

Table 1 - Instream Protected Flows for the Segments of the Souhegan River Designated as Protected Pursuant to RSA 483:15, XIII

Upper Souhegan Protected Instream Flows for Fish			Common flow				Critical flow				Rare Flow			
Time of Year	Controlling IPUOCR Upper Souhegan Flows	Bioperiod	Common flow (cfs)	Common flow (cfsm)	Allowable duration (days)	Catastrophic duration (days)	Critical flow (cfs)	Critical flow (cfsm)	Allowable duration (days)	Catastrophic duration (days)	Rare flow (cfs)	Rare flow (cfsm)	Allowable duration (days)	Catastrophic duration (days)
Jan 1 – Feb 28	Fish overwinter	Over-Wintering	204	2.0	35	50	51	0.50	15	30	31	0.30	5	10
Mar 1 – Apr 30	Spring flood	Spring Flood	389	3.8	28	36	113	1.1	12	16	82	0.80	5	7
May 1 – Jun 14	Shad spawning	Shad Spawning	215	2.1	25	40	61	0.60	10	15	38	0.37	4	7
Jun 15 – Jun 30	GRAF spawning	GRAF Spawning	24	0.23	20	27	11	0.11	10	20	8	0.08	10	15
Jul 1 – Jul 14	GRAF spawning													
Jul 15 – Aug 21	GRAF rearing & growth													
Aug 22 – Sep 14	GRAF rearing & growth													
Sep 15 – Sep 30	GRAF rearing & growth	Rearing & Growth	31	0.30	30	42	16	0.16	15	35	10	0.10	5	30
Oct 1 – Nov 14	Salmon spawning	Salmon Spawning	41	0.40	30	40	10	0.10	12	23	10	0.10	10	23
Nov 15 – Dec 1	Fish overwinter	Over-Wintering	204	2.0	35	50	51	0.50	15	30	31	0.30	5	10
Dec 2 – Dec 31	Fish overwinter													

Lower Souhegan Protected Instream Flows for Fish			Common flow				Critical flow				Rare Flow			
Time of Year	Controlling IPUOCR Lower Souhegan Flows	Bioperiod	Common flow (cfs)	Common flow (cfsm)	Allowable duration (days)	Catastrophic duration (days)	Critical flow (cfs)	Critical flow (cfsm)	Allowable duration (days)	Catastrophic duration (days)	Rare flow (cfs)	Rare flow (cfsm)	Allowable duration (days)	Catastrophic duration (days)
Jan 1 – Feb 28	Wood Turtle hibernation	Over-Wintering	342	2.0	35	50	86	0.50	15	30	51	0.30	5	10
Mar 1 – Apr 30	Spring flood	Spring Flood	650	3.8	28	36	188	1.1	12	16	137	0.80	5	7
May 1 – Jun 14	Shad spawning	Shad Spawning	178	1.0	15	25	96	0.60	5	10	88	0.50	5	10
Jun 15 – Jun 30	Oxbow and backwater marsh maintenance	GRAF Spawning	39	0.23	17	25	239 / 26	1.4 / 0.15	13 / 15	23 / 20	325 / 17	1.9 / 0.10	10 / 10	10 / 10
Jul 1 – Jul 14	Oxbow and backwater marsh maintenance													
Jul 15 – Aug 21	Oxbow and backwater marsh maintenance	Rearing & Growth	103	0.60	20	40	26	0.15	15	20	17	0.10	5	10
Aug 22 – Sep 14	Oxbow and backwater marsh maintenance													
Sep 15 – Sep 30	GRAF rearing & growth													
Oct 1 – Nov 14	Salmon spawning	Salmon Spawning	184	1.1	23	40	96	0.60	12	40	39	0.23	5	10
Nov 15 – Dec 1	Fish overwinter	Over-Wintering	342	2.0	35	50	86	0.50	15	30	51	0.30	5	10
Dec 2 – Dec 31	Wood Turtle hibernation													

Bold values are upper limits for instream flow for protection of GRAF spawning. Flows should not be created that exceed these magnitudes and durations.

Souhegan Protected Instream Flows for Natural Communities, Wildlife Habitats and Rare, Threatened or Endangered Wildlife and Plants	
Wild Senna and Wild Garlic	>18.7 cfsm on a frequency of once every 2-10 years
Twisted Sedge/Fern Glade (upper Souhegan only)	>2.8 cfsm once every 1-3 years (December through April)
Wood Turtle (lower Souhegan only)	<5.85 cfsm (June through September)
Wood Turtle (lower Souhegan only)	Flow should exceed the average flow of the last two weeks of the previous November (December through February).
Fowler's Toad (lower Souhegan only)	>2.335 cfsm at least once to fill wetlands (March through May); and >0.175 cfsm at least monthly to maintain breeding pools (June through mid-August)
Silver Maple Floodplain Forest (lower Souhegan only)	>11.7 cfsm once every 1-3 years
Sycamore Floodplain Forest (lower Souhegan only)	>17.5 cfsm once every 1-3 years
Oxbow/Backwater Marsh (lower Souhegan only)	>3.5 cfsm at least once to fill (March through April)

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Table 1 - Attachment - Definitions

Bioperiod - biological periods - time segments within a year having biological significance for survival or propagation of species.

cfs - cubic feet per second - a measure of flow - one cubic foot is 7.481 gallons and one cfs is equivalent to almost 450 gallons per minute.

cfs_m - cubic feet per second per square mile of watershed - a rate of flow - used to determine stream flow in cfs at ungaged locations by multiplying the drainage area of the ungaged location and cfs_m. Cfs_m is derived from gages with known drainage areas.

GRAF - General Reference Adult Fish - a combination of the most common species representing the majority of fish species in the Souhegan Target Fish Community.

IPOOCR - acronym for the instream flow protected entities listed in RSA 483 (Instream Public Use, Outstanding Characteristic, and Resources).

PISF - Protected Instream Flows - described as **Common, Critical and Rare** flow levels that are to be protected from overly long durations that would result in catastrophic conditions.

Flow levels, flow durations, flow condition, and relief flow definitions

Flow levels - common, critical and rare flow magnitudes - assigned to a bioperiod and associated with durations

Common Flow - the flow corresponding to the highest habitat magnitude above which the frequency of occurrence begins to decline significantly with incremental increase in habitat magnitude. Common flow magnitudes represent near optimal habitat availability conditions that are exceeded during approximately 45% of the bioperiod.

Critical Flow - the flow corresponding to the second to the lowest habitat magnitude for which the frequency of occurrence increases significantly with incremental increase in habitat magnitude. Critical flow magnitudes describe less habitat availability than that provided by the common flow, but this habitat magnitude is not unusual. Critical flows represent habitat availability conditions that are exceeded during approximately 65% to 85% of the bioperiod.

Rare Flow - the flow corresponding to the lowest of habitat magnitudes for which the frequency of occurrence increases significantly with incremental increase in habitat magnitude. Rare flow habitat availability is severely reduced and very uncommon. Rare flow represents habitat availability that is exceeded during more than 90% of the bioperiod.

Durations - allowable or catastrophic - limits on the consecutive days when flow is below a protected flow magnitude. Flow durations are reset at the beginning of each new bioperiod.

Allowable - duration occurring in an average year. Flow below protected flow levels may often continue for this duration.

Catastrophic - duration occurring once in ten years. Flows below protected levels for catastrophic durations initiate management activities pursuant to a Water Management Plan.

Conditions - the result of stream flow relative to protected flow magnitude and duration.

Typical - condition when flow is within the desirable range. Flow has not exceeded allowable duration for any protected flow level.

Persistent - condition when flow is below a protected magnitude for more than the allowable duration, but less than the catastrophic duration. Repeated persistent conditions become a catastrophic condition.

Catastrophic - condition when catastrophic durations are exceeded for any protected flow level or if a persistent condition occurs repeatedly. Repeated persistent conditions become a catastrophic condition if occurring either 1) for three consecutive bioperiods, or 2) during the same bioperiod over three consecutive years. A catastrophic condition initiates management activities pursuant to a Water Management Plan.

Relief flows - those flows that may provide relief from catastrophic conditions - relief flows require flows for a duration of two days at or above the next higher protected flow level. Relief flows reset the duration clock to zero for the protected flow level exceeded. Relief flows may be natural or may be artificially created by releases from storage.