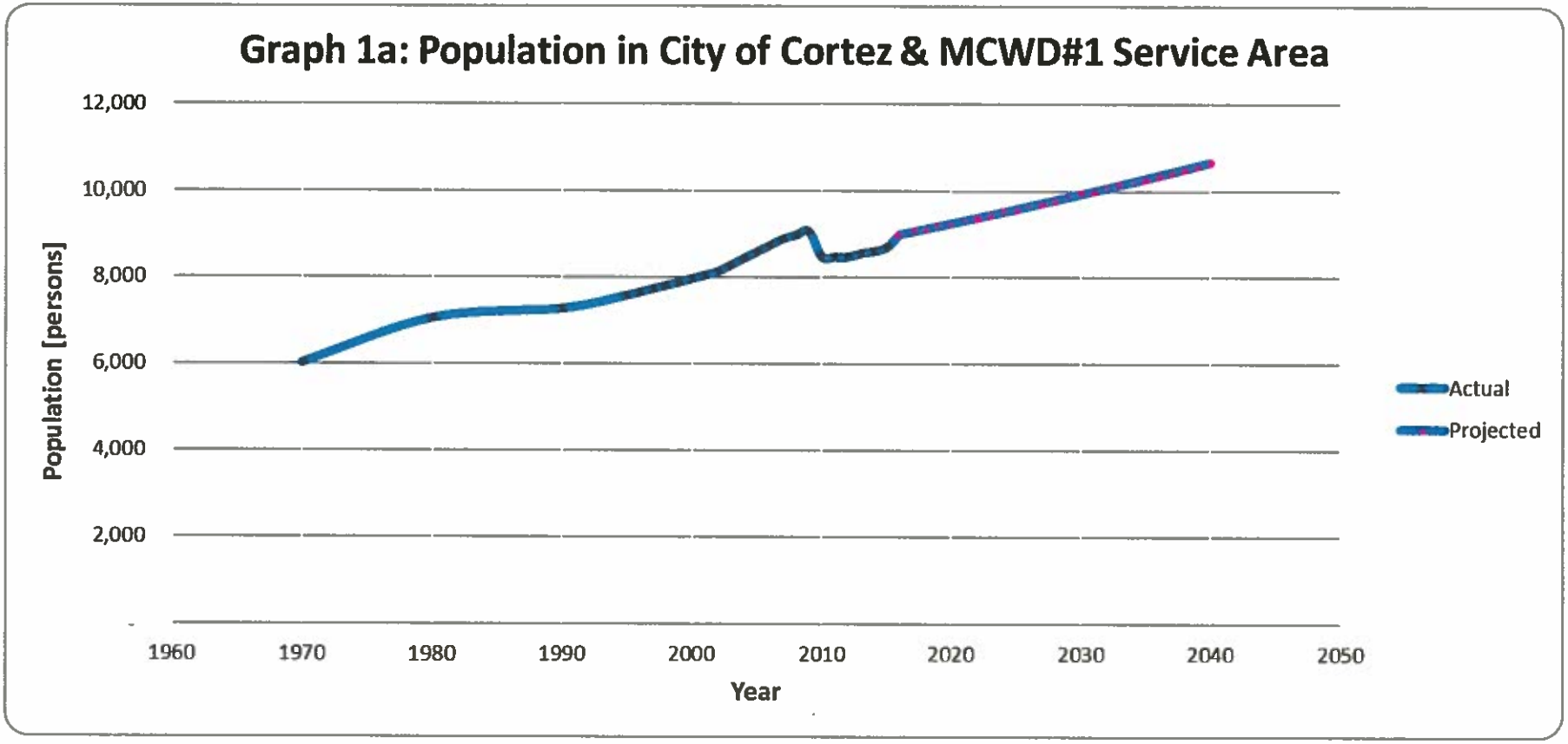
City of Cortez
2018 Water Conservation Plan

Appendix

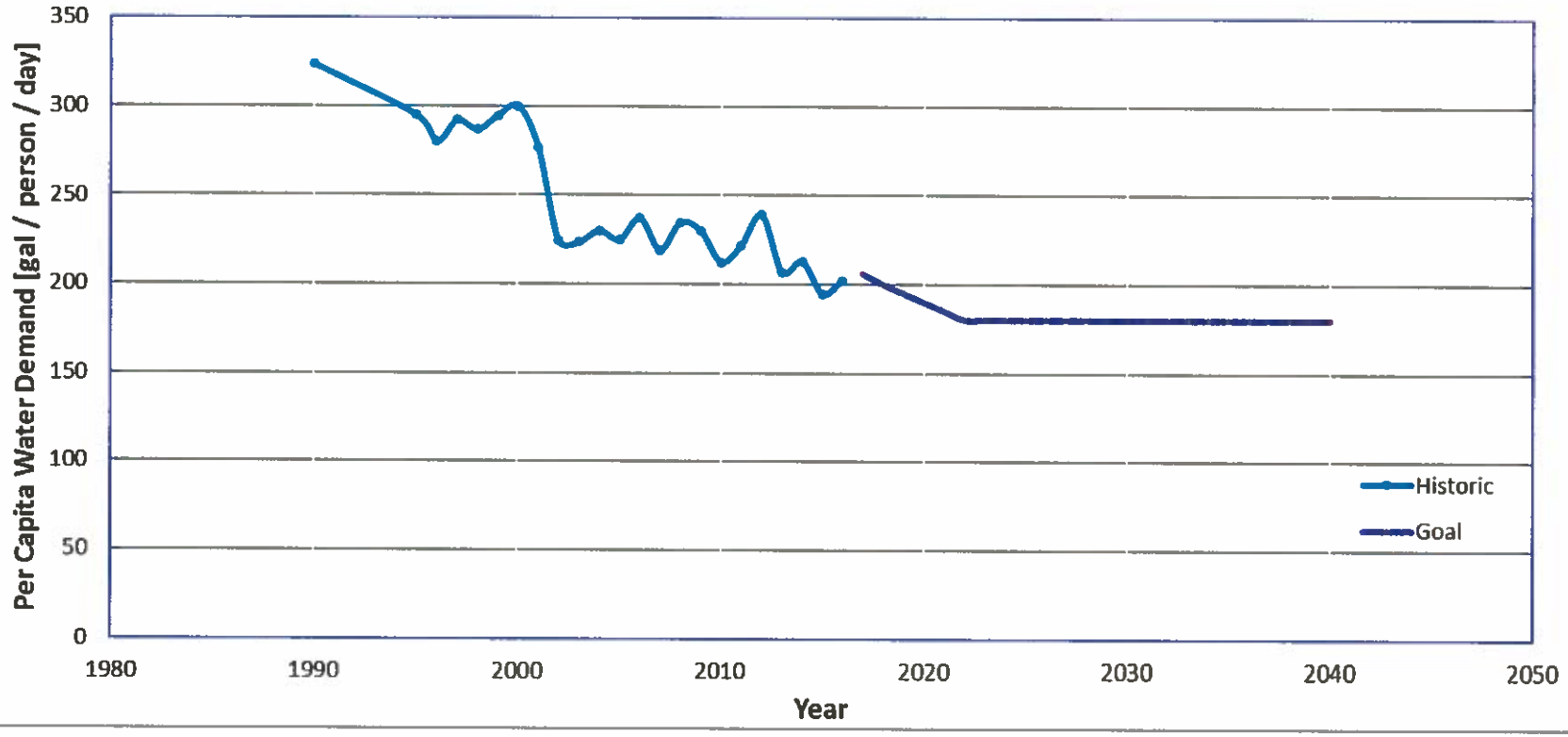
Tables and Graphs

Table 1: City of Cortez & MCWD #1: Population, Annual Water Demand/ Supply, Per Capita Demand

	Population (In Service Area)		Annual Water Demand [MG]				Per Capita Water Demand		
Year	Historic	Projected	Historic	Projected - Current Per Capita Water Use	Projected - Meet Water Conservation Goal	Available Annual Water Supply (Water Rights) [MG]	Historic	Projected - Current Per Capita Water Use	Projected - Meet Water Conservation Goal
1970	6,032					1,740			
1980	7,062					1,740			
1990	7,284		860			1,740	324		
1995	7,587		817			1,740	295		
1996	7,663		783			1,740	280		
1997	7,740		825			1,740	292		
1998	7,817		818			1,740	287		
1999	7,895		849			1,740	295		
2000	7,977		874			1,740	300		
2001	8,057		813			1,740	276		
2002	8,137		666			1,740	224		
2003	8,290		676			1,740	223		
2004	8,442		709			1,740	230		
2005	8,595		706			1,740	225		
2006	8,747		757			1,740	237		
2007	8,900		712			1,740	219		
2008	8,989		770			1,740	235		
2009	9,078		762			1,740	230	206	
2010	8,484		658			1,740	212	206	
2011	8,478		687			1,740	222	206	
2012	8,478		740			1,740	239	206	
2013	8,559		646			1,740	207	206	
2014	8,610		669			1,740	213	206	
2015	8,703		618			1,740	195	206	
2016	9,007	9,007	665		0	1,740	202	206	
2017	9,070	9,070			682	1,740	206	206	206
2018		9,133			667	1,740		206	200
2019		9,197			655	1,740		206	195
2020		9,262			642	1,740		206	190
2021		9,327			630	1,740		206	185
2022		9,392			617	1,740		206	180
2023		9,458			621	1,740		206	180
2024		9,524			626	1,740		206	180
2025		9,591			630	1,740		206	180
2026		9,658			635	1,740		206	180
2027		9,725			639	1,740		206	180
2028		9,793			643	1,740		206	180
2029		9,862			648	1,740		206	180
2030		9,931			652	1,740		206	180
2031		10,000			657	1,740		206	180
2032		10,070			662	1,740		206	180
2033		10,141			666	1,740		206	180
2034		10,212			671	1,740		206	180
2035		10,283			676	1,740		206	180
2036		10,355			680	1,740		206	180
2037		10,428			685	1,740		206	180
2038		10,501			690	1,740		206	180
2039		10,574			695	1,740		206	180
2040		10,648			700	1,740		206	180


Graph 1a: Population in City of Cortez & MCWD#1 Service Area
12,000
10,000
8,000
6,000
4,000
2,000
-
Population [persons]
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
Year
Actual
Projected

Graph 1b: Per Capita Water Demand in City of Cortez & MCWD#1 Service Area



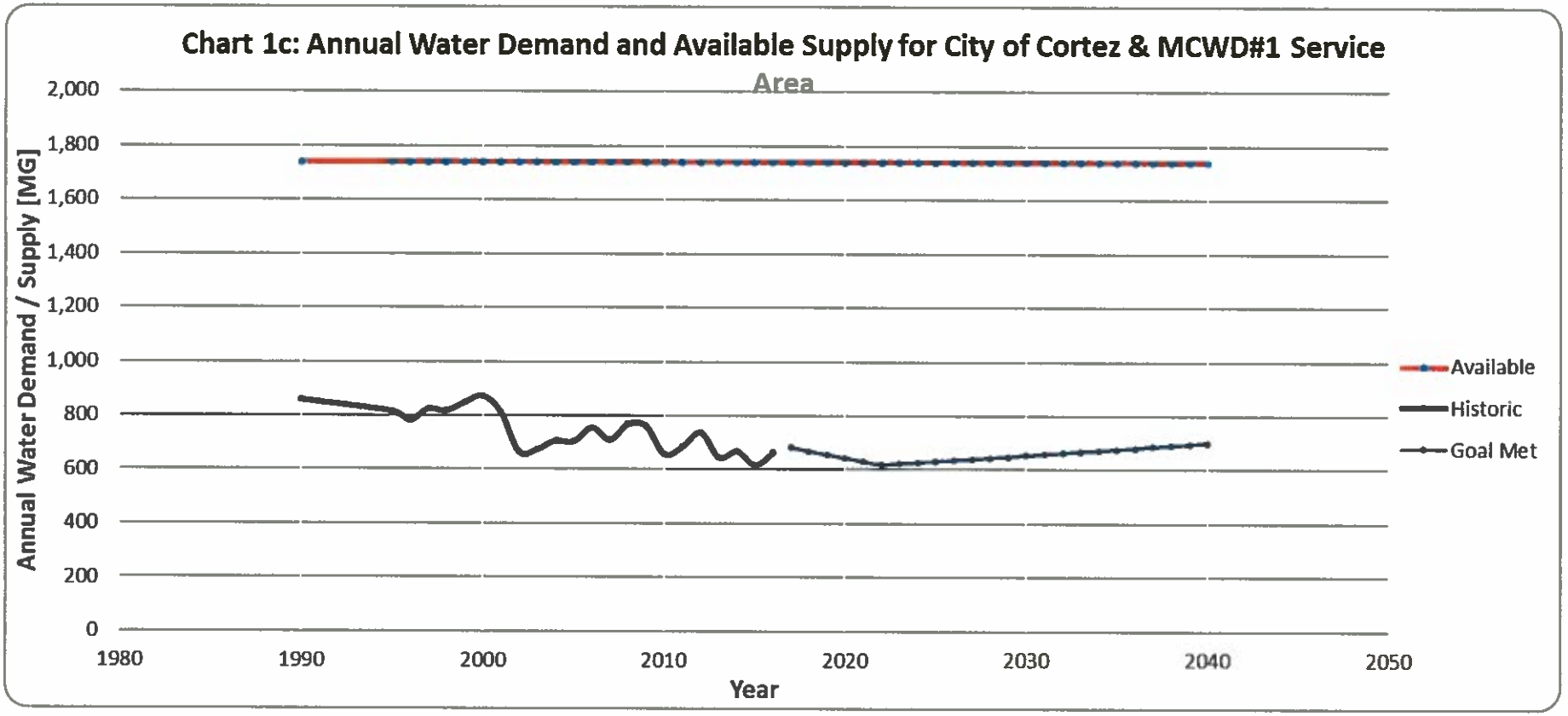


Chart 1c: Annual Water Demand and Available Supply for City of Cortez & MCWD#1 Service Area
Annual Water Demand / Supply [MG]
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
1980
1990
2000
2010
2020
2030
2040
2050
Year
Available
Historic
Goal Met

Table 2: Water Demand by User, Metered and Estimated Unmetered (2016 & 2017)

Metered Water User Type[1]	Water Demand [MG] 2016	2017	Change (2016 to 2017) Absolute [MG]	Percentage [%]
City of Cortez				
Residential (Single Unit)	327.8	319.6	-8.2	-2.5%
Residential (Multi-Unit)	52.9	73.7	20.7	39.1%
Commercial	145.9	123.8	-22.1	-15.1%
Schools	21.4	31.1	9.8	45.7%
Churches	6.2	7.2	1.0	15.6%
Government	10.9	7.6	-3.4	-30.9%
Total City of Cortez	565.1	562.9	-2.2	-0.4%
Montezuma County Water District No. 1	45.1	50.8	5.7	12.6%
TOTAL METERED WATER DEMAND	520.0	512.1	-7.9	-1.5%
Unmetered / Unmonitored Water Users (Estimated Water Use)				
Unmonitored Master Meter: Centennial Park Supplemental Irrigation, Swimming Pool, Street Sweepers[2]	1.0	1.0	0.0	0.0%
Unmetered: Hydrant Flushing Program	11.0	11.0	0.0	0.0%
TOTAL ESTIMATED UNMETERED WATER DEMAND	12.0	12.0	0.0	0.0%

Notes:

[1]Water demand by Ute Mountain Ute Tribe is accounted for separately

[2]Metered via a single master meter, but water use data used is not currently monitored

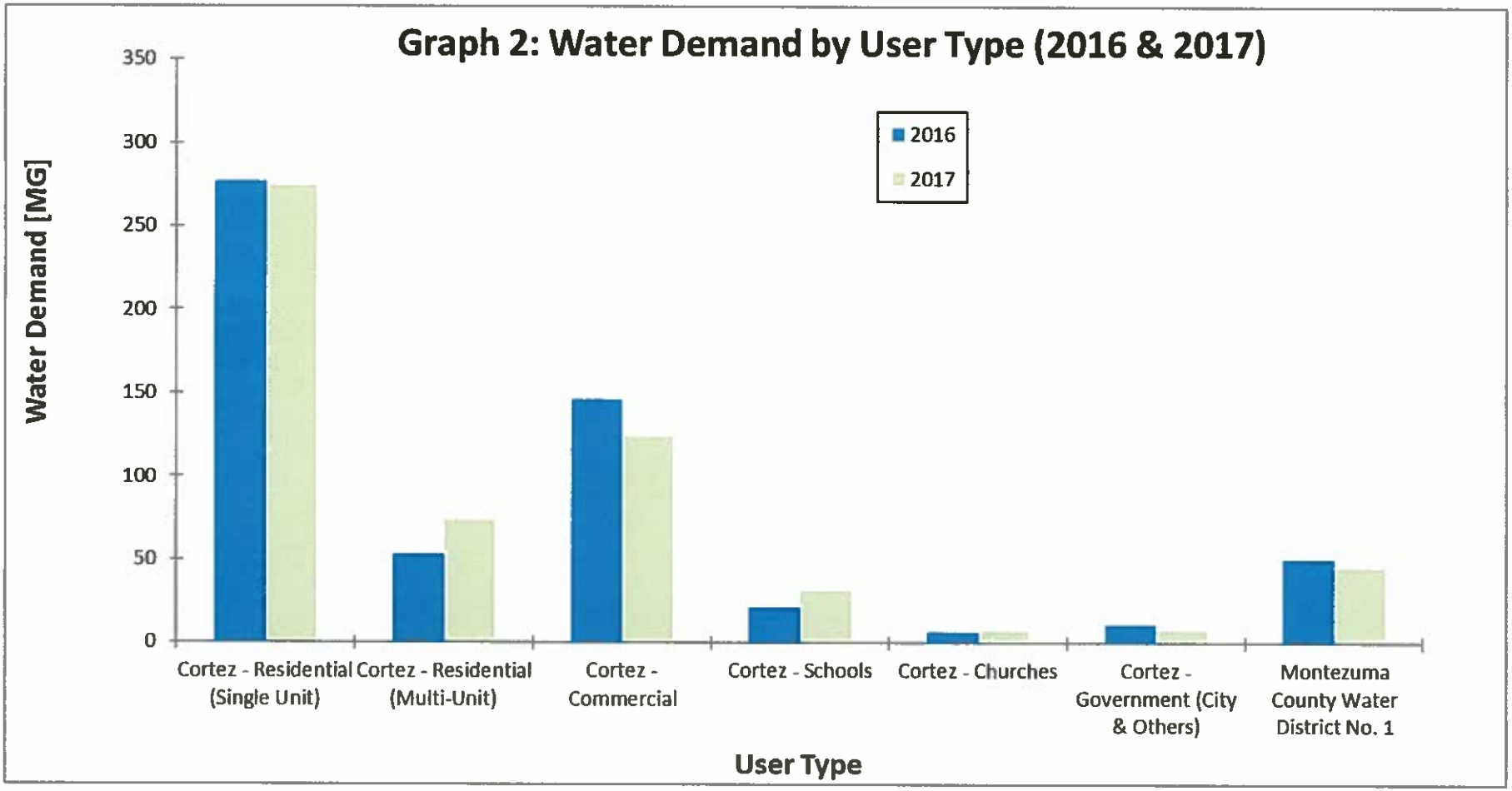

Graph 2: Water Demand by User Type (2016 & 2017)
Water Demand [MG]
350
300
250
200
150
100
50
0
2016
2017
Cortez - Residential (Single Unit)
Cortez - Residential (Multi-Unit)
Cortez - Commercial
Cortez - Schools
Cortez - Churches
Cortez - Government (City & Others)
Montezuma County Water District No. 1
User Type

Table 3: Number & Percent of Taps, Water Demand, Average Water Demand by User Type in City of Cortez (2016 & 2017)

Metered Water User Type	Number of Taps	Percent of Taps	Water Demand [MG]		Average Water Demand Per Tap [MG]	
			2016	2017	2016	2017
City of Cortez						
Residential (Single Unit)	2,879	80.8%	327.8	319.6	0.11	0.11
Residential (Multi-Unit)	179	5.0%	52.9	73.7	0.30	0.41
Commercial	425	11.9%	145.9	123.8	0.34	0.29
Schools	26	0.7%	21.4	31.1	0.82	1.20
Churches	29	0.8%	6.2	7.2	0.21	0.25
Government (City & Parks)	24	0.7%	10.9	7.6	0.46	0.31
TOTAL	3,562	100.0%	565.1	562.9		

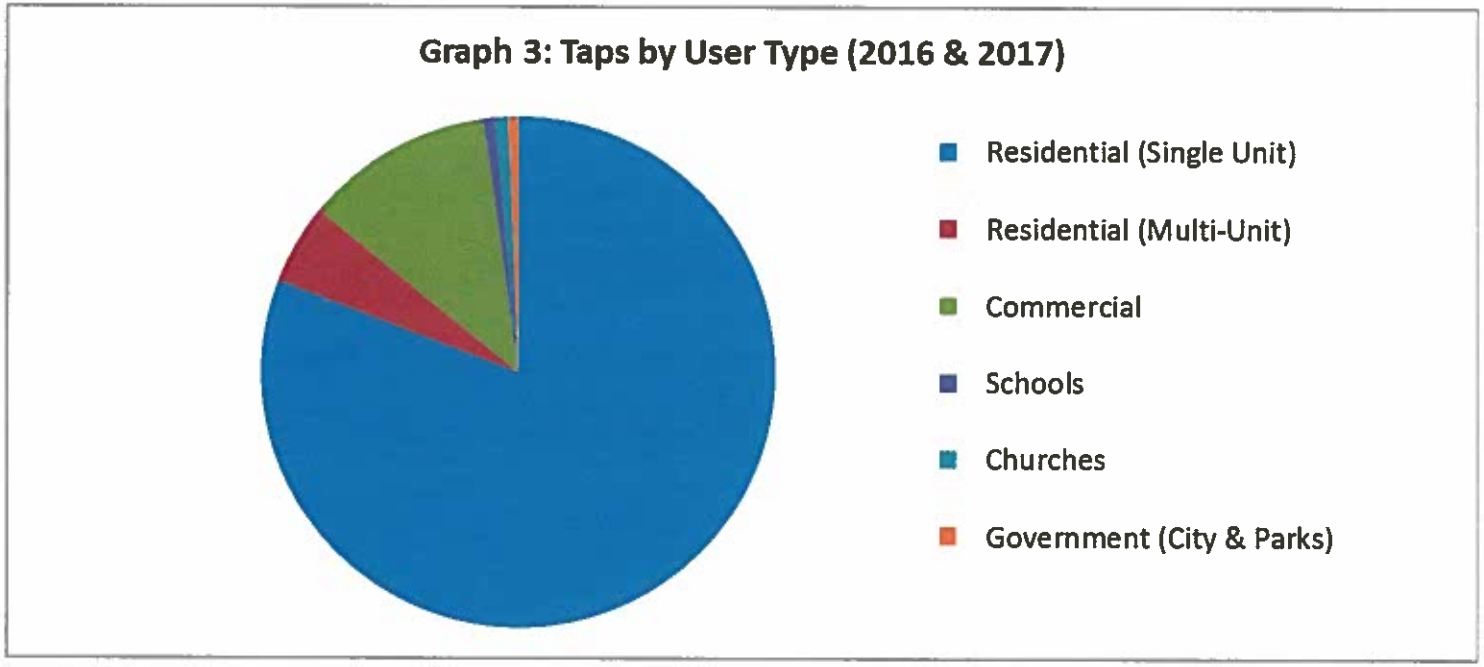


Table 4: Monthly Water Produced at Cortez WTP (2008 - 2017)

Units: [MG]	Year										
Month	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Monthly Average**
January	58.9	49.0	44.2	54.5	37.4	47.2	37.8	38.5	41.1	41.0	45.0
February	60.1	39.2	36.8	48.3	34.7	38.5	34.6	33.8	37.1	37.6	40.0
March	57.2	46.1	42.8	50.9	38.3	40.8	39.6	42.9	40.8	42.6	44.2
April	62.4	55.2	52.9	63.7	61.1	51.2	44.9	53.9	47.3	54.9	54.7
May	106.8	110.6	93.0	95.9	118.6	92.1	90.7	62.8	81.6	86.7	93.9
June	135.4	116.1	129.5	136.2	142.0	122.8	120.6	102.7	128.8	132.1	126.6
July	135.9	150.1	120.0	141.7	133.4	124.9	135.0	111.3	127.0	130.4	131.0
August	137.8	141.3	91.8	128.1	126.0	100.8	107.4	109.0	100.3	114.8	115.7
September	112.7	109.6	105.9	96.3	99.5	68.9	91.0	97.7	91.0	99.8	97.2
October	69.2	62.4	65.9	60.7	63.8	52.8	61.0	66.2	65.7	55.5	62.3
November	41.9	39.1	39.6	36.6	38.8	36.4	37.6	37.6	42.6	41.2	39.1
December	39.9	40.5	48.2	39.0	40.4	37.5	38.9	40.3	40.5	40.9	40.6
Annual Total	1,018.2	959.2	870.6	951.9	934.0	813.7	838.9	796.7	843.5	877.5	

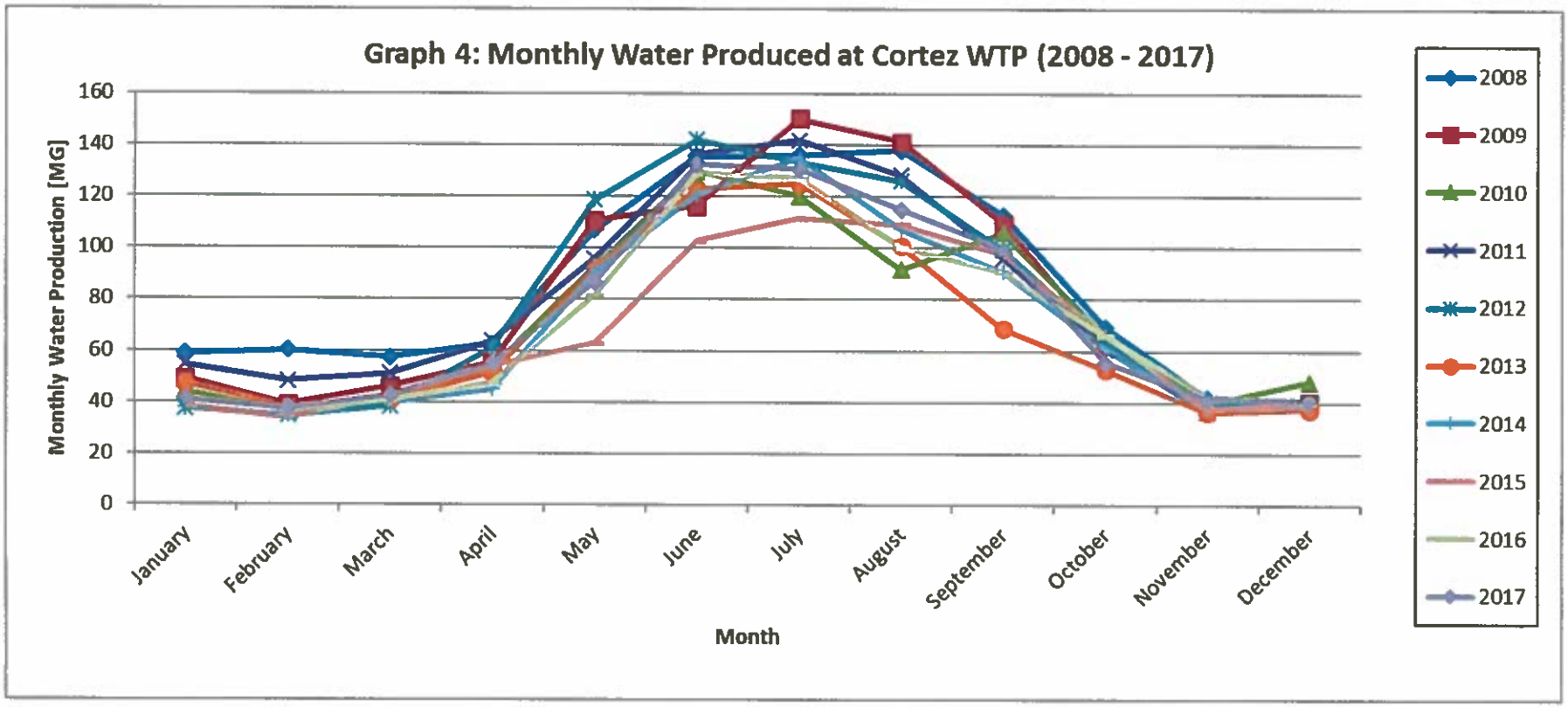


Table 5: Monthly Water Produced for City of Cortez & Montezuma County Water District #1 (2008 - 2017)

Units: [MG]

Month	Year										Monthly Average
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
January	37.1	37.4	29.1	28.9	29.7	36.2	29.3	29.1	31.3	30.5	31.8
February	45.7	28.8	24.5	26.4	26.2	27.4	27.6	25.0	28.0	27.7	28.7
March	42.0	32.7	29.0	28.6	29.1	30.3	31.5	32.5	30.5	31.2	31.7
April	45.7	42.6	38.4	40.7	48.6	40.2	34.6	39.5	36.5	42.8	41.0
May	86.2	90.8	76.9	68.9	97.8	75.1	75.0	48.2	66.0	71.0	75.6
June	103.0	95.4	107.2	103.2	116.4	99.7	97.8	81.1	101.4	104.9	101.0
July	111.8	122.2	95.0	112.0	106.6	100.0	108.8	89.6	103.0	101.4	105.0
August	114.5	114.4	72.7	101.7	99.1	82.0	87.0	86.0	80.0	91.0	92.8
September	94.8	89.1	83.3	76.6	77.4	55.5	71.3	78.3	74.0	79.3	78.0
October	52.7	47.9	48.0	44.0	50.1	42.1	48.1	51.8	52.8	41.8	47.9
November	33.0	29.9	26.5	27.3	29.2	28.2	28.5	27.5	31.6	30.7	29.2
December	28.5	29.4	26.8	28.7	29.4	29.1	30.0	29.2	30.0	30.2	29.1
Annual Total	795.0	760.6	657.3	687.0	739.6	645.9	669.3	617.8	665.1	682.6	

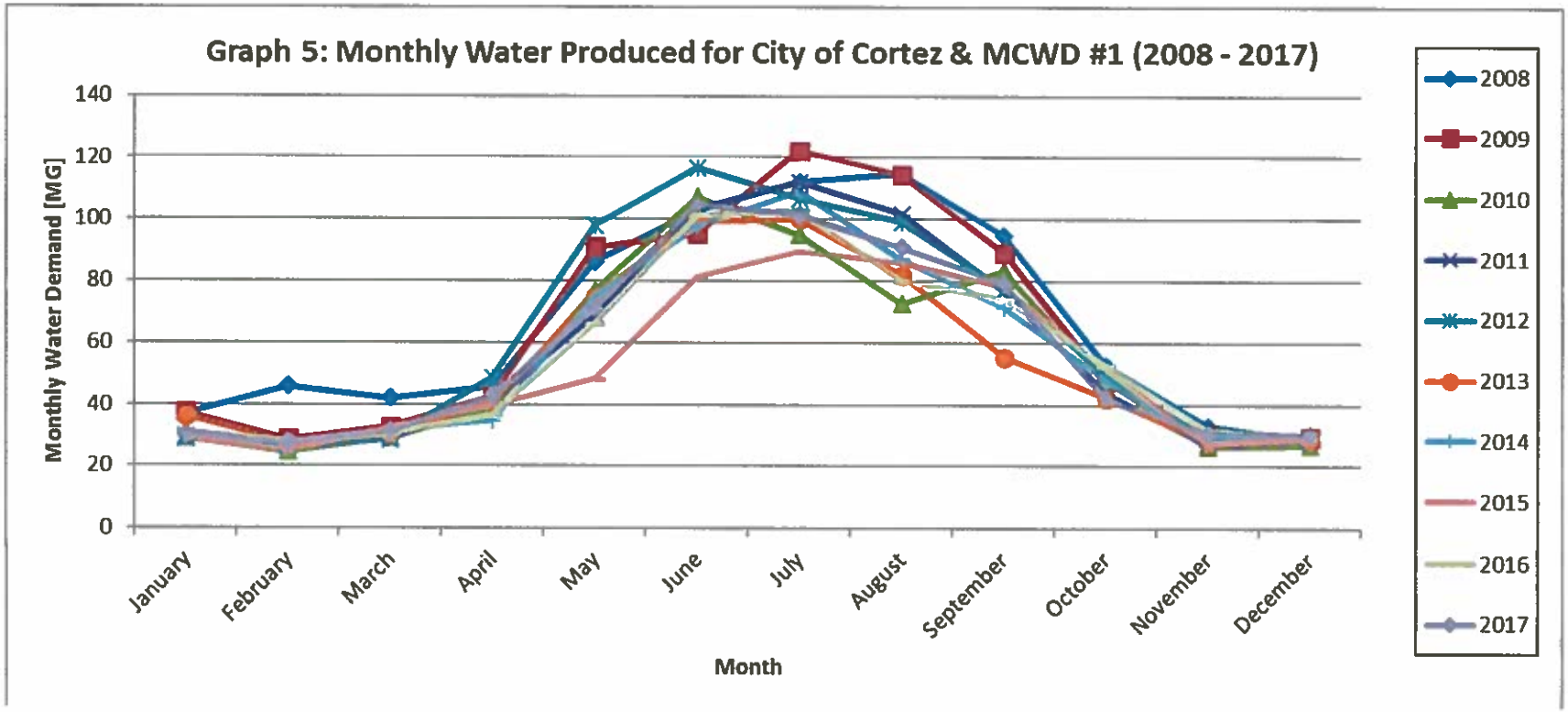


Table 6: Monthly Water Produced for Ute Mountain Ute Mountain Tribe (2008 - 2017)

Units: MG	Year										
Month	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Monthly Average**
January	21.8	11.6	15.1	25.6	7.8	11.0	8.5	9.4	9.8	10.5	13.1
February	14.3	10.4	12.3	21.9	8.4	11.0	7.0	8.8	9.0	9.9	11.3
March	15.2	13.4	13.7	22.3	9.2	10.5	8.1	10.4	10.3	11.4	12.5
April	16.8	12.5	14.5	22.9	12.5	11.0	10.3	14.4	10.9	12.1	13.8
May	20.7	19.8	16.1	27.0	20.8	17.0	15.6	14.6	15.6	15.7	18.3
June	32.4	20.7	22.3	33.0	25.6	23.2	22.8	21.6	27.3	27.2	25.6
July	24.1	27.9	25.0	29.7	26.7	24.8	26.2	21.8	24.0	29.0	25.9
August	23.3	26.9	19.1	26.4	26.9	18.8	20.3	23.0	20.3	23.9	22.9
September	17.9	20.6	22.6	19.7	22.1	13.4	19.6	19.4	16.9	20.5	19.3
October	16.5	14.4	17.9	16.7	13.6	10.7	13.0	14.4	12.9	13.7	14.4
November	8.9	9.2	13.2	9.4	9.7	8.2	9.1	10.1	11.0	10.4	9.9
December	11.4	11.1	21.3	10.3	11.0	8.3	8.9	11.1	10.4	10.7	11.5
Annual Total	223.3	198.5	213.3	264.9	194.4	167.8	169.6	178.9	178.4	195.0	

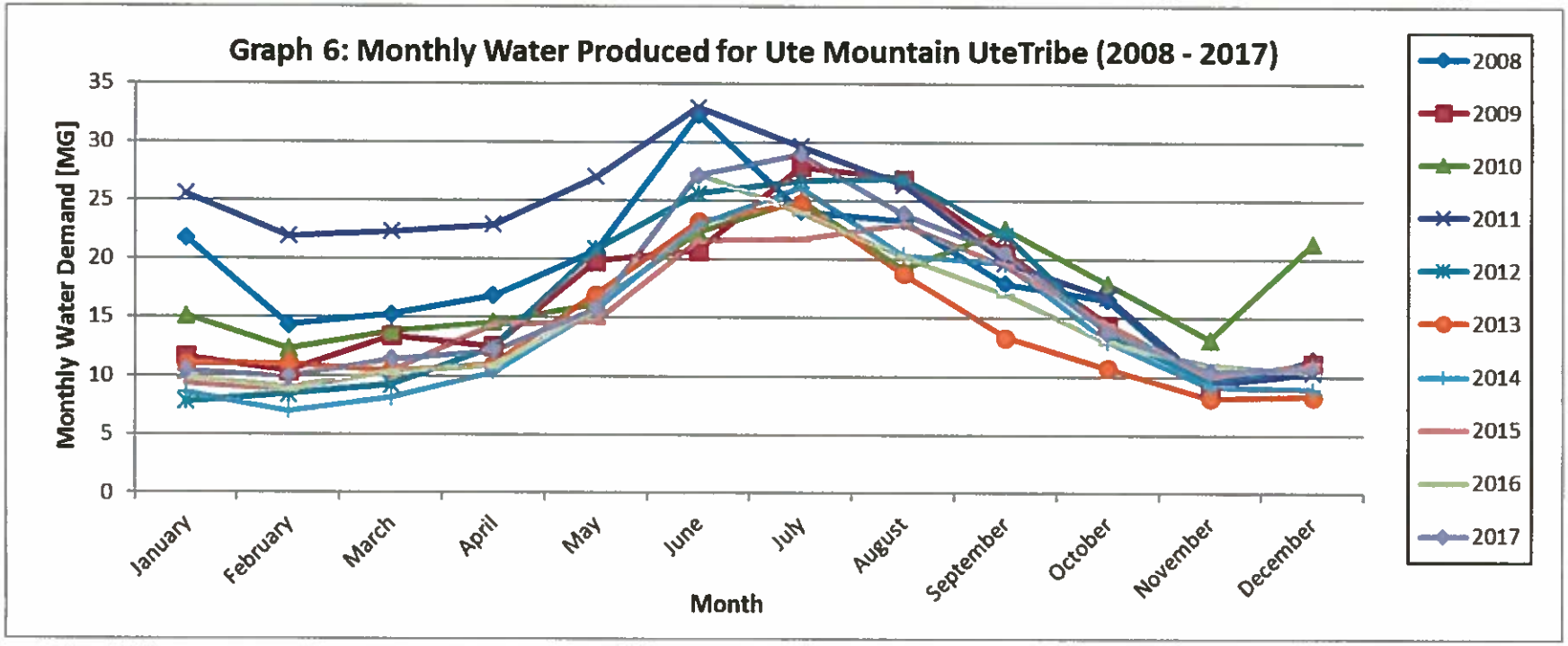


Table 7: Monthly Water Production by User (2008 - 2017)

Units: MG

Month	Total Water Produced	City of Cortez & MWD #1	Ute Mountain Ute Tribe
January	45.0	31.8	13.1
February	40.0	28.7	11.3
March	44.2	31.7	12.5
April	54.7	41.0	13.8
May	93.9	75.6	18.3
June	126.6	101.0	25.6
July	131.0	105.0	25.9
August	115.7	92.8	22.9
September	97.2	78.0	19.3
October	62.3	47.9	14.4
November	39.1	29.2	9.9
December	40.6	29.1	11.5

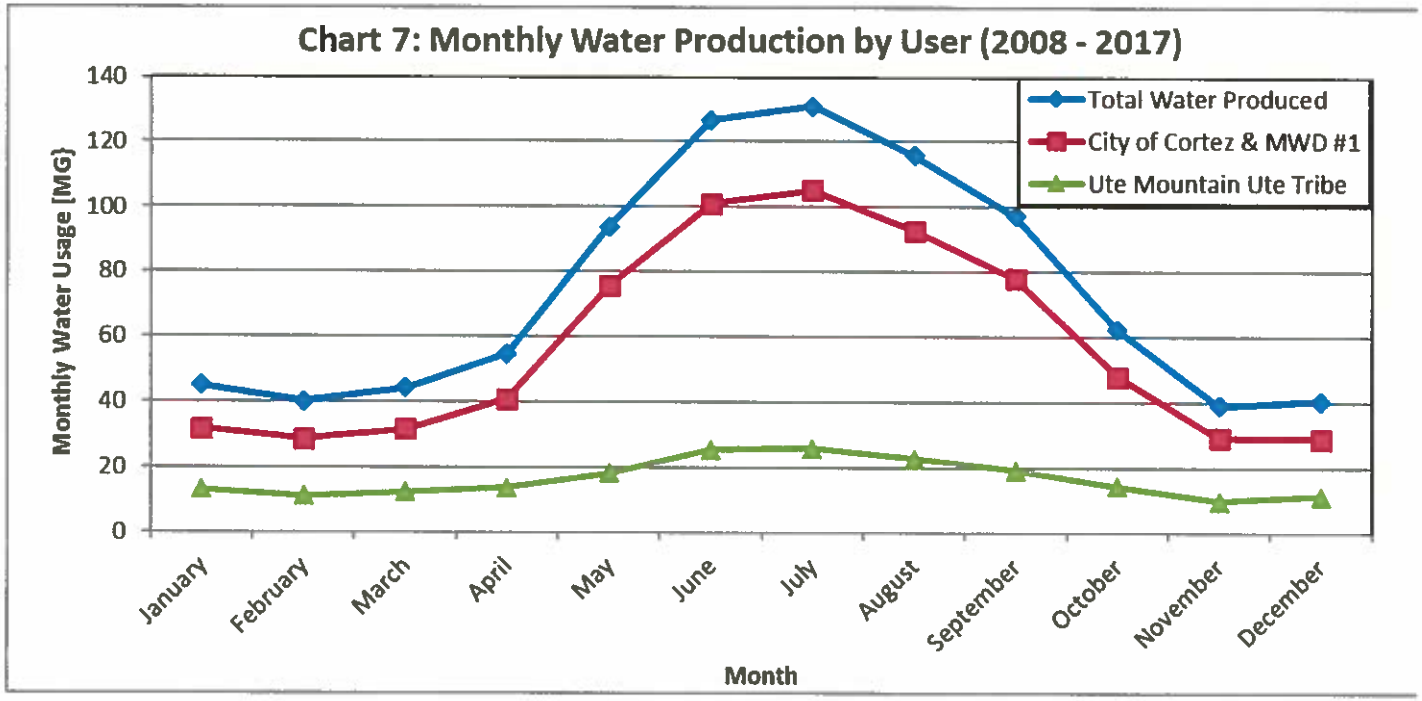


Table 8: Annual Water Production by User (2008 - 2017)

Units: MG

User	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Water Produced	1,018.2	959.2	870.6	951.9	934.0	813.7	838.9	796.7	843.5	877.5
City of Cortez & MWD #1	795.0	760.6	657.3	687.0	739.6	645.9	669.3	617.8	665.1	682.6
Ute Mountain Ute Tribe	223.3	198.5	213.3	264.9	194.4	167.8	169.6	178.9	178.4	195.0

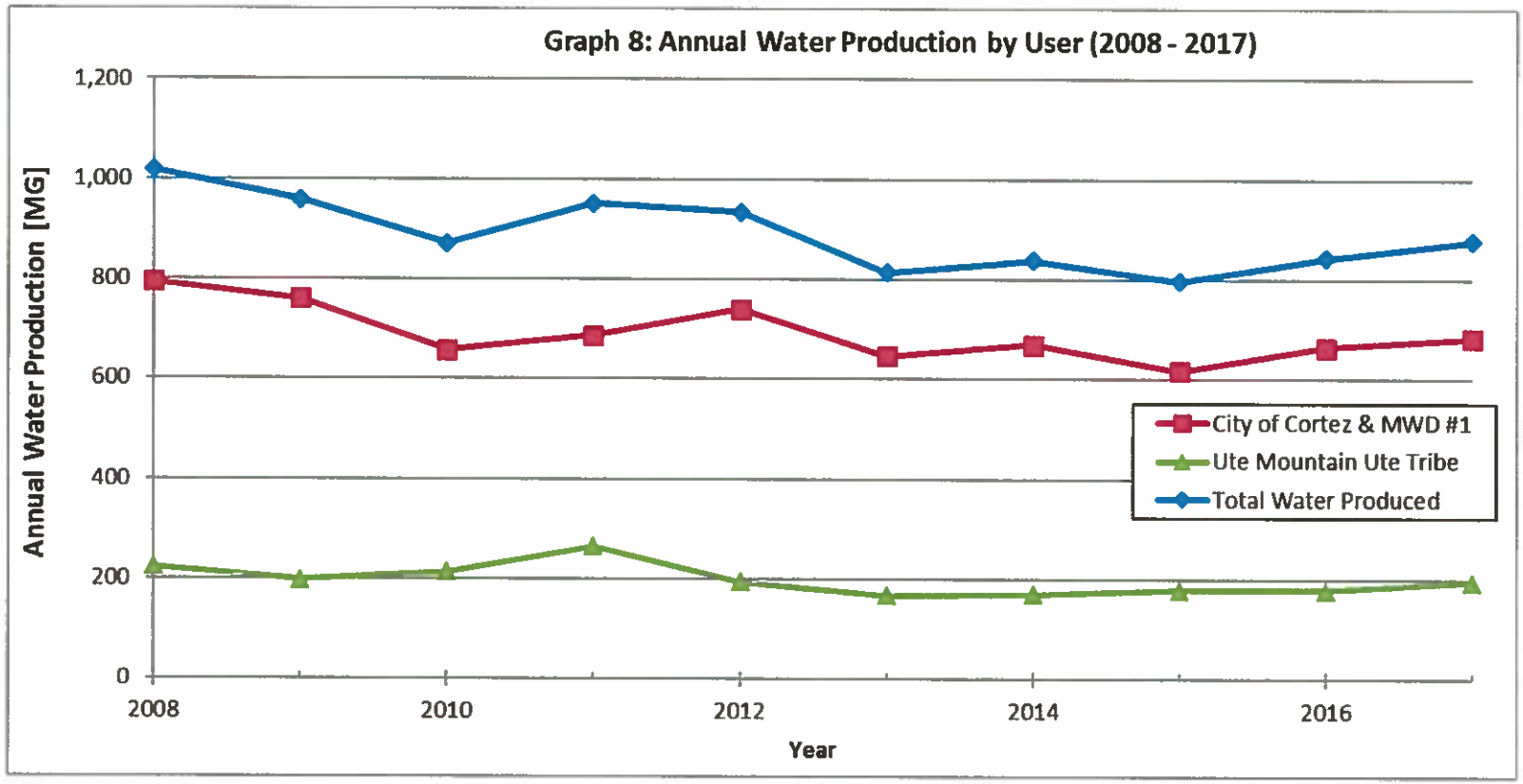
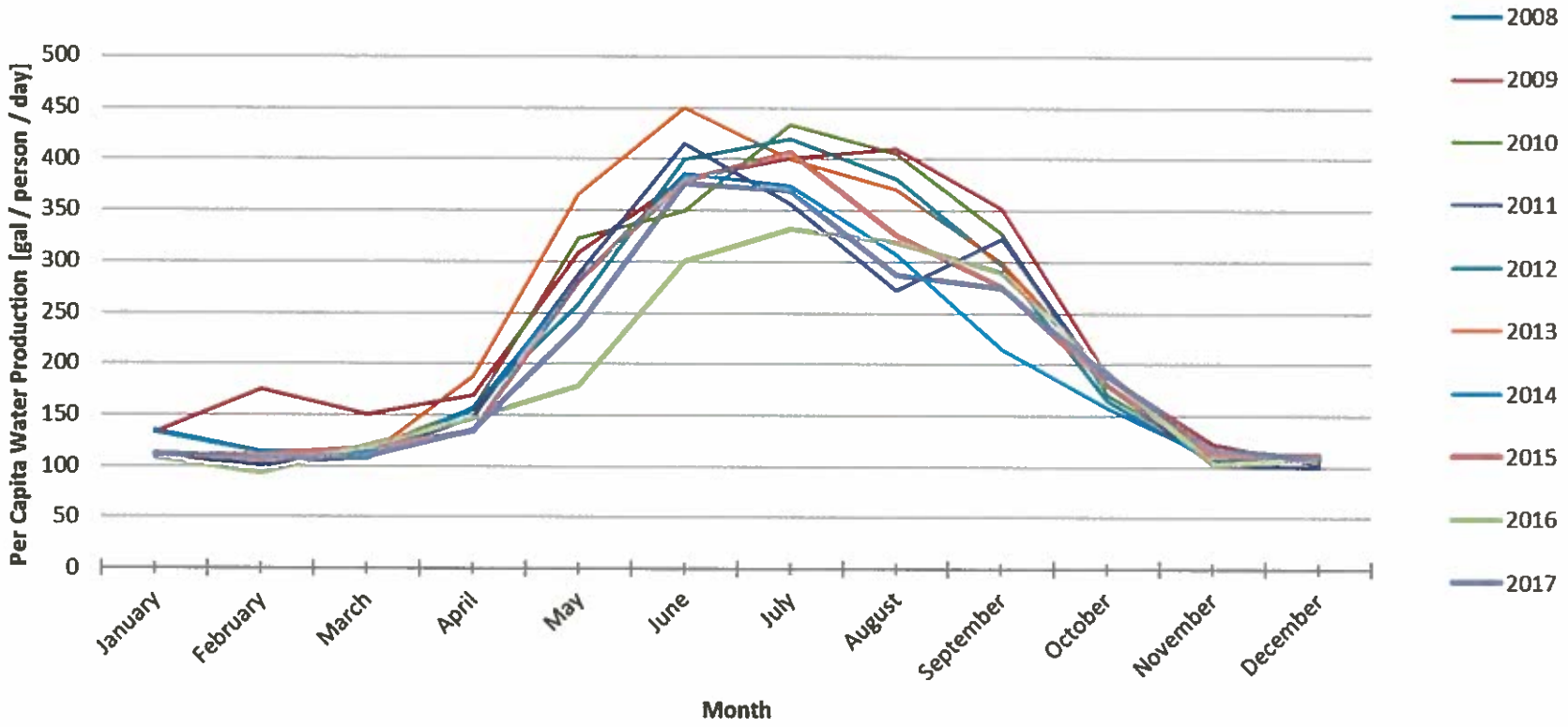


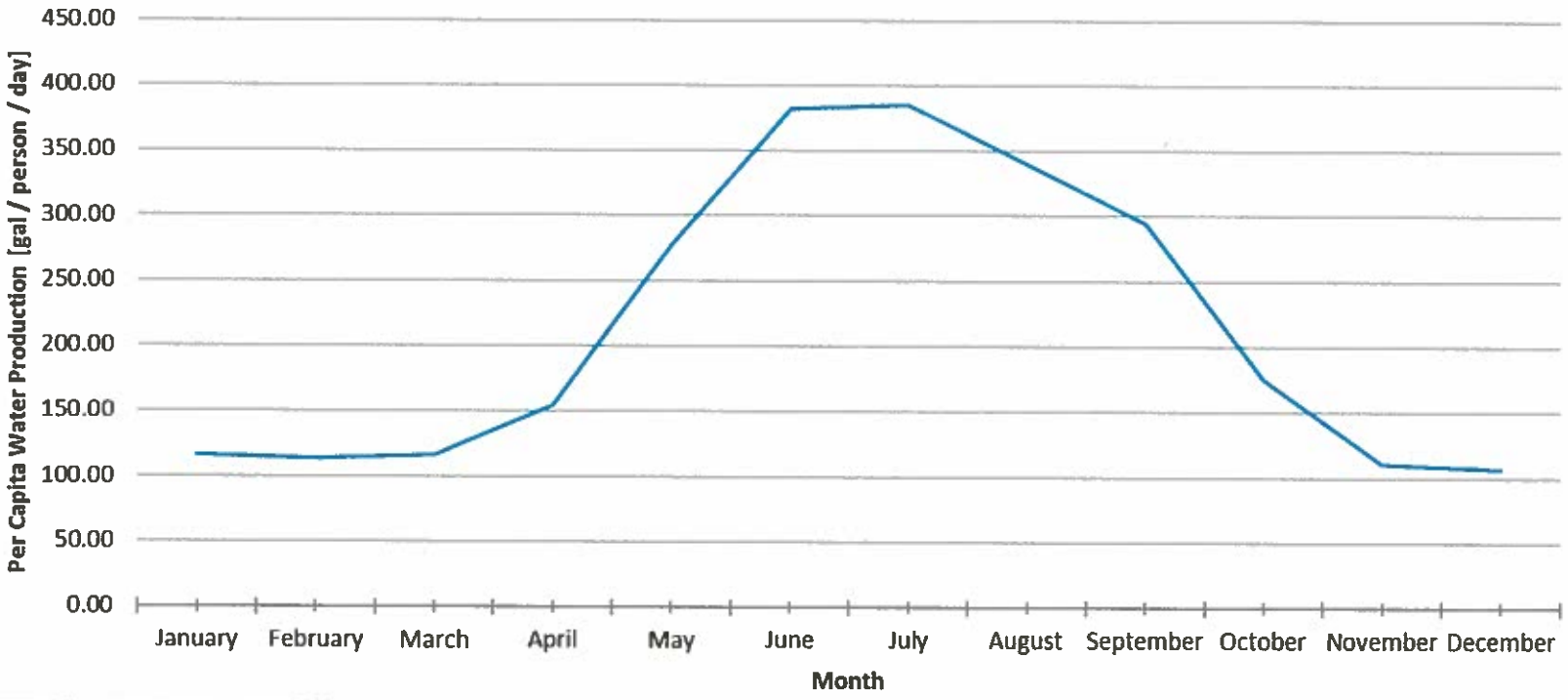
Table 9: Monthly Per Capita Daily Water Production for City of Cortez & Montezuma County Water District #1 (2008 - 2017)

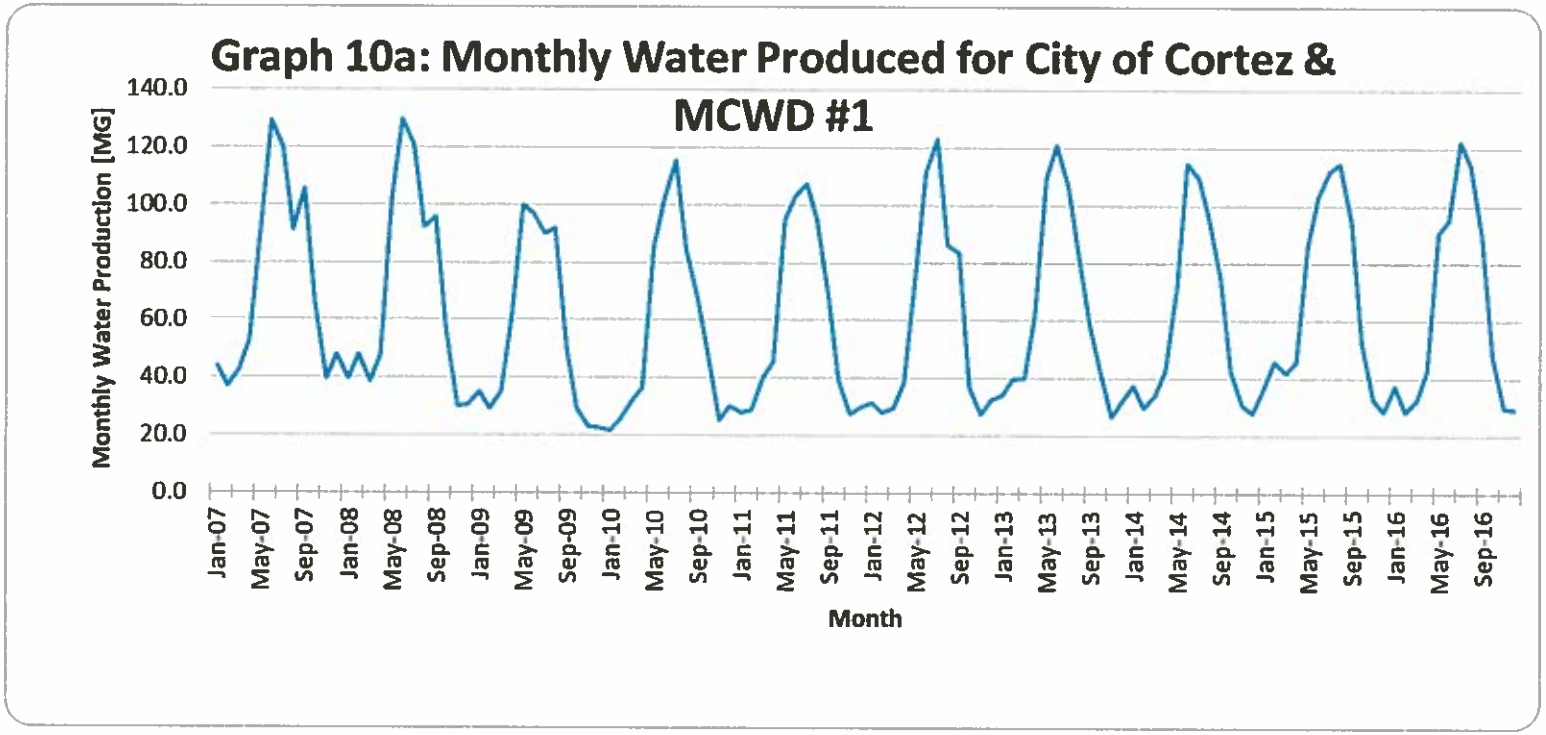
Month	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Monthly Average
January	133.0	132.8	108.93	108.26	111.09	135.53	109.62	107.98	112.23	108.49	116.79
February	175.3	113.1	101.62	109.38	105.09	113.82	110.36	92.64	107.61	108.96	113.80
March	150.7	116.2	108.78	107.25	109.13	113.51	117.96	120.28	109.42	111.00	116.42
April	169.3	156.6	148.55	157.74	188.15	155.62	133.86	146.41	135.29	157.32	154.88
May	309.2	322.7	287.98	258.15	366.47	281.42	281.10	178.80	236.76	252.58	277.51
June	381.8	350.2	415.18	399.58	450.60	385.81	378.45	300.73	376.25	385.65	382.42
July	401.4	434.3	356.08	419.46	399.42	374.81	407.60	331.97	369.82	360.79	385.56
August	411.0	406.4	272.25	381.16	371.21	307.27	326.12	318.67	287.16	323.49	340.47
September	351.6	327.1	322.49	296.52	299.65	214.91	276.10	290.11	274.53	291.33	294.43
October	189.2	170.3	179.66	164.76	187.88	157.73	180.04	192.11	189.45	148.53	175.96
November	122.3	109.6	102.49	105.53	112.88	109.18	110.25	101.91	117.15	112.99	110.43
December	102.3	104.4	100.46	107.50	109.99	109.14	112.31	108.15	107.87	107.56	106.97

Graph 9a: Monthly Per Capita Daily Water Production for City of Cortez & MCWD #1 (2008 - 2017)



Graph 9b: Ave. Monthly Per Capita Daily Water Production for City of Cortez & MCWD #1 (2008 - 2017)




Graph 10a: Monthly Water Produced for City of Cortez & MCWD #1
Monthly Water Production [MG]
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Jan-07
May-07
Sep-07
Jan-08
May-08
Sep-08
Jan-09
May-09
Sep-09
Jan-10
May-10
Sep-10
Jan-11
May-11
Sep-11
Jan-12
May-12
Sep-12
Jan-13
May-13
Sep-13
Jan-14
May-14
Sep-14
Jan-15
May-15
Sep-15
Jan-16
May-16
Sep-16
Month

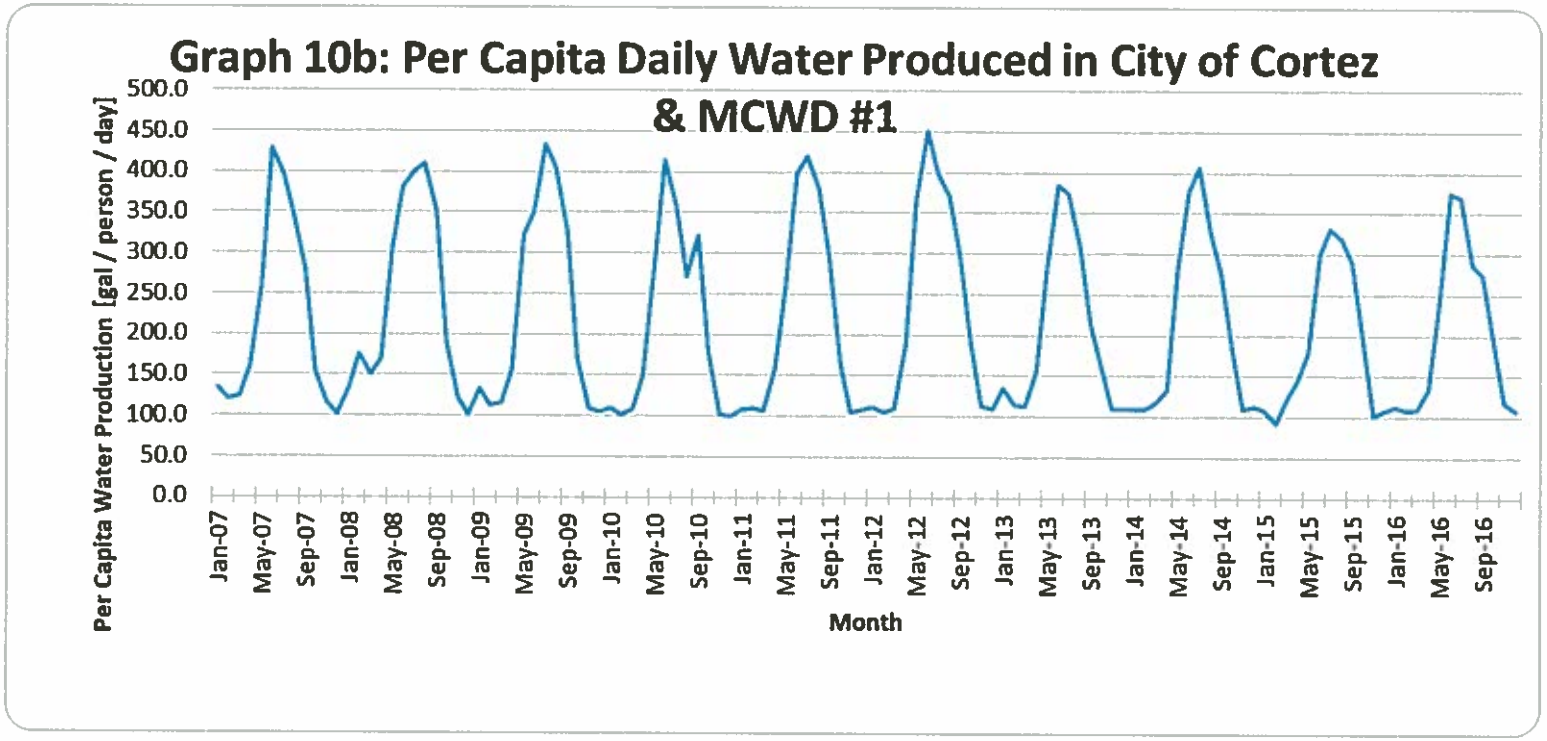
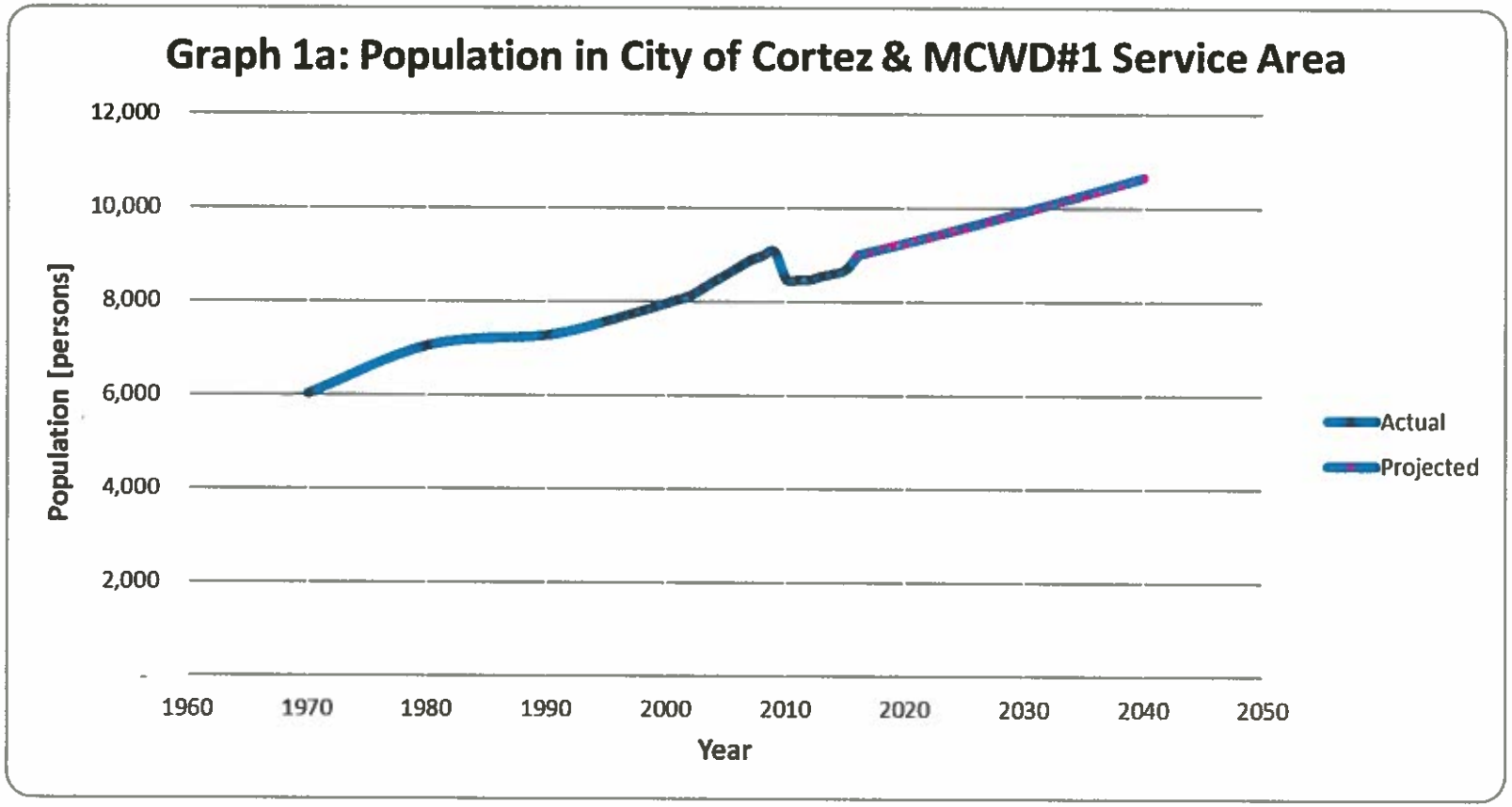

Graph 10b: Per Capita Daily Water Produced in City of Cortez & MCWD #1
Per Capita Water Production [gal / person / day]
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Jan-07
May-07
Sep-07
Jan-08
May-08
Sep-08
Jan-09
May-09
Sep-09
Jan-10
May-10
Sep-10
Jan-11
May-11
Sep-11
Jan-12
May-12
Sep-12
Jan-13
May-13
Sep-13
Jan-14
May-14
Sep-14
Jan-15
May-15
Sep-15
Jan-16
May-16
Sep-16
Month

Table 10: Estimates of Water Savings from Longer Filter Runs / Reduced Filter Backwash Frequency

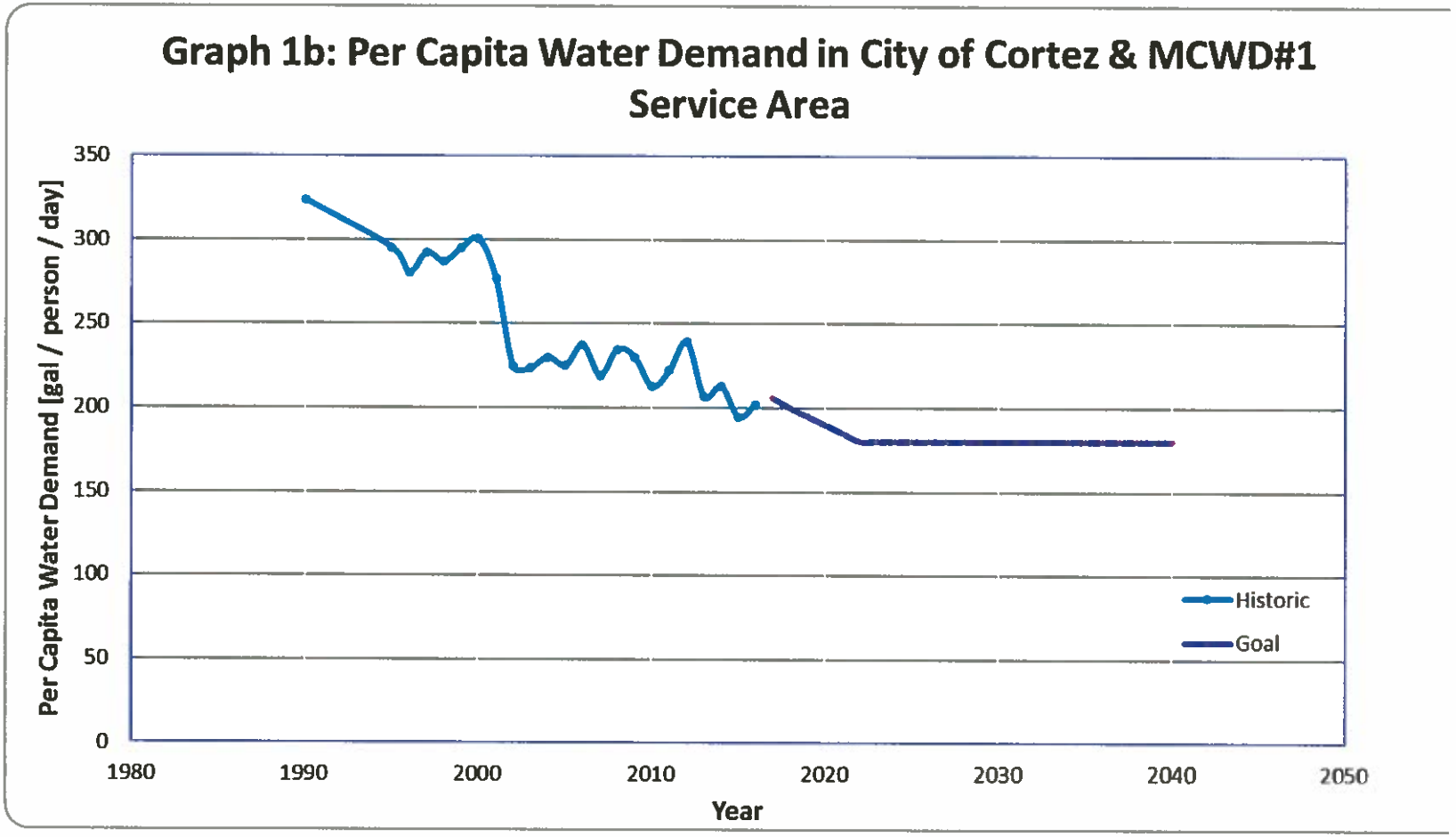
Inputted value
Carried over value
Calculated value

Pre-Filter Improvements	
Peak Use Period: June - August	
Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	92
Filter Backwash Frequency (backwashes / day)	4
Number of Filter Backwashes During Period (backwashes / period)	368
Volume of Backwash Water to Lower Pond (gal / period)	17,480,000
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	5,826,608
Volume of Water Recycled Back to Upper Pond (gal / period)	11,653,392
Moderate Use Period: May, September	
Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	61
Filter Backwash Frequency (backwashes / day)	2
Number of Filter Backwashes During Period (backwashes / period)	122
Volume of Backwash Water to Lower Pond (gal / period)	5,795,000
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	1,931,647
Volume of Water Recycled Back to Upper Pond (gal / period)	3,863,353
Off-Peak Use Period: October - April	
Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	212
Filter Backwash Frequency (backwashes / day)	1
Number of Filter Backwashes During Period (backwashes / period)	212
Volume of Backwash Water to Lower Pond (gal / period)	10,070,000
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	3,356,633
Volume of Water Recycled Back to Upper Pond (gal / period)	6,713,367
TOTAL VOLUME OF BACKWASH WATER TO LOWER POND (gal / year)	33,345,000
TOTAL VOLUME RECYCLED BACK TO UPPER POND (gal / year)	22,230,111
TOTAL VOLUME LOST DUE TO EVAPORATION / INFILTRATION (gal / year)	11,114,889
REDUCTION IN VOLUME LOST DUE TO EVAPORATION / INFILTRATION (gal / year)	6,128,072
REDUCTION IN VOLUME LOST DUE TO EVAPORATION / INFILTRATION (MG / year)	6.13

Post-Filter Improvements	
Peak Use Period: May - September	
Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	92
Time Between Backwashes (days/backwash)	2
Number of Filter Backwashes During Period (backwashes / period)	184
Volume of Backwash Water to Lower Pond (gal / period)	8,740,000
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	2,913,304
Volume of Water Recycled Back to Upper Pond (gal / period)	5,826,696
Moderate Use Period: May, September	
Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	61
Filter Backwash Frequency (backwashes / day)	1
Number of Filter Backwashes During Period (backwashes / period)	61
Volume of Backwash Water to Lower Pond (gal / period)	2,897,500
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	965,824
Volume of Water Recycled Back to Upper Pond (gal / period)	1,931,676
Off-Peak Use Period: October - April	
Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	212
Filter Backwash Frequency (backwashes / day)	0.33
Number of Filter Backwashes During Period (backwashes / period)	69.96
Volume of Backwash Water to Lower Pond (gal / period)	3,323,100
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	1,107,689
Volume of Water Recycled Back to Upper Pond (gal / period)	2,215,411
TOTAL VOLUME OF BACKWASH WATER TO LOWER POND (gal / year)	14,960,600
TOTAL VOLUME RECYCLED BACK TO UPPER POND (gal / year)	9,973,783
TOTAL VOLUME LOST DUE TO EVAPORATION / INFILTRATION (gal / year)	4,986,817
TOTAL WATER SAVINGS DUE TO REDUCED EVAPORATION / INFILTRATION & BACKWASH WATER RECYCLING (gal / year)	16,101,855
TOTAL WATER SAVINGS DUE TO REDUCED EVAPORATION / INFILTRATION & BACKWASH WATER RECYCLING (MG / year)	16.1



Updates



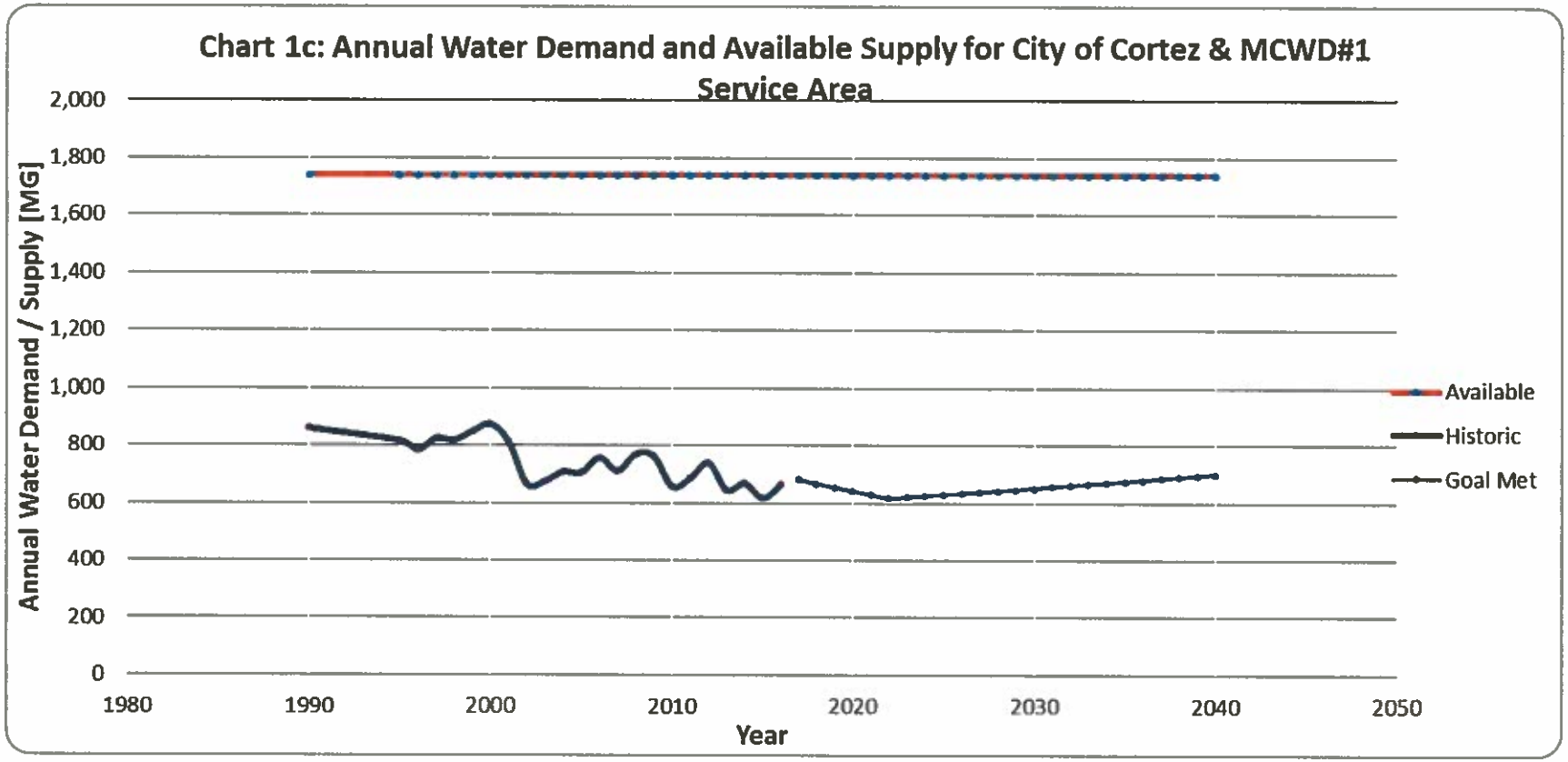


Table 2: Water Demand by User, Metered and Estimated Unmetered (2016 & 2017)

Metered Water User Type[1]	Water Demand [MG] 2016	2017	Change (2016 to 2017) Absolute [MG]	Percentage [%]
City of Cortez				
Residential (Single Unit)	327.8	319.6	-8.2	-2.5%
Residential (Multi-Unit)	52.9	73.7	20.7	39.1%
Commercial	145.9	123.8	-22.1	-15.1%
Schools	21.4	31.1	9.8	45.7%
Churches	6.2	7.2	1.0	15.6%
Government	10.9	7.6	-3.4	-30.9%
Total City of Cortez	565.1	562.9	-2.2	-0.4%
Montezuma County Water District No. 1	45.1	50.8	5.7	12.6%
TOTAL METERED WATER DEMAND	520.0	512.1	-7.9	-1.5%
Unmetered / Unmonitored Water Users (Estimated Water Use)				
Unmonitored Master Meter: Centennial Park Supplemental Irrigation, Swimming Pool, Street Sweepers[2]	1.0	1.0	0.0	0.0%
Unmetered: Hydrant Flushing Program	11.0	11.0	0.0	0.0%
TOTAL ESTIMATED UNMETERED WATER DEMAND	12.0	12.0	0.0	0.0%

Notes:

[1]Water demand by Ute Mountain Ute Tribe is accounted for separately

[2]Metered via a single master meter, but water use data used is not currently monitored

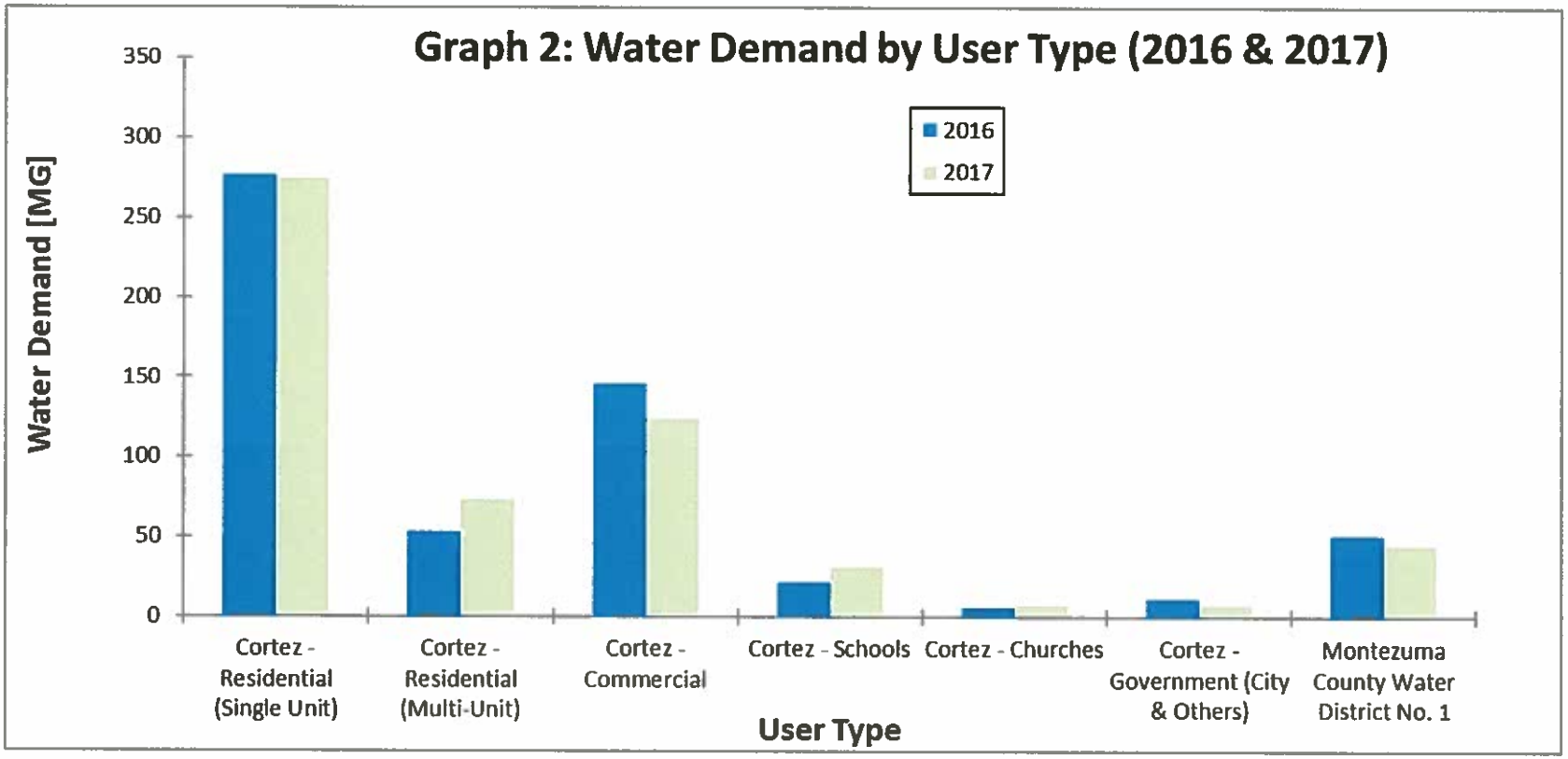

Graph 2: Water Demand by User Type (2016 & 2017)
Water Demand [MG]
350
300
250
200
150
100
50
0
2016
2017
Cortez - Residential (Single Unit)
Cortez - Residential (Multi-Unit)
Cortez - Commercial
Cortez - Schools
Cortez - Churches
Cortez - Government (City & Others)
Montezuma County Water District No. 1
User Type

Table 3: Number & Percent of Taps, Water Demand, Average Water Demand by User Type in City of Cortez (2016 & 2017)

Metered Water User Type	Number of Taps	Percent of Taps	Water Demand [MG]		Average Water Demand Per Tap [MG]	
			2016	2017	2016	2017
City of Cortez						
Residential (Single Unit)	2,879	80.8%	327.8	319.6	0.11	0.11
Residential (Multi-Unit)	179	5.0%	52.9	73.7	0.30	0.41
Commercial	425	11.9%	145.9	123.8	0.34	0.29
Schools	26	0.7%	21.4	31.1	0.82	1.20
Churches	29	0.8%	6.2	7.2	0.21	0.25
Government (City & Parks)	24	0.7%	10.9	7.6	0.46	0.31
TOTAL	3,562	100.0%	565.1	562.9		

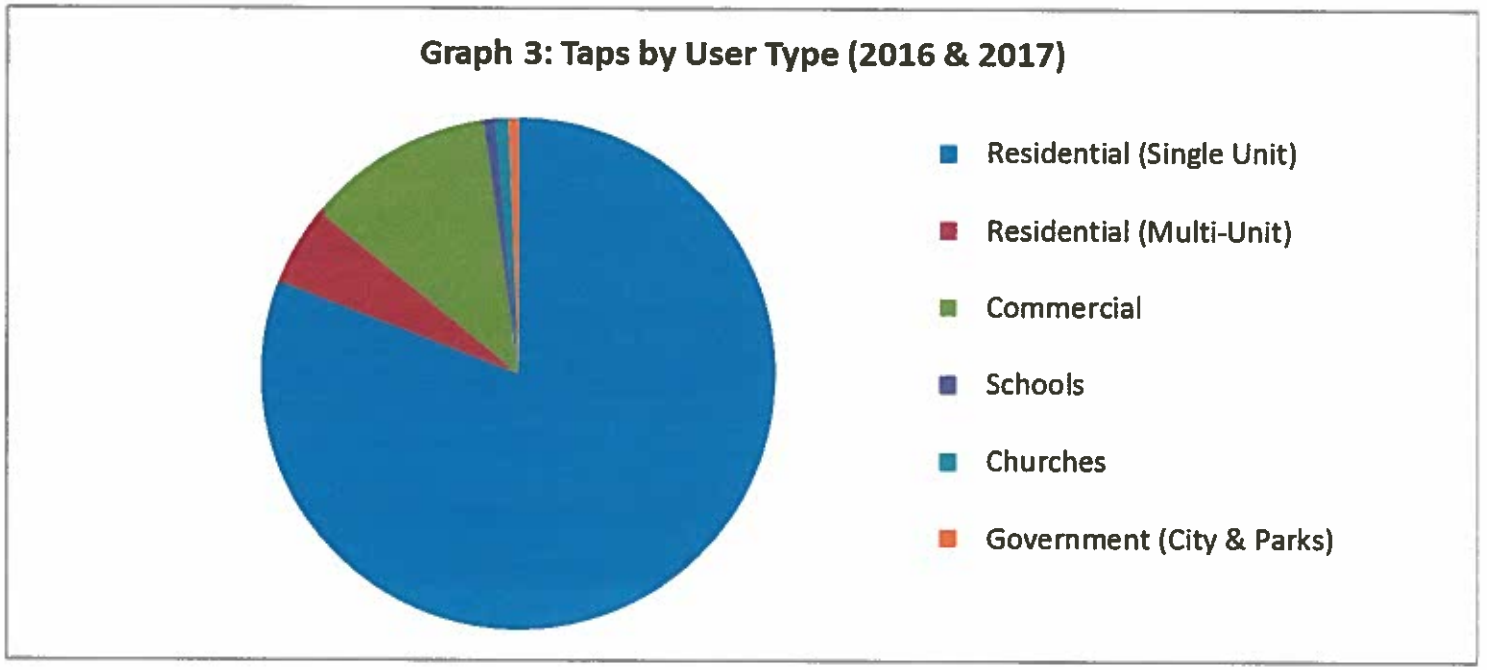


Table 4: Monthly Water Produced at Cortez WTP (2008 - 2017)

Units: [MG]

Month	Year										Monthly Average
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
January	58.9	49.0	44.2	54.5	37.4	47.2	37.8	38.5	41.1	41.0	45.0
February	60.1	39.2	36.8	48.3	34.7	38.5	34.6	33.8	37.1	37.6	40.0
March	57.2	46.1	42.8	50.9	38.3	40.8	39.6	42.9	40.8	42.6	44.2
April	62.4	55.2	52.9	63.7	61.1	51.2	44.9	53.9	47.3	54.9	54.7
May	106.8	110.6	93.0	95.9	118.6	92.1	90.7	62.8	81.6	86.7	93.9
June	135.4	116.1	129.5	136.2	142.0	122.8	120.6	102.7	128.8	132.1	126.6
July	135.9	150.1	120.0	141.7	133.4	124.9	135.0	111.3	127.0	130.4	131.0
August	137.8	141.3	91.8	128.1	126.0	100.8	107.4	109.0	100.3	114.8	115.7
September	112.7	109.6	105.9	96.3	99.5	68.9	91.0	97.7	91.0	99.8	97.2
October	69.2	62.4	65.9	60.7	63.8	52.8	61.0	66.2	65.7	55.5	62.3
November	41.9	39.1	39.6	36.6	38.8	36.4	37.6	37.6	42.6	41.2	39.1
December	39.9	40.5	48.2	39.0	40.4	37.5	38.9	40.3	40.5	40.9	40.6
Annual Total	1,018.2	959.2	870.6	951.9	934.0	813.7	838.9	796.7	843.5	877.5	

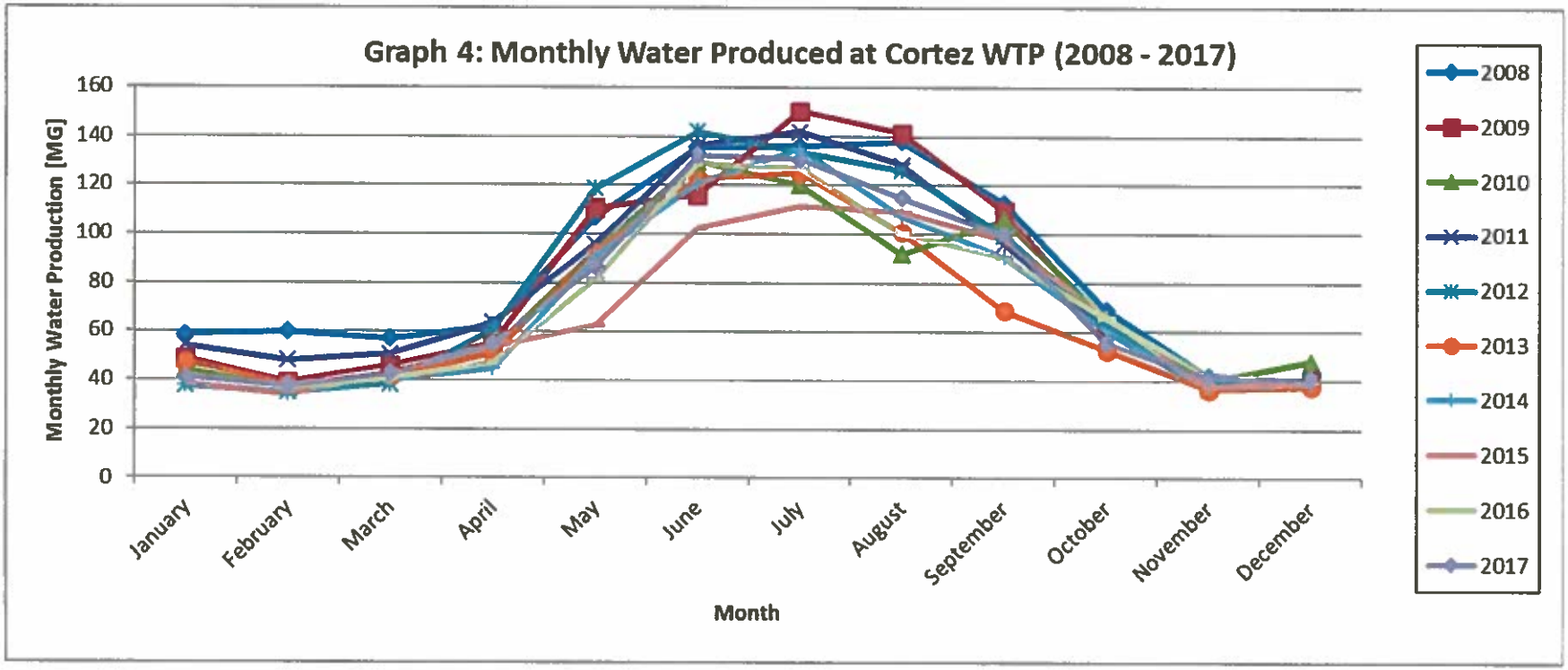


Table 5: Monthly Water Produced for City of Cortez & Montezuma County Water District #1 (2008 - 2017)

Units: [MG]

Month	Year										Monthly Average
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
January	37.1	37.4	29.1	28.9	29.7	36.2	29.3	29.1	31.3	30.5	31.8
February	45.7	28.8	24.5	26.4	26.2	27.4	27.6	25.0	28.0	27.7	28.7
March	42.0	32.7	29.0	28.6	29.1	30.3	31.5	32.5	30.5	31.2	31.7
April	45.7	42.6	38.4	40.7	48.6	40.2	34.6	39.5	36.5	42.8	41.0
May	86.2	90.8	76.9	68.9	97.8	75.1	75.0	48.2	66.0	71.0	75.6
June	103.0	95.4	107.2	103.2	116.4	99.7	97.8	81.1	101.4	104.9	101.0
July	111.8	122.2	95.0	112.0	106.6	100.0	108.8	89.6	103.0	101.4	105.0
August	114.5	114.4	72.7	101.7	99.1	82.0	87.0	86.0	80.0	91.0	92.8
September	94.8	89.1	83.3	76.6	77.4	55.5	71.3	78.3	74.0	79.3	78.0
October	52.7	47.9	48.0	44.0	50.1	42.1	48.1	51.8	52.8	41.8	47.9
November	33.0	29.9	26.5	27.3	29.2	28.2	28.5	27.5	31.6	30.7	29.2
December	28.5	29.4	26.8	28.7	29.4	29.1	30.0	29.2	30.0	30.2	29.1
Annual Total	795.0	760.6	657.3	687.0	739.6	645.9	669.3	617.8	665.1	682.6	

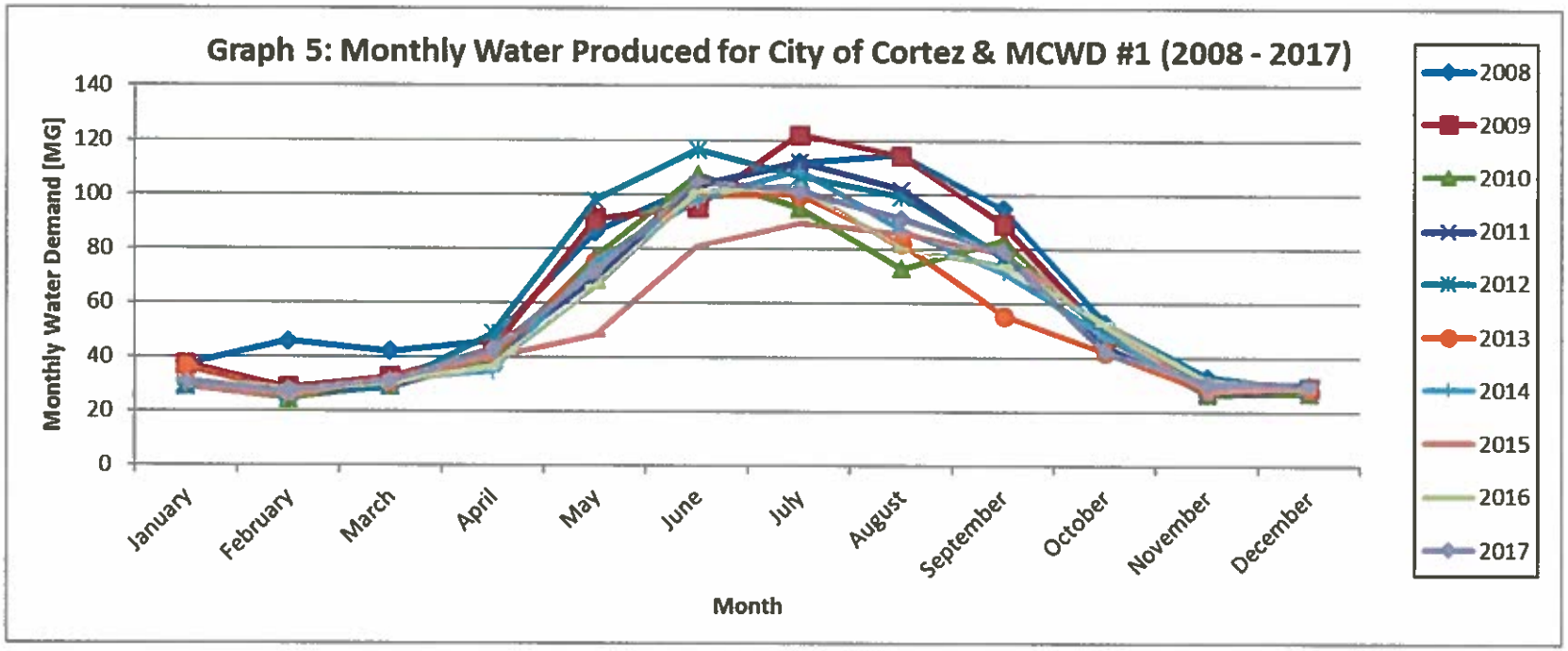


Table 6: Monthly Water Produced for Ute Mountain Ute Mountain Tribe (2008 - 2017)

Units: MG	Year										
Month	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Monthly Average**
January	21.8	11.6	15.1	25.6	7.8	11.0	8.5	9.4	9.8	10.5	13.1
February	14.3	10.4	12.3	21.9	8.4	11.0	7.0	8.8	9.0	9.9	11.3
March	15.2	13.4	13.7	22.3	9.2	10.5	8.1	10.4	10.3	11.4	12.5
April	16.8	12.5	14.5	22.9	12.5	11.0	10.3	14.4	10.9	12.1	13.8
May	20.7	19.8	16.1	27.0	20.8	17.0	15.6	14.6	15.6	15.7	18.3
June	32.4	20.7	22.3	33.0	25.6	23.2	22.8	21.6	27.3	27.2	25.6
July	24.1	27.9	25.0	29.7	26.7	24.8	26.2	21.8	24.0	29.0	25.9
August	23.3	26.9	19.1	26.4	26.9	18.8	20.3	23.0	20.3	23.9	22.9
September	17.9	20.6	22.6	19.7	22.1	13.4	19.6	19.4	16.9	20.5	19.3
October	16.5	14.4	17.9	16.7	13.6	10.7	13.0	14.4	12.9	13.7	14.4
November	8.9	9.2	13.2	9.4	9.7	8.2	9.1	10.1	11.0	10.4	9.9
December	11.4	11.1	21.3	10.3	11.0	8.3	8.9	11.1	10.4	10.7	11.5
Annual Total	223.3	198.5	213.3	264.9	194.4	167.8	169.6	178.9	178.4	195.0	

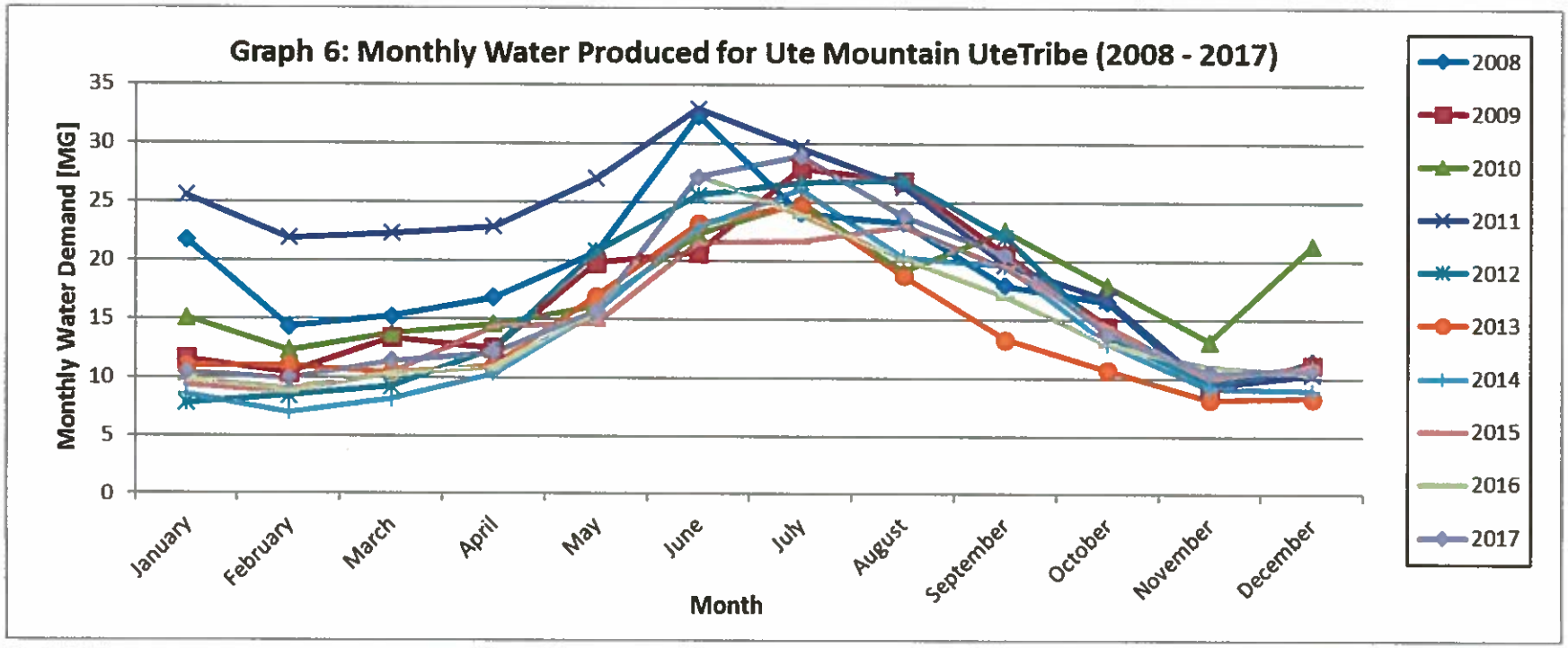


Table 7: Monthly Water Production by User (2008 - 2017)

Units: MG

Month	Total Water Produced	City of Cortez & MWD #1	Ute Mountain Ute Tribe
January	45.0	31.8	13.1
February	40.0	28.7	11.3
March	44.2	31.7	12.5
April	54.7	41.0	13.8
May	93.9	75.6	18.3
June	126.6	101.0	25.6
July	131.0	105.0	25.9
August	115.7	92.8	22.9
September	97.2	78.0	19.3
October	62.3	47.9	14.4
November	39.1	29.2	9.9
December	40.6	29.1	11.5

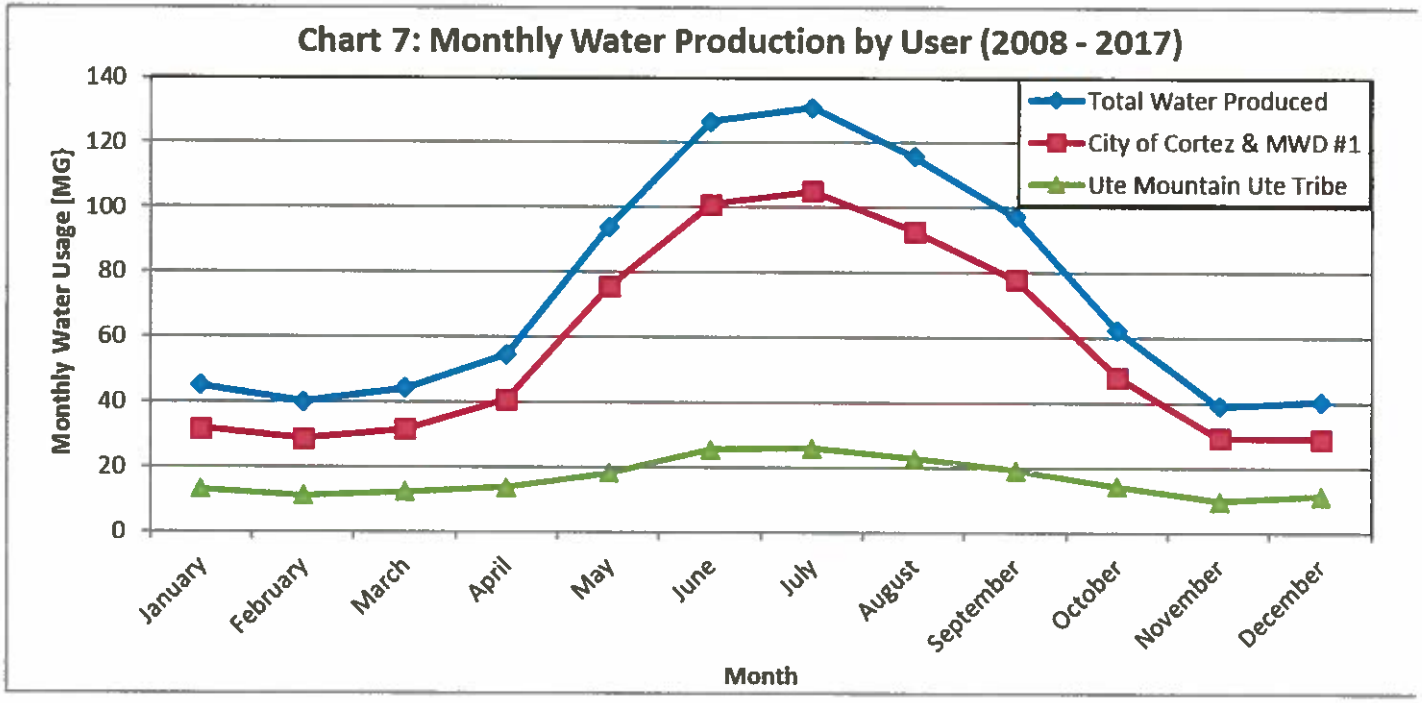


Table 8: Annual Water Production by User (2008 - 2017)

Units: MG

User	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Water Produced	1,018.2	959.2	870.6	951.9	934.0	813.7	838.9	796.7	843.5	877.5
City of Cortez & MWD #1	795.0	760.6	657.3	687.0	739.6	645.9	669.3	617.8	665.1	682.6
Ute Mountain Ute Tribe	223.3	198.5	213.3	264.9	194.4	167.8	169.6	178.9	178.4	195.0

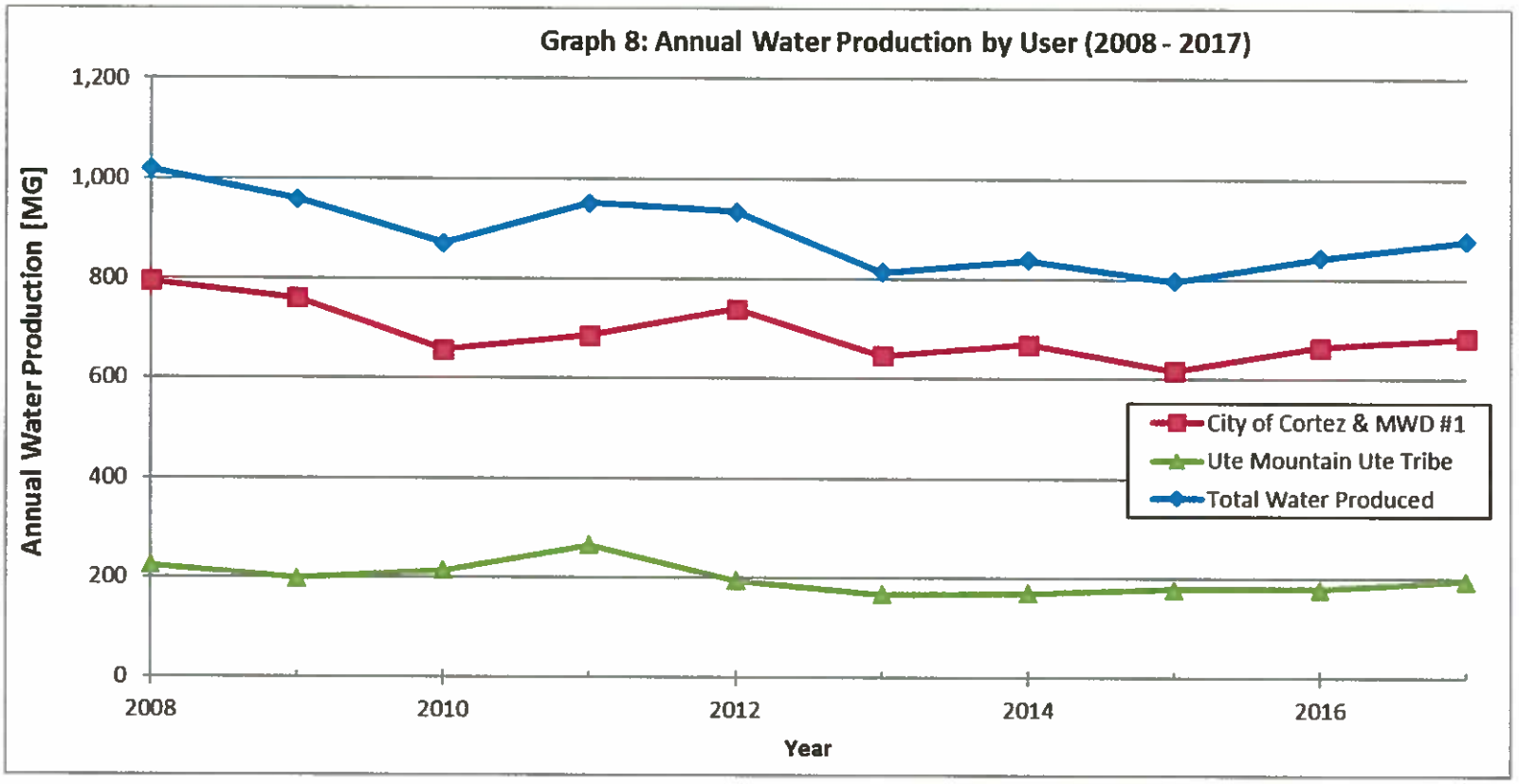
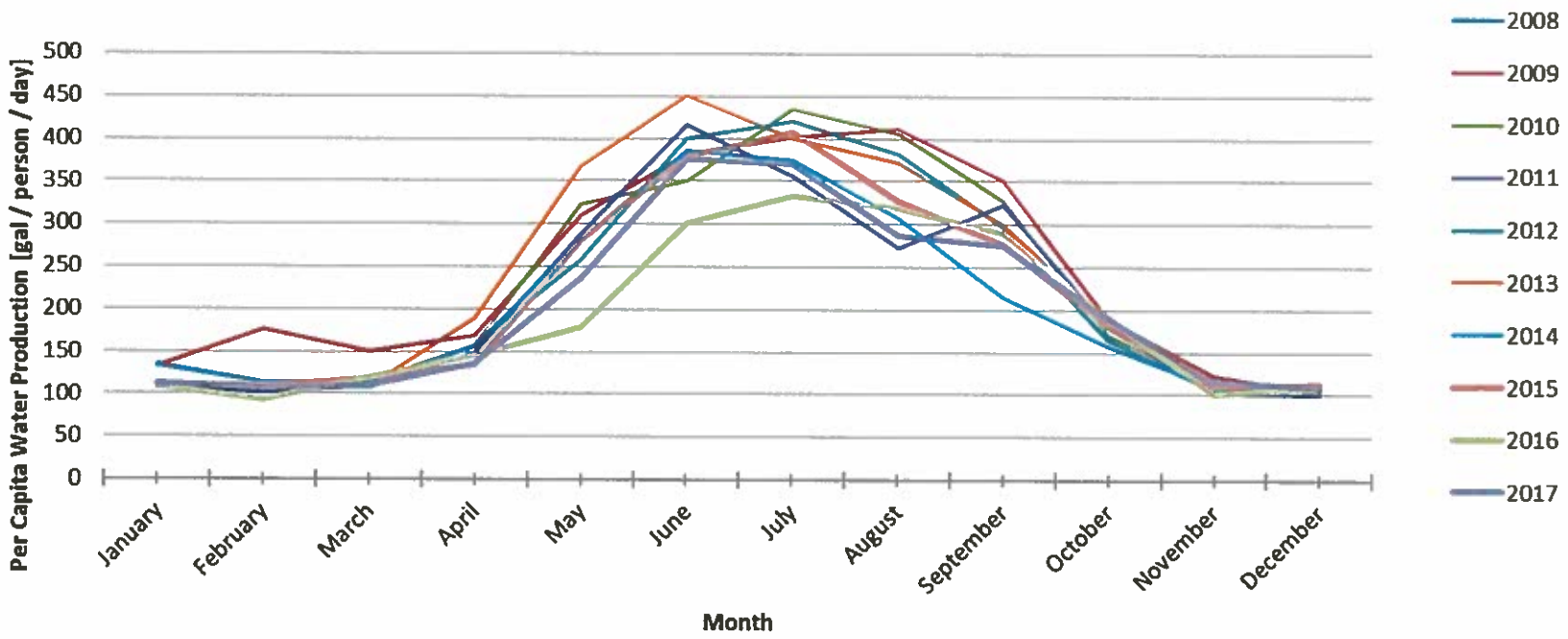


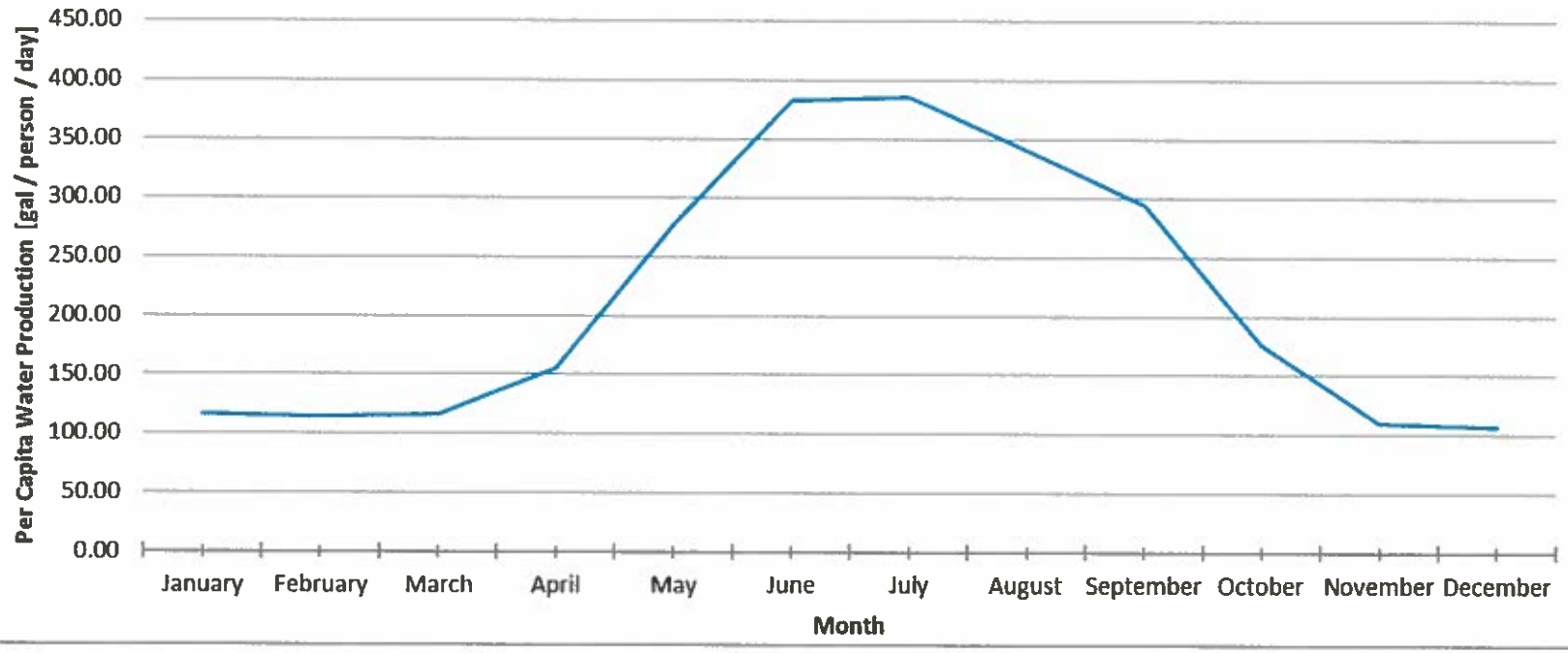
Table 9: Monthly Per Capita Daily Water Production for City of Cortez & Montezuma County Water District #1 (2008 - 2017)

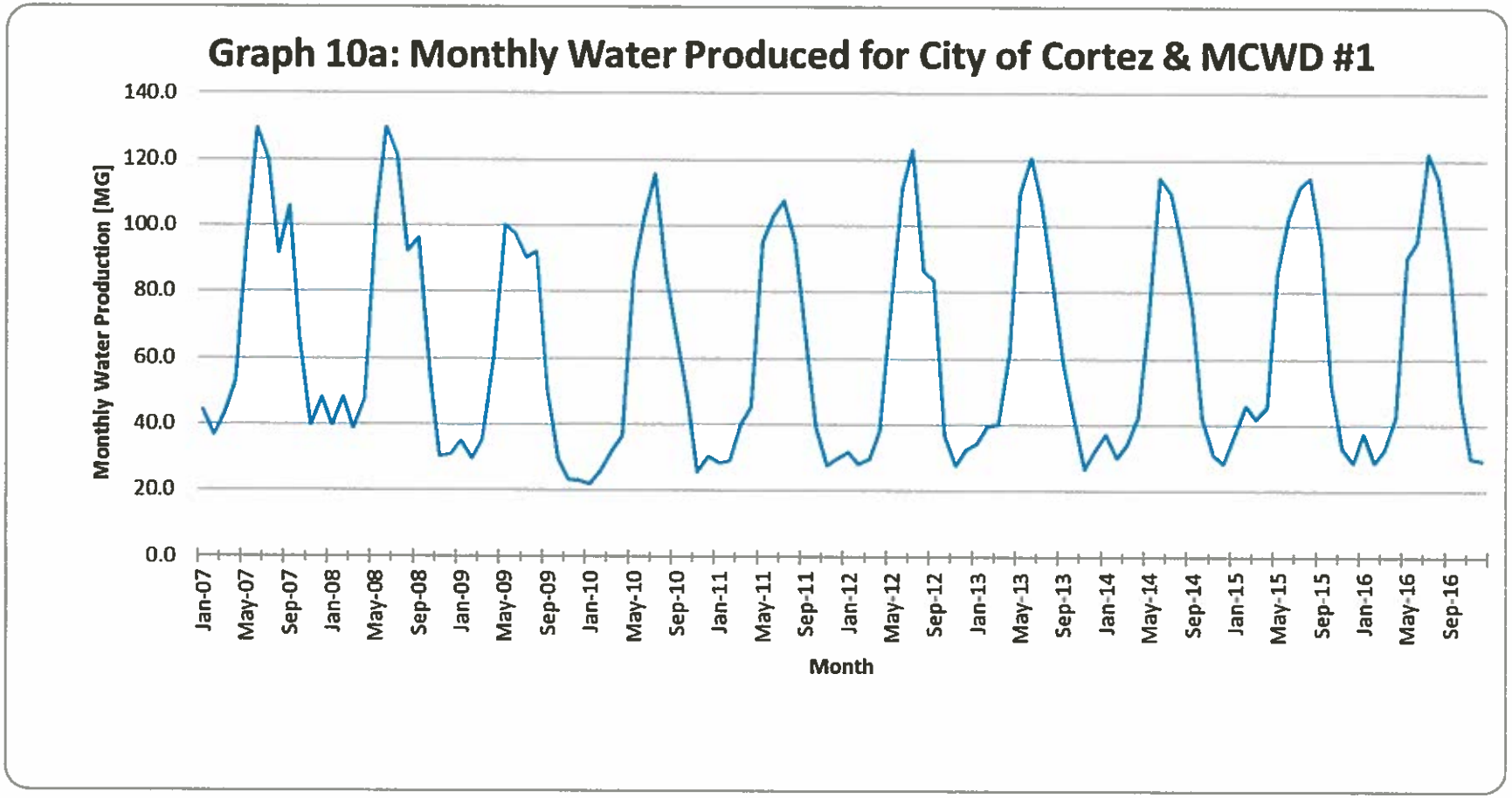
Month	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Monthly Average
January	133.0	132.8	108.93	108.26	111.09	135.53	109.62	107.98	112.23	108.49	116.79
February	175.3	113.1	101.62	109.38	105.09	113.82	110.36	92.64	107.61	108.96	113.80
March	150.7	116.2	108.78	107.25	109.13	113.51	117.96	120.28	109.42	111.00	116.42
April	169.3	156.6	148.55	157.74	188.15	155.62	133.86	146.41	135.29	157.32	154.88
May	309.2	322.7	287.98	258.15	366.47	281.42	281.10	178.80	236.76	252.58	277.51
June	381.8	350.2	415.18	399.58	450.60	385.81	378.45	300.73	376.25	385.65	382.42
July	401.4	434.3	356.08	419.46	399.42	374.81	407.60	331.97	369.82	360.79	385.56
August	411.0	406.4	272.25	381.16	371.21	307.27	326.12	318.67	287.16	323.49	340.47
September	351.6	327.1	322.49	296.52	299.65	214.91	276.10	290.11	274.53	291.33	294.43
October	189.2	170.3	179.66	164.76	187.88	157.73	180.04	192.11	189.45	148.53	175.96
November	122.3	109.6	102.49	105.53	112.88	109.18	110.25	101.91	117.15	112.99	110.43
December	102.3	104.4	100.46	107.50	109.99	109.14	112.31	108.15	107.87	107.56	106.97

Graph 9a: Monthly Per Capita Daily Water Production for City of Cortez & MCWD #1 (2008 - 2017)



Graph 9b: Ave. Monthly Per Capita Daily Water Production for City of Cortez & MCWD #1 (2008 - 2017)




Graph 10a: Monthly Water Produced for City of Cortez & MCWD #1
Monthly Water Production [MG]
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Jan-07
May-07
Sep-07
Jan-08
May-08
Sep-08
Jan-09
May-09
Sep-09
Jan-10
May-10
Sep-10
Jan-11
May-11
Sep-11
Jan-12
May-12
Sep-12
Jan-13
May-13
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Jan-14
May-14
Sep-14
Jan-15
May-15
Sep-15
Jan-16
May-16
Sep-16
Month

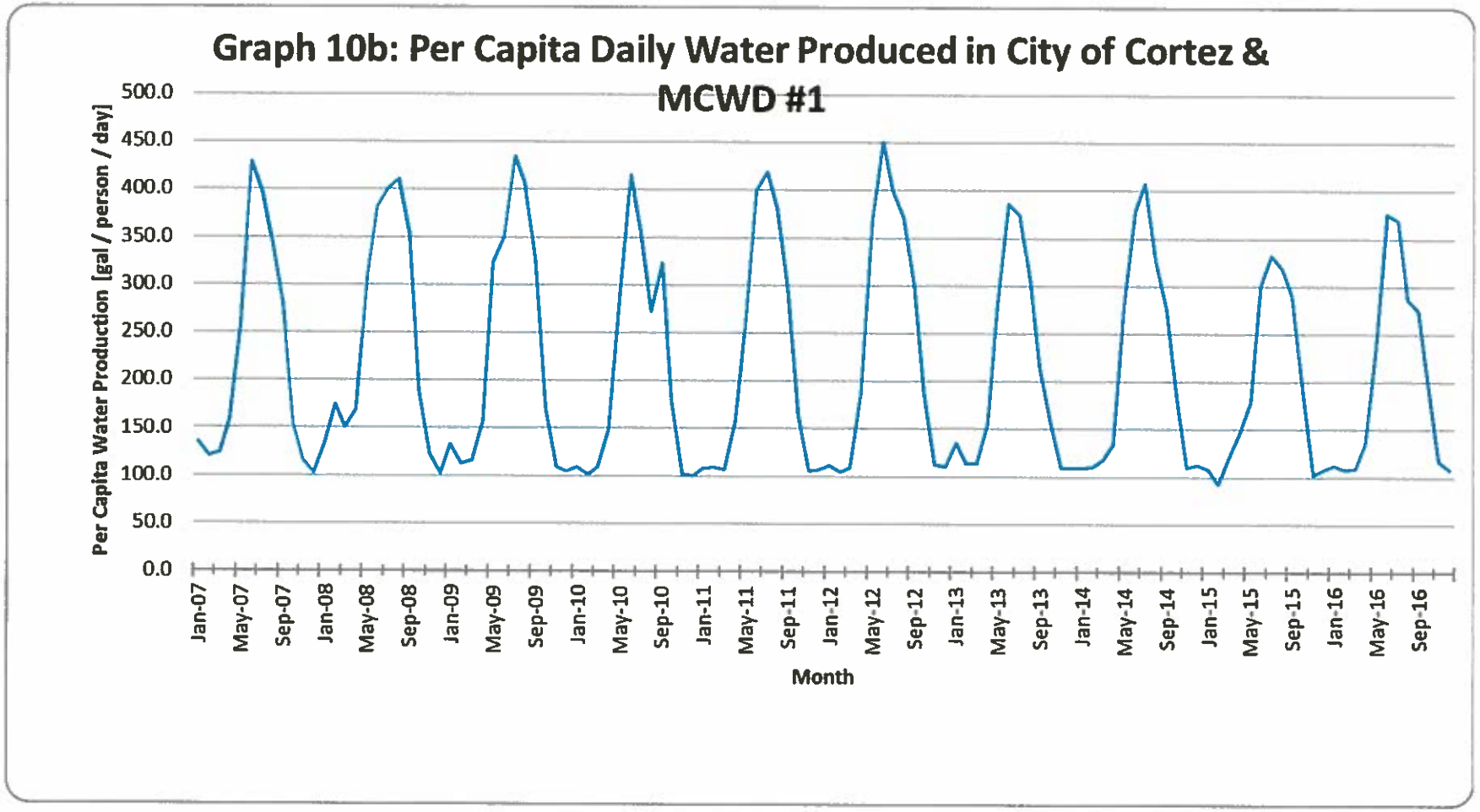

Graph 10b: Per Capita Daily Water Produced in City of Cortez & MCWD #1
Per Capita Water Production [gal / person / day]
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Jan-07
May-07
Sep-07
Jan-08
May-08
Sep-08
Jan-09
May-09
Sep-09
Jan-10
May-10
Sep-10
Jan-11
May-11
Sep-11
Jan-12
May-12
Sep-12
Jan-13
May-13
Sep-13
Jan-14
May-14
Sep-14
Jan-15
May-15
Sep-15
Jan-16
May-16
Sep-16
Month

Table 10: Estimates of Water Savings from Longer Filter Runs / Reduced Filter Backwash Frequency

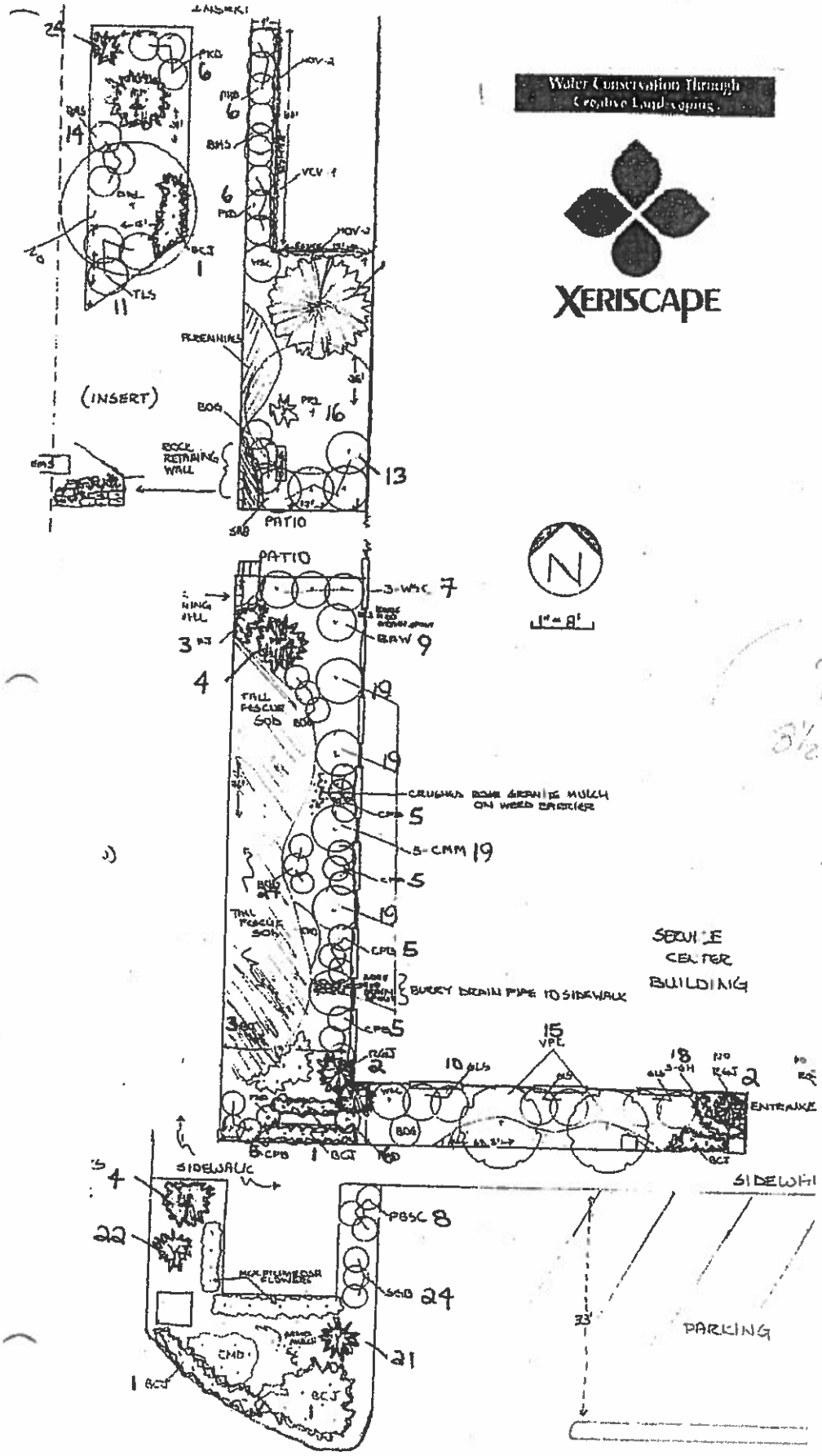
	Inputted value
	Carried over value
	Calculated value

Pre-Filter Improvements		Post-Filter Improvements	
Peak Use Period: June - August		Peak Use Period: May - September	
Backwash Volume (gal / backwash)	47,500	Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	92	Period Length (days / period)	92
Filter Backwash Frequency (backwashes / day)	4	Time Between Backwashes (days/backwash)	2
Number of Filter Backwashes During Period (backwashes / period)	368	Number of Filter Backwashes During Period (backwashes / period)	184
Volume of Backwash Water to Lower Pond (gal / period)	17,480,000	Volume of Backwash Water to Lower Pond (gal / period)	8,740,000
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333	Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667	Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	5,826,608	Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	2,913,304
Volume of Water Recycled Back to Upper Pond (gal / period)	11,653,392	Volume of Water Recycled Back to Upper Pond (gal / period)	5,826,696
Moderate Use Period: May, September		Moderate Use Period: May, September	
Backwash Volume (gal / backwash)	47,500	Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	61	Period Length (days / period)	61
Filter Backwash Frequency (backwashes / day)	2	Filter Backwash Frequency (backwashes / day)	1
Number of Filter Backwashes During Period (backwashes / period)	122	Number of Filter Backwashes During Period (backwashes / period)	61
Volume of Backwash Water to Lower Pond (gal / period)	5,795,000	Volume of Backwash Water to Lower Pond (gal / period)	2,897,500
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333	Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667	Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	1,931,647	Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	965,824
Volume of Water Recycled Back to Upper Pond (gal / period)	3,863,353	Volume of Water Recycled Back to Upper Pond (gal / period)	1,931,676
Off-Peak Use Period: October - April		Off-Peak Use Period: October - April	
Backwash Volume (gal / backwash)	47,500	Backwash Volume (gal / backwash)	47,500
Period Length (days / period)	212	Period Length (days / period)	212
Filter Backwash Frequency (backwashes / day)	1	Filter Backwash Frequency (backwashes / day)	0.33
Number of Filter Backwashes During Period (backwashes / period)	212	Number of Filter Backwashes During Period (backwashes / period)	69.96
Volume of Backwash Water to Lower Pond (gal / period)	10,070,000	Volume of Backwash Water to Lower Pond (gal / period)	3,323,100
Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333	Fraction of Water Lost in Lower Pond Due to Evaporation / Infiltration (-)	0.333
Fraction of Water Recycled Back to Upper Pond (-)	0.667	Fraction of Water Recycled Back to Upper Pond (-)	0.667
Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	3,356,633	Volume of Water Lost Due to Evaporation / Infiltration (gal / period)	1,107,689
Volume of Water Recycled Back to Upper Pond (gal / period)	6,713,367	Volume of Water Recycled Back to Upper Pond (gal / period)	2,215,411
TOTAL VOLUME OF BACKWASH WATER TO LOWER POND (gal / year)	33,345,000	TOTAL VOLUME OF BACKWASH WATER TO LOWER POND (gal / year)	14,960,600
TOTAL VOLUME RECYCLED BACK TO UPPER POND (gal / year)	22,230,111	TOTAL VOLUME RECYCLED BACK TO UPPER POND (gal / year)	9,973,783
TOTAL VOLUME LOST DUE TO EVAPORATION / INFILTRATION (gal / year)	11,114,889	TOTAL VOLUME LOST DUE TO EVAPORATION / INFILTRATION (gal / year)	4,986,817
REDUCTION IN VOLUME LOST DUE TO EVAPORATION / INFILTRATION (gal / year)	6,128,072	TOTAL WATER SAVINGS DUE TO REDUCED EVAPORATION / INFILTRATION & BACKWASH WATER RECYCLING (gal / year)	16,101,855
REDUCTION IN VOLUME LOST DUE TO EVAPORATION / INFILTRATION (MG / year)	6.13	TOTAL WATER SAVINGS DUE TO REDUCED EVAPORATION / INFILTRATION & BACKWASH WATER RECYCLING (MG / year)	16.1

City of Cortez
2018 Water Conservation Plan

Appendix

Waterwise Landscaping
Demonstration Garden Information
and
Draft Brochure



Reduced
8½ x 14 to 8½ x 11

Brochure
Page 1

City of Cortez Service Center Xeriscape Beds

Symbol	Plant Name	Xeriscape
Evergreens		
1	Blue Chip Juniper	X
2	Robusta Green Upright Junipe	X
3	Buffalo Juniper	X
4	Mugho Pine Shrub	X
Shrubs		
5	Crimson Pygmy Barberry	X
6	Potentilla 'Katherine Dykes'	X
7	Western Sandcherry	XX
8	Pawnee Buttes Sandcherry	XX
9	Blue Arctic Willow	
10	Gro-lo Sumac	X
11	Three Leaf Sumac	XXX
12	Littleleaf Sumac	XX
13	Silver Buffaloberry	X
14	Blue Mist Spiree	XX
Trees		
15	Velvet Pillar Upright Crabapple	
16	Purple Robe Locust	XX
17	Austrian Pine	X
Broadleaf Evergreens		
18	Compact Oregon Grape Holly	X
19	Curleaf Mt. Mahogany	X
20	Littleleaf Mt Mahogany	X
21	Yucca Banana	XXX
22	Yucca Narrowleaf	XXX
23	Yucca Red Flowering	X
24	Spanish Broom	XX
Perennials		
25	Blue Catmint Compact	X
26	Mexican Primrose	X
27	Blue Oat Grass	XX
28	Parkers Yarrow	XXX
29	Penstemon varieties	X
30	Sedum Autumn Joy	XX

X=Dry
XX=Very Dry
XXX=Extra Dry

Water Wise

(reduced 8½ x 14 to 8½ x 11)

Brochure Page 2

CITY OF CORTEZ
SERVICE CENTER
110 W. PROGRESS CIRCLE
CORTEZ, CO 81321

SITE LANDSCAPE PLAN AND PLANT MATERIAL FOR A DROUGHT TOLERANT LANDSCAPE.

Page 1

XERISCAPE™

PROMOTING WATER CONSERVATION THROUGH CREATIVE LANDSCAPING

Fundamentals of Xeriscape...

Planning & Design

Many people create their own designs with excellent results. Landscape professionals can also serve as helpful resources. They can provide advice, critique or develop your plan for you. Planning is one of the most important steps to a successful Xeriscape because it allows you to install your landscape in phases, which minimizes initial expenses.

Turf Alternatives

Locate turf where it provides functional benefits and separate it from other plantings so that it can be watered more efficiently. Consider alternatives to turf, such as patios, decks, mulches, and native or low water-use plantings that add to your property value, while they beautify your landscape.

Mulches

Mulched planting beds are an ideal replacement for turf areas. Mulches cover the soil and minimize evaporation, reduce weed growth and slow erosion. Organic mulches typically include bark chips, wood grindings and pole peelings. Non-organic mulches include rock and various gravel products.

Zoning of Plants

Plantings, including turf areas, should be divided into separate water use areas according to their function and location in the landscape. Take advantage of microclimates or existing water in the landscape and locate plants according to their specific water and cultural needs. Try to consolidate high water-use plants to the most accessible and easily maintainable portion of the landscape. Then, utilize the many beautiful low water-use plants available in zones designated for them. Use your plantings to create "rooms" or use areas in the landscape, and be sure to allow space for mature plant size.

Soil Improvements

Rocky mountain soils are improved with the addition of organic matter. This allows for better absorption of water and improved water holding capacity of the soil. Soils that have organic matter also provide beneficial nutrients to plants, as well as air for deep root growth. Improve the soil prior to planting and installation of automatic irrigation systems.

PLANT LIST

Very Low Water Zone

Trees

Bur Oak
Quercus macrocarpa
70-80'

Pinyon Pine
Pinus edulis
15-50'

Russian Olive
Elaeagnus angustifolia
15-40', gray leaves

Shrubs

Curlleaf Mountain Mahogany
Cercocarpus ledifolius
5-10'

Mexican Cliffrose
Cowania mexicana
6-10', yellow flowers

New Mexican Privet
Forestiera neomexicana
5-8'

Rubber Rabbitbrush
Chrysothamnus nauseosus
2-4', yellow flowers

Russian Sage
Perovskia atriplicifolia
3-5', purple flowers

Sand Cherry
Prunus besseyi
4-6'

Saskatoon Serviceberry
Amelanchier alnifolia
7-15', blue berries

Shrubby Sage
Artemisia spp.
2-5', gray leaves

Three Leaf Sumac
Rhus trilobata
3-5', red fall color

Ground Covers

Creeping Juniper
Juniperus horizontalis
6-12"

Creeping Red Penstemon
Penstemon pinifolius
6-12", red flowers

Fringed Sage
Artemisia frigida
8-20", gray leaves

Hardy Ice Plant
Delosperma nubigenum
3", yellow flowers

Pussytoes
Antennaria rosea
3", white/pink flowers

Sedum Spp.
Sedum spp.
3-15", multicolor flowers

Snow-in-Summer
Cerastium tomentosum
6-10", white flowers

Sulfur Flower
Eriogonum umbellatum
6-8", yellow flowers

Woolly Thyme
Thymus pseudolanuginosus
2", pink flowers

Perennials

Blanket Flower
Gaillardia aristata
18-30", yellow/red flowers

Blue Flax
Linum perenne
15-18", blue flowers

Gayfeather
Liatris punctata
18-24", purple flowers

Prairie Coneflower
Ratibida columnaris
15-18", yellow/orange flowers

Rocky Mountain Penstemon
Penstemon strictus
18-24", blue flowers

Silverleaf Cinquefoil
Potentilla hippiana
6-10", yellow flowers

Annuals

Annual Baby's Breath
Gypsophila elegans
18-20", white flowers

Page 2

Annual Coreopsis
Calliopsis tinctoria
12-18" orange/red flowers

California Poppy
Eschscholtzia californica
6-8", yellow/orange flowers

untain Bachelor Button
ntaurea cyanus
15", blue flowers

tica
tonium sinuata
26", blue/yellow flowers

TURF AREA
BUFFALO GRASS
BLUEGRAMA

PLANT LIST

Low Water Zone

Trees

Bigtooth Maple
Acer grandidentatum
18-25', red fall color

Golden Rain Tree
Koelreuteria paniculata
30-40', yellow flowers

Green Ash
Fraxinus pennsylvanica
55-75'

Kentucky Coffee Tree
Gymnocladus dioicus
60-75', pods

Ponderosa Pine
Pinus ponderosa
25-50'

Rocky Mountain Juniper
Juniperus scopulorum
30-40'

Rocky Mountain Maple
Acer glabrum
12-18', red fall color

Russian Hawthorne
Crataegus ambigua
12-20', red fruit

Western Catalpa
Catalpa speciosa
45-70', white flowers

Western Hackberry
Celtis occidentalis
40-60'

Shrubs

American Plum
Prunus americana
4-8', white flowers

Bluemist Spirea
Caryopteris clandonensis
30"-3', blue flowers

Golden Currant
Ribes aureum
3-4', yellow flowers

Littleleaf Mockorange
Philadelphus microphyllus
5-8', white flowers

Mugho Pine
Pinus mugo mughus
3-10'

Shrub Rose
Rosa rugosa
12"-3', pink flowers

Spreading Cotoneaster
Cotoneaster divaricata
18-24", red fruit

Ground Covers

Creeping Baby's Breath
Gypsophila repens
2-4", white flowers

Creeping Grape Holly
Mahonia repens
12-18", yellow flowers

Creeping Potentilla
Potentilla verna-nana
2", yellow flowers

Euphorbia
Euphorbia myrsinites
10-18", yellow leaves

Himalayan Border Jewel
Polygonum affine
8-12", white/pink flowers

Sweet Woodruff
Galium odorata
8-12", white flowers

Perennials

Asters, New York
Aster novae-belgii
12-28", purple/white flowers

Basket-of-Gold
Alyssum saxatile
8-12", yellow flowers

Carpathian Harebell
Campanula carpatica
4-8", blue/white flowers

Cottage Pinks
Dianthus plumaris
3-8", pink flowers

Daylilies
Hemerocallis spp.
12-24", multicolor

Evergreen Candytuft
Iberis sempervirens
8-12", white flowers

Evening Primrose
Oenothera spp.
8-30", yellow/white flowers

Iceland Poppy
Papaver nudicale
8-10", multicolor

Perennial Statice
Limonium latifolium
15", white/purple flowers

Annuals

Moss Rose
Portulaca grandiflora
8", multicolor

Siberian Wallflower
Cheiranthus allionii
8-10", yellow/orange

Strawflower
Helichrysum bracteatum
12-36", multicolor

TURF AREA
BUFFALO GRA
BLUE GRAMA
WHEATGRASS
SHEEP FESCI

Water Zones are suitable for Xeriscapes. This is a partial) additional species with similar character may also be appropriate. (Contact your nursery for further information.)

Use plants listed under Moderate Water Zone only in naturally moist areas or areas receiving frequent irrigation.

Page 3

Moderate Water Zone

Trees
Colorado Blue Spruce
Picea pungens
60-75'

Quaking Aspen
Populus tremuloides
30-50', yellow fall color

Shrubs
Cranberry Viburnum
Viburnum trilobum
4-6', red fall color

Dwarf Arctic Willow
Salix purpurea nana
4-6'

Kalmia St. Johnswort
Hypericum vaz kalmianum
2-3', yellow flowers

Winged Euonymus
Euonymus alata
10-18', red fall color

Ground Covers
Bishop's Weed
Aegopodium podagraria
10-15", variegated leaves

Bugleweed
Ajuga reptans
4-6", purple flowers

Periwinkle
Vinca minor
4-6", blue/purple flowers

Perennials
Native Blue Columbine
Aquilegia caerulea
18-24", blue/white flowers

Shasta Daisy
Chrysanthemum maximum
2-3', white flowers

Annuals
Four O'Clock
Mirabilis jalapa
24-30", magenta flowers

Globe Amaranth
Gomphrena globosa
30"-4', red flowers

Turf Selections

Turf Areas
Blue Grama
Buffalo Grass
Kentucky Bluegrass
Tall Fescue
CREEPING [illegible]

Ornamental Grasses
Blue Avena
Blue Fescue
Miscanthus Grass

Borders
Blue Grama
Wheatgrass

BLUE GRASS ALTERNATIVES:

THERE ARE MANY OTHER GRASSES THAT ARE SUITABLE FOR TURF AREAS THAT REQUIRE MUCH LESS WATER. GRASSES ARE EITHER COOL SEASON, (THEY LIKE COOL WEATHER AND ARE GREEN MOST OF THE YEAR) OR WARM SEASON. (THESE LIKE IT HOT AND ARE DORMANT MOST OF THE WINTER AND COOLER MONTHS.

COOL SEASON GRASS:...
- BLUE GRASS
- TALL FESCUE
- SHEEP FESCUE
- WHEATGRASSES

WARM SEASON.....
- BUFFALOGRASS
- BLUE GRAMA GRASS

BARK CHIPS OR SHREDDED WOOD PRODUCTS MAKE A GREAT GROUNDS COVER CRUSHED GRANITE, LAVA ROCK AND RIVER COBBLES ARE ALL GREAT LAWN SUBSTITUTES. MANY COLORS AND SIZE AGGREGATES ARE AVAILABLE USE A WEED BARRIER FABRIC UNDER ALL BARK CHIP OR GRAVEL GROUNDS COVERS

970 565 8356
03:11:46 p.m. 03-30-2010
6/7

IRRIGATION:

WATERING IS NEEDED TO GET EVEN DROUGHT TOLERANT PLANTS ESTABLISHED. THE FIRST GROWING SEASON AND WINTER ARE MOST CRUCIAL TO ESTABLISHING MANY PLANTS.

WHETHER A DRIP SYSTEM, SPRINKLER SYSTEM OR A HOSE AND BUCKET ARE YOUR CHOICE OF WATERING PLEASE ALLOW 2-3 YEARS FOR MOST PLANTS TO BECOME FULLY DROUGHT TOLERANT.

Page 4

XERISCAPE LANDSCAPING WILL HELP YOU CONSERVE WATER

These seven simple steps will produce a beautiful water saving landscape.

- Good Design
- Soil Improvement
- Reduced Turf Area
- Larger Mulch Areas
- Use Low Water Demand Plants
- Zoned Irrigation Systems
- Good Maintenance

GRASSES ARE AVAILABLE MAINLY FROM SEED. SOME VARIETIES SUCH AS BLUE GRASS, TALL FESCUE AND BUFFALOGRASS ARE AVAILABLE AS SOD OR PLUGS.

WATER REQUIREMENTS

BLUE GRASS	1" / WEEK 40"/YEAR
TALL FESCUE	18-30" / YEAR
SHEEP FESCUE	ENOUGH TO KEEP GREEN
WHEATGRASSES	ENOUGH TO KEEP GREEN
BUFFALO GRASS	10-15" / YEAR
BLUE GRAMA	10-15" / YEAR

MANY DROUGHT TOLERANT GRASSES CAN GO DORMANT IN SUMMER DROUGHTS AND GREEN UP WHEN RAINS OR IRRIGATION IS APPLIED. IT IS BEST TO KEEP GRASSES THAT ARE ESTABLISHED WATERED ENOUGH SO AS THEY STILL APPEAR GREEN. THIS MIGHT ONLY BE ONCE A WEEK ON MOST GRASSES.

970 565 8356

03:13:08 p.m. 03-30-2010

7/7

City of Cortez
2018 Water Conservation Plan

Appendix

Public Education Literature

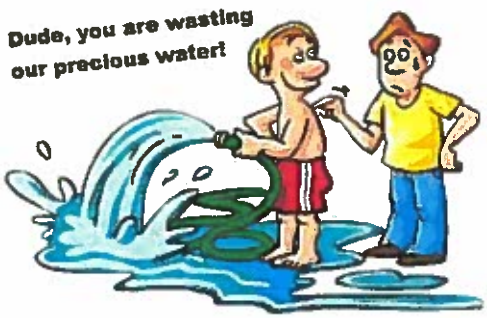
AREA DROUGHT IMPACTS
THE CORTEZ WATER SUPPLY

Southwest Colorado is experiencing extreme drought conditions this year; our snow pack is at record lows, similar to 1990 and 2002. Water supplies for homes and businesses are available this summer for City residents, but all water users will need to practice conservation of our water supplies. Water users are urged to practice beneficial water use as emphasized below and be extra careful not to waste water.

The City adopted a revised **Water Conservation Plan** in 2010 as a guide in the continuing effort to use water resources in the most efficient means possible. The Plan can be accessed on the City's website at: *http://www.cityofcortez.com/government/public_works/water*. The Plan contains information on the current level of water use in the City, with comparisons of historical usage, and the proposed programs the City will be providing to lower the per capita (per person) usage. In 2017, the City's per capita average use was 204 gallons per day. The City's goal is to reach a per capita usage of 180 gallons per day by 2020. With everyone practicing water conservation and participating in good water use practices, this goal can easily be achieved.

THE FOLLOWING CONSERVATION INFORMATION EXPLAINS THE BASICS OF HOW TO USE WATER WISELY.

The phrase **"Use Water Wisely"** is the focal point of water conservation and the City of Cortez continues to promote water conservation as an important part of daily water usage. City water supplies are adequate, but residents should only water outside uses what they need while complying with the **"NO WATERING BETWEEN 10:00 A.M. AND 5:00 P.M."** restriction. The ***"no watering during the hottest part of the day"*** restriction is a permanent ordinance and will be enforced.



The City passed **Ordinance No. 1013, Series 2004, which permanently banned irrigation watering between the hours of 10:00 a.m. and 5:00 p.m. and is enforced from May 15th through September 15th every year.** On the first violation, the water user will receive a warning. On the second violation, the user's water will be turned off and it will require a **$40.00 turn-on fee** to have the water turned back on. The best, and easiest, water conservation measure is to just not waste water.

Recommended Watering Schedule – It is recommended that residents implement a ***two times a week watering schedule.*** Residents can choose the days that best work for their lawns and garden. Those residents with automatic sprinklers for their lawns should be able to program their controllers to meet these recommendations.

NO WATERING IS ALLOWED BETWEEN 10 AM AND 5 PM FROM MAY 15 - SEPTEMBER 15 EACH YEAR.
Since most water evaporates during the heat of the day, this helps to conserve our water supply.

In-Home Water Conservation – There are many water conservation practices you can perform in the home that will save water. Some of these include: taking quicker showers, not letting the water run while shaving or brushing your teeth, and only running full loads of clothes or dishes.

Violations – The City enforces Sec. 27-19 of the Cortez City Code: ***"Wasting Water Prohibited"*** concerning unattended hoses/watering systems or excessive waste due to poor watering practices. Residents violating the ordinance will be notified by the City with a courtesy warning; however, successive **violations will receive a citation subject to fines.** Should the City declare a water conservation emergency, restrictions will be specifically stated and notices delivered to residents as to the extent of necessary water conservation.

Best Lawn Watering Practices – Lawns should be watered in the early morning between 3:00 a.m. and 7:00 a.m. or late evening between 7:00 p.m. and 11:00 p.m. Wetting the soil 4 to 6 inches deep, with several days between watering, develops deep, solid roots. Lawns with deep root growth are more resistant to drought. Residents should try to use a plan of watering their lawn **twice a week for approximately 20 minutes per station.**

LAWN WATERING CONSERVATION – BASIC LAWN WATERING CONSERVATION RULES:

- Water in early morning and late evening hours. **Do not water in the heat of the day between 10:00 a.m. and 5:00 p.m.** This is against City Ordinances and **fines will be imposed for violations.**
- Water lawns and landscaping only - not streets, sidewalks, or driveways.
- Avoid watering during windy weather - this wastes water due to increased evaporation and actually blows the water away from the area intended to be watered.
- Keep your grass height at 2½ to 3 inches - taller grass holds water better. Leave grass clippings on the lawn to form a temporary layer of mulch to conserve moisture.
- Mow often enough to cut only 25% of the length – this prevents excessive shock that causes grass to turn yellow.
- Monitor your lawn to water only when needed - typically when grass blades begin to look dull and bluish-gray.

No Wasted Water – Do not allow hoses to run unattended; fix plumbing leaks immediately; fix leaking toilets; and **report water main leaks in the street** to the Public Works Department by calling 970.565.7320.

Xeriscaping – When planning new areas for landscaping, consider flowers and plants that require less amounts of water to survive. In addition, residents can look into less water-intensive grass types such as fescues, blue grama, wheat grass, and buffalo grass, which all use less water than bluegrass. The landscaping at the City Service Center in the Industrial Park is an example of Xeriscaping with a fescue grass plot, gravel beddings, and low-water usage plants.

New Lawn Permit Available – Anyone who plans to start a new lawn this year and wants to water between 10:00 a.m. and 5:00 p.m. must get a **"New Lawn/Exemption from Watering Restrictions Permit"** from the Public Works Department in the City Service Center. The permit will allow daily watering between 10:00 a.m. and 5:00 p.m. for up to 21 days to start the grass growing. There is a $25 charge for this permit and it should be displayed prominently in the front yard. **If you do not need to water during the restricted watering period, a new lawn permit is not necessary.** There are many grass variety alternatives available that use less water, with each variety having different characteristics to consider. Check out the books and information on Xeriscaping at the Cortez Public Library for more information on which variety would be the best choice for your lawn.

Contact the Public Works Department in the City Service Center, 110 West Progress Circle, Cortez, CO 81321, or call 970.565.7320 for more information.

AN AVERAGE PERSON CAN GO NEARLY TWO MONTHS WITHOUT EATING. **BUT LESS THAN A WEEK WITHOUT WATER COULD KILL YOU.**

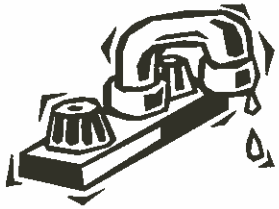
YET, AS IMPORTANT AS WATER IS, MOST OF US KNOW LITTLE ABOUT IT. TAKE THIS TEST AND SEE HOW MUCH YOU KNOW ABOUT WATER.

1. What percentage of the world is covered by water?

2. What percentage of the world's water is readily available for humans to use?

3. How much water is contained in the human body?

4. Which contains more water as a percentage of body weight, a woman's body or a man's body?



5. Why do male and female bodies tend to have different amounts of water?

6. How much water does the human body lose in a typical day?

7. Why is water especially good for people on a diet?

8. What is the largest use of water outdoors?

9. What is the largest use of water indoors?

10. Public water systems produce billions of gallons of drinking water every day, more than 180 gallons per person. What percentage of that is consumed by people?

SEE ANSWERS ON BACK

WATER TIPS

There is as much water in the world today as there was thousands of years ago. Actually, it's the same water. The water from your faucet could contain molecules that dinosaurs drank. Perhaps Columbus sailed across it.

For the price of a single 12-ounce can of soda - about 50 cents - many communities deliver up to 1,000 gallons of fresh, clean drinking water to homes 24 hours a day. If drinking water and soda pop were equally costly, your water bill would skyrocket more than 10,000%!!!

If everyone in the United States flushed the toilet just one less time per day, we could save a lakeful of water about a mile long, a mile wide, and four feet deep every day.

Little leaks add up in a hurry. A faucet drip or invisible toilet leak that totals only two tablespoons a minute comes to 15 gallons a day. That's 105 gallons a week and 5,460 wasted gallons of water a year.

Is it possible your toilet has a secret leak? You can test it by putting ten drops of food coloring in the tank. Don't flush for 15 minutes. If the colored water shows up in the bowl, the tank is leaking.

Seventy-five percent of a tree is water.

Plant drought-resistant trees and plants. Many beautiful trees and plants thrive with far less watering than other species.

Use your automatic dishwasher and automatic washing machine only for full loads.

Some people thoughtlessly flush away tissues and other bits of trash in the toilet. Using a wastebasket, instead, will save all those gallons of water that otherwise go wastefully down the drain.

Information taken from:
Catalog No. 70077 ©1991 AWWA
Catalog No. 70071 © 1991 AWWA

ANSWERS:

1. Some 80% of the world is covered by water or ice. Only about 20% is dry land.

2. 97% of the world's water is salty or otherwise undrinkable. Another 2% is locked in ice caps and glaciers. That leaves just 1% for all of humanity's needs - all its agricultural, manufacturing, community, and personal household needs.

3. If you're an adult, your body contains about 40 quarts (10 gallons) of water.

4. A man's body is 60-65% water. A woman's body is 50-60% water. The human brain is about 75% water.

5. Muscle tissue contains a large amount of water. Fat tissues contain virtually no water. Men tend to have more muscle as a percentage of body weight while women have more fat.

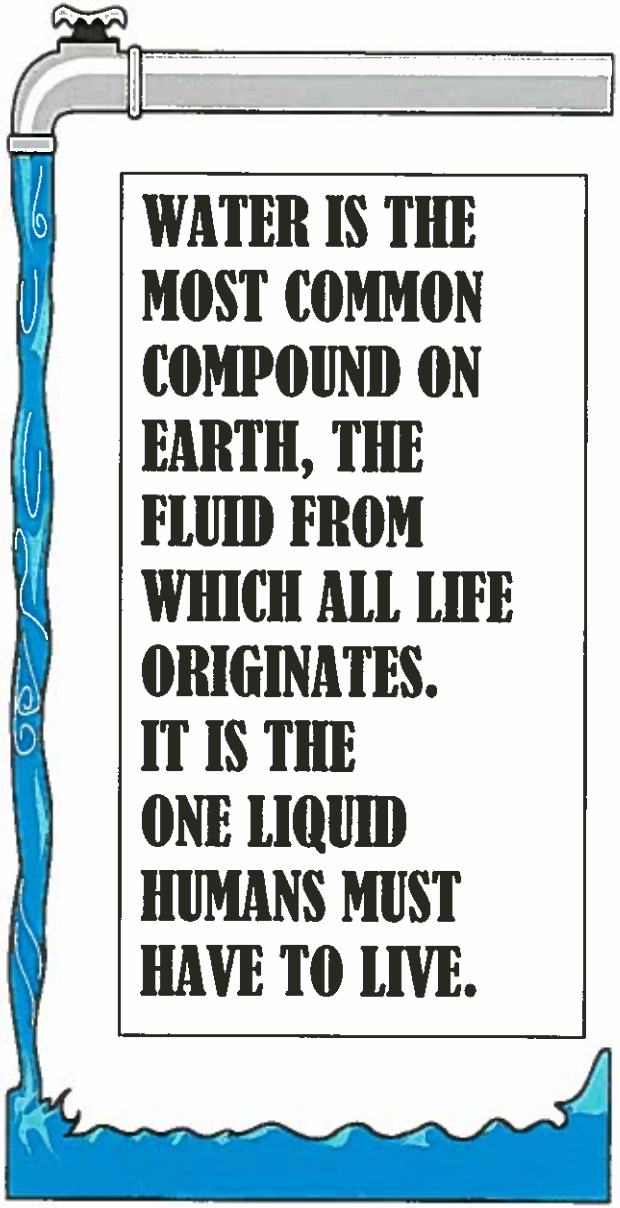
6. You lose 2-1/2 to 3 quarts of water per day through normal elimination, sweating and breathing. If you exercise or live in a humid climate, you may lose another quart.

7. It has zero calories and zero sugar, but a good drink of water can reduce hunger. Water also helps your body metabolize stored fats, helps maintain proper muscle tone, and helps rid the body of wastes.

8. Lawn sprinkling uses the most water outdoors.

9. Inside, toilets use the most water, with an average of 27 gallons per person per day. Laundry averages 17 gallons per person per day and showers 14 gallons.

10. Typically, less than 1% of the treated drinking water produced by utilities is actually consumed by people. Most goes for lawns, showers and tubs, toilets, etc.



CITY OF CORTEZ
Service Center
110 West Progress Circle
Cortez, CO 81321
Phone: 970-565-7320

City of Cortez
2018 Water Conservation Plan

Appendix

Regulatory Measures

Sec. 27-6. - Imposition of emergency or conservation restrictions.

(a) **Daytime watering restrictions.**

(1) Watering of yards will not be allowed between the hours of 10.00 A.M. and 5:00 P.M.

(2) These watering restrictions will be enforced between May fifteenth and September fifteenth of each year.

(3) Anyone violating the ordinance codified in this chapter, will be given a warning notice upon observation of the first offense.

(4) Upon a second observed offense, the person who is violating the ordinance codified in this chapter shall have his/her water shut off.

(5) After water service has been shut off, there shall be a re-connect fee set by the current fee resolution, to restore service to the offending home or business.

(b) **Lawn watering permits.**

(1) Any person installing a new lawn that needs to be watered every day and during the restricted time of 10:00 A.M. to 5:00 P.M. needs to obtain a "new lawn permit" from the public works department.

(2) The permit will be valid for twenty-one days of watering for newly-seeded lawns and fifteen days of watering for sod.

(3) The city strongly recommends using alternative grass types such as fescues, wheatgrasses, and Blue Grama in-lieu of Kentucky Bluegrass.

(4) The "new lawn permit" fee will be set according to the current fee resolution. The permit shall be displayed in a prominent, visible area in the front lawn. Watering violations will be enforced for new lawns that do not have a permit.

(Ord. No. 427, art. 2, § 5; Ord. No. 1013.)

Sec. 27-13. - Prohibited uses enumerated.

The following uses of water shall be considered as unlawful and punishable:

(a) Hoses with overflow or nozzle greater than 5/8 of an inch in diameter.

(b) Open hoses.

(c) Watering after hours or during water use restrictions.

(d) The use of booster pumps upon the user's premises.

(e) Unattended hoses. It shall be deemed unlawful for any householder or user of water to permit water to run through hoses when such householder is away from such premises, and it shall be the duty of each user to turn all water hoses off at the time such user leaves the premises; provided, that no other responsible person is left in charge.

(f) The use of any type of any inflow and outflow air conditioner. Such type is defined as

that type which does not have a recirculating pump or device mounted on such cooler and which permits the water to run from such cooler onto the ground or back into the city sewage system.

(g) Cooling water for refrigeration units.

(Code 1968, § 7-8-1.)

Sec. 27-19. - Wasting water prohibited.

No person shall:

(a) Waste the water at any hydrant or faucet or permit the water to be wasted through such source.

(b) Leave or permit the water to be left running through such to prevent freezing or for any other purpose except under the direction of the superintendent.

(c) Make use of any form of water closet which necessitates the constant running of water.

(d) In any manner waste or permit the waste of water from any pipe, fixtures or appliances under his control.

(Code 1968, § 7-8-7.)

ORDINANCE NO. 1013
SERIES 2004

AN ORDINANCE ESTABLISHING WATER USE RESTRICTIONS DUE TO SEVERE DROUGHT CONDITIONS

WHEREAS, the City of Cortez and the surrounding community is currently undergoing severe drought such as to create an emergency for the City and its citizens, and

WHEREAS, the City Council has the authority under Chapter 27, Section 6, of the Cortez City Code to impose emergency or conservation water use restrictions; and

WHEREAS, the City has the right to disconnect the service of anyone who violates the restrictions; and

WHEREAS, the City has the right to establish, by ordinance, re-connect fees after water has been shut off.

NOW THEREFORE, be it ordained by the City Council of the City of Cortez, Colorado, that Chapter 27, Section 6, Imposition of emergency or conservation restrictions, shall read:

I. DAYTIME WATERING RESTRICTIONS

A. Watering of yards will not be allowed between the hours of 10:00 a.m. and 5:00 p.m.
B. These watering restrictions will be enforced between May 15th and September 15th of each year.
C. Anyone violating Ordinance No. 1013, Series 2004, will be given a warning notice upon observation of the first offense.
D. Upon a second observed offense, the person who is violating this Ordinance shall have his/her water shut off.
E. After water service has been shut off, there shall be a re-connect fee set by the current fee resolution, to restore service to the offending home or business.

II. LAWN WATERING PERMITS

A. Any person installing a new lawn that needs to be watered every day and during the restricted time of 10:00 a.m. to 5:00 p.m. needs to obtain a "New Lawn Permit" from the Public Works Department.
B. The permit will be valid for twenty-one (21) days of watering for newly-seeded lawns and fifteen (15) days of watering for sod.

C. The City strongly recommends using alternative grass types such as fescues, wheatgrasses, and Blue Grama in-lieu of Kentucky Bluegrass.
D. The "New Lawn Permit" fee will be set according to the current fee resolution. The permit shall be displayed in a prominent, visible area in the front lawn. Watering violations will be enforced for new lawns that do not have a permit.

PUBLIC HEARING. This ordinance shall be considered for second and final reading on the 27th day of April, 2004, at the hour of 7:30 p.m. in the City Council Chambers in City Hall, Cortez, Colorado, at which time and place all persons may appear and be heard concerning the same.

PASSED, ADOPTED AND APPROVED ON FIRST READING THIS 13TH DAY OF APRIL, 2004.

CITY OF CORTEZ

CHERYL BAKER, MAYOR

ATTEST:

LINDA L. SMITH, CITY CLERK

PASSED, ADOPTED AND APPROVED ON SECOND AND FINAL READING THIS 27th DAY OF APRIL, 2004.

CITY OF CORTEZ

Mayor

ATTEST:

LINDA L. SMITH, CITY CLERK

APPROVED AS TO FORM:

JAMES HATTER, City Attorney

City of Cortez
2018 Water Conservation Plan

Appendix

Local Newspaper Articles

Cortez council discusses plans for water conservation

Public works director plans to revise strategies

By Stephanie Alderton (https://the-journal.com/lms/loading.html#rotftwetu=aHR0cHMlM0EvL3RoZS1qb3VybmFsLmNvbS8%3D&lbothsahtrtd=aHR0cHMlM0EvL3RoZS1qb3VybmFsLmNvbS9zdGFmZi8xMjIyLXN
Journal Staff Writer
Friday, Feb. 16, 2018 3:27 PM Updated: Thursday, Feb. 22, 2018 10:15 PM

Cortez Public Works Director Phil Johnson used a Tuesday workshop to outline his plans to update the city's water conservation strategies.

The city gets its water supply primarily from the Dolores River and the McPhee Reservoir, both of which are affected by the snowpack in the Dolores River Basin. Although the snow pack is only at 48 percent of normal, according to Natural Resources Conservation Service data on Thursday, Johnson said he doesn't anticipate any water shortages this year. But in order to prepare for possible future drought conditions, he said the city must revise its 2010 water conservation plan.

So far, this winter has had the lowest total snow accumulation in Montezuma County since 1990, Johnson said. That's in stark contrast to last year, when the Dolores River Basin snow pack was much higher than normal. Johnson said he believes the excess water from last year will help carry the town through this year's drier conditions.

"We're not in any danger here," he said. "This drought that we're going into now really won't substantially impact us until the following snow season."

But he said if the city's water sources don't accumulate enough excess water by the end of 2018, a dry 2019 could cause problems for Cortez residents. With that in mind, he urged council members to start thinking about the water conservation plan, which was adopted in 2010 and is scheduled for an update this year.

Eight years ago, the city set four water conservation goals: reduce per capita water demand to 200 gallons per day, implement full monitoring of water usage, maintain less than 5 percent water loss and institute an automatic meter reading system. Johnson said city staff haven't been able to prevent quite as much water loss as they planned, but he said the other goals have largely been met.

In 2018 the city will work on setting new goals for the water plan. Johnson said it will be a lengthy process that will require multiple workshops and a 60-day public comment period. Cortez water superintendent Rich Landreth said he plans to start the revision process after the municipal elections in April.

After the regular workshop, the council held an executive session to discuss legal issues related to town water rights.

Other action

Also during Tuesday's workshop, the council members introduced three new employees: code enforcement officer Keith Cramer, golf course superintendent Tom Kramlich and senior parks worker Don Cantrall. Library director Eric Ikenouye spoke about his plan to promote a part-time library employee to a full-time position as part of a minor staff reorganization, and City Manager Shane Hale gave a brief update on the city's long-range advance plan. The council members also discussed lowering the price of an office building in the Industrial Park they've been trying to sell for some time. Most were in favor of lowering the list price to $225,000, more than $60,000 less than its original price.

Cortez council discusses updating water conservation plan

Public Works to present water efficiency plan by fall

By Stephanie Alderton (https://the-journal.com/lms/loading.html#rotftwetu=aHR0cHMlM0EvL3RoZS1qb3VybmFsLmNvbS8%3D&ibothsahtrtd=aHR0cHMlM0EvL3RoZS1qb3VybmFsLmNvbS9zdGFmZi8xMjIyLXN
Journal Staff Writer
Monday, June 18, 2018 8:02 AM Updated: Monday, June 18, 2018 7:24 PM

In a workshop on Tuesday, the Cortez City Council discussed plans to improve the town's water efficiency during drought.

Public Works Director Phil Johnson and Water Plant Supervisor Rich Landreth presented a preliminary update to the Cortez water conservation plan, last updated in 2010. One of the plan's main short-term goals will be to reduce the city's water usage to less than 200 gallons per person per day. Johnson said such conservation efforts will become more and more necessary for Cortez as drought conditions become "the new normal."

According to Johnson and Landreth's preliminary update, water usage in Cortez has decreased in the past few decades. The daily water demand in 1990 was 325 gallons per capita, but it has since dropped to just over 200 gallons per capita. The new plan aims to drop that number to 180 gallons per day within the next seven years.

Although that goal would require some major water-saving measures, Landreth said he doesn't believe it's unreasonable.

"I think (these goals) will be easily attainable without a lot of heartache," he said.

Part of the process of updating the conservation plan will be adding more short- and long-term goals, he said.

The draft plan outlines several possible water-saving measures to help the city reach those goals. One is a rebate program designed to give Cortez residents an incentive to trade in their toilets, washing machines and other appliances for more water-efficient ones. Other recommendations include a water-efficient landscaping program for city property, a commercial water audit program, more aggressive leak prevention for the city water systems, a public education campaign and more.

The council members voiced approval of several items in the plan, particularly the rebate program and the water-efficient landscaping, which has already been implemented on a few city properties such as the Service Center.

Landreth urged council members to send him questions or suggestions for the new water plan. He and Johnson plan to bring their next draft to a later workshop, and eventually host public information meetings on it before bringing the final version

before the council for a vote. Johnson estimated the final update will be ready in October.

Johnson said water conservation and drought contingencies need to be a high priority for the city.

"We're facing the new normal now," he said. "The word 'drought' is being touted as a thing that shouldn't be used anymore, because people will see it as a temporary condition. We're now in the 19th year of this latest drought, and we're just getting drier and hotter."

He said the final version of the plan needs to take years of continued drought, as well as possible population increases, into account.

Other action

During the workshop, the council members also:

- Heard a presentation from the Common Ground Cortez Community Gardens group on the progress of the Recreation Center garden.
- Discussed setting a time limit on public comment during regular meetings.

The City Council members tentatively agreed on limiting public comments to four minutes per person.

- Discussed the next steps in the fiber to the home project.

Mayor Karen Sheek recommended spending about $25,000 on additional engineering and public surveys to determine the cost-benefit ratio of installing fiber throughout Cortez. The rest of the council tentatively agreed.

- Scheduled a special executive session for 7:15 a.m. June 18 to discuss contract negotiations for the new city manager.

The council plans to make a hiring decision at its next public meeting, on June 26.

Planning to conserve our most precious resource

Thursday, Oct. 11, 2018 5:03 PM

Anyone residing in Southwest Colorado knows what a precious commodity water is, and worry over drought is a constant in our collective consciousness. The lack of rain this summer has been of special concern given our mild winter, and even with the recent rains the situation is not good.

The United States Drought Monitor shows our area is experiencing D4, exceptional drought conditions, and last Friday's front page story in The Journal announced "Southwest Colorado headed for the second lowest water year in history" — in history! This really comes as no surprise to any of us who have tracked the water level at McPhee Reservoir or visited our neighbor to the east and seen the state of the Animas River. The drought is regional, affecting not only Montezuma County but other communities in the area as well.

Recently, the city of Cortez hosted researchers from Western Water Assessment, based at the University of Colorado Boulder campus, who presented a "Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) workshop. The program is a university-community partnership designed to help municipalities identify weather hazards and the impact of those hazards on the community, with the goal of developing strategic short- and long-term plans to mitigate the effects of long-term drought and changing weather conditions. A report on the findings of the Cortez workshop will be forwarded to the city by January and will be available for public review.

I was one of ten participants in the two half-day workshops, and I can tell you it was a sobering experience. Changing weather patterns are resulting in higher temperatures with longer fire seasons. Reduced snowpack last winter and minimal rain this spring and summer have left reservoirs that once stored water that could be tapped during drier years at dangerously low levels.

McPhee Reservoir is almost 62 feet below full elevation; Lake Powell almost 108 feet below. Lake Mead is at a critical low of 1078.41 feet which is over 141 feet below full elevation. When the lake reaches 1075 feet, lower basin states will be required to reduce withdrawals, and at 1050 feet hydro power production will be stopped. It will take years to replenish these reservoirs, and yet our need for the water they store is neverending, so . . . what to do?

While city water rights are sufficient to continue to meet community needs, it's important to understand that the water supply doesn't stop at the city limits. Everyone who gets their water from McPhee — folks who reside in our city and surrounding towns, farmers and ranchers, Towaoc residents — will be impacted as

water becomes less plentiful. Consequently, every citizen in the city, the county, indeed the region, will need to reevaluate water use and become more conscious of this most valuable resource.

The time for a comprehensive approach to water conservation is now, and the city has taken steps to begin the process. On August 28, the City Council approved a Water Conservation Plan which is available for citizen review and input on the city website, cityofcortez.com. The plan is presented in nine parts which include an existing water system profile, current water use and demand, water saving measures and programs, proposed facility improvements and an implementation plan highlighting the role of conservation in planning for the city's water supply.

The 18th century British physician Thomas Fuller said, "We never know the worth of water till the well is dry." The well isn't dry yet, but "conservation" has become our new "Word of the Day."

The goal of the city is to continue to provide safe, high-quality drinking water at a reasonable price while emphasizing ways to conserve. In the coming months we'll be sharing information on rebate programs to make it easier to invest in water saving devices, water conservation workshops, landscaping workshops to teach home and business owners how to maintain curb appeal while saving water, demonstration xeriscaping plots, and updates on ways the city is practicing what we're preaching.

I'm inviting everyone to come together to work on this issue and participate in the solution. Together we can become more responsible consumers of this priceless resource and wisely use what we have.

Karen Sheek is the mayor of Cortez, a position elected by council members. She was reelected to city council in 2016 and elected mayor for a third term in 2018. Reach her at ksheek@cityofcortez.com

Cortez to adopt water conservation plan in November

City aims for reduction in per capita water use

By Sean Dolan (https://the-journal.com/lms/loading.html#rotftwetu=aHR0cHMlM0EvL3RoZS1qb3VybmFsLmNvbS8%3D&ibothsahtrtd=aHR0cHMlM0EvL3RoZS1qb3VybmFsLmNvbS9zdGFmZi83NDM5LJ
Journal Staff Writer
Tuesday, Oct. 30, 2018 4:51 PM

Water consumption in Cortez has decreased 38.5 percent since 1990, but for Public Works Director Phil Johnson, that's still too high.

A consumer uses about 200 gallons of water each day, down from 325 gallons in 1990, but an update to the city's water conservation plan, last revised in 2010, aims to cut per capita water use to 180 gallons a day. The Cortez City Council will conduct a public hearing and take a final vote to adopt the water conservation plan at its regular meeting on Nov. 13 at 7:30 p.m.

Johnson said he would like to reach that 180-gallon goal in a couple of years — and then continue the downward trend.

"I would say that we need to get much lower than 180, especially given our current situation with our changing environment, the reduced snowpack levels, etc.," Johnson said.

He said he is concerned with the long-term impacts 50 to 100 years from now. As Cortez, like much of the arid Southwest, is married to snowpack, there won't be many opportunities to suddenly add water to the system.

"The reason I want to save water is so people can adjust and adapt their lifestyle to using less water ... because when our water supply is not what it is now — it's less — our quality of life will not be impacted as greatly because we're able to live within our means," Johnson said.

Reducing water use isn't easy. Johnson said Cortez will have to provide help and education to get there.

The draft plan details conservation goals and water-saving measures. In addition to a reduction in per person per day water use, the plan calls for full metering of all users in the Cortez system, a reduction in water loss and completion of a drought contingency plan.

Water-saving measures include a rebate program for water-efficient appliances like low-flow toilets and front-loading washing machines as well as encouragement of landscape efficiency, industrial efficiency and water reuse systems.

Johnson said reducing outdoor water use would provide the most benefits. He said the Public Works Department is training its employees to offer residents a water auditing service.

"A lot of people just overwater," Johnson said. "They think the grass needs a lot more water than it really does, and so we want to provide an audit where we can go out there and measure and talk to them."

In the experience of Vic Vanik, owner of Four Seasons Greenhouse and Nursery, persuading people to reduce outdoor water consumption is much easier during a drought than it is during a good water year.

"It's kind of a shame, but people don't really think there's a problem with drought until the drought is here," Vanik said.

He said he's seen an uptick over the past few months in customers looking for drought-tolerant plants. But those plants need a year to become established, so planting drought-tolerant plants during a drought is too late.

"If we continue the drought next year, there will be a lot interest, no doubt about it," Vanik said. "If we have a wet winter, people forget all about the fact that we're in a drought area."

To discourage wasteful outdoor water use, Johnson said Cortez since 2004 has imposed a restriction on watering during the heat of the day, between 10 a.m. and 5 p.m., from May 15 to Sept. 15. But the city's water rate structure does not necessarily encourage conservation, he said.

Cortez operates on a uniform water rate structure. The city charges a base rate for the first 1,000 gallons of monthly usage and a flat marginal rate for each additional 1,000 gallons used. The draft plan states Cortez will consider moving to a "conservation-oriented rate structure" that would encourage conservation among high water users.

Johnson said that could entail hiring a consultant to conduct a rate study in the coming year. He said a conservation-oriented rate structure would start with an affordable core service, maybe around 4,000 or 5,000 gallons per month, and then increase from there.

"Then if they want to use more than that for irrigation, that's a choice," Johnson said. "Obviously it would be something, I think, we're probably going to be looking at an increasing block rate so the more you use the more you pay."

If the Cortez City Council adopts the plan in November, Johnson said the public works department will make it a living, breathing document that will set the pace for local conservation practices.

Like Johnson, Vanik said education is the critical component in reducing water use. He said there are definitely people in Cortez who understand that they live in a desert, but people who come to the area often need a history lesson. Sometimes they don't understand the immutable relationship between snowpack and water supply.

"What happens if we don't have a wet winter? What are we going to do with McPhee (Reservoir) next year?" Vanik said. "It's going to be really bad if we don't have a good winter this winter."

sdolan@the-journal.com

City of Cortez
2018 Water Conservation Plan

Appendix

Preliminary Scope of Work for Future Water Rate Study

CITY OF CORTEZ
FUTURE WATER RATE STUDY
PRELIMINARY SCOPE OF WORK

A. **STUDY OBJECTIVES:**

1. Provide a comparison of current water system costs (operations, capital improvements, bonded debt) against appropriate industry benchmarks.
2. Recommend baseline rate structures required to fund the water system and consider annual inflationary, indexed adjustments to rates needed to maintain the water utility, as well as encourage water conservation by high water use customers.

B. **STUDY REQUIREMENTS:**

The study is to be performed in conformance with the following policy directions:

1. The recommended rate structure shall be based on cost of service and shall be sufficient to meet the revenue requirements of the water utility funds.
2. The study shall recommend rate structures that consider and make provisions for the following factors:
    a. Current and future cost of providing water service in accordance with established and anticipated standards and regulations.
    b. Projected demands.
    c. Age and condition of systems including repair and replacement cycle.
    d. Funding requirements for all current long-term liabilities and debt obligations (bond and loans).
3. The recommended rate structures shall provide direct identification of revenues appropriated to major funded activities and infrastructure.
4. The recommended rate structures shall be consistent with industry practice for utility rate making in Colorado.
5. The benefits of any proposed modifications shall be weighed against the financial impacts on ratepayers.
6. Justifications for any special classes of customers under the recommended rate structure shall be demonstrated.
7. The recommended rate structure shall result in no decrease in stability of the revenue stream, as compared to the current structure. An analysis will be completed to determine if funding is available for increased water conservation efforts. Consideration will also be given to funding past and future depreciation (i.e., replacement of facilities).
8. The recommended rate structure shall be easy to administer and understand.
9. The City of Cortez's existing billing system should be able to handle any proposed rate structure.
10. The recommended rate structure shall be planned for five years from 2020 through 2024.
11. The recommended rate structure shall be consistent with and reflect the city's policy direction as reflected in the City's most recent Comprehensive Plan and Water System Plan as of November 13, 2018.

12. The recommended rate structure will encourage water conservation by providing a sufficient pricing signal to high water use customers to encourage water conservation.

C. STUDY ELEMENTS:

In making its rate structure recommendations, the final report shall explicitly include the following elements and analysis:

1. Current Rate Structure: Assess the current rate structure's performance as a baseline for comparing recommended changes.
2. Equity: Assess the equity of recommended water rates for all types of property ownership to include multi-family units.
3. Sensitivity Analysis: Assess the ability of the revenue stream generated by the recommended rate structures to continue to fully fund water system costs. Assessment is to include a sensitivity analysis where the long-term revenue generated under each alternative shall be illustrated when confronted with the impacts of growth.
4. Other Service Charges: Assess existing customer service fee structure and identify other potential areas for service and system charges and recommend changes.
5. Annual operating fund balance targets.
6. Annual target contingency fund balances and level of liquidity.
7. Budgeting Horizon and Cycle: Assess appropriate budgeting horizon and cycle needed to support recommended rate structures.
8. Comprehensive Summary of Recommended Rate Structure(s): Assess performance of each recommended rate structure and provide recommendation on preferred rate structure. In recommending a rate structure the requirements of the Colorado law must be achieved.
9. Supporting Data: Provide data supporting conclusions and observations made for each of the areas above and site within study.
10. Utility Bond Rating: Identity utility bond rating enhancement opportunities.
11. Conservation Signal: Assess the strength of the pricing signal, of both the existing and recommended price structure, to encourage customers, particularly high water use customers, to conserve water.

D. SERVICES TO BE PROVIDED BY CONSULTANT:

1. Conduct a review of the existing water rates and status of the utility funds. Develop a general familiarity with the City of Cortez's billing system.
2. Meet or confer with staff as needed. Meet with a special committee during one late afternoon to obtain comments. Attend two meetings one late afternoon and one during the evening with the City Council to present the interim status of the study and obtain their input.
3. Conduct analyses as required to address the scope of work.
4. Preliminary Report:
    a. Prepare a preliminary study report and tentative rate structure.
    b. Submit 15 copies.
    c. Present preliminary report and tentative rate structure to staff and/or committee for comments.

d. Present preliminary report and tentative rate structures to the City Council.

5. Final Report:
   a. Incorporate changes pursuant to comments received at the first presentation.
   b. Submit 15 copies, plus one reproducible copy.
   c. Provide a disk with report in MS Word format, with spreadsheets in Excel format including a rate model with all assumptions.
   d. Present the final report and recommended rate structure to the City Council and members of the public at a regular Council meeting.
6. Supply a time schedule for developing the preliminary and final reports. The final report shall be delivered to the City by <date>.

E. SERVICES TO BE PROVIDED BY THE CITY DEPARTMENT OF PUBLIC WORKS:
The services to be provided by the City Department of Public Works include, but are not necessarily limited to the following:

1. Furnish all reasonably available records and information, including financial reports, budgets, and consumption data.
2. Provide staff and engineering support and assistance as required and agreed to in advance of study.