

## **ATTACHMENT B**

### **Trout Unlimited Comments Compliance with NEPA Moffat Collection System Project**

The following comments address the adequacy of the draft environmental impact statement (DEIS) for the Moffat Collection System Project (Moffat Project) and the extent to which the DEIS complies with the requirements of the National Environmental Policy Act (NEPA). They summarize the analysis contained in the Joint Rebuttal Report, submitted in conjunction with these comments, with a particular focus on impacts to aquatic resources. The issues identified in the Joint Rebuttal Report are placed here in the context of NEPA's legal requirements.

#### **CONCLUSION**

The DEIS does not comply with NEPA. NEPA requires federal agencies to take a “hard look” at the direct, indirect and cumulative impacts of proposed federal action – in this case, issuance of a CWA §404 permit. To accomplish this goal, NEPA requires federal agencies to use high quality information and accurate scientific analysis to identify, *inter alia*:

- Environmental impacts of the proposed action,
- Any adverse environmental effects that cannot be avoided,
- Any irreversible and irretrievable commitments of resources should the action be taken, and
- Measures to avoid, minimize and mitigate identified impacts

The DEIS does not comply with these NEPA requirements for the following reasons:

- The potential for critical environmental impacts that could lead to the irreversible and irretrievable loss of valuable west slope fisheries is acknowledged but not evaluated; no measures to monitor for, avoid, minimize or mitigate such impacts are identified.
- Water quality impacts that can significantly affect aquatic resources are only partially and qualitatively evaluated; where impacts are identified, they are dismissed as insignificant without explanation, in spite of sound science to the contrary.
- Dry up of streams known to support macroinvertebrate and fish populations is dismissed as an insignificant impact; no measures to avoid, minimize or mitigate such impacts are identified.

- Cumulative impacts are not evaluated, including:
  - Impacts of ongoing transmountain diversions projects that divert the majority of native flows of west slope streams affected by the proposed Project;
  - Impacts of significant additional west slope stream diversions that will occur before 2016, when the proposed Project is expected to come on line
  - Impacts of climate change and global warming
  - Impacts of beetle kill, prevalent in the watersheds from which the proposed Project will divert its water
  
- Evaluation of impacts to west slope streams relies on inaccurate predictive tools to assess the extent to which the proposed Project will reduce flows that support aquatic resources; such predictions are contradicted by actual data that reveals that the predictive model significantly under-estimates the magnitude of depletions the Project will cause.
  
- Evaluation of impacts of reduced peak flows on aquatic resources is incomplete, reaches conclusions that are contrary to empirical evidence and relies on obsolete and inadequate methodology.
  
- Evaluation of impacts of the proposed Project on stream flow regime omits critical information, including the extent to which Project depletions will increase the length and frequency of dry year conditions that are particularly harmful to aquatic life; available, independent information reveals that the Project will indeed increase the length and frequency of dry year conditions.
  
- To assess the proposed Project's impacts, the DEIS assumes a 2016 baseline hydrology but a 2006 baseline for water quality and aquatic resource conditions; as a result, resource impacts that are acknowledged will occur between 2006 and 2016 are simply ignored; no explanation for this unscientific, illogical and internally inconsistent approach is given.

## **NEPA REQUIREMENTS**

NEPA represents the Nation's sweeping commitment to "prevent or eliminate damage to the environment and biosphere." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989). The statute accomplishes this goal by focusing government and public attention on the environmental effects of proposed agency action." *Id.* By doing so, NEPA "ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast." *Id.*

***Agencies Must Take a "Hard Look" at Environmental Consequences***

The sweeping policy goals announced in § 101 of NEPA are realized through a set of action-forcing procedures that require that agencies take a ‘hard look’ at environmental consequences before resources are committed. *Id.* at 350-51.

### ***Environmental Impact Statement Requirements***

NEPA requires all federal agencies to prepare an environmental impact statement (EIS) prior to major federal action significantly affecting the quality of the environment. 42 U.S.C. § 4331; *Robertson*, 490 U.S. at 348.

An EIS must include a detailed statement of (1) the environmental impact of the proposed action; (2) any adverse environmental effects which cannot be avoided should the proposal be implemented; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long term productivity; and (5) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. *Id.* at 348-9; *citing* 42 U.S.C. § 4332.

### ***Evaluation of Direct, Indirect and Cumulative Impacts Required***

NEPA requires federal agency evaluation of the “direct,” “indirect,” and “cumulative” impacts of a proposed federal action. *Id.* at 1508.25(c); *see also id.* at §§ 1508.7, 1508.8. Direct effects are those that “are caused by the action and occur at the same time and place.” *Id.* at § 1508.8(a). Indirect impacts are those “which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.” *Id.* at § 1508.8(b). A project’s “cumulative impact,” is

“the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions . . . . Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

*Id.* at § 1508.7. *See also Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372, 1379 (9th Cir. 1998) (with respect to a cumulative impacts analysis, an agency must provide “some quantified or detailed information” because “[w]ithout such information, neither courts nor the public . . . can be assured that the [agency] provided the hard look that it is required to provide.”).

### ***Quality of Environmental Impact Statement Information***

Information provided in an EIS must be of high quality and must include accurate scientific analysis. 40 C.F.R. § 1500.1(b). “The NEPA process is intended to help public officials make decisions that are based on understanding environmental consequences, and take actions that protect, restore and enhance the environment.” 40 C.F.R. §1500.1(c). “When an agency is evaluating reasonably foreseeable significant adverse

effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.” 40 C.F.R. § 1502.22. If the information cannot be obtained because the overall costs would be exorbitant or the means to obtain the information unknown, the agencies must explain the relevance of the incomplete or unavailable information, provide a summary of existing credible evidence, and evaluate the impacts based on theoretical approaches or research methods generally accepted in the scientific community. 40 C.F.R. § 1502.22(b).

### ***Measures to Avoid, Minimize and Mitigate Impacts Must be Disclosed***

To fulfill the essential purposes of NEPA, federal agencies are required, to the fullest extent possible, to “use all practicable means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.” 40 CFR § 1500.2. These means include (1) avoiding the impact altogether by not taking the action; (2) minimizing the impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; (5) compensating for the impact by replacing or providing substitute resources or environments. 40 C.F.R. § 1508.20. Mitigation measures must be fully discussed in the EIS. 40 CFR §1502.14(f) and 40 CFR § 1502.16

## **DISCUSSION**

### **1. The DEIS Fails to Evaluate the Potential for the Project to Cause or Contribute to a Catastrophic Loss of Aquatic Life**

West slope streams that will be affected by the proposed Moffat Project have been significantly dewatered by existing transmountain diversion projects. Additional diversions before and after the proposed Moffat Project would come on line will significantly increase the percentage of native flows lost to these streams, in some cases, completely drying them up for a longer period of time. Degradation of some of the stream systems is already apparent and documented.

In light of the historical and ongoing impacts to these streams, the critical question the DEIS must answer is not only how much of a change will the Moffat Project and other water development will have on the affected streams of today, but whether these streams can withstand any further impacts without being pushed into an alternative state, one that cannot support healthy fish populations and other aquatic life. This question is critical to evaluating the impact of future projects and is not evaluated by the DEIS.

Ecologists have long recognized that many ecosystems exhibit nonlinear behavior in response to human perturbations. In other words, a continuous change in an independent

variable (e.g., a continuous decline in stream flow) may not produce smooth changes in a response variable (e.g., fish productivity). Instead, if a threshold is crossed, the system may flip from one capable of supporting trout to one that can not. The term “ecological resilience” has been used to describe the amount of disturbance required to propel the ecosystem across a threshold and into an alternative stable state (Holling 1996). Riverine ecosystems are strongly affected by external factors like stream flow, sediment, and temperature (Groffman et al. 2006). Indeed, the quantity and timing of stream flow are critical components responsible for maintaining the ecological integrity of river ecosystems (Poff et al. 1997) and stream flow is often considered a “master variable” that limits the distribution and abundance of riverine species (Resh et al. 1988). Continued reductions in stream flow quantity and changes in stream flow timing have the potential to fundamentally alter how the Colorado River ecosystem functions.

The DEIS recognizes the potential for these responses, but does not evaluate them, finding that “thresholds are difficult to identify and would require abundant data collection and analyses . . . that is beyond the scope of the EIS.” (*DEIS, page 4-311*). Given the impacts these streams and their aquatic habitat have been subject to and the magnitude of the proposed Moffat Project diversions and other foreseeable water development, the DEIS’s failure to either evaluate the potential for such catastrophic response or to define terms and conditions to monitor for and prevent such occurrence violates the legal requirements of NEPA.

## **2. The DEIS fails to adequately evaluate water quality impacts that significantly impacts aquatic life.**

Elevated stream temperatures are a significant concern in the Fraser River, its tributaries and the upper Colorado River. Stream temperature at various locations already periodically exceeds levels deemed to be safe for the fisheries under State stream temperature standards. Operation of the Moffat Project has the potential to significantly change the current hydrology of the Fraser and Colorado Rivers by prolonging periods of low flows in average and wet years, by creating more frequent dry-year river conditions, and by extending drought conditions across the years. These changes could significantly aggravate existing stream temperature conditions, increasing the length of time and frequency with which fisheries and other aquatic resources are exposed to the stress of high stream temperatures. Accordingly, a thorough evaluation of the impacts of the project on stream temperatures and of the impacts such increases will have on the river’s aquatic resources is critical. Unfortunately the DEIS fails to do any stream temperature modeling.

***Stream temperatures are at or exceeding state standards under Current Conditions (2006).*** The DEIS indicates that the water temperatures on “St. Louis Creek and Ranch Creek exceeded the summer DM (Daily Maximum) with maximum temperatures of 21.5 °C and 23.7 °C, respectively (versus a standard of 21.2 °C).” In addition “Ranch Creek exceeded the regulatory standard in August of 2007 for the MWAT, with a maximum of 17.5 °C (versus a regulatory standard of 17.0 °C).” *DEIS at p. 3-25.*

In addition, a “maximum temperature of 17 °C” was observed on the Williams Fork River below Williams Fork Reservoir where the “regulatory acute standard is 17 °C” *DEIS at p. 3-34*. On the Colorado River, the DEIS states that “all but one station experienced a DM or MWAT temperature within 1 degree of the regulatory maximum, indicating that the river is very near regulatory standards. Changes in conditions such as lower rainfall, higher temperatures, or lower stream flows could cause an exceedance of regulatory standards.” *DEIS at p. 3-41*.

These water temperature violations are occurring under current stream flow conditions and the frequency of water temperature violations are likely to increase if additional water is removed from the Colorado River, the Fraser River, the Williams Fork River and their tributaries.

***Dissolved Oxygen concentrations are approaching state standards under Current Conditions (2006)*** The DEIS indicates that Dissolved Oxygen standards are already approaching state standards on both the Fraser and Williams Fork Rivers and their tributaries under current stream flow conditions at several locations. *DEIS at pgs. 3-28 and 3-34*. As with Water Temperature standards, violations of the Dissolved Oxygen standards are likely to increase as flows become more depleted on the Fraser and Williams Fork Rivers and their tributaries.

***The DEIS fails to model and evaluate the potential for stream temperature conditions that have acute or chronic impacts on aquatic resources.*** The DEIS does not model or quantitatively evaluate the extent to which operation of the proposed Moffat Project and other water development will cause increases in stream temperature that create acute or chronic conditions harmful to the river’s aquatic resources. Chronic conditions include effects which, while not immediately lethal, have the potential to devastate fisheries - such as reduced growth, reduced reproduction, and reduced survivorship. The State has adopted standards that reflect temperature levels trout fisheries can tolerate, both on a daily basis (acute) and over a period of time (chronic). Chronic standards are expressed as maximum weekly average tolerance levels (MWATs).

To assess whether operation of the Moffat Project and other water development will cause increases in stream temperature that will exceed acute and chronic tolerance levels, the agencies must be able to evaluate how stream temperatures will change on a daily and weekly basis. The DEIS fails to provide any water temperature modeling to predict acute and chronic temperature impacts associated with the Moffat Project.

**3. The DEIS acknowledges that the Moffat Project would cause or contribute to exceedances of stream temperature standards, including acute (lethal) standards, but arbitrarily dismisses their impacts as insignificant.**

The DEIS states that empirical evidence on St. Louis Creek suggests that DM water temperature standards have been exceeded when flows drop to 13 cfs in August. The

DEIS goes on to say that PACSM data indicates that flows will drop below 13 cfs approximately 29% of the time under both the Full Use (2016) and Full Use w/Project (2030) scenarios . *DEIS at p. 4-41*. The logical conclusion from this analysis is that DM water temperature exceedances could occur 29% of the time in future Augusts. However, the DEIS concludes that “no impact is anticipated” since the percentage of exceedances doesn’t increase under the Full Use w/Project (2030) scenario.

The DEIS states that Ranch Creek is already experiencing DM water temperature exceedances and that “a reduction in flow due to additional diversion has the potential to increase the number of days that water temperatures exceed regulatory limits.” *DEIS at p. 4-41* The DEIS concludes that “a moderate impact on Ranch Creek is anticipated.”

The DEIS states that the mainstem Fraser was has not yet experienced DM or MWAT temperature exceedances but that lower flows under the Full Use (2016) and Full Use w/Project (2030) may “contribute to higher water temperatures”. *DEIS at p. 4-41 to 4-42*. The conclusion is incorrect, the State is in the process of listing portions of the mainstem of the Fraser in its CWA 303(d) list due to stream temperature exceedances. The DEIS conclusion that impacts that were identified are “anticipated to be minor” is unfounded.

The DEIS states that Ranch Creek “would likely have a moderate impact due to an increase in the number of days that temperatures exceed regulatory limits” and that the mainstem Fraser would experience “minor impacts with regards to temperature near the Town of Granby”. *DEIS at p. 4-5*.

The DEIS fails to describe the criteria by which the “frequency” of a stream temperature exceedance is deemed to yield a “measurable” impact for purposes of the NEPA analysis and arbitrarily concludes that impacts will be negligible, minor or moderate. The acute and chronic stream temperature standards adopted by the State define not only the levels, but also the frequency of exposure that results in lethal (daily) and chronic (weekly) impacts to trout fisheries. The DEIS’s conclusion entirely disregards these standards, established by the State of Colorado after extensive analysis and formal hearings. The DEIS fails to provide any explanation as to why the State’s frequency standard was disregarded, or what other criteria the agencies’ relied upon to conclude that no “measurable” impacts resulted. The conclusion is arbitrary and capricious, and contrary to NEPA and well established State law.

**4. The DEIS fails to take a “hard look” at how operation of the Moffat Project and other water development will change the hydrograph of affected streams and how those changes will impact the streams’ aquatic resources.**

Hydrological changes can have significant impacts on the river’s aquatic resources. Flows affect the availability of habitat, water quality, and water temperature of the stream. They also affect the stream’s ability to serve functions that play a critical role in supporting a healthy aquatic ecosystem, such as channel creation and maintenance and cleansing of sediments lodged in spawning beds. While recognizing the importance of

adequately predicting expected flow conditions to properly assess the project's impacts on aquatic resources, the DEIS in fact fails to do so.

***No evidence that aquatic environments are currently healthy or evaluation of most probably and potentially harmful cumulative impacts.*** The DEIS states that “Knowing whether a resource is healthy, declining, near collapse, or not functioning is necessary for determining the significance of any added impacts due to the Moffat Project” *DEIS at p. 5-3*. Unfortunately the DEIS does not make a determination regarding the current health of the resource, electing instead to apparently assume that the resource is currently healthy, not in decline or near collapse and functioning? In fact, a recent report by the Colorado Division of Wildlife (CDOW 2010) concludes that “the overall abundance and distribution of the stonefly *Pteronarcys californica* and mottled sculpin *Cottus bairdi*...is greatly reduced compared to pre-impoundment data” and that “increased future water diversions may exacerbate these trends.”

After electing not to quantify the current health of the resource, the DEIS attempts to determine whether impacts of the Moffat Project will be significant by defining three impact related time frames; Current (2006), Full Use (2016), and Full Use w/Project (2030). The DEIS also projects a level of demand associated with each time frame; Current Conditions (2006) = 285,000 af, Full Use (2016) = 345,000 af, and Full Use w/Project = 363,000 af. *DEIS at p. 4-1, Figure 4.1-1 and p. 5-3*.

The DEIS elects to simply “disclose” water-based impacts between Current (2006) and Full Use (2016) and limit its “analysis” to the 14-year period between Full Use (2016) and Full Use w/Project (2030). *Page 4-1*.

This issue reveals one of the largest flaws in the approach that was taken in the Moffat DEIS. DEIS Chapter 4 (Environmental Consequences) and Chapter 5 (Cumulative Impacts) are essentially rendered meaningless since the DEIS doesn't evaluate whether the stream system is currently “healthy” and not “near collapse” under Current Conditions (2006) or analyze the 60,000 af of additional depletions that are projected to occur between Current Conditions (2006) and Full Use (2016) which are significant and may push these rivers over the edge environmentally.

The cumulative impacts section of the DEIS should be required to provide evidence that the existing aquatic environment is healthy and to analyze the potential impacts of the 60,000 af/yr of additional water development that is contemplated between 2006 and 2016 in addition to the 18,000 af of additional water development that is contemplated between 2016 and 2030.

***Dry-year and prolonged drought conditions are particularly harmful to aquatic life.*** The DEIS aquatic impacts analysis focuses on average and wet year conditions, as those conditions are defined in the PACSIM Model. Dry year impacts are glossed over because the Moffat Project is not expected to increase existing diversions during dry year conditions. *See e.g., DEIS at 4-6*. Dry-year conditions can have significant impacts on aquatic resources, particularly when they occur in consecutive years. As discussed in

what follows, operation of the project alternatives is likely to increase the incidence of dry-year conditions and prolong drought conditions in the river. The DEIS does not ask whether or how often these dry-year and extended drought conditions will occur as a result of operation of the Moffat Project alternatives, or what impacts such conditions will have on aquatic resources. Rather, the DEIS looks at historical average and wet year depletions in general and anticipates water and aquatic resource impacts in isolation. In so doing, the DEIS fails to evaluate some of the most probably and potentially damaging effects of the project.

Dry year conditions can create particularly harmful bottle-necks for aquatic life; especially in late summer and early fall as stream flows decline to critical levels. Low stream flows cause reductions in available aquatic habitat as more of the stream channel becomes desiccated and the remaining aquatic habitat becomes marginal as velocities and depths are reduced. In addition, stream temperatures fluctuate more rapidly at low flows thereby increasing the probability of exceeding both daily maximum and weekly average temperature standards. Many of the Fraser River tributaries are completely dewatered by the Moffat Project and the Colorado River below Windy Gap already experiences low stream flows and high water temperatures during most dry and some average water years. MOFFAT PROJECT could significantly exacerbate these existing problems by prolonging low flow periods in average years, increasing the frequency of dry year conditions and effectively creating prolonged drought conditions.

The DEIS states that “Typically additional diversions would be greatest in wet years following dry year sequences”. *DEIS at Page 4-5*. This trend would create more frequent back-to-back dry years and therefore, more frequent stress to aquatic species. As currently presented, the data does not permit an evaluation of the impacts of increasing the frequency of back-to-back dry years.

The DEIS states that 1) PACSM uses a daily time step, 2) daily data was averaged by month to evaluate impacts to streamflows and reservoir contents and 3) daily data were used to determine frequency and magnitude of daily flow changes. *DEIS at Page 4-14*. Aggregating daily flow values into monthly averages eliminates extreme daily flow fluctuations from consideration. Extreme daily flow fluctuations are important considerations for evaluating impacts to aquatic habitat, especially for fish. (Fish need water everyday). Consolidating PACSM results by wet, average, and dry years does not allow the opportunity to evaluate the impacts of artificially created back-to-back dry years that may result from increased diversions in wet or average years that follow drought years when reservoirs are at minimum storage levels.

***The DEIS fails to evaluate the likelihood and frequency with which the proposed Moffat Project would increase the incidence of dry year conditions and resulting impacts to aquatic resources.*** Increased diversions during average years, particularly in those years at the lower end of the PACSIM Model average year range, could cause Fraser River tributary and Colorado River stream flows to dip into a dry year condition, resulting in a reduction in the amount of habitat which would have been

available in the absence of the project. The DEIS does not evaluate these potential impacts.

The DEIS does not ask how often these conditions will re-occur as a result of Moffat Project, nor does it evaluate what impacts they will have on the river's aquatic resources. For instance, the impacts of the 2002 drought continued to be felt in 2003 and subsequent years because of the 2002 reservoir draw-downs and because the fish had already been stressed by the drought. The DEIS PACSIM study period runs from 1947 through 1991 and by failing to include the 2002/2003 conditions in the analysis, the DEIS not only ignores one of the most severe droughts on record, it completely disregards the role of Moffat Project and other reasonably foreseeable projects in extending the duration of drought conditions and the impacts this would have on the Fraser and Colorado Rivers' aquatic resources.

***The DEIS analysis relies on a hydrologic model that is inadequate as a tool to predict and assess impacts to aquatic resources.*** The DEIS estimates predicted changes in available juvenile and adult rainbow and brown trout habitat within the stream using estimated flow scenarios supplied by Denver Water's Platte and Colorado Simulation Model (PACSIM). *DEIS at 4-10.* PACSIM estimates flow changes at particular locations in the Fraser and Colorado Rivers based on pre-defined average dry, average, and wet year conditions for the study period between 1947 through 1991. Dry and wet year conditions are defined by averaging the five driest and the five wettest years of the study period, respectively *DEIS at 4-13.* Average year conditions are defined based on the averaging of all years within the study period. While perhaps adequate for municipal water development and planning purposes, the model is inadequate to estimate impacts to aquatic resources.

***The DEIS Uses Monthly and Annual Average Flow Estimates To Evaluate Hydrologic Impacts.*** PACSIM reports flow estimates in terms of daily values, however these daily flow estimates are then aggregated into monthly and annual averages. Monthly averages can mask important stream flow changes that may have significant impacts on river ecosystems, generally, and fish species in particular. For example, flows throughout August may be very low, but a single, large flood event may elevate the month's average. Accordingly, while looking at the average flow values may not reveal a potential problem, the average may be masking harmful flow conditions that occur for most of the averaged period. As the National Academy of Sciences so aptly noted in a recent report, "planners operate on a monthly basis, but fish live on a daily basis". (*National Academy Science Report, 2007*). Indeed, the Academy considered Reclamation's use of monthly average flows to be a fatal flaw in its *Natural Flow of the Upper Klamath River* study. Given that fish and other aquatic organisms respond to changes in flow that occur on much shorter time scales, it is inappropriate to evaluate changes in hydrology using monthly averages.

***The Model Overestimates Anticipated Flows.*** The Model's use of averages is likely artificially inflating predictions of flows that will be available to the fisheries and other aquatic resources in a dry, average and wet year. Because stream flow time-series

tend to be positively skewed (i.e., high flows tend to be much larger than low flows) the average, mean annual runoff tends to be higher than the median annual runoff (Smakhtin 2001). By using average annual discharge values in its impacts analysis, the DEIS overestimates the amount of water flowing through the river in a typical year. Median discharge values should have been used.

This problem is compounded by the fact that the data used to estimate average annual flows in wet and dry years were also included in estimates of discharge in the average year. Estimates of the average flow based on the entire 45-year (1947 through 1991) record are higher than they would have been if only the 35 years that were not included in the wettest five or driest five were used. In other words, by double counting the extreme years, the DEIS further overestimates the discharge of an average year. This may not have been a problem if the DEIS had focused on median discharge values.

***The Model Yields Isolated Dry, Average and Wet Years Data.*** One of the most critical deficiencies rendering the PACSIM Model incapable of assessing the impacts of the MOFFAT PROJECT alternatives on aquatic resources is the fact that the model output is aggregated into dry, average and wet years in isolation. It does not look at how often operation of the MOFFAT PROJECT alternatives will turn what have historically been average years into dry years or wet years into average years. Nor does it look at the distribution of expected dry, average and wet years over time. Because the model does not provide the required information, the DEIS cannot and does not evaluate the most probable and potentially devastating impacts operation of the Moffat Project and other reasonably foreseeable projects will have on the river's aquatic resources: the creation of dry year conditions, extension of low flow conditions during average and wet years, and prolongation of drought (back-to-back dry year) conditions across the years. As further discussed in what follows, failure to evaluate this critical information renders the aquatic resources impacts analysis fatally flawed.

#### **6. The DEIS fails to take a “hard look” at the impacts of habitat availability reduction on the Fraser River’s aquatic resources.**

The DEIS fails to evaluate the most likely and critical hydrological changes caused by operation of the Moffat Project and other foreseeable projects: an increase in the extent and frequency of low flow periods, dry year, and drought conditions. This failure translates into fatal flaws in the DEIS’s habitat availability analysis. Simply put, evaluating available habitat losses or gains is not possible absent an understanding of the extent and frequency of expected low flow periods. The DEIS’s habitat availability analysis is deficient in other ways.

***The DEIS Aquatics Impact Analysis Is Based On Questionable Predictive Tools including IFIM, R-2-Cross and Professional Judgment.*** The DEIS uses the Incremental Instream Flow Methodology (IFIM) to evaluate impacts to trout habitat. However, quoting from one of the peer-reviewed, scientific papers cited in the DEIS itself, “As a predictive tool for ecological management, the IFIM modeling approach has

been criticized both in terms of the statistical validity of its physical habitat characterizations and the limited realism of its biological assumptions” (Poff et al. 1997).

With regard to the Fraser and Williams Fork basins, the DEIS further admits that “IFIM data were not available for most of these tributaries, but R-2-Cross data were available for a few” and that “no hydrologic data were available for most of these tributaries”. The DEIS goes on to state that on streams where “R-2-Cross information existed, potential impacts were analyzed for the tributaries using professional judgment” *DEIS 4-309*. Lastly, the DEIS once again admits to the use of “professional judgment” to evaluate changes to water quality, channel geomorphology, and riparian vegetation *DEIS at p. 4-307*.

The R-2-Cross methodology is significantly less rigorous and less accepted by the scientific community than IFIM. Professional judgment is subjective and should not be used to make important decisions regarding the long term health of the aquatic environment.

The use of IFIM, R-2-Cross, and professional judgment to evaluate impacts to fish habitat, water quality, channel geomorphology and riparian vegetation are insufficient to make a conclusive determination that the aquatic environments of these river basins will not be significantly degraded by the Moffat Project. The lack of available scientific data should not provide the basis for moving the Moffat Project forward. These data gaps should be filled prior to approving the project so that a complete impacts analysis can be disclosed.

***The DEIS improperly uses warm-season habitat suitability criteria to incorrectly conclude that winter habitat is more limiting to fish populations than depleted flows associated with the Moffat Project.*** In addition to the questions raised by the scientific community regarding the validity of IFIM as a predictive tool, the DEIS also admits that the IFIM analysis was based on only warm season habitat use criteria and it goes on to acknowledge that trout use different habitats between the summer and winter months. *DEIS at p. 4-308*. The DEIS indicates that “In winter, trout tend to use deeper habitat with slower velocity and slightly larger substrate and may be more oriented to cover”. Based on this, the DEIS concludes that “warm-season habitat use criteria likely overestimate the habitat actually used by trout in the winter”. This conclusion is incorrect.

In fact, the use of warm season curves would likely underestimate the amount of habitat available in the winter months. Since trout tend to use low velocity habitats during the winter months, the use of warm season criteria (that indicate a preference for faster velocities) in IFIM modeling would result in reduced amounts of preferred habitat as stream flows, and instream velocities, are reduced in the winter months.

Using warm season habitat use criteria to simulate winter habitat availability creates an erroneous modeling result and an incorrect conclusion regarding habitat availability. The DEIS conclusion that streams are limited by low habitat availability during the winter

months is unfounded since the DEIS relies on the flawed assumption that warm season habitat use criteria overestimates the amount of available habitat in winter.

***The DEIS improperly concludes that large flows are harmful to fish and fish habitat and that Moffat Project depletions are beneficial to fish and fish habitat.*** The DEIS mischaracterizes a paper written by Poff et al. (1997) to support the idea that extremes in flow and habitat conditions act as a “bottleneck to limit population size”. *Page 4-311.* In fact, the Poff paper cited in the DEIS is titled “The Natural Flow Regime: A paradigm for river conservation and restoration”. The primary focus of this paper is on the value of the natural flow regime and not on how flow extremes limit fish populations.

Contrary to the statements in the DEIS, Poff et al. acknowledges that “...what is “good” for the ecosystem may not consistently benefit individual species, and that what is good for individual species may not be of benefit to the ecosystem”. The paper also concludes that “rivers with highly altered and regulated flows loses their ability to support natural processes and native species” (Page 780) and that “setting specific goals to restore a more natural regime in rivers with altered flows should ideally be a cooperative process involving river scientists, resource managers, and appropriate stakeholders” (Page 781); i.e., adaptive management.

With regard to IFIM modeling, Poff et al state that “As a predictive tool for ecological management, the IFIM modeling approach has been criticized both in terms of the statistical validity of its physical habitat characterizations and the limited realism of its biological assumptions.”

The DEIS’s conclusion that large flows are harmful to fish, and implication that the Moffat Project’s flow reduction may actually improve fish habitat (*DEIS at p. 4-317*), is particularly troublesome because over-bank, habitat-producing flows were historically available to the river but were dramatically reduced by operation of the original Moffat Project. Yet, the DEIS arbitrarily begins the study period in 2016, thereby ignoring the impacts this huge reduction in peak flows has had on the Fraser River, its tributaries and their aquatic resources.

The Poff paper cited in the DEIS does not support the DEIS claim that extreme high and low flows are habitat bottlenecks for fish. Rather, high flows are necessary to flush sediments from gravels and maintain a healthy ecosystem. Modeling results from IFIM that predict minimal amounts of fish habitat at high and low flows and improved habitat conditions as a result of stream flow depletions associated with the Moffat Project should be ignored.

***The analysis fails to evaluate the temporal effects of habitat loss.*** The DEIS states that “Fish habitat was simulated with IFIM for average years, wet years, and dry years.” *Page 4-310.* Summarizing data into average, wet and dry year categories doesn’t reflect the true temporal variability in aquatic habitat that occurs sequentially between years; i.e., back-to-back dry years etc, or within years.

***The conclusions of the aquatic habitat modeling are unsupported by the IFIM modeling results.*** The DEIS presents a few of the IFIM modeling results in Figures 4.9-1 and 4.9-2 and 4.9-3. These three figures are used to draw general conclusions about habitat impacts from Moffat Project flow reductions.

The DEIS uses Figure 4.9-1 and Figure 4.9-3 to conclude that winter flows are more limiting than flows during other times of the year that may be depleted by the Moffat Project. However, as stated previously, modeled estimates of winter habitat were based on warm season habitat criteria which may underestimate the amount of habitat available to fish during the winter period. Therefore, IFIM modeling results on all streams that indicate minimal amounts of fish habitat during the winter should be ignored since habitat use during the winter is not accurately reflected in the habitat preference curves used in the IFIM modeling.

The DEIS uses Figure 4.9-2 to conclude that high flows are limiting to fish and that the Moffat Project increases fish habitat by depleting high flows. This argument fails to recognize that high flows maintain a healthy ecosystem by flushing sediments from gravels and precluding non-native, habitat generalist species from invading these waters. The DEIS also fails to recognize that trout have evolved under these highly variable flow conditions and they will move into more favorable backwater habitats at times when riffles and runs are being flushed by high flows. The beneficial effects on aquatic habitat health offset the modeling results from IFIM that predict minimal amounts of fish habitat at high flows.

***The analysis reaches a number of unexplained, unsupported, and arbitrary conclusions.*** The DEIS concludes that an IFIM-modeled reduction of 10% or greater in the minimum amount of habitat available between the Full Use (2016) and Full Use w/Project (2030) warrants “further analysis”. Reductions of less than 10% are “within the margin of error” and are “unlikely” to impact fish populations. *DEIS at p. 4-311*. The decision to use a “difference in minimum IFIM habitat availability of 10% or greater” to warrant further analysis is arbitrary.

In a comparison of Current Conditions (2006) versus Full Use (2016), the DEIS arbitrarily concludes that “additional diversions and/or the reductions in bypass flows would have a minor detrimental effect on the fish and invertebrate communities in the upper Fraser River and in Cooper, Little Vasquez, Vasquez, St. Louis, and Main Ranch creeks”. A discussion of North Fork South Platte River impacts follows where the DEIS arbitrarily concludes that a 22% increase to already high flows in this stream would have a “minor to moderate detrimental impact”. *Page 4-315* These conclusions are arbitrary opinions and lack scientific rigor.

The DEIS states that “the suitability of a stream to support aquatic resources is also influenced by changes to channel morphology and water quality” and that “changes in hydrology can affect water quality, such as temperature and salinity, channel morphology, and sedimentation”. *Page 4-307*. Unfortunately, “differences in these

aspects of the aquatic environment were incorporated using professional judgment of the suitability of the stream to support aquatic life.” Changes in channel morphology, water quality and sedimentation are equally important in evaluating impacts from the proposed project. These impacts should be evaluated scientifically, not by professional judgment.

**7. The DEIS fails to take a hard look at the impacts of reduced peak flows on channel dynamics, including sediment transport and aquatic resources.**

Peak flows are critical for maintaining healthy aquatic ecosystems. Floods of varying magnitude, duration and frequency perform different ecosystem functions such as building floodplains, forming and maintaining the active channel and scouring sediments from gravels to enhance trout spawning and macroinvertebrate habitat. Poff et al. (1997) state that “In the absence of high flushing flows, species with life stages that are sensitive to sedimentation, such as eggs and larvae of many invertebrates and fish, can suffer high mortality rates.”

The DEIS acknowledges that “Stream channel dynamics are affected by many factors including land usage changes, as well as increases in and decreases in stream flow or sediment production” *DEIS at p. 3-66*. Yet, it fails to adequately evaluate how these flows and stream processes will change as a result of operation of MOFFAT PROJECT and other reasonably foreseeable projects, or how these changes will impact the river’s resources.

The DEIS sediment transport studies generally indicate that transport capacity is greater than the sediment load. *DEIS at p4-53*. However, this conclusion is not supported by empirical field studies which indicate that sediments are currently accumulating under current hydrologic conditions. *DEIS Table 3.1-19 on p. 3-72*. More specifically, the DEIS used a representative reach approach to evaluate the balance between flow, sediment transport capacity and sediment supply. *DEIS at p. 3-66 to 3-72*. On the west slope, the DEIS used 8 sample sites to characterize sediment transport over 56 miles of river. Seven of these 8 sites are summarized in Table 3.1-19 and four of the seven indicate that “potential signs of aggradation” were observed. Aggradation occurs in areas where the supply of sediment is greater than the amount of material that the system is able to transport. Contrary to the sediment transport study findings, this observation would suggest that the current flow regime is insufficient to transport the existing sediment load. Additional depletions under the Full Use (2016) and Full Use w/Project (2030) scenarios will only exacerbate this problem.

The DEIS acknowledges that Fraser River mainstem annual peak flood flows would be reduced in all years *DEIS at p. 4-51*.

The DEIS states that “One important aspect of flow regimes is flushing flows and acknowledges the potential reduction of flushing flows attributable to future Project depletions. *Page 4-314* However, the DEIS fails to address this issue in detail.

The DEIS indicates that IFIM/PHABSIM and R2Cross data were available to quantify the relationship between fish habitat and stream flow and to assess the effects of the alternatives in tributary streams. *DEIS at p 3-213*. The use of fish habitat models like IFIM/PHABSIM and R2Cross generally results in a recommended range of flows that may maintain fish habitat but fail to recognize the flow requirements that are necessary to protect entire aquatic ecosystems; i.e., flushing flows, channel maintenance flows, and the timing, magnitude and duration of both peak flows and seasonal low flows.

***The DEIS does not adequately account for the benefits of large flows.*** As described above, the report does not account for or quantify the large increases in habitat that are produced when large flows overtop the banks and inundate the floodplain.

***The DEIS conclusion that the “overall pattern of the flow regime” in the Fraser River will “be the same, with highest flows during spring runoff and lowest flows in the winter...” is misleading.*** *DEIS at p. 4-316*. First, this conclusion results from the agencies’ arbitrary decision to ignore pre-2016 conditions as part of the analysis.<sup>1</sup> Second, as illustrated previously in Figure 1, there is by no means a “little” or “insignificant” change in expected peak flows from natural flow conditions. The statement that the overall pattern of the flow regime will be maintained may be correct but it is misleading since the magnitude of the peak flows projected in 2030 are diminished to the extent that they are only slightly larger than wintertime base flows (see Figure 1).

***The DEIS only evaluates changes in peak flows between Full Use (2016) and Full Use w/Project (2030)*** As mentioned previously, peak flows are necessary to maintain channels, flush gravels and create habitat for fish and aquatic invertebrates. On the Fraser River, the DEIS states that “in all cases, peak flows for a given recurrence interval...were less than peak flows for the same recurrence interval under the Full Use of the Existing System (2016)” and that “on the mainstem, annual peak flood flows would be reduced in all years in the study”. *DEIS at p 4-51* The DEIS reports similar findings on the Williams Fork above Williams Fork Reservoir *DEIS at p. 4-6*. The DEIS evaluates changes in peak flows between 2016 and 2030 but fails to consider the magnitude of the peak flow reduction between native flows (pre-1935) and modeled flows under the Full Use w/Project (2030) scenario.

***The DEIS’s Stream Morphology and Sedimentation study is flawed*** The DEIS sediment transport study generally concludes that “decreases in flow would result in decrease sediment transport capacity along the Fraser River, St. Louis Creek, Ranch Creek, Williams Fork River, Blue River and Colorado River” *DEIS at p. 4-9*. The DEIS goes on to say that “for the range of flows expected, sediment transport capacity exceeds

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<sup>1</sup> This is part and parcel of the DEIS’s failure to evaluate the impacts that the original Moffat Project, C-BT, Windy Gap and other pre-2016 projects have had on the river as part of its cumulative impacts analysis. The DEIS’s failure to look at available, pre-2016 hydrological information also indicates a failure to use the proper baseline for analysis. [CITE BASELINE CASES].

available sediment supply and, for all but the smallest flows, sediment transport capacity is orders of magnitude greater than available sediment supply” *DEIS at p. 4-9*

This conclusion is not universally accepted by the scientific community. Many experts question the methodologies used in the DEIS sediment transport study. *See Moffat Project Comment Letter from Dr. Brian Bledsoe.*

***Empirical evidence suggests that sediment is not being adequately flushed under the Current Conditions (2006) hydrology*** Appendix E4 of the DEIS provides photographic evidence of the stream channel condition under current conditions for the stream reaches affected by the Moffat Project. Several of the photos on west slope streams like the Fraser River and Colorado River are noted to have “sand deposits” *p. E-4-12, 13 &-20* and “organic material on cobbles” *p. E-4-35&36.*

For the past several years Grand County has been working with aquatic consultants to collect data in support of a Grand County Stream Management Plan. The photos attached below in Figures 4 through 7 from the Fraser River, Ranch Creek, and the Colorado River show that sediment deposition is currently occurring throughout the Fraser and Colorado River basins. Additional diversions from the Moffat Project will only exacerbate this existing condition.



**Figure 1. Example of sediment deposition - Fraser River d/s of DWB diversion**



**Figure 2. Example of sediment deposition - Fraser River near Winter Park**



**Figure 3. Example of sediment deposition - Ranch Creek**



**Figure 4. Example of sediment deposition - Colorado River below Windy Gap**

These photos indicate that sediment transport is already becoming a problem under existing hydrologic conditions. Sediment deposition can only be expected to worsen as stream flows are further depleted by the Moffat Project.

*The DEIS contradicts itself.* With regard to the sediment discussion on the Fraser River, the DEIS concludes that “sediment transport capacity for the Proposed Action remains orders of magnitude greater than sediment supply” *Page 4-52* and that “the system is sediment-limited and the morphology of the channel is not expected to be impacted by flow reductions” (*Page 4-53*). This conclusion is contrary to the information presented previously in Table 3.1-19 where “potential signs of aggradation” were observed at four of the seven study sites. If sedimentation is already occurring under the current (2006) flow regime, the problem will likely be exacerbated under a more depleted flow regime (2016 or 2030) with less power to transport sediment.

The DEIS draws similar conclusions on the Williams Fork River finding that peak flows will be reduced and that less sediment will be transported but that transport capacity is greater than sediment supply. *Page 4-69 to 4-73* Once again, this conclusion is contrary to the information presented previously in Table 3.1-19 where “potential signs of aggradation” were observed at four of the seven study sites and additional depletions will likely exacerbate the existing condition.

- 8. The DEIS fails to evaluate other critical impacts of Moffat Project and other reasonably foreseeable projects on trout fisheries and entirely fails to evaluate impacts on other aquatic species.**

Changes in WUA and stream temperature are not the only mechanisms by which fish can be impacted. Trout can be impacted if changes in flow lead to a collapse of important food resources like the stonefly, *Pteronarcys californica*, or mottled sculpin, *Cottus bairdii*. The CDOW has already documented reductions in the stonefly and mottled sculpin populations associated with water withdrawals below Windy Gap Dam and they conclude that additional water development will likely exacerbate this problem” In addition, if reduced peak flows cause additional sediments suitable for the tubificid worm, *Tubifex tubifex*, to accumulate along the Colorado River below Windy Gap, problems with whirling disease may be exacerbated. The DEIS fails to adequately evaluate these impacts or explain why these obvious effects of changes in flows have been ignored.

***The DEIS fails to take a “hard look” at potential impacts to macroinvertebrates.*** The DEIS states that benthic invertebrate communities were evaluated based on available hydrology, geomorphology and water quality information and that no habitat simulations were conducted for invertebrates. *Page 4-313*. The DEIS concludes that “as long as flushing flows are adequate to maintain substrate composition, invertebrates would have more favorable habitat availability with reductions in peak flows”.

The conclusion regarding flushing flows and invertebrates is subjective and should be supported by a scientific literature citation. In fact, empirical evidence suggests that some stream segments are already experiencing aggradation/accumulation of fine sediments and water quality degradation under current flow regimes. “Poff et al. (1997) state that in the absence of high flushing flows, species with life stages that are sensitive to sedimentation, such as the eggs and larvae of many invertebrates and fish, can suffer high mortality rates”.

Accumulation of fine sediment and degradation of invertebrate habitat can only be expected to worsen as peak flows are reduced.

***The DEIS fails to evaluate impacts to other fish species.*** The DEIS focuses on three non-native trout species, brook, brown and rainbow trout, to the exclusion of other fish species. The DEIS states that two native species of sculpin are present within Moffat System Project Area. *DEIS Table 3.9-1 at p. 3-211*. As stated previously, CDOW has already documented a decline in mottled sculpin populations that are attributable to existing water withdrawal practices. In addition, non-native dace, chub darter, and sucker can also be found in these study areas. The DEIS fails to evaluate impacts of MOFFAT PROJECT on these other native and non-native fish species.

***The DEIS fails to evaluate impacts of MOFFAT PROJECT and other reasonably foreseeable projects on whirling disease and, consequently, on the Colorado River, west slope reservoirs, and east slope streams and reservoirs fisheries.*** The DEIS lists two aquatic nuisance species; whirling disease and didymo. *Page 3-214*. Transbasin diversions could effectuate the spread of these aquatic nuisance species. The DEIS fails to consider the importation of west slope invasive species into east slope aquatic habitats.

From *Page 4-313 to 314* the DEIS discusses Invasive Species and concludes that conditions that result in increased sedimentation may provide additional habitat for the intermediate tubifex worm host for Whirling Disease. Reductions in the frequency and amount of flushing flows on these west slope rivers may increase sedimentation and exacerbate the Whirling Disease problem.

Failure to consider the potential impacts of increased MOFFAT PROJECT depletions and transbasin diversions on the spread of whirling disease and, therefore, on the survival of trout populations in the Fraser River, its tributaries, the Colorado River and in east slope reservoirs and streams, renders the DEIS fatally deficient.

**9. The DEIS fails to take a hard look at the cumulative impacts operation of the Moffat Project, combined with past, present and future reasonably foreseeable projects will have on the aquatic resources of the Colorado River.**

The DEIS's cumulative impacts is deficient in a number of ways. First, it fails to evaluate the impacts ongoing project operations, including C-BT, Moffat Tunnel and Windy Gap, have had on the river's aquatic resources. Second, it fails to evaluate the cumulative impacts of reasonably foreseeable future events, such as global warming, on the hydrology of Fraser and Colorado Rivers and their aquatic resources.

The DEIS states "...Denver Water, at times, diverts all the stream flow from tributaries in the Fraser River basin that do not have minimum bypasses. This results in no stream flow for some distance below the diversion. **This is how Denver Water has operated in the past and plans to operate in the future**". *DEIS at p. 3-23*: The DEIS goes on to say that in wet and average years, "Denver Water diverts 100% of the water from streams that do not have minimum bypass flow requirements" and these streams are "dried up early in the runoff season similar to dry years". On *Page 3-23*, the DEIS indicates that there are no bypass requirements and the Moffat Project diverts the entire stream flow on 18 of the 31 stream segments in the Fraser basin. Similarly, there are no bypass requirements on the four headwater tributaries in the Williams Fork drainage *DEIS at p. 3-239*. Streams that are completely dewatered do not provide fish habitat and they do not promote fish passage/migration. The Moffat Project currently dewateres several headwater tributaries in the upper Fraser and Williams Fork river basins. The ongoing practice as an existing, cumulative impact in the current permitting process.

On *Page 5-1* the DEIS states that the NEPA definition of cumulative impacts is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions..." It goes on to say that "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). On *Page 5-3* it goes on to say that "**Knowing whether a resource is healthy, declining, near collapse, or not functioning is necessary for determining significance of any added impacts due to the Moffat Project**". That said, the Cumulative Effects chapter of the DEIS provides a ½ page narrative describing the history of transbasin diversion from the Colorado River basin including the Grand River Ditch, Moffat Tunnel, C-BT, and Windy

Gap Projects but neglects to provide a scientific analysis of these past impacts. Clearly this is not a Cumulative Effects analysis. The DEIS goes on to provide several pages of descriptive text on Reasonably Foreseeable Future Actions but fails to evaluate the effects of these projects scientifically. Nothing in the Cumulative Effects chapter attempts to address the question posed on *Page 5-3* regarding whether the “**resource is healthy, declining, near collapse or not functioning**” under the Current Conditions (2006) scenario or the Full Use (2016) scenario.

The impacts of the Full Use (2016) scenario are disclosed but not evaluated and therefore it is impossible to determine what the state of the environment will be under predicted conditions in 2016. Given that no determination of the Current Condition (2006) has been made, and no evaluation of the impacts of the Full Use (2016) scenario has been rendered, the conclusions of the DEIS that the Full Use w/Project (2030) are unsupported.

*The DEIS fails to evaluate the impacts ongoing project operations, including the existing Moffat Project operations, have had on the Fraser and Colorado River aquatic resources.* The DEIS’s cumulative impacts analysis does not evaluate the impacts large transmountain diversions, such as the Moffat Tunnel, have had on the resources of the Fraser and Colorado Rivers. The DEIS acknowledges that these and other diversions have had a profound impact on the hydrologic regime of the river. For example, the DEIS discloses that average annual flows at the Fraser River at Winter Park gage have been reduced from 32,080 af/year prior to 1935 when Moffat first came on line to just 12,890 af since 1935; a reduction in flow of 60%! The DEIS also discloses that “Denver Water diverted approximately 50% of the average annual native flow available at the Fraser River at Winter Park gage for the 30-year period from 1975 through 2004. *DEIS at p. 3-21.* Yet, the DEIS fails to evaluate the impacts these changes have had when assessing the cumulative impacts of the Moffat Project and other foreseeable actions on water and aquatic resources. Instead, the cumulative impacts analysis only analyzes impacts between some future condition described as Full Use (2016) and Full Use w/Project (2030) and neglects to evaluate impacts between Current Conditions (2006) and Full Use (2016). The DEIS does not make a determination that the existing aquatic environment is healthy, it simply assumes that the condition of the aquatic environment will be healthy in 2016, and then it analyzes only the incremental impact of its proposed depletions between 2016 and 2030. Insert “This approach is contrary to the statements on Pages 5-1 and 5-3 of the DEIS which recognize the need to evaluate, not just disclose, past, present and reasonably foreseeable actions and the existing condition of the aquatic resource in order to fully analyze the potential impacts of the Moffat Project.

If the Fraser River is to avoid a death of 1,000 cuts, future changes must be placed in the broader context of the alterations that have occurred to date.

*The DEIS fails to evaluate the cumulative impacts of climate change and global warming and mountain pine beetle killed trees.* The DEIS recognizes that “numerous studies have been conducted on the relationship between climate change and water

resources in the west and that “Most climate change models project that temperatures will continue to rise in the West”. *DEIS at p. 5-34*. However, the DEIS fails to evaluate these potential impacts and simply states that “Climate change and global warming may be considered reasonably foreseeable; but currently there is no accepted scientific method of transforming the general concept of increasing temperature into incremental changes in stream flow or reservoir levels” *DEIS at p. 5-35*. Moreover, the DEIS fails to acknowledge the potential impacts of global warming on exacerbating already anticipated stream temperature problems.

The failure of the DEIS to evaluate climate change and global warming is inconsistent with the conclusions reached in a recent report prepared by the Western Water Assessment for the Colorado Water Conservation Board (CWCB). This report to the CWCB concludes that “[a] warming climate will amplify Colorado’s water related challenges, with potential reductions and seasonal shifts in water availability. While most water resource planning has been based on past hydrology, *water users can no longer assume that future conditions will reflect the past. Although there are uncertainties regarding aspects of the science, enough information is available to support adaptation planning for risks associated with climate variability and change* [emphasis added]<sup>2</sup>. Clearly acceptable science is currently available and the DEIS should utilize this science to evaluate anticipated changes in stream flow and water temperature that may be attributable to climate change and global warming.

The DEIS also recognizes that pine beetle killed trees may have implications for the Fraser and Colorado River watersheds such as increased wildfire risk resulting in increased runoff, sediment and nutrients *DEIS at 4-19* but the DEIS fails to quantitatively evaluate these impacts, particularly in terms of sedimentation and sediment transport problems, or to acknowledge potential impacts on stream temperature.

**10. The DEIS fails to take a “hard look” at the effects of Moffat Project and other reasonably foreseeable projects on the special State and Federal designations of the affected reach of the Colorado River.**

The Colorado and Blue River reaches impacted by the proposed Moffat Project and other foreseeable projects are subject to special designations by both the State and the Federal government. The Colorado River downstream of Windy Gap reservoir and the reach of the Blue River between Dillon Reservoir and the river’s confluence with the Colorado River are Gold Medal Trout fisheries, designated by the Colorado Wildlife Commission. This designation is reserved to outstanding fisheries that meet specific fish population and size requirements.<sup>3</sup> There are only 10 designated Gold Medal streams in the State of Colorado. The reach of the river between Gore Canyon and State Bridge is a designated

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<sup>2</sup> Climate Change in Colorado. A Synthesis to Support Water Resources Management and Adaptation. A Report by the Western Water Assessment for the Colorado Water Conservation Board. 2008. Page 43.

<sup>3</sup> The Colorado Wildlife Commission defines a Gold Medal Water as a lake or stream that supports a standing stock of at least 60 pounds per acre, and contains an average of at least 12 quality (14” or longer) trout per acre. See *Colorado Wildlife Commission’s “Wild and Gold Medal Trout Management Policy” September 18, 1992 (Revised June 12, 2008)*.

“Wild Trout” stream. This designation is based on the presence of naturally reproducing, wild trout.<sup>4</sup>

In addition to the State’s Gold Medal and Wild Trout designations, the Colorado River from downstream of Windy Gap reservoir to almost Glenwood Springs are candidates for Wild & Scenic Rivers Act (WSA) designation in recognition of their outstanding fishing. BLM manages these and other eligible rivers so as to not adversely affect their values pending potential WSA designation by Congress. The DEIS’s analysis entirely fails to evaluate the direct, indirect and cumulative impacts of the Moffat Project on these designations.

As discussed at great length in these comments, the aquatic resources impacts analysis on which the DEIS’s conclusions rely is fatally flawed and, therefore, cannot provide the basis for such conclusion. Moreover, while the aquatic impacts analysis discusses potential impacts to fisheries, it does not evaluate the impacts of the project on the quality of those fisheries for recreational use. For example, the size of fish plays as critical a role in the State’s designations as their numbers. Yet, the aquatic impacts analysis only describes potential impacts to fish populations. Because BLM’s outstanding recreational fishing designation is largely based on the State’s designation criteria, the aquatics analysis also fails to yield the information needed to assess potential impacts on designation under the WSA.

#### **11. The DEIS fails to present an adequate mitigation measures analysis.**

NEPA requires that mitigation measures be fully reviewed in the NEPA process. “[O]mission 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.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. at 352. CEQ regulations require that the agencies include in the EIS a discussion of appropriate measures to mitigate adverse environmental impacts. *40 CFR §1502.14(f) and 40 CFR § 1502.16(h)*. Agencies must also state whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. *40 CFR §1505.2(c)*. Mitigation must be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated. *Carmel-By-The-Sea v. Dept. of Transportation*, 123 F.3d 1142, 1154 (9<sup>th</sup> Cir. 1997). A mere listing of mitigation measures is insufficient to qualify as the reasoned discussion required by NEPA. *Northwest Indian Cemetery Protective Association v. Peterson*, 795 F.2d 688, 697 (9<sup>th</sup> Cir. 1986). Broad generalizations and vague references to mitigation, which fails to specify whether any mitigation measures would in fact be adopted or to provide an

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<sup>4</sup> The Colorado Wildlife Commission defines Wild Trout Water as a lake or stream that contains a wild trout population; a wild trout population is one that can sustain itself through natural reproduction and recruitment and a wild trout is a trout that completes its entire life cycle in a lake or stream. *Colorado Wildlife Commission’s “Wild and Gold Medal Trout Management Policy” September 18, 1992 (Revised June 12, 2008)*.

estimate of their effectiveness or why such estimate is not possible, do not meet NEPA requirements. *Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1380-81 (9<sup>th</sup> Cir. 1998)/

The DEIS describes three components to the west slope mitigation;

- Upper Colorado Endangered Fish Recovery,
- Fraser and Colorado River temperature monitoring, and
- Colorado River cutthroat trout habitat improvements. *DEIS at p. M-4.*

The DEIS's description of proposed mitigation measures fails to meet NEPA's requirements.

The DEIS states that “Most of the impacts to aquatic resources would be indirect and **long term** through changes in stream flow” *DEIS at p. 4-307* Impacts to aquatic resources will most definitely be “long term”. Several recent scientific articles (Arthington et al 2006; National Academies Press, 2004; Richter et al.1997) have stated that there is no easy answer to the question of how much water can be diverted without environmental consequence. Instead, they recommend the use of adaptive management plans to perform controlled experiments specific to individual streams and to balance stream flows and water withdrawals over time. Poff et al (1997) also conclude that “rivers with highly altered and regulated flows loses their ability to support natural processes and native species” and that “setting specific goals to restore a more natural regime in rivers with altered flows should ideally be a cooperative process involving river scientists, resource managers, and appropriate stakeholders”. Because the aquatic resource impacts will certainly be long term, any permit issued for the Moffat Project should include an adaptive management plan that would require Denver to ensure that negligible impacts they predict in the DEIS are in fact realized in the Fraser River, the Colorado River and their tributaries.

An adaptive management approach is also consistent with the suggestion in the DEIS that “Denver Water needs improved operational flexibility of the Moffat Collection System including being able to respond to global climate changes and adjusting operations in response to new scientific information”. *DEIS at p. 5-36* The environmental community would support an **adaptive management plan** that would allow Denver to respond to global climate changes **and environmental impacts associated with its Moffat collection system** by adapting its operations in response to new scientific information.

## REFERENCES CITED

Arthington, A.H., S.E Bunn, N.L Poff & R.J. Naiman. 2006. *The challenge of providing environmental flow rules to sustain river ecosystems*. Ecological Applications 16(4): 1311-1318.

“Nehring, R.B., J. Ewert, & S Hebein. 2010.” A review of Aquatic Invertebrate Studies and Fish Population Survey Data for the Colorado River in Middle Park, Colorado from 1980 through 2009: What does it tell us?.

Groffman, P.M., J.S. Baron, T. Blett, A.J. Gold, I. Goodman, L.H. Gunderson, B.M. Levinson, M.A. Palmer, H.W. Paerl, G.D. Peterson, N.L. Poff, D.W. Rejeski, J.F. Reynolds, M.G. Turner, K.C. Weathers, and J. Wiens. 2006. *Ecological Thresholds: The key to successful environmental management or an important concept with no practical application?* Ecosystems 9:1-13.

Holling, C.S. 1996. *Surprise for science, resilience for ecosystems, and incentives for people*. Ecological Applications 6(3):733-35.

National Academies Press. 2004. *Adaptive management for water resources project planning*. Panel on Adaptive Management for Resource Stewardship, Committee to Assess the U.S. Army Corps of Engineers Methods of Analysis and Peer Review for Water Resources Project Planning. National Academy Press, Washington, DC.

Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegard, B.D. Richter, R. E. Sparks & J.C. Stromberg. 1997. *The Natural Flow Regime: A Paradigm for River Conservation and Restoration*. Bioscience 47(11): 769-784.

Resh, V.H., A.V. Brown, A.P. Covich, M.E. Gurtz, H.W. Li, G.W. Minshall, S.R. Reice, A.L. Sheldon, F.B. Wallace & R. Wissmar. 1988. *The role of disturbance in stream ecology*. Journal of the North American Benthological Society 7:433-455.

Richter, B.D., J.V. Baumgartner, R. Wigington, & D.P. Braun. 1997. *How much water does a river need?* Freshwater Biology 37:231-249.

Scheffer, M. & S. R. Carpenter. 2003. *Catastrophic regime shifts in ecosystems: linking theory to observation*. TRENDS in Ecology and Evolution 18