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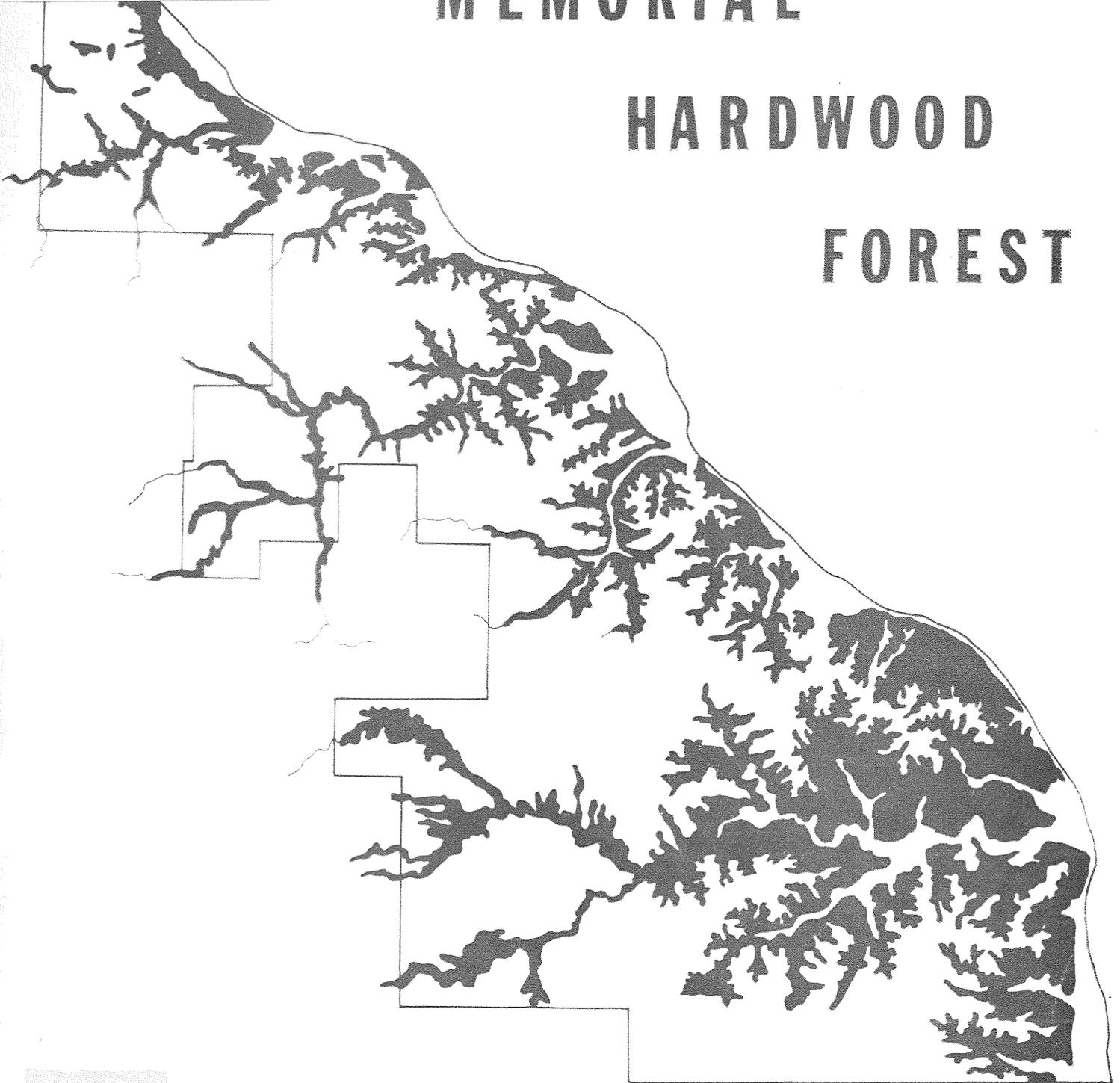


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MEMORIAL

HARDWOOD

FOREST



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STUDY REPORT and PLAN FOR DEVELOPMENT

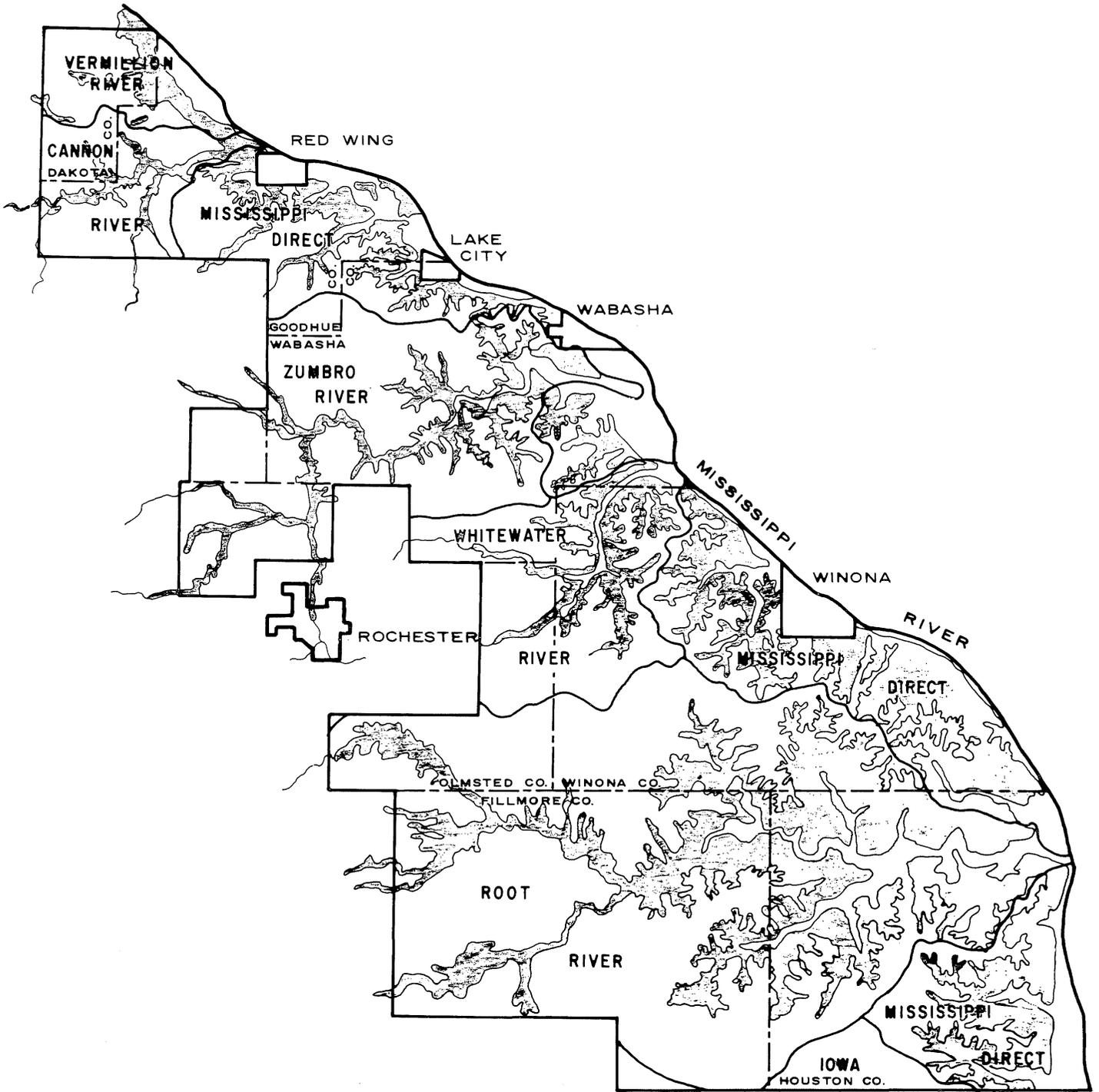
SEPTEMBER 1966

MEMORIAL HARDWOOD FOREST

STUDY REPORT
and
PLAN FOR DEVELOPMENT



SEPTEMBER 1966



The principal wooded areas in the Memorial Hardwood Forest.

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INTRODUCTION

Following a recommendation from the Minnesota Outdoor Recreation and Resources Commission, the 1965 Minnesota Legislature appropriated \$25,000 to the Department of Conservation for a detailed long-range plan for the development of the Memorial Hardwood Forest.

Former Commissioner of Conservation Wayne H. Olson then appointed the following Memorial Hardwood Forest Advisory Committee to establish the overall direction of this study and to review and suggest any modifications deemed necessary in a final report to be prepared by hired consultants:

Dr. Frank Irving, School of Forestry
University of Minnesota, Chairman

Mr. Clarence Buckman, Division of Forestry
Minnesota Department of Conservation,
Secretary

Dr. John R. Borchert, Geography Department
University of Minnesota

Mr. Carl Reidel, School of Forestry
University of Minnesota

Mr. Bernard Halver,
Minnesota Department of Conservation,

Mr. Willard West, Division of Forestry
Minnesota Department of Conservation

Ex-officio members of this committee were:

Dr. Frank Kaufert, Director
School of Forestry
University of Minnesota

Mr. Wayne H. Olson, Commissioner
Department of Conservation

Following a recommendation of the Memorial Hardwood Forest Advisory Committee, Mr. Russell N. Cunningham, Chief Consultant, and Mr. Edward Iversen were hired to make the study and prepare the required report for the Memorial Hardwood Forest. The completed report on the following pages recommends a land purchase program aimed at bringing state-owned conservation areas in southeastern Minnesota to approximately 100,000 acres by 1977 for forestry, recreation, wildlife, and soil conservation in Dakota, Fillmore, Goodhue, Houston, Olmsted, Wabasha, and Winona counties.

The land proposed for acquisition is a part of the approximately 600,000 acres rated as non-agricultural because of steep topography, poor drainage, or unsuitable soil texture. Land recommended for purchase is concentrated along the bluffs of the Mississippi River and tributary rivers. In these locations the state can acquire land in fairly large consolidated blocks, which will have special value as scenic background for the

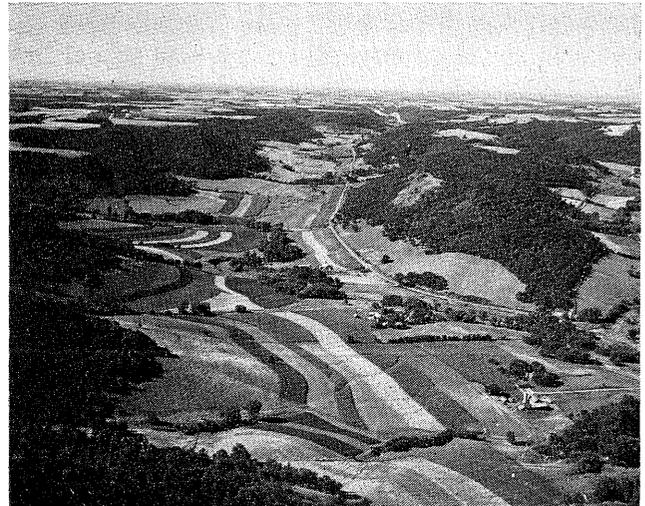
Great River Road and other highways and canoe routes.

It is recommended that the State acquire between 6,000 and 7,000 acres per year at an estimated cost of \$250,000 annually. This rate of purchase, together with more than 40,000 acres already owned in forests, parks, and game areas, will bring the total state ownership to 100,000 acres in 10 years. Ultimately, the Conservation Department should acquire 200,000 acres.

The Committee also recommends an additional budget of \$100,000 annually to protect the acquired lands, reforest portions, improve the quality of timber, develop campgrounds, improve game habitat, reduce soil erosion, and establish other recreational areas as needed.

The federal government owns approximately 35,000 acres of land in the Mississippi River bottoms. Counties and municipalities are expected to acquire additional areas for local parks. For the large remaining woodland acreage in private ownership, the Committee recommends an intensified cooperative effort to improve the quality of management under the leadership of the Department of Conservation.

The following report explains in some detail desirable objectives for the Memorial Hardwood Forest area and recommends the necessary action that must be taken if these objectives are to be realized, to the great benefit of future generations in Minnesota.



View of the Memorial Hardwood Forest in Winona County, showing typical pattern of intermingled forest and farm. Farms occupy most of the level uplands, and tongues of cropland extend along ridge tops toward the Mississippi River. Farms also occupy the valleys of tributary streams. Forests, in long continuous belts, occupy the river bluffs and steep valley sides. Forests also include bottomlands too wet or narrow for profitable tillage. (photo by U.S.D.A. Soil Conservation Service).

FOREWORD

With the great population increase, perhaps more than doubling of the population in the Twin City metropolitan area and at Rochester within the next 30 years, will come a greatly increased need for food, fiber, and recreational opportunities. The Memorial Hardwood Forest, because of its proximity to these centers and its position astride major north-south and east-west trunk highways, can contribute substantially in forest products and recreational facilities. Insofar as it can reduce erosion and lead to better land use, it will contribute to a more healthy and productive agricultural economy. (Page 12)

The Committee is convinced, therefore, that the development of the Memorial Hardwood Forest in southeastern Minnesota is an extremely worthwhile undertaking. The Forest presents exceptional opportunities for coordinated management of nonagricultural land for timber growing, recreation, wildlife production, and soil conservation. By acting promptly and in a well-planned fashion, Minnesota can create a multi-purpose forest, of great significance for the future, at a comparatively modest cost. (Page 13)

Principal Aims

State policy should be directed toward improved management of all of the approximately 600,000 acres of woods and sub-marginal farmland within the seven-county area. Thus, the State should continue to intensify its cooperation with farmers and other landowners. It should stimulate county land-use and recreational planning; and seek establishment of county, municipal, and school forests and parks. It should enlist the cooperation of federal agencies such as the Forest Service, Soil Conservation Service, Fish and Wildlife Service, Army Corps of Engineers, Agricultural Stabilization and Conservation Service, and Bureau of Outdoor Recreation. It should continue to integrate its work with that of various State departments, notably Conservation, Highways, and Agricultural Extension. (Page 21)

As a part of this over-all effort, the State should systematically increase its ownership of land, to provide demonstrations of good land management and to provide needed services to people of the State.

Land Acquisition

The original acquisition goal for the Memorial Hardwood Forest was 200,000 acres over a thirty-year or longer period. The Committee has no reason to question the suitability of this total figure,

but future events may affect it in various ways, and this goal should be adjusted continuously.

For the next ten years, the Committee recommends the purchase of 6,000 to 7,000 acres of land per year at an estimated annual cost of \$250,000. This figure, it believes, is realistic from the standpoint of efficient purchasing practice, urgency of needs, and the Department's ability to put areas under management. (Page 21)

As to where to buy land, the Committee presents in this report a set of county maps showing Forest Compartments which in its judgment have particular merit as purchase areas. It assumes that the State will not seek complete ownership in any of these purchase areas. The immediate goal is to acquire approximately 20 percent of the wooded land. (Page 28)

The nature of the land and price considerations require that the bulk of the acquired land will be rough, stoney land with immature timber. To this will be added some overflow land, some narrow sandy and gravelly terraces and talus slopes, some degraded pastures and fields on shallow Dubuque soils around the edge of gullies or on narrow ridges. If, in the course of buying entire abandoned farm units, the State obtains title to fields suitable for cultivation, it can dispose of them by means of leases or land exchanges. Under lease, some of them can be made to serve as demonstrations of successful conservation practices.

Development

The Committee recommends that the Conservation Department request a minimum annual appropriation of \$100,000 for each year of the 1967-68 biennium to develop and manage the newly acquired lands and increase their effectiveness as demonstration areas. This appropriation should be increased in subsequent years as additional land is acquired. It is pertinent to note that in Wisconsin, under the Twenty-Year \$50 Million Resource Development and Outdoor Recreation Program, the Department of Conservation proposes to spend \$0.98 for development and upkeep for every \$1 for acquisition for forest and park. The amount proposed here is at the rate of only \$0.40 per \$1 of acquisition. Expressed another way, it amounts to about 1 man-day of work or \$15 per acquired acre. It includes the following types of development:

Planting	\$ 30,000	(1)
Protection	10,000	(2)
Stand Improvement	20,000	(3)
Campground Improvement ...	20,000	(4)

Soil Conservation	5,000 (5)
Supervision and misc.	15,000
	<u>\$100,000</u>

- (1) To reforest approximately 10 percent of acquired areas, mainly with conifers, choice hardwoods, and some other native species suitable for game food and cover.
- (2) To provide some additional fire equipment, build waterhole dams, improve communications, and maintain fences.
- (3) For control of "wolf-trees" and the removal of diseased and insect infested trees. Initial work to be done in vicinity of campgrounds and along roadsides, as well as on demonstration plots.
- (4) For clearing out debris, providing access roads if needed, providing water supply, simple sanitary facilities, trails to nearby points of interest, signs and markers.
- (5) With SCS help, to install sod waterways, low earthen dams, and other measures to halt spread of gullies.

These development proposals cover only acquired State properties; they do not provide for intensification of general **Fire Protection** and **Cooperative Forestry** on private lands or provide additional staff positions for supervising **Recreational** and **Game Management** activities. These will have to be financed with additional funds. (Page 22)

Relationship to Other Federal and State Projects

The federal government, through the U. S. Army Corps of Engineers and the Fish and Wildlife Service, administers approximately 35,000 acres of land and water in the Mississippi River bottomlands. It is not currently active in land acquisition and, except possibly on small acreages in flood-control projects now under preliminary examination on the Root River and other tributaries, will not be in the market for land proposed for the Memorial Hardwood Forest. Instead, the federal government, through a number of grants-in-aid, proposes to assist the State and local units of government to acquire land for conservation uses. The Committee is making a number of suggestions as to how these aids may be used to accelerate the purchase program for the Memorial Hardwood Forest. (Page 19)

The Department of Conservation has approximately 25,846 acres in seven Game Areas, 2,307 acres in eight State Parks, in addition to land being purchased for the Memorial Hardwood Forest. It will require additional appropriations to acquire key tracts to consolidate the parks and game

areas. Beyond this, the Committee is recommending that appropriations for the Memorial Hardwood Forest include authorization to purchase land suitable for future State and local parks, and for game areas either within or outside of established projects where it can be obtained at reasonable prices in negotiated sales. (Page 20)

The Minnesota Department of Highways is responsible for traveler comfort and pleasure along some 600 miles of State and Federal Highways within the Memorial Hardwood Forest. It and the Department of Conservation should continue to cooperate closely in purchasing land for scenic strips and in development of rest and recreation areas.

The several Federal and State projects have certain primary objectives — water control, game protection, recreation — but all have secondary uses which bring them within the multi-purpose concept of the Memorial Forest. It should be a major function of the administrative organization set up by the Conservation Department here to integrate the work of the State divisions, and to collaborate with the federal and local agencies in an attempt to get maximum service for the public. The Committee has observed fairly satisfactory cooperation between agency men in the field but believes that more productive arrangements will evolve as the Forest program progresses.

Counties and Municipalities should Participate

Counties and municipalities are maintaining a few small parks and campgrounds within the Memorial Hardwood Forest. They will have an opportunity to expand these under the Land and Water Conservation Program. Approximately \$60,000 from this fund and an additional \$30,000 from matching State funds is available in the seven counties for the fiscal year 1966. However, to avail themselves of this aid, counties must submit suitable recreational plans or provide evidence of being in a satisfactory planning program and must provide at least 25 percent of the total cost from local funds. To date, one of the seven counties has qualified. It appears likely that some time may elapse before a significant acreage of recreational land will be acquired. Eventually, this program may become a very important adjunct to the Conservation Department's over-all Memorial Hardwood Forest operation. This possibility justifies the close participation by the Department's personnel in the preparation of county plans. (Page 20)

Acquisition of Land through Tax Forfeiture

Tax delinquency and forfeiture in past years have permitted some 781 acres to be transferred

from Fillmore, Houston, and Wabasha Counties to the Memorial Hardwood Forest at nominal cost. Presumably some limited additional acreages will be obtained in this way.

Private Contributions

When the Memorial Hardwood Forest was first announced in 1960, the Izaak Walton League started a campaign to collect funds from members and others to buy land. In all, a little more than \$10,000 was contributed in cash. A few hundred acres of land also were donated.

Sportsmen and other civic groups no doubt will be of considerable help to the Department in various ways in the future, but it appears unrealistic to depend upon cash contributions from such groups to provide any significant part of the total needed for land acquisition.

Easements

The Committee has given consideration to the possibility of using easements as an alternative to outright purchase of land for such purposes as maintaining scenic corridors along highways and canoe routes, providing access to fishing streams, assuring public use of foot and horse trails, preventing defilement of park entrances with billboards, taverns, etc. Its conclusion is that such easements can be used in a number of places particularly where high-value land is involved. However, where land can be purchased at a reasonable figure, outright ownership is believed preferable.

Fences

The Committee was asked to consider the fence problem where the State acquires land adjoining farm pastures.

Under the Memorial Hardwood Forest fencing law passed by the 1965 Legislature, if an adjoining land owner insists, the State is required to pay one-half the cost of establishing and/or maintaining a line fence. The Department of Administration has been budgeting \$1,000 each biennium to cover this liability. As of June 30, 1966, only three claims totaling \$280.49 have been presented. As land owners become familiar with the Forest fencing law, there may be more requests that the State pay its half of line fence cost. However, the amount of fencing will be small compared to the total length of boundaries between Memorial Hardwood State Forest lands and privately owned lands.

The potential fencing problem can be reduced by acquiring land in compact, contiguous tracts. The planting of hedges along property lines also deserves consideration. Species such as buffalo

berry, common lilac, wild plum, honeysuckle, and Missouri gooseberry are of possible value.

Current land purchase agreements often provide that the vendor take care of existing and anticipated fencing problems.

Historical and Scientific Sites

The proposed purchase areas include most of the historical sites, recognized natural areas, archeological sites, etc. in the Forest area which are known to the Committee. Insofar as they can be obtained within the normal range of forest land prices, they should be given high priority for purchase. The Division of Forestry already has a system for cataloging these areas and insuring that they will be managed to protect their unique features.

Effect of Program on Local Economy

Judging by experience to date, the acquisition program itself will not have a serious impact on local tax bases. However, it is necessary to recognize that some of the villages and townships within the purchase areas already are in a tight financial situation because of shortage of good farm land, continuing erosion, and lack of steady local payrolls. Eventually, forest-based industries should supply such payrolls, but in the meantime a problem exists. Some of the areas in the southeastern part of the Forest, where as much as 50 to 60 percent of the land has proved untillable, can be described as "Distressed Agricultural Areas" and as such would deserve consideration for special work projects such as provided in some of the northern counties. The State forest lands which are going to require planting and silvicultural treatment to raise productivity would be a good locale for such activity. (Page 45)

Extension of Boundaries

Three small boundary extensions are recommended.

1. Fractional Township 115 N., Range 16 West, and Sections 25 and 36 in Township 115 N., Range 17 West, containing roughly 2,500 acres. This will permit acquisition of several hundred acres of wetland comprising part of the Wood Duck Game Refuge in Dakota County.

2. East half of Township 113 North, Range 15 West, in Goodhue County. This area includes mainly wetlands near the mouth of the Cannon River. It has some timber and will be very valuable as a game refuge.

3. Townships 107 and 108 North, Range 16 West, in Dodge County. No large purchases are ex-

pected here, but inclusion will permit acquisition of selected tracts for recreational use. Nearby areas have historical interest.

Subjects for Future Study

In this report, the Committee has attempted to answer as many as possible of the questions referred to it for consideration. It believes that by following the proposals made in this report, the Memorial Hardwood Forest project can proceed effectively in accomplishing the desired objectives. At the same time, it recognizes that the program will be gradually evolving and that changes will be

necessary from time to time. With this in mind, it suggests a continuing study along these lines:

1. Administrative studies having to do with the personnel and equipment needs, and the best means of integrating the work of the several Divisions of the Department of Conservation in this area.
2. Technical studies of still unsolved forestry, wildlife, recreation, and erosion control problems peculiar to this area.
3. Review of the purchase plans at approximately five-year intervals. (Page 25)

I. THE SITUATION

Justification for the Memorial Hardwood Forest project rests on two assumptions: (1) that the increasing population in southern Minnesota is going to bring an increasing need for areas to support recreation and other forestry services, and (2) the lands adjacent to the Mississippi River south of the Twin Cities are singularly well equipped to provide these services. These propositions, accepted by the 1961 Legislature in establishing the Memorial Hardwood Forest, deserve further examination as a basis for more detailed planning for forest development.

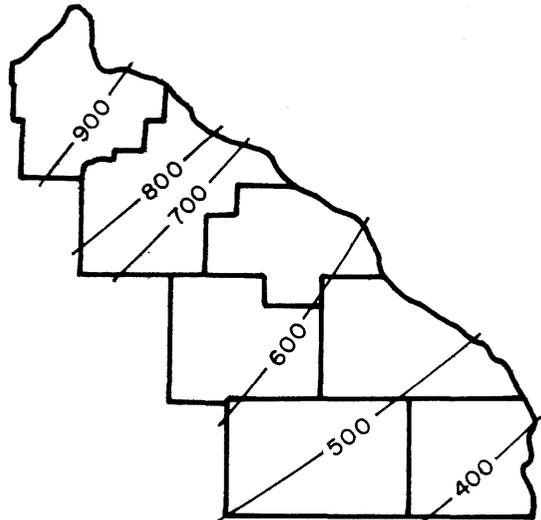
A. Demand Outlook

1. Recreation

The Minnesota Land and Water Recreational Plan recently prepared by the Department of Conservation staff includes forecasts indicating the Twin City metropolitan area population will likely increase from its 1960 figure of 1.5 million to about 2.2 million by 1976 and about 4 million by 2000. The Report emphasizes the increased demand this growth will create for recreational facilities for such things as pleasure driving, picnicking, camping, hiking, canoeing, hunting, fishing, etc. Some of the needed facilities can be created within the metropolitan area itself, but others will be needed in surrounding areas.

In their "Projection of Population and Highway Traffic in Minnesota," September, 1963, John R. Borchert and Philip Raup expressed the effect of such urban concentrations on surrounding counties in what they termed "Population Potential" which credits each county with its own population plus the overflow from adjacent counties (i.e. the population of each adjacent county divided by its distance away in miles). The 1970 Population Potential for the southeastern area is shown in Figure 1. The potential decreases progressively from Dakota County to Houston County. This indicates in a general way, the probable diminution in demand for recreational services with increasing distance from the Twin Cities.

The demand, however, will not come entirely from Minnesota people. Completion of the Great River Road is expected to bring a large increase in tourists from the South, and Interstate 90 will bring additional visitors from states to the east. The State Highway Department (MORRC Special Study Report #12) forecasts that annual north-south traffic will increase from 153,000 persons in 1963 to 380,000 by 2000; east-west traffic will increase from 241,000 in 1963 to 960,000 by 2000. It cannot be assumed that any large segment of



Population Potential (number of persons per square mile) in southeastern Minnesota Counties. (after Borchert and Raup)

this traffic will be drawn away from the arterial highways into a forest type of recreational environment, but many tourists will be attracted by the aesthetic features of the terrain and will seek stopovers in hotels, motels, resorts, tourist camps and public campgrounds.

Another indication of growing demand for recreational opportunities is seen in the attendance records at State Parks. Based on recent trends, the Division of State Parks anticipates that the number of campers at parks within the southeastern counties will approximately treble by 1976. Currently, about 58 percent of the campers come from Minnesota and 42 percent from other states and Canada (Morrc Report #12).

2. Forest Products

The prospective demand for timber products from this locality cannot be accurately estimated because of the broad competitive nature of the market. However, certain assumptions seem justified:

1. The market outlook for fuelwood and fence posts which formerly took large volumes of wood from this area is not good.
2. Demand for wood chips and pulpwood, both hardwood and softwood, should increase steadily as the population and the per capita consumption of paper and paperboard continues to rise throughout the Nation. Such material can be made available in this area almost immediately.
3. Demand for lumber logs and box-grade veneer logs should increase gradually, both for

local use and for commercial distribution. Demand will increase considerably faster if better quality timber can be made available in the immediate future.

4. Demand for good softwood logs and high-quality hardwood items such as walnut gunstock wood, high-grade veneer logs of walnut, butternut, oak and basswood; furniture stock of walnut and cherry appears insatiable. Production of this material in quantity will require a longer period of good forest management, but southern Minnesota has a high potential for the production of high-quality, high-value wood.

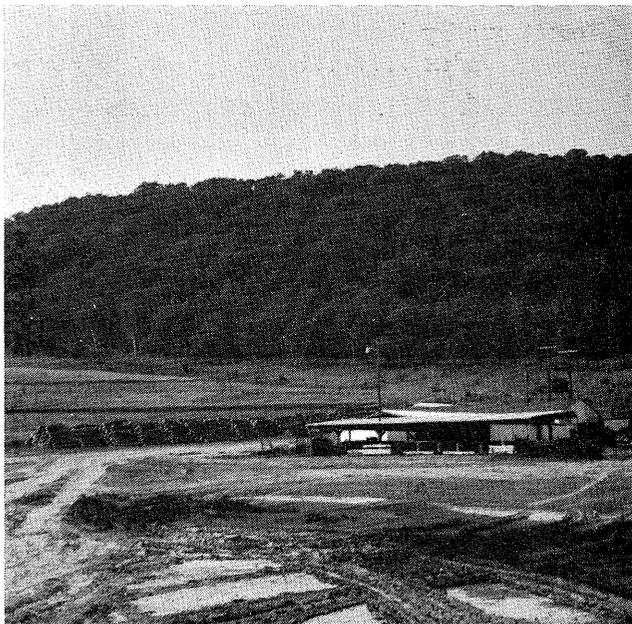
3. Other

Increasing population doubtless will bring increasing demand for Minnesota farm products. At first thought, this may seem to be an argument against reducing farm acreage in southeastern Minnesota. However, the lands proposed for forest use are not productive areas and their diversion will have little or no effect on crop yields. The situation does suggest, however, that preventing soil erosion and damage from floods which threaten good crop land should be one of the major aims of the Memorial Hardwood Forest project.

B. Resource Analysis

1. Areas Available

The Memorial Hardwood Forest covers a gross area of 1,920,000 acres in the southeastern corner



A number of small tie mills and lumber mills operate successfully within the Memorial Hardwood Forest. More will come in as the trees become larger and assume better form.



Eight-foot logs obtained from typical logging operation in Winona County. The Forest must be managed to produce longer and larger logs and thus yield higher income.

of Minnesota. One-fourth of the land or about 460,000 acres is wooded. In addition, at least 140,000 acres of open steep slopes, flooded lowlands, and eroded ridgetops are considered better suited to conservation uses than to agriculture.

Of the total 600,000 acres of "conservation area" a little more than one-half, or 341,300 acres lies in fairly concentrated strips adjacent to the Mississippi River and its major tributaries, the Root, Whitewater, Zumbro, and Cannon Rivers. The remainder occurs as narrow strips along secondary water courses and here and there as patches of farm woodlot.

The concentrated areas have been divided into a number of Forest Compartments for analysis and planning. Sampling indicates composition about as follows:

Wetlands	2.8 percent
Alluvial (periodically flooded) .	8.2 percent
Sandy terraces and talus slopes	4.6 percent
Steep and Stoney land	71.3 percent
Other land	13.1 percent
	100.0 percent

Wetlands. These occur mainly along the Mississippi River and near the mouths of major tributaries. More than half are included in Federal and State Wildlife refuges. Those proposed for inclusion in the Memorial Hardwood Forest consist of intermingled woods, open water, reeds, and lowland brush. They are primarily useful as game

habitat. In places they will give access to fishing and boating streams.

Forest quality index 1 (very poor)
 Wildlife index 5 (very good)

Alluvial. These lands have very fertile soil but are handicapped by periodic flooding. Some are used for farm crops, some for pasture, some are left in woods or other native cover. Best use will have to be determined in each individual case by the owner of the land. When stocked with cottonwood, elm, ash, and soft maple, the alluvial lands are very productive but sometimes present difficulties in timber harvesting. They are difficult and costly to reforest by planting. Some have prospective value for recreation, as campgrounds or as roadside or streamside scenic strips. As wildlife habitat, they are less highly regarded than the wetlands.

Forest quality index 4 (good)
 Wildlife index 3 (fair)

Sandy or gravelly terraces and talus slopes.
 Typical soils are:

- Plainfield and Sparta sands
- Boone and Chelsea sands (over 6% slope)
- Hixton sandy loams (over 12% slope)
- Terrace escarpments (sandy)
- Wycoff gravelly or sandy loam

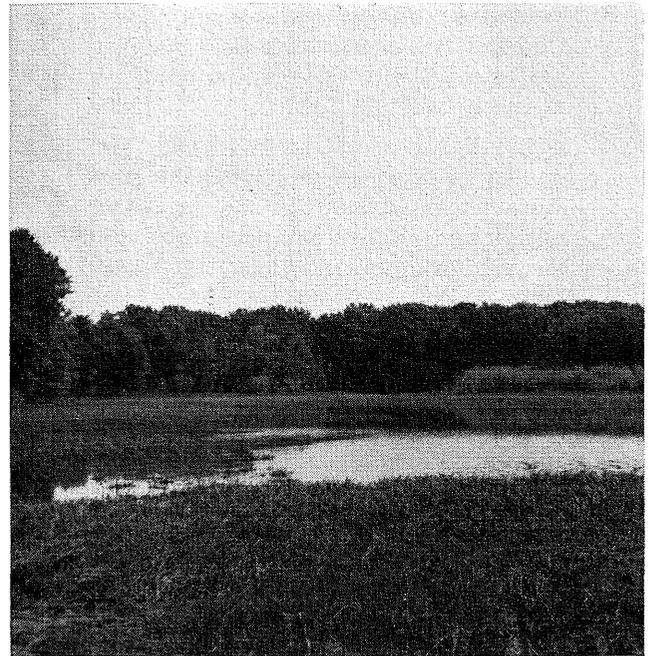
These dry and sterile soils, unless needed for homesite or barnyard have little value for agriculture. The native cover is scrub oak, grass, and weeds. The site is poor for hardwoods but from fair to good for pines.

Forest quality index 3.5 (fair to good)
 Wildlife index 1 (very poor)

Steep and stoney land. These lands are definitely non-agricultural. Forestry possibilities range from very poor on exposed south-facing



Alluvial land, although periodically flooded includes some highly productive forest areas. Cottonwood is one of the better species for this site.



Wetlands are primarily useful as game habitat and to give access to fishing and boating streams. Timber in background consists of willow, black ash, and other bottomland hardwoods.

bluffs to excellent in some sheltered coves. Game habitat is considered best on the more open hillsides. Both forest and wildlife conditions can be greatly improved by good management. Bluff lands adjacent to highways have considerable aesthetic value. These lands offer wide opportunity for hunting, hiking, etc.

	Open Hillsides	S & W Slopes	N & E Slopes
Forest quality index...	1	2	4.5
Wildlife index	4	4	2

Other land. This consists of a variety of soils and conditions. Essentially, it is made up of small tracts of open or lightly wooded land intermingled with larger forest areas in such a way that they form a part of a natural forest block. Typical conditions are:

1. Tracts of shallow Dubuque soil at heads of small timbered gullies. They may have been pastured or even cultivated but have suffered considerable sheet erosion and some gullyng.
2. Narrow ridges of Dubuque soil, surrounded by woods and isolated from the rest of the farm.
3. Steep valley phases of Fayette soil which merge into steep and stoney forest land in narrow valleys. These strips have marginal value for pasture but can produce excellent timber including white pine, maple, basswood, and walnut.

Forest quality index	3 to 5
Wildlife index	2 to 4

One cannot assume that all of the "conservation" land in the forest compartments is potentially purchasable. It appears reasonable to expect, however, that 50 to 60 percent of it could be purchased by the State over a period of years if that were considered desirable. Sixty percent would be 205,000 acres or about the figure initially proposed by the Department of Conservation.

2. The Forest Resource

The forests here lie in the Central Hardwood belt and, except for scattered clumps of white pine and junipers, consist of hardwood species. The principal types are:

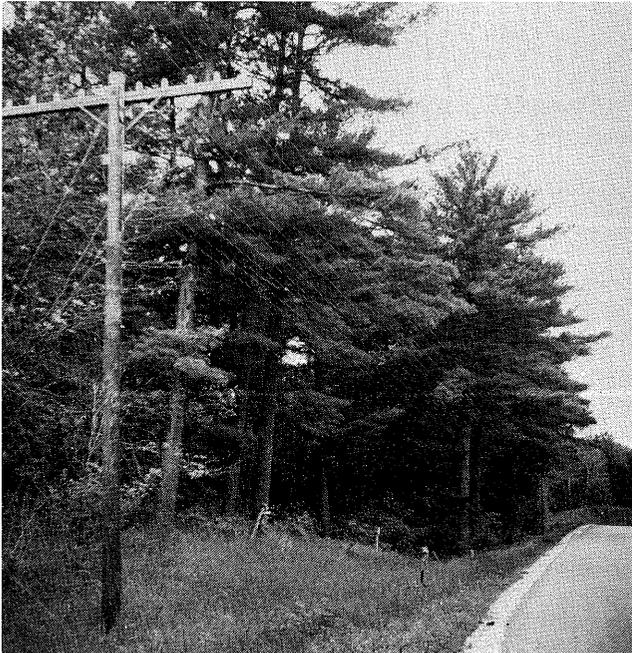
Oak Type, made up of red oak, white oak, burr oak, hickory, etc., occupies about 73 percent of the forest area.

Bottomland Hardwood Type, of elm, cottonwood, soft maple, ash, etc., covers about 10 percent of the area.

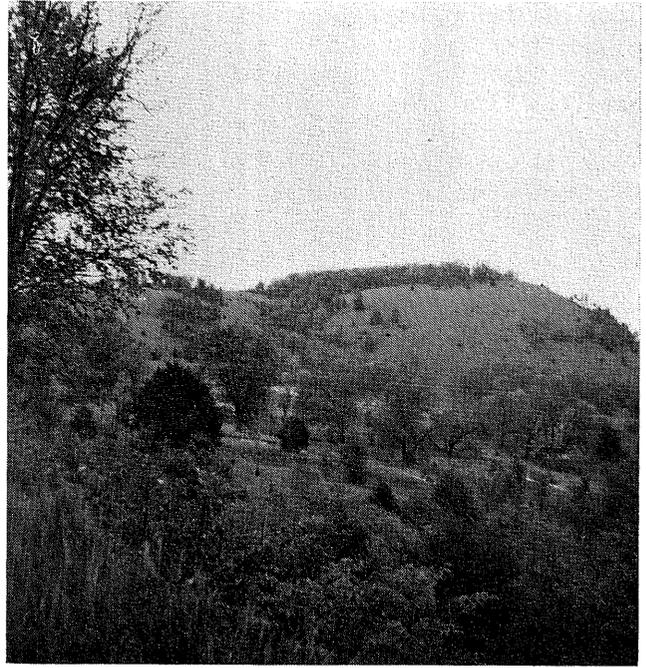
Mixed Hardwood, locally called "Big Woods," made up of basswood, elm, red oak, sugar maple, etc., covers 6 percent of the area.

Aspen-Birch Type and grass or brush-covered areas make up the remainder.

Within these types are to be found a number of other hardwoods, some of potentially very great value. Walnut, for example, is widely dis-



Native white pine growing on sandy talus slope on tributary of the Root River. Sandy terraces and talus slopes usually are poor sites for hardwoods but fair to good for pines.



This steep south-facing slope has been burned many times in the past. Land in the foreground has been heavily pastured. Present tree cover is very spotty, consisting of scrub oak, aspen, paper birch, and red cedar.

tributed, but present stands are mostly immature. However, a large tree can be found here and there which will sell for several hundred dollars on the stump. Butternut and Black Cherry also are present in limited quantities.

Plantations of conifers appear here and there throughout the district. White pine, red pine, Ponderosa pine, Scotch pine, jack pine, Norway spruce, white spruce, European larch, white cedar, and other species are represented.

Some secondary species, while of no commercial importance, are of value as game food and cover. Examples are: pin oak, alder, swamp willow, and juniper.

Although remnants of the mature forest give evidence that the potential productivity of this land is reasonably good, most of the present forest area is in poor condition. The large trees which remain are often deformed and defective. In many cases, large spreading "wolf trees" interfere with natural reproduction and establishment of thrifty young stands. The Forest Survey, conducted by the Lake States Forest Experiment Station in 1962, showed an average stand of only 2,000 board feet of saw timber size logs per acre. This was mostly in the form of short logs or tie bolts. Annual growth was only .25 cord per acre per year.

In spite of their poor condition as a result of burning, pasturing, and improper cutting, the forests in southeastern Minnesota have many fea-

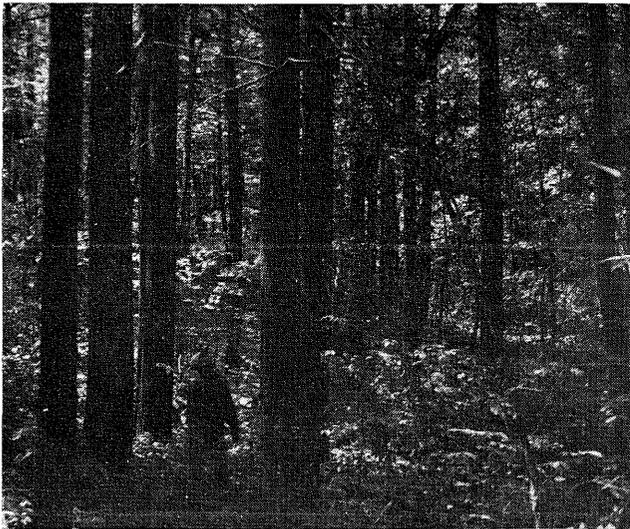
tures in their favor. The growing season, for instance, is much longer than in the northern part of the State. Most of the species reproduce readily from seed, or from stump sprouts. White pine blister rust is not a great threat here; and because of the great variety of species in mixture, other disease and insect epidemics are controllable. With relatively simple forest management practices, yields of merchantable forest products can be very greatly increased before the end of the century.

3. Recreational Potential

In the publication, "Outdoor Recreation for America," a report to the President and to the Congress by the Outdoor Recreation Resources Review Commission, January, 1962, recreational areas are grouped into six classes, only a part of which are represented in the Memorial Hardwood Forest. This scheme is useful in defining the function of the forest in the overall recreational goal for this part of the state.

Class I. (For high-density use). Represented by resorts, trailer camps, summer home groups, marinas, ski slides, etc. These are provided generally by private and municipal developments. A number may be located within the Forest, some even on leased state land, but they will not be a part of the direct forest enterprise.

Class II. (Fairly concentrated outdoor recreation areas). (Large picnic and camping grounds, public beaches, etc.) A large share of this will be provided by eight State Parks and by existing or prospective county and municipal parks. Some additional facilities will be provided on federal projects along the Mississippi River, some on Federal



North-facing cove provides an excellent site for timber. Here, white pine mixed with northern hardwoods and some walnut has immediate commercial value.



Badly eroded pasture at the head of a small stream. If taken into the Forest, the first necessity will be to check the gully, then restore some permanent vegetative cover to the land.

and State wildlife projects and some on interstate highways.

The Hardwood Forest can supplement these facilities in three ways: (1) It can provide a number of small secondary campsites for those who want to enjoy nature in relative seclusion, and (2) it can build up a bank of potential future park sites. (3) It can provide secondary areas for spillover during peak loads as on Fourth of July and Labor Day.

Class III. (Natural environmental areas with scattered rather than concentrated use). This describes the primary value of the Hardwood Forest; as a scenic background along tourist highways and around State Parks; as a means of enjoying nature along trails and secondary roads radiating from resorts, waysides and parks; as an aid to use of canoe routes and fishing streams. This type of use is compatible with selective logging and with use of the land for public hunting.

Class IV. (Areas of remarkable natural wonder, high scenic splendor, or scientific purposes). The Hardwood Forest is not expected to embrace areas of outstanding significance such as those set off in national or state monuments and parks. It will, however, include a number of scenic overlooks, some interesting caves and springs, and several points of archeological and geological interest.

Class V. Primitive areas such as the Bound-ary Waters Canoe Area in the northern part of

the state are not represented in the Hardwood Forest.

Class VI. (Historic and cultural sites). Only a very limited number of identifiable historic items remain within the boundary of the forest. When historic or scientific areas are purchased in connection with forest land acquisition, land-use cards are set up in the Division of Forestry to insure that the sites will not be disturbed.

4. Wildlife Potential

The principal forms of wildlife encountered within the forest are:

Big Game: Deer.

Small Game: Squirrels, rabbits, fox, and raccoon.

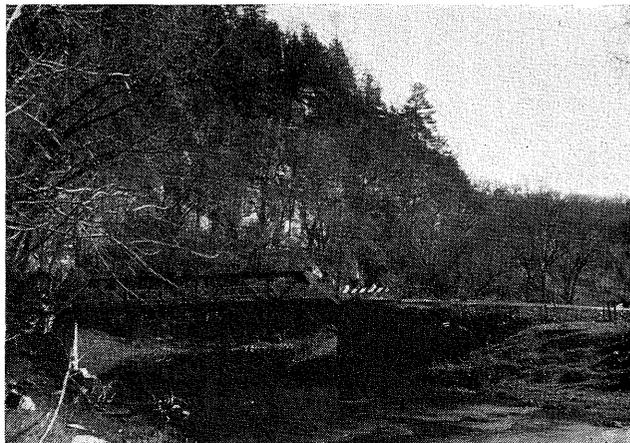
Furbearers: Muskrats, beaver, and mink are present but are much more common on the Mississippi bottoms outside the forest boundary.

Waterfowl: Geese and ducks in rather limited numbers.

Upland game birds: Ruffed grouse (common), quail (in certain areas), pheasants (mostly farther west). A few turkeys have been introduced.

Other birds: Most birds native to the region are to be found here. Some migrants winter here.

Fish: Bass and other native fish can be caught in the main rivers. A number of tributaries are kept stocked with trout. Pan fish thrive in pools and ponds. One important function of the forest will be to provide campsites near and access to fishing streams.



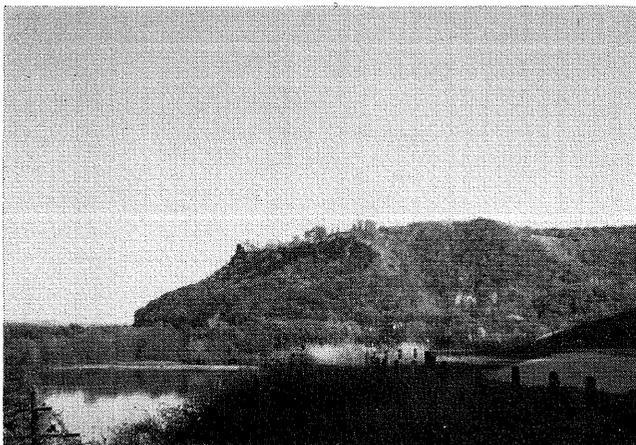
A fork of the Zumbro River in Wabasha County. The Memorial Forest includes 266 miles of trout streams and more than 200 miles of canoeable rivers.

The present forest, with its scrambled pattern of small fields, brush patches, clumps of trees, open bluffs, etc. provides a fairly satisfactory summer habitat for most forms of native wildlife. Small ponds forming behind erosion control dams are a valuable asset. What is lacking in many cases, however, is adequate food and shelter for winter. This will be provided incidental to reforestation efforts.

To provide additional game food and cover, and to insure that reforestation will create desirable wildlife environments, Game Specialists should work with Foresters in preparing management plans for the acquired lands.

5. Forest's Role in Soil Conservation

The agencies primarily concerned with improving farming conditions in southeastern counties of Minnesota, notably the Minnesota Extension Service, the Soil Conservation Service, and the

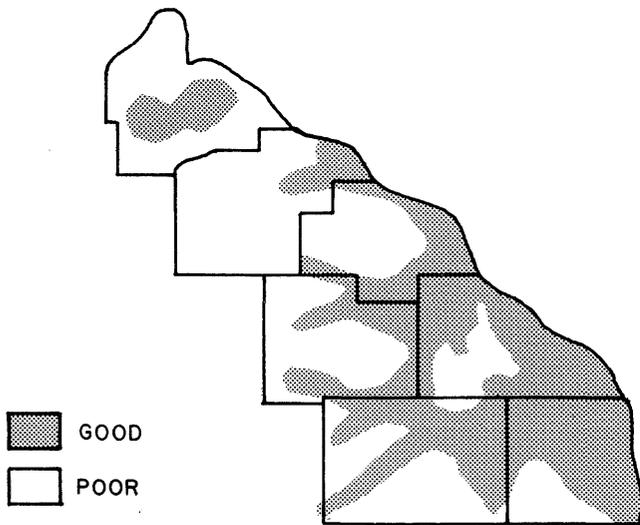


Wooded bluffs along the Mississippi River. The Memorial Hardwood Forest provides a scenic background for the Great River Road for a distance of more than 100 miles. Altogether, more than 600 miles of State and Federal highways crisscross the Forest.

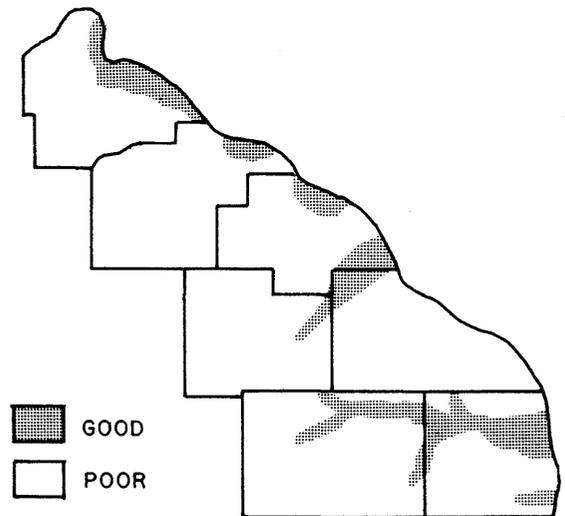


Whitewater State Park in Winona County. This and seven other State Parks in the area are designed for intensive recreational use. The surrounding Forest will provide hiking trails, secondary campgrounds, etc., as well as reserve sites for future Parks.

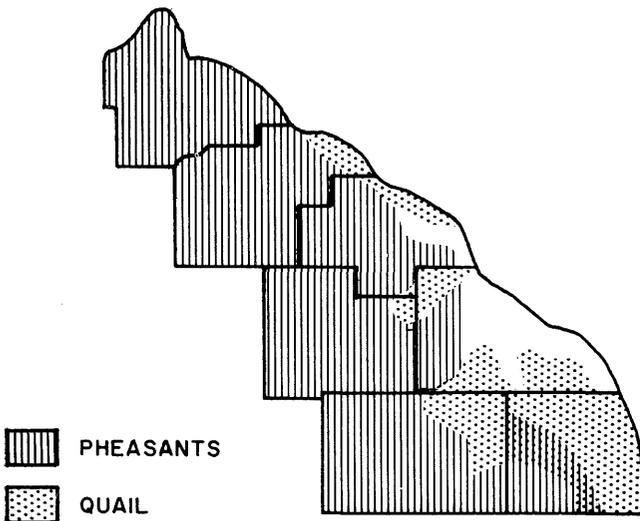
GEOGRAPHICAL DISTRIBUTION OF CERTAIN GAME SPECIES IN SOUTHEASTERN MINNESOTA



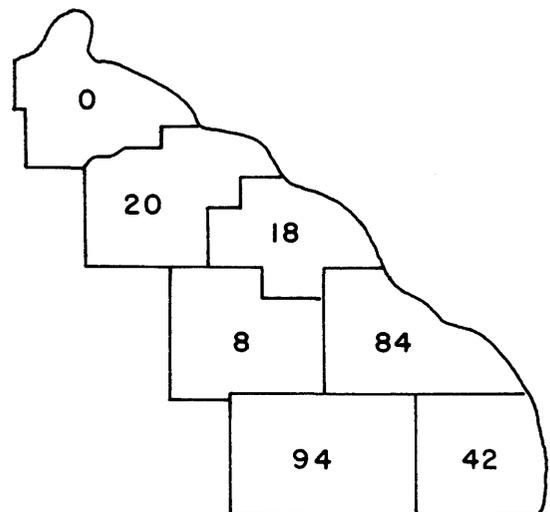
DEER, GROUSE, AND SQUIRREL



WATERFOWL AND FUR-BEARERS



PHEASANTS AND QUAIL

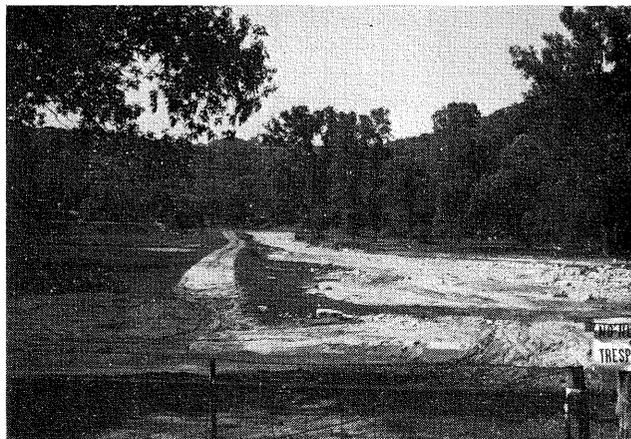


Agricultural Stabilization and Conservation Service, recognize that large acreages in these counties are unsuitable for intensive farm use because of their easily eroded soils. These agencies participate in programs encouraging farmers to take these lands out of crop production and convert them to forestry, wildlife, and other conservation uses. They are glad to see some of the more critical areas pass into public ownership for similar purposes, all the more so if the public owner will use them to demonstrate proper soil conservation practices.

On most of the steep valley sides, gravelly talus slopes, stream escarpments and flood plains, in short, most of the lands to be acquired for the Memorial Hardwood Forest, regrowth of trees will provide adequate protection for the soil. Limited reforestation combined with ordinary good forest management will accomplish all that is needed.

At the heads of some of the stream branches, however, cultivation or heavy pasturing on the thin erodible soils have created conditions conducive to gullying. The fresh gullies not only eat back into the level fields above, but they dump silt and gravel onto the highways and fields in the valleys below.

Not too many of these problem gully areas are included in the forest lands purchased to date, but it appears unavoidable that a number will be in the future. Some are present on lands immediately adjoining State Parks, and some lie above prospective campgrounds. Many are close to important state and county highways.



Erosion not only cuts across productive fields at the heads of streams, but flushes silt and gravel onto fields, roads, and camping sites at lower elevations.

Satisfactory measures for gully control have been worked out by the Soil Conservation Service and have actually been put in practice on a fairly large scale in Soil Conservation Districts and in Small Watershed projects.

C. Relationship To Other Public Projects

Two departments of the Federal government, three divisions of the Minnesota Department of Conservation, the State Department of Highways, and a number of counties and municipalities administer land in southeastern Minnesota.

Summary of public areas devoted to conservation purposes in a seven-county district in southeastern Minnesota.

County	Owned by Federal Agencies (acres)	Game & Fish (acres)	State Owned			County Municipal (acres)	Total Public (acres)
			State Parks (acres)	State Forest (acres)			
Dakota.....	354	824	—	56	49	1,283	
Goodhue.....	5,005	363	501	1,466	170	7,505	
Wabasha.....	8,176	2,505	211	1,633	5	12,530	
Olmsted.....	—	1,724	105	98	1,983	3,910	
Winona.....	6,641	20,430	1,070	2,007	2,220	32,368	
Houston.....	15,310	—	420	5,634	84	21,448	
Fillmore.....	—	—	—	1,605	36	1,641	
Group.....	35,486	25,846	2,307	12,499	4,547	80,685	

1. Federal

The Bureau of Sport Fisheries and Wildlife of the U. S. Department of Interior administers the Upper Mississippi Wildlife Refuge of approximately 30,053 acres in Minnesota. This includes 12,230 acres of wet bottomland under license from the U. S. Army Corps of Engineers. The Bureau's main concern is protection of migratory water-

fowl, but it also manages furbearers and other small game, sells timber from woodlands and offers certain types of recreation.

The U. S. Army Corps of Engineers has acquired lands and flowage easements above the navigational dams on the Mississippi River. It has transferred administration of surface use of most of the land to the Bureau of Sport Fisheries

and Wildlife and to the Minnesota Department of Conservation for wildlife management. On the lands remaining under its direct control, the Corps has prepared plans for recreational use. At several dam sites it offers parking and sight-seeing opportunities. The Corps also is involved in flood control surveys and studies of several rivers within or adjacent to the Memorial Hardwood Forest. It is authorized to cooperate with the State or local governments in developing recreational facilities around any flood control structures built.

The 1966 Cropland Adjustment Program (CAP) administered by the Agricultural Stabilization and Conservation Service, U.S.D.A., proposes to help farmers divert excess cropland to protective conservation uses under long-term (5 to 10 year) agreements. Participants will receive adjustment payments calculated as a portion of the value of the crops which otherwise would be produced. They will be eligible also for cost-share payments on the diverted land, and those who agree to permit free public access for fishing, hunting, hiking, and trapping, may get an additional per-acre payment.

Under another provision, CAP will help local, State, and other government agencies to acquire cropland for non-farm uses such as the preservation of open spaces and natural beauty, wildlife development and recreation, and the prevention of fire and water pollution. The help proposed is 50 percent of the purchase price or an amount equal to ten years diversion cost whichever is smaller.

It is not clear at this time how much practical use can be made of the CAP in acquiring land for the Memorial Hardwood Forest. Much will depend upon what kinds of land may be considered "cropland." However, the stated objectives of the program are clearly in harmony with Department of Conservation aims and justify continued close cooperation of men of the two agencies in the field.

2. State

The Game and Fish Division of the Minnesota

Department of Conservation has established seven wildlife areas within or adjoining the Forest. The largest of these, the Whitewater Game Refuge and Public Hunting Ground has a gross area of 39,180 acres with 24,479 acres of state-owned land acquired over a period of some 35 years. Lying in the center of the Memorial Hardwood Forest, it serves as a pilot operation for the Forest project.

The Division of State Parks of the Minnesota Department of Conservation has established eight parks in the district, with a gross area of 10,200 acres, with 2,307 acres of state-owned land. Overmature and defective timber can be harvested on these lands under the supervision of the Division of Forestry. Fishing is permitted, but not hunting, except on occasions when there is overstocking of game.

The Minnesota Department of Highways maintains more than 600 miles of major roads within the Memorial Hardwood Forest. This includes approximately 130 miles of the Great River Road, 45 miles of Interstate 90, 157 miles of U. S. Highway #14, 16, 52, 63, and about 300 miles on a dozen state trunks. Within the rights-of-way, the Highway Department provides rest areas and waysides, some with picnic tables and sanitation facilities. In a few places it permits overnight camping. On the Great River Road, which follows the entire eastern boundary of the Forest, the Department proposes to purchase or acquire scenic easement if such lands are considered essential to maintain the scenic and aesthetic value of the parkway.

3. Local

Counties have acquired small areas for picnic grounds and campsites. All of the cities and a number of villages in the district maintain parks and tourist campgrounds. Several state and federal aids are available to the local governments to encourage planning, acquisition of land, and development of additional areas for recreational purposes (see MORRC Staff Report #5, "Grants in Aid for Outdoor Recreation").

II. WHAT THE SITUATION CALLS FOR

The Department of Conservation can seek its objectives in southeastern Minnesota in three principal ways: (1) Assisting private landowners, (2) Cooperating with other public agencies, and (3) Creating and managing State Forests.

A. Assistance to Private Owners

The Division of Forestry of the Department of Conservation, in cooperation with the U. S. Forest Service, provides fire protection for lands in all ownerships. It furnishes small trees at cost for windbreak and woodlot planting on farms. It offers advice on planting procedures and other forestry measures. It helps land owners find markets for forest products and advises on sale contracts and other details.

In the years ahead, these services should be continued and intensified.

Fire protection already is showing some results in the gradual return of trees on formerly bare hillsides, but coverage is not yet complete and shortages of communication lines, trucks and fire-fighting equipment are sometimes encountered during critical periods.

There is much latent interest in tree planting among farmers, not only in the naturally wooded locations but also on the prairies farther west. Much of this interest rests on aesthetic considerations, some on the desire to encourage wildlife, some on the need for protection from wind and water erosion. This suggests the need for advertising the multi-purpose objectives of the Department of Conservation and for providing advisory services on the broadest possible basis. Much help will be needed from County Agents and State Extension Foresters in getting out publicity, giving advice to farmers, and setting up forestry demonstrations. Probably more help will be needed from other Divisions of the Department of Conservation to round out advice to farmers and other land owners. Especially needed are the services of Wildlife Ecologists.

B. Cooperation with Other Agencies

The Department of Conservation has a very good opportunity to give general direction to the forest conservation movement in southeastern Minnesota by collaborating closely with other state and federal agencies and by working with counties and various local groups.

Local Foresters* already devote a considerable share of their time working with S.C.S. and A.S.C. men in the forestry phases of the Soil Conservation District, Small Watershed District, and Crop Adjustment Programs. Fortunately, in three instances the District Foresters have offices adjoining those of the federal men.

Houston County, in preparing its recent Land Use Plan, repeatedly called upon the local Forester for information and advice. Fillmore and Olmsted Counties, in creating Park and Recreation Committees under the Land and Water Recreation Program, asked the local Forester to serve as a member. Doubtless other demands of this kind will arise.

The Foresters are called upon, and in fact devote considerable time both within and outside of regular hours, talking at various meetings, helping schools set up school forests, assisting Boy Scout groups with camp projects, working with sportsman groups, etc.

C. Land Acquisition

Acquisition and actual management of land is believed to be an essential part of the program in southeastern Minnesota. From a forestry standpoint, it will provide the local Foresters with a welcome opportunity to practice their profession, experiment with different kinds of silviculture, and demonstrate the results of good management. At the same time, it will add to the State's recreational assets, extend wildlife habitats, and remove some soil erosion sores.

The real questions are: How much land to buy, where to concentrate purchases, what kind of land to seek, and how much will it cost?

How much land to buy? The original proposals for the Memorial Hardwood Forest recommended 200,000 acres to be acquired in 50 years. Later, the Division of Forestry confirmed this area goal as attainable in 30 years. Compilations made in this study indicate the availability of even greater acreages, but the Committee has decided to leave open the question of ultimate State ownership,

*The Division of Forestry of the Department of Conservation has an Area Forester and Assistant Area Forester at Lake City, assisted by six District Foresters of whom four are in the Minnesota Memorial Hardwood State Forest counties. These Foresters are stationed at Preston (Fillmore and Olmsted counties), Caledonia (Houston county), Lewiston (Winona county), and Lake City (Wabasha, Goodhue, and Dakota counties).

and to confine its recommendations to the next ten-year period. In reaching these recommendations, it has considered several factors:

1. Urgency of need. There is no apparent need for a crash program of large-scale buying such as is being undertaken in some states farther east. On the other hand, experience has shown that, if a State waits until urgent needs are upon it, the cost of creating forests and parks become infinitely greater. Land values already have trebled in the past 30 years. This suggests the advisability of adopting a modest but steady program of purchase. Inasmuch as the program outlined here, includes purchases of land for wildlife refuges, and reserves for future State Parks, the scale of purchases should be increased over those of the 1965-66 biennium which were only for forest purposes.

2. Efficiency in buying. The Department of Administration has been very successful in maintaining a stable land value schedule and taking over titles during the current biennium. It seems doubtful, however, that the scale of operations could be more than doubled without inflating values and running into difficulties in appraising, surveying, obtaining abstracts, and other necessary details of administration.

3. Ability to put land under management. Most of the purchased land will need rehabilitation. In terms of about \$15 or one man day per acre as an average investment, 7,000 new acres per year would be a good load for the prospective Forestry Division organization.

With these considerations, purchase of 6,000 to 7,000 acres per year is recommended. This will cost an estimated \$250,000 per year or \$500,000 for a biennium.

Where to Buy? In its Report No. 4, "Minnesota Memorial Hardwood Forest," the Minnesota Outdoor Recreation Resources Commission (MORRC) recommended that "acquisition during the next two years should give first priority to land adjacent to the Great River Road, existing State Parks, historical sites, natural areas, game and fish lands, areas identified for acquisition as a part of local or county recreational plans, and areas along the tributaries of the Mississippi River" and further that "scattered purchases in units of 200 acres, or less, that cannot be ultimately firmed up in management units of 1,000 acres, or more, should be discouraged." Although addressed specifically to the 1965-1966 purchase operation, these suggestions appear applicable to the ten-year program and have been given great weight in the evaluations made in this report.

The Advisory Committee, in designating areas for purchase, has avoided identifying specific tracts wanted for State purposes. Experience has shown that such identification leads to speculative rises in land prices and restricts the opportunities for negotiation on the part of the land buyer. Instead, the Committee has outlined desirable compartment boundaries containing high-priority land, has set a purchase quota, and has indicated the type of land and general location preferred. It leaves to the local Foresters and the Department of Administration the job of selecting the specific tracts and terms of purchase.

Kind of Land? Approximately three-fourths of the purchasable land in the compartments is "rough and stoney land" and it is expected that this will make up a large share of the acquired area. However, some other types of land will be sought for wildlife, recreational, and soil conservation purposes. First consideration will be given to tracts of land definitely needed in the State program which, for one reason or another, are likely to become more difficult and costly to acquire in the future. Other things being equal, **preference will be given to tracts contiguous to tracts already in State ownership.**

No good cropland or productive pasture has been set up for purchase. However, it appears unavoidable that some such land will be included in tracts offered for sale. Often it may be more practical to accept small acreages, even at a considerably higher price, than to exclude them by expensive surveys and fencing. In many cases, they can be kept in private use by leasing to neighboring farmers. Land exchanges may be a solution in other cases.

Costs? It is to be expected that average land prices will be somewhat greater than heretofore. The kind of selective buying recommended in this report is going to involve some land of better than average quality and some with more favorable than average location. The proposed budget of \$250,000 per year indicates an average of \$36 to \$42 per acre including some cropland. The \$250,000, incidentally, must cover cost of surveying, often a very substantial item.

D. Forest Development

It is important that the State should take advantage of the opportunity to use the newly acquired land as a demonstration of good multiple-use forest management. Thus a comprehensive development plan and an adequate budget for its execution should be provided.

The development plan should be made for each tract prior to any improvement work being done.

This should be a joint effort of men trained in forestry, wildlife ecology, and recreational engineering to reach its full possibilities. It should cover at least the following six activities:

1. **Planting.** Roughly 10 percent of the land is expected to need some degree of artificial reforestation. On limited areas, this may mean solid planting, but more commonly it will be partial or spot planting to fill holes, improve composition, check erosion, provide game food, and provide game cover.

Plantings on old fields and pastures should give preference to native species such as White pine and Red cedar until exotics have been more thoroughly tested. Some varieties of spruce, and European larch appear to have good possibilities. Hardwoods should be planted sparingly until the best techniques can be determined.

Trial plantings to date indicate the necessity for having good vigorous planting stock and the advantages of getting it in early in the season. This suggests the possible need for a local transplant nursery to provide acclimated stock early in the spring.

Machine planting on fairly level open ground can be accomplished for about \$40 per acre including cost of trees. Hand planting runs to \$75 or more. A preliminary estimate of probable cost of reforestation 600 to 700 acres of land in the manner indicated here is \$30,000 per year.

2. **Protection.** The acquired lands, especially the planted areas, will require some special protection from fire; from insects, disease and animal predators; from trespass; from drought or floods; from weeds and from grass. Often this can be provided by arrangement with adjacent land owners. Otherwise, it will require periodic inspection by forest officers. An annual budget of \$10,000 is proposed.

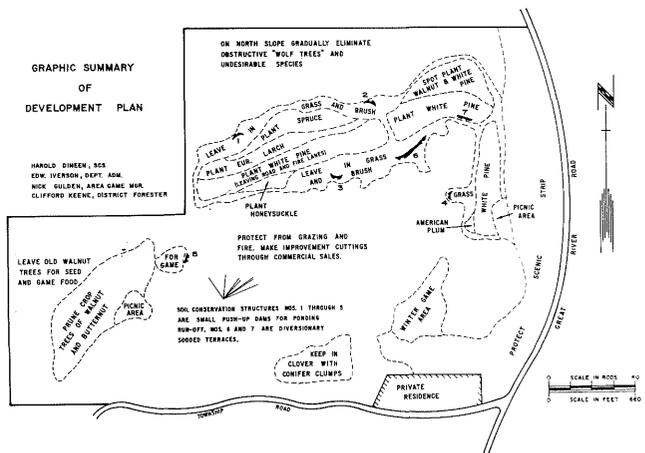
3. **Stand Improvement.** Management practices should emphasize rehabilitation and the improvement of stocking during the early phases. Elimination of "wolf trees" and harvesting as much as possible of the defective and poorly formed trees will give the young growing stock a chance to develop. Thinning for pulp wood, posts, etc., likewise will stimulate growth. Pruning of valuable species to improve form may be justifiable in places, but should be restricted to at most 100 "crop" trees per acre. More will be a waste of effort. Also, excessive pruning of conifers will impair their value as winter game cover.

The recreational engineer's concern here will be the maintenance of a scenic zone along major roads and streams, routing foot and horse trails, providing scenic overlooks, preserving suitable natural areas, etc.

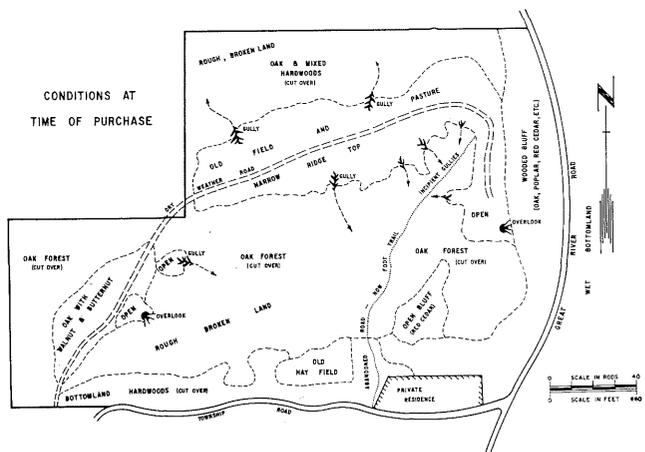
The Wildlife Ecologist will want to maintain some den trees, some natural openings in the forest, and some patches of shrubs for game food. There should be enough land and enough variations in stand quality to accommodate these needs.



Foresters, Game Specialist, and Soil Conservationist confer on development plans for newly acquired Lutchen tract on Mississippi River bluffs in Houston County.



Preliminary plan for developing the Lutchen tract in Houston County. Consideration is given to erosion control, recreational use, and game habitat, as well as timber production.



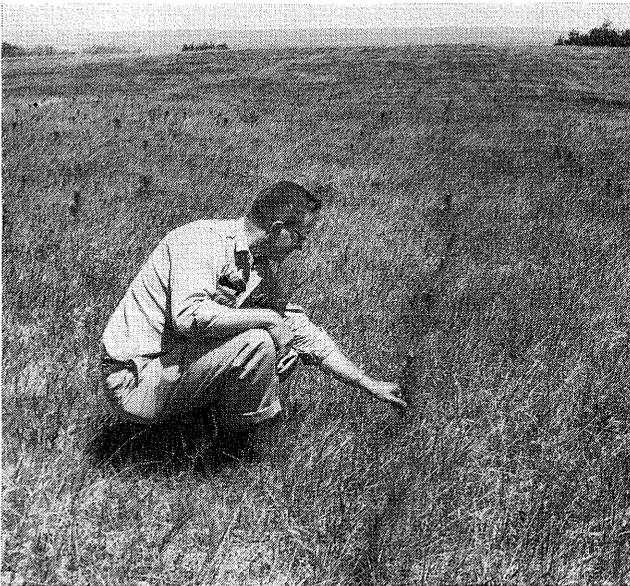
For stand improvement of all kinds, an annual investment of \$20,000 is proposed. This will be helped by commercial timber sales in overmature and defective timber.

Campground Development. Establishment of a small number of camping sites per year should be the immediate goal. Later the main job will be camp maintenance. These will be sites of minimum development in keeping with the definition for Class III recreational area. That is, they will include a cleared space for tent or trailer, a few tables, a water supply, toilet, and garbage pit but will not offer cabins, bath, electricity, and the more elaborate facilities found in parks and private trailer camps. However, they may provide trails to overlooks, caves, and historic sites. Where educational use is assured, typical trees and shrubs along the trails may be labeled.

Local labor should be used in camp development and wherever feasible, the job of supervision and maintenance should be worked out cooperatively with some local unit of government or local civic group.

An annual budget of \$20,000 is recommended.

Soil Conservation. The development plans for newly acquired lands should include measures needed for erosion control. In general, they will consist of throwing up small earthen dams across the main gullies, ditching or terracing to direct the run-off into the ponded area, sodding or planting protective shrubs and trees above the dam, and encouraging native woods to take over below. The Soil Conservation Service has offered



District Forester Shutz inspecting a year-old red pine plantation on abandoned ridge-top field adjacent to the Great River Road. Approximately 10 percent of the acquired land will need planting.



An over-dense stand of hardwoods in the Whitewater Valley in Winona County. Partial cutting of stands of this kind will yield some cash return and improve the condition of the forest.

to give technical assistance to the State on these projects.

An annual expenditure of at least \$5,000 is recommended.

Supervision and Miscellaneous. On the assumption that some of the expanding needs of the Division of Forestry for personnel, buildings, and equipment will be met by funds from other sources, only \$15,000 is listed here as expense directly chargeable to the acquired forest properties.

Total budget. The amounts recommended above add to \$100,000 per year, as follows:

Planting	\$ 30,000
Protection	10,000
Stand Improvement	20,000
Campgrounds	20,000
Soil Conservation	5,000
Supervision, etc.	15,000
	\$100,000

E. Organization

The Committee does not feel competent to make specific recommendations on staff needed to carry out the above responsibilities. It does, however, recommend that serious thought be given to this matter in the Conservation Department and that every effort should be made to provide very competent men under arrangements which will ensure that the work of the several Divisions will be closely integrated on the ground.

This region, because it is different from other parts of Minnesota, may be an excellent place to test an integrated area management pattern with

the whole operation under one roof; in other words, with a single conservation officer in charge of the project, but with technical specialists in the several fields providing the planning and advising services required.

F. Recommended Future Studies

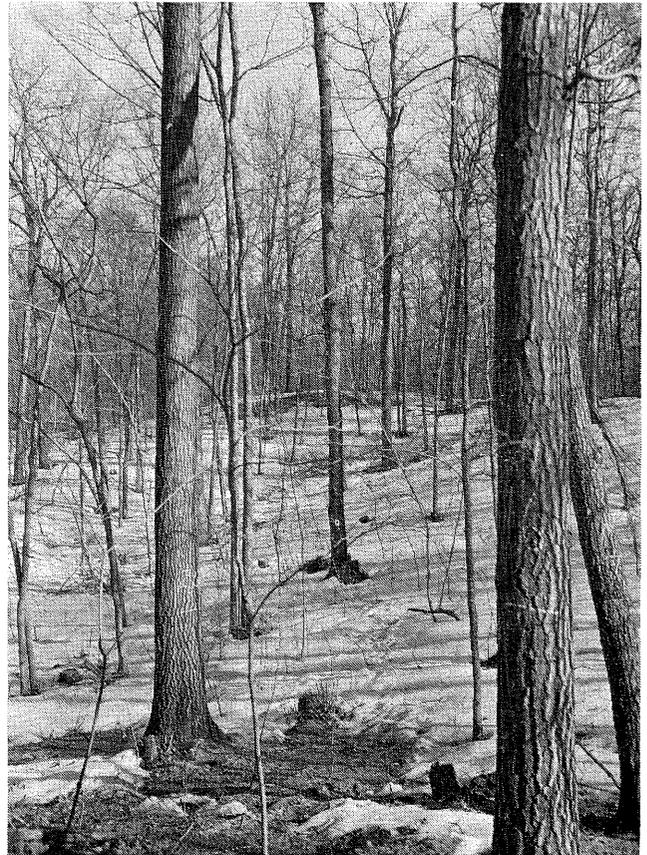
The Memorial Hardwood Forest project is still in a formative stage, and plans for land purchase and development may need to be revised from time to time. The Department of Conservation probably should take another look at the situation in about five years, and periodically thereafter.

Inasmuch as the Hardwood Forest differs greatly from other Minnesota State Forests in soil and topography, tree species, growing season, intensity of recreational use, and in wildlife species, the Department of Conservation might well seek the help of research agencies in conducting technical studies of still unsolved problems peculiar to this area. These studies could be very helpful in the proposed program reviews. The following are merely examples of items seemingly in need of study:

Administration. In addition to the Department's own budgetary and organizational studies, there could be some basic research in (1) the social, political, and economic aspects of large-scale land area management, emphasizing cooper-



This forest on naturally productive alluvial land is in need of timberstand improvement. The large spreading "wolf trees" which are retarding the growth of younger trees should be removed.



Another hardwood area after an improvement cutting. Remaining selected crop trees can be expected to accelerate in growth. Saplings of desirable species remain to fill in the open spaces.

ative relations among the Federal government, the State, the counties, and the municipalities, and between public agencies and private individuals, and (2) a study of administrative structures used to obtain optimum multiple-use land management.

Recreation. There is need for much more factual information on both the demand and supply aspects of future recreation in southeastern Minnesota. As regards probable **future demands** for various types of recreation facilities, a study might well include the entire Twin City Metropolitan Area and the out-of-state tourist needs as well as the needs of local residents. It can serve many purposes in addition to helping to shape the plans for the Memorial Hardwood Forest. The **supply** study could be initiated by taking a detailed recreational inventory of a specific watershed such as the Zumbro River.

Forestry. Much basic research remains to be done in management of the central hardwoods. However, a great deal has been learned in recent years, both here and in other Central States. In the Memorial Hardwood Forest, the most logical first step will be to assemble the available infor-

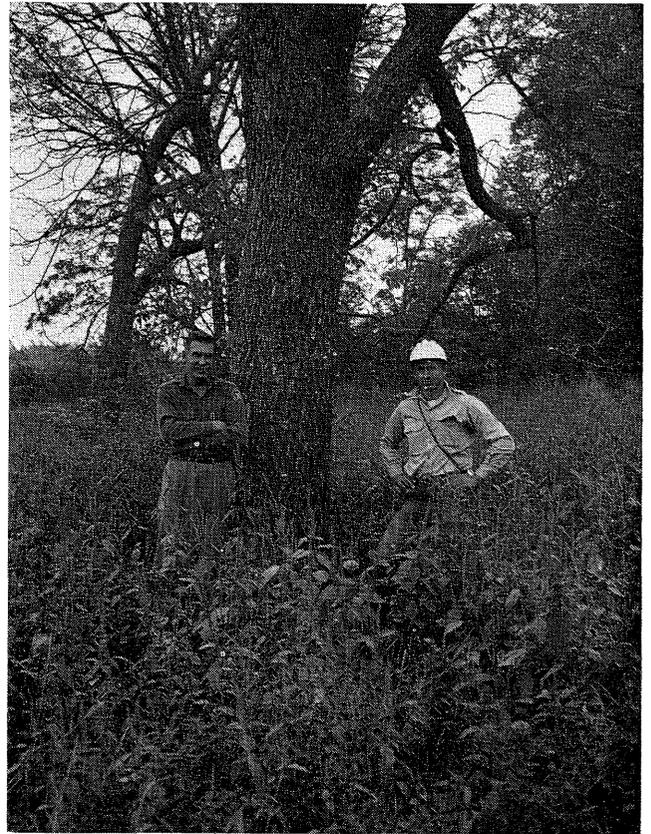
mation on increasing productivity of these types and then determine the applicability of the research results to local conditions. A useful procedure will be to issue a series of preliminary silvicultural guides summarizing what is known about suitable sites, planting methods, tree enemies, growth rates, cutting methods, markets, values, etc. Species of immediate interest are:

- The oaks
- Walnut and Butternut
- Conifers
- Cottonwood and other poplars
- Elms
- Basswood
- Maples

Land Appraisal. As the State proceeds with a broader and more diversified purchase program, there will be need for a standardized land-appraisal procedure. The more experienced purchasing agents with the help of University Foresters and Land Economists can prepare a simple manual which will be extremely useful to new men in this field.



Young walnut trees mixed with other species on the south fork of the Whitewater River. These potentially valuable trees deserve encouragement by thinning and pruning. In places, competing vegetation will need to be controlled.



This black walnut tree, 26 inches in diameter, will produce a valuable eight-foot log. If it had been pruned at an early age, doubtless it would yield a 16-foot log.

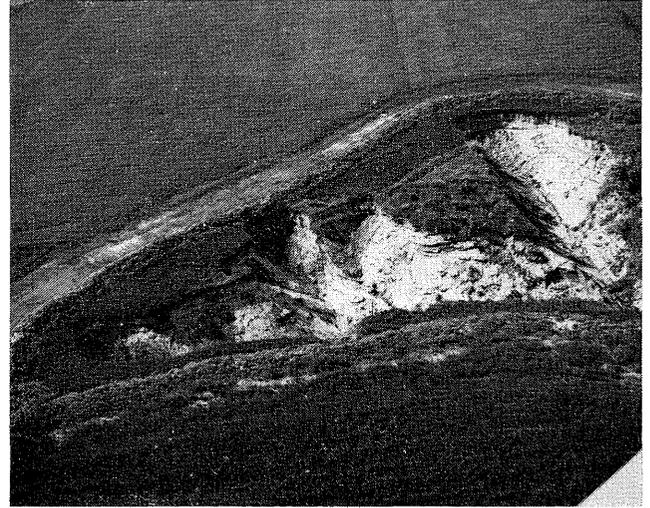
Land Capability. The Soil Conservation Service has initiated studies aimed at relating their soil types to forest and wildlife productivity. These studies extend into adjoining states as well as Minnesota. These can be very useful in this area.

Wildlife Management. There is need for continued surveys of game population in southeastern Minnesota and for further studies in the carrying capacity of different kinds of ground cover. Various patterns of tree and shrub cover for game food and shelter need more scientific testing.

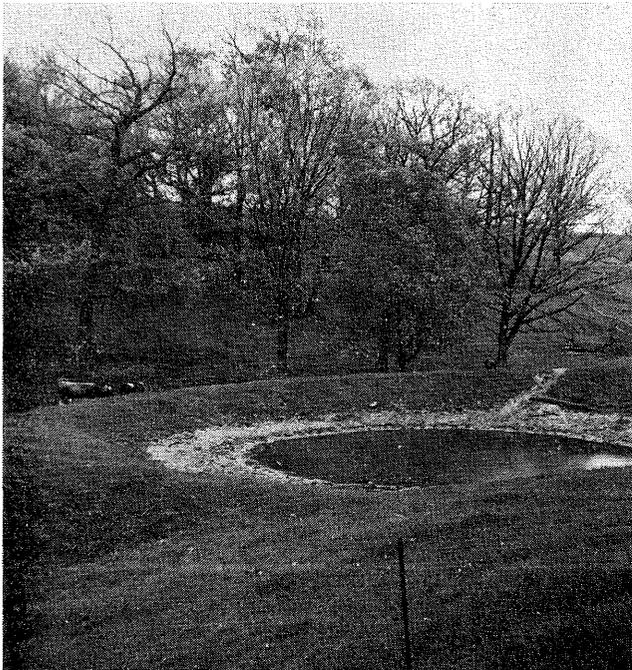
Other. Need for continuing studies in **gully control**, prevention of **stream-bank erosion**, control of **tree diseases**, and **insects** is evident.



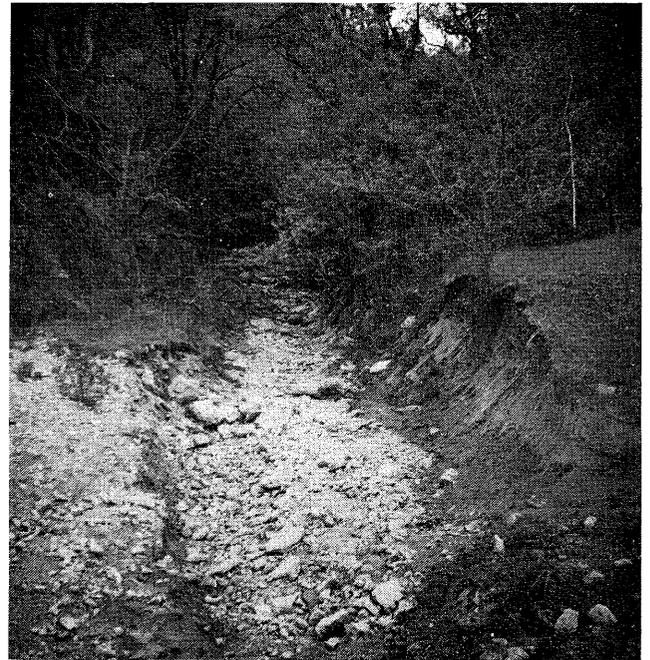
Incipient gully in Winona County. A wash-out like this tends to work uphill across the field and eventually destroy the usefulness of the land.



Raw gully heads being stopped by inexpensive diversion dike. (Photo by U.S.D.A. Soil Conservation Service.)



Small push-up dam at head of gully in Winona County. This, with sod on surrounding area, has largely stopped soil washing. It has additional value for stock watering and for attracting wildlife.



Once the excessive run-off has been checked, forests can take over and heal much of the badly eroded land below.

III. LAND ACQUISITION PLAN

A. Establishment of Compartments

In preparation for the purchase program authorized in 1961, the Division of Forestry outlined what it considered to be desirable purchase units, in most cases conforming with minor watersheds. From aerial photographs and other sources, local Foresters identified the wooded forties and spotted these on township plats. The wooded areas totaled well over 200,000 acres.

These have formed the basis for the present compartments but have been altered in a few respects. (1) The areas in Houston and Fillmore Counties have been joined into a continuous band along the Root River in recognition of the canoeing and other recreational possibilities of the

route. (2) Based upon actual purchasing experience of the past few years, the concept of purchasable land has been broadened to include some bare hillsides, eroding pastures, and similar land not strictly forested but so associated with forest that it forms a logical part of a purchase area. (3) Forest land within the Whitewater Game Refuge, and several large tracts of wetland which have been proposed as game refuges but which are not now a part of an active refuge acquisition program have been encompassed in forest compartments. This has increased the qualified acreage to more than 300,000 acres.

These compartments are summarized by major watersheds and by counties as shown in the following tables.

SUMMARY OF FOREST COMPARTMENTS BY WATERSHEDS

MAJOR WATERSHED	Total Area Within Forest Boundary (Acres)	Total (Acres)	Included in Forest Compartments Forest Land		Percentage of forest in Watershed (%)
			(Acres)	(%)	
Mississippi Direct.....	558,000	309,160	131,800	43	38
Root River.....	772,000	353,880	134,800	38	40
Whitewater River.....	162,000	46,130	17,045	37	5
Zumbro River.....	307,000	108,320	37,400	35	11
Cannon River.....	82,000	31,880	13,710	43	4
Vermillion River.....	39,000	18,280	6,590	36	2
Total.....	1,920,000	867,650	341,345	39	100

SUMMARY OF FOREST COMPARTMENTS BY COUNTIES

COUNTY	Total Area Within Forest Boundary (Acres)	Total (Acres)	Included in Forest Compartments Forest Land		Percentage of forest in County (%)
			(Acres)	(%)	
Dakota.....	57,287	12,360	3,760	30	1
Fillmore.....	391,917	112,480	37,600	33	11
Goodhue.....	204,090	91,960	32,820	36	10
Houston.....	360,523	269,560	116,940	43	34
Olmsted.....	172,597	38,360	8,300	22	2
Wabasha.....	341,286	149,560	57,840	39	17
Winona.....	392,300	193,370	84,085	43	25
Total.....	1,920,000	867,650	341,345	39	100

B. Evaluation of Compartments

With 341,345 acres available for possible purchase and only about 70,000 acres to be purchased within ten years, some basis must be provided for priorities.

Four factors were taken into consideration:

1. Quality of land for timber production.
2. Quality of land for wildlife protection.
3. Special recreational features, giving special weight to the Great River Road and existing state parks as recommended in MORRC report #4.
4. Accessibility from centers of population.

The details of this analysis are outlined in the appendix.

From the analysis, a combined factor was obtained to give weight to the available acreage in each compartment. The general effect was to increase the purchase quotas in compartments along the Great River Road and those lying close to the Twin Cities. Even so, the largest quotas must be assigned to watersheds and counties which have the bulk of the available land. See the following tables:

PURCHASE QUOTAS BY WATERSHEDS

MAJOR WATERSHED	10-Year Purchase Quota (Acres)	Quota as Percentage of Available Forest (%)
Mississippi Direct	27,300	20.7
Root River	25,400	18.8
Whitewater River	3,600	21.2
Zumbro River	8,600	23.0
Cannon River	3,500	25.5
Vermillion River	1,600	24.3
Total	70,000	20.5

PURCHASE QUOTAS BY COUNTIES

COUNTY	10-Year Purchase Quota (Acres)	Quota as Percentage of Available Forest (%)
Dakota	1,000	26.6
Fillmore	7,600	20.2
Goodhue	7,800	26.1
Houston	21,400	18.3
Olmsted	2,000	24.1
Wabasha	13,100	22.2
Winona	17,100	20.3
Total	70,000	20.5

C. Allocation of Quotas to Compartments

DAKOTA COUNTY

Total Area of County	365,440 acres
Area within Memorial Hardwood Forest	57,287 acres
Area in Proposed Compartments—Gross	12,360 acres
Forest	3,760 acres
Area proposed for purchase 1967-76	1,000 acres

Because of its nearness to the Twin Cities, Dakota County has advantages for forest development, especially as related to recreation and production of Christmas trees. However, most woods and potential tree planting areas are so dispersed and intermingled with farm and residential lands that they do not lend themselves to management as State Forests. Only two purchase areas are proposed: one consisting of wetlands and adjoining bluffs at the mouth of the Vermillion River and one along the Cannon River south of Miesville. Both adjoin purchase areas in Goodhue County and are combined with those for analysis.

To permit inclusion of all of the wetlands desired for the proposed Wood Duck Refuge, the Memorial Hardwood Forest Boundary, and the boundary of the Vermillion River compartment should be extended to cover the fractional Township 115 North, Range 16 West, and Sections 25 and 36 in Township 115 North, Range 17 West. This would add approximately 2,500 acres to the Forest.

PROPOSED 10-YEAR PURCHASE PROGRAM

COMPARTMENT	Acreage			Quality Indices (1)				10-Year Purchase Quota Acres
	Gross	Forest	%	For	Wl	Rec.	Acc.	
1. Vermillion River	7,240	2,460	34	2.1	3.7	4.0	4.6	See Goodhue County
2. Cannon River	5,120	1,300	25	2.8	3.4	3.7	5.0	
Total	12,360	3,760	30					1,000

¹These indices refer to the average quality of the land for forestry (timber production), wildlife value (food and cover), recreational assets (scenic roads, canoe routes, fishing streams, historic sites, etc.) and accessibility from centers of population. The numbers have the following significance:

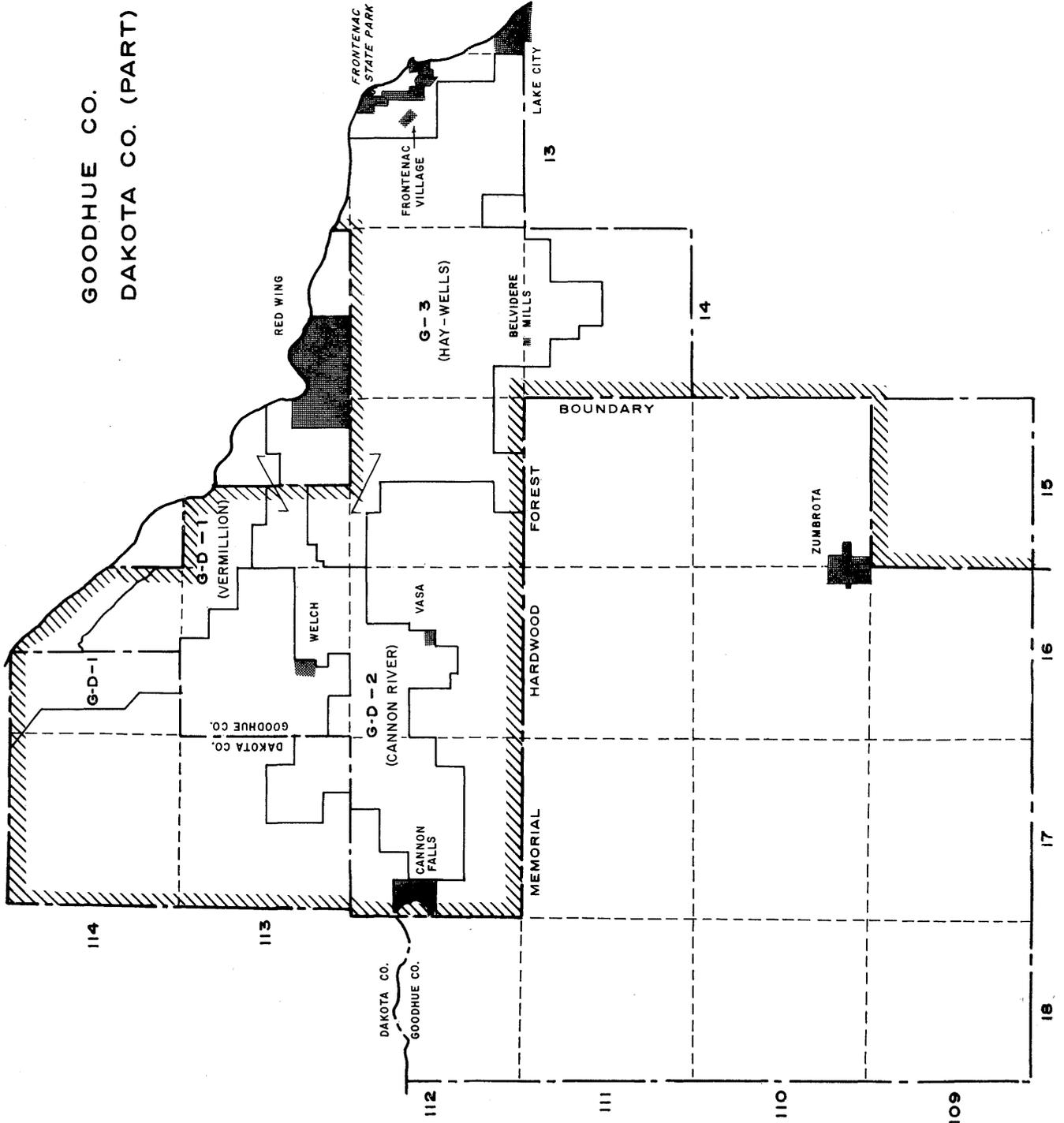
- 1 = Very poor
- 2 = Poor
- 3 = Fair
- 4 = Good
- 5 = Very good

GOODHUE COUNTY

Total area of county	485,120 acres
Area within Memorial Hardwood Forest	204,090 acres
Areas in proposed compartments—Gross . . .	91,960 acres
Forest	32,820 acres
Area proposed for purchase 1967-76	8,800 acres

Approximately 90 percent of the land in this county is in farms. An almost negligible area is in public projects.

The soil capability survey made in 1958 showed 95,800 acres in Classes VI and VII, or that are unsuitable because of erodability or poor drainages for general cultivation. With special treatment, some can produce certain soil conserving crops. Some are suitable for pasture. A



large share, however, are best suited for forestry, recreational, and wildlife purposes. The bulk of the lands included in the proposed forestry compartments are lands of this character.

The wetlands, as well as the terraces, and bluffs along the lower Vermillion and Cannon Rivers, although below average quality for timber, have some especially attractive features for wildlife production, water sports, camping, hunting, and other recreational use. These values are magnified by their favorable location relative to the Twin Cities. The high indices for wildlife, recreation, and accessibility have had the effect of increasing

the ten-year purchase quota moderately at the expense of other more distant watersheds. The Committee feels that an even high quota is desirable, especially in view of the prospect that spreading urban developments may soon make acquisition of land for public recreational use considerably more difficult. The Committee, however, is loath to make arbitrary shifts in general forest acquisition funds for such specialized use. Instead, it recommends that an effort be made to find other means, possibly under the "Open Space" program, to supplement the forest purchases in this particular locality.

PROPOSED 10-YEAR PURCHASE PROGRAM

COMPARTMENT	Acreage		%	For	Quality Indices			10-Year Purchase Quota Acres
	Gross	Forest			Wl	Rec.	Acc.	
1. Vermillion River.....	11,040	4,130	37	2.1	3.7	4.0	4.6	1,600*
2. Cannon River.....	26,760	12,410	46	2.8	3.4	3.7	5.0	3,500*
3. Hays Cr.—Wells Cr.....	54,160	16,280	30	2.8	3.3	3.0	4.1	3,700
Total.....	91,960	32,820	36					8,800

*Includes a total of 1,000 acres in Dakota County.

1. Vermillion River Compartment

This purchase unit follows the course of the Vermillion River from the outskirts of Hastings to the northwest boundary of Red Wing. It consists of 40 percent wet bottomland adjoining the Gore's Pool State Wildlife Management Area, 10 percent sandy terrace and talus slopes, and 50 percent steep bluffs. Thirty-seven percent or 2,460 acres of the woodland lies in Dakota County and 4,130 acres in Goodhue County.

The land is considerably below average productivity for timber growing, but the wetland has a high value for wildlife protection and good potential for boating, fishing, and hunting. The bluff-land has both aesthetic and recreational potential and can produce some sawtimber. The compartment has a distinctive advantage for recreational use in its proximity to Hastings, Red Wing, and the Twin Cities.

It is proposed that selective purchase be made of 1,600 acres for State Forest over a ten-year period and that other funds be secured for rounding out a unit of about 4,000 acres. This will require moving the Memorial Hardwood Forest boundary three miles east in Township 113 North, Range 15 West, in Goodhue County and adding fractional Township 115 North, Ranges 16 and 17 West, in Dakota County.

2. Cannon River Compartment

This includes a belt two to three miles either side of the Cannon River from Cannon Falls to its mouth near Red Wing. It has 13,710 acres of forest or potential forest of which 1,300 acres are in Dakota County.

The forest is made up of approximately 15 percent alluvial soils, 5 percent terrace land, and 80 percent steep and stoney or heavily gullied lands.

The land as a whole is below average quality for timber growing. Wooded strips tend to be rather narrow and sparsely stocked. They have suffered from heavy cutting and in many places from fires. The wetlands, especially near the river mouth, are valuable for wildlife development. Because of nearness to the Twin Cities, the land has a good recreational prospect.

The proposed ten-year purchase is 3,500 acres—about one-third wetland near the river mouth, with the remainder being in tracts chosen for recreational possibilities. If possible, this quota should be increased to about 6,000 acres by funds from other sources. This will require moving the Memorial Hardwood Forest boundary three miles east in Township 113 North, Range 15 West.

3. Hay Creek—Wells Creek Compartment

This includes also the basins of Spring Creek and Bullard Creek. The four small streams empty

into the Mississippi in the vicinity of Red Wing. Forest acreage is 16,280 acres made up almost entirely of steep stoney land.

The land is rated somewhat below average productively for timber because of the open nature of the forest growth on the bluffs. However, some reasonably good stands of timber are found farther inland. The open bluffs are rated good for wildlife and have aesthetic value in connection with the Great River Road. Wells Creek is close to Frontenac State Park. Several of the streams have been stocked with trout. An abandoned railroad grade from Clay Bank to Red Wing on Hay Creek offers an opportunity for a horse trail on a very scenic route. The scenic value of Memorial Highway # 19 will be enhanced by the development of this forest unit. Some lands possibly should be considered as suitable for county park.

The proposed ten-year purchase is 3,900 acres favoring locations adjacent to the roads and trout streams mentioned.

WABASHA COUNTY

Total area of county.....	485,120 acres
Area within Memorial	
Hardwood Forest	341,286 acres
Area in proposed	
compartments—Gross ...	149,560 acres
Forest (Net)	57,840 acres
Area proposed for purchase	
1967-76	13,100 acres

Approximately 92 percent of the land in this county is in farms. A little more than 4 percent is in public projects—principally wetlands along the Mississippi River.

The land capability survey made in 1958 indicated that 78,400 acres of land in Wabasha County were in Class VI or VII, unsuitable for ordinary cultivation. Most were recommended for maintenance in sod, timber, or cover favorable to wildlife. This type of land makes up the bulk of the 57,840 acres included in compartments recommended as purchase units.

PROPOSED 10-YEAR PURCHASE PROGRAM

COMPARTMENT	Acreage		%	For.	Quality Indices			10-Year Purchase Quota Acres
	Gross	Forest			Wl	Rec.	Acc.	
1. Lake Pepin	21,080	7,920	38	3.2	3.0	4.0	3.9	1,900
2. Trout Brook #2	14,760	4,000	27	3.0	3.2	2.5	3.4	*
3. Hells Coulee	13,320	2,720	20	3.0	3.1	2.6	3.4	*
4. Lower Zumbro	33,760	20,120	60	3.6	2.9	3.7	3.2	4,600
5. Kellogg Flats	10,640	5,560	52	2.7	2.8	4.1	3.6	*
6. Snake	26,400	10,480	40	2.9	3.2	3.2	3.4	2,300
7. Whitewater (Part)	3,000	160	5	3.0	3.2	3.3	3.0	*
8. West Indian	15,960	3,320	21	2.7	3.4	2.2	3.2	*
9. Upper Zumbro	10,640	3,560	33	3.8	2.6	3.9	3.7	*
Total	149,560	57,840	39					13,100

*Suggested that the small quotas here should be combined and used for very selective buying of tracts for special uses such as campsites, roadside or riverside screens, etc.

1. Lake Pepin Compartment

This extends about 15 miles from Lake City along the Mississippi River bluffs to Wabasha. It includes 7,920 acres of forest and waste land made up of:

Alluvial land	1 percent
Terraces	1 percent
Steep and stoney land	90 percent
Wooded gully heads	3 percent
Other land	5 percent

The land is about average quality for forestry, wildlife, and recreation. Because of its location adjacent to the Great River Road and reasonable driving distance from the Twin Cities, it should be

accorded priority in purchase plans. However, purchases will need to be carefully paced to avoid creation of a speculative market.

The proposed ten-year purchase is 1,800 acres favoring blufflands adjacent to the highway.

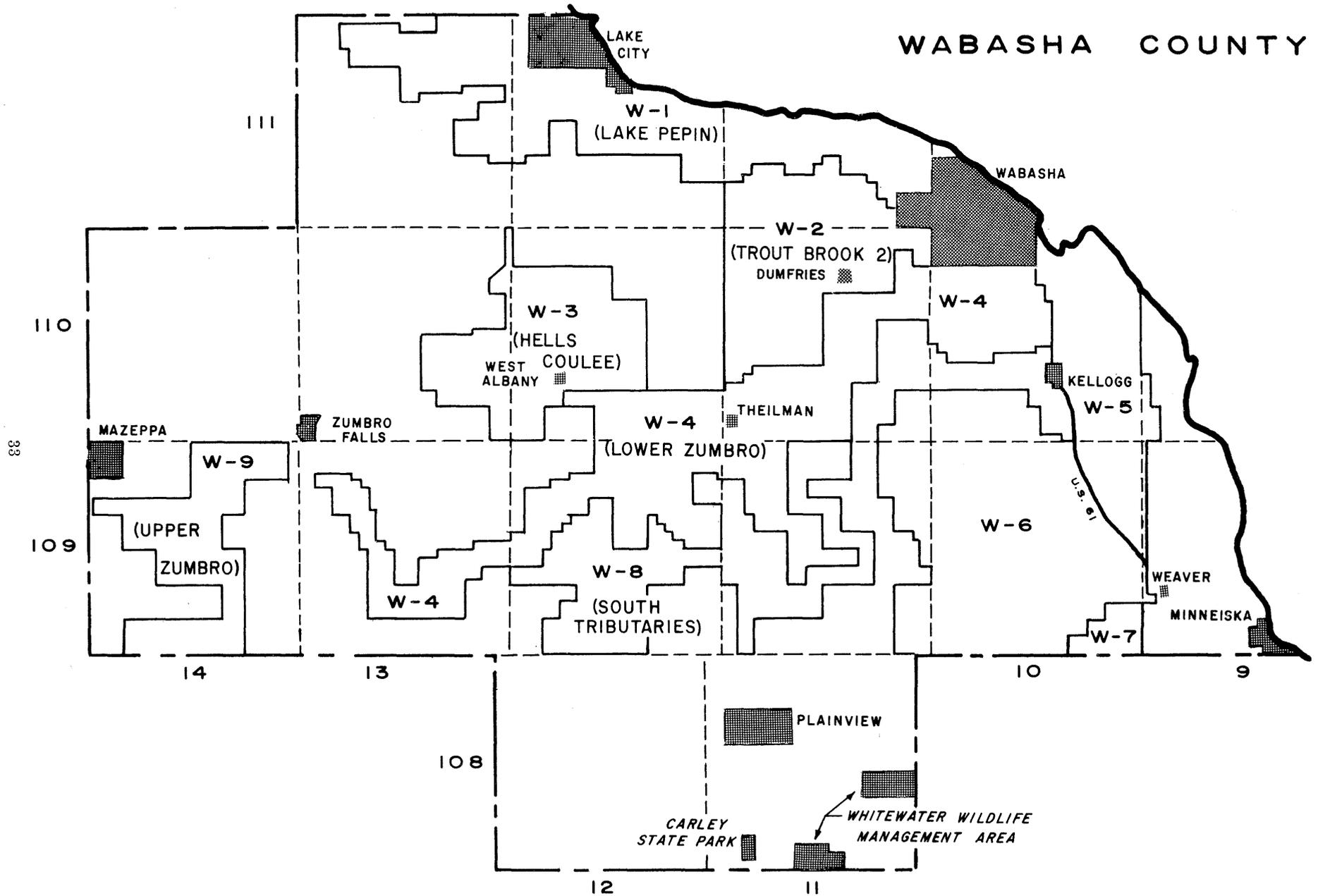
2. Trout Brook Compartment

3. Spring Creek (Hell's Coulee)

8. West Indian Compartment

These three watersheds are tributaries of the Lower Zumbro River. Each contains a considerable acreage of marginal farm land that would benefit from a program of land retirement. However, only 27 percent, 20 percent, and 21 percent of the land respectively has forest cover, and

WABASHA COUNTY



most of this has a patchy distribution. The areas do not offer a particularly attractive opportunity for creating state management units.

Acquisition, other than possibly a few roadside strips is not recommended for present. Possibly the Federal agricultural programs may make some of this land available for public use.

4. Lower Zumbro River Compartment

This is made up of a strip one to two miles wide along the Zumbro River from Zumbro Falls to Kellogg and includes also the lower courses of several southern tributaries (Long Creek, Middle Creek, and West Indian Creek). Sixty percent of the land is forest or potential forest. The forest area consists of:

Alluvial land	34 percent
Terraces—talus slopes	5 percent
Steep and stoney land	48 percent
Wooded gully heads	10 percent
Other land	3 percent

This is a very attractive forestry prospect from almost every aspect—high proportion of land available, reasonable productivity for timber and wildlife, good recreational prospects, and reasonably good access from either Wabasha or Zumbrota.

The proposed ten-year purchase quota is 4,600 acres, preferably in tracts with recreational potential. If supplemental funds can be obtained, it will be desirable to increase public ownership to as much as 10,000 acres.

5. Kellogg Flats Compartment

This lies east of Highway 61 between Kellogg and Weaver, joining in places, the Mississippi bottomlands administered by the Army Corps of Engineers and the U. S. Fish and Wildlife Service.

The land is made up of roughly equal parts of wet bottomland, periodically wet alluvial land, and dry sandplains. Some land is under cultivation, and some river frontage is being developed for residences and summer homes.

The long-run forest potential is fairly good, as evidenced by the growth of pine and spruce planted on some of the sandplains in the 30's and by natural stands of bottomland hardwoods in certain spots. However, so much of the land is now devoid of timber that its quality rating must be placed below average. Danger of flooding is a consideration for agriculture, forestry, and recreation.

The wetlands are valuable for wildlife production, but the uplands are not very useful. Some quail are reported on the sandplains.

The area gets a high rating for recreation and public access because of its position on the Great River Road.

No specific purchase quota has been assigned, but purchases of wetlands up to 1,000 acres and sandplains up to 300 acres may be justified if suitable land can be obtained at a reasonable price.

6. Snake Creek Compartment

This unit includes, in addition to Snake Creek, the lower basins of Gorman Creek and East Indian Creek as far down as Highway 61.

The 10,480 acres of forest are made up of:

Alluvial land	1 percent
Terraces and talus slopes	5 percent
Steep and stoney land	76 percent
Wooded gully heads	10 percent
Other land	8 percent

Timber growing possibilities range from good on north slope to extremely poor on some south-facing bluffs. The overall quality is slightly below average.

Wildlife possibilities for deer and upland birds are considered fairly good.

Proximity to the Great River Road gives this area special aesthetic value. Recreational values otherwise are about average.

The proposed purchase quota is about 2,300 acres during the next ten years, concentrating on blufflands adjacent to Highway 61.

9. Upper Zumbro River Compartment

Above Zumbro Falls, the lands adjacent to the river, although one-third wooded, offer few opportunities for establishing solid forest blocks of 1,000 acres or more. However, the area has certain desirable features which may justify selective buying on a small scale.

The 3,560 acres of forest are made up of:

Alluvial land	13 percent
Terraces and talus slopes	9 percent
Steep and stoney land	34 percent
Wooden gully heads	41 percent
Other land	3 percent

Forest quality is somewhat above average. Some gully heads which have not been cleared have fairly dense stands of "big woods" type. Some riverside and lakeside tracts are well wooded. Farm forestry might be advanced by one or two demonstration tracts.

Wildlife potential is not outstanding but can be improved.

Recreational possibilities include boating on the lake and river, horseback riding, hiking, and hunting. Proximity to the Twin Cities and Rochester is a favorable factor.

Private recreational development is present and is likely to increase.

There is no specific land purchase quota, but way should be left open to pick up tracts valuable for demonstration of forest management or for recreational use up to possibly 1,000 acres.

OLMSTED COUNTY

Total area of county 419,200 acres

Area within Memorial
 Hardwood Forest 172,597 acres
 Area in proposed
 compartments—Gross ... 38,360 acres
 Forest 8,300 acres
 Area proposed for purchase
 1967-76 2,000 acres

Over most of this county, woods are too scattered and intermingled with farmland to make attractive public projects. Only two rather small compartments are proposed. In these, principal interest is in their aesthetic and recreational values and possibly as forest management demonstrations.

PROPOSED 10-YEAR PURCHASE PROGRAM

COMPARTMENT	Gross	Acreage Forest	%	For.	Quality Indices		Acc.	10-Year Purchase Quota Acres
					WI	Rec.		
1. Middle Branch, Zumbro	19,880	3,680	18	3.8	2.6	3.4	4.0	1,000
2. North Branch, Root	18,480	4,620	25	3.6	2.8	3.1	3.2	1,000
Total	38,360	8,300	21					2,000

1. Middle Branch Zumbro (Oronoco) Compartment

This lies west of Oronoco on tributaries of the Zumbro River. Only 18 percent of the area is forested, and some of this forest is on land potentially useful for agriculture. Thus, it cannot be considered a favorable location for large-scale forest acquisition. However, the favorable location of the area relative to population centers, its recreational potential, and the possible need for demonstration forests, may justify selective buying within the next ten years.

It is proposed that way should be left open for selective buying up to 1,000 acres but without any pressure to accomplish a specified quota. The same authorization should extend east of Oronoco along the course of the Middle Fork to Zumbro Lake and along the shores of Zumbro Lake to Wabasha County.

2. North Branch Root (Pleasant Grove) Compartment

This lies astride Highway 52, some 15 miles southeast of Rochester. Woods occupy only 25 percent of the land but are so distributed that it would be possible to establish a concentrated unit of around 3,000 acres just west of the highway.

The forests can be rated fairly good for timber production, and about average for wildlife. The area has no outstanding recreational features, but it must be rated fairly high because of proximity

to Rochester. From the Twin Cities, it is slightly more accessible than the Whitewater River. It has possibilities as a county park.

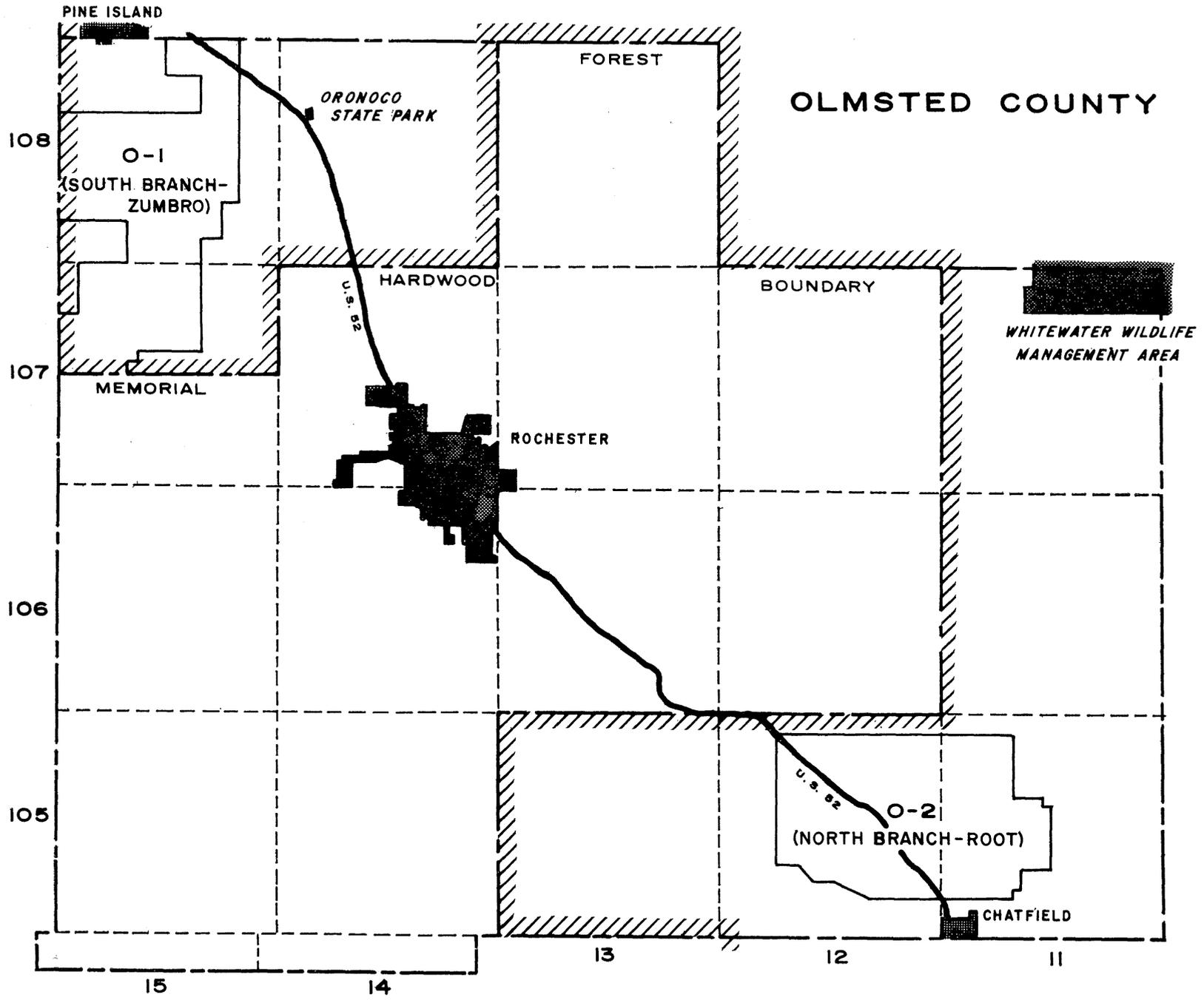
The proposed authorization of purchases is up to 1,000 but without pressure to accomplish a specified quota. Fragmented ownership may present some difficulties in part of this area.

WINONA COUNTY

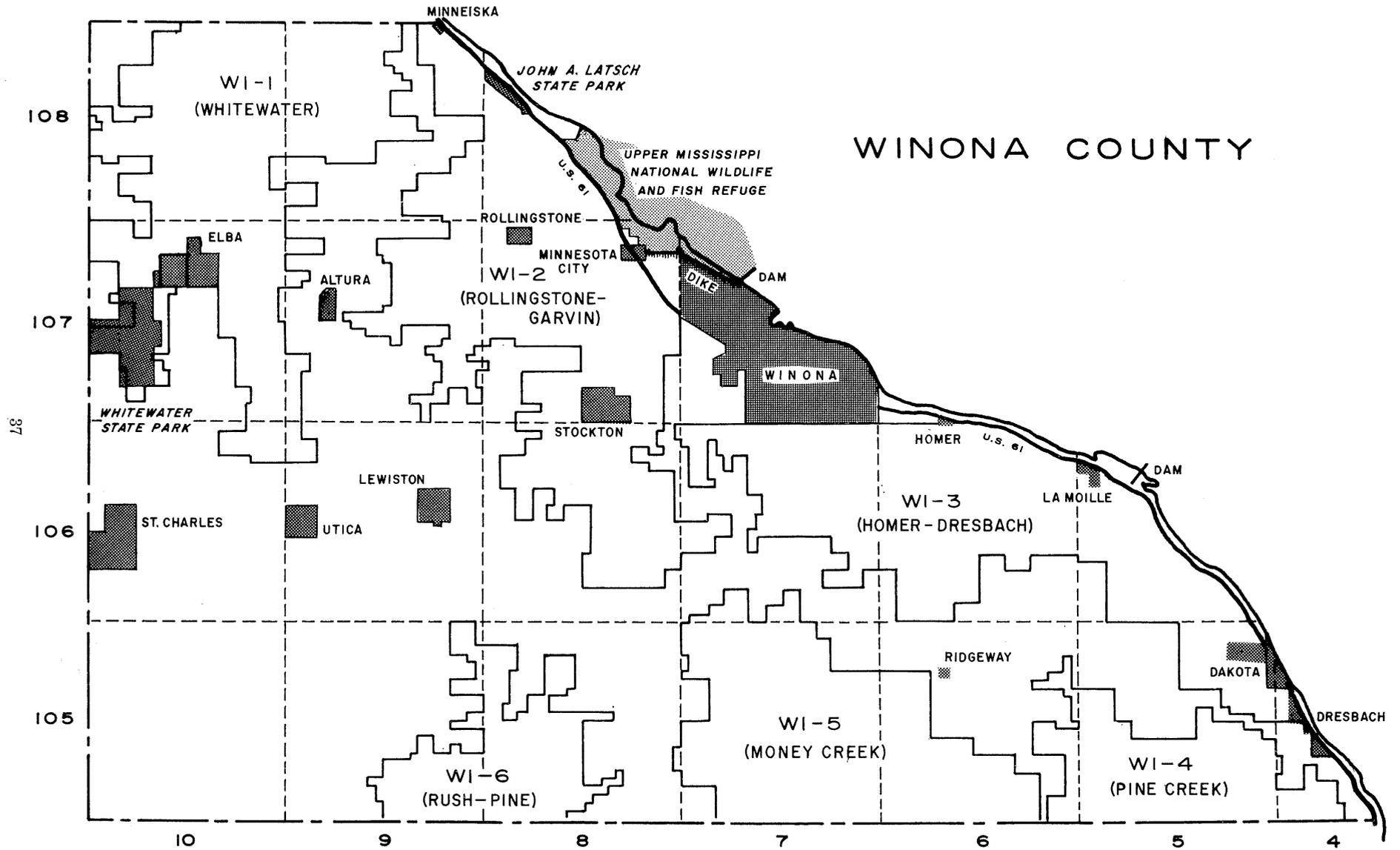
Total area of county 398,720 acres
 Area within Memorial
 Hardwood Forest 392,319 acres
 Area in proposed
 compartments—Gross ... 193,370 acres
 Forest 84,085 acres
 Area proposed for purchase
 1967-76 17,100 acres

Approximately 86 percent of the land in Winona County is farms. A little more than 7 percent is in public projects, including the Whitewater and John Latsch State Parks, Whitewater Wildlife Refuge, Upper Mississippi Wildlife and Fish Refuge, and lands controlled by the U. S. Army Corps of Engineers.

The land capability survey in 1958 classified 127,400 acres as Class VI or VII, that is, unsuitable for regular cultivation because of severe erodability or poor drainage. The bulk of the 84,085 acres of forest included in recommended forestry compartments comes from this type of land.



WINONA COUNTY



PROPOSED 10-YEAR PURCHASE PROGRAM

COMPARTMENTS	Acreage		%	For	Quality Indices			10-Year Purchase Quota Acres
	Gross	Forest			Wl	Rec.	Acc.	
1. Whitewater.....	43,130	16,885	39	3.0	3.2	3.3	3.0	3,600
2. Rollingstone.....	47,600	18,980	40	3.1	3.1	3.6	2.8	4,100
3. Homer-Dresbach.....	43,040	20,700	48	2.9	3.1	3.8	2.7	4,400
4. Pine Creek (Part).....	15,600	7,680	49	2.8	3.2	2.6	2.3	*
5. Money Creek (Part).....	30,080	12,940	43	2.8	3.3	2.4	2.1	2,300
6. Rush-Pine (Part).....	13,920	6,900	50	2.9	3.2	2.5	2.0	*
Total.....	193,370	84,085	43					17,100

*Recommended only for highly selective purchases.

1. Whitewater River Compartment

This includes the present Whitewater Game Refuge and Public Hunting Grounds, the Whitewater State Park, and certain adjoining areas to the east—all within the Whitewater River Watershed. Gross area in Winona County is 43,130 acres. Of this, about half has already been acquired for the state projects. An estimated additional 16,885 acres is suitable for conservation use.

The state lands are primarily under the jurisdiction of the Divisions of Parks and Game and Fish. However, the Division of Forestry prepares timber management plans and supervises timber sales on the wildlife lands. The entire area is suitable for coordinated use for recreation, wildlife management, and timber production.

The proposed purchase is 3,600 acres, favoring lands with recreational potential but not necessarily associated with the Park.

2. Rollingstone Compartment

This large compartment follows Highway 61 from the north county line near Minneiska to the outskirts of the city of Winona. It includes the wooded portions of Rollingstone Creek and Garvin Brook. It surrounds John Latsch State Park and the villages of Rollingstone, Minnesota City, and Stockton.

The 18,980 acres of forest are made up of:

Alluvial land	7 percent
Terraces and talus slopes	3 percent
Steep and stoney land	83 percent
Gully heads	7 percent

Timber growing potential is variable but on the whole is slightly above average. The same can be said for its wildlife potential.

Its position on the Great River Road adds to its natural recreational features. It rates somewhat below average in terms of access from the

Twin Cities but is readily accessible to Winona residents and travelers from east and south. Some portions may be suitable for county or city parks.

The proposed purchase is 4,100 acres favoring tracts adjacent to the Great River Road.

3. Homer-Dresbach Compartment

This compartment follows the Great River Road from Winona south to the county line. It includes the wooded lands of Gilmore Creek, Burns Creek, Pleasant Valley Creek, Homer Creek, Cedar Creek, Trout Creek, Dakota Creek, and other small streams flowing directly into the Mississippi. It surrounds the villages of Homer, La Moille, Donehower, Dakota, and Dresbach.

The 20,700 acres of forest are made up of:

Alluvial land	2 percent
Terraces and talus slopes.....	4 percent
Steep and stoney land	90 percent
Gully heads	4 percent

A part of the "forest" (roughly 1 acre in 5) is now devoid of tree cover, and this feature reduces the timber productivity index to slightly below average. The same feature increases the wildlife productivity particularly for deer and upland birds.

The position of the area relative to the Great River Road, Highway 90, and the existence of trout streams, scenic overlooks, historic sites, and other features give it a high recreational rating. Access from the Twin Cities is intermediate. Some portions may be suitable for county or city parks.

The proposed purchase is 4,400 acres favoring areas adjacent to the Great River Road and tracts susceptible to multi-purpose management.

4. Pine Creek Compartment

Pine Creek rises in southeastern Winona County, flows south into Houston County, and empties into the Mississippi River near La Crescent.

The 7,680 acres of forest in Winona County and 5,320 acres in Houston County are made up of:

Wet alluvial land	3 percent
Other alluvial land	2 percent
Terraces and talus slopes	5 percent
Steep and stoney land	79 percent
Wooded gully heads and narrow ridges	5 percent
Other land	6 percent

Much of the steep land has a southerly or westerly exposure, and the density and quality of timber is relatively poor. Wildlife potential, however, is fairly good.

The unit has relatively limited frontage on the Great River Road and few outstanding recreational features.

Some fairly steep land has been successfully used for orchards. This is a competitive use found in few other localities.

Conditions justify some land purchases here, but it is suggested that initiation of buying program be deferred until adjacent compartments are more fully established.

5. Money Creek Compartment

This includes the wooded portions of Money Creek and Looney Creek, which flow south into the Root River near Houston.

The 12,940 acres of forest in Winona County and 8,500 acres in Houston County are made up of:

Alluvial land	2 percent
Terrace and talus slopes	2 percent
Steep and stoney land	84 percent
Wooded gullies	8 percent
Other land	4 percent

Much of the steep land has a southerly or westerly exposure. Large areas were burned about 20 years ago. The forest quality, therefore, is below average. Its wildlife potential, however, is relatively good.

It has some favorable recreational features including fishing streams, horseback trails, and rustic camping sites. It has no direct access from major highways but is close to Interstate 90 on the north and U. S. 16 on the south and is crossed by Scenic State Road # 76.

The state owns limited acreages in this compartment.

The proposed purchase is 3,800 acres divided roughly—2,300 acres in Winona County and 1,500 acres in Houston County.

6. Rush-Pine Creek Compartment

The two streams rise in southwestern Winona County, enter Fillmore County, and empty into the Root River near Rushford.

The 6,900 acres of forest in Winona County, and 2,920 acres in Fillmore County are made up of:

Alluvial land	12 percent
Terraces and talus slopes	4 percent
Steep and stoney land	69 percent
Gully heads	15 percent

The alluvial land consists mainly of narrow meadows along streams, some of which are fishing streams. Steep and stoney land is more commonly south and west facing rather than north and east. Woods, therefore, are somewhat open and scrubby. They do not occur in extensive blocks.

Timber growing potential is rated about average. Wildlife has benefited by the small farm ponds and other soil conservation practices in the Rush-Pine Small Watershed Project.

The compartment is fairly close to Interstate 90 on the north, U. S. 16 on the south, and State 43 on the east, but is not actually penetrated by any major highway. It is remote from the Twin Cities but is only about 40 miles from Rochester. Trout fishing and potential upland bird and small game hunting are the principle recreational attractions.

No specific acquisition quota is recommended. The State owns a few 40's on Pine Creek. Additional tracts contiguous to this ownership should be acquired as they become available. Acquisition of a few other strategic tracts may be justified for such purposes as providing public campgrounds, access to fishing streams, furthering the aims of the small watershed project, and providing demonstrations to help extension programs.

HOUSTON COUNTY

Total area of county	361,600 acres
Area within Memorial Hardwood Forest	360,523 acres
Area in proposed compartments— Gross	269,560 acres
Forest	116,940 acres
Area proposed for purchase 1967-76	21,400 acres

Approximately 89 percent of the land in the county is in farms. About 4½ percent is in public projects, primarily the Upper Mississippi Wildlife and Fish Refuge.

The land capability survey in 1958 placed

172,600 acres in Classes VI and VII, that is, unsuitable for general cultivation because of extreme erodability or poor drainage. Most of the 116,940 acres of forest included in the proposed forestry compartments comes from this class of land.

PROPOSED 10-YEAR PURCHASE PROGRAM

COMPARTMENT	Acreages			For	Quality Indices			10-Year Purchase Quota Acres
	Gross	Forest	%		Wl	Rec.	Acc.	
1. Pine Creek (Part)	11,920	5,320	45	2.8	3.2	2.6	2.3	*
2. Money Creek (Part)	19,960	8,500	43	2.8	3.3	2.4	2.1	1,500
3. Lower Root	92,280	44,808	47	3.1	3.1	3.2	1.7	8,400
4. Wildcat Creek	14,040	6,840	49					
5. Crooked Creek	37,280	18,000	48	3.3	3.0	3.1	1.6	7,200
6. Winnebago Creek	27,400	14,040	51					
7. South Fork Root	64,040	19,940	31	3.4	2.9	2.5	1.0	3,300
8. Rush-Pine	1,640	220	13	3.0	3.2	2.5	2.0	*
Total	268,560	117,668	43					21,400

*Recommended only for highly selective purchases.

1. Pine Creek Compartment

2. Money Creek Compartment

(See Winona County for information on the above compartments.)

3. Lower Root River Compartment

This includes the land two to three miles either side of the Root River across Houston County plus the Thompson Valley between Calendonía and Hokah.

The forest area of 44,080 acres is made up of:

Wet alluvial land	7 percent
Other alluvial land	12 percent
Terraces and talus slopes	5 percent
Steep and stoney land	72 percent
Gully heads and narrow ridges	4 percent

Forty-seven percent of all land in the compartment is classified as forest or potential forest. Thus, the purchase of large compact blocks can easily be accomplished. Substantial acreages have been purchased already.

The timber growing potential and the wildlife production possibilities are variable, but on the whole, above average.

Recreational possibilities are excellent. Scenic Highway U. S. 16 extends the length of the river, and Highway 61 is on the east boundary. The unit is crossed by State Highways 76 and 44, both scenic routes. The river here is a recognized canoe route, and both it and its tributaries offer fishing opportunities. It includes several recognized "nat-

ural areas" and has possibilities for future campgrounds if not fully developed park area.

The only handicap is its considerable distance from the Twin Cities which gives it a rather low rating for accessibility.

The proposed purchase is 8,400 acres of all-purpose forest land, favoring tracts close to the river and major highways.

4. Wildcat Creek Compartment

5. Crooked Creek Compartment

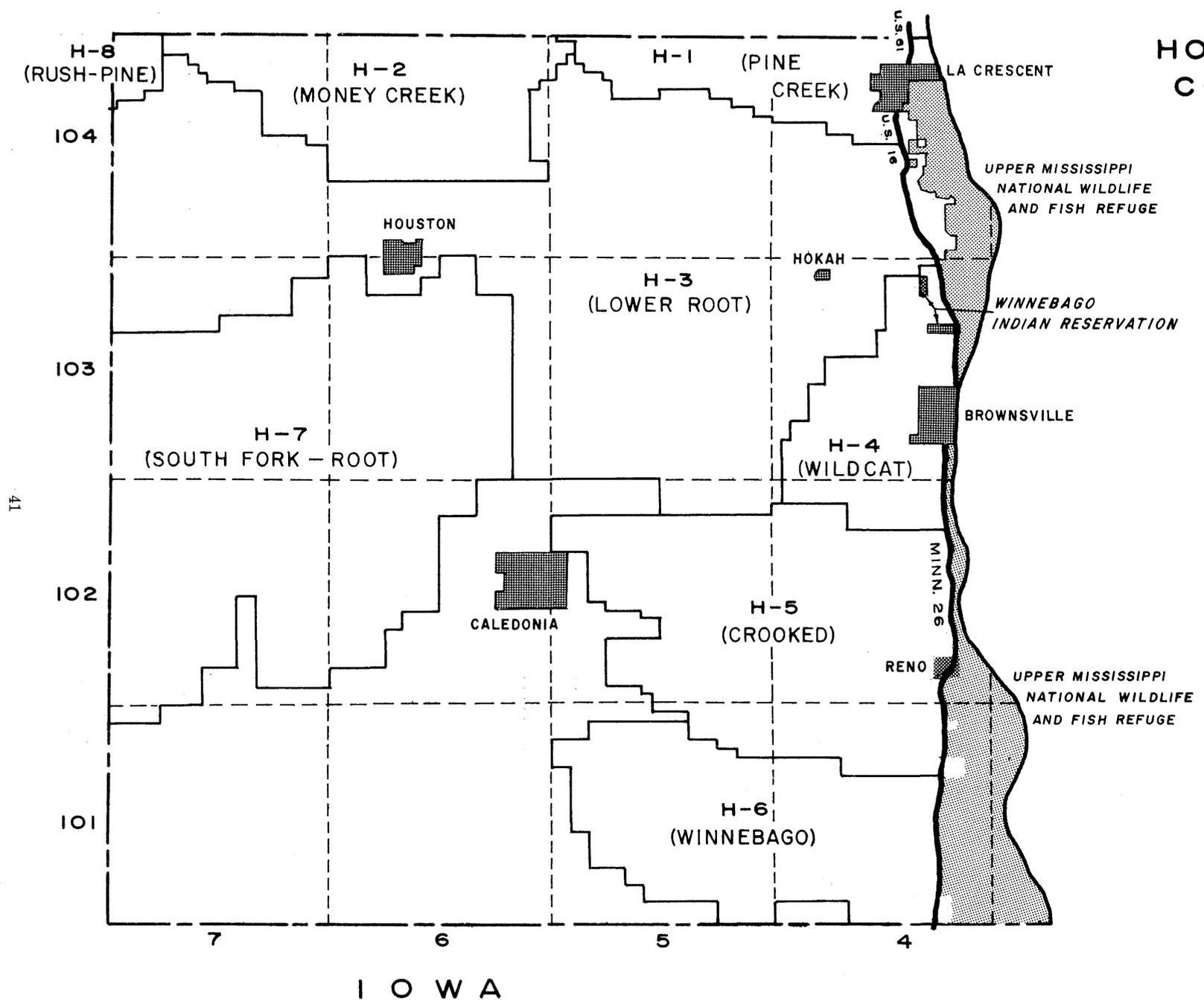
6. Winnebago Creek Compartment

These three watersheds empty directly into the Mississippi River. Only lands west of Highway 26 (The Great River Road) are included in the purchase program. The three compartments are essentially equal in productivity and potential.

Timber growing potential, influenced by a good mixture of species and fairly dense stocking, is rated above average. Wildlife potential is average. Recreational features, including some 20 miles of the Great River Road, 40 miles of other scenic roads, 18 miles of trout streams, and a number of scenic overlooks and several nature preserves, give it an above average rating. Accessibility to population centers is the only weak rating.

The proposed purchase is 7,200 acres of all-purpose forest land.

HOUSTON COUNTY



7. South Fork of Root River

It enters the Root River from the south just below the village of Houston. It contains 19,940 acres of forest land in Houston County and some additional in Fillmore County.

The forest is made up of:

Alluvial land	2 percent
Terraces and talus slopes.....	3 percent
Steep and stoney land	76 percent
Wooded gully heads.....	14 percent
Other land	5 percent

The timber production capacity is variable being very good on the north and east facing slopes and gully heads in the lower part of the valley. The main South Fork and Beaver Creek rise in prairie country and in their upper stretches support only narrow stringers of woods, unsuitable for public management.

Wildlife potential is about average.

Recreational features of note are the Beaver Creek State Park, some 15 miles of trout streams,

10 miles of scenic state road, nature preserves, and an archeological site. The area gets a low rating for accessibility from population centers.

The proposed purchase is up to 3,300 acres favoring tracts in the northern part of the valley and those adjacent to the State Park.

FILLMORE COUNTY

Total area of county	549,760 acres
Area within Memorial	
Hardwood Forest	391,917 acres
Area in proposed	
compartments—Gross ...	112,480 acres
Forest	37,600 acres
Area proposed for purchase	
1967-76	7,600 acres

All of the forest land is within the Root River Watershed. Topography is considerably less rugged than in Houston and Winona Counties. A much larger proportion of total land area is successfully farmed. Less than 1 percent of the land is in public projects.

PROPOSED 10-YEAR PURCHASE PROGRAM

COMPARTMENTS	Acreage		%	For	Quality Indices			10-Year Purchase Quota Acres
	Gross	Forest			Wl	Rec.	Acc.	
1. Rush-Pine (Part).....	10,520	2,920	28	2.9	3.2	2.5	2.0	*
2. Upper Root.....	40,360	14,480	36	3.5	3.0	3.2	1.7	2,800
3. South Fork Root.....	20,200	7,200	36	3.7	2.5	2.5	1.4	1,200
4. Middle Branch Root.....	25,720	8,140	32	3.6	2.8	3.8	2.3	2,000
5. South Branch Root.....	15,680	4,860	31	3.9	2.8	4.5	2.1	1,100
Total.....	112,480	37,600						7,600

1. Rush-Pine Compartment

(See Winona County)

2. Upper Root River Compartment

This includes the land adjacent to the main Root River from the Houston County line up to Lanesboro, surrounding the villages of Rushford, Peterson, and Whalen.

The 14,480 acres of forest land are made up of:

Alluvial land	8 percent
Terraces and sandy talus slopes	8 percent
Steep and stoney land.....	61 percent
Wooded gully heads.....	17 percent
Other land	6 percent

Timber producing capacity, in spite of some bare south-facing hillsides, is rated above average. Some coves and gullies have timber stands

of very good density and quality. Wildlife potential is about average.

The area has good recreational possibilities with State Highway 16 crossing it from east to west and # 43 passing from north to south. The river is a recognized canoe route. Accessibility from population centers, however, is relatively poor.

The proposed purchase is up to 2,800 acres favoring tracts adjacent to the river but including as much as productive forest land.

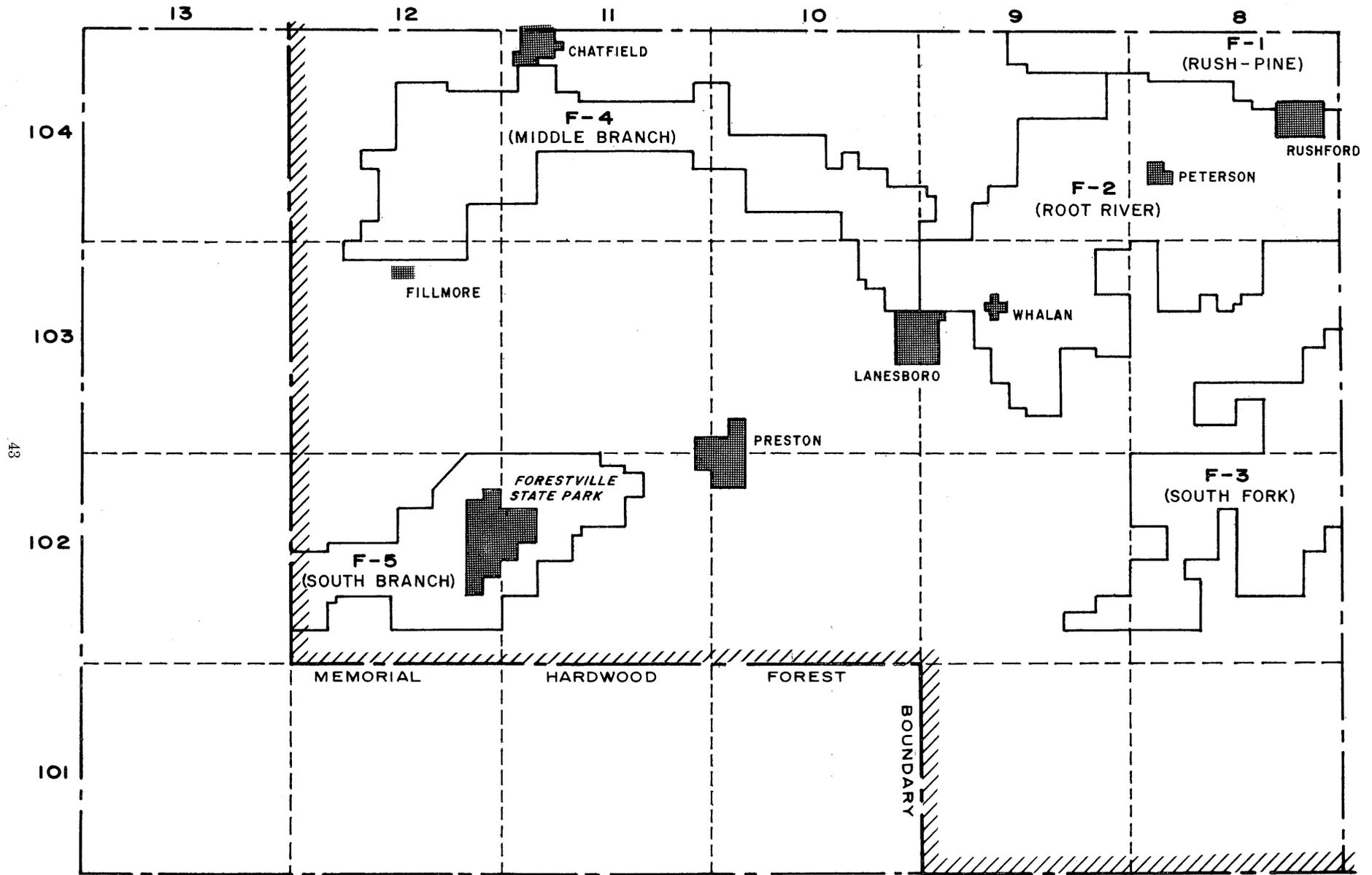
3. South Fork of Root Compartment

This area joins the South Fork Compartment in Houston County.

The 7,200 acres of forest are made up of:

Alluvial land	3 percent
Terraces and sandy talus slopes	1 percent

FILLMORE COUNTY



I O W A

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Steep and stoney land	47 percent
Wooded gully heads	38 percent
Other land	11 percent

The topography is gentler than in Houston County, and the timberland is rated as having better potential. Wildlife and recreational possibilities are about the same. The area is remote from population centers. It has some seven miles of trout stream, at least one natural area, and a number of potential campsites.

The proposed purchase is 1,200 acres of all-purpose forest land.

4. Middle Branch of Root (Chatfield) Compartment

This includes a narrow band of land on both sides of the main Root River from Lanesboro up to Chatfield.

The 8,140 acres of forest are made up of:

Alluvial land	10 percent
Terraces and sandy talus slopes	4 percent
Steep and stoney land	45 percent
Wooded gully heads	32 percent
Other land	9 percent

The gully heads and north-facing slopes, when not heavily pastured, support good stands of timber, and the area as a whole is rated above average for timber production. Wildlife potential is a little below average but can be improved. Recreational assets are some 25 miles of canoe route, 37 miles of fishing stream (includes the Lanesboro Fish Hatchery), a short mileage of scenic highway, and a number of potential campsites. The Army Engineers are considering a flood control

dam in the area which, if constructed, would offer additional facilities for boating and fishing. The compartment is comparatively remote from the Twin Cities but is reasonably accessible to residents of Rochester.

Proposed purchase is 2,000 acres favoring tracts useful for recreational activities but including as much as possible of productive timberland.

5. South Branch of Root Compartment

This comparatively small block surrounds the recently established Forestville State Park.

The 4,860 acres of forest outside of the park consist of:

Alluvial land	19 percent
Terraces and talus slopes.....	1 percent
Steep and stoney land	30 percent
Wooded gully heads	38 percent

The 2,000 acre Park takes in the best of the forest land including some mature hardwood timber, although some of the lands outside the park boundaries rate high in potential productivity.

The area as a whole presents a splendid opportunity for integrating the various activities of the Department of Conservation. The intensive recreational developments (campgrounds, historic sites, landscaping, etc.) within the Park can be augmented by hiking, horseback riding, fishing, and boating on adjoining forest land. Public hunting can be accommodated during the off tourist season. Over-mature timber can be harvested to prevent deterioration of the stands.

The proposed purchase is 1,100 acres favoring tracts which will fit well with the Park.

IV. ECONOMIC EFFECTS OF LAND PURCHASES

Some concern has been expressed in certain localities that the State land purchases may have an adverse effect on local communities by removing property from the tax rolls and possibly reducing the output of grain and livestock.

Examination of recent purchase cases does not substantiate these concerns. Loss of taxes so far has been minor. Likewise, the reduction in pasture and crop acreage has been very limited. Both will be more than offset in the long run by increased revenue from the forest property.

In Houston County, where the heaviest purchases are recommended, the acreage taken each year will amount to only 6/10 of 1 percent of the total land and, of course, a much smaller proportion of the land values.

A. Reduction in Crop Acreage

The State is attempting to confine its purchases largely to non-agricultural land. Obviously, if it is to maintain its average prices in the range indicated in the proposed budget, this is a virtual necessity. In general, the cropland which the State will acquire will be in small irregular fields with steep slopes and of low productivity, made more so by poor farming practices. It should be retired from farm crop production. When, as has occurred in a few cases, the State buys an entire farm unit containing land adjacent to operations of neighboring farms, the State proposes to dispose of the cropland by lease or exchange. One such case is in process now.

Often, the cropland and improved pasture is set off by a metes and bounds survey and is retained by the farm owner, with only the non-agricultural portion being offered for sale to the State.

B. Tax Loss

As a rule, the lands being acquired are not actually earning the taxes assessed to them. This happens because the tax assessments lump good and poor lands together for a total tax lien on the ownership. The better lands must provide the revenue by which the entire tax is paid. In many cases, after the farmer sells his woodland to the State, he will be able to use the proceeds of the sale for capital improvements on the rest of the farm, thus not only maintaining the tax-base, but improving his own situation.

When an entire farm unit is transferred to the State, there is, of course, a loss in taxes. If, however, this is a submarginal farm which already is failing to provide the farmer a livelihood, the reduction is more apparent than real; it would only be a matter of time until the taxes would become delinquent.

In certain locations it appears likely that removal of isolated farms from the tax rolls may be accompanied by savings in road maintenance and bussing children to school greater than the lost tax revenue.

C. Effect on Livestock Production

Unquestionably, the purchases will take out of use some land which has been pastured in the past. There seems to be general agreement, however, that pasturing steep erodible land is neither good for the land nor the livestock. Cattle growers in this area are turning more and more to better breeds of stock. These modern types must have ample feed with a minimum of physical effort, precluding utilization of the steep valley sides and river bluffs. There will, of course, be borderline cases, and it should not be the policy of the State to take over properties being successfully used by cattle enterprises.

D. Contributions of the Forest to Local Communities

State law provides that 50 percent of the gross revenue from the State Forest shall be returned to the local governments in lieu of taxes. One should not exaggerate the magnitude of these payments in the immediate future, because the lands in their present condition are not going to yield heavy revenue. In the long run, however, the payments should become fairly substantial.

The money invested in developing State Forests will be used in large part to employ local labor and should more than offset job losses incurred as a result of the acquisition program.

Expansion of forest industries with increasing payrolls can be anticipated with some degree of optimism. Starting with simple fiber and chip operations, industries should develop gradually into other lines with improving forest conditions.

By helping to beautify routes of travel and by providing picnic grounds, hunting areas, and trout streams, the Memorial Hardwood Forest should attract thousands of additional tourists to this part of the State. This will bring business to the local communities.

It is almost self-evident that the Memorial Hardwood Forest will contribute toward making this area a more attractive and desirable place to live.

All in all, there appears to be little reason for concern that local communities will suffer from the proposed gradual expansion of public holdings in this area.

APPENDIX

METHOD AND COST OF LAND ACQUISITION WITHIN THE MEMORIAL HARDWOOD FOREST

to June 30, 1966

Method of Acquisition	Total Acres	Purchase Cost	Ave. Cost per Acre
Trust fund land—State	1,276	\$ 1.	nominal
Tax forfeited—counties	781	1.	nominal
Gift of land—private	385	—	none
Purchase—contributed funds	440	7,050.	} \$24.90
Purchase—State funds	9,617	250,375.	
Totals	12,499	\$257,427.	\$20.60

ACREAGE ACQUIRED IN MEMORIAL HARDWOOD FOREST IN SEVEN COUNTIES

to June 30, 1966

County	By Purchase (acres)	By Gift (acres)	Tax Forfeited (acres)	Trust Fund (1) (acres)	Total (acres)
Dakota	—	—	—	56	56
Fillmore	1,282	43	160	120	1,605
Goodhue	1,239	—	—	227	1,466
Houston	4,500	—	581	553	5,634
Olmsted	98	—	—	—	98
Wabasha	1,461	132	40	—	1,633
Winona	1,477	210	—	320	2,007
Total	10,057	385	781	1,276	12,499

¹Within boundaries of Memorial Hardwood Forest when established.

STATUS OF LAND OWNED OR CONTROLLED U. S. ARMY CORPS OF ENGINEERS IN MEMORIAL HARDWOOD FOREST COUNTIES

June 30, 1964

COUNTY	Ownership or Control			Licensed to:	
	Total	Owned	Under Easement	Minn. Dept. Conservation	U. S. Fish Wildlife Service
Dakota	364	354	10	347	—
Goodhue	5,007	5,005	2	3,896	—
Houston	3,369	3,315	54	—	3,278
Wabasha	8,110	4,910	3,200	—	4,906
Winona	5,292	4,079	1,213	—	4,046
Total	22,142	17,663	4,479	4,243	12,230

**STATUS OF LAND WITHIN THE UPPER
MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE¹**

June 30, 1966

COUNTY	Total (acres)	Owned	Acquired Land (acres)	Under License from U.S. Army Corps of Engineers (acres)
		Public Domain (acres)		
Houston.....	11,995	14	11,981	3,278
Wabasha.....	3,266	50	3,216	4,906
Winona.....	2,562	178	2,384	4,046
Total.....	17,823	242	17,581	12,230

¹Administered by the Bureau of Sport Fisheries and Wildlife of the U. S. Fish and Wildlife Service.

**ACREAGE OF STATE WILDLIFE AREAS WITHIN
OR ADJOINING THE MEMORIAL HARDWOOD FOREST**

June 30, 1966

COUNTY	PROJECT	Project Area	Acquired Area	Leased From U. S. Army Corps of Engineers (acres)
		(acres)	(acres)	
Dakota	Wood Duck.....	464	—	—
"	Gore's Pool.....	1,480	824	347
Goodhue	Gore's Pool.....	4,306	363	3,896
Fillmore	Middle Root.....	251	—	—
Wabasha	Izaak Walton.....	80	80	—
"	McCarthy Lake.....	3,195	80	—
"	Zumbro.....	1,338	20	—
"	Whitewater.....	3,775	2,325	—
Winona	Whitewater.....	32,481	20,430	—
Olmsted	Whitewater.....	2,924	1,724	—
Totals		50,294	25,846	4,243

**STATUS OF STATE PARKS WITHIN THE
MEMORIAL HARDWOOD FOREST**

June 30, 1966

COUNTY	PARK	Project Area	Acquired Land
		(acres)	(acres)
Fillmore	Forestville.....	2,440	*
Goodhue	Frontenac.....	1,320	501
Houston	Beaver Creek Valley.....	1,028	420
Olmsted	Oronoco.....	105	105
Wabasha	James A. Carley.....	1,329	211
Winona	John A. Latsch.....	1,460	322
Winona	Whitewater.....	1,168	748
Winona	O. L. Kipp ¹	1,350	*
Total.....		10,200	2,307

*In process of acquisition.

¹Partly in Houston County.

HISTORY OF THE MINNESOTA MEMORIAL HARDWOOD STATE FOREST

The Minnesota Memorial Hardwood State Forest was established as a living memorial to Minnesota's pioneers and veterans of all wars on April 20, 1961, by a law now referred to as M. S. A. 89.021, Subdivision 34.

Some of the interesting events leading to establishment of the Forest were detailed in a leaflet circulated by the Minnesota Division of The Izaak Walton League of America, August 1, 1962, in these words:

"The project was conceived and fostered by Richard J. Dorer who first envisaged the forest playground project some 22 years ago. It was included in a long-range Minnesota Conservation Program he drew up when he was supervisor of State wildlife development. When he retired as State Supervisor of Game, May 20, 1958, he began work on a prospectus with four Waltonian colleagues who had been sold on the project for years. They were: George Meyer, Whitewater Refuge Manager; Willis Kruger, Wabasha County game warden; Phil Nordeen, retired Goodhue County warden; and Ed Franey, Minneapolis newsman and conservation writer.

"On October 14, 1958, Dorer called a meeting of a volunteer committee of Waltonians at which the proposed forest program was drafted. In the group were David Vesall who succeeded Dorer as Game Chief; Clarence Buckman of the Forestry Division; Morris Paterson, Rubbel Pond Refuge Manager; Meyer, Kruger, Nordeen, and Franey. Sitting in as advisers were Sam Jorgensen and Jim Coutts of the Fish and Wildlife Service.

"On December 6, Dorer was elected President of the Minnesota Division, Izaak Walton League, and received the convention's endorsement of his forest program. On December 29, Dorer and Ed Franey, as chairman of the League's forest committee, outlined the project at a meeting with Conservation Commissioner Selke, Deputy Commissioner Clarence Prout, and Director E. L. Lawson of the Forestry Division. The Commissioner and his aides were unanimous in their approval of the program.

"One by one, the County Boards gave official approval of the forest but it was not until March, 1960, that the go ahead had been given by all seven counties—Dakota, Goodhue, Wabasha, Winona, Houston, Fillmore, and Olmsted.

"The official proclamation of the Minnesota Memorial Hardwood Forest was issued by Com-

missioner Selke on March 17, 1960. It was almost a year later that the State Legislature gave official approval—but without appropriations.

"Even before the seven counties had given their approval and the Minnesota Memorial Hardwood Forest was officially proclaimed, a public fund for land purchases already had been launched. First individual contributors were Richard Dorer and Dr. Selke, who each gave \$25, and the first organization was the South Minneapolis chapter, Izaak Walton League, which sent in \$100 on February 3, 1960. Since that time, as the story of the forest-playground spread, contributions ranging from dollars to hundreds have come in. These contributions have been from 40 Izaak Walton League chapters, many Conservation Federation affiliates and other sportsmen's clubs. Also contributing have been American legion and V. F. W. posts, D. A. R. and Purple Heart chapters, Rotory, Kiwanis, Lions and other civic service clubs, P. T. A.'s, garden clubs, business firms, and individuals.

"Total money contributions to date (1962) are about \$7,400, of which Minnesota Walton chapters have raised \$4,740. Leading fund raiser in the Walton League is the Rochester chapter with a total of \$1,059. Next are South Minneapolis chapter with \$838 and Austin chapter with \$637. Conservation Federation affiliates have contributed about \$1,200.

"Largest land contribution in value (\$3,670) was from the Red Wing Izaak Walton chapter and the Red Wing Conservation Club which jointly turned over 36-acre Carlson Island to the Forest. The Zumbro Valley Sportsmen's Club gave three parcels of land totalling 192.33 acres and valued at \$3,006. Houston County donated three tracts totalling 381 acres and valued at \$4,572. Fillmore County gave 50 acres valued at \$600. Total land contributions are estimated at \$11,998.

"Lands purchased with contributed funds include 240 acres in Wabasha County valued at \$4,800 and 40 acres in Fillmore County valued at \$250.00."

Cash contributions continued and totaled \$10,485.88 by June 30, 1966. In September of 1962, the Legislative Advisory Committee provided \$18,800 for acquisition of key tracts by the Division of Forestry. The 1963 Legislative session passed the Omnibus Natural Resources and Recreation Act which is financed by an additional 1c per pack tax on cigarettes. Upon passage of this act, \$300,000 was provided the Division of

Forestry for land acquisition for the biennium starting July 1, 1963 and ending June 30, 1965. With this appropriation, the responsibility for appraisal of land and processing of the land acquisition was transferred from the Division of Forestry to the Department of Administration. The Division of Forestry, however, is still responsible for locating prospective tracts for purchase and giving overall guidance to the acquisition

program. A copy of a memorandum of understanding between the Division of Forestry and the Department of Administration is attached. The 1965 Legislature appropriated an additional \$200,000 to the Department of Administration to be used for the purchasing of land for the biennium beginning July 1, 1965 and ending June 30, 1967. The 1965 Legislature also appropriated \$25,000 for a development study of this forest.

MEMORANDUM OF UNDERSTANDING

By common agreement, the following procedure has been established between Department of Administration appraisers and the Division of Forestry for the acquisition of lands within the Minnesota Memorial Hardwood State Forest:

1. Forestry fieldmen will locate desired tracts that in their judgment can be acquired at a reasonable price, and will obtain permission from the owner for the appraisal of such lands.

2. The area field forester will then transmit the land descriptions desired to Mr. Matson, Chief of

Land Acquisition, Department of Administration, with a copy to the Division of Forestry.

3. The field appraisers for the Department of Administration will then complete appraisal work, obtain the necessary option, and complete the transaction. It can be expected that forestry fieldmen will assist Department of Administration field appraisers to a reasonable degree in locating land to be appraised or in contacting owners. However, the actual appraising, and other work related to acquisition is the responsibility of Department of Administration field appraisers.

Dated 10-29-63

/s/ Ray Matson

Ray Matson, Chief of Land Acquisition
Department of Administration

Dated 10-28-63

/s/ Clarence Prout

Clarence Prout, Director
Division of Forestry

**DEPARTMENT OF CONSERVATION
DIVISION OF FORESTRY**

L—Timber

Preservation of Timber for
Aesthetic and Watershed Purposes

St. Paul 1, Minnesota

June 13, 1958

CIRCULAR LETTER TO: All Field Personnel and
State Land Management Staff

Your attention is directed to the extreme importance of protecting the natural beauty of State lands that are used by the public adjacent to lakes, rivers, streams, access sites, camp grounds, and in State Parks. The value of such areas for recreational purposes is steadily increasing and must be given the maximum amount of consideration and protection.

Any cutting in or adjacent to such areas can be tolerated **only** when the natural beauty will not be impaired in any manner.

When cutting must be done, the cutting regu-

lations and permit supervision must be of the highest caliber. Skidding methods, slash disposal, and individual tree selection must receive painstaking attention.

All cutting regulations for any proposed cutting within a State Park must have the complete approval of the Park Superintendent. Circular Letter, L—Timber, No. 7, Sec. 2, dated June 13, 1958, requires that the Park Superintendent's signature and the Area Forester's signature must appear at the bottom of Application for Small Timber Sale, F-80, before sent to St. Paul.

No cutting can be permitted on State Land that will increase erosion or contribute to the silting or other damaging of rivers and streams.

/s/ E. L. LAWSON, DIRECTOR

ELL:CBB:de

QUALITATIVE RATINGS USED IN COMPARING PURCHASE COMPARTMENTS

To assist in allocating purchase quotas on an objective basis, there is need for a simple rating scheme to compare the timber-growing, wildlife, and recreational potentials and an expression of the relative accessibility of the several compartments.

The forestry and wildlife potentials can be rated on the basis of broad soil types. Recreational features, tabulated, give a basis for comparing values. Travel distance from the Twin Cities over various types of roads gives a basis for accessibility rating.

For forestry and wildlife appraisal, the "conservation" land in each compartment was classified by a 10-percent sample on soil survey maps into eight broad types. Each was given a numerical rating having this significance:

- 1 = Very poor
- 2 = Poor
- 3 = Fair
- 4 = Good
- 5 = Very good

Forestry Potential Types and Ratings:

Wetlands	1
Alluvial	4
Sandy terraces & talus slopes.....	3.5
Steep & stoney (open hillsides).....	1
Steep & stoney (S & W slopes).....	2
Steep & stoney (N & E slopes).....	4.5
Loamy talus & wooded coves.....	5
Eroded gully heads & ridges.....	3

Wildlife Potential Types and Ratings:

Wetlands	5
Alluvial	3
Sandy terraces & talus slopes.....	1
Steep & stoney (open hillsides).....	4
Steep & stoney (S & W slopes).....	4
Steep & stoney (N & E slopes).....	2
Loamy talus & wooded coves.....	2
Gully heads & ridges (grass, etc.).....	4

Recreational Potential

All compartments have some recreational or aesthetic possibilities; thus, none were rated less than 2. All were then credited with certain points according to extent of special features included. These were:

Mileage through Wooded Area	Total Mi.	Weight per Mi. ¹
Great River Road.....	121	8
Other Main Trunk Highways	87	7
Other Scenic Roads.....	214	2
Canoe Routes	147	4
Primary Fishing Streams....	305	1
State Park Boundary.....	41	15

¹To make the rating comparable, the weights were adjusted to bring the figures for large compartments down, and for small compartments up to the level of an average-size compartment. The formula used was:

$$\frac{\text{Miles} \times \text{Weight} \times \text{Sq. Mi. in Ave. Comp.}}{\text{Sq. Mi. in this Compartment}}$$

An additional 20 points was given for significant historic, natural, and scientific sites, and in a few cases, because of suitability of land for intensive recreational use as a result of proximity to cities or large villages.

The number of adjusted points for individual compartments ranged from 27 to 324. These were converted to a numerical rating ranging from 2.0 to 4.5 by the following formula:

$$\text{Rating} = \left(\frac{X \text{ (points)} - 27}{297} \right) \times 2.5 + 2$$

Accessibility

The rating was made in terms of miles of road travel from the Twin Cities to the center of each Compartment. Major trunk highways were given a weight of 1 per mile. Other paved U. S. and State highways were given a weight of 2. Secondary (gravel) roads were given a weight of 3.

Total points for individual Compartments ranged from 26 to 197, the higher number indicating least accessibility. These were converted to a numerical rating by formula:

$$\text{Rating} = [(197 - X \text{ (points)}) \times .234] + 1$$

