RECLAMATION

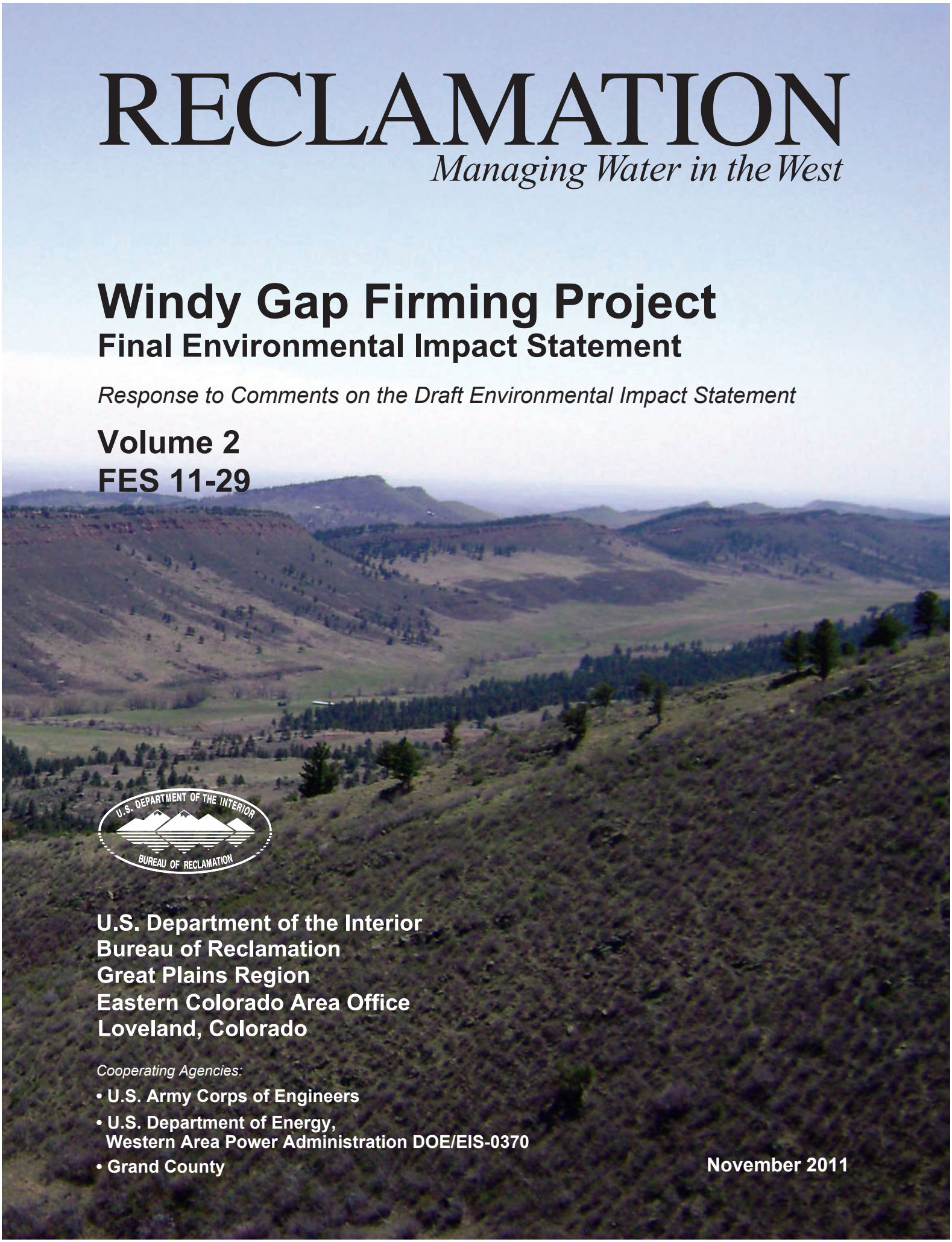
Managing Water in the West

Windy Gap Firming Project

Final Environmental Impact Statement

Response to Comments on the Draft Environmental Impact Statement

Volume 2
FES 11-29



U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region
Eastern Colorado Area Office
Loveland, Colorado

Cooperating Agencies:

- **U.S. Army Corps of Engineers**
- **U.S. Department of Energy, Western Area Power Administration DOE/EIS-0370**
- **Grand County**

November 2011

Windy Gap Firming Project

Volume 2
Appendix F to FEIS

Response to Comments on the Draft Environmental Impact Statement

TABLE OF CONTENTS

Introduction

Completion of the Draft EIS was announced in the Federal Register (73 FR 50999) and made available to the public for a 60-day comment period from August 29, 2008 to October 28, 2008. Requests were made to extend the 60-day comment period and one was granted until December 29, 2008, providing a few days more than 120 in total. During that time, Reclamation received 1,150 letters and comment forms, and recorded oral and written statements made at two public hearings. Public hearings were held on October 7, 2008 in Loveland, Colorado and October 9, 2008 in Granby, Colorado. Written and oral comments were received from 65 government agencies and officials, 18 organizations, 44 businesses, and 1,026 individuals. Of the comments received, 714 were standardized form letters received from individuals. Each letter, email, or recorded public hearing comment was given a unique document number. All of the comment material was systematically reviewed for content, organized into topics, and responses were developed for substantive comments. Responses to comments are organized by the following sections:

- Response to Comments by Cooperating Agencies
- Response to Comments by Government Agencies and Elected Officials
- Response to Comments by Organizations, Environmental Groups, and Local Businesses
- Response to Comments by Individuals
- Response to Form Comment Letters

Comments received from cooperating agencies; government agencies and elected officials; and organizations, environmental groups, and businesses were reproduced and are included in this document. Each of the unique comments from these entities was given a number with a corresponding response from Reclamation.

Numerous individual comments provided information that:

- Questioned the accuracy of the information in the document;
- Questioned the adequacy of the environmental analysis;
- Proposed other alternatives;
- Suggested the need for changes in the Draft EIS or revisions to one of the alternatives considered in detail; or
- Provided new or additional information relevant to the analysis.

Comments from individuals were categorized into several main topics. An alphabetical list of commenters and the impact topic associated with each comment is summarized beginning on page 593. Because of the number of comments and to reduce repetition, responses to individual comments were grouped by topic with corresponding responses. Many of the comments expressed by individuals also were made by government agencies and organizations; therefore, additional information on these topics can be found by reviewing the responses to comments from these entities. Where appropriate, the text of the Final EIS was revised and the section where the change was made is noted in the response to comments.

All of the original comments on the Draft EIS that Reclamation received are available for public inspection at the Reclamation address listed in the abstract at the front of the Final EIS and on

Reclamation's website at: http://www.usbr.gov/gp/nepa/quarterly.cfm#ecao. Reclamation appreciates the public's interest in the proposed project and their participation in the EIS process.

Legal Issues

Reclamation received comments on the Draft EIS that questioned the proposed action's consistency with existing legislation (e.g., Senate Document 80, Section 14 of the Reclamation Act of 1939, the Reclamation Act of 1902); water rights decrees; and other agreements enacted to apportion and protect water resources in the upper Colorado River basin. In response to these comments, we note that it is Reclamation's responsibility to determine whether or not a proposed action is consistent with Reclamation's authorizations for operation of an existing project and whether or not a proposed project can be implemented consistent with those authorities. To address these concerns, Reclamation has added text to Section 1.10.2 of the EIS to clarify our position and the process that Reclamation will follow to assure that the proposed action is consistent with existing Reclamation authorities for the Colorado-Big Thompson Project.

Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract.

Response to Comments by Cooperating Agencies

Cooperating agencies for the WGFP were the U.S. Army Corps of Engineers (Corps), Western Area Power Administration (Western), and Grand County. The Corps and Western provided information needed for preparation of the EIS, but had no additional comments on the Draft EIS. Grand County provided a number of comments on the Draft EIS; as shown below with Reclamation's corresponding responses.

Grand County Letters and Responses

Com-ment	Letter #1075	Response

WGFP 1075

SULLIVAN GREEN SEAVY LLC

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December 29, 2008

VIA EMAIL: **WTULLY@gp.usbr.gov**
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U.S. Army Corps of Engineers
9307 South Wadsworth Blvd.
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Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project
Grand County Cooperating Agency Comments:
Windy Gap Firming Project Draft Environmental Impact Statement

Gentlemen:

This letter was prepared on behalf of our client, Grand County, acting in its capacity as a cooperating agency under the National Environmental Policy Act ("NEPA") for the Windy Gap Firming Project ("WGFP") Draft Environmental Impact Statement dated August 2008 ("DEIS"). This letter synthesizes comments prepared by Lurline Underbrink Curran and Katherine Morris, Grand County; Jeff Clark, Bishop Brogden; Lane Wyatt, Wyatt and Associates; Jean Townsend, Coley/Forrest, Tom Cope and Robert Tuchman, Holme Roberts & Owen LLP; Dave Taussig, White and Jankowski; and Barbara Green, Sullivan Green Seavy LLC. This letter also incorporates by reference all written comments previously submitted by or on behalf of Grand County during the WGFP EIS process, all of which should be included in the administrative record. Such comments include those in the letters listed in Exhibit A, as well as in our letter to you dated March 31, 2008 ("PDEIS Comments"), concerning the WGFP Preliminary Draft Environmental Impact Statement ("PDEIS").

Grand County continues to be concerned that the DEIS, like the PDEIS, fails to satisfy NEPA's fundamental requirement that an environmental impact statement ("EIS") "foster both informed decision-making and informed public participation." *See Colorado Environmental Coalition v. Dombeck,* 185 F.3d 1162, 1172 (10th Cir. 1999); *accord*

Com-ment	Letter #1075	Response
1	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 2 *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). None of our concerns with the DEIS is new. The most serious concern continues to be that the DEIS fails to use *existing* (actual) hydrologic conditions against which to measure the impacts of the Windy Gap Firming Project. The Windy Gap Reservoir stream depletions used in the DEIS to describe "existing" stream conditions are over three times greater than actual depletions. Consequently, the percentage of change in depletions at the Windy Gap Reservoir as presented in the DEIS for each alternative are much smaller than the percentage of change in depletions that actually will occur. The DEIS's failure to adequately describe the significance of new stream depletions calls into question all of the analysis of impacts to the aquatic environment likely to occur in the Colorado River. Thus, the DEIS is fatally flawed. This flaw is discussed in more detail, below. **General Comments** **1. The Analysis of Impacts Caused by Hydrologic Modifications is Fatally Flawed** Some of the most significant impacts to Grand County result from hydrologic changes associated with flow depletions. The analysis of hydrologic conditions in the DEIS must document changes in magnitude, frequency, duration, timing, and rate of change before the impacts of flow depletions on the aquatic environment can be adequately understood. *See* B.D. Richter, J.V. Baumgartner, J. Powell and D.P. Braun, *A Method for Assessing Hydrologic Alteration within Ecosystems,* Conservation Biology 10(4) (1996). NEPA requires EISs to contain high quality information and accurate scientific analysis. 40 C.F.R. § 1500.1(b); *see also id.* §1502.24. When relevant information is incomplete or unavailable except at an exorbitant cost, the EIS must disclose that the information is incomplete or unavailable and discuss its significance. *Id.* § 1502.22. To the extent that information on actual impacts to the Upper Colorado River Basin from the existing Windy Gap Project is available or readily obtainable, it should be used in preference to predicted impacts from modeling. Because Windy Gap diversions have occurred primarily in May and June, and only in specific years, the analysis should focus on actual stream conditions when the Windy Gap Project actually operated. An understanding of the actual impacts of the Windy Gap Project requires at a minimum a comparison of pre-Windy Gap Project conditions with *existing* conditions. Only then could predictions of future conditions be potentially reliable. Moreover, it is important to recognize that all models have limitations that information on actual impacts does not: I sometimes think we place too much faith in models -- computer programs, or similar patterns -- rather than	1. The EIS was prepared consistent with guidance from the Council on Environmental Quality implementing the procedural provisions of the NEPA and Reclamation's guidance on preparation of NEPA documents. The effects of the proposed action and alternatives were developed by comparing each alternative to the No Action alternative and to existing conditions. Effects on flows due to the alternatives, including the No Action alternative, were based on a comparison with modeled existing conditions that reflect the existing Windy Gap Project and that are indicative of the current administration of the river, demands, infrastructure, and operations. This process is explained in Section 7.1 of the WGFP Water Resources Technical Report (ERO and Boyle 2007).

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1	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 3 walking the ground, looking, seeing, feeling. Models, rather than improving thought, often impose a barrier to thought. We get so wrapped up in our analogue we forget that *it is reality we seek to describe.* *Utahans for Better Transportation v. U.S. Department of Transportation*, 180 F. Supp. 2d 1286, 1290 (D. Utah 2001) (emphasis added). There are several problems with the way that the analysis of hydrologic impacts has been approached. A discussion of some of the key problems follows. For a more thorough discussion of problems with the model *see Report on Windy Gap Firming Project Hydrology Technical Report* by Bishop-Brogden Associates ("*BBA Report*"), attached to this letter as Exhibit B, and *Memo on Windy Gap Firming Project DEIS Aquatics Resources Technical Report* by Lane Wyatt ("*Wyatt Memorandum*"), attached to this letter as Exhibit C.	
2	1.1 **The significance of hydrologic modifications is under-reported and therefore, the accuracy of the impact analysis is called into question.** a. <u>The amount of existing diversions are over-reported</u>. The DEIS does not use actual existing diversions to determine baseline conditions, so the "existing" diversions from Windy Gap Reservoir are over-reported. Table 3 on page 22 of the DEIS Water Resources Technical Report states that the existing average diversions at the Windy Gap Reservoir total **11,080** af per year. (See column labeled "Total" and row labeled "Average".) This number is very close to the diversion records maintained by the Office of the State Engineer, so we believe it is reasonably accurate. On Table 3-2 on page 3-9 of the DEIS, however, the "existing" average annual diversions from Windy Gap Reservoir are reported as **36,532** af per year. (See column labeled "Existing Conditions/Average Annual Flow" and row labeled "Windy Gap Diversions.") This is a discrepancy of 25,452 af per year.	2. Windy Gap diversions for the last 10 years (1999 through 2008) averaged 22,158 acre-feet per year (AF/yr), which is significantly higher than the average diversion of 11,080 AF/yr for the period from 1985 through 2005 (presented in Table 3 of the Water Resources Technical Report). Windy Gap diversions were made in accordance with the project's water rights, the same water rights that would be used to effect diversions if the WGFP is constructed. The increase in recent diversions represents the Participants' need for additional water to meet increasing water demands, which is supported by information presented in Chapter 1 of the FEIS on the Participants' water demands and needs. Modeled Windy Gap diversions under existing conditions reflect the recent increases in Windy Gap Participant demands. Windy Gap pumping for the 8-year period from 2001 through 2008 (since Granby Reservoir last filled) averaged about 27,450 AF/yr. That average includes 2002 and 2004, when almost no Windy Gap water was pumped. Therefore, estimated pumping under existing conditions is much closer to recent operations than suggested in the comment.
3	b. <u>The percent increase in diversions over existing conditions is under-reported.</u> Because of the failure to use *actual* existing average annual diversions, the percent increase in diversions at Windy Gap for all alternatives is *under-reported*. For example, Table 3-2 calculates the percent difference between "existing conditions" for Windy Gap diversions and Windy Gap diversions for each alternative. For the Proposed Action, Table 3-2 reports that the average annual Windy Gap diversions will be 46,084 af. (See column labeled "Alternative 2/Avg. Annual Flow" and row labeled "Windy Gap diversions".) This number is compared to "existing" average annual flows of 36,532 af to derive an increase of 9,552 af in average annual diversions, which is a percent difference of **26%**. (*See* column labeled "Alternative 2/Percent Diff" and row labeled "Windy Gap	3. Refer to responses to Comment Nos. 1 and 2 regarding why historical Windy Gap diversions were not used to evaluate the increase in diversions over existing conditions. The comment indicates that the percent increase in diversions compared to existing conditions is underreported; therefore, future depletions under the Proposed Action are underreported. That is incorrect for the following reasons. Impacts would be understated if the difference in Colorado River flows below Windy Gap was 9,552 AF/yr on average, which is the difference in Windy Gap pumping under the Proposed Action (46,084 AF/yr) and existing conditions (36,532 AF). However, the average difference in flows below Windy Gap between the Proposed Action and existing conditions is 21,283 AF/yr, which is the increase

Com-ment	Letter #1075	Response
		in net depletion to the Colorado River. This reflects the net effect of additional Windy Gap diversions from the Colorado River and the difference in spills from Granby Reservoir. The increased net depletion to the Colorado River is much greater than the increase in Windy Gap diversions under the Proposed Action; therefore, potential impacts are not minimized. Pumping Windy Gap water that is later spilled is a re-timing of flows; not a depletion to the river. In other words, a considerable portion of Windy Gap water diverted from the Colorado River is delivered back to the river via a spill under the existing conditions scenario. Windy Gap operations were simulated in this manner to present the amount of water that could be diverted with the project's current water rights to meet demands even if a portion of the water is subsequently spilled from Granby Reservoir back to the Colorado River. For example, the net depletion to the Colorado River for the existing conditions scenario is about 17,750 AF (36,530 AF of Windy Gap diversions (Table 3-6) less 18,780 AF of Windy Gap spills (Table 3-5). The net effects of Windy Gap operations also can be summarized by reviewing estimated Windy Gap deliveries through the Adams Tunnel. Average annual Windy Gap pumping under existing conditions is estimated to be 36,532 AF/yr; however, after spills, diversion shrink, carryover shrink, and allocations to Middle Park Water Conservancy District (Middle Park), only 11,500 AF/yr of Windy Gap water is delivered through the Adams Tunnel, as shown in Table 3-6 of the FEIS. The effects assessments based on net depletions to the Colorado River below Windy Gap, as presented in the FEIS, are appropriate. Windy Gap diversions under existing conditions reasonably reflect recent operations and diversions, which are much higher than the 20-year average from 1985 through 2005. In addition, this issue does not affect Windy Gap diversions in dry years; therefore, Windy Gap pumping, net depletions to the Colorado River and associated impacts are appropriately estimated in dry years, which are typically more critical for aquatics, water quality, and other flow-related resources.

Com-ment	Letter #1075	Response
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3	diversions".) However, if the 46,084 af of average annual Windy Gap diversions for Alternative 2 is compared to the *actual* existing average annual diversions of **11,080** af, then the increase in diversions is **35,004** af which is a percent difference of over **300%.** Consequently, the significance of the future depletions that will be caused by the Proposed Action is grossly under-reported.	4. Reclamation believes that average annual streamflows below Windy Gap are accurately estimated in the EIS. Refer to responses to Comment Nos. 1 and 2 regarding why historical Windy Gap diversions should not be used to evaluate streamflows below Windy Gap. As stated above, average annual Windy Gap diversions between 1999 and 2008 were 21,951 acre-feet per year to meet the Participants' increasing water demands. Also see response to Comment No. 3 regarding streamflows below Windy Gap and the net depletion to the Colorado River. The average annual flow below Windy Gap is 151,358 AF, which is the difference between 187,889 AF and the existing conditions diversion of 36,532 AF. However, the net depletion to the Colorado River for the existing conditions scenario is about 17,750 AF (36,530 AF of Windy Gap diversions (Table 3-6) less 18,780 AF of Windy Gap spills (Table 3-5). The net depletion is less than the amount diverted because of the Windy Gap spills that would occur under existing conditions. Pumping Windy Gap water that is later spilled is a re-timing of flows; not a depletion to the river.
4	c. The average annual stream flows below Windy Gap for existing conditions is under-reported. Because of the failure to use the lower *actual* existing average annual diversions, the existing average annual stream flows below Windy Gap Reservoir are under-reported. For example, Table 3-2 reports that the Colorado River below Windy Gap Reservoir is **151,358** af under existing conditions. (See column labeled "Existing Conditions/Avg. Annual Flow" and Row labeled "Colorado River below Windy Gap.") This number is simply the difference between 187,889 af at the Colorado River above Windy Gap Reservoir, and the "existing" diversions of 36,532. If, however, the actual existing average annual diversions of 11,080 are used, then the existing average annual flows below Windy Gap Reservoir would actually be **176,809** af.	
5	d. The percent decrease in annual average stream flows over existing conditions below Windy Gap Reservoir is under-reported. Because of the failure to use the *actual* existing average diversions to calculate existing stream flows below Windy Gap Reservoir, the percent change in stream flows below Windy Gap Reservoir that would result from each alternative are incorrect. For the Proposed Action, for example, Table 3-2 reports that flows in the Colorado River below Windy Gap will be **130,075** af. (*See* column labeled "Alternative 2/Avg. Annual Flow" and row labeled "Colorado River below Windy Gap.") This number is compared to "existing" flows below Windy Gap Reservoir of 151,358 af to derive a decrease in average annual flows of **21,283** af which is a percent difference of **14%** (*See* column labeled "Alternative 2/Percent Diff" and row labeled "Colorado River below Windy Gap".) However, if Alternative 2 is compared to the *actual* existing average annual diversions of **11,080** af and the corresponding existing flow of **176,809** af below Windy Gap Reservoir, then the reported 130,074 af flow in the Colorado River below Windy Gap Reservoir for Alternative 2 represents a decrease in average annual flows of **46,734** af, or a decrease in over **26%**. Consequently, the significance of stream flow depletions that will be caused by the Proposed Action is grossly under-reported.	5. Reclamation believes that the percent decrease in average annual streamflows below Windy Gap is accurately estimated in the EIS. Refer to responses to Comment Nos. 1 and 2 regarding why historical Windy Gap diversions should not be used to evaluate streamflows below Windy Gap. Use of the historical average annual Windy Gap diversion of 11,080 AF from 1985 through 2005 does not reflect recent Windy Gap diversions to meet the Participants' water demands. Also see response to Comment No. 3 regarding streamflows below Windy Gap and the net depletion to the Colorado River.
6	e. The analysis of impacts to the aquatic environment cannot be accurate. Because the "existing" diversions are over-reported and the percent decrease in stream flows for each alternative is under-reported, the analysis of the impact of these changes to the aquatic environment, recreation and water and wastewater facilities is called into question	6. See responses to Comment Nos. 2, 3, 4, and 5. The analysis for the aquatic environment used the daily hydrology values and is consistent with CEQ and Reclamation guidance on the preparation of an EIS. See Section 3.9.2.3 of the FEIS.

Com-ment	Letter #1075	Response
7	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 5 1.2 **The model study period is inadequate to evaluate west slope impacts.** A model study period of 1950 to 1996 was used. DEIS at 3-13. This period overstates projected stream flows for the alternatives and therefore understates resulting impacts to the Upper Colorado River Basin. Extending the model study period through approximately 2005 would result in a more accurate representation of water demands, stream flows, reservoir operations, and water administration under drought-year and dry-year conditions, when impacts are more significant. *See* Hydrosphere Resource Consultants, Inc., *Upper Colorado River Basin Study, Phase II* (May 29, 2003) ("UPCO Phase II Report") at 75 (discussing impacts of 2002-2003 drought). The DEIS provides no justification for omitting 2002 from its summary of annual changes in flow for the five driest years. DEIS at 3-17. Additionally, although the Windy Gap water rights might not be in priority during drought years such as 2002, the DEIS provides no justification for ignoring the impact of such conditions when analyzing cumulative effects. *Id.* at 3-14, 3-42.	7. The modeling effort for the WGFP began in 2000. At that time, the decision was made to end the study period in 1996 because data required for the model (e.g., flow, diversion, evaporation, and precipitation) were readily available through that year and the State's CDSS Model study period also ended in 1996. The need to extend the WGFP model study period was evaluated to determine whether a study period that includes recent hydrology, and in particular 2002, would change conclusions regarding associated hydrologic changes and WGFP yields. The period from 1997 through 2003 was analyzed in a spreadsheet exercise using Excel. A copy of the technical memorandum, *Significance of 2002 Hydrology to WGFP Modeling, (Meg Frantz September 27, 2004)*, which summarizes that analysis, was provided to Grand County at a meeting on March 4, 2005. At Grand County's request, the analysis was subsequently updated to take into account the "relaxation" of the Shoshone call. Key conclusions of that analysis are as follows: o The addition of a WGFP reservoir would not change Colorado River flows in a year like 2002. Windy Gap water rights did not come into priority in 2002, and the addition of a WGFP reservoir would not change that condition. Therefore, Windy Gap would not divert in a dry year like 2002 with or without a WGFP reservoir because Windy Gap diversions would be limited by the amount physically and legally available as opposed to available storage capacity. o The WGFP firm yield would not change if the model period was extended through 2002. A comparison of model output for the 1950–1996 study period with the period from 1997–2003 shows other sequences of years within the 1950–1996 study period that are more critical than 2002 with respect to Windy Gap yield.
8	1.3 **Average annual or monthly flows are not adequate to determine impacts to aquatic environment**. As Grand County has previously pointed out, what is important is not changes in *average* annual or monthly flows or water quality (or predicted water quality on a single day such as July 25), but actual changes in *daily* flows and *daily* water quality, including temperature. Reporting average annual or monthly flows and ignoring other flow factors can mask significant impacts that may occur on a given day or series of days, thereby creating the false impression that environmental impacts are insignificant, because *on average* they appear to be insignificant. The monthly time-step may be reasonable for estimating gross-level changes in yield or reservoir storage, but it is inadequate to address daily fluctuations in river flow, stage, channel width, and other factors that affect the aquatic environment. *See, e.g., id.* at 3-67, Figure 3-29 (exceedances of weekly average temperature standard in Colorado River during July and August 2007).	
9	1.4 **The results of the QUAL2K model are inadequate to describe water quality impacts.** The modeling of water quality impacts by the QUAL2K model are even more problematic. *Id.* at 3-90 to 3-92. Although the DEIS uses disaggregated daily flows for analyzing surface water hydrology, it does not use daily flows for analyzing surface water quality. Instead, conditions on only a single day each year, July 25, were modeled, based on the apparently untested assertion that it represents a worst case analysis. *Id.* at 3-92, 3-141. The DEIS does not adequately explain why, in any given year, a day other than July 25 might not have worse water quality conditions than those modeled for July 25. *See Wyatt Memorandum,* Exhibit C.	
10	**2. Violations of Legal Requirements**	The current model study period also addressed the carry-over or recovery effects of additional Windy Gap diversions in wet years following dry years like 2002 and 2003. The current model study period from 1950–1996 includes several series of dry years followed by wet years, which illustrate the effects of increased diversions to refill Windy Gap firming storage. For example, the existing study period

Com-ment	Letter #1075	Response
		includes the mid-1950s drought followed by 1957 (a wet year), 1963 and 1964 (dry years) followed by 1965 (wet year), 1977 (dry year) followed by 1978 (wet year), and 1981 (dry year) followed by several wet years in the mid-1980s. These sequences of years allow for an evaluation of impacts associated with diverting additional water in wet years following dry years. The model study period is suitable for estimating hydrologic effects associated with the EIS alternatives for both direct effects and cumulative effects because it includes a broad range of average, wet, and dry years, and sequences of years that include dry years followed by wet years. The year 2002 is omitted from the summary of annual changes in flow for the five driest years because 2002 was not included in the model study period. Years included in the dry year average were selected from the model study period, which extends from 1950 through 1996. 8. Daily data were developed from monthly model output by disaggregating monthly values using historical gage records. Two sets of daily data were developed. Daily data were developed for the entire study period for the USGS gages on the Colorado River below Granby Reservoir, below Windy Gap, at Hot Sulphur Springs, and near Kremmling, and the gage on Willow Creek below Willow Creek Reservoir. In addition to the daily data developed for the entire study period at the locations listed above, average, wet, and dry monthly flows were disaggregated to daily values to develop average, wet, and dry daily hydrographs. A combination of daily and monthly hydrologic data was used for evaluations of resources dependent on flows or reservoir storage contents and levels. Average monthly summaries of flows, diversions, reservoir outflow, end-of-month reservoir contents, surface elevations, and surface areas for average, wet, and dry conditions were used to support general characterizations of hydrologic changes associated with the alternatives. Daily data were used to generate flow duration curves and daily hydrographs, and to determine the frequency and magnitude of daily flow changes. These types of hydrologic analyses were based on daily variations, and were used in resource assessments where the magnitude or value of the resources is especially sensitive to daily hydrologic changes and where the use of average, wet, and dry monthly values would mask the severity of the effects on those resources. For example, daily hydrologic data were used as an input parameter for the River2D Model to evaluate the effects on aquatic resources. Use of daily data for the entire hydrologic study period supported an assessment of the overall range and frequency of aquatic habitat changes. Section 3.5.2.2 of the FEIS was revised to include information related to the use of daily data for resource evaluations, including fisheries and water quality that are sensitive to daily flow variations.

Com-ment	Letter #1075	Response
10	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 6 Whether an environmental impact is significant depends on both its context and its intensity. 40 C.F.R. § 1508.27. "Intensity" means "severity of impact" and is determined by evaluating a number of factors, including "[w]hether the action threatens a violation of Federal, State, or local law or requirements imposed for protection of the environment." *Id.* § 1508.27(b)(10). Here, the Proposed Action threatens violation of such laws and requirements, thereby increasing the significance of the WGFP's environmental impacts, but the DEIS fails to acknowledge these potential violations.[1] A related requirement is that the environmental consequences section of an EIS must discuss "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, and local . . . land use plans, policies, and controls for the area concerned. *Id.* § 1502.16(c); *see also id.* § 1506.2(d). Furthermore, when such laws or requirements are violated, heightened scrutiny of environmental impacts is required, which the DEIS also fails to do. *See Maryland-National Capital Park & Planning Comm'n v. U.S. Postal Service*, 487 F.2d 1029, 1037 (D.C. Cir. 1973) ("When . . . the Federal Government exercises its sovereignty so as to override local zoning protections, NEPA requires more careful scrutiny."). The Proposed Action threatens to violate the following Federal, State, or local laws or requirements (as have operations of the existing Windy Gap Project and the Colorado-Big Thompson Project ("C-BT") in some instances):[2]	Because of its relatively junior water rights, the Windy Gap Project is not in priority and is precluded from diverting water from the Colorado River during droughts and low-flow periods with or without the alternatives assessed to provide firming storage. During low-flow periods, the Windy Gap Project would operate the same whether there is a firming project online or not. In these low-flow conditions, downstream Colorado River flows, whether they are viewed on a monthly or on a daily basis, are the same for existing conditions, the No Action Alternative, and each of the EIS alternatives. Because there are no hydrologic impacts due to the WGFP during low-flow and drought periods, a daily model is not needed to assess effects for these low-flow periods and the disaggregation of monthly data to daily data is sufficient for the assessment of effects for non-drought conditions. The aquatic habitat analysis used the daily values for hydrology for all alternatives. The daily hydrology and daily habitat analysis accounts for appropriate fluctuations. All data presented in the graphs and tables are generated from those daily analyses. See FEIS Section 3.9.2.3 9. See response to Comment No. 129.
11	2.1 **Senate Document 80.** Requirements of Senate Document 80, including its provisions on "Manner of Operation of Project Facilities and Auxiliary Features" will control WGFP. DEIS at 1-42 to 1-43. Connection of WGFP facilities to C-BT facilities and storage of C-BT water in non-project facilities would require Congress to amend Senate Document 80 because Senate Document 80 does not include Chimney Hollow Reservoir as a C-BT project feature. a. <u>The Bureau of Reclamation's authority is constrained</u>. Senate Document 80 is the legal foundation of the C-BT Project. Senate Document 80 describes C-BT facilities and conditions to protect the beneficiaries of those facilities, including Grand County. Senate Document 80 contains requirements for use of C-BT water by the Municipal Subdistrict as a supplemental supply on the east slope, use of Green Mountain Reservoir for west slope beneficiaries, and provisions that specifically protect the headwaters of the Colorado River system in Grand County. Senate Document 80 is [1] It may be that the applicant intends to comply with all laws and requirements, but the DEIS fails to mention all applicable laws and requirements or the steps that will be taken to ensure compliance. As presented, the Proposed Action would violate several laws and requirements. [2] Grand County has raised many of these issues in prior letters and meetings, but to no avail. Some of these violations may not necessarily involve environmental protection or land use laws or requirements, but are included because they must be addressed before the Bureau could approve the WGFP.	10-14. Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract. See the discussion of text added at the beginning of Section 1.10.2 of the FEIS.

Com-ment	Letter #1075	Response
11	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 7 unique. But for the agreement between the east and west slopes contained in Senate Document 80, the project would not have been built. The 10th Circuit has described Senate Document 80 as "The Document, embodying the salient features of the project, [Senate Document 80] was Congressional sanction for a conciliation of conflicting interests of affected water users on both sides of the Rockies." *United States v. Northern Colo. Water Conservancy Dist.*, 608 F.2d 422, 430 (10th Cir. 1979) *citing*, *United States v. Martin*, 267 F.2d 764 (10th Cir. 1959). The Bureau of Reclamation's ("Reclamation") role in operating the C-BT Project is that of "a trustee responsible for the protection of West Slope interests and delivering water to northeastern Colorado." Consolidated Cases Nos. 2782, 5016 and 5017, Supplemental Judgment and Decree, p. 2 dated February 9, 1978; aff'd by *United States v. Northern Colorado Water Conservancy Dist.*, 608 F.2d 422, 429-30 (10th Cirt. 1979). b. Any excess capacity contract that Reclamation enters with the Municipal Subdistrict must comply with Senate Document 80. (1) Reclamation must include terms and conditions in any excess capacity contract to ensure that WGFP operations are consistent with Senate Document 80. Primary purposes of Senate Document 80 that concern Grand County are: (a) Primary Purpose No. 1 "to preserve the vested and future rights in irrigation" (b) Primary Purpose No. 2 "to preserve the fishing and recreational facilities and the scenic attractions of Grand Lake, the Colorado River, and Rocky Mountain National Park" (c) Primary Purpose No. 3 "to preserve the present surface elevations of the water in Grand Lake and to prevent a variation in these elevations greater than their normal fluctuations" (d) Primary Purpose No. 5 "to maintain conditions of river flow for the benefit of domestic and sanitary uses of this water" (2) Senate Document 80 requires that to facilitate compliance with the stipulations in paragraphs (j), (k), and (l) a representative may be selected to represent the interests of Grand County and "will be	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 8	
	recognized as the official spokesman of said interests in all matters dealing with project operations affecting Grand County."	
11	(3) Because the WGFP implicates Senate Document 80, through its use of C-BT facilities, the WGFP "deal[s] with project operations affecting Grand County", Grand County must be consulted regarding any determination on whether a C-BT excess capacity or carriage contract can be issued and must consent to any changes in operations to C-BT facilities contemplated by the WGFP.	
	(4) As Reclamation is aware, similar concerns were expressed by Grand County when Northern was seeking to transfer Operations and Maintenance, including water scheduling from Reclamation to Northern. In his letters dated May 14, June 1, and June 11, 2007 to Eric Wilkerson, Mr. Fred Ore made it clear that any changes in operations would require a "collaborative agreement" among all project beneficiaries due to the unique status of the C-BT Project and the mandates of Senate Document 80. The same rationale applies to the WGFP – Grand County's agreement is required for changes in project operations which includes such a major change in operations that would allow prepositioning.	
12	2.2 **Section 402 of the Federal Water Pollution Control Act ("FWPCA"), 33 U.S.C. § 1342.** Transport of Windy Gap water through Grand Lake is an un-permitted point source discharge of pollutants (including nitrogen, phosphorus, and possibly elevated temperatures) into navigable waters, in violation of the FWPCA.	
13	2.3 **Section 401 of the Federal Water Pollution Control Act ("FWPCA") 33 U.S.C. § 1341.** Section 401 of the FWPCA requires that in connection with issuance of a section 404 permit the State of Colorado certify that the project will not cause violations of State water quality standards. Given the water quality violations that would result from the Proposed Action, a 404 permit could not be issued.	
	2.4 **Water Conservancy Act, Colo. Rev. Stat. § 37-45-118(1)(b)(II).** The Act requires	
14	"Any works or facilities planned and designed for the exportation of water from the natural basin of the Colorado river and its tributaries in Colorado, by any district created under this article, shall be subject to the provision of the Colorado river compact, and the "Boulder Canyon Project	

Com-ment	Letter #1075	Response
14	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 9 Act.' Any such works or facilities shall be designed, constructed and operated in such manner that the present appropriations of water and, in addition thereto, prospective use of water for irrigation and other beneficial consumptive use purposes, including consumptive uses for domestic, mining, and industrial purposes, within the natural basin of the Colorado River in the state of Colorado from which water is exported will not be impaired nor increased in cost at the expense of the water users within the natural basin. The facilities and other means for the accomplishment of said purposes shall be in incorporated in and made a part of any project plans for the exportation of water from said natural basin of Colorado." Each of the alternatives includes new "works or facilities planned and designed for the exportation of water from the Colorado River and its tributaries." Accordingly, facilities and other means to protect the Colorado River basin must be part of the project plan and permit conditions for the WGFP.	15. The Subdistrict developed a Fish and Wildlife Mitigation Plan (FWMP) in accordance with the requirements of CRS 37-60-122.2 (FEIS Appendix E). The Colorado Wildlife Commission adopted the FWMP on June 9, 2011 and the Colorado Water Conservation Board (CWCB) adopted it on July 13, 2011. The FWMP is a component of the mitigation and environmental commitments described in the FEIS (Section 3.25).
15	2.5 **Colo. Rev. Stat. § 37-60-122.2.** These provisions require mitigation of impacts to fish and wildlife.	
16	2.6 **Grand County Areas and Activities of State Interest ("1041") Regulations**. A new or amended 1041 permit is required owing to changes in project participants and operations compared to the Windy Gap Project as originally permitted. Reclamation, however, has stated in the past that a new or amended 1041 permit may not be required for the WGFP and the DEIS continues to state that a 1041 permit will be required only if there is construction of facilities in Grand County.	16. There are ongoing discussions between Grand County and the Subdistrict on the need for a new or modification of the existing Windy Gap 1041 permit. The EIS provides an estimation of the anticipated direct and cumulative effects of the proposed action based on available information. However, resolution of this issue is not required for completion of the NEPA process or issuance of a Record of Decision. Additional discussion on this issue was added to Section 1.10.4 of the FEIS.
17	2.7 **Reclamation Project Act of 1939, 43 U.S.C. § 389.** Section 14 of the Reclamation Project Act of 1939 requires a determination that a contract would be in the best interest of the United States and the project. DEIS at 1-43.	
18	2.8 **Reclamation Act of 1902**. Section 8 of Reclamation Act of 1902 requires that the "Secretary of Interior, in carrying out the provision of this Act, shall proceed in conformity with State law" relating to the use water. *California v. US,* 438 US 645 (1978)	17-19. Prior to making a final decision in a Record of Decision (ROD), Reclamation will evaluate the specific authorities through a technical review process. The review will lead to a determination of whether or not the proposed action can be implemented in compliance with Senate Document 80 and other authorities. See added text in Section 1.10.2 of the FEIS.
19	2.9 **Colorado Water Law.** Colorado water law requires a change of the Windy Gap water rights decree from a direct flow right to a storage right. Section 8 of the Reclamation Act of 1902 recognizes Colorado laws on the control, appropriation, use, or distribution of water and requires Reclamation to proceed in conformity with them.	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 10	20. If the WGFP is constructed, the Windy Gap Project will continue to divert water in accordance with Colorado Water law and its water rights, including the limits on diversions which are 90,000 acre feet of water in one year and 65,000 acre feet of water on a ten-year running average as measured through the Alva B. Adams Tunnel. The WGFP will not cause the Windy Gap Project to exceed these limits. See response to Comment No. 19 regarding the need to change the Blue River decrees.
19	*See* 43 U.S.C. § 383. Since none of the proposed WGFP east slope reservoirs were covered by the Blue River Decree, a change of C-BT water rights also would be required to store C-BT water in the east slope reservoirs described in the DEIS such as Chimney Hollow.	
20	a. The Expansion of Use Doctrine. To protect water users, Colorado courts read limitations into decrees by implication. One such limitation is that an appropriator may not "**lend, rent**, or **sell** any **excess water** after completing the irrigation of the land for which the water was appropriated." (emphasis added) *Orr v. Arapahoe Water and Sanitation District*, 753 P.2d 1217, 1223 (Colo. 1988). Accordingly, if the original appropriators of the Windy Gap water rights do not have a need for the water, under Colorado law the water must be left in the Colorado River. Pre-positioning will expand the use of the C-BT water rights. Colorado's statute on changes of use does not allow such expansion to the injury of other water rights. C.R.S. § 37-92-305(3) – (4). In *Twin Lakes Reservoir & Canal Co. v. City of Aspen*, 568 P.2d 45, 50 (Colo. 1977) the Colorado Supreme Court said the expanded use doctrine applies to water rights in the exporting basin of a transmountain diversion. The Proposed Alternative cannot be implemented without a change in the water rights decree	21. The comment does not correctly state Colorado law, mischaracterizes the history of the Windy Gap Project, and ignores existing contracts. Colorado's anti-speculation doctrine does not prohibit the transfer of rights to water from one user to another so long as the new user has a need for the water and the limitations inherent in the rights continue to apply. Documents obtained from Grand County's own files indicate that all parties knew at the time of execution of the Agreement Concerning the Windy Gap Project and the Azure Reservoir and Power Project dated April 30, 1980, that Windy Gap Project participants could, at any time, convey a part or all of their rights to Windy Gap Project water to others so long as the new users are within the boundaries of the Subdistrict and are subject to the same rights and duties as the original participants who approved the agreement. West Slope interests agreed to this practice. This understanding is documented in a letter to from John M. Sayre to Kenneth Balcomb dated June 6, 1980, a letter from Kenneth Balcomb to John M. Sayre dated June 13, 1980, and a letter from Gregory J. Hobbs, Jr., to Gerald E. Dahl, dated June 30, 1980. At the time of the letters Mr. Balcomb represented the Colorado River Water Conservation District and Mr. Dahl represented Grand County. Finally, the DEIS, in Table 1-6 on page 1-39, states the number of units in the Windy Gap Project owned or leased by each WGFP participant, except for the Middle Park Water Conservancy District. The Middle Park Water Conservancy District does not own any units in the Windy Gap Project. Its right to water from the project derives from the Agreement Concerning the Windy Gap Project and the Azure Reservoir and Power Project dated April 30, 1980, as amended. Grand County is fully aware that Windy Gap units are permanent allotment contracts for water from the Windy Gap Project issued pursuant to the Water Conservancy Act.
21	b. The Anti-Speculation Doctrine. Originally, the Windy Gap Project had only six participants. Presently thirteen entities are participating in the firming project, most of which are not those original six entities. *See* Exhibit D, *Windy Gap Ownership and Transfer History*. The Municipal Subdistrict proposes to use its Windy Gap water rights, with priority dates of 1968, 1976 and 1980, to serve new demands by cities that were not entitled to Windy Gap units at the time the project was built in 1985, much less when the rights were originally filed upon (and in the case of the City and County of Broomfield, not even in existence). The Municipal Subdistrict's attempt to serve these new municipalities under its 1968 priority violates Colorado's anti-speculation doctrine because the service of water to these new municipalities was not contemplated at the time the Windy Gap appropriations were made. *City of Thornton v. Bijou Irrigation Co.*, 926 P.2d 1, 37-40 (Colo. 1996) (applying the anti-speculation doctrine to municipal appropriators). Nor does the DEIS disclose any firm contracts for water service. To add these new municipalities to the Windy Gap system, the Municipal Subdistrict must (1) file for a change of water rights to change the place of use for these water rights for these new entities; or (2) seek a decree with appropriation dates reflecting the time at which it had firm contractual commitments to use the water.	
22	2.10 **Water Supply Act.** The Water Supply Act ("WSA"), 43 U.S.C. §390b(b) provides that storage may be included in any reservoir project surveyed or constructed by the U.S. Army Corps of Engineers ("COE") or Reclamation for anticipated future	22-23. Prior to making a final decision in a Record of Decision (ROD), Reclamation will evaluate the specific authorities through a technical review process. The review will lead to a determination of whether or not the proposed action can be implemented in compliance with Senate Document 80 and other authorities. See discussion text added to Section 1.10.2 of the FEIS.

Com-ment	Letter #1075	Response
22	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 11 demand or need for municipal or industrial purposes. However, Section 390b(d) provides: > Modifications of a reservoir project heretofore authorized, …to include storage as provided in subsection (b) of this section which would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve **major structural or operational changes shall be made only upon approval of Congress** as now provided by law. (emphasis added). The D.C. Circuit Court of Appeals concluded that a settlement agreement between COE, Southeastern Power Customers, Inc., a group of Georgia Water Supply providers and the State of Georgia providing for the reallocation of water stored in Lake Lanier to municipal purposes violated the W.S.A. *Southeastern Federal Power Customers v. Geren*, 514 F.3d 1316 (D.C. Cir. 2008). The Court held that the reallocation of Lake Lanier's storage capacity to local consumption constituted a "major operational change" and thus required congressional approval. *Id.* at 1325. *See also* Order and Memorandum of Decision, Dated September 25, 2008, *Lower Arkansas Valley Water Conservancy District v. United States, et.al*, Civil Action No. 07-cv-0224-EWN-MEH, United District Court for the District of Colorado at 38, "*Re Application of City and County of Denver*, 1989 WL 128576, at *5 (D. Colo. Oct 23, 1989) (noting that an application to change a "water right to a different point of diversion, use and place of use" is '[b]y definition . . . a major operational change that may only be made upon congressional approval"). The C-BT project was approved by Congress to bring water from the western slope to lands on the eastern slope greatly in need of "supplemental irrigation" using the facilities in Senate Document 80. Use of C-BT Project facilities for the delivery and storage of (1) Windy Gap municipal supplies and C-BT water rights (2) in a new 90,000 acre foot non-federal Chimney Hollow Reservoir (3) under the guise of prepositioning, all constitutes "major structural and operational change" and thus congressional approval for all of the alternatives that would rely on the C-BT.	
23	2.11 **Warren Act, 43 U.S.C. §§ 523-525**. Warren Act of 1911 does not allow Reclamation to enter into a carriage contract for non-irrigation water. All of the proposed alternatives presented in the DEIS contemplate that there will be an Excess Capacity Contract between Reclamation and the Municipal Subdistrict. The Warren Act allows Reclamation to contract for the use of excess capacity in reclamation project facilities, but places strict limits on this authority. *Id.*, § 523. In particular, "[e]xcess capacity will	

Com-ment	Letter #1075	Response
23	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 12 be made available **only for the storage and conveyance of non-project water to be used for *irrigation***…." *Id.* During the 1980's, Reclamation developed principles to govern transfers of project water, including the use of excess capacity in projects owned by the Department of Interior. *See* Department of the Interior, *Principles Governing Voluntary Water Transactions that Involve or Affect Facilities Owned or Operated by the Department of Interior* (Dec. 16, 1988)("*1988 Principles.*") The policies emphasize that transactions must be agreed to among willing parties and must not adversely affect third parties. *Id.*, Preamble, § 3. The transaction must comply with applicable state and federal laws. *Id.*, § 1 In 2001, Reclamation issued a new policy - WTR-P04 - that specifically addresses contracts for excess capacity in reclamation projects. Reclamation Manual, Policy WTR-P04 (Jan. 10, 2001). The policy begins by reaffirming the 1988 Principles. *Id.*, ¶ 1. It also recites the Warren Act restriction that excess capacity is available only for irrigation. *Id.*, § 5.A (citing 43 U.S.C. § 523). . Policy WTR-P04 recites the Warren Act restriction that: "[e]xcess capacity will be made available **only for the storage and conveyance of non-project water to be used for *irrigation***…." *Id.*, § 5.A (citing 43 U.S.C. § 523) (emphasis added). According to these laws and policies, none of the proposed alternatives presented in the DEIS would be lawful because they will convey non-project water for purposes other than irrigation.	
24	**3. Purpose and Need; Range of Alternatives** As Grand County pointed out in its PDEIS Comments, the statement of purpose and need is too narrow, thereby unduly limiting the range of alternatives analyzed. This shortcoming persists in the DEIS, whose narrow range of alternative results in a document that fails to satisfy NEPA's requirement "that agencies take a 'hard look' at environmental consequences . . . ." *Robertson v. Methow Valley Citizens Council*, 490 U.S. at 350 (1989). The DEIS states that the purpose of the WGFP is "to deliver a firm annual yield of about 30,000 af of water from the existing Windy Gap Project to meet a portion of the water deliveries anticipated from the original Windy Gap Project and to provide up to 3,000 af of storage to firm water deliveries for the [Middle Park Water Conservation District]." DEIS at 1-4. The justification for this purpose is the need "to meet a portion of the existing and future demands of the Project Participants." *Id.* The DEIS estimates future water needs of WGFP participants, which will eventually exceed water supplies available to them, due in part, but only in part, to limited historic yields from the Windy Gap Project. *Id.* at 1-20 to 1-40. What emerges from this information, however, is the	24. Reclamation believes that the Purpose and Need statement is reasonable and appropriate. The WGFP was initiated by the Participants because the original Windy Gap Project failed to deliver the yield from Participant water rights that were anticipated in the 1981 EIS for the reasons discussed in more detail in Section 1.5 of the WGFP FEIS, including insufficient storage. To address the shortcomings of the Windy Gap Project, Participants determined that a cooperative project with shared storage in a new reservoir(s) would be the most efficient way to collectively firm their Windy Gap water supply. Windy Gap water represents a source of existing water available to the Participants, but requires additional infrastructure to provide reliable deliveries. Thus, the purpose of the WGFP was to fix a broken project, not to search for other sources of water. The WGFP is only functional as a collaborative effort on the part of Windy Gap Project unit holders. Many of the WGFP Participants have additional future water needs beyond what the WGFP would supply and will be investigating other sources of water to meet those needs.

Com-ment	Letter #1075	Response
24	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 13 conclusion that even with the WGFP, all the participants are predicted to face significant water shortages in 2050. The total projected water demand for the WGFP participants in 2050 is 251,450 af, with an estimated shortage of 110,688 af, of which 26,138 af[3] would be met by the WGFP (excluding Middle Park Water Conservation District's 429 af of firm yield, since its water demand and shortage are not included in the 2050 totals). *See id.* Table ES-1. WGFP's contribution to meeting participants' 2050 water demand would only amount to 10% of total demand. *See id.* Figure ES-2. The remainder, 84,550 af (34% of total 2050 demand) would have to be met by new water supplies—as yet unidentified—and conservation—as yet unquantified and of doubtful efficacy because it is voluntary. *Id.* Participants' needs, therefore, are not so much to firm Windy Gap Project yields, but to obtain additional water supplies to meet their anticipated needs. *See id.* at 1-37. Moreover, it is apparent that none of the alternatives in the DEIS will accomplish the stated purpose of the WGFP. Taking into account cumulative impacts, the Proposed Action would firm only about 24,000 af of water. DEIS Tables 3-20, 3-21. This is only 80% of the approximately 30,000 af included in the statement of purpose. The situation would be even worse for Middle Park, which would receive a firm yield of only 429 af, compared to the 3,000 af included in the statement of purpose. One reason none of the alternatives analyzed in the DEIS satisfies the purpose and need is that the purpose and need is too narrow. Consideration of alternatives is "the heart of the environmental impact statement." 40 C.F.R. § 1502.14. Because of this, agencies may not define purpose and need "so narrowly that it foreclose[s] a reasonable consideration of alternatives." *Davis v. Mineta*, 302 F.3d at 1118. As Reclamation's NEPA Handbook explains, > This brief statement [of purpose and need] is a critical element that sets the overall direction of the process and serves as an important screening criterion for determining which alternatives are reasonable. All reasonable alternatives examined in detail must meet the defined purpose and need. > A brief background discussion may be included for additional information, as appropriate. . . . This background [3] This actually overstates WGFP's potential contribution to meeting participants' water needs in 2050. Taking into account cumulative effects, the WGFP firm yield is predicted to be only 23,616 af (excluding 429 af for Middle Park). *See* DEIS Tables 3-20, 3-21. This represents only 9.4% of participants' total water demands.	The purpose and need goal of 30,000 AF was based on the number of Windy Gap units that Participants own, storage available in a new reservoir, and estimated Windy Gap diversions. While model results indicated that delivery of a full supply of 30,000 AF may not be feasible under any of the alternatives, the Preferred Alternative would have a firm yield of about 26,500 AF. The WGFP would meet about 2 to 46 percent of the Participants' total water needs.

Com-ment	Letter #1075	Response
24	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 14 discussion should be general and not tied to any specific alternative. Care must be taken to ensure an objective presentation rather than a justification. A purpose and need statement will generally allow a range of reasonable alternatives. If a purpose and need statement appears to allow only one reasonable solution, the statement and the reasons for rejecting other alternatives should be re-examined and confirmed or revised, as appropriate. U.S. Department of the Interior, Bureau of Reclamation, National Environmental Policy Act Handbook 8-5 to 8-6 (Public Review Draft: 2000) ("2000 NEPA Handbook"); *see also* United States Department of the Interior, Bureau of Reclamation, National Environmental Policy Act Handbook (Oct. 1990) 4-3 ("1990 NEPA Handbook"). As a result of the flawed statement of purpose and need in the DEIS, the range of alternatives it analyzes is unreasonably narrow. All alternatives - even the so-called "no action" alternative - rely on construction of one or more reservoirs to store water diverted from the Colorado River. The consequence of this, as the DEIS acknowledges, is that "[a]ll alternatives would result in an increase in water diversions from the Colorado River below the Windy Gap Reservoir." DEIS at 3-55. They are merely variations on the same theme. In addition, the DEIS reports that alternatives were excluded from consideration because Congressional approval would be required. Nevertheless, the Proposed Action would also require Congressional approval. Because of this, there is no way to ensure that the least environmentally damaging alternative will be selected as required under the COE's 404(b)(1) analysis. Finally, the alternatives that are presented do not even make a significant contribution to the water needs used to justify the purpose. On the other hand, a statement of purpose and need such as the following would lead to a broader range of reasonable alternatives, some of which might even be more cost effective than or environmentally preferable to those analyzed in the DEIS: "Meet Participants' existing and future water demands to the extent of 30,000 af per year [or whatever quantity would be appropriate] by measures such as mandatory conservation measures or goals, new sources of water, firming the yield of the Windy Gap Project, and requiring that all Windy Gap water be reused to extinction." The mitigation measures listed below that should have been discussed in the DEIS could serve as alternatives, or parts of alternatives, for analysis.	Reclamation does not believe that the WGFP, as proposed, requires Congressional approval. As previously stated, Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract. See the discussion of text added at the beginning of Section 1.10.2 of the FEIS. In addition, the purpose of the WGFP is to correct deficiencies in the Windy Gap Project and better utilize existing decreed absolute water rights, not to develop a new water supply.

Com-ment	Letter #1075	Response
25	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 15 **4. Baseline, Cumulative Effects.** An understanding of baseline conditions in the Upper Colorado River Basin, including those that result from on-going human disturbances, is essential under NEPA. In discussions about the inadequate baseline used to measure impacts in the DEIS, Reclamation has insisted that the word "baseline" is not even mentioned in NEPA. This misses the point. NEPA requires an analysis of existing conditions, whether or not the word "baseline" is used. "Without establishing the baseline conditions which exist [before the Proposed Action occurs], there is simply no way to determine what effect the proposed [action] . . . will have on the environment, and, consequently, no way to comply with NEPA." *Half Moon Bay Fishermans' Mktg Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). In this case, existing conditions consist of an aquatic environment that has been significantly altered. Not only does the DEIS fail to explain this, but it does not even accurately describe the existing hydrologic conditions. (*See* General Comments Section, above.) The Upper Colorado River Basin has been severely degraded by human activities. On average, an estimated 65% of the water in the Upper Colorado River System is diverted to the east slope—a percentage that will increase to 85% if both the WGFP and Denver Water's Moffat Collection System Project are implemented. Graphs presented in Exhibit B, *BBA Report*, visually demonstrate the reduction in average daily stream flows at Hot Sulphur Springs before and after various water projects came online. As a result of such diversions to the east slope, the following impacts have occurred in Grand County in recent years (many of which constitute violations of Senate Document 80), largely due to C-BT and Windy Gap operations: • reduced water quality in Grand Lake; • insufficient flows for agricultural irrigators to pump water from the Colorado River; • insufficient flows for Hot Sulphur Springs to pump water for its public water system; • insufficient flows to preserve fishing on the Colorado River, despite the instream flow requirements of the June 23, 1980 Memorandum of Understanding; • insufficient flows in late summer to maintain commercial fish ponds on some ranches;	25. Reclamation believes that the description of existing conditions in Chapter 3 of the EIS is an accurate representation of conditions in the study area. The purpose of the EIS is to evaluate and disclose the anticipated effects of the proposed action and reasonable alternatives. The Windy Gap Project that became operational in 1981 is part of the existing environment and not the subject of this EIS. The affected environment Section 3.5 of Surface Water Hydrology describes historical hydrologic conditions and the various actions and projects that have contributed to existing conditions. Tables 3-1 and 3-20 were added to the Surface Water Hydrology Section 3.5 of the FEIS to provide additional detail on the effect of past and present actions on Colorado River streamflow. Other sections in the EIS provide discussions on the existing condition and status of the various resources as a basis for comparing resource impacts. The existing hydrologic conditions presented in the EIS provide an accurate baseline from which to make reasonable comparisons of the impacts of each of the alternatives. In addition, the WGFP FEIS fully considered the cumulative impacts of all past, present, and reasonably foreseeable future actions. Hydrologic modeling for the cumulative effects analysis includes all of the effects of these past, present, and future actions. The cumulative effects analysis for water quality, aquatics, and other resources were analyzed using the cumulative effect hydrology, and the cumulative analysis was conducted in the same level of detail as the direct impact of the WGFP.

Com-ment	Letter #1075	Response
25	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 16 • high temperatures in the Colorado River above Williams Fork, resulting in fish mortality; • establishment of the didymo (rock snot) a nonnative algae that creates thick mats of moss that attach to rocks creating nuisances; • reduction in the number of kayaking days; • death of cottonwood trees along the river; • increased nutrient loading and other potential impacts from birds (some nonnative, such as pelicans) attracted to the Windy Gap Reservoir; and • spread of whirling disease. Documentation of these conditions may be found in a number of technical reports, including the UPCO Phase II Report and Coley/Forrest, *Grand County: Its Economy & Water Resources* (July 2007). A more detailed description of past water diversion projects and their resulting impacts (e.g., conditions before and after the C-BT, the Windy Gap Project, and Denver Water's Moffat Collection System project) is necessary to understand how these conditions came about as well as how they can be mitigated. *See Lands Council v. U.S. Forest Service*, 395 F.3d 1019, 1028 (9th Cir. 2004) (holding that EIS for a timber sale "should have provided adequate data of the time, type, place, and scale of past timber harvests and should have explained in sufficient detail how different project plans and harvest methods affected the environment.") As EPA explains: The identification of the effects of past actions is critical to understanding the environmental condition of the area. Knowing whether the resource is healthy, declining, near collapse, or completely devastated is necessary for determining the significance of any added impacts due to the proposed project. The NEPA document should consider how past activities have historically affected and will continue to detrimentally affect the resources of concern.	

Com-ment	Letter #1075	Response
25	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 17 EPA, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*, EPA 315-R-99-002/May 1999, § 4.3. A significant shortcoming of the DEIS is that it lacks a detailed description of on-going impacts from past water projects. A description of ongoing impacts to natural hydrologic conditions could enable Reclamation to develop a more defensible prediction of the likely effects of the WGFP, as well as improve the analysis of the incremental impacts of the WGFP when added to other past, present, and reasonably foreseeable future actions. Moreover, a more detailed description is especially important here because of the complex interactions among the various diversions from the Colorado River and its tributaries and the real possibility that implementation of the WGFP could be a "tipping point," resulting in disproportionately greater impacts in the river basin than otherwise would result if WGFP depletions did not occur in an already severely degraded stream system. Finally, a more detailed description would reveal that mitigation of many of the impacts associated with the existing Windy Gap Project could be mitigated by the project proponent through modifications to reservoir diversions and pumping schedules and coordination with the Denver Water Board and Reclamation. In Grand County, existing impacts are of two kinds. The first result from permanent features constructed for past projects, such as the Windy Gap Reservoir. The second are more dynamic and result from actions that can be modified, such as the timing and quantity of diversions and of releases from reservoirs. Because existing and future hydrologic conditions—particularly the frequency, duration, and magnitude of stream depletions—are controlled, and can therefore be modified by the Municipal Subdistrict, Reclamation, and the Denver Water Board, hydrologic conditions can form the basis for an adaptive management plan that could significantly mitigate both existing and future impacts for the mutual benefit of all. Adaptive management is discussed below under mitigation. **5. No Action Alternative** Like the PDEIS, the DEIS improperly identifies the No Action Alternative (Alternative 1) as the possible future enlargement of the Ralph Price Reservoir by 13,000 af. DEIS 2-14 to 2-18. The DEIS admits that Alternative 1 "was analyzed along with the action alternatives *to provide a basis for comparison*." *Id.* at 2-14 (emphasis added). As Table 2-6 of the DEIS illustrates, Reclamation uses Alternative 1 to advantage, by making changes in various parameters from the Proposed Action appear insignificant when compared to the changes predicted for Alternative 1. Such an approach is contrary to the purpose behind analyzing a no action alternative:	26. The No Action Alternative presents what WGFP Participants would do if Reclamation does not allow the proposed connections to C-BT facilities. Consistent with CEQ guidance on what should be considered in a No Action alternative, it does not mean that agencies stop what they are doing. In the case of existing agreements, prior court decisions and CEQ guidance would define No Action as no change to existing agreements. For Windy Gap and the WGFP this means that Reclamation would continue operation under the existing agreement between Reclamation and the Subdistrict for conveyance of WG water through the C-BT Project system. (See CEQ 40 Questions, No. 3) This also includes foreseeable actions by the participants. It is not Reclamation's responsibility to tell participants what they will do if the proposed project is not approved. For this information, each participant was asked what they would do if the WGFP is not approved and the Windy Gap Project continued operation under existing agreements with Reclamation. For most Participants, this includes continuing to take Windy Gap deliveries and increasing those deliveries as water demand increases within the capacity of the existing Windy Gap Project facilities and available storage in Granby Reservoir. One Participant would likely sell their WGFP shares. The City of Longmont would pursue enlargement of Ralph Price Reservoir to store its Windy Gap water. While there is no guarantee that enlarging Ralph Price Reservoir would acquire all of the regulatory authorizations, it is a reasonable action for the City of Longmont and no fatal flaws were discovered in review of this alternative in the WGFP EIS. The majority of the hydrologic impacts, including increased Windy Gap diversions under the No Action Alternative come from WGFP Participants increasing their deliveries, which they can do today without any infrastructure changes or additional authorizations or approvals from Reclamation. It is unreasonable to assume that Windy Gap diversions would remain status quo under the No Action Alternative.
26		While Reclamation NEPA policy and guidance uses a comparison of the action alternatives with the No Action Alternative, the FEIS provides data for comparisons of action and no action alternatives with existing conditions.

Com-ment	Letter #1075	Response
26	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 18 > In requiring consideration of a no-action alternative, the Council on Environmental Quality intended that agencies compare the potential impacts of the proposed major federal action to the *known impacts of maintaining the status quo*. . . .In other words, the *current level of activity is used as a benchmark.* *Custer County Action Assn' v. Garvey*, 256 F.3d 1024, 1040 (10th Cir. 2001) (emphasis added). It is true that CEQ guidance states that when "choice of 'no action' by the agency would result in *predictable* actions by others, this consequence of the 'no action' alternative should be included in the analysis." Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, Question 3, 46 Fed. Reg. 18,026, 18,027 (Mar. 23, 1981) (emphasis added). Alternative 1 is not, however, predictable. It is speculative, because there is no assurance that the regulatory authorizations for enlargement of the Ralph Price Reservoir will be received, that Longmont will obtain funding for and actually construct the enlarged reservoir or that water rights will be properly decreed. The environmental impacts of Alternative 1 would need to be analyzed in an EA or EIS. DEIS at 2-17. In addition, a 404 permit from COE and a 1041 permit from Boulder County, as well as county location and extent review and special use review would be required. *Id.* at 2-17, 1-46. Detailed design studies for the enlargement of the Ralph Price Reservoir have not been conducted. *Id.* at 2-17. As a result, specific information on the construction, material requirements, scheduling, and cost is not available. *Id.* "To be a reasonable alternative, it must be non-speculative, and bounded by some notion of feasibility." *Utahans for Better Transportation v. U.S. Department of Transportation*, 305 F.3d 1152, 1172 (10th Cir. 2002) (citations omitted). Alternative 1 fails that test. The No Action Alternative should be maintaining the status quo. If anything, possible enlargement of the Ralph Price Reservoir should be included in the cumulative impact analysis for the no action alternative.	
27	**6. Reliance on Illegal Prepositioning** As Grand County has pointed out repeatedly, prepositioning is illegal, among other reasons, because it requires the C-BT project to be operated in violation of Senate Document 80, and requires changes in C-BT and Windy Gap water rights to allow storage in a non-federal facility on the east slope. *See e.g.,* letter dated March 22, 2004 from the Colorado River Conservation District, Grand County and Northwest Colorado Council of Governments to Richard Aldrich and John Chaffin, a copy of which is attached as Exhibit E. These concerns have never been satisfactorily addressed. The January 2007 personal communication with the Colorado State Engineer, who "indicated	27. Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract. See the discussion of text added at the beginning of Section 1.10.2 of the FEIS.

Com-ment	Letter #1075	Response
27	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 19 that the Proposed Action to deliver and store water in Chimney Hollow Reservoir using prepositioning could be administered in compliance with current water right decrees and within the priority system," does not do so. DEIS at 3-7. The question is not whether prepositioning would pose an impediment to administering water rights under Colorado law, but whether prepositioning violates Senate Document 80 and other federal and state law. Grand County continues to believe that it is illegal. The request by Reclamation to the State Engineer was misdirected – a declaratory judgment should be obtained. It has long been the law in Colorado that the courts – not the State Engineer - determine use rights in water. ("**Administrative action**, forbearance of enforcement or **State Engineer acquiescence** in water use practice **does not substitute for judicial determination of use rights**." (emphasis added) *Empire Lodge Homeowners' Ass'n. v. Moyer*, 39 P.3d 1139, 1156-7, (Colo. 2001). Moreover, the statement by the State Engineer is wrong. It is not within Northern's, or the Municipal Subdistrict's, or Reclamation's, or the State Engineer's discretion on whether a change of water rights application must be filed – rather it is a mandatory requirement. Colorado's Supreme Court has told the State Engineer and all water users that "[t]he change of water right and augmentation plan statutes provide that **applications for approval of the water use practices** they encompass **are mandatory, not discretionary**." (emphasis added) *Empire Lodge*, 39 P.3d at 1158. NEPA requires that the lead agency evaluate "all reasonable alternatives." 40 C.F.R. § 1502.14(a). An illegal alternative is not a reasonable alternative. It is only a "phantom alternative." *National Resources Defense Council v. Evans*, 364 F. Supp. 2d 1083, 1116 (N.D. Cal. 2003). Because of the illegality of Alternative 2 and the DEIS's emphasis on it as the Proposed Action, the document fails to inform the public, let alone Reclamation, of a range of reasonable alternatives, thereby failing to promote informed decision making, and ultimately fails to fulfill NEPA's purposes. At a minimum, the DEIS should have analyzed an additional alternative, construction of Chimney Hollow Reservoir without use of prepositioning. This would enable Reclamation to take into account the uncertainty arising from the illegality of prepositioning and also inform the COE's section 404(b)(1) Guidelines analysis.	
28	**7. Inadequate Analysis of Socioeconomic Impacts Identified during Scoping** The west slope socioeconomic issues identified during scoping include, among others, "potential impacts to tourism and recreation industries in Grand County" (not just active recreation participants using publicly accessed facilities), "additional cost associated with the potential need to upgrade wastewater treatment plants in the Fraser River and Colorado River basins," and "economic impacts to the communities of Grand Lake, Kremmling and Hot Sulphur Springs and how each alternative would affect future	28. West Slope socioeconomic impacts likely to occur as a result of the action alternatives were considered to the extent information was available. Additional mitigation measures were defined and developed for the FEIS to minimize or avoid the potential impacts from implementation of the proposed project. The effectiveness of those measures are described for each resource in Environmental Consequences—Chapter 3. An updated summary of mitigation measures also is included in Section 3.25 of Chapter 3 of the FEIS. Also see responses to Comment Nos. 328–346 for more specific responses to socioeconomic comments.

Com-ment	Letter #1075	Response
28 29	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 20 growth and real estate values." ERO Resources Corp., *Public Scoping Report* 14 (Dec. 19, 2003). While the DEIS addresses some of these potential impacts, its analysis is too narrow and excludes impacts of vital importance to Grand County and its citizens. Therefore, the DEIS fails to take the hard look that NEPA requires. There are three types of impacts that are excluded from consideration, understated, or ignored in the DEIS's socio-economic analysis: (1) impacts referenced in ERO's Public Scoping Report and not pursued; (2) impacts referenced in the Recreation, Land Use or Visual Impacts sections of the DEIS and not pursued; and (3) impacts mentioned in earlier documents submitted by Grand County but are missing from the DEIS. Many of these impacts are discussed in sections 1.1, 1.2, and 1.3 of the memorandum dated December 15, 2008, from Coley/Forrest, *Windy Gap Firming Project - Draft Environmental Impact Report (DES 08-30)* ("*Coley/Forrest Memorandum*"), attached as Exhibit F. 7.1 **Pervasive Disregard for the Private Sector in Grand County**. Water resources and the local Grand County economy are inextricably linked, as set forth in Coley/Forrest, Inc., *Grand County: Its Economy and Water Resources* (2007) (prepared for Grand County). Although the WGFP directly impacts the environmental quality of the Colorado River, Lake Granby, Shadow Mountain Reservoir, and Grand Lake, there is a pervasive and nearly total disregard in the DEIS for private sector impacts arising from the WGFP's impacts on these surface waters. Some private sector impacts that are ignored include: • ranchers whose irrigation systems fail due to reduced stream flow in the Colorado River; • ranchers who rely on fishing leases along the Colorado River; • real estate and resort developments where a healthy Colorado River is their primary or sole asset; • lakefront and riverfront properties whose value is directly related to reservoir water clarity and water quality; • numerous summer recreation-oriented and visitor-oriented businesses including private marinas, local motels, restaurants, recreation gear and apparel retailers, grocers and the like; • construction-related impacts on adjacent properties and developments.	29. Impacts on the Grand County private sector are evaluated and disclosed in the EIS to the extent that information was available and the action alternatives would have an effect on those resources. See responses to Comment Nos. 328–346 for more detailed discussion of this comment.

Com-ment	Letter #1075	Response
30	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 21 7.2 **Socioeconomic Impacts Excluded – Recreation.** The most significant exclusion arises from the DEIS's definition of recreation which is limited to active recreation where there is public access. There is a general bias in the DEIS that, if recreation is not active recreation that is accessible by the general public, then it merits no analysis. The only recreation activities quantified in the DEIS are commercial kayaking and commercial rafting on selected portions of the Colorado River and related camping. This is narrow and inadequate. While commercial kayaking and commercial rafting in selected reaches of the Colorado River are a few core summertime visitor activities, there are other more significant recreation activities that bolster the Grand County economy in the summer that are likely impacted by the WGFP. These include: • commercial and private fishing in locations other than Reach 5 of the Colorado River; • other commercial and private boating in reservoirs; • camping in locations other than Reach 5 of the Colorado River, and • passive recreation enjoyment of the Colorado River and the reservoirs. Each of these affected recreation activities has related impacts on lodging, restaurant sales, recreation equipment, rental providers, guides or outfitters, and other related purchases. In the summer, many out-of-state visitors come to Grand County because of Rocky Mountain National Park, a national destination, but they linger because of the fishing, boating, and scenic beauty that Grand County currently offers. The local economy relies on this recreation relationship. The water resources that are compromised by the WGFP are necessary components of Grand County's scenic beauty and tranquility and its more passive recreation venues. (See comments R-1, R-2, R-6 to R-8, R-11 in the attached *Coley/Forrest Memorandum*.) Further, the DEIS drops certain recreation impacts from further consideration because they are "too difficult to quantify" or "unlikely to affect visitors." These are discussed in section 1.7 of the *Coley/Forrest Memorandum*. This is inconsistent with EPA *Guidelines for Economic Analyses* which provide extensive detail on how to treat qualitative or uncertain impacts. (See comments SE-3 - SE-7, SE-10, and SE-12 in the attached *Coley/Forrest Memorandum*.)	30. The recreation and socioeconomic analyses focused on boating opportunities on the Colorado River and at existing reservoirs. Those uses were identified as issues during the scoping process and are the most likely to be affected by hydrological changes resulting from the alternatives. Potential impacts to land-based recreational activities, including camping, hiking, scenic driving, and sightseeing, are described in the Recreation Resources Technical Report and in the Section 3.19.2.3 on Recreation—Effects Common to All Alternatives. Effects were quantified where data on use and impacts are available. Effects of the proposed alternatives on recreation experiences and aesthetics are quantitatively described wherever possible. Where a quantitative discussion is not possible, effects are discussed qualitatively, recognizing that these effects vary widely by individual user. The DEIS correctly states that hydrological changes are unlikely to adversely impact sport fishing under any alternatives, and that changes to the visual quality of the Colorado River would not be discernable to most viewers and would remain similar to existing conditions. It is therefore reasonable to assume that the proposed hydrological changes would not impact fishing use of private lands along the Colorado River. Potential effects of hydrological changes on commercial and private fishing opportunities are further described in the FEIS. However, the aquatic resource analysis determined that the projected effects to fish habitat would not result in a loss of angling opportunities or success. The direct and secondary economic impacts of boating and camping activities are described in detail in the Socioeconomics Section 3.22.2 of the EIS. The recreation resources analysis focuses on the potential effects of the proposed hydrological changes on river and lake recreation. Where possible, these quantitative hydrological changes are related to measurable thresholds that affect recreational access and opportunities (such as flow levels and access to boat ramps). By their very nature, most recreation uses are widely dispersed, are not quantified, and the quality of recreation experiences vary widely by individual user. For this reason, no attempt was made to quantify effects on recreation if there is not sufficient data to support that analysis. Instead, potential impacts were described wherever possible in a qualitative manner based on professional experience using the best available information. This approach is consistent with NEPA requirements and the level of impacts that would result from the alternatives. Section 3.25 of the EIS describes a number of mitigation measures that directly or indirectly would reduce potential socioeconomic impacts.

Com-ment	Letter #1075	Response
31	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 22 7.3 **Socioeconomic Impacts Excluded – Land Use / Agricultural Impacts.** The Land Use section (3.18) of the DEIS does not acknowledge a relationship between Colorado River hydrology and agricultural land use. Therefore, the DEIS's discussion of socioeconomic impacts does not address this important negative impact. Based on research conducted by Coley/Forrest, there are substantial potential negative relationships between further reductions in Colorado River streamflow and agricultural land uses through irrigation ditch failures, impacts to development directly dependent on river and reservoir views and usage. These are documented in communications with the Grand County ranching community. Coley/Forrest, Inc., *Grand County: Its Economy and Water Resources* (2007) (prepared for Grand County, Colorado). See *also* comments SE-1 and SE-9 in the attached *Coley/Forrest Memorandum.*	31. The WGFP would not typically divert water under low-flow conditions and would not cause flows to drop below the minimum bypass requirements in the Windy Gap water rights decrees. Irrigation water rights senior to upstream water rights have the ability to place a call on the river if flows are insufficient. The FEIS points out that water rights for existing agriculture, municipal, and other uses would be protected under Colorado water law, and any municipal or agricultural diversions downstream from Windy Gap Reservoir, per Colorado water law (C.R.S. § 37-92-102(2)(b)). Irrigation diversions would remain responsible for developing a reasonable means of diversion for their water. The Subdistrict paid $500,000 to upgrade diversion structures for ranches on the Colorado River below Windy Gap Reservoir for the original Windy Gap Project, which would divert more water than the WGFP.
32	7.4 **Countywide Analysis.** The few socioeconomic impacts that are reported in the DEIS are presented on a countywide basis. This approach misses the significance of impacts that may seem small on a countywide basis, but comprise the economic lifeblood of smaller communities and some economic sectors. For example fishing and boating along some reaches of the Colorado River are significant areas of summer economic activity in the relatively small communities of Hot Sulphur Springs and Kremmling. The *Public Scoping Report* expressly mentions concerns about impacts on these communities; the DEIS ignores them.	32. There is not sufficient economic information available to evaluate impacts on particular communities; thus, countywide results are reported. An explanation was added to the Section 3.22.2.2 (Method for Effects Analysis) in the FEIS explaining that countywide effects may be concentrated in particular communities or areas within the county.
33	7.5 **Cumulative Effects Analysis**. The DEIS states that the "cumulative socioeconomic effects were evaluated" but provides only the results of this analysis. DEIS at 3-286. The analytical steps are excluded from the DEIS and the Socioeconomic Technical Resource Report, so it is not possible to analyze the results. If Reclamation had concluded that the socioeconomic issues identified during scoping were not significant or had been covered by prior environmental review, it was required to include "a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere." 40 C.F.R. § 1501.7(a)(3). Therefore, the DEIS must include an analysis of *all* issues identified during scoping or an explanation of why they are insignificant or have already been analyzed. Furthermore, when the DEIS does analyze environmental impacts, it often fails to do so adequately by minimizing or overlooking impacts to Grand County. Such deficiencies are identified in this letter, the comment letters on technical reports, and the other letters that Grand County has submitted.	33. The Cumulative Effects Section 3.22.3 for Socioeconomics was clarified in the FEIS to explain that the quantitative hydropower and socioeconomic impacts were calculated using the same methodology as direct effects using the cumulative effects hydrology. As explained in responses to other socioeconomic comments, the FEIS has been modified where necessary to provide cross-references to the discussion of impacts elsewhere in the document, or an explanation has been provided regarding why the impacts were not considered to be significant or were covered by prior environmental review.
34	**8. Criteria on Significance** The DEIS reports many impacts in numerical form, often without criteria for determining whether those impacts are significant and without explaining what those	34. The context and intensity of resource impacts were described as accurately as possible in the Environmental Consequences section of the EIS based on the best available information. Quantitative analysis of impacts was made wherever sufficient data were available. Impacts were compared to regulatory laws or standards where applicable. The results of the impact analysis were used to develop mitigation measures to reduce or eliminate impacts where possible.

Com-ment	Letter #1075	Response
34	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 23 numerical changes mean. For example, we are told that there would be increases in temperature, specific conductivity, ammonia concentrations, inorganic phosphorus concentrations, selenium concentrations, and aquatic plant growth and decreases in dissolved oxygen concentrations in the Colorado River on July 25; and that these changes vary by alternative. DEIS at 3-96 to 3-101. But we are not told what effect these changes would have on aquatic life in the Colorado River or whether any of the changes would be significant. Without knowing whether the changes would be significant or insignificant and the reasons therefore, it is impossible to make an informed comparison of the environmental impacts of different alternatives. Although the DEIS does refer to various water quality standards, they are not necessarily relevant to the issue of significance for purposes of NEPA. To correct this deficiency, the DEIS should include specific criteria for each impact category to determine whether a given impact would be less than significant, potentially significant, or significant, and explain the reasoning behind these conclusions It should also include a discussion of mitigation measures for impacts that are potentially significant or significant.	
35	**9. Inadequate Discussion of Mitigation** An EIS must include a discussion of "[m]eans to mitigate adverse environmental impacts . . . ." 40 C.F.R. § 1502.16(h); *see also* 73 Fed. Reg. at 61,316-17 (to be codified at 43 C.F.R. § 46.130). As the Supreme Court recognized, such a discussion is essential to ensure that agencies take a hard look at the environmental consequences of proposed actions. *Robertson v. Methow Valley Citizens Council*, 490 U.S. at 352. Furthermore, > omission of a reasonably complete discussion of possible mitigation measures would undermine the "action-forcing" function of NEPA. *Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects.* *Id.* (emphasis added); *see also Colorado Environmental Coalition v. Dombeck*, 185 F.3d at 1173 ("It is not enough to merely list possible mitigation measures."). Judged by these requirements, the discussion of mitigation in the DEIS is still inadequate.[4] Many of the proposed west slope mitigation measures for the Proposed Action are too vague and uncertain to enable Reclamation, Grand County, or other [4] The status of one mitigation measure is unclear, because it is found in the Executive Summary, but does not appear to be included in the body of the DEIS. DEIS at ES-21 ("Opportunities for improvements to aquatic life habitat in the Colorado River and mitigation of impacts to fish will be coordinated with CDOW, Grand County and other responsible agencies."), 3-145, 3-293.	35. Additional mitigation measures were defined and developed to minimize or avoid potential adverse impacts from implementation of the proposed project. Mitigation measures and the effectiveness of those measures are described for each resource in Environmental Consequences—Chapter 3. An updated summary of mitigation measures also is included in Section 3.25 of the FEIS.

Com-ment	Letter #1075	Response
35	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 24 interested groups and individuals to evaluate "the severity of the adverse effects." *Robertson v. Methow Valley Citizens Council*, 490 U.S. at 352. Some of the most significant west slope impacts from the WGFP would result, directly or indirectly, from reduced surface water flows. Yet the only proposed mitigation measures for surface water hydrology relate solely to Granby Reservoir. DEIS at 3-55. Even those are too uncertain to qualify as mitigation. Reclamation notes only that "*it may be possible* to modify prepositioning operations" and undertakes to conduct additional evaluations "*to determine if* changes in the timing of water deliveries to the East Slope can reduce impacts to Granby Reservoir while still meeting the purpose and need for the project." *Id* (emphasis added). As a cooperating agency, Grand County is entitled to review and comment on all such proposals and evaluations. *Memorandum of Agreement Between the Bureau of Reclamation and Grand County Board of County Commissioners for the Windy Gap Firming Project Proposed by the Municipal Subdistrict, Northern Colorado Water Conservancy District*, dated effective January 22, 2005 ("MOA"), § V.I.	
36	With regard to surface water quality, Grand County appreciates the Municipal Subdistrict's commitment to continued participation and funding of ongoing nutrient studies in the Three Lakes System. DEIS at 3-129. Although the County also welcomes the proposal to determine whether increasing bypass flows from 90 to 135 cfs when Windy Gap is being pumped would result in reduced downstream temperatures, it is dismayed the Municipal Subdistrict would only "consider increasing required bypass flows under certain water supply conditions" if the studies are favorable. *Id.* As mitigation for recreation and socioeconomic impacts, the Municipal Subdistrict would curtail diversions from the Colorado River if flows at the Kremmling gage are less than 2,200 cfs during the annual Big Gore Race. Id. at 3-253, 3-290. While Grand County appreciates that gesture, the measure would not mitigate impacts to kayaking, rafting, fishing, and other recreational activities on days other than those on which the Big Gore Race are held, nor would it address the other significant socioeconomic impacts to Grand County discussed in these comments. *See also* comment letters dated February 11, 2008 on Draft Recreation Resources Technical Report and Draft Socioeconomic Resources Technical Report; and letter dated February 11, 2008 transmitting Coley/Forrest report on Draft Recreation Resources Technical Report and Draft Socioeconomic Resources Technical Report.	36. Effects of the WGFP on temperatures downstream of the WG Project were addressed in the Fish and Wildlife Mitigation Plan (FWMP) developed by the Subdistrict in accordance with CRS 37-60-122.2 (FEIS Appendix E). The Colorado Wildlife Commission adopted the FWMP on June 9, 2011 and the Colorado Water Conservation Board (CWCB) adopted it on July 13, 2011. The FWMP is a component of the mitigation and environmental commitments described in the FEIS (Section 3.25). Mitigation measures were developed to correspond with projected impacts. Dynamic temperature modeling of Colorado River stream temperatures was used to assess potential impacts as described in Surface Water Quality Section 3.8.2 of the FEIS. To prevent impacts to the flows needed for the annual Gore Race, the Subdistrict will curtail diversions if flows in Gore Canyon at the Kremmling gage fall below 1,250 cfs, the preferred flows for kayaking in this reach per comments from the Bureau of Land Management (Comment Letter 1054 and Comment No. 8). The Recreation Section 3.19.2 of the FEIS provides a revised discussion on impacts to boating on the Colorado River, and as indicated in Section 13.19.2, the impacts to preferred recreation boating flows from the WGFP would be fairly minor and infrequent.
37	Another deficiency of the DEIS regarding mitigation is that it merely catalogs the mitigation measures included in the 1981 Windy Gap EIS, and does not include an adequate discussion of those measures. *See* DEIS at 1-7 to 1-8. What is needed is a comparison of the impacts predicted in the Windy Gap Project EIS with the actual impacts that have resulted from that project, together with an analysis of whether, and to what extent, the mitigation measures have been effective. For example, the Municipal Subdistrict paid $100,000 for a habitat manipulation project and $450,000 for biological	37. Mitigation measures implemented as part of the 1981 Windy Gap EIS are presented in Chapter 1 of the FEIS as background material. These measures were developed as part of agreements with Grand County, the Colorado River Water Conservation District, Northwest Council of Governments, Three Lakes Water and Sanitation District, and other West Slope parties as mitigation for the Windy Gap Project. To the extent that mitigation measures implemented for the original Windy Gap Project have affected the existing environment, these measures are now part of the existing environment. Additional mitigation measures were developed for the identified impacts of the WGFP and are presented in the FEIS (Section 3.25).

Com-ment	Letter #1075	Response
37	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 25 investigations. The DEIS should have reported on the effectiveness of the habitat mitigation project and what was learned from the biological investigations. *Id.* at 1-7. Another example is the proposal to determine whether increasing bypass flows from 90 cfs to 135 cfs when Windy Gap is being pumped would result in reduced downstream temperatures. *Id.* at 3-129. That study should have been completed before the DEIS was prepared. An analysis of the original Windy Gap mitigation could also provide a basis for Reclamation to determine whether existing mitigation measures satisfied the Municipal Subdistrict's obligation under Colo. Rev. Stat. § 37-45-118(1)(b)(II) for the original Windy Gap Project and to decide what additional mitigation measures would be necessary for the Windy Gap Project or the WGFP.	38. Reclamation cannot require how any entity uses its water rights. As mentioned in Chapter 1 of the FEIS, Participants would be reusing their Windy Gap water as best suited for their specific circumstances. For some Participants, this includes a capture and reuse program for nonpotable irrigation; for others, a second use of Windy Gap water is used to augment other depletions. When Windy Gap water deliveries become reliable through a firming project, Participants can better plan the most efficient way to reuse this water. Additionally, WGFP participants have committed and will be required to maintain a state-approved water conservation plan in accordance with the Water Conservation Act of 2004, as amended (Colorado House Bill 04-1365). Reuse is one of the elements that must be fully considered as participants develop conservation plans that are submitted to Colorado for approval. Reclamation would require maintenance of a state-approved water conservation plan as a condition to a contract with the Subdistrict.
38	There are a number of obvious mitigation measures the DEIS should have considered, but does not. More detailed mitigation proposals are contained in Grand County's December 29, 2008 letter to COE regarding the Windy Gap Firming Project 404 Permit Application ("*404 Permit Comment Letter*"). Examples of mitigation that should have been discussed in the DEIS include, without limitation:	39. Water conservation is a component of each of the Participants' operations, and Participants have committed to maintaining a state-approved conservation plan. The plan measures help conserve available water supplies and reduce demand, and as a result, can delay the timing of future water needs. Additional discussion on water conservation is found in response to Comment No. 54.
39	• Because Windy Gap water can be reused to extinction, unlike C-BT water, the DEIS should have discussed requiring WGFP participants to reuse to extinction all or a significant portion of their Windy Gap water. *See* DEIS at 1-12, 1-19. • Although the DEIS rejects water conservation as an alternative, it does not explain why water conservation should not be proposed as an additional mitigation measure. The DEIS does, after all, recognize that "[t]o meet future water requirements will require continued improvements in water conservation in addition to the proposed WGFP." *Id.* at 1-18.	40. The purpose of the WGFP is to provide the Participants with reliable delivery of their water rights. Participants therefore need some degree of certainty on the availability of water to meet their demands. Mitigation measures were developed based on the impacts identified through the NEPA process, and Reclamation has determined that these measures should effectively reduce impacts. Effects of the WGFP on stream temperatures downstream of the WG Project were addressed in the Fish and Wildlife Mitigation Plan (FWMP) developed by the Subdistrict in accordance with CRS 37-60-122.2 (FEIS Appendix E). The FWMP is a component of the mitigation and environmental commitments described in the FEIS (Section 3.25). The FWMP includes modifying prepositioning to reduce fluctuations in Granby Reservoir and additional operational measures such as runoff forecasting would be used to better time Windy Gap pumping to reduce spills. While WGFP mitigation measures may contribute to meeting some of the goals of Grand County's Stream Management Plan (SMP), the WGFP and SMP have different objectives.
40	• The DEIS does not consider what would probably be the most effective mitigation measure, adaptive management of the Upper Colorado River. 73 Fed. Reg. at 61,315 (to be codified at 43 C.F.R. § 46.30) ("Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain."); 61,317 (to be codified at 43 C.F.R. § 46.145) ("Bureaus should use adaptive management, as appropriate, particularly in circumstances where long-term impacts may be uncertain . . . ."). *See generally* The NEPA Task Force Report to the Council on Environmental Quality: Modernizing NEPA Implementation 44-56 (Sept. 2003). In short, this would entail developing a stream management plan with all the major diverters. The plan would include qualitative goals, monitoring to identify whether the goals are being met, and specified triggers to require	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 26	
40	changes in operation. A decision-making process would be established to adapt operations to achieve the management plan's goals for the benefit of all parties, when specified. The Grand County Stream Management Plan is the perfect basis for an Adaptive Management Plan.	
41	• The DEIS does not consider integrated operations of the Denver Water Board and the Municipal Subdistrict systems to serve the City of Broomfield, a WGFP participant that wants to firm 13,739 af of water. Since the Denver Water Board and the Municipal Subdistrict both serve Broomfield, it would seem that allowing water to bypass the Denver Water Board diversion points in the headwaters of the Fraser River, be captured in Windy Gap, and then moved through the C-BT system to Broomfield could provide benefits to the Fraser River. Unlike water moved through the Moffat system which cannot be used to extinction, water provided from Windy Gap can be. This measure could provide additional water for the front range.	41. There is no delivery mechanism for Broomfield to receive deliveries of water from Denver Water if the water is transported through C-BT facilities. The Southern Water Supply Pipeline does not have sufficient capacity to deliver more water from Carter Lake to Broomfield. In addition, Broomfield currently receives treated water from Denver Water and would need to upgrade their water treatment capabilities if they received raw water.
42	• The DEIS does not consider upgrading the Windy Gap Substation. Currently, Western Area Power Administration is in the process of preparing an EIS for upgrading a 69kV line to 138 kV from the Windy Gap Substation to the Granby Pump Plant. Prepositioning would require more pumping by a system that may not be able to meet future demands. This potential impact could be mitigated, at least in part, by upgrading the substation.	42. The proposed upgrade of the 69kV power line is not related to the WGFP. The proposed upgrade is not required to satisfy power demands for pumping of Windy Gap water. Western Area Power Administration's (Western) planned upgrade of the existing transmission line is not dependent on implementation of the WGFP nor is the WGFP dependent on implementation of the power line and substation upgrade. The purpose of the project is to strengthen the power grid in this area to minimize or eliminate impacts to all current electrical power users caused by increased growth in this area of Grand County and the potential failure of the Adams Tunnel power cable. The new line could improve reliability for Windy Gap pumping, but is not necessary for continued operation of the existing pumps.
43	• Reclamation is a beneficiary of the WGFP through "shrink" water. This water could produce approximately $1.4 million in additional revenue to Reclamation, which could be used to fund the clean up of Grand Lake. If one of the short-term solutions is to draw down Shadow Mountain Reservoir, these funds should also be used to pay for the pumping and power interruption charges, so that no other agency or entity is required to bear any such costs.	43. Western receives the power from any additional water deliveries to the East Slope and has existing contracts to sell this power when it is available. Reclamation does not receive any of the revenues from hydropower generation.
44	**10. Cumulative Actions** Cumulative actions are actions "which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement." 40 C.F.R. § 1508.25(a)(2). Although section 1508.25(a)(2) uses the word "should," courts have made preparation of a single EIS mandatory in the case of cumulative actions: "Under § 1508.25, two or more agency actions *must* be discussed in	44. The WGFP FEIS fully considered the cumulative impacts of the Moffat Collection System Project, as well as other reasonably foreseeable future actions. The cumulative effects analysis included hydrologic modeling of the Moffat Project including changes in Fraser River, Williams Fork, and Blue River flows. Hydrologic impacts of the Moffat Project are actually overstated in the WGFP analysis because Denver's Blue River demands are 30,000 AF less than used in the hydrologic modeling for the WGFP. Denver changed their demand estimate after the hydrologic model for the WGFP was completed. The cumulative effects analysis for water quality, aquatics, and other resources were analyzed in the same level of detail as the direct impact of the WGFP. The WGFP and Moffat Project have different objectives, different project proponents, and no shared facilities. Combining the two projects in one EIS is not needed to adequately evaluate the cumulative effects of the projects. The U.S. Army Corps of Engineers (Corps) is a cooperating agency for the WGFP, and Reclamation and the Corps have coordinated on the assessment of cumulative effects and mitigation for the two projects.

Com-ment	Letter #1075	Response
44	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 27 the same impact statement where they are . . . 'cumulative' actions." *Klamath-Siskiyou Wildlands Center v. Bureau of Land Management*, 387 F.3d 989, 998-99 (9th Cir. 2004) (emphasis added). As explained in *Klamath-Siskiyou*, the environmental analysis must be done in a single document "when the record raises 'substantial questions' about whether there will be 'significant environmental impacts' from the collection of anticipated projects." *Id.* at 999. *See Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1215 (9th Cir. 1998) (single EIS required for five timber sales in same watershed). The WGFP and the Denver Water Board's Moffat Collection System Expansion project are cumulative actions. The Denver Water Board proposes to develop 18,000 af of new firm yield to the Moffat Treatment Plant, primarily through diversions from the Upper Fraser River and Williams Fork River basins. DEIS at 2-42. Specifically, flows in the Fraser River and the Colorado River below the confluence with the Fraser will be reduced by average annual diversions of about 9,300 af. *Id.* at 3-42. Other impacts to the Colorado River will result from changes in the timing of flows below the Williams Fork Reservoir due to changes in the operation of the reservoir. *Id.* at 3-46. These impacts to the Colorado River are themselves significant, as are those of the WGFP. Together they are cumulatively significant and therefore must be analyzed in the same EIS.[5] 40 C.F.R. § 1508.25(a)(2). Cumulative impacts to the Platte River basin may also be cumulatively significant. A single EIS analyzing the impacts of both projects is not a mere formality. Without such EIS, there can be no assurance that Reclamation and COE have, collectively, taken a hard look at alternatives to the simultaneous operation of the WGFP and Moffat Collection System Expansion project, the cumulative environmental impacts of those two projects (with emphasis on the hydrology, water quality, and aquatic resources of the Colorado River), and measures to mitigate those impacts. Here, a single EIS is particularly appropriate, given the complex interrelationships among present and future diversions from the Upper Colorado River Basin. *See Kleppe v. Sierra Club*, 427 U.S. 390, 413 (1976) ("Cumulative environmental impacts are, indeed, what requires a comprehensive impact statement."). Indeed such complexity argues for use of adaptive management, with development of a stream management plan and monitoring to ensure that the operation of both projects contributes to achieving the management plan's goals. [5] The Environmental Protection Agency also suggested this in its comments on WGFP EIS scoping. Letter dated November 4, 2003, from EPA to the Bureau.	

Com-ment	Letter #1075	Response
45	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 28 **11. Wild and Scenic Designation** The DEIS notes that the Kremmling and Glenwood Springs Field Offices of the BLM analyzed river and stream segments that might be eligible for inclusion in the National Wild and Scenic Rivers System ("NWSRS") and identified several segments in Grand County that are eligible for inclusion. DEIS at 3-233 to 3-234. The DEIS also recognizes BLM's policy that when a river segment is determined to be eligible "its identified outstandingly remarkable values shall be afforded adequate protection, subject to valid existing rights, and until the eligibility determination is superseded, management activities and authorized uses shall not be allowed to adversely affect either eligibility or the tentative classification . . . ." BLM Manual § 8351.32.C (May 19, 1992); see also *id.* § 8351.52.C. But the DEIS fails to take the next step and analyze what effect the alternatives would have on BLM's interim management policy and whether Reclamation should use its own authorities to protect these segments until the eligibility determination is superseded. In addition, "[o]nce a river is found eligible, the respective agency is committed to evaluate all actions within its control through the filter of the river's potential for designation. Some specific authorities for protecting river-related values include the Clean Water Act for free flow and water quality, the Endangered Species Act for plant and animal species within a river corridor, and the Archaeologic[al] Resources Protection Act for cultural resources." Interagency Wild and Scenic Rivers Coordinating Council, *The Wild & Scenic River Study Process* 30 (Dec. 1999). The DEIS also fails to evaluate the WGFP "through the filter of the river's potential for designation." Instead, it specifically declines to determine whether any of the alternatives would affect the suitability of the eligible segments for inclusion in the NWSRS. DEIS at 3-235. The Nationwide Rivers Inventory compiled by the National Park Service ("NPS"), available at http://www.nps.gov/ncrc/programs/rtca/nri/states/co.html, includes a 23-mile reach of the Colorado River, from State Bridge to the Blue River. (As of December 4, 2008, the NPS webpage had not been updated to include the 5 segments BLM determined were eligible in March 2007.) "Each federal agency shall, as part of its normal planning and environmental review process, take care to avoid or mitigate adverse effects on rivers identified in the Nationwide Inventory . . . ." Presidential Memorandum for the Heads of Departments and Agencies (Aug. 2, 1979). The DEIS fails to do that. Further, "[a]gencies shall, as part of their normal environmental review process, consult with the Heritage Conservation and Recreation Service [now the NPS] prior to taking actions which could effectively foreclose wild, scenic, or recreational river status on rivers in the Inventory. *Id*; *see also* CEQ Memorandum for Heads of Agencies, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory, 45 Fed. Reg. 59,190 (Sept. 8, 1980) ("CEQ Memorandum").	45. Evaluation and potential designation of portions of the Colorado River as Wild and Scenic is a separate and ongoing process being pursued by the BLM. Recreational values are among the outstanding remarkable values identified for segments of the river. The Wild and Scenic designation process is described in the Recreation Section 3.19.1.4 of the FEIS. While the effects to river recreation described in the FEIS could relate to the recreational values along the Colorado River, the decision on Wild and Scenic River status is a determination made by the BLM as part of the planning process, and is not part of the evaluation for the WGFP EIS. Reclamation provided BLM with hydrologic model data from the evaluation of the WGFP for use in the Wild and Scenic River evaluation. None of the WGFP alternatives would affect BLM recreation facilities within the upper Colorado River Special Recreation Management Area. Reclamation began preparation of the WGFP EIS in 2003. Prior to any of the dates mentioned in the comments. The draft EIS was released for public review and comment on August 29, 2008. Although BLM may not be a cooperating agency in preparation of the EIS, there was coordination with BLM during preparation of the EIS and the EIS contains substantial analysis that can be used in the wild and scenic evaluation process. Additionally, Reclamation is a participant in the wild and scenic evaluation process being conducted by BLM. BLM was provided copies of the DEIS for review and comment and provided comments on the DEIS.

Com-ment	Letter #1075	Response
45	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 29 Such consultation did not occur. *See* DEIS at 4-4. The CEQ Memorandum also requires that "[w]hen environmental impact statements are prepared on proposals that affect Inventory rivers, the lead agency should request HCRS and the affected land managing agency to be cooperating agencies as soon as the Notice of Intent to prepare an EIS has been published." 45 Fed. Reg. at 59,192. It does not appear, however, that Reclamation requested either the NPS or BLM to be cooperating agencies.	
46	**12. Grand County's Status as a Cooperating Agency** In its congressional declaration of policy, NEPA provides that "it is the continuing policy of the Federal Government, *in cooperation with State and local governments* . . . to use all practicable means and measures . . . in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." 42 U.S.C. § 4331(a) (emphasis added). A cooperating agency is any federal, state, or local agency (other than a lead agency) that "has jurisdiction by law or special expertise[6] with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment." 40 C.F.R. § 1508.5. A cooperating agency is entitled to active and meaningful participation in preparation of an EIS. The CEQ regulations require a lead agency to "[u]se the environmental analysis and proposals of cooperating agencies with jurisdiction by law or special expertise, *to the maximum extent possible* consistent with its responsibility as lead agency." *Id.* § 1501.6(a)(2) (emphasis added). Recently promulgated Department of the Interior regulations (based on 516 DM 1-6) also highlight the important role cooperating agencies should play in the NEPA process.[7] For example, "In accordance with 40 CFR 1501.6, throughout the development of an environmental document, the lead bureau will collaborate, *to the fullest extent possible*, with all cooperating agencies concerning those issues relating to their jurisdiction and special expertise." 73 Fed. Reg. at 61,320 (to be codified at 43 C.F.R. § 46.230) (emphasis added). Furthermore, the official of a bureau who is responsible for [6] "*Special expertise* means statutory responsibility, agency mission, or related program experience." 40 C.F.R. § 1508.26. Grand County's special expertise includes its 1041 permitting authority and special use permitting authority over the Windy Gap Project and any modifications thereto, as well as substantial knowledge about the west slope environmental impacts associated with the Windy Gap Project and the proposed WGFP, most of which would occur in Grand County. [7] These regulations apply to the Bureau. *See* 73 Fed. Reg. 61,291, 61,314 (Oct. 15, 2008) (to be codified at 43 C.F.R. § 46.10(a)).	46. Reclamation fully considered comments received from Grand County and the other cooperating agencies in preparing the EIS. All comments received from Grand County on the preliminary draft EIS were considered in developing the DEIS. There have been numerous meetings with Grand County to discuss their comments on various aspects of the EIS.

Com-ment	Letter #1075	Response
46	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 30 making and implementing a decision and ensuring NEPA compliance "must whenever possible consult, coordinate, and cooperate with relevant State, local, and tribal governments . . . concerning the environmental effects of any Federal action within the jurisdictions or related to the interests of these entities." 73 Fed. Reg. at 61,317 (to be codified at 43 C.F.R. § 46.155). Grand County is a cooperating agency for preparation of the WGFP EIS pursuant to Memorandum of Agreement Between the Bureau of Reclamation and Grand County Board of County Commissioners for the Windy Gap Firming Project Proposed by the Municipal Subdistrict, Northern Colorado Water Conservancy District, dated effective January 22, 2005 ("MOA"). The MOA recognizes that Grand County qualifies as a cooperating agency because the WGFP may have impacts on the County's environment and may require the County to issue a new special use permit, a new 1041 permit, or amendments to the existing permits. MOA, § I.A, C. Among other things, Reclamation agreed to: • Identify the County in the EIS as a cooperating agency and summarize its roles and responsibilities as a cooperating agency. • Be available to discuss with the County any questions or issues related to County jurisdiction and special expertise. • Use the environmental analyses and proposals of the County, where it has special expertise and jurisdiction, to the maximum extent possible, consistent with Reclamation's responsibilities as the lead agency. • Prior to inclusion in the EIS, provide to the County for review and comment project information and study results concerning the County's jurisdiction and special expertise,[8] including: (1) Draft hydrology and water quality reports, data, and analyses for reservoirs, lakes and stream reaches in Grand County that may be impacted by the project and the analyzed alternatives. (2) Draft reports, data and analyses for environmental and social impacts within Grand County due to the project. [8] Grand County retained the right, however, to comment on all issues relating to the EIS. MOA, § IX.C.	

Com-ment	Letter #1075	Response
46	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 31 (3) Reports, data and analyses of alternatives to be evaluated in detail in the Draft and Final Environmental Impact Statements ("EISs"). (4) Preliminary draft Chapters of EISs describing existing conditions and impacts within Grand County likely to be caused by the project. (5) Comment letters on the draft and final EISs that are specific to County data and impacts, for preparation of suggested responses. (6) Mitigation proposals that address impacts that may occur in Grand County caused by the Project. • Consult with Grand County on technical studies when the County has jurisdiction by law or special expertise associated with the resource being studied. • Promptly inform the County of all schedule changes relative to comment deadlines and meetings. MOA, § V. As a cooperating agency, Grand County submitted detailed comments through its counsel, Sullivan Green Seavy LLC, on the technical reports prepared for the WGFP Preliminary Draft Environmental Impact Statement ("PDEIS"). Although Grand County submitted these comments in a timely manner, it did not learn until too late that Reclamation intended to release the PDEIS for comment before it had reviewed or, in the case of some reports before it had even received, all the County's comments. As a result, Reclamation could not have considered or taken into account in its DEIS any of Grand County's comments submitted in 2008, contrary to its responsibilities to Grand County as a cooperating agency generally, and specifically under § I of the MOA. *See* 40 C.F.R. § 1501.6(a)(2); 73 Fed. Reg. at 61,320 (to be codified at 43 C.F.R. § 46.230); *see also Davis v. Mineta*, 302 F.3d 1104, 1123 (10th Cir. 2002) ("a reviewing court may properly be skeptical as to whether an EIS's conclusions have a substantial basis in fact if the responsible agency has apparently ignored the conflicting views of other agencies having pertinent expertise.") (internal quotation marks and citation omitted); *Fund for Animals v. Norton*, 281 F. Supp. 2d 209, 227 (D.D.C. 2003) (inadequate review of public comments suggests a failure to take a "hard look" under NEPA). A list of the County's comment letters on the technical reports is provided in Exhibit A. Neither the County nor its	

Com-ment	Letter #1075	Response
46	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 32 counsel ever received any response to these comments. From our review of the DEIS, it is apparent that Reclamation largely ignored Grand County's comments when it prepared the DEIS. As a cooperating agency, Grand County also submitted comments on March 31, 2008 through its counsel, Sullivan Green Seavy LLC, on the PDEIS and requested a meeting to go through the comments in greater detail. Neither the County nor its counsel ever received any response to the PDEIS Comments. Nor did the requested meeting ever take place. Again, it is apparent that Reclamation largely ignored Grand County's comments when it prepared the DEIS. More generally, Reclamation's failure to take Grand County's comments into account is contrary to Executive Order 13,352 on "Facilitation of Cooperative Conservation," which directs the Secretary of the Interior to "carry out the programs, projects, and activities of the agency . . . that implement laws relating to the environment and natural resources in a manner that: (i) facilitates cooperative conservation; . . . [and] (iii) properly accommodates local participation in Federal decision-making . . . ." Exec. Order No. 13,352, § 3(a), 69 Fed. Reg. 52,989 (Aug. 30, 2004). "Cooperative conservation" is defined as "actions that relate to use, enhancement, and enjoyment of natural resources, protection of the environment, or both, and that involve collaborative activity among Federal, State, local, and tribal governments . . . . *Id.* § 2. In the preamble to its NEPA rulemaking, Department of the Interior recognized that "an emphasis on the use of cooperating agencies may result in additional steps in the NEPA process, but is likely to lead to improved cooperative conservation and enhanced decision making." 73 Fed. Reg. at 61,301. Reclamation's actions are not consistent with these objectives. In addition, Reclamation's lack of regard for Grand County's comments are contrary to the principle of consensus-based management, which "involves outreach to persons, organizations or communities directly who may be interested in or affected by a proposed action with the assurance that their input will be given consideration by the Responsible Official in selecting a course of action." 73 Fed. Reg. 61,316 (to be codified at 43 C.F.R. § 46.110(a)); see also Department of the Interior, Environmental Statement Memorandum ESM03-7, Procedures for Implementing Consensus-Based Management in Agency Planning and Operations (July 2, 2003). Understandably, Grand County has no assurance that its input was in fact given consideration. **Specific Comments by Section** 47 **Section 1.3.1 Municipal Subdistrict** Page 1-4	47. See responses on next page.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 33	
47	**Comment.** The purpose and need is drawn so narrowly as to foreclose other less environmentally damaging alternatives. The purpose is "to deliver 30,000 af of water from the existing Windy Gap Project to meet a portion of the water deliveries anticipated from the original Windy Gap Project and to provide up to 3,000 af of storage to firm water deliveries for the [Middle Park Water Conservation District]." The real purpose and need for the participants is for more water generally. The purpose and need statement might have more credibility if the original Windy Gap Project participants were the same as the WGFP participants. Instead, the DEIS ignores the fact that of the original eight cities in the original Windy Gap Project, only three are participating in the WGFP, and only one to the full extent of its ownership (Longmont 80 original and firming units).). See attached Exhibit D, *Windy Gap Ownership and Transfer History*. This Exhibit shows that only 28% of the requested storage volume is by original owners, who collectively need only 26,000 af. The City of Broomfield, the participant requesting the most storage at 25,000 af was not even located within the boundaries of Northern or the Municipal Subdistrict when the water rights were appropriated or the ROD issued for the original project.	See response to Comment No. 24 for issues related to the WGFP purpose and need. Windy Gap units are fully transferable and, therefore, the needs of the current Windy Gap unit holders participating in the WGFP are the basis for establishing the project purpose and need. The location of the WGFP Participants' service area is not a factor in receiving Windy Gap water. There is no required service area for the Windy Gap Project as there is for the C-BT Project.
48	**Section 1.4.1 Colorado-Big Thompson Project** Page 1-4 **Comment.** Please note that the C-BT Project was approved by Congress in Senate Document 80 and decreed in the Blue River Decree for supplemental irrigation and industrial use, not municipal purposes. In addition note that the C-BT project does not allow for storage of C-BT water in Chimney Hollow Reservoir because Chimney Hollow reservoir is not a C-BT project feature approved by Congress.	48. Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract. See the discussion of text added at the beginning of Section 1.10.2 of the FEIS.
49	**Section 1.4.2.1 Windy Gap Project Environmental Impact Statement** Page 1-5 **Comment.** The June 8, 1981 ROD issued by the Corp of Engineers permitted a project (Application No. 6520) with a maximum diversion of 300 cfs according to Exhibit A to that ROD, which described "a pumping plant with a maximum discharge capacity of 300 cfs." The DEIS notes that diversions are limited to 600 cfs. Impacts greater than 300 cfs need to be included in this NEPA analysis and corresponding mitigation to substantially reduce impacts associated with diversions at 600 cfs.	49. The 404 permit on file with the Corps, which was revised in a letter from the Corps dated June 26, 1981, lists a diversion rate of 600 cfs. Reclamation's final EIS and ROD on the WG Project dated June 18, 1981 and all mitigation and agreements for the original project, including the Biological Opinion from USFWS, were based on a diversion rate of 600 cfs and an estimated annual depletion to the Colorado River of about 58,000 acre-feet. Mitigation is only required for the incremental impacts of the WGFP.
50	**Section 1.5.2 Windy Gap Project Delivery Shortage**	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 34	
50	Page 1-9 **Comment.** The actual diversions from Windy Gap averaged 11,080 af.	50. The purpose of this section is to present Windy Gap *deliveries* as opposed to Windy Gap *diversions*. Historical Windy Gap deliveries have averaged less than 10,000 AF/yr for the period from 1985 through 2004. Table 3-2 was added to the FEIS, which shows historical Windy Gap diversions.
51	Page 1-10 **Comment.** Additional reasons that need to be added to the bullet points for lack of diversions are: (1) lack of demand by original participants; (2) sale of units to new entities which increased water demand over time; (3) power costs charged for pumping based on starting up a pump and costs to purchase "Overrun Power" at market rates which is considerably higher than the preferred rate for "Allotted Power".	51. Items (1) lack of demand by original participants and (2) sale of units to new entities, which increased demand over time, are not an accurate description of Participant demands. It was anticipated that demands would increase over time and sale of units did not increase demand, but only shifted demand to different Participants. The anticipated increase in demand over time, which is listed as the third bullet point on page 1-10, is the primary reason for low deliveries to date. As demand grew in the mid-1990s, there was no unused capacity in the C-BT System to deliver in-priority Windy Gap water to the Participants. The last bullet point in the discussion in Section 1.5.2 of the FEIS indicates that Participant demands in the early years were less than the amount of available water. The sale of Windy Gap units to new entities may have changed the amount and timing of demand for Windy Gap water, but the effect on historical diversions would be difficult to identify.
52	**Section 1.6.1 Sources of Water Supply** Page 1-11 **Comment.** What is the basis of the statement that extreme droughts are excluded from firm yield planning? How does the author define an "extreme drought?"	Historically, the Subdistrict tried to optimize the timing of their pumping to minimize the associated power costs based on their power contract, but did not limit diversions because of power costs. Power costs have not been a significant factor in demands to date. 52. There is no precise definition of an extreme drought, but typically this indicates a period of very low precipitation such as a 1 in 100-year drought. Water providers seek to develop water storage to meet dry year needs, but it is generally not practicable or economical for firm yield planning to develop water supplies to meet extreme drought events like a 1 in 100-year drought. Additional text was added to Section 1.6.1 of the FEIS to clarify this.
53	Page 1-12 **Comment.** The discussion of "reuse" of trans-mountain water is incomplete. First, the 404 (b)(1) Guidelines require applicants for 404 Permits to take steps to "minimize potential adverse effects" to the aquatic ecosystem. Second, Colorado law requires that: "In order to minimize the amount of water removed from Western Colorado eastern slope importers should, **to the maximum extent feasible**, reuse and make successive use of the foreign water." *Denver v. Fulton Irrigating Ditch Company*, 506 P.2d 145, 148 (Colo. 1972) (emphasis added). In *Fulton* 506 P.2 at 146-147, the Colorado Supreme Court defined the terms "reuse" "successive use" and "right of disposition" as follows: (1) "'Re-use' means a subsequent use of importer water for the same purpose as the original use." [for example treatment of sewage to potable water standards and re-cycled into the regular water system, which the Court noted that Denver's research was continuing such that in the future potable water will be extracted from sewage for delivery to the water mains] (2) "'Successive use' means a subsequent use by the water importer for a different purpose." [for example after municipal use the treated sewage is used for irrigation] and (3) "'Right of disposition" means the right to sell, lease, exchange or otherwise dispose of effluent containing foreign water after distribution through Denver's water system and collection in its sewer system." The DEIS discloses that these participants practice "successive use" and "disposition" through exchanges of some of trans-mountain water. None "reuse" Windy Gap water. To satisfy requirements of federal and state law, the discussion of reuse must be expanded.	53. The discussion of reuse in Section 1.6.1 was revised in the FEIS as follows: Many of the Project Participants successively use, or are planning to successively use, Windy Gap supplies to minimize the acquisition of new supplies. Colorado

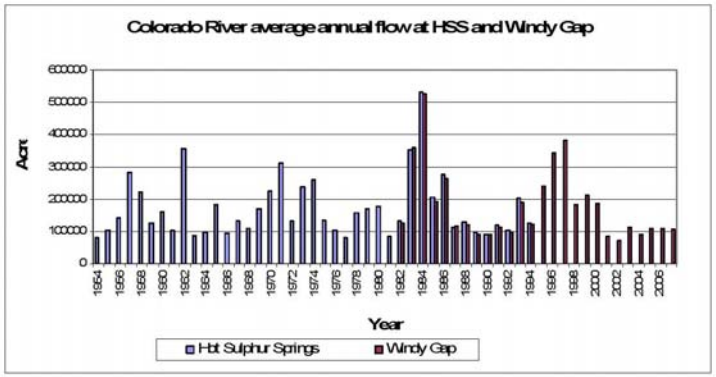
Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 35	water law allows for the reuse and successive use of transbasin imports such as Windy Gap water and requires that East Slope importers should, to the maximum extent feasible, reuse and make successive use of foreign water to minimize the amount of water removed from Western Colorado. Water reuse includes the subsequent use of imported water for the same purpose as the original use, such as the treatment of sewage to potable water standards for redistribution into the treated water system. Successive use refers to a subsequent use of imported water for a different purpose. For example, successive use may involve diversion from a wastewater treatment plant, and then conveyance to storage or distribution as nonpotable water for irrigation of parks, golf courses, and landscaping. Successive use allows a portion of outdoor water uses to be met without using raw water treated to drinking water standards (potable water). Participants also have the right to sell, lease, or exchange effluent-containing imported water after distribution through their water system and treatment. Several Participants, including Broomfield, Louisville, and Superior, have developed nonpotable irrigation systems, including conveyance and storage, to successively use their Windy Gap supplies. The Platte River Power Authority successively uses Windy Gap water to meet the cooling needs of the Rawhide Energy Station. None of the Project Participants reuse Windy Gap water for potable uses. Some Participants successively use Windy Gap water to meet augmentation or return flow obligations. Successive use of Windy Gap supplies for these purposes does not directly satisfy potable demands identified for a Participant, but this use helps meet other legal or contractual needs of the Participant.
54	**Section 1.6.2.3 Water Conservation** Page 1-15 **Comment.** The DEIS notes that water conservation includes both supply-side and demand-side management. If the WGFP is to be permitted as the least damaging environmental alternative, then conservation measures need to be included as conditions to the Carriage Contract or the 404 Permit. We have proposed such a permit condition in the *404 Permit Comment Letter*.	54. The WGFP Participants have committed to maintaining a state-approved water conservation plan in accordance with the Water Conservation Act of 2004 (Colorado House Bill 04-1365). Seven of the WGFP Participants have CWCB-approved plans, and other municipal water providers and water districts have committed to acquiring a CWCB-approved plan prior to delivery of WGFP water. Reclamation would require maintenance of a state-approved water conservation plan as a condition to a contract with Subdistrict WGFP Participants for use of C-BT facilities.
55	**Section 1.10 The Decision Process** Page 1-42 **Comment.** As noted above, the decision process will require resolution of many threshold legal questions that have not been resolved. Either execution of the Carriage Contract should be delayed until such questions can be resolved or any approvals must be contingent on resolving those questions.	55-56. Reclamation expects to complete the NEPA process with a Record of Decision (ROD) no sooner than 30 days after the Final EIS is made available to the public. The ROD will document Reclamation's selection of an alternative for the WGFP and discuss the factors, including C-BT Project water rights that were considered in making that decision. If the selected alternative includes issuing a water contract, Reclamation intends to determine whether the proposed contract complies with Senate Document 80, and other applicable authorities, prior to execution of the proposed contract. See the discussion of text added at the beginning of Section 1.10.2 of the FEIS.
56	**Section 1.10.2 Senate Document 80 and Section 14 Analyses** Page 1-42 **Comment.** The DEIS notes that Reclamation's decision on whether an excess capacity contract is consistent with Senate Document 80 and other federal law will be made "later" and is not part of this EIS. Grand County reiterates that it must be included in the negotiation process for any excess capacity contract pursuant to Senate Document 80.	
57	Pages 1-42 and 1-43 **Comment.** In a Reclamation study of nutrients in the C-BT system (Leiberman, 2008), there is a box and whisker plot showing the statistical similarity in secchi depths between Granby Reservoir, Grand Lake, Carter Lake, and Horsetooth Reservoir, and that also illustrates secchi depths are statistically different (shallower) on Shadow Mountain Reservoir. When Reclamation undertakes to "consider the effects of the proposed project on Reclamation's ability to continue meeting the five primary purposes of the C-BT Project and whether or not the C-BT Project can continue to be operated in accordance with lettered stipulations (a) through (l) in the Manner of Operation," please include in this consideration the fact that Grand Lake is the only natural lake of the five water bodies mentioned above, and that its trophic status prior to construction and operation of	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 36	57. While it is true that Grand Lake is the only natural lake of the lentic water bodies considered, and the water quality of Grand Lake before the construction of the C-BT system may have been quite different than it is today, the analysis presented in the DEIS is focused on the expected changes in water quality as a result of the WGFP. The discussion of the current trophic state (based on data from 2000–2005) has been changed from mesotrophic to meso-eutrophic (see response to Comment No. 154).
57	the C-BT system was oligotrophic. This status has not been maintained, and in fact has been steadily degraded to the current conditions in which Grand Lake, contrary to the DEIS assertion that it is mesotrophic, can often be considered eutrophic.	Proposed water quality mitigation, as described in Section 3.8.4 of the FEIS, will reduce nutrient loading from the WGFP to the Three Lakes System so that the WGFP should not exacerbate the algae and clarity problem in Shadow Mountain Reservoir and Grand Lake. Therefore the WGFP should not affect the trophic state of Grand Lake.
	Section 1.10.3.	
58	**Comment.** Please add that Grand County will have 1041 permitting authority over all of the alternatives, not just those where there will be construction in Grand County. Grand County issued permits for the original Windy Gap Project. Each of the proposed alternatives will result in a change in the operation of and participants in the permitted Windy Gap Project thereby triggering either amendments to the existing permits or new permits.	58. See response to Comment No. 16.
	Section 2.1.2.1 Level 1 Alternative Screening Page 2-5	59. Section 2.1.2.1 was changed to include a discussion on the proposal that would prevent expansion of the C-BT Project diversions. Additionally, prior to making a final decision in a Record of Decision (ROD), Reclamation will evaluate the specific authorities through a technical review process. The review will lead to a determination of whether or not the proposed action can be implemented in compliance with Senate Document 80 and other authorities. See discussion text added to Section 1.10.2 of the FEIS. To model the effects of the proposed project and to ensure that total allowable C-BT storage would not change and that C-BT and Windy Gap water rights would not be expanded, the model assumes that C-BT Project would stop diverting water from the Colorado River for storage in Granby Reservoir when total C-BT contents in Granby Reservoir and Chimney Hollow Reservoir reach the volumetric limit of 539,758 AF, which is the physical capacity of Granby Reservoir. This would prevent expansion of C-BT Project diversions because it imposes the same constraint as if C-BT water was stored in Granby Reservoir as opposed to a portion being stored in Chimney Hollow Reservoir. Currently, C-BT diversions from the Colorado River to Granby Reservoir are curtailed when total contents in Granby Reservoir reach 539,758 AF because the reservoir is full and spilling.
59	**Comment.** Prepositioning is carried forward as part of the preferred alternative even though it may be illegal. The DEIS does not disclose the factual or legal basis for the statements that: 1) Total allowable C-BT storage would not change; or 2) the existing C-BT water rights and diversion would not be expanded. As described above, prepositioning involves both a change of C-BT and Windy Gap water rights. Only the water court has jurisdiction to decide whether: 1) total allowable storage would not change; 2) whether C-BT and Windy Gap water rights would be expanded; and 3) what terms and conditions need to be included to protect from injury.	
	Page 2-6	
60	**Comment.** The DEIS should explain why storage of CB-T water in Chimney Hollow Reservoir and prepositioning were not eliminated. Storage of Windy Gap water in Horsetooth Reservoir was eliminated because it would require Congressional action; Congressional action is required for storage of C-BT water in Chimney Hollow Reservoir.	60. Storage of Windy Gap water in Horsetooth would require that Reclamation enlarge Horsetooth.
	Section 2.2.1 Current Windy Gap Project Operations Page 2-14	
61	**Comment.** The DEIS states that Windy Gap is not stored on the East Slope. Since the impact analysis is based on this assertion, any amendment to the Carriage Contract must	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 37	
61	make this limitation a condition. For purposes of this condition, storage would mean that water shall not be held in any facility for more than 72 hours.	61. This statement in the DEIS is a description of current Windy Gap project operations and does not apply to the proposed project. Both the C-BT Project and Windy Gap Project would continue to be operated in accordance with Colorado water law and each project's water rights decrees.
62	**Section 2.2.2 Participant Operations under the No Action Alternative** Page 2-15 **Comment.** It is speculative to include the enlargement of Ralph Price Reservoir as the No Action Alternative.	62. See response to Comment No. 26.
63	**Section 2.4.2 Operations** Page 2-24 **Comment.** The DEIS notes that Windy Gap is delivered instantaneously through the Adams Tunnel. However, in order to distinguish between Windy Gap water or C-BT water and to prevent unlawful enlargement of C-BT water rights, the Carriage Contract must require that each water right that is carried through the Adams Tunnel be accounted for separately based on actual - not instantaneous - diversion/deliveries.	63. Windy Gap water is accounted for in the C-BT Project system. This section was revised to clarify that the water is delivered to the East Slope by exchange.
64	**Comment.** The DEIS states that when C-BT water is stored in Chimney Hollow, that creates more space in Granby Reservoir. More space in Granby Reservoir creates the ability of the C-BT water rights, which are senior to Windy Gap, to store in that space. This creates the potential for expansion of use of the C-BT water rights. The DEIS says the C-BT diversions and water rights would not be expanded. We have proposed a permit condition in the *404 Permit Comment Letter* so that C-BT water rights will not be expanded.	64. See response to Comment No. 59 above.
65	**Comment.** Middle Park's 3,000 af should continue to be stored in Granby Reservoir. There is no need to deliver Middle Park's water to Chimney Hollow and then "exchange" it back Granby Reservoir for release.	65. This statement describes the proposed project, which includes 3,000 acre-feet of storage in Chimney Hollow Reservoir for Middle Park. At times, Middle Park's 3,000 AF would be stored in Granby Reservoir, and at other times it may be necessary to store Middle Park's Windy Gap water in Chimney Hollow Reservoir to prevent spilling from Granby Reservoir. Without storage in Chimney Hollow, Middle Park water would be subject to spill when Granby Reservoir fills with C-BT water. If Middle Park's Windy Gap water was only stored in Granby Reservoir, there would be no firm yield associated with that supply in years that Granby Reservoir fills and spills under current operations.
66	**Section 2.8.2 Reasonably Foreseeable Actions** Page 2-42 **Comment. Add to reasonably foreseeable future projects the** Colorado Springs Substitution and Green Mountain Reservoir Substitution and Power Interference Agreements as described in Grand County's letter dated October 30, 2008.	66. Additional discussion on the Colorado Springs Substitution and Green Mountain Reservoir Substitution and Power Interference Agreements was added to Section 2.8.2, Reasonably Foreseeable Actions of the FEIS. As described in detail in the FEIS, these agreements would have a very minor contribution to cumulative effects and, therefore, were not included in the analysis. Section 2.8.2.1 in the FEIS was revised to better explain these potential projects.
67	Page 2-44	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 38	
67	**Comment.** (also page 3-42 and elsewhere) The reasonably foreseeable actions and cumulative effects sections should include a discussion of climate change. The United States Supreme Court has stated that the "harms associated with climate change are serious and well recognized." *Massachusetts v.* EPA, 127 S.Ct. 1438, 1455 (2007) (ruling that EPA can regulate greenhouse gases under the Clean Air Act). Therefore, global climate change must be analyzed under NEPA. See e.g. *Border Power Plant Working Group v. Department of* Energy, 260 F. Supp. 2d 997, 1028-1029 (S.D. Cal. 2007). At a minimum, the EIS could include a discussion of the influence of a 4 degree Fahrenheit temperature increase by 2050 and the possible influence on planning for increased winter precipitation matched by decreased summer precipitation as predicted in the Colorado Water Conservation Board's "Climate Change in Colorado" report. In considering climate change, Reclamation should follow the methods outline in its own document, appendix U of the "Final EIS- Colorado River Interim Guidelines For Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead, October 2007."	67. The discussion of climate change in Section 2.8.2, Reasonably Foreseeable Actions was revised in the FEIS. This section includes updated information from recent publications on climatic change trends in the upper Colorado River basin and possible future changes. Potential environmental impacts from climate change are qualitatively evaluated as part of the cumulative effects evaluation for applicable resources in Chapter 3 of the FEIS.
	Section 2.10.2 Comparison of Alternative Impacts Page 2-56	68. See responses to Comment Nos. 1 through 5.
68	**Comment.** Table 2-6 lists average Windy Gap Diversions of 36,352 af as existing conditions. This is wrong. Actual diversions from Windy Gap have averaged 11,000 af from 1985 to 2004 (page 1-9). This is the existing condition against which to compare impacts.	
	Page 2-67	69. See responses to Comment Nos. 1 through 5.
69	**Comment.** Table 2-7 Comparison of cumulative effects. The same error occurs in this table as in Table 2-6 with the incorrect reporting of Windy Gap diversions of 36,352 af	
	Chapter 3 Affected Environment and Environmental Consequences	70. Reclamation is not in a position, nor qualified, to determine whether or not a proposed project or alternatives is or is not in compliance with local zoning regulations or County Master Plans. In general, all of the alternatives would be subject to a variety of local, state, and federal permitting and compliance requirements beyond the requirements of NEPA. The FEIS identifies these compliance requirements but may or may not cover all necessary permitting requirements. It will be the responsibility of the applicant to comply with the appropriate local, State, and Federal permitting requirements. Many of the local zoning, land use, and permitting requirements established by the counties are additional regulatory measures with which the project proponent would need to comply; however, these regulatory measures are not necessarily in conflict
70	**Comment.** The DEIS fails to describe that most of the alternatives are not consistent with the requirements of existing local and regional plans including the Grand County Master Plan and the NWCCOG Water Quality Management Plan.	
71	**Comment. Displaying Windy Gap Diversions of 36,352 af as "Existing Conditions" is a fatal flaw.** Throughout the DEIS, Windy Gap Diversions for Existing Conditions are listed as 36,352 af as an average annual amount. This is a modeled number that is over	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 39	with the proposed project. Counties and other regulatory entities will need to evaluate the conditions, terms, and permitting necessary to satisfy the requirements of their local jurisdictions for the selected alternative. See response to Northwest Colorado Council of Government's (NWCCOG) comments on the DEIS in relation to the Water Quality Management Plan in Letter No. 1107.
71	three times actual diversions. This flaw permeates every table, graph, text and makes it difficult to comment. See discussion in General Comments Section, above.	71. See responses to Comment Nos. 1 through 5.
	Section 3.3 Determination of Environmental Effects Page 3-2	
72	**Comment. The DEIS states that** "[f]or Reclamation purposes action alternatives are compared to the No Action alternative for determining effects." Reclamation should use existing conditions to compare effects.	72. The FEIS provides a comparison of the effects of the action alternatives with existing conditions and information for a comparison of no action with existing conditions. It was prepared in accordance with Reclamation and CEQ guidance on preparation of an EIS.
	Section 3.4 Area of Potential Effect Page 3-3	
73	**Comment.** Change "may" to "will" in the 8th line and put a period after "diminish" in the 13th line. As written, there are no bases for these statements without the changes.	73. In Section 3.4 of the FEIS, the "may" in the referenced sentence was changed to "would." The comma after diminish was deleted.
	Section 3.5.1.1 Affected Environment; Areas of Potential Effect Pages 3-3, 3-4 and 3-6	
74	**Comment.** For alternatives including Rockwell Mueller, affected area should include the Fraser River, which should also be considered due to impacts from the Moffat Firming Project. The statement "The Fraser River is not included in the study area because none of the alternatives affect Fraser River flows" cannot be true even during the filling of the Rockwell/Mueller Creek reservoir site.	74. The CDSS Model, which was used to evaluate hydrologic effects on the West Slope, covers the Colorado River drainage from the headwaters to the Colorado-Utah state line. Therefore, the active model area includes the Fraser River. However, the area considered for the analysis of hydrologic effects does not include the Fraser River basin because Windy Gap water would be the only source of supply for filling Rockwell/Mueller Reservoir. Native inflow to that reservoir from Rockwell and Mueller creeks would be bypassed; therefore, there would be no change in streamflows in those creeks or the Fraser River. The methodology for calculating or gaging native inflows to Rockwell/Mueller and Jasper East reservoirs has not yet been determined. The final methodology for calculating or gaging inflows would be determined with input from the State Engineer's Office (SEO) and Division of Water Resources. There would be no cumulative effects with the Moffat Collection System Project on the Fraser River. Additional discussion was added to the FEIS in Section 3.5.2.9.
	Page 3-6	
75	**Comment.** The sentence "Colorado River average monthly flow changes, as a percentage of total streamflow, would be less than 10 percent downstream of the confluence with the Blue River…" is misleading simply due to the location of the site downstream of two major confluences. Moreover, it probably is wrong owing to the inaccurate description of existing conditions discussed in General Comments Section, above. The percent change for each stream segment from the Granby Dam down to the study area boundary should be presented here in a table, or alternatively, the stream segments with the highest *and* lowest percent changes should be offered.	75. Average monthly flow changes as a percentage of total streamflow decrease downstream due to tributary inflows and gains. Therefore, it is not misleading that the percentage change in flow along the Colorado River is less at Kremmling versus upstream at Hot Sulphur Springs due to tributary inflows from the Blue River and Muddy Creek. The percentage change for several locations along the Colorado River from Granby Reservoir downstream to the USGS gage near Kremmling are presented in Appendix A of the FEIS (see Tables A-8, A-9, A-10, A-12, A-13, and A-14). Section 3.5.1.1 in the FEIS was revised to reference these tables in the discussion of the downstream extent for resource evaluations, and
76	**Section 3.5.1.3 Water Rights, Agreements and Contracts**	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 40 Page 3-6 **Comment.** As described above, there are a number of legal actions that are necessary to implement the WGFP. **Section 3.5.1.4 West Slope Surface Water Hydrology** Page 3-8 **Comment.** Figure 3-3. This figure should not stop at 1994, but should continue on through the latest date available. While the USGS gage at Hot Sulphur Springs was abandoned by GS, USGS continues to maintain the gage at Windy Gap, which has been proven[9] to be statistically consistent with the Hot Sulphur Springs data (see figure below). The additional period of record from 1995 to 2007 is important to show the cumulative year drought conditions during that time, in particular the driest year on record from 1905 to 2007, which was 2002. In addition, a figure ought to be included to display predicted future flows over the next 30 years with WGF.  The additional water years should be included when evaluating trends, and low flow conditions. Similarly, special consideration should be made for the years in which Windy Gap water was and was not diverted. In addition, consideration should also be made for [9] Personal communication with Alan D. Druliner, Colorado Water Science Center, USGS, September 2008.	Colorado River stream segments with the highest and lowest percent change were also listed. Refer to responses to Comment Nos. 1 through 5 regarding the description of existing conditions.
76		76. See response to Comment Nos. 11–23.
77		77. This figure was revised in the FEIS to include data through 2008 for the USGS gage at Windy Gap. Section 3.5.1.4 in the FEIS was revised to account for the additional water years included when evaluating trends and low-flow conditions. A figure was not included to display predicted future flows over the next 30 years. The WGFP model does not predict future flows, rather it relies on historical hydrology for the period from 1950 through 1996 to predict how the WGFP would operate under those hydrologic conditions. Table 3-2 was added to the FEIS in Section 3.5.1.4 to display historic Windy Gap pumping data for the period from 1985 through 2008. Consideration of climate change and associated effects on flows is addressed in Section 2.8.3.2 of the FEIS under the subsection Climate Change.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 41	
77	the fact that the last century was one of the wettest on record, and that "climate models predict a reduction of Colorado River flows ranging from 5 to 50% by mid-century".[10]	78. Figure 3-4 was revised in the FEIS to include 2002 as the lowest flow year. An additional figure was not added showing average flows from 1950 through 2008 and the lowest flow year (2002) since Figure 3-4 was intended to illustrate the wide range in average flows for different time periods. The scale of Figure 3-4 is sufficient to discern that average flow rates have decreased substantially for the periods from 1905 through 1949, 1950 through 1984, and 1985 through 2008.
78	**Comment.** Figure 3-4 This diagram should be edited to include 2002 as the lowest water year. The difference in flow between the two years is 10,352 af (80,360.3 af versus 70,007.6). As the figure scale does not allow for adequate discernment of the changes to low flow, an additional figure should be added showing average flows from 1950-2008, the lowest flow year (2002) as represented by USGS Windy Gap gage data, and the flow due to proposed changes from the preferred alternative.	
	Page 3-9	
79	**Comment.** Please note that the flows from the Windy Gap diversion point to the mouth of the Williams Fork River of 90 cfs is 10 cfs below the flow identified as being critical *in winter* in the Grand County Stream Management Plan, Phase II. It is 150 cfs below critical summer flow recommendations. Similarly, from the mouth of the Williams Fork River to the mouth of the Troublesome Creek, the flow of 135 cfs is 15 cfs below winter critical flows, and 115 below summer critical flows. The flushing flow recommended by the Azure Settlement is equivalent to the optimal flows recommended by the Stream Management Plan, and 300-750 cfs below that recommended for flushing flows. In 2003, 64,200 af were diverted via Windy Gap. This is 91.7% of the annual flow in the 2002 water year.	79. Comment noted. This section of the FEIS is describing the existing environment and current operating conditions. If the WGFP is constructed, the Windy Gap project would continue to be operated in accordance with the Azure Agreement and Supplement to the Azure Agreement, and the Windy Gap water rights decree which was made absolute by the State of Colorado in 1990. Additionally, unless it is modified or changed, the Windy Gap Project will continue to operate in compliance with the agreement between the Subdistrict and the Colorado Division of Wildlife dated June 23, 1980. Additionally, the Subdistrict developed a Fish and Wildlife Mitigation Plan in accordance with the requirements of CRS 37-60-122.2 (FEIS Appendix E) that includes additional flushing flows under certain conditions.
	Page 3-10	
80	**Comment.** If no historic gage flow data is available, how can Reclamation plan to "bypass native flows" in the Rockwell Mueller or Jasper East areas?	The total annual Colorado River flow at Windy Gap in 2003 was 111,322 AF, and Windy Gap's diversion rights were in priority during April, May, and June of 2003. In 2002, when the annual flow volume was much less, Windy Gap could not divert.
	Section 3.5.1.5 East Slope Surface Water Hydrology	
81	Page 3-11	80. The methodology for calculating or gaging native inflows to Rockwell/Mueller and Jasper East Reservoir to determine required bypasses has not yet been determined. The final methodology for calculating or gaging inflows to these reservoir sites would be determined with input from the SEO and Division of Water Resources.
	Comment. figure 3-6 Please attach year labels on the X axis.	
82	**Section 3.5.2.2 Method for Effect of Analysis**	81. Apparently the x-axis labels did not print correctly in the DEIS. This was corrected in the FEIS.
	Page 3-14	
	[10] Colorado School of Mines Magazine, Summer 2008	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 42	82. Comment noted. See response to Comment No. 179.
82	**Comment.** Use of a daily time step model would not require "disaggregation" to get to daily diversions.	83. The 10% diversion shrink charged upon introduction of Windy Gap water to the C-BT Project is provided for in paragraph 1.(h) of the "Amendatory Contract for the Introduction, Storage, Carriage, and Delivery of Water for the Municipal Subdistrict, Northern Colorado Water Conservancy District, Colorado-Big Thompson Project, Colorado," Contract No. 4-07-70-W0107, between the Municipal Subdistrict, Northern Colorado Water Conservancy District, the United States of America, and the Northern Colorado Water Conservancy District (Carriage Contract). The "diversion shrink" provided for in paragraph 1.(h), as well as the "carry-over shrink" provided for in paragraph 11.(a), is intended to offset losses incurred by the C-BT Project due to the introduction, storage, carriage, and delivery of Windy Gap water. These losses include, but are not limited to, additional evaporation associated with storing Windy Gap water in Granby Reservoir and conveyance losses associated with delivering Windy Gap water via C-BT facilities. Diversion shrink does not create an expanded use of the C-BT decree. Section 3.5.2.3 of the FEIS was revised to further explain diversion shrink.
	Section 3.5.2.3 Facilities and Stream Segments Affected by Windy Gap Operations Page 3-14	
83	**Comment.** The DEIS notes that Windy Gap water that is pumped into Granby Reservoir is assessed a 10% shrink charge upon introduction. It appears that this shrink is then attributed to the CB-T decree. This operation appears to create an expanded use of the C-BT decree, because the C-BT is not decreed for diversion at Windy Gap, but water diverted from Windy Gap is attributed to C-BT. This needs to be explained further and the decree that authorizes this operation referenced.	
84	**Comment.** We are not aware of any decree for either Windy Gap or C-BT that allows an exchange of C-BT water with Windy Gap water that is called an "instantaneous delivery." This needs to be explained and the legal authority for doing so under Colorado law referenced. It appears that the fiction of "instantaneous delivery" will not be operated under the WGFP, but rather water would be routed to Chimney Hollow Reservoir.	84. The agreement that allows an exchange of C-BT water with Windy Gap water to facilitate delivery of Windy Gap water (termed "instantaneous delivery") is the Carriage Contract. Paragraph 10.(a) of this agreement states that "Deliverable Subdistrict Water shall be considered to be available at any time or place for delivery at any point in the Project System, and tracking or accounting for Subdistrict Water through each point in the Project Works shall not be required, so long as an accounting for the credit or deficit position, in terms of total AF of Subdistrict in the Project System, is maintained at all times." This method of delivering Windy Gap water has been used since the Windy Gap Project began operating in 1985, and would continue to be used under the WGFP for WGFP Participants and for Windy Gap unit holders not in the firming Project, including the City of Boulder and Town of Estes Park. However, Windy Gap water also would be delivered to WGFP Participants via direct releases from Chimney Hollow Reservoir using C-BT conveyance facilities. Instantaneous delivery is described in Section 3.5.2.3 in the FEIS. No court decree is required for this exchange.
	Page 3-15	
85	**Comment.** Willow Creek should not be affected by WGFP, but it apparently is. This appears to be the result of an undecreed exchange of Windy Gap water to Willow Creek Reservoir, which causes Willow Creek Reservoir rather than Granby Reservoir to spill. This operation makes no sense and needs to be explained. The DEIS needs to disclose the decree that authorizes this exchange of Windy Gap water to Willow Creek Reservoir.	
	Page 3-16	
86	**Comment.** The DEIS states that "C-BT water delivered would not exceed current amounts." The impact analysis in the DEIS is based on this assumption. Therefore, the Carriage Contract must include a condition that limits deliveries of C-BT water through the Adams Tunnel to current amounts. We have proposed such a permit condition in our *404 Permit Comment Letter*.	
	Section 3.5.2.5 C-BT and Windy Gap Project Operations and Diversions	
87	Pages 3-19 through 3-21	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 43	
87	**Comment.** Tables 3-2, 3-3 and 3-4 erroneously lists Windy Gap Diversions at 36,532 af (average) at 7,804 af (dry) and 38,512 af (wet). Actual diversion records are much less in all types of years. See General Comments Section, above.	85. Windy Gap water may be spilled from Willow Creek Reservoir as a result of an un-decreed exchange that is provided for in paragraphs 1.(g) and 11.(c) of the Carriage Contract. When Willow Creek pumping would cause a spill of Granby Reservoir, Windy Gap water is exchanged from Granby Reservoir to Willow Creek Reservoir (with an equal amount of C-BT water exchanged from Willow Creek Reservoir to Granby Reservoir) and subsequently spilled from Willow Creek Reservoir. This operation, which occurs infrequently, increases efficiency by reducing pumping energy (and the associated costs) that would be necessary to pump water from Willow Creek Reservoir to Granby Reservoir and then spill it. No court decree is required for this exchange.
88	**Comment.** Table 3-2 purports to compare average annual flow and diversion amounts. This is an example of how it is deceiving to present Windy Gap Diversions of 36,532 af as "existing conditions" rather than actual diversion when deriving differences and percentage of change. In fact *actual* diversions at Windy Gap Reservoir are show in Table 3, p. 22 of the Water Resources Technical Report. Those diversions averaged 11,080 af. That amount is the "existing conditions;" that is the amount of effect on the river since Windy Gap came on line. It is not some hypothetical modeled amount that created the existing conditions. Accordingly when one puts in the actual diversions of Windy Gap, the comparison looks much different and the impacts are staggering. See General Comments Section, above. Table 3-2 should be revised:	86. Reclamation will continue to operate the C-BT Project in accordance with the water rights for the C-BT Project. 87. See responses to Comment Nos. 1 through 5. 88. See responses to Comment Nos. 1 through 5.
89	Page 3-21 **Comment.** (also 3-25 and elsewhere). The assertion is regularly made that Windy Gap would not divert during dry years, yet there are tables that show diversions in dry years. Correct this conflict or limit diversions to dry years as a condition of the Carriage Contract.	89. Windy Gap would not divert or would divert minimal amounts in dry years like 1954, 2002, and 2004. Section 3.5.2.5 of the FEIS states that in dry years, average annual Windy Gap diversions would be relatively low compared with average and wet year diversions, and there would be no difference among the alternatives and existing conditions. Section 3.5.2.5 also includes an explanation that the dry year Windy Gap diversion shown in Table 3-7 in FEIS is an average of the five driest years. Not all of the dry years included in that average (1954, 1966, 1977, 1981, and 1989) are as severe as 1954, which is why the average dry year diversion is greater than zero. Section 3.5.2.5 in the FEIS was revised to clarify Windy Gap diversions in dry years.
90	Page 3-24 **Comment.** Please discuss nocturnal pumping scheme for Windy Gap which minimizes power cost during pumping and maximizes power generation and revenues during daylight hours when power demands are high. How will the WGFP influence this	90. The Windy Gap Project does not operate with a "nocturnal pumping scheme." Windy Gap pumps are operated to match inflows to Windy Gap Reservoir while maintaining required flows downstream of the diversion point and would continue to be operated in this manner with the WGFP. The new Windy Gap pumping contract with Tri-State Generation & Transmission will provide an incentive for off-peak (nighttime) pumping during the months of July and August. However, because Windy Gap water is delivered to the east slope by exchange, and because increases in Windy Gap deliveries as a result of WGFP are small in comparison to the total amount of water delivered through the Adams Tunnel (<5-10%), operation of Farr Pumping Plant is not expected to change appreciably.

Location	Existing Conditions		Proposed Action	
	Avg Ann Flow	Avg Ann Flow	Diff	Percent diff
Windy Gap Diversions **(modeled)**	36,532 af	46,084 af	9,552 af	26% increase
Windy Gap Diversions **(actual)**	11,080 af	46,084 af	35,004	316% increase

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 44	Windy Gap water is conveyed through Farr Pumping Plant to Shadow Mountain Reservoir before delivery to the East Slope. However, because Windy Gap water is delivered through "instantaneous delivery" and because increases in Windy Gap deliveries through Adams Tunnel as a result of the WGFP are small in comparison to the total amount of water delivered through the Adams Tunnel (<5-10%), operation of the Farr Pumping Plant is not expected to change appreciably.
90	schedule? A discussion of this schedule here would be appropriate to make way for the related impacts to water quality in section 3.8.	91. See responses to Comment Nos. 1 through 5.
91	**Section 3.5.2.6 West Slope Streams and Existing Reservoirs** Page 3-26 **Comment.** The DEIS states that average annual flows below Windy Gap would decrease 14% from existing conditions. As stated numerous times, the so called "existing" conditions do not reflect actual diversions by Windy Gap, which are much less. In fact, the average annual flows will decrease by 26% . See General Comments Section, above.	92. The hydrograph was not split into two time periods because there would be no changes in flow between the action alternatives, No Action Alternative, and existing conditions from September through November when average flows are less than 200 cfs. Changes in flow below 200 cfs only occur in August and are on the order of 10 to 30 cfs, which can be determined from Table A-9 in Appendix A of the FEIS. Table A-9 presents average monthly changes in flows in the Colorado River above Windy Gap.
92	**Comment.** Figure 3-12. Please break hydrograph into two time periods so that changes in flow below 200 cfs can be distinguished.	
93	Page 3-27 **Comment.** Figure 3-13. Please break hydrograph into two time periods so that changes in flow below 200 cfs can be distinguished.	93. The hydrograph was not split into two time periods because there would be no changes in flow between the action alternatives, No Action Alternative, and existing conditions from September through November when average daily flows are less than 200 cfs. Changes in flow below 200 cfs only occur in August and are on the order of 10 to 50 cfs, which can be determined from Table A-10 in Appendix A of the FEIS. Table A-10 presents average monthly changes in flows in the Colorado River below Windy Gap.
94	**Comment.** The table on this page shows that the Proposed Action would increase the number of days that flows dropped below 100 cfs over the 47 year study period from about 1.8 days per year in August to 2.9 days. This 47 year period does not include the extended drought conditions and lowest flow year on record, so it underestimates the true number of low flow days. According to the Grand County Stream Management Plan the critical/minimum cfs for that stretch is 250 during the summer, optimal is 450 cfs. Critical flows are defined as "that flow below which habitat is lost at the greatest rate." (GC SMP, March 2008, pA-4).	
95	**Comment.** Tables 3-7 and 3-8. The DEIS should state where these figures are derived. They might be helpful once corrected to determine the low flows in the critical reach below Windy Gap. Changes in stream flows should been shown in cfs as reported for increases in east slope streams. (Tables 3-9, 3-10, 3-11.) Similar tables in cfs should be prepared for West Slope streams where the decreases (impacts) will occur.	94. The purpose of Table 3-13 in FEIS is to present the number of days that flows below Windy Gap Reservoir would be less than 100 cfs as a result of Windy Gap diversions. In May and June, the number of days that flows are less than 100 cfs would not change under all the alternatives. In July and August, the greatest increase in such days would occur in August, but the total number of days of less than 100 cfs flows would be about only about 10% of the time during August. There are days that flows below Windy Gap are less than 100 cfs when Windy Gap is not diverting. For example, in 2002 flows below Windy Gap were less than 100 cfs for the majority of August, but that was not a result of Windy Gap pumping. Inclusion of the year 2002 would not increase the number of days that Windy Gap pumping causes flows to be less than 100 cfs; therefore, Table 3-7 does not underestimate the number of low-flow days caused by additional pumping under the action alternatives.
96	Page 3-28 **Comment.** Willow Creek is already seeing below standard levels of dissolved oxygen for its stream classification. The DEIS must describe how the reduction in flows will exacerbate this situation.	

Com-ment	Letter #1075	Response
		The model study period from 1950 through 1996 is suitable for estimating hydrologic effects associated with the EIS alternatives because it includes a broad range of average, wet, and dry years, and sequences of years that include dry years followed by wet years. See response to Comment No. 7 regarding the adequacy of the study period. The Aquatic Resource Technical Report uses daily streamflow data to determine impacts. These flow data included natural flows, existing conditions, and the alternatives for average, wet, and dry hydrologic conditions. In contrast, the Grand County SMP used only the weighted usable area graphs to determine the preferred flow range (optimum to critical minimum) without regard to whether that flow was available or could be maintained under either natural or regulated conditions. Optimal flows, as defined by weighted usable area, rarely exist, even under natural conditions. The flow habitat relationship is developed from the theoretical response of fish habitat use to stream channel configuration and not from a flow regime. The more appropriate analysis and the approach that is consistent with guidelines for application of the instream flow methodology is to use a hydrologic and habitat time series as applied in the Aquatic Resource Technical Report (Miller Ecological 2010) and summarized in the FEIS. 95. WGFP model monthly output that was disaggregated to daily data for each alternative was used to derive the values in Tables 3-7 and 3-8 in DEIS. The source of data for these tables was added to Section 3.5.2.6 in the FEIS. Changes in streamflows are shown in cfs for West Slope streams in Appendix A (see Tables A-8 through A-14). Tables (similar to Tables 3-9, 3-10, and 3-11) that show flow changes based on a comparison with historical gage data were not included for West Slope streams because the analysis of effects from the action alternatives was based on a comparison of modeled existing conditions to historical conditions (see response to Comment No. 1). Tables 3-9, 3-10, and 3-11 in the DEIS were included for East Slope streams because those streams were not included in the WGFP model. Therefore, the best available information for assessing impacts to East Slope streams was historical gage data because modeled existing conditions streamflows were not available. 96. Additional discussion on Willow Creek was added to Section 3.8.1.3 of the FEIS.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 45	
97	Page 3-30 **Comment.** Please explain what "reintroduction shrink" means; what percentage is charged in each East Slope firming reservoirs; which decree it is charged to; and the basis for a reintroduction shrink.	97. A diversion shrink of 10% is paid when Windy Gap water is introduced into the C-BT system per the Carriage Contract. Shrink would be paid when Windy Gap water is initially diverted to Granby Reservoir and exchanged into Chimney Hollow Reservoir or delivered to Dry Creek Reservoir. Once in Chimney Hollow or Dry Creek Reservoir, Windy Gap water would no longer be in the C-BT system. When Windy Gap water is released from those reservoirs for delivery to the Participants, it would be reintroduced into the C-BT system; therefore, based on the Carriage Contract, the Subdistrict would be charged an additional 10% shrink, which was termed "reintroduction shrink." Reintroduction shrink only applies to East Slope firming reservoirs including Chimney Hollow and Dry Creek reservoirs. Diversion shrink would not be paid on Windy Gap diversions to Jasper East or Rockwell/Mueller Creek Reservoir. Diversion shrink would only be paid once deliveries are made from these West Slope reservoirs and introduced into the C-BT system for the first time. Reintroduction shrink would be charged to the Windy Gap Project and allocated to the C-BT Project for storage in Carter Lake or Horsetooth Reservoir or delivery to C-BT users. Section 3.5.2.6 in the FEIS was revised under the subsection Granby Reservoir to further describe reintroduction shrink. An amendment to the Carriage Contract or an additional contract would be required to implement one of the WGFP action alternatives. The final terms and conditions related to reintroduction shrink would be determined through negotiations on the amendment or new contract.
98	**Section 3.5.2.9 Windy Gap Firming Project Yield** Page 3-41 **Comment.** Table 3-13. The WGFP does not satisfy the purpose and need statement. The firm yield reported is 26,600 af rather than 30,000 af. The WGFP also does not meet the Purpose and Need for Middle Park's firm yield of 3,000 af. Instead, it is reported that only 429 af of firm yield is generated for Middle Park.	98. The purpose and need statement is a goal for the project. There is no requirement that the project exactly meet the goal. The purpose and need for Middle Park is to provide 3,000 AF of storage, not 3,000 AF of firm yield. Although the target firm yield was not reached by any of the alternatives, this does not diminish the need for the water or value of the project.
99	**Section 3.5.3 Cumulative Effects** Page 3-42 **Comment.** The additional foreseeable actions described for Section 2.8 above need to be added to the cumulative impacts section.	99. See response to Comment Nos. 66 and 67.
100	**Section 3.5.3.1 Summary Comparison of Hydrologic Changes** Page 3-42 **Comment.** The cumulative impacts section demonstrates the need to use the same model to identify the impacts of the WGFP and the Moffat Collection System Expansion project. There are a number of assumptions on how the Denver Water Board may operate. Use of the Denver Water Board's daily point flow model would ensure those assumptions are accurate and applied to both projects. For example, when the Big Lake Ditch lease expires, that would take the call off of the Denver Water Board's Jones Pass Tunnel, and more water is likely to be diverted out of the Williams Fork River by the Denver Water Board, PLUS there is the lack of return flow down Reeder Creek. The timing of when those impacts occur is also critical. It is not adequate to look at the impacts on an average annual basis.	
101	**Section 3.5.3.2 Facilities, Streams and Lakes Affected by Reasonably Foreseeable Actions** Pages 3-43 through 3-45	

Com-ment	Letter #1075	Response
		100. A significant effort was made by the Corps and Reclamation to coordinate the modeling efforts for the WGFP and Moffat Project EISs. Prior to initiating the modeling of EIS alternatives and cumulative effects for the Moffat Project and WGFP, the lead federal agencies for the EISs convened a process to compare hydrologic modeling approaches and tools. This process included reviews of Windy Gap diversions, Granby Reservoir, and Adams Tunnel flows simulated in PACSM and Moffat Project and Roberts Tunnel flows simulated in the WGFP models. This process also included a detailed comparison of flows in the vicinity of the projects' diversions, which was summarized in the technical memorandum, *Comparison of Fraser River flows simulated in the WGFP CDSS model with those simulated in PACSM (Boyle 2005*). Model data were shared between the two projects to ensure that the WGFP and Moffat Project were reflected in a similar manner in each model. As a result, assumptions regarding how Denver Water would operate the Moffat Project are accurately reflected in the WGFP model. The cumulative effects analyses for the WGFP and Moffat Project also considered the same reasonably foreseeable water-based actions such as the expiration of the Big Lake Ditch contract. The cumulative effects analysis was conducted based on an analysis of hydrologic changes on an annual, monthly, and daily basis. Section 3.5.2.2 of the FEIS was expanded to include a discussion of the coordination of hydrologic effects assessments for the WGFP and Moffat Project EISs. The analysis of cumulative effects considered both average annual and monthly values (see Tables A-23 through A-45 in Appendix A of the FEIS). Similar analyses conducted using daily data for the direct effects analysis also were conducted for the cumulative effects analysis.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 46	101. See responses to Comment Nos. 1 through 5.
101	**Comment.** The comparisons in Tables 3-14, 3-15, 3-16, are wrong because they start from the wrong baseline for Windy Gap diversions of existing conditions of 36,532 af rather than the actual diversions of 11,080 af. See General Comments Section, above.	102. The Shoshone call reduction is analyzed as a reasonably foreseeable action in the DEIS and in Section 3.5.3.3 of the FEIS under the subsection Colorado River and in Section 8.4.2.6 of the WGFP Water Resources Technical Report. The analysis of the Shoshone call reduction describes the potential frequency and magnitude of hydrologic effects when the call reduction is in place. In 2003, Windy Gap diverted approximately 7,850 AF out of a total diversion of 64,200 AF due to the Shoshone call reduction. Windy Gap diversions were high in 2003 primarily because conditions in the Upper Colorado River were not dry as opposed to the relaxation of the Shoshone call. Windy Gap did not benefit from the Shoshone call reduction in 2004 because other factors, including instream flow requirements below Windy Gap, constrained diversions. While Windy Gap diversions may increase under a Shoshone call reduction, diversions with or without the WGFP would be the same since available storage capacity in Granby Reservoir would not be a limiting factor in dry years when the call reduction would be invoked.
102	Page 3-47 **Comment.** The Shoshone call reduction needs to examined more closely. In fact, when that agreement went into effect in 2003, that was also the greatest year of diversion by Windy Gap of 64,200 af. The report is replete with statements that Windy Gap will not divert during a dry year, but there is no analysis of the effects from the Shoshone call reduction.	
103	**Section 3.5.3.4 West Slope Streams and Existing Reservoirs** Page 3-50 **Comment.** Figure 3-25 excludes the months of December through March. In addition, the resolution is inadequate in the months shown where flow is below 200 cfs to be able to distinguish one condition from another, rendering the figure relatively useless for understanding much of the water year.	103. Figure 3-25 in the DEIS excludes the months of December through March because flow changes in those months were minimal and averaged 4 cfs or less. Changes in flow below 200 cfs that occur in April and August and are on the order of 10 to 30 cfs, which can be determined from Table A-31 in Appendix A, presents average monthly changes in flows in the Colorado River above Windy Gap.
104	Page 3-51 **Comment.** Figure 3-26 excludes the months of December through March. In addition, the resolution is inadequate in the months shown where flow is below 200 cfs to be able to distinguish one condition from another, rendering the figure relatively useless for understanding much of the water year.	104. Figure 3-26 excludes the months of December through March because flow changes in those months were minimal and averaged 4 cfs or less. Changes in flow below 200 cfs that occur in April and August are on the order of 10 to 30 cfs, which can be determined from Table A-32 in Appendix A, presents average monthly changes in flows in the Colorado River below Windy Gap.
105	Page 3-52 **Comment.** The potential consecutive dry year reduction in the surface elevation of Granby Reservoir of 33 feet means that when compared to the average depth at full pool of 74 feet, the reduction will be 44%. When compared to the maximum depth at full pool of 221 feet, the reduction will be 15%. With such a significant potential reduction, the inclusion of a bathymetric map, with an evaluation of regions of the reservoir where water levels might be reduced significantly enough to prohibit access is necessary. In addition, a calculation of the potential reduction in water surface also would be instructive.	105. Resource evaluations relied on average monthly surface area and elevation data for Granby Reservoir to analyze environmental effects. Figures 35, 36, and 55 in the Water Resources Technical Report present Granby Reservoir elevations for direct effects and cumulative effects analyses associated with the WGFP. Summaries of average monthly Granby Reservoir elevations and surface area for average, wet, and dry conditions are presented in Appendix A of the FEIS in Tables A-21, A-22, A-44, and A-45. A bathymetric map was not generated since it was not needed for the effects analysis. The maximum reduction in surface area associated with WGFP operation would be approximately 1,680 acres, which corresponds with the maximum reduction in surface elevation of 33 feet.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 47	A mitigation measure was proposed that would modify the manner in which prepositioning is operated with Chimney Hollow and Granby reservoirs. C-BT deliveries to Chimney Hollow Reservoir would be reduced in years that Granby Reservoir is forecasted to fall below elevation 8,250. This would reduce water level fluctuations attributable to the WGFP and raise water levels in Granby Reservoir particularly in dry years. See Section 3.5.4 in the FEIS for a discussion of this mitigation measure.
106	**Comment.** Please develop area-elevation curves for Granby Reservoir under different scenarios, similar to what was done for the Shadow Mountain Reservoir drawdown, showing reservoir surface area versus reservoir stage or area of reservoir bed exposed versus reservoir stage.	106. Resource evaluations relied on average monthly surface area and elevation data for Granby Reservoir to analyze environmental effects. Figures 35, 36, and 55 in the Water Resources Technical Report present Granby Reservoir elevations for direct effects and cumulative effects analyses. Summaries of average monthly Granby Reservoir elevations and surface area for average, wet, and dry conditions are presented in Appendix A of the FEIS in Tables A-21, A-22, A-44, and A-45. Effects to reservoir recreation were evaluated by comparing changes in surface area and water levels under the alternatives compared to existing conditions. Additional area-elevation curves for Granby Reservoir were not generated since they were not needed for the effects analysis.
107	**Comment.** Please develop a figure to project future Granby Reservoir elevations under consecutive dry year, moderate, and wet year scenarios that can be compared side-by-side with, or that also includes historical elevations like those shown in figure 3-6, and that makes clear how the historical elevation fluctuations might be exacerbated.	
108	**Comment.** Reductions in water surface elevation, water surface area, increases in exposed reservoir sediment surface areas call for accompanying discussions and mitigation in sections concerning water quality (3.8), recreation area, access to boat ramps (3.19), and air quality (due to potential dust issues) (3.16), and probably other sections as well.	
109	**Comment.** All of these same issues may also be true for Willow Creek Reservoir and should be discussed both here and in other appropriate sections in the document.	107. Figure 55 in the Water Resources Technical Report presents monthly surface elevations for Granby Reservoir for the entire study period for the Proposed Action and existing conditions. The 47-year study period includes consecutive average, wet, and dry years. For example, the existing study period includes the mid-1950s drought followed by 1957 (a wet year), 1963 and 1964 (dry years) followed by 1965 (wet year), 1977 (dry year) followed by 1978 (wet year), and 1981 (dry year) followed by several wet years in the mid-1980s. Figure 55 can be compared side-by-side to Figure 3-6 in the FEIS. Figure 55 shows that elevation fluctuations under the Proposed Action would increase compared to existing conditions and historical fluctuations due primarily to prepositioning C-BT water in Chimney Hollow Reservoir.
110	**Section 3.5.4 Proposed Mitigation.** Page 3-55 **Comment.** See the discussion of mitigation in the General Comments Section, above. Numerous additional mitigation conditions are required as detailed in the *404 Permit Comment Letter*.	
111	**Section 3.6.1.3 West Slope Ground Water Hydrology and Quality** Page 3-56 **Comment.** Water quality results are reported from: 1) Apodaca and Bails 2000, a survey study that looked at water quality in 12 Colorado counties in addition to Grand County. Sampling sites in Grand County were 5, maybe 6 in number: 2 on the upper Fraser, 2 in the extended Grand Lake area, 1 at the confluence of the Colorado River with the Blue River, and one, potentially in Grand County, on the Blue River. 2) Topper 2003, a survey of ground water in the entire state of Colorado, and *which relies upon data from the Apodaca and Bails article* for the upper Colorado River 3) Bauch and Bails 2004, which studied the Fraser River watershed with sites located only as far downstream as Tabernash. Based upon these resources it is difficult to understand from where water quality values specific to the Colorado River in the study area in question may have come	108. A mitigation measure (modified prepositioning) is included that will minimize adverse water level fluctuations in Granby Reservoir attributable to the proposed project and prepositioning As a result, water levels in Granby would remain higher, particularly during dry years, compared to the originally proposed prepositioning. Higher water levels would reduce effects on boat ramp access and exposed shoreline. The potential dust from additional shoreline exposure in dry years would not be substantially different than current conditions. The effects of modified preposition is discussed in the mitigation section for applicable resources in the FEIS. 109. There would be no impact to Willow Creek Reservoir under any of the alternatives.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 48	110. See response to Comment No. 35.
111	from. The Topper publication states that ground water quality in the Colorado River *can vary widely*.	111. About 10 wells in the study area sampled by the USGS were evaluated in addition to information from the three referenced reports. This reference was added to Section 3.6.1.3 of the FEIS.
112	**Comment.** The discussion of impacts to ground water is inadequate. For example, there is no analysis of potential degradation and influence from coal formations which extend just west of the Granby area, nor analysis of the influence from the hot springs in Hot Sulphur Springs. Also omitted is a discussion of potential degradation from leaking underground storage tanks which have been identified in Grand Lake, Heeney, Hot Sulphur Springs, Kremmling, Parshall, and Winter Park (Colorado Ground Water Atlas 2000). Any discussion of impacts to ground water quality from reduced flows in the Colorado River are missing. In order to discuss ground water quality in the study area with any degree of certainty a study would have had to have been conducted, because without such a study, the data is entirely too sparse to draw any reliable conclusions.	112. Ground water discharge from features such as coal formations and hot springs would not be affected by changes in Colorado River stage. The various bedrock ground water systems are not hydraulically connected to the river other than they ultimately discharge to the Colorado River because the river basin is the lowest topographic feature in the region. Assuming the ground water from these features is of a poorer water quality than that of the Colorado River, they currently contribute to the overall quality of the river, which has been measured and described in the EIS. The discharge to the river and quality of the hot springs at Hot Sulphur Springs has been discussed in the EIS. With respect to leaking underground storage tanks, they are the responsibility of the Colorado Division of Oil and Public Safety (OPS) and the responsible party that owns the tank. Any leaking tanks should be an OPS priority for removal and remediation.
113	**Section 3.6.2.3 Ground Water Hydrology** Page 3-57 **Comment.** Please quantify the "temporary changes in ground water levels near the reservoirs" that might be expected due to "the occasional large decreases in reservoir elevations during a series of dry years" and account for the number of homeowners who would lose access to their water supplies, if any.	113. Because Granby Reservoir is the lowest local topographic feature, ground water moves toward the reservoir. Therefore, the water level in many wells is not subject to fluctuation as a result of reservoir level, but rather typical seasonal changes in recharge. A review of water level information for three USGS wells immediately surrounding Granby Reservoir conducted for the EIS found that the ground water table elevation is higher than that of the reservoir, indicating that ground water is flowing to the reservoir (i.e., the reservoir is gaining water from the surrounding aquifer). Depending on the geology, however, there may be areas around the lake where ground water levels are controlled by reservoir level because they are in low-lying areas or in alluvium connected to the lake. The reservoir currently experiences large stage change due to varying runoff and water deliveries. During the 2002 drought period, the lake level was reported to be at its lowest level since filling in 1950. No published reports of water shortages in water supply wells from the 2002 drought period were found. If this is correct, it is confirmation that most local water supplies are from deeper formations that are somewhat buffered from large variations in recharge from precipitation and are not affected by large changes in reservoir water levels. Water levels in wells may decrease during periods of drought or lowered reservoir levels, but water apparently can still be pumped to the surface for use.
114	**Comment.** It is difficult to understand how the potential consecutive dry year reduction in the surface elevation of Granby Reservoir of 33 feet mentioned on p3-52 coincides with the statement "The historical variation in the lake surface elevation of Granby Reservoir (nearly 90 feet) is larger than the expected change due to any alternative." How can this variation be accounted for with a mean reservoir elevation of 74 feet? Again, a thorough examination of the issues identified in the comment for p3-52 are required to understand the increases in variations.	
115	**Section 3.6.2.4 Ground Water Quality** Page 3-58 **Comment.** In section 3-10 the statement is made that the Colorado River is a gaining river throughout most of the study area. The ground water section would be a good place to discuss this as well, in particular where the Colorado River is *not* a gaining river, and under what conditions. To say that changes in river stage and hence ground water levels,	

Com-ment	Letter #1075	Response
		Hundreds of private water wells are around the perimeter of Granby Reservoir. Of the 632 SEO wells listed as having been constructed, 138 are domestic water wells, 23 are commercial wells, 446 are household water use wells, 10 are municipal water wells, 5 are listed as "other" use, and 10 have no listing associated with use. Of these 632 wells, 44 were installed with the top of the well screen at less than 50 feet below ground surface, and 200 wells have no screen depth information listed. Of the 200 wells with no screen information listed, 59 have a listed total well depth of less than 100 feet. Additional information on effects of the project to these wells was added to the FEIS in Section 3.6.2.3. 114. Figure 3-6 in the EIS shows that water levels in Granby Reservoir have fluctuated historically by nearly 90 feet. The consecutive dry year reduction in Granby Reservoir elevation is the amount attributable to the WGFP Proposed Action. 115. Because the Colorado River is the lowest topographic feature in this part of Colorado, by standard hydrologic principles, bedrock ground water discharges to the Colorado River. The river may lose water for short distances to the alluvium in localized areas, but ultimately, this ground water would discharge back to the Colorado River some distance downstream from the point of loss. Bedrock ground water of varying water quality currently discharges to the river alluvium and eventually the river and the current water quality reflects this combination of surface water and bedrock ground water. Windy Gap diversions would not affect ground water discharge to the river and, therefore, would not change the current input of dissolved material to the river. See response to Comment No. 116. Section 3.6.2.4 of the FEIS was revised to provide a more detailed discussion of this issue.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 49	
115	due to the project, especially with attenuation over distance, would be insignificant compared to what currently exists ignores the fact that ground water quality in certain regions of the study area may already be unacceptably degraded. Without having accurate measurements of the current condition (measured water quality parameters), it is impossible to understand what "some changes in water quality that could increase as much as 38 to 45 percent" means.	116. Water quality in alluvium adjacent to the Colorado River is currently dependent on many processes, including the rate and location of discharge from bedrock aquifers, water quality of bedrock ground water, and recharge from the Colorado River. Relatively small predicted stage changes in the Colorado River due to Windy Gap diversions would not impact bedrock ground water quantity or quality, or its influence on alluvial water quality. The predicted changes in river water quality due to the WGFP would influence alluvial water quality where river water recharges the alluvium. However, because the Colorado River is a gaining river, all bedrock and alluvial ground water would eventually discharge to the river. All alluvial ground water returns to the river where the thickness of the alluvium essentially reduces to zero, such as at the mouths of various canyons along the river. Refer to technical memos regarding the recharge relationship between predicted stage changes in the river and alluvial ground water (Hydros Consulting 2011a, 2011b, and 2011c). Section 3.6.2 of the FEIS was revised with the above information.
116	**Comment.** "There may be some changes in water quality that could increase as much as 38 to 45 percent in some parts of the Colorado River. Similar changes in alluvial ground water quality along the Colorado River would be expected." The preceding statements suggest that ground water quality has been evaluated only as an extrapolation of surface water quality. This is inadequate because the effects to ground water quality are likely to be more strongly felt due to increasing influence from bedrock aquifers and decreasing contributions from recharge or any potential periods when the stream might switch to a "losing stream" due to excess flow. The requisite "hard look" requires an evaluation of carefully selected ground water samples on a regular basis.	
	Section 3.7 Stream Morphology and Floodplains.	
117	**Comment.** The DEIS recognizes the need for channel maintenance flows ranging from 80 percent of 1.5-year discharge to the 25-year peak flow (p3-60). These flows maintain the physical characteristics of the river channel, banks and floodplain and to maintain unimpaired flow in the channel. In addition the channel will need periodic flushing flows to remove sediment and accumulated interstitial debris. These are two different functions.	117. Comment noted.
118	**Comment.** Page 3-62 of the DEIS establishes the channel maintenance flows as the 2-year peak discharge (i.e. the lower end of the range previously identified), which the DEIS equates to about 1,240 cfs at Hot Sulphur Springs. The DEIS then indicates that under existing conditions this necessary channel maintenance flow is exceeded about 4% of the time, and with WGFP this would be reduced to about 3% frequency of exceedance, and a similar analysis for cumulative effects. The PDEIS concludes this change is about 1% less than existing conditions and so is a minor change and not an impact. This conclusion is completely unsupported. (1) A change from 4% exceedance interval to a 3% exceedance interval is a 25% change, so describing it as occurring 1% less frequently is grossly inaccurate.	118. (1). That is correct—the flow duration curve for Hot Sulphur Springs does show a 25% decrease in the frequency of flows of 1,240 cfs (the 2-year flow) 3% to 4% of the time. However, the flow duration curves show that for flows exceeding 1,240 cfs, the decrease in frequency of occurrence would be less and become nearly the same as existing conditions for the highest flows. According to the channel maintenance flows analysis, the range of channel maintenance flows (80% of the 1.5-year flow to the 25-year flow) would occur about 1% less frequently under the Proposed Action than existing conditions, and the duration of such flows in years when channel maintenance flows occur could be slightly longer. Section 3.7.2.3 of the FEIS was revised to provide additional discussion on channel maintenance flows. Figures 3-34 to 3-37 were added to Section 3.7.2.3 to show the changes in channel maintenance flows at Hot Sulphur Springs and Kremmling under the alternatives.

Com-ment	Letter #1075	Response
118	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 50 (2) The 2-yr peak discharge (1240 cfs) is based the current flow levels, not those that initially formed the channel, and so the flow criteria used is irrelevant and the conclusion is flawed. (3) This issue is dismissed (p3-60) because aerial photos from the 1970's, 1990's and 2005 indicate only minor channel changes in river morphology, and the fact that the channel is currently fairly stable in spite of significant C-BT that started in 1947. The DEIS also dismisses the need for evaluation channel maintenance and flushing flows between Granby Reservoir and Windy Gap and the potential WGFP impacts from changes to these flows because flows in this reach are "controlled by instream flows; therefore, it is difficult to define a range of channel maintenance flows based on peak flow events" (p3-63). (4) No mitigation is proposed (p3-65); we assume this is because the proposed action will maintain the existing requirement for 450 cfs sediment flushing flow for 50 hours once every three years (p 3-62). Flushing flows are different than channel maintenance flows.	(2). The task of the EIS is to compare the effects of the project alternatives to existing conditions and no action, not to conditions that existed more than 100 years ago prior to the beginning of human impacts on the flows of the upper Colorado River. (3). Several methods were used to evaluate affects to stream morphology and sediment transport and, therefore, the issue was not simply dismissed. Please see Section 3.7.2.3 of the FEIS. Figures 3-34 to 3-37 were added to this section to show changes in channel maintenance flows at Hot Sulphur Springs and Kremmling under the alternatives. In addition, an analysis of shear stress values for the Colorado River was added in Section 3.7.2.3 of the FEIS. For the Colorado River below Granby Reservoir, Table D-4 in the Water Resources Technical Report provides information on the magnitude, frequency, and duration of spills. Spills would continue to be sufficient to maintain channel capacity, transport sediment, and provide periodic scouring. (4). This is correct. Unless it is modified, flushing flows in accordance with the MOU between the Subdistrict and Colorado Division of Wildlife will continue to occur. Flows of 450 cfs or greater would continue to occur 23 days per year on average. See Table 3-34 of the FEIS. Larger flows would continue under the alternatives, as described in the FEIS. The analyses concluded that under the alternatives, flows would continue to be sufficient to maintain channel capacity, transport sediment, and provide periodic scouring. The Fish and Wildlife Mitigation Plan developed by the Subdistrict in accordance with the requirements of CRS 37-60-122.2 (FEIS Appendix E) includes additional flushing flows.
119	**Section 3.7.1.4 West Slope Stream Morphology and Sedimentation** Page 3-60 **Comment.** The statements that the Colorado River has continued to convey sediment without aggradation or degradation of the stream channel and that the river is a morphological stable stream are not supported by any data.	119. A sediment transport evaluation was completed for the Colorado River using streamflow and shear stress values at the Breeze station, a riffle site located downstream of the confluence of the Williams Fork. This analysis provides a generalized relationship between sediment mobilization and streamflows in the Colorado River. The results showed that fine sediments (sand, 2 mm or finer) would be mobilized at this riffle site at flows of less than 50 cfs. Fine gravel (8 mm) would require a flow of 200 cfs, medium gravel (16 mm) would require a flow of about 400 cfs, and coarse gravel (32 mm) would require a flow of about 850 cfs to be mobilized. The extensive data collection from Ward and Eckhardt 1981 study is still applicable. This study at four locations below Windy Gap to above the Blue River showed that fine sediments (sand, 2 mm or finer) would be mobilized at discharges ranging from 140 to 240 cfs (depending on location, with the highest flow at the lowest site above the Blue River). The flow duration curve for Hot Sulphur Springs shows minor changes in flows of 150 cfs or less and little change at Kremmling in flows of about 1,000 cfs or less. Additional discussion was added in Section 3.7.2.6 of the FEIS describing sediment transport. In addition, historic and recent aerial photos show minimal changes in stream morphology.
120	**Comment.** Please explain in quantitative terms what the following sentence means for this system: "The lower limit of channel maintenance flows has been defined as 80 percent of the 1.5-year discharge and the upper limit as the 25-year instantaneous peak flow."	
121	**Section 3.7.2.3 West Slope Streams** Page 3-62 **Comment.** The DEIS says that flushing flows were based on a 1981 study. This should be updated. Grand County's Stream Management Plan recommends a flushing flow of 750 to 1200 cfs for a 3 day duration with a frequency of 1 in 2 years during the May to late June period. Flushing flows are critical to transport the sediment. Tubifex worms thrive in sediment.	

Com-ment	Letter #1075	Response
		120. Table 3-32 in the FEIS appendices provides the estimated channel maintenance flow values for the Colorado River at Hot Sulphur Springs. Eighty percent of the 1.5-year discharge is 510 cfs and the 25-year peak flow is 6,520 cfs. 121. As explained in the DEIS, Ward's 1981 study remains valid today. The "Recommended Environmental Flows" provided in Grand County's SMP are, as stated in the first sentence of the Executive Summary for the SMP, "preferred flow regimes…for aquatic habitat and other non-consumptive water use." The SMP states that "the term environmental flow regime refers to those flows that are determined to best maintain the ecological needs of the stream in relation to its fisheries." The "flushing flows" provided in the SMP are not channel maintenance flows. The SMP states that "the magnitude of each flushing flow is based upon bedload transport modeling to identify the threshold flow at which spawning gravel mobilization is initiated." However, the modeling used particle sizes much larger than fine sediment. It is the finer particles of 2 mm or less that may fill between the larger gravels and bury fish habitat. The plan also states that "the recommended flushing flows are based on [modeling] and are not yet supported by empirical evidence of gravel mobilization." Please see response to Comment No. 119. The Aquatic Resource Technical Report uses daily streamflow data to determine impacts. These flow data included natural flows, existing conditions, and the alternatives for average, wet, and dry hydrologic conditions. In contrast, the SMP used only the weighted usable area graphs to determine the preferred flow range (optimum to critical minimum) without regard to whether that flow was available or could be maintained under either natural or regulated conditions. Optimal flows, as defined by weighted usable area, rarely exist, even under natural conditions. We feel that the more appropriate approach and the approach that is consistent with guidelines for application of the instream flow methodology is to use a hydrologic and habitat times series, as applied in the Aquatic Resource Technical Report and described in the FEIS. Flushing flows were evaluated using data from the hydraulic model. The sediment transport analysis showed that fine sediment up through medium gravel would be moved by flows of 450 cfs. Larger sediment size classes would be moved by flows up to 1,200 cfs. The range of size classes moved by the 450 cfs flow would clean spawning gravels and maintain habitat for aquatic invertebrates. These conditions would maintain macroinvertebrate diversity and aquatic habitat for spawning and incubation. Fine sediment is not expected to accumulate in any greater amount than current conditions.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 51	
122	**Section 3.7.3 Cumulative Effects** Page 3-65 **Comment.** A reduction of 1.5 in the current 4 percent exceedences rate of the 2-year peak discharge is a difference of 37.5%. Please correct and quantify reductions at the Kremmling gage similarly.	122. Section 3.7.3 of the FEIS was revised and further discussion provided to clarify impacts.
123	**Section 3.7.4 Proposed Mitigation** Page 3-65 **Comment.** The argument in the mitigation section on this page ignores the fact that stream flows are already too low for healthy channel maintenance. The preceding discussion said nothing about pool depth, interconnectivity between pools, the influence of flow volumes and channel depth on water temperatures, or refuge. The assumption that everything's fine and that the status quo will prevail is inadequate. The channels either need increased flows, or they need rehabilitation.	123. The Subdistrict developed a Fish and Wildlife Mitigation Plan (FWMP) in accordance with the requirements of CRS 37-60-122.2 (FEIS Appendix E). The FWMP includes an increase in channel maintenance flows. Flushing flows from the original Windy Gap Project (1980 MOU) would be modified to increase from 450 cfs to 600 cfs. In any year when flows below Windy Gap have not exceeded 600 cfs for at least 50 consecutive hours in the previous two years, and total Subdistrict water supplies in Chimney Hollow and Granby Reservoirs exceed 60,000 AF on April 1, the Subdistrict would cease all Windy Gap pumping for at least 50 consecutive hours to enhance peak flows below Windy Gap. The FWMP is a component of the mitigation and environmental commitments described in the FEIS (Section 3.25).
124	**Section 3.8 Surface Water Quality: General comments regarding issues with the DEIS modeling approach for Colorado River.** (*See also BBA Report*, Exhibit B) **Comment.** The DEIS concludes (p 3-129) that the only adverse impacts to streams in Grand County associated with WGFP diversions are an increase in stream temperatures and concentrations of ammonia, inorganic phosphorus, and total dissolved solids for the Colorado River. Proposed mitigation is to "consider increasing required bypass flows under certain water supply conditions" if it can be show that increases would result in measurable benefits to the trout fishery. Both statements are wrong. The reason the DEIS only identifies minor stream impacts in the Colorado River is because of the inappropriate choice of the steady state QUAL2K model for the purpose of evaluating changes from WGFP alternatives and issues with the input parameters used for the modeling. The use of QUAL2K to model temperature impacts demonstrates this issue. QUAL2K evaluates increases in Colorado River temperature resulting from diversion of water at Windy Gap for a single day, July 25th, and considers both the average diversion for that day, and a diversion to the point where only the 90 cfs mandatory bypass flow remains in the Colorado River below Windy Gap. According to the DEIS this approach would represent worst case conditions (DEIS page 3-92 and	124. See response to Comment No. 129.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 52	
124	page 51, Stream Water Quality Technical Report). The conclusions from this modeling approach are flawed for many reasons including:	
125	(1) The actual result from QUAL2K is that Colorado River temperature would increase as much as 4.0 degrees to a maximum of 18.9 just upstream of the Williams Fork confluence when average stream flows (approximately 425 cfs) are reduced to 90 cfs by WGFP diversions on the single day, July 25 given median meteorological conditions. QUAL2K does not consider a more realistic extended timeframe. For example, if the temperature is predicted to increase 4.0 degrees when flows are reduced from 425 cfs to 90 cfs on July 25, then the temperature of the Colorado River will continue to increase above 18.9 several days later if river flows are maintained at minimum levels due to WGFP diversions and the meteorological conditions (air temperature and sunlight) remain relatively unchanged. Depending on daily weather conditions, there would be a gradual warming of the river downstream from Windy Gap over time, not a single spike in temperature. QUAL2K cannot handle this, a dynamic model would be more appropriate.	125. Temperature effects on the Colorado River from the WGFP were addressed in the Fish and Wildlife Mitigation Plan developed by the Subdistrict in accordance with the requirements of CRS 37-60-122.2 (FEIS Appendix E). Please see Section 3.8.4 of the FEIS for a description of temperature mitigation.
126	(2) The DEIS concludes that WGFP will only increase temperature to exceed the temperature standard under worst case conditions, but this would not occur on average (p3-96). This statement cannot be supported. This statement is based on the median July temperature of 14.3 degrees as ambient conditions for input to QUAL2K. The source of this data is USGS grab samples which are collected 1 or 2 times per month (p3-67). Median data for 1 to 2 samples per month has no relevance to Colorado Water Quality Control Commission temperature standards which are determined as the Maximum Weekly Average Temperature (MWAT). Inputs to the QUAL2K model for many water quality parameters were based on the median value of measured water quality data for the period of record for July. The median value means that half of the data is greater than that value, which is why the State of Colorado defines existing quality as the 85th percentile for most parameters (5 CCR 1002-31, Section 31.5(20)).	126. The analysis of Colorado River stream temperature was revised using a dynamic temperature model rather than the QUAL2K model. However, the dynamic temperature modeling results support the conclusions from the QUAL2K modeling. In general, dynamic temperature modeling indicates that all of the alternatives would result in an increase in the frequency that the maximum weekly average standard (MWAT) and daily maximum (DM) standard would be exceeded, relative to the number of exceedances for existing conditions. This applies to all of the alternatives in the 24-mile reach of the Colorado River below Windy Gap Reservoir to the confluence with the Williams Fork, and is based on the model results which applied the very warm 2007 meteorology data. See Section 3.8.2.4 for a complete discussion of temperature impacts.
127	(3) Despite the QUAL2K model conclusions that WGFP diversions will rarely be of a magnitude to result in exceedance of temperature standards (page 3-96), there are already instances where increased stream temperatures in the Colorado River below Windy Gap in summer exceed standards. Existing MWAT data for Colorado River near Windy Gap indicates water temperature is already at or exceeding the water quality	127. The FEIS acknowledges instances where the temperature standard has been exceeded in the Colorado River. Results of the dynamic temperature model allowed a direct comparison between temperature standards and predicted results over the course of a season as indicated in response to Comment No. 126.. As noted in response to Comment No. 125, the FWMP includes mitigation to address exceedance of the temperature standards. See response to Comment Nos. 2 through 5 for comment on flow reductions.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 53	128. The majority of variables used in the Visual Basic for Applications Code of QUAL2K are double precision. Output of the QUAL2K model for water temperatures (in the DEIS) and concentrations are presented with a precision of six places to the right of the decimal. The results presented in the DEIS are often shown rounded to only two decimal places to correspond with the precision of the model input data.
127	standard (MWAT standard = 18.2 degrees) in July and August (p3-67 and 68, Figure 3-29). Moreover, all of the conclusions assume less reductions in flows from current conditions than actually will occur. *See* General Comments Section, above.	The model output shown in Figure 14 on page 21 of the WGFP Stream Water Quality Modeling and Methods Report graphically describes numeric data at the precision of the QUAL2K model (i.e., six decimal places). The y-axis numeric description is formatted as integers for clarity of the figure. The sharp steps in water temperature shown in the figure in the DEIS are primarily a result of tributary inputs modeled as point sources. Water temperature in the mainstem is predicted to change just downstream of a tributary source of a different temperature. Smaller step changes in water temperature are a result of model output from the discrete set of 78 computational elements in the modeled reach. Neither of these step changes shown in the model are a result of the precision (resolution) of the model output. See response to Comment No. 126 on the use of a dynamic temperature model in the FEIS.
128	(4) Conclusions about changes in temperature based on QUAL2K are shown in tenths of a degree Celsius (and concentrations of other water quality constituents are shown in tenths of a microgram per liter). This level of resolution is beyond the capabilities of QUAL2K Model. This shortcoming is demonstrated in the sensitivity analysis in the May 2008 Stream Water Quality Modeling and Methods Report (see for example Figure 14, p 21 MM Report).	
129	**Comment.** QUAL2K is a steady-state model, meaning it simulates water quality based on a multitude of inputs and assumptions for a single instant in time and thus is not dynamic over time. The condition of a steady-state instant (day) that the DEIS assessment considers is July 25 for "average" streamflow years. The concept was that this date is when the Colorado River experiences low-flows and hot and sunny summertime conditions, and it is also when Windy Gap could be diverting. (Note that although the DEIS chose July 25 of an average year to represent a worst case for temperature exceedances and impacts on aquatic life, there is no history of the temperature influence of Windy Gap pumping on aquatic life in July, because between 1984 and 2006 Windy Gap has only diverted one time (in 1985) in the month of July).	129. Yes, QUAL2K is a steady-state model and uses a multitude of inputs and assumptions under steady-state conditions. This model is actively being supported by the EPA. Steady-state water quality models have been used for decades by regulatory agencies and consultants (Birgand 2004). QUAL2E, the model which QUAL2K is based on, is considered a standard for water quality models (Chapra 1997; Shanahan et al. 1998). A dynamic water quality model relies on a much greater number of inputs and assumptions, many of which vary over time. Time series of inflowing water quality from tributaries, point, and nonpoint sources (at a fine time step) are required. These data were not available for the Colorado River when the DEIS was developed. QUAL2K was utilized on July 25, a date determined to be representative of flow conditions when Windy Gap diversions could occur and air temperatures would be high. Since completion of the DEIS, numerous additional temperature sensors were placed in the Colorado River during the summer months, allowing the development of a dynamic temperature model to simulate potential effects on the alternatives on river temperature. See response to Comment No. 126. Results of this analysis were provided to the CDPW, who worked with the Subdistrict develop a Fish and Wildlife Mitigation Plan in accordance with the requirements of CRS 37-60-122.2. A discussion of temperature mitigation is found in Section 3.8.4 of the FEIS.
130	**Comment.** The approach to evaluating Willow Creek water quality is different and found at page 3-92. SSTEMP was chosen to evaluate stream temperature changes in Willow Creek and a mass balance approach was used to evaluate changes in concentrations of ammonia, copper and iron on a single day, July 15. First of all, ammonia is not a conservative parameter and disassociates based on temperature and pH, so mass balance analysis is inappropriate. Further it was assumed that the WWTP plant discharge would not change pH or temperature as effluent becomes a greater percentage of the streamflow because Willow Creek Reservoir releases are reduced under WGFP alternatives (Stream Water Quality Technical Report, page 54). These assumptions are completely unjustified for the following reasons:	
131	(1) The Preferred Alternative would reduce Willow Creek streamflow by 36% in July of average years (see Table D-15, Water Resources Technical Report Appendices).	
132	(2) The DEIS assumes average Three Lakes WWTP flows (0.53 cfs) for Three Lakes WWTP (see page 36, Water Quality Monitoring and Methods	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 54	130. The analysis provided the ammonia concentration before biogeochemical processes reduce ammonia concentrations in the stream; thus, the mass balance analysis shows the largest possible increase in ammonia concentrations prior to disassociation in the stream. 131. The flow reductions provided in Table D-15 were used for the water quality effects analyses for Willow Creek.
132	Technical Report) is continuous steady discharge when evaluating both alternatives and cumulative impacts (Stream Water Quality Technical Report, page 116). However, the Three Lakes Service Area population is projected to increase from 8,230 in 2005 to 12,821 by 2020. In addition, peak flows for Three Lakes Sanitation District occur typically in July, so average WWTP discharge flows are not appropriate. For example, the Stream Water Quality Technical Report (page 25) states the monthly average discharge from Three Lakes WWTP between 2003 and 2006 ranged from 0.46 cfs to 1.34 cfs.	132. As stated in the FEIS, the Three Lakes WWTP was recently expanded. It is assumed that the expansion was designed with future foreseeable population growth (12,821 by 2020) in the service area considered. For the FEIS, a review was conducted of additional discharge and water quality data from the Three Lakes WWTP. The maximum WWTP discharge that occurred from 2001 to mid-2009 (1.34 cfs) was used for the revised analysis. For cumulative effects, the maximum allowable discharge of 3.1 cfs was used for the analysis.
133	(3) Existing noncompliance with current water-quality standards in Willow Creek (Stream Water Quality Technical Report, p. 26) are noteworthy and must be considered in the assessment of impacts.	133. The FEIS states that "potential changes to ammonia, iron, and copper concentrations in Willow Creek were evaluated because these constituents sometimes have elevated concentrations in Willow Creek and could exceed standards more frequently at lower streamflows."
134	**Section 3.8 Surface Water Quality: General comments regarding issues with the DEIS modeling approach for Lakes and Reservoirs.** **Comment.** The DEIS (p 3-129) describes only minor adverse impacts to lakes and reservoirs in Grand County from WGFP. The identified impacts are lower dissolved oxygen resulting in manganese concentrations that would continue to exceed water quality standards, nutrient concentrations would increase in the Three Lakes system, and clarity in Grand Lake would decrease (0.1 meters). As with the DEIS stream impact analysis, this conclusion is a result of a flawed approach to evaluating impacts. The minor impacts to the Three Lakes system summarized by the DEIS in Tables 3-48 to 3-55 are based on modeling by the Three Lakes Water Quality Model and are problematic for many reasons, including:	134. See response to Comment Nos. 135–137.
135	(1) The DEIS describes increases in annual average nutrient concentrations (Table 3-47, p 3-103). However, impacts from nutrients are primarily related to algae growth and eutrophication in these waterbodies (page 3-93) which is a seasonal problem. Nutrient concentrations during the algae growing season are more relevant than annual averages. The growing season primarily coincides with the pumping of Colorado River water into Three Lakes which will increase with the WGFP, so actual impacts will be greater than depicted by annual averages.	135. The increases in annual average nutrient concentrations for each of the Three Lakes is described in the DEIS in Tables 3-50, 3-52, and 3-54. Table 3-47 shows the average annual nutrient load into the Three Lakes for existing conditions. Chlorophyll *a* concentrations measured from 2005 to 2009 indicate that the growing season is July to September for Grand Lake and Shadow Mountain Reservoir and May to July for Granby Reservoir. Growing season epilimnetic nutrient concentrations for existing conditions and the Preferred Alternative (Alternative 2) are shown in the table below:
136	(2) Future nutrient concentrations used as input to the Three Lakes Water Quality Model for waters pumped by Windy Gap are based on completely unrealistic projections of nutrient concentration, particularly phosphorus, discharged from WWTPs in the Fraser River watershed. Fraser River water is then pumped by Windy Gap into the Three Lakes system (page 30	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 55	
136	Stream Water Quality Modeling and Methods Report). Therefore, both the in-lake concentrations and the algal response are underestimated. Since the conclusion that WGFP alternatives create no nutrient related impacts to streams or the Three Lakes System is based on the assumption of advanced treatment, then the WGFP project beneficiaries should be responsible for building the WWTP improvements necessary to make this assumption real.	
137	(3) Conclusions regarding changes in trophic Status Index are based on average chlorophyll *a* concentrations (p 3-93). Evaluating impacts of WGFP on Three Lakes should be weighted by pumping schedules instead of averaging.	
138	**Comment.** The overall approach to evaluating impacts to the Three Lakes system is flawed. The assessment of impacts from WGFP is focused on eutrophication and does not consider the exacerbation of the existing problems associated with the discharge of pollutants into the 3-Lakes from C-BT pumping. Eutrophication is the increase in productivity of a waterbody, meaning the acceleration of algae and aquatic weed growth as a result of the addition of nutrients or other elements otherwise limiting this growth. Eutrophication is associated with decreased clarity and dissolved oxygen and potential increased concentrations of certain metals. It is usually associated with the gradual worsening of water quality. The pumping of pollutants problem manifests itself in Grand Lake. It is seasonal in nature and can be best demonstrated by the following example from 2007.	

		TP (ug/l)		TN (ug/l)	
Water Body	**Growing Season**	**EC**	**A2**	**EC**	**A2**
Grand Lake	July-Sept	7.7	9.2	239	248
Shadow Mtn. Reservoir	July-Sept	11.5	13.1	256	264
Granby Reservoir	May-July	14.5	16.3	303	305

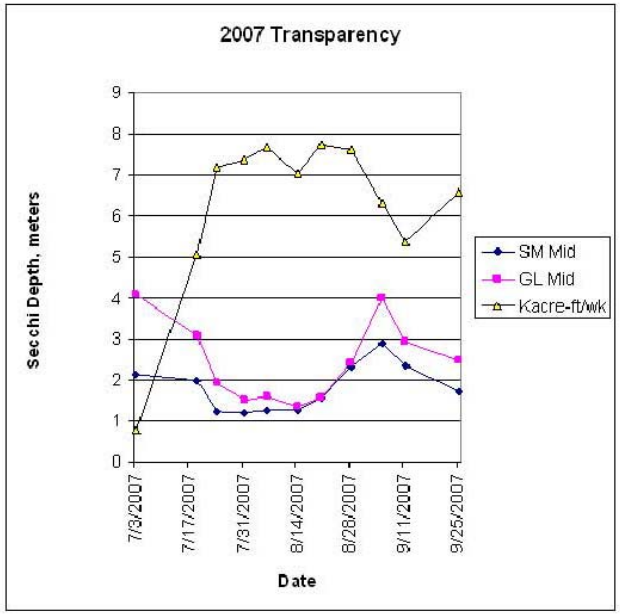
This information was added to the FEIS.

136. During the development of the DEIS, a certain level of treatment was assumed for future conditions for WWTPs in the Fraser River basin. We assumed a level currently being successfully achieved elsewhere in Colorado at WWTPs that impact another critical water body (Dillon Reservoir). Proposed nutrient mitigation described in Section 3.8.4 of the DEIS includes upgrades to the Fraser River WWTP and measures to reduce nonpoint source nutrient discharges. These measures would largely offset nutrient loading to the Three Lakes from Windy Gap pumping.

137. Changes in trophic status are computed using the methodology set forth by Carlson (1977). This method uses average chlorophyll *a* concentrations. In addition to reporting the trophic status, we report average chlorophyll *a* concentrations by year and peak chlorophyll *a* concentrations by year. A daily graph is included in the Lake and Reservoir Water Quality Technical Report and has been added to the FEIS.

The pumping schedule is accounted for in the model. See response to Comment No. 138.

138. The EIS evaluates and discloses the anticipated effects of the WGFP, it is not an evaluation of the C-BT Project and the effects of the C-BT Project on Grand Lake. The comment is made that the assessment is "focused on eutrophication and does not consider the exacerbation of the existing problems." The current problems, including those that the commenter describes (e.g., low clarity) are related to eutrophication and is the reason that a eutrophication (or nutrient food-chain) model is being used for the analysis. These types of models are not used to only look at long-term trends over a series of years or decades, but are also used to better understand dynamics on a shorter time scale.

Com-ment	Letter #1075	Response
138	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 56  The graph shows a period of about three months in late summer of 2007. Transparency in Shadow Mountain Reservoir ("SMR"), as measured by Secchi Disk depth, begins to decline in July. This is probably because of eutrophication of the SMR, the well documented seasonal blooms of algae and rooted aquatic vegetation in SMR. It is also documented that pollution levels in Grand Lake are a affected by water quality in SMR (see Page 37, US Bureau of Reclamation Report *Nutrients, Chlorophyll a and Secchi Disk Transparency of Five Reservoirs on the Colorado Big Thompson Project, 2005 to 2006*, Davine Lieberman, April 2007; "This late season peak [of total phosphorus] does not occur in Lake Granby, indicating that SMR and Grand Lake are linked by the overflow of SMR water flowing into the epilimnion of Grand Lake during pumping operations.").	

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 57	
138	From the graph it is obvious that as C-BT pumping begins in earnest in late July, Grand Lake clarity is diminished and essentially matches that of SMR. In early September the SMR bloom begins to die off, pumping is reduced and Grand Lake regains its 4 meter clarity briefly. Transparency of SMR again is diminished and the pumping increases toward the end of September and the transparency of Grand Lake responds accordingly. The average of the Secchi disk depth in Grand Lake during this period is 2.45 meters. This is almost the same value as what is shown as the average annual value of the 15-Year modeling period for both existing conditions and projected alternatives in the WGFP water quality assessment (see Table 45, page 103 of the Lake and Reservoir Technical Report). Although there is a seasonal reduction in Grand Lake's 4 meter clarity by over 65% during this same period as a result of pumping, on *average* there is little change. The approach to analysis of projected impacts focuses on annual averages and fails to incorporate the real problem of seasonal impacts to the 3-Lakes from pumping, and so the DEIS fails to project how WGFP will really affect this existing water quality problem.	
139	**Comment.** Note that predicted changes for both SMR and Grand Lake for water quality parameters associated with algae growth and affecting clarity are slightly worsened for all WGFP alternatives *on average* (DEIS Table 43 page 91 and Table 46 page 103 of Lake and Reservoir Water Quality Report, July 2008). Given that slight worsening *on average*, it is reasonable to expect that this seasonal polluting of Grand Lake associated with pumping will get significantly worse. The Three-Lakes Water Quality Model does not account for this situation.	139. In addition to reporting the annual average concentrations, the range of concentrations are reported in the DEIS for total phosphorus, total nitrogen, chlorophyll *a*, and Secchi-disk depth (Tables 3-52 and 3-54 for Shadow Mountain Reservoir and Grand Lake). Thus, the reader can compare worst-case conditions. In addition, daily graphs for nutrients, chlorophyll a, dissolved oxygen, and Secchi-disk depth have been added to the FEIS.
140	**Comment.** The model assumes instantaneous dispersal of constituents introduced into 3-Lakes (page 65 of WGFP Lake and Reservoir Water Quality Report, July 2008). However, it has been shown that because of temperature differences SMR waters "tend to slide over the surface waters of Grand Lake when water is being pumped down the Adams Tunnel" (see page 8, US Bureau of Reclamation Report *Physical Attributes of Five Reservoirs on the Colorado Big Thompson Project, 2005 to 2006*, Davine Lieberman, undated). This confirms that physical circumstances related to pumping in Grand Lake, at least, partially limit the possibility of eutrophication because pollutants are stripped out of the Lake instead of mixing. It also confirms that the DEIS may be looking at the wrong problem, using incorrect assumptions about mixing, and drawing faulty or misleading conclusions about impacts. Given this, the proposed mitigation to continue participation in ongoing Nutrient Studies in the Three Lakes system is meaningless.	140. The Three Lakes Water Quality Model was modified after Reclamation's report was written to incorporate the phenomenon described by the commenter. The current version of the model routes the water flowing from Shadow Mountain Reservoir to the surface of Grand Lake. Proposed nutrient mitigation described in Section 3.8.4 of the FEIS would reduce nutrient concentrations in Willow Creek and the Colorado River upstream of Windy Gap Reservoir and subsequently, the amount of nutrients being pumped into the Three Lakes System as a result of the WGFP. These measures would offset nutrient loading to the Three Lakes as a result of increased pumping from the WGFP. These measures would also improve water quality in portions of the Fraser River, Willow Creek, and Colorado River year-round.
141	Page 3-65	

Com-ment	Letter #1075	Response

Mr. Will Tully
Mr. Chandler Peter, P.E.
Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project
Grand County Cooperating Agency Comments:

Windy Gap Firming Project Draft Environmental Impact Statement
December 29, 2008
Page 58

141 **Comment.** In the surface water quality section, the statement "Windy Gap Reservoir is a small in channel reservoir and would have water quality similar to that of the Colorado River; therefore it was not evaluated separately" is unsupportable; monitoring on the reservoir was only begun in earnest in 2008. Windy Gap Reservoir slows and heats discharges from both the Fraser and Colorado Rivers, promoting the growth of algae and vast amounts of aquatic plants. In addition the contributions of migratory and summer populations of water fowl are at this time unknown. The effects to water quality from these influences can only be negative, and warrant further study and separate consideration. (An example of this is the low dissolved oxygen values mentioned below Windy Gap on p 3-66).

Section 3.8.1.3 West Slope Affected Environment

142 Page 3-66

Comment. The didymo (rock snot algae) also has effects on irrigators and water diverters because it plugs their pumps and intakes. The (Spaulding 2007) cite is not included in the references.

143 **Comment.** The statement "Colorado River water is generally of good quality throughout the study area" was grafted from p21 of the Stream Water Quality Technical Report and *refers to water quality data presented for the Colorado River below Baker Gulch, a site on the Colorado located in Rocky Mountain National Park that is of exceptional water quality and is not representative of conditions in the study area.* Data for the Baker Gulch site is presented on p16 of the Stream Water Quality Technical Report and in the cases of specific conductivity, dissolved oxygen, pH, ammonia, nitrate and nitrite, sodium, manganese, and selenium, nearly all of the upper range values are considerably lower than any reported in table 3-23 of the DEIS, and some of the ranges are entirely below those reported in 3-23.

This statement and presentation of the water quality data from that site as being representative of the whole region or even as being inside the study area is deliberately misleading. The statement should read that Colorado River water quality is quite variable throughout the study area.

144 **Comment.** While it is the convention of sanitation plants and associated permits to use the units of gallons per day or per minute, these units are inconsistent with the cubic feet per second and acre feet per year units used elsewhere in this document, making this section unintelligible.

141. The water quality in Windy Gap Reservoir is now included in the monitoring program. A comparison of some water quality variables at nearby sites, taken on or near the same day, is shown below. The sites are above the reservoir (CR-WGU), in the reservoir (WG-DAM), and below the reservoir (CR-WGC). In general, there is not much variation.

	TP (ug/l)			TN (ug/l)		
Date	**CR-WGU**	**WG-DAM**	**CR-WGC**	**CR-WGU**	**WG-DAM**	**CR-WGC**
6/16-17/09	53	37	34	247	250	220
7/15/09	43	48	44	313	290	468

	Chla (ug/l)			TOC (mg/l)		
Date	**CR-WGU**	**WG-DAM**	**CR-WGC**	**CR-WGU**	**WG-DAM**	**CR-WGC**
6/16-17/09	3	1	2.7	5.4	4.7	4.6
7/15/09	1.4	-	2.2	4.6	4.2	4.6

Dissolved oxygen concentrations have been taken above and below the reservoir. Data for summer 2008 above and below the reservoir are shown below. There is little change between the two sites. Note that since 1995, all dissolved oxygen measurements at the USGS gage downstream of Windy Gap Reservoir have been above the standard.

Dissolved Oxygen Concentrations (mg/l)

Date	CR-WGU	CR-WGC
5/20/08	8.5	8.9
5/29/08	8.8	9.1
6/3/08	8.7	8.7
6/12/08	9.2	8.7
6/16/08	8.7	8.2
7/1/08	7.9	8.6
8/27/08	9.4	9.3

142. The Spaulding reference was added to the FEIS references in Chapter 5.

143. There was an error in the Water Quality Technical Report on page 26. The sentence should read "Tables 5 through 10 show that the Colorado River is generally of good quality throughout the study area." The rest of the paragraph describes Colorado River water quality conditions from below Baker Gulch to near Kremmling. This error was not in the EIS; therefore, no changes were made to the FEIS.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 59	144. Flows in terms of cfs have been added to the discussion in the FEIS.
145	**Comment.** The Three Lakes Water and Sanitation District should be included in the listing of dischargers to the Colorado River here, and their effluent should be considered a part of the water quality modeling if it was not, as it will be included in the total Windy Gap nutrient load that is returned to the Three Lakes.	145. The Three Lakes Water and Sanitation District has been added to the discussion of dischargers. The impact of this plant has been considered in the analysis.
146	Page 3-67 **Comment.** Figure 3-29. As discussed above, water temperature standards are currently being exceeded. The Proposed Action will make things worse.	146. Mitigation for impacts to temperature are discussed in Section 3.8.4 of the FEIS.
147	**Comment.** Table 3-26. Water Quality standards are not being met for Granby Reservoir for: dissolved oxygen; chronic summer temperature; and manganese.	147. According to Table 3-26 of the DEIS, this statement is true.
148	Page 3-68 **Comment.** Table 3-24 for Willow Creek water quality demonstrates that water quality in the study area is variable and quite different from that of Baker Gulch, which has better water quality in nearly all parameters than that of Willow Creek.	148. Willow Creek water quality was treated separately from the Colorado River in both the Water Quality Technical Report and the EIS. The discussion of the Colorado River was of the mainstem, not its tributaries.
149	**Comment.** A hard look requires an analysis of the impacts of pumping on the Three Lakes paying particular attention 1) to how the WGFP will reduce flexibility in the system to turn off pumping to stop the export and feeding of algae blooms in Shadow Mountain Reservoir to Grand Lake, 2) to how pumping to optimize nighttime energy consumption when power costs are low and daytime releases through the Adams Tunnel to maximize revenues from energy generation influences water quality.	149. Reclamation and the NCWCD are currently evaluating how modification to pumping operations on the Three Lakes affects water quality. This is an ongoing effort that will continue irrespective of the WGFP, with the goal of improving lake water quality while maintaining water deliveries.
150	**Comment.** For the section including surface water quality and the Three Lakes region, please discuss the fact that 1) the west slope water bodies are more productive than the east slope water bodies (higher chlorophyll α), and 2) the west slope water bodies produce bluegreen algae where the east slope do not. Please include in this discussion 1) why this might be, 2) and what these circumstances mean operationally for the system, and 3) what special challenges they pose to operating in a fair and equitable manner on both sides of the Continental Divide.	150. According to Liebermann (2008), "at this time, greater productivity on the western slope most likely is from a combination of factors including the exchange of water between the three bodies of water during pumping operations." It appears that specific reasons for the differences between water bodies and on the East Slope and West Slope were not determined in the three-year study. In addition, no reasons were cited for the cause of the growth of blue-green algae on the West Slope. A discussion of special challenges for operating the system in a fair and equitable manner is beyond the scope of the EIS.
151	Page 3-74 **Comment.** Grand Lake is not only the largest natural lake in Colorado, it was specifically protected by Senate Document 80 as a primary purpose of the CB-T project: 2. To preserve the fishing and recreational facilities and the scenic attractions of Grand Lake . . ." (emphasis added). "Preserve" is defined as	

Com-ment	Letter #1075	Response
151	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 60 1. To keep safe, as from injury or peril: PROTECT. 2. To maintain unchanged. 3. To keep or maintain intact. Webster's II New College Dictionary (1999). The DEIS demonstrates that water quality has not been preserved in Grand Lake. Instead it has been degraded. The DEIS needs to analyze the alternatives beginning with this key existing problem. The DEIS should explain whether and to what extent the WGFP will "preserve" the water quality in Grand Lake, or whether pumping more polluted water from the Colorado River into Lake Granby, through Shadow Mountain, and into Grand Lake will exacerbate the existing water quality concerns.	151. The predicted impacts on Granby Reservoir, Shadow Mountain Reservoir, and Grand Lake from the WGFP are described in the DEIS. These impacts are compared to existing conditions and the No Action Alternative. The predictions show some degradation of water quality. Proposed nutrient mitigation described in Section 3.8.4 of the FEIS includes measures that will minimize nutrient loading from additional WGFP pumping. These measures would offset nutrient loading to the Three Lakes from Windy Gap pumping.
152	**Comment.** Please update the discussion of dissolved oxygen in Shadow Mountain Reservoir to include what we know to be true, that dissolved oxygen standards are regularly exceeded in the southern end of the reservoir, also updating your table, and especially including a thorough discussion and consideration of the impacts to water quality beyond the mere statement that "Low DO concentrations can be a concern because of the potential release of orthophosphate, ammonia, iron, and manganese from the sediments under anoxic conditions."	152. The FEIS has been revised to include additional discussion of dissolved oxygen in Shadow Mountain Reservoir.
153	**Comment. Algae and Trophic State.** The statement "All microcystin results received through July 24, 2007 for Shadow Mountain Reservoir have been below the detection limit" tells a partial truth because it stops short of the date for which we do have a value above the detection limit. Results for 8/6/2007 indicate a microcystin toxin value of 1.15 micrograms per liter by ELISA in Shadow. While HPLC results do not corroborate this value, it is not certain that they would, and in any case would likely have required sample concentration techniques, the need for which were unknown at the time. As such, the ELISA value, while acknowledged to be subject to false positives, is the best value we have from the time and should be mentioned with explanation of its limitations.	153. The DEIS states that "all microcystin results received through 2007 for Grand Lake have been below the detection limit except for two August 2007 samples with concentrations of 0.85 ug/l and 0.87 ug/l" (Clements 2007). In addition, all samples taken in 2008 were below the detection limit of 0.06 ug/l, with the exception of one at GL-PIC on September 8, 2008. This measurement was 0.139 ug/l. Microcystin toxin levels of more than 1 ug/l are a concern for drinking water purposes (WHO 1998).
154	**Comment. Algae and Trophic State.** If Ms. Leiberman's data is used, 7.3 micrograms per liter of chlorophyll is an inaccurate average, and peak concentrations have risen to 28 micrograms per liter, or nearly double the value cited here. Nonetheless, a value of 7.3 micrograms per liter does not define the lake as mesotrophic, but rather places it on the meso/eutrophic boundary. Using Ms. Leiberman's averages instead for 1, 5, or 1-5 meter sample collections puts the lake squarely in the eutrophic category, which is unacceptably degraded over pre-Windy Gap and especially pre-C-BT values. Please see comment regarding Jahnke, 1981 document in Lake and Reservoir Water Quality Technical Report section.	154. The statistics reported were for the period from 2000 to 2005. It is noted that a value of 7.3 ug/l would place the lake at the boundary of a meso-eutrophic trophic status. The FEIS has been revised to reflect this.
155	**Comment. Nutrients.** "No recent bioassays have been conducted to determine if this situation has changed." is untrue. Davine Leiberman has completed her three year study	155. Ms. Leiberman did not conduct bioassays as part of her study. The results of her study (2005 and 2006) were used in the development of the Three Lakes Model.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 61	
155	on the Three Lakes and from my understanding the final report has been submitted to Northern. Data from this report is new, more thorough than what was provided previously to the EIS process, and should be brought to bear on the document.	
156	**Comment. Grand Lake.** "The residence time…is short due to the operation of the C-BT Project and varies according to operations." This cannot be true for the entire volume of the lake, particularly with the strong stratification that is acknowledged to occur during the summer. Please see comments on p3-93. Again we have a case where it is very inappropriate to use an averaged value, in this case residence time, to represent such a complex system with any degree of accuracy. Discussion of microcystin toxin in Grand Lake is improved over the PDEIS but still leaves out ELISA value of 1.48 ug/L for 8/6/2008. This value is potentially more reliable than the HPLC values which most likely require concentration of the sample, concentration that did not occur, before they can accurately be relied upon for quantitative values, if at all. Though the ELISA is susceptible to false positives, far better to state this than to omit a potentially significant value. In addition a concentration of 0.19 ug/L was detected in the lake on 8/20/08, and a Grand Lake homeowner's tap checked in at 0.19 ug/L on 8/14/07.	156. Our request to GCWIN for 2008 microcystin data did not include the observations reported in this comment. All samples we received for 2008 were below the detection limit with the exception of one sample at GL-PIC on September 8, 2008. This measurement was 0.139 ug/l. Measurements for Grand Lake on August 5, 2008 (one day before the date in question) were below the detection limit.
157	**Comment.** The section on clarity notes that Grand Lake clarity has varied between 1.8 meters and 5.6 meters. The 5.6 meter Secchi depth measurement is the second best measurement ever documented on Grand Lake (second only to Pennak's 9.2 meter measurement in 1941). That data was taken in November of 2006, at a time when water temperatures had cooled, summer algal blooms had died off, and C-BT pumping had ceased three weeks earlier to facilitate the draw-down of Shadow Mountain reservoir for weed mitigation. Only East and North Inlet stream flows were providing water to Grand Lake during that time period. These circumstances serve to highlight the fact that pumping schedules and seasonal algae blooms have a very substantial effect on water quality especially in terms of clarity.	157. The 5.6-meter Secchi-disk depth measurement is not the second best measurement ever documented for Grand Lake. On November 21, 2000, the Secchi-disk depth was reported as 5.7 meters by the USGS. It is not unusual for the transparency of a lake to improve in the fall. Note that in 1953, the range of Secchi-disk depth readings in Grand Lake was found to be 1.2 to 4.6 meters. The 1953 readings were taken between May and October.
158	**Section 3.8.2.2 Regulatory Requirements** Page 3-86 **Comment.** The need for a 401 Certification from the State of Colorado as part of the 404 permit and an anti-degradation review by CDPHE are noted. However, in spite of conclusions throughout the DEIS regarding exceedances of water quality standards, the DEIS analysis is not consistent with the approach used by CDPHE for evaluating compliance with standards or the anti-degradation review. The DEIS typically considers median water quality values and average flow conditions, which is not the approach	158. Every attempt was made to assess water quality standards using the same methodology used by CDPHE at the time. Median water quality values and average flow conditions were not used for evaluating compliance with standards.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 62	
158	CDPHE uses for determining compliance with standards (5 CCR 1002-82) or in an anti-degradation review (5 CCR 1002-31.8(3)). The DEIS is inadequate to form the basis of the 404 permit.	
	Pages 3-87 and 3-88	
159	**Comment.** The requirement to obtain a 404 permit applies to alternatives that construct reservoirs in waters subject to the jurisdiction of COE.	159. True. A 404 Permit would be needed for all of the alternatives.
	Section 3.8.2.3 Method for Effects Analysis	
	Page 3-93	
160	**Comment.** The representation of flow down the Adams Tunnel as coming entirely from the epilimnion is incorrect. For this concept we are working from a diagram found in a Reclamation document entitled "Hydraulic Lab Report Number 151: Model Studies of the Alva B. Adams Tunnel Inlet Control Structure…" dated September 21, 1944. Some of what follows is contingent on this diagram accurately representing or at least approximating the actual structure of the current Adams Tunnel Inlet. According to this diagram, the inlet mouth is about four feet high, spanning a distance from roughly 7.4 feet to 12 feet below water surface, calculated from the top possible elevation of the water surface. The location of the Adams Tunnel inlet between the North Inlet and the East Inlet is ideal for maximizing capture of the clean water that flows into Grand Lake from these two very pure rivers. In addition, we believe that the elevation of the Adams Tunnel inlet structure is well placed to "high grade" (to borrow a term from mining) the good quality water that flows into Grand Lake for much of the summer. In the spring after ice-off the lake turns over and is well mixed. Stratification begins immediately, and an epilimnion, metalimnion and hypolimnion begin to develop. During May, June and possibly all of July (depending on the time of ice off), these layers are thin enough that the water flowing into the inlet is either derived entirely from the mixed waters, the diluted hypolimnion which at this time of year has desirable water quality roughly the same as the mixed waters, or from the very high quality metalimnion, into which we believe the rivers flow once stratification has become established. It is not until roughly late July or early August that the epilimnion has become wide enough (about 4 meters or 16 feet at that time of year) that it is finally able to span the entirety of the Adams Tunnel mouth. At this time all of the water flowing down the Adams Tunnel does appear to be coming from the epilimnion, which is believed to be composed almost entirely of the poorer quality water pumped in from Shadow Mountain Reservoir. From late July or early August, until fall turnover in either October or November, sediment and	160. The commenter takes issue with the assumption that the flow from Grand Lake to the Adams Tunnel inlet comes from the epilimnion of Grand Lake. For the months when the lake is well mixed (~November – April), and concentrations are similar for each layer. For the months of August through October, the commenter agrees that the epilimnion is thick enough to cover the Adams Tunnel inlet and that the epilimnion at this time consists of poor quality water. The apparent discrepancy occurs for the months of May through July. The commenter notes that during this period, the flow could be coming from the mixed layer, the metalimnion, or the "diluted hypolimnion" – all of which, it is noted, are of high quality. We understand that the size of the layers changes over time and that although the layer-outflow relationship can be changed in the model on a monthly basis, we assigned the epilimnion to the Adams Tunnel throughout the year. Since the flow to the Adams Tunnel during May through July (as the commenter notes) could come from different layers, the concentrations are similar during that period. Thus, the load of nutrients being exported from Grand Lake to the Adams Tunnel should be similar whether or not the flow is from the epilimnion, the metalimnion, or the "diluted hypolimnion."

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 63	
160	algae laden water from Shadow Mountain Reservoir is thought to spread out over the entire epilimnion, some of which is siphoned off by the Adams Tunnel. At the time of fall turnover, Grand Lake is capped with a layer of low transparency, high algae and sediment content water. When turnover occurs, this load is incorporated into the whole of Grand Lake, and again the diluted mixed waters are made available to the Adams Tunnel. The flow down the Adams Tunnel is composed of water from Shadow Mountain Reservoir only about three months out of the year, rather than six. The continual loading of the epilimnion in summer, as well as of the entire mixed water body in winter, year after year, can only mean that Grand Lake has had to arrive at, or continues to approach, a new equilibrium which reflects those undesirable contributions from Shadow Mountain Reservoir. This is evident, among other indicators, in reduced clarity, increased algae growth, and the formation of a significant delta at the channel entrance.	
161	Pages 3-104 and 3-107 **Comment.** The argument is made that increased pumping will decrease residence times in the three lakes, thereby reducing impacts from increased nitrogen concentrations. This argument appears to be erroneous at least for Grand Lake, but probably also for Granby Reservoir, when according to Davine Leiberman's 2008 study, algae blooms persist in Grand Lake even when pumping is high and flushing rates increase to within the range of days.	161. The discussion on pages 3-104 and 3-107 of the DEIS are focused on nitrogen concentrations, not chlorophyll *a* concentrations, nor the impacts of nitrogen concentrations.
162	**Section 3.8.3 Cumulative Effects** Page 3-115 **Comment.** Pine-bark beetle infestation and climate change must be considered as part of the cumulative impacts for lake and reservoir water quality report and for stream water quality.	162. Quantitative effects of pine bark beetle infestation and climate change on water quality are difficult to accurately predict because of the numerous assumptions that would be necessary. Additional discussion was added in Section 3.8.3—Cumulative Effects of the FEIS on potential qualitative effects to water quality from climate change and bark beetles. See also response to Comment No. 67.
163	**Comment.** The use of one day of July 25th as a worst case scenario makes no sense.	163. See response to Comment No. 129.
164	**Section 3-8.3.1 West Slope Cumulative Effects** Page 3-121 **Comment.** Granby Reservoir. "Phosphorus concentrations would be lower than in the direct effects analysis due to anticipated advanced wastewater treatment in the Fraser	164. Proposed nutrient mitigation described in Section 3.8.4 of the FEIS includes measures to reduce nonpoint source nutrient discharges. These measures would offset nutrient loading to the Three Lakes from additional pumping that results from the WGFP. See also response to Comment No. 136.

Com-ment	Letter #1075	Response
164 165 166 167 168 169	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 64 River basin in the future." If the analysis of phosphorous concentrations in the DEIS is based on the assumption that treatment plants will be upgraded, then the Carriage Contract must be conditioned on such upgrades being constructed by the applicant for the predictions about phosphorous to be accurate. **Comment.** There is no discussion of how the possible consecutive dry year reduction in water levels of up to 44% from the mean depth of 74 meters, 15% difference from the maximum depth (p3-53 WGFP DEIS), will influence water quality. Repeated freezing and thawing of exposed sediments is likely to increase nutrient and potentially metals loading in the reservoir which is not accounted for in any way. **Section 3.9 Aquatic Resources** **Comment.** The conclusions in the Aquatic Resources section are based on the information contained in the Aquatic Resources Technical Report dated July, 2008. The conclusions brought forward into the DEIS are inaccurate because of the many problems with that technical report. Please refer to the *Wyatt Memorandum*, Exhibit C for a detailed discussion of the inadequacies of the aquatic resources impact assessment. In addition, all of the conclusions about impacts to aquatic resources are called into question by the failure to use existing conditions to measure the significance of stream depletions. See General Comments Section, above. **Comment.** This section should refer to Grand County's Stream Management Plan. See comment under Chapter 5, below. Page 3-137 **Comment.** The reduction of 24% habitat for fishery is significant and is likely to be far more significant if the impacts were measured against actual *existing* stream flow conditions. *See* General Comments Section above. **Section 3.9.3 Cumulative Effects** **Comment.** Senate Document 80, the document that controls operation of the C-BT, states that one of the primary purposes of C-BT is "[T]o preserve the fishing and recreational facilities and the scenic attraction of Grand Lake, the Colorado River…" As part of discussion of the cumulative effects, there should be a discussion of whether fishing and recreation actually have been preserved under current conditions. The DEIS also should make reference to the 1951 report prepared by the US Fish and Wildlife for Reclamation which detailed the devastating effects of Granby Dam on the Colorado River. We are aware of two scientific assessments of the stream reach below Granby	165. As described in Section 3.5.4 of the FEIS, proposed mitigation includes a modification in prepositioning to reduce drawdowns in Granby Reservoir. However, there would still be some difference in the swings in surface water elevations in Granby Reservoir between existing conditions and the modified Preferred Alternative. The table below shows the changes in surface water elevation (SWE) for the dry years of 1954 to 1957: | | Change in SWE (ft) for EC | Change in SWE (ft) for Modified Alt 2 | |---|---|---| | June 1954 – April 1955 | -37 | -39 | | April 1955 – June 1955 | +13 | +14 | | June 1955 – March 1956 | -46 | -43 | | March 1956 – June 1956 | +49 | +50 | | June 1956 – April 1957 | -37 | -46 | | April 1957 – July 1957 | +79 | +86 | Although the reservoir currently experiences large swings in contents, the modified Preferred Alternative could lead to a slight increase in shoreline erosion, turbidity, suspended sediment, and phosphorus to Granby Reservoir, although given the current operations, it would probably not be measurable. This is not accounted for in the Three Lakes Model. Section 3.5.4 in the FEIS was modified. 166. The Aquatic Resource Technical Report used existing daily flows and existing conditions for fish and macroinvertebrates. Habitat analysis was based on the current state-of-the-art two-dimensional hydrodynamic model as recommended by USGS. See also response to Comment Nos. 2 to 5. 167. A discussion of Grand County's SMP was added to Section 3.9.1.4 of the FEIS. The existing streamflow conditions were used for the analysis. The impact of the habitat reduction is stated in the FEIS. Additional analysis and tables are included in the FEIS for clarification (Section 3.9.2).

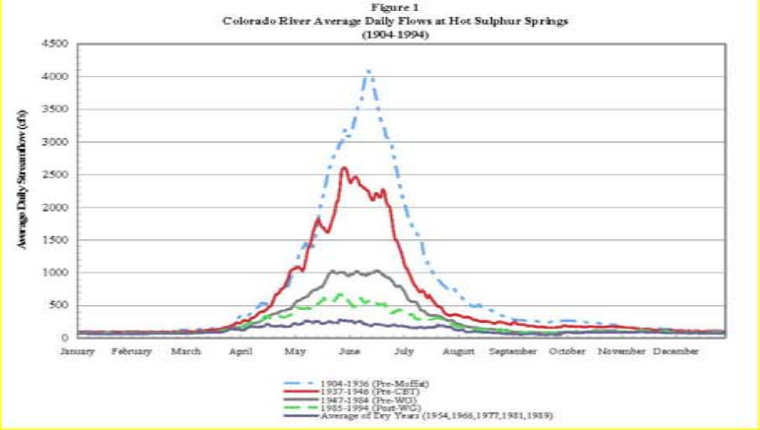
Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 65	168. The effects of the WGFP on aquatic resources are based on the proposed changes from the WGFP compared to existing conditions. The existing conditions include changes that have occurred in the Colorado River basin prior to this EIS. With the many changes that have occurred to the landscape and river since the 1950s, the 1951 report would not reflect the current conditions nor likely predict how the river would respond to the changes that have occurred. See also response to Comment Nos. 2 to 5.
169	Reservoir the 1951 United States FWS report and the Grand County Stream Management Plan. Exhibit G attached shows comparisons of the flows below Granby Reservoir. There is no assessment whether existing bypass flow requirements below Lake Granby and Windy Gap are appropriate for protection of the environment or whether prolonged durations at those flow levels as a result of WGFP alternatives will have an adverse impact.	169. Both of these reaches of river have minimum instream flow decrees that protect the resource to a reasonable degree. These flows are based on the technique specified by the State of Colorado to determine minimum flows for protection of the aquatic environment. The WGFP has no impact on the established instream flows below Granby Reservoir. The adequacy of these bypass flows are outside the scope of this EIS.
170	**Section 3.9.4 Proposed Mitigation** Page 3-145 **Comment.** The discussion of mitigation of impacts to aquatic resources is inadequate.	170. The FEIS includes additional mitigation measures for aquatic resources as included in the Fish and Wildlife Mitigation Plan developed by the Subdistrict (FIES Appendix E). These measures include curtailment of WGFP diversions under certain conditions when Colorado River temperatures exceed water quality standards; use of the Windy Gap Reservoir bypass valve and auxiliary outlet to release cooler water; increased flushing flows below Wind Gap Reservoir; and nutrient reduction measures to improve water quality in the Fraser River, Willow Creek, and Colorado River. These measures are described in Sections 3.8.4 and 3.9.4 and summarized in Section 3.25 of the FEIS.
171	**Section 3.13.2.2 Methods for Effects Analysis** Page 3-195 **Comment.** If the original Windy Gap was purported to divert an average of 56,000 af why is only 18,779 af of average depletions being paid for under the Fish and Wildlife Service Programmatic Biological Opinion for recovery of endangered fish?	171. The Programmatic Biological Opinion (PBO) provides for the continued "existing depletions" as of September 30, 1995, which includes 18,779 AF for the Windy Gap Project (see "Final Programmatic Biological Opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions in the Upper Colorado River Above the Confluence with the Gunnison River," December 1999, including Appendix B and Appendix F). Additional depletions for the Windy Gap Project (above 18,779 AF) would be treated as "new depletions" and are subject to PBO requirements, including a depletion charge.
172	**Section 3.18 Land Use** Page 3-216 Please see attached *Coley/Forrest Memorandum*, Exhibit F pg 7 section 1.6, and page specific comments at pg 28 section 2.1 for a complete discussion of the problems with the land use impact assessment.	172. See responses to Grand County Comment Nos. 355 to 364 and 402 to 406.
173	**Section 3.19 Recreation** Page 3-230 The discussion of impacts to recreation is inadequate to satisfy the "hard look" test. Please see attached *Coley/Forrest Memorandum*, Exhibit F pg 9 section 1.7, and page specific comments at pg 29 section 2.2 for a complete discussion of the problems with the recreation impact assessment.	173. See responses to Grand County Comment Nos. 365 to 388 and 407 to 431.
174	**Section 3.21 Visual Quality** Page 3-265	174. See responses to Grand County Comment Nos. 394 and 432 to 438.

Com-ment	Letter #1075	Response
	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 66	
174	The discussion of impacts to visual quality is inadequate to satisfy the "hard look" test. Please see attached *Coley/Forrest Memorandum*, Exhibit F pg 24 section 1.8, and page specific comments at pg 33 section 2.3 for a complete discussion of the problems with the visual quality impact assessment.	
175	**Section 3.22 Socioeconomics.** Page 3-272 The discussion of socioeconomic impacts is inadequate to satisfy the "hard look" test. Please see attached *Coley/Forrest Memorandum*, Exhibit F pg 25 section 1.9, and page specific comments at pg 35 section 2.4 for a complete discussion of the problems with the socioeconomics impact assessment.	175. The socioeconomic impact assessment appropriately evaluates the relevant resources that may be affected, specifies assumptions, discloses methods, and supports conclusions with the best data available. See responses to Comment Nos. 328 to 346, 397, and 439 to 454.
176	**Chapter 5 References** **Comment.** The DEIS fails to consider or discuss *Grand County's Stream Management Plan, Phase 2, Environmental and Water Users Flow Recommendations*, April 2008 and mitigation. Grand County has been involved in an ongoing effort to provide a scientific study for the analysis and recommendation for preferred flow regimen for streams and rivers in Grand County. Phase 2 of that study focused among other things on an environmental flow regimen "determined to best maintain the ecological needs of the stream in relation to fisheries." *Grand County's Stream Management Plan, Phase 2, Environmental and Water Users Flow Recommendations*, April 2008, ES-1. ("GCSMP"). The GCSMP has been and is still on the Grand County website. Although the DEIS was completed months after Phase 2 of the GCSMP, the DEIS does not cite this study as a reference or discuss the findings and recommendations for environmental flows. The DEIS needs to be supplemented to include the information from the GCSMP and to include a discussion of potential mitigation measures developed in the GCSMP. The stream reaches that are affected by the proposed alternatives included in the GCSMP are: • CR3, Colorado River – Granby Reservoir to Windy Gap. • CR4, Colorado River – Windy Gap to Williams Fork. • CR5, Colorado River - Williams Fork to KB Ditch.	176. The Grand County SMP was reviewed during preparation of the EIS. Our understanding is that the objective of the SMP was to develop preferred and recommended streamflows, water quality, and available water supplies for water users in the basin. The focus of the EIS was to evaluate and disclose the anticipated environmental effects of the alternatives. Where adverse effects were identified, mitigation measures were identified to offset or minimize those impacts. The mitigation measures developed for the WGFP are linked to identified project impacts and may not necessarily meet the target recommendations included in the SMP. A discussion of Grand County's SMP was added to Section 3.1.9.4 of the FEIS.

Com-ment	Letter #1075	Response
176	Mr. Will Tully Mr. Chandler Peter, P.E. *Re: Northern Colorado Water Conservancy District, Windy Gap Firming Project* *Grand County Cooperating Agency Comments:* *Windy Gap Firming Project Draft Environmental Impact Statement* December 29, 2008 Page 67 • CR6, Colorado River - KB Ditch to Blue River Confluence. • CR7, Colorado River - Gore Canyon to Grand-Eagle County Line. • WC, Willow Creek – Willow Creek Reservoir to Colorado River. • BR, Blue River - Green Mountain Reservoir to Colorado River. We would look forward to a meeting to discuss these concerns at any time. Sincerely, Barbara J.B. Green cc: Board of County Commissioners of Grand County Lurline Underbrink Curran J. Scott Franklin (via email: j.scott.franklin@usace.army.mil) Deborah Lebow-Aal, EPA	

Com-ment	Letter #1075	Response
177	BBA water consultants BISHOP-BROGDEN ASSOCIATES, INC. Michael A. Sayler Christopher J. Sanc Jeffrey A. Clark Charles E. Stanzior Robert E. Brogden December 23, 2008 Barbara Green, Sullivan Green Seavy, 2969 Baseline Rd., Boulder, CO 80303 Dave Taussig, White & Jankowski, 511 16th St., #500, Denver, CO 80202 Peter Fleming, Colorado River Water Consv. Dist., P.O. Box 1120, Glenwood Springs, CO 81602 RE: Concerns and Comments on the Windy Gap Firming Project DEIS Dear Barb, Dave and Peter: This letter report provides a summary of our primary concerns and comments regarding the water resource aspects of the Draft Environmental Impact Statement (DEIS) for the Windy Gap Firming Project (WGFP), dated August 2008, and the potential impacts to the upper Colorado River basin. We have reviewed this report on behalf of our clients Grand County, Colorado and the Colorado River Water Conservation District. For purposes of this letter report, we have reviewed the DEIS in general (dated August 2008), but have focused our review on the Water Resources Technical Report (WRTR) and Technical Report Appendices, dated December 2007. We have also reviewed prior drafts reports, supporting engineering or technical reports, records of the Colorado State Engineers Office, published information, information in our files and information available on-line. This letter report presents an overall summary of our concerns with the information presented in the DEIS and its overall conclusions, followed by detailed comments regarding the Water Resources Technical Report. This letter report also presents a summary of recommended mitigation measures that should be included in any permit approval associated with an Action Alternative for the WGFP. **Overall Principal Concerns** We believe that both the analysis and the overall conclusions of the DEIS are flawed. The DEIS derives its conclusions based on inaccurate modeling and inappropriate methodology. This conclusion regarding the DEIS flaws is based on the following primary concerns: 1. The DEIS does not accurately portray the effects of prior water diversion projects in the Upper Colorado River basin. An EIS analysis is intended to compare the proposed actions to the past, current and future environmental conditions. The upper reaches of the Colorado River in Grand County have been heavily depleted by existing water development projects. The information contained in the DEIS is insufficient to present an accurate representation of the changes in hydrology that have occurred over time. www.bbawater.com 333 West Hampden Avenue, Suite 1050 Englewood, Colorado 80110 phone 303.806.8952 fax 303.806.895	177. Additional information similar to BBA's table was added to Section 3.5.1.4 of the FEIS to summarize the effects of historical upstream depletions at the Colorado River at Windy Gap gage (09034250) for the 20-year period from 1985 through 2004. This period was selected because the Windy Gap Project came online in 1985; therefore, it includes the effects of all major upstream transbasin diversions (Grand River Ditch, C-BT Project, Moffat Project, and Windy Gap Project). Table 3-1 better represents the impacts of upstream diversions than the table proposed by BBA in their comment because BBA did not consistently present data for the same time period. For example, BBA presents average annual native flow for the period from 1904 through 1936, yet includes average annual diversion data for periods from 1975 through 2007, 1975 through 2006, 1985 through 2005, and 1974 through 2004. There is no way to discern differences in flow caused by diversions vs. differences due to variations in hydrologic

Com-ment	Letter #1075	Response
177	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 2 The table below presents a summary of the historic water development projects as they have affected the native and remaining streamflows. As the table shows, the current average annual streamflow volume at the Hot Sulphur Springs streamgage (USGS Gage No. 09034500) is approximately 26% of the historical native supplies. With the projected depletions from the WGFP, coupled with the foreseeable action of the Moffat Expansion Project, the remaining streamflow will be approximately 17% of the historical native supplies. Figure 1 below shows similar information presented as the average annual hydrographs before and after the development of key water diversion projects. This figure also compares the actual existing hydrology from the USGS gaging stations following completion of the Windy Gap Project to the average streamflow for the five "Dry Years" used in the DEIS. As can be seen on Figure 1, the actual existing average streamflow hydrology is very close to the Dry Year average flow compared to historic flow conditions. The DEIS does not present any substantive information beyond Figure 5 (page 19, WRTR) to represent the true past and present conditions for comparison to the projected depletions. The projected depletions from the WGFP, as well as the proposed Moffat Expansion project, will further deplete the remaining streamflows such that this section of the Colorado will be approach a 'dry year' in a majority of the years in the future. **Summary of Colorado River Streamflow and Diversions** **Colorado River at Hot Sulphur Springs, CO** | | Approx Avg Annual Flow Volume (ac-ft) | Remaining Avg Annual Flow (ac-ft) | % of Native Flow Volume Remaining | Notes | |---|---|---|---|---| | **Native Flow** | **540,000** | | 100% | Colorado River flow at Hot Sulphur Springs from 1904-1936 (pre-Moffat, adjusted for approximate Grand River Ditch diversions) | | Grand River Ditch | 18,500 | 521,500 | 97% | Based upon CDSS recorded annual diversions from 1975-2007. | | Moffat Diversions | 57,000 | 464,500 | 86% | Based upon Denver Water diversion records at the East Portal from 1975-2006. | | CBT Diversions | 228,800 | 235,700 | 44% | Based upon 1985-2005 diversions as shown in the WGFP EIS (Table 5). | | CBT Evaporation | 15,500 | 220,200 | 41% | Based upon 1975-2007 avg Granby content from BOR and SAC tables from NCWCD, plus full SMR, WC & WG acres | | Windy Gap | 11,100 | 209,100 | 39% | Based upon 1975-2004 diversions as shown in the Windy Gap Firming Project (WGFP) EIS. | | Grand County Uses | 1,200 | 207,900 | 39% | Based on current Grand County demands (3,100 af, UPCO 2003) with assumed 60% return flows | | **Current Flow** | **138,700** | | **26%** | Based upon SEO streamflow records at Hot Sulphur Springs (1985-1994). Note measured flows less than calculated remaining flows. | | Windy Gap Firming Project | 35,000 | 103,700 | 19% | Based upon projected additional future diversions projected in the WGFP EIS. | | Moffat Expansion | 9,300 | 94,400 | 17% | Based upon projected additional future diversions projected in the WGFP EIS. | | **Future Flow** | **94,400** | | **17%** | Equal to the current flow less additional projected diversions. | Notes: CBT evaporation is replaced at confluence with Blue River This table may be revised with information presented in pending EIS information for the Moffat Expansion Project www.bbawater.com Bishop-Brogden Associates, Inc.	conditions (snowpack, precipitation, temperature, and runoff) because of the varying periods used by BBA. Furthermore, the Moffat Tunnel diversion of 57,000 AF should not include Denver Water's diversions from Williams Fork River through Gumlick Tunnel, which occurs downstream of Hot Sulphur Springs. Last, it is not appropriate to compare future WGFP and Moffat Expansion diversions to historical flows as shown in the comment. Effects on flows due to future diversions should be based on a comparison against modeled existing conditions as opposed to historical conditions since the hydrology associated with existing conditions reflects the current administration of the river, demands, infrastructure, and operations. As discussed in Section 7.1 of the Water Resources Technical Report (December 2007), hydrologic output associated with the action alternative was not compared with historical hydrology for the following reasons: • Demands have changed considerably over the course of the study period, • Certain facilities and reservoir were not in operation for the entire study period, and • River administration and project operations have changed over the study period. Figure 3-3 was revised in the FEIS to include data through 2008 for the USGS gage at Windy Gap. Section 3.5.1.4 in the FEIS was revised to account for the additional water years included when evaluating trends and low-flow conditions. Figure 3-4 in the FEIS was revised to show average daily flows at the Hot Sulphur Springs and Windy Gap USGS gages before and after development of the C-BT and Windy Gap Projects, and is similar to BBA's Figure 1.

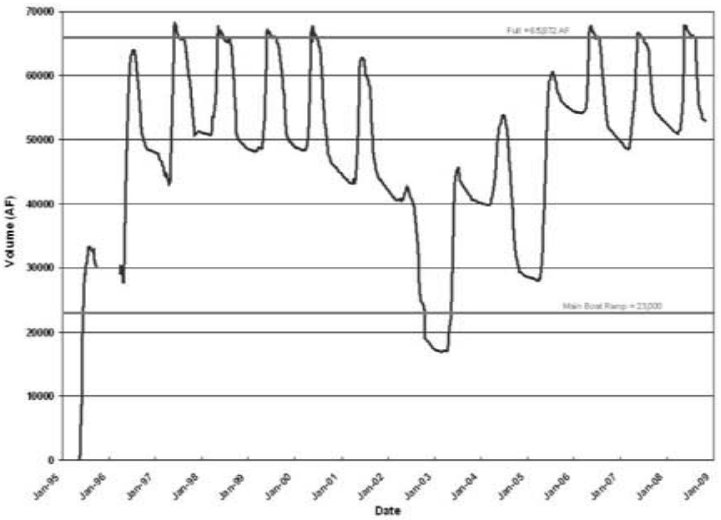
Com-ment	Letter #1075	Response
177 178	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 3 Figure 1 Colorado River Average Daily Flows at Hot Sulphur Springs (1904-1994)  2. The DEIS inaccurately represents Existing Conditions for the Alternatives Analysis. The spectrum of hydrologic effects contained in the DEIS for the WGFP (i.e. water diversions, operations, storage, releases, changes in storage and changes in streamflow) for all project alternatives are modeled by comparing the alternatives to the Existing Condition. Further, the evaluation of all water-based effects associated with an alternative, such as water quality, aquatics, stream morphology, ground water, wetlands, etc., are based on the predicted changes in hydrology. However, the DEIS presents an Existing Condition that is not accurate. Specifically, the DEIS states that "The purpose of the Existing Conditions scenario is to model current conditions as if they occurred under the same hydrologic conditions or baseflows that existed throughout the study period (1950 through 1996)." All future alternatives are compared to the Existing Condition as shown on Table 3-2 of the EIS (Table 18 WRTR), which shows an average annual Windy Gap (for both WGFP participants and non-participants) diversion of 36,532 acre-feet (af). This presentation of the Existing Condition is contrary to Table 3 (WRTR) which states that the Windy Gap project historic diversions since construction have averaged 11,080 af per year (1985-2005). This level of historic diversions of the Windy Gap project correspond with the CDSS diversions records, which show average annual diversions of 11,987 af. Based on the text of the WRTR, it appears that the model used indicates diversions of Windy Gap water into Granby Reservoir even though it may spill in upcoming months. However, it is impossible to tell from the results presented in the DEIS for a comparison of how much water is later spilled versus how much is diverted to the Windy Gap users directly or into storage for later delivery. Based on the total average flow quantification upstream and downstream of Windy Gap, it appears that, on average, the flow in the Colorado River will be depleted by 36,532 af/year – indicating that this number is inclusive of Granby spills. Based on this information, the Existing Conditions number used in the DEIS overstates the actual existing conditions by over 300%, and therefore understates future depletions by 25,452 af/year. Further, the model indicates that there are three nodes, or points of quantification, upstream of the Windy Gap diversion dam (Colorado River above Windy Gap); Colorado River below Lake Granby, www.bbawater.com Bishop-Brogden Associates, Inc.	178. The existing conditions scenario is reasonable for evaluation of hydrologic effects for the following reasons. Windy Gap diversions for the last 10 years (1999 through 2008) averaged 22,158 AF/yr, which is significantly higher than the average diversion of 11,080 AF/yr for the period from 1985 through 2005, as presented in Table 3 of the Water Resources Technical Report. Windy Gap diversions were made in accordance with the project's water rights, the same water rights that would be used to effect diversions with a WGFP. Recent diversions represents the Participants' need for water to meet increasing water demands, which is supported by information presented in Chapter 1 on the Participants' water demands and needs. Modeled Windy Gap diversions under existing conditions reflect the recent Windy Gap Participant demands. Windy Gap pumping for the 8-year period from 2001 through 2008 since Granby Reservoir last filled averaged 27,450 AF/yr. That average includes 2002 and 2004 when almost no Windy Gap water was pumped. Therefore, estimated pumping under existing conditions is much closer to recent operations than suggested in the comment. The comment asserts that potential impacts of additional Windy Gap diversions under the Proposed Action are minimized or underestimated based on a comparison against existing conditions. Reclamation does not believe that to be the case. The average decrease in Colorado River flows below Windy Gap between the Proposed Action and existing conditions is 21,283 AF/yr, which is the estimated increase in net depletions to the Colorado River. This reflects the net effect of additional Windy Gap diversions from the Colorado River and the difference in spills from Granby Reservoir. A considerable portion of Windy Gap water diverted from the Colorado River is delivered back to the river via a spill under the existing conditions scenario. Windy Gap operations were simulated in this manner to present the amount of water than could be diverted with the project's current water rights to meet demands even if a portion of the water is subsequently spilled from Granby Reservoir back to the Colorado River. Table 3-9 was added to the FEIS to better illustrate the water balance associated with the Proposed Action. In summary, Reclamation believes the effects assessments based on net depletions to the Colorado River below Windy Gap, as presented in the FEIS, are appropriate. Windy Gap diversions under existing conditions reasonably reflect recent operations and diversions, which are much higher than the 20-year average from 1985 through 2005. In addition, this issue does not affect Windy Gap diversions in dry years; therefore, Windy Gap pumping, net depletions to the Colorado River, and associated impacts are appropriately estimated in dry years,

Com-ment	Letter #1075	Response
		which are typically more critical for aquatics, water quality, and other flow-related resources. See response to Comment No. 183 regarding Windy Gap spills and forecasting. Tables 3-2 though 3-4 were revised in the FEIS (Tables 3-6 to 3-8) to include C-BT and Windy Gap spills from Granby Reservoir. Sections 3.5.2.5 and 3.5.2.6 in the FEIS also were revised to provide more information on forecasting and net depletions to the Colorado River due to Windy Gap diversions to clarify how much Windy Gap water is delivered to users vs. spilled. The difference between the three points of quantification (Colorado River below Granby Reservoir, Willow Creek at the confluence, Fraser River at the confluence) and upstream of the Windy Gap diversion is 19,200 AF/yr on average, which is the average annual gain for this reach as determined in the Colorado Decision Support System (CDSS) model. Footnotes were added to Tables 3-6, 3-7, and 3-8 that the Fraser River at the confluence corresponds with outflow from the Scybert Ditch, and Willow Creek at the confluence corresponds with outflow at the Bunte Highline Ditch since these ditches are the furthest downstream nodes modeled on these tributaries in the CDSS model. The gains for the reach described above should not be close to zero as indicated in the comment. NCWCD has completed a point flow analysis of gains in this reach using available gage and diversion data. Gains predicted by the CDSS model are in line with gains estimated by NCWCD. It is not valid to compare modeled existing conditions at the Hot Sulphur Springs gage with historical USGS gage data at that location. That comparison is flawed for the following reasons: • Demands have changed considerably over the course of the study period, • Certain facilities and reservoir were not in operation for the entire study period, and • River administration and project operations have changed over the study period. The Windy Gap Project did not come online until 1985. Therefore, it is inaccurate to evaluate the effects of Windy Gap diversions under the alternatives based on a comparison with historical flows at Hot Sulphur Springs because they do not include the effects of the Windy Gap Project prior to 1985.

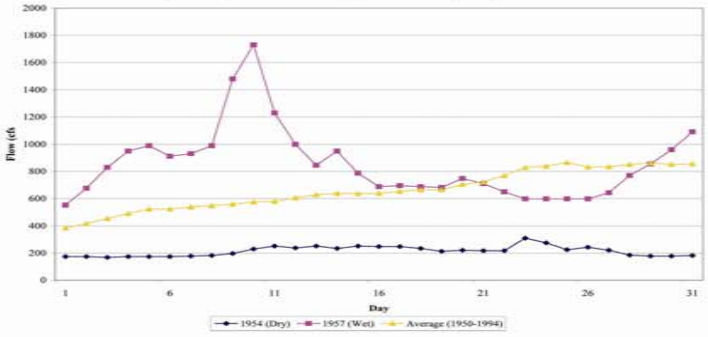
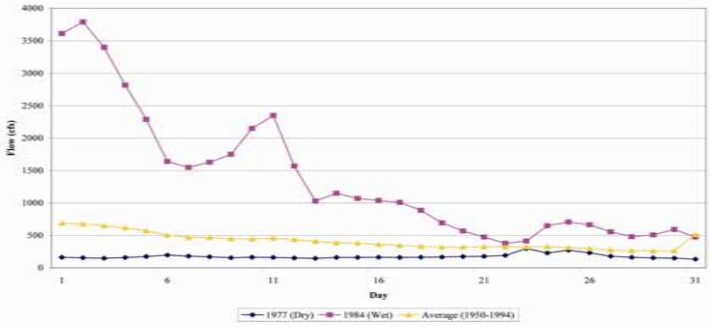
Com-ment	Letter #1075	Response
178	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 4 Willow Creek at the confluence with the Colorado River and Fraser River at the confluence with the Colorado River. However, the sum of these three nodes under the Existing Conditions is approximately 19,200 af/year less than the indicated flow at this location. The sum of these three nodes should be nearly identical to the flow available at Windy Gap (allowing for some minor local inflows or diversions). The Technical Appendices to the WRTR presents the modeled average streamflow at various locations. Table D-16 shows the average monthly streamflow for Average, Dry and Wet conditions at Hot Sulphur Springs. We compared the 'Existing Conditions' average monthly streamflows (1950-1996) to the USGS streamgage data for this same location (1950-1994), and note several significant differences: **Comparison of Modeled and Actual Average Monthly Flow** **Colorado River at Hot Sulphur Springs** (all values in cfs) | Data Source | April | May | June | July | Aug | Sept | Oct | Nov | Annual | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | USGS Gage | 276 | 664 | 793 | 403 | 152 | 90 | 96 | 93 | 256 | | DEIS Model | 146 | 278 | 953 | 482 | 170 | 87 | 87 | 83 | 216 | DEIS flows from WRTR Table D-16 for Existing Conditions USGS data for Colorado River at Hot Sulphur Springs (No. 09034500) This table indicates that the streamflow used in the DEIS for Existing Conditions is significantly lower in most months than the actual hydrology at this location. This also indicates that, on average, the modeled streamflow is 40 cfs less than the actual streamflow. Thus, the DEIS understates the actual effects of the action alternatives. For these and other reasons described herein, we believe that the alternatives comparison methodology is flawed and inaccurately represents the effects from the proposed project.	179. The modeling effort for the WGFP began in 2000. At that time, the State's CDSS model study period was not available in a daily time-step format. Therefore, the CDSS model was used in a monthly time-step, which was the best available information at that time. While a daily time-step was not used, monthly model output was disaggregated to daily data for the entire study period for the USGS gages on the Colorado River below Granby, below Windy Gap, at Hot Sulphur Springs, and near Kremmling, and for the gage on Willow Creek below Willow Creek Reservoir. The comment suggests that a daily model was used to evaluate the project new water yield under the WGFP and an independent monthly model was used to evaluate hydrologic effects to the source area of the water supplies. That is incorrect. The WGFP model was developed using two monthly models. The Boyle Engineering Stream Simulation Model (BESTSM) was used in conjunction with the Upper Colorado Water Resource Planning Model from the CDSS model. BESTSM focuses on East Slope C-BT and Windy Gap facilities and operations, while the CDSS model covers the Colorado River drainage on the West Slope. In order to interface with the CDSS model, the West Slope portion of BESTSM downstream to the Windy Gap diversion was adopted from and matches the CDSS model.
179	3. The DEIS modeling does not accurately represent the impacts associated with the WGFP 3.1. Model Time-Step We have significant concerns regarding the model time step used to evaluate West Slope impacts as described in DEIS. We believe that it is inappropriate to use a detailed daily model to evaluate the projected new water yield from additional facilities and additional diversions under the WGFP, and then use an independent, monthly model to evaluate the hydrologic effects to the source area of the water supplies. In Colorado, water rights are typically administered on a daily basis. As a result, the upper Colorado River basin can experience dramatic flow changes due to daily changes in both natural conditions and water administration, as well as the operations of several large-scale water facilities within the modeling area. For example, a Shoshone Powerplant 'call' coming on or off within a month may result in significant changes in streamflow that would not be accurately represented by a monthly time-step. Currently, there are four other EIS documents being prepared or under review associated with Federal permit applications for major water projects in Colorado; • NCWCD's NISP Project • Denver Water's Moffat Expansion Project • Fort Collins/Greeley's Haligan-Seaman Enlargement Project, and www.bbawater.com Bishop-Brogden Associates, Inc.	We acknowledge that the Upper Colorado River basin can experience dramatic flow changes due to daily changes in both natural conditions and water administration; however, that does not preclude the use of the monthly model for purposes of the WGFP EIS. The Windy Gap water right is primarily controlled by downstream instream flow requirements and the Shoshone call. During months the Shoshone call is entirely on or off, the total monthly amount available for diversion by Windy Gap would be the same in both a monthly and daily time-step model. The time-step model is only an issue in situations when the Shoshone call changes during the month. The difference in Windy Gap diversions due to the time-step model in these situations equals the sum of daily differences in flow in excess or deficit of the calling rights, depending on whether the call is on or off for a portion of the month. This difference is low since Windy Gap often does not divert or diverts small amounts in April when the Shoshone call typically comes off. Similarly the Shoshone call typically comes back on late in the runoff season (mid- to late July) again when Windy Gap is either not diverting or diverting small amounts. Windy Gap diversions are more often limited by downstream instream flow requirements as opposed to the Shoshone call. Differences caused by the time-step model in a dry year are not an issue because the Windy Gap Project would divert the same amount of water with or without a firming project. There are no hydrologic changes due to the firming project regardless of the time-step model used in dry years.

Com-ment	Letter #1075	Response
179	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 5 • Colorado Springs Utilities' Southern Delivery System (SDS) Three out of these four projects, the Moffat, Haligan-Seaman and SDS projects, are being evaluated using a daily operations model. Only the NISP project, also being initiated by NCWCD, uses a monthly model to evaluate effects. The Moffat Project and the WGFP both propose additional diversions from essentially the same source, the Fraser River (since Colorado River flows above Windy Gap are largely captured by the Colorado-Big Thompson (CBT) project). Further, the depletions from both projects affect essentially the same general area and stream segments, aquatic environment, recreation, water quality, etc. In our opinion, it is both inaccurate and inappropriate to use a monthly model, when a daily model already exists for the exact same study area (DW's PACSM model, which was also originally constructed by Boyle Engineering). For this and other reasons described herein, we believe that the effects from both projects should be considered together using the same daily model.	The comment suggests use of Denver Water's PACSM for the WGFP EIS. While PACSM is a daily time-step model, some input to that model was derived based on a disaggregation of monthly data to daily data in a manner similar to the approach used to disaggregate monthly WGFP model output to daily data. Some types of model input data are unavailable (e.g., reservoir contents) or sporadic on a daily basis. In those instances, Denver Water employed data filling and disaggregation techniques prior to running the model using a daily time-step. Depending on the amount of daily data that needs to be estimated, the overall accuracy of a daily model may not be significantly greater than a monthly model. The CDSS model was run using a monthly time-step and then disaggregated to daily data. This approach is less accurate than running the model in a daily format primarily during the rising and falling limbs of the hydrograph (April and August). Because Windy Gap diversions during these periods are typically low, model results were reasonable for assessing hydrologic changes, particularly since hydrologic effects are based on a relative comparison of the alternatives to existing conditions. We believe the monthly WGFP model is appropriate for use in generating information to analyze hydrologic effects and that use of Denver Water's daily PACSM is not required.
180	3.2. Model Study Period We also have significant concerns regarding the modeling period used to evaluate WGFP effects (1950 – 1996). We recommend that any model used to evaluate the effects of the WGFP should include hydrologic and water operations data up through at least 2005. The drought during the early part of this decade, which we may still be suffering from, is well-documented as being the most severe on record at many locations. We understand that during single drought years, such as 2002, the WGFP may not have been able to divert (although this may not be true in the future due to the Shoshone call relaxation agreement discussed below), however the record-low streamflows in 2002 can have carry-over effects on water operations, water storage, water administration, water quality, recreation and other aspects of the WGFP. The dramatic changes in water operations and water supplies in the years following 2002 are an example of why this period needs to be included in the assessment of impacts. For example, the four highest total annual diversions for the Windy Gap project occurred in the years immediately following 2002; 2003, 2005, 2006 and 2007. This is likely due to significantly increased demand for water to refill Windy Gap users' reservoirs, coupled with significant storage space available in general and, in particular, in Lake Granby. This may also be partially due to the fact that in 2002 the CBT project was unable to deliver its annual "Quota" to its shareholders for the first and only time in the 60-year history of the project. As the operations of the Windy Gap project are intertwined with CBT operations, these significant modeling events need to be included in any analysis of effects. For example, the end of month storage records for Horsetooth Reservoir, a CBT project reservoir, show that it reached the lowest monthly levels of all-time in 8 of the 12 months in 2002 in 2003. This is likely a component of the record diversions of the Windy Gap project in 2003. Further, many streamgages in the upper Colorado River basin, including the WGFP modeling area, recorded the lowest streamflows ever during this time period. In particular, 2002 and/or 2004 are in the "Top 5" driest years at several locations throughout the basin of impact, and should be modeled as part of their dry-year averages (see table below). Any evaluation of effects to streamflow, water operations, water quality, stream morphology, recreation, etc. may be significantly inaccurate without considering this data. We also note that the model relied upon for West Slope impacts, CRDSS, has been extended to include 2005 data and is presently available. www.bbawater.com Bishop-Brogden Associates, Inc.	180. See response to Grand County Comment No. 7.

Com-ment	Letter #1075	Response
180	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 6 **Colorado River High/Low Annual Streamflow Comparison 1950 - 2005** 1950-2005 Fraser at Winter Park; 1954-2005 Colorado blw Baker Gulch; 1962-2005 Colorado nr Kremmling; 1950-2005 Colorado nr Dotsero **Top 5 Wettest** 1984 34,081 / 1984 79,294 / 1984 1,772,380 / 1984 3,064,944 1957 33,045 / 1983 77,719 / 1983 1,321,769 / 1983 2,394,818 1995 32,595 / 1997 77,054 / 1997 1,260,346 / 1997 2,370,025 1983 31,712 / 1995 72,782 / 1962 1,239,785 / 1957 2,338,400 1996 23,256 / 1986 66,978 / 1996 1,141,010 / 1962 2,332,556 **Top 5 Driest** 1966 5,017 / 1977 25,856 / 1964 418,582 / 1981 850,017 1964 4,706 / 1989 25,712 / 1981 406,927 / 2004 829,383 2002 4,617 / 1981 22,787 / 1963 401,375 / 1954 803,510 1963 4,557 / 1954 20,353 / 2004 373,800 / 1977 766,998 1954 4,011 / 2002 18,063 / 2002 362,861 / 2002 626,028 The years highlighted in yellow are NOT included in the WGFP modeling for these locations.	
181	Another example of the effects of the 2002 drought sequence is shown by the storage levels of Wolford Mountain Reservoir (WMR). This reservoir came on-line in approximately 1995, but was "turned on" for the entire period of record in the DEIS model in the Future Conditions model. The chart below shows the total storage volume for WMR since construction, and clearly shows a dramatic drop in storage levels in 2003 - 2005. It is not clear if and how such operations were modeled in the DEIS. By extending the model period, it would capture all of the known operational data during this extreme event. www.bbawater.com Bishop-Brogden Associates, Inc.	181. Reductions in Wolford Mountain Reservoir contents in dry years due to releases to meet contract depletions that are out-of-priority, Denver Water's and Colorado Spring Utilities' substitution repayment obligations, and for fish flow purposes are captured in the current study period in years such as 1954, 1977, and 1981. Information on how Wolford Mountain Reservoir is modeled in the CDSS model is available in Section 4.1 of the *Windy Gap Firming Project Modeling Report Addendum (Boyle, July 2006)* and *Colorado Decision Support System Colorado River Basin Water Resources Planning Model, Final Report and Appendices (Colorado Water Conservation Board, Colorado Division of Water Resources, July 2000).*

Com-ment	Letter #1075	Response
181 182	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 7 **Wolford Mountain Reservoir Historic Volume**  Source: Colorado River Water Conservation District 3.3. Disaggregation of Daily Flows The methodology used to estimate daily changes in streamflow is flawed and inaccurate. This is due to the fundamental assumption regarding the use of the daily disaggregation factors to evaluate effects. The WRTR states that "absent any flow changes due to the WGFP, the historical relationship between daily and total monthly flows should apply to total monthly flow estimated by the model." However, the report later concludes that annual streamflows may be reduced by as much as 157,000 af/year (WRTR Table 32); presumably this reduction would occur during the months of May through July. The report also states that the monthly streamflow at certain locations may be increased by up to 25% and reduced by as much as 37% (Section 8.6). These changes projected by the model represent a dramatic alteration of the existing hydrologic record, and should not be relied upon as an accurate means of predicting daily changes in streamflow. It is our understanding that the creation of daily flows was based on disaggregation of the long-term average daily streamflow as a function of the monthly total. The flow regimes in the upper Colorado River basin are highly variable, from month to month, year to year and, in particular, subject to extreme changes from wet years to dry years. As an example, we compared the long-term average daily streamflow for the months of May and July (replicating the disaggregation factors used in the analysis) to the actual streamflow for one of the "wet" and "dry" years indicated in the modeling. As is evident on the graphs below, there are dramatic differences between the average, wet and dry conditions that are not captured by the DEIS model. Even using the modeled average monthly flows presented in Table D-14, it shows that average year flows are reduced from 472 cfs to 365 cfs in July (reduction of 108 cfs, or 23%) and wet year flows are reduced from 1716 cfs to 1265 cfs in the same month (reduction of 450 cfs, or 26%). www.bbawater.com Bishop-Brogden Associates, Inc.	182. Under direct effects, it is reasonable to assume that absent any flow changes due to the WGFP, the historical relationship between daily and total monthly flows should apply to total monthly flow estimated by the hydrologic model, since predicted flow changes are due to WGFP operations (e.g., diversions and spills). Under cumulative effects, reasonably foreseeable actions would contribute to flow reductions and may alter the relationship between daily and total monthly flows. However, the basic pattern of the hydrograph is expected to be maintained, flows would rise during runoff in April, May, and June; reach a peak; and then diminish during July and August. Little change in baseflows and the pattern of daily flows during the month is expected from September through March. Under direct effects, the average annual flow reduction at the gage near Kremmling under the Proposed Action would be approximately 21,300 AF/yr compared to existing conditions. The average reduction in streamflows of 157,000 AF/year near Kremmling under the Proposed Action cited in the comment refers to wet year average annual flow reductions under future conditions with reasonably foreseeable actions. This represents an average annual flow reduction of about 13%. Therefore, the majority of flow in the stream would likely continue to reflect a pattern similar to the historical relationship between daily and total monthly flows. Figure 3-4 shows there has been little change in the general shape of the hydrograph based on a comparison of the average daily flow for the 1950–1984 period versus 1985–2008 even though Windy Gap Project came online in 1985. Daily streamflows were generated using two methods. Average daily disaggregation factors were calculated as the average of all daily percentages available for each day. These long-term average daily disaggregation factors were used to generate daily flows and hydrographs for average, wet, and dry conditions, which were relied on to generally characterize hydrologic changes associated with the alternatives. Separate dry and wet year disaggregation factors were not developed because USGS gage data did not exist for all of the selected wet and dry years at several locations. In which case, daily disaggregation factors for dry and wet conditions may reflect only one or two years. Given the limitations in using long-term average daily factors to generate average, wet, and dry daily hydrographs described in the comment, monthly model output also was disaggregated to daily data for the entire study period for the USGS gages on the Colorado River below Granby, below Windy Gap, at Hot Sulphur Springs, and near Kremmling, and for the gage on Willow Creek below Willow Creek Reservoir. The disaggregation of monthly flows relied on historical daily data for nearby USGS gages, which reflects the variability in streamflows from month to month and year to year. Daily disaggregation factors were developed as follows: for each day that data were available during the 1947–1996 study period, the percentage of flows that occurred on that day was calculated as the daily flow

Com-ment	Letter #1075	Response
		divided by the total flow that occurred in the corresponding month. The daily disaggregation factors were applied to the monthly flow data at the corresponding gage to develop daily flows. See Section 4.2.4 in the Water Resources Technical Report for a detailed discussion of the process used to disaggregate monthly model output. A combination of daily and monthly hydrologic data was used for evaluations of resources dependent on flows or reservoir storage contents and levels. Average monthly summaries of flows, diversions, reservoir outflow, end-of-month reservoir contents, surface elevations, and surface areas for average, dry, and wet conditions were used to support general characterizations of hydrologic changes associated with the alternatives. Daily data were used to generate flow duration curves and daily hydrographs and to determine the frequency and magnitude of daily flow changes. These types of hydrologic analyses, based on daily variations, were used in resource assessments where the magnitude or value of the resources are especially sensitive to daily hydrologic changes, and where the use of average, wet, and dry monthly values would mask the severity of the effects on those resources. For example, daily hydrologic data were used as an input parameter for the River2D Model to evaluate the effects on aquatic resources. Use of daily data for the entire hydrologic study period supported an assessment of the overall range and frequency of aquatic habitat changes. Section 3.5.2.2 of the FEIS was revised to include information related to the use of daily data for resource evaluations, including fisheries and water quality that are sensitive to daily flow variations. Because of its relatively junior water rights, the Windy Gap Project is not in priority and is precluded from diverting water from the Colorado River during droughts and low-flow periods with or without the alternatives assessed to provide firming storage. During low-flow periods, the Windy Gap Project would operate the same whether there is a firming project online or not. In these low-flow conditions, downstream Colorado River flows, whether they are viewed on a monthly or on a daily basis, are the same for existing conditions, the No Action Alternative, and for each of the EIS Alternatives. Because there are no hydrologic impacts due to the WGFP during low-flow and drought periods, a daily model is not needed to assess effects for these low-flow periods and the disaggregation of monthly data to daily data is sufficient for the assessment of effects for non-drought conditions.

Com-ment	Letter #1075	Response
182	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 8 The dry-year flows for the same month are 127 cfs. The use of the long-term average daily flows to generate the factors to represent daily flows in all years, wet (1716 cfs), average (472 cfs) or dry (127 cfs), is inappropriate and can be highly inaccurate. In other words, the daily pattern of streamflows within a given month is not the same from year to year, even within two "average" years. This difference is even more pronounced between wet and dry years, and will result in inaccurate predictions of daily flows. For these reasons, we believe that the application of the disaggregation factors can be highly inaccurate resulting in daily flow estimates that are flawed. As noted above, using a daily point-flow model such as PACSM would alleviate the errors from the disaggregation methodology used in the DEIS. **Colorado River at Hot Sulphur Springs** **May Comparison of Average, Wet & Dry Daily Streamflow**  **Colorado River at Hot Sulphur Springs, CO** **July Comparison of Average, Wet, & Dry Daily Streamflow**  	183. A forecasting function was not included in the WGFP model because assumptions regarding project operations required for forecasting are questionable and do not correlate well with actual operations. The annual decision to pump Windy Gap water takes into consideration many factors including snowpack, Granby Reservoir C-BT and Windy Gap contents, precipitation, Big Thompson River basin forecasts, and orders for Windy Gap water. Incorporating a forecasting function in the model would require making a number of assumptions regarding the variables listed above; which may or may not improve the accuracy of model output. Forecasting does not eliminate Windy Gap spills as evidenced by historic Windy Gap spills in 1995 and 1996. For example, Windy Gap water was pumped in May and June of 1995, yet Granby Reservoir spilled in July that year. As the model is currently configured without a forecasting function, Windy Gap diversions occur as long as there is available storage space. Windy Gap operations were simulated in this manner to present the amount of water that could be diverted with the project's current water rights to meet demands even if a portion of the water is subsequently spilled from Granby Reservoir back to the Colorado River. As a result, Windy Gap diversions may be greater in some wet years; however, historic operations show that Windy Gap water would be pumped in some wet years under existing conditions. In the model, when Granby Reservoir fills and spills in wet years, Windy Gap water pumped in April and May is often spilled in June and July. In effect, early season Windy Gap diversions are retimed as spills later in the season. Early season diversions only occur in wet years when Granby Reservoir fills and occurs much less under the Proposed Action and Alternatives 3, 4, and 5 because Windy Gap diversions early in the season would be stored in firming reservoirs as opposed to Granby Reservoir.
183	3.4. Granby Spills in the Model The operation of the model is discussed in Section 7.4.1.1, page84. The DEIS model overestimates probable actual WGFP pumping that would later spill due to a lack of a forecasting tool in the model. Windy Gap water rights, with or without the WGFP, should have little or no impact on the flows in the Colorado River immediately below the Lake Granby dam but before Windy Gap. Yet the DEIS reports that the Preferred Alternative will result in over 5,000 www.bbawater.com Bishop-Brogden Associates, Inc.	Lack of a forecasting function in the WGFP model may increase Windy Gap diversions, and consequently spills, in some wet years under existing conditions and No Action; however, the impact analysis based on net depletions to the Colorado River below Windy Gap is still valid (see response to Comment No. 178). Windy Gap diversions under existing conditions reasonably reflect recent operations and diversions, which are much higher than the 20-year average from 1985 through 2005. In addition, this issue does not affect Windy Gap diversions in dry years; therefore, Windy Gap pumping, net depletions to the Colorado River, and associated impacts are appropriately estimated in dry years, which are typically more critical for aquatics, water quality, and other flow-related resources.

Com-ment	Letter #1075	Response
183	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 9 af/yr less flow below Lake Granby than under the No Action Alternative (the comparison should be to existing conditions). Windy Gap water is pumped in the model even when Granby is certain to spill. Since CBT spills more frequently in the No Action Alternative, there are more Windy Gap spills in the No Action Alternative. Under the Preferred Alternative, when the Windy Gap spills decrease, the flow below Lake Granby decreases. In reality, with adequate forecasting, these Windy Gap spills would be less likely to occur, and therefore the flows immediately below Lake Granby would see little change. We recommend that the model be modified to include some form of forecasting to reduce this effect. As is, the DEIS dramatically overstates the WGFP pumping and the reduction in streamflow in the Colorado River between Lake Granby and Windy Gap.	As pointed out in the comment, the stretch of river that is most impacted by the lack of a forecasting function is the Colorado River below Granby Reservoir downstream of the Windy Gap diversion; however, the impact analysis for this reach is conservative. Flows in this reach may see less change than predicted in the model because of additional Windy Gap spills in June through August under existing conditions and No Action. Since the impact analysis is conservative for this reach, the model was not modified to include forecasting.
184	3.5 Foreseeable Actions We believe that the DEIS fairly accurately considers future actions that can reasonably be considered foreseeable, and reports that most were incorporated into the Future Conditions model. However, the DEIS does not incorporate one of the key future conditions that we believe will have a dramatic effect on future water operations in this area and therefore needs to be included; the Shoshone Call Reduction (by virtue of DW's contract with Xcel). The DEIS does not indicate why this future condition was not included. The Shoshone Call Reduction is a long-term agreement that has been enacted since the modeling for this DEIS, and very likely will be implemented in the future. Although the implementation of this agreement may occur in principally drier years, when Windy Gap diversions may otherwise be reduced, it is still critical to include it in the model. The diversion records for the Windy Gap project for the year immediately following the 2002 drought provide a dramatic example. Prior to 2002, the highest volume pumped by the Windy Gap model was 21,896 af (1992, Table 3 WRTR). However, in the following dry year of 2003, during which the Shoshone agreement was being implemented, the Windy Gap project pumped a total of 64,200 af – nearly three times the prior maximum. Although the WRTR reports that only 7,850 af of this can be attributed to the Shoshone call reduction agreement, this amount should be included in the modeling to accurately assess the changes in both water operations and environment effects.	184. The future operation of the Shoshone call reduction was not included in the WGFP model; however, a detailed discussion of the potential frequency and magnitude of hydrologic effects when the call reduction is in place is provided in Section 8.4.2.6 under the subsection Colorado River in the Water Resources Technical Report (ERO and Boyle 2007). The Shoshone call reduction was not included in the model because information on the conditions under which it would occur was not available for a significant portion of the study period. Streamflow forecasts for the Colorado River at Kremmling were not available and streamflow forecasts for the Colorado River at Dotsero did not exist prior to 1969. In addition, invoking the call reduction is at the discretion of Denver Water, even if all conditions of the agreement are met. Last, the agreement requires that Denver Water make available 10 percent of the net water stored or diverted by Denver Water by virtue of the call relaxation to West Slope entities. However, the West Slope beneficiaries and the timing and amount of deliveries are not specified in the agreement. Due to the difficulty in incorporating this action in the model, the evaluation of potential hydrologic effects presented in the Water Resources Technical Report and summarized in the DEIS was based on historical data. This analysis was appropriate particularly since Windy Gap diversions with or without the firming project would be the same under a Shoshone call reduction since available storage capacity in Granby Reservoir would not be a limiting factor in dry years.
185	4. The WGFP does not provide Middle Park Water Conservancy District (MPWCD) a firm annual supply of 3,000 af. Based on the 1980 Azure Settlement Agreement(s), Northern (MSD) committed to provide 3,000 af of water **per year** to MPWCD as part of the approvals of the Windy Gap project. It is well-known that, despite the presentation of information at the time, the Windy Gap project has not been able to deliver this water to MPWCD every year. The DEIS explains that the WGFP will 'firm up' approximately 26,000 af per year to the WGFP participants based on new diversions and storage facilities, but DOES NOT proposed to firm up the original contractual commitment to the West Slope of this 3,000 af per year. Rather, the Purpose and Need statement for the WGFP states that it will "…provide up to 3,000 af **of storage** to firm water deliveries for the Middle Park Water Conservancy District" (emphasis added). The commitment of storage space is NOT the same as the firm annual delivery of water. In fact, the DEIS proposed actions result in a firm yield to MPWCD of approximately 429 af per year – only 14% of the original obligation. This is completely unacceptable. Any new project that results in the "firming-up" of water under the Windy Gap project needs to first provide 3,000 af per year to MPWCD before any Windy Gap users receive delivery of any water under the project.	185. Paragraph 2 of the "1985 Supplement" to the "1980 Agreement Concerning the Windy Gap Project and the Azure Reservoir and Power Project" states that "The Subdistrict will dedicate and set aside annually, but noncumulatively, at no cost to Middle Park, 3,000 AF of water in Granby Reservoir that is produced each water year from Subdistrict water supplies, for beneficial use without waste, either directly or by exchange or substitution in Middle Park." The Subdistrict has no obligation to provide water to Middle Park in any year when such water cannot be produced from Subdistrict supplies. Middle Park has been offered the opportunity to participate in the WGFP and improve their yield with storage in much the same manner as other WGFP Participants.
186	5. A copy of the model needs to be made available to all interested parties. We believe that a copy of the DEIS hydrology model needs to be made available to interested parties so that a thorough review and understanding of the model and its results can be made. Such a review may eliminate some of the questions and uncertainties, or reveal areas where the model may be improved resulting in more accurate results and conclusions. We believe that any representations regarding impacts from a project of this magnitude needs to made using a model that has been peer-reviewed and critiqued by all the major stakeholders. As discussed below, a thorough comparison of the model results from www.bbawater.com Bishop-Brogden Associates, Inc.	

Com-ment	Letter #1075	Response
	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 10	186. The hydrology model was developed specifically for the WGFP and is not available for general distribution. In previous discussions and meetings with Grand County to discuss and explain the model, Reclamation has offered to run specific model scenarios for Grand County if Grand County provided the necessary information. In the spirit of cooperation, Reclamation renews that offer. If there are specific scenarios that Grand County would like analyzed using the hydrology model, Reclamation will work with the proponent and try to get the information run through the model and make the output available to Grand County. Additional information on the hydrology model including calibration information is included in the Modeling Report Addendum dated July 2006. A draft version of this report was provided to Grand County in late 2004. In March 2005, Reclamation received extensive comments from Grand County on the model and its use. These comments were considered in developing the Modeling Report Addendum dated July 2006. The July 2006 report includes extensive information on development and use of the Hydrology Model for the Windy Gap Firming Project including information on calibration.
186	Denver Water's PACSM related to the Moffat Expansion Project needs to be made prior to proceeding with either project.	
187	6. The EIS analysis needs to be combined with the Moffat Expansion Project. As described in the Cumulative Effects section of the DEIS, Denver Water's Moffat Expansion Project will result in additional depletions to essentially the same source of water as the WGFP. Because the CBT project already captures nearly all of the available streamflow from the Colorado River system above Windy Gap (except for the minimum bypass flows), the vast majority of the yield to Windy Gap is derived from inflows from the Fraser River. Therefore, both projects divert from essentially the same source. Further, both projects will have cumulative effects to the nearly identical segments of the Colorado River system. Both projects will need to evaluate nearly identical hydrologic, environmental, recreational, socio-economic, etc., effects from the projects. In our opinion, it is highly illogical to evaluate both projects using completely independent methodologies. At a minimum, we believe that this EIS needs to be tabled until completion of the EIS for the Moffat Collection System such that an "apples-to-apples" comparison of the results can be made.	
188	7. The DEIS does not address the need to modify the Lake Granby outlet structure with pre-positioning. As stated in the DEIS, the WGFP should not result in changes to the operation of the CBT project. Under the Preferred Alternative, if prepositioning is allowed, large volumes of CBT water will be stored by prepositioning in Chimney Hollow Reservoir. Any CBT water stored in Chimney Hollow will need to be accounted for as CBT water in Lake Granby to prevent an enlargement of the CBT water rights and additional new depletions to the Colorado River. As a result, if for example, there is 50,000 ac-ft of CBT water stored in Chimney Hollow, Lake Granby should reach a "paper fill" when the Lake Granby CBT contents reach approximately 490,000 ac-ft (Lake Granby's total capacity less 50,000 af). When this happens, all inflows to Lake Granby in excess of the CBT direct-flow rights should start to "spill" – as if the reservoir was physically full like it would be without pre-positioning. Therefore, prepositioning could create occurrences in the future when Lake Granby water levels will not be at the spillway, but the inflows will be in excess of the 440 cfs outlet capacity. According to the DEIS, inflows could be greater than 3,000 cfs and, in fact, have historically been over 4,000 cfs. The outlet from Granby Reservoir will need to be modified to allow for releases of this magnitude in order to prevent this excess inflow from being stored, which would constitute an enlargement of the CBT water rights, or at the very least, a retiming of inflows that would have otherwise spilled from the dam. This is the way NCWCD has modeled the Preferred Alternative; however, the modeled results cannot actually occur in the future without the modification to the outlet works a capacity of 3,000 cfs or greater.	187. See response to Grand County Comment No. 44.
	Water Resources Technical Report – Detailed Comments	188. The spillway at Granby Reservoir consists of an ogee crest at an elevation of 8,260 feet, which is approximately 130,000 AF below the full level; and two radial gates that can be used to regulate spillway flows. If a paper fill is achieved and inflows greater than 440 cfs outlet capacity, the spillway gates would be operated to pass inflow and prevent the situation mentioned in the comment. The combined capacity of the spillway gates and outlet increases from 440 cfs at elevation 8,260 to over 12,000 cfs with a full reservoir.
	The following provides a summary of our concerns and comments regarding specific sections of the WRTR. The concerns are described sequentially with the report and reference specific pages or sections. Page 2:	189. Under the Proposed Action, C-BT storage at Granby Reservoir and Chimney Hollow Reservoir is limited to the active capacity of Granby Reservoir, which is 465,568 AF. This equals the total storage capacity of 539,758 AF minus the dead storage of 74,190 AF.
189	• The modeling needs to limit the operational storage capacity at both Granby and Chimney Hollow Reservoirs to the current active capacity of 465,568 af for Lake Granby.	
190	• The DEIS needs to show how, with 90,000 af available for storage at Chimney Hollow, the operational storage targets will change for both CBT and Windy Gap water.	190. The operational storage *targets* would not change for the C-BT Project with 90,000 AF of storage available at Chimney Hollow. For example, the same storage targets were modeled for Carter Lake and Horsetooth Reservoir for existing conditions and the Proposed Action. Operations at the WGFP reservoirs are discussed in Chapter 2 of the DEIS. There would be differences in C-BT and Windy Gap storage contents under the Proposed Action in C-BT reservoirs compared to existing conditions, which are discussed in Section 3.5 of the DEIS and in Chapter 7 of the Water Resources Technical Report.
191	• Regarding the No Action alternative, the report states that "Most participants indicate that in the long term, they would seek other storage options… to firm Windy Gap water…" We	
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Com-ment	Letter #1075	Response
191	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 11 agree with this statement, that most participants will seek to find ways to firm up the Windy Gap water on their own. In fact, the original "Environment Statement" for the Windy Gap project (1981) stated "*It is anticipated that this storage requirement could be accommodated either by utilizing available storage in Granby Reservoir for longer periods and/or by utilizing East Slope storage currently owned or leased by Windy Gap participants. -- Since there is currently over 400,000 acre-feet of privately owned storage within the boundaries of the Conservancy District with only a present demand for approximately 30,000 acre-feet, it is logical to assume that the storage requirements for Windy Gap water are present without dependence upon new reservoir construction along the Front Range*. (Page IV-68). This indicates that the overall Purpose and Need for the project, as well as the alternatives analysis are flawed, as there may be less-environmentally damaging alternatives than the ones discussed in the DEIS. The DEIS needs to thoroughly develop the No Action alternative to confirm that there is a need for this project and the alternatives presented for review.	191. The purpose and need for the project was considered in detail as documented in the *Windy Gap Firming Project: Purpose and Need Report* (ERO 2005). More than 170 alternative plans were evaluated, including construction of new reservoirs, expansion of existing reservoirs, re-regulation of existing reservoirs, ground water storage, and nonstructural and institutional options. Results of the alternatives analysis are documented in the *Windy Gap Firming Project: Alternatives Report* (ERO 2005). The alternatives screening process was based on Section 404(b)(1) criteria in concert with the Corps, and resulted in the alternatives considered in the EIS. The No Action Alternative also was developed as part of the alternatives process and provides the most likely course of action if Reclamation does not enter into a new or amended contract with the Subdistrict for the Proposed Action. More discussion of the No Action Alternative is found in response to Comment No. 26.
192	Page 3 We recommend that the active modeling area be extended downstream to the Dotsero streamgage. This would incorporate the anticipated depletions upstream of Shoshone from projected growth in the Eagle River basin, and would allow for an evaluation of the effects from the construction of Wolcott Reservoir as a potential source for the 10,825 water.	192. The CDSS model, which was used to evaluate hydrologic effects on the West Slope, covers the Colorado River drainage from the headwaters to the Colorado-Utah state line. Therefore, the active model area extends downstream of the Dotsero gage. However, the area considered for the analysis of hydrologic effects extends downstream to the USGS gage near Kremmling. The downstream extent of the study area was initially based on the location where average monthly flow changes would be less than 10% under direct effects. Resource evaluations were conducted to determine impacts at that location and assess the validity of the downstream study area extent. Results of the resource evaluations indicate direct effects due to the WGFP would be negligible to minor along the Colorado River near the Kremmling gage. Therefore, extension of the study area further downstream is not warranted based on the results of the resource evaluations. Regarding future potential projects downstream of Kremmling, see Section 8.1 of the Water Resources Technical Report for a discussion of the criteria for identifying reasonably foreseeable actions. Wolcott Reservoir was not considered reasonably foreseeable and is currently not a component of the proposed project to supply 10,825 AF of water for Colorado River endangered fish, which is being evaluated in a separate Environmental Assessment.
193	Page 4 The first full sentence starting with "Flow changes, as a percentage of total streamflow,…" should be deleted. This presents conclusions without context and may prejudice readers of this document.	193. See response to Comment No. 192. The reader can refer to Chapter 7 of the Water Resources Technical Report for a discussion of the data used to define the study area.
194	Page 9 4.2.1 We believe that the model time step produces highly inaccurate results. See our overall concerns above regarding the model time step used to evaluate West Slope impacts.	194. See response to Comment No. 179.
195	4.2.2 We believe that the modeling period does not accurately reflect changes in hydrology and any associated water-based effects, and must be extended through at least 2005. See our overall concerns above regarding the modeling period used to evaluate WGFP effects.	195. See response to Comment No. 180.
196	4.2.4 The use of disaggregation factors to predict daily flow is highly inaccurate, and the associated evaluation of flow effects is flawed. See our overall concerns above regarding the daily disaggregation factors to evaluate the effects.	196. See response to Comment No. 182
197	Page 15, last paragraph The letter from the former State Engineer indicating that he *could* administer the CBT and WGFP system in compliance with the current decrees is misleading and does not indicate approval of this practice. Only the water court or modifications to the Blue River decree in District Court can approve the storage of CBT or Windy Gap water in new facilities. Currently, the water rights for the CBT project and the Windy Gap project are not decreed to allow for storage at Chimney Hollow and some of the other action alternatives. These rights will need to be changed in water court before water can be diverted pursuant to any of the action alternatives.	
198	Page 16, 6.1.1.2 • The report should specify that the USGS ceased operations at the Hot Sulphur Springs gage (09034500) in 1994, but that NCWCD has maintained a gage near this site since 1989 during the summer months only. However, we note that a comparison of the records for these two nearly-identical locations have several extremely large discrepancies. If the DEIS model used data from NCWCD, it may be inaccurate.	
199	• This section should present a significant discussion and show much more detailed information regarding the full history of streamflows and stream depletions to this region, not just the flows averages before and after CBT. See our overall concerns above regarding the presentation of historical hydrology above.	
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Com-ment	Letter #1075	Response
		197. The FEIS includes mitigation measures to increase flushing flows. Flushing flows from the original Windy Gap Project (1980 MOU) would be modified to increase from 450 cfs to 600 cfs. In any year when flows below Windy Gap have not exceeded 600 cfs for at least 50 consecutive hours in the previous two years, and total Subdistrict water supplies in Chimney Hollow and Granby Reservoirs exceed 60,000 AF on April 1, the Subdistrict would cease all Windy Gap pumping for at least 50 consecutive hours to enhance peak flows below Windy Gap. 198. Section 3.5.1.4 in the FEIS was revised under the subsection Colorado River to specify that the USGS gage at Hot Sulphur Springs ceased operations in 1994. The DEIS model did not use data from NCWCD for their gage near that site. 199. See response to Comment No. 177.

Com-ment	Letter #1075	Response
	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 12	
200	Table 2, page 21 This table shows the historical spills from Lake Granby from 1957 - 2001, which shows that there have been 15 years of spill during this time, or 1 out of 3 years on average. However, we note that Granby spilled 6 years in a row from 1995-2000, with the previous duration of 4 consecutive years. The model used to evaluate WGFP yields, which are highly vulnerable to Granby spills, only captures 2 years of the longest period of historic spills. This is another example of why the hydrology used for the modeling should be extended to include the time period up through at least 2005.	200. The study period from 1950 through 1996 includes an adequate number of years that Granby Reservoir spilled to evaluate differences in Windy Gap diversions in wet years due to the addition of firming storage. The period from 1983 through 1986 when Granby Reservoir filled and spilled is similar to the period from 1995 through 2000 in terms of representing Windy Gap diversions in sequential spill years.
201	Table 3, page 22 There are differences in monthly and total annual volumes of water pumped between this table and the official diversion records maintained by the SEO as shown on CDSS. Although the differences are minor in most years, we note that there is a large discrepancy in June of 2005 (19,520 af). The DEIS needs to explain these differences.	201. A table of Windy Gap diversions (Table 3-2) was added to Section 3.5.1.4 of the FEIS under the subsection Colorado River, and diversions in 2005 were corrected. Minor differences between CDSS and NCWCD records are largely due to differences in converting cfs to AF. The CDSS database used 1.9835 AF/cfs to convert cfs to AF, whereas 2.0 AF/cfs was used in Table 3 of the Water Resources Technical Report. Differences due to the conversion factor were revised in the Windy Gap diversions table inserted in the FEIS. If there are differences in other months that are not attributable to the conversion factor, the data provided from NCWCD accurately reflect the amount pumped at Windy Gap.
202	Table 4, page 23 The table should also show the average annual number of days pumped, which is significantly less than the sum of the monthly average days. Based on the records available on CDSS, the Windy Gap project pumped approximately the same average annual volume (just over 11,000 af/year) before and after 1996 (the end of the model study period). However, the duration of pumping is significantly different for these two time periods. The Windy Gap project pumped water for an average of approximately 30 days per year during the model study period, but averaged approximately 57 days per year since 1996. This means that the project diversion season has recently been nearly twice as long as the data used in the model analysis. The model may therefore inaccurately predict the effects of pumping to the source area. This is another reason to extend the model through at least 2005 to more accurately capture both the project operations and hydrologic effects.	202. The average annual volume pumped before and after 1996 is not the same as indicated in the comment. The average annual pumping from 1985 through 1996 was 11,073 AF/yr vs. an average of 18,298 AF/yr for the period from 1997 through 2008. In addition, the average from 1997 through 2008 is skewed by the fact that no Windy Gap water was pumped from 1997 through 2000 because Granby Reservoir filled. The duration of pumping is higher since 1996 because Windy Gap diversions have increased. The Participants' demand for Windy Gap water has increased due to growth and their need for reusable supplies. The comment indicates that historical Windy Gap pumping data was used in the model analysis and, therefore, reflects a shorter pumping duration. That is incorrect. The model reflects the Participants' current demand for Windy Gap water; therefore, the duration of pumping in the model is consistent with current operations and demands. The average annual number of days Windy Gap was pumped was not added to Table 4 since average monthly values were sufficient to present the typical pumping schedule.
203	Figure 6, page 24 The records and calculations used to support this figure need to be provided in the DEIS.	
204	Table 6, page 25 This table of existing Colorado River water rights is missing several large capacity ditches that divert from the upper Colorado River. The report should also include a list of water rights shown on the tabulation, and not included in the model, including the reasons they were not considered. The text on page 23 states that these water rights were incorporated into the hydrologic model, but doesn't discuss the details of how they were modeled. Previous EIS information indicated that these water rights were included in the model based on their priorities as tabulated by the Division Engineers Office. We believe that the DEO tabulation of these priorities is incorrect, as they should be administered as senior to the CBT project. Previous EIS information has also indicated that these rights would not be entitled to divert during times of Shoshone call. However, the modeling is inaccurate as these rights are currently entitled to divert due to protection from the HUP account in Green Mountain Reservoir allowing them to divert during times of a Shoshone call.	
205	6.4.1 West Slope GW Hydrology and Quality This section makes several conclusions that are not supported by technical evidence described in the DEIS.	
206	Table 10 (page 41) We note that 5 of the 13 WGFP Participants are also participants in the proposed NISP project. While we understand from NCWCD staff that the future water demands of these entities is more than the combined potential yield from both projects, this DEIS should provide more detailed information about the joint participation in both projects and the consequences if one or both projects are not developed.	
207	7.1, page 59 This section states that the WGFP Participants existing demand for Windy Gap water is approximately 21,045 af/year, whereas the No Action demand is approximately 40,765 af/yr. Given that several of the participants have an immediate need for additional water and significant levels of projected future demands, the DEIS needs to state in detail why the demands will rise for all the alternatives compared to existing conditions. The demands presented in DEIS appear to be designed to meet and exceed available supplies, and not represent demands that were determined by analysis.	
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Com-ment	Letter #1075	Response
		203. An EIS is not intended to present all of the information available that was used in the development of the EIS. 40 CFR 1502.21 directs Federal agencies to incorporate material into an EIS by reference to "cut down on bulk". A substantial amount of information on the hydrologic effects of the WGFP was generated during preparation of the EIS. Where appropriate, that information is included in the Water Resources Technical Report and other referenced sources. The WGFP would not effect C-BT diversions from the Colorado River, thus this figure was not included in the EIS. 204. The purpose of Table 6 was to list the *major* decree water users that divert from the reach of the Colorado River from Granby Reservoir to the gage near Kremmling that are modeled explicitly in the CDSS model. Other ditches in this reach of the Colorado River are reflected in the CDSS model through inclusion in aggregated diversion structures (51_ADC001, 51_ADC007, 51_ADC008, 51_ADC011, and 50_ADC012). The CDSS HydroBase database was reviewed and it does not appear there are any other large capacity ditches in this reach. Information on how these ditches are reflected in the CDSS model is available in the *Colorado Decision Support System Colorado River Basin Water Resources Planning Model, Final Report and Appendices (Colorado Water Conservation Board, Colorado Division of Water Resources, July 2000).* BBA provided a memorandum dated February 25, 2005, summarizing their review of the WGFP Modeling Report (December 2003). As part of that effort, BBA provided a list of Meadow Pumpers' water rights, which are treated as senior to the C-BT Project water rights per SD 80. The CDSS model baseline scenario (current conditions with no WGFP) was reviewed to determine how the CDSS model portrays the ability of these water rights to divert water in relation to the C-BT Project. The actual priorities of the Meadow Pumpers' rights are maintained in the CDSS model so these rights do not divert out-of-priority. If these rights were made senior to C-BT, they would be modeled incorrectly in relation to other rights with priorities junior to C-BT rights, but senior to these rights. Discrepancies caused by this representation in the model are minor. Therefore, the representation of the Meadow Pumpers' rights, whether junior or senior to C-BT Project water rights does not affect or change the evaluation of environmental consequences. We agree with BBA that water rights associated with the Meadow Pumpers that are senior to October 15, 1977 are entitled to Green Mountain Reservoir HUP protection and are entitled to divert at times the Shoshone call is on. Rights that are upstream of the confluence with the Blue River would need to divert water by exchange with Green Mountain HUP protection.

Com-ment	Letter #1075	Response
		205. See responses Comment Nos. 220 to 223 for additional information on ground water. 206. For those Windy Gap Participants that are also in the Northern Integrated Supply Project (NISP) (Central Weld County Water District, Erie, Evans, Fort Lupton, and Lafayette), the estimated yield from NISP was added to the discussion in *Section 1.7 Participant Water Supply and Demand* of the FEIS. Because the projected water needs for these entities exceed the potential yield from WGFP or NISP, if one or both projects are not completed, available water supplies would not meet future needs and other sources of water would need to be developed. 207. A detailed description of Windy Gap demands is provided in Section 2.1.10 in the WGFP Modeling Report Addendum (July 2006) and in Section 7.9 of the Water Resources Technical Report. Windy Gap demands were not designed to meet and exceed supplies. The Participants' demands and projected water needs (shortages in firm yield) are described in Sections 1.7 and 1.8 of the DEIS and FEIS. Section 3.5.3.7 of the FEIS was revised to explain why demands would rise for all alternatives compared to existing conditions.

Com-ment	Letter #1075	Response
208	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 13 Page 61 • The last paragraph states that "There would be some days under all of the alternatives at all three locations when flows would increase, which is due to changes in the timing of spills from Lake Granby." Table 14 also shows percentages of flow increases below Windy Gap. This information is inaccurate and misleading, as the report also discusses in Section 7.4.1.1 (page84) that the model overestimates probable actual WGFP pumping that would later spill due to a lack of a forecasting tool in the model. This section should be modified to specifically reflect the overestimation of flow increases due to the model.	208. It is not inaccurate and is misleading that there could be flow increases below Granby Reservoir and Windy Gap due to differences in spills under existing conditions compared to the action alternatives. As shown in Table 14 of the Water Resource Tech Report, flows below Windy Gap from May through August would increase infrequently, approximately 1.3% of the time. This is not due to the lack of a forecasting tool in the model. Flows would increase below Granby Reservoir and Windy Gap under the Proposed Action primarily due to small increases in C-BT spills. As shown in Table 17 of the Water Resource Tech Report, C-BT spills would increase slightly under the Proposed Action. Differences in Granby Reservoir C-BT contents and spills among alternatives occur due to variations in Windy Gap operations (including the amount of Windy Gap shrink paid to the C-BT Project), instantaneous deliveries and prepositioning, as well as differences in the allocation of C-BT water in Granby Reservoir, Carter Lake, and Horsetooth Reservoir due to prepositioning C-BT water in Chimney Hollow Reservoir. For example, in a wet year like 1984, model results show that Windy Gap would not pump under existing conditions; however, under the Proposed Action, approximately 37,000 AF would be pumped. The additional Windy Gap diversion shrink paid to the C-BT Project would be spilled, creating an increase in flows below Granby Reservoir. This increase in flows would occur below Windy Gap in months that Windy Gap does not pump (e.g., when Chimney Hollow is full).
209	• This section also presents information about how often the streamflow doesn't change. While this is useful information, it is much more significant and appropriate to also have a thorough discussion of the flow changes during the days of pumping.	209. Sections 3.5.2.5 and 3.5.2.6 in the FEIS were revised to provide more information on Windy Gap spills and the frequency and magnitude of flow changes below Windy Gap.
210	• The DEIS must include a detailed presentation of information regarding any increases in duration of minimum flow conditions at various location on the Colorado River. The Windy Gap project is subject to meeting minimum flow conditions at certain locations. The DEIS needs to report the frequency and duration of flow conditions at or below these minimums under the Existing Conditions and each of the alternatives.	210. Table 3-13 in the FEIS describes the number of days that flows below the Windy Gap diversion would be less than 100 cfs over the study period as a result of Windy Gap pumping. The table describes the frequency that flows are at or near the Windy Gap minimum flows as a result of the alternatives.
211	• Table 14, on page 63 The title states "Colorado River at Hot Sulphur Springs and Kremmling," but does not explain if the percent of flow changes are identical at both locations.	211. Table 14 from the Water Resource Tech Report was included in the DEIS as Tables 3-6 and 3-8. Table 3-8 in the DEIS was labeled Colorado River below Windy Gap (Hot Sulphur Springs to Kremmling) – daily flow changes compared to existing conditions from May through August. The percent flow changes due to Windy Gap compared to existing conditions are the same at all locations in that reach.
212	Page 65, 3rd paragraph from bottom This paragraph states "Therefore, under Existing Conditions and the No Action alternative, Windy Gap diversions would be limited or curtailed in most wet years." This statement is not consistent with Tables 18 and 20. These tables show Windy Gap Adams Tunnel diversions under Existing Conditions being fairly similar in average (11,500 af) and wet (12,081 af) years. However, under the No Action alternative, Windy Gap deliveries jump from 10,910 af in average years to 29,879 af in wet years. This represents a 274% increase, which is not considered "limited."	212. The intent of the statement "Windy Gap diversions would be limited or curtailed in most wet years" was that Windy Gap diversions would be limited to
213	Page 69 This page discusses the assessment of evaporation among Windy Gap and CBT water in the reservoirs. It states that pre-positioning CBT in Chimney Hollow would be subject to a different evaporation rate than if it was stored in Granby, which is true. Table 16 shows that evaporation at Lake Granby would be reduced (418 af/yr average) between the Existing Condition and the Proposed Action, which makes sense since Granby elevation and content are both projected to be lower. However, the table also shows evaporation in Chimney Hollow increasing by only 356 af/yr. This cannot be accurate, as the gross evaporation rate at Chimney Hollow is much greater than at Granby. This section should summarize the projected evaporation of CBT and Windy Gap water separately at each facility under each alternative. Also note that the word "Hollow" is missing in the middle paragraph (which states "Long term storage of C-BT water in Chimney [sic] Reservoir…")	
214	Table 17, page 70 This table is incorrect, as it shows that CBT spills increase with the Proposed Action, compared to the Existing Conditions. With pre-positioning, CBT spills should decrease, so this table inaccurately represents the actual conditions if the preferred alternative is adopted. This is likely due to the lack of adequate forecasting in the model used to evaluate effects.	
215	Table 18: This table is flawed, with the following examples: • Based on the information provided, the total flow available above the Windy Gap diversion should be equal to the sum of the three flow nodes above it; at Colo R below Granby + Willow Creek at confluence + Fraser River at the confluence. However, under the Existing Conditions column, the sum of these flows (168,700 af) is approximately 19,200 af less than the modeled flow above Windy Gap. There may be minor inflows and some irrigation diversions between these gages, but not as much as 19,200 af/year. Similar inaccuracies are shown for the other alternatives. We also note that a similar table in the DEIS Report (Table 3-2) fails to show any data for the Fraser River, which further adds to confusion. www.bbawater.com Bishop-Brogden Associates, Inc.	

Com-ment	Letter #1075	Response
		the period prior to Granby Reservoir filling, which is why "or curtailed" was added as synonymous with limited. Windy Gap deliveries increase dramatically in wet years due primarily to the delivery of Longmont's Windy Gap water to Ralph Price Reservoir and instantaneous Windy Gap deliveries prior to Granby Reservoir spilling since the demand for Windy Gap water is higher under No Action. This statement was revised in the FEIS in Section 3.5.2.3 under the subsection Colorado River below Granby Reservoir. 213. Table 16 in the Water Resource Report presents modeled evaporative losses attributed to the C-BT Project for each alternative in each major C-BT facility and Chimney Hollow Reservoir. Evaporative losses in all C-BT reservoirs are charged to the C-BT Project regardless of the amount of Windy Gap contents in that facility because the diversion shrink paid by the Windy Gap Project is intended to offset the losses incurred by the C-BT Project due to the carriage and delivery of Windy Gap water. The total average annual net evaporative loss at Chimney Hollow Reservoir was estimated to be 1,510 AF/yr under the Proposed Action, of which 356 AF/yr would be attributed to C-BT and 1,154 AF would be attributed to Windy Gap. Estimated C-BT evaporative losses attributed to C-BT water stored in Chimney Hollow are accurate for the following reasons. Average end-of-month C-BT contents in Chimney Hollow Reservoir would be about 24,400 AF or approximately 27% of the total reservoir volume. The average annual evaporative loss attributed to C-BT water in Chimney Hollow Reservoir would be approximately 24% of the total average annual evaporative loss. That is slightly less than the percentage of C-BT water in Chimney Hollow on an average monthly basis; however, C-BT contents would tend to be higher in Chimney Hollow during the winter months when evaporative losses are lower compared to summer months when Windy Gap diversions occur and are exchanged into Chimney Hollow Reservoir. This explanation was added to Section 3.5.2.3 of the FEIS under the subsection Loss of C-BT Water from Reservoir Evaporation. An additional table summarizing Windy Gap evaporative losses in each facility is not needed. 214. The Table correctly estimates that C-BT spills increase with the Proposed Action compared to existing conditions. Differences in C-BT contents in Granby Reservoir occur due to differences in the amount of Windy Gap diversions and carryover shrink paid to the C-BT Project, instantaneous Windy Gap deliveries, and differences in the allocation of C-BT water in Granby Reservoir, Carter Lake, and Horsetooth Reservoir due to prepositioning C-BT water in Chimney Hollow Reservoir. For example, Windy Gap diversions increase under the Proposed Action; therefore, more diversion shrink is paid to the C-BT Project. This increases C-BT contents in Granby Reservoir, which may spill before losses are incurred by the C-BT Project due to the carriage and delivery of Windy Gap water.

Com-ment	Letter #1075	Response
216	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 14 • Under the Existing Conditions column, the Windy Gap diversions are shown to be 36,532 af/yr, yet the Windy Gap Adams Tunnel deliveries are only 11,500 af/year. This leaves a difference of 25,032 af/yr, which is not explained in the DEIS.	See also response to Comment No. 208. Also, prepositioning of C-BT water in Chimney Hollow occupies space in the Adams Tunnel that might otherwise have been used to fill Carter Lake and Horsetooth Reservoir. This could result in more C-BT water positioned on the West Slope as opposed to East Slope under the Proposed Action at times C-BT contents in Granby Reservoir and Chimney Hollow reach 539,758 AF, resulting in increased C-BT spills compared to existing conditions. Overall, the increase in C-BT spills under the Proposed Action is minor and only 2% greater than under existing conditions. The lack of a forecasting function in the WGFP model has a minimal effect on C-BT spills. 215. See response to Comment No. 178 regarding the gains below Granby Reservoir, Willow Creek at the confluence, Fraser River at the confluence, and above Windy Gap. Data for the Fraser River were added to Tables 3-6, 3-7, and 3-8 in the FEIS. 216. The difference between Windy Gap diversions and Windy Gap Adams Tunnel deliveries equals Windy Gap deliveries to Middle Park, diversion shrink, carryover shrink, and spills from Granby Reservoir. More information on Windy Gap diversions, spills, and the net depletion to the Colorado River was added to Section 3.5.2.5 in the FEIS under the subsection Windy Gap Diversions, and in Section 3.5.2.6 under the subsection Colorado River to explain the differences between Windy Gap diversions and deliveries through Adams Tunnel.
217	• These tables (18, 19 and 20) should also show lines for Windy Gap water into and out of storage in Granby and Chimney Hollow, water exchanged between them, as well as actual deliveries through the Adams Tunnel.	
218	Table 20 • This table is flawed for the same reasons as Table 18 and 19	
219	• The report states that under most wet years, Windy Gap will not be able to divert under Existing Conditions due to capacity in the CBT system. This table shows average Windy Gap Adams Tunnel deliveries of 12,081 af/yr and average Windy Gap diversions of 38,512 af/yr (under Existing Conditions). However, we note that 4 of the 5 wet years modeled were actually years that Granby spilled (Table 2), and Windy Gap yield should be nearly zero. If the model used historic hydrology (and historic spills), the average diversions and tunnel deliveries under Wet years should be nearly zero. This is important because the data presented in the DEIS under-estimates the impacts of all action alternatives.	
220	7.2 • This section of the DEIS presents conclusions regarding groundwater conditions that are not supported by any reported evidence or analysis. For the alluvial wells in the vicinity of Lake Granby, the DEIS does not present any water level mapping or inventory of wells logs for this area indicating depth and water levels compared to the reservoir. In localized areas, along the shoreline particularly near the dam, the groundwater gradient may be from the reservoir to the alluvium, in which case changes in reservoir storage may have a significant effect on the water levels in local residential wells. This may also induce a flow of lower quality water from the reservoir into relatively sterile residential wells.	
221	• Changes in riparian alluvium of up to 6 inches may have an adverse effect on alluvial wells depending upon the duration of the changes in the groundwater elevations. The discussion in this section is also unsupported by any data or technical analysis.	
222	• Changes in river stage can result in a change in alluvial bank-storage, which will cause lagged changes in streamflow. While the effects of this may be minimal over most stream reaches due to the limited alluvium, the DEIS needs to address this.	
223	7.4.1.2: • This section needs to show much more detailed information about the reductions in streamflow during projected days of pumping, not just percent of time when flows won't change. It should present the information as both numerical changes in modeled flows compared to existing flows and as a percentage change of flow during times of pumping, under wet, average and dry conditions. It should clearly show the range of maximum daily flow changes by month at various locations (from X cfs to Y cfs). It should also discuss the frequency and duration of flows at or near the Windy Gap minimum flows as a result of the project alternatives.	
224	• Similarly with the changes in stream depth (top of page 87) due to the reductions in flow, the report should state that the depth is reduced from a depth of X inches to a depth of Y at various locations, and not just the percentage change.	
225	• The report should address these changes in comparison to both existing flows and to historic (pre-project) flow regimes to the extent this information can be estimated. www.bbawater.com Bishop-Brogden Associates, Inc.	217. Tables 18 through 20 were included in the DEIS as Tables 3-2, 3-3, and 3-4. These tables were revised in the FEIS (Tables 3-6, 3-7, and 3-8) to include Windy Gap spills to provide more information on Windy Gap water out of Granby Reservoir. Windy Gap water into Granby Reservoir equals the Windy Gap diversion, which is already included in those tables. More information on Windy Gap diversions, spills, and the net depletion to the Colorado River was added to Section 3.5.2.5 in the FEIS under the subsection Windy Gap Diversions, and in Section 3.5.2.6 under the subsection Colorado River. Historical or actual deliveries through Adams Tunnel were not added to tables because the evaluation of hydrologic effects was based on a comparison of modeled existing conditions. Historical Adams Tunnel deliveries are summarized in Table 5 of the Water Resources Technical Report. The purpose of Tables 18 through 20 was to present information useful in analyzing flow changes at key locations on the West and East slopes; therefore, information on Windy Gap water into and out of Chimney Hollow Reservoir was not added to the table. End-of-month C-BT and Windy Gap contents in Chimney Hollow are displayed in Figure 37, and similar information for Granby Reservoir is displayed in Figures 27, 29,

Com-ment	Letter #1075	Response
		37, and 44 for existing conditions, No Action, the Proposed Action, and Alternative 3, respectively. These figures display the net effects of Windy Gap and C-BT inflows and releases from these reservoirs. 218. See response to Comment Nos. 215 through 217. 219. See response to Comment No. 183 regarding Windy Gap diversions under existing conditions in wet years when Granby Reservoir fills. Windy Gap may divert early during the runoff period even in wet years depending on many factors, including snowpack; Granby Reservoir, C-BT, and Windy Gap contents; Carter Lake and Horsetooth Reservoir contents; precipitation; Big Thompson River basin forecasts; and orders for Windy Gap water. Windy Gap pumped 26,369 AF from April 28 through June 18, yet 2009 was a wet year in the Upper Colorado River basin above Windy Gap. In 1995 (a wet year), Windy Gap pumped 14,061 AF, some of which was spilled later that year. Data for 1995 and 2009 show that Windy Gap diversions and deliveries should not be nearly zero in wet years. Windy Gap may deliver water in a wet year even though Granby Reservoir spills because the deliveries occur prior to the spill. The data presented in Tables 18 through 20 are based on a water year from October 1 through September 30; therefore, the average annual Windy Gap diversions and Windy Gap deliveries through the Adams Tunnel during a wet year reflect what would occur prior to a Granby Reservoir spill. Section 3.5.2.3 in the FEIS was revised to explain that Windy Gap diversion in wet years would be curtailed after Granby Reservoir fills. Windy Gap diversions in wet years prior to Granby Reservoir filling depend on many factors including snowpack, Granby Reservoir contents (C-BT and Windy Gap), precipitation, Big Thompson River basin forecasts, and orders for Windy Gap water. 220. Granby Reservoir currently experiences large swings in reservoir stage due to existing water diversions and seasonal fluctuations. If alluvial water supply wells exist near the dam, they have been operating under these conditions without any apparent negative impacts. Assuming that the reservoir is the source of water to these alluvial wells, ground water quality in the alluvium is likely very similar in quality to that of the reservoir. For that reason, the WGFP would not "induce a flow of lower quality water from the reservoir into relatively sterile residential wells." Also see response to Comment No. 113.

Com-ment	Letter #1075	Response
		221. Water level fluctuations of 6 inches or more are common in alluvial ground water systems due to natural seasonal climatic variations, ground water pumping, irrigation return flows, and stream diversions. Alluvial ground water users currently divert water under fluctuating water level conditions. A decrease in water levels of 6 inches would not likely be noticeable to a user pumping from the alluvium, assuming the average saturated thickness is adequate to produce water by pumping at any specific location. 222. The predicted stage changes of up to 6 inches along the Colorado River would have immeasurable affects on bank storage and streamflow lags within the natural variability of these parameters. The river system is dynamic in that stage, is constantly increasing or decreasing, and the effects of a few inches of change due to Windy Gap diversions would not be identifiable within the overall background changes. Also see response to Comment No. 115. 223. The EIS presents information on reductions in streamflow when Windy Gap pumps. Table A-10 in Appendix A of the FEIS presents the average monthly numerical changes in modeled flows and percentage change in flow compared to existing conditions for average, wet, and dry conditions. The range of maximum daily flow decreases by month (from X cfs to Y cfs) below Windy Gap was added to Section 3.5.2.6 in the FEIS under the subsection Colorado River below the Windy Gap Diversion. Section 3.5.2.6 in the FEIS was revised to provide more detail on the frequency and magnitude of flow decreases for the Colorado River below the Windy Gap diversion. Table 3-13 in the FEIS to describe the number of days flows below the Windy Gap diversion would be less than 100 cfs over the study period as a result of Windy Gap pumping. 224. Information on changes in stream depth due to reductions in flow are presented in Table E-2 in Appendix E to the Water Resources Technical Report. Table E-2 is referenced in the section where changes in stage are reported; therefore, it is not necessary to state that the stage is reduced from a depth of X inches to a depth of Y inches. The reader can refer to Table E-2 for that information. 225. See response to Grand County Comment No. 1.

Com-ment	Letter #1075	Response
226	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 15 • This section, and all other action alternatives, need to have a table similar to Table 21 showing the monthly average and maximum streamflow before and after at various locations on the East Slope. The evaluation for West Slope streams should equal or exceed the evaluation of the source area streams.	226. See response to Comment No. 228.
227	Figures 27 and 29 (page 88) The report needs to show both the Existing Conditions and the current option on the same graph to be able to compare the changes in storage.	227. The data in Figures 27 and 29 were not shown on the same graph. A figure combining the data in Figures 27 and 29 was not included because the figure is difficult to read with that much data presented. The reader can refer to Table F-7 in the Appendix to the Water Resources Technical Report to compare average monthly changes in total Granby Reservoir contents for average, wet, and dry years. Figure 36, which shows Granby Reservoir estimated monthly surface elevation for the Proposed Action compared to existing conditions, is similar to the graph requested in the comment. In addition, Figure 35 shows Granby Reservoir estimated average year surface elevation for all alternatives compared to existing conditions.
228	Table 21 This is a very helpful table, however, it is only presented for East Slope streams. This is the exact type of information that would be helpful to evaluation potential impacts to West Slope streams.	228. Tables similar to Table 21, which show flow changes based on a comparison with historical gage data, were not included for West Slope streams because it is appropriate to assess effects due to the EIS alternatives based on a comparison to modeled existing conditions as opposed to historical conditions. The hydrology associated with existing conditions reflects the current administration of the river, demands, infrastructure, and operations, as discussed in Section 7.1 of the Water Resources Technical Report. Table 21 was included for East Slope streams because those streams were not included in the WGFP model. Therefore, the best available information for assessing impacts to East Slope streams was historical gage data because modeled existing conditions streamflows were not available.
229	7.4.2.1: • This section is misleading regarding changes in Granby elevations. The DEIS minimizes the changes in elevations by stating that the 18' projected are much less than the existing 90' fluctuations. However, such a change represents a 20% increase over current conditions.	229. Section 3.6.2.3 of the FEIS was revised to clarify the discussion on changes in Granby Reservoir elevations. To address possible large drops in lake level during a series of dry years, mitigation was added to the Preferred Alternative that would modify prepositioning operations by curtailing deliveries of C-BT water to Chimney Hollow Reservoir when Granby is forecasted to drop below elevation 8,250. Thus, C-BT deliveries to Chimney Hollow would generally be curtailed when water storage in Granby Reservoir reaches about 340,000 AF. This measure would reduce water level fluctuations, and Granby Reservoir would remain higher in dry years than predicted in the DEIS, as described in Section 3.5.4 in the FEIS.
230	• Regarding the numerous domestic wells that supply water to the homes surrounding Lake Granby, this section states "is probable that much of the ground water adjacent to the lake is from topographically higher areas surrounding the lake rather than from Lake Granby." As described above, the DEIS does not present any data or analysis to support this assertion.	230. See response to Comment No. 113. Additional information was added to the ground water discussion in the FEIS.
231	7.4.3.1 • This is one of the sections that appears to present conclusions regarding changes in daily streamflow, that are likely a result of the disaggregation methodology. The results in this section are erroneous, as the methodology to generate the daily flows is flawed. A daily model would produce the best results for estimating daily flow data. At a minimum, the DEIS should use varying disaggregation factors for wet, average and dry years at the various locations (instead of the long-term average factors). See our overall concerns above regarding the use of daily disaggregation factors to evaluate effects under the DEIS.	231. See response to Comment No. 182 regarding the methodology used to generate daily flows.
232	• As with other sections of this report, this section needs to present the hard-number changes in flow, averages and maximums, for both the existing and alternative conditions. For example, the text indicates that the 2-year peak flow is 923 cfs at HSS under Existing Conditions, but does not report what the projected flow will be under No Action. Rather it deflects the information by stating that the changes will only reduce the exceedance of this flow rate "less than 1 percent." Further, a change from 3.3% exceedance to 3% exceedance is a 10% change overall – not a less than 1% reduction.	
233	• This section should also present information about the changes to the 2-year peak flow from historic conditions, as well as Existing conditions.	
234	• Similarly with the range of channel maintenance flows (bottom page 96), the DEIS needs to present the total number of years that such events occurred during the 47-year period. This section should also compare this information to historic hydrology.	
235	7.5.1.2 (page 104) • As before, this section may be misleading due to the lack of "forecasting" in the model, and the resulting increase in WGFP pumping and subsequent spills from Lake Granby, that would probably not occur in reality. This section should also present information regarding the change in frequency of Granby spills, as well as the average and maximum change in spill duration. For example, if you were to summarize the information on Table D-4, it appears that Lake Granby www.bbawater.com Bishop-Brogden Associates, Inc.	

Com-ment	Letter #1075	Response
	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 16	232. See Table 3-32 in the FEIS for a quantification of the estimated changes in channel maintenance flows for the alternatives. The discussion on percent changes in the 2-year flow shown in the flow duration curve was revised in the FEIS.
235	spills would drop from 21 years (out of 47) and roughly 1,200 total days of spill down (57 days/year during spill years) to 14 years and 880 days of spill (a reduction of 2 weeks/year during spill years) under the preferred action. Further, under Table D-11, it concludes that there will a 100% reduction of spills in the months of July and August. However, the DEIS needs a comprehensive explanation of the changes to Granby spills, rather than the bits and pieces of tangential information.	233. Consistent with CEQ and Reclamation guidance, the EIS analyzed the effects of the project alternatives compared to existing conditions and No Action, not to historic conditions. The cumulative effects analysis looks at how past, present, and reasonably foreseeable future actions affect resources.
236	• This section needs to present much more actual projected daily flow changes on an average and maximum basis, in addition to the monthly and annual averages. Similarly, what are the projected maximum daily changes in river stage (depth), in addition to the monthly averages.	234. Information on changes in the percent of years and duration of various channel maintenance flows occur during the model period is found in Table 3-32 of the FEIS.
237	• Figures 31 through 34 should also present historic hydrology.	
	7.5.1.3	
238	• The current Windy Gap water rights do not allow for storage in Chimney Hollow. The participants will need to change their water rights in Water Court to allow for such storage. The fact that "There are no decreed storage limits in Chimney Hollow Reservoir" and the discussion on Granby/Chimney Hollow operations (page 110) indicate that such a change of operations is contemplated. Therefore, terms and conditions in the water rights decree may be necessary to prevent injury to other water rights.	235. See response to Comment No. 183 regarding the lack of a forecasting function. Section 3.5.2.5 in the FEIS was revised to provide more information on the frequency and duration of Granby Reservoir spills. 236. Section 3.5.2.6 of the FEIS was revised to include more information on maximum daily flow and river stage changes.
239	• The discussion regarding changes in Lake Granby should also show, similar to Figures 35 and 36, the projected elevation changes during wet and dry years. Figure 37 should also show the same information for the Existing Condition to compare the proposed changes.	237. See response to Comment No. 177 Historical average daily flows at the Hot Sulphur Springs USGS Gage and Willow Creek USGS Gage are presented in Figures 3-4 and 3-5 of the FEIS, respectively. The reader can refer to these figures for a presentation of historic hydrology.
240	Sections 7.5, 7.6 and 7.7 Many of the comments from Section 7.4 (No Action) also apply to these sections. These sections needs to present much more detailed information regarding specific changes in flow and stage, duration of changes, etc., to accurately identify the impacts. Tables such as Table 24 for the East Slope streams should also be presented here.	
241	Section 7.9 As described above, the original Windy Gap Project anticipated a firm delivery of 3,000 AF to Middle Park WCD. Any changes to the project as a result of the WGFP should fulfill the original obligation of the project, and 'firm up' Middle Park's 3,000 af/year prior to any additional deliveries to the East Slope.	238. See response to Comment No. 197.
242	Section 8.2.1, page 144 This section is highly misleading regarding Urban Growth in Grand and Summit Counties. The information presented here is total projected water demands, where only a small percentage of these demands will be consumptively used. The return flows from these uses will return to the river system immediately and over the next several months. This results in an inaccurate comparison to Windy Gap or Moffat diversions – which are 100% depletive to the Colorado River system.	239. Wet and dry projected elevation and surface area changes are presented in Tables F-7 and F-8 of the Water Resource Tech Report. That information is sufficient to present changes in wet and dry years; therefore, additional figures were not included. The same information presented in Figure 37 (C-BT and Windy Gap contents in Granby Reservoir for the Proposed Action) was presented in Figure 27 for existing conditions. Those figures can be compared to evaluate proposed changes. A figure combining the data in Figures 27 and 37 was not included because it is difficult to read with that much data presented.
243	Section 8.3 See discussion above regarding the Shoshone call reduction in the Future Conditions model. This is a long-term agreement that very likely <u>will</u> be implemented in the future, and needs to be included in the modeling and comparison of alternatives.	
	Section 8.4.2:	
244	• The section indicates that "downstream demands would increase in the future" (page 148). The DEIS provides no information or basis to support this assertion. We believe that it would be accurate and appropriate to state that the projected additional depletions of water upstream of these demands (from WGFP, Moffat, etc.) will reduce the water supplies to these demands, resulting in an increase in administrative calls in the future.	240. Information presented in Sections 7.5, 7.6, and 7.7 is sufficiently detailed to identify impacts. Information on changes in flow, stage, and reservoir contents is included in the Appendices to the Water Resources Technical Report. Information on the frequency and magnitude of daily flow changes along the Colorado River near Granby Reservoir, Hot Sulphur Springs, Kremmling, and Willow Creek is presented in Table 14 and Appendix B in the Water Resource Tech Report (flow duration curves). Appendix D includes information on average, wet, and dry
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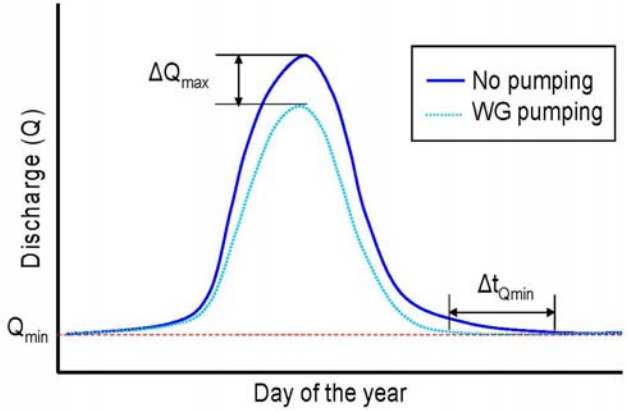
Com-ment	Letter #1075	Response
		monthly changes in streamflows at key locations, Windy Gap diversions, and Granby Reservoir spills. Appendix E includes information on average, wet, and dry monthly changes in stream stage at key locations. Appendix F includes information on average, wet, and dry changes in reservoir contents, elevation, and surface area. The information presented in the appendices is described and explained in Sections 7.5 through 7.8. Those sections also include additional tables and figures showing average daily flow changes along the Colorado River and Willow Creek, average daily changes in reservoir surface elevation, and monthly surface elevations for the entire period of record for Granby Reservoir, Carter Lake, Horsetooth Reservoir, and Chimney Hollow Reservoir. Tables such as Table 24 were not included for West Slope streams because it is appropriate to assess effects due to the EIS alternatives based on a comparison against modeled existing conditions as opposed to historical conditions since the hydrology associated with existing conditions reflects the current administration of the river, demands, infrastructure, and operations as discussed in Section 7.1 of the Water Resources Technical Report. Table 24 was included for East Slope streams because those streams were not included in the WGFP model; therefore, the best available information for assessing impacts to East Slope streams was historical gage data. 241. See response to comment No. 185. 242. Section 2.8.2.2 in the FEIS was revised to include a discussion of depletions to the Colorado River system associated with urban growth in Grand and Summit counties. 243. See response to Comment No. 184. An explanation regarding why the Shoshone call relaxation was not included in the model was added to Section 3.5.3.2 in the FEIS under the subsection Colorado River. 244. The DEIS provides information supporting the comment that downstream demands would increase in the future. Water-based reasonably foreseeable actions with increased demands and depletions include the Moffat Project, population growth in Grand and Summit counties, and increases in Wolford Mountain Reservoir contract demands, which are described in Section 2.8.2.1 of the DEIS. Section 3.5.3.4 of the FEIS was revised under the subsection Colorado River below the Windy Gap Diversion to include more discussion of the increase in administrative calls in the future. Future administrative calls also are described in Section 3.5.3.3 of the FEIS.

Com-ment	Letter #1075	Response
245	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 17 • Based on the information in the DEIS, it is highly unlikely that the flows at HSS will increase 25% of the time in the future. The cumulative effects section discusses the projected additional depletions upstream of this gage from the WGFP, Moffat and some minor increases in Grand County consumptive uses. This conclusion may be significantly inaccurate, and inappropriately presents the results of the project. Alternatively, this is solely a result of the lack of forecasting in the model which shows an increase in flows due to Windy Gap water that is pumped and then later spilled at Lake Granby – which is not realistic.	245. The estimated increases in flows at Hot Sulphur Springs are not the result of the lack of forecasting in the model. Modeled Windy Gap diversions and consequently spills may be overstated in wet years primarily under existing conditions because forecasting is not incorporated in the WGFP model. As a result, flows below Granby Reservoir may see less flow reduction (not flow increase) than predicted in the model because of additional Windy Gap spills in June through August under existing conditions and No Action. Flow increases at Hot Sulphur Springs compared to existing conditions are primarily due to increases in the flow that Windy Gap must bypass to satisfy downstream senior rights. Flows are predicted to increase below Windy Gap approximately 25 percent of the time; however, approximately 10 percent of the time, the increase in flow is less than 10 cfs. Small flow increases of less than 5 cfs at Hot Sulphur Springs are due to additional bypasses for increased indoor and outdoor depletions associated with future municipal growth along the Colorado River. Larger increases in flow below Windy Gap would generally be caused by an increase in administrative calls in the future.
246	Section 8.4.2.2 The last full paragraph (page 151) states that the cessation of irrigation under the Big Lake ditch by Denver Water "would result in approximately 8,800 AF/year less depletion and a corresponding increase in flows on average in the Williams Fork River…" It would be helpful to present an estimate of the NET increase to the Colorado River from the reduction in consumptive uses associated with the cessation of irrigation under this ditch. This section implies that there is an increase in flows of 8,800 af/year to the river system. While this may be accurate for flows in the Williams Fork, it is not an accurate representation of flow changes to the Colorado River system. The cessation of irrigation under this ditch will result in an increase in yield to the Denver Water system from both a reduction of bypasses at the upstream Jones Pass collection system, as well as increased water supplies for storage at Williams Fork Reservoir. The additional water stored in Williams Fork Reservoir will be used to offset additional depletions at either the Moffat Collection System or Dillon Reservoir. Thus, there is no net gain to the Colorado River downstream of the Blue River and an actual loss in streamflow to the Fraser and Blue Rivers. This section of the DEIS needs to present a detailed summary of the changes to the Denver Water system and the resultant additional depletions to the Colorado River. This is another example of why the EIS evaluation for both projects needs to be combined and evaluated using a daily model.	246. Section 3.5.3.2 of the FEIS was edited to include a discussion of the net change to the Colorado River due to the expiration of the Big Lake Ditch contract .
247	Section 8.4.2.6 • The gains represented in Table 29 by the Shoshone call relaxation agreement are an excellent example of why the model used to evaluate impacts to the West Slope needs to a) be extended through at least 2005, and b) include the implementation of this agreement. Further, as the Shoshone relaxation benefits both the WGFP and the Moffat Expansion Project, both should be evaluated using the same model.	247. See responses to Comment Nos. 184 and 180 regarding inclusion of the Shoshone call relaxation in the model and extension of the model study period. See responses to Comment Nos. 179 and 187 regarding use of the same model for the cumulative effect analysis for the WGFP and Moffat Project EISs and combining the two EISs.
248	• This section does not explain why the model did not include this agreement in the Future Conditions. Both of the above factors may understate the projected impacts to the West Slope.	248. See response to Comment No. 184.
249	• Table 29 indicates that Windy Gap realized additional yields of 7,850 af from the Shoshone agreement in 2003. This would mean that Windy Gap diverted approximately 56,350 af under its own water rights. This total volume is approximately 2.5 times the previous maximum diversions of 21,900 af/year (1992), which would appear to be highly unlikely given the drought conditions that were occurring in 2003. This section should provide additional information regarding how the values shown in Table 29 were determined. Further, the DEIS should state what the increases were to CBT diversions, which either occurred as a result of diversions under the CBT direct-flow right or from additional storage at Granby that was not replaced by the CBT pool in Green Mountain Reservoir.	249. The data presented in Table 29 regarding the gains from the Shoshone call relaxation were quantified by Denver Water and reviewed and agreed to by Reclamation, River District, and other West and East Slope entities. Gains from the Shoshone call relaxation were approved for use in calculation of 10% of the net water stored or diverted by Denver Water by virtue of the call relaxation, which was provided to various West Slope entities. The calculation of gains for each project/water rights shown in Table 29 relied on Shoshone call data, diversion data at each project, and gaged flow at the USGS gage at Dotsero to determine how much of the diversion at these projects would have been called out had the call not been relaxed. Potential benefits to the C-BT Project are included in the gains shown for Green Mountain Reservoir. Section 3.5.3.2 of the FEIS was revised to clarify the gains to Green Mountain Reservoir to include benefits to the C-BT Project.
250	• The Summary on page 158 indicates that, based on historic information and the forecasting criteria, the Shoshone call reduction agreement may have been enacted in "1 out of every 6 to 7 years" during the modeling period. Given this frequency of occurrences, this foreseeable action should be included in the modeling for the WGFP.	
251	Tables 30 – 32: • Many of the same comments for Table 18-20 also apply to these tables www.bbawater.com Bishop-Brogden Associates, Inc.	

Com-ment	Letter #1075	Response
252	Barb Green, Dave Taussig, Peter Fleming December 23, 2008 Page 18 • These tables no longer show "Adams Tunnel Windy Gap Deliveries." The only information presented about Windy Gap operations is "Windy Gap Diversions," which also includes significant quantities of water that will subsequently spilled at Granby. This may significantly overstate the actual future Windy Gap operations.	250. See response to Comment No. 184. 251. See responses to Comment Nos. 215 through 219 regarding Tables 18 through 20. 252. Tables 30 through 32 were included in the DEIS as Tables 3-14, 3-15, and 3-16. These tables were revised in the FEIS (Tables 3-21, 3-22, and 3-23) to include information on Windy Gap spills, and Adams Tunnel C-BT and Windy Gap deliveries. See response to Comment No. 183 regarding overstating future Windy Gap operations.
253	• It would be very helpful to have two comparison columns, Existing Conditions and the modeled Future Conditions, to better understand what the action consequences are.	253. Hydrologic effects under cumulative effects were based on a comparison with existing conditions. It is not clear what is meant by "modeled Future Conditions" in the comment. A comparison against the No Action Alternative is not needed.
254	• These tables show an Existing Condition Windy Gap diversion of 36,532 af, and then compare all alternatives to this volume. In fact, the Existing Conditions should show a Windy Gap diversion of approximately 11,500 af/year. Because the EIS and Executive Summary also represent the "Difference" as a result of the WGFP, this is a highly inaccurate portrayal of the total project pumping and the effects of the alternatives.	254. See response to Comment Nos. 177 and 183.
255	• These tables should also show lines for Windy Gap water into, and out of, storage in Granby to really understand the operations.	255. The purpose of these tables was to present relevant information for understanding changes in streamflow along the Colorado River and other key locations. Tables 30 through 32 were included in the FEIS as Tables 3-21, 3-22, and 3-23. These tables were revised to include Windy Gap spills and Adams Tunnel Windy Gap deliveries to provide more information on Windy Gap water into and out of storage in Granby Reservoir.
256	• Table 32 shows that, during wet years, **the Cumulative Effects will deplete the flow of the Colorado River at Kremmling by an average of 157,000 AF.** This is critical piece of information regarding impacts to the West Slope, and needs to highlighted in the DEIS and Executive Summary documents.	256. Section 3.5.3.2 of the FEIS was revised under the subsection Colorado River to include more discussion of the anticipated flow changes along the Colorado River due to reasonably foreseeable actions. The Executive Summary provides a qualitative overview of environmental consequences for all affected resources. Flow changes at specific locations under average, wet, and dry conditions under cumulative effects are presented in Chapter 3 of the FEIS.
257	Section 8.7.1.3 This section should present much more detailed information regarding the effects to Rockwell/Mueller Reservoir in addition to Lake Granby. If the changes are similar to Section 7, then this should be stated in the section.	257. Section 3.5.2.6 of the DEIS under the subsection Granby Reservoir describes changes in water levels and contents under the action alternatives (see Figure 3-16), and Section 3.5.2.8 of the DEIS describes operations and effects at Rockwell/Mueller Reservoir (see Figure 3-25). Those sections cite similarities to Alternatives 3 and 4. Tables A-21, A-22, A-44, and A-45 in Appendix A of the DEIS also show average monthly changes in Granby Reservoir elevation and surface area for Alternative 5 under direct effects and cumulative effects.
258	**Recommended Terms for Mitigation and Approval** As you know, we assisted in the preparation of a set of criteria or conditions that should be incorporated into any approval of permits associated with the Windy Gap Firming Project. These conditions are summarized in Grand County's comment letter to the U.S. Army Corps of Engineers regarding the 404 Permit Application for the WGFP. Please let me know of any questions regarding this information. Very truly yours, BISHOP-BROGDEN ASSOCIATES, INC. Jeffrey A. Clark Principal - Hydrologist cc: Lurline Curran Eric Kuhn Stan Cazier BBA Job Nos: 0502.00 & 0808.00 www.bbawater.com Bishop-Brogden Associates, Inc.	258. Mitigation measures addressing impacts of the WGFP were incorporated in the FEIS, as summarized in Section 3.25. The Corps will address any conditions associated with the 404 Permit.

Com-ment	Letter #1075	Response
259	**WATER QUALITY / QUANTITY COMMITTEE (QQ)** Post Office Box 2308 • Silverthorne, Colorado 80498 970-468-0295 • Fax 970-468-1208 • email: qqwater@Colorado.net **EXHIBIT C** To: Barbara Green, Mary Keyes From: Lane Wyatt Date: November 20, 2008 RE: WGFP DEIS Aquatic Resources Technical Report (July 2008) I reviewed the revised Aquatic Resources Technical Report for changes since the November 2007 PDEIS version. I took the February 11, 2008 Grand County comment letter on this report and changed it so that references to page numbers and tables are correct for the July 2008 version of the Technical Report. I also eliminated previous comments that did not seem useful. The new version of the comments on the July 2008 Aquatics Technical Report is below. **1.0 GENERAL COMMENTS.** In spite of Grand County's written comments to the Bureau of Reclamation, the analysis continues to rely on "average monthly" values for diversions and stream flows. This is a fatal flaw that calls into question all of the conclusions that might be drawn regarding environmental impacts that are caused by changes in hydrology. So that decision makers can understand the nature and extent of impacts to the aquatic environment, flows need to be depicted in terms that display the magnitude and duration of flow conditions. A similar concern with the use of monthly flow data to determine environmental effects was discussed in a report by the National Academy of Sciences, Committee on Hydrology, Ecology, and Fishes of the Klamath River Basin, National Research Council, Hydrology, Ecology, and Fishes of the Klamath River Basin, (2007) ('National Academy of Science Report") www.nap.edu/catalog/12072.html. The committee concluded that "[a]lthough monthly flow values can be useful for general river-basin planning, they are not useful for ecological modeling for river habitats, because the monthly average masks important discharge values that may exist only for a few days or even less. In short, planners operate on a monthly basis, but fish live on a daily basis." (National Academy	259. See response to Grand County Comment No. 8.

Com-ment	Letter #1075	Response
260	Science Report at 5)[1] The following comments elaborate on the problem caused by using monthly average flows as a predictive tool, and summarize the major deficiencies in the Aquatics Report. **1.1 Frequency of Conditions.** The Report focuses on the probability that a given amount of habitat will be available during any given wet or average water year. It does not look at how altering flows may impact the frequency with which conditions in the reach below Windy Gap (or for that matter below Lake Granby) will resemble those of a dry year as a result of diverting water to the East Slope.	260. The hydrology used for the habitat analysis was reported in the Hydrology Technical Report and the DEIS. The changes to flow frequency would not increase the frequency of dry year conditions. See response to Comment No. 261.
261	**1.2 Changes to the Hydrograph.** In those years when Windy Gap is pumping, we expect two changes to occur. First, the magnitude of peak flows below Windy Gap will be reduced. Second, because the WGFP will allow pumping to occur later into the year, the day at which the outflow from the reservoir equals the CWCB minimum flow requirement will be moved early in the year (*See* **Figure 1.2 A**, below). As a result, in many years, there will be an increase in the number of days that stream flows below Windy Gap will be reduced to the CWCB minimum. [1] The Bureau of Reclamation estimated monthly stream flows in its Natural Flow Study, which monthly flows were used as inputs into the instream flow studies for the Klamath River. (National Academy Science Report. at 3) The Committee concluded the Natural Flow Study was "seriously compromised" because among other things, the flows were calculated as monthly values, where the ecological applications of these calculated flows required daily values, and as a result, the output of the study would not have satisfied ultimate use requirements. (Id. at 3-4). It added that the use of monthly data was a "major shortcoming" which was "so severe that [it] should be addressed before decision makers can use the outputs of the study to establish precise flow regimes with confidence." (Id. at 5). 2	261. The comment states that the magnitude of peak flows below Windy Gap would be reduced when Windy Gap is pumping. The magnitude of peak flows below Windy Gap would be reduced in wet years, when Windy Gap would be able to divert additional water with the firming project; however, in years that Granby Reservoir does not fill and spill (most average years and all dry years), there would be no change in the magnitude of peak flows below Windy Gap. When there is sufficient storage space in Granby Reservoir for Windy Gap water, there would be no difference in Windy Gap diversions with or without the firming project. The only difference would be where Windy Gap water is stored. Under existing conditions, Windy Gap water would be stored in Granby Reservoir, whereas under the Proposed Action, Windy Gap water would be stored in Chimney Hollow Reservoir. In wet years, Windy Gap would be able to divert additional water with firming storage, which would reduce peak flows. As shown in Figure 3-13 in the DEIS, the peak flow would decrease from approximately 1,050 cfs under existing conditions to 850 cfs under the Proposed Action on average. In wet years, the peak flow would decrease from approximately 2,665 cfs under existing conditions to 2,470 cfs under the Proposed Action on average. Reductions in the magnitude of peak flows were addressed in the resource evaluations as follows. Peak flow effects on aquatic resources were evaluated by examining the magnitude and frequency of occurrence. In addition, the range of flows for the alternatives was evaluated for sediment transport capabilities compared to existing conditions.

Com-ment	Letter #1075	Response
261	 ***Figure 1.2 A.*** Theoretical hydrographs showing discharge out of Windy Gap Reservoir when water is not being diverted (No pumping) and when water is being diverted (WG pumping) over the course of a calendar year. Pumping is expected to reduce peak discharge by ΔQ_{max}, which is less than or equal to the maximum pumping rate of the Windy Gap pumping station. In addition, pumping is expected to increase length of time discharge below Windy Gap is equal to the CWCB's minimum flow by Δt_{Qmin}. The Report ignores potential changes in the extent and frequency of low flow periods and the impacts of such changes on aquatic resources. The impacts of the WGFP cannot be assessed without this information. One way to begin to address this question would be to model how daily flows below Windy Gap Reservoir would have been decreased were any of the project alternatives in operation. This sort of analysis would have the additional benefit that it could then serve as the base for analyzing cumulative impacts by examining how, for example, the frequency and duration of low flows (not to mention peak flows) increase if the Denver Water Department's Moffat Firming Project comes online. Discharges in the Colorado River are highly variable, ranging from 23 cfs to approximately 4,300 cfs (Aquatics Report, p. 14). As with other rivers, the peak flows are critical for maintaining a healthy ecosystem. However, floods of different sizes with different return intervals often provide different services, in terms of maintaining ecosystem function. For example, very large floods may be responsible for building the floodplain through major bar deposits, whereas slightly smaller, bankfull floods may be responsible for the formation and maintenance of the active channel. More frequent moderately sized floods may, in turn, provide other sets of important services, including the scouring of sediments from spawning sites and flushing of these sediments downstream. Unfortunately, how reductions in the average magnitude of peak flows will affect their ability to maintain a healthy stream ecosystem is not addressed. 3	Under the Proposed Action, Windy Gap would divert additional water in years that Granby Reservoir fills. In some of those years, there would be an increase in the number of days that streamflows below Windy Gap would be reduced to the CWCB minimum, and the day at which the outflow from Windy Gap Reservoir equals the CWCB minimum flow requirement would be moved to earlier in the year. However, oftentimes in wet years, the flows above Windy Gap are significantly higher than 700 cfs. Under those circumstances, even if Windy Gap is diverting the full decreed amount of 600 cfs, flows below Windy Gap would still be considerably higher than the CWCB minimum. Therefore, additional diversions under the Proposed Action would not always increase the extent of low-flow periods. The WGFP Water Resource Technical Report addresses potential changes in the extent and frequency of low-flow periods caused by WGFP alternatives by evaluating how modeled daily flows below Windy Gap would decrease with any of the project alternatives in operation. Table 3-7 in the DEIS shows the number of days that flows below the Windy Gap diversion would be less than 100 cfs over the 47-year study period as a result of Windy Gap pumping. Under the Proposed Action, Windy Gap diversions would increase the number of days near the CWCB minimum by 10 days in 4 years in July, and 54 days in 4 years in August over the 47-year study period. There would be no change in the number of days that Windy Gap pumping causes flows to be near the CWCB minimum in May and June due to the WGFP alternatives. Section 3.5.2.6 of the FEIS was revised to indicate the number of years during the study period that Windy Gap diversions would increase the number of days near the CWCB minimum. The WGFP would not increase the incidence of dry-year conditions or prolong drought conditions. Windy Gap diversions during below-average years or in the year following a drought typically do not change with additional firming storage online. The Windy Gap Project is able to divert water in below-average years and wet years following dry years because there is typically storage space available in Granby Reservoir. In years when there is sufficient storage space in Granby Reservoir, there would be no difference in the amount of Windy Gap water diverted. In those types of years, the same amount of Windy Gap water would be diverted under the Proposed Action as existing conditions; however, the Participants' Windy Gap water would be stored in Chimney Hollow Reservoir as opposed to Granby Reservoir. For example, there is no difference in Windy Gap diversions between the Proposed Action and existing conditions in 1965 (wet year) following two dry years (1963 and 1964), in 1978 (wet year) following 1977 (dry year), and in 1982 (above-average year) following 1981 (dry year). Although there would be additional Windy Gap water diverted under the Proposed Action in

Com-ment	Letter #1075	Response
261	Peak flows between Lake Granby and Windy Gap will be reduced in some years. The Aquatics Report states: "Maximum average monthly flow reductions of up to 20 to 30 percent [will occur] in July and August of wet years. This may cause some shift in habitat as a response to reduction in peak flows, but is unlikely to impact fish populations." (p.39). In spite of the magnitude of these reductions, no evidence is presented to support the assertion that the impacts to fish populations are unlikely. It would be surprising if changes of this magnitude did not result in aquatic resource changes of some significance. Because stream temperatures increase more rapidly when flows are low, extending the period of low flow increases the probability that both daily maximum temperature and weekly average temperatures will increase. As further discussed in "Temperature Effects" below, the Report does not evaluate these potential impacts.	1957, which is a wet year following a drought period, the additional diversions would not cause Colorado streamflows to drop to dry year conditions. For example, under the Proposed Action, an additional 32,420 AF would be diverted in July 1957 compared to existing conditions; however, flows below Windy Gap would still be considerably higher than 90 cfs. The most significant additional diversions under the Proposed Action occur in wet years following wet years, or wet years following average years, which would not increase the incidence of dry-year conditions or prolong drought conditions. Table 3-32 in the FEIS shows that larger flows, ranging from bankfull flows (0.8 x 1.5-yr flow to 2-yr flow) to 25-year flows would continue to occur under the alternatives. This table provides information on when the various high flows would occur during the year, the magnitude of the flows under the different alternatives, and the frequency and duration of such flows. Aquatic ecosystems in rivers with a snowmelt-based hydrograph are maintained by the change in flow throughout the year. River channels and the resulting aquatic habitat are created and maintained by the flows that occur during snowmelt runoff. In general, flows that occur every 2 years maintain the channel characteristics, while high flows that occur less frequently create new habitat. The peak flow magnitudes and recurrence intervals are similar between existing conditions and the Proposed Action (Table 3-32). As such, the ecosystem functions that depend on high flows are not expected to change.
262	**1.3 Changes to the Hydrologic Regime.** The Aquatics Report focuses on the *probability* that the WGFP will impact the Colorado River in any given year. For example, it attempts to assess the probability that the WUA for a particular life stage of a given trout species will increase or decrease as a result of pumping in wet, average, and dry water years. However, the Report does not recognize how changing the *probability* of low flows in any given year impacts the *frequency* with which these changes occur across a period of years. This is surprising because the report does talk about the frequency with which, for example, the WUA available to Juvenile Rainbow Trout below Windy Gap will change (e.g., Table 22 p.45). However, it does not extend this analysis to the relevant time scale. Instead the Report simply talks about the number of average years out of ten that experience the maximum change from existing conditions. By reducing peak flows and by increasing the duration of low flows in average years, the WGFP is essentially creating more years that have a hydrograph that is typical of low flow, or dry years. The Report recognizes that the proportion of years with protracted low flows late in the season will increase, yet no analysis of the consequences of these extended dry year conditions is offered. The proportion is important because population dynamics of many species are very dynamic. Trout, in particular, have highly variable recruitment. The vulnerability of trout varies with both species and life stage. For example, because late-season flows are often correlated with higher temperatures, low flow years may enhance growth of fish fry but place additional stress on juveniles and adults. By reducing growth of juveniles and adults, egg production in spawning season will be low and recruitment the following year poor. If years with poor recruitment are rare, the long-term viability of the population may not suffer as a result of low flow years. Conversely, by increasing the frequency of these low flow years, the WGFP could substantially limit recruitment and thus impair the long-term viability of the population. How the increase in the frequency of years with protracted periods of low flow will impact the trout population has not been assessed. 4	262. See response to Comment No. 261 regarding reductions in peak flows and increases in the frequency that low-flow periods would occur during the 47-year study as a result of WGFP alternatives. See response to Comment No. 261 regarding effects to aquatic environment.

Com-ment	Letter #1075	Response
263	Below Windy Gap, both the magnitude and duration of floods with different recurrence intervals (e.g., 2-yr, 5-yr, 10-yr) will tend to be decreased. Similarly, the size and duration of the typical flood in an average year will be reduced. These reductions are likely to be exacerbated by the additional changes that are occurring within the basin (e.g., Moffat Tunnel expansion, urban growth in Summit and Grand Counties) which will also further reduce peak flows. These changes in the flow regime raise a number of important questions which have not been addressed, such as the effect on ecosystem services relating to reduction in volume and duration of flood flows. Will there be a decrease in the efficiency with which fine sediments are flushed through the system and thus a reduction in availability of suitable spawning habitat? What will be the impact of these changes in the flow regime be on other species? Will algal growth be promoted? Will recruitment of riparian species be reduced? Will macroinvertebrate habitat more frequently be buried by fine silts? **1.4 Instream Flow Incremental Methodology.** The bulk of the analysis presented in the Aquatics Report focuses on how changes in flow resulting from the WGFP will affect habitat availability. Although this sort of analysis is useful, as presented, the analysis is incomplete.	263. See response to Comment No. 261 regarding the reduction in peak flows due to WGFP alternatives. The analysis of bed materials and movement showed that the required periodic flushing flow of 450 cfs should be sufficient to transport fine sediments (2 mm or finer) and maintain spawning substrate, macroinvertebrate habitat. Table 3-32 shows that flows exceeding 450 cfs (channel maintenance flows) would continue to occur under the alternatives, as would flows ranging from 510 to 6,520 cfs (bankfull flow to the 25-year flow). A recent evaluation was completed of available streamflow vs. shear stress data at the Breeze station, a riffle site located downstream of the confluence of the Williams Fork. This analysis provides a generalized relationship between sediment mobilization and Colorado River streamflows. The results showed that fine sediments (sand, 2 mm or finer) would be mobilized at this riffle site at flows of less than 50 cfs. Fine gravel (8 mm) would require a flow of 200 cfs, medium gravel (16 mm) would require a flow of about 400 cfs, and coarse gravel (32 mm) would require a flow of about 850 cfs to be mobilized. In Ward's 1981 study, his results at four locations from below Windy Gap to above the Blue River showed that fine sediments (sand, 2 mm or finer) would be mobilized at discharges ranging from 140 to 240 cfs (depending on location, with the highest flow at the lowest site above the Blue River). The flow duration curve for Hot Sulphur Springs shows almost no changes in flows of 150 cfs or less, and for Kremmling shows almost no changes at flows of about 1,000 cfs or less. Sufficient channel maintenance flows would be available to support riparian functions. If the comment on algae refers to diatoms like Didymo, there is no consensus on conditions for this naturally occurring species. Unfortunately, there is a lack of basic biological and ecological knowledge for this organism (Spaulding and Elwell 2007). It thrives under a wide range of freshwater conditions – both hydrological and chemical (Spaulding and Elwell 2007), although it is commonly reported that it prefers streams with low phosphorus and low mean discharge (Miller et al, 2009; Kirkwood et al. 2007). Spaulding and Elwell (2007) found no relation between water velocity and visual biovolume indices. Discussion on sediment transport was added to Section 3.7.2.3 of the FEIS.
264	First, the analysis focuses on the proportion of time a given WUA is available to adult or juvenile brown or rainbow trout. As presented, it is impossible to answer questions about whether or not certain types of habitat are available when they are needed. For example, it does not matter if adequate amounts of spawning habitat are available 95% of the time, if the habitat is never available during the spawning season. An analysis of how the WUA available to each life stage of each species varies over the course of the year is needed. Information should be presented regarding flow and habitat requirements at different life stages for relevant species.	264. The habitat time series analysis is based on the seasonal habitat occurrence when the species or life stage of interest is present in the stream. Therefore, the percent of time available refers only to times when the life stage and species being evaluated would be present in the river. Tables were revised in Section 3.9.2 of the FEIS that show the year-round change in habitat.
265	Second, effects of changes in flow on suitable habitat availability of adult and juvenile life stages are modeled, but effects of flow changes on fry and spawning habitat were not. Typically, all four life stages are evaluated in analyses using the Instream Flow Incremental Methodology (IFIM). Because they are such poor swimmers, comparatively speaking, availability of suitable fry habitat is more sensitive to changes in flow than is availability of habitat for adults. By failing to evaluate how changes in flows impact the availability of fry and spawning habitat, the Aquatics Report systematically ignores potentially critical impacts of the WGFP.	265. The species and life stages evaluated were determined during the discussions with CDPW at the initiation of the study. Since the physical habitat model does
266	Third, as mentioned above, the analyses appear to have been conducted using monthly average flows. Flows vary on a variety of time scales ranging from hours (e.g., during flash floods) to years (e.g., changes in precipitation driven by climatic events like La Niña and El Niño). By using monthly averages, variations occurring on smaller temporal scales can be masked. For example, flows throughout July may be very low but if there was a very large flood during the month, average monthly flows may appear closer to the long-term average. More importantly, by using monthly averages, extreme events tend to be dampened. Given that fish and other aquatic organisms respond to 5	

Com-ment	Letter #1075	Response
266	changes in flow that occur on much shorter time scales, it is inappropriate to evaluate changes in habitat availability using a monthly time step. Furthermore, the exceedence graphs (Figures 27-410) should indicate how time was measured. Does the X-axis represent the percentage of days, months, or years for which a given WUA or percent change in exceedence is exceeded?	not simulate the dynamic change in the streambed, spawning habitat can be indirectly evaluated by the sediment transport parameters, which were used in this evaluation. The sediment transport capacity for spawning substrates are the same for existing conditions and the Proposed Action, and both have sufficient sediment movement to refresh spawning areas. 266. Daily flows were used for the aquatic habitat evaluation as stated in the Methods section (Section 3.9.2.2 of FEIS). Additional tables were generated to clarify the seasonal changes in habitat and are shown in Section 3.9.2 of the FEIS. The y-axis of the new graphs show the percent change for the time-step shown on the x-axis.
267	Fourth, not only do flows vary on shorter time scales than is picked up in monthly averages, but by presenting the results of the analysis as the proportion of time that a given WUA is available, the effects of annual variability are masked. Based on the analysis presented in the Aquatics Report, we cannot answer the question: how much more likely is it that brown trout fry will be limited by low habitat availability in successive years if the WGFP is online, versus the current condition? Similarly, we cannot answer whether or not it is more likely that trout populations will experience a catastrophic event. If, as suggested above, daily flows for the period of record were modeled under the different project alternatives, we could ask questions about how WUA would, in turn, vary. Such an analysis would allow us to ask when and how frequently did the WUA available to the various life stages drop to low levels? These issues could potentially be addressed by changes in the level of aggregation in which the analyses have been done.	267. The IFIM was developed as a tool to compare flow alternatives, not as a method to develop explicit flow recommendations based on WUA alone. The comparisons are made between flow regimes, both hydrologic and management. The daily flows that were used for the analysis are based on both hydrologic year types and management alternatives. This approach has been used by other applications of IFIM, including those by the USGS and USFWS. Long periods of daily records do not allow the analysis of typical conditions, but rather can result in a broad band of continuous habitat traces without a distinct difference between alternatives. To get a more discrete characterization, year types are used, as was the case for the WGFP.
268	Fifth, changes in WUA or temperature are not the only mechanisms by which fish can be impacted. For example, trout could be impacted if changes in flow lead to a collapse of important food resources like the stonefly, *Pteronarcys californica*. Alternatively, if reduced peak flows cause additional sediments suitable for the tubificid worm, *Tubifex tubifex*, to accumulate along the Colorado River below Windy Gap then problems with whirling disease may be exacerbated. As these examples make clear, the report needs to justify why its focus on WUA is appropriate and why some of the other obvious effects of changes in flows have been ignored.	268. Multiple types of analyses were used for the assessment of impacts to aquatic resources. These include hydrology (including peak flows), sediment transport, water quality, two-dimensional hydraulic modeling, and habitat modeling. The syntheses of these analyses are presented in the Aquatic Resources Technical Report and the FEIS. Based on those multiple methods, the peak flows are shown to continue to maintain the channel form, maintain sediment transport for spawning habitat and benthic invertebrate habitat health, have dissolved oxygen levels for healthy fish and macroinvertebrate populations, maintain base flow conditions for existing conditions and the Proposed Action, and maintain the current benthic macroinvertebrate habitat.
269	Finally, at the very least the Report should provide justification for why it does not fully evaluate the environmental impacts of the WGFP on any species other than brown and rainbow trout. The focus on trout species to the exclusion of most other species is inappropriate. Virtually all of the Colorado's aquatic species and many if not most of its riparian species are adapted to the historic flow regime. The report makes no effort to assess how changes in flow may impact other fishes, including the native mottled sculpin, algae, or riparian communities. The EIS should be adequate to satisfy the analysis of impacts to the aquatic environment that must be performed by the Corps of Engineers under the 404(b)(1) guidelines. Limiting the analysis to salmonid and macroinvertebrates is not adequate for 404(b)(1) purposes.	269. The analysis used several metrics to analyze impacts to aquatic resources (see response to Comment No. 268). The FEIS was edited to clarify the use of multiple analyses.
270	**1.5 Unsupported Conclusions.** The Report does give a brief nod to the impacts on aquatic macroinvertebrates, asserting that "[H]abitat needs of the macroinvertebrates present in the Colorado River are similar to those of trout species. Water quality conditions are not expected to change. The species and distributions of macroinvertebrates are not expected to change. The 6	270. See response to Comment Nos. 268 and 269.

Com-ment	Letter #1075	Response
270	abundance should remain the same as observed with the future conditions for all alternatives." (p. 46) However, no evidence is presented for these assertions. Since invertebrates live on the surfaces of and in the interstices between the rocks and cobbles of the stream bottom rather then in the water column where trout are found, it is not really accurate to say that the habitat needs of the two groups are similar. Further, because low flows will not only reduce the proportion of the stream channel that is inundated and thus the WUA, but may also increase the likelihood that the interstitial spaces become clogged with sediments, it is not at all clear that the effects of low flows on habitat availability will be similar for trout and macroinvertebrates. **1.6 Temperature Effects.** The Report fails to adequately address how stream temperatures will be impacted by the WGFP. The Report analysis models how reducing flows will affect temperatures based on average July 25 flows. It concludes that reducing flows will cause an increase in water temperature on the Colorado of between 0.8°C and 4°C on July 25, with the greatest increases seen when flows are reduced to 90 cfs (p.38). Although this analysis is useful, it is unclear how assessing the anticipated increase in stream temperature on July 25 will be extended from a daily maximum to a weekly average. Does this analysis account for the probability that stream temperatures on July 25 are not only affected by the conditions on that day, but by the conditions on previous days? Does reducing the flow through the Colorado River have the same impact on average weekly stream temperatures as it does on maximum daily temperatures?	
271		271. See response to Grand County comment No.125. Please see Section 3.8.4 of the FEIS for a description of temperature mitigation.
272	Because stream temperatures fluctuate more rapidly when flows are low, extending the period of low flow increases the probability that both daily maximum temperatures and weekly average temperatures will increase during those years pumping extends the low flow period. When flows are low the stream is poorly buffered against hot, sunny days. Further, when the low flow period is extended the probability that hot sunny days will occur when flows are low is increased. Thus when the low flow period is extended, there is a greater probability that hot, sunny days will result in higher stream temperatures.	272. See response to Comment No. 271. The dynamic model accounts for an extended low-flow period.
273	By increasing the number of years with protracted low-flow seasons, the WGFP increases the frequency with which critical temperatures (either daily maximum temperatures or maximum weekly average temperatures) will be exceeded. Assuming that the probability of having a temperature exceedence is correlated with the length of the low flow season, increasing the frequency with which years with protracted low flows occur will increase the frequency years with high temperatures are observed. This begs the question: how will increasing the frequency of years with elevated stream temperatures affect the stream biota, generally, and trout specifically?	273. See response to Grand County comment No. 261 and 125.
274	On p. 38 the report states: "Lower flows could increase the potential for exceedence of the weekly maximum average temperature standards for aquatic life, but is unlikely to measurably impact fish populations. This conclusion is based on the observed water temperatures, which occasionally exceed 19°C under current conditions, and the 7	274. Additional mitigation measures were defined and developed to reduce or offset the potential impacts from implementation of the proposed project from those present in the DEIS. Mitigation measures and the effectiveness of those measures are described for each resource in Chapter 3—Environmental Consequences. An updated summary of mitigation measures also is included in Section 3.25 of the FEIS. The Subdistrict developed a Fish and Wildlife Mitigation Plan (FWMP) in accordance with the requirements of CRS 37-60-122.2 (FEIS Appendix E), which includes mitigation of temperature effects in the Colorado River.

Com-ment	Letter #1075	Response
274	healthy fish population that is in the river." That healthy trout coincide with occasional observations of high temperatures is not evidence that the trout are unaffected by high temperatures. Part of the rationale behind temperature standards is the need to protect against sublethal effects that may not be manifest without protracted, repeated exposure to elevated temperatures. That trout have withstood the occasional high temperature observed to date is not evidence that that their populations will remain healthy and vigorous if the frequency (either within a year or across years) with which they are exposed to high temperatures increases. Indeed this observation is not evidence that there have been no effects of the high temperatures observed under current conditions. A more thorough evaluation of the impacts of increased temperatures is warranted. **1.7. Cumulative Effects.** The cumulative effects section (p. 50-55) is both brief and incomplete. As with other sections it focuses on the proportion of time juvenile and adult trout habitat will be reduced. As written, it is impossible to tell which impacts will occur when, as only the proportion of years with reductions in habitat availability and maximum percent change during those years is reported. Thus, the analysis presented does not address the question how will the cumulative impacts of the various foreseeable actions on habitat availability impact the long-term health and viability of the brown and rainbow trout fisheries?	
275		275. Additional analyses were completed with the data from the aquatics habitat modeling. An additional table was added to the aquatic impact discussion in Section 3.9.2.3 to show the seasonal changes in habitat by alternative.
276	There are a number of other problems with the cumulative effects section. First, the Report only analyzes the cumulative impacts of the reasonably foreseeable actions on trout WUA. It does not analyze other potential impacts on the stream ecosystem. Perhaps the most significant oversight is the lack of an analysis of the cumulative impacts of the various reasonably foreseeable actions on temperature – both daily maximums and weekly averages. Again, such an analysis should focus not only on the degree to which temperatures on a given day may increase, but on the likelihood that trout will experience potentially harmful daily or weekly temperatures as a result of more frequent (i.e. more years) and more prolonged (i.e., more days each year) low flow seasons. As before, modeling changes on a daily time step would be useful because it would allow estimates of both daily maximum temperatures and weekly average temperatures to be produced.	276. Additional discussion of the stream ecosystem, including peak flows, sediment transport, water temperature, and habitat was added to Section 3.9.2.3 of the FEIS.
277	Second, as mentioned previously, trout are not the only species likely to be affected by changes in the hydrologic regime. The cumulative impacts of these actions on other species must be considered.	277. See response to Comment No. 276. See FEIS Section 3.9.2.3.
278	Third, the list of "reasonably foreseeable actions expected to affect hydrologic conditions and potentially aquatic resources" (p. 50 is incomplete. There has been no mention of the potential of global climate change to contribute to the cumulative impacts of this project. Although the impacts of climate change are uncertain, reduced precipitation, earlier runoff, and increased late season temperatures are all possible and would all have negative impacts on the river. At the very least, the potential for global climate change to exacerbate the impacts of the WGFP should be discussed.	278. See response to Comment No. 67.
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Com-ment	Letter #1075	Response
279	Fourth, the cumulative impacts section does not appear to recognize the importance of the impacts that have already occurred within the Colorado River basin. If, as we suggest, the frequency with which the stream experiences low flow years determines the long-term impact of low flow events, then it is important to recognize that the frequency of low flow years has already been increased by the numerous water projects already operating in the basin. Part of the goal of a cumulative impacts analysis is to ensure that ecosystems do not die the death of a thousand cuts. However, this is hard to ensure if the first 500 are ignored. The cumulative impacts sections must factor in how the existing water projects have increased the frequency and duration of low flow periods.	279. The existing conditions include other past and present water projects. The cumulative effects assessment includes the combined impact of all past, present, and reasonably foreseeable future actions with the alternatives evaluated in the FEIS. The appropriate comparison for the WGFP is the comparison of existing conditions with expected future conditions.
280	**1.8 Study Area** The study focused on riverine habitat in the Colorado River from Lake Granby downstream to the confluence with the Blue River (p. 3), which is expected to input enough water to buffer any further effects downstream. However, this assumes that the Blue River will continue to be managed as it is presently, with high releases (commonly 350 – 1000+ cfs) from Green Mountain Reservoir through most of the year. Moreover, there appears to be some indication that Blue River flows may be reduced by a reduced call for Blue River water to the Shoshone power plant (see "reasonably foreseeable actions" on p. 50). It is reasonable to expect that the less water contributed from the Blue River, the less its buffering capacity. Lastly, capacity of the Blue River to "buffer" hydraulic and temperature changes does not necessarily imply a capacity to buffer ecological changes (e.g., increased downstream export of energy and organisms due to changes in ecosystem function and metabolism). Although the effects of changes in streamflow will be diminished below the Blue River, this does not mean they necessarily will be insignificant. A quantitative assessment is needed that demonstrates the impacts of changes in flow resulting from either Windy Gap or the cumulative impacts of the various projects being considered in the Upper Colorado. This could be done, for example, if a flow analysis demonstrated that the maximum amount of water that could be diverted through Windy Gap was trivial compared to the flow on Colorado below the Blue River – even during periods of low flow.	280. The area of potential effect may vary among the resources, depending on the likely area of impact. Because hydrologic impacts of the WGFP on the Colorado River diminish below the Blue River confluence, measurable impacts to aquatic resources are unlikely farther downstream. The Aquatic Resource section of the DEIS includes an analysis of impacts to habitat downstream of the Blue River confluence. Results of the analysis of impacts to fish habitat for the below the Blue River location are indicative of likely impacts for several miles below the Colorado River. Those impacts are displayed in Tables 3-90 and 3-91 in the DEIS. The analysis did not assume that the Blue River would "buffer the effects of WGFP" rather, the proportion of flow affected by WGFP to the total flow in the Colorado River downstream of the Blue River is small and, thus, effects to aquatic habitat diminish downstream.
281	The Colorado River was divided into two reaches for the IFIM analysis (p. 66). The first reach extended from Windy Gap to the Williams Fork River and the second from the Williams Fork Reservoir to the Blue. Although it was stated that this division was made on the basis of "hydrology and habitat characteristics" (p. 70), evidence supporting this assertion is lacking. Similarly, evidence demonstrating that the two study sites established to represent these reaches were, in fact, "representative" (p. 36) also is lacking. Because of this it is difficult to evaluate how the hydrology data were combined with the habitat data from Lone Buck or Breeze to scale up to the entire "Habitat Reach" (p.37). 9	281. Table 30 in the Aquatic Resource Technical Report shows the reach variables and changes in each reach. The site selection process followed the guidelines in the IFIM analysis.

Com-ment	Letter #1075	Response
281	These may not be appropriate representative reaches, and it is perhaps unrealistic to presume that each segment could be represented by one representative reach for two reasons: (1) Geomorphology. The "Lone Buck" reach represents the floodplain run-riffle habitat that characterizes much of the upstream segment. However this reach does not represent the constrained higher-gradient habitat which runs through Byers Canyon. Likewise the "Breeze" reach represents the floodplain run-riffle habitat that characterizes much of the downstream segment, but does not represent the slow moving, low gradient habitat in the lower reaches nearer to Kremmling. (2) Land Management. Both representative reaches are located on State Wildlife Areas, which are managed to provide habitat for fish and wildlife. These areas have reduced livestock grazing regimes, and reduced livestock access to the stream and riparian zone. It is unlikely that other ranches in the Colorado River valley manage livestock, grazing, and other land uses in an equally sustainable way.	
282	A related concern involves the propagation of error. How sensitive is the IFIM analysis to errors made in the field either in the measurement of hydrologic parameters or in the proportion of different habitat types? Similarly, before the conclusion can be reached that there will be few impacts of any of the alternatives, it would be good to know how sensitive the IFIM is to changes in discharge within the Colorado River.	282. Several sources of errors can affect the IFIM modeling. These include errors in the field measurements and model errors. For this analysis, a threshold of 15% change was used as the level above which impacts to aquatic habitat were considered to have effects. Other investigators in Oregon and Washington have also used this threshold level (Instream Flow Council 2008 – Short Course - What About Those High Flows have used this threshold level? Environmental Flow Requirements for High Flows on Streams and Rivers, Moderator: Alan Wald, Washington Department of Fish & Wildlife, October 6, 2008). The rationale for selecting a threshold level is based on the errors associated with field measurements and the error within the habitat models.
283	**1.9 Additional Incompletely Addressed Impacts.** Although changes in flow associated with WGFP may have the greatest impact on aquatic biota, other changes resulting from WGFP and associated cumulative changes should also be explicitly considered in the Report. Discussion of the impact of the presence and operation of the WGFP facilities on aquatic biota (e.g., the obstacle to fish movement caused by the Windy Gap dam, or possible fish entrainment from pumping activities) is almost entirely lacking. Whether this should be done as part of the evaluation of the cumulative impacts, or as the discussion of the WGFP specific impacts is unclear, but it should be addressed in the report.	283. No physical changes such as new dams or diversions are part of the WGFP on the Colorado River. As such, the existing features for the WGFP and all other structures on the river that impact aquatic resources would continue to have the same level of impact.
284	As with temperature, discussion of WGFP impacts on other water quality parameters was brief. Although the report states that dissolved oxygen levels below Windy Gap could decrease by 0.6 mg/L, it does not discuss what they will likely be or how frequently they will be reduced. As a result, it is difficult to assess what the impacts of this reduction may be other than knowing that trout will not be acutely impacted. As with temperature, knowing that dissolved oxygen remains above the lethal minimum oxygen requirement of 5.0 mg/L is no assurance that chronic effects will not result from the change in operations.	284. Section 3.9.2.3 of the DEIS and FEIS discuss the relationship between the 0.6 mg/l reduction and the 5.0 mg/l level.
	10	

Com-ment	Letter #1075	Response
285	Although the Report states that there will be no change in the trophic state of west slope streams and reservoirs, it does not provide data in support of this conclusion. How will nutrient availability in both the Colorado River and the affected reservoirs change as a result of the WGFP? Will these changes have any impacts aside from their potential to alter the tropic state of these ecosystems?	285. Mitigation measures are included in the FEIS that will offset the anticipated additional nutrients that would be added to the Three Lakes system as a result of the WGFP. Also see responses to Grand County comments No. 137 and 138. Current and predicted ammonia and nitrate concentrations are well below the standards (see Table 2 in the Stream Water Quality Technical Report and Section 3.8.2.4 in the FEIS).
	2.0 SPECIFIC COMMENTS BY PAGE	
286	**Comment No. 1** **Page 2:** a. The Report contains legal conclusions about prepositioning that are contrary to Colorado law. Grand County and the Colorado River Water Conservation District have sent many letters to the Bureau of Reclamation raising concerns about prepositioning. Because of reliance on legal conclusions that do not conform to Colorado law, subsequent conclusions in the Aquatics Report are based on the false premise that there will be no expansions of C-BT diversions. Before the actual levels of diversions can be quantified, the proponents of the WGFP will need to file an application to change the place of storage of C-BT water rights (assuming Reclamation will consent) and of the Windy Gap water rights to allow them to be stored in the proposed new reservoirs. Whether or not there will in fact not be any expansion of the C-BT and Windy Gap water rights from existing conditions will depend on the decrees issued by the water court.	286. See response to comment No. 197.
287	**Comment No. 2** **Page 3:** **a.** The study area should extend to 15- mile reach for endangered species to comply with the Endangered Species Act.	287. Potential effects to Colorado River endangered fish species are addressed in Section 3.13 of the FEIS.
288	**Comment No. 3** **Page 10:** a. Macroinvertebrate sampling was done on September 17, 2004 for assessment of existing conditions. No effort is made to explain how the flows during this period compare to average, wet or dry year hydrology presented in the Technical Reports. Conclusions about water quality are based on a worst case analysis for July 25th . Are macroinvertebrate population metrics expected to be different during the falling limb of the hydrograph (July) than at base flow (September)?	288. Macroinvertebrate communities in snowmelt-dominated rivers have evolved to persist with the general shape of the hydrograph. Further, most macroinvertebrates in snowmelt rivers have evolved to avoid runoff. This is accomplished by being very small (egg or early instar), or out of the water (adult phase). Many of the species in the Colorado River have one complete life cycle per year and deposit their eggs in spring or summer. Either fall or spring sampling is typical to obtain information regarding the invertebrate community structure. The September sampling date is a time when field conditions are safe and the specimens are of a size that is more easily identified to the species level than earlier in the year. The number of species that can be identified directly influences macroinvertebrate metrics. The population metrics are expected to be different during July and September mainly due to the inability to capture and identify the species in July.
289	**Comment No. 4** **Page 13:** a. Table 1. Are the temperature values shown based on daily, maximum or weekly average? Or some other value?	289. These are absolute values that depict the range of tolerance or optima that apply to each life stage. The time increment varied by study.
290	b. What is the basis of statement that management actions of stocking and regulations limiting harvesting affect fish population more than environmental conditions? Describe what is meant by catastrophic event.	290. The basis for the statement regarding management actions comes from general fishery principles and specific studies conducted by CDPW in the 1970s and 1980s. There is a large body of literature on the effect of restrictions to harvest limits and types of tackle. In general, when harvest limits are enforced or no harvest is allowed (such as catch and release), fish populations increase. Examples of catastrophic events are provided on page 13 of the Aquatic Resource Technical Report.
	11	

Com-ment	Letter #1075	Response
291	**Comment No. 5** **Page 14:** a. Table 2. What were the native species in the Colorado River in the past, before C-BT and Moffat? Cutthroat trout?	291. There were 14 species native to the upper Colorado Basin prior to European settlement. The only native trout in the upper Colorado River was the Colorado River cutthroat trout.
292	b. Table 3. Where range of temperatures and dissolved oxygen are given, at what locations were samples taken? When?	292. The locations are provided in Table 3 of the Stream Water Quality Technical Report (ERO and AMEC 2007).
293	**Comment No. 6** **Page 15:** a. Senate Document 80, the document that controls operation of the C-BT, states that one of the primary purposes of C-BT is "[T]o preserve the fishing and recreational facilities and the scenic attraction of Grand Lake, the Colorado River…" As part of discussion of past actions, there should be a discussion of whether preservation of fishing and recreation has occurred. The Report should rely on and make reference to the 1951 report prepared by the US Fish and Wildlife for the Bureau of Reclamation which detailed the devastating effects of Granby Dam on the river.	293. See responses to Grand County comments No. 10 through 14.
294	b. How was the reduction in the flows established by 1961 Operating Principles for the C-BT project modeled? The Report should disclose the impacts that occurred in September 2006 when the flows below Granby dam were reduced to 20 cfs.	294. Flows below Granby are modeled as they are stated in the 1961 Principles. The 1961 Principles allow for reductions dependent upon the forecasted inflows to the Three Lakes System as discussed in paragraph (3) of the 1961 Principles.
295	c. Portions of the River below Windy Gap are also a Gold Medal Fishery.	295. The FEIS reports the Gold Medal designation.
296	d. Existing bypass flow requirements below Lake Granby and Windy Gap are described, but there is no assessment whether these flows are appropriate for protection of the environment or whether prolonged durations at those flow levels as a result of WGFP alternatives will have adverse impacts.	296. These minimum flows are held by CWCB and, as stated in the statute, protect the environment to a "reasonable degree." Reclamation assumes the specified flows were derived with the techniques specified by CWCB and, therefore, are appropriate minimum flows. The flows below Granby were derived following a study and report by the Fish and Wildlife Service and a decision by the Secretary of the Interior in accordance with the requirements of Stipulation l in Senate Document 80. The WGFP would not change the minimum flow requirements below Granby Reservoir or Windy Gap. The habitat analysis, using daily flows, evaluated the effects of flows that result from WGFP compared to existing conditions, which included maintaining existing bypass flows
297	**Comment No. 7** **Page 24:** a. Why are the metrics of fish population for Willow Creek in Table 10 different than those for the Colorado River found in Tables 4 and 5, page 19?	297. The sources of data varied by collection and where possible, the same metrics are displayed. In instances where the metrics differ, the data were not available to convert to a common metric.
298	**Comment No. 8** **Page 25:** a. The macroinvertebrate metrics in Table 11 are fairly consistent at the three sites on Willow Creek. Only two sites are used for to represent the much longer reach of the Colorado River, with many more environmental influences along that reach. There is not the same consistency of these metrics for the Colorado River (see Tables 8 & 9, page 21) as for Willow Creek. Willow Creek data were collected in May 1997 whereas Colorado River data were collected in September 2004. There is no discussion as to whether this inconsistency between results for Willow Creek and the Colorado River demonstrates the effects of seasons (May versus September) on macroinvertebrate 12	298. Both Willow Creek and the Colorado River were segmented according to standard IFIM protocols. The focus of the invertebrate sampling was the effects of the WGFP, which is the reason for the selection of the sampling sites. The May 1 sample in Willow Creek was collected at a time when the majority of the expected taxa were susceptible to capture and large enough for accurate identification. The same applies to the fall sample for the Colorado River.

Com-ment	Letter #1075	Response
298	metrics, or hydraulics (early runoff versus base flow), or hydrology (were 1997 & 2004 wet, dry or average years?).	299. Irrespective of the sucker population in each lake, Granby and Shadow Mountain Reservoirs and Grand Lake each provide recreational fishing opportunities as stated in the report. The reason for this statement is unclear since most other large mountain lakes and reservoirs have similar population levels of suckers. The tables do not present population levels. Many factors can affect the sampling results. CDPW data was used to show the species present, not to infer population dynamics.
299	**Comment No. 9** **Pages 27-29:** a. The text reports that all these lakes and reservoirs provide recreational fishing. What is not stated, but is demonstrated by the tables, is that the reservoirs are dominated by non-native suckers, which are not considered a game fish: Table 14 Shadow Mountain Reservoir – 81% suckers; Table 15 Granby Reservoir – 86% suckers; and Table 16 Windy Gap Reservoir – 89% suckers.	
300	**Comment No. 10** **Page 29:** a. There is a discussion of Whirling Disease, but not on the effects of the WGFP on that disease. As part of the past actions, Windy Gap Reservoir became a breeding ground for tubifex worm which caused and contributed to Whirling Disease in the Colorado River. What data forms the basis of statement that Windy Gap is no longer considered a "major source" of TAM?	300. The statement attributing lower whirling disease pathogens comes from Mr. Barry Nehring of CDPW. The FEIS was edited to note the source of that statement. The lower number of pathogens may be, in part, due to a shift in the species composition of tubifex worms in Windy Gap Reservoir. In a presentation made on the Colorado River fishery, Jon Ewert, CDPW biologist, stated that the nonhost tubifex species was becoming more prevalent in the reservoir and was part of the reason for the lower incidence of whirling disease pathogens (Jon Ewert, CDPW, July 14, 2009).
301	**Comment No. 11** **Page 32:** a. Need to extend study to 15 mile reach for endangered species.	301. See response to Comment No. 287.
302	b. What data forms the basis of the statement that the Colorado River cutthroat does not occur in the study area? What was the cutthroat in Shadow Mountain Reservoir? What was the dominant species in the Upper Colorado River before damming of the river and diversions by C-BT, Denver and Windy Gap? Wasn't it the Colorado River cutthroat? How has the disappearance of the Colorado River cutthroat from the head waters of the Colorado River been factored into past actions?	302. Available data for fish populations was acquired from CDPW. No Colorado River cutthroat trout were reported in CDPW data. The decline in Colorado River cutthroat populations is primarily from the introduction of nonnative salmonids and is unrelated to the WGFP. See response to Comment No. 291.
303	**Comment No. 12** **Page 34:** a. Figure 8. Typical hydrograph is presented based on average daily flows. How was this daily hydrograph used in the Aquatics Report, if at all? Graphs of low daily flows and high daily flows would be helpful for comparison purposes.	303. Daily flows were used in all habitat analyses. Figures of average hydrology were added to Section 3.9.2.3 of the FEIS for the Below Windy Gap and Above the Blue River reaches to illustrate how the daily data were used in the habitat analysis.
304	**Comment No. 13** **Page 36:** a. Only two sites were selected for studying fish habitat, and the sites are stated to be representative of the reach of the river affected. Those two sites are not representative of the reach from Granby Dam to Windy Gap Reservoir, nor the reach from Windy Gap to the head of Byers Canyon, nor of the reach in Byers Canyon, nor the reach below Con Ritchards through the Kremmling area to the head of Gore Canyon, nor of the reach in Gore Canyon.	304. The site selection process followed the guidelines in the IFIM literature. Table 30 in the Aquatic Resource Technical Report shows the reach variables and the changes in each reach. The final site selection was completed in conjunction with CDPW at the initiation of the study. The sites are representative.
	13	

Com-ment	Letter #1075	Response
305	b. The report states the hydrologic conditions at six sites were combined with the habitat data from the two sites to determine changes to fish habitat. The report does not say how the hydrologic data was used in the River 2D model, but the report states that "average dry, and wet years were modeled under the various WGFP alternatives" not daily stream flows.	305. FEIS Section 3.9.2.3 was edited to clarify the use of the hydrology and habitat data.
306	**Comment No. 14** **Page 37:** a. Figure 9. This schematic should also be represented by a field map showing these locations on the ground. Are these locations the same as where a stream gage is located? If so, this should be stated. If so, how were actual daily gauged stream flows used to calibrate the modeled flows in River 2D?	306. The figure depicts the study area as the data were applied. The habitat sites represent longer reaches than the hydrology data. The hydrology data were derived from hydrology locations that were representative of homogeneous hydrology. A field map would have the same schematic appearance.
307	**Comment No. 15** **Page 38** a. What is the basis for statement that a "qualitative" approach for assessing changes in fish community/population is sufficient for this analysis? The Report concludes that factors such as fishing pressure, management and stocking can change fish population more than physical habitat. What is the basis of this statement? What fishing pressures have been experienced in the study area? What management and stocking practices are in place in study area? What about Whirling Disease's impact on Rainbow Trout?	307. See response to Comment No. 290.
308	b. There are no clear criteria to define an "impact" to the aquatic environment. For example, temperature changes are reported at an accuracy of a tenth of a degree Celsius in the Stream Water Quality Report for the July 25th worst case. The Aquatics Report then concludes that although temperatures are projected to increase 4 degrees to about 19 degrees as a result of WGFP in this worst case, and thus will exceed State of Colorado water quality standards for temperature below Windy Gap, it is "unlikely to measurably impact fish populations." A water quality standard has been established to protect the fish; a violation of this standard is, in and of itself, an impact and the standard is the criterion to measure whether impacts will occur.	308. The discussion of the threshold for impact analysis was added to the Section 3.9.2.2 of the FEIS. Also, see response to Comment No. 282.
309	**Comment No. 16** **Page 37:** a. The basis for not studying daily values in May, June, July, August is not revealed. The assumption is that flows are high in May and June, which may or may not be true, depending upon the year, and the flows that year. It appears that more refined water quality studies were conducted when the July 25th flows below Windy Gap dropped below 90 cfs. This method, if properly done, is what needs to occur on a daily basis to determine impacts. The 19° C predicted temperature is just above the Williams Fork confluence, miles downstream. What was the predicted temperature just below Windy Gap? The Report does not reference the temperature data gathered by Grand County Network. How does that temperature data compare to Miller's data? Isn't it a fact that the lower flows "will" (not could potentially) increase the weekly maximum average temperature below Windy Gap? There is no discussion of the interim 14	309. Daily flows were modeled and the data incorporated into the FEIS. Predicted worst-case stream temperatures for July 25 for the Colorado River downstream for 45 miles are shown in the figures in Section 3.8.2.4 of the FEIS. Grand County water temperature data for the Lone Buck site in 2007 was presented in Figure 3-29 of the DEIS. WGFP diversions are projected to increase stream temperature downstream. Effects of the WGFP on temperatures downstream of Windy Gap Reservoir were further evaluated with a dynamic temperature model as described in Section 3.8.2 of the FEIS. The Fish and Wildlife Mitigation Plan developed by the Subdistrict in accordance with CRS 37-60-122.2 includes measures to minimize temperature standard exceedances associated with the WGFP. There is no data to show that the condition factor of any trout species during summer in this reach of the river is affected by water temperature.

Com-ment	Letter #1075	Response
309	temperature standard on this reach. Why? Are the Rainbow Trout healthy in this reach of the river, as stated in the Report?	
310	**Comment No. 17** **Pages 38-47:** a. Out of a 292 page report, only 7 pages with three tables are devoted to describing the impacts on the streams on the West Slope.	310. The appendices with additional supporting data for West Slope impacts are cited and included in the revised Aquatic Resource Technical Report.
311	**Comment No. 18** **Page 39:** a. Contrary to the statement that fish habitat data is not available for the reach between Granby Dam and Windy Gap, the 1951 Fish and Wildlife Report studied this reach extensively. As part of past, present and future actions, this 1951 report should be independently factored into the WGFP analysis – from a scientific perspective. The statement is made (without any supporting basis) that there may be shift in habitat, but unlikely to impact fish populations. Where would the impacted habitat be located and where would the fish shift to find suitable habitat? When would this occur? Under what circumstances? What are the daily flows when a shift would occur?	311. A report that documents conditions in 1951 is not appropriate for use in 2008; however, we understand that Grand County has completed studies in 2007 for the Colorado River between Granby and Windy Gap Reservoir. The Grand County SMP is discussed in the FEIS, but the SMP had different objectives than the WGFP EIS. The statement regarding the shift in habitat was referring to a spatial change for the location of available habitat within the river channel due to changes in depth or velocity.
312	b. It is not surprising that the habitat model shows a consistent pattern for the WGFP alternatives. That is what happens when "monthly averages" are used – everything is "smoothed" out - spikes in flows are gone, back to back days of low flows disappear, series of low flow days or high flow days are masked, daily opportunities to divert based on river conditions get averaged, etc. It is not a real picture of the impacts. It is perhaps for this reason that the "impacts" in figures 27-231 are presented in such a meaningless manner as: (1) percentage change in exceedence and (2) percent change in percent exceedence – without a correlation of flows.	312. Since this is a "Technical Report," the data are presented in the usual format for this type of analysis. Daily flows were used for the habitat analysis. The WGFP Aquatic Resource Report (Miller 2010) was revised to provide additional analysis of impacts to aquatic habitat. The results are included in Section 3.9.3 of the FEIS.
313	c. The Report concludes no "substantial" change in fish habitat at 4 specified sites as a result of any WGFP alternative in all flow conditions. However, Tables 21 and 22 (p44 and 45) show some of these 4 sites with 24% loss in habitat (e.g. Hot Sulphur) in wet years (frequency of 1 in 10 years - it is not clear if that is 1 in 10 wet years or the wet year frequency is 1 out of 10 years, as in the Water Resources Report). The Report also states that below Windy Gap "substantial" (20-30%) losses of habitat occur for all WGFP alternatives for both Brown and Rainbow trout. Then it states these losses only occur 10-20% of the time. Who determines what is a "substantial" change?	313. The maximum changes in habitat values for the proposed action occur at a time of year when there is much more habitat available than during the fall and winter when the lowest amount of habitat occurs. For example, see Figures 83 and 85 for juvenile rainbow trout.
314	**Comment No. 19** **Pages 43-45:** a. Tables 20, 21 and 22. This is the "heart" of the impact analysis. There are a number of problems. First, the percent change could be an increase of decrease in habitat, which is not shown. Second, the frequency of occurrence is measured in "years," not days or even months. The model should show the days in the months of the years that the impacts occur. Third, although life stages are said to be shown, the spawning stage is not presented. Fourth, no basis is stated for asserting that dry year flow conditions would not change. Fifth, the statement that four of the sites exhibited no 15	314. The summary tables were revised in the FEIS to note positive or negative changes. The data were generated from daily flows and then adjusted for the yearly recurrence. All life stages modeled are presented in the table. There are no changes to flow in dry years; therefore, there is no change in habitat. The narrative in Section 3.9.2 of the FEIS was edited to reflect the revisions to the tables. The data presentation was changed to a seasonal analysis rather than the exceedance values presented in the DEIS.

Com-ment	Letter #1075	Response
314	substantial change is not borne out by the table. Sixth, what is considered substantial decrease in habitat? 20-30% decrease according to the Report, but on an average monthly basis. How does this translate into days of decrease in habitat and what are the flows on those days?	
315	**Comment No. 20** **Page 46:** a. It is not surprising that fish habitat changes for all alternatives are very similar because averages will tend to smooth out the bumps. An impact, even in 1 out of 10 years is an impact, especially if the flow and habitat are reduced on a day or a series of days, which is not shown. The measure of the frequency of impact in years is too broad. It needs to be brought down to a daily basis to have any meaning.	315. Daily flows were used in the analysis. See additional tables and discussion in Section 3.9.2.3 of the FEIS that show the duration of changes in habitat.
316	b. What is the basis of the statements on this page about the trout being able to withstand impacts based on frequency of years of impact?	316. The general literature regarding fish ecology and trout life history were relied on for the statement.
317	c. The Report concludes that because trout in the study area have a maximum age of about 6 to 7 years, the loss of habitat associated with the WGFP alternatives that are projected to occur less frequently than their life span (e.g. 2 out of 10 years) are not consequential. This conclusion makes no sense: there is a significant habitat loss (e.g. 24% reduction), and there is no consideration of losses for other subsequent hydrologic years. The entire population present at that time would be affected even if it is only twice in 10 years	317. The population present at the time of any decrease or increase could be effected; however, the duration of the increase or decrease also must be considered. Additional analyses were completed using the same data set to show the duration of the change in habitat. Those analysis were included in Section 3.9.2.3 of the FEIS and the Aquatic Resource Technical Report.
318	**Comment No. 21** **Pages 51:** a. One very short paragraph in the Aquatics Report asserts fish habitat impacts under cumulative impact analysis is very similar to those described in the section on direct effects of WGFP alternatives. However a comparison of Tables 25 and 26 with Table 21 and 22 shows additional losses from cumulative affects typically at least 5% more than direct effects and as much as 18% additional habitat loss for adult Rainbows above the Blue River in average years. Interpretation of the data in these tables in the text is misleading at best.	318. See response to Comment No. 317.
319	**Comment No. 22** **Page 51 and Tables 26 and 27:** a. The problems concerning the analysis of direct impacts are multiplied when attempting to look at cumulative impacts, especially when it comes to daily flows and the need to take a "hard look" at impacts. The conclusion presented in Tables 26 and 27 cannot be verified, because monthly averages are shown. The statement that this is a "slight increase in loss of habitat but a slight decrease in frequency" is not explained because each of the reasonably foreseeable actions is not described. Accordingly it is impossible to know which of the actions caused the incremental increase in loss of habitat and which of the actions caused a slight decrease in frequency and why this phenomenon occurred. 16	319. The analysis was based on daily flows not monthly flows. The effects of reasonably foreseeable actions were not segregated in the analysis. See the additional discussion added to Section 3.9.3 in the FEIS.

Com-ment	Letter #1075	Response
320	**Comment No. 23** **Page 66:** a. As described on page 66, the output from a stream flow model should show "changes in habitat for a duration of time". Because fish live on a daily basis, that habitat change should be modeled on a daily time step.	320. See response to Comment No. 319.
321	**Comment No. 24** **Page 73:** a. Figure 14. This photograph shows low flows with rocks exposed as "existing conditions." The existing conditions include substantial transmountain diversions by past actions. Where is the analysis and comparison of pre-development flows (past) to existing flows (current) to reasonably foreseeable cumulative actions (future) and the impacts on the aquatic system?	321. The affected environment for all resource evaluations is based on existing conditions at the time the reports were written. Existing conditions reflect past actions, such as the Windy Gap Project, which was completed in 1985, and other actions since that time. Existing conditions, as well as the No Action Alternative, provide the baseline for comparison of the incremental impacts of the Proposed Action and other alternatives. To provide a consistent comparison of the impacts of the alternative actions, the cumulative effects analysis uses the same baseline (existing conditions and No Action) as the direct effects analysis. The cumulative effects analysis includes the effects of the alternative WGFP actions added to existing conditions, which reflect past actions, plus the incremental effects from identified reasonably foreseeable actions. The cumulative effects evaluation represents what the environment would look like in the future if all of the reasonably foreseeable actions are implemented along with one of the WGFP alternatives.
322	**Comment No. 25** **Page 74:** a. The Report recognizes that the "actual habitat experienced by species is a function of the discharge at the site over time." Because rivers flow on a daily basis and changes in flows occur daily, it is important to know the flow regimen of the river on any particular day.	
323	b. The Report recognizes the importance of the habitat flow step over time, but fails to make an analysis of the daily flows. Instead, "for this study, the flows from the Windy Gap analysis and monthly gage data (ERO and Boyle 2007) was used to generate a baseline and proposed action hydrology data sets." The "hydrology data set of interest is copied into spreadsheet columns." That is, this is the "input" based on "monthly average flows".	322. The analysis used daily flows. 323. The analysis used daily flows.
324	**Comment No. 26** **Page 78:** a. Whirling Disease is a "limiting factor" for Rainbow Trout, but no further discussion is provided as to whether the WGFP alternatives will increase the disease.	324. There are many factors that could control or curtail the spread of whirling disease. Whirling disease in particular is widespread across Colorado and has resulted in the loss or substantial reduction of rainbow trout populations in most of the state's rivers. The CDPW is actively researching ways to counteract whirling disease within the river systems, including stocking alternate species that are less susceptible to whirling disease. See also response to Grand County Comment No. 300. Given the complexity of the problem and the lack of a specific cause-and-effect relationship, we have tried to address the expected changes qualitatively based on the best available data.
325	**Comment No. 27** **Page 82:** a. The Report notes that the habitat for both species peaks at both sites between 400 cfs and 500 cfs. It is not clear if those peaks are transposed up or down the stream to different sites with different habitat conditions. A range of flows preferred by trout should be provided.	325. The range of habitat and flow is presented in the figures. The habitat function applies to the reach of stream it represents.
326	**Comment No. 28** **Pages 84-86:** a. Figures 20 to Figure 23 are the most helpful in showing the Habitat Area with a flow rate in cfs as it is typically done for these types of study. All of the impacts should be done showing impacts at a given rate of flow. Without translating this 17	326. The habitat time series translates the habitat flow function to habitat over time using the daily hydrology. The results displayed in the habitat time series graphs and tables incorporate the impacts on a daily basis.

Com-ment	Letter #1075	Response
326	information to flows, the impacts cannot be readily determined by those familiar with stream flows measured in cfs or whether there is an impact to fish on a given day. 18	

Com-ment	Letter #1075	Response

COLEY/FORREST

990 S. ADAMS WAY • DENVER, CO 80209 • JTOWNSEND@COLEYFORREST.COM

Date: December 15, 2008

To: Lurline Underbrink-Curran, County Manager
Grand County, Colorado

From: Jean Townsend, President
Coley/Forrest, Inc.

RE: WINDY GAP FIRMING PROJECT - DRAFT ENVIRONMENTAL IMPACT REPORT (DES 08-30)

This memorandum includes a review of the *Draft Windy Gap Firming Project – Draft Environmental Impact Statement* (DES 08-30) (DEIS) with emphasis on land use, recreation, visual quality and socioeconomic components in Grand County.

Section 1.0 introduces issues, concerns and potential inadequacies of the DEIS. Section 2.0 provides page-specific comments that correspond with the issues referenced in Section 1.0.

TABLE OF CONTENTS

Com-ment	Letter #1075	Response
	1.0 GENERAL COMMENTS This section introduces issues and concerns about specific topics presented in the DEIS that affect Grand County. Where appropriate, page-specific comments are listed at the conclusion of the discussion of each issue or concern. These comments are presented in Section 2.0. – The first three sections address impacts that have been excluded from consideration. Some were mentioned in the *Public Scoping Report* but excluded (1.1); some were mentioned in the DEIS in a qualitative manner and then dismissed (1.2); some are simply excluded from consideration (1.3) – The next two sections discuss concerns about the baseline conditions and methodology (1.4) and the definition of the No Action Alternative (1.5). – The next four sections summarize concerns about specific sections of the DEIS including land use (1.6), recreation (1.7), visual impacts (1.8) and socioeconomic (1.9). – The final section discusses mitigation. (1.10). **1.1 IMPACTS LISTED IN PUBLIC SCOPING REPORT** The *Public Scoping Report* (ERO Resources, December 2003) lists a number of issues and concerns related to potential Windy Gap Firming Project (WGFP) land use, recreation, visual, and socioeconomic impacts in Grand County. However, a number of these concerns either were not addressed or were not addressed comprehensively in the DEIS. Some illustrative examples follow. All page references in this section are from the *Public Scoping Report*. 327 328 ***Land Use Remarks:*** – Two remarks regarding agriculture were: "Disclose effects to irrigation lands and rights downstream of the project and any associated economic effects." *(page D-10)* and "Evaluate effects to agricultural/irrigation users in the Colorado River Basin." *(page D-11)* 329 – Land use concerns related to lakeshore properties "from an alluvial buildup on the Grand Lake side of the outlet canal" were recorded. *(page 15)* 330 – "Landowner development plans for portions of the Jasper Reservoir should be taken into consideration." (p*age D-12)* ***Recreation Remarks:*** 331 – A specific request to "evaluate recreation impacts on Grand Lake" was recorded. *(page D-11)* REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 2 OF 40	327. See response to Comment Nos. 328 through 339. 328. See response to Comment No. 348. 329. A discussion of the delta located in Grand Lake at the east end of the channel is included in the revised FEIS. It is very difficult to quantitatively describe the factors influencing the development of this delta given the existing problems with sediment in Shadow Mountain Reservoir. While it is possible that the Farr pumping contributes to the formation of the delta, there is insufficient information to determine the cause of the delta. 330. Construction of the Jasper East Reservoir would directly affect individual properties that may be subject to acquisition for reservoir construction and operation. Most of the reservoir site is owned by the Subdistrict and Reclamation. As pointed out in the Socioeconomics section of the DEIS, construction of Jasper East Reservoir may result in beneficial effects to nearby private property if recreation is developed at that site. 331. As described in the Recreation section of the DEIS, none of the proposed alternatives would affect water levels at Grand Lake and, therefore, would not result in any changes to recreation activities or opportunities. Nutrient mitigation measures, as summarized in Section 3.25 of the FEIS, would address water quality impacts to the Three Lakes system as a result of the WGFP and any associated impacts to recreation.

Com-ment	Letter #1075	Response
332	– Several concerns about aquatic resources related directly to fishing in the Colorado River included "concern about fish kills due to stream flow changes", "impacts to aquatic resources from water temperature changes and stream flow changes" and "potential impacts to all Colorado River fish species." *(page D-8)* ***Socioeconomic Remarks:*** – Socioeconomic issues in Grand County included "potential impacts to tourism and recreation industries" (not just active recreation participants using publicly accessed facilities), "additional costs associated with the potential need to upgrade wastewater treatment plants", and "economic impacts to the communities of Grand Lake, Kremmling and Hot Sulpher Springs." *(pages 14 and D-10)*	332. The Aquatic Resources section of the FEIS discusses impacts to fish. The Subdistrict developed a Fish and Wildlife Mitigation Plan (FWMP) in accordance with the requirements of CRS 37-60-122.2 (FEIS Appendix E) to address impacts to aquatic resources. The FWMP is a component of the mitigation and environmental commitments described in the FEIS (Section 3.25).
333		333. The focus of the socioeconomics analysis is on the water-based recreation activities of fishing and boating because those activities are where the majority of effects are likely to occur. Proposed nutrient, temperature, and other aquatic resource mitigation measures, as summarized in Section 3.25 of the FEIS, would reduce the potential for adverse economic effects.
334	– Two broad socioeconomic impact remarks were provided: "Evaluate baseline conditions and future impacts to Grand County's water-based recreation economy and tourism industry." *(page D-10)* and "Evaluate impacts to the Grand County economy and its ability to grow if water diversions from the basin increase." *(page D-11)* ***Visual Impact Remark:***	334. As noted in the preceding response, the socioeconomics analysis specifically focuses on water-based recreation, including the affected environment and future impacts. There is no evidence that there would be insufficient water for future Grand County growth because of the WGFP or other reasonably foreseeable projects. In the 1980 *Agreement Concerning the Windy Gap Project and the Azure Reservoir Power Project*, the Subdistrict subordinated its Windy Gap decrees to all present and future in-basin irrigation, domestic, and municipal uses, excluding industrial uses, on the Colorado and Fraser rivers and their tributaries above Windy Gap Reservoir.
335	– Visual impact scoping remarks included "impacts to scenic resources caused by streamflow depletions." *(page D-10)* ***Water Resource and Wastewater Treatment Remarks:***	335. The Visual Quality section of the DEIS includes discussion on effects to scenic quality under the alternatives.
336	– "Calculate impacts of worst case scenarios on flows and storage." *(page D-5)*	336. The DEIS evaluated the hydrologic effects for a 47-year period or record that included a range of average, wet, and dry conditions. In addition, the EIS provided an analysis of impacts to water quality, aquatic life, and other resources under minimum instream flow of 90 cfs allowable below Windy Gap Reservoir. The DEIS provided an analysis of storage in Granby Reservoir and effects to resources under a series of dry years that would lower the reservoir level. Both of these analyses were provided in Section 3.5.2.6 of the DEIS.
337	– "Evaluate future water supplies for Kremmling and Hot Sulphur Springs *(page D-5)*	337. Kremmling does not get its water supply from the Colorado River. Hot Sulphur Springs has a right to divert 3.34 cfs of water from the Colorado River that is senior to the Windy Gap diversion rights. Colorado water law states that Windy Gap cannot impair Hot Sulphur Springs' more senior water right to divert this water. Evaluating future water supplies for these towns is beyond the scope of the Proposed Action.
338	– "Evaluate impacts to water and wastewater facilities in the Fraser and Colorado River Basins. *(page D-5)*	338. Water and wastewater facilities on the Fraser River would not be affected by the WGFP. However, proposed nutrient mitigation would likely improve water
339	– Several remarks addressed "…the amount of water that would remain available for West Slope needs in the Fraser River Basin and the communities of Hot Sulphur Springs and Kremmling on the Colorado River." *(page 11)* **1.2 IMPACTS ACKNOWLEDGED IN DEIS**	
340	There are many instances in which the DEIS acknowledges a negative impact but it does not follow through by quantifying the effects or considering the socioeconomic consequences. These qualitative remarks are also removed from the summary and missing from any mitigation consideration. REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 3 OF 40	

Com-ment	Letter #1075	Response
341	***Construction Impacts.*** Construction impacts are acknowledged. Some impacts last for up to 38 months. However, there is no recognition of potential negative consequences on private property, such as loss of serenity, or on the County due to increased road maintenance costs. (See comment LU-3.)	quality in the Fraser and Colorado rivers. The Kremmling WTP is not located on the Colorado River and its WWTP does not discharge to the Colorado River. Hot Sulphur Springs' WTP diversion and WWTP discharge are located on the Colorado River. The original Windy Gap project provided the Town of Hot Sulphur Springs $150,000 to improve their WTP and $270,000 to improve their WWTP. A discussion of impacts to the Hot Sulphur Springs' WTP and WWTP is included in a new subsection in (Section 3.8.2.4 of the FEIS).
342	***Assessed Valuation Losses.*** Land acquisition is required and acknowledged in Alternatives 3, 4 and 5, but there is no mention of the County's loss in assessed valuation as property is removed from private use and purchased by a tax-exempt entity. These are straightforward calculations that were excluded.	339. Water supply in the Fraser River basin would not be affected by the WGFP. See response to Comment No. 337 on Kremmling's and Hot Sulphur Springs' water supply.
343	***Existing Reservoir Degradation.*** Decreases in reservoir water surface area, reservoir water clarity and reservoir water quality are all mentioned has having potential negative impacts on recreation and visitation, but there is no attempt to quantify or follow through in the analysis discussion of socioeconomic effects. There is easily accessible secondary literature that addresses and quantifies these relationships. In addition, there is recent case history of lower water surface area effects on Lake Granby from 2002 and 2003. The analysts did not report any attempts to learn about these localized and relevant impacts. The DEIS concludes that it is unknown whether reduced water clarity, algal growth or chronic toxin concerns in Grand Lake and Shadow Mountain Reservoir will have an impact and so it ignores further consideration. (See comments R-9, R-12, R-15 and R-24.)	340. See response to Comment Nos. 341 through 344. 341. The effects of construction of a reservoir and related facilities construction on private property and businesses is discussed in the Socioeconomics section of the FEIS. With respect to impacts on serenity, possible temporary reductions in property values due to noise, traffic, and disturbances are described in the Socioeconomics section. Noise impacts are discussed in Section 3.17 of the FEIS. 342. See response to Comment No. 404.
344	***Real Estate Values.*** The DEIS acknowledges "concern" about real estate values but provides no quantitative or qualitative description and no mitigation solutions. There are scholarly articles regarding the relationship between water clarity and property values that could have been applied. [1] [2] [3] [4]	343. We were unable to find any information to quantify the incremental impacts on recreation and visitation from changes in water surface area, clarity, and water quality for a high elevation western water storage reservoir where water levels fluctuate widely like Granby Reservoir. The literature referenced in the comments pertains to natural lakes in Maine or reservoirs devoted to multiple purposes in the Southeast United States. Moreover, recreation and visitation during extended droughts when Granby Reservoir would be at low levels also are impacted by fire restrictions, high temperatures (Brad Orr, USFS 2008), or other factors such as sparse upland vegetation that are unrelated to water level. Proposed mitigation measures for the Preferred Alternative in the FEIS (Section 3.25), including modification of prepositioning to maintain higher water levels in Granby Reservoir and nutrient mitigation to offset nutrient loadings to the Three Lakes, would reduce the potential for recreation and socioeconomic impacts.
345	**1.3 IMPACTS EXCLUDED FROM CONSIDERATION** There is a third category of impacts that were not mentioned in the Public Scoping Document and were not referenced in the DEIS, but were mentioned in earlier documents submitted to the Applicant by Grand County. These types of impacts have also been excluded from consideration. They include: - loss of sport fishing lease revenues, due to lower streamflows; - loss of private boating and fishing activities conducted by visitors; - water supply and demand needs in Grand County; - reduced real estate values of resorts, dude ranches and developments that rely on views and streamflow.	
346	There is an implicit assumption that Grand County should endure any environmental impacts with socioeconomic consequences so that <u>future</u> Subdistrict customers can have water. It is unclear why one West Slope county should be burdened so that other Front Range counties can	344. As described in response to Comment No. 343, proposed modifications in prepositioning and nutrient mitigation would reduce the potential for any measurable impacts to real estate values near the Three Lakes that might be attributable to the WGFP.

REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 4 OF 40

Com-ment	Letter #1075	Response
346	grow. There is no apparent commitment to water conservation by existing Subdistrict customers to even minimize their need for additional water **1.4 BASELINE CONDITIONS AND PARAMETERS** ***Baseline - Affected Environment.*** *Guidelines for Preparing Economic Analyses*, prepared by the US Environmental Protection Agency, provides principles for describing baseline conditions. "Specification of baseline conditions can have profound influence on the measurement and interpretation of analytical results…The honesty and integrity of the analysis depend on the ability of the analyst to provide well-defined and defensible choices in selection and estimation of baseline conditions. The first step is to select a baseline that is appropriate to the question the analysis is intended the address. The second step is to estimate the values of relevant factors in the selected baseline scenario." [5]	345. Effects were quantified where data on use and impacts are available. Effects of the proposed alternatives on recreation experiences and aesthetics is qualitatively described wherever possible, recognizing that these effects vary widely by individual user. As described in the Aquatic Resources section, projected effects to fish habitat are not anticipated to translate to a loss in fishing opportunities or fishing success. Measures in the Fish and Wildlife Mitigation Plan (FEIS Appendix E) would reduce aquatic resource impacts. Reductions in preferred boating flows and boating days are described in the Recreation and Socioeconomics sections. This analysis focuses primarily on commercial boating, for which baseline use data exists. The DEIS correctly states that hydrological changes are unlikely to adversely impact sport fishing under any alternative, and that changes to the visual quality of the Colorado River would not be discernable to most viewers. It is therefore reasonable to assume that the proposed hydrological changes would not affect private development along the Colorado River. See response to Comment No. 344 regarding impacts on property values.
347	The table below summarizes the types of baseline conditions presented in the DEIS for land use, recreation, visual quality and socioeconomic. In my judgment, the depth of quantitative information provided for land use, visual, recreation and socioeconomic baseline conditions is inadequate because it does not match up with many questions outlined in the *Public Scoping Report* or provided by Grand County in prior written communication. PARAMETERS USED IN THE DEIS TO DESCRIBE THE (BASELINE) AFFECTED ENVIRONMENT IN GRAND COUNTY TOPIC & SECTION / PARAMETER USED Land Use (3.18.1): - amount of state and federal land; - % of land in agriculture; - comment about low-density residential development Recreation (3-19.1): - surface water acres, number of boat ramps, number of marinas; - preferred boating streamflows on selected reaches of the Colorado River; - commercial boating and fishing visitor days on one reach of the Colorado River; - number of fishing guide companies; - number of annual user days for fisherman in 2004 (no location reference) Visual Quality (3.21.1): - analysis focuses only on new reservoirs; - images that are visible from the proposed reservoirs Socioeconomic (3.22.1): - permanent population - countywide and towns; - seasonal population - countywide and Three Lakes Area; - skier visitors and Rocky Mountain National Park visitors; - race & ethnicity; - employment, labor force, top industries (collapsed), agricultural employment; - Per capita income, poverty level, wage rates, household income; - income of agricultural production - new reservoirs; - broad remarks about tourism, countywide; - commercial fishing user days on one reach of the Colorado River; - community services (schools, emergency medical, fire protection, State Patrol) If more rigor had been applied in collecting baseline information that aligned with scoping remarks, then the analyst may have been less likely to ignore potential impacts or dismiss potential impacts as "too difficult to quantify", "unlikely to noticeably affect", "contribute to a REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 5 OF 40	346. See response to Grand County Comment No 38. 347. See response to Comment Nos. 365 and 373. Relevant socioeconomic data are provided in the Socioeconomics section of the FEIS, and qualitative descriptions are included where data are not available.

Com-ment	Letter #1075	Response
347	diminished recreation experience", "minimal" and the like. (See comments R-9, R-12, R-13, R-23 and R-24.) Some examples follow.	
348	– The land use baseline excludes the relationship between the Colorado River and adjacent agricultural properties that depend on the River for irrigation.	348. See response to Bar Lazy J Guest Ranch (Letter No. 1052) Comment No. 3.
349	– The recreation analysis excludes baseline information for any visitor but commercial boating and commercial fishing on one reach of the Colorado River, it excludes all other recreation activities.	349. See response to Comment No. 365.
350	– The visual quality analysis excludes consideration of Lake Granby, Shadow Mountain Reservoir, Grand Lake and Willow Creek Reservoir, and the Colorado River as scenic assets that attract and extend the stay of visitors.	350. All of the water bodies mentioned in the comment are considered in the visual quality analysis. However, the analysis does not attempt to correlate visual quality levels with visitor behavior.
351	– The new information introduced by the socioeconomic analysis excludes consideration of the local economies of the municipalities impacted and property values. The socioeconomic analysis is also hampered by inadequate information in the land use, recreation and visual quality sections.	351. There is not sufficient economic information available to evaluate impacts on particular communities; thus, countywide results are reported. An explanation was added to Section 3.22.2.2 (Method for Effects Analysis) in the FEIS explaining that countywide effects may be concentrated in particular communities or areas within the county. See response to Comment No. 344 regarding property values.
352	***Hydrological Study Period.*** Remarks about water-based recreation are based on changes in streamflow from a 47-year hydrologic period (1950 – 1996). It is curious that the last 11 years of data (1997 – 2007) where the streamflow may have been further reduced by man-made factors, including the (original) Windy Gap Project, is excluded from the baseline data set. If more recent information were included and this expanded information set baseline streamflow conditions lower, then the incidence of sub-par streamflow might increase. This condition suggests that any impact findings that rely on the 1947 to 1996 streamflow information might be understated. (See comments R-17 and R-21.)	352. See response to Comment No. 7.
353	***Water Measurement Parameter***. The information on water hydrology that is used in the land use, visual impact and socio-economic components of the DEIS is expressed in average monthly figures, but for the discussion regarding commercial rafting and kayaking. In the one place were daily flows were applied in the analysis, the DEIS found environmental effects and quantified their socioeconomic consequences. Most environmental impacts and socioeconomic consequences simply do not occur in average monthly increments. The frequency, duration and magnitude of hydrologic changes and related temperature effects impact flushing flows, recreation usage, agricultural usage for irrigation, fishing, boating, scenic viewing and many more types of impacts that have related socioeconomic consequences. The intricate relationships between water flow, water quality, changes in the magnitude of flow, temperature and temperature changes and timing are vitally important to Grand County. Because in most cases, ERO reports only average monthly statistics, many environmental REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 6 OF 40	353. The analysis of resource impacts used the best hydrologic data available to access impacts. For some resources, such as aquatics, recreation, and water quality, daily hydrologic data were used; and for other resources, such as lake recreation, average monthly reservoir content was a reasonable measure of changes in lake storage. Table 3-4 was added to the FEIS to indicate how hydrologic data was used for resource evaluations.

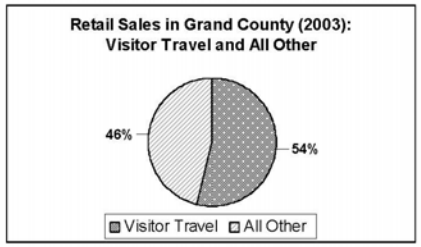
Com-ment	Letter #1075	Response
353	impacts with potential related socioeconomic effects in Grand County might be unreported or understated.	354. While Reclamation NEPA policy and guidance uses a comparison of the action alternatives with the No Action Alternative, the FEIS provides data for alternatives comparison of action and no action alternatives with existing conditions. The No Action Alternative presents what WGFP Participants would do if Reclamation does not allow the proposed connections to C-BT facilities. For most Participants, this includes continuing to take Windy Gap deliveries and increasing those deliveries as water demand increases within the capacity of the existing Windy Gap Project facilities and available storage in Granby Reservoir. One Participant would drop out of the WGFP. The City of Longmont would pursue enlargement of Ralph Price Reservoir to store its Windy Gap water. While there is no guarantee that enlargement of Ralph Price Reservoir would acquire all of the regulatory authorizations, it is reasonable action for the City of Longmont, and no fatal flaws were discovered in review of this alternative in the WGFP EIS. The majority of the hydrologic impacts, including increased Windy Gap diversions under the No Action Alternative come from WGFP Participants increasing their deliveries, which they can currently do without any infrastructure changes or additional authorizations or approvals from Reclamation. It is unreasonable to assume that Windy Gap diversions would remain status quo under the No Action Alternative. The NEPA process does not isolate and evaluate separately the effects of previous actions, except to the extent they are part of the cumulative effects. 355. Direct land use effects would be limited to the locations of new constructed facilities, and associated transportation corridors. The effects of construction of a reservoir and related facilities construction on private property and businesses are discussed in the Socioeconomics section of the FEIS. See response to Comment Nos. 343 through 345 regarding indirect effects to lakeshore or riverbank properties, or Comment No. 328 regarding agricultural water uses. 356. See response to Comment No. 31.
354	**1.5 DEFINITION OF "NO ACTION" ALTERNATIVE** In some instances, the DEIS evaluates impacts against the No Action Alternative which already includes substantial impacts relative to Existing Conditions; in other instances, the analysis compares alternatives against Existing Conditions. With the WGFP, the action alternatives are proposed by the same or a related organization that created the No Action Alternative. While the No Action Alternative may (or may not) meet the required regulatory definition, it is not clear how it can be a "no action" alternative in the common sense definition of "no action." The land use, visual, recreation and socioeconomic components of the DEIS provide no clear delineation of the original Windy Gap project as part of Existing Conditions, the No Action Alternative, the Proposed Action Alternative, other action alternatives, or cumulative effects. The "existing" hydrologic conditions correspond to a historic study period from 1950 to 1996 that includes some original Windy Gap effects and excludes others. As described in the DEIS, the WGFP places incremental environmental burdens on Grand County, relative to the original Windy Gap project. In my judgment, it is of heightened importance that the (original) Windy Gap project impacts be clearly and quantitatively singled out throughout the DEIS, whether or not compensatory mitigation was accomplished.	
	1.6 LAND USE IMPACTS (DEIS SECTION 3.18) In the DEIS, land use includes land ownership, land use and transportation.	
355	***Narrow List of Impacts.*** The land use analysis only addresses impacts that are related to construction of new infrastructure. "None of the alternatives would directly affect land use at locations outside of those needed to support project facilities." (See comment LU-1.)	
356	***Method.*** The DEIS states that "effects to existing land uses were evaluated based on anticipated physical changes at new reservoir sites." (page 3-223) Also, it states that no new facilities would be constructed along the Colorado River that would affect existing land ownership and land uses. Accordingly, the DEIS identifies no land use impacts in Grand County for No Action Alternative or Proposed Alternative because there are no new reservoir sites and no new facilities along the Colorado River. That is, no hard construction. There is no acknowledgement of the relationship between water and land use. In my opinion, there are substantial and potentially negative relationships between WGFP water impacts and land use including impacts to agriculture through irrigation ditch failures and impacts to REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 7 OF 40	

Com-ment	Letter #1075	Response
356	development directly dependent on river and reservoir and US 40 views and usage. Also, the *Public Scoping Report* specifically identifies potential impacts to the Grand Lake shoreline and property rights from an alluvial buildup on the Grand Lake side of the outlet canal. Both scholarly secondary research and anecdotal illustrative information is available to describe these relationships. (See comments LU-1 and LU-2.)	357. The potential transportation impacts to adjacent lands are described in the Land Use section, including the effects of facility construction, and potential long-term traffic increases if recreation facilities were developed.
357	***Transportation.*** Alternatives 3 and 4 have a construction impact in Grand County lasting 38 months; congestion and traffic delays are acknowledged. Yet, the DEIS contains no related effects on Grand County or on adjacent land uses. (See comment LU-3.)	358. The cumulative loss of agricultural and undeveloped land due to planned future developments near the Jasper East and Rockwell Reservoir sites is discussed in Land Use, Section 3.18. Section 2.8.2.2 describes reasonably foreseeable future land use near alternative reservoir sites. Construction of major reservoir facilities and large development projects in Grand County are subject to Special Use Review and other land use regulations, which could affect the amount or character of development.
358	***Land Ownership Changes***. The DEIS estimates land acquisition needs for Alternatives 3, 4 and 5 of 300 to 500 acres and notes a loss in agricultural production. Land ownership changes from cumulative effects would be substantially greater; 1,590 acres for Alternative 3 and 4,770 acres for alternatives 4 and 5. The derivation of these figures was not provided.	
359	There is no discussion of potential effects other than "potential loss in additional agricultural land and undeveloped land." Only 28% of Grand County land is in private ownership (page 3-216). The loss of privately held land has lasting negative impacts on the School District, the County and other jurisdictions that rely on property tax revenues.	359. See response to Comment No. 404.
360	***Agriculture.*** An analysis of effects on agriculture is missing from the DEIS, but for mention of some loss of irrigated pasture where reservoirs would be constructed. With the WGFP, average monthly streamflow decreases of up to 6% in the No Action Alternative and up to 11% in the Proposed Action Alternative are anticipated. With cumulative effects, average monthly streamflow reductions of 15% in the No Action Alternative and between 18% and 21% in the action alternatives are anticipated. There is no mention of related impacts to irrigation ditch operations. Our interviews with a rancher and former water commissioner [6] and supplemented by the *Grand County Stream Management Plan – Draft Report* [7] suggest that additional streamflow reductions would further compromise the agricultural irrigation pump intake system perhaps to failure in some situations. Significant drops in streamflow and related increases in temperature hamper or prohibit irrigation activity either because there is inadequate pressure or because dead fish and algae clog the irrigation gate network. All alternatives exacerbate this marginal condition. Lower streamflow and additional irrigation ditch structure failures is a relationship that the Subdistrict understands. The Municipal Subdistrict paid $500,000 in mitigation to upgrade diversion structures for ranches below the Colorado River as part of the original construction of Windy Gap Reservoir. REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 8 OF 40	360. See response to Comment No. 348.

Com-ment	Letter #1075	Response
361	In addition, streamflow reductions may comprise the quality of the Colorado River for fishing, which is a supplemental source of income to ranchers who lease their property to individuals and fishing guides. (See comments LU-2 and LU-4.)	361. See response to Comment No. 345.
362	***Construction Impacts.*** The DEIS acknowledges construction impacts of up to 38 months and related construction traffic, periodic vehicle delays and congestion at intersections. There is no mention of related negative impacts on adjacent land uses for Alternatives 3, 4 and 5. (See comment LU-3.)	362. See response to Comment No. 341.
363	***Real Estate Development Impacts.*** The DEIS excludes any consideration of the relationship of surface water reductions to Lake Granby and adjacent real estate development or water clarity and quality reductions in Grand Lake and Shadow Mountain Reservoir and adjacent real estate.	363. See response to Comment Nos. 343 and 344 regarding impacts of Granby Reservoir water levels on property values, water clarity, and water quality. As described in the Recreation section, none of the alternatives would affect water levels at Grand Lake. See response to Comment No. 329 regarding water quality. Granby Reservoir water levels have fluctuated widely in the past and would continue to do so in the future. It is reasonable to assume that a 6 percent reduction in surface area in a water storage reservoir that regularly fluctuates under existing conditions would not noticeably affect recreation use or the quality of the recreation experience. Additional information has been added to Section 3.19.2.4 of the FEIS to better correlate severe drawdowns during consecutive dry years with reservoir surface area. Dry years and low water levels have occurred in the past and would continue to occur in the future. The mitigation measures proposed by the Subdistrict would maintain higher water levels in Granby Reservoir and offset nutrient loading to the Three Lakes, minimizing potential impacts to nearby real estate values.
364	***Cumulative Impacts.*** The DEIS states that cumulative impacts "would not have any direct incremental effect on land ownership or use…" (page 3-229) In our judgment, cumulative effects exacerbate streamflow decreases and impact adjacent ranchers through the added potential for irrigation ditch structure failure and reduced opportunity for fishing lease revenues.	364. See response to Comment No. 345.
	1.7 RECREATION (DEIS SECTION 3.19)	
365	***Narrow Definition of Recreation.*** There is a general bias in the DEIS that if recreation is not active recreation that is accessible by the general public, then it merits no consideration or analysis. The only recreation activities quantified are commercial kayaking and commercial rafting on selected reaches of the Colorado River and related camping on one reach of the Colorado River. This is narrow and inadequate. While commercial kayaking and commercial rafting in selected reaches of the Colorado River are a few core summertime visitor activities, there are other more significant recreation activities that bolster the Grand County economy in the summer that are likely impacted by the WGFP. These include: - commercial and private fishing in locations other than Reach 5 of the Colorado River; - other commercial and private boating by visitors in reservoirs; - camping in locations other than Reach 5 of the Colorado River, and - passive visitor enjoyment of the US 40 corridor, a national scenic byway, the Colorado River, Grand Lake, Shadow Mountain Reservoir, and Lake Granby. Each of these affected recreation activities have related impacts on lodging, restaurant sales, recreation equipment rental providers and guides or outfitters, and other incidental purchases. In the summer, many out-of-state visitors come to Grand County because of Rocky Mountain National Park, a national destination, but they linger because of the fishing, boating, and scenic beauty that Grand County currently offers. The local economy relies on this recreation REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 9 OF 40	365. See response to Comment No. 30.

Com-ment	Letter #1075	Response
365	relationship. The water resources that are compromised by the WGFP are necessary components of the County's scenic beauty and tranquility and its more passive recreation venues. (See comments R-1, R-2, R-6 to R-8, R-11.)	

The Tourism Sector in Grand County. Tourism has played a pivotal role throughout Grand County's history. In the 1870s, rustic "resorts" were built in Hot Sulphur Springs and Grand Lake. These resorts attracted fisherman and hunters. In the early 1900s, tourism activity broadened as Grand Lake emerged as a recreation respite for affluent families escaping the summer heat. Fishing and boating were the cornerstone recreation activities.



Gradually, tourism has grown to become the primary economic driver in Grand County. Unlike other more urban environments, every tourist activity in Grand County relies directly on the natural flow of water.

The *Economic Impact of Travel on Colorado* report [8] estimates that in Grand County, the direct impact of spending by visitors equaled $169.7 million in 2003. These expenditures included only spending on travel, lodging, food and beverages, recreation and other visitor-related commodities. It understates the actual impact on the County's economy because it included no secondary (indirect and induced) impacts such as visitor-related construction activity and business services. This volume of spending comprised 54% of total retail expenditures in the County.[9] In addition, visitors paid $7.1 million in local government taxes, which included lodging, auto rental, and sales tax.

As illustrated in the graph to the right, retail sales in July, August and September (the 3rd quarter), for Grand County excluding Winter Park, are 16% to 40% higher than any other quarter. This is the height of the tourism season for the portion of Grand County most impacted by the WGFP.[10] Local businesses as well as municipal governments are highly dependent on retail sales.

As described above August ranks second and July ranks third in retail sales activity. This summer activity is attributable to visitors, may of whom come to see the Rocky Mountain

Com-ment	Letter #1075	Response

National Park (2.9 visitors in 2005) but linger in Grand County to participate in fishing, rafting, kayaking, boating, mountain biking, hiking or site-seeing.

US 40 – Grand County's Tourism Corridor. In 2005, the 80-mile stretch of US 40 from Grand Lake through Granby, Hot Sulpher Springs and Kremmling to State Bridge, known as the Colorado River Headwaters, was designated by the US Secretary of Transportation as a National Scenic Byway. It is one of only ten "America's Byways" in Colorado. It is also one of 19 Colorado Scenic and Historic Byways. The Colorado River and US 40 are inextricably linked from the visitor's perspective. Travelers from throughout the country choose to visit Colorado in the summer months because of this prestigious designation.

Preferred Streamflows and Recreation. The table below compares Colorado River streamflow recommendations for recreation contained in the WGFP DEIS with recommendations contained in the *Draft Grand County Stream Management Plan – Phase 2.*[11]

COMPARISON OF COLORADO RIVER STREAMFLOW RECOMMENDATIONS FOR RECREATION	
WGFP DEIS	DRAFT GRAND COUNTY STREAM MANAGEMENT PLAN
COLORADO RIVER – WINDY GAP TO WILLIAMS FORK RIVER (BYERS CANYON) – GOLD MEDAL FISHERY	
REACH #2 Angling: No data Kayaking: > 400 cfs	CR-4 Angling: Minimum, 60 cfs; Optimum, 200-300 cfs Kayaking: Minimum, 300 cfs; Optimum, 1,000 - 1600 cfs
COLORADO RIVER – WILLIAMS FORK RIVER TO KREMMLING – GOLD MEDAL FISHERY	
REACH #3: Angling: No data	CR-5: Angling: Optimum, 200 - 300 cfs
COLORADO RIVER – KREMMLING TO PUMPHOUSE (GORE CANYON)	
REACH #4 Angling: No Data Rafting: 850 to 1,250 cfs Kayaking: Min. Preferred, 400 - 2,200 cfs Preferred, 1,100 – 2,200 cfs	CR-6: (ALSO GORE CANYON IN CR-7) Angling: Optimum – 200 to 300 cfs Kayaking: Minimum, 900 cfs; Optimum, 1,200 - 1,400 cfs Rafting: Minimum, 1,000 cfs; Optimum, 1,200- 1,800 cfs
COLORADO RIVER – PUMPHOUSE TO STATE BRIDGE (PUMPHOUSE)	
REACH #5: Angling: No data Rafting & Kayaking: Min. Preferred, 400 - 3,000 cfs Rafting: Preferred, 2,000 – 3,000 cfs	CR-7 (Pumphouse) Angling: Minimum, 450 cfs; Optimum, 1,000 cfs Kayaking: Minimum, 500 cfs; Optimum, 600 -1,000 cfs Rafting: Minimum, 700 cfs; Optimum, 900 - 1,300 cfs
Sources: WGFP DEIS, Chapter 3, Affected Environment; Draft Grand County Management Plan information is from the "Reach Summary" section.	

366 The DEIS provides no streamflow figures for angling for any portion of the Colorado River, even though several sections have a Gold Medal Fishery designation. The DEIS flow recommendations for kayaking and rafting are lower or broader than the *Draft Grand County Stream Management Plan-Phase 2* recommendations in most cases. If the *Draft Stream*

366. Based on the results of the Aquatic Resources analysis and proposed temperature, nutrient, and other mitigation (FEIS Section 3.25), the WGFP is not expected to adversely affect the Colorado River fishery. It is not clear from the Grand County SMP how angling flows were derived.

Com-ment	Letter #1075	Response
366	*Management Plan* recommendations are more valid, then the magnitude of impacts is greater and the figures should be adjusted. The *Draft Stream Management Plan* also contains recommendations for environmental flows, and flushing flows and reports CWCG minimum flow requirement. These are excluded from this analysis of recreation impacts. ***Senate Document 80.*** Senate Document 80, enacted in 1937, allowed the construction of the Colorado-Big Thompson Project. This Document states, "The project must be operated in such a manner as to most nearly affect the following primary purposes … "to preserve the fishing and recreation facilities and scenic attractions of Grand Lake, the Colorado River and the Rocky Mountain National Park.[12] This suggests that an added level of analysis and scrutiny is appropriate when considering the recreation effects of the WGFP, which is enabled by Senate Document 80. In my judgment, the analysis is too narrowly focused and dismissive of many recreation impacts that are itemized throughout this memorandum. ***Fishing in Grand County.*** A significant portion of Grand County's summer and fall tourism is based on fishing. While fishing is one of several visitor attractions in East Grand County, it is an economic lifeline to West Grand County. Tom Clark, Mayor of Kremmling, explains that fishing is fundamental part of the local cultural heritage and is a key factor in retaining the local rural atmosphere. While exact figures are not available, Mayor Clark believes that fishing is a substantial part of the local West Grand County economy.[13] Henry Kirwin, co-owner of Mo Henry's Trout Shop, reports that his 500 to 1,000 fishing guide clients may come to Grand County to fish its Gold Medal streams, but often extend their stay to enjoy other active and passive recreation opportunities. Fishing is a destination purpose for many summer visitors. The Colorado Division of Wildlife recently released a report[14] that stated the direct expenditures of anglers averaged $67 per activity day for Colorado residents and $118 per activity day for non-Colorado residents. With the secondary impact of dollars re-spent in the economy, the total economic impacts are $118 per activity day for Colorado residents and $208 per activity day for non-Colorado residents. The DEIS estimates expenditures for fishing per user day at $53 (page 3-275). This low expenditure figure, plus the exclusion of all private fishing activity significantly underestimates the contribution of fishing to the local economy. The DEIS concludes that there are no measurable impacts on fishing in Grand County because the impact on fish habitats will not adversely impact sports fishing. This analysis challenges the DEIS conclusion that fishing is a singular function of fish habitat. The DEIS provides no evidence that fishing is a singular function of fish habitat. (See comment R-23.) The decision to fish in a stream or river in Grand County relates directly to the anticipated quality and success of the fishing experience, which is a function of many factors, including streamflows, water temperature, water clarity including the absence of slippery moss and algae, the scenic environment of the river corridor, and the expectation of success. Currently, due the existing compromised condition of some streams in Grand County, fishing guides, local fishing REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 12 OF 40	The Grand County SMP was reviewed during preparation of the EIS. Our understanding is that the objective of the SMP was to develop recommendations of preferred streamflow regimes to support stream health for aquatic habitat and other nonconsumptive water uses, as well as the flow regimes necessary to support water use requirements for irrigators, municipalities, industry, and recreation. The focus of the EIS was to evaluate and disclose the anticipated environmental effects of the alternatives. Where adverse effects were identified, mitigation measures were identified to offset or minimize those impacts. The mitigation measures developed for the WGFP are linked to identified project impacts and may not necessarily meet the target recommendations included in the SMP. However, mitigation measures included in the FEIS such as reductions in nutrient loadings to the Colorado River and Three Lakes and measures develop in the Fish and Wildlife Mitigation Plan (FEIS Appendix E) would help meet some of the goals of the SMP. After review of the Grand County SMP and additional conversations with BLM staff, the preferred flow ranges for boating were changed and simplified to use a preferred flow of 850 to 1,250 cfs in Gore Canyon and 1,100 to 2,200 cfs at Pumphouse. The FEIS includes these changes. 367. See response to Comment No. 10. 368. There are no anticipated adverse impacts to fishing in Grand County, as a result of the WGFP, under any of the alternatives (see response to Comment Nos. 345, 365, and 366). Thus, there would not be any economic impacts from a loss of fishing. In terms of the affected environment, the 2008 BBC estimates for the economic impacts of fishing is included in Section 3.22.1.7 of the FEIS. The Subdistrict in cooperation with the Colorado Division of Parks and Wildlife developed a Fish and Wildlife Mitigation Plan in accordance with the requirements of CRS 37-60-122.2 to address stream temperature and aquatic habitat impacts. Nutrient mitigation measures also would improve water quality in the Fraser River, Willow Creek, and Colorado River.
367		
368		

Com-ment	Letter #1075	Response
368	experts, and retailers report[15] that they are guarded in recommending some stream locations to fish and, in the summer months, also encourage anglers to use a temperature gauge and avoid fishing in the afternoon when water temperatures are higher. The WGFP will further erode the quality of the Colorado River and its tributaries. The *Grand County Draft Stream Management Plan - Phase 2* [16] describes a number of specific existing conditions where the quality of fishing is threatened by whirling disease and/or elevated temperatures. It seems unreasonable to conclude without any evidence that this condition will not reducing.	369. The analysis of potential effects on Granby Reservoir and other reservoirs focuses on the magnitude of impact (change in water levels) and the effect on boating accessibility (boat ramp elevations). Specific visitor surveys to ascertain the behavioral impact of these changes was not pursued because of: a) the relatively small anticipated impacts on reservoir recreation in most years, and b) the likely finding that most users prefer higher water levels is intuitive and is supported by existing studies (such as Smith and Hill 2000). In the absence of existing visitor use data at these reservoirs, additional qualitative information would not be sufficient to draw quantitative conclusions about the potential changes to the number of users/visitors.
369	***Method to Assess Water Resources and Recreation Effects.*** The *Recreation Resources Technical Report* (ERO Resources, 7/08, p 26) cited one analysis on the Arkansas River Basin (Smith and Hill 2000) to conclude that "water levels in reservoirs do not generally influence people's behavior patterns and it would be speculative to attempt to draw such conclusions about visitor use patterns based on reservoir elevations. However, Smith and Hill showed a strong correlation between water surface area available for recreation and user satisfaction." The DEIS estimates reductions in water surface area at Lake Granby but makes no attempt to quantify the recreation visitor impact. There is no follow through in the socioeconomic section. In addition, the authors appear to have made no attempt to develop a local analysis in Grand County through survey research or any other technique. There is secondary research available plus directly relevant and recent experience with low water levels in the Lake Granby that should be pursued. [17] [18]	As a result of operation of the C-BT Project, Granby Reservoir water levels have fluctuated widely in the past and would continue to do so in the future. In addition to low water levels, campfire restrictions in the Recreation Area are a deterrent for visitors, which is often the case when water levels are down in dry periods. Excessive rain or extreme temperatures during the summer season also may deter visitors from Granby Reservoir (Brad Orr, USFS 2008; see references in Recreation Report). Granby Reservoir was constructed as a water supply reservoir and, therefore, is operated to meet water demands rather than optimize for recreation use. Modified prepositioning would reduce Granby Reservoir drawdowns from those described in the DEIS, particularly during dry years. See Section 3.5.4 in the FEIS.
370	***Fishing in the Colorado River – Gold Medal Fishery And Wild Trout Water Designations.*** A 20-mile segment of the Colorado River from Windy Gap Reservoir to Troublesome Creek and up Troublesome Creek (Reaches 2 and 3) has a "Gold Medal Fishery" designation from the Colorado Wildlife Commission. This designation for outstanding trout fishing is bestowed sparingly; only 168 miles (1.9%) of the 9,000 miles of trout streams in Colorado have earned this designation. The reputation of the Gold Medal Fishery designation draws fisherman nationally and internationally throughout the summer, according to Dan Murphy [19], owner of the Fishing Hole in Kremmling. The DEIS acknowledges this designation but does not discuss whether the WGFP or the cumulative effects would threaten this designation. This neglect lessens the significance of potential impacts. The Colorado Division of Wildlife also designates certain mountain streams and some high lakes as "wild trout waters." These designations are reserved only for waters where the habitat is capable of sustaining a wild trout population and the primary fishery management objective is to maintain a wild trout population and fishery. [20] Further degradation to the Colorado River from the WGFP or the cumulative effects would threaten this designation. (See comments R-3 and R-4.)	370. The Gold Medal designation requires that waters with this designation meet the minimum criteria of a standing stock of 60 pounds of trout per acre and a minimum of 12 quality trout (>14 inches long) per acre. The current population estimates in the Colorado River below Windy Gap are 131 pounds per acre and 51 fish greater than 14 inches. Many factors can affect fish density and size including habitat and food resources. Based on the results of the Aquatic Resource analysis, food resources are not expected to change as a result of the WGFP, and habitat would decrease in some years. Another factor that can affect fish populations more rapidly is fishery management, in particular harvest regulations. CDOW studies during the mid- to late-1970s showed that restricting harvest limits or terminal tackle could result in large increases to fish populations in Colorado rivers. The project proponent or Reclamation do not specify fishery management for the Colorado River or the reservoirs. We have assumed that CDOW management of those waters would be consistent with management in the recent past. Therefore, we do not expect that the WGFP would alter the Gold Medal designation. See aquatic resource mitigation measures in Sections 3.8.4 and 3.9.4 of the FEIS.
371	***Wild and Scenic River Designation.*** All reaches of the Colorado River in Grand County are under consideration by the Bureau of Land Management (BLM) for "Wild and Scenic River	

Com-ment	Letter #1075	Response
371	Designation." The DEIS specifically states that it excludes consideration of whether the WGFP would impact BLM's determination of Wild and Scenic Designation. This is a potentially significant designation that could generate substantial visitor revenues for Grand County. While not usurping BLM's analysis, the DEIS should compare eligibility requirements against anticipated impacts of the WGFP and the cumulative effects. (See comment R-10.)	371. See response to Comment No. 45.
372	***Land-Based Recreation.*** The DEIS states that effects from water-based recreation would have a limited direct impact on land-based recreation, such as camping, picnicking, mountain biking, and hiking. This statement is unsubstantiated. There is no effort to determine what portion of visitors come to Grand County for a water-based recreation experience, such as boating or fishing, and also participate in complimentary land-based activities. If the water-based recreation opportunity is constrained, it seems reasonable that land-based recreation is also impacted.	372. Potential impacts to land-based recreational activities, including camping, hiking, scenic driving, and sightseeing, are described in the Recreation Resources Technical Report and in the section on Effects Common to All Alternatives in the EIS. No data currently exist regarding the relationship between water-based activities and land-based recreation. Considering the extensive recreational opportunities available in Grand County and the broad cross section of visitors and users, the level of study that would be needed to determine the relationship between activities is beyond what is necessary to describe the impacts of anticipated hydrological changes on river and reservoir recreation. The direct and secondary economic impacts of boating and camping activities are described in detail in Section 3.22, Socioeconomics of the FEIS. Mitigation measures that modify prepositioning operations to maintain higher water levels in Granby Reservoir, particularly during dry years, would reduce the potential for negative impacts to recreation activities as a result of the WGFP. Water quality mitigation measures that reduce nutrient loading in the Three Lakes also would contribute to maintaining aesthetic recreation values.
373	***Qualitative Remarks and Remarks about Uncertainty***. In many instances, the recreation section identifies a potential impact but marginalizes the impact using qualitative words such as "difficult to quantify", "too speculative", "may contribute to a diminished recreation experience", "unlikely to noticeably affect", etc. These statements are unsubstantiated. No criteria appear to have been applied to determine whether an impact is potentially significant. In each instance, there is no attempt to quantify the impact in this section, no explanation as to why quantification is not possible, no follow-up attempt to analyze the socioeconomic implications, no consideration of a multiplier effect, and no reference in the summary chapter. Stated simply, once stated, all qualitative remarks disappear from further consideration in the DEIS. Ignoring these impacts substantially understates the recreation effects and related socioeconomic implications. The US Environmental Protection Agency *Guidelines for Preparing Economic Analyses*[21], published in 2000, and the draft *Guidelines*[22], prepared in 2008, provide expert guidance on how to treat uncertainty and qualitative findings. Some illustrative statements that highlight the importance of presenting qualitative information and information that may be uncertain are cited below. - "The issue for the analyst is not how to avoid uncertainty, but how to account for it and present useful conclusions to those making policy decisions."[23] The *Guidelines* provide several alternative analytical tools with which to present uncertainty, including sensitivity analyses, "switch points" and ways to reduce the range of uncertainty. - "Highlighting Non-monetized and Unquantified Effects. Economic analyses should present and highlight non-monetized effects when these are important for policy decisions. Reasons why these consequences cannot be valued in monetary terms are important to communicate as well." [24] REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 14 OF 40	373. See response to Comment No. 30.

Com-ment	Letter #1075	Response

These quotes are from the 2000 document. The draft 2008 document is even more explicit on these points but EPA does not allow cites or quotes from this later document since it is still in external review draft format. The dismissive style of the DEIS is inconsistent with EPA *Guidelines* and renders the impact analysis questionable. (See comments R-9, R-12 to R-15, and R-17.)

374

Recreation at Reservoirs. The Lake Granby, Shadow Mountain Reservoir and Grand Lake are centerpieces of the local Grand County economy in the Three Lakes Area. This is evidenced by the number of recreation-oriented and visitor-oriented businesses and related employment, the flow of retail sales, lodging occupancy and other statistics in central Grand County and the Three Lakes area.

The DEIS reports anticipated decreases in water surface area, increases in exposed shoreline, and impacts on boat ramp access. It reports potential adverse boating, camping, hiking and shoreline activities during low water levels but concludes that any impacts are difficult to quantify and so no effort is made to quantify and potential socioeconomic implications are ignored.

It reports a "concern" about reduced water clarity and algal growth in Grand Lake and Shadow Mountain Reservoir that "may contribute to a diminished recreation experience"(page 3-236), but it does not attempt to quantify this effect, describe potential socioeconomic implications, mention the possibility in the summary chapter, or provide mitigation solutions.

The table below consolidates illustrative remarks from the DEIS about recreation impacts in the Three Lakes area.

SUMMARY OF RECREATION EFFECTS
ON EXISTING GRAND COUNTY RESERVOIRS FROM WGFP OR CUMULATIVE EFFECTS - DEIS

	Lake Granby	Willow Creek Reservoir	Shadow Mountain Reservoir	Grand Lake
Boating	"unlikely to noticeably affect"	None	No mention	No mention
Fishing	"not substantially affect shoreline fishing"	None	No effect	No effect
Camping	"could decrease in during low water levels"	None	No mention	No mention
Visitor Experience	"may reduce quality of visitor experience"	None	"reduced water clarity may contribute to a diminished recreation experience"	"reduced water clarity may contribute to a diminished recreation experience"

Source: DEIS: p 3-237, 3-236, 3-246

There is scholarly research regarding the relationship between lakes and reservoirs and recreation.[25] [26] In addition, some straightforward research in Grand County to first quantify baseline summer recreation in the Three Lakes area and second to measure the impacts of summer recreation in the recent low water years (2002 and 2003) would provide pertinent data.

374. There would be no change to water levels in Grand Lake or Shadow Mountain Reservoir; therefore, the economic activities focused on Granby Reservoir. The average reduction of 3 to 6 percent in summer surface area of Granby Reservoir is not anticipated to result in large impacts for a water storage reservoir that regularly fluctuates under existing conditions. Dry years and low water levels have occurred in the past and would continue to occur in the future. The modified prepositioning mitigation measures proposed by the Subdistrict would reduce Granby Reservoir water level fluctuations (FEIS Section 3.5.4).

The existing economy around the Three Lakes system has developed despite the operation of the C-BT Project and extreme fluctuations in Granby Reservoir because of operation of the C-BT Project. The dominant effect on water levels at Granby will continue to be the C-BT Project. Operation of the WGFP will have an incrementally small effect on Granby water levels. The literature referenced in the comments pertains to natural lakes in Maine or reservoirs devoted to multiple purposes in the Southeast United States. We were unable to find any information to quantify the incremental impacts on recreation and visitation from changes in water surface area, clarity, and water quality for a high elevation western water storage reservoir where water levels fluctuate widely, such as Granby Reservoir. Similarly, we are not aware of readily available information on the impacts specifically related to low Granby Reservoir water levels in 2002 and 2003. During drought conditions like 2002, water levels are expected to be lower from reduced runoff and as water users tap available storage to meet needs. That is the function of a water supply reservoir. Windy Gap did not pump any water into Granby Reservoir in 2002 because of its junior water rights. However, Windy Gap pumped more than 64,000 AF in 2003, which contributed to higher lake water levels.

Com-ment	Letter #1075	Response
374	Ignoring the relationship between the size, access, health and beauty of Lake Granby, Shadow Mountain Reservoir and Grand Lake and recreation activity is a serious flaw, in my judgment, that minimizes the impacts of the WGFP.	
375	The DEIS excludes consideration of Senate Document 80 [27] requirements which protect Grand Lake and the Colorado River, including specific considerations about recreation, aesthetics and fish.	375. See response to Comment Nos. 10-14,
376	***Lake Granby – Boat Ramp Access – Average Year***. The DEIS reports in an average year under the No Action and all action alternatives, one of the three boat ramps on Lake Granby may be inaccessible for one month (May) due to the WGFP. With cumulative effects, one or two boat ramps may be inaccessible for one month (May). See the summary table below.	376. See response to U.S. Forest Service (Letter No. 1127) Comment No. 12.
	LAKE GRANBY – BOAT RAMP ACCESS – AVERAGE YEAR (MEASURED IN # OF RAMPS)	
	Alternative / Windy Gap Firming Project: Boat Ramps Accessible / Windy Gap Firming Project: % Change from Existing Conditions / Cumulative Effects: Boat Ramps Accessible / Cumulative Effects: % Change from Existing Conditions	
	Existing Conditions: 3 / / 3 /
	No Action: 2 / -33% / 2 / -33%
	Proposed Action: 2 / -33% / 1 / -67%
	Alternatives 3-5: 2 / -33% / 1 / -67%
	Note: Accessibility differs by month in some scenarios. Sources: DEIS pages 3-236 and 3-246	
	The analysis of this condition concludes that under either the WGFP analysis or the cumulative effects analysis "it is unlikely to noticeably affect recreation use or the quality of the recreation experience under any alternative. " (page 3-237; also see 3-247) It is not clear how a 33% to 67% reduction in access to boat ramps would not affect recreation use. At the end of May each year, the Granby Chamber of Commerce hosts "The Granby Fishing Contest", a festival that celebrates the beginning of the fishing season in Lake Granby. If this event presents a poor aesthetic for fishing, then the local economy will be compromised throughout the summer as anglers select other places to fish. In addition to three public boat ramps, there are two private marinas that function in Lake Granby. (The DEIS notes this, page 3-230.) These private marinas would also experience a reduction in users from WGFP impacts. This private sector impact is ignored in the analysis. Ignoring private sector impacts is a consistent error throughout the DEIS, in my judgment. (See comments R-16 and R-24.)	
377	***Lake Granby – Boat Ramp Access – Dry Year***. The DEIS reports that in a dry year, under the No Action and all action Alternatives, all boat ramps on Lake Granby may be inaccessible for one or two months due to the WGFP. In a dry year, under cumulative effects, no data was provided in the DEIS. (See summary table below.)	377. As described in the Recreation Resources Technical Report, dry year reductions in lake elevations under the Proposed Action would affect use of the Arapaho Bay boat ramp and the Stillwater boat ramp in September. Modified prepositioning efforts would limit impacts to the Arapaho Bay boat ramp during successive dry years. The FEIS was changed to clarify boat ramp access during dry years, and to better describe the frequency and impacts of consecutive dry years on boating opportunities for existing conditions and the Proposed Action, along with the benefits of modified prepositioning efforts.

Com-ment	Letter #1075	Response
377		378. It is reasonable to assume that a 6 to 7 percent reduction in surface area in a water storage reservoir that regularly fluctuates under existing conditions would not noticeably affect recreation use or the quality of the recreation experience, particularly when compared to the infrequent major reductions (up to 20 percent) that have been known to occur during consecutive dry years. See response to Comment Nos. 352 and 353 regarding the rationale for the hydrological model study period and the use of monthly values. See also response to Comment No. 377. See Sections 3.5.4 and 3.19.4 in the FEIS on mitigation to maintain higher Granby Reservoir water levels.
378		

LAKE GRANBY – BOAT RAMP ACCESS – DRY (MEASURED IN # OF RAMPS)

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Boat Ramps Accessible	% Change from Existing Conditions	Boat Ramps Accessible	% Change from Existing Conditions
Existing Conditions	3		3	
No Action	0	-100%	?	?
Proposed Action	0	-100%	?	?
Alternatives 3-5	0	-100%	?	?

Note: Accessibility differs by month in some scenarios.
Sources: DEIS pages 3-236, 3-237, 3-246, 3-247

The DEIS acknowledges that "lower water levels in dry years "may reduce the quality of the recreation experience or "could reduce the quality of the recreation experience…" This appears to be a significant understatement since all boat ramps would be inaccessible in one or more summer months. (See Comments R-16 and R-24.)

Lake Granby – Water Surface Area Effects – Average Year. The DEIS reports that in an average water year, the WGFP would trigger a reduction in surface water area of up to 6% under the Proposed Action and up to 7% under the Proposed Action – Cumulative Effects.

LAKE GRANBY – SURFACE AREA CHANGES – AVERAGE YEAR (MEASURED IN ACRES)

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Surface Area (May)	% Change from Existing Conditions	Surface Area (May)	% Change from Existing Conditions
Existing Conditions	5,970		5,970	
No Action	-140 or 5,830	-2%	-190 or 5,780	-3%
Proposed Action	-351 or 5,619	-6%	-431 or 5,539	-7%
Alternatives 3-5	-167 or 5,803	-	-239 or 5,731	-4%

Sources: DEIS, Table 3-116, p 3-236 and p 3-246

- The analysis states that these "relatively small" reductions in boatable area are unlikely to noticeably affect recreation use or quality. (p 3-237) This remark might be based on one personal interview with Orr, in 2008. There is ample secondary research that provides quantitative relationships between reductions in surface areas and recreation.

- This data is presented in average monthly statistics. There is no information on the volume of daily fluctuations within the month. Visitors and recreation users view and use the reservoir on a daily basis. Average monthly statistics might mask the more realistic impacts.

- The derivation of the Existing Conditions figure is uncertain. It might be based on an historic time period (1950 to 1996) that excludes two of the driest years in recent history. If so, then the Existing Conditions figure may be too low and the related impacts understated.

There is historic data available to discern the relationship between of a reduction of water surface area, visitation and recreation, since Lake Granby experienced this effect in 2002 and

Com-ment	Letter #1075	Response
378	2003. It appears that no attempt was made to assemble this information. Our recent interviews with the local business community who experienced these low water years points out that there was a direct relationship. [28] "As the Granby Chamber of Commerce, a community dependent on fishing and boating as one of our major draws to the area, we had to spend a lot of additional time and marketing dollars to convince people that the low water would not detract from their visit. The low water levels did stop people from coming up for the views – dirt where water should be was not always attractive to tourists." [29]	
379	***Lake Granby – Water Surface Area Effects – Dry Year.*** In a dry year, the DEIS states that the WGFP impacts could cause decreases of up to 18 feet under No Action and up to 23 feet under the Proposed Action but provides no information that enables the reviewer to compare these conditions with Existing Conditions. It provides no similar information about cumulative effects. This is an inadequate presentation of potentially significant information that provides the reviewer no context. The table below illustrates the lack of information.	379. The FEIS has been modified to clarify the effects of successive dry years on Granby Reservoir water levels, as well as the benefits of modified prepositioning efforts to reduce those effects. As a result of modified prepositioning, water level reductions would be limited to no more than 15 feet in successive dry years under the Proposed Action, compared to existing conditions. See Sections 3.5.4 and 3.19.4 in the FEIS on mitigation to maintain higher Granby Reservoir water levels.

LAKE GRANBY – SURFACE AREA CHANGES – DRY YEAR (MEASURED IN FEET)

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Surface Area	% Change from Existing Conditions	Surface Area	% Change from Existing Conditions
Existing Conditions	?		?	?
No Action	Up to 18' decline	?	?	?
Proposed Action	Up to 23' decline	?	?	?
Alternatives 3-5	?	?	?	?

Sources: DEIS page 3-236

380	***River Hydrology and Adjacent Recreation Dependent Developments.*** In Grand County, private developments and recreation oriented destinations are a primary foundation of the local economy. Deterring recreation activity in the Colorado River through changes in the timing and magnitude of water flow, water temperature, and water quality directly impacts the socioeconomic fabric of the Grand County economy. There are several major real estate resorts, dude ranches and developments along the Colorado River that rely on fishing as an important guest service or resident benefit; these include Shorefox, Elk Trout Lodge and Bar Lazy J. The DEIS acknowledges the presence of two of these developments but attributes no potentially negative impacts from further hydrologic compromises to the River. (See comment R-2.)	380. The DEIS correctly states that hydrological changes are unlikely to adversely impact sport fishing under any alternative. This is based on both the timing of flow changes and the results of the Aquatic Resources analysis, which determined that the projected effects to fish habitat would not result in a loss of angling opportunities or success. Potential impacts on private fishing lodges have been added to the FEIS. See Sections 3.8.4 and 3.9.4 of the FEIS for mitigation measures for aquatic resources.
381	***Average Monthly Streamflow and Fishing.*** The DEIS reports average monthly streamflow information by reach but states that there is no adverse impact on fish habitat based on estimated effects to fish habitat and communities. (page 3-236) There is an intricate relationship between *daily* stream hydrology (flow magnitude, water temperature) and fishing. Fish don't function on a monthly average basis. If flow levels are too high, anglers cannot wade safely; if flow levels are too low or temperatures are too high, anglers will avoid fishing to preclude further stress the fish. In our judgment, an inadequate amount of information has been presented to reach the DEIS conclusion.	381. As stated in the EIS Chapter 3, Section 3.9.2.2, daily streamflows were used for the impact assessment for aquatic resources. Monthly flows were not used.

Com-ment	Letter #1075	Response
381	Even with the data as presented, the impact of the Proposed Action and Alternatives 3, 4 and 5 are to reduce the number of days of preferred flows by 20% to 43% in some instances. This magnitude of decrease may effectively eliminate these activities from Grand County.	
382	***Commercial Kayaking and Rafting – WGFP Effects Quantified.*** The DEIS provides extensive information regarding the impact of a change in daily streamflow regime on commercial kayaking and commercial rafting in Reaches 2, 4 and 5 of the Colorado River relative to preferred flows. These figures are important because they are one of few impacts to be quantified and reported in the socioeconomic section (3.22). The data is analyzed against a baseline study period that extends from 1950 to 1996; it excludes the more recent information where streamflows may have been lower. If more recent data includes lower streamflows, then the number of days of inadequate flow increases. This may be a serious methodological issue that should be considered. It is unclear how the designations of "preferred flow" and "minimum preferred flows" were determined. The American Whitewater Association has conducted a series of studies aimed at quantifying flow needs that support the "outstandingly remarkable" rafting, float-fishing and kayaking activities on the Colorado River. [30] The DEIS concludes that the reduced streamflows will have a negligible impact but for in Reach 2, where there is a 22.7% reduction between the Proposed Action and Existing Conditions. The percent change is presented in the last column in the table below. In a prior section, the DEIS discounts this significant reduction by stating that in Reach 2, "Byers Canyon does not support commercial boating and is infrequently used for kayaking." (page 3-239) The socioeconomic section miscalculates the impact in Reach 2, as described later in this memorandum. DEIS ANALYSIS: WINDY GAP FIRMING PROJECT EFFECTS COLORADO RIVER DAILY STREAMFLOW CHANGES AND IMPACT ON COMMERCIAL KAYAKING AND RAFTING | Reach Name and Number | Boat Type | CFS | Number of Days over 47 Years within "Preferred" Range: Existing Conditions | No Action | Proposed Action | % Change: Existing to Proposed | | Byers, #2 | Kayaking | > 400 | 1012 | 870 | 792 | -22.7% | | Big Gore #4 | Rafting | 850 – 1,250 | 848 | 824 | 825 | -2.7% | | | Kayaking | 400 – 2,200 (1) | 1,421 | 1,425 | 1,425 | -0.3% | | | Kayaking | 1,100 – 2,200 (2) | 1,034 | 1,035 | 1,030 | -0.4% | | Pumphouse, #5 | Rafting & Kayaking | 400 – 3,000 (1) | 3,498 | 3,520 | 3,536 | +1.1% | | | Rafting | 2,000 – 3,000 (2) | 441 | 447 | 421 | -4.5% | (1) "Minimum Preferred Streamflows" (2) "Preferred Streamflows" Sources: DEIS Tables: 3-117, 3-119, 3-120, 3-121, 3-122, 3-123 - For "minimum preferred conditions", the DEIS sets a wider band of streamflows. This term seems internally inconsistent. REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 19 OF 40	382. There would be no change in WGFP diversions during dry years because of the junior nature of the project water rights; therefore, inclusion of additional years would not change effects associated with the WGFP. The development of "preferred flow" and "minimum preferred flow" standards for boating on the Colorado River was based on previous studies, published guidebooks, and personal communications with raft guides and BLM staff. After review of the Grand County SMP and additional conversations with BLM staff, the preferred flow ranges for boating were changed and simplified to use a preferred flow of 850 to 1,250 cfs in Gore Canyon and 1,100 to 2,200 cfs at Pumphouse. The Recreation section of the FEIS includes these changes.

Com-ment	Letter #1075	Response
382	- The derivation of these figures is not explained in the recreation section and so it is not possible to validate the figures independently. (See comments R-5 and R-21.)	383. See response to Comment No. 382. Preferred flow ranges have been changed and simplified to improve the analysis. In addition, WGFP cumulative effects hydrology modeling of the Moffat Project overstated the decrease in Blue River flows by 30,000 AF annually because Denver Water changed their estimate of future water demand after the hydrology modeling for the WGFP was completed. Therefore, cumulative impacts to flows for boating in the WGFP FEIS are overstated and would be less than described.
383	***Commercial Kayaking and Rafting – Cumulative Effects Quantified.*** The DEIS also provides extensive information regarding the cumulative impact of a change in daily streamflow regime on commercial kayaking and commercial rafting in Reaches 2, 4 and 5. For preferred flows (not preferred minimum flows), cumulative effects are a negative 28% in Reach 2, a negative 20% in Reach 4 and a negative 43% in Reach 5. In Reach 5, preferred rafting streamflows (2,000 to 3,000 cfs) under Existing Conditions are achieved an average of 10% of the time (441 / 4324 days = 10%); with the Proposed Action, rafting in preferred streamflow conditions will be achieved 6% of the time, a 40% reduction. When preferred conditions occur so rarely, this significant drop may signal the end of commercial rafting in Reach 5. DEIS ANALYSIS: CUMULATIVE EFFECTS COLORADO RIVER DAILY STREAMFLOW CHANGES AND IMPACT ON COMMERCIAL KAYAKING AND RAFTING | Reach Name and Number | Boat Type | CFS | Number of Days over 47 Years within "Preferred" Range: Existing Conditions | No Action | Proposed Action | % Change: Existing to Proposed | | Byers, #2 | Kayaking | > 400 | 1,012 | 768 | 725 | -28.4% | | Big Gore #4 | Rafting | 850 – 1,250 | 848 | 808 | 792 | -6.6% | | | Kayaking | 400 – 2,200 (1) | 1,421 | 1,416 | 1,416 | -0.4% | | | Kayaking | 1,100 – 2,200(2) | 1,034 | 844 | 827 | -20.0% | | Pumphouse, #5 | Rafting & Kayaking | 400 – 3,000 (1) | 3,498 | 3,563 | 3,579 | +2.3% | | | Rafting | 2,000 – 3,000 (2) | 441 | 235 | 251 | -43.1% | (1) "Minimum Preferred Streamflows" (2) "Preferred Streamflows" Sources: DEIS Tables: 3-124, 3-126, 3-127, 3-128, 3-129, 3-130 - The difference between "minimum preferred streamflows" and "preferred streamflows" is significant when considering cumulative effects. The term "minimum preferred streamflows" appears to be internally inconsistent. - The derivation of these cumulative figures is not explained in the recreation section and so it is not possible to validate the figures independently. (See comments R-5 and R-21.)	
384	***Colorado River – Average Monthly Streamflow Changes.*** The *Recreation Resources Technical Report* (ERO Resources, 7/08) provides average monthly streamflow information for various reaches of the Colorado River. These figures are excluded from the DEIS. The tables below summarize this data for the month of July for each reach of the Colorado River. REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 20 OF 40	384. As stated in the DEIS, it is reasonable to assume that streamflow changes are not likely to impact boating in reaches where little boating occurs. Impacts to fishing were analyzed based on flow as a component of overall aquatic habitat, as described in the Aquatic Resource section.

Com-ment	Letter #1075	Response
384	- *Colorado River Reach #1.* For the Proposed Action in an average year, average monthly streamflow changes, using July as an example, are 11% below Existing Conditions; for the Proposed Action plus cumulative effects, the average monthly streamflow is 18% below Existing Conditions, a 63% reduction. Yet, the DEIS finds no impact to fishing or boating in this Reach. (See comment R-18.)	
385	- *Colorado River Reach #2.* For the Proposed Action, the reduction in average monthly streamflow in an average year, using July as an example, is 22% below Existing Conditions and 24% below Existing Conditions under cumulative effects. This reach has a "Gold Medal" fishing designation. Yet, the DEIS concludes no negative impacts to fishing. Boating is discussed elsewhere. (See comment R-19.)	385. See response to Comment No. 370.
386	- *Colorado River Reach #3.* For the Proposed Action, the reduction in average streamflow in an average year, using July as an example, is 14% below Existing Conditions and 17% below Existing Conditions under cumulative effects. This reach has a "Gold Medal" fishing designation. The DEIS concludes that there is limited boating in this Reach so negative impacts associated with lower streamflows are not quantified and fishing is not impacted. (See comment R-20.)	386. See response to Comment No. 370.

COLORADO RIVER – REACH #1 (LAKE GRANBY TO WINDY GAP)
AVERAGE YEAR - AVERAGE MONTHLY FLOW – JULY

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Average Monthly Flow (CFS)	% Change from Existing Conditions	Average Monthly Flow (CFS)	% Change from Existing Conditions
Existing Conditions	519		519	
No Action	487	-6%	441	-15%
Proposed Action	462	-11%	425	-18%
Alternatives 3-5	467	-10%	429	-17%

Sources: *Recreation Resources Technical* Report, p 38, p 64

COLORADO RIVER – REACH #2 – WINDY GAP RESERVOIR TO WILLIAMS FORK RIVER (BYERS CANYON)
AVERAGE YEAR – AVERAGE MONTHLY FLOW – JULY

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Average Monthly Flow (CFS)	% Change from Existing Conditions	Average Monthly Flow (CFS)	% Change from Existing Conditions
Existing Conditions	482		482	
No Action	386	-20%	355	-26%
Proposed Action	374	-22%	265	-24%
Alternatives 3-5	351	-27%	336	-30%

Sources: *Recreation Resources Technical* Report, p 40, p 65

COLORADO RIVER – REACH #3 (WILLIAMS FORK TO KREMMLING)
AVERAGE YEAR – AVERAGE MONTHLY FLOW - JULY

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Average Monthly Flow (CFS)	% Change from Existing Conditions	Average Monthly Flow (CFS)	% Change from Existing Conditions
Existing Conditions	735		735	
No Action	641	-13%	597	-19%

Com-ment	Letter #1075	Response
386	COLORADO RIVER – REACH #3 (WILLIAMS FORK TO KREMMLING) AVERAGE YEAR – AVERAGE MONTHLY FLOW-JULY Alternative / Windy Gap Firming Project: Average Monthly Flow (CFS), % Change from Existing Conditions / Cumulative Effects: Average Monthly Flow (CFS), % Change from Existing Conditions Proposed Action: 629, -14%, 607, -17% Alternatives 3-5: 606, -18%, 578, -21% Sources: *Recreation Resources Technical* Report, p 42, p 68	
387	- *Colorado River Reach #4.* For the Proposed Action in an average year, reduction in average monthly streamflow, using July as an example, is 6% below Existing Conditions and 25% below Existing Conditions under cumulative effects. This is among the most significant differences between the WGFP effects and cumulative effects. There is no discussion of this difference in the DEIS. The Gore Race, an internationally acclaimed race that brings visitors and economic benefit to western Grand County, occurs annually in August in Reach 4. Streamflow for the time period leading up to and the day of the event is important since this is the time period where competitors are making a go/no go decision. Preferred streamflows are marginally achieved (Figure 3-74, p 3-240) during August with WGFP effects and are not achieved under cumulative effects (Figure 3-77, p 3-249). If the hydrological study period had been extended from 1996, we question whether preferred streamflows could be achieved in August. Mitigation on the weekend of the event is inadequate because competitors already know that preferred flows are marginal or not being achieved. The conclusion appears to be inconsistent with the analysis. The DEIS states that with mitigation, the Gore Race boating event, held in August, should not be affected. The conclusion appears to be inconsistent with the analysis.	387. The analysis of boating on the Colorado River is based on changes to preferred boating flows using daily flows for the 47-year study period, not average monthly flows. While the cumulative effects of WGFP and other projects would result in a decrease in streamflow of up to 25 percent in July, the remaining flow (1,313 cfs) would still be above the preferred boating flow for Big Gore Canyon, and within the range of preferred flows for the Pumphouse reach. Under this same scenario, the average flow during June (2,002 cfs) would still be well above the preferred flow range for Big Gore Canyon, although it would be 24 percent less than existing conditions. Also, see response to Comment No. 382. Based on comments and input from the BLM, the preferred flow range for the Gore Race is the same as the general boating range: 850 to 1,250 cfs. The FEIS has been changed to reflect this correction. The Subdistrict remains committed to the mitigation measure of reducing diversions during the race in August if flows fall below 1,250 cfs. Given this mitigation commitment and the flows that are necessary to support the race, it is reasonable to state that the WGFP would have no effect on the Gore Race.
	COLORADO RIVER – REACH #4 (KREMMLING TO PUMPHOUSE – BIG GORE CANYON) AVERAGE YEAR – AVERAGE MONTHLY FLOW-JULY Alternative / Windy Gap Firming Project: Average Monthly Flow (CFS), % Change from Existing Conditions / Cumulative Effects: Average Monthly Flow (CFS), % Change from Existing Conditions Existing Conditions: 1,745, , 1,745, No Action: 1,660, -5%, 1,303, -25% Proposed Action: 1,647, -6%, 1,313, -25% Alternatives 3-5: 1,624, -7%, 1,286, -26% Sources: *Recreation Resources Technical* Report, p 44, p 69.	
388	- *Colorado River Reach #5.* In an average year, the DEIS provides a graph for WGFP effects in Reach 5 (Figure 3-75, p 3-241) but not for cumulative effects. The *Recreation Resources Technical Report* provides both graphs (p 49 and 76). Neither document provides corollary data in tabular format. The WGFP graph indicates that preferred average monthly streamflows for rafting are only achieved in June; the cumulative effects graph indicates that preferred average monthly streamflows for rafting are possibly achieved in June only.	388. See response to Comment Nos. 382 and 387 regarding flow ranges. One of the purposes of the Recreation Technical Report is to provide more detailed documentation of the resources and potential effects, some of which are not repeated at the same level of detail in the EIS. The average change in number of preferred flow days (1,100 to 2,200 cfs) for this reach would be less than 1 day per year.

Com-ment	Letter #1075	Response
388	Using daily streamflow information (see above), the DEIS concludes that there would be a neutral to positive impact of days when streamflow would be within the preferred flow range. (Tables 3-122, 3-123) with WGFP effects. This conclusion seems significantly understated given the monthly streamflow information.	

COLORADO RIVER – REACH #5 (PUMPHOUSE TO STATE BRIDGE)
AVERAGE YEAR – AVERAGE MONTHLY FLOW - JULY

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Average Monthly Flow (CFS)	% Change from Existing Conditions	Average Monthly Flow (CFS)	% Change from Existing Conditions
Existing Conditions	Graph but no data		Graph but no data	
No Action	Graph but no data		Graph but no data	
Proposed Action	Graph but no data		Graph but no data	
Alternatives 3-5	Graph but no data		Graph but no data	

Source of Graphs: DEIS, Figure 3-75, page 3-241; Recreation Technical Report, 7/08, pages 49 and 76.

1.8 VISUAL QUALITY (DEIS SECTION 3.21)

389 ***Narrow Definition of Visual Quality.*** The DEIS "study area" for the visual quality assessment focuses only on the visual quality surrounding the proposed new reservoirs. The DEIS acknowledges a concern expressed during "scoping" about the impact to scenic resources from hydrological changes and does make some qualitative remarks.

389. The Visual Quality section in both the DEIS and FEIS includes a detailed discussion about the visual effects on existing streams and reservoirs based on hydrological changes.

Visual Impacts of Water Resources. Grand County economy thrives on the visual beauty of the Colorado River and its reservoirs.

390 - *Colorado River*. The DEIS dismisses the likely degradation of visual quality to the Colorado River from lower streamflows and the related additional moss and algae growth on the riverbed. The DEIS reports that "lower streamflows could potentially reduce the visual quality of the Colorado River, but for most viewers these changes would not be discernable." The data provided in this section is expressed in average monthly "feet" reduced with no information about the magnitude of the statistic relative to Existing Conditions. The reviewer cannot analyze the results with incomplete information. (See Comment V-5.)

390. See response to Comment No. 263 regarding moss and algae. The FEIS clarifies that the average monthly changes in river stage is compared to existing conditions. The majority of changes in stream stage would occur at higher flows during spring runoff. Diversions in the summer months when flows are lower would be more noticeable. Proposed mitigation measures (FEIS Section 3.8.4) that reduce nutrient loading to the Fraser River, Willow Creek, and Colorado River are expected to have a beneficial effect on water quality.

391 - *Willow Creek below Willow Creek Reservoir*. The DEIS reports lower average annual streamflows of 7% under the No Action, 14% under the Proposed Action and 12% for others. Average annual streamflows are a poor indicator of visual quality which is experienced by viewers on a daily, not average annual basis. The DEIS acknowledges that lower flows would reduce the visual quality for some viewers, but dismisses the impact because "public access…is limited."

391. Average monthly streamflows are a reasonable means of characterizing anticipated hydrological changes. The DEIS and FEIS acknowledge the potential for visual quality effects on Willow Creek, but it is correct to state that the lack of public access (and therefore people who view the resource) would diminish the impact.

Com-ment	Letter #1075	Response
392	- *Grand Lake.* The DEIS mentions "predicted changes in water clarity or increased algal growth in Grand Lake may contribute to diminished visual quality" but makes no attempt to quantify the impact or measure its socioeconomic consequences. This statement holds for the WGFP and the cumulative impacts. (See comment V-2)	392. See response to Town of Grand Lake (Letter No. 222) Comment No.2.
393	- *Shadow Mountain Reservoir.* The DEIS states that there will be no change in water clarity and minor water quality changes. These impacts "are unlikely to noticeably affect the visual quality." The conclusion is not quantified or substantiated. (See comment V-3.)	393. See response to Town of Grand Lake (Letter No. 222) Comment No.2.
394	- *Lake Granby.* The DEIS reports increases in visible shoreline in an average year that are up to 93% greater than Existing Conditions due to the WGFP and 120% greater than Existing Conditions from Cumulative Effects. During dry years, the analysis does not provide comparable data. With these sizeable impacts, the DEIS states only that the visual quality of the reservoir for some viewers would be reduced. There is no quantification of potential negative effects on visitation and no follow through in the socioeconomic impact analysis. The magnitude of quantitative information appears to be inconsistent with the qualitative and unsubstantiated judgment. (See comments V-4 and V-7.)	394. The Visual Quality analysis does not speculate on visitor behavior or reactions to aesthetic effects. The potential socioeconomic effects of low lake levels are described in greater detail in the Socioeconomics section. However, sufficient information is not available to correlate lower lake levels with visitor use and behavior. See proposed mitigation in Sections 3.5.4 and 3.19.4 describing how modified prepositioning would maintain higher water levels in Granby Reservoir.

LAKE GRANBY – EXPOSED SHORELINE IN AVERAGE YEAR (MEASURED IN ACRES)

Alternative	Windy Gap Firming Project		Cumulative Effects	
	Exposed Shoreline	% Change from Existing Conditions	Exposed Shoreline	% Change from Existing Conditions
Existing Conditions	290		290	
No Action	398	37%	450	55%
Proposed Action	560	93%	638	120%
Alternatives 3-5	445	53%	456	57%

Sources: DEIS pages 3-268 and 3-270

In addition, one year of a substantially negative effect may have a multiple year impact on visitors who may not return and who might tell their friends about their negative experience. This has been the experience of local business community representatives.

1.9 SOCIOECONOMIC IMPACTS (DEIS SECTION 3.22)

Socioeconomic Impacts Considered. The socioeconomic impacts that are quantified are:
- construction costs, jobs and economic output associated with new reservoir construction;
- loss of agricultural land and related output due to reservoir construction;
- loss of commercial kayaking and rafting participants on three reaches of the Colorado River;
- camping associated with loss of kayaking and rafting participants on one reach of the Colorado River.

395	***Excluded Impacts.*** The most significant flaw with the socioeconomic impact section is that it is too narrow. There are three types of impacts that are excluded from consideration, understated, or ignored in the socio-economic impact analysis: (a) Impacts referenced in the *Public Scoping*	395. See response to Comment Nos. 328 through 346.

Com-ment	Letter #1075	Response
395	*Report* and not pursued; (b) Impacts referenced in the Recreation, Land Use or Visual Impacts sections and not pursued; (c) Impacts missing from the analysis. These are have been detailed earlier in Sections 1.1, 1.2 and 1.3. (See comment SE-2.)	
396	***Pervasive Disregard for the Private Sector in Grand County.*** Water resources and the local Grand County economy are inextricably linked.[31] The WGFP directly impacts the environmental quality of the Colorado River, Lake Granby, Shadow Mountain Reservoir, and Grand Lake. There is a pervasive and nearly total disregard for private sector impacts from the WGFP. Some private sector impacts that are ignored include: - ranchers whose irrigation systems fail due to reduced streamflow in the Colorado River; - ranchers who rely on fishing leases along the Colorado River; - real estate and resort developments where a healthy Colorado River is their primary or sole asset; - lakefront and riverfront properties whose value is directly related to reservoir water clarity and water quality; - numerous summer recreation-oriented and visitor-oriented businesses including private marinas, local motels, restaurants, recreation gear and apparel retailers, grocers and the like; - construction-related impacts on adjacent properties and developments.	396. See response to Comment Nos. 328 through 346.
397	***Socioeconomic Impacts Excluded – Recreation.*** The most significant exclusion develops from the DEIS' definition of recreation which is active recreation where there is public access. In Grand County, the "recreation sector" has a widespread impact on the entire economy, since recreation is a primary economic driver. When recreation impacts are described in qualitative or conditional terms and marginalized because they are "too difficult to quantify" or "unlikely to affect visitors", then they are dropped from further consideration and excluded from the summary section. These are discussed in Section 1.7. This is inconsistent with EPA *Guidelines for Economic Analyses*, which provide extensive detail on how to treat qualitative or uncertain impacts. (See comments SE-3 - SE-7, SE-10, and SE-12.)	397. See response to Comment No. 348. The analysis in the Socioeconomics section is consistent with the portion of the 2000 EPA Guidelines for Economic Analyses that are relevant to NEPA analyses (note that the 2008 version is still a draft and is not to be cited according to the EPA).
398	***Socioeconomic Impacts Excluded – Land Use / Agricultural Impacts.*** The Land Use Section (3.18) of the DEIS does not acknowledge a relationship between Colorado River hydrology and agricultural land use. Therefore, the socioeconomic section does not address this important negative impact. Based on my research, there are substantial potential negative relationships between further reductions in Colorado River streamflow and agricultural land uses through irrigation ditch failures, impacts to development directly dependent on river and reservoir views and usage. These are documented in communications with the Grand County ranching community. [32] (See comments SE-1 and SE-9.)	398. See response to Comment Nos. 355 through 364. The Subdistrict would comply with state water law. Also, see the 1980 and 1985 agreements included with the water rights decrees for the Windy Gap project.
399	***Countywide Analysis.*** The few socioeconomic impacts that are reported are presented on a countywide basis. This approach misses the significance of impacts that may seem small on a countywide basis but comprise the economic lifeblood of smaller communities and some economic sectors. For example fishing and boating along some reaches of the Colorado River are significant areas of summer economic activity in the relatively small communities of Hot	399. See response to Comment No. 351.

Com-ment	Letter #1075	Response
399	Sulphur Springs and Kremmling. The *Public Scoping Report* expressly mentions concerns about impacts on these communities.	
400	***Cumulative Effects Analysis.*** The DEIS states that the "cumulative socioeconomic effects were evaluated" but provides only the results of this analysis. The analytical steps are excluded from the DEIS and the *Socioeconomic Technical Resource Report*, so it is not possible to analyze the results.	400. The Cumulative Effects section for Socioeconomics was clarified in the FEIS to explain that the quantitative socioeconomic and hydropower impacts were calculated using the same methodology as direct effects, based on cumulative effects hydrology.
	1.10 MITIGATION In the visual, land use, recreation and socioeconomic impacts, the DEIS provides very few mitigation solutions because it quantifies very few impacts, as summarized below. While there is a relative broad remark about negotiating a fair market value for any property impacted, it is reasonable to interpret the meaning to focus only on land required for outright purchase by the property.	
	SUMMARY OF MITIGATION RECOMMENDATIONS IN GRAND COUNTY TYPE — WGFP MITIGATION & CUMULATIVE EFFECTS MITIGATION Land Use — "No specific mitigation … other than what may be needed for land acquisitions or county land use requirements, including special use review, location and extent review and 1041 permitting." (p 3-229) Compensation for acquisition of property or homes impacted by project facilities (p. 3-229) Recreation — "..curtail Colorado River diversions during the annual Big Gore Race..held in August if flows at the Kremmling gage are below 2,200 cfs." (P 3-253) Visual — "Minimize amount of grand clearing, reclamation and restoration of areas disturbed during construction." (P 3-272) Socioeconomic — " … negotiate a fair market value for acquisition of any property or homes that would be impacted by implementation of any alternative." (p 3-290) "…curtail Colorado River diversions during the annual Big Gore Race…held in August if flows at the Kremmling gage are below 2,200 cfs." (P 3-290) Source: DEIS, various pages listed above.	
401	If the DEIS is amended to acknowledge and quantify the range of remarks identified above, then there are a host of mitigation solutions that may minimize and in some cases, eliminate negative impacts. If impacts are not acknowledged, then extensive monitoring arrangements should be implemented to assure that the DEIS conclusions hold true with automatic and mandatory mitigation actions if the conclusions do not hold true.	401. Additional mitigation measures were defined and developed to reduce or offset the potential impacts from the proposed project. Mitigation measures and the effectiveness of those measures are described for each resource in Environmental Consequences—Chapter 3. An updated summary of mitigation measures also is included in Section 3.25 of the FEIS.
	REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 26 OF 40	

Com-ment	Letter #1075	Response
402	**2.0 SPECIFIC COMMENTS BY PAGE** **2.1 LAND USE IMPACTS** **Comment LU-1, Page 3-223.** *New Reservoir Impacts Only.* "…effects to existing land uses were evaluated based on anticipated changes at reservoir sites." "None of the alternatives would directly affect land use at locations outside of those needed to support project facilities." The analysis assumes that land uses are only impacted by new construction. Our findings show that ranchers with irrigation ditches along the Colorado River and real estate developments that rely on fishing as a feature or singular summer activity are directly impacted by changes in Colorado River streamflows. Also, summer visitors who have come to enjoy the stretch of US 40 in Grand County because of its National and Colorado Scenic Byway designation may also be impacted.	402. See response to Comment No. 348 regarding irrigation ditches and water rights, and Comment No. 365 regarding the overall approach to recreation analysis. The Recreation section in the FEIS has been revised to further acknowledge private fishing lodges along the Colorado River.
403	**Comment LU-2, Page 3-223.** *Agricultural Impacts – WGFP.* This section acknowledges that water diversions would affect Colorado River streamflows downstream of the Windy Gap diversion but states without any proof that "No new facilities would be constructed along the Colorado River that would affect land ownership and land uses." This ignores the relationship between the flow of water and directly related irrigation ditch structure failures. The original Windy Gap Project acknowledged this relationship and provided $500,000 in mitigation funds to correct problems. The DEIS finds no problem with further reductions in streamflows. Our investigation verified that reduced streamflows and irrigation ditch structure failures are related.	403. See response to Comment No. 348. The Subdistrict would comply with state water law. Also, see the 1980 and 1985 agreements included with the water rights decrees for the Windy Gap project.
404	**Comment LU-3, page 3-227, 3-228 and 3-229.** *Construction Impacts.* Construction impacts for 38 months are mentioned in Alternatives 3, 4, and 5 including periodic traffic delays and congestion. However, there is no mention of (a) potentially adverse effects to residential properties; (b) financial impacts on the County due to reduction in assessed valuation from between 70 and 530 acres of private land, and; (c) mitigation solutions.	404. The effects of construction of a reservoir and related facilities on private property and businesses are discussed in the Socioeconomics section of the FEIS. In addition, possible temporary reductions in property values due to noise, traffic, and disturbances are described in the Socioeconomics section. Property tax impacts have been added to the Socioeconomics section.
405	**Comment LU-4, Page 3-229.** *Agricultural Impacts – Cumulative Effects.* "Reasonably foreseeable water-based actions on the West Slope would affect streamflows in the Colorado River, but would not have any direct incremental effect on land ownership or use that overlap the effects of the WGFP." If ditch irrigation systems cannot function, then there is a direct and significant impact on agricultural land uses, as described above.	405. See response to Comment No. 403.
406	**Comment LU-5, page 3-229.** *Land Use Mitigation.* There are no land use mitigation recommendations, even though there are acknowledged impacts.	406. Reclamation and the Subdistrict worked to identify meaningful and reasonable mitigation measures to address impacts of the WGFP. It is acknowledged that not all effects of the project would be mitigated.

REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 27 OF 40

Comment	Letter #1075	Response
407	2.2 RECREATION **Comment R-1, page 3-230.** *Data Sources / Method.* "Emphasis was given to water-based recreation because the greatest potential for recreation impacts would occur to activities such as boating and fishing." This remark is unsubstantiated, ignores specific remarks in the Public Scoping Document, and significantly understates the significance of water to recreation in the Grand County economy.	407. The emphasis of the Recreation analysis on water-based recreation is reasonable considering that most of the impacts and the concerns identified during scoping are related to boating and fishing. Potential impacts to land-based recreational activities, including camping, hiking, scenic driving, and sightseeing, are described in the Recreation Resources Technical Report and in the section on Effects Common to All Alternatives in the EIS. Additional information is provided in the response to Comment No. 372.
408	**Comment R-2, page 3-231.** *Colorado River – Reach #1.* "This 7-mile reach … is mostly private land with no designated recreation sites. Fishing opportunities are present primarily on private land…such as Orvis." With these statements, there is no recognition that the 1,553-acre Shorefox development by Orvis is directly dependent on a healthy Colorado River, not only for fishing but also for it passive scenic beauty as it traverses through residential lots and golf courses. This development features the Colorado River as its primary asset and is an example of the inextricable connection of the local recreation-based Grand County economy to its river corridors.	408. Potential effects of hydrological changes on commercial and private fishing opportunities are briefly described in the FEIS. However, the Aquatic Resources analysis determined that the projected effects to fish habitat would not result in a loss of angling opportunities or success. Our understanding is that the Orvis Shorefox development was never completed and is in foreclosure.
409	**Comment R-3, page 3-231.** *Colorado River – Gold Medal Stream Designation – Reach #2.* "This reach is designated as a Gold Medal stream for outstanding fishing opportunities." There is no follow-up as to whether the WGFP or cumulative impacts would threaten this valued designation that has direct socioeconomic effects on the local tourism sector in the summer months.	409. See response to Comment No. 370. The Windy Gap Project cannot divert water when streamflows below Windy Gap Reservoir drop below the minimum streamflow of 90 cfs. Aquatic resource mitigation measures are described in Sections 3.8.4 and 3.9.4 of the FEIS.
410	**Comment R-4, page 3-231.** *Colorado River – Gold Medal Stream Designation – Reach #3.* "Gold Medal waters for fishing are present upstream of Troublesome Creek ... Private lands adjacent to the river, such as Elk Trout Lodge property, also provide opportunities for fishing access and guided fishing." There is no follow-up as to whether the WGFP or cumulative impacts would threaten this valued designation or impact the high-profile Elk Trout Lodge. The commercial guest ranch referenced is a 22-guest resort that was established 25 years ago. It attracts affluent people seeking a high-quality fishing experience and is among the largest employers in this area. Also, outfitters make needed supplemental income by providing fishing guide services on this vital Gold Medal stretch of the Colorado River.	410. See response to Comment Nos. 408 and 409.
411	**Comment R-5, page 3-231** *"Preferred Flows."* Table 3-114 introduces a category called "preferred minimum flows." The term, which is used in subsequent sections, seems internally inconsistent. No explanation of the term is provided. The *Draft Grand County Stream Management Plan – Phase 2* [33] provides clearly documented definitions of minimum and optimum streamflows. The authors should review and consider use of this report.	411. See response to Bureau of Land Management (Letter No. 1054) Comment No. 7.
412	**Comment R-6, page 3-233** *Commercial vs. Total Usage.* This section of the DEIS reports both commercial boating and commercial fishing data and total visitation data for Reach 4. Total visitation data, which	412. The total visitation data reported in the DEIS is for both water- and land-based recreation within the Pumphouse and Radium Recreation Areas administered by the BLM. The commercial boating and fishing data are separate, and is truly limited to commercial visitors. Potential economic effects to land-based nonboating recreational uses in the Gore Canyon area are evaluated in the Socioeconomic section of the FEIS.

REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 28 OF 40

Com-ment	Letter #1075	Response
412	presumably includes commercial and private visitation, is 44% higher than commercial only data. The remainder of the DEIS focuses on only commercial boating and commercial fishing information. Private visitation has similar socioeconomic impacts as commercial visitation. If total visitation data were used throughout the discussion of recreation, then the impact analysis would be more complete and reliable.	
413	**Comment R-7, page 3-233.** *Fishing Guides.* The DEIS reports that 15 companies offer guided fishing trips in Reach 4, totaling about 30,000 to 40,000 annual user days. There is no discussion about the potential of reduced fishing activity in the recreation section and the ripple effect in the local economy in the subsequent socioeconomic section. The relationship between fishing activity and the Colorado River is a function of daily flows, water temperature, clarity, and fish, not a singular function of fish habitat. [34] The *Draft Grand County Stream Management Plan-Phase* 2 [35] provides well-researched information about optimum flows for angling.	413. See response to National Wildlife Federation (Letter No.1108) Comment No. 5.
414	**Comment R-8, page 3-233.** *Commercial Boating Only.* Socioeconomic effects considered commercial boating and fishing only. Boating and fishing are core summertime visitor activities. What about the impact of reductions in private boating and fishing. This likely has a significant visitor impact.	414. Impacts on private boating were quantified where estimates were available in the socioeconomics section (Byers Canyon) and are at least partially covered by using a worst-case assumption of the complete loss of private boating when flows are less than the preferred range. Per CEQ guidance and regulations implementing the provisions of the National Environmental Policy Act, agencies are required to use the best available information and there is currently no reliable data for private boating use on the Upper Colorado, and most commercial use is downstream of Kremmling.
415	**Comment R-9, page 3-235.** *Water Surface Area Impacts.* The DEIS states, "In general, a decrease in water surface area would be considered a negative effect, although it is difficult to quantify any change in visitor use." The researchers appear to have made no effort to quantify potential effects, even though there is recent relevant experience in the Lake Granby area from 2002 and 2003. [36]	415. A number of factors contribute changes in visitor use at Granby Reservoir. No statistical information is kept on visitor numbers at Granby Reservoir from which to compare visitor numbers for different years. Certainly, visitor preference is for a fuller reservoir, but quantifying the incremental impacts on recreation and visitation from strictly changes in lake level for a water storage reservoir that fluctuates widely is challenging. We are not aware of readily available information on the impacts specifically related to low Granby water levels in 2002 and 2003. To reduce the frequency and amount of fluctuations in Granby Reservoir, prepositioning was modified to maintain about 340,000 AF of storage in the reservoir or an elevation of about 8,250 feet (FEIS Section 3.5.4).
416	**Comment R-10, page 3-235.** *Wild & Scenic River Designation – Colorado River Designation.* All five reaches of the Colorado River are under consideration for "Wild and Scenic River" designation by the BLM. The DEIS makes no attempt to evaluate the impacts of the WGFP or the cumulative effects against the criteria being used by the BLM to determine eligibility. This is a potentially significant designation that could generate substantial visitor revenues for Grand County. While not usurping BLM's analysis, the DEIS should compare eligibility requirements against anticipated effects of the WGFP and the cumulative effects.	416. See response to Comment No. 371.
417	**Comment R-11, page 3-236.** *Land-Based Recreation.* The DEIS states that "the effects to water-based recreation would have limited direct impacts on land-based recreation activities such as camping, picnicking and hiking. … There could be a decrease in camping in upper Colorado River campgrounds during periods when streamflow is less than preferred for boating." While these two statements are in the same paragraph. They seem to conflict with each other.	417. Comment noted. The latter statement is not supported and has been deleted from the FEIS.

Com-ment	Letter #1075	Response
417	Visitors may come (or not come) to Grand County for water-based recreation such as fishing and boating and then participate in land-based recreation as complimentary activities. There is no effort to determine whether this is true or false.	
418	**Comment R-12, page 3-236.** *Grand Lake and Shadow Mountain Reservoir – Water Quality.* "Reduced water clarity and algal growth has been a concern in Grand Lake and Shadow Mountain Reservoir that may contribute to a diminished recreation experience." There is no further attempt quantify the current recreation usage of Grand Lake and Shadow Mountain Reservoir or to quantify and impacts from the WGFP. As described earlier in this memorandum, there is ample secondary research to analyze this concern.	418. See response to Comment Nos. 343 and 344.
419	**Comment R-13, page 3-236.** *Grand Lake and Shadow Mountain Reservoir – Fishing.* "The assessment of aquatic resources … determined that the predicted water quality changes in Grand Lake and Shadow Mountain Reservoir would not adversely impact fish, and therefore, there would be no effect on fishing opportunities in these lakes." Recreational fishing relates to the environmental quality of the experience as much as the presence of fish. With continued deterioration in water clarity and algal growth, fishing may become less attractive to anglers, regardless of whether there are fish in the water bodies. [37]	419. See response to Comment Nos. 343 and 344.
420	**Comment R-14, page 3-236.** *Lake Granby Surface Area.* The DEIS states that in an average year, the water surface area of Lake Granby would be 140 acres (2%) less under the No Action Alternative, 351 acres (6%) less under the Proposed Action Alternative and 167 acres less under Alternatives 3 to 5. - It is unclear how the Existing Conditions surface area acreage was derived. - The DEIS reports that it is "unlikely to noticeably affect recreation use or the quality of the recreation experience." This is unsubstantiated.	420. Existing Granby Reservoir surface area was derived based on modeling of the 47-year study period. It is reasonable to assume that a 6 percent reduction in surface area in a water storage reservoir that regularly fluctuates under existing conditions would not noticeably affect recreation use or the quality of the recreation experience. See response to Comment No. 421.
421	**Comment R-15, page 3-236.** *Lake Granby Water Level – Dry Years.* The DEIS states that Lake Granby water level could decline by up to 18′ under No Action and 23′ under Proposed Action in consecutive dry years. - There is no correlation with these water level figures and surface acres and so the reader cannot evaluate the magnitude of this remark. - It can take a community years and considerable public relations effort to overcome a bad visitor impression such as this. Our interviews with members of the local business community indicate that visitor impact of a few dry years can last multiple years thereafter. The DEIS ignores this very real possibility.	421. Additional information has been added to the FEIS to better correlate severe drawdowns during consecutive dry years with reservoir surface area. Dry years and low water levels have occurred in the past and would continue to occur in the future. The modified prepositioning mitigation measures proposed by the Subdistrict would maintain higher water levels in Granby Reservoir. With modified prepositioning in place, water level reductions in consecutive dry years would be limited to about 15 feet. See also response to Comment No. 369.
422	**Comment R-16, pages 3-236-237.**	422. See response to Comment No. 377.

REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 30 OF 40

Com-ment	Letter #1075	Response
422	*Lake Granby – Boat Ramp Access.* There are 3 public boat ramps on Lake Granby (page 3-230). The DEIS states that the Arapaho Bay ramp would be affected under all alternatives. In successive dry years, Arapahoe Bay, Stillwater and Sunset boat ramps would be not function. (This is 100% of the public boat ramps.) The DEIS states that boat ramp access would be affected and it may reduce the quality of the recreation experience. If all boat ramps are affected, it appears to be an understatement that the circumstance "may" reduce the quality of the recreation experience. Also, there is no quantification of this effect or its ripple effect in the economy in the subsequent socioeconomic section.	
423	**Comment R-17, pages 3-237.** *Lake Granby – Recreation Experience.* The DEIS states that the "relatively small percent reduction in boatable area in most years is unlikely to noticeably affect recreation use or the quality of the recreation experience under any alternative. Additional exposed shoreline at lower water levels could reduce the aesthetic value. Lower water levels under all alternatives would not substantially affect accessibility for shoreline fishing but in periods of success dry years, lower water levels would affect boat ramp access which may reduce the quality of the recreation experience." - This contains a substantial amount of judgment based on one personal communication with a recreation manager with the US Forest Service There is substantial case example information available. - Recent low water years for the Lake Granby (2002 and 2003) appear to have been excluded from the analysis of baseline hydrological conditions, making any impact conclusions questionable. With many reservoir choices, reductions in aesthetic value will likely impact the visitor experience not only in the year that water levels are low but for multiple years thereafter as the visitor experience is remembered and shared with fellow travelers.	423. See response to Comment Nos. 369, 377, 415, 420, and 421.
424	**Comment R-18, page 3-238.** *Colorado River Reach #1 Monthly Streamflow & Fishing.* The DEIS states monthly streamflow for Colorado River Reach 1 would decrease up to 6% under the No Action Alternative and up to 11% under other Alternatives. It states that because this reach is not a popular boating destination, there would be negligible boating impacts; it does not mention fishing impacts. The DEIS also fails to consider the impact on private fishing from the Shorefox development by Orvis, which uses the Colorado River as its feature asset for fishing and aesthetic value.	424. See response to Comment No. 408.
425	**Comment R-19, page 3-238.** *Colorado River Reach #2 (Byers Canyon) – Monthly Streamflow.* In Colorado River Reach 2, average monthly streamflow reduction data is not provided in the DEIS but is provided in the *Recreation Resources Technical Report* (ERO Resources, Page 40, Table 18). This reach would experience among the most significant decreases in average monthly flow.	425. One of the purposes of the Recreation Resources Technical Report is to provide more detailed documentation of the resources and potential effects, some of which are not repeated at the same level of detail in the EIS. Impacts to boating use in Byers Canyon are described in the FEIS. Kayaking use of this reach of the Colorado River is infrequent.
426	**Comment R-20, page 3-238.**	
	REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 31 OF 40	

Com-ment	Letter #1075	Response
426	*Colorado River Reach #3 – Monthly Streamflow.* In Colorado River Reach 3, average monthly streamflow would decrease up to 13% under the No Action Alternative, up to 15% under the Proposed Action and up to 18% under the other action alternatives. The DEIS reports limited boating activity but does not address fishing along this visible stretch. Fish are already compromised due to lower streamflows; monthly streamflow data is inadequate to make any definitive claim about fishing impacts in this or other reaches.	426. See response to Comment Nos. 381 and 386.
427	**Comment R-21, pages3-238, 3-239 to 3-244, 3-247 to 3-252.** *Baseline Data for Reductions in Preferred Streamflow for Kayaking and Rafting.* For Colorado River Reaches 2, 4 and 5, the DEIS provides extensive data regarding the number of days that the preferred streamflow would be below preferred and acceptable levels for kayaking and rafting for the Windy Gap Firming Project and for Cumulative Effects. The baseline data upon which streamflow reductions are measured extends only from 1950 to 1996. If more recent data shows lower streamflow levels, then the magnitude of the calculated impacts should be adjusted.	427. See response to Comment No. 7 regarding the rationale for the hydrological model study period of 1950 to 1996. Also see response to Comment No. 415.
428	**Comment R-22, pages 3-238, 3-239-44.** *Effects of Preferred Streamflow Reductions for Kayaking and Rafting – WPFP Effects.* Refer to the earlier discussion in Section 1.7 of this memorandum.	428. See response to Comment Nos. 382, 387, and 411.
429	**Comment R-23, page 3-246.** *Common Cumulative Effects - Fishing.* "Potential effects to aquatic resources from changes in streamflow and reservoir storage … are unlikely to adversely impact sport fishing under any alternative based on accessed impacts to fish habitat." No substantiation for this assertion is provided.	429. See response to Comment No. 380.
430	**Comment R-24, pages 3-246 – 3-247.** *Lake Granby – Cumulative Effects.* The DEIS reports the No Action Alternative would trigger a surface area decrease of 190 acres (3%), the Proposed Action, 431 acres (7%), and the Action Alternatives, 4%. In a dry year, surface area decrease would be 7% for the No Action, 9% for the Proposed Action and 4% for the other alternatives. The DEIS provides no quantification of potential effects of these impacts and does not follow-through in the socio-economic impact analysis. It simply states that "Lower water levels and reduced surface areas could reduce the quality of the recreation experience…"	430. See response to Comment Nos. 369, 378, and 420.
431	**Comment R-25, pages 3-247 – 3-252** *Effects of Preferred Streamflow Reductions for Kayaking and Rafting – Cumulative Effects.* Refer to the earlier discussion in Section 1.7 of this memorandum.	431. See response to Comment Nos. 383 through 388.
432	**2.3 VISUAL QUALITY** **Comment V-1, page 3-266.**	432. See response to Comment No. 389.

Com-ment	Letter #1075	Response
432	*Issues.* "Issues of concern identified during scoping were the potential effect to existing visual quality near the reservoir sites …and the impact to scenic resources from hydrological changes." The DEIS contains no follow-through related to this concern.	
433	**Comment V-2, page 3-268 and 3-270.** *Grand Lake – water clarity and algal growth.* The DEIS states that "predicted small reductions in water clarity and increased algal growth" in Grand Lake may contribute to diminished visual quality. There is no quantification or follow-through from this remark. Substantial research is available regarding the relationship of water clarity, visitation and property values. [38]	433. See response to Comment No. 392.
434	**Comment V-3, page 3-268 and 3-270.** *Shadow Mountain – Water Clarity.* The DEIS states that there would be no change in water clarity at Shadow Mountain and water quality changes would not likely be noticeable. There is no quantification of the amount of water quality changes and no substantiation of the conclusion. As stated above, there is research available regarding the relationship of water quality and visitation.	434. See response to Comment No. 393.
435	**Comment V-4, page 3-268** *Lake Granby – Shoreline - WGFP.* In an average year, the DEIS states that visible shoreline will increase by 37% with the No Action alternative, 93% with the Proposed Action Alternative, and 53% with Alternatives 3, 4 and 5. In successive drought years, comparable data was not provided. It is critical to provide comparable data for drought years. Also, the DEIS simply provides a qualitative statement that lower water levels "would reduce the visual quality of the reservoir for some viewers compared to existing conditions." The magnitude of these impacts suggests that the unsubstantiated statement is not justified. This potentially significant impact needs to be addressed in a quantitative and rigorous manner.	435. See response to Comment No. 394.
436	**Comment V-5, page 3-269.** *Colorado River Streamflow.* The DEIS reports only single figures for average monthly streamflow reductions in feet. This data is incomplete and misleading. - There are no figures for Existing Conditions; percentage changes cannot be observed in context. - Visual impacts do not occur in monthly average statistics but in daily experiences. - Since only one average monthly streamflow figure is provided per remark, the implication is that it is calculated over 12 months. Winter streamflows are not relevant because visitors do not focus on the visual impacts at this time.	436. The FEIS clarifies that the average monthly changes in river stage is compared to existing conditions. Stream stage varies daily, and for simplicity in comparing alternatives, average monthly stream stage is presented in the FEIS. Stream change was not calculated on an annual basis. The Water Resource Technical Report Appendix E (ERO and Boyle Engineering 2007) shows average monthly stream change by alternative.
437	**Comment V-6, page 3-269.** *Willow Creek Streamflow.* The DEIS reports average annual streamflow reductions in percentage terms. The No Action Alternative would decrease annual average streamflows by 7%, the Proposed Action streamflow would decrease by 14%, and Alternatives 3-5 streamflow would decrease 12% relative to Existing Conditions. Average annual statistics are not meaningful indicators for measuring visual impact because they include winter conditions when visitors are	437. No stage data were available for Willow Creek. Section 3.21.2.5—Visual Quality was revised to indicate changes in average monthly streamflow.

Com-ment	Letter #1075	Response
437	not viewing Willow Creek. They mask the higher streamflow reductions in the summer months.	
438	**Comment V-7, page 3-270.** *Lake Granby – Shoreline – Cumulative Effects.* The DEIS states that the visible shoreline from the cumulative effects will be greater than from the WGFP. In an average year, the DEIS states that visible shoreline will increase by 55% with the No Action Alternative, 120% with the Proposed Action Alternative, and 57% with Alternatives 3, 4 and 5. Similar to above, the DEIS provides a modest qualitative impact remark "changes in shoreline exposure would decrease the visual quality of the reservoir … for some viewers." There is no attempt to quantify related visitor impacts due to reductions in visual quality and no follow-through in the socioeconomic impacts section. As described above, there is ample secondary data as well as direct data about Lake Granby from the recent low water years, 2002 and 2003.	438. See response to Comment Nos. 343 and 374.
439	2.4 SOCIO-ECONOMIC IMPACTS **Comment SE-1, page 3-278.** *Agricultural Impacts.* Lower streamflow and additional irrigation ditch structure failures is a relationship that the Subdistrict does understand. The Municipal Subdistrict paid $500,000 to upgrade diversion structures for ranches below the Colorado River as part of the original construction of Windy Gap Reservoir. However, the potential for additional irrigation ditch structure failures is not acknowledged.	439. The Windy Gap Project cannot divert water when streamflows below Windy Gap Reservoir drop below the minimum streamflow of 90 cfs. See response to Comment No. 348.
440	**Comment SE-2, page 3-279.** *Narrow Recreation Impacts.* The DEIS acknowledges "potential effects to the recreation economy include changes in recreation boating, fishing opportunities and other related land-based activities such as camping and sightseeing." The DEIS only quantifies effects from loss of commercial boating on three Colorado River reaches and camping on one Colorado River reach. It concludes that any other type of impact is "too speculative" or "too difficult to quantify."	440. See response to Comment No. 345.
441	**Comment SE-3, pages 3-280 – 3-281.** *Annualized Cost or Benefit - Kayaking and Rafting Days Lost.* The DEIS estimates numbers of visitor days lost related to reduced kayaking and rafting opportunities by river reach and reports annualized equivalent figures. (Table 3-139). This is based on the analysis of days that streamflow is below preferred levels that are presented in the Recreation Section. There are several unresolved issues regarding these figures. (a) The DEIS and the Socioeconomic Resources Technical Document provide insufficient information to understand these calculations. Having received an oral explanation of mathematical steps from the author, a significant math error that underestimates values was found in the Byers Canyon information. (b) This table should include Existing Conditions so that these figures can be placed into context. (c) If the figures are added, and with the corrected information about Byers Canyon, then the Proposed Action Alternative costs the community $14,905 per year in visitor expenditures lost. (e) There is no mitigation recommendation to counterbalance this annual loss	441. The boating impact information in the Recreation and Socioeconomic sections has been revised and the calculations are explained in the FEIS. There was not a significant math error in the Byers Canyon results reported in the DEIS, and the effects reported in the FEIS are even less based on the preferred flow thresholds in the Grand County SMP. The number of boating days under existing conditions is provided in the Recreation section, which provides context for the changes resulting from the action alternatives. In the FEIS, the total average annual impact from boating impacts under the Proposed Action is about $4,200. There is no requirement under NEPA for all impacts to be mitigated.

Com-ment	Letter #1075	Response
441	which will be concentrated in the small communities of Hot Sulpher Springs (2007 population, 956) and Kremmling (2007 population, 1,564).	
442	**Comment SE-4, page 3-282.** *Colorado River Angling.* In the same paragraph, the DEIS appears to make four seemingly inconsistent or, at a minimum, confusing statements: - "Projected changes in streamflow on the Colorado River below Granby Reservoir under all of the alternatives would result in a loss of fish habitat." - "The anticipated reduced flows, which are greatest during the high runoff period, are not expected to adversely impact fish populations or fishing opportunities." - "Projected effects to fish habitat are not predicted to translate to loss of angling opportunities or fishing success." - "Lower flows in some months could diminish the aesthetic value of the river for some visitors and possibly affect the quality of the recreation experience." Whatever the message is, the DEIS does not quantify potential impacts and does not reference this issue in the summary remarks. Are these figures based on average monthly flows, which would understate the impact on fish populations? Angling relates to an experience that is based not only on the presence of fish population but also on daily flows, water temperature, water clarity, the presence of slippery moss and algae, and other issues. The DEIS statements appear to be inconsistent and are unsubstantiated in the socioeconomic impact section.	442. The Socioeconomics section in the FEIS has been revised to clarify that the alternatives would result in a loss of fish habitat, but that loss of habitat would not result in impacts to fish populations or angling opportunities. See response to Comment No. 380.
443	**Comment SE-5, page 3-282.** *Three Lakes Recreation Usage.* The DEIS states that "reduced water clarity and algal growth … may contribute to a diminished recreation experience…It is unknown whether these issues would translate to a loss in visitors and associated economic effects." This issue is dropped without justification or follow-through. It is not mentioned in the summary chapter. The implication is that there is no effect. "Chronic toxin levels could have an economic effect, but there is currently not enough information to determine whether this is true." Again, this issue is dropped. There is secondary data that provides a relationship between water clarity, algal growth and toxin levels, and recreation and property values. This scholarly research was not considered. *EPA Guidelines for Economic Impacts* clearly state that if an impact cannot be quantified, that an explanation as to why it cannot be quantified is recommended and the qualitative remark should continue to be represented in the analysis. That is, it cannot be dropped just because it is not quantified.	443. See response to Comment 343. Proposed nutrient mitigation measures would reduce loadings to the Three Lakes and the potential for impacts to water clarity, algal growth, and toxins. The analysis in the Socioeconomics section is consistent with the portion of the 2000 EPA Guidelines for Economic Analyses that are relevant to NEPA analyses (note the 2008 version is still a draft and is not to be cited according to the EPA). There is not a requirement under NEPA for each qualitative effect to be included in the Summary of Impacts.
444	**Comment SE-6, page 2-283.** *Lake Granby Recreation Usage.* "Sufficient information is unavailable to determine if lower Lake Granby water levels would directly affect visitor use." The statement was made, even though (a) there is recent experience at Lake Granby that was not pursued or considered; (b) the remark	444. See response to Comment No. 443.

Com-ment	Letter #1075	Response
444	was highlighted in the *Public Scoping Report* as a point of concern, and; (c) the EPA *Guidelines for Economic Impacts* caution against ignoring an impact just because it is not quantified.	
445	**Comment SE-7, page 3-283.** *Three Lakes Fishing Usage.* "Predicted minor changes in physical and water quality conditions are…unlikely to affect the fish communities. Thus, there would be no effect to recreational fishing opportunities." There is no obvious justification for this statement in this section.	445. The logic is sound; if there is no substantial adverse effect on fish, there is not likely to be an effect on fishing.
446	**Comment SE-8, page 3-286.** *Cumulative Effects Analysis.* The DEIS states that the "cumulative socioeconomic effects were evaluated" but provides only the results of this analysis. The analytical steps are excluded from the DEIS and the Socioeconomic Resource Report, so it is not possible to analyze the results.	446. The FEIS explains that the quantitative socioeconomic and hydropower and impacts were calculated using the same methodology as direct effects based on cumulative effects hydrology.
447	**Comment SE-9, page 3-287.** *Agricultural Production – Cumulative Effects.* The DEIS reports that additional water diversions from cumulative effects "would have no cumulative effect to existing agricultural production or farm income in Grand County." This statement is contrary to our research, which shows a direct relationship between streamflows and irrigation ditch operations.	447. See response to Comment No. 348.
448	**Comment SE-10, page 3-287.** *Colorado River – Tourism – Cumulative Effects.* "…no adverse impact to boating or fishing in the Colorado River that would impact the tourism-related expenditures is likely for any alternative." This appears to be contrary to the subsequent section 3.22.3.4.	448. The sentence in Section 3.22.3.2 has been changed to refer only to a no adverse impact on fishing.
449	**Comment SE-11, page 3-288-3-289** *Cumulative Impacts.* The DEIS evaluates cumulative impacts against the No Action Alternative which already includes substantial impacts relative to Existing Conditions. This seriously reduces the magnitude of the impact. Note that in an earlier section, the DEIS evaluates WGFP against Existing Conditions.	449. The cumulative socioeconomic effects are all relative to changes in boating days from existing conditions. This has been clarified in the FEIS.
450	**Comment SE-12, page 3-289.** *Annualized Costs or Benefits – Kayaking and Rafting Days Lost – Cumulative Effects.* Table 3-142 (Section 3.22.3.4) reports annualized costs from commercial kayaking and rafting. In my judgment, there are several unresolved issues with this information: (a) The DEIS and the Socioeconomic Resources Technical Report provide insufficient information to understand these calculations. Having received an oral explanation of mathematical steps from the author, a significant math error that underestimates values was found in the Byers Canyon information.	450. See response to Comment No. 441.
451	(b) This table should include Existing Conditions so that these figures can be placed into context.	451. See response to Comment No. 441.

REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 36 OF 40

Com-ment	Letter #1075	Response
452	(c) Data for kayaking in the Pumphouse reach is not provided in the DEIS upon which to make the annualized calculations.	452. See response to Comment No. 441.
453	(d) If the figures are added, and with the corrected information about Byers Canyon, then the Proposed Action Alternative costs the community $148,817 per year in visitor expenditures lost.	453. When comparing the direct effects of the WGFP with the cumulative effects, including reasonably foreseeable water-based actions, it is clear that only a small portion of the impacts is attributable to the WGFP.
454	(e) There is no mitigation recommendation to counterbalance this significant annual loss which will be concentrated in the small communities of Hot Sulpher Springs (2007 population, 956) and Kremmling (2007 population, 1,564).	454. See response to Comment No. 351; there is insufficient information available to evaluate impacts on specific communities. Also, there is no requirement under NEPA for all impacts to be mitigated.
	REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 37 OF 40	

Com-ment	Letter #1075	Response

SUMMARY OF ERO'S FINDINGS – SOCIOECONOMIC MPACTS ON THE EXISTING RESERVOIRS IN GRAND COUNTY
DEIS Socioeconomic Section, 3.22
(This table does not provide additional information that is not presented above.)

Lake/Reservoir	Lake Granby	Shadow Mountain	Grand Lake	Willow Creek	Windy Gap
Boating *(p 3-282, 3-290)*	Unlikely to affect use	No mention	No mention	No mention	No mention
Fishing *(p 3-283)*	No impact	No impact	No impact	No mention	No mention
Camping	No mention	No mention	No mention	No mention	No mention
Other *(p 3-282)*	Aesthetic value may be reduced; don't know if visitor use affected	Diminished recreation experience possible	Diminished recreation experience possible	No mention	No mention

SUMMARY OF ERO'S FINDINGS – SOCIOECONOMIC MPACTS ON THE COLORADO RIVER
DEIS Socioeconomic Section, 3.22
(This table does not provide additional information that is not presented above.)

Reach #	*#1*	#2	#3	#4	#5
Location of Reach	*Lake Granby to Windy Gap*	*Windy Gap Res. to Williams Fork River (Byers Canyon)*	*Williams Fork River to Kremmling*	*Kremmling to Pumphouse (Big Gore)*	*Pumphouse to State Bridge (Pumphouse)*
Land Use *(p 3-287)*	No impact	No impact	No impact	No impact	No impact
Boating – Rafting *(p 3-280, 3-281, 3-288, 3-289)*	No mention	No mention	No mention	Some visitors days lost	Some visitors days lost
Boating – Kayaking *(p3-280, 3-281, 3-288, 3-289)*	No mention	Some visitor days lost	No mention	Some visitors days lost	Some visitor days lost
Camping (p 3-282)	No mention.	No mention.	No mention.	No mention.	Some visitor days lost
Fishing *(p 3-282, 3-289)*	Possible; no measurable effect.	Possible; no measurable effect.	Possible; no measurable effect.	Possible; no measurable effect.	Possible; no measurable effect.
Other	None	None	None	None	None

NA = No Action; PA = Preferred Alternative; 3-5 = Alternatives 3, 4, and 5.

[1] Krysel, Charles, Goyer, Elizabeth Marsh, Parson, Charles and Weele, Patrick. 2003. *Lakeshore Property Values and Water Quality: Evidence from Property Sales in the Mississippi Headwaters Region*. May 2003.

[2] Terrill R. Hanson, Luther Upton Hatch, Howard C. Clonts. 2002. *Reservoir Water Level Impacts on Recreation, Property, and Nonuser Values.* Journal of American Water Resources, Volume 38, No. 4, 1007-1018, 2002)

[3] P. Joan Poor, Keri L. Pessagno, Robert W. Paul. 2006. *Exploring the hedonic value of ambient water quality: A local watershed-based study.* Environmental Economics, 2006, available at www.sciencedirect.com, pp 8-9.

REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 38 OF 40

Com-ment	Letter #1075	Response

[4] Holly Michael, Kevin Boyle, Roy Bouchard. 1996. *Water Quality Affects Property Prices: A Cast Study of Selected Main Lakes.* Maine Agricultural and Forest Experiment Station, Misc. Report 398, February 1996, University of Maine.

[5] Environmental Protection Agency. 2000. *Guidelines for Preparing Economic Analyses.* Office of the Administrator, EPA 240-R-00-003, September 2000, page 21.

[6] Conversation with Bill Thompson, Grand County rancher and water commissioner, December 2006.

[7] Tetra Tech, Walsh Aquatic Consultants, Inc., Habitech, Inc. *Draft Report – Grand County Stream Management Plan – Phase 2.* April 2008, pages CR4-2, CR5-2.

[8] Dean Runyon Associates. 2004. *Economic Impact of Travel on Colorado: 1996 – 2003,* prepared for the Colorado Tourism Office, June 2004, page 41.

[9] 2003 Travel Expenditures in Grand County, $169,700,000 / 2003 retail sales in Grand County, $316,668,000 = 54%. Retail sales data are from the Colorado Department of Revenue.

[10] Data provided by Colorado Department of Revenue web site.

[11] Tetra Tech, *Ibid.*

[12] Senate Document 80, 75th Congress, 1st Session, Colorado-Big Thompson Project, June 15, 1937, page 3.

[13] Conversation with Mayor Clark, December 2006.

[14] BBC Research & Consulting, *The Economic Impacts of Hunting, Fishing and Wildlife Watching in Colorado.* 2008. Prepared for the Colorado Division of Wildlife.

[15] Fishing Experts and Fishing-Related Business Representatives. Conversation with owners of Mo Henry's Trout Shop, other experienced and knowledgeable anglers in Grand County and experts knowledgeable about fishing in Grand County. December 2008.

[16] Tetra Tech, *Ibid,* pages CR4-4, CR5-3, CR6-4.

[17] Terrill R. Hanson

[18] Kevin Boyle, Jennifer Scheutz and Jeffery Kahl. 1997. *Great Ponds Play an Integral Part of Maine's Economy.* University of Maine Water Research Institute Report #473.

[19] Conversation with Dan Murphy, owner of the Fishing Hole in Kremmling, December 2006.

[20] Colorado Wildlife Commission Policy, "Wild and Gold Medal Trout Management", effective date: September 18, 1992; revised date: June 12, 2008.

[21] Environmental Protection Agency. 2000. *Ibid.*

Com-ment	Letter #1075	Response
	[22] National Center for Environmental Economics. 2008. *Guidelines for Preparing Economic Analyses – External Review Draft*. Office of Policy Economics and Innovation, US Environmental Protection Agency, September 12, 2008. [23] Environmental Protection Agency, *Ibid.* page 27. [24] Ibid, page 175. [25] Terrill R. Hanson. [26] Kevin Boyle. [27] Senate Document 80, *ibid.* [28] Lake Granby Business Community. Telephone conversations with Granby Chamber of Commerce staff, Granby area motel operator and other business representatives indicate that there is a direct relationship between surface water acreage and visitors. (November 2008) [29] Sharon Brenner, President, CEO, Greater Granby Area Chamber of Commerce. December 2008. [30] http://www.americanwhitewater.org. _ [31] Coley/Forrest, Inc. 2007. *Grand County: Its Economy and Water Resources.* Prepared for Grand County Colorado. [32] Ibid. [33] Tetra Tech, *Ibid.* [34] Fishing Experts and Fishing-Related Business Representatives, *Ibid.* [35] Tetra Tech, *Ibid.* [36] Lake Granby Business Community. [37] Terrill R. Hanson, Kevin Boyle. [38] Charles Krysel, Terrill R. Hanson, P. Joan Poor, and Holly Michael. REVIEW OF WINDY GAP FIRMING PROJECT DEIS OF AUGUST 2008 – PAGE 40 OF 40	