WIN:	25515.00	**Project Name:**	
Town:	St George	**Stream Name:**	
Route No.	ME-73	**Bridge Name:**	
Asset ID:	46906	**Analysis by:**	csh / mrl
Lat:	44.01402 **Long:** -69.1852	**Date:**	4/22/2021

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

Enter data in blue cells only!

ver. 2020 Feb 07

	km^2	mi^2	ac	*Enter data in [mi^2]*
A	6.73	2.60	1664.0	Watershed Area *DRNAREA*
W	1.17	0.5	288.2	Wetlands area (by NWI)
P_c	485781	4874854		watershed centroid (E, N; UTM 19N; meters)
County	Knox			*choose county from drop-down menu*
pptA				mean annual precipitation (inches; by look-up)
A (km^2)	6.73	**Conf Lvl**	0.67	
W (%)	17.32			NWI Wetlands % *STORNWI*

Worksheet prepared by:

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Environmental Office
Maine Dept. Transportation
Augusta, ME 04333-0016
207-557-1052
Charles.Hebson@maine.gov

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

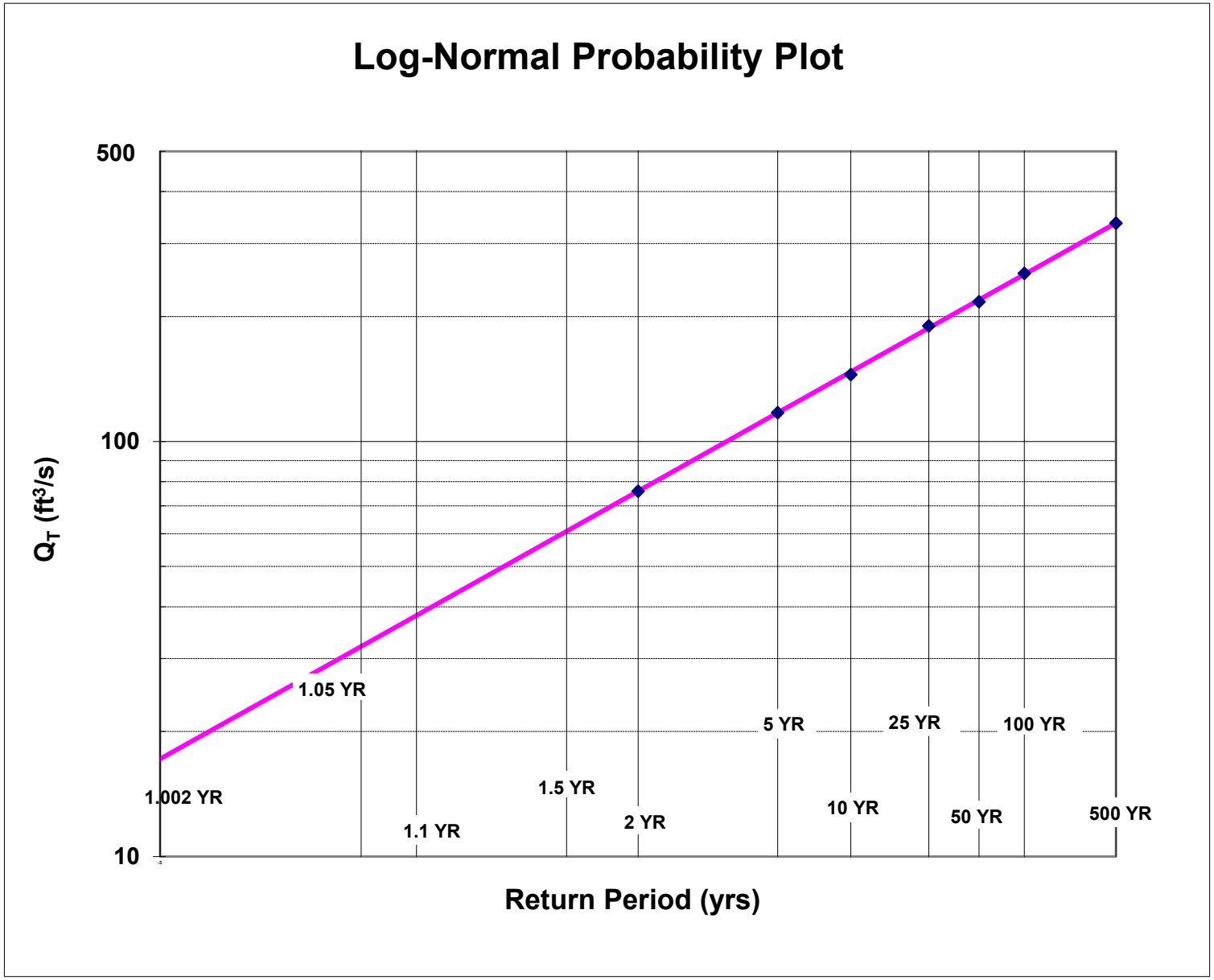
Watershed Characteristics for Monthly & Daily Flows

EAVG	85.5	mean basin elevation (ft)
SLOPE	4.37	mean basin slope (%)
EMAX	157	maximum basin elevation (ft)
WATER	0.24	percent of drainage basin land cover classified as open water
PRECIP	47.1	mean annual precipitation
SG	0.00	sand & gravel aquifer as decimal fraction of watershed A
HGA	23	mean basin percentage of hydrological soil group A
DIST	29.00	distance from the coast (mi)

Ret Pd T (yr)	Peak Flow Estimate Lower	Q_T (m^3/s)	Upper	Q_T (ft^3/s)
1.1		1.08		38.1
2		2.15		76.0
5		3.33		117.5
10		4.11		145.0
25		5.38		189.9
50		6.16		217.3
100		7.21		254.4
500		9.52		336.1

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
500
100
10
Q_T (ft^3/s)
1.002 YR
1.05 YR
1.1 YR
1.5 YR
2 YR
5 YR
10 YR
25 YR
50 YR
100 YR
500 YR
Return Period (yrs)

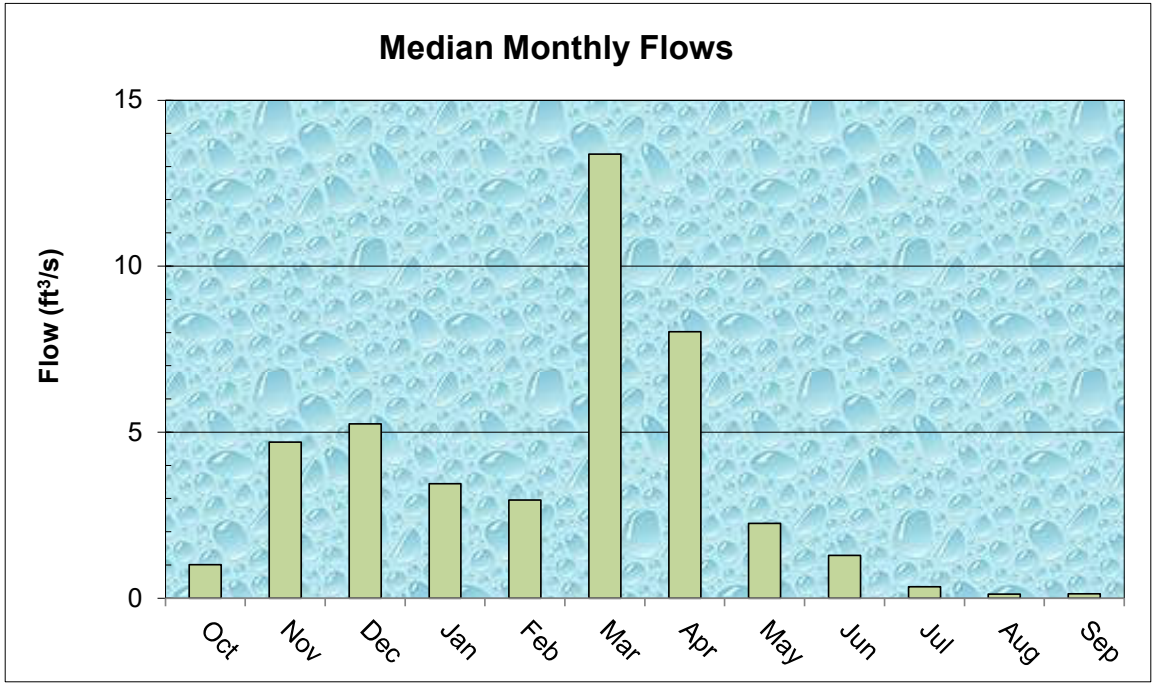
WIN:	25515.00	**Project Name:**	0
Town:	St George	**Stream Name:**	0
Route No.	ME-73	**Bridge Name:**	0
Asset ID:	46906	**Analysis by:**	csh / mrl
Lat:	44.01402 **Long:** -69.18516	**Date:**	4/22/2021

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
	2.60	*A*	Area (mi^2)
485781	4874854	P_c	Watershed centroid (E,N; UTM; Zone 19; meters)
	28.61	*DIST*	Distance from Coastal reference line (mi)
	47.1	*pptA*	Mean Annual Precipitation (inches)
	0.00	*SG*	Sand & Gravel Aquifer (decimal fraction of watershed area)

Month	Q_{median} (ft3/s)	(m^3/s)
Jan	**3.45**	0.0977
Feb	**2.95**	0.0837
Mar	**13.37**	0.3789
Apr	**8.03**	0.2274
May	**2.25**	0.0637
Jun	**1.29**	0.0366
Jul	**0.34**	0.0097
Aug	**0.12**	0.0034
Sep	**0.13**	0.0036
Oct	**1.01**	0.0286
Nov	**4.70**	0.1332
Dec	**5.25**	0.1487



Q_{bf}	**14.2**	
ann avg	**5.6**	
ann med	**2.3**	
$Q_{1.002}$	**17.2**	
$Q_{1.01}$	**22.8**	
$Q_{1.05}$	**32.1**	
Q_{bf}	**52.5**	assume v = 4ft/s

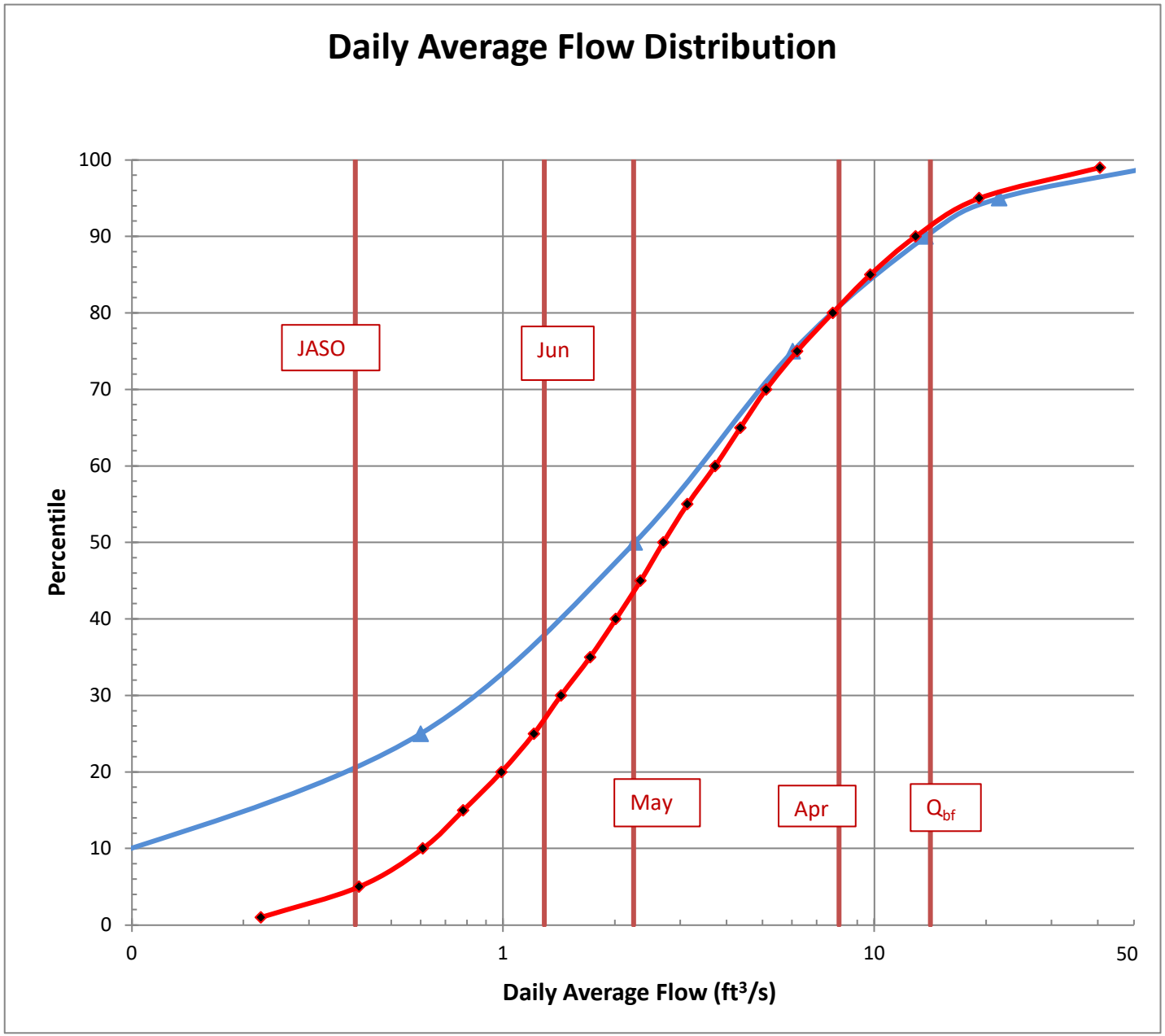
W_{bf}	**16.0**	estimated bankfull width (ft)
d_{bf}	**0.8**	estimated bankfull depth (ft)
A_{bf}	**10.3**	estimated bankfull flow area (ft^2)

References

Dudley, 2013. FY2013 Progress Report - Phase 1 …, USFWS QRP Project

Dudley, 2004. Estimating Monthly Streamflows … , SIR 2004-5026

Dudley, 2015. Regression Equations for Monthly & Annual Mean..., USGS SIR 2015-5151



Daily Avg Flow Dist		
A_{ws} = (mi^2)		2.6
Q (ft^3/s)		
Pctl	Median	84th pctl
1	0.22	0.39
5	0.41	0.66
10	0.61	0.91
15	0.78	1.14
20	0.99	1.38
25	1.21	1.62
30	1.43	1.85
35	1.72	2.11
40	2.01	2.43
45	2.35	2.75
50	2.70	3.24
55	3.14	3.77
60	3.72	4.43
65	4.36	5.16
70	5.11	6.02
75	6.20	7.24
80	7.73	8.64
85	9.75	11.08
90	12.92	14.87
95	19.17	23.13
99	40.54	53.37

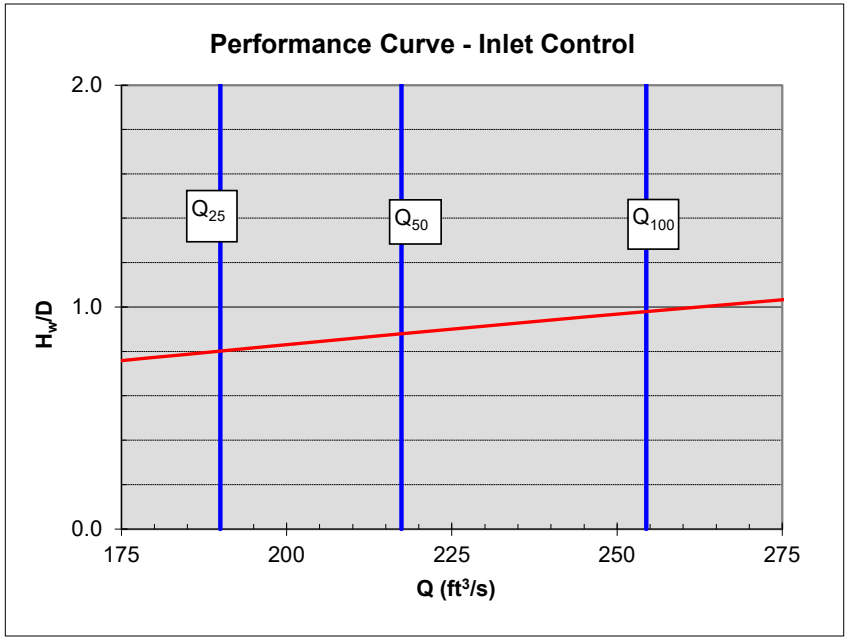
Q_{bf}	14.2
$Q_{1.002}$	17.2
$Q_{1.1}$	38.1
Q_2	76.0

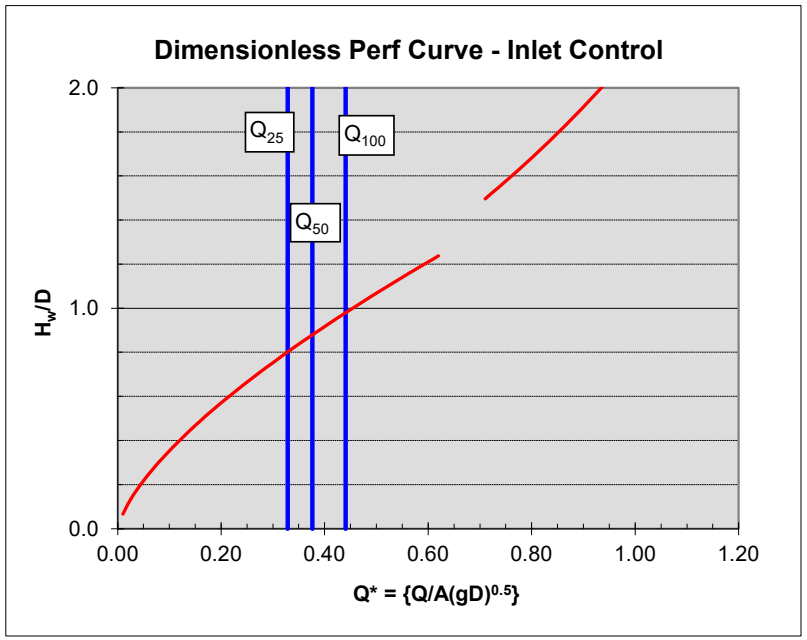
NOTE: ***This page is for preliminary sizing only.***
Final design should be done with HY8 or HDS-5

Preliminary Culvert Sizing - Round & Box Culverts

Shape:	Round						
Type:	Box 0 ww		Q_{25}	189.9			
D or R (ft)	7		Q_{50}	217.3	trial D / R =	7.1	
w (ft)	*12*	*box width*	Q_{100}	254.4	trial w: BFW =	16.0	
Slope (ft/ft)	0.02						
A (ft^2)	38.48						
g (ft/s^2)	32.2						

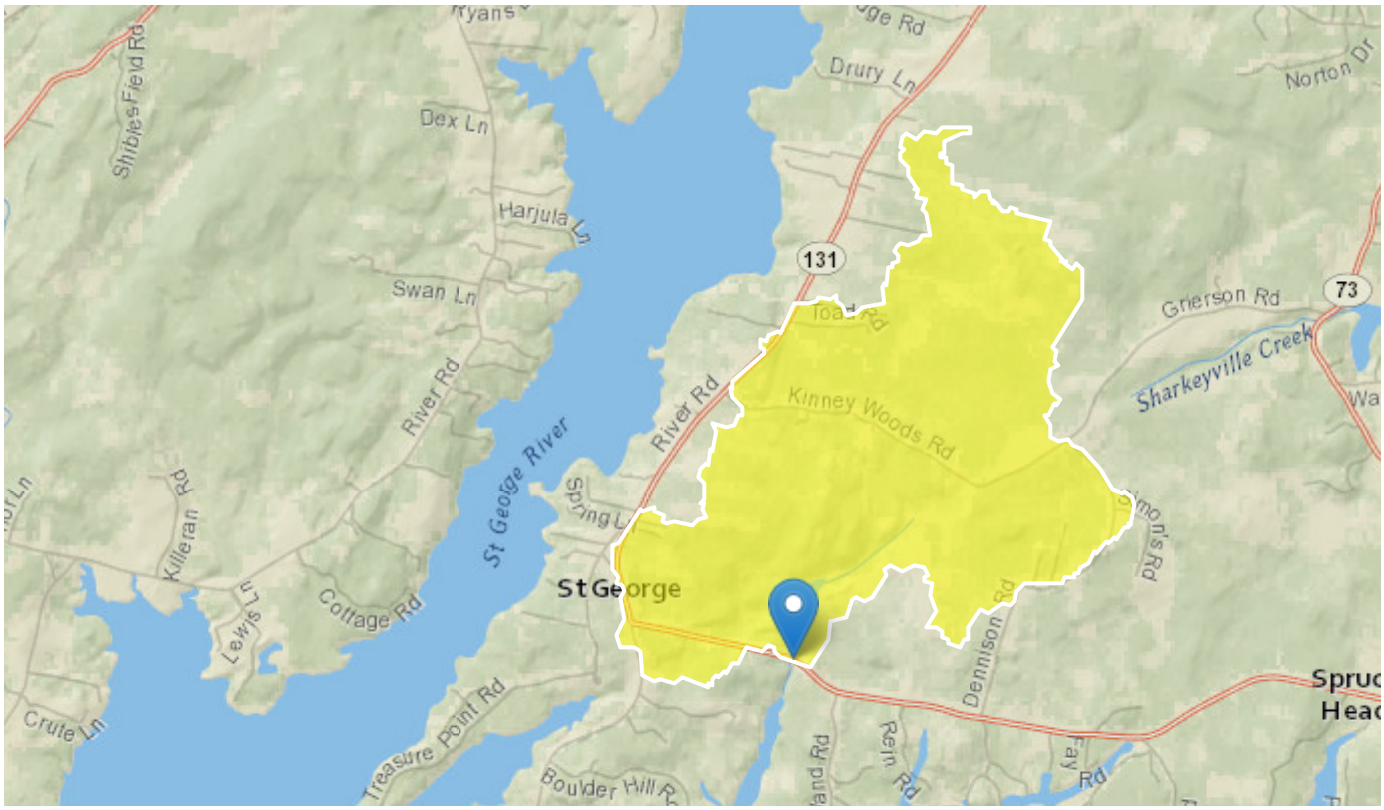
Note:
culvert dimensions are for open flow area; adjust for lost capacity due to embedding / backfilling (min {2' / 25% rise} embedment)





Saint George WIN 25515.00 -- USGS StreamStats Report PRELIMINARY

Region ID: ME
Workspace ID: ME20210420154631666000
Clicked Point (Latitude, Longitude): 44.01402, -69.18516
Time: 2021-04-20 11:46:52 -0400



LC-46906 M. Lickus 4-20-2021

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	2.6	square miles
STORNWI	Percentage of strorage (combined water bodies and wetlands) from the Nationa Wetlands Inventory	17.32	percent

Parameter Code	Parameter Description	Value	Unit
SANDGRAVAF	Fraction of land surface underlain by sand and gravel aquifers	0	dimensionless
ELEV	Mean Basin Elevation	85.5	feet
STATSGOA	Percentage of area of Hydrologic Soil Type A from STATSGO	23	percent
COASTDIST	Shortest distance from the coastline to the basin centroid	29	miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	4.37	percent
LC06WATER	Percent of open water, class 11, from NLCD 2006	0.24	percent
ELEVMAX	Maximum basin elevation	156.7	feet
CENTROIDX	Basin centroid horizontal (x) location in state plane coordinates	485781.16	meters
CENTROIDY	Basin centroid vertical (y) location in state plane units	4874853.74	meters
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	5.2	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.94	percent
PRDECFEB90	Basin average mean precipitation for December to February from PRISM 1961-1990	13	inches
PRECIP	Mean Annual Precipitation	47.1	inches
SANDGRAVAP	Percentage of land surface underlain by sand and gravel aquifers	0	percent

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	2.6	square miles	0.31	12
STORNWI	Percentage of Storage from NWI	17.32	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
99-percent AEP flood	23.4	ft^3/s	38
50-percent AEP flood	75.9	ft^3/s	34
20-percent AEP flood	117	ft^3/s	35
10-percent AEP flood	145	ft^3/s	37
4-percent AEP flood	190	ft^3/s	39
2-percent AEP flood	217	ft^3/s	41
1-percent AEP flood	254	ft^3/s	42
0.4-percent AEP flood	282	ft^3/s	44
0.2-percent AEP flood	336	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)

Annual Flow Statistics Parameters [Statewide Annual SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.6	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	85.5	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

Statistic	Value	Unit
Mean Annual Flow	5.58	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	2.6	square miles	14.9	1419
STATSGOA	STATSGO Percent Hydrologic Soil Type A	23	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	2.6	square miles	14.9	1419
COASTDIST	Distance From Coast To Basin Centroid	29	miles	46.6	193
BSLDEM10M	Mean Basin Slope from 10m DEM	4.37	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	2.6	square miles	14.9	1419
COASTDIST	Distance From Coast To Basin Centroid	29	miles	46.6	193
LC06WATER	Percent_Water_from_NLCD2006	0.24	percent	0	6.2

Monthly Flow Statistics Parameters [Statewide April SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.6	square miles	14.9	1419
COASTDIST	Distance From Coast To Basin Centroid	29	miles	46.6	193
LC06WATER	Percent_Water_from_NLCD2006	0.24	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	2.6	square miles	14.9	1419
BSLDEM10M	Mean Basin Slope from 10m DEM	4.37	percent	1.5	26.6
LC06WATER	Percent_Water_from_NLCD2006	0.24	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	2.6	square miles	14.9	1419
BSLDEM10M	Mean Basin Slope from 10m DEM	4.37	percent	1.5	26.6
LC06WATER	Percent_Water_from_NLCD2006	0.24	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	2.6	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	85.5	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	2.6	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	85.5	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	2.6	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	85.5	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	2.6	square miles	14.9	1419
SANDGRAVAF	Fraction of Sand and Gravel Aquifers	0	dimensionless	0	0.212
ELEV	Mean Basin Elevation	85.5	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	2.6	square miles	14.9	1419
ELEVMAX	Maximum Basin Elevation	156.7	feet	633	6290

Monthly Flow Statistics Parameters [Statewide December SIR 2015 5151]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.6	square miles	14.9	1419
STATSGOA	STATSGO Percent Hydrologic Soil Type A	23	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	7.15	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	6.4	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	23	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	15.1	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	3.71	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	4.07	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	1.25	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	0.625	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	0.787	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	4.64	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	8.35	ft^3/s

Monthly Flow Statistics Disclaimers [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	9.17	ft^3/s

Monthly Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
January Mean Flow	7.15	ft^3/s
February Mean Flow	6.4	ft^3/s
March Mean Flow	23	ft^3/s

Statistic	Value	Unit
April Mean Flow	15.1	ft^3/s
May Mean Flow	3.71	ft^3/s
June Mean Flow	4.07	ft^3/s
July Mean Flow	1.25	ft^3/s
August Mean Flow	0.625	ft^3/s
September Mean Flow	0.787	ft^3/s
October Mean Flow	4.64	ft^3/s
November Mean Flow	8.35	ft^3/s
December Mean Flow	9.17	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)

Application Version: 4.5.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.1