Maine's Whitewater Rapids

Executive Department

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MAINE'S WHITEWATER RAPIDS

and

Their Relevance to the Critical Areas Program

By

Janet McMahon

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FOREWORD

The following report on whitewater rapids was prepared for Maine's Critical Areas Program. This program was established by an act of the Legislature in 1974 which directed the State Planning Office to develop an official Register of Critical Areas and to encourage and coordinate the conservation of such areas as part of its overall responsibility for comprehensive statewide planning and coordination of planning activities. The Act defines Critical Areas as natural features of statewide importance because of their unusual natural, scenic, or scientific significance.

The Act also created the Critical Areas Advisory Board to advise and assist the State Planning Office in the establishment of the Register and the conservation of critical areas. In this capacity, the Advisory Board helps formulate and approves an Action Plan for each topic. The Action Plan is based on recommendations made by the author and identifies action that will be taken on the registration and conservation of critical areas. The program established by the Act is not regulatory, with the minor exception that notification of proposed alterations of critical areas is required of the landowners thereof. The program is primarily one of identifying critical areas and providing advice to and coordinating the voluntary activities of landowners, state and local government organizations, conservation groups and others to the end of encouraging the conservation of critical areas. The Critical Areas Program further provides a specific focus for the evaluation and coordination of programs relating to critical areas in Maine. The program also serves as a source of information on critical areas and their management.

The purpose of these reports is to present the results of thorough investigations of subjects areas chosen for consideration in the Critical Areas Program. The reports are an intermediate phase in a systematic registration process which starts with the identification of subjects for consideration and concludes with the analysis of each potential critical area individually and, if appropriate, inclusion of areas on the Register.

In addition to the specific task which they are intended to fulfill in the registration process, it is my hope that these reports will be useful in a more general sense as a source of information on the various topics they cover. For more information on whitewater rapids or other aspects of the Critical Areas Program, feel free to contact me or other members of the staff at the State Planning Office.

R. Alec Giffen, Director
Natural Resouce Division

ABSTRACT

Whitewater rapids of some magnitude are found on all of Maine's rivers. Although they are scattered throughout Maine, rapids are generally concentrated in the more mountainous central and western portions of the state or near the headwaters of rivers and streams. Rapids are among the state's most beautiful natural features and are aesthetically and scientifically valuable for the following reasons. The surficial and bedrock exposures often associated with rapids are important in understanding the geologic history of a region; alternating rapid and quickwater stretches provide spawning grounds and nurseries for many cold water fish species: and many of Maine's rapids are renowned as excellent areas for fishing, whitewater canoeing, kayaking, and rafting.

From 1977 to 1981, the Critical Areas Program conducted a statewide inventory of whitewater rapids. Based upon a literature search and field work, Maine's finest examples of whitewater rapids were determined. This report defines criteria by which the scientific and natural attributes of whitewater rapids can be assessed. One hundred eighty nine rapids were considered. One hundred two of these were overflown and 55 were visited. Thirty-eight sites (20% of the 189 inventoried) are recommended to be evaluated for inclusion on the Critical Areas Register and three areas with marginal significance are described in detail in this report. A visit on the ground is recommended for one other area. The hydropower potential for each site and economic implications of registration are not addressed in this report.

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AUTHOR'S NOTE:

This planning report is not intended to be used as a recreational guidebook to the rapids of Maine's rivers. Because the approach taken during the inventory and writing of this report was a scientific one and because many of the rapids inventoried are considered impassable or navigable only by expert canoeists, kayakers or rafters, I strongly advise the reader who is planning a trip down any of the sites described in this study to consult a recreational river guide.

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ACKNOWLEDGEMENTS

The whitewater rapids inventory evolved over a period of two and a half years and during that time has involved many people. I am grateful to all of them for their help with the inventory and this report. I would like to thank:

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INTRODUCTION

Why Are Whitewater Rapids Important?

"There is three miles of this turbulent water, the roughest that the will of man ever brought to heel and made to carry his freights for him. Three miles of Niagara, a lumberman once called it, and the phrase well describes the canyon, ripped out of solid rock, with sheer and often inaccessible walls, and the rock-ribbed, boulder-studded riverbed, falling more than 70 feet to the mile, down which rushes a boiling, seething, smoking flood of water, all a-lather in its haste."

The Penobscot Man
by Fannie Hardy Eckstorm

Whitewater rapids are among the state's most beautiful natural features. To the canoeist and observer alike, the churning whitewater and roar of a rapid reveal the power of an "untamed" river and create a sense of wildness that is unparalleled in nature. The importance of whitewater rapids is four-fold. They are valued for aesthetic reasons and have many recreational uses; they are ecologically important to many cold water fish species; they are important in understanding both the bedrock and surficial geology of an area; and they have played an interesting part in Maine's history. The economic value of rapids as hydroelectric power sites is briefly discussed in the General Evaluation of Rapids for Inclusion on the Register of Critical Areas (pages 155-158)

Scenic and Recreational Value

The recreational values of rapids are closely tied to their scenic attributes. The excellent water quality, abundance of cold water fish and the "wilderness" connotation often associated with rapids attract paddlers and fishermen from all over New England. Rapids are most commonly used for whitewater canoeing, rafting, kayaking, tubing and fishing. All of these activities are becoming increasingly popular in Maine. Conversations with campers and fishermen indicate a recent influx of canoeists from urban and suburban sections of New England. Many areas which until recently were protected by their remote locations, are rapidly gaining statewide and, in some cases, national reputations. Especially popular at a regional level are the rapids of the Saint John and Allagash Rivers. Many canoeing and fishing parties are guided down these and other rivers, such as the Machias, Saint Croix and West Branch of the Penobscot, by canoeing outfitters and licensed Maine guides. Two of New England's most spectacular rafting trips include the rapids of the West Branch of the Penobscot and those within the Kennebec River Gorge. Another area which is popular among canoeists is the Lower Dead River. This rapid is considered one of the state's finest whitewater stretches and, along with the Rapid River, is the location of an annual whitewater canoe race.

The scenic beauty of many of Maine's rapids is well recognized. Rapids such as Gordon and Hardscrabble rFalls are popular picnicking areas while others, such as Limington Rips and Grindstone Falls, have been made into roadside rest areas by the Maine Department of Transportation.

Campsites and hiking trails exist near many areas such as Indian Carry to Grand Pitch on Webster Brook, The Cribwork, Airline Rips and Seboomook Rapids. Some of these originated as portage trails or convenient resting areas and have been used for centuries.

Many rapids described in this report are, at least at a local level, popular fishing spots. The pools that frequently occur above and below rapid areas and the nurseries provided by the rapids themselves, are ideal habitats for trout, salmon and other cold water fish. The State's best river fishery for landlocked salmon is located on the West Branch of the Penobscot River below Ripogenus Dam. Rapid stretches such as those on the Machias, Narraguagus, and Sheepscot Rivers offer good fishing for another prized species - the Atlantic Salmon.

Geologic Values

Rapids are geologically significant for several reasons. Many are developed on well-washed bedrock surfaces. Such exposures are unusual in glacially modified terrain and may be important in understanding the geology of the surrounding region. For example, Haskell Rock Pitch on the East Branch of the Penobscot provides an excellent exposure of a fossil-bearing sequence of conglomerate, sandstone, and siltstone (Neuman and Rankin, 1966). Big Ambejackmockamus and The Cribwork, on the West Branch of the Penobscot, are developed on Katahdin quartz monzonite near its contact with the surrounding metamorphic rock (Griscom, 1966; Doyle et al. 1967).

Rapids that are developed on boulders rather than bedrock may provide information on the glacial history of an area. The boulders exposed at Spencer Rips on the Moose River appear to be the excavated remains of a terminal or recessional moraine which suggests a pause in the late Pleistocene deglaciation of the region (Brewer, unpub.). A cross-section of the flood plain exposed at Limington Rips appears to indicate that an earlier episode of deposition along this portion of the Saco River has been followed by renewed down-cutting.

Rapids may also exhibit hydrologic sculpturing or other forms of erosion. Haskell Rock is an extraordinary erosional remnant. The Cribwork and portions of Wassataquoik Stream Rapids appear to be developed by erosion of sheeting joints in the underlying bedrock.

Finally, some rapids are excellent examples of a particular hydrologic regimen, representing a state of equilibrium between the river and the terrain over which it flows. This is discussed further in the section on the origin of rapids.

Historic Value

Rivers and streams played an important part in opening up the Maine wilderness. Not only did they provide the first paths into the state's interior, but they were also vital arteries for the forest industry. The state's industrial growth depended heavily on dams built at waterfall and rapid sites to generate power for manufacturing and to regulate waterflow for carrying wood to the mills (Saltonstall, 1974).

Whitewater rapids have a place in Maine's history primarily because they obstructed transportation routes. As a result, they were often considered more of a hindrance than a resource. Unless water levels were high, a rapid was a sure location of a log jam. The huge pile-ups of logs that plagued nearly every river drive were the result of their shallow obstructed channels and fast currents. Names such as Chase Carry and The Hulling Machine suggest the difficulty in running logs or navigating through rapids. Many areas, such as Big Black Rapids on the Saint John River, were blasted to clear the channel of ledge and boulders or were dammed, such as the Cribwork or Old Roll Dams on the Penobscot's West Branch, to hold back enough water to carry the logs over. Camps were often set up near these difficult stretches. Some camps persist today at a number of locations including Big Eddy below the Cribwork on the West Branch of the Penobscot and at Spencer Rips on the Moose River.

The difficulties posed by rapids to log drivers of the 19th and early 20th centuries led to a heroic tradition that rivals early stories from the American West (Eckstorm, 1972). The romance of this period lingers in the Maine woods today with traces of logging booms, breached dams, abandoned equipment and camps, and the paper company farms.

The rivers that drain the mountains of Katahdin have had a long history of exploration. The most notable accounts of this are Thoreau's records of trips on the West Branch of the Penobscot in 1848 and 1853, and on the East Branch in 1857 (Thoreau, 1864).

Long before rapids were considered as sources of hydropower, they were valued as a source of food. Because of their association with cold water fish such as trout and salmon, Indian fishing camps were often located nearby. Evidence of one of these camps exists where the South Branch of the Penobscot River enters Seboomook Lake.

The character and beauty of many of the state's rapids are reflected in their Indian names. Several examples and their translations include: Passamagamet - "at the place of many fish", Debsconeag - "carrying place", Ambejackmockamus - "slantwise of the regular route" and Abol - "where the water laughs in coming down."

Extent of Knowledge

Surprisingly little detailed work has been done on whitewater rapids in Maine. Although general information on the location and canoeability of many of the state's rapids is available in various river guides, scientific information is almost entirely lacking. Through the National Wild and Scenic Rivers Study, the Heritage Conservation and Recreation Service has inventoried many of the state's river segments and classified them according to their naturalness and their recreational potential. Many rapid areas are mentioned but are not covered extensively.

Geology

Because rapids are generally considered to be temporary landscape features, they have been studied as one step in an erosional cycle rather than as an entity. As a result, there is very little literature on the origin and development of whitewater rapids. Although many rapids are characterized by good bedrock exposures, the geology of many rapid areas has not been studied because of their remote location and inaccessibility.

Ecology

Several publications on fish ecology briefly describe the importance of whitewater rapids to cold water fish. The exact locations of spawning and nursery areas are recorded by fisheries biologists throughout the state, providing a practical and accurate source of information on the relationship between rapids and fish.

Hydropower

Whitewater rapids are under careful scrutiny by hydropower interests. The most recent study on hydroelectric power potential of Maine's rivers was completed by the New England River Basins Commission in 1981. This study screened out the most economically viable sites many of them are rapid areas. A second study, performed by the Army Corps of Engineers in 1980, lists potential and existing sites according to the amount of energy that could be or is being produced.

Future Work

Rapids are highly valued as recreational and scenic sites and are very much a part of Maine's natural heritage. A topic that should be addressed immediately, is to what extent increasing pressure from hydropower developers will conflict with the natural and aesthetic uses of whitewater rapids. Can Maine meet its energy needs without developing rapids that have statewide significance?

NATURAL HISTORY OF MAINE'S WHITEWATER RAPIDS

Definition of a Whitewater Rapid

Probably no one is more familiar with the sheer force and power of a whitewater rapid than the canoeist or kayaker. Sinking into a "hole" or "keeper", plowing through large standing waves, being turned by eddies and strong cross-currents or shooting through a narrow passage provides the paddler with an understanding of what a whitewater rapid is. The hydrologic features that make a rapid so exciting to the canoeist are also what make it fascinating from a natural history perspective. For purposes of this study, whitewater rapids can be defined by the following characteristics (Brewer, unpub.):

1) The water flow is turbulent rather than laminar. This implies that the flow has a relatively high velocity and the river channel is relatively shallow.

2) The length of the rapid is noticeably greater than the river's width. Otherwise the area might be classed as a waterfall.

3) The flow within the rapid appears chaotic and ill-defined rather than occurring over a few obvious drops.

4) The gradient of the channel is steep. The slope required to form a rapid depends on many factors including the size and flow of the river and the type of sediment in it. Most rapids have a water surface slope of at least 25 feet per mile.

5) The motion or turbulence of the water is the most important scenic element present. This distinguishes a rapid from a gorge in which the bedrock is the most important scenic element.

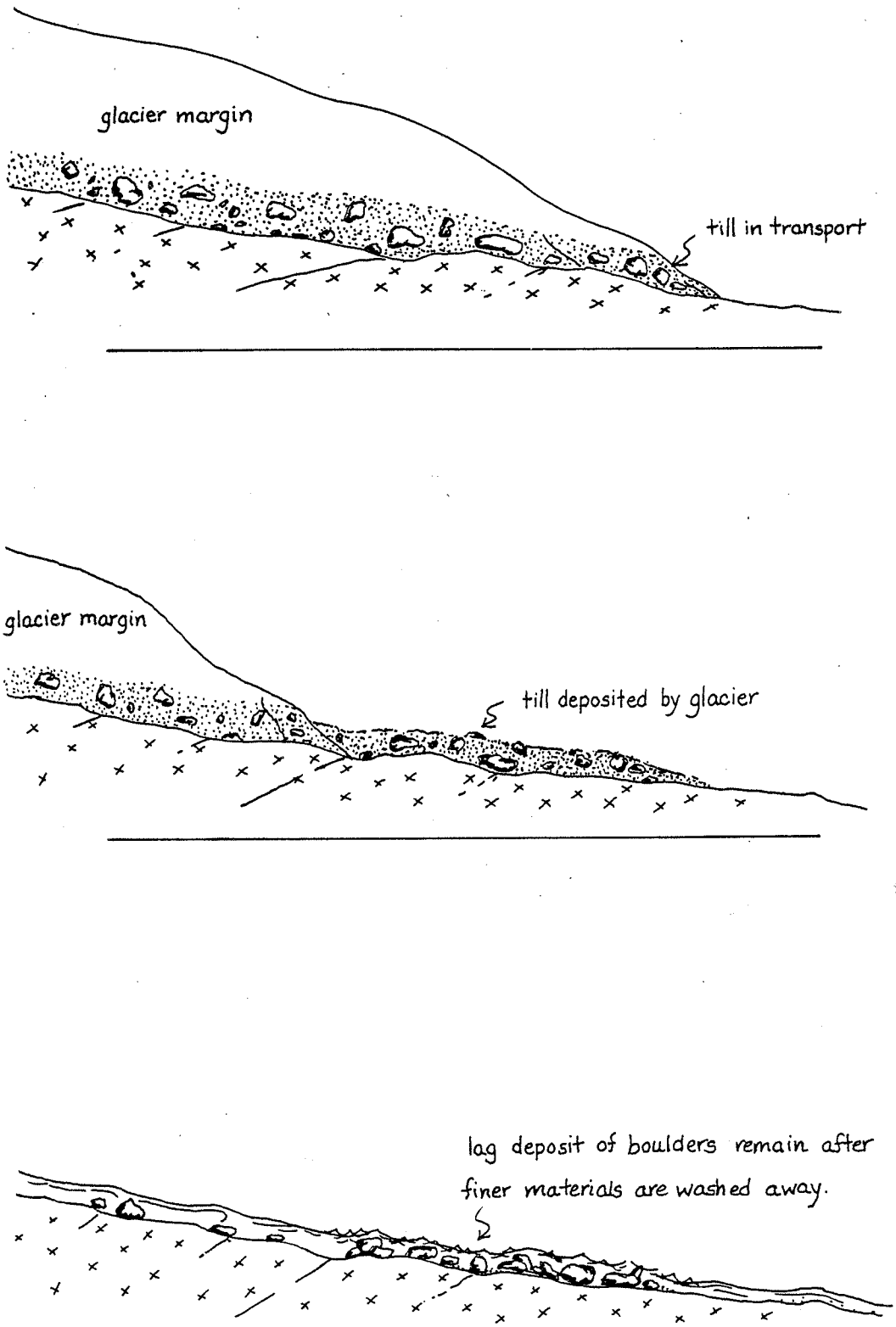
Origin

The physical characteristics of Maine's whitewater rapids are dependent upon the processes of riverbed formation, the flow and load of the respective rivers, and the structure and nature of the underlying rock. Their variable size, origin and character is largely due to the state's diverse geology and the effects of glaciation during Pleistocene time (10,000 - 2,000,000 years ago).

Most landforms owe their existence to the action of rivers. Through a process called degradation, steep terrain is gradually eroded to a surface of low relief (Gresswell, 1958). In this sequence, beginning with a "youthful" stream flowing over mountainous terrain, a rapid represents an interim stage between a waterfall and a peneplain (a land surface worn down by erosion to a nearly flat or broadly undulating plain). Because a large amount of energy is released at the lip of a falls, waterfalls are usually temporary landscape elements in terms of geologic time. As the bedrock beneath a waterfall erodes down and back, this energy is dissipated over a longer stretch of stream and a

Figure 1

Rapids developed over a lag deposit.



rapid is formed. Ultimately, the rapid disappears and the stream becomes a meandering channel with a gradient (depending on stream size) of five feet or less per mile of channel length. This entire process may take hundreds of thousands of years.

In addition to this erosional cycle it is normal to some extent, for rivers to create their own rapids out of available sedimentary materials. A straight or nonmeandering channel characteristically has an undulating bed that alternates along its length between regularly spaced deep and shallow stretches (Leopold, et al. 1964). The material making up the riverbed is generally coarser in the shallows (or riffles) than in the pools. The water surface over this pool-riffle sequence consists of alternating flat stretches of low gradient and steeper stretches that often contain rapids. The overall appearance is summarized in the fishermen's adage, "smooth water over the pools and riffles over the bar" (Leopold, et al. 1964).

On most rivers in Maine both of the above processes have been affected by glaciation. Deposition of ground, terminal and recessional moraines* caused changes in drainage patterns that gave rise to dozens of waterfalls and rapids and formed many of the lakes that are scattered throughout the state. In many cases, streams in recently glaciated areas have not had time to reestablish an equilibrium with the terrain they flow over after the ice movement disrupted their original courses.

The following specific processes appear to have led to Maine's whitewater rapids. The final stages of glaciation resulted in the deposition of moraines across many of Maine's river valleys. The till composing these moraines often contained large boulders that measured up to several yards in diameter. As the ice sheet continued to withdraw, melt water and postglacial streams cut through the recently formed moraines. The finer materials were washed away leaving a "lag deposit" of boulders in the stream (Figure 1). Many rapids in Maine occur over lag deposits of boulders that are too large for transport. An excellent example of a rapid that appears to have formed in this way is Pockwockamus Falls on the West Branch of the Penobscot River. A lag deposit will remain in place until abrasion reduces the boulders to a transportable size. They are then carried as part of the stream's normal load.

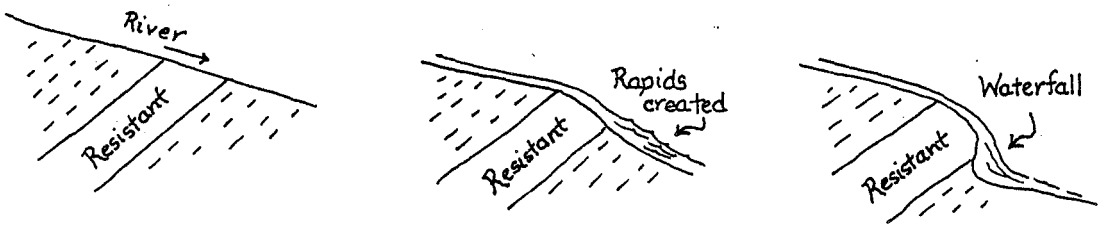
With the recession of the glacier, stream courses developed where water could most easily flow. Frequently the stream crossed ledge containing a sharp drop caused by some process of glacial erosion such as plucking from the lee slope (Brewer, unpub.). As the water flowed across the drop, it would form a small waterfall. The waterfall would eventually wear down into a series of irregular drops. Rapids formed in this way often have a gradient of 50 feet or more per mile and have an upper section developed on bedrock and possibly a lower section composed of eroded debris. A good example of this type of rapid is Haskell Rock Pitch on the East Branch of the Penobscot River.

*Ground moraine is a general term for the blanket of till that covers much of Maine. Terminal and recessional moraines are ridges of till or sand and gravel that accumulated in the marginal zone of a glacier (Thompson, 1979).

Rapids may also form over structural weaknesses in the underlying bedrock. Postglacial streams are sometimes developed over bedrock contacts or faults, either of which bring together rock units of varying erosional resistances. The streams selectively erode the less resistant rock and in so doing create a rapid or falls by increasing the gradient of the stream (Figure 2).

Figure 2

Development of Rapids due to Differential Erosion



Columnar jointing and fracturing can also alter the strength of the bedrock, resulting in erosion of the rock along a preferred orientation. The erosion of such fractures leads to the removal of large blocks of rock, creating sudden drops and large obstructions. The influence of heavily jointed bedrock on rapid formation can be seen on several portions of Wassataquoik Stream Rapids.

The orientation of the bedrock can influence the formation of a rapid in a second way. Whitewater rapids, like waterfalls, may be superimposed across foliated rocks that have a nearly vertical cleavage. If the direction of foliation is also vertical, rapids which are dependent upon the excavation of joint blocks tend to form in the following two ways (Brewer, 1978): 1) where the bedrock dips upstream at a high angle, large drops will occur if the dipping joint surfaces break away cleanly from the rim of the bedrock (Figure 3). This usually results in a small waterfall, although the steep pitches found in many of the state's rapids were probably formed in this way. 2) Where the bedrock dips downstream at a high angle, large blocks cannot fall freely away from the rim as in the first case. Instead, these rapids tend to form as a series of small drops (Figure 4). Stair Falls, on the East Branch of the Penobscot River is an excellent example of a rapid formed over resistant rock layers that dip upstream.

The processes of formation described in this section are affected by the complex behavior of rivers over long periods of time. The character of a river is influenced by many factors and it is often difficult to pick out one set of factors as "causes" and another set as "effects". On

Figure 3

Rapids developed on foliated bedrock with cleavage dipping upstream.

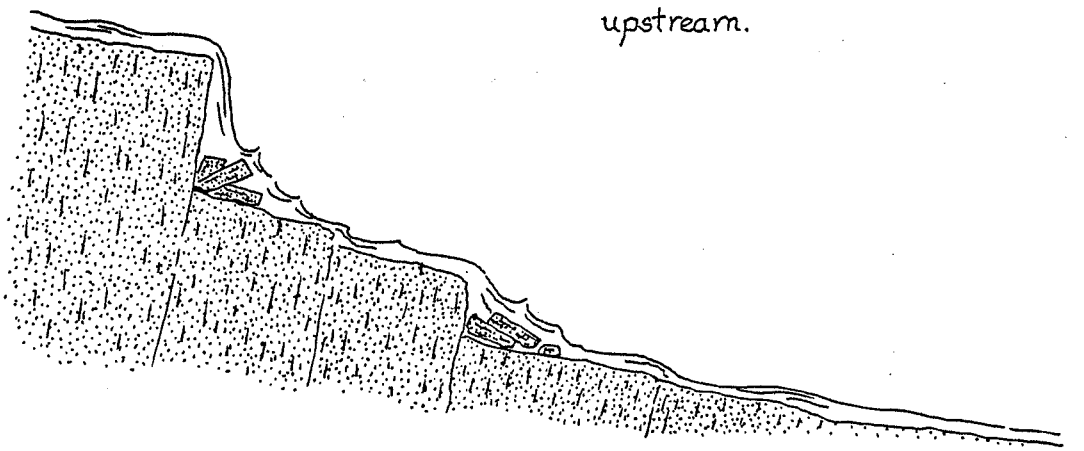
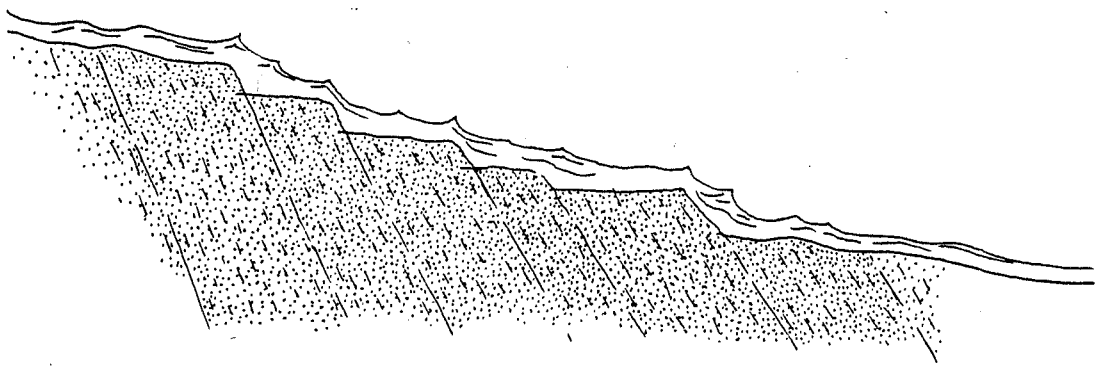


Figure 4

Rapids developed on foliated bedrock with cleavage dipping downstream.



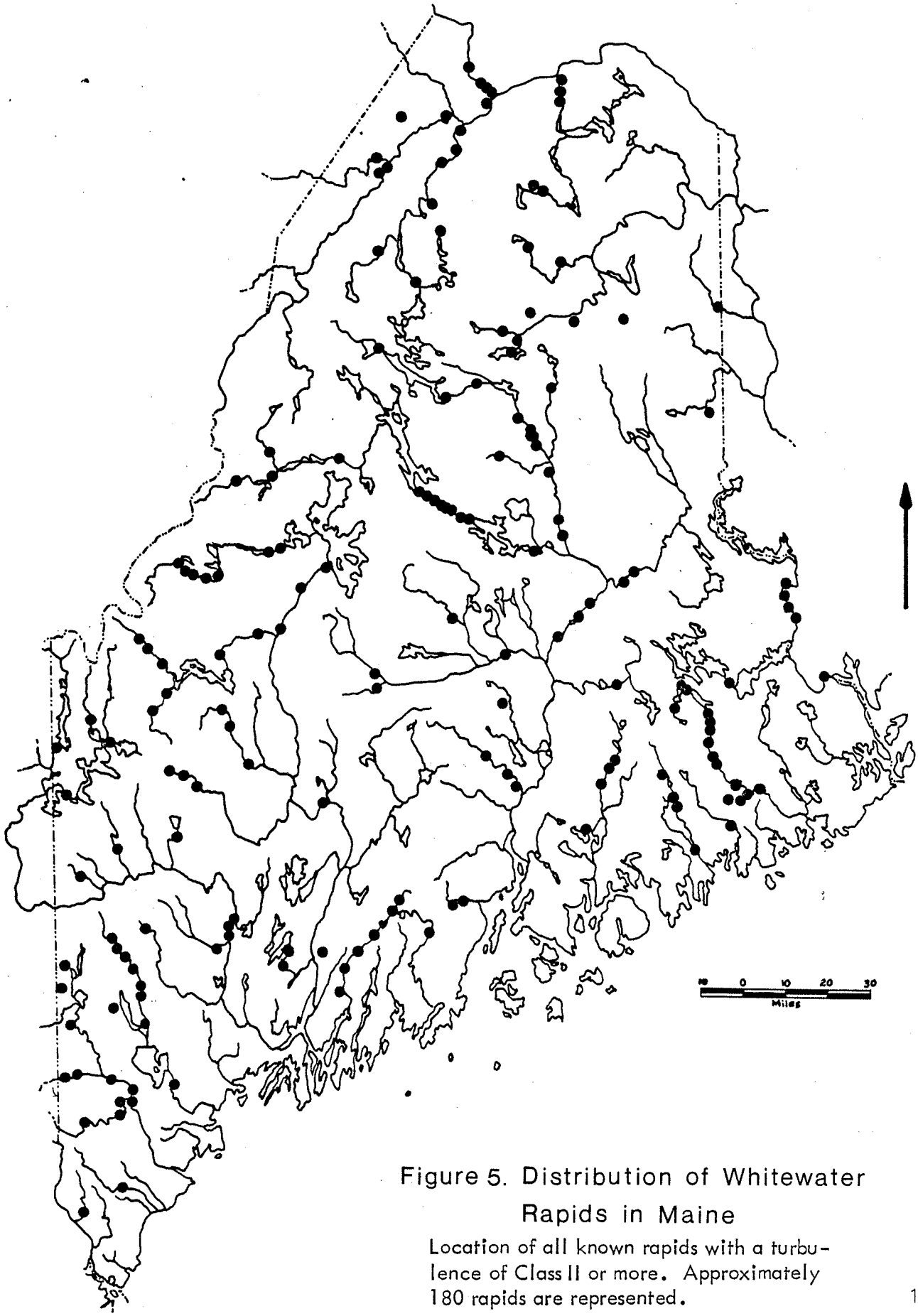


Figure 5. Distribution of Whitewater Rapids in Maine

Location of all known rapids with a turbulence of Class II or more. Approximately 180 rapids are represented.

any river segment, the width, depth, gradient and velocity are interrelated and a change in one will cause changes in the others. For example, the velocity of a stream determines the type of sediments carried and the sediments which are present conversely determine the bottom conditions. These, in turn, determine the velocity by virtue of their roughness. Furthermore, the river may deposit or erode materials in its channel in order to establish an appropriate balance between the types of sediment available and the geometrical features mentioned above. The complexities of river flow are discussed quantitatively in many works by Leopold, Wolman and Miller. A good qualitative discussion was written by Makin in 1963.

Distribution

As a river approaches the sea, the influx of water from each tributary causes the waterflow and depth of the river to increase and its gradient to decrease. As a result, rapids tend to be clustered near the headwaters of rivers and streams.

Unlike waterfalls, which are located primarily in the mountainous portions of western and central Maine, whitewater rapids occur throughout the state. The widespread distribution of rapids in Maine can be attributed to the blanket of till and other surficial deposits laid down by the glaciers that once covered the state. These continental glaciers modified the preexisting topography by smoothing hills and partially filling the valleys with glacial deposits (Thompson, 1979).

The following observations were made from the data collected through groundchecking. Most of the rapids in the coastal portion of the state, including those on the Machias, Narraguagus, Sheepscot and Saco Rivers, appear to be developed primarily over lag deposits. Rapids located further inland tend to be influenced both by glacial deposits and the underlying bedrock. Because lag deposits occur in coastal as well as inland areas, rapids are not restricted to mountainous terrain. Waterfalls, on the other hand, are most concentrated in areas where bedrock rather than surficial geological processes are dominant.

Figure 5 shows the location of all known rapids with a turbulence of Class II or more. Approximately 180 rapids are represented. Inventoried areas that are better classified as waterfalls or gorges are not shown.

Associated Hydrologic Features

The chaotic appearance of the water surface over a rapid is primarily caused by a high velocity flow over an irregular riverbed. Ledge drops, which form over structural weaknesses in the bedrock (see page 10), are found in many of Maine's rapids. These, along with boulders and gravel bars, obstruct the riverflow and often create a second feature that is characteristic of rapids -- standing waves. A standing wave is defined in the Glossary of Geology (Gary et. al., 1972) as "a water wave, the wave form of which oscillates vertically between two points or nodes, without progressive movement." Standing waves may vary in height from a few inches to more than 5 feet. Some of the largest waves seen during this inventory were on the Cribwork (West Branch of the Penobscot River) and on the Rapid River. The waves in these rapids measured between 4 and 6 feet in height.

An additional feature influenced by turbulent water flow is hydrologic sculpturing. The riverbeds of rapids such as the Heater (Mattawamkeag River) and those on the Swift River have been cut into circular hollows called potholes. Potholes form when a slight depression becomes filled with pebbles. The current follows the contours of the depression and causes the pebbles to swirl around. This grinds the pebbles smaller and makes the pothole wider and deeper.

An exceptional example of the eroding power of rivers occurs at Haskell Rock Pitch on the East Branch of the Penobscot River. Haskell Rock is an impressive rounded mass of conglomerate that has been shaped by the action of the rapid.

Whitewater Rapid Ecology

Maine's cold water fishery is composed of six kinds of trout, landlocked salmon (Salmo salar), Atlantic salmon (Salmo salar), cusk (Lota lota) and whitefish (Coregonus clupeaformis). Species in the trout group include brook trout (Salvelinus fontinalus), lake trout or togue (Salvelinus namaycush), brown trout (Salmo trutta), rainbow trout (Salmo gairdneri) and the chars (blueback (Salvelinus alpinus oquassa)and Sunapee trout (Salvelinus alpinus aureolus)) (ME IF&W, 1977). The native species most often associated with rapids are brook trout, landlocked salmon and Atlantic salmon.

Whitewater rapids play an important part in the life cycles of these species because they frequently occur near spawning grounds and they provide nursery areas for young fish. Most cold water fish require a large amount of oxygen to survive. Rapids provide an ideal habitat because water masses with fast currents are characterized by supersaturation of oxygen (Nikolsky, 1963). Also, water flowing through the gravel of a riffle provides aeration essential to the incubation of fish ova (Stuart, 1953).

Trout and salmon are adapted to life in fast moving water in several ways. They have torpedo-shaped bodies which offer little resistance to movement; their short powerful tails are able to propel them upstream; the eggs adhere to the riverbed which prevents the current from carrying them away; and the lateral line of river fishes enables them to orient to the currents.

Although the life cycles of cold water species vary, they follow this general pattern. Adult fish spawn in shallow depressions called redds which are usually made in gravel or cobbles. Ideal spawning grounds occur where there is a moderate current, usually at the outlets of tributaries or at the tail end or head of rapid areas. When the eggs hatch, the young fish swim to well-oxygenated rapid stretches where the irregular riverbed offers protection from predators. Brook trout and landlocked salmon spend from one to three years in these nursery areas before returning to quieter water to spawn. In the life cycle of Atlantic salmon, an anadromous species, young salmon migrate downstream and feed at sea for one to three years before migrating back to rapid areas to spawn.

METHODS

In 1977, the Critical Areas Program began an investigation of waterfalls, gorges and whitewater rapids. Dr. Thomas Brewer researched these subjects and identified 57 significant waterfalls, 19 gorges and 6 rapids in Maine. In February 1979, following Brewer's research, the program began an in-depth statewide inventory of Maine's whitewater rapids. An extensive literature search was conducted by environmental interns Stephen Roy and Kim Marsh to identify significant whitewater rapids in the state. The 1978 Update of Maine's Natural Areas Inventory was reviewed and the following river and canoeing guides were examined: 1976 A.M.C. River Guides, Volumes I and II; No Horns Blowing, The Weekender, and Hot Blood and Wet Paddles by Eben Thomas; and Pole, Paddle and Portage by Bill Riviere.

All whitewater rapids that received more than a Class I designation (using the international classification which ranges from I-V in order of increasing turbulence) were included in a preliminary list of 176 areas. This list was reviewed by canoeists, woodsmen, wardens, foresters, and other knowledgeable people in a series of four meetings held at different locations throughout the state. Representing the central part of the state as well as other regions in general were Herb Hartman, Director of the Bureau of Parks and Recreation and a long-time canoeist, Clinton Townsend, an attorney from Skowhegan and an avid canoeist, and Eben Thomas, author of several river guides consulted during the literature search. The southern rivers and streams were handled by Art Bearce, Chairman of the AMC Maine Chapter and canoeing enthusiast, and Gerry Mayberry of Portland, another long-time canoeist. The many rivers and streams of the Penobscot basin were covered by three members of the Penobscot Paddle and Chowder Society: Bill Stearns and Bucky Owen, professors at the University of Maine at Orono, and Don Fletcher. Pete Sawyer, a former Commissioner of the Land Use Regulation Commission, resident of Ashland and frequent canoeist, Eric Hendrickson of Presque Isle and president of Northern River Runners, Wilfred Atkins also of Presque Isle and a retired warden, and Dave Lutes of Allagash, a well known river guide in northern Maine, provided information on Maine's northern rivers and streams.

Before each meeting, charts were compiled using available literature and sent to the above people for review. Information such as the name of the rapid, length and gradient, type of bottom, canoeing difficulty, and length of canoeable season was included and organized by watershed. At the meetings, corrections, deletions and information on new areas were discussed and the charts were updated. Approximate lengths were provided and the areas were plotted on the appropriate USGS quadrangle maps.

Hydrologic, geologic and biologic criteria were used to determine which rapids should be further evaluated as potential critical areas. The criteria were arrived at by identifying the values and features that characterize rapids in Maine. As the inventory progressed, some of the criteria were modified slightly, depending on additional information and the discovery of new features. A total of 102 rapids were recommended in a draft version of Maine's Potentially Significant Whitewater Rapids (Roy and Marsh, unpub.) which was sent to 120 people for review in November, 1979. Comments, additions and corrections were evaluated and in January 1980, final revisions to the data charts were made.

The second phase of the whitewater rapids inventory was a detailed follow-up evaluation of each rapid recommended in the draft version of Maine's Potentially Significant Whitewater Rapids. An aerial reconnaissance survey proved to be an efficient way to inventory such a large number of areas for the following reasons:

- it was a less time and energy expensive means of inventorying and screening out Maine's rapids than a ground survey;

- it could be used to supplement existing information on each area;

- it would provide photo documentation of each area; and

- the rapids could be surveyed in a relatively short period of time (4 weeks) as opposed to at least 20 weeks on the ground. This would result in more accurate information on rapid dimensions, turbulence, waterflow, etc. It would also provide a better basis for comparison since waterflow, and as a result the overall appearance of each rapid, varies considerably with the seasons.

The rapids were grouped and flown according to watershed. Seven days (a total of 45 hours in the air) chosen over a period of four weeks to allow for changing weather conditions and maximum waterflow, were required for a comprehensive reconnaissance (Table I). Because Maine's climate and, as a result, the time of spring freshet varies from north to south and east to west, water resource data were studied to determine the best time and order to fly each watershed.

A four passenger plane (Cessna 172 Skyhawk) was used in the survey. Two photographers and a navigator/data recorder accompanied the pilot on each flight. The high wing design of the Cessna was ideal for through the window photography. An aerial field data form (see page 18) and a hand-held tape recorder were used to record all prominent features.

Fifty-six of the 102 whitewater rapids overflown in the aerial survey were considered significant enough for ground checking. This constituted the third phase of the inventory which lasted from mid June until November. Information on the hydrology, biology and geology of each area was recorded on a ground survey field data form (see pages 19 and 20) and color slides were taken. This information along with data collected in the air was synthesized into detailed descriptions of each rapid recommended for registration. The amount of time spent at each site varied from an hour to a full day depending on the length of the rapid and access into the area. During the five months required to groundcheck these areas, water levels in most of the state's rivers and streams fluctuated considerably. Using the aerial field data sheets it was possible to gauge the relative significance of each area.

TABLE I

FLIGHT PLAN SUMMARY

Region Overflown	Number of Rapids	Air hours from Wiscasset	Date
Mid-Coastal Watersheds	5	2.0	April 17, 1980
Saco River Basin	4	2.6	April 17, 1980
Penobscot River Basin (South-eastern portion)	14	4.5	April 19, 1980
Eastern Coastal Watersheds	14	6.4	May 2, 1980
Androscoggin River Basin and Western Kennebec River Basin	21	7.0	May 15, 1980
Kennebec River Basin (Moosehead Lake Region)	9	5.9	May 16, 1980
Penobscot River Basin (North-western portion)	23	7.4	May 20, 1980
Saint John River Basin	12	8.7	May 22, 1980
	102	44.5	

Date:_____
Completed by:_____
Time spent at site:_____

Whitewater Rapid Field Data Form

Aerial Survey

1. Name of Area:

2. Mark area on attached U.S.G.S. sheet:

3. Turbulence (circle): I II III IV V

   Briefly describe extent of turbulent sections:

4. Hydrologic features (x):

   a. large eddies
   b. whirlpools
   c. exceptionally steep pitches
   d. large standing waves

5. Vegetation (species, height, approximate age):

6. Geologic features:

   a. description of riverbed:

   b. origin (x):

      1. lag deposit
      2. resistant rock layers
      3. material transported from tributaries
      4. glacial action

7. Extent of development (presence of permanent structures, dams, roads):

8. Degree of scenic beauty (vistas):

9. Access, campsites, portage trails:

10. Film frame #'s:

11. Altitude_____ Time_____

12. Weather conditions at time of survey:

13. General Comments:

Date:_____
Completed by:_____
Time spent at site:_____

Whitewater Rapid Field Data Form

Ground Survey

1. Name of Area:

2. Length_____ meters; _____ feet; _____ chains
   Width _____ meters; _____ feet; _____ chains

   Method of measurement used:

   Does the width vary over length of rapids?

3. Ownership:

4. Attach xerox of U.S.G.S. sheet, mark area.

5. Directions to the area:

6. Briefly describe boundaries of critical area using a physical feature for a reference point. Give the size of the area.

7. Turbulence (circle): at time of visit I II III IV V
   at maximum flow (esimate) I II III IV V

   Briefly describe extent of turbulent sections:

8. Gradient (estimate if not shown on topo):

9. Flow (estimate) at time of visit:
   at maximum flow:

   Is the river dam controlled?

10. Water quality (color, odor):

11. Hydrologic features (x): A. at time of visit B. at maximum flow

    a. large eddies
    b. whirlpools
    c. exceptionally steep pitches
    d. large standing waves

12. Geologic features:

    a. bedrock sample
    b. description of riverbed
    c. origin (x)

        1. lag deposit
        2. resistant rock layers
        3. materials tranported from tributaries
        4. glacial action

13. Biologic features:

    a. general vegetation type (species, height, approximate age)
    b. rare plant or animal species
    c. unusual habitat
    d. fish species and abundance

14. Significance for watershed or region:

    One of _____ significant rapids in the _____ watershed.

15. Extent of development (presence of permanent structures, roads):

16. Degree of scenic beauty (vistas):

17. Access, use:

18. Campsites, portage trails:

19. Film frame #'s:

20. Weather conditions at time of survey:

General Comments (including additional information needed):

Draw a sketch map of the area on the back of this page:

CRITERIA USED TO IDENTIFY SIGNIFICANT WHITEWATER RAPIDS

The following criteria were applied to the information available on rapids in Maine (as of May, 1979) to determine which areas should be evaluated as potential critical areas. Hydrologic, biologic and geologic criteria were arrived at by identifying features that best characterize whitewater rapids in Maine. By comparing the data collected on individual rapids, it was possible to systematically differentiate between significant and insignificant rapids.

In order for an area to be recommended for further evaluation, it must meet the naturalness criterion in I. In addition, it must meet at least two other criteria. While hydrologic criteria in II and to a lesser extent the geologic criteria in III account for the selection of most of the recommended areas, an area could qualify on the basis of any two of the criteria listed.

I. NATURALNESS

The site contains a whitewater rapid that is in a relatively natural and undisturbed condition.

II. HYDROLOGIC

A. Turbulence (Character) and Length

The area contains either a:

1. Class V, VI or other extraordinarily turbulent whitewater rapid;
2. Class IV whitewater rapid that is at least 1/4 mile in length, or
3. Class III whitewater rapid that is at least 1/2 mile in length, or
4. Class II whitewater rapid that is at least 1 mile in length and fairly continuous, or
5. A combination of Class II, III and IV rapids which occupy a distance of at least 1 mile within a total distance of 2 miles.

B. Gradient

The area contains a rapid with a gradient steeper than the following:

1. Where the drainage area above the rapid is 2,000 square miles or larger	10 feet/mile

*Although the waterflow in a rapid area may be affected by a dam located upstream, it is assumed that the rapid would persist if the river were free-flowing.

2. Where the drainage area above the rapid is between 500 and 2,000 square miles — 20 feet/mile

3. Where the drainage area above the rapid is between 150 and 500 square miles — 30 feet/mile

4. Where the drainage area above the rapid is between 25 and 150 square miles — 40 feet/mile

The gradient needed to make a rapid significant on a large river is less than that required on a small river because the gradient on large rivers is normally smaller, and also because the large volume of water flowing in these rivers creates greater hydrologic action.

C. Unusual Features

The area contains unusual hydrologic features such as large holes (also known as keepers or hydraulics), large eddies, whirlpools, or exceptionally steep pitches.

D. Width

The area contains a rapid that is greater than 300 feet in width for a distance of at least 1/4 of a mile.

E. Variety of Hydrologic Values

The area has an exceptional variety of hydrologic features, e.g. a waterfall or gorge in association with a rapid.

F. Significant for Watershed or Region

The area contains a Class II, III, or IV rapid that is unique or unusual to a watershed or region.

III.GEOLOGIC

The area contains:

A. Geologic features such as:

1. well developed or unusual forms of hydrologic sculpturing, e.g. well developed potholes,

2. rare fossils,

3. a fossil-type locality,

4. an unusual type of bedrock,

5. an exposed fault in areas where this does not generally occur,

6. a contact zone between two or more types of bedrock, or

7. others of importance to understanding the geology of the region;

B. Geologic features particularly useful in teaching the science of geology, or

C. Especially good examples of how rapids are formed in Maine by:

1. lag deposits

2. resistant rock layers

3. materials transported in from tributaries, or

4. glacial action.

IV. BIOLOGIC

The area is:

A. The habitat of rare or unusual plant or animal species, or

B. An especially good example of the habitat of a more common plant or animal species or community.

* * * * * * * *

The International River Classification, which is shown below, was used to determine and describe turbulence. The emphasis here is on the overall appearance of the rapid rather than its degree of difficulty for the canoeist or kayaker.

Class I riffles, some small regular waves; passages clear: sandbanks

Class II low ledges; small waves; passages clear and wide

Class III waves numerous, high and irregular; rocks; passages are clear though narrow; eddies

Class IV waves powerful and irregular; dangerous rocks; passages narrow and winding; boiling eddies

Class V long and very violent rapids; riverbed extremely obstructed; steep drops; violent current; very steep gradient.

Other Considerations

Because the results of the whitewater rapids inventory are based primarily on a set of criteria, most areas can be systematically recommended or rejected. There are, however, a number of less tangible considerations which have affected the outcome of the survey. Because of these, the end result may be subject to revision in the future. A comparative and objective approach has been taken, trying to consider as many factors as possible.

The purpose of the Critical Areas Program is to preserve unusual natural features. Rapids that occur in urban or developed areas have been rejected or excluded from the inventory. Big Eddy in Skowhegan, Milltown Rapids on the Saint Croix, Lisbon Falls in the town of Lisbon Falls and Cherryfield Rapids on the Narraguagus River are examples of rapids that were rejected because the urban character of the surrounding riverbanks detracted from the natural beauty of the rapid. In each of these cases, the rapids met other whitewater rapid criteria.

Several areas that met at least two criteria were excluded from further evaluation because of their ephemeral nature. Certain sites, especially those on small coastal rivers, are exposed riverbeds or flatwater stretches for all but one or two months of the year. Others, such as those on the Penobscot and Dead Rivers which are dam controlled, persist for a much longer period. The spring of 1980 was abnormally dry and the water level of nearly every rapid overflown was below normal. Rapids such as those on Tannery Brook and the Penobscot River were nonexistent in late May and early June and as a result, were not considered for further study. Because of this factor, the list of field checked rejected and undecided areas may be subject to change when evaluated in a more typical water year.

It is sometimes difficult to distinguish between a very turbulent rapid and a waterfall or gorge. Many areas listed on the preliminary data sheets such as Old Roll Dams and Spencer Gut, are better characterized as waterfalls or gorges and recommendations have been made to that effect. In addition, several rapids, because of their proximity to a waterfall or gorge that is already a registered critical area, such as Fish River Rapids near Fish River Falls, will be included in a revised register entry description of the more dominant feature.

RESULTS

During the whitewater rapids inventory, 189 rapids were considered (Table V - Summary Table of all Whitewater Rapids Inventoried). This number does not include rapids with a turbulence of less than Class II. Also, many small streams, where rapids are present for only one or two months of the year, were not considered. Although other areas may be discovered in the future, the 189 rapids inventoried should represent a comprehensive list of Maine's potentially significant whitewater rapids. Of this sum, 87 rapids (46%) were rejected after the literature search and 102 rapids were overflown. During the aerial survey 46 (24%) rapids were rejected and 56 were recommended for ground checking. After visiting 55 areas on the ground, an additional 14 areas (8%) were rejected from consideration. The outcome of the survey is a list of 38 rapids (20% of the original 189) that are worthy of evaluation for inclusion on the Critical Areas Register and an additional three areas that have marginal significance. These 41 areas are listed in Table II. A reference number has been assigned to each significant area. This number corresponds to Figure 6, a site location map, and to the individual site descriptions. The 147 rejected areas are included in Table IV. In both tables, the rapids are grouped according to watershed. One area (Long Falls on the Machias River) met the criteria after being overflown but was not ground checked in 1980. This area should be visited before a final decision on its status is made.

Of the 41 areas listed in Table II, 16 occur in the Penobscot River drainage basin, 8 in the Kennebec, 6 in Eastern Coastal watersheds, 4 in the Androscoggin, 3 in the Saint John, 3 in the Saco and 1 in a Mid-Coastal watershed.

By county, these areas are distributed as follows (two rapids occur in more than one county making the total 43 rather than 41):

Aroostook County	2	Penobscot County	7
Franklin County	5	Piscataquis County	10
Hancock County	1	Somerset County	5
Lincoln County	1	Washington County	6
Oxford County	3	York County	3

Descriptions of Maine's Significant Whitewater Rapids

A list of significant features, a general description, and the condition and use of each area follow. The rapids are grouped according to river basin. A river basin map and summary precedes each group. The map shows the approximate location of all significant whitewater rapids within that particular watershed. Additional information on location and ownership, and more detailed descriptions of site boundaries are available from the Critical Areas Program.

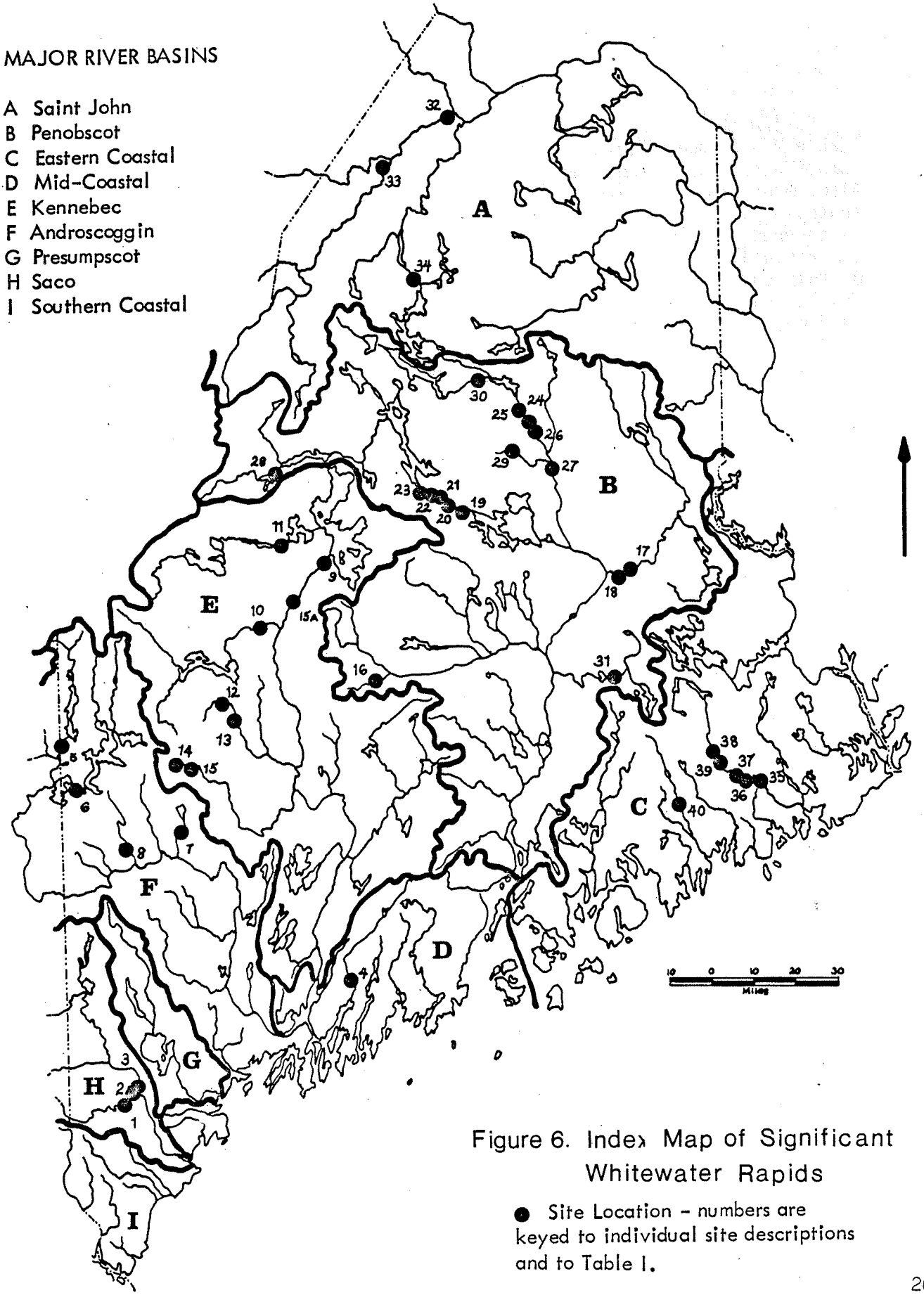


Figure 6. Index Map of Significant Whitewater Rapids

● Site Location - numbers are keyed to individual site descriptions and to Table 1.

TABLE II

SIGNIFICANT WHITEWATER RAPIDS

Number	Whitewater Rapid	River	Town	County	Length	Turbulence
1.	Hardscrabble Falls	Little Ossipee	Limington	York	0.7 mile	Class IV-V
2.	Chases Mills	Little Ossipee	Limington	York	0.14 mile	Class IV-V
3.	Limington Rips	Saco	Limington, Standish	York	0.25 mile	Class III
*4.	Sheepscot River Rapids	Sheepscot	Whitefield, Alna	Lincoln	2 miles	Class II-III
5.	Aziscohos Falls	Magalloway	Lincoln Plantation	Oxford	1.8 miles	Class III-V
6.	Rapid River Rapids	Rapid	Upton, Magalloway T.C, C Surplus	Oxford	6 miles	Class III-V
*7.	Webb River Rapids	Webb	Carthage	Franklin	6 miles	Class II-V
8.	Swift River Rapids	Swift	Byron, Roxbury, Mexico	Oxford	11.5 miles	Class II-IV
9.	Kennebec River Rapids (East Outlet)	Kennebec	T1R7 (Sapling), T2R6 (Big Squaw)	Somerset, Piscataquis	3.5 miles	Class III-IV
10.	Lower Dead River Rapids	Dead	T3R4, T2R4, T1R4, T3R5, T2R5, West Forks	Somerest	15 miles	Class II-IV
11.	Moose River Rapids	Moose	T1R1 (Sandwich Academy)	Somerset	2.5 miles	Class III-IV
12.	Upper Carrabassett River Rapids	Carrabassett	Carrabassett Valley	Franklin	3 miles	Class V
13.	Carrabassett River Rapids	Carrabassett	Carrabasset Valley, Kingfield	Franklin	9.8 miles	Class II-III
14.	Upper Sandy River Rapids	Sandy	Madrid	Franklin	7 miles	Class II-III
15.	Sandy River Rapids	Sandy	Phillips	Franklin	6 miles	Class II

Number	Whitewater Rapid	River	Town	County	Length	Turbulence
15a.	Kennebec River Gorge Rapids	Kennebec	T1R6 BKPWKR, The Forks, W. Forks, T1R6 BKPEKR, T1R5 BKPEKR, T2R5 BKPEKR	Somerset	11 miles	Class IV-V+
*16.	Kingsbury Rapids	Kingsbury Str.	Abbott, Parkman	Piscataquis	3.6 miles	Class II
17.	The Heater	Mattawamkeag	Mattawamkeag	Penobscot	2 miles	Class III-V
18.	Gordon Falls	Mattawamkeag	Mattawamkeag, Winn	Penobscot	0.7 miles	Class III-V
19.	Debsconeag Falls	Penobscot-W. Br.	T2R9 WELS	Piscataquis	0.25 miles	Class IV-V
20.	Pocwockamus Falls	Penobscot-W. Br.	T2R10 WELS	Piscataquis	0.5 miles	Class IV
21.	Abol Falls	Penobscot-W. Br.	T2R10 WELS	Piscataquis	0.4 miles	Class IV
22.	Big Ambejackmockamus Falls	Penobscot-W. Br.	T2R11 WELS	Piscataquis	0.3 miles	Class V
23.	The Cribwork	Penobscot-W. Br.	T3R11 WELS	Piscataquis	1 mile	Class V
24.	Stair Falls	Penobscot-E. Br.	T5R8 WELS	Penobscot	0.16 mile	Class II-III
25.	Haskell Rock Pitch	Penobscot-E. Br.	T5R8 WELS	Penobscot	0.19 mile	Class III-V
26.	The Hulling Machine	Penobsoct-E. Br.	T5R8 WELS	Penobscot	0.11 mile	Class IV-V
27.	Grindstone Falls	Penobscot-E. Br.	T1R7 (Grindstone)	Penobscot	1 mile	Class III-IV
28.	Seboomook Rapids	Penobscot-S. Br.	T2R4 (Pittston Academy Grant)	Somerset	3 miles	Class II-V
29.	Wassataquoik Stream Rapids	Wassataquoik Stream	T4R9, T4R8, T3R8, T3R7 WELS	Piscataquis, Penobscot	15 miles	Class II-V
30.	Indian Carry to Grand Pitch	Webster Brook	T6R9 WELS, T6R10 WELS	Piscataquis	2 miles	Class III-IV

Number	Whitewater Rapid	River	Town	County	Length	Turbulence
31.	Grand Falls Rapids	Passadumkeag	Grand Falls Plt., T3ND	Hancock	0.9 mile	Class II-V
32.	Big Rapids	Saint John	Allagash	Aroostook	2 miles	Class III
33.	Big Black Rapids	Saint John	T15R13 WELS, T14R13 WELS	Aroostook	0.8 mile	Class III
34.	Chase Carry	Allagash	T10R12 WELS	Piscataquis	9 miles	Class II-III
35.	Great Falls Rapids	Machias	Centerville	Washington	0.5 miles	Class III
36.	Lower Holmes Falls Rapids	Machias	Northfield	Washington	0.25 mile	Class IV
37.	Wigwam Rapids	Machias	T25MD	Washington	2.5 miles	Class II-III
38.	Airline Rips	Machias	T31MD	Washington	0.6 mile	Class III
39.	Little Falls	Machias	T25MD	Washington	0.25 mile	Class III-IV
40.	Deblois Rapids	Narraguagus	Deblois	Washington	0.2 mile	Class III-V

*Sheepscot River Rapids, Webb River Rapids, and Kingsbury Stream Rapids occur on small rivers or streams where the water runs out quickly in the spring. Although these areas meet the minimum whitewater rapid criteria, because they are nonexistent for most of the year, their significance is marginal when compared to other areas listed in Table II.

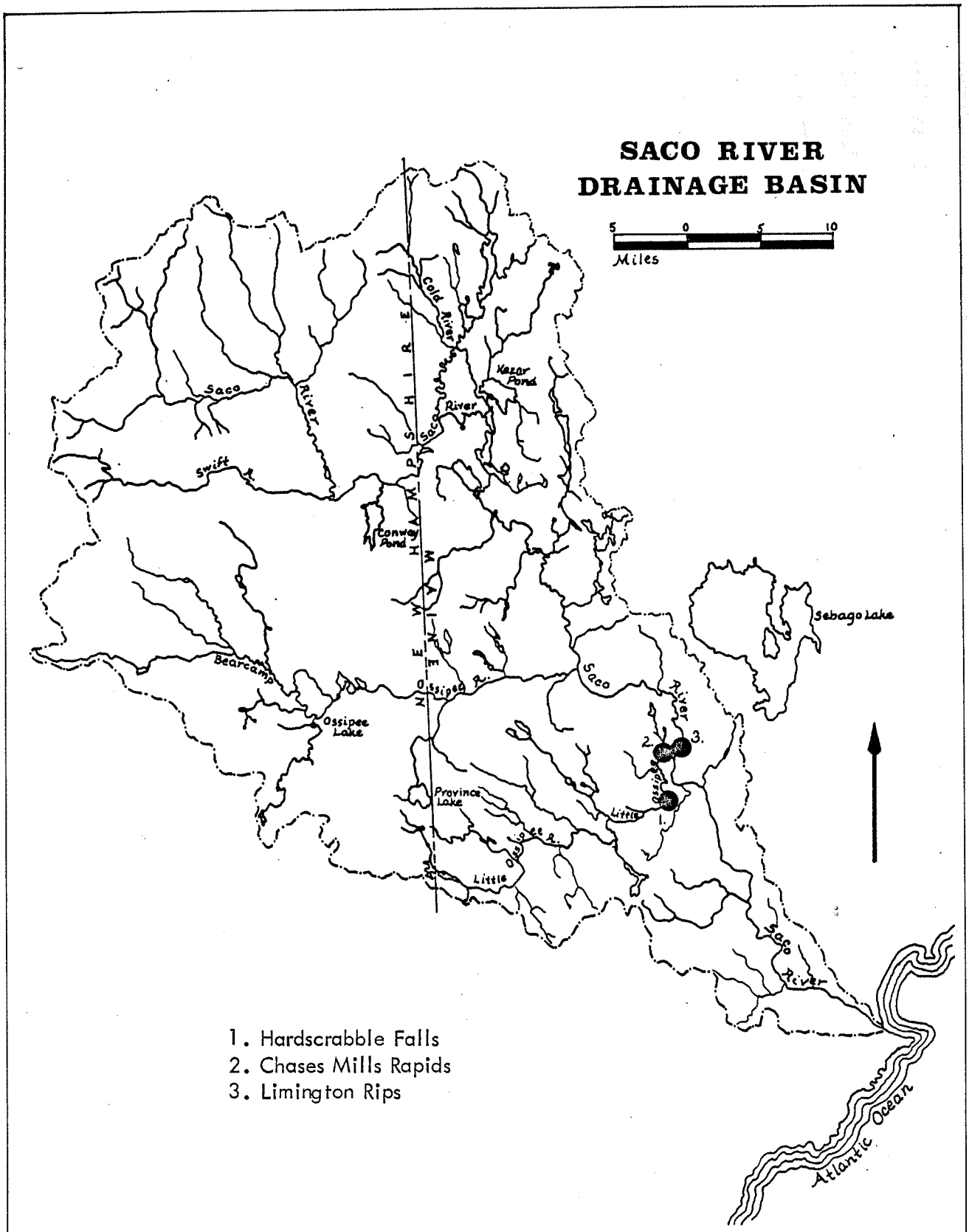

SACO RIVER
DRAINAGE BASIN
5 0 5 10
Miles
Saco River
Cold River
Saco River
Kezar Pond
Swift R.
Conway Pond
Bearcamp
Ossipee R.
Ossipee Lake
Province Lake
Little Ossipee R.
Little
Saco River
Sebago Lake
Saco River
Saco River
Atlantic Ocean
1. Hardscrabble Falls
2. Chases Mills Rapids
3. Limington Rips

Figure 7.

The Physiography of the Saco River Basin

The Saco River drains an area of 1,697 square miles. The basin, which is approximately 75 miles in length, is bordered by the watersheds of the Androscoggin and Presumpscot Rivers to the north, the Connecticut and Merrimack Rivers to the west and southwest and the southern coastal rivers to the south.

The Saco has its source in the heart of the White Mountains at the outlet of Saco Lake near Crawford Notch, New Hampshire. The headwaters drain many mountains with elevations of 5,000 feet or more, including Mount Washington which is located at the northern rim of the basin and has an elevation of 6,288 feet above sea level. Dropping nearly 1,200 feet in its first 14 miles, the gradient becomes more gradual as the Saco flows in a southeasterly direction through New Hampshire where it is joined by the Ellis and Swift Rivers.

In Maine, the Saco turns to the north and divides into two channels at Fryeburg. One branch follows the course of a canal built in the early 1800's to control flooding and is joined below Kezar Lake by the second branch. Below Kezar Lake, the Saco follows a meandering course over a surface of low relief. The Ossipee and Little Ossipee Rivers enter the Saco below Cornish and the river then continues to the towns of Biddeford and Saco, where it enters the Atlantic Ocean.

In New Hampshire, the tributaries and mainstem of the Saco contain many exceptional whitewater stretches. The most turbulent of the rapids in Maine's portion of the basin occur in the town of Limington where the Little Ossipee joins the Saco River.

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1. HARDSCRABBLE FALLS WHITEWATER RAPIDS - LITTLE OSSIPEE RIVER

Town: Limington
County: York
Quad: Buxton, Maine 15'
Length: 0.7 mile (1.1 kilometers)
Size of Rapid Area: 52 acres (21 hectares)
Date Overflown: April 17, 1980
Date Groundchecked: June 12, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a rapid with a turbulence of Class IV-V that is 0.7 mile long.
- The area is an important nursery for brook trout.
- The area contains unusual hydrologic features such as eddies, and exceptionally steep pitches.
- The area has been kept in its natural state and is highly scenic.

General Description of the Area:

Hardscrabble Falls Whitewater Rapids, located on the Little Ossipee River, is part of the Saco River drainage basin in southwestern Maine. The rapid extends for approximately 0.7 mile (1.1 kilometers) and has a gradient of 40 feet/mile (7 meters/kilometer). The width varies from 75 to 150 feet (23 to 45 meters) over the length of the rapid. The river is widest between the small wooden bridge that spans the head of the rapid and the first pitch. It then narrows to 75 feet (23 meters) near the foot of the rapid. Waterflow on the Little Ossipee River is regulated by the Ledgemere Dam and is generally low at Hardscrabble Falls by midsummer.

During the first 0.4 mile (0.64 kilometer), the rapid has a turbulence of Class V. In this stretch, the river cascades across a series of irregular one to three foot drops, with standing waves and small eddies adding to the rapid's turbulence. This stretch is followed by approximately 0.2 mile (0.32 kilometer) of Class IV water which gradually diminishes into a Class II rapid. The overall effect is spectacular and is unparalleled in this section of Maine.

Hardscrabble Falls is developed on granitic bedrock layers. Low granite islands and large boulders divide the river into several narrow channels. Two small chutes, standing waves and several eddies are created by the irregular riverbed. These boulders have broken off from the bedrock that outcrops upstream. The geomorphology of this type of rapid, characterized by an upper section developed on bedrock and a lower section composed of eroded debris, is believed to be caused by the initial retreat of a waterfall (Brewer, unpub) resulting in an interim stage between a waterfall and meandering stream.

The bedrock of the area is composed of biotite granite and some quartz monzonite (Doyle et. al., 1967). These clean light-colored rocks add to the beauty of the rapid area. The riverbanks are lined with alder and cherry, and the surrounding forest is composed of a mature stand of eastern white pine, maple, grey birch and red oak.

Hardscrabble Falls is an important nursery for a natural population of brook trout and a stocked population of brown trout. The young fish stay in the rapid area for one to three years before moving to quickwater gravelly stretches to spawn.

Condition and Use:

The surrounding area is very beautiful and relatively undisturbed. It has been designated a wildlife sanctuary by the Bureau of Parks and Recreation. Except for a dirt road leading to the site and a portage trail that parallels the eastern riverbank, which is used primarily by fishermen, there is little sign of human visitation. Hardscrabble Falls appears to be in excellent natural condition.

2. CHASES MILLS WHITEWATER RAPIDS - LITTLE OSSIPEE RIVER

Town: Limington
County: York

Quad: Buxton, Maine 15'
Length: 750 feet (230 meters)
Size of the Rapid Area: 3.9 acres (1.5 hectares)
Date Overflown: April 17, 1980
Date Groundchecked: June 12, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class IV-V rapid that is 750 feet long.
- The rapid contains exceptionally steep pitches.
- The rapid is an important nursery for brook trout.
- The area is scenic and relatively undisturbed.

General Description of the Area:

Chases Mills Whitewater Rapids, located on the Little Ossipee River near its confluence with the Saco, is part of the Saco River drainage basin in southwestern Maine. The rapid extends in a southeasterly direction for a distance of approximately 750 feet (230 meters). The river is 80 feet (24 meters) wide near the small bridge that spans the head of the rapid and narrows to 30 feet (9 meters) in the middle portion where the steepest drop occurs. It then widens to approximately 75 feet (23 meters) near the southeastern boundary.

The rapid has a turbulence of Class IV-V created by an irregular riverbed, ledge drops and differential erosion of the underlying bedrock. The elevation of the river in this section decreases 12 feet (3.6 meters) over the length of the rapid which is equivalent to a gradient of 84 feet/mile (16 meters/kilometer). Waterflow on the Little Ossipee River is regulated at the Ledgemere Dam. The low water levels typical of midsummer provide an excellent opportunity to study the geology of the area.

Chases Mills is developed over resistant rock layers and consists of a series of uneven one- to three-foot ledge drops. Blocky granitic islands and large boulders that have broken off create an irregular riverbed. The bedrock is composed of pink granite which has been intruded by basalt dikes that are 0.5 to 1.0 meter in width. The black basalt contrasts markedly with the lighter coarse grained granite. Several dikes extend across the riverbed where they are being eroded at a faster rate than the surrounding bedrock.

Chases Mills is an important nursery for a natural population of brook trout and a stocked population of brown trout. The young fish stay in the rapid area for one to three years before moving to quickwater gravelly stretches to spawn.

Condition and Use:

Chases Mills is located in a rural area and is very picturesque. One house is visible from the rapid and, where the river widens, fields can be seen through a mature stand of beech and red oak trees. A portage trail parallels the rapid.

3. LIMINGTON RIPS WHITEWATER RAPIDS - SACO RIVER

Town: Limington, Standish
County: York
Quad: Buxton, Maine 15'
Length: 1155-1300 feet (350-400 meters)
Size of Rapid Area: 6 acres (2.5 hectares)
Date Overflown: April 17, 1980
Date Groundchecked: June 12, 1980

Significant Features (Based on the Whitewater Rapids Criteria):

- The area contains a Class III rapid that is 1300 feet long.
- The area is a good example of a rapid formed from deposition of large boulders in the streambed during glaciation.
- The surrounding area has an unusual type of bedrock.
- The rapid is an important nursery for brook trout.
- The area is very scenic and relatively undisturbed.

General Description of the Area:

Limington Rips, located on the Saco River, is part of the Saco River drainage basin in southwestern Maine. The rapid extends for 1155-1300 feet (350-400 meters) and includes a 3 foot (1 meter) falls near the northern boundary. The total drop over the entire length of the rapids is about 15 feet (5 meters) and the gradient averages 55 feet/mile (10 meters/kilometer). The width of the river in this section varies from 130 to 150 feet (30 to 45 meters). Limington Rips has a turbulence of Class II-III during normal flow. This may increase to Class IV when the water level is exceptionally low or high. During the spring, large standing waves are formed over the boulder-strewn sections of the riverbed.

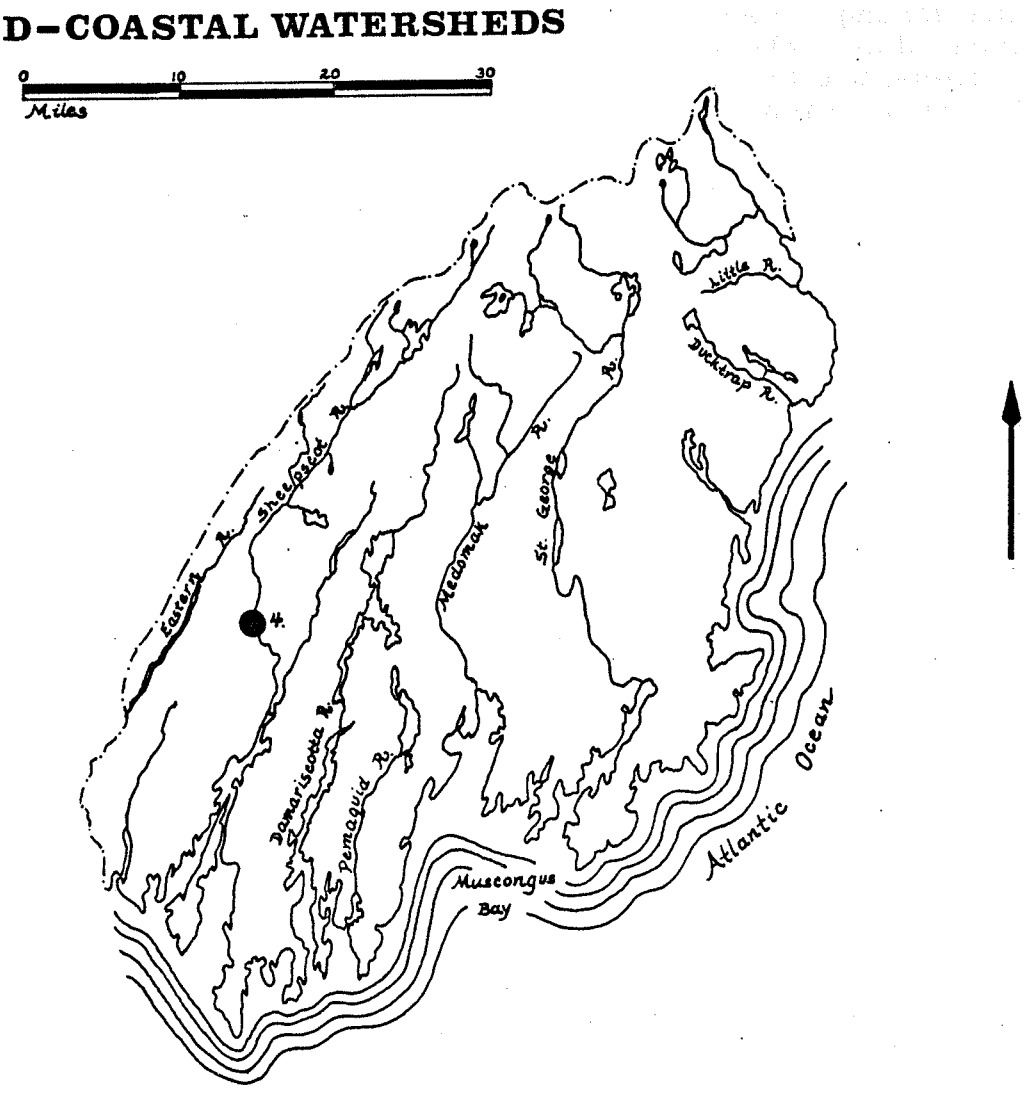
The riverbed is made up of boulders and outcrops. In some places, where bedrock is exposed, small potholes have been carved out by hydrologic action. Limington Rips is developed over a lag deposit of boulders in the streambed (a result of glaciation) that were too large for stream transport. The rapid is also partially developed on granite bedrock which is cut by pegmatite dikes. The pegmatite is made up of an interesting assemblage of feldspar and quartz crystals. The dikes are located at the southern boundary of the rapids.

The upper riverbanks are forested with mature red oak and eastern white pine. Small red maples and several species of ferns grow at the river's edge.

Limington Rips is an important nursery for natural population of brook trout. The young fish stay in the rapid area for one to three years before moving to gravelly stretches to spawn. Limington Rips is stocked with brown trout to meet the demands of the sports fishery for this species.

Condition and Use:

The rapids receive a great deal of recreational use, particularly in the spring. Depending upon the regulation of waterflow by upstream dams, the rapids are often used over an extended season. The accessibility of the rips, which are abutted by a Department of Transportation picnic area, also accounts for their heavy use.



4. Sheepscot River Rapids

Figure 8.

The Physiography of the Mid-Coastal Watersheds

The coastal rivers that empty into the Atlantic Ocean between the mouths of the Penobscot and Kennebec Rivers are generally referred to as the Mid-Coastal Watersheds. All are small rivers that follow a southwesterly course through valleys of low relief. From east to west, this group includes the basins of the St. George, Medomak, Pemaquid, Damariscotta, and Sheepscot Rivers. These basins are briefly described below.

The St. George River flows out of Quantabacook Pond in Searsmont. It follows a southwesterly course through Sebec Pond and Round Pond in Union; and then veers to the southeast until Thomaston. Below Thomaston, the river again turns to the southwest and flows into Muscongus Bay. The St. George River has a total length of 45 miles and drains an area of 280 square miles. The river falls 181 feet in this distance.

The Medomak River has its source in Liberty. It flows in a southwesterly direction for 35 miles and falls 575 feet before emptying into an arm of Muscongus Bay. The Medomak drains an area of 107 square miles.

The Pemaquid River, with a drainage area of 44 square miles, is the smallest of the Mid-Coastal rivers. From its source at Duckpuddle Pond in Nobleboro and Damariscotta, it flows through Pemaquid and Biscay Ponds, to its mouth at Pemaquid Harbor in Bristol, a distance of 17 miles.

The Damariscotta River begins in Damariscotta Lake in the towns of Nobleboro and Jefferson. It follows a southwesterly course for 20 miles to its mouth at the Atlantic Ocean, 3.5 miles southeast of Boothbay Harbor Village. The Damariscotta drains an area of 105 square miles.

The Sheepscot is the longest of the Mid-Coastal rivers. Formed by the confluence of two small streams in Montville, it extends for 57 miles to its mouth at the upper end of Sheepscot Bay. The Sheepscot falls 420 feet in this distance and drains an area of 256 square miles.

This portion of the Atlantic seaboard is a classic example of a drowned river valley coastline. Glaciation and marine invasion have greatly modified the original topography of the region. Differential erosion of alternating weak and resistant rock layers resulted in the development of ridges and valleys which are elongated in a northeast-southwest direction, following the strike of the underlying bedrock. The rivers of this region are oriented in this direction as are the long narrow bays into which they flow.

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4. SHEEPSCOT RIVER WHITEWATER RAPIDS (ABOVE HEAD TIDE) - SHEEPSCOT RIVER

Town: Whitefield, Alna
County: Lincoln
Quad: Wiscasset, Maine 15'
Length: 2 miles (3.2 kilometers)
Size of Rapid Area: 135 acres (54 hectares)

Date Overflown: April 17, 1980
Date Groundchecked: February 20, 1981

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-III rapid that is 2 miles in length.
- The rapids support a natural population of Atlantic salmon.
- The area is relatively undisturbed and very scenic.

General Description of the Area:

Sheepscot River Whitewater Rapids begins 1.75 miles (2.8 kilometers) below the Route 218 bridge in Whitefield and is continuous for 2 miles (3.2 kilometers). The rapid has a turbulence of Class II-III during highwater and diminishes to quickwater 0.25 mile (0.4 kilometer) above the village of Head Tide. The width of the river ranges from 40-75 feet (12 to 23 meters) and the average gradient of the two-mile stretch is approximately 19 feet/mile (3.3 meters/kilometer). This section of the Sheepscot River has an average waterflow of 249 cubic feet per second.

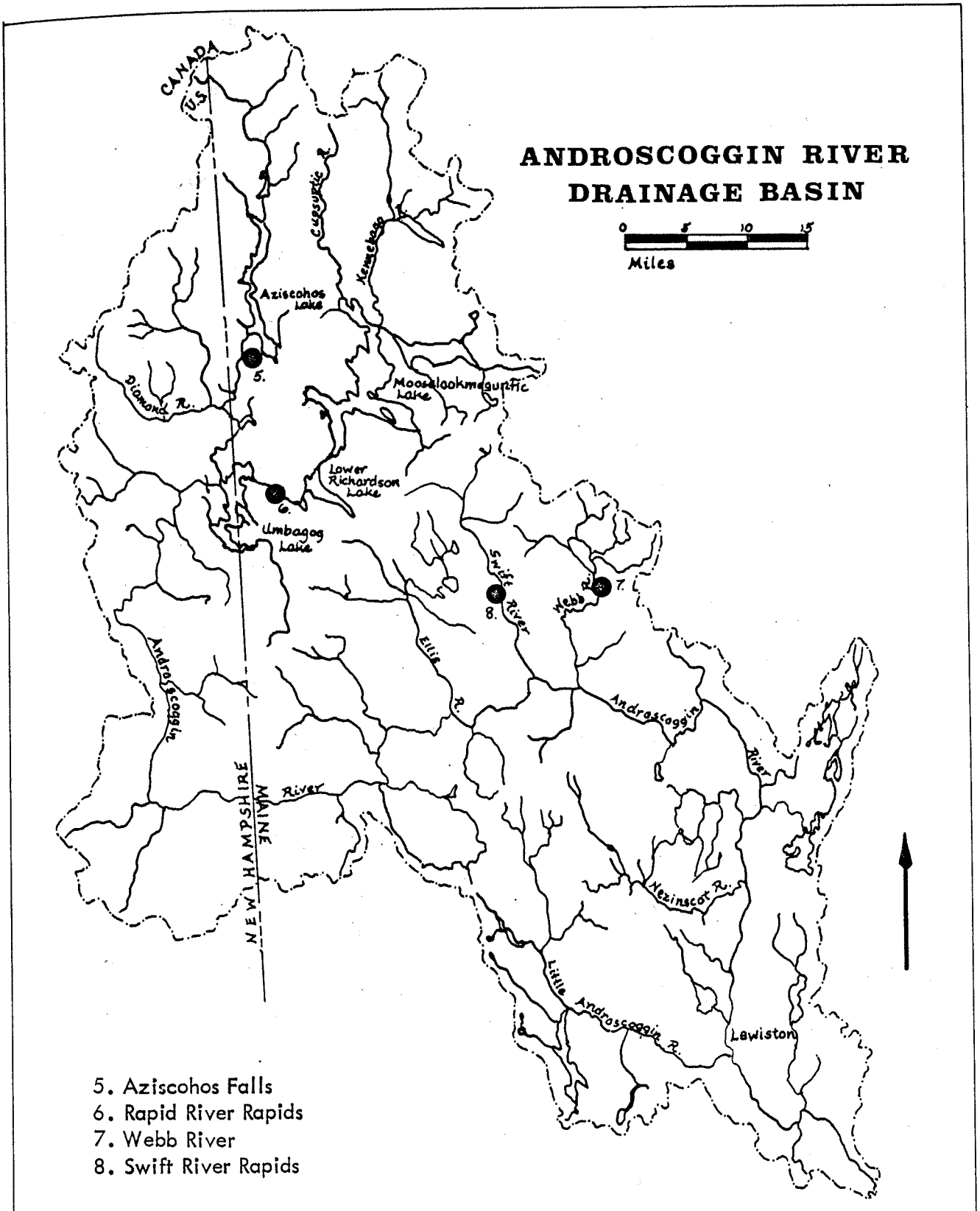
The rapids are developed over a riverbed of small boulders. Bedrock is exposed in only a few places and is composed primarily of metamorphic rocks such as thinly interbedded phyllite or schist, quartzite and micaceous schist (Doyle et. al., 1967). Gravel and coarse sand cover the riverbed where the current is slower.

The Sheepscot River from Cooper's Mills to Head Tide supports a natural population of Atlantic salmon. The alternating quickwater and rapid stretches provide important spawning grounds and nurseries for this species.

The river valley is forested with eastern white pine, hemlock, red maple and white birch.

Condition and Use:

Although a small river, that is usually a bouldery riverbed by early July, this portion of the Sheepscot is undeveloped and very scenic. The narrow winding channel and steep-sided river banks add to the natural beauty of the rapid area. This stretch is not accessible by road and only one structure is located immediately adjacent to the river. In the spring, the rapids are frequently used by canoeists and fishermen.


ANDROSCOGGIN RIVER
DRAINAGE BASIN
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Miles
CANADA
U.S.
Aziscohos Lake
Diamond R.
Moosilookmeguntic Lake
Lower Richardson Lake
Umbagog Lake
Swift River
Webb R.
Ellis R.
Androscoggin River
NEW HAMPSHIRE
MAINE
Androscoggin River
Androscoggin River
Nezinscot R.
Little Androscoggin R.
Lewiston
5. Aziscohos Falls
6. Rapid River Rapids
7. Webb River
8. Swift River Rapids

Figure 9.

The Physiography of the Androscoggin River Basin

The Androscoggin River flows from Umbagog Lake to its outlet near Brunswick, a distance of 164 miles, and drains an area of 3,450 square miles. Four fifths (2,730 square miles) of the basin lies in Maine and one fifth (720 square miles) lies in New Hampshire. The Androscoggin River has common divides with the watersheds of the Kennebec River to the east, the Presumpscot and Saco Rivers to the south, the Connecticut River to the west and several Canadian rivers to the north.

Rangeley, Mooselookmeguntic, Aziscohos and the Richardson Lakes, along with the many streams that flow into them, form the headwaters of the Androscoggin. The river's mainstem begins 50 miles south of the Rangeley Lake region, at the northwest outlet of Umbagog Lake. Lakes and ponds occupy four percent of the Basin's total area. Headwater tributaries include the Cupsuptic, Kennebago and Magalloway Rivers. Downstream tributaries include the Ellis, Swift, Webb, Dead, Nezinscot and Little Androscoggin Rivers.

Three major types of landforms occur in the Androscoggin River basin. The first is the White Mountain section which includes almost two thirds of the entire basin, extending from the Presidential Range in New Hampshire to the Mahoosic and Longfellow Mountains in Maine. Many mountains in these ranges have elevations of 4,000 feet or more and Mount Washington, which is the highest point on the divide of the Saco and Androscoggin basins, rises 6,288 feet above sea level. These mountains provide a beautiful backdrop to the many rapids and lakes in the northern part of the basin.

The central upland portion of the basin drains many smaller mountains with elevations of 1,000 to 2,000 feet above sea level. The valleys of the region's tributaries are narrow and steep-sided and many smaller rivers, such as the Swift and Webb, are characterized by rocky riverbeds, steep gradients and fast moving water.

Below Livermore Falls, the Androscoggin flows over a low rolling upland, with hills rising to 800 feet. As it approaches the coastal lowland region south of Lewiston, elevations decrease to less than 300 feet. The Androscoggin becomes a tidal river below Central Maine Power Company's dam in Brunswick.

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5. AZISCOHOS FALLS WHITEWATER RAPIDS - MAGALLOWAY RIVER

Town: Lincoln Plantation
County: Oxford
Quad: Errol, Maine-NH 15', Oquossoc, Maine 15'
Length: 1.8 miles (3 kilometers)
Size of Rapid Area: 125 acres (50 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: June 19, 1980

Significant Features (Based on the Whitewater Rapids Criteria):

- The area contains a Class III-V+ rapid that is 1.8 miles in length.
- The rapid contains exceptionally steep pitches and hydraulics.
- The area is a good example of a rapid formed over a lag deposit.
- The area has been kept in its natural state and is highly scenic.

General Description of the Area:

Aziscohos Falls Whitewater Rapids, located on the Magalloway River, is part of the Androscoggin River drainage basin in northwestern Maine. The rapid extends in a westerly direction for a distance of approximately 1.8 miles (3 kilometers) and consists of a series of spectacular Class III-V+ rapids made up of two to four foot drops interspersed with quickwater and terminating with a short stretch of Class I water at the Route 16 bridge in Wilson's Mills. The first mile is the most turbulent with a rating of Class V+ (impassable). Three to five foot standing waves, large eddies and cross currents are created by the irregular boulder-strewn channel. The width of the river in this section is variable, ranging from approximately 45 feet to more than 100 feet over the length of the rapid.

Waterflow is controlled by the dam at Aziscohos Lake, which is located at the head of the rapids, and is in excess of 1,000 cubic feet per second during normal flow. The large volume of water, coupled with a decrease in elevation of 200 feet (60 meters) over the first mile, creates one of the state's most beautiful rapids. This is the steepest gradient documented to date on a large Maine river.

Aziscohos Falls is an excellent example of a rapid developed over a lag deposit. The river valley is steep-sided and large boulders, along with several bedrock outcrops, make up the riverbed. The lag boulders are up to 13 feet (4 meters) in diameter.

The slope of the river valley has probably prevented cutting of the surrounding forest. As a result, a beautiful stand of mature yellow birch, balsam fir, white pine and spruce grows on either side of the rapid except in the vicinity of Wilson's Mills. White pine was apparently an abundant tree in the area, as the name Aziscohos, an Indian word meaning "small pine trees", suggests.

Landlocked salmon and brook trout are found in the rapid above Wilson's Mills. The gradient of the upper part of Aziscohos Falls results in a rapid that is too turbulent to provide a nursery for young salmon and trout.

Condition and Use:

Access to the rapid is difficult except at the Androscoggin Power Project Dam and at the foot of the rapid. As a result, the river and its banks remain in their natural state. The beauty of the area is enhanced by impressive views of the surrounding mountains.

6. RAPID RIVER WHITEWATER RAPIDS

Town: Upton, Magalloway, T.C, C Surplus
County: Oxford
Quad: Errol, ME-NH 15', Oquossoc, ME 15'
Length: 6 miles (9.6 kilometers)
Size of Rapid Area: 363 acres (145 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: August 11, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains four miles of nearly continuous Class III-V whitewater.
- The rapid contains steep pitches and hydraulics.
- A cluster of old growth white pine occurs in the area.
- The islands at the river's outlet provide nesting habitat for the Common Loon.
- The rapid is interrupted by a large pond.
- The area is in its natural state and is exceptionally scenic.

General Description of the Area:

Rapid River Whitewater Rapids are located between Lower Richardson and Umbagog Lakes and are part of the Androscoggin River drainage basin in northwestern Maine. The Rapid River, which contains approximately 4 miles (6.4 kilometers) of nearly continuous Class III-V rapids, is one of the most spectacular whitewater rivers in Maine. The river contains a number of individual rapids that are worthy of recognition. The most impressive of these are the first three drops after Long Pool, which is downstream from Pond in the River, including Cluley's Rip, Elephant Rock, and Cold Spring Rapid. These are all about 250 yards (230 meters) long with about 50 yards (45 meters) of quickwater separating them. Following these are Smooth Ledges, Island Rip and the Devil's Hopyard--three more sets of significant whitewater rapids.

The river flows in a northwesterly direction and drops approximately 156 feet (47 meters) in 6 miles (9.6 kilometers). There are no falls or steep drops in the river which is unusual for a stretch with this gradient. The riverflow is measured and regulated at Middle Dam to provide the necessary flow rate in the Androscoggin River for power generation. The average flow is upwards of 1,000 cubic feet per second producing 4 to 6 foot (1 to 2 meter) standing waves.

The riverbed is ledgy and strewn with boulders. The rapids are developed on both lag deposits and bedrock. The bedrock of the area is composed primarily of granodiorite. Excellent exposures can be seen at Smooth Ledges.

The Rapid River is located in a sparsely populated and exceptionally scenic area. The river is beautiful from its outlet at Lower Richardson Lake to its mouth at Umbagog Lake. Apart from the rapids, there are a number of other natural features that add to the beauty of the area. At the river's mouth, it divides into several channels around some low silver maple lined islands. These islands provide nesting habitat for the Common Loon (Gavia immer), which is becoming increasingly rare in New England.

The Rapid River is the setting of Louise Dickenson Rich's book, We Took to the Woods. Rich and her family lived at Forest Lodge, which overlooks Pond in the River, for several years. Pond in the River, located approximately 0.5 mile (0.8 kilometer) south of Middle Dam, is an unusual 160 acre pond through which the Rapid River flows. The remains of an old winchboat (called an Alligator), which was used to haul wood across long flatwater stretches, can be seen near the southern outlet of the Pond. By running an anchor ahead, which was attached to a huge steel cable, and winching it in, the winchboat and a boomful of pulp logs could be moved slowly across the water.

Clusters of five to ten old growth eastern white pines (Pinus strobus) grow near Smooth Ledges and just east of Pond in the River on the northern bank of the river. These trees vary in diameter from 18 to over 30 inches. Beautiful stands of mature white pine, balsam fir, northern white cedar and spruce line the riverbanks.

The entire Rapid River is a nursery for natural populations of landlocked salmon and brook trout. Pond in the River and several small pools in the river itself are used as spawning grounds by both species. In spite of heavy fishing pressure, salmon and trout populations appear stable.

Condition and Use:

The Rapid River is most accessible by water, although a dirt road parallels the river from Cedar Stumps campsite to Middle Dam. Forest Lodge and several other camps, some abandoned, are located on the northern river bank. Small signs mark foot trails leading to Pond in the River, the Alligator, and several good fishing spots. The natural beauty of the area has not been noticeably altered by human visitation.

7. WEBB RIVER WHITEWATER RAPIDS - WEBB RIVER

Town: Carthage
County: Franklin
Quad: Dixfield, Maine 15'
Length: 6 miles (9.6 kilometers)
Size of Rapid Area: 138 acres (55 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: August 6, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-V rapid that is six miles in length.
- The area is relatively undeveloped and very scenic.

General Description of the Area:

Webb River Whitewater Rapids begins at the outlet of Webb Lake in Weld and is part of the Androscoggin River drainage basin in western Maine. The rapids, which extend for a distance of six miles (9.6 kilometers) has a turbulence that varies from Class II-V, depending on the water level. The river in this section is very narrow, with an average width of 30-50 feet (9-15 meters). The gradient over the length of the rapids averages 30 feet/mile (4.5 meters/kilometer).

The riverbed is composed primarily of boulders and ledge. The quickwater stretches are generally underlain by gravel. Bedrock is exposed in only a few places and is composed primarily of granitic rocks such a biotite-muscovite granite and quartz monzonite (Doyle et. al., 1967).

The riverbanks are forested with hardwood species such as white birch, red oak and sugar maple. Spruce, balsam fir and eastern white pine are also present.

Condition and Use:

The surrounding area, which is located just a few miles south of Mount Blue State Park, is very scenic. Above Berry's Mills, the river winds through an undeveloped valley. The stretch of river between Berry's Mills and Carthage is overlooked by several houses and camps. Bridges span the Webb River in both towns. Most of the river is inaccessible by road.

8. SWIFT RIVER WHITEWATER RAPIDS - SWIFT RIVER

Town: Byron, Roxbury, Mexico
County: Oxford
Quad: Rumford, Maine 15'
Length: 11.5 miles (19.4 kilometers)
Size of Rapid Area: 257 acres (100 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: June 19, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-IV rapid that is 11.5 miles in length.
- The rapid contains several steep pitches and a small waterfall.
- A contact zone occurs within the area.

- The area contains excellent examples of hydrologic sculpturing.

- The area is very scenic and relatively undeveloped.

General Description of the Area:

The Swift River Whitewater Rapids are part of the Androscoggin River drainage basin in western Maine. The rapid, beginning just below Coos Canyon in Byron, is nearly continuous for 11.5 miles (19.4 kilometers) and has a turbulence of Class II-IV. The most turbulent portion is an extremely obstructed stretch below Coos Canyon. This mile long stretch is followed by approximately 2 miles (3.2 kilometers) of Class I-II water which increases to Class III-IV as the river approaches Roxbury. A beautiful waterfall, known as Swift River Falls, is located at a state rest area in Roxbury. Swift River Falls consist of two drops of about 6.5 feet (2 meters) each. After the falls, the rapid diminishes to Class II and III until Hale, where another steep pitch occurs. The river in this section is very narrow, ranging from 20 to 40 feet (6 to 12 meters) in width, and has a gradient of 27 feet/mile (5 meters/kilometer).

The riverbed is primarily boulder-strewn, with ledge outcrops where it passes over two small granitic intrusions (Doyle et. al., 1967). Contacts between these plutons and the country rock, which is locally composed primarily of grey biotite gneiss and schist, are exposed in the riverbed. The bedrock of the falls area consists of jointed feldspar-quartz-garnet-muscovite-biotite granite with pegmatite veins, some of which appear to be folded. Several outstanding examples of hydrologic sculpturing of the granite make the falls area unique for studying these processes. The Swift River is a popular place to pan for gold, which can be found in small amounts (AMC, 1971).

The river banks are steep-sided and forested with eastern white pine, spruce, balsam fir, and hardwood species. This portion of the Swift River resembles a small mountain stream as it winds through the foothills of the Mahoosuc Mountains. Beautiful views of the surrounding hills can be seen from the river. Swift River Falls and Coos Canyon add to the scenic beauty of the rapid area.

The cold clear water of the Swift River above Rumford supports a natural population of brook trout. The rapid area provides a nursery and spawning ground for this species.

Condition and Use:

Route 17, which parallels the rapid along its eastern riverbank, and Route 120, which follows the western bank below Frye, pass within a few hundred feet of the river in several places. Many camps overlook the rapid in the towns of Roxbury and Hale. The stretch of river in between these towns is relatively undeveloped and very scenic. Above Roxbury and below Frye the river valley widens and much of the land is cultivated. The Swift River Rapids are occasionally used by fishermen and canoeists.

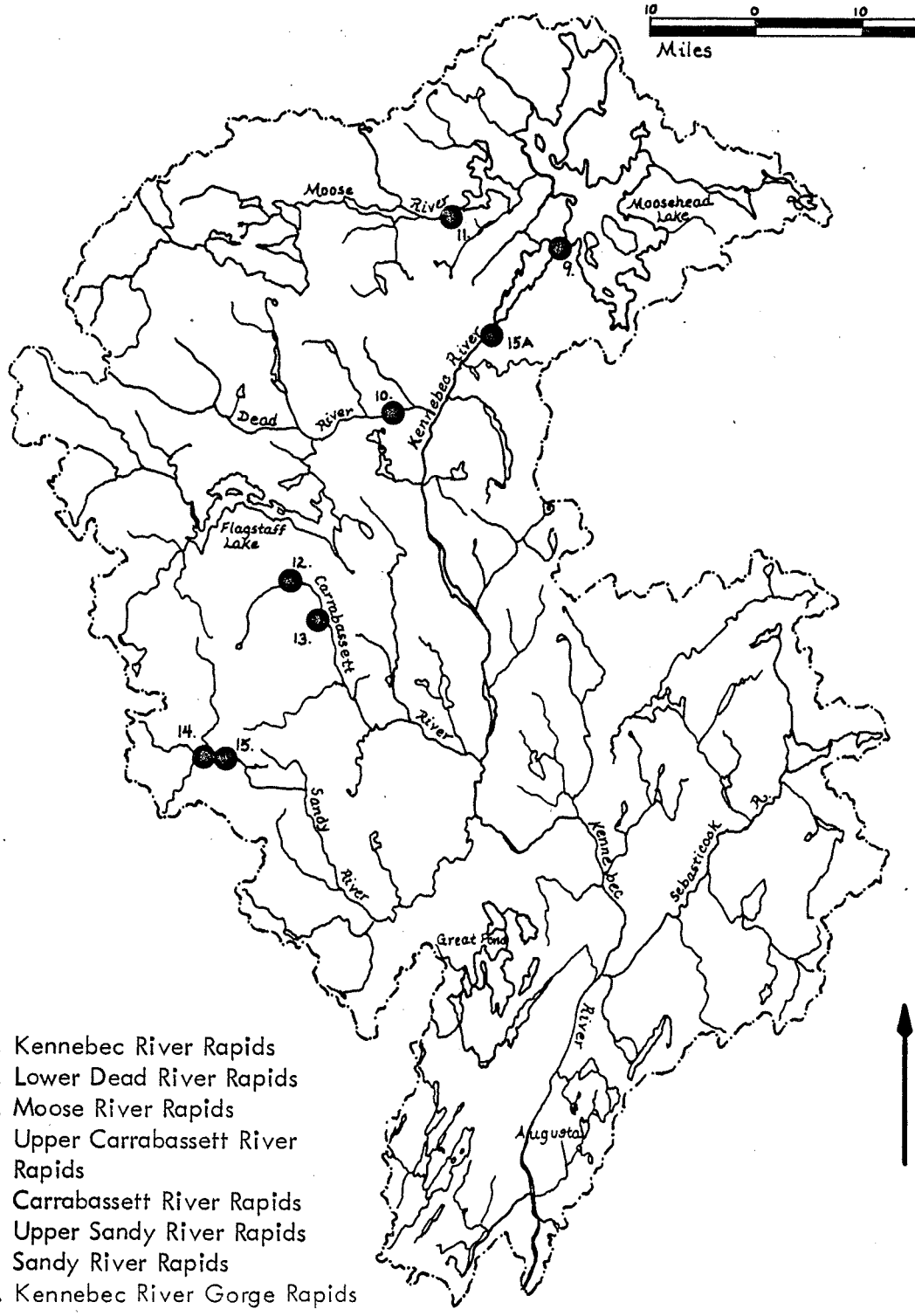
KENNEBEC RIVER
DRAINAGE BASIN
10 0 10 20
Miles
Moose River
Moosehead Lake
Kennebec River
Dead River
Flagstaff Lake
Carrabassett River
Sandy River
Kennebec River
Sebasticook R.
Great Pond
Augusta
9.
10.
11.
12.
13.
14.
15.
15A
9. Kennebec River Rapids
10. Lower Dead River Rapids
11. Moose River Rapids
12. Upper Carrabassett River Rapids
13. Carrabassett River Rapids
14. Upper Sandy River Rapids
15. Sandy River Rapids
15a. Kennebec River Gorge Rapids

Figure 10.

The Physiography of the Kennebec River Basin

The Kennebec River, which drains an area of 5,870 square miles, forms New England's third largest watershed. Located in west-central Maine, the 155 mile long river valley extends from Moosehead Lake to Merrymeeting Bay. The Kennebec River basin is bordered by the watersheds of the Androscoggin to the west, the Penobscot to the north and east and several coastal rivers to the south. The basin's northwestern limit forms the International Boundary between the United States and Canada.

Mountainous terrain dominates the northern half of the basin. The entire Dead River watershed and the headwater areas of the Carrabassett and Sandy Rivers occur within the White Mountain physiographic region. Many of the peaks along the northern perimeter reach elevations of 3,000 feet or more, and the basin's highest points, Sugarloaf Mountain, Bigelow Mountain, Saddleback Mountain and Mount Abraham rise to well over 4,000 feet above sea level.

Moosehead Lake (which is the largest lake in Maine) and its tributaries, the Moose and Roach Rivers, form the headwaters of the Kennebec River. Flowing through Moosehead Lake's two outlets and through the Harris Dam impoundment, the Kennebec travels swiftly for 30 miles. This stretch has an average gradient of 17 feet per mile and includes the spectacular Kennebec River Gorge.

As the river continues southward, it is joined by the Carrabassett, Sandy and Sebasticook Rivers and Wesserunsett Stream. Elevations gradually decline and the gradient decreases to approximately six feet per mile. Below Waterville, the river valley becomes deeply incised and is bordered by low steep hills. At Augusta, 46 miles from its mouth, the Kennebec becomes a tidal river.

Because of the large number of dams that impound the river below Moosehead Lake, few rapids occur on the main stem. The many rapids of the basin are located primarily on the upper reaches of the Kennebec or on the river's many free-flowing tributaries.

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9. KENNEBEC RIVER WHITEWATER RAPIDS (EAST OUTLET OF MOOSEHEAD LAKE) KENNEBEC RIVER

Town: T1 R7 (Sapling), T2 R6 (Big Squaw)
County: Somerset, Piscataquis
Quad: Moosehead Lake, ME 15', Brassua Lake, ME 15'
Length: 3.5 miles (5.6 kilometers)
Size of Rapid Area: 297 acres (119 hectares)
Date Overflown: May 16, 1980
Date Groundchecked: August 28, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-IV rapid that is 3.5 miles in length.

- The area contains a rapid that is 200 feet wide.
- The rapid flows through a small gorge.
- The area is in its natural state and is highly scenic.

General Description of the Area:

The Kennebec River Whitewater Rapids along the East Outlet of Moosehead Lake (which form part of the Somerset-Piscataquis County border) are part of the Kennebec River drainage basin in northcentral Maine. This long stretch of alternating Class III-IV rapids and quickwater extends for a distance of 3.5 miles (5.6 kilometers) before emptying into Indian Pond. The river in this section is about 200 feet (65 meters) wide and has a gradient of 25 feet/mile (5 meters/kilometer). Waterflow in this portion of the Kennebec River averages nearly 2,000 cubic feet per second and is regulated by the Moosehead Lake East Outlet Dam. The water is odorless and light brown in color.

The rapids are formed primarily over a lag deposit of boulders. Sand and gravel cover the riverbed where the current is slower. Bedrock is exposed in several places and is composed primarily of slate, metasiltstone, quartzite and other metamorphic rocks (Doyle et. al., 1967). A steep ledge drop occurs within the first mile of the rapids and large standing waves form over the irregular riverbed during periods of high flow.

The upper portion of this long and nearly continuous stretch of whitewater flows through a small boulder-strewn gorge that is up to 33 feet (10 meters) deep (AMC, 1976). The spruce-fir forested banks offer several good vistas of the rapids.

The East Outlet of Moosehead Lake is habitat for brook trout and landlocked salmon. The alternating quickwater and rapid stretches provide spawning grounds and nurseries for both species.

Condition and Use:

With the exception of Route 15, which passes near the gaging station and dam, and two bridges at the northeastern end of the rapids; most of the area is inaccessible except by canoe. The eastern portion of the rapid is a popular fishing area. The entire stretch is part of a Maine National High Adventure Area and is used frequently by Boy Scouts.

10. LOWER DEAD RIVER WHITEWATER RAPIDS - DEAD RIVER

Town: T3 R4, T2 R4, T1 R4, T3 R5, T2 R5, West Forks
County: Somerset
Quad: Pierce Pond, ME 15'; The Forks, ME 15'
Length: 15 miles (25 kilometers)
Size of Rapid Area: 1209 acres (484 hectares)
Date Overflown: May 16, 1980
Date Groundchecked: October 20, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains Class II-IV rapids that extend for 15 miles.
- The rapid contains steep pitches and large eddies.
- The area is in its natural state and is highly scenic.

General Description of the Area:

The whitewater rapids along the lower Dead River from Spencer Stream to the confluence of the Dead and Kennebec Rivers are located in Somerset County and are part of the Kennebec River drainage basin. The rapids run continuously for a distance of approximately 15 miles (25 kilometers) making this one of the longest whitewater stretches in the state. The turbulence of the rapids varies from Class II-IV, during normal flow, to Class III-IV during periods of high water. Spencer Rips which is the first rapid encountered on the Lower Dead is followed by eleven miles of an indistinguishable succession of Class II-IV rapids. The whitewater is nearly continuous except for a few small drops and pools. The flow of water in this section is regulated by the dam at Long Falls (operated by Central Maine Power Company to achieve optimum waterflow on the Kennebec River) which is located at the outlet of Flagstaff Lake. The estimated flow in this stretch of the Dead River is in the thousands of cubic feet per second. The Dead is a wide river, averaging about 165 feet (50 meters) in width, and has a gradient of 29 feet/mile (6 meters/kilometer).

The rapids are developed over a lag deposit of medium-sized boulders. The shallow boulder-strewn riverbed is interrupted by exposures of steeply-dipping bedrock. The bedrock of the area consists primarily of slate, phyllite, and other low-grade metamorphic rocks. The foliation of the bedrock dips slightly upstream which has lead to undercutting of some of the resistant rock layers. Several small ledge drops have been formed in this way.

The Dead River winds through a beautiful steep-sided valley. Little Bigelow Mountain can be seen from the head of the rapids. The surrounding area is forested with spruce, balsam fir, eastern white pine and hardwood species. Just upstream of the confluence of the Dead River and Spencer Stream is a spectacular view of Grand Falls. At Grand Falls, the river cascades over a curved rim of bedrock into a pool 32 feet (10 meters) below.

The boulder-strewn riverbed and fast current of the rapid stretches provide ideal nurseries for rainbow trout, brook trout and landlocked salmon. The abundance of these three species varies with the water level of the river. All have been able to maintain relatively stable populations.

The Dead River takes its name from the flatwater section that now lies beneath Flagstaff Lake. The Dead River was used for log driving for many years. Remains of an old dam above Grand Falls and an old log chute on the southern bank about 10 miles downstream are relics of the log driving era.

Condition and Use:

Although paved or gravel roads provide access to both ends of the area, access to most of the river is limited primarily to canoes. Campsites at Long Falls Dam and Spencer Stream are frequently used by fishermen or as put in points for canoeists. The river is otherwise undisturbed. The Lower Dead River is now the site of an annual canoe race from Long Falls Dam to Webb's General Store in West Forks.

11. MOOSE RIVER WHITEWATER RAPIDS ABOVE BRASSUA LAKE - MOOSE RIVER

Town: T2 R1 (Sandwich Academy)
County: Franklin
Quad: Brassua Lake, ME 15'
Length: 2.5 miles (4 kilometers)
Size of Rapid Area: 178 acres (71 hectares)
Date Overflown: May 16, 1980
Date Groundchecked: August 28, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-IV rapid that is 2.5 miles in length.
- The area includes a fossil type locality.
- The rapid contains steep pitches.
- The area is relatively undisturbed and is exceptionally scenic.

General Description of the Area:

Moose River Whitewater Rapids above Little Brassua Lake is part of the Kennebec River watershed. The rapid begins approximately 328 feet (100 meters) west of a Scott Paper Company bridge and extends for 2.5 miles (4 kilometers) to the outlet of the Moose River at Little Brassua Lake. The first mile of the rapid has a turbulence of Class III-IV and except for a few quickwater stretches, located primarily at the river bends, it is nearly continuous. The turbulence diminishes to Class III in the last half mile of the rapid. The width of the river in this section is fairly uniform -- ranging from 75-100 feet (23-30 meters). As it approaches Little Brassua Lake, the river widens to nearly 150 feet (45 meters). The elevation decreases 80 feet (27 meters) over the length of the rapids, which is equivalent to a gradient of 32 feet/mile (6 meters/kilometer).

Moose River Rapids is developed primarily over a lag deposit. The river flows over both ledge and boulders. The boulders cause large standing waves to form during periods of high water. Several small drops over shale ledges occur near the head of the rapid. The bedrock of the area is composed primarily of metamorphosed dark sandstone, tuffaceous sandstone, shale and quartzite (Doyle et. al., 1967). Good exposures of these sedimentary and metamorphic rocks can be seen at a chute near Stony Brook. The Moose River area contains a number of fossil-bearing strata.

Imprints of brachiopods (small marine invertebrates with two unequal shells) were found in a weathered piece of shale.

The rapids occur in a steep-sided river valley. The banks are forested with a mature stand of balsam fir, hemlock, eastern white pine and spruce. Many of the trees on the northern bank appear to be very old. The steepness of the riverbank has probably discouraged intensive cutting. Alders are abundant where the banks are flat and silty. As the river approaches Brassua Lake, the shoreline becomes gravelly and moist. In the spring and summer, colorful wildflowers such as bluets, asters and jewelweed are abundant.

This segment of the Moose River is a nursery for a natural population of landlocked salmon. The salmon stay in the river for up to three years, seeking the well-oxygenated water and protection of whitewater rapid stretches. They then swim out to either Brassua Lake or Long Pond to spawn. The mouth of the Moose River is a traditional fishing spot in early spring and is accessible only by boat.

Condition and Use:

The surrounding area is beautiful and undisturbed. As the river enters Little Brassua Lake, it opens up into a beautiful marsh offering a nice view of the nearby hills and mountains. An overgrown foot path parallels the northern bank and a railroad passes within hearing distance of the rapid. These and the Scott Paper Company bridge are the only signs of human disturbance. The Moose River, from Long Pond to Brassua Lake, is used by the Boy Scouts as a National High Adventure Area.

12. UPPER CARRABASSETT RIVER WHITEWATER RAPIDS - CARRABASSETT RIVER

Town: Carrabassett Valley
County: Franklin
Quad: Little Bigelow, ME 15'; Stratton, ME 15'
Length: 3 miles (4.8 kilometers)
Size of Rapid Area: 120 acres (48 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: August 7, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class V or greater rapid that is three miles in length.
- The rapid occurs within a contact zone.
- The area is exceptionally scenic and relatively undisturbed.

General Description of the Area:

The Upper Carrabassett River Rapids, beginning at the confluence of the south and main branches of the Carrabassett River, extends for three miles (4.8 kilometers) and is part of the Kennebec River drainage basin in central Maine. The river, which drains Sugarloaf Mountain and the Bigelow Mountain Range, is rocky and exceptionally clear. This stretch of the Carrabassett is extremely narrow, with an average width of 30 feet (9 meters), and has a gradient of 60 feet/mile (11 meters/kilometer). The water level fluctuates considerably in response to rainfall or drought and is highest during the months of May and June.

The Upper Carrabassett River Rapids is a good example of a rapid developed over a lag deposit. The riverbed is strewn with large boulders, creating a rapid with a turbulence of Class V or better. The rapids are broken by a number of 2-3 foot drops and several short gravelly stretches. The turbulence decreases to Class III as the river approaches Valley Crossing.

Ledge outcrops are exposed in several places and a natural rock pier can be seen from Route 27 during periods of low water. The bedrock of the area is composed primarily of norite (a gabbro composed of calcium-poor pyroxene and calcium-rich plagioclase feldspar). The rapid area lies within a contact zone between norite and low-grade metamorphic rocks.

This portion of the Carrabassett River supports a natural population of brook trout. The clear cold water and alternating boulder-strewn and gravelly stretches provide excellent spawning grounds and nurseries for this species.

Condition and Use:

The Carrabassett River flows past some of western Maine's highest mountains and is exceptionally scenic. The valley is narrow and steep sided and is forested with white birch, poplar, spruce and fir. With the exception of a major highway, Route 27, which parallels the western riverbank, most of this stretch is undisturbed. A number of camps are located on both sides of the river.

13. CARRABASSETT RIVER WHITEWATER RAPIDS - CARRABASSETT RIVER

Town: Carrabassett Valley, Kingfield
County: Franklin
Quad: Kingfield, ME 15'
Length: 9.8 miles (15.8 kilometer)
Size of Rapid Area: 291 acres (116 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: August 7, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-III rapid that is 9.8 miles long.
- The area contains significant geologic features including contacts between different bedrock types and igneous compositional layering.

- The area is highly scenic and relatively undisturbed.

General Description of the Area:

Carrabassett River Rapids, beginning 0.6 mile (1 kilometer) southeast of the confluence of Poplar Stream and the Carrabassett, extends for 9.8 miles (15.8 kilometers) and is part of the Kennebec River drainage basin in central Maine. This portion of the Carrabassett River, which drains Sugarloaf Mountain and Bigelow Mountain Range is rocky and clear. The rapid, from Carrabassett to Kingfield, consists of nearly continuous Class II-III water. The river in this stretch has an average width of 95 feet (23.6 meters) and a gradient of 27 feet/mile (5.2 meters/kilometer). The turbulence is dependent upon the waterflow which fluctuates considerably in response to rain or drought and is greatest during the months of May and June.

The rapids are developed over a boulder-strewn and gravelly riverbed with some ledge outcrops. In several places, the river turns sharply, and has cut down through bedrock. Several outcrops in this stretch of river are important in understanding the geology of the surrounding area. The primary type of bedrock present is norite (a gabbro composed of a calcium-poor pyroxene and a calcium-rich plagioclase feldspar). The river flows over the contact of a muscovite granite dike. Biotite and hornblende are also present, providing additional evidence of a contact. Approximately one mile (1.6 kilometers) below Valley Crossing, the norite shows compositional layering. Some layers contain piokilitic hypersthene (a second variety of pyroxene). Many crystals are up to two inches in length. (Griscom, 1960). The overall geology of the area is controlled by a contact between norite and low grade metamorphic rocks such as slate.

This portion of the Carrabassett River supports a natural population of brook trout. The high water quality and alternating boulder-strewn and gravelly riverbed of the rapid provide spawning and nursery areas for this species.

The Carrabassett River flows past some of western Maine's highest mountains. The riverbanks are steep sided and forested primarily with white birch, poplar, other hardwoods and spruce and fir. In its first eight miles (12.8 kilometers) the river valley is narrow and winding. It gradually opens up into a fertile flood plain as it approaches the town of Kingfield.

Condition and Use:

The entire stretch is paralleled by Route 27 on the western bank. A number of small camps and permanent homes are present on both sides of the river. A foot trail parallels the eastern riverbank for most of the rapid's length. In spite of the presence of roads and permanent structures, Carrabassett River Rapids retains much of its natural beauty and is exceptionally scenic.

14. UPPER SANDY RIVER WHITEWATER RAPIDS - SANDY RIVER

Town: Madrid
County: Franklin
Quad: Rangeley, ME 15'; Phillips, ME 15'
Length: 7 miles (11.2 kilometers)
Size of Rapid Area: 151 acres (60 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: August 6, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-III rapid that is 7 miles in length.
- The rapid contains two exceptionally steep pitches.
- Contact zones occur within the rapid area.
- The area is in a relatively natural undeveloped condition.

General Description of the Area:

The Upper Sandy River Rapids, located near the headwaters of the Sandy River, is part of the Kennebec River drainage basin. Beginning at the base of Smalls Falls, the rapid is nearly continuous for seven miles (11.2 kilometers), extending to the confluence of the South Branch and Sandy Rivers. The turbulence of the rapid ranges from Class II to III and is most turbulent immediately below Smalls Falls where a mile (1.6 kilometers) long stretch of Class III water occurs. Except for a steep Class IV-V drop in Madrid, the next four miles (6.4 kilometers) have a turbulence of Class II which increases to Class III as the rapids enter a small rocky gorge. Below the gorge is another mile of continuous Class II water that leads into a second gorge. Within this 300 foot (91 meter) long gorge is a second Class IV pitch. The turbulence diminishes near the confluence of the Sandy River with the South Branch. The elevation of the river in this stretch decreases steadily, with a gradient of 43 feet/mile (8.2 meters/kilometer). The river varies in width from 15 to 40 feet (4.5-12.1 meters).

The Upper Sandy River Rapids are developed over ledge and small boulders. The lower section of the rapid flows over small cobbles, sand and gravel. At its confluence with the South Branch, the Sandy divides around several low sand islands. The bedrock of the area is composed primarily of metamorphosed shale, siltstone and calcareous sandstone. (Doyle et. al., 1967). The river flows across several contact between these bedrock types.

The riverbanks along the upper portion of the rapids are forested primarily with balsam fir and eastern white pine. Hardwood species such as ash, red maple, white birch and red oak become increasingly abundant as the Sandy River flows east and south.

This portion of the Sandy River supports a natural population of brook trout. The rapids and quickwater provide good nursery and spawning grounds for this species.

Condition and Use:

The Sandy River above its confluence with the South Branch is a turbulent mountain stream. It is paralleled by Route 4 and the town of Madrid is located along its banks. In spite of these developments, except where bridges constrict the river channel, the rapid is in its natural state and is highly scenic. It is used frequently by canoeists and fishermen in the spring.

15. SANDY RIVER WHITEWATER RAPIDS FROM SOUTH BRANCH TO PHILLIPS - SANDY RIVER

Town: Phillips
County: Franklin
Quad: Phillips, ME 15'
Length: 6 miles (9.6 kilometers)
Size of Rapid Area: 141 acres (56 hectares)
Date Overflown: May 15, 1980
Date Groundchecked: August 6, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II rapid that is 6 miles in length.
- The rapid contains exceptionally steep pitches.
- The area occurs within a contact zone.
- The area contains well-developed potholes.
- The area is in a relatively natural undeveloped condition.

General Description of the Area:

Sandy River Rapids extends from the confluence of the South Branch and Sandy Rivers to the town of Phillips and is part of the Kennebec River drainage basin. Except for two short Class IV-V stretches, the rapid has a turbulence of Class II for most of its 6 mile (9.6 kilometers) length. Above Orbeton Stream the river is narrow and winding, with a turbulence of Class II-III. Below this tributary, the rapid widens as the river flows through a fertile valley providing beautiful views of the mountains to the north and west. From this point on, the rapids are mostly Class II. Large standing waves are common at many of the river bends. A short Class IV stretch occurs where Route 142 crosses the river. This is an exceptionally scenic spot containing large outcrops of granitic rocks. The granite has been carved out by hydrologic action into small potholes. The next 0.25 mile (0.4 kilometer) is very turbulent. A ledge drop occurs in this section. The gradient increases near the eastern boundary of the rapid. In Phillips, the channel narrows to 15-20 feet (4.5-6 meters) forming a Class IV-V granite-sided chute. Two large drops and many well-developed potholes occur within this stretch. The turbulence quickly diminishes to Class II as the river leaves Phillips. The width of the river varies from 15-60 feet (4.5-18 meters) and the average gradient is 17.5 feet/mile (3.3 meters/kilometer).

The rapids are developed primarily over cobbles, small boulders, and bedrock. Sandy stretches occur where the river is relatively calm. A contact zone between a granitic pluton and metamorphosed shale and sandstone occurs above the Route 142 bridge. Excellent exposures of the contact can be seen under the bridge. Mica schist and large veins of milky quartz are abundant in the contact region.

The riverbanks are forested primarily with hardwood species such as ash, red maple, white birch and red oak. Some eastern white pine is also present. Much of the surrounding area has been cleared and the eastern portion of the river flows through rolling farmland.

The Sandy River from South Branch to Phillips supports stable populations of brook and brown trout. These species use the rapid areas as nurseries and the quickwater stretches as spawning grounds.

Condition and Use:

Much of this portion of the Sandy River is paralleled by Route 4. The river flows through rural farmland and is highly scenic. Very few structures occur on the riverbanks and except for the section in Phillips, the rapids are in a relatively natural state. In the spring, the area is used frequently by canoeists and fishermen.

15A. KENNEBEC RIVER GORGE WHITEWATER RAPIDS - KENNEBEC RIVER*

Town: T1R6 BKPWKR, The Forks, West Forks, T1R6 BKPEKR, T1R5 BKPEKR, T2R5 BKPEKR
County: Somerset
Quad: The Forks, ME 15'
Length: 11 miles (18 kilometers)
Size of Rapid Area: 667 acres (267 hectares)
Date Overflown: May 16, 1980
Date Groundchecked: August 4, 1981

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class V or greater rapid that is 11 miles in length.
- The rapid contains steep pitches and hydraulics (keepers).
- The rapids occur in one of the longest and wildest gorges in the state.
- This is probably the best example in the state of a geomorphicaly youthful river flowing through youthful terrain.
- The area is in its natural state and is highly scenic.

General Description of the Area:

This section of the Kennebec River contains one of the state's most spectacular rapids and flows through a wild gorge of remarkable beauty, there being no other gorges of comparable magnitude in New England.

Kennebec Gorge takes the form of a V-shaped valley that extends for 11 miles (18 kilometers) from Harris Dam to Route 201 in The Forks. Water throughout the gorge is turbulent with long stretches of continuous whitewater occurring in several places. The first 4.5 miles (7.2 kilometers) have a turbulence greater than Class V (they are impassable except by kayak or whitewater raft) and the remaining 6.5 miles (10.8 kilometers) are rated as Class IV-V. The rapids contain steep pitches, keepers and standing waves that are over five feet (1.5 meters) in height.

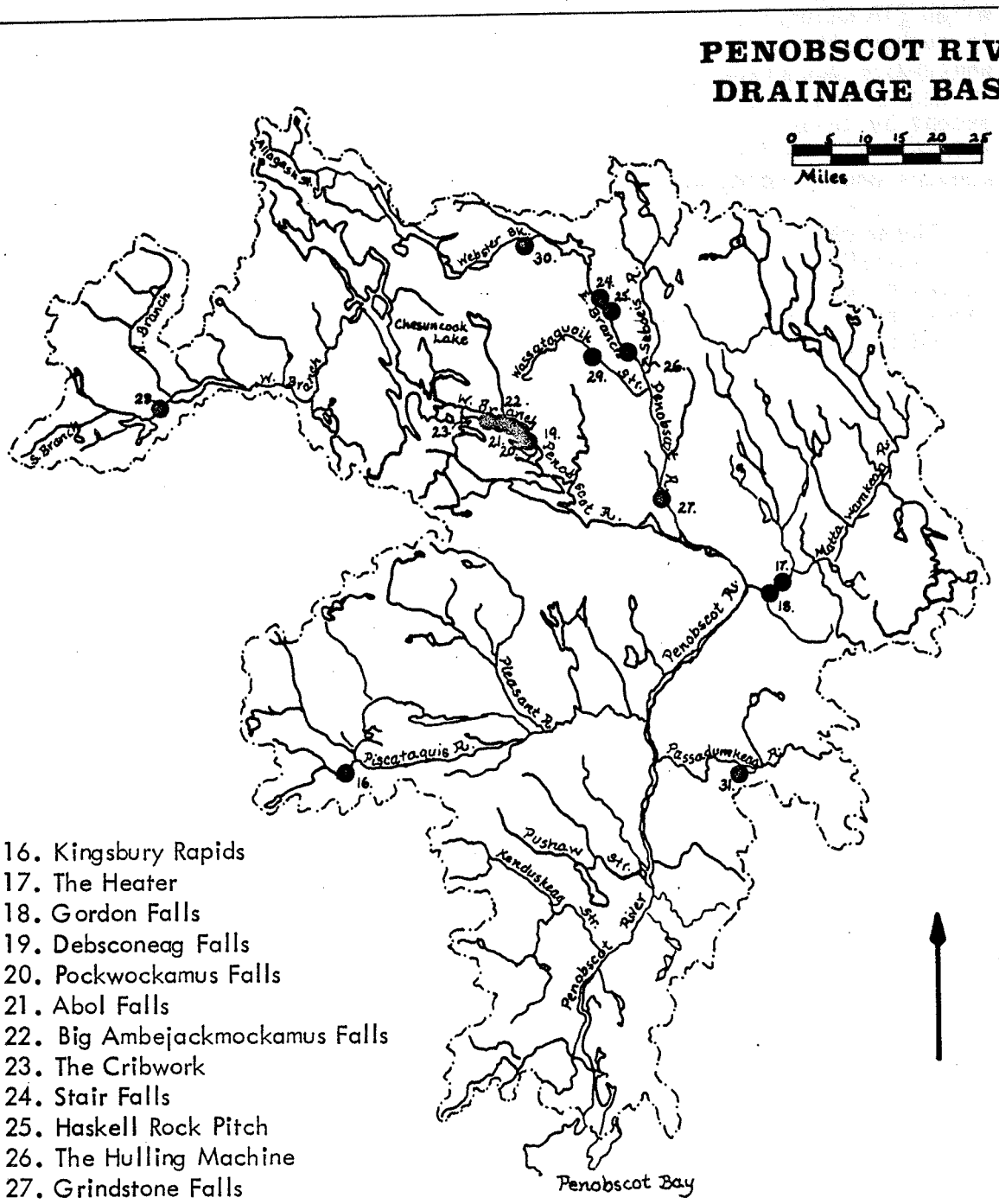
The width of the river varies from 131 to 262 feet (40-80 meters). The Width/Depth ratio is about 6 at the highest point and the gradient varies between 21 and 31 feet/mile (4 and 6 meters/kilometer). Waterflow ranges from 100 to 12,000 cubic feet per second (3.5 - 420 m3/sec) depending on regulation at Harris Dam. The rapid flows over both gravel bars and ledgy boulderstrewn stretches. This stretch of river provides excellent habitat for brook trout and landlocked salmon.

From a scientific standpoint, this is probably the best example in the state of a geomorphically youthful river flowing through youthful terrain (Brewer, 1978). The gorge follows the regional strike and lies primarily in one or two units of Cambrian and Ordovician rocks. Bedrock exposures appear to be primarily slate and other low grade metamorphic rocks, however, the inaccessibility of the steep gorge walls makes the area difficult to research.

Condition and Use:

Although the waterflow within the gorge is regulated at the Harris Dam, the Kennebec Gorge and Rapids is in a highly natural state. A few remnants of log driving operations can still be seen along the river. Most of the Kennebec River is now used for hydroelectric generation with this stretch being the only major section left undammed. Road access is limited to the head and foot of the gorge. There appears to be no trail along either rim. The inaccessibility of the area has preserved its natural character almost completely. The gorge is exceptionally scenic. Its walls are thickly forested with spruce, balsam fir, poplar, birch and other hardwoods. Angler use is substantial and the river is regularly used by several whitewater rafting outfits as well as kayakers.

*The rapids in the Kennebec River Gorge are described in this report to provide an accurate listing of the state's significant whitewater areas. Because this portion of the Kennebec is included in a planning report on gorges by Dr. Thomas Brewer and because it has already been evaluated by the Critical Areas Advisory Board, it will not be included in the conclusions or action plan of this report.



16. Kingsbury Rapids
17. The Heater
18. Gordon Falls
19. Debsconeag Falls
20. Pockwockamus Falls
21. Abol Falls
22. Big Ambejackmockamus Falls
23. The Cribwork
24. Stair Falls
25. Haskell Rock Pitch
26. The Hulling Machine
27. Grindstone Falls
28. Seboomook Rapids
29. Wassataquoik Stream Rapids
30. Indian Carry to Grand Pitch
31. Grand Falls Rapids

Figure 11.

The Physiography of the Penobscot River Basin

The Penobscot River drains an area of 8,570 square miles, forming the largest watershed in Maine. With a maximum length of 125 miles and a maximum width of 115 miles, only one New England river basin - the Connecticut - surpasses it in size. The Penobscot River basin is located between the watersheds of the Saint John to the north, the Saint Croix to the east, several coastal rivers to the south and the Kennebec to the west. The upper portion of the basin is drained by the East and West Branches which join to form the mainstream at Medway, approximately ten miles east of Millinocket. The Penobscot then flows in a southerly direction for 105 miles before empyting into Penobscot Bay.

The East Branch has its source in the northernmost part of the basin. The headwater ponds and streams, including Allagash Stream and Allagash and Chamberlain Lakes, were part of the Saint John River watershed until 1841, when the direction of flow was diverted to the south so that logs could be driven to American rather than Canadian mills. From Chamberlain Lake, the East Branch (Webster Brook) flows in an easterly direction for 38 miles through a series of lakes and ponds to Grand Lake Matagamon. It then continues for 47 miles to its confluence with the West Branch at Medway. The total fall between Allagash Lake and Medway, a distance of 92 miles, is 805 feet. The steepest gradients occur at Webster Brook and in the first seven miles below Grand Lake Matagamon, where the river drops 130 feet in 2.5 miles. One of the East Branches most turbulent rapids, Haskell Rock Pitch, occurs within this stretch. Below Haskell Rock Pitch, the river is joined by two beautiful tributaries, Wassataquoik Stream and the Seboeis River.

The West Branch begins at Seboomook Lake, which is fed by several streams (including the South Branch of the Penobscot) that originate near the Canadian border. From Seboomook Lake, the West Branch follows an easterly course for 97 miles through a series of lakes to its confluence with the East Branch. In this distance, the elevation decreases 830 feet. The greatest slope occurs in the 17 mile stretch below Ripogenus Lake, where the river drops 445 feet. One of the state's most beautiful gorges and five of its most spectacular rapids occur in this stretch.

Below Medway, the Penobscot River is joined by three major tributaries, the Mattawamkeag, Piscataquis, and Passadumkeag Rivers. The steepest gradients on these rivers generally occur in rapid areas such as the Heater and Gordon Falls on the Mattawamkeag and at Grand Falls on the Passadumkeag, where the river drops 60 feet in 0.7 miles.

Most of the Penobscot River basin is characterized by low rolling hills rising above wide flat valleys. In the central portion, Mount Katahdin, which forms the divide between the East and West Branches, towers over the surrounding hills. Rising 5,267 feet above sea level. Baxter Peak, Katahdin's highest mountain, forms an impressive backdrop to the many rapids of the upper Penobscot River basin.

16. KINGSBURY STREAM WHITEWATER RAPIDS - KINGSBURY STREAM

Town: Abbot, Parkman
County: Piscataquis
Quad: Guilford, ME 15'
Length: 3.6 miles (5.7 kilometers)
Size of Rapid Area: 87 acres (35 hectares)
Date Overflown: May 16, 1980
Date Groundchecked: July 29, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II rapid that is 3.6 miles in length.
- The rapid contains an exceptionally steep pitch.
- The area is scenic and relatively undisturbed.

General Description of the Area:

Kingsbury Stream Whitewater Rapids begins at the confluence of Carlton and Kingsbury Streams and extends for 3.6 miles (5.7 kilometers) to the Route 15 bridge in Abbot Village. Kingsbury Stream is a major tributary of the Piscataquis River and is part of the Penobscot River drainage basin in northcentral Maine. The rapids are intermittent with a turbulence ranging from Class II to Class IV. The river is most turbulent under the bridge in Abbot Village, where a 10 foot (3 meter) drop occurs, and within a mile long Class II-III stretch that begins approximately one mile below the outlet of Carlton Stream. The remainder of the rapid is mostly Class II. The river in this section is very narrow, with an average width of 50 feet (15 meters). The channel widens to 75 feet (23 meters) as the river approaches Abbot Village. The gradient of the rapid stretch is approximately 17 feet/mile (3.2 meters/kilometer).

The rapid is developed over ledge and some boulders. Small bedrock islands divide the rapids in the northern part of the stream. The bedrock of the area is composed primarily of vertically dipping metamorphic rocks such as quartzite and metagreywacke (Doyle et. al., 1967).

Kingsbury Stream supports a stocked population of Atlantic Salmon. The rapids provide nurseries for young salmon and the quickwater stretches are important spawning grounds.

The riverbanks are forested with spruce, balsam fir, eastern white pine, northern white cedar and hardwood species such as white birch, poplar and red maple. The banks are steep near the middle portion of the rapid, but flatten out upstream.

Condition and Use:

Except at the northern boundary, most of the rapid occurs in an undeveloped and scenic area. A small dirt road parallels the

northwestern bank of the stream for most of its length. Several houses in Abbot Village and the Route 15 bridge, which spans the northeastern end of the stream are visible from the rapid. The salmon population draws a large number of local fishermen in the spring and summer. During other seasons most of this stretch is seldom visited.

17. THE HEATER - MATTAWAMKEAG RIVER

Town: Mattawamkeag
County: Penobscot
Quad: Mattawamkeag, ME 15'
Length: 2 miles (3.2 kilometers)
Size of Rapid Area: 140 acres (56 hectares)
Date Overflown: April 19, 1980
Date Groundchecked: June 16, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-V rapid that is two miles in length.
- The rapid contains exceptionally steep pitches.
- The area contains well-developed potholes.
- The area provides habitat for Atlantic salmon.
- The area has been kept in its natural state and is highly scenic.

General Description of the Area:

The Heater Whitewater Rapids are located on the Mattawamkeag River, a major tributary of the Penobscot River. The rapids extend for 2 miles (3.2 kilometers). The most turbulent portion, locally known as Slewgundy Heater, stretches for approximately one mile (1.6 kilometers). The width varies from 30 to 125 feet (9 to 37 meters) over the length of the rapids. The first mile has a fairly uniform width of approximately 125 feet. At Slewgundy Heater, the river narrows abruptly into a 30 foot wide chute and then widens to 75-80 feet for 0.25 mile, followed by a 0.25 mile stretch that is 50 feet wide. The average yearly flow of the Mattawamkeag River at this location is 2,500 cubic feet per second.

Turbulence is also variable over the length of the rapids. The mile preceding Slewgundy Heater consists of several short Class III rapids separated by quickwater. Just above the Heater, the turbulence increases to Class IV for 0.25 mile followed by two Class V stretches that are separated by 0.25 mile of quickwater. The average gradient of this rapid is 23 feet/mile (14 meters/kilometer).

The rapid's first mile is developed primarily over a lag deposit of small boulders. Ledge outcrops also contribute to the river's turbulence. The Heater is developed on vertically-dipping bedrock ledges. The bedrock is composed of low grade metamorphic rocks such as slate and phyllite. Serpentine may also occur. Large quartz veins

dissect the bedrock in several locations. The river course is winding and narrow and the steep-sided banks give it a gorge-like appearance. In many spots, the ledge has been carved into small potholes. Some small boulders are strewn across the riverbed at the foot of the Heater.

The steep banks and the narrowness of the river in this stretch result in a rapid of exceptional turbulence. When the waterflow is high in the spring, the water appears to "boil" within the cauldron-like walls of the ledgy riverbanks, hence the name the Heater. Slewgundy is an old logging word for a narrow and winding course or path.

The ledgy riverbanks support a rich and diverse plant community. In early June, the ledges are colored with wild columbine, pussytoes and ragwort. Overstory vegetation is dominated by northern white cedar, spruce, balsam fir, white birch and red oak with scattered eastern white pines towering over the canopy.

The Mattawamkeag River, like many tributaries of the Penobscot River is important habitat for the Atlantic salmon. Atlantic salmon, along with landlocked salmon and brook trout, use the rapid stretches as nurseries.

Condition and Use:

The Heater is an exceptionally beautiful whitewater rapid. A large volume of water shooting through the steep ledgy narrows creates one of the State's most spectacular whitewater stretches. Its beauty is enhanced by the winding bedrock ledges of the riverbed and the colorful flora.

Access to the Heater is limited to a gravel road (maintained by International Paper Company) that leads to Mattawamkeag Wilderness Park. The rapid is marked by a small sign and the underbrush on the southeastern bank of the river has been cleared to provide a better view for picnickers and tourists travelling on the park access road. The Heater is visited frequently by fishermen.

18. GORDON FALLS WHITEWATER RAPIDS - MATTAWAMKEAG RIVER

Town: Mattawamkeag, Winn
County: Penobscot
Quad: Mattawamkeag, ME 15'
Length: 0.7 mile (1.1 kilometer)
Size of Rapid Area: 40 acres (16 hectares)
Date Overflown: April 19, 1980
Date Groundchecked: June 16, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-V rapid that is 0.7 mile in length.
- The rapid contains exceptionally steep pitches.

- The area contains well developed potholes.

- The area is a nursery and spawning ground for Atlantic salmon.

- The area has been kept in its natural state and is highly scenic.

General Description of the Area:

Gordon Falls Whitewater Rapids are located on the Mattawamkeag River, a major tributary of the Penobscot River. The site includes two sets of rapids, Upper and Lower Gordon Falls, separated by approximately 0.2 mile (0.4 kilometer) of quickwater. The total length of the site is 0.7 mile (1.1 kilometers). The average yearly flow of the Mattawamkeag River at this location is approximately 2,500 cubic feet per second.

Upper Gordon Falls extends for approximately 800 feet (242 meters). The width varies from 20 to 75 feet (6 to 23 meters). The rapid begins with two narrow chutes measuring 20 to 30 feet (6 to 9 meters) across that widen to 75 feet in the middle portion and narrow again near the western boundary. During normal flow Upper Gordon Falls has a turbulence of Class IV-V. The gradient is steep, with the elevation of the river decreasing 14 feet over the length of the rapids. Standing waves three to four feet high and two steep pitches add to the turbulence of the rapid.

Lower Gordon Falls extends for approximately 1580 feet (480 meters). The river in this stretch is narrow and the width variable, forming a chute that is 40 to 100 feet (13 to 30 meters) wide. The rapids are Class III-V with three to four foot standing waves, large eddies and several small drops. The largest drop is located near the head of the rapids and is approximately three feet in height.

Both Upper and Lower Gordon Falls are developed on vertically-dipping bedrock ledges. The bedrock is composed of low grade metamorphic rocks such as slate and phyllite. Some serpentine may also occur. Large quartz veins dissect the bedrock in several locations. The river course is winding and narrow and is divided by several ledgy islands. In many spots, the ledge has been carved into small potholes. Boulders are strewn across the river at the foot of both sets of rapids.

The islands and ledge riverbanks support a rich and diverse plant community. In early June the ledges are colored with wild columbine, pussytoes and ragwort. Overstory vegetation is dominated by northern white cedar, spruce, white birch and red oak with scattered eastern white pines towering over the canopy.

The Mattawamkeag River, like many tributaries of the Penobscot River, is an important spawning ground and nursery for Atlantic salmon. Both salmon and brook trout spawn at the mouth of Gordon Brook. Shortly after spawning they swim to the rapids at Gordon Falls where they spend between one and three years.

Condition and Use:

The Gordon Falls area is exceptionally scenic and undisturbed. Access to the rapids is limited to a gravel road (maintained by International Paper Company) that leads to Mattawamkeag Wilderness Park. Both Upper and Lower Gordon Falls are marked by small signs and the underbrush on the southeastern banks of the river near each rapid has been cleared to allow a better view for picnickers and tourists travelling on the park access road.

19. DEBSCONEAG FALLS WHITEWATER RAPIDS - WEST BRANCH OF THE PENBOSCOT RIVER

Town: T2 R9 WELS
County: Piscataquis
Quad: Katahdin, ME 15'
Length: 1,300 feet (480 meters)
Size of Rapid Area: 21 acres (8 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: June 21, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class IV-V rapid that is 1,300 feet in length.
- The river in this stretch is approximately 200 feet wide.
- The area is an especially good example of a rapid developed over both resistant rock layers and eroded debris.
- The rapid is an important nursery area for landlocked salmon.
- The area is in its natural state and is exceptionally scenic.

General Description of the Area:

Debsconeag Falls Whitewater Rapids is located on the West Branch of the Penobcot River and is part of the Penobscot River drainage basin in northcentral Maine. The rapid is continuous for a distance of 1,300 feet (480 meters) and has a turbulence of Class IV-V during normal flow. The width of the river in this section is approximately 200 feet (90 meters) and varies little over the length of the rapid. The river drops 28 feet over a distance of 1,300 feet, which is equivalent to a gradient of 114 feet/mile (21 meters/kilometer). Water flow on the West Branch is regulated by Ripogenus Dam and averages in the 1,000's of cubic feet per second.

The riverbed has scattered bedrock outcrops between boulder-strewn sections, and the channel is divided on the eastern side by two large islands. Two steep pitches occur at the head of the rapids and the water surface is marked by large standing waves. The gradient and width of the river contribute to the rapid's exceptional turbulence.

The bedrock of the area is composed of medium-grained Katahdin quartz monzonite. It has a blocky appearance due to well-developed joints. Huge granitic boulders which have broken off from the bedrock at the head of the rapids are found in the riverbed below and along the banks. Debsconeag Falls is a beautiful example of a rapid developed over both resistant rock layers and eroded debris.

Debsconeag Falls, like many rapids on the West Branch, is an important nursery for landlocked salmon. The West Branch, below Ripogenus Dam, is considered to be the best river fishery for this species in Maine. Smelt are also abundant in this stretch.

The rapids and surrounding area are exceptionally scenic, offering an exceptional view of Mount Katahdin. The riverbanks are forested with mature stands of eastern white pine, white birch and poplar. Northern white cedar is abundant along the water's edge.

The rapid is usually portaged by canoeists as the name Debsconeag, an Indian word meaning "carrying place" suggests. This area was one of many obstacles that caused log jams on the Penobscot River drives. Log booms were used to collect logs until the water level was high enough to carry them over the rapid. Huge old logs, chained together, are beached on the eastern bank of Debsconeag Falls.

Condition and Use:

Although a private road parallels the eastern river bank adjacent to the rapids, public access to the area is primarily limited to canoes. Debsconeag Falls receives a fair amount of use from fishermen and rafting parties. In spite of frequent visitation, especially in late spring and early summer, Debsconeag Falls is very scenic and relatively undisturbed.

20. POCKWOCKAMUS FALLS WHITEWATER RAPIDS - WEST BRANCH OF THE PENOBSCOT RIVER

Town: T2 R10 WELS
County: Piscataquis
Quad: Katahdin, ME 15'
Length: 0.5 mile (0.9 kilometer)
Size of Rapid Area: 34 acres (13 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: June 22, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains two Class IV rapids with a combined length of 0.5 mile.
- The rapid contains an exceptionally steep pitch.
- The area is one of the best examples of a rapid formed over a lag deposit in the State.
- The rapid is an important nursery for landlocked salmon.

- The area is in its natural state and is highly scenic.

General Description of the Area:

Pockwockamus Falls Whitewater Rapids, located on the West Branch of the Penobscot River, are part of the Penobscot River drainage basin in north central Maine. The site includes two sets of rapids, Upper and Lower Pockwockamus Falls, separated by approximately 0.15 mile (0.24 kilometer) of quickwater. The total length of the rapid area is 0.5 mile (0.9 kilometer). Water flow on the West Branch is regulated by Ripogenus Dam and is relatively constant, averaging between 2,500 and 3,000 cubic feet per second.

Pockwockamus Falls consists of two distinct drops separated by a short stretch where the river becomes noticeably wider. At Upper Pockwockamus Falls, there is an 8 foot decrease in elevation over 860 horizontal feet (a gradient of 48 feet/mile). At the lower falls, the river drops three feet over 260 horizontal feet (a gradient of 63 feet/mile). The channels where the rapids occur vary from 40-70 feet (12-22 meters) in width. Both rapids have a turbulence of Class IV. The turbulence of Lower Pockwockamus Falls is primarily the result of large standing waves and a steep 3 foot (1 meter) pitch located at the head of the rapid.

Both rapids are developed over an extremely boulder-strewn riverbed. Large boulders which have broken off due to jointing, suggest a strong turbulent flow and powerful erosional forces. Several ledge outcrops are found in the riverbed as well. The appearance of the rapids suggests that both glacial action and hydrologic erosion of the bedrock were important in their formation. This area is one of the best examples of rapids formed over a lag deposit in the state. The bedrock underlying Pockwockamus Falls is composed primarily of Katahdin quartz monzonite and medium-grained granitic rocks.

Landlocked salmon and brook trout use rapids such as Pockwockamus Falls as nursery areas. The boulder-strewn riverbed and well-oxygenated water of the rapid area are ideal for young fish. The West Branch of the Penobscot, below Ripogenus Dam, is considered to be the best river fishery for landlocked salmon in the state. Smelt are also abundant in this stretch, providing an important source of food for salmon and trout.

Pockwockamus is an Indian word meaning "muddy pond" and probably refers to the dead water below the rapids.

Pockwockamus Falls Rapids are very scenic and offer a beautiful view of Mount Katahdin. The surrounding area is forested with eastern white pine, northern white cedar and hardwood species such as red maple, white birch, poplar and red oak. The meandering stream course and alternate narrowing and widening river channel add to the scenic beauty of the area.

Condition and Use:

Access to Pockwockamus Falls is primarily limited to canoes and a small foot trail that parallels the western river bank. The rapids are frequently used by fishermen, canoeists, and rafting parties. Except for several camps, located on the western river bank near the head of Upper Pockwockamus Falls, the site is relatively undisturbed.

21. ABOL FALLS WHITEWATER RAPIDS - WEST BRANCH OF THE PENOBSCOT RIVER

Town: T2 R10 WELS
County: Piscataquis
Quad: Katahdin, ME, 15'
Length: 2,100 feet (636 meters)
Size of Rapid Area: 37 acres (15 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: June 22, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class IV rapid that is 0.4 mile in length.
- The area contains a rapid with a width of 264 feet.
- The rapid contains exceptionally steep pitches.
- The rapid is an important nursery area for landlocked salmon.
- The area is in its natural state and is highly scenic.

General Description of the Area:

Abol Falls Whitewater Rapids, located on the West Branch of the Penobscot River, is part of the Penobscot River drainage basin in north central Maine. The rapid is continuous for 2,100 feet (636 meters) and ends just above a sharp left turn in the river. Abol Falls has a turbulence of Class IV during normal flow and consists of two major drops. The first is a 4 foot decrease in elevation over 1600 horizontal feet (13 feet/mile) and the second is a 9 foot decrease in elevation over 500 horizontal feet (95 feet/mile). The average gradient in this stretch is 32 feet/mile (6.7 meters/kilometer). Waterflow on the West Branch is regulated by Ripogenus Dam and is relatively constant, averaging between 2,500 and 3,000 cubic feet per second.

The river in this section has an average width of 264 feet (80 meters) and measures over 300 feet across at its widest point. The riverbed is boulder-strewn with some ledge. Huge boulders measuring 8 to 10 feet in diameter are abundant along the edges and at the foot of the rapids. Large standing waves occur in the center of the river course where the waterflow is greatest. The geomorphology of the rapid is controlled primarily by a series of smooth ledge drops. Two steep pitches occur over these resistant rock layers. Small sand and gravel beaches occur on either side of the river at the foot of the rapids. The bedrock of the area is composed primarily of Katahdin quartz monzonite (Doyle, 1967).

Landlocked salmon and brook trout use many of the rapids on the West Branch as nurseries. The West Branch, below Ripogenus Dam, is considered to be Maine's best fishery for landlocked salmon.

The riverbanks are lined with eastern white pine, northern white cedar and hardwood species. The area is exceptionally scenic and a

beautiful view of Mount Katahdin can be seen from the foot of the rapids. The name Abol Falls is derived from an Indian word meaning "place where the water laughs in coming down."

Condition and Use:

Abol Falls is used frequently by fishermen, canoeists and rafting parties. A portage trail parallels the western bank adjacent to the rapid. Public access to Abol Falls is limited primarily to canoes and, except for a camp located at the foot of the rapids, the area is relatively undisturbed.

22. BIG AMBEJACKMOCKAMUS FALLS WHITEWATER RAPIDS - WEST BRANCH OF THE PENOBSCOT RIVER

Town: T3 R11 WELS
County: Piscataquis
Quad: Harrington Lake, ME 15'
Length: 1670 feet (510 meters)
Size of Rapid Area: 24 acres (9.5 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: June 22, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class V rapid that is 1670 feet in length.
- The rapid contains hydraulics (keepers).
- The bedrock of the rapid area provides evidence of a contact zone.
- This section of the West Branch is an important nursery and spawning ground for landlocked salmon.
- The area is relatively undisturbed and highly scenic.

General Description of the Area:

Big Ambejackmockamus Falls Whitewater Rapids is located on the West Branch of the Penobscot River and is part of the Penobscot River drainage basin in north central Maine. The rapid extends for a distance of 1670 feet (510 meters) and is mostly Class V during normal flow. The most turbulent portion of the rapids is in the middle section where the river drops 5 to 6 feet over a distance of 50 feet. This is followed by a short Class II-III stretch which leads into the Horserace. The rapid is most spectacular during the spring freshet. The West Branch has a relatively constant year-round flow that averages between 2,500 and 3,000 cubic feet per second. Waterflow is regulated by Ripogenus Dam.

The width of the river in this stretch is approximately 120 feet (40 meters). The gradient averages 45 feet/mile (8.5 meters/kilometer). The riverbed is boulder-strewn with some ledge and curves sharply to the north and then south. Blocky ledge islands and several huge boulders create an extremely obstructed river course. The bedrock of the area is composed primarily of plutonic breccia of quartz monzonite fragments in a quartz diorite matrix. This is believed to be part of a contact zone between quartz monzonite and the northwest end of an elongated stock of quartz diorite (Griscom, 1966). Many of the granitic rocks exhibit well-developed joints. The cliffs adjacent to the rapids provide excellent exposures of the area's bedrock.

The name Ambejackmockamus is derived from an Indian word meaning "slantwise of the regular route" which probably refers to the sharp "s" curve the river takes in this stretch. This narrow, winding rapid is relatively undeveloped and exceptionally beautiful. Mount Katahdin and other peaks to the north, along with the forested hills and ridges through which the river flows, provide a scenic backdrop to the rapids. The surrounding banks are forested primarily with eastern white pine, yellow and white birch, ash and some cherry.

The West Branch, below Ripogenus Dam, is an important nursery and spawning ground for landlocked salmon and is considered to be the best river fishery for this species in the state. Smelt are also abundant in this stretch and provide an important source of food for the salmon.

Condition and Use:

Great Northern Paper Company's major access road to its forest lands in the drainage closely follows the southern bank of Big Ambejackmockmus Falls, providing easy access to the rapid. The area is used heavily by fishermen, canoeists, and rafting parties. In spite of frequent visitation, especially in late spring and early summer, Big Ambejackmockamus Falls is very scenic and relatively undisturbed.

23. THE CRIBWORK WHITEWATER RAPIDS - WEST BRANCH OF THE PENOBSCOT RIVER

Town: T3 R11 WELS
County: Piscataquis
Quad: Harrington Lake, ME 15'
Length: 1 mile (1.6 kilometers)
Size of Rapid Area: 70 acres (28 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: June 22, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class V rapid that is one mile in length.
- The area is an especially good example of how rapids are formed over structural weaknesses in the bedrock.
- The area contains unusual hydrologic features including large eddies and exceptionally steep pitches.

- The area contains well-developed potholes.

- The rapid is an important nursery area for landlocked salmon.

- The area is in its natural state and is exceptionally scenic.

General Description of the Area:

The Cribwork Whitewater Rapids, located on the West Branch of the Penobscot River between Ripogenus Gorge and Big Eddy, is part of the Penobscot River drainage basin in northcentral Maine. It is one of the most turbulent whitewater stretches in the state. The rapid is continuous for approximately 1 mile (1.6 kilometers) and is Class V or more during normal flow. The Penobscot River at this location has a flow averaging in the 1,000's of cubic feet per second and is regulated by the Ripogenus Dam.

The width of the river in this section varies considerably. The widest portion, located where the river divides around two islands, measures over 328 feet (100 meters) while the main channel averages from 50 to 75 feet (15 to 23 meters) in width. Where the river narrows to less than 30 feet (9 meters) two chutes occur. The West Branch drops approximately 40 feet (12 meters) over the length of the rapids.

The Cribwork is developed on bedrock benches of Katahdin quartz monzonite that have been split away due to sheeting. The lower section of the riverbed is composed of eroded debris. The blocky form of the granitic bedrock results in a series of steep three to six foot (1-2 meter) ledge drops. Some potholes have been carved into the bedrock. Spectacular five to six foot standing waves and large eddies created by an irregular riverbed, make the middle portion of the rapid resemble a giant cauldron.

Evidence of the Penobscot log drives can be seen in the rapid area. The Cribwork probably gets its name from the type of dam that was once located here. The remains of an old stone and wood "cribwork" is located on the northern side of the rapid. The dam was used to block off a small side channel and augment the waterflow in the main stream. This helped to flood out natural obstructions and also funneled the logs into the main branch of the river.

The Cribwork, like many rapids on the West Branch, is an important nursery for landlocked salmon. The West Branch below Ripogenus Dam, supports the best river fishery for this species in Maine. Smelt are also abundant in this stretch.

The Cribwork is exceptionally beautiful. The surrounding area is forested with a mature stand of eastern white pine, white birch, poplar and ash. The ledgy boulder-strewn river banks and a spectacular view of Mount Katahdin add to the natural beauty of the rapid.

Condition and Use:

The overall appearance of the Cribwork is marred slightly by a steel bridge that spans the head of the rapid. Because of its accessibility,

the Cribwork receives a fair amount of use, primarily by fishermen and rafting parties. In spite of frequent visitation, especially in late spring and early summer, the Cribwork is very scenic and relatively undisturbed.

24. STAIR FALLS WHITEWATER RAPIDS - EAST BRANCH OF THE PENOBSCOT

Town: T5 R8 WELS
County: Penobscot
Quad: Traveler Mountain, ME 15'
Length: 825 feet (250 meters)
Size of Rapid Area: 12 acres (5 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: July 22, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area is an especially good example of how rapids are formed over resistant rock layers.
- The area contains an unusual type of bedrock.
- The rapid consists of a series of pitches.
- The area is in its natural state and is exceptionally scenic.

General Description of the Area:

Stair Falls Whitewater Rapids, located on the East Branch of the Penobscot River, is part of the Penobscot River drainage basin in northcentral Maine. The rapid consists of a series of shallow ledge drops that extend for approximately 825 feet (250 meters) and are Class II and III during normal flow. Although these pitches are not steep (they range from 8 inches to 2 feet in height) the number of drops and the symmetry of the rapid when viewed as a whole make this one of the most unusual rapids in the Penobscot River basin. The width of the river in this section is approximately 125 feet (38 meters). Stair Falls has a gradient of 22 feet/mile (4.6 meters/kilometer). Waterflow on the East Branch averages in the 1,000's of cubic feet per second and is regulated by Grand Lake Matagamon Dam.

Two rock types are found in the vicinity of the falls. A thick-bedded medium grained sandstone similar to the bedrock farther downstream at Haskell Rock Pitch, occurs on the far side of the rapid. The ledges of Stair Falls are composed of graded beds of finer-grained sandstone and dark siltstone. Although a few boulders are scattered in the riverbed, the geomorphology of the rapid is controlled primarily by the bedrock. The cleavage dips downstream at a high angle. Since large blocks cannot fall freely away from the lip of the bedrock (Brewer, 1978), Stair Falls takes the form of a series of small regular drops.

The river banks are forested with yellow and white birch, cherry, specked alder and an occasional eastern white pine. Looking upstream is a beautiful view of Traveler Mountain and some of the adjacent hills of Baxter State Park. The East Branch of the Penobscot River supports natural populations of landlocked salmon and brook trout. Rapids such as Stair Falls provide protection and well-oxygenated water for the young of these species.

Condition and Use:

Access to Stair Falls is difficult and it is rarely visited except by boat. Except for a small log cabin located on the western riverbank, Stair Falls remains in its natural state. Both Stair Falls and Haskell Rock Pitch are mislocated on the Traveler Mountain quadrangle.

25. HASKELL ROCK PITCH WHITEWATER RAPIDS - EAST BRANCH OF THE PENOBSCOT

Town: T5 R8 WELS
County: Penobscot
Quad: Traveler Mountain, ME 15'
Length: 990 feet (330 meters)
Size of Rapid Area: 14 acres (5 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: June 24, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-V rapid that is 990 feet in length.
- The area contains unusual hydrologic features including eddies and steep pitches.
- The area contains significant geologic features including hydrologic sculpturing, fossils, an unusual type of bedrock and an encised meander.
- The area remains in its natural state and is exceptionally scenic.

General Description of the Area:

Haskell Rock Pitch, located on the East Branch of the Penobscot River, is part of the Penobscot River basin in northcentral Maine. The rapid is continuous for approximately 990 feet (300 meters) and is made up of a series of steps with a 20 foot (6 meter) total drop (a gradient of 106 feet/mile). The East Branch has a flow of up to many 1,000's of cubic feet per second depending on regulation at Grand Lake Matagamon Dam.

During normal flow, the river between Haskell Deadwater and Haskell Rock Pitch has a turbulence of Class III-IV increasing to Class V at the eastern end of the rapid. The width of the river in this section is variable. Just after the marshland of the deadwater, the river narrows and then immediately widens to 100 feet (30 meters) at the base of the

first pitch. Here, the elevation decreases approximately 10 feet (3 meters) in a series of ledge drops. Following a straight stretch, the rapid narrows into a 25 foot (8 meter) wide chute that winds sharply around two bends. The riverbed is very irregular due to ledges, large boulders and erosion of the bedrock. Large standing waves and strong eddies make this a spectacular set of rapids.

Haskell Rock Pitch is an exceptional scientific locality containing large exposures of sedimentary rocks. The bedrock of the area is composed primarily of limy shale, sandstone and conglomerate. Brachiopod, trilobite and coral fossils have been found in the shaley sections. (Neuman and Rankin, 1966). The upper part of the rapid is developed on bedrock benches, and the lower part is probably debris eroded from above. Haskell Rock is a distinctive rounded mass of conglomerate that has been heavily eroded. The presence of exposed bedrock indicates nearly 13-17 feet (4-5 meters) of post-Pleistocene erosion (Brewer, unpub.). The sharp bend in the river at this location is becoming an encised meander.

Haskell Rock is reportedly named after a logger who became stranded on the rock at high flow and drowned soon after.

Haskell Rock Pitch is in an extremely beautiful area. The riverbanks are thickly forested with northern white cedar, eastern white pine, red maple, and white birch. The rapid begins at the base of a beautiful marshy deadwater. This is ideal beaver habitat and a lodge is located on the northern side of the marsh. The mountains of Baxter Park, along with the hills and ridges through which the river flows, provide a scenic backdrop to the rapid.

The East Branch of the Penobscot River supports natural populations of landlocked salmon and brook trout. Because rapids such as Haskell Rock Pitch provide protection and well-oxygenated water, they are important nurseries for young fish.

Condition and Use:

A Great Northern Paper Company road passes near the western river bank and a small overgrown portage trail parallels the rapid. Although Haskell Rock Pitch is used frequently by fishermen and canoeists, except for a small fireplace, there is little sign of human visitation and the surrounding area is relatively undisturbed.

26. THE HULLING MACHINE WHITEWATER RAPIDS - EAST BRANCH OF THE PENBSCOT RIVER

Town: T5 R8 WELS
County: Penobscot
Quad: Shin Pond, ME 15'
Length: 600 feet (182 meters)
Size of Rapid Area: 7 acres (3 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: July 22, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class IV-V rapid that is 600 feet in length.
- The rapid contains an exceptionally steep pitch.
- The rapid is very scenic and undisturbed.

General Description of the Area:

The Hulling Machine is located on the Penobscot River and is part of the Penobscot River drainage basin in northcentral Maine. The rapid is continuous for 600 feet (182 meters) and has a turbulence of Class IV and V. The elevation of the river in this stretch decreases 22 feet over a horizontal distance of 0.2 mile (0.32 kilometer) which is equivalent to a gradient of 110 feet/mile (20 meters/kilometer). The river channel is extremely narrow, measuring approximately 20 feet (6 meters) in width. The width, steep gradient and ledgy riverbed create an exceptionally turbulent set of rapids. Waterflow on the East Branch measures in the 1,000's of cubic feet per second and is regulated by Grand Lake Matagamon Dam.

The Hulling Machine is developed over bedrock. Ledge outcrops occur both above and below the rapids. The rapid contains one exceptionally steep 10-15 foot (3-4.5 meter) pitch that, because of the narrow width of the river, occurs as a chute. The bedrock of the area is composed of grey, green and red slate, quartzite and greywacke (Neuman and Rankin, 1966). These rocks are collectively known as the Grand Pitch Formation.

The East Branch of the Penobscot River, provides habitat for brook trout and landlocked salmon. Rapids such as the Hulling Machine are used as nursery and spawning grounds for both species.

The Hulling Machine is said to be so named because this pitch used to peel the bark off logs that were driven over it.

The surrounding area is forested with eastern white pine, spruce, balsam fir and hardwood species.

Condition and Use:

A portage trail on the western riverbank offers a beautiful view of the rapids. Although a dirt road parallels the eastern bank in this stretch, public access is limited primarily to canoes. The Hulling Machine occurs in a very scenic and undisturbed area.

27. GRINDSTONE FALLS WHITEWATER RAPIDS - EAST BRANCH OF THE PENOBSCOT RIVER

Town: T1 R7 (Grindstone)
County: Penobscot
Quad: Millinocket, ME 15'

Length: 1 mile (1.6 kilometers)
Size of Rapid Area: 51 acres (20 hectares)
Date Overflown: April 19, 1980
Date Groundchecked: June 24, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-IV rapid that is one mile in length.
- The area contains a rapid that is 270 feet in width.
- The rapid contains exceptionally steep pitches.
- The area is highly scenic and relatively undisturbed.

General Description of the Area:

Grindstone Falls Whitewater Rapids, located on the East Branch of the Penobscot River, is part of the Penobscot River drainage basin in northcentral Maine. The rapid is continuous for a distance of one mile (1.6 kilometers) and has a turbulence of Class III-IV during normal flow. The river at Grindstone Falls has an average waterflow of nearly 2,000 cubic feet per second and is regulated by Grand Lake Matagamon Dam.

The width of the river in this section is approximately 270 feet (82 meters). The rapid consists of three 2 to 4.5 foot (0.6 to 1.2 meter) pitches followed by a series of smaller ledge drops. The river flows smoothly over the first two drops which are oriented parallel to each other. In the first 0.75 mile (1.2 kilometers), the river drops 27 feet (8 meters). In the next 0.25 mile (0.4 kilometer) the river drops 9 feet (2.7 kilometers). The total gradient is approximately 36 feet/mile (12 meters/kilometer).

Grindstone Falls is developed over ledge and boulders. The irregular channel creates large standing waves in the middle portion of the rapids. The bedrock of the area is composed of vertically dipping low-grade metamorphic rocks such as slate and greywacke. Shale is also present. The sharp tooth-like outcrops which cut diagonally across the riverbed create an unusual set of rapids.

A rare plant, Purple Clematis Clematis verticillaris, grows along the eastern riverbank near the head of the rapids. Purple Clematis, with its delicate lavender flower, is currently known from five other sites in Maine and is considered rare at the state level. For more information on the plant see the Critical Areas Program report, Rare Vascular Plants of Maine, by L.M. Eastman and Susan C. Gawler.

Natural populations of brook trout and landlocked salmon are present in the East Branch. The combination of a boulder-strewn riverbed and quickwater provides good nursery and spawning grounds for both species.

The riverbanks are forested with white pine, red maple, beech and ash. Spruce and balsam fir are abundant on the western riverbank.

Condition and Use:

The rapids are very scenic and relatively undisturbed. Several small camps occur near Route 11 which parallels a portion of the eastern riverbank. A rest area is located off of Route 11 and offers a beautiful view of the rapid's steepest pitches. Grindstone Falls is used frequently by fishermen and canoeists.

28. SEBOOMOOK WHITEWATER RAPIDS - SOUTH BRANCH OF THE PENOBSCOT RIVER

Town: T2 R4 (Pittston Academy Grant)
County: Somerset
Quad: Seboomook Lake, ME 15'
Length: 3 miles (4.8 kilometers)
Size of Rapid Area: 212 acres (85 hectares)
Date Overflown: May 16, 1980
Date Groundchecked: August 27, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-V rapid that is three miles in length.
- The rapid contains steep pitches and powerful eddies.
- The area contains a small gorge with an unusual display of boudinage structures.
- The area is an important spawning and nursery area for brook trout.
- The area is exceptionally scenic and relatively undisturbed.

General Description of the Area:

Seboomook Whitewater Rapids, located on the South Branch of the Penobscot River, is part of the Penobscot River basin in northcentral Maine. The rapids are continuous for 3 miles (4.8 kilometers), beginning at the base of Canada Falls Dam and ending at Seboomook Lake. This stretch has a gradient of 47 feet/mile (9 meters/kilometer). Waterflow on the South Branch fluctuates considerably due to regulation at Canada Falls Dam.

The turbulence over the length of the rapids varies from Class I to V. The width of this stretch is also variable, ranging from 15 to 150 feet (4-47 meters) and is narrowest where chutes occur. The first 0.25 mile (0.4 kilometer) of Seboomook Rapids has a turbulence of Class II. Following several large powerful eddies that occur just below Canada Falls Dam, the river narrows and the valley becomes steep and ledgy. The turbulence increases to Class IV as the river flows over a small drop and then diminishes to Class I for nearly 0.5 mile (0.8 kilometer). This is followed by a gorge-like stretch where the river narrows into a Class IV chute, which leads into a spectacular 300 foot (90 meter) stretch of Class V rapids. At this point the river takes a right angle turn and is overshadowed by 10-15 foot (3-4.5 meter) cliffs. The rapids diminish to continuous Class III and IV as they approach Seboomook Lake, ending with a beautiful 4 foot (1.2 meter) drop. The combination of chutes, large standing waves and eddies, and steep ledge drops make this one of the Penobscot River basin's most spectacular rapids.

The riverbed is encised into bedrock, forming chutes in three places. Boulders add to the irregularity of the riverbed in the middle portion of the rapids. The bedrock of the area is composed primarily of vertically dipping slate and phyllite and contains veins of milky quartz.

Pittston Academy Gorge, critical area number 329, occurs along this portion of the South Branch. Bedrock in this locality is a green phyllite with more massive units such as quartzite interbedded. Of unusual significance are what appear to be large boudinage structures in the bedrock. Boudinage structures occur when rock units are deformed together with the most ductile units flowing and surrounding blocks of more brittle units. The material in these boudins is either quartzite or perhaps altered igneous rock. Deformation in the rocks at this locality has been extreme and is very well-displayed. Differential weathering is also evident in spots. Metamorphism here appears higher grade than at other nearby localities. The pods which comprise the boudins are up to 3 feet across and are shown in the attached sketch map from both a front and side view. Dr. Thomas Brewer who conducted a statewide inventory of gorges, considers this site to contain the best display of these unusual structures in his experience.

The river winds through a steep-sided valley that is vegetated with a beautiful forest of northern white cedar, balsam fir, spruce and some large eastern white pines. Alder thickets occur in some of the low-lying areas.

The Seboomook Lake area is steeped in logging history. Pittston Farm, owned by Great Northern Paper Company, is located near the base of the rapids at the western end of Seboomook Lake. This farm was an important lumbering camp during the Penobscot River drives. Before Pittston Farm was established, the entrance to Seboomook Lake was an Indian campground.

The South Branch of the Penobscot River in this section supports a natural population of brook trout. The fish never leave the three-mile stretch where they spawn in slow-moving gravelly stretches and use the rapids as nurseries.

Condition and Use:

Except for an overgrown portage trail that parallels the southern bank, much of this portion of the South Branch is inaccessible. A Great Northern Paper Company haul road passes near the river at both ends and a fire warden's camp overlooks the rapid's most spectacular chute. A picnic area, which is frequently used by fishermen, is located below Canada Falls Dam. For the most part, Seboomook Rapids remain in their natural state and are exceptionally beautiful.

29. WASSATAQUOIK STREAM WHITEWATER RAPIDS - WASSATAQUOIK STREAM

Town: T4 R9 WELS, T4 R8 WELS, T3 R8 WELS, T3 R7 WELS
County: Piscataquis, Penobscot
Quad: Katahdin, ME 15'; Traveler Mountain, ME 15'; Stacyville, ME 15'
Length: 15 miles (25 kilometers)
Size of Rapid Area: 982 acres (393 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: February 27, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-V rapid that is fifteen miles long.
- The rapid contains exceptionally steep pitches and is associated with several small waterfalls.
- The rapid is an excellent example of a rapid formed by a lag deposit over jointed bedrock.
- The riverbank along the southern portion of the stream supports an old growth stand of white pine.
- The area is undisturbed and exceptionally scenic.

General Description of the Area:

Wassataquoik Stream is a major tributary of the East Branch of the Penobscot River and is part of the Penobscot River drainage basin in northcentral Maine. The stream consists of continuous rapids that begin at the base of the Katahdin range and extend for 15 miles (25 kilometers) to the East Branch of the Penobscot River. The gradient is extremely steep, averaging 85 feet/mile (16 meters/kilometer) over the length of the rapids. The gradient and narrow width - the stream is seldom wider than 40 feet (12 meters) - along with a boulder-strewn and ledgy riverbed create an extremely turbulent set of rapids. The first three miles (4.8 kilometers) are Class V or more. The remainder is Class II to IV with other Class V stretches located at Ledge Falls, Grand Falls, Norway Falls and Orin Falls.

The riverbed is extremely obstructed throughout its length. There are large bedrock exposures in the upper sections and several wooded gravelly islands divide the channel downstream. The middle and lower portions of the rapids are developed over a lag deposit of large boulders. Much of the surrounding area is covered by glacial till. A small esker parallels the southwestern river bank. The steep gradient and high velocity of the upper stretch of Wassataquoik Stream has enabled it to transport all but the larger boulders, uncovering expanses of bedrock. The bedrock of the area is composed primarily of granite. Contraction of the granite during cooling and extreme stress produced during uplift of the region has caused joints to form. The joints are widely spaced, causing the rock to break away from the outcrop in large angular blocks. A particularly good example of this can be seen at Ledge Falls, where steep pitches occur over the jointed bedrock.

The river valley is forested with eastern white pine, northern white cedar, balsam fir, spruce and hardwoods. White pine is most abundant near the mouth of Wassataquoik Stream and an old growth stand occurs on the northern riverbank, approximately 1.5 miles (2.3 kilometers) upstream of the East Branch of the Penobscot. The upper section of the stream, which is over 1,000 feet higher than the stream's mouth, is dominated by spruce, fir and a stand of white birch, elm and speckled alder. The valley becomes narrow and steep-sided as the stream winds between Russel and Wassataquoik Mountains and passes near the base of Baxter Park's highest peaks.

Wassataquoik Stream supports natural populations of both landlocked salmon and brook trout. These species use the rapids and pools as nursery and spawning grounds. Bluebacked trout are found in Wassataquoik Lake and may occasionally use the stream's rapids as nursery areas. This species, which is endemic to the state, is found in only a few Maine lakes.

Condition and Use:

The rapids on Wassataquoik Stream are beautiful. A combination of rapids and waterfalls, spectacular scenery, diverse vegetation, and lack of human disturbance results in one of Maine's most beautiful river stretches. Within Baxter State Park, the Appalachian Trail and an old tote road parallel sections of the stream and two small bridges span the rapids. Outside the park, a dirt logging road parallels the southern riverbank for several miles. Because of its length, access to most of the stream is difficult and the middle portion is seldom visited.

30. WHITEWATER RAPIDS FROM INDIAN CARRY TO GRAND PITCH - WEBSTER BROOK

Town: T6 R9 WELS, T6 R10 WELS
County: Piscataquis
Quad: Traveler Mountain, ME 15'
Length: 2 miles (3.2 kilometers)
Size of Rapid Area: 129 acres (52 hectares)
Date Overflown: May 20, 1980
Date Groundchecked: May 12, 1981

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-IV rapid that is two miles in length.
- The area contains exceptionally steep pitches and is associated with a waterfall.
- The area contains well-developed potholes.
- The area is in its natural state and is exceptionally scenic.

General Description of the Area:

The whitewater rapids between Indian Carry and Grand Pitch are located on Webster Brook and are part of the Penobscot River drainage basin in northcentral Maine. The rapid begins 2.5 miles (4.0 kilometers) west of Grand Lake Matagamon and extends for a distance of 2 miles (3.2 kilometers). The rapid consists of a series of six class III-IV ledge drops that are separated by Class II-III water. The two steepest pitches occur below Grand Pitch, which is a 20-foot (6 meter) nearly vertical waterfall. The average gradient of the two-mile stretch is 30 feet/mile (5 meters/kilometer). The most turbulent portions of the rapid occur at

Indian Carry and immediately below Grand Pitch. At Indian Carry, the river drops 12 feet (3.6 meters) over a distance of a hundred yards (90 meters). The Carry consists of a five-foot drop followed by two three-foot drops that are formed over boulders and resistant rock layers. At the base of the third drop, the bedrock has been carved out by hydrologic action into well-developed potholes.

Webster Brook is a narrow stream that has a variable width, ranging from 15 to 50 feet (4 to 15 meters). The rapids are developed primarily over bedrock which is composed of low-grade metamorphic rocks such as slate and metasandstone (Doyle et. al., 1967). Bedrock is exposed in the riverbed and banks, and a small gorge occurs below Indian Carry. In the less turbulent stretches of the rapid, the river is divided by low gravelly islands. Boulders are scattered in the stream channel, resulting in standing waves during periods of high water. Many of these boulders are glacial erratics that are granitic in composition.

The rapids are occasionally interrupted by gravelly stretches which provide excellent spawning grounds for landlocked salmon and brook trout. Grand Pitch is a natural barrier to salmon migration and as a result this species does not occur above the base of the falls. Young trout and salmon seek the turbulent boulder-strewn rapid areas for protection from predators. Both species are abundant in Webster Brook in spite of heavy fishing pressure.

The riverbanks adjacent to the rapids between Indian Carry and Grand Pitch are forested with northern white cedar, speckled alder, spruce, balsam fir and white birch. White pine is also abundant, and occurs along with red pine at higher elevations.

Condition and Use:

The whitewater rapids from Indian Carry to Grand Pitch are exceptionally beautiful. A diversity of hydrologic features, including rapids, a gorge-like river valley, and a spectacular waterfall, add to the natural beauty of this two-mile stretch.

This portion of Webster Brook lies within the boundaries of Baxter State Park, and is accessible only by canoe. As a result, the surrounding area is in its natural state. Portage trails, that parallel both Indian Carry and Grand Pitch, are the only signs of human disturbance. This site is part of a Boy Scout High Adventure Area and is frequently used by Boy Scouts and fishermen.

31. GRAND FALLS WHITEWATER RAPIDS - PASSADUMKEAG RIVER

Town: Grand Falls Plantation, T.3 ND
County: Hancock
Quad: Saponac, ME 15'
Length: 4680 feet (1420 meters)
Size of Rapid Area: 23 acres (9 hectares)
Date Overflown: May 2, 1980
Date Groundchecked: September 24, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-V rapid that is 4680 feet in length.
- The rapid contains exceptionally steep pitches and is associated with a small waterfall.
- The area is very scenic and relatively undisturbed.

General Description of the Area:

Grand Falls Whitewater Rapids, located on the Passadumkeag River, is part of the Penobscot River basin in northcentral Maine. The rapid is approximately 4680 feet (1420 meters) in length and has a turbulence that varies from Class II to Class V. The width of the river in this stretch ranges from 50 to 70 feet (15-22 meters) and is widest where the river bends. The river drops 80 feet (24 meters) over the length of the rapids, which is equivalent to a gradient of 94 feet/mile (18 meters/kilometer).

Above a small bridge that passes over the rapid near its southern boundary is a stretch of continuous Class II-III rapids. The turbulence increases to Class IV below the bridge and is followed by 250 yards (227 meters) of Class V rapids. Grand Falls, a 6 foot (2 meter) nearly vertical drop, occurs in this section. Immediately below Grand Falls the water is extremely turbulent, broken by steep pitches and standing waves. After the falls, the rapid diminishes to Class II-III and ends just below a small island.

Grand Falls is developed over both resistant rock layers and large boulders. The geomorphology of most of the Passadumkeag River is controlled by glacial as well as bedrock geology. Some of the boulders in the riverbed, which are glacial erratics, measure up to 10-13 feet (3-4 meters) in diameter. Small potholes are forming in the bedrock below the falls.

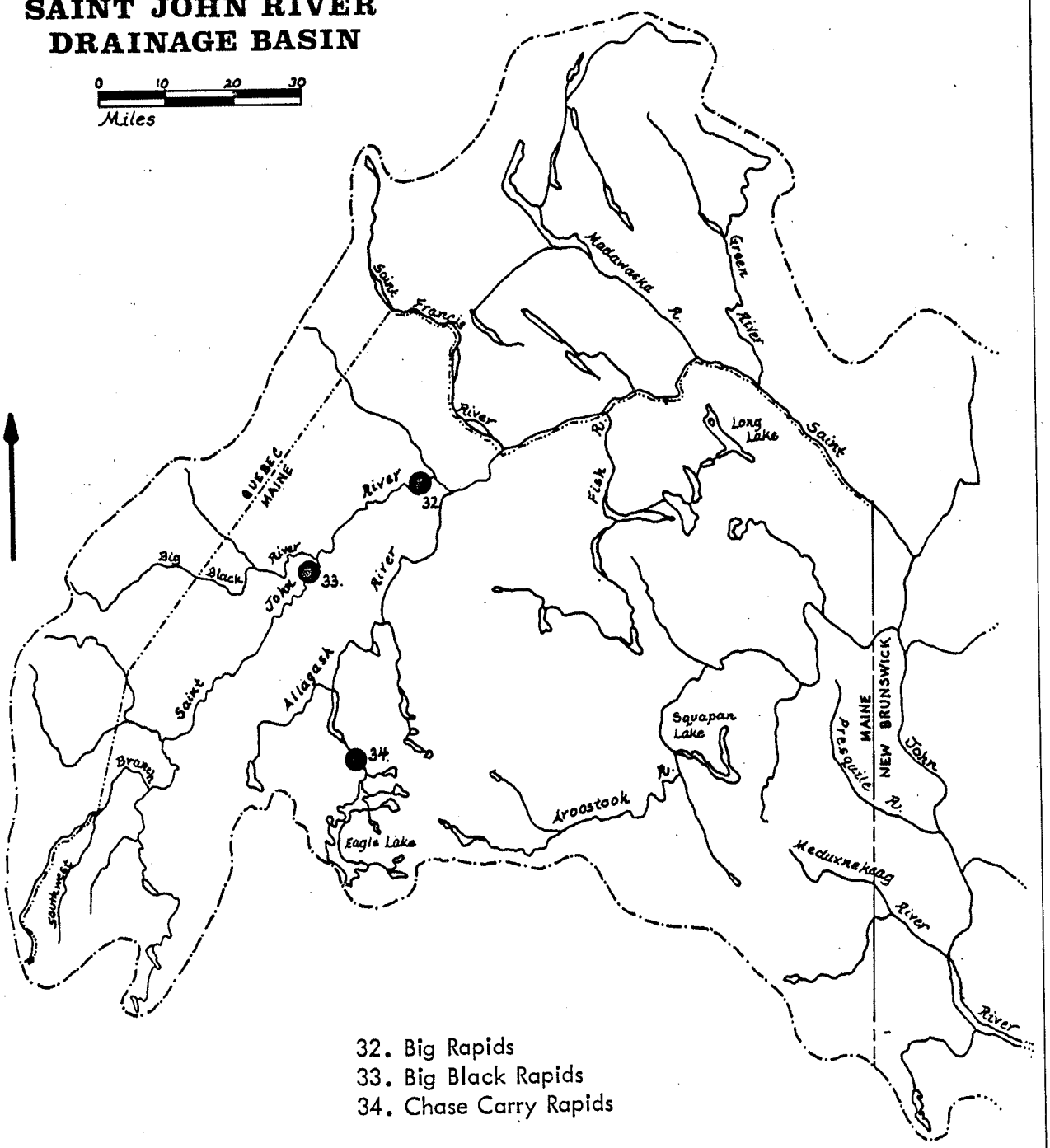
The bedrock of the area is composed primarily of pegmatitic granite that contains large crystals of plagioclose feldspar, quartz and biotite. Grand Falls Rapids lies on the outer edge of a contact zone between biotite-muscovite granite and low-grade metamorphic rocks (Doyle et. al., 1967).

This section of the Passadumkeag River valley is steep-sided and narrow. The surrounding area is very scenic. Large red/oak trees shade the river at the falls. The riverbanks are forested with mature white birch, northern white cedar, eastern white pine and red maple. The rapids flow out of a small marshy area that is forested with large elm trees. Royal and sensitive ferns are abundant at the water's edge.

The Passadumkeag River, like many tributaries of the Penobscot River, is important habitat for cold water fish. Brook trout and landlocked salmon are found in the river and use the rapid areas as nurseries.

Condition and Use:

Four camps and a small fireplace are located near the bridge. Except for these there is little sign of human visitation. There are no trails leading to the rest of the rapids and the area is relatively undisturbed.



32. Big Rapids
33. Big Black Rapids
34. Chase Carry Rapids

*This map shows only the portion of the Saint John River Basin that lies in Maine.

Figure 12.

The Physiography of the Saint John River Basin

The Saint John River forms an impressive watershed, draining approximately 21,360 square miles in Maine and the Canadian provinces of Quebec and New Brunswick. Next to the St. Lawrence, it is the largest drainage basin of any river on the Atlantic seaboard of North America. Thirty-six percent (7,360 square miles) of the total drainage lies in Maine. The basin has common divides with the watersheds of the St. Lawrence to the north and the Penobscot and St. Croix Rivers to the south.

The Saint John extends for approximately 450 miles, from Little Saint John Pond* to the city of Saint John, New Brunswick where it enters the Bay of Fundy. In Maine, the river follows a northeasterly course and for 95 miles forms the International Boundary between the United States and Canada. At Hamlin, the river turns to the southeast and enters New Brunwick where it continues for another 200 miles to Saint John. Between Little Saint John Pond and Hamlin, the river drops 1,159 feet. The steepest gradient occurs above Allagash and, as a result, the upper portion of the river is characterized by a continuous succession of rapids of varying turbulence. This free-flowing stretch has an unpredictable waterflow that may range from over 60,000 to less than 200 cubic feet per second depending on snow cover and rainfall.

The upper Saint John River has three major tributaries, the Aroostook, the Allagash, and the Fish River. The most renowned is the Allagash, which rises in Eagle and Churchill Lakes in northern Piscataquis County and flows north for nearly 63 miles to its confluence with the Saint John. Other tributaries include the Southwest and Northwest Branches and the Little Black, Big Black and St. Francis Rivers.

Most of the watershed, in Maine, Quebec and New Brunwick lies in glaciated upland. Southwest of the Big Black River, the headwater region is one of low relief, with flat plains, swamps and wetlands. Downstream, the relief increases to 800 to 1,000 feet and from the Big Black River to St. Francis, the basin takes on a "valley" appearance. Below St. Francis, the river flows through an alluvial flood plain bordered by small hills.

Although the rapids of the Saint John River basin lack the turbulence, unusual hydrologic features and spectacular views that are characteristic of many of the rapids in the Penobscot and other watersheds, their naturalness, remote locations and associated high water quality make them among the most significant of the state's whitewater stretches.

*The Internationl Joint Committee considers Little Saint John Pond and the Southwest Branch (rather than First to Fifth Saint John Ponds) to be the true headwaters of the Saint John .

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32. BIG RAPIDS WHITEWATER RAPIDS - SAINT JOHN RIVER

Town: Allagash
County: Aroostook

Quad: Allagash, ME 15'
Length: 2 miles (3.2 kilometers)
Size of Rapid Area: 230 acres (92 hectares)
Date Overflown: May 22, 1980
Date Groundchecked: May 22, 1979

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III whitewater rapid that is two miles in length.
- The rapid has a width of over 300 feet.
- The area is habitat for a number of vascular plant species that are rare in Maine.
- The area is in its natural state and is highly scenic.

General Description of the Area:

Big Rapids, located 2.5 miles (4 kilometers) southwest of St. Clair Island, in Allagash, is part of the Saint John River drainage basin in northern Maine. The rapid, which is the largest in the Saint John watershed, is continuous for 2 miles (3.2 kilometers) and is Class III in medium to high water. The Saint John is a free-flowing river that flows in a northerly direction until Allagash where it turns east. Because the water level fluctuates considerably in early spring in response to rain or drought, the rapid is most spectacular in early spring or after periods of heavy rain. By mid to late summer, the size of the rapid diminishes considerably due to low flow.

The river makes a sharp elbow turn where the rapids occur. The width of the river in this section is approximately 450 feet (136 meters). Big Rapids is the widest rapid in the state. The riverbed is strewn with large boulders and the rapid is developed over a lag deposit. When the water level is high, large standing waves form over the irregular riverbed. The bedrock of the area is composed primarily of weakly metamorphosed greywacke, with minor amounts of phyllite and slate. The large volume of water, winding and irregular riverbed, and exceptional width create a highly scenic and spectacular set of rapids.

Northern white cedar, poplar and ash line both the eastern and western river banks. An unusual plant habitat occurs along the regularly flooded riverbanks of the Saint John River. The seeping sand-gravel soils adjacent to Big Rapids provide an ideal habitat for a number of Maine's rare vascular plant species including furbish's lousewort (Pedicularis furbishiae), an endemic species found only in the Saint John River Valley, false asphodel (Tofieldia glutinosa), glaucous white lettuce (Prenanthes racemosa), grass of parnassus (Parnassia glauca), northern painted cup (Castelleja septentrionalis), sweet broom (Hedysarum alpinus), and dwarf Canadian primrose (Primula mistassinica).

The predominant fish species in the Saint John is brook trout. A natural population has been able to maintain itself in spite of substantial fishing pressure. Landlocked salmon also occur in the Saint John. Big Rapids is used as a nursery for both species. Spawning probably occurs in the sand and gravel stretches adjacent to the rapid.

Condition and Use:

Access to Big Rapids is primarily limited to canoes. A logging road passes near the western river bank at the head of the rapids. Except for this road and a cluster of small homes on the northern bank at the foot of the rapids, this stretch of the Saint John remains in its natural state. The magnitude of Big Rapids, particularly during periods of high water flow, adds to the scenic beauty of the surrounding area.

33. BIG BLACK WHITEWATER RAPIDS - SAINT JOHN RIVER

Town: T15 R13 WELS, T14 R13 WELS
County: Aroostook
Quad: Round Pond, Maine 15'
Length: 4,100 feet (1242 meters)
Size of Rapid Area: 78 acres (31 hectares)
Date Overflown: May 22, 1980
Date Groundchecked: May 20, 1979

Significant Features (Based on the Whitewater Rapids Criteria):

- The area contains a Class III rapid that is 4,100 feet in length.
- The rapid has a width of over 300 feet.
- The area is in its natural state and is very scenic.

General Description of the Area:

Big Black Whitewater Rapids, located on the Saint John River near the confluence of the Big Black River, is part of the Saint John River drainage basin in northern Maine. The rapids are continuous for approximately 4,100 feet (1242 meters) and are Class III in medium to high water. The Saint John is a free-flowing river that flows in a northerly direction until Allagash. Because the water level fluctuates considerably in response to rain or drought, the rapids are most spectacular in early spring or after periods of heavy rain. By mid to late summer, the size of the rapids diminishes considerably due to low flow.

The rapid begins where the river turns sharply and narrows. The width of the river in this section is 330 feet (100 meters). The riverbed is made up of boulders, cobbles and several flat ledges. When the water level is high, the irregular riverbed results in large standing waves. Small cliffs and ledges border the river along this stretch. The bedrock of the area is composed primarily of greywacke. Low grade metamorphic rocks such as phyllite and slate are also present.

Large northern white cedar trees line both the eastern and western riverbanks. Some balsam fir, poplar, and paper birch are also present. Red and white spruce dominate the vegetation further back. The trees on the northwestern bank appear to be very old. The water is colored brown from tannic acid and is odorless.

The predominate fish species in the Saint John is brook trout. A natural population has been able to maintain itself in spite of fishing pressure. Landlocked salmon also occur in the Saint John. Big Black rapids is used as a nursery for both species. Spawning probably occurs in the sand and gravel stretches adjacent to the rapid.

Big Black Rapids is an unusual rapid for a variety of reasons. 1) The river is wide and a large volume of water flows over an irregular riverbed, creating several complicated channels, 2) the water flow is extremely variable, and 3) the area is very remote.

Condition and Use:

The narrow, winding tree-lined rapid is exceptionally scenic and the surrounding area is undisturbed. Access to Big Black Rapids is limited to canoes. A portage and scouting trail follows the western shore of the river adjacent to the rapid. This is the only sign of human visitation.

34. CHASE CARRY WHITEWATER RAPIDS - ALLAGASH RIVER

Town: T10 R12 WELS
County: Piscataquis
Quad: Churchill Lake, ME 15'; Umsaskis Lake, ME 15'
Length: 9 miles (14.4 kilometers)
Size of Rapid Area: 627 acres (251 hectares)
Date Overflown: May 22, 1980
Date Groundchecked: June 6, 1979

Significant Features (Based on the Whitewater Rapids Criteria):

- The area contains a Class II-III rapid that is nine miles in length.
- The rapid contains a steep drop.
- The area is very scenic and is in its natural state.

General Description of the Area:

Chase Carry Whitewater Rapids is located on the Allagash River in northern Maine. The rapid begins just below Churchill Dam and extends in a northerly direction for nine miles (14.4 kilometers) to Umsaskis Lake. The turbulence varies from Class I to III. The most turbulent stretch occurs within the rapids first three miles (4.8 kilometers). Three to five foot standing waves are frequently present and a steep two foot drop occurs approximately one mile below Churchill Dam. The average width of the rapid is 75 feet (23 meters). The rapid widens to 100-150 feet

(30-45 meters) as it approaches Umsaskis Lake. The average gradient of the rapids is 9 feet/mile (2.7 meters/kilometer). The last two miles of Chase Carry meander around several low grassy islands.

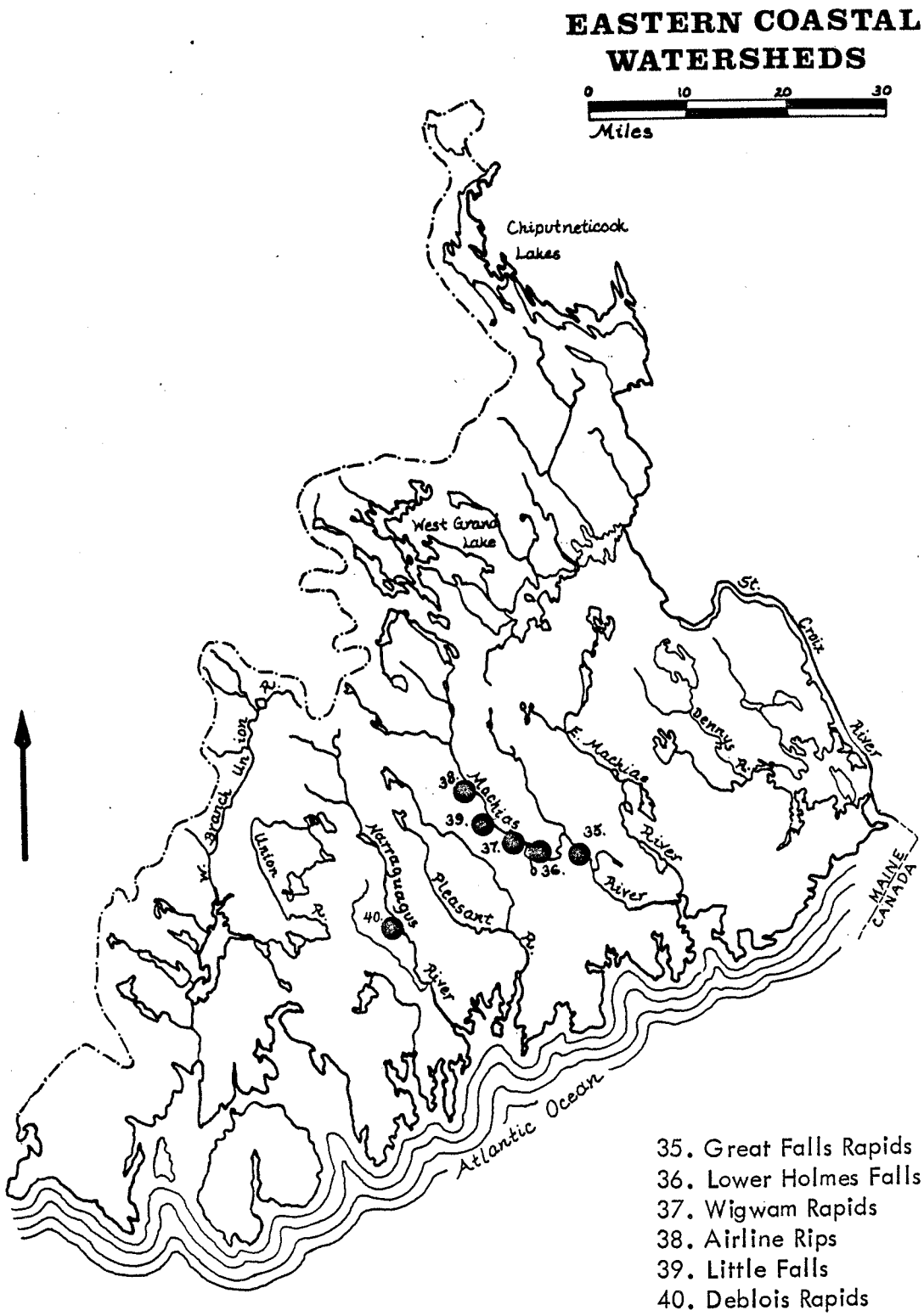
The riverbed is strewn with boulders. Very little bedrock is exposed in this stretch. Bedrock is composed primarily of cyclically bedded dark grey slate and metasandstone. (Doyle et. al., 1967). This rock type occurs in a wide band that extends across northern Maine and is typical of much of the bedrock underlying the Allagash and Saint John Rivers.

The predominant fish species in the Allagash River is brook trout. The alternating quickwater and rapid stretches and the boulder-strewn riverbed found at Chase Carry provide nursery and spawning grounds for this species. In spite of extremely heavy fishing pressure, especially in the months of May and June, the brook trout population has been able to maintain itself.

The riverbanks are low and thickly forested with spruce and balsam fir. Poplar, white birch, and other hardwood species are also present.

Condition and Use:

Chase Carry occurs within the Allagash Wilderness Waterway. A 400-800 foot (121-242 meter) corridor parallels each riverbank and is protected from commercial development, dam construction and uncontrolled logging. The remote character of the river has made it one of the most popular canoeing rivers in the northeast. Although this stretch of river receives a great deal of use by fishermen and canoeists, it is very scenic and shows few signs of human disturbance. A road bridge crosses the rapid approximately three miles north of Churchill Dam.



35. Great Falls Rapids
36. Lower Holmes Falls Rapids
37. Wigwam Rapids
38. Airline Rips
39. Little Falls
40. Deblois Rapids

Figure 13.

The Physiography of the Eastern Coastal Watersheds

The Eastern Coastal watersheds include the basins of all rivers east of the Penobscot which empty into tidal arms of the Atlantic Ocean. From east to west, the major rivers of this group include the St. Croix, Dennys, East Machias, Machias, Pleasant, Narraguagus and Union Rivers. All except the Saint Croix are small clear rivers and all follow a southeasterly course. These rivers are briefly described below.

The St. Croix is by far the largest of the eastern coastal rivers and is often considered separately. It originates at the outlet of Grand Lake in the Chiputneticook Lake system and flows for 77 miles to Passamaquoddy Bay. The river flows through two large lake systems, which join near Kellyland, and forms the International Boundary for most of its length. The St. Croix drains a total area of 1,635 square miles - 1,010 square miles in Maine and 625 square miles in New Brunswick - and has a total fall of 424 feet.

The Dennys River has its source in Meddybemps Lake. From its source to its mouth at Hinckley Point, Cobscook Bay, it falls 170 feet and drains an area of 131 square miles.

The East Machias River begins at Crawford Lake near Princeton. It flows in a southeasterly direction through a series of lakes to its confluence with the Machias River at Newcomb Point in East Machias. The river drains an area of 314 square miles falling 132 feet over a distance of 35 miles.

The Machias River rises in Fifth Machias Lake and follows an irregular course through a series of ponds, waterfalls and rapids, to its mouth at Machias Bay. The river is 75 miles long, has a total fall of 374 feet and, excluding the East Machias basin, drains an area of 495 square miles.

The Pleasant River begins at Pleasant River Lake and flows in a southeasterly direction for 37 miles to its mouth at Pleasant Bay. The river falls 317 feet in this distance and drains an area of 127 square miles.

The Narraguagus River flows out of Eagle Lake in T34 MD and flows southeastward for 50 miles. The river drops 406 feet between Eagle Lake and its outlet at Narraguagus Bay and drains an area of 247 square miles.

The Union River is formed by the confluence of its East and West Branches which extend for 26 and 21 miles respectively. From the confluence of the two branches, the Union River flows for 24 miles to Union River Bay. The entire drainage encompasses 893 square miles. The gradients of the East and West Branches are steep, averaging nearly 10 feet per mile.

The eastern coastal area is characterized by small hills rising a few hundred feet above gently rolling plains, large swamp areas and peatlands. The topography has been greatly altered by glaciation and the rivers flow past numerous deltas and extensive outwash plains. The highest point in the area is Lead Mountain which rises 1,475 feet above sea level.

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35. GREAT FALLS WHITEWATER RAPIDS - MACHIAS RIVER

Town: Centerville
County: Washington
Quad: Wesley, ME 15'
Length: 0.5 mile (0.8 kilometer)
Size of Rapid Area: 39 acres (16 hectares)
Date Overflown: May 2, 1980
Date Groundchecked: September 26, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III rapid that is 0.5 mile in length.
- The area contains a rapid that is 200 feet in width for a distance of 0.25 mile.
- The rapid is a spawning ground and nursery for Atlantic salmon.
- The area remains in its natural state and is very scenic.

General Description of the Area:

Great Falls Whitewater Rapids in Centerville, is located on the Machias River, an eastern coastal watershed. The rapid extends for a distance of 0.5 mile (0.8 kilometer) and has a turbulence of Class III during normal flow. The width of the river in this stretch varies from 100 to 200 feet (30 - 60 meters) and the gradient is 25 feet/mile (5 meters/kilometer). Waterflow has been estimated at 100 cubic feet per second. This estimate was made during an exceptionally dry period.

Great Falls is developed primarily over a lag deposit of medium-sized boulders. Shallow gravelly stretches precede and follow the rapid. The rapid's geomorphology has also been influenced by resistant rock layers. The rapid is most turbulent where the river narrows and flows over a series of ledge drops. The bedrock of the area is composed of granite. Excellent exposures are present on the eastern shore adjacent to the rapid.

The Machias River provides important habitat for natural populations of Atlantic salmon and brook trout. The alternating gravelly and boulder-strewn stretches of the river provide excellent spawning grounds and nurseries for both fish species.

The riverbanks are forested with a young stand of spruce and balsam fir. Hardwood species, such as white birch, grey birch and red maple are also abundant. The river above and below Great Falls becomes wider and marshy and is exceptionally beautiful.

Condition and Use:

Although at one time St. Regis Paper Company blasted rocks in the stream channel, this area is remote enough so that it has maintained its natural beauty. A camp, which is located on the northern riverbank near

the foot of the rapid, and a small portage trail are the only signs of development. Great Falls is used frequently by canoeists and fishermen.

36. LOWER HOLMES FALLS WHITEWATER RAPIDS - MACHIAS RIVER

Town: Northfield
County: Washington
Quad: Wesley, ME 15'
Length: 0.25 mile (0.4 kilometer)
Size of Rapid Area: 16 acres (6 hectares)
Date Overflown: May 2, 1980
Date Groundchecked: September 25, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class IV rapid that is 0.25 mile in length.
- The rapid is made up of a series of steep pitches.
- The area contains an excellent display of geologic features, including irregular jointing, irregular granite veins and basalt dikes, and curved fracture surfaces.
- The rapid is a nursery area and spawning ground for Atlantic salmon.
- The rapid is associated with Upper Holmes Falls, a significant waterfall.
- The area is in its natural state and is exceptionally scenic.

General Description of the Area:

Lower Holmes Falls Whitewater Rapids, located in Northfield township, is part of the Machias River basin in eastern Maine. Beginning at Deadman's Island, on the northern end of which is a memorial to Obadiah Hill, a pioneer who died in 1786 (AMC, 1976), Lower Holmes Falls extends for a distance of 0.25 mile (0.4 kilometer). The rapid, which occurs where the river flows around two ledgy islands, has a turbulence of Class IV. A short Class V stretch occurs on the eastern side of the southernmost island. This is the steepest portion of the rapid, with a 7-8 foot (2-2.5 meter) decrease in elevation over a distance of approximately 90 feet (27 meters). The total drop within the critical area is about 13 feet (4 meters) yielding a gradient of 52 feet/mile (10 meters/kilometer). The rapid is developed over a series of bedrock ledges. The narrow channels, which range in width from 20 to 50 feet (6 to 15 meters), and a bouldery riverbed in the lower portion of the rapid, create three to four foot standing waves.

The bedrock of the area is composed of gabbro and basalt as is Upper Holmes Falls. This site exhibits an outstanding display of mafic bedrock with a diabasic texture. The rock is irregularly jointed. One prominent set is oriented more or less transverse to the river, striking N80°W and dipping steeply. The joints are spaced from 3.9 inches to 3.3 feet (10 centimeters to one meter) apart. The bedrock is brecciated and has

been intruded with irregular granite veins and several basalt dikes. Some curved fracture surfaces are also present (Westerman, per. comm. 1981).

The Machias River provides important habitat for natural populations of Atlantic salmon and brook trout. Whitewater rapids, and the gravelly stretches that generally occur above and below them, are important nurseries and spawning grounds for these species.

The riverbanks are forested with a mature stand of eastern white pine, hemlock and spruce. Red maple and speckled alder are abundant immediately adjacent to the river. The natural beauty of the rapid area is enhanced by a marshy deadwater, the steep ledge islands and riverbanks, and its proximity to Upper Holmes Falls, which is located just upstream.

Condition and Use:

Although Lower Holmes Falls is frequently visited by canoeists and fishermen, the area is relatively undisturbed and exceptionally scenic. A foot trail, leading from Upper Holmes Falls to Lower Holmes Falls is the only sign of human visitation.

37. WIGWAM RAPIDS - MACHIAS RIVER

Town: T25 MD
County: Washington
Quad: Wesley, ME 15'
Length: 2 miles (3.2 kilometers)
Size of Rapid Area: 121 acres (48 hectares)
Date Overflown: May 2, 1980
Date Groundchecked: September 25, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class II-III rapid that is 2 miles in length.
- The area is a good example of a rapid formed over a lag deposit.
- The area is one of the only rapids in Maine that cuts through a large glacial deposit of sand and gravel.
- The rapid is a nursery and spawning ground for Atlantic salmon.
- The rapid is in its natural state and is exceptionally scenic.

General Description of the Area:

Wigwam Rapids are located on the Machias River, an eastern coastal watershed. The rapids begin 0.25 mile (0.4 kilometer) below Mopang Stream and extend for a distance of 2 miles (3.2 kilometers). During normal flow, the rapids have a turbulence of Class II-III. Although they

are normally continuous, when waterflow is high, many of the smaller riffles are inundated and the rapids consist of four distinct pitches. The first pitch is 0.25 mile (0.4 kilometer) in length and is followed by quickwater. The upper section contains large boulders that reach up to 12 feet (3.6 meters) in diameter. The second pitch, along with many smaller rapids which are flooded out during high water, occurs within the next mile. After a sharp bend, the third pitch (a short but steep Class III ledge drop) and the fourth rapid occur. The width of the river varies from 50 feet to 50 yards (15 to 45 meters) over the length of the rapids.

At the upper portion of the Wigwams, the Machias River cuts through a large blueberry barren forming an excellent example of a rapid developed over a lag deposit. Sand and gravel have been winnowed out leaving behind boulders that are too large for stream transport. Bedrock does influence the geomorphology in the lower portion of the rapid. The bedrock exposures that are not covered by a blanket of till are composed of medium to fine-grained gabbrodiorite which is intruded locally by granite.

The riverbanks are spongy and moss-covered due to dozens of small springs that seep into the river from the base of the barrens. The surrounding area is forested primarily with a young stand of balsam fir, eastern white pine, spruce, white birch and poplar. The blueberry barrens, which are not commercially harvested, are vegetated with low shrubs and stunted birch and poplar.

The Machias River provides important habitat for natural populations of Atlantic salmon and brook trout. The alternating sandy and boulder-strewn riverbed and the large number of springs that flow into the river at the Wigwams provide excellent spawning grounds and nurseries for both fish species.

Condition and Use:

Small camps are located on the southern riverbank near the head of the rapids and at the base of the first pitch. Two dirt roads lead to the site. Although the Wigwams are frequently used by canoeists and fishermen, there is little sign of human visitation and the area remains in its natural state. The height of the barrens, which rise 120 feet (36 meters) above the river, adds to the beauty and the uniqueness of this rapid area.

38. AIRLINE RIPS WHITEWATER RAPIDS - MACHIAS RIVER

Town: T31 MD
County: Washington
Quad: Tug Mountain, ME 15'
Length: 0.6 mile (0.96 kilometer)
Size of Rapid Area: 41 acres (16.5 hectares)
Date Overflown: May 2, 1980
Date Groundchecked: September 25, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III rapid that is 0.6 mile in length.
- The outcropping ledge shows hydrologic sculpturing.
- The area is a nursery and spawning ground for Atlantic salmon.
- The area is relatively undisturbed and very scenic.

General Description of the Area:

Airline Rips Whitewater Rapids is located on the Machias River, an eastern coastal watershed. The rapid is continuous for 0.6 mile (0.96 kilometer) and has a turbulence of Class III during normal flow. Several small 6-12 inch drops and standing waves created by an irregular riverbed add to the rapid's turbulence. The width of the river in this section varies from 35 to 100 feet (10 to 30 meters) and the gradient is 32 feet/mile (6 meters/kilometer). The flow of water, determined when the river was exceptionally low, was measured at 30 cubic feet per second. During an average water year, waterflow on the Machias, although variable, is much greater. In 1974, dams on Fourth and Third Machias Lakes were removed and the Machias River once again became a free-flowing river. The water is clear and odorless and the sandy river bottom between drops adds to the attractiveness of the rapid.

Airline Rips is developed over a lag deposit of small boulders. Some of the larger boulders were removed from the stream to facilitate log driving. Resistant rock layers are also present, but play a minor role in the rapid's geomorphology. The ledge outcrops exhibit hydrologic sculpturing. Bedrock of the area is composed primarily of Devonian-aged granitic rocks that have been intruded by pegmatitic veins.

The Machias River provides important habitat for natural populations of Atlantic salmon and brook trout. The alternating sandy and boulder-strewn river bottom found in this stretch provides excellent nursery and spawning grounds for both fish species.

The riverbanks are forested with eastern white pine, spruce, balsam fir, red oak, red maple and northern white cedar. A lush carpet of royal and sensitive ferns grows immediately adjacent to the river.

Airline Rips takes its name from the highway it passes under. Route 9, locally known as "The Airline" was once used by airplane pilots as a visual reference point.

Condition and Use:

Route 9, which passes over the head of the rapids, provides easy access to the rapids. As a result, Airline Rips receives a lot of use from canoeists and fishermen. The forest service maintains several lean-tos and campsites on the eastern riverbank.

39. LITTLE FALLS WHITEWATER RAPIDS - MACHIAS RIVER

Town: T25 MD
County: Washington
Quad: Tug Mountain, ME 15'
Length: 0.13 mile (0.2 kilometer)
Size of Rapid Area: 8 acres (3 hectares)
Date Overflown: May 2, 1980
Date Groundchecked: September 25, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The rapid contains exceptionally steep pitches.
- The rapid is a spawning ground and nursery for Atlantic salmon.
- The surrounding area provides good habitat for a mature stand of eastern white pine.
- The area is undisturbed and exceptionally scenic.

General Description of the Area:

Little Falls Whitewater Rapids is located on the Machias River, an eastern coastal watershed. The rapid is continuous for a distance of 0.13 mile (0.2 kilometer) and varies in width from 40 to 100 feet (12 to 33 meters). Little Falls begins with a short Class III stretch that increases to Class V over a series of steep ledge drops and diminishes to Class II again before turning to quickwater. The riverbed is ledgy and partially obstructed with boulders. The shoreline is sandy above and below the rapids and a small sand beach occurs on the eastern riverbank.

The bedrock of the area is composed of metamorphosed sedimentary and volcanic rocks. The dip of the bedrock is nearly vertical and has influenced the geomorphology of the rapid by creating a stair effect, which causes the river to drop in a series of steps.

The Machias River provides important habitat for natural populations of Atlantic salmon and brook trout. The alternating sandy and boulder strewn stretches characteristic of rapids such as Little Falls are important spawning grounds and nurseries for both species.

The riverbanks are forested with a mature stand of eastern white pine, white birch, red oak and spruce. The stand appears to be naturally thinned and understory species are almost nonexistent. Red oak is uncommon along the Machias. Its growth is apparently associated with the sandy open areas characteristic of the barren lands. The average diameter at breast height of the pines is 14-18 inches. Several grow below the high spring water levels of the river. As a result, three to five feet of sandy soil has been washed away exposing their root systems.

Condition and Use:

Little Falls is one of the Machias River's most scenic rapid stretches. The mature forest and sandy riverbed add to its natural beauty. The rapid area is inaccessible by road, though it is frequently visited by canoeists. A small campsite and a sandy portage trail, that leads around the rapid, are the only signs of human visitation.

40. DEBLOIS WHITEWATER RAPIDS - NARRAGUAGUS RIVER

Town: Deblois
County: Washington
Quad: Tunk Lake, ME 15'
Length: 1,000 feet (285 meters)
Size of Rapid Area: 12 acres (5 hectares)
Date Overflown: May 2, 1980
Date Groundchecked: July 1, 1980

Significant Features (Based on the Whitewater Rapid Criteria):

- The area contains a Class III-V rapid that is 1,000 feet long.
- The rapid contains exceptionally steep pitches.
- The rapid is a nursery and spawning ground for Atlantic salmon.
- The surrounding area is in its natural state and is highly scenic.

General Description of the Area:

Deblois Whitewater Rapids is located on the Narraguagus River, an eastern coastal watershed. The rapid extends for a distance of 1,000 feet (285 meters) and has a turbulence of Class III-V. The large volume of water (the yearly average flow on the Narraguagus is 500 cubic feet per second) flowing through a steep narrow channel creates a spectacular set of rapids. The first 750 feet (227 meters) consist of Class V water and is followed by approximately 250 feet (76 meters) of Class III rapids. The rapids gradually diminish to quickwater. The width of the river varies from 25 to 50 feet (8 to 15 meters) over the length of the rapids and in places the gradient exceeds 200 feet/mile (38 meters/kilometer).

The rapids are developed over large boulders and ledge. The riverbed is extremely obstructed with glacial erratics that measure up to 12 feet (4 meters) in diameter. Because of several steep pitches and an irregular riverbed, the rapids occur as a series of drops. The bedrock of the area is composed of very coarse-grained granite. The cleanly-scoured light-colored bedrock enhances the natural beauty of the rapid area.

The Narraguagus River provides important habitat for Atlantic salmon and brook trout. Rapid stretches and the quickwater gravelly stretches that generally occur immediately above and below, are ideal nurseries and spawning grounds for both species. Salmon are known to spawn at the base of the rapids in Deblois.

The riverbanks are thickly-forested with a mature stand of hemlock, balsam fir, spruce, northern white cedar, white birch and red maple.

Condition and Use:

The surrounding area is very scenic and except for a bridge that spans the river near the head of the rapids and a small foot path that parallels the northeastern riverbank, is completely undeveloped. The rapid area is used frequently by fishermen.

A Ranking Scheme for Whitewater Rapids

In order to evaluate the results of the whitewater rapids inventory, all ground-checked areas have been given a score and ranked. Using the whitewater rapid criteria (pages 21-24), numerical values have been assigned to significant natural features as shown below. Because the amount of information collected for each area is dependent upon the extent and thoroughness of field checking, only ground-checked areas have been ranked. This insures that an equivalent data base was used to determine the total score for each area.

The 51 whitewater rapids listed on the score sheets were recommended for ground-checking as an outcome of the aerial survey.* They represent 26% of the 189 areas inventoried and only a small fraction of the whitewater rapids in Maine. Ten of these areas have been rejected for evaluation as potential critical areas. The reasons for rejection are given in the summary table of all whitewater rapids inventoried (see Table V). These sites are noted by asterisks (*) on the score sheets.

The numerical values shown below are based on 1) the rarity of the feature, and 2) how important a feature is in the definition of a whitewater rapid. The maximum score that an area can receive is 72 points (34 points for hydrologic, 22 points for geologic and 16 points for biologic features.) Because scenic beauty is largely a function of a diversity of natural characteristics and the natural condition of an area, numerical values have not been assigned to this category. Scenic value is indirectly represented in the numerical values assigned to other natural features.

I. Hydrologic (34 possible points)

A. Turbulence (Character)

1. Class II (1 point)
2. Class III (3 points)
3. Class IV (5 points)
4. Class V (8 points)

B. Length

1. 1/4 mile (1 point)
2. 1/2 mile (2 points)
3. 1 mile (3 points)
4. 3 miles (5 points)
5. 5 miles (6 points)
6. 7 miles (7 points)
7. 9 miles (8 points)
8. 11 miles (9 points)
9. 13 miles (10 points)
10. 15 miles (11 points)

C. Unusual Hydrologic Features

1. Exceptionally steep pitches (2 points)
2. Large eddies (2 points)
3. Large holes (keepers) (2 points)

*Areas such as Old Roll Dams and Spencer Gut were included in the waterfall or gorge inventories and have not been ranked.

D. Width

1. The width of the rapid is greater than 300 feet for a distance of at least 1/4 mile. (6 points)

2. The width of the rapid is greater than 200 feet for a distance of at least 1/4 mile. (3 points)

E. Variety of Hydrologic Values

The area has an exceptional variety of hydrologic features, e.g. a waterfall or gorge in association with a rapid (3 points).

II. Geologic (22 possible points)

A. The area contains unusual geologic features such as:

1.	hydrologic sculpturing	(4 points)
2.	rare fossils	(2 points)
3.	a fossil-type locality	(2 points)
4.	an unusual type of bedrock	(2 points)
5.	an exposed fault	(2 points)
6.	a contact zone	(2 points)
7.	other important features	(2 points)

B. The rapid is an especially good example of how rapids are formed in Maine by:

1.	lag deposits	(4 points)
2.	resistant rock layers	(4 points)
3.	other geological processes, ie. downcutting of a stream in a large sand and gravel deposit.	(4 points)

III. Biologic (16 possible points)

A. The area is the habitat of a rare plant or aquatic animal species. (6 points)

B. The area supports an unusual plant or animal species or community, i.e. old growth white pine. (2 points)

C. The area is an essential habitat for maintaining the populations of cold-water fish species in a watershed i.e. rapids often provide nursery and spawning grounds. (4 points)

D. The area is the habitat for a particularly important fishery, i.e. the West Branch of the Penobscot River is considered to be the best river fishery for landlocked salmon in the state. (4 points)

TABLE III

SCORE SHEET FOR THE RANKING OF GROUNDCHECKED WHITEWATER RAPIDS

WHITEWATER RAPIDS/RIVER	Hydrologic				Geologic		Biologic					TOTAL SCORE
	Turbulence	Length	Width	Unusual Hydrologic Feat.	Diversity of Hydrologic Features	Unusual Geologic Features	Type Example of Origin	Rare Aquatic Animal Species	Unusual Species or Community Plant or	Important for Maintaining Fish Population in Watershed	Significant Fishery Habitat	
Saco River Watershed												
Hardscrabble Falls/Little Ossipee	8	2		2							4	16
Chases Mills/Little Ossipee	8	1		2							4	15
Limington Rips/Saco	3	1		2		2	4				4	16
Mid-Coastal Watersheds												
Sheepscot River Rapids/Sheepscot	1	3						6				10
Androscoggin River Watershed												
Aziscohos Falls/Magalloway	8	3		4			4					19
Rapid River Rapids/Rapid	8	6		4	2		4	6	2			28
* Rangeley River Rapids/Rangeley	3	3										6
Webb River Rapids/Webb	5	5										10
Swift River Rapids/Swift	5	9		2	2	2						20
* Sunday River School Rapids/Sunday	5	3										8
Kennebec River Watershed												
Kennebec River Rapids/East Outlet Moosehead Lake	5	5	3	2	2							17
Lower Dead River Rapids/Dead	5	11		2								18
* Rapids near Lutton Brook/South Branch Dead Stream	3	3		3								8
Rapids below Long Pond Dam/Moose River	5	3		2		2						12
Upper Carrabassett River Rapids/Carrabassett	8	3		2		2						15
Carrabassett River Rapids in Kingfield/Carrabassett	3	9				2						14
* Rapids above New Portland/Carrabassett	1	3		2		2						8
Upper Sandy River Rapids/Sandy	3	7		2								12
	8	9		4	3		4					30

SCORE SHEET FOR THE RANKING OF GROUNDCHECKED WHITEWATER RAPIDS

WHITEWATER RAPID/RIVER	Hydrologic: Turbulence	Hydrologic: Length	Hydrologic: Width	Hydrologic: Unusual Hydrologic Feat.	Geologic: Diversity of Hydrologic Features	Geologic: Unusual Geologic Features	Biologic: Type Example of Origin	Biologic: Rare Aquatic Animal Species	Biologic: Unusual Species or Community Plant or	Biologic: Important for Maintaining Fish Population in Watershed	Biologic: Significant Fishery Habitat	TOTAL SCORE
Kennebec River Watershed												
Sandy River Rapids from South Branch to Phillips/Sandy	3	7		2								12
Penobscot River Watershed												
* Huntington Mill Rapids/West Branch Dead Stream	1	5		2								8
* Schoodic Point Rapids/Piscataquis	3	3		2								8
Kingsbury Stream Rapids/Kingsbury Stream	3	5		2								10
* Rapids near Katahdin Iron Works/W. Branch Pleasant	3	5										8
* West Branch Seboeis Stream Rapids	5	1										6
The Heater/Mattawamkeag	8	3		2			4		6			23
Gordon Falls/Mattawamkeag	8	2		2			4		6			22
Debsconeag Falls/West Branch Penobscot	8	1	3					4			4	20
Pockwockamus Falls/West Branch Penobscot	5	2						4			4	15
Abol Falls/West Branch Penobscot	5	1	3	2							4	15
Big Ambejackmockamus Falls/West Branch Penobscot	8	1		2			2				4	17
The Cribwork/West Branch Penobscot	8	3		4			4				4	23
Stair Falls/East Branch Penobscot	3			2			2	4				11
Haskell Rock Pitch/East Branch Penobscot	5			4			8					17
The Hulling Machine/East Branch Penobscot	8			2	2							12
Grindstone Falls/East Branch Penobscot	5	3	3	2								13
Seboomook Rapids/South Branch Penobscot	8	5		4							4	21
Wassataquoik Stream Rapids/Wassataquoik	8	11		2	2					2		25
Indian Carry to Grand Pitch/Webster Brook	8	3		2	2		4					19

SCORE SHEET FOR THE RANKING OF GROUNDCHECKED WHITEWATER RAPIDS

WHITEWATER RAPID/RIVER	Hydrologic					Geologic		Biologic						TOTAL SCORE
	Turbulence	Length	Width	Unusual Hydrologic Feat.	Diversity of Hydrologic Features	Unusual Geologic Features	Type Example of Origin	Rare Aquatic Animal Species	Species or Community Plant or	Unusual Fish Population	Important for Maintaining Fishery in Watershed	Significant Habitat		
Penobscot River Watershed														
* Telos Cut/Webster Brook		3	3											6
Grand Falls Rapids/Passadumkeag		8	2		2	2								14
Saint John River Watershed														
Big Rapids/Saint John River		3	3	6	2						2			16
Big Black Rapids/Saint John River		3	2	6	2						2			15
Chase Carry/Allagash		3	8											11
Eastern Coastal Watersheds														
Great Falls Rapids/Machias		3	2	3					6					14
Lower Holmes Falls/Machias		5	1		2	2	4		6					20
Wigwam Rapids/Machias		3	3					4	6					16
Airline Rips/Machias		3	2				4		6					15
Little Falls/Machias		5			2				6	2				15
* Rock Dam Rips/Narraguagus		1	2						6					9
Deblois Rapids/Narraguagus		8			2				6					16

TABLE IV

SIGNIFICANT AREAS RANKED ACCORDING TO THEIR TOTAL SCORES

Whitewater Rapid - River	Total Score (points)
Kennebec River Gorge - Kennebec	30
Rapid River Rapids - Rapid	28
Wassataquoik Stream Rapids - Wassataquoik	25
The Cribwork - West Branch of the Penobscot	23
The Heater - Mattawamkeag	23
Gordon Falls - Mattawamkeag	22
Seboomook Rapids - South Branch of the Penobscot	21
Debsconeag Falls - West Branch of the Penobscot	20
Lower Holmes Falls - Machias	20
Swift River Rapids - Swift	20
Indian Carry to Grand Pitch Rapids - Webster Brook	19
Aziscohos Falls - Magalloway	19
Lower Dead River Rapids - Dead	18
Big Ambejackmockamus Falls - West Branch of the Penobscot	17
Haskell Rock Pitch - East Branch of the Penobscot	17
Kennebec River Rapids - Kennebec, East Outlet	17
Big Rapids - Saint John	16
Hardscrabble Falls - Little Ossipee	16
Deblois Rapids - Narraguagus	16
Wigwam Rapids - Machias	16
Limington Rips - Saco	16
Big Black Rapids - Saint John	15
Pockwockamus Falls - West Branch of the Penobscot	15
Abol Falls - West Branch of the Penobscot	15
Little Falls - Machias	15
Airline Rips - Machias	15
Upper Carrabassett River Rapids - Carrabassett	15
Chases Mills Rapids - Little Ossipee	15
Grand Falls Rapids - Passadumkeag	14
Carrabassett River Rapids (near Kingfield) Carrabassett	14
Great Falls Rapids - Machias	14
Grindstone Falls - East Branch of the Penobscot	13
Moose River Rapids (above Brassua Lake) - Moose	12

Whitewater Rapid - River	Total Score
The Hulling Machine - East Branch of the Penobscot	12
Upper Sandy River Rapids - Sandy	12
Sandy River Rapids - Sandy	12
Stair Falls - East Branch of the Penobscot	11
Chase Carry - Allagash	11
*Sheepscot River Rapids - Sheepscot	10
*Kingsbury Stream Rapids - Kingsbury	10
*Webb River Rapids - Webb	10

* Areas with marginal significance

A Discussion of the Inventory Results

No other New England state is criss-crossed by as many undeveloped rivers and streams as Maine, and few rivers in the east contain rapids of such magnitude. Maine's whitewater rapids are as varied as the terrain they flow through. Of the areas described in this section, a "typical" rapid does not exist. The turbulence and overall appearance of each area are influenced by factors such as length, width, gradient and waterflow. Examples of how these factors vary follow:

- The two longest rapids in the state, Wassataquoik Stream and the Lower Dead River, are continuous for 15 miles, while the shortest rapid that meets the whitewater criteria, the Hulling Machine is only 200 yards long.

- Big Rapids, on the Saint John River, measures 450 feet from riverbank to riverbank and is Maine's widest rapid. Other rapids, such as those on the Webb River, are as narrow as 30-50 feet.

- The gradient may be as steep as 200 feet/mile, as at Aziscohos Falls, or as gradual as 9 feet/mile (Chase Carry).

- Waterflow may range from several hundred to many thousand cubic feet per second, depending on the time of year, the size of the river channel and whether or not dams are located upstream.

The following observations provide additional comparative information on the 41 areas listed in Table II:

- Seventy-eight percent of the 41 areas have a turbulence of at least Class IV and 40% have a turbulence of Class V.

- The average gradient for all significant areas is 56 feet/mile.

- Eighteen areas (45%) are less than one mile in length; 28 areas (70%) are less than three miles in length; and only 7 areas (12%) have a length of seven miles or more.

- Only two rapids in the state, Big Black and Big Rapids on the Saint John River, are greater than 300 feet in width and only seven of the 40 areas listed are more than 200 feet wide.

- Dams are located upstream of twenty-one of the rapids listed. Some of these dams are used for storage, such as Middle Dam at the head of the Rapid River, and others, such as Ripogenus Dam on the West Branch of the Penobscot, are used for power generation. In either case, the result is an extreme fluctuation in water level which may be low in the spring, when other rivers are high, or high in the fall, when other rivers are low. During the past two centuries, many of the state's rivers were dammed for log driving purposes. Most of these are now breached. Long Pond Dam on the Moose River and Knight Dam on the Machias River, for example, are completely breached and the river stretches that they impounded are once again free-flowing.

Table V

SUMMARY TABLE OF ALL WHITEWATER RAPIDS INVENTORIED

Table V includes information on all areas initially chosen for the whitewater rapids inventory. The data in the summary table is organized under 10 drainage basins and consists of 189 whitewater rapid sites occuring on 77 Maine rivers. An explanation of each category of information on the charts is given below.

RIVER AND RAPID NAME OR LOCATION The name of the river on which the rapid occurs, followed by the name of the rapid, or, if it has no name, a short description of the site location.

TOWN/COUNTY/USGS QUADRANGLE The name of the town or towns, county, and the name of the USGS quadrangle map(s) where the rapids occur. Unless otherwise indicated, the quadrangle listed is a 15-minute scale map.

LENGTH/TURBULENCE The estimated length of the rapids followed by its turbulence. Turbulence is quantified using the international river classification scheme (see Criteria).

WIDTH/GRADIENT (if known) The average width (in feet or miles) of the river or stream where the rapid occurs followed by the gradient measured in feet per mile. The gradients specified for long stretches are averaged over the length. Individual rapids may have considerably higher gradients.

RIVERBED DESCRIPTION The general nature of the riverbed over and around which the rapid flows e.g. ledge, boulders, cobbles, etc. Where two or more types of bottom are present, the predominant type is listed first.

UNUSUAL NATURAL FEATURES Includes unusual hydrologic, geologic, and biologic features (see Criteria).

DATA SOURCE The inventory method used.

- L: A literature search was conducted using published river guides as a primary source of information.
- P: Information was provided by people familiar with the rapid area.
- T: USGS quadrangle maps and/or aerial photograph inspection.
- A: Low-level overflight and photographs.
- V: Ground check and photographs.

STATUS

Recommended: recommended for evaluation as a critical area. (For further information, see descriptions of recommended areas.)
Rejected: not suitable for evaluation as a significant whitewater rapid; inventory method used and primary reason for rejection are given.
Undecided: primary reason for undecided status is given.

TABLE V
SUMMARY TABLE OF ALL
WHITEWATER RAPIDS INVENTORIED

Piscataqua River Drainage Basin

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Little River, Rapids below Hessenger Bridge	Berwick/York/Berwick	0.75 mile/ Class II	

Saco River Drainage Basin

Saco River, Walker Rips	Fryeburg/York/ Brownfield, 7.5 minute series	30 feet/ Class II	50 feet
Saco River, Old Bald Rapid	Limington/York/ Sebago Lake	900 feet/ Class II	250 feet
Saco River, Parkers Rips	Limington/York/ Buxton	0.4 mile/ Class II	100-250
Saco River, Limington Rapids (Rips)	Limington , Standish/ York/Buxton	1300 feet/ Class II-III	130 feet/ 55 feet/mile
Saco River, Rapids below Steep Falls	Standish/Cumberland/ Sebago Lake	750 feet/ Class V+	100-200 feet
Saco River, Great Falls	Baldwin/Cumberland/ Sebago Lake	600 feet/ Class V+	572 feet/ mile

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge, cobbles, boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge and small boulders	Exhibits well-defined meandering pattern; site of AMC campsite	L,T	Rejected after literature search; does not meet whitewater rapid criteria for length & turbulence
Small boulders	Large standing waves when water level is high	L,T	Rejected after literature search; does not meet whitewater rapid criteria for length & turbulence
Boulders		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length & turbulence
Boulders with ledge outcrops	3' falls at south end; lag deposit; pegmatite dikes with large feldspar crystals; nursery for brown & brook trout	L,T,P, A,V	Recommended; see description on page 34.
Ledge		L,T,I	Rejected after literature search; The rapid water stretch is inseparable from Steep Falls, a waterfall
Ledge	DOT picnic area -- highly scenic	L,T,P	Rejected after literature search; Great Falls is better characterized as a waterfall

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Little Ossipee River, Rapids above and under the bridge in Newfield	Newfield/York/ Newfield	0.25 mile/ Class II	
Little Ossipee River, Hardscrabble Falls	Limington/York/ Buxton	0.7 mile/ Class IV-V	50-150 feet/ 80 feet/mile
Little Ossipee River, Chases Mills Rapids	Limington/York/ Buxton	750 feet/ Class IV-V	50 feet/ 84 feet/mile
Ossipee River, Rapids before bridge to Porter	Porter/Oxford/ Kezar Falls	Short/ Class II	
Ossipee River, Rapids after bridge to Porter	Porter/Oxford/ Kezar Falls	Short/ Class II	
Cold River, Cold River Rapids	Stow, Fryeburg/ Oxford/Center Lovell, 7.5 minute series	Entire river, 8 miles/ Class II-III	Very steep gradient
Little Cold River, Rapids in Stow	Stow/Oxford/Center Lovell, 7.5 minute series	0.5 mile/ Class II-III	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge upstream, boulders downstream		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Series of ledge drops	Important spawning & nursery for brook and brown trout. Within a fish & game preserve	L,T,P, A,V	Recommended; see description on page 31.
Ledge	Exceptionally steep pitches; basalt dikes; spawning and nursery area for brook and brown trout	L,T,P, A,V	Recommended; see description on page 32.
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders and ledge		L,T,P	Rejected after literature search; rapid is nonexistent by early summer due to low flow
Mostly boulders		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Mousam River, Rapids below Old Falls Pond	Kennebunk/York/ Kennebunk	0.25 mile/ Class II	
Crooked River, Rapids just east of North Waterford	Waterford/Oxford/ Fryeburg	1 mile/ Class III above, Class II below	20-40 feet
Crooked River, Rapids just before the Waterford-Norway border	Waterford/Oxford/ Norway	0.25 mile/ Class III	60 feet
Crooked River, McDaniel's Rips	Norway/Oxford/ Norway	0.75 mile/ Class III	
Crooked River, Rapids just above Twin Bridges	Norway/Oxford/ Norway	450 feet/ Class III	
Crooked River, Rapids at Twin Bridges	Otisfield/Cumberland/ Norway	0.25 mile/ Class II	
Crooked River, Rapids below dam at Bolsters Mills	Otisfield/Cumberland/ Norway	0.5 mile/ Class II	
Crooked River, Rapids below dam at Scribners Mills	Otisfield/Cumberland/ Norway	0.25 mile/ Class II	
Crooked River, Rapids below Edes Falls	Naples/Cumberland/ Sebago Lake	0.25 mile/ Class II	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Large boulders, ledge		L,T,V	Rejected after groundchecking; does not meet naturalness criteria--sawmill and highway detract from natural beauty
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders	Large standing waves are present when water level is high	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge and boulders		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Cobbles and pebbles		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge and boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence

Southern Coastal Watersheds

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Pleasant River, Rapids below Rt. 202 in Windham to Presumpscot	Windham/Cumberland/ Gray	5 miles/ Class II	
Stevens Brook, Rapids between Highland and Long Lakes	Bridgton/Cumberland/ Norway	2 miles/ Class III-IV	

Midcoastal Watersheds

Cobbosseecontee Stream, Rapids 1½ miles from dam on lake	West Gardiner/Kennebec/Gardiner	600 feet/ Class II	
Cobbosseecontee Stream, Rapids near Gardiner	Gardiner/Kennebec/ Gardiner	1 mile/ Class III-IV	
St. George River, Rapids below bridge in Searsmont	Searsmont/Waldo/ Belfast	1.5 miles/ Class II	
Passagassawakeag River, Rapids at Poor Mills	Belfast/Waldo/ Belfast	300 feet/ Class III	
Passagassawakeag River, Rapids after Poor Mills	Belfast/Waldo/ Belfast	300 feet/ Class III	
Sheepscot River, Rapids from Montville to Sheepscot Pond	Montville, Liberty, Palermo/Waldo/ Liberty	6 miles (intermittent rapids)/ Class II	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Mostly ledge		T,P,A	Rejected after aerial survey; rapids were nonexistent in late May when overflown
Many boulders		T,P,V	Rejected after groundcheck; brook flows through a residential area and does not meet the naturalness criteria
Some ledge, boulders	Prehistoric site adjacent to rapid	L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
		L,T	Rejected after literature search; does not meet naturalness criteria, urban location detracts from natural beauty of area
		L,T,A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
		L,T,P	Rejected after aerial survey; rapids extremely intermittent and small when overflown in May, 1980

Mid Coastal Watersheds

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Sheepscot River, Rapids below Sheepscot Pond	Palermo, Somerville/ Waldo, Lincoln/ Liberty	2 miles/Class III in first $\frac{1}{2}$ mile, Class II below	
Sheepscot River, Rapids at Coopers Mills	Whitefield/Lincoln/ Vassalboro	0.25 mile/ Class III	
Sheepscot River, Rapids before Head Tide	Whitefield/Lincoln/ Wiscasset	2 miles/ continuous Class II	60-100 feet/ 20 feet/mile

Androscoggin River Drainage Basin

Rangeley River, Rapids below dam to Mooselookmeguntic Lake	Rangeley/Franklin/ Oquossoc	1 mile/ Class II-III	45 feet/ 67 feet/mile
Rapid River, Rapids between Lower Richardson and Umbagog Lakes	Upton, Magalloway, T.C., C. Surplus/ Oxford/Oquossoc Errol	4 miles/ Class III-V	40-60 feet/ 52 feet/mile
Cupsuptic River, Rapids above Little Falls	Lower Cupsuptic Township/Oxford/ Cupsuptic Errol	0.25 mile/ Class V	
Sunday River, Rapids above Sunday River School beginning at the Pool	Newry/Oxford/ Bethel	2.5 miles/ Class III-V	20-50 feet
Swift River, Rapids just below gorge in Byron to Hale	Byron, Roxbury, Hale/Oxford/ Rumford	13 miles/ Class II-IV	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge		L,T,P, A,V	Rejected after aerial survey; rapids intermittent and Class II or less when overflown in May 1980
Ledge	Atlantic salmon use this stretch of river as a spawning ground and nursery	L,T,P, A,V	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Round boulders	Atlantic salmon use this stretch of river as a spawning and nursery area	L,T,P, A,V	Undecided; meets criteria, but rapid is nonexistent for much of the year. See description on page 37.
Small boulders, cobbles and gravel		L,T,P, A,V,	Rejected after groundcheck; Rapids intermittent Class I by mid June
Boulders and some ledge	Exceptional gradient; 4-6 foot standing waves; old growth white pine; Common Loon habitat	L,T,P, A,V	Recommended; see description on page 42.
Boulders, some ledge, sandy river mouth	Steep pitch below bridge	L,T,A	Rejected after aerial survey; rapids mostly Class I -III in mid May
Ledge, gravelly riverbed	Hydrologic sculpturing in riverbank outcrops; lag deposit	L,T,A, V	Rejected after groundcheck; rapids nonexistent after mid June
Ledge, Boulders	Several steep pitches and a small waterfall	L,T,P, A,V	Recommended, stretch below Hale has been rejected; it does not meet naturalness criteria; see description, p. 44.

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Magalloway River, Aziscohos Falls Rapids	Lincoln Plantation/ Oxford/Errol, Oquossoc	3 miles Class III-V	45-100 feet/ Elevation decreases 200' 1st mile
Webb River, Rapids between Lake Webb and Carthage	Carthage/Franklin/ Dixfield	6 miles/ Class III-V	30-40 feet 30 feet/mile
Nezinscot River, Rapids above, at and below the first bridge in Turner	Turner/Androscoggin/ Turner Center, 7.5 minute series	1.5 miles/ Class I-II	
Little Androscoggin River, Rapids from Greenwood City to Tubbs School	Greenwood/Oxford/ Bryant Pond	3.4 miles/ Class III	
Androscoggin River, Rapids above Strickland Ferry	Livermore/Androscoggin/ Livermore Falls, 7.5 minute series	0.4/ Class II	
Androscoggin River, Rapids below Turtle Islands	Livermore/Androscoggin/ Turner Center, 7.5 minute series	105 feet/ Class II	
Androscoggin River, Rapids below Twin Bridges	Turner/Androscoggin/ Turner Center, 7.5 minute series	300 feet/ Class IV	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Large boulders	Excellent example of rapid formed over a lag deposit	L,T,P, A,V	Recommended; see description on page 40.
Small boulders		L,T,P, A,V	Undecided; meets criteria, but rapid is nonexistent for much of the year. See description on page 43.
Small boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders		L,T,P, A	Rejected after aerial survey; when overflown in May, 1980, rapids were mostly Class I with short stretches of Class II
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Dead River, Rapids from Spencer Stream to the Forks	T.3 R.4, T.2 R.4, T.1 R.4, T.3 R.5, T.2 R.5, West Forks/ Somerset/ Pierce Pond, The Forks	15 miles/ Class I-IV	Up to 160'/ 29 feet/mile
Spencer Stream, Spencer Gut	T.3 R.5/Somerset/ Spencer Lake	1.7 miles	10-50 feet/ 50 feet/mile
Dead River, North Branch, Rapids at Sarampus and Little Sarampus Falls	Alder Stream/Franklin Chain Lakes	0.25 mile/ Class II-III	30 feet
Dead River, North Branch, Rapids before and after Ledge Falls	Jim Pond/Franklin/ Kennebago Lake, Stratton	0.25 mile/ Class III	50 feet
Dead River, North Branch, Rapids at Shadagee Falls	Jim Pond/Franklin/ Chain Lakes	100 feet/ Class II	30 feet
Dead River, South Branch, Rapids in gorge and 3 miles below Langtown Mill	T.2 R.3 (Lang), T.2 R.2 (Dallas)/Franklin/ Kennebago Lake	4 miles/Class IV in first mile, Class II below	
Dead River, South Branch, Rapids above Lutton Brook to Nash Stream	Eustis/Franklin/ Stratton	1.5 miles/ Class III	50-100 feet/ 40 feet/mile
Moose River, Camel Rips	Holeb/Somerset/ Attean	50 feet/ Class II	40 feet
Moose River, Holeb Falls Rapids (before and after)	T.5 R.7/Somerset Attean	300 feet before falls, 90 feet after/Class II	30-50 feet

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Mostly ledge, boulder strewn	Slate bedrock w/other metamorphics; one of longest whitewater stretches in State; part of annual canoe race	L,T,P, A,V	Recommended; see description on page 48.
Ledge upstream, boulders downstream	Unusual bedrock containing serpentine; potholes; exceptional series of cascades and rapids	L,T,A, V	Spencer Gut is better classified as a gorge and has been included in the gorge inventory
Ledge	Hydraulics occur at pool below Upr. Sarampus. Basalt outcrop; Rt. of Arnold's expedition	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Large boulders on left and ledge	Route of Arnold's expedition; now used in State whitewater championships	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge	Small hydraulics; Route of Arnold's expedition; now used in State whitewater championships	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Series of ledge drops in first mile		L,T,A	Rejected after aerial survey; these rapids almost nonexistent by early summer due to low flow
Gravel, some ledge	Steep sided river valley, very scenic	L,T,A, V	Rejected existence of rapid is very dependent on water level; river very low by early June
Smooth ledge	3-4 foot drop	L,T,P,V	Rejected after groundcheck; existence of rapid is dependent on water level; river very low by mid-June
Ledge upstream, boulders downstream	Holeb Falls is a registered critical area	L,T,V	Rejected after literature search; does not meet whitewater rapid criteria; rapids are inseparable from Holeb Falls

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Moose River, Mosquito Rips	Attean/Somerset/ Attean	21 feet/ Class II	
Moose River, Spencer Rips	T.5 R.7/Somerset/ Attean	480 feet/ Class II	100 feet/ 55 feet/mile
Moose River, Attean Falls (upper and lower)	T.4 R.7/Somerset/ Long Pond	300 feet (upper) 75 feet (lower)/ Class II	
Moose River, Rapids below Scott Paper bridge to Brassua Lake	T.2 R.1 (Sandwich Academy)/Somerset/ Brassua Lake	2.5 miles/ Class III-IV	150 feet/ 32 feet/mile
Moose River, Rapids between Mackamp and Scott Paper bridge	T.2 R.1 (Sandwich Academy), Long Pond/ Somerset/Long Pond, Brassua Lake	3 miles/ Class II	150 feet
Sandy River, Rapids below Smalls Falls to South Branch	Madrid/Franklin/ Rangeley, Phillips	7 miles/ continuous Class III	20-40 feet/ 43 feet/mile
Sandy River, Rapids from South Branch to Phillips	Phillips/Franklin/ Phillips	6 miles/ Class II	40-50 feet/ 17.5 feet/ mile
Sandy River, Rapids above Route 142 bridge in Phillips	Phillips/Franklin/ Phillips	600 feet/ Class IV	
Togus Stream, Rapids from Chelsea to the Kennebec River	Chelsea, Randolph/ Kennebec/Wiscasset, Gardiner	3 miles/ Class II-III	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders (up to 10 feet in diameter)	Boulder lag deposit of Attean quartz monzonite from terminal or recessional moraine	L,T,P, A,V	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Mostly boulders		L,T,P, V	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Many boulders, ledge	Hydraulics just below bridge; several steep drops, brachiopod fossils found in riverbed; very scenic	L,T,P, A,V	Recommended, see description on page 50.
Boulders and ledge	Small whirlpools	L,T,P, A	Rejected after aerial survey; rapids nonexistent when overflown in May due to low flow
Boulders below falls, several ledge drops	Variety of bedrock types including granite pegmatites and mica schist; granite contains large potholes	L,T,P, A,V	Recommended; see description on page 54.
Ledge with some boulders, gravel in between	Hydrologic sculpturing in medium grade metamorphic rocks; steep pitches	L,T,P, A,V	Recommended; see description on page 55.
Ledge	Extremely steep pitch occurs under bridge	L,T,P, A,V	Included in the description of Sandy River Rapids from South Branch to Phillips; see page 55.
Boulders and ledge		L,T,P, A	Rejected after aerial survey; water level in Togus Stream becomes very low by early summer

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Roach River, Rapids below Lazy Tom Stream to Spencer Bay	T.1 R.14/Piscataquis/ First Roach Pond, Moosehead Lake	5.5 miles/ Class II-III	25-40 feet/ 36 feet/mile
Kennebec River, Rapids along East Outlet of Moosehead Lake	T.1 R.7 (Sapling), T.2 R.6 (Big Squaw)/Somerset, Piscataquis/Moosehead Lake and Brassua Lake	3.5 miles/ Class III-IV	200 feet/ 25 feet/mile
Kennebec River, Rapids in Kennebec River Gorge	T.1 R.6, T.1 R.5, T.2 R.5, T.1 R.6, West Forks, The Forks/ Somerset/The Forks	11 miles/ Class IV-V+	150-200'/ 25 feet/mile
Kennebec River, Rapids in the gorge above Great Eddy in Skowhegan	Skowhegan/Somerset/ Skowhegan	1 mile/ Class III-IV	
Carrabassett River, Rapids along Route 27	Carrabassett Valley (T.3 R.2)/Franklin/Little Bigelow, Stratton	3 miles/ Class V+	30 feet/ 60 feet/mile
Carrabassett River, Rapids between Carrabasset and Kingfield	Carrabassett Valley, Kingfield/Franklin/ Kingfield	9.8miles Class II-III	95 feet/ 27 feet/mile
Carrabasset River, Rapids from Kingfield to East New Portland	Kingfield, New Portland/Franklin, Somerset/Kingfield	12 miles/ intermittent Class II	100-200'
Carrabassett Stream, Rapids just before entrance to Kennebec	Clinton/Kennebec/ Waterville	0.5 mile/ Class II	150 feet

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Mostly boulders, some ledge	Nice views of surrounding mountains	L,T,A	Rejected after aerial survey, water runs out quickly in spring; rapids are intermittent and in places nonexistent by ear. sum.
Some large boulders	First 1.5 miles of rapid occurs within small gorge; 2 steep pitches occur; rapids over glacial lag deposits	L,T,P, A,V	Recommended; see description on page 47.
Boulders and ledge	Rapids occur within one of Maine's most spectacular gorges	L,T,P, A	Recommended; see description on page 56.
Boulders and ledge		L,T,A	Rejected after aerial survey; urban location of rapid detracts from natural beauty of area
Small boulders ledge	Natural rock pier can be seen from Rt. 27; several steep pitches; rapid formed over lag deposits	L,T,A,V	Recommended; see description on page 51.
Boulders, gravel and some ledge	Rapid flows over two contacts; igneous bedrock shows compositional layering	L,T,A,V	Recommended; see description on page 52.
Mostly boulders	Scenic stretch of river, overlooked by high bluffs; spectacular falls in East New Portland	L,T,P, A,V	Rejected after ground checking; Rapids diminish to mostly quick water by mid summer
Boulders upstream, ledge downstream		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence

Penobscot River Drainage Basin

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Penobscot River, East Branch, Crowfoot Falls Rapids	T.1 R.7 (Grindstone)/ Penobscot/Stacyville	0.5 mile/ Class II-III	
Penobscot River, South Branch, Rapids between Canada Falls Dam and Seboomook Lake	T.2 R.4/Somerset/ Seboomook Lake	3 miles/ continuous Class III-V	15-150 feet/ 47 feet/mile
Penobscot River, South Branch, Kelleher Rapids	T.4 R.4/Somerset/ Penobscot Lake	300 feet/ Class II-III	50-80 feet
Penobscot River, West Branch, Old Roll Dams	Seboomook/Somerset/ North East Carry	3 miles/ Class III-IV	270 feet/ 25 feet/mile
Penobscot River, West Branch, The Cribwork Rapids	T.3 R.11/Piscataquis/ Harrington Lake	0.75 mile/ Class V	Width varies 50 to 330'/ 130 feet/ mile
Penobscot River, West Branch, Little Ambejackmockamus Falls	T.3 R.11/Piscataquis/ Harrington Lake	600 feet/ Class I-II	
Penobscot River, West Branch, Big Ambejackmockamus Falls	T.3 R.11/Piscataquis/ Harrington Lake	1670 feet/ Class II-V	120 feet/ 45 feet/mile
Penobscot River, West Branch, The Horserace	T.3 R.11/Piscataquis/ Harrington Lake	1.5 mile/	100 feet
Penobscot River, West Branch, Rapids in Ripogenus Gorge	T.3 R.11/Piscataquis/ Harrington Lake	0.5 mile/ Class IV-V	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Boulders	Eddies and whirlpools	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Series of ledge drops	Steep pitches and two beautiful chutes; important spawning and nursery area for brook trout	L,T,P, A,V	Recommended; see description on page 75.
Ledge	Chute used to move wood from Portage Lake to Penobscot Lake	L,T,P	Rejected after literature search; does not meet whitewater criteria for turbulence and length
Series of ledge drops	Eddies, whirlpools and steep pitches	L,T,P, A,V	Old Roll Dams has been registered as a waterfall
Ledge upstream, boulders downstream	Important landlocked salmon fishery; steep pitches, large standing waves; potholes have been carved into ledge	L,T,P, A,V	Recommended; see description on page 68.
Ledge, some boulders	Important landlocked salmon fishery; some large standing waves	L,T,P, A,V	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Ledge and large boulders	Important landlocked salmon fishery; keepers and large standing waves; contact zone & granitic rocks	L,T,P, A,V	Recommended; see description on page 67.
Boulders	Important landlocked salmon fishery	L,T,P, A	Rejected after aerial survey; Class II-III rapids exist only during periods of high water
Boulders	Important landlocked salmon fishery	L,T,P, A,V	These rapids are written up in the Ripogenus Gorge description; this is being considered for registration as a gorge

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Penobscot River, West Branch, Abol Falls	T.2 R.10/Piscataquis/ Katahdin	2,100 feet/ Class IV	264 feet/ 32 feet/mile
Penobscot River, West Branch, Upper and lower Pockwockamus Falls	T.2 R.10/Piscataquis/ Katahdin	0.5 mile/ Class IV	40-70 feet/ upper: 48'/ mile, lower: 63'/mile
Penobscot River, West Branch, Debsconeag Falls	T.2 R.9/Piscataquis/ Katahdin	1300 feet/ Class IV-V	200 feet/ 114 feet/ mile
Penobscot River, West Branch, Passamagamet Falls	T.1 R.9/Piscataquis/ Katahdin, Norcross	200 feet/ Class III-IV	50 feet/ 35 feet/ mile
Penobscot River, West Branch, Rapids between Quakish Lake and Grand Falls	Millinocket/ Piscataquis/ Millinocket	2.5 miles/ Class II-III	
Penobscot River, East Branch, Stair Falls Rapids	T.5 R.8/Penobscot/ Traveler Mountain	825 feet/ Class II-III	125 feet/ 22 feet/mile
Penobscot River, East Branch, Haskell Rock Pitch	T.5 R.8/Penobscot/ Traveler Mountain	990 feet/ Class III-V	25-100 feet/ 106 feet/ mile
Penobscot River, East Branch, The Hulling Machine	T.5 R.8/Penobscot/ Shin Pond	600 feet/ Class IV-V	20 feet/ 110 feet/ mile
Penobscot River, East Branch, Bowline Falls	T.5 R.8 Penobscot/ Shin Pond	300 feet/ Class II	100 feet

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Boulders, ledge	Important landlocked salmon fishery	L,T,P, A,V	Recommended; see description on page 66.
Large boulders	Important landlocked salmon fishery; excellent example of rapid formed over lag deposit	L,T,P, A,V	Recommended; see description on page 64.
Ledge, boulders	Important landlocked salmon fishery; 2 steep pitches	L,T,P, A,V	Recommended; see description on page 63.
Boulders, ledge	Important landlocked salmon fishery; steep pitches	L,T,P, A,V	Rejected after groundcheck; does not meet whitewater rapid criteria for length and turbulence
Small boulders		L,T,P, A	Rejected after aerial survey; riverbed completely exposed when overflown in May, 1980 due to Quakish Dam regulation
Series of ledge drops	Excellent example of a rapid developed over resistant rock layers; beautiful view of Traveler Mountain	L,T,P, A,V	Recommended; see description on page 69.
Eroded bedrock ledges, large boulders	Large standing waves, eddies, steep pitches, hydrologic sculpturing; unusual bedrock, fossils, and encised meander	L,T,P, A,V	Recommended; see description on page 71.
Ledge	Rapid contains a chute and an exceptionally steep pitch (10-15 feet)	L,T,P, A	Recommended; see description on page 72.
Ledge	Red oak, jack pine and 3 tooth cinquefoil, species generally found further south; steep pitch	L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Penobscot River, East Branch, Whetstone Falls	T.3 R.7/Penobscot/ Stacyville	0.5 miles (two sets of short rapids divided by quick-water)/Class II-III	
Penobscot River, East Branch, Grindstone Falls	T.1 R.7 (Grindstone)/ Penobscot/Millinocket	1 mile/ Class III-IV	270 feet/ 36 feet/mile
Penobscot River, East Branch, Ledge Falls	Medway/Penobscot/ Millinocket	300 feet/ Class II	150 feet
Penobscot River, Five Island Rapids	Mattawamkeag, Winn/ Penobscot/Winn	1 mile/ Class II	150-200 feet
Penobscot River, Sebonibus Rapids	Lincoln/Penobscot/ Winn	1 mile/ Class II	
Penobscot River, Mohawk Rapids	Lincoln, T.1 R.7/ Penobscot/Lincoln	2 miles/ 3 small sets of rapids divided by quickwater	200 feet
Mattawamkeag River, Rapids beginning in small gorge and ending at The Heater	Mattawamkeag/ Penobscot/Matta-wamkeag, Wytopitlock	1.75 miles/ Class II	75-125 feet
Mattawamkeag River, The Heater	Mattawamkeag/ Penobscot/ Mattawamkeag	2 miles/ Class III-V	30-125 feet/ 23 feet/mile
Mattawamkeag River Rapids at Upper and Lower Gordon Falls	Mattawamkeag, Winn/Penobscot/ Mattawamkeag	0.7 mile/ Class III-V	20-100 feet/ 24 feet/mile

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge		L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Ledge and boulders	Sharp tooth-like outcrops extend diagonally across river, steep pitches are present during normal levels	L,T,P, A,V	Recommended; see description on page 73.
Ledge, some large boulders	Two ledge drops; esker nearby	L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T,P, A	Rejected after aerial survey; Class I when overflown; does not meet whitewater criteria for length and turbulence
Boulders		L,T,P,	Rejected after aerial survey; nonexistent when overflown; does not meet rapid criteria for length and turbulence
Large boulders		L,T,P, A	Rejected after aerial survey; does not meet criteria for length and turbulence
Ledge and boulders	Rapid provides habitat for Atlantic salmon	L,T,A	Rejected after aerial survey; lower portion is part of The Heater; remainder does not meet whitewater rapid criteria
Ledge and small boulders	Rapids within small steep-sided gorge; steep pitches, hyd. sculpturing, standing waves; Atlantic salmon habitat	L,T,A, V	Recommended; see description on page 60.
Ledge and boulders	Hydrologic sculpturing; large standing waves, steep pitches, habitat for Atlantic salmon	L,T,A, V	Recommended; see description on page 61.

Penobscot River Drainage Basin

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Piscataquis River, Rapids between Blanchard and ME-15 bridge at Upper Abbot	Blanchard, Monson, Abbot/Piscataquis/ Greenville, Kingsbury, Guilford	8 miles/ Class III	40 feet/ 22 feet/mile
Kingsbury Stream, Kingsbury Stream Rapids	Abbot, Parkman/ Piscataquis/Guilford	3.6 miles/ Intermittent Class II-IV	50 feet 17 feet/mile
Piscataquis River, Schoodic Point Rapids	Medford/ Piscataquis/ Schoodic	3 miles/ Class II-III	300 feet 20 feet/mile
Pleasant River, West Branch, West Branch of the Pleasant River Rapids	T.6 R.9, T.6 R.8/ Piscataquis/Sebec	3 miles Class II-III	100 feet/ 40 feet/mile
Pleasant River, West Branch, Rapids in Gulf Hagas	T.7 R.10, T.8 R.10/ Piscataquis/Sebec	4 miles/ Class IV	50-80 feet 30 feet/mile
Seboeis River, Rapids from Seboeis Fish and Game Club Camps to Grand Lake Road	T.6 R.7/Penobscot/ Shin Pond	5 miles/ Class II-III	
Webster Brook, Telos Cut	T.6 R.11/Piscataquis/ Telos Lake	1 mile/ Class II-III	50 feet/ 60 feet/mile
Webster Brook, Indian Carry to Grand Pitch	T.6 R.9, T.6 R.10/ Piscataquis/ Traveler Mountain	2 miles/ Class II-IV	15-50 feet/ 30 feet/mile
Wassataquoik Stream, Wassataquoik Stream Rapids	T.4 R.9, T.4 R.5, T.3 R.8, T.3 R.7/Piscataquis, Penobscot/Katahdin, Traveler Mtn, Stacyville	15 miles/ Class II-V	40 feet/ 85 feet/mile

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge upstream, boulders downstream	Small gorge near bridge, steep pitch in Blanchard	L,T,P, A	Rejected after aerial survey; intermittent Class I-III when overflown; does not meet whitewater rapid criteria
Boulders, ledge	Several steep ledge drops including a 10-foot drop in Abbot	L,T,P, A	Undecided; meets criteria but rapid is nonexistent for much of the year. See description on page 59.
Ledge above, boulders below	Several small pitches	L,T,P, A,V	Rejected after groundchecking in July; the rapids were intermittent Class I and II
Small boulders		L,T,P, A,V	Rejected after groundchecking; does not meet two whitewater rapid criteria
Ledge, boulders	Occurs within one of the State's most spectacular gorges	L,T,P, V	Gulf Hagas is a registered gorge; rapids are described in the register entry
Series of ledge drops	Rapid occurs within an unusually beautiful gorge	L,T,P, A	Seboeis River Gorge is a registered critical area; rapids are described in register entry
Gravel and cobbles		L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria; Telos Cut is man-made
Ledge	6 steep ledge drops, ending in a 20-foot waterfall; bedrock has been sculptured into potholes	L,T,A	Recommended; see description on page 78.
Boulders, ledge	Formed over lag deposit & jointed bedrock; many steep pitches; old growth white pine; esker on riverbank	L,T,P,	Recommended; see description on page 76.

Penobscot River Drainage Basin

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Seboeis River, West Branch, Rapids from outlet of Endless Lake	T.3 R.9, Seboeis/ Penobscot/Schoodic	4 miles/ Class III (intermittent)	20-30 feet
Dead Stream, West Branch, Rapids from Huntington Mill to Mill Cemetery	Bradford/Penobscot/ Boyd Lake	5 miles/ Class II-III	20 feet/ 20 feet/mile
Kenduskeag Stream, Rapids in town of Kenduskeag	Kenduskeag/Penobscot Bangor	300 feet/ Class III-IV	264 feet/mi
Kenduskeag Stream, Rapids at Six Mile Falls	Bangor/Penobscot/ Bangor	600 feet/ Class III	132 feet/mi
Kenduskeag Stream, Rapids at Flour Mill Dam	Bangor/Penobscot/ Bangor	105 feet/ Class IV	590 feet/mi
Passadumkeag River, Grand Falls Rapids	Grand Falls Plt., T3ND/ Penobscot/Saponac	4680 feet/ Class II-V	50-70 feet/ 94 feet/mile

Saint John River Drainage Basin

Saint John River, Basford Rapids	T.14 R.14, T.14 R.15/ Aroostook/Round Pond	0.5 mile/ Class II	
Saint John River, Big Black Rapids	T.14 R.13, T.15 R.13/ Aroostook/Round Pond	4100 feet/ Class III	330 feet

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	DATA SOURCE	STATUS
Boulders, some ledge and gravel		L,T,P, A	Rejected after aerial survey; rapids intermittent, mainly Class I-II; does not meet whitewater rapid criteria
Ledge and small boulders	2 steep pitches	L,T,P, A,V	Rejected after groundcheck; intermittent Class I-II by mid summer; does not meet whitewater rapid criteria
Ledge	Location of largest canoe race in Maine	L,T,P, A	Rejected after aerial survey; does not meet whitewater criteria for length, naturalness or turbulence
Ledge, boulders	Location of largest canoe race in Maine	L,T,P	Rejected after literature search; does not meet whitewater criteria for length and turbulence
Ledge and boulders	Location of largest canoe race in Maine; contains a 10-foot drop	L,T,P	Rejected after literature search; does not meet whitewater criteria for length and turbulence
Ledge and large boulders	Many steep pitches including Grand Falls, a 6' drop; standing waves, small potholes	L,T,P, A,V	Recommended; see description on page 79.
	Unusual riverbank ecology	L,T,P, V	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders and flat ledges	Good brook trout fishery; mature old growth forest	L,T,P,A, V	Recommended; see description on page 84.

Saint John River Drainage Basin

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Saint John River, Big Rapids	Allagash/Aroostook/ Allagash	2 miles/ Class III	450 feet
Saint John River, Rankin Rapids	T.18 R.10, St. Francis/ Aroostook/St. Francis	0.5 mile/ Class II	
Munsungen Stream, Rapids at Munsungen Falls	T.8 R.9/Piscataquis/ Millinocket Lake	0.5 mile/ Class III	200 feet
Millinocket Stream, Rapids at Millinocket Falls	T.8 R.8/Penobscot/ Millinocket Lake	0.25 mile/ Class III	100 feet
Millinocket Stream, Rapids at Devil's Elbow	T.8 R.8/Penobscot/ Millinocket Lake	0.5 mile/ Class II	100-200'
Saint Francis River Cross Lake Rapids	T.18 R.10/Aroostook/ Beau Lake	0.4 mile/ Class III	
Saint Francis River, Falls Brook Rapids	T.18 R.10/Aroostook/ St. Francis	0.4 mile/ Class III	
Saint Francis River, Horseback Rapids	T.18 R.10/Aroostook/ St. Francis	0.25 mile/ Class II	
Saint Francis River, MacDonald Rock Rapid	T.18 R.10/Aroostook/ St. Francis	0.4 mile/ Class II	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Large boulders	Riverbanks provide ideal habitat for several rare vascular plant species	L,T,P,A, V	Recommended; see description on page 82.
Rounded boulders	Unusual riverbank ecology	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge	3 ledge drops; whirlpool at base of first	L,T,P, A	Rejected after aerial survey; rapids only at 3 drops with Class I or quickwater in between
Ledge		L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Jagged ledge, series of small pitches		L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Large boulders	Powerful eddies	L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Large boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Large boulders	2 short steep drops	L,T	Rejected after literature search; does not meet whitewater criteria for length and turbulence
One large and some smaller boulders		L,T	Rejected after literature search; does not meet criteria for length and turbulence

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Big Machias River, Rapids at Roaring Bull	T.12 R.8/Aroostook/ Mooseleuk Lake, Greenlaw	3 miles/ Class III	
Big Machias River, McConnel Rips	T.11 R.7, Garfield/ Aroostook/Greenlaw	3 miles/ Class II	300 feet
Big Machias River, Rapids in Ashland	Ashland/Aroostook/ Ashland	900 feet/ Class II	
Chimenticook Stream, Rapids along the entire stream	T.17 R.14, T.17 R.13, T.16 R.13/Aroostook/ Rocky Mountain	12 miles/ Class II	50 feet/ 25 feet/mile
Mooseleuk Stream, Rapids at Boars Head Falls	T.9 R.8/Aroostook/ Millinocket Lake	0.25 mile/ Class II	
Fish River, Rapids at Fish River Falls	T.14 R.8/Aroostook/ Winterville	1312 feet	33 feet/ 200 feet/mi
Fish River, Rapids at Shrew Falls	T.14 R.8/Aroostook/ Winterville	150 feet/ Class II	
Fish River, Rapids above Soldier Pond	Wallagrass/Aroostook/ Eagle Lake	0.25 mile/ Class II	
Fish River, Rapids at Fish River Falls	Fort Kent/Aroostook/ Eagle Lake	0.5 mile/ Class IV	

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Scattered boulders		L,T,A	Rejected after aerial survey; intermittent Class I-II when overflown in May, 1980
Large boulders, jagged ledges		L,T,P, A	Rejected after aerial survey; intermittent Class I-II when overflown in May, 1980
Ledges	3 steep drops	L,T,P	Rejected after literature search; does not meet white water rapid criteria for length and turbulence
Boulders		L,T,P, A	Rejected after aerial survey; rapids intermittent & mostly Class I when overflown in May, 1980
Ledge		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge	8 sets of falls (3.2'-13'); curved fracture surfaces, blocky jointing in basaltic rocks	L,T,P, A	Fish River Falls is a registered critical area and has been classified as a waterfall
Ledge		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Sharp ledge		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge	Falls occur as three separate drops	L,T,P,A	Rejected after aerial survey; this area is better classified as a waterfall

Saint John River Drainage Basin

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Fish River, Martin Rapids	Fort Kent/Aroostook/ Eagle Lake	0.25 mile/ Class II	
Fish River, Rapids at Fort Kent Mills	Fort Kent/Aroostook/ Eagle Lake	0.25 mile/ Class II	
Big Black River, from Five Mile Brook to confluence with Saint John	T.15 R.14/Aroostook/ Seven Islands, Round Pond	5 miles/ Class II-III	100 feet/ 10 feet/mile
Saint Croix Stream, Rapids south of Griswold	T.9 R.4/Aroostook/ Oxbow	0.4 mile/ Class II-III	
Umcolcus Stream, Rapids along entire stretch	Oxbow/Aroostook/ Oxbow	0.4 mile/ Class II	25 feet/mile
Prestile Stream, Rapids before border	Bridgewater/Aroostook/ Bridgewater	600 feet/ Class II-III	
Meduxnekeag, South Branch, Rapids before Cary's Mills	Hodgdon, Houlton/ Aroostook/Houlton	0.5 mile/ Class II	

Allagash Wilderness Waterway

Allagash River, Chase Carry	T.10 R.12/Piscataquis/ Churchill Lake, Umsaskis Lake	9 miles/ Class I-III	75-150'/ 9 feet/mile

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders, cobbles		L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T,P, A	Rejected after aerial survey; rapids intermittent and mostly Class I when overflown in May, 1980
Ledge	Two small ledge drops	L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length, turbulence and naturalness
Small boulders	One steep pitch	L,T,A	Recommended; see description on page 85.

Allagash Wilderness Waterway

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Allagash River, Rapids before Allagash Falls	T.15 R.11/Aroostook/ Allagash Falls	45-90 feet/ Class II	
Allagash River, Twin Brook Rapids	Allagash/Aroostook/ Allagash	0.5 mile/ Class II	
Chemquasabamticook Stream, Rapids below Clayton Lake	T.11 R.14, T.11 R.13, T.13 R.12/Aroostook/ Clayton Lake, Umsaskis Lake	9.5 miles/ Class II	
Musquacook Stream, Lower Horse Race Rapids to Allagash River	T.12 R.11, T.13 R.11, T.13 R.12/Aroostook/ Musquacook Lakes, Allagash Falls	9.25 miles/ Class I-III	
Allagash Stream, Rapids between Allagash Lake and Little Round Pond	T.8 R.14/Piscataquis/ Churchill Lake	1 mile/ Class II	25-50 feet

Eastern Coastal Watersheds

Narraguagus River, Rapids 1.5 miles before and 0.5 mile beyond Airline bridge	T.29 MD, Beddington/ Washington/Lead Mountain	2 miles/ Class II	
Narraguagus River, Rock Dam Rips (beginning below Bog Brook)	Beddington, Deblois/ Washington/Lead Mountain, Tunk Lake	4 miles/ Class II-III at high water	20-40 feet/ 10 feet/mile
Narraguagus River, Rapids under bridge in Deblois	Deblois/Washington/ Tunk Lake	1,000 feet/ Class III-V	25-50 feet/ 200 feet/mi

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge	Exceptionally scenic falls below with varied rock structures	L,T,P	Rejected after literature search; rapids should be registered with Allagash Falls
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge		L,T,A	Rejected after aerial survey; rapids intermittent and mostly Class I when overflown in early June, 1980
Boulders and ledge	Narrow, sharp bends	L,T,A	Rejected after aerial survey; rapids intermittent and mostly Class I when overflown in early June, 1980
Ledge	Very scenic area	L,T,A	Rejected after aerial survey; rapids intermittent, does not meet whitewater rapid criteria for turbulence and length
Many boulders	Atlantic salmon habitat	L,T,P	Rejected after literature search; water runs out quickly in the spring; does not meet white-water rapid criteria
Many large boulders above, gravel riffles, pools below	Atlantic salmon habitat; several steep pitches	L,T,P, A,V	Rejected after groundcheck; rapids intermittent and mostly Class I-II when overflown in May, 1980
Large boulders and ledge	Atlantic salmon habitat; rapid developed over lag deposit; series of steep ledge drops	L,T,P, A,V	Recommended; see description on page 95.

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Narraguagus River, Rapids under railroad bridge in Cherryfield	Cherryfield/Washington/ Cherryfield	1 mile/ Class IV-V above Class II below	50 feet/ 20 feet/mile
Pleasant River, Rapids below second dam in Columbia	Columbia, Columbia Falls/Washington/ Cherryfield, Columbia Falls	1 mile/ Class II-V	40-100 feet/ 60 feet/mile
Mopang Stream, Rapids below Six Mile Dam	T.24 MD, T.19 MD, T.25 MD/Washington/ Tug Mountain	0.75 mile/ Class II	45 feet
Mopang Stream, Penman Rips	T.25 MD/Washington Tug Mountain	0.5 mile/ Class III	45 feet
Machias Fifth Lake Stream, Rapids above Knight Dam	T.41 MD/Hancock/ Nicatous Lake	1.5 miles/ Class II	25-50 feet
West Branch of the Machias River, Rapids below Rolford Dam	T.36 MD, T.30 MD/ Washington/Tug Mountain	5 miles/ intermittent class I-II; short class IV-V stretches	50-100 feet
Machias, Fourth Lake Stream, Rapids just beyond outlet of Fourth Lake	T.5 ND/Washington/ Wabassus Lake	0.25 mile/ Class II	50 feet
Machias, Fourth Lake Stream, Shoreline Rapids	T.5 ND/Washington/ Wabassus Lake	0.25 mile/ Class II	50 feet
Machias River, Rapids just below Old Dam of Third Machias Lake	T.43 MD/Washington/ Wabassus Lake	0.5 mile/ Class II	65 feet

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Boulders, some ledge	Atlantic salmon habitat; several steep pitches	L,T,P, A,V	Rejected after groundcheck; residential area; urban character detracts from natural beauty of rapid area
Ledge, boulders	Atlantic salmon habitat; 2 exceptionally steep pitches, jointed bedrock, waterfall	L,T,P, A,V	Rejected after groundcheck; included in Tom Brewer's waterfall inventory and is locally known as Saco Falls
Boulders		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Large boulders, some ledge		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge, some boulders	Series of five ledge drops; small esker near southern portion of rapid	L,T,P, A	Rejected after aerial survey; does not meet whitewater rapid criteria for length and turbulence
Shallow sandy bottom broken by 4-5 steep ledges	Atlantic salmon habitat	L,T,P, A	Rejected after aerial survey; rapids intermittent Class I-II when overflown in May, 1980
Shallow		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Short drops between boulders	Open view of Third Machias Lake	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Many boulders	Atlantic salmon habitat	L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Machias River, Otter Rips	T.43 MD/Washington/ Wabassus Lake	0.25 mile/ Class II-III	60 feet
Machias River, Long Falls	T.43 MD, T.37 MD/ Washington/Wabassus Lake	1.25 miles/ Class II-III	60-180 feet
Machias River, Carrot (Carrick) Rips	T.30 MD/Washington/ Tug Mountain	0.25 mile/ Class III	35 feet
Machias River, Boot Rips	T.30 MD/Washington/ Tug Mountain	0.25 mile/ Class III	150 feet
Machias River, Airline Rips	T.31 MD/Washington/ Tug Mountain	0.6 mile/ Class III	35-100 feet/ 32 feet/mile
Machias River, Little Falls	T.25 MD/Washington/ Tug Mountain	0.13 mile/ Class II-III	40-100 feet
Machias River, Wigwam Rapids	T.25 MD/Washington/ Wesley	2.0 miles/ Class II-III	50-150 feet
Machias River, Lower Holmes Falls	Northfield/Washington/ Wesley	0.25 mile/ Class IV	20-50 feet/ 52 feet/mile
Machias River, Upper Holmes Falls	Northfield/Washington/ Wesley	600 feet/ Class IV-V	48 feet/ 1144 feet/ mile

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge, many boulders	Atlantic salmon habitat	L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledges, large boulders exposed when low	Atlantic salmon habitat; several steep pitches	L,T,P	Undecided; Long Falls Rapids has not been field checked
Many boulders	Atlantic salmon habitat	L,T,P, V	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Boulders	Atlantic salmon habitat	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Small boulders, ledge	Atlantic salmon habitat; lag deposit; hydrologic sculpturing	L,T,A,V	Recommended; see description on page 92.
Ledge, small boulders, sandy stretches	Atlantic salmon habitat; mature eastern white pine stand; several steep pitches	L,T,V	Recommended; see description on page 94.
Boulders, gravel and sand, some ledge	Atlantic salmon habitat; downcut through blueberry barrens; lag deposit with several steep pitches	L,T,P, A,V	Recommended; see description on page 91.
Ledge	Atlantic salmon habitat; steep pitches; irregular jointing, granite veins; basalt dikes; curved fracture surfaces	L,T,P, A,V	Recommended; see description on page 90.
Ledge	Atlantic salmon habitat; small gorge, irregular jointing, granite veins, basalt dikes, curved fracture surfaces	L,T,P, A,V	Upper Holmes Falls has been included in Tom Brewer's inventory as a significant waterfall

Eastern Coastal Watersheds

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Machias River, Great Falls	Centerville/Washington/ Wesley	0.5 mile/ Class III	100-200' 25 feet/mile
East Machias River, Great Meadow Riffles	T.19 ED/Washington/ Wesley	0.5 mile/ Class II	180 feet
East Machias River, Smith Mill Pitch	T.18 ED/Washington/ Wesley	0.25 mile/ Class II	180 feet
East Machias River, Lower Riffles	T.18 ED/Washington/ Wesley	0.25 mile/ Class II	180 feet
East Machias River, Munson Rips	T.18 ED/Washington/ Wesley	0.25 mile/ Class II	110 feet
East Machias River, Wigwam Riffles	T.18 ED/Washington/ Wesley	0.25 mile/ Class II	110 feet
East Machias River, Crooked Pitch	T.18 ED/Washington/ Wesley	0.25 mile/ Class II	120 feet
Grand Lake Stream, Rapids from West Grand Lake to Little Falls	Grand Lake Stream Plantation, T.27 ED/ Washington/Wabassus Lake	2 miles/ Class II-IV	40-50 feet
St. Croix River, Rapids at Little Falls	Lambert Lake/ Washington/ Vanceboro	300 feet/ Class II-III	50 feet

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Lag deposit of Boulders	Atlantic salmon habitat; series of steep ledge drops	L,T,P, A	Recommended; see description on page 89.
Small boulders, shallow	Atlantic salmon habitat	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge, some boulders	Atlantic salmon habitat; rapids occur as a straight chute	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge	Atlantic salmon habitat; rapids occur as a straight chute	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Small boulders	Atlantic salmon habitat	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Small boulders	Atlantic salmon habitat	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Small boulders, sharp bend at lower end of rapids	Atlantic salmon habitat	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Small boulders, some ledge; shallow	Three steep pitches	L,T,P, A	Rejected after aerial survey; rapids were intermittent Class I-II when overflown in May, 1980
Ledge upstream, boulders downstream	Evidence of log booms in riverbed	L,T,A	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
St. Croix River, Rocky Rips	T.1 R.2/Washington/ Kellyland	0.5 mile/ Class II	300 feet
St. Croix River, Mile Rips	Lambert Lake/ Washington/Vanceboro	1.5 miles/ Class II	225 feet
St. Croix River, Meetinghouse Rips	T.1 R.2/Washington/ Kellyland	0.5 mile/ Class II	300 feet
St. Croix River, Dog Falls	T.1 R.2/Washington/ Kellyland	0.25 mile/ Class II	300 feet
St. Croix River, Haycock Rips	T.1 R.2/Washington/ Kellyland	0.25 mile/ Class II-III	300 feet
St. Croix River, Canoose Rips	T.1 R.2/Washington/ Kellyland	900 feet/ Class II-III	335 feet
St. Croix River, Rapids at Baring	Baring/Washington/ Calais	0.25 mile/ Class III	
St. Croix River, Saint Croix Rapids at Milltown	Calais/Washington/ Calais	0.5 mile Class IV	
Union River, West Branch, Rapids before Hellsgate	Great Pond Plantation/ Hancock/Great Pond	300 feet/ Class II	90 feet

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Small boulders; shallow		L,T,P, A	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Small boulders; shallow		L,T,P, A	Rejected after aerial survey; rapids mostly Class I when overflown in May, 1980
Small boulders		L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge drops on either side of Dog Island		L,T,P, A	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge, large boulders	Leads into Loon Bay; highly scenic	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Wide ledge drop; shallow below	Steep pitch	L,T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
		L,T	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge, river divides around ledgy island		L,T,A	Rejected after aerial survey; rapid does not meet naturalness criterion
Jagged ledge		T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence

RIVER AND RAPID NAME OR LOCATION	TOWN/COUNTY/ USGS QUADRANGLE	LENGTH/ TURBULENCE	WIDTH/ GRADIENT
Union River, West Branch, Hellsgate Rapids	Great Pond Plantation/ Hancock/Great Pond	300 feet/ Class III	60 feet
Union River, West Branch, Rapids at Gaging Station	Amherst/Hancock/ Great Pond	225 Feet/ Class IV	60 feet
Tannery Brook, Rapids below Floods Pond	Otis/Hancock/ Ellsworth	2 miles/ Class III	10-15 feet/ 90 feet/mile

RIVERBED DESCRIPTION	UNUSUAL NATURAL FEATURES	SOURCE	STATUS
Ledge	Used by Indians during their seasonal migration to the ocean	T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge	Brown trout nursery; Used by Indians during their seasonal migration to the ocean	T,P	Rejected after literature search; does not meet whitewater rapid criteria for length and turbulence
Ledge, boulders	Granite drops	T,P,A	Rejected after aerial survey, Intermittent Class I-III when overflown in May, 1980. Runs out quickly in spring

CONCLUSIONS

1. The following whitewater rapids should be evaluated for inclusion on the Register of Critical Areas (the numbers correspond to Table II and the site descriptions):

Hardscrabble Falls (#1)

Chases Mills Rapids (#2)

Limington Rips (#3)

Aziscohos Falls (#5)

Rapid River Rapids (#6)

Swift River Rapids (#8)

Kennebec River Rapids (#9)

Lower Dead River Rapids (#10)

Moose River Rapids (#11)

Upper Carrabassett River Rapids (#12)

Carrabassett River Rapids (#13)

Upper Sandy River Rapids (#14)

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The Heater (#17)

Gordon Falls (#18)

Debsconeag Falls (#19)

Pockwockamus Falls (#20)

Abol Falls (#21)

Big Ambejackmockamus Falls (#22)

The Cribwork (#23)

Stair Falls (#24)

Haskell Rock Pitch (#25)

The Hulling Machine (#26)

Grindstone Falls (#27)

Seboomook Rapids (#28)

Wassataquoik Stream Rapids (#29)

Indian Carry to Grand Pitch (#30)

Grand Falls Rapids (#31)

Big Rapids (#32)

Big Black Rapids (#33)

Chase Carry (#34)

Great Falls Rapids (#35)

Lower Holmes Falls (#36)

Wigwam Rapids (#37)

Airline Rips (#38)

Little Falls (#39)

Deblois Rapids (#40)

Sheepscot River Rapids (#4), Webb River Rapids (#7) and Kingsbury Stream Rapids (#16) are located on small streams where the water runs out quickly in the spring and, as a result, they are nonexistent for most of the year. Although all three meet the whitewater rapid criteria, their significance is marginal when compared to other areas

listed in Table II that are characterized by a greater number of unusual features. They should be evaluated only if new data indicates the presence of additional features.

2. Long Falls, on the Machias River, should be field-checked and evaluated for inclusion on the Register of Critical Areas.

3. As additional information on other whitewater rapids becomes available, if the information indicates that a rapid meets the criteria developed in this report, that area should be evaluated for inclusion on the Register.

4. The Critical Areas Program should work closely with landowners of whitewater rapids to encourage wise management of the areas.

5. The Critical Areas Program should work with individuals and agencies who are investigating hydroelectric power generation to encourage the careful consideration of its impacts on Maine's rivers and streams.

GENERAL EVALUATION OF WHITEWATER RAPIDS FOR INCLUSION ON THE REGISTER OF CRITICAL AREAS

1. Description of Whitewater Rapids:

A rapid is a part of a stream where the current is moving with a greater swiftness than usual and where the water surface is broken by obstructions. It commonly results from a sudden steepening of the stream gradient, from unequal resistance of the successive rocks traversed by the stream, or from an extremely obstructed riverbed. Maine's rapids vary in turbulance from Class I-V+, in length from less than 200 feet to 15 miles, in width from 30 feet to 450 feet and have gradients ranging from 9 to 200 feet per mile. Rapids are widely distributed throughout Maine but are most abundant near the headwaters of streams and in the mountainous western portions of the State.

2. Considerations in Registration:

A. Values and qualities represented by the area (specifically including any unique or exemplary qualities of the feature).

The large rapids in Maine are exceptional scenic and recreational localities. Some contain well-washed bedrock exposures and important geologic relationships may be revealed as a result. Geologic features often found in rapid areas include fossils, unusual minerals, geologic structures, and igneous, sedimentary and metamorphic lithologies. Hydrologic features associated with rapids are large eddies, steep pitches, large standing waves and hydrologic sculpturing. Rapids are ecologically important to cold water fish species because they provide nursery areas and are often located adjacent to spawning grounds.

B. Probable effects of uncontrolled use (specifically in relation to its intrinsic fragility).

Uncontrolled use of Maine's rapids has seriously altered their character in the past when many areas were flooded or blasted to facilitate log driving. Today the greatest threat facing rapids is low-head hydropower. Any dam can be expected to have some impacts ranging from total destruction to a change in a rapid's magnitude. Construction of roads, buildings and bridges greatly reduce the aesthetic qualities and naturalness of a rapid area. Although a rapid's character may not be significantly changed by increased recreational use, the immediate surroundings may be affected. Problems involving litter, sanitation and soil compaction and erosion of adjacent riverbanks often result from overuse.

C. Present and probable future use (specifically present and future threats of destruction).

Proposed hydroelectric dams are a serious threat to several sites included in this report. Permits have been issued to construction firms for at least three recommended areas, and the development of many other sites is economically feasible. At the present time, no licenses have been issued.

A hydroelectric dam can effect a rapid in two ways. If a dam is located downstream, the rapid area will be inundated, converting it from a running water habitat to a standing water habitat, with concurrent changes in its biological community. If a dam were located upstream, fluctuations in water flow would occur that could change the turbulence and character of the rapid. Reduction of peak flows below a dam could also reduce scouring and cause organic detritus to accumulate (Ridley and Steel, 1975). This, in turn, would favor rooted aquatic vegetation and disrupt invertebrate and fish populations (Fefer and Patricia, 1980).

Altering the rapid environment could drastically effect inland and anadromous fish populations. In general, rapids provide ideal nurseries for young fish because of the well-oxygenated water, protection afforded by a bouldery riverbed and turbulent water (they can't be picked out from above by predators, for instance), and in some cases an increased food supply. Species such as brook trout and landlocked salmon spawn in sandy or gravelly stretches where there is a moderate current. The young fish eventually leave the spawning grounds and move to rapid areas where they spend between one and three years. If a dam floods or reduces the flow of a rapid area, important habitat will be lost.

The most obvious effect of dam construction will be on recreation. Maine's whitewater stretches host many recreational activities, primarily canoeing, kayaking, rafting and fishing. Although the flow in some recreational rivers is controlled by hydropower of flood control facilities which release water on a regular basis, the development of new dams or the restriction of flows at existing dams threatens the existence of adjacent whitewater stretches.

D. Level of Significance.

The rapids recommended in this report are of regional or state importance because of their geologic and ecologic attributes, their scenic and recreational uses and their natural qualities. When compared to other parts of the eastern United States, Maine's whitewater stretches are among the most spectacular and occur in the greatest numbers.

E. Probable effects of registration - positive and negative (Specifically including the economic implications of inclusion of the area on the register).

The expected positive effect of the registration will be to give official recognition to the importance of the major whitewater rapids in Maine. Also, the landowners will be informed of the importance of preserving these features. Registration will encourage monitoring and conservation of rapid areas. Most importantly, registration may help focus hydropower development on less significant whitewater rapids.

The expected negative effects of registration would be potential conflicts raised with hydropower interests and the publicity generated in the registration process. Hydropower concerns will be on a site-by-site basis, since not all rapids are equally economical. Effects of increased human use are harder to access. In general, increased visitation leads to the deterioration of the natural and scenic qualities of an area.

F. Management Suggestions:

1. Many rapids have only recently become popular as recreational and scenic areas (especially among canoeists, kayak enthusiasts and rubber raft outfitters). Thought should be given to the management of these areas and the preservation of their natural character.

2. Hydropower interests should be focused on less significant rapid areas. Maine should avoid the widespread and nonselective development that has occurred in other New England states.

3. The importance of scientific, recreational and scenic uses of rapid areas to local and state economies should be determined and compared to the economic potential of hydroelectric power generation. Rapids may be a more valuable economic resource in terms of recreation rather than energy production.

4. The importance of individual rapid areas to native fish populations should be assessed.

3. Conclusions:

A. Conformance with definition contained in the Act:

The Act defines a critical area as meaning: "an area containing or potentially containing plant or animal life or geological features worthy of preservation in their natural condition, or other natural features of significant scenic or scientific value."

The areas recommended for evaluation in this report are the result of an intensive survey of Maine's whitewater rapids. Each has its own scenic, geologic and biologic attributes which can be destroyed by uncontrolled use. Many of these areas are tied to the state's economy because of their scenic and recreational significance. The 38 recommended areas can thus be considered critical areas under the legislated definition.

B. Conformance with the Guidelines for the Registration of Critical Areas, adopted by the Critical Areas Advisory Board on September 11, 1975:

Section 1. Knowledge of the Area: This report, Maine's Whitewater Rapids and Their Relevance to the Critical Areas Program was prepared for the Critical Areas Program in order to provide detailed documentation of the geologic, biologic, scenic and natural significance of rapids in Maine.

Section 2. Representation on the Register: Rapids are not included on the Register of Critical Areas at this time.

Section 3. Variety of Values: The recommended rapids have a variety of values. They have geologic and hydrologic significance; they provide essential habitat for many fish species; and they are important scenic and recreational areas.

Section 4. Scarcity: Each site recommended in this report is unique in at least one important respect. Many areas have several unique features of importance.

Section 5. Quality: The 38 sites recommended in this report have been recommended because they are exceptional examples of whitewater rapids in Maine. Eighty percent of the rapids inventoried have been rejected, even though the inventory was biased in favor of sites of known quality.

Section 6. Persistence: Most of the rapids have been in existence in some form since the withdrawal of the continental ice sheet about 10,000 years ago. The long term prospects for the continued existence of these features is exceptionally promising if they remain unaltered by man.

Section 7. Geographic Distribution: Both the field and literature search phases of this study have been carried out on a statewide basis. Rapids from different geographic regions in Maine have been considered and are recommended for registration.

Section 8. Use: Rapids have exceptional scenic and recreational potential and offer opportunities for scientific, natural history, and educational use.

Section 9. Manageability: All rapids recommended for registration can be managed easily to perpetuate their described features.

Section 10. Potential Economic Effects: This varies a great deal from rapid to rapid. Many of the State's most spectacular rapids, which are often characterized by steep gradients and large water flows, are also among the most appealing for hydroelectric power generation. Conflicts may arise in connection with sites that have hydroelectric potential. Landowners favoring the maintenance of the rapids in a natural state will find little or no economic effect because of registration. The economic implications of registration of the areas described in this report will be discussed in individual site evaluations. In addition, the hydropower potential of each area will be reviewed as part of the evaluation of each individual area.

Section 11. Potential Effect on the Conservation of the Area: Registration is expected to have a positive effect on the conservation of Maine's rapids.

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ACTION PLAN

On May 8, 1981, the Critical Areas Advisory Board and the State Planning Office decided to implement the following actions:

1. The following whitewater rapids will be evaluated for inclusion on the Register of Critical Areas (the numbers correspond to Table II and the site descriptions):

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