Hydrogeology of the Sharpe Brook IHD Watershed Kings County, Nova Scotia

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By

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November, 1969

Negatives

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INTRODUCTION

Purpose and Scope of the Investigation

This report describes the geology and some aspects of the hydrology of the Sharpe Brook watershed, the third International Hydrologic Decade (IHD) watershed to be instrumented in Nova Scotia.

General Description of the Area

The Sharpe Brook watershed includes an area of 3.36 square miles* in Kings County south of Cambridge (see Fig. 1). The principal access to the area is provided by secondary roads along the northern and southern extremities of the watershed. Many parts of the interior of the watershed can be reached with a four-wheel drive vehicle over logging roads.

Although the total relief of the watershed is nearly 550 feet with the elevation ranging from 305 feet at the weir site to 850+ feet at the western side of the watershed, much of the area is a gently undulating upland with local relief less than 100 feet. Sharpe Brook is incised in places more than 250 feet below the surface of the adjacent upland.

Soils in the watershed are strongly influenced by the underlying bedrock which consists of slate, quartzite and granite. Soils that mantle quartzite and granite terrane are stony, often shallow, and are suitable for little more than forest. The loam to slaty loam soils mantling slate terrane make good to fair crop land but are found only in the northern and southeastern parts of the watershed (Cann, MacDougall, and Hilchey, 1965).

Several families live along the secondary roads within the limits of the watershed. Although some of these families do a little farming, they derive most of their income from jobs elsewhere.

According to the Nova Scotia Department of Lands and Forests (1967), land in the watershed can be classified as 11 per cent softwood, 12 per cent hardwood, 72 per cent mixed softwood-hardwood, and 5 per cent non-forested. Timber has been cut from most parts of the watershed recently or in the past. At one time the Lloyds operated a saw mill next to Sharpe Brook near the slate-quartzite contact.

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* Area determination by the Water Survey of Canada. The watershed boundary shown in figure 1 is based on National Topographic Series 1:50,000 maps and is not as precise as the boundary shown on map 1.

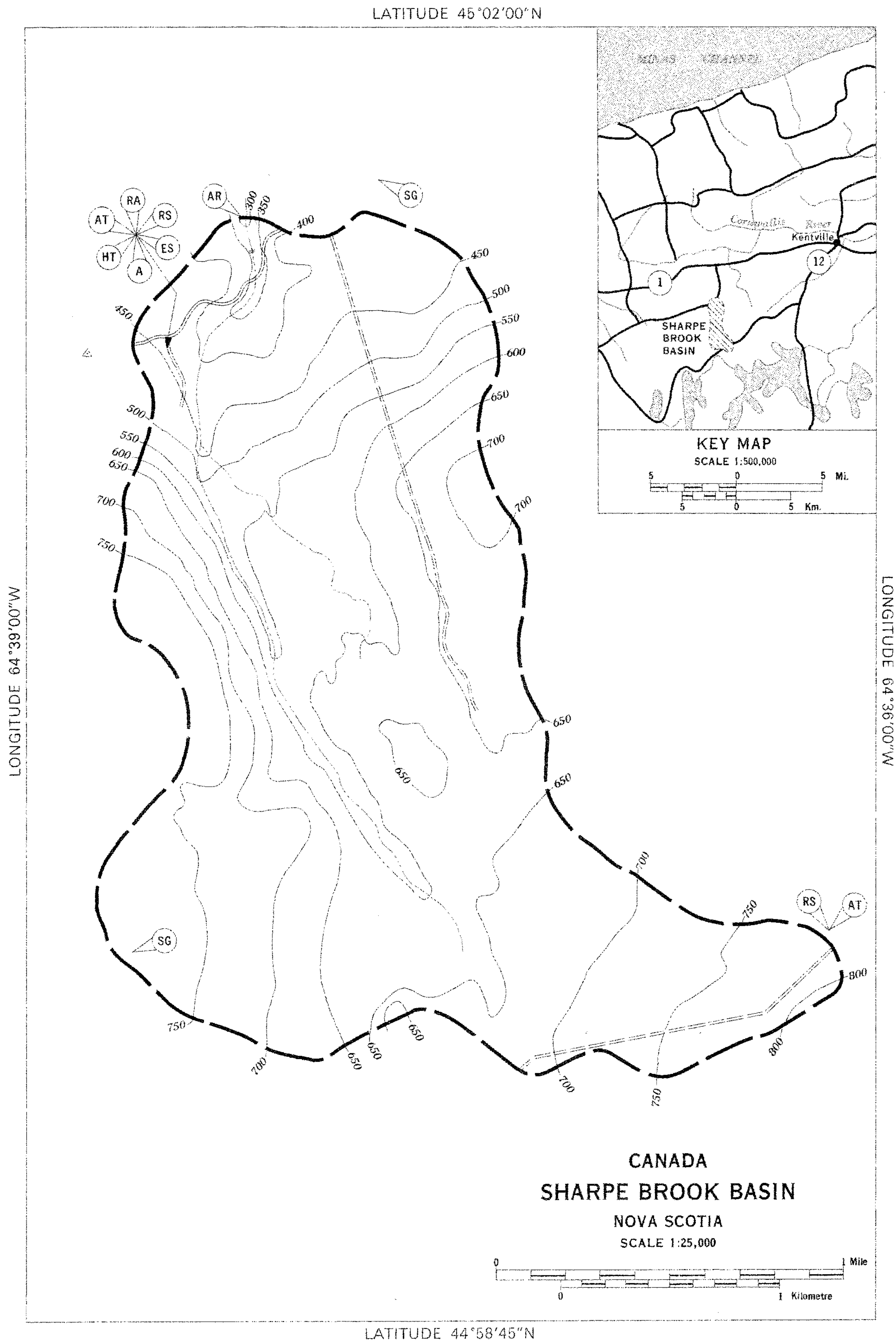

FIGURE 1. Location of the Sharpe Brook IHD Basin.

Climate

Nova Scotia has a humid, temperate, continental climate modified by the Atlantic Ocean which almost completely surrounds the province and by the Gulf Stream which runs northeasterly parallel to the Atlantic coast. The proximity of the ocean tends to prevent extreme temperatures in the summer and winter and minimizes the number of severe atmospheric storms (N. S. Dept. of Trade and Industry, 1965).

The nearest long-term climatic records are those for Kentville eight miles east of Lloyds. The 50-year annual precipitation at Kentville is 41.98 inches. Total snow fall for the winter months averages 84.9 inches. Precipitation is fairly well distributed during the year with slightly higher precipitation occurring during the fall and winter months than during the spring and summer months.

The mean annual temperature is 43.6°F; the mean temperature of the coldest month (February) is 21.1°F, and of the warmest month (July) is 66.2°F. The average frost-free period at Kentville is 125 days (Canada Dept. of Agriculture, Research Station, Kentville, 1961).

The meteorological station at Lloyds was installed in November 1967. The total precipitation for 1968 was 47.35 inches (47.18 inches at Kentville); the mean temperature was 43°F (44°F at Kentville); and the total snowfall was 93.5 inches (91.0 inches at Kentville).

Previous Investigations

For most of the watershed, the only bedrock map available is the Geological Map of Nova Scotia (Weeks, 1965) at a scale of 1 inch equals 8 miles. Taylor (1962) mapped 21 A at a scale of 1 inch equals 4 miles, but this map includes only the small part of the watershed south of north latitude 45°00'. The reports by Stevenson (1959), Smitheringale (1960), and Crosby (1962) cover nearby areas and contain good descriptions of the lithologies found within the watershed.

Dawson (1893) made observations of the glacial features of Nova Scotia. Goldthwait's (1924) description of the physiography of Nova Scotia includes discussions of geomorphic evolution and effects of glaciation in Nova Scotia. The writer (Trescott, 1968) previously mapped the surficial deposits of the area but not in the detail shown on map 1.

Field Work and Maps

The writer spent the week of September 9, 1968 in the field mapping the geology of the Sharpe Brook watershed. Most rock outcrops in the watershed are found in and adjacent to the main channel and principal tributaries of Sharpe Brook. Few traverses were made cross country because outcrops are rare (none were seen along any of the logging roads traveled) and because the boulder-strewn granite and quartzite terrane is difficult to walk in.

Due to the restricted number of outcrops, bedrock boundaries were located in many places with the aid of aeromagnetic maps and study of the overlying till. Some erratics, of course, are carried for great distances before deposition, but generally till composition is a good indicator of the nature of the underlying bedrock.

On map 1, bedding and cleavage symbols have been placed as close as possible to the location of the outcrop measured. The symbols showing the orientation of associated joints are placed nearby. For a system of joints measured on a granite outcrop, the most southerly of the group of joint symbols is located at the site of the outcrop measured.

Acknowledgments

The writer was ably assisted in the field by Jim Gunn. The writer also wishes to acknowledge the cooperation of those living in and adjacent to the Sharpe Brook watershed.

GEOLOGY

Rock Units

Goldenville Formation

The Goldenville and Halifax Formations form the Meguma Group (Woodman, 1904). The Goldenville Formation underlies an area south and east of the old saw mill at Lloyds and a small area in the southeastern part of the watershed, but is exposed only near the junction of the principal tributaries of Sharpe Brook. Its maximum thickness within the watershed is estimated to be 3,500 feet.

> "The Goldenville formation consists of alternate bands of quartzite and slate, with slate forming an estimated 5 per cent of the whole. The quartzite is light grey to dark greenish grey, breaks with a conchoidal fracture, and commonly grades into narrow bands of micaceous, siliceous slate rarely more than a few inches thick. Individual quartzite beds may be several tens of feet thick.
>
> "Megascopically, the quartzite is a dense, uniformly textured, chloritic, fine-grained rock that characteristically weathers light grey to white. Some beds contain cubes of pyrite, whose individual crystals may be up to a quarter inch across.
>
> "Under the microscope, the quartzite is seen to consist mainly of angular to subrounded quartz fragments, with a few feldspar fragments intermingled....Chlorite and muscovite are abundant and some kaolin was noted in a few thin sections....Distinct schistosity, which megascopically could not be discerned, was revealed by the microscope in many sections....In composition the Goldenville quartzite [can be classified as] a subgreywacke" (Stevenson, 1959, pp. 11, 12).

The quartzites and slates are dense and hard as the result of regional metamorphism. In most places the rock is cut by three distinct sets of nearly orthogonal fractures. In many places it is difficult to distinguish fractures along the bedding from other joints. The exposed part of the Goldenville Formation near Lloyds is the northern limb of an anticline. Secondary folding within the formation is not evident in the outcrops.

The base of the formation in the watershed is an intrusive contact with Devonian granite. In one place (see Map 1) a granite apophysis was found in a quartzite outcrop. This area was assumed to be close to the contact with the granite intrusion. In two other locations, quartzite boulders containing granite apophyses were found in the overlying till. These boulders, along with the general composition of the till, were used to locate the assumed granite-quartzite contact.

The quartzites within the watershed have been correlated with the Goldenville Formation on the basis of lithology and stratigraphic position since they are isolated from the main body of Goldenville rocks and no fossils have been found in them. The Goldenville Formation is considered to be early Ordovician or possibly pre-Ordovician in age (Smitheringale, 1960; Weeks, 1965).

Halifax Formation

The Halifax Formation underlies the northern and southeastern parts of the watershed, but exposures are limited to areas along Sharpe Brook and its tributaries from the weir site south to the saw mill at Lloyds and to a few places near but outside the watershed. Its maximum thickness within the watershed is estimated to be 2,500 feet.

> "[The Halifax Formation]...forms a monotonously uniform succession of rusty weathering, sericitized, banded slates and argillites, commonly interbedded with relatively narrow bands of siltstones and chloritic, dense quartzites, the quartzites forming probably less than 5 per cent of the whole" (Stevenson, 1959, p. 13).

In the watershed, crossbedded siltstones in beds up to 8 inches thick are exposed near the weir site. Elsewhere outcrops are composed mostly of slate.

> "As seen in thin section, the slates are composed predominantly of sericite. Angular to subangular quartz grains are most abundant in the lighter coloured layers. The siltstones comprise angular to subangular grains of quartz and [generally less than 10 per cent] feldspar in a matrix of small sericite flakes" (Crosby, 1962, p. 18).

The slates and siltstones are dense and hard as the result of regional metamorphism. Cleavage fractures, generally the most prominent joints, are usually spaced at intervals of 0.1 to 1 inch. Bedding in the siltstones and cleavage in the slates can be compared near the weir site (Fig. 2). In one place bedding and cleavage are parallel, but generally (as also observed by Stevenson, 1959, p. 14) cleavage and bedding are not parallel.

Beds of the Halifax Formation exposed in Sharpe Brook generally dip to the north. In some of the larger outcrops, secondary, nearly isoclinal folds can be seen. Cleavage dipping south in one of the tributaries to Sharpe Brook may reflect secondary folding in this area. The crests of folds contain many quartz veins and, in the southeastern part of the area, are the sites of several mineral prospects.

Near the saw mill, the basal Halifax slates grade downward for a distance of several tens of feet into the typically blocky Goldenville quartzites. This is similar

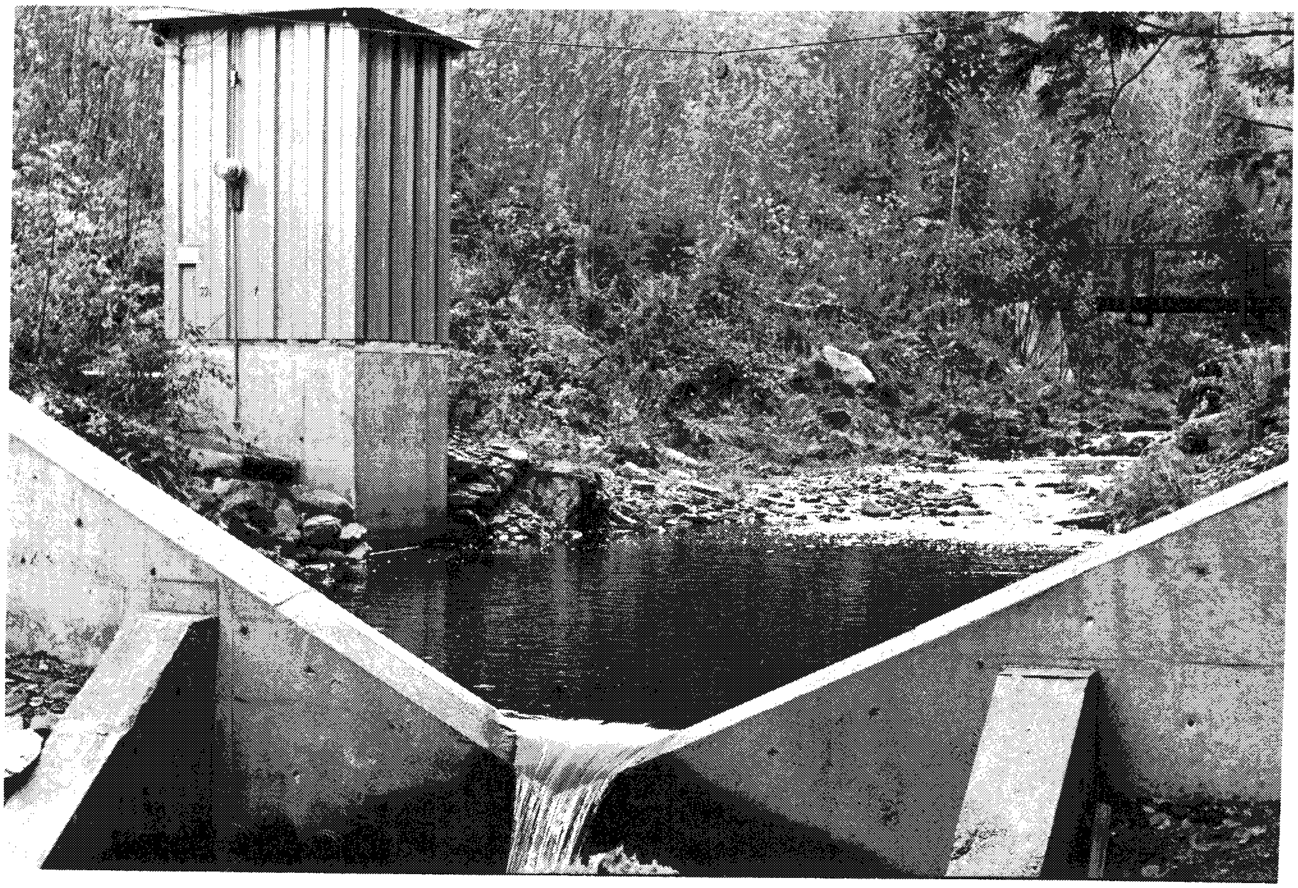

FIGURE 2. Sharpe Brook weir site where Halifax Formation slates and siltstones are well exposed.

to the conformable Goldenville - Halifax contact described by Faribault (1909) along the upper part of Black River.

> "The general uniformity and great thickness of the [Meguma Group] point to deposition in a gently subsiding, marine, geosynclinal basin where the water was fairly shallow and very muddy" (Stevenson, 1959, p. 10).

Fossils collected by Crosby (1962, p. 21) in the Wolfville map-area confirm "that most, if not all, of the Halifax Formation was deposited under marine conditions." On the basis of these fossils, the formation has been assigned an early Ordovician age.

Southern Nova Scotia Batholith

Granite of the Southern Nova Scotia Batholith (Smitheringale, 1960) underlies all of the watershed except the northern and southeastern parts. Although granite boulders are abundant in the drift, few outcrops are present except along the main channel of Sharpe Brook.

Smitheringale (1960) described six types of granite in the Nictaux-Torbrook map-area. In the Sharpe Brook watershed, the granite is like that described by Crosby (1962, p. 29):

> "The granite is porphyritic, with large euhedral to subhedral phenocrysts of white to salmon-red potash feldspar, averaging between 2.5 and 5 cm long, in a coarse-grained matrix of quartz, potash feldspar, plagioclase, and biotite crystals, averaging about 0.5 cm in diameter. The rock has a reddish or whitish appearance depending upon the colour of the potash feldspar....The mineral composition of the granite varies from place to place, but is approximately potash feldspar (45%), quartz (20%), oligoclase (20%), and biotite (15%)."

The granite is commonly cut by three sets of nearly orthogonal joints with the spacing varying from a foot or less to ten or more feet. Although the granite-quartzite contact is covered, it can be located accurately in Sharpe Brook. The only intrusive effects noted in the quartzites were the granite apophyses. Contact metamorphic effects might be seen if thin sections of the quartzite were examined. The intrusive contact with the Halifax slates is not exposed in or near the watershed. Crosby (1962, p. 30) found extensive contact metamorphism in Halifax slates in Wolfville map-area.

The Southern Nova Scotia Batholith has been dated as late Devonian (Smitheringlae, 1960, p. 25).

Surficial Deposits

Glacial Till

The surficial deposit over most of the watershed is glacial till. Its thickness varies from 0 to 60 or more feet and its composition depends on the nature of the underlying bedrock.

Till overlying the Halifax Formation is typically a silty loam, often with an abundance of weathered slate pebbles. Erratics of other lithologics are commonly present. This till can be observed in cuts along the secondary roads and in a few places along Sharpe Brook. In a mineral prospect along the southern watershed boundary, slaty till is at least 20 feet thick. An indication of the thickness of till at Lloyds is the location of a spring emerging from a gravel lens in slaty till. This spring is at least 60 feet below the surface of a hill composed mostly of till but capped by two small kames.

The till mantling quartzite terrane is more sandy than the slaty till and contains numerous quartzite boulders along with erratics. This till is exposed in a few places along Sharpe Brook but elsewhere it is covered by vegetation and is poorly exposed. The maximum thickness of till mantling the quartzites is not known.

Till derived from granite is typically a sandy loam and contains abundant granite boulders. No cuts that would give an indication of its thickness were observed in this till.

Glaciofluvial Deposits

Glaciofluvial deposits are present only at and near Lloyds in the northern part of the watershed. They consist of several kames (hills of stratified sand and gravel formed in contact with wasting ice) and an esker (a subglacial channel deposit).

The largest kame, which may be more than 20 feet thick, is exposed in a road cut east of the weir site. Smaller kames are present on the Lloyd's farm. These kames and the lenses of stratified sand and gravel along the secondary road were the basis for classifying a much larger area at Lloyds as ice-contact stratified drift on an earlier map (Trescott, 1968). New exposures along the secondary road, however, revealed that the stratified deposits are only inclusions in the slaty till. Furthermore, the area west of the road to the saw mill at Lloyds contains several shallow, poorly drained depressions. The drainage would be much better if this area were underlain by permeable sand and gravel deposits. Some of the more sandy material at the surface is probably an ablation till.

The watershed boundary follows an esker for most of a distance of 2,200 feet east of the large kame. Its surface is covered with boulders (probably an ablation till) in places and it is often less than ten feet thick. A cut made for a logging road exposes the sand and gravel beds in the esker near its western terminus.

Stream Alluvium

Most of the Sharpe Brook channel is V-shaped and contains no flood plain. East of Lloyds, however, is a 1,600-foot reach where the valley widens and a flood plain with a width of about 100 feet has formed. Alluvium in the flood plain is very coarse and consists of slate, quartzite and granite pebbles, cobbles and boulders. The alluvium is so permeable that all of the flow of Sharpe Brook is subsurface along some segments of the flood plain during dry weather.

Peat and Muck

Peat and muck have accumulated in three depressional areas along a tributary to Sharpe Brook. A fourth area of peat and muck is located outside the watershed boundary north of the esker.

Structure

> "The quartzites and slates of the Meguma group are characterized by high-angle faults, tight folds, and low-grade metamorphism... [produced by the Devonian Acadian Orogeny]" (stevenson, 1959, p. 37).

The main structural feature in the Sharpe Brook watershed is an anticline with a northeast plunge. The pattern of gamma contours on the aeromagnetic map suggests that several large secondary folds map be present in the Halifax Formation in the southeastern part of the watershed. Smaller secondary folds may be observed in the Halifax Formation near Lloyds.

No large faults were observed in the watershed. Minor faults, offsetting beds from several inches to several feet, may be seen in a few outcrops.

Cleavage is well developed in the slates of the Halifax Formation but is indistinct or non-existent in the siltstones and quartzites. The strike of the cleavage parallels the axial plane of the anticline.

Geomorphology

The South Mountain highland is an erosional surface formed throughout eastern North America in the Cretaceous. During uplift of this surface in the late

Cretaceous or early Tertraiy, streams on the upland (including Sharpe Brook) became incised (Goldthwait, 1924).

Glacial erosion and deposition during the Pleistocene altered the topography locally, but did not change the gross, bedrock-controlled features of the watershed.

HYDROLOGY

Drainage

Surface drainage is good along the main channel of Sharpe Brook and on the steeper slopes. On the relatively flat upland areas, however, surface drainage is poorly defined and shallow boggy areas are common. The best example of this is the principal tributary to Sharpe Brook which drains the southeastern part of the watershed. The channel of this tributary passes through the three relatively large areas of peat and muck and is difficult to define in many places.

Groundwater

Due to the lack of well-defined surface drainage on the uplands, much of the precipitation must infiltrate and drain laterally through the overburden and more permeable, partly weathered zone of the bedrock. None of the surficial deposits or the bedrock units, however, contain good aquifers.

The water-table over most of the watershed is probably less than 20 feet and often less than 10 feet below the surface. The water level in a mineral prospect along the southern boundary of the watershed, for example, was 16 feet. The prospect is located at the crest of a broad hill on slaty till. Other groundwater levels measured in dug wells in the watershed are shown on Map 1.

The location of several springs and the head of dry-weather flow in stream channels is shown on Map 1. The discharge from a spring emerging from a gravel lens in slaty till at Lloyds (Fig. 3) has been measured weekly since September 1967 (discharge data for this spring are given at the end of this report). The writer and George Pinder plan to compare the discharge from this spring with groundwater discharge over the weir as determined by the chemistry of total discharge (Pinder and Jones, 1969) to see if the discharge of this spring is a good index to groundwater discharge in the basin.

Chemical Quality of Surface Water

For the paper on the separation of the groundwater component of stream flow on the basis of the chemistry of total discharge (Pinder and Jones, 1969), water samples were collected from three different points on Sharpe Brook every two days for two months. The analyses for Site 1, the only site within the IHD watershed, are given at the end of this report. The reader is referred to the original paper for details of this project.

FIGURE 3. Spring where discharge is being measured one every week.

SUMMARY

The Sharpe Brook IHD watershed includes an area of 3.36 square miles south of Cambridge in Kings County. The watershed, which has a total relief of 550 feet, is located on the South Mountain highland and is covered mostly by second-growth, mixed softwood-hardwood forest.

The northern and southeastern parts of the watershed are underlain by steeply dipping quartzites of the early Ordovician (possible pre-Ordovician) Goldenville Formation and slates of the early Ordovician Halifax Formation. The remainder of the watershed is underlain by late Devonian granite which has intruded the slates and quartzites. Since bedrock exposures are generally limited to an area adjacent to the main channel of Sharpe Brook, bedrock boundaries over most of the area are based on aeromagnetic maps and on the composition of the overlying glacial till.

Glacial till mantles the bedrock over most of the watershed. It is generally a silty loam in the area underlain by slate and a sandy loam with abundant boulders over granite and quartzite terrane. A few kames and an esker are found in the northern part of the watershed. Recent coarse alluvium is present in one segment of the Sharpe Brook valley, and accumulations of peat and muck are found in three depressional areas along the principal tributary to Sharpe Brook.

Surface drainage is poor except near the main channel of Sharpe Brook. Elsewhere most precipitation probably infiltrates to the water-table and drains laterally to stream channels or to boggy depressional areas. The water-table in many parts of the watershed is probably less than ten feet from the surface during most of the year.

The discharge from a spring at Lloyds has been measured weekly since September 1967, and surface water chemical analyses are available for a two month period in the fall of 1967.

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A[redacted]ndix[redacted] Ch[redacted]al yses urfc /ate [redacted]nplu[redacted]llec... from three sites on Sharpe Brook in the fall of 1967.

PARAMETERS

Sharpe Brook Basin

Except where indicated, all parameters are reported in parts per million.

Date	– Date sample was taken
Stor.	– Storage period; the number of days from sampling until tests are commenced in the laboratory
Temp. °C.	– Temperature of sample at time of collection in °C.
Carb. diox.	– Carbon dioxide (calculated)
Color	– in Hazen units
Turb.	– Turbidity in turbidity units
Cond.	– Specific conductance in micromhos at 25°C.
Non-carb.	– Noncarbonate hardness
% Sod.	– per cent sodium
Sod. abs. ratio	– Sodium absorption ratio
Sat. index	– Saturation index
Stab. index	– Stability index
Sum of Cons.	– Sum of constituents

Cal.	– Calcium
Mag.	– Magnesium
Diss.	– Dissolved
Alum.	– Aluminum
Pot.	– Potassium
Carb.	– Carbonate
Bicarb.	– Bicarbonate
Sulp.	– Sulphate
Chlor.	– Chloride
Fluor.	– Fluoride
Phos.	– Phosphate
Nitr.	– Nitrate
Sil.	– Silica
Amm.	– Ammonia

TABLE 1 A

Chemical Analyses of Surface Waters in Sharpe Brook, Nova Scotia

No.	Date	Stor.	Temp. °C	Carb. diox. (CO_2)	pH	Color	Turb.	Cond.	Hardness as $CaCO_3$ Total	Hardness as $CaCO_3$ Non-carb.	% Sod.	Sod. abs. ratio	Sat. index	Stab. index	Sum of Cons.
SAMPLING SITE NO. 1 (550 feet south of the weir)															
1	Aug. 1/67	24	17.8	10	5.8	45	5	39.5	9.1	5.9	44	0.5	−4.8	15	19.0
2	Sept. 24	29	13.9	4	6.0	30	–	38.9	5.6	3.6	53	0.2	−5.0	16	27.6
3	Sept. 26	27	10.6	6	5.6	100	–	33.5	2.6	1.3	54	0.6	−5.4	16	24.8
4	Sept. 28	25	12.8	5	5.6	70	–	34.5	6.2	5.1	50	0.7	−5.6	17	28.1
5	Sept. 30	23	14.4	4	5.9	65	–	34.9	5.9	4.2	56	0.7	−5.1	16	26.4
6	Oct. 2	21	12.2	3	5.8	70	–	35.1	6.2	5.0	55	0.6	−5.3	16	26.2
7	Oct. 4	19	11.7	3	5.9	55	–	34.5	6.4	5.0	53	0.6	−5.1	16	27.0
8	Oct. 6	17	10.0	3	6.1	60	–	35.6	6.4	4.9	55	0.7	−4.9	16	28.2
9	Oct. 8	15	8.9	4	5.9	50	–	36.5	6.4	4.8	56	0.7	−5.1	16	27.5
10	Oct. 10	49	11.1	8	5.5	100	–	38.1	6.6	5.4	49	0.6	−5.6	17	27.1
11	Oct. 12	47	10.6	24	4.8	140	–	38.8	6.7	6.7	49	0.5	−6.4	18	24.1
12	Oct. 14	46	8.9	14	5.0	120	–	37.1	6.9	6.7	50	0.6	−6.4	18	26.3
13	Oct. 16	44	10.0	11	5.1	110	–	37.6	6.8	6.5	52	0.6	−6.1	17	25.2
14	Oct. 18	42	11.1	11	5.2	110	–	36.7	7.1	6.5	50	0.6	−6.0	17	26.3
15	Oct. 20	40	8.9	9	5.1	110	–	35.1	6.5	6.3	52	0.6	−6.1	17	26.0
16	Oct. 22	38	11.7	5	5.2	100	–	35.0	6.0	5.9	53	0.6	−6.1	17	25.3
17	Oct. 24	36	7.8	3	5.3	80	–	34.5	6.7	6.6	51	0.5	−5.8	17	25.8
18	Oct. 26	39	10.0	6	5.4	80	–	35.4	6.6	6.0	51	0.6	−5.9	17	24.3
19	Oct. 28	37	8.3	1	5.4	80	–	35.4	6.1	5.8	57	0.7	−6.4	18	23.6
20	Oct. 30	35	6.7	1	5.4	80	–	35.1	5.5	5.1	61	0.8	−6.4	18	23.7
21	Nov. 1	33	8.9	3	5.5	70	–	35.2	6.0	5.4	59	0.8	−6.1	18	23.7
22	Nov. 3	31	11.7	6	5.5	70	–	35.2	5.9	5.1	59	0.8	−5.9	17	23.7
SAMPLING SITE NO. 2 (at road crossing 1.3 miles north of weir)															
1	Sept. 24/67	29	13.3	7	6.1	50	–	49.0	10.4	4.5	37	0.5	−4.1	14	32.6
2	Sept. 26	27	12.2	4	6.3	60	–	39.2	8.7	4.8	45	0.5	−4.1	15	29.3
3	Sept. 28	25	16.7	3	6.5	50	–	40.4	8.9	4.2	45	0.6	−3.8	14	30.0
4	Sept. 30	23	17.8	3	6.5	40	–	42.5	9.2	4.1	46	0.6	−3.8	14	30.3
5	Oct. 2	21	11.7	2	6.7	35	–	40.5	9.2	4.1	45	0.5	−3.6	14	29.6
6	Oct. 4	19	12.8	2	6.7	30	–	41.8	10.1	4.8	43	0.5	−3.5	14	30.3
7	Oct. 6	17	10.6	2	6.8	30	–	43.4	10.1	4.4	43	0.5	−3.4	14	31.1
8	Oct. 8	15	9.4	3	6.6	20	–	44.3	10.1	4.3	43	0.5	−3.6	14	30.8
9	Oct. 10	49	12.8	4	6.5	80	–	59.6	14.9	8.5	30	0.4	−3.5	14	40.8
10	Oct. 12	47	11.1	17	5.1	130	–	38.0	7.5	6.8	47	0.5	−6.0	17	26.6
11	Oct. 14	46	10.0	7	5.5	110	–	37.1	8.6	7.6	45	0.5	−5.5	17	27.7
12	Oct. 16	44	10.0	9	5.7	90	–	37.1	7.8	5.6	48	0.6	−5.1	16	27.5
13	Oct. 18	42	13.3	7	5.7	80	–	37.5	8.4	6.6	44	0.5	−4.9	16	28.3
14	Oct. 20	40	8.9	5	5.7	100	–	36.5	7.2	5.9	49	0.6	−5.3	16	26.7

TABLE 1 B

Chemical Analyses of Surface Waters in Sharpe Brook, Nova Scotia

No.	Date	Cal. (Ca)	Mag. (Mg)	Iron (Fe)		Alum. (Al)	Manganese (Mn)		Copper (Cu)	Zinc (Zn)	Sod. (Na)	Pot. (K)	Carb. (CO_3)	Bicarb. (HCO_3)	Sulp. (SO_4)	Chlor. (Cl)	Fluor. (F)	Phos. (PO_4)	Nitr. (NO_3)	Sil. (SiO_2)	Amm. (NH_4)
				Total	Diss.		Total	Diss.													
	SAMPLING SITE NO. 1 (550 feet south of the weir)																				
1	Aug. 1/67	1.8	1.1	0.02	–	–	–	–	–	0.010	3.5	0.5	0.0	3.9	5.2	4.4	–	–	1.05	0.5	–
2	Sept. 24	0.9	0.8	1.00	–	0.14	0.09	–	0.008	0.005	3.7	0.5	0.0	2.4	4.7	6.9	0.18	–	0.24	7.3	–
3	Sept. 26	1.6	0.7	0.37	–	0.38	0.04	–	0.005	0.002	3.8	0.2	0.0	1.6	4.1	7.3	0.14	–	0.01	9.2	–
4	Sept. 28	1.3	0.7	0.34	–	0.33	0.03	–	0.005	0.002	3.8	0.3	0.0	1.3	4.5	7.3	0.14	–	<0.05	8.7	–
5	Sept. 30	1.2	0.7	0.34	–	0.29	0.02	–	0.003	0.002	3.8	0.3	0.0	2.1	4.3	6.9	0.14	–	0.05	8.4	–
6	Oct. 2	1.3	0.7	0.30	–	0.27	0.02	–	0.005	0.002	3.6	0.3	0.0	1.5	3.6	6.8	0.13	–	<0.05	8.5	–
7	Oct. 4	1.4	0.7	0.28	–	0.25	0.02	–	0.000	0.002	3.7	0.4	0.0	1.7	3.8	7.1	0.12	–	<0.05	8.4	–
8	Oct. 6	1.4	0.7	0.28	–	0.26	0.01	–	0.000	0.003	3.8	0.3	0.0	1.8	3.9	7.6	0.11	–	0.07	8.9	–
9	Oct. 8	1.4	0.7	0.32	–	0.23	0.02	–	0.000	0.003	3.9	0.3	0.0	2.0	4.1	7.1	0.11	–	0.05	8.3	–
10	Oct. 10	1.3	0.8	0.74	–	–	0.11	–	0.000	0.002	3.3	0.6	0.0	1.5	4.0	6.4	0.08	–	1.22	8.7	–
11	Oct. 12	1.3	0.8	0.59	–	–	0.01	–	0.000	0.005	3.2	0.4	0.0	0.0	3.8	7.8	0.12	–	0.02	6.6	–
12	Oct. 14	1.4	0.8	0.47	–	–	0.02	–	0.000	0.003	3.5	0.5	0.0	0.2	5.6	7.1	0.08	–	0.07	7.1	–
13	Oct. 16	1.4	0.8	0.42	–	–	0.02	–	0.005	0.005	3.5	0.3	0.0	0.4	4.8	6.8	0.08	–	0.05	7.3	–
14	Oct. 18	1.5	0.8	0.46	–	–	0.02	–	0.000	0.005	3.5	0.5	0.0	0.7	5.3	6.9	0.13	–	0.08	7.2	–
15	Oct. 20	1.4	0.7	0.45	–	–	0.02	–	0.000	0.006	3.4	0.3	0.0	0.2	5.4	7.2	0.07	–	0.10	7.3	–
16	Oct. 22	1.2	0.7	0.43	–	–	0.01	–	0.000	0.006	3.4	0.4	0.0	0.1	5.3	7.0	0.06	–	0.07	7.1	–
17	Oct. 24	1.5	0.7	0.38	–	–	0.02	–	0.000	0.004	3.4	0.4	0.0	0.1	5.6	6.7	0.10	–	0.07	7.3	–
18	Oct. 26	1.4	0.8	0.37	–	–	0.04	–	0.000	0.003	3.5	0.5	0.0	0.7	5.3	7.2	0.14	–	0.02	5.1	–
19	Oct. 28	1.2	0.8	0.37	–	–	0.03	–	0.005	0.004	4.1	0.4	0.0	0.4	4.4	6.8	0.19	–	0.01	5.2	–
20	Oct. 30	1.0	0.7	0.35	–	–	0.02	–	0.000	0.002	4.2	0.3	0.0	0.5	4.6	6.7	0.17	–	0.03	5.4	–
21	Nov. 1	1.2	0.7	0.35	–	–	0.02	–	0.000	0.003	4.2	0.3	0.0	0.7	4.4	6.6	0.17	–	0.02	5.3	–
22	Nov. 3	1.2	0.7	0.33	–	–	0.02	–	0.000	0.003	4.2	0.3	0.0	1.0	4.2	6.7	0.14	–	0.04	5.4	–
	SAMPLING SITE NO. 2																				
1	Sept. 24/67	2.5	1.0	0.56	–	0.13	0.15	–	0.020	0.002	3.5	1.7	0.0	6.0	4.4	9.0	0.10	–	0.47	6.3	–
2	Sept. 26	2.0	0.9	0.34	–	0.15	0.03	–	0.007	0.003	3.7	0.3	0.0	4.8	4.1	6.7	0.13	–	0.13	8.5	–
3	Sept. 28	2.1	0.9	0.32	–	0.10	0.04	–	0.000	0.002	3.8	0.4	0.0	5.7	4.4	6.8	0.13	–	0.18	8.0	–
4	Sept. 30	2.2	0.9	0.38	–	0.07	0.03	–	0.020	0.000	3.9	0.6	0.0	6.2	4.5	6.8	0.11	–	0.13	7.6	–
5	Oct. 2	2.2	0.9	0.35	–	0.07	0.04	–	0.005	0.003	3.7	0.5	0.0	6.2	3.9	6.8	0.10	–	0.20	7.8	–
6	Oct. 4	2.4	1.0	0.31	–	0.06	0.03	–	0.000	0.000	3.8	0.5	0.0	6.5	4.1	6.9	0.10	–	0.27	7.7	–
7	Oct. 6	2.4	1.0	0.40	–	0.07	0.03	–	0.000	0.000	3.8	0.6	0.0	6.9	4.2	6.8	0.10	–	0.26	8.0	–
8	Oct. 8	2.4	1.0	0.27	–	0.02	0.04	–	0.000	0.000	3.8	0.5	0.0	7.1	4.3	7.0	0.08	–	0.19	7.8	–
9	Oct. 10	3.8	1.3	1.08	–	–	0.25	–	0.000	0.005	3.4	1.6	0.0	7.8	5.1	7.9	0.07	–	5.00	8.8	–
10	Oct. 12	1.6	0.9	0.58	–	–	0.05	–	0.010	0.005	3.3	0.4	0.0	0.9	5.9	7.3	0.07	–	0.08	6.7	–
11	Oct. 14	1.9	0.9	0.47	–	–	0.05	–	0.000	0.002	3.5	0.5	0.0	1.2	6.0	6.9	0.08	–	0.09	7.2	–
12	Oct. 16	1.7	0.9	0.43	–	–	0.04	–	0.000	0.004	3.6	0.5	0.0	2.7	5.4	6.6	0.07	–	0.11	7.3	–
13	Oct. 18	1.9	0.9	0.72	–	–	0.06	–	0.000	0.002	3.4	0.7	0.0	2.2	6.1	6.8	0.13	–	0.42	6.9	–
14	Oct. 20	1.5	0.8	0.47	–	–	0.03	–	0.000	0.005	3.5	0.5	0.0	1.6	5.6	6.9	0.14	–	0.06	6.9	–

TABLE 1 A

Chemical Analyses of Surface Waters in Sharpe Brook, Nova Scotia

No.	Date	Stor.	Temp. °C	Carb. diox. (CO_2)	pH	Color	Turb.	Cond.	Hardness as $CaCO_3$ Total	Hardness as $CaCO_3$ Non-carb.	% Sod.	Sod. abs. ratio	Sat. index	Stab. index	Sum of Cons.
	SAMPLING SITE NO. 2 (concluded)														
1	Oct. 22/67	38	11.1	3	6.0	80	–	36.5	7.5	5.8	49	0.6	–4.8	16	27.7
2	Oct. 24	36	8.9	2	6.2	80	–	36.2	7.5	5.9	48	0.6	–4.7	16	26.9
3	Oct. 26	39	11.7	3	6.2	60	–	37.7	7.5	5.1	48	0.5	–4.6	15	25.3
4	Oct. 28	37	8.9	3	6.1	60	–	38.6	7.6	5.3	53	0.7	–4.7	16	25.8
5	Oct. 30	35	7.8	2	6.4	60	–	38.0	7.6	5.3	54	0.7	–4.4	15	26.1
6	Nov. 1	33	11.1	2	6.4	50	–	38.3	7.6	4.8	54	0.7	–4.3	15	20.5
7	Nov. 3	31	14.4	4	6.1	50	–	38.7	7.5	4.5	55	0.7	–4.6	15	24.0
	SAMPLING SITE NO. 3 (at road crossing 2.2 miles north of weir)														
1	Sept. 24/67	29	15.6	5	6.6	40	–	61.4	17.9	6.2	27	0.4	–3.0	13	44.4
2	Sept. 26	27	11.1	3	6.8	50	–	47.1	12.8	4.2	36	0.5	–3.1	13	35.2
3	Sept. 28	26	13.3	3	6.9	30	–	52.0	14.2	3.2	35	0.4	–2.8	13	36.5
4	Sept. 30	23	15.0	3	6.9	20	–	54.9	14.7	3.3	33	0.4	–2.8	13	38.2
5	Oct. 2	21	10.7	3	6.9	20	–	53.5	14.5	3.2	34	0.4	–2.8	13	37.2
6	Oct. 4	19	11.3	2	7.0	20	–	55.1	15.5	3.0	32	0.4	–2.6	12	39.3
7	Oct. 6	17	8.9	3	6.9	20	–	54.6	15.7	3.3	32	0.4	–2.7	12	29.6
8	Oct. 8	15	7.8	3	7.0	10	–	57.4	16.2	3.2	31	0.4	–2.6	12	39.9
9	Oct. 10	49	13.9	3	6.2	50	–	43.2	7.4	4.9	42	0.5	–4.5	15	28.5
10	Oct. 12	47	11.7	11	5.5	150	–	41.8	8.8	7.2	43	0.5	–5.4	16	28.5
11	Oct. 14	46	10.6	6	6.0	100	–	40.5	10.0	6.8	42	0.5	–4.5	15	30.8
12	Oct. 16	44	9.4	5	6.3	80	–	43.0	10.2	5.5	41	0.5	–4.0	14	31.6
13	Oct. 18	42	13.3	8	6.0	100	–	43.8	10.1	6.2	38	0.5	–4.3	15	31.6
14	Oct. 20	40	8.9	3	6.3	90	–	38.9	9.1	6.0	44	0.5	–4.2	15	29.3
15	Oct. 22	38	11.1	2	6.6	80	–	40.4	10.6	6.2	40	0.5	–3.7	14	31.5
16	Oct. 24	36	8.9	3	6.6	60	–	43.3	10.8	5.4	40	0.5	–3.5	14	32.4
17	Oct. 26	39	11.7	1	6.6	50	–	45.7	10.7	4.3	39	0.5	–3.6	14	29.6
18	Oct. 28	37	7.2	2	6.7	50	–	44.6	10.8	4.7	44	0.6	–3.5	14	26.7
19	Oct. 30	35	6.1	3	6.7	50	–	45.1	10.9	4.5	45	0.6	–3.4	14	30.8
20	Nov. 1	33	10.0	3	6.7	40	–	45.4	10.9	3.8	45	0.6	–3.4	14	31.1
21	Nov. 3	31	13.9	2	6.9	40	–	45.5	11.1	3.8	41	0.5	–3.1	13	25.7

TABLE 2 B

Chemical Analyses of Surface Waters in Sharpe Brook, Nova Scotia

No.	Date	Cal. (Ca)	Mag. (Mg)	Iron (Fe) Total	Iron (Fe) Diss.	Alum. (Al)	Manganese (Mn) Total	Manganese (Mn) Diss.	Copper (Cu)	Zinc (Zn)	Sod. (Na)	Pot. (K)	Carb. (CO_3)	Bicarb. (HCO_3)	Sulp. (SO_4)	Chlor. (Cl)	Fluor. (F)	Phos. (PO_4)	Nitr. (NO_3)	Sil. (SiO_2)	Amm. (NH_3)
	SAMPLING SITE NO. 2 (concluded)																				
1	Oct. 22/67	1.7	0.8	0.44	–	–	0.02	–	0.000	0.005	3.6	0.5	0.0	2.0	6.0	6.9	0.07	–	0.05	7.1	–
2	Oct. 24	1.7	0.8	0.40	–	–	0.01	–	0.000	0.004	3.5	0.5	0.0	2.0	5.8	6.3	0.11	–	0.11	7.1	–
3	Oct. 26	1.6	0.9	0.46	–	–	0.04	–	0.000	0.003	3.5	0.6	0.0	2.9	5.3	6.8	0.14	–	0.07	5.0	–
4	Oct. 28	1.6	0.9	0.41	–	–	0.04	–	0.010	0.002	4.2	0.4	0.0	2.8	4.9	6.5	0.20	–	0.15	5.1	–
5	Oct. 30	1.6	0.9	0.40	–	–	0.04	–	0.000	0.003	4.3	0.3	0.0	2.8	4.9	6.6	0.15	–	0.12	5.4	–
6	Nov. 1	1.6	0.9	0.40	–	–	0.03	–	0.000	0.002	4.3	0.3	0.0	3.4	4.3	6.1	0.15	–	0.13	5.3	–
7	Nov. 3	1.6	0.9	0.43	–	–	0.03	–	0.000	0.000	4.5	0.5	0.0	3.7	4.5	5.9	0.15	–	0.13	5.4	–
	SAMPLING SITE NO. 3																				
1	Sept. 24/67	5.0	1.3	0.78	–	–	0.03	–	0.008	0.005	3.5	1.8	0.0	14.3	5.7	8.1	0.10	–	1.8	9.5	–
2	Sept. 26	3.3	1.1	0.27	–	0.12	0.03	–	0.008	0.002	3.8	0.5	0.0	10.5	4.0	6.7	0.12	–	0.38	9.7	–
3	Sept. 28	3.7	1.2	0.25	–	0.03	0.03	–	0.000	0.000	3.7	0.6	0.0	13.4	3.9	6.2	0.10	–	0.38	9.8	–
4	Sept. 30	3.9	1.2	0.29	–	0.01	0.04	–	0.010	0.002	3.5	0.8	0.0	13.9	4.4	6.7	0.08	–	0.55	9.9	–
5	Oct. 2	3.8	1.2	0.26	–	0.03	0.03	–	0.000	0.000	3.6	0.7	0.0	13.8	3.8	6.5	0.10	–	0.49	9.9	–
6	Oct. 4	4.2	1.2	0.27	–	0.02	0.03	–	0.000	0.000	3.6	0.7	0.0	15.2	4.5	6.7	0.08	–	0.51	10.0	–
7	Oct. 6	4.3	1.2	0.27	–	0.02	0.03	–	0.000	0.002	3.6	0.7	0.0	15.1	3.8	6.7	0.09	–	0.46	10.	–
8	Oct. 8	4.5	1.2	0.21	–	0.04	0.03	–	0.005	0.002	3.6	0.7	0.0	15.8	3.9	6.7	0.06	–	0.56	11	–
9	Oct. 10	1.6	0.8	10	–	–	1.5	–	0.010	0.012	3.1	1.6	0.0	3.0	4.5	6.6	0.09	–	2.09	6.6	–
10	Oct. 12	2.0	0.9	0.57	–	–	0.05	–	0.005	0.005	3.3	0.5	0.0	2.0	5.7	7.1	0.08	–	0.39	7.5	–
11	Oct. 14	2.5	0.9	0.45	–	–	0.02	–	0.000	0.003	3.6	0.6	0.0	3.9	5.6	6.9	0.11	–	0.40	8.3	–
12	Oct. 16	2.5	1.0	0.40	–	–	0.01	–	0.000	0.004	3.5	0.5	0.0	5.7	5.2	6.7	0.07	–	0.56	8.8	–
13	Oct. 18	2.5	0.9	0.97	–	–	0.10	–	0.000	0.008	3.3	1.2	0.0	4.8	5.3	7.0	0.08	–	1.65	7.3	–
14	Oct. 20	2.2	0.9	0.45	–	–	0.02	–	0.000	0.005	3.5	0.5	0.0	3.8	5.1	7.0	0.15	–	0.28	7.8	–
15	Oct. 22	2.8	0.9	0.41	–	–	0.01	–	0.010	0.004	3.5	0.5	0.0	5.4	5.7	6.7	0.07	–	0.37	8.3	–
16	Oct. 24	2.9	0.9	0.36	–	–	0.02	–	0.000	0.003	3.4	0.4	0.0	6.6	6.0	6.6	0.06	–	0.41	8.5	–
17	Oct. 26	2.7	1.0	0.37	–	–	0.02	–	0.000	0.002	3.4	0.7	0.0	7.8	4.3	6.6	0.16	–	0.22	6.3	–
18	Oct. 28	2.7	1.0	0.40	–	–	0.03	–	0.000	0.000	4.2	0.5	0.0	7.4	4.3	6.5	0.15	–	0.41	6.5	–
19	Oct. 30	2.7	1.0	0.41	–	–	0.03	–	0.000	0.002	4.3	0.5	0.0	7.8	4.2	6.5	0.20	–	0.41	6.7	–
20	Nov. 1	2.7	1.0	0.38	–	–	0.03	–	0.000	0.002	4.3	0.5	0.0	8.7	4.2	6.2	0.13	–	0.50	6.9	–
21	Nov. 3	2.8	1.0	0.37	–	–	0.03	–	0.000	0.004	3.7	0.3	0.0	8.9	4.6	5.6	0.12	–	0.37	6.8	–

Appendix B. Discharge from a spring in the Sharpe Brook basin,
September 24, 1967 to October 18, 1969

0026?

RECORD FOR SPRING DISCHARGE

for spring at Shayes Brook

Recorded by Mrs Peta Lloyd. 0.16 / No sec = cfs

Date	Time	Time to fill a ½ gallon jug (min)			Discharge g/m		cfs
Sept 24-1967	5.30 PM	1 min 15 sec.	150	1.25	0.80	0.40	.00107
Sept 26-1967	5.30 P.M	1 min 25 secs	170	1.42	0.70	0.35	.00094
Sept 28-1967	6.30 PM	2 mins	240	2.00	0.50	0.25	.00067
Sept 30-1967	6.30 PM.	1 min 34 secs	188	1.57	0.64	0.32	.00085
Oct 2-1967	6.45 PM	1 min 45 secs	210	1.75	0.57	0.28	.00076
Oct 4-1967	6.30 PM	2 mins 12 secs	264	2.20	0.45	0.22	.00061
Oct 6-1967	8 AM.	1 min 35 secs	190	1.58	0.63	0.31	.00084
Oct 8-1967	8 AM.	1 min 20 secs	160	1.33	0.75	0.37	.0010
Oct 10-1967	7.55 AM	1 min 10 secs	140	1.17	0.85	0.42	.0011
Oct 12-1967	7.50 AM	55 secs	110	.92	1.09	0.54	.0015
Oct 14-1967	8 AM	1 min	120	1.00	1.00	0.50	.0013
Oct 16-1967	7.40 AM	1 min 5 secs	130	1.08	0.93	0.46	.0012
Oct 18-1967	7.45 AM	1 min 9 secs	138	1.15	0.87	0.43	.0012
Oct 20-1967	7.50 AM	52 secs	104	.87	1.15	0.57	.0015
Oct 22-1967	8 AM.	1 min 3 secs	126	1.05	0.95	0.47	.0013
Oct 24-1967	7.40 AM	1 min 2 secs	124	1.03	0.97	0.48	.0013
Oct 26-1967	7.45 AM	57 secs	114	.95	1.05	0.52	.0014
Oct 28-1967	7.40 AM	59 secs	118	.98	1.02	0.51	.0014
Oct 30-1967	7.45 AM	54 secs	108	.90	1.10	0.55	.0015
Nov 1-1967	7.45 AM	57 secs 96	114	.95	1.05	0.52	.0014
Nov 3-1967	[illegible]	[illegible]	[illegible]	1.72	1.37	0.69	[illegible]

RECORD FOR SPRING DISCHARGE

for spring at *Sharps* Brook

Recorded by *Mrs Rete Lloyd*

Date	Time	Time to fill a ½ gallon jug	Discharge g/½m	gpm	cfs
Nov 11 - 1967	130 PM	42 secs (84) .70	1.43	0.71	.0019
Nov. 18 - 1967	3. P.M	38 secs (76) .64	1.56	0.78	.0021
Nov 25 - 1967	3.15 PM	22 secs (44) .37	2.70	1.35	.0036
Dec 2 - 1967	3. P.M	5 secs (10) .08	12.5	6.2	.016
Dec 9 - 1967	2.15 P.M	4 secs (8) .06 water flowing over sides of dam	17	8	.02

Dept. of Mines
RECEIVED
MAR 26 1968
NOVA SCOTIA

RECORD FOR SPRING DISCHARGE

for spring at Sharps Brook

Recorded by Rita Lloyd

Date	Time	Time to fill a ½ gallon jug	g/½m	Discharge cfs	g/m
Dec 16-1967	1 P.M	7 secs 14 .12	8.3	.011	4.1
Dec 23-1967	3. P.M	9 secs 18 .15	6.7	.0089	3.3
Dec 30-1967	5:PM	15 secs 30 .25	4.0	.0053	2.0
JAN 6-1968	2.15 P.M	8 secs 16 .13	7.7	.010	3.8
JAN 13 (14) - 1968	3 PM	15 secs 30 .25	4.0	.0053	2.0
JAN 20 (21) - 1968	3.30 PM	25 secs 50 .42	2.4	.0032	1.2
JAN 27 (28) - 1968	3 PM	14 secs 28 .23	4.3	.0057	2.1
FEB 4-1968	10.30 AM	25 secs 50 .42	2.4	.0032	1.2
FEB 10 (11) - 1968	1.45 PM	10 secs 20 .17	5.9	.0080	2.9
Feb 17 (20) - 1968	3.30 PM	20 secs 40 .33	3.0	.0040	1.5
Feb 24 (25) - 1968	2 P.M	27 secs 54 .45	2.2	.0030	1.1
March 3-1968	4.45 PM	25 secs 50 .42	2.4	.0032	1.2
March 9-1968	4.35 PM	20 secs 40 .33	3.0	.0040	1.5
March 16 (17) - 1968	1.30 PM	10 secs 20 .17	5.9	.0080	2.9
March 23 (24) - 1968	2.20 PM	9 secs 18 .15	6.7	.0089	3.3

Dept. of Mines
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JUN 25 1968
NOVA SCOTIA

RECORD FOR SPRING DISCHARGE

for spring at Sharps Brook

Recorded by Mrs Reta Lloyd

Date	A.S.T. Time	Time to fill a ½ gallon jug	g/½ m	Discharge cfs	g/m
March 30 (31) - 1968	4.10 P.M	10 secs. (20) .17	5.9	.0080	2.9
April 6 (7) - 1968	12 A.M.	15 secs. (30) .25	4.0	.0053	2.0
April 13 (14) - 1968	1.30 P.M	20 secs. (40) .33	3.0	.0040	1.5
April 20 (21) - 1968	6.20 P.M	20 secs. (40) .33	3.0	.0040	1.5
April 27 (28) - 1968	5.45 P.M	25 secs. (50) .42	2.4	.0032	1.2
daylight saving time					
May 4 - 1968	7.15 P.M.	37 secs. (74) .62	1.6	.0022	0.8
May 11 (12) - 1968	6.55 P.M	43 secs. (86) .72	1.4	.0019	0.7
May 18 (19) - 1968	4.30 P.M	40 secs. (80) .67	1.5	.0020	0.75
May 25 - 1968	6. P.M.	39 secs. (78) .65	1.54	.0020	0.77
June 1 - 1968	6.55 P.M	46 secs (92) .77	1.3	.0017	0.65
June 8 - 1968	7 P.M	56 secs (112) .93	1.07	.0014	0.53
June 15 - 1968	6.45 P.M	42 secs (84) .70	1.43	.0019	0.71
June 22 - 1968	6.40 P.M.	30 secs (60) .50	2.0	.0025	1.0

RECORD FOR SPRING DISCHARGE

for spring at Sharp's Brook

Recorded by Mrs Peter Lloyd

Date	D.S.T. Time	Time to fill a ½ gallon jug	Discharge
June 29-1968	6.45 P.M	28 secs.	
July 6-1968	6.25 P.M.	25 secs.	
July 13-1968	7.35 P.M.	37 secs.	
July 20-1968	7.45 P.M	25 secs.	
July 27-1968	6.05 P.M.	75 secs.	
Aug 3-1968	5.40 P.M.	72 secs.	
Aug 10-1968	5.50 P.M.	76 secs	
Aug 17-1968	7.20 P.M	132 secs.	
Aug 24-1968	6.45 P.M.	135 secs	
Aug 31-1968	7 P.M.	160 secs	
Sept 7-1968	6.50 P.M.	158 secs	
Sept 14-1968	4 P.M	135 secs	
Sept 21-1968	6.30 P.M	110 secs	
Sept 28-1968	5.45 P.M.	123 secs	
Oct 5-1968	5.15 P.M	135 secs	

RECORD FOR SPRING DISCHARGE

for spring at Sharps Brook

Recorded by Mrs Pete Lloyd

Date	Time	Time to fill a ½ gallon jug	Discharge
Oct 12 - 1968	5.25 P.M.	138 secs	
Oct 19 - 1968	5.30 P.M	130 secs	
Oct 26 - 1968	4.30 P.M	80 secs	
Nov 2 - 1968	3.30 P.M	78 secs	
Nov 9 - 1968	4 P.M	20 secs	
Nov 16 - 1968	1.30 P.M	11 secs	
Nov 23 - 1968	2.30 P.M	9 secs	
Nov 30 - 1968	3.05 P.M	3 secs	
Dec 7 - 1968	3.30 P.M.	3 secs	
Dec 14 - 1968	4 P.M	5 secs	
Dec 21 - 1968	3.30 P.M.	8 secs	
Dec 28 - 1968	2.25 P.M	8 secs	
Jan 4 - 1969	11.25 A.M.	12 secs	
Jan 11 - 1969	2.15 P.M	7 secs	
Jan 18 - 1968	1.45 P.M	13 secs	
Jan 25 - 1968	2.30 P.M	~~30~~ 20 secs	

RECORD FOR SPRING DISCHARGE

for spring at Slaps Brook

Recorded by Mrs Pete Lloyd

Date	Time	Time to fill a ½ gallon jug	Discharge
Feb 1-1969	3.30P.M	20 secs	
Feb 8 - 1969	2.10P.M	19 secs	
Feb 15 - 1969	3.30P.M.	20 secs	
Feb 22 - 1969	4PM	17 secs	
March 1 - 1969	2.35P.M	20 secs	
March 8 - 1969	3.15PM	18 secs	
March 15 - 1969	2.50P.M	37 secs	
22-1969	2.25PM	25 secs	
March 29 - 1969	2.15P.M	7 secs	
pril 5-1969	2.30PM	12 secs	
pril 12-1969	4 PM	10 secs	
pril 19-1969	1.30PM	10 secs	
April 26 - 1969	5.45PM	12 secs	
May 3 - 1969	6.35 PM	16 secs.	Daylight Saving Time
May 10 - 1969	12.30AM	20 secs.	
May 17 - 1969	2.10P.M	15 secs	
May 24 - 1969	8.15AM	15 secs	
May 30 - 1969	5.30P.M	24 secs	
June 7 - 1969	6.30P.M	27 secs	

RECORD FOR SPRING DISCHARGE

for spring at Sharp's Brook

Recorded by Mrs Rita Lloyd

Date	Time	Time to fill a ½ gallon jug	Discharge
June 14 - 1969	2.10 P.M	37 secs	
June 21 - 1969	6.30 P.M	60 secs	
June 28 - 1969	7.05 P.M	69 secs	
July 5 - 1969	6.45 P.M	65 secs	
July 12 - 1969	6.50 P.M	70 secs	
July 19 - 1969	5.25 P.M	72 secs	
July 26 - 1969	3.30 P.M.	82 secs	
August 2 - 1969	4.15 P.M	97 secs	
August 9 - 1969	2 P.M	115 secs	
August 16 - 1969	3.15 P.M	118 secs	
August 23 - 1969	2.30 P.M.	120 secs	
August 30 - 1969	5.30 P.M	122 secs	
Sept 6 - 1969	4.45 P.M	114 secs	
Sept 13 - 1969	5 P.M	118 secs	
Sept 20 - 1969	3.15 P.M	115 secs	
Sept 27 - 1969	2.30 P.M	120 secs	
Oct 4 - 1969	3.30 P.M.	152 secs	
Oct 11 - 1969	4.15 P.M	156 secs	
Oct 18 - 1969	3 P.M	180 secs	