Orange Water and Sewer Authority
2023 Drinking Water Test Results Summary

Summary of all substances for which we analyzed in 2023 (unless otherwise noted).
Please see the definitions at the end. For example, BDL means below detectable level.

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Microbiological					
Total Coliform Bacteria (percent)	N/A	N/A	TT*	N/A	Naturally present in the environment
* If a system collecting 40 or more samples per month finds greater than 5% of monthly samples are positive in one month, a Level 1 or Level 2 Assessment is required. No assessments were required in 2023.					
E. coli Bacteria (percent)	0	no range	If either an original routine sample and/or its repeat samples(s) are *E. coli* positive, a Tier 1 violation exists.	0	Human and animal fecal waste
Turbidity (NTU)	0.070 (highest single turbidity measurement) and 100% of samples below 0.3	0.017 to 0.070 with an average of 0.027	TT = 1 NTU and at least 95% of samples below 0.3	N/A	A measure of the cloudiness of water caused by inorganic soil particles or organic matter that can interfere with treatment
Inorganics					
Antimony (ppb)	BDL	no range	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic (ppb)	BDL	no range	10	0	Natural deposits; orchard runoff; glass and electronics production waste runoff
Asbestos (MFL) (last tested 2020)	BDL	no range	7	7	Decay of asbestos cement water mains; erosion of natural deposits
Barium (ppm)	BDL	no range	2	2	Drilling waste & metal refinery discharges; natural deposits
Beryllium (ppb)	BDL	no range	4	4	Metal refinery and coal-burning factory discharges; electrical, aerospace, and defense industry discharges
Cadmium (ppb)	BDL	no range	5	5	Galvanized pipe corrosion; natural deposits; metal refinery discharges; waste batteries & paints

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Chromium (ppb)	BDL	no range	100	100	Steel & pulp mill discharges; natural deposits
Copper (ppm)	0.033 (90^{th} percentile) 0 sample sites above the action level	0.0035 to 0.090	1.3 (action level)	1.3	Household plumbing corrosion; natural deposits; leaching from wood preservatives
Cyanide (ppb)	BDL	no range	200	200	Metal, plastic, & fertilizer factory discharges
Fluoride (ppm)	0.65	0.54 to 0.71	4	4	Natural deposits; water additive which promotes strong teeth; fertilizer and aluminum factory discharges**
** In accordance with federal requirements, our annual Water Quality Report Cards include a statement that potential sources of fluoride in drinking water include erosion of natural deposits; water additive which promotes strong teeth; [and] discharge from fertilizer and aluminum factories. However, there are no fertilizer or aluminum factories in the watersheds of our Cane Creek Reservoir and University Lake.					
Lead (ppb)	0.73 (90^{th} percentile) 1 sample site above the action level	<0.5 to 40.0	15 (action level)	0	Household plumbing corrosion; natural deposits
Mercury (ppb)	BDL	no range	2	2	Natural deposits; refinery and factory discharges; landfills runoff; cropland runoff
Nickel (ppm)	BDL	no range	not regulated	not regulated	Occurs naturally in soils
Nitrate (ppm)	0.38	no range	10	10	Fertilizer runoff; septic tanks & sewage leaching; erosion of natural deposits
Nitrite (ppm)	BDL	no range	1	1	
Selenium (ppb)	BDL	no range	50	50	Petroleum and metal refinery discharges; erosion of natural deposits; mine discharge
Sodium (ppm)	33	no range	not regulated	not regulated	Occurs naturally in soils
Sulfate (ppm)	53	no range	250 [Secondary MCL]	N/A	
Thallium (ppb)	BDL	no range	2	0.5	Ore-processing leachate; electronics, glass, & pharmaceutical factory discharges

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Disinfectants and Disinfection Byproducts					
Total Haloacetic Acids (HAA5) (ppb)	17.0 (highest LRAA)	9.3 to 20.3 (individual sites)	60	0	Byproducts of drinking water disinfection
Total Trihalomethanes (TTHMs) (ppb)	33.2 (highest LRAA)	15.4 to 41.1 (individual sites)	80	0	Byproducts of drinking water disinfection
Chloramines (ppm)	3.1 (highest RAA)	0.1 to 3.9 (individual distribution system samples Jan., Feb., & April-Dec.)	MRDL = 4	MRDLG = 4	Water additives used to control microbes
Chlorine (ppm)	1.17 (highest RAA)	0.02 to 2.50 (individual distribution system samples in March)	MRDL = 4	MRDLG = 4	
Disinfection Byproduct Precursors					
Total Organic Carbon, Treated (removal ratio)	1.83 (lowest RAA Removal Ratio)	1.80 to 1.95 (range of Removal Ratios)	TT = Removal Ratio ≥ 1.0	N/A	Naturally present in environment
Total Organic Carbon, Treated (ppm)	0.84	0.75 to 0.97	N/A	N/A	
Specific Ultraviolet Absorption (L/mg-m)	2.41	0.81 to 3.18	not regulated	not regulated	
Synthetic Organics, including Pesticides and Herbicides					
2,4-D (ppb) (last tested 2021)	BDL	no range	70	70	Runoff form herbicide used on row crops
2,4,5-TP (Silvex) (ppb) (last tested 2021)	BDL	no range	50	50	Residue of banned herbicide
Alachlor (ppb) (last tested 2021)	BDL	no range	2	0	Runoff from herbicides used on row crops
Atrazine (ppb) (last tested 2021)	BDL	no range	3	3	
Benzo(a)pyrene (ppt) (last tested 2021)	BDL	no range	200	0	Water storage tank & distribution line linings

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Carbofuran (ppb) (last tested 2021)	BDL	no range	40	40	Soil fumigant used on rice and alfalfa
Chlordane (ppb) (last tested 2021)	BDL	no range	2	0	Residue of banned termiticide
Dalapon (ppb) (last tested 2021)	BDL	no range	200	200	Runoff from herbicide used on rights of way
Di(2-ethylhexyl)adipate (ppb) (last tested 2021)	BDL	no range	400	400	Discharge from chemical factories
Di(2-ethylhexyl)phthalate (ppb) (last tested 2021)	BDL	no range	6	0	Discharge from rubber and chemical factories
Dibromochloroprane (DBCP) (ppt) (last tested 2021)	BDL	no range	200	0	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
Dinoseb (ppb) (last tested 2021)	BDL	no range	7	7	Runoff from herbicide used on soybeans and vegetables
Endrin (ppb) (last tested 2021)	BDL	no range	2	2	Residue of banned insecticide
Ethylene Dibromide (EDB) (ppt) (last tested 2021)	BDL	no range	50	0	Discharge from petroleum refineries
Heptachlor (ppt) (last tested 2021)	BDL	no range	400	0	Residue of banned termiticide
Heptachlor epoxide (ppt) (last tested 2021)	BDL	no range	200	0	Breakdown of heptachlor
Hexachlorobenzene (ppb) (last tested 2021)	BDL	no range	1	0	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclopentadiene (ppb) (last tested 2021)	BDL	no range	50	50	Discharge from chemical factories
Lindane (ppt) (last tested 2021)	BDL	no range	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Methoxychlor (ppb) (last tested 2021)	BDL	no range	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl(vydate) (ppb) (last tested 2021)	BDL	no range	200	200	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinated Biphenyls (PCB) (ppt) (last tested 2021)	BDL	no range	500	0	Landfill runoff; discharge of waste chemicals
Pentachlorophenol (ppb) (last tested 2021)	BDL	no range	1	0	Wood preserving factory discharges
Picloram (ppb) (last tested 2021)	BDL	no range	500	500	Herbicide runoff
Simazine (ppb) (last tested 2021)	BDL	no range	4	4	
Toxaphene (ppb) (last tested 2021)	BDL	no range	3	0	Insecticide used on cotton and cattle runoff
Volatile Organics					
Benzene (ppb)	BDL	no range	5	0	Factory discharges; gas storage tank & landfill leachate
Carbon Tetrachloride (ppb)	BDL	no range	5	0	Chemical plant & industrial activity discharges
Chlorobenzene (ppb)	BDL	no range	100	100	Agricultural & non-ag chemical factory discharges
1,2-Dichlorobenzene (ppb)	BDL	no range	600	600	Discharge from industrial chemical factories
1,4-Dichlorobenzene (ppb)	BDL	no range	75	75	
1,2-Dichloroethane (ppb)	BDL	no range	5	0	
1,1-Dichloroethylene (ppb)	BDL	no range	7	7	
cis-1,2-Dichloroethylene (ppb)	BDL	no range	70	70	

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
trans-1,2-Dichloroethylene (ppb)	BDL	no range	100	100	Discharge from industrial chemical factories
Dichloromethane (ppb)	BDL	no range	5	0	Pharmaceutical & chemical factory discharges
1,2-Dichloropropane (ppb)	BDL	no range	5	0	Chemical factory discharges
Ethylbenzene (ppb)	BDL	no range	700	700	Petroleum refinery discharges
Styrene (ppb)	BDL	no range	100	100	Rubber & plastic factory discharges; landfill leachate
Tetrachloroethylene (ppb)	BDL	no range	5	0	PVC pipes; factories & dry cleaner discharges
Toluene (ppm)	BDL	no range	1	1	Petroleum factory discharges
1,2,4-Trichlorobenzene (ppb)	BDL	no range	70	70	Discharge from textile-finishing factories
1,1,1-Trichloroethane (ppb)	BDL	no range	200	200	Metal degreasing sites & factory discharges
1,1,2-Trichloroethane (ppb)	BDL	no range	5	3	Industrial chemical factory discharges
Trichloroethylene (ppb)	BDL	no range	5	0	Metal degreasing sites & factory discharges
Vinyl Chloride (ppb)	BDL	no range	2	0	PVC piping; plastics factory discharges
Xylenes (Total) (ppm)	BDL	no range	10	10	Petroleum & chemical factory discharges

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Major Source in Drinking Water
Unregulated Substances			
Cryptosporidium (oocysts/100 L)	BDL	no range	Intestinal protozoa found in human and animal fecal waste
Giardia (cysts/100 L)	BDL	no range	
Chlorate (ppb)	151	89 to 210	Byproduct of drinking water disinfection
Perchlorate (ppb) (last tested 2019)	BDL	no range	Discharge & runoff from manufacture & use of solid rocket propellants, munitions, fireworks, vehicle airbag initiators, matches, signal flares, & nitrate fertilizers; impurity in hypochlorite (drinking water disinfectant†); occurs naturally especially in arid climates
† Our supplier has a proactive monitoring and reduction program in place to minimize this source.			
Lithium (ppb) (last tested 2022)	BDL	no range	Natural deposits
Anatoxin-a (ppb)	BDL	no range	Algal toxins released from cyanobacteria
Cylindrospermopsin (ppb)	BDL	no range	
Microcystin (ppb)	0.17	<0.15 to 0.17	
4:2 Fluorotelomer Sulfonic Acid (4:2 FTS) (ppt)	BDL	no range	Manufactured chemicals used in waterproof and stain-proof fabrics, nonstick cookware, some food packaging materials, and some fire suppression foams. Also used in manufacturing processes for a variety of reasons including suppressing fires, repelling moisture, and reducing mechanical wear.
6:2 Fluorotelomer Sulfonic Acid (6:2 FTS) (ppt)	BDL	no range	
8:2 Fluorotelomer Sulfonic Acid (8:2 FTS) (ppt)	BDL	no range	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA) (ppt)	BDL	no range	
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS) (ppt)	BDL	no range	
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) (ppt)	BDL	no range	

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Major Source in Drinking Water
Hexafluoropropylene oxide dimer acid (HFPO-DA or GenX) (ppt)	BDL	no range	Manufactured chemicals used in waterproof and stain-proof fabrics, nonstick cookware, some food packaging materials, and some fire suppression foams. Also used in manufacturing processes for a variety of reasons including suppressing fires, repelling moisture, and reducing mechanical wear.
Perfluorobutanesulfonic acid (PFBS) (ppt)	1.9	<2.0 to 3.4	
Perfluorobutanoic acid (PFBA) (ppt)	4.0	3.7 to 4.3	
Perfluorodecanoic acid (PFDA) (ppt)	BDL	no range	
Perfluoroheptanoic acid (PFHpA) (ppt)	4.1	2.1 to 6.1	
Perfluorohexanesulfonic acid (PFHxS) (ppt)	2.9	<2.0 to 5.3	
Perfluorohexanoic acid (PFHxA) (ppt)	4.7	3.1 to 6.4	
Perfluorododecanoic acid (PFDoA) (ppt)	BDL	no range	
Perfluorononanoic acid (PFNA) (ppt)	BDL	no range	
Perfluorooctanesulfonic acid (PFOS) (ppt)	8.1	2.8 to 13.0	
N-ethyl Perfluorooctanesulfonamidoacetic acid (NEtFOSAA) (ppt)	BDL	no range	
N-methyl Perfluorooctanesulfonamidoacetic acid (NMeFOSAA) (ppt)	BDL	no range	
Perfluorooctanoic acid (PFOA) (ppt)	12.5	6.6 to 19.0	
Perfluorotridecanoic acid (PFTrDA) (ppt)	BDL	no range	
Perfluoroundecanoic acid (PFUnA) (ppt)	BDL	no range	
Perfluoroheptanesulfonic acid (PFHpS) (ppt)	BDL	no range	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA) (ppt)	BDL	no range	

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Major Source in Drinking Water
Perfluoro-4-methoxybutanoic acid (PFMBA) (ppt)	BDL	no range	Manufactured chemicals used in waterproof and stain-proof fabrics, nonstick cookware, some food packaging materials, and some fire suppression foams. Also used in manufacturing processes for a variety of reasons including suppressing fires, repelling moisture, and reducing mechanical wear.
Perfluoro-3-methoxypropanoic acid (PFMPA) (ppt)	BDL	no range	
Perfluoropentanoic acid (PFPeA) (ppt)	4.3	3.7 to 5.0	
Perfluoropentanesulfonic acid (PFPeS) (ppt)	0.7	<2.0 to 2.0	
Perfluorotetradecanoic acid (PFTA) (ppt)	BDL	no range	
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA) (ppt)	BDL	no range	
Perfluoropropionic acid (PFPrA) (ppt)	210	no range	
Perfluoropropanesulfonic acid (PFPrS) (ppt)	2.4	no range	
NEtFOSE (ppt)	BDL	no range	
NMeFOSE (ppt)	BDL	no range	
NEtFOSA (ppt)	BDL	no range	
NMeFOSA (ppt)	BDL	no range	
Perfluorooctanesulfonamide (ppt)	BDL	no range	
Perfluorodecanesulfonic acid (ppt)	BDL	no range	
Perfluorononanesulfonic acid (ppt)	BDL	no range	
Perfluorododecanesulfonic acid (ppt)	BDL	no range	
3:3 FTCA (ppt)	BDL	no range	

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Major Source in Drinking Water
5:3 FTCA (ppt)	BDL	no range	Manufactured chemicals used in waterproof and stain-proof fabrics, nonstick cookware, some food packaging materials, and some fire suppression foams. Also used in manufacturing processes for a variety of reasons including suppressing fires, repelling moisture, and reducing mechanical wear.
PMPA (ppt)	BDL	no range	
R-EVE (ppt)	BDL	no range	
PEPA (ppt)	BDL	no range	
PFO2HxA (ppt)	BDL	no range	
PFO3OA (ppt)	BDL	no range	
PFO4DA (ppt)	BDL	no range	
Perfluoro-3,5,7,9,11-pentaoxadodecanoic acid (ppt)	BDL	no range	
PFMOAA (ppt)	BDL	no range	
EVE acid (ppt)	BDL	no range	
Hydro-EVE acid (ppt)	BDL	no range	
Perfluoro-4-isopropoxybutanoic acid (ppt)	BDL	no range	
MTP (ppt)	BDL	no range	
Perfluoro-4-ethylcyclohexanesulfonic acid (ppt)	BDL	no range	
NVHOS (ppt)	BDL	no range	
PES (ppt)	BDL	no range	
Perfluoro-3,6-dioxaheptanoic acid (ppt)	BDL	no range	

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Major Source in Drinking Water
R-PSDA (ppt)	BDL	no range	Manufactured chemicals used in waterproof and stain-proof fabrics, nonstick cookware, some food packaging materials, and some fire suppression foams. Also used in manufacturing processes for a variety of reasons including suppressing fires, repelling moisture, and reducing mechanical wear.
Hydrolyzed PSDA (ppt)	BDL	no range	
R-PSDCA (ppt)	BDL	no range	
PS acid (ppt)	BDL	no range	
Hydro-PS acid (ppt)	BDL	no range	
HFPODA (ppt)	BDL	no range	
10:2 FTS (ppt)	BDL	no range	
Perfluorooctadecanoic acid (ppt)	BDL	no range	
Perfluorohexadecanoic acid (ppt)	BDL	no range	
8:2 FTUCA (ppt)	BDL	no range	
8:2 FTCA (ppt)	BDL	no range	
6:2 FTUCA (ppt)	BDL	no range	
6:2 FTCA (ppt)	BDL	no range	
7:3 FTCA (ppt)	BDL	no range	
10:2 FTUCA (ppt)	BDL	no range	
10:2 FTCA (ppt)	BDL	no range	
FBSA (ppt)	BDL	no range	

Substance (units) (year measured if not 2023)	Average Level Detected	Range Detected	Major Source in Drinking Water
FHxSA (ppt)	BDL	no range	Manufactured chemicals used in waterproof and stain-proof fabrics, nonstick cookware, some food packaging materials, and some fire suppression foams. Also used in manufacturing processes for a variety of reasons including suppressing fires, repelling moisture, and reducing mechanical wear.
FBSEE (ppt)	BDL	no range	

Physical Water Quality Characteristics

The following characteristics impact the taste and appearance of drinking water.

Substance (Units)	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)
Alkalinity (mg $CaCO_3$/L)	32.5	23.0 to 44.3	not regulated	not regulated
Total Hardness (mg $CaCO_3$/L)	26.2	21.0 to 34.0	not regulated	not regulated
Calcium Hardness (mg $CaCO_3$/L)	16.7	13.2 to 19.8	not regulated	not regulated
Calcium (ppm)	6.67	5.29 to 7.94	not regulated	not regulated
Estimated Magnesium (ppm) based on calculation	2.3	no range	not regulated	not regulated
Iron (ppm)	0.01	0 to 0.06	No MCL SMCL = 0.3	0.3
Manganese (ppm)	0.003	0 to 0.022	No MCL SMCL = 0.05	0.05
Ortho-phosphate as P (ppm)	0.63	0.60 to 0.67	not regulated	not regulated
pH	8.31	7.27 to 8.83	No MCL	6.5 to 8.5
Specific Conductance (µS/cm)	252	208 to 304	not regulated	not regulated
Color (CU)	0	no range	No MCL	15
Total Phosphorus (ppm)	0.84	0.69 to 0.99	not regulated	not regulated

Definitions

90^{th} Percentile – 90 percent of the samples were below this value. Required reporting unit for lead and copper.

Action Level – The concentration of a substance which, if exceeded, triggers a treatment or other requirement which a water system must follow.

BDL – Below detection level.

CU – Color units - a measurement used for color of water.

Level 1 Assessment – A study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in a water system.

Level 2 Assessment – A very detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred and/or why total coliform bacteria have been found in a water system on multiple occasions.

L/mg-m – Unit of measure for Specific Ultraviolet Absorbance (SUVA). Measured in units of absorbance per meter of path length and normalized to the concentration of dissolved organic carbon.

LRAA – Locational Running Annual Average - The average of results for samples taken at a monitoring location during the previous four calendar quarters under the Stage 2 Disinfectants and Disinfection Byproducts Rule.

MCL – Maximum contaminant level - the highest level of a substance that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG – Maximum contaminant level goal - the level of a substance in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MFL – Million fibers per liter - a measure of the presence of asbestos fibers that are longer than 10 micrometers in water.

mg $CaCO_3$/L - Milligrams of calcium carbonate per liter water.

MRDL – Maximum Residual Disinfection Level - the highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG – Maximum Residual Disinfection Level Goal - The level of drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NTU – Nephelometric Turbidity Unit - a measure of the cloudiness of water. Turbidity above 5 NTU is noticeable to the average person.

pCi/L – PicoCuries per liter - a measure of radioactivity in water with an activity equal to one millionth of a millionth of a curie.

ppb – Parts per billion - equivalent to micrograms per liter (µg/L). One part per billion is comparable to 1 penny in $10,000,000.

ppm – Parts per million - equivalent to milligrams per liter (mg/L). One part per million is comparable to 1 penny in $10,000.

ppt – Parts per trillion - equivalent to nanograms per liter (ng/L). One part per trillion is comparable to 1 penny in $10,000,000,000.

RAA – Running Annual Average - The average of results for samples taken during the previous four calendar quarters.

Removal Ratio – Measure of the effectiveness of Total Organic Carbon (TOC) removal during treatment process. Percentage of TOC removed through treatment divided by the required percent removal. [(Raw TOC – Treated TOC) ÷ (Raw TOC)] ÷ (Required Percentage TOC Removal).

SMCL – Secondary maximum contaminant level - limits set for aesthetic reasons. They are non-enforceable.

TT – Treatment technique - a required process intended to reduce the level of a substance in drinking water.

µS/cm – Microsiemens per centimeter - a measure of the conductivity of water.

µm – Micrometer - a measure of distance equivalent to one millionth of a meter.