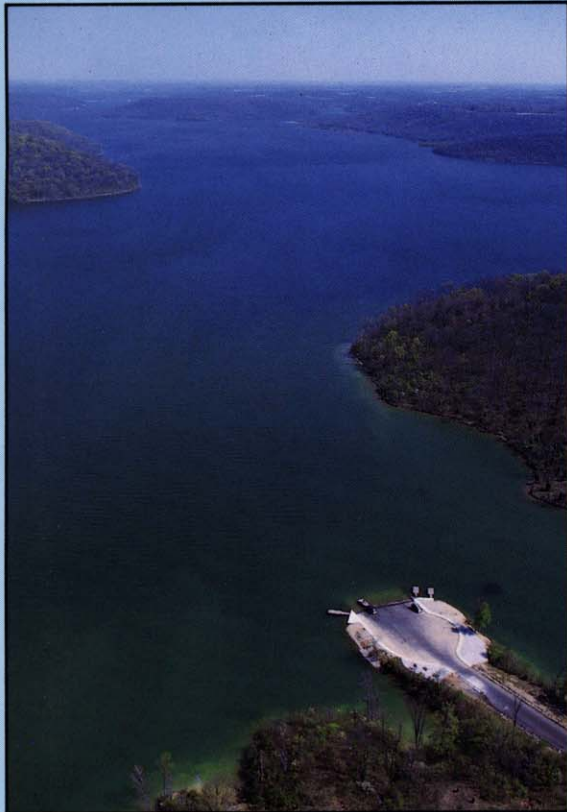




# WATER RESOURCE AVAILABILITY IN THE WHITEWATER RIVER BASIN, INDIANA



STATE OF INDIANA  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF WATER

1988

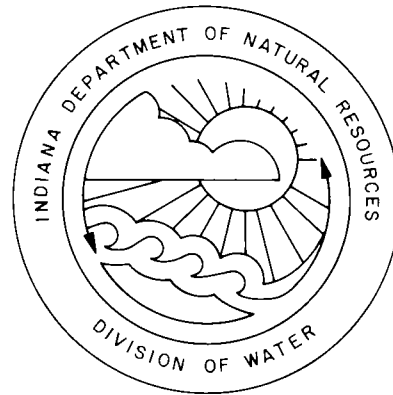
# **WATER RESOURCE AVAILABILITY IN THE WHITEWATER RIVER BASIN, INDIANA**

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**STATE OF INDIANA  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF WATER**

**Water Resource Assessment 88-2**



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**Robert D. Orr, Governor**  
**DEPARTMENT OF NATURAL RESOURCES**  
**James M. Ridenour, Director**  
**DIVISION OF WATER**  
**John N. Simpson, Director**

Project Manager: Judith E. Beaty  
Editor: Cynthia J. Clendenon  
Photography: Richard Fields  
Cover Design: Robert Allen

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Basin Studies Section of the Water Management Branch.

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Engineering Assistant

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## ACRONYMS AND ABBREVIATIONS USED IN TEXT

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IDNR	Indiana Department of Natural Resources
IDEM	Indiana Department of Environmental Management
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
NASQUAN	National Stream Quality Accounting Network
USEPA	U.S. Environmental Protection Agency
USCE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
app.	appendix
fig.	figure
pl.	plate
cfs	cubic feet per second
°F	degrees Fahrenheit
m.s.l.	mean sea level
gpd	gallons per day
gpm	gallons per minute
mg	million gallons
mgd	million gallons per day
mg/l	milligrams per liter
ml	milliliters
sq. mi.	square miles

---

## SELECTED CONVERSION FACTORS

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Multiply	By	To obtain
<b>AREA</b>		
Acres	43,560	Square feet
	0.001562	Square miles
<b>VOLUME</b>		
Acre-feet	0.3259	Million gallons
	43,560	Cubic feet
<b>FLOW</b>		
Cubic feet per second	0.646317	Million gallons per day
Gallons per minute	0.002228	Cubic feet per second
Gallons per minute	0.0014	Million gallons per day

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# WATER RESOURCE AVAILABILITY IN THE WHITEWATER RIVER BASIN, INDIANA

## INTRODUCTION

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The Water Resource Management Act (I.C. 13-2-6.1) was signed into law on April 7, 1983 by Governor Robert D. Orr. Under Section 3 of the act, the Natural Resources Commission must (1) conduct a continuing assessment of water resource availability, (2) conduct and maintain an inventory of significant withdrawals of ground and surface water, and (3) plan for the development and conservation of the water resource for beneficial uses. Section 5 further mandates the statewide investigation of (1) low stream-flow characteristics, (2) water use projections, (3) the capabilities of streams and aquifers to support various uses, and (4) the potential for alternative water supply development. These and other directives reflect a comprehensive approach to water resource management and establish a legislative foundation upon which management programs can be further developed.

To help meet mandated responsibilities, the Commission has divided Indiana into 12 water management basins (fig. 1). As the Commission's technical staff, the Indiana Department of Natural Resources, Division of Water will characterize the availability of water on and below the land surface through a series of basin-wide investigations.

### STUDY AREA

The Whitewater River Basin, which lies within the Miami River Basin of the Ohio River drainage system, drains 1329 sq. mi. (square miles) in southeast Indiana and 145 sq. mi. in southwest Ohio (fig. 2). Headwaters of the Whitewater River and its east fork are located in extreme southern Randolph County, Indiana and southwest Darke County, Ohio. The two rivers flow south and slightly west through Indiana's Wayne, Fayette, and Union Counties (fig. 2). In Franklin County, the Whitewater River bends southeast to join the east fork near Brookville, then exits Indiana in Dearborn County. About two miles into Ohio, the Whitewater River joins the southwest-flowing Great Miami River, which empties into the Ohio River at the intersection of the Indiana, Ohio, and Kentucky state lines.

The Whitewater River Basin drains an area characterized by rolling farmland and adequate to abun-

dant water resources in the north, and hilly to rugged forested topography and less abundant water supplies in the south. The basin also contains Brookville Lake, Indiana's second deepest and third largest manmade reservoir.

Surface-water and ground-water supplies in the Whitewater River Basin serve a diversity of human needs, ranging from non-withdrawal uses such as in-stream recreation to large water withdrawals for public supply and industrial manufacturing. Demands on the water resource are expected to increase as both the economy and population continue to diversify.

### PURPOSE AND SCOPE

This report describes the availability, distribution, quality, and use of surface and ground water in the Whitewater River Basin, Indiana (fig. 2). The second in a series of 12 regional investigations, the report is intended to provide background hydrologic information for water resources decision-making. Industrial, agricultural, commercial, recreational, governmental, and other public interests can utilize the summarized data in developing and managing the basin's water resource.

Because the report is written for a wide spectrum of readers, key technical words within the text are italicized the first time they appear, and where appropriate thereafter. Brief definitions are given in the glossary (app. 1).

Although some detailed data are included in technical appendices, this report is not intended for evaluating site-specific water resource development projects. Persons involved in such projects should contact the Division of Water for further information.

The Whitewater River Basin includes parts of two states (fig. 2), but all discussions in this report refer only to the Indiana portion. Unless otherwise indicated, discussions address only the areas of Indiana counties lying within the basin boundary (see table 1).

Much of the information presented has been summarized from data and maps obtained from state and federal agencies, from various technical reports, and from departmental communications. Some new ground-water quality data were collected during the

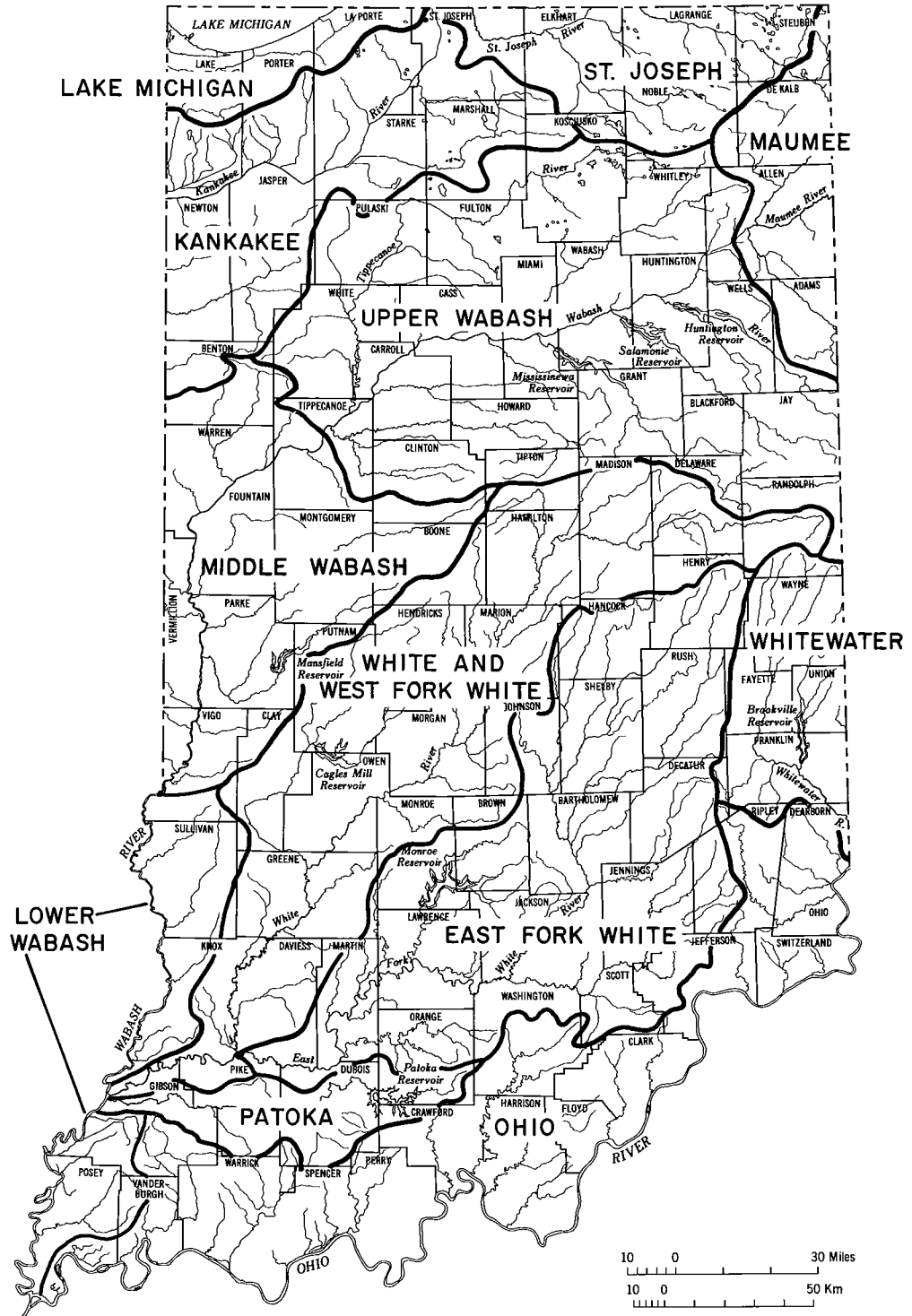


Figure 1. Indiana water management basins

investigation, and other hydrologic data have been compiled, analyzed, and interpreted.

### PREVIOUS INVESTIGATIONS

To date, no comprehensive hydrologic studies of the Whitewater River Basin have been published. However, a work plan for structural engineering improvements in the East Fork Whitewater River Basin discusses proposed measures for watershed protection, flood prevention, recreation, and water management (State of Indiana and State of Ohio, 1971).

Four journal articles by Gooding (1963, 1966, 1973, and 1975) were particularly useful in describing the geology of the Whitewater Basin. A series of unpublished geologic quadrangle maps of southeast Indiana by Gooding, in addition to various reports by his co-workers and students at Earlham College, address both geologic and hydrogeologic characteristics of various areas within the basin. A report by Bruns (1976) summarizes the geology of Wayne County.

Maps by the Indiana Geological Survey (Burger and others, 1971; Gray, 1983; Gray and others, 1972, 1987) summarize surficial and bedrock geology. Malott (1922) provides a comprehensive treatment of regional *physiography*. Gruver (1984) characterizes *outwash* deposits along the Whitewater River.

Table 1. Indiana counties within the Whitewater River Basin

County	Total area (sq mi)	In-basin area (sq mi)	Percent of total basin area
Dearborn	307	42	3.16
Decatur	373	33	2.48
Fayette	215	197	14.82
Franklin	385	365	27.47
Henry	395	43	3.24
Randolph	454	84	6.32
Ripley	447	21	1.58
Rush	408	14	1.05
Union	163	128	9.63
Wayne	404	402	30.25
<b>Total</b>	<b>3551</b>	<b>1329</b>	<b>100</b>

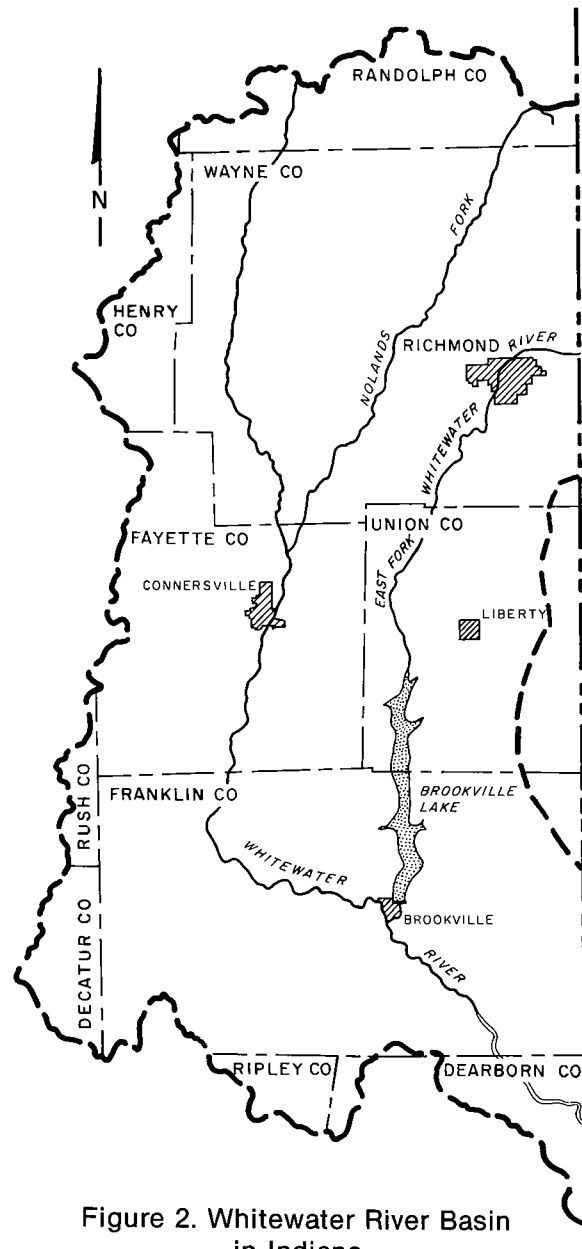


Figure 2. Whitewater River Basin in Indiana

A report by the Governor's Water Resource Study Commission (1980) assesses various aspects of water availability and use for 18 planning and development regions in Indiana. Most of the Whitewater Basin lies within two of these regions. A series of land use and planning maps for Fayette County (Smith, 1977) and Wayne County (Wayne County Resource Inventory Council, Inc., 1976) includes maps of bedrock and unconsolidated deposits, depth to bedrock, bedrock *topography*, and ground-water availability. Two atlases by Uhl (1969, 1973) outline the geography, population, climate, geology, ground-water and surface-water quality, ground-water availability, and water usage for Randolph and Henry Counties. Soil survey reports provide background information on the economy, land use, and water resources of Fayette and Union Counties (Alfred and others, 1960), Rush County (Brock, 1986), Decatur County (Shively, 1983), and Dearborn County (Nickell, 1981).

Sources utilized in the Whitewater study and those of potential use are listed in the "Selected References."

#### **ACKNOWLEDGEMENTS**

The following agencies provided valuable informa-

tion and assistance during the preparation of this report: IDNR Divisions of Engineering, Fish and Wildlife, and the Indiana Geological Survey; Indiana State Board of Health; Indiana Department of Environmental Management; Indiana State Data Center; Indiana-American Water Company, Inc.; Earlham College; Purdue University; Indiana University; U.S. Geological Survey (Water Resources Division); U.S. Army Corps of Engineers (Louisville District); U.S. Environmental Protection Agency (Region 5); U.S. Department of Agriculture (Soil Conservation Service); and the National Oceanic and Atmospheric Administration (National Weather Service).

The authors also thank residents of the Whitewater River Basin for their cooperation during the 1985 ground-water sampling project. In addition, well-drilling contractors and county clerks contributed water-well and property records during the study.

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