BEFORE THE COLORADO WATER QUALITY CONTROL COMMISSION Department of Public Health and Environment, State of Colorado

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RESPONSIVE PREHEARING STATEMENT OF THE BEAR CREEK WATERSHED ASSOCIATION

IN THE MATTER OF THE RULEMAKING HEARING FOR CONSIDERATION OF REVISIONS AND ADOPTION OF THE 2015 LIST OF WATER-QUALITY-LIMITED SEGMENTS REQUIRING TOTAL MAXIMUM DAILY LOADS AND COLORADO'S MONITORING AND EVALUATION LIST (REGULATION NO. 93)

The Bear Creek Watershed Association (hereinafter "Association") presents its Responsive Prehearing Statement in the above referenced matter.

Factual Claims.

Association Authority. The Association is the water quality management agency for the Bear Creek Watershed. The Association is responsible for watershed management, restoration and implementation within the context of a management agency and the Bear Creek Control Regulation (Control Regulation 74, 5 CCR 1002-74).

Association Concerns About Listing Process. The Association is disappointed by the lack of consultation from the WQCD staff in this listing and hearing process. There appears to be little interest by the Division staff in working with the Association or utilizing the annual reporting being done by the Association. It is discouraging to be a conscientious management agency and land steward that faithfully collects and analyses data to better manage the water quality within the watershed, and then be completely discounted in the listing review process. This is especially true in a watershed that has experienced devastating flooding that altered stream morphology, habitat, and watershed hydrology. The Association is uniquely positioned to understand how the system was altered and the current water quality trends. However, there is limited opportunity incorporate this knowledge into the current listing process. The lack of trust to use data analyses from the annual Association data files is apparent. The Division staff is compelled to reanalyze data, even though the Association data report provides an honest appraisal of the water quality by segments. The Association also provides the spreadsheets with the data and has produced specialized spreadsheets when requested by state staff.

The Association has reviewed the data spreadsheets posted on the state FTP site and used in the listing progress and found numerous gross errors, including but not limited to; wrong site coordinates in the chemistry files, wrong standards applied to segments, and mislabeled temperature data spreadsheets for all Bear Creek segments (e.g. spreadsheet labeled *WQCDex93-1!COSPBE01b.Temperature*, which should be segment 1b from the Harriman Ditch to Bear Creek Reservoir has data for Corral Creek in Clear Creek County, mixed with flow records above Evergreen Lake, and classifications for Segment 1b). Other temperature files are for Waterton canyon in Douglas County. There is no Bear Creek temperature data posted on the state FTP site for Association review. Consequently, the Association does not have an opportunity to review any of the temperature data supposedly used by the Division in this listing process. The spreadsheet file *WQCDex93-1!COSPBE01b.chemALL* is for Bear Creek Segment 1b but contains no Association data and lists a station site WQCD site 122 that is not located on the stream.

Association Data Record Submitted to WQCD. The Association conducts multiple stream monitoring programs along Bear Creek. The monitoring year divides into a warm-season period with more intense sampling and a cold- season period, designed to provide representative winter and spring data. The

Association's annual Data Reports and Annual Reports are submitted to the WQCC and WQCD as required by Regulation #74. These reports summarize temperature and water quality monitoring data, sampling results obtained from in-stream locations, and data from wastewater treatment plant effluents. The complete water quality data set is an electronic data report, which was also transmitted to the WQCD staff.

Stream sampling and monitoring data, including pH, Temperature, Dissolved Oxygen, Specific Conductance, Ammonia, Nitrate+Nitrite, Total Inorganic Nitrogen (calculated) and Total Phosphorous is collected from July through September, at up to 35 sites. Stream temperature dataloggers are located at 28-32 Sites, excluding the five-wastewater treatment plants. Eight sites have dataloggers temperatures from January 1 through December 30. The remaining sites have temperature data from May through September. Manual flows are measured at 16-25 sites during the June to September timeframe.

The Association on an annual basis since 1997 has annually provided to the Division all data collected by the Association in a format as defined by the Bear Creek Control Regulation and consistent with the Division accepted water quality monitoring plan, which is annually reviewed and updated. The Association provides electronic copies annually of the yearly data report, annual report, and spreadsheets of all collected data after QA/QC. In late 2014, at the request of Division staff, the Association placed a substantial amount of information (>1 GB) on the Divisions FTP site in a Bear Creek folder. The understanding with Division staff was that anyone within the Division who needed Association data and information for any purpose could download from the state site. It appears that the submitted Association data record was again not considered in the Regulation #93 evaluation process. The requested information, data and spreadsheet files were as follows (Table 1):

Table 1 Files Submitted to the Division in late 2014

WDF12	2007 BC & Temp Data
WDF13	2008 BC & Temp Data
WDF14	2009 BC & Temp Data
WDF15	2010 BC & Temp Data
WDF16	2011 BC & Temp Data
WDF17	2012 BC & Temp Data
WDF18	2013 BC & Temp Data
WDF19	2014 BC & Temp Data
MSD2009	P1-P4 Master Spreadsheet
MSD2010	P1-P4 Master Spreadsheet
MSD2011	P1-P4 Master Spreadsheet
MSD2012	P1-P4 Master Spreadsheet
MSD2013	P1-P4 Master Spreadsheet
MSD2014	P1-P4 Master Spreadsheet
MSD01	BCWA Site ID Historical Master
MSD02	Macroinvertebrate Summary
MSD03	BCW Flow & Watershed Record
MSD04	Total Phosphorus & WS Nutrient Master Record
MSD05	Evergreen Lake BCWA Data Master
MSD06	Site 45 Data Summary
MSD07	Sheridan Data Record BCWA
MSD08	TIN Watershed
MSD11	Coyote Gulch Data Master
MSD12	Kerr Swede Master
MSD17	Phytoplankton Master
MSD18	Bear Creek Fishery Master
DR2004	BCWA Data Report
DR2005	BCWA Data Report
DR2006	BCWA Data Report
DR2007	BCWA Data Report
DR2008	BCWA Data Report
DR2009	BCWA Data Report

DR2010	BCWA Data Report
DR2011	BCWA Data Report
DR2012	BCWA Data Report
DR2013	BCWA Data Report
DR2014	BCWA Data Report
AR2007	Annual Report WQCC
AR2008	Annual Report WQCC
AR2009	Annual Report WQCC
AR2010	Annual Report WQCC
AR2011	Annual Report WQCC
AR2012	Annual Report WQCC
AR2013	Annual Report WQCC
AR2014	Annual Report BCWA

Association Summary Positions. There are ten proposed 303(d) listing of segments and one delisting of a segment within the Bear Creek Watershed as contained in the Water Quality Control Division Proponent Prehearing Statement (Table 2). The Association position for these segments is summarized in Table 3. Table 4 shows the Association's recommended 303(d) listings for segments in the Bear Creek Watershed.

Table 2 Segments in Bear Creek Watershed for proposed listing and delisting by WQCD in Regulation #93.

Segment	Stream Segment Description	Portion	M&E	303(d) Listing	Priority
1a	Mainstem of Bear Creek from the boundary of the Mt. Evans Wilderness area to the inlet of Evergreen Lake	Bear Creek below the confluence with Yankee Creek		Temperature	H
1b	Mainstem of Bear Creek from Harriman Ditch to the inlet of Bear Creek Reservoir	All		Ag, Temperature	M
1c	Bear Creek Reservoir.	All		Chl-a, phosphorus	H
1e	Mainstem of Bear Creek from the outlet of Evergreen Lake to the Harriman Ditch.	All		Cu, Temperature	H
1e	Mainstem of Bear Creek from the outlet of Evergreen Lake to the Harriman Ditch.	Bear Creek from the outlet of Evergreen Lake to Forest Hill Road Bridge		Aquatic Life	H
2	Mainstem of Bear Creek from the outlet of Bear Creek Reservoir to the confluence with the South Platte River.	Below Kipling Parkway (CO 391)		E.coli (May-Oct)	H
3	All tributaries to Bear Creek, including all wetlands, from the source to the outlet of Evergreen Lake, Except for specific listings in Segment 7.	All		Temperature	H
5	Swede, Kerr, Sawmill, Troublesome, and Cold Springs Gulches, and mainstem of Cub Creek from the source to the confluence with Bear Creek.	Swede/Kerr Gulch		~~E.coli (May-Oct)~~	~~L~~
6a	Turkey Creek system, including all tributaries and wetlands, from the source to the inlet of Bear Creek Reservoir, except for specific listings in Segment 6b.	Turkey Creek below Parmalee Gulch	Temperature		
6b	Mainstem of North Turkey Creek, from the source to the confluence with Turkey Creek.	All	Temperature		
11	Lakes and reservoirs in the Bear Creek system from the outlet of Evergreen Lake to the confluence with the South Platte River, except as specified in Segments 1c, 10, and 12; includes Soda Lakes.	Harriman Reservoir	As		

Table 3 BCWA Issues with Proposed Listings

Segment	Stream Segment Description	WQCD Portion	BCWA Position
1a	Mainstem of Bear Creek from the boundary of the Mt. Evans Wilderness area to the inlet of Evergreen Lake	Bear Creek below the confluence with Yankee Creek	The BCWA does not support a listing for temperature as a high priority. The BCWA opposes changing the portion of stream to start at Yankee Creek. The BCWA has a reference monitoring station located at Golden Willow road. Macroinvertebrate sampling and temperature monitoring shows no indication of impairment. The portion of the segment for M&E monitoring of temperature should begin at Golden Willow Road Bridge, Clear Creek County and extend downstream to the inlet of Evergreen Lake. If the preference is to use a water feature, then the Witter Gulch break-point remains appropriate.
1b	Mainstem of Bear Creek from Harriman Ditch to the inlet of Bear Creek Reservoir	All	There is a concern about listing Silver (Ag). The WQCD data (WQCDex93-1!COSPBE01b.chemALL) is problematic and the standard calculation are in error. 13 measurements are listed with 11 zeros and the high number is below the PQL; the median value is 0.0 ug/l and the average is 0.1 ug/l, this does not denote a chronic Ag problem. There are massive changes in stream channel & hydrology in this segment due to extreme flood impacts. This segment is under investigation by the BCWA to establish new baseline conditions. Continue monitoring for temperature.
1c	Bear Creek Reservoir.	All	The BCWA supports the listing as a high priority. However, the BCWA is troubled that the WQCD data listed does not match the BCWA data record.
1e	Mainstem of Bear Creek from the outlet of Evergreen Lake to the Harriman Ditch.	All	Concern about Cu listing for entire segment when sample was taken from the Harriman Ditch and is not representative of the segment. Temperature listing is supported by BCWA data. Recent data for last 3-years shows no problem. There have been extensive changes in stream channel morphology & hydrology.
1e	Mainstem of Bear Creek from the outlet of Evergreen Lake to the Harriman Ditch.	Bear Creek from the outlet of Evergreen Lake to Forest Hill Road Bridge	The BCWA is not supporting listing based on data, 2014 MMI = 56.2 for the Little Bear site is in attainment for this portion of Bear Creek. Restoration work from flood in progress, extreme changes in channel morphology and habitat are greatly improved.
2	Mainstem of Bear Creek from the outlet of Bear Creek Reservoir to the confluence with the South Platte River.	Below Kipling Parkway (CO 391)	The BCWA opposes changing the portion for listing. There is no E. coli problem in segment 2 from the BCWA site 45 (outlet of Bear Creek Reservoir) down to Wadsworth; as such the break should be at Wadsworth
3	All tributaries to Bear Creek, including all wetlands, from the source to the outlet of Evergreen Lake, Except for specific listings in Segment 7.	All	The BCWA does not support listing all tributaries for listing. Measurements are only available for Vance Creek. Preliminary BCWA temperature data for other tributaries shows no temperature problem. Vance Creek was extensively altered during the floods with increased flows since 2013 of over 100%. These Tributaries should only be a Low priority
5	Swede, Kerr, Sawmill, Troublesome, and Cold Springs Gulches, and mainstem of Cub Creek from the source to the confluence with Bear Creek.	Swede/Kerr Gulch	The BCWA supports delisting based on a 5-year data record showing no E. coli problems.
6a	Turkey Creek system, including all tributaries and wetlands, from the source to the inlet of Bear Creek Reservoir, except for specific listings in Segment 6b.	Turkey Creek below Parmalee Gulch	The BCWA does support continued monitoring. This segment shows compliance with the temperatures standards from 2013-2015 with only a minor shoulder season excursion in 2013.
6b	Mainstem of North Turkey Creek, from the source to the confluence with Turkey Creek.	All	The BCWA does support continued monitoring. This segment shows compliance with the temperatures standards from 2013-2015 with only a minor shoulder season excursion in 2013.

Segment	Stream Segment Description	WQCD Portion	BCWA Position
11	Lakes and reservoirs in the Bear Creek system from the outlet of Evergreen Lake to the confluence with the South Platte River, except as specified in Segments 1c, 10, and 12; includes Soda Lakes.	Harriman Reservoir	The BCWA is concerned about listing for arsenic (AS) based on 3 samples that are near the MDL. However, the Association won't oppose this M& E listing. The site coordinates listed in the spreadsheet are not for the outlet, but rather the center of the reservoir.

Table 4 The BCWA recommendations for listings of Segments in the Bear Creek Watershed

Segment	Stream Segment Description	Portion	M&E	303(d) Listing	Priority
1a	Mainstem of Bear Creek from the boundary of the Mt. Evans Wilderness area to the inlet of Evergreen Lake	Bear Creek below the confluence with ~~Yankee Creek~~ Witter Gulch	Temperature	~~Temperature~~	~~H~~
1b	Mainstem of Bear Creek from Harriman Ditch to the inlet of Bear Creek Reservoir	All	Temperature	~~Ag, Temperature~~	~~M~~
1c	Bear Creek Reservoir.	All		Chl-a, phosphorus	H
1e	Mainstem of Bear Creek from the outlet of Evergreen Lake to the Harriman Ditch.	All		~~Cu,~~ Temperature	H
1e	Mainstem of Bear Creek from the outlet of Evergreen Lake to the Harriman Ditch.	~~Bear Creek from the outlet of Evergreen Lake to Forest Hill Road Bridge~~	-	~~Aquatic Life~~	~~H~~
2	Mainstem of Bear Creek from the outlet of Bear Creek Reservoir to the confluence with the South Platte River.	~~Below Kipling Parkway (CO 391)~~ Below Wadsworth		E.coli (May-Oct)	H
3	All tributaries to Bear Creek, including all wetlands, from the source to the outlet of Evergreen Lake, Except for specific listings in Segment 7.	~~All~~ Vance Creek	Temperature	~~Temperature~~	~~H~~
5	Swede, Kerr, Sawmill, Troublesome, and Cold Springs Gulches, and mainstem of Cub Creek from the source to the confluence with Bear Creek.	~~Swede/Kerr Gulch~~		~~E.coli (May-Oct)~~	~~L~~
6a	Turkey Creek system, including all tributaries and wetlands, from the source to the inlet of Bear Creek Reservoir, except for specific listings in Segment 6b.	Turkey Creek below Parmalee Gulch	Temperature		
6b	Mainstem of North Turkey Creek, from the source to the confluence with Turkey Creek.	All	Temperature		
11	Lakes and reservoirs in the Bear Creek system from the outlet of Evergreen Lake to the confluence with the South Platte River, except as specified in Segments 1c, 10, and 12; includes Soda Lakes.	Harriman Reservoir	As		

2014 Macroinvertebrate Analysis. Since 2004, the BCWA has conducted macroinvertebrate sampling and data collection at up to 14 sites along the mainstem of Bear Creek (*BCWA Fact Sheet 32 Stream Macroinvertebrates; BCWA MSD02 Macroinvertebrate Summary*), including Colorado Parks and Wildlife fish survey sites along Bear Creek: Bear Creek Lake Park, Morrison (west end), Idledale, Lair o' the Bear Park, O' Fallon Park, Bear Creek Cabins, Main Street Evergreen (across from the Little Bear), above Evergreen Lake upstream within Dedisse Park, Singing River Ranch, Bear Tracks near Mount Evans Wilderness, above Singing River Ranch, and Golden Willow Bridge.

There was no macroinvertebrate sampling done in 2013 due to the September flood event (*BCWA Fact Sheet 16 September 2013 Flood, BCWA Fact Sheet 14 Flood Recovery Tips, BCWA Fact Sheet 17 Health, Hydrology & Sediments, and BCWA Fact Sheet 18 Flood Score Card*). The mainstem of Bear Creek was extensively altered by the flood event, with deep stream bed scouring. Macroinvertebrate habitat was clearly affected by the flood event. In 2014, the BCWA selected ten sample sites to continue the Macroinvertebrate sampling program (*BCWA TM2014.13- Macroinvertebrates and MMI Scores BCW*):

- Site 15a Bear Creek Park below bridge
- Site 14a Morrison at gaging station
- Site 13a Idledale, 200 feet upstream of sample site near bridge
- Site 12 Lair O' Bear, 200 feet upstream of sample site
- Site 9 O' Fallon Park, adjacent to the new parking lot
- Site 8b BCC at Bridge, 50 feet downstream OWTS
- Site 5 Little Bear, downtown and 50 feet downstream of sample site
- Site 3a Keys on the Green, at bridge
- Site 2a Golden Willow, 300 feet upstream of bridge
- Site 58 Upper Bear Creek above SRR

Sample collection was done by the Water Quality Control Division timed-kick net methodology protocol (*WQCDSOP-001 Benthic Macroinvertebrate Sampling Protocols, May 2010; BCWA ME04 Macroinvertebrate Field Sample Method*). Only fast riffles were targeted for sampling. Riffle habitat refers to the portions of the stream where moderate velocities and substrate roughness produce turbulent conditions which break the surface tension of the water and may produce whitewater.

GEI Consultants analyzed samples collected by the BCWA for benthic macroinvertebrates. Samples collected by the Association follow the *BCWA M04 Macroinvertebrate Field Sample Method*. Data for samples are reported as number of organisms per square meter. Percent of total is also reported. The species are counted consistent with the CDPHE EDAS import columns for taxa and species. This data can then be converted into MMI scores. MMI scores calculated using CDPHE EDAS Access database. As required by the database, all species were confirmed to comply with the EDAS database. The 2014 MMI scores are shown in Table 5. Table 6 shows all sites were in full attainment or above the impairment threshold. <u>As such, the Association does not support listing a portion of Segment 1e from Evergreen lake outlet to Forest Hill Road Bridge for aquatic life.</u>

Table 5 2014 MMI and Total Taxa

WQCD Station ID	BCWA Station ID	Location	Total Taxa	MMI
5756a	15a	Bear Creek Lake Park	20	48.8
122	14a	above Morrison Park	22	49.5
122a	12	at Lair of the Bear Park	20	44.8
122b	9	at O'Fallon Park	20	59.3
122C	13a	at Baker Bridge (Idledale)	27	66.4
5762	8	below Evergreen (BC Cabins)	26	49.6
5763	5	at Little Bear Evergreen	25	56.2
5764	3a	at Key of the Green GC	25	43.9
5768B	58	Mount Evans Wilderness	29	67.0
5768d	2a	Golden Willow	26	60.8

Table 6 MMI Attainment (All Sites Above Thresholds)

BCWA Station ID	Location	MMI	Full Attainment	Above Impairment Threshold
15a	BCLP	48.8		
14a	above Morrison Park	49.5		
12	at Lair of the Bear Park	44.8		
9	at O'Fallon Park	59.3		
13a	at Baker Bridge (Idledale)	66.4		
8	below Evergreen (BC Cabins)	49.6		
5	at Little Bear Evergreen	56.2		
3a	at Key of the Green GC	43.9		
58	Mount Evans Wilderness	67.0		
2a	Golden Willow	60.8		

Altered Stream Channel Morphology and Habitat Impacts. In September 2013, a major flood event significantly impacted Bear Creek. The peak stage (UDFCD) was 3,200 cfs in Morrison. This is the highest September flows in 113-year record. Bear Creek Segment 1b has some of the most severely altered stream channels. The channel was widened by as much as 40 feet (Segment 1b) and several areas (Segment 3) were scoured by over 8 feet. There was extreme deposition of sediment, gravel and boulders. In 2015, this segment was further scoured by over 85,000 acre-feet of water, where the median long-term inflow into Bear Creek Reservoir from Bear Creek and Turkey Creek combined is 27,000 acre-feet. This is the third highest annual flow on Bear Creek for the 115 years of record.

Measuring the "health" of a watershed can be very complex. Many physical, chemical, ecological, biological (bacteria, bugs, fish and wildlife), hydrologic, and socio-economic factors influence the "health" of a watershed. In 2013, the total estimated annual discharge into Bear Creek Reservoir at the bottom of the watershed was above average with about **49,973** acre-feet and about **45,726** acre-feet flow through (includes **4,246** acre-feet of evaporation and infiltration). In 2012, the total discharge into the reservoir was <6,000 acre-feet. Most of 2013 flow came in September/October (**35,700 Acre-Feet**) when Bear Creek flooded and slowly drained. A major flood can vastly alter the water resources of a watershed and sometimes cause an "ecological reset". The heavy rains and flood "flushed" nitrogen and phosphorus from the areas along the streams. The watershed nutrient concentrations in late October and November were some of the lowest values ever measured.

Vast amount of sediments, including suspended sediments and bedload, were moved downstream during storm events. The Association has no reliable method to determine the total amount of sediment transported by the 2013 floods. The Association did make some approximations of the amounts deposited into Evergreen Lake and Bear Creek Reservoir. It is very apparent that millions of tons of sediments were moved by storm waters (Table 7). There was extensive erosion throughout the watershed. Streambanks were lost and channels altered. The Association has conducted new habitat (*BCWA F01 BCWA Habitat Indices*) and physical configuration (*BCWA F02 BCWA Physical Stream Indices*) analyses at all primary monitoring stations.

Table 7 Sediment Deposition in Evergreen Lake and Bear Creek Reservoir

Evergreen Reservoir			
Sep-13		Oct-13	
TSS Based (SSL Load)		TSS Based (SSL Load)	
Tons/month	Cubic Yards/Month	Tons/month	Cubic Yards/Month
905	745	28	23
Estimated Bedload		Estimated Bedload	
Tons/month	Cubic Yards/Month	Tons/month	Cubic Yards/Month
13,582	11,179	142	117
Evergreen Reservoir			
Sep-13		Oct-13	
TSS Based (SSL Load)		TSS Based (SSL Load)	
Tons/month	Cubic Yards/Month	Tons/month	Cubic Yards/Month
905	745	28	23
Estimated Bedload		Estimated Bedload	
Tons/month	Cubic Yards/Month	Tons/month	Cubic Yards/Month
13,582	11,179	142	117

The flood made some significant changes to the mainstem of Bear Creek in both Clear Creek and Jefferson Counties (Table 8).

Table 8 Flood Impact on Bear Creek – The Good and Bad

The Bad	The Good
Property damage and human suffering	Reduced stream sediment embeddedness
Stream channel and bed altered. Down cutting up to 8 feet, channel widened by 10-30 feet, heavy debris deposits, downed trees, boulder dams	Improved some in-channel habitat
Infrastructure damage (roads, bridges, pipes, crossings)	Flushed organic and woody deposits
Changed water quality by increasing loadings	Flushed stream corridor nutrients/ pollutants
Heavy bank erosion and sediment deposition	"Ecological reset"
Massive sediment transport in streams and scouring	Federal dollars can be used for improvements
Moved fish populations/ losses	Increased public awareness
Flushed macroinvertebrates and altered stream ecology	Identify potential problem areas
Introduced new pollutants	Re-evaluation of management
Damaged stream corridor habitats	Nutrient enrichment of adjacent flood areas
Disrupted wildlife and killed animals	
Transported invasive species	
Deposited nutrients into lakes and reservoirs	
Revise monitoring programs and management strategies	

The average inflow into Bear Creek Reservoir from both Turkey Creek & Bear Creek (1987-2012) was 27,024 acre-feet per year. Since the flood of September 2013, the average inflow into the reservoir has been 63,675 acre-feet per year. This year to date (2015), there has been over 117,000 acre-feet flowing through the reservoir. It appears that only 2-years in the 115-year record on Bear Creek had higher flows - 1901 & 1944 (flood years). The mean annual flow in the South Platte River at Waterton (1926-2014) is 119,435 acre-feet.

The recent floods and runoff events in the Bear Creek Watershed have altered the watershed and changed the habitat, chemistry and affected the biological populations. The Association is working diligently to record these changes and adapt the monitoring and management plans. The Association is very concerned that making 303(d) listings based on pre 2013 data is misleading and will lead to incorrect management efforts and strategies. The Association urges caution when reviewing listing data.

Temperature Monitoring and Reporting. The Association conducts special stream monitoring programs within the Bear Creek Watershed including Bear Creek, and a portion of the Turkey Creek Drainage (North and South Turkey Creek). The monitoring year divides into a warm-season period with more intense sampling and a cold-season period, designed to provide minimal winter and spring data. The Association 2014 Data Report summarizes temperature and water quality monitoring data, sampling results obtained from in-stream locations, and data from five-wastewater treatment plant effluents. The complete water quality data set is an electronic data report containing 268,032 individual temperature data points obtained from the twenty-eight data logger sites within the watershed (excluding the WWTP data). The warm-season and cold-season temperature compliance summary is shown in Table 9. A limited number of temperature compliance issues occurred in both the warm and cold seasons.

Table 9 Watershed Temperature Compliance Summary Warm/ Cold Seasons

	Cold-season		Warm Season	
Segment 3	**9°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 1a	**9°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	0	1	0	0
% Compliance	100%	99%	100%	100%
Segment 1d	**9.0°C WAT**	**13.0°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances			0	0
% Compliance			100%	100%
Segment 1e	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 1b	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	6	14	0	0
% Compliance	67%	90%	100%	100%
Segment 5	**9°C WAT**	**13°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances	4	17	0	0
% Compliance	88%	79%	100%	100%
Segment 6a	**9°C WAT**	**13°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 6b	**9°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	0	1	0	0
% Compliance	100%	99%	100%	100%
Segment 2	**13.7°C WAT**	**14.3°C DM**	**27.5°C WAT**	**28.6°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 1c	**9°C WAT**	**13°C DM**	**24.0°C WAT**	**26.0°C DM**
# Exceedances		0	0	0
% Compliance		100%	100%	100%

Segment 1a Temperature Listing. The Association in consultation with the Division staff established a permanent reference monitoring station at the Golden Willow Bridge. This site was selected to address suspected water quality concerns within the Upper Bear portion of Bear Creek from the Witter Gulch discharge down to the Inlet of Evergreen Lake. The Golden Willow monitoring site has confirmed that some water quality degradation is associated with the stretch of Upper Bear from Witter Gulch to the Keys on the Green monitoring site near Evergreen Lake.

The Division is proposing to move the listing segment for temperature upstream to the Yankee Gulch discharge point. There is no good reason to use Yankee Gulch, which is a very small tributary as the break-point for partitioning the segment. The Yankee Creek discharge into Bear Creek is on private land and there is no good location to establish a reference site or place a temperature probe. The cost of establishing a new reference site at Yankee Creek will be about $5,000 and the Association sees little value to have this

site. The Golden Willow site has only a couple of temperature excursions from 2010-2015. Although there are some temperature excursions in this segment, the Association has no evidence that temperature is the parameter that caused previous lower MMI scores at Keys on the Green. The Golden Willow site is one of the best fishery sites with over 1,375 fish per acre at 97 pounds per acre. The Association is working to resolve a sediment loading and nutrient loading problem in Upper Bear by doing specialized sampling to better identify nutrient and fine sediment sources in the segment. The Association prefers to spend limited funds to resolve the more probable causes of potential lower macroinvertebrate population in the lower portion of Upper Bear. An unnecessary temperature listing for this segment will delay completing, in progress, water quality improvements.

The Association recommends keeping a portion of the segment on the M&E list for Temperature. Monitoring of temperature should begin at Golden Willow Road Bridge, Clear Creek County and extend downstream to the Inlet of Evergreen Lake. If the preference is to use a water feature, then the Witter Gulch break-point remains appropriate.

Segment 1b Silver and Temperature List. The Association is concerned about listing Silver (Ag). The WQCD data (*WQCDex93-1!COSPBE01b.chemALL*) is problematic. The spreadsheet lists 13 measurements taken for silver at a site that is not on the stream. In this spreadsheet, 11 data points are zeros, one is listed as a "median" and the only high number is marked with a "J" meaning the data point is below the PQL; the median value of all data is 0.0 ug/l and the average is 0.1 ug/l. While the 85th percentile is listed as 0.086 ug/l, a single value below the PQL should not be construed to denote a chronic silver problem. The silver standards shown in the spreadsheet appear to be calculated incorrectly. As such, the Association recommends not listing silver as a chronic impairment.

Bear Creek flow diverts at the Harriman Ditch in Morrison for agricultural water uses. Bear Creek flow diverts into the Arnett-Harriman during the irrigation season. The Arnett-Harriman ditch reduces flows in Segment 1b Bear Creek below 10 cfs in the operational season about 35% of the time. The ditch systems can completely dewatered (< 0.5 cfs) Bear Creek segment 1b for periods of up 15 consecutive days. In 2014, the Harriman diverted water for 273 days with about 4,291 acre-feet of removal as reported by Denver Water Department. Bear Creek Segment 1b was dewatered (<5 cfs flow) for about 50 days or 15% of the time. The Association has demonstrated temperature spikes on the data probes with this dewatering. As such, part of the temperature problem on Segment 1b can be partly attributed to water right withdrawals. The Association believes a special exclusion maybe necessary for this segment because of these water withdrawals. The Association temperature record does show excursions for this segment below the Morrison wastewater discharge. The Association recommends keeping this segment on the M&E list. If it is placed on the 303(d) list, then the priority should be low.

Segment 1c Bear Creek Reservoir Chlorophyll and Total Phosphorus Listings. The Association data record shows Bear Creek Reservoir is not consistently meeting the Chlorophyll standard (Table 10). This is due to the internal load of phosphorus and periodic storm loads (Figure 1). The Association supports the continued listing for both Total Phosphorus and Chlorophyll and is currently developing new management strategies to address this long-term problem.

Table 10 Growing Season Chlorophyll data for Bear Creek Reservoir

	Growing Season Chlorophyll a (-1m) (ug/l)			
	Jul-Sept	**Jan-Dec**	**Standard**	
1991	7.9	14.4	12.2	Okay
1992	39.6	26.7	12.2	Exceedance
1993	40.3	17.4	12.2	Exceedance
1994	69.0	33.4	12.2	Exceedance
1995	22.5	12.2	12.2	Exceedance
1996	43.5	17.1	12.2	Exceedance
1997	7.9	8.2	12.2	Okay
1998	3.5	4.9	12.2	Okay

Growing Season Chlorophyll a (-1m) (ug/l)

	Jul-Sept	Jan-Dec	Standard	
1999	5.0	6.4	12.2	Okay
2000	46.8	23.9	12.2	Exceedance
2001	33.7	24.4	12.2	Exceedance
2002	29.3	15.4	12.2	Exceedance
2003	24.0	14.8	12.2	Exceedance
2004	10.2	6.6	12.2	Okay
2005	25.8	14.2	12.2	Exceedance
2006	16.1	9.1	12.2	Exceedance
2007	15.1	9.8	12.2	Exceedance
2008	25.8	17.3	12.2	Exceedance
2009	23.3	12.5	12.2	Exceedance
2010	15.2	10.6	12.2	Exceedance
2011	10.8	9.3	12.2	Okay
2012	25.1	14.9	12.2	Exceedance
2013	26.4	14.0	12.2	Exceedance
2014	8.3	5.3	12.2	Okay

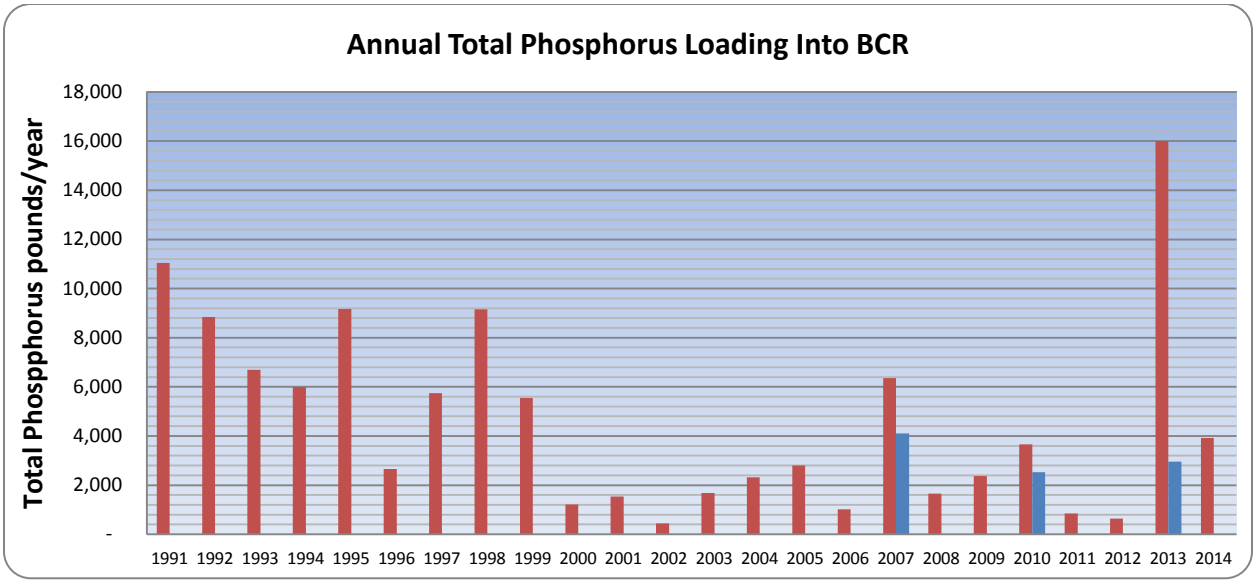

Figure 1 Annual Total Phosphorus Loading into Bear Creek Reservoir

Segment 1e Copper Listing. The Association is concern about Cu listing for the entire 22 miles of segment 1e when the samples were taken from the Harriman Ditch after diversion from Bear Creek Segment 1e. The Association contends that this data is not representative of the segment. The spreadsheet lists 91 samples from the ditch system with 79 zero measurements and an 85th percentile = 0.0 ug/l. There are four data points shown over the listed chronic standard = 7.01 ug/l. However, the listed chronic and acute standards are incorrect, based on the median hardness for the site. The Acute standard should be 9.6 ug/l and the chronic standard is 14.1 ug/l. There are no acute copper exceedances and two chronic exceedances. The Association recommends not listing Segment 1e for copper. Additional monitoring could be done on the actual segment to determine if there is a copper problem in Segment 1e.

Segment 1e Temperature Listing. The Association temperature data record supports a temperature listing for this segment and the Association doesn't object to this listing. When site specific temperature standards were established for this segment, the limits were set very tight to the data with an expectation that there would be exceedances. The Association is working toward recommending a more realistic site specific temperature number for this segment based on long-term data measurements.

Segment 2 E. coli Listing. The association supports the E. coli listing for Segment 2, with a recommendation to change the portion listed to be from Wadsworth to the South Platte River, and not start at Kipling Parkway. The Association monitors E. coli at site 45 below Bear Creek Reservoir continuously from November 2012 and seasonally (May-September) from 2004. This site has a geometric mean based on monthly sampling of 3 cts/100 ml from 2000-2014. This site 45 has never exceeded standards. As such, the BCWA concludes that there is not an E. coli discharge problem associated with Bear Creek Reservoir. The E. coli monitoring results for the BCWA Site 45 at the out let of Bear Creek Reservoir is shown in Table 11.

Table 11 BCWA Site 45 E. Coli

BCWA Site 45 E. Coli Geometric mean cts/100ml

	J-F	M-A	M-J	J-A	S-O	N-D	Annual
2004-2014							3
2012						1	
2013	1	6	2	9	2	1	2
2014	2	2	5	2	1	14	3
2015	3	3	8	2			

The Lower Bear Creek Watershed Work Group (Groundwork Denver, 2014) has been monitoring E. coli from the Association Site 45 to the confluence with the South Platte River. They have several monitoring stations located within the boundary of the Bear Creek Watershed. Their monitoring station BCL5 is upstream of Wadsworth. Their geometric mean for Site BCL5 is 46, based on 8 samples (Table 12). The LBCW concluded that the Average *E. coli* concentrations do not exceed the water quality standards for *E. coli* impairment (126 CFU/100 mL) at four monitored sites: BCL1, BCL3, BCL4 and BCL5. There is no indication of an E. coli problem on Bear Creek Segment 2 from the outlet of Bear Creek Reservoir to Wadsworth.

Table 12 LBCW Site BCL5 E. coli

LBCW Site BCL5 E. coli (MPN/100ml)

	J-F	M-A	M-J	J-A	S-O	N-D	Annual
2013			62	36	54		46

The Association is recommending changing the portion designation to extend from Wadsworth to the South Platte River. The Association is establishing a new P-1 reference monitoring station upstream from Wadsworth that will include 16 annual E. coli measurements. The Association has also adopted a new monitoring strategy that specifically targets E. coli and can be used to identify problematic areas and institute a remediation strategy (*BCWA Fact Sheet 51 Reducing Risk of Ecoli Contamination of Streams*). The Association is aware that the LBCW has identified a concern that there is *E. coli* contribution from some source(s) into Bear Creek along the reach between BCL5 and BCD1 (downstream of Wadsworth). They note it is unclear at this time where and how along this reach E. *coli* enters the stream, whether the contribution is point source or non-point source, or whether the contribution is of human or non-human origin. However, this potential source(s) has not caused an E. coli problem. The Association preference is to monitor upstream of Wadsworth and establish a long-term trend at this site, much like has been done at the BCWA Site 45.

Segment 3 Temperature Listing. Segment 3 includes all tributaries to Bear Creek, including all wetlands, from the source to the outlet of Evergreen Lake, Except for specific listings in Segment 7. This is a very extensive set of tributaries in the most mountainous portion of the watershed. The Association does collect temperature data from Vance Creek, which is part of the Segment 3 tributary set. Vance Creek is one of the most altered tributaries from the recent flood and apparent change in upstream hydrology. Since the flood event the normal flow in Vance Creek (historical average 2008-2012 was 2 cfs) of has drastically increased with a September 2013-2015 average flow of 75 cfs and multiple peak flows exceeding 150 cfs. These

higher than normal flows has scoured this creek and caused increased bank erosion. While the pre 2013 Association temperature record would support the proposed listing, the Association recommends that only Vance Creek be listed as the targeted portion. In 2014 and 2015, Vance Creek was in 100% compliance with the temperature standards (Table5). Preliminary work done in by the Association in 2015 does not show any water quality problems on several other small tributaries in Segment 3.

Segment 5 Kerr Swede Delisting. The Association supports the Divisions recommendation to delist Kerr/ Swede Gulch for E. coli based on the 5-year Association data record.

Segments 6a and 6b Temperature Monitoring. The Association continues to collect temperature data on the Turkey Creek segments and support the continued listing on the M&E Monitoring list. In 2015, Segment 6a was in compliance with the temperature standard and Segment 6b had one acute exceedance of the daily maximum.

Segment 11 Arsenic Listing for Harriman Reservoir. The BCWA is concerned about listing for arsenic (As) based on 3 samples that are near the MDL. However, the Association won't oppose adding As to the M&E list.

II. Exhibits and Written Testimony.

The Association reserves the right to submit additional materials as part of the rebuttal process, as necessary.

III. Witnesses.

The following manager and members of the Association may provide testimony on the appropriateness of proposed changes and rebuttal testimony as needed.

Russell Clayshulte Bear Creek Watershed Manager 1529 S. Telluride St. Aurora, Colorado 80017-4333	Dave Lighthart Bear Creek Watershed Association Board 30920 Stagecoach Boulevard Evergreen, Colorado 80437
Chris Schauder Bear Creek Watershed Association Co-Chair 30920 Stagecoach Boulevard Evergreen, Colorado 80437	Alan D. Searcy Bear Creek Watershed Association Co-Chair City of Lakewood, Public Works Department 480 S. Allison Parkway, Civic Center North Lakewood, CO 80226