

Appendix D

Task 8 Analysis: Frequency of Not Meeting the Protected Instream Flows

Lamprey River Water Management Plan

August 2013

Withdrawals of Concern

Pertinent withdrawals were considered to be greater than 15% of the lowest recommended PISF (protected instream flow) for the Lamprey River. This PISF occurred during the Rare flow spanning the GRAF (generic resident adult fish) Spawning and Rearing and Growth Bioperiods (June 20 – Oct 6) and was determined to be 0.09 cfs. Therefore withdrawals lower than 0.0135 cfs were not considered. The withdrawal comparisons to the flow duration curves at the three stated locations can be found in the following three figures. The vertical axis for these figures is the flow per unit watershed area (cubic feet per second per square mile – cfs/mi²) and the horizontal axis is the probability that this flow will be exceeded. For example, the lowest recorded flow for the gage at Packer’s Falls is 0.004 cfs/mi², and that flow will be exceeded nearly 100% of the time. Subsequent higher flows will decrease in their likeliness to be exceeded.

In the three Figures (D.1, D.2, and D.3) you will see a thick blue dashed line with a thin red line almost directly over it. These are the flow-duration curves for Today’s and Naturalized Flows, respectively. These flow values are from the hydrographs which were derived as described earlier. There will also be a horizontal green line representing the aforementioned lowest recommended PISF value of 0.09 cfs/mi².

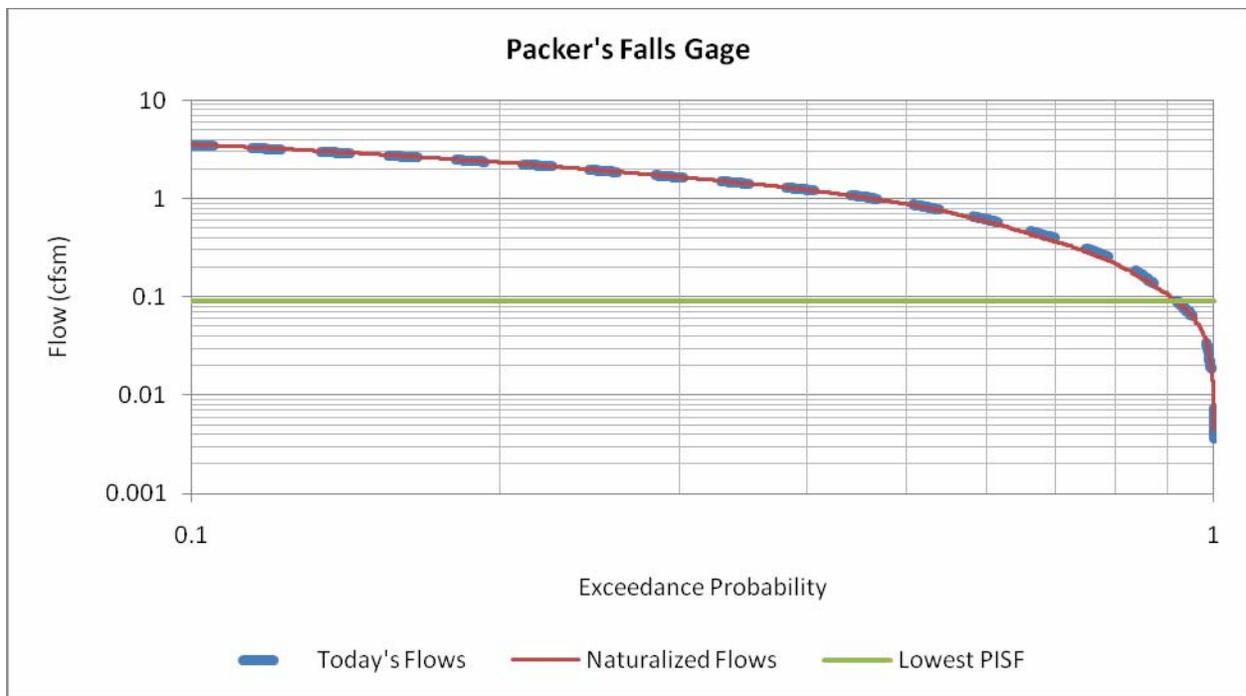


Figure D.1 – Comparison of Withdrawals at the Packer’s Falls Gage.

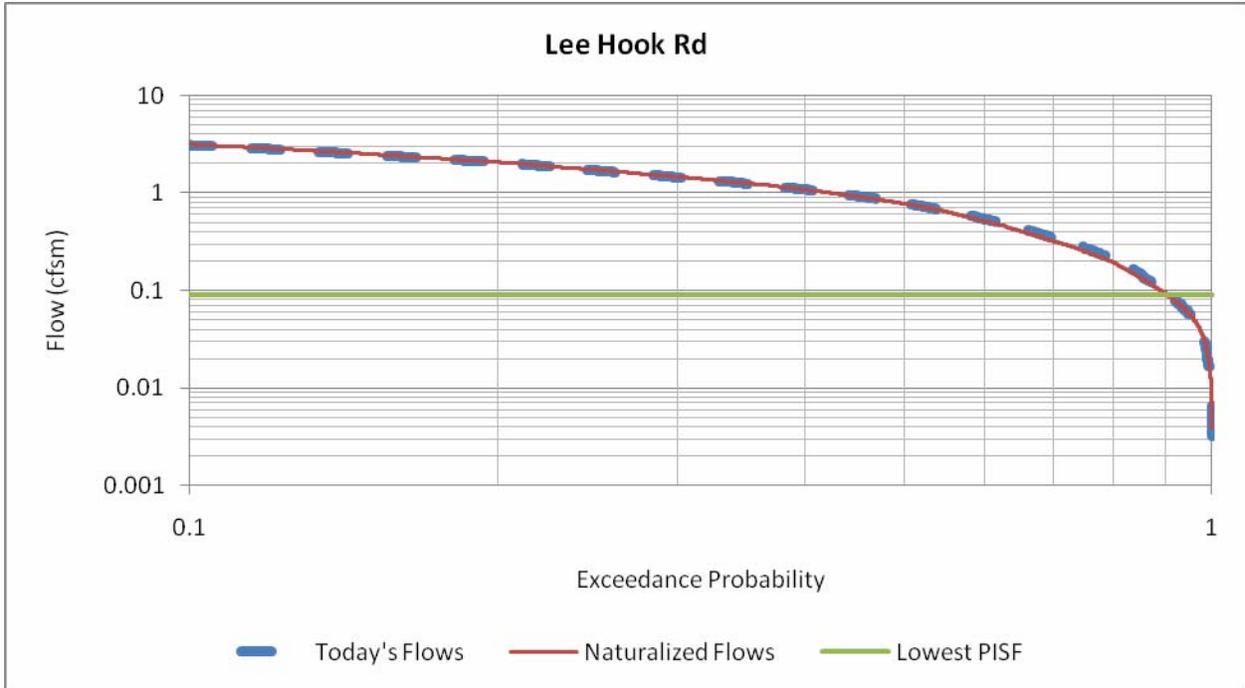


Figure D.2 – Comparison of the Withdrawals at Lee Hook Road.

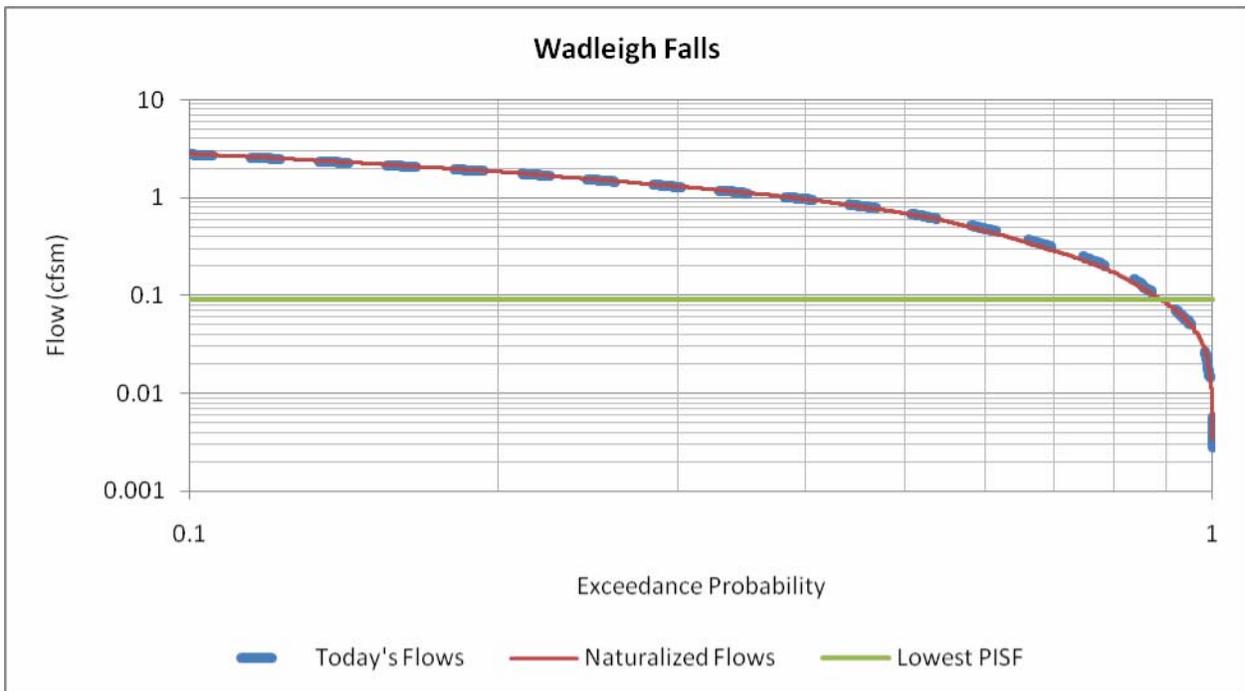


Figure D. 3 – Comparison of the Withdrawals at Wadleigh Falls.

When Are the Recommended Protected Flow Magnitudes Not Met?

The developed hydrographs at the three locations have been analyzed to see when violations in the PISFs occurred. For each location there are six bioperiods, for each of which there are three flow values and associated “drought” durations (consecutive durations below that flow value). These have all been analyzed and are presented in the following tables. The time periods looked at were the Last 30, Last 5, High 3, Average 3 and Low 3 years. The following tables are ordered first by location, then by time period, then by hydrograph. The first number listed is for the violations in flow. This number represents the total number of times the protected flow magnitude was not met during that bioperiod. The percentage below that number represents the total percentage of days the protected flow magnitude was not met during that bioperiod. The following two numbers below that are for violations in durations. These are the number of times the measured or calculated flow was below the stated allowable duration of days for that bioperiod. These numbers can be greater than the number of years in the analysis if the duration is short enough.

Table D.1 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Last 30 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Last 30 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	183	183	183	183	183	183	183	183
Violations of Common Flow	2408	440	1304	1276	461		280	
Violations of Common Flow (%)	85.39%	23.28%	53.01%	65.44%	33.41%		62.22%	
Violations of Allowable Duration	22	8	23	32	13		15	
Violations of Catastrophic Duration	9	1	5	2	2		0	
Violations of Critical Flow	801	123	460	381	109	878	16	102
Violations of Critical Flow (%)	28.40%	6.51%	18.70%	19.54%	7.90%	63.62%	3.56%	22.67%
Violations of Allowable Duration	15	1	10	13	6		2	
Violations of Catastrophic Duration	5	1	2	3	2		0	
Violations of Rare Flow	671	77	255	119	83	606	13	61
Violations of Rare Flow (%)	23.79%	4.07%	10.37%	6.10%	6.01%	43.91%	2.89%	13.56%
Violations of Allowable Duration	30	4	8	12	5		2	
Violations of Catastrophic Duration	12	2	2	4	2		1	

Common shiner R&G GRAF Spawning

Table D.2 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Last 30 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Last 30 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	183	183	183	183	183	183	183	183
Violations of Common Flow	2408	595	1312	1230	459		280	
Violations of Common Flow (%)	85.39%	31.48%	53.33%	63.08%	33.26%		62.22%	
Violations of Allowable Duration	22	10	23	28	13		15	
Violations of Catastrophic Duration	9	1	5	2	1		0	
Violations of Critical Flow	797	248	483	280	109	881	16	103
Violations of Critical Flow (%)	28.26%	13.12%	19.63%	14.36%	7.90%	63.84%	3.56%	22.89%
Violations of Allowable Duration	15	5	11	8	6		2	
Violations of Catastrophic Duration	5	1	2	2	2		0	
Violations of Rare Flow	667	116	264	55	83	606	13	61
Violations of Rare Flow (%)	23.65%	6.14%	10.73%	2.82%	6.01%	43.91%	2.89%	13.56%
Violations of Allowable Duration	30	6	8	6	5		2	
Violations of Catastrophic Duration	12	3	2	1	2		1	

Common shiner R&G GRAF Spawning

Table D.3 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Last 5 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Last 5 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	183	183	183	183	183	183	183	183
Violations of Common Flow	412	107	264	228	39		26	
Violations of Common Flow (%)	87.66%	33.97%	64.39%	70.15%	16.96%		34.67%	
Violations of Allowable Duration	3	1	4	6	1		1	
Violations of Catastrophic Duration	2	1	2	0	1		0	
Violations of Critical Flow	167	72	123	86	7	185	0	27
Violations of Critical Flow (%)	35.53%	22.86%	30.00%	26.46%	3.04%	80.43%	0.00%	36.00%
Violations of Allowable Duration	2	1	2	4	1		0	
Violations of Catastrophic Duration	1	1	1	1	0		0	
Violations of Rare Flow	149	65	67	25	5	142	0	16
Violations of Rare Flow (%)	31.70%	20.63%	16.34%	7.69%	2.17%	61.74%	0.00%	21.33%
Violations of Allowable Duration	6	4	2	2	1		0	
Violations of Catastrophic Duration	2	2	1	1	0		0	

Common shiner R&G GRAF Spawning

Table D.4 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Last 5 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Last 5 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	183	183	183	183	183	183	183	183
Violations of Common Flow	412	140	264	221	38		26	
Violations of Common Flow (%)	87.66%	44.44%	64.39%	68.00%	16.52%		34.67%	
Violations of Allowable Duration	3	2	4	6	1		1	
Violations of Catastrophic Duration	2	1	2	0	0		0	
Violations of Critical Flow	163	81	131	65	7	187	0	28
Violations of Critical Flow (%)	34.68%	25.71%	31.95%	20.00%	3.04%	81.30%	0.00%	37.33%
Violations of Allowable Duration	2	1	2	3	1		0	
Violations of Catastrophic Duration	1	1	1	0	0		0	
Violations of Rare Flow	147	70	65	7	5	142	0	16
Violations of Rare Flow (%)	31.28%	22.22%	15.85%	2.15%	2.17%	61.74%	0.00%	21.33%
Violations of Allowable Duration	6	4	2	1	1		0	
Violations of Catastrophic Duration	2	2	1	0	0		0	

Common shiner R&G GRAF Spawning

Table D.5 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Highest Flow 3 years using Today’s Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the High 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	183	183	183	183	183	183	183	183
Violations of Common Flow	244	40	75	64	1		16	
Violations of Common Flow (%)	86.52%	21.16%	30.49%	32.82%	0.72%		35.56%	
Violations of Allowable Duration	3	1	1	2	0		1	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Critical Flow	81	8	17	12	0	133	0	18
Violations of Critical Flow (%)	28.72%	4.23%	6.91%	6.15%	0.00%	96.38%	0.00%	40.00%
Violations of Allowable Duration	2	0	0	0	0		0	
Violations of Catastrophic Duration	0	0	0	0	0		0	
Violations of Rare Flow	63	7	0	0	0	103	0	13
Violations of Rare Flow (%)	22.34%	3.70%	0.00%	0.00%	0.00%	74.64%	0.00%	28.89%
Violations of Allowable Duration	3	0	0	0	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.6 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Highest Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the High 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	183	183	183	183	183	183	183	183
Violations of Common Flow	244	60	72	59	1		16	
Violations of Common Flow (%)	86.52%	31.75%	29.27%	30.26%	0.72%		35.56%	
Violations of Allowable Duration	3	1	1	2	0		1	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Critical Flow	81	20	21	9	0	133	0	18
Violations of Critical Flow (%)	28.72%	10.58%	8.54%	4.62%	0.00%	96.38%	0.00%	40.00%
Violations of Allowable Duration	2	0	1	0	0		0	
Violations of Catastrophic Duration	0	0	0	0	0		0	
Violations of Rare Flow	63	10	5	0	0	103	0	13
Violations of Rare Flow (%)	22.34%	5.29%	2.03%	0.00%	0.00%	74.64%	0.00%	28.89%
Violations of Allowable Duration	3	0	0	0	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.7 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Average Flow 3 years using Today’s Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Average 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	183	183	183	183	183	183	183	183
Violations of Common Flow	242	8	90	148	81		45	
Violations of Common Flow (%)	85.82%	4.23%	36.59%	75.90%	58.70%		100.00%	
Violations of Allowable Duration	1	0	1	4	2		3	
Violations of Catastrophic Duration	1	0	0	0	1		0	
Violations of Critical Flow	92	3	12	46	8	54	0	0
Violations of Critical Flow (%)	32.62%	1.59%	4.88%	23.59%	5.80%	39.13%	0.00%	0.00%
Violations of Allowable Duration	2	0	0	2	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Rare Flow	78	0	0	15	5	26	0	0
Violations of Rare Flow (%)	27.66%	0.00%	0.00%	7.69%	3.62%	18.84%	0.00%	0.00%
Violations of Allowable Duration	3	0	0	2	0		0	
Violations of Catastrophic Duration	2	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.8 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Average Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Average 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	183	183	183	183	183	183	183	183
Violations of Common Flow	242	8	93	145	81		45	
Violations of Common Flow (%)	85.82%	4.23%	37.80%	74.36%	58.70%		100.00%	
Violations of Allowable Duration	1	0	1	4	2		3	
Violations of Catastrophic Duration	1	0	0	0	1		0	
Violations of Critical Flow	92	3	10	40	8	54	0	0
Violations of Critical Flow (%)	32.62%	1.59%	4.07%	20.51%	5.80%	39.13%	0.00%	0.00%
Violations of Allowable Duration	2	0	0	1	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Rare Flow	76	0	0	8	5	26	0	0
Violations of Rare Flow (%)	26.95%	0.00%	0.00%	4.10%	3.62%	18.84%	0.00%	0.00%
Violations of Allowable Duration	3	0	0	1	0		0	
Violations of Catastrophic Duration	2	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.9 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Lowest Flow 3 years using Today’s Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Low 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	183	183	183	183	183	183	183	183
Violations of Common Flow	269	128	178	145	68		43	
Violations of Common Flow (%)	95.39%	67.72%	72.36%	74.36%	49.28%		95.56%	
Violations of Allowable Duration	3	3	3	4	3		3	
Violations of Catastrophic Duration	2	0	1	0	0		0	
Violations of Critical Flow	188	63	113	39	25	65	11	0
Violations of Critical Flow (%)	66.67%	33.33%	45.93%	20.00%	18.12%	47.10%	24.44%	0.00%
Violations of Allowable Duration	4	3	3	1	1		1	
Violations of Catastrophic Duration	3	0	1	1	1		0	
Violations of Rare Flow	176	15	60	0	21	23	9	0
Violations of Rare Flow (%)	62.41%	7.94%	24.39%	0.00%	15.22%	16.67%	20.00%	0.00%
Violations of Allowable Duration	7	1	4	0	1		1	
Violations of Catastrophic Duration	4	0	0	0	1		1	

Common shiner R&G GRAF Spawning

Table D.10 Violations of the Protected Instream Flow Criteria at the Packers Falls gage in the Lamprey Designated River for the Lowest Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at the Packers Falls Gage in the Lamprey Designated River for the Low 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	183	183	183	183	183	183	183	183
Violations of Common Flow	275	144	178	137	68		43	
Violations of Common Flow (%)	97.52%	76.19%	72.36%	70.26%	49.28%		95.56%	
Violations of Allowable Duration	3	3	3	4	3		3	
Violations of Catastrophic Duration	2	0	1	0	0		0	
Violations of Critical Flow	188	108	111	23	25	65	11	0
Violations of Critical Flow (%)	66.67%	57.14%	45.12%	11.79%	18.12%	47.10%	24.44%	0.00%
Violations of Allowable Duration	4	3	3	0	1		1	
Violations of Catastrophic Duration	3	0	1	0	1		0	
Violations of Rare Flow	176	17	58	0	21	23	9	0
Violations of Rare Flow (%)	62.41%	8.99%	23.58%	0.00%	15.22%	16.67%	20.00%	0.00%
Violations of Allowable Duration	7	2	4	0	1		1	
Violations of Catastrophic Duration	4	0	0	0	1		1	

Common shiner R&G GRAF Spawning

Table D.11 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Last 30 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Last 30 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	161	161	161	161	161	161	161	161
Violations of Common Flow	2465	525	1456	1386	517		304	
Violations of Common Flow (%)	87.41%	27.78%	59.19%	71.08%	37.46%		67.56%	
Violations of Allowable Duration	22	8	24	39	17		15	
Violations of Catastrophic Duration	9	1	6	4	5		0	
Violations of Critical Flow	906	151	567	492	156	803	22	87
Violations of Critical Flow (%)	32.13%	7.99%	23.05%	25.23%	11.30%	58.19%	4.89%	19.33%
Violations of Allowable Duration	17	1	17	16	11		2	
Violations of Catastrophic Duration	8	1	4	5	2		1	
Violations of Rare Flow	801	79	300	168	120	510	16	52
Violations of Rare Flow (%)	28.40%	4.18%	12.20%	8.62%	8.70%	36.96%	3.56%	11.56%
Violations of Allowable Duration	40	4	11	15	11		2	
Violations of Catastrophic Duration	15	2	3	6	4		2	

Common shiner R&G GRAF Spawning

Table D.12 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Last 30 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Last 30 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	161	161	161	161	161	161	161	161
Violations of Common Flow	2465	660	1458	1359	515		304	
Violations of Common Flow (%)	87.41%	34.92%	59.27%	69.69%	37.32%		67.56%	
Violations of Allowable Duration	22	10	24	37	17		15	
Violations of Catastrophic Duration	9	1	6	4	4		0	
Violations of Critical Flow	904	287	590	403	156	804	22	87
Violations of Critical Flow (%)	32.06%	15.19%	23.98%	20.67%	11.30%	58.26%	4.89%	19.33%
Violations of Allowable Duration	17	6	17	13	11		2	
Violations of Catastrophic Duration	8	1	4	3	2		1	
Violations of Rare Flow	797	127	310	106	120	511	16	52
Violations of Rare Flow (%)	28.26%	6.72%	12.60%	5.44%	8.70%	37.03%	3.56%	11.56%
Violations of Allowable Duration	39	6	11	11	11		2	
Violations of Catastrophic Duration	15	3	2	4	4		2	

Common shiner R&G GRAF Spawning

Table D.13 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Last 5 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Last 5 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	161	161	161	161	161	161	161	161
Violations of Common Flow	418	125	274	240	45		31	
Violations of Common Flow (%)	88.94%	39.68%	66.83%	73.85%	19.57%		41.33%	
Violations of Allowable Duration	3	1	4	8	1		1	
Violations of Catastrophic Duration	2	1	2	1	1		0	
Violations of Critical Flow	187	77	144	114	14	177	0	23
Violations of Critical Flow (%)	39.79%	24.44%	35.12%	35.08%	6.09%	76.96%	0.00%	30.67%
Violations of Allowable Duration	2	1	3	4	1		0	
Violations of Catastrophic Duration	1	1	2	1	0		0	
Violations of Rare Flow	167	66	91	37	8	120	0	14
Violations of Rare Flow (%)	35.53%	20.95%	22.20%	11.38%	3.48%	52.17%	0.00%	18.67%
Violations of Allowable Duration	9	4	5	3	1		0	
Violations of Catastrophic Duration	2	2	1	1	0		0	

Common shiner R&G GRAF Spawning

Table D.14 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Last 5 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Last 5 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	161	161	161	161	161	161	161	161
Violations of Common Flow	418	152	277	235	44		31	
Violations of Common Flow (%)	88.94%	48.25%	67.56%	72.31%	19.13%		41.33%	
Violations of Allowable Duration	3	2	4	7	1		1	
Violations of Catastrophic Duration	2	1	2	1	0		0	
Violations of Critical Flow	185	85	151	93	14	177	0	23
Violations of Critical Flow (%)	39.36%	26.98%	36.83%	28.62%	6.09%	76.96%	0.00%	30.67%
Violations of Allowable Duration	2	1	3	4	1		0	
Violations of Catastrophic Duration	1	1	2	1	0		0	
Violations of Rare Flow	163	72	84	23	8	120	0	14
Violations of Rare Flow (%)	34.68%	22.86%	20.49%	7.08%	3.48%	52.17%	0.00%	18.67%
Violations of Allowable Duration	8	4	5	2	1		0	
Violations of Catastrophic Duration	2	2	1	1	0		0	

Common shiner R&G GRAF Spawning

Table D.15 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Highest Flow 3 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the High 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	161	161	161	161	161	161	161	161
Violations of Common Flow	251	54	97	83	6		19	
Violations of Common Flow (%)	89.01%	28.57%	39.43%	42.56%	4.35%		42.22%	
Violations of Allowable Duration	3	1	2	3	0		1	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Critical Flow	94	9	24	14	0	125	0	16
Violations of Critical Flow (%)	33.33%	4.76%	9.76%	7.18%	0.00%	90.58%	0.00%	35.56%
Violations of Allowable Duration	3	0	1	0	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Rare Flow	81	7	1	0	0	98	0	10
Violations of Rare Flow (%)	28.72%	3.70%	0.41%	0.00%	0.00%	71.01%	0.00%	22.22%
Violations of Allowable Duration	4	0	0	0	0		0	
Violations of Catastrophic Duration	2	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.16 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Highest Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the High 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	161	161	161	161	161	161	161	161
Violations of Common Flow	251	65	94	77	6		19	
Violations of Common Flow (%)	89.01%	34.39%	38.21%	39.49%	4.35%		42.22%	
Violations of Allowable Duration	3	1	2	3	0		1	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Critical Flow	94	20	24	12	0	125	0	16
Violations of Critical Flow (%)	33.33%	10.58%	9.76%	6.15%	0.00%	90.58%	0.00%	35.56%
Violations of Allowable Duration	3	0	1	0	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Rare Flow	81	10	9	0	0	98	0	10
Violations of Rare Flow (%)	28.72%	5.29%	3.66%	0.00%	0.00%	71.01%	0.00%	22.22%
Violations of Allowable Duration	4	0	0	0	0		0	
Violations of Catastrophic Duration	2	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.17 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Average Flow 3 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Average 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	161	161	161	161	161	161	161	161
Violations of Common Flow	248	9	121	157	86		45	
Violations of Common Flow (%)	87.94%	4.76%	49.19%	80.51%	62.32%		100.00%	
Violations of Allowable Duration	1	0	1	5	3		3	
Violations of Catastrophic Duration	1	0	0	0	2		0	
Violations of Critical Flow	103	3	20	63	17	45	2	0
Violations of Critical Flow (%)	36.52%	1.59%	8.13%	32.31%	12.32%	32.61%	4.44%	0.00%
Violations of Allowable Duration	2	0	1	2	1		0	
Violations of Catastrophic Duration	2	0	0	1	0		0	
Violations of Rare Flow	92	0	0	18	11	19	0	0
Violations of Rare Flow (%)	32.62%	0.00%	0.00%	9.23%	7.97%	13.77%	0.00%	0.00%
Violations of Allowable Duration	5	0	0	2	1		0	
Violations of Catastrophic Duration	2	0	0	1	0		0	

Common shiner R&G GRAF Spawning

Table D.18 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Average Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Average 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	161	161	161	161	161	161	161	161
Violations of Common Flow	248	11	121	156	86		45	
Violations of Common Flow (%)	87.94%	5.82%	49.19%	80.00%	62.32%		100.00%	
Violations of Allowable Duration	1	0	1	5	3		3	
Violations of Catastrophic Duration	1	0	0	0	2		0	
Violations of Critical Flow	103	3	19	51	17	45	2	0
Violations of Critical Flow (%)	36.52%	1.59%	7.72%	26.15%	12.32%	32.61%	4.44%	0.00%
Violations of Allowable Duration	2	0	1	2	1		0	
Violations of Catastrophic Duration	2	0	0	0	0		0	
Violations of Rare Flow	92	0	0	15	11	19	0	0
Violations of Rare Flow (%)	32.62%	0.00%	0.00%	7.69%	7.97%	13.77%	0.00%	0.00%
Violations of Allowable Duration	5	0	0	2	1		0	
Violations of Catastrophic Duration	2	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.19 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Lowest Flow 3 years using Today’s Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Low 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	161	161	161	161	161	161	161	161
Violations of Common Flow	273	133	192	164	73		44	
Violations of Common Flow (%)	96.81%	70.37%	78.05%	84.10%	52.90%		97.78%	
Violations of Allowable Duration	3	3	3	3	3		3	
Violations of Catastrophic Duration	2	0	1	1	0		0	
Violations of Critical Flow	199	70	115	53	27	52	12	0
Violations of Critical Flow (%)	70.57%	37.04%	46.75%	27.18%	19.57%	37.68%	26.67%	0.00%
Violations of Allowable Duration	4	4	3	1	1		1	
Violations of Catastrophic Duration	3	0	1	1	1		0	
Violations of Rare Flow	188	20	86	0	26	18	11	0
Violations of Rare Flow (%)	66.67%	10.58%	34.96%	0.00%	18.84%	13.04%	24.44%	0.00%
Violations of Allowable Duration	8	1	4	0	2		1	
Violations of Catastrophic Duration	4	1	0	0	1		1	

Common shiner R&G GRAF Spawning

Table D.20 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Lowest Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Lee Hook Rd in the Lamprey Designated River for the Low 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	161	161	161	161	161	161	161	161
Violations of Common Flow	276	150	192	157	73		44	
Violations of Common Flow (%)	97.87%	79.37%	78.05%	80.51%	52.90%		97.78%	
Violations of Allowable Duration	3	3	3	4	3		3	
Violations of Catastrophic Duration	2	1	1	0	0		0	
Violations of Critical Flow	199	111	114	41	27	52	12	0
Violations of Critical Flow (%)	70.57%	58.73%	46.34%	21.03%	19.57%	37.68%	26.67%	0.00%
Violations of Allowable Duration	4	3	3	1	1		1	
Violations of Catastrophic Duration	3	0	1	0	1		0	
Violations of Rare Flow	188	29	87	1	26	18	11	0
Violations of Rare Flow (%)	66.67%	15.34%	35.37%	0.51%	18.84%	13.04%	24.44%	0.00%
Violations of Allowable Duration	8	2	4	0	2		1	
Violations of Catastrophic Duration	4	1	0	0	1		1	

Common shiner R&G GRAF Spawning

Table D.21 Violations of the Protected Instream Flow Criteria at Wadleigh in the Lamprey Designated River for the Last 30 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Last 30 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	135	135	135	135	135	135	135	135
Violations of Common Flow	2519	598	1621	1500	600		323	
Violations of Common Flow (%)	89.33%	31.64%	65.89%	76.92%	43.48%		71.78%	
Violations of Allowable Duration	22	10	26	42	17		16	
Violations of Catastrophic Duration	9	1	7	6	8		0	
Violations of Critical Flow	1061	184	689	614	196	724	31	77
Violations of Critical Flow (%)	37.62%	9.74%	28.01%	31.49%	14.20%	52.46%	6.89%	17.11%
Violations of Allowable Duration	18	2	18	21	13		2	
Violations of Catastrophic Duration	10	1	8	9	5		1	
Violations of Rare Flow	906	83	355	226	161	449	22	44
Violations of Rare Flow (%)	32.13%	4.39%	14.43%	11.59%	11.67%	32.54%	4.89%	9.78%
Violations of Allowable Duration	46	3	11	22	12		2	
Violations of Catastrophic Duration	17	1	3	6	6		2	

Common shiner R&G GRAF Spawning

Table D.22 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Last 30 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Last 30 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	135	135	135	135	135	135	135	135
Violations of Common Flow	2518	733	1618	1469	599		323	
Violations of Common Flow (%)	89.29%	38.78%	65.77%	75.33%	43.41%		71.78%	
Violations of Allowable Duration	22	13	26	40	17		16	
Violations of Catastrophic Duration	9	2	8	5	8		0	
Violations of Critical Flow	1054	335	691	515	196	725	30	77
Violations of Critical Flow (%)	37.38%	17.72%	28.09%	26.41%	14.20%	52.54%	6.67%	17.11%
Violations of Allowable Duration	18	6	18	16	13		2	
Violations of Catastrophic Duration	10	1	8	7	5		1	
Violations of Rare Flow	904	146	365	153	161	454	22	44
Violations of Rare Flow (%)	32.06%	7.72%	14.84%	7.85%	11.67%	32.90%	4.89%	9.78%
Violations of Allowable Duration	45	7	12	14	12		2	
Violations of Catastrophic Duration	17	2	3	5	6		2	

Common shiner R&G GRAF Spawning

Table D.23 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Last 5 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Last 5 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	135	135	135	135	135	135	135	135
Violations of Common Flow	428	139	301	247	56		37	
Violations of Common Flow (%)	91.06%	44.13%	73.41%	76.00%	24.35%		49.33%	
Violations of Allowable Duration	3	2	4	8	1		1	
Violations of Catastrophic Duration	2	1	2	1	1		0	
Violations of Critical Flow	222	83	183	134	16	164	0	21
Violations of Critical Flow (%)	47.23%	26.35%	44.63%	41.23%	6.96%	71.30%	0.00%	28.00%
Violations of Allowable Duration	3	1	5	5	1		0	
Violations of Catastrophic Duration	2	1	2	3	1		0	
Violations of Rare Flow	187	67	103	50	14	108	0	12
Violations of Rare Flow (%)	39.79%	21.27%	25.12%	15.38%	6.09%	46.96%	0.00%	16.00%
Violations of Allowable Duration	10	3	4	5	1		0	
Violations of Catastrophic Duration	2	1	1	1	1		0	

Common shiner R&G GRAF Spawning

Table D.24 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Last 5 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Last 5 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	135	135	135	135	135	135	135	135
Violations of Common Flow	427	161	300	242	56		37	
Violations of Common Flow (%)	90.85%	51.11%	73.17%	74.46%	24.35%		49.33%	
Violations of Allowable Duration	3	3	4	8	1		1	
Violations of Catastrophic Duration	2	1	3	1	1		0	
Violations of Critical Flow	216	90	179	121	16	164	0	21
Violations of Critical Flow (%)	45.96%	28.57%	43.66%	37.23%	6.96%	71.30%	0.00%	28.00%
Violations of Allowable Duration	3	1	4	4	1		0	
Violations of Catastrophic Duration	2	1	2	2	1		0	
Violations of Rare Flow	185	76	97	35	14	109	0	12
Violations of Rare Flow (%)	39.36%	24.13%	23.66%	10.77%	6.09%	47.39%	0.00%	16.00%
Violations of Allowable Duration	9	4	4	3	1		0	
Violations of Catastrophic Duration	2	1	1	1	1		0	

Common shiner R&G GRAF Spawning

Table D.25 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Highest Flow 3 years using Today's Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the High 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi ²)	135	135	135	135	135	135	135	135
Violations of Common Flow	255	60	129	107	14		23	
Violations of Common Flow (%)	90.43%	31.75%	52.44%	54.87%	10.14%		51.11%	
Violations of Allowable Duration	3	1	3	4	0		1	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Critical Flow	109	12	28	22	0	120	0	15
Violations of Critical Flow (%)	38.65%	6.35%	11.38%	11.28%	0.00%	86.96%	0.00%	33.33%
Violations of Allowable Duration	3	0	1	1	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Rare Flow	94	7	8	4	0	91	0	9
Violations of Rare Flow (%)	33.33%	3.70%	3.25%	2.05%	0.00%	65.94%	0.00%	20.00%
Violations of Allowable Duration	5	0	0	0	0		0	
Violations of Catastrophic Duration	3	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.26 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Highest Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the High 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	135	135	135	135	135	135	135	135
Violations of Common Flow	255	74	128	98	14		23	
Violations of Common Flow (%)	90.43%	39.15%	52.03%	50.26%	10.14%		51.11%	
Violations of Allowable Duration	3	1	3	3	0		1	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Critical Flow	109	27	28	16	0	120	0	15
Violations of Critical Flow (%)	38.65%	14.29%	11.38%	8.21%	0.00%	86.96%	0.00%	33.33%
Violations of Allowable Duration	3	0	1	0	0		0	
Violations of Catastrophic Duration	1	0	0	0	0		0	
Violations of Rare Flow	94	10	15	0	0	92	0	9
Violations of Rare Flow (%)	33.33%	5.29%	6.10%	0.00%	0.00%	66.67%	0.00%	20.00%
Violations of Allowable Duration	5	0	1	0	0		0	
Violations of Catastrophic Duration	3	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.27 Violations of the Protected Instream Flow Criteria at Lee Hook Road in the Lamprey Designated River for the Average Flow 3 years using Today’s Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Average 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	135	135	135	135	135	135	135	135
Violations of Common Flow	251	9	143	162	94		45	
Violations of Common Flow (%)	89.01%	4.76%	58.13%	83.08%	68.12%		100.00%	
Violations of Allowable Duration	1	0	1	4	3		3	
Violations of Catastrophic Duration	1	0	0	1	2		0	
Violations of Critical Flow	111	3	23	78	31	38	4	0
Violations of Critical Flow (%)	39.36%	1.59%	9.35%	40.00%	22.46%	27.54%	8.89%	0.00%
Violations of Allowable Duration	2	0	1	3	2		0	
Violations of Catastrophic Duration	1	0	0	1	0		0	
Violations of Rare Flow	103	0	3	29	20	15	2	0
Violations of Rare Flow (%)	36.52%	0.00%	1.22%	14.87%	14.49%	10.87%	4.44%	0.00%
Violations of Allowable Duration	4	0	0	3	1		0	
Violations of Catastrophic Duration	2	0	0	1	0		0	

Common shiner R&G GRAF Spawning

Table D.28 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Average Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Average 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	135	135	135	135	135	135	135	135
Violations of Common Flow	251	18	144	160	94		45	
Violations of Common Flow (%)	89.01%	9.52%	58.54%	82.05%	68.12%		100.00%	
Violations of Allowable Duration	1	0	1	5	3		3	
Violations of Catastrophic Duration	1	0	0	0	2		0	
Violations of Critical Flow	111	3	22	63	31	38	4	0
Violations of Critical Flow (%)	39.36%	1.59%	8.94%	32.31%	22.46%	27.54%	8.89%	0.00%
Violations of Allowable Duration	2	0	1	2	2		0	
Violations of Catastrophic Duration	1	0	0	1	0		0	
Violations of Rare Flow	103	0	0	17	20	16	2	0
Violations of Rare Flow (%)	36.52%	0.00%	0.00%	8.72%	14.49%	11.59%	4.44%	0.00%
Violations of Allowable Duration	4	0	0	2	1		0	
Violations of Catastrophic Duration	2	0	0	0	0		0	

Common shiner R&G GRAF Spawning

Table D.29 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Lowest Flow 3 years using Today’s Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Low 3 years of Today's Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	135	135	135	135	135	135	135	135
Violations of Common Flow	275	138	199	181	88		45	
Violations of Common Flow (%)	97.52%	73.02%	80.89%	92.82%	63.77%		100.00%	
Violations of Allowable Duration	3	3	3	5	3		3	
Violations of Catastrophic Duration	2	1	1	1	1		0	
Violations of Critical Flow	214	81	116	61	30	40	13	0
Violations of Critical Flow (%)	75.89%	42.86%	47.15%	31.28%	21.74%	28.99%	28.89%	0.00%
Violations of Allowable Duration	5	4	3	2	2		1	
Violations of Catastrophic Duration	3	0	1	2	1		0	
Violations of Rare Flow	199	28	98	8	27	11	12	0
Violations of Rare Flow (%)	70.57%	14.81%	39.84%	4.10%	19.57%	7.97%	26.67%	0.00%
Violations of Allowable Duration	9	2	4	1	2		1	
Violations of Catastrophic Duration	4	1	0	0	1		1	

Common shiner R&G GRAF Spawning

Table D.30 Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Lowest Flow 3 years using Naturalized Hydrology.

Violations of the Protected Instream Flow Criteria at Wadleigh Falls in the Lamprey Designated River for the Low 3 years of Naturalized Flows								
Bioperiod	Rearing & Growth	Salmon Spawning	Overwintering	Spring Flood	Clupeid Spawning		GRAF Spawning	
Approximate start date	7/5	10/7	12/9	3/1	5/5		6/20	
Approximate end date	10/6	12/8	2/28	5/4	6/19		7/4	
Days	94	63	82	65	46		15	
Indicator	Common Shiner	Atlantic Salmon	Flow	Flow	Min	Max	Min	Max
Watershed area (mi²)	135	135	135	135	135	135	135	135
Violations of Common Flow	277	151	199	174	88		45	
Violations of Common Flow (%)	98.23%	79.89%	80.89%	89.23%	63.77%		100.00%	
Violations of Allowable Duration	3	3	3	5	3		3	
Violations of Catastrophic Duration	2	1	1	0	1		0	
Violations of Critical Flow	214	116	115	52	30	40	13	0
Violations of Critical Flow (%)	75.89%	61.38%	46.75%	26.67%	21.74%	28.99%	28.89%	0.00%
Violations of Allowable Duration	5	4	3	2	2		1	
Violations of Catastrophic Duration	3	0	1	0	1		0	
Violations of Rare Flow	199	49	98	2	27	11	12	0
Violations of Rare Flow (%)	70.57%	25.93%	39.84%	1.03%	19.57%	7.97%	26.67%	0.00%
Violations of Allowable Duration	9	2	4	0	2		1	
Violations of Catastrophic Duration	4	1	0	0	1		1	

Common shiner R&G GRAF Spawning