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.

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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.

ED_013248_00000578-00002

ALUM GULCH

Headwaters - 312820 / 1104351
15050301-561A
0.3 Miles

Category 4A
Not attaining

Santa Cruz

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

IMPAIRMENT STATUS

AWE - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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.

ED_013248_00000578-00003

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
AWW - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Medium	Collect more cadmium, copper, zinc and pH samples during critical conditions to monitor effectiveness of remediation at mine sites. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
TMDL completed in 2003.

ED_013248_00000578-00004

ALUM GULCH

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

Category 4A
Not attaining

Santa Cruz

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

IMPAIRMENT STATUS

PBC - Not Attaining • AGL - Not Attaining
AWE - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

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

Impairment Discussion
TMDL completed in 2003.

ED_013248_00000578-00005

A RIVACA LAKE

15050304-0080
118 acres

Category 4A
Not attaining

IMPAIRMENT STATUS

Mercury in fish tissue (1996)

AWW - Inconclusive • AGI - Inconclusive
AGL - Inconclusive • FBC - Inconclusive • FC - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

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.

ED_013248_00000578-00006

CIENEGA CREEK

Empire Gulch - USGS Gage station (Pantano Wash)
15050302-006B
28.8 Miles

Category 2
Attaining some uses

FC - Attaining • FBC - Attaining • AGL - Attaining
AWW - Inconclusive

Use Support

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	6.0 mg/L	9/10/2012	4.32 mg/L	AWW is attaining. Low dissolved oxygen attributed to groundwater upwelling.
		4/18/2013	4.89 mg/L	
Bottom deposits	< 50% fines	4/18/2013	66%	AWW is inconclusive.

Monitoring Summary

Sampling period: 8/30/2012 - 4/18/2013

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT MARSH STATION ROAD	SCCIE002.89	100263	ADEQ	Ambient Monitoring
BETWEEN SITES 100480 AND 101177	SCCIE020.45	103300	ADEQ	Ambient Monitoring

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

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Bottom deposits, biocriteria
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Selenium, mercury (dissolved)

Priority	Monitoring Recommendations
Medium	Collect more macroinvertebrate samples to verify the IBI score (IBI on 4/18/13 was 47 and inconclusive). Collect additional bottom deposit samples due to the exceedance.

ED_013248_00000578-00007

COX GULCH

Headwaters - Three R Canyon
15050301-560
2.3 Miles

Category 4A
Not attaining

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

IMPAIRMENT STATUS

AWW - Not Attaining • AGL - Not Attaining
FBC - Not Attaining • FC - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites. Collect core parameters to represent at least 3 seasons during an assessment period.

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

ED_013248_00000578-00008

DAVIDSON CANYON

Headwaters - Spring at 315900/1103846
15050302-153A
13.6 Miles

Category 3
Inconclusive

Status 2012

PBC - Inconclusive • AGL - Inconclusive • AWE - Inconclusive

Use Support

No Exceedances

Monitoring Summary

Sampling period: 9/10/2012 - 11/20/2012

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT OAW SPRING SOURCE	SCDVC002.50	109222	ADEQ	Ambient Monitoring

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

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Low	Collect core parameters to represent at least 3 seasons during an assessment period.

ED_013248_00000578-00009

HARSHAW CREEK

Headwaters - 312743 / 1104321
15050301-025A
3.3Miles

Category 4A
Not attaining

IMPAIRMENT STATUS

Copper and pH (1992)

AWE - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Medium	Conduct effectiveness monitoring once remedial strategies are implemented at mine sites. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
Harshaw Creek TMDL completed in 2003.

ED_013248_00000578-00010

HUMBOLDT CANYON

Headwaters - Alum Gulch
15050301-340
2.6 Miles

Category 4A
Not attaining

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

FC - Inconclusive • FBC - Not Attaining
AWW - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect more samples during critical conditions to monitor effectiveness of remediation at Humboldt Canyon mines. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
TMDL completed as part of the Alum Gulch TMDL (2003).

ED_013248_00000578-00011

LAKESIDE LAKE

15050302-0760
15 Acres

Category 4A
Not attaining

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

AWW - Not Attaining • PBC - Not Attaining
FC - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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.

ED_013248_00000578-00012

NOGALES WASH

Mexico Border - Portrero Creek
15050301-011
6.239 Miles

Category 5
Impaired

Status Quo

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

IMPAIRMENT

FC - Inconclusive • PBC - Impaired • AWW - Impaired

STATUS

No Exceedances

Monitoring Summary

Sampling period: 8/25/2010 - 10/4/2013

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT MORLEY STREET TUNNEL	SCNGW004.87	100251	Friends of the Santa Cruz	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(1-12) Arsenic, cadmium, copper, lead, selenium, zinc	(1-12) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-2) Dissolved oxygen, *E. coli*, pH, SSC

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), dissolved oxygen, pH, *E. coli*, mercury (or mercury in fish tissue)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, *E. coli*, mercury
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
High	Collect more *E. coli*, chlorine, ammonia and dissolved copper samples to support TMDL development. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
Remains impaired for *E. coli* (1998), chlorine (1996), ammonia and copper (2004). Twelve out of 13 ammonia samples did not have the corresponding pH and temperature values.

ED_013248_00000578-00013

PARKER CANYON LAKE

15050301-1040
129 Acres

Category 5
Impaired

IMPAIRMENT STATUS

Mercury in fish tissue (EPA 2004)

FC - Impaired • FBC - Attaining • AGI - Inconclusive
AGL - Attaining • AWC - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect mercury tissue samples in support of TMDL development.

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

ED_013248_00000578-00014

PATAGONIA LAKE

15050301-1050
231 Acres

Category 2
Attaining some uses

DWS - Inconclusive • FC - Attaining • FBC - Inconclusive
AGI - Inconclusive • AGL - Inconclusive • AWC - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	7.0 mg/L	9/4/2014	5.12 mg/L	AWC is inconclusive with 2 exceedances in 2 samples (binomial).
		11/4/2014	4.84 mg/L	
Manganese	980 ug/L	7/24/2014	4300 ug/L	DWS is inconclusive with 2 exceedances in 3 samples (binomial).
		9/4/2014	2070 ug/L	

Monitoring Summary

Sampling period: 7/24/2014 - 11/6/2014

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
MID LAKE	SCPAT-B	100327	ADEQ	Ambient Monitoring
AT DAM	SCPAT-A	100060	ADEQ	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(5) Arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(5) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(2-11) Dissolved oxygen, *E. coli*, pH, total dissolved solids, fish tissue mercury

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Dissolved oxygen, manganese
Missing Core Parameters	Zinc (dissolved), *E. coli*
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, nitrite/nitrate, arsenic, chromium, lead, boron, manganese, copper
Lab Detection Limits Not Low Enough	Cadmium (dissolved), selenium

Priority	Monitoring Recommendations
Low	Collect more dissolved oxygen and manganese samples due to the exceedances. Collect core parameters to represent at least 3 seasons during an assessment period.

ED_013248_00000578-00015

PENA BLANCA LAKE

15050301-1070
51 Acres

Category 4A
Not attaining

IMPAIRMENT STATUS

Mercury in fish tissue (1996)

FC - Not Attaining • FBC - Inconclusive • AGI - Attaining
AGL - Inconclusive • AWW - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	6.0 mg/L	10/2/2013	4.86 mg/L	AWW is inconclusive with 1 exceedance in 8 samples (binomial).
pH	6.5 SU	10/2/2013	6.27 SU	AWW, AGL and FBC are inconclusive with 1 exceedance in 8 samples (binomial).

Monitoring Summary

Sampling period: 3/7/2011 - 6/18/2014

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

Metal Samples	Nutrients & Related Samples	Other Samples
(9-16) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(2-16) Ammonia, nitrite/nitrate, nitrogen, phosphate, phosphorus, total Kjeldahl nitrogen	(2-20) Dissolved oxygen, *E. coli*, pH, total dissolved solids, fish tissue mercury

Data Gaps and Monitoring Needs

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

ED_013248_00000578-00016

Priority	Monitoring Recommendations
Low	Collect more pH and dissolved oxygen samples due to the exceedances. Continue sample collection to determine the effectiveness of TMDL load reduction strategies for mercury.

Impairment Discussion
Mercury TMDL completed in 1999. Fish consumption advisory issued in 1995 and still in effect. All three largemouth bass samples collected in this assessment period exceeded the fish tissue mercury standard.

ED_013248_00000578-00017

POTRERO CREEK

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

Category 5
Impaired

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

IMPAIRMENT STATUS

FC - Inconclusive • FBC - Impaired • AGL - Inconclusive
AWW - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	6.0 mg/L	7/28/2010	4.29 mg/L	AWW remains impaired with 5 exceedances in 20 samples (binomial).
		8/25/2010	5.12 mg/L	
		9/29/2010	5.29 mg/L	
		7/27/2011	5.27 mg/L	
		8/31/2011	5.45 mg/L	
E. coli	235 cfu/100 ml	8/25/2010	2400 cfu/100 mL	FBC remains impaired. No data in the last 3 years of monitoring.
SSC	80 mg/L	8/25/2010	110 mg/L	AWW is inconclusive - not enough samples to calculate a median.

Monitoring Summary

Sampling period: 7/28/2010 - 10/4/2013

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

Metal Samples	Nutrients & Related Samples	Other Samples
(3-12) Cadmium, copper	(12) Ammonia	(1-20) Dissolved oxygen, *E. coli*, pH, SSC

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	Zinc (dissolved), *E. coli*, lead, mercury (or mercury in fish tissue)
Missing Seasonal Distribution	Zinc (dissolved), *E. coli*, copper, lead, mercury
Lab Detection Limits Not Low Enough	None

ED_013248_00000578-00018

Priority	Monitoring Recommendations
High	Collect chlorine, dissolved oxygen and *E. coli* samples to support TMDL development.

Impairment Discussion
Remains impaired for chlorine, dissolved oxygen and *E. coli* (2010). No recent data on total residual chlorine and *E. coli*.

ED_013248_00000578-00019

ROSE CANYON LAKE

15050302-1260
7 Acres

Category 5
Impaired

IMPAIRMENT STATUS

Low pH (EPA 2004)

FC - Inconclusive • FBC - Impaired • AGL - Inconclusive
AWC - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
pH	6.5 SU	8/21/2014	6.2 SU	FBC and AWC remain impaired.

Monitoring Summary

Sampling period: 8/21/2014 - 8/21/2014

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT DAM	SCROS-A	100183	ADEQ	TMDL Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(1-2) Arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(1) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1) 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*, copper, lead, mercury
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, copper, lead, mercury
Lab Detection Limits Not Low Enough	Selenium

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

ED_013248_00000578-00020

Impairment Discussion
Remains impaired for low pH (EPA, 2004)

ED_013248_00000578-00021

SABINO CREEK

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

Category 2
Attaining some uses

DWS - Inconclusive • FC - Attaining • FBC - Inconclusive
AGI - Attaining • AWW - Attaining

Use Support

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Arsenic	10 ug/L	8/27/2014	19.4 ug/L	DWS is inconclusive with 1 exceedance in 8 samples (binomial).
Lead	15 ug/L	8/27/2014	72.1 ug/L	DWS and FBC are inconclusive with 1 exceedance in 8 samples (binomial).
Manga-nese	980 ug/L	8/27/2014	1830 ug/L	DWS is inconclusive with 1 exceedance in 8 samples (binomial).

Monitoring Summary

Sampling period: 8/30/2012 - 5/5/2015

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE USGS GAGING STATION	SCSAB005.09	106482	ADEQ	Ambient Monitoring
ABOVE BRIDGE 9	SCSAB007.15	102835	ADEQ	Ambient Monitoring

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

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Arsenic, lead, manganese
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Cadmium (dissolved), copper (dissolved), lead (dissolved), selenium, zinc (dissolved), mercury (dissolved)

Priority	Monitoring Recommendations
Low	Collect more arsenic, lead and manganese samples due to the exceedances.

ED_013248_00000578-00022

SANTA CRUZ RIVER

Canada Del Oro - HUC 15050303
15050301-001
8.634 Miles

Category 5
Impaired

Ammonia (2010)
Add E. coli to the 303(d) list.

IMPAIRMENT STATUS

PBC - Impaired • AWEDW - Not Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Ammonia	2.46 mg/L chronic @ pH 7.2 & temp 26.4 C	11/18/2010	21 mg/L	AWEDW remains not attaining with 11 chronic exceedances and 4 acute exceedances. The exceedance on 8/22/13 was influenced by stormflow, which does not represent chronic conditions.
	2.38 mg/L chronic @ pH 7.8 & temp 18.5 C	2/24/2011	17 mg/L	
	1.36 mg/L chronic @ pH 7.7 & temp 30.0 C	5/12/2011	17 mg/L	
	1.57 mg/L chronic, 10.1 mg/L acute @ pH 7.9 & temp 23.5 C	2/26/2013	17.9 mg/L	
	2.02 mg/L chronic, 11.1 mg/L acute @ pH 7.9 & temp 20.6 C	4/17/2013	12 mg/L	
	1.56 mg/L chronic, 12.1 mg/L acute @ pH 7.8 & temp 25.6 C	5/30/2013	15 mg/L	
	1.21 mg/L chronic, 12.1 mg/L acute @ pH 7.8 & temp 29.5 C	8/22/2013	37.8 mg/L	
	1.75 mg/L chronic @ pH 7.4 & temp > 30 C	9/18/2013	7.89 mg/L	
	1.43 mg/L chronic @ pH 7.9 & temp 24.9 C	11/14/2013	5.78 mg/L	
	2.28 mg/L chronic @ pH 7.6 & temp 22.8 C	1/29/2015	2.5 mg/L	
	1.63 mg/L chronic @ pH 7.8 & temp 24.9 C	2/19/2015	2.64 mg/L	
	1.25 mg/L chronic @ pH 7.8 & temp 29.0 C	5/21/2015	1.62 mg/L	
Chlorine	11 ug/L chronic, 19 ug/L acute	8/20/2013	300 ug/L	AWEDW is inconclusive with 1 exceedance in 14 samples.
E. coli	576 cfu/100 mL	9/8/2010	3629.4 cfu/100 mL	PBC is impaired with 3 exceedances in 26 samples (12% exceedance rate). Exceedances on 9/8/10 and 8/22/13 were storm-related. *Below the screening value (630 cfu/100 mL) - not included in impairment determination.
		5/30/2013	1200 cfu/100 mL	
		8/22/2013	1410 cfu/100 mL	
		4/29/2014	579.4 cfu/100 mL*	

ED_013248_00000578-00023

Parameter	Applicable Standard	Date	Result	Designated use support comments
Selenium	2 ug/L	5/12/2011	2.3 ug/L	AWEDW is inconclusive with 1 exceedance.

Monitoring Summary

Sampling period: 9/8/2010 - 5/26/2015

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT CORTARO, AZ USGS 09486500	SCSCR039.63	100237	ADEQ	Ambient Monitoring
NEAR INA RD WWTP	SCSCR40.94	105061	PCWWM	Data Sharing Partnership
4.6 MILES DOWNSTREAM INA RD WWTP	SCSCR36.50	105064	PCWWM	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(10-42) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(3-32) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(7-32) Chlorine, dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids, organic pollutants

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Chlorine, selenium
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Ammonia, chlorine, copper (dissolved), cyanide, mercury (dissolved), selenium

Priority	Monitoring Recommendations
High	Collect more chlorine and selenium samples due to the exceedances. Continue monitoring for ammonia. Collect more *E. coli* samples for TMDL development. Use a lower reporting limit for chlorine.

Impairment Discussion
Remains not attaining for ammonia (2010). Ina Road WWTP was replaced by Tres Rios Wastewater Reclamation Facility (WRF) in 2013. Post-upgrade data showed improvements of ammonia levels, but there were still three exceedances in this reach in 2015. Pima County Regional Wastewater Reclamation Department is working to reduce nutrient levels at Tres Rios WRF.

ED_013248_00000578-00024

SANTA CRUZ RIVER

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

Category 2
Attaining some uses

Santa Cruz

Use Support

PBC - Attaining • AWEDW - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Ammonia	1.93 mg/L chronic @ pH 7.7 & temp 24.1 C	4/24/2014	1.96 mg/L	AWEDW is inconclusive with only one valid exceedance. The exceedance on 4/24/14 was not used for impairment determination because the magnitude of exceedance was less than 20% of the standard. The exceedance on 2/5/15 was influenced by stormflow, which did not represent chronic conditions.
	2.27 mg/L chronic @ pH 7.6 & temp 23.2 C	2/5/2015	3.91 mg/L	
	0.75 mg/L chronic, 11.1 mg/L acute @ pH 8.3 & temp 25.6 C	4/23/2015	0.91 mg/L	

Monitoring Summary

Sampling period: 1/23/2014 - 4/23/2015

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
NEAR ROGER RD WWTP	SCSCR45.57	105059	PCWWM	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(5-11) Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium	(6) Nitrite/nitrate, phosphorus	(5-6) Dissolved oxygen, *E. coli*, pH, organic pollutants

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Ammonia
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Chlorine, cyanide, mercury (dissolved)

ED_013248_00000578-00025

Priority	Monitoring Recommendations
Medium	Keep monitoring for ammonia. Use a lower reporting limit for chlorine.

Impairment Discussion
Remove ammonia (2010) from the 4B list. The Roger Road wastewater treatment plant was replaced by Agua Nueva Wastewater Reclamation Facility (WRF) in 2013. The new facility has been fully operational since 12/17/13.

ED_013248_00000578-00026

SANTA CRUZ RIVER

HUC 15050303 Boundary - Baumgartner Road
15050303-005A
24.5 Miles

Category 2
Attaining some uses

Use Support

PBC - Inconclusive • AWEDW - Attaining

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Ammonia	3.18 mg/L chronic @ pH 7.8 & temp 11.5 C	2/26/2013	11.5 mg/L	AWEDW is attaining. Ina Road WWTP was replaced by Tres Rios Wastewater Reclamation Facility (WRF) in 2013. There were no exceedances in the post-upgrade data.
	1.47 mg/L chronic, 17 mg/L acute @ pH 7.6 & temp > 30 C	8/21/2013	36.7 mg/L	
E. coli	576 cfu/100 mL	8/21/2013	5910 cfu/100 mL	PBC is inconclusive with one exceedance. Note: The exceedance was storm-related.
Lead	15 ug/L	8/21/2013	124 ug/L	PBC is attaining with 1 exceedance in 11 sample.
Selenium	2 ug/L	8/21/2013	5.58 ug/L	AWEDW is attaining. The exceedance was storm-related and does not represent chronic conditions. The value estimated below MRL.

Monitoring Summary

Sampling period: 2/26/2013 - 5/20/2015

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
PIMA COUNTY WATER QUALITY SITE SC-09	SCSCR030.70	111155	PCWWM	Data Sharing Partnership
SOUTH OF THE TOWN OF MARANA	SCSCR28.41	105068	PCWWM	Data Sharing Partnership
NEAR TRICO RD	SCSCR23.24	105070	PCWWM	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(10-21) Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel selenium, silver, thallium, zinc	(1-11) Nitrate, nitrite, nitrite/nitrate, phosphate, phosphorus, total Kjeldahl nitrogen	(10-11) Dissolved oxygen, *E. coli*, pH, organic pollutants

ED_013248_00000578-00027

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Medium	Collect more E. coli samples due to the exceedance. Keep monitoring for ammonia. Use a lower reporting limit for chlorine.

Impairment Discussion
Remove dissolved copper (2010) from the 4B list. Ina Road WWTP was replaced by Tres Rios Wastewater Reclamation Facility (WRF) in 2013. There were no copper exceedances in the post-upgrade water quality data.

ED_013248_00000578-00028

SANTA CRUZ RIVER

Josephine Canyon - Tubac Bridge
15050301-008A
4.788 Miles

Category 5
Impaired

Ammonia and E. coli (2010)

IMPAIRMENT STATUS

PBC - Impaired • AGL - Attaining • AWEDW - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Chlorine	11 ug/L chronic	8/10/2010	50 ug/L	AWEDW is inconclusive. The exceedance on 8/10/10 is questionable - free chlorine was much greater than total residual chlorine. No new data since 2011.
		2/23/2011	29 ug/L	
E. coli	576 cfu/100 mL SSM, 126 cfu/100 mL Geometric mean	7/13/2010	47000 cfu/100 mL	PBC remains impaired with 3 single sample exceedances in the last 3 years of monitoring and 2 geometric mean exceedances in the assessment period.
		7/20/2010	200000 cfu/100 mL	
		7/29/2010	210000 cfu/100 mL	
		8/12/2010	11645.5 cfu/100 mL	
		8/18/2010	35000 cfu/100 mL	
		8/25/2010	71000 cfu/100 mL	
		8/31/2010	1700 cfu/100 mL	
		10/14/2010	3629.4 cfu/100 mL	
		9/13/2011	23000 cfu/100 mL	
		8/14/2012	1755.33 cfu/100 mL	
		9/24/2014	3629.4 cfu/100 mL	
		6/10/2015	3629.4 cfu/100 mL	
		7/1/2010 - 7/29/2010	26712 cfu/100 mL	
		8/4/2010 - 8/31/2010	5090 cfu/100 mL	
Lead	15 ug/L	5/9/2012	42 ug/L	PBC is attaining with 1 exceedance in 12 samples (binomial).
Lead (dissolved)	6.151 ug/L chronic @ 230 mg/L hardness	5/9/2012	40 ug/L	AWEDW is inconclusive with 1 exceedance in 14 samples.

ED_013248_00000578-00029

Monitoring Summary

Sampling period: 7/1/2010 - 4/7/2015

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT SANTA GERTRUDIS LANE	SCSCR103.45	100247	ADEQ, International Boundary and Water Commission	Ambient Monitoring, Permit Monitoring
TUBAC 2	SCSCR100.32	107643	Sonoran Institute	Data Sharing Partnership
AT TUBAC, AZ USGS 09481740	SCSCR103.39	101002	USGS	Data Sharing Partnership
TUMACACORI EDUCATION	SCSCR103.39	106121	NPS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(2-20) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(3-18) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(3-53) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect more samples to support TMDL development. Keep monitoring for ammonia, total chlorine and dissolved lead.

Impairment Discussion
Remains impaired for ammonia and *E. coli*. Although there were no ammonia exceedances in 17 samples, additional monitoring is recommended during hot summer months to ensure attainment.

ED_013248_00000578-00030

SANTA CRUZ RIVER

Mexican border - Nogales WWTP
15050301-010
16.981 Miles

Category 3
Inconclusive

DWS - Inconclusive • FC - Inconclusive • FBC - Inconclusive
AGI - Inconclusive • AGL - Inconclusive • AWW - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	6.0 mg/L	8/25/2010	5 mg/L	AWW is inconclusive with 1 exceedance in 6 samples (binomial).
E. coli	235 cfu/100 ml	8/25/2010	2000 cfu/100 mL	FBC is inconclusive with 1 exceedance outside the assessment window (last 3 years of monitoring).

Monitoring Summary

Sampling period: 8/25/2010 - 8/31/2013

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT JOHNSON'S RANCH	SCSCR128.54	105698	Friends of the Santa Cruz	Data Sharing Partnership
NEAR NOGALES INTERNATIONAL WWTP	SCSCR114.68	103646	USGS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(1-4) Arsenic, cadmium, copper, lead, selenium, zinc	(1-4) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-7) Dissolved oxygen, *E. coli*, pH

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	Dissolved oxygen, *E. coli*
Missing Core Parameters	Zinc (dissolved), *E. coli*, nitrite/nitrate, fluoride, arsenic, chromium, lead, boron, manganese, copper, lead, mercury (or mercury in fish tissue)
Missing Seasonal Distribution	Zinc (dissolved), cadmium (dissolved), copper (dissolved), *E. coli*, nitrite/nitrate, fluoride, arsenic, chromium, lead, boron, manganese, copper, lead, mercury
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Low	Collect more dissolved oxygen and *E. coli* samples due to the exceedances. Collect core parameters to represent at least 3 seasons during an assessment period.

ED_013248_00000578-00031

SANTA CRUZ RIVER

Nogales WWTP - Josephine Canyon
15050301-009
9.112 Miles

Category 5
Impaired

IMPAIRMENT STATUS

E. coli (2012/14)

PBC - Impaired • AGL - Inconclusive • AWEDW - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
E. coli	576 cfu/100 mL	8/25/2010	2400 cfu/100 mL	PBC remains impaired with 2 new exceedances in the last 3 years of monitoring.
		9/24/2014	3629.4 cfu/100 mL	
		6/10/2015	3629.4 cfu/100 mL	
Nickel (dissolved)	83 ug/L chronic @ 174 mg/L hardness	6/10/2015	100 ug/L	AWEDW is inconclusive with 1 exceedance.

Monitoring Summary

Sampling period: 7/28/2010 - 6/17/2015

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT RIO RICO	SCSCR111.66	100238	Friends of the Santa Cruz, International Boundary and Water Commission	Permit Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(1-17) Arsenic, cadmium, chromium, copper, lead, nickel, selenium, zinc	(2-16) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-24) Dissolved oxygen, *E. coli*, pH, SSC

Data Gaps and Monitoring Needs

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

ED_013248_00000578-00032

Priority	Monitoring Recommendations
High	Collect more *E. coli* samples in support of TMDL development. Collect additional dissolved nickel samples due to the exceedance. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
Reach remains impaired for *E. coli*. Delist cadmium from the 303(d) list - there were no exceedances of dissolved cadmium in 13 samples collected during the assessment period. Remove total residual chlorine (TRC) and ammonia from the 4B list. For ammonia, there were 13 ambient samples with good seasonal distribution including summer months, and no exceedances. For TRC, there were no ambient data, but DMR data for Outfall 001 (only discharge point) showed no exceedances. Routine discharge monitoring for TRC is no longer required since the plant uses UV disinfection system and use chlorination/dechlorination as backup only.

ED_013248_00000578-00033

SANTA CRUZ RIVER

Tubac Bridge - Sopori Wash
15050301-008B
8.947 Miles

Category 5
Impaired

IMPAIRMENT STATUS

Add E. coli to the 303(d) list.

PBC - Impaired • AGL - Inconclusive • AWE - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
E. coli	576 cfu/100 mL	8/25/2010	2400 cfu/100 mL	PBC is impaired. See Impairment Discussion below.
		9/8/2010	1046.2 cfu/100 mL	

Monitoring Summary

Sampling period: 7/20/2010 - 9/18/2013

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
NORTH OF CHAVES SIDING ROAD	SCSCR096.72	100244	ADEQ	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(1-9) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(1-11) Ammonia, nitrate, nitrite, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-24) Dissolved oxygen, *E. coli*, pH, SSC, simazine, total dissolved solids

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect more *E. Coli* samples in support of TMDL development. Collect core parameters to represent at least 3 seasons during an assessment period.

Add *E. coli* to the 303(d) list. Although the reach does not meet a minimum sample requirement for storm-related *E. coli* impairment (a minimum of 10 samples in the assessment period), the reach is listed based on a weight-of-evidence approach. *E. coli* is identified as a prevalent water quality issue throughout the Upper Santa Cruz watershed above this reach. The Santa Cruz River reaches immediately above this reach (15050301-008A and 15050301-009) are already impaired for *E. coli*.

ED_013248_00000578-00035

SONOITA CREEK

1600 Feet Below Patagonia Wwtp - Patagonia Lake
15050301-013C
9.03 Miles

Category 5
Impaired

IMPAIRMENT STATUS

Zinc (2004) and low dissolved oxygen (1998)

FC - Inconclusive • FBC - Inconclusive • AGI - Inconclusive
AGL - Inconclusive • AWW - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Zinc (dissolved)	379 ug/L @ 400 mg/L hardness	12/5/2012	620 ug/L	AWW remains impaired with 1 exceedance in 7 samples.
Bottom deposits	< 50% fines	4/17/2012	53%	AWW is inconclusive. Impairment decisions cannot be made until the Impaired Waters Identification Rule is updated.
		4/18/2013	56%	

Monitoring Summary

Sampling period: 9/8/2010 - 4/18/2013

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
UPSTREAM END TNC PRESERVE, ABOVE TEMPORAL GULCH	SCSON016.78	100320	ADEQ	Ambient Monitoring
BELOW ALUM CANYON	SCSON015.35	100257	ADEQ	Ambient Monitoring
UPSTREAM OF ALUM GULCH	SCSON015.51	109405	ADEQ	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(7-8) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(9) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(2-9) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids, biocriteria, bottom deposits

Data Gaps and Monitoring Needs

Parameters Needing More Samples to Assess	Biocriteria, bottom deposits
Missing Core Parameters	None
Missing Seasonal Distribution	None
Lab Detection Limits Not Low Enough	Selenium, mercury (dissolved)

ED_013248_00000578-00036

Priority	Monitoring Recommendations
High	Collect more zinc and dissolved oxygen samples to support TMDL development. There were two bottom deposits standard violations, but impairment decisions cannot be made until the Impaired Waters Identification Rule is updated. There were two inconclusive IBI scores for biocriteria (46 on 4/17/12 and 47 on 4/18/13). Collect more macroinvertebrate samples to verify the IBI score.

Impairment Discussion
Remains impaired for Zinc (2004) and low dissolved oxygen (1998). Although there were no dissolved oxygen exceedances in 8 samples, a minimum of 10 samples is required to delist.

ED_013248_00000578-00037

SONOITA CREEK

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

Category 3
Inconclusive

PBC - Inconclusive • AGL - Inconclusive
AWEDW - Inconclusive

UseSupport

No Exceedances

Monitoring Summary

Sampling period: 11/10/2010 - 2/23/2011

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

Metal Samples	Nutrients & Related Samples	Other Samples
(2) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(2) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(2) Dissolved oxygen, *E. coli*, 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*, 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
Low	Attaining all uses in the 2012/14 assessment. Collect core parameters to represent at least 3 seasons during an assessment period.

ED_013248_00000578-00038

THREE R CANYON

Headwaters - 312819 / 1104556
15050301-558A
2.3 Miles

Category 4A
Not attaining

Santa Cruz

IMPAIRMENT STATUS

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

AWE - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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.

ED_013248_00000578-00039

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 STATUS

AWW - Not Attaining • AGL - Not Attaining
FBC - Not Attaining • FC - Inconclusive

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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

Santa Cruz

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

IMPAIRMENT STATUS

AWE - Not Attaining • AGL - Not Attaining
PBC - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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.

ED_013248_00000578-00041

UNNAMED TRIB (UA2) TO ALUM GULCH

Headwaters - Alum Gulch
15050301-641
0.3 Miles

Category 4A
Not Attaining

IMPAIRMENT

Zinc and copper (2012)

STATUS

PBC - Inconclusive • AWE - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Medium	Collect more dissolved copper, zinc and pH samples to monitor effectiveness of remediation at mine sites.

Impairment Discussion
This reach is in the same general area covered by Alum Gulch TMDL.

UNNAMED TRIB TO COX GULCH

Headwaters - Cox Gulch
15050301-890
1 Mile

Category 4A
Not Attaining

Santa Cruz

IMPAIRMENT STATUS

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

AWE - Not Attaining • PBC - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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.

ED_013248_00000578-00043

UNNAMED TRIB TO HARSHAW CREEK

Headwaters - Harshaw Creek
15050301-888
2 Miles

Category 4A
Not Attaining

IMPAIRMENT

Copper and pH (1992)

STATUS

AWE - Not Attaining • PBC - Not Attaining

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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.

ED_013248_00000578-00044

UNNAMED TRIB TO THREE R CANYON

Headwaters - Three R Canyon
15050301-889
2 Miles

Category 4A
Not Attaining

Status

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

IMPAIRMENT

AWE - Not Attaining • PBC - Not Attaining

STATUS

No Exceedances

Monitoring Summary

Sampling period: No samples

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
N/A				

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(0) None

Data Gaps and Monitoring Needs

Exceedances Needing More Samples to Assess	None
Missing Core Parameters	All core parameters
Missing Seasonal Distribution	All core parameters
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.

ED_013248_00000578-00045