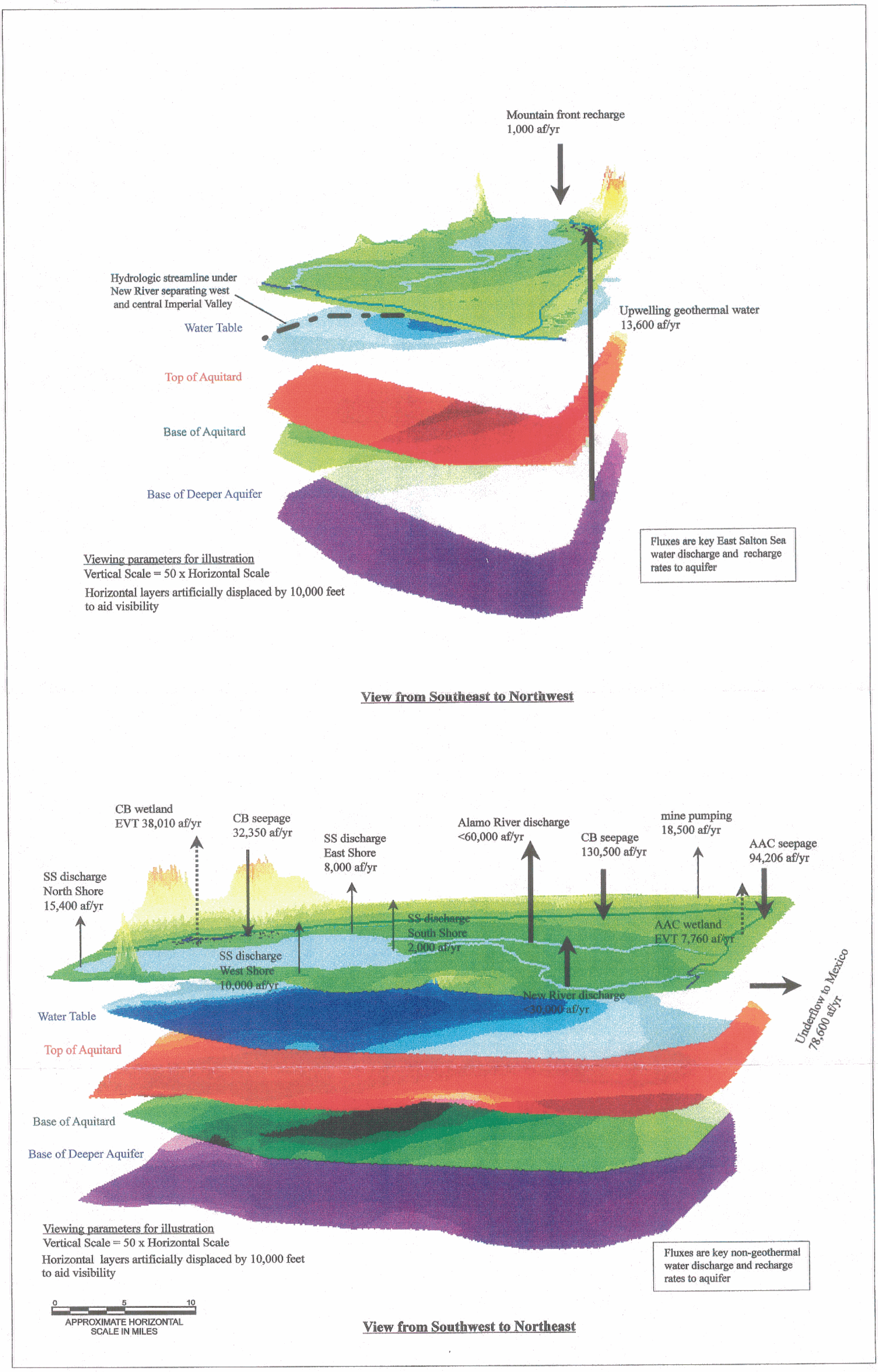

Figure 3-8 Isometric Block Diagram of Groundwater Conceptual Model

into the New and Alamo Rivers and the Dran La Mesa in Mexico, drainage from the agricultural fields and the extensive drain network in central Imperial County, and discharge into the Salton Sea and adjacent wetlands.

3.4.3 Hydraulic Conductivity Distribution

Aquifer transmissivity values derived from pumping tests are depicted in Figure 3-9. Transmissivity varied from 200 ft^2/day in central Imperial Valley to 100,000 ft^2/day in East Mesa. Hydraulic conductivity values for the upper and lower aquifers were initially estimated using this transmissivity data, the Imperial County Groundwater Model report (Montgomery Watson 1995), and the East Mesa Groundwater Model (Bureau of Reclamation 1987). Aquifer hydraulic conductivity values varied from a low value of 0.5 foot per day in the Imperial Irrigation District, where sediments are low conductivity lake deposits, to a high value of 80 feet per day in East Mesa, where sediments are high conductivity sands and gravels. Values for the Sand Hills are 50 feet per day. Areas lacking data are assumed to have a hydraulic conductivity value of 30 feet per day for locations east of the pre-historic Lake Cahuilla Shoreline and 0.5 foot per day for locations west of the pre-historic Lake Cahuilla Shoreline (44 feet MSL).

3.4.4 Vertical Leakance

Direct field measurements of the aquitard leakance are not available, and values are typically estimated by model calibration. Assuming an aquitard vertical hydraulic conductivity value of 0.05 foot per day and an average thickness of 80 feet results in an aquitard leakance of 0.001 day^{-1}, which is similar to the value used in the East Mesa Groundwater Model (Bureau of Reclamation 1987). The Imperial Valley Groundwater Model used a leakance value that varied between 0.001 and 0.02 day^{-1}.

3.4.5 Preliminary Water Balance

A preliminary water balance is estimated for the study area bordered on the northeast by the Chocolate and Orocopia Mountains, on the southeast by the Cargo Muchacho Mountains and Pilot Knob, on the south by the La Mesa Drain, on the southwest by the New River, and on the northwest by the Salton Sea. Table 3-1 presents all key components of aquifer inflow and outflow with comments regarding the applicable time period, as well as a citation for the reference. Table 3-2 presents key components of the water budget for the Salton Sea. Table 3-3 presents key components of the water balance for the Salt Creek Area.

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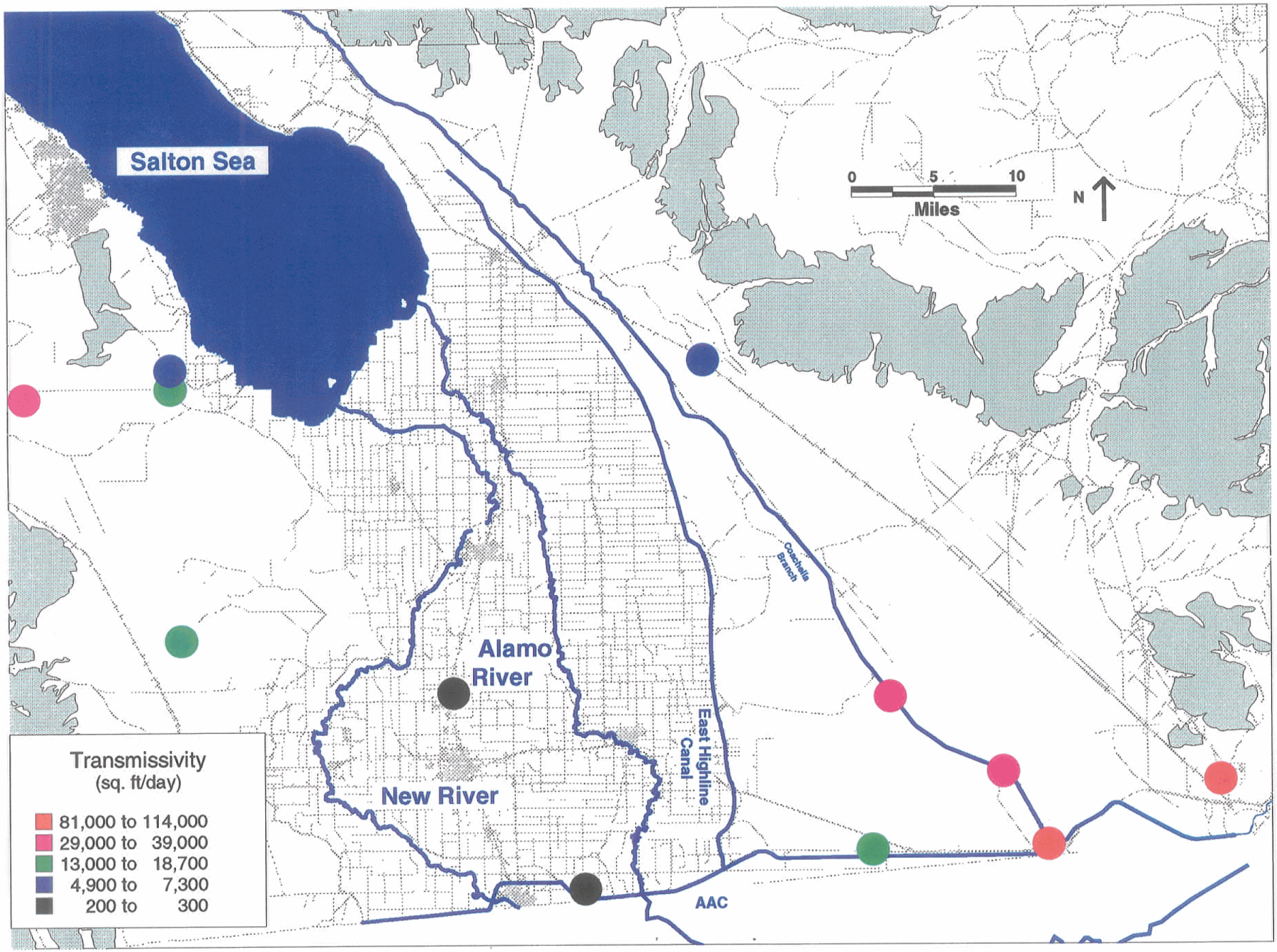

Figure 3-9 Aquifer Transmissivity Values Derived from Pump Tests

Table 3-1

Preliminary Water Balance

Feature Type	Name	Rate (af/yr)[1]	Timing	Comment	Reference	Uncertainty[2]
Canal seepage	AAC, Pilot Knob to Drop 2	77,070	1940 to ~ 2000	1940 to ~ 2000	USBR 1991	1
	AAC, Drop 2 to EHC	17,136	1940 to ~ 2000	1940 to ~ 2000	USBR 1991	1
	CB, first 49 miles	130,500	1948 to 1979	1948 to 1979	Fogg 1989	1
	CB second 37 mile	32,350	1948 to ~2000	1948 to ~2000	USBR 1992	1
Discharge into canal	EHC, first 9 miles	(4,400)	1948 to current	1948 to current	Fogg 1989	2
Discharge into river	New River	(< 30,000)	varies as per Table 2-2	upper bound is stream gains	IID gauge data	4
	Alamo River	(< 60,000)	varies as per Table 2-2	upper bound is stream gains	IID gauge data	4
	La Mesa Drain	(24,300)	1960 to current		USBR 1991	2
Discharge to Salton Sea	East Shore	(8,000)	1960s			3
	Imperial Valley	(2,000)	1960s			3
	Coachella Valley	(30,000)	1960s			3
	West Shore	(10,000)	1960s			3
Evapotrans-piration	Coachella Branch	(38,010)	1948 to ~ 2000	see Table 5-1	USBR 1992	2
	AAC	(7,760)	1940 to 2050		USBR 1991	2
Mountain Front Stream Recharge	Salt Creek	1,000				3
Underflow at boundaries	Between Cargo Muchacho and Chocolate Mountains	2,000	1960s		Olmsted 1973	4
	Between Cargo Muchacho and Pilot Knob Mountains	2,000	1960s		Olmsted 1973	3
	Beneath La Mesa Drain	(54,300)	1980s			2
Pumpage	Artesian discharge, East Salton Sea	(6,600)				3
	Mesquite and American Girl Mines	18,000	1980s		Imperial County Model	2
Precipitation recharge	All unirrigated areas	1,000		post-agriculture development	Skrivan 1997	3
	Recharge in irrigated areas	50,000		<9 cm/yr	Schroeder *et al.* 1991	3

Notes: [1] af/yr = acre-feet per year
[2] Uncertainty tabulated from lowest (1) to highest (4) with 1 = ±5 to 10%, 2 = ±10 to 20%, 3 = ±20 to 50%, and 4 = ±50 to 100%.

Table 3-2

Salton Sea Water Budget

	Rate (af/yr)[1]	Uncertainty[2]
Inflow from Groundwater Discharge	50,000	3
Surface Inflow	1,300,000	2
Precipitation	30,000	2
Evaporation	(1,380,000)	2

Notes: [1] af/yr = acre-feet per year
[2] Uncertainty tabulated from lowest (1) to highest (4) with 1 = ±5 to 10%, 2 = ±10 to 20%, 3 = ±20 to 50%, and 4 = ±50 to 100%.

Table 3-3

Water Budget for Salt Creek Area

Item	Inflow (acre-ft/yr)	Outflow (acre-ft/yr)	Comment	Source	Uncertainty*
Canal seepage	32,350			CB EIS/EIR	1
Mountain front recharge	1,000		Estimated for a 206-sq-mile catchment basin	-	3
Salt Creek Area rising geothermal water	14,660		Estimated by net balance of flux	-	3
Hot Mineral Spa extraction		6,600	Artesian geothermal water	El Centro O & G	3
Hot Mineral Spa rising geothermal water	6,600		Artesian geothermal water	El Centro O & G	2
Discharge to Salton Sea		8,000	Total east shore	486 K	3
Discharge as Salt Creek baseflow		2,000		CB EIS/EIR	2
Wetland ET		38,010	5 ft/yr from mapped areas	CB EIS/EIR	2
Total	54,610	54,610	Assumed steady state		

Note: * Uncertainty tabulated from lowest (1) to highest (4) with 1 = ±5 to 10%, 2 = ±10 to 20%, 3 = ±20 to 50%, and 4 = ±50 to 100%.