4B.5 Duval County Water Supply Plan

Table 4B.5-1 lists each water user group in Duval County and their corresponding surplus or shortage in years 2030 and 2060. For each water user group with a projected shortage, a water supply plan has been developed and is presented in the following subsections.

Table 4B.5-1.
Duval County Surplus/(Shortage)

Water User Group	*Surplus/(Shortage)*[1]		*Comment*
	2030 (acft/yr)	*2060 (acft/yr)*	
City of Benavides	0	0	Supply equals demand
City of Freer	0	0	Supply equals demand
City of San Diego	0	0	Supply equals demand
County-Other	0	0	Supply equals demand
Manufacturing	none	none	No demands projected
Steam-Electric	none	none	No demands projected
Mining	(2,973)	(4,205)	Projected shortages for entire planning period— see plan below
Irrigation	0	0	No demands projected
Livestock	0	0	Supply equals demand

[1] From Tables 4A-7 and 4A-8, Section 4 – Comparison of Water Demands with Water Supplies to Determine Needs.

4B.5.1 City of Benavides

The City of Benavides receives groundwater supplies from the Goliad Sands of the Gulf Coast Aquifer. No shortages are projected for the City of Benavides. Although projections indicate that Benavides' current wells will produce adequate supply to meet their anticipated demand, there is local concern that the quality of the water produced by the city's wells will decline to the point that advanced treatment will be necessary to stay in compliance with regulatory water quality guidelines. If the City of Benavides requires groundwater desalination for their highest water demand over the planning period, a 0.6 MGD reverse osmosis membrane system would be sufficient. If no additional infrastructure is required, it is estimated then the total capital cost for a membrane water treatment plant will be $2,377,600, and total project cost

will be $3,568,800. Total annual cost will be $464,200, resulting in a unit cost of $691 per acft, or $2.12 per 1,000 gallons, assuming full utilization of treatment plant.

4B.5.2 City of Freer

The City of Freer receives groundwater supplies from the Catahoula Tuff. No shortages are projected for the City of Freer. Although projections indicate that Freer's current wells will produce adequate supply to meet their anticipated demand, there is local concern that the quality of the water produced by the city's wells will decline to the point that advanced treatment will be necessary to stay in compliance with regulatory water quality guidelines. If the City of Freer requires groundwater desalination for their highest water demand over the planning period, a 1.2 MGD reverse osmosis membrane system would be sufficient. If no additional infrastructure is required, it is estimated then the total capital cost for a membrane water treatment plant will be $3,599,000, and total project cost will be $5,297,000. Total annual cost will be $739,000, resulting in a unit cost of $550 per acft, or $1.69 per 1,000 gallons, assuming full utilization of treatment plant.

4B.5.3 City of San Diego

The City of San Diego is in both Duval and Jim Well Counties; consequently, its water demand and supply values are split into tables for each county. The City of San Diego receives groundwater supplies from the Goliad Sands of the Gulf Coast Aquifer. The City of Alice has run a 16-inch water transmission line to Hwy 281 bypass, approximately 8 to 9 mines from the City of San Diego.[1] This pipeline could be extended to provide water supply from the City of Alice to San Diego.

No shortages are projected for the City of San Diego. Although projections indicate that San Diego's current wells will produce adequate supply to meet their anticipated demand, there is local concern that the quality of the water produced by the city's wells will decline to the point that advanced treatment will be necessary to stay in compliance with regulatory water quality guidelines. If the City of San Diego requires groundwater desalination for their highest water demand over the planning period, a 1 MGD reverse osmosis membrane system would be

[1] Conservation with Carl Crull, July 2005.

sufficient. If no additional infrastructure is required, it is estimated that the total capital cost for a membrane WTP will be $3,280,000, and total project cost will be $4,844,000. Total annual cost will be $662,000, resulting in a unit cost of $591 per acft, or $1.81 per 1,000 gallons assuming full utilization of treatment plant.

4B.5.4 County-Other

Duval County-Other municipal users receive groundwater supplies from the Gulf Coast Aquifer. No shortages are projected for the Duval County-Other. In 2000 Duval County Other has a per capita per day usage of 191 gallons per capita per day (gpcd) and an estimated usage of 178 gpcd in 2060 (after built-in savings for low flow plumbing fixtures), based on TWDB water demand and population projections. The CBRWPG recommends additional water conservation of 15 percent by 2060 for all municipal entities with reported use greater than 165 gpcd in 2060.

4B.5.5 Manufacturing

No manufacturing demand exists or is projected for the county.

4B.5.6 Steam-Electric

No steam-electric demand exists or is projected for the county.

4B.5.7 Mining

4B.5.7.1 Description

- Source: Groundwater – Gulf Coast Aquifer
- Estimated Reliable Supply: 4,122 to 4,348 acft/yr
- System Description: Various mining operations.

4B.5.7.2 Options Considered

The Duval County mining water user group has projected shortages of 1,738 acft/yr in 2010, 2,973 acft/yr in 2030, and 4,205 acft/yr in 2060. Their shortages are attributed to reducing pumping to meet drawdown constraints established by the CBRWPG. Table 4B.5-2 lists the water management strategies, references to the report section discussing the strategy, total project cost, and unit costs that were considered for meeting the shortage for Duval County-Mining.

Table 4B.5-2.
Water Management Strategies Considered for Duval County-Mining

Option	*Yield (acft/yr)*	*Approximate Cost*[1]	
		Total	*Unit ($/acft)*
Mining Water Conservation (Section 4C.4)	147 to 1,283	N/A[2]	N/A[2]
No Action	—	N/A[3]	N/A[3]

[1] Unless otherwise noted, costs are Total Project Cost and Unit Cost ($/acft/yr) for treated water delivered to the water supply entity or entities. Unit cost is for full utilization of project capacity.
[2] Costs are unavailable for Mining Water Conservation Best Management Practices (Section 4C.4).
[3] Total economic impact of not meeting needs (i.e. "no action" alternative) not included in TWDB Report (see Appendix F). Annual impact of not meeting needs is presented by decade in Table 4B.5-3.
N/A = Not applicable.

4B.5.7.3 Water Supply Plan

Working within the planning criteria established by the Coastal Bend RWPG and TWDB, the following water supply plan is recommended to reduce the projected 2010 to 2060 shortages for Duval County-Mining:

- Mining Water Conservation (includes water reuse)
- No Action

Mining water conservation is only able to meet a portion of the projected shortage. The socioeconomic impact of not meeting mining needs will be considered for the final plan.

It is probable that Duval County mining users could avoid excessive drawdowns by spreading out the area of their wells, instead of concentrating them in a small area represented by a cluster of adjacent cells. This option is discussed in Section 4C.7.2, including costs to drill an additional 11 wells to meet the projected shortages. The costs estimates take into consideration size and depth of wells.

In addition to the management strategy listed above, the RWPG supports strategies for reuse of existing supplies.

4B.5.7.4 Costs

For mining water conservation, the Water Conservation Implementation Task Force Guide includes a list of Best Management Practices for industries (included in Section 4C.4) but does not include specific costs. Therefore, no additional capital costs can be reasonably calculated for the mining water plan. The recommended Water Supply Plan, including anticipated supplies to meet shortages is summarized by decade in Table 4B.5-3.

Table 4B.5-3.
Recommended Plan Costs by Decade for Duval County-Mining

Plan Element	*2010*	*2020*	*2030*	*2040*	*2050*	*2060*
Projected Surplus/(Shortage) (acft/yr)	(1,738)	(2,518)	(2,973)	(3,386)	(3,809)	(4,205)
Mining Water Conservation						
Supply From Plan Element (acft/yr)	147	332	534	761	1,014	1,283
Annual Cost ($/yr)	N/A	N/A	N/A	N/A	N/A	N/A
Unit Cost ($/acft)	N/A	N/A	N/A	N/A	N/A	N/A
No Action						
Annual Cost ($/yr)[1]	$22,330,000	$30,010,000	$34,570,000	$36,840,000	$42,420,000	$46,250,000

[1] Includes lost output, lost income, and lost business taxes associated with not meeting needs.

4B.5.8 Irrigation

Irrigation demands in Duval County are declining over the planning period. The county-wide decline in water use is likely due to expected reductions in irrigated land in the future, however this would imply a reversal of the trend observed in reported irrigated acreage from 1994 to 2000 (Section 4C.2). These demands are met by groundwater from the Gulf Coast Aquifer. No shortages are projected for irrigation and no changes in water supply are recommended.

4B.5.9 Livestock

The livestock water demands in Duval County are met by groundwater from the Gulf Coast Aquifer and surface water from local on-farm sources. No shortages are projected for livestock and no changes in water supply are recommended.

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