C I V I L E N G I N E E R S • L A N D S U R V E Y O R S

Bruno Associates

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MEMORANDUM

To: Jay Gamble

From: Nicole Kesselring, PE NSK

Re: Mount Sunapee Resort West Bowl Expansion
Snowmelt Drainage and Watershed Analysis

Date: 5/27/04

In response to our meeting on May 3, 2004, regarding the above mentioned project, our office has performed a hydrologic study to examine the potential impact snowmaking operations could have on The Gunnison Brook, Lake Gunnison and Rand Pond.

During that meeting you conveyed the concerns of some Goshen Citizens regarding:

- Potential impact to the water quality and quantity of Lake Gunnison, also known as the Goshen Ocean,
- Potential impact to the water quality and quantity of Rand Pond, and
- The potential for flooding and washout along Brook Road.

As part of this study, we performed a field visit to each of the water bodies, and examining all culverts and bridges on the Gunnison Brook along Brook Rd. Further information was gathered through the use of USGS Maps, the FEMA Flood Insurance Study for Newport, NH (none is currently available for Goshen), FEMA Flood Insurance Maps for Goshen, and a phone conversation with Alan Hanscom of the NH DOT.

We feel that the following study will provide information which will demonstrate that the work proposed by Mt. Sunapee in the West Bowl Area will not adversely impact the Gunnison Brook Watershed.

Per our conversation, you stated that Mt. Sunapee proposes to make snow on 75 Ac of proposed trails in the West Bowl. 2 ½ feet of snow is typically made over each Ac, at a volume of 180,000 gallons per ac-ft of snow. This means that the entire volume of water proposed for snowmaking in this area will be approximately 33.75 million gallons of water.

The West Bowl area lies on the western slope of Mt. Sunapee within the Gunnison Brook Watershed. This watershed is comprised of 4,500 Ac to the point where the Gunnison Brook crosses under Rt. 10. The West Bowl area drains to an unnamed tributary on the eastern side of Brook Rd., which then discharges into the Gunnison Brook near the 90° corner in Brook Rd.(Merrill's corner). From this point the Gunnison Brook follows

JOHN BRUNO BRUCE BOEDTKER
Registered Engineer • Vermont, Connecticut, New Hampshire, New York, Massachusetts
Registered Land Surveyor • Vermont and New Hampshire

Brook Rd. its entire length, and crosses Rt. 10 prior to discharging into the South Branch of the Sugar River. See Exhibit 1.

Lake Gunnison: Lake Gunnison, also know as the Goshen Ocean, lies within the Sugar River Watershed area, on Blood Brook. The Blood Brook was dammed in this part of the valley to create the lake. Although Gunnison Brook and Lake Gunnison both lie within the Sugar River Watershed, Lake Gunnison is fed by Blood Brook, and is not hydraulically connected to Gunnison Brook. Chandler Hill and other mountain peaks create a drainage divide between the Gunnison Brook and Blood Brook, separating these two watersheds. Waters from these two brooks meet in Goshen, across Rt. 10 from Brook Rd., where the South Branch of the Sugar River begins.

Due to the hydraulic separation of the lake from Gunnison Brook, there is no potential for the lakes water level or water quality to be affected by snowmelt from the proposed trails within Mt. Sunapee Resort's West Bowl Area.

Rand Pond: Rand Pond lies within the Gunnison Brook Watershed. The pond's watershed area is approximately 270 Ac, and does not receive any runoff from the Mt. Sunapee West Bowl area. Rand Pond is fed by numerous tributaries, and it outflows drain into the Gunnison Brook. Due to the fact that the pond is located hydraulically upgradient of the Gunnison Brook, its inflows and water quality will not in any way be affected by snowmaking in the West Bowl area.

Bridges and Culverts along Brook Rd.: To assess the potential impact that snowmaking melt waters could have on the Gunnison Brook watershed a number of factors were examined.

First the snowmelt water quantity in relation to storm runoff from the entire watershed was examined. Based on The FEMA Flood Insurance Study for Newport, since none is available for Goshen, a discharge per square mile of watershed was calculated. This discharge was then applied to the Gunnison Brook Watershed area which is comprised of 7 Ac to arrive at stream flows for Gunnison Brook. These flows can be viewed in Table 1.

Table 1: Watershed Flow Data

S. Branch Sugar River @ Coon Brook Rd.				Gunnison Brook Watershed	
Storm Event (yr)	Stream Flow (cfs) *	Drainage Area (sq. miles)	Discharge per sq. mi (cfs)	Drainage Area (sq. miles)	Stream Flow (cfs) *
10	1,290	26.5	49	7	341
50	1,860	26.5	70	7	491
100	2,120	26.5	80	7	560

(Please note that due to the fact that peak flows for Gunnison Brook Watershed were calculated based on a much larger drainage area, that for a portion of the South Branch of the Sugar River, the actual peak flows out of the Gunnison Brook Watershed is most likely greater than the numbers represented in the table.)

Once the storm event streamflow for Gunnison Brook Watershed was calculated, we determined what percentage of total flow the snowmelt water from the West Bowl area will be. Snowmelt occurs at the end of the ski season as daily temperatures slowly rise. In any given year, snow can usually be seen left on the mountain in excess of 4 weeks after the mountain has closed. Taking into considering that when the mountain closes, melt has most likely already been occurring for up to 4 weeks, it would be reasonable assumed that snowmelt off the mountain actually occurs over an 8 week period of time. To be conservative, our calculations used a 7 day and 30 day melt period to determine what percentage of streamflow these quantities would represent. A 7 day melt time is unrealistic, but it puts into perspective the flow quantities we are dealing with.

As can be seen in Table 2, if melt were to occur over 7 days, snowmelt runoff would represent 2.2% of streamflow for a 10 year storm event and 1.3% of streamflow for a 100 year storm event. Similarly, runoff from a 30 day melt period would represent 0.5% to 0.3 % for a 10 and 100 year storm, respectively. As these calculations show, the snowmelt runoff, will represent such a small quantity of total flow, that it should not create an adverse impact.

Table 2: Snowmelt runoff as a % of Streamflow

Gunnison Brook Watershed		Snowmelt runoff as % of Streamflow	
Storm Event (yr)	Stream Flow (cfs) *	7 day melt (7.46cfs) (%)	30 day melt (1.74 cfs) (%)
10	341	2.2	0.5
50	491	1.5	0.4
100	560	1.3	0.3

Bridges and culverts along Brook Road were examined as part of this study. Our site visit revealed 4 driveway and class 4 road bridges, 2 culvert crossings, and 3 bridge crossings for Brook Rd. As Brook Rd. is a state road, bridges on this road are designed to the flood of record or the 50 year storm event, which ever is greater. All the bridges viewed appeared to be in good condition, with adequate clearance to pass large storm events. The two culverts under Cross Rd. appear to each be 68" diameter steel culverts, and appear to be in good condition. A single 60" culvert under a farm road, just east of the Province Rd./Brook Rd. intersection

was severely clogged with branches and debris, thereby decreasing its capacity. The area in which this culvert is located is shown as flood plain on the FEMA Flood Maps, so it is likely, that flooding occurs in this area in the spring time. It did not appear that the crossing is used for more than access to fields on the other side of the brook.

Alan Hanscom of the NH DOT was also contacted to determine if he was aware of any problems in this area. He stated that from time to time road shoulder maintenance is necessary due to washout out from some larger storm events, where the brook comes very close to the road. He was unaware of any bridge issues along Gunnison Brook.

Storm event runoff from the proposed trails is expected to be negligible in terms of the overall watershed area, since no impervious area will be created, and the infiltration characteristics of the land will remain substantially the same.

In summary, Lake Gunnison and Rand Pond will be completely unaffected by any increase in snowmelt from the West Bowl area because they are hydraulically disconnected. The increase in flow that will be realized by the Gunnison Brook during spring melt is a very small percentage of its storm event flow and is unlikely to create a noticeable impact at any bridges or culvert crossings. Based on the above discussion, it is my professional opinion that there will not be any adverse impact from the increase in snowmelt created by the proposed West Bowl area.

M:\03jobs\03022\03022-EX1.dwg, 5/27/2004 1:29:18 PM, JWK

MOUNT SUNAPEE WATERSHED AREA MAP	BRUNO ASSOCIATES INC. P.C. ENGINEERS, PLANNERS, SURVEYORS PO BOX 387, THE MILL BUILDING WOODSTOCK, VERMONT 05091 PHONE: (802) 457-3590 FAX: (802) 457-4853	GUNNISON BROOK WATERSHED AREA MAP FOR MOUNT SUNAPEE RESORT IN GOSHEN & SUNAPEE NEW HAMPSHIRE	NO.	REVISIONS	DATE

EX-1

DATE: 5/27/04

PROJECT: 03022

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West Bowl Area Fact Sheet

Gunnison Brook Watershed Area = **4,500 Ac**

Gunnison Brook has it headwaters at the top of Mt. Sunapee, and follows Brook Road down to Rt. 10. Shortly after it crosses under Rt. 10 it converges with the South Branch of the Sugar River.

Snowmelt in West Bowl Area
Proposed snowmaking trail area = **75 Ac**

Trail area = **1.67 % of Watershed**

Snow making snow quantity= **180,000 gal/ac-ft**

snow making snow depth = **2.5 ft**

Total snowmaking snow quantity = **33,750,000 gal = 4,512,032 cf**

Hypothetically, If entire snowmaking quantity melted over: **7 days**

runoff to Gunnison Brook would be: **7.46 cfs**

Hypothetically, If entire snowmaking quantity melted over: **30 days**

runoff to Gunnison Brook would be: **1.74 cfs**

In reality snow on mountain melts over a period of 4 - 6 weeks after Mt. Sunapee has closed. (runoff from melt begins prior to the mountain closing)

Gunnison Brook Watershed			Snowmelt runoff as % of Streamflow	
Storm Event (yr)	Drainage Area (sq. miles)	Stream Flow (cfs) *	7 day melt (7.46cfs) (%)	30 day melt (1.74 cfs) (%)
10	7	341	2.2	0.5
50	7	491	1.5	0.4
100	7	560	1.3	0.3

FEMA, Flood Insurance Study, Newport, NH

S. Branch Sugar River @ Coon Brook Rd.				Gunnison Brook Watershed	
Storm Event (yr)	Stream Flow (cfs) *	Drainage Area (sq. miles)	Discharge per sq. mi	Drainage Area (sq. miles)	Stream Flow (cfs) *
10	1,290	26.5	49	7	341
50	1,860	26.5	70	7	491
100	2,120	26.5	80	7	560

United States Department of Agriculture
NRCS Natural Resources Conservation Service

New Hampshi

New Hampshire County Rainfall Frequency Data

County or Area Rainfall Amounts in Inches by Frequency

County or Area	1 Year Inches	2 Years Inches	5 Years Inches	10 Years Inches	25 Years Inches	50 Years Inches	100 Years Inches
Belknap	2.4	2.8	3.7	4.1	5.0	5.5	6.1
Carroll - South	2.5	2.9	3.8	4.3	5.2	5.5	6.2
Carroll - North	3.0	3.3	4.3	5.0	5.7	6.2	6.6
Cheshire	2.4	2.8	3.7	4.2	5.0	5.6	6.3
Coos - South	3.0	3.5	4.1	4.8	5.6	6.2	6.8
Coos - North	2.4	3.0	3.5	4.2	4.9	5.3	6.1
Grafton	2.4	2.7	3.6	4.2	4.9	5.2	5.9
Hillsborough	2.5	2.9	3.8	4.3	5.1	5.7	6.3
Merrimack	2.4	2.8	3.7	4.2	5.0	5.6	6.2
Rockingham	2.5	3.0	3.8	4.3	5.2	5.7	6.4
Strafford	2.5	3.0	3.8	4.3	5.1	5.6	6.3
Sullivan	2.3	2.7	3.6	4.1	4.8	5.3	6.0

FLOOD INSURANCE STUDY

TOWN OF NEWPORT, NEW HAMPSHIRE

SULLIVAN COUNTY

APRIL 17, 1985

Federal Emergency Management Agency

COMMUNITY NUMBER - 330161

In the updated study, discharge-frequency relationships for the Sugar River were obtained from a hydrologic model of the Sugar River Basin using the HEC-1 Flood Hydrograph Package (Reference 4). This model did not include the area draining toward Lake Sunapee. It was determined that, with the high storage capacity of the lake, this area will not have a significant effect on the flooding downstream of the lake. To account for the lake dam outflows, 100 cubic feet per second (cfs) were added to HEC-1 discharges. This value was obtained from an integration of the curve of the average lake dam outflows for the past 20 years.

The discharges for the North Branch Sugar River and the South Branch Sugar River were determined using regional analyses of USGS gages in New Hampshire (Reference 5).

A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SUGAR RIVER					
Downstream of confluence of North Branch Sugar River	204.1[1]	7,252	10,417	13,020	18,200
At Belknap Avenue	121.7[1]	4,054	5,414	6,793	9,700
At State Route 10	76.0[1]	1,720	2,367	3,053	4,600
NORTH BRANCH SUGAR RIVER					
At Old Cornish Turnpike	80.8	2,070	2,980	3,410	4,390
SOUTH BRANCH SUGAR RIVER					
At Elm Street	45.7	1,810	2,610	2,980	3,840
At Coon Brook Road	26.5	1,290	1,850	2,120	2,730

[1]Includes area draining toward Lake Sunapee

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

TABLE 2

FLOODWAY DATA

SUGAR RIVER-NORTH BRANCH SUGAR RIVER-SOUTH BRANCH SUGAR RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NEWPORT, NH

(SULLIVAN CO.)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
Sugar River (continued)								
AT	56,893[1]	85	798	3.8	846.9	846.9	847.2	0.3
AU	56,957[1]	59	639	4.9	847.4	847.4	847.7	0.3
AV	57,352[1]	111	415	7.4	847.8	847.8	848.1	0.3
AW	58,057[1]	212	957	3.2	851.8	851.8	852.6	0.8
North Branch Sugar River								
A	122[2]	80	304	11.2	773.3	765.8[3]	765.8	0.0
B	190[2]	80	646	5.3	773.3	768.0[3]	768.0	0.0
C	4,080[2]	135	759	4.5	773.3	772.5[3]	772.7	0.2
D	8,662[2]	130	989	3.4	776.1	776.1	777.1	1.0
E	9,552[2]	37	428	8.0	776.8	776.8	777.6	0.8
F	9,604[2]	56	631	5.4	777.4	777.4	778.1	0.7
G	10,134[2]	75	779	4.4	777.9	777.9	778.6	9.7
South Branch Sugar River								
A	242[2]	84	403	7.4	788.3	783.7[3]	784.0	0.3
B	309[2]	60	374	8.0	788.3	784.5[3]	784.5	0.0
C	5,754[2]	228	1,213	2.5	794.9	794.9	795.8	0.9
D	11,682[2]	138	449	6.6	803.1	803.1	803.4	0.3
E	11,751[2]	150	650	4.6	803.5	803.5	804.0	0.5

[1]Feet above corporate limits
[2]Feet above confluence with Sugar River
[3]Elevation computed without consideration of backwater from Sugar River

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
South Branch Sugar River (continued)								
F	12,351	75	339	8.8	805.1	805.1	805.2	0.1
G	13,351	85	396	7.5	810.8	810.8	811.0	0.2
H	14,351	126	584	4.6	819.7	819.7	819.8	0.1
I	15,086	36	209	12.8	851.0	851.0	851.4	0.4
J	18,474	40	340	7.9	877.0	877.0	877.8	0.8
K	19,174	48	275	9.7	880.2	880.2	881.0	0.8
L	20,819	67	306	8.7	893.9	893.9	894.6	0.7
M	23,831	49	313	6.8	913.0	913.0	913.3	0.3
N	27,561	45	240	8.8	920.6	920.6	921.5	0.9
O	27,626	60	273	7.8	922.0	922.0	922.0	0.0
P	29,311	56	452	4.7	928.6	928.6	929.5	0.9

[1]Feet above confluence with Sugar River

FEDERAL EMERGENCY MANAGEMENT AGENCY

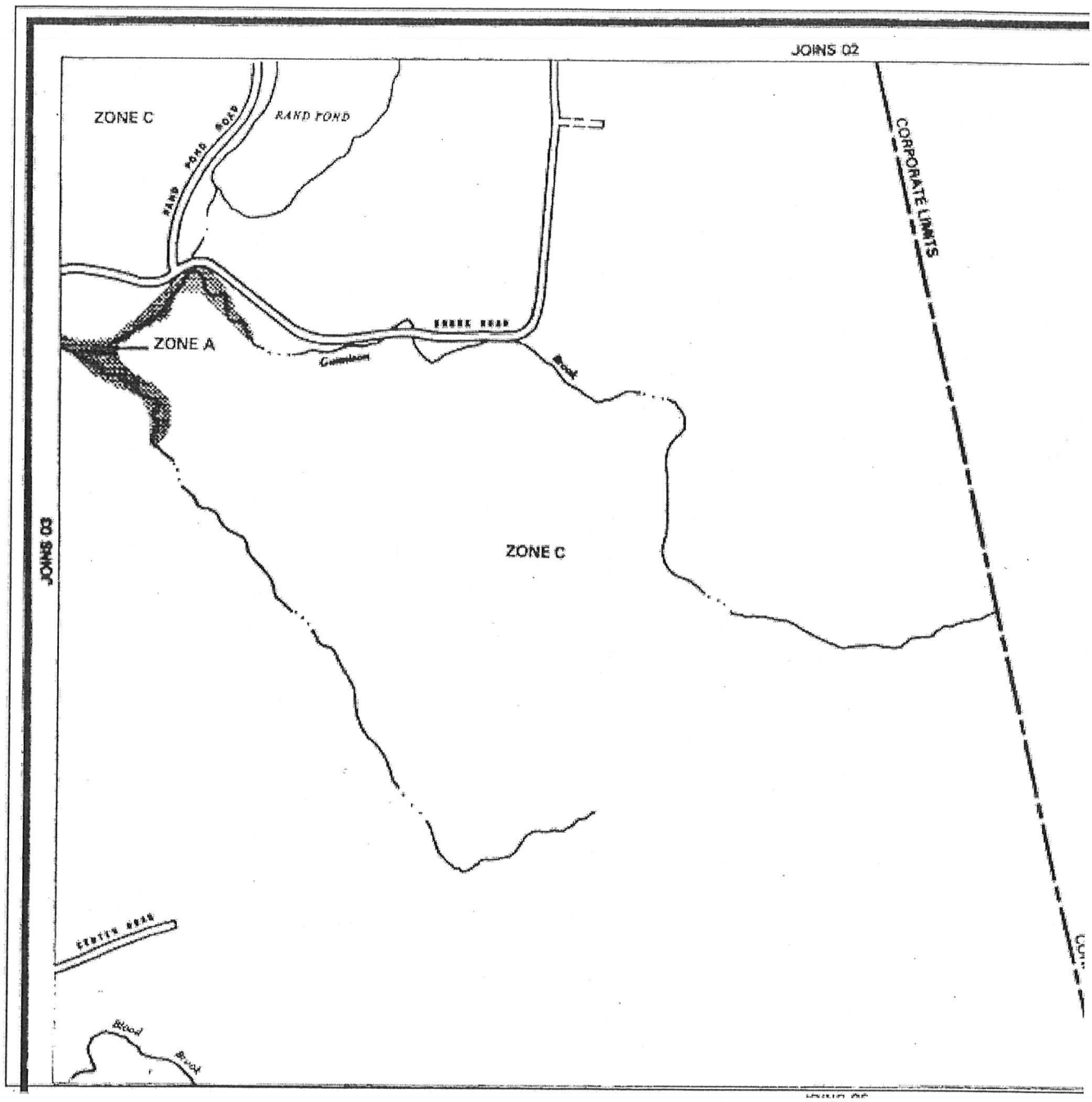
TOWN OF NEWPORT, NH

(SULLIVAN CO.)

FLOODWAY DATA

SOUTH BRANCH SUGAR RIVER

TABLE 2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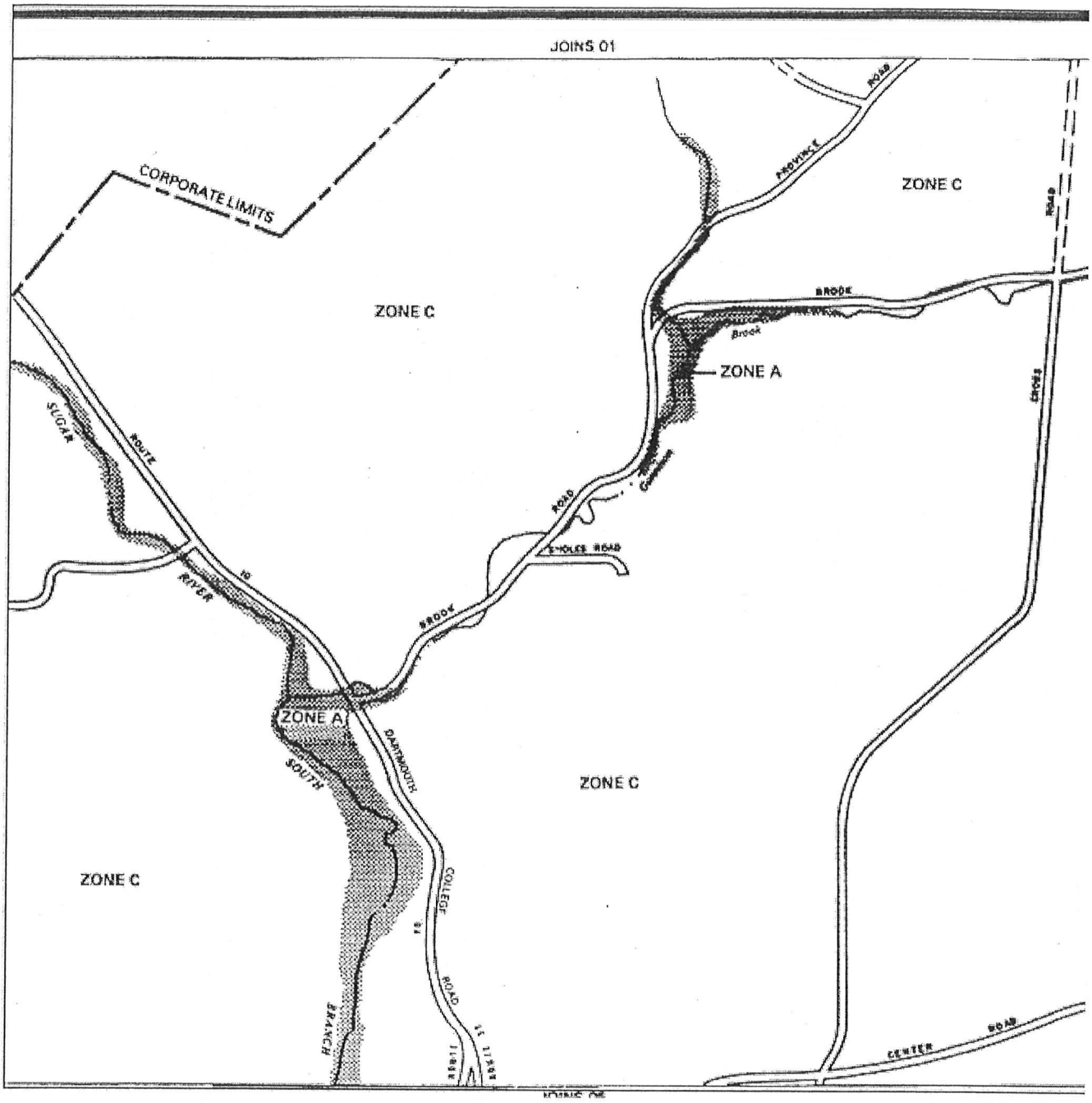
ZONE C
RAND POND
RAND POND ROAD
CORPORATE LIMITS
ZONE A
Creek
ZONE C
JOINS 03
Brook
Brook


JOINS 01
CORPORATE LIMITS
ZONE C
ZONE C
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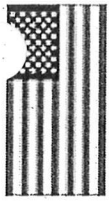
ZONE C
ROAD
PROVINCE
BROOK
Brook
SUGAR
ROUTE
RIVER
10
ROAD
BROOK
DARTMOUTH
SOUTH
COLLEGE
ROAD
BRANCH
CENTER
ROAD

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Erosion factors		Organic matter
							K	T	
	In	Pct	G/cm3	In/hr	In/in	pH			Pct
MaB, MaC, MaD----- Marlow	0-8	3-10	1.00-1.30	0.6-2.0	0.10-0.23	3.6-6.0	0.24	3	2-8
	8-24	3-10	1.30-1.60	0.6-2.0	0.06-0.20	3.6-6.0	0.32		
	24-60	3-10	1.60-2.05	0.06-0.6	0.05-0.12	3.6-6.0	0.20		
MbB, MbC, MbD, MbE----- Marlow	0-4	3-10	1.00-1.30	0.6-2.0	0.10-0.23	3.6-6.0	0.20	3	---
	4-24	3-10	1.30-1.60	0.6-2.0	0.06-0.20	3.6-6.0	0.32		
	24-60	3-10	1.60-2.05	0.06-0.6	0.05-0.12	3.6-6.0	0.20		
McB, McC, McD----- Monadnock	0-8	1-8	0.80-1.20	0.6-2.0	0.15-0.21	3.6-6.0	0.28	3	3-8
	8-36	1-8	0.80-1.30	0.6-2.0	0.09-0.17	3.6-6.0	0.28		
	36-60	1-5	1.30-1.60	2.0-6.0	0.04-0.08	3.6-6.0	0.17		
MfB, MfC, MfD----- Monadnock	0-2	1-8	0.80-1.20	0.6-2.0	0.14-0.20	3.6-6.0	0.24	3	---
	2-36	1-8	0.80-1.30	0.6-2.0	0.09-0.17	3.6-6.0	0.28		
	36-60	1-5	1.30-1.60	2.0-6.0	0.04-0.08	3.6-6.0	0.17		
MrC*, MrD*, MrE*: Monadnock-------	0-2	1-8	0.80-1.20	0.6-2.0	0.10-0.18	3.6-6.0	0.24	3	---
	2-36	1-8	0.80-1.30	0.6-2.0	0.09-0.17	3.6-6.0	0.28		
	36-60	1-5	1.30-1.60	2.0-6.0	0.04-0.08	3.6-6.0	0.17		
Hermon----------	0-3	2-6	0.95-1.20	6.0-20	0.07-0.20	3.6-5.5	0.10	3	---
	3-17	2-7	1.00-1.30	6.0-20	0.05-0.17	3.6-6.0	0.10		
	17-60	1-4	1.50-1.70	6.0-20	0.03-0.10	5.1-6.0	0.10		
MuD*: Monadnock-------	0-2	1-8	0.80-1.20	0.6-2.0	0.14-0.20	3.6-6.0	0.20	3	---
	2-36	1-8	0.80-1.30	0.6-2.0	0.09-0.17	3.6-6.0	0.28		
	36-60	1-5	1.30-1.60	2.0-6.0	0.04-0.08	3.6-6.0	0.17		
Hermon----------	0-3	2-6	0.95-1.20	6.0-20	0.07-0.20	3.6-5.5	0.10	3	---
	3-17	2-7	1.00-1.30	6.0-20	0.05-0.17	3.6-6.0	0.10		
	17-60	1-4	1.50-1.70	6.0-20	0.03-0.10	5.1-6.0	0.10		
MvB*, MvC*, MvD*: Monadnock-------	0-2	1-8	0.80-1.20	0.6-2.0	0.14-0.20	3.6-6.0	0.24	3	---
	2-36	1-8	0.80-1.30	0.6-2.0	0.09-0.17	3.6-6.0	0.28		
	36-60	1-5	1.30-1.60	2.0-6.0	0.04-0.08	3.6-6.0	0.17		
Lyman-----------	0-2	2-10	0.75-1.20	2.0-6.0	0.13-0.24	3.6-6.0	0.20	2	---
	2-15	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	0.32		
	15	---	---	---	---	---	---		
MwB*, MwC*, MwD*: Monadnock-------	0-2	1-8	0.80-1.20	0.6-2.0	0.14-0.20	3.6-6.0	0.24	3	---
	2-36	1-8	0.80-1.30	0.6-2.0	0.09-0.17	3.6-6.0	0.28		
	36-60	1-5	1.30-1.60	2.0-6.0	0.04-0.08	3.6-6.0	0.17		
Lyman-----------	0-2	2-10	0.75-1.20	2.0-6.0	0.13-0.24	3.6-6.0	0.20	2	---
	2-15	2-10	0.90-1.40	2.0-6.0	0.08-0.28	3.6-6.0	0.32		
	15	---	---	---	---	---	---		
Rock outcrop.									
Na---------- Naumburg	0-7	1-5	1.20-1.50	2.0-6.0	0.05-0.09	3.6-5.5	0.17	5	3-7
	7-33	1-5	1.20-1.50	6.0-20	0.06-0.08	3.6-5.5	0.17		
	33-60	1-5	1.45-1.65	6.0-20	0.04-0.06	4.5-6.5	0.17		
NnA---------- Ninigret	0-9	3-7	1.00-1.25	2.0-6.0	0.13-0.25	4.5-6.0	0.28	3	2-8
	9-26	3-7	1.35-1.60	2.0-6.0	0.06-0.18	4.5-6.0	0.32		
	26-60	0-2	1.45-1.70	6.0-20	0.01-0.13	4.5-6.0	0.10		
Of---------- Ondawa	0-10	1-9	1.15-1.40	2.0-6.0	0.12-0.26	4.5-6.5	0.24	5	3-7
	10-36	1-9	1.15-1.45	2.0-6.0	0.12-0.22	4.5-6.5	0.37		
	36-60	0-3	1.30-1.50	2.0-20	0.04-0.13	4.5-6.5	0.20		

See footnote at end of table.

GRANITEHIGHWAYS.COM NBI



Place Name: Goshen (Town of)

NBI Structure Number: **009800850011700**
Longitude: **-72° 08' 51"**, Latitude: **43° 18' 5"**

Show me a Map on the U.S. Census Service Tiger Map Server

Facility Carried: **BROOK ROAD**
Feature Intersected: **GUNNISON BROOK**
Location: **.05 MI NE OF JCT NH 10**

Year Built: **1940**, Reconstructed: **1998**

Owned and maintained by: **State Highway Agency**

Functional Classification: **Rural Minor Collector**
Service On Bridge: **Highway**
Service Under Bridge: **Waterway**
Lanes On Structure: **2**

Structure Length: **8.9 m**
Bridge Roadway Width: **8.9 m**
Operating Rating: **56. Metric Tons**
Number of Spans in Main Unit: **1 Span**
Material Design: **Concrete**
Design Construction: **Slab**

Deck Condition: **Good Condition**
Superstructure Condition: **Good Condition**
Substructure Condition: **Good Condition**
Scour: **Foundations determined to be stable for assessed scour conditions**

Bridge Railing: **Meets currently acceptable standards.**
Inspection Date: **May, 2000**

Structural Evaluation: **Better than present minimum criteria**
Water Adequacy Evaluation: **Superior to present desirable criteria**

Average Daily Traffic: **200**
Year of Average Daily Traffic: **1984**
Sufficiency Rating: **97. %**

Return to National Bridge Inventory Database query form.

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Place Name: Goshen (Town of)

NBI Structure Number: **009800870012000**
Longitude: **-72° 08' 39"**, Latitude: **43° 18' 14"**

Show me a Map on the U.S. Census Service Tiger Map Server

Facility Carried: **BROOK ROAD**
Feature Intersected: **GUNNISON BROOK**
Location: **.32 MI NE OF JCT NH 10**

Year Built: **1940**

Owned and maintained by: **State Highway Agency**

Functional Classification: **Rural Minor Collector**
Service On Bridge: **Highway**
Service Under Bridge: **Waterway**
Lanes On Structure: **2**

Structure Length: **9.8 m**
Bridge Roadway Width: **8.6 m**
Operating Rating: **25. Metric Tons**
Number of Spans in Main Unit: **1 Span**
Material Design: **Steel**
Design Construction: **Stringer/Multi-beam or Girder**

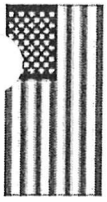
Deck Condition: **Good Condition**
Superstructure Condition: **Good Condition**
Substructure Condition: **Good Condition**
Scour: **Foundations determined to be stable for assessed scour conditions**
Bridge Railing: **Does not meet currently acceptable standards.**
Inspection Date: **May, 2000**

Structural Evaluation: **Somewhat better than minimum adequacy to tolerate being left in place as is**
Water Adequacy Evaluation: **Equal to present minimum criteria**

Average Daily Traffic: **200**
Year of Average Daily Traffic: **1984**
Sufficiency Rating: **74. %**

Return to National Bridge Inventory Database query form.

GRANITEHIGHWAYS.COM NBI



SEARCH
HOME
NEW
MAIN
BRIDGE DATABASE
PHOTO SEARCH
LINKS
ABOUT
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Place Name: Goshen (Town of)

NBI Structure Number: **009800900012300**
Longitude: **-72° 08' 30"**, Latitude: **43° 18' 20"**

Show me a Map on the U.S. Census Service Tiger Map Server

Facility Carried: **BROOK ROAD**
Feature Intersected: **GUNNISON BROOK**
Location: **.47 MI N E OF JCT NH 10**

Year Built: **1945**

Owned and maintained by: **State Highway Agency**

Functional Classification: **Rural Minor Collector**
Service On Bridge: **Highway**
Service Under Bridge: **Waterway**
Lanes On Structure: **2**

Structure Length: **7 m**
Bridge Roadway Width: **8 m**
Operating Rating: **48. Metric Tons**
Number of Spans in Main Unit: **1 Span**
Material Design: **Concrete**
Design Construction: **Slab**

Deck Condition: **Good Condition**
Superstructure Condition: **Good Condition**
Substructure Condition: **Good Condition**
Scour: **Foundations determined to be stable for assessed scour conditions**

Bridge Railing: **Meets currently acceptable standards.**
Inspection Date: **May, 2000**

Structural Evaluation: **Better than present minimum criteria**
Water Adequacy Evaluation: **Equal to present desirable criteria**

Average Daily Traffic: **200**
Year of Average Daily Traffic: **1984**
Sufficiency Rating: **95. %**

Return to National Bridge Inventory Database query form.

GHL GRANITEHIGHWAYS.COM NBI

EARTH
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PHOTO SEARCH
LINKS
ABOUT
MAINE

Bridge Photos and Road Photos and Train Pictures For Sale Online

Place Name: Goshen (Town of)

NBI Structure Number: **009801050012900**
Longitude: **-72° 07' 32"**, Latitude: **43° 18' 45"**

Show me a Map on the U.S. Census Service Tiger Map Server

Facility Carried: **CROSS ROAD**
Feature Intersected: **GUNNISON BROOK**
Location: **TOWN RD**

Year Built: **1940**

Owned and maintained by: **City or Municipal Highway Agency**

Functional Classification: **Rural Local**
Service On Bridge: **Highway**
Service Under Bridge: **Waterway**
Lanes On Structure: **2**

Structure Length: **4.3 m**
Operating Rating: **9.1 Metric Tons**
Number of Spans in Main Unit: **2 Spans**
Material Design: **Aluminum, Wrought Iron or Cast Iron**
Design Construction: **Culvert (includes frame culverts)**

Scour: **Foundations determined to be stable for assessed scour conditions**
Bridge Railing: **Does not meet currently acceptable standards.**
Inspection Date: **November, 2000**

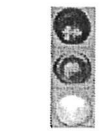
Structural Evaluation: **Basically intolerable requiring high priority of corrrective action**

Water Adequacy Evaluation: **Equal to present minimum criteria**

Average Daily Traffic: **110**
Year of Average Daily Traffic: **1987**
Sufficiency Rating: **40. %**

Return to National Bridge Inventory Database query form.

GHL GRANITEHIGHWAYS.COM NBI



Place Name: Goshen (Town of)

NBI Structure Number: **009800810011700**
Longitude: **-72° 08' 55"**, Latitude: **43° 18' 5"**

Show me a Map on the U.S. Census Service Tiger Map Server

Facility Carried: **NH 10**
Feature Intersected: **GUNNISON BROOK**
Location: **1.78 MI N LEMPSTER TL**

Year Built: **1975**

Owned and maintained by: **State Highway Agency**

Functional Classification: **Rural Major Collector**
Service On Bridge: **Highway-pedestrian**
Service Under Bridge: **Waterway**
Lanes On Structure: **2**

Structure Length: **7.6 m**
Bridge Roadway Width: **9.8 m**
Operating Rating: **61. Metric Tons**
Number of Spans in Main Unit: **1 Span**
Material Design: **Concrete**
Design Construction: **Frame (except frame culverts)**

Deck Condition: **Good Condition**
Superstructure Condition: **Good Condition**
Substructure Condition: **Good Condition**
Scour: **Foundations determined to be stable for assessed scour conditions**

Bridge Railing: **Does not meet currently acceptable standards.**
Inspection Date: **July, 1999**

Structural Evaluation: **Better than present minimum criteria**
Water Adequacy Evaluation: **Superior to present desirable criteria**

Average Daily Traffic: **2600**
Year of Average Daily Traffic: **1993**
Sufficiency Rating: **91. %**

Return to National Bridge Inventory Database query form.

Water Resources

Data Category: Site Information | Geographic Area: New Hampshire | go

A scheduled power outage will affect access to **NWISWeb historical data**, updates for WaterWatch maps, and ftp services for water.usgs.gov. The outage could begin as early as Friday, May 21, 2004 at 10:30 pm EDT, and may continue as late as Monday May 24, 2004, 12:00 pm EDT. We are sorry for any inconvenience this may cause.

The following NWISWeb services will be affected:

- Discrete data **will not** be available during this time period (Water Quality Information, Ground-water levels, peaks, historical streamflow)
- Daily Streamflow Conditions maps **will not** be up-to-date.
- However, Real-time data **will** be available at http://waterdata.usgs.gov/nwis

Site Map for New Hampshire

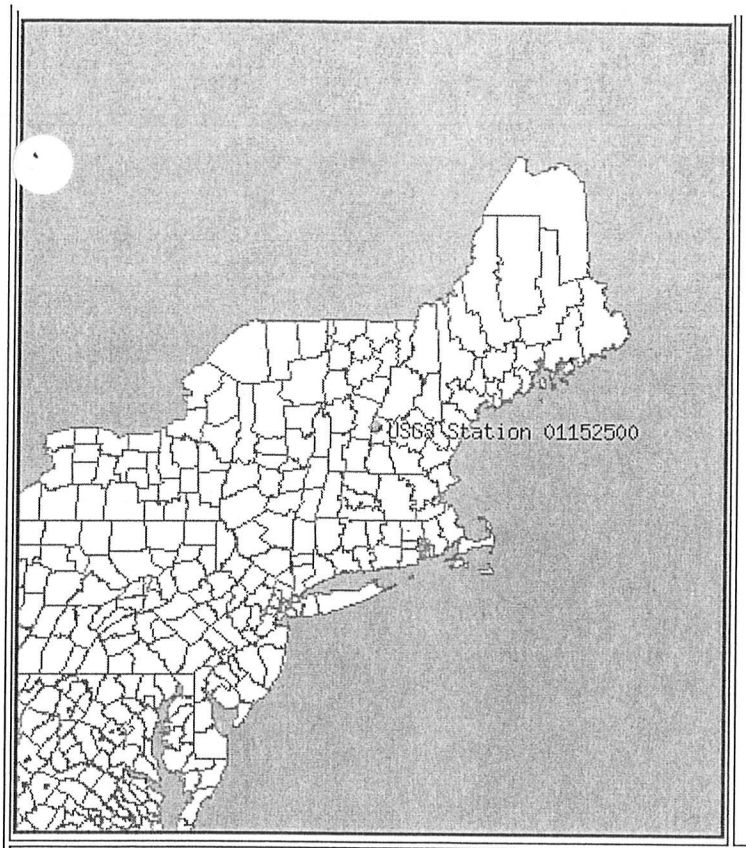
View real-time groundwater levels in Warner, NH. here

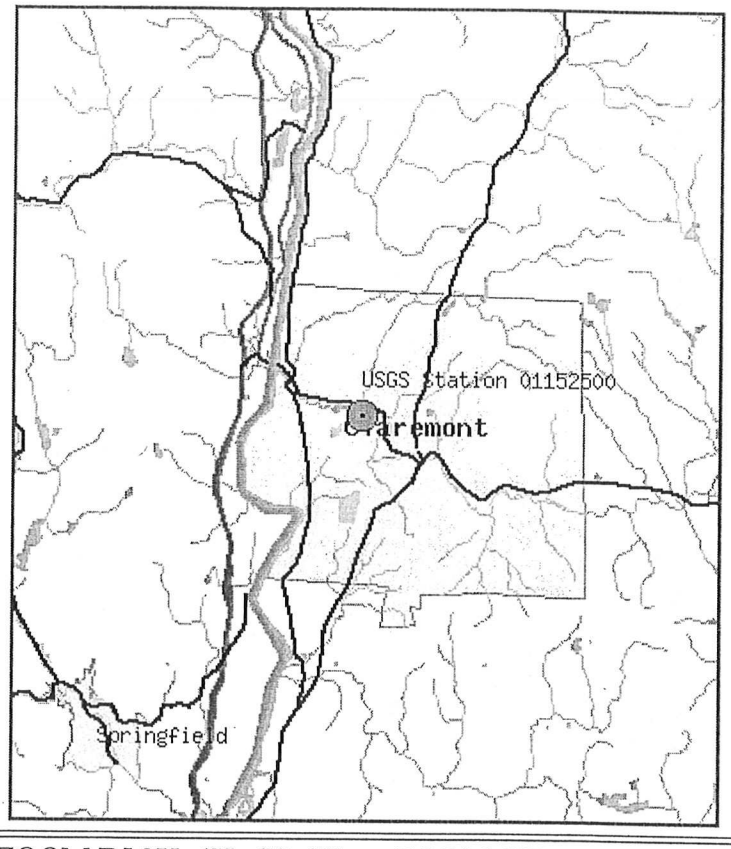
USGS 01152500 SUGAR RIVER AT WEST CLAREMONT, NH

Available data for this site Station site map GO

Sullivan County, New Hampshire
Hydrologic Unit Code 01080104
Latitude 43°23'15", Longitude 72°21'45" NAD27
Drainage area 269.00 square miles
Gage datum 358.78 feet above sea level NGVD29

Location of the site in New Hampshire.	Site map.





ZOOM IN 2X, 4X, 6X, 8X, or ZOOM OUT 2X, 4X. 6X. 8X.

Maps are generated by US Census Bureau TIGER Mapping Service.

Questions about data gs-w-nh_NWISWeb_Data_Inquiries@usgs.gov
Feedback on this website gs-w-nh_NWISWeb_Maintainer@usgs.gov

Top
Explanation of terms

NWIS Site Inventory for New Hampshire: Site Map
http://waterdata.usgs.gov/nh/nwis/nwismap?

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Department of the Interior, U.S. Geological Survey
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