

LONG CREEK WATERSHED MANAGEMENT DISTRICT Request for Proposal -- Monitoring Services

The Long Creek Watershed Management District (LCWMD) is seeking proposals from qualified applicants to provide monitoring services on a contractual basis under appointment by the LCWMD Governing Board.

Interested parties may request a Request for Proposals (RFP) from LCWMD c/o CCSWCD at 35 Main Street, Suite 3, Windham, ME; at the website: www.restorelongcreek.org; or by e-mail from tamara@cumberlandswcd.org. **Proposals are due by 4:00 p.m., June 17, 2010.**

Any late proposals will not be accepted and will be returned to the proposer. The LCWMD reserves the right to accept or reject any or all proposals.

The LCWMD Governing Board will base its selection on its evaluation of the written proposal, the consultant's qualifications and experience, client references and the overall fee structure.

Proposals must be received by the LCWMD c/o CCSWCD at 35 Main Street, Suite 3, Windham, ME on or before **4:00 PM, June 17, 2010**. Proposals must be sealed and clearly marked, "Monitoring Services for the Long Creek Watershed Management District". Respondents must submit **an original proposal and two (2) copies.**

Miscellaneous Requirements: The LCWMD will not be responsible for any expenses incurred in preparing, submitting or presenting a proposal. Emphasis should be on completeness and clarity of content.

The LCWMD reserves the right to waive any informalities in proposals, to accept or reject any or all proposals for any reason, to negotiate with any applicant and to select an applicant deemed to have submitted a proposal that in the judgment of the LCWMD Board is in the best interest of the LCWMD.

Proposals may be held by the LCWMD for a period not to exceed sixty (60) days from the date of the opening of proposals for the purpose of reviewing proposals and investigating the qualifications of the applicants prior to the award of a contract.

INTRODUCTION

The Long Creek Watershed Management District is a quasi-municipal, special purpose district established as a separate legal entity and instrumentality and as a body corporate and politic under the laws of the State of Maine. The LCWMD was formed to provide the structure for the implementation of the Long Creek Watershed Management Plan, which includes implementing the Long Creek Monitoring Plan (Appendix A).

Long Creek is a freshwater stream that flows into Clarks Pond, eventually draining into the Fore River and Casco Bay. The Long Creek Watershed is approximately 3.45 square miles and is located in Portland, South Portland, Westbrook and Scarborough. Long Creek does not meet state water quality standards. The Creek currently does not meet State water quality standards due to elevated concentrations of metals, chloride, phosphorus, nitrogen, polycyclic aromatic hydrocarbons (PAHs); and reduced dissolved oxygen concentrations. Additional NPS threats include altered hydrological conditions and increased water temperatures.

Development over the past several decades has converted the landscape from mostly forests and fields to commercial, light industrial, retail and transportation uses. One of the primary results of this conversion process has been the creation of impervious cover (IC) such as roads, driveways, parking lots, sidewalks, rooftops and any other impermeable surfaces of the built environment.

Impervious cover alters hydrology and acts as a conveyance for pollutants into adjacent surface waters by stormwater or melting snow. High IC increases the volume of runoff directed to Long Creek by decreasing filtration through soils and directing of overland flows to ditches and storm drains. In stream watersheds with less impervious cover, stream flows are less variable, which encourages a healthier biotic community. Figure 1 displays the water levels of Long Creek and Red Brook (28% and 6% IC, respectively) after the indicated amount of time post-storm event.

A direct correlation has been established between impervious cover and the health of aquatic ecosystems. It has been shown that as impervious cover increases above 10% there is a corresponding increase in stormwater flows and degradation in water quality, stream habitat, and diversity of aquatic life. Some areas of the Long Creek watershed have an impervious cover of greater than 60%. The goal of this program is for Long Creek to meet State water quality standards by 2019. It is proposed that this will be accomplished by reducing the effective impervious cover by treating 150 acres with structural stormwater treatment retrofits, implementing nonstructural measures to limit the impact of all impervious cover on stream health and implementing in-stream, riparian and floodplain restoration to rehabilitate stream habitat.

Due to the impacts of IC, EPA made a final determination on November 9, 2009 to designate stormwater discharges from impervious areas equal to or greater than one acre in the Long Creek Watershed as requiring stormwater discharge permits. Owners of property within the watershed that meet the permitting threshold have two permitting options for discharging stormwater into Long Creek – general permit or individual permit. The general permit will involve the collaborative implementation of the Long Creek Watershed Management Plan, which will include implementation of the Long Creek Monitoring Plan (Appendix A).

This monitoring plan will be overseen by LCWMD in cooperation with CCSWCD, DEP, EPA and CBEP. DEP will, ultimately, assess whether Long Creek is meeting State water quality standards. It is anticipated that the implementation of this program will result in associated pollutant load reductions as described in the Long Creek Watershed Management Plan (July 2009).

THE PROPOSAL

Scope of Monitoring Services Required per RFP

Attached to this request for Proposal is Appendix A, the Long Creek Monitoring Plan, which describes the purpose, sampling design, proposed sampling locations, parameters, methods and sampling schedule.

The services that are being sought at this time include all parameters listed on page 9 of Appendix A for 2010 except for biomonitoring and stream geomorphology. The anticipated start time for such monitoring services is July 2010.

It is recognized that the attached Monitoring Plan has cost estimates included. These are estimates only. A winning applicant may be selected whose proposed charges are (overall or for particular components of the Plan) lower or higher than the estimated costs provided in the attached Plan.

This is the kick off year of this monitoring program. As such, some of the methods, parameters and sampling schedules may change to accommodate new and better approaches. We welcome applicant input as part of your proposal.

As part of your pricing, please provide unit price per sample (where appropriate), which will allow us to either increase or decrease the number of samples collected, if necessary.

Qualifications and Experience of Monitoring Applicant

The proposal must identify who will be providing monitoring services to the LCWMD. The proposal should demonstrate the qualifications, competence and capacity of the applicant to carry out the monitoring services of the LCWMD. Resumes shall be submitted for each lead person specifically assigned to the providing of services to the LCWMD.

Client references

Provide list of references with addresses and phone numbers who may be contacted by the Long Creek Watershed Management LCWMD in connection with the proposal.

Other Required Narrative Topics

Contract for Services

The applicant that is selected by the Long Creek Watershed Management District will be required to sign a contract that is provided as Appendix B.

The Long Creek Watershed Management District will entertain proposals for payment on an hourly basis, on a flat fee or capped basis, or any combination thereof. Any variations in the hourly rate should be disclosed, along with a rate schedule for the applicant. Any additional billable costs for other services should be noted in the proposal. Itemized bills including the date, time and description of service, person providing service and the associated hourly rate will be required to be submitted prior to payment. Such bills shall be submitted on a monthly basis.

Selection Process: Proposals shall be reviewed by the LCWMD Executive Director and select members of the LCWMD Board. The Executive Director shall make a recommendation to the LCWMD Board, who shall make a final selection.

LONG CREEK MONITORING PLAN

APRIL 29, 2010

PURPOSES OF MONITORING

Monitoring of conditions in Long Creek as funded by landowners in the watershed reflect specific regulatory and management needs. These are:

- (1) To determine whether or not Long Creek meets applicable water quality standards;
- (2) To gather information to improve management of Long Creek; and
- (3) To document effectiveness of restoration programs and progress towards meeting standards.

The committee working on the design of the monitoring plan did not support a fourth potential goal – documenting the effectiveness of individual BMPs. The committee considered that the probable costs to gather data of practical, scientific or engineering significance was likely to be too high. In addition, meeting participants were of the opinion that excellent research on effectiveness of BMPs is already being carried out at the UNH Stormwater Center, and little new would be learned by carrying out similar work in Long Creek.

This monitoring plan is not an open-ended research effort, but is focused on gathering the information needed to manage Long Creek. We believe that the restoration of Long Creek provides a unique opportunity to study changes in an urban watershed in the face of a watershed-wide restoration effort. The work being undertaken here should attract interest from academics and funders. Such studies should be encouraged since the information gathered through them can improve the management of Long Creek (and potentially other urban impaired streams elsewhere). Such studies, however, are distinct from the base monitoring effort we are concerned with in this plan.

HYDROLOGIC MONITORING

Monitoring of hydrology is central to the monitoring program. We need good flow data not only to document changes in hydrology (which may be affected by actions undertaken in the watershed), but also guide collection and interpretation of water quality samples. We envision detailed hydrologic monitoring at all primary monitoring stations around the watershed, with rainfall monitoring at three of those locations as well.

Water flow (stream discharge) will be measured based on empirical stage-discharge relationships developed for all primary monitoring stations. These relationships will be statistically derived based on simultaneous field measurements of stage (water surface elevation) and discharge at particular locations in the stream. For each location, a minimum of five such sets of data, collected

from as wide a range of different flow levels as is practicable, will be used to develop the stage-discharge curve. Stage-discharge relationships will also be checked at least annually.

The elevation of the water surface in the stream ("stage") is straight forward to measure nearly continuously using inexpensive submersible pressure transducers (data loggers). Once the stage-discharge relationships have been established, a data logger can be deployed to report stream stage, which is then used to estimate stream flow.

For understanding the effects of restoration, however, good flow data alone is probably insufficient. Precipitation and storm patterns differ year to year. Thus a simple comparison of flow in Long Creek prior to restoration with flow after significant work has been completed confounds the effects of restoration efforts with year to year variation in the weather.

A comprehensive understanding of the hydrologic effects of restoration will require a combination of field data and hydrologic modeling. A watershed model of Long Creek can be calibrated based on data collected in the first year or two of the restoration effort, and then used in the future to estimate how the observed hydrologic response of the watershed to storms differs from what would have been predicted if no restoration activities were to take place.

MAJOR PARAMETERS

WATER QUALITY STANDARDS

The following parameters were considered important because there have either been documented failures to meet water quality standards in Long Creek, or such failures are strongly suspected based on other evidence.

- Hydrology and Flow (this is the most direct effect of impervious surfaces, the primary stressor identified in the TMDL)
- Biological Monitoring – Invertebrates
- Biological Monitoring – fish community
- Dissolved Oxygen (continuous monitoring at Primary sites)
- Chloride
- Metals

INFORMATION AND UNDERSTANDING

In addition to the parameters that are directly connected with known or suspected failures to meet water quality standards, other parameters can help us understand the forces shaping the water quality of Long Creek. We propose to collect data on the following. (Some of these parameters are inexpensive to measure; others are thought to be directly related water quality standards violations.)

- Temperature
 - Conductivity
 - pH
- Collected nearly continuously during the summer months using automated water quality "sondes"

- Phosphorus
- Bacteria (*E. coli*)
- Organic toxics – especially polycyclic aromatic hydrocarbons (PAHs)
- Geomorphology, stream channel stability, habitat complexity (e.g., in-stream large wood) and channel morphology

DOCUMENT EFFECTIVENESS OF ACTIONS

Urbanization triggers major hydrologic changes in urban streams. In fact, Vermont's approach to monitoring and managing urban impaired watersheds focuses on comparing the hydrology of impaired versus non-impaired streams. Maine's approach to developing urban watershed TMDLs emphasizes control of directly connected impervious area, in large part because of the impact that impervious surfaces have on stream hydrology.

However, the impacts of urbanization on stream ecosystems are multifaceted. A number of actions planned for the Long Creek Watershed (e.g., good housekeeping practices, street sweeping, installation of tree box filters) reduce pollutant loadings, but may have little effect on storm event hydrology. Therefore, documenting the effectiveness of actions undertaken in Long Creek, cannot focus solely on hydrology, but will examine effects on other stressors as well, such as high temperatures, toxic pollutants and chlorides.

Fortunately, no additional parameters must be tracked solely to document effectiveness of restoration efforts. Instead, the sampling design for measuring the parameters already listed will be developed to ensure that we can document changes that occur AT THE WATERSHED LEVEL in four focus areas:

- System hydrology
- Pollutant loading or concentrations
- Habitat structure
- Biological response

SAMPLING DESIGN

Multiple goals and multiple parameters make the overall sampling plan difficult to design. This is further complicated by the fact that some parameters are inexpensive to monitor, while others cost quite a lot.

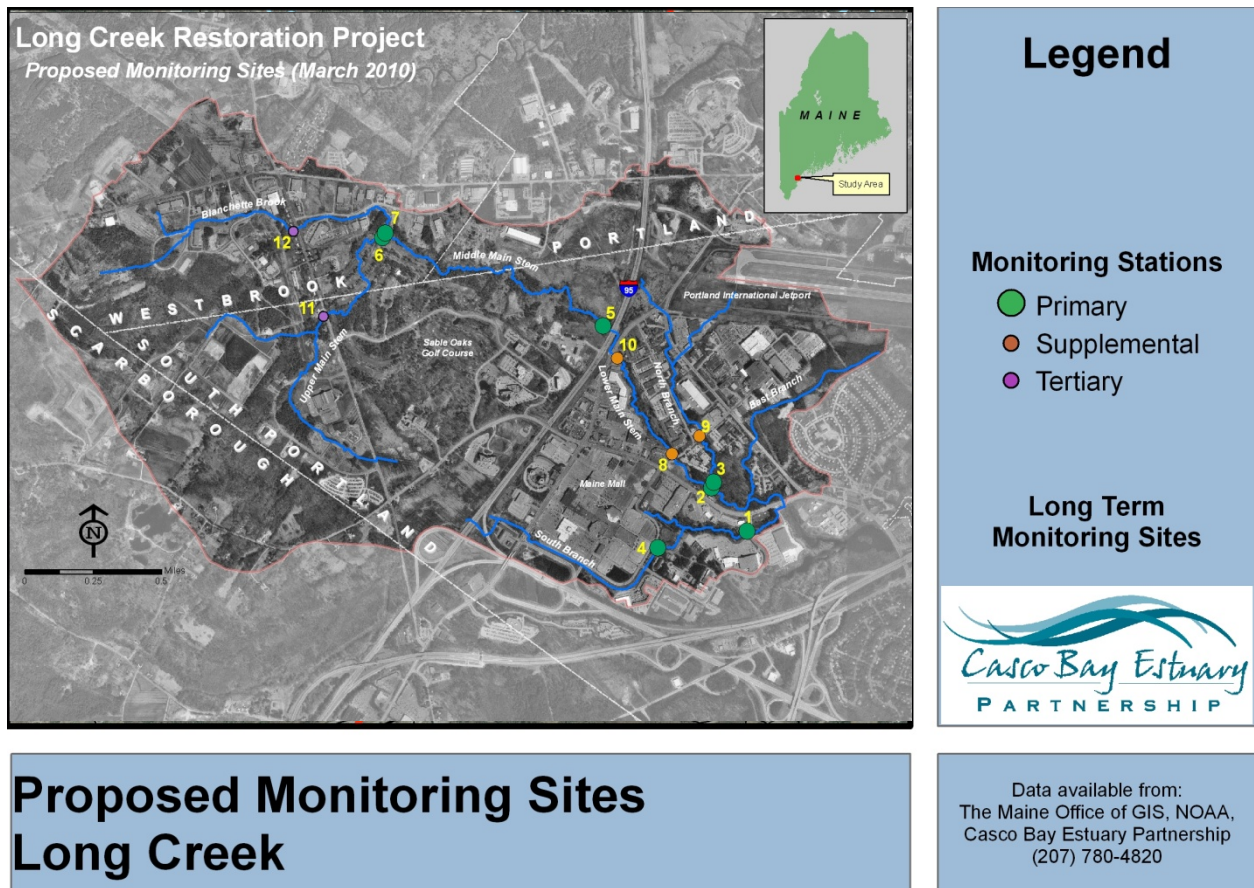
The sampling design must allow both longitudinal documentation of trends at single locations and upstream-downstream comparisons to evaluate changes occurring within the watershed. However, multiplication of sampling locations will lead to multiplication of costs.

Accordingly, we propose focusing ongoing monitoring at a small number of permanent monitoring stations. Sampling at those locations repeatedly would generate a long-term record that will be

informative of changing conditions in the Long Creek and its tributaries. Planning sampling activity then becomes a matter of identifying which parameters to sample at which locations, how frequently.

PROPOSED SAMPLING LOCATIONS

We have identified 7 proposed locations (4 permanent / 3 rotating) for primary sampling stations; 3 proposed locations for secondary sampling stations; and 2 proposed locations for tertiary sampling stations. Primary sampling locations will be sites for hydrologic monitoring, and data addressing most parameters will be collected at those locations. They are located at the downstream end of each sub-watershed, and at several locations higher in the watershed to facilitate upstream-downstream comparisons and improve mechanistic understanding of stream hydrology. Secondary and tertiary sites include locations where violations of water quality standards have been observed in the past and should therefore provide an especially useful mechanistic understanding of impairment causes. The sites are shown on Map 1 and listed in Tables 1 and 2.



Map 1: Sampling Locations for Long Creek Monitoring Plan

A LIMITATION OF PROPOSED SAMPLING LOCATIONS

It is important to point out that these proposed locations do NOT represent all locations where violations of water quality have been observed or could be observed, but have been selected to provide a synoptic view of conditions in Long Creek. Regulatory agencies may wish to carry out sampling at additional locations to determine whether Long Creek meets water quality standards everywhere.

Table 1: Listing of permanent sample locations for monitoring of Long Creek.

Site No.	Primary Monitoring Location	Site Type	DEP Site Code
1	South Branch above Clarks Pond access road	Primary	LC-S-0.186
2	Main Stem above confluence with North Branch	Primary	LC-M-0.380
3	North Branch above confluence with Main Stem	Primary	LC-N-0.415
4	South Branch below Econolodge Motel	Primary	
5	Main Stem above turnpike	Primary	
6	Main Stem – above confluence with Blanchette Br.	Primary	LC-Mn-2.270
7	Blanchette Br. – above confluence with Main Stem	Primary	LC-M-2.274
8	Main Stem above Foden Rd. crossing	Supplemental	
9	South Branch above Foden Rd. crossing	Supplemental	LC-M-0.6 (Station 752)
10	Main Stem below Maine Mall Rd / Turnpike	Supplemental	
11	Upper Main Stem above Spring St. crossing	Tertiary	LC-M-2.754
12	Blanchette Br. above Spring St. crossing	Tertiary	

Table 2: Where to sample what: Major parameters associated with each sample location.

Site No.	Type	Sondes	Hydro	Bio-monitoring	Nutrients	Metals	Chloride	PAHs
1	Primary	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Primary	Yes	Yes	Yes	Yes	Yes	Yes	
3	Primary	Yes	Yes	Yes	Yes	Yes	Yes	
4	Primary	Yes	Yes		Yes	Yes		
5	Primary	Rotating	Yes	Yes	Yes	Yes	Yes	
6	Primary	Rotating	Yes	Yes	Yes	Yes		
7	Primary	Rotating	Yes	Yes	Yes	Yes		
8	Supplemental							Yes
9	Supplemental			Yes				Yes
10	Supplemental							Yes
11	Tertiary				Yes			
12	Tertiary				Yes			

EXPLANATION

Sondes: Data will be collected year-round when risk of ice damage is low (to protect equipment) for dissolved oxygen (D.O.), temperature, pH, and conductivity using continuous water quality sondes at all 7 Primary stations (4 permanent / 3 rotating). Additional parameters such as oxidation-reduction potential (ORP) and turbidity may be considered depending on the availability of funds.

Hydrology: Collected at Primary stations only. We currently believe that sampling these locations will result in data with sufficient density to permit development and calibration of hydrological models.

Bio-monitoring: Biomonitoring samples for stream invertebrates will be collected at all 7 Primary stations twice in every 5 year period (e.g., in years 3, 5, 8 and 10). One additional site (#9) has previously failed to meet invertebrate-community based water quality criteria, so that site should be sampled at least once every five years. We anticipate that DEP will be able to support some of this work every five years, as the state's Biomonitoring Program returns to the Cumberland County area as part of their ongoing sampling program.

Nutrients: Data will be collected at the seven permanent stations as well as at two stations on the Main Stem, upstream of Spring Street. These upstream locations would contribute to our understanding of sources and sinks for nutrients within the watershed and floodplain, as well as help us understand the potential role of nutrient enrichment in generating low dissolved oxygen conditions. Data will be collected ONLY on phosphorus, not on other macronutrients. While data on other macronutrients, especially nitrogen, would be of interest with regards to impact of stormwater pollution in Casco Bay, nitrogen loads are less likely to contribute to failure of the stream to meet water quality criteria.

Metals: High levels of metals can create toxic conditions that may contribute to the failure of urban streams to support sensitive invertebrate species, thus contributing to a stream's failure to meet the invertebrate biomonitoring-based water quality criteria. Data on metals will be collected at all seven Primary stations under base and storm flow conditions.

Chloride: High chloride levels are associated with high input of salts (especially sodium and calcium chlorides) derived from deicing activities that enter the stream during snow melt or via groundwater. In most urban watersheds not influenced by ocean waters, chlorides are highly correlated with conductivity, which will be measured nearly continuously with water quality sondes. Chloride data will be collected at four sites to check for such an association in Long Creek and develop a statistical model to estimate chlorides based on conductivity data.

PAHs and other toxic chemicals: Polycyclic aromatic hydrocarbons are a class of organic compounds found in a variety of petroleum products and produced as a byproduct of combustion of hydrocarbons. They tend to be found in higher concentrations in areas with heavy automobile use. Unfortunately, PAHs and other organic toxins are expensive to measure. To control costs, PAHs will be sampled at only four sites – those where elevated levels are most likely to occur. The goal is to use data from limited sites to ascertain whether organic toxins are contributing to failure of the stream to meet water quality criteria. The frequency with which we collect organic toxics data will depend on what we find in the first sampling period. If values are consistently low, we will sample only once every five years. If levels are higher, we will sample twice in every five year period.

PROPOSED METHODS

Parameter	Method	Locations
<u>Hydrologic Alteration</u>		
Stream Hydrology	Stage-discharge curves	Primary Sites
Precipitation	Precipitation monitoring at a minimum of three sites	Sites 1, 4 and 7, supplemented by Portland Airport data
Weather	Air temperature, relative humidity, solar radiation	Portland International Jetport
<u>Addressing WQ Standards</u>		
Continuous water chemistry – DO, pH, conductivity, temp	Data sondes	Sites 1, 2, 3 and 7 with additional deployments as availability of sondes allows
Biomonitoring -- invertebrates	Rock baskets	Primary Sites (and some supps)
Biomonitoring -- fishes	Electrofishing	Primary Sites
Chloride	Via established chloride - conductivity relationships	Primary Sites
<u>Documenting Watershed Processes</u>		
Conventional Pollutants: Phosphorus, turbidity, hardness, SSC	Base flow samples	Primary Sites
	Storm event sampling	Primary Sites
Water Temperature	Sondes or inexpensive data loggers	Data collected with sondes at all primary sites. Other sites to be selected to enhance watershed-wide coverage and test thermal impacts of specific outflows
Stream Geomorphology	Rapid assessment	Selected stream channel reaches (including J. Field’s survey areas)
	Permanent monitoring	Restoration project sites
Conductivity	Base flow samples	Collected with sondes at all Primary sites
	Storm event sampling	Collected with sondes at all Primary sites
<u>Toxicity and Toxic Chemicals</u>		
Metals	Via correlations with selected indicator metals	Collected at all Primary stations only to establish or check correlation with indicator metals
Indicator Metals -- Copper and Zinc	Base flow samples	Test as surrogate for other metals; all Primary stations

	Storm event sampling	Test as surrogate for other metals; all Primary stations
Toxic organic compounds	Storm event sampling	Sites 1, 8, 9 and 10 (<i>field verification needed to determine whether it should be 8 & 9 or 2 & 3</i>)

SAMPLING SCHEDULE

While these parameters are all related to specific documented or suspected failures of conditions on Long Creek to meet water quality standards, they vary in cost and in how much information they provide about what is going on in the stream.

The approach taken to develop the sampling schedule has been to:

- (1) Identify monitoring goals,
- (2) Identify parameters to track,
- (3) Document resources needed to collect that data, and
- (4) Propose a schedule for monitoring that offers a balance between frequency of data collection and cost.

As a practical matter, more expensive parameters will often be monitored less often than less expensive ones.

STORM EVENT SAMPLING

A high proportion of pollutants are discharged from urban watersheds during storm events. Sampling for pollutants will be designed to collect data under both base flow and storm event conditions.

To minimize the costs of storm event monitoring, storm water samples will be collected with "rising stage" event samplers. These are devices that fill up with water the first time they are submerged during a storm, and then store the sample until it is collected by a technician and returned to the laboratory for analysis. At the start of the storm flow sampling season, we will determine whether multiple rising stage samplers should be used at particular Primary sites based on the specific flow characteristics of each. If multiple rising stage samplers are used for any single storm event then the contents from each sampler will be combined for a single composite sample for the storm event.

PROPOSED SAMPLING SCHEDULE 2010- 2014

Parameter	Timing	Year				
		2010	2011	2012	2013	2014
<u>Addressing WQ Standards</u>						
Continuous DO, pH, conductivity, temp	Summer months. A minimum of monthly two week deployments; Continuous monitoring as resources allow.	X	X	X	X	X
Biomonitoring -- invertebrates	Twice every five years	X			X	
Biomonitoring -- fishes	Every three to five years				X	
Chloride	3 storms plus 3 baseflow samples in late winter and spring; 3 storms plus 3 baseflow samples in summer.		X			X
Toxic organic compounds	Two storm events and one baseflow "grab" sample at each site (COST of this is substantial)		X			X
Subset of Metals -- Copper and Zinc (?)	Three Storm events at each site, monitored annually	X	X	X	X	X
Metals	Three storms at each site, every three to five years	X		X		
<u>Documenting Watershed Processes</u>						
Conventional Pollutants - Base Flow (phosphorus, turbidity, SSD)	5 base-flow samples, summer months	X	X	X	X	X
Conventional Pollutants - Storm events	Minimum of 5 storms at each Primary station, deployed as paired samples where possible	X	X	X	X	X
Weather (precipitation, temperature)	Continuous	X	X	X	X	X
Temperature	Continuous during the summer months, using sondes and data loggers	X	X	X	X	X
Stream flow	Continuous from Apr-Nov based on rating curves for each Primary site	X	X	X	X	X
Stream Geomorphology	Every 3-5 years				X	
<u>Document Effectiveness of Actions</u>						
Stream Geomorphology	Restoration site monitoring every 2 years, minimum	X	X		X	

ESTIMATED COSTS

ANNUAL COSTS

A preliminary estimate of the average annual (not inflation adjusted) cost of monitoring following a schedule such as this one is between \$83,308 per year and \$93,808 per year. To refine this cost estimate would require:

1. Better information on staff, equipment and analytic costs, some of which will vary depending on the extent to which monitoring depends on state agencies, CBEP, University of Maine, other partners or on contractors.
2. Consideration of potential inflation over the 5 year period of the monitoring plan.

CAPITAL COSTS

Significant start-up costs will be associated with investing in the necessary capital equipment to establish a robust monitoring plan. These capital costs were included in the estimated average annual costs just presented, but they are broken out here because they may represent a significant cash flow issue for management of the monitoring plan.

EQUIPMENT COST SUMMARY	Total Cost	Approx. Cost Per Site
Continuous WQ (5 sondes / 7 sites)	\$29,525	\$5,905
Hydrology (6 sites)	\$8,388	\$1,398
Storm Sampling (7 sites)	\$2,135	\$305
	\$40,048	\$7,608
MAINTENANCE COST SUMMARY (10% equipment reserve & consumables)		
Continuous WQ	\$6,440	\$1,288
Hydrology	\$1,643	\$274
Storm Sampling	\$1,794	\$256
	\$9,877	\$1,818

Appendix A

EQUIPMENT COST DETAILS					
CONTINUOUS WATER QUALITY - 5 sondes for 4 primary sites & 3 rotating sites					
Description	Part #	Quantity	Unit Price	Total	Comments
YSI 600OMS (w/out depth sensor)	600-02	5	\$3,340	\$16,700	Includes 1 combination temp/cond sensor and internal battery compart.; 25-30 day battery life @ 15 min sampling interval (4 AA batteries)
Optical DO sensor	ROX ODO (ppm)	5	\$1,745	\$8,725	Confirm w/ YSI whether % sat can be derived from ppm readings.
				\$25,425	
Accessories					
650MDS Handheld Datalogger					
High memory w/ internal barometer	650-04	1	\$2,765	\$2,765	50,000 dataset storage (barometer needed for instrument calibration)
High memory w/o internal barometer	650-02		\$2,485		
Low memory w/ internal barometer	650-03		\$1,770		150 dataset storage
Low memory w/o internal barometer	650-01		\$1,490		
8' non-vented cable	-	1	\$375	\$375	For instrument setup & data retrieval (vent not needed since depth won't be measured)
Conductivity Standard (case of 8 pints)*	-	5	\$122	\$610	One case for each sonde assumes 1 pint per sonde per calibration @ 8 cal/yr (*ongoing annual cost)
				\$3,750	
Sonde Deployment / Anchoring System	-	7	\$50	\$350	Metal sign posts, slotted PVC pipe sleeves, clamps, bolts, locks and cable (labor not included)
Real-Time Data Transfer					
EcoNet Real-Time Data to Web Delivery			\$8,016		Includes waterproof enclosure, solar panel, cellular antenna, first year of web hosting service and first year of cellular service
Web Hosting / Cellular Service Fee			\$2,365		Ongoing annual cost after the first year
				\$10,381	
Continuous Temp Measurement					
Hobo Pro V2 Temp Data Logger	U22-001		\$123		
Optic USB Base Station	Base-U-4		\$115		Includes couplers
HoboWare Pro	BHW-Pro		\$99		Includes CD and USB cable
				\$337	

Datasonde Capital Cost: \$29,525

HYDROLOGY					
Stage - continuous @ 6 sites					
Description	Part #	Quantity	Unit Price	Total	Comments
Solinst LT Levellogger Junior	108858	6	\$385	\$2,195	Linear sampling with 5 yr battery (LT Levellogger Gold has 10 yr battery ~ \$550 each)
Barologger	108079	1	\$487	\$463	Need for barometric P compensation - synchronized with Levellogger readings
Leveloader Gold	108354	1	\$610	\$610	Data transfer device that allows for simple field programming
Direct Read Comm. Pkg.	107379	1	\$396	\$396	Allows logger to stay in place w/out having to be pulled for data transfer
Direct Read Cable Ass'y	104940	6	\$100	\$600	Needed for each logger to connect w/Leveloader (or laptop)
Stilling wells / anchoring systems	-	6	\$50	\$300	Metal stakes, slotted PVC pipe sleeves, cable, bolts and locks (labor not included)
				\$4,563	
Discharge - 6 visits / yr @ 6 sites for 3 yrs					
Description	Part #	Quantity	Unit Price	Total	Comments
USGS Type AA-MH Model 6215 Current Meter	101-003	1	\$775	\$775	
AquaCalc Pro Open Channel Flow Computer & Rod Mount/Adapter	102-010 102-005 102-006	1	\$2,305	\$2,305	AquaCalc Pro*=\$2200; Rod mount=\$60; Adapter=\$45 (*AquaCalc Pro offers more user-friendly features than AquaCalc 5000)
USGS Top Setting Wading Rod (6')	105-002	1	\$415	\$415	
Beaded Tagline (300') w/ Columbus Reel	109-030	1	\$330	\$330	
Wading Rod Outfit	103-024		\$3,605		Type AA meter w/ case; headphones; 4' to setting wading rod; AquaCalc 5000
				\$3,825	

Flow Monitoring Capital Cost: \$8,388

STORM SAMPLING - Rising Stage @ 7 Primary Sites					
	Part #	Quantity	Unit Price	Total	Comments
Storm Water Sampler - Single Use Glass*	1120-1000	42	\$40	\$1,680	Assume 6 storms per site per year at all 7 primary sites; cost increases by multiple of 1 for each additional sampler deployed (*ongoing annual cost)
Mounting Kit - Reuseable	1160-1000	7	\$40	\$280	
Anchoring systems	-	7	\$25	\$175	Metal stakes, cables, bolts and locks (labor not included)
ISCO 6712 Portable Sampler	68-6710-070		\$3,069		Requires link to other instrumentation for storm sampling programming
Sampling container	68-6700-015		\$149		2.5 gal glass
Suction line strainer	60-9004-379		\$94		
Battery (lead acid)	60-3004-106		\$165		
Battery charger	68-3004-198		\$103		
			\$3,580		
Storm Sampling Capital Cost: \$2,135					

Appendix A

LABOR COST DETAILS			
CONTINUOUS WATER QUALITY* - Five Datasondes for 7 sites and 9 month-long deployments	Cost	Approx Level of Effort (Hrs)	Comments
Create deployment / anchoring system	\$3,553	63	Includes \$245 material / equip costs
Mobilization & instrument calibration	\$9,565	180	Includes \$115 material / equip costs
Sonde deployment and retrieval	\$3,225	52	Includes \$495 for travel
Post-deployment QA & data download	\$2,543	45	Includes \$180 material / equip costs
Data management	\$3,544	68	
Meetings, data summary & report	\$1,819	32	
<i>*FBE derived estimates</i>	\$24,248	439	
HYDROLOGY* - 6 sites			
Stage - Level Loggers with 4 data retrievals			
Site Design and Installation	\$2,040	33	
Mobilization & instrument calibration	\$440	7	Includes \$20 material / equip costs
Field work	\$908	12	Includes \$310 for travel
De-mobilize	\$437	7	Includes \$80 material / equip costs
Data management	\$840	14	
Meetings, data summary & report	\$1,178	19	
	\$5,843	92	
Discharge - Flow Meter for 6 measurements			
Project and site familiarization	\$540	8	
Mobilization & instrument calibration	\$1,165	18	Includes \$85 material / equip costs
Field work	\$6,066	108	Includes \$460 for travel
De-mobilize	\$1,065	18	Includes \$120 material / equip costs
Data management	\$2,160	36	
Meetings, data summary & report	\$1,425	24	
	\$12,421	212	
<i>*FBE derived estimates</i>	\$18,264	304	
INSTANTANEOUS WATER QUALITY SAMPLING** - 7 sites for 4 base flow and 4 storm flow measurements			<i>This estimate doesn't include costs for sampling nutrients at sites 11 & 12 or PAHs at sites 8, 9 & 10.</i>
Mobilization & instrument calibration	\$620	12	Includes \$80 in calibration standards
Field work	\$5,968	112	Includes \$88 in travel
Sample delivery to lab	\$694	12	Includes \$154 in travel
De-mobilization	\$540	12	
Data management	\$540	12	
Data summary & report	\$1,140	17	
Equip maintenance & admin	\$398	9	Includes equip replacement & admin costs
<i>**FD derived estimates</i>	\$9,900	186	
LABOR COST SUMMARY			
Continuous Water Quality (5 sites)	\$24,248	\$4,850	
Hydrology (6 sites)	\$18,264	\$3,044	
Instantaneous Water Quality (7 sites)	\$9,900	\$1,414	

\$52,411

\$9,308

WATER CHEMICAL ANALYTICAL COSTS

Description	Cost / Sample
Metals (Pb, Zn, Cu, Ni, Cd)	\$98
VPHs (volatile petroleum hydrocarbons)	\$125
EPHs (extractable petroleum hydrocarbons)	\$240
PAHs (EPA 625)	\$175
EPH w/ PAHs	\$300
Pesticides & PCBs (EPA 608)	\$170
Total Phosphorus	\$30
Ortho-Phosphate	\$30
Ammonia	\$30
Nitrate-Nitrite	\$40
TKN	\$45
SSC	\$18
Chloride	\$20
<i>*ME Environmental prices good until 12/31/10</i>	

Key Parameters	Cost per Site per Event	Cost for Planned Sites per Event	Cost for Planned Sites per Season
Nutrients - P compounds only (sites 1-7, 11 & 12)	\$60	\$540	\$4,320
Metals (sites 1-7)	\$98	\$683	\$5,460
Chloride (sites 1, 2, 3 & 5)	\$20	\$80	\$640
PAHs (sites 1, 8, 9 & 10)	\$175	\$700	\$5,600
	\$293	\$2,003	\$16,020

BIOMONITORING ANALYTICAL COSTS

Description	Cost / site
Rock bag identification	\$1500
	Cost / season
<i>Biomonitoring to occur at seven primary sites every 3 – 5 years. DEP will do every 5 years, but the LCWMD may have to pay for some of the sites.</i>	\$6000 - \$10,500

OVERALL BUDGET SUMMARY		
PROGRAM COMPONENT	COST	EXPLANATION
Equipment Costs		
Continuous Water Quality	\$29,525	Assumes 5 sondes to monitor 4 primary permanent sites and 3 secondary rotating sites.
Hydrology	\$8,388	Assumes flow measurement at 6 primary sites
Storm Sampling	\$2,135	Assumes storm flow monitoring at 7 primary sites
Equip. Replacment / Maintenance	\$9,877	Based on expected equipment life & ongoing maintenance needs
Subtotal:	\$49,925	
Approx. cost per site:	\$9,426	Underestimates actual cost if less equipment is purchased and/or fewer sites are monitored
Labor Costs		
Continuous Water Quality	\$24,248	Assumes 9 month-long deployments for 7 sondes
Hydrology	\$18,264	Assumes 6 primary sites with 6 flow measurements per site & 4 visits to retrieve data
Base Flow & Storm Sampling	\$9,900	Assumes 7 primary sites with 4 base flow and 4 storm flow sets of grab samples
Subtotal:	\$52,411	
Approx. cost per site:	\$9,308	Underestimates actual cost due to efficiencies from visiting multiple sites per sampling event
Analytical Costs¹	\$16,020	Assumes 8 visits for key parameters (nutrients, metals, chloride & PAHs)
Total Cost:	\$118,357	
Annual Cost Excluding Initial Capital:	\$78,308	

¹ Biomonitoring will occur every three to five years. DEP will do it every five years, but it is not clear yet whether they will do all seven primary sites identified in this plan. Years one & three of this plan will have an added cost of \$6,000 - \$10,500.

MONITORING SERVICES AGREEMENT

THIS Monitoring Services Agreement (the "Agreement") is entered into this ____ day of _____, 20__, by and between _____, a sole proprietorship/partnership/corporation/limited liability company (choose one) duly organized and existing under the laws of the State of _____ whose mailing address is _____ (the "Contractor") and the **Long Creek Watershed Management District**, a quasi-municipal, special purpose district established as a separate legal entity and instrumentality and as a body corporate and politic under the laws of the State of Maine ("LCWMD"). The foregoing also are referred to herein collectively as the "Parties" or singly as "Party."

WITNESSETH:

For and in consideration of the covenants and conditions set forth herein, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. CONTRACTOR'S RESPONSIBILITIES.

1.1 Monitoring Services. In return for payment made as provided in Section 2 of this Agreement, Contractor agrees to furnish monitoring services to LCWMD for the Long Creek Watershed, all as described in the Request for Proposals attached as Exhibit A to this Agreement and Contractor's Proposal attached as Exhibit B to this Agreement, both of which are attached hereto and hereby are incorporated into this Agreement (together, the "**Monitoring Services**").

1.2 Contractor shall be responsible for the professional quality, technical accuracy, timely completion, and the coordination of all analyses, reports, and other Monitoring Services furnished by Contractor under this Agreement. Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its analysis, reports, and other Monitoring Services. Deficiencies are defined as willful or negligent acts that distort or falsify the state of the art of the Monitoring Services developed and provided hereunder, or willful or negligent nonassignment of personnel or assignment of unqualified personnel to perform the duties hereunder.

1.3 Approval by LCWMD of analyses, reports, and other Monitoring Services furnished hereunder shall not in any way relieve Contractor of responsibility for the technical adequacy of the work. Neither LCWMD's review, approval or acceptance of, nor payment for, any of the Monitoring Services shall be construed to operate as a waiver of any rights under this Agreement or of any cause of action arising out of the performance of this Agreement, and Contractor shall remain liable in accordance with applicable law for all damages to LCWMD caused by Contractor's willfully negligent performance of any of the Monitoring Services furnished under this Agreement.

1.4 Contractor Obligations. Contractor warrants:

A. That it will furnish all vehicles, materials, personnel, tools and equipment, except as otherwise specified herein, and do everything necessary and proper to satisfactorily perform the Monitoring Services required by this Agreement.

B. That it is financially solvent, is experienced in and competent to perform the Monitoring Services and is able to furnish the vehicles, materials, personnel, tools and equipment to be furnished by it.

C. That it is familiar with all federal, State and local statutes, laws, rules, regulations, ordinances and orders which may in any way affect the Monitoring Services.

D. That it has carefully examined the Request for Proposals and this Agreement and has conducted its own investigation of the nature and location of the Monitoring Services, the character of equipment and personnel needed to perform the Monitoring Services and all conditions which may in any way affect the performance of the Monitoring Services.

E. That any increase in Contractor's costs during the term of this Agreement shall be the sole responsibility of Contractor.

2. TERM OF AGREEMENT.

2.1 Term. This Agreement is for a term of one year commencing on the date of execution of this Agreement by LCWMD.

2.2 Payment.

A. LCWMD shall pay Contractor for the performance of Audit Services under this Agreement the sum of \$ _____ (_____ Dollars).

[or other basis as proposed and accepted by LCWMD]

B. No later than the 10th day of each month, Contractor shall submit for LCWMD's approval an invoice for payment for the Auditing Services performed by Contractor hereunder during the previous month. LCWMD shall pay Contractor approved amounts within thirty (30) days of receipt of the invoice. Payments due and unpaid under this Agreement shall bear interest from the date payment is due at the maximum rate permitted under Maine law at the time of the delinquency for unpaid municipal taxes.

3. TERMINATION.

3.1 Without prejudice to any other right or remedy, LCWMD may terminate this Agreement for cause by providing Contractor with seven (7) days' written notice of termination. For purposes of this Agreement, cause includes, but is not limited to: the adjudication of Contractor as a bankrupt; the making of a general assignment by Contractor for the benefit of its creditors; the appointment of a receiver because of Contractor's insolvency; Contractor's

persistent or repeated refusal or failure, except for cases in which extension of time is provided, to supply enough properly-skilled workers or proper materials to perform the Audit Services; Contractor's persistent disregard of federal, state or local statutes, laws, codes, rules, regulations, orders or ordinances; and Contractor's substantial violation of any provisions of this Agreement. In the event of a termination for cause, LCWMD may take possession of all materials and finish the Monitoring Services by whatever method it may deem expedient. In such case Contractor shall not be entitled to receive any further payment until the Monitoring Services are finished. If the unpaid balance of the Agreement price shall exceed the expense of finishing the Monitoring Services, including compensation for additional architectural, managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, Contractor shall pay the difference to the LCWMD. Further, LCWMD may terminate this Agreement for convenience upon thirty (30) days' written notice to Contractor, in which case LCWMD shall pay Contractor for all Monitoring Services satisfactorily performed and materials purchased up to the date of receipt of such notice by Contractor. In the event that LCWMD terminates this Agreement for cause and it subsequently is determined that cause did not exist, such termination shall be deemed to be for convenience.

4. INSURANCE AND INDEMNIFICATION.

4.1 Insurance. Except as otherwise provided by this Agreement, Contractor and its subcontractors and consultants, if any, shall obtain and maintain, throughout the term of this Agreement and for a period of at least two years following the completion of Monitoring Services under this Agreement, at no expense to LCWMD, the following insurance coverages:

A. **Public Liability Insurance** in the amount of not less than Four Hundred Thousand Dollars (\$400,000) or such other amount as is established by the Maine Tort Claims Act (14 M.R.S.A. §8101 et seq.) as amended from time-to-time, combined single limit, to protect the Contractor, any subcontractor performing Monitoring Services under this Agreement, and LCWMD from claims and damages that may arise out of, be caused by or result from the performance of Monitoring Services under this Agreement, whether by Contractor or by a subcontractor or by anyone directly or indirectly employed by them.

B. **Automobile Liability Insurance** in the amount of not less than Four Hundred Thousand Dollars (\$400,000) or such other amount as is established by the Maine Tort Claims Act (14 M.R.S.A. §8101 et seq.) as amended from time-to-time, combined single limit, to protect Contractor, any subcontractor performing Monitoring Services under this Agreement, and LCWMD from claims and damages that may arise out of, be caused by or result from the performance of Monitoring Services under this Agreement, whether by Contractor or by a subcontractor or by anyone directly or indirectly employed by them.

C. **Workers' Compensation Insurance** in amounts required by Maine law and **Employer's Liability Insurance**, as necessary, as required by Maine law.

D. **Professional Liability Insurance** in the amount of One Million Dollars (\$1,000,000) to protect Contractor, any subcontractor performing Monitoring Services under this Agreement and LCWMD from claims and damages that may arise out of, be caused by or result from the errors, omissions or negligence of the Contractor or its subcontractors, if any, in the performance

of Monitoring Services under this Agreement. The deductible for such insurance shall not exceed Five Thousand Dollars (\$5,000) without LCWMD's prior written consent.

E. All such insurance policies shall name LCWMD and its officers, agents and employees as additional insureds, except for workers' compensation insurance. Contractor, prior to commencement of Monitoring Services under this Agreement, and any of its subcontractors, prior to commencement of Monitoring Services under any subcontract, shall deliver to LCWMD certificates satisfactory to LCWMD evidencing such insurance coverages, which certificates shall state that Contractor and its subcontractors must provide written notice to LCWMD at least thirty (30) days prior to cancellation, non-renewal, material modification or expiration of any policies, evidenced by return receipt of United States Certified Mail. Replacement certificates shall be delivered to LCWMD prior to the effective date of cancellation, termination, material modification or expiration of any such insurance policy. Contractor shall not commence Monitoring Services under this Agreement until it has obtained all insurance coverages required under this subparagraph and such insurance policies have been approved by LCWMD, nor shall Contractor allow any of its subcontractors to commence Monitoring Services on any subcontract until all such insurance policies have been obtained by the subcontractor and approved by LCWMD. All such insurance policies shall have a retroactive date which is the earlier of the date of this Agreement between the Parties or Contractor's commencement of Monitoring Services hereunder.

4.2. Indemnification. Contractor agrees to defend, indemnify, and hold harmless LCWMD and its officers, agents, and employees against any and all liabilities, causes of action, judgments, claims or demands, including attorney's fees and costs, for personal injury (including death) or property damage arising out of or caused by the performance of Monitoring Services under this Agreement by Contractor, its subcontractors, agents or employees. The foregoing indemnity expressly extends to claims of injury, death, or damage to employees of Contractor or of a subcontractor. In claims against any person or entity indemnified under this Section by an employee of Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for Contractor or a subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts. Contractor expressly waives immunity under workers' compensation laws for the purposes of this indemnity provision.

5. MISCELLANEOUS PROVISIONS

5.1 Notices. All notices, demands or other communications made pursuant to this Agreement shall be in writing and shall be sent by (i) registered or certified United States mail, postage prepaid, (ii) by overnight courier, or (iii) by facsimile. Such notice shall be deemed effective upon delivery addressed as follows:

To CONTRACTOR:

To LCWMD:

Long Creek Watershed Management District
c/o Cumberland County Soil & Water Conservation District
35 Main Street, Suite 3
Windham, Maine 04062
Attention: Executive Director

5.2 Entire Agreement, Modifications. This Agreement and the Exhibits A and B attached hereto and hereby incorporated constitute the entire agreement of the Parties, and neither Party shall be bound by any statement or representation not contained herein. The failure of any Party to insist in any one or more instances upon strict performance of any of the terms or provisions of the Agreement, or to exercise an option or election under the Agreement, shall not be construed as a waiver or relinquishment for the future of such terms, provisions, option or election, but the same shall continue in full force and effect, and no waiver by any Party of any one or more of its rights or remedies under the Agreement shall be deemed to be a waiver of any prior or subsequent rights or remedy under the Agreement or at law. This Agreement cannot be changed, amended or modified, except by another agreement in writing signed by all Parties hereto or by their respective successors in interest.

5.3 Headings. The section headings contained herein are for convenience of reference only and are not intended to define, limit, or describe the scope or interest of any provisions of this Agreement.

5.4 Severability. If any section, term, covenant, or condition of this Agreement or the application thereto to any person or circumstances shall, to any extent be illegal, invalid or unenforceable because of judicial construction, the remaining sections, terms, covenants, and conditions of this Agreement, or the application of such term, covenant, or condition to persons or circumstances other than those as to which it is held invalid or unenforceable shall not be affected thereby, and each section, term, covenant, or condition of this Agreement shall be valid and be enforced to the fullest extent permitted by Law.

5.5 Governing Law, Remedies. This Agreement shall be governed by and construed in accordance with the laws of the State of Maine. Except as otherwise agreed by the Parties in writing, all disputes, claims, counterclaims and other matters in question between LCWMD and Contractor arising out of or relating to this Agreement shall be decided by a Maine court of

competent jurisdiction. This Agreement is made and shall be construed under the laws of the State of Maine. Except as otherwise expressly agreed by the parties in writing, exclusive venue for any such civil action shall be in Maine.

5.6 Compliance with Applicable Laws. Contractor agrees that it and its subcontractors, if any, shall comply with all applicable federal, State and local statutes, laws, rules, regulations, codes, ordinances, orders and resolutions in the performance of Monitoring Services under this Agreement.

5.7 Assignment; Successors and Assigns. This Agreement may not be assigned by either Party without the prior written consent of the other Party, which consent shall not be unreasonably conditioned, delayed or withheld. This Agreement shall benefit and be binding upon the Parties hereto and their respective permitted successors and assigns.

5.8 Subcontracts. The Contractor shall not sublet any part of this Agreement without the prior written permission of LCWMD. The Contractor agrees that it is fully responsible to LCWMD for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

5.9 Ownership of Documents. Drawings, notes, documents, plans, reports and specifications or other material to be developed under this Agreement shall become the property of LCWMD and be promptly delivered to LCWMD upon the completion of Monitoring Services under this Agreement or sooner upon LCWMD's request or the termination of this Agreement. Contractor shall be responsible for the protection and/or replacement of any work or materials in its possession, including work or materials provided to Contractor by LCWMD.

5.10 Force Majeure. Provided such Party gives written notice to the other of such event, a Party shall not be liable for its failure to perform its respective obligations under this Agreement, if prevented from so doing by any cause beyond the reasonable control of such Party such as, but not limited to, strikes, lockouts, or failure of supply or inability by the exercise of reasonable diligence, to obtain supplies, parts, or employees necessary to perform such obligations, or because of war or other emergency. The time within which such obligations shall be performed shall be extended for a period of time equivalent to the delay from such cause.

5.11 Non-Waiver. Except as expressly provided in this Agreement, the failure or waiver, or successive failures or waivers on the part of either Party hereto, in the enforcement of any paragraph or provision of this Agreement shall not render the same invalid nor impair the right of either Party hereto, its successors or permitted assigns, to enforce the same in the event of any subsequent breach thereof.

IN WITNESS WHEREOF, the Parties hereto have caused this Monitoring Services Agreement to be executed by their duly authorized representatives as of the date first set forth above.

CONTRACTOR

By: _____
Signature

Print Name
Its: _____ (Title)

LONG CREEK WATERSHED MANAGEMENT DISTRICT

By: _____
Signature

Print Name
Its: _____ (Title)