

MaineDOT Culvert Hydrology Summary Sheet

Town: Bremen WIN (or Region): 24283.00

Route: Rt 32 Local Road Name:

Stream: unnamed trib to Webber Pond

Lat: 44.00034 Long: -69.4422

Asset ID: LC-46827 Also Known As:

Existing Structure: 60 inch CMP

Watershed Area: 0.7 sq. mi. NWI Wetlands: 9.5 %

Wbf - calculated: 9.1 feet Wbf - measured (if known): 8 feet

Q50: 103.1 cfs

Q100: 120.5 cfs

Preliminary Pipe Size*:

* Note: this size may NOT meet fish passage regulatory requirements. Consult with ENV staff for guidance.

Comments:

By: MRL
Date: 1/22/2020
Revised:

ver: 2018 Jul 09

WIN: 24283.00
 Town: Bremen
 Route No. Rt 32
 Asset ID: LC-46827
 Lat: 44.00034 Long: -69.44218

Project Name: Reg 2
 Stream Name: unnamed trib to Webber Pond
 Bridge Name:
 Analysis by: MRL
 Date: 1/22/2020

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

Enter data in blue cells only!

	km ²	mi ²	ac
A	1.81	0.70	448.0
W	0.17	0.1	42.5
P _c	465009.8	4873123	
County	Lincoln		
pptA			
A (km ²)	1.81		
W (%)	9.49		

Enter data in [mi²]

Watershed Area DRNAREA
 Wetlands area (by NWI)
 watershed centroid (E, N; UTM 19N; meters)
 choose county from drop-down menu
 mean annual precipitation (inches; by look-up)
 Conf Lvl 0.67
 NWI Wetlands % STORNWI

ver. 2018 Jul 09
Worksheet prepared by:
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 207-557-1052
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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	715	mean basin elevation (ft)
SLOPE	9.88	mean basin slope (%)
EMAX	1192	maximum basin elevation (ft)
WATER	0	percent of drainage basin land cover classified as open water
PRECIP	47.0	mean annual precipitation
SG	0.00	sand & gravel aquifer as decimal fraction of watershed A
HGA	0.39	mean basin percentage of hydrological soil group A
DIST	39.00	distance from the coast (mi)

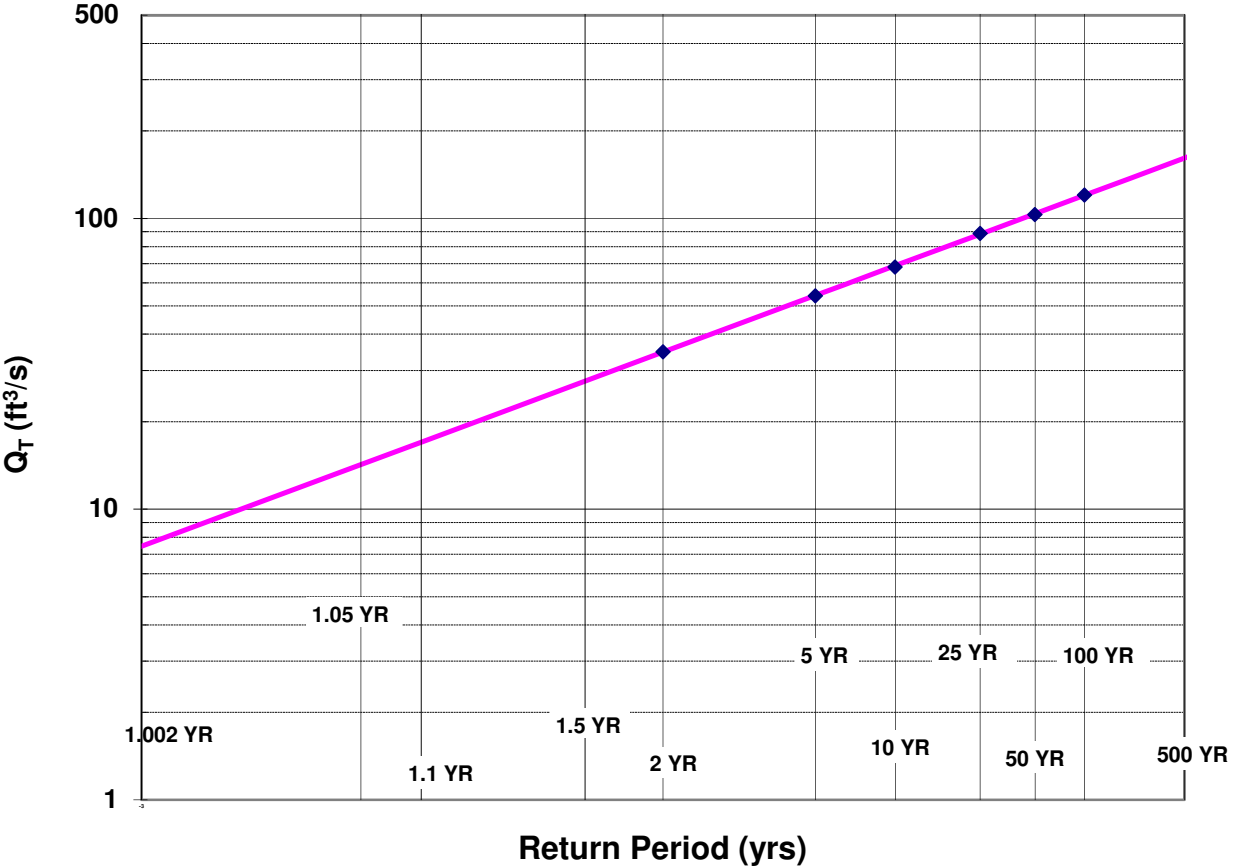
Ret Pd	Peak Flow Estimate		
T (yr)	Lower	Q _T (m ³ /s)	Upper
1.1		0.48	
2	0.69	0.98	1.40
5	1.07	1.54	2.20
10	1.33	1.92	2.79
25	1.70	2.51	3.71
50	1.95	2.92	4.37
100	2.24	3.41	5.19
500	2.90	4.57	0.00

Q _T (ft ³ /s)
17.0
34.7
54.2
68.0
88.7
103.1
120.5
161.4

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:	24283.00
Town:	Bremen
Route No.:	Rt 32
Asset ID:	LC-46827
Lat:	44.00034
Long:	-69.44218

Project Name:	Reg 2
Stream Name:	unnamed trib to Webber Pond
Bridge Name:	0
Analysis by:	MRL
Date:	1/22/2020

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)

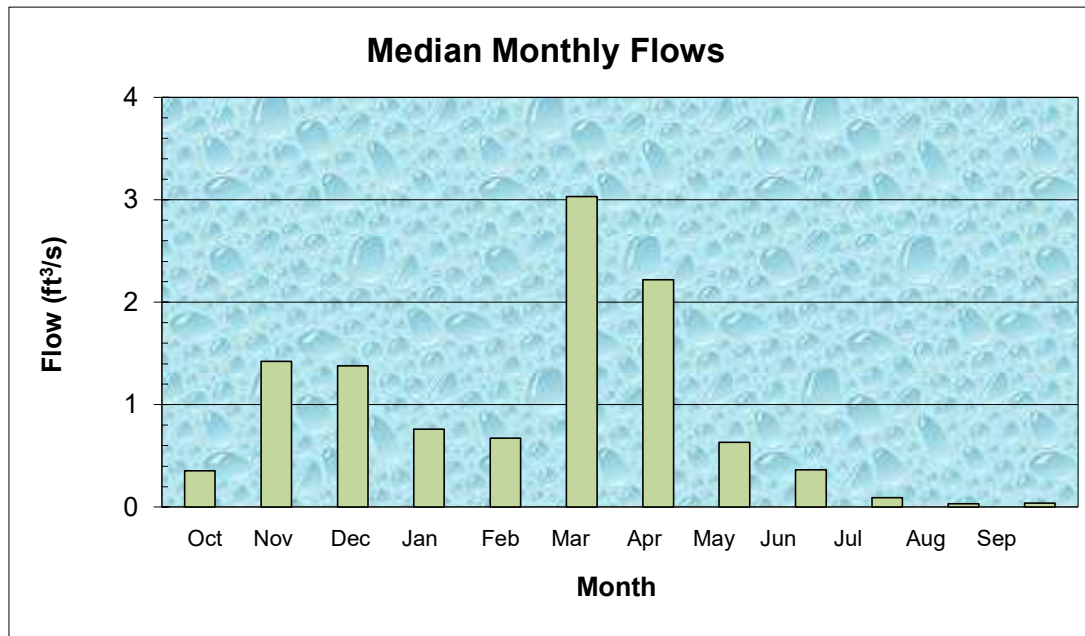
Value	Variable	Explanation
0.70	A	Area (mi ²)
465009.8	P _c	Watershed centroid (E,N; UTM; Zone 19; meters)
34.09	DIST	Distance from Coastal reference line (mi)
47.0	pptA	Mean Annual Precipitation (inches)
0.00	SG	Sand & Gravel Aquifer (decimal fraction of watershed area)

Month	Q _{median} (ft ³ /s)	(m ³ /s)
Jan	0.76	0.0215
Feb	0.67	0.0191
Mar	3.03	0.0859
Apr	2.22	0.0629
May	0.63	0.0179
Jun	0.36	0.0103
Jul	0.09	0.0026
Aug	0.03	0.0009
Sep	0.04	0.0011
Oct	0.35	0.0100
Nov	1.42	0.0403
Dec	1.38	0.0390

Q _{bf}	3.6
ann avg	1.7
ann med	0.7
Q _{1.002}	7.5
Q _{1.01}	10.0
Q _{1.05}	14.2
Q _{bf}	19.1

assume v = 4ft/s

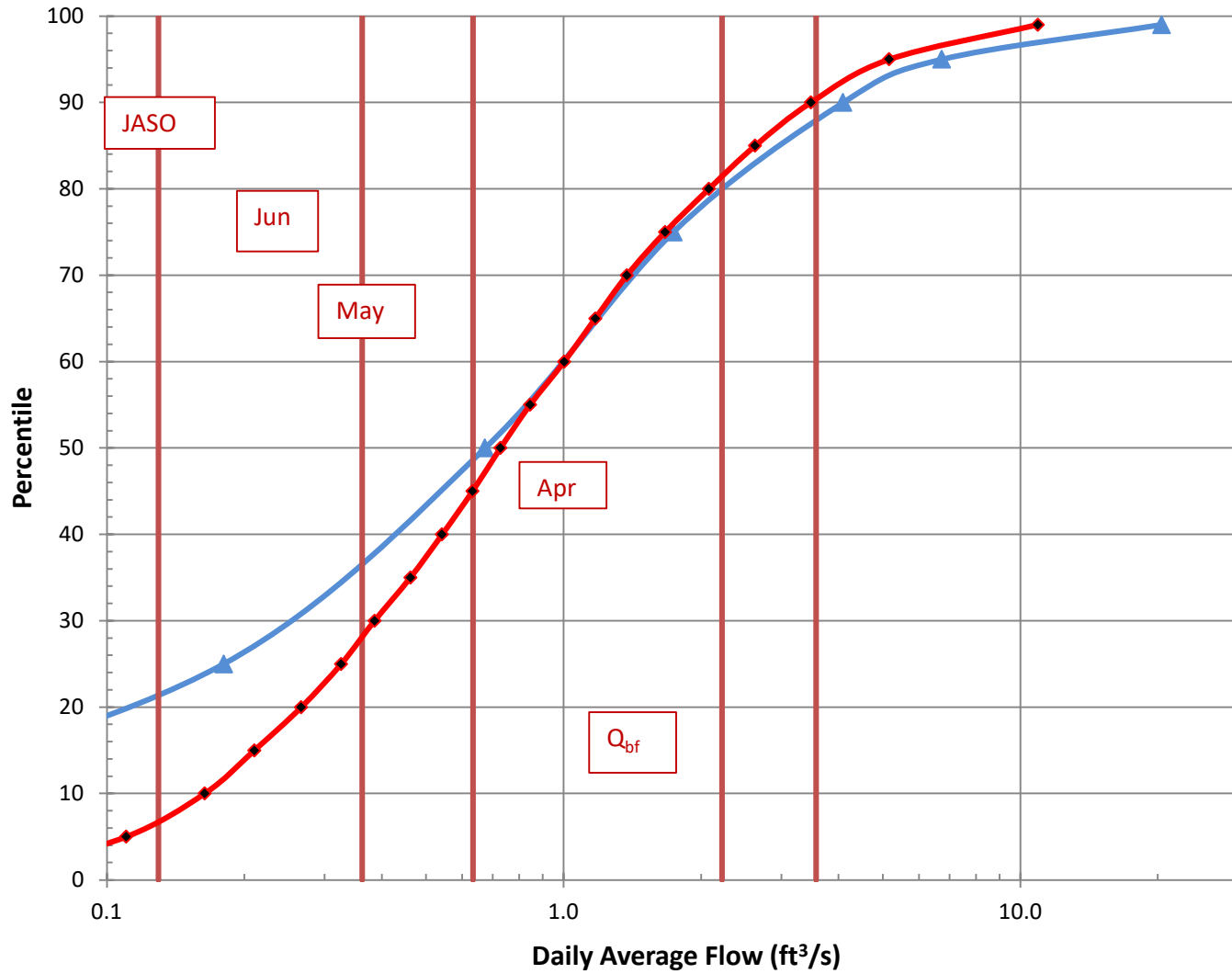
W _{bf}	9.1	estimated bankfull width (ft)
d _{bf}	0.5	estimated bankfull depth (ft)
A _{bf}	3.3	estimated bankfull flow area (ft ²)



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

$A_{ws} = (mi^2)$ 0.7

Q (ft³/s)

Pctl	Median	84 th pctl
1	0.06	0.11
5	0.11	0.18
10	0.16	0.25
15	0.21	0.31
20	0.27	0.37
25	0.33	0.44
30	0.39	0.50
35	0.46	0.57
40	0.54	0.65
45	0.63	0.74
50	0.73	0.87
55	0.84	1.02
60	1.00	1.19
65	1.17	1.39
70	1.38	1.62
75	1.67	1.95
80	2.08	2.33
85	2.63	2.98
90	3.48	4.00
95	5.16	6.23
99	10.91	14.37

Q _{bf}	3.6
Q _{1.002}	7.5
Q _{1.1}	17.0
Q ₂	34.7

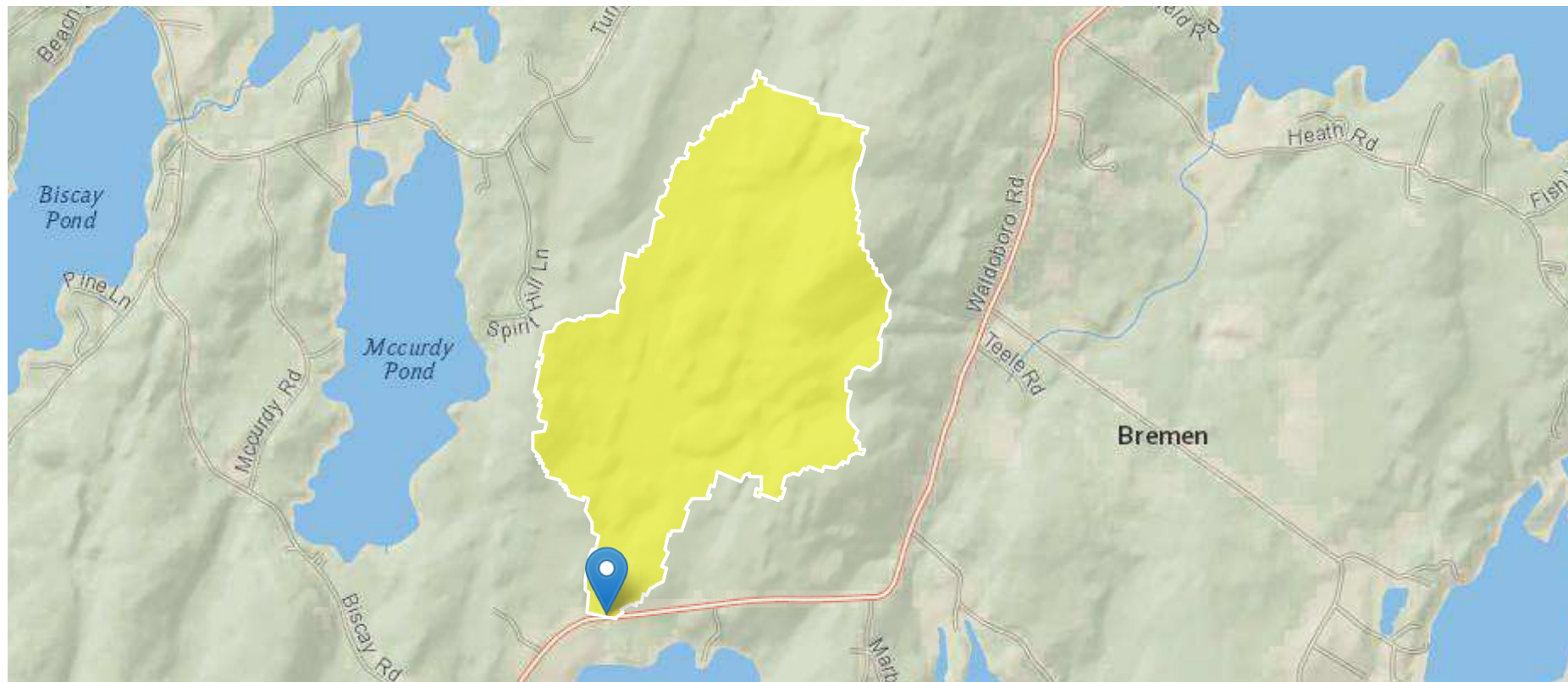
Bremen 24283.00 StreamStats Report

Region ID: ME

Workspace ID: ME20200122154413560000

Clicked Point (Latitude, Longitude): 44.00034, -69.44218

Time: 2020-01-22 10:44:30 -0500



LC-46827 MRL 1-22-2020

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.7	square miles
SANDGRAVAF	Fraction of land surface underlain by sand and gravel aquifers	0	dimensionless
STORNWI	Percentage of storage (combined water bodies and wetlands) from the National Wetlands Inventory	9.49	percent
ELEV	Mean Basin Elevation	145.4	feet
STATSGOA	Percentage of area of Hydrologic Soil Type A from STATSGO	1.89	percent
COASTDIST	Shortest distance from the coastline to the basin centroid	34	miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	8.27	percent
LC06WATER	Percent of open water, class 11, from NLCD 2006	0	percent
ELEVMAX	Maximum basin elevation	302	feet
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	465009.77	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	4873122.99	meters
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	0.29	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.0278	percent
SANDGRAVAP	Percentage of land surface underlain by sand and gravel aquifers	0	percent

Low-Flow Statistics Parameters^[Statewide LowFlow SIR 2004 5026]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	9.79	1418
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.455

Low-Flow Statistics Disclaimers[Statewide LowFlow SIR 2004 5026]

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

Low-Flow Statistics Flow Report[Statewide LowFlow SIR 2004 5026]

Statistic	Value	Unit
7 Day 10 Year Low Flow	0.0151	ft ³ /s

Low-Flow Statistics Citations

Dudley, R.W.,2004, Estimating Monthly, Annual, and Low 7-Day, 10-Year Streamflows for Ungaged Rivers in Maine: U.S. Geological Survey Scientific Investigations Report 2004-5026, 22 p. (<http://water.usgs.gov/pubs/sir/2004/5026/pdf/sir2004-5026.pdf>)

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

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	0.31	12
STORNWI	Percentage of Storage from NWI	9.49	percent	0	22.2

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

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

Statistic	Value	Unit	SEp
1.01 Year Peak Flood	10.7	ft ³ /s	38
2 Year Peak Flood	34.7	ft ³ /s	34
5 Year Peak Flood	54.2	ft ³ /s	35
10 Year Peak Flood	67.9	ft ³ /s	37

Statistic	Value	Unit	SEp
25 Year Peak Flood	88.6	ft ³ /s	39
50 Year Peak Flood	103	ft ³ /s	41
100 Year Peak Flood	120	ft ³ /s	42
250 Year Peak Flood	136	ft ³ /s	44
500 Year Peak Flood	161	ft ³ /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>)

Bankfull Statistics Parameters[Central and Coastal Bankfull 2004 5042]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	2.92	298

Bankfull Statistics Disclaimers[Central and Coastal Bankfull 2004 5042]

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

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

Statistic	Value	Unit
Bankfull Streamflow	3.57	ft ³ /s
Bankfull Width	6.37	ft
Bankfull Depth	0.526	ft

Statistic	Value	Unit
Bankfull Area	3.35	ft^2

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>)

Flow-Duration Statistics Parameters[Statewide Annual SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	145.4	feet	239	2120

Flow-Duration Statistics Disclaimers[Statewide Annual SIR 2015 5151]

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

Flow-Duration Statistics Flow Report[Statewide Annual SIR 2015 5151]

Statistic	Value	Unit
1 Percent Duration	0.000609	ft^3/s
5 Percent Duration	0.00571	ft^3/s
10 Percent Duration	0.0202	ft^3/s
25 Percent Duration	0.15	ft^3/s
50 Percent Duration	0.62	ft^3/s

Statistic	Value	Unit
75 Percent Duration	1.67	ft ³ /s
90 Percent Duration	3.88	ft ³ /s
95 Percent Duration	6.24	ft ³ /s
99 Percent Duration	17.7	ft ³ /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^[Statewide Annual SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	145.4	feet	239	2120

Annual Flow Statistics Disclaimers^[Statewide Annual SIR 2015 5151]

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

Annual Flow Statistics Flow Report^[Statewide Annual SIR 2015 5151]

Statistic	Value	Unit
Mean Annual Flow	1.6	ft ³ /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>)

Monthly Flow Statistics Parameters[Statewide January SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
STATSGOA	STATSGO Percent Hydrologic Soil Type A	1.89	percent	0	31.5

Monthly Flow Statistics Parameters[Statewide February SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
COASTDIST	Distance From Coast To Basin Centroid	34	miles	46.6	193
BSLDEM10M	Mean Basin Slope from 10m DEM	8.27	percent	1.5	26.6

Monthly Flow Statistics Parameters[Statewide March SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
COASTDIST	Distance From Coast To Basin Centroid	34	miles	46.6	193
LC06WATER	Percent_Water_from_NLCD2006	0	percent	0	6.2

Monthly Flow Statistics Parameters[Statewide April SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
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Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
COASTDIST	Distance From Coast To Basin Centroid	34	miles	46.6	193
LC06WATER	Percent_Water_from_NLCD2006	0	percent	0	6.2

Monthly Flow Statistics Parameters[Statewide May SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
BSLDEM10M	Mean Basin Slope from 10m DEM	8.27	percent	1.5	26.6
LC06WATER	Percent_Water_from_NLCD2006	0	percent	0	6.2

Monthly Flow Statistics Parameters[Statewide June SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
BSLDEM10M	Mean Basin Slope from 10m DEM	8.27	percent	1.5	26.6
LC06WATER	Percent_Water_from_NLCD2006	0	percent	0	6.2

Monthly Flow Statistics Parameters[Statewide July SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	145.4	feet	239	2120

Monthly Flow Statistics Parameters[Statewide August SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	145.4	feet	239	2120

Monthly Flow Statistics Parameters[Statewide September SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	145.4	feet	239	2120

Monthly Flow Statistics Parameters[Statewide October SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	145.4	feet	239	2120

Monthly Flow Statistics Parameters[Statewide November SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
ELEVMAX	Maximum Basin Elevation	302	feet	633	6290

Monthly Flow Statistics Parameters[Statewide December SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
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Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.7	square miles	14.9	1419
STATSGOA	STATSGO Percent Hydrologic Soil Type A	1.89	percent	0	31.5

Monthly Flow Statistics Disclaimers[Statewide January SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide January SIR 2015 5151]

Statistic	Value	Unit
January Mean Flow	1.79	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide February SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide February SIR 2015 5151]

Statistic	Value	Unit
February Mean Flow	1.53	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide March SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide March SIR 2015 5151]

Statistic	Value	Unit
March Mean Flow	6.11	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide April SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide April SIR 2015 5151]

Statistic	Value	Unit
April Mean Flow	4.53	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide May SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide May SIR 2015 5151]

Statistic	Value	Unit
May Mean Flow	1.01	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide June SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide June SIR 2015 5151]

Statistic	Value	Unit
June Mean Flow	1.2	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide July SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide July SIR 2015 5151]

Statistic	Value	Unit
July Mean Flow	0.31	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide August SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide August SIR 2015 5151]

Statistic	Value	Unit
August Mean Flow	0.151	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide September SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide September SIR 2015 5151]

Statistic	Value	Unit
September Mean Flow	0.207	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide October SIR 2015 5151]

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

Monthly Flow Statistics Flow Report[Statewide October SIR 2015 5151]

Statistic	Value	Unit
October Mean Flow	1.46	ft ³ /s

Monthly Flow Statistics Disclaimers[Statewide November SIR 2015 5151]

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

Monthly Flow Statistics Flow Report^[Statewide November SIR 2015 5151]

Statistic	Value	Unit
November Mean Flow	2.58	ft ³ /s

Monthly Flow Statistics Disclaimer^{S[Statewide December SIR 2015 5151]}

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

Monthly Flow Statistics Flow Report^[Statewide December SIR 2015 5151]

Statistic	Value	Unit
December Mean Flow	2.31	ft ³ /s

Monthly 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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