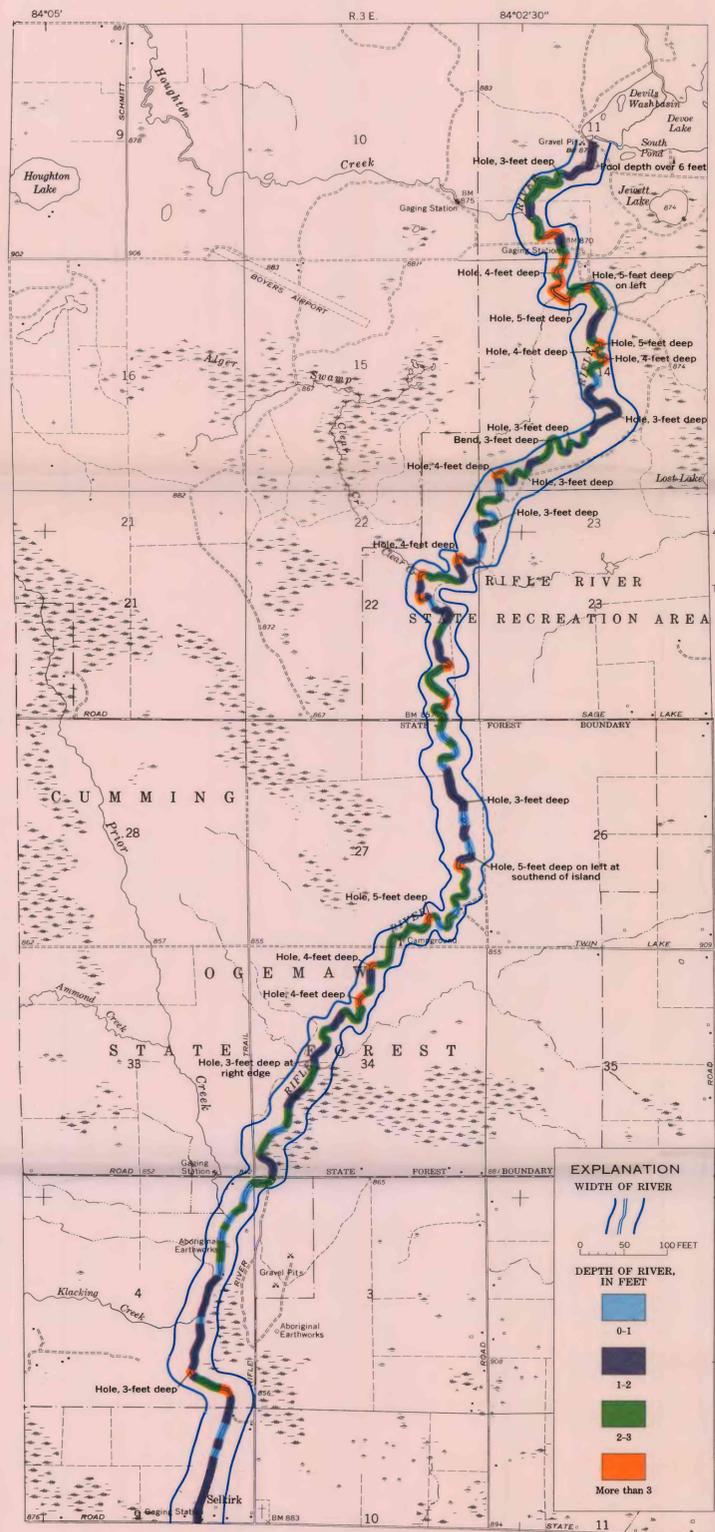


BED AND BANKS

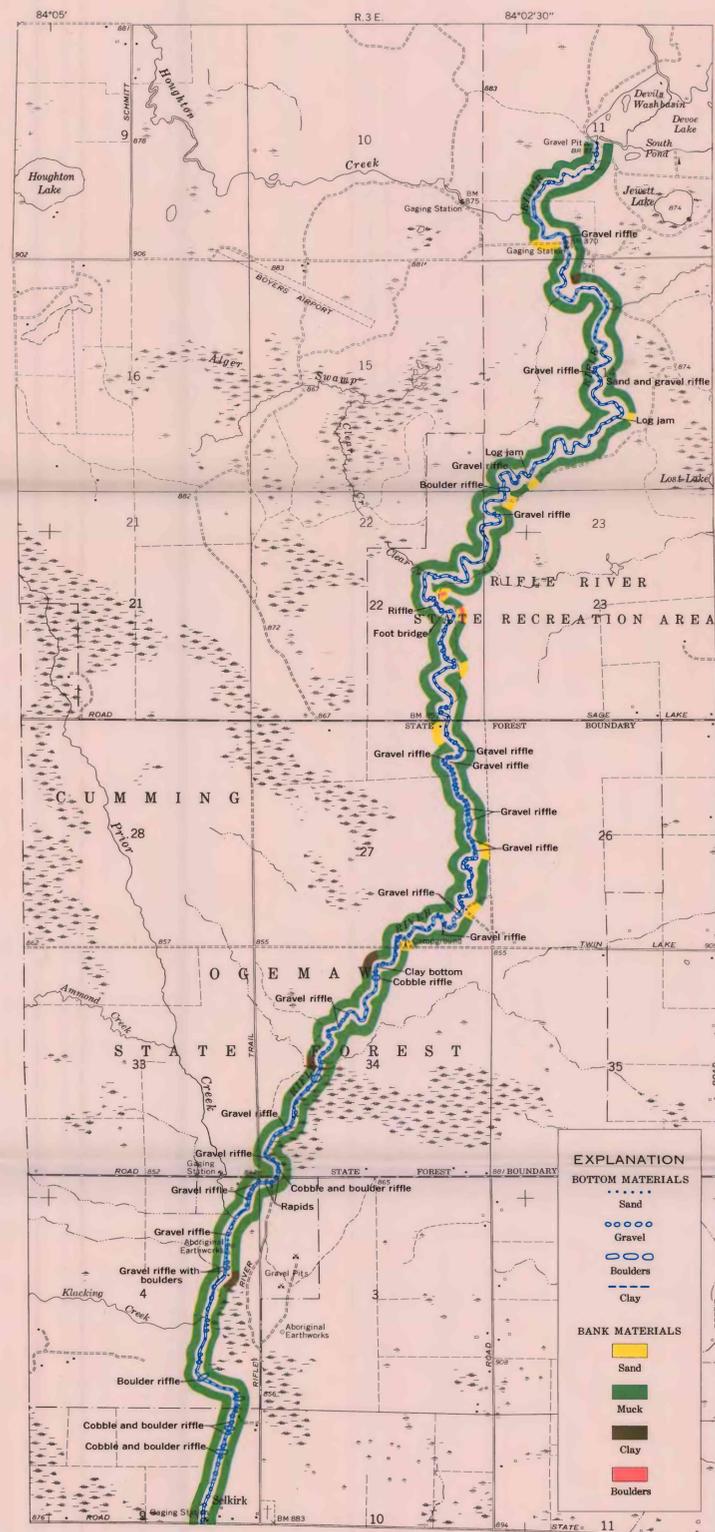
The character of bed, banks, and channel of a river strongly influence streamflow characteristics, water temperature, chemical quality, and recreational values. The three maps on this sheet indicate the physical features of the Rifle River determined by field reconnaissance on July 28 and 29, 1968. During this reconnaissance the gage height (stage) of the Rifle River at Selkirk ranged from about 1.7 to 1.8 feet, and discharge ranged from 82 to 96 cubic feet per second. The depth and width of stream and apparent height of banks vary with stage. The maps show the width and depth of stream, the bed and bank materials, height of banks, and character of bank cover.

The character of bed, banks, and channel of the Rifle River and the effects on recreational uses are summarized below:

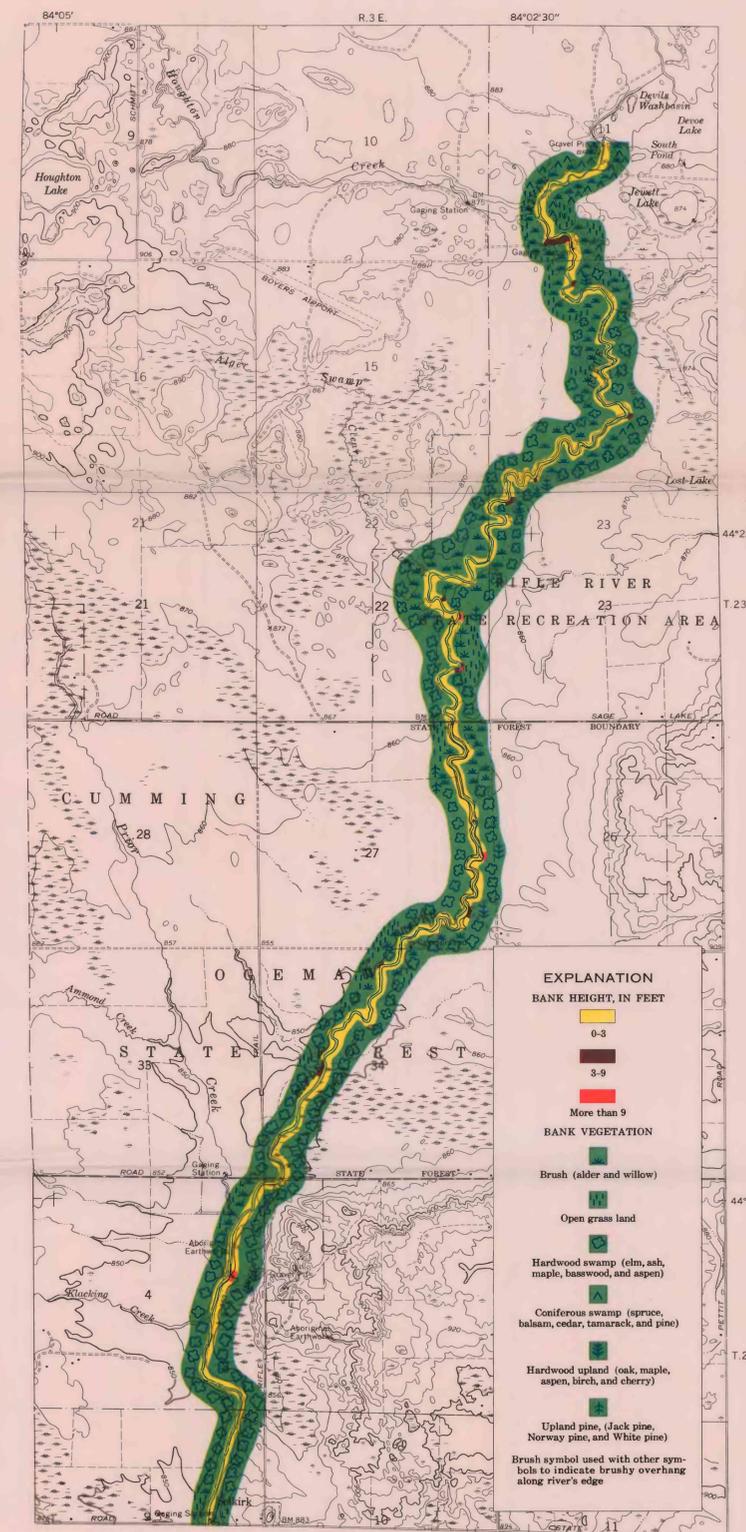
Recreational use	Relation of physical and hydro-characteristics to recreational use (prepared by Michigan Department of Natural Resources)	Characteristics of Rifle River
Trout fishing	<p>Broad open water makes fly casting easier, but tends to warm the water. Warm water can have adverse effects on trout propagation and population.</p> <p>Variability in depth, usually related to variability in velocity and affects wading. Predominantly shallow depth make wading easier.</p> <p>Gravel beds provide spawning opportunity and produce fish food. Sand fills deeper holes; buries escape cover, food organisms and gravel beds.</p> <p>Overhanging banks, logs, fallen trees, and boulders provide trout cover.</p> <p>Streamside trees and shrubs shade water and keep water temperature low. This shade may reduce food production, and the plants may intercept part of ground-water discharge to stream.</p> <p>Clay banks and bottoms produce turbidity, reducing photosynthesis and hence food production. Turbidity also interferes with sight feeding by trout. Sand, gravel, and muck banks more desirable in this respect.</p> <p>Banks denuded by erosion, undercutting, cattle crossing, and boat landing traffic may add undesirable quantities of sand, silt, and clay to the water.</p> <p>Variability in gradient is related to variability in velocity and affects wading.</p> <p>Bottom vegetation adequate to contribute to food production is desirable, but when excessive it chokes stream and produces extreme daily fluctuations in dissolved oxygen and temperature.</p>	<p>Broad and open enough for easy fly-casting in most of main stem. Most of tributaries too narrow for easy casting. Broad reaches on main stem above Selkirk contribute to warmer water temperatures.</p> <p>River is shallow enough for easy wading in most reaches, except at times of high flows. Houghton Creek too deep in many places.</p> <p>Sand and gravel beds alternate in most reaches of river and tributaries.</p> <p>Fair to good cover in main stem and most tributaries.</p> <p>Main stem is well-shaded, except for a few open patches. Many open reaches on tributaries from the west.</p> <p>Sand and muck (peat) banks predominate in most reaches of Rifle and tributaries. Clay banks and bottoms common in tributaries along the base of the West Branch Moraine near Rose City.</p> <p>Banks are well-stabilized by vegetation and rip-rap in most reaches. Low peat banks not subject to much erosion. A few areas of exposed sand and clay banks still are being eroded.</p> <p>Stream gradient varies in different reaches.</p> <p>Bottom vegetation is sparse to moderate in most of main stem. Becomes dense above bridge at Selkirk.</p>
Boating	<p>Boat stability increases as width and depth increase.</p> <p>On smaller streams, sweepers and log jams decrease boat stability. Obstructions, shallows, boulders objected to by some canoeists, welcomed by others. If present in excessive amounts, may eliminate boating.</p> <p>A meandering stream is more attractive and interesting than a straight stream.</p> <p>Variety of streamside vegetation adds to interest.</p> <p>Alternating high and low banks add to interest.</p> <p>Undeveloped river banks add to enjoyment of most canoeists.</p> <p>Frequency and suitability of boat launching and take-out points, as determined by bank characteristics and vegetation, influence usability.</p>	<p>Main stem is easily navigated by canoes and other light craft. Tributaries generally too small for easy boating.</p> <p>Obstructions are few in main stem; numerous in tributaries.</p> <p>Main stem is meandering in most of study area. About 2 miles of river above Selkirk is relatively straight.</p> <p>Streamside vegetation mostly hardwood swamp. Some cedar swamp and upland forests.</p> <p>Banks of main stem mostly low. Tributaries have higher banks where they cut into moraine in the western and northern parts of the watershed.</p> <p>Streamside cabins are sparse. Frontage on most of the main stem is in state ownership.</p> <p>Low sandy banks at most bridges and public access sites provide easy launching and take-out points.</p>
Camping and cabin living	<p>Characteristics favorable to fishing and boating generally also desirable for camping and cabin living.</p> <p>Moderately high sandy slopes provide good drainage and easy access to river.</p>	<p>See descriptions above.</p> <p>Many good camp sites on sandy banks along river, but in Rifle River Recreation area camping is restricted to prepared campsites.</p>



MAP 1—WIDTH AND DEPTH OF CHANNEL



MAP 2—BED AND BANK MATERIALS



MAP 3—HEIGHT OF BANKS AND BANK VEGETATION

RECONNAISSANCE OF THE RIFLE RIVER, A COLD-WATER RIVER IN THE NORTHEASTERN PART OF MICHIGAN'S SOUTHERN PENINSULA

By
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1972