

The Economic Impact of Potential Water Shortages on San Antonio's Economy: A Case Study



February 2, 2016



Tasked by SA Chamber to Evaluate Failure to Secure Additional Supply (2013)

- **Purpose:** illustration in support of policy development, rather precise projections, and therefore makes a series of simplifying assumptions that are unlikely to occur as actual events unfold. In reality, droughts occur at uncertain intervals, individual customers respond in unique ways to water shortages, and the capacity to reduce demand through conservation and technology continues to evolve.
- **Methodology:** combination of projections from SAWS regarding demand and supply of water in its service territory, secondary information from several sources regarding the sensitivity of different sectors of the economy to changes in the availability of water, and standard regional economic impact models.



Initial Step is to Identify the Level of Potential Shortfall

- Information below provided by SAWS; if not shortage, then no economic impact

Percentage Shortfall under Two Scenarios (Assumes No New Supply)

	135 gpcpd	169 gpdpd
2020	11.0%	29.0%
2025	17.4%	34.0%
2030	20.2%	36.2%
2035	23.9%	39.2%
2040	28.9%	43.2%

Sources: SAWS, TXP



Current Structure of the San Antonio (SAWS) Economy

- About 25% significantly influenced by water availability; 10% manufacturing and 15% commercial.

Industrial Sector	2012 Output (Sales)
WATER-INFLUENCED	\$52,522,068,974
Agriculture & Mining	\$792,075,206
Manufacturing	\$20,710,821,569
Food/Kindred Products	\$3,674,141,292
Stone/Clay/Glass Products	\$400,299,539
Electronic Components Mfg.	\$292,041,026
Other Manufacturing	\$16,344,339,712
Commercial	\$31,019,172,199
Hotels	\$1,289,937,453
Water-Intensive Consumer ¹	\$609,039,135
Other Commercial ²	\$29,120,195,611
Total Estimated Other Sectors	\$166,650,839,418
Total Estimated All Sectors	\$219,172,908,392



Output Elasticities

- Elasticity concept: for every X% change in water supply, economic activity in a given sector changes Y%.
- Derived from previous academic research, customer interviews in the Bay Area, and some work done by the Texas Water Development Board.

Sector	Level of Shortage				
	0-5%	6-15%	16-30%	31-50%	51%+
Food/Kindred Products	0.00	0.10	0.33	0.65	1.00
Stone/Clay/Glass Products	0.00	0.10	0.33	0.65	1.00
Electronic Components	0.00	0.10	0.25	0.50	0.75
Other Manufacturing	0.00	0.10	0.25	0.50	0.75
Hotels	0.00	0.10	0.25	0.50	1.00
Water-Intensive Consumer	0.00	0.10	0.33	0.65	1.00
Other Commercial	0.00	0.05	0.10	0.25	0.50
Agriculture	0.00	0.10	0.50	0.75	1.00
Mining	0.00	0.10	0.33	0.50	0.75



Economic Impact of Water Shortages

Direct Output Losses: 135 gpcpd

	2020	2030	2040
Sector	11.0%	20.2%	28.9%
Food/Kindred Products	\$40,415,554	\$244,918,259	\$350,402,855
Stone/Clay/Glass Products	\$4,403,295	\$26,683,967	\$38,176,567
Electronic Components	\$3,212,451	\$14,748,072	\$21,099,964
Other Manufacturing	\$179,787,737	\$825,389,155	\$1,180,878,544
Hotels	\$14,189,312	\$65,141,841	\$93,197,981
Water-Intensive Consumer	\$6,699,430	\$40,598,549	\$58,084,062
Other Commercial	\$160,161,076	\$588,227,951	\$841,573,653
Agriculture	\$972,776	\$8,931,849	\$12,778,735
Mining	\$7,740,052	\$46,904,713	\$67,106,248
TOTALS	\$417,581,683	\$1,861,544,356	\$2,663,298,609

- Values above go up by a factor of 4-5x if 169 gpcpd is assumed



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Key Finding #1

- **There are likely to be negative economic impacts associated with sustained water shortages at even modest levels.** The key here is the duration of the shortage, as most companies can find ways to adjust operations and/or production processes to accommodate temporary shortfalls. However, demand does harden at some point, reducing the capacity to adjust and creating economic consequences.



Key Finding #2

- **Negative impacts accelerate as the level of shortage increases.** As the severity of shortage rises, the impacts increase exponentially before leveling off to some degree.
- At 11.0 percent shortage, total jobs lost are estimated at approximately 6,700, 23.9 percent shortage yields a loss of almost 34,000, and 43.2 percent pushes total lost jobs to just under 135,000 in San Antonio. While these estimates are approximations, they illustrate the order of magnitude of the potential negative consequences of inadequate water supply to the local economy.



Economic Impact of Water Shortages

Key Finding #2: Total Impact of 23.9% Shortage

NAICS	Output	Earnings	Employment
Agriculture, Forestry, Fishing, & Hunting	\$38,663,156	\$6,598,107	414
Mining	\$74,175,487	\$18,694,261	230
Transportation/Utilities	\$165,484,033	\$51,810,191	1,072
Construction	\$45,158,632	\$17,257,366	441
Manufacturing	\$1,562,011,099	\$402,416,998	6,865
Trade	\$289,011,835	\$97,149,224	2,864
Information	\$136,598,102	\$32,156,365	505
Finance and Insurance	\$248,911,716	\$69,220,466	1,254
Real estate	\$337,382,976	\$25,795,551	1,110
Professional/Scientific/Technical Services	\$143,427,503	\$65,898,472	1,061
Management Companies & Enterprises	\$84,277,077	\$34,733,649	453
Admin./Waste Management Services	\$147,397,456	\$53,424,100	2,026
Educational Services	\$21,955,243	\$8,922,446	373
Health Care & Social Assistance	\$171,141,157	\$81,475,296	2,195
Arts, Entertainment, & Recreation	\$20,916,364	\$8,081,542	424
Accommodation & Food Services	\$172,726,750	\$53,742,526	2,702
Other Services	\$791,804,092	\$243,464,775	9,796
TOTALS	\$4,451,042,675	\$1,270,841,336	33,786



Key Finding #3

- **Additional supply is a necessary part of the solution.** A combination of technologies, utility programs and incentives, changes in business practice, and overall customer awareness have served to facilitate increased conservation in recent years. More gains can continue to be made in this area, but there is little doubt that additional supply is critical to insuring that a community has adequate water to meet future needs.



Conclusions

- Water shortages can have a direct negative impact on the economy.
- Duration and severity will directly influence the size and scope of that negative impact.
- If both individuals and business are assured an adequate water supply, an area of potential weakness could turn into a competitive advantage.
- Investments in basic infrastructure likely to pay increasing dividends going forward.