

DRAFT MEMORANDUM



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TO: Panhandle Water Planning Group

FROM: Jeremy Rice, Simone Kiel

SUBJECT: DRAFT Municipal Conservation Strategy

DATE: October 31, 2014

PROJECT: PPC11456

Water conservation is a demand management strategy that pro-actively reduces future water needs. Conservation facilitates more efficient use of existing water supplies and may delay the need to develop new water supplies. An expected level of conservation is included in the demand projections from the Texas Water Development Board (TWDB) due to the natural replacement of less efficient plumbing fixtures with low flow fixtures, as mandated under the Plumbing Code. Additional conservation savings can potentially be achieved in the region through the implementation of conservation best management practices (BMPs). These additional conservation measures were considered for all municipal water user groups in the Panhandle Water Planning Area (PWPA). The PWPA recognizes that it has no authority to implement, enforce, or regulate water conservation practices. These water conservation practices are intended to be guidelines. Water conservation strategies determined and implemented by the individual water user group supersede the recommendations in the Regional Water Plan (Plan) and are considered to meet regulatory requirements for consistency with the Plan.

Each public water supplier is required to update and submit a Water Conservation Plan (WCP) to the Texas Commission on Environmental Quality (TCEQ) every five years. Per Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code, some specific conservation strategies are required to be included as part of a water conservation plan. At a minimum each plan must include:

- Utility Profile that describes the entity, water system and water use data;
- Record management system that is capable of recording water use by different types of users;
- Quantified five-year and ten-year water savings goals;
- Metering device with a 5% accuracy to measure the amount of water diverted from the source of supply;
- A program for universal metering;
- Measures to determine and control water loss;

- A program of continuing public education and information regarding water conservation;
- A non-promotional water rate structure.

If a public water supplier serves over 5,000 people, they are additionally required to have a conservation oriented rate structure and a program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system.

1.0 Identification of Potentially Feasible Conservation BMPS

To assess the appropriateness of additional conservation BMPs for the PWPA, 68 potential strategies were identified and a screening level evaluation was conducted. Due to difference in the water needs and available resources between the larger municipalities and smaller rural areas, the screening evaluation was performed both for entities with populations less than 20,000 people and entities with population great than 20,000. In the PWPA, there are four entities that have populations greater than 20,000 during the planning period: Amarillo, Canyon, Dumas and Pampa.

The evaluation considered six criteria:

- Cost
- Potential Water Savings
- Time to Implement
- Public Acceptance
- Technical Feasibility
- Staff Resources

Each criterion was scored from 1 to 5 with 5 being the most favorable. Scores for all the criteria were then added to create a composite score. The strategies were then ranked and selected based on their composite score.

2.0 Recommended Municipal Conservation BMPS for Further Consideration

Selected Strategies for Entities under 20,000

Based on the screening level evaluation and requirements from the TCEQ, the following strategies were selected for consideration for entities in the PWPA with less than 20,000 people during every decade of the planning period:

- Education and Outreach
- Water Audits and Leak Repair
- Conservation – Oriented Rate Structure
- Water Waste Ordinance

Selected Strategies for Entities over 20,000

Based on the screening level evaluation and requirements from the TCEQ, the following strategies were selected for consideration for entities in the PWPA with more than 20,000 people during any decade of the planning period:

- Education and Outreach
- Water Audits and Leak Repair
- Conservation – Oriented Rate Structure
- Water Waste Ordinance
- Landscape Ordinance
- Time of Day Watering Limit

Each of the selected strategies above, were considered and evaluated for the appropriate water user groups (greater than or less than 20,000). For the purposes of strategy evaluation, each household was assumed to have an average of three people. The following assumptions were used in the evaluation of the selected municipal conservation measures.

3.0 Description of Municipal Conservation Strategies

Published reports and previous studies were used to refine the description for the selected BMPs, including the potential water savings and costs. Water savings for some BMPs are difficult to estimate since there is little data for an extended time period. Also, most entities tend to implement a suite a strategies at the same time, which makes it difficult to estimate the individual water savings. These factors were considered in developing the assumptions defined below for each BMP. As more data become available through more rigorous water use tracking, the ability to estimate water conservation savings will improve.

Education and Outreach

Local officials would offer water conservation education to schools, civic associations, include information in water bills, provide pamphlets and other materials as appropriate. It was assumed that the education outreach programs would be needed throughout the planning period to maintain the water savings. Per person cost were based on data obtained from municipalities and water providers.

Potential Savings Assumptions

- Education and Outreach saves 2% of the total water demand after plumbing code.

Costs Assumptions

- Education and Outreach costs \$2.75 per person per year for entities <20,000.
- Education and Outreach costs \$1.81 per person per year for >20,000.

Water Audits and Leak Repair

Local officials would perform a water audit system wide and create a program of leak detection and repair including infrastructure replacement as necessary. It was assumed that the leak detection and repair program is an on-going activity to maintain the level of water loss reductions assumed below.

Potential Savings Assumptions

- If TWDB water loss data was available for the entity, it was utilized to assess potential reductions in water loss.
- This strategy was considered for all cities with greater than or equal to 15% losses.
- This strategy was considered for all Water Supply Corporations (WSCs) or Special Utility Districts (SUDs) with greater than or equal to 25% losses.
- It was assumed that 20% of an entity's losses could be recovered through a water audit and leak repair program.
- If no water loss data was available, this strategy was considered for an entity with a gpcd over 140. A constant 5% savings rate was assumed until an entity's gpcd was equal to 140.

Costs Assumptions

- A Water Audit and Leak Repair Program costs \$25,000¹ plus \$10² per person per year for entities <20,000.
- A Water Audit and Leak Repair Program costs \$10 per person per year for entities >20,000.

Rate Structure

Local officials would implement an increasing block rate structure where the unit cost of water increases as consumption increases. Increasing block rate structures discourage the inefficient use or waste of water. Many cities already have a non-promotional rate structure. This strategy assumes that the entity adopts a higher level of a non-promotional rate structure.

Potential Savings Assumptions

- Increasing block rates saves 6,000³ gallons per households per year with a 10%³ adoption rate (assumes that 10% of the customers respond to this measure by reducing water use).

Costs Assumptions

- It is likely the entity would conduct the rate structure modifications themselves and incur no additional costs.

Water Waste Ordinance

Local officials would implement an ordinance prohibiting water waste such as watering of sidewalks and driveways or runoff into public streets.

Potential Savings Assumptions

- A water waste ordinance saves 3,000⁴ gallons/household/year with a 75%⁴ adoption rate.

Costs Assumptions

- Annual enforcement costs \$5,000⁵ per year for entities <20,000.
- Annual enforcement costs \$25,000⁵ per year for entities >20,000.

¹ Base cost assumption from Freese and Nichols Inc.

² Per person cost estimate from Freese and Nichols Inc.

³ Handbook of Water Use and Conservation

⁴ 2011 Region C Plan

⁵ Enforcement cost assumption from Freese and Nichols Inc.

Landscape Ordinance

Local officials would implement an ordinance that would promote residential plantings that conserve water for all new construction. This strategy is assumed to be implemented by 2030.

Potential Savings Assumptions

- Landscape ordinances would only apply to only new construction.
- Would include both residential and commercial properties.
- Saves 1,000⁶ gallons per increased number of households per year with 100% adoption rate.

Costs Assumptions

- Annual enforcement cost of \$25,000 per year for entities >20,000.

Time of Day Watering Limit

Local officials would implement an ordinance prohibiting outdoor watering during the hottest part of the day when most of that water is lost (wasted) through evaporation. Many ordinances limit outdoor watering to between 6 p.m. and 10 a.m. on a year round basis.

Potential Savings Assumptions

- Time of day watering limits saves 1,000⁷ gallons/household/year.
- 75 percent of the population would realize these savings (the other 25 percent is either not irrigating or already abide by this practice).

Costs Assumptions

- Annual enforcement cost of \$25,000 per year for entities >20,000.

4.0 Evaluation of Municipal Conservation Strategies

Quantity, Reliability and Cost

The water savings associated with municipal conservation vary depending on the potential of the entity's customers to reduce water use. For most water users in the PWPA, water that is conserved (i.e., not consumed) will further protect the natural resources for future use. The reliability is moderate because this strategy relies on actions of others (customers) and the willingness to change daily behaviors. The suite of recommended strategies focuses on the actions of the water provider, which have shown to be successful in reducing water consumption. The costs are low to moderate for larger entities and high for smaller entities. Much of the higher costs are

⁶ San Antonio Water System

⁷ Savings assumption by Freese and Nichols Inc.

associated with the leak detection and repair strategy. For smaller entities, this strategy may not be cost effective. Table 1 shows the total water savings by provider and associated costs for each decade.

Environmental Factors

Potential environmental impacts associated with municipal conservation should be neutral to positive. Reductions in water use will preserve water for other uses, including potential environmental purposes.

Agricultural and Rural Impacts

Impacts to agricultural and rural areas should be neutral to positive. Conserved water by cities could provide additional supplies to agricultural and rural areas.

Impacts to Natural Resources and Key Parameters of Water Quality

Impacts to natural resources should be neutral to positive. Conserved water by cities would protect limited groundwater supplies for future use. If the water remains in the original source and is not used for other purposes, municipal conservation could help maintain existing water quality of these resources. High use of some water sources can possibly degrade water quality over time.

Impacts to Other Water Resources and Management Strategies

There are no known impacts to other water resources and management strategies.

5.0 Panhandle Water Planning Area Municipal Conservation Summary

It is estimated that the municipal conservation strategy outlined in this memorandum will save, on a regional basis, over 3,600 acre-feet in 2020 and over 5,400 acre-feet in 2070. The cost for this strategy is over \$2.2 million in 2020 increasing to approximately \$2.9 million in 2070. The combined unit cost across the region is approximately \$605 per acre-foot in 2020 and \$534 per acre-foot in 2070. The unit costs varies considerably between water user groups depending on the population size, and implementation of a water audit and leak repair program for entities with high water losses. Table 1 includes a summary by water user group.

Table 1: Municipal Water Conservation Strategy Summary by Water User Group

WUG	Conservation Savings (Ac-ft/yr)						Annual Conservation Cost						Conservation Unit Cost (\$/Ac-ft)						Demand After Conservation (Ac-ft/yr)					
	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070
Amarillo	1,734	1,935	2,122	2,316	2,534	2,762	\$432,980	\$501,809	\$547,028	\$592,633	\$641,811	\$693,285	\$250	\$259	\$258	\$256	\$253	\$251	45,997	50,175	54,688	59,544	65,097	70,977
Booker	15	17	18	19	20	21	\$9,846	\$10,448	\$10,819	\$11,298	\$11,650	\$11,952	\$648	\$618	\$603	\$583	\$570	\$559	488	540	571	616	649	679
Borger	104	107	106	106	106	106	\$42,769	\$44,122	\$44,394	\$44,394	\$44,394	\$44,394	\$410	\$414	\$417	\$417	\$418	\$418	3,111	3,147	3,128	3,123	3,119	3,118
Cactus	32	36	41	45	50	55	\$16,638	\$18,266	\$20,001	\$21,761	\$23,598	\$25,471	\$519	\$504	\$491	\$479	\$469	\$460	953	1,072	1,201	1,337	1,482	1,631
Canadian	64	70	76	82	88	93	\$68,454	\$73,108	\$77,060	\$81,128	\$84,761	\$88,089	\$1,073	\$1,037	\$1,012	\$986	\$963	\$943	722	796	858	927	991	1,052
Canyon	127	142	156	171	187	203	\$76,793	\$104,961	\$108,132	\$111,379	\$114,834	\$118,424	\$604	\$737	\$693	\$653	\$615	\$583	3,506	3,840	4,187	4,565	4,992	5,440
Childress	132	135	138	141	145	148	\$110,363	\$113,423	\$115,973	\$118,460	\$120,933	\$123,343	\$836	\$839	\$842	\$842	\$837	\$832	1,492	1,523	1,548	1,581	1,623	1,666
Clarendon	14	13	13	13	13	13	\$10,742	\$10,742	\$10,742	\$10,742	\$10,742	\$10,742	\$787	\$798	\$807	\$813	\$813	\$813	364	356	348	343	343	343
Claude	29	29	28	28	28	28	\$45,338	\$45,338	\$45,338	\$45,338	\$45,338	\$45,338	\$1,556	\$1,575	\$1,595	\$1,603	\$1,607	\$1,607	329	324	320	318	317	317
County - Other (Potter)	266	291	318	347	379	413	\$225,014	\$249,520	\$275,440	\$301,259	\$329,424	\$359,068	\$846	\$858	\$866	\$869	\$869	\$869	2,817	3,065	3,344	3,636	3,974	4,335
County - Other (Randall)	143	158	173	189	207	225	\$70,346	\$78,070	\$85,803	\$93,723	\$102,152	\$110,903	\$493	\$496	\$496	\$496	\$494	\$492	3,522	3,844	4,186	4,559	4,980	5,426
Dalhart	79	86	93	100	107	113	\$29,206	\$31,576	\$33,914	\$36,180	\$38,349	\$40,423	\$369	\$367	\$365	\$363	\$360	\$357	2,590	2,802	3,017	3,236	3,458	3,672
Dumas	133	152	171	190	210	231	\$80,584	\$109,861	\$114,416	\$119,039	\$123,861	\$128,802	\$606	\$722	\$671	\$628	\$590	\$558	3,405	3,789	4,217	4,676	5,181	5,702
Fritch	37	38	37	37	37	37	\$57,999	\$59,019	\$59,287	\$59,312	\$59,325	\$59,351	\$1,562	\$1,565	\$1,584	\$1,590	\$1,594	\$1,591	402	406	402	400	399	400
Groom	5	5	5	5	5	5	\$6,579	\$6,579	\$6,579	\$6,579	\$6,579	\$6,579	\$1,252	\$1,267	\$1,277	\$1,281	\$1,281	\$1,281	174	171	169	168	168	168
Gruver	23	25	26	28	30	31	\$46,652	\$48,449	\$50,018	\$51,331	\$52,657	\$53,881	\$2,063	\$1,969	\$1,894	\$1,838	\$1,774	\$1,725	287	311	334	352	374	394
Happy	26	28	30	31	33	35	\$46,652	\$48,449	\$50,018	\$51,331	\$52,657	\$53,881	\$1,829	\$1,747	\$1,680	\$1,631	\$1,574	\$1,530	284	308	330	349	371	390
Lake Tanglewood	25	24	24	24	24	24	\$40,455	\$40,455	\$40,455	\$40,455	\$40,455	\$40,455	\$1,636	\$1,655	\$1,670	\$1,674	\$1,679	\$1,679	294	291	288	287	286	286
McLean	17	18	20	23	25	27	\$40,761	\$41,909	\$43,286	\$45,058	\$46,460	\$47,939	\$2,425	\$2,295	\$2,159	\$1,992	\$1,881	\$1,781	188	204	223	251	274	299
Memphis	34	23	14	14	14	14	\$59,555	\$60,371	\$11,551	\$11,551	\$11,551	\$11,551	\$1,774	\$2,620	\$803	\$805	\$806	\$806	349	359	358	356	355	355
Miami	17	18	17	17	17	17	\$37,816	\$37,943	\$37,956	\$37,956	\$37,956	\$37,956	\$2,165	\$2,160	\$2,178	\$2,187	\$2,187	\$2,187	207	207	206	205	205	205
Pampa	146	161	178	202	220	240	\$85,322	\$114,089	\$118,601	\$124,409	\$129,036	\$133,867	\$584	\$707	\$665	\$615	\$586	\$559	3,565	3,830	4,182	4,724	5,157	5,615
Panhandle	47	48	48	48	48	48	\$61,760	\$62,933	\$63,545	\$63,545	\$63,545	\$63,545	\$1,306	\$1,306	\$1,313	\$1,322	\$1,324	\$1,324	525	533	534	529	528	528
Perryton	85	90	96	103	111	119	\$31,752	\$33,749	\$35,894	\$38,201	\$40,679	\$43,343	\$374	\$373	\$372	\$370	\$367	\$364	2,744	2,904	3,087	3,298	3,539	3,803
Shamrock	30	31	31	32	33	35	\$55,156	\$56,150	\$57,107	\$58,088	\$59,172	\$60,320	\$1,823	\$1,830	\$1,831	\$1,801	\$1,767	\$1,734	320	322	326	337	350	363
Spearman	24	24	25	25	26	27	\$14,639	\$15,032	\$15,337	\$15,651	\$15,975	\$16,311	\$619	\$619	\$619	\$617	\$612	\$606	648	659	666	679	698	719
Stinnett	37	38	37	37	37	37	\$54,863	\$55,755	\$55,985	\$55,985	\$55,985	\$55,985	\$1,487	\$1,486	\$1,501	\$1,504	\$1,507	\$1,507	409	414	411	410	409	409
Stratford	39	42	43	44	45	46	\$57,923	\$60,269	\$61,544	\$62,666	\$63,482	\$64,081	\$1,474	\$1,442	\$1,434	\$1,419	\$1,405	\$1,393	431	456	467	480	491	500
Sunray	37	42	46	52	57	63	\$58,254	\$62,194	\$66,401	\$70,673	\$75,135	\$79,687	\$1,570	\$1,498	\$1,432	\$1,371	\$1,315	\$1,268	467	520	580	643	713	784
TCW Supply Inc	58	59	59	59	59	59	\$57,629	\$58,611	\$58,866	\$58,866	\$58,866	\$58,866	\$994	\$987	\$991	\$996	\$997	\$997	680	696	695	691	690	690
Texline	18	20	22	24	26	28	\$37,472	\$38,415	\$39,410	\$40,379	\$41,322	\$42,227	\$2,129	\$1,957	\$1,812	\$1,687	\$1,587	\$1,501	209	233	258	284	309	334
Vega	22	23	23	23	23	23	\$42,253	\$43,056	\$43,056	\$43,056	\$43,056	\$43,056	\$1,934	\$1,877	\$1,900	\$1,912	\$1,912	\$1,912	250	262	258	256	256	256
Wellington	44	45	46	47	49	50	\$59,555	\$61,123	\$62,156	\$63,354	\$64,285	\$65,101	\$1,369	\$1,361	\$1,358	\$1,339	\$1,323	\$1,311	481	495	503	520	533	545
Wheeler	15	15	16	16	17	18	\$9,524	\$9,703	\$9,873	\$10,049	\$10,244	\$10,451	\$638	\$631	\$624	\$615	\$605	\$593	492	505	517	533	552	574
White Deer	20	21	21	21	21	21	\$44,344	\$44,879	\$45,147	\$45,147	\$45,147	\$45,147	\$2,178	\$2,162	\$2,168	\$2,175	\$2,175	\$2,175	224	227	227	226	226	226
Region A Total	3,677	4,009	4,320	4,662	5,031	5,418	\$2,225,981	\$2,450,372	\$2,521,128	\$2,640,972	\$2,765,413	\$2,893,809	\$605	\$611	\$584	\$567	\$550	\$534	82,927	89,586	96,631	104,436	113,089	122,198