



Orange Water and Sewer Authority 2016 Drinking Water Test Results Summary



(All substances we tested for; please see the [definitions](#) at the end of the test results. For example, BDL means below detectable level.)

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Microbiological					
Total Coliform Bacteria* (percent)	1	0 – 1	Jan. 1 – Mar. 31*: No more than 5% of the monthly samples positive. Apr. 1 – Dec. 31*: 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.	0	Naturally present in the environment
* On April 1, 2016 an update to regulations was implemented, changing the reporting requirements for total coliform samples going forward.					
<i>E. coli</i> Bacteria (percent)	0	no range	If either an original routine sample and/or its repeat samples(s) are <i>E. coli</i> positive, a Tier 1 violation exists.	0	Human and animal fecal waste
Turbidity (NTU)	0.111 and 100% of samples below 0.3	0.027 to 0.111 with an average of 0.043	TT = 1 NTU and 95% of samples below 0.3	N/A	A measure of the cloudiness of water. It may be caused by inorganic soil particles or fragments of 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	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
Barium (ppm)	BDL	no range	2	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium (ppb)	BDL	no range	4	4	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Cadmium (ppb)	BDL	no range	5	5	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (ppb)	BDL	no range	100	100	Discharge from steel and pulp mills; erosion of natural deposits
Copper (ppm) (last tested 2014)	BDL (90 th percentile, with 0 sample sites above the action level)	no range	1.3 (action level)	1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Cyanide (ppb)	BDL	no range	200	200	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride (ppm)	0.66	no range	4*	4	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories**
<p>* The fluoride level in our water (0.70 of one part per million) was well below the maximum allowed (4 parts per million).</p> <p>** In accord 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.</p>					
Lead (ppb) (last tested 2014)	BDL (90 th percentile, with 0 sample sites above the action level)	<3 – 13	15 (action level)	0.0	Corrosion of household plumbing systems; erosion of natural deposits
Mercury (ppb)	BDL	no range	2	2	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills; runoff from cropland
Nickel (ppm)	BDL	no range	not regulated	not regulated	A mineral that occurs naturally in soils
Nitrate (ppm)	BDL	no range	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite (ppm)	BDL	no range	1	1	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium (ppb)	BDL	no range	50	50	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines
Sodium (ppm)	31	no range	not regulated	20 [proposed]	An element that occurs naturally in soils

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Sulfate (ppm)	53	no range	250 [Secondary MCL]	N/A	A mineral that occurs naturally in soils
Thallium (ppb)	BDL	no range	2	0.5	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories
Synthetic Organics, including Pesticides and Herbicides					
2,4-D (ppb)	BDL	no range	70	70	Runoff from herbicide used on row crops
2,4,5-TP (Silvex) (ppb)	BDL	no range	50	50	Residue of banned herbicide
Alachlor (ppb)	BDL	no range	2	0	Runoff from herbicide used on row crops
Atrazine (ppb)	BDL	no range	3	3	Runoff from herbicide used on row crops
Benzo(a)pyrene (ppt) (last tested 2015)	20	<20 – 20	200	0	Leaching from linings of water storage tanks and distribution lines
Carbofuran (ppb)	BDL	no range	40	40	Leaching of soil fumigant used on rice and alfalfa
Chlordane (ppb)	BDL	no range	2	0	Residue of banned termiticide
Dalapon (ppb)	BDL	no range	200	200	Runoff from herbicide used on rights of way
Di(2-ethylhexyl)adipate (ppb)	BDL	no range	400	400	Discharge from chemical factories
Di(2-ethylhexyl)phthalate (ppb)	BDL	no range	6	0	Discharge from rubber and chemical factories
Dibromochloropropane (DBCP) (ppt)	BDL	no range	200	0	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Dinoseb (ppb)	BDL	no range	7	7	Runoff from herbicide used on soybeans and vegetables
Endrin (ppb)	BDL	no range	2	2	Residue of banned insecticide
Ethylenedibromide (EDB) (ppt)	BDL	no range	50	0	Discharge from petroleum refineries
Heptachlor (ppt)	BDL	no range	400	0	Residue of banned termiticide
Heptachlor epoxide (ppt)	BDL	no range	200	0	Breakdown of heptachlor
Hexachlorobenzene (ppb)	BDL	no range	1	0	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclopentadiene (ppb)	BDL	no range	50	50	Discharge from chemical factories
Lindane (ppt)	BDL	no range	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor (ppb)	BDL	no range	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl(vydate) (ppb)	BDL	no range	200	200	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinatedbiphenyls (PCB) (ppt)	BDL	no range	500	0	Runoff from landfills; discharge of waste chemicals
Pentachlorophenol (ppb)	BDL	no range	1	0	Discharge from wood preserving factories
Picloram (ppb)	BDL	no range	500	500	Herbicide runoff
Simazine (ppb)	BDL	no range	4	4	Herbicide runoff

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Toxaphene (ppb)	BDL	no range	3	0	Runoff/leaching from insecticide used on cotton and cattle
Volatile Organics					
Benzene (ppb)	BDL	no range	5	0	Discharge from factories; leaching from gas storage tanks and landfills
Carbon Tetrachloride (ppb)	BDL	no range	5	0	Discharge from chemical plants and other industrial activities
Chlorobenzene (ppb)	BDL	no range	100	100	Discharge from chemical and agricultural chemical factories
o-Dichlorobenzene (ppb)	BDL	no range	600	600	Discharge from industrial chemical factories
p-Dichlorobenzene (ppb)	BDL	no range	75	75	Discharge from industrial chemical factories
1,2-Dichloroethane (ppb)	BDL	no range	5	0	Discharge from industrial chemical factories
1,1-Dichloroethylene (ppb)	BDL	no range	7	7	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene (ppb)	BDL	no range	70	70	Discharge from industrial chemical factories
trans-1,2-Dichloroethylene (ppb)	BDL	no range	100	100	Discharge from industrial chemical factories
Dichloromethane (ppb)	BDL	no range	5	0	Discharge from pharmaceutical and chemical factories
1,2-Dichloropropane (ppb)	BDL	no range	5	0	Discharge from industrial chemical factories
Ethylbenzene (ppb)	BDL	no range	700	700	Discharge from petroleum refineries

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Styrene (ppb)	BDL	no range	100	100	Discharge from rubber and plastic factories; leaching from landfills
Tetrachloroethylene (ppb)	BDL	no range	5	0	Leaching from PVC pipes; discharge from factories and dry cleaners
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	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane (ppb)	BDL	no range	5	3	Discharge from industrial chemical factories
Trichloroethylene (ppb)	BDL	no range	5	0	Discharge from metal degreasing sites and other factories
Tolulene (ppm)	BDL	no range	1	1	Discharge from petroleum factories
Vinyl Chloride (ppb)	BDL	no range	2	0	Leaching from PVC piping; discharge from plastics factories
Xylenes (ppm)	BDL	no range	10	10	Discharge from petroleum factories; discharge from chemical factories
Disinfectants and Disinfection Byproducts Contaminants					
Total Haloacetic Acids (ppb)	15.5 (highest Locational Running Annual Average)	8.3 to 20.8 (individual sample sites)	60	0	By-product of drinking water chlorination
Total Trihalomethanes (ppb)	25.4 (highest Locational Running Annual Average)	9.4 to 41.0 (individual sample sites)	80	0	By-product of drinking water chlorination
Chloramines (ppm)	3.1 (average of monthly distribution system samples Jan., Feb., and April through Dec.)	0.1 to 3.9 (range of individual distribution system samples Jan., Feb., and April through Dec.)	MRDL = 4	MRDLG = 4	Water additive used to control microbes

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Chlorine (ppm)	1.12 (average of distribution system samples in March during burnout)	0.03 to 3.40 (range of individual distribution system samples in March during burnout)	MRDL = 4	MRDLG = 4	Water additive used to control microbes

Unregulated Synthetic Organic Chemicals

Aldicarb (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Aldicarb sulfone (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Aldicarb sulfoxide (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Aldrin (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Aroclor 1016 (ppb)	BDL	no range	not regulated	not regulated	N/A
Aroclor 1221 (ppb)	BDL	no range	not regulated	not regulated	N/A
Aroclor 1232 (ppb)	BDL	no range	not regulated	not regulated	N/A
Aroclor 1242 (ppb)	BDL	no range	not regulated	not regulated	N/A
Aroclor 1248 (ppb)	BDL	no range	not regulated	not regulated	N/A
Aroclor 1254 (ppb)	BDL	no range	not regulated	not regulated	N/A
Aroclor 1260 (ppb)	BDL	no range	not regulated	not regulated	N/A
Butachlor (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Carbaryl (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Dicamba (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Dieldrin (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
3-Hydroxycarbofuran (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Methomyl (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Metolachlor (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Metribuzin (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Propachlor (ppb) (last tested in 2012)	BDL	no range	not regulated	not regulated	N/A
Unregulated Volatile Organic Chemicals					
Bromodichloromethane (ppb)	3.4	no range	not regulated	not regulated	By-product of drinking water chlorination
Bromoform (ppb)	BDL	no range	not regulated	not regulated	By-product of drinking water chlorination
Chloroform (ppb)	11	no range	not regulated	not regulated	By-product of drinking water chlorination
Chlorodibromomethane (ppb)	BDL	no range	not regulated	not regulated	By-product of drinking water chlorination
Bromochloromethane (ppb)	BDL	no range	not regulated	not regulated	N/A

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Bromobenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
Bromomethane (ppb)	BDL	no range	not regulated	not regulated	N/A
n-Butylbenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
sec-Butylbenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
tert-Butylbenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
Chloroethane (ppb)	BDL	no range	not regulated	not regulated	N/A
Chloromethane (ppb)	BDL	no range	not regulated	not regulated	N/A
o-Chlorotoluene (ppb)	BDL	no range	not regulated	not regulated	N/A
p-Chlorotoluene (ppb)	BDL	no range	not regulated	not regulated	N/A
1,2-Dibromo-3-chloropropane (DBCP) (ppb)	BDL	no range	not regulated	not regulated	N/A
1,2-Dibromoethane (EDB) (ppb)	BDL	no range	not regulated	not regulated	N/A
Dibromomethane (ppb)	BDL	no range	not regulated	not regulated	N/A
m-Dichlorobenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
Dichlorodifluoromethane (ppb)	BDL	no range	not regulated	not regulated	N/A

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
1,1-Dichloroethane (ppb)	BDL	no range	not regulated	not regulated	N/A
1,3-Dichloropropane (ppb)	BDL	no range	not regulated	not regulated	N/A
2,2-Dichloropropane (ppb)	BDL	no range	not regulated	not regulated	N/A
1,1-Dichloropropylene (ppb)	BDL	no range	not regulated	not regulated	N/A
cis-1,3-Dichloropropylene (ppb)	BDL	no range	not regulated	not regulated	N/A
trans-1,3-Dichloropropylene (ppb)	BDL	no range	not regulated	not regulated	N/A
Fluorotrichloromethane (ppb)	BDL	no range	not regulated	not regulated	N/A
Hexachlorobutadiene (ppb)	BDL	no range	not regulated	not regulated	N/A
Isopropylbenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
p-Isopropyltoluene (ppb)	BDL	no range	not regulated	not regulated	N/A
Methyl-t-Butyl Ether (MTBE) (ppb)	BDL	no range	not regulated	not regulated	N/A
Naphthalene (ppb)	BDL	no range	not regulated	not regulated	N/A
n-Propylbenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
1,1,1,2-Tetrachloroethane (ppb)	BDL	no range	not regulated	not regulated	N/A

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
1,1,2,2-Tetrachloroethane (ppb)	BDL	no range	not regulated	not regulated	N/A
1,2,3-Trichlorobenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
1,2,3-Trichloropropane (ppb)	BDL	no range	not regulated	not regulated	N/A
1,2,4-Trimethylbenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
1,3,5-Trimethylbenzene (ppb)	BDL	no range	not regulated	not regulated	N/A
1,2-Xylene (ppb)	BDL	no range	not regulated	not regulated	N/A
1,3 + 1,4-Xylene (ppb)	BDL	no range	not regulated	not regulated	N/A
Disinfection By-product Precursors					
Total Organic Carbon (ppm) Treated	1.81 (running annual average of Removal Ratio)	1.73 to 1.95 (range of Removal Ratios)	TT = Removal Ratio greater than or equal to 1.0	N/A	Naturally present in environment.
Specific Ultraviolet Absorption (L/mg-m)	2.12	0.90 to 2.82	not regulated	not regulated	
Additional Unregulated Analyses					
Cryptosporidium (oocysts/100 L)	BDL	no range	not regulated	not regulated	Intestinal protozoan found in human and animal fecal waste
Giardia (cysts/100 L)	BDL	no range	not regulated	not regulated	Intestinal protozoan found in human and animal fecal waste

Substance and Unit Measurement	Highest Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)	Major Source in Drinking Water
Microcystin (ppb)	BDL	no range	not regulated	not regulated; WHO recommends 1.0; non-regulatory EPA Health Advisory levels are 0.3 for children less than 6 years old and 1.6 for adults and children 6 years and older	Algal toxin released from blue green algae
Anatoxin-a (ppb)	BDL	no range	not regulated	not regulated	Algal toxin released from blue green algae
Cylindrospermopsin (ppb)	BDL	no range	not regulated	not regulated; non-regulatory EPA Health Advisory levels are 0.7 for children less than 6 years old and 3.0 for adults and children 6 years and older	Algal toxin released from blue green algae
Saxitoxin (ppb) (last tested in 2014)	BDL	no range	not regulated	not regulated	Algal toxin released from blue green algae
Chlorate (ppb)	103	55 to 150	not regulated	not regulated	Byproduct of drinking water disinfection

Unregulated Contaminant Monitoring Rule

To date there have been three rounds of UCMR testing (called UCMR 1, 2, and 3), each focusing on a separate set of compounds. OWASA has participated in all three rounds and will continue to participate in future iterations of the UCMR. The data OWASA collected in each round of UCMR testing are available at <http://www.owasa.org/testing-for-unregulated-compounds>.

Physical Water Quality Characteristics

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

Substance and Unit Measurement	Average Level Detected	Range Detected	Highest Level Allowed (MCL)	Highest Level Goal (MCLG)
Alkalinity (mg CaCO ₃ /L)	34.3	19.7 to 46.0	not regulated	not regulated
Total Hardness (mg CaCO ₃ /L)	26.3	20.0 to 38.0	not regulated	not regulated
Calcium Hardness (mg CaCO ₃ /L)	15.1	10.6 to 22.4	not regulated	not regulated
Calcium (ppm)	6.06	4.25 to 8.98	not regulated	not regulated
Estimated Magnesium (ppm) based on calculation	2.7	no range	not regulated	not regulated
Iron (ppm)	0.010	0 to 0.20	No MCL	0.3
Manganese (ppm)	0.005	0 to 0.032	No MCL	0.05
Orthophosphate as P (ppm)	0.56	0.51 to 0.64	not regulated	not regulated
pH	8.23	7.16 to 8.71	No MCL	6.5 to 8.5
Specific Conductance (µmhos/cm)	229	197 to 275	not regulated	not regulated
Color (CU)	1	0 to 2	No MCL	15
Total Phosphorus (ppm)	0.74	0.66 to 0.81	not regulated	not regulated

Definitions

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

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

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

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

BDL – Below detection level

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

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

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.

NTU – Nephelometric Turbidity Units – Units of measurement used for turbidity or the clarity of water.

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

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

mg CaCO₃/L - Milligrams of calcium carbonate per liter water.

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

umhos/cm – Micromhos per centimeter - a measurement used for conductivity of water.

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.

MRDL – Maximum Residual Disinfection Level - The “Highest Level” (MRDL) of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Removal Ratio – Measure of the effectiveness of Total Organic Carbon removal during treatment process. Actual percentage of Total Organic Carbon removed through treatment divided by the required percent removal. $[(\text{Raw TOC} - \text{Treated TOC})/\text{Raw TOC}]/\text{Required Percentage TOC Removal}$.

Nephelometric Turbidity Unit (NTU) – A measure of the clarity of water. Turbidity in excess of 5 NTU is noticeable to the average person.

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

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 our 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 our water system on multiple occasions.