Ambient Groundwater Quality Monitoring Implementation Plan

For

Fiscal Year 2014

Purpose

This document outlines how the Groundwater Characterization Program (GWCP) resources will be allocated to implement the Ambient Groundwater Quality Monitoring Strategy in Fiscal Year 2014 (FY14).

Cost Analysis

A total of $102,110 has been allotted to statewide groundwater sampling activities in FY14.

The U.S. Geological Survey (USGS) will receive $47,240 to continue monitoring of up to fourteen (14) chloride samples and one (1) equipment blank sample for QA/QC purposes in Virginia's Coastal Plain region.

Approximately $42,610 will be directed toward the purchase and modification of one (1) four-wheel drive (4x4) box truck capable of carrying sampling pumps, reels and other bulky sampling equipment including generators, coolers, and the large volumes of ultrapure water necessary to run field blanks on submersible sampling pumps. In addition to providing secure storage for these items, the sample truck will have a sample processing area for optimizing sample collection and preparation conditions.

The remaining $12,260 has been dedicated toward laboratory analytical costs. Staff per diem and fuel costs will be absorbed in the current GWCP travel budget. Table 1 shows the proposed cost breakdown for the number of spot sampling and trend wells in coastal plain and fractured rock provinces that will be sampled.

Table 1: Proposed distribution of laboratory analytical budget for FY14.

	Cost per Unit	Fractured Rock		Coastal Plain			Total Costs
		Trend Wells	Spot Sampling	Trend Wells	Spot Samping	Total #	
Number of Monitoring Sites	N/A		5	2	4	11	N/A
CORE (Major Ions, Nutrients, Physical parameters)	$235.00		5	8	4	17	$3,995.00
Equipment Blank - CORE	$235.00					1	$235.00
Trace Metals (Dissolved)	$260.00		5		4	9	$2,340.00
Field Blank - Trace Metals (1 Dissolved per well)	$260.00		5		4	9	$2,340.00
Radiologicals	$260.00		5		4	9	$2,340.00
Acid Wash Tubing and Carbouys	$1,000.00					1	$1,000.00
			Total Laboratory Expenditure				$12,250.00

Trend Sampling Sites

Coastal Plain

Due to the limited number of Tier One and Tier Two wells that remained following evaluation of their chloride and well construction data, two wells from the current chloride monitoring network were also selected for inclusion in the interim chloride monitoring network. In addition, one previously un-sampled well was identified and included in the interim chloride monitoring network based on its location close to the 250 mg/L chloride contour at the top of the Potomac aquifer illustrated in McFarland 2010 figure 13.

For FY 2014, USGS Virginia Water Science Center staff will obtain quarterly samples from the Tier 1 (and existing chloride monitoring network well) Diascund Research Station Well SOW 177A (USGS 56H 25), the existing chloride monitoring network well Dominion Terminal Associates Well SOW 213 (USGS 59D 25), and the existing chloride monitoring network well Greenmont Production Well SOW 195 (USGS 58F 127). Virginia DEQ staff will obtain quarterly samples from the Tier 2 SOW 98A Pungo well DEQ 228-0167 (USGS 62B 1) and the previously un-sampled Busch Gardens Flume Observation well DEQ 147-308 (USGS 57F 36).

Fractured Rock Provinces

Trend well monitoring will not occur in the fractured rock provinces during FY 2014.

Spot Sampling Areas

A total of 9 spot samples will be collected in regions identified as having low to non-existent groundwater quality data. The numbered polygons in Figure 1 delineate areas where existing public, industrial, private, or agricultural wells and/or springs will be utilized for spot sampling.

SPOT sampling in the Coastal Plain for FY 2014 will be comprised of four wells at the newly constructed McKendree Church Research Station in King William County. All four wells at that station

will be sampled for CORE major ions. Additionally, the Aquia (SOW 235-C USGS 53K 27) and Piney Point (SOW 235-D USGS 53K 28) wells will be sampled for dissolved metals primarily in order to determine if arsenic is present in the water from these two wells as has been noted in these aquifers in areas of Maryland and the Northern Neck of Virginia. Radiological samples will be collected from the Lower Potomac and Middle Potomac (SOW 235-A USGS 53K 25 and SOW 235-B USGS 53K 26) wells primarily in order to determine if hazardous radioactive particles are present in the water from these two wells as has been noted in some Potomac aquifer wells near the fall zone in Virginia.

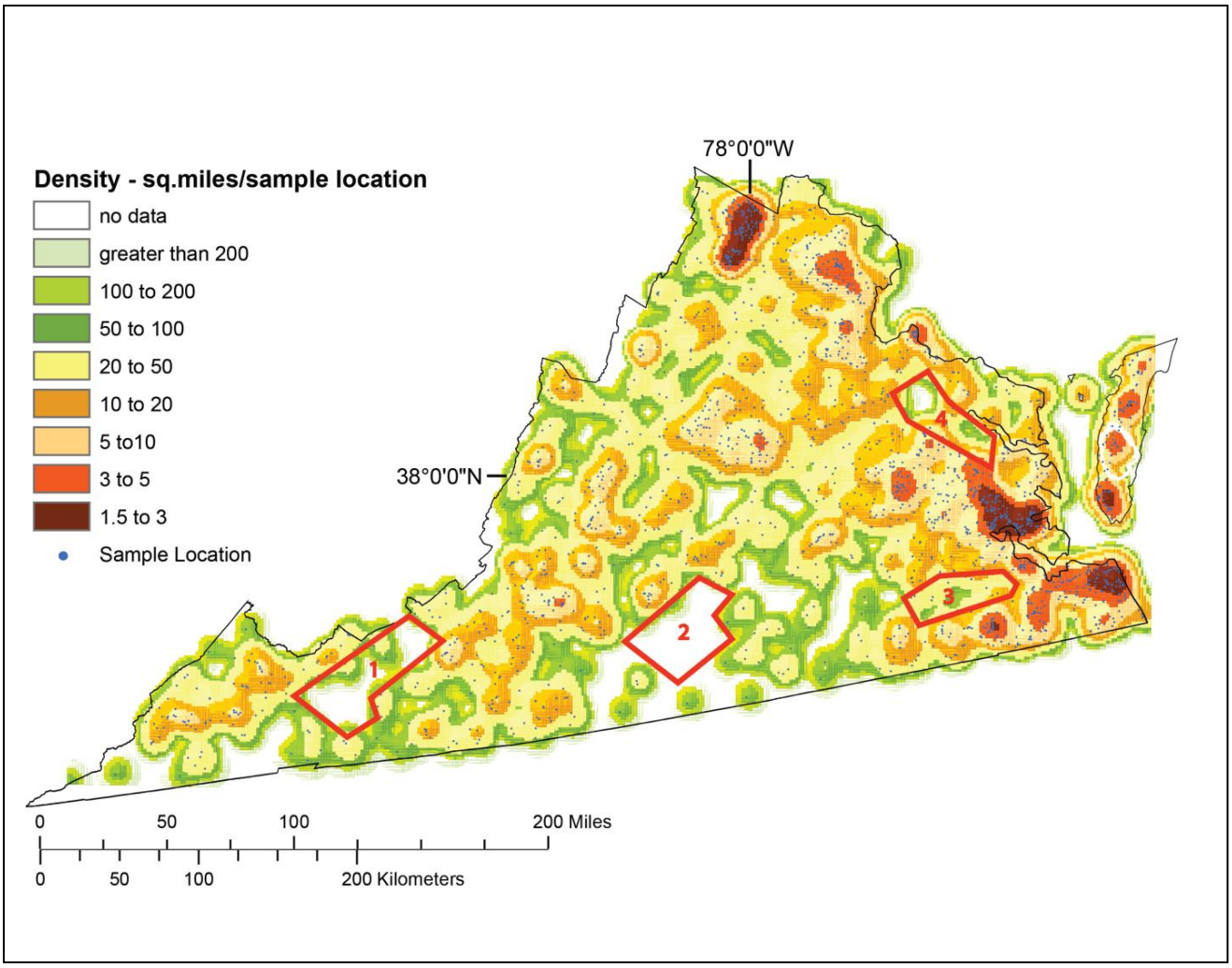

Figure 1: Density distribution of current groundwater sample coverage. Red polygons (1-4) show areas to be targeted for spot groundwater sampling.

Tentative Sampling Calendar:

Below is an anticipated calendar for the remainder of FY14 that includes sampling run dates. This does not include USGS sampling events. Spot area numbers correspond to numbered polygons in Figure 1 above. Shaded blocks indicate known dates when sampling will not be possible.

		Week				
		1	2	3	4	5
2013	September					
	October			Spot-Area 4		
	November		CP Trend			
	December		Spot-Area 2			
2014	January		CP Trend			
	February		Spot - Area 3			
	March				CP Trend	
	April		Spot-Area1			
	May	CP Trend				
	June					

Figure 2. Anticipated sampling schedule for the 2014 sampling year. The number of spot samples to be taken for each area are as follows: Area4 – 2; Area2 – 3; Area3 – 2; Area 1 – 2.