APPENDIX C:
Crystal River Water Quality Summary, 2004-2014

CRYSTAL RIVER WATER QUALITY SUMMARY

2004-2014

A report for the Crystal River Ecological Evaluation

THE CRYSTAL RIVER WATER QUALITY SUMMARY

The Crystal River Water Quality Summary is a data product of the Crystal River Ecological Evaluation. Information in this report is intended to supplement other water quality analysis available from Roaring Fork Conservancy, Colorado Mesa University, and other sources. This purpose of this work is to inform partners of the Crystal River Recovery regarding existing and historical water quality conditions in the watershed, and how those conditions may relate to past and present land uses on the mainstem and tributaries.

Prepared For:

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Bringing People Together to Protect Our Rivers

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DEFINITION OF TERMS

CDPHE: Colorado Department of Health and Environment

CPW: Colorado Parks and Wildlife

CWA: Clean Water Act

EPA: Environmental Protection Agency

RFC: Roaring Fork Conservancy

HUC: Hydrologic Unit Code

M&E: Monitoring and Evaluation

NWCCOG: Northwest Colorado Council of Governments

NWIS: National Water Information System

QAQC: Quality Assurance and Quality Control

STORET: Storage and Retrieval System

TVS: Table Value Standards

USGS: United States Geological Survey

USFS: United States Forest Service

WQCC: Water Quality Control Commission

WQCD: Water Quality Control Division

WQS: Water quality standard

INTRODUCTION

1 PURPOSE STATEMENT

This document serves as report to stakeholders of the Crystal River Stream Management Plan process; including the Roaring Fork Conservancy. The purpose of the Crystal River Stream Management Plan is to "identify, prioritize and guide management actions that honor local agricultural productivity, preserve existing water uses, and enhance the ecological integrity of the river." Synthesis of existing water quality data in the context of the Clean Water Act legal framework for water quality assessment provides stakeholders with information on potential water quality issues, and the spatial relations between watershed land uses and select water quality monitoring parameters.

Water quality monitoring efforts support scientifically-based decision making by transforming raw data generated from environmental field samples into the information necessary to answer specific questions, aid organizational management objectives, and effectively communicate water quality conditions and/or trends to stakeholders and the public. Functional water quality monitoring activities focus not only on the collection of samples from the field, but also on generating the types of analyses and interpretations necessary to turn raw data into meaningful action.

Stakeholder groups often struggle with the task of transforming data into the information necessary for guiding efforts to protect or enhance water quality conditions. Water quality data analysis and interpretation must provide the community with timely and relevant information about water quality in the water body(s) of interest within the context of existing regulatory frameworks and local knowledge of perceived or observed water quality stressors. Knowledge gained from analysis of water quality data transfers most readily to decision-making processes through targeted and well-planned communication and reporting efforts.

Water quality reporting must convey highly pertinent information to target audiences with highly variable levels of technical understanding and information needs. The mechanisms selected for communicating results of water quality data analysis must provide each target audience with discussions and interpretations considerate of their respective levels of technical expertise.

To provide the greatest utility to local stakeholders and the general public, this report strives to:

- Align with State and federal regulatory frameworks,
- Utilize data produced by numerous agencies and organizations,
- Provide adequate analysis to help stakeholders understand relationships between current water quality conditions and a range of possible water uses, and
- Present analysis results and interpretations to a diverse audience in an easy-to-understand format.

This Crystal River Water Quality Summary generally corresponds to Colorado's 305(b) and 303(d) assessment and reporting requirements outlined in the Federal Clean Water Act (CWA). The Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) administers the CWA in Colorado. WQCD delineates and classifies all waters in the State according to existing or potential beneficial uses. 305(b) stream segmentation and corresponding water quality standards reflect streams and rivers geographical orientation, ambient water quality conditions, expected water use types, and/or impacts from one or more water quality stressors. WQCD uses data produced by ongoing water quality monitoring to determine whether or not water bodies continue to retain a level of quality necessary to support the beneficial use(s) assigned to it. For a full discussion of 305(b) and 303(d) reporting requirements, please refer to the Integrated Water Quality Monitoring and Assessment Report (CDPHE, 2012). The water quality regulatory framework defined by the CWA provides a convenient construct for reporting on observed water quality conditions for segments of the Crystal River and its tributaries as it provides quantifiable

benchmarks of water quality for data comparison. Assessment of collected data against WQCD standards for water quality also allows stakeholders to anticipate future regulatory action under CWA on a given water body where water quality measurements fail to meet standards.

Evaluation of water quality monitoring results in this report generally follows the guidelines established in CDPHE Regulation #93: Section 303(d) Listing Methodology, 2012 Listing Cycle. The largest difference between water quality reporting conducted here and that performed by WQCD resides in the handling of water quality parameters relevant to multiple designated water uses. Common WQCD practice dictates evaluation of data collected for a given parameter against only the most stringent water quality standard adopted on a given water body. For example, the WQCD defines different standards for arsenic for multiple designated water use types. The chronic arsenic standard for aquatic life use attainment is much higher (150 μg/l) than the standard for domestic water supply use attainment (0.02-10 μg/l). In such a case, WQCD may elect to evaluate arsenic data only against the domestic water supply use standard. This report evaluates data against all applicable standards for each stream segment in the watershed, as defined by their designated water uses and the relevant standards defined in CDPHE Regulation #31. This approach provides a more comprehensive understanding of water quality conditions across the watershed. Generally, the reporting template utilized here strives to distill large amounts of water quality sampling data using a set of methods justifiable to the scientific and regulatory communities, while presenting interpretations in a highly visual manner.

Aggregation and distillation of recently collected water quality data in a context relevant to resource management decision-making processes (i.e. CWA regulatory framework) allows decision makers to quickly 1) better understand existing data gaps, 2) assess the future effectiveness of water quality protection/improvement programs or policies, 3) evaluate the effects of various land use practices on water quality conditions, and 4) anticipate regulatory action from state or federal agencies.

2 METHODOLOGY

2.1 DATA SOURCES

Multiple agencies and organizations collect water quality data across the Crystal River watershed (Table 1). Insufficient metadata may lead to inappropriate data use, or misinterpretation of results and represents a significant barrier to data analysis. The existence of multiple non-standardized data formatting approaches represents another barrier to data analysis, as reformatting data sets may require a significant time investment. Therefore, selection of data sources that minimize formatting concerns and provide adequate data annotation represents a critical step when conducting water quality evaluations. To this end, data aggregated and used here represents only a subset of the data produced by active data collection efforts in the watershed.

Table 1. Entities that produced data utilized in the generation of this report.

ID	Organization	WQX ID
CDHPE	Colorado Departmernt of Public Health and Environment	21COL001
CORIVWCH	Colorado River Watch	CORIVWCH_WQX
USGS	United States Geologic Survey	USGS-CO

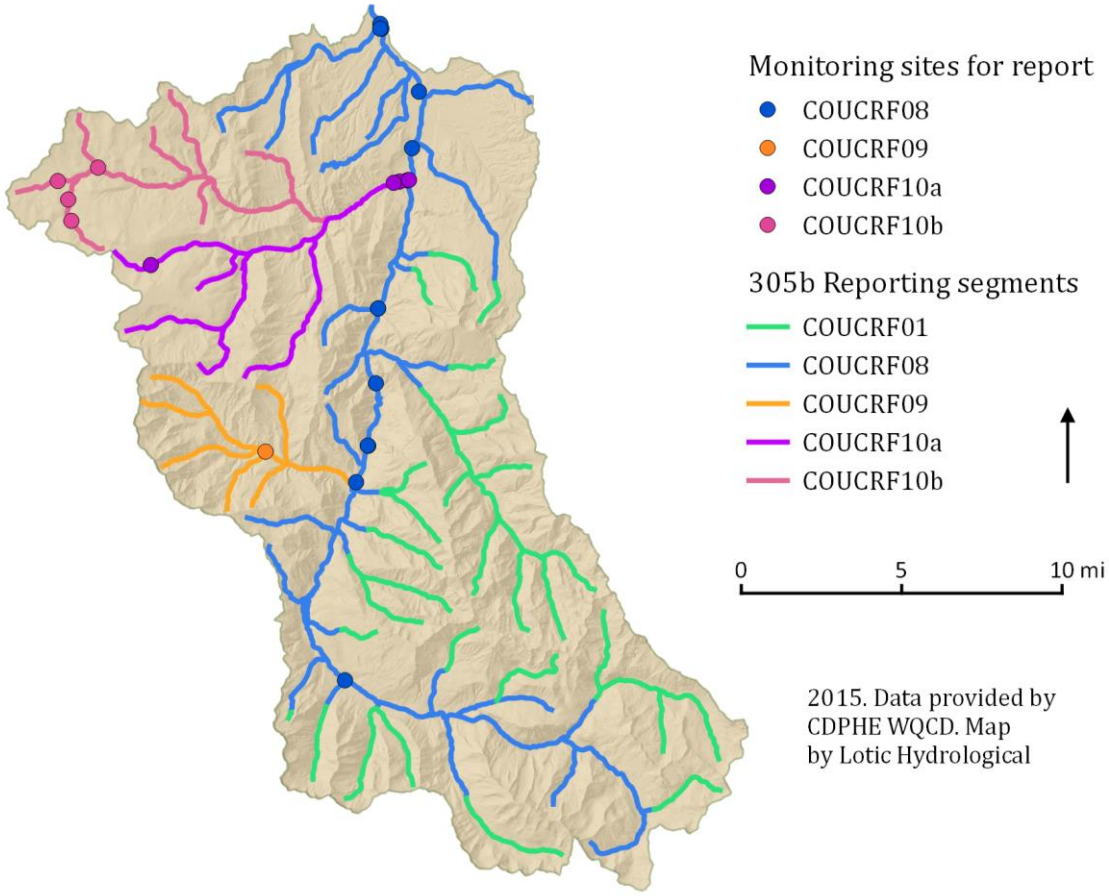
To ensure that readers of this report retain the ability to cross-reference statistical summary information against raw data from the selected data source(s), LH utilized only data stored in public electronic data repositories. All data utilized for analysis in this report came from either the USGS NWIS database, or the EPA STORET database—both accessible through the National Water Quality Monitoring Council Water Quality Portal (www.waterqualitydata.us). Use of these electronic repositories greatly simplifies data formatting concerns during analysis. Additionally, the

requirements by the NWIS and STORET repositories for storage and publication of minimum metadata sets with any stored water quality data value provide an avenue for evaluation of data reliability. The fact that not all data collection entities across the watershed store data in either NWIS or STORET and because some data entry into STORET experiences a significant lag time between data collection and publication (e.g. Colorado Watershed Assembly River Watch data) there are some inherent disadvantages to using the selected data sources.

2.2 DATA ANALYSIS

Data used in this report was derived from surface water samples collected along 305(b) stream segments in the Crystal River Watershed over ten water years spanning the time period between January 1, 2004 and December 31th, 2014. The resultant data set contained just over 12,000 individual data points collected from 23 sampling locations (Appendix 1). The entire Crystal River basin comprises one 10-digit HUC watershed. Prior to analysis, water quality data was grouped according 305(b) stream segments. This data aggregation schema aligns with the State of Colorado's assessment methodology for Clean Water Act reporting. Data did not exist over the time period of interest for all 305(b) segments in the Crystal River Watershed; notably, no data exists for segment COUCRF01 *All tributaries to the Roaring Fork River system within the Maroon Bells/Snowmass, Holy Cross, Raggeds, Collegiate Peaks and the Hunter/Fryingpan Wilderness Areas*. This resulted from either no data or a lack of recent sample collection at some locations, or the lag-time between sample collection and data publication noted above. Only 4 data points from a single day sampling event existed for segment COUCRF10b, the North and Middle Branches of Thompson Creek.

Figure 1. Monitoring locations within the Crystal River watershed producing data used in this report.



Analysis of data collected for each chemical water quality parameter produced summary statistics useful for qualitative interpretation and ranking. Summary statistics included the minimum observed value, the median value, the maximum value, the date when the maximum was observed, the 15th percentile of the data, the 50th percentile of the data, and the 85th percentile of the data.

Assessment of water quality conditions relied on comparison of collected data to WQCD water quality standards for particular water uses on a given water body. Data analysis utilized EPA recommendations for water quality parameters where no WQCD standard exists. Water uses and associated water quality standards for a given segment corresponded to 305(b) water use type classifications and narrative or numeric standards outlined in CDPHE Regulation #31 and Regulation #33. Aggregation of data for a particular 305(b) segment did not attempt to distinguish differences in water quality conditions between multiple data collection locations on that segment. Quantitative analysis of numerical data relied on the R statistical computing environment (http://www.r-project.org/).

Methods for data evaluation followed CDPHE Regulation #93 for attainment of water quality standards, as quoted below:

> *"Attainment of chronic chemical standards, in both streams and rivers, and lakes and reservoir systems, is based upon the 85th percentile of the ranked data, […]. Percentile values are calculated by ranking individual data points in order of magnitude. Hardness-based metal standards are evaluated by comparing the 85th percentile against the assigned hardness-based equation using the mean hardness. Total recoverable metals are evaluated against the median value, or the 50th percentile. Dissolved metals are evaluated against the 85th percentile. Dissolved oxygen (DO) is evaluated at the 15th percentile for streams. Minima pH is evaluated against the 15th percentile, maxima at the 85th percentile. […]"*
>
> *"Sample data that are below detection limits will, in general (except coliform data), be treated as zeroes for assessment of attainment. […]"*
>
> *"Attainment of the E.coli standard is assessed using the geometric mean of representative stream samples. […] E.coli data that are reported as less than detect will be treated as a value of one to allow calculation of a geometric mean. […] Evaluation of the E. coli standard is over multiple fixed two-month intervals. The evaluation intervals are: January/February, March/April, May/June, July/August, September/October, and November/December. […]"*
>
> *"Biological and/or physical assessment protocols may support a determination of non-attainment of numeric standards or, alternately, nonattainment of narrative standards and classified uses. […] In general, a determination that an assigned aquatic life use is not supported will be consistent with the protocols established in WQCC Policy 10-1, 'Aquatic Life Use Attainment, Methodology to Determine Use Attainment for Streams and Rivers.' […]"*

Calculation of mean hardness values for assessments using hardness-based standards utilized all hardness data collected on a given segment over the entire observation period. Comparison of observed water quality data against water supply use protection standards did **not** consider the location of the observed arsenic, nitrate, or nitrite data in relation to any drinking water supply intakes. Neither did this assessment attempt to calculate standards for manganese, iron and sulfate using pre-2000 existing water quality conditions. Rather, in keeping with the intention of this report as a coarse-screening tool for assessing water quality conditions throughout the watershed, table value standards (TVS) were used for assessment of water supply use protection on each stream segment.

Categorical use-protection rankings were assigned to each parameter evaluated against State of Colorado water quality standards or EPA recommendations. In general, if the ambient levels of a given water quality parameter (defined as the 50th percentile of the ranked data for total metals and the 85th percentile for all other chemical

parameters) exceeded the relevant water quality standard, the segment received a 'Poor' use protection rating for that parameter. If the ambient quality did not exceed the standard, but did exceed 50% of the standard concentration *and* the maximum observed concentration exceeded the standard, the segment or site received a 'Concern' use protection rating for that parameter. If neither the ambient quality nor the maximum observed concentration exceeded the standard, but ambient conditions did exceed 50% of the standard concentration, the segment or site received an 'Acceptable' use protection rating for that parameter. A use protection rating of 'Good' was awarded when ambient conditions did not exceed 50% of the standard for a given parameter. When the number of censored values in a data set equaled the number or water quality samples, the segment or site received a "Poor Resolution" rating. This ranking system generally aligns with the "Concern levels" adopted by the USGS in the *Comparison of 2011–12 water years and historical water-quality data, Eagle River Basin, Colorado* (http://co.water.usgs.gov/infodata/eagle_summaries/).

Several parameters were not evaluated as described above. In the cases of pH and dissolved oxygen, a 'Poor' use protection rating was awarded when ambient conditions exceeded the standard. All other instances produced a 'Good' rating. Parameters evaluated in the field using USGS severity codes did not lend themselves to assessment based on statistical summaries. A 'Good' use protection rating reflected a USGS severity ranking of 'None'. A USGS severity ranking of 'Mild' or 'Moderate' garnered a 'Concern' use protection rating, while a USGS severity ranking of 'Severe' or 'Extreme' produced a 'Poor' rating for a given parameter. Fish tissue advisories producing data outside the expected range received a 'Poor' use protection rating and advisories producing data within the expected range received a 'Good' rating. Macroinvertebrate data produced a 'Poor' rating when results indicated an exceedances of the standard, a "Concern' rating when results fell within the 'gray zone' described in WQCC Policy 10-1, and 'Good' rating for all other conditions.

Assignment of a 'Concern' or 'Poor' use protection rating for any given water quality parameter led to subsequent identification of potential, suspected, or known impairment sources. Water quality impairment sources fell into two main categories (point- and non-point source) and several sub-categories. Existing water quality reports, scientific literature, and expert knowledge informed source identification. Importantly, assignment of sources to water quality parameters indicating impairment does not qualify as an official determination of impairment as defined by WQCD. All source assignments should be considered preliminary and likely require further investigation.

2.3 DATA QUALITY AND REPRESENTATIVENESS

Aggregating data from multiple reporting organizations ranging from federal agencies to local volunteers can create concerns regarding quality, reliability, and comparability. Data used in this assessment came from multiple sources: USGS, Colorado River Watch, and CDPHE. Sample collection conducted by the USGS adheres to the strictest quality assurance and quality control protocols and earns the highest data quality ranking. CDPHE likewise maintains strict quality assurance protocols in field and analytical methods. River Watch sample collection also occurs under a QAQC plan. However, long holding times prior to sample analysis and initial data collection by volunteers can reduce the reliability in the data. The relatively large data set used to characterize water quality conditions, especially for the mainstem Crystal River, should also decrease potential error and bias in overall statistical summaries of monitoring data. For the purposes of this assessment, all data is assumed to be equal quality. Data points leading to assessment ratings of 'Concern' or 'Poor' may receive individually closer scrutiny to ensure reliability of results.

2.4 NAVIGATING THE CRYSTAL RIVER WATER QUALITY SUMMARY

The following section presents the general organization of summary information for water quality reporting on various stream segments in the Crystal River watershed. Both the general public and resource managers with some technical expertise in water quality should find this report useful. LH strives to strike a balance between simplifying the interpretation of water quality data and providing enough statistical summary information to make a more

thorough or detailed evaluation possible. The most highly summarized and qualitative interpretations and discussions appear first, while the more data rich sections containing quantitative assessments and statistical summaries appear later. A reader primarily interested in gleaning a high level interpretation of water quality conditions will likely find the watershed overview and summary discussions most useful, but may not delve more deeply into the statistical summaries of data collected on individual segments or monitoring locations. Conversely, a resource manager interested in a particular water quality issue on a water body of interest may quickly review the watershed summary information and spend the majority of his or her time reviewing the assessment of water quality by designated water use or the statistical summaries of collected data.

Section 3 presents a summary of water quality conditions across the watershed. Section 4 reports in more detail on water quality conditions observed on each segment. Each subsection in Section 4 provides a summary of factors impacting water quality on the 305b segment, the current regulatory status, a brief narrative discussion of water quality conditions of concern. The appendices provide detailed descriptive statistics for both aggregated segments. This information will primarily be useful to the reader wishing to discern the specific conditions driving a particular assessment rating for a site or parameter. Provided summary statistics include the number of samples used (n), the median and range of the observations in the review time period, the 15 and 85 percentiles used in standards comparison, whether statistically significant trends exist, the presence of WQCD standards exceedances, along with the qualitative assessment ranking for each parameter using the criteria defined above.

3 QUALITY OF WATERS IN THE CRYSTAL RIVER SUBWATERSHED

3.1 WATER QUALITY CONDITIONS SUMMARIZED BY 305(B) SEGMENT

This water quality report summarizes the available data generated from data collection sites across the Crystal River watershed over the previous 10 calendar years (January 04 — December 2014); it may not report findings for a given water quality parameter on a water body if sampling did not occur in that period. Additionally, and due to the nuanced nature of water quality reporting presented here, LH recommends that all readers refer to the narrative discussions of perceived water quality concerns on a given segment, as well as the statistical summaries within the appendices, prior to forming a final impression of the issue or taking any action in response to the summary information presented in various figures or tables. The data quality, number of samples, and number of censored values for a particular parameter are of particular importance when considering water quality use protection ratings.

The Crystal River drains approximately 350 square miles in Garfield, Pitkin, and Gunnison Counties in Colorado. Watershed elevations range from 14,000 to 6,800 and land cover includes alpine, subalpine forest, dry forest, scrub, range, agricultural, and urban uses. For a thorough description of watershed characteristics, see: Clarke et al., 2008; Malone and Emerick, 2007; and RFC, 2006.

WQCD currently designates 5 segments in the Crystal Basin for biannual 305b assessments to EPA (Table 2). Segment 10 formerly comprised all of Thompson Creek but was split to 10a and 10b. These segments total nearly 300 stream miles, nearly all off of which currently attain all beneficial uses; known as Category 1 waters in 305b reporting. The exception is Segment 10a, which has logged periodic exceedances of aquatic life standards for total iron and is currently a Category 5 water. Generally, water quality conditions across the Crystal River watershed remain in compliance with the recommended standards or limits established by WQCD or EPA. Limited exceptions occur with a subset of trace metals and elements, and recreation aesthetics parameters. The mainstem Crystal River (segment COUCRF08) scored a 'Poor' Use Protection assessment for Human Health-Drinking Water standards for lead; and for Fish Ingestion and Fish+Water standards for Arsenic. Monitoring results on this segment also identified previous concerns for the Recreation Use Class protection indicators Taste/Odor and Turbidity. Observations of dissolved aluminum produced a use-protection rating of 'Concern' and 'Poor' on segments in the Thompson Creek Watershed. A more detailed discussion of these issues occurs in Section 4.

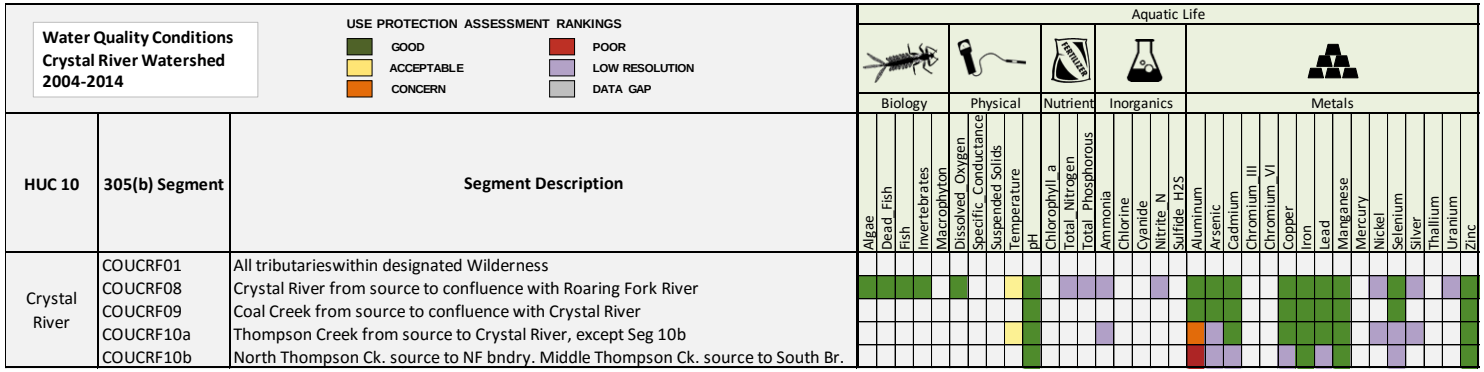
In 2012, CDPHE identified total iron as a concern in the Thompson Creek Watershed, and placed segment COUCRF10a on the state's Monitoring and Evaluation list (WQCD, 2012). In reviewing historical water quality data stretching to the 1960's, Colorado Mesa University researchers also noted high total iron as an issue on the Crystal River and Coal Creek (Cite Russ's study). Those authors noted limited standards exceedances of lead and total arsenic, and even more infrequent exceedances for pH, nitrate, cadmium, copper, and selenium. These exceedances either did not meet common Colorado regulatory benchmark for standards assessment (85th percentile of observations exceeds the standard for dissolved parameters, 50th percentile exceeds the standard for recoverable), or were not aggregated by CMU researches in a manner that allowed for standards assessment.

Table 2. HUC 1401000407 Crystal River watershed 305b stream segments, 2014.

ID 305(B)	Assessment Unit Name	Total Size	Unit	First Year	Designated Uses	Causes of Impairment	Impariment Sources	Category
COUCRF01	All tribs to Roaring Fork system, including wetlands, within Maroon Bells/Snowmass, Holy Cross, Raggeds, Collegiate Peaks and Hunter/Fryingpan Wilderness areas	81.40	MILES	--	OW, Agriculture, Aq Life Cold 1, Water Supply, Primary Contact Recreation	N/A	N/A	1
COUCRF08	Crystal River, including all tribs and wetlands, from source to confluence with Roaring Fork River	119.40	MILES	--	Primary Contact Recreation,Agriculture, Aq Life Cold 1, Water Supply	N/A	N/A	1
COUCRF09	Coal Creek, including all tribs and wetlands from source to confluence with Crystal River	22.30	MILES	--	Primary Contact Recreation, Water Supply, Agriculture,Aq Life Cold 1	N/A	N/A	1
COUCRF10a	Thompson Creek including all tribs and wetlands from source to Crystal River, except Seg 10b	29.30	MILES	--	Agriculture, Aq Life Cold 1, Water Supply, Primary Contact Recreation	Fe(Trec) [M&E]	N/A	5
COUCRF10b	North Thompson Creek, including tribs and wetlands, from source to WRNF boundary. Middle Thompson Creek, including all tribs and wetlands, from source to confluence with South Branch Middle Thompson Creek	28.30	MILES	--	OW, Water Supply, Aq Life Cold 1, Agriculture, Primary Contact Recreation	N/A	N/A	1

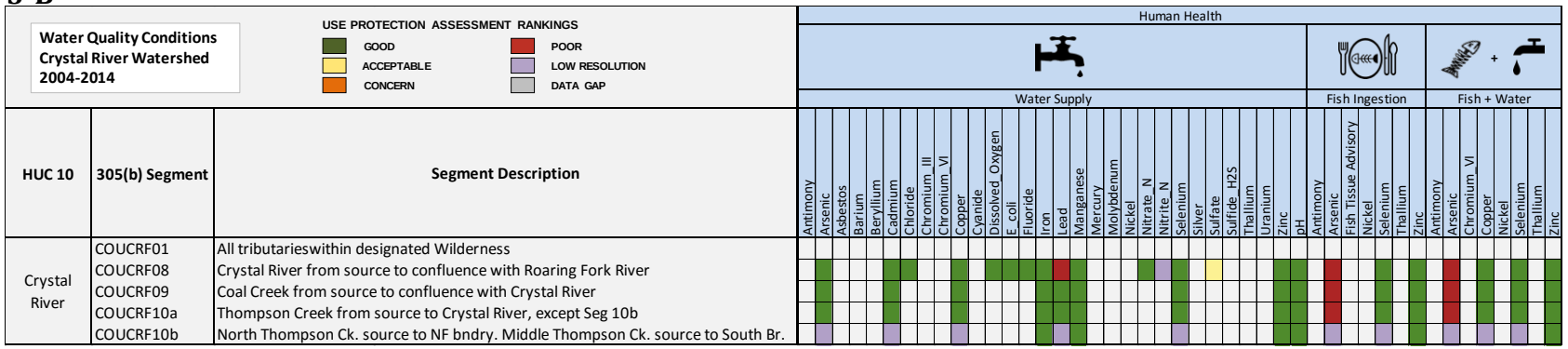
Table 3. Beneficial Use Class protection ratings for Crystal River watershed segments. Panels A-C: Aquatic Life, Human Health, Agriculture and Recreation. See Section 2.2 for a full description of the methodology for assigning Use Class Assessment Ratings

3-A



HUC 10	305(b) Segment	Segment Description
Crystal River	COUCRF01	All tributarieswithin designated Wilderness
	COUCRF08	Crystal River from source to confluence with Roaring Fork River
	COUCRF09	Coal Creek from source to confluence with Crystal River
	COUCRF10a	Thompson Creek from source to Crystal River, except Seg 10b
	COUCRF10b	North Thompson Ck. source to NF bndry. Middle Thompson Ck. source to South Br.

3-B



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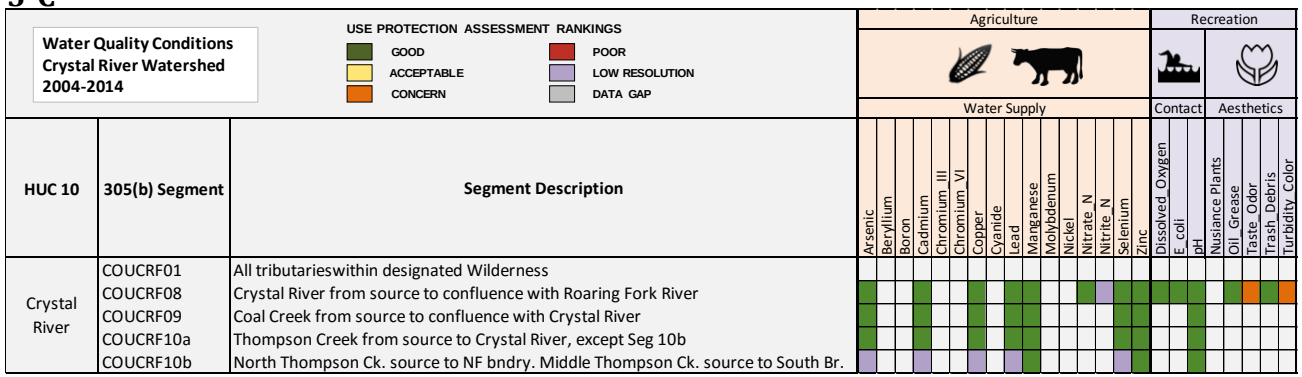
3-C



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	COUCRF10b	North Thompson Ck. source to NF bndry. Middle Thompson Ck. source to South Br.

4 STREAM SEGMENT REVIEWS

4.1 SEGMENT COUCERF01

Reach Description: All tributaries to the Roaring Fork River system within the Maroon Bells/Snowmass, Holy Cross, Raggeds, Collegiate Peaks and the Hunter/Fryingpan Wilderness Areas.

Designated Uses: Recreation (E), Agriculture, Aquatic Life Cold (Type 1), and Water Supply

4.1.1 Summary

No reported data collection in these Crystal River Tributaries is reported in the STORET and NWIS databases for the period of review, constituting a large *data gap* for these waters. These streams flow out of the southwest portion of the Maroon Bells/Snowmass Wilderness and the northeast side of the Raggeds Wilderness. Wilderness areas, by their nature, encompass undisturbed or pristine lands. Headwater streams draining undisturbed areas will generally exhibit conditions that conform to water quality standards recommended by WQCD. In cases where conditions do not meet standards, surficial geology, climate, or natural ecosystem succession likely drive water quality. Therefore, understanding conditions on wilderness tributaries to the Crystal River may help understand reference and background water quality conditions for the Crystal River, but will not lead to changes in land or water use management. Data collection entities that may be active in these tributaries but not reported to the unified databases used here include the USFS.

4.1.2 Regulatory Status

WQCD classifies Segment 1 or the Roaring Fork River as fully supportive of all water uses.

4.1.3 Water quality parameters of interest

None

4.2 SEGMENT COUCRF08

Reach Description: Mainstem of Crystal River, including all tributaries and wetlands, from source to the confluence with the Roaring Fork River, except for specific listings in segments 1, 9, and 10.

Designated Uses: Recreation (E), Agriculture, Aquatic Life Cold (Type 1), and Water Supply

4.2.1 Summary

Segment 8 comprises the entire Crystal River mainstem the forks above the town of Marble to the confluence at Carbondale. A wide variety of land uses occur in the watershed and near-stream areas that can potentially impact water quality conditions. Upper watershed land uses are marked by resource extraction activities, including forestry, legacy hardrock mining, and limited current underground quarrying in Marble and Avalanche Creek. In the past, exceedances of multiple trace metals have been documented in the upper watershed, with legacy hardrock mining activities identified as the likely source (NWCCOG, 2012). These trace metal issues have not seemed to continue more recently. Tributary watersheds like Coal Creek experienced significant mining historically that generating sediment impacts from disturbed lands in the present day. The Highway 133 corridor closely follows the river throughout the middle and upper watershed, generating runoff from vehicle use and road maintenance, and altering the physical channel structure in many locations within the narrow canyon. In the lower (northern) portion of the basin, the river

enters a wide alluvial valley containing large irrigated acreages of hay and livestock pasture. Closer to Carbondale, agricultural lands are supplanted by light-to-medium density residential subdivisions and increasing urban land uses.

Impacts from these land uses are largely absent in the 10 year period of review for this report; the river maintains healthy physic-chemical conditions based on assessment of available information. Although the ambient water quality as defined by chemistry monitoring shows good health conditions, other sources have noted extensive riparian and physical alteration (RFC SHI, 2007), as well as extensive flow extraction and flow regime alteration that contribute to overall ecosystem degradation in the stream system by creating low flow or near-dry conditions (S.K. Mason, 2012).

4.2.2 Regulatory Status

CDPHE classifies Segment 8 of the Crystal River as fully supportive of all water uses.

4.2.3 Water quality parameters of interest

Arsenic

At least one field sample collected on Segment 8 produced arsenic concentrations in excess of the WQCD standard for water and fish use protection. The 50tth percentile of the data (the ambient water quality) also exceeded the standard. Concern over arsenic concentrations is abated by the fact that the likelihood of achieving a clinical dose from combined fish consumption and water ingestion is extremely low. The scientific consensus on appropriate arsenic levels and human health risk is still in flux at the state regulatory level in Colorado. Thus, while the ambient conditions violate the arsenic standard for water supply and fish, Segment 8 is not considered water quality impaired for arsenic by CDPHE. Elevated arsenic concentrations are most likely related to natural geological weathering.

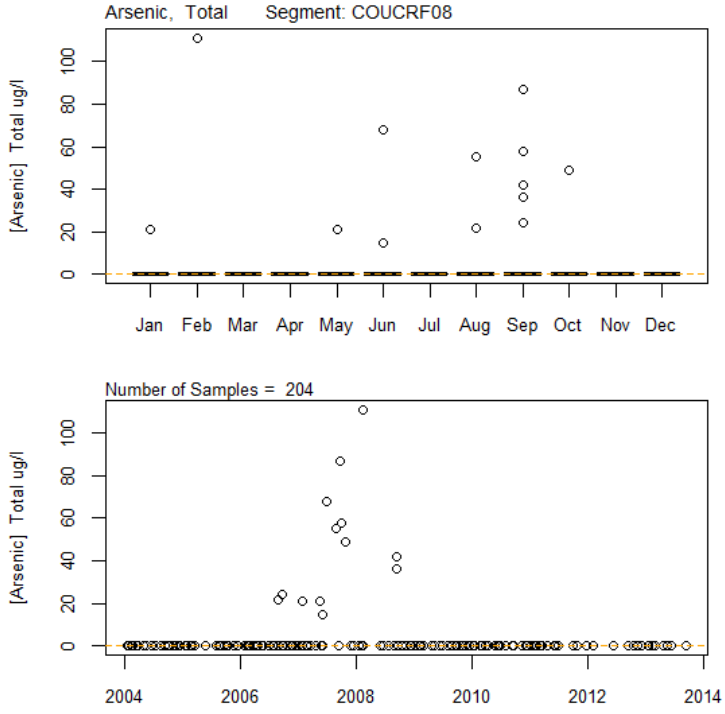

Figure 2. Seasonal patterns of total arsenic concentrations, Segment 8.

Lead

At least one field sample collected on Segment 8 produced lead concentrations in excess of the WQCD standard for water supply use protection. However, the 85th percentile of the data (the ambient water quality) did not exceed the standard. The maximum observation occurred in 2007 and other exceedances in the 10 year review period are absent. Reasons for elevated iron concentrations are unclear.

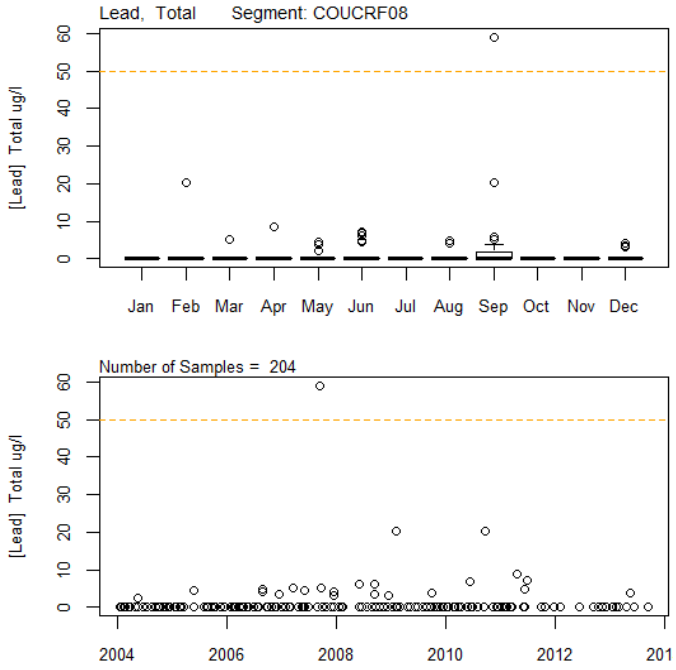

Figure 3. Seasonal patterns of total lead, Segment 8.

Taste/Odor

USGS personnel observed one moderately severe taste and odor issues in 2005 near Avalanche Creek. A dearth of recent taste and odor data makes it difficult to determine whether the issue is ongoing.

Turbidity/Color

Moderate to serious turbidity was observed on Segment 8. Inspection of the dataset reveals most observations occur between March and June. Natural increases in turbidity are likely in the Crystal watershed during snowmelt and following late summer storm events, reducing the overall concern associated with these observations.

4.3 SEGMENT COUCRF09

Reach Description: Coal Creek, including all tributaries and wetlands, from source to confluence with Crystal River

Designated Uses: Recreation (E), Agriculture, Aquatic Life Cold (Type 1), and Water Supply

4.3.1 Summary

Coal Creek is a significant tributary on in the southwest portion of the Crystal River Watershed. As the name implies, significant coal deposits supported mining operations throughout the first half of the 20th century. Today, no active mining occurs, but disturbed high-elevation mine lands contribute to geomorphic instability and increased generation of sediment load and potentially dissolved metals in the stream. A regional water quality review found exceedances of both acute and chronic standards for dissolved lead and cadmium between 2006 and 2011 (NWCCOG, 2012). Unstable geology and steep slopes also naturally contribute high sediment inputs to the stream. Efforts to reclaim much of the scarified land and stabilize soils have met with some successes. More-extensive information on Coal Creek is available in the Roaring Fork Watershed Plan at www.roaringfork.org.

4.3.2 Regulatory status

CDPHE classifies Segment 9 of the Crystal River as fully supportive of all water uses.

4.3.3 Water quality parameters of interest

Arsenic

At least one field sample collected on Segment 9 produced arsenic concentrations in excess of the WQCD standard for water and fish use protection. The 50tth percentile of the data (the ambient water quality) also exceeded the standard. Concern over arsenic concentration is abated by the fact that no drinking water supply is sourced Thompson Coal Creek. The scientific consensus on appropriate arsenic levels and human health risk is still in flux at the state regulatory level in Colorado. Thus, while the ambient conditions violate the arsenic standard for water supply and fish, Segment 10a is not considered water quality impaired for arsenic by CDPHE. Elevated arsenic concentrations are most likely related to natural geological.

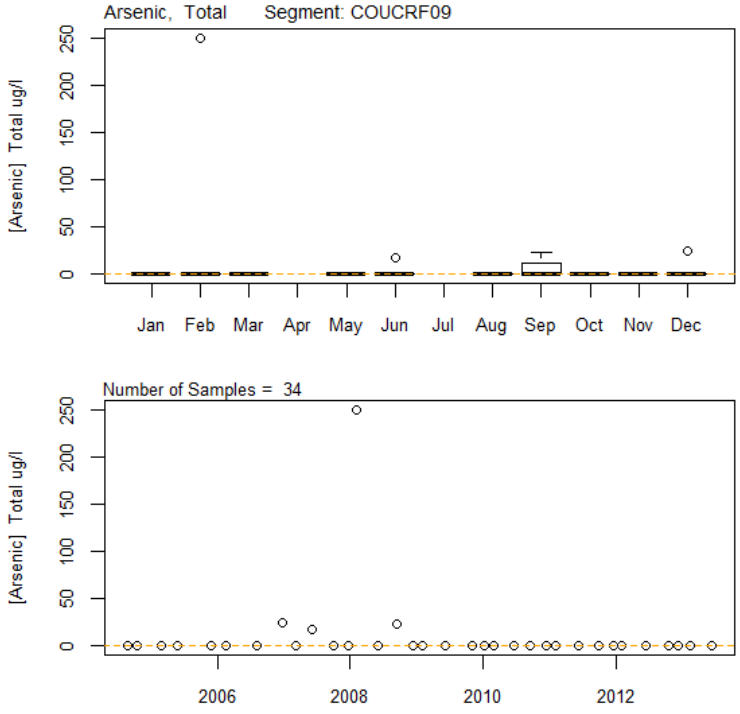

Figure 4. Seasonal patterns of total arsenic, Segment 9.

4.4 **SEGMENT COUCRF10a**

Reach Description: Thompson Creek including all tribs and wetlands from source to Crystal River, except segment 10b.

Designated Uses: Recreation (E), Agriculture, Aquatic Life Cold (Type 1), and Water Supply

4.4.1 Summary

Thompson Creek drains the northwestern portion of the Crystal River watershed; these areas tend to be lower elevation and slightly more arid than the Elk Mountains to the south. Heavily forested hillslopes cover upper elevations, while piñon-juniper and scrub are widespread closer to the Crystal River. Increased oil and gas development interest in the upper basin reaches, known locally as the Thompson Divide, holds potential to significantly impact water resources. Local advocacy groups instituted baseline water quality monitoring in 2009, although that data is reported separately and not currently available in STORET/NWIS (Moran, 2014). Limited forestry activities and widespread dryland ranching on private lands and public leases with USFS continue presently. Soils and geology in the lower watershed area contain erosive sedimentary formations with the potential to generate high fluxes of sediment and dissolved solids, including total metals, during runoff. A regional water quality review noted exceedances aquatic life standards for total iron as well as dissolved lead (NWCCOG, 2012).

4.4.2 Regulatory status

Segment 10a is on CDPHE's Monitoring and Evaluation list for total iron, *Fe(Trec)*.

4.4.3 Water quality parameters of interest

Aluminum

At least one field sample collected on Segment 10a produced dissolved aluminum concentrations in excess of the WQCD standard for aquatic life use protection. However, the 85th percentile of the data (the ambient water quality) did not exceed the standard. Highest observations coincide with time periods of spring snowmelt, indicating that elevated aluminum concentrations are most likely related to natural geologic weathering and sediment (Figure X.X).

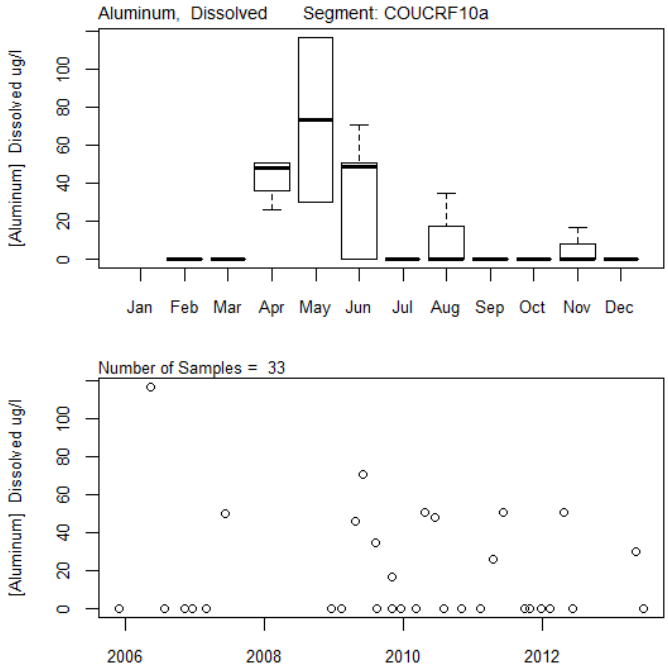

Figure 5. Seasonal patterns of dissolved aluminum, Segment 10a.

Arsenic

At least one field sample collected on Segment 10a produced arsenic concentrations in excess of the WQCD standard for water and fish use protection. The 50tth percentile of the data (the ambient water quality) also exceeded the standard. Concern over arsenic concentrations is abated by the fact that no drinking water supply is sourced from Coal Creek. The scientific consensus on appropriate arsenic levels and human health risk is still in flux at the state regulatory level in Colorado. Thus, while the ambient conditions exceed the arsenic standard for water supply and fish, Segment 10a is not considered water quality impaired for arsenic by CDPHE. Elevated arsenic concentrations are most likely related to natural geological weathering but may be exacerbated by historical mining activities along upstream reaches.

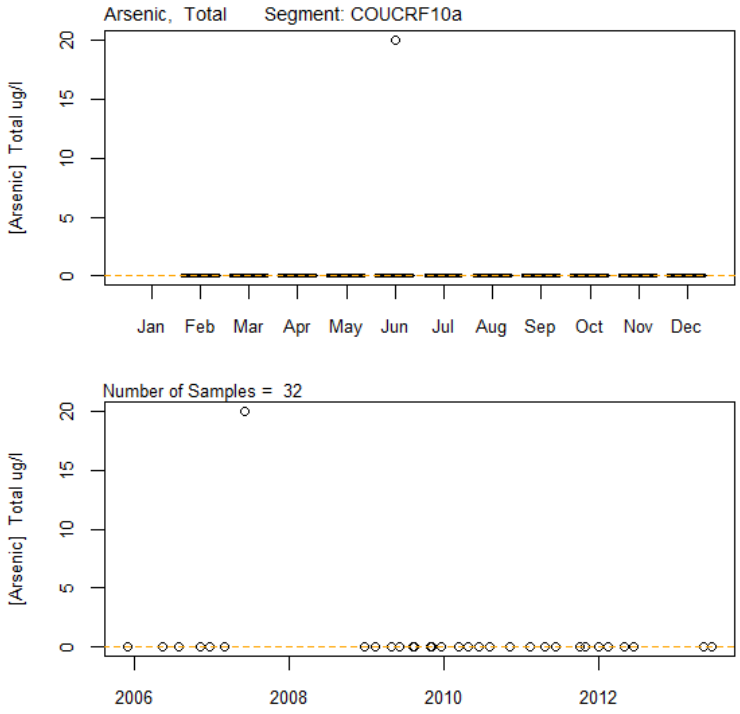

Figure 6. Seasonal patterns of total arsenic, Segment 10a.

4.5 SEGMENT COUCRF10b

Reach Description: North Thompson Creek, including tributaries and wetlands, from source to USFS boundary; Middle Thompson Creek, including all tributaries and wetlands, from source to confluence with South Branch Middle Thompson Creek.

Designated Uses: Recreation (E), Agriculture, Aquatic Life Cold (Type 1), and Water Supply

4.5.1 Summary

Segment 10b includes the North and Middle Branches of Thompson Creek. Watershed physiography is similar to the main stem and South Branch: heavily forested hillslopes cover upper elevations, while pinon-juniper and scrub are widespread closer to the Crystal River. Increased oil and gas development interest in the upper basin reaches, known locally as the Thompson Divide, holds potential to significantly impact water resources. Local advocacy groups instituted baseline water quality monitoring in 2009, although that data is reported separately and not currently available in STORET/NWIS (Moran, 2014). Underground coal mining activities occurred up until the last decade in the North Branch, and one NPDES discharge permit existed for a coal processing discharge tied to the mine. Although high total metals concentrations (iron) are present in the natural background stream quality above mining-impacted lands, increases in TDS and salinity were previously notable below mined lands (NWCCOG, 2012). Limited forestry activities and widespread dryland ranching on private lands and public leases with USFS continue presently. Soils and geology in the lower watershed area contain erosive sedimentary formations with the potential to generate high fluxes of sediment and dissolved solids, including total metals, during runoff.

4.5.2 Regulatory status

CDPHE classifies Segment 10b of the Crystal River as fully supportive of all water uses.

4.5.3 Water quality parameters of interest

Aluminum

At least one field sample collected on Segment 10b produced aluminum concentrations in excess of the WQCD standard for aquatic life use protection. The 85th percentile of the data (the ambient water quality) also exceeded the standard. Only 4 data points existed for the review period on this stream segment, therefore any inferences about the spatial and temporal extent of aluminum concerns on Segment 10b should be cautious. Additional sampling over several years and variable seasons should illuminate the issue more clearly.

5 REFERENCES

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6 APPENDIX: 305b Segment Statistical summary tables

Segment COUCRF08: Crystal River from source to confluence with Roaring Fork River

								DATA ANALYSIS											
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Aquatic Life	Biology	Algae	code		54		USGS-CO				None								Good
		Dead_Fish	code		54		USGS-CO				None								Good
		Fish	unitless		0														
		Invertebrates	unitless		0														
		Macrophyton	code		0														Data Gap
	Physical	Dissolved_Oxygen	mg/l	Dissolved	40	0	USGS-CO	7.8	9.65	11.8		1/30/2008	8.6	10.915			FALSE	FALSE	Good
		Specific_Conductance	umho/cm		0														Data Gap
		Suspended Solids	mg/l		0														
		Temperature	deg C		82	0	21COL001_WQX,USGS-CO	0.3	7.95	21.2		8/8/2012	3.3	13.9			FALSE	FALSE	Acceptable
		pH	Std. Units		214	2	21COL001_WQX,CORIVWCH_WQ	0	8.305	8.91		1/14/2009	8.11	8.48			FALSE	FALSE	Good
	Nutrients	Chlorophyll_a	mg/m^2		0														Data Gap
		Total_Nitrogen	ug/l	Total	8	8	USGS-CO												Poor Resolution
		Total_Phosphorous	ug/l	Total	1	1	USGS-CO												Poor Resolution
	Inorganics	Ammonia	mg/l as N	Total	10	10	21COL001,21COL001_WQX												Poor Resolution
		Chlorine	mg/l	Total Residual	0														Data Gap
		Cyanide	mg/l	Free Available	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	56	56	USGS-CO												Poor Resolution
		Sulfide_H2S	mg/l		0														Data Gap
	Metals	Aluminum	ug/l	Total	204	22	CORIVWCH_WQX	0	60.5	17060		9/17/2007	18	549.85			TRUE	FALSE	Good
		Arsenic	ug/l	Dissolved	209	198	21COL001,21COL001_WQX,CORI	0	0	62		9/28/2007	0	0			FALSE	FALSE	Good
		Cadmium	ug/l	Dissolved	243	226	21COL001,21COL001_WQX,CORI	0	0	0.39		2/22/2010	0	0			FALSE	FALSE	Good
		Chromium_III	ug/l	Dissolved	0														Data Gap
		Chromium_VI	ug/l	Dissolved	0														Data Gap
		Copper	ug/l	Dissolved	243	212	21COL001,21COL001_WQX,CORI	0	0	3.8		5/25/2006	0	0			FALSE	FALSE	Good
		Iron	ug/l	Total	231	4	CORIVWCH_WQX	0	92	45190		9/17/2007	32.5	734.5			TRUE	FALSE	Good
		Lead	ug/l	Dissolved	243	234	21COL001,21COL001_WQX,CORI	0	0	3.6		12/12/2008	0	0			FALSE	FALSE	Good
		Manganese	ug/l	Dissolved	239	178	21COL001,21COL001_WQX,CORI	0	0	19		12/17/2007	0	5.73			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Nickel	ug/l	Dissolved	3	3	21COL001_WQX												Poor Resolution
		Selenium	ug/l	Dissolved	243	204	21COL001,21COL001_WQX,CORI	0	0	9.3		6/29/2007	0	0.264			TRUE	FALSE	Good
		Silver	ug/l	Dissolved	39	39	21COL001,21COL001_WQX,USGS-CO												Poor Resolution
		Thallium	ug/l	Dissolved	0														Data Gap
		Uranium	ug/l	Dissolved	2	2	21COL001												Poor Resolution
		Zinc	ug/l	Dissolved	243	155	21COL001,21COL001_WQX,CORI	0	0	52.9		9/29/2009	0	5.07			FALSE	FALSE	Good
Recreation	Contact	Dissolved_Oxygen	mg/l	Dissolved	40	0	USGS-CO	7.8	9.65	11.8		1/30/2008	8.6	10.915			FALSE	FALSE	Good
		E_coli	cfu/100ml		40	8	USGS-CO	0	6	140		8/7/2007	0	32.3			TRUE	FALSE	Good
		pH	Std. Units		214	2	21COL001_WQX,CORIVWCH_WQ	0	8.305	8.91		1/14/2009	8.11	8.48			FALSE	FALSE	Good
	Aesthetics	Nusiance Plants	code		0														Data Gap
		Oil_Grease	code		54		USGS-CO				None								Good
		Taste_Odor	code		54		USGS-CO				Moderate								Concern
		Trash_Debris	code		54		USGS-CO				None								Good
		Turbidity_Color	code		54		USGS-CO				Moderate								Concern

DATA ANALYSIS																		
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Human Health	Water Supply	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	204	191	CORIVWCH_WQX	0	0	111		2/15/2008	0	0			TRUE	FALSE	Good
		Asbestos	fibers/L		0														Data Gap
		Barium	ug/l	Total	0														Data Gap
		Beryllium	ug/l	Total	0														Data Gap
		Cadmium	ug/l	Total	204	184	CORIVWCH_WQX	0	0	0.95		2/22/2010	0	0			FALSE	FALSE	Good
		Chloride	mg/l	Dissolved	30	0	USGS-CO	0.57	3.475	12.7		2/6/2012	1.008	6.465			FALSE	FALSE	Good
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	204	187	CORIVWCH_WQX	0	0	67.8		9/17/2007	0	0			FALSE	FALSE	Good
		Cyanide	mg/l	Free Available	0														Data Gap
		Dissolved_Oxygen	mg/l	Dissolved	40	0	USGS-CO	7.8	9.65	11.8		1/30/2008	8.6	10.915			FALSE	FALSE	Good
		E_coli	cfu/100ml		40	8	USGS-CO	0	6	140		8/7/2007	0	32.3			FALSE	FALSE	Good
		Fluoride	mg/l	Dissolved	30	7	USGS-CO	0	0.195	0.32		2/6/2012	0	0.28			FALSE	FALSE	Good
		Iron	ug/l	Dissolved	208	119	21COL001_WQX,CORIVWCH_WQ	0	0	74		5/26/2005	0	15.95			FALSE	FALSE	Good
		Lead	ug/l	Total	204	180	CORIVWCH_WQX	0	0	59		9/17/2007	0	0			TRUE	TRUE	Poor
		Manganese	ug/l	Dissolved	239	178	21COL001,21COL001_WQX,CORI	0	0	19		12/17/2007	0	5.73			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	40	0	USGS-CO	0.046	0.136	0.209		9/19/2007	0.0921	0.18045			FALSE	FALSE	Good
		Nitrite_N	mg/l as N	Dissolved	56	56	USGS-CO												Poor Resolution
		Selenium	ug/l	Total	204	172	CORIVWCH_WQX	0	0	40.8		9/25/2007	0	2.555			FALSE	FALSE	Good
		Silver	ug/l	Total	0														Data Gap
		Sulfate	mg/l	Dissolved	30	0	USGS-CO	19	80.9	225		2/6/2012	25.835	150			FALSE	FALSE	Acceptable
		Sulfide_H2S	mg/l	Dissolved	0														Data Gap
		Thallium	ug/l	Total	0														Data Gap
		Uranium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	204	112	CORIVWCH_WQX	0	0	205.3		9/17/2007	0	10.75			FALSE	FALSE	Good
		pH	Std. Units		214	2	21COL001_WQX,CORIVWCH_WQ	0	8.305	8.91		1/14/2009	8.11	8.48			FALSE	FALSE	Good
	Fish Ingestion	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	204	191	CORIVWCH_WQX	0	0	111		2/15/2008	0	0			TRUE	TRUE	Poor
		Fish Tissue Advisory	unitless		0														
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	204	172	CORIVWCH_WQX	0	0	40.8		9/25/2007	0	2.555			FALSE	FALSE	Good
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	204	112	CORIVWCH_WQX	0	0	205.3		9/17/2007	0	10.75			FALSE	FALSE	Good
	Fish + Water	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	204	191	CORIVWCH_WQX	0	0	111		2/15/2008	0	0			TRUE	TRUE	Poor
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	204	187	CORIVWCH_WQX	0	0	67.8		9/17/2007	0	0			FALSE	FALSE	Good
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	204	172	CORIVWCH_WQX	0	0	40.8		9/25/2007	0	2.555			FALSE	FALSE	Good
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	204	112	CORIVWCH_WQX	0	0	205.3		9/17/2007	0	10.75			FALSE	FALSE	Good

DATA ANALYSIS																		
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Agriculture	Water Supply	Arsenic	ug/l	Total	204	191	CORIVWCH_WQX	0	0	111		2/15/2008	0	0			FALSE	FALSE	Good
		Beryllium	ug/l	Total	0														Data Gap
		Boron	mg/l	Dissolved	0														Data Gap
		Cadmium	ug/l	Total	204	184	CORIVWCH_WQX	0	0	0.95		2/22/2010	0	0			FALSE	FALSE	Good
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	204	187	CORIVWCH_WQX	0	0	67.8		9/17/2007	0	0			FALSE	FALSE	Good
		Cyanide	mg/l	Dissolved	0														Data Gap
		Lead	ug/l	Total	204	180	CORIVWCH_WQX	0	0	59		9/17/2007	0	0			FALSE	FALSE	Good
		Manganese	ug/l	Total	231	94	CORIVWCH_WQX	0	6.7	953.4		9/17/2007	0	24.9			TRUE	FALSE	Good
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	40	0	USGS-CO	0.046	0.136	0.209		9/19/2007	0.0921	0.18045			FALSE	FALSE	Good
		Nitrite_N	mg/l as N	Dissolved	56	56	USGS-CO												Poor Resolution
		Selenium	ug/l	Total	204	172	CORIVWCH_WQX	0	0	40.8		9/25/2007	0	2.555			FALSE	FALSE	Good
		Zinc	ug/l	Total	204	112	CORIVWCH_WQX	0	0	205.3		9/17/2007	0	10.75			FALSE	FALSE	Good
Comments					Values below detection limits are treated as zeros														

Segment COUCRF09: Coal Creek, including wetlands and tributaries, from source to Crystal River

DATA ANALYSIS																			
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Aquatic Life	Biology	Algae	code		0														Data Gap
		Dead_Fish	code		0														Data Gap
		Fish	unitless		0														
		Invertebrates	unitless		0														
		Macrophyton	code		0														Data Gap
	Physical	Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		Specific_Conductance	umho/cm		0														Data Gap
		Suspended Solids	mg/l		0														
		Temperature	deg C		0														Data Gap
		pH	Std. Units		37	0	CORIVWCH_WQX	8.16	8.48	8.87		8/23/2004	8.368	8.642			FALSE	FALSE	Good
	Nutrients	Chlorophyll_a	mg/m^2		0														Data Gap
		Total_Nitrogen	ug/l	Total	0														Data Gap
		Total_Phosphorous	ug/l	Total	0														Data Gap
	Inorganics	Ammonia	mg/l as N	Total	0														Data Gap
		Chlorine	mg/l	Total Residual	0														Data Gap
		Cyanide	mg/l	Free Available	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Sulfide_H2S	mg/l		0														Data Gap
	Metals	Aluminum	ug/l	Total	34	2	CORIVWCH_WQX	0	138.5	2916		6/8/2011	20.9	400.9			TRUE	FALSE	Good
		Arsenic	ug/l	Dissolved	34	32	CORIVWCH_WQX	0	0	290		2/7/2008	0	0			TRUE	FALSE	Good
		Cadmium	ug/l	Dissolved	34	31	CORIVWCH_WQX	0	0	0.29		12/21/2006	0	0			FALSE	FALSE	Good
		Chromium_III	ug/l	Dissolved	0														Data Gap
		Chromium_VI	ug/l	Dissolved	0														Data Gap
		Copper	ug/l	Dissolved	34	32	CORIVWCH_WQX	0	0	2.1		2/4/2009	0	0			FALSE	FALSE	Good
		Iron	ug/l	Total	34	0	CORIVWCH_WQX	18	172	4032		6/8/2011	30.9	552.85			TRUE	FALSE	Good
		Lead	ug/l	Dissolved	34	32	CORIVWCH_WQX	0	0	6.4		2/7/2008	0	0			TRUE	FALSE	Good
		Manganese	ug/l	Dissolved	34	31	CORIVWCH_WQX	0	0	7.7		9/17/2010	0	0			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Nickel	ug/l	Dissolved	0														Data Gap
		Selenium	ug/l	Dissolved	34	30	CORIVWCH_WQX	0	0	5.9		2/16/2006	0	0			TRUE	FALSE	Good
		Silver	ug/l	Dissolved	0														Data Gap
		Thallium	ug/l	Dissolved	0														Data Gap
		Uranium	ug/l	Dissolved	0														Data Gap
		Zinc	ug/l	Dissolved	34	25	CORIVWCH_WQX	0	0	7.2		12/19/2007	0	4.01	0	0.0144302	FALSE	FALSE	Good
Recreation	Contact	Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		E_coli	cfu/100ml		0														Data Gap
		pH	Std. Units		37	0	CORIVWCH_WQX	8.16	8.48	8.87		8/23/2004	8.368	8.642			FALSE	FALSE	Good
	Aesthetics	Nusiance Plants	code		0														Data Gap
		Oil_Grease	code		0														Data Gap
		Taste_Odor	code		0														Data Gap
		Trash_Debris	code		0														Data Gap
		Turbidity_Color	code		0														Data Gap

DATA ANALYSIS																			
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Human Health	Water Supply	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	34	30	CORIVWCH_WQX	0	0	250		2/7/2008	0	0			TRUE	FALSE	Good
		Asbestos	fibers/L		0														Data Gap
		Barium	ug/l	Total	0														Data Gap
		Beryllium	ug/l	Total	0														Data Gap
		Cadmium	ug/l	Total	34	28	CORIVWCH_WQX	0	0	0.51		9/28/2007	0	0.1915			FALSE	FALSE	Good
		Chloride	mg/l	Dissolved	0														Data Gap
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	34	31	CORIVWCH_WQX	0	0	5.4		2/25/2005	0	0			FALSE	FALSE	Good
		Cyanide	mg/l	Free Available	0														Data Gap
		Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		E_coli	cfu/100ml		0														Data Gap
		Fluoride	mg/l	Dissolved	0														Data Gap
		Iron	ug/l	Dissolved	34	22	CORIVWCH_WQX	0	0	64		11/23/2005	0	14	0	0.0082524	FALSE	FALSE	Good
		Lead	ug/l	Total	34	27	CORIVWCH_WQX	0	0	12.8		9/28/2007	0	3.11			FALSE	FALSE	Good
		Manganese	ug/l	Dissolved	34	31	CORIVWCH_WQX	0	0	7.7		9/17/2010	0	0			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Selenium	ug/l	Total	34	29	CORIVWCH_WQX	0	0	10.7		6/8/2007	0	0.15	0	0.0465639	FALSE	FALSE	Good
		Silver	ug/l	Total	0														Data Gap
		Sulfate	mg/l	Dissolved	0														Data Gap
		Sulfide_H2S	mg/l	Dissolved	0														Data Gap
		Thallium	ug/l	Total	0														Data Gap
		Uranium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	34	17	CORIVWCH_WQX	0	1.45	48.1		11/23/2005	0	7.32	-0.6321429	0.0030344	FALSE	FALSE	Good
		pH	Std. Units		37	0	CORIVWCH_WQX	8.16	8.48	8.87		8/23/2004	8.368	8.642			FALSE	FALSE	Good
	Fish Ingestion	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	34	30	CORIVWCH_WQX	0	0	250		2/7/2008	0	0			TRUE	TRUE	Poor
		Fish Tissue Advisory	unitless		0														
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	34	29	CORIVWCH_WQX	0	0	10.7		6/8/2007	0	0.15	0	0.0465639	FALSE	FALSE	Good
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	34	17	CORIVWCH_WQX	0	1.45	48.1		11/23/2005	0	7.32	-0.6321429	0.0030344	FALSE	FALSE	Good
	Fish + Water	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	34	30	CORIVWCH_WQX	0	0	250		2/7/2008	0	0			TRUE	TRUE	Poor
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	34	31	CORIVWCH_WQX	0	0	5.4		2/25/2005	0	0			FALSE	FALSE	Good
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	34	29	CORIVWCH_WQX	0	0	10.7		6/8/2007	0	0.15	0	0.0465639	FALSE	FALSE	Good
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	34	17	CORIVWCH_WQX	0	1.45	48.1		11/23/2005	0	7.32	-0.6321429	0.0030344	FALSE	FALSE	Good

DATA ANALYSIS																		
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Agriculture	Water Supply	Arsenic	ug/l	Total	34	30	CORIVWCH_WQX	0	0	250		2/7/2008	0	0			TRUE	FALSE	Good
		Beryllium	ug/l	Total	0														Data Gap
		Boron	mg/l	Dissolved	0														Data Gap
		Cadmium	ug/l	Total	34	28	CORIVWCH_WQX	0	0	0.51		9/28/2007	0	0.1915			FALSE	FALSE	Good
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	34	31	CORIVWCH_WQX	0	0	5.4		2/25/2005	0	0			FALSE	FALSE	Good
		Cyanide	mg/l	Dissolved	0														Data Gap
		Lead	ug/l	Total	34	27	CORIVWCH_WQX	0	0	12.8		9/28/2007	0	3.11			FALSE	FALSE	Good
		Manganese	ug/l	Total	34	17	CORIVWCH_WQX	0	2.7	76		6/8/2011	0	13.755			FALSE	FALSE	Good
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Selenium	ug/l	Total	34	29	CORIVWCH_WQX	0	0	10.7		6/8/2007	0	0.15	0	0.0465639	FALSE	FALSE	Good
		Zinc	ug/l	Total	34	17	CORIVWCH_WQX	0	1.45	48.1		11/23/2005	0	7.32	-0.6321429	0.0030344	FALSE	FALSE	Good
Comments					Values below detection limits are treated as zeros														

Segment COUCRF10a: Thompson Creek from source to Crystal River, except Seg 10b

DATA ANALYSIS																		
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Aquatic Life	Biology	Algae	code		0														Data Gap
		Dead_Fish	code		0														Data Gap
		Fish	unitless		0														
		Invertebrates	unitless		0														
		Macrophyton	code		0														Data Gap
	Physical	Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		Specific_Conductance	umho/cm		0														Data Gap
		Suspended Solids	mg/l		0														
		Temperature	deg C		2	0	21COL001_WQX	1.6	6.755	11.91		8/9/2011	3.1465	10.3635			FALSE	FALSE	Acceptable
		pH	Std. Units		28	0	21COL001_WQX,CORIVWCH_WQ	8.01	8.305	9.07		8/13/2009	8.1225	8.713			FALSE	FALSE	Good
	Nutrients	Chlorophyll_a	mg/m^2		0														Data Gap
		Total_Nitrogen	ug/l	Total	0														Data Gap
		Total_Phosphorous	ug/l	Total	0														Data Gap
	Inorganics	Ammonia	mg/l as N	Total	2	2	21COL001_WQX												Poor Resolution
		Chlorine	mg/l	Total Residual	0														Data Gap
		Cyanide	mg/l	Free Available	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Sulfide_H2S	mg/l		0														Data Gap
	Metals	Aluminum	ug/l	Total	32	2	CORIVWCH_WQX	0	363	13908		6/7/2011	35.95	1966.15			TRUE	FALSE	Concern
		Arsenic	ug/l	Dissolved	33	33	21COL001_WQX,CORIVWCH_WQX												Poor Resolution
		Cadmium	ug/l	Dissolved	34	32	21COL001_WQX,CORIVWCH_WQ	0	0	0.22		5/17/2006	0	0			FALSE	FALSE	Good
		Chromium_III	ug/l	Dissolved	0														Data Gap
		Chromium_VI	ug/l	Dissolved	0														Data Gap
		Copper	ug/l	Dissolved	34	33	21COL001_WQX,CORIVWCH_WQ	0	0	1.9		12/16/2009	0	0			FALSE	FALSE	Good
		Iron	ug/l	Total	32	0	CORIVWCH_WQX	18	328	11855		6/7/2011	50.65	1424.6			TRUE	FALSE	Good
		Lead	ug/l	Dissolved	34	32	21COL001_WQX,CORIVWCH_WQ	0	0	5.5		12/19/2008	0	0			TRUE	FALSE	Good
		Manganese	ug/l	Dissolved	34	28	21COL001_WQX,CORIVWCH_WQ	0	0	13		8/5/2009	0	4.075			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Nickel	ug/l	Dissolved	1	1	21COL001_WQX												Poor Resolution
		Selenium	ug/l	Dissolved	34	34	21COL001_WQX,CORIVWCH_WQX												Poor Resolution
		Silver	ug/l	Dissolved	2	2	21COL001_WQX												Poor Resolution
		Thallium	ug/l	Dissolved	0														Data Gap
		Uranium	ug/l	Dissolved	0														Data Gap
		Zinc	ug/l	Dissolved	34	29	21COL001_WQX,CORIVWCH_WQ	0	0	14		5/8/2013	0	0.3	0	0.0463016	FALSE	FALSE	Good
Recreation	Contact	Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		E_coli	cfu/100ml		0														Data Gap
		pH	Std. Units		28	0	21COL001_WQX,CORIVWCH_WQ	8.01	8.305	9.07		8/13/2009	8.1225	8.713			FALSE	FALSE	Good
	Aesthetics	Nusiance Plants	code		0														Data Gap
		Oil_Grease	code		0														Data Gap
		Taste_Odor	code		0														Data Gap
		Trash_Debris	code		0														Data Gap
		Turbidity_Color	code		0														Data Gap

DATA ANALYSIS																		
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Human Health	Water Supply	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	32	31	CORIVWCH_WQX	0	0	20		6/8/2007	0	0			TRUE	FALSE	Good
		Asbestos	fibers/L		0														Data Gap
		Barium	ug/l	Total	0														Data Gap
		Beryllium	ug/l	Total	0														Data Gap
		Cadmium	ug/l	Total	32	27	CORIVWCH_WQX	0	0	0.65		6/7/2011	0	0.0665			FALSE	FALSE	Good
		Chloride	mg/l	Dissolved	0														Data Gap
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	32	26	CORIVWCH_WQX	0	0	9.1		6/7/2011	0	1.17			FALSE	FALSE	Good
		Cyanide	mg/l	Free Available	0														Data Gap
		Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		E_coli	cfu/100ml		0														Data Gap
		Fluoride	mg/l	Dissolved	0														Data Gap
		Iron	ug/l	Dissolved	34	10	21COL001_WQX,CORIVWCH_WQ	0	24.5	117		5/17/2006	0	63.3			FALSE	FALSE	Good
		Lead	ug/l	Total	32	22	CORIVWCH_WQX	0	0	34.1		6/7/2011	0	4.77			FALSE	FALSE	Good
		Manganese	ug/l	Dissolved	34	28	21COL001_WQX,CORIVWCH_WQ	0	0	13		8/5/2009	0	4.075			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Selenium	ug/l	Total	32	31	CORIVWCH_WQX	0	0	6		5/17/2006	0	0			FALSE	FALSE	Good
		Silver	ug/l	Total	0														Data Gap
		Sulfate	mg/l	Dissolved	0														Data Gap
		Sulfide_H2S	mg/l	Dissolved	0														Data Gap
		Thallium	ug/l	Total	0														Data Gap
		Uranium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	32	13	CORIVWCH_WQX	0	4.1	63.3		6/7/2011	0	14.435			FALSE	FALSE	Good
		pH	Std. Units		28	0	21COL001_WQX,CORIVWCH_WQ	8.01	8.305	9.07		8/13/2009	8.1225	8.713			FALSE	FALSE	Good
	Fish Ingestion	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	32	31	CORIVWCH_WQX	0	0	20		6/8/2007	0	0			TRUE	TRUE	Poor
		Fish Tissue Advisory	unitless		0														
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	32	31	CORIVWCH_WQX	0	0	6		5/17/2006	0	0			FALSE	FALSE	Good
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	32	13	CORIVWCH_WQX	0	4.1	63.3		6/7/2011	0	14.435			FALSE	FALSE	Good
	Fish + Water	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	32	31	CORIVWCH_WQX	0	0	20		6/8/2007	0	0			TRUE	TRUE	Poor
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	32	26	CORIVWCH_WQX	0	0	9.1		6/7/2011	0	1.17			FALSE	FALSE	Good
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	32	31	CORIVWCH_WQX	0	0	6		5/17/2006	0	0			FALSE	FALSE	Good
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	32	13	CORIVWCH_WQX	0	4.1	63.3		6/7/2011	0	14.435			FALSE	FALSE	Good

DATA ANALYSIS																		
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Agriculture	Water Supply	Arsenic	ug/l	Total	32	31	CORIVWCH_WQX	0	0	20		6/8/2007	0	0			FALSE	FALSE	Good
		Beryllium	ug/l	Total	0														Data Gap
		Boron	mg/l	Dissolved	0														Data Gap
		Cadmium	ug/l	Total	32	27	CORIVWCH_WQX	0	0	0.65		6/7/2011	0	0.0665			FALSE	FALSE	Good
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	32	26	CORIVWCH_WQX	0	0	9.1		6/7/2011	0	1.17			FALSE	FALSE	Good
		Cyanide	mg/l	Dissolved	0														Data Gap
		Lead	ug/l	Total	32	22	CORIVWCH_WQX	0	0	34.1		6/7/2011	0	4.77			FALSE	FALSE	Good
		Manganese	ug/l	Total	32	10	CORIVWCH_WQX	0	9.75	409.1		6/7/2011	0	41.01			TRUE	FALSE	Good
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Selenium	ug/l	Total	32	31	CORIVWCH_WQX	0	0	6		5/17/2006	0	0			FALSE	FALSE	Good
		Zinc	ug/l	Total	32	13	CORIVWCH_WQX	0	4.1	63.3		6/7/2011	0	14.435			FALSE	FALSE	Good
Comments					Values below detection limits are treated as zeros														

Segment COUCRF10b: N Thompson Creek from source to NF boundary. Middle Thompson Creek from source to S Br

DATA ANALYSIS																			
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Aquatic Life	Biology	Algae	code		0														Data Gap
		Dead_Fish	code		0														Data Gap
		Fish	unitless		0														
		Invertebrates	unitless		0														
		Macrophyton	code		0														Data Gap
	Physical	Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		Specific_Conductance	umho/cm		0														Data Gap
		Suspended Solids	mg/l		0														
		Temperature	deg C		0														Data Gap
		pH	Std. Units		4	0	CORIVWCH_WQX	7.85	7.89	8.16		9/21/2011	7.859	8.0475			FALSE	FALSE	Good
	Nutrients	Chlorophyll_a	mg/m^2		0														Data Gap
		Total_Nitrogen	ug/l	Total	0														Data Gap
		Total_Phosphorous	ug/l	Total	0														Data Gap
	Inorganics	Ammonia	mg/l as N	Total	0														Data Gap
		Chlorine	mg/l	Total Residual	0														Data Gap
		Cyanide	mg/l	Free Available	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Sulfide_H2S	mg/l		0														Data Gap
	Metals	Aluminum	ug/l	Total	4	0	CORIVWCH_WQX	77	130	437		9/21/2011	95.45	304.25			TRUE	TRUE	Poor
		Arsenic	ug/l	Dissolved	4	4	CORIVWCH_WQX												Poor Resolution
		Cadmium	ug/l	Dissolved	4	4	CORIVWCH_WQX												Poor Resolution
		Chromium_III	ug/l	Dissolved	0														Data Gap
		Chromium_VI	ug/l	Dissolved	0														Data Gap
		Copper	ug/l	Dissolved	4	4	CORIVWCH_WQX												Poor Resolution
		Iron	ug/l	Total	4	0	CORIVWCH_WQX	143	229.5	799		9/21/2011	148.4	576.25			FALSE	FALSE	Good
		Lead	ug/l	Dissolved	4	4	CORIVWCH_WQX												Poor Resolution
		Manganese	ug/l	Dissolved	4	0	CORIVWCH_WQX	7.1	10.75	14.8		9/21/2011	7.775	13.945			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Nickel	ug/l	Dissolved	0														Data Gap
		Selenium	ug/l	Dissolved	4	4	CORIVWCH_WQX												Poor Resolution
		Silver	ug/l	Dissolved	0														Data Gap
		Thallium	ug/l	Dissolved	0														Data Gap
		Uranium	ug/l	Dissolved	0														Data Gap
		Zinc	ug/l	Dissolved	4	3	CORIVWCH_WQX	0	0	12.9		9/21/2011	0	7.095			FALSE	FALSE	Good
Recreation	Contact	Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		E_coli	cfu/100ml		0														Data Gap
		pH	Std. Units		4	0	CORIVWCH_WQX	7.85	7.89	8.16		9/21/2011	7.859	8.0475			FALSE	FALSE	Good
	Aesthetics	Nusiance Plants	code		0														Data Gap
		Oil_Grease	code		0														Data Gap
		Taste_Odor	code		0														Data Gap
		Trash_Debris	code		0														Data Gap
		Turbidity_Color	code		0														Data Gap

DATA ANALYSIS																			
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Human Health	Water Supply	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Asbestos	fibers/L		0														Data Gap
		Barium	ug/l	Total	0														Data Gap
		Beryllium	ug/l	Total	0														Data Gap
		Cadmium	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Chloride	mg/l	Dissolved	0														Data Gap
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Cyanide	mg/l	Free Available	0														Data Gap
		Dissolved_Oxygen	mg/l	Dissolved	0														Data Gap
		E_coli	cfu/100ml		0														Data Gap
		Fluoride	mg/l	Dissolved	0														Data Gap
		Iron	ug/l	Dissolved	4	0	CORIVWCH_WQX	39	90.5	178		9/21/2011	51.15	149.65			FALSE	FALSE	Good
		Lead	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Manganese	ug/l	Dissolved	4	0	CORIVWCH_WQX	7.1	10.75	14.8		9/21/2011	7.775	13.945			FALSE	FALSE	Good
		Mercury	ug/l	Total	0														Data Gap
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Selenium	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Silver	ug/l	Total	0														Data Gap
		Sulfate	mg/l	Dissolved	0														Data Gap
		Sulfide_H2S	mg/l	Dissolved	0														Data Gap
		Thallium	ug/l	Total	0														Data Gap
		Uranium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	4	2	CORIVWCH_WQX	0	2.45	5.3		9/21/2011	0	5.12			FALSE	FALSE	Good
		pH	Std. Units		4	0	CORIVWCH_WQX	7.85	7.89	8.16		9/21/2011	7.859	8.0475			FALSE	FALSE	Good
	Fish Ingestion	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Fish Tissue Advisory	unitless		0														
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	4	2	CORIVWCH_WQX	0	2.45	5.3		9/21/2011	0	5.12			FALSE	FALSE	Good
	Fish + Water	Antimony	ug/l	Total	0														Data Gap
		Arsenic	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Nickel	ug/l	Total	0														Data Gap
		Selenium	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Thallium	ug/l	Total	0														Data Gap
		Zinc	ug/l	Total	4	2	CORIVWCH_WQX	0	2.45	5.3		9/21/2011	0	5.12			FALSE	FALSE	Good

DATA ANALYSIS																			
USE		INDICATOR	UNITS	VALUE TYPE	SAMPLE COUNT	CENSORED COUNT	DATA SOURCES	MIN	MEDIAN	MAX	SEVERITY	DATE OF MAXIMUM	15TH PERCENTILE	85TH PERCENTILE	KENDAL SLOPE	KENDAL P-VALUE	STANDARD EXCEEDED	WQCD IMPAIRED	ASSESSMENT
Agriculture	Water Supply	Arsenic	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Beryllium	ug/l	Total	0														Data Gap
		Boron	mg/l	Dissolved	0														Data Gap
		Cadmium	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Chromium_III	ug/l	Total	0														Data Gap
		Chromium_VI	ug/l	Total	0														Data Gap
		Copper	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Cyanide	mg/l	Dissolved	0														Data Gap
		Lead	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Manganese	ug/l	Total	4	0	CORIVWCH_WQX	11.8	15.7	22.7		9/21/2011	13.15	19.955			FALSE	FALSE	Good
		Molybdenum	ug/l	Total	0														Data Gap
		Nickel	ug/l	Total	0														Data Gap
		Nitrate_N	mg/l as N	Dissolved	0														Data Gap
		Nitrite_N	mg/l as N	Dissolved	0														Data Gap
		Selenium	ug/l	Total	4	4	CORIVWCH_WQX												Poor Resolution
		Zinc	ug/l	Total	4	2	CORIVWCH_WQX	0	2.45	5.3		9/21/2011	0	5.12			FALSE	FALSE	Good
Comments					Values below detection limits are treated as zeros														