2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Treatment Plant Effluents and Distribution System

Parameter	Units	State and Federal Standards MCL ‡	PHG	State DLR (RL)	Range Average	Treatment Plant Effluent †						Major Sources in Drinking Water
						Diemer Plant	Jensen Plant	Mills Plant	Skinner Plant	Weymouth Plant	Distribution System	
Percent State Water Project	%	NA	NA	NA	Range	0 - 100	100	100	6 - 100	0 - 100		NA
					Average	64			54	68		
PRIMARY STANDARDS—Mandatory Health-Related Standards												
CLARITY												
Combined Filter Effluent (CFE) Turbidity (a)	NTU	TT	NA	NA	Highest	0.05	0.06	0.06	0.07	0.04		Soil runoff
	%				% <= 0.3	100	100	100	100	100		
MICROBIOLOGICAL (b)												
Total Coliform Bacteria (c)	% Positive Monthly Samples	5.0	MCLG = 0	NA	Range	NA	NA	NA	NA	NA	0 - 0.2	Naturally present in the environment
					Average						0	
Escherichia coli (E. coli) (d)	Number	0	MCLG = 0	NA	Number of Positive Samples	NA	NA	NA	NA	NA	0	Human and animal fecal waste
Heterotrophic Plate Count (HPC) Bacteria (e)	CFU/mL	TT	NA	(1)	Median Range	ND - 1	ND - 64	ND - 1	ND - 1	ND - 1		Naturally present in the environment
					Median	ND	ND	ND	ND	ND		
Cryptosporidium	oocysts/200 L	TT	MCLG = 0	(1)	Range	ND	ND	ND	ND	ND		Human and animal fecal waste
					Average							
Giardia	cysts/200 L	TT	MCLG = 0	(1)	Range	ND	ND	ND	ND	ND		Human and animal fecal waste
					Average							
ORGANIC CHEMICALS												
Synthetic Organic Compounds (f)												
1,2,3-Trichloropropane (1,2,3-TCP)	ppt	5	0.7	5	Range	ND	ND	ND	ND	ND		Discharge from industrial and agrichemical factories; byproduct of producing other compounds and pesticides; leaching from hazardous waste sites
					Average							
2,4,5-TP (Silvex)	ppb	50	3	1	Range	ND	ND	ND	ND	ND		Residue of banned herbicide
					Average							
2,4-D	ppb	70	20	10	Range	ND	ND	ND	ND	ND		Runoff from herbicide used on row crops, rangeland, lawns, and aquatic weeds
					Average							
Acrylamide (g)	ppm	TT	MCLG = 0	NA	Range	NA	NA	NA	NA	NA		Water treatment chemical impurities
					Average							
Alachlor	ppb	2	4	1	Range	ND	ND	ND	ND	ND		Runoff from herbicide used on row crops
					Average							
Atrazine	ppb	1	0.15	0.5	Range	ND	ND	ND	ND	ND		Runoff from herbicide used on row crops and along railroad and highway right-of-ways
					Average							
Bentazon	ppb	18	200	2	Range	ND	ND	ND	ND	ND		Runoff/leaching from herbicide used on beans, peppers, corn, peanuts, rice, and ornamental grasses
					Average							
Benzo(a)pyrene	ppt	200	7	100	Range	ND	ND	ND	ND	ND		Leaching from linings and coatings of water storage tanks and distribution mains
					Average							
Carbofuran	ppb	18	0.7	5	Range	ND	ND	ND	ND	ND		Leaching of soil fumigant used on rice, alfalfa, and grape vineyards
					Average							
Chlordane	ppt	100	30	100	Range	ND	ND	ND	ND	ND		Residue of banned insecticide
					Average							
Dalapon	ppb	200	790	10	Range	ND	ND	ND	ND	ND		Runoff from herbicide used on right-of-ways, and crops and landscape maintenance
					Average							
Di(2-ethylhexyl)adipate	ppb	400	200	5	Range	ND	ND	ND	ND	ND		Discharge from chemical factories
					Average							
Di(2-ethylhexyl)phthalate	ppb	4	12	3	Range	ND	ND	ND	ND	ND		Discharge from rubber and chemical factories; inert ingredient in pesticides
					Average							
Dibromochloropropane (DBCP)	ppt	200	1.7	10	Range	ND	ND	ND	ND	ND		Banned nematocide that may still be present in soils due to runoff/leaching
					Average							
Dinoseb	ppb	7	14	2	Range	ND	ND	ND	ND	ND		Runoff from herbicide used on soybeans, vegetables, and fruits
					Average							
Dioxin (2,3,7,8-TCDD)	ppq	30	0.05	5	Range	ND	ND	ND	ND	ND		Waste incineration emissions; chemical factory discharge
					Average							
Diquat	ppb	20	6	4	Range	ND	ND	ND	ND	ND		Runoff from herbicide used for terrestrial and aquatic weeds
					Average							
Endothall	ppb	100	94	45	Range	ND	ND	ND	ND	ND		Runoff from herbicide used for terrestrial and aquatic weeds; defoliant
					Average							

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Endrin	ppb	2	0.3	0.1	Range Average	ND	ND	ND	ND	ND		Residue of banned insecticide and rodenticide
Epichlorohydrin (g)	ppm	TT	MCLG = 0	NA	Range Average	NA	NA	NA	NA	NA		Water treatment chemical impurities
Ethylene Dibromide (EDB)	ppt	50	10	20	Range Average	ND	ND	ND	ND	ND		Petroleum refinery discharges; underground gas tank leaks; banned nematocide that may be still present in soils due to runoff and leaching
Glyphosate	ppb	700	900	25	Range Average	ND	ND	ND	ND	ND		Runoff from herbicide use
Heptachlor	ppt	10	8	10	Range Average	ND	ND	ND	ND	ND		Residue of banned insecticide
Heptachlor Epoxide	ppt	10	6	10	Range Average	ND	ND	ND	ND	ND		Breakdown product of heptachlor
Hexachlorobenzene	ppb	1	0.03	0.5	Range Average	ND	ND	ND	ND	ND		Discharge from metal refineries and agrichemicals factories; wastewater chlorination reaction byproduct
Hexachlorocyclopentadiene	ppb	50	2	1	Range Average	ND	ND	ND	ND	ND		Discharge from chemical factories
Lindane	ppt	200	32	200	Range Average	ND	ND	ND	ND	ND		Runoff/leaching from insecticide used on cattle, lumber, and gardens
Methoxychlor	ppb	30	0.09	10	Range Average	ND	ND	ND	ND	ND		Runoff/leaching from insecticide uses on fruits, vegetables, alfalfa, and livestock
Molinate (Ordram)	ppb	20	1	2	Range Average	ND	ND	ND	ND	ND		Runoff/leaching from herbicide used on rice
Oxamyl (Vydate)	ppb	50	26	20	Range Average	ND	ND	ND	ND	ND		Runoff/leaching from insecticide uses
Pentachlorophenol	ppb	1	0.3	0.2	Range Average	ND	ND	ND	ND	ND		Discharge from wood preserving factories other insecticidal and herbicidal uses
Picloram	ppb	500	166	1	Range Average	ND	ND	ND	ND	ND		Herbicide runoff
Polychlorinated Biphenyls (PCBs)	ppt	500	90	500	Range Average	ND	ND	ND	ND	ND		Runoff from landfills; discharge of waste chemicals
Simazine	ppb	4	4	1	Range Average	ND	ND	ND	ND	ND		Herbicide runoff
Thiobencarb	ppb	70	42	1	Range Average	ND	ND	ND	ND	ND		Runoff/leaching from herbicide used on rice
Toxaphene	ppb	3	0.03	1	Range Average	ND	ND	ND	ND	ND		Runoff/leaching from insecticide used on cotton and cattle
Volatile Organic Compounds												
1,1,1-Trichloroethane	ppb	200	1,000	0.5	Range Average	ND	ND	ND	ND	ND		Metal degreasing site discharge; manufacture of food wrappings
1,1,2,2-Tetrachloroethane	ppb	1	0.1	0.5	Range Average	ND	ND	ND	ND	ND		Discharge from industrial and agrichemical factories; solvent used in production of TCE, pesticides, varnish, and lacquers
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	ppm	1.2	4	0.01	Range Average	ND	ND	ND	ND	ND		Discharge from metal degreasing sites and other factories; dry cleaning solvent; refrigerant
1,1,2-Trichloroethane	ppb	5	0.3	0.5	Range Average	ND	ND	ND	ND	ND		Discharge from industrial chemical factories
1,1-Dichloroethane	ppb	5	3	0.5	Range Average	ND	ND	ND	ND	ND		Extraction and degreasing solvent; fumigant
1,1-Dichloroethylene	ppb	6	10	0.5	Range Average	ND	ND	ND	ND	ND		Discharge from industrial chemical factories
1,2,4-Trichlorobenzene	ppb	5	5	0.5	Range Average	ND	ND	ND	ND	ND		Discharge from textile-finishing factories
1,2-Dichlorobenzene	ppb	600	600	0.5	Range Average	ND	ND	ND	ND	ND		Discharge from industrial chemical factories
1,2-Dichloroethane	ppt	500	400	500	Range Average	ND	ND	ND	ND	ND		Discharge from industrial chemical factories
1,2-Dichloropropane	ppb	5	0.5	0.5	Range Average	ND	ND	ND	ND	ND		Industrial chemical factory discharge; primary component of some fumigants

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1,3-Dichloropropene	ppt	500	200	500	Range	ND	ND	ND	ND	ND		Runoff/leaching from nematocide used on croplands
					Average							
1,4-Dichlorobenzene	ppb	5	6	0.5	Range	ND	ND	ND	ND	ND		Discharge from industrial chemical factories
					Average							
Benzene	ppb	1	0.15	0.5	Range	ND	ND	ND	ND	ND		Plastics factory discharge; gas tanks and landfill leaching
					Average							
Carbon Tetrachloride	ppt	500	100	500	Range	ND	ND	ND	ND	ND		Discharge from chemical plants and other industrial waste
					Average							
cis -1,2-Dichloroethylene	ppb	6	100	0.5	Range	ND	ND	ND	ND	ND		Industrial chemical factory discharge; byproduct of TCE and PCE biodegradation
					Average							
Dichloromethane (Methylene Chloride)	ppb	5	4	0.5	Range	ND	ND	ND	ND	ND		Discharge from pharmaceutical and chemical factories; insecticide
					Average							
Ethylbenzene	ppb	300	300	0.5	Range	ND	ND	ND	ND	ND		Petroleum refinery discharge; industrial chemical factories
					Average							
Methyl-*tert* -butyl ether (MTBE)	ppb	13	13	3	Range	ND	ND	ND	ND	ND		Gasoline discharge from watercraft engines
					Average							
Monochlorobenzene	ppb	70	70	0.5	Range	ND	ND	ND	ND	ND		Discharge from industrial and agrichemical factories, and dry cleaners
					Average							
Styrene	ppb	100	0.5	0.5	Range	ND	ND	ND	ND	ND		Rubber and plastics factories discharge; landfill leaching
					Average							
Tetrachloroethylene (PCE)	ppb	5	0.06	0.5	Range	ND	ND	ND	ND	ND		Discharge from factories, dry cleaners, and auto shops
					Average							
Toluene	ppb	150	150	0.5	Range	ND	ND	ND	ND	0.6		Discharge from petroleum and chemical refineries
					Average							
trans -1,2-Dichloroethylene	ppb	10	60	0.5	Range	ND	ND	ND	ND	ND		Industrial chemical factory discharge; byproduct of TCE and PCE biodegradation
					Average							
Trichloroethylene (TCE)	ppb	5	1.7	0.5	Range	ND	ND	ND	ND	ND		Discharge from metal degreasing sites and other factories
					Average							
Trichlorofluoromethane (Freon-11)	ppb	150	1,300	5	Range	ND	ND	ND	ND	ND		Industrial factory discharge; degreasing solvent; propellant and refrigerant
					Average							
Vinyl Chloride	ppt	500	50	500	Range	ND	ND	ND	ND	ND		Leaching from PVC piping; plastic factory discharge; byproduct of TCE and PCE biodegradation
					Average							
Xylenes	ppm	1.750	1.8	0.0005	Range	ND	ND	ND	ND	ND		Discharge from petroleum and chemical refineries; fuel solvent
					Average							
INORGANIC CHEMICALS												
Aluminum (h)	ppb	1,000	600	50	Range	ND - 65	ND - 290	ND - 94	ND - 94	ND - 110		Residue from water treatment process; runoff and leaching from natural deposits
					Highest RAA	124	58	ND	51	122		
Antimony	ppb	6	1	6	Range	ND	ND	ND	ND	ND		Petroleum refinery discharges; fire retardants; solder; electronics
					Average							
Arsenic	ppb	10	0.004	2	Range	ND	ND	ND	ND	ND		Natural deposits erosion, glass and electronics production wastes
					Average							
Asbestos (i)	MFL	7	7	0.2	Range	ND	ND	ND	ND	ND		Asbestos cement pipes internal corrosion; runoff and leaching from natural deposits
					Average							
Barium	ppb	1,000	2,000	100	Range	ND	ND	ND	ND	ND		Oil and metal refineries discharge; runoff and leaching from natural deposits
					Average							
Beryllium	ppb	4	1	1	Range	ND	ND	ND	ND	ND		Discharge from metal refineries, aerospace, and defense industries
					Average							
Cadmium	ppb	5	0.04	1	Range	ND	ND	ND	ND	ND		Internal corrosion of galvanized pipes; discharge from electroplating, industrial factories, and metal refineries; runoff from waste batteries and paints; runoff and leaching from natural deposits
					Average							
Chromium	ppb	50	MCLG = 100	10	Range	ND	ND	ND	ND	ND		Discharge from steel and pulp mills; natural deposits erosion
					Average							
Copper (j)	ppm	AL = 1.3	0.3	0.05	Range	ND	ND	ND	ND	ND		Internal corrosion of household pipes; runoff and leaching from natural deposits; leaching from wood preservatives
					Average							
Cyanide	ppb	150	150	100	Range	ND	ND	ND	ND	ND		Discharge from steel/metal, plastic, and fertilizer factories
					Average							

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Fluoride (k)	ppm	2.0	1	0.1	Range	0.1 - 0.9	0.4 - 0.8	0.1 - 0.9	0.3 - 0.8	0.6 - 0.9	0.1 - 0.9	Runoff and leaching from natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
					Average	0.7	0.7	0.7	0.7	0.7	0.7	
Lead (j)	ppb	AL = 15	0.2	5	Range	ND	ND	ND	ND	ND		Internal corrosion of household water plumbing systems; industrial manufacturers' discharge; runoff and leaching from natural deposits
					Average							
Mercury	ppb	2	1.2	1	Range	ND	ND	ND	ND	ND		Runoff and leaching from natural deposits; factory discharge; landfill runoff
					Average							
Nickel	ppb	100	12	10	Range	ND	ND	ND	ND	ND		Runoff and leaching from natural deposits; discharge from metal factories
					Average							
Nitrate (as Nitrogen)	ppm	10	10	0.4	Range	0.5	0.5	0.6	ND	0.5		Runoff and leaching from fertilizer use; septic tank and sewage; runoff and leaching from natural deposits
					Average							
Nitrite (as Nitrogen)	ppm	1	1	0.4	Range	ND	ND	ND	ND	ND		Runoff and leaching from fertilizer use; septic tank and sewage; runoff and leaching from natural deposits
					Average							
Perchlorate	ppb	6	1	4	Range	ND	ND	ND	ND	ND		Industrial waste discharge
					Average							
Selenium	ppb	50	30	5	Range	ND	ND	ND	ND	ND		Refineries, mines, and chemical waste discharge; runoff from livestock lots
					Average							
Thallium	ppb	2	0.1	1	Range	ND	ND	ND	ND	ND		Leaching from ore processing; discharge from electronics, glass, and pharmaceutical factories
					Average							
RADIOLOGICALS (l)												
Gross Alpha Particle Activity	pCi/L	15	MCLG = 0	3	Range	ND	ND - 3	ND	ND - 4	ND		Runoff/leaching from natural deposits
					Average		ND		ND			
Gross Beta Particle Activity	pCi/L	50	MCLG = 0	4	Range	ND	ND	ND	ND - 5	ND		Decay of natural and man-made deposits
					Average				ND			
Radium-226	pCi/L	NA	0.05	1	Range	ND	ND	ND	ND	ND		Runoff/leaching from natural deposits
					Average							
Radium-228	pCi/L	NA	0.019	1	Range	ND	ND	ND	ND	ND		Runoff/leaching from natural deposits
					Average							
Combined Radium-226 + 228	pCi/L	5	MCLG = 0	NA	Range	ND	ND	ND	ND	ND		Runoff/leaching from natural deposits
					Average							
Strontium-90	pCi/L	8	0.35	2	Range	ND	ND	ND	ND	ND		Decay of natural and man-made deposits
					Average							
Tritium	pCi/L	20,000	400	1,000	Range	ND	ND	ND	ND	ND		Decay of natural and man-made deposits
					Average							
Uranium	pCi/L	20	0.43	1	Range	ND	ND - 1	ND	ND - 3	ND		Runoff/leaching from natural deposits
					Average		ND		ND			
DISINFECTION BYPRODUCTS, DISINFECTANT RESIDUALS, AND DISINFECTION BYPRODUCT PRECURSORS (m)												
Total Trihalomethanes (TTHMs) (Plant Core Locations and Distribution System)	ppb	80	NA	1.0	Range	16 - 30	12 - 21	12 - 36	14 - 30	14 - 31	12 - 56	Byproduct of drinking water chlorination
					Highest LRAA	24	17	25	23	27	28	
Sum of Five Haloacetic Acids (HAA5) (Plant Core Locations and Distribution System)	ppb	60	NA	1.0	Range	2.2 - 8.9	2.0 - 5.0	1.9 - 9.0	2.3 - 11	ND - 9.0	ND - 13	Byproduct of drinking water chlorination
					Highest LRAA	5.5	3.4	9.0	7.4	6.0	9.0	
Total Chlorine Residual	ppm	MRDL = 4.0	MRDLG = 4	(0.05)	Range						0.5 - 2.9	Drinking water disinfectant added for treatment
					Highest RAA						2.4	
Bromate (n)	ppb	10	0.1	1.0	Range	ND - 5.9	1.6 - 8.4	ND - 7.3	ND - 10	ND - 8.1		Byproduct of drinking water ozonation
					Highest RAA	2.0	5.6	3.6	2.8	1.9		
Total Organic Carbon (TOC)	ppm	TT	NA	0.30	Range	1.8 - 2.6	2.0 - 2.5	1.5 - 3.0	2.0 - 2.7	1.7 - 2.6		Various natural and man-made sources; TOC is a precursor for the formation of disinfection byproducts
					Highest RAA	2.4	2.3	2.2	2.4	2.4		
SECONDARY STANDARDS—Aesthetic Standards												
Aluminum (h)	ppb	200	600	50	Range	ND - 65	ND - 290	ND - 94	ND - 94	ND - 110		Residue from water treatment process; runoff/leaching from natural deposits
					Highest RAA	124	58	ND	51	122		
Chloride	ppm	500	NA	(2)	Range	53 - 58	62	38 - 44	68 - 78	46 - 55		Runoff/leaching from natural deposits; seawater influence
					Average	56		41	73	50		
Color	Color Units	15	NA	(1)	Range	ND - 1	1 - 2	ND - 1	ND - 2	ND - 1		Naturally-occurring organic materials
					Average	ND	2	ND	1	ND		
Copper (j)	ppm	1.0	0.3	0.05	Range	ND	ND	ND	ND	ND		Internal corrosion of household pipes; runoff/leaching from natural deposits; wood preservatives leaching
					Average							
Foaming Agents - Methylene Blue Active Substances (MBAS)	ppb	500	NA	(50)	Range	ND	ND	ND	ND	ND		Municipal and industrial waste discharges
					Average							

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Iron	ppb	300	NA	100	Range	ND	ND	ND	ND	243		Leaching from natural deposits; industrial wastes
					Average							
Manganese	ppb	50 NL = 500	NA	20	Range	ND	ND	ND	ND	ND		Leaching from natural deposits
					Average							
MTBE	ppb	5	13	3	Range	ND	ND	ND	ND	ND		Gasoline discharge from watercraft engines
					Average							
Odor Threshold (o)	TON	3	NA	1	Range	ND - 1	ND - 1	ND	1	1		Naturally-occurring organic materials
					Average	ND	ND					
Silver	ppb	100	NA	10	Range	ND	ND	ND	ND	ND		Industrial discharges
					Average							
Specific Conductance	µS/cm	1,600	NA	NA	Range	508 - 521	471 - 505	299 - 343	576 - 644	435 - 503		Substances that form ions in water; seawater influence
					Average	514	488	321	610	469		
Sulfate	ppm	500	NA	0.5	Range	89 - 93	56 - 62	24 - 39	90 - 108	65 - 81		Runoff/leaching from natural deposits; industrial wastes
					Average	91	59	32	99	73		
Thiobencarb	ppb	1	42	1	Range	ND	ND	ND	ND	ND		Runoff/leaching from rice herbicide
					Average							
Total Dissolved Solids, Filterable (TDS) (p)	ppm	1,000	NA	(2)	Range	296 - 312	280 - 286	163 - 196	330 - 379	244 - 289		Runoff/leaching from natural deposits
					Average	304	283	180	354	266		
Turbidity	NTU	5	NA	0.1	Range	ND	ND	ND	ND	ND		Soil runoff
					Average							
Zinc	ppm	5.0	NA	0.05	Range	ND	ND	ND	ND	ND		Runoff/leaching from natural deposits; industrial wastes
					Average							
OTHER PARAMETERS												
General Minerals												
Alkalinity (as $CaCO_3$)	ppm	NA	NA	(1)	Range	69 - 74	80 - 84	54 - 59	84 - 87	67 - 70		Runoff/leaching of natural deposits; carbonate, bicarbonate, hydroxide, and occasionally borate, silicate, and phosphate
					Average	72	82	56	86	68		
Calcium	ppm	NA	NA	(0.1)	Range	29 - 30	26 - 28	14 - 16	33 - 39	23 - 27		Runoff/leaching from natural deposits
					Average	30	27	15	36	25		
Hardness (as $CaCO_3$)	ppm	NA	NA	(1)	Range	124 - 130	112 - 117	66 - 76	139 - 164	101 - 116		Runoff/leaching from natural deposits; sum of polyvalent cations, generally magnesium and calcium present in the water
					Average	127	114	71	152	108		
Magnesium	ppm	NA	NA	(0.01)	Range	13 - 14	12 - 13	8.0 - 8.5	14 - 16	11 - 12		Runoff/leaching from natural deposits
					Average	14	12	8.2	15	12		
Potassium	ppm	NA	NA	(0.2)	Range	2.6 - 2.9	2.7	1.8 - 2.2	3.3 - 3.6	2.2 - 2.7		Salt present in the water; naturally-occurring
					Average	2.8		2.0	3.4	2.4		
Sodium	ppm	NA	NA	(1)	Range	54 - 57	51 - 54	33 - 40	62 - 69	46 - 54		Salt present in the water; naturally-occurring
					Average	56	52	36	66	50		
Unregulated Contaminants												
Boron	ppb	NL = 1,000	NA	100	Range	120	160	120	120	120		Runoff/leaching from natural deposits; industrial wastes
					Average							
Chlorate	ppb	NL = 800	NA	20	Range	55	ND	28	35	42		Byproduct of drinking water chlorination; industrial processes
					Average							
Chromium VI	ppb	NA	0.02	1	Range	ND	ND	ND	ND	ND		Runoff/leaching from natural deposits; discharge from industrial wastes
					Average							
Vanadium	ppb	NL = 50	NA	3	Range	ND	ND	ND	ND	ND		Naturally-occurring; industrial waste discharge
					Average							
tert-Butyl alcohol (TBA)	ppb	NL = 12	NA	2	Range	ND	ND	ND	ND	ND		MTBE breakdown product; used as gasoline additive
					Average							
Dichlorodifluoromethane (Freon-12)	ppb	NL = 1,000	NA	0.5	Range	ND	ND	ND	ND	ND		Industrial waste discharge
					Average							
N-Nitrosodimethylamine (NDMA)	ppt	NL = 10	3	(2)	Range	ND	ND	3.9	3.9	ND	ND - 4.0	Byproduct of drinking water chloramination; industrial processes
Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) List (q)												
Perfluorooctanoic Acid (PFOA)	ppt	NL = 5.1	NA	(2)	Range	ND	ND	ND	ND	ND		Industrial chemical factory discharges; runoff/leaching from landfills; used in fire-retarding foams and various industrial processes
					Average							
Perfluorooctanesulfonic Acid (PFOS)	ppt	NL = 6.5	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluorononanoic acid (PFNA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Treatment Plant Effluents and Distribution System

Parameter	Units	State and Federal Standards MCL ‡	PHG	State DLR (RL)	Range Average	Treatment Plant Effluent †						Major Sources in Drinking Water
						Diemer Plant	Jensen Plant	Mills Plant	Skinner Plant	Weymouth Plant	Distribution System	
Perfluorohexanesulfonic acid (PFHxS)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoroheptanoic acid (PFHpA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluorobutanesulfonic acid (PFBS)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluorodecanoic acid (PFDA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluorododecanoic acid (PFDoA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluorohexanoic Acid (PFHxA)	ppt	NA	NA	(2)	Range	2.2 - 2.3	2.6	2.7 - 3.0	2.2 - 2.4	2.5 - 2.6		
					Average	2.3		2.9	2.3	2.6		
Perfluorotetradecanoic acid (PFTeDA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluorotridecanoic acid (PFTrDA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoroundecanoic acid (PFUnA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
4,8-dioxa-3H-perfluorononanoate (ADONA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
F-53B Major (11Cl-PF3OUdS)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
F-53B Minor (9Cl-PF3ONS)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
GenX (HFPO-DA)	ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
					Average							
N-ethyl Perfluorooctanesulfonamidoacetic acid	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
N-methyl Perfluorooctanesulfonamidoacetic acid	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Extended List (r)												
10:2 Fluorotelomer sulfonic acid	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		Industrial chemical factory discharges; runoff/leaching from landfills; used in fire-retarding foams and various industrial processes
					Average							
4:2 Fluorotelomer sulfonic acid	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
6:2 Fluorotelomer sulfonic acid	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
8:2 Fluorotelomer sulfonic acid	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
N-ethylperfluorooctane sulfonamidoethanol	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		Industrial chemical factory discharges; runoff/leaching from landfills; used in fire-retarding foams and various industrial processes
					Average							
N-methylperfluorooctane sulfonamide (NMeFOSA	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
N-methylperfluorooctane sulfonamidoethanol	ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoro-2-methoxyacetic acid	ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoro-2-methoxyethoxyacetic acid	ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoro-3-methoxypropanoic acid (PFMOPrA)	ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoro-4-isopropoxybutanoic acid	ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluoro-4-methoxybutanoic acid (PFMOBA)	ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
					Average							
Perfluorobutanoic acid (PFBA)	ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
					Average							

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Treatment Plant Effluents and Distribution System

Parameter		Units	State and Federal Standards MCL [‡]	PHG	State DLR (RL)	Range Average	Treatment Plant Effluent [†]						Major Sources in Drinking Water
							Diemer Plant	Jensen Plant	Mills Plant	Skinner Plant	Weymouth Plant	Distribution System	
Perfluorodecanesulfonic acid (PFDS)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluorododecanesulfonic acid (PFDoS)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluoroheptanesulfonic acid (PFHpS)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluorohexadecanoic acid (PFHxDA)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluorononanesulfonic acid (PFNS)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluorooctane sulfonamide (PFOSA)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluoropentanesulfonic acid (PFPeS)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluoropentanoic acid (PFPeA)		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Nafion Byproduct 1		ppt	NA	NA	(2)	Range	ND	ND	ND	ND	ND		
						Average							
Nafion Byproduct 2		ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluoro (3,5,7,9-tetraoxadecanoic) acid		ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluoro (3,5,7-trioxaoctanoic) acid		ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
						Average							
Perfluoro (3,5-dioxahexanoic) acid		ppt	NA	NA	(5)	Range	ND	ND	ND	ND	ND		
						Average							
Miscellaneous	(s)												
Calcium Carbonate Precipitation Potential (CCPP) (as $CaCO_3$)	(t)	ppm	NA	NA	NA	Range	1.2 - 7.7	1.1 - 3.5	0.2 - 2.4	0.4 - 5.6	1.1 - 7.3		Elemental balance in water; affected by temperature, other factors
						Average	3.0	2.0	1.2	2.9	2.6		
Corrosivity (as Aggressiveness Index)	(u)	AI	NA	NA	NA	Range	12.1 - 12.2	12.1 - 12.3	11.9 - 12.0	12.0	12.1 - 12.2		Elemental balance in water; affected by temperature, other factors
						Average	12.1	12.2	12.0		12.1		
Corrosivity (as Saturation Index)	(v)	SI	NA	NA	NA	Range	0.33 - 0.52	0.28 - 0.46	0.20 - 0.25	0.20 - 0.28	0.34 - 0.38		Elemental balance in water; affected by temperature, other factors
						Average	0.43	0.37	0.22	0.24	0.36		
pH		pH Units	NA	NA	NA	Range	8.4 - 8.5	8.4 - 8.5	8.6	8.1 - 8.2	8.5		NA
						Average	8.4	8.4		8.1			
Radon		pCi/L	NA	NA	100	Range	ND	ND	ND	ND	ND		Gas produced by the decay of naturally-occurring uranium in soil and water
						Average							
Total Dissolved Solids, Calculated (TDS)	(w)	ppm	1,000	NA	NA	Range	279 - 611	257 - 289	163 - 292	314 - 574	246 - 606		Runoff/leaching from natural deposits
						Average	362	276	226	396	352		
Ethyl-*tert*-butyl ether (ETBE)		ppb	NA	NA	3	Range	ND	ND	ND	ND	ND		Used as gasoline additive
						Average							
tert-Amyl-methyl ether (TAME)		ppb	NA	NA	3	Range	ND	ND	ND	ND	ND		Used as gasoline additive
						Average							
Sum of Five Haloacetic Acids (HAA5)	(x)	ppb	60	NA	1.0	Range	1.0 - 3.0	1.5 - 4.9	2.4 - 6.6	ND - 7.1	ND - 6.7		Byproduct of drinking water chlorination
						Average	2.1	2.8	4.2	4.1	2.8		
Total Trihalomethanes (TTHMs)	(x)	ppb	80	NA	1.0	Range	13 - 21	8.2 - 39	8.6 - 33	12 - 44	9.7 - 30		Byproduct of drinking water chlorination
						Average	16	12	20	21	17		

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Treatment Plant Effluents and Distribution System

Parameter	Units	State and Federal Standards MCL ‡	PHG	State DLR (RL)	Range Average	Treatment Plant Effluent †						Major Sources in Drinking Water
						Diemer Plant	Jensen Plant	Mills Plant	Skinner Plant	Weymouth Plant	Distribution System	

DEFINITION OF TERMS AND FOOTNOTES

† As a wholesale water system, Metropolitan provides its member agencies with relevant source water information and monitoring results that they may need for their annual water quality report. Metropolitan's compliance with state or federal regulations is determined at the treatment plant effluent and/or distribution system locations and source water or plant influent locations per frequency stipulated in Metropolitan's State-approved monitoring plan, and is based on TT, RAA, or LRAA, as appropriate. Data above Metropolitan's laboratory reporting limit (RL) but below the State DLR are reported as ND in this report; these data are available upon request. Metropolitan was in compliance with all primary and secondary drinking water regulations for the current monitoring period.

Note: Metropolitan monitors the distribution system for constituents under the revised Total Coliform Rule (TCR), Water Fluoridation Standards, and Disinfectants/Disinfection Byproduct Rule (TTHMs, HAA5, and total chlorine residual), including NDMA. Constituents with grayed out areas in the distribution system column are routinely monitored at treatment plant effluents and not in the distribution system.

‡ The Maximum Contaminant Level (MCL) is the highest level of a contaminant set by the State and the Environmental Protection Agency (EPA) that is allowed in drinking water except for the chemical disinfectant, which is expressed as Maximum Residual Disinfectant Level (MRDL). MCL is based on the most stringent value between the State and EPA MCLs. A contaminant with no MCL but requires compliance with other drinking water regulations is designated either as Treatment Technique (TT), Action Level (AL), or Notification Level (NL).

Definition of Terms

AI	Aggressiveness Index	MCL	Maximum Contaminant Level	RAA	Running Annual Average; highest RAA is the highest of all Running Annual Averages calculated as an average of all the samples collected within a 12-month period
AL	Action Level	MCLG	Maximum Contaminant Level Goal		
Average	Result based on arithmetic mean	MFL	Million Fibers per Liter		
$CaCO_3$	Calcium Carbonate	MRDL	Maximum Residual Disinfectant Level	Range	Results based on minimum and maximum values; range and average values are the same if a single value is reported for samples collected once or twice annually
CCPP	Calcium Carbonate Precipitation Potential	MRDLG	Maximum Residual Disinfectant Level Goal		
CFE	Combined Filter Effluent	NA	Not Applicable		
CFU	Colony-Forming Units	ND	Not Detected at or above DLR or RL	RL	Reporting Limit
DLR	Detection Limits for Purposes of Reporting	NL	Notification Level to SWRCB	SI	Saturation Index (Langelier)
EPA	Environmental Protection Agency	NTU	Nephelometric Turbidity Units	SWRCB	State Water Resources Control Board
HAA5	Sum of five haloacetic acids	pCi/L	picoCuries per Liter	TDS	Total Dissolved Solids
HPC	Heterotrophic Plate Count	PHG	Public Health Goal	TON	Threshold Odor Number
LRAA	Locational Running Annual Average; highest LRAA is the highest of all Locational Running Annual Averages calculated as an average of all samples collected within a 12-month period	ppb	parts per billion or micrograms per liter (µg/L)	TT	Treatment Technique is a required process intended to reduce the level of a contaminant in drinking water
		ppm	parts per million or milligrams per liter (mg/L)		
		ppq	parts per quadrillion or picograms per liter (pg/L)	TTHMs	Total Trihalomethanes
		ppt	parts per trillion or nanograms per liter (ng/L)	µS/cm	microSiemen per centimeter; or micromho per centimeter (µmho/cm)

Footnotes

(a) Metropolitan monitors turbidity at the CFE locations using continuous and grab samples. Turbidity, a measure of cloudiness of the water, is an indicator of treatment performance. Turbidity was in compliance with the TT primary drinking water standard and the secondary drinking water standard of less than 5 NTU.

(b) Per the State's Surface Water Treatment Rule, treatment techniques that remove or inactivate *Giardia* cysts will also remove HPC bacteria, *Legionella,* and viruses. *Legionella* and virus monitoring is not required.

(c) Compliance is based on monthly samples from treatment plant effluents and the distribution system.

(d) The MCL for *E. coli* is based on any of the following conditions: Coliform-positive routine and repeat samples with either of them positive for *E. coli*; failure to analyze a repeat sample following an *E. coli*-positive routine sample; or a coliform-positive repeat sample is not tested for the presence of *E. coli*.

(e) All distribution system samples had detectable total chlorine residuals, so no HPC analysis was required. Metropolitan monitors HPC bacteria to ensure treatment process efficacy.

(f) Data are from samples collected in 2018 for the required triennial monitoring (2017-2019) except for 1,2,3-Trichloropropane which began monitoring in 2018.

(g) Metropolitan uses acrylamide for water treatment processes and was in compliance with the treatment technique requirements regarding its use when treating drinking water. Metropolitan does not use any epichlorohydrins.

(h) Compliance with the State MCL for aluminum is based on RAA. No secondary standard MCL exceedance occurred in the Jensen treatment plant effluent.

(i) Data reported once every nine-year compliance cycle until the next samples are collected in 2020. Current monitoring results are from 2011.

(j) As a wholesaler, Metropolitan has no retail customers and is not required to collect samples at consumers' taps. However, compliance monitoring under Title 22 is required at plant effluents.

(k) Metropolitan was in compliance with all provisions of the State's fluoridation system requirements. Fluoride feed systems were temporarily out of service during treatment plant shutdowns and/or maintenance work in 2019, resulting in occasional fluoride levels below 0.6 mg/L.

(l) Data are from samples collected in 2017 for the required triennial monitoring (2017-2019) until the next samples are collected.

(m) Compliance with the State and Federal MCLs is based on RAA or LRAA, as appropriate. Plant core locations for TTHM and HAA5 are service connections specific to each of the treatment plant effluents.

(n) Compliance with the State and Federal bromate MCL is based on RAA. No MCL exceedance occurred in the Skinner treatment plant effluent.

(o) Compliance with odor threshold secondary MCL is based on RAA. Both Diemer and Jensen treatment plants returned to compliance during the first quarter of 2019 with reduced monitoring frequency from quarterly to annual.

(p) Metropolitan's TDS compliance data are based on flow-weighted monthly composite samples collected twice per year (April and October). The 12-month statistical summary of flow-weighted data is reported in the "Other Parameters" section under "Miscellaneous".

(q) Data are from two analytical methods based on EPA 537.1 and a research method for 18 different PFAS.

(r) Data are from a research method that can detect all 45 different PFAS including 18 PFAS reported under EPA 537.1.

(s) Data are from voluntary monitoring of constituents and are provided for informational purposes.

(t) Positive CCPP = non-corrosive; tendency to precipitate and/or deposit scale on pipes. Negative CCPP = corrosive; tendency to dissolve calcium carbonate. Reference: *Standard Methods (SM2330)*

(u) AI ≥ 12.0 = Non-aggressive water; AI 10.0–11.9 = Moderately aggressive water; AI ≤ 10.0 = Highly aggressive water. Reference: *ANSI/AWWA Standard C400-93 (R98)*

(v) Positive SI = non-corrosive; tendency to precipitate and/or deposit scale on pipes. Negative SI = corrosive; tendency to dissolve calcium carbonate. Reference: *Standard Methods (SM2330)*

(w) Statistical summary represents 12 months of flow-weighted data and values may be different than the TDS reported to meet compliance with secondary drinking water regulations. Metropolitan's calculated TDS goal is ≤ 500 mg/L.

(x) HAA5 and TTHMs noncompliance samples collected at treatment plant effluents.

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
Percent State Water Project	%	Range	100	10 - 79	0	0	100	100	100	NA
		Average		56						
ORGANIC CHEMICALS										
Synthetic Organic Compounds **(a)**										
1,2,3-Trichloropropane (1,2,3-TCP)	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial and agrichemical factories; byproduct of producing other compounds and pesticides; leaching from hazardous waste sites
		Average								
2,4,5-TP (Silvex)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Residue of banned herbicide
		Average								
2,4-D	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide used on row crops, rangeland, lawns, and aquatic weeds
		Average								
Alachlor	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide used on row crops
		Average								
Atrazine	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide used on row crops and along railroad and highway right-of-ways
		Average								
Bentazon	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from herbicide used on beans, peppers, corn, peanuts, rice, and ornamental grasses
		Average								
Benzo(a)pyrene	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Leaching from water storage tank linings and distribution lines
		Average								
Carbofuran	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Leaching of soil fumigant used on rice, alfalfa, and grape vineyards
		Average								
Chlordane	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Residue of banned insecticide
		Average								
Dalapon	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide used on right-of-ways, and crops and landscape maintenance
		Average								
Di(2-ethylhexyl)adipate	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from chemical factories
		Average								
Di(2-ethylhexyl)phthalate	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from rubber and chemical factories; inert ingredient in pesticides
		Average								
Dibromochloropropane (DBCP)	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Banned nematocide that may still be present in soils due to runoff/leaching
		Average								
Dinoseb	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide used on soybeans, vegetables, and fruits
		Average								
Dioxin (2,3,7,8-TCDD)	ppq	Range	ND	ND	ND	ND	ND	ND	ND	Waste incineration emissions; chemical factory discharge
		Average								
Diquat	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide used for terrestrial and aquatic weeds
		Average								
Endothall	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide used for terrestrial and aquatic weeds
		Average								
Endrin	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Residue of banned insecticide and rodenticide
		Average								
Ethylene Dibromide (EDB)	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Petroleum refinery discharges; underground gas tank leaks; banned nematocide that may be still present in soils due to runoff and leaching
		Average								
Glyphosate	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from herbicide use
		Average								
Heptachlor	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Residue of banned insecticide
		Average								
Heptachlor Epoxide	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Breakdown product of heptachlor
		Average								

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
Hexachlorobenzene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from metal refineries and agrichemicals factories; wastewater chlorination reaction byproduct
		Average								
Hexachlorocyclopentadiene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from chemical factories
		Average								
Lindane	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from insecticide used on cattle, lumber, and gardens
		Average								
Methoxychlor	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from insecticide uses on fruits, vegetables, alfalfa, and livestock
		Average								
Molinate (Ordram)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from herbicide used on rice
		Average								
Oxamyl (Vydate)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from insecticide uses
		Average								
Pentachlorophenol	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from wood preserving factories other insecticidal and herbicidal uses
		Average								
Picloram	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Herbicide runoff
		Average								
Polychlorinated Biphenyls (PCBs)	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Runoff from landfills; discharge of waste chemicals
		Average								
Simazine	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Herbicide runoff
		Average								
Thiobencarb	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from herbicide used on rice
		Average								
Toxaphene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from insecticide used on cotton and cattle
		Average								
Volatile Organic Compounds										
1,1,1-Trichloroethane	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Metal degreasing site discharge; manufacture of food wrappings
		Average								
1,1,2,2-Tetrachloroethane	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial and agrichemical factories; solvent used in production of TCE, pesticides, varnish, and
		Average								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	ppm	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from metal degreasing sites and other factories; dry cleaning solvent; refrigerant
		Average								
1,1,2-Trichloroethane	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial chemical factories
		Average								
1,1-Dichloroethane	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Extraction and degreasing solvent; fumigant
		Average								
1,1-Dichloroethylene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial chemical factories
		Average								
1,2,4-Trichlorobenzene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from textile-finishing factories
		Average								
1,2-Dichlorobenzene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial chemical factories
		Average								
1,2-Dichloroethane	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial chemical factories
		Average								
1,2-Dichloropropane	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Industrial chemical factory discharge; primary component of some fumigants
		Average								
1,3-Dichloropropene	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from nematocide used on croplands
		Average								
1,4-Dichlorobenzene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial chemical factories
		Average								
Benzene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Plastics factory discharge; gas tanks and landfill leaching
		Average								

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
Carbon Tetrachloride	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from chemical plants and other industrial waste
		Average								
cis -1,2-Dichloroethylene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Industrial chemical factory discharge; byproduct of TCE and PCE biodegradation
		Average								
Dichloromethane (Methylene Chloride)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from pharmaceutical and chemical factories
		Average								
Ethylbenzene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Petroleum refinery discharge; industrial chemical factories
		Average								
Methyl-*tert* -butyl ether (MTBE)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Gasoline discharge from watercraft engines
		Average								
Monochlorobenzene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from industrial and agrichemical factories, and dry cleaners
		Average								
Styrene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Rubber and plastics factories discharge; landfill leaching
		Average								
Tetrachloroethylene (PCE)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from factories, dry cleaners, and auto shops
		Average								
Toluene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from petroleum and chemical refineries
		Average								
trans -1,2-Dichloroethylene	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Industrial chemical factory discharge; byproduct of TCE and PCE biodegradation
		Average								
Trichloroethylene (TCE)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from metal degreasing sites and other factories
		Average								
Trichlorofluoromethane (Freon-11)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Industrial factory discharge; degreasing solvent; propellant
		Average								
Vinyl Chloride	ppt	Range	ND	ND	ND	ND	ND	ND	ND	Leaching from PVC piping; plastic factory discharge; byproduct of TCE and PCE biodegradation
		Average								
Xylenes	ppm	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from petroleum and chemical refineries; fuel solvent
		Average								
INORGANIC CHEMICALS										
Aluminum	ppb	Range	ND	ND	ND	ND	100	ND	200	Residue from water treatment process; runoff/leaching from natural deposits
		Average								
Antimony	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Petroleum refinery discharges; fire retardants; solder; electronics
		Average								
Arsenic	ppb	Range	2.4	ND	2.3	2.2	2.0	ND	ND	Runoff/leaching from natural deposits, glass and electronics production wastes
		Average								
Asbestos (b)	MFL	Range	ND	ND	ND	ND	ND	ND	ND	Asbestos cement pipes internal corrosion;runoff/leaching from natural deposits
		Average								
Barium	ppb	Range	ND	ND	115	115	ND	ND	ND	Oil and metal refineries discharge;runoff/leaching from natural deposits
		Average								
Beryllium	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from metal refineries, aerospace, and defense industries
		Average								
Cadmium	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Internal corrosion of galvanized pipes; discharge from electroplating, industrial factories, and metal refineries; runoff from waste batteries and paints; runoff/leaching from natural deposits
		Average								
Chromium	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from steel and pulp mills; runoff/leaching from natural deposits
		Average								
Copper	ppm	Range	ND	ND	ND	ND	ND	ND	ND	Internal corrosion of household pipes; runoff/leaching from natural deposits; leaching from wood preservatives
		Average								
Cyanide	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Discharge from steel/metal, plastic, and fertilizer factories
		Average								

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Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
Fluoride	ppm	Range	0.1	0.1 - 0.2	0.3	0.3	0.1	0.1	ND	Runoff/leaching from natural deposits; discharge from fertilizer and aluminum factories
		Average		0.2						
Lead	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Internal corrosion of household water plumbing systems; industrial manufacturers' discharge; runoff/leaching from natural deposits
		Average								
Mercury	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; factory discharge; landfill runoff
		Average								
Nickel	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; discharge from metal factories
		Average								
Nitrate (as Nitrogen)	ppm	Range	ND	ND	ND	ND	0.4	ND	0.4	Runoff and leaching from fertilizer use; leaching from septic tank and sewage; runoff/leaching from natural deposits
		Average								
Nitrite (as Nitrogen)	ppm	Range	ND	ND	ND	ND	ND	ND	ND	Runoff and leaching from fertilizer use; septic tank and sewage; natural deposits erosion
		Average								
Perchlorate	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Industrial waste discharge
		Average								
Selenium	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Refineries, mines, and chemical waste discharge; runoff from livestock lots
		Average								
Thallium	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Leaching from ore processing; discharge from electronics, glass, and pharmaceutical factories
		Average								
RADIOLOGICALS (c)										
Gross Alpha Particle Activity	pCi/L	Range	ND - 6.1	ND - 3.7	3.3 - 6.3	ND - 3.2	ND	ND	ND	Erosion of natural deposits
		Average	ND	ND	4.3	ND				
Gross Beta Particle Activity	pCi/L	Range	ND - 5.2	ND	5.1 - 5.3	ND - 12	ND	ND - 5.4	ND - 4.8	Decay of natural and man-made deposits
		Average	ND		5.2	4.3		ND	ND	
Radium-226	pCi/L	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits
		Average								
Radium-228	pCi/L	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits
		Average								
Combined Radium-226 + 228	pCi/L	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits
		Average								
Strontium-90	pCi/L	Range	ND	ND	ND	ND	ND	ND	ND	Decay of natural and man-made deposits
		Average								
Tritium	pCi/L	Range	ND	ND	ND	ND	ND	ND	ND	Decay of natural and man-made deposits
		Average								
Uranium	pCi/L	Range	ND	ND - 1.3	2.5 - 3.0	2.8 - 3.3	ND - 1.2	1.4 - 2.1	ND	Runoff/leaching from natural deposits
		Average		ND	2.7	3.1	1.1	1.6		
AESTHETIC PARAMETERS (d)										
Aluminum	ppb	Range	ND	ND	ND	ND	100	ND	200	Residue from water treatment process; runoff/leaching from natural deposits
		Average								
Chloride	ppm	Range	67 - 68	64 - 82	84 - 85	89 - 92	59	82 - 84	29 - 37	Runoff/leaching from natural deposits; seawater influence
		Average	68	73	84	90		83	33	
Color	Color Units	Range	5	5 - 10	5	2 - 3	5 - 10	5	10 - 15	Naturally-occurring organic materials
		Average		8		2	8		12	
Copper	ppm	Range	ND	ND	ND	ND	ND	ND	ND	Internal corrosion of household pipes; runoff/leaching from natural deposits; wood preservatives leaching
		Average								
Foaming Agents - Methylene Blue Active Substances (MBAS)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Municipal and industrial waste discharges
		Average								
Iron	ppb	Range	ND	ND	ND	ND	103	ND	237	Runoff/leaching from natural deposits; industrial wastes
		Average								
Manganese	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits
		Average								

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Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
MTBE	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Gasoline discharge from watercraft engines
		Average								
Odor Threshold	TON	Range	4	7	10	6	2	8	7	Naturally-occurring organic materials
		Average								
Silver	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Industrial discharges
		Average								
Specific Conductance	µS/cm	Range	466 - 494	543 - 686	926 - 939	934 - 961	450 - 468	522 - 526	244 - 300	Substances that form ions in water; seawater influence
		Average	480	614	932	948	459	524	272	
Sulfate	ppm	Range	46 - 50	76 - 113	213 - 215	220	52 - 58	40 - 42	14 - 27	Runoff/leaching from natural deposits; industrial wastes
		Average	48	94	214		55	41	20	
Thiobencarb	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from rice herbicide
		Average								
Total Dissolved Solids (TDS)	ppm	Range	260 - 271	312 - 394	591 - 592	596 - 600	267 - 269	283	138 - 168	Runoff/leaching from natural deposits
		Average	266	353	592	598	268		153	
Turbidity	NTU	Range	0.3 - 0.4	0.8 - 1.2	0.4 - 1.0	0.7 - 0.8	1.0 - 2.1	0.5 - 1.1	0.8 - 3.3	Soil runoff
		Average	0.4	1	0.7	0.8	1.6	0.8	2.1	
Zinc	ppm	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; industrial wastes
		Average								
OTHER PARAMETERS										
Microbiological										
Total Coliform Bacteria	CFU or MPN /100 mL	Range	5 - 1,400	10 - 9,800	12 - 31,000	6 - 4,800	NC	96 - 3,700	34 - 3,400	Naturally present in the environment
		Median	130	340	1,200	230		310	200	
Escherichia coli (E. coli)	CFU or MPN /100 mL	Range	ND - 2	ND - 2	ND	ND - 200	NC	ND - 82	ND - 12	Human and animal fecal waste
		Median	ND	1		9		12	3	
General Minerals										
Alkalinity (as $CaCO_3$)	ppm	Range	77 - 82	88 - 99	130 - 131	110 - 128	76 - 77	83 - 85	56 - 58	Runoff/leaching of natural deposits; carbonate, bicarbonate, hydroxide, and occasionally borate, silicate, and phosphate
		Average	80	94	130	119	76	84	57	
Calcium	ppm	Range	24 - 25	33 - 39	71 - 72	63 - 68	26 - 28	23 - 24	14 - 15	Runoff/leaching from natural deposits
		Average	24	36	72	66	27	24	14	
Hardness (as $CaCO_3$)	ppm	Range	109 - 113	137 - 170	271 - 277	257 - 277	114 - 117	107 - 109	64 - 72	Runoff/leaching from natural deposits; sum of polyvalent cations, generally magnesium and calcium present in the water
		Average	111	154	274	267	116	108	68	
Magnesium	ppm	Range	11 - 12	14 - 17	25	26	12 - 13	13	7.4 - 8.1	Runoff/leaching from natural deposits
		Average	12	16			12		7.8	
Potassium	ppm	Range	3.2 - 3.5	3.2 - 3.7	4.5	4.6 - 4.7	2.7 - 2.8	3.4 - 3.5	1.7 - 2.2	Salt present in the water; naturally-occurring
		Average	3.4	3.4		4.6	2.8	3.4	2.0	
Sodium	ppm	Range	47 - 51	55 - 69	86 - 88	92 - 96	47 - 48	60 - 61	23 - 30	Salt present in the water; naturally-occurring
		Average	49	62	87	94	48	60	26	
Unregulated Contaminants										
Boron	ppb	Range	150	130	120	120	160	160	120	Runoff/leaching from natural deposits; industrial wastes
		Average								
Chromium VI	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; discharge from industrial waste factories
		Average								
Dichlorodifluoromethane (Freon-12)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Industrial waste discharge
		Average								
Ethyl-*tert*-butyl ether (ETBE)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Used as gasoline additive
		Average								
tert-Amyl-methyl ether (TAME)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Used as gasoline additive
		Average								
tert-Butyl alcohol (TBA)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	MTBE breakdown product; used as gasoline additive
		Average								

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Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
Vanadium	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Naturally-occurring; industrial waste discharge
		Average								
Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) List (e)										
Perfluorooctanoic Acid (PFOA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	Industrial chemical factory discharges; runoff/leaching from landfills; used in fire-retarding foams and various industrial processes
		Average								
Perfluorooctanesulfonic Acid (PFOS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorononanoic acid (PFNA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorohexanesulfonic acid (PFHxS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoroheptanoic acid (PFHpA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorobutanesulfonic acid (PFBS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorodecanoic acid (PFDA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorododecanoic acid (PFDoA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorohexanoic Acid (PFHxA)	ppt	Range	NC	2.2 - 2.6	NC	ND - 12	2.5	3.4 - 3.8	2.9 - 3.0	
		Average		2.4		6.0		3.6	3.0	
Perfluorotetradecanoic acid (PFTeDA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorotridecanoic acid (PFTrDA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoroundecanoic acid (PFUnA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
4,8-dioxa-3H-perfluorononanoate (ADONA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
F-53B Major (11Cl-PF3OUdS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
F-53B Minor (9Cl-PF3ONS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
GenX (HFPO-DA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
N-ethyl Perfluorooctanesulfonamidoacetic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
N-methyl Perfluorooctanesulfonamidoacetic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Extended List (f)										
10:2 Fluorotelomer sulfonic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	Industrial chemical factory discharges; runoff/leaching from landfills; used in fire-retarding foams and various industrial processes
		Average								
4:2 Fluorotelomer sulfonic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
6:2 Fluorotelomer sulfonic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
8:2 Fluorotelomer sulfonic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
N-ethylperfluorooctane sulfonamide (NEtFOSA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
N-ethylperfluorooctane sulfonamidoethanol	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
N-methylperfluorooctane sulfonamide (NMeFOSA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
N-methylperfluorooctane sulfonamidoethanol	ppt	Range	NC	ND	NC	ND	ND	ND	ND	Industrial chemical factory discharges; runoff/leaching from landfills; used in fire-retarding foams and various industrial processes
		Average								
Perfluoro-2-methoxyacetic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoro-2-methoxyethoxyacetic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoro-3-methoxypropanoic acid (PFMOPrA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoro-4-isopropoxybutanoic acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoro-4-methoxybutanoic acid (PFMOBA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorobutanoic acid (PFBA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorodecanesulfonic acid (PFDS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorododecanesulfonic acid (PFDoS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoroheptanesulfonic acid (PFHpS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorohexadecanoic acid (PFHxDA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorononanesulfonic acid (PFNS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluorooctane sulfonamide (PFOSA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoropentanesulfonic acid (PFPeS)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoropentanoic acid (PFPeA)	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Nafion Byproduct 1	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Nafion Byproduct 2	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoro (3,5,7,9-tetraoxadecanoic) acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Perfluoro (3,5,7-trioxaoctanoic) acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Source Waters

Parameter	Units	Range Average	Source Water †							Major Sources in Drinking Water
			Diamond Valley Lake	Lake Skinner	Lake Havasu	Lake Mathews	Castaic Lake	Lake Perris	Silverwood Lake	
Perfluoro (3,5-dioxahexanoic) acid	ppt	Range	NC	ND	NC	ND	ND	ND	ND	
		Average								
Miscellaneous										
Ethyl-*tert*-butyl ether (ETBE)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Used as gasoline additive
		Average								
pH	pH Units	Range	7.5 - 8.0	8.0 - 8.4	8.1 - 8.2	8.0 - 8.2	7.5 - 7.8	7.9 - 8.2	7.9 - 8.0	NA
		Average	7.7	8.2	8.2	8.2	7.6	8.0	8.0	
Radon	pCi/L	Range	ND	ND	ND	ND	ND	ND	ND	Gas produced by the decay of naturally-occurring uranium in soil and water
		Average								
tert-Amyl-methyl ether (TAME)	ppb	Range	ND	ND	ND	ND	ND	ND	ND	Used as gasoline additive
		Average								
Total Organic Carbon (TOC)	ppm	Range	2.6 - 2.8	3.2 - 3.7	3.0 - 3.2	2.8 - 3.3	2.8 - 3.0	3.6 - 3.8	2.7 - 4.1	Various natural and man-made sources; TOC is a precursor for the formation of disinfection byproducts
		Average	2.7	3.4	3.1	3.0	2.9	3.7	3.4	

DEFINITION OF TERMS AND FOOTNOTES

† As a wholesale water system, Metropolitan provides its member agencies with relevant source water information and monitoring results that they may need for their annual water quality report. Metropolitan's compliance with state or federal regulations is determined at the treatment plant effluent and/or distribution system locations and source water or plant influent locations per frequency stipulated in Metropolitan's State-approved monitoring plan. MCLs, PHGs, and state DLRs are included in the Treatment Plant Effluent Report. Data above Metropolitan's laboratory reporting limit (RL) but below the State DLR are reported as ND in this report; these data are available upon request.

Definition of Terms

Average	Result based on arithmetic mean	pCi/L	picoCuries per Liter
$CaCO_3$	Calcium Carbonate	PHG	Public Health Goal
CFU	Colony-Forming Units	ppb	parts per billion or micrograms per liter (µg/L)
DLR	Detection Limits for Purposes of Reporting	ppm	parts per million or milligrams per liter (mg/L)
MCL	Maximum Contaminant Level	ppq	parts per quadrillion or picograms per liter (pg/L)
MFL	Million Fibers per Liter	ppt	parts per trillion or nanograms per liter (ng/L)
MPN	Most Probable Number	Range	Results based on minimum and maximum values; range and average
NA	Not Applicable		values are the same if a single value is reported for samples collected
NC	Not Collected		once or twice annually
ND	Not Detected at or above DLR or RL	TON	Threshold Odor Number
NTU	Nephelometric Turbidity Units	µS/cm	microSiemen per centimeter; or micromho per centimeter (µmho/cm)

Footnotes

(a) Data are from samples collected in 2018 for the required triennial monitoring (2017 - 2019) except for 1,2,3-Trichloropropane which began monitoring in 2018.

(b) Data reported once every nine-year compliance cycle until the next samples are collected. Current monitoring results are from 2011.

(c) Data are from samples collected in 2017 for the required triennial monitoring (2017 - 2019) until the next samples are collected.

(d) Aesthetic parameters under the State Secondary Standards apply to water supplied to the public by community water systems; annual monitoring is required for approved surface water sources or distribution system entry points of the effluent of source water treatment.

(e) Data are from two analytical methods based on EPA 537.1 and a research method for 18 different PFAS.

(f) Data are from a research method that can detect all 45 different PFAS including 18 PFAS reported under EPA 537.1.

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Treatment Plant Influents

Parameter	Units	Range Average	Treatment Plant Influent †					Major Sources in Drinking Water
			Diemer Plant	Jensen Plant	Mills Plant	Skinner Plant	Weymouth Plant	
Percent State Water Project	%	Range	0 - 100	100	100	6 - 100	0 - 100	NA
		Average	64			55	68	
COMPLIANCE MONITORING PARAMETERS								
Microbiological								
Total Coliform Bacteria	CFU or MPN /100 mL	Range	ND - 1,700	31 - 3,200	26 - 2,100	15 - 9,500	3 - 2,000	Naturally present in the environment
		Median	320	620	150	490	240	
Escherichia coli (E. coli)	CFU or MPN /100 mL	Range	ND - 3	ND - 2	ND - 4	ND - 23	ND - 4	Human and animal fecal waste
		Median	1	1	1	2	1	
Chemical								
Alkalinity (as $CaCO_3$)	ppm	Range	58 - 130	74 - 80	45 - 78	76 - 125	61 - 132	Runoff/leaching of natural deposits; carbonate, bicarbonate, hydroxide, and occasionally borate, silicate, and phosphate
		Highest RAA	113	76	71	117	114	
Fluoride	ppm	Range	0.1 - 0.3	0.1 - 0.2	0.1	0.1 - 0.3	0.1 - 0.3	Erosion of natural deposits; discharge from fertilizer and aluminum factories
		Average	0.2	0.2		0.2	0.1	
Total Organic Carbon (TOC)	ppm	Range	2.7 - 4.1	2.7 - 3.3	2.6 - 5.0	2.8 - 4.8	2.6 - 4.2	Various natural and man-made sources
		Highest RAA	3.2	3.0	3.4	3.2	3.2	
OTHER PARAMETERS								
Aluminum	ppb	Range	110	100	240	ND	110	Residue from water treatment process; runoff/leaching from natural deposits
		Average						
Antimony	ppb	Range	ND	ND	ND	ND	ND	Petroleum refinery discharges; fire retardants; solder; electronics
		Average						
Arsenic	ppb	Range	ND	2.0	ND	ND	ND	Runoff/leaching from natural deposits, glass, and electronics production wastes
		Average						
Barium	ppb	Range	ND	ND	ND	ND	ND	Oil and metal refineries discharges; runoff/leaching from natural deposits
		Average						
Beryllium	ppb	Range	ND	ND	ND	ND	ND	Discharge from metal refineries, aerospace, and defense industries
		Average						
Boron	ppb	Range	120	160	120	130	120	Runoff/leaching from natural deposits; Industrial wastes
		Average						
Cadmium	ppb	Range	ND	ND	ND	ND	ND	Internal corrosion of galvanized pipes; discharge from electroplating, industrial factories, and metal refineries; runoff from waste batteries and paints; runoff/leaching from natural deposits
		Average						
Chromium	ppb	Range	ND	ND	ND	ND	ND	Discharge from steel and pulp mills; runoff/leaching from natural deposits
		Average						
Chromium VI	ppb	Range	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; Industrial wastes
		Average						
Copper	ppm	Range	ND	ND	ND	ND	ND	Internal corrosion of household pipes; runoff/leaching from natural deposits; leaching from wood preservatives
		Average						
Cryptosporidium	oocysts/10 L	Range	ND	ND	ND	ND	ND	Human and animal fecal waste
		Average						
Giardia	cysts/10 L	Range	ND	ND	ND	ND	ND	Human and animal fecal waste
		Average						
Hardness (as $CaCO_3$)	ppm	Range	78 - 284	102 - 124	54 - 98	14 - 264	84 - 282	Runoff/leaching from natural deposits; sum of polyvalent cations, generally magnesium and calcium present in the water
		Average	147	115	78	166	140	

2019 Water Quality Report to Member Agencies—The Metropolitan Water District of Southern California
Treatment Plant Influents

Parameter	Units	Range Average	Treatment Plant Influent †					Major Sources in Drinking Water
			Diemer Plant	Jensen Plant	Mills Plant	Skinner Plant	Weymouth Plant	
Iron	ppb	Range	127	103	229	ND	130	Runoff/leaching from natural deposits; industrial wastes
		Average						
Lead	ppb	Range	ND	ND	ND	ND	ND	Internal corrosion of household water plumbing systems; industrial manufacturers' discharge; runoff/leaching from natural deposits
		Average						
Manganese	ppb	Range	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits
		Average						
Mercury	ppb	Range	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; factory discharge; landfill runoff
		Average						
Nickel	ppb	Range	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; discharge from metal factories
		Average						
Perchlorate	ppb	Range	ND	ND	ND	ND	ND	Industrial waste discharge
		Average						
pH	pH Units	Range	7.9 - 8.5	7.4 - 7.9	7.5 - 8.3	7.6 - 8.4	7.9 - 8.4	NA
		Average	8.1	7.7	7.9	8.1	8.1	
Selenium	ppb	Range	ND	ND	ND	ND	ND	Refineries, mines, and chemical waste discharge; runoff from livestock lots
		Average						
Specific Conductance	µS/cm	Range	345 - 962	420 - 479	223 - 526	478 - 938	361 - 960	Substances that form ions in water; seawater influence
		Average	558	456	372	638	544	
Silver	ppb	Range	ND	ND	ND	ND	ND	Industrial discharges
		Average						
Thallium	ppb	Range	ND	ND	ND	ND	ND	Leaching from ore processing; discharge from electronics, glass, and pharmaceutical factories
		Average						
Turbidity	NTU	Range	0.6 - 2.6	0.6 - 4.9	0.3 - 8.7	0.3 - 1.6	0.4 - 3.1	Soil runoff
		Average	1.1	1.4	1.3	0.8	1.1	
Vanadium	ppb	Range	ND	ND	ND	ND	ND	Naturally-occurring; industrial waste discharge
		Average						
Zinc	ppm	Range	ND	ND	ND	ND	ND	Runoff/leaching from natural deposits; industrial wastes
		Average						

DEFINITION OF TERMS AND FOOTNOTES

† As a wholesale water system, Metropolitan provides its member agencies with relevant source water information and monitoring results that they may need for their annual water quality report. Metropolitan's compliance with state or federal regulations is determined at the treatment plant effluent and/or distribution system locations and source water or plant influent locations per frequency stipulated in Metropolitan's State-approved monitoring plan. MCLs, PHGs, and state DLRs are included in the Treatment Plant Effluent Report. Data above Metropolitan's laboratory reporting limit (RL) but below the State DLR are reported as ND in this report; these data are available upon request.

Definition of Terms

Average	Result based on arithmetic mean
$CaCO_3$	Calcium Carbonate
CFU	Colony-Forming Units
DLR	Detection Limits for Purposes of Reporting
MCL	Maximum Contaminant Level
MPN	Most Probable Number
NA	Not Applicable
ND	Not Detected at or above DLR or RL
NTU	Nephelometric Turbidity Units
PHG	Public Health Goal
ppb	parts per billion or micrograms per liter (µg/L)
ppm	parts per million or milligrams per liter (mg/L)
RAA	Running Annual Average; highest RAA is the highest of all Running Annual Averages calculated as an average of the all samples collected within a 12-month period
Range	Results based on minimum and maximum values; range and average values are the same if a single value is reported for samples collected once or twice annually
µS/cm	microSiemen per centimeter; or micromho per centimeter (µmho/cm)