Colorado – Grand Canyon Watershed

Watershed Description

This watershed is defined by the Colorado River drainage area, beginning in Arizona at Lake Powell, through the Grand Canyon National Park, to Hoover Dam at Lake Mead. It does not include the Little Colorado River drainage. The watershed contains spectacular incised canyons formed by erosion of sandstone formations, as well as volcanically formed mountains and high plateaus.

Land ownership is divided approximately as: 57% federal, 22% tribal, 13% private, and 8% state. Most of the 17,110 square miles in this watershed are sparsely populated, with an approximate population of 67,500 people (2000 census). The largest communities are Kingman and Williams. Land use is primarily open grazing, recreation, and silviculture (forestry), with scattered mining districts. The Grand Canyon National Park, Kaibab National Forest, Lake Mead National Recreation Area, and Glen Canyon National Recreation Area are all located within this watershed and all have restricted land uses to protect natural resources. These federal lands also draw a large number of tourists and recreationists.

Elevations range from 1,000 feet (above sea level) along the Colorado River to 10,400 feet near Flagstaff. The majority of the watershed is between 5,000-7,000 feet elevation, with high desert fauna and flora, including coldwater aquatic communities where perennial waters exist.

Water Resources

Precipitation varies from 10-15 inches a year, including about 1 inch of snowfall per year in higher elevations. Excluding the Colorado River and its reservoirs (Lake Powell and Lake Mead), surface water is sparse.

An estimate of surface water resources in the Colorado – Grand Canyon 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 Colorado – Grand Canyon Watershed

	Perennial	Intermittent	Ephemeral
Stream miles	480	260	14,870
	Perennial	Non-perennial	
Lake acres	68,400	13,415	

Additional Estimated Water Resources on Tribal Lands – Not Assessed

	Perennial	Intermittent	Ephemeral
Stream miles	125	5	3,740
	Perennial	Non-perennial	
Lake acres	390	0	

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 Colorado – Grand Canyon Watershed can be separated into the following drainage areas in Arizona:

14070006	Lake Powell
14070007	Paria River
15010001	Marble Canyon
15010002	Grand Canyon
15010003	Kanab Creek
15010004	Havasu Creek
15010005	Lake Mead
15010006	Grand Wash
15010007	Red Lake
15010009	Fort Pearce Wash
15010010	Virgin River
15010014	Detrital Wash

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.

CATARACT LAKE

15010004-0280
38 Acres

Category 3
Inconclusive

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

No Exceedances

Monitoring Summary

Sampling period: 6/30/2012 - 9/30/2012

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT DAM	CGCAT-A	100015	USFS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(2) 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*, nitrite/nitrate, fluorine, arsenic, chromium, copper, lead, mercury (or mercury in fish tissue)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, nitrite/nitrate, fluorine, arsenic, chromium, copper, lead, mercury
Lab Detection Limits Not Low Enough	None

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

COLORADO RIVER

Glen Canyon Dam - Lees Ferry
14070006-001
16.9 Miles

Category 1
Attaining all uses

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	7.0 mg/L	6/19/2013	6.8 mg/L	AWC is attaining with 2 exceedances in 37 samples (binomial).
		10/6/2014	6.8 mg/L	
SSC	25 mg/L	11/11/2014	86 mg/L	AWC is attaining with no median exceedance.

Monitoring Summary

Sampling period: 8/23/2010 - 12/8/2014

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT LEES FERRY, AZ USGS 09380000	CGCLR698.93	100743	USGS	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(3-17) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(14-38) Nitrate, nitrite, nitrite/nitrate, nitrogen, phosphate, phosphorus, total Kjeldahl nitrogen	(7-38) 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	None

Priority	Monitoring Recommendations
Low	Good core parameter and seasonal coverage. Keep monitoring for selenium. Although there were no total selenium exceedances, there were 4 dissolved selenium exceedances in 31 samples. Only 9 samples had both total and dissolved fractions reported, and all of them had the dissolved fraction grater than the total result.

Colorado - Grand Canyon

COLORADO RIVER

Unnamed Trib @ 360554.796/1120435.253 - Bright Angel Creek
15010001-001
1.06 Miles

Category 3
Inconclusive

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
SSC	25 mg/L	8/20/2014	933 mg/L	AWC is inconclusive. Not enough samples calculate a median.

Monitoring Summary

Sampling period: 8/20/2014 - 8/20/2014

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
NEAR GRAND CANYON, AZ USGS 09402500	CGCLR610.88	101481	USGS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(1) Nitrite_nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1) 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), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, nitrite/nitrate, fluorine, arsenic, chromium, boron, manganese, copper, lead, mercury
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, nitrite/nitrate, fluorine, arsenic, chromium, boron, manganese, copper, lead, mercury
Lab Detection Limits Not Low Enough	None

Priority	Monitoring Recommendations
Medium	Collect more suspended sediment samples due to the exceedance. Collect core parameters to represent at least 3 seasons during an assessment period.

COLORADO RIVER

Parashant Canyon - Diamond Creek
15010002-003
27.621 Miles

Category 5
Impaired

Selenium and SSC (2004)

IMPAIRMENT STATUS

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Arsenic	10 ug/L	11/21/2012	10.7 ug/L	DWS is inconclusive with 1 exceedance in 5 samples (binomial).
Dissolved oxygen	7.0 mg/L	5/23/2012	2.1 mg/L	AWC is inconclusive with 2 exceedances in 6 samples (binomial).
		7/23/2012	2.1 mg/L	
Lead	15 ug/L	11/21/2012	19.4 ug/L	DWS and FBC are inconclusive with 2 exceedances in 5 samples (binomial).
		8/25/2014	16.4 ug/L	
SSC	25 mg/L	8/25/2014	1420 mg/L	AWC remains impaired. Not enough samples to calculate a median.
		11/3/2014	62 mg/L	

Monitoring Summary

Sampling period: 1/24/2012 - 11/3/2014

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE DIAMOND CREEK USGS 09404200	CGCLR473.00	101483	USGS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(2-6) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc	(4-6) Nitrate, nitrite, nitrite/ nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(2-6) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect samples to support development of suspended sediment and selenium TMDLs. Collect more arsenic, lead and dissolved oxygen samples due to the exceedances.

Impairment Discussion
Reach remains impaired for suspended sediment due to insufficient data to assess. There were no selenium exceedances in 5 samples collected in this assessment period.

Colorado - Grand Canyon

DOGTOWN RESERVOIR

15010004-0480
70 Acres

Category 3
Inconclusive

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

No Exceedances

Monitoring Summary

Sampling period: 6/30/2012 - 9/30/2012

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT BOAT RAMP	CGDOG-BR	101319	USFS	Data Sharing Partnership
AT DAM	CGDOG-A	100019	USFS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(4) pH

Data Gaps and Monitoring Needs

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

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

HAVASU CREEK

Unnamed Trib @ 36°18'02"/112°45'14" - Colorado River
15010004-001B
0.87 Miles

Category 3
Inconclusive

FC - Inconclusive • FBC - Inconclusive • AWW - Inconclusive

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Selenium (dissolved)	2 ug/L	8/28/2012	2.2 ug/L	AWW is inconclusive with 1 chronic exceedance in 5 dissolved samples. Two total selenium samples did not have exceedances.

Monitoring Summary

Sampling period: 10/3/2010 - 10/15/2012

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE COLORADO RIVER USGS 09404115	CGHAV000.36	100568	USGS	Ambient Monitoring

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

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Low	Collect more selenium samples due to the exceedance.

Colorado - Grand Canyon

KAIBAB LAKE

15010004-0710
61 Acres

Category 3
Inconclusive

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

No Exceedances

Monitoring Summary

Sampling period: 6/30/2012 - 9/30/2012

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT DAM	CGKAI-A	100027	USFS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(0) None	(2) 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*, nitrite/nitrate, fluorine, arsenic, chromium, boron, manganese, copper, lead, mercury (or mercury in fish tissue)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, nitrite/nitrate, fluorine, arsenic, chromium, boron, manganese, copper, lead, mercury
Lab Detection Limits Not Low Enough	None

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

KANAB CREEK

Johnson Wash - Jacob Canyon
15010003-013
4.238 Miles

Category 3
Inconclusive

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

No Exceedances

Monitoring Summary

Sampling period: 10/8/2010 - 10/8/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
NEAR FREDONIA, AZ	CGKAN057.62	101829	USGS	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(1) Manganese	(1) Nitrate, nitrite, nitrite/ nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1) 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*, nitrite/nitrate, fluorine, arsenic, chromium, lead, copper, mercury (or mercury in fish tissue)
Missing Seasonal Distribution	Zinc (dissolved), dissolved oxygen, pH, cadmium (dissolved), copper (dissolved), *E. coli*, nitrite/nitrate, fluorine, arsenic, chromium, lead, copper, mercury
Lab Detection Limits Not Low Enough	None

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

KANAB CREEK

Jump - up Canyon - Colorado River
15010003-001
12.769 Miles

Category 5
Impaired

Add selenium to the 303(d) list.

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Selenium	2 ug/L	8/27/2012	2.09 ug/L	AWW is impaired with 2 exceedances in 2 samples.
		10/13/2012	2.75 ug/L	

Monitoring Summary

Sampling period: 10/5/2010 - 10/13/2012

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
ABOVE COLORADO RIVER	CGKAN000.26	100577	USGS	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(2-4) Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, zinc	(3-6) Nitrate, nitrite, nitrite/ nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-7) Dissolved oxygen, pH

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect more selenium samples in support of TMDL development.

Impairment Discussion
Add selenium to the 303(d) list. Reach is impaired for selenium with 2 chronic exceedances in 2 samples. There were also 8 dissolved selenium samples, of which 4 samples exceeded the chronic criterion.

Colorado - Grand Canyon

LAKE POWELL

14070006-1130
9770 Acres

Category 5
Impaired

IMPAIRMENT STATUS

EPA mercury in fish tissue (2010)

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Dissolved oxygen	7.0 mg/L	7/15/2010	5.2 mg/L	AWC is inconclusive with 1 exceedance in 1 sample.

Monitoring Summary

Sampling period: 7/13/2010 - 7/15/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT STATE LINE	CGPOW-STATE	102973	USGS	Ambient Monitoring
AT LONE ROCK BEACH	CGPOW-LONER	102974	USGS	Ambient Monitoring
AT WARM CREEK BAY	CGPOW-WARM	102976	USGS	Ambient Monitoring
AT ANTELOPE MARINA	CGPOW-ANTEL	102956	USGS	Ambient Monitoring
AT DANGLING ROPE MARINA	CGPOW-DANGL	102978	USGS	Ambient Monitoring
AT RAINBOW BRIDGE	CGPOW-RAINB	102977	USGS	Ambient Monitoring
AT SAN JUAN RIVER INFLOW	CGPOW-JUAN	102979	USGS	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(8) Nitrite, ammonia	(8) Dissolved oxygen

Data Gaps and Monitoring Needs

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

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

Impairment Discussion
EPA overfile for mercury in fish tissue. Fish consumption advisory issued in 2012 and still in effect.

Colorado - Grand Canyon

PARIA RIVER

Paria River, Utah border - Colorado River
14070007-123
29.426 Miles

Category 5
Impaired

SSC (2004) and E. coli (2006/8).
Add selenium to the 303(d) list.

IMPAIRMENT STATUS

FC - Inconclusive • FBC - Impaired • AWW - Impaired

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Arsenic	30 ug/L (FBC) & 80 ug/L (FC)	8/28/2012	170 ug/L	FBC and FC are inconclusive with 1 exceedance in 4 samples (binomial).
Chromium	100 ug/L	8/28/2012	640 ug/L	FBC is inconclusive with 1 exceedance in 4 samples (binomial).
Dissolved oxygen	6.0 mg/L	8/22/2012	5.8 mg/L	AWW is attaining with 1 exceedance in 13 samples (binomial).
E. coli	235 cfu/100 mL	8/28/2012	22298 cfu/100 mL	FBC remains impaired with 1 exceedance.
Lead	15 ug/L	8/28/2012	300 ug/L	FBC is inconclusive with 1 exceedance in 4 samples (binomial).
SSC	80 mg/L	8/28/2012	43000 mg/L	AWW remains impaired with 1 median exceedance.
		12/12/2012	220 mg/L	
		2/26/2013	540 mg/L	
		4/24/2013	150 mg/L	
Selenium	2 ug/L	8/28/2012	30 ug/L	AWW is impaired with 2 exceedances in 3 samples.
		2/26/2013	4.4 ug/L	
Bottom deposits	< 50% fines	4/24/2013	60%	AWW is inconclusive with 1 exceedance.
Biocriteria	IBI ≥ 50 attaining IBI 40 - 49 inconclusive IBI ≤ 39 violating	4/24/2013	IBI 25	AWW is inconclusive with 1 violation.

Monitoring Summary

Sampling period: 8/23/2010 - 8/31/2013

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT LEES FERRY, AZ USGS 09382000	CGPAR000.49	101073	ADEQ	Ambient Monitoring
AT LEES FERRY, AZ	CGPAR001.23	101447	USGS	Ambient Monitoring

Metal Samples	Nutrients & Related Samples	Other Samples
(4) Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, zinc	(3-4) Ammonia, nitrite/nitrate, nitrogen, phosphorus, total Kjeldahl nitrogen	(1-21) Dissolved oxygen, *E. coli*, pH, SSC, total dissolved solids, bottom deposits, biocriteria

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect arsenic, chromium and lead samples due to the exceedances. Collect verification samples for bottom deposits and biocriteria. Collect additional *E. coli* and suspended sediment samples to support TMDL development. Use a lower lab reporting limit for selenium.

Impairment Discussion
Reach remains impaired for *E. coli* (2006) and suspended sediment (2004) due to additional exceedances. Add selenium to the 303(d) list - there were two new A&W chronic exceedances in this assessment period.

Colorado - Grand Canyon

VIRGIN RIVER

Beaver Dam Wash - Sand Hollow Wash
15010010-003
8.56 Miles

Category 5
Impaired

E. coli (2010), SSC and selenium (2004)

IMPAIRMENT STATUS

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
E. coli	235 cfu/100 mL	4/28/2014	350 cfu/100 mL	FBC remains impaired with 1 exceedance in the last 3 years of assessment.
Selenium (dissolved)	2 ug/L	4/28/2014	2.2 ug/L	AWW remains impaired with 2 chronic exceedances. No total selenium was collected.
		7/30/2014	2.3 ug/L	

Monitoring Summary

Sampling period: 4/28/2014 - 11/6/2014

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT LITTLEFIELD, AZ USGS 09415000	CGVGR038.80	101836	USGS	Data Sharing Partnership

Metal Samples	Nutrients & Related Samples	Other Samples
(0) None	(3) Nitrate, nitrite, nitrite/ nitrate, nitrogen, phosphate, phosphorus, total Kjeldahl nitrogen	(1-3) Dissolved oxygen, *E. coli*, pH, simazine, total dissolved solids

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect samples to support development of selenium, suspended sediment and *E. coli* TMDLs. Collect core parameters to represent at least 3 seasons during an assessment period.

Impairment Discussion
Reach remains impaired for SSC (2004), selenium (2004) and *E. coli* (2010) with additional *E. coli* and selenium exceedances. No new data on SSC.

Colorado - Grand Canyon

VIRGIN RIVER

Black Rock Gulch - Sullivans Canyon
15010010-006
10.282 Miles

Category 3
Inconclusive

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Bottom deposits	< 50% fines	2/26/2013	70%	AWW is inconclusive with 1 exceedance.

Monitoring Summary

Sampling period: 7/21/2010 - 7/21/2010

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
BELOW I-15 REST STOP	CGVGR051.33	101834	USGS	Ambient Monitoring
AT REST STOP	CGVGR052.23	100679	ADEQ	Ambient Monitoring

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

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
Medium	Collect a verification sample for bottom deposits. There were also *E. coli*, selenium and bottom deposits exceedances in the previous (2012/14) assessment.

VIRGIN RIVER

Sullivans Canyon - Beaver Dam Wash
15010010-004
9.734 Miles

Category 5
Impaired

Selenium (2012)

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

Exceedances

Parameter	Applicable Standard	Date	Result	Designated use support comments
Boron	1000 ug/L	9/27/2012	1100 ug/L	AGI is inconclusive with 2 exceedances in 4 samples (binomial).
		4/24/2013	1100 ug/L	
SSC	80 mg/L	9/27/2012	130 mg/L	AWW is inconclusive with 1 median exceedance.
		12/13/2012	680 mg/L	
Selenium	2 ug/L	9/27/2012	3.4 ug/L	AWW remains impaired with 2 new exceedances in this assessment period.
		2/26/2013	3.05 ug/L	
Biocriteria	IBI ≥ 50 attaining IBI 40 - 49 inconclusive IBI ≤ 39 violating	4/24/2013	IBI 29	AWW is inconclusive with 1 violation.
Bottom deposits	< 50% fines	4/24/2013	57%	AWW is inconclusive with 1 exceedance.

Monitoring Summary

Sampling period: 9/27/2012 - 4/24/2013

Site Name(s)	Site ID #	DEQ #	Sampling Agency	Purpose
AT MOUTH OF NARROWS	CGVGR044.58	101835	ADEQ	Ambient Monitoring

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

Colorado - Grand Canyon

Data Gaps and Monitoring Needs

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

Priority	Monitoring Recommendations
High	Collect selenium samples to support TMDL development. Collect more boron, suspended sediment, bottom deposits and biocriteria samples due to the exceedances. Use a lower reporting limit for selenium.

Impairment Discussion
Reach remains impaired for selenium with additional exceedances.