RECLAMATION

Managing Water in the West

Windy Gap Firming Project

Supplemental Information Report

November 2012

U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Introduction

In November 2011, the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), in cooperation with the U.S. Army Corps of Engineers (Corps), Western Area Power Administration, and Grand County Colorado, issued a Final Environmental Impact Statement (FEIS) disclosing the environmental effects of the proposed Windy Gap Firming Project (WGFP). The preferred alternative would improve the firm yield of water from the Windy Gap Project primarily through the construction of a new reservoir, Chimney Hollow, on the East Slope. The Municipal Subdistrict, Northern Colorado Water Conservancy District (Subdistrict) is the project proponent representing 14 water providers.

Since release of the FEIS, Reclamation discovered that new methodology has been developed by the State of Colorado relative to assessing the condition of existing aquatic invertebrate populations in the Colorado River below Windy Gap Reservoir.

Guidance

The Council on Environmental Quality (CEQ) regulations provides direction regarding the review of an Environmental Impact Statement (EIS) and preparation of supplemental statements. The CEQ regulations (Section 1502.9(c)) state: "Agencies: (1) Shall prepare supplements to either draft or final environmental impacts statements if:

i. The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or
ii. There are significant new circumstances or information relevant to environmental concerns and bearing upon the proposed action or its impacts."

A supplemental EIS is prepared under the above circumstances to ensure that the agency has the best possible information on which to make its decision regarding the proposal. In evaluating the updated description of the condition of existing aquatic invertebrate populations in the Colorado River below Windy Gap Reservoir, the criteria in Section 1502.9(c) of the CEQ regulations were employed to determine if significant new circumstances or information relevant to the environmental concerns and bearing on the project or its impacts have occurred since completion of the EIS in 2011.

Water Quality Control Commission (WQCC) - Aquatic Life Use Attainment WQCC Policy 2010-1

In October 2010, the Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Commission (WQCC) adopted the Aquatic Life Use Attainment WQCC Policy 2010-1, which established a methodology for the assessment of aquatic life use attainment in Colorado's rivers and streams. The WQCC also adopted the 2012 Listing Methodology in March 2011. The WQCC determined that the Colorado Multiple Metric Index (MMI) is an appropriate tool for the quantitative bioassessment of the health of aquatic communities. The CDPHE uses the MMI as a measure for determining whether streams are attaining their aquatic life use standard.

Section 303(d) of the federal Clean Water Act (CWA) requires states to identify waters where effluent limitations mandated by Section 301(b)(1)(A) and Section 301(b)(1)(B) are not stringent enough to attain water quality standards (CDPHE 2011). These waters are compiled into the Section 303(d) list of impaired waters. The Colorado Section 303(d) List identifies those water bodies, where there are exceedances of water quality standards or non-attainment of uses. Streams that are determined to have water quality impairments, including quantitative bioassessment measures, are placed on the States' 303(d) list. The Monitoring and Evaluation List (M&E List) identifies water bodies where there is reason to suspect water quality problems, but there is also uncertainty regarding one or more factors, such as whether the data are representative (CDPHE 2011).

Based on Colorado Division of Parks and Wildlife (CPW) data, the Water Quality Control Division (WQCD) determined that the portion of the Colorado River from below Windy Gap Reservoir to the Road 578 Bridge should be placed on the M&E List for impairment of aquatic life. The WQCD recognized that samples taken below water impoundments may not be reflective of the health of the aquatic community throughout the entire segment, and that an M&E listing may be more appropriate for this segment than inclusion on the 303(d) list (WQCC 2011). The WQCD indicates plans for future study of an alternate threshold for portions of stream segments below reservoirs because of the different physical and flow conditions found below dams (WQCC 2011).

The MMI values used for evaluating aquatic invertebrates reported in the WGFP FEIS were calculated using a previous version of MMI protocols. The CDPHE has revised the methodology for the calculations (CDPHE 2010). The following discussion describes the recalculation of MMI values using the updated protocols. In addition, a separate Erratum has been prepared showing the specific changes to the text of the FEIS as a result of the updated MMI calculations (USBOR 2012).

Calculation of MMI Values

Miller Ecological Consultants (MEC) revised their previous calculation of MMI values reported in the WGFP FEIS based on the current CDPHE protocols (MEC 2012). The updated CDPHE methodology for calculation of MMI values resulted in different values

than those reported in the WGFP FEIS (page 3-229). The current methodology for calculation of MMI values includes the following protocols:

- The samples are collected in the stream using a kick-net method for approximately 1 square meter of streambed in 1 minute, preserved and returned to the lab for analysis.
- In the lab, the samples are sorted using a random grid selection process and picked to a fixed count of 300 individual specimens.
- The sorted specimens are identified and logged into Colorado's Ecological Data Application System (EDAS) database.
- The EDAS database software is used to determine ecoregion, slope, and elevation based on the global positioning system (GPS) coordinates of the sample location.
- The EDAS software then calculates the MMI using the equations appropriate for the Biotype shown in Policy Statement 10-1, Appendix D (CDPHE 2010).

As part of the evaluation of baseline conditions for the WGFP EIS, MEC collected aquatic invertebrate replicate samples from the Colorado River at the Lone Buck site upstream from the confluence with the Williams Fork, and the Breeze site downstream from the Williams Fork. These study sites for both fish and aquatic invertebrates data collection were selected in consultation with the CPW. MEC collected aquatic invertebrate samples using a modified Hess sampler. This method collects a quantitative sample as compared to the qualitative sample collected using the kick-net technique listed in WQCC Policy Statement 10-1. MEC used a whole sample count for all of their samples to get a complete description of the invertebrates in each individual sample. The three replicate samples allowed calculation of statistics for each location sampled. This differs from the methodology in WQCC Policy Statement 10-1, which results in a single value from a subsample of the entire sample collected. No statistical analysis can be completed on the value calculated using the WQCC Policy Statement 10-1 protocols because there are no replicated samples.

Reclamation and MEC believed whole count sampling, rather than subsampling, provided a better assessment of aquatic invertebrate condition. However, regulatory agencies often use rapid bioassessment protocols and rely heavily on subsampling for evaluation of stream aquatic life because the data can be conducted faster and with less expense than more detailed data collection (CDPHE 2010; Nichols et al. 2006; Nichols and Norris 2006; Baker and Huggins 2005; Environment Canada 2002; Russell 2008). However, there are concerns, as noted in the literature, with the implications from relying on fixed-count subsampling. One of the main reasons for using subsampling is the ability to provide a metric in a cost- and time-efficient manner when compared to whole sample counts (Barbour and Gerritsen 1996; Courtemach 1996). The overall objective of subsampling for biomonitoring is twofold: 1) to distinguish when an actual change to the stream biota occurs and 2) to conduct the sampling on a large number of streams in a cost- and time-efficient manner. The former objective is not easy to achieve with subsampling, as several researchers have determined. Vinson and Hawkins (1996) recommend pooling several small area samples rather than a single sample of the same total area to potentially get a more comprehensive sample. Doberstein et al. (2000) found

that subsampling reduced the ability to differentiate between stream classes for some levels of subsampling. They also concluded that for subsamples of 100 to 300 individuals, the discriminatory power was low enough to mislead water resource decision makers.

As described above, the CDPHE currently uses the WQCC Policy Statement 10-1 subsampling methodology for calculating MMI values. Therefore, in addition to the whole count sampling, MEC recalculated the MMI values using the 300-fixed-count subsample from the whole count samples as described below.

Use of EDAS Program for Calculating MMI Values

MMI values were calculated using the EDAS program developed by the CDPHE. The database calculates the slope, ecoregion, and elevation of each sample site based on the geographic coordinates. These physical data are needed to determine the Biotype for the stream sample and apply the appropriate equations to compute the MMI value.

The sample sites on the Colorado River collected by MEC in 2004 are classified as Biotype 1 per the CDPHE protocols. This Biotype is characterized as "transitional" between mountains and plains. Ecoregion designation and the stream slope mainly determine the Biotype classification.

The first step in the MMI process is to subsample the MEC whole count samples to construct a 300-count subsample consistent with CDPHE protocols using the EDAS program. MEC composited three replicate samples collected with a modified Hess sampler for the subsampling procedure to compute the 300-count subsample. The subsample was then used in EDAS to calculate the intermediate values used in calculation of the MMI. The EDAS program calculated various metrics related to aquatic invertebrates as well as the MMI values.

Results from the EDAS program indicate MMI values of 42.9 for the Breeze site and 52.7 for the Lone Buck site (Table 1 and Table 2). CDPHE aquatic life thresholds for Biotype 1 have an attainment threshold MMI value of 52 and an impairment MMI value of 42 (CDPHE 2010). Thus, the Lone Buck site indicates it is above the attainment threshold and the Breeze site is in the zone between attainment and impairment. The MMI calculation in the FEIS using the previous CDPHE methods had indicated that both the Breeze and Lone Buck sites were above the attainment threshold.

Auxiliary metric thresholds are used to supplement MMI results when MMI values fall between attainment and impairment. Auxiliary metrics for Biotype 1 include a Hilsenhoff Biotic Index (HBI) value of less than 5.4 and a Shannon Diversity Index (S-W Diversity) greater than 2.4. Both the Breeze and Lone Buck sites fall within these ranges and indicate the sites are not impaired. As a basis of comparison, the whole count MMI scores are also displayed in Table 1 and Table 2.

The results of the updated MMI and auxiliary metric calculations were used to correct the information presented in the WGFP FEIS and are presented in a separate Errata Sheet based on the data in Table 1 and Table 2.

Table 1. MMI calculations for Colorado River at Breeze site, 300-count subsamples compared to whole count samples.

Biotype 1	Subsample 300-Count Data	MEC Whole Count Data
(Sub)sample size	345	6,908
S-W Diversity	3.57	3.68
HBI	3.67	2.4
MMI	42.9	68.3

Table 2. MMI calculations for Colorado River at Lone Buck site, 300-count subsamples compared to whole count samples.

Biotype 1	Subsample 300-Count Data	MEC Whole Count Data
(Sub)sample size	343	1,978
S-W Diversity	3.84	3.90
HBI	3.72	3.52
MMI	52.7	68.8

There are concerns with reliance on the MMI values calculated using the EDAS database software because of the use of small unreplicated samples and the inherent errors associated with subsampling. MEC determined the CDPHE protocols using the EDAS program can produce variable results (MEC 2012), based on subsequent EDAS subsample runs. Variations in the MMI scores spanned the attainment and impaired thresholds. Given this information, it appears the stronger datasets for interpretation of aquatic life conditions are the traditional metrics for aquatic invertebrates such as ephemeroptera, plecotera, trichoptera (EPT) taxa, diversity, evenness, HBI, density, biomass, and functional feeding groups. These metrics where used for all three replicate samples at each of the WGFP study sites, and use more data in the interpretation of aquatic invertebrates than the limited subsampling used for calculation of MMI. The traditional metrics were used in the original interpretation of the benthic macroinvertebrate data in the FEIS.

Conclusions

In summary, the updated MMI calculations indicate aquatic invertebrates at the Lone Buck site are at the attainment level and MMI values at the Breeze site are between impairment and attainment. Auxiliary indicators, as well as other standard aquatic invertebrate measurements of EPT diversity, evenness, and functional feeding groups indicate a healthy aquatic invertebrate population that supports a trout population that CPW indicates as “consistently excellent” (Ewert 2011).

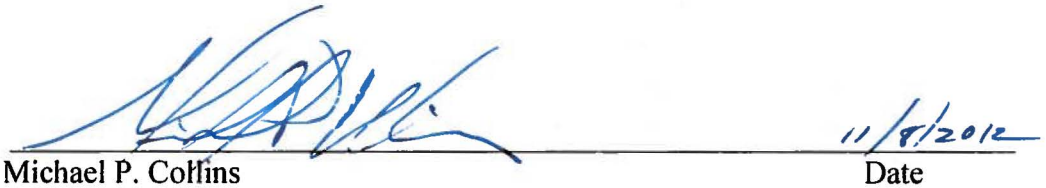
The 2011 FEIS concluded that the species, abundance, and distribution of macroinvertebrates in the Colorado River should remain similar to existing conditions based on the anticipated changes in flow and changes in water quality associated with the preferred alternative. The revised MMI values do not change this conclusion. All mitigation measures and environmental commitments in the *Fish and Wildlife Mitigation Plan* developed with CPW, and as listed in the FEIS, would remain unchanged.

Need for FEIS Changes and Additional Analysis

This supplemental information report (SIR) finds that the updated MMI values do not substantially change the analysis or findings presented in the WGFP FEIS. This SIR is referenced in an erratum, which documents the change to the text in the FEIS regarding MMI values.

There are no changes to the project or significant new circumstances or information that affect the analysis and conclusions in the WGFP FEIS. In addition, Reclamation concludes that no significant new circumstances or information relevant to environmental concerns and bearing on the WGFP or its impacts have occurred since completion of the FEIS.

For the above reasons, the updated description of the condition of existing aquatic invertebrate populations in the Colorado River below Windy Gap Reservoir based on new methodology used by the State of Colorado, as described in this SIR, does not necessitate the preparation of a supplemental FEIS.



11/8/2012

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Date

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