

New Hampshire Department of Environmental Services

Volunteer River Assessment Program

2007 Programmatic Report & QAQC Audit

In 2007, VRAP supported 29 volunteer groups and 189 volunteers on numerous rivers and watersheds throughout the state (Table 1, Figures 1 through 3). These volunteers contributed approximately 1,696 hours of time solely collecting in-situ data (Figure 3). VRAP volunteers conduct water quality monitoring on an ongoing basis. Each year VRAP has continued to grow both in terms of the number of groups participating and the amount of useable data that is collected.

During 2007 the VRAP program continued to work to improve its ability to collect quality environmental data and to provide service to the participating volunteer groups.

Table 1. 2007 VRAP Groups
1. Ammonoosuc River Local Advisory Committee
2. Androscoggin River Watershed Association
3. Ashuelot River Local Advisory Committee
4. Baker River Watershed Association
5. Bellamy River Watershed Association
6. Blackwater River VRAP Group
7. Cains Brook VRAP Group
8. Cocheco River Watershed Coalition
9. Cold River Local Advisory Committee
10. Contoocook River Local Advisory Committee
11. Dalton Conservation Commission (<i>Connecticut & Johns River</i>)
12. Exeter Conservation Commission
13. Sharon Conservation Commission (<i>Gridley River</i>)
14. Gunnison Brook VRAP Group
15. Meredith Conservation Commission (<i>Hawkins Brook</i>)
16. Hodgson Brook Advisory Committee
17. Hooksett Conservation Commission (<i>Peters Brook, Browns Brook, Dalton Brook, Messer Brook</i>)
18. Isinglass River Local Advisory Committee
19. Israel River VRAP Group
20. Lamprey River Watershed Association
21. Nashua River Watershed Association
22. Oyster River Watershed Association
23. Pemigewasset River Local Advisory Committee
24. Piscataquog River Watershed Association
25. Powwow River VRAP Group
26. Bartlett Conservation Commission (<i>Saco River</i>)
27. Somersworth 4-H Club (<i>Salmon Falls River</i>)
28. Sucker Brook VRAP Group
29. Warner River VRAP Group

Figure 1

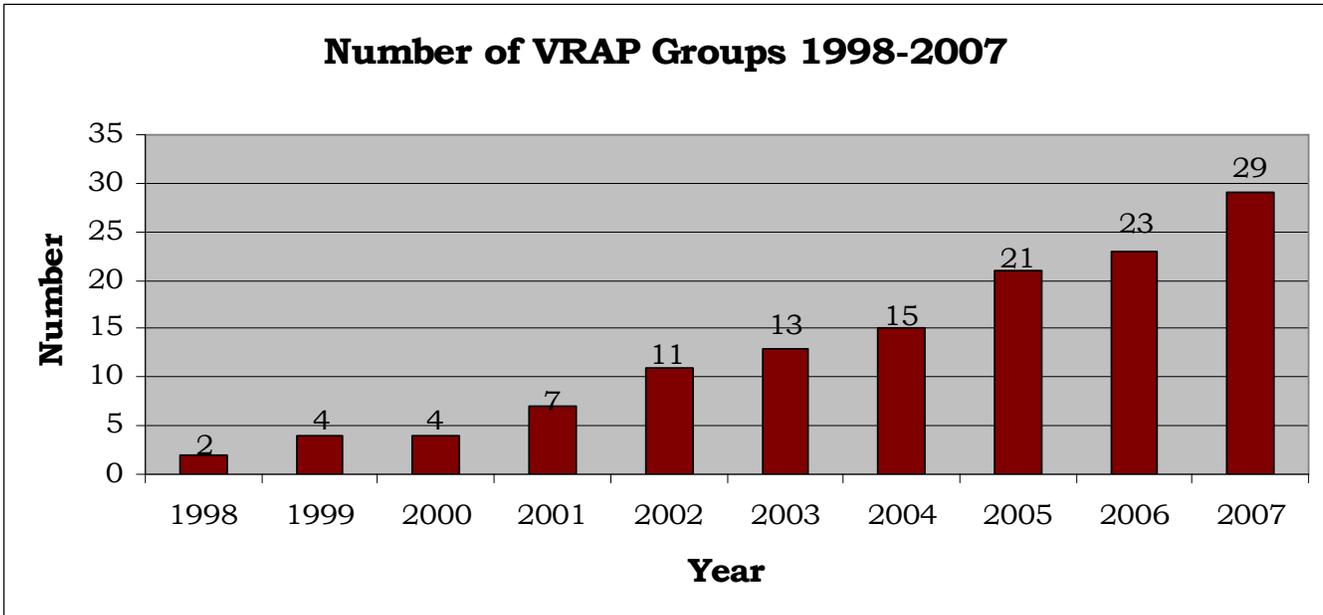


Figure 2: Number of VRAP Volunteers 2003 - 2007

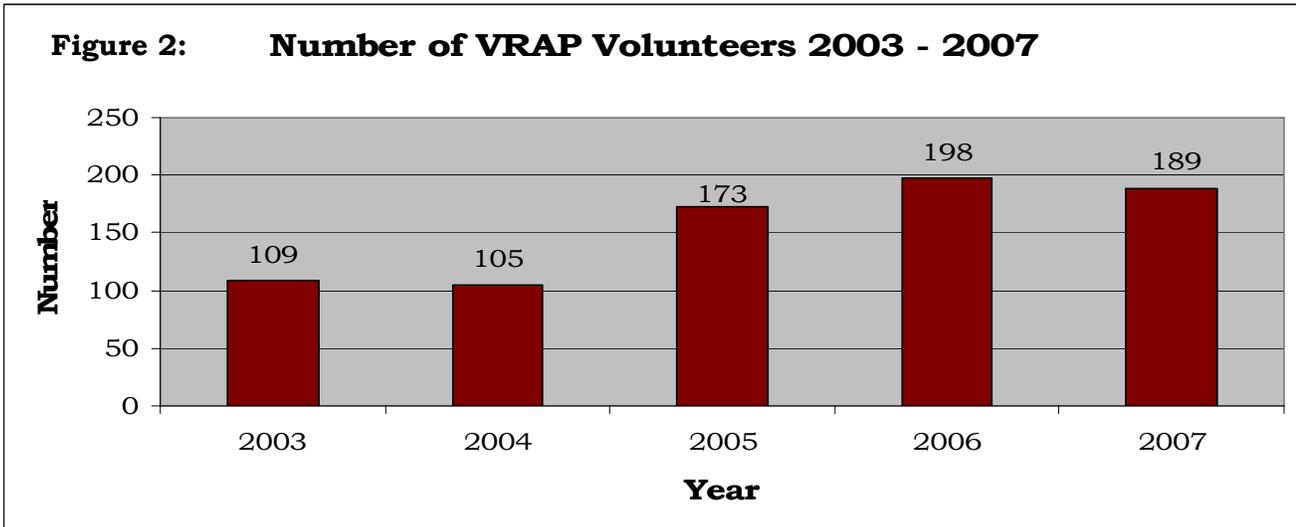
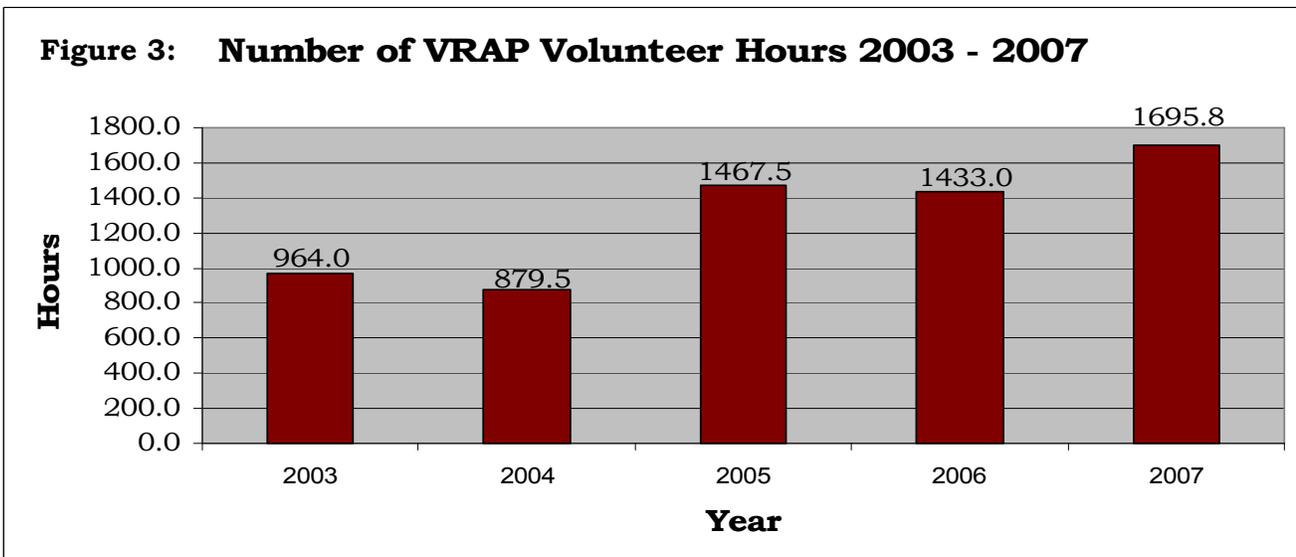


Figure 3: Number of VRAP Volunteer Hours 2003 - 2007



2007 Administrative Highlights

- In May 2007, the New Hampshire Estuaries Project (NHEP) generously donated water quality monitoring equipment to four VRAP groups in the Great Bay watershed. The NHEP purchased and distributed water quality monitoring equipment to the Cocheco River Watershed Coalition, the Oyster River Watershed Association, the Lamprey River Watershed Association and the Bellamy River VRAP group. This generous donation of over \$8,000 worth of monitoring equipment has helped to facilitate the continuation and expansion of the long term water quality monitoring program that these VRAP groups have initiated, and which are vital to understanding the water quality trends in the Great Bay watershed. Five equipment “kits” were purchased.
- Three VRAP groups (Contoocook, Dalton, Gunnison Brook) purchased their own equipment kits, and one VRAP group (Isinglass) was granted a kit through Waste Management, Inc., alleviating the strain on the fixed number of VRAP kits to be loaned to groups throughout the sampling season. VRAP also purchased an additional three equipment kits in 2007.
- Five coastal VRAP groups (*Cocheco, Exeter, Hodgson, Isinglass and Oyster*) participated in the NHDES Volunteer Biological Assessment Program (VBAP) during 2007. This year, VRAP water quality data was collected in conjunction with VBAP monitoring. This additional data has been included in the 2007 VRAP reports.
- For the first time, VRAP and VBAP data/reports will be integrated into one, comprehensive water quality and biological data report for those VRAP groups that also participated in the Volunteer Biological Assessment Program. This endeavor has provided a unified “watershed management” reporting approach.

2007 Outreach and Education Highlights

- In February 2007, a survey was distributed to all VRAP groups seeking input in how the program could be improved, and to allow participating groups to evaluation state of the program. Many helpful suggestions were received and incorporated into the planning process for the 2007 monitoring season.
- In March 2007, VRAP staff created a **“Troubleshooting Guide to VRAP Water Quality Monitoring Meters”** and distributed it to each participating VRAP group. It is also available on the VRAP website, and is in each VRAP equipment kit. For each frequently used meter, the most common problem/error codes, probable causes, and probable remedies were listed.
- From April through June 2007, VRAP organized 14 **annual volunteer training workshops**. Training workshops were held in Rochester, New Boston, Claremont, Portsmouth, Franklin, Keene, Rollinsford, Littleton, Epping, Exeter, Webster, Warner, and Dalton. **One hundred eighty-seven volunteers** attended the events.
- In July 2007, VRAP released its second annual program newsletter, **“Streamlines.”** This was e-mailed to distribution groups and posted on the VRAP website.
- In July 2007, 21 copies of **“A Field Guide to Common Riparian Plants”** were mailed to each VRAP Group and Local River Management Advisory Committee. Subsequently, more than 15 additional copies have also been printed and distributed.
- On November 17, the VRAP Coordinator gave a presentation and a workshop at the annual Watershed Conference at the New Hampshire Technical Institute in Concord. The presentation was entitled **“The Role of Volunteer Programs and the Volunteer/Program Partnership.”** The workshop was entitled **“A (Virtual) Field Guide to In-Stream and Riparian Plants of New Hampshire.”** Over 60 people attended the presentation and workshop.

2007 Monitoring Highlights

The number of water quality samples measured in-situ has grown significantly over the last eight years from 385 samples in 1998 to **9,754 in 2007**. These figures only include parameters such as turbidity, pH, water temperature, dissolved oxygen (mg/L and percent saturation), specific conductance, and air temperature, and do not include samples analyzed in the laboratory such as nutrients (phosphorus, nitrogen), *E.coli*/bacteria, chloride, metals, etc; which would increase the total number of VRAP samples to **11,630**.

- In addition to instantaneous measurements, NHDES and VRAP volunteers utilized multiparameter dataloggers and water temperature dataloggers to collect more detailed information on dissolved oxygen, pH, specific, conductance and/or water temperatures. These dataloggers generated an additional **195,849** datapoints making the total number of samples measured **207,459**.
- The number of stations monitored has also grown from 16 in 1998 to 358 stations in 2007.

Figure 4

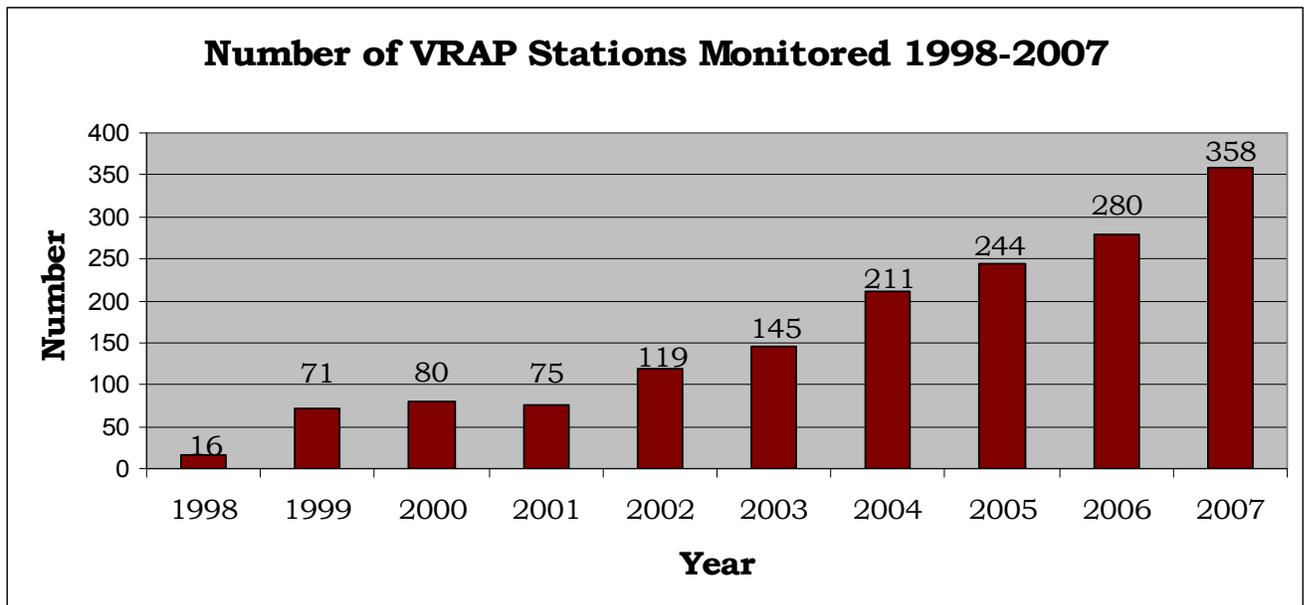


Figure 5

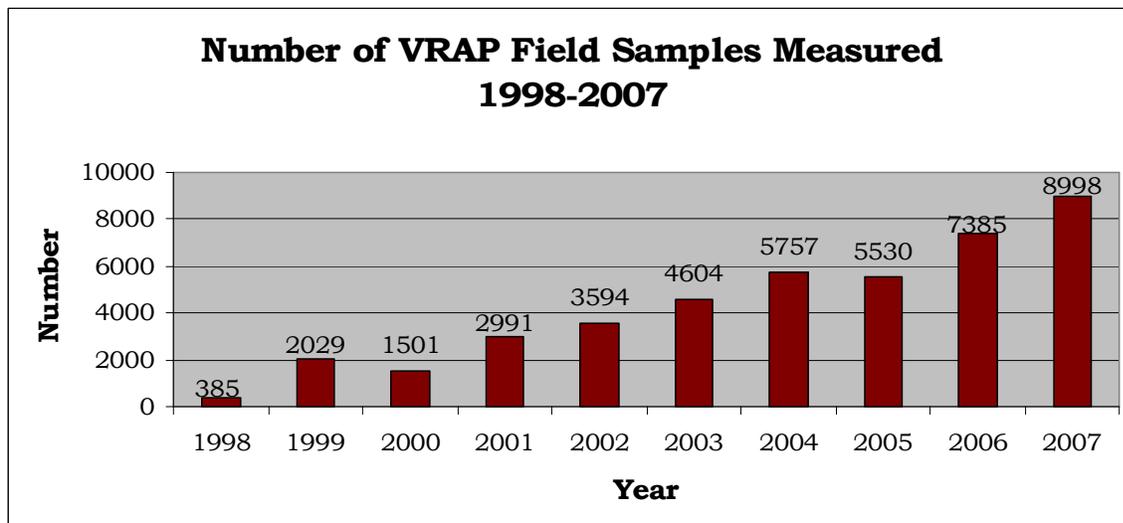


Figure 6

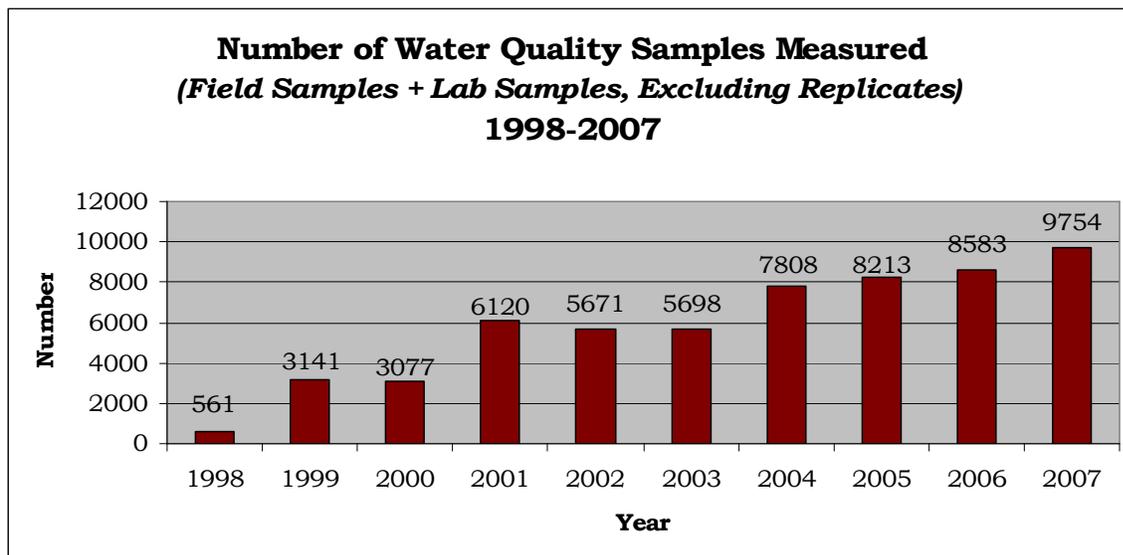


Figure 7

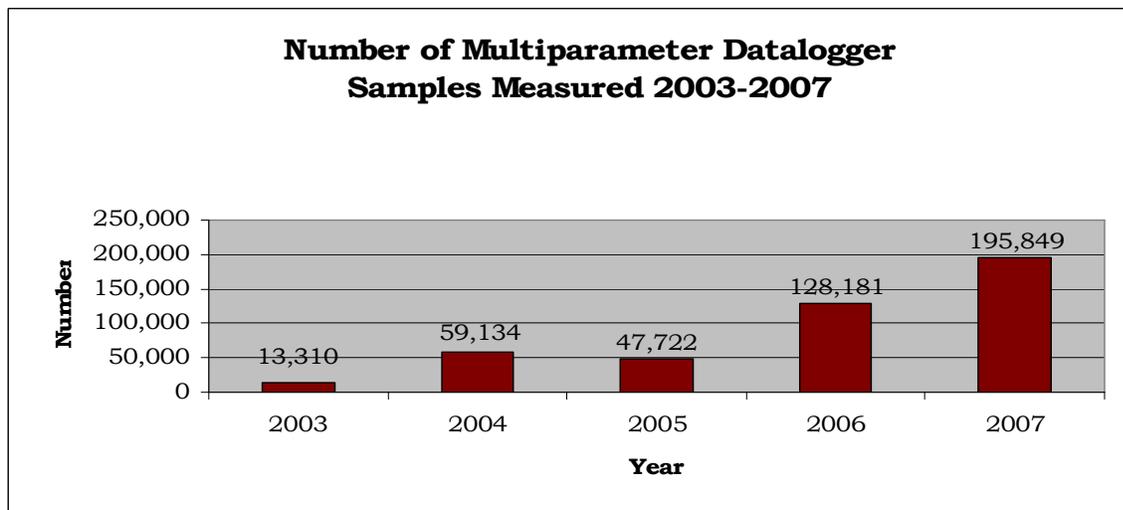


Table 2. VRAP Group and Number of Stations Monitored - 2007

Group	Number of Stations Monitored
1. Ammonoosuc River Local Advisory Committee	15
2. Androscoggin River Watershed Association	5
3. Ashuelot River Local Advisory Committee	17
4. Baker River Watershed Association	13
5. Bellamy River Watershed Association	10
6. Blackwater River VRAP Group	4
7. Cains Brook VRAP Group	8
8. Cocheco River Watershed Coalition	44
9. Cold River Local Advisory Committee	29
10. Contoocook River Local Advisory Committee	11
11. Dalton Conservation Commission (Connecticut & Johns River)	5
12. Exeter Conservation Commission	18
13. Sharon Conservation Commission (Gridley River)	4
14. Gunnison Brook VRAP Group	4
15. Meredith Conservation Commission (Hawkins Brook)	5
16. Hodgson Brook Advisory Committee	9
17. Hooksett Conservation Commission (Peters Brook, Browns Brook, Dalton Brook, Messer Brook)	4
18. Isinglass River Local Advisory Committee	17
19. Israel River VRAP Group	13
20. Lamprey River Watershed Association	20
21. Nashua River Watershed Association	7
22. Oyster River Watershed Association	30
23. Pemigewasset River Local Advisory Committee	8
24. Piscataquog River Watershed Association	15
25. Powwow River VRAP Group	7
26. Bartlett Conservation Commission (Saco River)	3
27. Somersworth 4-H Club (Salmon Falls River)	3
28. Sucker Brook VRAP Group	5
29. Warner River VRAP Group	3

Table 3. Summary of Parameter Count for VRAP - 2007

Parameter	Individual Results via Single Samples	Individual Results via Data Loggers
Air Temperature (C)	1590	
Aluminum	7	
Chloride (mg/L)	56	
Chlorophyll-a (mg/L)	4	
Copper	4	
Dissolved Oxygen (% Sat.)	1474	31872
Dissolved Oxygen (mg/L)	1472	31872
<i>E.coli</i> (cts/100ml)	444	
Lead	4	
Nitrogen, Ammonia as N	4	
Nitrogen, Nitrite + Nitrate	45	
pH (std. units)	1398	31872
Specific Conductance (uS/cm)	1775	31872
Total Kjeldahl Nitrogen	46	
Total Phosphorous (mg/L)	231	
Turbidity (NTU)	1372	
Water Temperature (C)	1700	68361
Zinc	4	
TOTALS	11,630	195,849
GRAND TOTAL		207,479

II. 2007 QA/QC VRAP SUMMARY

The QA/QC procedures incorporated into the VRAP QAPP are designed to generate data that is of sufficient quality to be useable in NHDES's 305(b) 303(d) reports. Field SOPs and protocols are written to translate the QA/QC requirements of the QAPP into terms and explanations useable by volunteer monitors. Frequent QA/QC checks by VRAP staff, field audits, and open communication lines with the VRAP groups are to ensure that proper QA/QC procedures are being followed and that a maximum of data collected is useable for assessment purposes.

Documentation/Data Verification

Upon submission of VRAP field data sheets to NHDES, VRAP staff go through a detailed QA/QC check to determine what status the data should be flagged with in the Environmental Monitoring Database (EMD).

1. Data is manually entered into the EMD. Templates already exist in the EMD to ensure the proper scientific methods and parameter specific units are documented.
2. Data is from the EMD is proofed against the original VRAP field data sheets. Any errors are corrected. If necessary VRAP staff will contact the appropriate volunteer coordinator to verify the data.
3. The data is then checked against the QAPP requirements documented in Table 2. Data that is invalidated is flagged as such in the EMD with an explanation of why the data was invalidated. (For example, "RPD of sample/replicate 23% exceeds QAPP requirements of less than 10 percent and would be flagged.) Data that is invalidated are also documented in the annual VRAP reports to each group.

The VRAP Quality Assurance/Quality Control (QA/QC) measures include a six-step approach to ensuring the accuracy of the equipment and consistency in volunteer sampling efforts.

- **Calibration:** Prior to each measurement, the pH and DO meters must be calibrated. Conductivity and turbidity meters are checked against a known standard before the first measurement and after the last one.
- **Replicate Analysis:** A second measurement by each meter is taken from the original sample at one of the stations during the sampling day. If the same sampling schedule is used throughout the monitoring season, the replicate analysis should be conducted at different stations. Replicates should be measured within 15 minutes of the original measurements.
- **6.0 pH Standard:** A reading of the pH 6.0 buffer is recorded at one of the stations during the sampling day. If the same sampling schedule is used throughout the monitoring season, the 6.0 pH standard check should be conducted at different stations.
- **Zero Oxygen Solution:** A reading of a zero oxygen solution is recorded at one of the stations during the sampling day. If the same sampling schedule is used throughout the monitoring season, the zero oxygen standard check should be conducted at different stations.
- **DI (De-Ionized) Turbidity Blank:** A reading of the DI blank is recorded at one of the stations during the sampling day. If the same sampling schedule is used throughout the monitoring season, the blank check should be conducted at different stations.
- **End of the Day Conductivity and Turbidity Meter Check:** At the conclusion of each sampling day, the conductivity and turbidity meters are re-checked against a known standard.

Measurement Performance Criteria

Precision is calculated for field and laboratory measurements through measurement replicates (instrumental variability) and is calculated for each sampling day. The use of VRAP data for assessment purposes is contingent on compliance with a parameter-specific relative percent difference (RPD) as derived from equation 1, below. Any data exceeding the limits of the individual measures are disqualified from surface water quality assessments. All data that exceeds the limits defined by the VRAP QAPP are acknowledged in the data tables. Table 4 shows typical parameters studied under VRAP and the associated quality control procedures.

(Equation 1)

$$RPD = \frac{|x_1 - x_2|}{\frac{x_1 + x_2}{2}} \times 100 \%$$

where x_1 is the original sample and x_2 is the replicate sample

Table 4. Field Analytical Quality Controls

Water Quality Parameter	QC Check	QC Acceptance Limit	Corrective Action	Person Responsible for Corrective Action	Data Quality Indicator
Temperature	Measurement Replicate	RPD < 10% or Absolute Difference <0.8 C.	Repeat Measurement	Volunteer Monitors	Precision
Dissolved Oxygen	Measurement Replicate	RPD < 10%	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Precision
	Known Buffer (Zero O ₂ Sol.)	RPD < 10% or Absolute Difference <0.4 mg/L	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Relative Accuracy
pH	Measurement Replicate	RPD < 10% or Absolute Difference <0.3 pH units	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Precision
	Known Buffer (pH = 6.0)	± 0.1 std units	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Accuracy
Specific Conductance	Measurement Replicate	RPD < 10% or Absolute Difference <5µS/cm	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Precision
	Method Blank (Zero Air Reading)	± 5.0 µS/cm	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Accuracy
Turbidity	Measurement Replicate	RPD < 10% or Absolute Difference <0.5 NTU	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Precision
	Method Blank (DI Water)	± 0.1 NTU	Recalibrate Instrument Repeat Measurement	Volunteer Monitors	Accuracy
Laboratory Parameters	Measurement Replicate	RPD < 20% or Absolute Difference less than ½ the mean value of the parameter in NHDES's Environmental Monitoring Database	Repeat Measurement	Volunteer Monitors	Precision

III. SUMMARY OF 2007 QA/QC RESULTS

A. Description of Training Activities

For Volunteers:

- During April and May 2007, VRAP organized 14 training workshops. Training workshops were held in Rochester, New Boston, Claremont, Portsmouth, Franklin, Keene, Rollinsford, Littleton, Epping, Exeter, Webster, Warner, and Dalton. One hundred eighty seven volunteers attended the events. Topics included: calibration and meter checks, quality assurance and quality control, sample collection for field and laboratory analysis, order of field tests, sampling techniques, and instruction on water quality parameters and state standards.
- From May through October 2007, 27 field audits were conducted by VRAP staff. Twenty VRAP groups were audited. Four groups were audited more than once, either because they were a newly established group, or they were an existing group that needed additional assistance. To facilitate this process, the “*Field Sampling Procedures Assessment*” data sheet was revised and used to assess sampling procedures during the field audit.

For the VRAP Intern:

The VRAP intern hired for the 2007 season was new to the program.

- The VRAP intern was trained on proper use of hand-held water quality sampling equipment and in-situ multiparameter dataloggers according to the approved SOPs. This instruction was given both in the “classroom” (NHDES office and laboratories in Concord) as well as in the field.
- The VRAP intern was trained on proper laboratory sampling techniques, collection methods, sample volumes, container sizes/types, as well as preservative requirements and holding times at the NHDES office and laboratories in Concord as well as in the field.
- The program manager and program coordinator accompanied the VRAP intern on two training “trials”. For each trial, the intern drove to a river sampling station (as they would on a regular sampling day), and performed all monitoring tasks under the supervision of the program manager and/or program coordinator. This included the collection of samples, calibration and operation of instruments, documentation of data, and storage of instruments during travel. Any inconsistencies with the SOPs were discussed with the field technicians at each trial station during the training session.
- The VRAP intern also accompanied other NHDES Watershed Management Bureau staff and experienced interns on several field days for additional training. Additional trainings would have occurred if the VRAP intern had not been comfortable with the instrumentation or procedures.

B. Documentation of Usable Data Versus Actual Data Collected

Field Measurements and Grab Sampling

VRAP staff reviewed all results from field sampling and laboratory analysis. Comments relative to the field data were written directly on the field data sheets, whereas comments relative to laboratory data were written directly on the laboratory results sheets. Table 2 summarizes the number of data points collected for each parameter and the corresponding number and percent of invalid data. During 2007, 11,630 instantaneous data points were collected via the VRAP program. Of these, 272 or 2.34 percent were ruled invalid (Table 5).

Data was classified as invalid if calibrations were not conducted, replicates did not meet the requirements in Table 4, or the program manager had other reasons to question the validity of the data. The invalid data were input to the Environmental Monitoring Database (EMD), but will not be used for surface water quality assessment purposes. Invalid data is specifically flagged in the EMD as such.

Table 5. Summary of Data Verification (Field /Laboratory Samples) - 2007

Parameter	Total Count	Invalid Count	% Invalid
Air Temperature (C)	1590	0	0.00
Aluminum	7	0	0.00
Chloride (mg/L)	56	0	0.00
Chlorophyll-a (mg/L)	4	0	0.00
Copper	4	0	0.00
Dissolved Oxygen (% Sat.)	1474	72	
Dissolved Oxygen (mg/L)	1472	82	
<i>E.coli</i> (cts/100ml)	444	12	
Lead	4	0	0.00
Nitrogen, Ammonia as N	4	0	0.00
Nitrogen, Nitrite + Nitrate	45	0	0.00
pH (std. units)	1398	28	
Specific Conductance (uS/cm)	1775	58	
Total Kjeldahl Nitrogen	46	0	0.00
Total Phosphorous (mg/L)	231	0	0.00
Turbidity (NTU)	1372	12	
Water Temperature (C)	1700	8	
Zinc	4	0	0.00
TOTALS	11,630	272	2.34%

Submersible Multiprobe Datalogger Measurements

In addition to collecting data via instantaneous readings and laboratory samples, VRAP uses multiparameter dataloggers to collect water quality data. The multiparameter dataloggers are capable of measuring dissolved oxygen (mg/L and % sat.), pH, conductivity, and water temperature. All dataloggers can record data at a user-defined time interval (generally 15 minutes).

The dataloggers are calibrated prior to deployment, deployed for three to seven days, and QA/QC checked upon retrieval. On a parameter by parameter basis each deployment is flagged in the EMD as valid or invalid. VRAP staff will also look at the data and invalidate individual datapoints where necessary, e.g., probe failure, data collected out of water. During 2007, a total of 67 multiparameter datalogger deployments and 13 temperature logger deployments accounting for 195,849 instantaneous data points were collected (Table 6). Of these, 13,462 or 6.87 percent were ruled invalid (Table 7).

Table 6. Summary of VRAP Datalogger Deployments – 2007

Station	Waterbody Name	Town	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Sat)	pH	Specific Conductance (us/cm)	Water Temp. (Deg C)
00-BRY	Isinglass River	Barrington	563	563	563	563	563
00M-OTT	Otter Brook	Lancaster	0	0	0	0	2498
01-ALB	Alder Brook	Jefferson	0	0	0	0	2932
01-DLT	Dalton Brook	Hooksett	376	376	376	376	376
01-DMS	Dames Brook	Farmington	313	313	313	313	313
01-DTB	Dart Brook	Gilsum	754	754	754	754	754
01-ELA	Ela River	Farmington	463	463	463	463	463
01-FDY	Fordway Brook	Raymond	361	361	361	361	361
01-GFB	Grafton Brook	Portsmouth	765	765	765	765	765
01-MHB	Mohawk Brook	Strafford	563	563	563	563	563

01-MLD	Madla Brook	Barrington	589	589	589	589	589
01-MSR	Messer Brook	Hooksett	188	188	188	188	188
01-NWD	Newfields Ditch	Portsmouth	764	764	764	764	764
01-POK	Pokamoonshine Brook	Farmington	460	460	460	460	460
01-SKB	Sucker Brook	Franklin	379	379	379	379	379
01-STL	Stalbird Brook	Lancaster	0	0	0	0	2498
01A-PET	Peters Brook	Hooksett	370	370	370	370	370
02-BNB	Brown Brook	Hooksett	372	372	372	372	372
02-DDY	Dudley Brook	Exeter	372	372	372	372	372
02-ISG	Isinglass River	Rochester	550	550	550	550	550
02-ISR	Israel River	Lancaster	0	0	0	0	2500
02-LTE	Little River	Exeter	480	480	480	480	480
02-MLG	Mallego Brook	Barrington	587	587	587	587	587
02-NIP	Nippo Brook	Barrington	565	565	565	565	565
02-OTB	Otter Brook	Roxbury	747	747	747	747	747
02-PIS	Piscassic R	Newmarket	1048	1048	1048	1048	1048
02-SBA	South Branch Ashuelot River	Swanzey	473	473	473	473	473
02-SGB	Stag Hollow Brook	Jefferson	0	0	0	0	2930
02X-HOB	Hodgsons Brook	Portsmouth	755	755	755	755	755
03-HOB	Hodgsons Brook	Portsmouth	755	755	755	755	755
03-SGB	Stag Hollow Brook	Jefferson	0	0	0	0	2932
04-BRY	Berrys River	Strafford	558	558	558	558	558
04-BUM	Bumford Brook	Barrington	588	588	588	588	588
05-LTE	Little River	Exeter	371	371	371	371	371
05-NOR	North River	Nottingham	655	655	655	655	655
06-SGB	Stag Hollow Brook	Jefferson	0	0	0	0	2933
06-SKB	Sucker Brook	Andover	382	382	382	382	382
07-BLM	Bellamy River	Madbury	1049	1049	1049	1049	1049
08-ISR	Israel River	Lancaster	0	0	0	0	2498
08-SKB	Sucker Brook	Andover	384	384	384	384	384
09-BLM	Bellamy River	Madbury	1052	1052	1052	1052	1052
09-NOR	North River	Nottingham	659	659	659	659	659
10-BLM	Bellamy River	Madbury	1037	1037	1037	1037	1037
10-EXT	Exeter River	Exeter	471	471	471	471	471
11-EXT	Exeter River	Exeter	480	480	480	480	480
12-BLM	Bellamy River	Barrington	1035	1035	1035	1035	1035
12-EXT	Exeter River	Exeter	480	480	480	480	480
12-ISG	Isinglass River	Strafford	568	568	568	568	568
12A-LMP	Lamprey River	Epping	379	379	379	379	379
12B-LMP	Lamprey River	Epping	380	380	380	380	380
13-CCH	Cocheco River	Rochester	562	562	562	562	562
14-ISR	Israel River	Jefferson	0	0	0	0	2928
14T-ASH	Ashuelot River	Swanzey	473	473	473	473	473
15-ASH	Ashuelot River	Swanzey	474	474	474	474	474
15-CCH	Cocheco River	Rochester	553	553	553	553	553
15-OYS	Oyster River	Barrington	380	380	380	380	380
16-ISR	Israel River	Jefferson	0	0	0	0	2952
16B-ASH	Ashuelot River	Swanzey	472	472	472	472	472
17-ISR	Israel River	Jefferson	0	0	0	0	3021
19-ISR	Israel River	Jefferson	0	0	0	0	2936

20-CTC	Contoocook River	Deering	749	749	749	749	749
20-ISR	Israel River	Randolph	0	0	0	0	2931
21P-ASH	Ashuelot River	Surry	752	752	752	752	752
22-CTC	Contoocook River	Bennington	751	751	751	751	751
26-LMP	Lamprey River	Deerfield	1033	1033	1033	1033	1033
27F-MER	Merrimack River	Concord	295	295	295	295	295
35-CTC	Contoocook River	Jaffrey	765	765	765	765	765
AYERSIMP02	Pemigewasset River	Bristol	473	473	473	473	473
Individual Parameter Totals							
			31872	31872	31872	31872	68,361
Total Data Points							195,849

Table 7. Summary of Multiparameter Datalogger Data Verification - 2007

Parameter	Total Count	Invalid Count	% Invalid
Dissolved Oxygen (mg/L)	31872	4353	13.66
Dissolved Oxygen (% Sat)	31872	4352	13.65
pH (std. units)	31872	2685	8.40
Specific Conductance (uS/cm)	31872	1911	5.99
Water Temperature (C)	68361	161	0.24
TOTALS	195,849	13,462	6.87%

C. Use and Effectiveness of Corrective Actions

Corrective actions were rarely necessary during the sampling season. VRAP staff remained in contact with VRAP group leaders and volunteers throughout the year and immediately communicated any problems with the data or sampling techniques. When questions or problems did arise they were quickly corrected.

D. Conformance to QAPP Requirements/Descriptions of Deviations

Table 8 shows the inconsistencies with the approved VRAP QAPP during the 2007 monitoring season.

Table 8: Non-Conformances with the Approved NHDES VRAP QAPP Identified Following the 2006 & 2007 VRAP Monitoring Seasons.

QAPP Inconsistency No.	QAPP Section	Description	QAPP/SOP Inconsistency	Reconciliation of QAPP Inconsistency
2007-01	4.4	Training Certification Form	The VRAP QAPP indicates that each volunteer and volunteer group coordinator must participate in an annual training workshop and this training must be documented. Given that some of the group coordinators have been monitoring for over 5 years a “train the trainer” session was established whereby the volunteer group coordinator can attend the annual training workshop and then retrain veteran volunteers and train new recruits. This also allows for the recruitment of new volunteer monitors during the monitoring season when the training sessions have been completed.	The current VRAP QAPP will be revised accordingly. Documentation of those coordinators participating in the “train the trainer” session is being documented.
2007-02	5.1	Project Planning Meetings	QAPP indicates that formal planning meeting should be held with each group annually to discuss monitoring plan. Some groups who indicated that they would repeat the same plan as previous years did not have meetings. Some meetings were also held via email and/or telephone conversations	The current VRAP QAPP will be revised accordingly. Documentation of all conversations and email related to sampling plan development are being documented.
2007-04	7.2	Measurement Performance Criteria	<u>Precision – Turbidity</u> : Precision of ± 1.0 NTU was used as the primary acceptance criteria for turbidity, as this level conforms more to the lower turbidity levels typically seen in NH rivers and streams. The RPD <5% was not used for data acceptance.	The current VRAP QAPP will be revised accordingly. This change is consistent with the ARMP program. QAQC checked and data validation adjusted to accommodate new precision standard.

QAPP Inconsistency No.	QAPP Section	Description	QAPP/SOP Inconsistency	Reconciliation of QAPP Inconsistency
2007-05	7.2	Measurement Performance Criteria	<u>Precision – E. coli</u> : The approved RPD for <i>E. coli</i> bacteria was exceeded on a number of occasions, but the data were flagged as “Valid” in the EMD. This will not reduce the quality of the data.	The RPD was changed from 50% and 20% to 100% for all replicate samples. RPDs of 67% typically occurred throughout the monitoring period and were primarily related to low <i>E. coli</i> levels (e.g., regular results of 10-20 cts/100 ml and duplicate results of 20-40 cts/100 ml). The absolute differences rarely exceeded 40 cts/100. The current VRAP QAPP will be revised accordingly.
2007-06	7.2	Measurement performance criteria	<u>Relative percent difference (RPD) and absolute difference between replicate samples</u> : Acceptance limits were revised for water temperature, dissolved oxygen, pH, specific conductance, turbidity, nitrate+nitrite, total Kjeldahl nitrogen, ammonia, BOD ₅ , hardness, alkalinity, total solids, total suspended solids, <i>E. coli</i> , aluminum, and chlorophyll <i>a</i> .	Alternative acceptance limits were used and were based on a statistical analysis of existing VRAP/ARMP data. This will not reduce the quality of the data. The current VRAP QAPP will be revised accordingly.
2007-07	13.1	Sampling Quality Control	<u>Field Duplicates</u> : During the 2007 season VRAP groups were not required to collect duplicate samples as they had in the past. This decision was made due to the inability to determine if any variability between the duplicate and sample was due to instrument issues or true environmental variability.	The current VRAP QAPP will be revised accordingly. This will not reduce the quality of the data or its ability to be flagged as valid.
2007-08	13.1	Sampling Quality Control	Frequency of Replicates: VRAP groups are instructed to conduct a replicate on each sampling day for field parameters. In cases where there was no field replicate conducted, the 10% replicate requirement was used and the replicate for the previous or next sampling event	The current VRAP QAPP will be revised accordingly. This will not reduce the quality of the data or its ability to be flagged as valid.

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			was used for QA/QC purposes on the date without a replicate.	
2007-09	16.1	Technical System Audits	Technical system audits were conducted for 69% of VRAP groups whereas the QAPP requires that all groups be audited. In addition some audits were conducted in conjunction with field visits to groups for other purposes. All of the groups that did not receive audits are experienced in sampling techniques and QA/QC procedures and have experienced group leaders. This did not reduce the quality of the data collected as all data was still subject to the QA/QC procedures described in the VRAP QAPP.	An effort will be made to audit all VRAP groups during the 2008 season regardless of the number of years they have been participating. If this is not possible a priority will be given to new groups and those deemed by the Program Manager and Program Coordinator as in need of an audit.
2007-10	17.0	QA Management Reports	The prescribed QA Memorandum will not be completed.	<p>The NHDES QA System Annual Program Self-Audit will be completed instead of the prescribed QA Memorandum.</p> <p>The current VRAP QAPP will be revised to state that the self-audits will be conducted annually.</p>

QAPP Inconsistency No.	QAPP Section	Description	QAPP/SOP Inconsistency	Reconciliation of QAPP Inconsistency
2007-11	Appendix A	Field Sampling Protocols	The field sampling protocols in the approved QAPP were not used during 2007	The field sampling protocols were modified to reflect changes in QA/QC procedures listed above. The use of the revised field protocols will not reduce the quality of the data.
2007-12	Appendix B	VRAP Sampling Plan and Analysis Template	The sampling template in the approved QAPP was not used in 2007.	VRAP staff allowed for flexibility in how a sampling plan was documented as long as sampling QA/QC requirements were met. This will not reduce the quality of the data.
2007-13	Appendix C	VRAP Field Data Sheet	The Field Data Sheet in the approved QAPP was not used in 2007. This will not reduce the quality of the data.	Field data sheet updated and improved to reflect changes in QA/QC requirements and to reflect minor changes requested by VRAP groups.