

HJA Flume Calibration Summary - Rating curve equations by set and version

Revised 10/22/2018 D.Henshaw
 Revised 12/02/2002 D.Henshaw
 Original 11/30/1994 D.Henshaw

Equation parameters

where,

$$\ln y = \ln a + b \ln(x) + c [\ln(x)]^{**2} + d [\ln(x)]^{**3}$$

and,

y=cfs and x=gage height in feet

Max GageHt (ft.)	ln a	b	c	d	Calc.Max GageHt (ft.)
------------------------	------	---	---	---	-----------------------------

 Andrews Watershed #1, equation set A, version 1
 (use from 10/1/1952 through 8/31/1956 only)

0.020	1.6549710	1.0780520	0.0000000	0.0000000	0.0197
0.076	3.4585459	1.5371380	0.0000000	0.0000000	0.0759
0.274	2.8872161	1.3155500	0.0000000	0.0000000	0.2741
2.000	3.3595591	1.6805220	0.0000000	0.0000000	2.0000

Andrews Watershed #1, equation set B, version 1

(use from 9/1/1956 through 9/30/1998 only - this main flume rating curve was operative online through September 2018 including WY 1956 through WY 2016 data. Replacement rating equations are used to recalculate discharge beginning WY 1999 to Present (Equation Set D version 1) except summer v-notch periods

0.041	3.4810755	1.6658920	0.0000000	0.0000000	0.0414
0.085	1.7674992	1.1277280	0.0000000	0.0000000	0.0854
0.113	3.4640393	1.8171530	0.0000000	0.0000000	0.1134
0.186	2.4405980	1.3469430	0.0000000	0.0000000	0.1862
0.342	3.4657080	1.9568490	0.0000000	0.0000000	0.3417
0.701	3.0569163	1.5761290	0.0000000	0.0000000	0.7010
2.000	3.2120695	2.0129220	0.0000000	0.0000000	2.0000

Andrews Watershed #1, equation set C, version 1

(v-notch, use summers 1999 to present)

1.000	1.6066490	2.5884790	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #1, equation set D, version 1

(use from 10/1/1998 to present except summer v-notch periods - use set C)

0.045	4.3900970	2.1141930	0.0000000	0.0000000	0.0452
0.186	2.4261690	1.4800410	0.0000000	0.0000000	0.1863
2.000	3.1040300	1.8834030	0.0000000	0.0000000	2.0000

 Andrews Watershed #2, equation set A, version 1

(use from 10/1/1952 through 9/30/1998 only - this main flume rating curve was operative online through September 2018 including WY 1953 through WY 2016 data. Replacement rating equations are used to recalculate discharge beginning WY 1999 to Present (Equation Set C version 1) except summer v-notch periods

0.200	2.3663579	1.4487690	0.0000000	0.0000000	0.1999
0.352	3.3182687	2.0399510	0.0000000	0.0000000	0.3521
0.610	2.8519870	1.5932080	0.0000000	0.0000000	0.6103
3.000	3.0418270	1.9776560	0.0000000	0.0000000	3.0000

Andrews Watershed #2, equation set B, version 1

(use summers 1999 to present)

1.000	1.5122450	2.5043430	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #2, equation set C, version 1

(use from 10/1/1998 to present except summer v-notch periods- use set B)

0.031	1.4786130	1.1489330	0.0000000	0.0000000	0.0306
0.159	2.1448290	1.3400270	0.0000000	0.0000000	0.1585
3.000	3.0606230	1.8372470	0.0000000	0.0000000	3.0000

Andrews Watershed #3, equation set A, version 1

(use from 10/1/1952 through 9/30/1998, except after 1964 flood - use set B -
this main flume rating curve was operative online through September 2018 including
WY 1953 through WY 2016 data. Replacement rating equations are used to recalculate
discharge beginning WY 1999 to Present (Equation Set D version 1) except summer v-
notch periods

0.069	2.5773451	1.3483210	0.0000000	0.0000000	0.0686
0.143	1.7995735	1.0580930	0.0000000	0.0000000	0.1431
0.321	2.7113672	1.5271440	0.0000000	0.0000000	0.3206
3.000	3.0428213	1.8185370	0.0000000	0.0000000	3.0000

Andrews Watershed #3, equation set B, version 1

(use from 12/11/1964 to 01/05/1966 and from 07/01/1966 to 09/30/1966)

0.298	2.4267333	1.3403300	0.0000000	0.0000000	0.2977
3.000	3.1039768	1.8993200	0.0000000	0.0000000	3.0000

Andrews Watershed #3, equation set C, version 1

(use summers 1999 to present)

1.000	1.4883400	2.4691700	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #3, equation set D, version 1

(use from 10/1/1998 to present except summer v-notch periods - use set C)

0.031	0.3926380	0.7749040	0.0000000	0.0000000	0.0314
0.104	1.8573070	1.1982880	0.0000000	0.0000000	0.1045
0.260	2.8881220	1.6546420	0.0000000	0.0000000	0.2600
3.000	3.1302340	1.8343560	0.0000000	0.0000000	3.0000

Andrews Watershed #6, equation set A, version 1

(use from 10/1/1963 to 9/30/1997)

0.218	0.3733241	1.7673730	0.0000000	0.0000000	0.2179
0.460	0.6606951	1.9559480	0.0000000	0.0000000	0.4604
1.006	0.8007145	2.1364440	0.0000000	0.0000000	1.0057
2.000	0.7997244	2.3105090	0.0000000	0.0000000	2.0000

Andrews Watershed #6, equation set B, version 1

(use from 10/01/1997 to present except summers beginning 1998 - use set C)

2.500	1.2720849	1.8719476	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #6, equation set C, version 1

(use summers 1998 to present)

1.000	1.2631618	2.6092280	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #7, equation set A, version 1

(use from 10/1/1963 to 9/30/1997)

0.218	0.3733241	1.7673730	0.0000000	0.0000000	0.2179
0.460	0.6606951	1.9559480	0.0000000	0.0000000	0.4604
1.006	0.8007145	2.1364440	0.0000000	0.0000000	1.0057
2.500	0.7997244	2.3105090	0.0000000	0.0000000	2.5000

Andrews Watershed #7, equation set B, version 1

(use from 10/01/1997 to present except summers beginning 1998 - use set C)

2.500	1.4286173	2.0809090	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #7, equation set C, version 1

(use summers 1998 to present)

1.000	0.8081007	2.3798699	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #8, equation set A, version 1

(use from 10/1/1963 through 9/30/1987)

0.218	0.3733241	1.7673730	0.0000000	0.0000000	0.2179
0.460	0.6606951	1.9559480	0.0000000	0.0000000	0.4604
1.006	0.8007145	2.1364440	0.0000000	0.0000000	1.0057
2.500	0.7997244	2.3105090	0.0000000	0.0000000	2.5000

Andrews Watershed #8, equation set B, version 1

(**NO LONGER USED** was operative 10/1/1987-2/15/1996
discharge data recalculated using set B, version 2)

2.000	1.3046720	2.0104480	0.0000000	0.0000000	2.0000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #8, equation set B, version 2

(**NO LONGER USED** was operative online through September 2018 including WY 1988 through WY 2016 data except summer v-notch periods - Replacement equations are used to recalculate discharge data (equation set D, version 1)

0.235	1.0201232	1.7578675	0.0000000	0.0000000	0.2355
0.759	1.3039270	1.9541120	0.0000000	0.0000000	0.7598
2.000	1.4562189	2.5086018	0.0000000	0.0000000	2.0000

Andrews Watershed #8, equation set C, version 1

Watershed #8, curve C1 (use summers 1998 to present)

1.000	0.9121577	2.4360416	0.0000000	0.0000000	
-------	-----------	-----------	-----------	-----------	--

Andrews Watershed #8, equation set D, version 1

(use from 10/1/1987 to present except summers beginning 1998 - use C)

0.027	1.9833950	2.0683950	0.0000000	0.0000000	0.0271
0.115	1.4007190	1.9069610	0.0000000	0.0000000	0.1146
0.690	1.2210970	1.8240420	0.0000000	0.0000000	0.6899
2.000	1.4725780	2.5015270	0.0000000	0.0000000	2.0000

Andrews Watershed #9, equation set A, version 1

(use from 10/1/1968 through 8/7/1973)

0.218	0.3733241	1.7673730	0.0000000	0.0000000	0.2179
0.460	0.6606951	1.9559480	0.0000000	0.0000000	0.4604
1.006	0.8007145	2.1364440	0.0000000	0.0000000	1.0057
2.500	0.7997244	2.3105090	0.0000000	0.0000000	2.5000

Andrews Watershed #9, equation set B, version 1

(**NO LONGER USED** was operative 8/8/1973-12/1/2002)
discharge data recalculated using set B, version 2)

2.500	0.4930839	2.6535380	0.0000000	0.0000000	2.5000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #9, equation set B, version 2

(use summers only 1973 to 1979 - see dates below)

2.500	-1.964220	0.9660340	0.0000000	0.0000000	2.5000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #9, equation set C, version 1

(**NO LONGER USED** was operative 10/15/1973-12/1/2002)
discharge data recalculated using set C, version 2)

2.500	1.7029910	1.9368440	0.3469885	0.0582070	2.5000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #9, equation set C, version 2

(use from 10/15/1973 to present, except summer v-notch periods - use B, D)

0.004	-3.114290	0.4353170	0.0000000	0.0000000	0.0041
0.053	0.9459340	1.1748590	0.0000000	0.0000000	0.0529
2.500	1.4544700	1.3478210	0.0000000	0.0000000	2.5000

Andrews Watershed #9, equation set D, version 1

(use summers 1997 to present)

1.000	0.8280009	2.4121165	0.0000000	0.0000000	1.0000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #10, equation set A, version 1

(use from 10/1/1968 through 8/15/1973)

0.218	0.3733241	1.7673730	0.0000000	0.0000000	0.2179
0.460	0.6606951	1.9559480	0.0000000	0.0000000	0.4604
1.006	0.8007145	2.1364440	0.0000000	0.0000000	1.0057
2.500	0.7997244	2.3105090	0.0000000	0.0000000	2.5000

Andrews Watershed #10, equation set B, version 1

(use summers only 1973 to 1979 - see dates below)

2.500	0.4930839	2.6535380	0.0000000	0.0000000	2.5000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #10, equation set C, version 1

(**NO LONGER USED** was operative 10/1/1973-12/1/2002)

discharge data recalculated using set C, version 2)

2.500	1.7757490	1.9295120	0.3025086	0.0510656	2.5000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #10, equation set C, version 2

(use from 8/16/1973 through 09/30/1996, except summer v-notch periods- use B, D

- this rating curve was operative online through September 2018 including WY 1997 through WY 2016 data except summer v-notch periods - Replacement equations are used to recalculate discharge data using set E version 1.

0.033	3.1873490	1.9295560	0.0000000	0.0000000	0.0325
2.500	1.6399500	1.4778080	0.0000000	0.0000000	2.5000

Andrews Watershed #10, equation set D, version 1

(use summers 1997 to present)

1.000	0.7829691	2.3768995	0.0000000	0.0000000	1.0000
-------	-----------	-----------	-----------	-----------	--------

Andrews Watershed #10, equation set E, version 1

(use from 10/01/1996 to present, except summer v-notch periods - use D)

0.010	-4.4770900	0.2419410	0.0000000	0.0000000	0.0100
0.038	2.7063640	1.8033370	0.0000000	0.0000000	0.0377
2.500	1.6399650	1.4781100	0.0000000	0.0000000	2.5000

Andrews Mack Creek, equation set A, version 1

(**NO LONGER USED** was operative 10/1/1994-11/30/2001)

discharge data recalculated using set A, version 3)

0.555	3.5168000	1.4907940	0.0000000	0.0000000	0.5549
2.540	3.8745760	2.0983320	0.0000000	0.0000000	2.5400

Andrews Mack Creek, equation set A, version 2

(**NO LONGER USED** was operative 11/30/2001-12/1/2002)

discharge data recalculated using set A, version 3)

0.162	1.1973810	0.4640050	0.0000000	0.0000000	0.1619
0.547	3.7012320	1.8390770	0.0000000	0.0000000	0.5472
2.540	3.8714820	2.1214520	0.0000000	0.0000000	2.5400

Andrews Mack Creek, equation set A, version 3

(use from 10/1/1979 to present, main flume only after 10/1/1995)

0.509	3.5680000	1.7415620	0.0000000	0.0000000	0.5093
2.540	3.8561960	2.1687310	0.0000000	0.0000000	2.5400

Andrews Mack Creek Fish Ladder, equation set A, version 1

(**NO LONGER USED** was operative 11/1/1997-11/30/2001)

discharge data recalculated using set A, version 2)

0.502	1.4884000	2.4490000	0.0000000	0.0000000	0.5023
2.750	1.0784800	1.8536960	0.0000000	0.0000000	2.7500

Andrews Mack Creek Fish Ladder, equation set A, version 2

(use from 10/1/1995 to present)

0.810	1.5550540	2.4347240	0.0000000	0.0000000	0.8103
1.029	1.4806740	2.0810830	0.0000000	0.0000000	1.0289
2.750	1.4924460	1.6675710	0.0000000	0.0000000	2.7500

Watershed Areas in acres

Watershed #1 237
Watershed #2 149
Watershed #3 250
Watershed #6 32
Watershed #7 38
Watershed #8 53
Watershed #9 21.1
Watershed #10 25.3
Watershed Mack 1436
Watershed Lookout 15424

Watershed # 9 1970's v-notch
installation periods (inclusive
dates)

on @ 0000	off @ 2400
yyyymmdd	yyyymmdd
-----	-----
19730808	19731014
19740619	19741004
19750617	19750928
19760610	19761022
19770715	19770921
19780608	19781113
19790621	19791019

Watershed #10 1970's v-notch
installation periods (inclusive
dates)

on @ 0000	off @ 2400
yyyymmdd	yyyymmdd
-----	-----
19730816	19730930
19740620	19741003
19750618	19750930
19760608	19761020
19770708	19770921
19780608	19781113
19790621	19791019