COLORADO
Department of Public
Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

March 25, 2016

Jeff Drager, Project Manager
Municipal Subdistrict, Northern Colorado Water Conservancy District
220 Water Ave
Berthoud, Colorado 80513

Re: Section 401 Colorado Water Quality Certification No.: 4366
US Army Corps of Engineers 404 Permit No.: 200380523
Project Name: Windy Gap Firming Project
Location: Grand and Larimer Counties
Water Course: Colorado River, Willow Creek, Grand Lake, Windy Gap, Shadow Mountain, Granby and Willow Creek Reservoirs, Lake Estes, Big Thompson River, Carter Lake, Horsetooth Reservoir and Chimney Hollow Reservoir (new)
Reviewable Designation: COUCUC03, COUCUC02, COUCUC06a, COUCUC04, COUCUC12, COUCUC13, COSPBT16, COSPBT02, COSPBT11, COSPCP14

Dear Mr. Drager:

The Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division (Division) has completed its review of the Windy Gap Firming Project Clean Water Act (CWA) Section 401 Permit Application. We have also reviewed our preliminary determination with the issuance of the State of Colorado 401 Certification Public Notice (5 CCR 1002-82, § 82.5(B)) and have completed an antidegradation review pursuant to Regulation 31, Basic Standards and Methodologies for Surface Water (5 CCR 1002-31, § 31.8(3)).

Regulation 82 Requirements

Regulation 82, (5 CCR 1002-82) which addresses certifications under Section 401 of the Clean Water Act, directs the Division to consider antidegradation requirements indentified in the state's Procedural Regulation, Regulation 21 (5 CCR 1002-21), requirements contained in the Basic Standards and Methodologies for Surface Water, Regulation 31 (5 CCR 1002-31), the Basic Standards for Ground Water, Regulation 41 (5 CCR1002-41), as well as appropriate classifications and water quality standards, effluent limits, control regulations, Best Management Practices (BMPs), water quality mitigation measures and public comments. The Division is directed to provide either a regular certification, conditional certification, or to deny certification based upon review of the application and the applicable water quality requirements as listed in section 82.5(A)(1) of Regulation 82.

Section 82.5(B)(6) provides that "[c]ertifcation shall not be denied where the imposition of conditions or denial would result in material injury to water rights as prohibited under section 25-8-104 C.R.S." The pertinent part of § 25-8-104(1) states as follows:

> No provision of this article shall be interpreted as to supersede, abrogate, or impair rights to divert water and apply water to beneficial uses in accordance with the provisions of sections 5 and 6 of article XVI of the constitution of the State of Colorado, compacts entered into by the State of Colorado, or the provisions of articles 80 to 93 of title 37, C.R.S., or Colorado court determinations with respect

> to the determination and administration of water rights. Nothing in this article shall be construed, enforced, or applied so as to cause or result in material injury to water rights.... Nothing in this article shall be construed to allow the commission or the division to require minimum stream flows or minimum water levels in any lakes or impoundments.

Project Background

The Windy Gap Firming Project is expected to provide water deliveries to Colorado's Front Range and West Slope through the construction of a new reservoir adjacent to Carter Lake on the east side of the Continental Divide. On the West Slope the project is expected to have impacts to the Grand Lake and the Colorado River after it enters Shadow Mountain Reservoir through Granby Reservoir, and below Windy Gap Reservoir to the confluence with the Williams Fork. The impacted portion of the Colorado River is identified as Upper Colorado River Basin segment 3. Willow Creek Reservoir, Grand Lake, Shadow Mountain Reservoir, and Granby Reservoir are identified as Upper Colorado River Basin segment 12. Windy Gap Reservoir is Upper Colorado River Basin segment 13. The Colorado River from Shadow Mountain Reservoir to Granby Reservoir is Upper Colorado segment 2. Willow Creek is identified as Upper Colorado River Basin segment 4 (on National Forest land) and Upper Colorado River Basin segment 6a (outside of National Forest land).

The project impacts the following water bodies on the East Slope: St. Mary's Lake and Lake Estes (Big Thompson River Basin segment 16) below the mouth of the Adams Tunnel, and other tunnels at the eastern edge of Rocky Mountain National Park, the Big Thompson River below Lake Estes (Big Thompson River Basin segment 2), Carter Lake (Big Thompson River Basin segment 11) and Horsetooth Reservoir (Cache La Poudre River Basin segment 14).

All of these segments are "reviewable," meaning that an antidegradation review is required. The antidegradation review process requires a determination as to whether the activity is likely to result in significant degradation of the impacted waters. The Division's "significance determinations" consider the "net effect of the new or increased water quality impacts .... Taking into account any environmental benefits resulting from the regulated activity and any water quality enhancements or mitigation measures...." 5 CCR 1002-31, § 31.8(3)(c).

Division Comments and Antidegradation Review

The Division has reviewed information submitted concerning the Windy Gap Firming Project against the requirements of Regulation 82 and the other applicable regulations cited herein. The construction activities described in the Windy Gap Firming Project are expected to be only short-term in nature and are therefore not significant in the context of an antidegradation review. Operation of the Windy Gap Firming Project does not involve discharges, but it does lead to potential long-term water quality impacts. These potential impacts and the required conditions to mitigate such impacts are explained in detail in the attached *Rationale for Conditional 401 Certification of the Windy Gap Firming Project*.

Certification Statement

Based on the Division's analysis and evaluation, as further explained in the attached *Rationale for Conditional 401 Certification for the Windy Gap Firming Project*, and based on consideration of the short-term impacts of construction activities and BMPs and conditions imposed by other agencies, as well as conditions on operation of the project as imposed by the Division, including the development of adaptive management practices in response to monitoring and assessed conditions, the Division concludes that there is reasonable assurance that the project will be conducted in a manner that complies with all applicable water quality requirements. *See* 5 CCR 1002-82, § 82.5(A)(3); 40 CFR § 121.2(a)(3). Therefore, this letter shall serve as official notification that the Division is issuing a "Conditional Certification" in accordance with 5 CCR

1002-82, § 82.5(A)(3). Conditions for this certification are included in the attached document, *Rationale for Conditional 401 Certification of the Windy Gap Firming Project*.

This § 401 Water Quality Certification shall apply to both the construction and operation of the project for which a federal license or permit is required, and shall apply to the water quality impacts associated with the Windy Gap Firming Project. This certification does not constitute a relinquishment of the Division's authority as defined in the Colorado Water Quality Control Act, nor does it fulfill or waive any other local, state, or federal requirements.

If you have any questions or need additional information, please contact John Hranac of my staff at (303) 692-3586.

Sincerely,

Patrick Pfaltzgraff
Director, Water Quality Control Division
Colorado Department of Public Health and Environment

Enclosures: *Rationale for Conditional 401 Certification of the Windy Gap Firming Project*
Regulation 82.6 Certification Requirements

C: Rena Brand, US Army Corps of Engineers, Denver Regulatory Office, Littleton, CO
Lurline Underbrink Curran, Grand County Manager, Hot Sulphur Springs, CO
Lane Wyatt, Northwest Colorado Council of Governments, Silverthorne, CO
Gary Wockner, Save the Colorado, Ft. Collins, CO
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Michael J. Ryan, Regional Director, Bureau of Reclamation, Billings, MT
Karen Hamilton, US EPA Region 8, Denver, CO

Rationale for Conditional 401 Certification of the Windy Gap Firming Project

The proposed Windy Gap Firming Project (WGFP), which is described as "Alternative 2" in the United States Bureau of Reclamation (USBR) Record of Decision (ROD), will add 30,000 Acre Feet (AF) of firm yield to east slope water supplies. It includes construction of a new reservoir – Chimney Hollow – on the east slope. Construction of the project will involve placing fill material into and excavation of Chimney Hollow Creek and associated wetlands. The dam, reservoir and pipeline construction activities will impact waters of the United States. Although the operation of the project does not involve a discharge of pollutants, it does involve significant "hydrologic modifications." By altering flows on both sides of the Continental Divide, the project directly affects the quantity and quality of aquatic habitat, and it indirectly affects water quality by changing contributions to mass balance for all constituents.

The project requires certification under Section 401 of the Federal Clean Water Act, and it is the responsibility of the Water Quality Control Division (Division) to determine whether to certify, conditionally certify or deny certification for the project. Water Quality Control Commission (Commission) Regulation 82 provides direction to the Division concerning the nature and scope of the evaluation of potential water quality impacts, including those resulting from hydrologic modifications.

The regulation, in section 82.5(A), specifies what the Division will review and consider in reaching its determination about certification. Items relevant to the determination for this project include the certification application, anti-degradation (AD) review, maintenance of water quality standards and protection of designated uses in waters in the affected area, information received in the public comment period, and commitments already made by the Applicant (Municipal Subdistrict of the Northern Colorado Water Conservancy District) for mitigation of anticipated impacts and enhancements to water quality that may yield environmental benefit.

The 401 Water Quality Certification Technical Report (Technical Report) provides a thorough characterization of water quality impacts and an extensive catalog of the commitments the Applicant has made to mitigate those impacts or otherwise improve water quality in the affected area. The Division generally agrees with the Applicant's characterization of impacts and also recognizes the value of the many commitments the Applicant has made to improve water quality. The Division's ability to issue a certification for this project is based on a determination of "reasonable assurance" that the proposed mitigation and enhancement measures will perform as expected and counteract the predicted

adverse impacts of the project. Thus, the Division is imposing conditions on the certification as a means of assessing the performance of these mitigation and enhancement measures.

Development of Conditions

The Division seeks to satisfy two objectives by imposing conditions. The first is to ensure that significant water quality impacts are mitigated wherever possible. Opportunities for direct mitigation are relatively limited insofar as the impacts are the result of hydrologic modifications and not the release of pollutants. Nevertheless, it is important to apply these conditions where they can be effective and where they are consistent with section 25-8-104 of the Water Quality Control Act, as specified in Regulation 82[1]. Although it is beyond the Division's authority to unilaterally impose a condition inconsistent with 25-8-104, such a condition could be included if the Applicant finds it acceptable[2].

The second objective is to provide reasonable assurance that commitments made for mitigation of impacts and enhancement of water quality provide the expected benefits. The 401 certification application lists the existing commitments and ties each to one or more of the agreements already in place. These mitigation and enhancement measures, if successful, may contribute to "net environmental benefit" as it relates to the significance determination in the AD review.

Each commitment for mitigation or an enhancement measure makes a prediction, usually based on modeling, about the expected benefit. Consequently, there is an implicit, but untested, assumption that the proposed measures will be successful in mitigating impacts or improving some aspect of water quality. The Division will impose conditions to clarify expectations and to determine the actual benefit after the mitigation and enhancement measures have been implemented and the project has been completed.

The Division recognizes that the Applicant's commitments for mitigation and enhancement measures have been made in good faith and with the expectation that those measures will prove successful. There is no way to ensure success, however. Consequently, it is important to have a process for handling situations where those measures fall short and impairments[3] occur. Thus,

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[1] Section 82.14: "There may be hydrologic modification impacts that can be mitigated without materially injuring water rights. The Commission believes that it has a responsibility to assure the maximum practical water quality protection that does not conflict with the provisions of section 25-8-104."

[2] Section 82.5(A)(3).

[3] Throughout the text, the terms "impaired" and "impairment" refer in all instances to conclusions reached on the basis of water quality assessment protocols given in

conditions include a requirement for the Applicant to investigate sources and mechanisms contributing to the impairment and, if necessary, to develop an appropriate response.

General Considerations for Water Quality Monitoring

Water quality monitoring provides the information necessary for evaluating the performance of mitigation and enhancement measures. As such, there are general requirements regarding locations, sampling frequency, analytical precision, and reporting that determine the usefulness of the data for reaching conclusions about performance and about the possible occurrence of impairments. The general considerations for monitoring work are specified here, and the requirements specific to individual parameters are described in conjunction with conditions. In addition, a monitoring requirement is added for Chimney Hollow Reservoir, which is to be constructed as a key element of the project.

For sampling locations, preference is given to sites that have been sampled in the past, especially where they played a role in assessing the potential for project impacts. The historical record at these sites establishes context for baseline conditions and for the magnitude and patterns of variability that will facilitate interpretation of data obtained in the future.

Sampling frequency depends to some extent on the parameter, the nature of the expected impacts, and the needs for evaluating the performance of mitigation and enhancement measures. For stream temperature, continuous monitoring (15-min intervals) is required for establishing the temporal patterns of variation and for assessing attainment[4] of standards. Water chemistry sampling in streams and lakes must be monthly or more frequent, with the caveat that lakes may not be safe to sample under ice cover. For fish and aquatic macroinvertebrates, annual or biennial sampling is required.

Analytical precision determines the usefulness of data for constituents that are present in relatively low concentrations. Laboratory analyses must include an empirical determination of the method detection limit (MDL), and readings below the MDL are to be treated as non-detects. Readings between the MDL and the reporting limit must be reported as estimated concentrations and flagged as estimated values.

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the Division's 303(d) Listing Methodology, which is revised biennially. A formal listing in Regulation 93 is not required for reaching an impairment conclusion.

[4] Throughout the text, the term "attainment" refers consistently to situations where assessment of ambient water quality data shows that the applicable water quality standard is met.

All monitoring data – lab and field results – must be compiled annually and provided to the Division in electronic form by April 1 following each calendar year of sampling. The requirement for sampling and reporting generally will begin as soon as the 404 permit has been issued, and the obligation will remain in place until five years after the project is fully operational[5]. The annual report will include assessments of attainment for all parameters measured and a brief discussion of any impairments.

General Considerations for Response to Impairment

Although there is good reason to expect that mitigation or enhancement measures will be successful, there is no guarantee. It is possible that, despite best efforts, water quality will become, or continue to be, impaired. It is important to anticipate this possibility by including conditions that specify a course of action to foster improved water quality to the extent possible. The course of action described below is essentially an adaptive management strategy for developing the appropriate remedial action.

When an impairment is identified in annual reports submitted by the Applicant or through the Division's assessment process, the Applicant will be required to investigate sources and mechanisms in an effort to determine the extent to which operation of the project (WGFP) causes or contributes to the impairment. The Applicant is well-positioned to investigate these impairments by having collected the data and through familiarity with the project area.

The Applicant will have 1 year following the detection of the impairment to prepare an impairment investigation report in which conclusions will be presented about the main source(s) and mechanism(s) at work, and the responsibility attributable to the project. Results of the impairment investigation will be discussed with the Division to determine what further actions are required of the Applicant. This report may be developed with contractor support or through the Learning by Doing[6] process.

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[5] "Fully operational" is defined as the date of the first filling of Chimney Hollow Reservoir with Windy Gap Firming Project water, in accordance with Condition 1 of the 2012 Grand County 1041 Permit.

[6] Learning by Doing is a cooperative process that has a goal of maintaining or improving the "stream environment" in the project area. An adaptive management strategy is employed to make decisions about allocating resources to meet the goal. The Learning by Doing Cooperative Effort was established by the Subdistrict, Northern Colorado Water Conservancy District, Grand County Board of Commissioners, Middle Park Water Conservancy District and the Colorado River Water Conservancy District. The management committee is made up of Denver Water, Trout Unlimited and Colorado Department of Park and Wildlife in addition to the entities listed above.

Where the Division concludes that operation of the project bears little or no responsibility for the impairment, the Division will use the impairment investigation report to facilitate development of a TMDL consistent with regulatory requirements. If the Division concludes that operation of the project is primarily responsible for the impairment, the Division will require that the Applicant actively explore preparation of a Category 4b Plan[7] that will define the actions necessary to bring water quality back to attainment of the standard. In doing so, the Applicant will be encouraged to work with other significant contributors to impairment, if applicable.

A Category 4b Plan must ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, must be consistent with CRS 25-8-104, and must be submitted to the Division no more than 2 years after the Division's determination that the plan is applicable. If it becomes apparent that a Category 4b Plan cannot ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, or if such plan is not accepted by the Division or EPA, or is precluded by or inconsistent with the water rights provisions in section CRS 25-8-104, then the Division anticipates a 303(d) listing and, in cooperation with the Applicant, preparation of a TMDL to bring water quality back to attainment of the standard. The Applicant, at its discretion, may agree to remedial actions to restore water quality that are inconsistent with the water rights provisions of CRS 25-8-104.

Rationales and Conditions

Conditions are generally organized by water quality parameters. Each condition is accompanied by a rationale that explains the nature of the anticipated impact, what can be done in the way of direct mitigation, and what reliance is placed on commitments that the Applicant has made to other parties. An impact may be considered significant when it erodes assimilative capacity beyond the *de minimis* rules set forth in the AD review guidance in Regulation 31. Also, any impact that causes an impairment or contributes to an existing impairment is considered significant. In the case of cause-or-contribute impacts, the Division will include consideration of qualitative assessments, especially where modeling was not feasible or data were lacking.

[7] A Category 4b Demonstration Plan addresses water quality impairments in a manner that makes the TMDL process unnecessary. The plan identifies mechanisms that are expected to result in attainment of water quality standards in a reasonable period of time.

Temperature

Cumulative impacts on temperature in the Colorado River are predicted to be significant. Those impacts include loss of assimilative capacity and increases in the number of exceedances of temperature standards. These conclusions are based on results produced by a dynamic temperature model developed by the Applicant and calibrated with recent temperature data. The Division has reviewed the modeling work and has determined it is credible.

The Applicant has made commitments that are expected to provide partial mitigation of temperature impacts and to reduce the risk of exceedances. Arguably the most important measure concerns the amount and timing of flows – known as the 5412 flows - to be released pursuant to Supplement 9 of the Repayment Contract between Northern Colorado Water Conservancy District[8] and the USBR. The schedule of release is expected to conform, on average, to the flows shown in the following table.

Table 1. Release pattern for 5412 flows from Granby Reservoir. Flows represent averages for each date range according to hydrologic conditions as described in the FONSI. Table entries are copied from the FONSI.

Date	Granby Releases, cfs		
	Type of Year		
	Dry	Average	Wet
July 1-14	0	0	0
July 15-31	22	0	0
August 1-14	47	50	35
August 15-31	47	50	50
September 1	55	50	70
September 2-9	38	50	70
September 10-15	38	50	50
September 16-20	21	29	50
September 20-30	21	29	24

By releasing the 5412 flows in the last two weeks of July[9] in dry years, a greater amount of cooler water enters the segment when stream temperatures are likely to be near the peak for the summer. The Division finds that there is a reasonable expectation for the 5412 flows to offset predicted temperature

[8] Northern Colorado Water Conservancy District is a separate legal entity from the Municipal Subdistrict (the Applicant).

[9] Table 2, page 13 IN: Environmental Assessment Finding of No Significant Impact, Colorado Water Users' Commitment to Provide 10,825 acre-feet to the 15-Mile Reach of the Upper Colorado River. US Bureau of Reclamation, Great Plains Region, Eastern Colorado Area Office. FONSI NO. 2012 – 031, March 2012.

increases in late July. This measure also is likely to enhance the temperature regime downstream by increasing flows.

The Division is confident that existing agreements[10] provide reasonable assurance that the 5412 flows will be maintained in perpetuity. The flows are currently required in support of the Upper Colorado River Endangered Fish Recovery Program, and the schedule is governed by the Repayment Contract. If the Recovery Program no longer exists – through recovery or extinction of the endangered fishes – the requirement for the flows is assured by the IGA. However, the IGA does not specify a schedule for releases. Consequently, the Division imposes a condition to assure that the anticipated benefits to temperature are maintained in the event the Recovery Program no longer exists.

In addition to the 5412 flows, the Applicant has agreed to provide water and up to 4,500 acre feet of storage space in Granby Reservoir to Grand County (see Windy Gap Firming Project, Intergovernmental Agreement, Section III.F and H). Grand County intends to make releases of this water "for beneficial use in a manner that results in optimizing the benefits to aquatic and recreation resources within the County and furthering the goals of the Learning By Doing Cooperative Effort" (WGFP IGA, Section III.F.4) and it is expected that these releases will also enhance the temperature regime of the Colorado River below Windy Gap Dam.

The Applicant is required to provide direct mitigation by reducing or suspending pumping as per criteria listed in Appendix E of the ROD. This is a significant commitment, but there is uncertainty about its practical capacity to mitigate temperature exceedances. The Division believes uncertainty can be reduced by using the existing temperature model to optimize alterations to pumping. The concept for this optimization analysis is found in the Learning by Doing process, but the Division believes that it should be supplemented with specific conditions. Also, the Division has concerns about the *de minimis* provisions included in Appendix E of the ROD. Consequently, the Division will impose conditions to predict and validate performance and to review any *de minimis* assessment.

The ROD requires the Applicant to "use the Bypass Valve and Auxiliary Outlet to the maximum extent practicable" to send colder water downstream. The Division supports the intent of this measure, but has reservations about releases through the Bypass Valve due to the potential to augment manganese

[10] Repayment Contract between Northern Colorado Water Conservancy District and the USBR, Supplement 9; and, 2012 Intergovernmental Agreement between the Northern Colorado Water Conservancy District, Grand County, Middle Park Water Conservancy District, and the Colorado River Water Conservation District, article 1g.

concentrations, as described later. A condition is imposed to address this concern.

Other commitments that may benefit the temperature regime include habitat improvements required under the Fish & Wildlife Mitigation plan and a plan to construct a bypass around Windy Gap Reservoir as covered in the Windy Gap Bypass Funding Agreement. The Division believes both measures have potential to improve the temperature regime, but there is insufficient information at this time to be specific about expected benefits.

In aggregate, the proposed mitigation and enhancement measures have great potential to address temperature impacts and to improve the temperature regime in the Colorado River. However, there is no guarantee that performance will match predictions. Conditions requiring monitoring will lead to on-going assessments of performance, but more is needed if there is to be reasonable assurance that adequate steps are taken to minimize future impacts. Accordingly, the Division will impose a condition for remedial action in the event that the performance of mitigation and enhancement measures falls short of expectations and that responsibility for the impact is attributable in part or in full to operation of the project.

Condition 1: The Applicant will develop a temperature monitoring program to review and, if needed, to improve spatial resolution of the dynamic temperature model developed for the Environmental Impact Statement (EIS) and updated for the AD review in the 401 certification process. Improved spatial resolution may be important for using the model in a real-time predictive mode. At all sites used previously to develop the temperature model, continuous monitoring data will be collected for as long as necessary to support improvements to the model. The Applicant will complete changes to the model within one year of the issuance of the 404 permit, and performance of the model will be reviewed with the Division.

Condition 2: The Applicant will install a third real-time temperature monitoring station in addition to the two[11] required by the Fish and Wildlife Mitigation Plan (5.3.3). The third station will be upstream of Hot Sulphur Springs and is intended to facilitate development of a predictive system to avoid acute exceedances. The station will have the same or better monitoring, reporting and reliability capabilities as the sites established by the Fish and Wildlife Mitigation Plan. Monitoring at these three sites will begin as soon as practicable, but no later than one year after the date of issuance for the 404 permit, and will continue for not less than 5 years after the project becomes fully operational. The data from each calendar year and a report documenting exceedances of the temperature standard will be submitted to the Division by

[11] Colorado River at the Windy Gap gage (CR-WGD; USGS gage 09034250) and Colorado River upstream of the confluence with the Williams Fork River (CR-WFU).

April 1 following each calendar year of sampling. The data also will be used to support the analysis required in Condition 3.

Condition 3: The Applicant will use the dynamic temperature model, with improvements and additional data as appropriate, to optimize the release of flows and the cessation of pumping for avoiding exceedances of temperature standards. Considerations include, but are not limited to, trigger levels, travel times and flow volumes. Modeling and operational experience will determine if the trigger levels proposed in the Technical Report (1°C below the applicable acute standard and 0.3°C below the applicable chronic standard) are adequate for avoiding exceedances.

Modeling will also help determine under what conditions, if any, temperature mitigation measures will yield only a *de minimis* level of mitigation (described in the ROD, Appendix E). Within 5 years of issuance of the 404 permit, the Applicant will submit to the Division for approval a summary of the modeling work that will include an explanation of the optimization scheme for avoiding exceedances and a defense of claims regarding any mitigation measures found to deliver *de minimis* benefit.

If the Applicant concludes that temperature mitigation measures provide only a *de minimis* benefit, the Division must review the justification and approve before any decision is taken to stop implementing these mitigation measures.

Condition 4: If temperature monitoring indicates an impairment, the Applicant will perform investigations to determine what contribution operation of the project has made. The impairment investigation report and all supporting information will be submitted to the Division within 12 months after the impairment has been detected. If the Division concludes that operation of the project is primarily responsible for the impairment, the Division will require that the Applicant actively explore preparation of a Category 4b Plan that will define the actions necessary to bring water quality back to attainment of the standard. In doing so, the Applicant will be encouraged to work with other significant contributors to impairment, if applicable.

A Category 4b Plan must ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, must be consistent with CRS 25-8-104, and must be submitted to the Division no more than 2 years after the Division's determination that the plan is applicable. If it becomes apparent that a Category 4b Plan cannot ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, or if such plan is not accepted by the Division or EPA, or is precluded by or inconsistent with the water rights provisions in section CRS 25-8-104, then the Division anticipates a 303(d) listing and, in cooperation with the Applicant, preparation of a TMDL to bring water quality back to

attainment of the standard. The Applicant, at its discretion, may agree to remedial actions to restore water quality that are inconsistent with the water rights provisions of CRS 25-8-104.

Condition 5: In the event that the Recovery Program no longer exists, the requirement for release of the 5412 flows defaults to the 2012 IGA, by which the parties intend to "maximize the benefits and results of efforts to maintain and enhance the aquatic environment in Grand County." The Municipal Subdistrict will use its influence and authority to ensure, to the extent possible, that the timing, schedule and release of 5412 flows conforms, on average, to the schedule of releases shown in Table 1.

Condition 6: When it is appropriate to release water from Windy Gap Reservoir for the purpose of mitigating or avoiding temperature exceedances, the bypass valve will not be used (except as needed for normal operations and exercise of water rights) unless the Applicant can demonstrate that the additional releases will not cause or contribute to additional exceedances of the Water Supply standard for dissolved manganese[12].

Nutrients

The additional volume of water to be delivered by the WGFP would likely increase nutrient loading to the Three Lakes System. Increased nutrient loads have potential to stimulate additional algal growth, which has implications for other aspects of water quality (e.g., dissolved oxygen, clarity, and precursors of disinfection by-products). However, the eventual impact to water quality in the Three Lakes System depends heavily on assumptions about wastewater discharge to the Fraser River, including potential mitigation measures to improve nutrient removal during wastewater treatment.

The AD review presented in the Applicant's Technical Report was based on concentrations predicted with modeling scenarios that relied on wastewater treatment assumptions developed for the EIS. These predictions showed no significant impact for phosphorus or nitrogen. However, the underlying assumptions were called into question during the public comment period. The Applicant responded by revising the assumptions and making new predictions.

The new assumptions, which are consistent with those used recently in the Moffat Collection System Project Final EIS, include changes to point and non-point contributions to the Fraser River. The new assumptions provide a more realistic scenario for effluent concentrations at facilities required to meet limits set forth in Regulation 85. With the new assumptions, predicted increases in total phosphorus (TP) concentrations in the Three Lakes System

[12] See section on manganese impacts for additional justification regarding this condition.

would constitute a significant impact in terms of the AD review, but increases for total nitrogen (TN) would not.

There are two main elements to the nutrient reduction measures that the Applicant has presented. The first concerns development of a plan for nutrient reduction measures that would likely contain some of the options for control point and non-point sources that are listed in the ROD. However, the ROD does not go into specifics about the implementation of options. Instead, the Applicant must prepare a nutrient reduction plan that is to be submitted to USBR and the USACE for approval. Grand County, through a condition in its 1041 permit, also must approve the nutrient reduction plan. In the absence of specifics about the nature of the plan and the nutrient sources that will be targeted, the Division cannot rely on this plan as a component of measures addressing phosphorus impacts.

For the second element, which appears in the Technical Report, the Applicant offered to "enter into an agreement [with the Fraser Sanitation District] specifying the [wastewater treatment plant] improvements and Subdistrict funding." This action alone, or a comparable reduction in nutrient loads at other facilities, would directly mitigate the predicted increase in phosphorus load to the Three Lakes System. In addition, it would improve water quality (phosphorus and nitrogen concentrations) in the Fraser and Colorado rivers throughout the year (i.e., not just phosphorus and not just when the WGFP is operating). In view of the general environmental benefit expected from reducing nutrient loads to the Fraser River, it is important to impose a condition to ensure that the work is done.

Although this mitigation measure has great potential to address phosphorus impacts, there is no guarantee that performance will match predictions. Conditions for monitoring will lead to on-going assessments of performance, but more is needed to provide reasonable assurance that adequate steps will be taken to minimize impacts. Accordingly, the Division will impose a condition for remedial action in the event that performance of the Wastewater Treatment Plant (WWTP) improvement falls short of expectations.

Condition 7: The Applicant must enter into an agreement specifying improvements to the Fraser WWTP or for improvements to other WWTPs that would yield comparable reductions in nutrient loads. The improvements must be implemented before completion of Chimney Hollow Reservoir. Improvements must yield effluent nutrient concentrations that are equal to or better than the TN and TP concentrations used in the recent model predictions. The benefit predicted from the treatment upgrades is based on expectations about improvements to treatment at the Fraser WWTP, but comparable load reductions at other facilities could achieve the same benefit. The Division seeks to ensure that the full benefit is achieved.

Condition 8: The Applicant will monitor total phosphorus (TP) and total nitrogen (TN) at existing sampling sites[13] in the Three Lakes System. Samples will be taken monthly from the mixed layer during the ice-free season. Monitoring at these three sites will begin no later than the date of issuance for the 404 permit and will continue for not less than 5 years after the project becomes fully operational. The data will be submitted annually to the Division along with a report documenting exceedances of the nutrient standards; the report is due by April 1 following each calendar year of sampling.

Condition 9: The Applicant will be responsible for, or must arrange for, monthly monitoring of TP and TN concentrations in effluent discharged by the upgraded WWTP(s). A summary of discharge monitoring reports is an acceptable alternative. Nutrient monitoring to satisfy this condition will begin when improvements to the WWTP(s) have been completed and are fully operational. The data will be submitted annually to the Division along with a report documenting any instances when the aforementioned effluent limits are exceeded; the report is due by April 1 following each calendar year of sampling. The monitoring required for this condition may be terminated after two years of successful compliance with the nutrient limits.

Condition 10: If monitoring of TP concentrations in the Three Lakes System indicates an impairment, the Applicant will perform investigations to determine what contribution operation of the project has made. The impairment investigation report and all supporting information will be submitted to the Division within 12 months after the impairment has been detected. If the Division concludes that operation of the project is primarily responsible for the impairment, the Division will require that the Applicant actively explore preparation of a Category 4b Plan that will define the actions necessary to bring water quality back to attainment of the standard. In doing so, the Applicant will be encouraged to work with other significant contributors to impairment, if applicable.

A Category 4b Plan must ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, must be consistent with CRS 25-8-104, and must be submitted to the Division no more than 2 years after the Division's determination that the plan is applicable. If it becomes apparent that a Category 4b Plan cannot ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, or if such plan is not accepted by the Division or EPA, or is precluded by or inconsistent with the water rights provisions in section CRS 25-8-104, then the Division anticipates a 303(d) listing and, in cooperation with the Applicant, preparation of a TMDL to bring water quality back to

[13] Granby Reservoir (GR-DAM), Shadow Mountain Reservoir (SM-DAM), and Grand Lake (GL-MID).

attainment of the standard. The Applicant, at its discretion, may agree to remedial actions to restore water quality that are inconsistent with the water rights provisions of CRS 25-8-104.

Dissolved Oxygen (DO)

Shadow Mountain Reservoir is currently on the 303(d) list for an existing DO impairment. Low DO concentrations can be attributed mainly to water delivered to Shadow Mountain Reservoir via the Farr Pump canal, which draws water from the hypolimnion of Granby Reservoir. Oxygen concentrations in the hypolimnion of Granby are low and may be further reduced when lake level is drawn down. Passage through the canal does little to raise the DO concentration before the water reaches Shadow Mountain Reservoir. This constitutes a cause-or-contribute scenario with respect to the existing impairment.

The additional pumping anticipated with operation of the WGFP leads to two suppositions based on the link between DO in Shadow Mountain Reservoir and DO in the hypolimnion of Granby Reservoir. The first is that more pumping means a larger volume of water with low DO concentrations will be delivered to a lake that already is impaired for DO. The second is that, to the extent that additional pumping for pre-positioning results in greater or more frequent drawdowns of Granby Reservoir, operation of the project would likely compound the DO problems anticipated in Shadow Mountain Reservoir. The prediction is largely qualitative, but merits attention in view of the existing impairment.

Concerns about the effect of project operation on DO in Shadow Mountain Reservoir are reduced by two existing commitments, although they were not developed specifically for addressing DO problems. The first is a commitment in the Fish and Wildlife Mitigation Plan (developed pursuant to § 37-60-122.2, C.R.S.) and the 2014 Carriage Contract between the Northern Colorado Water Conservancy District and the USBR that reduces pumping when water levels in Granby Reservoir fall below 8,250 ft; this is known as “modified prepositioning.” In concept, modified pre-positioning may prevent operation of the project from exacerbating DO problems, but it is not clear if it can provide any improvement.

The second commitment involves nutrient reduction through WWTP improvements. To the extent that nutrient loads to Granby Reservoir can be reduced (and that the nutrient reduction will also limit algal productivity), there is potential to improve hypolimnetic DO concentrations.

One additional possibility for mitigation may emerge from a study in progress to design an aeration system to improve DO concentrations in the pump canal. The USBR is supporting the work, but results are not yet available.

Uncertainty about the effect of the project on DO concentrations in Shadow Mountain Reservoir prompts the Division to impose a condition for monitoring and follow-up action if DO remains impaired.

Condition 11: The Applicant will monitor DO at existing sampling sites[14] in Granby Reservoir and Shadow Mountain Reservoir, and an additional site in the Farr pump canal. In each lake, vertical profiles of DO will be taken monthly throughout the water column during the ice-free season. Concurrent samples will be taken from the pump canal when pumping is occurring. Monitoring at these sites will begin no later than the date of issuance for the 404 permit and will continue for not less than 5 years after the project becomes fully operational. The data will be submitted annually to the Division along with a report documenting exceedances of the DO standards; the report is due by April 1 following each calendar year of sampling.

Condition 12: If monitoring of DO concentrations in the Shadow Mountain Reservoir indicates an increase in the frequency or duration of impairment, the Applicant will perform investigations to determine what contribution operation of the project has made. The impairment investigation report and all supporting information will be submitted to the Division within 12 months after the impairment has been detected. If the Division concludes that operation of the project is primarily responsible for the impairment, the Division will require that the Applicant actively explore preparation of a Category 4b Plan that will define the actions necessary to bring water quality back to attainment of the standard. In doing so, the Applicant will be encouraged to work with other significant contributors to impairment, if applicable.

A Category 4b Plan must ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, must be consistent with CRS 25-8-104, and must be submitted to the Division no more than 2 years after the Division's determination that the plan is applicable. If it becomes apparent that a Category 4b Plan cannot ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, or if such plan is not accepted by the Division or EPA, or is precluded by or inconsistent with the water rights provisions in section CRS 25-8-104, then the Division anticipates a 303(d) listing and, in cooperation with the Applicant, preparation of a TMDL to bring water quality back to attainment of the standard. The Applicant, at its discretion, may agree to remedial actions to restore water quality that are inconsistent with the water rights provisions of CRS 25-8-104.

[14] Granby Reservoir (GR-DAM) and Shadow Mountain Reservoir (SM-DAM).

Aquatic Life

The portion of the Colorado River from the outlet of Windy Gap Reservoir to Derby Creek is currently on the Monitoring and Evaluation List for aquatic life use. Although there is no model for predicting a quantitative change in the Multimetric Index (MMI) score as a result of cumulative impacts, there is a logical basis for a qualitative prediction. It is the Division's view that the habitat loss and increased temperatures expected with flow reductions could adversely impact the aquatic macroinvertebrates unless mitigation measures are in place. In addition, the interruption of sediment transport and other consequences of impoundment in Windy Gap Reservoir may continue to adversely affect downstream habitat conditions.

The Applicant has made significant commitments to support habitat improvements downstream of Windy Gap Reservoir (Fish & Wildlife Enhancement Plan) and to maintain flushing flows (ROD Appendix E, item 2a; Grand County 1041, permit condition 29). In addition, aquatic communities may benefit from the flow releases, described above, for mitigating temperature impacts.

The Division endorses habitat improvement as an enhancement with good potential to yield environmental benefit. However, since the actual benefit cannot be predicted quantitatively, the Division considers it prudent to impose a condition to monitor the condition of the aquatic macroinvertebrates before and after the habitat improvements are made.

The Division recognizes the value of flushing flows for maintenance of aquatic habitat. The existing commitment for flushing flows is important and, because it involves impacts to the exercise of water rights, potentially goes beyond what the Division is authorized to require. Monitoring will help determine the effectiveness of the measure.

A commitment has also been made to provide partial funding for constructing a bypass around Windy Gap Reservoir, if a feasibility study identifies "significant, measurable benefits and there is stakeholder consensus to pursue the project". The commitment was made in response to concerns about the "current condition of the aquatic ecosystem in the Colorado River" below Windy Gap Reservoir. The Division shares those concerns.

The feasibility study was funded by the Applicant, and it concluded that such a bypass would provide significant benefit. The chief obstacle at this point is project cost. Commitments have been made to cover approximately half the cost of the project, including $2M from the Applicant. The Division is optimistic that funding will be obtained. Furthermore, the Division is confident that the Applicant's obligations have been adequately addressed in Condition 28 of the

Grand County 1041 and in the Windy Gap Bypass Funding Agreement. However, in the event that sufficient funding cannot be secured in a timely fashion, the Division will require that the Applicant request that its $2M commitment to the bypass be re-directed to support additional habitat improvements.

Condition 13: The Applicant will monitor the health of aquatic communities by sampling benthic macroinvertebrates and calculating MMI scores. The macroinvertebrate sampling will be conducted using the Division's protocols, which are described in Policy Statement 10-1 Aquatic Life Use Attainment Methodology to Determine Use Attainment for Rivers and Streams. The Applicant will develop a Sampling Analysis Plan for the collection and preservation of benthic macroinvertebrates that will be reviewed by the Division prior to the start of macroinvertebrate sampling.

Three sampling sites[15] are specified for assessing the performance of mitigation and enhancement measures, not including the proposed habitat restoration work. These include a site upstream of Windy Gap Reservoir that will serve as "control" in the sense that it will document normal variability and trends that are unrelated to the mitigation and enhancement measures. The other two locations are downstream of the reservoir, and site selection was informed in part by comments received during the public comment period. These sites also will be useful for evaluating the benefits of the proposed bypass, if and when it is built. See Table below for site details.

Table 2. Monitoring locations for benthic macroinvertebrates.

Historic Stations with Multimetric Index Scores				
Station ID	**Site Description**	**Organization**	**Latitude**	**Longitude**
CR-WGU	WG upstream	Northern Water	40.10045	-105.97248
COL WG11	Below Windy Gap Reservoir	TU-NEHRING	40.10887	-106.00163
12101A	Colorado River at Pioneer Park	WQCD	40.08026	-106.09857

Sampling at the three primary sites will be conducted in the fall of each year beginning after the issuance of the 404 permit and will continue for not less than 5 years after the project becomes fully operational. Additional years of sampling may be required if the bypass is constructed. The raw data and MMI scores from each calendar year and a report documenting any impairment of aquatic life will be submitted to the Division by June 1 following each calendar year of sampling. If there are concerns about the representativeness of conditions in a particular year (e.g., if there has been a flood or other natural disaster), alterations to the sampling may be accommodated upon prior approval by the Division.

[15] Upstream of Windy Gap Reservoir (CR-WGU), below Windy Gap Reservoir (COL New WG11; Nehring site), and at Pioneer Park upstream of Williams Fork confluence (WQCD 12101A).

Condition 14: As soon as the plan for habitat improvements has been developed, the Applicant, in consultation with the Division, will select two additional sampling sites to be located within the reach to be modified. These sites will be sampled at least once prior to altering the habitat, and will be re-sampled at three years and four years after the work has been completed. Sampling protocols and reporting requirements are the same as those specified for the three primary sites in Condition 13.

Condition 15: The large financial commitment required for the Windy Gap Bypass creates uncertainty about prospects for its construction. The Applicant has made a significant commitment of funds, but that alone is insufficient to ensure that the bypass will be built. If adequate funds have not been committed within five years after the project becomes fully operational, the Applicant will request that its contribution ($2M) to the bypass be re-directed to support habitat improvements in the Colorado River through the Learning by Doing process. Re-directing the funds to a habitat improvement project is subject to approval of all parties to the Windy Gap Bypass Funding Agreement. Any proposal by the parties to re-direct the funds for a different purpose must be approved by the Division.

Mercury

The impact of project operation on mercury in fish tissue is of considerable concern because Fish Consumption Advisories (FCAs) already are in place for three reservoirs in the project area – Carter, Horsetooth, and Granby. For existing reservoirs, greater fluctuations in lake level may increase opportunities for mercury methylation by increasing the area that is alternately exposed and re-wetted, and by shrinking the volume of the hypolimnion in a manner that increases volumetric oxygen demand. Shadow Mountain Reservoir and Grand Lake may experience less risk insofar as water surface elevations vary minimally.

The project also involves construction of a new reservoir – Chimney Hollow. It is not possible to develop quantitative predictions for mercury in fish tissue in the new reservoir, but there are two reasons to expect problems. The first is that the new reservoir will have much in common (location, morphometry, water source) with Carter Reservoir, which currently has mercury problems. The second reason is based on the observation in the literature that mercury methylation is enhanced while a reservoir is filling. When a new reservoir is filled, or the water level in an existing reservoir rises, organic matter in the newly inundated area decays. This biogeochemical process can produce conditions that are conducive to the methylation of mercury, which then makes its way through the food chain over a period of several years[16].

[16] Lucotte, M, et al., 1999. Mercury in the Biogeochemical Cycle: Natural Environments and Hydroelectric Reservoirs of Northern Quebec. Berlin: Springer.

Some mitigation may be provided by modifying plans for prepositioning water in Chimney Hollow Reservoir. Prepositioning is a strategy for moving project water from Granby Reservoir into Chimney Hollow Reservoir. It would have resulted in relatively large fluctuations in the water level of Granby Reservoir. However, the strategy now involves "modified prepositioning" (ROD, Appendix E, item 1b; 2014 Carriage Contract) to maintain higher water levels in Granby Reservoir. Implementation of modified prepositioning reduces concerns that project operation will augment existing mercury problems in Granby Reservoir.

The problem of mercury in fish tissue in Colorado lakes has been addressed chiefly through monitoring and posting FCAs, as appropriate. The Applicant will be required to support this approach for the six reservoirs in the affected area. The required monitoring is broader in scope than the monitoring specified in condition 22 of the Grand County 1041 permit. The sampling objective, as captured in the Applicant's Technical Report, is to be "sufficient to evaluate the need for FCAs every year".

Limiting the Applicant's role to monitoring and posting is a practical necessity. The nature and scope of the mercury problem in Colorado are too broad in scale to be resolved in Chimney Hollow Reservoir alone. The importance of atmospheric sources of mercury and the complexity of the biogeochemical processes that influence concentrations in fish tissue require a statewide strategy. Accordingly, the Division will develop a strategy to address the problem statewide. However, in the event that impairment is detected in Chimney Hollow Reservoir, the Applicant's responsibility for monitoring in that reservoir will be extended. Data collected at Chimney Hollow Reservoir will benefit the Division's effort to address mercury impairments statewide.

Condition 16: The Applicant will work with the Division and Colorado Parks and Wildlife (CPW) to support a program to monitor mercury in fish tissue in six lakes in the project area: Chimney Hollow, Granby, Shadow Mountain, Grand Lake, Carter and Horsetooth. Field work to collect the fish will be performed as directed by CPW, and the goal will be to obtain adequate representation of the important species as per the Division's protocol. The sampling effort for Chimney Hollow Reservoir will begin in the first field season after the reservoir has filled and will continue annually until five years after project becomes fully operational. In the event that there is impairment for mercury, the obligation for monitoring will be extended for an additional five years or until mercury levels fall below the level of concern for three consecutive years.

For the other reservoirs, sampling will begin in the first field season following issuance of the 404 permit and will continue biennially for not less than five years after the project becomes fully operational. The sampling effort for Shadow Mountain Reservoir and Grand Lake may be terminated, if approved by

the Division, after three sampling events provided mercury levels do not warrant concern.

If fish tissue analyses show that a FCA is required, the Applicant will work with the Technical Advisory Team (TAC)[17] of the Colorado Fish Consumption Advisory Committee to provide public education including the posting of signs with associated consumption advisories. The TAC will determine design of the signs and the information to be included. The Applicant will incur the costs of the signs and be responsible for proper posting of such signs.

Manganese

The AD review revealed that concentrations of dissolved manganese in the Colorado River below Windy Gap Reservoir currently exceed the water supply standard of 50 µg/L. Although the segment is not currently on the state's 303(d) List for manganese, site-specific data suggest that it could be listed. In addition, modeling of cumulative impacts predicts a small increase in dissolved manganese below the reservoir. As a result, there would be a "cause-or-contribute" concern with project operation.

Following review of comments received in the public comment period, the Division decided to take a closer look at manganese data in order to reach a conclusion about the potential for project operation to increase concentrations. Data were supplied by the Applicant (see Table below). Manganese concentrations in the Colorado River are quite low in water released from Granby Reservoir, but are augmented significantly (median increase is 39 µg/L) in the short reach between Granby Reservoir and the inlet to Windy Gap Reservoir. The increase is sufficient to raise the 85th percentile concentration above the 50 µg/L standard even before the river enters Windy Gap Reservoir.

[17] Members include representative from CPW, the Division, and the Disease Control and Environmental Epidemiology Division of the Colorado Department of Public Health and Environment.

Table 3. Manganese concentrations (µg/L) at sites below Granby Reservoir. Data submitted by the Applicant for 2009-15. Sampling schedules varied among the sites.

Site	Median	85th	Maximum
Colorado River below Granby Reservoir	1.9	2.6	6.1
Colorado River above Windy Gap Reservoir	42.7	68.7	120.0
Colorado River below Windy Gap Reservoir	40.4	64.6	114.0
Willow Creek below Willow Creek Reservoir	9.9	52.8	313.5
Fraser River above Windy Gap Reservoir	24.8	37.4	71.7
Windy Gap Reservoir top	26.0	42.9	57.0
Windy Gap Reservoir bottom	41.6	58.7	84.6

There are two tributaries to the Colorado River between Granby Reservoir and Windy Gap Reservoir – Willow Creek and the Fraser River. Both have relatively low manganese concentrations that cannot account for the observed increase in the mainstem of the Colorado River. Because the source of the additional manganese remains uncertain, it is not possible to speculate on the potential for the project to make things better or worse. Future monitoring may clarify the matter.

In the course of reviewing the manganese data in detail, another important point emerged concerning concentrations in Windy Gap Reservoir. Concentrations on the bottom of the reservoir are typically higher than those on the top; the median difference (14 µg/L; May-Sep) is statistically significant and potentially important. Although this kind of disparity is not unusual for reservoirs, it creates a conundrum with respect to a mitigation measure proposed for alleviating temperature problems downstream of Windy Gap Reservoir.

The Applicant has committed to an impact avoidance measure for temperature whereby the "Bypass Valve and Auxiliary Outlet [would be used] to the maximum extent practicable to release colder water…." The unintended consequence of releasing the cooler bottom water to mitigate for temperature increases would likely be exacerbation of an existing impairment for manganese. Fortunately, the commitment to release water does not compel the use of the bypass valve; there is an option. To avoid the unintended consequence, a condition is imposed to preclude release through the bypass valve if it will augment manganese concentrations; see Condition 6 under temperature impacts. An additional condition is imposed requiring the Applicant to conduct a manganese impairment investigation and prepare a report summarizing the results, which may lead to development of a Category 4b plan for manganese.

Condition 17: The Applicant will investigate sources and mechanisms contributing to the large increase in manganese concentrations observed in the Colorado River between Granby Reservoir and Windy Gap Reservoir. Within five years of issuance of the 404 permit, the Applicant will submit to the Division a report explaining the cause(s) of increased manganese concentrations and the potential, if any, for project operation to exacerbate the problem. If the Applicant determines, and the Division agrees, that there is no potential for operation of the project to contribute to the existing impairment for manganese, the report will fulfill the obligation under this condition.

If there is potential for operation of the project to contribute to impairment for manganese, the Division will require that the Applicant actively explore preparation of a Category 4b Plan that will define the actions necessary to bring water quality back to attainment of the standard. In doing so, the Applicant will be encouraged to work with other significant contributors to impairment, if applicable.

A Category 4b Plan must ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, must be consistent with CRS 25-8-104, and must be submitted to the Division no more than 2 years after the Division's determination that the plan is applicable. If it becomes apparent that a Category 4b Plan cannot ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, or if such plan is not accepted by the Division or EPA, or is precluded by or inconsistent with the water rights provisions in section CRS 25-8-104, then the Division anticipates a 303(d) listing and, in cooperation with the Applicant, preparation of a TMDL to bring water quality back to attainment of the standard. The Applicant, at its discretion, may agree to remedial actions to restore water quality that are inconsistent with the water rights provisions of CRS 25-8-104.

Monitoring in Chimney Hollow Reservoir

Chimney Hollow Reservoir will be constructed and filled before the project will be fully operational. It is reasonable to expect that water quality in the new reservoir will be similar to that in Carter Lake, as mentioned earlier. However, that assumption cannot be tested beforehand. Consequently, the Division will impose a condition requiring general monitoring of water quality in the new reservoir.

Condition 18: The Applicant will monitor water quality in Chimney Hollow Reservoir. Monitoring will begin no later than the date when the project becomes fully operational and will continue for not less than 5 years. The data will be submitted annually to the Division along with a report documenting any

water quality concerns. The report is due by April 1 following each calendar year of sampling.

The frequency and analytical scope of the monitoring in Chimney Hollow Reservoir will match that employed now for Grand Lake. Samples will be taken at a site near the dam. In the months of January, February, and June through October, analysis will include general field parameters[18], major ions[19], nutrients and biological collections[20], and metals[21]. In the months of January, June, and October, analysis will also include expanded lists for major ions[22] and metals[23].

Significance Determination

The AD review process is guided by Regulation 31 Section 31.8(3), which describes what is required for the significance determination. The first step is to determine if there are significant impacts to water quality, as has been done in the preceding sections of this document. There are significant impacts, but there are also commitments for mitigation and enhancement measures (i.e., offsets) that lessen the impacts or otherwise improve water quality.

The next step is to decide if the balance of impacts and offsets results in net environmental benefit. In cases like the present application, where requirements for direct mitigation could interfere with normal exercise of water rights, the offsets become important. At the same time, evaluation of offsets presents a challenge in that it requires a measure of subjectivity; it is a comparison of apples and oranges.

The Division has evaluated the offsets with the following questions:

1) Does the action provide direct mitigation? In other words, where a significant impact has been identified for a particular water quality parameter, does the offset lessen the impact at the appropriate place and time?
2) In addition to lessening a significant impact, does the action also improve conditions at other times or places or for other uses within the project area?

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[18] Vertical profiles of temperature, DO, conductance, pH, turbidity, and secchi depth
[19] Total organic carbon and total suspended solids
[20] Total Kjeldahl nitrogen, ammonia-nitrogen, nitrite+nitrate-nitrogen, ortho-phosphorus, total phosphorus, chlorophyll-a, phytoplankton, and zooplankton
[21] Dissolved copper, dissolved iron and dissolved manganese
[22] Calcium, magnesium, chloride, potassium, sodium, sulfate, and total alkalinity
[23] Total recoverable form: iron, arsenic, and chromium; Dissolved form: arsenic, boron, cadmium, chromium, lead, nickel, selenium, silver, uranium, and zinc

3) Does the action result in a measurable improvement to water quality for a parameter that may have been degraded previously, but is not further degraded by the project?

After reviewing the mitigation and enhancements measures for which the Applicant has already made commitments, the Division finds five that are particularly noteworthy. These include: WWTP improvements, release of 5412 flows, modified prepositioning, habitat improvements, and the Windy Gap bypass. Each merits additional comment.

The WWTP improvements are exceptional in providing full mitigation of the phosphorus impacts predicted with operation of the project. In addition, the improvements will yield a significant reduction in phosphorus and nitrogen concentrations in the Fraser River and the Colorado throughout the year, even when the project is not operating. The sanitation district also would benefit by having a substantial financial subsidy to help achieve limits that will be required eventually through Regulation 85.

Release of the 5412 flows, which is required as part of other agreements, has great potential to mitigate temperature impacts. Almost any release of the 5412 flows can reduce the erosion of assimilative capacity for temperature. More importantly, shifting the start date for the releases to July 15 in dry years makes it possible to mitigate temperature impacts when stream temperatures are highest (end of July). There is a strong likelihood that these releases of cold water also can offset impacts resulting from previous anthropogenic changes.

Modified prepositioning in Granby Reservoir was proposed initially as a benefit to recreation by maintaining a relatively high water level. Fortuitously, it has potential to provide water quality benefits for DO and mercury that would lessen impacts of the project. Improved DO concentrations would also benefit water quality in Shadow Mountain Reservoir.

The commitment to support habitat improvements below Windy Gap Reservoir and to monitor the effectiveness of those improvements involves a significant monetary investment. In addition, the investment in habitat work is complemented by other actions (flushing flows, flow releases for temperature mitigation, 5412 flows, and reduction of nutrient loads) beneficial to aquatic life.

Construction of the Windy Gap bypass is a great opportunity to remedy past impacts to aquatic habitat by creating more natural conditions for flows, sediment transport and fish passage. In addition, water in the Colorado River would no longer be detained and warmed before continuing the journey downstream. It is thus reasonable to expect an improvement in the thermal regime of the river downstream. The bypass arguably has the most potential

for a significant contribution to net environmental benefit, but it also has the greatest uncertainty about implementation.

Finally, as follow-up to water quality monitoring, if the Division concludes that operation of the project is primarily responsible for any impairment, the Division will require that the Applicant actively explore preparation of a Category 4b Plan that will define the actions necessary to bring water quality back to attainment of the standard. In doing so, the Applicant will be encouraged to work with other significant contributors to impairment, if applicable.

A Category 4b Plan must ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, must be consistent with CRS 25-8-104, and must be submitted to the Division no more than 2 years after the Division's determination that the plan is applicable. If it becomes apparent that a Category 4b Plan cannot ensure attainment with all applicable water quality standards through agreed upon pollution control mechanisms within a reasonable time period, or if such plan is not accepted by the Division or EPA, or is precluded by or inconsistent with the water rights provisions in section CRS 25-8-104, then the Division anticipates a 303(d) listing and, in cooperation with the Applicant, preparation of a TMDL to bring water quality back to attainment of the standard. The Applicant, at its discretion, may agree to remedial actions to restore water quality that are inconsistent with the water rights provisions of CRS 25-8-104.

A Category 4b Plan, or TMDL, is important because it establishes a pathway for water quality improvement where predictions may have over-estimated the benefit of proposed mitigation measures. In addition, even in the event that the impairment is not attributable to operation of the project, much of the exploratory work required to identify sources and causes will have been done and be available for the Division's use. Development of a Category 4b plan, or a TMDL, does not represent a mitigation measure per se, but it could be considered a component of net environmental benefit in the sense that it leads to improvement of water quality.

The Division concludes that the conditions imposed on the Applicant provide reasonable assurance that the commitments for mitigation and enhancement measures are sufficient to result in net environmental benefit. Therefore, the finding in regard to the significance determination is: no significant degradation.

WQCC Regulation 82.6 Certification Requirements:

(A) The following requirements shall apply to all certifications:

(1) Authorized representatives from the Division shall be permitted to enter upon the site where the construction activity or operation of the project is taking place for purposes of inspection of compliance with BMPs and certification conditions.

(2) In the event of any changes in control or ownership of facilities where the construction activity or operation of the project is taking place, the successor shall be notified in writing by his predecessor of the existence of the BMPs and certification conditions. A copy of such notification shall be provided to the Division.

(3) If the permittee discovers that certification conditions are not being implemented as designed, or if there is an exceedance of water quality standards despite compliance with the certification conditions and there is reason to believe that the exceedance is caused, in whole or in part, by the project, the permittee shall verbally notify the Division of such failure or exceedance within two (2) working days of becoming aware of the same. Within ten (10) working days of such notification, the permittee shall provide to the Division, in writing, the following:

(a) In the case of the failure to comply with the certification conditions, a description of (i) the nature of such failure, (ii) any reasons for such failure, (iii) the period of non-compliance, and (iv) the measures to be taken to correct such failure to comply; and

(b) In the case of the exceedance of a water quality standard, (i) an explanation, to the extent known after reasonable investigation, of the relationship between the project and the exceedance, (ii) the identity of any other known contributions to the exceedance, and (iii) a proposal to modify the certification conditions so as to remedy the contribution of the project to the exceedance.

(4) Any anticipated change in discharge location and/or quantities associated with the project which may result in water quality impacts not considered in the original certification must be reported to the Division by submission of a written notice by the permittee prior to the change. If the change is determined to be significant, the permittee will be notified within ten days, and the change will be acknowledged and approved or disapproved.

(5) Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions herein is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any

facilities necessary for compliance with limitations and prohibitions herein. The Division shall be notified immediately in writing of each such diversion or bypass.

(6) At least fifteen days prior to commencement of a project in a watercourse, which the Division has certified, or conditionally certified, the permittee shall notify the following:

(a) Applicable local health departments;

(b) Owners or operators of municipal and domestic water treatment intakes which are located within twenty miles downstream from the site of the project; and

(c) Owners or operators of other intakes or diversions which are located within five miles downstream from the site of the project.

The permittee shall maintain a list of the persons and entities notified, including the date and form of notification.

(7) Immediately upon discovery of any spill or other discharge to waters of the state not authorized by the applicable license or permit, the permittee shall notify the following;

(a) Applicable local health departments;

(b) Owners or operators of municipal and domestic water treatment intakes which are located within twenty miles downstream from the site of the project; and

(c) Owners or operators of other intakes or diversions which are located within five miles downstream from the site of the project.

The permittee shall maintain a list of the persons and entities notified, including the date and form of notification.

(8) Construction operations within watercourses and water bodies shall be restricted to only those project areas specified in the federal license or permit.

(9) No construction equipment shall be operated below the existing water surface unless specifically authorized by the 401 certification issued by the Division.

(10) Work should be carried out diligently and completed as soon as practicable. To the maximum extent practicable, discharges of dredged or fill material shall be restricted to those periods when impacts to designated uses are minimal.

(11) The project shall incorporate provisions for operation, maintenance, and replacement of BMPs to assure compliance with the conditions identified in this section, and any other conditions placed in the permit or certification. All such provisions shall be identified and compiled in an operation and maintenance plan which will be retained by the project owner and available for inspection within a reasonable timeframe upon request by any authorized representative of the Division.

(12) The use of chemicals during construction and operation shall be in accordance with the manufacturers' specifications. There shall be no excess application and introduction of chemicals into state waters.

(13) All solids, sludges, dredged or stockpiled materials and all fuels, lubricants, or other toxic materials shall be controlled in a manner so as to prevent such materials from entering state waters.

(14) All seed, mulching material and straw used in the project shall be state-certified weed-free.

(15) Discharges of dredged or fill material in excess of that necessary to complete the project are not permitted.

(16) Discharges to state waters not identified in the license or permit and not certified in accordance therewith are not allowed, subject to the terms of any 401 certification.

(17) Except as otherwise provided pursuant to subsection 82.7(C), no discharge shall be allowed which causes non-attainment of a narrative water quality standard identified in the Basic Standards and Methodologies for Surface Waters, Regulation #31 (5 CCR 1002-31), including, but not limited to discharges of substances in amounts, concentrations or combinations which:

(a) Can settle to form bottom deposits detrimental to beneficial uses; or

(b) Form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or

(c) Produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species, or to the water; or

(d) Are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or

(e) Produce a predominance of undesirable aquatic life; or

(f) Cause a film on the surface or produce a deposit on shorelines.

(B) Best Management Practices:

(1) Best management practices are required for all projects for which Division certification is issued except for section 402 permits. Project applicants must select BMPs to be employed in their project. A listing and description of best management practices is located in Appendix I of Regulation No. 82: 401 Certification Regulation 5 CCR 1002-82.

(2) All requests for certifications which require BMPs shall include a map of project location, a site plan, and a listing of the selected BMPs chosen for the project. At a minimum, each project must provide for the following:

(a) Permanent erosion and sediment control measures that shall be installed at the earliest practicable time consistent with good construction practices and that shall be maintained and replaced as necessary throughout the life of the project.

(b) Temporary erosion and sediment control measures that shall be coordinated with permanent measures to assure economical, effective, and continuous control throughout the construction phase and during the operation of the project.