

TABLES

Minimum Instream Flows (MISFs) at Control Points in the Little Spokane River Basin (cfs).

Month	Day	Elk	Chattaroy	Dartford	Confluence
January	1	40	86	150	400
	15	40	86	150	400
February	1	40	86	150	400
	15	43	104	170	420
March	1	46	122	190	435
	15	50	143	218	460
April	1	54	165	250	490
	15	52	143	218	460
May	1	49	124	192	440
	15	47	104	170	420
June	1	45	83	148	395
	15	43	69	130	385
July	1	41.5	57	115	375
	15	39.5	57	115	375
August	1	38	57	115	375
	15	38	57	115	375
September	1	38	57	115	375
	15	38	63	123	380
October	1	38	70	130	385
	15	39	77	140	390
November	1	40	86	150	400
	15	40	86	150	400
December	1	40	86	150	400
	15	40	86	150	400

Minimum Instream Flow Excursion Summary for WRIA 55

	Elk		Chattaroy		At Dartford	
	7/1949 - 10/1971	June - October Only	10/1975 - 09/1996	June - October Only	5/1929 - 9/1932, 1/1947 - 9/1999	June - October Only
Period Of Record						
Days in Record	8415	3633	7671	3213	20515	8659
Days of Instream Flow Violations	813	416	2521	1352	3135	1909
Number of Continuous Excursions of Instream Flow Levels	71	22	162	62	205	94
Percent of Record below Instream Flow Levels	10%	11%	33%	42%	15%	22%
Max Continuous Days below Instream Flow Levels	153	92	262	153	245	181
Average Continuous Days below Instream Flow Levels	12	19	16	22	15	20

TABLE 2-1**Comparison of PRISM and Little Spokane River Basin Climate Station Data**

(Golder Associates, 2001)

Station	Station Elevation (ft amsl)	Avg. Annual Station Precipitation (inches)	Avg. Annual PRISM Precipitation Range (inches)
Spokane International Airport	2,355	16.25	15 – 20
Deer Park 2 E	2,201	21.8	20 – 25
Newport	2,134	26.5	25 – 30
Mt. Spokane Summit	5,280	41.4	>35

TABLE 2-2**USGS Land Use / Land Cover Summary for Little Spokane River Basin**

(Golder Associates, 2001).

Land Use/Land Cover	Acres	% WRIA 55
Urban or Built Up Land	19,181	4.4
Agricultural Land	110,293	25.5
Rangeland	6,391	1.5
Forest Land	292,051	67.5
Water	2,498	0.6
Wetland	1,023	0.2
Barren Land	903	0.2

TABLE 2-3**Little Spokane River Basin Population**

(Golder Associates, 2001)

County	Population		% Change
	1990	2000	
Spokane	361,364	417,939	16
Stevens	30,948	40,066	29
Pend Oreille	8,915	11,732	32

TABLE 2-4

UPDATED LIST OF FISH SPECIES REPORTED TO OCCUR WITHIN THE LITTLE SPOKANE RIVER SYSTEM

(from McLellan and O'Connor, 2003)

Common Name	Species Name	Location	Source
Salmonidae			
Brown Trout <i>Introduced Species</i>	<i>Salmo trutta</i>	Dry Creek	McLellan (2003)
		Eloika Lake	Divens and others (2001)
		Little Spokane River	Hartung and Meier (1980); EWU, unpubl. data (2001)
		Otter Creek	McLellan (2003)
		Sacheen Lake	WDFW, unpubl. data (2000)
		W. Branch Little Spokane River	EWU, unpubl. data 1999; McLellan (2003)
		Wethey Creek	WDFW, unpubl. data (2002)
		Bear Creek	McLellan (2003)
		Beaver Creek ¹	McLellan (2003)
		Buck Creek	EWU, unpubl. data 2000; McLellan (2003)
Eastern Brook Trout <i>Introduced Species</i>	<i>Salvelinus fontinalis</i>	Deer Creek	WDFW, unpubl. data 1978; EWU, unpubl. data (1999); McLellan (2003)
		Dragoon Creek	EWU, unpubl. data (2001)
		Dry Creek	McLellan (2003)
		Heel Creek	McLellan (2003)
		Little Deer Creek	EWU, unpubl. data (1999)
		Little Spokane River	EWU, unpubl. data (1999)
		Mud Creek	Lines (1982)
		Otter Creek	WDFW, unpubl. data 1974; McLellan (2003)
		Sacheen Lake	Divens and others (2002b)
		S. Fork Deadman Creek	EWU, unpubl. data (1999)
Lake Trout <i>Introduced Species</i>	<i>Salvelinus namaycush</i>	Spring Heel Creek	McLellan (2003)
		Trout Lake	WDFW, unpubl. data (1993)
		Wethey Creek	WDFW, unpubl. data (2002)
		Horseshoe Lake	WDFW, unpubl. data (1993, 1995 and 1997)

TABLE 2-4

UPDATED LIST OF FISH SPECIES REPORTED TO OCCUR WITHIN THE LITTLE SPOKANE RIVER SYSTEM

(from McLellan and O'Connor, 2003)

Kokanee <i>Native Species</i>	<i>Oncorhynchus nerka</i>	Buck Creek	EWU, unpubl. data (2000)
		Chain Lake	WDFW, unpubl. data 1993; Polacek and Baldwin (1999)
		Horseshoe Lake	WDFW, unpubl. data (1993, 1995 and 1997)
		Little Spokane River	EWU, unpubl. data (2000)
		Bear Creek	McLellan (2003)
		Beaver Creek ¹	McLellan (2003)
		Buck Creek	EWU, unpubl. data 2000; McLellan (2003)
		Chain Lake	Polacek and Baldwin (1999)
		Dartford Creek	WDFW, unpubl. data (1986 and 1992)
		Deadman Creek	EWU, unpubl. data (1999)
Rainbow Trout <i>Introduced/ Native Species</i>	<i>Oncorhynchus mykiss</i>	Deer Creek	EWU, unpubl. data 1999; McLellan (2003)
		Diamond Lake	Phillips and Divens (2000)
		Dragoon Creek	EWU, unpubl. data (2001)
		Dry Creek	McLellan (2003)
		Eloika Lake	Divens and others (2001)
		Fan Lake	Divens and others (2002a)
		Horseshoe Lake	WDFW, unpubl. Data (1993)
		Little Deep Creek	EWU, unpubl. data (1999)
		Little Deer Creek	EWU, unpubl. data (1999)
		Little Spokane River	Hartung and Meier (1980 and 1995); Peden (1987); Pfeiffer (1988); EWU, unpubl. data 1999, 2001
WB Little Spokane River Wethey Creek		Otter Creek	WDFW, unpubl. data 1974; McLellan (2003)
		Trout Lake	WDFW, unpubl. data (1993)
		WB Little Spokane River	McLellan (2003)
		Wethey Creek	WDFW, unpubl. data (2002)

TABLE 2-4

UPDATED LIST OF FISH SPECIES REPORTED TO OCCUR WITHIN THE LITTLE SPOKANE RIVER SYSTEM

(from McLellan and O'Connor, 2003)

Page 3 of 7

Mountain Whitefish <i>Native Species</i>	Bear Creek	McLellan (2003)
	Chain Lake	WDFW, unpubl. data 1993; Polacek and Baldwin (1999)
	Dry Creek	McLellan (2003)
	Horseshoe Lake	WDFW, unpubl. data 1993
	Little Spokane River	Hartung and Meier (1980 and 1995); Pfeiffer (1988); EWU, unpubl. data (2001)
	Otter Creek	McLellan (2003)
	WB Little Spokane River	McLellan (2003)
Pygmy Whitefish <i>Native Species</i>	Wethey Creek	WDFW, unpubl. data (2002)
	Horseshoe Lake	Mongillo and Hallock (1995); Hallock and Mongillo (1998)
	Little Spokane River	Hartung and Meier (1980)
Esocidae		
Grass Pickerel <i>Introduced Species</i>	Buck Creek	EWU, unpubl. data (2000)
	Eloika Lake	Zook (1978); Divens and others (2001)
	Fan Lake	Divens and others (2002a)
	Little Spokane River	Hartung and Meier (1980 and 1995)
	WB Little Spokane River	McLellan (2003)
Cyprinidae		
Carp <i>Introduced Species</i>	Little Spokane River	Hartung and Meier (1980)
	Chain Lake	WDFW, unpubl. data (1993); Polacek and Baldwin (1999)
Chiselmouth <i>Native Species</i>	Little Spokane River	Hartung and Meier (1980 and 1995); Peden (1987); Pfeiffer (1988); EWU, unpubl. data (1999 and 2001)
	Bear Creek	McLellan (2003)
Longnose Dace <i>Native Species</i>	Deadman Creek	EWU, unpubl. data (1999)
	Deer Creek	McLellan (2003)
	Dry Creek	McLellan (2003)
	Little Deep Creek	EWU, unpubl. data (1999)
	Little Spokane River	Hartung and Meier (1980, 1995); Peden (1987); EWU, unpubl. data (2001)
	WB Little Spokane River	McLellan (2003)

TABLE 2-4

UPDATED LIST OF FISH SPECIES REPORTED TO OCCUR WITHIN THE LITTLE SPOKANE RIVER SYSTEM

(from McLellan and O'Connor, 2003)

Page 4 of 7

Northern Pikeminnow <i>Native Species</i>	<i>Pychocheilus oregonensis</i>	Chain Lake	WDFW, unpubl. data 1993; Polacek and Baldwin (1999)
		Dragoon Creek	Lines (1982); EWU, unpubl. data (2001)
		Dry Creek	McLellan (2003)
Redside Shiner <i>Native Species</i>	<i>Richardsonius balteatus</i>	Little Spokane River	Hartung and Meier (1980, 1995); Pfeiffer (1988); EWU, unpubl. data (1999 and 2001)
		Chain Lake	Polacek and Baldwin (1999)
		Deadman Creek	EWU, unpubl. data (1999)
		Dragoon Creek	Lines (1982)
		Little Deep Creek	EWU, unpubl. data 1999
Speckled Dace <i>Native Species</i>	<i>Rhinichthys osculus</i>	Little Spokane River	Hartung and Meier (1980; 1995); Peden (1987); Pfeiffer (1988); EWU, unpubl. data (1999 and 2001)
		Bear Creek	McLellan (2003)
		Deadman Creek	EWU, unpubl. data (1999)
		Dragoon Creek	EWU, unpubl. data (2001)
		Little Deep Creek	EWU, unpubl. data (1999)
Tench <i>Introduced Species</i>	<i>Tinca tinca</i>	Little Spokane River	EWU, unpubl. data (1999)
		Otter Creek	McLellan (2003)
		Chain Lake	WDFW, unpubl. data (1993); Polacek and Baldwin (1999)
		Eloika Lake	Zook (1978); Divens and others (2001)
		Fan Lake	Divens and others (2002a)
		Little Spokane River	Hartung and Meier (1980)
		Sacheen Lake	Divens and others (2002b)
		Trout Lake	WDFW, unpubl. data (1993)
		W. Branch Little Spokane River	EWU, unpubl. data 1999; McLellan (2003)
		Catostomidae	
Bridgelip Sucker <i>Native Species</i>	<i>Catostomus columbianus</i>	Bear Creek	McLellan (2003)
		Deadman Creek	EWU, unpubl. data (1999)
		Dragoon Creek	EWU, unpubl. data (2001)
		Little Deep Creek	EWU, unpubl. data (1999)
		Little Spokane River	Hartung and Meier (1980 and 1995); EWU, unpubl. data (2001)

TABLE 2-4

UPDATED LIST OF FISH SPECIES REPORTED TO OCCUR WITHIN THE LITTLE SPOKANE RIVER SYSTEM

(from McLellan and O'Connor, 2003)

Largescale Sucker <i>Native Species</i>	<i>Catostomus macrocheilus</i>	Chain Lake	WDFW, unpubl. data 1993; Polacek and Baldwin (1999)
		Little Spokane River	Hartung and Meier (1980 and 1995); Peden (1987); Pfeiffer (1988); EWU, unpubl. data (2001)
Longnose Sucker <i>Native Species</i>	<i>Catostomus catostomus</i>	Horseshoe Lake	WDFW, unpubl. data (1993)
		Little Spokane River	Hartung and Meier (1980)
		Little Spokane River	Pfeiffer (1988)
		Trout Lake	WDFW, unpubl. data (1993)
Centrarchidae			
Black Crappie <i>Introduced Species</i>	<i>Pomoxis nigromaculatus</i>	Chain Lakes	WDFW, unpubl. data (1993)
		Diamond Lake	Phillips and Divens (2000)
		Eloika Lake	Zook (1978); Divens and others (2001)
		Fan Lake	Divens and others (2002a)
		Little Spokane River	Hartung and Meier (1980)
Bluegill <i>Introduced Species</i>	<i>Lepomis macrochirus</i>	Sacheen Lake	Divens and others (2002b)
		Horseshoe Lake	WDFW, unpubl. data (1995)
		Little Spokane River	Hartung and Meier (1980)
		W. Branch Little Spokane River	EWU, unpubl. data 1999; McLellan (2003)
		Bear Creek	McLellan (2003)
Green Sunfish <i>Introduced Species</i>	<i>Lepomis cyanellus</i>	Diamond Lake	Phillips and Divens (2000)
		Eloika Lake	Zook (1978); Divens and others (2001)
		Fan Lake	Divens and others (2002a)
		Horseshoe Lake	WDFW, unpubl. data (1995)
		Sacheen Lake	Divens and others (2002b)
		Trout Lake	WDFW, unpubl. data (1993)

TABLE 2-4

UPDATED LIST OF FISH SPECIES REPORTED TO OCCUR WITHIN THE LITTLE SPOKANE RIVER SYSTEM

(from McLellan and O'Connor, 2003)

Largemouth Bass <i>Introduced Species</i>	<i>Micropterus salmoides</i>	Diamond Lake	Phillips and Divens (2000)
		Dry Creek	McLellan (2003)
		Eloika Lake	Zook (1978); Divens and others (2001)
		Fan Lake	Divens and others (2002a)
		Little Spokane River	Hartung and Meier (1980); Pfeiffer (1988)
		Sacheen Lake	Divens and others (2002b)
		Spring Heel Creek	McLellan (2003)
		Trout Lake	WDFW, unpubl. data (1993)
		W. Branch Little Spokane River	EWU, unpubl. data 1999; McLellan (2003)
		Pumpkinseed <i>Introduced Species</i>	<i>Lepomis gibbosus</i>
Eloika Lake	Zook (1978); Divens and others (2001)		
Fan Lake	Divens and others (2002a)		
Horseshoe Lake	WDFW, unpubl. data (1993)		
Little Spokane River	Hartung and Meier (1980 and 1995)		
Sacheen Lake	Divens and others (2002b)		
W. Branch Little Spokane River	EWU, unpubl. data 1999; McLellan (2003)		
Smallmouth Bass <i>Introduced Species</i>	<i>Micropterus dolomieu</i>	Eloika Lake	Zook (1978)
		Percidae	
Yellow Perch <i>Introduced Species</i>	<i>Perca flavescens</i>	Chain Lake	WDFW, unpubl. data 1993; Polacek and Baldwin (1999)
		Diamond Lake	Phillips and Divens (2000)
		Eloika Lake	Zook (1978); Divens and others (2001)
		Fan Lake	Divens and others (2002a)
		Horseshoe Lake	WDFW, unpubl. data (1993 and 1995)
		Little Spokane River	Hartung and Meier (1980)
		Sacheen Lake	Divens and others (2001)
		Trout Lake	WDFW, unpubl. data 1993
		W. Branch Little Spokane River	EWU, unpubl. data 1999; McLellan (2003)
		Ameiurus	
Black Bullhead <i>Introduced Species</i>	<i>Ameiurus melas</i>	Eloika Lake	Divens and others (2001)

TABLE 2-4

UPDATED LIST OF FISH SPECIES REPORTED TO OCCUR WITHIN THE LITTLE SPOKANE RIVER SYSTEM

(from McLellan and O'Connor, 2003)

Page 7 of 7

Brown Bullhead <i>Introduced Species</i>	<i>Ameiurus nebulosus</i>	Diamond Lake	Phillips and Divens (2000)
		Eloika Lake	Divens and others (2001)
		Little Spokane River	Hartung and Meier (1980); EWU, unpubl. data (1999)
		Sacheen Lake	Divens and others (2002b)
		Trout Lake	WDFW, unpubl. data (1993)
		Eloika Lake	Zook (1978); Divens and others (2001)
Yellow Bullhead <i>Introduced Species</i>	<i>Ameiurus natalis</i>	Fan Lake	Divens and others (2002a)
		Horseshoe Lake	WDFW, unpubl. data (1995)
		Spring Heel Creek	McLellan (2003)
		W. Branch Little Spokane River	EWU, unpubl. data 1999; McLellan (2003)
		Cottidae	
Sculpin spp. <i>Native Species</i>	<i>Cottus</i> spp.	Buck Creek	EWU, unpubl. data (2000)
		Dragoon Creek	Lines (1982); EWU, unpubl. data (2001)
		Little Spokane River	EWU, unpubl. data (1999)
		Wethey Creek	WDFW, unpubl. data (2002)
		Deer Creek	McLellan (2003)
Mottled Sculpin <i>Native Species</i>	<i>Cottus bairdi</i>	Dry Creek	McLellan (2003)
		Little Spokane River	Hartung and Meier (1980, 1995); Peden (1987)
		Otter Creek	McLellan (2003)
		WB Little Spokane River	McLellan (2003)
Slimy Sculpin <i>Native Species</i>	<i>Cottus cognatus</i>	Bear Creek	McLellan (2003)
		Buck Creek	McLellan (2003)
Torrent Sculpin <i>Native Species</i>	<i>Cottus rotheus</i>	Dry Creek	McLellan (2003)

¹Beaver Creek; tributary to the West Branch Little Spokane River

TABLE 3-1

Summary of Little Spokane River Flows

Site Visit	Date	Time	Flow at Darford (cfs)	LSR-1 Pine River Park (cfs)	LSR-2 Elk Park (cfs)	LSR-3 Chatteroy (cfs)	LSR-4 Otter Creek (cfs)	LSR-5 Dragon Creek (cfs)	LSR-6 Deadman Creek (cfs)
1	9/24/2002	8:00	119			68.7			
		16:00	119	32.3					
		17:00	119						
2	10/24/2002	7:00	119 ¹				3.7		
		11:00	117						5.5
		12:00	117	106.1					
3	10/25/2002	13:00	132			75.9			
		10:00	132		40.0				
		12:00	132						8.2
		13:00	130	119.5					
		13:00	123 ²				3.0		
		15:00	126					27.8	
4	12/16/2002	11:00	305			152.4			
		13:00	305					73.5	
		15:00	318		48.9				
		16:00	318				7.0		
		9:00	400	340.6					34.2
5	1/8/2003	11:00	400						
		13:00	329					54.6	
		15:00	325		51.5				
		16:00	322				3.7		
		10:00	308			188.9			
6	1/9/2003	11:00	308	300.9					
		13:00	308						24.4
		10:00	525						
		12:00	525						123.2
		14:00	525 ³	549.4					
		16:00	520						49.8
7	2/7/2003	10:00	496		58.0				
		11:00	496				5.3		
		10:00	823 ⁴			509.2			
		13:00	828	868.1					
8	3/26/2003	15:00	828						
		16:00	828					172.3	
		10:00	894		69.3				
9	3/27/2003	12:00	894				10.1		

1) Flows at Darford ranged between 117-119 cfs during gaging
 2) Flows at Darford ranged between 123-125 cfs during gaging period
 3) Flows at Darford ranged between 520-525 cfs during gaging period
 4) Flows at Darford ranged between 823-828 cfs during gaging period

TABLE 5-1**Wetted Perimeter Flow Recommendations at Little Spokane River Basin Study Sites**

Study Site	Wetted Perimeter Flow Recommendation (cfs)
Little Spokane River at Pine River Park	160
Little Spokane River at Chattaroy	50
Little Spokane River at Elk	32
Dragoon Creek	40 / 9*
Deadman Creek	13 / 6*
Otter Creek	13

* Multiple inflection points result in alternative interpretations of minimum instream flow recommendation based on the Wetted Perimeter Method.

TABLE 5-2**Stage-Discharge Modeling Results for the Little Spokane River at Pine River Park**

Measured Discharge (cfs)	Modeled Flow Range (cfs)	Measured WSL (ft)	Predicted WSL (ft)	Difference (ft)
106.1	50 - 240	96.34	96.33	-0.01
119.5		96.43	96.43	0.00
300.9	160 - 600	97.20	97.20	0.00
549.4		97.99	98.04	+0.05
868.1	400 - 875	98.93	98.89	-0.04

TABLE 5-3**Stage-Discharge Modeling Results for the Little Spokane River at Chattaroy**

Measured Discharge (cfs)	Modeled Flow Range (cfs)	Measured WSL (ft)	Predicted WSL (ft)	Difference (ft)
68.7	30 – 120	88.70	88.70	0.00
188.9	100 - 250	89.46	89.40	-0.06
312.0	200 – 350	89.81	89.81	0.00
509.2	300 – 525	90.76	90.76	0.00

TABLE 5-4**Stage-Discharge Modeling Results for the Little Spokane River at Elk**

Measured Discharge (cfs)	Modeled Flow Range (cfs)	Measured WSL (ft)	Predicted WSL (ft)	Difference (ft)
32.3	22 – 46	93.23	93.23	0.00
40.0		93.35	93.32	-0.03
51.5		93.41	93.44	+0.03
58.0	30 – 90	93.46	93.49	+0.03
69.2		93.60	93.58	-0.02

TABLE 5-5**Stage-Discharge Modeling Results for Dragoon Creek**

Measured Discharge (cfs)	Modeled Flow Range (cfs)	Measured WSL (ft)	Predicted WSL (ft)	Difference (ft)
17.2	10 – 35	94.71	94.72	+0.01
54.6	26 – 95	95.19	95.19	0.00
73.5		95.39	95.34	-0.05
172.2	85 – 175	95.78	95.83	+0.05

TABLE 5-6**Stage-Discharge Modeling Results for Deadman Creek**

Measured Discharge (cfs)	Modeled Flow Range (cfs)	Measured WSL (ft)	Predicted WSL (ft)	Difference (ft)
5.5	3 – 8	95.70	88.70	0.00
8.2	5 – 15	95.81	95.80	-0.01
24.4	12 – 60	96.12	96.14	+0.02
98.6	50 – 125	96.70	96.69	-0.01
152.0	100 – 200	97.08	97.03	-0.05

TABLE 5-7**Stage-Discharge Modeling Results for Otter Creek**

Measured Discharge (cfs)	Modeled Flow Range (cfs)	Measured WSL (ft)	Predicted WSL (ft)	Difference (ft)
3.0		95.16	95.15	-0.01
3.7	2 – 9	95.24	95.25	+0.01
5.3		95.46	95.45	-0.01
13.7	7 – 25	96.10	96.10	0.00

TABLE 6-2**Juvenile and Adult Rainbow Trout Flow and Optimum Habitat Values for the Little Spokane River at Pine River Park**

Date	Discharges (cfs)					Rainbow Trout Juvenile/Adult Habitat Relative to Optimum Habitat				
	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Oct 1	130	170	150	109	160	0.89	0.99	0.95	0.79	0.97
Oct 15	140	193	154	103	160	0.92	1.00	0.96	0.76	0.97
Nov 1	150	214	160	113	160	0.95	0.99	0.97	0.81	0.97
Nov 15	150	233	180	123	160	0.95	0.98	0.99	0.86	0.97
Dec 1	150	287	187	123	160	0.95	0.90	1.00	0.86	0.97
Dec 15	150	324	209	132	160	0.95	0.83	0.99	0.90	0.97
Jan 1	150	336	214	130	160	0.95	0.81	0.99	0.89	0.97
Jan 15	150	437	227	150	160	0.95	0.72	0.98	0.95	0.97
Feb 1	150	514	234	162	160	0.95	0.59	0.98	0.98	0.97
Feb 15	170	750	277	176	160	0.99	0.41	0.92	0.99	0.97
Mar 1	190	839	409	200	160	1.00	0.39	0.74	1.00	0.97
Mar 15	218	898	470	222	160	0.99	0.40	0.67	0.99	0.97
Apr 1	250	1175	563	248	160	0.98	0.40	0.55	0.98	0.97
Apr 15	218	1107	582	230	160	0.99	0.40	0.55	0.98	0.97
May 1	192	1017	523	220	160	1.00	0.40	0.58	0.99	0.97
May 15	170	628	435	194	160	0.99	0.52	0.72	1.00	0.97
Jun 1	148	566	325	152	160	0.95	0.55	0.82	0.96	0.97
Jun 15	130	462	263	141	160	0.89	0.69	0.95	0.93	0.97
Jul 1	115	305	211	120	160	0.82	0.87	0.99	0.85	0.97
Jul 15	115	241	166	105	160	0.82	0.98	0.98	0.77	0.97
Aug 1	115	192	148	99	160	0.82	1.00	0.94	0.74	0.97
Aug 15	115	175	134	94	160	0.82	0.99	0.91	0.69	0.97
Sep 1	115	176	132	99	160	0.82	0.99	0.90	0.74	0.97
Sep 15	123	174	135	102	160	0.86	0.99	0.91	0.75	0.97
Average Habitat						0.93	0.74	0.87	0.88	0.97

*MISF = regulatory minimum instream flow per WAC 173-555.

TABLE 6-3**Spawning Rainbow Trout Flow and Optimum Habitat Values for the Little Spokane River
at Pine River Park**

		Discharges (cfs)				Rainbow Trout Spawning Habitat Relative to Optimum Habitat				
Date	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Mar 1	190	839	409	200	160	0.36	0.05	0.09	0.34	0.43
Mar 15	218	898	470	222	160	0.30	0.05	0.06	0.29	0.43
Apr 1	250	1175	563	248	160	0.26	0.05	0.06	0.26	0.43
Apr 15	218	1107	582	230	160	0.30	0.05	0.06	0.28	0.43
Average Habitat						0.31	0.05	0.07	0.29	0.43

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-4**Adult Mountain Whitefish Flow and Optimum Habitat Values for the Little Spokane River at Pine River Park**

Date	Discharges (cfs)					Mountain Whitefish Adult Habitat Relative to Optimum Habitat				
	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Oct 1	130	170	150	109	160	0.67	0.84	0.75	0.57	0.80
Oct 15	140	193	154	103	160	0.71	0.93	0.77	0.54	0.80
Nov 1	150	214	160	113	160	0.75	0.98	0.79	0.59	0.80
Nov 15	150	233	180	123	160	0.75	1.00	0.88	0.64	0.80
Dec 1	150	287	187	123	160	N/A	N/A	N/A	N/A	N/A
Dec 15	150	324	209	132	160	N/A	N/A	N/A	N/A	N/A
Jan 1	150	336	214	130	160	N/A	N/A	N/A	N/A	N/A
Jan 15	150	437	227	150	160	N/A	N/A	N/A	N/A	N/A
Feb 1	150	514	234	162	160	0.75	0.56	1.00	0.81	0.80
Feb 15	170	750	277	176	160	0.84	0.37	0.98	0.87	0.80
Mar 1	190	839	409	200	160	0.92	0.33	0.74	0.95	0.80
Mar 15	218	898	470	222	160	0.98	0.31	0.62	0.99	0.80
Apr 1	250	1175	563	248	160	1.00	0.31	0.51	1.00	0.80
Apr 15	218	1107	582	230	160	0.98	0.31	0.49	0.99	0.80
May 1	192	1017	523	220	160	0.93	0.31	0.55	0.99	0.80
May 15	170	628	435	194	160	0.84	0.45	0.69	0.93	0.80
Jun 1	148	566	325	152	160	0.74	0.50	0.91	0.76	0.80
Jun 15	130	462	263	141	160	0.67	0.64	0.99	0.71	0.80
Jul 1	115	305	211	120	160	0.60	0.94	0.97	0.62	0.80
Jul 15	115	241	166	105	160	0.60	1.00	0.83	0.55	0.80
Aug 1	115	192	148	99	160	0.60	0.93	0.74	0.53	0.80
Aug 15	115	175	134	94	160	0.60	0.86	0.69	0.50	0.80
Sep 1	115	176	132	99	160	0.60	0.87	0.68	0.53	0.80
Sep 15	123	174	135	102	160	0.64	0.86	0.69	0.54	0.80
Average Habitat						0.70	0.80	0.72	0.76	0.80

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-5**Spawning Mountain Whitefish Flow and Optimum Habitat Values for the Little Spokane River at Pine River Park**

		Discharges (cfs)				Mountain Whitefish Spawning Habitat Relative to Optimum Habitat				
Date	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Dec 1	150	287	187	123	160	0.86	0.99	0.96	0.75	0.90
Dec 15	150	324	209	132	160	0.86	1.00	0.97	0.79	0.90
Jan 1	150	336	214	130	160	0.86	1.00	0.98	0.78	0.90
Jan 15	150	437	227	150	160	0.86	0.93	0.98	0.86	0.90
Average Habitat						0.86	0.98	0.97	0.80	0.90

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-6**Juvenile and Adult Rainbow Trout Flow and Optimum Habitat Values for the Little Spokane River at Chattaroy**

Date	Discharges (cfs)					Rainbow Trout Juvenile/Adult Habitat Relative to Optimum Habitat				
	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Oct 1	70	102.7	67.6	47.3	50.0	0.53	0.85	0.50	0.27	0.30
Oct 15	77	107.1	64.4	37.5	50.0	0.60	0.89	0.46	0.16	0.30
Nov 1	86	125.9	70.0	51.9	50.0	0.68	0.98	0.53	0.32	0.30
Nov 15	86	144.8	83.7	67.0	50.0	0.68	0.96	0.66	0.49	0.30
Dec 1	86	184.5	101.5	76.7	50.0	0.68	0.81	0.85	0.59	0.30
Dec 15	86	197.8	118.1	71.9	50.0	0.68	0.76	0.94	0.54	0.30
Jan 1	86	215.9	128.7	88.8	50.0	0.68	0.69	0.99	0.70	0.30
Jan 15	86	202.3	128.6	85.7	50.0	0.68	0.74	0.99	0.67	0.30
Feb 1	86	240.2	114.9	89.3	50.0	0.68	0.59	0.93	0.70	0.30
Feb 15	104	285.4	119.4	82.0	50.0	0.86	0.43	0.95	0.64	0.30
Mar 1	122	435.8	181.9	99.3	50.0	0.96	0.27	0.82	0.83	0.30
Mar 15	143	478.4	222.9	117.8	50.0	0.97	0.29	0.66	0.94	0.30
Apr 1	165	610.4	245.5	139.2	50.0	0.89	0.31	0.56	0.97	0.30
Apr 15	143	460.5	292.2	133.5	50.0	0.97	0.28	0.40	0.99	0.30
May 1	124	422.5	252.5	120.7	50.0	0.97	0.27	0.53	0.96	0.30
May 15	104	347.6	183.0	92.5	50.0	0.86	0.27	0.82	0.74	0.30
Jun 1	83	281.4	152.0	70.8	50.0	0.65	0.45	0.94	0.53	0.30
Jun 15	69	283.0	130.7	61.9	50.0	0.51	0.44	1.00	0.43	0.30
Jul 1	57	209.5	108.8	60.1	50.0	0.38	0.72	0.90	0.42	0.30
Jul 15	57	176.4	94.0	51.4	50.0	0.38	0.84	0.76	0.31	0.30
Aug 1	57	133.8	77.9	41.0	50.0	0.38	0.99	0.60	0.19	0.30
Aug 15	57	103.4	65.4	33.6	50.0	0.38	0.86	0.47	0.12	0.30
Sep 1	57	103.8	64.9	35.7	50.0	0.38	0.86	0.47	0.14	0.30
Sep 15	63	105.6	61.0	40.4	50.0	0.45	0.88	0.43	0.19	0.30
Average Habitat						0.66	0.64	0.72	0.54	0.30

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-7

**Spawning Rainbow Trout Flow and Optimum Habitat
Values for the Little Spokane River at Chattaroy**

Date	Discharges (cfs)					Rainbow Trout Spawning Habitat Relative to Optimum Habitat				
	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Mar 1	122	435.8	181.9	99.3	50.0	0.24	0.00	0.05	0.49	0.94
Mar 15	143	478.4	222.9	117.8	50.0	0.14	0.00	0.01	0.27	0.94
Apr 1	165	610.4	245.5	139.2	50.0	0.09	0.00	0.00	0.15	0.94
Apr 15	143	460.5	292.2	133.5	50.0	0.14	0.00	0.00	0.17	0.94
Average Habitat						0.15	0.00	0.02	0.27	0.94

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-8**Adult Mountain Whitefish Flow and Optimum Habitat Values for the Little Spokane River at Chattaroy**

Date	Discharges (cfs)					Mountain Whitefish Adult Habitat Relative to Optimum Habitat				
	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Oct 1	70	102.7	67.6	47.3	50.0	0.51	0.74	0.49	0.32	0.35
Oct 15	77	107.1	64.4	37.5	50.0	0.55	0.77	0.46	0.22	0.35
Nov 1	86	125.9	70.0	51.9	50.0	0.61	0.92	0.51	0.36	0.35
Nov 15	86	144.8	83.7	67.0	50.0	0.61	0.99	0.60	0.48	0.35
Dec 1	86	184.5	101.5	76.7	50.0	N/A	N/A	N/A	N/A	N/A
Dec 15	86	197.8	118.1	71.9	50.0	N/A	N/A	N/A	N/A	N/A
Jan 1	86	215.9	128.7	88.8	50.0	N/A	N/A	N/A	N/A	N/A
Jan 15	86	202.3	128.6	85.7	50.0	N/A	N/A	N/A	N/A	N/A
Feb 1	86	240.2	114.9	89.3	50.0	0.61	0.80	0.83	0.63	0.35
Feb 15	104	285.4	119.4	82.0	50.0	0.75	0.66	0.87	0.59	0.35
Mar 1	122	435.8	181.9	99.3	50.0	0.89	0.47	0.98	0.72	0.35
Mar 15	143	478.4	222.9	117.8	50.0	0.98	0.47	0.86	0.86	0.35
Apr 1	165	610.4	245.5	139.2	50.0	1.00	0.49	0.78	0.97	0.35
Apr 15	143	460.5	292.2	133.5	50.0	0.98	0.47	0.63	0.96	0.35
May 1	124	422.5	252.5	120.7	50.0	0.90	0.47	0.76	0.88	0.35
May 15	104	347.6	183.0	92.5	50.0	0.75	0.50	0.98	0.66	0.35
Jun 1	83	281.4	152.0	70.8	50.0	0.59	0.67	1.00	0.51	0.35
Jun 15	69	283.0	130.7	61.9	50.0	0.50	0.67	0.95	0.44	0.35
Jul 1	57	209.5	108.8	60.1	50.0	0.40	0.91	0.79	0.43	0.35
Jul 15	57	176.4	94.0	51.4	50.0	0.40	0.99	0.67	0.36	0.35
Aug 1	57	133.8	77.9	41.0	50.0	0.40	0.96	0.56	0.26	0.35
Aug 15	57	103.4	65.4	33.6	50.0	0.40	0.75	0.47	0.18	0.35
Sep 1	57	103.8	64.9	35.7	50.0	0.40	0.75	0.47	0.21	0.35
Sep 15	63	105.6	61.0	40.4	50.0	0.45	0.76	0.43	0.25	0.35
Average Habitat						0.63	0.75	0.73	0.53	0.35

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-9**Spawning Mountain Whitefish Flow and Optimum Habitat Values for the Little Spokane River at Chattaroy**

		Discharges (cfs)				Mountain Whitefish Spawning Habitat Relative to Optimum Habitat				
Date	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Dec 1	86	184.5	101.5	76.7	50.0	0.70	1.00	0.80	0.63	0.40
Dec 15	86	197.8	118.1	71.9	50.0	0.70	1.00	0.88	0.60	0.40
Jan 1	86	215.9	128.7	88.8	50.0	0.70	0.98	0.92	0.72	0.40
Jan 15	86	202.3	128.6	85.7	50.0	0.70	1.00	0.92	0.70	0.40

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-10**Juvenile and Adult Rainbow Trout Flow and Optimum Habitat Values for the Little Spokane River at Elk**

Date	Discharges (cfs)					Rainbow Trout Juvenile/Adult Habitat Relative to Optimum Habitat				
	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Oct 1	38	50.1	45.3	39.4	32.0	0.90	0.74	0.79	0.88	0.94
Oct 15	39	52.3	45.0	39.4	32.0	0.89	0.74	0.80	0.88	0.94
Nov 1	40	54.7	44.5	38.8	32.0	0.87	0.73	0.80	0.89	0.94
Nov 15	40	52.1	45.4	39.7	32.0	0.87	0.74	0.79	0.88	0.94
Dec 1	40	58.2	48.0	38.9	32.0	0.87	0.73	0.75	0.89	0.94
Dec 15	40	56.7	46.6	42.8	32.0	0.87	0.73	0.78	0.83	0.94
Jan 1	40	62.4	49.4	41.4	32.0	0.87	0.73	0.75	0.86	0.94
Jan 15	40	70.3	48.1	41.4	32.0	0.87	0.73	0.75	0.86	0.94
Feb 1	40	73.4	51.1	41.1	32.0	0.87	0.72	0.74	0.86	0.94
Feb 15	43	82.2	53.0	43.9	32.0	0.83	0.70	0.74	0.81	0.94
Mar 1	46	89.4	62.0	44.5	32.0	0.79	0.68	0.73	0.80	0.94
Mar 15	50	86.6	64.7	45.9	32.0	0.74	0.69	0.74	0.79	0.94
Apr 1	54	112.9	72.1	53.1	32.0	0.74	N/A	0.72	0.74	0.94
Apr 15	52	120.8	80.0	58.9	32.0	0.74	N/A	0.70	0.73	0.94
May 1	49	115.2	77.1	57.0	32.0	0.75	N/A	0.71	0.73	0.94
May 15	47	98.2	70.3	55.2	32.0	0.77	N/A	0.73	0.73	0.94
Jun 1	45	86.8	66.2	49.0	32.0	0.80	0.68	0.73	0.75	0.94
Jun 15	43	76.5	59.7	47.5	32.0	0.83	0.71	0.73	0.76	0.94
Jul 1	41.5	71.4	55.1	42.3	32.0	0.85	0.72	0.73	0.84	0.94
Jul 15	39.5	65.0	50.9	43.4	32.0	0.88	0.74	0.74	0.82	0.94
Aug 1	38	56.2	47.4	39.7	32.0	0.90	0.73	0.76	0.88	0.94
Aug 15	38	52.1	45.6	39.6	32.0	0.90	0.74	0.79	0.88	0.94
Sep 1	38	51.7	44.7	38.2	32.0	0.90	0.74	0.80	0.90	0.94
Sep 15	38	51.0	42.9	37.8	32.0	0.90	0.74	0.83	0.90	0.94
Average Habitat						0.84	0.71	0.76	0.83	0.94

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-11**Adult Mountain Whitefish Flow and Optimum Habitat Values for the Little Spokane River at Elk**

Date	Discharges (cfs)					Mountain Whitefish Adult Habitat Relative to Optimum Habitat				
	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Oct 1	38	50.1	45.3	39.4	32.0	0.81	0.91	0.87	0.82	0.74
Oct 15	39	52.3	45.0	39.4	32.0	0.82	0.93	0.87	0.82	0.74
Nov 1	40	54.7	44.5	38.8	32.0	0.83	0.95	0.86	0.82	0.74
Nov 15	40	52.1	45.4	39.7	32.0	0.83	0.93	0.87	0.83	0.74
Dec 1	40	58.2	48.0	38.9	32.0	N/A	N/A	N/A	N/A	N/A
Dec 15	40	56.7	46.6	42.8	32.0	N/A	N/A	N/A	N/A	N/A
Jan 1	40	62.4	49.4	41.4	32.0	N/A	N/A	N/A	N/A	N/A
Jan 15	40	70.3	48.1	41.4	32.0	N/A	N/A	N/A	N/A	N/A
Feb 1	40	73.4	51.1	41.1	32.0	0.83	1.00	0.92	0.84	0.74
Feb 15	43	82.2	53.0	43.9	32.0	0.85	0.99	0.94	0.86	0.74
Mar 1	46	89.4	62.0	44.5	32.0	0.88	0.98	0.99	0.86	0.74
Mar 15	50	86.6	64.7	45.9	32.0	0.91	0.98	0.99	0.87	0.74
Apr 1	54	112.9	72.1	53.1	32.0	0.95	N/A	1.00	0.94	0.74
Apr 15	52	120.8	80.0	58.9	32.0	0.93	N/A	0.99	0.98	0.74
May 1	49	115.2	77.1	57.0	32.0	0.90	N/A	1.00	0.97	0.74
May 15	47	98.2	70.3	55.2	32.0	0.88	N/A	0.99	0.96	0.74
Jun 1	45	86.8	66.2	49.0	32.0	0.87	0.98	0.99	0.90	0.74
Jun 15	43	76.5	59.7	47.5	32.0	0.85	1.00	0.98	0.89	0.74
Jul 1	41.5	71.4	55.1	42.3	32.0	0.84	1.00	0.95	0.85	0.74
Jul 15	39.5	65.0	50.9	43.4	32.0	0.82	0.99	0.92	0.86	0.74
Aug 1	38	56.2	47.4	39.7	32.0	0.81	0.96	0.88	0.83	0.74
Aug 15	38	52.1	45.6	39.6	32.0	0.81	0.93	0.87	0.82	0.74
Sep 1	38	51.7	44.7	38.2	32.0	0.81	0.93	0.86	0.81	0.74
Sep 15	38	51.0	42.9	37.8	32.0	0.81	0.92	0.85	0.81	0.74
Average Habitat						0.85	0.96	0.92	0.86	0.74

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-12**Spawning Mountain Whitefish Flow and Optimum Habitat Values for the Little Spokane River at Elk**

		Discharges (cfs)				Mountain Whitefish Spawning Habitat Relative to Optimum Habitat				
Date	MISF*	Flow Exceedance			WP	MISF*	Flow Exceedance			WP
		10%	50%	90%			10%	50%	90%	
Dec 1	40	58.2	48.0	38.9	32.0	0.92	0.98	0.94	0.91	0.83
Dec 15	40	56.7	46.6	42.8	32.0	0.92	0.98	0.94	0.93	0.83
Jan 1	40	62.4	49.4	41.4	32.0	0.92	0.99	0.95	0.92	0.83
Jan 15	40	70.3	48.1	41.4	32.0	0.92	1.00	0.94	0.92	0.83
Average Habitat						0.92	0.99	0.94	0.92	0.83

*MISF – regulatory minimum instream flow per WAC 173-555

TABLE 6-13**Normalized Habitat Availability in Dragoon Creek Defined by Wetted Perimeter Analysis**

Life Stage	Normalized Habitat at Wetted Perimeter Flow	
	40 cfs	9 cfs
Mountain Whitefish Adult	0.60	0.12
Mountain Whitefish Juvenile	0.78	0.22
Mountain Whitefish Fry	0.95	0.80
Mountain Whitefish Spawning	0.63	0.01
Rainbow Trout Juvenile/Adult	1.00	0.19
Rainbow Trout Fry	0.43	0.90
Rainbow Trout Spawning	0.67	0.19

TABLE 6-14**Normalized Habitat Availability in Deadman Creek Defined by Wetted Perimeter Analysis**

Life Stage	Normalized Habitat at Wetted Perimeter Flow	
	13 cfs	6 cfs
Mountain Whitefish Adult	0.33	0.16
Mountain Whitefish Juvenile	0.44	0.25
Mountain Whitefish Fry	1.00	0.89
Mountain Whitefish Spawning	0.18	0.00
Rainbow Trout Juvenile/Adult	0.86	0.44
Rainbow Trout Fry	0.41	0.12
Rainbow Trout Spawning	0.38	0.70

TABLE 6-15**Normalized Habitat Availability in Otter Creek Defined by Wetted Perimeter Analysis**

Life Stage	Normalized Habitat at Wetted Perimeter Flow (13 cfs)
Mountain Whitefish Adult	0.79
Mountain Whitefish Juvenile	0.81
Mountain Whitefish Fry	0.91
Rainbow Trout Juvenile/Adult	0.90
Rainbow Trout Fry	0.46

TABLE 6-16**Bankfull Discharge and Mean Annual Flow at Little Spokane River Instream Flow Needs Study Sites**

	LSR at Pine River Park	LSR at Chattaroy	LSR at Elk	Dragoon Creek	Deadman Creek	Otter Creek
Bankfull Discharge (cfs)	1100	375	120	400	320	50
Mean Annual Flow (cfs)	309.8	150.2	56.5	Undetermined	Undetermined	Undetermined

TABLE 6-17**Additional Instream Flow Analysis Results Compared to Existing Minimum Instream Flows (MISFs)**

Study Site	MISF Flow Range (cfs)	200% MAF	0.8 – 1.6 Bankfull	1.25 Bankfull
LSR @ Dartford	115 – 250	620	880 - 1760	1375
LSR @ Chattaroy	57 – 165	300	300 – 600	469
LSR @ Elk	38 – 54	113	96 – 192	150
Dragoon Creek	Undetermined	Undetermined	320 – 640	500
Deadman Creek	Undetermined	Undetermined	256 - 512	400
Otter Creek	Undetermined	Undetermined	40 – 64	63