STATE OF MONTANA

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From: Ethan Mace, Surface Water Hydrologist, Montana DNRC

RE: Review of Barry Dutton 2015 CSKT Compact Evaluation

The State of Montana has reviewed conclusions made in a report titled Historic Water Use and Crop Water Requirements at the Flathead Indian Irrigation Project (FIIP), dated March 5, 2015, by Barry Dutton, prepared for Boone Cole, Jerry Laskody, Shane Orien, Wayne Blevins, and Tim Orr of the Flathead Joint Board of Control (FJBC). [1] The report consists of 20 pages, and 85 pages of appendices, 80 pages of which are reprints of an earlier report by Mr. Dutton entitled, Flathead Irrigation Information System: Summary Report and Irrigation Guide, which was produced in 1994 by the Land and Water Consulting INC and is based on three-years of field data collected by Mr. Dutton.

Generally, Mr. Dutton's report is based on inaccurate assumptions about the 2015 proposed Compact which lead to erroneous and inaccurate conclusions. Mr. Dutton also inaccurately represents the field-measurements collected as part of his own 1994 Land and Water Report.

Misrepresentation of 1994 Field-Measurement Data

Mr. Dutton reported in his March 5th report that irrigators have been applying up to 28 inches of irrigation, citing his 1994 published field-measurements. Examination of these 1989-1992 field-measurements clearly shows that the maximum application reported as 28 inches includes a combination of 23.5 inches of irrigation and 4.5 inches of rainfall. Rainfall does not constitute "applied irrigation." Based on Mr. Dutton's subsequent contribution to the Lake County Leader, he has acknowledged this mistake, and revised the maximum application observed down to 24 inches (reported as 23.5 inches in the 1994 report). While this correction is certainly necessary, the simple restatement of the maximum application without careful consideration of average water use and the distribution of the data collected grossly exaggerates the amount of water historically applied across the Project.

An accurate summary of the data collected by Mr. Dutton as part of his 1994 report should acknowledge that seventy six percent of his field-measurements demonstrated annual irrigation applications of less than 12 inches, and only 16 measurements from nine individuals demonstrate annual irrigation applications in excess of 15 inches—just 12% of all measurements collected. The

[1] Mr. Dutton offered corrections to his March report in an article posted in the Lake County Leader http://www.leaderadvertiser.com/members/soil-scientist-barry-dutton-clarifies-compact-water-study/article_76f640fa-dc8f-11e4-a072-2fc88c317083.html

average of all of Dutton's measured annual irrigation applications was less than 9 inches. Summarizing the 138 measurements as demonstrative of irrigation applications of up to 24 inches is misleading; the 23.5 inches should have been characterized as a maximum of all measured values.

Misinterpretation of the 2015 Compact

As part of the negotiations leading to the 2015 Compact, the State evaluated the 2013 Water Use Agreement negotiated by the FJBC. In that evaluation[2], the State considered maximum irrigation applications, including field-measurements presented in Mr. Dutton's 1994 report, and concluded that the 2013 Farm Turnout Allowances (FTA) imposed maximum values on per-acre annual irrigation applications that were not consistent with actual use. Some FIIP irrigators historically applied substantially more than the FTA, while others used substantially less. The Flathead Indian Irrigation Project's (FIIP) Project Operator has jurisdictional authority over water deliveries made from this federally owned irrigation project and will continue to do so regardless of whether the Compact passes. Accordingly, the State negotiated a FIIP water right without FTAs, thereby allowing the Project Operator to continue those historic practices of water delivery, which takes this variability into account and allows for individual deliveries in excess of the 2013 FTA values.

The significance of removing the FTA was explained in detail to Mr. Dutton in personal communications in advance of his release of his 2015 Compact review. Despite those conversations, Mr. Dutton ignored this change, as well as other newly negotiated provisions, and chose to emphasize the 2013 FTA concept as if it were a part of the 2015 settlement. Mr. Dutton concluded that the FTAs were not adequate for irrigators who had historically applied more than the FTA, which is the identical conclusion the State came to in its own 2014 evaluation of the WUA that informed its subsequent negotiation position and led to the changes in the 2015 proposed Compact. Dutton's reliance on the 2013 settlement provisions is erroneous. The FTA cap on per acre irrigation applications no longer exists and the issue he raises has been resolved in the 2015 proposed Compact.

Erroneous Comparisons to Potential Crop Growth

In his 2015 Report, Mr. Dutton offers exhaustive comparisons of both irrigation application field-measurements and settlement driven water rights quantifications to the amounts of water required for 'potential crop growth.' This comparison is valueless for purposes of reviewing the settlement documents as it bears no relation to existing water-use on the project, which is what the Compact seeks to protect. The FIIP has historically operated, and will continue to operate, with a deficit water supply. This has been acknowledged by the FJBC, Mr. Dutton in his 1994 report, and all negotiating parties. Potential crop growth does *not* equate to current or historic use on the project and never has.

The State's Use of the 1994 Report in Evaluating the WUA

Appendix B of Dutton's 1994 report presents a table of 138 annual field-measurements of irrigation application for 34 water users served by the FIIP. The State referenced these field measurements in formulating its negotiation position for quantification of the FIIP water supply, as field measurements relating to irrigation on the FIIP are scarce. The field-data collected as part of the 1994 report was therefore unique and was critical to the State's technical analysis, but contrary to Mr. Dutton's conclusions, the negotiated terms of the Compact pertaining to the FIIP actually

[2] Instream Flow and Irrigation Diversion Aspects of the FIIP Water Use Agreement: State of Montana Evaluation and Recommendations; http://dnrc.mt.gov/divisions/reserved-water-rights-compact-commission/docs/state_wua_evaluation_8-4-14.pdf

provide for water in excess of the majority of the field measurements that he recorded in his 1994 study.

In its own evaluation of Dutton's field measurements, the State utilized an approach that maximized average irrigation application values by factoring in a 10% irrecoverable wind-throw and evaporation loss to account for water losses between the sprinkler head and the field where the measurements were taken. Taking into account these un-measured losses, the State determined that the average farm delivery of the 138 annual irrigation applications measured by Dutton was approximately 9.8 inches. In order to maximize its determination of historic use, the State removed Dutton's lowest 33 values and averaged his highest 105 values, again applying a 10% application loss to the measured values. This calculation method bolstered the historically applied values to approximately 11.9 inches of annual applied irrigation (std. dev. of 4.46 inches), but the Compact actually provides for more water than this bolstered value.

The Compact's commitment to irrigation deliveries takes the form of Historic Farm Deliveries (HFDs). They are set forth in Appendix 3.3 of the Compact. The Compact includes a verification process to ensure these HFD volumes continue to be delivered once the Compact is implemented. The HFDs do not mandate maximum or minimum deliveries to individual acres, but rather quantify the annual volume of water promised to be delivered as a composite to farms within associated HFD Areas. These aggregate volumes equate to historic use within these areas. As each area is acreage is specific and the annual HFD volumes are specified in the Compact, simple division can be used to estimate an average delivery per acre. In reality, each year there are typically acres within each HFD Area that are fallowed, but this does not reduce the annual volumes. Accordingly, any average that uses the total service acreage within an HFD Area will almost always be less than the 'actual' average deliveries per acre that occur any given year. The HFDs set forth in the Compact have different volumes based on wet, average, and dry water years, reflecting the reality of water supply variability and the need for greater volumes in dry years.

Compared to the Jocko and Little Bitterroot Areas, the Mission Area has historically had the lowest farm deliveries per irrigated acre. This is not to say that individual farms in the Mission Area have not historically had large deliveries, but rather to illustrate that the Mission Area ratio of water delivered to acres served has historically been the lowest of the three project regions. The averages below are offered here for purposes of demonstrating that *even the lowest average HFDs in the Compact offer a larger allocation than the field-measurement values collected by Mr. Dutton*.

<u>Mission Area Compact HFD approximate averages per irrigated acre:</u>

- 12.4 inches/acre/year for a wet year
- 13.0 inches/acre/year for an normal year
- 13.7 inches/acre/year for a dry year

<u>Average Dutton field-measurements:</u>

- 8.8 inches

<u>State Adjustment of Dutton field-measurements:</u>

- 9.8 inches after 10% application losses
- 11.9 inches after dropping lowest 33 values and applying 10% application loss

As is clearly evident, even the lowest of the average HFDs set forth in the Compact are larger than the average values collected by Mr. Dutton across the entire project. Even after applying the State's generous adjustments to Mr. Dutton's field-measurements, the Compact still offers more water on an

average per acre delivery basis, yet places no cap on individual applications in excess of this average.

That is the reason the State did not rely solely on Dutton's field measurements in its calculation of Historic Farm Deliveries: the measurements collected and presented in Appendix B of the 1994 report, if considered as a stand-alone measure of FIIP irrigation application, grossly underestimate FIIP water use as compared to more comprehensive techniques developed and implemented by the State, such as the METRIC satellite analysis. By relying on all of these sources in formulating its negotiating position, the State was able to generate a more accurate representation of historic use on the Project than is contained in Mr. Dutton's 1994 study.

Incomplete Consideration of River Diversion Allowances

Mr. Dutton concludes the River Diversion Allowances (RDAs) offered by the Compact do not satisfy irrigation deliveries he measured in the past and that the RDA calculations do not include conveyance losses that occur between the headworks and the farm turnout. Mr. Dutton states that he is confused by the language in the Compact that provides for an amount of water that will be delivered to individual irrigators.

The FIIP is a very complex irrigation system with over a thousand miles of canals, 17 reservoirs, and three pumping stations. The FIIP currently serves more than 128,000 acres of irrigated lands and uses multiple trans-basin conveyances and diversions both on and off the Reservation. Those diversions have historically allocated variable quantities of water based on irrigator demands, water supply, and delivery capacity limitations. Conveyance losses for the FIIP are highly variable across the different soil and infrastructure types located throughout the FIIP. The ratios of RDA to HFD are correspondingly variable in a manner necessary to accommodate these realities and *are* reflective of inefficiencies at the diversion and conveyance level. Not only do the RDAs reflect these conveyance losses, they also in many locations contain an added "cushion" of water over and above what is needed to supply the historically delivered amount when taking into account conveyance losses.

For example, when looking at the Jocko and Mission areas, applying identical conveyance loss rates is inappropriate. The Jocko has sandier soils, canals that seep water at higher rates, and less irrigation water reuse when compared to the Mission area. If we compare the Compact RDA and HFD values to generate averages and composites the need for this complexity becomes clear:

Jocko Area average RDA volume/irrigated acre	3.78 acre-feet/year
Jocko Area average HFD volume/irrigated acre	1.28 acre-feet/year
Jocko Area average composite efficiency from diversion to farm (HFD/RDA)	34%

Mission Area average RDA volume/irrigated acre	1.74 acre-feet/year
Mission Area average HFD volume/irrigated acre	1.14 acre-feet/year
Mission Area average composite efficiency from diversion to farm (HFD/RDA)	66%

The example above is presented merely for illustrative purposes. The Compact itself uses 45 discrete administrative points for purposes of making site-specific calculations. Also of importance is the fact that the RDA values contemplate implementation of significant Operational Improvements

projects that will be funded by the Compact. The values presented are averages that in no way constitute maximum or minimum deliveries. It is anticipated that the historic practices of delivering more water to some irrigated lands and less water to others will continue as it has in the past via coordination between the individual irrigator and the Project Operator. Using the averages described above in no way constitutes a cap on the total water that can be applied to any specific field—rather it allows for flexibility by both the Project Operator and the irrigator into the future as efficiency improvements are made to the project.

When Mr. Dutton concludes that it requires significant calculation to determine how much water irrigators will receive, he is correct. The complex FIIP system requires a complex water right in order to maintain flexibility for future water deliveries. Trying to simplify this water right to a one-size fits all delivery amount is contrary to what irrigators expressed they wanted following the failure of the 2013 compact and would do a disservice to them by imposing needless and overly-confining limitations on their use of water. By way of reference, the duplicative water rights filed by both the BIA and the FJBC for the project water rights are many pages longer than the entire Compact and its appendices.

To confirm the accuracy of the RDAs, as compared to HFDs, it required advanced GIS mapping of irrigated lands correlated with the up to twenty years of streamflow and diversion water measurements. The State corroborated these values using multiple scientifically proven methods ranging from estimates based on County crop production records to satellite imagery. These methods were also endorsed by the Technical Working Group commissioned by the Water Policy Interim Committee, which ultimately concluded that the Compact provided for reasonable water deliveries as compared to historic practice and that the instream flow rights contained in the compact were calculated to maintain existing irrigation use rather than maximize fishery flows. By contrast, Mr. Dutton's report includes no scientific analysis of the RDAs, only Mr. Dutton's unsubstantiated conclusion that the RDAs are not adequate.

Mr. Dutton's March 5th Compact evaluation fails to adhere to the irrigation water requirement formulas he presents in section 4.5 (page 13) when he failed to remove effective precipitation from his irrigation application metric. Mr. Dutton compares only his highest measured field applied irrigation values with the Compact's average Historic Farm Delivery values (Appendix 3.3 of the Compact) in an attempt to demonstrate a deficient settlement, when in fact his averages are less when compared to the amounts provided for by the Compact. Given these foundational errors in Mr. Dutton's approach to evaluating the 2015 Compact and his own 1994 study, it is no surprise that his efforts lack the ability to accurately assess the FIIP water right quantification provided for in the Compact.

Failure to Acknowledge Benefits to Irrigators

Mr. Dutton's evaluation of the 2015 Compact also ignores the substantial fiscal benefits to irrigators and stock growers that would accrue from the settlement. Of the total $55 million of the State's commitment to the settlement, $42 million would be allocated to directly fund improvements that benefit the FIIP irrigators, most of whom are non-Indians. These improvements include three $4 million dollar allocations for alternative stock water, on-farm irrigation efficiency improvements, and water measurement. $30 million would be allocated to a pumping fund to pay for power needed to run the Flathead pumping station, with excess interest applied toward a variety of irrigation infrastructure improvements. These funds represent a substantial commitment to the irrigation infrastructure that will likely be matched multiple times over by the Federal settlement. These benefits will be used to improve water supply from pump stations, more efficiently convey and deliver water, and more efficiently use diverted water volumes.

Perhaps Mr. Dutton's biggest failure in evaluating the 2015 Compact is his failure to consider the ramification to irrigation on the FIIP in the absence of a settlement. Absent a settlement, the status quo will not be maintained. The repercussions of the Legislature failing to ratify the Compact include larger instream flow water rights claims the Tribes will almost certainly file on-Reservation and the legal requirement to re-evaluate instream flows for ESA compliance absent a settlement. As a Federal irrigation project, the FIIP is required to maintain Endangered Species Act (ESA) compliance for bull trout. If the Compact passes, the Interim Instream Flows that have been mandated by the courts since 1987 will eventually be replaced with the Minimum Enforceable Flow values set forth in the compact. By contrast, without the Compact in place, the BIA will continue its evaluation of the sufficiency of the interim flows and will do so without consideration of current irrigation needs or the ability to increase instream flows through efficiency upgrades, which were the driving forces behind the settlement provisions.[3]

The Compact addresses both of these potential impacts in a way that is extremely protective of existing water use on the FIIP. Any responsible consideration of the Compact's merits must be weighed against these potential ramifications.

[3] http://dnrc.mt.gov/divisions/reserved-water-rights-compact-commission/docs/cskt/2013-bia_instream_flows.pdf