WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

November 8, 2005

John Field
Field Geology Services, Inc.
PO Box 985
Farmington, ME 04938

Subject: Conceptual Hydraulic Analysis of Connecticut River Upstream of Wyoming Dam

Dear Mr. Field:

This report presents methods and results applied by Woodlot Alternatives, Inc. (Woodlot) as part of a conceptual hydraulic analysis of changes in water surface elevations upstream of the former Wyoming Dam site on the Connecticut River near Guildhall, Vermont. This work was performed by Woodlot on behalf of Field Geology Services, Inc. (FGS). The results of the hydraulic analysis suggest that following the failure of the dam, upstream water surface elevations in the Connecticut River have decreased through the entire study reach for the evaluated hydrologic events.

Hydrologic Analysis

Project flows were developed for the 2, 5, and 100-year return interval events. Peak flows associated with these events was determined using peak flow data obtained from United States Geological Survey (USGS) stream gaging stations located on the Connecticut River upstream and downstream of the Wyoming Dam site. Peak flows for the evaluated return interval events at each gaging station were calculated using the USGS PEAKFQ software system. Peak flows on the Connecticut River at the Wyoming Dam site were subsequently determined using calculated peak flows at the upstream and downstream USGS gaging station based on linear interpolation of peak flows and drainage areas. The results of this analysis are presented in Table 1.

Table 1: Hydrologic Analysis Results

USGS Station Number	Location	Drainage Area (square miles)	Return Interval Peak Flow (cubic-feet-per-second)		
			2-Year	5-Year	100-Year
01129500	CT River, North Stratford, NH	799	13,940	18,350	30,870
01131500	CT River Near Dalton, NH	1514	21,890	28,850	47,500
-	Wyoming Dam	1192	18,837	24,811	41,289

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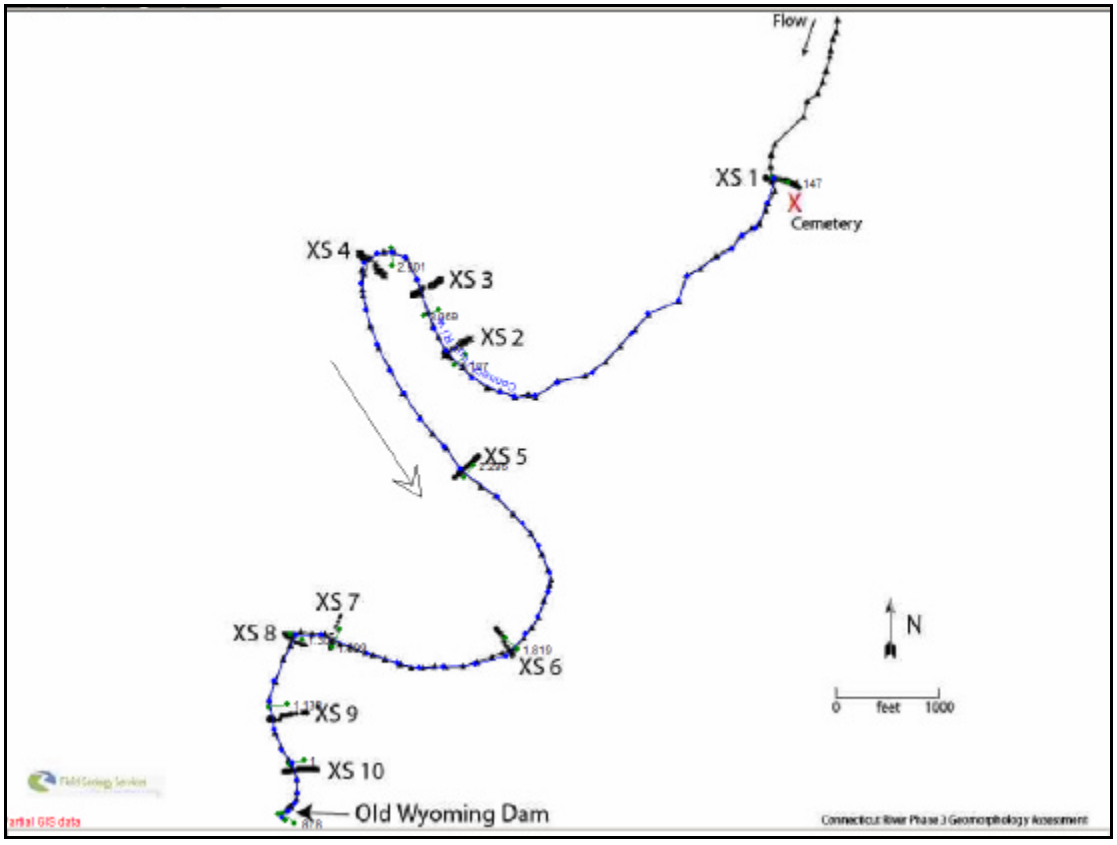
Hydraulic Analysis

A hydraulic analysis was performed to evaluated water surface elevations upstream of the Wyoming Dam site during the 2, 5, and 100-year return interval events. The hydraulic analysis was performed using the United States Army Corps of Engineers (Corps) HEC-RAS software system.

Geometry data for the hydraulic model was provided to Woodlot by FGS and the New Hampshire Department of Environmental Services (NHDES). Data provided by FGS included channel cross sections at ten locations from the dam extending upstream approximately three miles, and reference elevations at the Wyoming Dam site. Data provided by the NHDES included the Phase 1 dam inspection report for the Wyoming Dam (I.D. No 182.01) prepared by the Corps in February 1979. Information obtained in this report included approximate dimensions of the dam and spillway capacity calculations. Different arbitrary vertical datum were used by FGS and the USACE. Vertical data presented in the Corps report was rectified to the vertical datum used by FGS based on the assumption that the elevation described as "Elevation of top of spillway gate = 44.11" is the same as the "top of dam" elevations at the left and right abutments of 100.00-feet (ft) in the Corps report. This correction was checked against reported thalweg elevations and appeared to be reasonable. All analyses performed by Woodlot were subsequently performed using the arbitrary vertical datum established by FGS.

The locations of cross sections provided by FGS was checked by plotting the locations overlying the HEC-RAS model on a planform map of the Connecticut River developed by FGS showing the survey locations (**FIGURE 1**). This check suggests that the reach lengths provided by FGS are reasonably accurate. The numbered reach locations shown on the model locations are in river miles, with Cross Section No. 10 ("XS 10") set at river mile "1".

Figure 1: Schematic Layout of Study Reach



The width of the channel through the breach in the Wyoming Dam was set at 220-ft based on observations of water surface elevations provided by FGS. To account for the increased channel width immediately upstream of the dam site, the first upstream cross section (SX 10) was duplicated at a point 50-ft upstream of the dam. Interpolated cross sections were also set at a maximum interval of 100-ft within the balance of the hydraulic model to "smooth" the calculated water surface elevations.

The evaluation of existing ("dam-out") and past ("dam-in") water surface elevations in the project reach was performed through the application of applicable downstream boundary conditions in the hydraulic model.

For the dam-out (i.e., existing conditions) scenario, the downstream boundary condition was set using a normal depth slope of 0.005. The results of this analysis were checked using daily average flow data obtained from the USGS gaging station on the Connecticut River at North Stratford, NH (USGS Station No. 01129500) for July 26, 2005, and the water surface elevation recorded by FGS at XS 1 on that date. The recorded and calculated water surface elevations were within 0.2-ft, which was deemed expectable by Woodlot for this study. For the dam-in scenario, the downstream boundary condition was set using stage-discharge data at the Wyoming Dam presented in the Corps study.

All of the hydraulic calculations were performed with the assumption that supercritical flow would not occur in all areas of the study reach for the evaluated events. Calculated hydraulic parameters at the upper end of the model reach (XS 1) are presented in **TABLE 1**.

Table 2: Results of Hydraulic Analysis at XS 1 (Sta. 4.147)

Event	Scenario	WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (fps)	Top Width (ft)
2-Year	*Dam-In*	55.23	3.97	2.9	368.29
2-Year	*Dam-Out*	51.26		3.66	363.73
5-Year	*Dam-In*	57.6	3.78	3.39	371.02
5-Year	*Dam-Out*	53.82		4.12	366.67
100-Year	*Dam-In*	63.59	3.96	4.4	377.92
100-Year	*Dam-Out*	59.63		5.15	373.36

Figures 2 through 4 (below) provide a graphical presentation changes in water surface elevations within the study reach for the evaluated hydrologic events.

Figure 2: Plotted Water Surface Profiles for 2-Year Event

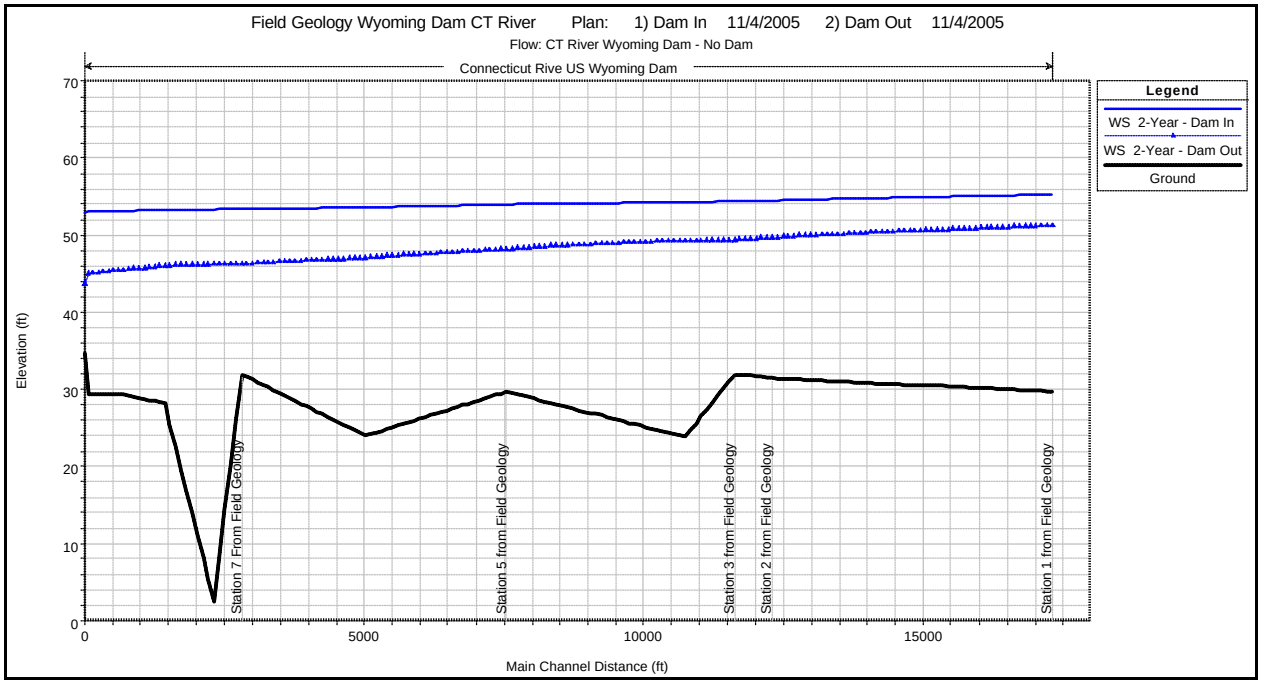


Figure 3: Plotted Water Surface Profiles for 5-Year Event

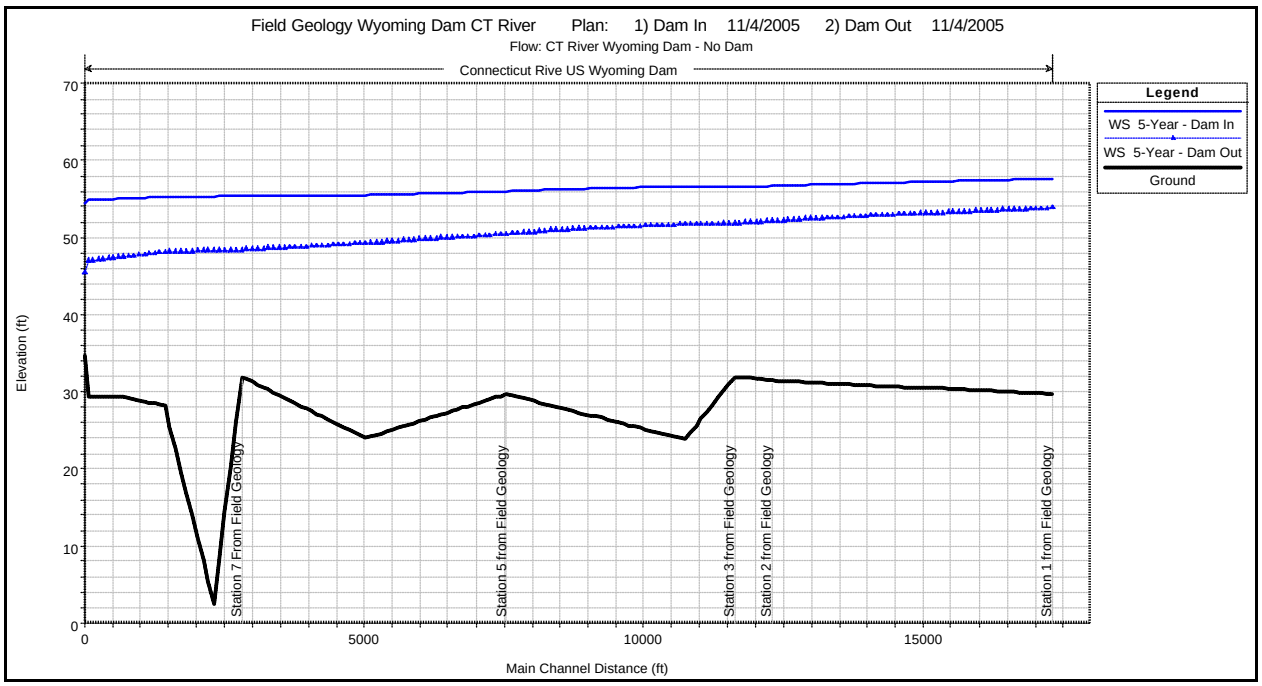
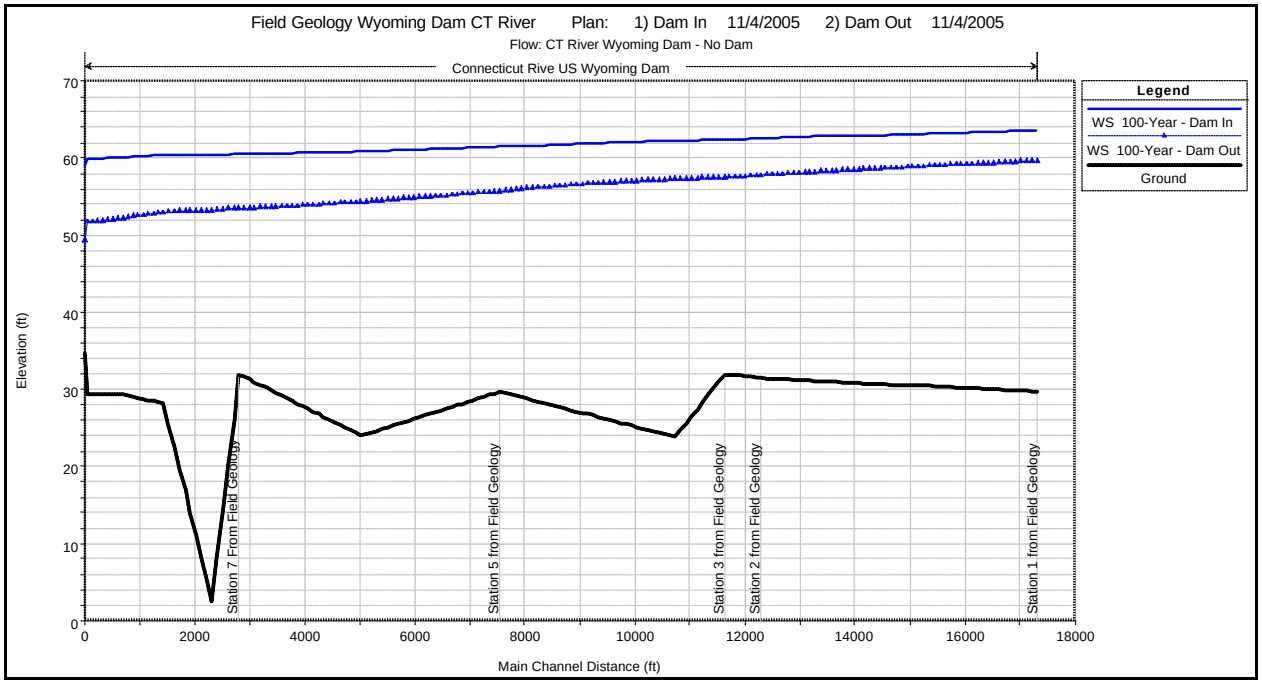


Figure 4: Plotted Water Surface Profiles for 100-Year Event



Discussion of Results

The results of the hydraulic analysis suggest that following the failure of the dam, upstream water surface elevations in the Connecticut River have decreased through the entire study reach for each of the evaluated hydrologic events. It is of note that the calculated extent of the backwater influence from the Wyoming Dam extended upstream beyond the upper limit of the study reach. This condition is apparent in that the calculated water surface elevations depicted in Figures 2 – 4 are higher for the "dam-in" scenario.

For all of the six evaluated scenarios (i.e., dam-in and dam-out scenarios with three hydrologic events each) the water surface elevations exceeded the maximum elevations of the surveyed cross sections at one or both streambanks. This condition may have affected the results of the hydraulic modeling performed as part of this study. The use of "full width" cross sections would likely have resulted in lower water surface elevations for all of the evaluated scenarios. In general, the use of full-width cross sections (i.e., including the entire floodplain) would result in lower calculated water surface elevations for the dam-in scenario and larger hydrologic events due to increased conveyance in floodplain areas. The effect of full-width cross sections would likely decrease if peak flows are contained within a given cross-section, particularly if this occurred in a more downstream section of the evaluated reach.

Please contact our office if you have any questions relating to the information presented in this report, or if we can be of further assistance.

Sincerely,
Woodlot Alternatives, Inc.

Michael Chelminski

Michael Chelminski
Director, Ecological Restoration Division

Appendix

Appendix Materials

- Phase 1 Inspection Report (from NHDES)
- USGS Peak Flow Data for USGS Station No. 01129500 (CT River, North Stratford, NH)
- PEAKFQ Output for USGS Station No. 01129500 (CT River, North Stratford, NH)
- USGS Peak Flow Data for USGS Station No. 01131500 (CT River Near Dalton, NH)
- PEAKFQ Output for USGS Station No. 01131500 (CT River Near Dalton, NH)
- Spreadsheet presentation of PEAKFQ Output for USGS Station No. 01129500 (CT River, North Stratford, NH)
- Spreadsheet presentation of PEAKFQ Output for USGS Station No. 01131500 (CT River Near Dalton, NH)
- Spreadsheet of hydrologic interpolation to Wyoming Dam on Connecticut River
- Spreadsheet of (1) cross section reach stationing, (2) spillway capacity, and (3) spillway rating curve. (2) and (3) from Phase 1 Inspection Report
- HEC-RAS output

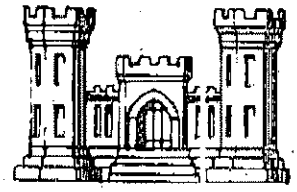
57
Stern.

CONNECTICUT RIVER BASIN
NORTHUMBERLAND NEW HAMPSHIRE

CONNECTICUT GROVETON DAM
N.H. 00147

Fk → 182.01

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

FEBRUARY 1979

The recent inspection of November 16, 1978 found the dam to be in the same apparent configuration as in 1975. The reader is referred to Section 3 for a detailed description of that inspection.

i. Normal Operating Procedures

There are no operating procedures evident or reported for this dam.

1.3 Pertinent Data

a. Drainage Area

The drainage area above the Connecticut Groveton Dam consists of 1194 square miles in New Hampshire, Vermont and Canada. The relatively large area includes a wide range of terrain and the soils are predominantly glacial till with shallow hardpan or bedrock.

b. Discharge at Dam Site

(1) Spillway

The log crib spillway is 180 feet long with a maximum capacity of 29,700 CFS with the water elevation at the top of the left abutment (elevation 100.0). The gates at both abutments are open but because of the possibility of clogging they were not used to calculate hydraulic capacity.

(2) Bypass Spillway and Channel

The 30-foot wide bypass channel in the right abutment has undergone extensive deterioration and erosion. A relatively small rise in river elevation causes water to flow over the remains of the spillway weir and into the bypass channel. The capacity of the bypass spillway and channel has been estimated at 3,400 CFS with the water surface at the top of the left abutment (elevation 100.0).

(3) Maximum Known Flood at Dam Site

According to the records at the Dalton, New Hampshire gauge, located approximately 22 miles downstream, the maximum known flood occurred on March 20, 1936 of 48,600 CFS. Using the hydrologic ratio between Dalton and Groveton, the resultant flood at Groveton is estimated at 40,800 CFS.

(4) Test Flood

The combined spillway bypass channel capacity of 33,100 CFS, at elevation 100.0, is 79.8 percent of the test flood of 41,500 CFS. The test flood would result in a water surface elevation of 102.2 which is 2.2 feet above the left abutment, but 1.8 feet below the approximate top of the river banks at elevation 104.0.

c. Elevations

(Based on an assumed elevation of 100.0 at the top of the concrete platform of the New Hampshire power house. See plan sheet for TBM location.)

(1) Top of Dam

Left abutment - 100.0
Right abutment - 100.0
River banks - 104±

(2) Maximum Pool

104±

(3) Full Flood Control Pool

104±

(4) Recreation Pool

87.2

(5) Spillway Crest

87.2

(6) Upstream Portal Invert

Not applicable.

(7) Streambed at Centerline of Dam

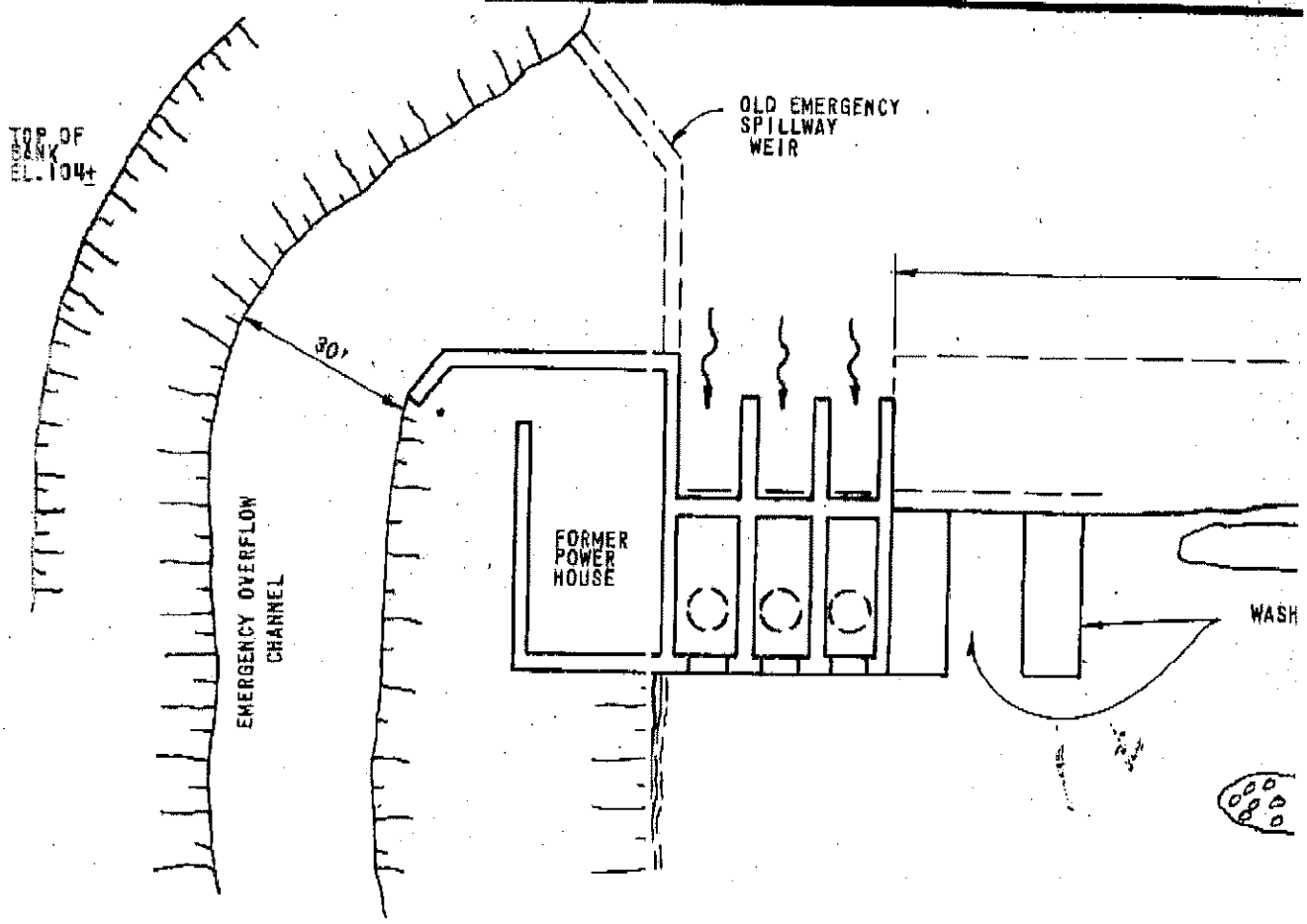
76.2

(8) Maximum Tailwater

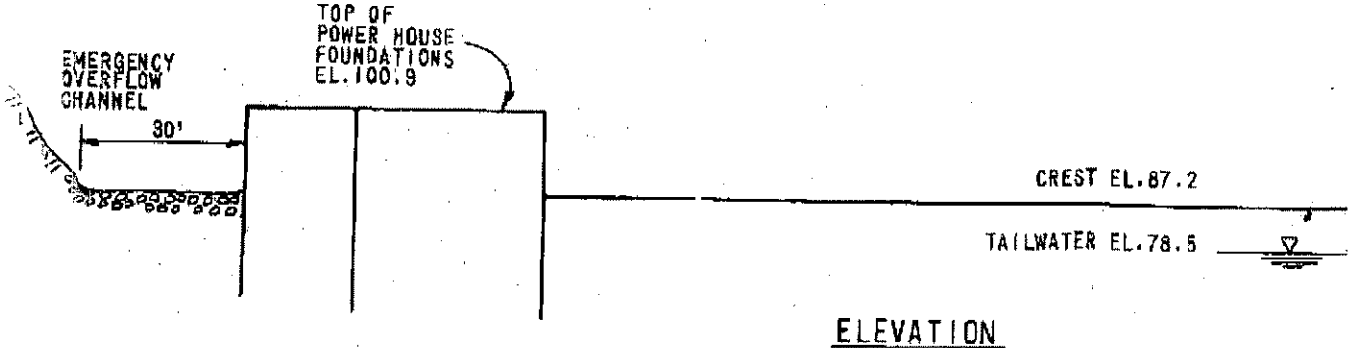
Not known.

(9) Test Flood Surcharge

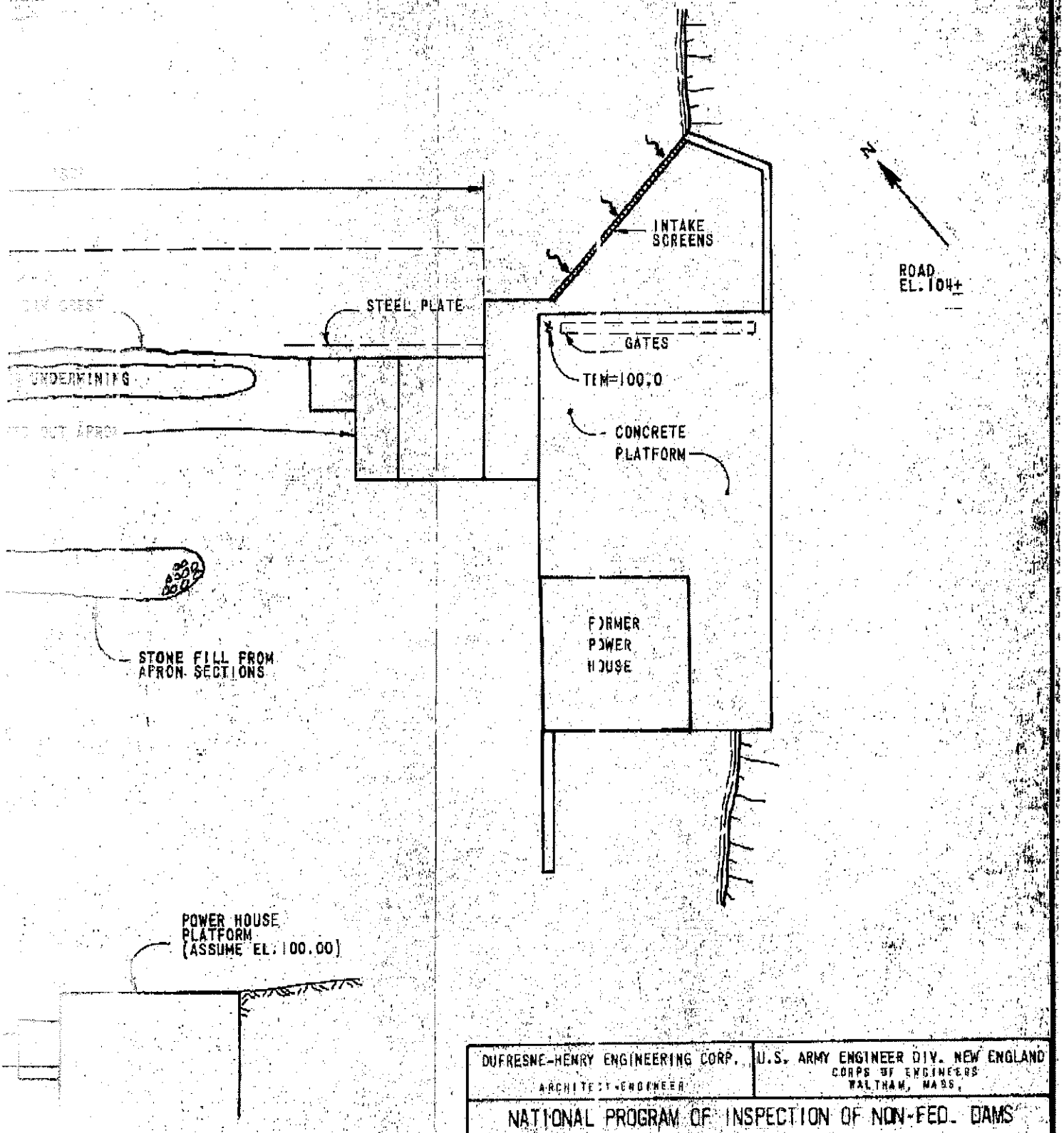
102.2



PLAN



ELEVATION



DUFRESNE-HENRY ENGINEERING CORP.
ARCHITECT-ENGINEER

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

CONNECTICUT GROVETON DAM

PLAN - ELEVATION

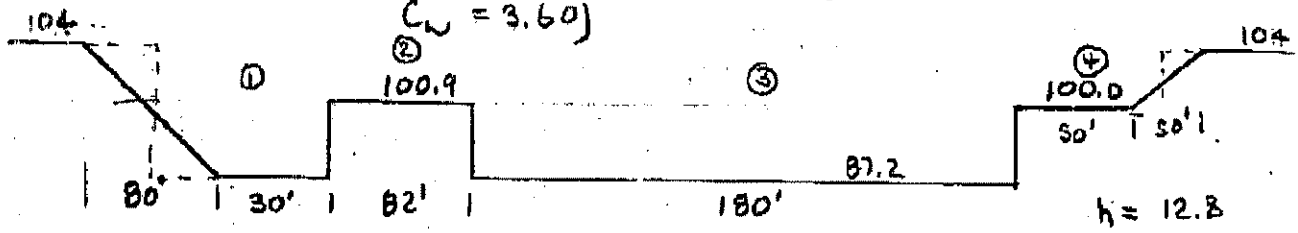
GROVETON NEW HAMPSHIRE

CLIENT NO.	04-0082	SCALE	N.T.S.
ENGR.	IAD	DATE	1-22-79

DUFRESNE-HENRY ENGINEERING CORPORATION

BY J. DOHRMAN SUBJECT CONNECT CUT GROVETON DAM SHEET NO. 3 OF 6
DATE 2-20-79 H+H CALCULATION JOB NO.

SPILLWAY CAPACITY (EXISTING CREST IS VERY IRREGULAR WITH MOST OF APRON WASHED AWAY ASSUME $C_w = 3.60$)



MAIN SPILLWAY

$Q = CLH^{3/2} = (3.6)(180)(45.8) = 29,674$ SAY 29,700 CFS

BY-PASS CHANNEL

$Q = CLH^{3/2} = (2.5)(31)(45.8) = 3435$ 3,400 CFS

TOTAL CAPACITY = 33,100 CFS

MAX. CAPACITY @ 104 h = 16.8

$A = \underset{①}{1176} + \underset{②}{254} + 3024 + 380 = 4754$ FT²

$Q = (2.5)(4754)(4.10) =$ 48,728 CFS

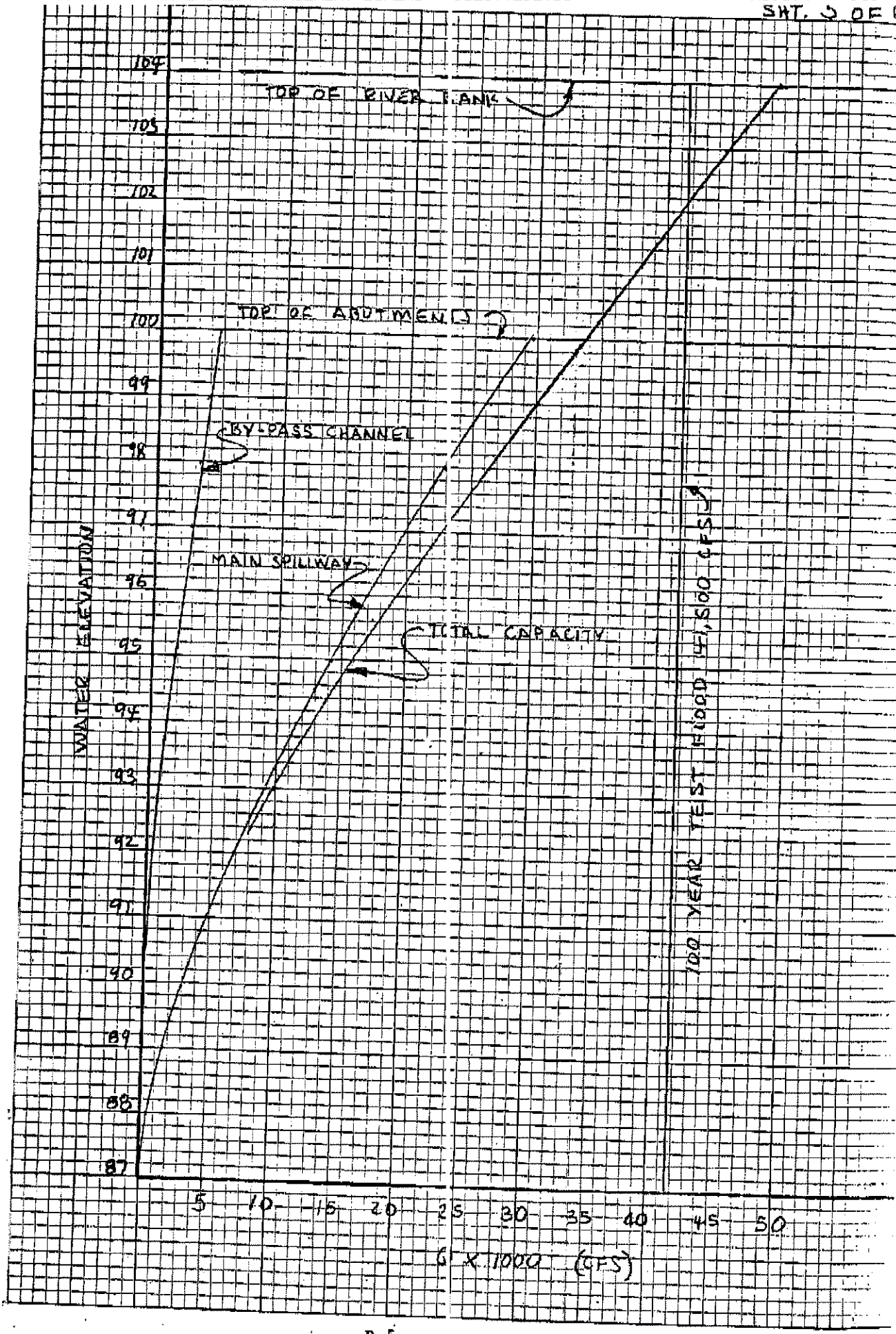
DUFRESNE-HENRY ENGINEERING CORPORATION

BY J DOHRMAN SUBJECT CONNECT CUT GROVETON SHEET NO. 4 OF
DATE 2-2-79 HYD. CALCULATIONS JOB NO. 04-0082

FLOOD STAGE CALCULATION

ELEVATION	MAIN SPILLWAY FLOW		BYPASS CHANNEL FLOW		TOTAL FLOW CFS
	h	Q	h	Q	
88	.8	464	0	0	464
89	1.8	1565	.8	54	1619
90	2.8	3036	1.8	190	3226
91	3.8	4800	2.8	387	5187
92	4.8	6814	3.8	638	7452
93	5.8	9051	4.8	946	9997
94	6.8	11,490	5.8	1309	12799
95	7.8	14,116	6.8	1729	15,845
96	8.8	16,916	7.8	2206	19,122
97	9.8	19,879	8.8	2741	22,620
98	10.8	22,999	9.8	3336	26,335
99	11.8	26,266	10.8	3993	30,256
100	12.8	29,674	11.8	4712	34,386
101					38,141
102					40,238
103					44,500
104					48,728

SHT. 5 OF 6


TOP OF RIVER BANK
TOP OF ABUTMENT
BY-PASS CHANNEL
MAIN SPILLWAY
TOTAL CAPACITY
100 YEAR TEST FLOOD 41,500 CFS
WATER ELEVATION
104
105
102
101
100
99
98
97
96
95
94
93
92
91
90
89
88
87
5
10
15
20
25
30
35
40
45
50
X 1000 (CFS)

```
Z01129500                       USGS
H01129500   44445907137540033330075W01080101799.00          880.17
N01129500   CONNECTICUT RIVER AT NORTH STRATFORD, NH
Y01129500
301129500   19310412  128006              9.62
301129500   19320410  102006              8.84
301129500   19330418  215006             12.39
301129500   19340425  217006             12.73
301129500   19350428  110006              9.13
301129500   19360319  284006             14.64
301129500   19370430  137006             10.10
301129500   19380922  128006              9.81
301129500   19390508  137006             10.13
301129500   19400503  195006             12.00
301129500   19410416  122006              9.59
301129500   19420426  153006             10.63
301129500   19430616  287006             14.67
301129500   19440505  115006              9.34
301129500   19450329  164006             10.97
301129500   19451002   98206              8.69
301129500   19470413  135006             10.00
301129500   19480328  104006              8.93
301129500   19490328  111006              9.21
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301129500   19610510  101006              8.81
301129500   19620430  129006              9.80
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301129500   19670403   93806              8.49
301129500   19680324   87006              9.15
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301129500   19710505  104006              8.91
301129500   19720505  203006             12.25
301129500   19730630  158006             10.76
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301129500   19890406  126006              9.70
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nstrat.dat

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301129500	19950117	86506	8.17
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301129500	19961202	124006	9.62
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301129500	20000511	192006	11.89
301129500	20010425	200006	12.15
301129500	20020404	211006	12.50
301129500	20030330	146006	10.39
301129500	20031111	120006	9.48

1

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.1, February, 2002)

--- PROCESSING DATE/TIME ---

2005 OCT 23 11:51:00

--- PROCESSING OPTIONS ---

Plot option	= None
Basin char output	= None
Print option	= Yes
Debug print	= No
Input peaks listing	= Long
Input peaks format	= WATSTORE peak file

1

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.1, February, 2002)

Station - 01129500 CONNECTICUT RIVER AT NORTH STRATFORD, NH
2005 OCT 23 11:51:00

I N P U T D A T A S U M M A R Y

Number of peaks in record	=	74
Peaks not used in analysis	=	0
Systematic peaks in analysis	=	74
Historic peaks in analysis	=	0
Years of historic record	=	0
Generalized skew	=	0.255
Standard error of generalized skew	=	0.550
Skew option	=	WEIGHTED
Gage base discharge	=	0.0
User supplied high outlier threshold	=	--
User supplied low outlier criterion	=	--
Plotting position parameter	=	0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 5565.9
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 35608.4

1

Station - 01129500 CONNECTICUT RIVER AT NORTH STRATFORD, NH
2005 OCT 23 11:51:00

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	DISCHARGE	EXCEEDANCE PROBABILITY	MEAN	STANDARD DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	4.1485	0.1384	0.170
BULL.17B ESTIMATE	0.0	1.0000	4.1485	0.1384	0.188

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	6554.0	6520.0	6404.0	5715.0	7303.0
0.9900	7012.0	6983.0	6882.0	6171.0	7761.0
0.9500	8483.0	8469.0	8403.0	7653.0	9225.0
0.9000	9423.0	9417.0	9367.0	8607.0	10160.0
0.8000	10740.0	10740.0	10710.0	9942.0	11480.0
0.5000	13940.0	13950.0	13940.0	13100.0	14820.0
0.2000	18350.0	18350.0	18410.0	17160.0	19810.0
0.1000	21300.0	21290.0	21460.0	19740.0	23360.0
0.0400	25090.0	25050.0	25430.0	22930.0	28070.0
0.0200	27960.0	27880.0	28500.0	25290.0	31720.0
0.0100	30870.0	30740.0	31660.0	27650.0	35500.0
0.0050	33840.0	33660.0	34970.0	30020.0	39430.0
0.0020	37890.0	37640.0	39590.0	33210.0	44880.0
0.6667	12179.5	(1.50-year flood)			
0.4292	14746.6	(2.33-year flood)			

1

Station - 01129500 CONNECTICUT RIVER AT NORTH STRATFORD, NH
2005 OCT 23 11:51:00

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1931	12800.0	K	1968	8700.0	K
1932	10200.0	K	1969	16700.0	K
1933	21500.0	K	1970	16000.0	K
1934	21700.0	K	1971	10400.0	K
1935	11000.0	K	1972	20300.0	K
1936	28400.0	K	1973	15800.0	K
1937	13700.0	K	1974	18700.0	K
1938	12800.0	K	1975	11300.0	K
1939	13700.0	K	1976	14700.0	K
1940	19500.0	K	1977	12500.0	K
1941	12200.0	K	1978	11400.0	K
1942	15300.0	K	1979	12200.0	K
1943	28700.0	K	1980	8030.0	K
1944	11500.0	K	1981	17000.0	K
1945	16400.0	K	1982	15300.0	K
1946	9820.0	K	1983	11900.0	K

1947	13500.0	K	1984	16200.0	K
1948	10400.0	K	1985	9130.0	K
1949	11100.0	K	1986	15800.0	K
1950	14900.0	K	1987	20000.0	K
1951	11500.0	K	1988	11100.0	K
1952	11700.0	K	1989	12600.0	K
1953	16800.0	K	1990	19100.0	K
1954	20400.0	K	1991	13900.0	K
1955	18700.0	K	1992	18800.0	K
1956	10600.0	K	1993	12600.0	K
1957	9550.0	K	1994	18500.0	K
1958	16100.0	K	1995	8650.0	K
1959	7680.0	K	1996	20400.0	K
1960	19700.0	K	1997	12400.0	K
1961	10100.0	K	1998	32300.0	K
1962	12900.0	K	1999	12500.0	K
1963	15000.0	K	2000	19200.0	K
1964	18200.0	K	2001	20000.0	K
1965	6530.0	K	2002	21100.0	K
1966	10400.0	K	2003	14600.0	K
1967	9380.0	K	2004	12000.0	K

Explanation of peak discharge qualification codes

PEAKFQ CODE	WATSTORE CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

1

Station - 01129500 CONNECTICUT RIVER AT NORTH STRATFORD, NH
2005 OCT 23 11:51:00

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
1998	32300.0	0.0133	0.0133
1943	28700.0	0.0267	0.0267
1936	28400.0	0.0400	0.0400
1934	21700.0	0.0533	0.0533
1933	21500.0	0.0667	0.0667
2002	21100.0	0.0800	0.0800
1954	20400.0	0.0933	0.0933
1996	20400.0	0.1067	0.1067
1972	20300.0	0.1200	0.1200
1987	20000.0	0.1333	0.1333
2001	20000.0	0.1467	0.1467
1960	19700.0	0.1600	0.1600
1940	19500.0	0.1733	0.1733
2000	19200.0	0.1867	0.1867

1990	19100.0	0.2000	0.2000
1992	18800.0	0.2133	0.2133
1955	18700.0	0.2267	0.2267
1974	18700.0	0.2400	0.2400
1994	18500.0	0.2533	0.2533
1964	18200.0	0.2667	0.2667
1981	17000.0	0.2800	0.2800
1953	16800.0	0.2933	0.2933
1969	16700.0	0.3067	0.3067
1945	16400.0	0.3200	0.3200
1984	16200.0	0.3333	0.3333
1958	16100.0	0.3467	0.3467
1970	16000.0	0.3600	0.3600
1973	15800.0	0.3733	0.3733
1986	15800.0	0.3867	0.3867
1942	15300.0	0.4000	0.4000
1982	15300.0	0.4133	0.4133
1963	15000.0	0.4267	0.4267
1950	14900.0	0.4400	0.4400
1976	14700.0	0.4533	0.4533
2003	14600.0	0.4667	0.4667
1991	13900.0	0.4800	0.4800
1937	13700.0	0.4933	0.4933
1939	13700.0	0.5067	0.5067
1947	13500.0	0.5200	0.5200
1962	12900.0	0.5333	0.5333
1931	12800.0	0.5467	0.5467
1938	12800.0	0.5600	0.5600
1989	12600.0	0.5733	0.5733
1993	12600.0	0.5867	0.5867
1977	12500.0	0.6000	0.6000
1999	12500.0	0.6133	0.6133
1997	12400.0	0.6267	0.6267
1941	12200.0	0.6400	0.6400
1979	12200.0	0.6533	0.6533
2004	12000.0	0.6667	0.6667
1983	11900.0	0.6800	0.6800
1952	11700.0	0.6933	0.6933
1944	11500.0	0.7067	0.7067
1951	11500.0	0.7200	0.7200
1978	11400.0	0.7333	0.7333
1975	11300.0	0.7467	0.7467
1949	11100.0	0.7600	0.7600
1988	11100.0	0.7733	0.7733
1935	11000.0	0.7867	0.7867
1956	10600.0	0.8000	0.8000
1948	10400.0	0.8133	0.8133
1966	10400.0	0.8267	0.8267
1971	10400.0	0.8400	0.8400
1932	10200.0	0.8533	0.8533
1961	10100.0	0.8667	0.8667
1946	9820.0	0.8800	0.8800
1957	9550.0	0.8933	0.8933
1967	9380.0	0.9067	0.9067
1985	9130.0	0.9200	0.9200
1968	8700.0	0.9333	0.9333
1995	8650.0	0.9467	0.9467
1980	8030.0	0.9600	0.9600
1959	7680.0	0.9733	0.9733
1965	6530.0	0.9867	0.9867

1

End PEAKFQ analysis.

Stations processed	:	1
Number of errors	:	0
Stations skipped	:	0
Station years	:	74

```
Z01131500                    USGS
H01131500  442436071431600333300 7SW010801011514.00          799.89
N01131500  CONNECTICUT RIVER NEAR DALTON, NH
Y01131500
301131500  19280409  443006
301131500  19290410  282006
301131500  19300409  171006
301131500  19310413  159006
301131500  19320413  202006
301131500  19330420  358006
301131500  19340426  315006
301131500  19350430  225006
301131500  19360320  483006              25.60
301131500  19370501  196006              17.30
301131500  19380922  196006              17.53
301131500  19390423  236006              18.82
301131500  19400504  313006              21.10
301131500  19410417  193006              17.45
301131500  19420427  231006              18.64
301131500  19430618  214006              18.05
301131500  19440507  204006              17.96
301131500  19450331  249006              19.79
301131500  19451002  141006              15.87
301131500  19470604  218006              18.45
301131500  19480403  168006              16.64
301131500  19490329  160006              16.33
301131500  19500422  213006              18.27
301131500  19501126  184006              17.24
301131500  19520422  183006              17.22
301131500  19530328  346006              22.38
301131500  19540424  341006              22.25
301131500  19550417  271006              20.19
301131500  19560501  180006              17.11
301131500  19570422  138006              15.50
301131500  19580423  286006              20.63
301131500  19590407  147006              15.85
301131500  19600420  274006              20.26
301131500  19610425  183006              17.21
301131500  19620410  207006              18.08
301131500  19630423  211006              18.21
301131500  19640416  244006              19.31
301131500  19650423   85706              13.19
301131500  19660424  146006              15.81
301131500  19670405  154006              16.12
301131500  19680325  153006              16.09
301131500  19690419  294006              20.58
301131500  19700427  240006              19.02
301131500  19710505  172006              16.81
301131500  19720506  322006              21.34
301131500  19730702  208006              18.04
301131500  19740425  266006              19.78
301131500  19750421  162006              16.45
301131500  19760401  226006              18.59
301131500  19770402  188006              17.35
301131500  19780511  188006              17.35
301131500  19790327  197006              17.67
301131500  19800412  114106              14.59
301131500  19810224  207006              18.00
301131500  19820420 2500026
301131500  19830505  175006              16.93
301131500  19840601  284006              20.30
301131500  19850425  121006              14.88
301131500  19860331  254006              19.46
```

301131500	19870402	292006	20.54
301131500	19880407	170006	16.75
301131500	19890407	279006	20.16
301131500	19900319	387006	23.22
301131500	19910411	216006	18.30
301131500	19920424	266006	19.79
301131500	19930418	173006	16.87
301131500	19940418	275006	20.06
301131500	19950117	299006	20.73
301131500	19960425	304006	20.86
301131500	19970408	151006	16.22
301131500	19980401	420006	23.70
301131500	19990918	163006	16.51
301131500	20000512	241006	19.09
301131500	20010425	323006	21.38
301131500	20020416	324006	21.40
301131500	20030331	199006	17.17
301131500	20031030	163006	16.52

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U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.1, February, 2002)

--- PROCESSING DATE/TIME ---

2005 OCT 23 11:47:23

--- PROCESSING OPTIONS ---

Plot option	= None
Basin char output	= None
Print option	= Yes
Debug print	= No
Input peaks listing	= Long
Input peaks format	= WATSTORE peak file

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U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.1, February, 2002)

Station - 01131500 CONNECTICUT RIVER NEAR DALTON, NH
2005 OCT 23 11:47:23

I N P U T D A T A S U M M A R Y

Number of peaks in record	=	77
Peaks not used in analysis	=	0
Systematic peaks in analysis	=	77
Historic peaks in analysis	=	0
Years of historic record	=	0
Generalized skew	=	0.300
Standard error of generalized skew	=	0.550
Skew option	=	WEIGHTED
Gage base discharge	=	0.0
User supplied high outlier threshold	=	--
User supplied low outlier criterion	=	--
Plotting position parameter	=	0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 8469.5
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 56935.9

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Station - 01131500 CONNECTICUT RIVER NEAR DALTON, NH
2005 OCT 23 11:47:23

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	DISCHARGE	EXCEEDANCE PROBABILITY	MEAN	STANDARD DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	4.3416	0.1414	0.005
BULL.17B ESTIMATE	0.0	1.0000	4.3416	0.1414	0.060

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	9670.0	9510.0	9423.0	8389.0	10820.0
0.9900	10450.0	10310.0	10230.0	9158.0	11600.0
0.9500	12930.0	12860.0	12800.0	11650.0	14080.0
0.9000	14500.0	14470.0	14410.0	13240.0	15650.0
0.8000	16680.0	16700.0	16630.0	15450.0	17840.0
0.5000	21890.0	21950.0	21890.0	20580.0	23280.0
0.2000	28850.0	28880.0	28950.0	26980.0	31160.0
0.1000	33390.0	33330.0	33620.0	30940.0	36590.0
0.0400	39080.0	38850.0	39560.0	35750.0	43630.0
0.0200	43300.0	42890.0	44040.0	39230.0	48970.0
0.0100	47500.0	46880.0	48590.0	42650.0	54390.0
0.0050	51720.0	50860.0	53240.0	46050.0	59930.0
0.0020	57380.0	56150.0	59610.0	50540.0	67450.0
0.6667	19040.7	(1.50-year flood)			
0.4292	23192.7	(2.33-year flood)			

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Station - 01131500 CONNECTICUT RIVER NEAR DALTON, NH
2005 OCT 23 11:47:23

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1928	44300.0	K	1967	15400.0	K
1929	28200.0	K	1968	15300.0	K
1930	17100.0	K	1969	29400.0	K
1931	15900.0	K	1970	24000.0	K
1932	20200.0	K	1971	17200.0	K
1933	35800.0	K	1972	32200.0	K
1934	31500.0	K	1973	20800.0	K
1935	22500.0	K	1974	26600.0	K
1936	48300.0	K	1975	16200.0	K
1937	19600.0	K	1976	22600.0	K
1938	19600.0	K	1977	18800.0	K
1939	23600.0	K	1978	18800.0	K
1940	31300.0	K	1979	19700.0	K
1941	19300.0	K	1980	11410.0	K
1942	23100.0	K	1981	20700.0	K
1943	21400.0	K	1982	25000.0	K

1944	20400.0	K	1983	17500.0	K
1945	24900.0	K	1984	28400.0	K
1946	14100.0	K	1985	12100.0	K
1947	21800.0	K	1986	25400.0	K
1948	16800.0	K	1987	29200.0	K
1949	16000.0	K	1988	17000.0	K
1950	21300.0	K	1989	27900.0	K
1951	18400.0	K	1990	38700.0	K
1952	18300.0	K	1991	21600.0	K
1953	34600.0	K	1992	26600.0	K
1954	34100.0	K	1993	17300.0	K
1955	27100.0	K	1994	27500.0	K
1956	18000.0	K	1995	29900.0	K
1957	13800.0	K	1996	30400.0	K
1958	28600.0	K	1997	15100.0	K
1959	14700.0	K	1998	42000.0	K
1960	27400.0	K	1999	16300.0	K
1961	18300.0	K	2000	24100.0	K
1962	20700.0	K	2001	32300.0	K
1963	21100.0	K	2002	32400.0	K
1964	24400.0	K	2003	19900.0	K
1965	8570.0	K	2004	16300.0	K
1966	14600.0	K			

Explanation of peak discharge qualification codes

PEAKFQ CODE	WATSTORE CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

1

Station - 01131500 CONNECTICUT RIVER NEAR DALTON, NH
2005 OCT 23 11:47:23

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
1936	48300.0	0.0128	0.0128
1928	44300.0	0.0256	0.0256
1998	42000.0	0.0385	0.0385
1990	38700.0	0.0513	0.0513
1933	35800.0	0.0641	0.0641
1953	34600.0	0.0769	0.0769
1954	34100.0	0.0897	0.0897
2002	32400.0	0.1026	0.1026
2001	32300.0	0.1154	0.1154
1972	32200.0	0.1282	0.1282
1934	31500.0	0.1410	0.1410
1940	31300.0	0.1538	0.1538

1996	30400.0	0.1667	0.1667
1995	29900.0	0.1795	0.1795
1969	29400.0	0.1923	0.1923
1987	29200.0	0.2051	0.2051
1958	28600.0	0.2179	0.2179
1984	28400.0	0.2308	0.2308
1929	28200.0	0.2436	0.2436
1989	27900.0	0.2564	0.2564
1994	27500.0	0.2692	0.2692
1960	27400.0	0.2821	0.2821
1955	27100.0	0.2949	0.2949
1974	26600.0	0.3077	0.3077
1992	26600.0	0.3205	0.3205
1986	25400.0	0.3333	0.3333
1982	25000.0	0.3462	0.3462
1945	24900.0	0.3590	0.3590
1964	24400.0	0.3718	0.3718
2000	24100.0	0.3846	0.3846
1970	24000.0	0.3974	0.3974
1939	23600.0	0.4103	0.4103
1942	23100.0	0.4231	0.4231
1976	22600.0	0.4359	0.4359
1935	22500.0	0.4487	0.4487
1947	21800.0	0.4615	0.4615
1991	21600.0	0.4744	0.4744
1943	21400.0	0.4872	0.4872
1950	21300.0	0.5000	0.5000
1963	21100.0	0.5128	0.5128
1973	20800.0	0.5256	0.5256
1962	20700.0	0.5385	0.5385
1981	20700.0	0.5513	0.5513
1944	20400.0	0.5641	0.5641
1932	20200.0	0.5769	0.5769
2003	19900.0	0.5897	0.5897
1979	19700.0	0.6026	0.6026
1937	19600.0	0.6154	0.6154
1938	19600.0	0.6282	0.6282
1941	19300.0	0.6410	0.6410
1977	18800.0	0.6538	0.6538
1978	18800.0	0.6667	0.6667
1951	18400.0	0.6795	0.6795
1952	18300.0	0.6923	0.6923
1961	18300.0	0.7051	0.7051
1956	18000.0	0.7179	0.7179
1983	17500.0	0.7308	0.7308
1993	17300.0	0.7436	0.7436
1971	17200.0	0.7564	0.7564
1930	17100.0	0.7692	0.7692
1988	17000.0	0.7821	0.7821
1948	16800.0	0.7949	0.7949
1999	16300.0	0.8077	0.8077
2004	16300.0	0.8205	0.8205
1975	16200.0	0.8333	0.8333
1949	16000.0	0.8462	0.8462
1931	15900.0	0.8590	0.8590
1967	15400.0	0.8718	0.8718
1968	15300.0	0.8846	0.8846
1997	15100.0	0.8974	0.8974
1959	14700.0	0.9103	0.9103
1966	14600.0	0.9231	0.9231
1946	14100.0	0.9359	0.9359
1957	13800.0	0.9487	0.9487
1985	12100.0	0.9615	0.9615

1980	11410.0	0.9744	0.9744
1965	8570.0	0.9872	0.9872

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U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.1, February, 2002)

End PEAKFQ analysis.

Stations processed	:	1
Number of errors	:	0
Stations skipped	:	0
Station years	:	77

Woodlot Alternatives, Inc. PN 105168

PEAKFQ Results for North Stratford USGS Station (USGS No. 01129500)

Return Interval	ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CON FOR BULL. LOWER	FIDENCE LIMITS 17B ESTIMATES UPPER
1.005	0.995	6554	6520	6404	5715	7303
1.010	0.99	7012	6983	6882	6171	7761
1.053	0.95	8483	8469	8403	7653	9225
1.111	0.9	9423	9417	9367	8607	10160
1.25	0.8	10740	10740	10710	9942	11480
2	**0.5**	**13940**	**13950**	**13940**	**13100**	**14820**
5	**0.2**	**18350**	**18350**	**18410**	**17160**	**19810**
10	0.1	21300	21290	21460	19740	23360
25	0.04	25090	25050	25430	22930	28070
50	0.02	27960	27880	28500	25290	31720
100	**0.01**	**30870**	**30740**	**31660**	**27650**	**35500**
200	0.005	33840	33660	34970	30020	39430
500	0.002	37890	37640	39590	33210	44880
1.50	0.6667	12179.5	1.50-year			
2.33	0.4292	14746.6	2.33-year			

Bold - Return-Interval Events Reguested for Hydraulic Analysis

Woodlot Alternatives, Inc. PN 105168

PEAKFQ Results for Dalton USGS Station (USGS No. 01131500)

Return Interval	ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CON FOR BULL. LOWER	FIDENCE LIMITS 17B ESTIMATES UPPER
1.005	0.995	9670	9510	9423	8389	10820
1.010	0.99	10450	10310	10230	9158	11600
1.053	0.95	12930	12860	12800	11650	14080
1.111	0.9	14500	14470	14410	13240	15650
1.25	0.8	16680	16700	16630	15450	17840
2	**0.5**	**21890**	**21950**	**21890**	**20580**	**23280**
5	**0.2**	**28850**	**28880**	**28950**	**26980**	**31160**
10	0.1	33390	33330	33620	30940	36590
25	0.04	39080	38850	39560	35750	43630
50	0.02	43300	42890	44040	39230	48970
100	**0.01**	**47500**	**46880**	**48590**	**42650**	**54390**
200	0.005	51720	50860	53240	46050	59930
500	0.002	57380	56150	59610	50540	67450
1.50	0.6667	19040.7	1.50-year			
2.33	0.4292	23192.7	2.33-year			

Bold - Return-Interval Events Reguested for Hydraulic Analysis

Woodlot Alternatives, Inc. **PN 105168**
Interpolation of PEAKFQ Results
Wyoming Dam HEC-RAS on Connecticut River

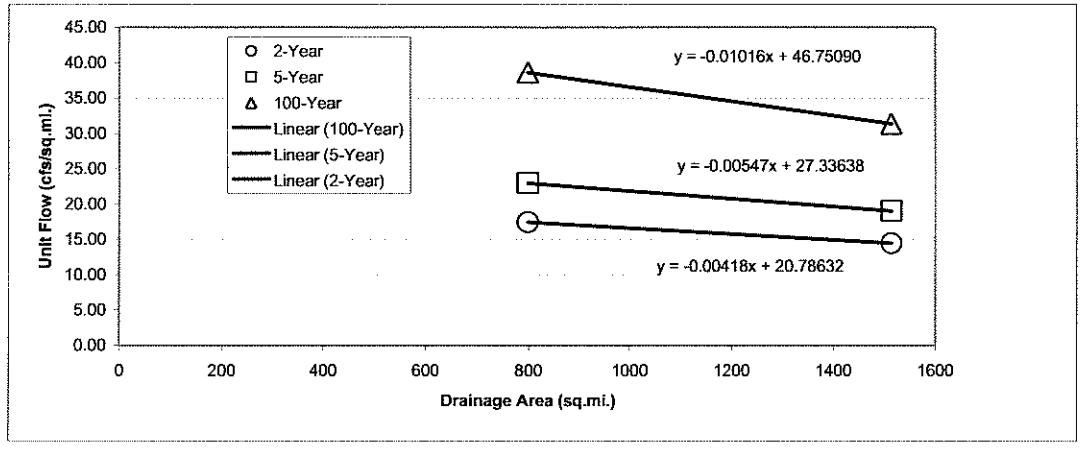
	DA (sq.mi.)
D.A. at former Wyoming Dam (from Field Geology email dated 10/20/05):	1191.9

USGS Station Data			Return Interval Q (cfs)			Unit Return Interval Q (cfs/sq.mi.)		
Station No.	*Location*	*DA (sq.mi.)*	*2*	*5*	*100*	*2*	*5*	*100*
1129500	CT River, North Stratford, NH	799	13940	18350	30870	17.45	22.97	38.64
1131500	CT River Near Dalton, NH	1514	21890	28850	47500	14.46	19.06	31.37

Check of Interpolation Functions:			*Slope**	-0.00418	-0.00547	-0.01016
			*Intercept**	20.78632	27.33638	46.7509
CT River, North Stratford, NH	*799*			17.45	22.97	38.63
CT River Near Dalton, NH	*1514*			14.46	19.05	31.37

Application of Functions to Wyoming Dam:				
Unit Q (cfs/sq.mi.)	*1191.9*	15.804	20.817	34.641
Q (cfs)		18,837	24,811	41,289

**Note - Slope and intercept data from linear interpolation of data on chart.*



Sheet Added By Woodlot to Calculate HEC-RAS "Reach Lengths"

Data From Field Geology *- Note that XS 2 and XS 3 as presented by Field Geology showed XS 3 upstream of XS 2. Woodlot put the stations in this order in the HEC-RAS model but switched to cross section names (not data) to preserved a logical numerical ordering of the cross sections.*

							Woodlot Data			
				Distance from			Reach No. (mi.)		delta	cum
Xsec #/Location	*Corresponding LP pt #*	*Distance*	*Cum Distance (ft)*	*downstream end (ft)*	*WSE (ft)*	*Thalweg (ft)*			data in ft	
Upstream end	1	0	0	19367						
1	1514	2054	2054	17313	37.58	30.03	4.147		5019	17313
3	1565	5019	7074	12293	37.10	29.56	3.197		671	12293
2	1569	671	7745	11622	37.02	30.78	3.069		887	11622
4	1596	887	8632	10735	36.90	25.75	2.901		3195	10735
5	1610	3195	11827	7540	36.61	30.71	2.296		2521	7540
6	1641	2521	14348	5019	36.14	26.30	1.819		2217	5019
7	1675	2217	16565	2802	35.91	31.97	1.399		492	2802
8	1679	492	17057	2310	35.99	13.35	1.306		884	2310
9	1683	884	17941	1426	35.92	28.38	1.138		730	1426
10	1687	730	18671	696	35.85	28.63	1.000	Set as 1.000	696	696
WAI Xsec US of Dam				50			0.878			
Old Wyoming Dam*	1694		19367	0	35.49	34.70	0.868		0	0

Assumed Spillway Capacity		2-Year	5-Year	100-Year	NHDES Test Flood		
Q (cfs)		18,837	24,811	41,289	41,500	29,700	
Length	180						
Spillway Elevation (ft)	44.11						
Spillway Coefficient	2.8						
Head Over Spillway (ft):		11.18	13.43	18.86	18.93	12.00	*Adjust these values for Goal Seek*
Q from Weir Equation		18,837	24,811	41,289	41,500	20,954	
Goal Seek = 0		0	(0)	0	(0)	8,746	
Q Check (cfs):		18,837	24,811	41,289	41,500	20,954	
Head Over Spillway (ft):		11.18	13.43	18.86	18.93	12.00	
Spillway Elev (ft):	87.2	98.38	100.63	106.06	106.13	99.20	

Flood Stage Calcs:	Stage (NHDES	Stage (Field Geolog	Q (NHDES)	Interp Q	Interp Stage	Event
	95	51.91	15845			
	96	52.91	19122	18,837	52.82	*2-Year*
	97	53.91	22620			
	98	54.91	26335	24,811	54.50	*5-Year*
	99	55.91	30562			
	100	56.91	34386			
	101	57.91	36141			
	102	58.91	40238			
	103	59.91	44500	41,289	59.16	*100-Year*
	104	60.91	48728			

Woodlot Alternatives, Inc. PN 105168
HEC-RAS Model Results
Wyoming Dam HEC-RAS on Connecticut River

XSec Name	Station	Event	Scenario	WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (fps)	Top Width (ft)	E.G. Slope
XS 1	*4.147*	*2-Year*	*Dam-In*	55.23		2.9	368.29	0.000145
XS 1	*4.147*	*2-Year*	*Dam-Out*	51.26	3.97	3.66	363.73	0.000312
XS 1	*4.147*	*5-Year*	*Dam-In*	57.6		3.39	371.02	0.000171
XS 1	*4.147*	*5-Year*	*Dam-Out*	53.82	3.78	4.12	366.67	0.000324
XS 1	*4.147*	*100-Year*	*Dam-In*	63.59		4.4	377.92	0.000209
XS 1	*4.147*	*100-Year*	*Dam-Out*	59.63	3.96	5.15	373.36	0.000350
XS 2	*3.197*	*2-Year*	*Dam-In*	54.53		3.08	362.21	0.000157
XS 2	*3.197*	*2-Year*	*Dam-Out*	49.66	4.87	4.16	354.14	0.000412
XS 2	*3.197*	*5-Year*	*Dam-In*	56.76		3.63	362.21	0.000189
XS 2	*3.197*	*5-Year*	*Dam-Out*	52.11	4.65	4.67	362.21	0.000426
XS 2	*3.197*	*100-Year*	*Dam-In*	62.52		4.75	362.21	0.000240
XS 2	*3.197*	*100-Year*	*Dam-Out*	57.73	4.79	5.77	362.21	0.000454
XS 3	*3.069*	*2-Year*	*Dam-In*	54.44		2.9	366.36	0.000143
XS 3	*3.069*	*2-Year*	*Dam-Out*	49.4	5.04	3.92	359.52	0.000387
XS 3	*3.069*	*5-Year*	*Dam-In*	56.65		3.42	366.36	0.000173
XS 3	*3.069*	*5-Year*	*Dam-Out*	51.84	4.81	4.42	366.36	0.000400
XS 3	*3.069*	*100-Year*	*Dam-In*	62.37		4.49	366.36	0.000220
XS 3	*3.069*	*100-Year*	*Dam-Out*	57.44	4.93	5.49	366.36	0.000425
XS 4	*2.901*	*2-Year*	*Dam-In*	54.37		2.43	370.43	0.000069
XS 4	*2.901*	*2-Year*	*Dam-Out*	49.23	5.14	3.1	363.05	0.000148
XS 4	*2.901*	*5-Year*	*Dam-In*	56.56		2.93	373.58	0.000090
XS 4	*2.901*	*5-Year*	*Dam-Out*	51.66	4.9	3.61	366.54	0.000174
XS 4	*2.901*	*100-Year*	*Dam-In*	62.26		3.99	381.57	0.000131
XS 4	*2.901*	*100-Year*	*Dam-Out*	57.23	5.03	4.75	374.52	0.000229
XS 5	*2.296*	*2-Year*	*Dam-In*	53.94		3.27	313.45	0.000167
XS 5	*2.296*	*2-Year*	*Dam-Out*	48.17	5.77	4.55	298.1	0.000491
XS 5	*2.296*	*5-Year*	*Dam-In*	56		3.91	322.9	0.000211
XS 5	*2.296*	*5-Year*	*Dam-Out*	50.43	5.57	5.2	301.91	0.000535
XS 5	*2.296*	*100-Year*	*Dam-In*	61.44		5.21	347.91	0.000284
XS 5	*2.296*	*100-Year*	*Dam-Out*	55.65	5.79	6.62	321.32	0.000616
XS 6	*1.819*	*2-Year*	*Dam-In*	53.61		2.93	362.15	0.000134
XS 6	*1.819*	*2-Year*	*Dam-Out*	47.08	6.53	4.35	340.6	0.000480
XS 6	*1.819*	*5-Year*	*Dam-In*	55.57		3.5	363.53	0.000171
XS 6	*1.819*	*5-Year*	*Dam-Out*	49.24	6.33	4.95	359.1	0.000521
XS 6	*1.819*	*100-Year*	*Dam-In*	60.88		4.68	370.6	0.000232
XS 6	*1.819*	*100-Year*	*Dam-Out*	54.3	6.58	6.2	362.63	0.000577

XSec Name	Station	Event	Scenario	WSEL (ft)	Difference in WSEL (ft)	Channel Velocity (fps)	Top Width (ft)	E.G. Slope
XS 7	*1.399*	*2-Year*	*Dam-In*	53.42		2.18	461.73	0.000079
XS 7	*1.399*	*2-Year*	*Dam-Out*	46.28	7.14	3.41	451.52	0.000347
XS 7	*1.399*	*5-Year*	*Dam-In*	55.33		2.62	461.73	0.000102
XS 7	*1.399*	*5-Year*	*Dam-Out*	48.4	6.93	3.86	461.73	0.000363
XS 7	*1.399*	*100-Year*	*Dam-In*	60.57		3.52	461.73	0.000138
XS 7	*1.399*	*100-Year*	*Dam-Out*	53.42	7.15	4.78	461.73	0.000382
XS 8	*1.306*	*2-Year*	*Dam-In*	53.37		2.43	295.96	0.000048
XS 8	*1.306*	*2-Year*	*Dam-Out*	46.2	7.17	3.11	264.21	0.000104
XS 8	*1.306*	*5-Year*	*Dam-In*	55.26		3.02	297.86	0.000069
XS 8	*1.306*	*5-Year*	*Dam-Out*	48.28	6.98	3.8	275.86	0.000142
XS 8	*1.306*	*100-Year*	*Dam-In*	60.41		4.34	298.45	0.000121
XS 8	*1.306*	*100-Year*	*Dam-Out*	53.18	7.23	5.36	295.77	0.000235
XS 9	*1.138*	*2-Year*	*Dam-In*	53.32		2.26	456.6	0.000088
XS 9	*1.138*	*2-Year*	*Dam-Out*	45.98	7.34	3.64	449.43	0.000424
XS 9	*1.138*	*5-Year*	*Dam-In*	55.2		2.71	456.6	0.000112
XS 9	*1.138*	*5-Year*	*Dam-Out*	48.04	7.16	4.09	456.6	0.000437
XS 9	*1.138*	*100-Year*	*Dam-In*	60.34		3.63	456.6	0.000152
XS 9	*1.138*	*100-Year*	*Dam-Out*	52.92	7.42	5.05	456.6	0.000452
XS 10	*1.000*	*2-Year*	*Dam-In*	53.19		2.91	355.94	0.000131
XS 10	*1.000*	*2-Year*	*Dam-Out*	45.47	7.72	4.71	340.48	0.000617
XS 10	*1.000*	*5-Year*	*Dam-In*	55.02		3.52	355.94	0.000171
XS 10	*1.000*	*5-Year*	*Dam-Out*	47.46	7.56	5.36	355.94	0.000669
XS 10	*1.000*	*100-Year*	*Dam-In*	60.05		4.77	355.94	0.000243
XS 10	*1.000*	*100-Year*	*Dam-Out*	52.2	7.85	6.71	355.94	0.000740
Dam Site	*0.868*	*2-Year*	*Dam-In*	52.82		4.73	220	0.000527
Dam Site	*0.868*	*2-Year*	*Dam-Out*	43.66	9.16	9.56	220	0.005004
Dam Site	*0.868*	*5-Year*	*Dam-In*	54.5		5.7	220	0.000693
Dam Site	*0.868*	*5-Year*	*Dam-Out*	45.33	9.17	10.61	220	0.005000
Dam Site	*0.868*	*100-Year*	*Dam-In*	59.16		7.67	220	0.000994
Dam Site	*0.868*	*100-Year*	*Dam-Out*	49.31	9.85	12.84	220	0.005000