

Lake Creek Instream Flow Study

Appendix E

Spawning and Rearing Habitat Suitability Indices

Chinook Spawning Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.00	0.00	0.00
0.50	0.00	0.50	0.00
1.00	0.10	1.20	1.00
1.30	0.70	3.40	1.00
1.75	1.00	5.00	0.00
3.00	1.00	99.99	0.00
4.00	0.00		
99.99	0.00		

Note: For Chinook spawning substrate preferences use Table Y.

Coho Spawning Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.40	0.00	0.00
0.25	0.40	0.45	0.00
1.05	1.00	1.15	0.75
1.80	0.81	2.05	1.00
2.65	0.29	3.25	0.09
3.90	0.00	4.00	0.01
99.99	0.00	99.99	0.01

Note: For coho spawning substrate preferences use Table Y.

Steelhead Spawning Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.00	0.00	0.00
0.55	0.00	0.65	0.00
2.50	1.00	1.25	1.00
3.25	1.00	1.55	1.00
3.45	0.62	2.40	0.50
5.00	0.00	99.99	0.50
99.99	0.00		

Note: For steelhead spawning substrate preferences use Table Z.

Rainbow Trout Spawning Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.06	0.00	0.00
0.60	0.10	0.25	0.00
1.65	0.91	0.45	0.58
2.10	1.00	0.85	1.00
2.45	1.00	1.15	1.00
3.30	0.00	1.30	0.45
99.99	0.00	1.95	0.40
		2.50	0.40
		99.99	0.40

Cutthroat Trout Spawning Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.00	0.00	0.00
0.15	0.00	0.15	0.04
0.40	0.30	0.35	0.90
0.55	0.90	0.45	1.00
0.95	1.00	0.75	1.00
1.15	1.00	0.95	0.10
1.50	0.80	1.30	0.07
2.00	0.26	5.00	0.00
3.00	0.00	99.99	0.00
99.99	0.00		

Note: For cutthroat trout spawning substrate preferences use Table AA.

Table Y. Chinook and Coho Salmon Spawning Substrate Preferences

Substrate Code	Substrate Preference	Substrate Code	Substrate Preference	Substrate Code	Substrate Preference
11.90	0.00	52.80	0.80	75.90	0.55
31.70	0.00	52.90	0.90	76.50	0.75
31.80	0.24	53.50	0.65	76.90	0.55
31.90	0.27	53.90	0.93	77.90	0.50
32.50	0.00	54.50	1.00	78.50	0.25
32.70	0.00	56.90	1.00	78.90	0.00
32.80	0.24	57.50	0.75	79.50	0.00
32.90	0.27	57.90	0.95	79.90	0.00
33.90	0.30	58.50	0.50	80.50	0.00
34.50	0.65	58.90	0.90	80.90	0.00
34.90	0.37	59.50	0.00	81.50	0.00
35.50	0.65	59.90	0.00	81.90	0.00
35.90	0.37	60.50	0.00	82.50	0.00
36.50	0.65	60.90	0.00	82.90	0.00
36.90	0.37	61.50	0.00	83.50	0.00
37.50	0.40	61.70	0.00	83.90	0.00
37.90	0.32	61.80	0.80	84.50	0.00
38.50	0.15	61.90	0.90	84.90	0.00
38.90	0.27	62.50	0.00	85.50	0.00
39.50	0.00	62.70	0.00	85.90	0.00
39.90	0.00	62.80	0.80	86.50	0.00
40.50	0.00	62.90	0.90	86.90	0.00
40.90	0.00	63.50	0.65	87.50	0.00
41.50	0.00	63.90	0.93	87.90	0.00
41.70	0.00	64.50	1.00	88.50	0.00
41.80	0.80	66.90	1.00	88.90	0.00
41.90	0.90	67.50	0.75	89.50	0.00
42.50	0.00	67.90	0.95	89.90	0.00
42.70	0.00	68.50	0.50	90.50	0.00
42.80	0.80	68.90	0.90	90.90	0.00
42.90	0.90	69.50	0.00	91.50	0.00
43.50	0.65	69.90	0.00	91.90	0.00
43.90	0.93	70.50	0.00	92.50	0.00
44.90	1.00	70.90	0.00	92.90	0.00
46.90	1.00	71.50	0.00	93.50	0.00
47.50	0.75	71.70	0.00	93.90	0.00
47.90	0.95	71.80	0.40	94.50	0.00
48.50	0.50	71.90	0.45	94.90	0.00
48.90	0.90	72.50	0.00	95.50	0.00
49.50	0.00	72.70	0.00	95.90	0.00
49.90	0.00	72.80	0.40	96.50	0.00
51.50	0.00	72.90	0.45	96.90	0.00
51.70	0.00	73.50	0.40	97.50	0.00
51.80	0.80	73.90	0.48	97.90	0.00
51.90	0.90	74.50	0.75	98.50	0.00
52.50	0.00	74.90	0.55	98.90	0.00
52.70	0.00	75.50	0.75	99.50	0.00

Table Z. Steelhead Spawning Substrate Preferences

Substrate Code	Substrate Preference	Substrate Code	Substrate Preference	Substrate Code	Substrate Preference
11.90	0.00	49.90	0.00	71.80	0.24
31.70	0.00	51.50	0.00	71.90	0.27
31.80	0.40	51.70	0.00	72.50	0.00
31.90	0.45	51.80	0.80	72.70	0.00
32.50	0.00	51.90	0.90	72.80	0.24
32.70	0.00	52.50	0.00	72.90	0.27
32.80	0.40	52.70	0.00	73.50	0.40
32.90	0.45	52.80	0.80	73.90	0.32
33.90	0.50	52.90	0.90	74.50	0.65
34.50	0.75	53.50	0.75	74.90	0.37
34.90	0.55	53.90	0.95	75.50	0.65
35.50	0.75	54.50	1.00	75.90	0.37
35.90	0.55	56.90	1.00	76.50	0.65
36.50	0.75	57.50	0.65	76.90	0.37
36.90	0.55	57.90	0.93	77.50	0.30
37.50	0.40	58.50	0.50	77.90	0.30
37.90	0.48	58.90	0.90	78.50	0.00
38.50	0.25	59.50	0.00	78.90	0.00
38.90	0.45	59.90	0.00	79.50	0.00
39.50	0.00	61.50	0.00	79.90	0.00
39.90	0.00	61.70	0.00	81.50	0.00
41.50	0.00	61.80	0.80	82.90	0.00
41.70	0.00	61.90	0.90	83.50	0.00
41.80	0.80	62.50	0.00	83.90	0.00
41.90	0.90	62.70	0.00	84.50	0.00
42.50	0.00	62.80	0.80	86.90	0.00
42.70	0.00	62.90	0.90	87.50	0.00
42.80	0.80	63.50	0.75	87.90	0.00
42.90	0.90	63.90	0.95	88.50	0.00
43.50	0.75	64.50	1.00	92.90	0.00
43.90	0.95	66.90	1.00	93.50	0.00
44.50	1.00	67.50	0.65	93.90	0.00
44.90	1.00	67.90	0.93	94.50	0.00
46.90	1.00	68.50	0.50	96.90	0.00
47.50	0.65	68.90	0.90	97.50	0.00
47.90	0.93	69.50	0.00	97.90	0.00
48.50	0.50	69.90	0.00	98.50	0.00
48.90	0.90	71.50	0.00	99.90	0.00
49.50	0.00	71.70	0.00		

Table AA. Rainbow Trout and Cutthroat Trout Spawning Substrate Preferences

Substrate Code	Substrate Preference	Substrate Code	Substrate Preference	Substrate Code	Substrate Preference
11.90	0.00	42.70	0.00	63.50	0.65
13.90	0.00	42.80	0.80	63.90	0.53
14.50	0.00	42.90	0.90	64.50	0.75
14.90	0.00	43.50	0.90	64.90	0.55
15.50	0.00	43.90	0.98	65.50	0.65
15.90	0.00	44.90	1.00	65.90	0.53
16.50	0.00	45.50	0.90	66.90	0.50
16.90	0.00	45.90	0.98	67.50	0.25
17.50	0.00	46.50	0.75	67.90	0.45
21.50	0.00	46.90	0.95	68.50	0.25
23.90	0.00	47.50	0.50	68.90	0.45
24.50	0.00	47.90	0.90	69.50	0.00
24.90	0.00	48.50	0.50	69.90	0.00
25.50	0.00	48.90	0.90	71.50	0.00
25.90	0.00	49.50	0.00	72.90	0.00
26.50	0.00	49.90	0.00	73.50	0.00
26.90	0.00	51.50	0.00	73.90	0.00
27.50	0.00	51.70	0.00	74.50	0.00
29.90	0.00	51.80	0.64	74.90	0.00
31.50	0.00	51.90	0.72	75.50	0.00
31.70	0.00	52.50	0.00	75.90	0.00
31.80	0.64	52.70	0.00	76.50	0.00
31.90	0.72	52.80	0.64	76.90	0.00
32.50	0.00	52.90	0.72	77.90	0.00
32.70	0.00	53.50	0.80	82.90	0.00
32.80	0.64	53.90	0.80	83.50	0.00
32.90	0.72	54.50	0.90	83.90	0.00
33.90	0.80	54.90	0.82	84.50	0.00
34.50	0.90	55.90	0.80	84.90	0.00
34.90	0.82	56.50	0.65	85.50	0.00
35.50	0.80	56.90	0.77	85.90	0.00
35.90	0.80	57.50	0.40	86.50	0.00
36.50	0.65	57.90	0.72	86.90	0.00
36.90	0.77	58.50	0.40	87.50	0.00
37.50	0.40	58.90	0.72	92.90	0.00
37.90	0.72	59.50	0.00	93.50	0.00
38.50	0.40	59.90	0.00	93.90	0.00
38.90	0.72	61.50	0.00	94.50	0.00
39.50	0.00	61.70	0.00	94.90	0.00
39.90	0.00	61.80	0.40	95.50	0.00
41.50	0.00	61.90	0.45	95.90	0.00
41.70	0.00	62.50	0.00	96.50	0.00
41.80	0.80	62.70	0.00	96.90	0.00
41.90	0.90	62.80	0.40	97.50	0.00
42.50	0.00	62.90	0.45	99.99	0.00

Table BB. Chinook Rearing Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.09	0.00	0.00
0.35	0.26	0.45	0.00
0.45	0.93	1.35	0.50
0.70	1.00	1.55	0.80
1.15	0.90	2.20	1.00
1.25	0.75	99.99	1.00
2.30	0.08		
3.60	0.00		
99.99	0.00		

Note: For Chinook rearing substrate preferences use Table CC.

Table BB. Coho Rearing Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.78	0.00	0.00
0.15	1.00	0.10	0.00
0.30	0.96	0.25	0.25
0.45	0.31	1.55	0.90
0.60	0.20	2.50	1.00
1.20	0.16	3.25	1.00
2.00	0.00	3.90	0.90
99.99	0.00	4.00	0.27
		99.99	0.27

Note: For coho rearing substrate preferences use Table CC.

Table BB. Steelhead Rearing Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.23	0.00	0.00
0.25	0.30	0.25	0.00
0.90	0.80	1.80	0.39
1.35	1.00	2.65	1.00
1.55	1.00	2.95	1.00
2.60	0.80	4.50	0.64
2.95	0.39	99.99	0.64
3.65	0.22		
5.50	0.16		
6.00	0.00		
99.99	0.00		

Note: For steelhead rearing substrate preferences use Table CC.

Table BB. Rainbow Trout Rearing Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.25	0.00	0.00
0.85	1.00	0.55	0.00
1.75	0.45	1.55	0.45
2.65	0.40	2.25	0.50
3.70	0.10	2.60	0.65
5.25	0.00	2.75	1.00
99.99	0.00	3.40	1.00
		4.75	0.66
		99.99	0.66

Note: For rainbow trout rearing substrate preferences use Table CC.

Table BB. Rainbow Trout Winter Rearing Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	1.00	0.00	0.00
0.50	1.00	0.20	0.00
1.00	0.20	0.30	0.20
2.00	0.00	0.50	1.00
99.99	0.00	1.50	1.00
		3.00	0.25
		3.50	0.10
		6.00	0.10
		99.99	0.10

Note: For rainbow trout winter rearing substrate preferences use Table CC.

Table BB. Cutthroat Trout Rearing Depth and Velocity Preferences

Plotted Velocity	Velocity Preference	Plotted Depth	Depth Preference
0.00	0.13	0.00	0.00
0.15	0.20	0.65	0.00
0.35	0.80	1.80	0.50
0.65	1.00	1.95	0.90
0.75	1.00	2.05	1.00
1.05	0.82	2.25	1.00
1.35	0.50	2.65	0.80
1.85	0.50	2.80	0.60
2.70	0.15	99.99	0.60
3.25	0.15		
4.00	0.00		
99.99	0.00		

Note: For cutthroat trout rearing substrate preferences use Table CC.

Table CC. Chinook, coho, steelhead, rainbow, and cutthroat trout rearing substrate preferences.

Substrate Code	Substrate Preference	Substrate Code	Substrate Preference	Substrate Code	Substrate Preference
0.10	1.00	38.90	1.00	68.50	1.00
0.20	1.00	39.50	0.20	68.90	1.00
0.30	1.00	39.90	0.12	69.50	0.40
0.40	1.00	41.50	0.20	69.90	0.48
0.50	0.80	41.90	0.28	71.50	0.40
0.60	0.80	42.50	0.20	71.90	0.64
0.70	0.10	42.90	0.28	72.50	0.40
0.80	0.70	43.50	0.20	72.90	0.64
0.90	0.20	43.90	0.28	73.50	0.40
11.90	0.10	44.90	0.30	73.90	0.64
13.90	0.10	45.90	0.30	74.50	0.50
14.50	0.20	46.50	0.40	74.90	0.66
14.90	0.12	46.90	0.32	75.50	0.50
15.50	0.20	47.50	0.50	75.90	0.66
15.90	0.12	47.90	0.34	76.50	0.60
16.50	0.30	48.50	1.00	76.90	0.68
16.90	0.14	48.90	1.00	77.90	0.70
17.50	0.40	49.50	0.30	78.50	1.00
17.90	0.16	49.90	0.30	78.90	1.00
18.50	1.00	51.50	0.20	79.50	0.50
18.90	1.00	51.90	0.28	79.90	0.66
19.50	0.20	52.50	0.20	81.50	1.00
19.90	0.12	52.90	0.28	83.90	1.00
21.50	0.10	53.50	0.20	84.50	1.00
23.90	0.10	53.90	0.28	85.90	1.00
24.50	0.20	54.50	0.30	86.50	1.00
24.90	0.12	55.90	0.30	86.90	1.00
25.50	0.20	56.50	0.40	87.50	1.00
25.90	0.12	56.90	0.32	87.90	1.00
26.50	0.30	57.50	0.50	88.90	1.00
26.90	0.14	57.90	0.34	89.50	1.00
27.50	0.40	58.50	1.00	89.90	1.00
27.90	0.16	58.90	1.00	91.50	0.20
28.50	1.00	59.50	0.30	91.90	0.28
28.90	1.00	59.90	0.30	92.50	0.20
29.50	0.20	61.50	0.30	92.90	0.28
29.90	0.12	61.90	0.46	93.50	0.20
31.50	0.10	62.50	0.30	93.90	0.28
33.90	0.10	62.90	0.46	94.50	0.30
34.50	0.20	63.50	0.30	95.90	0.30
34.90	0.12	63.90	0.46	96.50	0.40
35.50	0.20	64.50	0.40	96.90	0.32
35.90	0.12	64.90	0.48	97.50	0.50
36.50	0.30	65.50	0.40	97.90	0.34
36.90	0.14	65.90	0.48	98.50	1.00
37.50	0.40	66.90	0.50	98.90	1.00
37.90	0.16	67.50	0.60	99.99	0.30
38.50	1.00	67.90	0.52		