Comments and Responses Yakima River Basin Study				
Document and Version (date): **TM: Water Needs for Out-of-Stream Uses** (Draft for Peer Review, dated August 5, 2010)				
Responses Prepared by: Graham, Montgomery				
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Section	**Page**	**Source**	**Comment**	**Response**
General		WSU Engineering Team	Citations should be included (along with a list of citations) so that readers can locate the sources and check facts	Citations will be added, where missing; and a list of citations will be included.
General		WSU Engineering Team	All data and other sources information should be provided – so that the information can be reviewed and checked	Not clear why this is suggested. The report is intended to stand alone as to document the data reviewed and the assumptions and analysis developed.
General		WSU Engineering Team	All assumptions should be defended	We will review assumptions and add further explanation on the basis for assumptions, where warranted.
General		WSU Engineering Team	The tables and figures in the appendices should be labeled and referred to explicitly in the body of the text (Table A1, etc…)	Agree.
General		WSU Engineering Team	In many cases the tables and figures in the report need to be described more fully – particularly by including detailed table and figure captions	Agree, this should help make the report more readable and informative.
General		WSU Engineering Team	Defending all assumptions	See response above to similar comment.

General		WSU Engineering Team	Investigating the discrepancies in various methods and data sources and to examine the sensitivity of the results to these discrepancies	A brief summary will be provided of effects on the water needs assessment from the main item of this nature flagged in the Peer Review: i.e. use of WSDA crop acreage data vs. irrigation district crop acreage data.
General		WSU Engineering Team	Throughout the report, keep in mind that *data* is plural and *datum* is singular	Will convert verbs to plural form, wherever the word "data" is used.
1		WSU Engineering Team	Second paragraph is too vague in terms of who was part of the workgroup	The current document will become an appendix to the Integrated Plan, and the Integrated Plan will list membership of the YRBWEP Workgroup.
2	6	WSU Engineering Team	Second paragraph – needs reference for study related to 16,400 acres and 45,500 AF on consumptive use	Will provide reference to study related to 16,400 acres (NRCE). 45,500 AF is our estimate, will explain.
2	6	WSU Engineering Team	Fourth paragraph – please define "severe economic loss". Does this mean they can live with 70% every year and donate the rest of their water for conservation?	As indicated in the report, this is an opinion expressed by representatives of the irrigation community and relates to occasional drought conditions. 70% is not a viable level year after year. And there is no intent for water users to donate water that they are entitled to receive in years with adequate water supply.
2	6	WSU Engineering Team	Fourth paragraph – is KRD return flow instantaneous or are there timing issues?	There is some lag in return flow; however a very high percentage of the quantity indicated returns to the Yakima River during irrigation season. The phrase "during irrigation season" will be added to the statement on p. 6.

2	6	WSU Engineering Team	Last paragraph on page 6 – How do you know "a lower quantity is LIKELY used…" outside the area?	Because it refers to a drought year when water supplies across the basin are reduced.
2	7	WSU Engineering Team	First paragraph - where did the 70% non-consumptive estimate for 34,000 AF of domestic wells come from?	This value should have been reported as 60%, consistent with Table 36. This was based on professional judgment; however we will cite *Wastewater Engineering*, 4th Ed., Metcalf & Eddy. They give a range from 60% to 90%, with the lower end of the range intended for hot, arid areas of the southwestern U.S.
2	7	WSU Engineering Team	Second paragraph – If 70% non-consumptive why 20,000 AF instead of 15,000 AF?	See prior response. This result is drawn from Table 36, which uses a value of 60% non-consumptive use.
2	7	WSU Engineering Team	Third paragraph – Given concerns over exempt wells in region, non-community public water systems (is that code for exempt wells?), why isn't mitigation for these an issue?	Non-community public water systems are not the same as exempt wells. This is a very diverse category that typically includes campgrounds; parks; rest-stops; and some types of self-supplied commercial facilities. This is a relatively small component of overall water demand and has not been evaluated in detail. Mitigation is not the subject of this technical memorandum, but is being considered as one issue within the broader Yakima River Basin Study.

3	8	WSU Engineering Team	continuing paragraph – Specify instream flows and show wet, average, and dry hydrographs and unmet demand.	This information requested is not appropriate for this document. This memorandum has a specific purpose: to estimate quantities of water used for out-of-stream purposes. It is not intended to describe or analyze instream flows or hydrologic conditions. The reference in the text to instream flow targets is intended only to explain why "Parker Gage" is a significant control point. This sets up later discussion of water uses above Parker and below Parker.
3	8	WSU Engineering Team	Second paragraph – TWSA in normally… Specify how often (1 in 10, 1 in 30…)	Will add this information – in 75% of years.
3	8	WSU Engineering Team	Fourth paragraph – quantify "small effect" e.g., less than x % of total.	Ok
3	Table 1	WSU Engineering Team	It would be nice to have another column for post-1905 entitlements, even those these are smaller than the other entitlements	The values for post-1905 entitlements are listed in footnotes 2 – 5 under the table. These total less than 0.5% of the total in column 1, and do not justify adding another column.
3	10	WSU Engineering Team	paragraph 1: What criteria were used in selecting the drought years?	This will be explained. The criterion is based on how the Yakima Project is operated in response to hydrologic conditions, and specifically refers to years in which prorationing occurred.

3	Table 2	WSU Engineering Team	Why isn't the '92-'94 drought not included in Table 2?	We focused on more recent years because diversions have changed with time. 2001 and 2005 are representative of severe, single year droughts.
3	Table 2	WSU Engineering Team	caption: *Diversions* is misspelled.	The word is "divisions" and was not misspelled. However to avoid confusion we will delete "divisions" from the title; and also delete "districts" from the upper left cell of the table. (the distinction between districts and divisions is explained in the text of the document).
3	Table 2	WSU Engineering Team	explain why KID diversion is greater than entitlement.	We will route this question to KID, and if a response is obtained we will footnote the reason.
3	10	WSU Engineering Team	last paragraph – is there a reason that decline in total diversions is "most likely" caused by… Is conversion to drip for wine grapes a large factor?	The terminology "most likely" is used to indicate we are offering an opinion on the reason for reduced diversions. Conversion to drip irrigation for wine grapes is indeed a factor.
3	Figure 2	WSU Engineering Team	could be our laser printer but color between WIP & KRD hard to distinguish.	We will review the color scheme and see if others experience the same issue, if so we can change the color.
3	11	WSU Engineering Team	Defend the assumption here that daily return flow is the sum of the mentioned irrigation diversions divided by 2.	A citation to Reclamation's Interim Operating Plan is provided, and this would seem to be sufficient. The Interim Operating Plan was developed based on Reclamation's experience in actual project operations.

3		WSU Engineering Team	Exactly how are the return flows estimated here taken into account in this analysis?	Later in the report (p. 27) we use the estimate of return flow from KRD to adjust the estimate of total water needed to meet 70% of proratable water users' needs.
3	Table 3	WSU Engineering Team	The discrepancies between the irrigation district and the WSDA data are a major concern and should be investigated in depth. Non-inclusion of irrigated pasture lands does not seem like it can be the only cause of this discrepancy. Also, what is the sensitivity of the water demand results to this discrepancy? Is it possible that the irrigation estimates are biased in any way? You say in paragraph below that it may be partly because WSDA excluded irrigated pasture but is that the majority of the difference?	We will explain more clearly exactly how the two data sources were used.
3	Table 4	WSU Engineering Team	What are the years represented in this table?	2002-2008. This was documented in the first paragraph in section 3.3; and will also be added as a footnote to the table.
3	Table 5	WSU Engineering Team	Will the information from the other irrigation districts eventually be included? Also, "ND" needs to be inserted for KRD column. WIP vegetable estimates are off by 100%.	The information was requested, and will be inserted if provided by the three remaining districts. Will insert ND in KRD column. It was recognized that WSDA data and District data vary significantly. Further discussion of this will be provided.
3	13	WSU Engineering Team	paragraph 1: Why is it most likely that hay/silage and non-crop cereal grain groups comprise most of the acreage missing from the WSDA survey?	WSDA provided to us some of the limitations of their data set which we can better describe in the report.

3	Tables 6 & 7	WSU Engineering Team	Should sprinkler, wheel and center pivot in Table 6 be added to get sprinkler percentages in Table 7. In other words, what did districts call wheel and center pivot?	There is a difference in terminology between these tables that came from different sources. Districts include wheel and center pivot equipment under the sprinklers category.
3	15	WSU Engineering Team	Describe in more detail how CIR is calculated.	The description starting on p. 14 will be clarified and slightly expanded.
3		WSU Engineering Team	It would be very useful to provide a map of the Yakima basin that has topography as well as the locations of each of the WIG stations used and the delineations of each of the irrigation districts – this would help in demonstrating the representativeness of the WIG stations for each district.	Topographic data seems unnecessarily detailed, given the descriptive nature of this information. However we can show the stations on a map.
3		WSU Engineering Team	It would also be helpful to include a table for each of the crop types in each district and the source of information used in determining the CIR , whether it be a WIG station, Agrimet station, or weighted average. Also, what was the metric in determining if a crop type was similar to another crop type?	We will add an appendix with supporting tables.
3	15	WSU Engineering Team	paragraph 1: These are weighted by area? How did the irrigation districts determine their crop irrigation requirements? This would help in understanding the comparison presented in table 9.	Weighting was done by area (i.e. acreage). The irrigation districts did not calculate crop irrigation requirements, we did using their crop census data and representative CIRs.
3	Table 10	WSU Engineering Team	different categories than Table 6. Why? Are these included under “other”?	Correct, flood, big gun and hand comprise the “other” category in Table 6.

3	Tables 10 & 11	WSU Engineering Team	These values will vary under different conditions. E.g. percent evaporated is strongly controlled by climate. Percent return flow will depend on soil conditions. This should at least be mentioned and the accuracy should be discussed.	These estimates are used for broad descriptive purposes. We will mention the variables listed by the reviewer.
3	Table 13	WSU Engineering Team	These estimates are for an averaged historical climate condition?	All of the analysis in Section 3 of the report represents "current" conditions. The crop irrigation requirement is the largest individual component, and this is based on the Washington Irrigation Guide, published in 1985.
3	17	WSU Engineering Team	second paragraph, last sentence: What are the seepage losses for lined versus unlined systems – are these taken into account in this analysis?	The districts supplied their conveyance loss estimates. Their systems have both lined and unlined canals and laterals.
3	Table 14	WSU Engineering Team	Spell out WCP and MWD. Provide proper references for these sources of information. What is the methodology used in the cited reports in determining the conveyance losses and is the methodology consistent for each irrigation district? How accurate are these estimates?	The acronyms will be spelled out. We have not performed an independent analysis of the methodology used to determine seepage losses, and this activity is not scoped for this study.
3	Table 16	WSU Engineering Team	Mention explicitly how the difference values in the two bottom rows were calculated (e.g., the first difference value is a subtraction of "estimated total on-farm delivery needs" from "estimated deliveries to farms".	This will be explained.

3	Table 16	WSU Engineering Team	Except for SVID, most of the on-farm delivery needs are under-estimated. Why is this so? What is the source of the under-estimation?	The reviewer is assuming they are underestimated. We don't know for sure; that is simply the difference between two values calculated using different sources of information. The differences range from -9% to +3%. This indicates a pretty high level of consistency between the two approaches and suggests that the estimated values are reasonably close to the true values.
3	Table 16	WSU Engineering Team	The Roza and YTID results should also in this table. Rather than stating that results were poor therefore a different method was used, the results should be shown and a discussion of the reasons for the poor results should be provided. Also, if subtracting conveyance losses from average diversions was best for Roza and YTID, why wasn't this method also used for the other irrigation districts?	Tables 16 and 17 are presented for descriptive purposes, in an effort to explore where water goes after it is diverted. The data was acquired from several different sources, including the districts themselves. The data assembled for Roza and YTID gave results that did not make sense. This did not offer descriptive value, so an alternate approach was used for these two districts. In each case we have used the data and method that provides the best description of where water goes after it is diverted.
3	18	WSU Engineering Team	last paragraph, first sentence is awkward - explain why it is ok to change apparoach.	Ok.

3	19	WSU Engineering Team	first paragraph: It would be give to give some accuracy estimates for each of these rather than just stating that many errors are inherent in the data. Also, it would be good to investigate the sensitivity of these inaccuracies to the results.	It would be extremely speculative to assign error estimates when we don't know the quality of the data collected in the first place. We were limited to using existing data. The reviewer should also recognize that this section is used as a general characterization of the use and fate of water in the Yakima Project. Performing more detailed studies would provide tighter estimates but would not add significantly to the value of the information.
3	19	WSU Engineering Team	second paragraph – repetitive – copied directly from earlier in report.	Repetition occurs because the earlier section is a summary section.
3	19	WSU Engineering Team	second paragraph – what is/are SVID and YTID reason(s) for not needing water?	This has been a consistent position by these two districts for many years. We have not investigated their reasons.
3	19	WSU Engineering Team	last paragraph – sometimes Parker gage and other times Parker Gage – consistent use of g or G throughout document would be preferable.	Ok.
3	22	WSU Engineering Team	second paragraph – where does leased water come from?	Other water users in the basin including SVID.
3	22	WSU Engineering Team	fifth paragraph: typo: "Different methods can *be* used.."	It will be corrected.
3	Figure 6	WSU Engineering Team	mention in the text or in the caption that the shortfall is the gray area, which is the difference between the 2001 and non-drought average diversions. Same with the other figures.	Ok

3	25	WSU Engineering Team	third paragraph – what is the criteria for "severe"?	See earlier comment and response.
3	25	WSU Engineering Team	fourth paragraph: consider rewording: "A calculation of the volume of water *a* 70 percent…"	Will replace "a" with "that".
3	Table 20	WSU Engineering Team	there are grammatical problems in the first column of this table	Will re-word to improve clarity.
3	Figure 9	WSU Engineering Team	Why are leased water amounts not included in this Figure but they are in Table 20? Should these be consistent?	We don't have the amount of leased water by month – just the annual total. The annual quantity of leased water is provided in a note on the figures.
3	Table 21	WSU Engineering Team	Adding another row for 70% reliability would be interesting.	The 70% level is shown in the prior Table, Table 21. However, we can add it to this table to make the comparison easier.
3	27	WSU Engineering Team	third paragraph, first sentence: typo: "…using leased water need to be added…"	That paragraph was deleted in the latest version.
3	27	WSU Engineering Team	second to last paragraph: define "short time period".	Will change to "during irrigation season".
3	27	WSU Engineering Team	second to last paragraph: "…the total shortfall should be reduced to approximately 282,300 acre-feet in the 2001 drought year." - Using which method?	We will clarify that it is calculated using the second method from the prior paragraph. This number was in error. The correct number is 299,100 acre-feet.

4	29	WSU Engineering Team	first paragraph: Ec was based on professional judgment. Please cite a proper source.	We will explain the basis of this factor (conveyance efficiency).
4	Table 22	WSU Engineering Team	WSDOA should be WSDA	Agree.
4	Table 22	WSU Engineering Team	Where did the 15% adjustment factor come from? Defend this value.	Footnote 3 to Table 22 explains how the 15% adjustment was developed. We used GIS analysis of a sample of aerial photographs from the basin, and we compared WSDA acreages with observed acreages at the same location. Further information will be added to the text of the report.
5	31	WSU Engineering Team	Page 31, third paragraph, first sentence: "Water conservation measures result in the *greatest water savings* in years with at least average water supply." Is better to write than that they are most effective in years with at least average water supply. This is because they are not as important in the high water years as they are in the low water years. So "effective" is not the best choice of words here.	Will re-word as "greatest water savings." Conservation measures are less important in low water years as there is less water used throughout the basin. They may be important on a case-by-case basis but there is less contribution to basin water supplies from conservation in dry years.
5	32	WSU Engineering Team	first paragraph: Similarly, this language needs to be clarified. "During drought years, the water savings would be reduced as less water is applied to fields." Say that the volume of water is reduced, but not necessarily the percentage of water savings.	Volume is really the focus of the discussion in this paragraph and relates best to the overall purposes of the document, which is estimating water needs in terms of acre-feet. No change.

5	32	WSU Engineering Team	third paragraph: Explain in more detail why a reduction of seepage on the mentioned farms does not improve water supply conditions in the basin.	Ok – its because of return flow described in earlier sections.
5	32	WSU Engineering Team	5th paragraph: Briefly mention what some of the reasons are for why Wapato lands are idle.	Ok
5		WSU Engineering Team	It would help to mention at the beginning of Chapter 5 that new acreage is not likely to occur because current entitlements are not sufficient to serve current acreage during drought years.	Ok
5	Table 23	WSU Engineering Team	Remove the footnote that states that the units are in acre-feet. These are percentages. Also, mention what these percentages are of: are these percentages of the areal extent of all irrigated agriculture in the basin? Or are they a percent of how much water is utilized by each crop as a percentage of the total irrigation water needs in the basin? Can both of these be shown in table 23? Also, why are developed and CRP lands shown in the other category if they do not have any irrigation demands?	Footnote will be corrected. These are percentages of land acreage within each individual district. The table title or footnotes will be adjusted to explain this. Developed and CRP lands are listed because these have acreages associated with them and are included in the lands inventoried by the Districts.
5	Table 24	WSU Engineering Team	Also in this table, mention exactly what the percentages are. Are they of area? What area?	Ok

5.5		WSU Engineering Team	Why not directly apply the UW work? A more defensible method than relying on "professional judgment" should be used. Also, will changes in seasonality in water availability be dealt with? Total annual streamflow amounts may or may not decrease, but the change in the seasonality of surface water availability will cause water stress in the Yakima basin. How will this be dealt with?	We have found the UW work not comprehensive enough to use for this section. They do not have future water demands for crops other than apples and cherries. We will use the RiverWare model to examine changes in seasonal demands as well as runoff patterns and amounts.
6	36	WSU Engineering Team	third paragraph: how reliable are population projections? Is under reporting an issue?	Population data and projections were obtained from county governments in the Basin, water utilities, and a Washington State database that relies on self-reporting by water utilities. No assessment of the reliability of these data was performed. Both under-reporting and over-reporting could occur, among the various original sources for these data.
6		WSU Engineering Team	Axis labels are missing from many of the figures in this section – e.g., Figure 13	Labels will be added to chart axes.

6	Figure 14	WSU Engineering Team	Average ANNUAL use seems very high. Was anything mentioned in DOH municipal report on leaks or lost water? Could there be more people per house than reported? Why is Yakima much greater than Ellensburg? Is peak summer demand more of an issue than average?	These figures represent total water pumped or diverted and therefore include non-consumptive use associated with water delivery systems. Most of the municipal water systems in the Yakima Basin rely on irrigation canals to serve outdoor irrigation uses. Canal systems are less efficient than piped systems, so per capita usage is higher than for cities using piped systems. The higher per capita usage in Yakima than Ellensburg is likely due in part to this factor, since a large area of the City of Yakima is served by canals, while Ellensburg is served entirely by piped water. Water that leaks from the canal beds returns to the Yakima River. In addition, many suburban and rural residents in the Yakima Basin have multi-acre properties containing irrigated orchards, gardens or pasture. This also increases the per capita water usage, compared with more urban land uses in other areas of the Western states. Water usage is broken down by irrigation season and off-season in Table 36. For the purposes of this study, more detailed peaking analysis is not necessary.

6	43	WSU Engineering Team	second paragraph: be clear if this is total or consumptive use. How do the values vary during dry versus average water year?	This is total production (pumping plus diversions). The estimates were based on 2008 which was not a dry year. Variation in dry years was not explored for the municipal and domestic sectors. Since "dry year" in the agricultural section is defined by surface water supply, it would not be directly comparable to "dry year" in the municipal sector, where metered demands are served primarily by ground water. Since municipal and domestic demands are much smaller than agricultural demands, it was considered unnecessary to analyze these differences.
6	45	WSU Engineering Team	first bullet: be more specific in the verbiage here: mention that total basin (not municipal) water used is reduced as lands are converted from agricultural use to urban use. Also, these are offset by the reduction in irrigation use (last sentence in that bullet).	Will review and clarify the language.
6	Table 34	WSU Engineering Team	be clearer with respect to consumptive or total needs.	Will clarify.

6	48	WSU Engineering Team	third paragraph: WSDA not WSDOA. Also, based on the earlier analysis, is the WSDA cropland geodatabase reliable enough for this analysis? Also, in this paragraph, what is the source of the assumption that one third of the land would be developed by 2030 and two-thirds by 2060? Are these linked to population growth and density?	There are several uncertain variables involved in calculating effects of land conversion on water usage. Use of the WSDA cropland data is one of those variables. Uncertainty in this variable is in the range of 15% to 50% based on comparison with other sources of cropland data explored in the report. This range is on par with uncertainty in the other variables involved. An example of this is the second part of the comment: involving assumptions on how much land will be developed by particular dates in the future. This assumption was informed by consideration of the population growth estimates developed in Section 6, and represents only an educated guess at the pace of development. A brief discussion of uncertainty regarding the land conversion factor will be added to the report.
6		WSU Engineering Team	Should the unit acre-feet per acre should be replaced in all instances by the unit feet?	While this would be mathematically accurate, the “water duty” is commonly expressed in acre-feet per acre in the agricultural irrigation context. Therefore we will continue using acre-feet.

6	48	WSU Engineering Team	fifth paragraph: “homeowners reportedly tend to use at least as much water as adjacent farmlands” – what is the source of this information? Is it reliable?	As noted in the paragraph, this information was provided in interviews with irrigation district managers in the Basin (Roza, Sunnyside and Yakima-Tieton irrigation districts).
6	48	WSU Engineering Team	sixth paragraph: Defend the assumption that one third of the lands converting would be low density. Is this the current trend?	We have not investigated this assumption in detail. It appears reasonable based on input from the Subcommittee of the YRBWEP Workgroup that reviewed the water needs assessment. The subcommittee includes irrigation district managers, Yakama Nation staff; city and county public works staff; and others.
6	Table 37	WSU Engineering Team	You used 7,000 and 9300. Put in comma.	Ok.
		WSU Engineering Team	Somewhere you should estimate that water demand is likely to be larger than values because reservoir evaporation and seepage losses could be significant. It is probably too soon to look at specific reservoir sites but you should mention that you can’t just store what is needed.	The water needs assessment is about water usage, and does not address water supply considerations. Water supplies are being analyzed under a separate task of the project. Reclamation staff indicated that evaporation and seepage losses are relatively small for the reservoirs of the Yakima Project – likely less than 5%.
Appendices		WSU Engineering Team	put table numbers and captions even in these sections.	Ok.

6	35	WSU Engineering Team	Should they specify where they got this water system data? (i.e. explicitly state: water system plans as required by the Department of Health)? Data can also be obtained from other sources ... and they may not be the same.	Sources are documented in the more detailed sections that follow this brief summary of methodology.
6	35	WSU Engineering Team	So number of connections=number of households. But what if there are industrial activities in these rural areas? (Remember the comment by someone at the sub-PAG about using certain water systems to represent smaller areas. They jumped on that by comparing Quincy to Wenatchee, I think. Quincy has a lot of industrial apparently.)	We will clarify that there is minimal industrial activity outside the municipally-supplied systems of the Yakima River Basin.
6	35	WSU Engineering Team	Should they say where these county planning estimates come from? I'm assuming from Census data, which would say the average number of people/household. It could be OFM too.	We will clarify the origin of county planning estimates (Washington State Office of Financial Management is the underlying source).
6	Figure 13	WSU Engineering Team	I think the axes should be labelled, even though it is obvious what these are. (But we've always been told to label them, always!)	OK
6	Table 32	WSU Engineering Team	Units? Probably gpcd, but should label for clarity.	OK
6	43	WSU Engineering Team	Maybe they should reiterate here what the three categories are. I was lost for a little bit and then went back and remembered what was going on. The table before lists two categories, and the last one was the large PWS.	Will review and clarify.

6	Figure 16	WSU Engineering Team	Although we've seen the legend many times, maybe they should include it here so we don't need to page back.	Agree.
6	46	WSU Engineering Team	I searched the document for what IWRMP is and couldn't find it. Is it this document? Or something else?	Will clarify. It is the "Integrated Water Resources Management Plan" for the Yakima Basin.
		WSU Economics Team	Our assessment is that the methods used in this report are inadequate to provide a foundation to make sound economic decisions about the water supply (as noted in the previous paragraphs). The report contains estimates of past diversions and consumptive use based on crop production patterns in drought and non-drought years, and discussions about some factors that will affect water use and availability in the future. These estimates may be useful for some purposes, but are not adequate for making resource allocation decisions; whether the resource under consideration is water, taxpayer dollars, or both. Such an approach ignores current and future prices, which are dominate drivers of demand and crop mix (and for which past water project reports have been strongly criticized).	This comment seems external to the specific subject matter covered in the technical memorandum reviewed. The memorandum addresses the quantity of water used in the basin, existing deficiencies in supply, and expected changes in water use over the coming 50 years. This memorandum is not the sole basis of decision-making on new water supply alternatives. We agree that economic analysis is necessary to support sound decision-making. Economic analysis is being performed under a separate task of the Yakima Basin study. It includes cost-benefit comparisons of the alternative projects under consideration, as well as an evaluation of the combined effects of the Integrated Plan on the basin economy.

		WSU Economics Team	In our opinion what is needed to support the types of decisions stated in this report is a thorough economic assessment of the relative value of water across competing uses in the basin, and a cost/benefit analysis to assess economic efficacy of investments in water supply enhancement projects. Although some of the data summarized in the draft report can help *support* economic analyses of the type required to satisfy its purpose, the report as written contains effectively no economic analysis. Much is made in the report of the impact of drought years on agricultural producers in the basin, but there is no economic characterization of impact on them. One cannot infer from this type of analysis, for example, if the value of additional water in drought years to farmers in the Yakima Basin districts is as high as the value of additional water made available to other uses, or whether and to what extent such water shortfalls would justify any additional investment in water diversion capacity and/or storage to relax water constraints in drought years.	This comment will be provided to the team conducting the economic analysis for the Yakima Basin Study.