



United States Department of the Interior

NATIONAL PARK SERVICE Zion National Park Springdale, UT 84767



IN REPLY REFER TO:

N3617

July 1, 2014

Mr. Jim Harris
Water Quality Monitoring Section Manager
Utah Division of Water Quality
PO Box 144870
Salt Lake City, UT 84114-4870

Jim,

We have reviewed the Utah Division of Water Quality 2014 Integrated Report on the status of water quality, and offer some comments and observations on the listings that pertain to Zion National Park.

The North Fork of the Virgin River as assessed at four sites in close proximity upstream of the park (assessment unit ID UT15010008-013) is not supporting the protected uses for E. coli. Our data supports this conclusion and we also support the continued efforts on the part of UDWQ to implement a project to correct this problem. One of the sites (4951265) is also listed for aluminum. We believe that this is in error caused by the failure to link field and laboratory data for the sample date 7/24/2008. The National Park Service collects field parameters and water quality samples at NPS sampling locations, and then submits the water quality samples to the state of Utah for laboratory analysis. Field data are submitted separately, and in some cases, laboratory samples have not been correctly paired with field data. When the field pH of 8.38 was not entered into the database for the sample on that date, the assessment screening incorrectly applied the chronic standard for aluminum when the acute standard should have been applied for waters with a pH greater than 7.0. With the correct pH and standard applied there is no exceedence. The applicable datasheet with a field pH of 8.38 on 7/24/2008 is attached.

We were unaware of a temperature problem at this site 4951265 prior to this listing, and look forward to working with the UDWQ staff to evaluate it. Runoff from the irrigated fields upstream is probably a contributing factor, so there may be an improvement concurrent with improving the irrigation system on those fields.

The North Fork of the Virgin is also listed for E. coli in the reach downstream of Deep Creek (assessment unit UT15010008-015) based on data from site number 4951199 at the Temple of Sinawava. This may be in error depending on how the analysis was conducted. Our data for this site from 2009 through 2013 shows a geometric mean of 35.8 MPN/100 ml for 57 samples. This is well below the 2A chronic standard. We found that 12 of the 57 individual samples, or 12.3% exceeded the chronic standard. E. coli levels at this site are probably elevated by the downstream

persistence of contamination from the pastures upstream of the park, and from water play engaged in by visitors in the more immediate vicinity.

The elevated pH on North Creek (assessment unit UT15010008-014) has been noticeable in our data following the Kolob Fire that occurred in 2007. We expected some recovery as the nutrient flush from the fire progressed through the system and algal growth subsided. Our field observations are that while the algal growth has indeed diminished, we still see some summer samples with a pH exceeding the 9.0 threshold. Our data probably captures the daily peak in pH because samples are usually collected around mid-day when photosynthesis is at its peak.

Thank you for your continued diligence in protecting the waters of Utah. Please contact our hydrologist Dave Sharrow at 970-240-5431 with any questions regarding this matter.

Sincerely,

A handwritten signature in black ink, reading "Cindy J. Purcell", is enclosed in a thin black rectangular border.

Cindy J. Purcell
Acting Superintendent

enclosure (field data sheet for 7/24/2008)

cc: Rebecca Weissinger, NCPN hydrologist, Moab, UT

NCPN I&M WATER QUALITY FIELD FORM

Draft #7 7/14/2008

Created by: David Thoma NPS NCPN I&M

Works with version 4.57.0.0 pocket situ for Troll 9500

Long Name N FK VIRGIN R AT WSA BNDRY		Sample team Dave Thoma, Kelly Lawrence		Date(m/d/yr) 7-24-08
Station abbrev. nfv_wsa	Lat 37.371	map datum WGS84	UTM_E	Zone 12
Long 112.882	altitude (ft) na 1677 m	UTM_N	NAD83	Start time 12:15
7.5' quad. DA	Storet # 4951265	HUC code 15010008	State Utah	End time 0:01
Comments	County Kane	125 0933268	14:30	Mean time 0:00
	Park ZION	4137571		Sample Collected at

UT LABORATORY INFORMATION						All except carry bottle are from
Samples collected? (y/n)	Collect Total chem.	Collect Filt. metals	Collect Nutrients	Collect Turbidity	Collect Carry	Div. of Lab Services
(y/n)	y	y	y	y	y	46 N. Medical Drive
(y/n)	Microbiology	Secchi disc	Chl. a	Algae	Inverts	Salt Lake City, UT 84113
	y	n	n	n	n	801-584-8400
Bottles labeled (y/n)	Date & time	STORET #	Collector	Site name		Filter packs Pall Aquapure
(y/n)	y	y	y	y		Lot # Fm6965
Sample period (m / q)	q					
Sam Dpth (ft)	0	Suite	Preservative	lot #	CAS #	Exp date
Total Chemistry	2		none	2008098	none	4.17.10
Non-filtered Nutrients	2		H ₂ SO ₄	2008091	7664-93-9	4.15.09
Filtered nutrients	9			2008107		4.11.09
Filtered metals	3		HNO ₃	2008079	7697-37-2	4.3.09
Sample type	4					
Source code	10		Date shipped (m/d/yr)			
Project	358		UPS tracking #			
			Date received (m/d/yr)			

FIELD MEASUREMENTS							
measurable dischar. (y/n)C	Water color	Visual est. of mixing					
y	T	W					
disch.method	serial #	flow value	units (C,G,M,blank)	meas type (M,E,blank)	avg veloc (ft/s, blank)	vtype (M,E,blank)	
gaging meter		11.39	C	M	1.97	M	
Gage in (ft)				hydrograph stage	flow severity		
Q inst.(cfs)				b	N		
AquaCalc file name							
current meter discharge(cfs)							
estimated discharge (cfs)	6	estimate type visual					
Volumetric measurement	vol (mL)	time (s)	(mL/s)	(gpm)	(cfs)	estimated % loss	adjusted flow (cfs)
1							
2							
3							
4							
5							
		stable flow?				average	
Weir measurement	stage (ft)	calculated (gpm)			(cfs)	estimated % loss	adjusted flow (cfs)
1							
2							
3							
4							
5							
		stable flow?				average	
Flume measurement	stage (ft)	Look up (gpm)			(cfs)	estimated % loss	adjusted flow (cfs)
1							
2							
3							
4							
5							
		stable flow?				average	

Discharge comments high flow about 2ft above base within last week

100

Troll 9500 file name		Core Parameters				Bacteria	IDEXX Quantitray 2000
Reading #	% DO (mg/L)	Baro. Press. (mm Hg)	Spc. Cond (uS/cm@25 °C)	Water temp °C	pH unitless	held < 10°C?	Date Time
1	100.5	7.04	624.4	432.4	73.66	8.38	collect start inc. 16:40
2							duration held (d) read 19:30
3							duration inc (d)
4							data credible? n
5							big wells (+) sm. well(+)
6							Tot. Coli 43
7							E. Coli 39
median range	0.00	0.00	0.00	0.00	0.00	0.00	Tot. Coli (MPN/100mL) 95L MPN 95II
well mxid?	yes		yes	yes	yes		
DO sat(%)	29.6						
Turbid(ntu)	0						
%Cloud Cov.	0						
Weather	1						
Field condns	1	recent high flow still turbid					

* Tot. Coli Feard @ 15:30
E. coli read @ 19:30

CALIBRATION INFORMATION

Temperature check		Conversion formulas	
Liquid filled air temp °C	Liquid filled air temp °F	(F - 32) x 5/9 = C	(C x 1.8) + 32 = F
27	80.6		
H2O temp °C	H2O temp °F	enter temp	
24.5		C to F	F to C

Enviro-safe liquid filled thermometer is NIST traceable, 0.5 °C increments
H-B Instrument Company
610-489-5500

Internal (NCPN) Notes

5 Hikers heading to narrow from trailhead. Large carpet partially in stream just down from sample site. Site is just before wilderness study area marker up from exposed rock face on stream left.

Spin test pygmy price AA	minutes	seconds	date	pass?
		53		

Turbidity	date	time	Signal avg (on/off)
		14:30	on

most recent calibration	Secondary gelex standards (ntu)
6/10/2008	5.6 reads 5.76
	55.5 reads 32.7
	519 reads 511

Is recalib. necessary?

Photo Log	Photos taken?	View	Comments
77	digital	up	Kelly taking flow measurement
78	digital	down	
79	digital	up	large sandbar 10 yds upstream from site
80	digital	down	
81	digital	up	USA Boundary sign

Conductivity standards (us/cm)		Is recalib. necessary?	
Cond of std used for calibration	1413		
Cond. reading prior to calibration	1409	Cond. post calib	1414
manufacturer	Aqua Solutions	%rel diff	
lot #	7062660	calib good?	
CAS#	see MSDS		
expiration date	Jun-08		
catalog #	5895-32		

pH standards		pH high	
pH low	7	pH high	10.01
pH prior to calibration	7.02	pH post calibration	10.01
manufacturer	Aqua Solutions	manufacturer	Aqua Solutions
lot #	7071378	lot #	70620108
expiration date	7/30/09	expiration date	6/30/09
catalog #	1500-4L	catalog #	1525-4L
CAS#	see MSDS	CAS#	see MSDS

1 point air saturated with water method		%rel diff	
DO pre calib	7.16 mg/L	26.25%	
DO post calib	7.40 mg/L	21.19%	
%rel diff			
calib good?			
DO stim	7.26		