

Appendix 5.5 - Summary of Murray Reservoir Source Water Constituents 2016 - 2020

CSD

			Federal/California Drinking Water Standards ¹			Basin Plan Inland Surface Waters Quality ²		2016 - 2020 Source Water Quality at Surface			
Group/Constituents	Units	CSD MDL	DLR	Primary MCL	Secondary SMCL	Criteria	Objectives	No. of Samples	Min	Max	Mean
General Physical											
Alkalinity, (Total) (as CaCO3 equivalents)	MG/L	20						19	95	129	113
Calcium Hardness (CaCO3)	MG/L	10						18	96.3	181	135
Color, Apparent (Unfiltered)	COLOR	1			15	20	20	19	2	34	11.2
Corrosivity ³	-							16	0.21	1.22	0.67
Hydroxide Alkalinity	MG/L							19	ND	ND	ND
MBAS (Foaming Agents)	MG/L	0.05		0.5		0.5		5	ND	0.071	ND
Odor Threshold @ 60 C (TON)	ODOR	1	1		3		none	2	17	17	17
pH	PH					6.5-8.5 ⁶		19	7.78	9.02	8.31
Specific Conductance (E.C.)	UMHO/CM				1600			19	585	999	819
Total Filterable Residue @ 180 C (TDS)	MG/L	10			1000	300	1500	19	337	657	507
Total Hardness (CaCO3)	MG/L	10						19	162	304	232
Turbidity, Laboratory	NTU	0.07	0.1		5	20	20	22	0.42	3.28	1.34
Microbiological											
Enterococcus	/100 ML	1				60 ⁷		255	< 1	1300	27.5
Escherichia Coli	/100 ML	1		Present		190 ⁷		255	< 10	510	66.8
Total Coliform	/100 ML	1		Present				255	41	> 24000	2290
Total Crypto Oocyst Count	/ L	0.1		1				9	ND	ND	ND
Total Giardia Cyst Count	/ L	0.1		1				9	ND	ND	ND
Radiologicals											
Gross Alpha	PCI/L		3	15				2	ND	ND	ND
Gross Beta	PCI/L		4	50 ⁸				2	ND	5.20	2.6
Uranium	PCI/L		1	20				1	1.9	1.9	1.9

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Group/Constituents	Units	CSD MDL				Criteria	Objectives	No. of Samples			
			DLR	Primary MCL	Secondary SMCL				Min	Max	Mean
Metals ⁴											
Aluminum (Al)	UG/L	5	50	1000	200			20	ND	ND	ND
Antimony	UG/L	1	6	6				20	ND	ND	ND
Arsenic	UG/L	1	2	10				22	ND	2.02	ND
Barium (Ba)	UG/L	2	100	1000				22	49.7	126	78.6
Beryllium	UG/L	0.5	1	4				21	ND	ND	ND
Boron	UG/L	5	100			500	1000	21	110	172	132
Cadmium (Cd)	UG/L	0.5	1	5				22	ND	ND	ND
Calcium (Ca)	MG/L	5						20	38.5	72.4	54.1
Chromium (Total Cr)	UG/L	1	10	50				22	ND	ND	ND
Chromium, Hexavalent	UG/L	1						5	ND	ND	ND
Copper (Cu) ⁵	UG/L	1	50	1300	1000			22	ND	1.98	ND
Iron (Fe)	UG/L	100	100		300	300	1000	20	ND	147	ND
Lead (Pb) ⁵	UG/L	0.5	5	15				22	ND	ND	ND
Magnesium (Mg)	MG/L	3						40	17	29.5	23
Manganese (Mn)	UG/L	0.5	20		50	50	1000	21	7.11	57.8	19.8
Mercury (Hg)	UG/L	0.2	1	2				16	ND	ND	ND
Nickel	UG/L	1	10	100				22	ND	ND	ND
Potassium (K)	MG/L	0.5						18	3.93	5.26	4.64
Selenium (Se)	UG/L	2	5	50				22	ND	ND	ND
Silver	UG/L	1	10	50				22	ND	ND	ND
Sodium (Na)	MG/L	20				60%	60%	20	60.6	101	82.7
Thallium	UG/L	0.5	1	2				22	ND	ND	ND
Vanadium	UG/L	1	3					22	ND	ND	ND
Zinc (Zn)	UG/L	5	50		5000			20	ND	ND	ND

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Group/Constituents	Units	CSD MDL						No. of Samples			
			DLR	Primary MCL	Secondary SMCL	Criteria	Objectives		Min	Max	Mean
Inorganic Constituents											
Ammonia-N	MG/L	0.031				0.025		43	ND	0.127	ND
Asbestos Chrysotile Fibers >10 microns	MFL	0.2	0.2	7				1	ND	ND	ND
Bicarbonate (as HCO3)	MG/L							20	106	154	135
Bromide	MG/L	0.1						20	ND	0.162	ND
Carbonate (as CO3)	MG/L							20	ND	6.41	1.07
Chloride	MG/L	0.5			500	250	400	20	74.1	126	98.1
Cyanide	UG/L		100	150				5	ND	ND	ND
Fluoride	MG/L	0.02	0.1	2		1	1	19	0.152	0.333	0.256
Nitrate (as NO3)	MG/L		2	45		5		66	-0.01	1.01	0.196
Nitrite (NO2)	MG/L	0.0156	0.131	0.328				49	ND	0.28	ND
Perchlorate	UG/L	4	4	6				42	ND	ND	ND
Phosphate, Ortho (as PO4)	MG/L	0.2						20	ND	ND	ND
Phosphorus	MG/L	0.078				0.025 ⁹	0.025 ⁹	48	ND	0.715	ND
Silica	MG/L	0.625						20	4.75	11.1	7.98
Sulfate (SO4)	MG/L	0.5	0.5		500	65	500	20	87.8	235	161
Total Nitrogen	MG/L	0.156					0.25 ⁹	50	ND	1.32	0.346

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Group/Constituents	Units	CSD MDL	DLR	Primary	Secondary	Criteria	Objectives	No. of Samples	Min	Max	Mean
				MCL	SMCL						
Organic Constituents, Regulated											
1,1,1-Trichloroethane (1,1,1-TCA)	UG/L	0.4	0.5	200		200		20	ND	ND	ND
1,1,2,2-Tetrachloroethane	UG/L	0.4	0.5	1		1		20	ND	ND	ND
1,1,2-Trichloroethane (1,1,2-TCA)	UG/L	0.4	0.5	5		32		20	ND	ND	ND
1,1-Dichloroethane (1,1-DCA)	UG/L	0.4	0.5	5		5		20	ND	ND	ND
1,1-Dichloroethylene (1,1-DCE)	UG/L	0.4	0.5	6		6		20	ND	ND	ND
1,2,4-Trichlorobenzene	UG/L	0.4	0.5	5				20	ND	ND	ND
1,2-Dichlorobenzene (o-DCB)	UG/L	0.4	0.5	600				20	ND	ND	ND
1,2-Dichloroethane (1,2-DCA)	UG/L	0.4	0.5	0.5		0.5		20	ND	ND	ND
1,2-Dichloropropane	UG/L	0.4	0.5	5		5		20	ND	ND	ND
1,4-Dichlorobenzene (p-DCB)	UG/L	0.4	0.5	5		5		20	ND	ND	ND
2,3,7,8-tetra CDD	UG/L		5E-06	0.00003				2	ND	ND	ND
2,4,5-TP (SILVEX)	UG/L	1	1	50		10		20	ND	ND	ND
2,4-D	UG/L	3	10	70		100		20	ND	ND	ND
Alachlor (ALANEX)	UG/L	0.5	1	2				9	ND	ND	ND
Atrazine (AATREX)	UG/L	0.4	0.5	1		3		9	ND	ND	ND
Bentazon (BASAGRAN)	UG/L	2	2	18		18		20	ND	ND	ND
Benzene	UG/L	0.4	0.5	1		1		20	ND	ND	ND
Benzo(a)pyrene	UG/L	0.1	0.1	0.2				9	ND	ND	ND
Bromodichloromethane	UG/L	0.4	1			100		20	ND	2.43	0.971
Bromoform	UG/L	0.4	1			100		20	ND	0.65	ND
Carbofuran (FURADAN)	UG/L	0.4	5	18		18		20	ND	ND	ND
Carbon Tetrachloride	UG/L	0.4	0.5	0.5		0.5		20	ND	ND	ND
Chlordane	UG/L	0.1	0.1	0.1		0.1		2	ND	ND	ND
Chlorodibromomethane	UG/L	0.4	1					20	ND	2.37	1.01
Chloroform (Trichloromethane)	UG/L	1	1			100		20	ND	2.35	1.03
cis-1,2-Dichloroethylene (c-1,2-DCE)	UG/L	0.4	0.5	6		6		20	ND	ND	ND
Dalapon	UG/L	2	10	200				2	ND	ND	ND
Di(2-ethylhexyl) Adipate	UG/L	2	5	400				9	ND	ND	ND
Di(2-ethylhexyl)phthalate (DEHP)	UG/L	3	3	4		4		11	ND	ND	ND
Dibromoacetic Acid (DBAA)	UG/L	1	1					2	ND	ND	ND
Dibromochloropropane (DBCP)	UG/L	0.01	0.01	0.2		0.2		22	ND	ND	ND
Dichloroacetic Acid (DCAA)	UG/L	1	1					2	ND	ND	ND
Dichloromethane (Methylene Chloride)	UG/L	0.4	0.5	5				20	ND	ND	ND
Dinoseb (DNBP)	UG/L	2	2	7				20	ND	ND	ND
Diquat	UG/L	3	4	20				2	ND	ND	ND
Endothall	UG/L	15	45	100				2	ND	ND	ND

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Endrin	UG/L	0.1	0.1	2		0.2		11	ND	ND	ND
Ethyl Benzene	UG/L	0.4	0.5	300		680		20	ND	ND	ND
Ethylene Dibromide (EDB)	UG/L	0.02	0.02	0.05		0.02		22	ND	ND	ND
Glyphosate	UG/L	10	25	700		700		19	ND	13.8	ND
Haloacetic Acids (five) (HAA5) ¹⁰	UG/L	1		60				2	ND	1.41	ND
Heptachlor	UG/L	0.01	0.01	0.01		0.01		2	ND	ND	ND
Heptachlor Epoxide	UG/L	0.01	0.01	0.01		0.01		2	ND	ND	ND
Hexachlorobenzene	UG/L	0.5	0.5	1				11	ND	ND	ND
Hexachlorocyclopentadiene	UG/L	0.211	1	50				10	ND	ND	ND
Lindane (gamma-BHC)	UG/L	0.2	0.2	0.2		4		2	ND	ND	ND
meta,para xylenes	UG/L	0.4	0.5			1750		20	ND	ND	ND
Methoxychlor	UG/L	0.5	10	30		100		11	ND	ND	ND
Methyl tert-Butyl Ether (MTBE)	UG/L	0.4	3	13	5			20	ND	ND	ND
Molinate (ORDRAM)	UG/L	0.5	2	20		20		8	ND	ND	ND
Monobromoacetic Acid (MBAA)	UG/L	1	1					2	ND	ND	ND
Monochloroacetic Acid (MCAA)	UG/L	2	2					2	ND	ND	ND
Monochlorobenzene (Chlorobenzene)	UG/L	0.4	0.5	70				20	ND	ND	ND
Oxamyl (Vydate)	UG/L	0.4	20	50				20	ND	ND	ND
o-Xylene	UG/L	0.4	0.5					20	ND	ND	ND
Pentachlorophenol (PCP)	UG/L	0.2	0.2	1		1		20	ND	ND	ND
Picloram	UG/L	1	1	500				20	ND	ND	ND
Polychlorinated Biphenyls, Total, as DCB	UG/L	0.5		0.5				8	ND	ND	ND
Simazine (PRINCEP)	UG/L	0.5	1	4		10		9	ND	ND	ND
Styrene	UG/L	0.4	0.5	100				20	ND	ND	ND
Tetrachloroethylene (PCE)	UG/L	0.4	0.5	5		5		20	ND	ND	ND
Thiobencarb (BOLERO)	UG/L	0.5	1	70	1	70		9	ND	ND	ND
Toluene	UG/L	0.4	0.5	150				20	ND	ND	ND
Total Organic Carbon (TOC)	MG/L	0.3						59	2.97	5.85	3.89
Total Toxaphene	UG/L	1	1	3		5		2	ND	ND	ND
Total Trihalomethanes (TTHMs) ¹⁰	UG/L	0.4		80				20	ND	2.43	ND
trans-1,2-Dichloroethylene (t-1,2-DCE)	UG/L	0.4	0.5	10		10		20	ND	ND	ND
Trichloroacetic Acid (TCAA)	UG/L	1	1					2	ND	1.41	ND
Trichloroethylene (TCE)	UG/L	0.4	0.5	5		5		20	ND	ND	ND
Trichlorofluoromethane (FREON 11)	UG/L	0.4	5	150		150		20	ND	ND	ND
Trichlorotrifluoroethane (FREON 113)	UG/L	0.4	10	1200				20	ND	ND	ND
Vinyl Chloride (VC)	UG/L	0.4	0.5	0.5		0.5		20	ND	ND	ND

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Organic Constituents, Unregulated											
1,1,1,2-Tetrachloroethane	UG/L	0.4	0.5					20	ND	ND	ND
1,1-Dichloropropene	UG/L	0.4	0.5					20	ND	ND	ND
1,2,3-Trichlorobenzene	UG/L	0.4	0.5					20	ND	ND	ND
1,2,3-Trichloropropane	NG/L	5	5					13	ND	ND	ND
1,2,4-Trimethylbenzene	UG/L	0.4	0.5					20	ND	ND	ND
1,3,5-Trimethylbenzene	UG/L	0.4	0.5					20	ND	ND	ND
1,3-Dichlorobenzene (m-DCB)	UG/L	0.4	0.5					20	ND	ND	ND
1,3-Dichloropropane	UG/L	0.4	0.5			0.5		20	ND	ND	ND
2,2-Dichloropropane	UG/L	0.4	0.5					20	ND	ND	ND
2,4,5-T	UG/L	3						20	ND	ND	ND
2,4-DB	UG/L	3						20	ND	ND	ND
2-Chlorotoluene	UG/L	0.4	0.5					20	ND	ND	ND
2-Methylisoborneol	NG/L	5						249	ND	> 55	ND
3,5-Dichlorobenzoic Acid	UG/L	3						20	ND	ND	ND
3-Hydroxycarbofuran	UG/L	0.4	3					20	ND	ND	ND
4-Chlorotoluene	UG/L	0.4	0.5					20	ND	ND	ND
4-Nitrophenol	UG/L	3	5			1		20	ND	ND	ND
Acenaphthylene	UG/L	0.5						7	ND	ND	ND
Acifluorfen	UG/L	3						20	ND	ND	ND
Aldicarb (TEMIK)	UG/L	0.4	3					20	ND	ND	ND
Aldicarb Sulfone	UG/L	0.4	4					20	ND	ND	ND
Aldicarb Sulfoxide	UG/L	0.4	3					19	ND	ND	ND
Aldrin	UG/L	0.1	0.075					2	ND	ND	ND
Anthracene	UG/L	0.5						8	ND	ND	ND
Baygon	UG/L	0.4						20	ND	ND	ND
Benzo (a) Anthracene	UG/L	0.5						8	ND	ND	ND
Benzo (b) Fluoranthene	UG/L	0.5						8	ND	ND	ND
Benzo (ghi) Perylene	UG/L	0.5						7	ND	ND	ND
Benzo (k) Fluoranthene	UG/L	0.5						8	ND	ND	ND
Benzyl Butyl Phthalate	UG/L	0.5						8	ND	ND	ND
Bromobenzene	UG/L	0.4	0.5					20	ND	ND	ND
Bromochloromethane	UG/L	0.4	0.5					20	ND	ND	ND
Bromomethane (Methyl Bromide)	UG/L	0.4	0.5					20	ND	ND	ND
Carbaryl (Sevin)	UG/L	0.4	5					20	ND	ND	ND
Chloramben	UG/L	3						20	ND	ND	ND
Chloroethane	UG/L	0.4	0.5					20	ND	ND	ND

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Chloromethane (Methyl Chloride)	UG/L	0.4	0.5					20	ND	ND	ND
Chrysene	UG/L	0.5						8	ND	ND	ND
cis-1,3-dichloropropene	UG/L	0.4	0.5					20	ND	ND	ND
Dibenzo (a,h) anthracene	UG/L	0.5						7	ND	ND	ND
Dibromomethane	UG/L	0.4	0.5					19	ND	ND	ND
Dicamba (BANVEL)	UG/L	1.5	1.5					20	ND	ND	ND
Dichlorodifluoromethane (Freon 12)	UG/L	0.4	0.5					20	ND	ND	ND
Dichlorprop	UG/L	3						20	ND	ND	ND
Dieldrin	UG/L	0.02	0.02					2	ND	ND	ND
Diethylphthalate	UG/L	0.5						8	ND	ND	ND
Diisopropyl Ether (DIPE)	UG/L	0.4	3					19	ND	ND	ND
Dimethyl phthalate	UG/L	0.5						8	ND	ND	ND
di-n-Butylphthalate	UG/L	2						8	ND	ND	ND
Ethyl-tert-Butyl Ether (ETBE)	UG/L	0.4	3					20	ND	ND	ND
Fluorene	UG/L	0.5						8	ND	ND	ND
Geosmin	NG/L	5						249	ND	10.7	ND
Hexachlorobutadiene	UG/L	0.4	0.5					20	ND	ND	ND
Indeno (1,2,3-cd) Pyrene	UG/L	0.5						8	ND	ND	ND
Isopropylbenzene (Cumene)	UG/L	0.4	0.5					20	ND	ND	ND
MCPA	UG/L	3						20	ND	ND	ND
MCPP	UG/L	3						20	ND	ND	ND
Methiocarb	UG/L	0.4						20	ND	ND	ND
Methomyl	UG/L	0.4	2					20	ND	ND	ND
Naphthalene	UG/L	0.4	0.5					20	ND	ND	ND
n-Butylbenzene	UG/L	0.4	0.5					20	ND	ND	ND
n-Propylbenzene	UG/L	0.4	0.5					20	ND	ND	ND
Paraquat	UG/L	4	20					2	ND	ND	ND
PCB-1016 (as DCB)	UG/L	0.26	0.5	0.5				8	ND	ND	ND
PCB-1221 (as DCB)	UG/L	0.19	0.5	0.5				8	ND	ND	ND
PCB-1232 (as DCB)	UG/L	0.23	0.5	0.5				8	ND	ND	ND
PCB-1242 (as DCB)	UG/L	0.26	0.5	0.5				8	ND	ND	ND
PCB-1248 (as DCB)	UG/L	0.3	0.5	0.5				8	ND	ND	ND
PCB-1254 (as DCB)	UG/L	0.33	0.5	0.5				8	ND	ND	ND
PCB-1260 (as DCB)	UG/L	0.36	0.5	0.5				8	ND	ND	ND
Phenanthrene	UG/L	0.5				1		8	ND	ND	ND
p-Isopropyltoluene	UG/L	0.4						20	ND	ND	ND
Propachlor	UG/L	0.5	0.5					10	ND	ND	ND
Pyrene	UG/L	0.5						8	ND	ND	ND

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sec-Butylbenzene	UG/L	0.4	0.5					20	ND	ND	ND
tert-Amyl Methyl Ether (TAME)	UG/L	0.4	3					20	ND	ND	ND
tert-Butyl Alcohol (TBA)	UG/L	1	2					20	ND	ND	ND
tert-Butylbenzene	UG/L	0.4	0.5					20	ND	ND	ND
trans-1,3-dichloropropene	UG/L	0.4	0.5	0.5				20	ND	ND	ND
Trifluralin	UG/L	0.5						8	ND	ND	ND

End Notes:

CSD MDL: City of San Diego Water Quality Laboratory minimum detection level, DLR: detection level for reporting, MCL: maximum contaminant level, SMCL: Secondary MCL, ND: not detected. Calculated mean below CSD MDL reported as ND.

¹ DLR, MCL, SMCL are obtained from California OEHHA and SWRCB and apply to drinking water and are for reference only. California MCL and SMCL values may be more stringent than federal standards for drinking water.

² Water Quality Control Plan for the San Diego Basin (9) with amendments effective on or before May 17, 2016. Water Quality Objectives concentrations not to be exceeded more than 10% of the time during any one year period.

³ Based on the Langelier index. A positive value indicates non-corrosive tendencies. A negative value indicates corrosive tendencies.

⁴ Trace metal values were from filtered and unfiltered samples. Differences in values were negligible.

⁵ Values referred to as MCLs for Lead and Copper are actually called Action Levels under the Lead and Copper Rule.

⁶ Waters designated Fresh or Warm changes in normal ambient pH levels shall not exceed 0.5 units

⁷ Beach Action Values (BAV): Amendment to the Domestic Water Permit issued by SWRCB to CSD, August 27, 2018

⁸ DDW considers 50 pCi/L to be the level of concern for beta particles.

⁹ P= 0.025 mg/L in any standing body of water. Nitrogen threshold determined by monitoring or if data are lacking, ratio of N:P = 10:1 is used. These values not to be exceeded more than 10% of the time.

¹⁰ Total Trihalomethane and HAA5 compliance is based on quarterly Locational Running Annual Averages (LRAA)