YAHARA RIVER 1965

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EFFECT OF TREATED EFFLUENT DIVERSION ON YAHARA RIVER FLOW, WISCONSIN

by

K. B. Young

Prepared as part of cooperative program with
the Public Service Commission of Wisconsin

Open-file report

Madison, Wisconsin
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Effect of Treated Effluent Diversion on Yahara River Flow, Wisconsin

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Purpose and Scope

Before December 1958 the treated sewage effluent from the Madison, Wisconsin, metropolitan area was discharged into the Yahara River at the north end of Lake Waubesa, which is upstream from the USGS gaging station on the Yahara River near McFarland, Wis. Since December 1958 the effluent has been diverted southward from the sewage treatment plant into Badfish Creek and enters the lower reach of Yahara River, thus by-passing the gaging station. The purpose of this report is to demonstrate the effect that this diversion seems to have on the flow of the Yahara River near McFarland. Indirectly, it also demonstrates the effect on streamflow of withdrawing ground water for use in the Madison metropolitan area since the treated effluent is primarily the major portion of the used ground water.

Background Information

Ground water makes up a large part of the water entering streams and lakes in the Madison metropolitan area (Cline, 1965). Ground water, also, is the source of water supply for this area. Consequently, any substantial withdrawal of ground water which is eventually diverted from a part of the Yahara River basin as treated sewage effluent will reduce the contribution to local streams and lakes. This is the situation that has existed in this area since December 1958 when treated effluent began to be discharged into Badfish Creek (see fig. 1).

The flow of the Yahara River past the gaging station near McFarland is influenced by three lakes upstream, Mendota, Monona and Waubesa (storage

[1/]District Engineer, U. S. Geological Survey, Madison, Wis.

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WATER RESOURCES DIVISION

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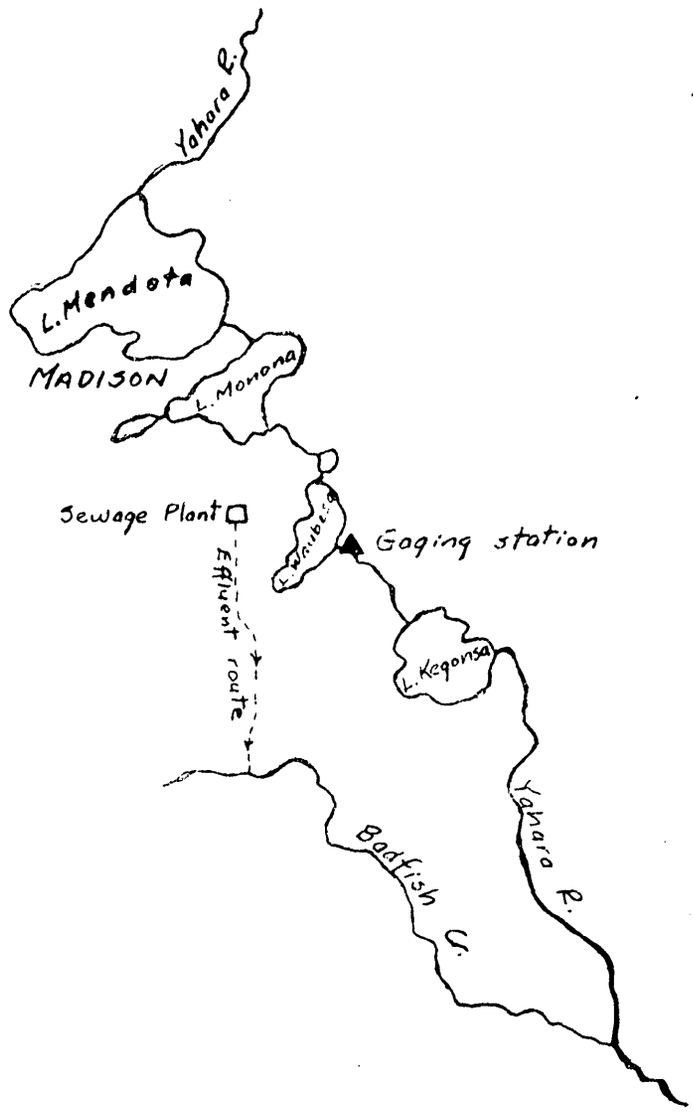

FIGURE 1. — The Yahara River system in the Madison, Wis., area.

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and release of water, evaporation, etc.). The increased pumpage of ground water and the diversion of treated effluent around the gaging station since December 1958 also affect the flow. As part of its cooperative program with the Public Service Commission of Wisconsin, the U. S. Geological Survey has obtained discharge records at the gaging station since September 1930. Consequently, the runoff prior to the effluent diversion is very well documented. As of now (1965) there are six years of discharge record since the diversion began.

More water is pumped from wells for water supply in the Madison metropolitan area than finds its way as treated effluent discharged into Badfish Creek. For example, in 1963 an average of about 30 mgd were pumped from wells in the Madison area, but only 22.7 mgd were discharged as effluent. The difference between these amounts is water lost through evapotranspiration, consumptive use, or seepage into the ground-water reservoir and discharged into streams and lakes.

Effect of Diverting Effluent

The double-mass curve technique is used to demonstrate the effect on the flow of the Yahara River at the gaging station of diverting the treated effluent around the station. The theory of the double-mass curve is based on the fact that a graph of the cumulation of one quantity against the cumulation of another quantity during the same period will plot as a straight line so long as the data are proportional. A break in the slope of the line means that a change in the relationship between the two variables has occurred, or that the relationship is not consistent at all rates of cumulation.

One of the variables for developing the double-mass curve was the annual runoff for the Yahara River near McFarland. The other variable

was similar data for the Sugar River near Brodhead, an adjacent drainage basin with a comparable precipitation pattern. Both of these gaging stations began as non-recording stations. However, by 1939 both stations had instruments to record the stage. For this reason, only that portion of the double-mass curve from 1939 on was considered in this analysis.

A plot of the cumulation of runoff data for the Yahara and Sugar Rivers (see fig. 2) forms a straight line from water year 1939 through water year 1960, one year following that in which the diversion was initiated. Points representing the Yahara River flow plus the amount of the diversion plot reasonably close on the extension of this straight line. After water year 1960, the points representing actual flow of the Yahara River appear to begin a line with a different slope. Theoretically, the change in slope indicates a change in the relationship between the two variables. Actually, there should be a change in the relationship because of the decreased flow of the Yahara River resulting from diversion of effluent from the upper basin. Additional years of runoff data to add to this graph will be helpful to confirm this change.

In a relatively high-runoff year like 1960, the effluent diversion amounts to about 13 percent of the actual flow (unadjusted) past the gaging station (see table 1). In a low-runoff year such as 1964, it amounts to more than one-half the Yahara River flow. Through water year 1958 (prior to diversion), the average annual flow of the Yahara River at the gaging station was 150 cfs. The average effluent diversion from water year 1960 to 1964 is about 34.5 cfs. This is equivalent to about 23 percent of the pre-diversion Yahara River flow.

FIGURE 2. — DOUBLE-MASS CURVE FOR YAHARA AND SUGAR RIVERS

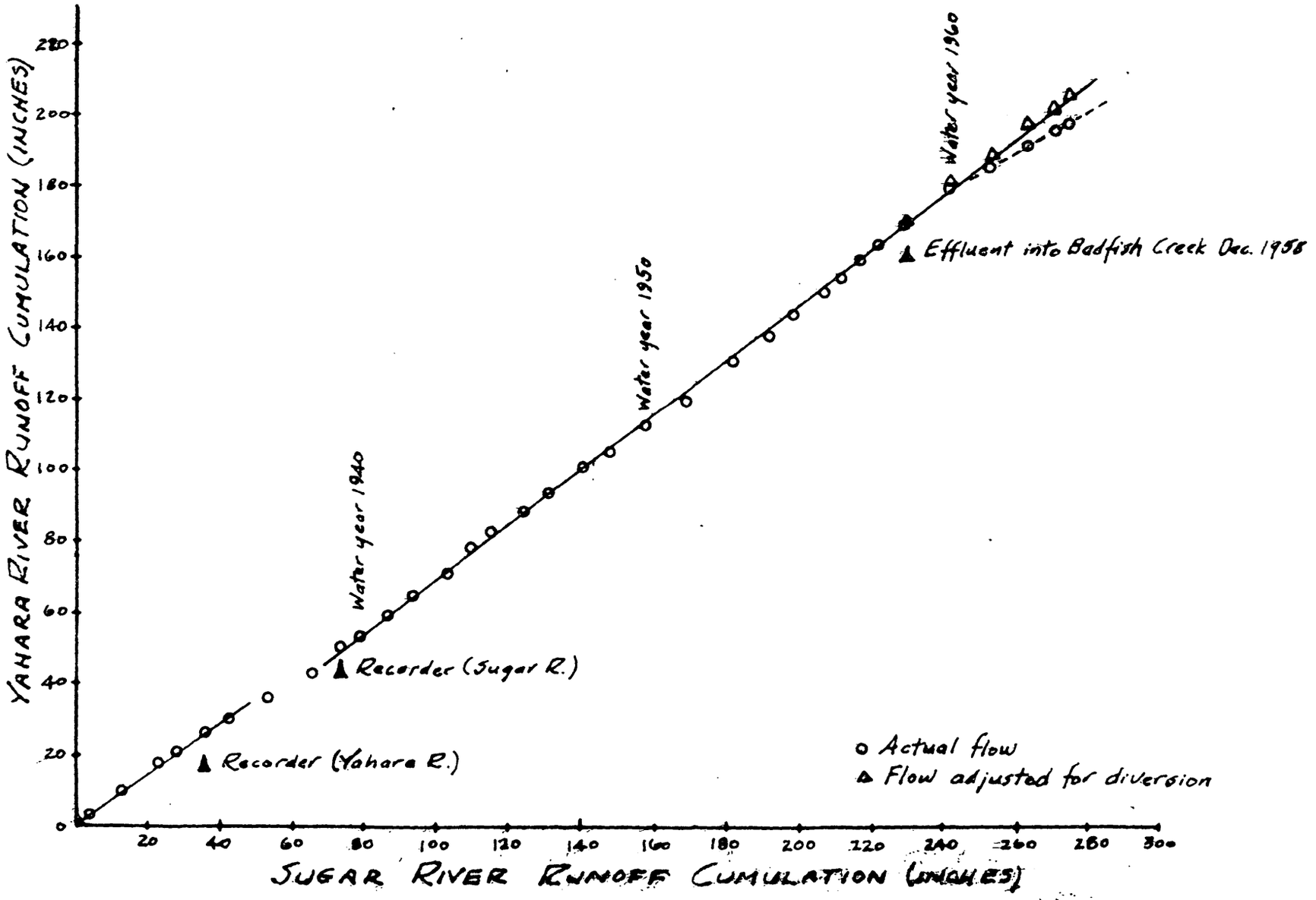

Table 1. Effluent diversion in terms of percent of discharge of Yahara River at gaging station near McFarland, Wis.

Water Year	Yahara River Discharge (Annual mean, cfs)	Effluent Diversion (cfs)*	Effluent Percent of Yahara
1960	274	34.9	12.7
1961	159	33.2	20.8
1962	164	34.6	21.1
1963	95.6	34.7	36.3
1964	63.8	35.0	55.0

*Data obtained from Madison Metropolitan Sewerage District.

While the above discussion has been based on annual averages, it should be noted that the summer months' period is when nature's take of water through evaporation and transpiration is at a peak. Also, it is the period when the flow of the Yahara River is at a low level. During the summer months the effluent diversion around the gage could amount to nearly twice the discharge of the Yahara River at the gaging station. For example, the average flow of the Yahara River at the gage during July and August 1964 was 20 cfs. The effluent average entering the stream below the gage for this same period was 35 cfs.

Conclusions

The data obtained and analyzed so far indicate that the annual flow of the Yahara River at the gaging station is being decreased approximately equivalent to the amount of effluent being diverted into Badfish Creek. If there is a substantial increase in water use in the Madison area, and if existing untreated effluent that now enters Lake Mendota is channeled into the sewerage system, there likely will be a corresponding decrease in the flow of the Yahara River. At what point this decrease in flow becomes detrimental to the Yahara River environment and measures for preventing further deterioration of the situation are needed, are matters for future serious consideration.

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K N O W Y O U R R I V E R B A S I N

A Study of

THE YAHARA RIVER BASIN

INTRODUCTION

This report, compiled by the Madison League of Women Voters, hopes to give our membership an overall look at our own river basin. Although this study is made under the authority of a national item, it is hoped that a look at our local basin will provide practical examples of the problems for which a National Water Policy must furnish workable answers. The water resources item, as adopted at the national convention in April 1958, reads as follows: "WATER RESOURCES: Support of those national water policies and practices which promote coordinated administration, equitable financing, and regional or river basin planning."

NOTE: Although some attention has been given to the whole Rock River, this study mainly covers the YAHARA RIVER from its source near Madison to where it enters the Rock River at Indian Ford.

FOREWORD

WISCONSIN'S WATER----Water, because of its abundance, is very important to Wisconsin. Only one state, Michigan, has a larger total area of water under its jurisdiction. Wisconsin has 10,062 square miles of outlying water and 1,439 square miles of inland waters under its control. Increase in inland waters is due to so-called flowages back of dams.

WISCONSIN'S RIVER SYSTEMS----Of the total area of the state, approximately 38,617 square miles (67.6%) drain into the Mississippi, 14,388 square miles (25.9%) into Lake Michigan and 3,048 square miles (5.5%) into Lake Superior. The interior of the state is drained by six principal river systems which, with their approximate drainage areas, in our basin are, Wisconsin 11,715 square miles, Rock, including the Pecatonica, 5,569 square miles. The Rock enters Illinois at Beloit and the Mississippi at Rock Island, Illinois.

WISCONSIN'S DRAINAGE BASINS----Most of Wisconsin drains to the Mississippi. One of the principal tributary river systems is the Wisconsin; the Rock is also an important river which rises in Wisconsin but flows into Illinois at Beloit. Lakes are numerous throughout the glaciated part of the state. There are nearly 9000 of them. One of the best known is the Madison chain.

CHARACTERISTICS OF THE YAHARA RIVER BASIN

I. PHYSICAL

The Yahara River--formerly called the Catfish River--is part of the Rock River Basin. From its source in southwestern Fond du Lac County, the Rock flows south and slightly west to Beloit where it leaves Wisconsin, enters Illinois, and flows southwest to join the Mississippi River near Davenport, Iowa.

The Yahara itself is an easy flowing river which rises in a small lake in Dane County, links and drains the Four Lakes, goes past Stoughton and joins the Rock River nine miles northwest of Janesville.

Madison, the capitol city of Wisconsin and the second largest city of the state, lies on an isthmus between Lakes Mendota and Monona in the Four Lakes Group on the Yahara River.

II. POPULATION CHARACTERISTICS (1950 census)

Madison	96,056	Dane County
McFarland	593	Dane County
Monona	2,544	Dane County
Stoughton	4,833	Dane County
Middleton	2,110	Dane County

Madison lies on an isthmus between Lakes Mendota and Monona. The entire region is one of rapid population growth. Madison, its largest city, now has a population of over 126,000.

III. ECONOMICS

A prosperous dairy industry with diversified manufacturing and light industry characterizes the economy of the area. It is also a governmental and educational center, has a high proportion of professional, managerial and technical personnel employed in both public and private business.

WATER USE AND CONTROL PROGRAM - YAHARA RIVER BASIN

I. WATER SUPPLY

All public water supplies in the basin, including that of Madison, are drawn from artesian wells. In addition private wells supply some individual property owners. Small industrial wells also

Though lake water could be supplied more cheaply, ground water tastes better and is uniformly colder, making it more useful for industrial purposes.

Madison's supply of ground water is ample for an estimated 160,000 population (at the present rate of per capita consumption), therefore it is possible that in 10 to 15 years there may be a problem of water supply.

The Madison Water Department service outside the city boundaries was limited by the City Council in 1951 to include only the villages and sanitary districts then being serviced. (Only 5 per cent of the service is currently outside the city.) The Department is a publicly owned utility which receives no tax money: all costs including city taxes, are paid by the sale of water and steam.

II. POLLUTION

Pollution is one of the major problems on the Yahara. The chief characteristic is the factor of additional nutrients, phosphorus and nitrogen, being added to a river and lake system that is already over-supplied with these nutrients. Presence of these chemicals is attributed to the natural drainage, run-off and erosion from rich agricultural lands which these lakes drain, as well as disposal of effluent. The result is that the lakes produce great quantities of algae, which, as they die, produce unpleasant odors from decomposition.

Madison and its immediately surrounding areas are organized into a metropolitan sewerage district, which receives and treats, then disposes of sewage from the City of Madison, the villages of Maple Bluff, Shorewood Hills, Monona and Middleton, from sanitary districts in the Towns of Blooming Grove, Madison and Middleton, and from Mendota State Hospital, Dane County Fairgrounds and University Houses.

The principal industrial waste contributor is the Oscar Mayer Packing Company, which pre-treats its wastes prior to discharge in the metropolitan system. Oscar Mayer Company has also sponsored extensive investigations into the treatment of effluent for the removal of phosphorus and nitrogen.

Protests of downstream residents culminated in the passage of a state law which prohibits discharge of treatment plant effluent into lakes less than six square miles in an area located within ten miles of the point of discharge. As a result of this law, and upon order of the Committee on Water Pollution, the Madison Metropolitan Sewerage District completed plans for diversion by way of Badfish Creek, a flowing stream in which it was believed an algae nuisance would not result. The diversion was completed in 1958. The Conservation Department has planted trout in the diversion canal, and in Badfish Creek, and is watching to see how they are affected by the hot weather. Experiments in agricultural irrigation are also being conducted.

In addition to the M.M.S.D., villages in the Yahara Basin in the main have satisfactory treatment arrangements.

III. FLOOD CONTROL

Flooding of the Yahara River has never been a serious problem. The Madison lakes act as storage reservoirs, in addition to which there are three lake control dams: one owned by the City of Madison and administered by the City Engineer's Office and two owned by Dane County, administered by the Park Committee of the County Board.

The Dane County Board is taking an active interest in a flood plain zoning ordinance, designed to prevent industry from building in the flood plain areas.

IV. IRRIGATION

It is not used here to any extent (only 2 private operations) nor is it likely that it will be because of sufficient rainfall in this area.

V. POWER

Though not the principal source of power for the basin, there are four power dams on the Yahara: three owned by the city of Stoughton to furnish power for its municipally owned utility, and one owned by the Wisconsin Power and Light Company as part of its system. (There are no multiple-purpose projects on the Yahara.)

VI. NAVIGATION

Limited to small pleasure craft.

VII. WATERSHED MANAGEMENT

Watershed management has not in the past appeared to be absolutely necessary, due to the gently rolling land, hence has been slow to develop. There are no P.L. 566 projects here: "To have supervisory responsibility over programs provided by P.L. 566....relating to the planning and carrying out of works of improvement for soil conservation and other purposes and such programs shall be referred to the Natural Resources Committee of State Agencies for its information."

The Act places full responsibility for starting small watershed projects on local people who will act through their own organizations. Only local organizations can initiate a project. Federal help cannot be given if the project is disapproved by the state.

The Four Lakes Watershed Association is set up to protect the headwaters of Lake Mendota, to promote setting up of small watershed groups and to take an interest in watershed problems. The Conservancy District of Dane County was established for the purpose of preserving marsh lands.

VIII. RECREATION, FISH AND WILDLIFE

There are no state or federal parks, forests or camp grounds in this basin. However, local governments provide and maintain numerous supervised beaches, parks and playgrounds, with the river and Four Lakes as the center of attraction. These facilities, like those on the University of Wisconsin campus, are in constant use throughout the year.

The State Conservation Department maintains a constant interest in and a protective eye on the conditions of the lakes and streams, and the quantity and condition of the fish to be found in them. Lake Mendota is noted for the quality of the perch fishing--both

in summer and in winter as ice-fishing. Lake Mendota is also well-known in scientific circles as the basis for exhaustive limnological research by the well-known biologist, Dr. E. A. Birge, his colleagues and successors.

THE ADMINISTRATIVE ORGANIZATION OF THE YAHARA RIVER BASIN

I. LOCAL

A. WATER SUPPLY SYSTEMS

except those who buy water from Madison

Each town along the river has its own water supply, municipally owned, supplied from a well. This includes Middleton, Madison (which has a Board of Water and Sewerage Commissioners), Monona, McFarland, Stoughton, Kegonsa, Fulton. Rates are regulated by the Public Service Commission and sanitation by the State Board of Health.

+ De Forest (& what about villages on tributaries eg. Waunakee Oregon

No!

B. SEWAGE DISPOSAL SYSTEMS

1. Madison Metropolitan Sewerage District.
This is a corporate body with the powers of a municipal corporation operating under state law, created by judgment of the Dane County Court in 1930. Its governing body is a board of three commissioners appointed by the Court for three year terms.

The District receives, treats, and disposes of the sewage from the City of Madison, the Villages of Maple Bluff, Middleton, Monona and Shorewood Hills; from sanitary districts and other areas in the Towns of Blooming Grove, Madison and Middleton; and from the Mendota Hospital, the Dane County Fair Grounds and the University Houses.

C. LOCAL UTILITIES:

City of Stoughton maintains a municipally owned electric utility which owns and operates three dams on the Yahara River. The dam at Fulton is owned by the Wisconsin Power and Light Company, and the village is served by private power, as are Madison and the other municipalities of the Basin.

D. CITY AND COUNTY HEALTH DEPARTMENTS

Each county and city in the Basin maintains a Health Department which varies in size according to the population, and which concerns itself with the river and the area water insofar as it concerns health matters.

E. SOIL CONSERVATION DISTRICTS

Dane County has a Soil Conservation District which is interested in the Yahara Basin as a watershed.

F. DANE COUNTY BOARD OF SUPERVISORS

Dane County owns two lake control dams on the Yahara admin-

istered by the Park Committee of the Board.

II. STATE

A. STATE DEPARTMENTS

1. Conservation Department
   a. Promotes watershed management.
   b. Acquires lands and waters suitable for state park purposes and maintains said parks.
   c. Prepares and administers a state-wide enforcement program to enforce the laws and regulations on fish and game, water pollution, state parks and water safety.
   d. Determines effect on conservation values of variation in water levels in connection with any stream or bodies of water.
   e. Maintains up-to-date inventory of Priority I streams which are listed for preservation in the natural state.
   f. Represents conservation interests in connection with diversion of water from Wisconsin streams for agricultural purposes.

2. Public Service Commission
   a. Issues permits:
      (1) To construct or maintain a dam.
      (2) To divert water for purposes of irrigation.
      (3) To dredge materials from bed of navigable lake.
      (4) To deposit materials or place any structure on bed of navigable waters.
      (5) To establish shore lines on navigable waters.
      (6) To add utility plant facilities or make interconnections.
   b. Measures stream flow when necessary.
   c. Inspects dams and reviews plans for their construction or repair.

3. State Board of Health
   a. Provides general supervision over public water supplies, sewage systems and swimming facilities, insofar as their sanitary and physical condition affects general health or comfort.
   b. Reviews and approves, prior to construction, plans for new systems as covered in item (a) above and improvements to existing ones.
   c. Certifies water supplies and watering points used by interstate carriers.
   d. Reviews plats not served by a public sewer system for conformity with regulations adopted.
   e. Supervises public bathing places, garbage and refuse disposal, and recreational and trailer camps.
   f. Licenses those engaged in the business of servicing septic tanks, seepage pits, etc.
   g. Regulates plumbing and drainage installations and licenses plumbers.
   h. Issues permits for high capacity wells.
   i. Inspects wells and enforces minimum standards for pure water for human consumption.

4. State Laboratory of Hygiene
   Analyzes water specimens from all parts of the state for purity.

B. STATE AGENCIES

1. Committee on Water Pollution. Committee is composed of State Chief Engineer, Conservation commissioner or employee, State Health Officer, State Sanitary Engineer or other engineer appointed by State Board of Health. Since 1949 there has been a full time director of water pollution control.
   a. Supervises the enforcement and administration of all laws governing pollution of the surface waters of the state.
   b. Determines source of pollution and conditions of receiving streams through study.
   c. Conducts studies at sewage treatment plants and industrial waste treatment plants to determine the effectiveness of treatment facilities.
   d. To control pollution of interstate streams, the Committee has entered into joint resolutions with Illinois, Iowa, Minnesota and Michigan. The resolutions establish minimum degrees of treatment for waste discharged into interstate waters.
   e. Maintains supervision over chemical control of aquatic weeds, algae and "swimmers' itch" on lakes used for recreational purposes through a sub-committee on aquatic nuisance control.

2. Natural Resources Committee of State Agencies
   a. Collects, analyzes and interprets information and makes recommendations to the several state agencies on matters relating to the soils, waters, forests, fish and other natural resources of the state.
   b. Reports to each session of the legislature and, upon request, to any other state agency.

3. Soil Conservation Committee
   a. Promotes the creation and provides for the servicing of organized county soil conservation districts.
   b. Apportions among the several districts any funds allocated from state or federal sources.
   c. Provides supervisory responsibilities over small watershed programs provided by law (PL 566, 83d Congress).

4. Water Regulatory Board
   Supervises the operation, repair and maintenance of about 150-200 dams, dikes, a nd other works constructed under the water conservation program by the federal government.

5. State Geologist
6. Agricultural Extension Service
7. State Highway Commission
8. State Chief Engineer

III. FEDERAL

There is no federal authority or river basin commission existing on the Yahara River. Federal influence is confined to the activities of the individual deparments:

A. GEOLOGICAL SURVEY
Maintains stream gauges on the rivers for the purposes of determining stream flow.
Also study of g.w. resources of Dane County & Rock County

B. PUBLIC HEALTH SERVICE
Becomes involved in local problems at the invitation of the state agencies. In cases of pollution this has not been necessary in recent years.

C. SOIL CONSERVATION SERVICE
Cooperates with local and state agencies.

D. WEATHER BUREAU
Limited to the maintenance of a few weather stations.

E. FARMERS' HOME ADMINISTRATION

F. AGRICULTURAL STABILIZATION & CONSERVATION AGENCY

IV. FEDERAL - STATE - LOCAL

There are several levels of cooperation between the various administrative agencies on the river. At the local level there are municipally owned utilities, (electric, water, sewage, etc.), the privately owned dams, industrial and hydroelectric, and the other private users of water and power in the river basin. These are regulated and supervised by state agencies, such as the Public Service Commission and the State Board of Health.

Then there are relations existing between the state and federal agencies which are concerned with similar situations. These may be described, in a general way, as rising from problems which have grown too large for the smaller state agency to handle, such as the opportunity for the State Water Pollution Committee to call in the U.S. Public Health Service. Usually this cooperation comes at the direct invitation of the state agency.

The most recent type of inter-action among local-state-federal agencies is that found among the watershed groups, where the desire and impetus comes from the small local group, proceeds upward through the County Soil Conservation District to the State Soil Conservation Committee for approval and finally proceeds with federal assistance. There has been close cooperation in the watershed problems between local, state and federal agencies.

MAJOR CONFLICTS AMONG USERS OF THE YAHARA RIVER

I. CONFLICTS BETWEEN UPSTREAM AND DOWNSTREAM USES

A. Madison Metropolitan Sewerage District controversy

The pollution of the Yahara and the downstream lakes, Waubesa and Kegonsa, by the sewage from the metropolitan district has been a source of trouble for years. Each year as the lakes "bloom" and the attending stench arises, a new set of protests rises with it. However, the new canal and the diversion of the effluent in the Badfish Creek may still some of the voices from the lower lakes. On the other hand, the action has caused many protests from the riparians along the Badfish.

B. The matter of river and lake level occasionally gives residents on the downstream lakes cause for complaint, as they feel that water is being held or not held on Lake Mendota, resulting in the water on Lake Monona and the other lakes being either too low or too high.

II. CONFLICTS BETWEEN SPECIFIC USES OF THE WATER RESOURCE

The metropolitan pollution of the Yahara (and now the Badfish) has been protested by the fish-wildlife-recreation interest, as well as the agricultural interests who feel that this pollution of the stream may prove injurious to the health of their livestock who use the creek as a source of drinking water.

The new locks on the Yahara River at Tenney Park are owned by the City of Madison. When this project was started the City of Madison suggested to the Dane County Board of Supervisors that Dane County bear part of the cost since the locks are used by non-residents of the city as well as residents. This was turned down by the County Board and the City built the locks alone. This matter of the degree of sharing expense on the improvement of the lakes and the river is likely to come up frequently.

ALLOCATION OF BENEFITS, RESPONSIBILITIES AND COSTS OF THE YAHARA RIVER BASIN

I. LOCAL

Local governments, private citizens and local organizations play a small part in financing and administration of water resources of the area. They finance and administer the various municipally owned utilities along the river; build, maintain and operate the municipal dams and locks; and purchase and maintain local parks.

II. STATE

The state government has the responsibility for the regulation and supervision of the water resources of the state, since the bed of a navigable stream or lake is held to belong to all the people of the state. It accordingly pays the cost of such regulation and

supervision. In addition, the state builds and maintains state parks within the area, creates and administers game refuges, studies and conserves fish life within the waters of the basin.

III. FEDERAL

There are no national parks in the Yahara River Basin to be wholly dependent on federal funds. However, federal funds for many purposes (i.e. pollution control, watershed development, etc.) have been made available to the local and state agencies who administer their use.

IV. AGREEMENTS BETWEEN STATES

Since the pollution of interstate waterways affects the neighboring states, the State Water Pollution Committee has entered into agreements with the surrounding states.* Each state benefits from clean water, assumes the responsibilities of keeping water flowing out of the state pure, and bears the cost of this pollution control (with the assistance of federal funds).

* Since the Yahara River flows into the Rock River, it is indirectly affected by these agreements.

FUTURE OF THE YAHARA RIVER BASIN

I. PROBLEMS

A. At present there seems to be no large problem that would require a basin planning agency, though some overall planning certainly would be desirable.

B. The pollution problem will probably become greater with the growth in population, requiring a more permanent and satisfactory solution than that of diverting the Madison effluent to the Badfish Creek. Studies are being made on this problem, including a comprehensive one sponsored by the Oscar Mayer Company.

C. Work on the watershed level, while not as urgent as on some rivers because of the comparative absence of floods, should be continued. Erosion is still erosion even when it goes on at a slow pace.

D. Irrigation may become more common in this basin than it is at present, creating a conflict between the agricultural and the fish-wildlife-recreation interests.

E. While Madison has ample ground water for its population now, it may not have enough in ten or fifteen years. Will it then be necessary to use the lake water as a source of water supply?

F. With the increased interest in boating and all water activities, increased funds may be necessary for such things as docks, launching areas, increased park facilities, improved river channels, etc. Madison has just completed new locks on the river, and many persons feel it needs a marina--the

question always raised is: should Dane County share in the cost of these facilities since county residents so often share in their benefits.

II. PLANNING FOR SOLUTIONS

A. There is no overall plan for future development of the basin. This might legitimately be the function of the Natural Resources Committee of State Agencies.

B. The State Water Pollution Committee feels that funds for pollution control are adequate for the present and progress is being made in most areas. The Madison Metropolitan Sewerage District problem is not regarded as solved, but it is hoped that the diversion will take care of the immediate need. The Committee sees plans for all proposed industrial development and works with industry to prevent future pollution.

C. The State Geologist, U. S. Geological Survey, State Conservation Department, Public Service Commission, and Board of Health, are all cooperating to accumulate as much basic hydrologic data as possible. This involves stream gauging, recording pumping information (both from streams and from the ground water), and investigating all phases of marine life.

III. COORDINATED PLANNING

A. At the federal level there does not seem to be any great need for overall planning in the basin, unless it is to be considered as a part of the Rock River Basin and so a part of the Upper Mississippi Drainage Basin. Since the Yahara is not a problem area, there is a question as to whether the advantages of basin planning on this scale might not prove to be more expensive tax-wise than it warrants from its possible benefits.

B. Any other basin planning, however, must logically come from the state, since this river basin covers at least two counties and parts of others and inter-county cooperation does not seem practical. State planning has the advantage, too, of making the most efficient use of state funds, agencies and other facilities. Some groups feel that it would be desirable to have a single state agency responsible for the water development of the state, able to plan for an entire basin, but since that does not seem to be what the Legislature is likely to incorporate into its new water legislation, other arrangements may have to be made. As already mentioned, the Natural Resources Committee of State Agencies may be the most logical group to undertake this planning.

C. Locally, it would probably be of great benefit to the whole area if a committee could be formed, composed of representatives of the municipalities and counties in the basin, to formulate plans to develop the Yahara River-Four Lakes area as a recreational area. Perhaps this committee could work out an acceptable cost-sharing arrangement for the construction of any future facilities to be constructed.

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The following persons or departments were contacted:

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Ford, Mr. Henry, State Planning Commission of Wisconsin.
Hembre, Dr. I. O., Executive Secretary of the State Soil Conservation Committee, Soils Dept., University of Wis., Madison, Wis.
Holt, Mr. Lee, District Geologist of U.S. Geological Survey, Madison, Wis.
Landwehr, Edgar A., United States Soil Conservation Service.
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Public Service Commission, Madison, Wisconsin.
Sayles, William, Engineer, Public Service Commission of Wisconsin.
Scott, Ralph, Engineer, State Board of Health, Madison, Wisconsin.
Scott, Walter E., Administrative Asst., Conservation Dept. of Wis.
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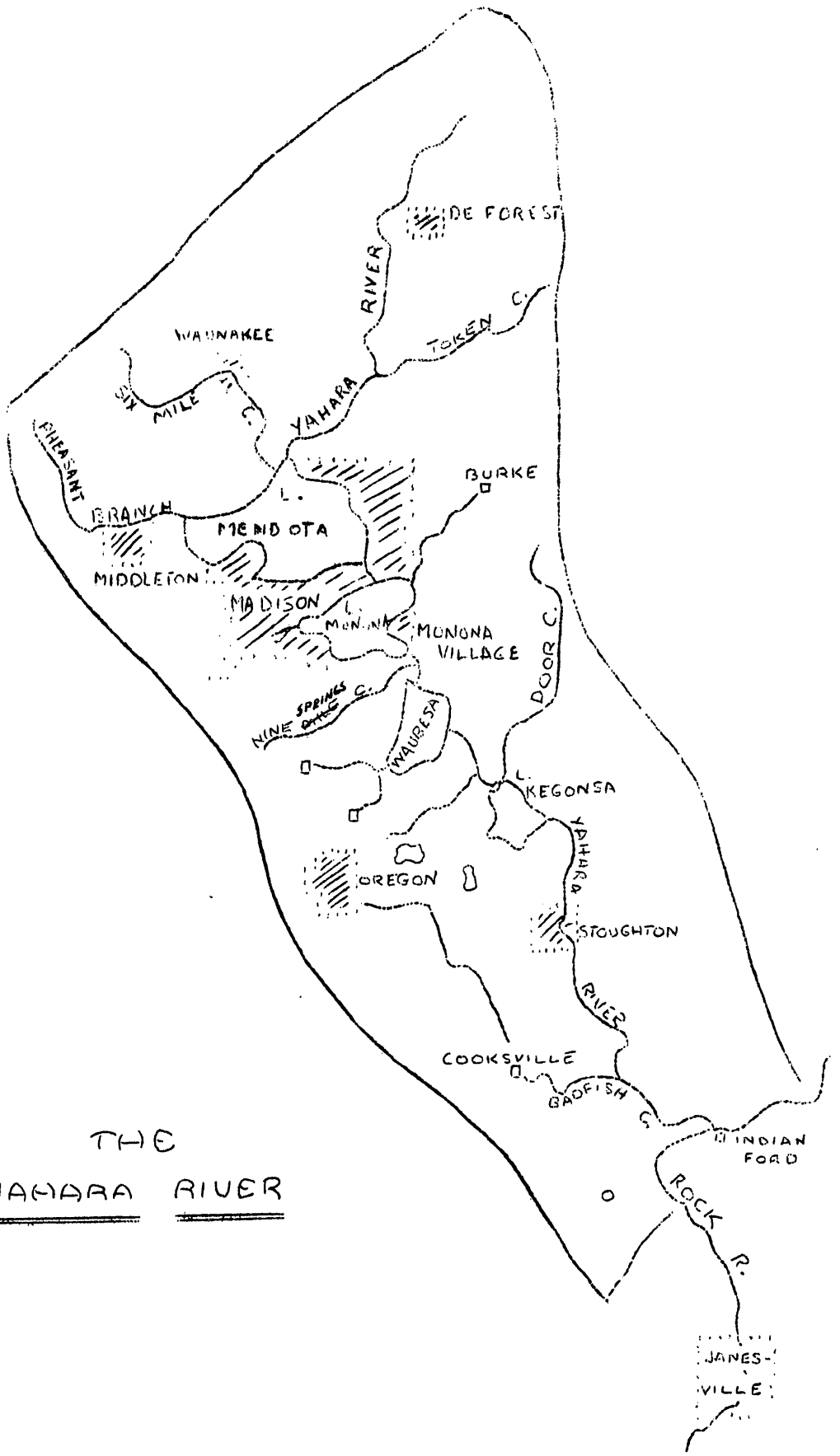
Wisconsin Valley Improvement Association, Wausau, Wisconsin.
Wisniewski, Theodore F., Director, Wisconsin Committee on Water Pollution.



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