched roof surface, has a value of one. A surface which absorbs, or allows precipitation to drain through it has a coefficient that approaches zero.

By urbanizing a tract of rolling grassland (value of 0.10), runoff may increase by as much as 200%. By simply clearing a forested area, runoff will increase from 20-100%.

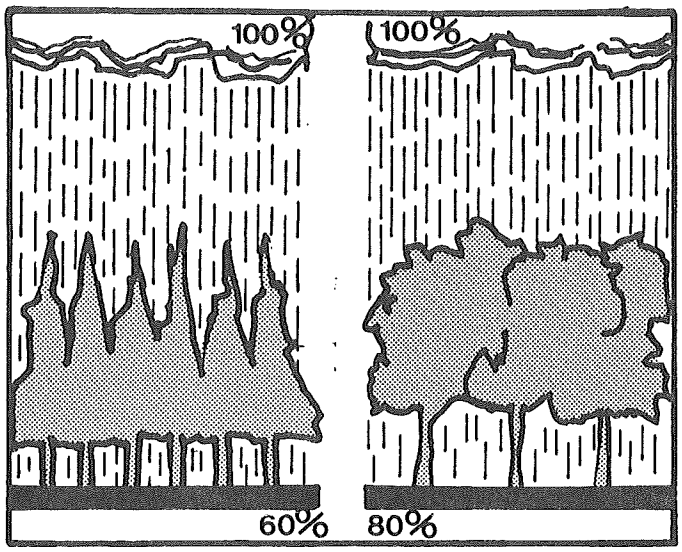
The use of vegetation will not only decrease runoff by slowing it down, but it will also play a very important role in erosion control and lake siltation control.

SURFACE TYPES	0-10° Slope	10-20° Slope
WOODLAND	0.10	0.35
PASTURE	0.10	0.50
CULTIVATION (ROW)	0.30	0.80
PARKS AND MEADOWS	0.10	0.50
URBAN		
30% IMPERVIOUS	0.40	0.50
50% IMPERVIOUS	0.55	0.65
80% IMPERVIOUS	0.68	0.80
GRAVEL ROADS	0.65	0.80
CONCRETE - BLK. TOP RD.	0.85	1.00
ROOFING	0.90	1.00

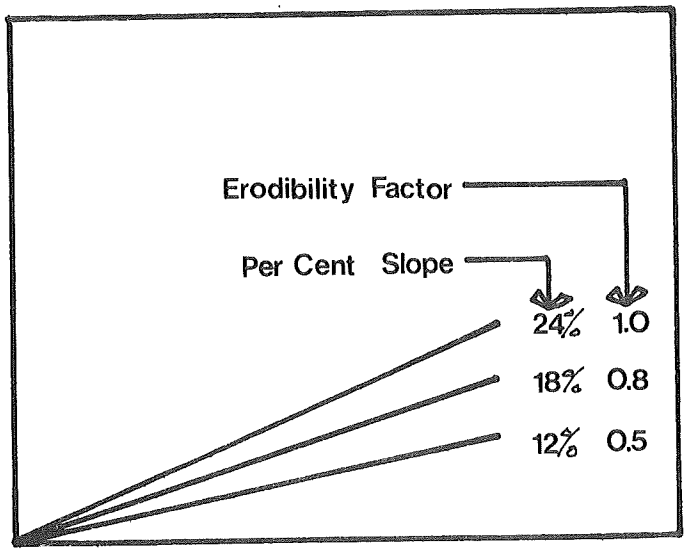
RUNOFF COEFFICIENTS FOR VARYING SURFACE TYPES

Other means of controlling runoff are to increase the amount of low "C" coefficient surfaces, such as grassy areas; resulting in a lower average total runoff coefficient. Another method is to use small scale retention ponds, such as roofs, parking lots, or water basins. This will slow down the quantity of water running off; in effect decreasing the runoff peak on the Runoff Hydrograph (two pages previous).

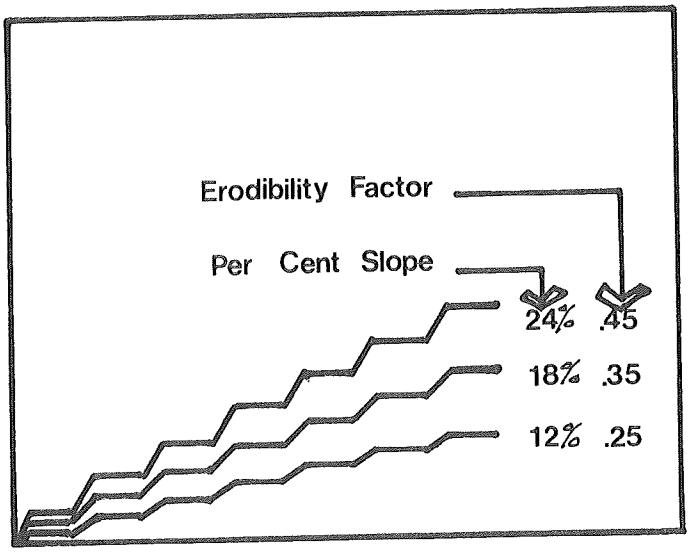
Changing the slope of a given area will also change its runoff potential. An alternative to this is to use contouring or terracing of severe slopes, to slow runoff and decrease erosion. This is a rather expensive procedure, so is not used on a wholesale basis.



RAIN PENETRATION



CONTOUR

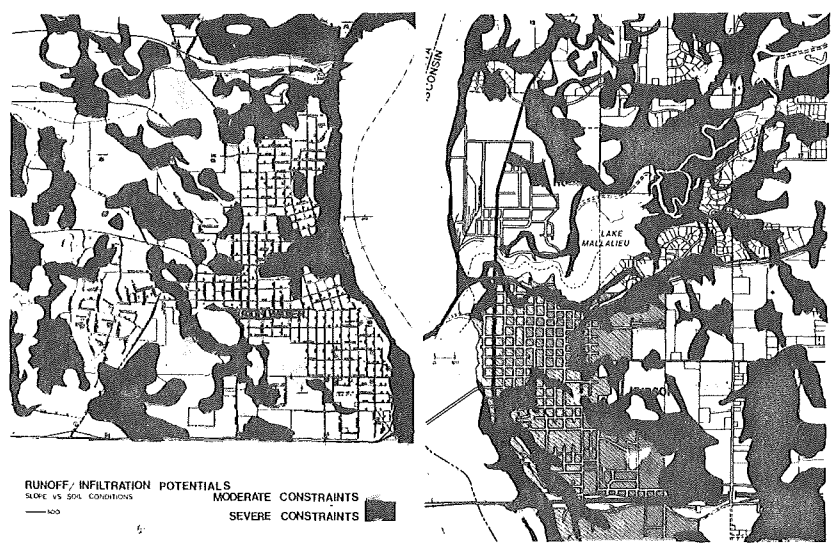


TERRACE

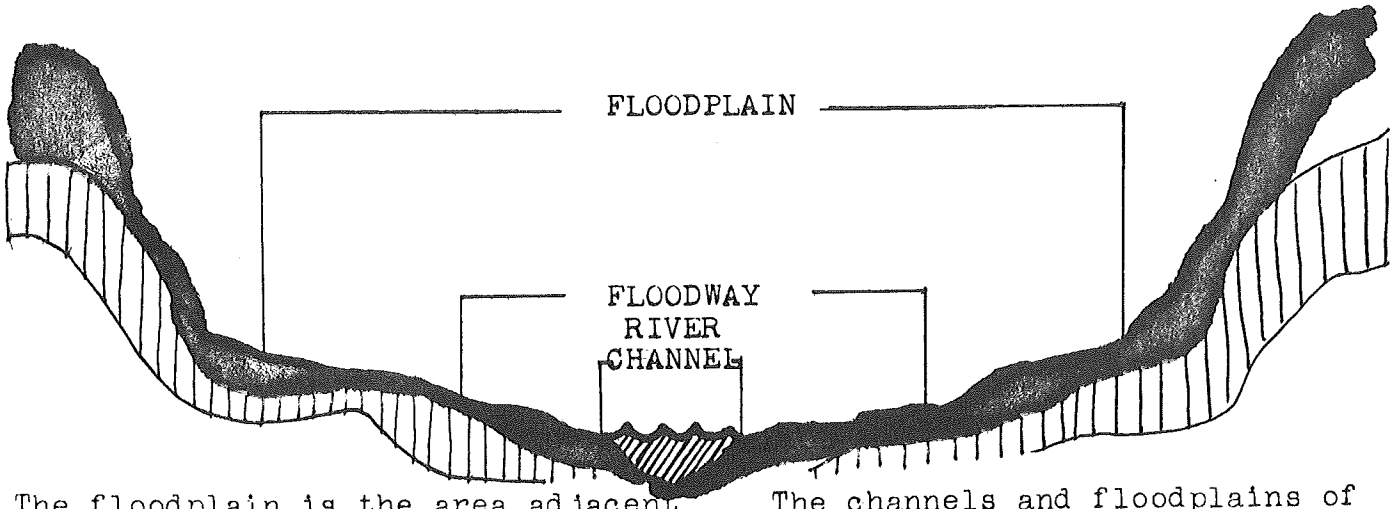
FACTORS IN EROSION CONTROL

The maps below delineate critical infiltration and runoff areas in Hudson (right) and Stillwater (left). This map was based upon slope and soil conditions. Development in the darker, critical areas must deal especially with the effect upon changing or increasing drainage, runoff and erosion conditions.

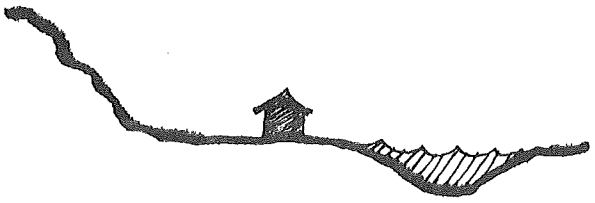
In lake intake regions, caution must be taken because of the delicate nature of the areas, which are usually swamp or bog areas. They act as natural filters for the lake bodies, and their damage would be costly to the health of the lake.



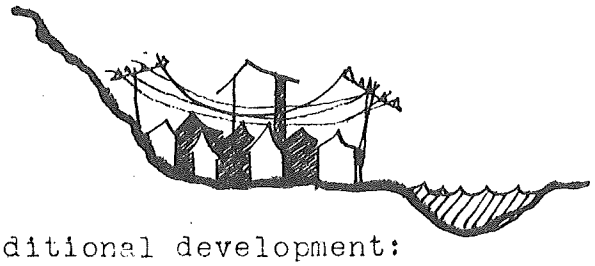
FLOODPLAINS/NAVIGATION



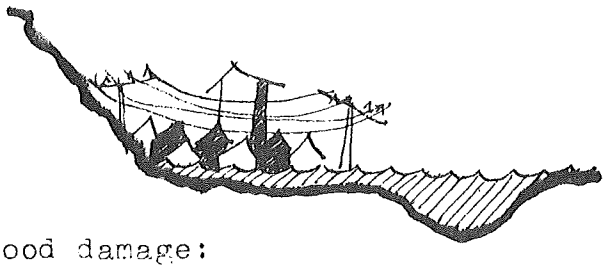
The floodplain is the area adjacent to a water source, which consists of an accumulation of alluvium sediment carried, deposited, and reworked by the river. The floodway refers to the river channel and portions of the adjoining floodplain which are required to carry and discharge the regional flood.



Initial development:



Additional development:



Flood damage:

The channels and floodplains of rivers and streams provide conveyance for flood flows resulting from the combination of excess amounts of snowmelt and/or rainfall and/or frozen ground. Prior to the construction of manmade materials on the floodplain, few flood problems existed. However, as the development of floodplain areas has increased, flood damages have also increased. Generally a flood problem arises when a single structure located on a floodplain at too low an elevation or without regard to the resultant increase in flood stages upstream. This initial development encourages additional construction on the flood plain which further reduces the waterway capacity and increases flood levels. Solid waste disposal then becomes a problem and can contaminate river water. Subsequently, the general public is affected by the installation of streets and other public services and utilities in these areas which, when damaged by floods, are repaired at public expense. The public will also be required to bear the costs of flood fighting and rehabilitation. Ultimately, flood control works constructed at public expense may be required to protect floodplain occupants.

ST. CROIX RIVER: DOWNSTREAM FLOOD DAMAGES *

DATE OF FLOOD	MILES	Damages in 1966 dollars			
		URBAN	AGRICULTURE	RURAL NON-CROP	TOTAL
1951	0-50	$ 29,000	$	$	$ 29,000
1952	0-50	1,171,000			1,171,000
1965 0	0-50	6,158,000			6,158,000
1965	50-100	61,100	58,800	37,900	157,800

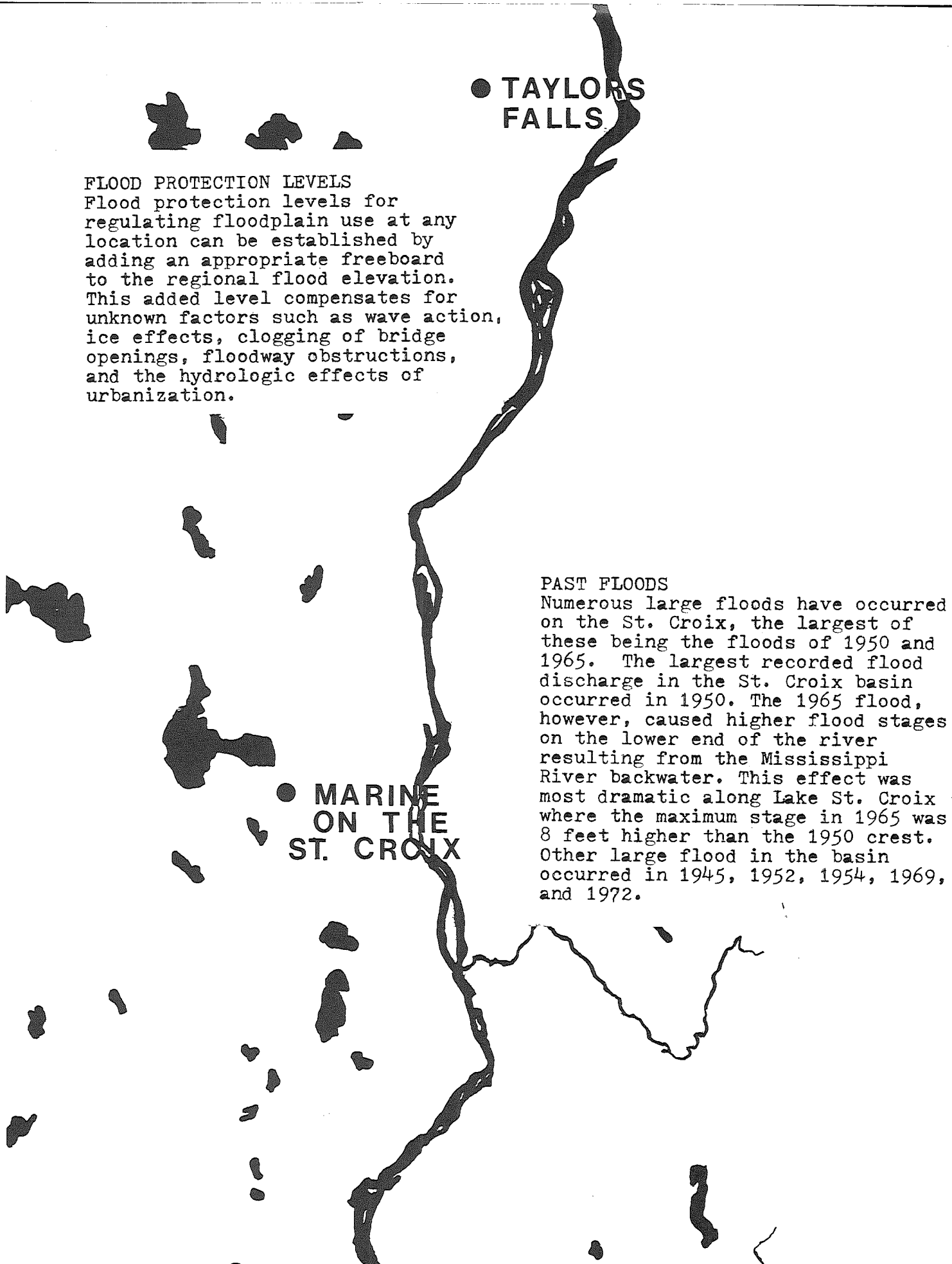
DOWNSTREAM FLOODPLAIN LAND USE *

MILES	TOTAL ACRES	CROPLAND	PASTURE	OTHER	URBAN AREAS SUBJECT TO FLOODING
0-50	9,200	200	700	8,300	Afton, St. Croix Beach, St. Mary's Pt., Lakeland Bayport, Stillwater, Marine on the St. Croix, & Hudson, Wisc.
50-100	20,800	700	5,700	14,400	Taylor's Falls, Mn.
100-146	29,900	600	2,400	26,900	

PROJECTION OF FUTURE DAMAGES *

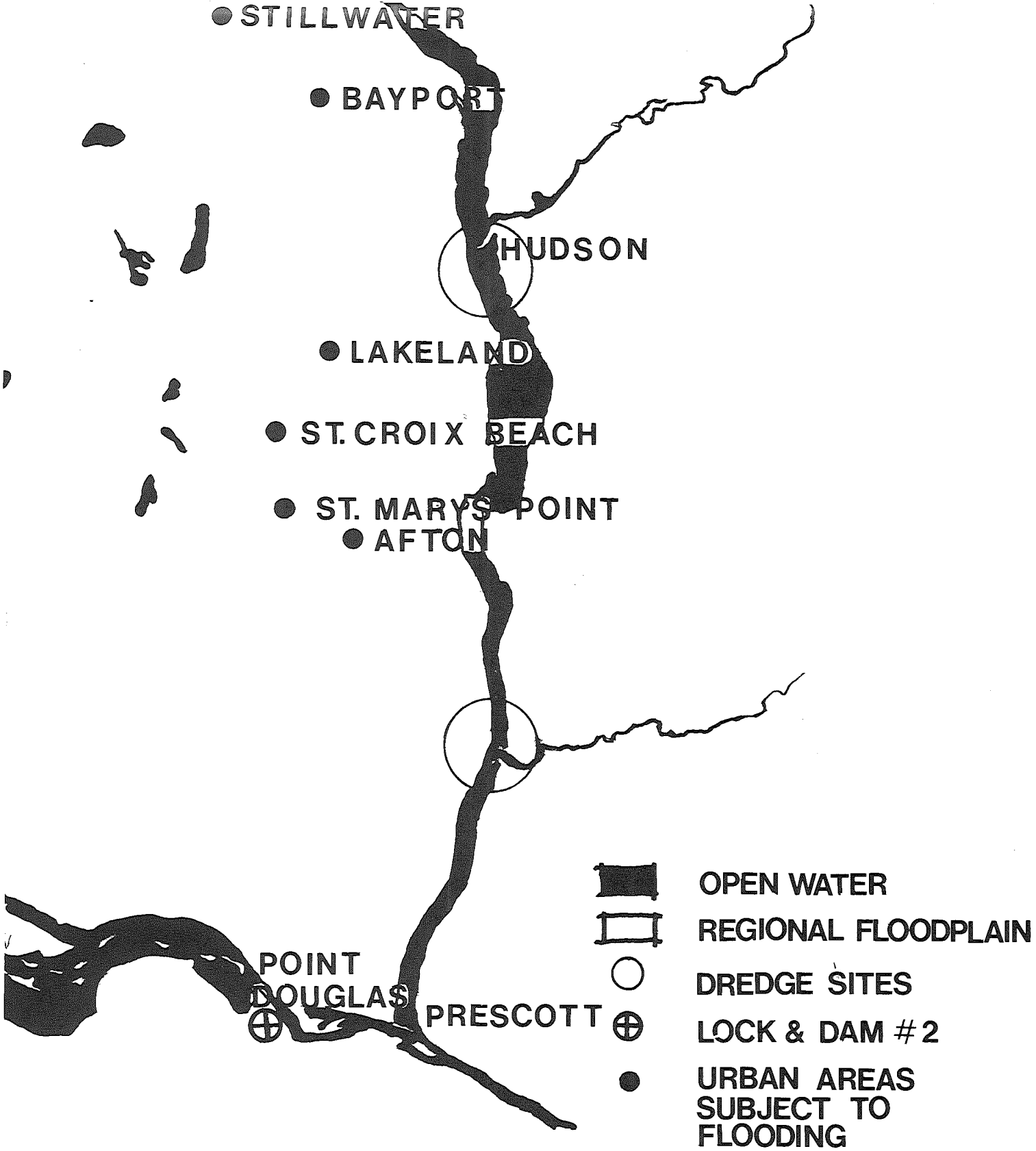
MILES	Total average annual damages (dollars)			
	1966	1980	2000	2020
0-50	$264,600	$428,900	$1,060,400	$1,706,600
50-100	16,200	28,700	45,600	52,400
100-146	18,300	33,100	45,400	52,300

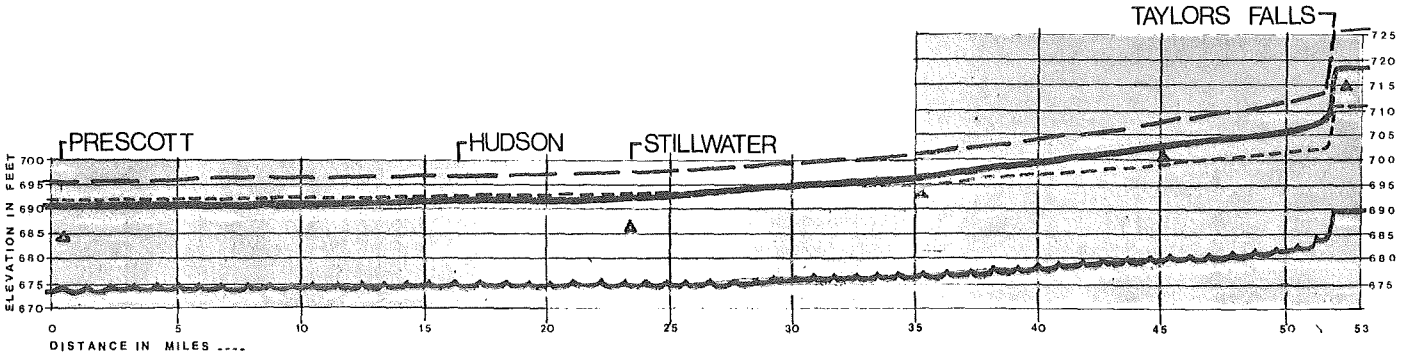
* Upper Mississippi River Comprehensive Basin Study, 1970



FLOOD PROTECTION LEVELS
Flood protection levels for regulating floodplain use at any location can be established by adding an appropriate freeboard to the regional flood elevation. This added level compensates for unknown factors such as wave action, ice effects, clogging of bridge openings, floodway obstructions, and the hydrologic effects of urbanization.

PAST FLOODS
Numerous large floods have occurred on the St. Croix, the largest of these being the floods of 1950 and 1965. The largest recorded flood discharge in the St. Croix basin occurred in 1950. The 1965 flood, however, caused higher flood stages on the lower end of the river resulting from the Mississippi River backwater. This effect was most dramatic along Lake St. Croix where the maximum stage in 1965 was 8 feet higher than the 1950 crest. Other large flood in the basin occurred in 1945, 1952, 1954, 1969, and 1972.

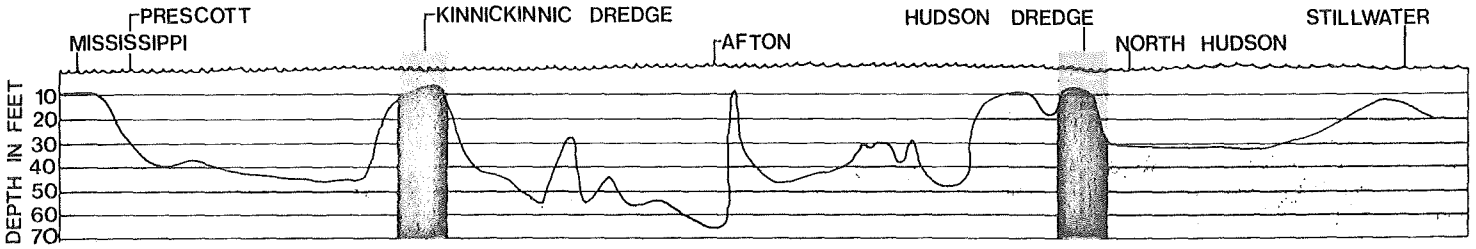

STILLWATER
BAYPORT
HUDSON
LAKELAND
ST. CROIX BEACH
ST. MARYS POINT
AFTON
POINT DOUGLAS
PRESCOTT
OPEN WATER
REGIONAL FLOODPLAIN
DREDGE SITES
LOCK & DAM # 2
URBAN AREAS SUBJECT TO FLOODING



WATER SURFACE PROFILE

LEGEND
ORIGINAL WATER LEVEL
100-YEAR FLOOD PROFILE
500-YEAR FLOOD PROFILE
1965 HIGH WATER LEVEL
1950 HIGH WATER MARKS

A profile of the regional flood alon the St. Croix is shown in figure . Shown with it are profiles of the 50 year and 1965 floods along with the high water marks from the 1950 flood. USGS quadrangle maps with mileage markers corresponding to those on Fi are available from the DNR.



NAVAGATION MAINTENANCE - DEPTH PROFILE

DREDGING AREA

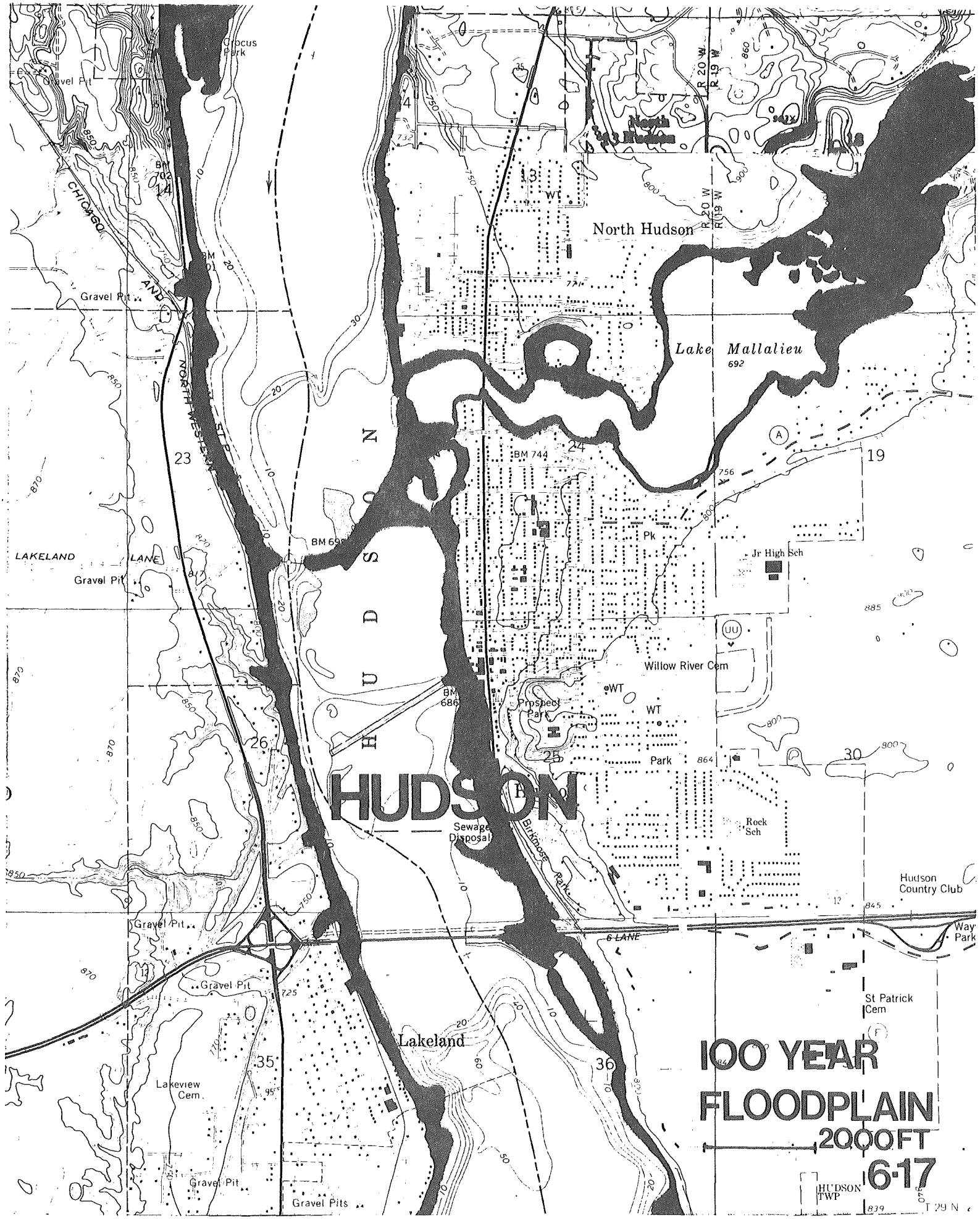
NAVIGATION

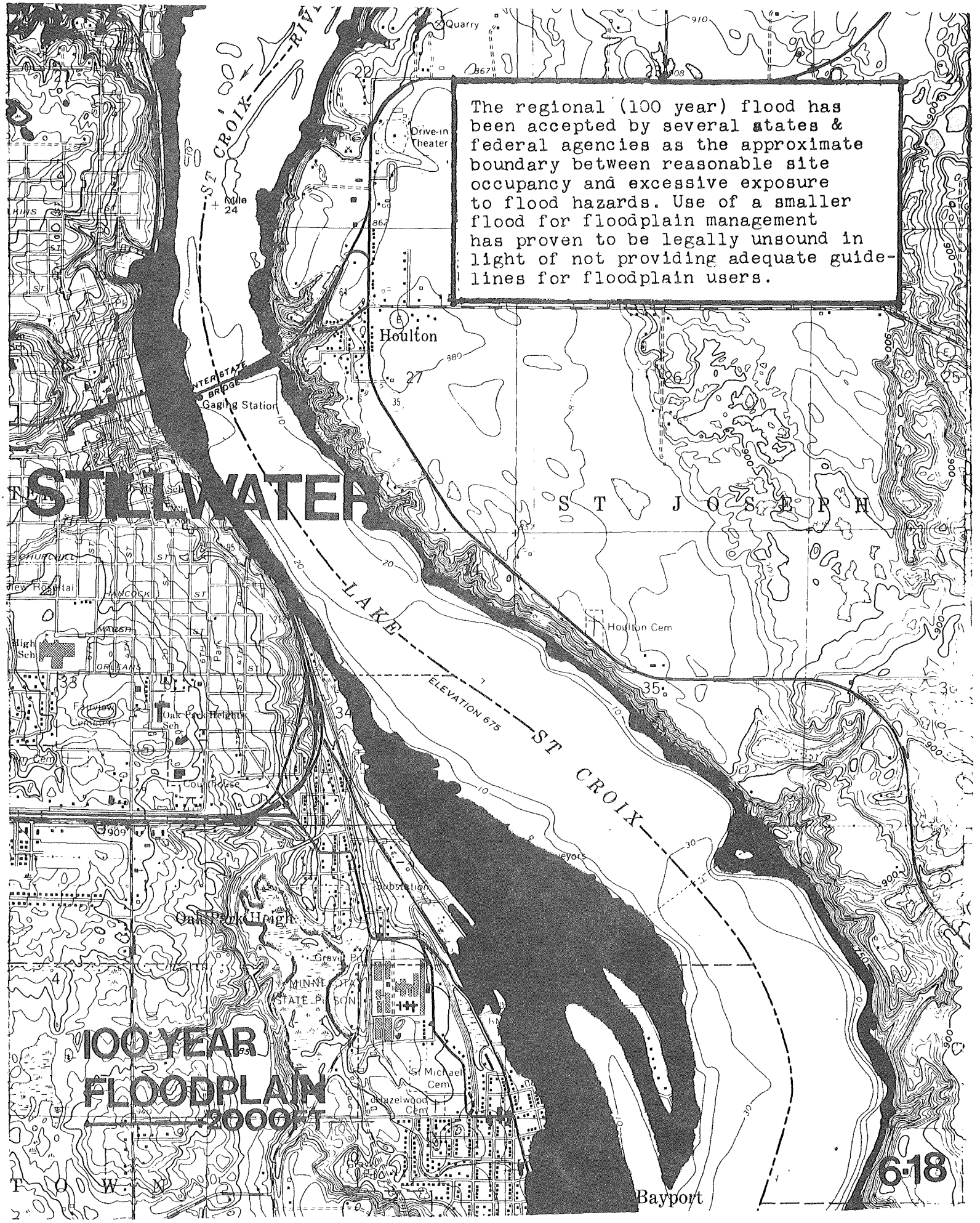
The state holds navigable waters for public use, defining them as "any stream is navigable in fact which is capable of floating any boat, skiff, or canoes of the shallowest draft used for recreation purposes. Watercourses are available for boating, fowling, skating, bathing, taking water for domestic or agricultural use, and cutting ice.

Channel dredging maintains a 9-13 foot depth for navigation purposes. If the channel is too wide for its depth the velocity will be insufficient to carry sediment. If the channel is too narrow the velocity increaes and the river banks will erode.

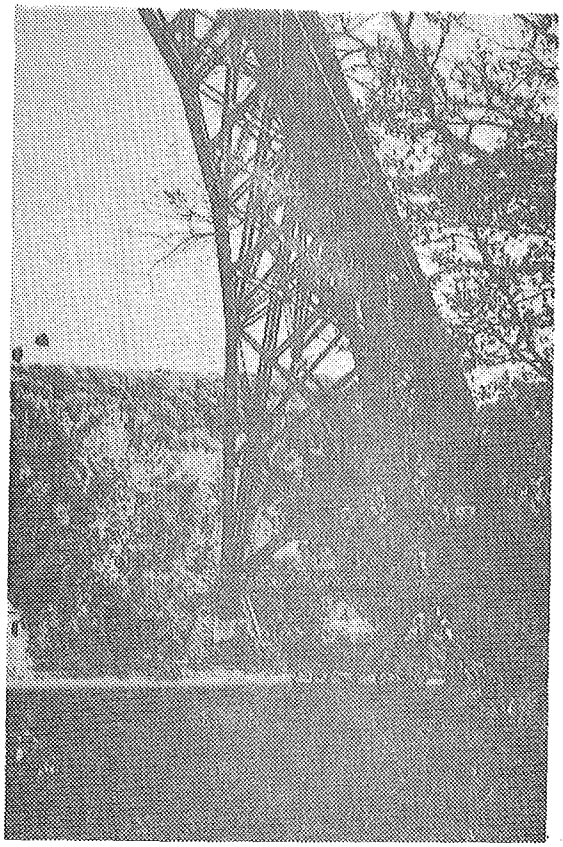
Over its length the St. Croix drops 340 feet. Along its length 2 sites require dredging. The Hudson site is dredged once every 9-10 years. The Kinnikinnic River site is dredged every 3-4 years.

Since 1978 dredging has been in compliance with the 1977 Clean Water Act, Requiring that dredge spoil be dumped into confinement areas with controlled effluent levels.

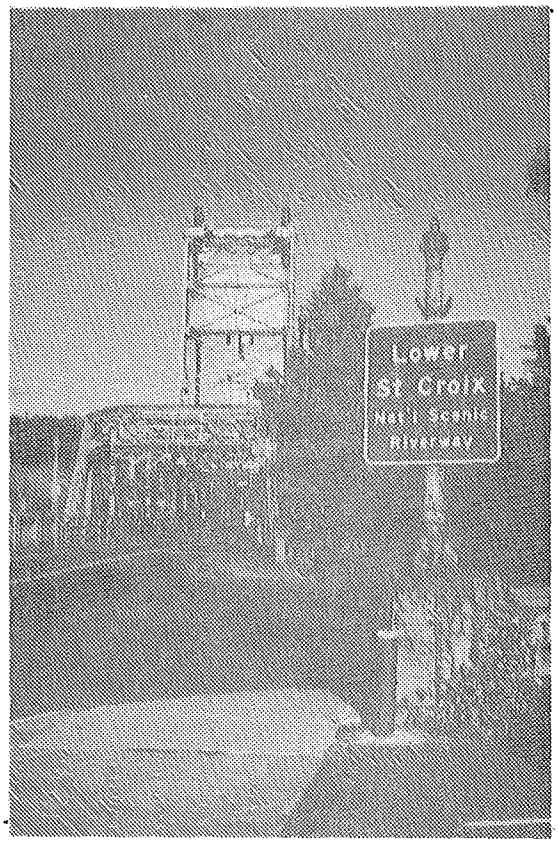

Crocus Park
Gravel Pit
CHICAGO
AND
NORTH WESTERN ST P
North Hudson
Lake Mallalieu
692
Gravel Pit
LAKELAND LANE
Gravel Pit
BM 744
BM 699
BM 686
Pk
Jr High Sch
Willow River Cem
Prospect Park
Park
HUDSON
Sewage Disposal
Rock Sch
Birkmose Park
Hudson Country Club
6 LANE
Gravel Pit
Gravel Pit
St Patrick Cem
Lakeland
Lakeview Cem.
Gravel Pit
Gravel Pits
HUDSON TWP
T 29 N
100 YEAR FLOODPLAIN
2000 FT
6-17


The regional (100 year) flood has been accepted by several states & federal agencies as the approximate boundary between reasonable site occupancy and excessive exposure to flood hazards. Use of a smaller flood for floodplain management has proven to be legally unsound in light of not providing adequate guidelines for floodplain users.
STILLWATER
ST CROIX RIVER
LAKE ST CROIX
ELEVATION 675
Houlton
Houlton Cem
Drive-in Theater
Gaging Station
INTERSTATE BRIDGE
Oak Park Heights
Oak Park High
Sch
Sub-station
MINNESOTA STATE PRISON
St Michael Cem
Hazelwood Cem
Bayport
S T J O S E P H
T O W N
100 YEAR FLOODPLAIN
2000 FT
6-18

Water/land Interface

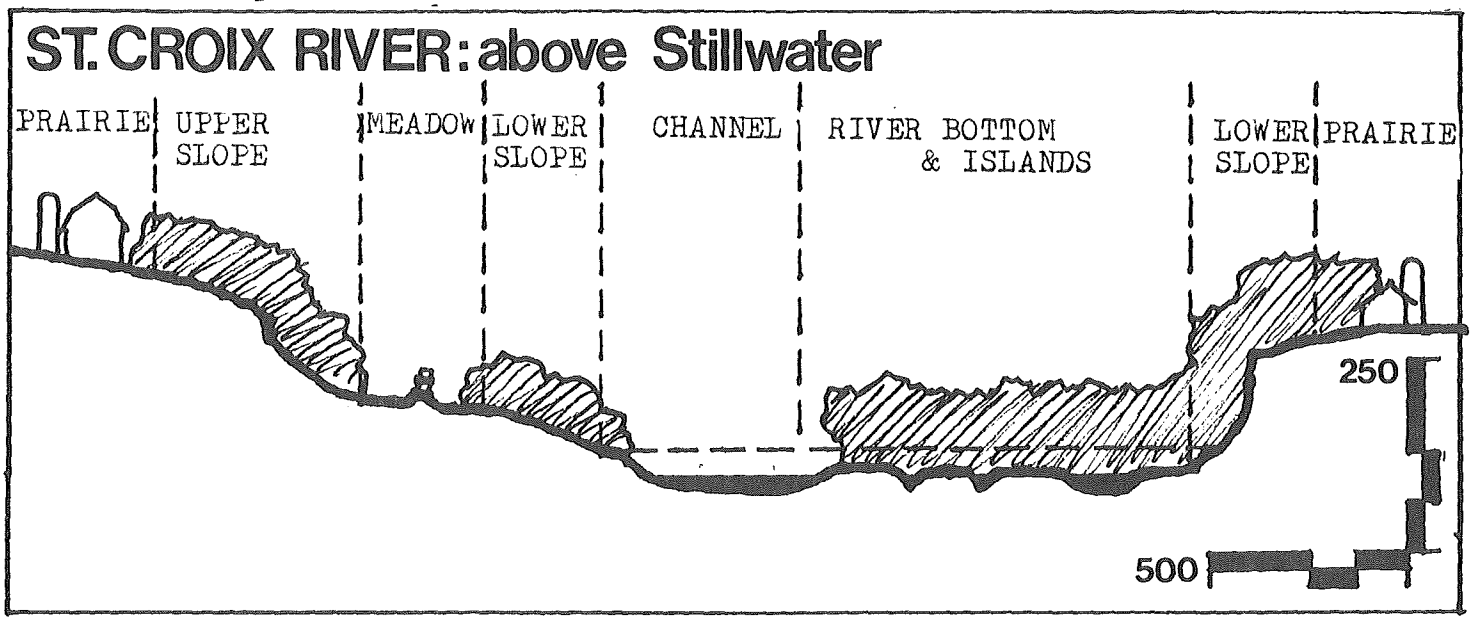


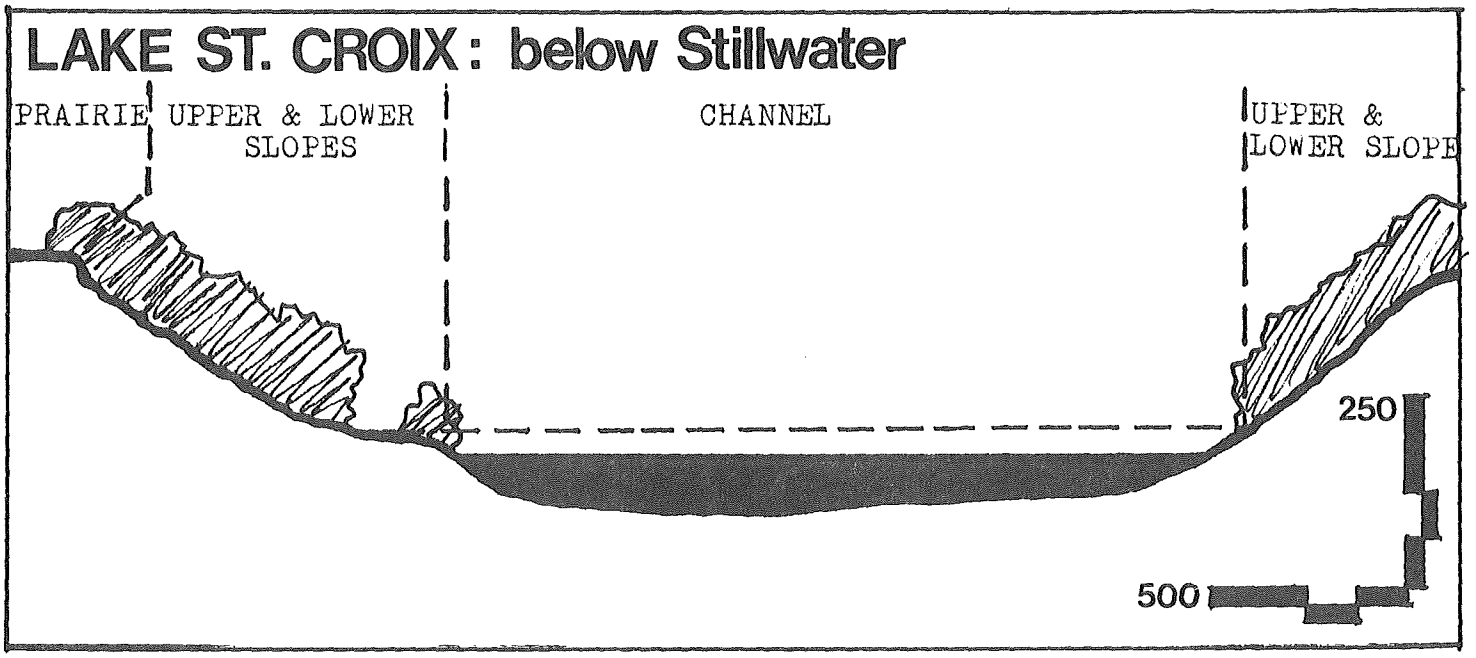
Interface is the way in which systems affect each other, either physically or perceptively. In the St. Croix valley, diverse natural systems have interacted for thousands of years, forming a delicate balance. Wildlife and vegatation are dependent on local hydrological, meteorological, and geological systems.
As Western culture moved into the valley, it both directly and indirectly affected the natural interface. Direct influence can be seen in the clearcutting of mature pine forests for construction. Visually, this changed the character of the valley, but indirectly, this affected erosion and siltation systems, adding more nutriants to the surface water, changing vegetation, and eventually changing wildlife patterns Although the St. Croix valley is very different from what it was 150 years ago, it is still a valley of both scenic and cultural beauty. If development is to continue, then attention must be paid to visual interface. This refers to how development affects the visual corridor, and how it relates to existing structures, as well as to natural surroundings. The character of the valley changes around every bend and bluff, and a structure which may be appropriate near an urban center could be out of place a half-mile upstream.



river valley interface

The St. Croix valley, due to geological phenomena previously discussed, has, from Taylors Falls to Prescott, two distinct personalities. Perpendicular to this river, from channel to bluff, such systems act in diverse says. Because land use and water affect all these systems, out interface with them must be examined before implementation causes irrepairable damage. This section will compare the transverse interface (shoreline to bluff) with the St. croix valley above Stillwater and on Lake St. Croix.





channel / lowlands

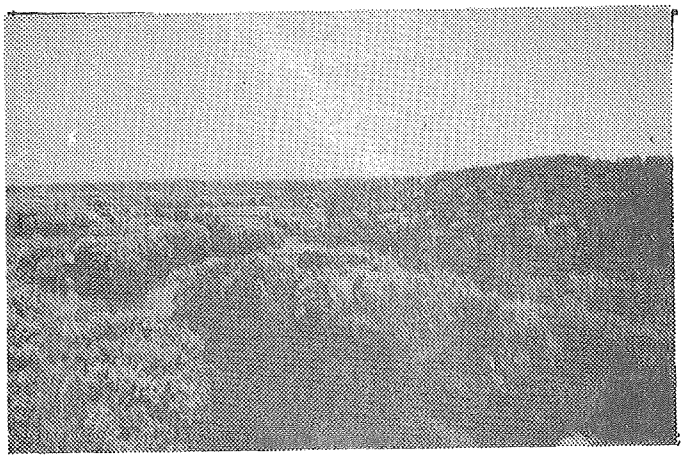
Above Stillwater, the channel is very narrow, with islands, backwater, and marshlands filling the valley floor. The lowland deciduous forests on the rivers edge confine visibility to the immediate forground, with occasional long-range vistas of the valley and bluffs.

The backwaters are filled with a diverse assortment of wildlife and vegetation because of the abundance of surface water. Amphibeans, reptiles, songbirds, migratory waterfowl, and mammals are abundant.

On Lake St. Croix, the channel is usually the full width of the valley, with the slopes abruptly meeting the channel at rocky shores or sand beaches of tributary valleys. Only animals capable of surviving on the steep slopes are found. The channel is very deep, so shallow shoreline feeding areas for wildlife are absent. The visual perception of the valley is quite different from the intimate forest edge of the river above Stillwater. Vistas welcome the traveler, with the bluff creating a massive edge to the corridor.

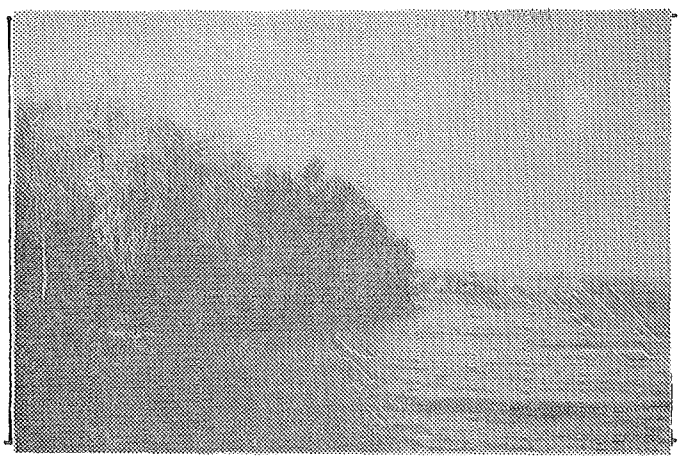
slopes

Above Stillwater, the slopes carry a mix of vegetation from prairie with vegetation from moister lowlands. On Lake St. Croix, the dry and upland deciduous, can be found.



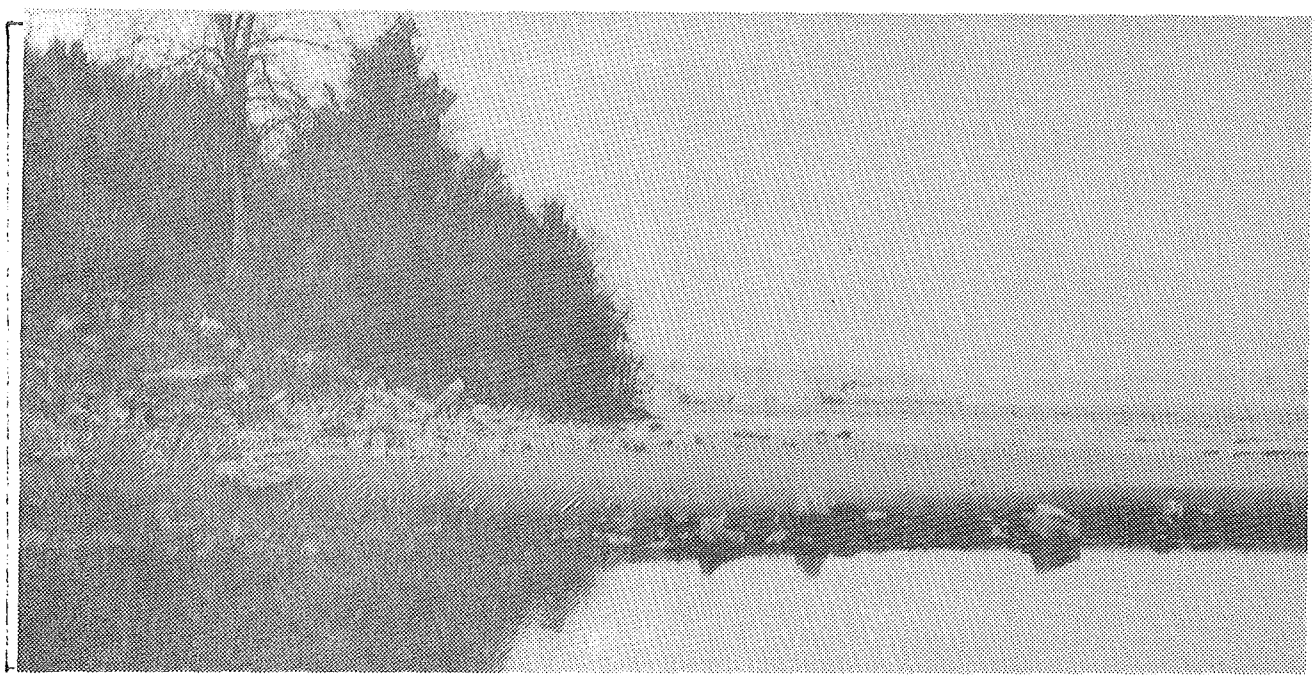
bluffline

The edge of the bluff has a severe slope change and often has limestone and sandstone escarpments. Because of the valley views found in this zone, it has long been a favorite area for building yearround and summer residences. The Wild and Scenic River designation of the St. Croix has changed this, so if development is considered anywhere between prairie and the channel, refer to the appendix of this chapter.

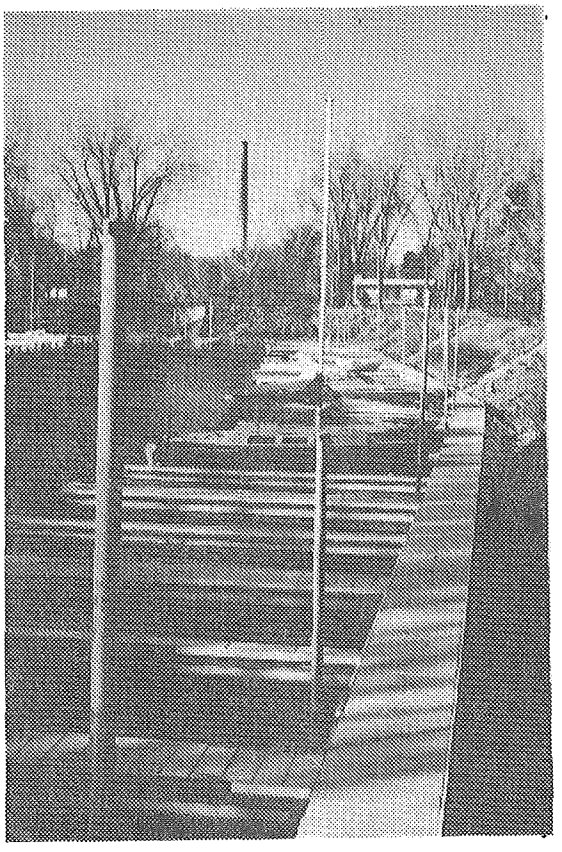


prairie

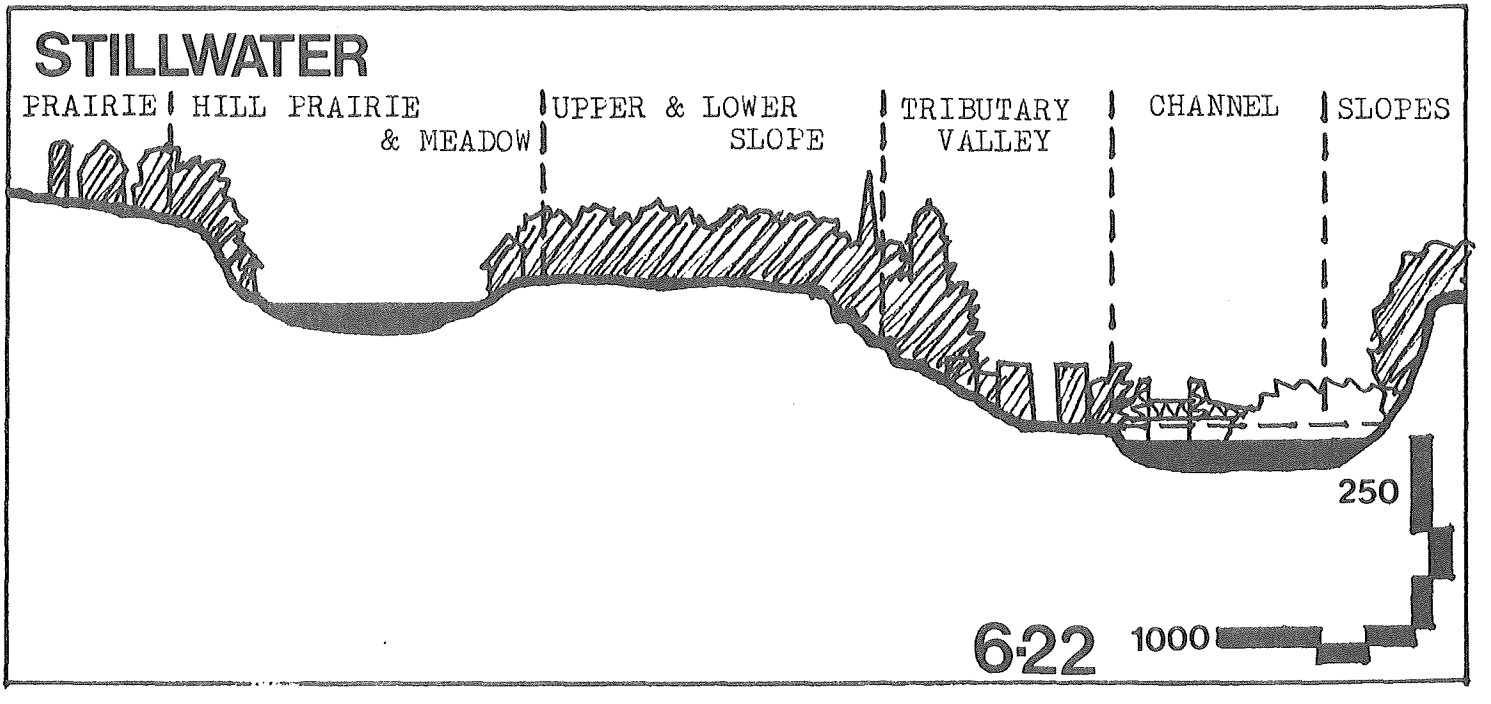
Over the last 150 years, the natural prairie has been replaced by agricultural land use. The prairie is divided by the many tributary valleys which drop toward the St. Croix. Often, from various vantage points along the prairie highways, one can see the prairies on the opposite side of the valley and not even perceive that there is a valley 300 feet deep and a half mile wide!

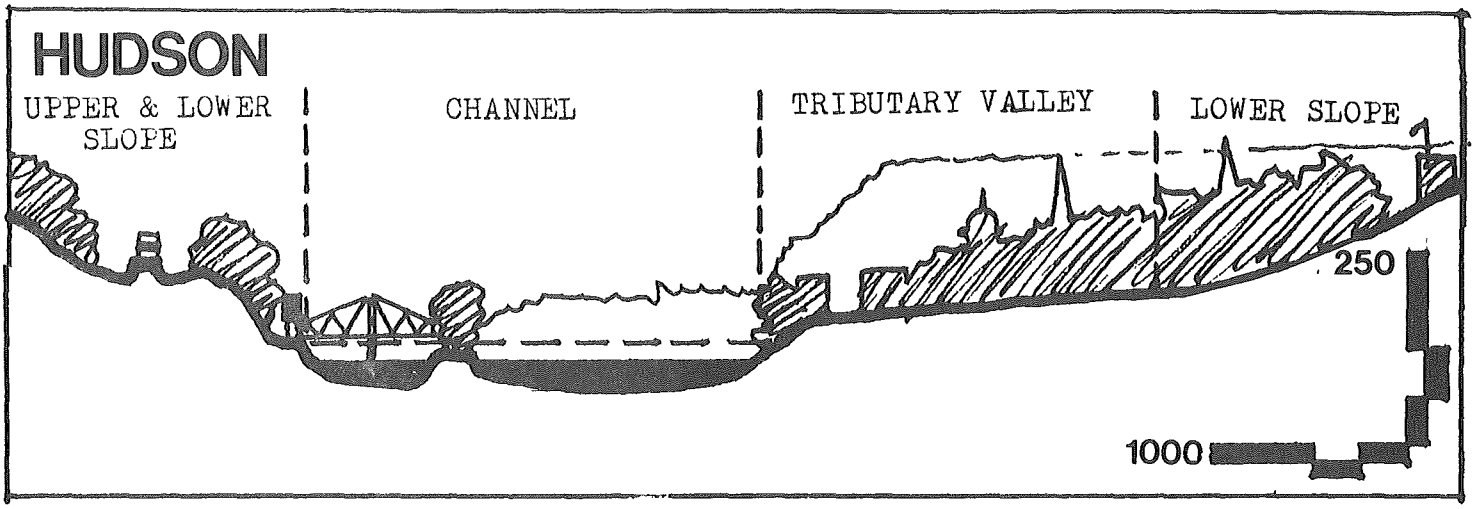


urban interface

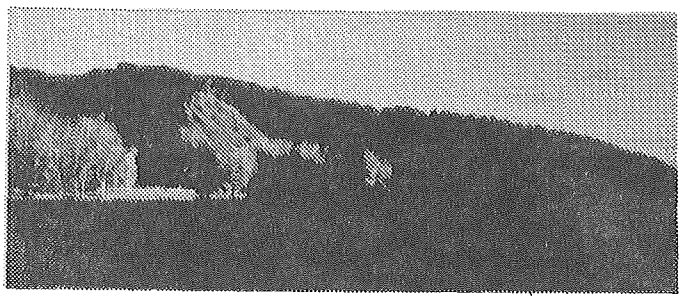


The interface of city and river deals with how the town is perceived from the river, how the river is seen from town, and how they affect each other in terms of their natural systems.
The vegetation and wildlife of both Stillwater and Hudson are so radically different than the tributary valley systems that existed 200 years ago that a new hierarchy of natural systems has taken over. Surface water runoff is no longer absorbed by soils, but carried off in storm sewers. Vegetation is typical mature Minnesota urban street plantings, with underbrush used as decoration or visual barriers rather than erosion control. Both towns were sited in valley floors because of the need for level terrain for building and the need for pottable surface water provided by the tributary rivers and local lakes. Because of different factors in their economic growth, they are quite different in visual character.



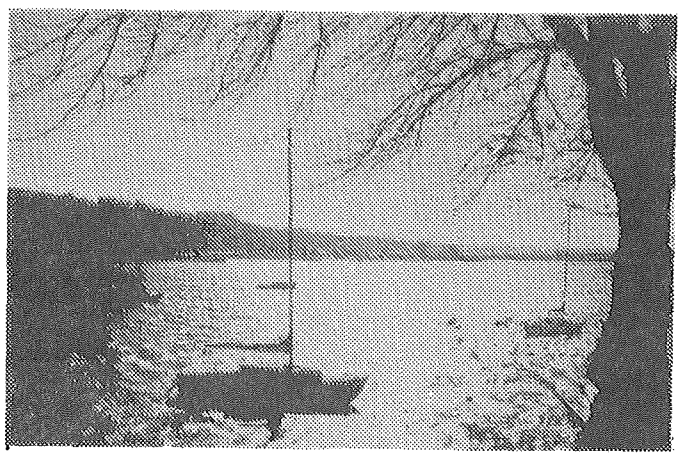


river corridor

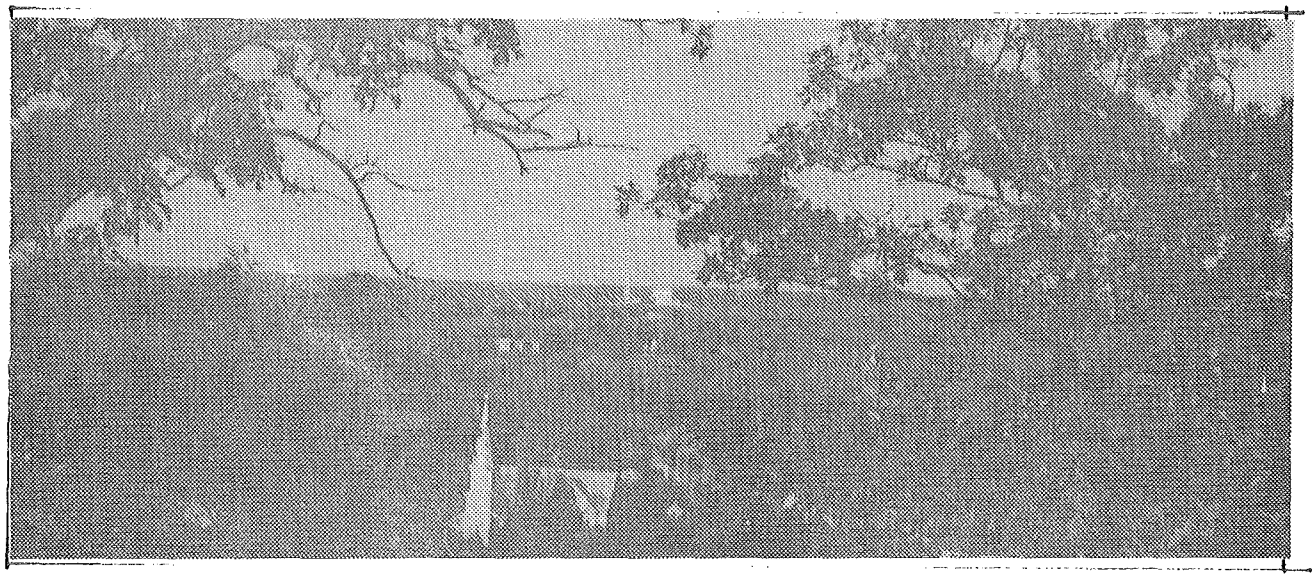


Both towns have encroached on the visual river corridor with bridge causeways; Stillwater has one, Hudson has 3. These causeways visually seperate different sections of the river, but do allow people to view the valley from the channel without needing a boat. Often this is the only view some people get of the St. Croix.

shoreline

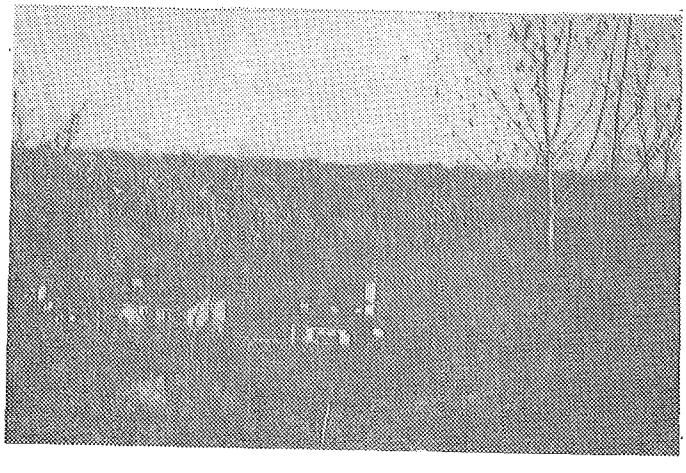


Both Stillwater and Hudson have recreational areas, light industry, and railway right-of-ways. Stillwaters park flanks the Interstate Bridge, and has a large impact on the visual interface from the channel, setting the traditional image which carries throughout the town. The parks strongest visual statement is a recalling of the shoreline parks of many small towns on the Mississippi River, noting Hastings and Winona, Minnesota as local examples. These parks were used for steamboat moorings during the 19th century, and few have been preserved as well as this one. On either side of the pard, however, the shoreline is in terrible condition with unmaintained asphalt shorelines littered with junk. Stillwater also has 5 marinas between the Bayport boundary and the "Boom Site". Hudson has a less formal park, perhaps to their advantage, with two marinas very close to it. The shoreline near the causeways is at least not paved, and has potential for maintaining a more natural interface with the river.



river/town interface

The effect on the river interface by the towns beyond the shoreline is dependent upon the relationships between buildings, vegetation, slopes, and traffic corridors. Because Stillwater is on a steep slope, and because the churches are located on the top half of the slopes, the skyline is very destinctive. This is inhanced by the fact that Stillwater is located at a bend in the river, so that it can be seen from the river when approaching from either direction on the channel.
Hudson is on a more gradual slope, and isn't at a bend in the river, so the town doesn't have the impact Stillwater has on the river. Because the causeways and bridges force boat circulation to the west side of the valley, the town remains to a distance from major recreation traffic.

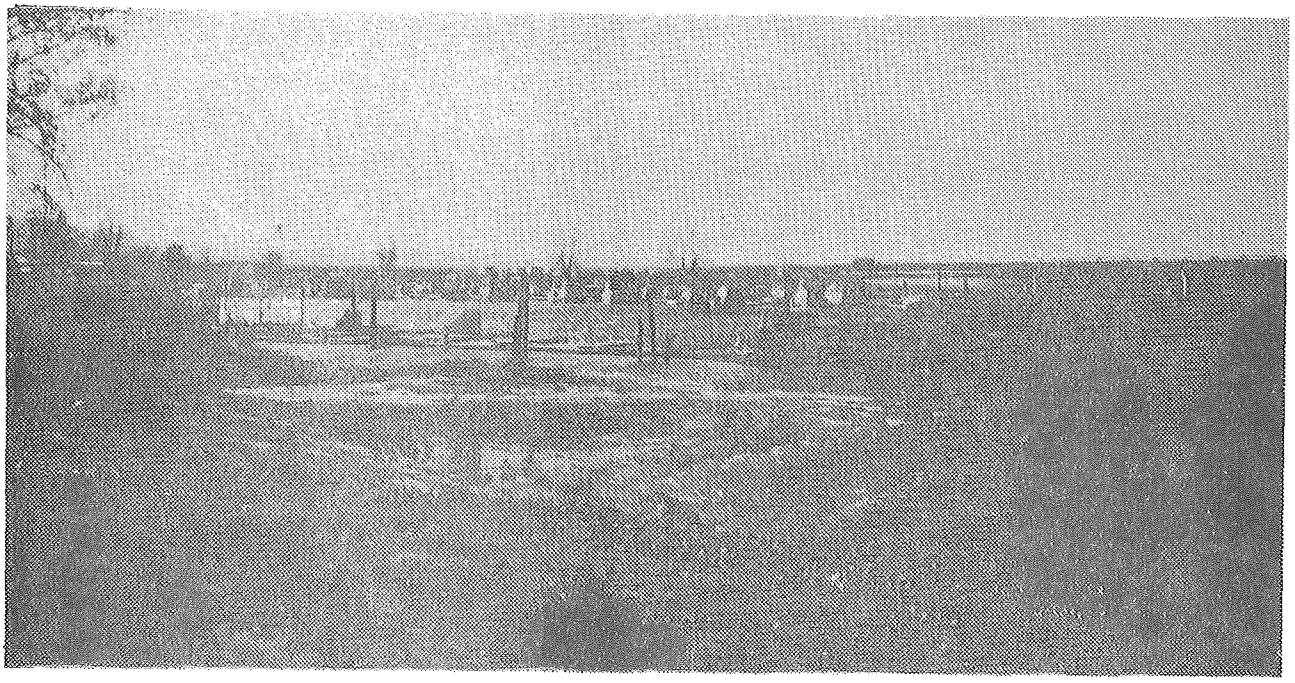


town/river interface

Any river town has both physical and visual impact on the river. The hydrologecal systems are very dependent on local sanitation policies, which are in turn dependent on State water quality standards. Although perception of the valley often happens by happenstance, planned overlooks can become public gathering points where a particular view may gain popularity. The long starway at the south end of Still stairway at the south end of Stillwaters Main Street rewards the climber with a dramatic view of the town and river valley. Pioneer Park offers more than just a view, with picnic and recreation space. Hudson has two parks at the edge of its bluffs; Prospect Park looking upriver and Britmose Park looking downriver.

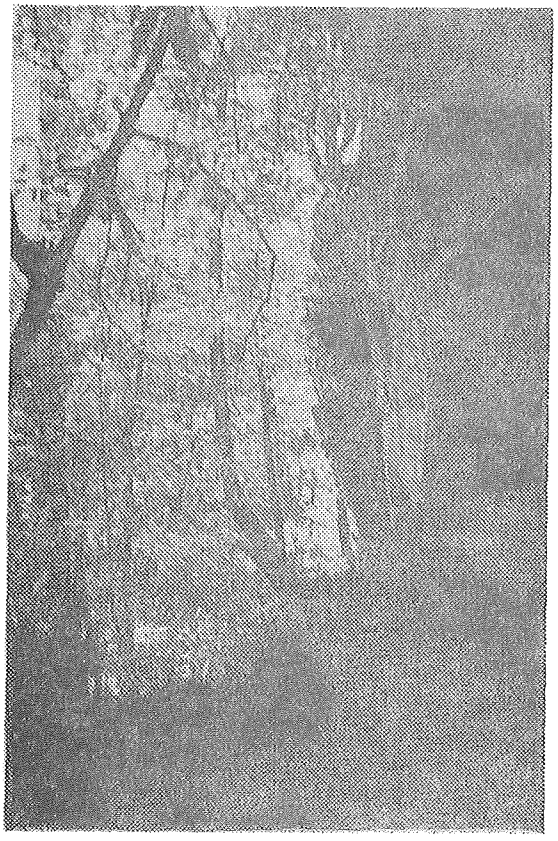
lakes

Stillwater has two lakes within it's city limits; Lily Lake, which is completely surrounded by housing, and McKusick Lake, which has a scenic drive along an undeveloped shore. Their impact on water/Land Interface is minor when compared to the river valleys impact.
Hudson and North Hudson are divided by Lake Mallalieu, which is a reservoir on the Willow River. It's winding shores and marches are as important to the two towns as the St. Croix in terms of visual interface.



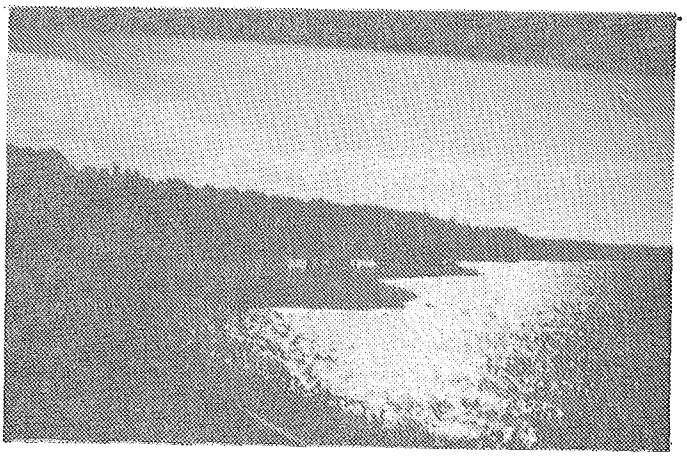
conclusion

Water/Land Interface is an issue which must be sensitive to natural systems and visual perception. This is best understood and implemented by focusing on "critical areas" where interface manifests itself.



Shoreline-bluffline: these areas, as edge conditions, are critical to the natural systems which interact there.

Visual Corridor: although the Wild and Scenic Rivers Act attempts to control development within the visible range of the River, they have direct control of only one forth of the land affected.



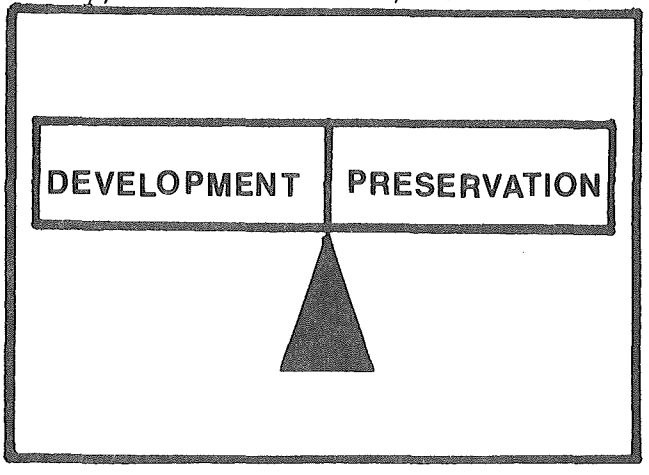
lower st croix national scenic riverway

The Wild and Scenic Rivers Act, an act of Congress, which designates the St. Croix National Scenic Riverway is the prime legislation for the protection of the river. See the appendix A-C for a summary of Public Law 90-542, amendment Public Law 92-560, and amendment Public Law 93-621. The goal of this law as it applies to the lower St. Croix Riverway is to preserve the existing natural and recreational resources particularly in regard to the view from the river. The section of the river below the Washington County-Chisago County line is designated as recreational under the act because it is readily accessible by road or rail, may have some development on its shores, and may have undergone some impoundment or diversion in the past.

The principal areas of concern are the shoreline under development presure, the possibility of water quality degradation as the population increases, and the possibility that uncontrolled use will destroy the physical characteristics of the river. The methods of protection used are zoning, which is historically weak in protecting aesthetic values, scenic easements nine hundred feet deep on each side of the river, and fee simple which extends four hundred feet on each side of the river. (See map for areas of fee and easement designation.)

administration

The administration of the Lower St. Croix Riverway, involves federal, state and local units of government. Over two dozen in the Riverway. Federal agencies are involved ranging from the Corps of Engineers and the Coast Guard to the Federal Power Commission. Their functions range from planning and operational to monitoring.



The major coordinating management unit is the Lower St. Croix Management Commission which consists of members from the National Park Service, Department of the Interior, Department of Natural Resources, State of Minnesota, Department of Natural Resources, State of Wisconsin and Minnesota-Wisconsin Boundary Area Commission (ex-officio).

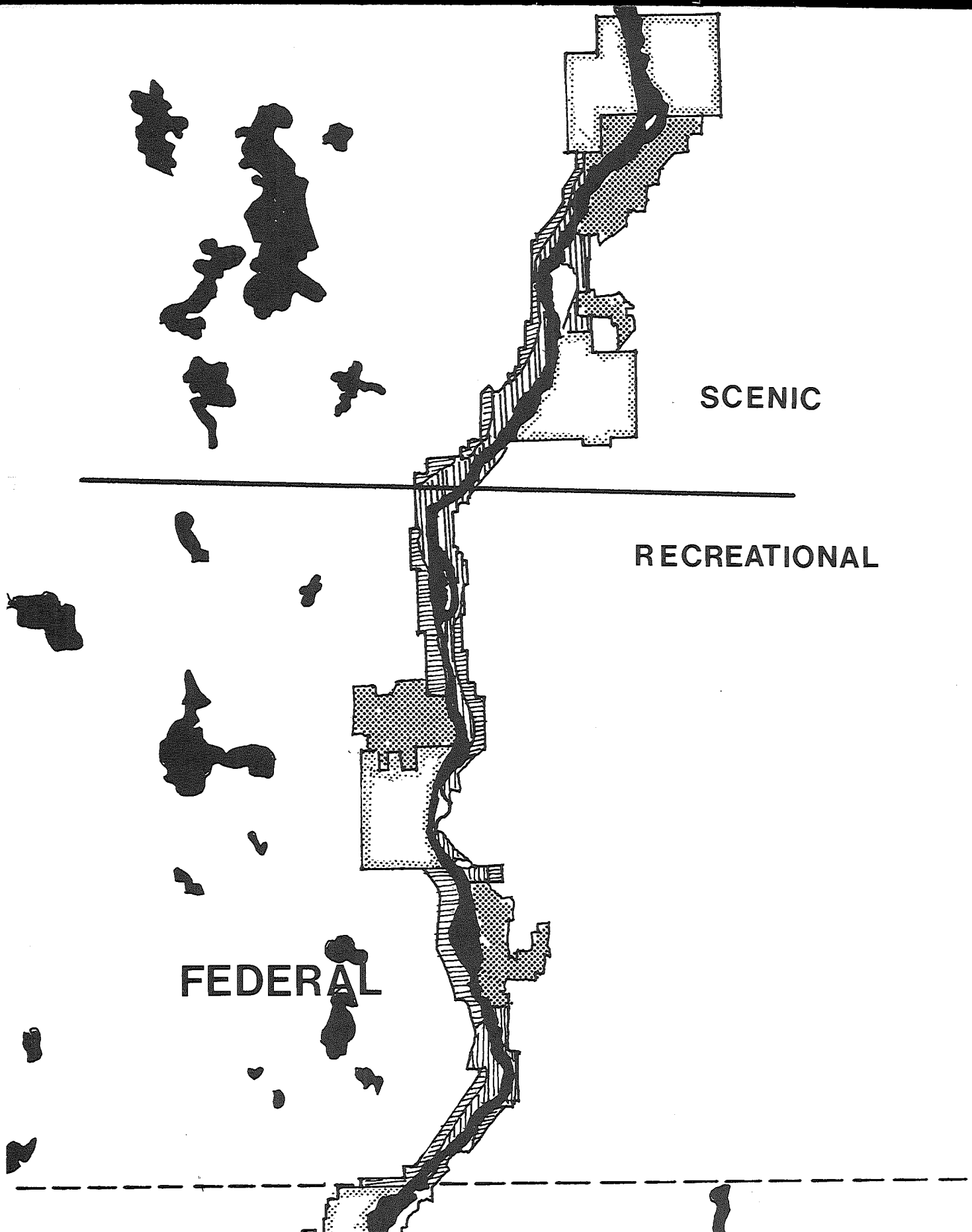
Its general objectives include:

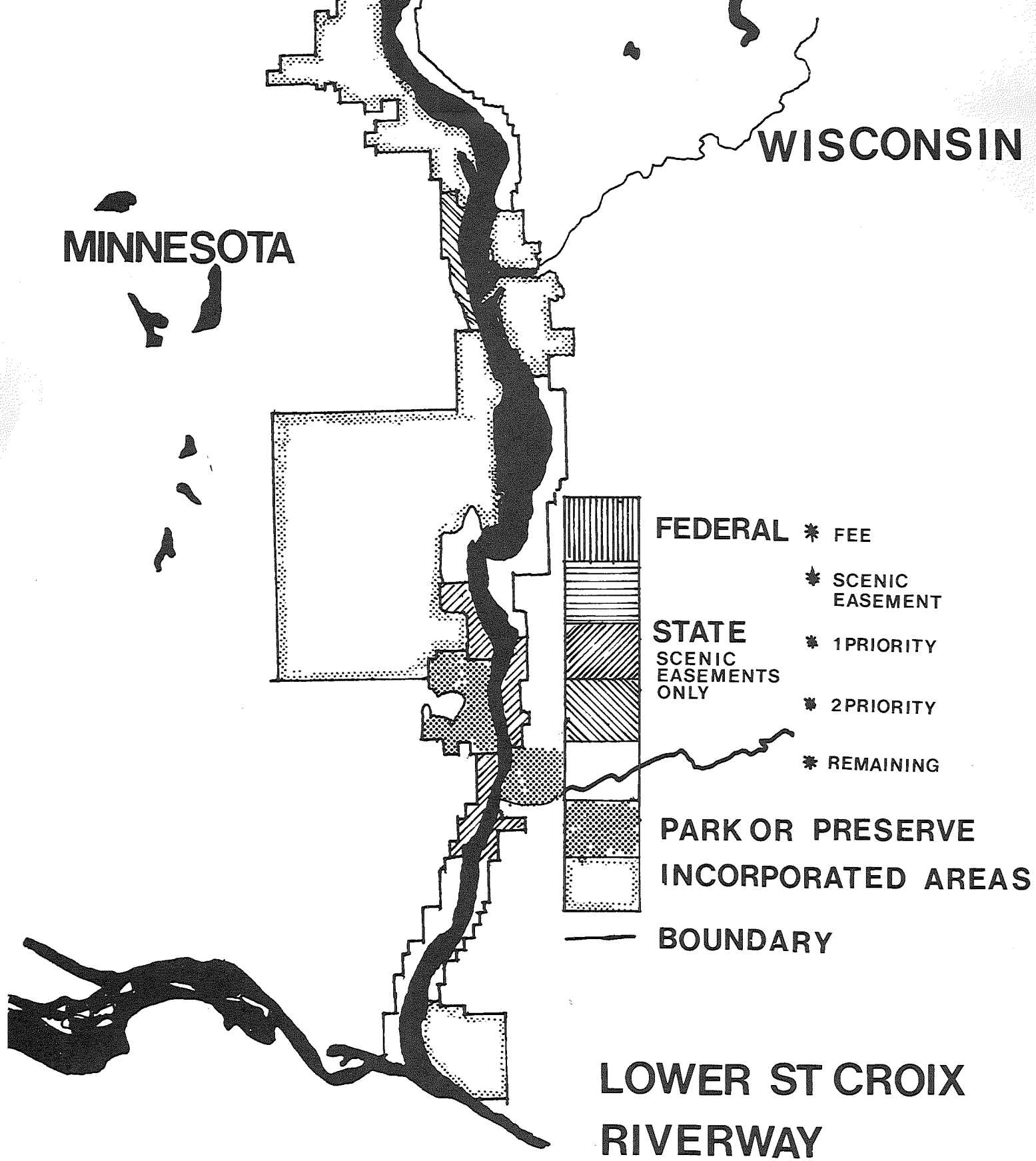
- -Maintenance of the Riverway in its present condition.
- -Maintenance of resource quality in its present condition.
- -Maintenance of peak period of recreational use that would not exceed present levels, however, if use declines, no attempt to retain present users should be made.
- -Management of the riverway to provide a broad spectrum of experiences from primitive to cosmopolitan.
- -Provide Riverway information to national aduience with recognition of its strongly regional character.
- -Increase enforcement of Riverway regulations by management authorities. For the commissions' policies see Appendix.

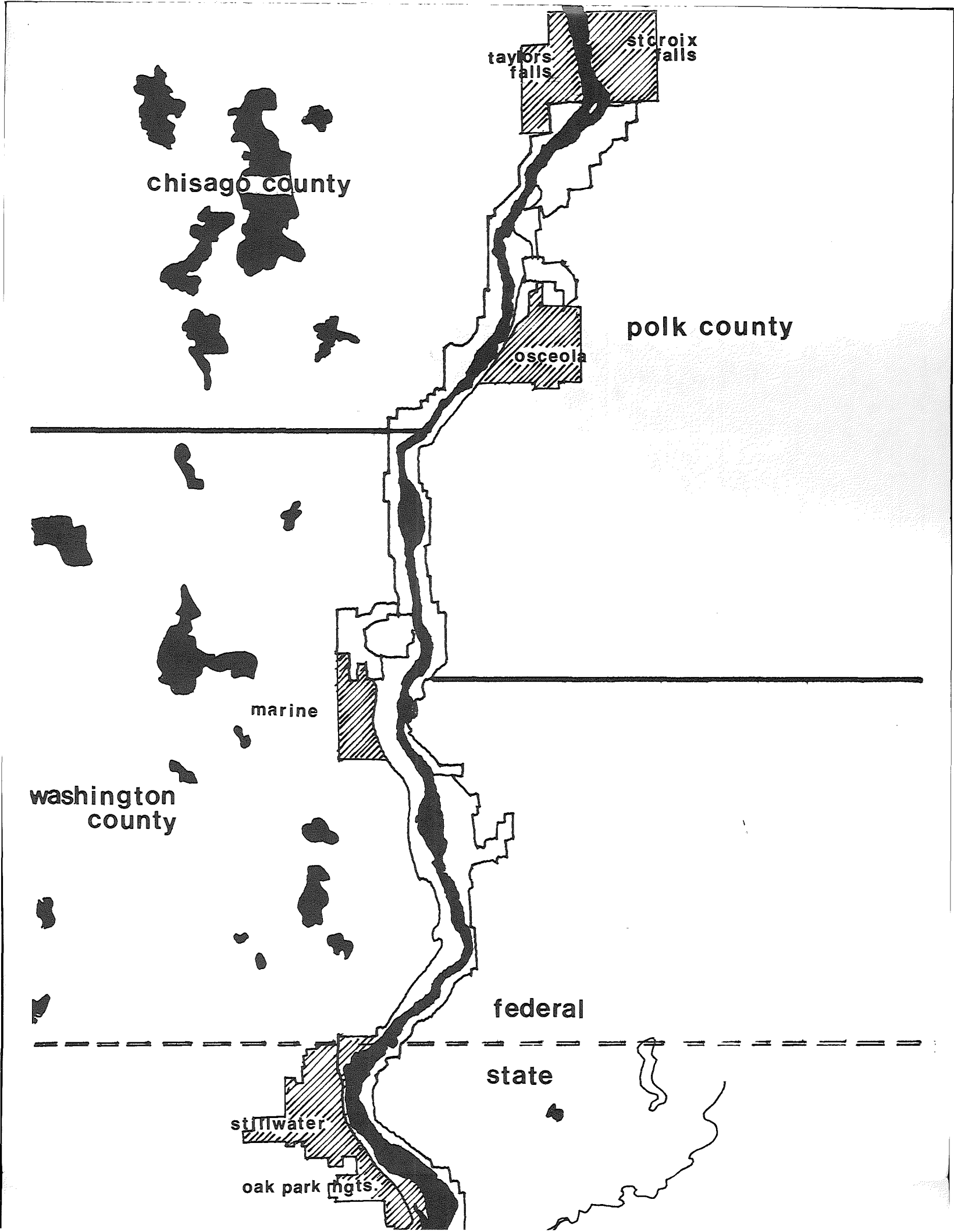
state

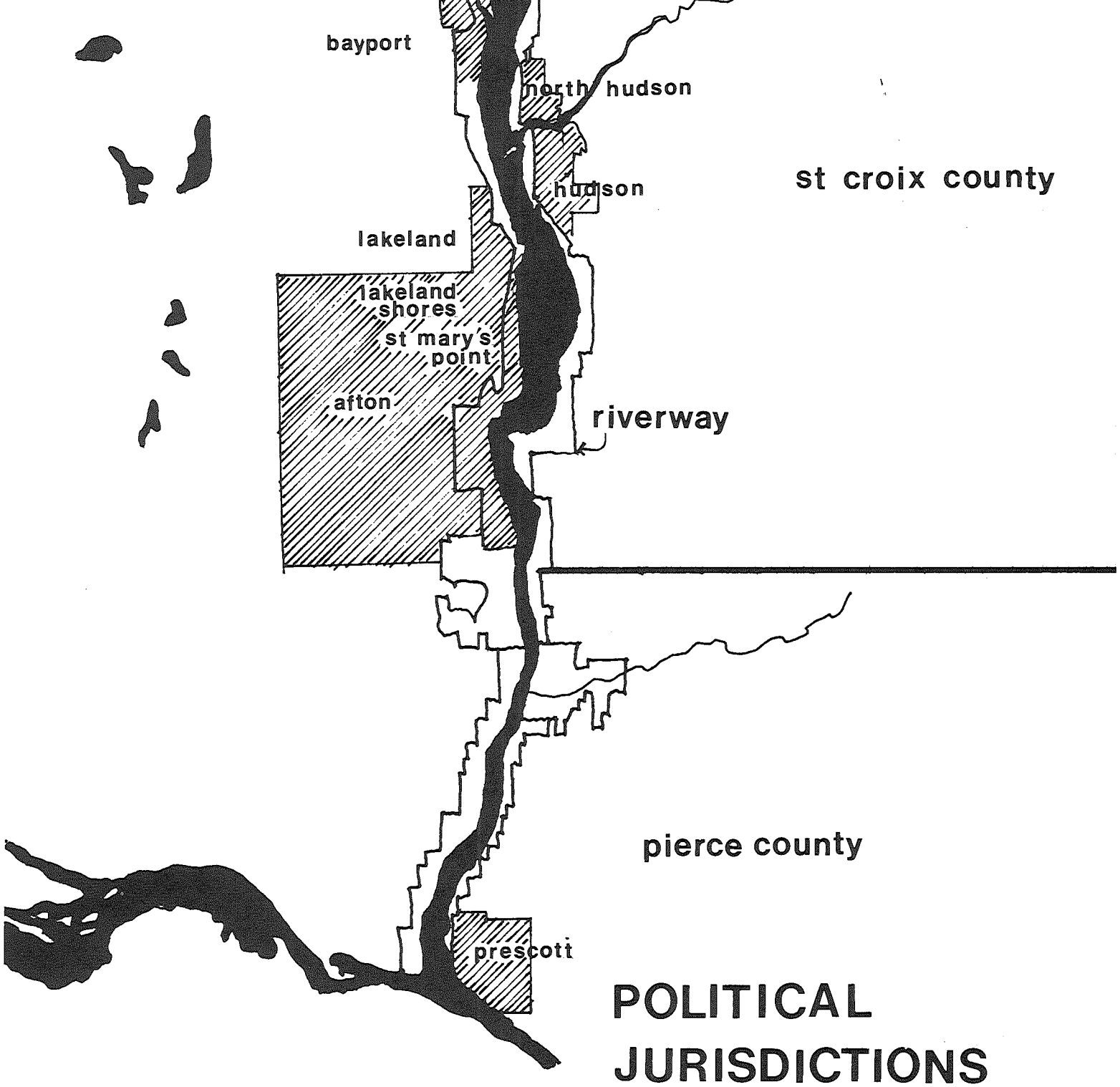
The Riverway south of Stillwater's northern city limits is managed by the State of Minnesota and the State of Wisconsin, respectively. The responsibilities of the states under the Riverway legislation include:

- -The acquisition of land or scenic easements for scenic and recreational attributes.
- -The acquisition and development of state parks.
- -The acquisition of the use and quality of the water and alternatives and alterations of river bottoms.
- -Preparation and adoption of minimum standards and criteria for shoreland management.

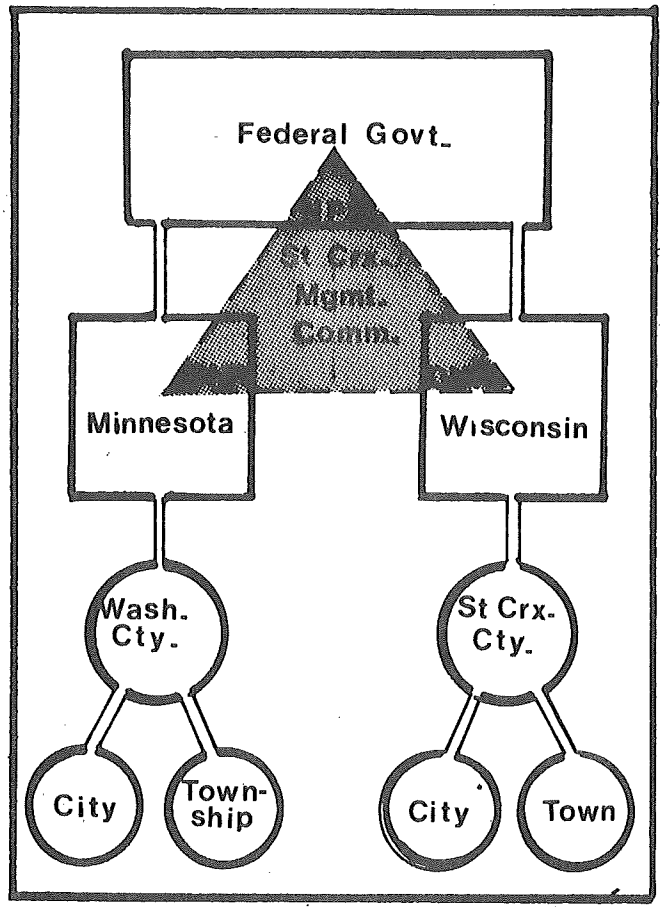

SCENIC
RECREATIONAL
FEDERAL


WISCONSIN
MINNESOTA
FEDERAL
FEE
SCENIC EASEMENT
1 PRIORITY
2 PRIORITY
REMAINING
STATE
SCENIC EASEMENTS ONLY
PARK OR PRESERVE
INCORPORATED AREAS
BOUNDARY
LOWER ST CROIX RIVERWAY


taylors falls
st croix falls
chisago county
polk county
osceola
marine
washington county
federal
state
stillwater
oak park hgts.



POLITICAL JURISDICTIONS



The implementation tools are Wisconson Statute 30.27 and Chapter NR 118 in Wisconsin and Minnesota Statute 104.25 and NR 2200-2202 in Minnesota.

county

Local administration and enforcement of the Riverway provisions rest with the counties, municipalities and towns or townships. The two counties in the study area St. Croix County, Wisconsin and Washington County, Minnesota have adopted ordinances dealing with building permits and uses which are in compliance with the spirit of NR 118 and NR 2200-2 respectively. However, the state DNRs have review authority over the county and local building permits and uses. In some cases the state DNR may delegate its authority to a particular monitoring unit. If there is a dispute, the principles of the federal law will govern.

city

The incorporated areas of Stillwater and Hudson have local ordinances that contain certain rights not available to the unincorporated areas in these counties. The main provisions in the county ordinances are shoreline and bluffline restrictions, on visibility from the river. Those provisions also include earthtone requirements for buildings, and restrictions. The city provisions are in general less restrictive. The city elements are permitted to be seen from the river and the earthtone provisions are not enforced. (For a more detailed description of the provisions for Stillwater, Hudson, North Hudson, Washington and St. Croix Counties, see Appendix under Ordinance provisions).

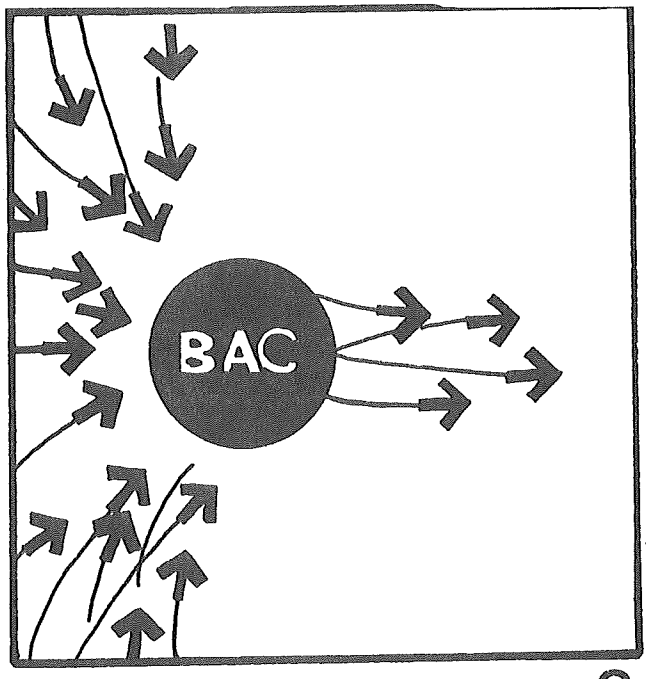
planning

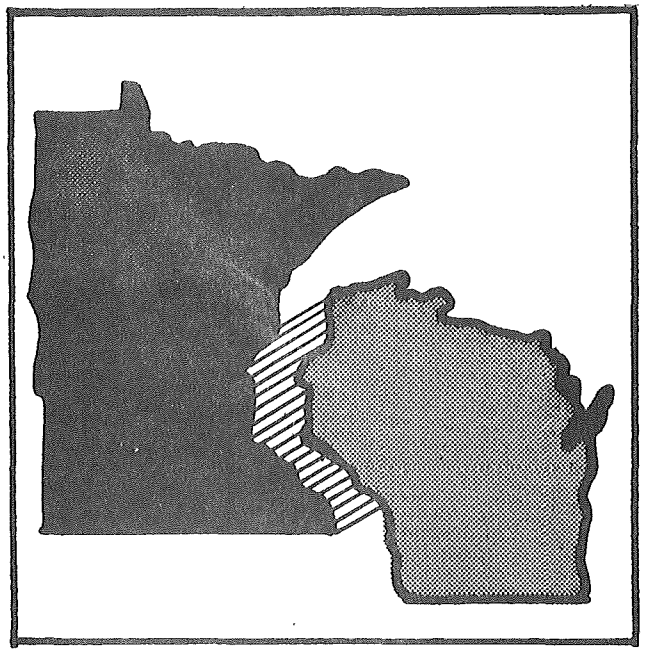
There are also a number of planning units involved with the Riverway. The Upper Mississippi River Basin Commission makes short and long term plans for water and related resources, coordinates state and federal actions, functions as a clearing house for information and is part of the national assessment of water resources.

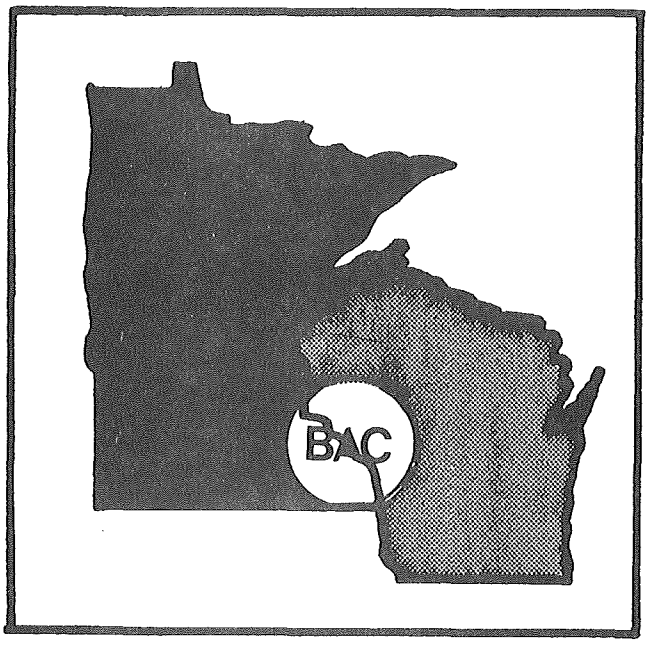
The Minnesota-Wisconsin Boundary Area Commission is the key planning agency for the Riverway. It coordinates efforts, creates guidelines, and acts in a limited way as an advocate for the river. Its major policies are contained in the Master Plan Lower St. Croix National Scenic Riverway.

bac

The BAC's general policies are identified to the Lower St. Croix Management Commission's policies. It also formulates specific policies as the occasion arises.





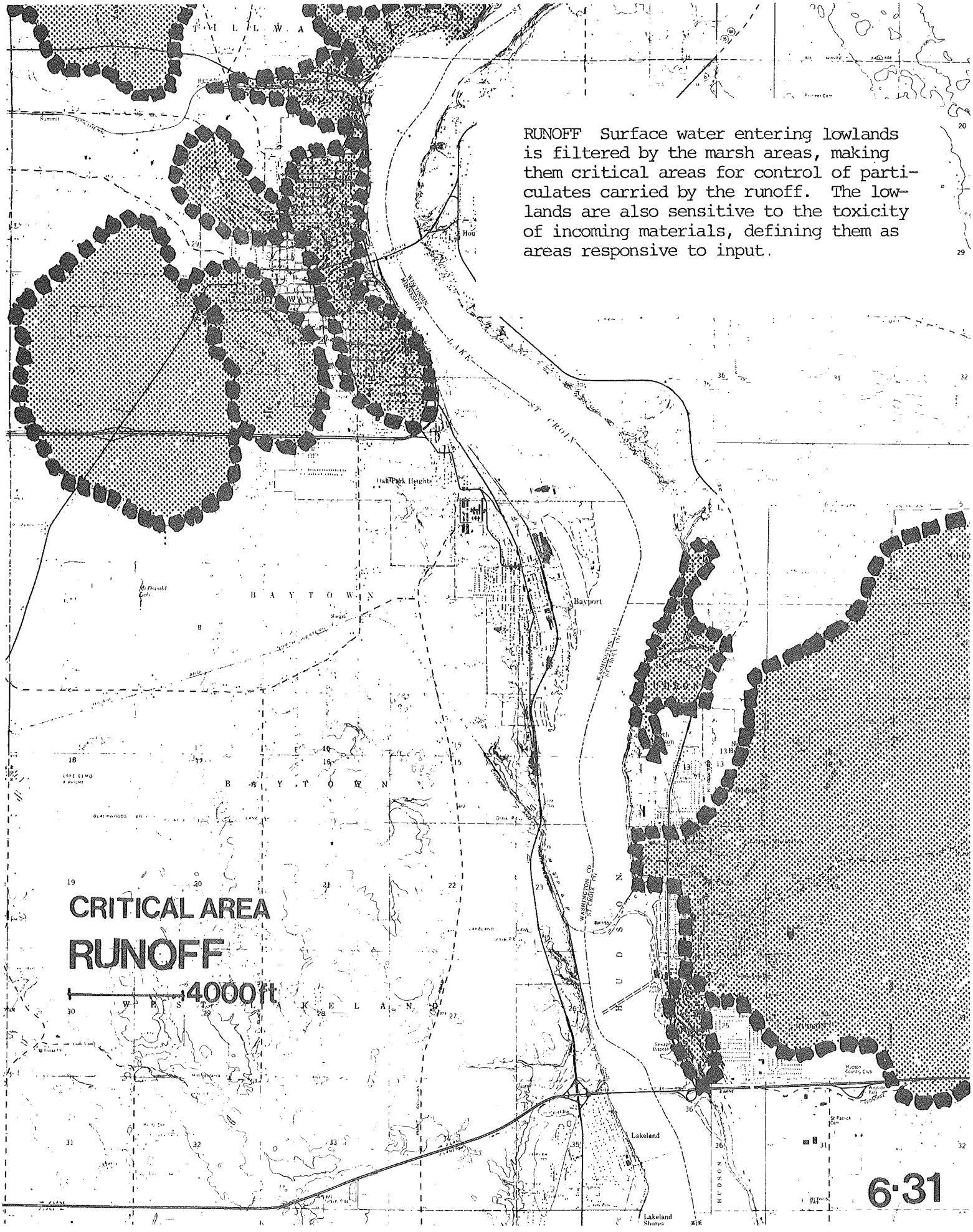


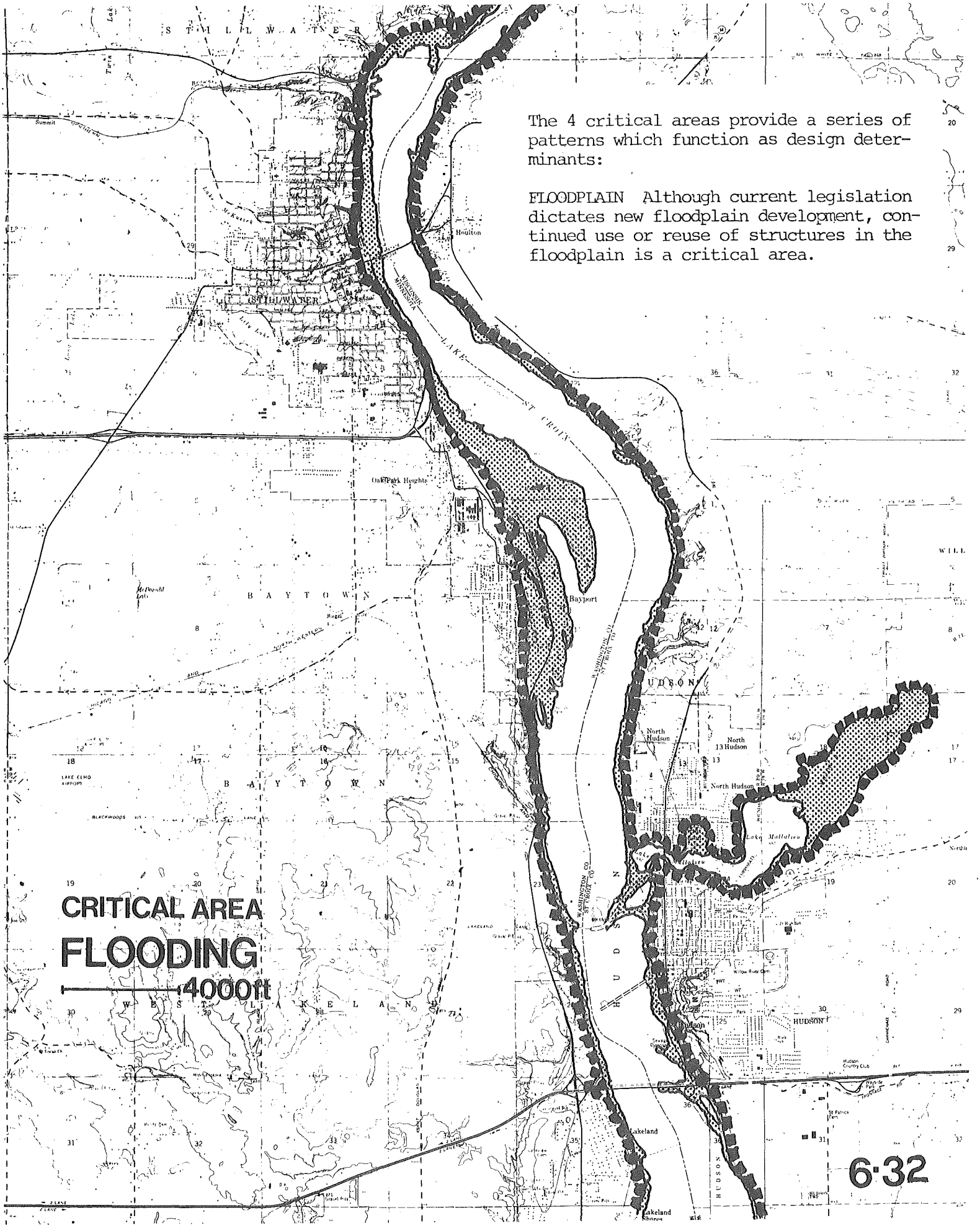
metro council

The Metropolitan Council is the comprehensive planning agency for the seven county metropolitan area which includes Washington County. The Metropolitan Development Guide has chapters on waste management and water resources. The council has powers of compliance and has used its sewer powers as its major tool to control development.

wcwrpc

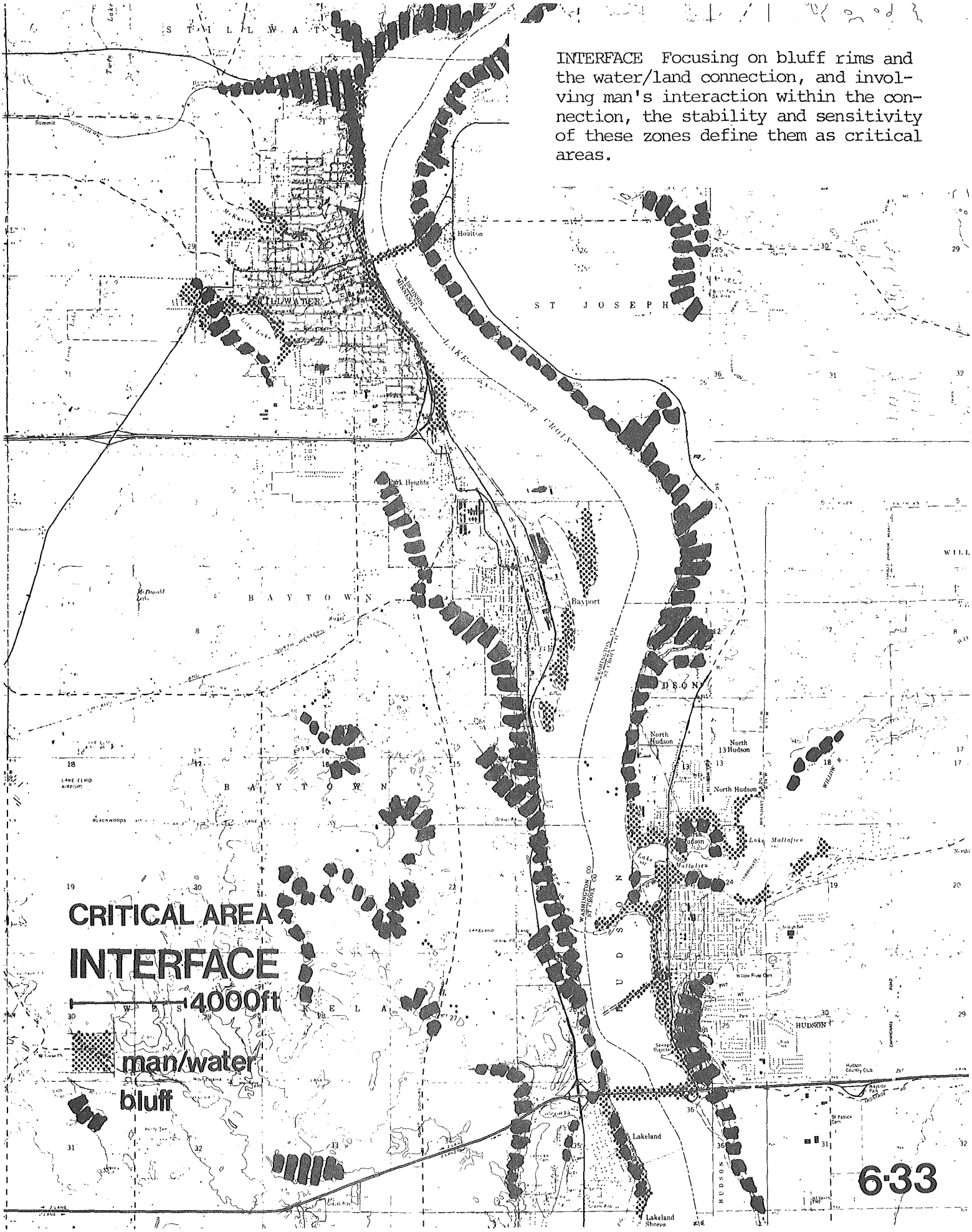
The West Central Wisconsin Regional Planning Commission is the same concept as the Metro council, yet it is very different in reality. Three of the original seven counties have withdrawn from it and it is not a comprehensive planning agency. Although it is mandated by the state to make and adopt a master plan, it has not because the local governments do not want one. It has A95 review powers to comment on federal funding applications, but is totally advisory with no powers of compliance. It is a pragmatic agency that works on specific projects and hires planners with local governments for their services.

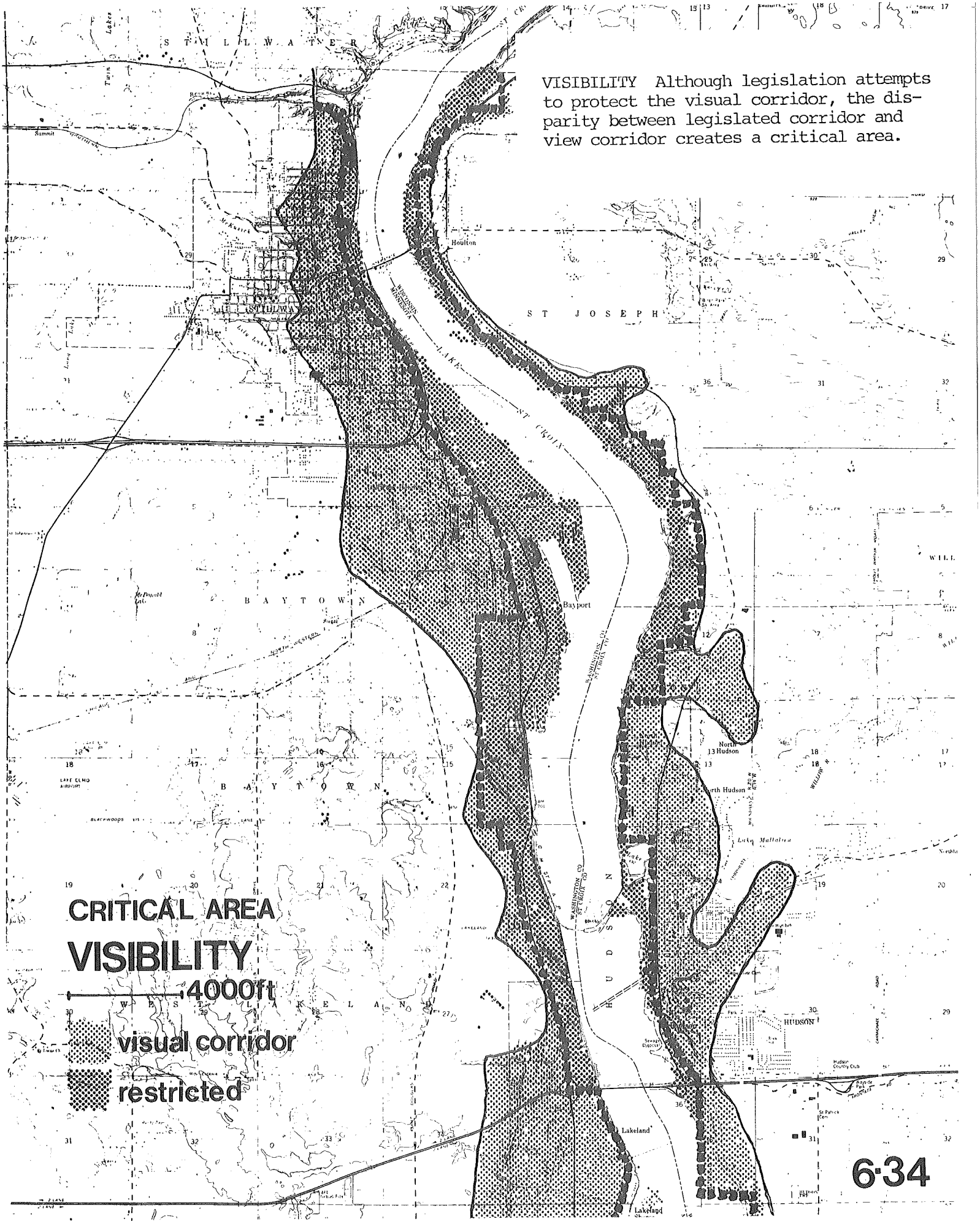

RUNOFF Surface water entering lowlands is filtered by the marsh areas, making them critical areas for control of particulates carried by the runoff. The lowlands are also sensitive to the toxicity of incoming materials, defining them as areas responsive to input.
CRITICAL AREA
RUNOFF
4000ft
Bayport
Lakeland
Lakeland Shores
Oak Park Heights
BAYTOWN
HUDSON
LAKE ST CROIX
6·31



The 4 critical areas provide a series of patterns which function as design determinants:

FLOODPLAIN Although current legislation dictates new floodplain development, continued use or reuse of structures in the floodplain is a critical area.


INTERFACE Focusing on bluff rims and the water/land connection, and involving man's interaction within the connection, the stability and sensitivity of these zones define them as critical areas.
CRITICAL AREA
INTERFACE
4000ft
man/water
bluff
6-33


VISIBILITY Although legislation attempts to protect the visual corridor, the disparity between legislated corridor and view corridor creates a critical area.
CRITICAL AREA
VISIBILITY
4000ft
visual corridor
restricted
STILLWATER
ST JOSEPH
BAYTOWN
WEST LAKELAND
HUDSON
Houlton
Bayport
North Hudson
Lakeland
Lakeland
6-34

bibliography

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Hudson Community, Demonstration Project. Planning Report #2, July,1975.

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Lower St. Croix Master Plan, 1976.

Metropolitan Council Development Guide.

Minnesota and Wisconsin, Study of St. Croix, Dept. of Natural Resources, 1973.

Minutes: TheMinnesota-Wisconsin Boundary Area Commission. 1975-6.

Model Code for Washington County Communities:

7. Lower St. Croix River Bluffland and Shoreland Management Ordinance.

3. Floodplain Ordinance.

St. Croix County Zoning Ordinance, Sept., 1978.

St. Croix Management Commission Policy Statement.

State of Minnesota, Dept. of Natural Resources, Chap. 22 NR 2200-2202.

Water Resources Development in Minnesota, U.S. Army Corps of Engineers, 1977.

Wild and Scenic Rivers Act. 90-542, S.119
92-560, S.1928
93-621, S. 3022.

Upper Mississippi River Comprehensive Basin Study, UMRCBS, Coordinating Committee, 1972.

U.S.G.S. Maps

wild & scenic rivers act

The following is a series of section summaries as taken from the Wild & Scenic Rivers Act.

- Section 2. (b) — The Rivers in their entirety or by sections must be classified as Wild, Scenic or Recreational.

- Section 3. (a) — The Act requires that Northern States Power Company and the United States enter into a cooperative agreement whereby the Company conveys certain lands and interests in lands to the United States.

- Section 3. (b) — By October 2, 1969 (the anniversary of the Act), there shall be published in the Federal Register:

    1. The boundaries which shall include not more than an average of 320 acres per mile.

    2. The identification of the classification of the two rivers or segments of them.

    3. Development plans.

    These provisions become effective 90 days after they have been sent to the President of the Senate and the Speaker of the House.

- Section 6. (a) — No more than an average of 100 acres per mile may be acquired in fee.

- Section 6. (a) — If 50% or more of the acreage within the boundaries are in public ownership, the United States cannot acquire fee title to any lands by condemnation.

- Section 6. (c) — No lands may be acquired by condemnation in any incorporated town which has in force a zoning ordinance which conforms with standards issued by the Secretary of the Interior. The objective of the Secretary's standards shall be to:

    1. Prohibit new commercial or industrial uses which are inconsistent with the purposes of the Act.

    2. Protect the river banks by acreage, frontage and setback requirements.

- Section 6. (g) — An owner may use his property for non-commercial residential purposes for up to 25 years or for the balance of his or his spouse's life as long as his use of the property is consistent with the purpose of the Act.

a

- Section 7. (a) — The FPC shall not issue any license which directly would affect the river. No other United States agency shall aid any water resources project having a direct and adverse affect on the rivers as determined by the Secretary.

- Section 9. (a) — All prospective mining, and other activities or claims not perfected prior to inclusion of the rivers in the System will be subject to the Secretary's regulations which consider water quality and scenery.

- Section 9. (a) — Issuance of patent to lands within System shall convey mineral and reasonable surface rights only and operations must be consistent with Secretary's regulations which consider water quality and scenery.

- Section 10. (a) — The rivers shall be administered to protect and enhance the values which caused them to be included in the System without limiting other uses which do not substantially interfere with public use and enjoyment of these values. Plans may establish varying degrees of intensity for protection and development.

- Section 10. (e) — The Secretary may enter into agreements with State or political subdivisions for their participation in the administration of the river especially where State or county-owned lands are included or adjacent.

- Section 13. (a) — Hunting and fishing shall be permitted. The Secretary may designate "no hunting" zones and periods when no hunting is permitted for public safety in consultation with State officials.

- Section 13. (b) — The United States shall justly compensate an owner for any water right taken by the inclusion as scenic river.

- Section 13. (f) — States retain existing rights to beds of navigable streams, including right of access.

- Section 13. (g) — The Secretary may grant easements over, under, across, or through the rivers provided they relate to the purposes of the Act.

a

§ 1274. Component rivers and adjacent lands; establishment of boundaries; classification; development plans

(a) The following rivers and the land adjacent thereto are hereby designated as components of the national wild and scenic rivers system:

(6) Saint Croix, Minnesota and Wisconsin.—The segment between the dam near Taylors Falls, Minnesota, and the dam near Gordon, Wisconsin, and its tributary, the Namekagon, from Lake Namekagon downstream to its confluence with the Saint Croix; to be administered by the Secretary of the Interior: *Provided*, That except as may be required in connection with items (a) and (b) of this paragraph, no funds available to carry out the provisions of this chapter may be expended for the acquisition or development of lands in connection with, or for administration under this chapter of, that portion of the Saint Croix River between the dam near Taylors Falls, Minnesota, and the upstream end of Big Island in Wisconsin, until sixty days after the date on which the Secretary has transmitted to the President of the Senate and Speaker of the House of Representatives a proposed cooperative agreement between the Northern States Power Company and the United States (a) whereby the company agrees to convey to the United States, without charge, appropriate interests in certain of its lands between the dam near Taylors Falls, Minnesota, and the upstream end of Big Island in Wisconsin, including the company's right, title, and interest to approximately one hundred acres per mile, and (b) providing for the use and development of other lands and interests in land retained by the company between said points adjacent to the river in a manner which shall complement and not be inconsistent with the purposes for which the lands and interests in land donated by the company are administered under this chapter. Said agreement may also include provision for State or local governmental participation as authorized under subsection (e) of section 1281 of this title.

(b) The agency charged with the administration of each component of the national wild and scenic rivers system designated by subsection (a) of this section shall, within one year from October 2, 1968, establish detailed boundaries therefor (which boundaries shall include an average of not more than three hundred and twenty acres per mile on both sides of the river); determine which of the classes outlined in section 1273(b) of this title best fit the river or its various segments; and prepare a plan for necessary developments in connection with its administration in accordance with such classification. Said boundaries, classification, and development plans shall be published in the Federal Register and shall not become effective until ninety days after they have been forwarded to the President of the Senate and the Speaker of the House of Representatives.

Pub.L. 90–542, § 3, Oct. 2, 1968, 82 Stat. 907; Pub.L. 92–560, § 2, Oct. 25, 1972, 86 Stat. 1174; Pub.L. 93–279, § 1(a), May 10, 1974, 88 Stat. 122.

Historical Note

1974 Amendment. Subsec. (a)(10). Pub.L. 93–279 added par. (10).

1972 Amendment. Subsec. (a)(9). Pub.L. 92-560 added par. (9).

Short Title of 1972 Amendment. Section 1 of Pub.L. 92-560 provided: "That this Act [which enacted subsec. (a)(9) of this section and provisions set out as notes under this section may be cited as the 'Lower Saint Croix River Act of 1972'."

Lower Saint Croix, Minnesota and Wisconsin. Sections 3 to 6 of Pub.L. 92-560 provided that:

b

"Sec. 3 **[Boundaries, Classification, and Development Plans; Joint Action; Master Plan; State Administration].** The Secretary of the Interior shall, within one year following the date of enactment of this Act [Oct. 25, 1972], take, with respect to the Lower Saint Croix River segment, such action as is provided for under section 3(b) of the Wild and Scenic Rivers Act [subsec. (b) of this section]: *Provided*, That (a) the action required by such section shall be undertaken jointly by the Secretary and the appropriate agencies of the affected States; (b) the development plan required by such section shall be construed to be a comprehensive master plan which shall include, but not be limited to, a determination of the lands, waters, and interests therein to be acquired, developed, and administered by the agencies or political subdivisions of the affected States; and (c) such development plan shall provide for State administration of the lower twenty-five miles of the Lower Saint Croix River segment and for continued administration by the States of Minnesota and Wisconsin of such State parks and fish hatcheries as now lie within the twenty-seven-mile segment to be administered by the Secretary of the Interior.

"Sec. 4 **[Land Acquisition].** Notwithstanding any provision of the Wild and Scenic Rivers Act [this chapter] which limits acquisition authority within a river segment to be administered by a Federal agency, the States of Minnesota and Wisconsin may acquire within the twenty-seven-mile segment of the Lower Saint Croix River segment to be administered by the Secretary of the Interior such lands as may be proposed for their acquisition, development, operation, and maintenance pursuant to the development plan required by section 3 of this Act [this section].

"Sec. 5 **[Navigation Aids].** Nothing in this Act [see Short Title of 1972 Amendment note out under this section] shall be deemed to impair or otherwise affect such statutory authority as may be vested in the Secretary of the Department in which the Coast Guard is operating or the Secretary of the Army for the maintenance of navigation aids and navigation improvements.

"Sec. 6 **[Authorization of Appropriations; Limitation].** (a) There are authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act [see Short Title note hereunder], but not to exceed $7,275,000 for the acquisition and development of lands and interests therein within the boundaries of the twenty-seven-mile segment of the Lower Saint Croix River segment to be administered by the Secretary of the Interior.

"(b) No funds otherwise authorized to be appropriated by this section shall be expended by the Secretary of the Interior until he has determined that the States of Minnesota and Wisconsin have initiated such land acquisition and development as may be proposed pursuant to the development plan required by section 3 of this Act [this section], and in no event shall the Secretary of the Interior expend more than $2,550,000 of the funds authorized to be appropriated by this section in the first fiscal year following completion of the development plan required by section 3 of this Act [this section]. The balance of funds authorized to be appropriated by this section shall be expended by the Secretary of the Interior at such times as he finds that the States of Minnesota and Wisconsin have made satisfactory progress in their implementation of the development plan required by section 3 of this Act."

Legislative History. For legislative history and purpose of Pub.L. 90-542, see 1968 U.S.Code Cong. and Adm.News, p. 3801. See, also, Pub.L. 92-560, 1972 U.S. Code Cong. and Adm.News, p. 4505; Pub.L. 93-279, 1974 U.S.Code Cong. and Adm.News, p. —.

PUBLIC LAW 93-621; 88 STAT. 2094

[S. 3022]

An Act to amend the Wild and Scenic Rivers Act (82 Stat. 906), as amended, to designate segments of certain rivers for possible inclusion in the national wild and scenic rivers system; to amend the Lower Saint Croix River Act of 1972 (86 Stat. 1174), and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That:

The Wild and Scenic Rivers Act (82 Stat. 906), as amended,[1] is further amended as follows:

(b) In section 5 reletter subsections (b) and (c) as (c) and (d), respectively, and insert a new subsection (b), as follows:

"(b)(1) The studies of rivers named in subparagraphs (28) through (55) of subsection (a) of this section shall be completed and reports thereon submitted by not later than October 2, 1979:

C

A-4

Provided, That with respect to the rivers named in subparagraphs (33), (50), and (51), the Secretaries shall not commence any studies until (i) the State legislature has acted with respect to such rivers or (ii) one year from the date of enactment of this Act, whichever is earlier.

"(2) The study of the river named in subparagraph (56) of subsection (a) of this section shall be completed and the report thereon submitted by not later than January 3, 1976.

"(3) There are authorized to be appropriated for the purpose of conducting the studies of the rivers named in subparagraphs (28) through (56) such sums as may be necessary, but not more than $2,175,000."

(c) In clause (i) of subsection (b) of section 7 strike the final comma and the following word "and" and insert in lieu thereof a colon and the following proviso: "*Provided*, That if any Act designating any river or rivers for potential addition to the national wild and scenic rivers system provides a period for the study or studies which exceeds such three complete fiscal year period the period provided for in such Act shall be substituted for the three complete fiscal year period in the provisions of this clause (i); and".

(d) In the fourth sentence of subsection (a) of section 4:

(1) between "rivers" and "with" insert "(i)", and

(2) strike "system." and insert in lieu thereof "system, and (ii) which possess the greatest proportion of private lands within their areas.".

Sec. 2. Subsection (a) of section 6 of the Lower Saint Croix River Act of 1972 (86 Stat. 1174) [2] is amended by deleting "$7,275,000" and inserting in lieu thereof "$19,000,000".

Approved Jan. 3, 1975.

2. 16 U.S.C.A. § 1274 note.

ordinance provisions washington county

Although there are some exceptions, for building permits and use functions, (except for incorporated areas such as Stillwater) the following standards apply:

402.01. The following chart sets forth the minimum area, setbacks, and other requirements of each district:

		Rural District	Urban District	Urban District with Public Sewer and Water
(1)	Minimum lot size above ordinary high water mark	2½ acres	1 acre	20,000 sq. ft.
(2)	Lot width at building setback line	200 feet	150 feet	100 feet
(3)	Lot width at water line	200 feet	150 feet	100 feet
(4)	Building setback from ordinary high water mark	200 feet	100 feet	100 feet
(5)	Building setback from bluffline	100 feet	40 feet	40 feet
(6)	On-site sewage treatment system setback from ordinary high water mark	200 feet	100 feet	
(7)	On-site sewage treatment system setback from bluffline	40 feet	40 feet	
(8)	Maximum structure height	35 feet	35 feet	35 feet
(9)	Maximum total lot area covered by impervious surface	20% (½ acre)	20% (8,700 sq. ft.)	20% (4,000 sq. ft.)
(10)	On slopes less than 12%, the controlled vegetative cutting areas setback are from:			
	ordinary high water mark	200 feet	100 feet	100 feet
	blufflines	40 feet	40 feet	40 feet

402.02. No structures shall be placed or grading done on any slopes greater than 12% (12 feet vertical rise in 100 feet horizontal distance).

402.03. No structures shall be placed in any floodway. Structures proposed within a floodplain shall be consistent with Community and State Floodplain Ordinances.

402.04. Exceptions to the minimum dimensional requirements include the following:

(1) In Rural Districts, structure setback from the bluffline may be varied to within the 40-100 foot range from the bluffline only by the variance procedure of this Ordinance. In the event that such a variance is necessary, the following items shall be considered conditions of the variance.

(i) The existing drainage patterns shall not be disturbed.

(ii) All construction and grading excavation or disruption of the natural ground cover due to the on-site construction shall be resodded or seeded within 180 days of the date of issuance of the building permit.

(iii) To the greatest extent possible, vegetation over six (6) inches in diameter shall not be removed.

(iv) The structure shall be visually inconspicuous as viewed from the river during summer months.

(v) The site shall be capable of supporting a standard septic treatment system as required in the Sanitary Sewer Disposal Ordinance, Chapter 4 of the Washington County Development Code.

(2) Developments which provide service to the public and which by their nature require a location on or adjacent to the public waters and which also require approval of the Commissioner of Natural Resources.

(3) Temporary or seasonal docks which extend into the water a minimum distance necessary for the launching or mooring of watercraft.

(4) Signs which are necessary for public health and safety or which designate areas available or not available for public use.

(5) Visually inconspicuous stairways and lifts enabling access to the river from steep slopes.

(6) On a vacant bluffland or shoreland lot which has two adjacent lots, with principal dwelling structures on both such adjacent lots within 200 feet of the common lot line, any new structure shall be setback the average setback of said adjacent structures plus 40 feet or the minimum standard setback, whichever is less.

stillwater

In the event a building permit or use pertains to an incorporated area (such as Stillwater) Minn. DNR approval is required if the permit or use qualified under the "grandfather clause" (5-1-74), Stillwater Ord. No. 301.03 (most retail businesses). The guidelines in meeting the DNR approval are:

301.02. In the urban districts of this Model Ordinance, existing zoning districts in effect and uses permitted on May 1, 1974, by the existing City of Stillwater Zoning Ordinance may again be permitted by the City Council of the City of Stillwater provided the project is listed in 301.03, has been approved in writing by the Commissioner of Natural Resources and meets or exceeds the following standards:

(1) The proposed use is consistent with and complimentary to the existing, adjacent, urban land uses and municipal plans.

(2) The dimensional requirements of Section 4 of this Ordinance.

(3) The sideyard setbacks and frontage requirements of the local zoning ordinance.

(4) A parking layout and site plan which provides on-site, off-street parking spaces for all employees of the project, an exclusive area for loading docks where required by local ordinance, and off-street customer parking spaces as required by local ordinance.

(5) An on-site grading and surface water run-off plan for the site which minimizes soil erosion and degradation of surface water quality.

(6) In sewered areas, public sewer will service the proposed project.

(7) A landscaping plan for the site is illustrated which minimizes the visual impact of the proposed project as viewed from the river and which visually screens all parking areas from the river. The applicant shall provide the Community with a performance bond for the cost of all landscaping to insure compliance with the landscaping plan.

(8) A public hearing as per Section 801 of this Ordinance and forwarding of the final action of the local community.

(9) The project meets all other existing local zoning and subdivision requirements.

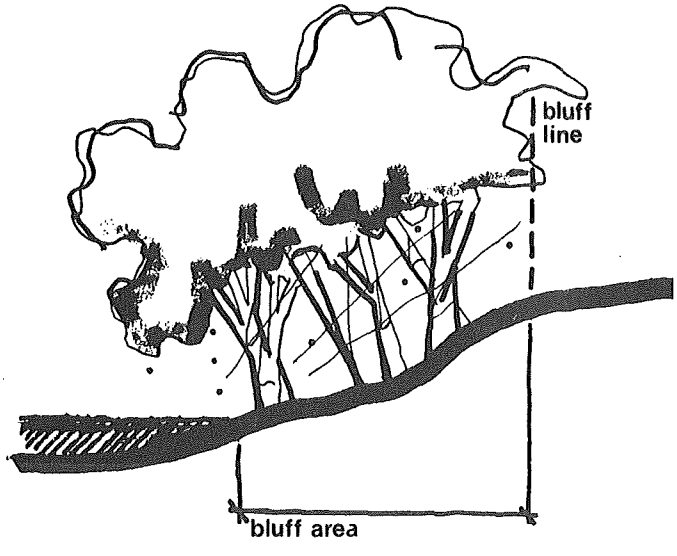
(10) The project requires no alteration or fill of shoreline, bluffland, or floodway, except for temporary docking and launching of watercraft.

(11) No lighted or flashing signs shall face riverward.

(12) Detailed plans and specifications as presented at the public hearing are sufficient to obtain all local access, building, zoning and sewer permits.

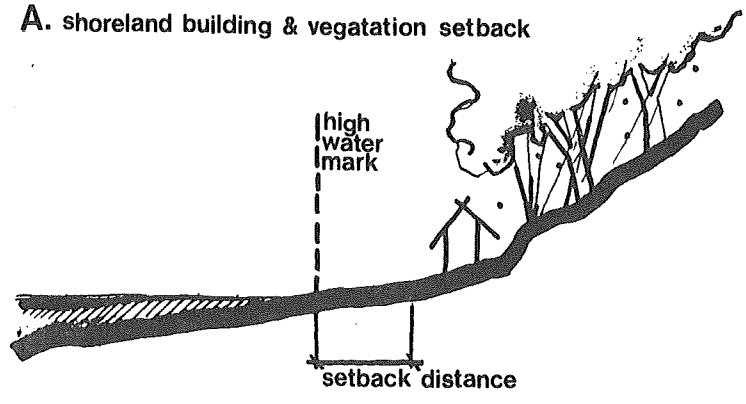
In the event the building permit or use deals with an unincorporated area, the county-wide ordinance standards apply as set forth above.

WASHINGTON COUNTY



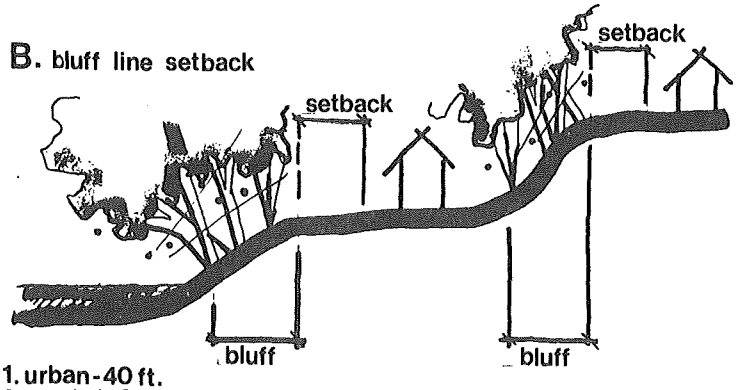
1. unbuildable areas – slopes greater than 12 %

A. shoreland building & vegatation setback



1. urban - 100 ft.
2. rural - 200 ft.

B. bluff line setback



1. urban - 40 ft.
2. rural - 100 ft.

ordinance provisions
st croix county

minimum lot size	one acre exclusive of slopes over 17%, if slope is no more than 20% of net project area.
minimum lot width at building line	80 feet
minimum lot width at water line	80 feet
desirable ratio of width to length of lot	1 to 2
setback for buildings from the ordinary high water mark	75 feet and 2 feet above high water elevation
building setbach from bluffline	100 feet -- residences 100 feet - agricultural buildings
height limitation on single family dwellings	35 feet
color of structures	earthtones if not screened
cutting of vegetation	if deseased or damaged no permit needed if permitted must preserve essential character and density of existing growth not allowed on bluff areas and bluff setback areas without permission of zoning administrator.

*For exceptions see St. Croix County Zoning Ordinance.

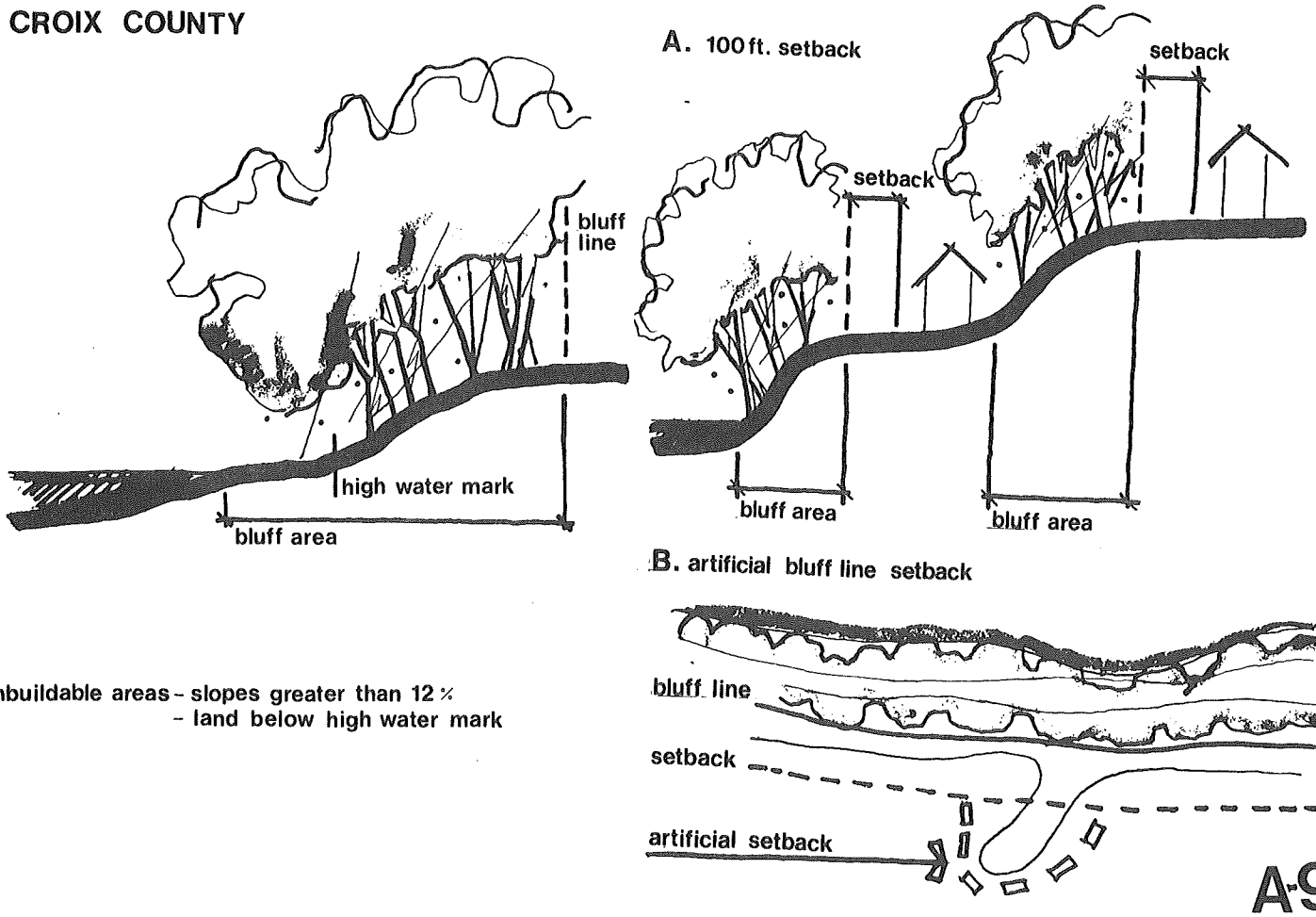
hudson

The St. Croix County zoning ordinance that incorporates in it Wisconsin DNR Regulation No. 118 shall apply in the City of Hudson except these regulations shall apply only to areas visible from the river during the summer as defined by photographs and a map on file in the Hudson City Clerk's Office. (See visibility map, four critical areas.) Hudson was able to retain its own height requirements, density patterns, property lines, setbacks and lot sizes.

north hudson

North Hudson has adopted by reference Wisconsin DNR Regulation No. 118. It like other incorporated areas retains certain "grandfather" rights.

ST. CROIX COUNTY



1. unbuildable areas - slopes greater than 12 %
   - land below high water mark

WATER SURFACE USE

Mile-per-hour watercraft speed limits are not technologically feasible now, but should be reconsidered if reasonable technology is developed.

Water Surface Use Regulations should be reviewed annually for needed changes.

Legislation should be enacted in both states establishing decibel limits for watercraft used in the Riverway.

Public excursion boat operations should be encouraged, since they provide river access for large numbers of people with minimal impacts on crowding and the resource.

Methods of encouraging fishing during off-peak periods should be studied and implemented.

Cooperative water surface use monitoring should be conducted biennially by the managing agencies.

ACCESS

New boat launch ramps, new marinas or capacity expansions are prohibited if they contribute to peak crowding or safety problems.

When properly managed and properly screened from view (when possible), transient docks serving adjacent facilities serve a public purpose and should be permitted.

Riparian slips and docks are acceptable, providing they do not exceed the resource limitations of the site, and providing they are the minimum size necessary to meet the owner's needs and reach a normal water depth of four feet, do not obstruct navigation, and do not extend beyond the slow speed shore zone. Non-riparian dockage and moorage outside of designated marinas and mooring areas should not be allowed since it has the potential of tremendously increasing boat traffic, greatly diminishing aesthetic values, and increasing safety problems. Riparian moorage cells are acceptable, providing they are of the minimum size and number necessary to meet the owner's needs, do not obstruct navigation, and are placed within the slow speed shore zone.

SHORE RECREATION USE

First priority for disposal of dredged material should be to meet needs at publicity-owned recreational facilities, with special consideration given to creation of new beach area and additional recreational islands where such dredged material disposal activities are legal.

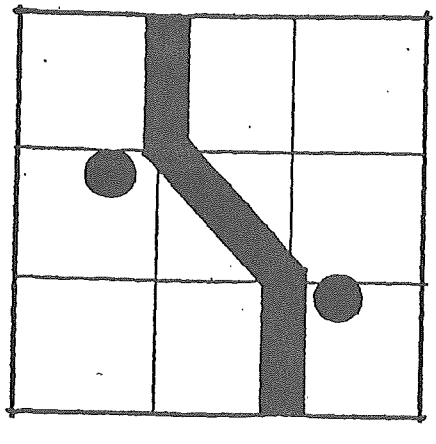
Some stabilizing of watercraft beaching sites needs to be undertaken, since they are the most heavily used areas of the Riverway and are the scene of the greatest resource damage. It is recommended that the general issue of hardening of beaching sites be carefully addressed in management plans for National Park Service lands and state, city and county parks. The possible need for boat tie-up rings should also be explored, where applicable, in those management plans. It is not now anticipated that path covers will be needed, they can later be installed on an as-needed basis if the situation changes.

Litter bags and trash cans should be provided at every access point where it is feasible. A vigorous "take out what you brought in" publicity campaign should be

undertaken to reduce littering, which is recognized by users and riparian owners as the Riverway's greatest single problem. Trash cans should not be provided at use areas, except at highly developed sites. Managing agencies should provide their own litter patrol for their own public land. It is not legally possible for public agencies to pick up letter on private land.

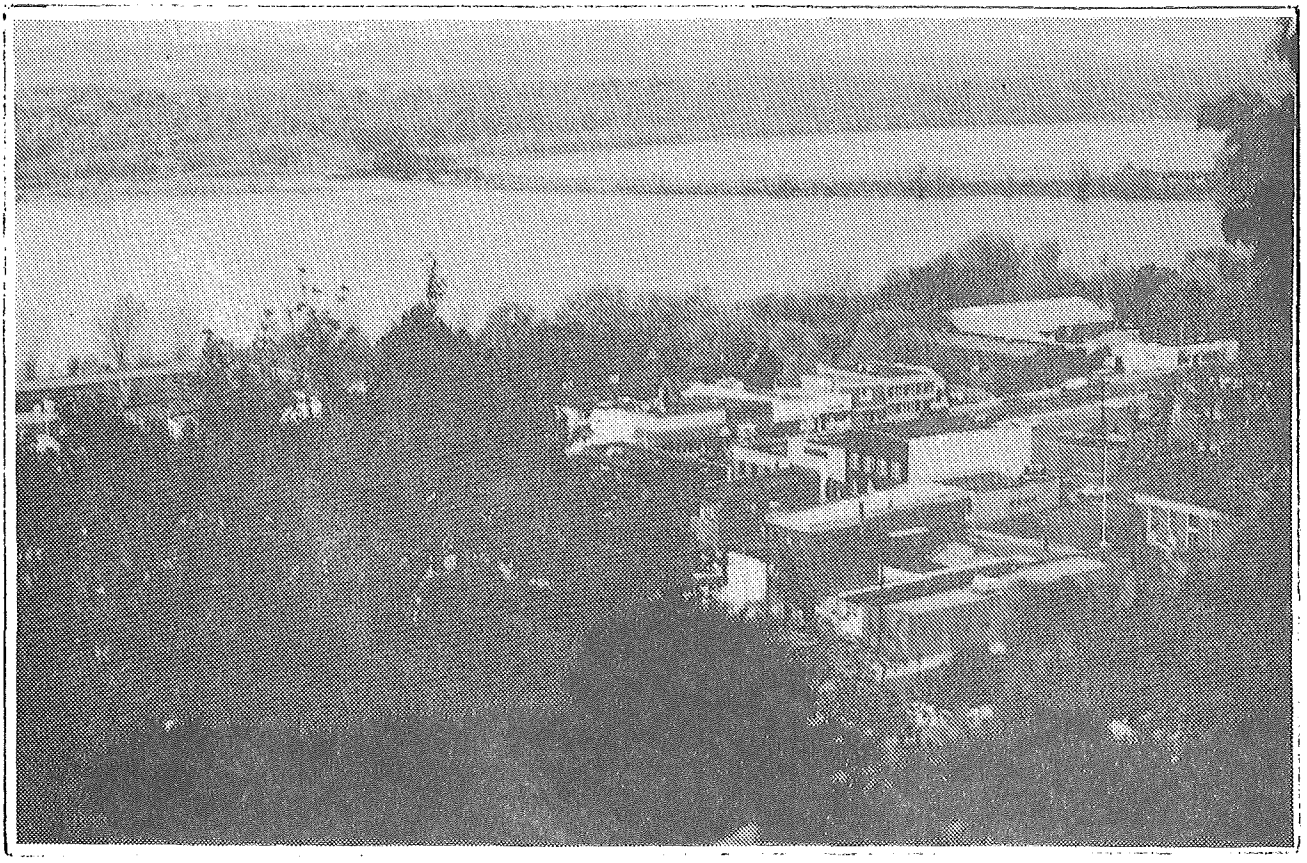
Sanitation facilities are needed at heavily used areas and at all locations where camping is permitted. Managing agencies should include sanitation facility design and locations in management plans for each use area.

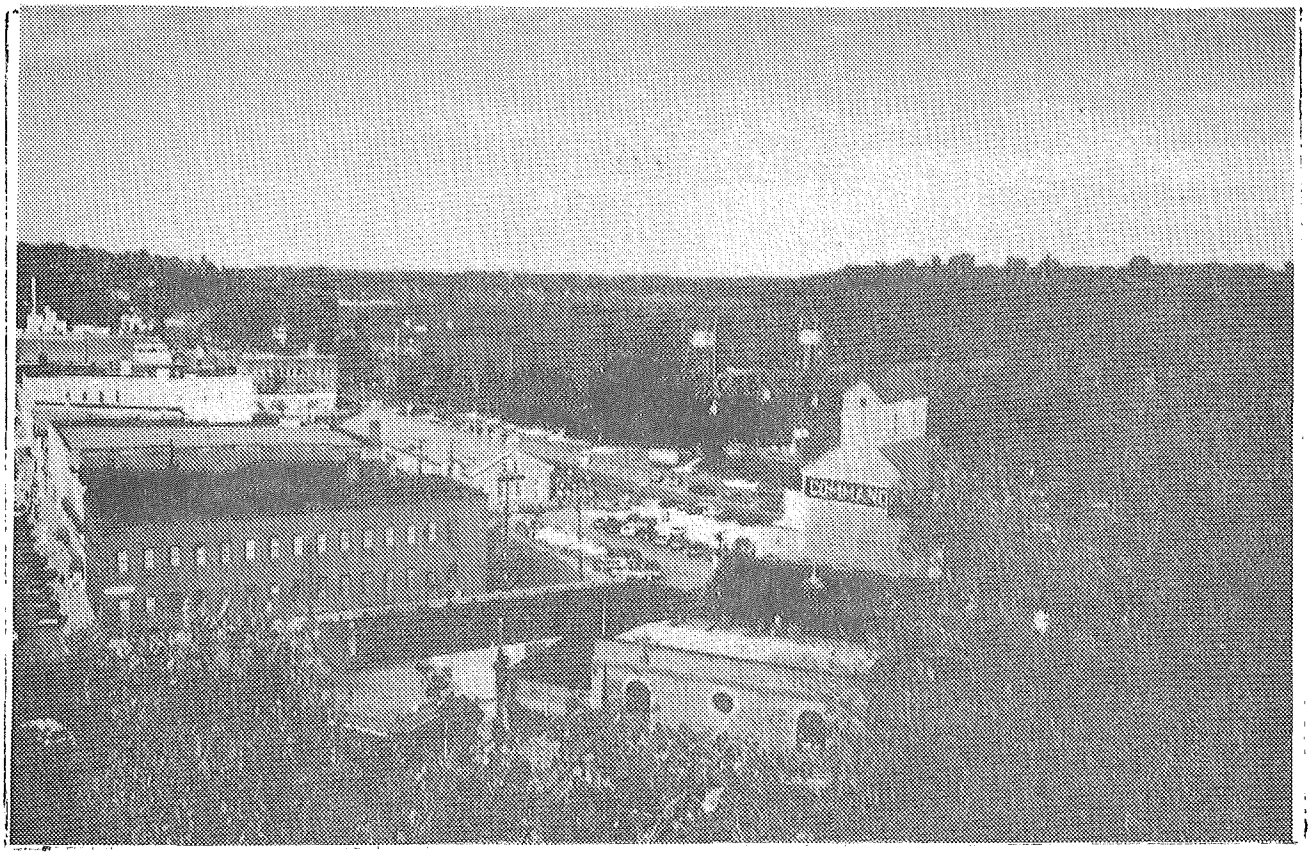
Neither a fire permit system nor a firewood concession is needed at current use levels. Use of campstoves should be encouraged. Snags removed from the boat channel by the Corps of Engineers should be stockpiled as firewood sources for Riverway users.



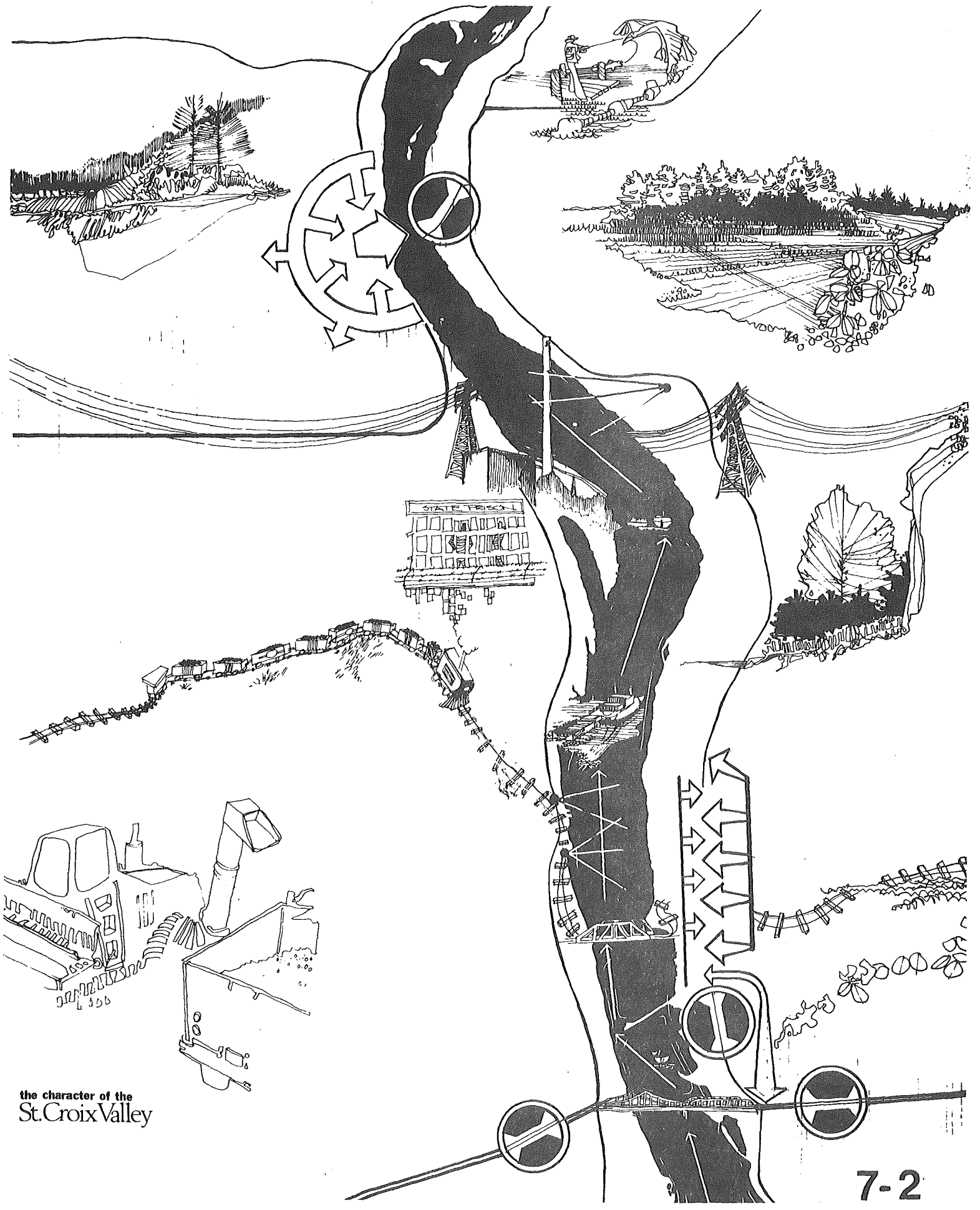
VISUAL IMAGE

7

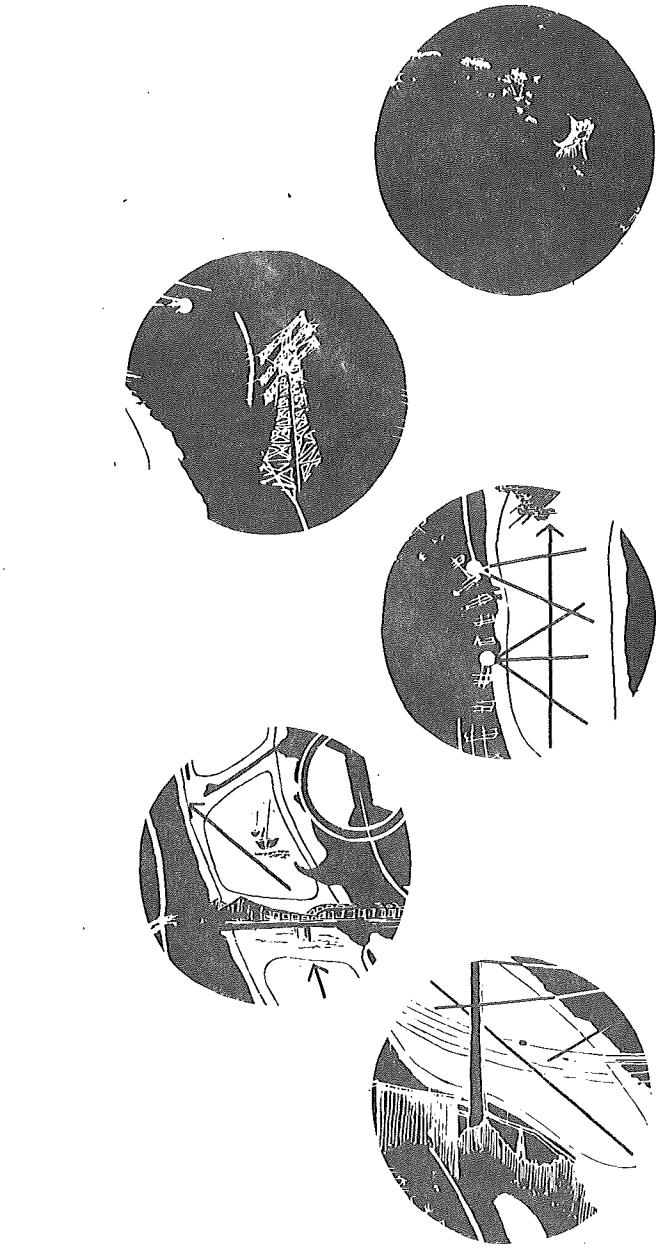




orientation



the character of the
St. Croix Valley



The outer edges of the St. Croix Valley region are characterized by relatively open farmlands. The major paths which link the study area to surrounding areas include Interstate 94, Highway 36, and north-south routes along the river valley, Highways 95 and 10. Urbanization, in the form of commercial strip architecture, intrusive power lines, and summer homes, occur with relationship to these highways. With the railroad, they also serve to divide the region into districts.

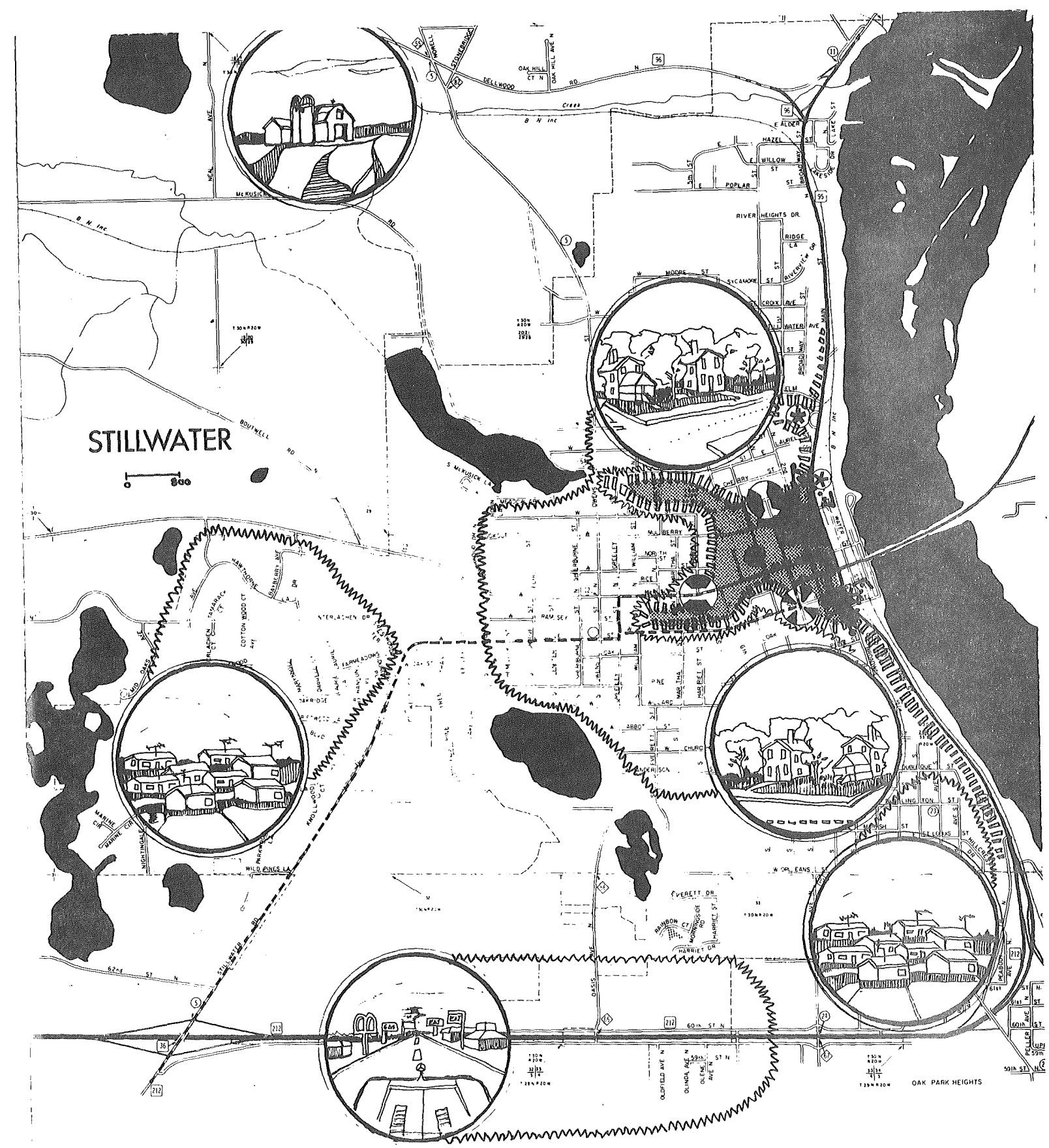
Near the river, a glimpse of the bluff line introduces one to the river valley. Yet the actual gateways, that is, where the river is first observed, occur very near the river. Along the north-south routes, the river can be perceived in only two major points, south of Bayport and north of Hudson.

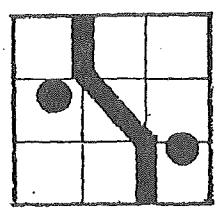
The study area is defined by the character of the river. South of Hudson, the river is broad, the bluffs steep and natural. North of Stillwater, sandbars make navigation difficult. The major bridges make the edges apparent.

The areas of containment through which the boater passes and the extent and direction of his view are indicated on this map. In Hudson these areas are broken up by natural and man-made barriers. The power plant stack is visible from most points in the area, dominating the view.

The bowl-shaped topography of Stillwater is an integral part of the city's visual structure. The city focuses on the river-front. The river can be perceived from nearly all points in the old city. Church steeples rise high enough to be clearly perceived as landmarks. New development stretches south and west from the bluff, gradually losing ties to the river focus.

The central area of Hudson is also contained geographically -- by the very steep bluffs on the south, gradual rise to the east, and the lake on the north. Yet the city is perceived as linear, since the city focuses on the highway, turning away from the river. New development is oriented towards I-94, separated from the city by the bluffs.





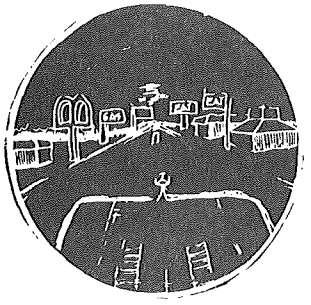
ORIENTATION

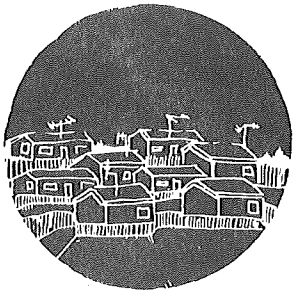
good foreground views
good distant views
visual edge
major visual landmark
visual entry
major image path
minor image path

7-4

stillwater

a focus on the areas surrounding its central business district



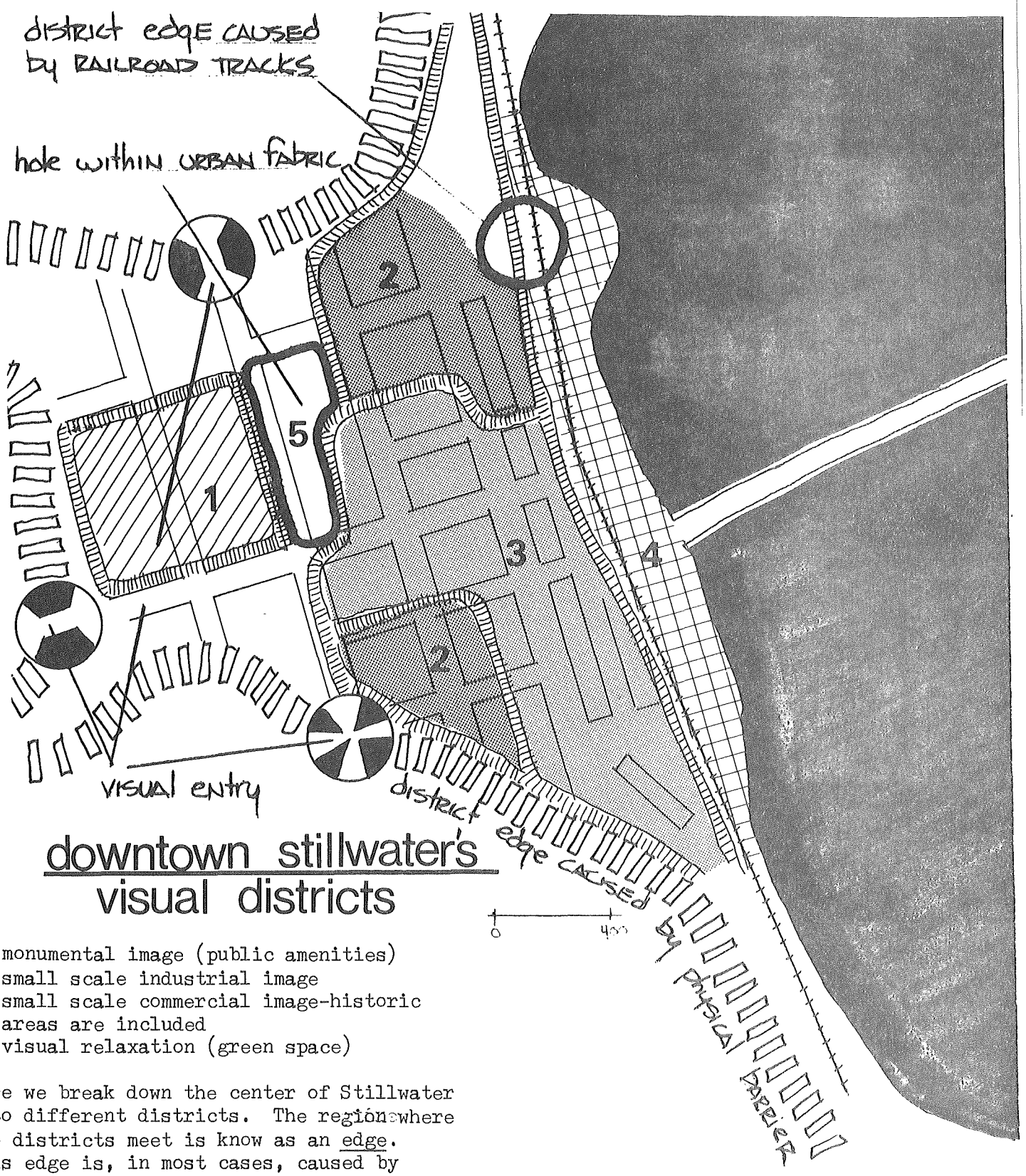


*Traveling from the Twin Cities area, the first visual district of Stillwater one would probably encounter would be the open commercial strip along highway 36. It is characterized by its lack of vegetation and great amount of signage and lighting. Being set back from the bluff line, there is no visual indication at this point of the proximity to the St. Croix River.

*Newer housing in the outer-laying southern and western areas are of a typical visual character. There is not much visual privacy and the homes are of similar box-like character.

*As we move in toward Stillwater's central business district, the housing image changes. These residential districts, located above the bluffs are older and retain the visual character of Stillwater's heritage. The homes are situated close to the streets and thus seem quite inviting. The developed growth of vegetation also aids in defining the visual character of these districts.

*In the outer areas of Stillwater the prominant visual aspects are those characteristics created by rolling farmlands, silos, barns, and farmhouses.

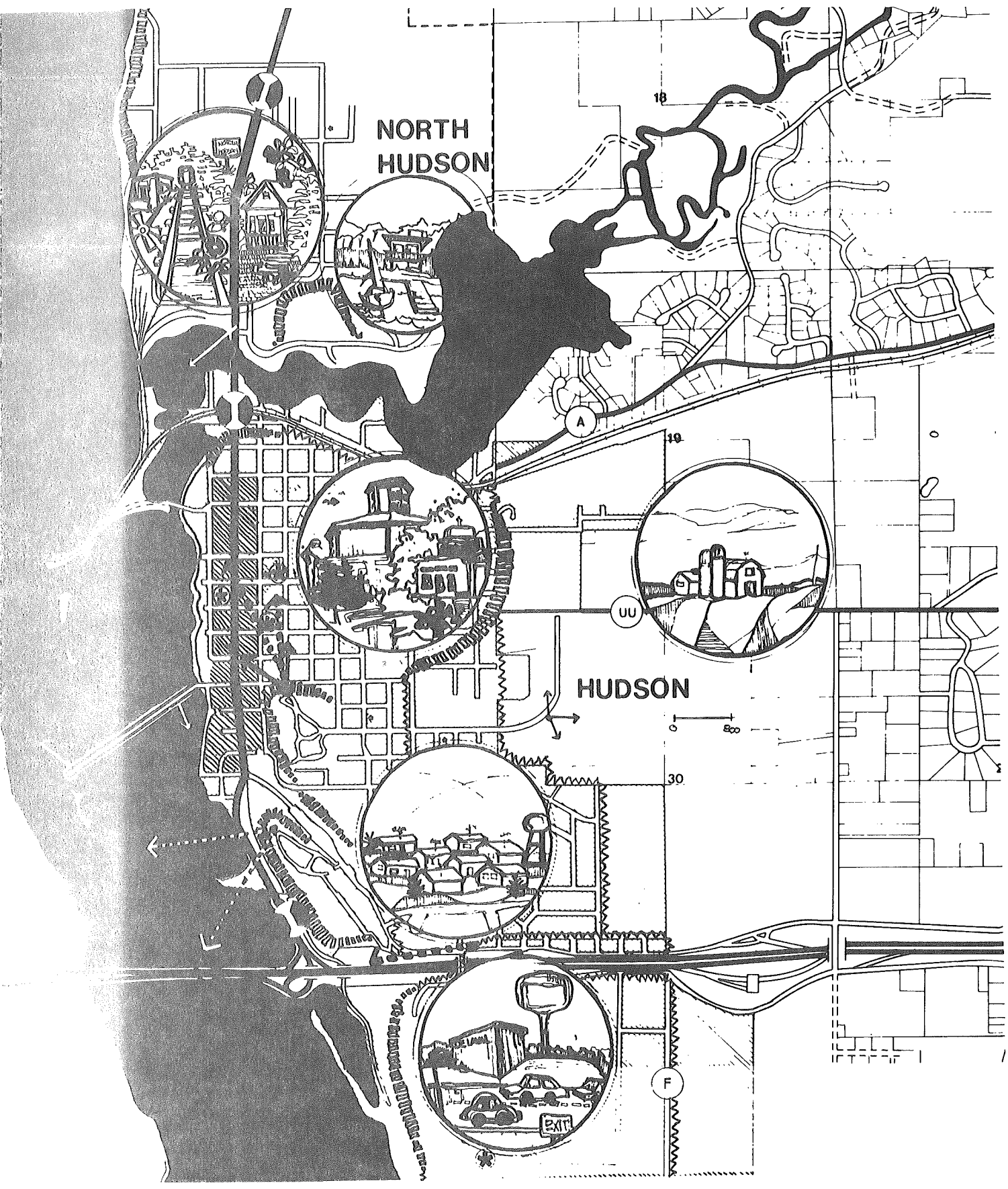


downtown stillwater's visual districts

1) monumental image (public amenities)
2) small scale industrial image
3) small scale commercial image-historic areas are included
4) visual relaxation (green space)

Here we break down the center of Stillwater into different districts. The region where two districts meet is know as an edge. This edge is, in most cases, caused by zoning or historical change and growth. In a few cases a natural edge causes the separation and creation of districts. Manmade edges such as railroads also separate districts. The causes of other edges simply are not evident.

Surprisingly there are few holes within the urban fabric. Holes are small areas within districts which do not fit in. In Stillwater, a small residential grouping separates public facilities from the commercial district.



ORIENTATION

good foreground views
good distant views
visual edge
major visual landmark
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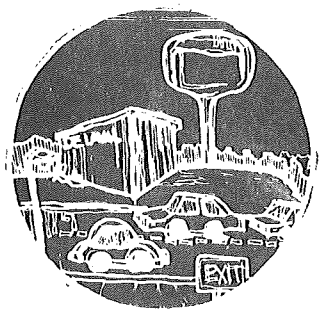
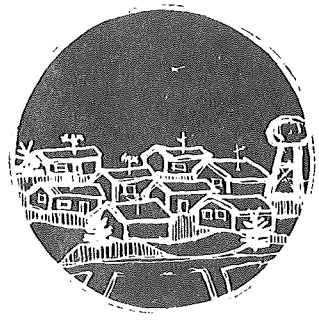
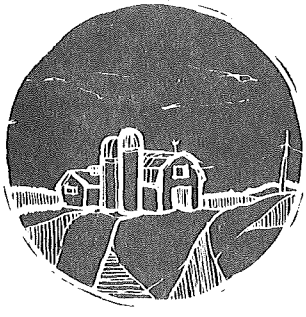
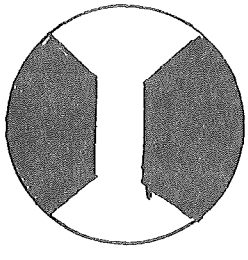
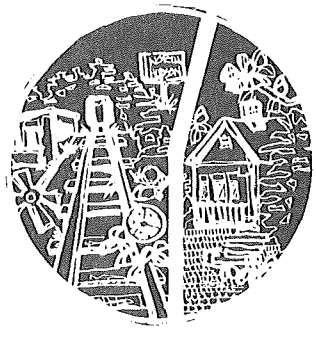
major image path
minor image path

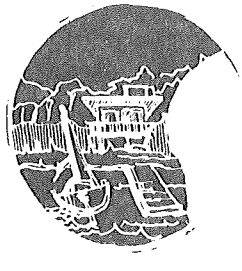












hudson

a focus on the areas surrounding its central business district

*Moving along one of Hudson's major paths, I-94, we enter the new industrial park and commercial strip. This expanding district is visually separated from the 'older Hudson' by the bluff line, which forms its western edge.

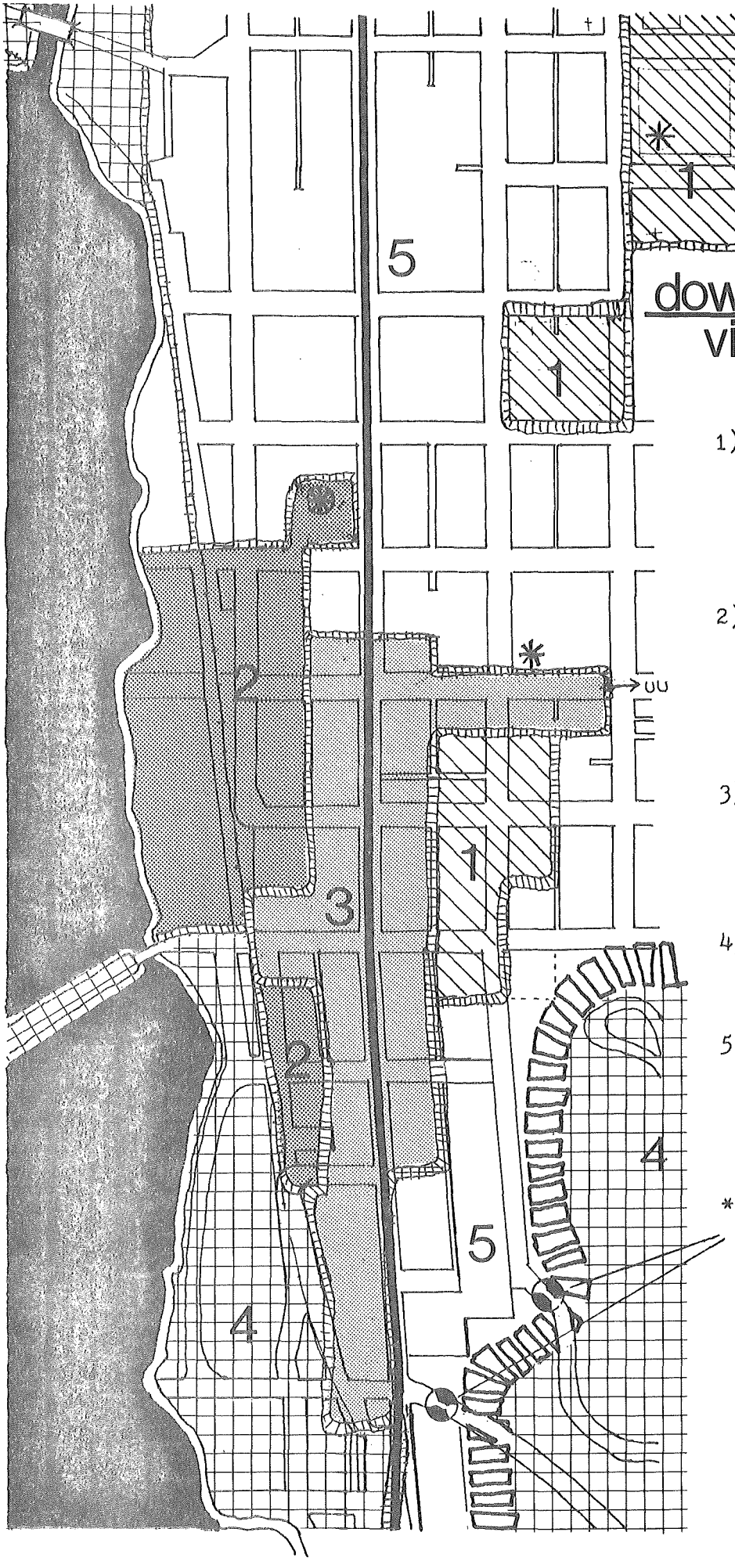
*Also on the bluff, north of the I-94 path, is a district of new residential development. This area, like the industrial park, is visually very bare, and lacking in vegetation. It is also visually repetitive.

*Moving east, we enter a farmland district defined on its west side by the edge of new development. There are some pleasant foreground and distant views of rolling hills here.

*Down, off the bluff, is a district of older, more established homes and civic buildings, sprinkled with a few newer buildings. It is characterized by its canopy of trees and greater privacy of spaces. Its edges are defined by the central business district, the railroad track, and the bluff line.

*Before we move across Lake Mallalieu into North Hudson, there is a special visual entry which forms a gateway between the two towns. At this point, Hudson's other major path, highway 35, dips down under the railroad bridge. In as much as it forms a distinct gateway it is also a visual barrier or obstruction to directed views along this path.

*North Hudson is generally characterized by its older area of homes and vacated railroad shops to the west of highway 35, some commercial development along this path, and newer expanding residential to the east. St. Croix Station, a new residential development is emerging north of the town, between the river and highway 35. Down along the lakefront there is a rustic mixture of old and new. Here one can understand the visual appeal of the Hudson area, which attracts its commuting residents.



downtown hudson's visual districts

1) institutional image - This district is characterized by the visual stability of mass. It includes civic buildings, schools, and some churches.

2) small scale industrial image - Visual disarray and decay, including a loading dock, feed elevator, an abandoned factory, utility buildings, and so forth, characterizes this district.

3) commercial corridor - This district is characterized visually by the variety of building type, a mixture of new and old, and use.

4) visual relaxation - Green space, park areas and marinas are included in this district.

5) old residential - This district includes small homes as well as some established historical sites.

* visual entry points not along the main axis path.

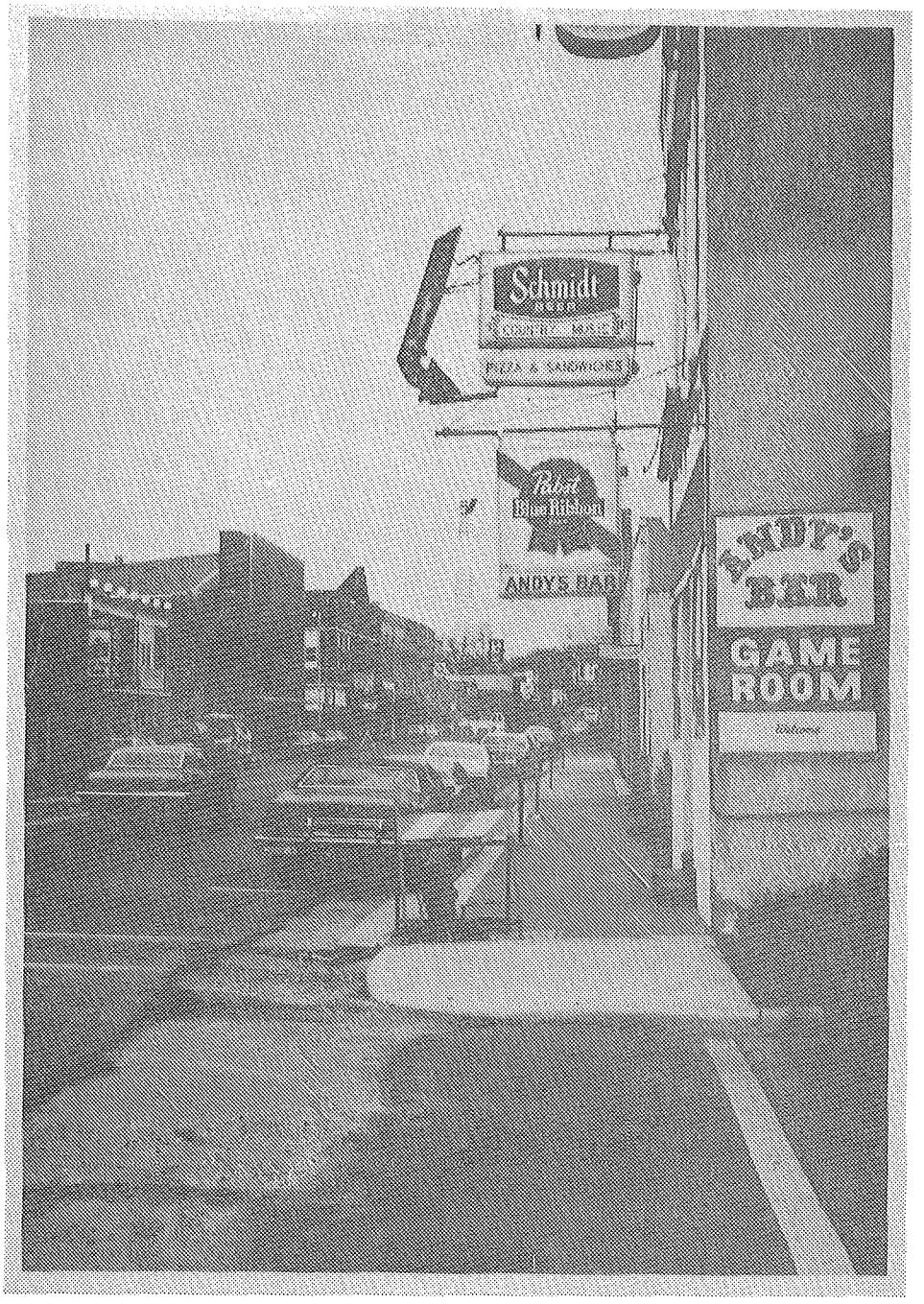
stillwater's
panoramic
views

Comparing the panoramic views of each town we see that:

-in Stillwater both the north and the south vantage points have a good overview of the whole area

-in Hudson it takes the combination of both vantage points to give this overview

hudson's
panoramic
views



experience

7-11

experience

The primary way we perceive the environment is in motion. This moving view draws us through sequences of spaces, creating both contrast and rhythmic progressions. By turning, changing speed, moving from lower to higher points, or moving from open to enclosed spaces, our view and orientation are altered. At these transition points, the constant flow of events is interrupted and our visual perception can be organized.

visual structure

Our analysis maps the entry paths to Hudson and Stillwater in terms of such transitions. Visual sequences moving through the cities' core areas are then shown to clarify the motorists' impressions. The degree to which visual contract with the river is maintained is an important facet of this analysis. How the city is perceived by boat, by car and on foot also reveals some important characteristics of the two cities.

The entrance to the city of Stillwater is very dramatic. The major access to the city moves on through direct and simple transitions.

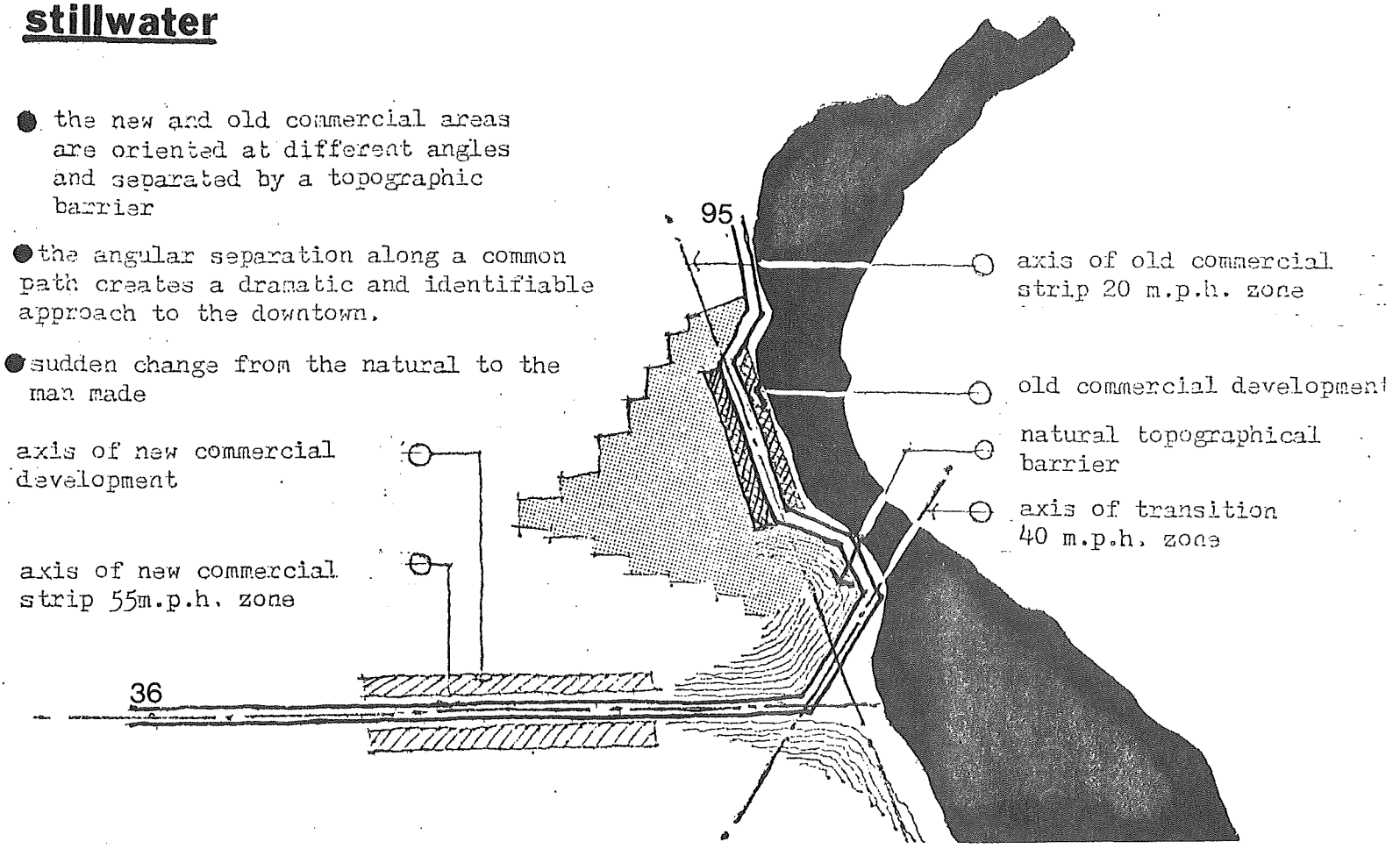
1) The entrance to Stillwater on Highway 36 is initially characterized by a typical fast food strip. The signage responds to the need to catch the attention of the rapidly-moving motorist. Distinctive forms, very large letters, and eye-catching colors (red and yellow) are typical.

2) The curve to the north on the same path opens up a sudden view to the wide St. Croix River with no man-made visual interruption. This natural setting is separated from the new commercial strip by high bluffs. Due to the curve in the path, vehicular speed is reduced to 40 m.p.h.

3) Yet another curve ends the "total river experience" and reduces the vehicular speed to 20 m.p.h. This prepares the driver for a dramatic entrance to the old commercial district.

stillwater

- the new and old commercial areas are oriented at different angles and separated by a topographic barrier
- the angular separation along a common path creates a dramatic and identifiable approach to the downtown.
- sudden change from the natural to the man made



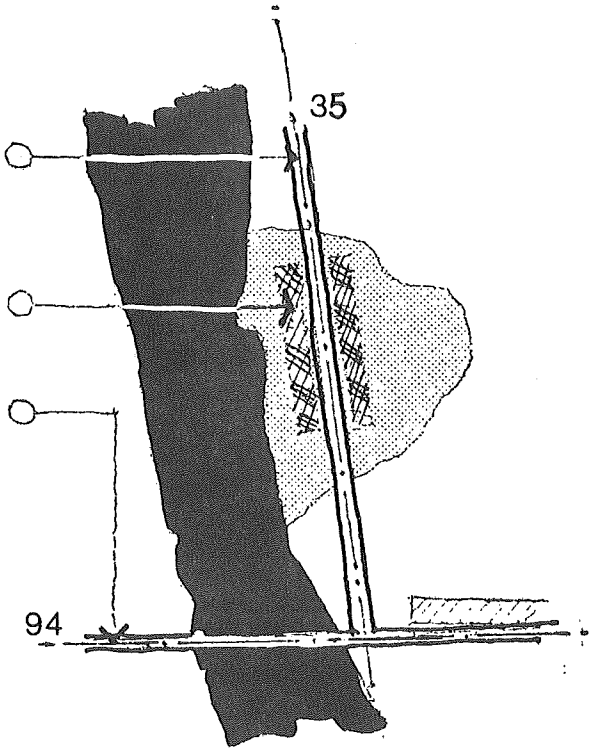
Approaching Hudson the the west, a view of the river occurs suddenly at the top of a hill. However, this view is dominated by the bridges crossing the river. While crossing the bridges, views of the river are, to a great extent, blocked by the guard rail and the other bridge. An abrupt circular exit from the eastbound bridge begins your entrance into Hudson. The high bluff to the right and marina on the left seem to have less impact than the signage ahead. The streetscape suddenly seems very narrow due to the signage protruding from the buildings. Because of the linear path, one does not experience any one part of the city as its focus or center.

From the east, the motorist may pass the new commercial strip, then going through a massive cavity cut in the bluff. The exit to Hudson is again abrupt.

If one exited at the new commercial area along I-94, he might enter the city along a rather "secret" path weaving down from the bluff through the older tree-lined residential streets.

hudson

- the mixture of old and new commercial development is along a common main axis. Its orientaion does not create a dramatic and identifiable approach
- the axis of downtown area and the new industrial area are not along common paths.



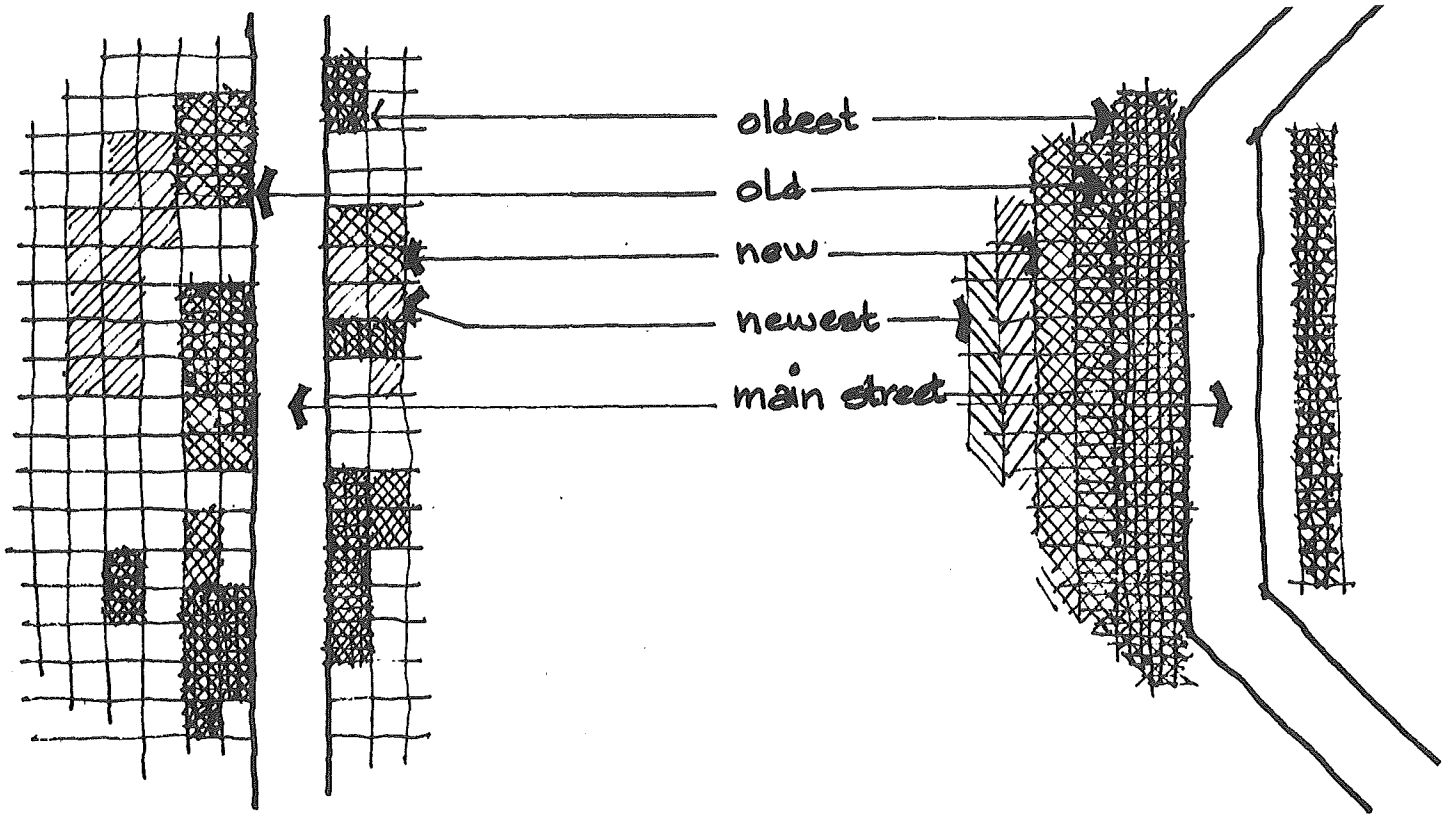
access of old and new development 55 and 20 m.p.h. zone.

old and new commercial development

axis of new commercialstrip 55 m.p.h. zone.

HUDSON

STILLWATER



*old character is modernized or replaced

*building detail and scale varies

*variety of old and new building material in the old commercial area

*example:

a) new office building in downtown

b) courthouse addition

*original building character is maintained

*major alterations in interior of the old buildings only, using building materials of same character

*building scale and detail from the same era

*gradual change of character from central point of growth of each district forms a definite and identifiable visual structure

*example:

a) new curthouse is removed from the old to maintain the character of old government district

stillwater

Vechicular experience

1 Edges of the business and cultural district are identifiable from a distance.

2 The north exit is a sudden entrance into nature.

3 Landmarks at the end of each city block punctuate the streetscape, creating a definite image.

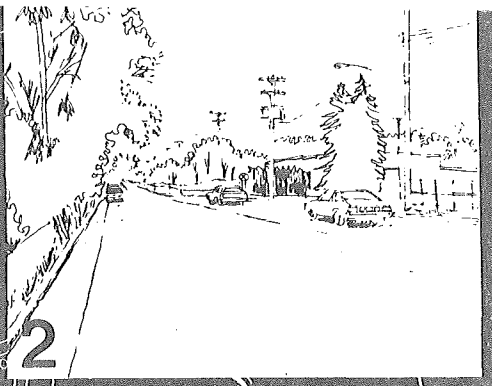
4 The view to the river over the roofs of the buildings is not obstructed and reinforces visual orientation.

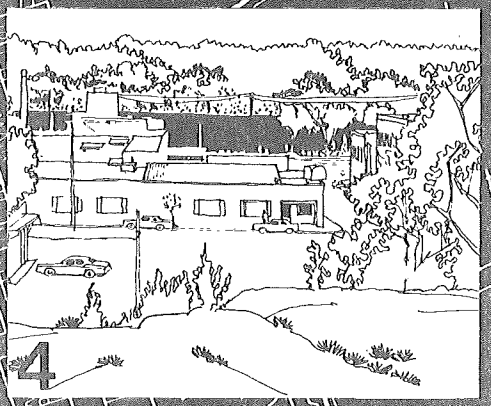
5 A conscious effort to restore old buildings to their original condition is noticed everywhere. The activity on the streets is as much a part of the visual structure as the architecture.

6 The river views from the edges of the residential district emphasize the focus of the city beyond the business district.

7 The first encounter after entering the city on the south is the old garage remodeled into a boutique center. Most of the store fronts used in the interior spaces have the same historic character as the building itself.

8 From the main busimess district and the midst of traffic and commercial activity, one can still view the river and wooded bluffs which provide visual relief.





MULBERRY

OLIVE

LOT 3

GOV'T LOT

MILWAUKEE

7-17

hudson

The motorist's first impression of Hudson is its character as a residential community. Yet the linear path proceeds through the city without visual access to the river. The streetscape fails to create a sense of focus of center for the city.

1 The old Train Station is utilized only by light industry.

2 The character of the old neighborhoods in Hudson and North Hudson is defined by the many tall trees and a substantial setback.

3 Among the waterfront still remains a small working Feedmill.

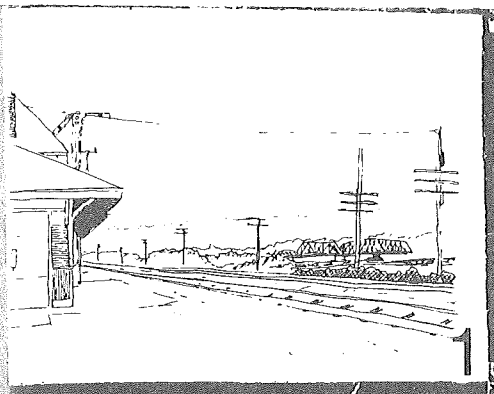
4 People of Hudson boast about the Octagon House as the main attraction in town.

5 A glimpse of the old gateway arch reminds one of the original entrance to Hudson. It now plays a lesser role as an entrance to the marina, the park, and the abandoned peninsula drive.

6 Some of the older buildings have been renovated to express a new character, but have fallen short of providing interesting public spaces within.

7 A public marina borders the waterfront entrance.

8 The bluff defines one side of the entrance to the CBD.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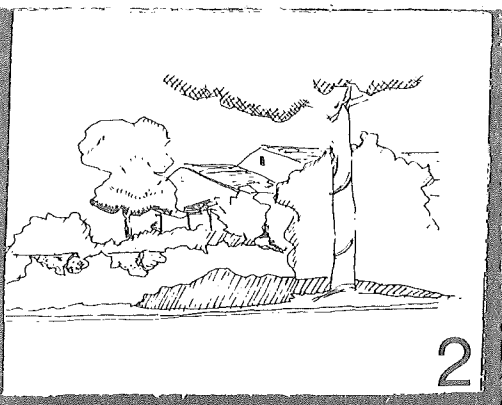
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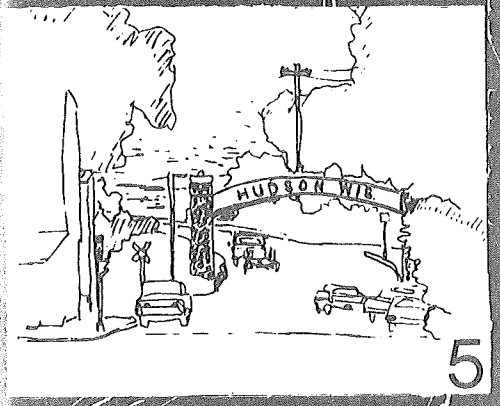
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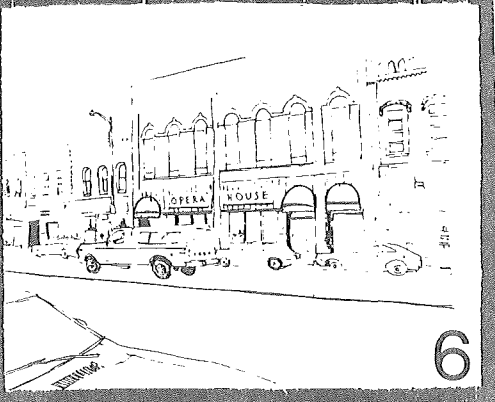
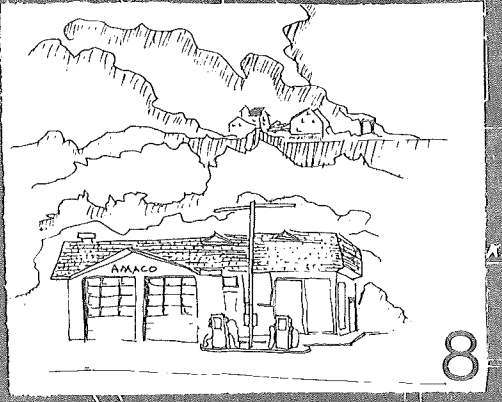
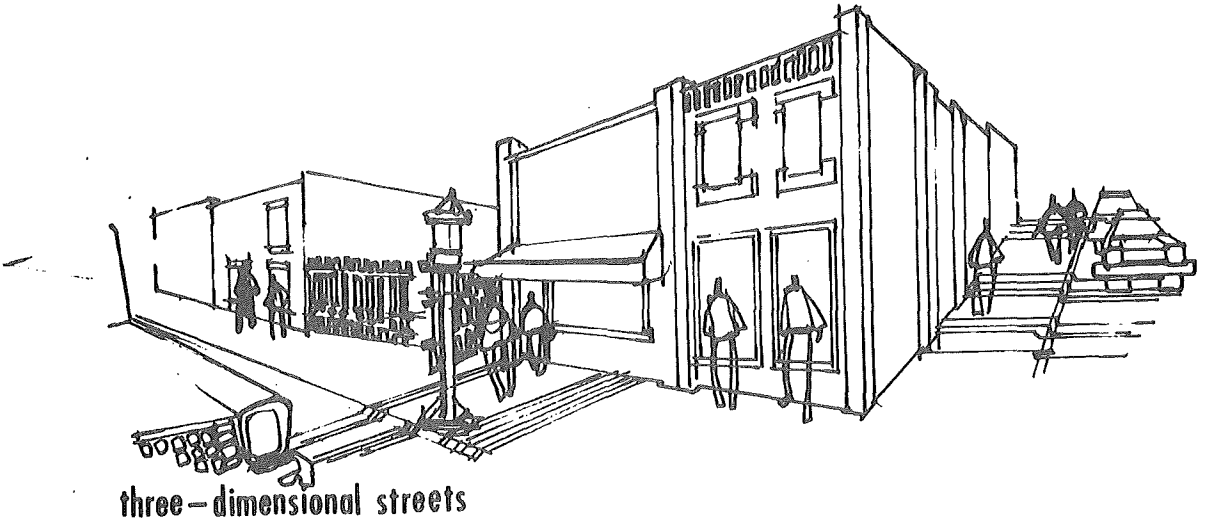

OPERA HOUSE
6


7


AMACO
8

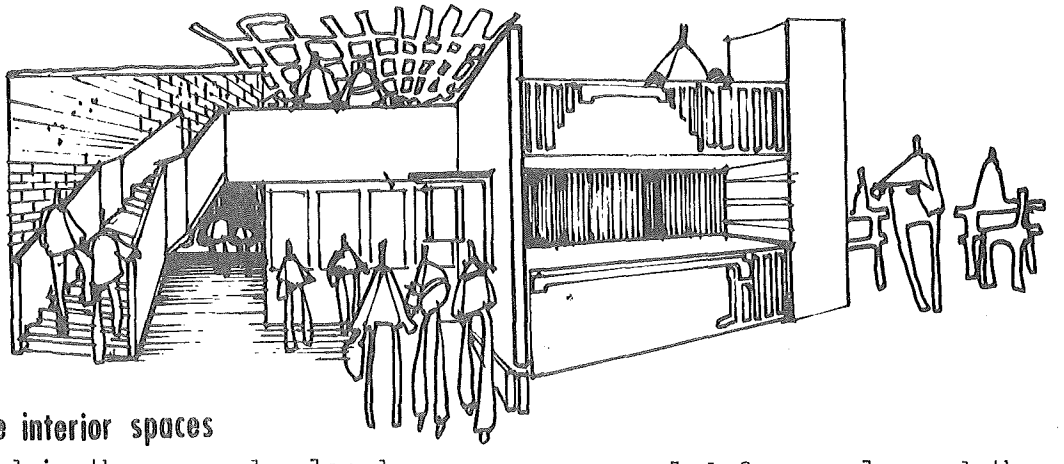
a waterfront focus

encourages the boater to become involved in the central area. The deep-waters adjacent to the shoreline allow the boat to dock right at the focus of the city.



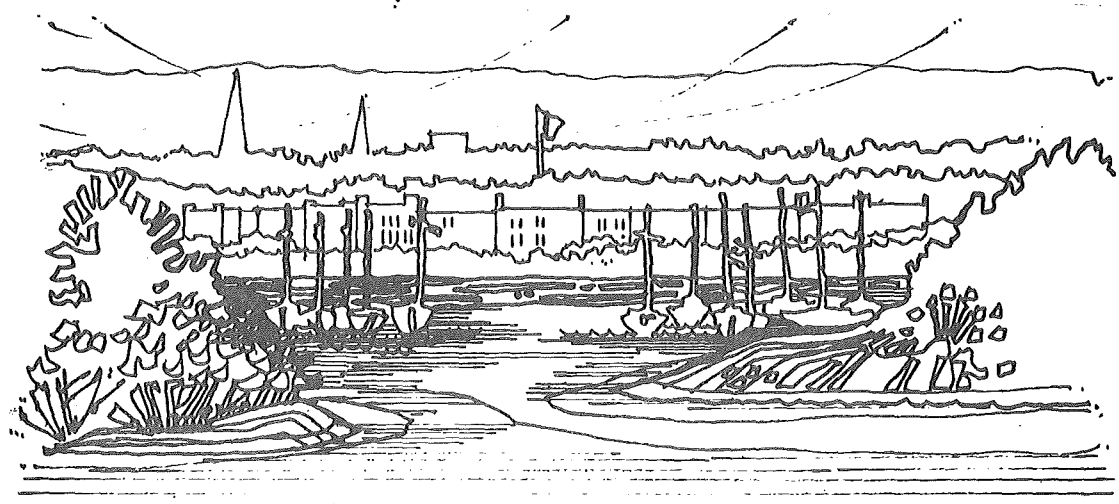
three-dimensional streets

draw the attention of the motorist to new areas of the city. The activity of the streets also encourages the driver to stop and participate.



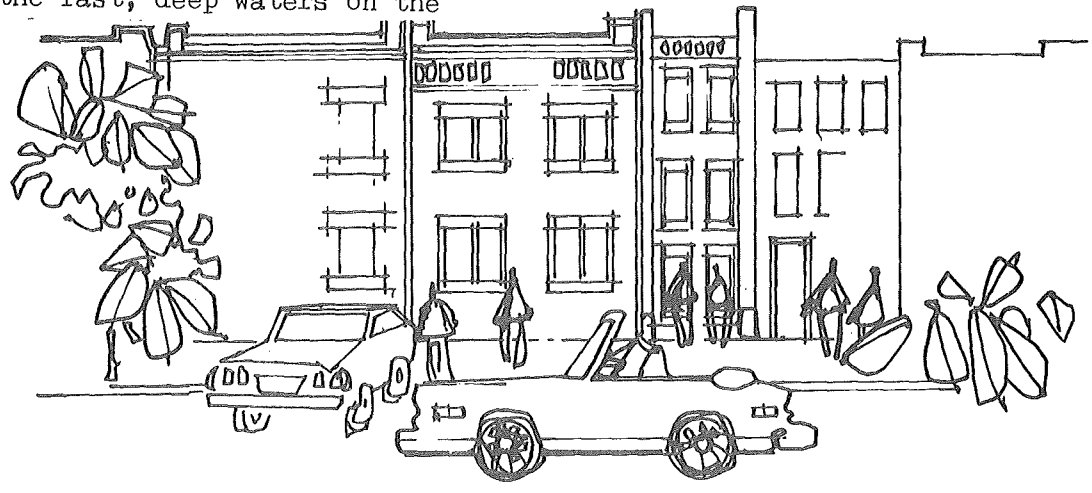
intimate interior spaces

can be experienced in the new redeveloped specialty shops of Stillwater. The spaces are scaled for people, and the new character is sympathetic with the old.



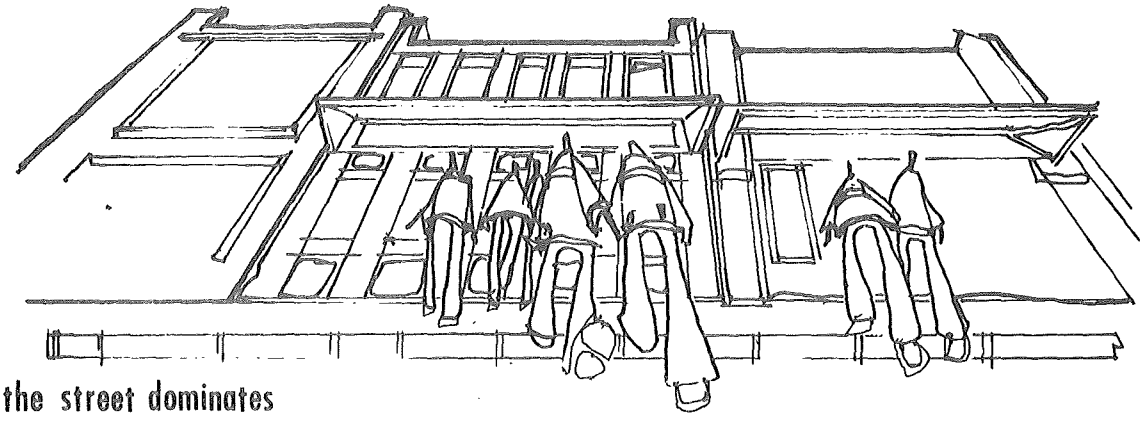
the non-descript view

of Hudson by boat prevents many from becoming involved in the city. The sandbars keep the fast, deep waters on the opposite banks of the river, as well as the passerby.



with a linear streetscape

Hudson does not draw the interest of the motorist passing through. The continuous flat planes of buildings confine his view and perception of the city.



the street dominates

the pedestrian even more so. There are few small-scaled elements or public spaces to relieve the effect of the rapid traffic.

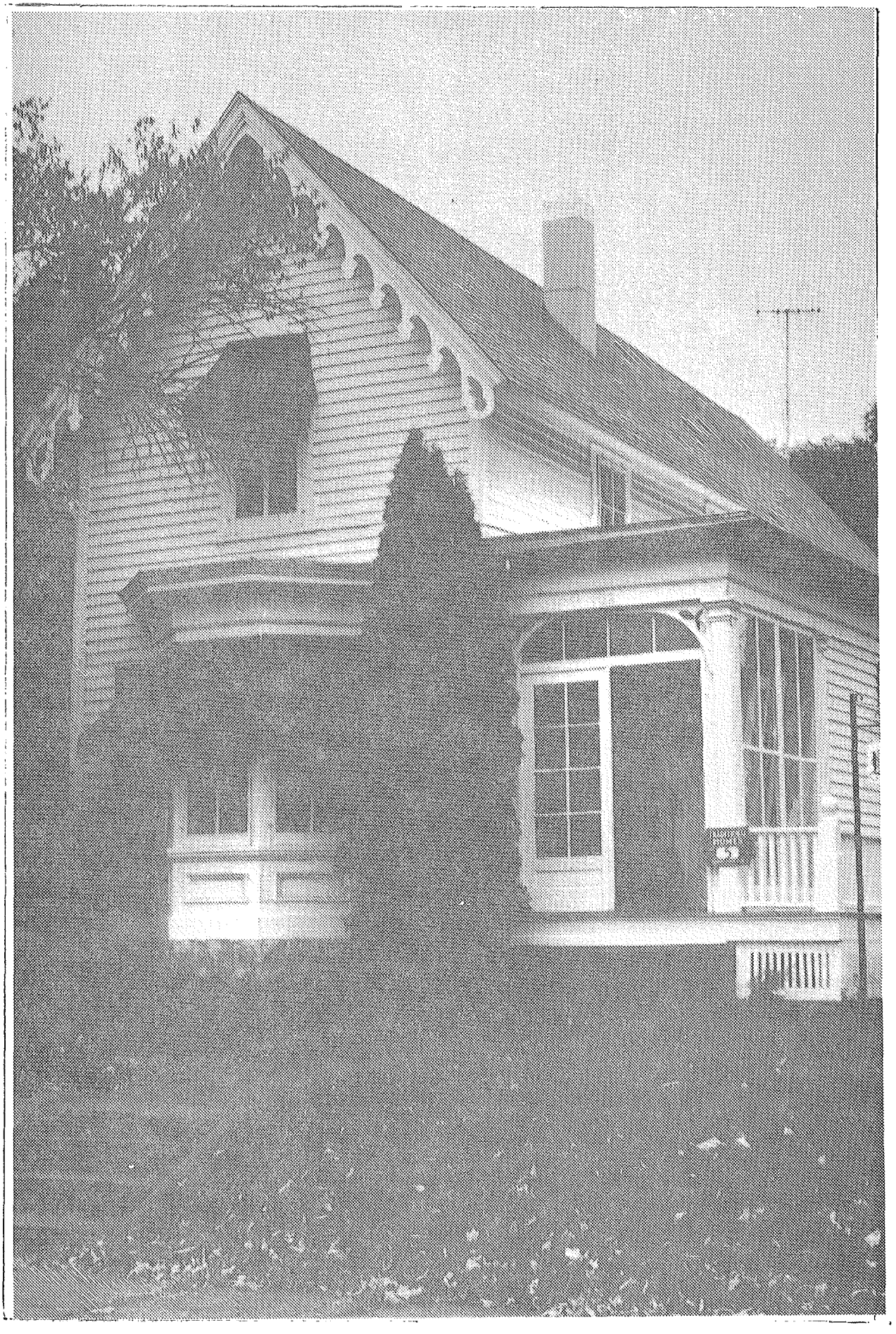
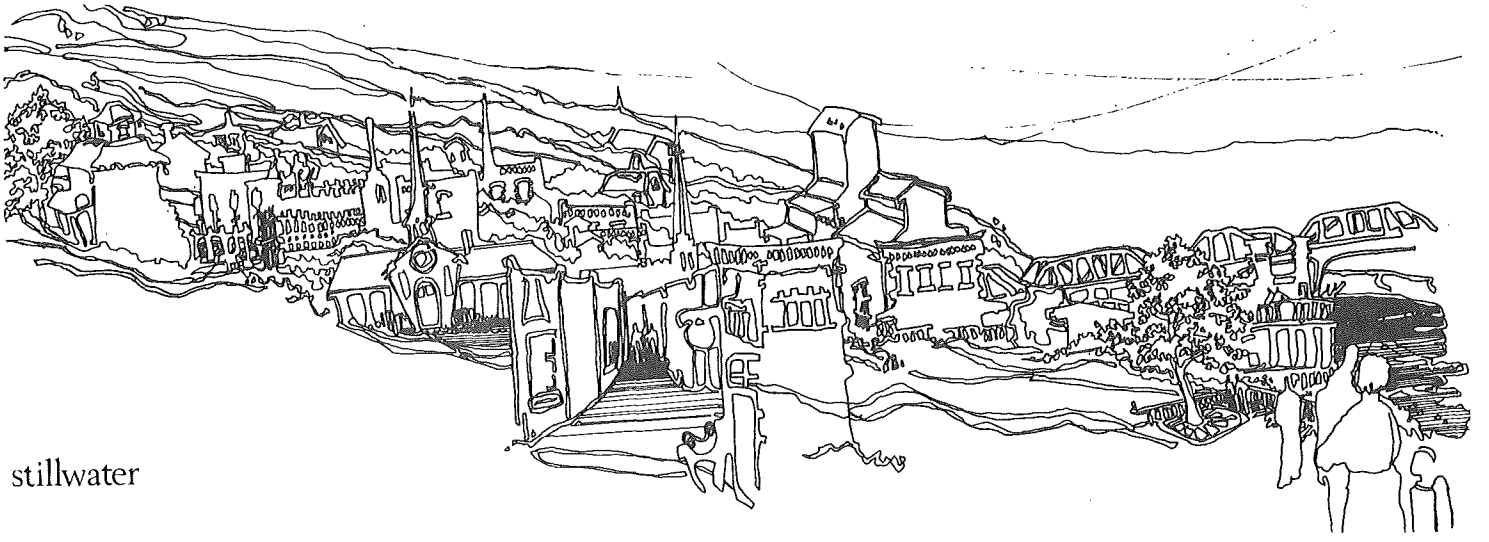


image
7-22

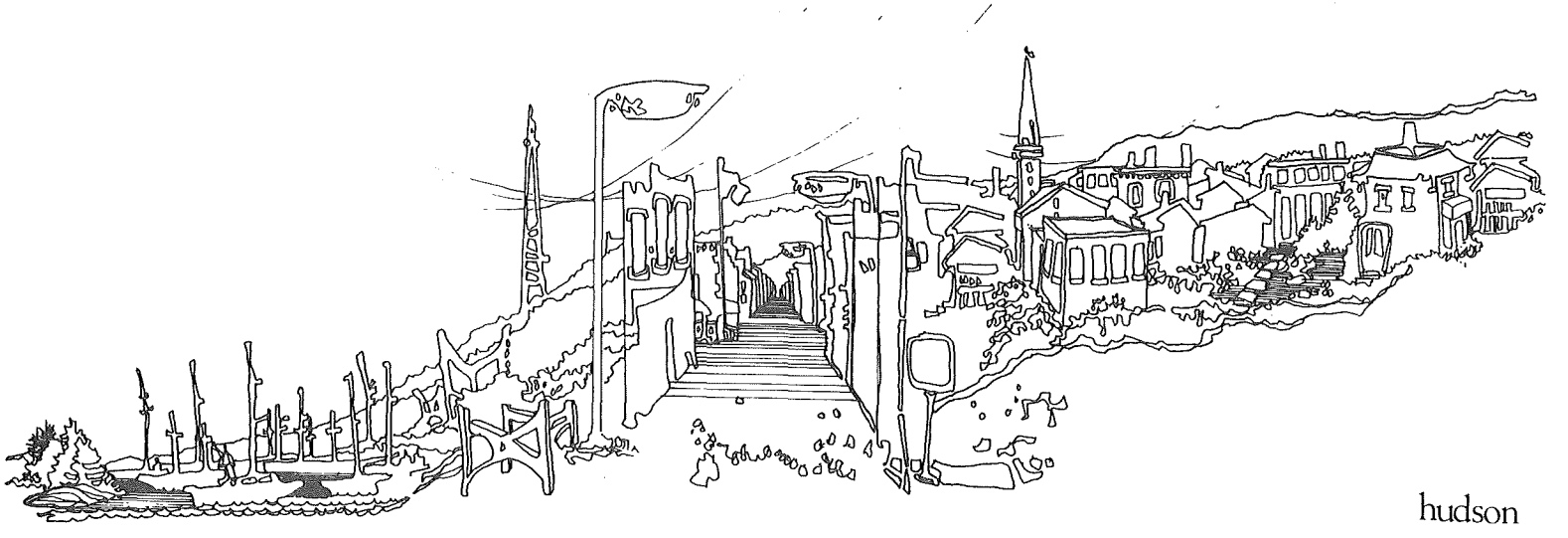
which can't be grasped in your hand or placed in your pocket. Yet the image structure of the two communities can be established in terms of the elements which comprise the cities.

frontage and bluffs. Yet they have developed very different images.



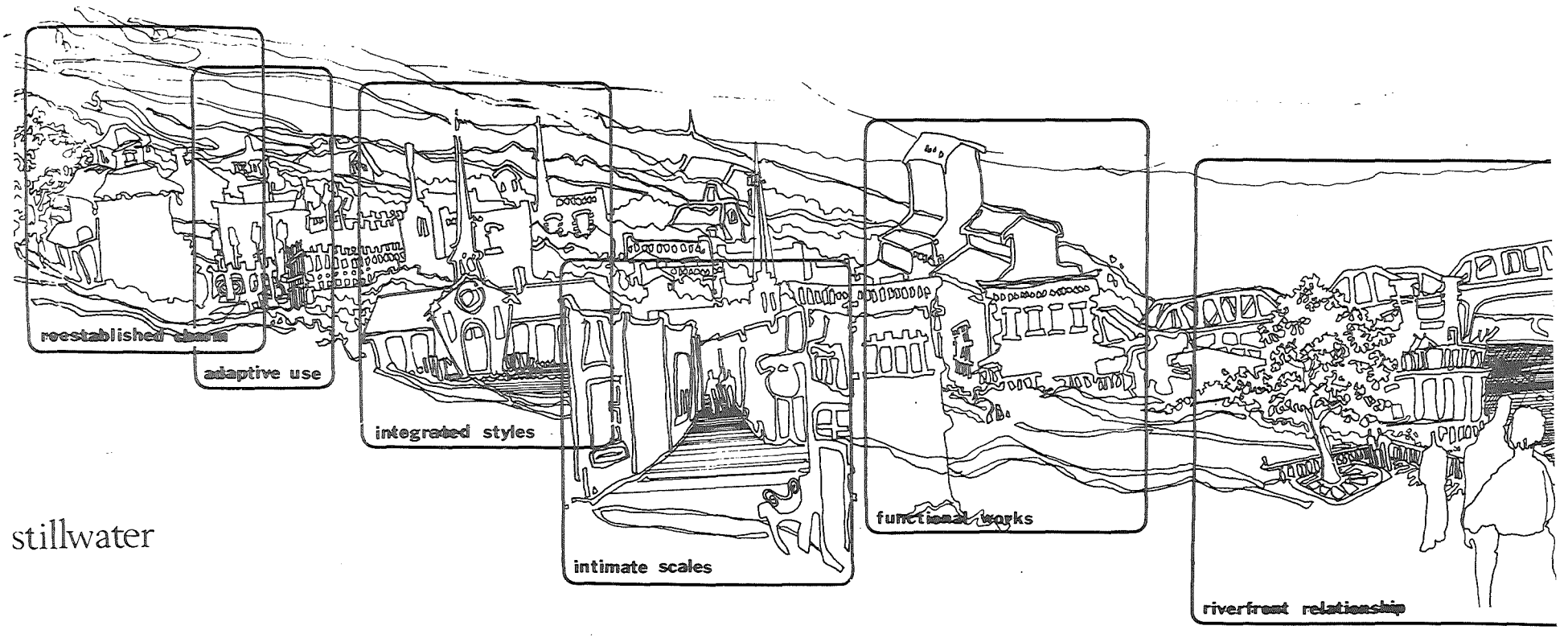
stillwater

The city of Stillwater is in close proximity to the active movement of the water traffic. Because of the bowl shaped composition of the related bluffs the city becomes part of the water life and oriented towards the activity. This gives the city it's waterfront personality, and assures a high degree of participation in river activities.



hudson

Hudson's proximity with the active part of the river is far removed when compared to Stillwater. The river and the slow rise of the bluffs projects the city higher onto the topography. Being physically removed from the river is also reflected in the image and orientation of the city. Because of its layed back feeling the town goes on undiscovered from the outsider.

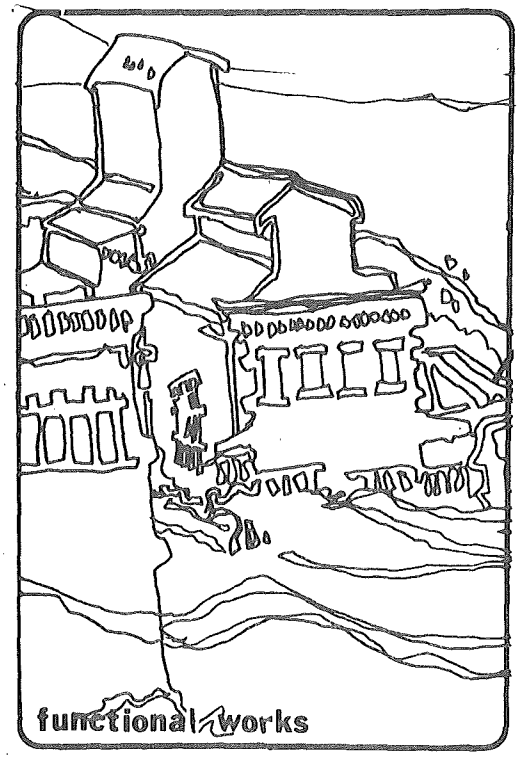


stillwater

A closer look at the city of Stillwater gives one a look at the fabric like composition. These segmented areas highlite these threads for us.

image structure

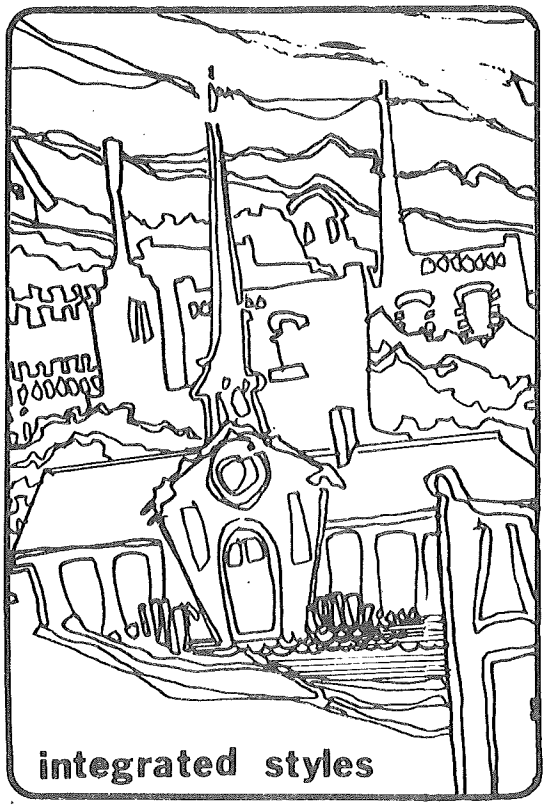
The waterfront involvement of the city of Stillwater is carried out through the original areas of the town. These areas are within the boundaries of the river corridor of involvement and are directly related to the river. A promenade along the waterfront allows direct contact with the river.



The functional works in this area of Stillwater carries the character of the old town by being kept up and functioning as part of the town. The characteristic rural image is an authentic element of the town's composition.

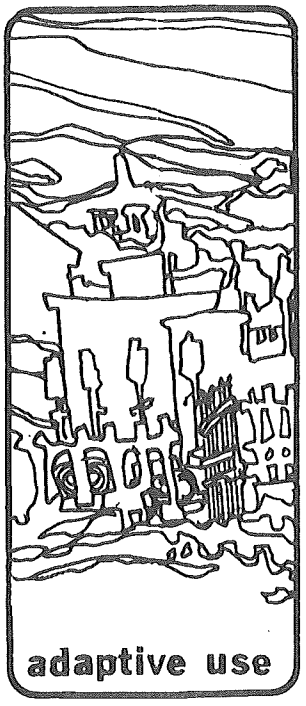
intimate scales

The intimate scales of the streetscape are appropriate for pedestrian use. The streets draw the user from one space to another by the use of diminishing focal points.

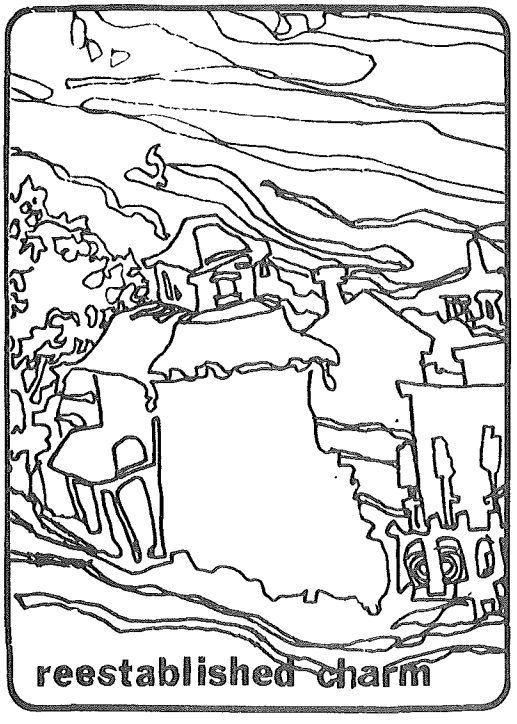


integrated styles

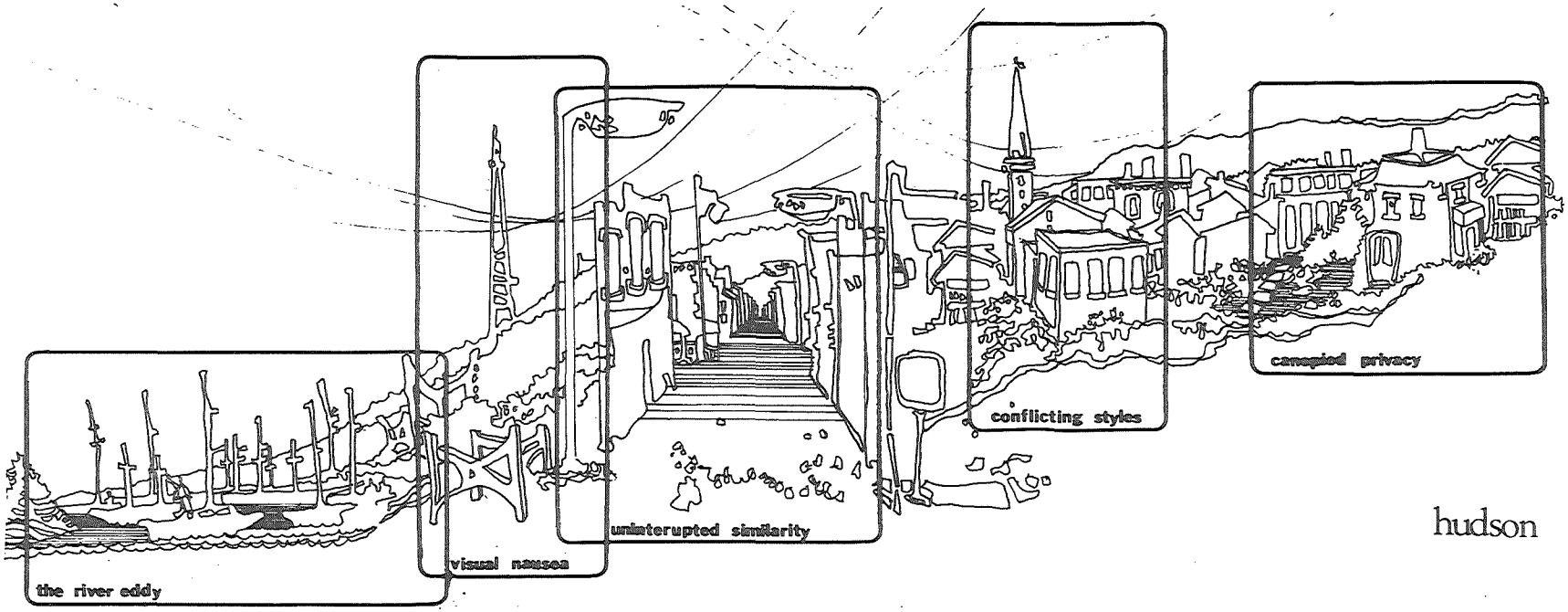
Through time, the original city changed with it's townspeople. The new additions also carry the common image of the original town. The new buildings are seen as part of the whole composition and not in harsh contrasts.



The elements of the streetscape are being readapted to reflect the river-town's historic character. Adapting the court spaces is part of the total composition of the town.



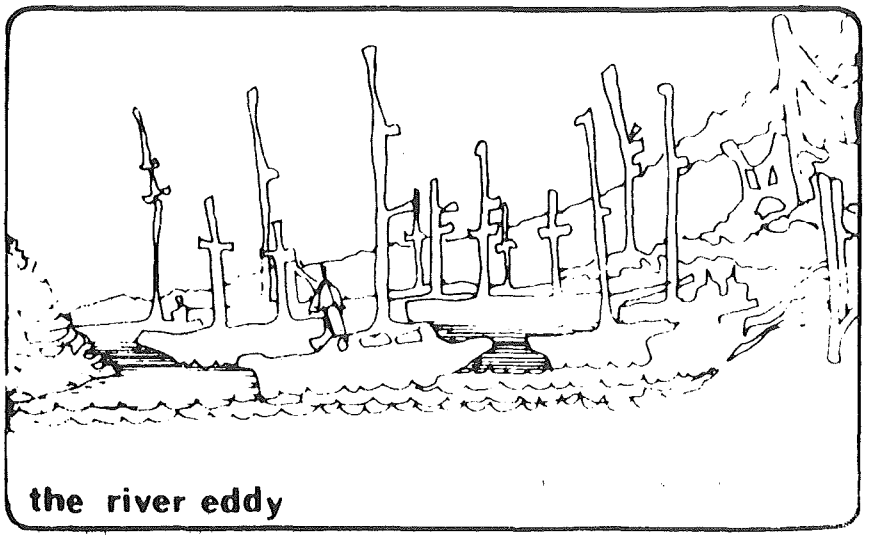
Urban redevelopment and restoration also hit the Stillwater area. Many historic homes are open for the public. Yet these homes are cared for and contain a family unit which also functions with in the community.



hudson

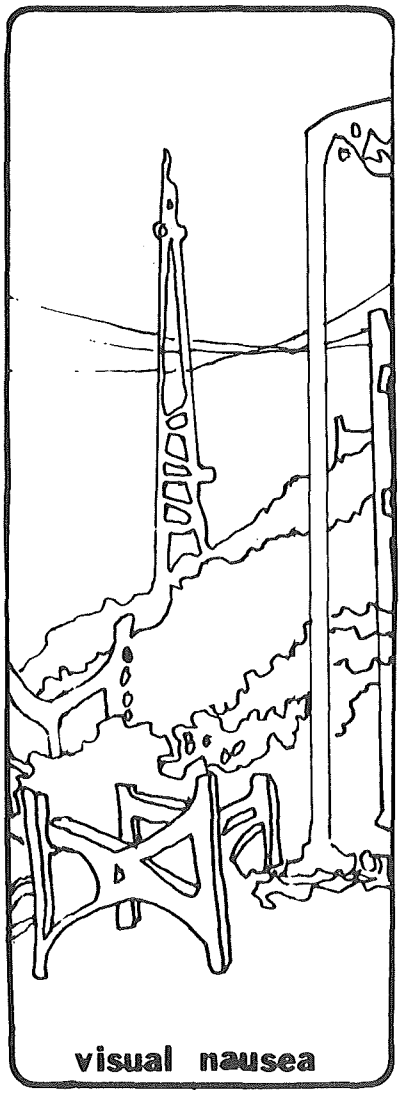
image structure

If we separate the fabric of Hudson we see a contrast when compared to Stillwater. But when observed we see a community unique in its image and a community character all its own.



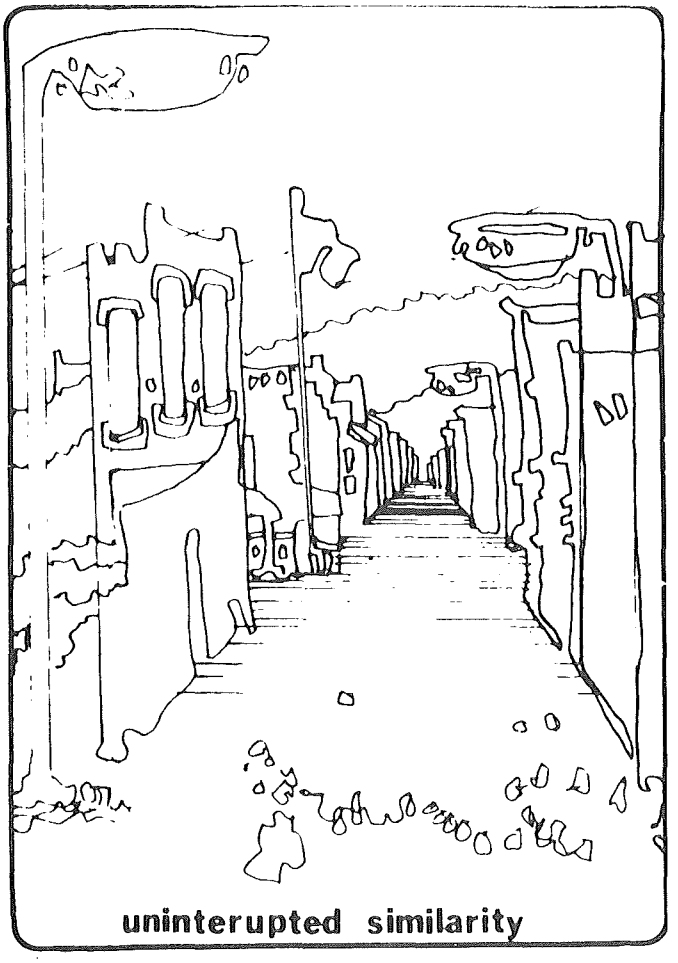
the river eddy

The river eddy has played an important part in developing recreational mooring areas for boating. The active flow of river traffic is removed from the city. When observed from Hudson, the eddy provides opportunities for passive recreational river use.



visual nausea

Visual nausea has resulted at portions of the city adjacent to the waterfront. Here they have chosen to turn from the river and treat it as an alley or service zone. These areas are functioning elements of the city, but could be developed to improve the waterfront image.

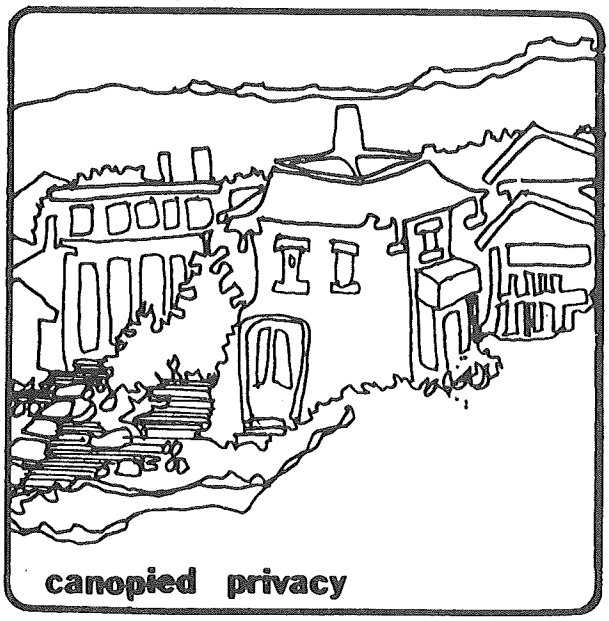


uninterupted similarity

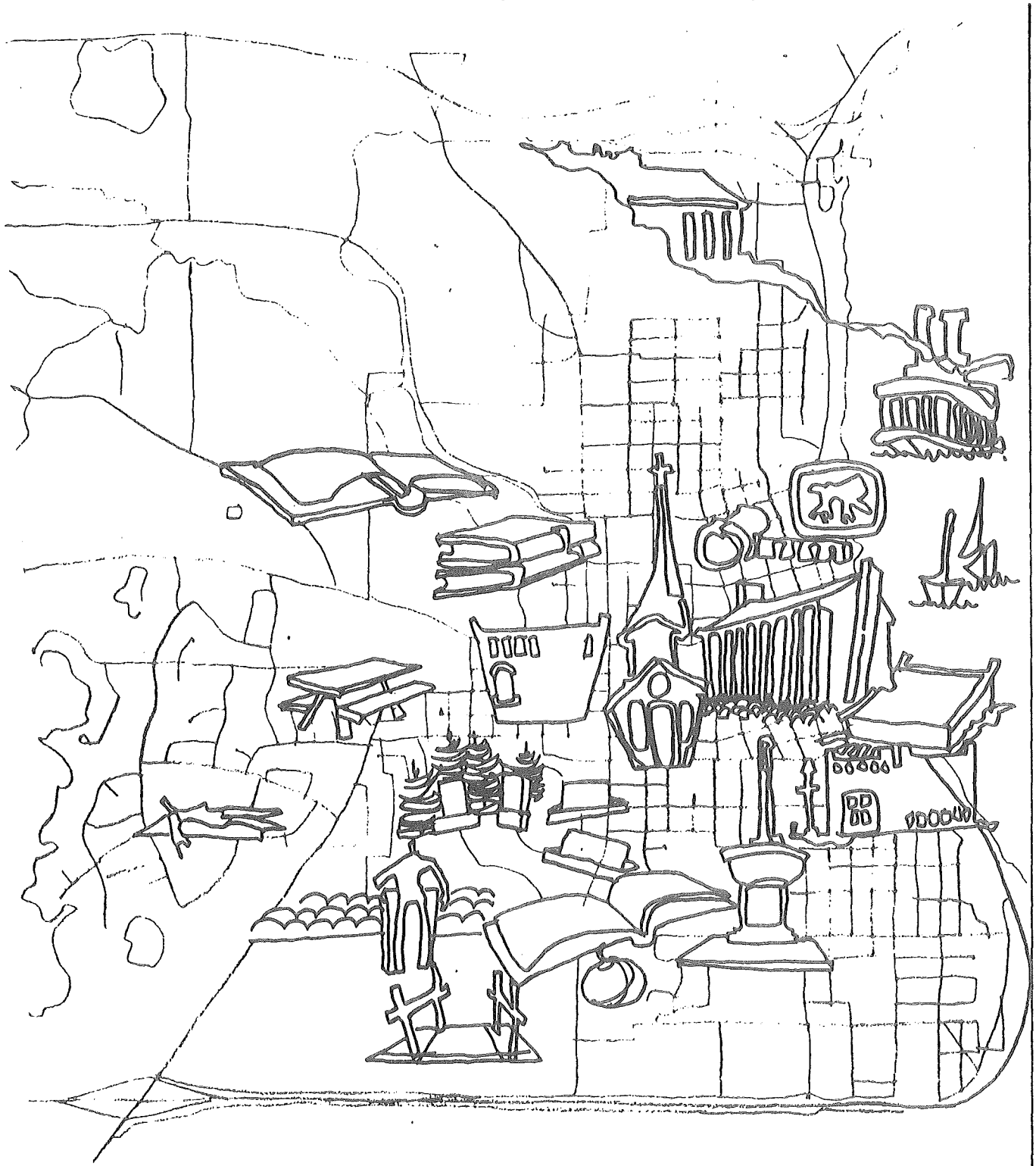
The linearity of the main street becomes a constant image also reflected in the character of the streetscape. Users are directed through town and are never relieved of the directional tension. The user is not offered an invitation to stop to enjoy the town.

conflicting styles

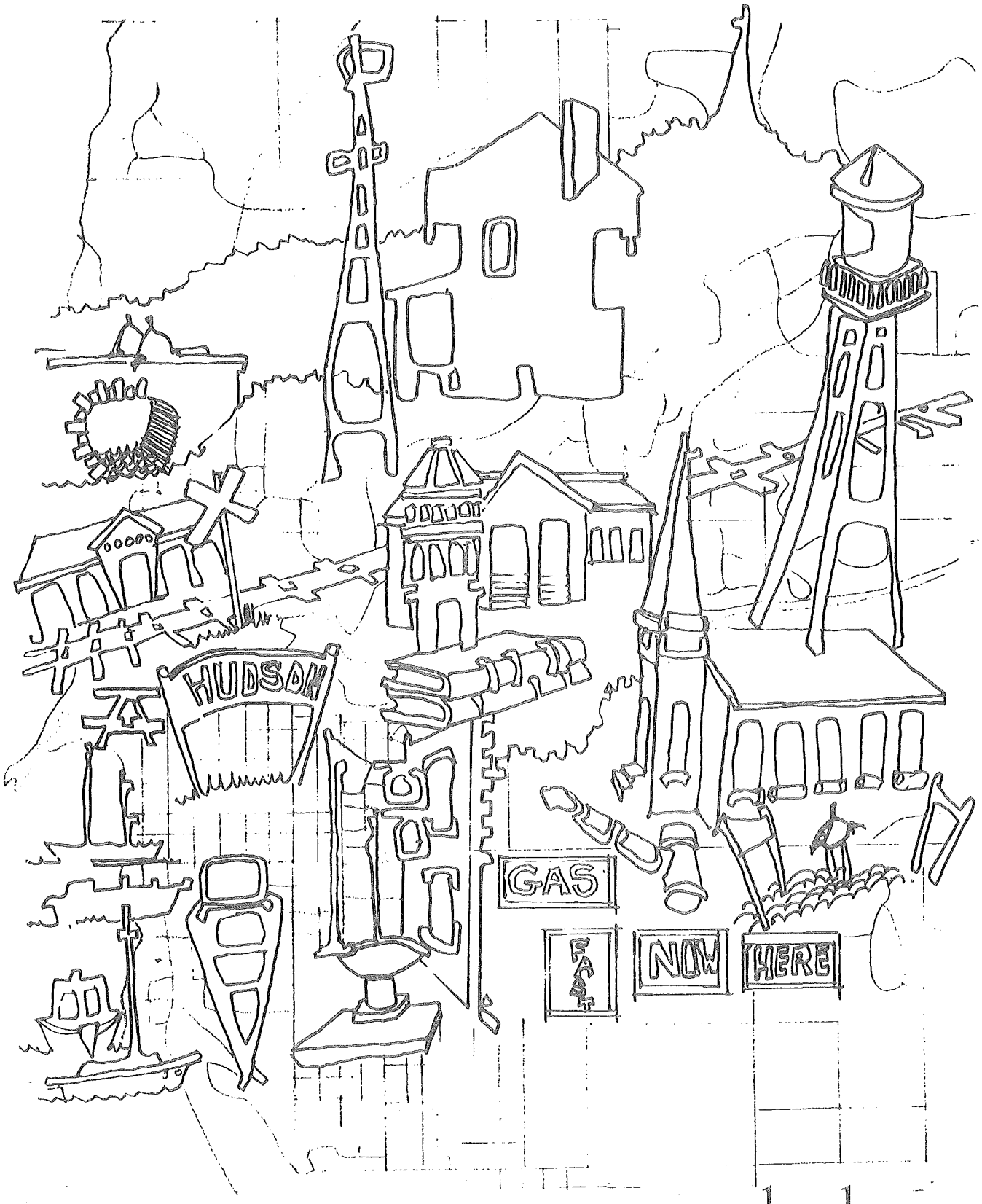
As the old sections of town were imposed upon, the modern townsmen forced their statements upon the land. This changed the original image and has left only small segments of the town existing with the old charm. The surrounding areas became confused transitional zones without recognized common images.



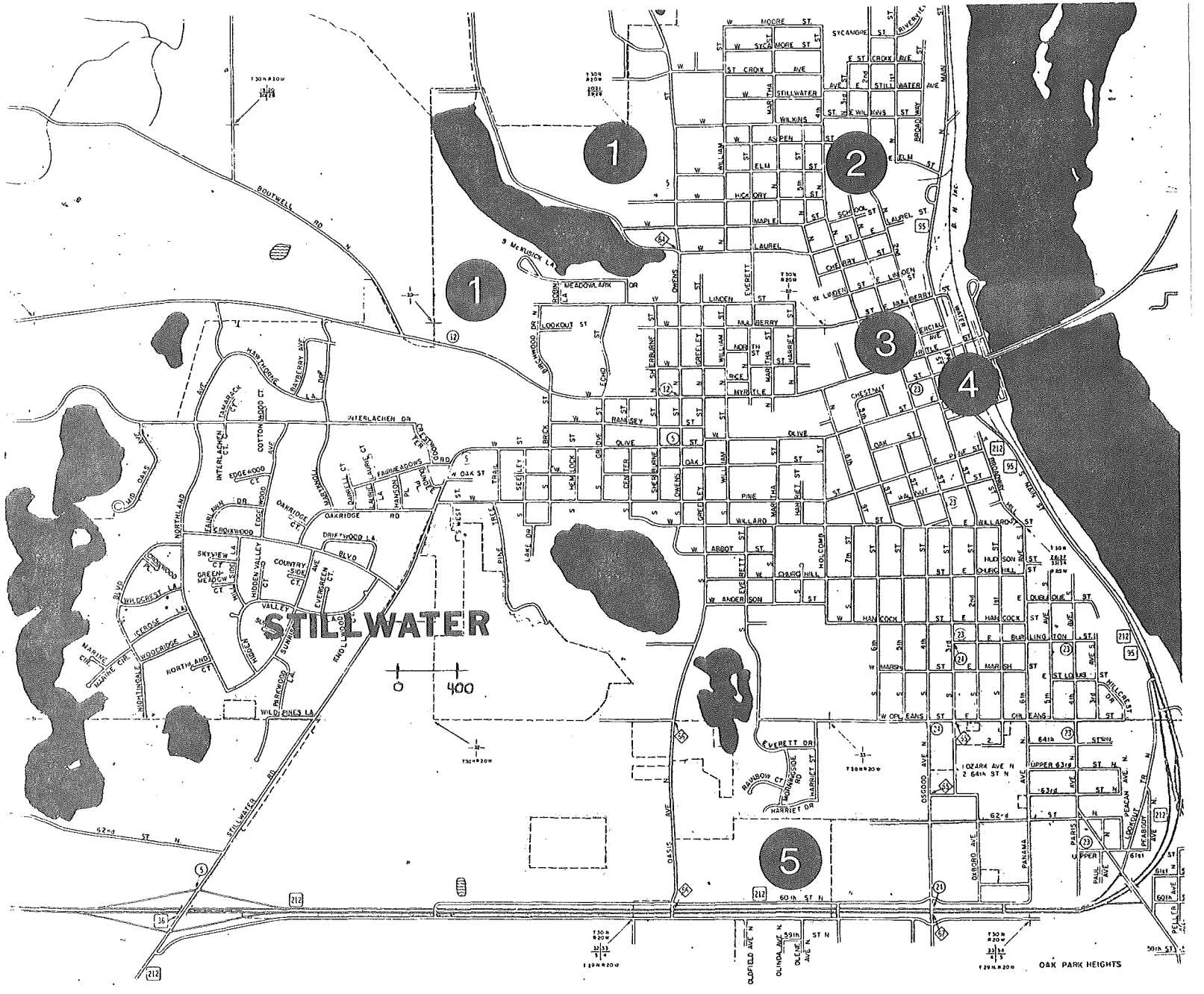
Canopied intimacy describes portions of the older residential areas. The areas surrounding the historic areas are residential areas that are also canopied and intimate yet are a combination of styles. These areas hold family units of the community which serve to support the area.



the community of stillwater



the community of hudson



visual issues

potential areas for improving the image structure

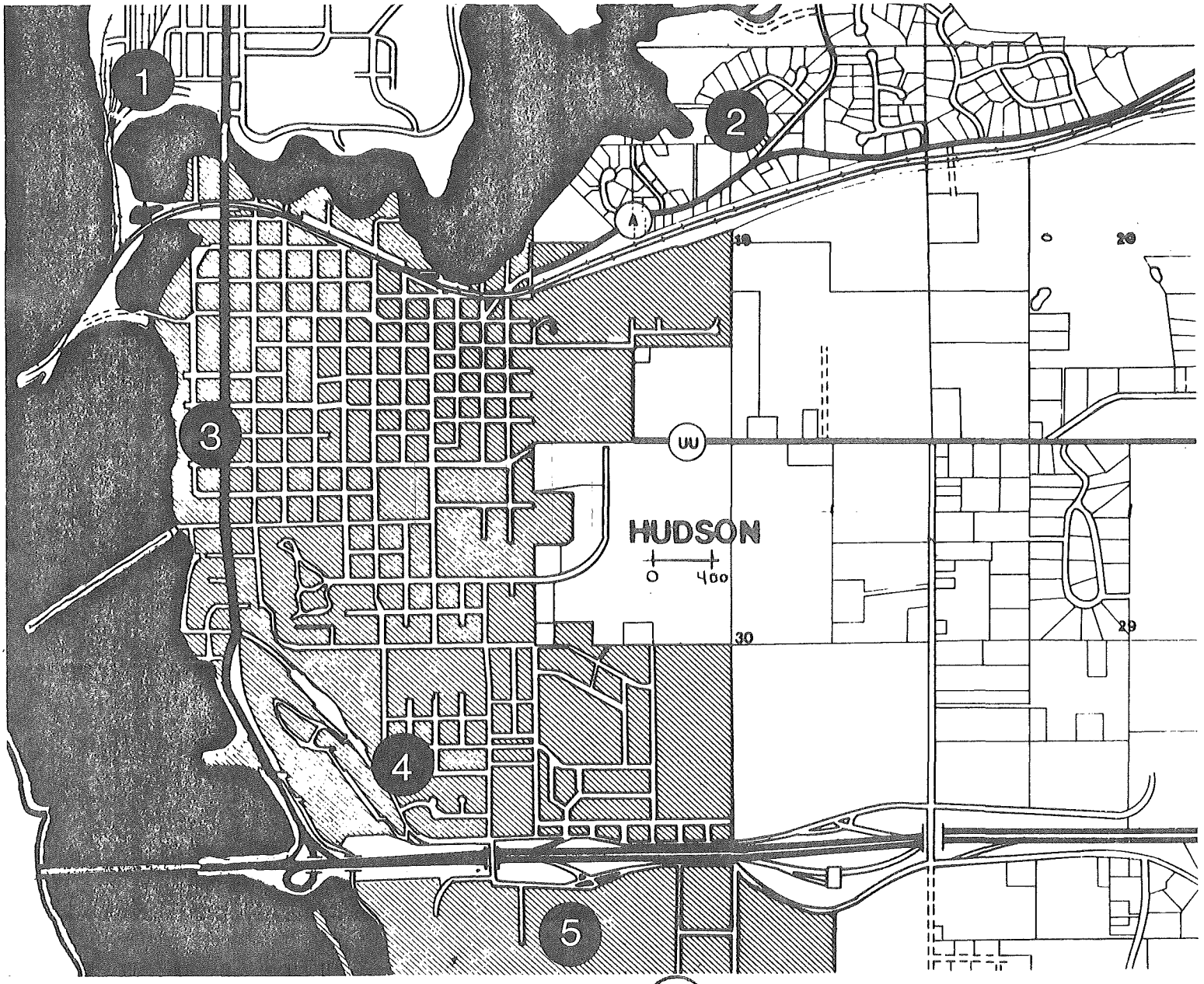
1. Probably the area where the greatest visual change could happen is here. Proposed in this area are 'fingers' of penetrating the farm areas, so as to create a softer edge. Still it will be difficult to limit the impact of expansion on the region.

2. The old prison is a potential shell for renovation and extension of the commercial district into northern Stillwater.

3. The new elderly housing complex shadows several buildings. Its scale and location next to the Lowell Inn is contrary to Stillwater's historical continuity.

4. The parking area between the river and main street may be considered a visual impediment.

5. The new commercial strip along 36 may not be an appropriate introduction to the city.



visual issues

potential areas for improving the image structure

1. The area of the abandoned railroad shops in North Hudson has potential for visual and commercial renovation as the town expands.

2. New residential development here may produce questionable images if not approached with visual sensitivity.

3. This area of "Industrial Nausea" creates a visual barrier between Hudson's main street and the river. Here Hudson has potential to visually address the river to a greater degree.

4. At this location, is proposed a 12 story residential complex, "High Meadows". If the ordinance limiting development above 3 stories is lifted, this may be the future location of a potential visual eyesore.

5. Potential for improving the image structure of the growing Industrial Park exists, perhaps by buffering with the use of vegetation and landscaping.

summary

- **contrast of boat / auto experience**

  On the regional scale, the boater is enclosed by steep tree-lined bluffs, while the motorist is seldom brought into contact with the river of the forested areas. However, such contact might not be possible without further intruding on the natural character of the river. Alternatively, the natural character of the open lands along the major vehicular paths could be reinforced.

- **containment of cities, landmarks**

  Hudson and Stillwater differ by virtue of their orientation (or lack of) to the river, and their geographical containment. Stillwater's church steeples are image-producing landmarks, while Hudson is dominated by the water and radio towers, which do not contribute to the city's identity.

- **impact of old/new images**

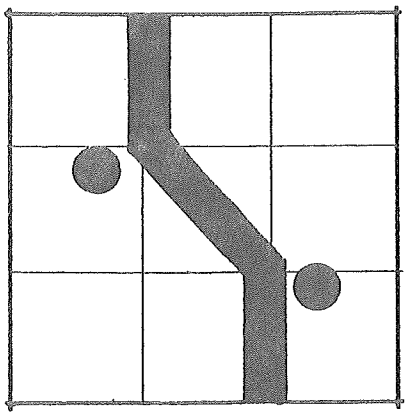
  In Hudson, old and new images often are side by side and in conflict. On the other hand, Stillwater separates old images from the new when in contrast. Other new building in Stillwater is sympathetic with the old.

- **accuracy of first impressions**

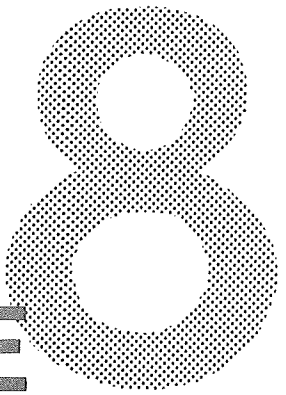
  Entering Stillwater for the first time, the orientation, character and structure of the city are apparent. A first impression of Hudson is distorted, since in a linear progression there are no clear points of transition from one district to another. Much of the community is kept a secret from the outsider.

- **visual issues**

  In providing active interesting public spaces, Stillwater has been quite successful. Hudson has ignored the public sector of the city image, concentrating its assets on a quite private life along tree-lined streets.



RECREATION AND OPEN SPACE



"The essential feature of a superior recreation system is that it be complete. It must be an interrelated and well balanced hierarchy of parks and open space of all types, each contributing its own unique and important part to the whole."

J. Symonds E.S.

introduction

Recreation requires an environment which contributes as much to the recreation experience as the activity itself. The choice of where is as important as what. The St. Croix River can be seen as a unique environment bordering on the metropolitan area and contributing to the whole.

Recreation is unique to the individual. One form of recreation cannot necessarily substitute another form. Recreation is characterized by choice not by location or time.

Recreation is the most direct use of the land. All other land use requires some form of processing before it reaches the consumer.

Different types of uses are more consumptive than others, certain groups may require special places. Threat of the majority may be an antithesis to providing a variety of experiences.

Modes of participation will change with declining personal mobility. The key is to provide satisfying experiences closer to home. Inevitably, as sites become more competitive we'll see the need for more program deliniation, more site program evolution. The facilities must respond to emerging social patterns and demands.

Recreation is the one area where the public likes to feel they still have freedom of choice.

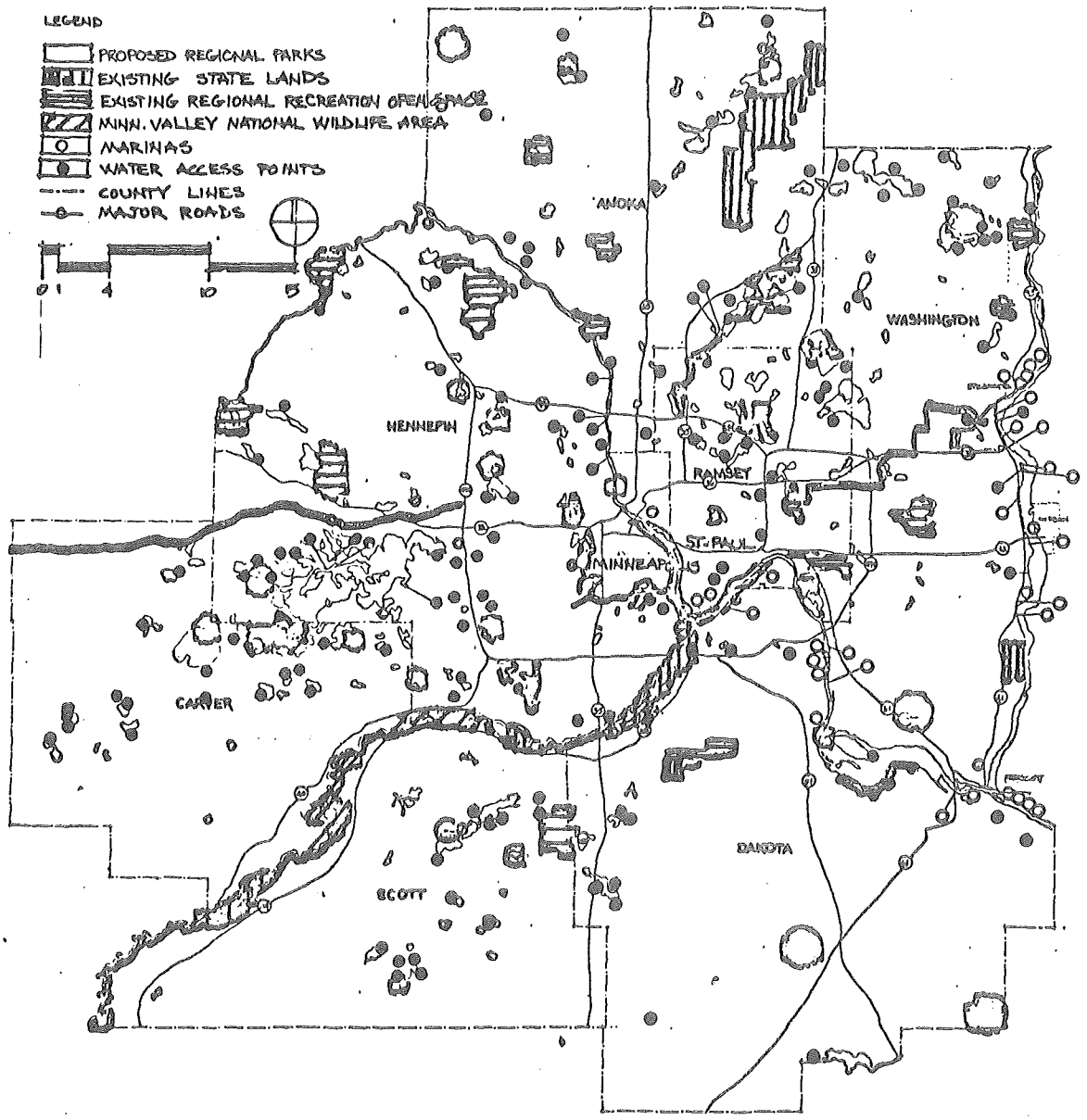
facilities

An analysis of the Metro area open space divides the district into four distinct regions of character and use. These regions, the upper Mississippi, the Minnesota River, Lake Minnetonka, and the St. Croix have differing conditions and character. For example, the St. Croix has unique bluff areas which are largely privately controlled, whereas the wilder lands along the Minnesota form a more public corridor.

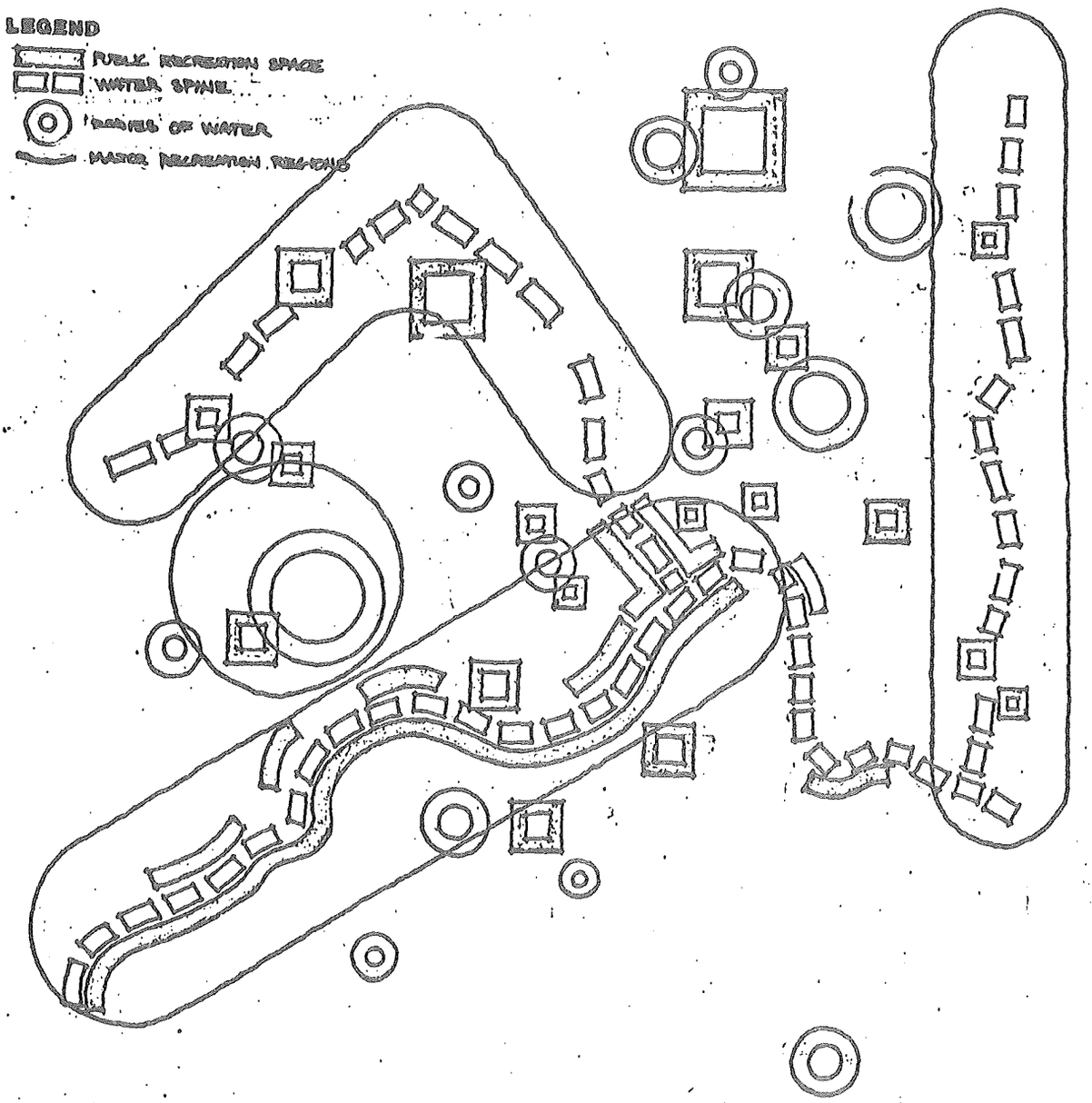
A characteristic common to all of the regions is the fact that their water surfaces can be seen as spines with nodal concentrations of activity areas. This land-water connection is very important in recreational land use and development.

The regional map and analysis reveal the clear relationship between river spine and recreation areas. Major land developments off river are linked to the tributaries due to private control of much of the property along the St. Croix.

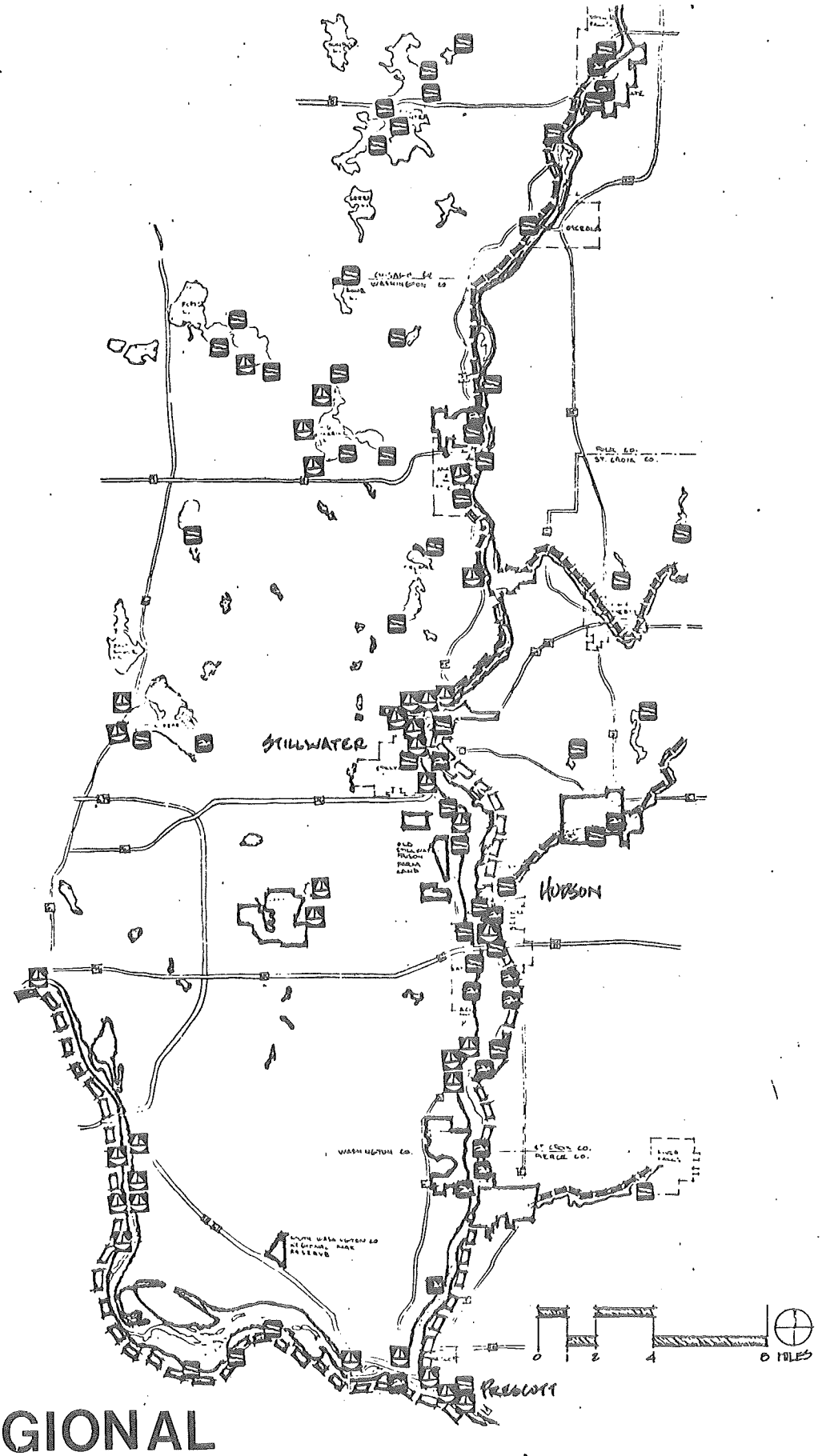
The heaviest concentration of water facilities is between Hudson and Stillwater, an area directly linked to the Twin Cities by state routes 12 and 36. Over 50% of the marina slips and two major water entry points are located on this ten mile stretch of the river. Though there are heavy restrictions on further marina development and expansion, there is little control on boat launch capacities.



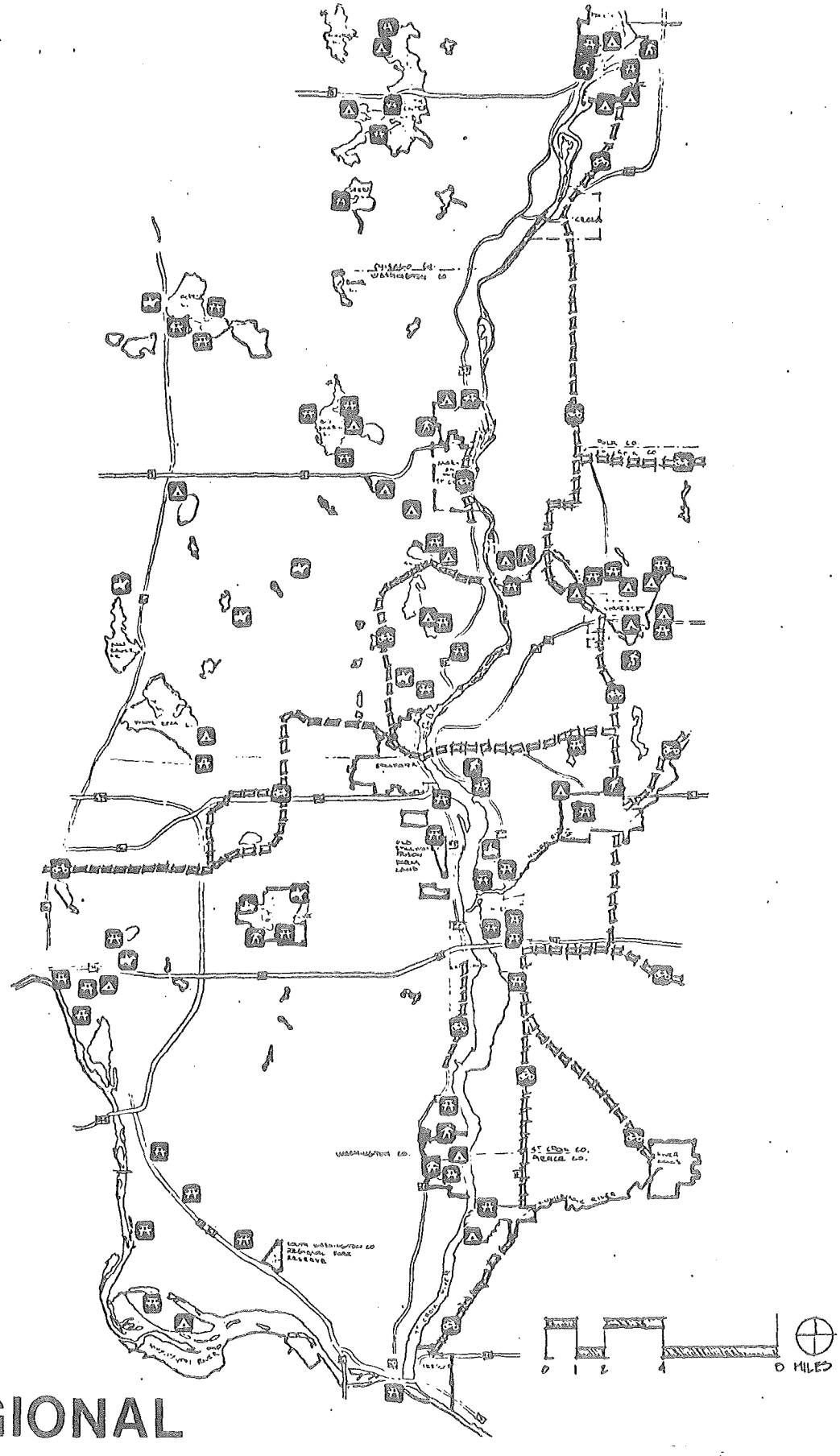
METRO FACILITIES



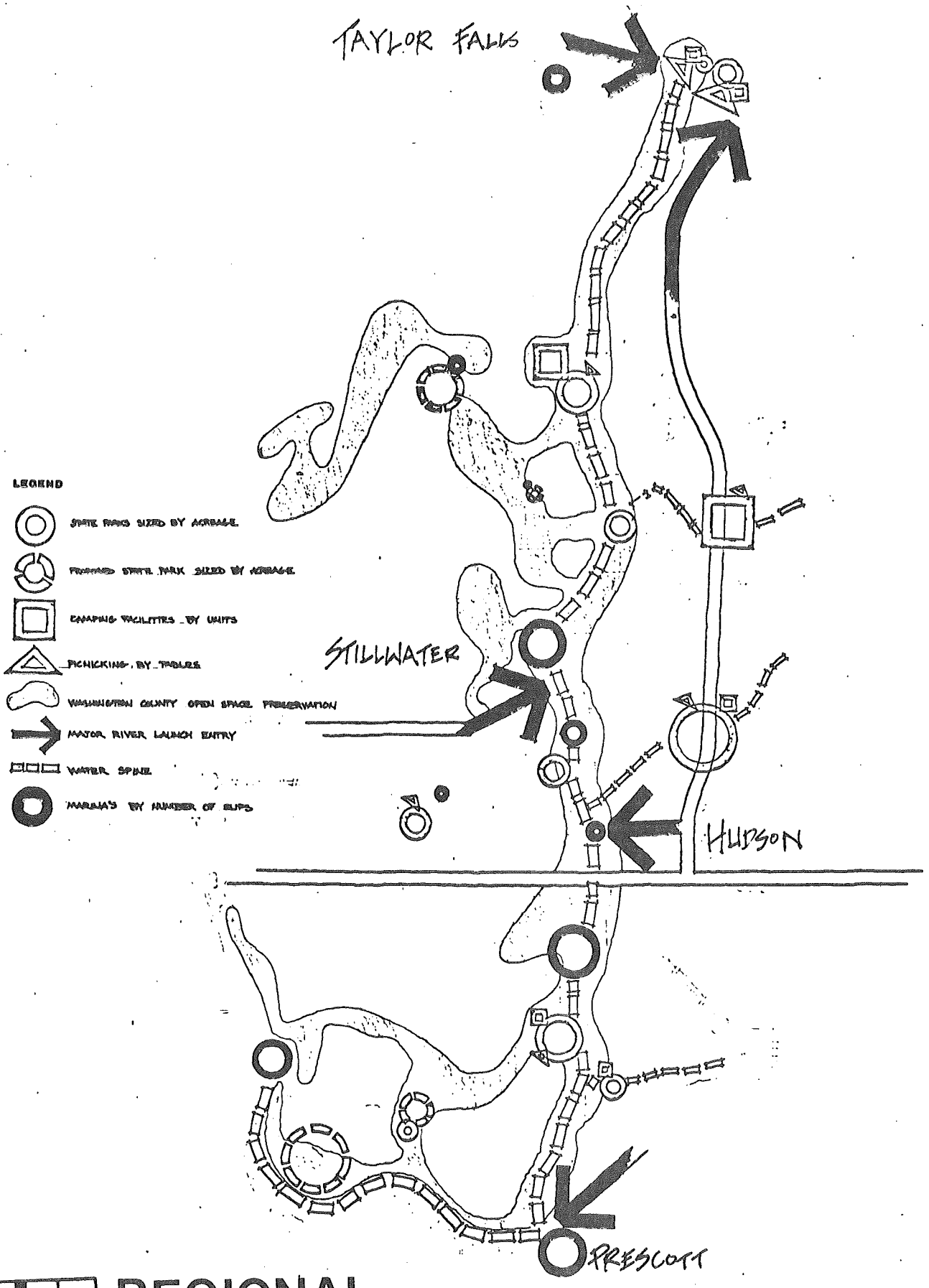
METRO ANALYSIS



REGIONAL WATER FACILITIES



REGIONAL LAND FACILITIES



REGIONAL FACILITIES ANALYSIS

PARK	ACRES	CAMP SIGHTS	PICNIC TABLES
INTERSTATE (MN)	168	67	300
INTERSTATE (WI)	1170	98	400
WM. O'BRIEN	1330	200	200
AFTON	1640	65	126
KINNICKINNIC	960	50	N.A.
WILLOW RIVER	2000	72	250
SOMERSET	N.A.	300	200
ST. CROIX IS.	1000	N.A.	N.A.
STATE PRISON FRM.	1000	N.A.	N.A.
LAKE ELMO PKS.	1200	N.A.	N.A.

hudson

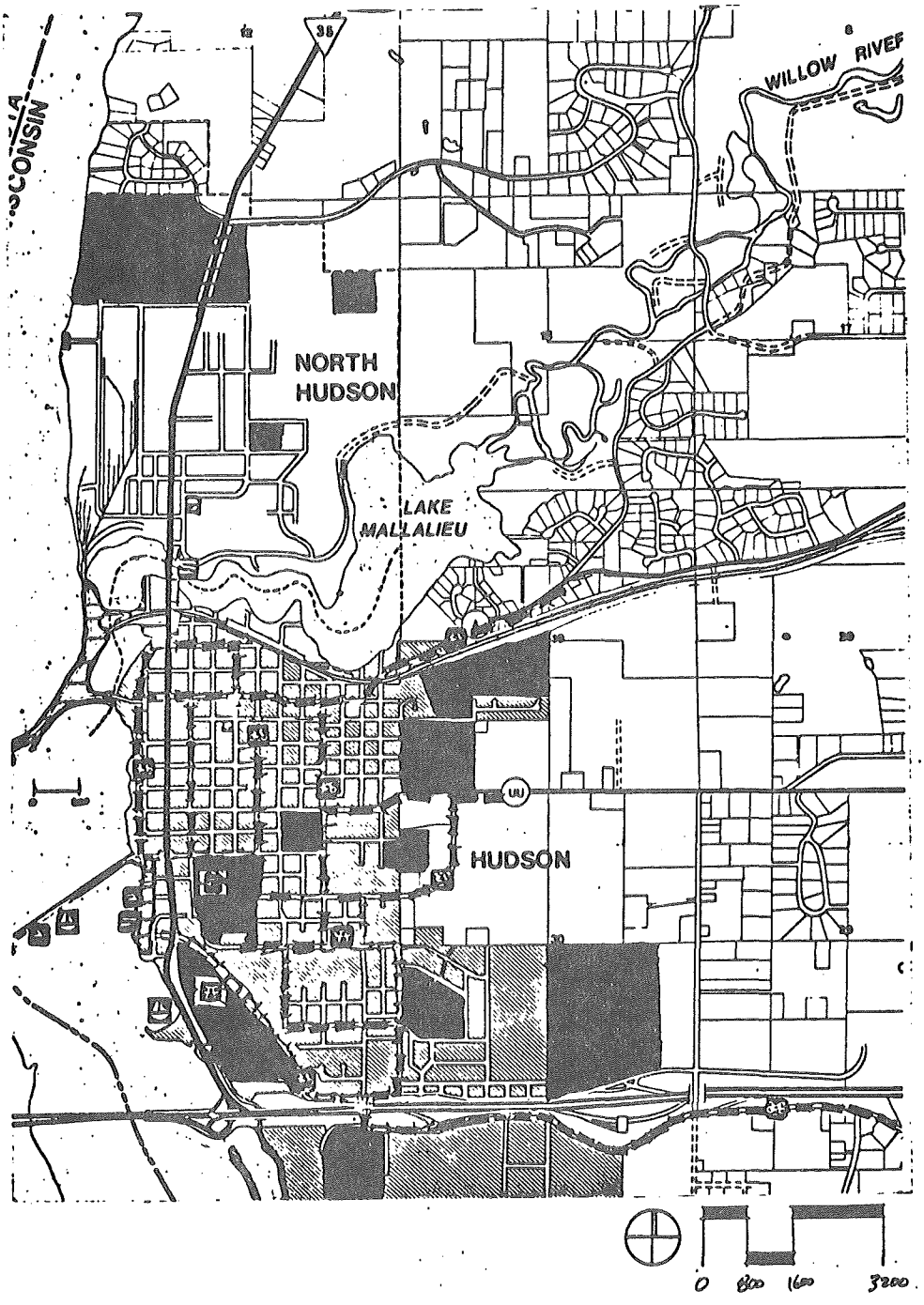
The open space system of Hudson is comprised of rather distinct water and land recreation areas. The land system is developed as spot parks which are linked by following the bluffline. Development strategy appears to be away from the river, as most of the parks are behind the town from the river point of view. In contrast to Stillwater the land is less severe and open areas of land could be developed.

Boating facilities are the principle developments along the riverfront. Most boats in the marinas are owned by non-residents. Likewise, the major launches are most heavily used by a non-resident day population. Access to the water from town is hampered by the transportation systems, and there is no evidence that attempts have been made to overcome the condition.

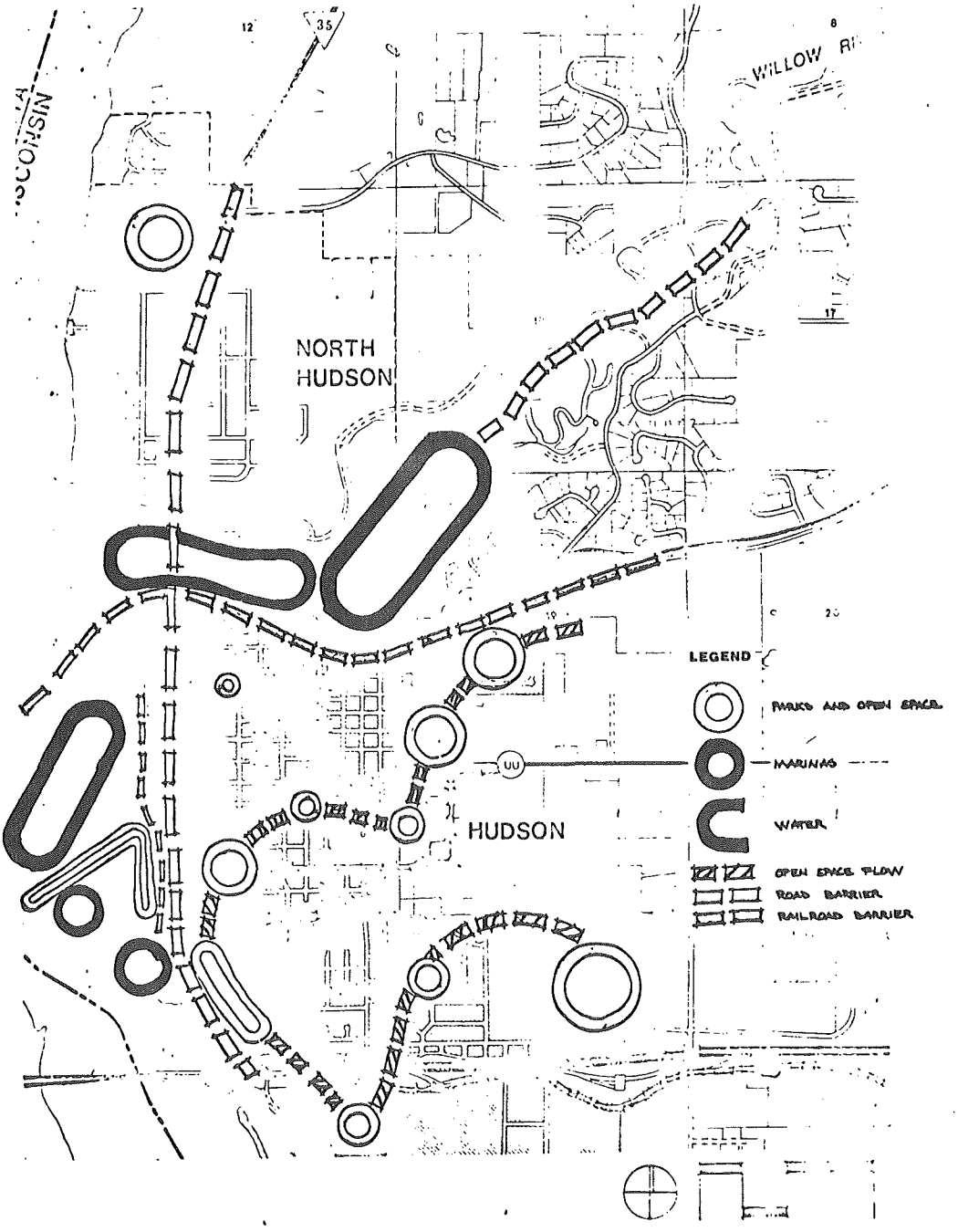
stillwater

The Stillwater open space system is mainly a valley with slopes converging on the river at the center of town. Much of this space is comprised of steep undevelopable slopes. Unlike Hudson, there is a strong water-land relationship through open space. The valley slopes link Lake Mckusic and the city owned property along the river.

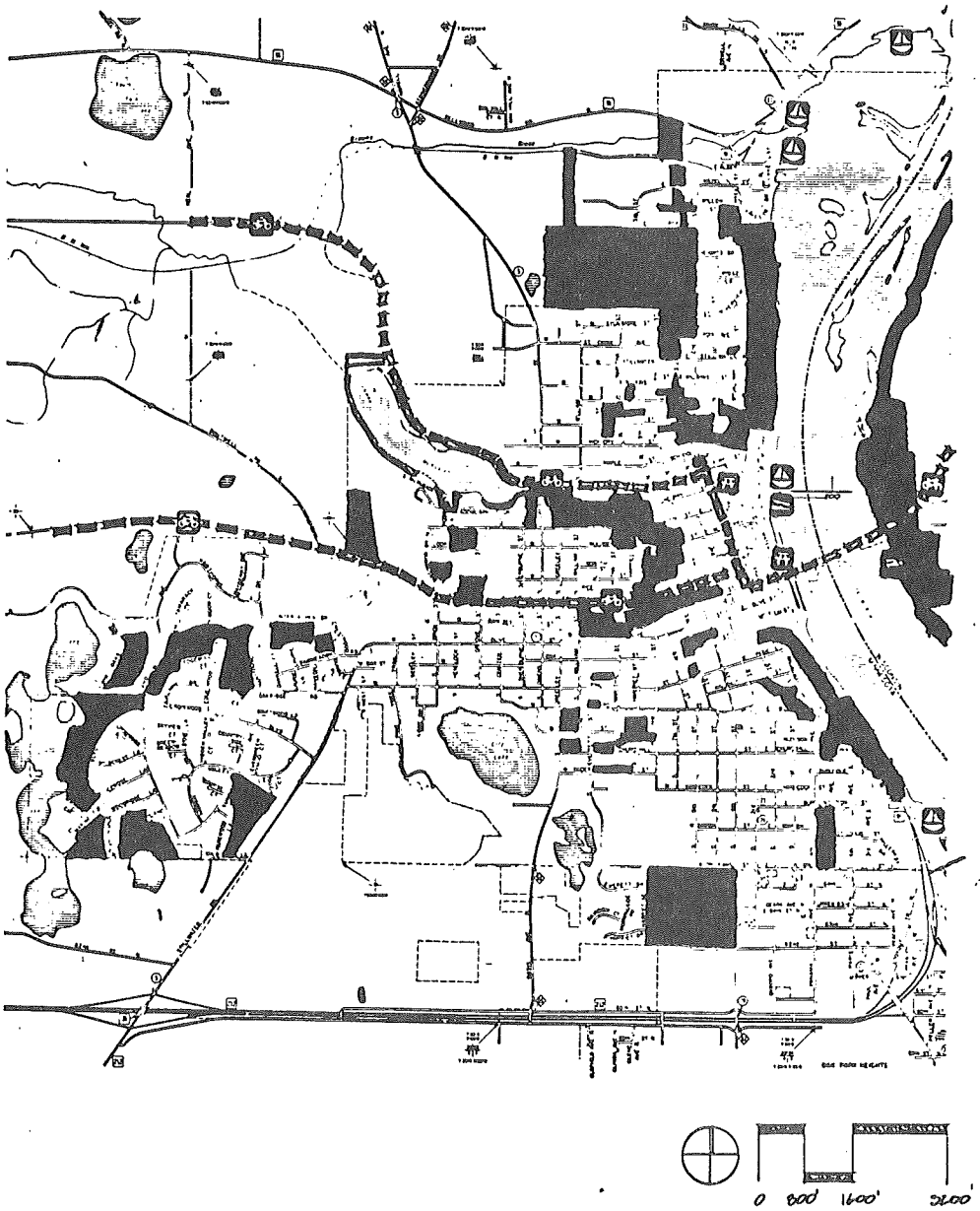
Recreation areas in Stillwater are limited because of the steep slopes and the steeper land values. Still there is more potential for riverfront development. However, development is hampered by the railroad and parking areas along the river, as well as excessive shoreline control by marinas.



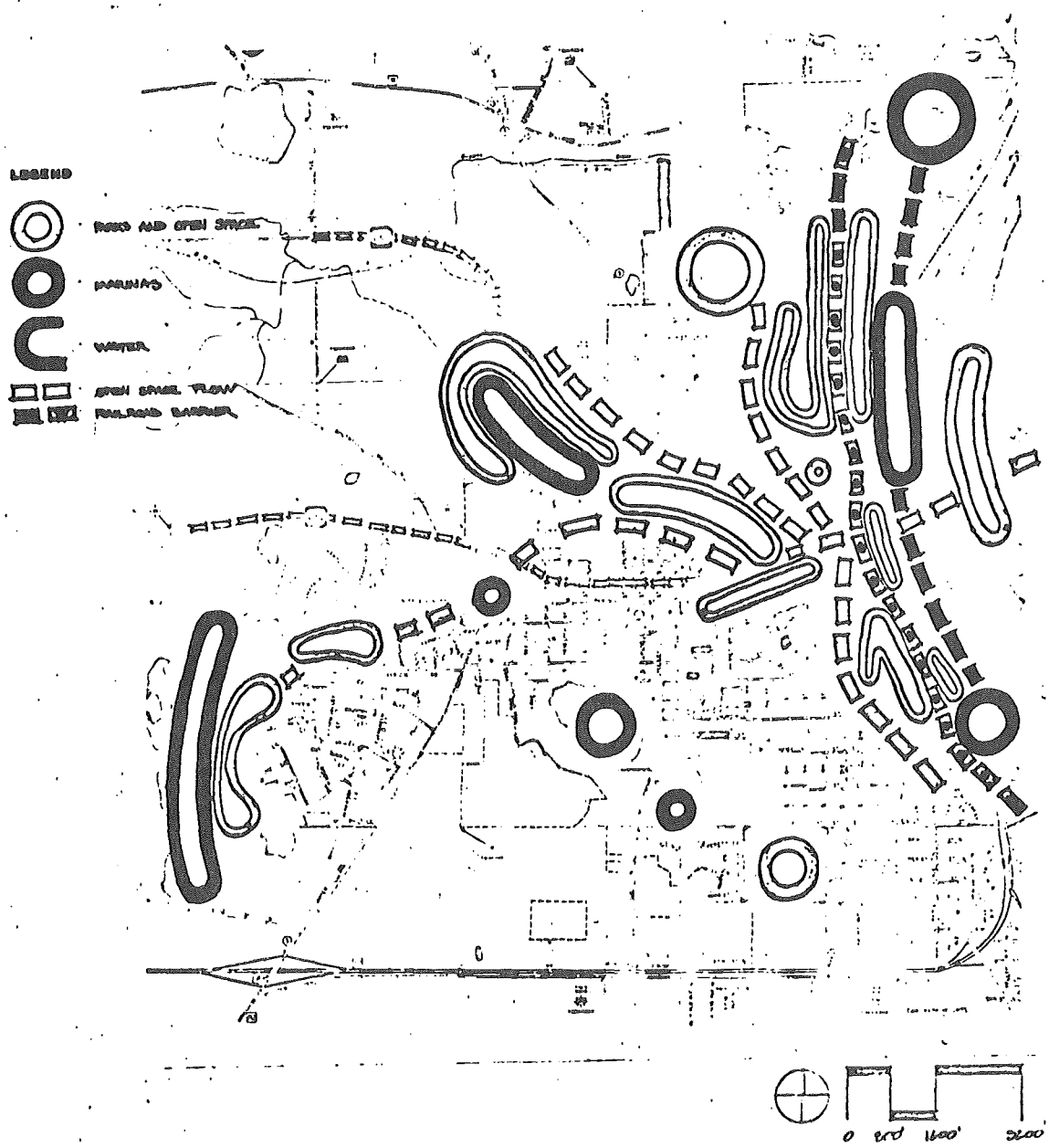
HUDSON RECREATION



HUDSON ANALYSIS

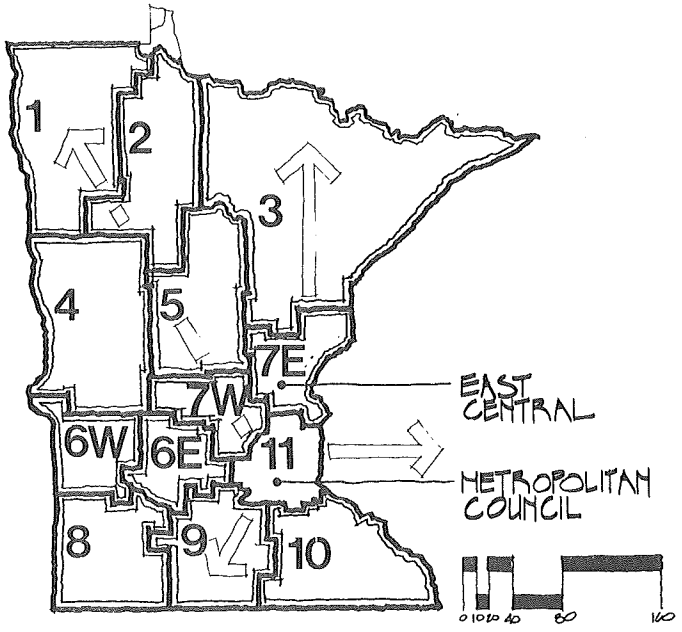


STILLWATER RECREATION

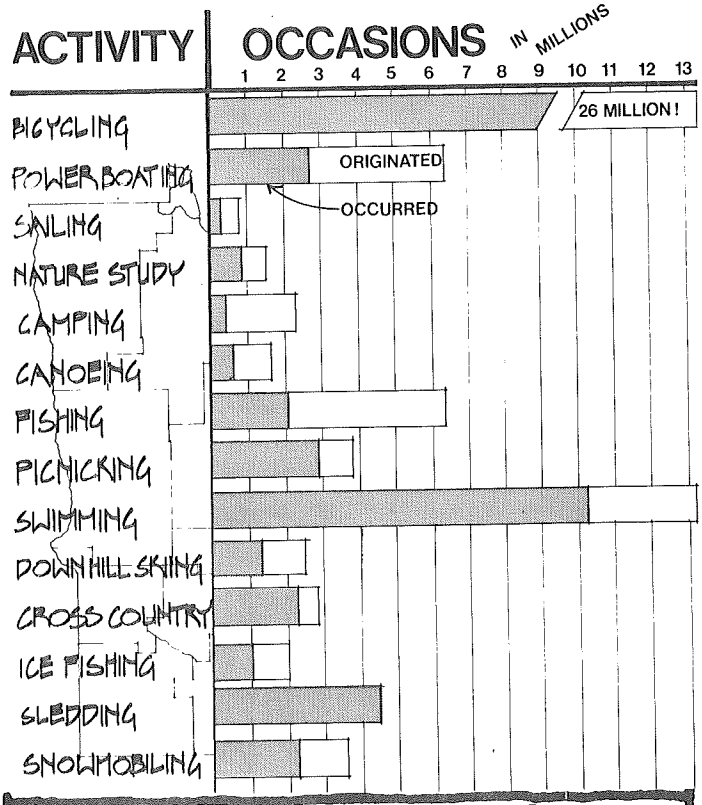


STILLWATER ANALYSIS

MACRO-ANALYSIS: IMPLICATIONS OF INTER-REGIONAL FLOW PATTERNS FOR RECREATIONAL PLANNING ALONG THE ST. CROIX



MACRO-ANALYSIS: IMPACT OF INTER-REGIONAL FLOW

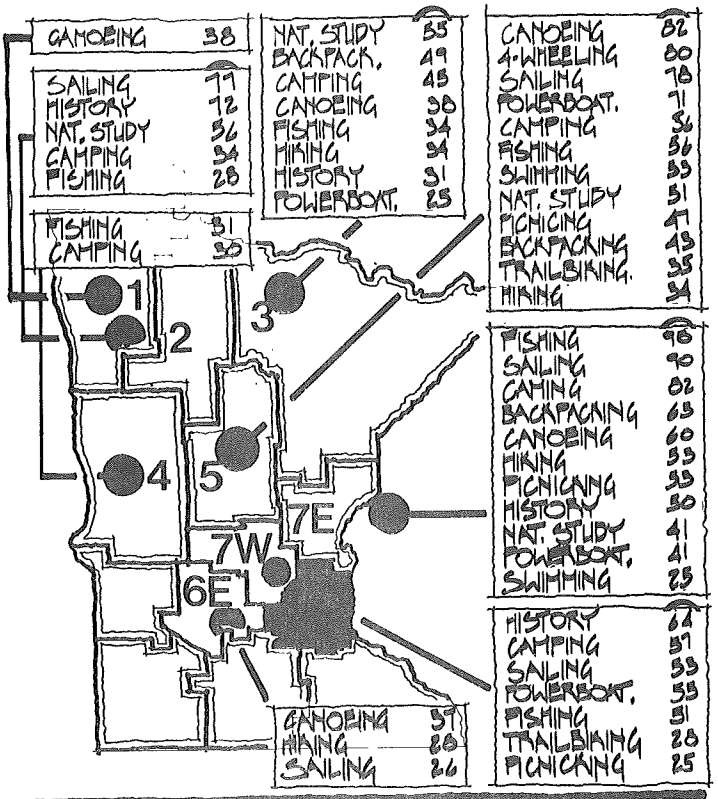


RECREATION OCCASIONS: REGION 11

Much of the recreational planning for the state of Minnesota occurs at the regional level. The division of the state into its thirteen developmental regions maps out the various planning areas. Of particular interest to the present problem of recreational planning for the areas surrounding the St. Croix River is the impact of Region 11 whose eastern boundary is the river itself.

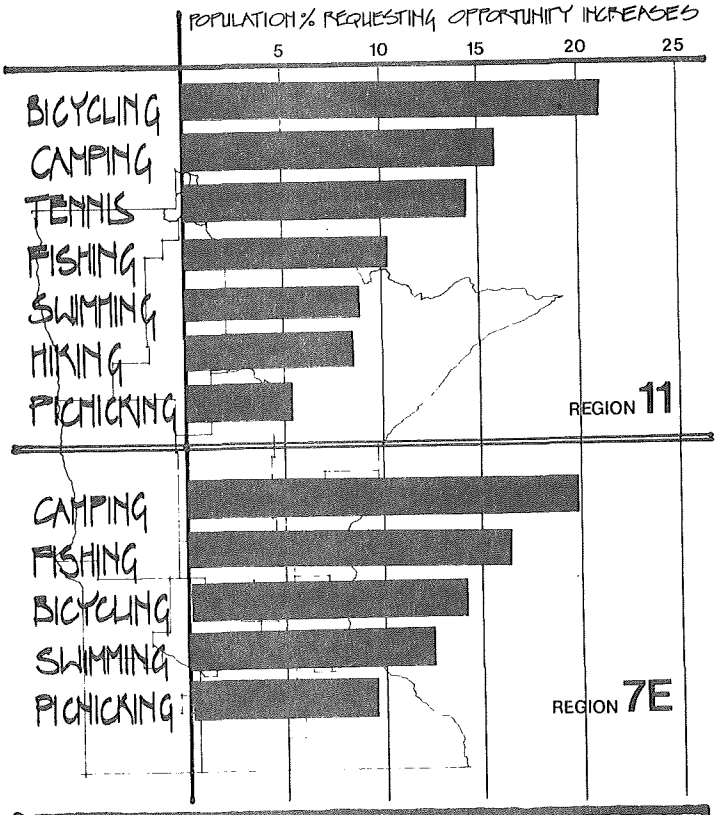
The role of Region 11 on the recreational usage patterns in the state is both widespread and multifaceted. The far-reaching inter-regional activity flow patterns of both summer and winter recreation occasions flow out to the northern-most reaches of the state. These flow patterns therefore command the careful scrutiny of any local planning effort which would attempt the control or reduction of any recreational activities which occur within Region 11. Displacement of any controlled or restricted activitites would undoubtedly take place toward those regions where flow from Region 11 is already established. The discussion below describes the dynamics of such inter-regional flow from Region 11 and the implications of activity control along the St. Croix. Special attention will be given to the relationship between Region 11 and Region 7E, its immediate neighbor to the north whose eastern boundary is also the St. Croix.

The inventory (AT left) of the number of estimated occasions for several selected activities shows not only the relative frequencies for various activity occasions, but more importantly the distinction between those occasions which originated and those which actually occurred in Region 11. The distinction is important because the difference between the two represents a net export from Region 11 for any given activity.



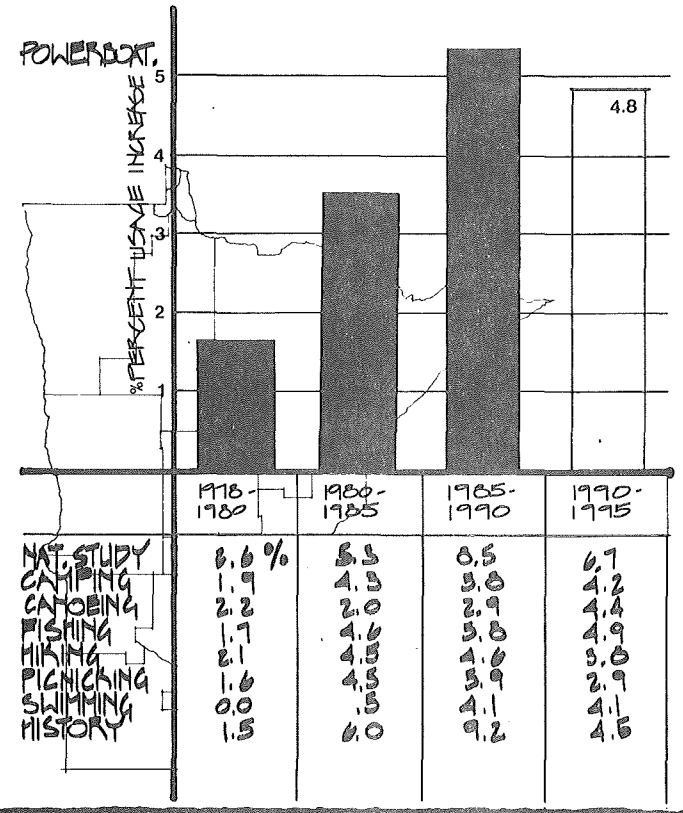
REGION 11: STATEWIDE IMPACT

This export of recreational activity occasions from Region 11 is distributed throughout the state's other twelve development regions. As is shown in the accompanying figure, several of the regions have large percentages of the activity occasions which occur within them originating from Region 11. Region 7E is of particular concern because of its proximity to Region 11 and the extent to which its recreational activity occasions are intimately dependent on flow from Region 11.

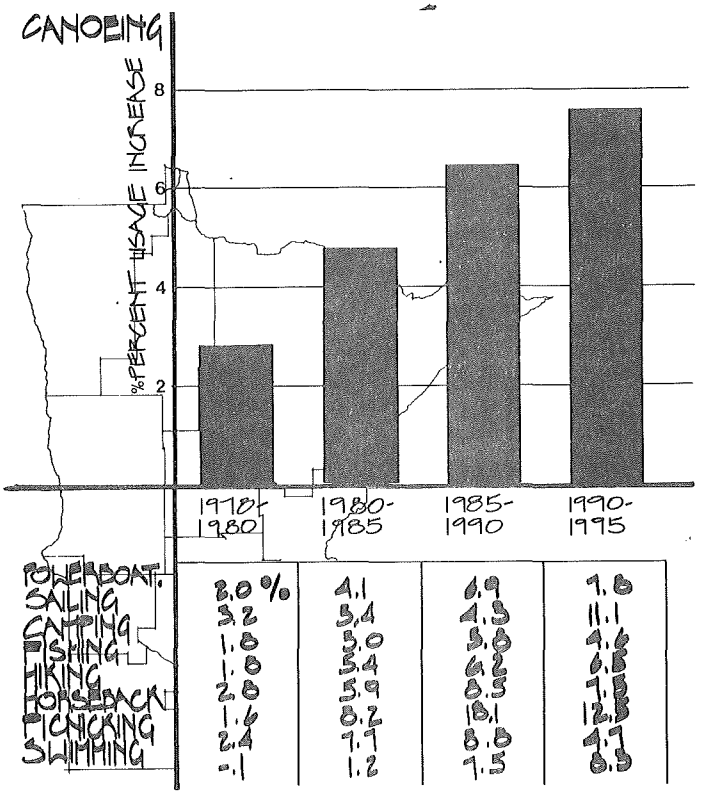


POPULATION PERCEPTIONS: OPPORTUNITY NEEDS

The impact which this vast influx of people from Region 11 into Region 7E is reflected by the perceptions of recreational need by the people of both regions. The residents of 7E recognize the same shortages of recreational opportunities as the residents of 11. Any further infusion of recreational occasions from Region 11 into 7E would without doubt aggravate these perceived shortages. Unfortunately, it appears that just such a trend is projected.



ACCELERATING USAGE: PROJECTIONS FOR REGION 11

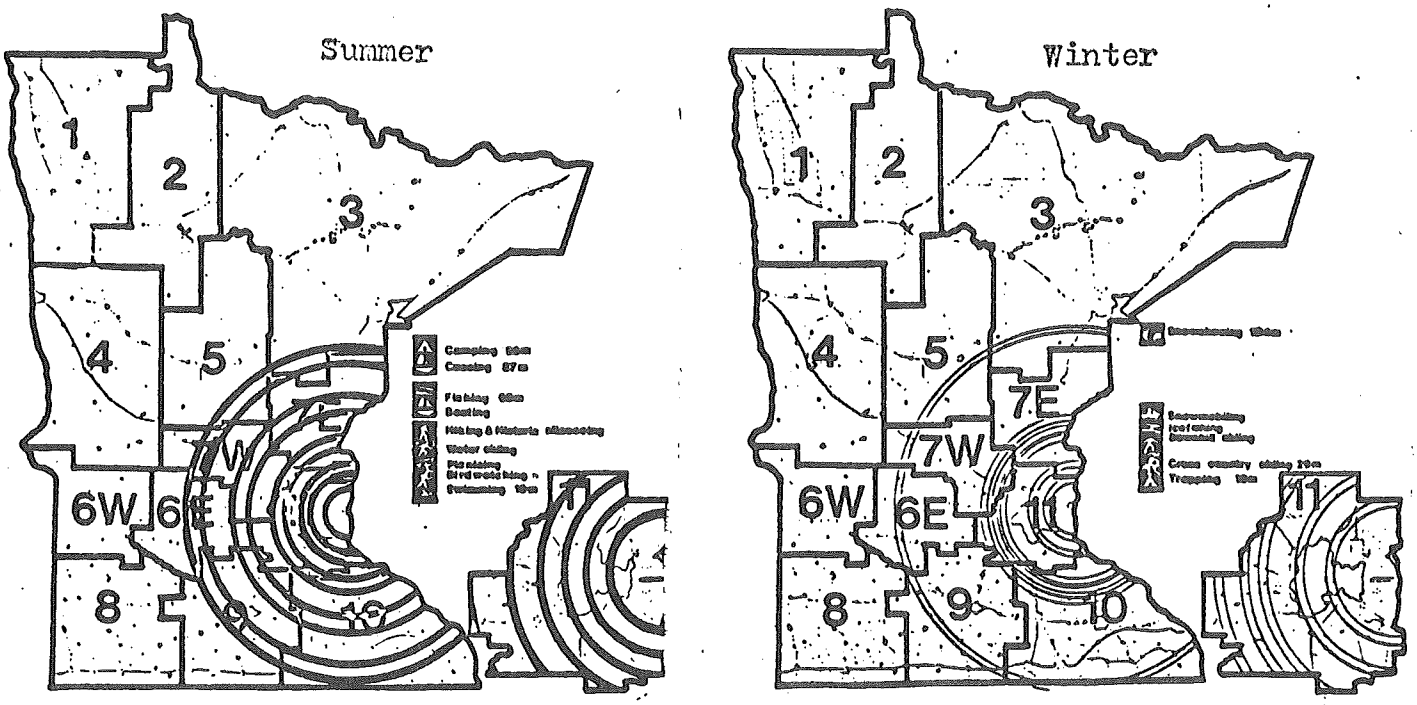


ACCELERATING USAGE: PROJECTIONS FOR REGION 7E

The accompanying figure shows a pattern of increasing rates of activity occasions originating from Region 11 for four future time periods extending into the 1990's. Clearly, if rates are increasing over time, actual usage must be accelerating. Projections for the same time periods for Region 7E are shown in the figure below. These projections show rate increases for occurance occasions, not originating occasions. Again, the same patterns of increasing rates of growth which imply accelerating usage are found. This pattern which cuts across both regions clearly reflects the dependency of usage in Region 7E on the origination of activity occasions in Region 11.

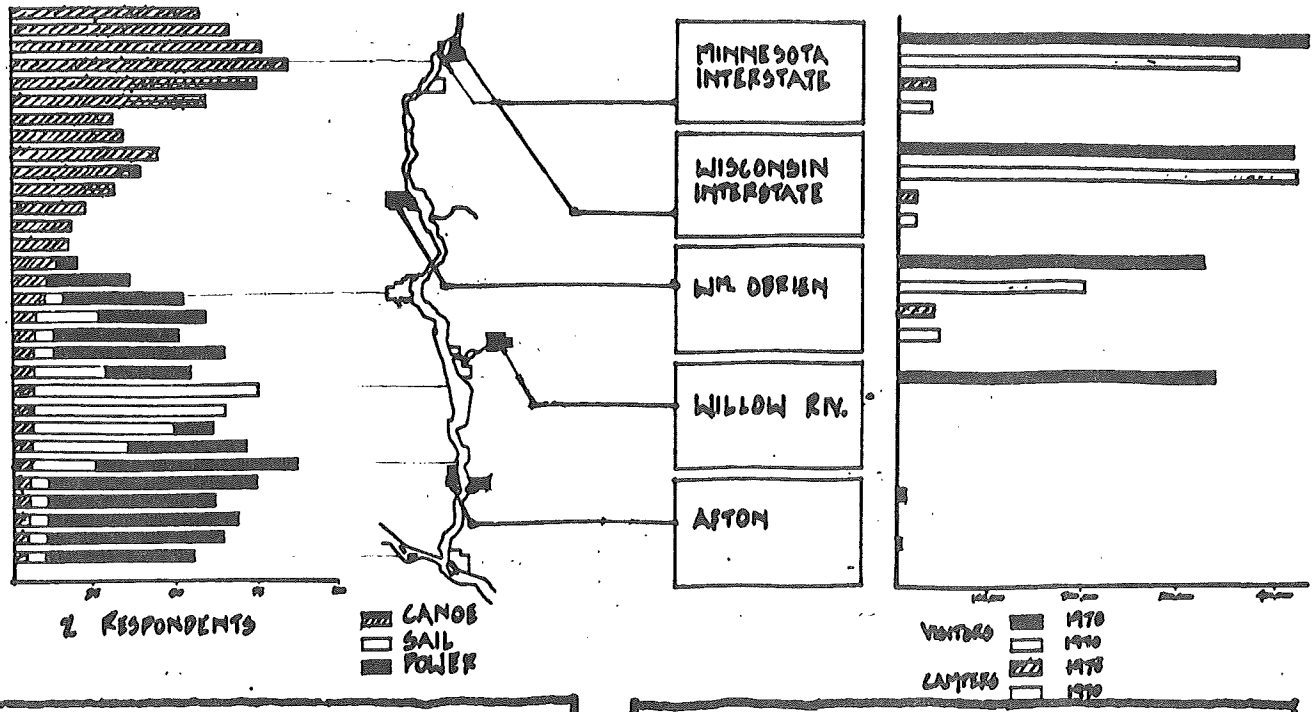
What are the implications of this relationship? Clearly, any attempt to curtail recreational activity occasions along the areas in Region 11 immediately adjacent to the St. Croix will likely have consequences elsewhere, the scope of which is as yet unknown. Certainly Region 7E would feel the impact. Similar analysis is applicable to those other regions de-pendent on Region 11 for recreational flow.

It is apparent that local recreational planning for the St. Croix cannot take place in a vacuum. Any solution with respect to over-usage must receive input at the state level. Coordinating inter-regional planning for recreation will avoid unfortunate and unforeseen decisions which would otherwise impact with unknown and perhaps destructive consequences.



MACRO-ANALYSIS
ACCEPTABLE TRAVEL DISTANCES

The above diagram illustrates the average distances people are willing to travel to do a particular recreational activity. The circles indicate the area which will potentially be affected by the development of a major recreational site along the St. Croix.



REGIONAL ANALYSIS: WATERCRAFT TYPES

STATE PARK USAGE

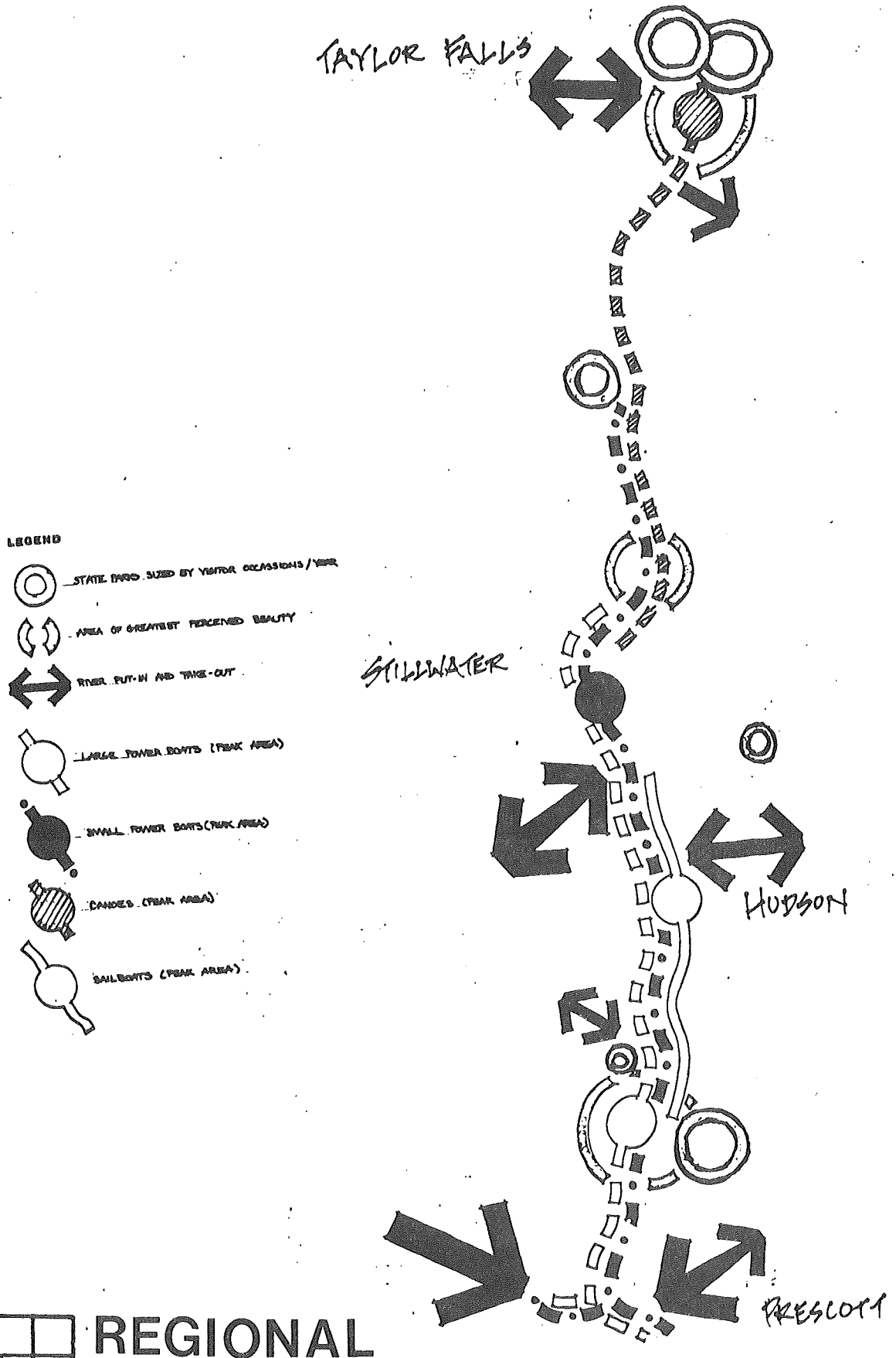
A major factor in the watercraft type distribution is the boundary of the 9' navigation channel 2.5 miles north of Stillwater. Larger powerboats which tend to reduce environmental quality for canoeing are effectively relegated to the lower portion of the river. The river to the north of this point is, more or less, a canoeing preserve. Unfortunately there is no such preserve for sailing. The width of the river and conditions for winds confine sailing craft to a region intensely used by powerboats.

The state parks are the most intensely used land areas for recreational purposes. The above graph shows the number of annual visitors relative to the number of campers for each park. Higher density of usage results in greater degradation of the environment, particularly through the process of "hardening". Hardening is a term used to describe the imposition of man-made facilities on the natural environment. While a hardened resource may be suitable to recreational enthusiasts seeking comfort in the outdoors, the quality of the recreational experience will be lowered for other user types. For example, people looking for a more reflective experience in nature are being displaced because the hordes of park visitors and the high density car-camping are destructive to their experience.

The regional user analysis provides a graphic description of the problem of overcrowding in the Lower St. Croix corridor. The arrows indicate relative numbers of put-ins and take-outs of watercraft. These peak use access points are significant when we realize that watercraft originating from boat launches are a large contributor to the crowding problem. On peak-use days launched boats account for 60% of the river traffic. The confluence of the St. Croix and Mississippi is another important point of influx. Over 1200 craft pass through this portal on peak days.

It is interesting to note that peak use points are in two of the three areas which river users consider most scenic. Since the pastime of beaching has a destructive impact on the local environmental quality, these will be the areas most strained by overuse. The Kinnickinic delta is especially vulnerable due to its accessibility to all types of watercraft, and its proximity to major access points.

The distribution of state parks reveals that there is relatively little state controlled public land in the southern part of the study region. Designation of the Kinnickinnic recreation area as a Wisconsin state park will begin to equalize the balance, with and anticipated attendance of 500,000 visitors per year. The Afton State Park, which is still under development, will be the only park in which the environment can be considered a nature preserve.



REGIONAL USER ANALYSIS

issues

The largest issue and the issue which is the source of all other conflicts in the St. Croix Valley is one of overcrowding. Not enough room for all the people who wish to use the resource. The reason for this is the fact that the river is an hour drive from most of the Metropolitan area.

The impact created by this imbalance between user and resource is that it creates an unsatisfactory experience for the user and results in a degradation of the resource. It is the responsibility of management to create a balance between the user and the resource.

Currently the management responsibility is shared by the National Park Service, Minnesota and Wisconsin Departments of Natural Resources, six counties, and various municipalities.

Management attempts to determine the ability of the resource to handle human intrusion through the concept of carrying capacity. Carrying capacity is the balance between optimum user satisfaction and minimum resource degradation.

It is important to note that recreational management has traditionally been oriented to user satisfaction, preferring to conserve the resource. The Wild and Scenic Rivers Act mandates that therivers be preserved not conserved. This requires the management team to find new methods of coping with the problems of overcrowding. No longer can the resource be altered to accomadate larger numbers of people.

There is currently a moratorium on marina expansion. There are approximately 1700 slips on the St. Croix river and at peak hours 29% of those boats will be on the river. This indicates that marinas are mainly boat storage areas.

Boat launches contribute 60% of the traffic on the river on peak hours. They currently have no capacity limits. After launch parking facilities are full people start parking on streets up to a mile from the launch facility.

Hudson currently has unsupervised swimming areas on the river which are very close to boat moorings. This results in potentially dangerous situations.

Landowners are extremely resistant to any trail development in the study area. They have the money and the power to defeat any such proposal.

This results in limiting access to the river to people who own boats or who can rent boats. T here are only two excursion boats on the St. Croix, The Jubilee in Stillwater and the excursion boat in Taylor Falls.

Conflicts which occur because of recreational incompatibility (i.e. canoes and power boats, sailboats and water skiers) are being allowed to settle themselves without management intervention.

The King plant in Vadnais Heights is considering power line crossings to Wisconsin which will result in a greater intrusion on the river.

Inevitably as sites become more competitive we'll see the need for more program deliniation and more site program evolution. What lies ahead remains to be seen.

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