

WIN:	23092.00		
Town:	Jefferson		
Route No.	ME-17		
Asset ID:	2218		
Lat:	44.24967	Long:	69.52912

Project Name:	
Stream Name:	Brann Brook
Bridge Name:	Davis Bridge
Analysis by:	CSH
Date:	1/31/2020

## Peak Flow Calculations by USGS Regression Equations (Hodgkins, 1999 & Lombard/Hodgkins, 2015)

*Enter data in blue cells only!*

	km <sup>2</sup>	mi <sup>2</sup>	ac
A	7.77	3.00	1920.0
W	1.36	0.5	336.8

*Enter data in [mi<sup>2</sup>]*

Watershed Area *DRNAREA*  
Wetlands area (by NWI)

P <sub>c</sub>	459520	4899205
County	Lincoln	

watershed centroid (E, N; UTM 19N; meters)

*choose county from drop-down menu*

pptA	
A (km <sup>2</sup> )	7.77
W (%)	17.54

Conf Lvl

0.67

mean annual precipitation (inches; by look-up)

NWI Wetlands % *STORNWI*

*ver. 2018 Jul 09*

**Worksheet prepared by:**

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### References:

Hodgkins, G.A., 1999.

Estimating the magnitude of peak flows for streams  
in Maine for selected recurrence intervals  
*WRIR 99-4008*, USGS Augusta, ME

### Watershed Characteristics for Monthly & Daily Flows

EAVG	281.3
SLOPE	7.09
EMAX	450.7
WATER	0
PRECIP	44.1
SG	0.00
HGA	0
DIST	50.00

mean basin elevation (ft)

mean basin slope (%)

maximum basin elevation (ft)

percent of drainage basin land cover classified as open water

mean annual precipitation

sand & gravel aquifer as decimal fraction of watershed A

mean basin percentage of hydrological soil group A

distance from the coast (mi)

Ret Pd	Peak Flow Estimate		
T (yr)	Lower	Q <sub>T</sub> (m <sup>3</sup> /s)	Upper
1.1		1.20	
2		2.40	
5		3.70	
10		4.57	
25		5.99	
50		6.85	
100		8.03	
500		10.60	

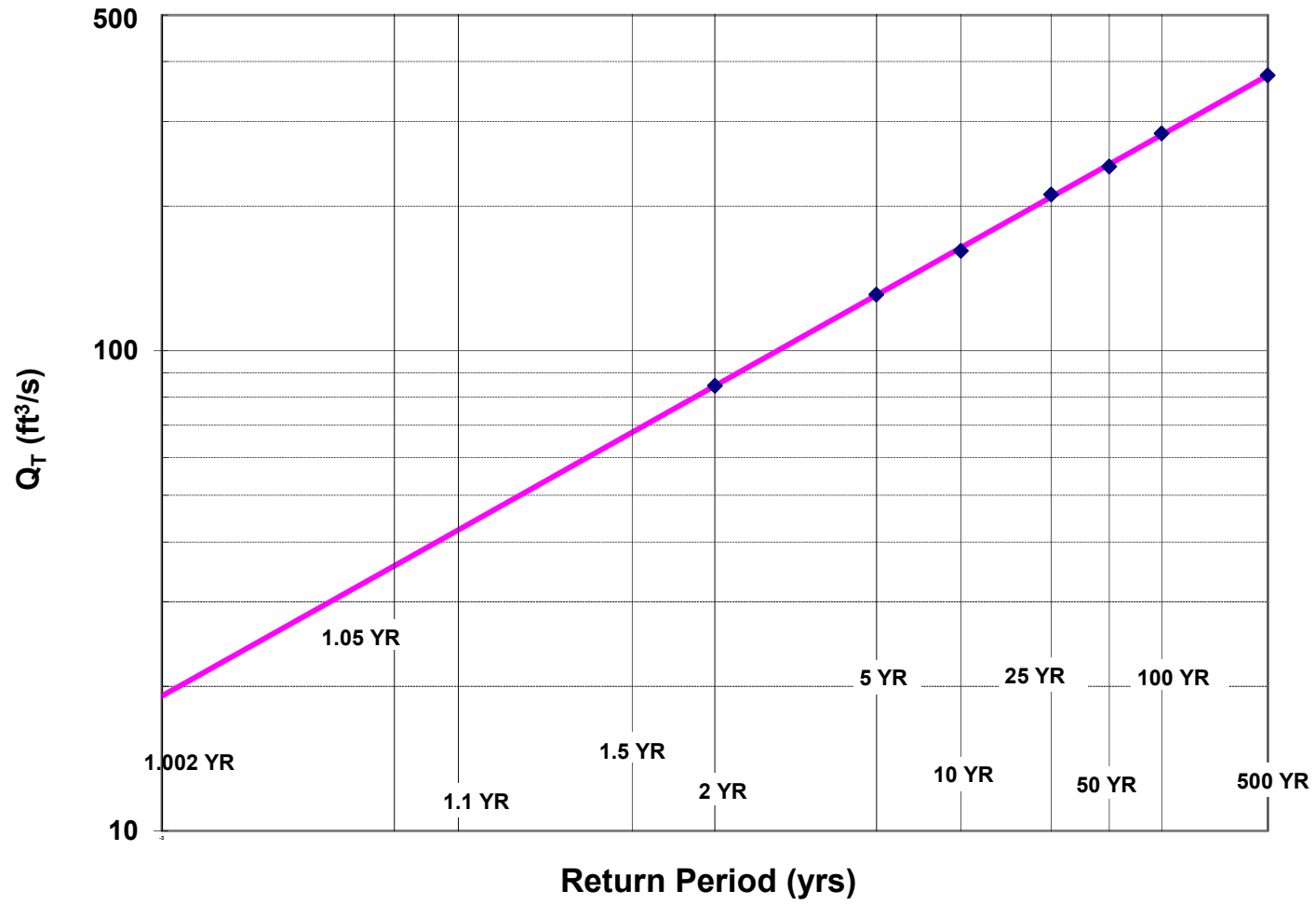
Q <sub>T</sub> (ft <sup>3</sup> /s)
42.4
84.6
130.8
161.5
211.6
242.0
283.4
374.3

Lombard, P.J. & G.A. Hodgkins, 2015.

Peak flow regression equations for small, ungaged streams in  
Maine - Comparing map-based to field-based variables  
*SIR 2015-4059*, USGS, Augusta, ME

$$Q_T = b \times A^a \times 10^{-wW}$$

# Log-Normal Probability Plot



WIN:	23092.00
Town:	Jefferson
Route No.:	ME-17
Asset ID:	2218
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Long:	69.52912

Project Name:	0
Stream Name:	Brann Brook
Bridge Name:	Davis Bridge
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**DO NOT ENTER ANY DATA ON THIS PAGE; EVERYTHING IS CALCULATED**

**MAINE MONTHLY MEDIAN FLOWS and HYDRAULIC GEOMETRY BY USGS REGRESSION EQUATIONS (2004, 2013, 2015)**

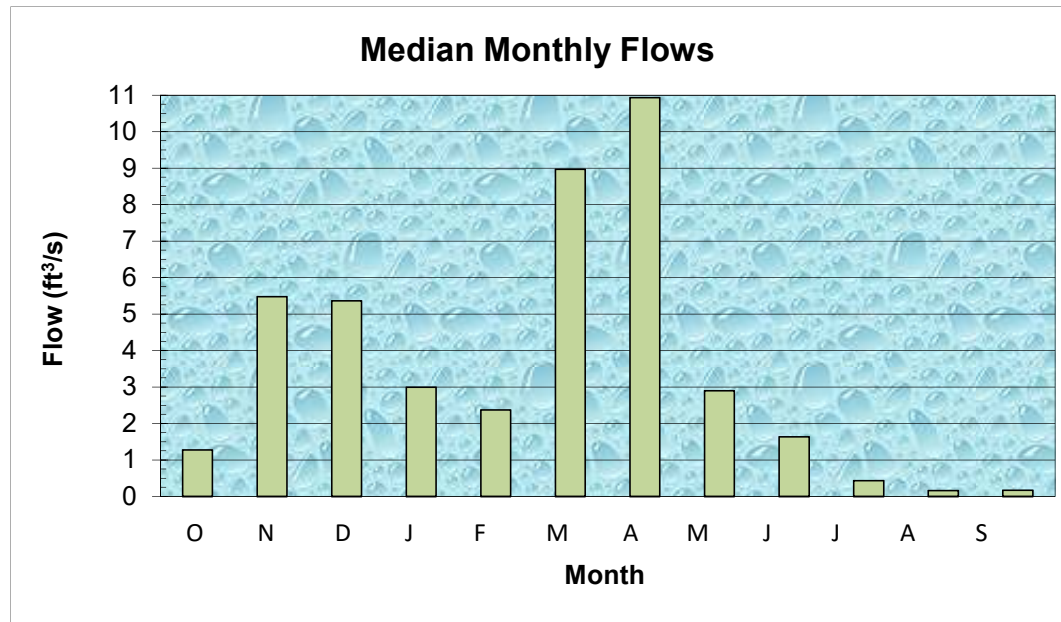
Value	Variable	Explanation
3.00	A	Area (mi <sup>2</sup> )
459520	4899205	$P_c$ Watershed centroid (E,N; UTM; Zone 19; meters)
49.73	DIST	Distance from Coastal reference line (mi)
44.1	pptA	Mean Annual Precipitation (inches)
0.00	SG	Sand & Gravel Aquifer (decimal fraction of watershed area)

Month	$Q_{median}$ (ft <sup>3</sup> /s)	(m <sup>3</sup> /s)
Jan	3.00	0.0849
Feb	2.37	0.0673
Mar	8.97	0.2542
Apr	10.94	0.3100
May	2.90	0.0822
Jun	1.63	0.0463
Jul	0.44	0.0125
Aug	0.16	0.0046
Sep	0.17	0.0049
Oct	1.28	0.0362
Nov	5.48	0.1552
Dec	5.37	0.1521

$Q_{bf}$	16.4
ann avg	6.6
ann med	2.7
$Q_{1.002}$	19.1
$Q_{1.01}$	25.4
$Q_{1.05}$	35.7
$Q_{bf}$	58.6

assume v = 4ft/s

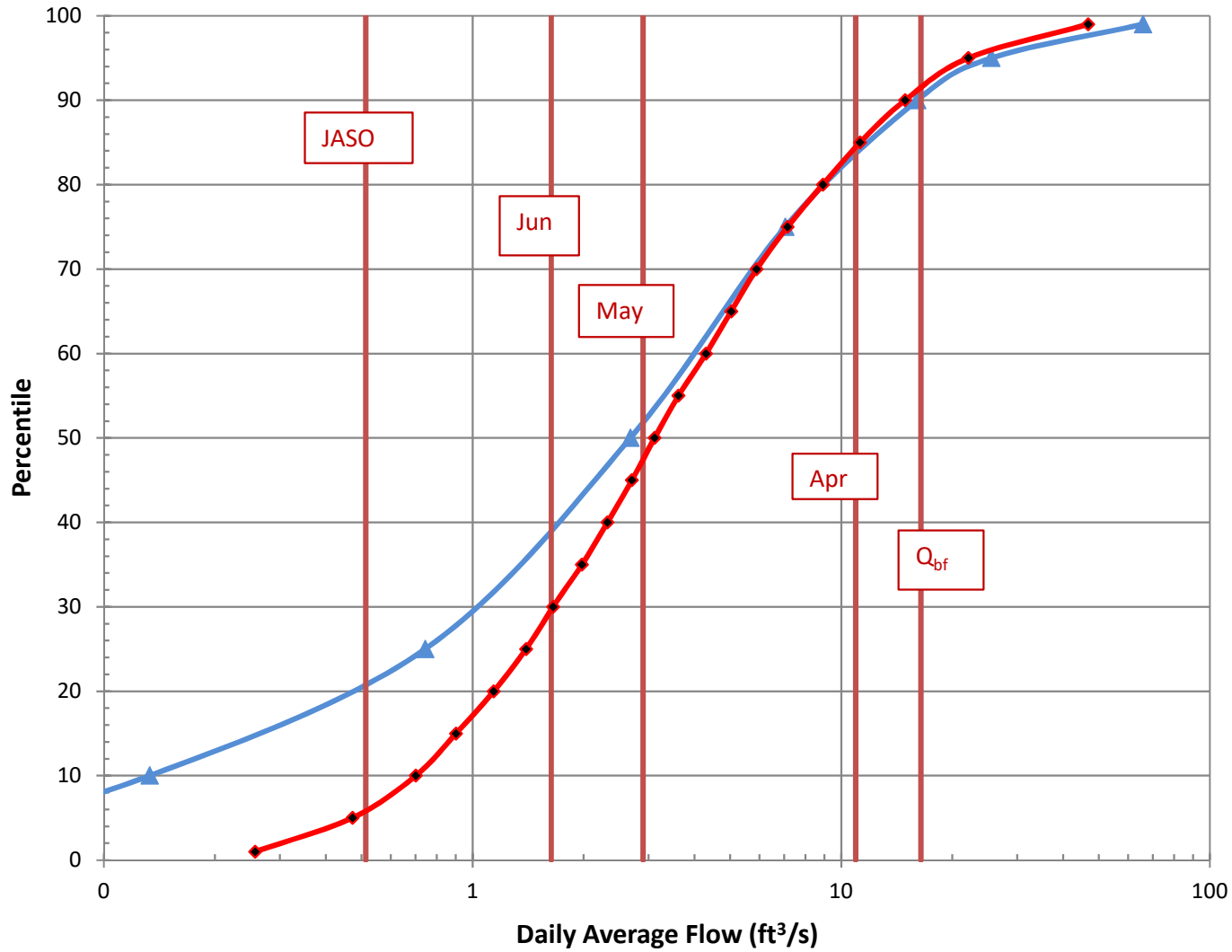
$W_{bf}$	17.0	estimated bankfull width (ft)
$d_{bf}$	0.9	estimated bankfull depth (ft)
$A_{bf}$	11.7	estimated bankfull flow area (ft <sup>2</sup> )



**References**

- Dudley, R.W., 2013. FY2013 Progress Report - Phase 1 ..., USFWS QRP Project
- Dudley, R.W., 2004. Estimating Monthly Streamflows ... , SIR 2004-5026
- Dudley, R.W., 2015. Regression Equations for Monthly and Annual Mean..., USGS SIR 2015-5151

# Daily Average Flow Distribution



## Daily Avg Flow Dist

$A_{ws} = (mi^2)$  3.0

Q (ft<sup>3</sup>/s)

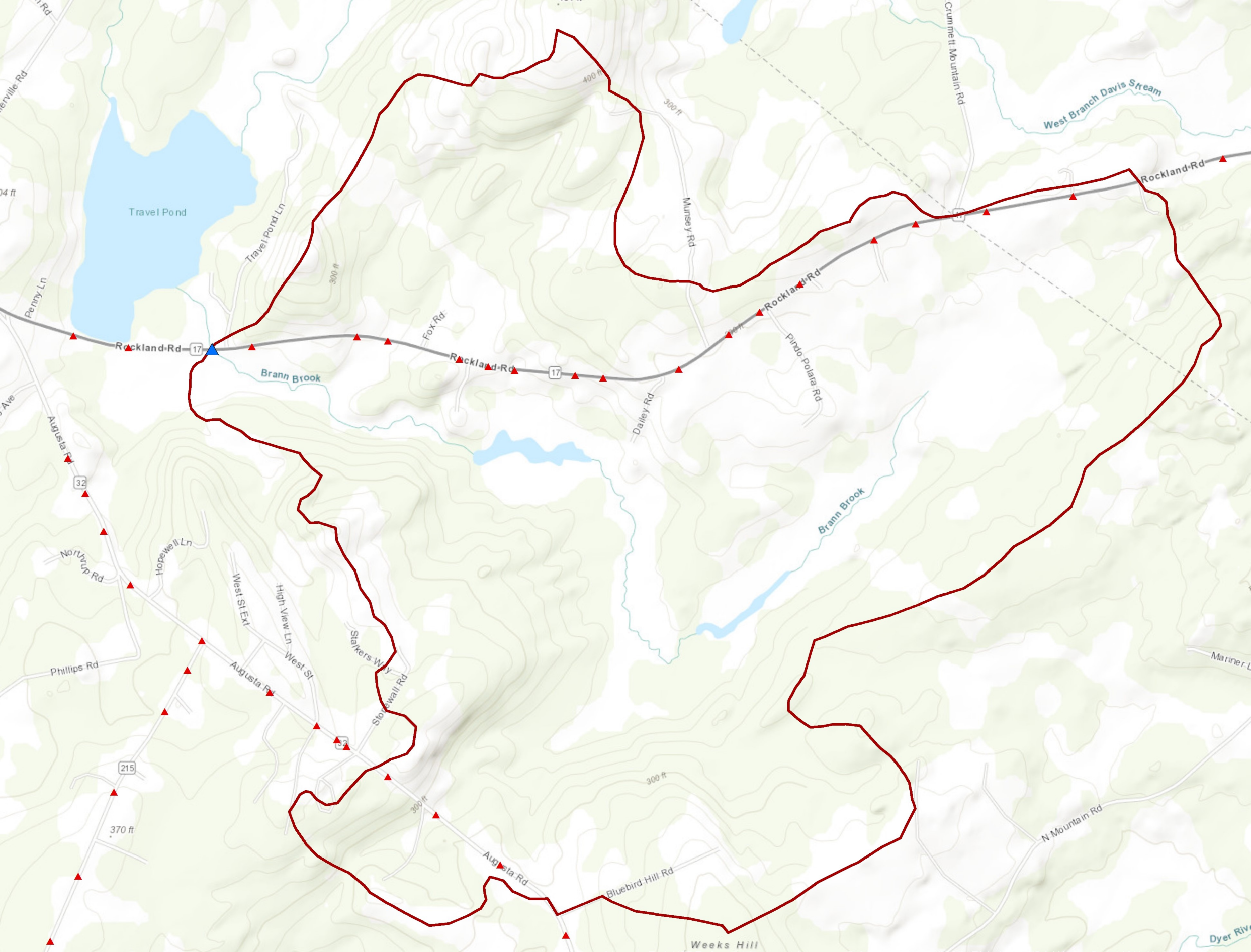
Pctl	Median	84 <sup>th</sup> pctl
1	0.26	0.46
5	0.47	0.76
10	0.70	1.05
15	0.90	1.32
20	1.14	1.60
25	1.40	1.87
30	1.65	2.13
35	1.98	2.44
40	2.32	2.80
45	2.71	3.17
50	3.12	3.74
55	3.62	4.35
60	4.30	5.11
65	5.03	5.95
70	5.90	6.95
75	7.15	8.35
80	8.92	9.97
85	11.25	12.78
90	14.90	17.16
95	22.12	26.69
99	46.77	61.58

Q<sub>bf</sub> 16.4

Q<sub>1.002</sub> 19.1

Q<sub>1.1</sub> 42.4

Q<sub>2</sub> 84.6



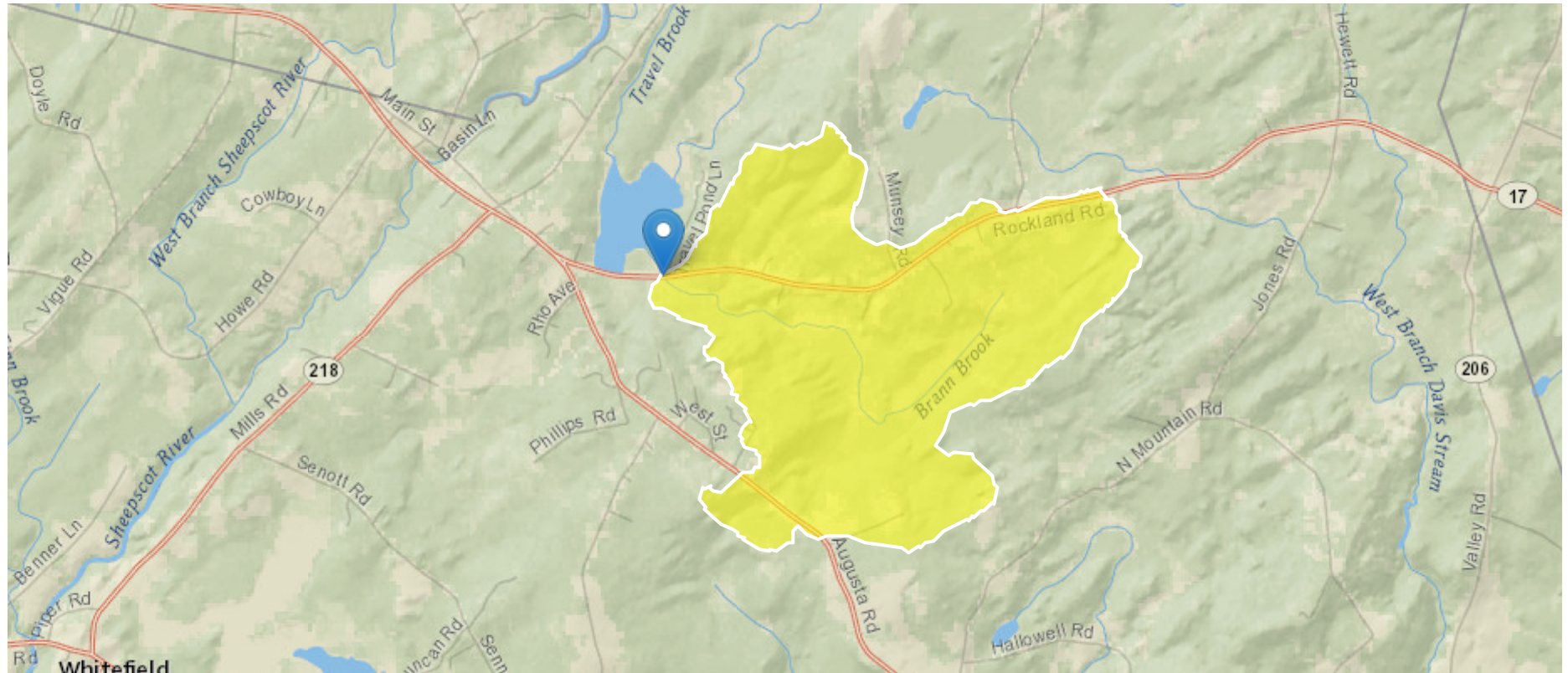
# Jefferson 23092 Davis Br #2218 ME17 @ Brann Brook

Region ID: ME

Workspace ID: ME20190903172317486000

Clicked Point (Latitude, Longitude): 44.24967, -69.52912

Time: 2019-09-03 13:23:33 -0400



Basin Characteristics

<b>Parameter Code</b>	<b>Parameter Description</b>	<b>Value</b>	<b>Unit</b>
DRNAREA	Area that drains to a point on a stream	3	square miles
STORNWI	Percentage of storage (combined water bodies and wetlands) from the National Wetlands Inventory	17.54	percent
SANDGRAVAF	Fraction of land surface underlain by sand and gravel aquifers	0	dimensionless
ELEV	Mean Basin Elevation	281.3	feet
BSLDEM10M	Mean basin slope computed from 10 m DEM	7.09	percent
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	459519.97	feet
CENTROIDY	Basin centroid vertical (y) location in state plane units	4899204.8	feet
COASTDIST	Shortest distance from the coastline to the basin centroid	50	miles
ELEVMAX	Maximum basin elevation	450.7	feet
LC06WATER	Percent of open water, class 11, from NLCD 2006	0	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	7.74	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.27	percent
PRECIP	Mean Annual Precipitation	44.1	inches
SANDGRAVAP	Percentage of land surface underlain by sand and gravel aquifers	0	percent
STATSGOA	Percentage of area of Hydrologic Soil Type A from STATSGO	0	percent

Bankfull Statistics Parameters[Central and Coastal Bankfull 2004 5042]

<b>Parameter Code</b>	<b>Parameter Name</b>	<b>Value</b>	<b>Units</b>	<b>Min Limit</b>	<b>Max Limit</b>
DRNAREA	Drainage Area	3	square miles	2.92	298

Bankfull Statistics Flow Report[Central and Coastal Bankfull 2004 5042]

<b>Statistic</b>	<b>Value</b>	<b>Unit</b>
Bankfull Streamflow	16.4	ft <sup>3</sup> /s
Bankfull Width	13.6	ft
Bankfull Depth	0.863	ft
Bankfull Area	11.7	ft <sup>2</sup>

*Bankfull Statistics Citations*

**Dudley, R.W.,2004, Hydraulic-Geometry Relations for Rivers in Coastal and Central Maine: U.S. Geological Survey Scientific Investigations Report 2004-5042, 30 p (<http://pubs.usgs.gov/sir/2004/5042/pdf/sir2004-5042.pdf>)**

Peak-Flow Statistics Parameters[Statewide Peak Flow DA LT 12sqmi 2015 5049]

<b>Parameter Code</b>	<b>Parameter Name</b>	<b>Value</b>	<b>Units</b>	<b>Min Limit</b>	<b>Max Limit</b>
DRNAREA	Drainage Area	3	square miles	0.31	12
STORNWI	Percentage of Storage from NWI	17.54	percent	0	22.2

Peak-Flow Statistics Flow Report[Statewide Peak Flow DA LT 12sqmi 2015 5049]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

<b>Statistic</b>	<b>Value</b>	<b>Unit</b>	<b>SEp</b>
1.01 Year Peak Flood	26	ft <sup>3</sup> /s	38
2 Year Peak Flood	84.5	ft <sup>3</sup> /s	34
5 Year Peak Flood	131	ft <sup>3</sup> /s	35
10 Year Peak Flood	161	ft <sup>3</sup> /s	37
25 Year Peak Flood	211	ft <sup>3</sup> /s	39

Statistic	Value	Unit	SEp
50 Year Peak Flood	242	ft <sup>3</sup> /s	41
100 Year Peak Flood	283	ft <sup>3</sup> /s	42
250 Year Peak Flood	314	ft <sup>3</sup> /s	44
500 Year Peak Flood	374	ft <sup>3</sup> /s	47

*Peak-Flow Statistics Citations*

**Lombard, P.J., and Hodgkins, G.A., 2015, Peak flow regression equations for small, ungaged streams in Maine— Comparing map-based to field-based variables: U.S. Geological Survey Scientific Investigations Report 2015–5049, 12 p. (<http://dx.doi.org/10.3133/sir20155049>)**

Flow-Duration Statistics Parameters<sup>[Statewide Annual SIR 2015 5151]</sup>

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	281.3	feet	239	2120

Flow-Duration Statistics Disclaimers<sup>[Statewide Annual SIR 2015 5151]</sup>

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Flow-Duration Statistics Flow Report<sup>[Statewide Annual SIR 2015 5151]</sup>

Statistic	Value	Unit
1 Percent Duration	0.00656	ft <sup>3</sup> /s
5 Percent Duration	0.0451	ft <sup>3</sup> /s

Statistic	Value	Unit
10 Percent Duration	0.133	ft <sup>3</sup> /s
25 Percent Duration	0.744	ft <sup>3</sup> /s
50 Percent Duration	2.68	ft <sup>3</sup> /s
75 Percent Duration	7.05	ft <sup>3</sup> /s
90 Percent Duration	16.1	ft <sup>3</sup> /s
95 Percent Duration	25.5	ft <sup>3</sup> /s
99 Percent Duration	65.8	ft <sup>3</sup> /s

*Flow-Duration Statistics Citations*

**Dudley, R.W.,2015, Regression equations for monthly and annual mean and selected percentile streamflows for ungaged rivers in Maine: U.S. Geological Survey Scientific Investigations Report 2015–5151, 35 p. (<http://dx.doi.org/10.3133/sir20155151>)**

Annual Flow Statistics Parameters<sup>[Statewide Annual SIR 2015 5151]</sup>

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	281.3	feet	239	2120

Annual Flow Statistics Disclaimers<sup>[Statewide Annual SIR 2015 5151]</sup>

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Annual Flow Statistics Flow Report<sup>[Statewide Annual SIR 2015 5151]</sup>

<b>Statistic</b>	<b>Value</b>	<b>Unit</b>
Mean Annual Flow	6.59	ft <sup>3</sup> /s

*Annual Flow Statistics Citations*

**Dudley, R.W.,2015, Regression equations for monthly and annual mean and selected percentile streamflows for ungaged rivers in Maine: U.S. Geological Survey Scientific Investigations Report 2015–5151, 35 p. (<http://dx.doi.org/10.3133/sir20155151>)**

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Application Version: 4.3.8