Appendix I

Upper Christmas Creek Site Calibration Information

Appendix I1. IFG4 Input File Upper Christmas Creek (High-Medium Flow)

```
UPPER CHRISTMAS CREEK          IFIM   UPXMAS3.IN4
Q/DATE MEASURED  154 CFS ON 1-4-89, 43 ON 12-3-88
IOC        0000000200000000000000
QARD  43.00
QARD 154.00
QARD 270.00
XSEC    1.0        0.01.00    192.9
        1.0  0.0196.6   .1194.7  1.0194.2  3.0193.6  4.0193.5  5.0193.5
        1.0  6.0193.4  7.0193.1  8.0193.5  9.0193.6 10.0193.6 11.0193.0
        1.0 12.0193.1 13.0193.4 14.0193.2 15.0193.4 16.0193.1 17.0193.0
        1.0 18.0193.1 19.0193.3 20.0193.3 21.0193.4 22.0193.4 23.0193.5
        1.0 24.0193.5 25.0193.5 26.0193.4 27.0193.4 28.0193.6 29.0193.6
        1.0 30.0193.5 31.0193.3 32.0193.4 33.0193.3 34.0193.5 35.0193.6
        1.0 35.3193.6 37.0193.8 39.0194.2 39.5194.2 41.0194.2 43.0194.6
        1.0 45.0194.5 47.0194.1 49.0194.1 51.0193.6 53.0193.6 54.9194.7
        1.0 55.8195.4
NS      1.0      75.50      75.50  1.575.50      75.50      75.50      75.50
NS      1.0      75.50      75.50     75.50      75.50      78.50      78.50
NS      1.0      78.50      78.50     78.50      78.50      78.50      78.50
NS      1.0      78.50      78.50     78.50      78.50      78.50      78.50
NS      1.0      78.50      78.50     68.60      68.60      68.60      68.60
NS      1.0      68.60      68.60     68.60      68.60      68.60      68.60
NS      1.0      68.60      68.60     68.60      68.60      68.60      68.60
NS      1.0      68.60      64.50     64.50      61.60  1.561.60       3.90
NS      1.0       3.90
CAL1    1.0     194.68     142.25
VEL1    1.0            0.00 1.40 2.60 6.00 5.10 4.40 3.40 5.50 4.20 3.00
VEL1    1.0 4.20 2.30 4.10 3.30 2.80 3.90 4.10 2.20 3.60 3.80 3.70 3.80
VEL1    1.0 4.20 1.90 4.60 4.50 3.80 5.00 2.60 2.00 2.00 2.70 2.10 3.20
VEL1    1.0 1.70 1.00 1.80 1.20  .90  .70  .70  .10  .30  .40 0.00
VEL1    1.0
CAL2    1.0     194.23      47.03
VEL2    1.0                  .80 2.80 3.20 1.60 2.70 2.20 1.40 1.60 1.70
VEL2    1.0 1.80 3.30 2.90 1.50 1.10 2.60 2.70 1.40 1.80 2.10 2.40 2.80
VEL2    1.0 1.50 2.50 3.10 2.60 2.00 2.60  .60  .20  .20 1.90 2.20 1.70
VEL2    1.0 1.50  .50 0.00
VEL2    1.0
XSEC    2.0      210.01.00    192.9
        2.0  0.0198.3   .1195.0  1.5194.5  5.0194.2  7.0194.1  9.0194.2
        2.0 11.0194.0 12.0194.0 13.0194.0 14.0193.8 15.0193.5 16.0193.6
        2.0 17.0193.5 18.0193.4 19.0193.3 20.0192.4 21.0193.2 22.0193.2
        2.0 23.0193.4 24.0193.5 25.0193.5 26.0193.3 27.0193.4 28.0194.0
        2.0 29.0193.9 30.0193.6 31.0193.7 32.0194.0 33.0193.9 34.0193.9
        2.0 35.0194.0 36.0194.0 37.0194.0 38.0194.0 39.0194.0 40.0194.0
        2.0 41.0194.0 42.0194.0 43.0194.0 44.0194.0 45.0194.0 46.0194.0
        2.0 47.0194.0 48.0194.0 49.0194.0 50.0194.0 51.0194.0 52.0194.0
        2.0 52.3194.0 54.0194.8 56.0194.8 57.0194.9 59.5195.0 66.0196.1
        2.0 72.9197.2
NS      2.0       1.90       1.90      1.90       1.90      35.60      35.60
NS      2.0      35.60      77.70     77.70      77.70      77.70      78.50
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Appendix I1. Continued

```
NS      2.0      78.50      78.50      78.50      78.50      78.50      78.50
NS      2.0      78.50      78.50      78.50      78.50      78.50      78.50
NS      2.0      78.50      78.50      78.50      78.50      78.50      78.50
NS      2.0      78.50      87.60      87.60      87.60      87.60      87.60
NS      2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      2.0      87.60      87.60      78.60      78.60      78.60      78.60
NS      2.0       2.90
CAL1    2.0     195.05     150.39
VEL1    2.0             .05 1.60 3.50 3.10 2.90 3.90 5.10 4.80 4.70 2.60
VEL1    2.0 4.30 1.70 1.20 3.40 5.70 4.10 2.00 1.30 2.50 1.70 3.20 4.70
VEL1    2.0 3.80 3.30 3.30 3.30 2.00 2.50 2.80 2.00 1.80 2.00  .30 1.20
VEL1    2.0  .90 1.50  .40  .60  .10  .80  .50  .70  .70  .30 2.70 2.70
VEL1    2.0  .60  .80  .60  .70
CAL2    2.0     194.41      45.63
VEL2    2.0                 .30 1.90 2.00 2.10 1.80 1.90 3.30 3.20 2.60
VEL2    2.0 2.70 2.10 1.10 1.30 1.85 1.60  .70  .20  .70  .20 2.60 3.20
VEL2    2.0 2.80 1.50 2.30 1.90 1.20 1.80 2.00 1.70  .20  .30  .10  .10
VEL2    2.0  .10  .10 0.00  .10 0.00  .10  .10  .30  .10 0.00  .10  .10
VEL2    2.0
XSEC    3.0       70.01.00     193.0
        3.0  0.0196.5   .8195.5  5.0195.0  6.0195.0  9.0195.5 12.5195.5
        3.0 13.0194.6 14.0194.3 15.0194.0 16.0193.9 17.0194.1 18.0194.0
        3.0 19.0194.1 20.0193.9 21.0193.6 22.0193.7 23.0194.2 24.0194.6
        3.0 25.0194.2 26.0194.6 27.0194.2 28.0194.6 29.0194.3 30.0194.3
        3.0 31.0194.4 32.0194.4 33.0194.4 34.0194.6 35.0194.4 36.0194.4
        3.0 37.0194.6 38.0194.6 39.0194.6 40.0194.6 41.0194.6 42.0194.6
        3.0 43.0194.4 44.0194.6 45.0194.6 46.0194.6 47.0194.4 48.0194.6
        3.0 49.0194.4 50.0194.6 51.0194.6 52.0194.3 53.0194.4 54.0194.6
        3.0 55.0194.4 56.0194.5 57.0194.4 58.0194.6 59.0194.6 60.0195.0
        3.0 60.6195.5 62.5196.2
NS      3.0        .30        .30  1.5  .30        .30        .30        .30
NS      3.0        .30        .30      73.60      73.60      73.60      73.60
NS      3.0      73.60      73.60      73.60      73.60      73.60      73.60
NS      3.0      73.60      87.80      87.80      87.80      87.80      87.80
NS      3.0      87.80      87.80      87.80      87.80      87.80      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50        .50        .50
NS      3.0        .50        .50
CAL1    3.0     195.48     168.73
VEL1    3.0            0.00 1.70 0.00 0.00  .80 1.70 3.70 5.30 5.50 5.00
VEL1    3.0 5.80 5.80 5.80 4.70 4.30 3.80 3.10 4.40 4.80 4.30 3.70 1.70
VEL1    3.0 1.40 3.40 4.50 5.00 4.00 4.70 4.70 1.80 4.70 1.50 1.30  .10
VEL1    3.0 1.70 1.60 1.30 1.00 1.90 1.20 1.20  .20  .90 1.50 2.10 1.90
VEL1    3.0 4.50 3.90 2.80  .30 1.10  .10
CAL2    3.0     194.99      41.81
VEL2    3.0                             .50 1.10 1.10 2.60 3.00 1.00
VEL2    3.0 3.50 3.60 4.00 2.50 1.90  .80 1.10  .80 1.50 1.90 2.40 1.50
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Appendix I1. Continued

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VEL2    3.0 2.60 3.70 2.50 1.80  .50 1.10  .20  .10  .10  .10 1.00 0.00
VEL2    3.0  .70  .50  .10  .20  .40  .10  .40  .10  .10  .10 1.00  .80
VEL2    3.0  .30  .90 1.20 1.80 0.00  .60
XSEC    4.0     440.01.00    194.2
        4.0  0.0196.9   .1195.9  1.5195.5  2.0195.2  3.0195.3  5.0195.2
        4.0  6.0195.2  7.0195.3  8.0195.2  9.0195.2 10.0195.1 11.0195.0
        4.0 12.0195.2 13.0195.1 14.0195.0 15.0195.0 16.0194.9 17.0195.0
        4.0 18.0195.1 19.0195.2 20.0195.1 21.0195.1 22.0195.1 23.0195.0
        4.0 24.0195.1 25.0195.1 26.0195.1 27.0194.9 28.0194.9 29.0194.8
        4.0 30.0194.9 31.0194.9 32.0195.1 33.0195.2 34.0195.2 35.0194.9
        4.0 36.0194.9 37.0195.1 38.0195.1 39.0195.1 40.0194.9 41.0195.2
        4.0 42.0194.9 43.0195.2 44.0195.0 45.0194.8 46.0195.1 47.0195.2
        4.0 48.0195.2 49.0195.2 50.0195.2 51.0195.2 52.0195.2 54.0195.2
        4.0 55.0195.2 56.0195.2 57.0195.2 58.0195.2 59.0195.2 60.0195.0
        4.0 61.0194.9 62.0195.2 63.0195.2 64.0195.9 65.0195.4 65.1195.5
        4.0 65.2195.9
NS      4.0     54.60     54.60  1.554.60     54.60     54.60     54.60
NS      4.0     54.60     54.60     54.60     54.60     54.60     54.60
NS      4.0     54.60     54.60     54.60     54.60     54.60     54.60
NS      4.0     54.60     54.60     54.60     54.60     54.60     54.60
NS      4.0     54.60     54.60     75.80     75.80     75.80     75.80
NS      4.0     75.80     75.80     75.80     75.80     75.80     75.80
NS      4.0     75.80     75.80     75.80     75.80     75.80     75.80
NS      4.0     75.80     75.80     75.80     75.80     87.50     87.50
NS      4.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      4.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      4.0     87.50     87.50     87.50     87.50     87.50  1.587.50
NS      4.0     87.50
CAL1    4.0    195.91    152.32
VEL1    4.0           0.00  .50  .40 2.70 2.70 1.90 3.00 1.80 2.70 3.00
VEL1    4.0 2.20 3.10 4.20 4.90 5.40 4.20 3.20 4.30 3.70 1.60 4.40 3.90
VEL1    4.0 4.30 4.00 4.40 4.00 2.50 3.10 4.60 3.90 4.60 2.70 4.50 4.50
VEL1    4.0  .90 5.10 5.10 4.50 3.80 4.40 4.70 6.50 5.80 2.80 3.00  .80
VEL1    4.0 3.20 2.30 1.70 1.20  .40  .10 1.30 2.00 1.10 1.80  .90 4.30
VEL1    4.0 2.90  .90 1.60  .10  .90 0.00
CAL2    4.0    195.34     43.05
VEL2    4.0                0.00  .10 1.10 1.40 2.10 2.00 2.00 1.70 1.40
VEL2    4.0 2.20 2.80 2.10 4.30 1.30 2.50 2.00 2.70 1.70  .50 3.10 3.40
VEL2    4.0 1.20 1.60 2.30 2.80 1.00 2.70 2.40  .30 1.60  .70  .90 2.10
VEL2    4.0  .70 2.00 3.10 2.60 2.60 1.20 3.10  .20 2.60 2.00 1.00  .10
VEL2    4.0 1.30  .10 1.10 1.10  .10 0.00  .10  .10  .50 1.20  .50 1.30
VEL2    4.0  .70  .30  .10 0.00 0.00
XSEC    5.0     210.01.00    195.3
        5.0  0.0199.2 16.8197.3 19.0197.1 21.0197.1 23.0197.0 24.0197.3
        5.0 25.0197.0 26.0197.0 27.0197.1 29.0196.9 31.0196.7 32.0196.6
        5.0 34.0196.8 35.0196.6 36.0196.2 37.0196.1 38.0196.0 39.0195.9
        5.0 40.0196.0 41.0196.1 42.0195.7 43.0195.6 44.0195.7 45.0195.8
        5.0 46.0196.2 47.0195.9 48.0195.9 49.0195.7 50.0195.9 51.0195.6
        5.0 52.0195.7 53.0195.6 54.0195.5 55.0196.2 56.0195.7 57.0196.0
        5.0 58.0196.1 59.0195.7 60.0196.2 61.0196.2 62.0196.2 63.0196.2
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Appendix I1. Continued

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        5.0 64.0196.2 65.0196.2 66.0196.2 67.0196.2 68.0196.2 69.0196.2
        5.0 70.0196.2 71.0196.0 72.0196.1 73.0195.8 74.0196.2 75.0196.0
        5.0 76.0196.2 77.0196.5 78.0196.3 79.0196.4 80.0197.0 80.1197.2
        5.0 80.2197.3 80.6197.9
NS      5.0     54.60     54.60     56.60     56.60     56.60     67.60
NS      5.0     67.60     67.60     67.60     67.60     67.60     67.60
NS      5.0     56.60     56.60     56.60     56.60     56.60     56.60
NS      5.0     56.60     56.60     56.60     56.60     68.50     68.50
NS      5.0     68.50     68.50     68.50     68.50     68.50     68.50
NS      5.0     68.50     68.50     87.50     87.50     87.50     87.50
NS      5.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      5.0     87.50     87.50     87.80     87.80     87.80     87.80
NS      5.0     87.80     87.80     87.80     87.80     87.80     87.80
NS      5.0     78.60     78.60     78.60     78.60     78.60  1.578.60
NS      5.0     78.60     78.60
CAL1    5.0    197.31    152.68
VEL1    5.0             .80 1.40 1.40 0.00 1.50 1.20 1.30 1.40 3.20 3.60
VEL1    5.0 3.60 1.80 2.40 3.30 4.20 4.00 4.20 5.10 2.90 4.40 3.70 2.30
VEL1    5.0 4.10 3.30 3.10 4.20 3.20 2.60 3.20 2.50 2.90 4.30 3.00  .90
VEL1    5.0 1.80 1.40 2.80  .20 2.40 1.40 2.80 3.00 1.50 2.70 3.40  .90
VEL1    5.0  .50 2.50 2.40 2.10 1.40 2.30 1.20 2.10 1.70 1.50  .60 0.00
VEL1    5.0
CAL2    5.0    196.76     36.01
VEL2    5.0                                                 1.00 1.30
VEL2    5.0  .20  .90  .80 1.40 2.30 1.40 1.30 2.30 2.30 3.10  .50  .70
VEL2    5.0  .10 2.00 1.80 1.30 1.40 1.80 1.90 2.40 1.60 1.60 1.60  .70
VEL2    5.0  .40 1.10 1.40  .50 1.30 1.00  .20  .20  .70  .70 1.20  .50
VEL2    5.0  .60  .60 1.50  .60  .10 1.70  .30  .20  .10  .70
VEL2    5.0
ENDJ
```

Appendix I2. Summary of Calibration Details Upper Christmas Creek (High-Medium Flow) UPXMAS3.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4	5

Discharge

157	153	167	156	169
57	39	43	25	42

Stage

194.68	195.05	195.48	195.91	197.31
194.23	194.41	194.99	195.34	196.76

Plotting Stage

1.78	2.15	2.48	1.71	2.01
1.33	1.51	1.99	1.14	1.46

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.4214	.5835	.1076	.5598	.6226
B =	.2849	.2591	.1633	.2210	.2284
SZF=	192.9	192.9	193.0	194.2	195.3

B Coefficient Log/Log Discharge/Stage Relationship

3.51	3.86	6.12	4.53	4.38

Appendix I3. Data Changes Upper Christmas Creek (High-Medium Flow)

Cell velocities changed for calibration

Transect 1	Vertical 3	Specified	Mannings	N of	1.5	
Transect 1	Vertical 32	VEL2	Changed	0.0	to	0.2
Transect 1	Vertical 33	VEL2	Changed	0.0	to	0.2
Transect 1	Vertical 46	VEL1	Changed	0.6	to	0.4
Transect 1	Vertical 47	Specified	Mannings	N of	1.5	
Transect 2	Vertical 36	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical 37	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical 38	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical 40	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical 42	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical 43	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical 47	VEL2	Changed	0.0	to	0.1
Transect 2	Vertical 48	VEL2	Changed	0.0	to	0.1
Transect 3	Vertical 3	Specified	Mannings	N of	1.5	
Transect 3	Vertical 31	VEL2	Changed	0.0	to	0.2
Transect 3	Vertical 32	VEL2	Changed	0.0	to	0.1
Transect 3	Vertical 39	VEL2	Changed	0.0	to	0.1
Transect 3	Vertical 42	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical 3	Specified	Mannings	N of	1.5	
Transect 4	Vertical 44	VEL2	Changed	0.0	to	0.2
Transect 4	Vertical 48	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical 50	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical 56	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical 63	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical 66	Specified	Mannings	N of	1.5	
Transect 5	Vertical 43	VEL2	Changed	0.0	to	0.2
Transect 5	Vertical 44	VEL2	Changed	0.0	to	0.2
Transect 5	Vertical 53	VEL2	Changed	0.0	to	0.1
Transect 5	Vertical 56	VEL2	Changed	0.0	to	0.2
Transect 5	Vertical 60	Specified	Mannings	N of	1.5	

Appendix I4. Velocity Adjustment Factors Upper Christmas Creek (High-Medium Flow)

Transect	Flow	VAF
1.00	43.0	.987
1.00	154.0	.994
1.00	270.0	.929
2.00	43.0	.994
2.00	154.0	.997
2.00	270.0	.885
3.00	43.0	.999
3.00	154.0	1.015
3.00	270.0	.876
4.00	43.0	1.000
4.00	154.0	1.001
4.00	270.0	.987
5.00	43.0	1.018
5.00	154.0	.998
5.00	270.0	.856

Appendix I5. IFG4 Input File Upper Christmas Creek (Medium-Low Flow)

```
UPPER CHRISTMAS CREEK        IFIM   UPXMAS4.IN4
Q/DATE MEASURED  43 CFS ON 12-3-88, 4 ON 3-4-88
IOC       0000000200000000000000
QARD   4.00
QARD  43.00
XSEC   1.0       0.01.00    192.9
       1.0  0.0196.6   .1194.7  1.0194.2  3.0193.6  4.0193.5  5.0193.5
       1.0  6.0193.4  7.0193.1  8.0193.5  9.0193.6 10.0193.6 11.0193.0
       1.0 12.0193.1 13.0193.4 14.0193.2 15.0193.4 16.0193.1 17.0193.0
       1.0 18.0193.1 19.0193.3 20.0193.3 21.0193.4 22.0193.4 23.0193.5
       1.0 24.0193.5 25.0193.5 26.0193.4 27.0193.4 28.0193.6 29.0193.6
       1.0 30.0193.5 31.0193.3 32.0193.4 33.0193.3 34.0193.5 35.0193.6
       1.0 35.3193.6 37.0193.8 39.0194.2 39.5194.2 41.0194.2 43.0194.6
       1.0 45.0194.5 47.0194.1 49.0194.1 51.0193.6 53.0193.6 54.9194.7
       1.0 55.8195.4
NS     1.0     75.50     75.50     75.50     75.50     75.50     75.50
NS     1.0     75.50     75.50     75.50     75.50     78.50     78.50
NS     1.0     78.50     78.50     78.50     78.50     78.50     78.50
NS     1.0     78.50     78.50     78.50     78.50     78.50     78.50
NS     1.0     78.50     78.50     68.60     68.60     68.60     68.60
NS     1.0     68.60     68.60     68.60     68.60     68.60     68.60
NS     1.0     68.60     68.60     68.60     68.60     68.60     68.60
NS     1.0     68.60  1.564.50     64.50     61.60     61.60      3.90
NS     1.0      3.90
CAL2   1.0    194.23     47.03
VEL2   1.0                 .80 2.80 3.20 1.60 2.70 2.20 1.40 1.60 1.70
VEL2   1.0 1.80 3.30 2.90 1.50 1.10 2.60 2.70 1.40 1.80 2.10 2.40 2.80
VEL2   1.0 1.50 2.50 3.10 2.60 2.00 2.60  .60  .20 0.00 1.90 2.20 1.70
VEL2   1.0 1.50  .50 0.00
VEL2   1.0
CAL3   1.0    193.58      4.52
VEL3   1.0                      .05  .05  .30 2.40 2.40 0.00 0.00  .60
VEL3   1.0  .80  .30  .60  .70  .50  .50  .40  .10  .30  .80  .50  .40
VEL3   1.0 1.50  .80 1.30  .40 0.00 0.00  .10  .50  .05  .30  .10 0.00
VEL3   1.0
VEL3   1.0
XSEC   2.0     210.01.00    192.9
       2.0  0.0198.3   .1195.0  1.5194.5  5.0194.2  7.0194.1  9.0194.2
       2.0 11.0194.0 12.0194.0 13.0194.0 14.0193.8 15.0193.5 16.0193.6
       2.0 17.0193.5 18.0193.4 19.0193.3 20.0192.4 21.0193.2 22.0193.2
       2.0 23.0193.4 24.0193.5 25.0193.5 26.0193.3 27.0193.4 28.0194.0
       2.0 29.0193.9 30.0193.6 31.0193.7 32.0194.0 33.0193.9 34.0193.9
       2.0 35.0194.0 36.0194.0 37.0194.0 38.0194.0 39.0194.0 40.0194.0
       2.0 41.0194.0 42.0194.0 43.0194.0 44.0194.0 45.0194.0 46.0194.0
       2.0 47.0194.0 48.0194.0 49.0194.0 50.0194.0 51.0194.0 52.0194.0
       2.0 52.3194.0 54.0194.8 56.0194.8 57.0194.9 59.5195.0 66.0196.1
       2.0 72.9197.2
NS     2.0      1.90      1.90      1.90      1.90     35.60     35.60
NS     2.0     35.60     77.70     77.70     77.70     77.70     78.50
NS     2.0     78.50     78.50     78.50     78.50     78.50     78.50
```

Appendix I5. Continued

```
NS      2.0      78.50      78.50      78.50      78.50      78.50      78.50
NS      2.0      78.50      78.50      78.50      78.50      78.50      78.50
NS      2.0      78.50      87.60      87.60      87.60      87.60   1.587.60
NS      2.0      87.60      87.60      87.60      87.60      87.60      87.60
NS      2.0      87.60      87.60      87.60   1.587.60      87.60      87.60
NS      2.0      87.60      87.60      78.60      78.60      78.60      78.60
NS      2.0       2.90
CAL2    2.0     194.41      45.63
VEL2    2.0                  .30 1.90 2.00 2.10 1.80 1.90 3.30 3.20 2.60
VEL2    2.0 2.70 2.10 1.10 1.30 1.85 1.60  .70  .20  .70  .20 2.60 3.20
VEL2    2.0 2.80 1.50 2.30 1.90 1.20 1.80 2.00 1.70  .20  .30  .10 0.00
VEL2    2.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00  .30  .10 0.00 0.00 0.00
VEL2    2.0
CAL3    2.0     193.95       4.82
VEL3    2.0                                 0.00 0.00  .40 1.10  .70
VEL3    2.0  .70  .30  .40  .70  .30  .20  .20 1.50  .30  .30 1.10 0.00
VEL3    2.0  .20  .50  .40 0.00  .10  .10
VEL3    2.0
VEL3    2.0
XSEC    3.0       70.01.00     193.0
        3.0  0.0196.5   .8195.5  5.0195.0  6.0195.0  9.0195.5 12.5195.5
        3.0 13.0194.6 14.0194.3 15.0194.0 16.0193.9 17.0194.1 18.0194.0
        3.0 19.0194.1 20.0193.9 21.0193.6 22.0193.7 23.0194.2 24.0194.6
        3.0 25.0194.2 26.0194.6 27.0194.2 28.0194.6 29.0194.3 30.0194.3
        3.0 31.0194.4 32.0194.4 33.0194.4 34.0194.6 35.0194.4 36.0194.4
        3.0 37.0194.6 38.0194.6 39.0194.6 40.0194.6 41.0194.6 42.0194.6
        3.0 43.0194.4 44.0194.6 45.0194.6 46.0194.6 47.0194.4 48.0194.6
        3.0 49.0194.4 50.0194.6 51.0194.6 52.0194.3 53.0194.4 54.0194.6
        3.0 55.0194.4 56.0194.5 57.0194.4 58.0194.6 59.0194.6 60.0195.0
        3.0 60.6195.5 62.5196.2
NS      3.0        .30        .30        .30        .30        .30        .30
NS      3.0        .30        .30      73.60      73.60      73.60      73.60
NS      3.0      73.60      73.60      73.60      73.60      73.60      73.60
NS      3.0      73.60      87.80      87.80      87.80      87.80      87.80
NS      3.0      87.80      87.80      87.80      87.80      87.80      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50      87.50      87.50
NS      3.0      87.50      87.50      87.50      87.50        .50        .50
NS      3.0        .50        .50
CAL2    3.0     194.99      41.81
VEL2    3.0                                 .50 1.10 1.10 2.60 3.00 1.00
VEL2    3.0 3.50 3.60 4.00 2.50 1.90  .80 1.10  .80 1.50 1.90 2.40 1.50
VEL2    3.0 2.60 3.70 2.50 1.80  .50 1.10 0.00 0.00  .10  .10 1.00  .05
VEL2    3.0  .70  .50  .05  .20  .40  .05  .40  .10  .10  .10 1.00  .80
VEL2    3.0  .30  .90 1.20 1.80  .05  .60
CAL3    3.0     194.47       3.30
VEL3    3.0                                  .20  .40  .50  .50  .70
VEL3    3.0  .60  .80  .70  .40  .20 0.00  .05 0.00  .80 0.00  .10  .90
VEL3    3.0  .70  .20  .60 0.00  .05 0.05 0.00 0.00 0.00 0.00 0.00 0.00
```

Appendix I5. Continued

```
VEL3    3.0  .05 0.00 0.00 0.00  .10 0.00  .10 0.00 0.00  .10  .20 0.00
VEL3    3.0  .05 0.00  .05 0.00
XSEC    4.0     440.01.00    194.2
        4.0  0.0196.9   .1195.9  1.5195.5  2.0195.2  3.0195.3  5.0195.2
        4.0  6.0195.2  7.0195.3  8.0195.2  9.0195.2 10.0195.1 11.0195.0
        4.0 12.0195.2 13.0195.1 14.0195.0 15.0195.0 16.0194.9 17.0195.0
        4.0 18.0195.1 19.0195.2 20.0195.1 21.0195.1 22.0195.1 23.0195.0
        4.0 24.0195.1 25.0195.1 26.0195.1 27.0194.9 28.0194.9 29.0194.8
        4.0 30.0194.9 31.0194.9 32.0195.1 33.0195.2 34.0195.2 35.0194.9
        4.0 36.0194.9 37.0195.1 38.0195.1 39.0195.1 40.0194.9 41.0195.2
        4.0 42.0194.9 43.0195.2 44.0195.0 45.0194.8 46.0195.1 47.0195.2
        4.0 48.0195.2 49.0195.2 50.0195.2 51.0195.2 52.0195.2 54.0195.2
        4.0 55.0195.2 56.0195.2 57.0195.2 58.0195.2 59.0195.2 60.0195.0
        4.0 61.0194.9 62.0195.2 63.0195.2 64.0195.9 65.0195.4 65.1195.5
        4.0 65.2195.9
NS      4.0     54.60     54.60     54.60  1.554.60     54.60     54.60
NS      4.0     54.60     54.60     54.60     54.60     54.60     54.60
NS      4.0     54.60     54.60     54.60     54.60     54.60     54.60
NS      4.0     54.60     54.60     54.60     54.60     54.60     54.60
NS      4.0     54.60     54.60     75.80     75.80     75.80     75.80
NS      4.0     75.80     75.80     75.80     75.80     75.80     75.80
NS      4.0     75.80     75.80     75.80     75.80     75.80     75.80
NS      4.0     75.80     75.80     75.80     75.80     87.50     87.50
NS      4.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      4.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      4.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      4.0     87.50
CAL2    4.0    195.34     43.05
VEL2    4.0                0.00  .10 1.10 1.40 2.10 2.00 2.00 1.70 1.40
VEL2    4.0 2.20 2.80 2.10 4.30 1.30 2.50 2.00 2.70 1.70  .50 3.10 3.40
VEL2    4.0 1.20 1.60 2.30 2.80 1.00 2.70 2.40  .30 1.60  .70  .90 2.10
VEL2    4.0  .70 2.00 3.10 2.60 2.60 1.20 3.10  .10 2.60 2.00 1.00  .10
VEL2    4.0 1.30  .10 1.10 1.10  .10  .10  .10  .10  .50 1.20  .50 1.30
VEL2    4.0  .70  .30 0.00 0.00 0.00
CAL3    4.0    195.19      4.73
VEL3    4.0                                          0.00  .05  .50
VEL3    4.0 0.00  .20  .30  .50  .60  .30  .30 0.00 1.00  .60  .40  .80
VEL3    4.0 1.00  .40 1.00 1.60  .40 2.00 2.00  .30  .40 0.00 0.00  .60
VEL3    4.0  .40  .10  .10  .10  .30 0.00  .80 0.00 1.40 1.10  .30 0.00
VEL3    4.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00  .05
VEL3    4.0  .10 0.00 0.00 0.00
XSEC    5.0     210.01.00    195.3
        5.0  0.0199.2 16.8197.3 19.0197.1 21.0197.1 23.0197.0 24.0197.3
        5.0 25.0197.0 26.0197.0 27.0197.1 29.0196.9 31.0196.7 32.0196.6
        5.0 34.0196.8 35.0196.6 36.0196.2 37.0196.1 38.0196.0 39.0195.9
        5.0 40.0196.0 41.0196.1 42.0195.7 43.0195.6 44.0195.7 45.0195.8
        5.0 46.0196.2 47.0195.9 48.0195.9 49.0195.7 50.0195.9 51.0195.6
        5.0 52.0195.7 53.0195.6 54.0195.5 55.0196.2 56.0195.7 57.0196.0
        5.0 58.0196.1 59.0195.7 60.0196.2 61.0196.2 62.0196.2 63.0196.2
        5.0 64.0196.2 65.0196.2 66.0196.2 67.0196.2 68.0196.2 69.0196.2
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Appendix I5. Continued

```
        5.0 70.0196.2 71.0196.0 72.0196.1 73.0195.8 74.0196.2 75.0196.0
        5.0 76.0196.2 77.0196.5 78.0196.3 79.0196.4 80.0197.0 80.1197.2
        5.0 80.2197.3 80.6197.9
NS      5.0     54.60     54.60     56.60     56.60     56.60     67.60
NS      5.0     67.60     67.60     67.60     67.60     67.60     67.60
NS      5.0     56.60     56.60     56.60     56.60     56.60     56.60
NS      5.0     56.60     56.60     56.60     56.60     68.50     68.50
NS      5.0     68.50     68.50     68.50     68.50     68.50     68.50
NS      5.0     68.50     68.50     87.50     87.50     87.50     87.50
NS      5.0     87.50     87.50     87.50     87.50     87.50     87.50
NS      5.0  1.587.50     87.50     87.80     87.80     87.80     87.80
NS      5.0     87.80     87.80     87.80     87.80     87.80     87.80
NS      5.0     78.60     78.60     78.60     78.60     78.60     78.60
NS      5.0     78.60     78.60
CAL2    5.0    196.76     36.01
VEL2    5.0                                                   1.00 1.30
VEL2    5.0  .20  .90  .80 1.40 2.30 1.40 1.30 2.30 2.30 3.10  .50  .70
VEL2    5.0  .10 2.00 1.80 1.30 1.40 1.80 1.90 2.40 1.60 1.60 1.60  .70
VEL2    5.0  .40 1.10 1.40  .50 1.30 1.00 0.00 0.00  .70  .70 1.20  .50
VEL2    5.0  .60  .60 1.50  .60 0.00 1.70  .30  .05  .10  .70
VEL2    5.0
CAL3    5.0    196.16      3.47
VEL3    5.0
VEL3    5.0                 .05  .10  .50  .50  .80 1.80  .80  .20  .10
VEL3    5.0 0.00  .10  .30  .40  .10  .20 1.00  .60  .40 0.00  .05  .20
VEL3    5.0  .05  .05 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
VEL3    5.0 0.00  .05  .05  .05 0.00  .20
VEL3    5.0
ENDJ
```

Appendix I6. Summary of Calibration Details Upper Christmas Creek (Medium-Low Flow) UPXMAS4.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4	5

Discharge

56	39	43	25	41
4	5	3	4	3

Stage

194.23	194.41	194.99	195.34	196.76
193.58	193.95	194.47	195.19	196.16

Plotting Stage

1.33	1.51	1.99	1.14	1.46
0.68	1.05	1.47	0.99	0.86

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.4806	.8088	.1302	.8890	.6825
B =	.2525	.1705	.1127	.7728	.2042
SZF=	192.9	192.9	193.0	194.2	195.3

B Coefficient Log/Log Discharge/Stage Relationship

3.96	5.87	8.87	12.94	4.90

Appendix I7. Data Changes Upper Christmas Creek (Medium-Low Flow)

Cell velocities changed for calibration

Transect 1	Vertical	5	VEL3	Changed	0.0	to	.05
Transect 1	Vertical	32	VEL2	Changed	0.0	to	0.2
Transect 1	Vertical	44	Specified	Mannings	N of	1.5	
Transect 2	Vertical	36	Specified	Mannings	N of	1.5	
Transect 2	Vertical	46	Specified	Mannings	N of	1.5	
Transect 3	Vertical	36	VEL2	Changed	0.0	to	.05
Transect 3	Vertical	39	VEL2	Changed	0.0	to	.05
Transect 3	Vertical	42	VEL2	Changed	0.0	to	.05
Transect 3	Vertical	59	VEL2	Changed	0.0	to	.05
Transect 4	Vertical	4	Specified	Mannings	N of	1.5	
Transect 4	Vertical	44	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical	48	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical	51	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical	54	VEL2	Changed	0.0	to	0.1
Transect 4	Vertical	56	VEL2	Changed	0.0	to	0.1
Transect 5	Vertical	16	VEL3	Changed	0.0	to	.05
Transect 5	Vertical	35	VEL3	Changed	0.0	to	.05
Transect 5	Vertical	43	Specified	Mannings	N of	1.5	
Transect 5	Vertical	56	VEL2	Changed	0.0	to	.05

Appendix I8. Velocity Adjustment Factors Upper Christmas Creek (Medium-Low Flow)

Transect	Flow	VAF
1.00	4.0	1.007
1.00	43.0	.995
2.00	4.0	.935
2.00	43.0	.999
3.00	4.0	1.000
3.00	43.0	.999
4.00	4.0	.969
4.00	43.0	.999
5.00	4.0	1.018
5.00	43.0	.990

Appendix J

Peterson Creek Site Calibration Information

Appendix J1. IFG4 Input File Peterson Creek (High Flow)

```
PETERSEN CREEK          IFIM   PETER5.IN4
Q/DATE MEASURED  16 CFS ON 11-8-88, 6 CFS ON 12-16-88, 4 CFS ON 11-18-88
IOC        00000002000000000000
QARD  11.00
QARD  16.00
QARD  30.00
XSEC   1.0        0.01.00    194.2
       1.0  0.0197.9  1.0196.0  2.0194.7  3.0194.4  4.0194.3  5.0194.2
       1.0  6.0194.2  6.9194.2  7.0194.2  7.5194.4  8.0194.5  8.4194.4
       1.0  9.0194.5  9.5194.6 10.0194.5 11.0194.6 12.0194.6 13.0194.4
       1.0 14.0194.4 15.0194.5 16.0194.5 17.0194.5 18.0194.6 18.5194.7
       1.0 20.5196.0 24.2199.9
NS     1.0        .50        .50  1.5  .50      64.60      64.60      64.60
NS     1.0      64.60      64.70      64.70      64.70      64.70      64.70
NS     1.0      64.70      64.70      64.70      64.70      64.70      37.70
NS     1.0      37.70      37.70      63.70      63.70      63.70  1.5  .50
NS     1.0        .50        .50
CAL1   1.0     195.01      16.00      13.55
VEL1   1.0                  1.80 2.20 2.10 2.00 1.30 1.30 1.80 1.50 1.20
VEL1   1.0 1.60 1.10 1.00 1.30 1.30 1.40 1.30 1.10 1.00 1.20  .80
VEL1   1.0
CAL2   1.0     194.77       6.00       5.09
VEL2   1.0
VEL2   1.0
VEL2   1.0
XSEC   2.0      315.01.00    194.2
       2.0  0.0199.5  5.1196.0  5.8195.0  6.0194.7  7.0194.6  8.0194.4
       2.0  9.0194.4 10.0194.3 10.5194.2 11.0194.1 11.5194.1 12.0193.8
       2.0 12.5193.6 13.0193.3 13.5193.4 14.0193.0 14.5193.0 15.0193.0
       2.0 15.5193.0 16.0192.7 16.5192.8 17.0192.9 17.5193.0 18.0193.1
       2.0 18.5193.1 19.0194.7 22.1194.7 22.5194.6 24.3198.9
NS     2.0        .50        .50  1.5  .50      65.60      65.60      65.60
NS     2.0      65.60      65.60      65.60      65.60      65.60      35.70
NS     2.0      35.70      35.70  1.535.70      35.70      35.70      35.70
NS     2.0      64.70      64.70      64.70      64.70      64.70      64.70
NS     2.0      64.70  1.564.70        .50        .50        .50
CAL1   2.0     195.03      16.00       13.79
VEL1   2.0                  1.90 2.50 3.90 4.10  .90 1.20 1.40  .20  .10
VEL1   2.0  .20 0.00 0.00  .10  .70 1.00  .40  .40  .40  .30  .60  .50
VEL1   2.0 1.10
CAL2   2.0     194.79       6.00       6.47
VEL2   2.0
VEL2   2.0
VEL2   2.0
XSEC   3.0      280.01.00    194.6
       3.0  0.0198.6  6.0195.6  7.8195.3  9.5195.0 10.0195.0 11.0195.1
       3.0 11.5194.7 12.0194.6 12.5194.7 13.0194.7 13.5194.9 14.0194.7
       3.0 14.5194.7 14.7194.7 15.0194.9 16.0194.7 17.0194.9 18.0194.9
       3.0 19.0195.1 20.0194.9 21.0194.9 22.0194.8 23.0194.9 24.0194.9
       3.0 24.8194.9 25.0194.9 25.8195.1 26.0195.6 27.8196.6 28.9199.2
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Appendix J1. Continued

```
        3.0 30.0199.7
NS      3.0       .50       .50  1.5  .50       .50       .50     65.60
NS      3.0     65.60     65.60     65.60     65.60     65.60  1.565.60
NS      3.0     65.60     65.60     65.60     65.60     65.60     65.60
NS      3.0     65.60     65.60     65.60     65.60     65.60       .50
NS      3.0       .50       .50  1.5  .50       .50       .50       .50
NS      3.0       .50
CAL1    3.0    195.65     16.00     21.72
VEL1    3.0           0.00 1.20 2.70 1.80 4.00 1.70 3.20 3.00 3.70 0.00
VEL1    3.0 2.50 1.00 3.30 3.10 1.30 1.40 1.40  .60  .80 1.70  .80  .40
VEL1    3.0  .10  .10 0.00
CAL2    3.0    195.13      6.00      6.98
VEL2    3.0
VEL2    3.0
VEL2    3.0
XSEC    4.0     315.01.00    195.1
        4.0  0.0199.6  4.0197.6 16.0197.8 24.8196.1 25.0195.9 26.0195.9
        4.0 27.0195.7 28.0195.6 29.0195.5 29.5195.5 30.0195.4 30.5195.5
        4.0 31.0195.1 31.5195.2 32.0195.1 32.5195.2 33.0194.9 33.5195.1
        4.0 34.0195.3 34.5195.7 35.0195.7 35.5196.1 36.6200.3
NS      4.0       .50       .50     36.60     64.60     64.60     64.60
NS      4.0     64.60     64.60     64.60     64.60     64.60     64.60
NS      4.0     64.60     64.60     64.60     64.60     64.60     64.60
NS      4.0     64.60       .50  1.5  .50       .50       .50
CAL1    4.0    196.07     16.00     14.68
VEL1    4.0                      .50  .50  .30 1.80 2.20 2.10 2.30 2.20
VEL1    4.0 2.00 3.20 3.10 4.00 4.40 3.30 1.80 1.50
CAL2    4.0    195.79      6.00      5.15
VEL2    4.0
VEL2    4.0
ENDJ
```

Appendix J2. Summary of Calibration Details Peterson Creek (High Flow) PETER5.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4

Discharge

14	14	22	15
5	6	7	5

Stage

195.01	195.03	195.65	196.07
194.77	194.79	195.13	195.79

Plotting Stage

0.81	0.83	1.05	0.97
0.57	0.59	0.53	0.69

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.3178	.2585	.1644	.4049
B =	.3589	.4445	.6023	.3253
SZF=	194.2	194.2	194.6	195.1

B Coefficient Log/Log Discharge/Stage Relationship

2.79	2.25	1.66	3.08

Appendix J3. Data Changes Peterson Creek (High Flow)

Cell velocities changed for calibration

Transect 1	Vertical 3	Specified Mannings N of 1.5
Transect 1	Vertical 24	Specified Mannings N of 1.5
Transect 2	Vertical 3	Specified Mannings N of 1.5
Transect 2	Vertical 15	Specified Mannings N of 1.5
Transect 2	Vertical 26	Specified Mannings N of 1.5
Transect 3	Vertical 3	Specified Mannings N of 1.5
Transect 3	Vertical 12	Specified Mannings N of 1.5
Transect 3	Vertical 27	Specified Mannings N of 1.5
Transect 4	Vertical 21	Specified Mannings N of 1.5

Appendix J4. Velocity Adjustment Factors Peterson Creek (High Flow)

Transect	Flow	VAF
1.00	11.0	.936
1.00	16.0	.999
1.00	30.0	1.145
2.00	11.0	.913
2.00	16.0	.989
2.00	30.0	1.117
3.00	11.0	1.182
3.00	16.0	.998
3.00	30.0	.827
4.00	11.0	.890
4.00	16.0	1.000
4.00	30.0	1.227

Appendix J5. IFG4 Input File Peterson Creek (Medium Flow)

```
PETERSEN CREEK          IFIM   PETER6.IN4
Q/DATE MEASURED  16 CFS ON 11-8-88, 6 CFS ON 12-16-88, 4 CFS ON 11-18-88
IOC        00000002000000000000
QARD   5.00
QARD   6.00
QARD  11.00
XSEC   1.0        0.01.00    194.2
       1.0  0.0197.9  1.0196.0  2.0194.7  3.0194.4  4.0194.3  5.0194.2
       1.0  6.0194.2  6.9194.2  7.0194.2  7.5194.4  8.0194.5  8.4194.4
       1.0  9.0194.5  9.5194.6 10.0194.5 11.0194.6 12.0194.6 13.0194.4
       1.0 14.0194.4 15.0194.5 16.0194.5 17.0194.5 18.0194.6 18.5194.7
       1.0 20.5196.0 24.2199.9
NS     1.0        .50        .50  0.5  .50     64.60     64.60     64.60
NS     1.0     64.60     64.70     64.70     64.70     64.70     64.70
NS     1.0     64.70     64.70     64.70     64.70     64.70     37.70
NS     1.0     37.70     37.70     63.70     63.70     63.70  0.5  .50
NS     1.0        .50        .50
CAL2   1.0    194.77      6.00      5.09
VEL2   1.0            0.00  .40  .40  .70 1.30  .80  .60  .80  .20  .70
VEL2   1.0 1.20 1.70 2.20 1.20  .90  .80  .80 1.10  .90 1.00  .20
VEL2   1.0
CAL3   1.0    194.65      4.00      3.18
VEL3   1.0
VEL3   1.0
VEL3   1.0
XSEC   2.0     315.01.00    194.2
       2.0  0.0199.5  5.1196.0  5.8195.0  6.0194.7  7.0194.6  8.0194.4
       2.0  9.0194.4 10.0194.3 10.5194.2 11.0194.1 11.5194.1 12.0193.8
       2.0 12.5193.6 13.0193.3 13.5193.4 14.0193.0 14.5193.0 15.0193.0
       2.0 15.5193.0 16.0192.7 16.5192.8 17.0192.9 17.5193.0 18.0193.1
       2.0 18.5193.1 19.0194.7 22.1194.7 22.5194.6 24.3198.9
NS     2.0        .50        .50        .50     65.60     65.60     65.60
NS     2.0     65.60     65.60     65.60     65.60     65.60     35.70
NS     2.0     35.70     35.70     35.70     35.70     35.70     35.70
NS     2.0     64.70     64.70     64.70     64.70     64.70     64.70
NS     2.0     64.70     64.70        .50       .50       .50
CAL2   2.0    194.79      6.00      6.47
VEL2   2.0                 .20 1.20 2.40 3.50 1.70  .90 1.70 1.80  .50
VEL2   2.0  .20  .10  .05  .05  .05  .05  .05  .05  .10  .05  .10  .40
VEL2   2.0  .10 0.00
CAL3   2.0    194.66      4.00      3.45
VEL3   2.0
VEL3   2.0
VEL3   2.0
XSEC   3.0     280.01.00    194.6
       3.0  0.0198.6  6.0195.6  7.8195.3  9.5195.0 10.0195.0 11.0195.1
       3.0 11.5194.7 12.0194.6 12.5194.7 13.0194.7 13.5194.9 14.0194.7
       3.0 14.5194.7 14.7194.7 15.0194.9 16.0194.7 17.0194.9 18.0194.9
       3.0 19.0195.1 20.0194.9 21.0194.9 22.0194.8 23.0194.9 24.0194.9
       3.0 24.8194.9 25.0194.9 25.8195.1 26.0195.6 27.8196.6 28.9199.2
```

Appendix J5. Continued

```
        3.0 30.0199.7
NS      3.0       .50       .50       .50       .50       .50     65.60
NS      3.0     65.60     65.60     65.60     65.60     65.60     65.60
NS      3.0     65.60     65.60     65.60     65.60     65.60     65.60
NS      3.0     65.60     65.60  1.565.60     65.60     65.60  1.5  .50
NS      3.0       .50       .50       .50       .50       .50       .50
NS      3.0       .50
CAL2    3.0    195.13      6.00      6.98
VEL2    3.0                 .60 2.30 2.60 3.30 3.50 3.50 3.70 3.60  .20
VEL2    3.0  .80  .80  .50  .20 0.00  .70  .40  .30 0.00  .60  .50 0.00
VEL2    3.0 0.00 0.00
CAL3    3.0    195.10      4.00      4.53
VEL3    3.0
VEL3    3.0
VEL3    3.0
XSEC    4.0     315.01.00    195.1
        4.0  0.0199.6  4.0197.6 16.0197.8 24.8196.1 25.0195.9 26.0195.9
        4.0 27.0195.7 28.0195.6 29.0195.5 29.5195.5 30.0195.4 30.5195.5
        4.0 31.0195.1 31.5195.2 32.0195.1 32.5195.2 33.0194.9 33.5195.1
        4.0 34.0195.3 34.5195.7 35.0195.7 35.5196.1 36.6200.3
NS      4.0       .50       .50     36.60     64.60     64.60     64.60
NS      4.0     64.60  1.064.60     64.60     64.60     64.60     64.60
NS      4.0     64.60     64.60     64.60     64.60     64.60     64.60
NS      4.0     64.60       .50       .50       .50       .50
CAL2    4.0    195.79      6.00      5.15
VEL2    4.0                                  0.00 1.00  .80 1.30 1.30
VEL2    4.0 1.30 1.50 2.30 1.40 1.60 2.80 2.30 1.60  .70
CAL3    4.0    195.73      4.00      3.32
VEL3    4.0
VEL3    4.0
ENDJ
```

Appendix J6. Summary of Calibration Details Peterson Creek (Medium Flow) PETER6.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4

Discharge

5	6	5	5
3	4	5	3

Stage

194.77	194.79	195.13	195.79
194.65	194.66	195.10	195.73

Plotting Stage

0.57	0.59	0.53	0.69
0.45	0.46	0.50	0.63

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.2099	.2638	.1659	.4902
B =	.6593	.4490	.7301	.2092
SZF=	194.2	194.2	194.6	195.1

B Coefficient Log/Log Discharge/Stage Relationship

1.52	2.23	1.37	4.78

Appendix J7. Data Changes Peterson Creek (Medium Flow)

Cell velocities changed for calibration

Transect 1	Vertical 3	Specified Mannings N of 0.5
Transect 1	Vertical 24	Specified Mannings N of 0.5
Transect 3	Vertical 21	Specified Mannings N of 1.5
Transect 3	Vertical 24	Specified Mannings N of 1.5
Transect 4	Vertical 8	Specified Mannings N of 1.0

Appendix J8. Velocity Adjustment Factors Peterson Creek (Medium Flow)

Transect	Flow	VAF
1.00	5.0	1.180
1.00	6.0	.999
1.00	11.0	.657
2.00	5.0	.964
2.00	6.0	.999
2.00	11.0	1.117
3.00	5.0	1.048
3.00	6.0	.990
3.00	11.0	.831
4.00	5.0	.904
4.00	6.0	.999
4.00	11.0	1.396

Appendix J9. IFG4 Input File Peterson Creek (Low Flow)

```
PETERSEN CREEK          IFIM   PETER7.IN4
Q/DATE MEASURED  14 CFS ON 11-8-88, 6 CFS ON 12-16-88, 4 CFS ON 11-18-88
IOC       00000002000000000000
QARD   4.00
QARD   5.00
XSEC   1.0        0.01.00    194.2
       1.0  0.0197.9  1.0196.0  2.0194.7  3.0194.4  4.0194.3  5.0194.2
       1.0  6.0194.2  6.9194.2  7.0194.2  7.5194.4  8.0194.5  8.4194.4
       1.0  9.0194.5  9.5194.6 10.0194.5 11.0194.6 12.0194.6 13.0194.4
       1.0 14.0194.4 15.0194.5 16.0194.5 17.0194.5 18.0194.6 18.5194.7
       1.0 20.5196.0 24.2199.9
NS     1.0        .50        .50        .50      64.60      64.60      64.60
NS     1.0      64.60      64.70      64.70      64.70      64.70      64.70
NS     1.0      64.70      64.70      64.70      64.70      64.70      37.70
NS     1.0      37.70      37.70      63.70      63.70      63.70        .50
NS     1.0        .50        .50
CAL2   1.0     194.77       6.00       5.09
VEL2   1.0
VEL2   1.0
VEL2   1.0
CAL3   1.0     194.65       4.00       3.18
VEL3   1.0                   .10 1.00 1.00 1.10 1.60 2.40 1.40  .60  .30
VEL3   1.0  .50  .70  .40  .40  .30  .20  .20  .60  .60  .50  .40
VEL3   1.0
XSEC   2.0      315.01.00    194.2
       2.0  0.0199.5  5.1196.0  5.8195.0  6.0194.7  7.0194.6  8.0194.4
       2.0  9.0194.4 10.0194.3 10.5194.2 11.0194.1 11.5194.1 12.0193.8
       2.0 12.5193.6 13.0193.3 13.5193.4 14.0193.0 14.5193.0 15.0193.0
       2.0 15.5193.0 16.0192.7 16.5192.8 17.0192.9 17.5193.0 18.0193.1
       2.0 18.5193.1 19.0194.7 22.1194.7 22.5194.6 24.3198.9
NS     2.0        .50        .50        .50      65.60      65.60      65.60
NS     2.0      65.60      65.60      65.60      65.60      65.60      35.70
NS     2.0      35.70      35.70      35.70      35.70      35.70      35.70
NS     2.0      64.70      64.70      64.70      64.70      64.70      64.70
NS     2.0      64.70      64.70        .50        .50        .50
CAL2   2.0     194.79       6.00       6.47
VEL2   2.0
VEL2   2.0
VEL2   2.0
CAL3   2.0     194.66       4.00       3.45
VEL3   2.0                        .40 1.20  .70 2.40 1.30  .90 1.30 1.80
VEL3   2.0  .10  .10  .10  .10  .05  .05  .05  .05  .05  .05  .05  .05
VEL3   2.0  .05  .05
XSEC   3.0      280.01.00    194.6
       3.0  0.0198.6  6.0195.6  7.8195.3  9.5195.0 10.0195.0 11.0195.1
       3.0 11.5194.7 12.0194.6 12.5194.7 13.0194.7 13.5194.9 14.0194.7
       3.0 14.5194.7 14.7194.7 15.0194.9 16.0194.7 17.0194.9 18.0194.9
       3.0 19.0195.1 20.0194.9 21.0194.9 22.0194.8 23.0194.9 24.0194.9
       3.0 24.8194.9 25.0194.9 25.8195.1 26.0195.6 27.8196.6 28.9199.2
       3.0 30.0199.7
```

Appendix J9. Continued

```
NS      3.0        .50        .50        .50        .50  0.5  .50      65.60
NS      3.0      65.60      65.60      65.60      65.60      65.60      65.60
NS      3.0      65.60      65.60      65.60      65.60      65.60      65.60
NS      3.0      65.60      65.60      65.60      65.60      65.60        .50
NS      3.0        .50        .50        .50        .50        .50        .50
NS      3.0        .50
CAL2    3.0     195.13       6.00       6.98
VEL2    3.0
VEL2    3.0
VEL2    3.0
CAL3    3.0     195.10       4.00       4.53
VEL3    3.0                                   1.70 1.50 1.40 2.70 4.30 2.30
VEL3    3.0 2.80 3.00 3.10 1.60  .30  .10 0.00  .40  .20  .20  .20 1.40
VEL3    3.0 1.30 1.20
XSEC    4.0      315.01.00    195.1
        4.0  0.0199.6  4.0197.6 16.0197.8 24.8196.1 25.0195.9 26.0195.9
        4.0 27.0195.7 28.0195.6 29.0195.5 29.5195.5 30.0195.4 30.5195.5
        4.0 31.0195.1 31.5195.2 32.0195.1 32.5195.2 33.0194.9 33.5195.1
        4.0 34.0195.3 34.5195.7 35.0195.7 35.5196.1 36.6200.3
NS      4.0        .50        .50      36.60      64.60      64.60      64.60
NS      4.0  0.564.60      64.60      64.60      64.60      64.60      64.60
NS      4.0      64.60      64.60      64.60      64.60      64.60      64.60
NS      4.0      64.60  0.5  .50        .50        .50        .50
CAL2    4.0     195.79       6.00       5.15
VEL2    4.0
VEL2    4.0
CAL3    4.0     195.73       4.00       3.32
VEL3    4.0                                     .30  .70  .70 1.00 1.00
VEL3    4.0 1.30 1.00 1.80 1.20 1.40 1.90 1.10
ENDJ
```

Appendix J10. Summary of Calibration Details Peterson Creek (Low Flow) PETER7.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4

Discharge

5	6	7	5
3	3	5	4

Stage

194.77	194.79	195.13	195.79
194.65	194.66	195.10	195.73

Plotting Stage

0.57	0.59	0.53	0.69
0.45	0.46	0.50	0.63

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.3110	.2820	.3844	.4857
B =	.3723	.3953	.1653	.2142
SZF=	194.2	194.2	194.6	195.1

B Coefficient Log/Log Discharge/Stage Relationship

2.69	2.53	6.05	4.67

Appendix J11. Data Changes Peterson Creek (Low Flow)

Cell velocities changed for calibration

Transect 3	Vertical	5	Specified Mannings N of 0.5
Transect 4	Vertical	7	Specified Mannings N of 0.5
Transect 4	Vertical	20	Specified Mannings N of 0.5

Appendix J12. Velocity Adjustment Factors Peterson Creek (Low Flow)

Transect	Flow	VAF
1.00	4.0	1.000
1.00	5.0	.988
2.00	4.0	1.000
2.00	5.0	1.128
3.00	4.0	.999
3.00	5.0	1.103
4.00	4.0	1.000
4.00	5.0	1.131

Appendix K

Bull Creek Site Calibration Information

Appendix K1. IFG4 Input File Bull Creek

```
BULL CREEK       IFIM   BULL3.IN4
Q/DATE MEASURED  15 CFS ON 11-8-88, 2 CFS ON 12-21-88
IOC        0000000200000000000000
QARD   2.00
QARD  15.00
QARD  25.00
XSEC   1.0        0.01.00    192.2
       1.0  0.0196.8 22.0193.1 23.0192.8 24.0192.6 25.0192.4 26.0192.3
       1.0 26.5192.2 27.0192.3 27.5192.2 28.0192.2 28.5192.3 29.0192.3
       1.0 29.5192.2 30.0192.2 30.5192.2 31.0192.2 31.3192.3 32.0192.5
       1.0 33.0192.6 34.4197.7
NS     1.0      63.70      63.70      63.70      35.70      35.70      35.70
NS     1.0      35.70      35.70      35.70      35.70      35.70      35.70
NS     1.0      35.70      35.70      35.70      35.70      35.70      35.70
NS     1.0      35.70        .50
CAL1   1.0     193.06      15.97
VEL1   1.0       0.00 1.20 1.90 2.60 2.80 2.60 2.40 2.90 2.90 2.50 2.40
VEL1   1.0 2.60 2.20 1.90 1.60 1.50 1.30 1.10 0.00
CAL2   1.0     192.51       1.64
VEL2   1.0                        .60  .70  .70 1.00 1.20  .90 1.00  .90
VEL2   1.0  .80 1.20 1.00  .50  .40  .70
XSEC   2.0      225.01.00    192.2
       2.0  0.0199.7 49.0193.1 50.0192.8 50.7192.6 51.0192.4 51.5192.3
       2.0 52.0192.3 52.5192.2 53.0192.1 53.5192.1 54.0192.2 54.5192.2
       2.0 55.0192.2 55.5192.1 56.0192.0 56.5192.0 57.0192.0 57.5192.0
       2.0 58.0192.1 58.5192.1 58.6193.1 58.7197.4
NS     2.0      32.50      65.60      65.60      65.60      65.60      65.60
NS     2.0      65.60      65.60      65.60      65.60      65.60      65.60
NS     2.0      65.60      53.70      53.70      53.70      53.70      53.70
NS     2.0      53.70      53.70      53.70        .50
CAL1   2.0     193.11      16.20
VEL1   2.0            1.50 1.90 2.30 2.50 3.10 2.70 2.80 2.70 2.60 2.30
VEL1   2.0 2.10 1.80 1.90 1.60 1.20  .90  .50  .50
CAL2   2.0     192.54       1.45
VEL2   2.0                  0.00  .40  .60 1.10  .50  .70  .90  .90  .60
VEL2   2.0  .50  .80  .40  .50  .30  .30  .10  .10
XSEC   3.0      170.01.00    192.2
       3.0  0.0198.6 30.0193.2 31.0192.9 32.0192.8 32.5192.6 33.0192.2
       3.0 33.5192.0 34.0192.0 34.5192.0 35.0191.9 35.5191.4 36.0191.4
       3.0 36.5191.2 37.0191.1 37.5190.9 38.0192.6 38.5192.6 39.0193.2
       3.0 43.0197.7 49.0200.6 51.2201.0
NS     3.0        .50      65.70      65.70      65.70      56.60      56.60
NS     3.0      56.60      56.60      56.60      56.60      56.60      56.60
NS     3.0      56.60      56.60      56.60      56.60      56.60      56.60
NS     3.0      56.60      56.60      56.60
CAL1   3.0     193.17      14.64
VEL1   3.0            1.00 1.80 2.60 2.70 1.50  .70 1.10 1.90 1.50 1.00
VEL1   3.0 1.20 1.90 1.40 3.20 2.20
CAL2   3.0     192.55       1.74
VEL2   3.0                  0.00  .10  .50  .50 1.00  .80  .20  .60  .20
```

Appendix K1. Continued

```
VEL2   3.0  .40  .80  .20
XSEC   4.0     380.01.00    193.1
       4.0  0.0198.8 27.0194.0 28.0193.9 29.0193.8 30.0193.6 31.0193.4
       4.0 31.5193.3 32.0193.3 32.5193.2 33.0193.2 33.5193.2 34.0193.2
       4.0 34.5193.2 35.0193.2 35.5193.2 36.0193.2 36.5193.2 37.0193.2
       4.0 37.5193.1 38.0193.1 38.5193.2 39.0193.1 39.5193.1 40.0193.2
       4.0 40.2193.2 41.0193.1 42.0193.2 43.0193.6 43.5193.7 44.5194.0
       4.0 45.0197.4 46.0197.8 46.9200.8
NS     4.0        .50     34.50     34.50     34.50     34.50     64.60
NS     4.0     64.60     64.60     64.60     64.60     64.60     64.60
NS     4.0     64.60     64.60     64.60     64.60     64.60     64.60
NS     4.0     64.60     64.60     64.60     64.60     64.60     64.60
NS     4.0     64.70     64.70     64.70     64.70     64.70     64.70
NS     4.0     64.70       .50       .50
CAL1   4.0    193.96     16.25
VEL1   4.0            .05  .90 1.20 1.30 1.60 1.80 1.50 1.60 1.70 1.70
VEL1   4.0 1.80 1.90 1.90 2.00 2.10 2.30 2.70 2.50 2.80 2.00 2.10  .60
VEL1   4.0  .80  .90  .50  .40  .30
CAL2   4.0    193.32      2.32
VEL2   4.0                         0.00 0.00  .20  .30  .40  .30  .20
VEL2   4.0  .20  .90  .80  .70 1.00  .20 1.70 3.00 1.90 1.40 1.10 2.60
VEL2   4.0 3.70 2.40  .05
ENDJ
```

Appendix K2. Summary of Calibration Details Bull Creek
BULL3.IN4

Calibration Information for Calculated Discharges

Transect Number

1	2	3	4

Discharge

16	15	15	16
2	2	2	2

Stage

193.06	193.11	193.17	193.96
192.51	192.54	192.55	193.32

Plotting Stage

0.86	0.91	0.97	0.86
0.31	0.34	0.35	0.22

Stage/Discharge Relationship (S vs Q) S=A*Q**B+SZF

A =	.2621	.2757	.2304	.1410
B =	.4326	.4381	.5363	.6529
SZF=	192.2	192.2	192.2	193.1

B Coefficient Log/Log Discharge/Stage Relationship

2.31	2.28	1.87	1.53

Appendix K3. Data Changes Bull Creek

Cell velocities changed for calibration

Transect 4 Used Depth Measurements From Medium Flow Data Set

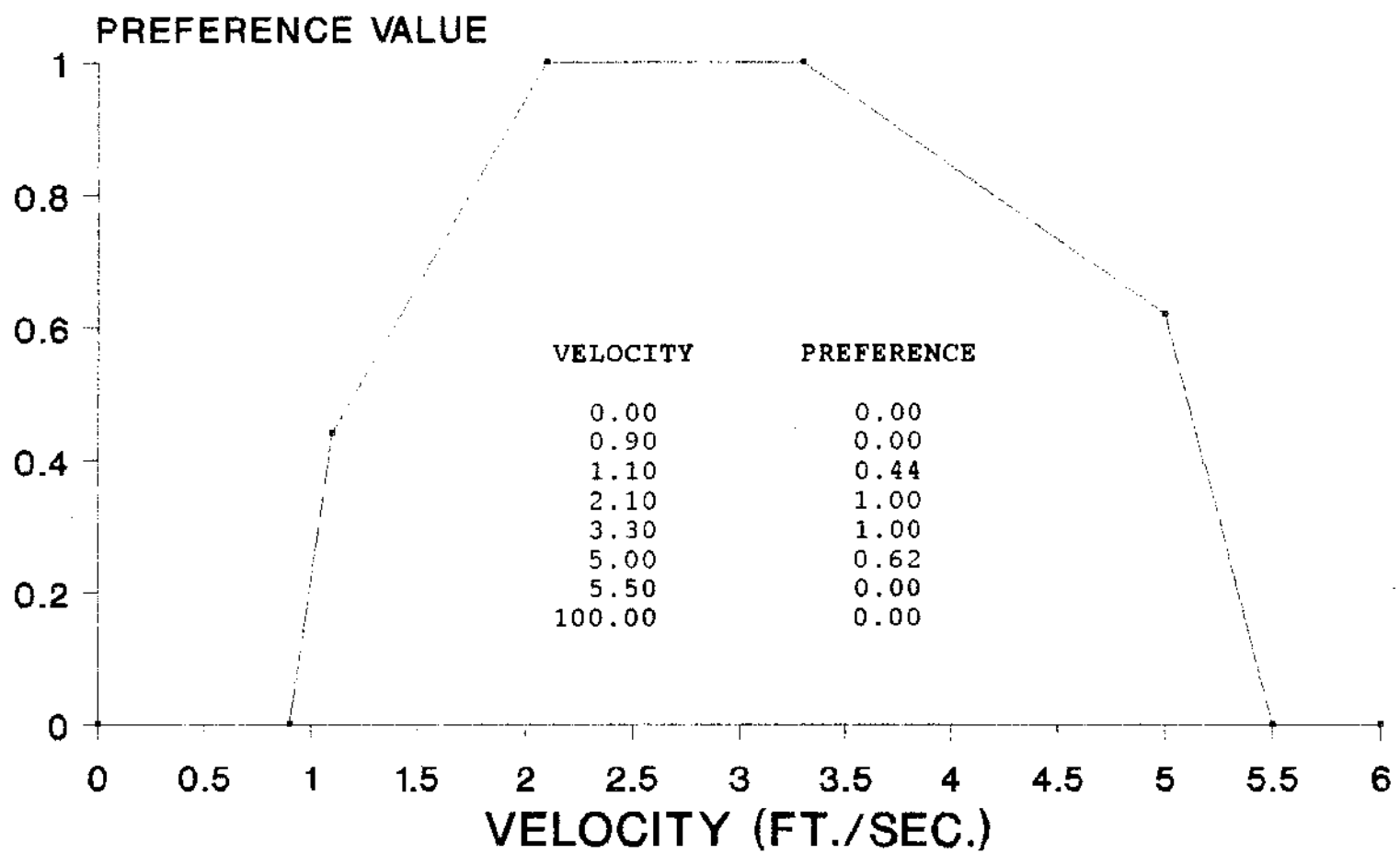
Appendix K4. Velocity Adjustment Factors Bull Creek

Transect	Flow	VAF
1.00	2.0	1.007
1.00	15.0	1.000
1.00	25.0	.998
2.00	2.0	1.016
2.00	15.0	1.003
2.00	25.0	.972
3.00	2.0	1.039
3.00	15.0	.995
3.00	25.0	.863
4.00	2.0	.964
4.00	15.0	1.024
4.00	25.0	.859

Appendix L

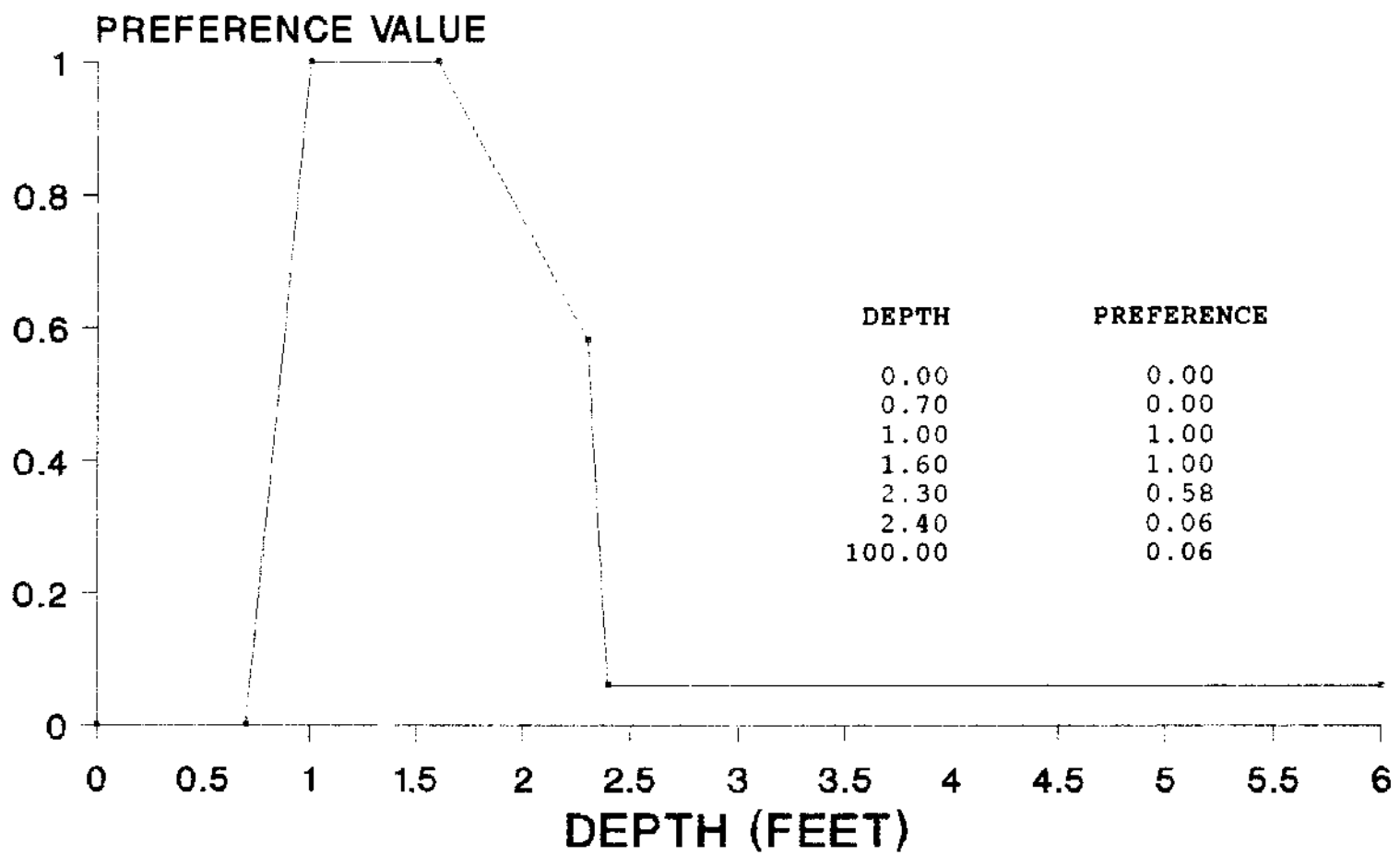
Depth and Velocity Habitat-Use Curves

STEELHEAD SPAWNING - VELOCITY



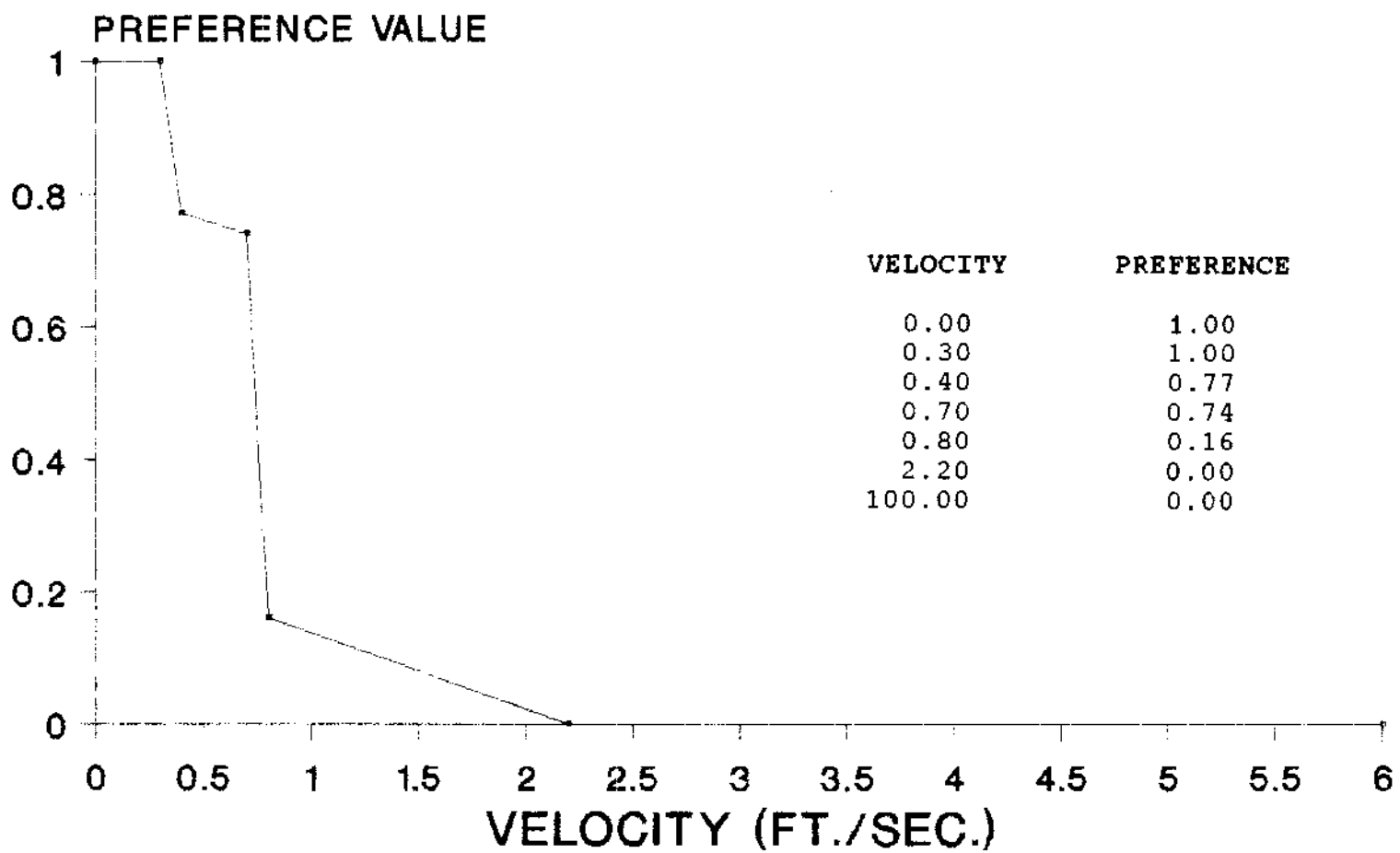
VELOCITY	PREFERENCE
0.00	0.00
0.90	0.00
1.10	0.44
2.10	1.00
3.30	1.00
5.00	0.62
5.50	0.00
100.00	0.00

STEELHEAD SPAWNING - DEPTH



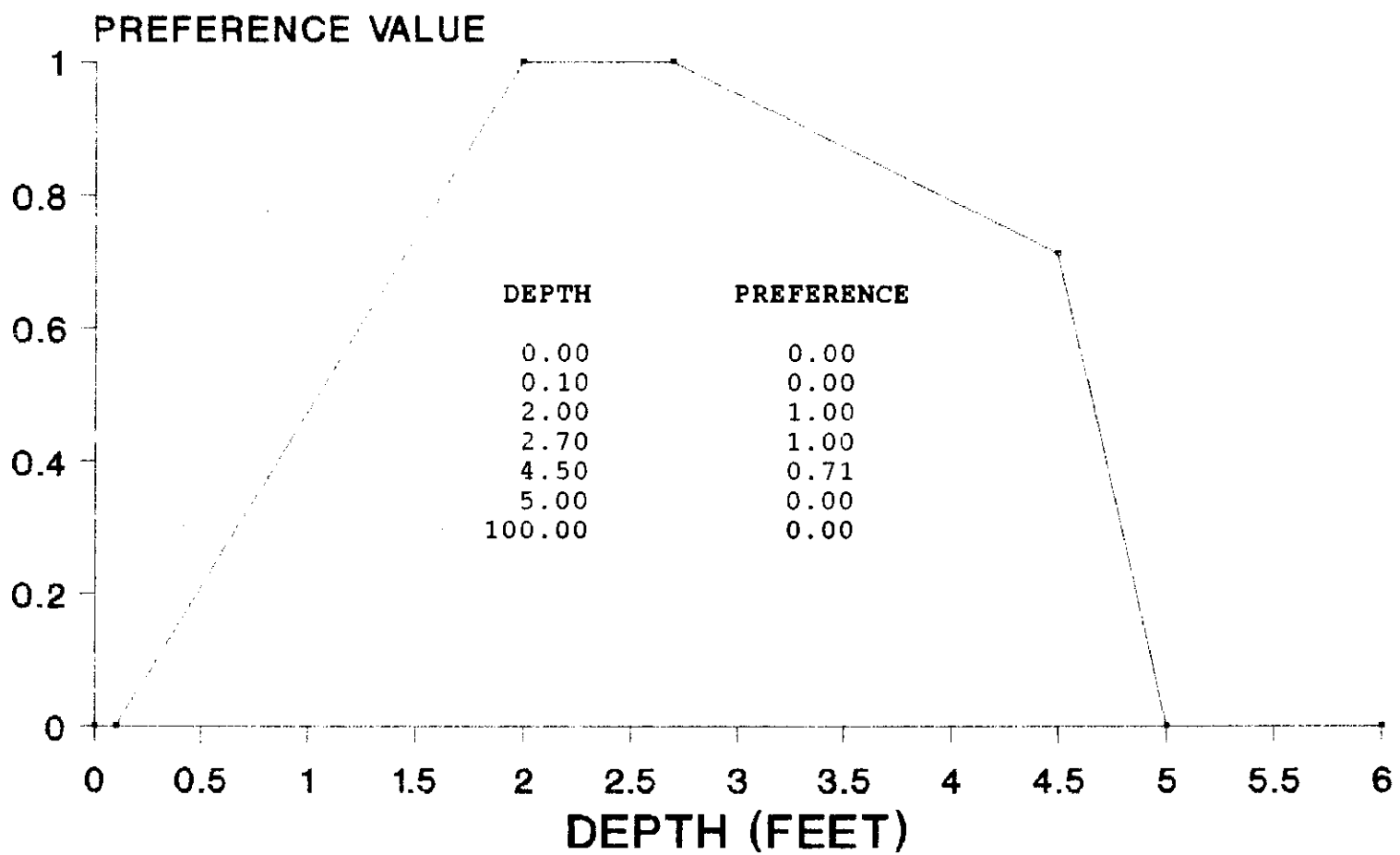
DEPTH	PREFERENCE
0.00	0.00
0.70	0.00
1.00	1.00
1.60	1.00
2.30	0.58
2.40	0.06
100.00	0.06

STEELHEAD FRY - VELOCITY



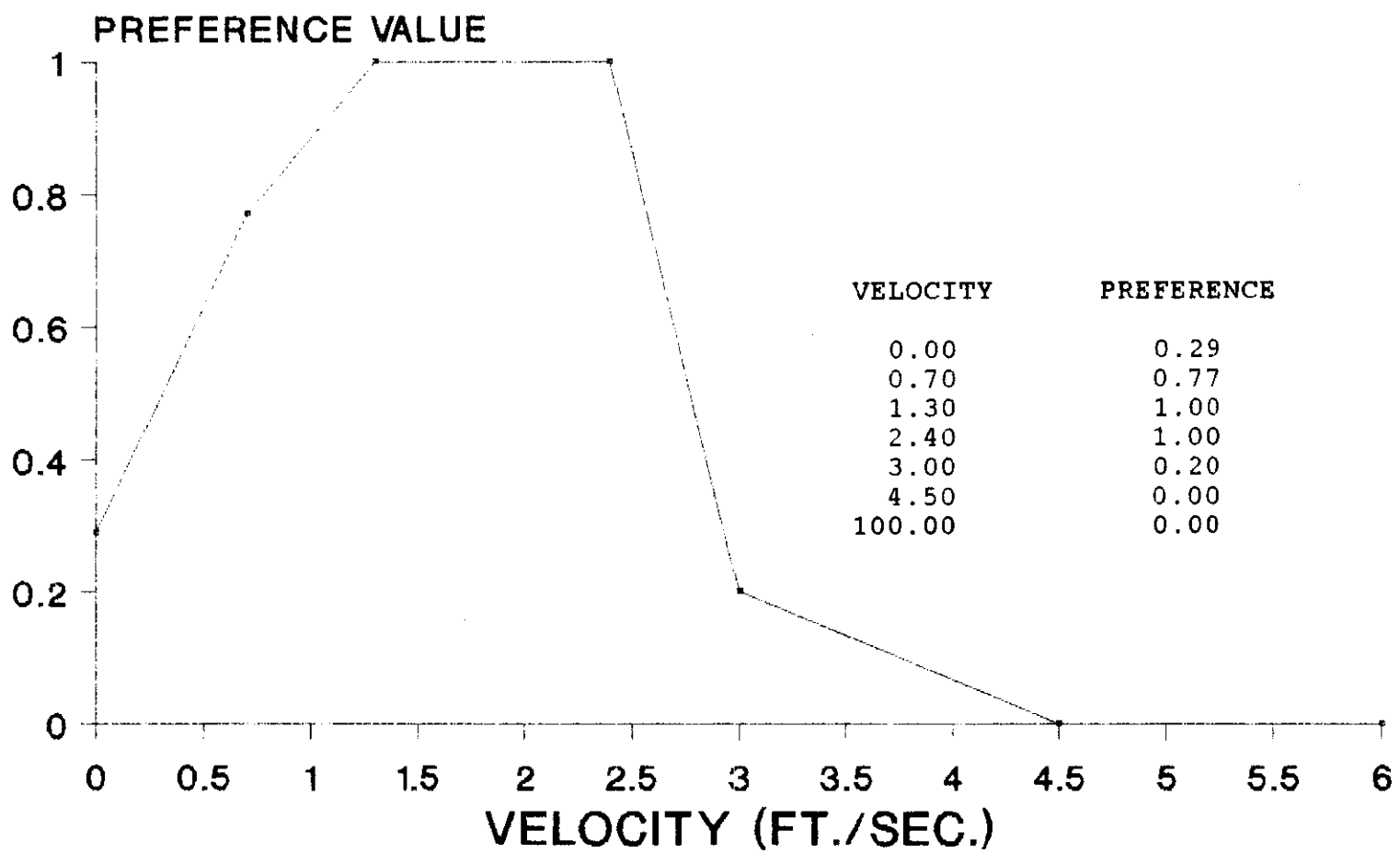
VELOCITY	PREFERENCE
0.00	1.00
0.30	1.00
0.40	0.77
0.70	0.74
0.80	0.16
2.20	0.00
100.00	0.00

STEELHEAD FRY - DEPTH



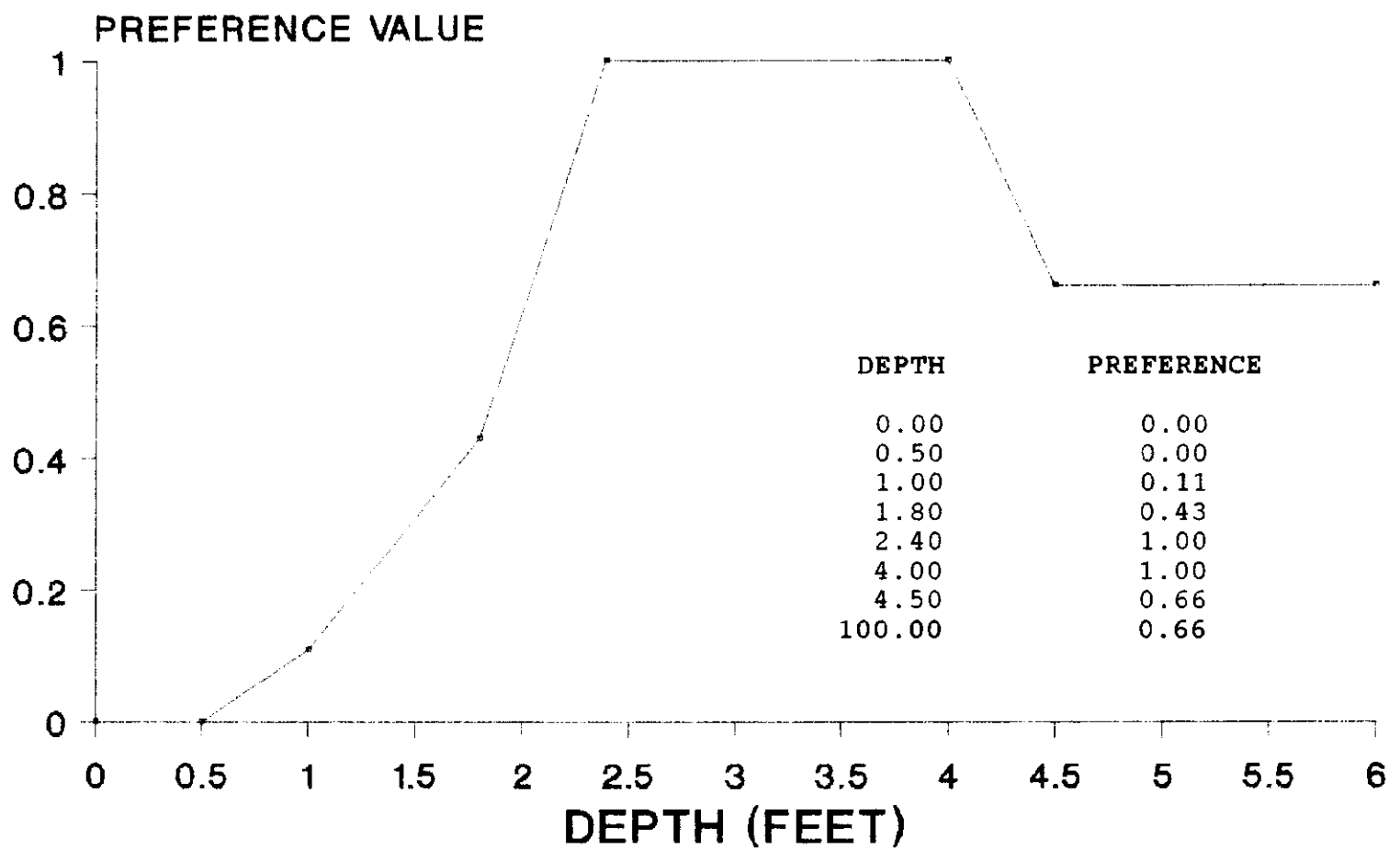
DEPTH	PREFERENCE
0.00	0.00
0.10	0.00
2.00	1.00
2.70	1.00
4.50	0.71
5.00	0.00
100.00	0.00

STEELHEAD PARR - VELOCITY



VELOCITY	PREFERENCE
0.00	0.29
0.70	0.77
1.30	1.00
2.40	1.00
3.00	0.20
4.50	0.00
100.00	0.00

STEELHEAD PARR - DEPTH

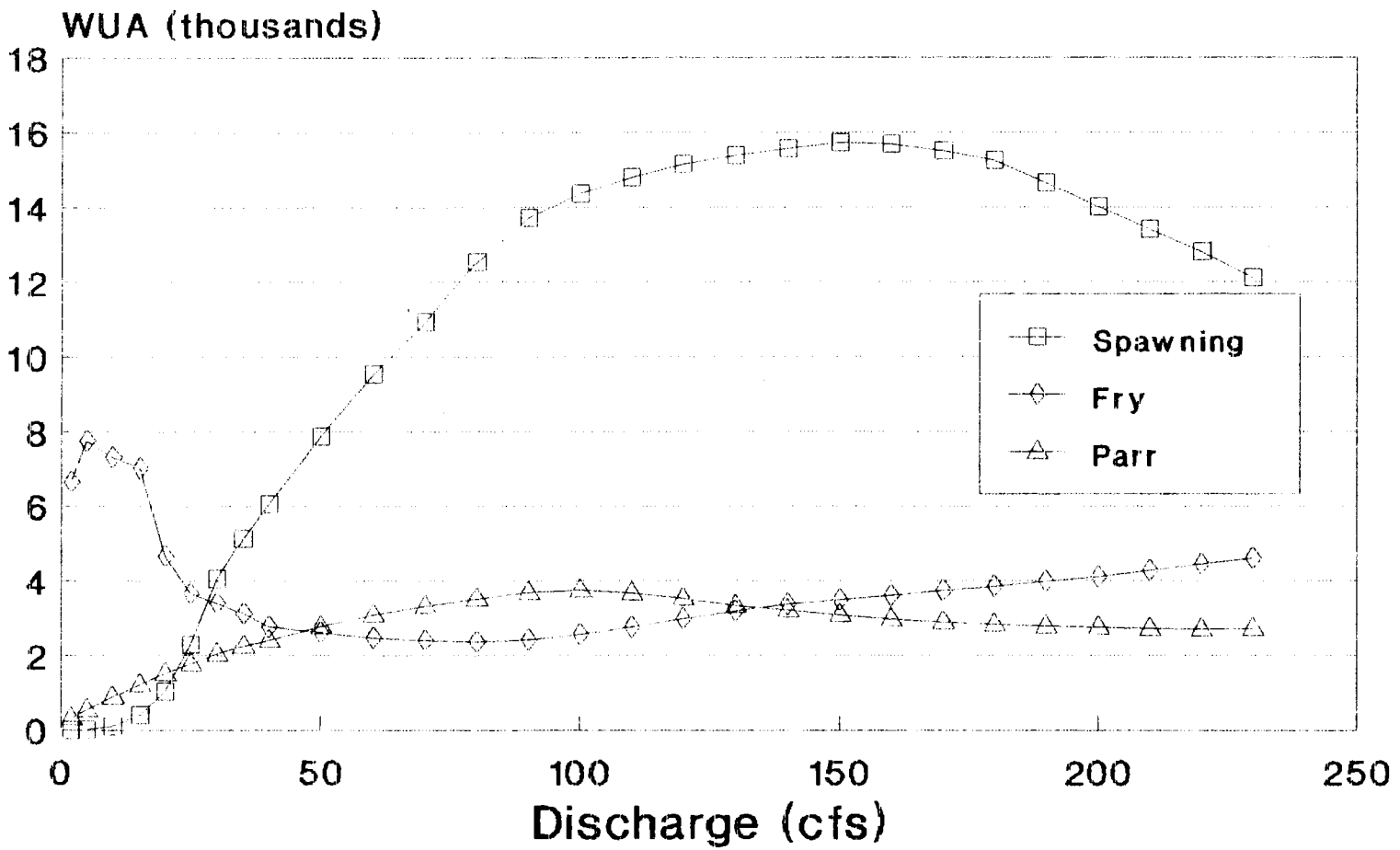


DEPTH	PREFERENCE
0.00	0.00
0.50	0.00
1.00	0.11
1.80	0.43
2.40	1.00
4.00	1.00
4.50	0.66
100.00	0.66

Appendix M

WUA Versus Flow Results

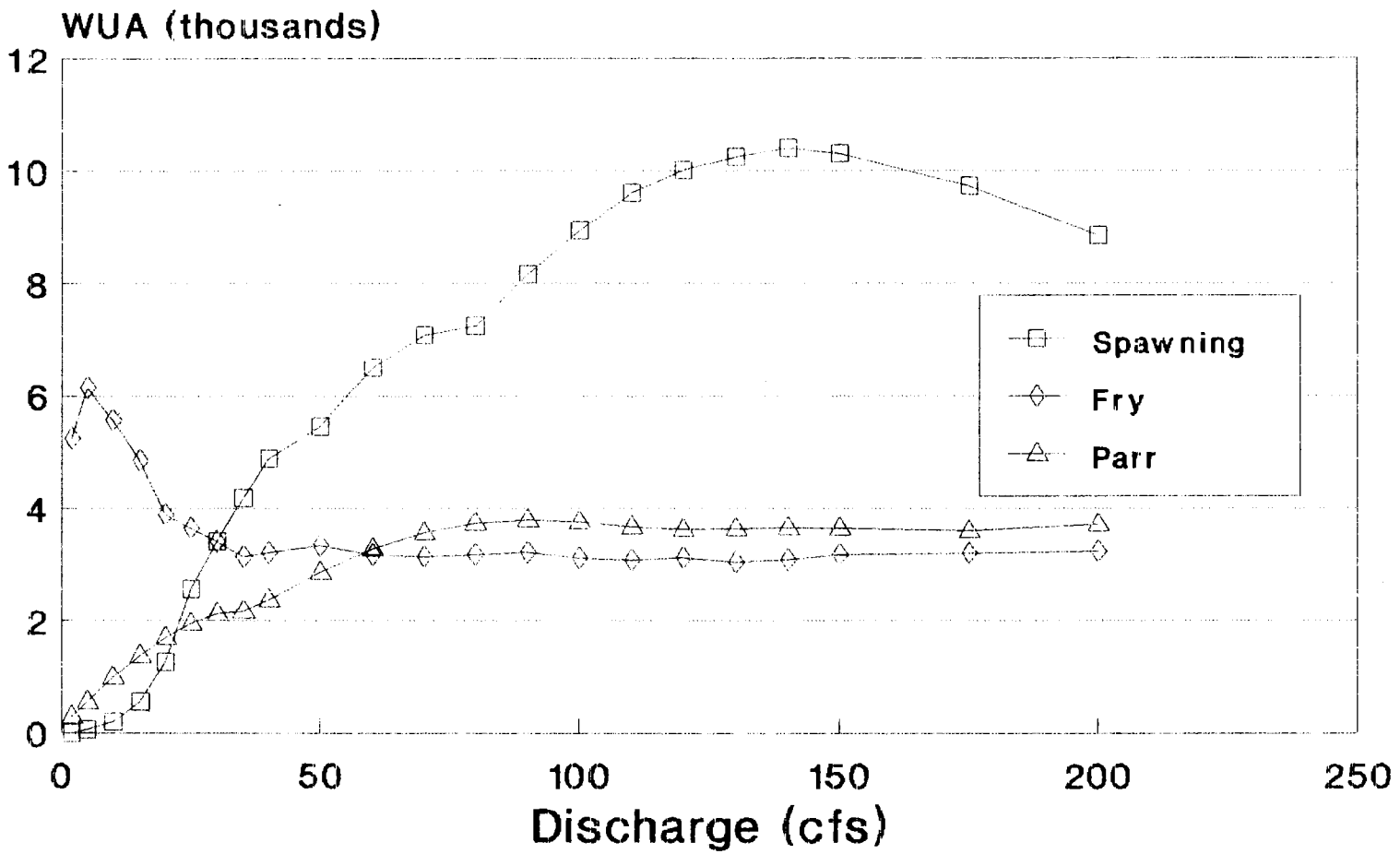
Steelhead Habitat
Lower Hurst Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Lower Hurst Creek Site

Flow	Spawning	Fry	Parr
2	0	6656	328
5	3	7750	541
10	95	7315	879
15	399	7026	1217
20	1026	4647	1515
25	2288	3661	1777
30	4051	3401	2032
35	5129	3128	2251
40	6050	2768	2409
50	7876	2610	2767
60	9538	2468	3087
70	10939	2408	3323
80	12523	2368	3520
90	13702	2416	3684
100	14358	2559	3749
110	14793	2761	3676
120	15149	2980	3523
130	15377	3193	3337
140	15564	3366	3208
150	15724	3491	3083
160	15680	3612	2965
170	15494	3731	2890
180	15250	3860	2833
190	14642	3981	2786
200	14005	4109	2751
210	13411	4278	2715
220	12805	4441	2707
230	12112	4604	2719

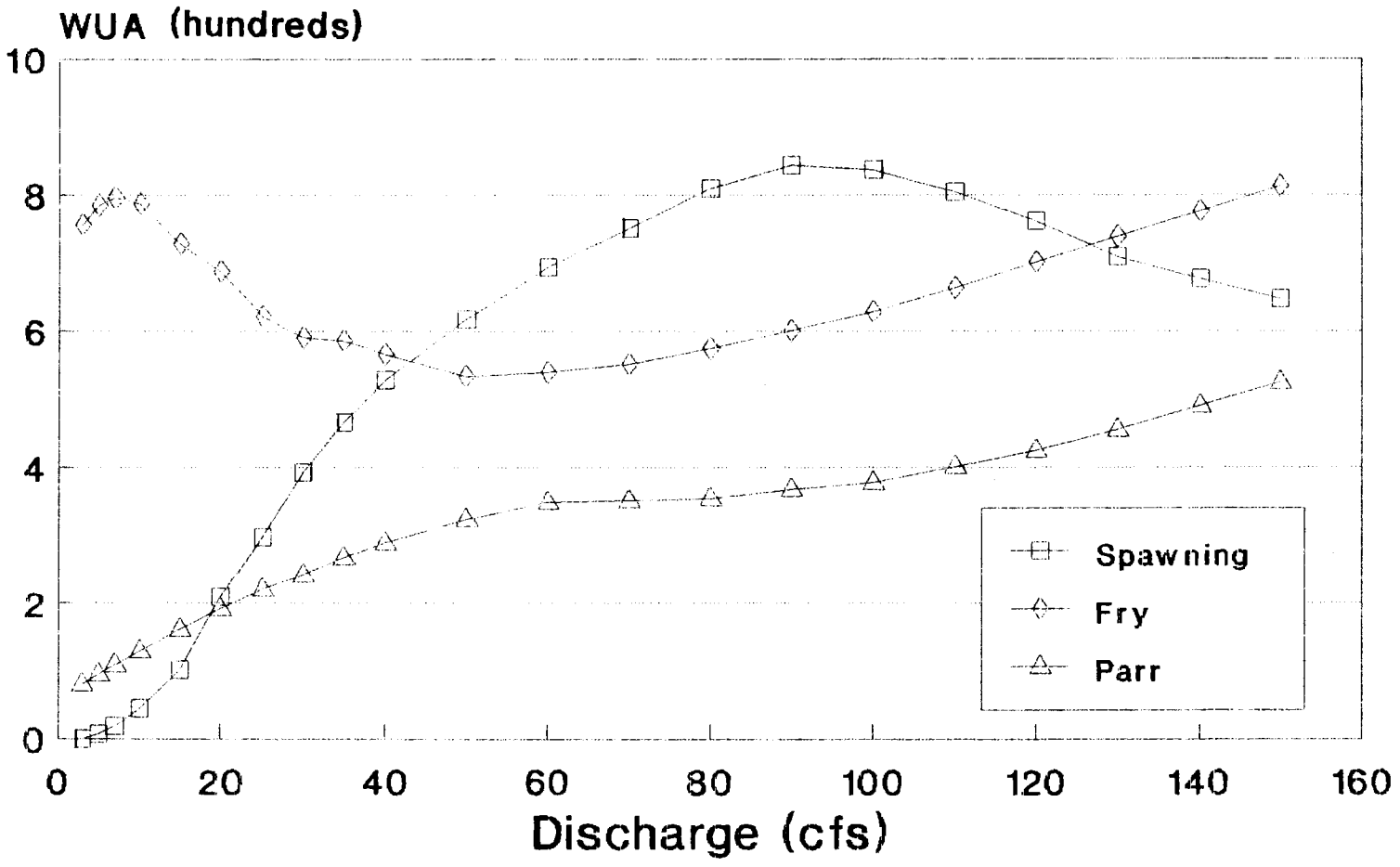
Steelhead Habitat
Upper Hurst Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Upper Hurst Creek Site

Flow	Spawning	Fry	Parr
2	1	5246	295
5	61	6149	553
10	195	5569	988
15	558	4858	1378
20	1266	3889	1699
25	2560	3644	1953
30	3404	3407	2126
35	4182	3133	2170
40	4886	3207	2370
50	5457	3339	2862
60	6503	3170	3273
70	7081	3140	3568
80	7248	3173	3726
90	8158	3217	3794
100	8938	3110	3755
110	9606	3073	3665
120	10008	3117	3625
130	10248	3042	3630
140	10404	3083	3647
150	10307	3175	3646
175	9733	3199	3596
200	8851	3230	3716

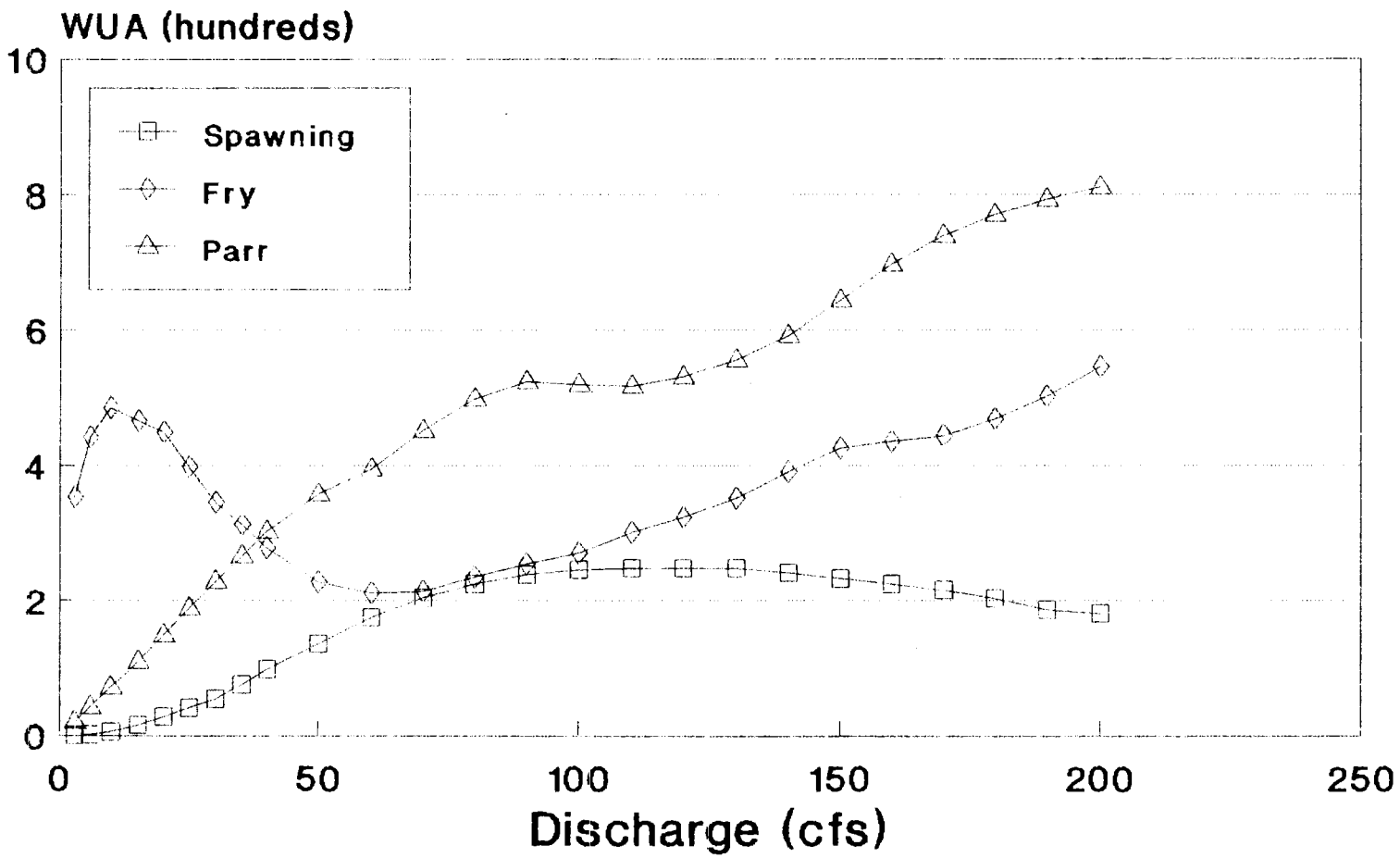
Steelhead Habitat
Shale Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Shale Creek Site

Flow	Spawning	Fry	Parr
3	0	7553	807
5	70	7848	949
7	190	7955	1089
10	447	7872	1290
15	1016	7282	1611
20	2086	6872	1917
25	2964	6215	2206
30	3922	5906	2413
35	4656	5853	2667
40	5278	5660	2883
45	5748	5516	3061
50	6173	5329	3228
60	6935	5397	3483
70	7507	5513	3508
80	8097	5743	3537
90	8437	6008	3672
100	8369	6284	3774
110	8040	6636	4007
120	7615	7009	4248
130	7088	7388	4553
140	6765	7760	4905
150	6470	8131	5249

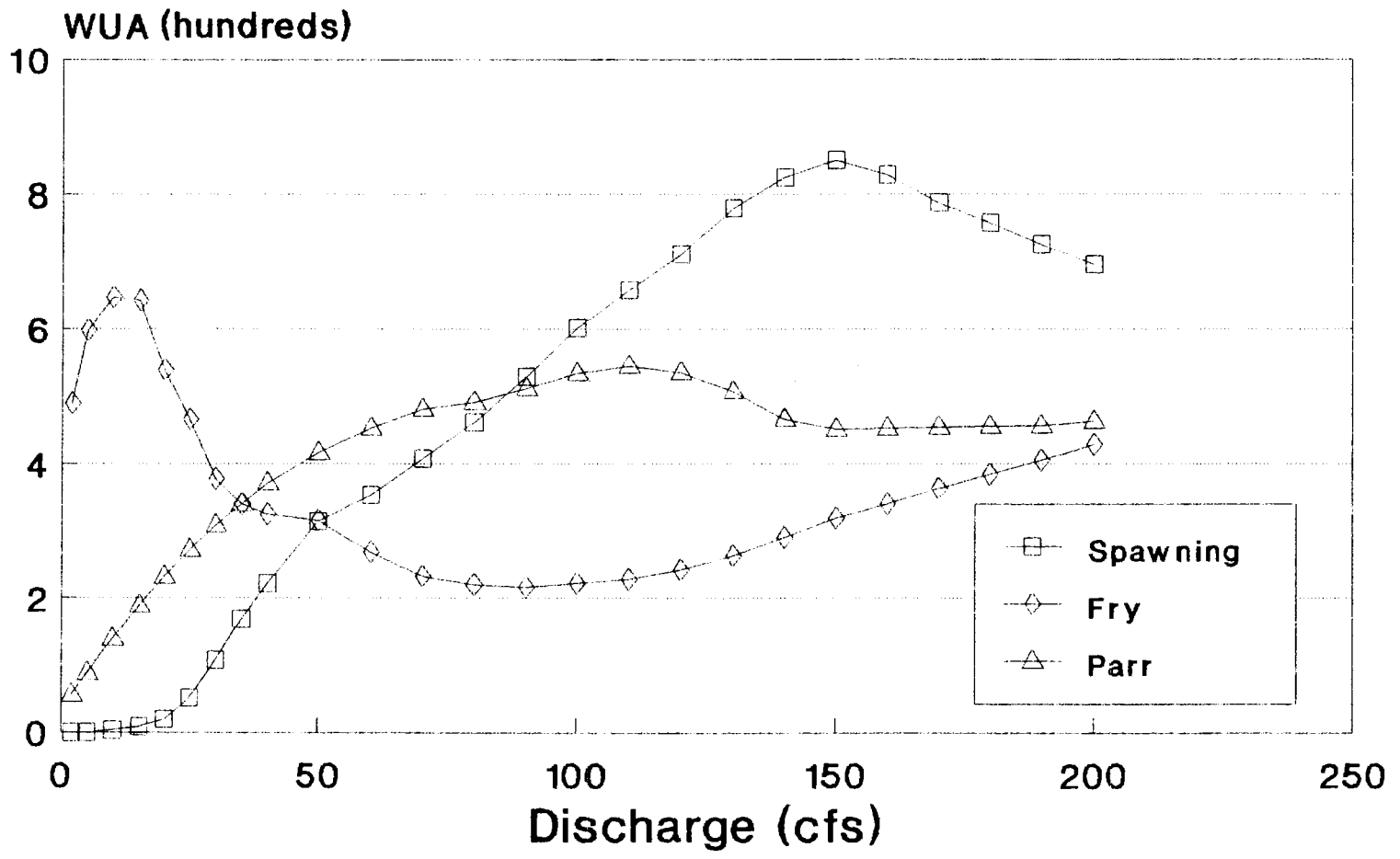
Steelhead Habitat
Lower Miller Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Lower Miller Creek Site

Flow	Spawning	Fry	Parr
3	2	3532	207
6	13	4420	425
10	52	4854	720
15	155	4659	1095
20	283	4488	1488
25	413	3980	1891
30	545	3449	2278
35	754	3125	2659
40	981	2775	3018
50	1355	2270	3572
60	1752	2110	3953
70	2042	2133	4517
80	2246	2348	4984
90	2381	2543	5237
100	2451	2698	5197
110	2473	3006	5170
120	2479	3233	5308
130	2475	3513	5554
140	2412	3906	5916
150	2325	4255	6435
160	2246	4358	6966
170	2154	4436	7387
180	2032	4686	7701
190	1868	5022	7929
200	1805	5456	8108

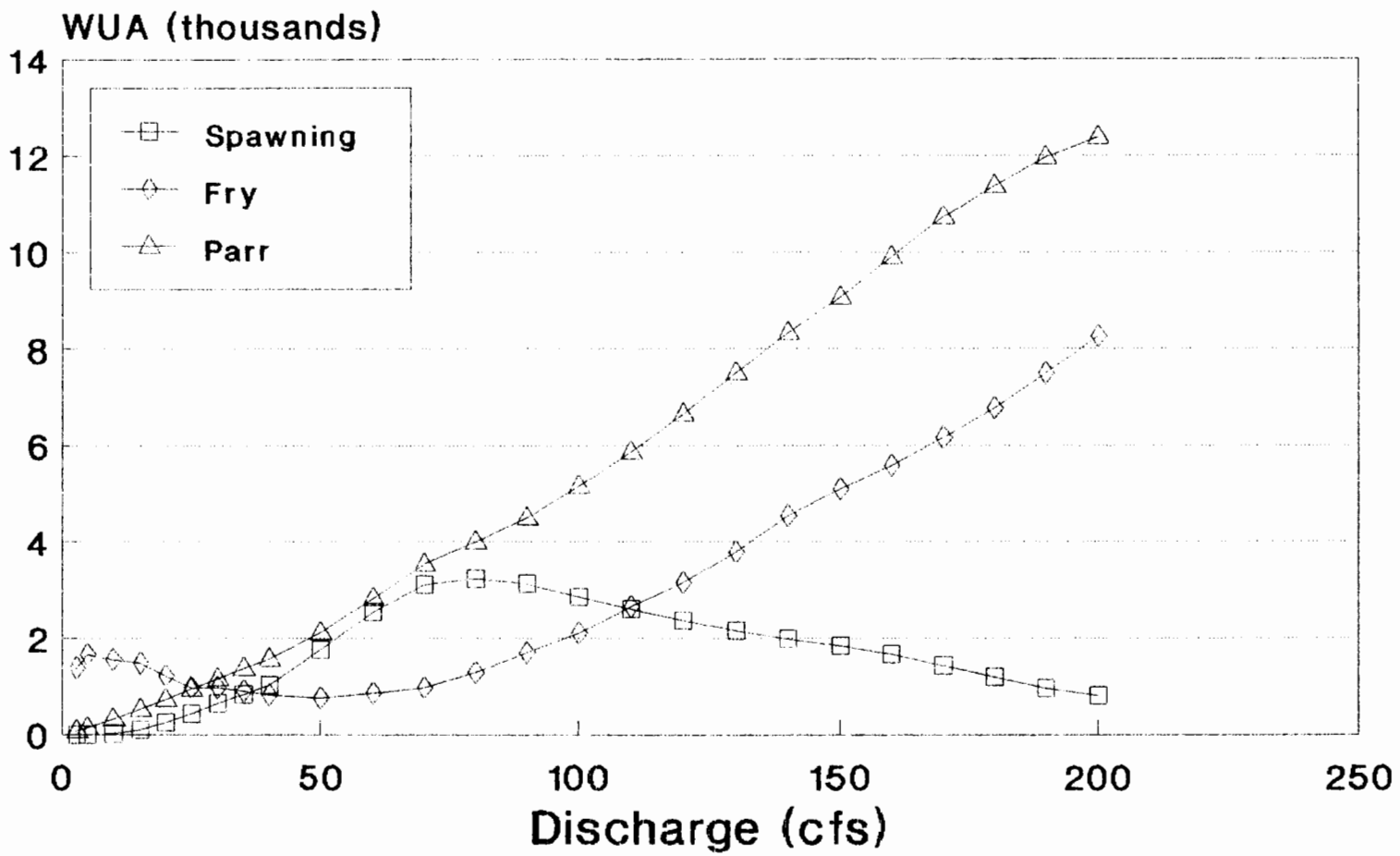
Steelhead Habitat
Middle Miller Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Middle Miller Creek Site

Flow	Spawning	Fry	Parr
2	0	4899	558
5	0	5981	885
10	35	6468	1391
15	87	6419	1887
20	190	5392	2315
25	513	4657	2716
30	1070	3775	3078
35	1682	3396	3400
40	2216	3246	3703
45	2705	3256	3946
50	3135	3150	4160
60	3533	2678	4527
70	4077	2325	4809
80	4611	2202	4908
90	5290	2165	5115
100	6017	2225	5341
110	6574	2282	5449
120	7104	2409	5355
130	7790	2629	5071
140	8248	2901	4655
150	8501	3189	4508
160	8286	3399	4526
170	7870	3629	4542
180	7569	3841	4553
190	7253	4055	4564
200	6955	4287	4629

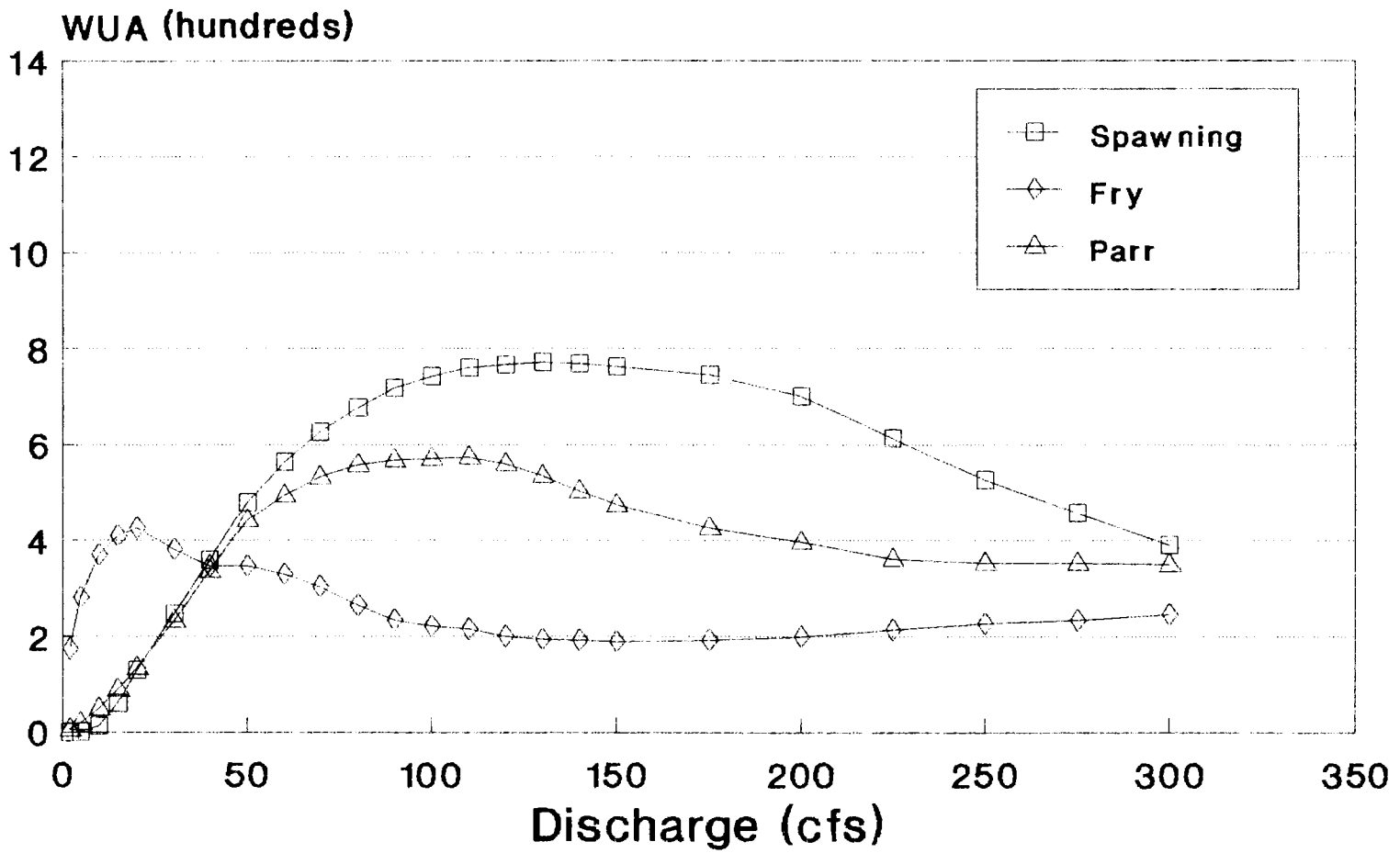
Steelhead Habitat
Upper Miller Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Upper Miller Creek Site

Flow	Spawning	Fry	Parr
3	0	1377	81
5	0	1653	139
8	3	1704	245
10	16	1555	322
15	96	1481	521
20	246	1214	729
25	439	972	945
30	648	974	1155
35	827	897	1373
40	1022	825	1566
50	1760	756	2111
60	2539	857	2821
70	3113	970	3536
80	3235	1286	3994
90	3128	1696	4496
100	2856	2104	5151
110	2605	2655	5872
120	2369	3149	6648
130	2149	3782	7503
140	1979	4531	8328
150	1834	5091	9060
160	1664	5581	9902
170	1429	6167	10716
180	1195	6776	11963
190	962	7499	11963
200	808	8261	12377

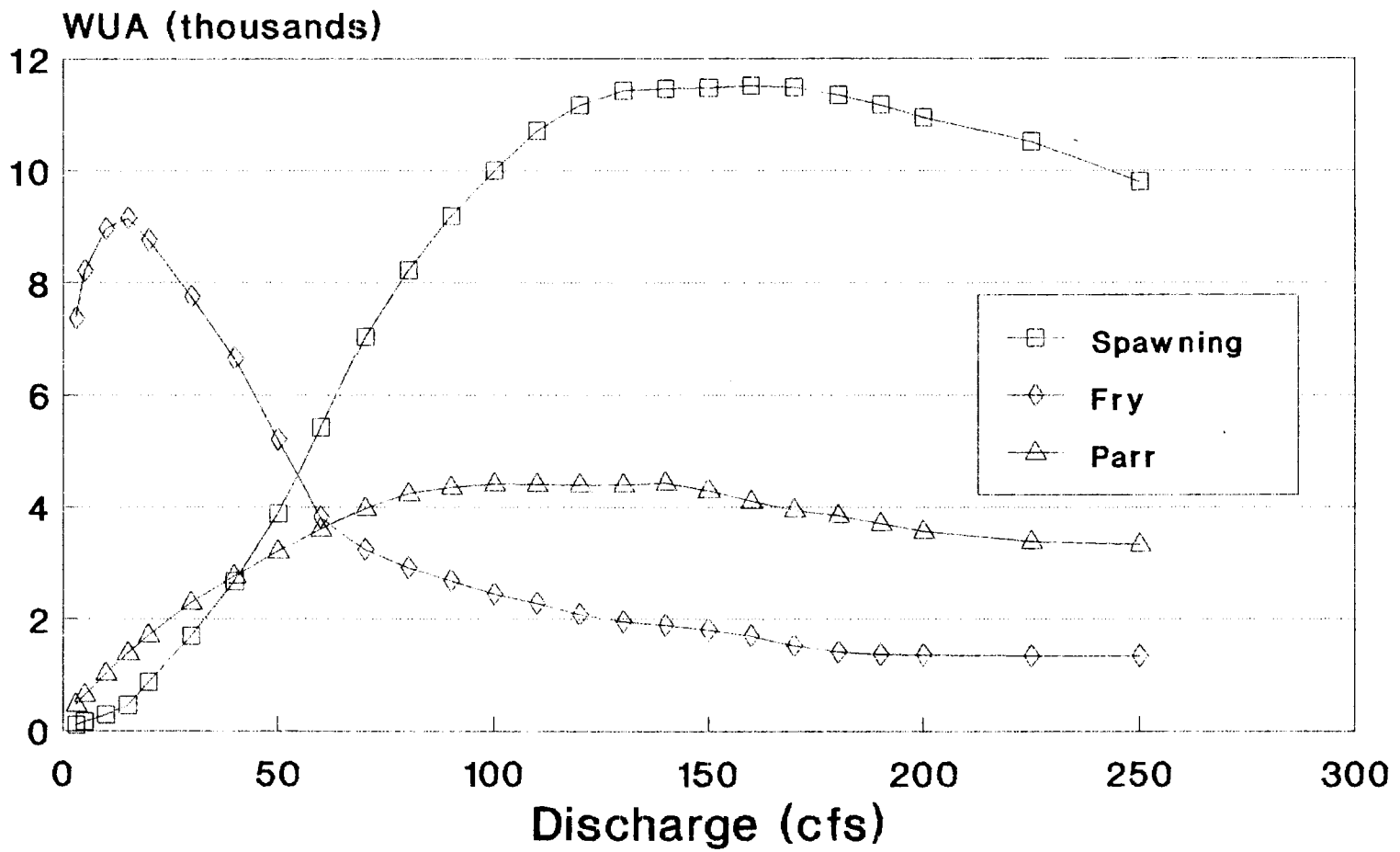
Steelhead Habitat
Lower Christmas Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Lower Christmas Creek Site

Flow	Spawning	Fry	Parr
2	0	1735	53
5	2	2811	193
7	49	3276	303
10	132	3702	497
15	609	4093	892
20	1303	4264	1346
30	2465	3812	2322
40	3585	3463	3369
50	4790	3470	4427
60	5645	3297	4937
70	6263	3038	5328
80	6771	2657	5583
90	7177	2340	5687
100	7424	2212	5718
110	7604	2149	5741
120	7668	1997	5600
130	7723	1937	5359
140	7692	1924	5033
150	7632	1888	4749
175	7450	1916	4257
200	7004	1988	3960
225	6134	2133	3614
250	5263	2261	3524

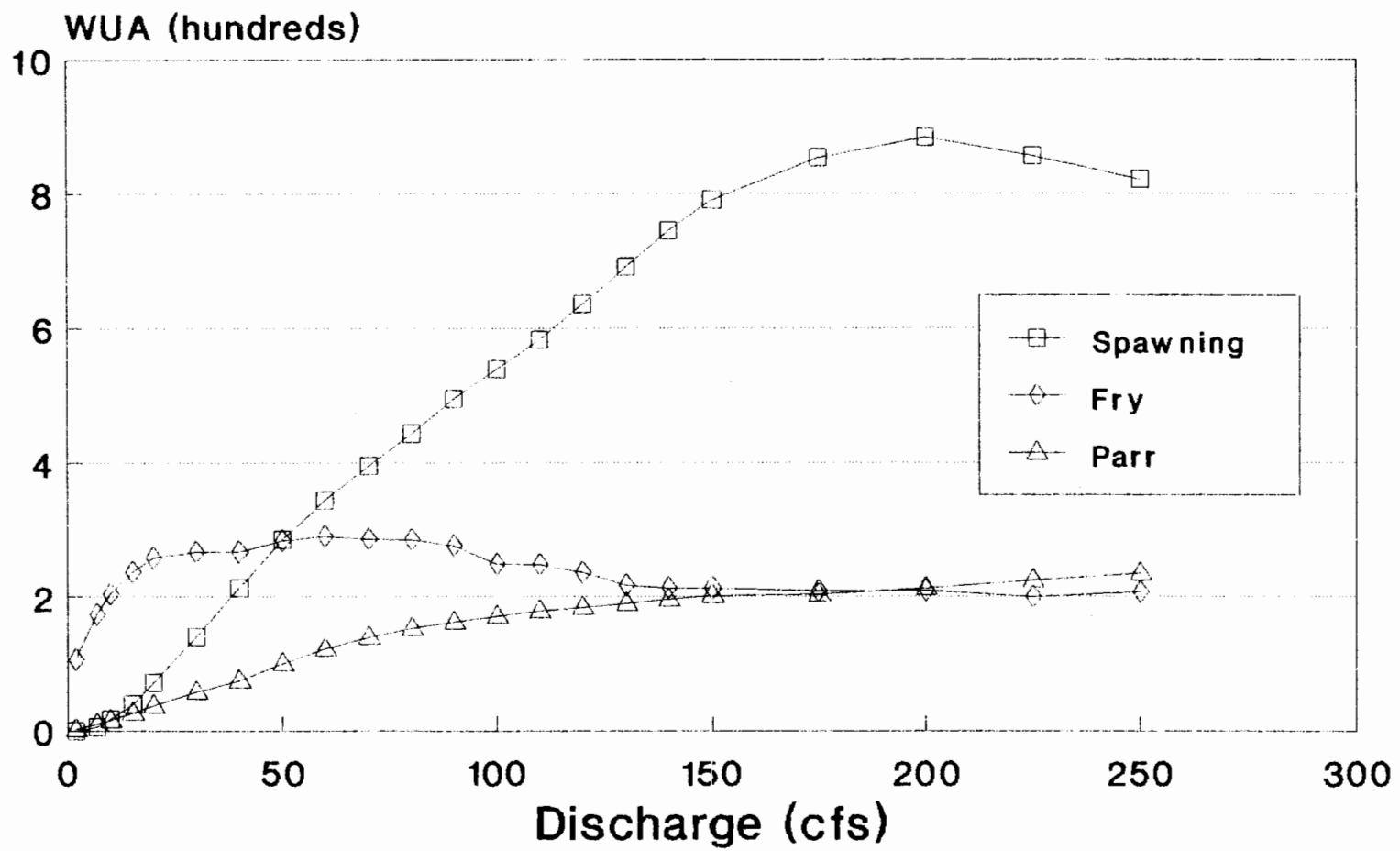
Steelhead Habitat
Middle Christmas Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Middle Christmas Creek Site

Flow	Spawning	Fry	Parr
5	162	8214	642
10	285	8933	1030
15	461	9152	1390
20	867	8763	1707
30	1692	7751	2294
40	2668	6655	2765
50	3875	5213	3203
60	5422	3821	3601
70	7038	3244	3972
80	8219	2912	4234
90	9185	2680	4361
100	9996	2446	4420
110	10707	2278	4411
120	11164	2079	4399
130	11420	1951	4404
140	11458	1888	4433
150	11477	1800	4300
160	11508	1701	4100
170	11485	1521	3948
180	11342	1413	3844
190	11172	1366	3708
200	10946	1357	3566
225	10513	1340	3382
250	9801	1337	3330

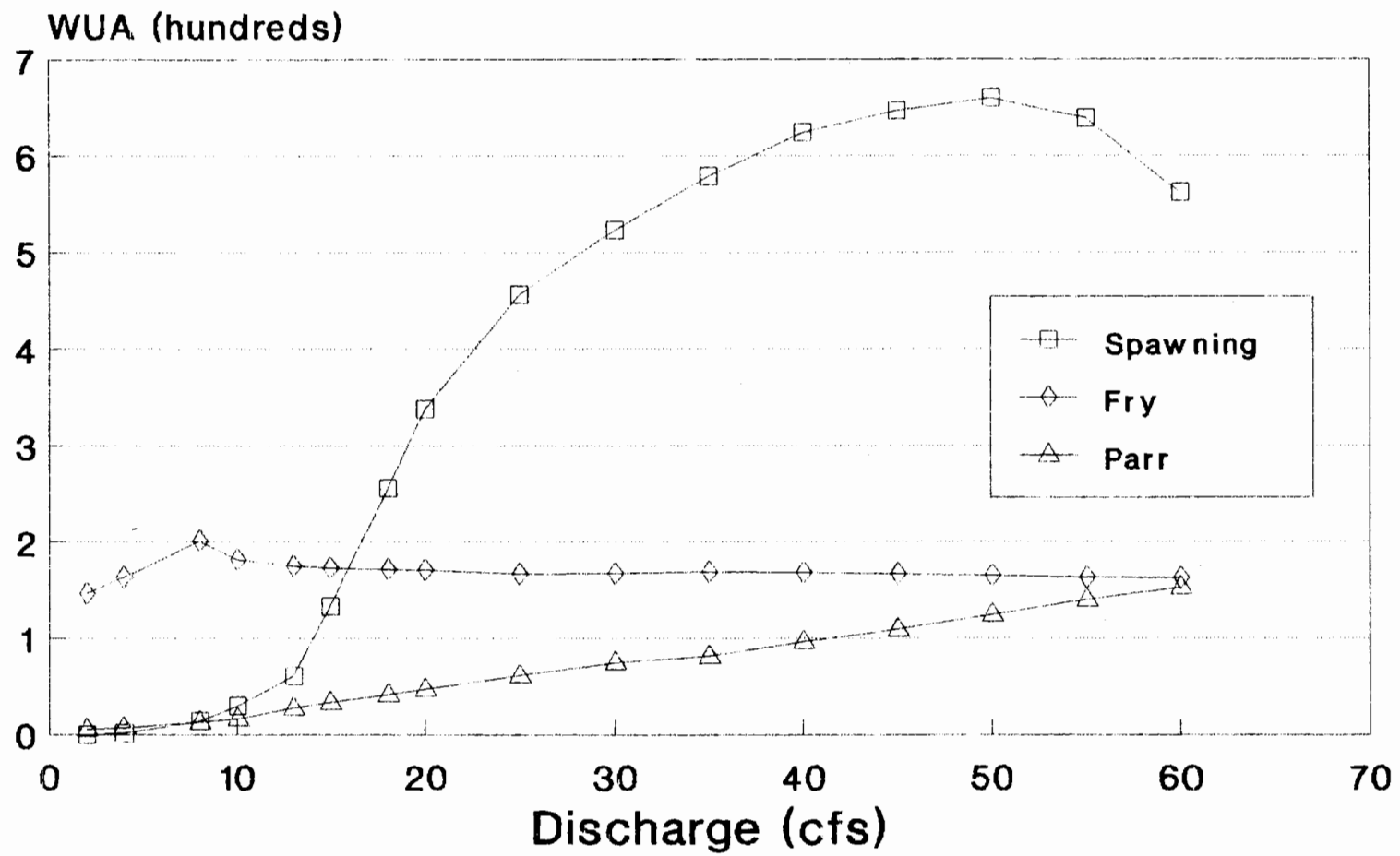
Steelhead Habitat
Upper Christmas Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Upper Christmas Creek Site

Flow	Spawning	Fry	Parr
2	0	1060	16
7	52	1733	100
10	170	2038	157
15	395	2365	263
20	719	2574	377
25	1053	2601	484
30	1404	2668	577
35	1762	2626	678
40	2128	2662	747
50	2844	2834	999
60	3433	2899	1219
70	3951	2855	1393
80	4430	2844	1524
90	4847	2757	1615
100	5387	2484	1708
110	5826	2475	1786
120	6353	2363	1840
130	6913	2170	1894
140	7445	2128	1961
150	7905	2124	2008
175	8533	2080	2034
200	8835	2089	2128
225	8556	1998	2242
250	8209	2066	2346

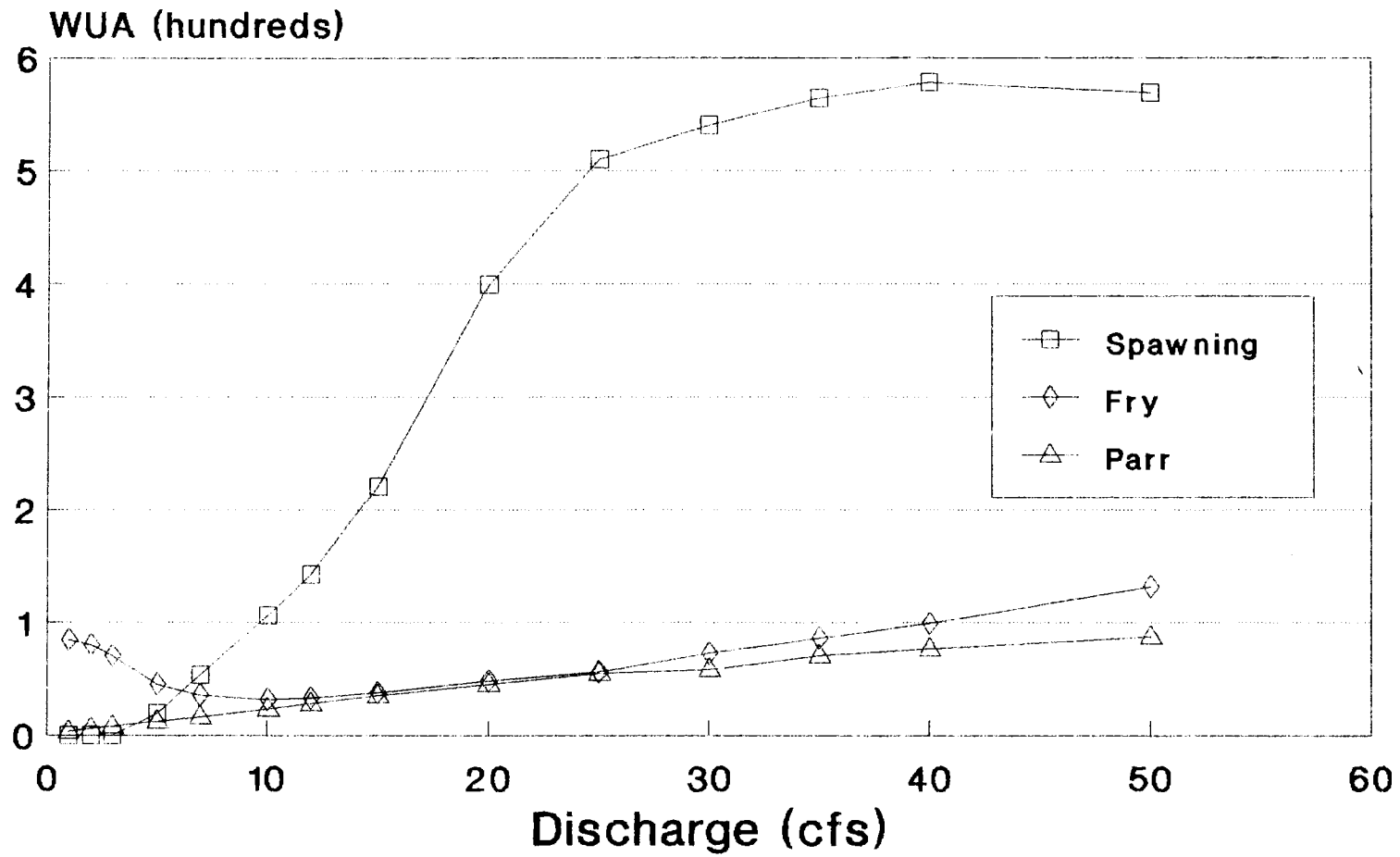
Steelhead Habitat
Petersen Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Peterson Creek Site

Flow	Spawning	Fry	Parr
2	0	1463	52
3	0	1520	62
4	14	1631	72
5	18	1778	84
8	141	2007	132
10	296	1815	166
13	610	1747	279
15	1330	1729	334
18	2558	1713	416
20	3378	1708	471
25	4559	1669	614
30	5229	1672	745
35	5790	1688	858
40	6243	1682	963
45	6463	1668	1093
50	5699	1653	1245
55	6388	1633	1402
60	5620	1625	1532

Steelhead Habitat
Bull Creek Site



STEELHEAD HABITAT
Weighted Useable Area (Square Feet)
Bull Creek Site

Flow	Spawning	Fry	Parr
1	0	846	34
2	0	800	58
3	0	703	80
5	195	450	123
7	536	356	166
10	1064	315	233
12	1424	331	284
15	2206	376	354
17	2926	414	395
20	3993	482	452
22	4587	503	488
25	5102	562	546
27	5249	624	585
30	5402	725	637
32	5491	784	665
35	5641	863	707
40	5779	992	765
50	5689	1318	876