Santa Cruz Watershed

Watershed Description

This watershed is composed of two hydrological areas: 1) the Santa Cruz River which flows north to the Gila River, and 2) a series of streams that flow south and eventually into the Rio Magdalena and Rio Sonoyta in Mexico. Most of the population in this 11,100 square mile watershed is clustered around metropolitan Tucson (approximately 844,000 people in the 2000 census) and Nogales in Arizona and Sonora Mexico (370,000 people, mostly in Mexico). Land ownership is approximately: 40% Tribal, 25% federal, 20% private, and 15% state.

Grazing is the dominant land use, with irrigated crop production near streams. Active and abandoned mines are scattered throughout the watershed. There are eight wilderness areas along with national forest and national monuments with restricted land uses.

Elevations range from 9,156 feet (above sea level) at Mount Lemmon to about 1,100 feet at the Gila River. Expect for a string of high mountains in the east, most of the watershed is below 5,000 feet, with low Sonoran desert flora and fauna and warmwater aquatic communities where perennial waters exist.

Water Resources

This watershed obtains about 15 inches of rain and up to 1 inch of snow per year. Ground water pumping has eliminated natural perennial flow in most of the mainstem Santa Cruz River. Treated wastewater effluent provides perennial flow below discharges from the cities of Nogales and Tucson.

An estimate of surface water resources in the Santa Cruz Watershed is provided in the following table. Waters on Tribal lands are not assessed by ADEQ; therefore, those statistics are shown separately.

Estimated Surface Water Resources in the Santa Cruz Watershed

	Perennial	Intermittent	Ephemeral
Stream miles	85	500	7,245
	Perennial	Non-perennial	
Lake acres	1,366	0	

Additional Surface Water Resources Located on Tribal Land – Not Assessed

	Perennial	Intermittent	Ephemeral
Stream miles	0	50	3,795
	Perennial	Non-perennial	
Lake acres	9,523	11,119	

Ambient monitoring focuses on perennial waters; however, special investigations may identify water quality problems on intermittent and even ephemeral waters. Estimated miles and acres are based on USGS digitized hydrology at 1:100,000 and have been rounded to the nearest 5 miles or 5 acres.

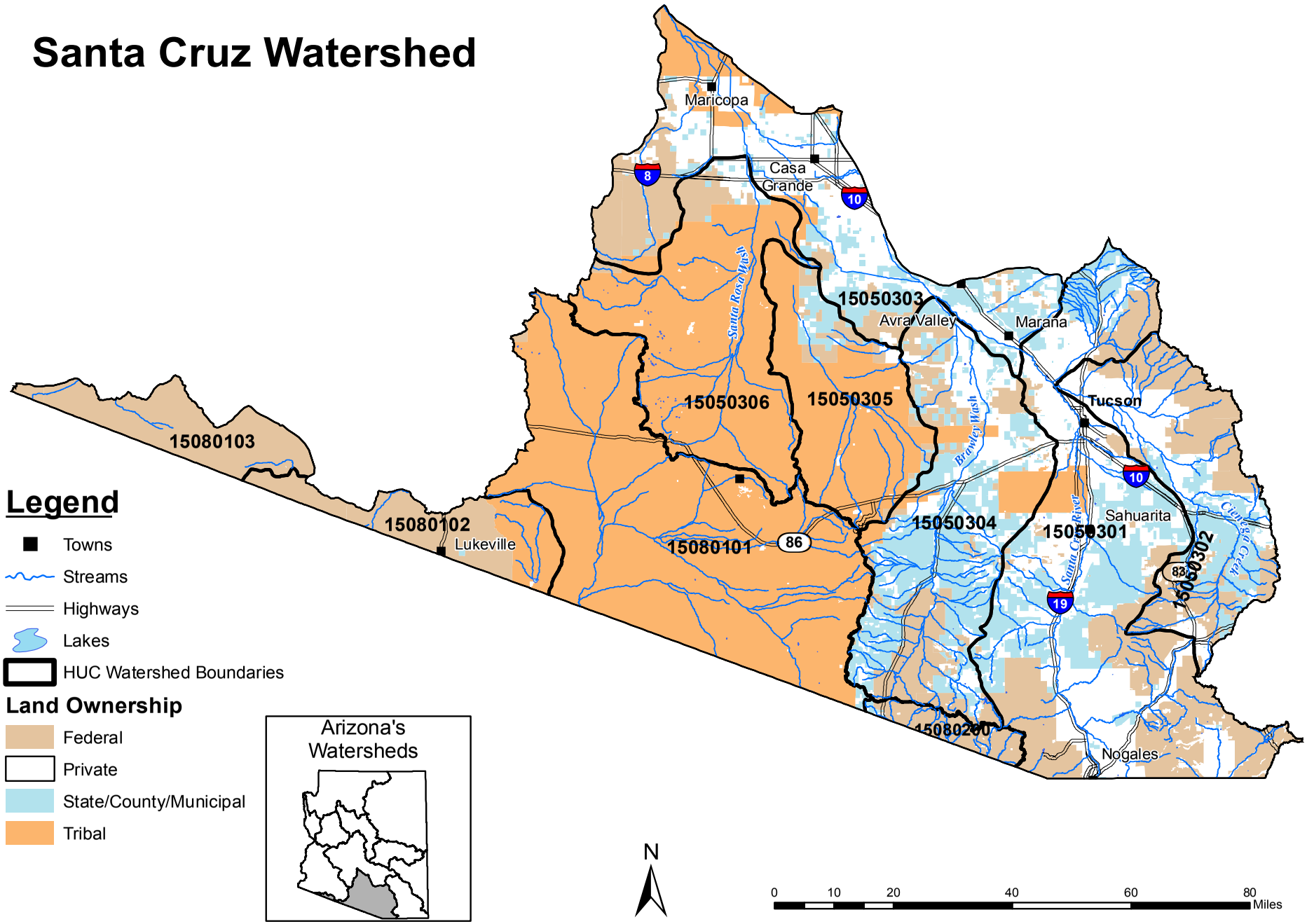
Assessments

The Santa Cruz Watershed can be separated into the following drainage areas (subwatersheds):

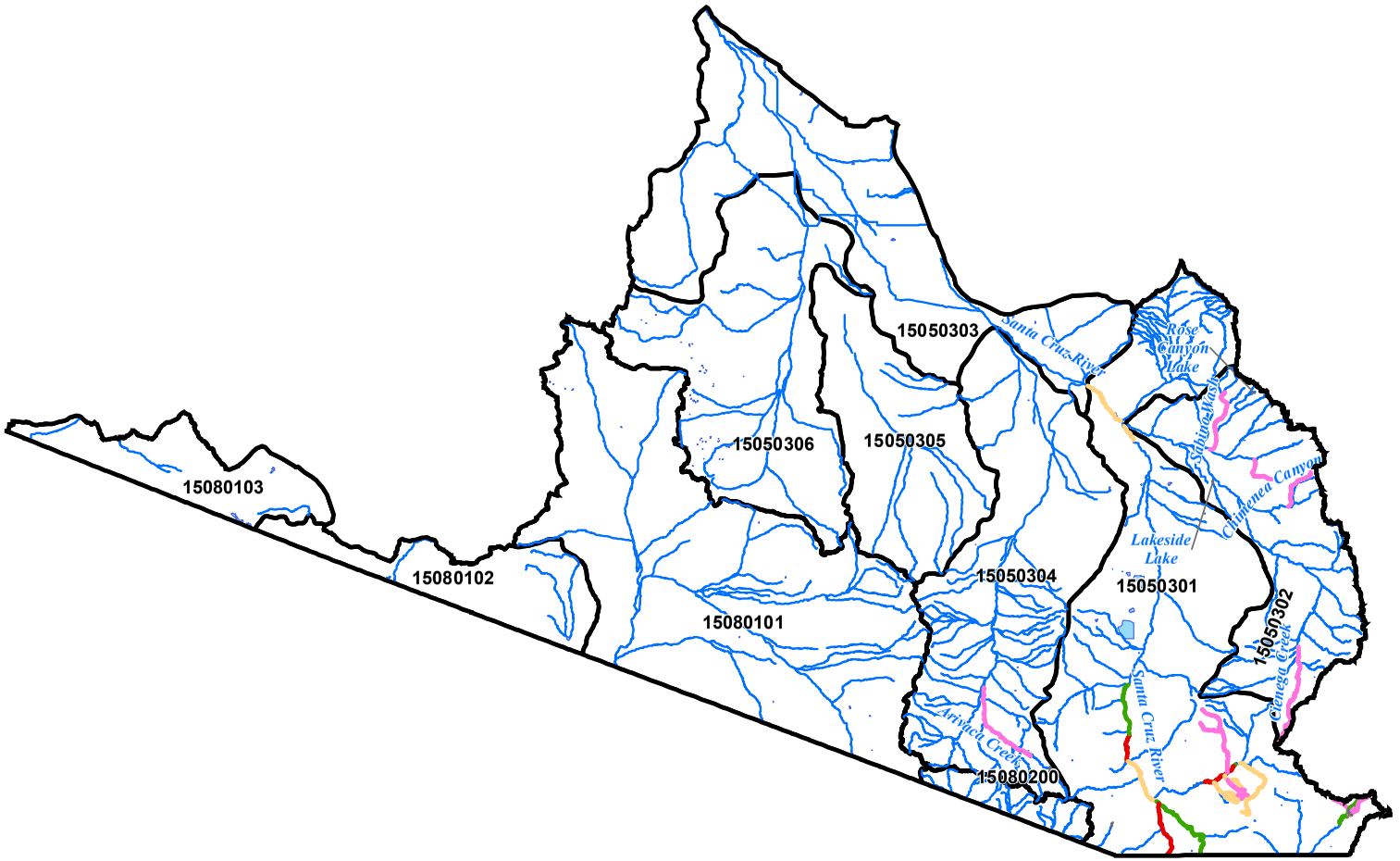
15050301	Upper Santa Cruz
15050302	Pantano Wash
15050302	Lower Santa Cruz
15050304	Brawley Wash
15050305	Aguirre Wash
15050306	Santa Rosa Wash
15080101	San Simon Wash (On Tribal Land – Not Assessed)
15080102	Rio Sonoyta
15080103	Tule Desert
15080200	Rio Asuncion

These drainage areas and the surface waters assessed as “attaining” or “impaired” are illustrated on the following watershed map. Methods used to complete these assessments are described in the “Surface Water Assessment Methods and Technical Support” document.

Santa Cruz Watershed



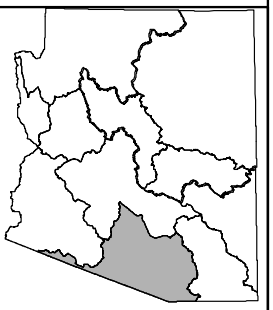
Santa Cruz / Rio Magdelana / Rio Sonoita Watershed
2012/2014 Assessment for Streams and Lakes



Legend

Assessed Lakes - 2012
ADEQ and EPA Listings
- Attaining
- Inconclusive
- Not Attaining
- EPA Impaired
- Impaired
- HUC Watershed Boundaries

Assessed Streams - 2012
ADEQ and EPA Listings
- Attaining
- Inconclusive
- Not Attaining
- EPA Impaired
- Impaired
- Lakes
- Streams



See Individual HUC Printouts for Waters not Labeled

N

0 40 Miles

A RIVACA CIENEGA

15050304-0001
3 acres

Category 3
Inconclusive

FC - Inconclusive • FBC - Inconclusive • A&Ww - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 6/4/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
MID LAKE	SCACL-USGS	101583	USGS	USGS Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
None	(1) Nitrite, nitrite/nitrate, nitrogen, phosphate, phosphorus, total Kjeldahl nitrogen	(1) Dissolved oxygen, pH, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	Ammonia

Priority	Monitoring Recommendations
Low	All core parameters need sample number and seasonal coverage.

ARIVACA CREEK

Headwaters - Puertocito/Alta Wash
15050304-008
14.9 Miles

Category 3
Inconclusive

FC - Inconclusive • FBC - Inconclusive • AGL - Inconclusive
A&Ww - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	6.0 mg/L	3/25/2008	5.2 mg/L	A&Ww is inconclusive with 10 exceedances in 12 samples (binomial). Minimum 20 samples are required to list.
		4/30/2008	3.2 mg/L	
		5/28/2008	3.1 mg/L	
		6/24/2008	0.8 mg/L	
		7/29/2008	4.2 mg/L	
		9/26/2008	4.5 mg/L	
		10/28/2008	4.6 mg/L	
		11/25/2008	4.6 mg/L	
		1/27/2009	4.8 mg/L	
		2/24/2009	3.9 mg/L	

Monitoring Summary

Sampling period: 3/25/2008 - 5/26/2009

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT FIGUEROA SPRINGS	SCARI010.07	100233	Friends of the Santa Cruz	Volunteer

Metal Samples	Nutrients & Related Samples	Other Samples
None	None	(12-14) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Dissolved oxygen
Missing Core Parameters	Zinc (dissolved), cadmium (dissolved), copper (dissolved), *E. coli*, copper, lead
Missing Seasonal Distribution	Zinc (dissolved), cadmium (dissolved), copper (dissolved), *E. coli*, copper, lead
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more DO samples to investigate large number of exceedances, check for possible groundwater upwelling. Collect core parameters to reflect 3 seasons of year.

UNNAMED ADIT TO ALUM GULCH

Headwaters - Alum Gulch
15050301-891

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
pH	6.5 SU	9/5/2009	5.82 SU	A&We and PBC are inconclusive with 2 exceedances in 2 samples (binomial).
		2/3/2010	5.79 SU	

Monitoring Summary

Sampling period: 9/5/2009 - 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ADIT BELOW WORLD'S FAIR MINE	SCXA3000.01	107722	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(3) Cadmium, copper, zinc	None	(2) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more pH samples due to exceedances. Collect core parameters to represent at least 3 seasons during an assessment period.

UNNAMED TRIB (UH2) TO HUMBOLDT CANYON

Headwaters - Humboldt Canyon
15050301-892
0.4 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper[d]	4.9 ug/L @ 19 mg/L hardness	2/3/2010	67.2 ug/L	A&We is inconclusive with only 1 exceedance.
pH	6.5 SU	2/3/2010	4.85 SU	A&We and PBC are inconclusive with 1 exceedance in 1 sample (binomial).

Monitoring Summary

Sampling period: 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
UNNAMED TRIB (UH2) TO HUMBOLDT CANYON - 125 METERS ABOVE MOUTH	SCUH2000.01	107745	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Cadmium, copper, zinc	None	(1) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH, copper (dissolved)
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more dissolved copper and pH samples due to exceedances. Collect core parameters to represent at least 3 seasons during an assessment period.

ALUM GULCH

Headwaters - 312820 / 1104351
15050301-561A
0.3 Miles

Category 4A
Not attaining

Low pH, zinc, copper, and cadmium (1996)

IMPAIRMENT

A&We - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

STATUS

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Below Trench Camp Mine, Above January Mine Adit	SCALG005.66	100839	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	N/A
Missing Seasonal Distribution	N/A
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Collect samples during critical conditions to monitor effectiveness of remediation at the Trench Camp Mine. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
TMDL completed in 2003

ALUM GULCH

312820 / 1104351 - 312917 / 1104425
15050301-561B
1.4 Miles

Category 4A
Not attaining

Low pH, zinc, copper, and cadmium (1996)

IMPAIRMENT STATUS

FC - Not Attaining • FBC - Not Attaining • AGL - Not Attaining
A&Ww - Not Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Cadmium	50 ug/L (AGL) 84 ug/L (FC)	11/21/2006	140 ug/L	AGL and FC remain not attaining. 5 AGL exceedances and 4 FC exceedances in 7 samples (binomial).
		7/31/2008	117 ug/L	
		8/31/2008	89.4 ug/L	
		9/1/2008	59.7 ug/L	
		9/5/2009	91.2 ug/L	
Cadmium[d]	6.22 ug/L^{chronic} @ > 400 mg/L hardness	11/21/2006	130 ug/L	A&Ww remains not attaining. 6 acute exceedances during the last 3 years of monitoring and 7 chronic exceedances during the assessment period.
	19.1 ug/L^{acute}, 6.22 ug/L^{chronic} @ > 400 mg/L hardness	7/31/2008	108 ug/L	
	19.1 ug/L^{acute}, 6.22 ug/L^{chronic} @ > 400 mg/L hardness	8/31/2008	109 ug/L (max) 64.4 ug/L (median)	
	19.1 ug/L^{acute}, 6.22 ug/L^{chronic} @ > 400 mg/L hardness	9/1/2008	78.9 ug/L (max) 72.8 ug/L (median)	
	19.1 ug/L^{acute}, 6.22 ug/L^{chronic} @ > 400 mg/L hardness	9/5/2009	134 ug/L (max) 92.8 ug/L (median)	
	19.1 ug/L^{acute} @ >400 mg/L hardness 3.64 ug/L^{chronic} @ 193 mg/L hardness	1/21/2010	102 ug/L (max) 18.9 ug/L (median)	
	19.1 ug/L^{acute}, 6.22 ug/L^{chronic} @ >400 mg/L hardness	2/3/2010	49.3 ug/L	
Copper	500 ug/L (AGL) 1300 ug/L (FBC)	11/21/2006	1100 ug/L	AGL remains not attaining with 7 exceedances in 7 samples (binomial). FBC remains not attaining with 2 exceedances in 7 samples (binomial).
		7/31/2008	1735 ug/L	
		8/31/2008	659 ug/L	
		9/1/2008	701 ug/L	
		9/5/2009	1467 ug/L	
		1/21/2010	654 ug/L	
		2/3/2010	647 ug/L	

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper[d]	49.6 ug/L[acute], 29.2 ug/L[chronic] @ > 400 mg/L hardness	11/21/2006	1100 ug/L	A&Ww remains not attaining. 6 acute exceedances during the last 3 years of monitoring and 7 chronic exceedances during the assessment period.
	49.6 ug/L[acute], 29.2 ug/L[chronic] @ > 400 mg/L hardness	7/31/2008	1780 ug/L	
	49.6 ug/L[acute], 29.2 ug/L[chronic] @ > 400 mg/L hardness	8/31/2008	551 ug/L (max) 519 ug/L (median)	
	49.6 ug/L[acute], 29.2 ug/L[chronic] @ > 400 mg/L hardness	9/1/2008	649 ug/L (max) 625 ug/L (median)	
	49.6 ug/L[acute], 29.2 ug/L[chronic] @ > 400 mg/L hardness	9/5/2009	1830 ug/L (max) 1460 ug/L (median)	
	49.6 ug/L[acute] @ > 400 mg/L hardness 14.7 ug/L[chronic] @ 178 mg/L hardness	1/21/2010	1290 ug/L (max) 377 ug/L (median)	
	49.6 ug/L[acute], 29.2 ug/L[chronic] @ > 400 mg/L hardness	2/3/2010	673 ug/L	
Dissolved oxygen	6.0 mg/L	11/21/2006	3.65 mg/L	A&Ww is inconclusive with 2 exceedances in 2 samples.
		7/31/2008	4.57 mg/L	
pH	6.5 SU	11/21/2006	4.29 SU	AGL, A&Ww, and FBC remain not attaining with 3 exceedances in 3 samples (binomial).
		7/31/2008	3.17 SU	
		2/3/2010	4.11 SU	
Zinc	5106 ug/L (FC) 25000 ug/L (AGL)	11/21/2006	39000 ug/L	FC and AGL remain not attaining. 7 FC exceedances and 1 AGL exceedance in 7 samples (binomial).
		7/31/2008	25000 ug/L	
		8/31/2008	20500 ug/L	
		9/1/2008	19429 ug/L	
		9/5/2009	21250 ug/L	
		1/21/2010	7750 ug/L	
		2/3/2010	17000 ug/L	
Zinc[d]	379 ug/L @ >400 mg/L hardness	11/21/2006	38000 ug/L	A&Ww remains not attaining. 6 acute exceedances during the last 3 years of monitoring and 7 chronic exceedances during the assessment period.
	379 ug/L @ >400 mg/L hardness	7/31/2008	24000 ug/L	
	379 ug/L @ >400 mg/L hardness	8/31/2008	34000 ug/L (max) 16000 ug/L (median)	
	379 ug/L @ >400 mg/L hardness	9/1/2008	20000 ug/L (max) 18000 ug/L (median)	
	379 ug/L @ >400 mg/L hardness	9/5/2009	32000 ug/L (max) 19000 ug/L (median)	
	379 ug/L[acute] @ > 400 mg/L hardness 205 ug/L[chronic] @193 mg/L hardness	1/21/2010	23000 ug/L (max) 4200 ug/L (median)	
	379 ug/L @ >400 mg/L hardness	2/3/2010	17000 ug/L	

Monitoring Summary

Sampling period: 11/21/2006 - 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
BELOW HUMBOLDT CANYON, ABOVE ALUM FALLS	SCALG005.15	100837	ADEQ	TMDL
APPROXIMATELY 200 M DOWNSTREAM FROM WORLD'S FAIR MINE.	SCALG004.45	100870	ADEQ	TMDL
JUST ABOVE WORLD'S FAIR ADIT AND MINE	SCALG004.72	100836	ADEQ	TMDL
JUST BELOW WORLD FAIR ADIT DRAINAGE	SCALG004.70	106622	ADEQ	TMDL
BELOW JANUARY MINE ADIT, ABOVE HUMBOLDT CANYON	SCALG005.35	100838	ADEQ	TMDL
AT JANUARY ADIT	SCALG005.45	102952	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(15) Cadmium, copper, zinc	None	(7-10) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Cadmium, cadmium (dissolved), copper, copper (dissolved), pH, zinc, dissolved oxygen, pH, copper
Missing Core Parameters	*E. coli*, lead
Missing Seasonal Distribution	Dissolved oxygen, *E. coli*, lead
Lab Detection Limits Not Low Enough	Cadmium (dissolved), copper (dissolved), zinc (dissolved)

Priority	Monitoring Recommendations
Medium	Collect more cadmium, copper, zinc and pH samples during critical conditions to monitor effectiveness of remediation at mine sites. Collect more dissolved oxygen samples due to exceedances. Collect at least 3 *E. coli*, dissolved oxygen, and lead samples over 3 seasons to complete core parameter coverage.

Impairment Discussion
Not attaining for copper, cadmium, zinc and low pH (1996). TMDL completed in 2003. New data for this assessment period shows continued exceedances in all impairment parameters.

ALUM GULCH

312917 / 1104425 - Sonoita Creek
15050301-561C
2.3 Miles

Category 4A
Not attaining

Low pH, zinc, copper,and cadmium (2010)

IMPAIRMENT

PBC - Not Attaining • AGL - Not Attaining
A&We - Not Attaining

STATUS

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Cadmium	50 ug/L	11/21/2006	79.0 ug/L	AGL remains not attaining.
Copper	500 ug/L (AGL) 1300 ug/L (PBC)	11/21/2006	1800 ug/L	AGL and PBC remain not attaining.
Copper[d]	85.9 ug/L[acute] @ > 400 mg/L hardness	11/21/2006	1900 ug/L	A&We remains not attaining.
	69.6 ug/L[acute] @ 320 mg/L hardness	7/31/2008	338 ug/L	
pH	6.5 SU	11/21/2006	3.81 SU	AGL, PBC and A&We remain not attaining with 2 exceedances in 2 samples.
		7/31/2008	4.08 SU	
Zinc[d]	3599 ug/L @ > 400 mg/L hardness	11/21/2006	24000 ug/L	A&We remains not attaining.
	2979 ug/L @ 320 mg/L hardness	7/31/2008	9700 ug/L	

Monitoring Summary

Sampling period: 11/21/2006 - 7/31/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT MOUTH	SCALG000.07	100259	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(2) Cadmium, copper, zinc	None	(2) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, copper, lead
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, copper, lead
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect samples during critical conditions to monitor effectiveness of remediation at mine sites. All core parameters need sample number and seasonal coverage.

Impairment Discussion
Not attaining for dissolved cadmium, copper, zinc and low pH (2010). No new data in this assessment period. TMDL completed in 2003.

A RIVACA LAKE

15050304-0080
118 acres

Category 4A
Not Attaining

IMPAIRMENT STATUS

Mercury in fish tissue (1996)

A&Ww - Inconclusive • AGI - Inconclusive
AGL - Inconclusive • FBC - Inconclusive • FC - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
At Dam	SCARI-A	100000	University of Arizona	Clean Lakes Program

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All
Missing Seasonal Distribution	All
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Continue sample collection to determine the effectiveness of TMDL load reduction strategies for mercury. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
Mercury TMDL completed in 1999.

CARPENTER TANK

15050304-0002
3 acres

Category 3
Inconclusive

FC - Inconclusive • FBC - Inconclusive • A&Ww - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 6/4/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
MID LAKE	SCCAR-USGS	101582	USGS	USGS Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
None	(1) Nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1) Dissolved oxygen, pH, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	Ammonia

Priority	Monitoring Recommendations
Low	All core parameters need sample number and seasonal coverage. Collect core parameters to reflect at least 3 seasons during assessment period.

CHIMENEA CREEK

Headwaters - Rincon Creek
15050302-140
8.0 Miles

Category 3
Inconclusive

FC - Inconclusive • FBC - Inconclusive • A&Ww - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 6/5/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT SAGUARO NATL PARK USGS	SCCHM004.75	101593	USGS	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
None	(1) Nitrite, nitrite/nitrate, nitrogen, phosphate, phosphorus, total Kjeldahl nitrogen	(1) Dissolved oxygen, pH, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	Ammonia

Priority	Monitoring Recommendations
Low	Collect at least 3 of each core parameter over 3 seasons of year.

CIENEGA CREEK

Headwaters - Gardner Canyon
15050302-006A
18.0 Miles

Category 3
Inconclusive

FC - Inconclusive • FBC - Inconclusive • AGL - Inconclusive
A&Ww - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 8/19/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE THE NARROWS	SCCIE019.90	100480	ADEQ	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, zinc, selenium	(1) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1) pH, SSC

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, copper, lead
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, copper, lead
Lab Detection Limits Not Low Enough	Mercury (dissolved), selenium, ammonia

Priority	Monitoring Recommendations
Low	All core parameters need sample and seasonal distribution coverage

COLLINS CANYON

Headwaters - Parker Canyon Lake
15050301-226
3.0 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 8/7/2006 - 12/4/2007

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT FOREST ROAD	SCCOC000.25	104006	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1-6) Antimony, arsenic, beryllium, boron, cadmium, copper, lead, manganese, mercury, selenium, zinc	(1-2) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(3-6) Dissolved oxygen, pH, SSC

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), cadmium (dissolved), copper (dissolved), *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	Copper (dissolved), lead, lead (dissolved)

Priority	Monitoring Recommendations
Low	Not enough data to assess. All core parameters need seasonal coverage and all except pH and dissolved oxygen need sample number coverage as well.

COX GULCH

Headwaters - Three R Canyon
15050301-560
16.3 Miles

Category 4A
Not attaining

Cadmium (2002); beryllium, copper, zinc, and pH (1996)

IMPAIRMENT STATUS

A&Ww - Not Attaining • AGL - Not Attaining
FBC - Not Attaining • FC - Inconclusive

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Below Tributary to European Mine	SCCXG000.81	100869	ADEQ	TMDL
Above Tributary to European Mine	SCCXG000.95	100876	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
Included as part of Three R Canyon TMDL completed in 2003.

FLUX CANYON

Headwaters - Alum Gulch
15050301-562
3.9 Miles

Category 3
Inconclusive

PBC - Inconclusive • AGL - Inconclusive
A&We - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper[d]	46.8 ug/L @ 210 mg/L hardness	7/31/2008	254 ug/L	A&We is inconclusive with 1 exceedance in 1 sample.
pH	6.5 SU	7/31/2008	4.28 SU	AGL, PBC and A&We are inconclusive with 1 exceedance in 1 sample (bino-mial).
Zinc[d]	2085 ug/L @ 210 mg/L hardness	7/31/2008	10000 ug/L	A&We is inconclusive with 1 exceedance in 1 sample.

Monitoring Summary

Sampling period: 7/31/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE MOUTH POINT WITH ALUM GULCH	SCFLC000.03	106543	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Cadmium, copper, zinc	None	(1) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Copper (dissolved), zinc (dissolved), pH
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dis-solved), *E. coli*, copper, lead
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dis-solved), *E. coli*, copper, lead
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more dissolved copper, zinc and pH samples to determine attainment status. All core parameters need sample number and seasonal distribution coverage.

HARSHAW CREEK

Headwaters - 312743 / 11043021
15050301-025A
3.3Miles

Category 4A
Not attaining

Copper and pH (1992)

IMPAIRMENT STATUS

A&We - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Below Trench Camp	SCHRS011.14	100319	ADEQ	TMDL
Below Endless Chain Mine Canyon	SCHRS013.17	100848	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
Harshaw Creek TMDL completed in 2003.

HUMBOLDT CANYON

Headwaters - Alum Gulch
15050301-340
2.6 Miles

Category 4A
Not attaining

Low pH, zinc, copper, and cadmium (1996)

IMPAIRMENT STATUS

FC - Inconclusive • FBC - Not Attaining
A&Ww - Not Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Cadmium[d]	6.62 ug/L^{acute} @ 150 mg/L hardness 1.24 ug/L^{chronic} @ 45 mg/L hardness	7/31/2008	123 ug/L (max) 22 ug/L (median)	A&Ww remains not attaining.
	3.44 ug/L^{acute}, 1.93 ug/L^{chronic} @ 82 mg/L hardness	8/31/2008	22.4 ug/L	
	1.79 ug/L^{acute} @ 45 mg/L hardness 1.05 ug/L^{chronic} @ 36 mg/L hardness	1/22/2010	17.9 ug/L (max) 9.2 ug/L (median)	
	1.03 ug/L^{acute}, 0.85 ug/L^{chronic} @ 27 mg/L hardness	2/3/2010	8 ug/L	
Copper	1300 ug/L	7/31/2008	2092 ug/L	FBC remains not attaining with 1 exceedance in 4 samples (binomial).
Copper[d]	19.7 ug/L^{acute} @ 150 mg/L hardness 4.53 ug/L^{chronic} @ 45 mg/L hardness	7/31/2008	3860 ug/L	A&Ww remains not attaining.
	11.1 ug/L^{acute}, 7.56 ug/L^{chronic} @ 82 mg/L hardness	8/31/2008	445 ug/L	
	6.33 ug/L^{acute} @ 45 mg/L hardness 3.74 ug/L^{chronic} @ 36 mg/L hardness	1/22/2010	1310 ug/L (max) 965 ug/L (median)	
	3.91 ug/L^{acute}, 2.93 ug/L^{chronic} @ 27 mg/L hardness	2/3/2010	854 ug/L	
pH	6.5 SU	7/31/2008	2.82 SU	A&Ww and FBC remain not attaining.
		2/3/2010	3.87 SU	

Parameter	Applicable Standard	Date	Result	Designated use support comments
Zinc[d]	165 ug/L[acute] @ 150 mg/L hardness 59.6 ug/L[chronic] @ 45 ug/L hardness	7/31/2008	8700 ug/L (max) 2900 ug/L (median)	A&Ww remains not attaining.
	99.0 ug/L[acute, chronic] @ 82 mg/L hardness	8/31/2008	2500 ug/L	
	59.6 ug/L[acute] @ 45 mg/L hardness 49.3 ug/L[chronic] @ 36 mg/L hardness	1/22/2010	2200 ug/L (max) 1300 ug/L (median)	
	38.6 ug/L [acute, chronic] @ 27 mg/L hardness	2/3/2010	990 ug/L	

Monitoring Summary

Sampling period: 7/31/2008 - 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE MOUTH POINT WITH ALUM GULCH	SCHMC000.05	106542	ADEQ	TMDL
AT FALLS UPSTREAM FROM HUMBOLDT WELL	SCHMC001.27	100840	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(5) Cadmium, copper, zinc	(0) None	(1-3) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Copper, pH
Missing Core Parameters	Dissolved oxygen, *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
High	Collect more samples during critical conditions to monitor effectiveness of remediation at Humboldt Canyon mines. Most core parameters need seasonal coverage.

Impairment Discussion
Not attaining for Cadmium, copper, zinc, and low pH (1996). TMDL completed as part of the Alum Gulch TMDL (2003).

LAKESIDE LAKE

15050302-0760
15 Acres

Category 4A
Not attaining

Ammonia, dissolved oxygen, and pH (DEQ, 2004)
Chlorophyll, nitrogen, and phosphorus (EPA, 2004)

IMPAIRMENT STATUS

A&Ww - Not Attaining • PBC - Not Attaining
FC - Inconclusive

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
At Dam	SCLAK-A	100034	University of Arizona	Clean Lakes Program
Mid Lake	SCLAK-B	100035	University of Arizona	Clean Lakes Program

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Schedule effectiveness monitoring - collect nutrients, chlorophyll, dissolved oxygen, and pH samples during critical conditions. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
TMDL completed in 2005 for nutrients and associated parameters.

LOMA VERDE

Headwaters - Tanque Verde Wash
15050302-268
4.0 Miles

Category 3
Inconclusive

FC - Inconclusive • FBC - Inconclusive • A&Ww - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
pH	9.0 SU	6/5/2008	9.6 SU	A&Ww and FBC are inconclusive with 1 exceedance in 1 sample (binomial).

Monitoring Summary

Sampling period: 6/5/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
IN SAGURO NATL PARK USGS	SCLMV003.51	101585	USGS	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
None	(1) Nitrite, nitrite/nitrate, nitrogen, phosphate, phosphorus, total Kjeldahl nitrogen	(1) Dissolved oxygen, pH, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	Ammonia

Priority	Monitoring Recommendations
Medium	Collect more pH samples to determine FBC and A&Ww status. Collect at least 3 of each core parameter to reflect 3 seasons of year.

MANSFIELD CANYON

Headwaters - Temporal Gulch
15050301-621
5.2 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper	1300 ug/L	4/3/2010	2320 ug/L	PBC is inconclusive with 1 exceedance in 1 sample (binomial).
Copper[d]	85.9 ug/L[acute] @ > 400 mg/L hardness	4/3/2010	2300 ug/L	A&We is inconclusive with 1 exceedance in 1 sample.
Lead	15 ug/L	4/3/2010	25.2 ug/L	PBC is inconclusive with 1 exceedance in 1 sample (binomial).
pH	6.5 SU	4/3/2010	4.35 SU	A&We and PBC are inconclusive with 1 exceedance in 1 sample (binomial).

Monitoring Summary

Sampling period: 4/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE CONFLUENCE WITH TEMPORAL GULCH	SCMFC000.55	108083	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	None	(1) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH, copper (dissolved), copper, lead, lead (dissolved)
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, *E. coli*, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, *E. coli*, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more total and dissolved copper and lead as well as pH samples to determine attainment status. All core parameters need sample number and seasonal distribution coverage.

MERRITT CANYON

Headwaters - Parker Canyon Lake
15050301-346
4.3 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 8/7/2006 - 9/6/2007

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT FOREST ROAD	SCMEC000.28	104007	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1-3) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(1-2) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-3) Dissolved oxygen, *E. coli*, pH, SSC

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Dissolved oxygen, *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	Lead, lead (dissolved), selenium

Priority	Monitoring Recommendations
Low	All core parameter samples need seasonal coverage, dissolved oxygen and *E. coli* need sample number coverage as well.

NOGALES WASH

Mexico Border - Portrero Creek
15050301-011
6.2 Miles

Category 5
Impaired

Copper and ammonia (2004), E. coli (1998) and chlorine (1996)

IMPAIRMENT STATUS

PBC - Impaired • A&Ww - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Ammonia	10.1 mg/L^{acute} @ pH 7.9	7/29/2008	13 mg/L	A&Ww remains impaired. 1 acute exceedance during the last 3 years of monitoring. Note: No temperature record to calculate a chronic standard.
Cadmium[d]	3.45 ug/L^{chronic} @ 180 mg/L hardness	7/29/2008	3.9 ug/L	A&Ww is inconclusive. Only 1 exceedance during the assessment period.
Chlorine (total residual)	19 ug/L^{acute} 11 ug/L^{chronic}	2/26/2008	70 ug/L	A&Ww remains impaired with 7 exceedances in 7 samples. 3 new exceedances in this assessment period.
		4/30/2008	100 ug/L	
		7/29/2008	3500 ug/L	
		10/28/2008	3500 ug/L	
		1/12/2009	338 ug/L	
		1/27/2009	3500 ug/L	
		4/28/2009	300 ug/L	
Copper[d]	14.8 ug/L^{chronic} @ 180 mg/L hardness	7/29/2008	18.2 ug/L	A&Ww remains impaired. 1 chronic exceedance during the assessment period.
Dissolved oxygen	6.0 mg/L	2/26/2008	3.9 mg/L	A&Ww is inconclusive with 3 exceedances in 5 samples (binomial).
		4/30/2008	5.8 mg/L	
		7/29/2008	4.8 mg/L	
E. coli	576 cfu/100 mL, SSM	2/26/2008	2419 cfu/100 mL	PBC remains impaired with 1 single sample exceedance in the last 3 years of monitoring.
		4/30/2008	14136 cfu/100 mL	
		7/29/2008	1674 cfu/100 mL	

Monitoring Summary

Sampling period: 7/31/2007 - 4/28/2009

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT MORLEY STREET TUNNEL	SCNGW004.87	100251	Friends of the Santa Cruz	Volunteer
SOUTH OF ROUTE 82 OVERPASS	SCNGW004.31	100701	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1-7) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc	(1-7) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-9) Dissolved oxygen, *E. coli*, pH, SSC, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Dissolved oxygen, cadmium (dissolved)
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Chlorine, lead (dissolved), mercury (dissolved), nickel (dissolved), selenium

Priority	Monitoring Recommendations
High	Collect more *E. coli*, chlorine, ammonia and copper samples to support TMDL development. Good core parameter coverage but many parameters are showing detection limit issues.

Impairment Discussion
Remains impaired for E. coli (1998), chlorine (1996), ammonia and copper (2004). In this assessment period, 2 new chlorine exceedances.

PARKER CANYON CREEK

Headwaters - Tributary at 312417 / 1102845
15050301-234A
3.0 Miles

Category 2
Attaining some uses

FC - Attaining • FBC - Inconclusive • A&Wc - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	7.0 mg/L	9/6/2007	5.92 mg/L	A&Wc is attaining. Low dissolved oxygen due to low flow/groundwater upwelling.
Iron[d]	1000 ug/L	5/23/2007	1200 ug/L	A&Wc chronic is inconclusive. Only 1 exceedance during the assessment period.
Mercury[d]	0.010 ug/L	7/31/2007	0.0124 ug/L	A&Wc chronic is attaining. This exceedance occurred during a local storm event and does not represent chronic conditions.
SSC	25 mg/L	7/31/2007	1529 mg/L	A&Wc is attaining. This single sample exceedance occurred during a local storm event.

Monitoring Summary

Sampling period: 8/7/2006 - 12/4/2007

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT FOREST ROAD	SCPRK000.05	103937	ADEQ	TMDL
BELOW DAM FIVE FEET BELOW WEIR	SCPRK010.65	105678	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1-5) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(1-3) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(2-5) Dissolved oxygen, *E. coli*, pH, SSC

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Iron (dissolved)
Missing Core Parameters	*E. coli*
Missing Seasonal Distribution	*E. coli*
Lab Detection Limits Not Low Enough	Antimony (dissolved), arsenic, arsenic (dissolved), cadmium (dissolved), copper (dissolved), lead, lead (dissolved), nickel (dissolved), selenium

Priority	Monitoring Recommendations
Medium	Collect more dissolved iron to ascertain assessment status. Collect at least 3 *E. coli* over 3 seasons of year to complete core parameter coverage.

PARKER CANYON LAKE

15050301-1040
129 Acres

Category 5
Impaired

IMPAIRMENT

Mercury in fish tissue (EPA, 2004)

STATUS

FC - Impaired • FBC - Attaining • AGI - Inconclusive
AGL - Attaining • A&Wc - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Mercury[d]	0.010 ug/L	8/31/2007	0.012 ug/L	A&Wc chronic is inconclusive. Only 1 exceedance in the assessment period.

Monitoring Summary

Sampling period: 2/21/2007 - 8/31/2007

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT SOUTH BOAT DOCK	SCPAK-RAMP	106039	ADEQ	TMDL
AT DAM	SCPAK-A	100057	ADEQ	TMDL
AT NORTH BOAT DOCK	SCPAK-D	100058	ADEQ	TMDL
NEAR CONFLUENCE OF COLLIN AND PARKER CANYON	SCPAK-B	104939	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(6-7) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(3-7) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(6-9) Dissolved oxygen, *E. coli*, pH, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	None
Missing Seasonal Distribution	Boron
Lab Detection Limits Not Low Enough	Cadmium (dissolved), copper (dissolved), lead (dissolved), nickel (dissolved), selenium, ammonia

Priority	Monitoring Recommendations
High	Collect mercury tissue samples in support of TMDL development. Collect boron samples to reflect 3 seasons of year to complete core parameter coverage.

Impairment Discussion
Remains impaired for mercury in fish tissue (EPA, 2004). Mercury fish consumption advisory issued in 2002 still exists.

PENA BLANCA LAKE

15050301-1070
50.5 Acres

Category 4A
Not Attaining

Mercury in fish tissue (1996)

IMPAIRMENT STATUS

FC - Inconclusive • FBC - Inconclusive • AGI - Inconclusive
AGL - Inconclusive • A&Wc - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	7.0 mg/L	10/6/2008	1.78 mg/L	A&Wc is inconclusive with 1 exceedance in 2 samples (binomial).

Monitoring Summary

Sampling period: 8/14/2007 - 3/7/2011

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT DAM	SCPEN-A	100064	ADEQ	TMDL
MID LAKE	SCPEN-B	100065	ADEQ	CLP, TMDL
MID LAKE 2	SCPEN-C	100066	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(3-5) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(1-6) Ammonia, nitrate, nitrite/nitrate, nitrogen, phosphate, phosphorus, total Kjeldahl nitrogen	(3-6) Dissolved oxygen, *E. coli*, pH, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Dissolved oxygen
Missing Core Parameters	None
Missing Seasonal Distribution	Zinc (dissolved), nitrogen, cadmium (dissolved), copper (dissolved), *E. coli*, boron, manganese, copper, lead
Lab Detection Limits Not Low Enough	Cadmium (dissolved), copper (dissolved), lead (dissolved), silver (dissolved)

Priority	Monitoring Recommendations
Medium	Collect more dissolved oxygen samples to determine A&W attainment status. Continue sample collection to determine the effectiveness of TMDL load reduction strategies for mercury. Analyze dissolved metals at lower lab detection limits.

Impairment Discussion
Mercury TMDL completed in 1999.

POTRERO CREEK

Interstate 19 - Santa Cruz River
15050301-500B
4.9 Miles

Category 5
Impaired

E. coli, low dissolved oxygen, and chlorine (2010)

IMPAIRMENT

FC - Inconclusive • FBC - Impaired • AGL - Inconclusive
A&Ww - Impaired

STATUS

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Chlorine (total residual)	19 ug/L^{acute} 11 ug/L^{chronic}	3/25/2008	100 ug/L	A&Ww remains impaired with 3 acute exceedances during the last 3 years of monitoring and 4 chronic exceedances during the assessment period.
		7/29/2008	100 ug/L	
		9/26/2008	100 ug/L	
		4/28/2009	100 ug/L	
Dissolved oxygen	6.0 mg/L	11/28/2006	4.1 mg/L	A&Ww remains impaired with 6 exceedances in 21 sample (binomial).
		9/25/2007	4.3 mg/L	
		11/27/2007	4.1 mg/L	
		7/29/2008	2.9 mg/L	
		9/26/2008	5.1 mg/L	
		3/31/2009	2.1 mg/L	
E. coli	235 cfu/100 mL, SSM	2/26/2008	272 cfu/100 mL	FBC remains impaired with 2 single sample exceedances in the last 3 years of monitoring.
		7/29/2008	> 2419 cfu/100 mL	
		10/28/2008	410 cfu/100 mL	

Monitoring Summary

Sampling period: 7/25/2006 - 5/26/2009

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT RUBY ROAD	SCPOT001.62	100571	Friends of the Santa Cruz, ADEQ	Ambient, TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1-2) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc	(2-3) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-28) Dissolved oxygen, *E. coli*, pH, SSC, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), cadmium (dissolved), copper (dissolved), copper, lead
Missing Seasonal Distribution	Zinc (dissolved), cadmium (dissolved), copper (dissolved), copper, lead
Lab Detection Limits Not Low Enough	Lead (dissolved), mercury (dissolved), nickel (dissolved), selenium, ammonia

Priority	Monitoring Recommendations
High	Collect chlorine, dissolved oxygen, and *E. coli* samples to support TMDL development. Several core parameters need sample number and seasonal coverage.

Impairment Discussion
Remains impaired for chlorine, dissolved oxygen, and *E. coli* (2010). In this assessment, 1 new exceedance in chlorine and dissolved oxygen.

ROSE CANYON LAKE

15050302-1260
7.3 Acres

Category 5
Impaired

IMPAIRMENT STATUS

Low pH (EPA, 2004)

A&Wc - Impaired • AGL - Inconclusive • FBC - Impaired
FC - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 10/16/2006

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
At Dam	SCROS-A	100183	ADEQ, AGFD	Clean Lake Program

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
High	Collect additional pH samples to support TMDL. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
All low pH values occurred below 4 meters deep and may be associated with natural conditions. However, pH remains to be a cause for impairment since not enough data was collected since the original listing to assess attainment.

SABINO CREEK

Tributary at 322328 / 1104700 - Tanque Verde Wash
15050302-014B
14.1 Miles

Category 2
Attaining some uses

DWS - Attaining • FC - Attaining • FBC - Inconclusive
AGI - Attaining • A&Ww - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
E. coli	235 cfu/100 mL, SSM	9/11/2008	310 cfu/100 mL	FBC is inconclusive with 1 exceedance in the assessment period.
Biocriteria	IBI ≥ 50 attaining IBI 40 - 49 inconclusive IBI ≤ 39 violating	9/11/2008	IBI 47.4	A&Ww is inconclusive.

Monitoring Summary

Sampling period: 9/11/2008 - 6/10/2009

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE USGS GAGING STATION	SCSAB005.09	106482	ADEQ	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(1-4) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(4) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(3-4) Dissolved oxygen, E. coli, pH, SSC, total dissolved solids, biocriteria

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	*E. coli*, biocriteria
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Cadmium (dissolved), copper (dissolved), lead (dissolved), selenium, silver (dissolved), zinc (dissolved)

Priority	Monitoring Recommendations
Medium	Collect an additional macroinvertebrate sample to verify the bioassessment result. Good core parameter coverage with small number of samples but many parameters have detection limit issues.

SANTA CRUZ RIVER

Canada del Oro - HUC 15050303
15050301-001
8.6 Miles

Category 4B
Not attaining

Ammonia (2010)

PBC - Inconclusive • A&Wedw - Not Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Ammonia	1.94 mg/L^{chronic} @ pH 7.5 and temp 27.1 °C	6/28/2007	16 mg/L	A&Wedw is not attaining. 3 acute exceedances and 7 chronic exceedances.
	2.03 mg/L^{chronic} @ pH 7.6 and temp 25.3 °C	9/11/2008	12.5 mg/L	
	2.63 mg/L^{chronic}, 12.8 mg/L^{acute} @ pH 7.8 and temp 18.0 °C	12/17/2008	18 mg/L	
	2.38 mg/L^{chronic} @ pH 7.3 and temp 26.3 °C	6/10/2009	11 mg/L	
	2.46 mg/L^{chronic} @ pH 7.2 and temp 26.4 °C	11/18/2010	21 mg/L	
	2.38 mg/L^{chronic}, 11.5 mg/L^{acute} @ pH 7.8 and temp 18.5 °C	2/24/2011	17 mg/L	
	1.37 mg/L^{chronic}, 15.2 mg/L^{acute} @ pH 7.7 and temp 30.0 °C	5/12/2011	17 mg/L	
Chlorine (total residual)	11 ug/L	6/28/2007	225 ug/L	A&Wedw chronic is inconclusive with 1 exceedance in 1 sample.
E. coli	576 cfu/100 mL, SSM	9/8/2010	2420 cfu/100 mL	PBC is inconclusive with 1 exceedance in 9 samples. Sample taken during flood conditions.
Selenium	2 ug/L	5/12/2011	2.3 ug/L	A&Wedw is inconclusive with 1 exceedance in 4 samples.

Monitoring Summary

Sampling period: 6/28/2007 - 5/12/2011

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
NEAR MARANA	SCSCR034.56	101081	ADEQ	Ambient
AT CORTARO, AZ USGS 09486500	SCSCR039.63	100237	ADEQ	Ambient
AT AVRA VALLEY RD	SCSCR034.31	105065	ADEQ	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(1-8) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(9) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(7-9) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Chlorine, selenium, *E. coli*
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Nickel (dissolved), selenium, mercury (dissolved)

Priority	Monitoring Recommendations
High	Collect more *E. coli* and selenium due to exceedances. Collect more ammonia, chlorine, and dissolved metal samples once upgrades to the existing plant are completed. Good core parameter coverage but many detection limit issues with data. Need lower detection limits on nickel (dissolved) and mercury (dissolved) to assess status.

Impairment Discussion
Remains not attaining for ammonia (2010). The Ina Road wastewater treatment facility has a permit variance for copper, ammonia, and chlorine starting in 2006. In this assessment, new data indicates continued ammonia impairment and detection limit issues with dissolved mercury.

SANTA CRUZ RIVER

Josephine Canyon - Tubac Bridge
15050301-008A
4.8 Miles

Category 5
Impaired

Ammonia and E. coli (2010)

IMPAIRMENT STATUS

PBC - Impaired • AGL - Inconclusive • A&Wedw - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Ammonia	3.5 mg/L^{chronic} @ pH 7.7 and temp 13.8 °C	4/30/2008	26 mg/L	A&Wedw chronic remains impaired. No new data in this assessment period
Chlorine (total residual)	19 ug/L^{acute}, 11 ug/L^{chronic}	2/23/2011	29 ug/L	A&Wedw chronic is inconclusive with 1 exceedance in 17 samples.
E. coli	576 cfu/100 mL, SSM	6/20/2007	2420 cfu/100 mL	PBC remains impaired with 1 single sample exceedance in the last 3 years of monitoring and 8 geometric mean exceedances in the assessment period. No new data since last assessment.
		6/25/2007	1046 cfu/100 mL	
		7/5/2007	770 cfu/100 mL	
		7/12/2007	3690 cfu/100 mL	
		7/18/2007	198630 cfu/100 mL	
		7/24/2007	3630 cfu/100 mL	
		8/9/2007	8664 cfu/100 mL	
		8/16/2007	13140 cfu/100 mL	
		8/21/2007	6770 cfu/100 mL	
		8/30/2007	5172 cfu/100 mL	
		9/5/2007	727 cfu/100 mL	
		9/21/2007	2420 cfu/100 mL	
		10/3/2007	2420 cfu/100 mL	
		10/9/2007	866 cfu/100 mL	
		10/18/2007	2420 cfu/100 mL	
		11/29/2007	72700 cfu/100 mL	
		12/4/2007	2420 cfu/100 mL	
		12/11/2007	10462 cfu/100 mL	
		12/18/2007	839 cfu/100 mL	
		1/29/2008	1340 cfu/100 mL	
		4/30/2008	766 cfu/100 mL	

Parameter	Applicable Standard	Date	Result	Designated use support comments
E. coli (continued)	576 cfu/100 mL SSM	7/29/2008	766 cfu/100 mL	
		6/14/2007	308 cfu/100 mL	
	126 cfu/100 mL Geometric mean	7/3/2007 - 7/24/2007	2696 cfu/100 mL	
		8/9/2007 - 8/30/2007	4760 cfu/100 mL	
		9/5/2007 - 9/28/2007	652 cfu/100 mL	
		10/3/2007 - 10/29/2007	880 cfu/100 mL	
		11/5/2007 - 11/30/2007	775 cfu/100 mL	
		12/4/2007 - 12/19/2007	2961 cfu/100 mL	
		1/3/2008 - 1/31/2008	138 cfu/100 mL	

Monitoring Summary

Sampling period: 7/25/2006 - 5/11/2011

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT SANTA GERTRUDIS LANE	SCSCR103.45	100247	ADEQ, Friends of the Santa Cruz	TMDL, Ambient
RIVER CROSSING	SCSCR102.88	106120	NPS	Ambient
TUMACACORI EDUCATION	SCSCR103.39	106121	NPS	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(1-3) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc	(1-4) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(4-80) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Chlorine
Missing Core Parameters	None
Missing Seasonal Distribution	Zinc (dissolved), cadmium (dissolved), copper (dissolved), copper, lead
Lab Detection Limits Not Low Enough	Lead (dissolved), nickel (dissolved), selenium, mercury (dissolved)

Priority	Monitoring Recommendations
High	Collect ammonia and *E. coli* samples to support TMDL development. Collect chlorine samples to determine A&Wedw status. Several core parameters need seasonal coverage.

Impairment Discussion
Remains impaired for Ammonia and *E. coli* (2010).

SANTA CRUZ RIVER

Mexican border - Nogales WWTP
15050301-010
17 Miles

Category 2
Attaining some uses

DWS - Inconclusive • FC - Inconclusive • FBC - Attaining
AGI - Inconclusive • AGL - Attaining • A&Ww - Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	6.0 mg/L	7/31/2007	3.8 mg/L	A&Ww is attaining. Low dissolved oxygen levels due to low flow conditions (< 0.5 cfs) and groundwater upwelling.
		4/30/2008	5.1 mg/L	
		7/29/2008	3.1 mg/L	

Monitoring Summary

Sampling period: 7/31/2007 - 1/27/2009

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT JOHNSON'S RANCH	SCSCR128.54	105698	ADEQ, Friends of the Santa Cruz	TMDL, Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(1-7) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc	(1-7) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(2-8) Dissolved oxygen, *E. coli*, pH, SSC, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Fluoride, chromium, boron, manganese
Missing Seasonal Distribution	Fluoride, chromium, boron, manganese
Lab Detection Limits Not Low Enough	Lead (dissolved), mercury (dissolved), selenium

Priority	Monitoring Recommendations
Low	Collect core parameters needing sample and seasonal coverage. Many parameters have detection limit issues.

SANTA CRUZ RIVER

Nogales WWTP - Josephine Canyon
15050301-009
9.1 Miles

Category 4B/5
Not attaining/impaired

Total residual chlorine and ammonia (2010), cadmium, *E. coli*(2012/14)

IMPAIRMENT

PBC - Impaired • AGL - Attaining
A&Wedw - Not Attaining

STATUS

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Ammonia	3.98 mg/L^{chronic} @ pH 7.6 and temp 10 °C	1/30/2007	26 mg/L	A&Wedw remains not attaining. 4 acute exceedances during the last 3 years of monitoring and 8 chronic exceedances during the assessment period.
	2.06 mg/L^{chronic} @ pH 7.4 and temp 27.1 °C	6/28/2007	34 mg/L	
	4.36 mg/L^{chronic} @ pH 7.5 and temp 13 °C	2/26/2008	26 mg/L	
	3.18 mg/L^{chronic} @ pH 7.6 and temp 18 °C	4/30/2008	25 mg/L	
	1.73 mg/L^{chronic}, 12.1 mg/L^{acute} @ pH 7.8 and temp 24 °C	7/29/2008	15 mg/L	
	2.07 mg/L^{chronic}, 8.41 mg/L^{acute} @ pH 8 and temp 17 °C	10/28/2008	20 mg/L	
	3.98 mg/L^{chronic}, 17.0 mg/L^{acute} @ pH 7.6 and temp 10.0 °C	1/12/2009	25 mg/L	
	4.02 mg/L^{chronic}, 17.3 mg/L^{acute} @ pH 7.6 and temp 13.0 °C	1/27/2009	21 mg/L	
Chlorine (total residual)	19 ug/L^{acute}, 11 ug/L^{chronic}	6/28/2007	190 ug/L	A&Wedw remains not attaining. 2 acute and 3 chronic exceedances.
		7/29/2008	100 ug/L	
		5/26/2009	100 ug/L	
Dissolved oxygen	3.0 mg/L	6/28/2007	2.47 mg/L	A&Wedw is attaining with 1 exceedance in 25 samples (binomial).
E. coli	576 cfu/100 mL, SSM	7/29/2008	2420 cfu/100 mL	PBC is impaired with two exceedances. 7/29 /2008 and 2010 exceedances were excluded as storm related.
		1/12/2009	1553 cfu/100 mL	
		7/28/2009	1000 cfu/100 ml	
		7/28/2010	31300 cfu/100 ml	
		8/25/2010	2400 cfu/100 ml	

Parameter	Applicable Standard	Date	Result	Designated use support comments
Cadmium[d]	2.99 ug/L @ hardness = 148 mg/L	7/28/09	3.5 ug/L	AWedw is impaired. 1 acute and 3 chronic exceedances with no indications that chronic conditions were not met.
	2.97 ug/L (chronic) and 6.47 ug/L (acute) @ hardness = 147 mg/L	10/27/09	8.1 ug/L	
	2.97 ug/L @ hardness = 147 mg/L	4/29/10	3.5 ug/L	

Monitoring Summary

Sampling period: 7/25/2006 - 5/26/2009

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT RIO RICO	SCSCR111.66	100238	ADEQ, Friends of the Santa Cruz	TMDL, Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(1-7) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc	(2-8) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-31) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Lead (dissolved), mercury (dissolved), nickel (dissolved), selenium

Priority	Monitoring Recommendations
High	Collect more chlorine samples to determine effectiveness of chlorine removal by the new plant. Continue monitoring for ammonia. Additionally, monitoring for dissloved cadmium, chromium, copper, nickel and zinc is recommended given the significant industrial sources within Sonora, Mexico. Although exceedances for all of these metals have not been measured within the Santa Cruz River, large fluctuations in metals concentrations have been observed in the plant's inffluent and effluent.

Impairment Discussion
Remains not attaining for ammonia and chlorine (2010). The Nogales International Wastewater Treatment Plant has been upgraded and fully operational since 2009. Effectiveness of chlorine removal by the new treatment plant will be determined in 2016 assessment. Also impaired for *E. coli* and cadmium(2012/14).

SANTA CRUZ RIVER

Roger Road WWTP Outfall - Intermittent Reach
15050301-003B
2.9 Miles

Category 4B
Not Attaining

Ammonia (2010)

IMPAIRMENT STATUS

PBC - Inconclusive • A&Wedw - Not Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Chlorine (total residual)	11 ug/L	6/28/2007	100 ug/L	A&Wedw chronic is inconclusive with 1 exceedance in 1 sample.
Ammonia	1.68 mg/L^{chronic} @ pH 7.5 and temp 30.0 °C	6/28/2007	20 mg/L	A&Wedw chronic is not attaining.

Monitoring Summary

Sampling period: 6/28/2007

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
BELOW RUTHRAUFF ROAD	SCSCR045.13	103623	ADEQ	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
None	(1) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1) Dissolved oxygen, pH, SSC, total dissolved solids, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Chlorine
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*
Lab Detection Limits Not Low Enough	Nickel (dissolved), mercury (dissolved)

Priority	Monitoring Recommendations
Medium	Collect more chlorine samples to determine A&Wedw status. Collect at least 3 of each core parameter to reflect at least 3 seasons of year.

Impairment Discussion
As part of the Ina Road WWTP expansion and upgrade project, the Roger Road wastewater treatment plant will be replaced by a new facility that would reduce the amount of ammonia and other chemicals in treated water.

SANTA CRUZ RIVER

Tubac Bridge - Sopori Wash
15050301-008B
8.9 Miles

Category 2
Attaining some uses

PBC - Inconclusive • AGL - Attaining • A&We - Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
E. coli	576 cfu/100 mL, SSM	7/29/2008	12010 cfu/100 mL	PBC is inconclusive. Both exceedances appear to be storm related.
		9/8/2010	1046 cfu/100 mL	

Monitoring Summary

Sampling period: 7/25/2006 - 11/10/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
NORTH OF CHAVES SIDING ROAD	SCSCR096.72	100244	ADEQ, Friends of the Santa Cruz	TMDL, Ambient
AT TUBAC BRIDGE	SCSCR099.40	100243	ADEQ, Friends of the Santa Cruz	TMDL, Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(2-3) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc	(2-7) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(4-19) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids, chlorine

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more *E. coli* samples to determine PBC attainment status.

SANTA CRUZ RIVER

HUC 15050303 Boundary - Baum
15050303-005A
24.5 Miles

Category 4B
Not Attaining

IMPAIRMENT

Copper (2010)

STATUS

PBC - Inconclusive • A&Wedw - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT AVRA VALLEY RD	SCSCR034.31	105065	Pima County Wastewater Management	Permit monitoring
DOWNSTREAM OF TRICO MARANA RD	SCSCR25.1	105069	Pima County Wastewater Management	Permit monitoring
NEAR TRICO RD	SCSCR23.24	105070	Pima County Wastewater Management, USGS	Permit monitoring, Ambient
SOUTH EAST OF THE TOWN OF MARANA	SCSCR29.35	105067	Pima County Wastewater Management	Permit monitoring
SOUTH OF THE TOWN OF MARANA	SCSCR28.41	105068	Pima County Wastewater Management	Permit monitoring
1.3 MILES DOWNSTREAM OF AVRA VALLEY RD.	SCSCR033.07	105066	Pima County Wastewater Management	Permit monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more copper samples to determine A&Wedw status.

Impairment Discussion
Remains not attaining for dissolved copper (2010). As part of the Ina Road WWTP expansion and upgrade project, the Roger Road wastewater treatment plant will be replaced by a new facility that would reduce the amount of copper and other chemicals in treated water.

SONOITA CREEK

1600 Feet Below Patagonia WWTP - Patagonia Lake
15050301-013C
9.0 Miles

Category 5
Impaired

Zinc (2004) and low dissolved oxygen (1998)

IMPAIRMENT STATUS

FC - Attaining • FBC - Attaining • AGI - Attaining
AGL - Attaining • A&Ww - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper[d]	29.3 ug/L[chronic] @ >400 mg/L hardness	11/21/2006	47 ug/L	A&Ww is inconclusive with 1 exceedance in 4 samples.
Dissolved oxygen	6.0 mg/L	11/21/2006	5.17 mg/L	A&Ww remains impaired.
Zinc[d]	379 ug/L[acute, chronic] @ >400 mg/L hardness	11/21/2006	810 ug/L	A&Ww remains impaired.
		8/20/2008	790 ug/L	

Monitoring Summary

Sampling period: 11/21/2006 - 5/11/2011

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE TEMPORAL GULCH, BELOW TNC	SCSON016.78	100320	ADEQ	TMDL
AT CIRCLE Z RANCH	SCSON014.52	101154	ADEQ	Ambient
BELOW ALUM CANYON	SCSON015.35	100257	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(4-7) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, zinc, selenium	(6) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(4-8) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Copper (dissolved)
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Mercury (dissolved), selenium

Priority	Monitoring Recommendations
High	Collect more zinc and dissolved oxygen samples to support TMDL development. Collect more dissolved copper samples to determine level of attainment. Good core parameter coverage with few samples. Use lower lab reporting limits for dissolved mercury and selenium.

Impairment Discussion
Remains impaired for Zinc (2004) and low dissolved oxygen (1998).

SONOITA CREEK

Patagonia WWTP Outfall - 1600 Feet Below
15050301-013B
0.3 Miles

Category 1
Attaining all uses

PBC - Attaining • AGL - Attaining • A&Wedw - Attaining

No Exceedances

Monitoring Summary

Sampling period: 11/13/2006 - 2/23/2011

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
BELOW PATAGONIA WWTP	SCSON018.17	100253	ADEQ	Ambient
BELOW PATAGONIA WWTP	SCSON018.31	100255	ADEQ	Ambient

Metal Samples	Nutrients & Related Samples	Other Samples
(3-4) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(4) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(3-4) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Mercury (dissolved), selenium, ammonia

Priority	Monitoring Recommendations
Low	Good core parameter coverage with few samples.

TEMPORAL GULCH

Headwaters - Mansfield Canyon
15050301-617
14.0 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 4/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE FR 72	SCTMG007.90	108082	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	None	(1) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Low	Not enough data to assess. Collect core parameter samples, at least three of each to represent 3 seasons of year.

THREE R CANYON

Headwaters - 312819 / 1104556
15050301-558A
2.3 Miles

Category 4A
Not attaining

IMPAIRMENT STATUS

Cadmium (2002); beryllium, copper, zinc, and pH (1996)

A&We - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Above Three R Mine	SCTHC004.30	100852	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
TMDL completed in 2003.

THREE R CANYON

312835 / 1104619 - 312827 / 1104712 (intermittent flow)
15050301-558B
1 Mile

Category 4A
Not Attaining

Cadmium (2002); beryllium, copper, zinc, and pH (1996)

IMPAIRMENT

A&Ww - Not Attaining • AGL - Not Attaining
FBC - Not Attaining • FC - Inconclusive

STATUS

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Below Uppermost Spring	SCTHC003.83	100872	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
TMDL completed in 2003.

THREE R CANYON

312827 / 1104712 - Sonoita Creek
15050301-558C
3 Miles

Category 4A
Not Attaining

Cadmium (2002); beryllium, copper, zinc, and pH (1996)

IMPAIRMENT STATUS

A&We - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Below Cox Gulch	SCTHC002.91	100322	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
TMDL completed in 2003.

UNNAMED TRIB (UA2) TO ALUM GULCH

Headwaters - Alum Gulch
15050301-641
0.3 Miles

Category 4A
Not Attaining

Impairment Status

Zinc and copper (2012)

PBC - Inconclusive • A&We - Not Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper[d]	85.9 ug/L[acute] @ > 400 mg/L hardness	7/31/2008	898 ug/L	A&We is not attaining with 2 exceedances in the last 3 years of monitoring.
		2/3/2010	519 ug/L	
pH	6.5 SU	7/31/2008	3.3 SU	A&We and PBC are inconclusive with 2 exceedances in 2 samples (binomial).
		2/3/2010	4.08 SU	
Zinc[d]	3599 ug/L[acute] @ > 400 mg/L hardness	7/31/2008	19000 ug/L	A&We is not attaining with 2 exceedances in the last 3 years of monitoring.
		2/3/2010	18000 ug/L	

Monitoring Summary

Sampling period: 7/31/2008 - 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE WORLDS FAIR MINE	SCUA2000.08	106824	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(2) Cadmium, copper, zinc	None	(1-2) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more dissolved copper, zinc and pH samples to monitor effectiveness of remediation at mine sites. All core parameters need sample number and seasonal distribution coverage.

Impairment Discussion
Inconclusive in last assessment period with 1 exceedance in dissolved copper, zinc and pH. New exceedances in this assessment, move reach to 4A status. This reach is in the same general area covered by Alum Gulch TMDL.

UNNAMED TRIB (UA3) TO ALUM GULCH

Headwaters - Alum Gulch
15050301-642
0.3 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper[d]	79.8 ug/L[acute] @ 370 mg/L hardness	7/31/2008	718 ug/L	A&We is inconclusive with 1 exceedance in 1 sample.
pH	6.5 SU	7/31/2008	3.22 SU	PBC and A&We are inconclusive with 1 exceedance in 1 sample.
Zinc[d]	3369 ug/L[acute] @ 370 mg/L hardness	7/31/2008	11000 ug/L	A&We is inconclusive with 1 exceedance in 1 sample.

Monitoring Summary

Sampling period: 7/31/2008

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
BELOW WORLDS FAIR MINE	SCUA3000.02	106822	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Cadmium, copper, zinc	None	(1) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH, copper (dissolved), zinc (dissolved)
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more dissolved copper and zinc samples as well as pH to determine attainment. All core parameters need sample number and seasonal distribution coverage.

UNNAMED TRIB (UA5)TO ALUM GULCH

Headwaters - Alum Gulch
15050301-893
0.4 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
JUST SOUTHWEST OF FLUX CANYON ROAD	SCUA5000.07	107742	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Cadmium, copper, zinc	None	(1) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Low	Not enough data to ascertain attainment. All core parameters need sample number and seasonal distribution.

UNNAMED TRIB (UAL) TO ALUM GULCH

Headwaters - Alum Gulch
15050301-640
0.3 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 1/21/2010 - 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
UP STREAM OF JANUARY ADIT	SCUAL000.01	106823	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(2) Cadmium, copper, zinc	None	(1) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Low	Core parameters need sample number and seasonal distribution coverage.

UNNAMED TRIB TO HUMBOLDT CANYON

Headwaters - Humboldt Canyon
15050301-894
0.3 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper[d]	3.9 ug/L[acute] @ 15 mg/L hardness	2/3/2010	102 ug/L	A&We is inconclusive with 1 exceedance in the last 3 years of monitoring.
pH	6.5 SU	2/3/2010	5.38 SU	A&We and PBC are inconclusive with 1 exceedances in 1 samples (binomial).

Monitoring Summary

Sampling period: 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE HUMBOLDT MINE	SCUHC000.01	107743	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Cadmium, copper, zinc	None	(1) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH, copper (dissolved)
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more pH and dissolved copper samples due to exceedances. Collect core parameters to represent at least 3 seasons during an assessment period.

UNNAMED TRIB TO COX GULCH

Headwaters - Cox Gulch
15050301-890
1 Mile

Category 4A
Not Attaining

Cadmium (2002); beryllium, copper, zinc, and pH (1996)

IMPAIRMENT STATUS

A&We - Not Attaining • PBC - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Above Cox Gulch	SCUCX000.01	100875	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
Included as part of Three R Canyon TMDL completed in 2003.

UNNAMED TRIB TO HARSHAW CREEK

Headwaters - Harshaw Creek
15050301-888
2 Miles

Category 4A
Not Attaining

IMPAIRMENT STATUS

Copper and pH (1992)

A&We - Not Attaining • PBC - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Below Endless Chain Mine	SCUHR000.38	100850	ADEQ	TMDL
Above Mining Impacted Area	SCUHR000.57	100851	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
Included as part of Harshaw Creek TMDL completed in 2003.

UNNAMED TRIB TO PARKER CANYON LAKE

Headwaters - Parker Canyon Lake
15050301-877
1 Mile

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: 8/7/2006 - 7/31/2007

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT FOREST ROAD	SCUPC000.24	104008	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1-2) Antimony, arsenic, beryllium, boron, cadmium, copper, lead, manganese, mercury, selenium, zinc	(1-2) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-2) Dissolved oxygen, pH, SSC

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	Cadmium (dissolved), copper (dissolved), lead, zinc (dissolved), lead (dissolved)

Priority	Monitoring Recommendations
Low	All core parameters need sample number and seasonal distribution coverage.

UNNAMED TRIB TO THREE R CANYON

Headwaters - Three R Canyon
15050301-889
2 Miles

Category 4A
Not Attaining

Cadmium (2002); beryllium, copper, zinc, and pH (1996)

IMPAIRMENT STATUS

A&We - Not Attaining • PBC - Not Attaining

Monitoring Summary

Sampling period: No current data

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
Above Three R Mine	SCUTH000.23	100874	ADEQ	TMDL

Metals Samples	Nutrients & Related Samples	Other Samples
None	None	None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	N/A
Missing Core Parameters	All designated uses
Missing Seasonal Distribution	All designated uses
Lab Detection Limits Not Low Enough	N/A

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites.

Impairment Discussion
Included as part of Three R Canyon TMDL completed in 2003.

UNNAMED TRIB (UH1) TO HUMBOLDT CANYON

Headwaters - Humboldt Canyon
15050301-895
0.6 Miles

Category 3
Inconclusive

PBC - Inconclusive • A&We - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Copper	1300 ug/L	2/3/2010	1380 ug/L	PBC is inconclusive with only 1 exceedance in 1 sample (binomial).
Copper[d]	7.3 ug/L @ 29 mg/L hardness	2/3/2010	1360 ug/L	A&We is inconclusive with only 1 exceedance in the last 3 years of monitoring.
pH	6.5 SU	2/3/2010	4.37 SU	PBC and A&We are inconclusive with only 1 exceedance in 1 sample.
Zinc[d]	391 ug/L @ 29 mg/L hardness	2/3/2010	510 ug/L	A&We is inconclusive with only 1 exceedance in the last 3 years of monitoring.

Monitoring Summary

Sampling period: 2/3/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
BELOW FALLS	SCUH1000.01	107744	ADEQ	TMDL

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Copper, zinc	None	(1) pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	pH
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved)
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more pH, copper and dissolved zinc samples due to exceedances. Collect core parameters to represent at least 3 seasons during an assessment period.