Samplepalooza 2014

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Connecticut River Watershed Council

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Introduction

In 2014, the Connecticut River Watershed Council (CRWC), New Hampshire Department of Environmental Services (NHDES), and Vermont Department of Environmental Conservation (VTDEC), coordinated the first of its kind, large-scale, one-day water testing event in the Connecticut River basin, known as "Samplepalooza 2014." On August 6, 2014, multiple teams of volunteers and professionals visited over 50 locations covering more than 1,000 river miles across the three states. Samples were tested for nutrients, chloride, and other water quality parameters to help determine the amount and impact of these pollutants.

Samplepalooza 2014 was a coordinated effort to collect data to support a multi-state effort working to reduce nitrogen pollution in Long Island Sound. Nitrogen from the Connecticut River and other rivers entering the Sound has been determined to be the cause of the "dead zone" documented by researchers in the Long Island Sound. Excess nitrogen causes large amounts of algae to grow. As the algae dies, it depletes the water of dissolved oxygen that is critical for aquatic wildlife. The states of Connecticut and New York have made many strides to reduce the amount of nutrients going into Long Island Sound. The upstream states find this project useful to help identify the primary areas of elevated nutrients in their watersheds.

The sampling strategy was to test a large number of locations on the same day, ideally a day with no rain in any portion of the three states. This allows for more accurate comparisons to be made between samples while minimizing differences in weather and river flow variation—issues that usually complicate such studies. The project was designed to identify areas of the watershed that provide the largest sources of nutrients and, in the future, will allow for more accurate targeting of efforts to reduce nutrient impacts. Sampling locations have been selected on the main stem of the Connecticut River, the downstream sections of its major tributaries, around suspected nutrient sources, and in reference locations on more pristine streams.

Methods

Sample locations in Vermont and New Hampshire were selected by VTDEC and NHDES agency staff, respectfully, assuming a total sample location number of 55. Sample locations in MA were selected by CRWC using locations historically sampled by the Massachusetts Department of Environmental Protection (MassDEP). Existing sample locations on large tributaries, reference sites, and suspected nutrient hot spots were generally chosen for analysis.

Sites in VT were sampled by agency staff and watershed organizations. Sites in NH were sampled by agency staff and CRWC volunteers. Sites in MA were sampled by CRWC volunteers and staff. CRWC volunteers were trained over the phone and in person by Andrea Donlon, who also gave volunteers a written sampling procedure. Agency staff and volunteers received training through their agencies.

Two days falling in different weeks of the summer were chosen as potential sample dates. We were aiming for a low flow day with no rain. On the second of the available weeks, we decided conditions were adequate for going forward with sampling.

Prior to the sample date, representatives from each group met in White River Junction, VT to distribute the appropriate bottles and sample labels to each group.

Water samples were collected in a single grab sample from the center of the water body, either off a bridge using a rope and bucket, or collected by wading into a stream. Total Nitrogen (TN) and Total Phosphorus (TP) samples were analyzed at the State of Vermont's Agriculture and Environmental Laboratory (VAEL) in Burlington VT. Chloride samples were collected and analyzed at the Jody Connor Limnology Center (JCLC) Lab

in Concord, NH. NHDES sample teams took field meter measurements of dissolved oxygen, pH, conductivity, turbidity and water temperature at their sites. All samples were also analyzed for dissolved organic carbon (DOC) by Yale University as part of a separate study project. Those results are not presented in this report, but are available through Yale University.

On the sample date, all groups met at a central location in White River Junction (the Natural Resources Conservation Services office), where field sheets and chain of custody forms were gathered and copied, and all samples were put into coolers going to VAEL, the JCLC Lab in NH, and the Yale University Lab in CT. In some cases, samples were picked up along another team's travel route to minimize driving time and the number of people needing to meet in White River Junction.

QA/QC Procedures

CRWC prepared a Quality Assurance Project Plan (QAPP) for this project which was submitted to VT DEC and NHDES, and was approved prior to the sample date.

At least one field duplicate/replicate and one field blank was collected for every ten samples collected. In addition, one matrix spike per every ten Total Phosphorus samples was collected and submitted to VAEL.

Table 1 - Laboratory Analysis Protocols for Water Samples

Parameter	Reporting Limit [A]	Accuracy[B] (% Recovery)	Estimated Precision for Field Duplicates [C] (RPD)	Laboratory Precision (RPD)	Analytical Method Reference[B]
Total Phosphorus	5 μg/l	85-115%	≤30%	15% [B]	*Std. Methods* (21st ed.) 4500-P H
Chloride (to NH Lab)	3 mg/l	85-115%	≤20%	≤10%	*Std. Methods* (21st ed.) D512C
Total Nitrogen (persulfate digestion)	0.1 mg/l	85-115%	≤20%	≤10%	*Std. Methods* (21st ed.) 4500-N C

(A) - Reporting Limit is the minimum reported value (lowest standard in calibration curve or MDLx3)

(B) - Section 5.0, Vermont Dept. of Conservation Laboratory QA Plan, 2008

(C) - Generated by the analysis of field duplicates

Table 2 - Overview of Sites

	River Name	Site ID	Town	Latitude	Longitude	Sampling Agency/Org
Mainstem Sites	Connecticut River	74-CNT	Pittsburg, NH	45.0211	-71.4640	NHDES
	Connecticut River	67-CNT	Stratford, NH	44.7526	-71.6303	NHDES
	Connecticut River	53-CNT	Dalton, NH	44.4110	-71.7227	CRWC
	Connecticut River	43-CNT	Haverhill, NH	44.1539	-72.0408	CRWC
	Connecticut River	27-CNT	Lebanon, NH	43.6348	-72.3273	CRWC
	Connecticut River	10-CNT	Walpole, NH	43.0847	-72.4330	NHDES
	Connecticut River	01-CNT/ W0478	Northfield, MA	42.6836	-72.4714	CRWC
	Connecticut River	W1395	Suffield, CT	42.0031	-72.6086	CRWC
New Hampshire Tributaries	Hall Stream	02-HAS	Pittsburg	45.0401	-71.4913	NHDES
	Mohawk River	00-MHK	Colebrook	44.9001	-71.5160	NHDES
	Simms Stream	05-SMS	Columbia	44.8492	-71.4931	NHDES
	Johns River	01-JHN	Dalton	44.4264	-71.6763	CRWC
	Israel River	02-ISR	Lancaster	44.4879	-71.5696	CRWC
	Israel River	14-ISR	Jefferson	44.4119	-71.4978	CRWC
	Upper Ammonoosuc River	01-UAM	Northumberland	44.5925	-71.5160	NHDES
	Ammonoosuc River	22-AMM	Bethlehem	44.2716	-71.6316	CRWC
	Ammonoosuc River	03-AMM	Bath	44.1548	-71.9819	CRWC
	Clark Brook	02-CKB	Haverhill	44.0898	-72.0249	CRWC
	Grant Brook	02-GNB	Lyme	43.8075	-72.1636	NHDES
	Hewes Brook	01-HEW	Lyme	43.7854	-72.1971	NHDES
	Mink Brook	01T-MKB	Hanover	43.6928	-72.2748	NHDES
	Mascoma River	01-MSC	Lebanon	43.6338	-72.3174	NHDES
	Blow-Me-Down Brook	01-BMD	Cornish	43.4964	-72.3759	CRWC
	Sugar River	01-SGR	Claremont	43.3983	-72.3939	NHDES
	Cold River	02-CLD	Walpole	43.1321	-72.3904	NHDES
	Ashuelot River	02-ASH	Hinsdale	42.7797	-72.4900	NHDES

	River Name	Site ID	Town	Latitude	Longitude	Sampling Agency/Org
Vermont Tributaries	Nulhegan River	Nulhegan_0.3	Bloomfield	44.7550	-71.6356	VT DEC
	Paul Stream	Paul Stream _0.1	Brunswick	44.6967	-71.6036	VT DEC
	Moose River	Moose_14.3	Concord	44.4833	-71.8656	VT DEC
	Sleepers River	Sleepers_1.1	St. Johnsbury	44.4139	-72.0250	VT DEC
	Passumpsic River	Passumpsic_4.9	Barnet	44.3744	-72.0311	VT DEC
	Water Andric	Water Andric _0.8	Barnet	44.3655	-72.0513	VT DEC
	Stevens River	Stevens_1.4	Barnet	44.3017	-72.0582	VT DEC
	Wells River	Wells_0.6	Wells	44.1544	-72.0489	VT DEC
	Waits River	Waits_0.3	Bradford	43.9965	-72.1224	VT DEC
	Ayers Brook	Ayers Bk_ 0.3	Randolph	43.9286	-72.6556	VT DEC
	Ompompanoosuc River	Ompompan-oosuc_3.8	Thetford	43.7858	-72.2547	VT DEC
	Bloody Brook	Bloody Bk_ 1.6	Norwich	43.7189	-72.3125	VT DEC
	First Branch White River	First Branch White_6.6	Tunbridge	43.8833	-72.5036	VT DEC
	Second Branch White River	Second Branch White_1.4	Royalton	43.8374	-72.5762	VT DEC
	White River	White_34	Stockbridge	43.7824	-72.7580	VT DEC
	White River	White_7.7	Hartford	43.7122	-72.4175	VT DEC
	Ottauquechee River	OtR006	Hartland	43.5932	-72.3488	VT DEC
	Mill Brook	Mill Bk_3.1	Windsor	43.4550	-72.4088	VT DEC
	Black River	Black_1.5	Springfield	43.2710	-72.4542	VT DEC
	Williams River	Williams_3.0	Rockingham	43.1917	-72.4881	VT DEC
	Saxtons River	Saxtons_.19	Westminster	43.1230	-72.4424	VT DEC
	West River	West_1.4	Brattleboro	42.8797	-72.5738	SeVWA
	Whetstone Brook	Whetstone Bk_0.2	Brattleboro	42.8507	-72.5594	SeVWA
Massachusetts Tributaries	Millers River	W0690	Erving/Wendell	42.5975	-72.4378	CRWC
	Deerfield River	W0476	Deerfield/ Greenfield	42.5697	-72.5921	CRWC
	Fort River	W1051	Hadley	42.3328	-72.5786	CRWC
	Mill River	W1796	Northampton	42.3190	-72.6651	CRWC
	Chicopee River	W0475	Chicopee	42.1504	-72.6076	CRWC
	Westfield River	W0474	West Springfield	42.0900	-72.6269	CRWC

Figure 1 - Map of 2014 Samplepalooza Sites

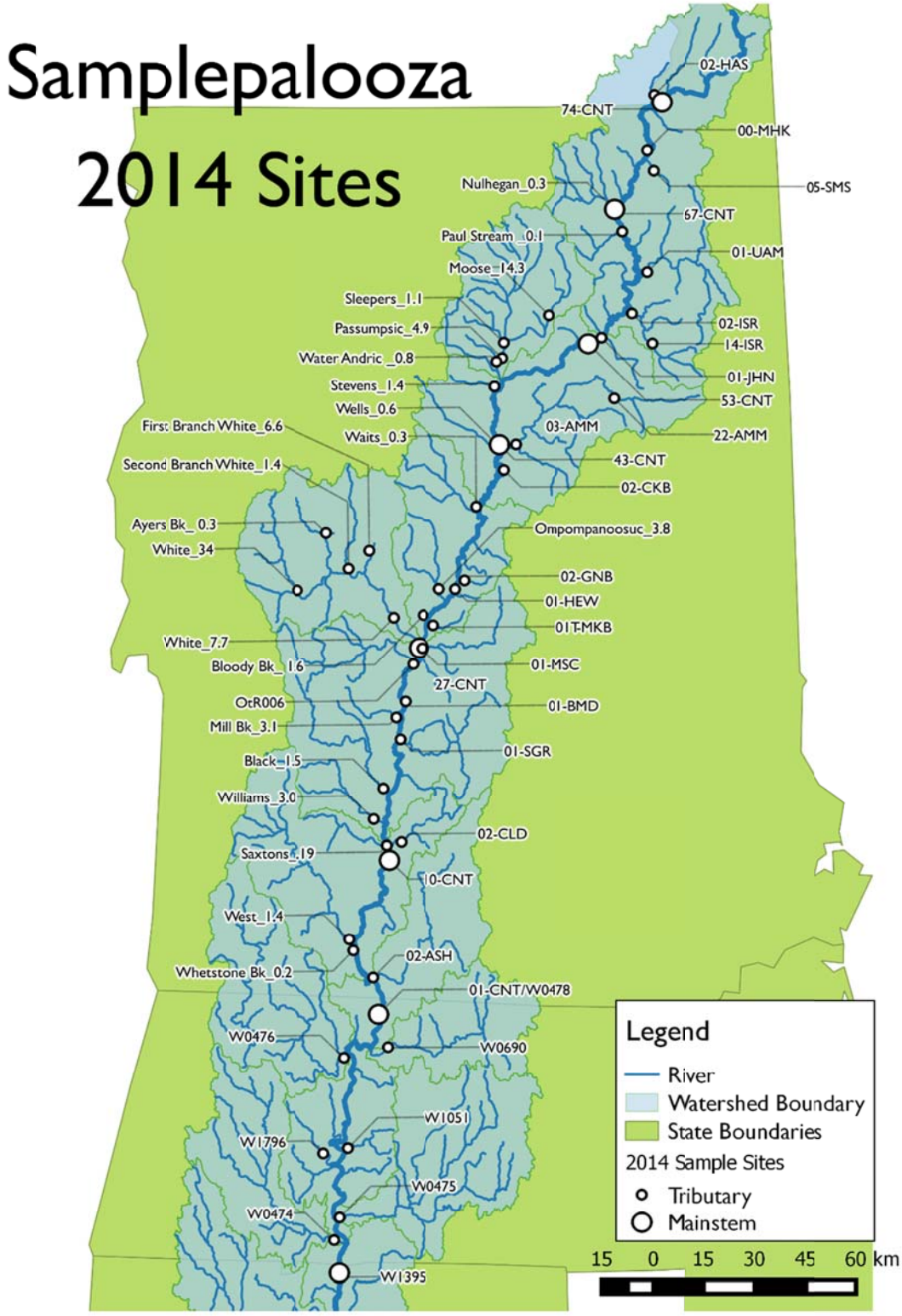


Table 3 - Samplepalooza Parameters Measured, Sampled, or Analyzed

Site	TN	TP	Cl	DOC	DO	pH	Cond	Turb	Water Temp	QC
Mainstem Sites										
CT River @ Pittsburgh NH	•	•	•	•	•	•	•	•	•	
CT River @ Stratford NH	•	•	•	•	•	•	•	•	•	
CT River @ Dalton NH	•	•	•	•						
CT River @ Haverhill NH	•	•	•	•						
CT River @ Lebanon NH	•	•	•	•						
CT River @ Walpole NH	•	•	•	•	•	•	•	•	•	FB (QC5)
CT River @ Northfield MA	•	•	•	•						
CT River @ Suffield CT	•	•	•	•						FB (QC9)
New Hampshire Tributaries										
Hall Stream @ Pittsburgh	•	•	•	•	•	•	•	•	•	
Mohawk River @ Colebrook	•	•	•	•	•	•	•	•	•	
Simms Stream @ Columbia	•	•	•	•	•	•	•	•	•	FREP (QC8)
Johns River @ Dalton	•	•	•	•						
Israel River @ Jefferson	•	•	•	•						FB (QC11)
Israel River @ Lancaster	•	•	•	•						
Upper Ammonoosuc River @ Northumberland	•	•	•	•	•	•	•	•	•	
Ammonoosuc River @ Bethlehem	•	•	•	•						
Ammonoosuc River @ Bath	•	•	•	•						
Clark Brook @ Haverhill	•	•	•	•						
Grant Brook @ Lyme	•	•	•	•	•	•	•	•	•	
Hewes Brook @ Lyme	•	•	•	•	•	•	•	•	•	FREP (QC6)
Mink Brook @ Hanover	•	•	•	•	•	•	•	•	•	
Mascoma River @ Lebanon	•	•	•	•	•	•	•	•	•	
Blow-Me-Down Brook @ Cornish	•	•	•	•						FREP (QC12)
Sugar River @ Claremont	•	•	•	•	•	•	•	•	•	
Cold River @ Walpole	•	•	•	•	•	•	•	•	•	
Ashuelot River @ Hinsdale	•	•	•	•	•	•	•	•	•	FB (QC7)

Site	TN	TP	Cl	DOC	DO	pH	Cond	Turb	Water Temp	QC
Vermont Tributaries										
Nulhegan River @ Bloomfield	•	•	•	•						Spike (TP)
Paul Stream @ Brunswick	•	•	•	•						
Moose River @ Concord	•	•	•	•						FB (QC1)
Sleepers River @ St. Johnsbury	•	•	•	•						
Passumpsic River @ Barnet	•	•	•	•						Spike (TP)
Water Andric @ Barnet	•	•	•	•						
Stevens River @ Barnet	•	•	•	•						
Wells River @ Wells	•	•	•	•						FDUP (QC2)
Waits River @ Bradford	•	•	•	•						
Ayers Brook @ Randolph	•	•	•	•			•		•	Spike (TP)
Ompompanoosuc River @ Thetford	•	•	•	•						
Bloody Brook @ Norwich	•	•	•	•			•			FB (QC3)
First Branch White River @ Tunbridge	•	•	•	•			•		•	
Second Branch White River @ Royalton	•	•	•	•			•		•	Spike (TP)
White River @ Stockbridge	•	•	•	•			•		•	Spike (TP)
White River @ Hartford	•	•	•	•			•		•	
Ottauquechee River @ Hartland	•	•		•			•			
Mill Brook @ Windsor	•	•	•	•						Spike (TP)
Black River @ Springfield	•	•	•	•		•			•	FDUP (QC4)
Williams River @ Rockingham	•	•	•	•						
Saxtons River @ Westminster	•	•	•	•					•	
West River @ Brattleboro	•	•	•	•						
Whetstone Brook @ Brattleboro	•	•	•	•						Spike (TP)
Massachusetts Tributaries										
Millers River @ Erving/Wendell	•	•	•	•						
Deerfield River @ Deerfield/Greenfield	•	•	•	•						FREP (QC10)
Fort River @ Hadley	•	•	•	•						
Mill River @ Northampton	•	•	•	•						
Chicopee River @ Chicopee	•	•	•	•						
Westfield River @ West Springfield	•	•	•	•						

Quality Assurance & Determinations

Results were checked to make sure they satisfied our quality control goals.

Data completeness, as shown in Table 4, was very good for the parameters we were focused on: TN, TP, and chloride. The other parameters were lower than we had originally predicted. When we wrote the QAPP, we had thought some of the sampling teams in VT and MA would measure more parameters in the field, and this did not happen. This change is not a quality control concern to us.

As shown in Table 5, we had 11% samples with duplicates and 11% samples with field blanks, and these met our goals.

Table 4 compares the relative percent difference of our field duplicate and replicates. The TN result for one site, 01-BMD (Blow-Me-Down Brook in NH), exceeded our QC goal. The field sheet was checked for any sampling anomalies and none were found; the samples were not rejected.

Table 4 - Data Completeness

Parameter	# Anticipated Samples (including QC)	# Valid Samples Collected & Analyzed (including QC)	% Complete*
Total Nitrogen (Persulfate Digestion) (VT Lab)	67	67	100%
Total Phosphorus (VT Lab)	67	67	100%
Chloride (NH Lab)	67	66	99%
pH (with meter)	47	17	36%
Turbidity (with meter)	47	15	32%
Dissolved Oxygen (with meter)	55	15	27%
Conductivity (with meter)	55	20	36%
Temperature - Water (with meter)	55	23	42%
Temperature - Air (with meter)	55	18	78%

**Percent Complete = # of Valid Samples Collected and Analyzed / # of Samples Anticipated*

Table 5 - Quality Control Completeness

	Parameter		
	TN	TP	Cl
Total number of sites	55	55	55
Total number of field duplicates	6	6	6
% of field dups (QC goal is ≥10%)	11%	11%	11%
Total number of field blanks	6	6	6
% of field blanks (QC goal is ≥10%)	11%	11%	11%

Table 6 - Field Duplicate Relative Percent Difference

Site ID	QC ID	Parameter					
		TN		TP		Cl	
05-SMS	QC8	0.29	0.27	13.5	12.8	<3	<3
RPD		7.1%		5.3%		0.0%	
01-HEW	QC6	0.31	0.29	7.21	7.37	21	20
RPD		6.7%		2.2%		4.9%	
01-BMD	QC12	0.35	0.24	21.3	23.1	16	15
RPD		**37.3%**		8.1%		6.5%	
Wells_0.6	QC2	0.3	0.31	10.7	11.9	9.7	9.6
RPD		3.3%		10.6%		1.0%	
Black_1.5	QC4	0.4	0.43	23.5	24.2	24	25
RPD		7.2%		2.9%		4.1%	
W0476	QC10	0.31	0.32	16.3	15.7	8.3	8.3
RPD		3.2%		3.8%		0.0%	
Mean RPD		**10.8%**		**5.5%**		**2.7%**	
RPD Goal		**≤20%**		**≤30%**		**≤20%**	

Overview of Results

Samplepalooza 2014 took place on August 6, 2014. Samples were collected at 55 locations in the Connecticut River watershed; 8 sites on the mainstem and 47 on tributaries. Approximately 88% of the drainage area of the CT River watershed in NH and VT had samples collected. Flow conditions on the sample day were not "low flow" as desired. In addition, there was some rainfall the night before sampling at a scattering of locations.

The sample at Connecticut River mainstem location at Lebanon, NH was collected by throwing a bucket on a rope off the bank on the New Hampshire side. The results at this site had very high nutrient concentrations, and it is likely that this sample location was too close to the wastewater treatment plant upstream and complete effluent mixing had not yet occurred. We present the data, but do not think it's representative of Connecticut River TN and TP concentrations. In 2015, this site was not sampled again.

Site 01-CNT in Northfield MA was the best representation of the TN and TP levels leaving NH and VT. W1395 at Suffield, CT was the best representation of the TN and TP levels leaving MA.

Daily mean flow was estimated at each site by using either a nearby USGS flow gage or by calculating flow using a reference gage and a ratio of watershed size in the reference river to the watershed size in the ungaged river.

Table 7 – Samplepalooza 2014 Results

	Site Name	River Name	TN Result (mg-N/L)	TP Result (µg-P/L)	Cl Result (mg-Cl/L)	Likely Received Rainfall >0.1" up to 48 hours prior	NPDES Discharge upstream?	Estimated or actual daily mean flow on 8/4/2014 (cfs)
Mainstem Sites	74-CNT	Connecticut River	0.38	11	<3	Y	NC	507
	67-CNT	Connecticut River	0.38	14	3.1	N	NC	1015
	53-CNT	Connecticut River	0.35	18	3.2	N	NC	2454
	43-CNT	Connecticut River	0.35	14	6.3	N	NC	3828
	27-CNT	Connecticut River	0.53	94	10	N	NC[2]	5324
	10-CNT	Connecticut River	0.33	14	12	N	NC	5923
	01-CNT/W0478	Connecticut River	0.33	14	10	Y	NC	7468
	W1395	Connecticut River	0.44	32	16	Y	NC	9560
New Hampshire Sites	02-HAS	Hall Stream	0.60	22	<3	Y	N	112
	00-MHK	Mohawk River	0.32	8.7	6.5	Y	Y	74
	05-SMS	Simms Stream	0.29	14	<3	Y	N	44
	01-JHN	Johns River	0.57	47	19	N	Y	98
	02-ISR	Israel River	0.24	15	4.5	N	Y	176
	14-ISR	Israel River	0.21	14	4.2	N	N	93
	01-UAM	Upper Ammonoosuc River	0.27	14	<3	N	Y	447
	22-AMM	Ammonoosuc River	0.26	8	7	N	N	137
	03-AMM	Ammonoosuc River	0.27	25	15	N	Y	439
	02-CKB	Clark Brook	0.47	34	14	N	N	11
	02-GNB	Grant Brook	0.27	7.4	20	Y	N	9
	01-HEW	Hewes Brook	0.31	7.2	21	Y	N	8
	01-MKB	Mink Brook	0.22	7.7	82	Y	N	11
	01-MSC	Mascoma River	0.29	10	48	N	Y	129
	01-BMD	Blow-Me-Down Brook	0.35 [3]	21	16	N	N	21
	01-SGR	Sugar River	0.68	35	26	Y	Y	207
	02-CLD	Cold River	0.30	12	9.5	Y	N	86
	02-ASH	Ashuelot River	0.34	18	18	Y	Y	573
VT Sites	Nulhegan_0.3	Nulhegan River	0.35	16	<3	N	N	124
	Paul Stream _0.1	Paul Stream	0.28	15	<3	N	N	40
	Moose_14.3	Moose River	0.31	18	<3	Y	N	54
	Sleepers_1.1	Sleepers River	0.23	6.5	25	Y	Y	17

	Site Name	River Name	TN Result (mg-N/L)	TP Result (µg-P/L)	Cl Result (mg-Cl/L)	Likely Received Rainfall >0.1" up to 48 hours prior	NPDES Discharge upstream?	Estimated or actual daily mean flow on 8/4/2014 (cfs)
Vermont Sites	Passumpsic_4.9	Passumpsic River	0.34	19	16	Y	Y	235
	Water Andric _0.8	Water Andric	0.23	8.7	12	Y	N	6
	Stevens_1.4	Stevens River	0.39	8.3	11	Y	N	24
	Wells_0.6	Wells River	0.30	11	9.7	Y	Y	69
	Waits_0.3	Waits River	0.26	9.0	13	N	N	106
	Ayers Bk_ 0.3	Ayers Brook	0.41	14	20	Y	Y	21
	Ompompanoosuc_3.8	Ompompanoosuc River	0.23	11	12	Y	N	48
	Bloody Bk_ 1.6	Bloody Brook	0.19	6.3	29	Y	N	40
	First Branch White_6.6	First Branch White River	0.19	6.5	11	Y	Y	91
	Second Branch White_1.4	Second Branch White River	0.46	17	17	N	N	87
	White_34	White River	0.28	5.1	6.6	N	N	10
	White_7.7	White River	0.23	13	12	N	Y	457
	OtR006	Ottauquechee River	0.23	15	NA	N	Y	31
	Mill Bk_3.1	Mill Brook	0.14	11	12	N	Y	154
	Black_1.5	Black River	0.40	24	24	Y	Y	92
	Williams_3.0	Williams River	0.49	16	16	Y	Y	34
	Saxtons_.19	Saxtons River	0.20	10	14	Y	Y	257
	West_1.4	West River	0.20	8.5	11	Y	Y	80
	Whetstone Bk_0.2	Whetstone Brook	0.26	12	20	Y	N	236
MA Sites	W0690	Millers River	0.47	26	22	Y	Y	417
	W0476	Deerfield River	0.31	16	8.3	Y	Y	1450
	W1051	Fort River	0.37	36	32	Y	N	45
	W1796	Mill River	0.33	20	17	Y	N	43
	W0475	Chicopee River	0.41	23	42	Y	Y	266
	W0474	Westfield River	0.50	18	22	Y	Y	622

Notes: NC – not considered. Virtually all mainstem river sites have a NPDES permit discharge upstream.

[1] Rainfall based on http://www.srh.noaa.gov/ridge2/RFC_Precip/ data for the sample date and the day before compared to sample locations

[2] This site is located just downstream of a wastewater treatment plant and is likely not representative of mixed concentrations on the river.

[3] The TN result and a field replicate at this sample site varied more from each other than deemed acceptable in our QAPP.

Table 8 - NPDES Discharges Upstream of Tributary Sites

	Site Name	River Name	Upstream NPDES Permits
New Hampshire Sites	02-HAS	Hall Stream	None
	00-MHK	Mohawk River	Colebrook WWTP, Columbia Sand & Gravel, Town of Colebrook
	05-SMS	Simms Stream	None
	01-JHN	Johns River	Whitefield WWTF
	02-ISR	Israel River	Lancaster Grange WWTP, Forbes Farm
	14-ISR	Israel River	None
	01-UAM	Upper Ammonoosuc River	Groveton WWTP, Groveton Paperboard Mill (Former), Northumberland Village Pollution Control, Berlin State Fish Hatchery
	22-AMM	Ammonoosuc River	None
	03-AMM	Ammonoosuc River	Lisbon WWTF, New England Wire Technologies Co HQ, Lahout Property Development, Tender Corporation, Littleton WWTP, Hitchiner MFG Co INC, Bethlehem Village WWTP
	02-CKB	Clark Brook	None
	02-GNB	Grant Brook	None
	01-HEW	Hewes Brook	None
	01T-MKB	Mink Brook	None
	01-MSC	Mascoma River	Victor Technologies, Timken Aerospace, Lebanon Water Filtration Facility, Walhowden Dairy Farm, New England Industries Inc
	01-BMD	Blow-Me-Down Brook	None
	01-SGR	Sugar River	Claremont WWTF, Michael Crone LLC, Lowes of Claremont #2616, Monadnock Park, Newport WWTF, Newport Sand & Gravel, Sturm Ruger & Co Inc, Carroll Concrete, Sunapee WWTF
	02-CLD	Cold River	None
	02-ASH	Ashuelot River	Hinsdale WWTP, Atlantic Paper Mills of NH Inc, Winchester WWTP

	Site Name	River Name	Upstream NPDES Permits
Vermont Sites	Nulhegan_0.3	Nulhegan River	None
	Paul Stream _0.1	Paul Stream	None
	Moose_14.3	Moose River	None
	Sleepers_1.1	Sleepers River	Coltect Industries
	Passumpsic_4.9	Passumpsic River	St Johnsbury WWTF, St Johnsbury Water Filtration Plant, Weidmann Electrical Technology Inc, Lyndon WWTP, Bradford Oil Co - Jons Auto, Lyndonville Water Treatment Plant, Coltect Industries
	Water Andric _0.8	Water Andric	None
	Stevens_1.4	Stevens River	None
	Wells_0.6	Wells River	Newbury Hydro Co
	Waits_0.3	Waits River	None
	Ayers Bk_ 0.3	Ayers Brook	Randolph (Agricultural)
	Ompompanoosuc_3.8	Ompompanoosuc River	None
	Bloody Bk_ 1.6	Bloody Brook	None
	First Branch White_6.6	First Branch White River	Chelsea WWTF
	Second Branch White_1.4	Second Branch White River	None
	White_34	White River	None
	White_7.7	White River	Randolph (Agricultural), Bethel (industrial), Chelsea WWTF, Royalton WWTF
	OtR006	Ottauquechee River	Hartford - Quechee (WWTP), Woodstock - Taftsville (agricultural), Woodstock WWTP, Killington Ski Resort
	Mill Bk_3.1	Mill Brook	Luzenac America West Windsor Mill
	Black_1.5	Black River	Springfield WWTF, Springfield Medical Care Systems, Springfield Municipal Pool, Cavendish WWTF, Luzenac America (Ludlow), Ludlow WWTF
	Williams_3.0	Williams River	Chester MTP
	Saxtons_.19	Saxtons River	Saxtons River WWTF
	West_1.4	West River	Eagle River Mining Inc, Imerys Talc Delaware, Jeffrey Residence
	Whetstone Bk_0.2	Whetstone Brook	None

	Site Name	River Name	Upstream NPDES Permits
Massachusetts Sites	W0690	Millers River	Erving POTW #3, Erving Center WWTP #2, Orange WWTP, Athol WWTF, LS Starrett, Royalston WWTP, Winchendon Water Pollution Control Facility, Ashburn & Winchendon WPF, Templeton WWTP, Seaman Paper Mill, Gardner Wastewater Treatment Facility, Gardner Water Treatment Plant
	W0476	Deerfield River	Greenfield Water Pollution Control Facility, Old Deerfield Wastewater Treatment Plant, Shelburne WWTF, Barnhardt Manufacturing, Charlemont WWTF, Monroe WWTF, Readsboro SS, Whitingham (nothing obvious on map), Whitingham-Jacksonville (agricultural), Coldbrook Fire District, Seasons on Mt Snow
	W1051	Fort River	None
	W1796	Mill River	None
	W0475	Chicopee River	Chicopee WWTP, Solutia Chemical Manufacturing Plant, Ludlow WWTP, McLaughlin State Trout Hatchery, Palmer Water Pollution Control Facility, Roger J Reeds Salmon Hatchery, Warren WWTP, Ware WWTP, Kanazaki Specialty Papers Inc, Quabbin Wire & Cable Co Inc, Hardwick Water Pollution Control Facility, Hardwick WWTP, Barre WWTF, Spencer WWTP, North Brookfield WWTP
	W0474	Westfield River	Lane, John S. & Son Inc, Westfield WWTP, Westfield Electroplating Co, Jen-Coat Inc, Huntington WWTP, Russell WWTF, Woronoco WWTF, West Parish Filters WTP, Westfield WTP - Southwick, The Maples

Total Nitrogen Results

None of the watershed states have established numeric criteria for total nitrogen in their water quality standards that would apply to the Connecticut River watershed. The State of Vermont has water quality criteria for nitrates of 5.0 mg/l in Class B waters. Outside of major runoff events when organic nitrogen levels can be elevated, most of the total nitrogen in Vermont waters is generally in the form of nitrates so 5 mg/l can be used as a threshold. The NH Volunteer River Assessment Program's "Description of Water Quality Parameters" list total Kjeldahl nitrogen (TKN) (ammonia plus organic nitrogen) concentrations 0.41-0.50 mg-TKN/L as being "more than desirable" and concentrations above 0.50 mg/L as being "excessive." Total nitrogen is the sum of TKN and nitrate-nitrite. Recently, EPA Region 1 has considered a total Nitrogen threshold for Long Island Sound of 0.45 mg/L as protective for dissolved oxygen (DO) and 0.34 mg/L for protective of eelgrass; the Connecticut River can support eelgrass and so the lower threshold would apply. The graphs below present results, with a line set at 0.34 mg/L for comparison purposes.

Leaving out the Lebanon, NH site, TN results on the mainstem were somewhat steady, but increased at the Suffield CT location. NH tributaries with the highest concentrations were Hall Stream, Johns River, Clark Brook, Blow-me-down Brook, and Sugar River. VT tributaries with the highest concentrations were Nulhegan River, Stevens River, Ayers Brook, Second Branch White River, Black River, and the Williams River. MA tributaries with high concentrations were the Millers River, Fort River, Chicopee River, and the Westfield River.

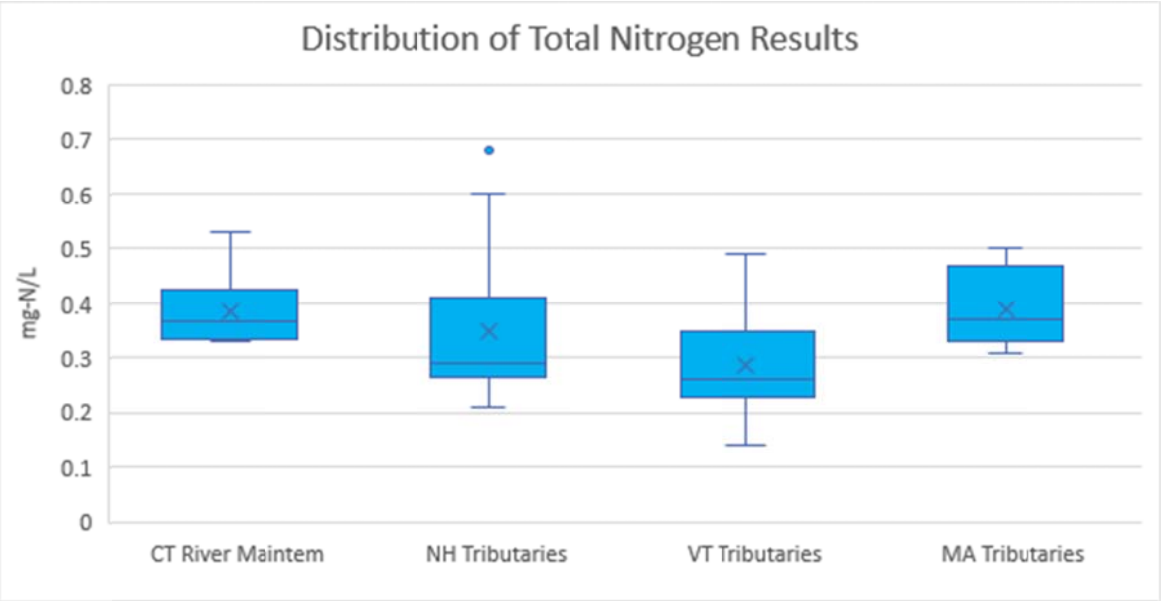
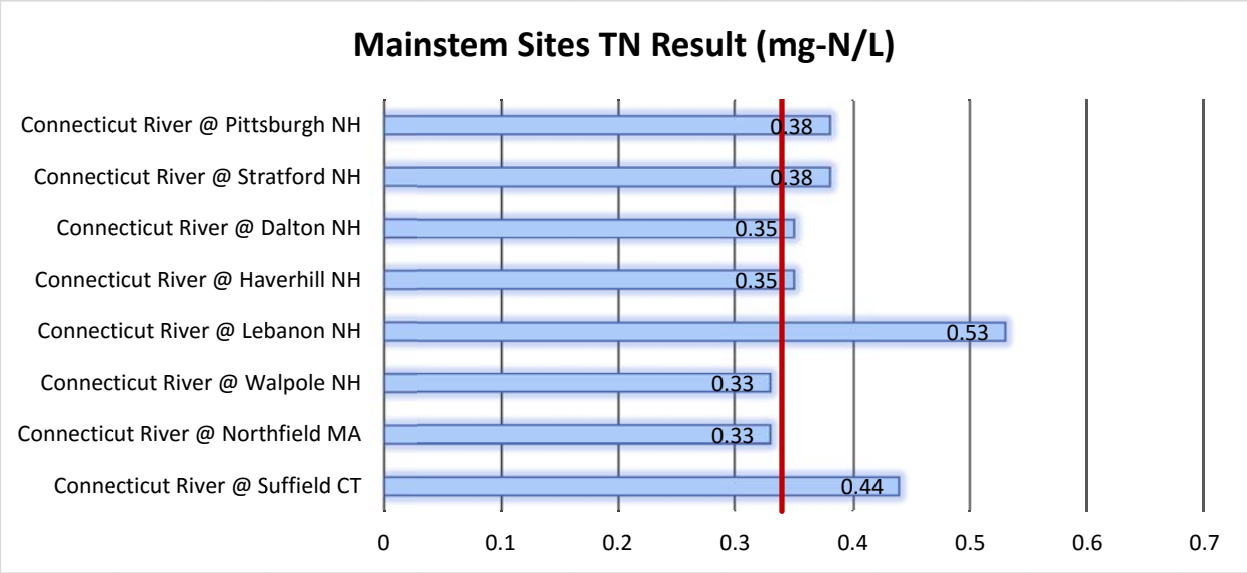
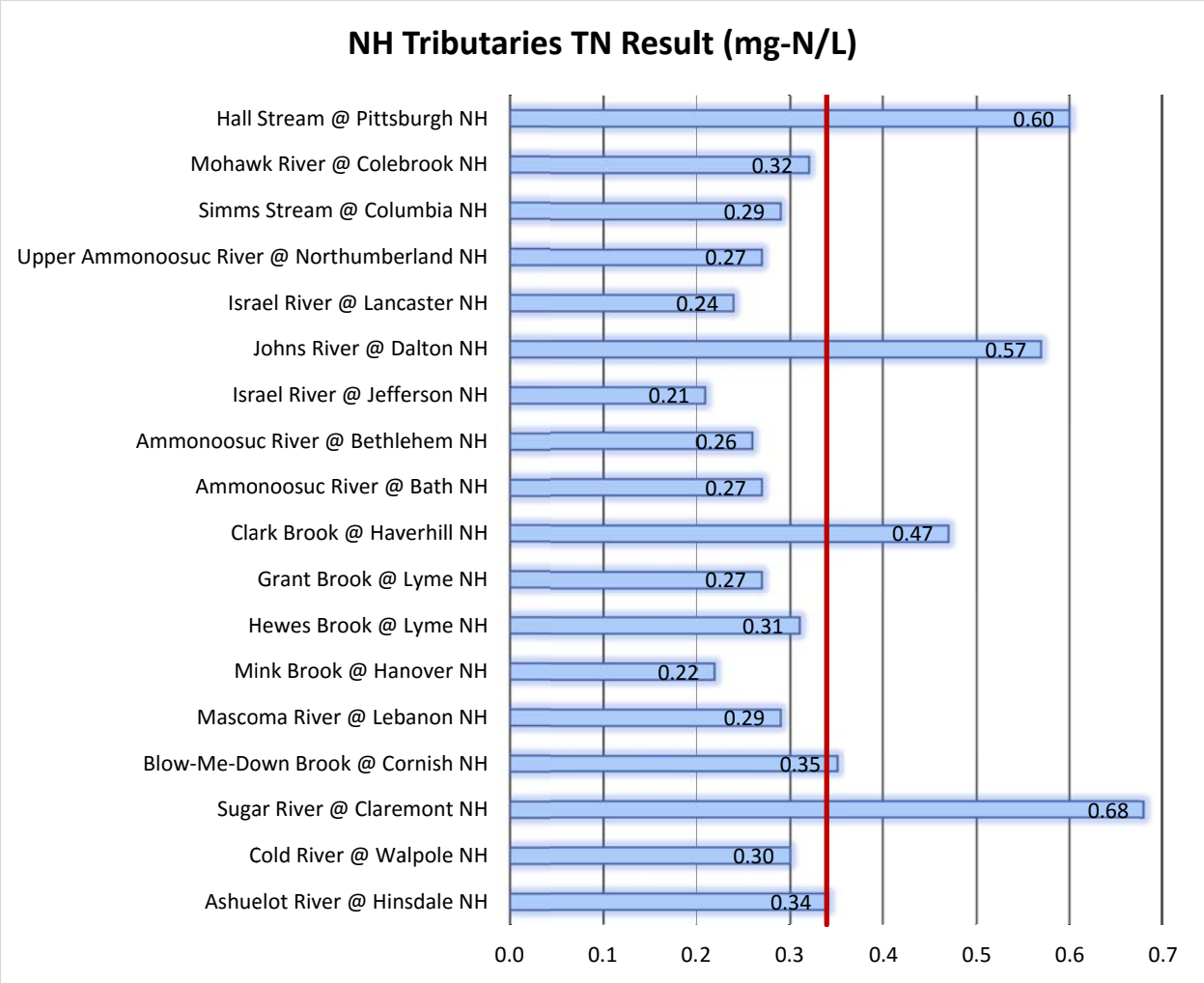
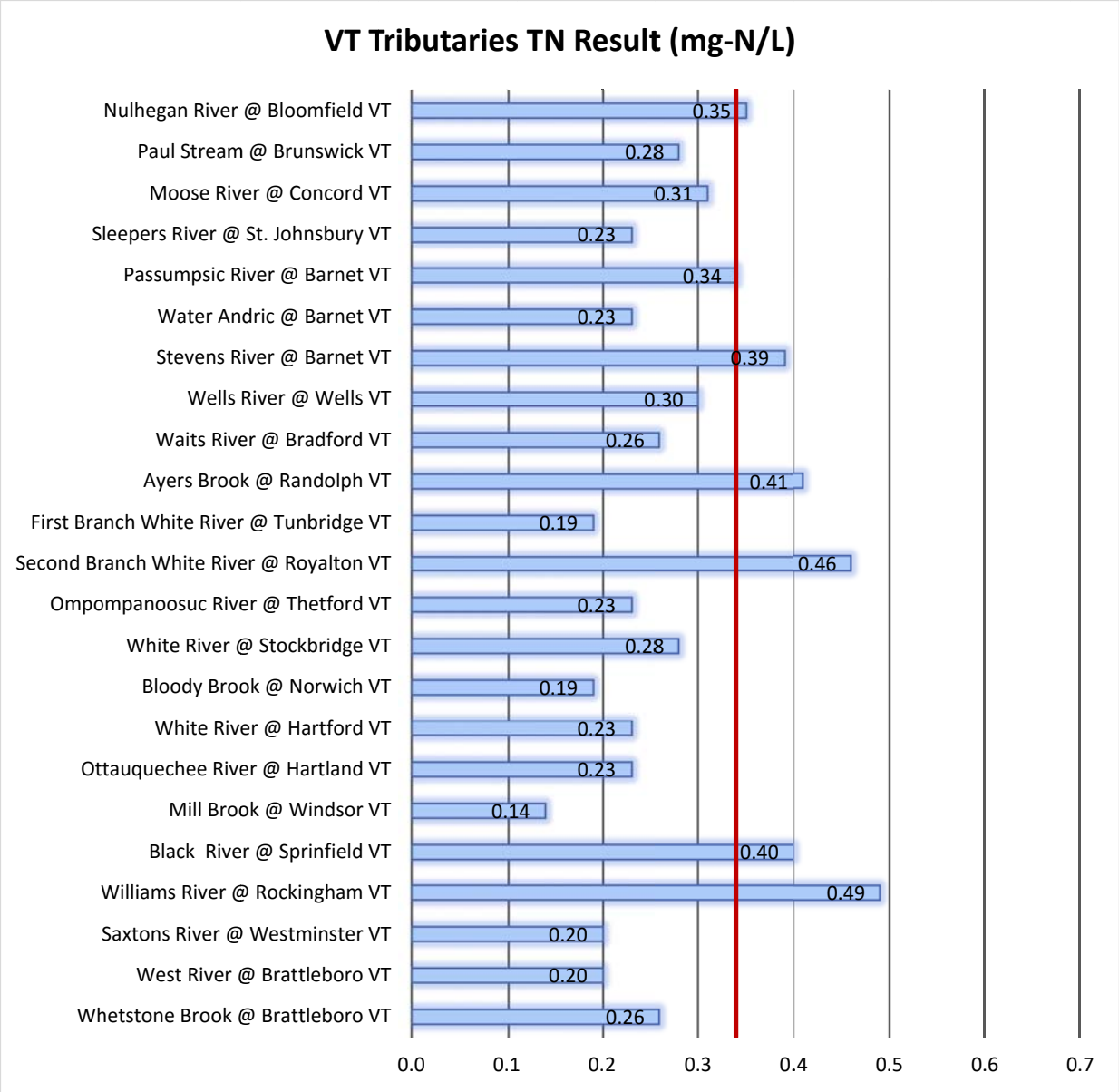


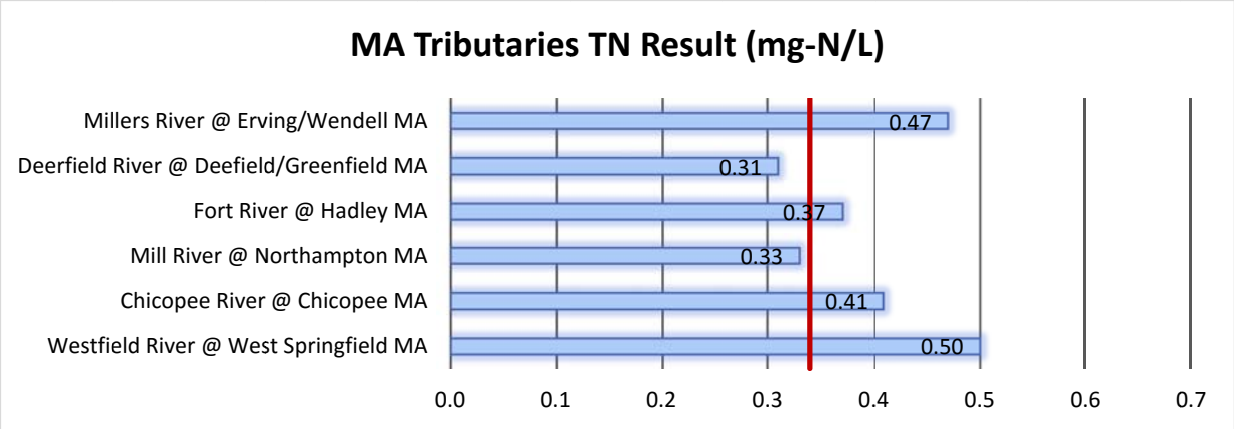
Figure 2 - Distribution of Total Nitrogen Results

Figure 3 - Total Nitrogen Results by Mainstem and State






VT Tributaries TN Result (mg-N/L)
Nulhegan River @ Bloomfield VT
Paul Stream @ Brunswick VT
Moose River @ Concord VT
Sleepers River @ St. Johnsbury VT
Passumpsic River @ Barnet VT
Water Andric @ Barnet VT
Stevens River @ Barnet VT
Wells River @ Wells VT
Waits River @ Bradford VT
Ayers Brook @ Randolph VT
First Branch White River @ Tunbridge VT
Second Branch White River @ Royalton VT
Ompompanoosuc River @ Thetford VT
White River @ Stockbridge VT
Bloody Brook @ Norwich VT
White River @ Hartford VT
Ottauquechee River @ Hartland VT
Mill Brook @ Windsor VT
Black River @ Sprinfield VT
Williams River @ Rockingham VT
Saxtons River @ Westminster VT
West River @ Brattleboro VT
Whetstone Brook @ Brattleboro VT
0.35
0.28
0.31
0.23
0.34
0.23
0.39
0.30
0.26
0.41
0.19
0.46
0.23
0.28
0.19
0.23
0.23
0.14
0.40
0.49
0.20
0.20
0.26
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7


MA Tributaries TN Result (mg-N/L)
Millers River @ Erving/Wendell MA
Deerfield River @ Deefield/Greenfield MA
Fort River @ Hadley MA
Mill River @ Northampton MA
Chicopee River @ Chicopee MA
Westfield River @ West Springfield MA
0.47
0.31
0.37
0.33
0.41
0.50
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

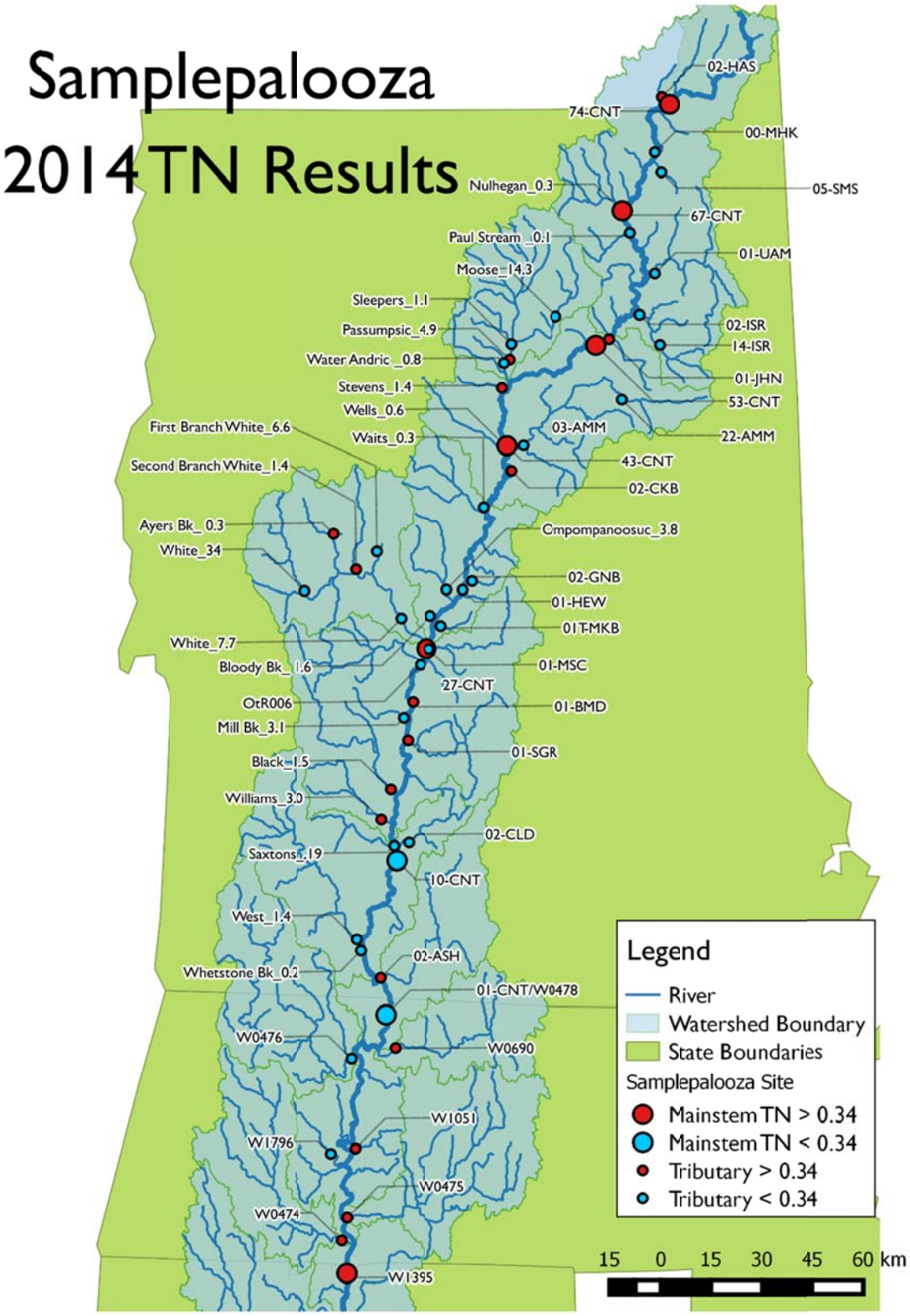


Figure 4 - Map of TN Results

Total Phosphorous Results

Only Vermont has established numeric criteria for total phosphorus in their water quality standards that would apply to the Connecticut River watershed. The Vermont phosphorus criteria for class B waters is 12 µg/l for small high gradient streams, 15 µg/l for medium high gradient streams and 27 µg/l for warm water medium gradient streams as measured at low median monthly flow. Most of the sites sampled in Vermont would fit into the warm water medium gradient stream type although flows on the sample date were likely above the low median monthly flow so the standard isn't directly applicable. The NH Volunteer River Assessment Program's "Description of Water Quality Parameters" list concentrations 26-50 µg-P/L as being "more than desirable" and concentrations above 50 µg-P/L as being "excessive." The graphs below present results, with a line set at 26 for comparison purposes.

Leaving out the Lebanon, NH site, TP results on the mainstem were somewhat steady, but increased at the Suffield, CT location. NH tributaries with the highest concentrations were Johns River, Clark Brook, and Sugar River. VT tributaries all fell below 27 µg/L. The Fort River in MA had high TP levels.

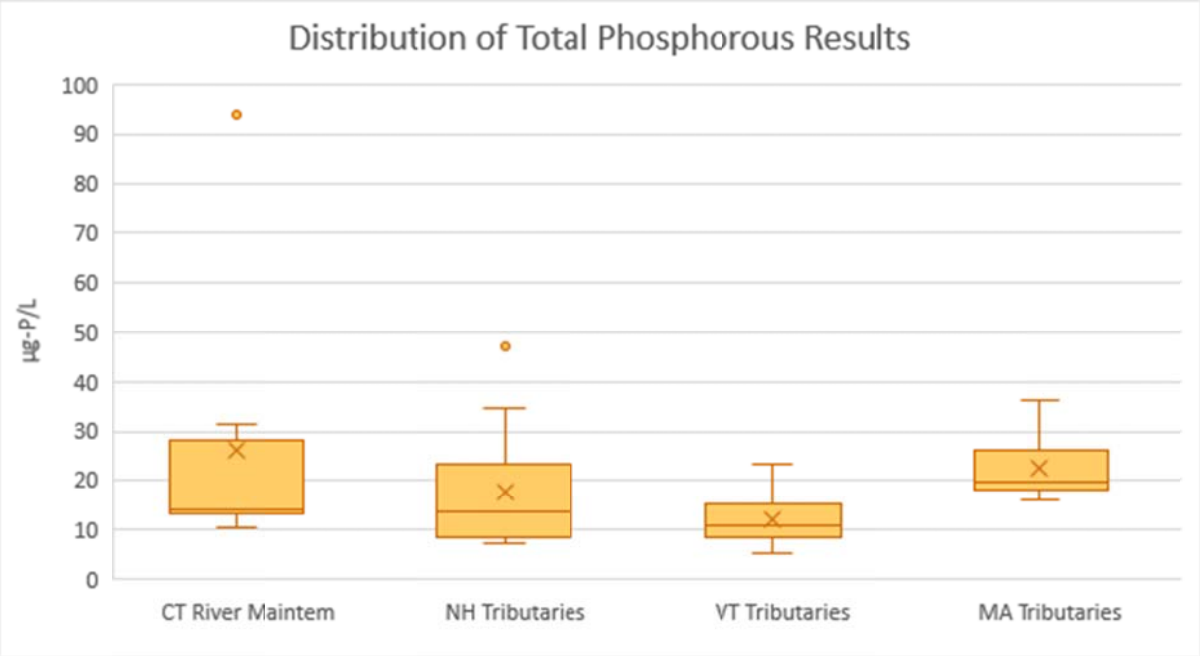
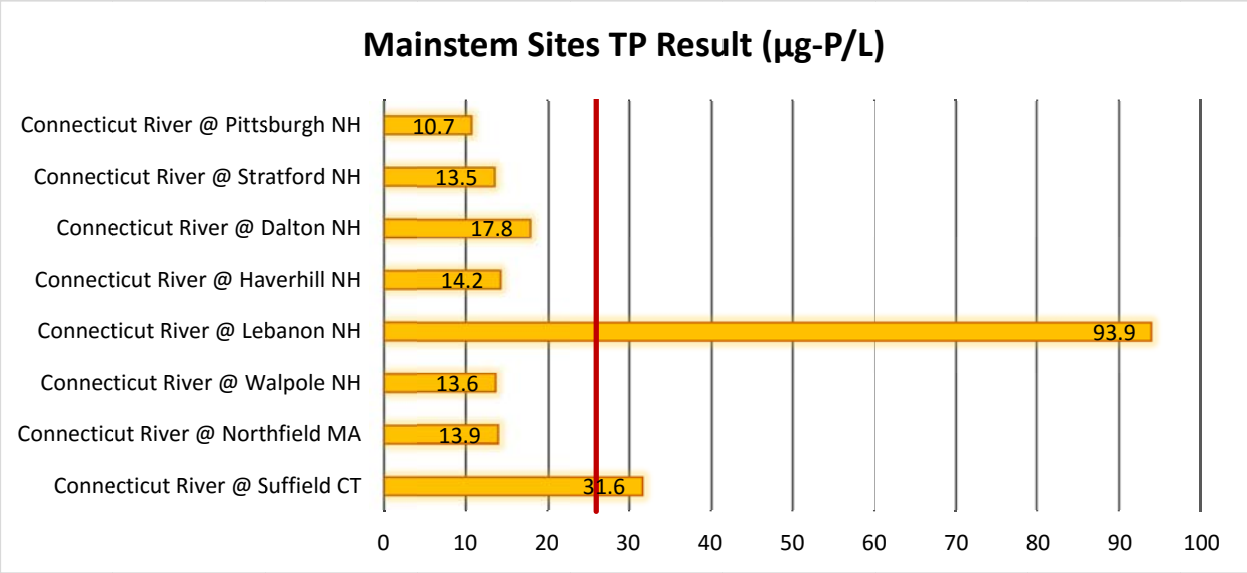
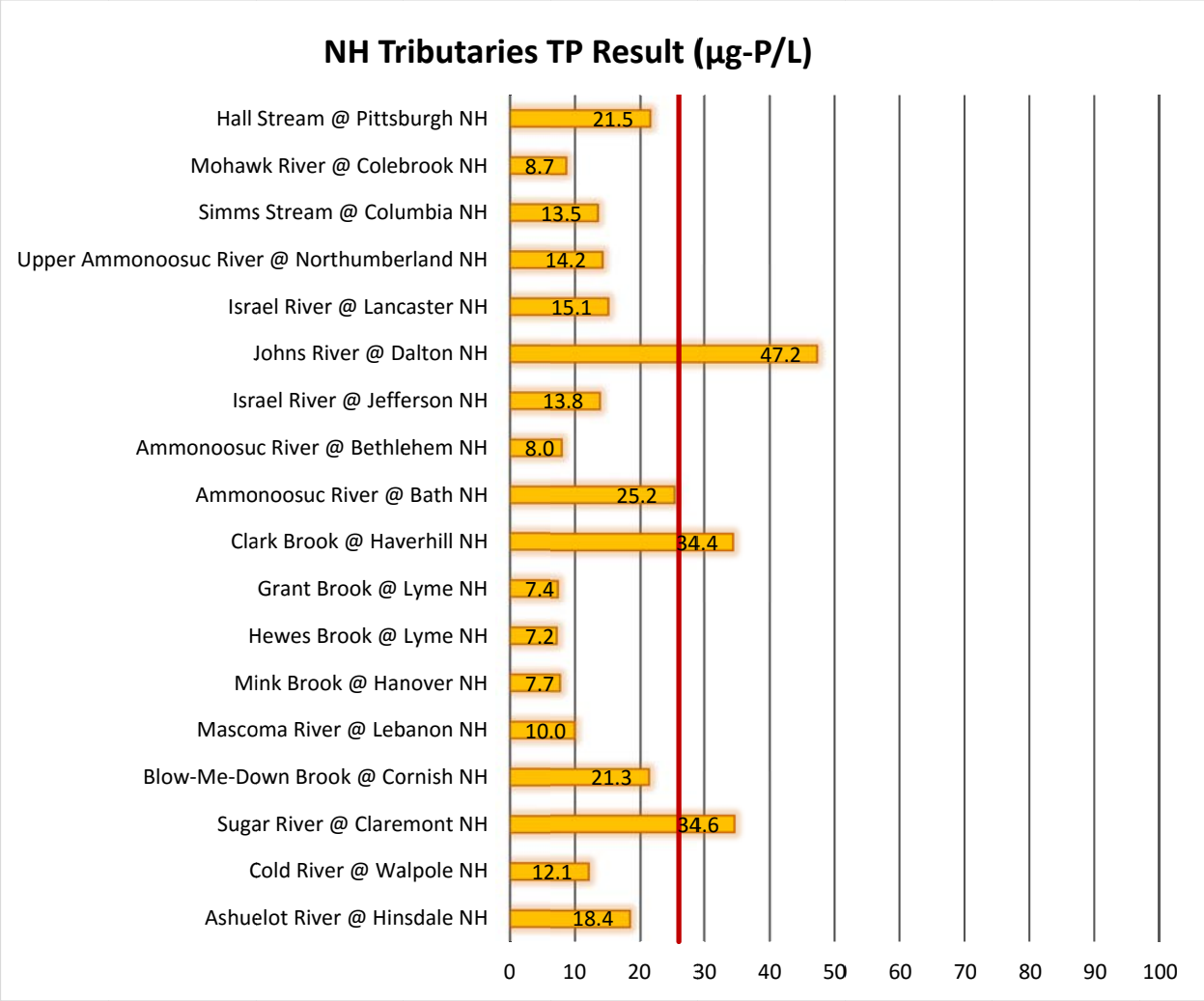
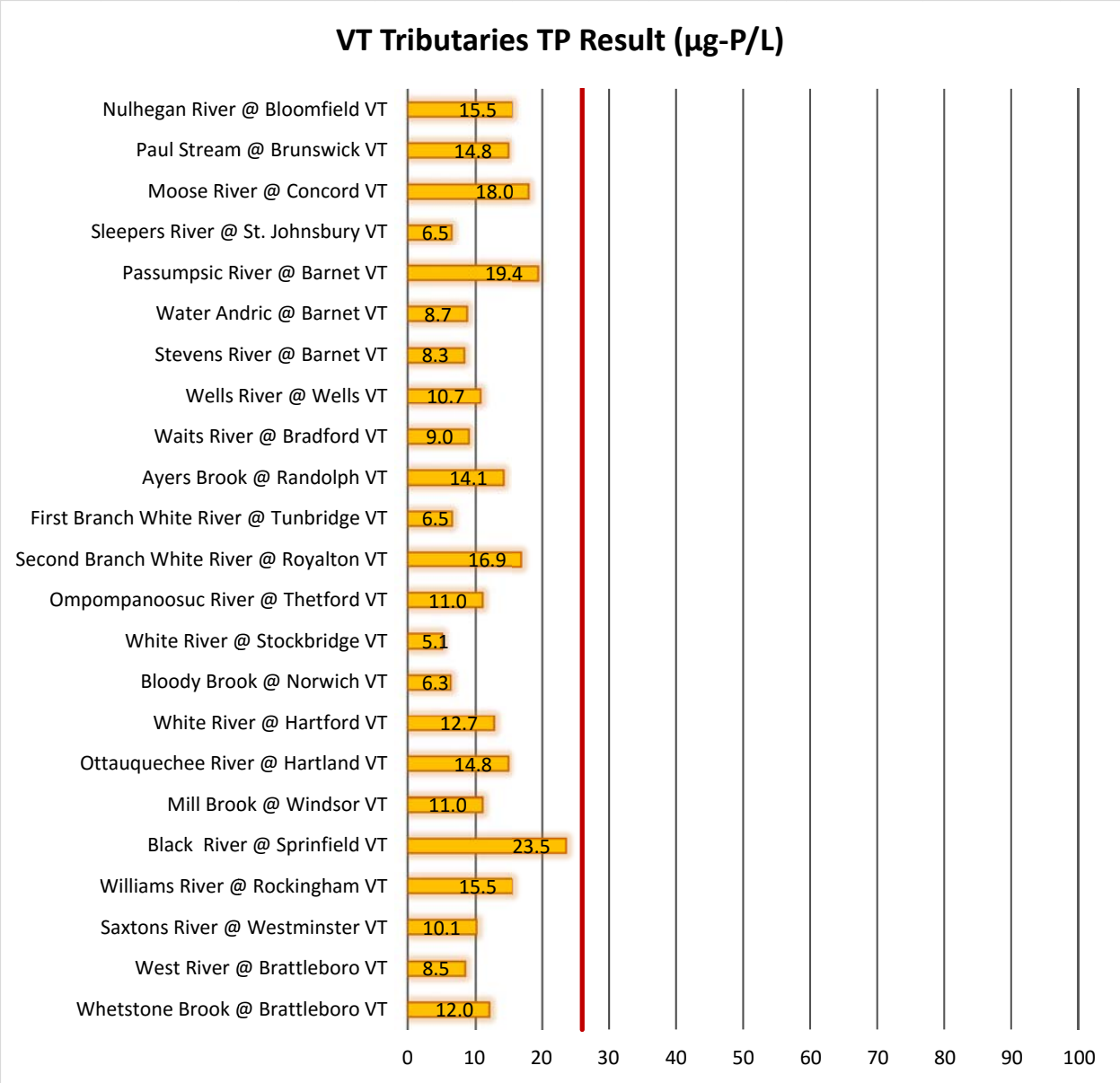


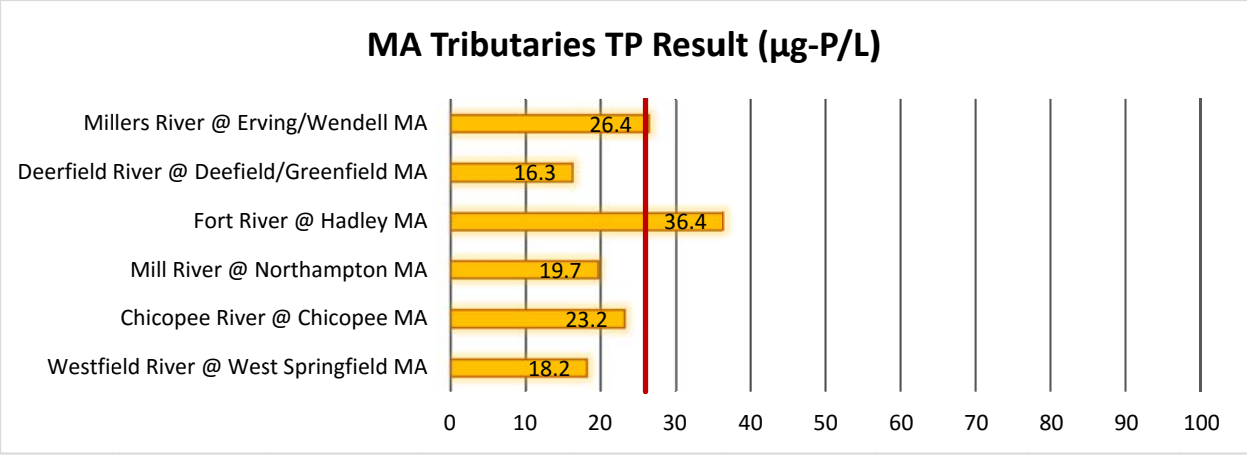
Figure 5 - Distribution of Total Phosphorous Results

Figure 6 - Total Phosphorous Results by Mainstem and State






VT Tributaries TP Result (µg-P/L)
Nulhegan River @ Bloomfield VT
15.5
Paul Stream @ Brunswick VT
14.8
Moose River @ Concord VT
18.0
Sleepers River @ St. Johnsbury VT
6.5
Passumpsic River @ Barnet VT
19.4
Water Andric @ Barnet VT
8.7
Stevens River @ Barnet VT
8.3
Wells River @ Wells VT
10.7
Waits River @ Bradford VT
9.0
Ayers Brook @ Randolph VT
14.1
First Branch White River @ Tunbridge VT
6.5
Second Branch White River @ Royalton VT
16.9
Ompompanoosuc River @ Thetford VT
11.0
White River @ Stockbridge VT
5.1
Bloody Brook @ Norwich VT
6.3
White River @ Hartford VT
12.7
Ottauquechee River @ Hartland VT
14.8
Mill Brook @ Windsor VT
11.0
Black River @ Sprinfield VT
23.5
Williams River @ Rockingham VT
15.5
Saxtons River @ Westminster VT
10.1
West River @ Brattleboro VT
8.5
Whetstone Brook @ Brattleboro VT
12.0
0
10
20
30
40
50
60
70
80
90
100


MA Tributaries TP Result (µg-P/L)
Millers River @ Erving/Wendell MA
26.4
Deerfield River @ Deefield/Greenfield MA
16.3
Fort River @ Hadley MA
36.4
Mill River @ Northampton MA
19.7
Chicopee River @ Chicopee MA
23.2
Westfield River @ West Springfield MA
18.2
0
10
20
30
40
50
60
70
80
90
100

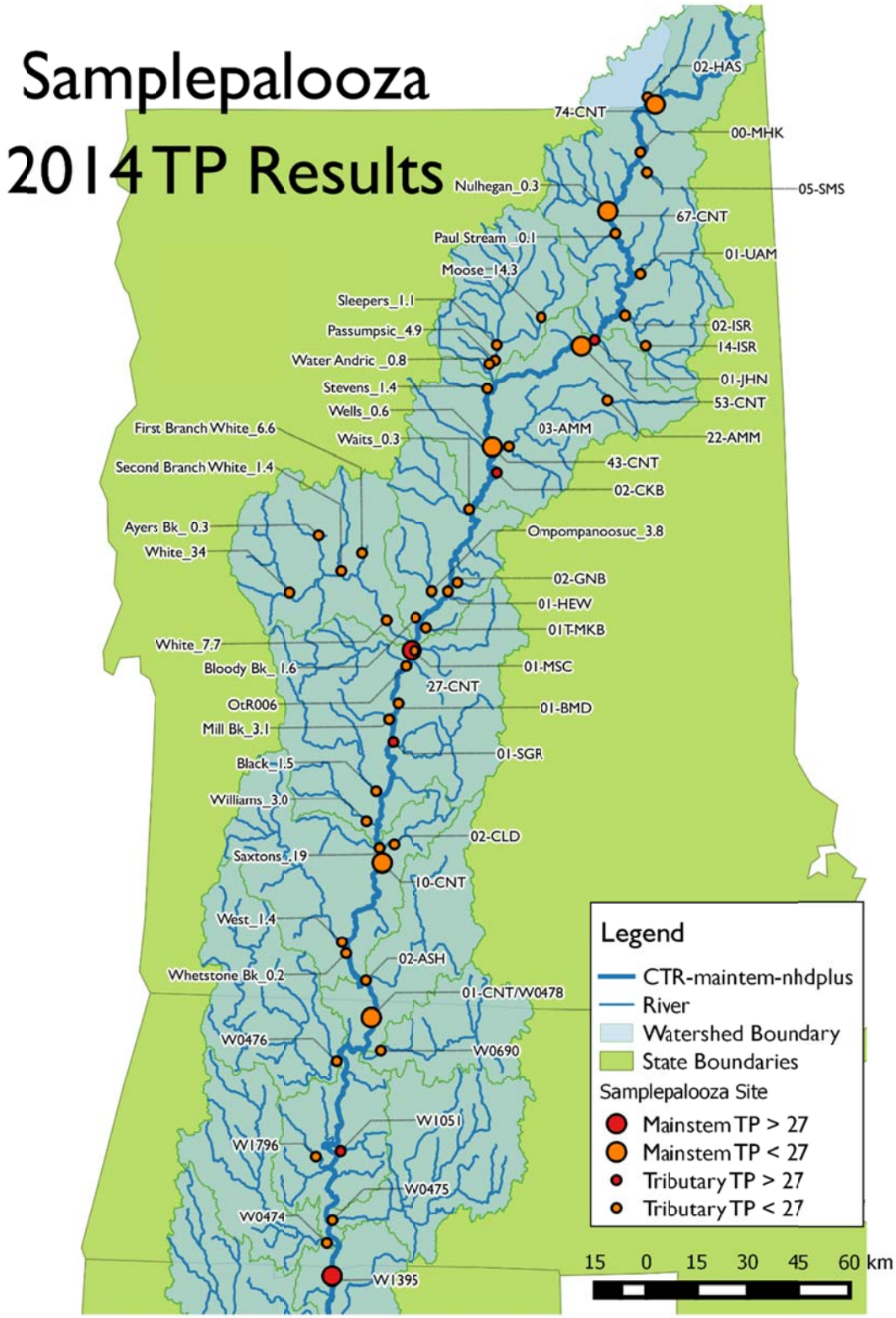


Figure 7 - Map of TP Results

Chloride Results

New Hampshire and Vermont use EPA's chronic toxicity guideline of 230 mg/L for chloride in their water quality standards. All chloride levels fell well below that guideline. The NH EPSCoR program uses a "conservative threshold of salinity for protecting aquatic life" of 44 mg/L. The graphs below present results, with a line set at 44 for comparison purposes. Mink Brook and the Mascoma River in NH both had chloride levels above 44 mg/L. All other sites fell below that threshold. In general, chloride concentrations averaged higher in Massachusetts tributaries, followed by New Hampshire, which makes sense given that those two states in 2000 had the highest application rates of road salt per lane mile in the northeast (Massachusetts Highway Department Snow and Ice Control Generic Environmental Impact Report, 2006).

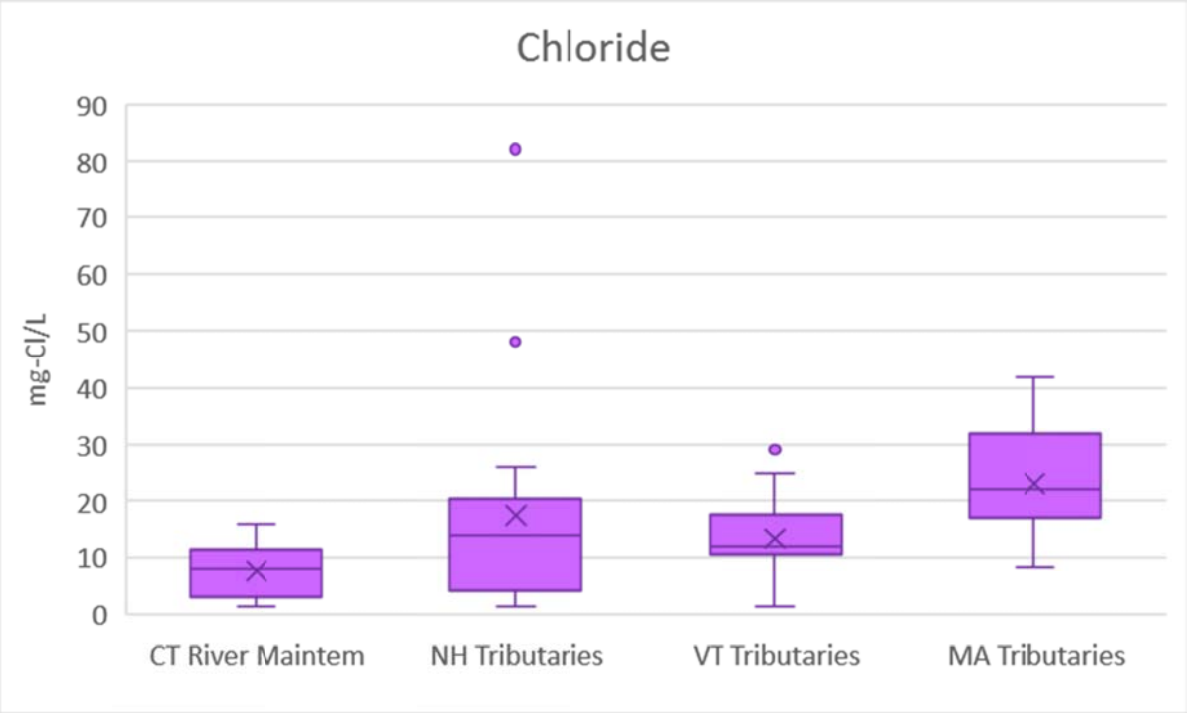
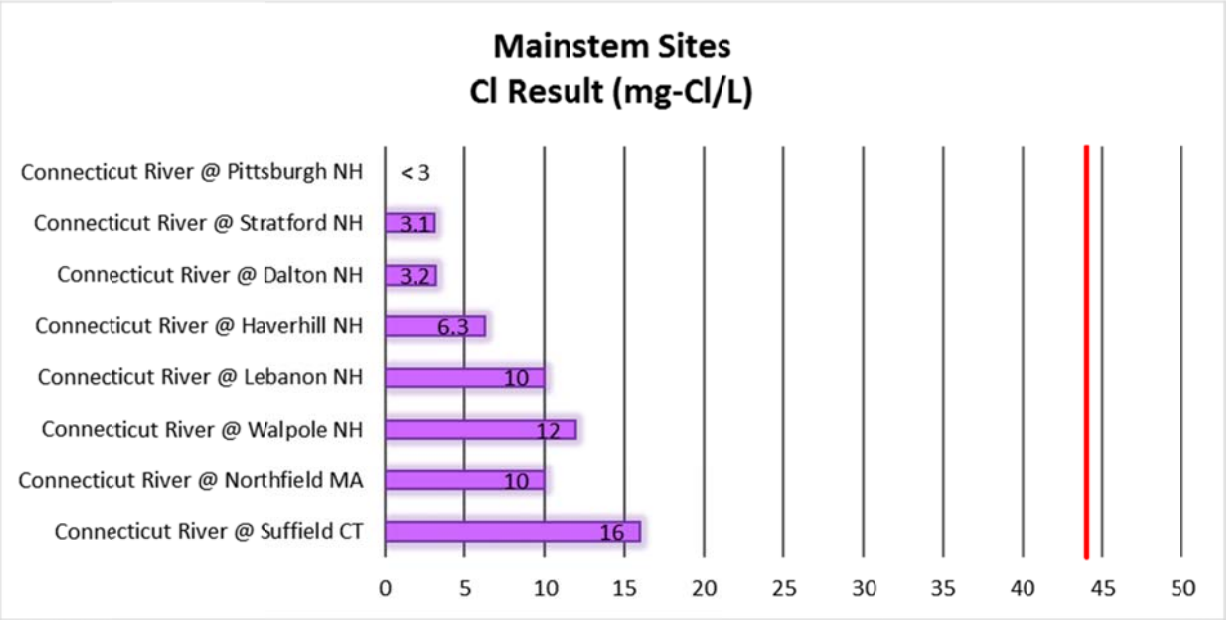
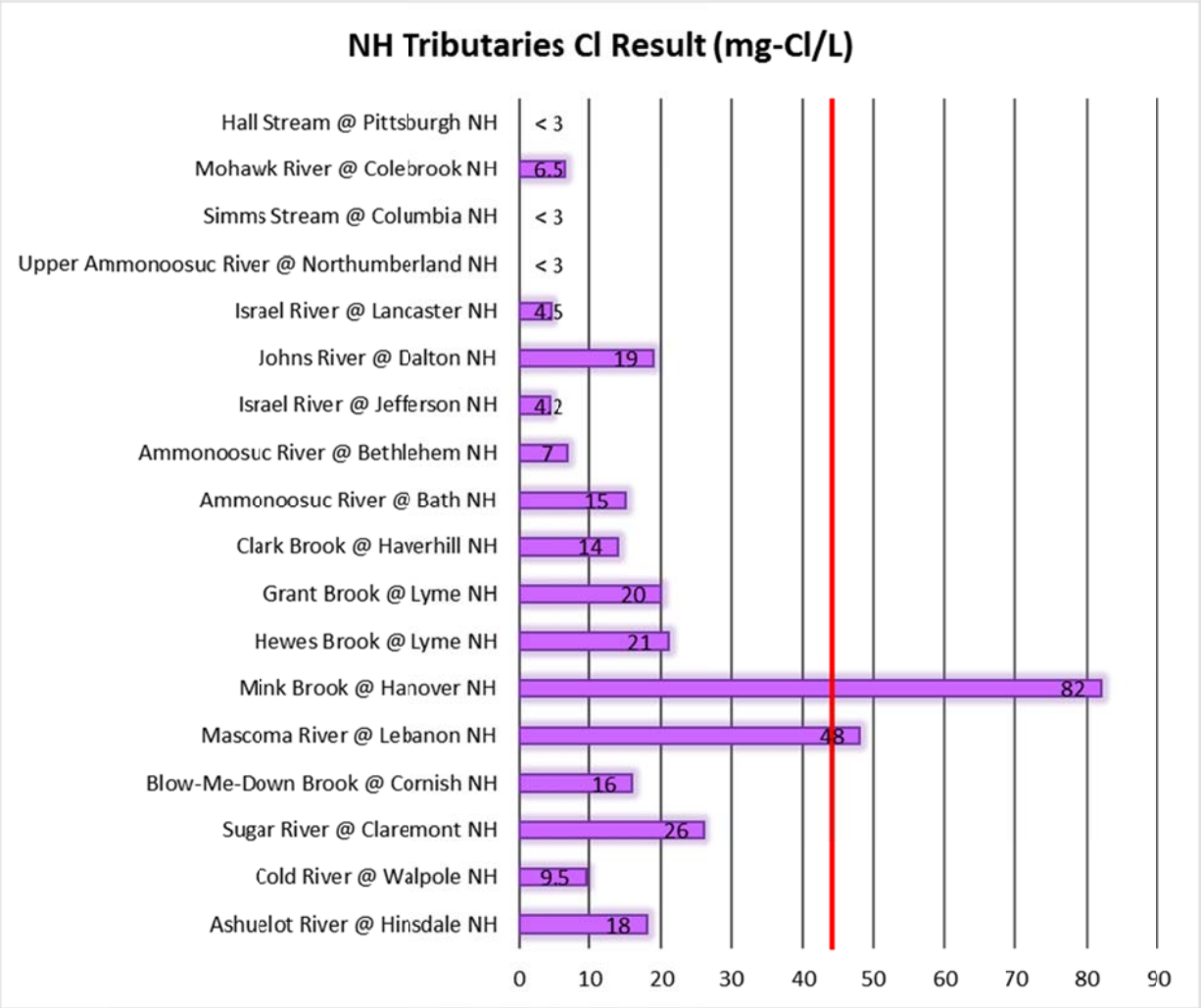
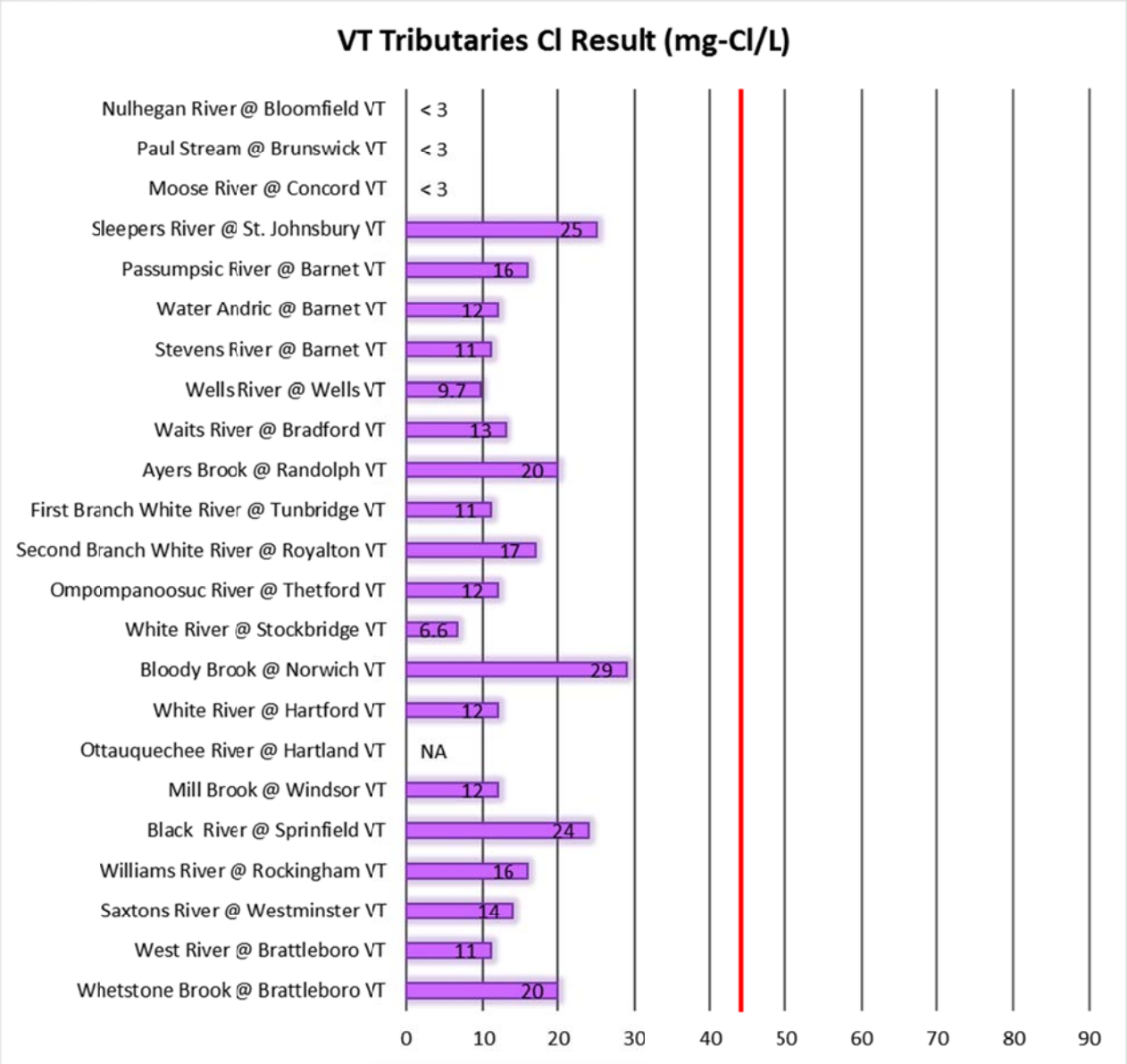


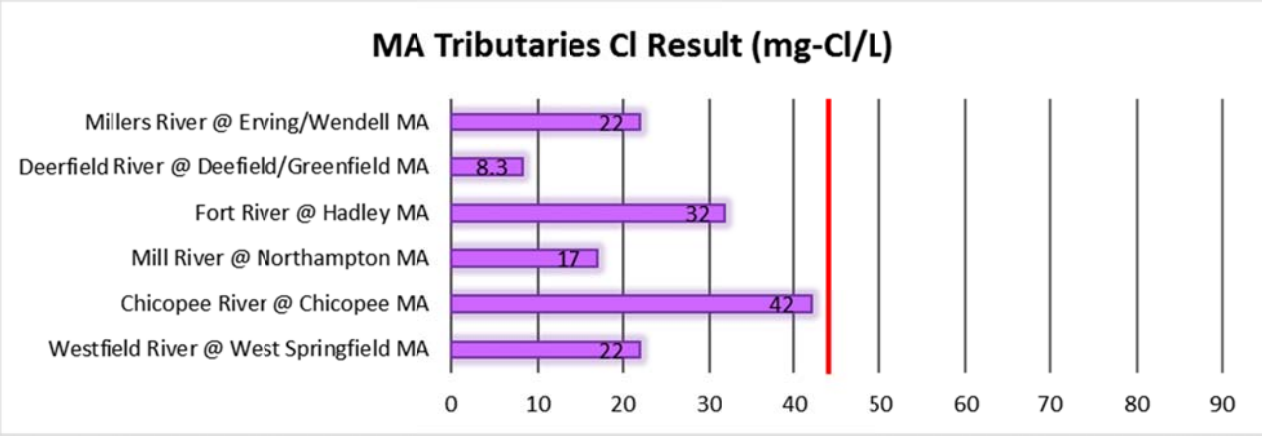
Figure 8 - Distribution of Chloride Results

Figure 9 - Chloride Results by Mainstem and State






VT Tributaries Cl Result (mg-Cl/L)
Nulhegan River @ Bloomfield VT
Paul Stream @ Brunswick VT
Moose River @ Concord VT
Sleepers River @ St. Johnsbury VT
Passumpsic River @ Barnet VT
Water Andric @ Barnet VT
Stevens River @ Barnet VT
Wells River @ Wells VT
Waits River @ Bradford VT
Ayers Brook @ Randolph VT
First Branch White River @ Tunbridge VT
Second Branch White River @ Royalton VT
Ompompanoosuc River @ Thetford VT
White River @ Stockbridge VT
Bloody Brook @ Norwich VT
White River @ Hartford VT
Ottauquechee River @ Hartland VT
Mill Brook @ Windsor VT
Black River @ Sprinfield VT
Williams River @ Rockingham VT
Saxtons River @ Westminster VT
West River @ Brattleboro VT
Whetstone Brook @ Brattleboro VT
< 3
< 3
< 3
25
16
12
11
9.7
13
20
11
17
12
6.6
29
12
NA
12
24
16
14
11
20
0
10
20
30
40
50
60
70
80
90


MA Tributaries Cl Result (mg-Cl/L)
Millers River @ Erving/Wendell MA
Deerfield River @ Deefield/Greenfield MA
Fort River @ Hadley MA
Mill River @ Northampton MA
Chicopee River @ Chicopee MA
Westfield River @ West Springfield MA
22
8.3
32
17
42
22
0
10
20
30
40
50
60
70
80
90

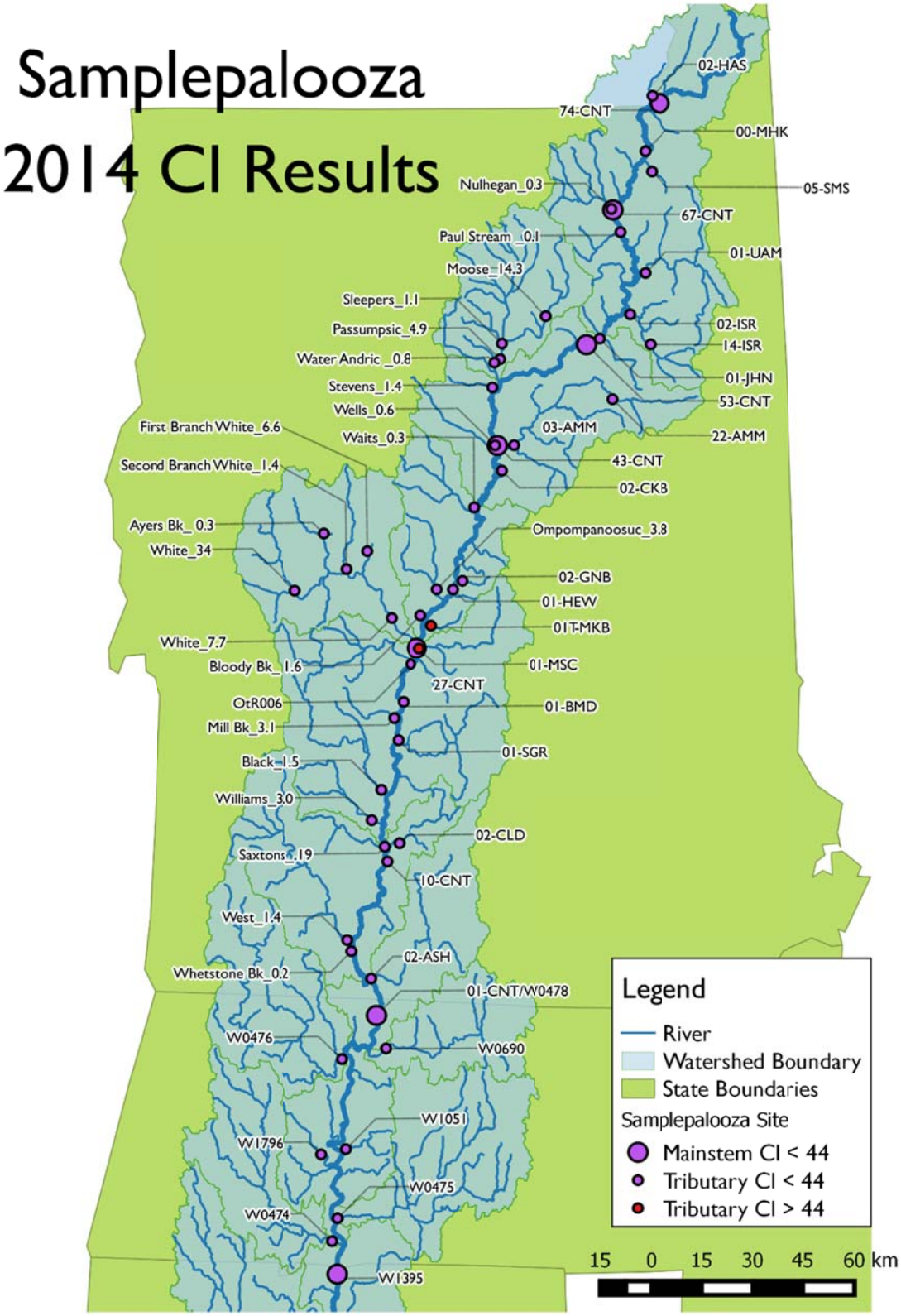


Figure 10 - Map of CI Results

Estimated Loading

Daily mean flow was estimated at each site by using either a nearby USGS flow gage or by calculating flow using a reference gage and a ratio of watershed size in the reference river to the watershed size in the ungaged river. A loading value for the sampling day at each site was calculated based on the concentration measured at each site and the daily mean flow.

Sites with no loading value shown in the bar graph had tested below the detection level for that parameter, and in these cases no estimated daily loading value was calculated.

Estimated nitrogen loading at the Connecticut River mainstem sites steadily increased from north to south, starting at 471 kg/day in Pittsburg NH and leaving the upper part of the watershed at 6,029 kg/day as measured in Northfield, MA. Daily loading leaving Massachusetts was 10,291 kg/day, as measured in Suffield, CT.

The tributary sites with estimated daily nitrogen loading values at or above 100 kg/day were Hall Stream, the Upper Ammonoosuc, Israel, Johns, Ammonoosuc, Sugar, and Ashuelot Rivers in New Hampshire; the Nulhegan, Passumpsic, Second Branch White, White, and Saxtons Rivers in Vermont; the Millers, Deerfield, Chicopee, and Westfield River in Massachusetts. The Deerfield River in Massachusetts was the only tributary with an estimated daily loading value that exceeded 1,000 kg/day.

Estimated phosphorus loading at the Connecticut River mainstem sites steadily increased from north to south, starting at 13 kg/day in Pittsburg NH and leaving the upper part of the watershed at 254 kg/day as measured in Northfield, MA. Daily loading leaving Massachusetts was 739 kg/day, as measured in Suffield, CT.

The tributary sites with estimated daily phosphorus loading values at or above 10 kg/day were the Upper Ammonoosuc, Ammonoosuc, Sugar, and Ashuelot Rivers in New Hampshire; the Passumpsic and White Rivers in Vermont; and the Millers, Deerfield, Chicopee, and Westfield Rivers in Massachusetts.

Estimated chloride loading at the Connecticut River mainstem sites steadily increased from north to south, starting at a level below detection level in Pittsburg NH and leaving the upper part of the watershed at 182,700 kg/day as measured in Northfield, MA. Daily loading leaving Massachusetts was 374,200 kg/day, as measured in Suffield, CT.

The tributary sites with estimated daily chloride loading values at or above 10,000 kg/day were the Ammonoosuc, Mascoma, Sugar, and Ashuelot Rivers in New Hampshire; the White River in Vermont; and the Millers, Deerfield, Chicopee, and Westfield Rivers in Massachusetts.

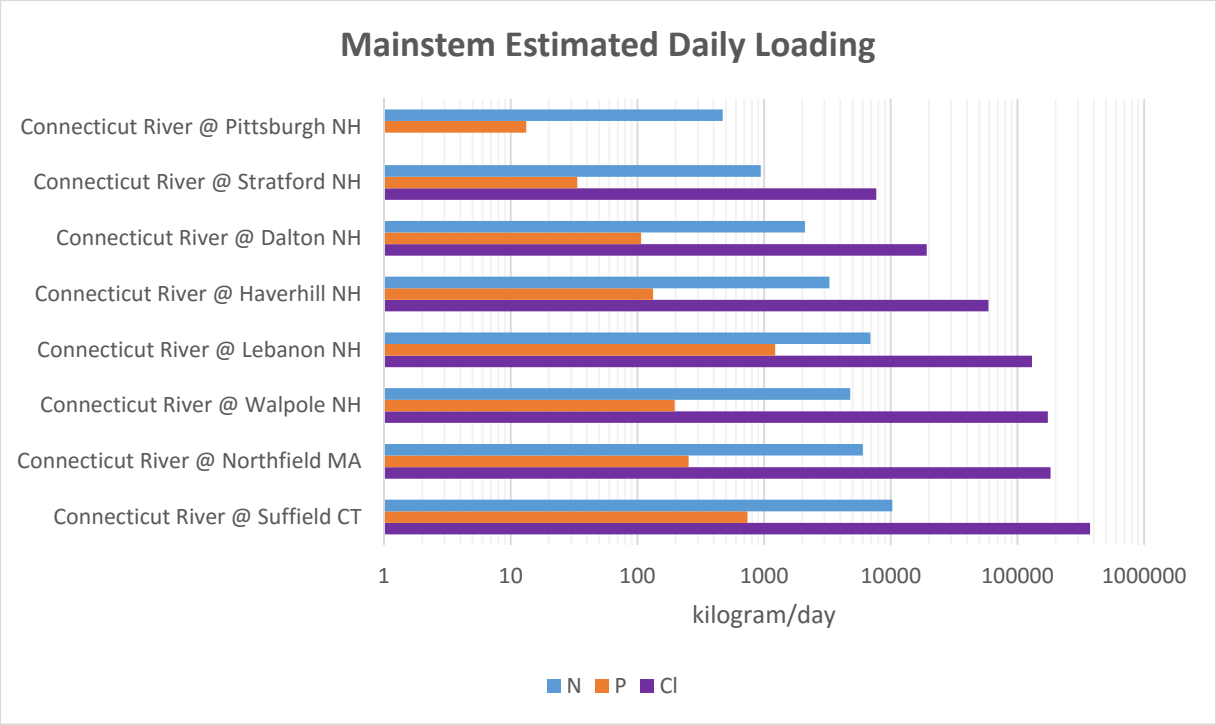


Figure 11 - Mainstem Estimated Daily Loading

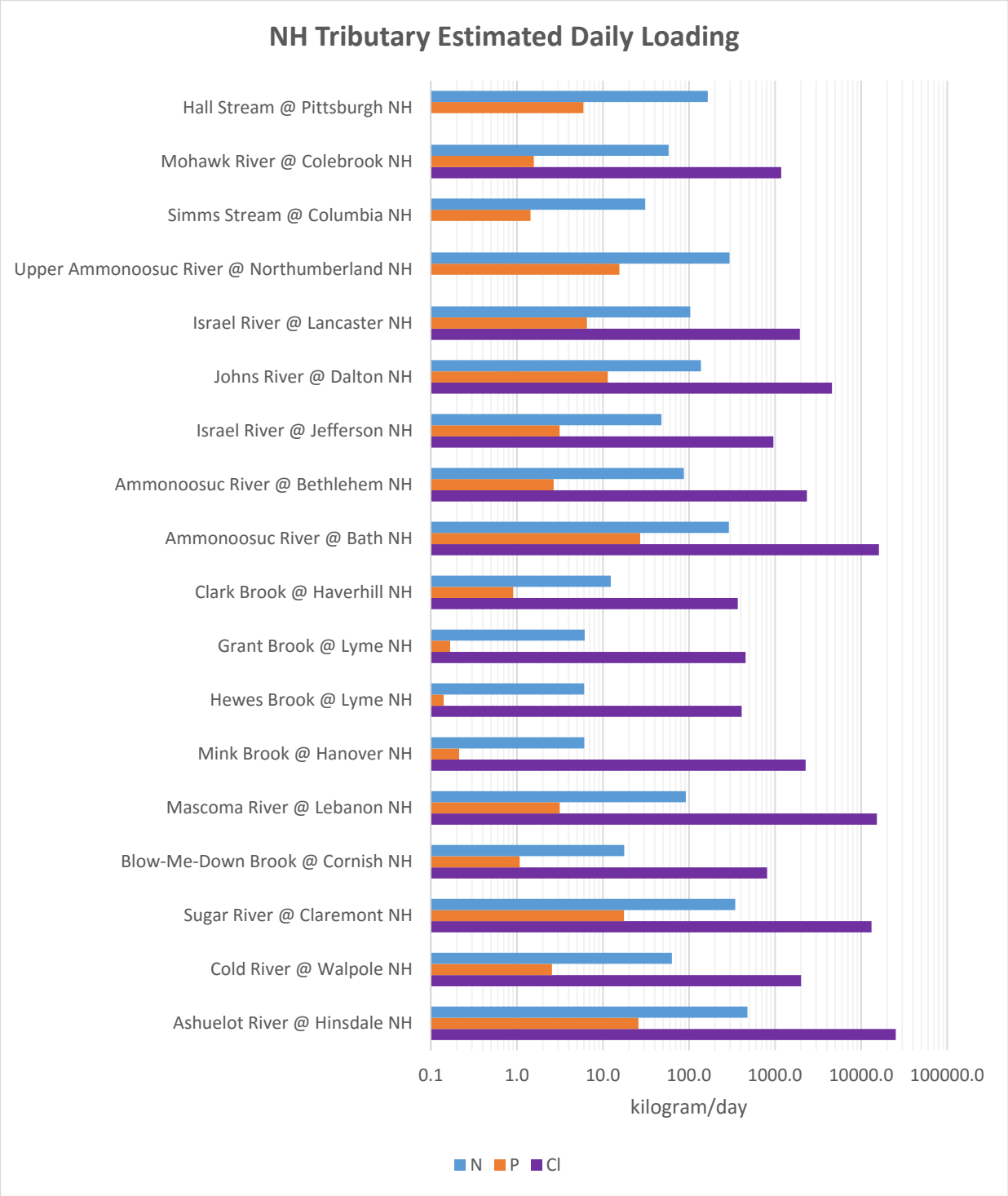


Figure 12 - New Hampshire Estimated Daily Loading

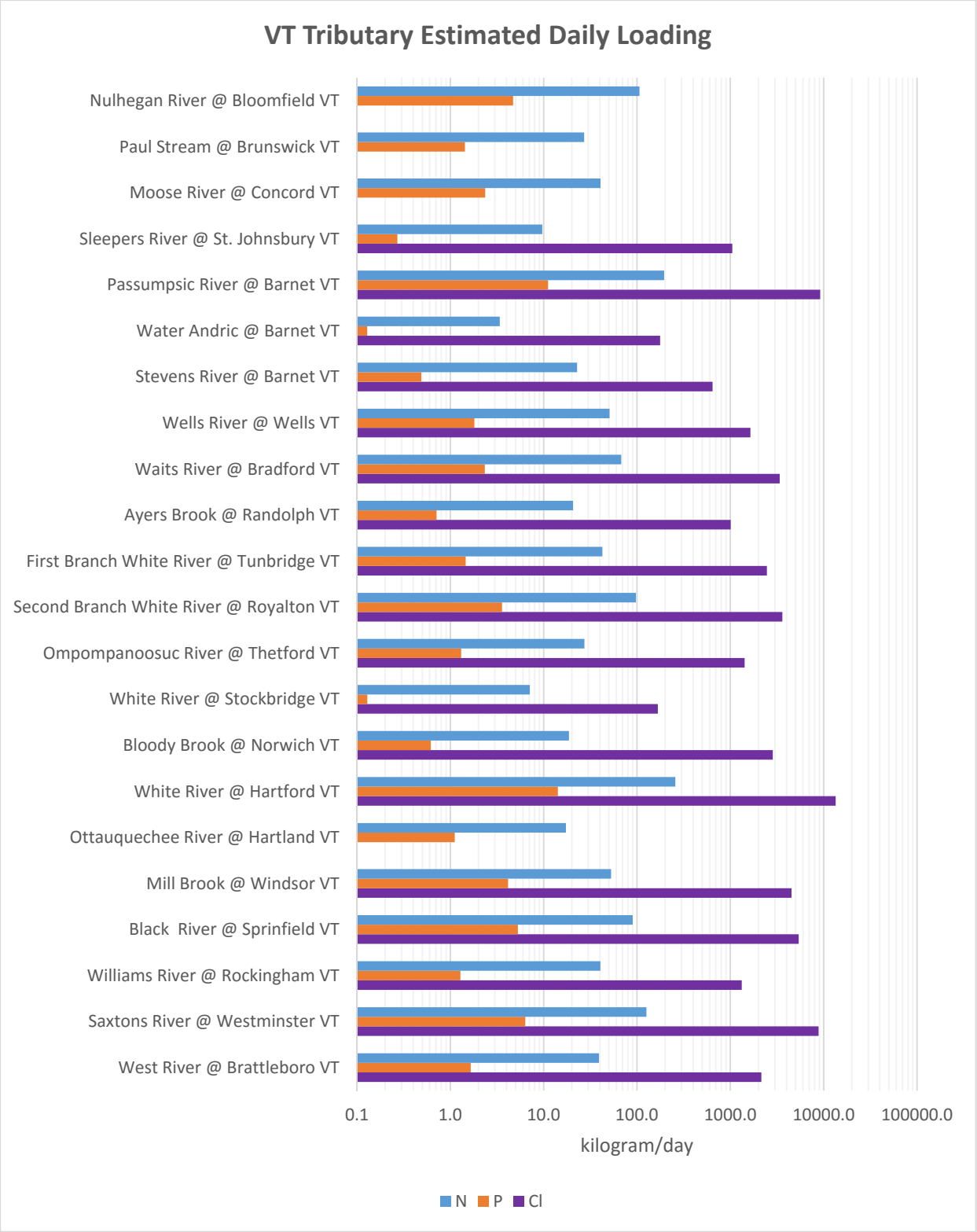


Figure 13 - Vermont Estimated Daily Loading

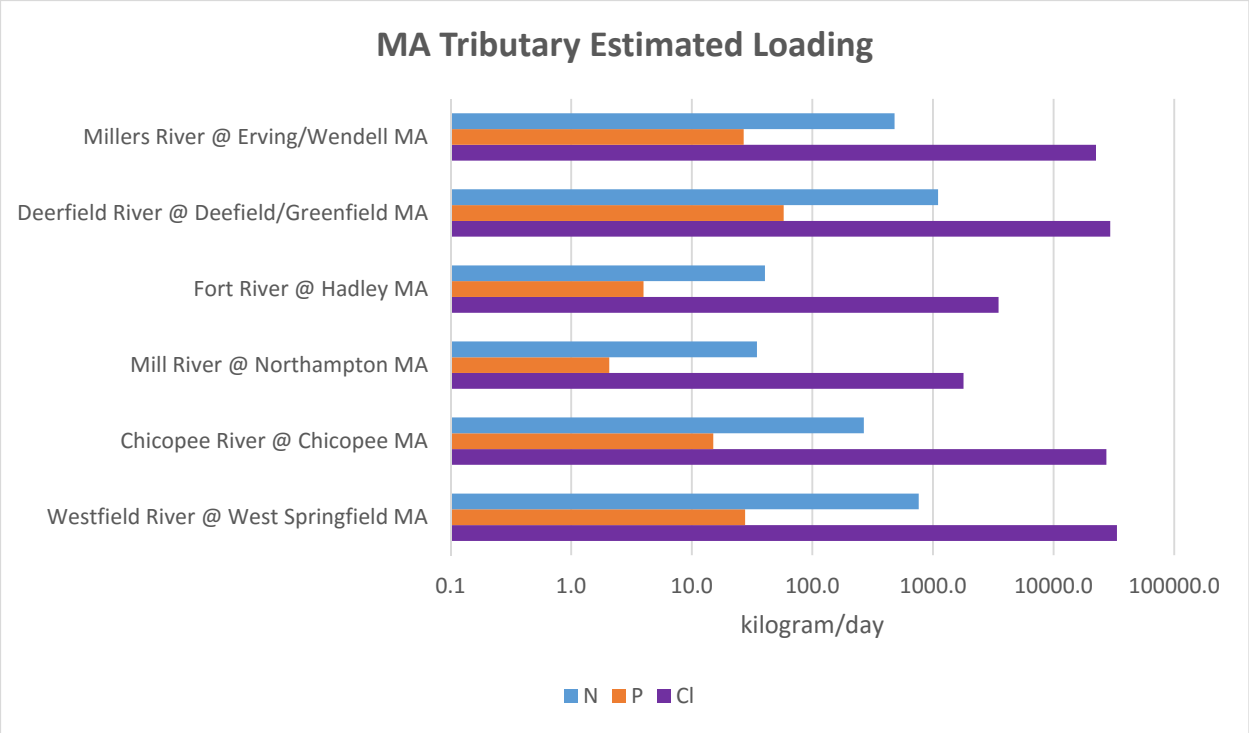


Figure 14 - Massachusetts Estimated Daily Loading

Table 9 – Other Parameter Results

Site Description	Water Temp (°C)	Air Temp (°C)	DO (mg/L)	DO (%)	pH	Specific Conductance (µS)	Turbidity (NTU)
Connecticut River @ Pittsburgh NH	14.2	17	10	97.6	6.93	40.6	1.18
Connecticut River @ Stratford NH	18.2	19.5	9.72	103	7.45	62.3	1.9
Connecticut River @ Walpole NH	23	22	8.62	100.4	7.18	146.8	1.61
Hall Stream @ Pittsburg NH	16.8	17.5	7.58	77.7	7.04	87.2	2.11
Mohawk River @ Colebrook NH	16.0	17.7	9.59	7.5	7.56	116.8	0.6
Simms Stream @ Columbia NH	17.0	18.0	9.46	97.7	7.30	48.8	1.28
Upper Ammonoosuc River @ Northumberland NH	18.4	18.5	9.22	98.1	6.53	30.8	1.00
Grant Brook @ Lyme NH	18.3	22.2	8.88	94.3	6.97	147.5	0.17
Hewes Brook @ Lyme NH	18.8	22.2	8.46	90.3	7.69	187.5	0.31
Mink Brook @ Hanover NH	19.4	22.2	8.54	93.0	7.65	391.9	0.4
Mascoma River @ Lebanon NH	25.3	22.2	7.05	86.4	7.47	267.6	0.72
Sugar River @ Claremont NH	23.4	24	9.47	111.0	7.32	151.5	1.17
Cold River @ Walpole NH	22.5	22	8.74	100.6	6.73	75.0	0.52
Ashuelot River @ Hinsdale NH	21.5	21	8.79	99.4	6.36	98.1	1.14
Ayers Brook @ Randolph VT	18.7					320	
First Branch White River @ Tunbridge VT	20.7					340	
Second Branch White River @ Royalton VT	20.3					340	
White River @ Stockbridge VT	21.1					90	
White River @ Hartford VT	23.2					210	
Black River @ Springfield VT	21.3	22.2			8.10		
Saxtons River @ Westminster	19.0	18.0					

Analysis

Tables 8 and 9 below compare the 2014 results against previous results at or near the sample locations tested in 2014. Existing data from summer months (June 1 to September 30) were collected from USGS, VT DEC, NHDES, and MassDEP.

For TN, 23 sample sites had previous data from USGS, VT DEC, or MassDEP with more than 1 data point. Of the 23 sites, 17 (74%) sites were within reasonable range (within 2 standard deviations) suggesting that a majority of the samples with historic data captured a typical sampling day. In general, the concentrations in 2014 tended to be a bit lower than the median or mean for those sites, and this may be because the flows were higher than base flow.

For TP, 46 sample sites had previous data from USGS, NH DES, VT DEC, or MassDEP with more than 1 data point. Of the 46 sites, 45 (98%) sites were within reasonable range (within 2 standard deviations). In general, concentrations in 2014 tended to be in the vicinity or lower than the median or mean for those sites.

Comparison with Historic Data

Table 10 - Historic Total Nitrogen Comparison (mg/L)

Samplepalooza Site	Count	Min	Max	Standard Dev.	Median	Mean	Samplepalooza TN	Within 2 stdev?
Mainstem Sites								
53-CNT	2	0.41	0.43	0.01	0.42	0.42	0.35	**No**
43-CNT	43	0.28	3.60	0.87	0.45	0.91	0.35	**Yes**
10-CNT	50	0.32	8.50	1.94	1.60	1.99	0.33	**Yes**
01-CNT/W0478	49	0.33	3.50	0.98	0.78	1.41	0.33	**Yes**
New Hampshire Tributary Sites								
22-AMM	13	0.25	0.34	0.03	0.31	0.30	0.26	**Yes**
Vermont Tributary Sites								
Nulhegan_0.3	8	0.17	0.34	0.05	0.24	0.24	0.35	**No**
Sleepers_1.1	15	0.23	0.87	0.18	0.36	0.41	0.23	**Yes**
Passumpsic_4.9	13	0.25	0.49	0.06	0.40	0.40	0.34	**Yes**
Stevens_1.4	8	0.19	0.36	0.05	0.32	0.31	0.39	**Yes**
Waits_0.3	2	0.13	0.15	0.01	0.14	0.14	0.26	**No**
Ayers Bk_ 0.3	16	0.35	0.66	0.08	0.46	0.47	0.41	**Yes**
Ompompanoosuc_3.8	6	0.14	0.20	0.02	0.17	0.17	0.23	**No**
First Branch White_6.6	7	0.15	0.24	0.03	0.20	0.20	0.19	**Yes**
Second Branch White_1.4	3	0.26	0.56	0.15	0.46	0.43	0.46	**Yes**
White_34	7	0.22	0.51	0.10	0.26	0.29	0.28	**Yes**
White_7.7	27	0.25	2.60	0.45	0.35	0.45	0.23	**Yes**
OtR006	12	0.24	0.48	0.07	0.33	0.34	0.23	**Yes**
Black_1.5	65	0.22	6.60	1.20	0.55	1.06	0.40	**Yes**
Williams_3.0	2	0.49	1.00	0.36	0.75	0.75	0.49	**Yes**
Whetstone Bk_0.2	4	0.37	0.60	0.11	0.42	0.45	0.26	**Yes**
Massachusetts Tributary Sites								
W0476	3	0.52	0.59	0.04	0.55	0.55	0.31	**No**
W1051	13	0.62	1.80	0.39	0.74	1.00	0.37	**Yes**
W1796	16	0.46	0.80	0.09	0.55	0.57	0.33	**No**

Table 11 - Historic Total Phosphorous Comparison (µg/L)

Samplepalooza Site	Count	Min	Max	Standard Dev.	Median	Mean	Samplepalooza TP	Within 2 stdev?
Mainstem Sites								
74-CNT	6	5	28	10.05	13.50	15.08	10.7	**Yes**
67-CNT	6	6	30	9.20	14.00	14.83	13.5	**Yes**
53-CNT	76	8	69	8.51	18.00	18.42	17.8	**Yes**
43-CNT	53	0	150	30.46	11.00	24.05	14.2	**Yes**
10-CNT	44	8	210	32.47	20.00	30.02	13.6	**Yes**
01-CNT/W0478	110	0	90	15.42	13.00	19.43	13.9	**Yes**
W1395	4	36	58	10.47	45.50	46.25	31.6	**Yes**
New Hampshire Tributary Sites								
00-MHK	2	5.4	9	2.55	7.20	7.20	8.66	**Yes**
05-SMS	8	5.28	17.4	4.08	6.43	8.19	13.5	**Yes**
01-JHN	6	14	53	14.97	50.00	44.00	47.2	**Yes**
02-ISR	33	8.67	37	6.90	16.00	16.36	15.1	**Yes**
14-ISR	22	8.08	34.1	6.92	13.20	14.82	13.8	**Yes**
01-UAM	15	8	15	2.30	10.00	11.00	14.2	**Yes**
22-AMM	41	0	33.1	6.33	5.66	6.47	7.98	**Yes**
03-AMM	28	5	67.6	12.03	10.00	13.07	25.2	**Yes**
02-CKB	6	31	60	10.23	47.00	47.33	34.4	**Yes**
02-GNB	8	5	9.28	1.74	5.17	6.16	7.38	**Yes**
01-HEW	2	8	27	13.44	17.50	17.50	7.21	**Yes**
01T-MKB	8	5.88	19	4.33	7.78	8.91	7.72	**Yes**
01-MSC	16	7	25	5.88	10.33	13.04	9.95	**Yes**
01-BMD	3	15	24	5.20	24.00	21.00	21.3	**Yes**
01-SGR	41	5	514	99.04	40.00	72.79	34.6	**Yes**
02-CLD	33	5	119	27.09	8.00	16.02	12.1	**Yes**
02-ASH	78	13.6	97	17.74	36.00	38.31	18.4	**Yes**
Vermont Tributary Sites								
Nulhegan_0.3	9	8.8	23.1	4.26	11.50	12.82	15.5	**Yes**
Sleepers_1.1	16	0	29	9.53	0.00	5.01	6.45	**Yes**
Passumpsic_4.9	13	0	40	8.35	18.00	18.77	19.4	**Yes**
Stevens_1.4	20	5.43	122	35.20	12.80	28.22	8.33	**Yes**
Waits_0.3	2	9.01	10.2	0.84	9.61	9.61	8.98	**Yes**
Ayers Bk_ 0.3	16	5.8	60	13.19	16.30	20.50	14.1	**Yes**
Ompompanoosuc_3.8	6	5.63	11.4	2.31	7.79	8.41	11	**Yes**
First Branch White_6.6	8	5	20.3	5.41	10.45	11.84	6.53	**Yes**
Second Branch White_1.4	2	12.9	25	8.56	18.95	18.95	16.9	**Yes**
White_34	6	0	147	58.97	2.99	26.83	5.0900	**Yes**
White_7.7	27	0	30	6.87	4.00	4.81	12.7	**Yes**

Samplepalooza Site	Count	Min	Max	Standard Dev.	Median	Mean	Samplepalooza TP	Within 2 stdev?
OtR006	16	9	39.5	6.93	14.75	16.93	14.8	**Yes**
Black_1.5	58	10.7	250	52.64	29.85	51.02	23.5	**Yes**
Williams_3.0	36	6.8	218	39.43	10.25	20.77	15.5	**Yes**
Saxtons_.19	53	5.8	98.6	14.47	10.00	13.99	10.1	**Yes**
West_1.4	93	5.6	85.1	11.98	10.50	14.16	8.45	**Yes**
Whetstone Bk_0.2	37	5	170	26.80	10.40	17.09	12	**Yes**
Massachusetts Tributary Sites								
W0476	6	13	30	7.94	21.00	21.50	16.3	**Yes**
W1051	17	20	160	37.36	61.00	69.94	36.4	**Yes**
W1796	19	13	1800	408.28	20.00	114.26	19.7	**Yes**
W0475	7	27	65	13.02	48.00	46.57	23.2	**Yes**
W0474	4	31	56	12.58	44.00	43.75	18.2	**No**

Conclusions

This study represents a 1-day snapshot in time, on a day that did not represent low flow conditions. The Samplepalooza effort was aimed at providing a relative comparison of sites around the watershed to each other on a single day. Results allow agencies and organizations to flag tributaries that may be hotspots for nutrients. Planning for 2015 involved adding and subtracting sites in order to look at the hot spots in more detail.

Samplepalooza 2014 was an exciting opportunity for states, the Connecticut River Watershed Council, Yale University, and volunteers to collaborate on a project together. The sample event received good attention from the press, especially because an algal bloom in the Great Lakes a week prior had heightened the public interest and awareness in the links between nutrient runoff and water quality. One of the project goals was to increase public awareness and involvement in water quality in the watershed.