A few important updates at CCAL:

PLEASE READ: To increase efficiency and consistency, CCAL has automated the method used for analysis of Total Phosphorus. The traditional manual method will no longer be routinely used. There may be differences between results for some sample matrices. Please see the following pages for more information.

In addition, alkalinity will now be reported as mg CaCO3/L. To convert from previously reported HCO3-C to CaCO3, multiply by 4.1664. To convert from mg CaCO3/L to ueq/L, multiply by 20. Please contact Cam or myself if you have any questions.

CCAL has also added several analyses; Inorganic Carbon, Turbidity and Color by visual comparison.

All documentation on the CCAL webpage is in the process of being updated to reflect changes. See http://www.ccal.oregonstate.edu or contact the lab for more information.

Thank you for your support,
Kathy

Kathryn Motter
CCAL Laboratory Manager &
IWW Collaboratory Manager
Oregon State University
College of Forestry
321 Richardson Hall
Corvallis, OR 97331
(541) 737-5120
(541) 737-5121
http://www.ccal.oregonstate.edu/
http://water.oregonstate.edu/collaboratory

Total Phosphorus FAQ (page 2) and Method Change for Total Phosphorus (pages 3-4) information included in this document.

Department of Forest Ecosystems and Society
CCAL Water Analysis Laboratory
Oregon State University, 321 Richardson Hall, Corvallis, Oregon 97331
T 541-737-5120 | **E** kathryn.motter@oregonstate.edu
T 541-737-5122 | **E** cam.jones@oregonstate.edu

Why is CCAL changing from a manual to an automated method for total phosphorus?

The manual method is labor intensive with multiple processing steps. The automated method will provide more consistent results by reducing the amount of processing steps. Color development is more consistent since temperature and reaction time are controlled.

How do the automated and manual total phosphorus methods compare?

The automated method produces results that are generally lower than the manual method. Comparisons for each project will be dependent on sample matrix.

Why does the automated method produce lower results?

The automated method is more effective in correcting for positive interferences such as silica.

Why weren't the positive interferences noticed before?

CCAL has participated in Performance Evaluation programs (EPA, USGS and NWRI) for over 25 years and always received excellent ratings on total phosphorus results. These Performance Evaluation samples have either been low in silica or had simple matrices so that the interference was not detected.

Can our samples continue to be analyzed using the manual method?

We will continue to run the manual method through the end of calendar year 2010 in an attempt to run comparisons for projects with historic results from the manual method. Some projects have already had samples analyzed by both methods during the method development period.

What if we want additional comparison samples analyzed?

Through the end of 2010 if you desire to have additional samples from your project run manually for comparison we will analyze one set (up to 20 samples) and send you the comparison results. The normal cost for total phosphorus ($27/sample) will apply.

Department of Forest Ecosystems and Society
CCAL Water Analysis Laboratory
Oregon State University, 321 Richardson Hall, Corvallis, Oregon 97331
T 541-737-5120 | **E** kathryn.motter@oregonstate.edu
T 541-737-5122 | **E** cam.jones@oregonstate.edu

The Cooperative Chemical Analytical Laboratory (CCAL) analyzes naturally occurring freshwaters for trace level nutrients. As a customer of CCAL you are being sent this notice to inform you of a change in our analytical methods.

The laboratory has automated the method used for analysis of total phosphorus (total phosphorus for unfiltered samples and total dissolved phosphorus for filtered samples) as of 16 June 2010. Samples submitted to the laboratory will now be analyzed using the Technicon Auto-Analyzer II (the same instrument used for analysis of nitrate, ammonia, phosphate, silica and total nitrogen). We have discontinued the routine use of the manual method using the Milton-Roy 601 spectrophotometer at this time. The primary reason for changing to the new method is to increase laboratory processing efficiency. Increased analytical efficiency will allow us to stabilize the fee for this analysis. An additional benefit of the automated method is that less sample volume will now be required to perform this analysis (40 ml instead of 110 ml). We will continue to run the manual method through the end of calendar year 2010 in an attempt to run comparisons for projects with historic results from the manual method.

Numerous projects have submitted samples to the laboratory for many years creating long-term databases for total phosphorus concentrations. For these long-term databases it is important to be able to correlate results and develop a relationship between the old manual method and the new automated method. The following is a brief discussion of how the two methods compare.

The automated method uses essentially the same chemistry as the manual method with only slight concentration differences in the reagents. The major difference is that the automated method is a heated chemistry. With the automated method, color development occurs under more consistent conditions which should result in increased precision. 181 samples were analyzed using both methods and the results compared to evaluate any difference between the methods. Sample concentrations ranged from 0.000 - 0.668 mg/l. Detection level for both the manual and automated method is 0.002 mg/l with precision of +/- 0.002 mg/l.

Overall, the mean difference between methods is -0.010 mg/l with the automated method producing results that are generally lower than the manual method. The agreement between comparison results is dependent on sample matrix. The dominant factor influencing agreement appears to be silica concentration. Generally, samples that are lower in silica (0.01 mg/l - 4.00 mg/l as silicon) have better agreement between comparison results while agreement between comparison results decreases as silica concentration increases (see Project Comparison Table). Projects with sampling areas that have silica concentrations greater than 4.00 mg/l (as silicon) are likely to see results produced by the automated method that are lower than historic results that have been produced by the manual method. However, these results are likely to be a better estimate of actual phosphorus concentrations since the positive silica interference has been minimized. Arsenic is known to produce a positive interference with the color development used to detect phosphorus and may also contribute to the differences in comparison results.

Please let me know if you have any questions about any of this information or if you have concerns as to how this change in method might affect your database. Thank you.

Cam Jones
CCAL Chemist
OSU Department of Forest Ecosystems & Society

Department of Forest Ecosystems and Society
CCAL Water Analysis Laboratory
Oregon State University, 321 Richardson Hall, Corvallis, Oregon 97331
T 541-737-5120 | **E** kathryn.motter@oregonstate.edu
T 541-737-5122 | **E** cam.jones@oregonstate.edu

TP Comparison by Project Summary								
Project	mean Difference	Population*		Notes		Si Range		P Range **
	(Automated - Manual)							
CCAT	-0.001	11		Low Si		0.4 - 3.8		0.002 - 0.668
CALL	0.001	19		Low Si		0.1 - 2.5		0.006 - 0.031
REDS	-0.002	12		Low Si		0.7 - 0.8		0.005 - 0.015
CABG	-0.009	6				???		0.006 - 0.060
HJAN	-0.010	88				~6.0 - 9.0		0.000 - 0.047
SILS	-0.011	11				3.0		0.000 - 0.031
LOSC	-0.016	3				7.0 - 11.0		0.016 - 0.033
CTLK	-0.016	16		High Si		8.0 - 17.0		0.016 - 0.064
WILL	-0.025	15		High Si		11.0 - 13.0		0.034 - 0.169
		181	total					
								**mean of both methods
mean	-0.0098							
sd	0.008							
n	181							
note: difference and ranges are mg/l								