



US Army Corps  
of Engineers  
Baltimore District



**Washington Aqueduct**

**U.S. ARMY Corps of Engineers**

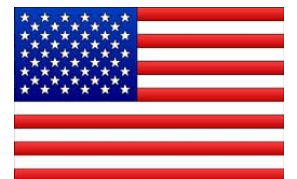
# **Annual Report of Water Analysis 2013**

Prepared by:

Water Quality Laboratory  
Plant Operations Branch  
Washington Aqueduct  
5900 MacArthur Boulevard, NW  
Washington, D.C. 20016-2514

 *March 20, 2014*

Approved by the Chief, Washington Aqueduct





# WASHINGTON AQUEDUCT, US ARMY CORPS OF ENGINEERS ANNUAL REPORT OF WATER ANALYSIS (2013)

## Potomac River Raw Water Supply

	Miscellaneous Physical Parameters									Inorganic Ions										Microorganisms						
	pH	ALKALINITY	CONDUCTIVITY	DISSOLVED SOLIDS	SUSPENDED SOLIDS	TOTAL SOLIDS	TEMPERATURE	TOTAL HARDNESS	TOTAL ORGANIC CARBON	TURBIDITY	TOTAL AMMONIA - N	HEXAVALENT CHROMIUM	BROMIDE	CHLORIDE	FLUORIDE	IODIDE	NITRATE - N	NITRITE - N	ORTHOPHOSPHATE - PO4	PERCHLORATE	SULFATE	ALGAE COUNT	TOTAL COLIFORM	E. COLI	GIARDIA	CRYPTOSPORIDIUM
	ppm	uS/cm	ppm	ppm	ppm	°F	ppm	ppm	NTU	ppm	ppb	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppb	ppm	org/mL	MPN /100mL	MPN /100mL	cysts/L	Oocysts/L	
Jan	7.8	70	290	148	ND	148	46	103	2.4	6	0.05	---	ND	25	ND	2.4	ND	ND	0.4	27	708	354	11	ND	ND	
Feb	7.7	68	274	162	11	173	50	105	2.0	12	ND	0.09	ND	28	ND	---	2.3	ND	ND	0.3	24	764	8	3	ND	ND
Mar	7.7	66	275	145	29	174	52	103	2.0	10	ND	---	ND	27	ND	---	1.7	ND	ND	0.3	24	1788	357	10	ND	ND
Apr	7.8	68	276	138	2	140	63	105	2.5	3	ND	---	ND	25	ND	ND	1.3	ND	ND	0.8	28	1728	140	4	0.04	ND
May	7.8	72	275	149	4	153	68	107	2.3	6	ND	0.04	ND	21	ND	---	1.3	ND	ND	0.6	28	1282	447	5	ND	ND
Jun	7.7	77	286	162	16	178	76	109	3.7	8	ND	---	ND	24	0.11	---	1.3	ND	ND	0.4	23	726	4622	118	ND	ND
Jul	7.8	95	335	204	ND	204	83	134	2.8	2	ND	---	ND	24	0.11	ND	1.2	ND	ND	0.4	31	588	931	6	0.05	ND
Aug	8.0	99	367	226	ND	226	78	140	2.8	3	ND	0.06	ND	28	0.11	---	1.1	ND	ND	0.3	34	944	1026	10	ND	ND
Sep	8.1	95	368	175	ND	175	76	144	2.6	3	ND	---	0.06	26	0.12	---	0.8	ND	ND	0.4	45	462	715	8	0.29	ND
Oct	7.9	94	352	214	ND	214	67	137	3.3	4	ND	---	0.05	29	0.11	---	1.4	ND	ND	0.4	39	454	830	26	0.26	ND
Nov	8.1	118	443	228	37	265	56	164	3.3	3	ND	0.09	0.05	36	0.12	ND	1.6	ND	ND	0.4	43	389	3533	3	ND	ND
Dec	7.6	68	330	224	18	242	50	106	3.6	8	ND	---	ND	41	ND	---	2.1	ND	ND	0.4	25	682	660	19	0.04	ND

	Metals																									
	ALUMINIUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	LITHIUM	MAGNESIUM	MANGANESE	MOLYBDENUM	NICKEL	SELENIUM	SILVER	SODIUM	STRONTIUM	THALLIUM	THORIUM	URANIUM	VANADIUM	ZINC
	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb
Jan	373	ND	ND	34	ND	ND	32	0.9	ND	1.6	160	ND	2.0	5	27	0.6	1.9	ND	ND	15	145	ND	ND	ND	ND	2.6
Feb	351	ND	ND	35	ND	ND	32	1.1	ND	1.4	302	ND	2.0	6	34	ND	2.6	ND	ND	16	132	ND	ND	ND	ND	3.8
Mar	239	ND	ND	32	ND	ND	31	1.1	ND	1.3	173	ND	1.8	6	35	ND	2.4	ND	ND	19	129	ND	ND	ND	ND	2.7
Apr	178	ND	ND	35	ND	ND	33	0.9	ND	1.2	148	ND	2.4	6	43	ND	2.1	ND	ND	13	146	ND	ND	ND	ND	1.8
May	251	ND	0.6	35	ND	ND	32	0.7	ND	1.4	178	ND	2.4	6	35	0.5	2.2	ND	ND	12	150	ND	ND	ND	ND	2.0
Jun	426	ND	0.7	38	ND	ND	33	1.1	ND	1.9	330	ND	2.5	6	44	0.6	2.6	ND	ND	13	151	ND	ND	ND	0.6	4.0
Jul	188	ND	0.9	42	ND	ND	41	1.2	ND	1.8	101	ND	2.7	8	49	0.8	2.1	ND	ND	14	198	ND	ND	ND	0.9	1.4
Aug	228	ND	0.8	40	ND	ND	43	1.0	ND	1.7	84	ND	2.8	8	34	1.0	2.5	ND	ND	17	216	ND	ND	ND	0.5	1.6
Sep	250	ND	0.7	41	ND	ND	42	0.7	ND	1.7	66	ND	3.6	10	25	1.0	3.5	ND	ND	17	236	ND	ND	ND	0.5	4.1
Oct	207	ND	0.6	40	ND	ND	42	1.0	ND	1.9	157	ND	2.8	8	28	0.8	2.7	ND	ND	17	196	ND	ND	ND	ND	1.9
Nov	209	ND	ND	40	ND	ND	50	1.1	ND	1.2	60	ND	2.7	10	18	0.8	2.2	ND	ND	20	251	ND	ND	ND	ND	1.8
Dec	501	ND	0.6	33	ND	ND	34	1.1	ND	2.0	481	ND	2.0	5	43	ND	2.2	ND	ND	23	141	ND	ND	ND	ND	3.7

ppb = Parts Per Billion

ppm = Parts Per Million

ND = Not Detected

--- = No Analysis Required



**WASHINGTON AQUEDUCT, US ARMY CORPS OF ENGINEERS  
ANNUAL REPORT OF WATER ANALYSIS (2013)**

EPA MCL*	Inorganic Ions											Metals																												
	TOTAL AMMONIA - N	BROMIDE	CHLORATE	CHLORIDE	FLUORIDE	IODIDE	NITRATE - N	NITRITE - N	ORTHOPHOSPHATE - PO4	PERCHLORATE	SULFATE	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	LITHIUM	MAGNESIUM	MANGANESE	MERCURY	MOLYBDENUM	NICKEL	SELENIUM	SILVER	SODIUM	STRONTIUM	THALLIUM	THORIUM	URANIUM	VANADIUM	ZINC		
					4		10	1				6	10	2000	4	5		100										2			50					2		30		
Units	ppm	ppm	ppb	ppm	ppm	ppb	ppm	ppm	ppm	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppb	

**Dalecarlia Water Treatment Plant Finished Water**

Jan	0.8	ND	---	29	0.6	ND	2.2	ND	2.3	0.4	42	32	ND	ND	32	ND	ND	35	ND	ND	0.7	ND	ND	1.6	5	1.0	ND	ND	1.7	ND	ND	20	137	ND	ND	ND	ND	0.9
Feb	0.7	ND	---	32	0.7	---	2.3	ND	2.3	0.4	40	30	ND	ND	33	ND	ND	36	1.0	ND	0.8	ND	ND	1.4	5	1.0	ND	ND	2.3	0.5	ND	19	126	ND	ND	ND	ND	1.2
Mar	0.7	ND	---	36	0.6	---	1.7	ND	2.3	0.3	38	20	ND	ND	31	ND	ND	33	0.6	ND	0.6	ND	ND	1.5	7	0.6	ND	ND	2.2	ND	ND	22	121	ND	ND	ND	ND	0.9
Apr	0.1	ND	---	27	0.7	ND	1.3	ND	2.4	0.5	40	25	ND	ND	34	ND	ND	34	1.0	ND	0.6	ND	ND	2.0	6	0.8	ND	ND	1.8	0.6	ND	19	147	ND	ND	ND	ND	0.8
May	0.7	ND	---	25	0.7	---	1.3	ND	2.4	0.6	42	18	ND	ND	33	ND	ND	33	1.0	ND	0.6	ND	ND	2.0	7	0.6	ND	ND	2.0	0.6	ND	19	140	ND	ND	ND	ND	0.7
Jun	0.7	ND	---	28	0.8	---	1.3	ND	2.4	0.4	42	30	ND	ND	39	ND	ND	37	0.9	ND	0.8	ND	ND	2.2	7	0.8	ND	0.6	2.3	0.7	ND	20	165	ND	ND	ND	0.7	0.5
Jul	0.7	ND	---	30	0.8	ND	1.1	ND	2.3	0.5	50	46	ND	0.6	41	ND	ND	44	1.3	ND	0.9	ND	ND	2.4	8	0.9	ND	0.8	2.1	0.9	ND	21	204	ND	ND	ND	1.1	ND
Aug	0.7	ND	---	33	0.8	---	1.0	ND	2.3	0.5	53	51	ND	0.6	37	ND	ND	45	1.4	ND	0.9	ND	ND	2.4	9	0.7	ND	1.0	2.0	0.9	ND	22	202	ND	ND	ND	1.0	0.7
Sep	0.7	ND	---	30	0.7	---	0.7	ND	2.2	0.7	61	61	ND	0.6	39	ND	ND	43	0.8	ND	0.9	ND	ND	3.0	10	0.9	ND	0.9	2.4	1.0	ND	22	226	ND	ND	ND	0.8	0.6
Oct	0.7	ND	---	33	0.7	---	1.4	ND	2.4	0.4	56	35	ND	0.6	37	ND	ND	43	1.1	ND	1.0	ND	ND	2.8	8	0.7	ND	0.7	2.1	1.0	ND	22	196	ND	ND	ND	0.7	0.7
Nov	0.7	ND	360	40	0.7	ND	1.6	ND	2.4	0.4	58	25	ND	ND	38	ND	ND	51	1.5	ND	1.0	ND	ND	2.0	10	0.9	ND	0.8	2.2	0.7	ND	26	246	ND	ND	ND	0.6	1.3
Dec	0.7	ND	367	42	0.6	---	2.1	ND	2.5	0.4	45	23	ND	ND	30	ND	ND	38	ND	ND	0.8	ND	ND	1.8	6	1.1	ND	ND	1.7	ND	ND	27	148	ND	ND	ND	ND	1.6

**McMillan Water Treatment Plant Finished Water**

Jan	0.8	ND	---	32	0.6	ND	2.1	ND	2.3	0.4	44	26	ND	ND	32	ND	ND	27	ND	ND	2.4	ND	ND	1.7	6	ND	ND	ND	1.7	ND	ND	22	132	ND	ND	ND	ND	1.1
Feb	0.8	ND	---	31	0.6	---	2.2	ND	2.3	0.5	41	13	ND	ND	33	ND	ND	27	ND	ND	2.1	ND	ND	1.4	6	ND	ND	ND	2.1	0.6	ND	21	123	ND	ND	ND	ND	0.9
Mar	0.7	ND	---	36	0.6	---	1.9	ND	2.4	0.4	42	14	ND	ND	33	ND	ND	26	0.7	ND	1.5	ND	ND	1.6	6	ND	ND	ND	2.2	0.5	ND	24	125	ND	ND	ND	ND	0.9
Apr	0.2	ND	---	30	0.7	ND	1.3	ND	2.4	0.5	44	23	ND	ND	33	ND	ND	29	0.7	ND	1.5	ND	ND	1.7	6	ND	ND	ND	1.6	0.6	ND	21	143	ND	ND	ND	ND	0.5
May	0.8	ND	---	25	0.7	---	1.2	ND	2.4	0.4	44	37	ND	ND	33	ND	ND	27	0.8	ND	1.7	ND	ND	1.7	7	ND	ND	ND	1.6	0.7	ND	18	142	ND	ND	ND	ND	0.5
Jun	0.8	ND	---	28	0.8	---	1.2	ND	2.4	0.3	45	38	ND	ND	37	ND	ND	27	0.7	ND	2.3	ND	ND	2.1	6	ND	ND	ND	1.6	0.7	ND	20	149	ND	ND	ND	ND	ND
Jul	0.8	ND	---	30	0.8	ND	1.0	ND	2.3	0.4	52	52	ND	0.5	40	ND	ND	36	1.1	ND	5.8	ND	ND	2.3	8	0.8	ND	0.7	1.7	1.0	ND	21	191	ND	ND	ND	0.7	ND
Aug	0.8	ND	---	33	0.7	---	0.9	ND	2.3	0.4	55	47	ND	0.5	39	ND	ND	39	1.2	ND	6.0	ND	ND	2.3	8	0.8	ND	0.9	1.9	1.0	ND	23	208	ND	ND	ND	0.8	ND
Sep	0.8	ND	---	31	0.7	---	0.7	ND	2.3	0.6	63	80	ND	0.5	40	ND	ND	37	0.8	ND	7.8	ND	ND	2.7	9	0.6	ND	0.9	2.0	1.0	ND	22	228	ND	ND	ND	0.7	ND
Oct	0.7	ND	---	34	0.7	---	1.1	ND	2.5	0.3	61	40	ND	0.5	38	ND	ND	32	0.9	ND	16.3	ND	ND	3.1	8	ND	ND	0.8	2.1	1.1	ND	23	205	ND	ND	ND	0.6	0.6
Nov	0.8	ND	360	39	0.7	ND	1.6	ND	2.5	0.4	59	31	ND	ND	39	ND	ND	45	1.3	ND	9.1	ND	ND	1.7	9	1.0	ND	0.8	2.1	0.7	ND	24	235	ND	ND	ND	0.6	1.3
Dec	0.8	ND	273	43	0.6	---	2.0	ND	2.4	0.4	49	21	ND	ND	33	ND	ND	29	ND	ND	5.2	ND	ND	2.0	6	ND	ND	ND	1.6	ND	ND	28	159	ND	ND	ND	ND	1.1

\*EPA MCL = Environmental Protection Agency's Maximum Contaminant Level for regulated parameters

ppb = Parts Per Billion

ppm = Parts Per Million

ND = Not Detected

"---" = No Analysis Required











# WASHINGTON AQUEDUCT, US ARMY CORPS OF ENGINEERS ANNUAL REPORT OF WATER ANALYSIS (2013)

	Synthetic Organic Compounds																				Miscellaneous					Nitrosamines											
	METOLACHLOR	METRIBUZIN	MOLINATE	trans-NONACHLOR	OXAMYL	PARAQUAT	PARATHION	PENDIMETHALIN	PERMETHRIN	PENTACHLOROPHENOL	PHENANTHRENE	PICLORAM	PROPACHLOR	PYRENE	SIMAZINE	TERBACIL	TERBUTHYLAZINE	THIOBENCARB	TRIFLURALIN	TOXAPHENE	2,4,5-T	2,4,5-TP (SILVEX)	DIBROMOCHLOROPROPANE (DBCP)	ETHYLENE DIBROMIDE (EDB)	CYANIDE	2,3,7,8-TCDD (DIOXIN)	HEXAVALENT CHROMIUM	N-NITROSODIMETHYLAMINE (NDMA)	N-NITROSO-n-PROPYLAMINE (NDPA)	N-NITROSODIBUTYLAMINE (NDBA)	N-NITROSODIETHYLAMINE (NDEA)	N-NITROSOMETHYLETHYLAMINE (NMEA)	N-NITROSPYROLIDINE (NPYR)				
EPA MCL*					200				1		500			4						3		50	200	50	0.2	30											
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppt	ppt	ppm	ppq	ppb	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt		
<b>Dalecarlia Water Treatment Plant Finished Water</b>																																					
Jan	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Feb	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.10	---	---	---	---	---	---	---	---	---	---
Mar	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Apr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	6	ND	ND	ND	ND	ND	ND		
May	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.06	---	---	---	---	---	---	---	---	---	---	---
Jun	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Jul	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aug	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.08	---	---	---	---	---	---	---	---	---	
Sep	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Oct	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	5	ND	ND	ND	ND	ND	ND			
Nov	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.09	---	---	---	---	---	---	---	---	---	
Dec	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
<b>McMillan Water Treatment Plant Finished Water</b>																																					
Jan	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Feb	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.05	---	---	---	---	---	---	---	---	---	---
Mar	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	4	ND	ND	ND	ND	ND	ND	ND		
May	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.04	---	---	---	---	---	---	---	---	---	---
Jun	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Jul	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Aug	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	0.05	---	---	---	---	---	---	---	---	---
Sep	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Nov	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.08	---	---	---	---	---	---	---	---	---
Dec	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

\*EPA MCL = Environmental Protection Agency's Maximum Contaminant Level for regulated parameters      ppm = Parts Per Million (mg/L)      ppb = Parts Per Billion (µg/L)      ppt = Parts Per Trillion (ng/L)      ppq = Parts per Quadrillion (pg/L)      "..." = No Analysis Required