

**PSNH Merrimack Station (PSNH) 7Q10 Estimate
December 13, 2006**

Spatial Reference	WS Area (acres)	WS Area (sq.mi.)	Cotton Drift Area (acres)	Cotton Drift Area (sq miles)	Mean Basin Elevation (feet)	Dingman "x"	Sub-area Dingman 7Q10
Merrimack R. near Goffs Falls to Upstream Gages*	281128.96	439.26	36833.235	57.552	503.5	1.480035	30.20
PSNH to Upstream Gages**	155137.92	242.40	28065.846	43.853	491.3	1.226727	16.85

*Piscataquog R. near Goffstown, Contoocook R. below Hopkinton dam, Warner R. at Davisville, Blackwater R. near Webster, Merrimack R. at Franklin Junction, Soucook R. near Concord, Suncook R. at N. Chichester;

**Upstream Gages listed above minus gages at Piscataquog R. near Goffstown and Suncook R. at N.Chichester

Where:

7Q10 = 10^x

x = -2.22 + 1.25 Log₁₀A+.0004Y+1.49D

A, Drainage Area in square miles

Y, Mean Basin Elevation in feet above sea level

D, Fraction of Basin Covered with Coarse-Grained Stratified Drift in Contact with Streams

Actual 7Q10 for area from Goffs Falls Gage to u.s. gages: 83.946 cfs (638.652 - 9.84 - 38.051- 5.286 - 12.807 - 477.825 - 6.929 - 3.968)
Ratio Dingman 7Q10 @ PSNH /Dingman 7Q10 @ Gage: 0.558

USGS Gages and periods of record used:

Gage 7Q10*

*Updated using SWSTAT Nov & Dec 2006

Merrimack R at Goffs Falls (1943-2006)	638.652 cfs
Piscataquog R. near Goffstown (1966-1978)	9.840 cfs
Contoocook at Hopkinton dam (1965-1989 and 2003-2006)	38.051 cfs
Warner R. at Davisville (1941-1978 and 2003-2006)	5.286 cfs
Blackwater R. near Webster (1943-1989)	12.807 cfs
Merrimack R at Franklin Junction (1943-1978 and 2003-2006)	477.825 cfs
Soucook R. at Pembroke Rd near Concord (1989-2006)	6.929 cfs
Suncook R at North Chichester (1950-1970)	3.968 cfs

Estimated 7Q10 just downstream of PSNH: 587.75 cfs [(.558 x 83.946) + 38.051 + 5.286 + 12.807 + 477.825 + 6.929]

PSNH Q at outfall 003 (both units on line) 290.00 mgd

Dilution Factor (DF):

DFc = $\frac{0.646 \times Q_s}{Q_{ave}}$ (x 0.9) DFa = $\frac{0.646 \times Q_s}{Q_{max}}$ (x 0.9)

Where:

0.9 = Reserve Capacity Factor of Safety

0.646 = Conversion from cfs to mgd (0.646 mgd = 1cfs)

Qs = 7Q10 streamflow downstream from PSNH (cfs)

Qave = PSNH's permitted ave flow (mgd)

DFc = $\frac{0.646 \times 587.75 \text{ cfs}}{290 \text{ mgd}}$ (x 0.9)= 1.18

DFa = $\frac{0.646 \times 587.75 \text{ cfs}}{290 \text{ mgd}}$ (x 0.9) = 1.18