

## **1.4 Transfer of SAWS Reclaimed Water to Coletto Creek Reservoir (L-20)**

### **1.4.1 Description of Option**

Central Power & Light (CP&L) holds water rights for the diversion of Guadalupe River water to augment cooling reservoir levels at their Coletto Creek Power Station. This option considers diverting a portion of SAWS reclaimed water from the San Antonio River near Goliad and delivering it to Coletto Creek Reservoir in exchange for CP&L returning its Guadalupe River water right (now being used as CP&L make-up water) to the Saltwater Barrier and terminating its current water supply contract with the Guadalupe-Blanco River Authority (GBRA) for water from Canyon Reservoir.

The major facilities needed for this option include a small diversion dam on the San Antonio River, water intake and pump station, a 5.9-mile transmission pipeline to Coletto Creek Reservoir, and a discharge structure near the reservoir. A possible location of the diversion near Goliad and pipeline route to Coletto Creek Reservoir are shown in Figure 1.4-1.

### **1.4.2 Available Yield**

A substantial quantity of reclaimed water or return flow is available from SAWS wastewater treatment plants on an annual basis. The GSA Model<sup>1</sup> was utilized to quantify excess SAWS reclaimed water delivered to Goliad that could be used for mitigation of water rights transfers in the lower Guadalupe River Basin. Excess reclaimed water is that remaining after needs for Braunig and Calaveras Lakes, the SAWS Reclaimed Water Program, and intervening mainstem water rights on the San Antonio River have been satisfied and channel losses are considered. In the analyses, Braunig Lake make-up needs were first met from its run-of-river water right (12,000 acft/yr) and additional make-up needs were met from SAWS reclaimed water.

Currently, make-up water for Coletto Creek Reservoir is provided from run-of-river rights and stored water released from Canyon Lake (by contract with GBRA). CP&L holds a diversion right for 20,000 acft/yr of run-of-river water from the Guadalupe River. Under this right, water may be diverted at a maximum rate of 35.65-cfs (70.6 acft/day) at a pump station upstream of Victoria. GBRA is under contract with CP&L to release water from Canyon Lake for pump-over

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<sup>1</sup> HDR Engineering, Inc. (HDR), "Guadalupe San Antonio River Basin Recharge Enhancement Study," Vol. I, II, and III, Edwards Underground Water District, September 1993.



to Coletto Creek Reservoir through the same pump station on the Guadalupe River. The contract with GBRA provides for the delivery of a maximum of 18,900 acft in any 1-year period and 30,000 acft in any 5-year period. An analysis was performed to compare availability of SAWS reclaimed water (delivered to Goliad) to the availability of Guadalupe River water under the existing rights and contracts. Table 1.4-1 compares average annual make-up diversion, drought average make-up diversion, and the percent of time that the CP&L make-up water needs would not have been fully satisfied from each of the alternative make-up water sources. At times when make-up water needs are not fully met, the steam-electric plant remains in operation, but must operate with the cooling reservoir at a lower surface elevation than desired, possibly resulting in higher reservoir temperatures and lower plant efficiencies.

**Table 1.4-1.  
Make-up Water Availability for  
Coletto Creek Reservoir**

	<b>Make-up Water Source</b>	
	<b>Guadalupe River Run-of-River Rights and Canyon Lake Contract<sup>1</sup></b>	<b>SAWS Reclaimed Water Delivered to Goliad via the San Antonio River<sup>2</sup></b>
Average Annual Make-up Diversion (acft/yr) <sup>3</sup>	9,500	8,720
Drought Average Make-up Diversion (acft/yr) <sup>4</sup>	16,300	14,400
Percent of Time Make-up Needs Not Fully Met <sup>5</sup>	16.8%	29.2%
<sup>1</sup> Represents existing conditions with Coletto Creek Reservoir make-up diversions from Guadalupe River under run-of-river water right (20,000 acft/yr) and Canyon Lake contract. <sup>2</sup> Represents Coletto Creek Reservoir make-up diversions from SAWS reclaimed water (1988 levels) delivered to Goliad after needs of SAWS Reclaimed Water Programs, Braunig and Calaveras Lakes, and existing water rights owners along the mainstem of the San Antonio River are met. <sup>3</sup> Represents average annual make-up diversions for the 1934 to 1989 period subject to water availability and a maximum diversion rate of 35.65 cfs. <sup>4</sup> Represents drought average make-up diversions for the 116 month period beginning in July 1947 and ending in February 1957 subject to water availability and a maximum diversion rate of 35.65 cfs. <sup>5</sup> Percent of time that the make-up need was not fully met due to the limits of water availability or maximum diversion rate.		

Table 1.4-1 shows that an average of 8,720 acft/yr of make-up water could be diverted from SAWS reclaimed water at Goliad on an average annual basis. This is about 92 percent of the make-up available and diverted under CP&L’s current water rights and contractual arrangements. During the drought of record, an average of 14,400 acft/yr of make-up water could be diverted from SAWS reclaimed water at Goliad, which is about 89 percent of the make-up available and diverted under existing conditions. Make-up water available for Coletto Creek

Reservoir at Victoria under existing conditions would result in the make-up needs not being fully met 16.8 percent of the time, or 113 months out of the 672-month period analyzed (1934 to 1989). In comparison, make-up water available from SAWS reclaimed water would result in the make-up needs not being fully met 29.2 percent of the time, or 196 months out of the 672-month period analyzed. The lack of make-up water available from SAWS reclaimed water in certain months is largely due to the demands for upstream uses—including SAWS Reclaimed Water Programs and Braunig and Calaveras Lakes, as well as losses in delivery of reclaimed water down the San Antonio River.

Comparisons were made of minimum annual Coletto Creek Reservoir pool levels with make-up water from the Guadalupe River at Victoria under existing conditions and with make-up water available from SAWS. The results are presented in Table 1.4-2 and Figure 1.4-2. For make-up water supply from SAWS reclaimed water, Table 1.4-2 shows that Coletto Creek Reservoir would operate at or below a 1-foot drawdown level about 6.8 percent of the time, compared to only 0.3 percent of the time for existing conditions. Figure 1.4-2 shows a comparison of minimum annual Coletto Creek Reservoir pool levels for the 1934 to 1989 period for both existing conditions (make-up from Guadalupe River) and with the make-up supply from SAWS reclaimed water from the San Antonio River. The minimum reservoir pool level with the make-up supply from SAWS return flows at Goliad was found to be 95.2 feet-mean sea level (ft-msl) in 1956 as compared to 96.3 ft-msl for existing conditions.

The availability of SAWS reclaimed water at the Guadalupe River Saltwater Barrier was determined in order to evaluate the potential for mitigation of GBRA water rights transferred from the Saltwater Barrier to upstream locations. Figure 1.4-3 shows the annual total of SAWS reclaimed water available at the Saltwater Barrier after all upstream uses are satisfied to the extent possible. Upstream uses include SAWS Reclaimed Water Programs, make-up demands for Braunig and Calaveras Lakes, make-up demands for Coletto Creek Reservoir, and use by existing water rights owners on the mainstem of the San Antonio River. The availability of SAWS reclaimed water at the Saltwater Barrier also accounts for channel losses from San Antonio to the Saltwater Barrier. The minimum simulated annual volume of reclaimed water available at the Saltwater Barrier would have been 7,300 acft in 1956. This is about 5.4 percent of the total annual SAWS treated effluent of 136,100 acft.

**Table 1.4-2.  
Comparison of Coletto Creek Reservoir Pool Levels**

Reservoir Pool Level (ft-msl)	Make-up Water from Guadalupe River Rights and Canyon Lake Contract <sup>1</sup>		Make-up Water from SAWS Reclaimed Water Delivered to Goliad <sup>2</sup>		Reservoir Area and Capacity	
	Number of Months at or Below Level <sup>3</sup>	Percent of Time at or Below Level <sup>4</sup>	Number of Months at or Below Level <sup>3</sup>	Percent of Time at or Below Level <sup>4</sup>	Surface Area (acres)	Storage Capacity (acft)
98.0	672	100.0%	672	100.0%	3,100	35,084
97.0	2	0.3%	46	6.8%	2,920	32,074
96.0	0	0.0%	6	0.9%	2,740	29,244
95.0	0	0.0%	0	0.0%	2,570	26,589
94.0	0	0.0%	0	0.0%	2,400	24,104

<sup>1</sup> Represents the existing conditions of Coletto Creek Reservoir make-up diversions from the Guadalupe River above Victoria under the existing run-of-river water right (20,000 acft/yr) and Canyon Lake contract. The minimum reservoir pool level is 96.3 ft-msl.  
<sup>2</sup> Represents the conditions of Coletto Creek Reservoir make-up diversions from SAWS reclaimed water delivered to Goliad after SAWS Reclaimed Water Programs and Braunig and Calaveras Lakes make-up needs have been met. The minimum reservoir pool level was 95.2 ft-msl.  
<sup>3</sup> The number of months that the reservoir pool was at or below the indicated level. The 1934 to 1989 historical period (672 months) was used for the simulations.  
<sup>4</sup> The percent of time during the 1934 to 1989 period that the reservoir was at or below the indicated reservoir pool level.

Once reclaimed water from the San Antonio River at Goliad is diverted to Coletto Creek Reservoir, CP&L may no longer need their 20,000 acft water right on the Guadalupe River or their contract with GBRA to deliver make-up water from storage at Canyon Lake. In this analysis, the CP&L contract with GBRA was assumed to be cancelled and the 20,000 acft water right on the Guadalupe River was assumed to be transferred back to its original location at the Saltwater Barrier near Tivoli. Using these assumptions, the firm yield of Canyon Lake was computed while considering the 20,000 CP&L right to be senior to Canyon Lake. The transferred 20,000 acft of water rights at the Saltwater Barrier was assumed to be the most junior of the water rights at Tivoli, which are senior in priority to Canyon Lake. Under this operational scenario, the volume of water developed concurrently at Canyon Lake and the Saltwater Barrier through replacement of make-up water for CP&L from the Guadalupe River with reclaimed water at Goliad would be about 6,200 acft/yr and 10,800 acft/yr, respectively.

The increase in Canyon Lake firm yield is primarily due to the cancellation of the contract with CP&L. The 10,800 acft/yr of water developed at the Saltwater Barrier represents availability under the 20,000-acft/yr water right in the minimum year, 1956 (Figure 1.4-4). As shown in Figure 1.4-4, diversions in excess of 15,000 acft/yr are available under the

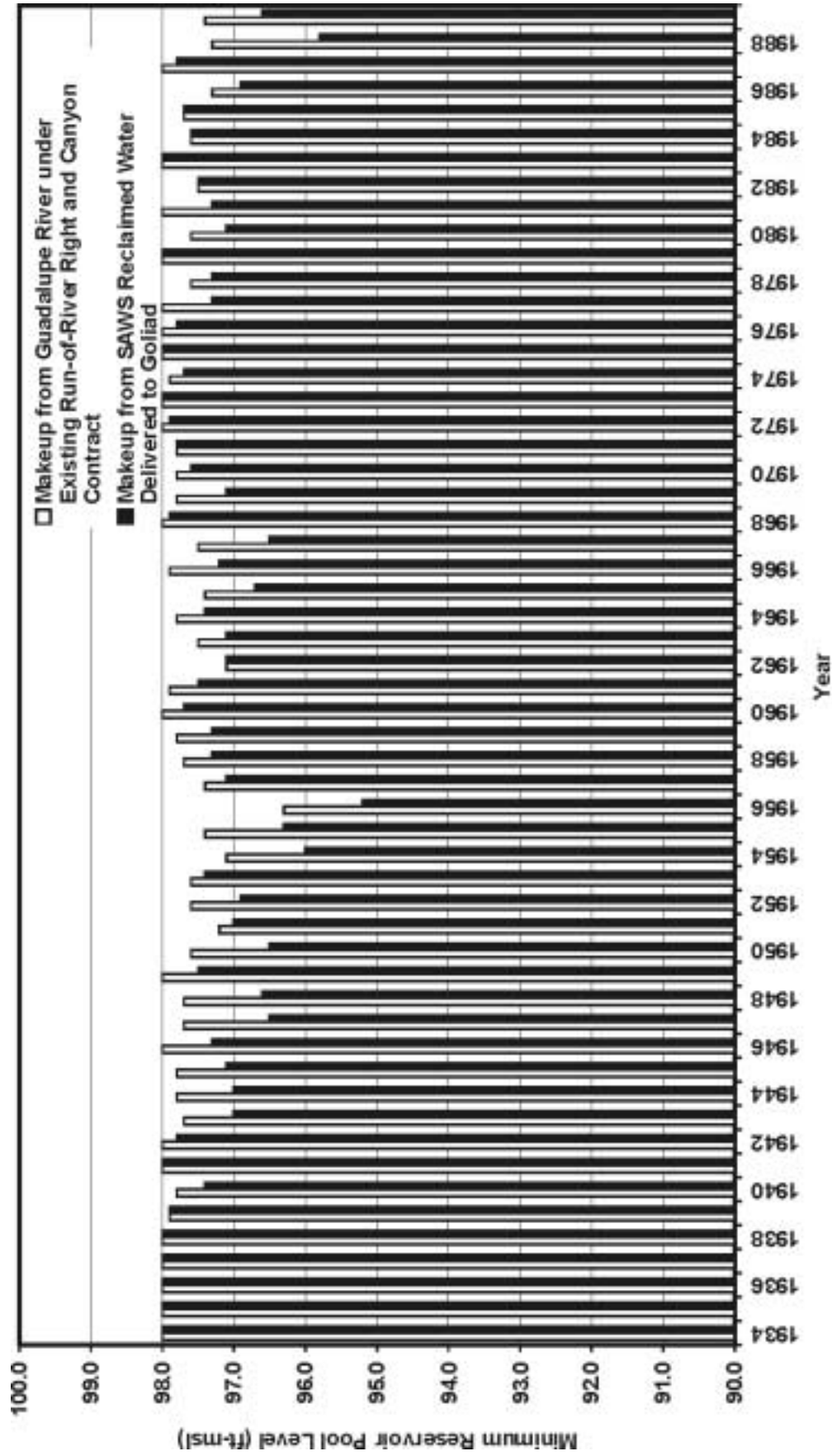


Figure 1.4-2. Comparison of Coletto Creek Reservoir Minimum Pool Levels

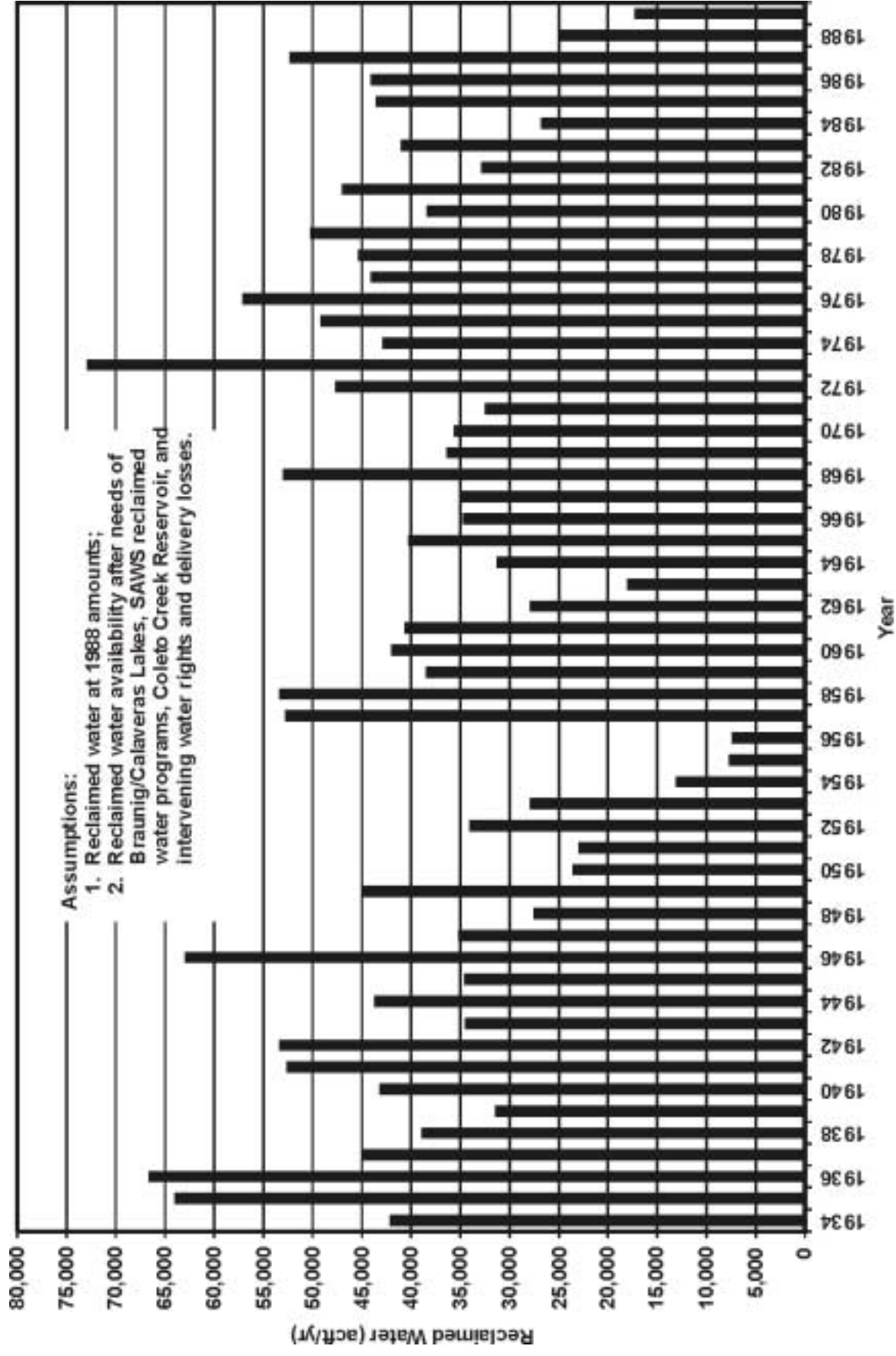


Figure 1.4-3. Availability of SAWS Reclaimed Water at Guadalupe River Saltwater Barrier

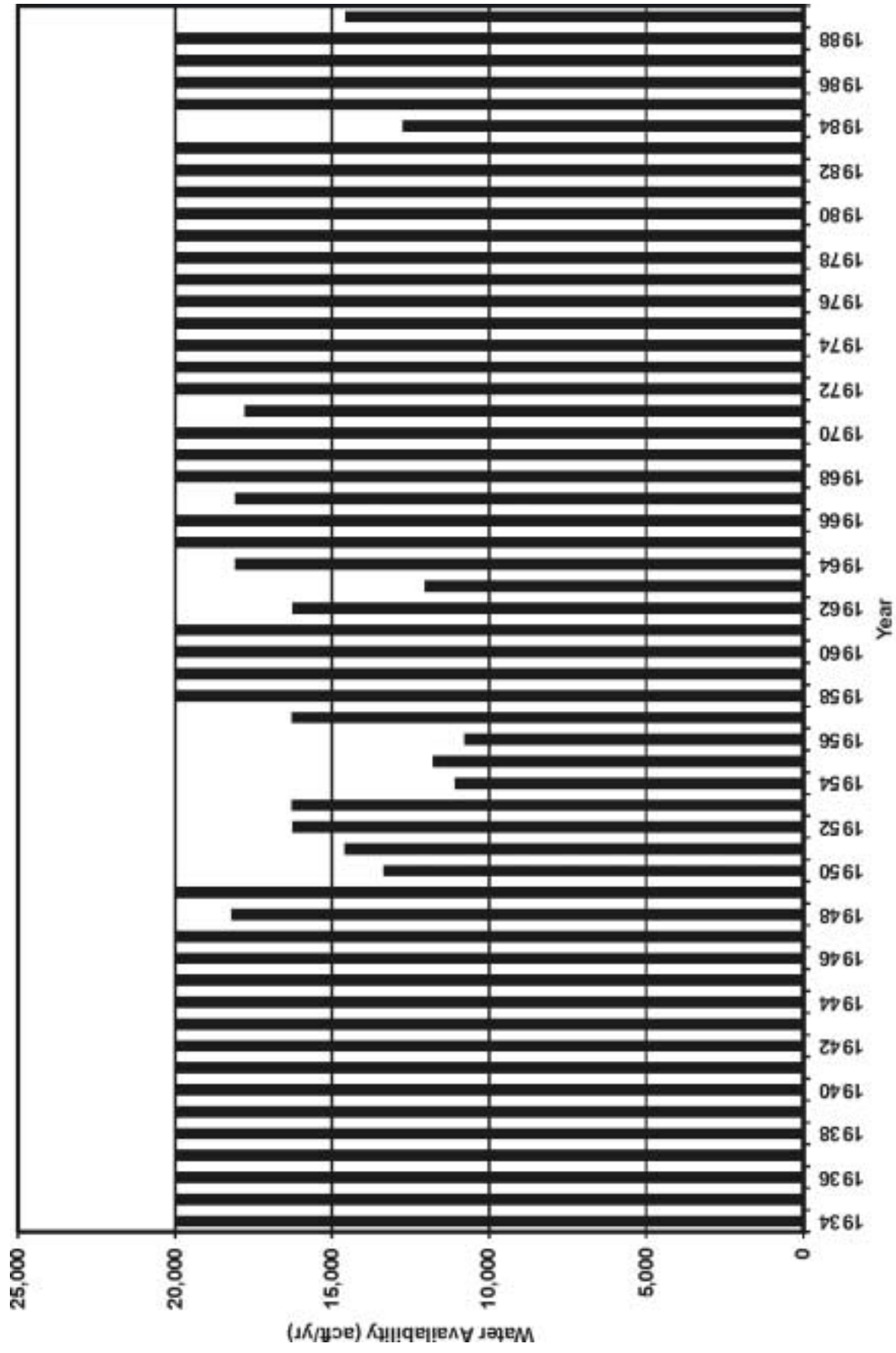


Figure 1.4-4. Availability Under CP&L Water Right Returned to Guadalupe River Saltwater Barrier

20,000-acft/yr right at Tivoli approximately 86 percent of the time. The average annual diversion available under the 20,000 acft right at the Saltwater Barrier is 18,500 acft/yr. It should be noted that under this operational scenario, raw water is developed at two locations, Canyon Lake and the Guadalupe River Saltwater Barrier.

Comparisons of monthly median streamflows and streamflow frequency curves are presented in Figure 1.4-5 for the San Antonio River at Goliad for conditions with and without the diversion of SAWS reclaimed water for Coletto Creek Reservoir make-up. The results show a small reduction in the median monthly streamflow in almost all months with the largest reductions of 12 percent and 10 percent occurring in August and September, respectively. The reduction in the median monthly streamflow was found to be less than 5 percent in all other months. The differences between the flow frequency curves at Goliad are almost indiscernible (Figure 1.4-5). Only the lowest 10 percent of flows show any detectable differences between the with and without project conditions. Figure 1.4-5 also includes comparisons of monthly median streamflows and streamflow frequency curves for the Guadalupe River at the Saltwater Barrier. The results show negligible reductions (less than 0.2 percent) in the median monthly streamflows in 11 of the 12 months, and no discernible difference in the flow frequency curves with and without the project.

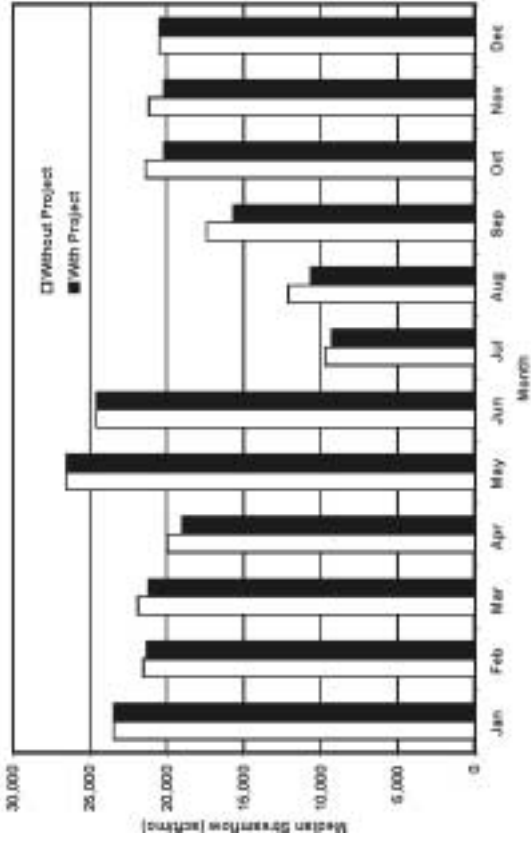
### **1.4.3 Environmental Issues**

The area potentially affected by this option includes the San Antonio River downstream of Goliad, Coletto Creek Reservoir in the Guadalupe River Basin and a pipeline corridor between the diversion point and reservoir. This area encompasses a landscape typical of the East Central Texas Plains. Both the San Antonio River and the Guadalupe River in the project area flow through nearly level bottomland hardwood corridors.<sup>2</sup> Coletto Creek Reservoir was completed in 1980 to provide recirculating cooling water for a CP&L electric generating station. Normal pool elevation is 98 ft-msl, spillway elevation is about 107 ft-msl and top of dam is 120 ft-msl.<sup>3</sup> The littoral of the relatively shallow reservoir is typically flat and seasonally flooded. Lower perennial wetlands with emergent vegetation are present in the area of the proposed discharge

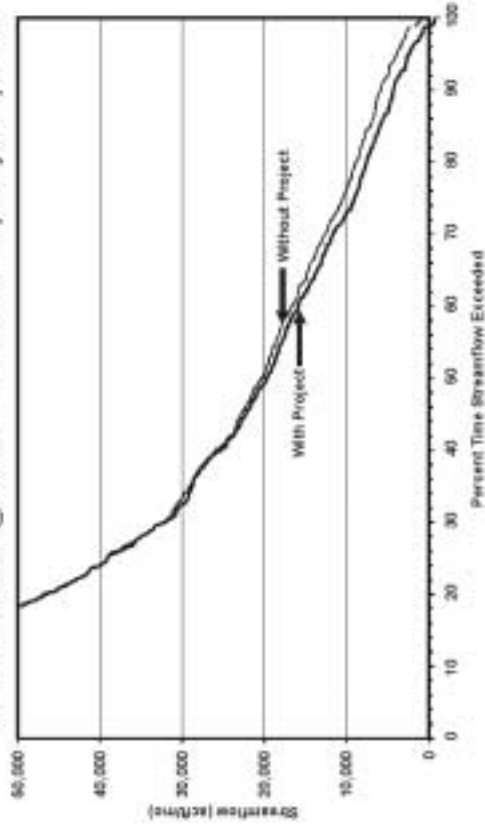
<sup>2</sup> U.S. Fish & Wildlife Service (USFWS), National Wetland Inventory Map Series, Fannin and Hensley Lake, Texas Quadrangles, U.S. Geological Survey (USGS), 1991.

<sup>3</sup> HDR, Personal Communication, Coletto Creek design drawings, 1991.

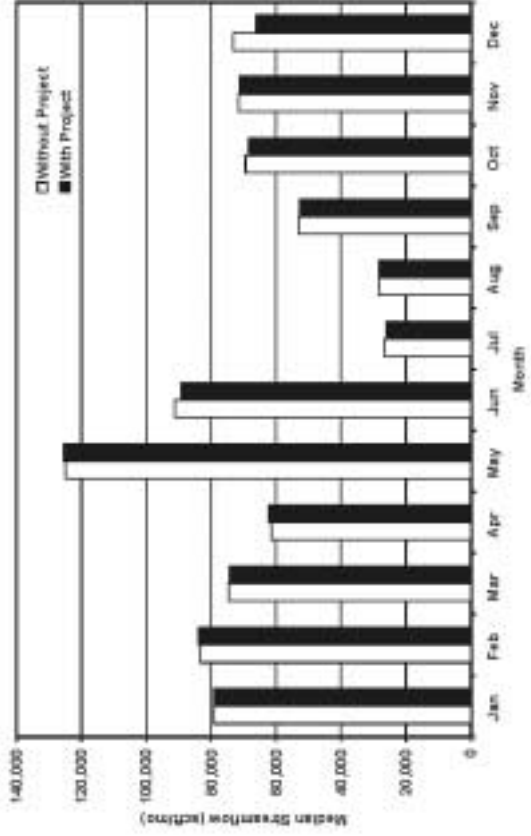
San Antonio River @ Goliad — Median Streamflow Comparison



San Antonio River @ Goliad — Streamflow Frequency Comparison



Guadalupe River @ Saltwater Barrier — Median Streamflow Comparison



Guadalupe River @ Saltwater Barrier — Streamflow Frequency Comparison

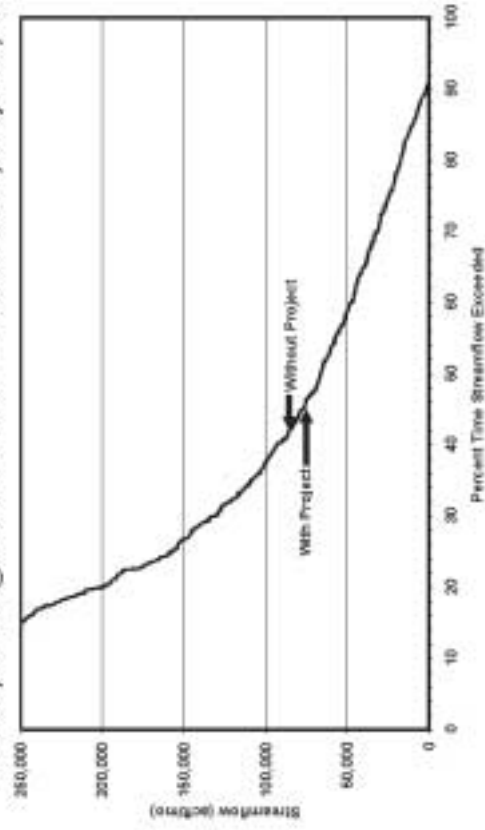


Figure 1.4-5. Transfer of SAWS Reclaimed Water to Coletto Creek Reservoir, Streamflow Comparisons

point, while higher elevations around the reservoir consist of upland forested knolls of pecan and elms.<sup>4,5</sup>

The estimated 71.5-acre construction corridor for the water transmission line (5.9 miles at 100-foot temporary construction easement that includes a 30-foot permanent easement) assessed as Option L-20 traverses areas comprised primarily of mesquite-invaded coastal post oak woods, and a forest and grassland mosaic developed on the sandy soils of the Post Oak Savannah.<sup>6,7</sup> The dominant species (post oak) occurs in open stands with a grass ground cover. The vegetation type is either considered to be part of the Eastern Deciduous Forest association or as part of the Prairie association.<sup>8,9,10,11,12,13,14</sup> The latter association is based upon the occurrence of a climax tall grass understory composed of prairie dominants, little bluestem, Indiangrass, and big bluestem. Recent agricultural practices, such as overgrazing, abandonment from cultivation, and fire control, have contributed to many acres being converted into dense woodland stands of post oak and winged elm.

The only stream to be crossed by the proposed transmission line corridor is Manahuilla Creek, a seasonally intermittent tributary to the San Antonio River.<sup>15</sup> In this reach of the San Antonio River (and Manahuilla Creek) wetlands are generally limited to the streambed itself, as the relatively steep, forested banks support mesic, upland woods dominated by pecan and elm.<sup>16</sup> The post oaks-mesquite savannah occupies about 90 percent of the corridor. Upland hardwood forests, including those along the stream banks, total about 8 percent of the corridor. Developed

<sup>4</sup> USFWS, Op. Cit., 1991.

<sup>5</sup> USGS, NAPP Photograph 1540-161 dated 2-23-89, EROS Data Center, Sioux Falls, South Dakota, 1989.

<sup>6</sup> McMahan, C.A., R.G. Frye, K.L. Brown, "The Vegetation Types of Texas Including Cropland," Texas Parks and Wildlife Department (TPWD), Austin, Texas, 1982.

<sup>7</sup> Gould, F.W., "Texas Plants — A Checklist and Ecological Summary," Texas A&M University, Texas Agricultural Experiment Station, MP-585/Rev., College Station, Texas, 1975.

<sup>8</sup> Correll, D.S., and M.C. Johnston, "Manual of the Vascular Plants of Texas," Texas Research Foundation, Renner, Texas, 1979.

<sup>9</sup> Tharp, B.C., "The Vegetation of Texas," Texas Acad. Sci., Anson Jones Press, Houston, Texas, 1939.

<sup>10</sup> Braun, E.L., "Deciduous Forest of Eastern North America," Hafner Publ. Co., Inc., New York, 1950.

<sup>11</sup> Kuchler, A.W., "Potential Natural Vegetation of the Conterminous United States," American Geog. Soc. S. Publ. No. 36, 1964.

<sup>12</sup> Mahler, W.F., "The Mosses of Texas," Southern Methodist University Herbarium, Dallas, Texas, 1980.

<sup>13</sup> Weaver, J.E. and F.E. Clements, "Plant Ecology," 2nd Ed. McGraw-Hill Book Co., New York, 1938.

<sup>14</sup> Daubenmire, Rexford, "Plant Geography with Special Reference to North America," Academic Press, New York, 1978.

<sup>15</sup> USFWS, Op. Cit. 1991

<sup>16</sup> McMahan, C.A. et al., Op. Cit., 1982.

areas along the transmission line corridor total less than 1 percent and wetlands occupy the remaining 1 percent.

The important species listed in Table 1.4-3 for Goliad and Victoria Counties might be affected by the implementation of Option L-20.<sup>17</sup> Three important birds may be found using habitat found in the study area. They are the American Bald Eagle, the White-tailed Hawk, and White-faced Ibis. The American Bald Eagle is known to nest along densely forested corridors of the San Antonio and Guadalupe River bottoms. The rare White-tailed Hawk is found in grasslands and coastal prairie of the Texas Gulf Coast. The White-faced Ibis has been reported as a summer resident in freshwater marshes and hardwood bottomlands southeast of the project area. Texas Scarlet Snake, listed as threatened by Texas Parks and Wildlife Department (TPWD), and the Texas Horned Lizard, which is also a candidate for federal protection, are the most likely important species to found in upland habitats of the study area. The semi-fossorial Texas Scarlet Snake is found on sandy soils of East Texas and the central and south Gulf Coast. The Texas Horned Lizard is a denizen of open, well-drained habitats with sparse cover. Ants, spiders, and isopods are included in their diets. The decline of Texas Horned Lizard populations is associated with the invasion of fireants, agricultural practices, and urbanization.<sup>18</sup> This statewide species preferred habitat is open, flat terrain with bare ground.

Important aquatic species known to the San Antonio River and Guadalupe River include the Guadalupe Bass and Cagle's Map Turtle. Both species are reported in the Guadalupe River basin around Victoria,<sup>19,20,21</sup> but populations of Guadalupe Bass tend to decline as the river enters the Coastal Plains.

The proposed diversion dam on the San Antonio River, surface intake and pump station would likely affect an estimated two acres of riverine wetlands. The transmission line from the San Antonio River diversion to Coletto Creek Reservoir is estimated to be about 5.9 miles long, and to require a 100-foot construction corridor, within which no more than 70 acres of post oak

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<sup>17</sup> TPWD, Data and Map Files of the Natural Heritage Program, Resource Protection Division, Austin, Texas, Unpublished, September 1994.

<sup>18</sup> Price, A., W. Donaldson, and J. Morse, "Final Report as Required by the Endangered Species Act, Section 6, Texas Project No. E-1-4, TPWD, Austin, Texas, 1993.

<sup>19</sup> Gary P. Garrett, "Guidelines for the Management of Guadalupe Bass," TPWD Austin, Texas, 1991.

<sup>20</sup> Haynes, David and Ronald R. McKown, "A New Species of Map Turtle (Genus *Graptemys*) from the Guadalupe River System in Texas," *Tulane Studies in Zoology and Botany*, Vol. 18, Num. 4., pp. 143-152, 1974.

<sup>21</sup> Killebrew, Flavius C. and Dan A. Porter, "Testudines, *Graptemys caglei*," *Herp Review*: 22(1), p. 24, 1991.

**Table 1.4-3.  
Important Species\* Having Habitat or Known to Occur  
in Counties Potentially Affected by Option<sup>1</sup>  
Transfer of Reclaimed Water to Coletto Creek Reservoir (L-20)**

Common Name	Scientific Name	Summary of Habitat Preference	Listing Agency			Potential Occurrence in County
			USFWS	TPWD	TOES	
<b>Birds</b>						
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Open country; cliffs	E	E	E	Nesting/Migrant in Goliad and Victoria
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	Open country; cliffs	E	T	T	Nesting/Migrant in Goliad and Victoria
Interior Least Tern	<i>Sterna antillarum athalassos</i>	Inland river sandbars for nesting and shallow water for foraging	E	E	E	Nesting/Migrant in Goliad and Victoria
Whooping Crane	<i>Grus americana</i>	Potential migrant	E	E		Migrant in Victoria and Goliad
Wood Stork	<i>Mycteria americana</i>	Forages in prairie ponds, ditches, and shallow standing water formerly nested in Texas		T	T	Migrant in Victoria
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Large Bodies of water with nearby resting sites	T	T	E	Nesting/Migrant in Goliad and Victoria
White-tailed Hawk	<i>Buteo albicaudatus</i>	Coastal prairies, savannahs and marshes in Gulf coastal plain		T	T	Nesting/Migrant in Goliad and Victoria
Eskimo Curlew	<i>Numenius borealis</i>	Coastal Prairies	E	E	E	Occasional in Victoria
Brown Pelican	<i>Pelecanus occidentalis</i>	Coastal inlands for nesting, shallow gulf and bays for foraging	E	E	E	Nesting/Migrant in Victoria
Reddish Egret	<i>Egretta rufescens</i>	Coastal inlands for nesting, coastal marshes for foraging	C2	T		Migrant in Victoria
White-faced Ibis	<i>Pelages chihi</i>	Prefers freshwater marshes, sloughs, and irrigated rice fields	C2	T	T	Migrant in Victoria
Snowy Plover	<i>Charadrius alexandrinus</i>	Beaches, flats, streamsides; Winters on coast, rarely nests on coast	C3			Migrant in Matagorda
Piping Plover	<i>Charadrius melodus</i>	Beaches and flats of Coastal Texas	T	T	T	Migrant in Matagorda
Sooty Tern	<i>Sterna fuscata</i>	Gulf coastal islands for nesting, deep Gulf for foraging		T	WL	Nesting in Matagorda
Attwater's Greater Prairie-Chicken	<i>Tympanuchus cupido attwateri</i>	Coastal Prairies of Gulf Coastal Plain	E	E	E	Nesting in Goliad and Victoria
<b>Reptiles</b>						
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Varied, sparsely vegetated uplands, grass, cactus, brush	C2	T	T	Resident in Victoria, Goliad, Matagorda
Spot-tailed Lizard	<i>Holbrookia lacerata</i>	Central & Southern Texas; oak-juniper woodlands and mesquite-prickly pear				Resident in Goliad
Texas Diamondback Terrapin	<i>Malaclemys terrapin litoralis</i>	Bays, coastal marshes of the upper two-thirds of Texas Coast	C2		T	Resident in Victoria
Gulf Saltmarsh Snake	<i>Nerodia clarkii</i>	Brackish to saline coastal waters	C2			Resident in Victoria and Matagorda
Texas Tortoise	<i>Gopherus berlandieri</i>	Open brush with grass understory; open grass and bare ground avoided; occupies shallow depressions at base of bush or cactus, underground burrows, under objects; active March through November		T	T	Resident in Goliad and Matagorda
Reticulate Collared Lizard	<i>Crotaphytus reticulatus</i>	Endemic grass prairies of South Texas Plains; usually thornbush, mesquite-blackbrush	C2	T	T	Western South Texas

**Table 1.4-3 (continued)**

Common Name	Scientific Name	Summary of Habitat Preference	Listing Agency			Potential Occurrence in County
			USFWS	TPWD	TOES	
Timber Rattlesnake	<i>Crotalus horridus</i>	Floodplains, upland pine, deciduous woodlands, riparian zones, abandoned farms, dense groundcover		T	T	Resident in Victoria
Keeled Earless Lizard	<i>Holbrookia propinqua</i>	Coastal dunes, Barrier islands and sandy areas				Resident in Goliad and Victoria
<b>Fish</b>						
Guadalupe Bass	<i>Micropterus treculi</i>	Clear flowing streams	C2		WL	Victoria, Bexar
Blue Sucker	<i>Cycleptus elongatus</i>	Large rivers throughout Mississippi River Basin south and west in major streams of Texas to Rio Grand River	C2	T	WL	Resident in South Texas
<b>Amphibians</b>						
Black-spotted Newt	<i>Notophthalmus meridionalis</i>	Ponds and resacas in south Texas		T	E	Resident in Victoria
Sheep Frog	<i>Hypopachus variolosus</i>	Deep sandy soils of Southeast Texas	T	T		Resident in Goliad
<b>Insects</b>						
Texas Asaphomyian Tabanid Fly	<i>Asaphomyia texanus</i>		C1			Resident in Goliad and Victoria
<b>Plants</b>						
Mulenbrock's Umbrella Sedge	<i>Cyperus grayioides</i>	Prairie grasslands, moist meadows in Texas, Louisiana, Illinois	C2			South Texas
Prairie Dawn (a.k.a. Texas Bitterweed)	<i>Hymenoxys texana</i>	Gulf Prairie and marshes in poorly drained depressions or at the base of mima mounds in open grasslands in almost barren areas	E	E		South Texas
Welder Machaeranthera	<i>Psilactis heterocarpa</i>	Shrub-infested grasslands and open mesquite-huisache woodlands on coastal prairie			WL	Resident in Victoria
<b>Mammals</b>						
Ocelot	<i>Felis pardalis</i>	dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas	E	E	E	Historical Resident in Goliad and Matagorda
Jaguarundi	<i>Felis yagouarundi</i>	South Texas thick brushlands, favors areas near water	E	E	E	Historical Resident in Goliad
<sup>1</sup> Texas Parks and Wildlife Department. Unpublished 1999. September 1999, Data and map files of the Natural Heritage Program, Resource Protection Division, Austin, Texas. * E = Endangered                      T = Threatened                      C1 = Candidate Category, Substantial Information                      C2 = Candidate Category C3 = No Longer a Candidate for Protection                      PE/PT = Proposed Endangered or Threatened                      NL = Not listed WL = Watch List – Potentially Threatened, especially in Texas                      Blank = Rare, but no regulatory listing status						

and grassland mosaic vegetation and 0.5 acres of intermittent streambed may be disturbed. The proposed discharge structure near Coletto Creek Reservoir would disturb about a quarter acre of palustrine wetlands with emergent vegetation. With all major facilities included, the total area potentially disturbed during construction could be as much as 71.5 acres. Within the construction corridor, a 30-foot right of way, totaling 21.5 acres free of woody vegetation, would be maintained for the life of the proposed transmission line. The small diversion dam and intake at San Antonio River, about half an acre, could affect riverine wetlands. The associated pump station may affect an estimated 2 acres of post oak uplands and the discharge structure would permanently affect an estimated quarter acre of littoral zone in vegetated wetlands of Coletto

Creek Reservoir. The location of the proposed alternative facilities and transmission line alignment are now only generally specified (Figure 1.4-1).

Option L-20 would replace Guadalupe River water with SAWS reclaimed water. One long-term effect on Coleta Creek Reservoir could be increased fluctuations in water surface elevation. The reservoir would operate at or below a 1-foot drawdown level about 6.8 percent of the time, and would experience drawdowns greater than 2 feet 0.9 percent of the time (Table 1.4-2, Figure 1.4-2). The changes in elevation that would accompany implementation of this option do not appear to exceed a rate of about 1-foot, except during extreme drought periods. This would not substantially affect fish reproduction in shallow water. Potential effects on reservoir water quality and recreational use of the reservoir are not addressed herein, but should be addressed if this option is considered further, since nitrogen and phosphorus are present in San Antonio River water at 5 to 100 times the concentrations reported for the current makeup water, the Guadalupe River.

Changes in monthly median streamflows in the San Antonio River below the Goliad diversion during most months would be quite small. Use of the Consensus Criteria has limited monthly median flow reductions to a maximum of about and 12.1 percent (Figure 1.4-5). No reductions in monthly minimum flows would result in implementation of this option. Flows in the Guadalupe River at the Saltwater Barrier are relatively unchanged (Figure 1.4-5), with median flow changes of less than 0.2 percent in 11 of 12 months.

Protected species that appear most likely to be encountered during construction of this option include the American Bald Eagle, White-faced Ibis, Texas Scarlet Snake, and the Texas Horned Lizard in forested and upland areas. Potential conflicts with the birds and reptiles should be easily avoidable with appropriate habitat and important species surveys. Cagle's Map Turtle and the Guadalupe Bass may be present in the project area. Potential conflicts should be avoidable by employing appropriate habitat and important species surveys (including instream flow evaluations) and appropriate construction techniques.

A cultural resources survey of all public property, including easements held by public entities, to be disturbed during construction is required by the Antiquities Code of Texas (Title 9, Chapter 191, Texas Natural Resources Code of 1977). Any sites located would be tested for significance and eligibility for the National Register. Disturbance of significant sites should be avoided to the extent possible.

#### **1.4.4 Engineering and Costing**

For this option, SAWS reclaimed water would be diverted at a location on the San Antonio River downstream of Goliad and pumped to Coletto Creek Reservoir to provide make-up water for steam-electric cooling needs. This use of reclaimed water would replace the run-of-river rights and stored water contract currently in place for Guadalupe River water. Facilities needed to implement this option include:

- Small Diversion Structure in the San Antonio River
- Surface Water Intake
- Pump Station
- Transmission Pipeline
- Discharge Structure in Coletto Creek Reservoir

##### **1.4.4.1 Cost of Water**

SAWS would supply reclaimed water to CP&L to replace, to the extent possible, the current make-up water sources for Coletto Creek Reservoir. Replacement of CP&L's run-of-river diversion right would be accomplished by SAWS making reclaimed water available at no cost to CP&L and compensating CP&L for the cost of facilities to deliver that water. Because CP&L's diversion right would be replaced with other water, no direct payment is anticipated to CP&L for their run-of-river water right.

Currently, CP&L holds a contract with GBRA to purchase up to 30,000 acft of stored water from Canyon Lake in any 5-year period, which is equivalent to an annual volume of 6,000 acft. If CP&L were to terminate its water supply contract with GBRA (based on a dependable supply of reclaimed water), the firm yield of Canyon Lake would increase by about 6,200 acft/yr. Purchase of this 6,200 acft/yr at \$61 per acft per year is included as an Annual Cost associated with implementation of this option.

##### **1.4.4.2 Cost of Facilities**

The pump station capacity for the new intake located on the San Antonio River is set at 35.65 cfs, matching the capacity of the existing diversion facility on the Guadalupe River supplying make-up water to Coletto Creek Reservoir. The new pipeline to Coletto Creek Reservoir would be 36 inches in diameter and 5.9 miles in length. The operating cost was determined for a static lift of 70 feet and an average annual water delivery of 8,720 acft.

Financing the project over 30 years at a 6 percent annual interest rate results in an annual cost of \$740,000 (Table 1.4-4). Average annual operation and maintenance costs, including power, total \$231,400 for either diversion location. Compensation for water purchased by SAWS from Canyon Lake is estimated to be \$378,200 per year. Annual costs, including debt repayment, interest, water contract purchase, and operation and maintenance, total \$1,349,600. For an annual firm yield of 17,000 acft (6,200 acft from Canyon Lake and 10,800 acft at the Guadalupe River Saltwater Barrier in minimum year), the resulting annual cost of make-up water is \$79 per acft (Table 1.4-4). Cost estimates are for raw water at sources and do not include delivery, treatment, or distribution.

#### **1.4.6 Implementation Issues**

Implementation of transfers of SAWS reclaimed water to Coletto Creek Reservoir could directly affect the feasibility of other water supply options under consideration, including L-11, L-14, S-14D, S-15Da, S-15Db, S-15Dc, S-15Ea, S-15Eb, S-16C, G-24, G-38C, SCTN-14a, SCTN-14b, SCTN-16a, SCTN-16b, and/or SCTN-16c.

##### **Requirements Specific to Use of Coletto Creek Reservoir:**

1. Studies need to be performed to determine if the reduced make-up water supply available from reclaimed water presents a problem for the operation and efficiency of CP&L's generating station and for the management of GBRA's recreational facilities at the reservoir. If additional make-up water supplies are needed, other water is potentially available from: increased SAWS reclaimed water availability in the future; maintaining a portion of CP&L's contract with GBRA for purchase of stored water; temporary releases of reclaimed water stored in Braunig and/or Calaveras Lake; temporary make-up from groundwater supplies; construction of a larger capacity pump station and pipeline; or some combination of these options.
2. If reservoir levels are decreased, pumping costs at the plant and reservoir water temperatures will increase.
3. Contract between CP&L and GBRA for delivery of Canyon Lake water would likely be terminated, and SAWS would need to negotiate a purchase contract with GBRA for stored water.
4. Ownership of CP&L's run-of-river diversion right on the Guadalupe River would be transferred to SAWS and the authorized diversion point transferred to the Guadalupe River Saltwater Barrier.
5. Studies should be performed of water quality issues (i.e., nutrient and dissolved solids loadings and possibly others) for use of SAWS reclaimed water as make-up water at Coletto Creek Reservoir. It is noted that SAWS reclaimed water has been used successfully by San Antonio's City Public Service Board for steam-electric cooling purposes for many years.

**Table 1.4-4.**  
**Cost Estimate Summary for**  
**Transfer of SAWS Reclaimed Water to**  
**Coletto Creek Reservoir (L-20)**  
**Second Quarter 1999 Prices**

<i>Item</i>	<b>Estimated Cost for Facilities</b>
Capital Costs	
Intake, Pump Station, and Channel Dam (23 MGD)	\$3,923,500
Transmission Pipeline (36-inch dia.; 5.9 miles)	<u>2,923,200</u>
<b>Total Capital Cost</b>	<b>\$6,846,700</b>
Engineering, Legal Costs and Contingencies	\$2,250,100
Environmental & Archaeology Studies, Mitigation, and Permitting	147,500
Land Acquisition and Surveying (23.5 acres)	207,400
Interest During Construction (2 years)	<u>740,700</u>
<b>Total Project Cost</b>	<b>\$10,192,400</b>
Annual Costs	
Debt Service (6 percent for 30 years)	\$740,000
Intake, Pipeline, Pump Station, and Channel Dam	107,800
Pumping Energy Costs (2,059,340 kWh @ \$0.06 per kWh)	123,600
Purchase of Water (6,200 @\$61 per acft)	<u>378,200</u>
<b>Total Annual Cost</b>	<b>\$1,349,600</b>
<b>Available Project Yield at Canyon Lake (acft/yr)</b>	<b>6,200</b>
<b>Available Project Yield at Saltwater Barrier (acft/yr)</b>	<b>10,800</b>
<b>Total (acft/yr)</b>	<b>17,000</b>
<b>Annual Cost of Water (\$ per acft) Raw Water at Source<sup>1</sup></b>	<b>\$79</b>
<b>Annual Cost of Water (\$ per 1,000 gallons) Raw Water at Source<sup>1</sup></b>	<b>\$0.24</b>
<sup>1</sup> Costs do not include delivery, treatment and distribution of water.	

**Requirements Specific to River Diversion and Transmission Pipeline:**

1. Necessary permits:
  - a. TNRCC beds and banks authorization for use of the San Antonio River to deliver SAWS reclaimed water
  - b. TNRCC interbasin transfer authorization.
  - c. U.S. Army Corps of Engineers (USCE) Sections 10 and 404 dredge and fill permits for stream crossings.
  - d. General Land Office (GLO) Sand and Gravel Removal permits.
  - e. TPWD Sand, Gravel, and Marl permit for river crossings.
2. Right-of-way and easement acquisition.
3. Crossings:
  - a. Highways and railroads.
  - b. Creeks and rivers.
  - c. Other utilities.