

# ANTELOPE VALLEY SALT/NUTRIENT MANAGEMENT PLAN STAKEHOLDER MEETING MINUTES

January 24, 2012

Location: Palmdale City Hall

**Attendees:** Jessica Bunker (LACWWD), Erika de Hollan (LACSD), Bob Large (Lake Town Council), Yvonne Malikowski (Lake LA Park Association), Dave Rydman (LACWWD), Chris Vidal (PWD), Carlyle Workman (City of Lancaster), Jan Zimmerman (Lahontan RWQCB)

## **RWQCB/DWR Updates**

Jan Zimmerman mentioned that at the Lahontan Regional Water Quality Control Board (Regional Board) Board meeting last October, the Regional Board accepted the Antelope Valley proposed Salt/Nutrient Management Plan Scope of Work and were pleased with the stakeholders' progress. At the Regional Board's January Board meeting, a State Board Member (Fran Spivy-Weber) was present and expressed that she was also pleased that Regional Board staff is working closely with the region and that the Salt Management Plan (SMP) will be included as an appendix to the Integrated Regional Water Management Plan (IRWMP). The SMP stakeholders will be receiving an acceptance letter from the Regional Board for the Scope of Work.

On January 31, 2012, the Department of Water Resources is holding a free public workshop on climate change, extreme weather, and southern California floods. An e-mail notification of the workshop was sent to all IRWMP stakeholders.

## **Scope of Work/Work Plan**

Since receiving the Regional Board's acceptance of the SMP Scope of Work, a recommendation for the Scope of Work to be finalized was expressed. With no objections, all stakeholders agreed to finalize the Scope of Work. The SMP Scope of Work can be found on the IRWMP website at [www.avwaterplan.org](http://www.avwaterplan.org).

## **Projects Contributing to Salt/Nutrient Impacts**

The group reviewed the current and future project list (*see Appendix A*) and revised the expected implementation dates for some of the projects. Chris Vidal will look into the Rosamond Community Services District's Golden Queens Mining Project and verify the "project type". The group also reviewed the Source Water Quality Table, which shows the concentration levels for each water source within the basin (*see Appendix B*). Additional analysis on the constituents Chloride, Fluoride, Arsenic, Boron, and Chromium were analyzed for the specific projects (*see Appendix C*). This water quality information will be used to determine a salt balance and impacts to the Antelope Valley with respect to current and future projects.

There was discussion on the concern that, with limited stormwater data from the Antelope Valley region, it is difficult to determine appropriate stormwater quality values for analysis. Carlyle Workman mentioned that the City of Lancaster may have taken stormwater samples in some of

their detention basins and will look into the City's sampling data. It was suggested that the Flood Control District may have taken samples in the Quartz Hill area. Jessica Bunker will verify with the Flood Control District. Tom Mele will also look into the Edwards Air Force Base water sampling data. Jan Zimmerman will analyze the Region Board's Groundwater Ambient Monitoring and Assessment Program (GAMA) website.

### **Data Analysis and Map**

Stakeholders were provided a map (*see Appendix D*) that shows all the municipal wells from Palmdale Water District, Rosamond Community Services District, Edwards Air Force Base, and LA County Waterworks District. These wells are monitored every three years and reported to California Department of Public Health (CDPH). GAMA compiles these test results with existing groundwater quality data from several agencies into a publicly-accessible internet database, GeoTracker GAMA (for more information, visit: [http://www.waterboards.ca.gov/water\\_issues/programs/gama/](http://www.waterboards.ca.gov/water_issues/programs/gama/)). The group will need to start developing a Salt Management Monitoring Plan (Monitoring Plan) and determine the assimilative capacity of the basin for each constituent of concern. The amount of assimilative capacity available is calculated as the difference between the constituent objective and current water quality. The group needs to determine an acceptable maximum objective level in the basin for each constituent of concern. The stakeholders will analyze the current basin water quality by using data from the wells provided and then determine how the current and future projects will affect the assimilative capacity over time. Water quality may differ in each sub-basin and there could be differing standards that the stakeholders accept as the objectives in each of these sub-basins. For example, stakeholders could agree to protect certain areas of the basin for drinking water uses, while allowing salts to accumulate in another area (e.g., where there is natural salt accumulation) to maintain basin sustainability. The SMP will ultimately need to defend these decisions to the Regional Board.

Stakeholders discussed using the available municipal wells for the Monitoring Plan. Each agency is expected to review their respective wells (*see Appendix D*) and identify which of those should be included in the Monitoring Plan. Agencies should verify whether: their wells monitor some or all of the constituents of concerns on the Source Water Quality Table found in Appendix B, the identified well(s) are representative of the local water quality, and there is adequate proximity of the well(s) to current and future projects. The stakeholders will provide their analyses at the next SMP meeting.

Erika de Hollan plans to contact the agriculture community to determine if they are willing to provide their well water quality data or if they report their water quality data to anyone. The LA County Sanitation Districts will be presenting an overview of the SMP and the current efforts in the Antelope Valley to the Los Angeles County Farm Bureau on January 26, 2012. The aim of this outreach effort is to update members of the agricultural community on the development of the SMP and encourage their contribution to the plan.

The stakeholder group discussed a draft conceptual flow chart of potential water supply in the Antelope Valley that is based on flows of the State Water Project, surface water, recycled water,

and other resources (*see Appendix E*). After applying water quality to these water sources, this flow chart will be used to develop a general basin-wide salt balance.

### **Next Meeting**

The next SMP stakeholder meeting is scheduled to be held in March. The date, time, and location of the meeting are yet to be determined. An e-mail notification of the meeting will be sent out with the meeting agenda.

***\*See Attachments Below***

Appendix A – Current and Future Basin Use Projects

## Current and Future Projects Contributing to Potential Salt/Nutrient Impacts

Agency	Project Name	Project Type	IRWMP Project	Source/Type of Water (imported/ sw/ gw/ rw)	Expected Implementation Date
AVEK/LACWWD40	Water Supply Stabilization Project (WSSP-2 Project)	Groundwater Banking	Y	imported	2015
Edwards Air Force Base	EAFB Irrigation Project	Landscape Irrigation	N	recycle	implemented
Edwards Air Force Base	Main Base Evaporation Ponds	Evaporation Pond/ RW Management	N	recycle	implemented
Edwards Air Force Base	AFRL Treatment Plant (Air Force Research Laboratory)	Wastewater Treatment Plant	N	recycle	implemented
LACWWD40	Aquifer Storage and Recovery Project	Groundwater Banking	Y	Imported	2010
LACWWD40	In-Situ Arsenic Removal on Unsaturated Alluvium (pilot-project)	Groundwater Treatment/Recharge	N	groundwater	2010-2012
LACWWD40/Palm./Lanc.	North LA/Kern County Regional Recycled Water Project	Landscape Irrigation (may include other M&I)	Y	recycle	2011
LACSD 14	Apollo Park	Recreational Impoundments/Landscape Irrig.	N	recycle	implemented
LACSD 14	Piute Ponds	Recreational Impoundments/Landscape Irrig.	N	recycle	implemented
LACSD 14	Agricultural Reuse Project	Agricultural Irrigation	N	recycle	implemented
LACSD 14	Lancaster Water Reclamation Plant	Wastewater Treatment Plant	Y	recycle	2011
LACSD 20	Agricultural Reuse Project	Agricultural Irrigation	N	recycle	implemented
LACSD 20	Palmdale Water Reclamation Plant	Wastewater Treatment Plant	Y	recycle	2011
Lancaster	Amargosa Water Banking & Stormwater Retention Project	Groundwater Banking/Recharge/Recreation	Y	imported / sw/ rw	on hold
Lancaster	eSolar Power Plant at Division and Avenue G	Evaporation Pond/ RW Management	N	recycle	2011
Palmdale	Barrel Springs Detention Basin and Wetlands	Groundwater Recharge	Y	stormwater	2035
Palmdale	Hunt Canyon Groundwater Recharge & Flood Control Basin	Groundwater Recharge	Y	stormwater	2035
Palmdale/LACWWD40	Amargosa Creek Recharge Project	Groundwater Recharge	Y	imported / sw	2015
Palmdale	Palmdale Hybrid Power Plant Project	Evaporation Pond/ RW Management	N	recycle	2011
Palmdale Water District	Groundwater Recharge - Recycle Water Project	Groundwater Recharge	Y	rw/ imported/ sw	2015
Rosamond	Antelope Valley Water Bank	Groundwater Banking	Y	imported	implemented
Rosamond	Evaporation Ponds	Evaporation Pond/ RW Management	N	recycle	implemented
Rosamond	Golden Queens Mining Project	Agricultural Irrigation	N	recycle	2012
Rosamond	RCSD Wastewater Treatment Plant Expansion	Wastewater Treatment Plant	N	recycle	2012

Appendix B – Source Water Quality Table

## Source Water Quality

	A	B	C	D	E	F	G	H	I	J	K	L
1	2010 Concentration	Units	Detection Limit	California Aqueduct <sup>(a)</sup>	Acton Plant <sup>(a)</sup>	Eastside Plant <sup>(a)</sup>	Quartz Hill Plant <sup>(a)</sup>	Rosamond Plant <sup>(b)</sup>	Recycled Water <sup>(c)</sup>	EAFB AFRL WWTP <sup>(d)</sup>	RCSD Treatment Plant <sup>(e)</sup>	RWQCB Stormwater Database <sup>(f)</sup>
2	Total Dissolved Solids	mg/L	NA	350	260	250	260	260	550	520	600	
3												
4	Ammonia <sup>(g)</sup> - N	mg/L							1	4	1	
5	Nitrate - N	mg/L	0.5	0.5	0	0.5	0.6	0.6	4	5.7	4	
6	Nitrite - N	mg/L	0.4	0	0	0	0	0	1	NA	1	
7	Nitrate+Nitrite - N	mg/L	0.4	1.0	0.0	1.0	1.0	1.0	8	NA	8	
8												
9	Chloride	mg/L	NA	82	91	89	86	89	140	75	140	
10	Fluoride	mg/L	0.1	0	0.12	0	0.12	0	0.3	NA	1	
11	Arsenic	µg/L	2	0	0	0	0	0	1	814	1	
12	Boron <sup>(h)</sup>	µg/L	100	150	240	180	170	160	500	330	500	
13	Chromium	µg/L	10	0	0	0	0	0	1			
14												
15	(a) Antelope Valley-East Kern Water Agency 2010 Annual Water Quality Report - Los Angeles County System											
16	(b) Antelope Valley-East Kern Water Agency 2010 Annual Water Quality Report - Kern County System											
17	(c) Predicted water quality for tertiary treatment at Lancaster and Plamdale WRPs (LACSD)											
18	(d) Air Force Research Laboratory (AFRL) 2010 Annual Monitoring Report (average values provided)											
19	(e) Predicted water quality for tertiary treatment at the Rosamond Community Services District (RCSD) Treatment Plant											
20	(f) Regional Water Quality Control Board database for average stormwater concentration values											
21	(g) COC's not reported in water quality reports or sample results											
22	(h) Boron is not a reported COC in Antelope Valley-East Kern Water Agency 2010 Annual Water Quality Report. Use concentrations from AVEK 2009 Water Quality Report.											
23	(i) 0 is used for all the COCs concentration below the detection limit.											
24	*Convert nitrate (NO3) to nitrate as N: molecular weight of NO3 = 62, atomic weight of N = 14, 62/14=4.42											

Appendix C – Project Water Quality Projection for Fluoride, Arsenic, Boron, and Chromium

Potential Salt/Nutrient Impacts - FLUORIDE																							
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Fluoride (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>3</sup>		2014 <sup>4</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>5</sup>		2030 <sup>6</sup>		2035 <sup>5</sup>	
				Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction
<b>Groundwater Recharge/Banking</b>																							
AVEKLACWWD40	Water Supply Stabilization Project (WSSP-2 Project)	imported	California Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LACWWD40	Aquifer Storage and Recovery Project	Imported	Quartz Hill Plant	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	
LACWWD40	In-Situ Arsenic Removal on Unsaturated Alluvium (pilot-project)	groundwater	Groundwater Samples	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Lancaster	Amargosa Water Banking & Stormwater Retention Project	imported / sw/ rw	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	20	18	20	18	20	18	20	18
Palmdale	Barrel Springs Detention Basin and Wetlands	stormwater	RWQCB Database	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Palmdale	Hunt Canyon Groundwater Recharge & Flood Control Basin	stormwater	RWQCB Database	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Palmdale/LACWWD40	Amargosa Creek Recharge Project	imported / sw	Quartz Hill Plant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	0	4	0	4	0	4	0	4	0
Palmdale Water District	Groundwater Recharge - Recycle Water Project	rw/ imported/ sw	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	0	4	0	4	0	4	0	4	0
Rosamond	Antelope Valley Water Bank	imported	California Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Fluoride (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>3</sup>		2014 <sup>4</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>5</sup>		2030 <sup>6</sup>		2035 <sup>5</sup>	
				flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow
<b>Irrigation/Impoundments</b>																							
Edwards Air Force Base	EAFB Irrigation Project	recycle	AFRL Treatment Plant	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
LACSD 14	Apollo Park	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Piute Ponds	recycle	Recycled Water	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
LACSD 14	Agricultural Reuse Project*	recycle	Recycled Water	0	0	0	0	0	0	4	4	4	4	4	4	5	5	5	5	5	5	5	6
LACSD 20	Agricultural Reuse Project**	recycle	Recycled Water	3	0	3	3	3	3	4	4	4	4	4	5	5	5	5	5	5	5	5	6
LACWWD40/Palm.Lanc.	North LA/Kern County Regional Recycled Water Project	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	3	4	4	4	4	4	5	5	5	5	5	5	5	5
Rosamond	Golden Queens Mining Project	recycle	RCSD Treatment Plant	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Fluoride (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>3</sup>		2014 <sup>4</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>5</sup>		2030 <sup>6</sup>		2035 <sup>5</sup>	
				outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow
<b>Treatment</b>																							
Edwards Air Force Base	AFRL Treatment Plant	recycle	AFRL Treatment Plant	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
LACSD 14	Lancaster Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	8	9	10	10	10	10	11	11	11	11	11	11	11	11
LACSD 20	Palmdale Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	6	7	7	7	7	8	8	8	8	8	8	8	8	9
Rosamond	RCSD Wastewater Treatment Plant Expansion	recycle	RCSD Treatment Plant	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Fluoride (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>3</sup>		2014 <sup>4</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>5</sup>		2030 <sup>6</sup>		2035 <sup>5</sup>	
				inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow
<b>Evaporation/Export</b>																							
Edwards Air Force Base	Main Base Evaporation Ponds	recycle	AFRL Treatment Plant	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Lancaster	eSolar Power Plant at Division and Avenue G	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palmdale	Palmdale Hybrid Power Plant Project	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Rosamond	Evaporation Ponds	recycle	RCSD Treatment Plant	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

\* Estimated Flow = (recycled water produced at Lancaster WRP) - (M&I use) - (Apollo Park flow) - (Piute Ponds flow)

\*\* Estimated Flow = (recycled water produced at Palmdale WRP) - (M&I use)

† The In-Situ Arsenic Removal on Unsaturated Alluvium Pilot Project is only sampling for Arsenic, and will not have water quality data for another year.

They are currently taking samples from the unsaturated zone (soil above the water table).

Bright yellow box indicates waiting for information

1. Tab 2010 WQ \* Tab FLOW RATE (AFY)  
 2. Tab 2011 WQ \* Tab FLOW RATE (AFY)  
 3. Tab 2012 WQ \* Tab FLOW RATE (AFY)  
 4. Tab 2013 WQ \* Tab FLOW RATE (AFY)  
 5. Tab 2014 WQ \* Tab FLOW RATE (AFY)  
 6. Tab 2010 WQ \* Tab FLOW RATE (AFY)

Conversion Factor:  
 (# AF)(325.851 gal/AF)(1 liter/0.2642 gal)(# mg/l)(1kg/1,000,000 mg)(2.2 lbs/1 kg)(1 ton/2,000 lbs)

Potential Salt/Nutrient Impacts - ARSENIC																							
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Arsenic (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction
<b>Groundwater Recharge/Banking</b>																							
AVEK/LACWWD40	Water Supply Stabilization Project (WSSP-2 Project)	imported	California Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACWWD40	Aquifer Storage and Recovery Project	Imported	Quartz Hill Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACWWD40	In-Situ Arsenic Removal on Unsaturated Alluvium†(pilot-project)	groundwater	Groundwater Samples	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lancaster	Amargosa Water Banking & Stormwater Retention Project	imported / sw/ rw	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0
Palmdale	Barrel Springs Detention Basin and Wetlands	stormwater	RWQCB Database	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Palmdale	Hunt Canyon Groundwater Recharge & Flood Control Basin	stormwater	RWQCB Database	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Palmdale/LACWWD40	Amargosa Creek Recharge Project	imported / sw	Quartz Hill Plant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
Palmdale Water District	Groundwater Recharge - Recycle Water Project	rw/ imported/ sw	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
Rosamond	Antelope Valley Water Bank	imported	California Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Arsenic (ton/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow		
<b>Irrigation/Impoundments</b>																							
Edwards Air Force Base	EAFB Irrigation Project	recycle	AFRL Treatment Plant	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
LACSD 14	Apollo Park	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Plute Ponds	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Agricultural Reuse Project*	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 20	Agricultural Reuse Project**	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACWWD40/Palm./Lanc.	North LA/Kern County Regional Recycled Water Project	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
Rosamond	Golden Queens Mining Project	recycle	RCSD Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Arsenic (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow		
<b>Treatment</b>																							
Edwards Air Force Base	AFRL Treatment Plant	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Lancaster Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0	0
LACSD 20	Palmdale Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0	0
Rosamond	RCSD Wastewater Treatment Plant Expansion	recycle	RCSD Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Arsenic (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow		
<b>Evaporation/Export</b>																							
Edwards Air Force Base	Main Base Evaporation Ponds	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lancaster	eSolar Power Plant at Division and Avenue G	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palmdale	Palmdale Hybrid Power Plant Project	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosamond	Evaporation Ponds	recycle	RCSD Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\* Estimated Flow = (recycled water produced at Lancaster WRP) - (M&I use) - (Apollo Park flow) - (Plute Ponds flow)  
 \*\* Estimated Flow = (recycled water produced at Palmdale WRP) - (M&I use)  
 † The In-Situ Arsenic Removal on Unsaturated Alluvium Pilot Project is only sampling for Arsenic, and will not have water quality data for another year.  
 They are currently taking samples from the unsaturated zone (soil above the water table).

Bright yellow box indicates waiting for information

1. Tab 2010 WQ \* Tab FLOW RATE (AFY)
2. Tab 2011 WQ \* Tab FLOW RATE (AFY)
3. Tab 2012 WQ \* Tab FLOW RATE (AFY)
4. Tab 2013 WQ \* Tab FLOW RATE (AFY)
5. Tab 2014 WQ \* Tab FLOW RATE (AFY)
6. Tab 2010 WQ \* Tab FLOW RATE (AFY)

Potential Salt/Nutrient Impacts - BORON																							
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Boron (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				Recharge	Extraction																		
<b>Groundwater Recharge/Banking</b>																							
AVEK/LACWWD40	Water Supply Stabilization Project (WSSP-2 Project)	imported	California Aqueduct	2	2	0	0	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5	5
LACWWD40	Aquifer Storage and Recovery Project	Imported	Quartz Hill Plant	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2
LACWWD40	In-Situ Arsenic Removal on Unsaturated Alluvium†(pilot-project)	groundwater	Groundwater Samples	N/A	N/A																		
Lancaster	Amargosa Water Banking & Stormwater Retention Project	imported / sw/ rw	Recycled Water	N/A	N/A	34	31	34	31	34	31	34	31										
Palmdale	Barrel Springs Detention Basin and Wetlands	stormwater	RWQCB Database	N/A	N/A																		
Palmdale	Hunt Canyon Groundwater Recharge & Flood Control Basin	stormwater	RWQCB Database	N/A	N/A																		
Palmdale/LACWWD40	Amargosa Creek Recharge Project	imported / sw	Quartz Hill Plant	N/A	N/A	N/A	6	0	6	0	6	0	6	0	6								
Palmdale Water District	Groundwater Recharge - Recycle Water Project	rw/ imported/ sw	Recycled Water	N/A	N/A	N/A	7	0	7	0	7	0	7	0	7								
Rosamond	Antelope Valley Water Bank	imported	California Aqueduct	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	4	4
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Boron (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				flow	flow	flow																	
<b>Irrigation/Impoundments</b>																							
Edwards Air Force Base	EAFB Irrigation Project	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Apollo Park	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Plute Ponds	recycle	Recycled Water	3	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
LACSD 14	Agricultural Reuse Project*	recycle	Recycled Water	1	0	1	1	1	1	1	1	1	1	1	6	7	8	8	8	8	8	8	9
LACSD 20	Agricultural Reuse Project**	recycle	Recycled Water	6	0	6	6	6	6	6	6	6	6	6	7	8	8	8	8	8	8	8	9
LACWWD40/Palm./Lanc.	North LA/Kern County Regional Recycled Water Project	recycle	Recycled Water	N/A	N/A	N/A	5	6	7	8	8	8	8	8	9								
Rosamond	Golden Queens Mining Project	recycle	RCSL Treatment Plant	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Boron (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				outflow	outflow	outflow																	
<b>Treatment</b>																							
Edwards Air Force Base	AFRL Treatment Plant	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Lancaster Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	N/A	14	15	16	18	18	18	18	18	19								
LACSD 20	Palmdale Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	10	11	12	13	13	13	13	13	13	14								
Rosamond	RCSL Wastewater Treatment Plant Expansion	recycle	RCSL Treatment Plant	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Boron (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>3</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				inflow	inflow	inflow																	
<b>Evaporation/Export</b>																							
Edwards Air Force Base	Main Base Evaporation Ponds	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lancaster	eSolar Power Plant at Division and Avenue G	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palmdale	Palmdale Hybrid Power Plant Project	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2
Rosamond	Evaporation Ponds	recycle	RCSL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\* Estimated Flow = (recycled water produced at Lancaster WRP) - (M&I use) - (Apollo Park flow) - (Plute Ponds flow)  
 \*\* Estimated Flow = (recycled water produced at Palmdale WRP) - (M&I use)  
 † The In-Situ Arsenic Removal on Unsaturated Alluvium Pilot Project is only sampling for Arsenic, and will not have water quality data for another year.  
 They are currently taking samples from the unsaturated zone (soil above the water table).

Bright yellow box indicates waiting for information

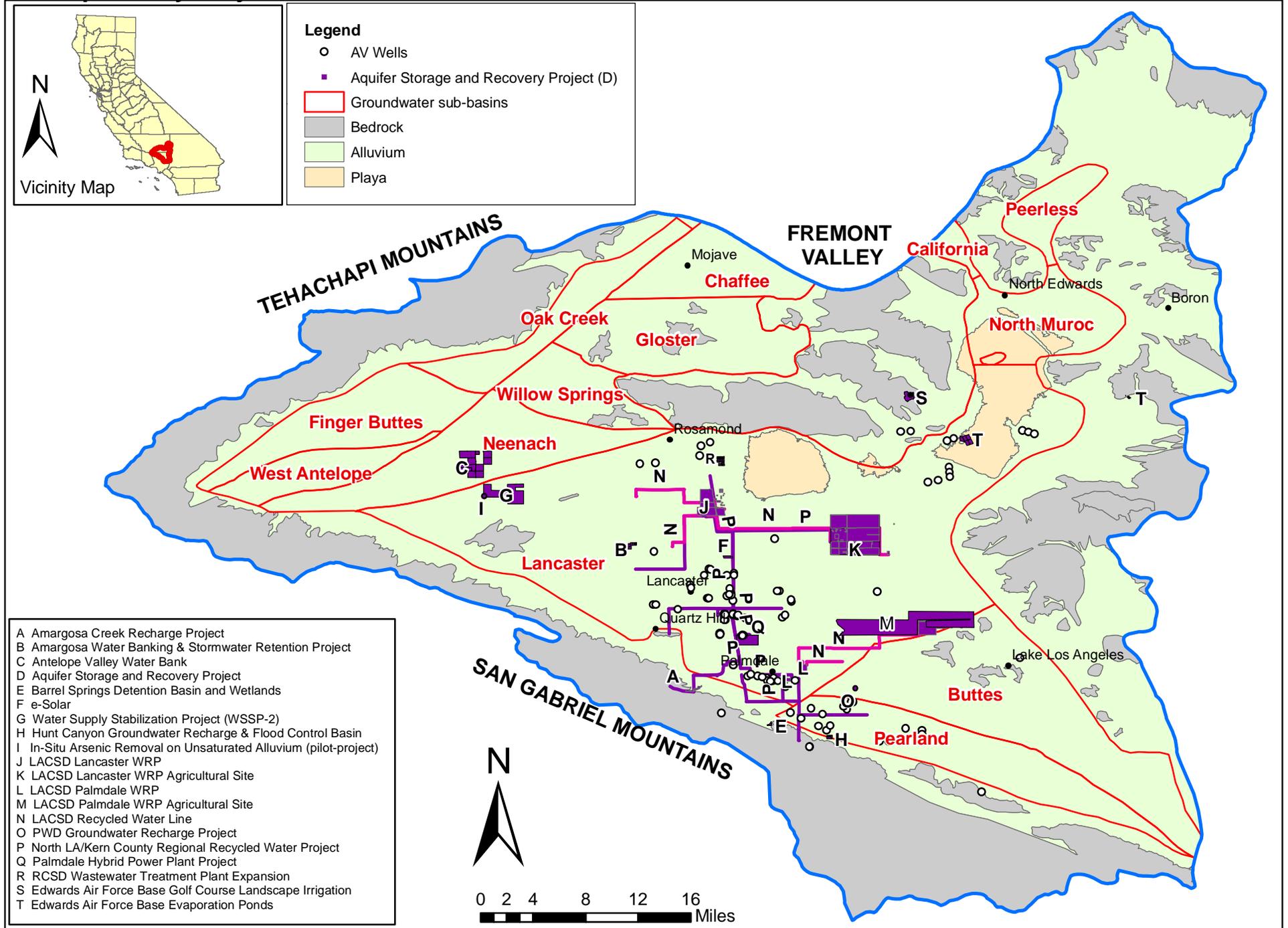
1. Tab 2010 WQ \* Tab FLOW RATE (AFY)
2. Tab 2011 WQ \* Tab FLOW RATE (AFY)
3. Tab 2012 WQ \* Tab FLOW RATE (AFY)
4. Tab 2013 WQ \* Tab FLOW RATE (AFY)
5. Tab 2014 WQ \* Tab FLOW RATE (AFY)
6. Tab 2010 WQ \* Tab FLOW RATE (AFY)

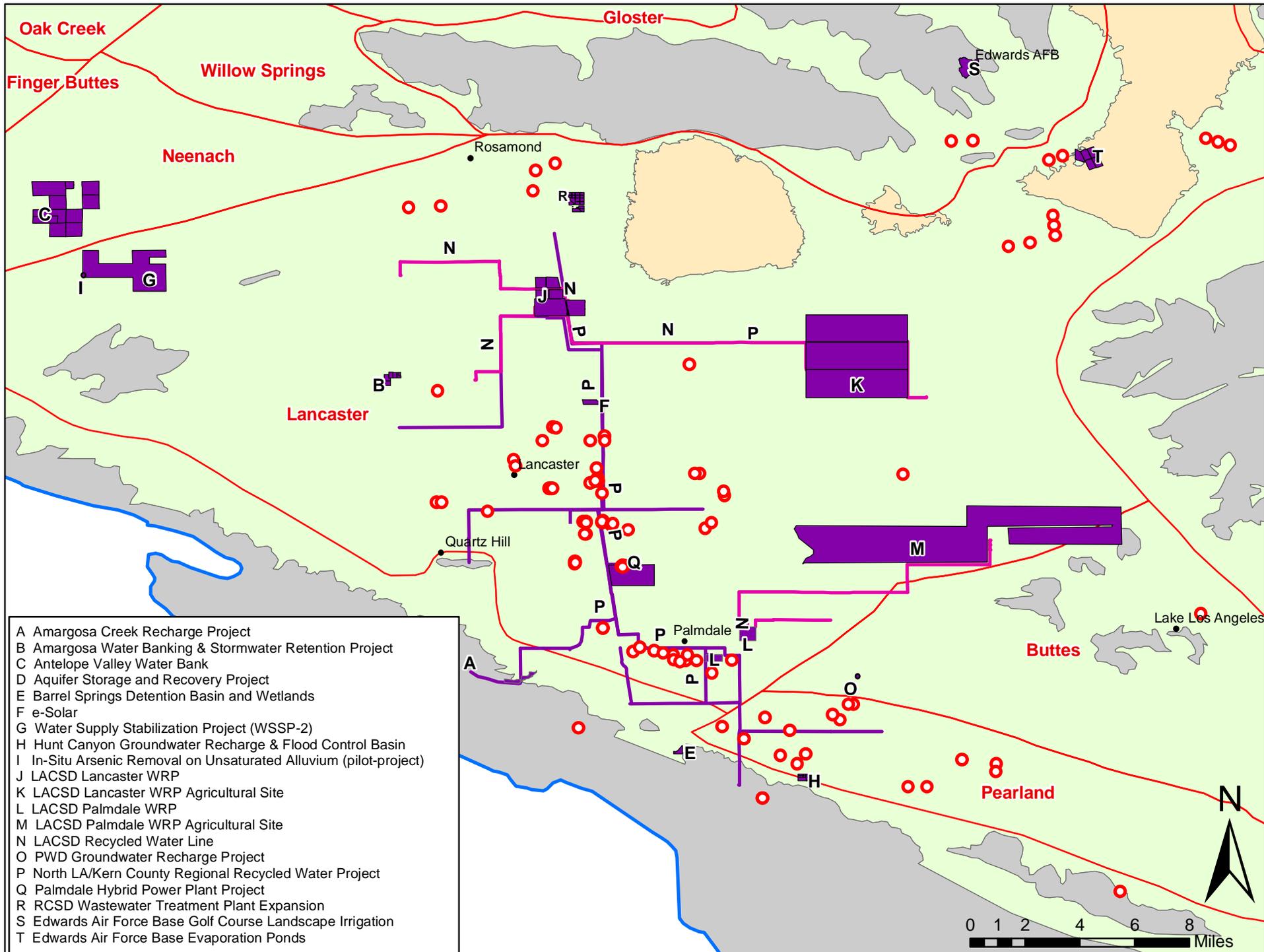
Potential Salt/Nutrient Impacts - CHROMIUM																							
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Chromium (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>2</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction	Recharge	Extraction
<b>Groundwater Recharge/Banking</b>																							
AVEK/LACWWD40	Water Supply Stabilization Project (WSSP-2 Project)	imported	California Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACWWD40	Aquifer Storage and Recovery Project	Imported	Quartz Hill Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACWWD40	In-Situ Arsenic Removal on Unsaturated Alluvium†(pilot-project)	groundwater	Groundwater Samples	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lancaster	Amargosa Water Banking & Stormwater Retention Project	imported / sw/ rw	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0
Palmdale	Barrel Springs Detention Basin and Wetlands	stormwater	RWQCB Database	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Palmdale	Hunt Canyon Groundwater Recharge & Flood Control Basin	stormwater	RWQCB Database	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Palmdale/LACWWD40	Amargosa Creek Recharge Project	imported / sw	Quartz Hill Plant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
Palmdale Water District	Groundwater Recharge - Recycle Water Project	rw/ imported/ sw	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
Rosamond	Antelope Valley Water Bank	imported	California Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Chromium (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>2</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow	flow		
<b>Irrigation/Impoundments</b>																							
Edwards Air Force Base	EAFB Irrigation Project	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Apollo Park	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Plute Ponds	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Agricultural Reuse Project*	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 20	Agricultural Reuse Project**	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACWWD40/Palm./Lanc.	North LA/Kern County Regional Recycled Water Project	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
Rosamond	Golden Queens Mining Project	recycle	RCSD Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Chromium (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>2</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow	outflow		
<b>Treatment</b>																							
Edwards Air Force Base	AFRL Treatment Plant	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LACSD 14	Lancaster Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
LACSD 20	Palmdale Water Reclamation Plant	recycle	Recycled Water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
Rosamond	RCSD Wastewater Treatment Plant Expansion	recycle	RCSD Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agency	Project	Source of Water (imported/ sw/ gw/ rw)	Water Quality Source	Chromium (tons/year)																			
				2010 <sup>1</sup>		2011 <sup>2</sup>		2012 <sup>2</sup>		2013 <sup>4</sup>		2014 <sup>5</sup>		2015 <sup>5</sup>		2020 <sup>6</sup>		2025 <sup>6</sup>		2030 <sup>6</sup>		2035 <sup>6</sup>	
				inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow	inflow		
<b>Evaporation/Export</b>																							
Edwards Air Force Base	Main Base Evaporation Ponds	recycle	AFRL Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lancaster	eSolar Power Plant at Division and Avenue G	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palmdale	Palmdale Hybrid Power Plant Project	recycle	Recycled Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rosamond	Evaporation Ponds	recycle	RCSD Treatment Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

\* Estimated Flow = (recycled water produced at Lancaster WRP) - (M&I use) - (Apollo Park flow) - (Plute Ponds flow)  
 \*\* Estimated Flow = (recycled water produced at Palmdale WRP) - (M&I use)  
 † The In-Situ Arsenic Removal on Unsaturated Alluvium Pilot Project is only sampling for Arsenic, and will not have water quality data for another year.  
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 4. Tab 2013 WQ \* Tab FLOW RATE (AFY)  
 5. Tab 2014 WQ \* Tab FLOW RATE (AFY)  
 6. Tab 2010 WQ \* Tab FLOW RATE (AFY)

## Appendix D – Map of Project and Well Locations

# Antelope Valley Projects



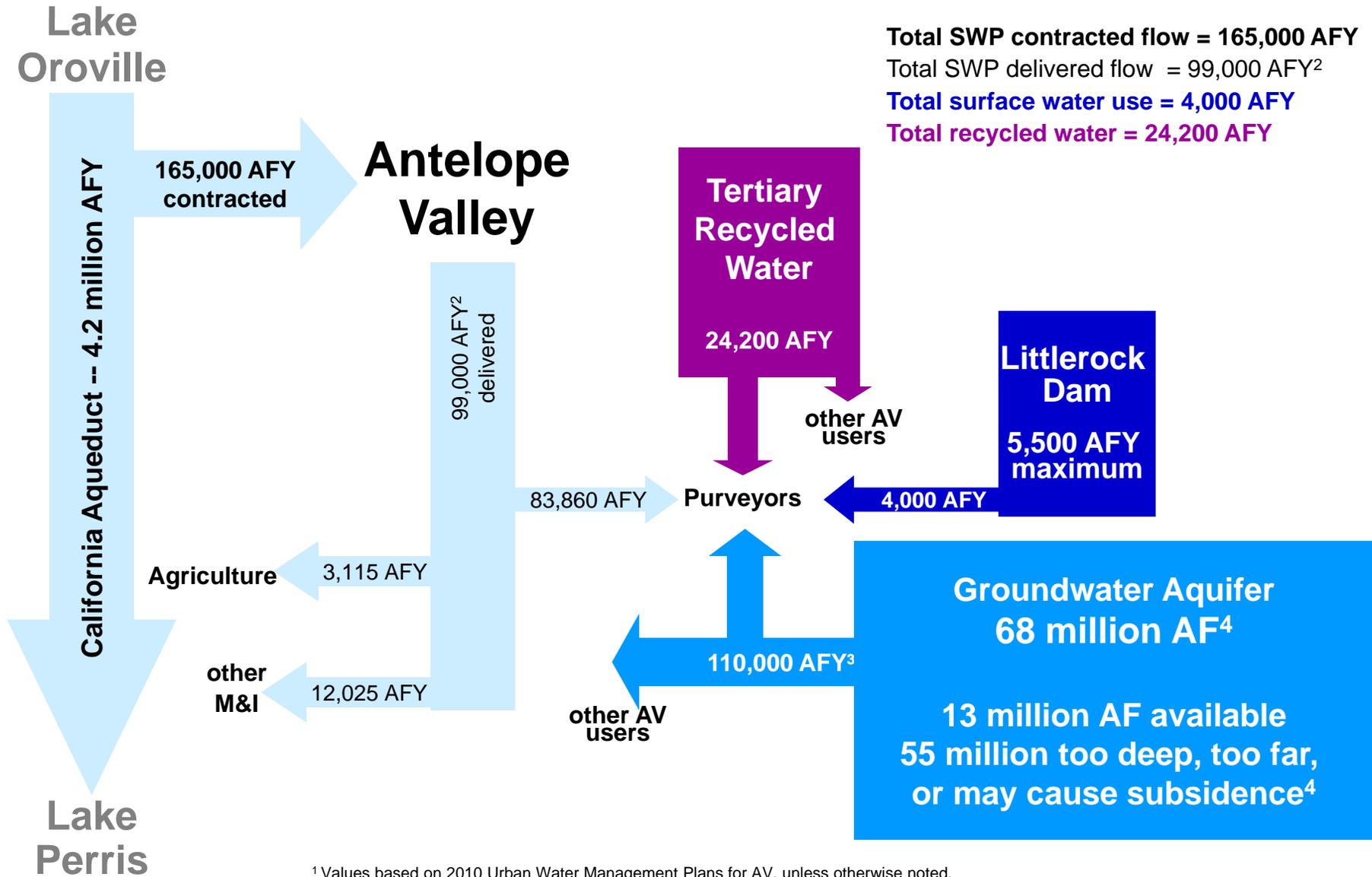


Appendix E - Draft Conceptual Flow Chart

# Water Supply in the Antelope Valley

(DRAFT - Conceptual Model) Normal Year<sup>1</sup> - 2015

Total SWP contracted flow = 165,000 AFY  
 Total SWP delivered flow = 99,000 AFY<sup>2</sup>  
 Total surface water use = 4,000 AFY  
 Total recycled water = 24,200 AFY



<sup>1</sup> Values based on 2010 Urban Water Management Plans for AV, unless otherwise noted.

<sup>2</sup> Based on 60% reliability per 2009 SWP Delivery Reliability Report.

<sup>3</sup> Based on Judge Komar's ruling on the basin's safe yield. Subject to future refinement.

<sup>4</sup> Based on California Department of Water Resources, Southern District. Planned Utilization of Water Resources in Antelope Valley, 1980.