

THE STUDY AREA

A. General Description

The Boardman River is located in Grand Traverse and Kalkaska counties in northwest lower Michigan. It rises in the Mahan swamp in north central Kalkaska County and flows in a southwesterly direction for 40 miles. Turning north for nine miles, it empties into Grand Traverse Bay at Traverse City. The Boardman River system drains a surface area of approximately 186,000 acres and includes about 130 linear miles of stream.

The Boardman is one of the outstanding trout streams in Michigan. This system has excellent water quality and habitat conducive to good trout reproduction. Approximately half of the streams in the river system flow through lands in public ownership.

B. Physiography and Soils

Throughout most of the Boardman River basin, glacial deposits are in excess of 500 feet thick. Glacial features consist of moraine, outwash plain and sandy glacial lakebeds. The outer ridge of the Port Huron Moraine extends east-west across the southern third of the basin while part of the inner ridge of this moraine generally parallels the area along the northern boundary of the basin. Between these two prominent morainic ridges is a six to 14 mile wide outwash plain through which the Boardman River flows.

A large part of the flow of the river, especially during low flow conditions, is sustained by ground water discharging into the river from permeable glacial outwash soils. This outwash channel constitutes the major ground-water aquifer in the basin.

The Boardman River originates in a large swamp area at an elevation of 1090 feet above sea level and drops to an elevation of 580 feet at the west arm of Grand Traverse Bay on Lake Michigan.

The topography of the river valley is mostly flat sandy plains broken locally by small shallow depressions. Pothole bogs and swampy lands bordering stream channels comprise a small portion of the total area. However, the land along the North Branch above Kalkaska is mostly flat swampy lowlands.

The major soils in the valley areas are of the Rubicon-Grayling type and to a lesser degree Rubison-Kalkaska type. These soil types are, for the most part, dry sandy soils, acidic in nature, very pervious and low in fertility. There are local inclusions which have sandy loam surface texture, gravelly and even cobbly areas. Soils in the river bottom above Kalkaska are mainly peat and muck.

The morainic areas north and south of the river valley rise sharply to defined highland ridges and broad plateaus. The topography is generally undulating with

many ridges, sharp valleys, hills and hollows. A region of numerous water table lakes exists north of the Mayfield area.

Principal soil types in these areas are the Emmet and Roselawn which are mostly sandy loams, but in part underlain by sand and reddish clay at shallow depths. Locally there are areas of gravelly soil and scattered boulders. These soils are generally dry, acid in nature with medium to low fertility depending on the amount of sand in the composition.

C. Stream Characteristics

The Boardman River system contains approximately 130 linear miles of streams.

Summary of Streams (Linear Length in Miles)

Stream			
Mainstream	26.0	Bancroft Creek	3.5
North Branch	23.5	Carpenter Creek	6.0
South Branch	10.0	Twenty-Two Creek	3.5
Hospital (Kid's) Creek	3.5	Taylor Creek	5.0
No Name Creek	2.0	Albright Creek	2.5
Beitner Creek	3.5	Crofton Creek	3.5
Jaxson Creek	5.5	Failing Creek	3.0
Swainston Creek	5.0	Vipond Creek	2.5
Jackson Creek	5.0	Palmer Creek	1.5
East Creek	3.5	Hauerstein Creek	1.5
Parker Creek	1.5	Misc. Laterals	<u>8.5</u>
		TOTAL	130.0

Twelve lakes ranging in size from a few acres to 60 acres drain into the Boardman River. Although the warmer waters from these lake outlets influence water temperatures for a short distance downstream, spring seepage soon cools the water sufficiently to support a variety of cold water fish species. The mainstream flows through three hydro-electric power ponds and Boardman Lake (340 acres) which elevates water temperatures, especially in the lower eight miles of river. Brown Bridge Pond (182 acres) is presently owned by Traverse City and is the only one of the three hydro dams that still produces power. This dam produces about 300,000,000 KWH of power per year. Grand Traverse County owns Boardman (95 acres) and Sabin (25 acres) ponds. In addition to these larger impoundments, there are still millponds on the North Branch at Kalkaska, on the South Branch at South Boardman and on Swainston Creek at Mayfield.

The Michigan Water Resources Commission has established by administrative rule intrastate water quality standards and use designations¹ for the Boardman River. It is to be protected for recreation - total body contact (i.e., swimming); intolerant fish - cold water species; industrial water supply; agricultural and commercial water supply and other uses. Where water is to be protected for more than one use under these standards, the most restrictive individual standard of designated water use applies. Also, if existing water quality is superior to the designated use requirements, it must be maintained at that level until it has been adequately demonstrated to the Michigan Water Resources Commission that the change in quality does not or will not become injurious to the public health, safety or welfare, or become injurious to any other uses being made of such waters.

Studies² conducted on the Boardman River by the Land and Water Management staff, Department of Environmental Quality, indicate that the quality of the waters within the Boardman River basin meet or exceed all standards, as mentioned above, established for the river. The villages of South Boardman and Mayfield are on septic tank-drainfield systems and Kalkaska disposes of its waste by land disposal methods. Traverse City operates a highly efficient wastewater treatment plant. Secondary treatment of wastes removes greater than 80 percent (and up to 90 percent) of the phosphorous before the effluent is discharged into the Boardman just below Boardman Lake.

Except for the impoundments on the mainstream (classed as top quality warmwater), the river above Boardman Pond to "the forks" is classified as top quality trout water. The North and South branches and most of the tributaries are classified as top quality trout tributaries.

Stream flow in the Boardman River is fairly stable, especially during low flow periods, as it is sustained by ground water discharging to the river from the permeable glacial soils. U.S. Geological Survey records taken during the last 22 years show an average daily discharge of 192 cubic feet per second. Although extremes were recorded during this period (maximum-1200 CFS, minimum - 50 CFS), an average minimum flow for the summer months is about 130 cubic feet per second. Spring flows normally raise the stage heights from two to four feet in the upper and lower reaches, respectively.

The Boardman River has a moderately fast stream gradient dropping 500 feet in elevation from its source north east of Kalkaska to Lake Michigan. Although the five dams from Kalkaska to Boardman Lake dissipate about 110 feet of fall, the average drop in elevation over this 50 miles of stream is eight feet per mile.

¹ Use Designation Areas for Michigan Intrastate Water Quality Standards, published by Michigan Water Resources Commission, Surface Water Quality, Department of Environmental Quality, March, 1969.

² Water Quality of Selected Lakes and Streams in the Grand Traverse Bay Region, published by the Michigan Water Resource Commission, Surface Water Quality, Department of Environmental Quality, March, 1970.

The river system is conducive to cold water fish species having a cold, clear water supply, productive bottom for food organisms, suitable escape cover and spawning habitat. Gravel, rubble, stable sand with areas of silt are dominant bottom types. Occasional areas of clay and hardpan are interspersed throughout the stream. Areas in the headwaters may run heavier to stable sands and silt, while the lower mainstream has areas of shifting sand.

Trout cover is adequate throughout most of the river system in the form of overhanging alders, logs, under cut banks and pools. Pools in the headwaters and most tributaries vary from 18 inches to three feet in depth while in the lower portions of the mainstream they are three to six feet in depth.

D. Vegetation

The watershed of the Boardman River contains a wide variety of timber cover which can be broken down into large general types which are most predominate.

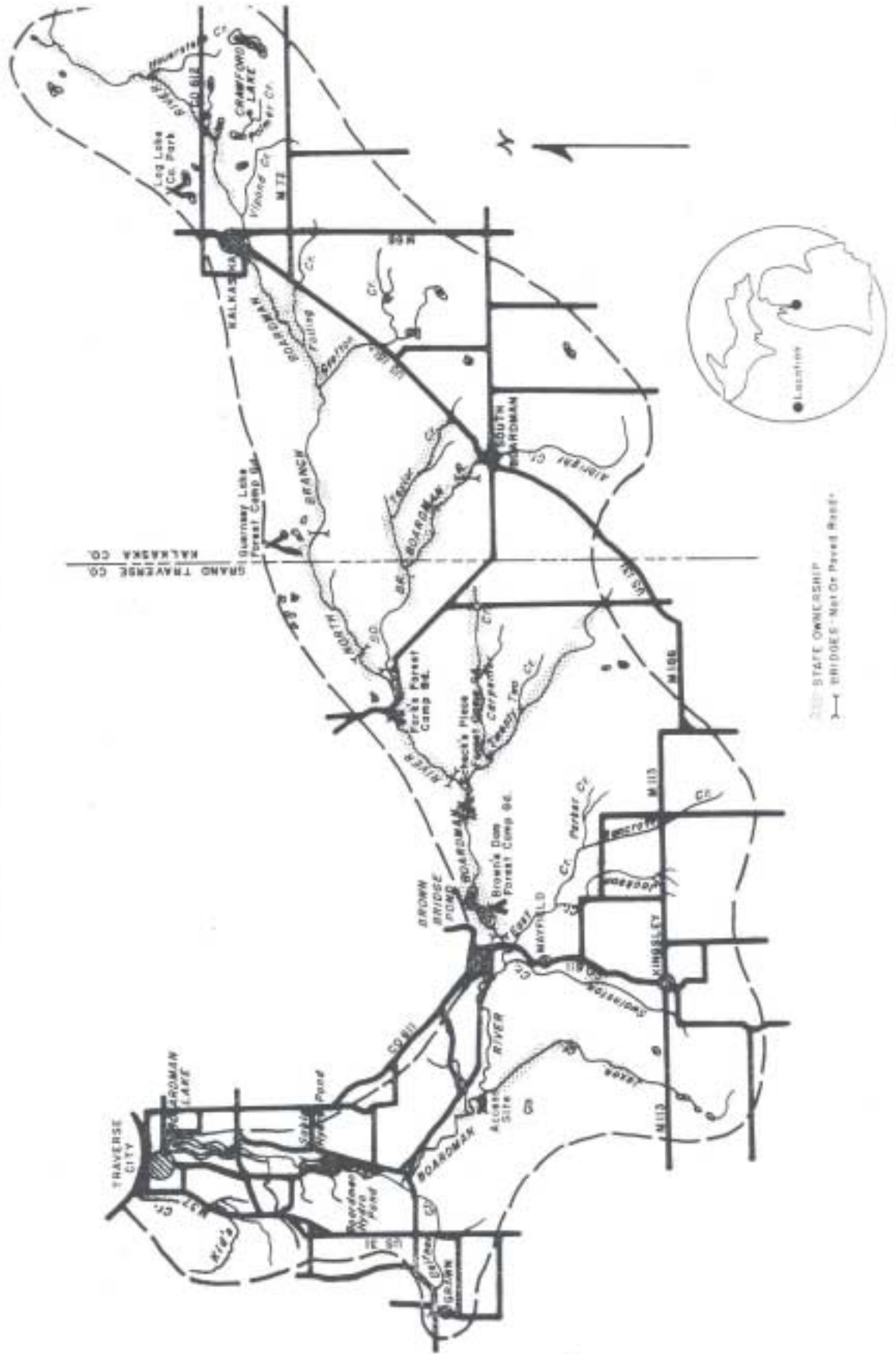
Areas immediate to the river contain tag alder, willows and dogwood with varying mixtures of cedar, balsam, hemlock, tamarack, aspen and white birch. This area of timber is very narrow; the Boardman River does not have the large flats that are so common on the Manistee River.

Upland areas adjacent to the immediate river areas contain red oak, red maple, aspen and jack pine with large white pines and red pine scattered throughout both the upland and lowland areas.

E. Climate

The climate in the Boardman River watershed is favorable for the summer recreationist with pleasant daytime temperatures and cool nights. Temperatures during the summer months average five degrees cooler than in southern lower Michigan. Lake Michigan and Grand Traverse Bay modifies the climate to create these generally cooler summers and milder winters. The area has an average annual precipitation of about 31 inches. Average annual snowfall is 73 inches at Traverse City and nearly 110 inches in northern Kalkaska County. The average annual temperature is 45 degrees with the highest monthly maximum temperature occurring in July (70 degrees F) and the lowest monthly maximum temperature occurring in February (22 degrees F).

BOARDMAN RIVER SYSTEM



F. Ownership

The Boardman River watershed contains roughly 186,000 acres of land. Of this total, 139,400 acres (75 percent) are in private ownership. The remaining 46,600 acres are in state ownership within the boundaries of the Fife Lake (25,140 acres) and Kalkaska (21,460 acres) state forests.

Ownership along the Boardman River and those tributaries selected for possible designation in the Natural Rivers Program are summarized as follows:

Ownership -- Boardman River System

Stream	Private		State	
	Est. Linear Miles	Frontage	Est. Linear Miles	Frontage
Mainstream (Brown Bridge Down)	12.00	24.00	1.00	2.00
Mainstream (Brown Bridge to Forks)	3.00	6.00	5.00	10.00
North Branch	4.50	9.00	10.50	21.00
South Branch	4.00	8.00	4.00	8.00
Beitner Creek	2.50	5.00	1.00	2.00
Jaxson Creek	2.00	4.00	2.50	5.00
Swainston Creek	4.00	8.00	1.00	2.00
Jackson Creek	5.00	10.00		
East Creek	3.50	7.00		
Parker Creek	1.50	3.00		
Bancroft Creek	3.50	7.00		
Carpenter Creek	1.50	3.00	4.50	9.00
Twenty-Two Creek	.25	.50	3.25	6.50
Taylor Creek	.25	.50	4.25	8.50
Crofton Creek	.25	.50	1.75	3.50
Failing Creek	<u>.25</u>	<u>.50</u>	<u>1.25</u>	<u>2.50</u>
TOTALS	48.00	96.00	40.00	80.00
	(54%)		(46%)	

G. Accessibility

Highway access to the Boardman River is good with a number of highways connecting the area to the population areas of southern Michigan. M-113 runs through the southern portion of the watershed in an east-west direction and connects M-37 on the west to US-131 on the east. M-37 and US-31 enter the very western part of the watershed about seven miles south of Traverse City. US-131 bisects the eastern part of the watershed from South Boardman to Kalkaska. M-72 enters the northeast part of the area at Kalkaska and connects US-131 with I-75 at Grayling. These major highways are connected by several county black top roads, however, there are large areas in the upper two-thirds of the watershed that are served only by sand-gravel roads and sand trails.