



Water Quality Monitoring in City of Rocks National Reserve (CIRO) - Main Stem Circle Creek

Importance

Freshwater habitats are diverse and productive ecosystems, providing habitat for aquatic plant, invertebrate, and vertebrate species including many fishes and birds. Rivers and streams are intimately connected to riparian zones, providing habitat for many specialist species. Additionally, most upland animals rely on aquatic habitats to one degree or another.

Water resources in the semi-arid west have been strongly affected by human activity, and many Upper Columbia Basin Network (UCBN) streams and rivers are listed by states as impaired for one or more parameters. Most UCBN waterbodies and many aquatic resources, such as migratory fish, are strongly influenced by activities in the larger watersheds outside park boundaries. Understanding the current status of freshwater ecosystems will help guide management and restoration efforts and provide insight into ecosystem change in a landscape with shifting climate and dynamic human influences.



Main Stem Circle Creek near water quality monitoring station, June 2009.

Status of Main Stem Circle Creek in City of Rocks National Reserve (CIRO)

Threats to water resources in CIRO have been listed as: ranching and grazing activities; residential development; gas, oil and mining operations; and recreational use. In June 2012, the Inventory and Monitoring Program measured 5 core water chemistry parameters in Main Stem Circle Creek including: dissolved oxygen, pH, specific conductance, temperature, and turbidity. Each parameter was evaluated every 30 minutes for 24 hours using a continuous water quality monitor. In addition, aquatic macroinvertebrates were collected according to United States Forest Service (USFS) - PACFISH/INFISH Biological Opinion Effectiveness Monitoring (PIBO-EM) Program protocol. For more on macroinvertebrates please see the integrated water quality annual report for CIRO on the UCBN website listed below.

Results indicate that all core parameters were within acceptable ranges relative to Idaho cold water aquatic life criteria. The following table is a basic summary of findings from 2012 monitoring. Note that Main Stem Circle Creek is an “undesignated surface water” and therefore should meet the state thresholds for cold water aquatic life shown in the table below.

UCBN water quality monitoring is conducted on a 3 year rotating panel. Main Stem Circle Creek will be sampled for water chemistry and macroinvertebrates again in 2015. For information about other streams within CIRO please refer to the 2012 annual report found on the website below.

Main Stem Circle Creek Water Chemistry Summary for 24 hour period 16-17 June 2012

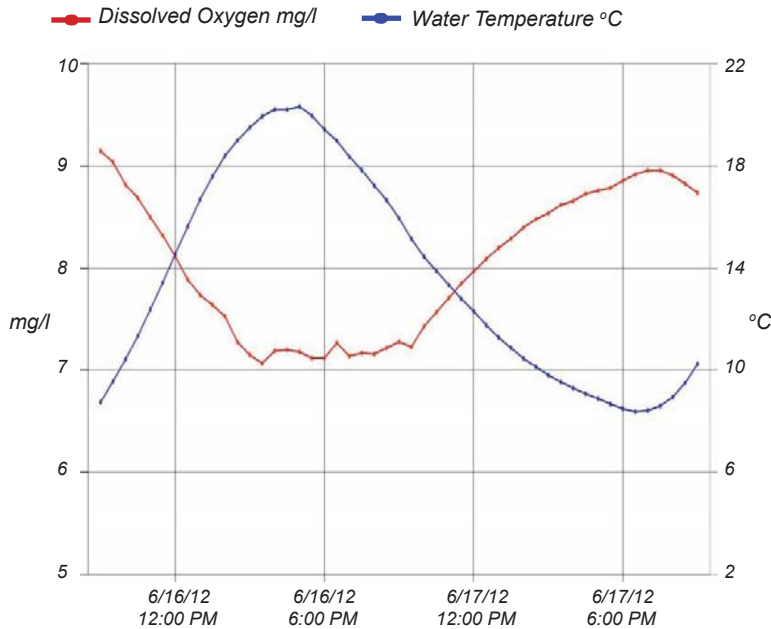
Measure	Current Condition (16-17 June, 2012)	State DEQ Thresholds ^a	% Exceedance ^b
Temperature (*MDMT, **MDAT)	*MDMT=20.34 °C **MDAT=16.14 °C	*MDMT=22 °C **MDAT=19 °C	0% 0%
Specific Conductance (mean)	432.14 µS/cm	N/A	N/A
Dissolved Oxygen (mean daily min)	7.52 mg/L	>6.0 mg/L	0%
pH (mean daily max)	8.32 pH Units	9.0 pH Units, Max	0%
pH (mean daily min)	8.25 pH Units	6.5 pH Units, Min	
Turbidity (mean daily max)	<0.2 NTU	< 50 NTU over background (instantaneous) < 25 for 10 consecutive days	Insufficient data

*MDMT – Maximum Daily Maximum Temperature, **MDAT – Maximum Daily Average Temperature, ^a Criteria for cold water aquatic life designation, ^b Proportion of samples above water quality standard (Note that % exceedance indicated is based on 24 hours of data).



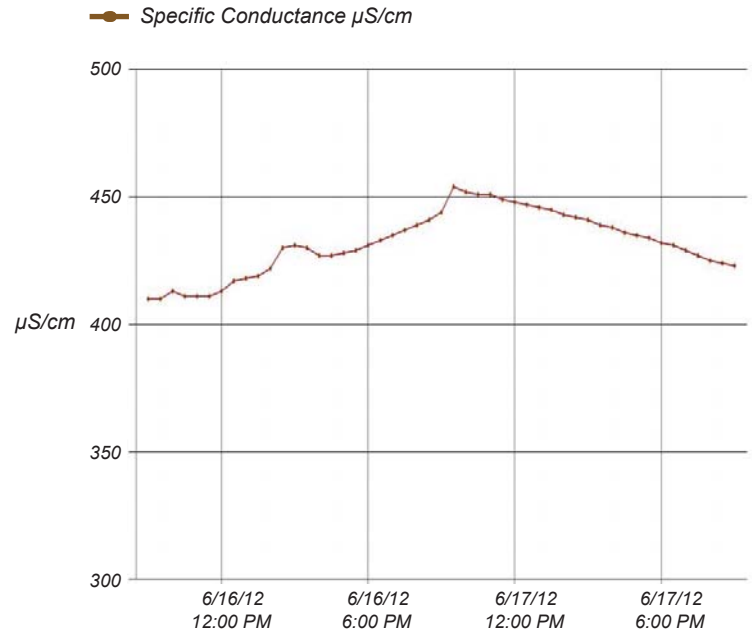
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**Corrected Dissolved Oxygen and Water Temperature,
Main Stem Circle Creek, June 16-17, 2012**



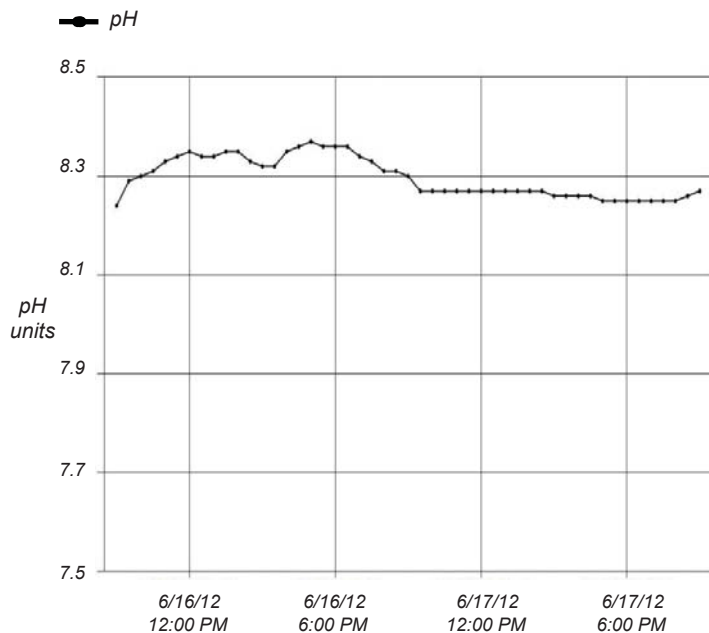
Note that temperature never exceeded the regulatory threshold daily maximum of 22 °C. In addition, daily minimum dissolved oxygen was never below the recommended threshold (6.0 mg/L).

**Corrected Specific Conductance,
Main Stem Circle Creek, June 16-17, 2012**



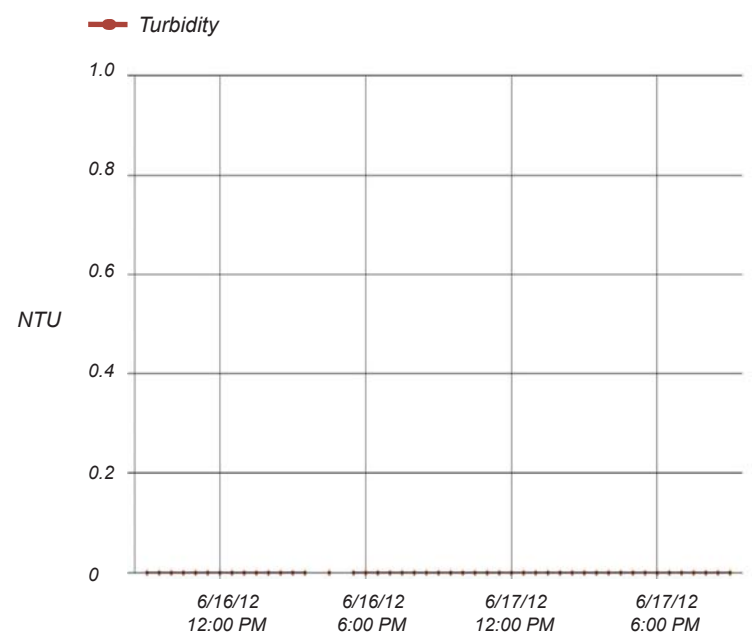
The mean specific conductance was 432.14 µS/cm. There is no established threshold for specific conductance.

**Corrected pH,
Main Stem Circle Creek,
June 16-17, 2012**



The minimum and maximum pH were never outside the acceptable regulatory thresholds of 6.5-9.0 pH units.

**Corrected Turbidity,
Main Stem Circle Creek,
June 16-17, 2012**



Turbidity was below detectable levels (< 0.2 NTU) during monitoring.