July 2023

Comment Summary Tables for WRIA 7, 8, 13, 14, and 15

The following technical comment tables were created by the review panelists during their review of the watershed plans. Where relevant to the report, their findings were incorporated into the Watershed Restoration and Enhancement Plan Review Report. These comment tables are provided below to share the WRIA-specific comments the panelists found during their assessment.

Contents

WRIA 7

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
7	all	**all**	**Overall Summary: The plan identifies a total of 11 water offset and 26 habitat projects that would provide an anticipated offset of 1,444 AFY to benefit streamflows and enhance the watershed. Ignores water quality concerns. Needs error bars around assumptions to show uncertainty.**	All
7	all	**all**	**The plan projects 3,389 new permit-exempt domestic well connections (PE wells) over the planning horizon. Associated consumptive use with the new wells is 797 AFY**	All
7	Throughout		Consider rounding Overall CU to the nearest AFY integer (not tenths). There is a lot of uncertainty in these numbers.	CU
7	4.3	46	Reasonable assumptions: 60 gpd per person - indoor, 2.73 to 2.75 people per household, 0.10 CUF	CU
7	Fig 4.2	49	Consider rounding Overall CU to the nearest AFY integer (not tenths). This figure shows AFY to the nearest integer, but the project is listed to the tenth AFY.	CU
7	4.2.2	40	Potential Flaw: assumptions about building. King Co. based on 2000 to 2017 and Snohomish Co based on 2008-2018. Consider updating years and assumptions to provide consistency across counties.	CU
7	4.2.2	40	Maybe use Snohomish Co method based on 2008-2018 (or use OFM). Account for new building rates. Consider updating years and assumptions to provide consistency across counties.	CU
7	Appendix B		Some of the King Co subbasins could be refined for CU.	CU
7	Throughout		Review project list for feasibility & certainty. Consider including the likelihood of projects being implemented	NEB
7	Throughout		Estimates may be high for water offsets - state assumptions clearly. Consider stating assumptions of water offset clearly.	NEB/WO
7	Throughout		Significant figures are inconsistent. Consider updating for consistency.	WO
7	Table 4.2	47	Total offset on an annual basis - note that summer consumptive use is much higher than winter consumptive use (see comment on Appendix B, B-48). Consider stating this limitation clearly.	CU
7	Ap B	B-7	Projections: Inconsistent methodology between PE well projections between counties, both in past trends and in potential locations. Note that both methodologies appear valid, but using a single methodology for a watershed would improve consistency. King County's methods result in a higher estimate of PE Wells as building rate from 2000-2009 was much higher than 2010-2017. Consider using the same methodology for both counties.	CU
7	Ap B	B-48	Appendix notes that average water use is one value, but average summer use (due to lawn irrigation) is higher and may need to be considered for offset purposes. Consider stating this limitation clearly.	CU
7	Table 4.2	47	Note that CU assumed average irrigated area which is lowest of 3 options given in Appendix D - reasonable assumption but check for consistency with other plans. Consider verifying assumptions with other plans.	CU
7	Appendices		Minor comment - overarching page numbers on appendices (most are in WRIA 7) would be useful for referencing. Consider format update for clarity.	other

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
7	Appendices		Minor comment - would be useful to have consistent Appendices throughout all watershed plans to the extent possible; example: WRIA 7 has meeting summary in Appendix A, WRIA 8's meeting summary is Appendix C. Consider format update for clarity.	other
7	Table 5.1	53	The number of projects in Pilchuck and Patterson seem light, considering the needs. We would have expected to see more projects in Cherry/Harris given projection---even if estimates are low. We would have expected some projects to focus on irrigation and agriculture along the Skykomish and Snoqualmie Rivers, even if only modest offsets to projected consumption. Consider including additional projects in these areas. 10 of 16 subbasins will still have a deficit of water.	NEB/WO
7	Throughout		Technical feasibility - not enough information provided; We would like to see additional information to assess this aspect in projects (landowner issues; funding issues, etc.). Consider updating project list based on likelihood of projects being implemented.	NEB/WO

WRIA 8

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
8	Fig ES.1	9	Format update to identify number of WO & Habitat Projects, similar to WRIA 7 figure.	WO & NEB
8	Throughout		Round Overall CU to the nearest AFY integer (not tenths). There is a lot of uncertainty in these numbers	CU
8	4.3	40	Reasonable assumptions: 60 gpd per person - indoor, 2.73 to 2.75 people per household, 0.10 CUF	CU
8	Overall		Expectations of 967 new permit-exempt wells may be low. Offset assumption of 10 projects providing a surplus for the watershed is great, but there would be a deficit in 6 of 12 subbasins. Water quality concerns are ignored (e.g., nutrients, endocrine disruptors).	CU/WO/NEB
8	Throughout		Known ecological problems are not addressed by Sammamish River projects. Salmon recovery projects have been on list since Basin Planning in the late 1990s, but little progress has been made.	NEB
8	Throughout		Review project list for feasibility, and certainty, maybe a matrix.	NEB
8			Assumptions need to be stated for estimates for WO - state assumptions clearly. Present error bars where appropriate.	NEB/WO
8	Throughout		Update significant figures	WO
8	Appendix E		Projects in the Sammamish Basin (Sammamish River, Bear Creek, Little Bear, North Creek, and Swamp Creek) seem to have the most mitigating effects on water withdrawals. Instream flows and water withdrawals were ignored for the municipal water supplies. The diversity of projects planned in these basins seem to provide more ecological value. The key will be to implement them. Cedar and Issaquah Basins have little value to instream flow, although Riverbend would have strong ecological value for fish.	NEB
8	Table 4.2	43	Total offset on an annual basis - note that summer consumptive use is much higher than winter consumptive use (see comment on B-48)	CU

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
8	Appendix D		Projections: Inconsistent methodology between PE well projections between counties, both in past trends and in potential locations - Note that both methodologies appear valid, but using a single methodology for a watershed would improve consistency. King County's methods result in a higher estimate of PE Wells as building rate from 2000-2009 was much higher than 2010-2017	CU
8	Appendix D		Appendix notes that average water use is one value, but average summer use (due to lawn irrigation) is higher and may need to be considered for offset purposes.	CU
8	Table 4.2	43	Note that CU assumed average irrigated area which is lowest of 3 options given in Appendix D - reasonable assumption but check for consistency with other plans	CU
8	Appendices		Minor comment - overarching page numbers on appendices (only some pages are labeled in WRIA 8) would be useful for referencing	other
8	Appendices		Minor comment - would be useful to have consistent Appendices throughout all watershed plans to the extent possible; example: WRIA 7 has meeting summary in Appendix A, WRIA 8's meeting summary is Appendix C	other
8	General Comment		Technical feasibility - not enough information provided; is there additional information to assess this aspect in projects (landowner issues; funding issues, etc.)? Develop a matrix to show where projects are in development stage.	NEB/WO

WRIA 13

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13	all	all	**Overall Summary: The plan identifies a total of 9 water offset and 19 habitat projects that would provide an anticipated offset of 1,801 AFY to benefit streamflows and enhance the watershed.**	All
13	all	all	**The plan projects 2,616 new permit-exempt domestic well connections (PE wells) over the planning horizon. Associated consumptive use with the new wells is 434 AFY**	All
13	2.1.3	11	Limiting factors are identified but not necessarily addressed. There are opportunities to work with natural stream processes for multi-objective solutions that address habitat, hydrology and water quality. Consider solutions that address and enhance natural processes such as wood additions to accrete sediments and increase water table elevations. Include discussion of projects that raise streambed elevations to raise water table elevations. Accreted gravels in streams act as filter media and improve water quality. If wood additions are coupled with riparian plantings, lateral stream migration can be arrested. Water quality is improved by shading stream flows and fine sediments tend to deposit on floodplains with intact riparian corridors NEB should be evaluated based on how offsets address salmonid population limiting factors.	NEB
13	2.3.2	16	"...Summer base flows in the watershed are sustained by groundwater." It is important to note that past land use practices of removing wood from streams and excavating drainage ditches through wetlands were performed to lower the water table, remove water from the landscape, and influence local groundwater trends to make water flow out of our streams. Recognize root causes of reduced summer base flows and develop strategies for reversing root causes to improve NEB.	NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13	2.3.3	18	The text recognizes alterations of the natural hydrologic regime, including: • alteration of the frequency and magnitude of high flow events (usually associated with increased stormwater runoff from impervious surfaces), and; • reduction of summer base flows that affect the salmonid rearing capacity of streams (usually associated with reduced infiltration of groundwater, water withdrawals, or excess coarse sediment that can cause the flow to go subsurface)." Recognize root causes of reduced summer base flows and develop strategies for reversing root causes to improve NEB. Display a preference for intercepting stormwater before it enters natural streams and subsequent increases in erosion and turbidity.	NEB
13	5.1	34	"Restoring floodplain connectivity and streamflow regimes, and re-aggrading incised channels are most likely to ameliorate streamflow and temperature changes and increase habitat diversity and population resilience (Beechie et al. 2013)." Include discussion of projects that raise streambed elevations to raise water table elevations. Floodplain connectivity offsets can be evaluated with analyses similar to those identified in the paragraph that spans Pages I-26 and I-27 in Appendix I and the following paragraph on page I-27.	NEB
13	5.2.1.1	34	"MAR potential was estimated in terms of 1) potential locations suitable for MAR projects, 2) flow available for diversion during high flows, and 3) the number of days when diversion is feasible." However, suitability of potential MAR project locations appears skewed toward streamflow withdrawal ($^1/_4$-$^1/_2$ mile from streams). Review of appendices does not reveal that existing stormwater conveyance systems were evaluated as source water for MAR candidate sites. Flow available during high flow appears to ignore the influence that turbid flows will have on operations and maintenance of MAR facilities. Feasibility analyses will likely reduce the number of days when diversion occurs due to the plugging effect of turbid flows. Discharging stormwater to streams, which increases turbidity, then removing flow from streams as source water for a MAR facility ignores the potential for turbid water to reduce the effectiveness of a MAR facility and it ignores increased operations and maintenance costs. Evaluate existing stormwater conveyance systems for MAR source water. Consider the turbid waters' plugging effect on MAR facilities. Make estimates of turbidity during high flows. Evaluate if turbid flows can be allowed, or if they will increase operations and maintenance costs to such a level that the number of diversion days must be reduced.	CU Offset Development and Evaluation

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13	5.2.1.1	35	MAR offsets could be overestimated since there appears to be no consideration of turbidly effects on operations and maintenance costs. Consider turbid waters' plugging effect on MAR facilities. Make estimates of turbidity during high flows. Evaluate if turbid flows can be allowed or if they will increase operations and maintenance costs to such a level that the number of diversion days must be reduced.	CU Offset Evaluation
13	5.2.4.1	37	Reconnection of the Schneider's Prairie off channel site represents an opportunity to raise Deschutes River streambed elevation and water table elevation. The off-channel connection will increase conveyance in the reach and the increased conveyance can be offset by reducing conveyance in the Deschutes River mainstem by raising the channel bed. Raising the channel bed will raise the water table and address reduced summer base flow root causes. Develop more solutions to address reduced summer base flow root causes. Include discussion of raised streambed elevations to raise water table elevations. Consider direct stormwater discharge to Schneider's Prairie off channel wetland.	CU Offset Development and NEB
13	5.2.7.1	39	Stormwater source addresses root causes of reduced summer base flow. Consider more projects with similar strormwater sources.	CU Offset Development and NEB
13	Table 12	57-64	Past land use practices often included management aimed at reducing streambed and water table elevations. Channel and streambed degradation is listed as a Habitat Limiting Factor Addressed for 16 of the 19 habitat projects listed in Table 12. This is an indication of root causes of reduced summer base flow. Channel degradation reduces water table elevations. This is a legacy of past land use practices. Consider solutions that address and raise streambed and water table elevations. Projects that seek to raise water table elevations address root causes of reduced summer base flow. Such projects should rank highly for NEB.	CU Offset Development and NEB
13	Appendix I	I-6	Reduction of stromwater flows from 3.5 cfs to 3 cfs appears arbitrary. Provide justification for reduction.	other
13	Appendix I	I-7	NOAA Puget Sound Salmon Recovery Plan identifies alterations of natural stream hydrology as a high priority limiting factor in WRIA 13 and streamflow is important for supporting riparian vegetation and wetlands that provide shading, wildfire breaks, food web support, and flood and sediment attenuation functions. Develop more solutions that consider natural processes to improve NEB.	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13	Appendix I	I-11	The Narrative Description for MAR projects mentions stormwater as a source for MAR projects. Yet, it is the only occurrence of the word "stormwater" in the entire description for Managed Aquifer Recharge Projects in WRIA 13, pages I-11 through I-34. Provide consideration of stormwater as a source for MAR projects.	CU Offset Development and NEB
13	Appendix I	I-12	"Favorable MAR locations were defined as those within 0.25 and 0.5 miles from a potential source stream or river" is the only bullet listed under "Distance to potential water source" This can be interpreted as a bias toward surface water extraction from natural stream flows to source water to MAR facilities. Provide consideration of stormwater as a source for MAR projects.	CU Offset Development and NEB
13	Appendix I	I-13 - 16	Many MAR facility locations are natural areas and there is no indication of natural resource impacts associated with the MAR. MAR sites could be an ecological benefit or impact depending on the MAR design. The MAR design could have passive controls that raise streambed elevations and increase floodplain inundation, or it could include forest clearing, berms for water retention and engineered diversions. Without a description of the design concept, NEB associated with MAR is difficult to determine. Improve description of MAR facilities to assist in determining NEB.	CU Offset Development and NEB
13	Table 2	I-16	There appears to be no consideration of turbidity associated with high flows and turbidity's effect on operations and maintenance of MAR facilities. Consideration of turbidity with high flows will likely reduce the number of delivery days to offset operations and maintenance costs of MAR facilities. Consider turbid waters' plugging effect on MAR facilities and operations and maintenance costs.	CU Offset Development and Evaluation
13	Table 5	I-20	There appears to be no consideration of turbidity associated with high flows and turbidity's effect on operations and maintenance of MAR facilities. Consideration of turbidity with high flows will likely reduce the number of delivery days to offset operations and maintenance costs of MAR facilities. Consider turbid waters' plugging effect on MAR facilities and operations and maintenance costs.	CU Offset Development and Evaluation

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13	Appendix I	I-22	"In the Puget Sound Salmon Recovery Plan, NOAA identifies the alteration of natural stream hydrology as a high priority limiting factor in WRIA 13 (NOAA 2007), and streamflow is important for supporting riparian vegetation and wetlands that provide shading, wildfire breaks, food web support, and flood and sediment attenuation functions." Solutions presented rely on further alteration of natural stream hydrology by removing surface water from natural streams during high flows. The Plan does not provide a convincing evaluation of using stormwater sources which would reduce alterations of natural stream hydrology. Develop and evaluate projects that reduce alterations of natural stream hydrology and avoid further manipulation of natural stream processes. The Plan should use caution when citing the quote from the Puget Sound Salmon Recovery Plan and claiming in the following paragraph that further manipulation of natural stream hydrology will provide a benefit to juvenile salmonids.	CU Offset Development and NEB
13	Appendix I	I-23	"The rates of diversion will be precisely maintained through engineering controls" does not consider the effects of sediment transport dynamics in natural alluvial systems.	CU Offset Development and NEB
13	Appendix I	I-33	"Groundwater recharge rate will be maintained through a program of periodic rehabilitation of the infiltration structure(s)." Rehabilitation could mean a number of things including excavating MAR facilities and screening out fines, which is not compatible with some of the natural areas identified as MAR locations. Description of operations and maintenance actions associated with MAR facilities is inadequate for assessing NEB.	CU Offset Development and NEB
13	Appendix I	I-43 - I-47	The straight alignment of Chambers Creek represents excavated wetland drainage ditches. It is commendable to increase sinuosity, but the apparent historical impact also includes reducing streambed elevations. The description does not address streambed elevations. Increasing streambed elevations would increase water table elevations and address root causes of reduced summer base flows. It is unclear if raising streambed elevations in Chambers Creek is considered. Please identify if streambed elevations will be raised to raise water table elevations.	NEB
13		35	The Water Rights Opportunities are the ones that seem to most directly off-set consumptive use estimates. MAR next, then LID and stormwater projects. My concern with the LID and stormwater is they are infiltrating stormwater into groundwater, and I would think there would be some WQ or contaminant issues. None of the MAR projects appear to use recycled Class A water from water treatment plants.	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13		36	Good to see not considering the LID projects and Woodard Creek projects due to uncertainties. No action required.	CU Offset Development and NEB
13		37-38	There seems to be quite a bit of uncertainties about around Schneider's Prairie project. Revisit whether offset is warranted given uncertainties.	CU Offset Development and NEB
13		38	Donnelly Drive Infiltration Galleries – I would be concerned about WQ and pollutants with this project. Address concerns about pollutants in stormwater.	CU Offset Development and NEB
13		45-46	Zangle Cove and Evergreen State College appear to be marine armor removal. This would not seem to meet the guidelines for habitat project offsets as they don't mention marine or nearshore projects. I would suggest removing these two projects or providing justification so it offsets freshwater habitats.	CU Offset Development and NEB
13		50	The 1,801 AFY far exceeds estimate of 434 AFY of consumptive use, but I think the 1,801 is still a liberal estimate. I would ramp that back based on the number of off-set projects that are purely conceptual or seem to have some issues. Authors should reconsider estimates of offset for more uncertain projects.	CU Offset Development and NEB
13		52	I understand that the term Net Ecological Benefit is undefined, but it appears it is being defined as the offset projects exceeding the estimated consumptive use. Figuring out what a reduction in stream flow would mean for fish would require detailed hydraulic mapping and isn't really feasible at the watershed scale. For habitat projects one could come up with an increase in amount of habitat or juvenile salmon capacity based on area or length of stream habitat created or improved. However, I'm not sure it would add much because the habitat projects aren't being used for the offset. (Comment – no specific action required)	CU Offset Development and NEB
13		53	It is concerning that 4 subbasins are projected to have surpluses and 5 deficits. This coupled with uncertainties around implementation of projects and somewhat liberal estimates of total offset are a concern. Consider revising estimates of volume of offsets. The lack of projects in so many sub-basins is a concern, but not sure how it can be addressed.	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13	Table 12		Again, I'm not sure the nearshore projects should be included. Not saying they aren't good projects, but given they are in marine environment, they aren't doing anything for instream flows. Consider removing these projects or provide justification how offset freshwater habitats.	CU Offset Development and NEB
13	Appendix 12	I-2 – I-5	Donnely Drive Infiltration Gallery - no project sponsor. Has as sponsor been identified? Adds to uncertainty related to benefits.	CU Offset Development and NEB
13	Appendix 12	I-11 to !-14	MAR projects are all very conceptual. Reconsider or justify estimate of offset.	CU Offset Development and NEB
13	Appendix 12	I-25 to I-34	Snieder's Prairie projects has several uncertainties. Reconsider estimates of offset.	CU Offset Development and NEB
13	Appendix 12	I 58- I 59	WRIA 13 General Floodplain Rest. Projects – all conceptual, no sponsors for any of the projects to date. Seems low likelihood any will be implemented given lack of sponsors, and this was an analysis done by consultant independent of any of salmon recovery groups doing restoration work. The authors should clarify if any of groups doing salmon recovery are considering using this analysis and any of projects identified.	CU Offset Development and NEB
13	General Comments		• Population and PE forecasts are consistent among 13, 14, 15 • CU estimates are consistent and conservative • Projects supply the required water offsets • Habitat projects are numerous and are based upon projects supplied by committee members, lead entities • An inconsistency is for MAR quantities – different method used in WRAI 13 and 14 compared to 15 for water availability/MAR offset	CU Offsets
13	2.1.3	8	First paragraph "changing weather patterns" - do you mean climate change? Also says "summer flows are expected to change" - should say summer flows are expected to reduce or similar wording. Sentence should be more direct	General
13	2.3.3	*16*	Footnote 24 - is that correct?	General

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
13	2.3.3	18	Third paragraph. Sentence starting "Comparison of August…" should have a reference. The 7.2 deg F also seems high, I don't think its correct. Take a look at USFS NorWeST site https://www.fs.usda.gov/rmrs/tools/stream-temperatures-monitoring-and-modeling for a better estimate. A quick check indicates a 2.4 deg C rise - < 5 deg F	General
13			general comment - found font sizes that weren't consistent in document.	General
13	4.3.1	28	second to last bullet - was that truly a "weighted average"? How was weighting done?	CU Offsets
13	5.2.1.1	35	The "flow rate estimated as less than 2% of minimum flows" seems arbitrary. How was that selected and does that affect the potential size of the MAR project compared to projects in other WRIAs?	CU Offsets
13	5.2.7.1	39	The Hicks Lake infiltration volume equals a flow of 3 cfs for only 49 days. Is that too conservative?	CU Offsets
13	5.3	45	"marginal offset benefit by increasing seasonal storage" - isn't that what the Schneiders Prairie project is?	CU Offsets
13	5.5.3	50	second paragraph. "water storage and stream augmentation". Should be rewritten to say MAR and infiltration projects?	CU Offsets
13	Appendix J		Appears to be redundancies in project descriptions in the appendix.	CU Offsets
13	Appendix H	6	last sentence - spelling error, should be "acres"	CU Offsets
13	App H, Section 5.2	9	2nd paragraph - is that the method used in the plan?	CU Offsets

WRIA 14

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
14	all	all	**Overall Summary: The plan identifies a total of 8 water offset and 23 habitat projects that would provide an anticipated offset of 1,725 AFY to benefit streamflows and enhance the watershed.**	All
14	all	all	**The plan projects 4,294 new permit-exempt domestic well connections (PE wells) over the planning horizon. Associated consumptive use with the new wells is 760 AFY**	All
14		all	General comment - Many projects are still very conceptual thus the likelihood of these being implemented is low. I would recommend they dial back their offset of 1,725 to include on the highly likely projects.	CU Offset Development and NEB
14		34	Indicated that highly conceptual projects were removed though it seems like there are many that are still highly conceptual that could be removed.	CU Offset Development and NEB
14		36	Based on details in Appendix I, these projects seem highly conceptual.	CU Offset Development and NEB
14		37	Based on details in Appendix, this is just an analysis of available water rights with some assumption that 10% would be willing to sell.	CU Offset Development and NEB
14		37	Mason County Rooftop Runoff – Based on assumption of full build-out.	CU Offset Development and NEB
14		38	City of Shelton Reclaimed Water – This seems like most likely of proposed offsets for this WRIA.	CU Offset Development and NEB
14		40	Summit Lake Water System – This seems highly conceptual and based on Appendix I doesn't have homeowner support at this time. Good to see that this wasn't included as an offset.	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
14	Table 9	49	Chapman Cove project sounds like a marine shoreline or nearshore project and not sure how would off-set consumptive use of well or stream water.	CU Offset Development and NEB
14	Table 9	50	How do acquisition projects off-set consumptive use?	CU Offset Development and NEB
14	Table 9	50	Oyster Bay CE – this is estuarine and marine shoreline. Not clear how would off-set consumptive use.	CU Offset Development and NEB
14	Table 9	51	Case Inlet Bulkhead removal and Little Skookum CE Acquisition are estuarine and marine shoreline projects, not clear how would off-set consumptive use.	CU Offset Development and NEB
14		56	See comments for WRIA 13 about NEB definition and calculation.	CU Offset Development and NEB
14		57	Surpluses in 5 subbasins and deficits in 3 subbasins though deficits are small with 2 of 3 less than 10 AFY.	CU Offset Development and NEB
14	Table 10	58	With exception of City of Shelton RW/WCC Source Switch (459 AFY) Most of these are highly conceptual. However, if you reduce all the others by half there is still an offset of 1,092 AFY which results in NEB of 332 (1092-760 AFY).	CU Offset Development and NEB
14		60-61	Again, I would remove those that are marine nearshore/estuarine projects. As I note in my comments for appendix, many of these are highly conceptual.	CU Offset Development and NEB
14		74	There is a large surplus, but if you remove many of the highly conceptual projects or reduce the benefit of these highly conceptual projects by half, you are left with a NEB of 332.	CU Offset Development and NEB
14	Appendix I	I-2	Shelton Water Reclaim – in design phase – seems high likelihood	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
14	Appendix I	I-8	Evergreen Mobile Home Estates Water System Consolidation -decommission wells and go on city water. Direct benefit.	CU Offset Development and NEB
14	Appendix I	I-12	MAR Projects – These seem very conceptual with only potential locations identified and feasibility seems unknown. Thus, there is high uncertainty of these being implemented. MAR offset of 910 seems high given uncertainty.	CU Offset Development and NEB
14	Appendix I	I-24	Mason County Rooftop Runoff for new rural residential developments of 5 acres or more – requires that proposed requirement is adopted. No indication of how likely this is.	CU Offset Development and NEB
14	Appendix I	I-33	Steamboat Middle Storage Enhancement and Habitat Improvement -expand water storage in an existing forested/non-forested wetland. – because still conceptual only claiming 14 AF/Y	CU Offset Development and NEB
14	Appendix I	I-36	Summit Lake Alternative Water Supply (235 homes) – currently use surface water from Summit Lake…not an offset if pump groundwater or take surface water. Also, would restrict irrigation if on new source which would be a benefit. This seems like an unlikely project with no funding source or homeowner cooperation to date.	CU Offset Development and NEB
14	Appendix I	I-42	Water Right Acquisition – took 90% of available rights. Unclear if anyone interested in selling.	CU Offset Development and NEB
14	Appendix I	I-45	WRIA 14 General Floodplain Restoration Project – Like WRIA 13, this was just based on GIS analysis no idea if feasible or interest in funding these.	CU Offset Development and NEB
14	Appendix I	I-51	Goldsborough Hilburn Restoration Project – Sponsored by SPS Salmon Enhancement Group – seems to be high likelihood of implementation.	CU Offset Development and NEB
14	Appendix I	I-54	Skookum Valley Ag Project – Sponsored by Squaxin Tribe. – high likelihood.	CU Offset Development and NEB
14	Appendix I	I-58	Skookum Valley Railroad Culvert Blockages – Squaxin Island Tribe – Still need approval of railroad owners.	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
14	2.3.3	19	Climate impacts discussion isn't consistent with WRIA 13. This description is better and perhaps should be used in WRAI 13 plan.	General
14	4.3.1	28	at end of page starting with "60 gallons per day….". Formatting is off, perhaps this was a sub-bullet?	CU Offsets
14	4.3.1	29	Same comment as in WRIA 13 plan - how was IR weighted average calculated?	CU Offsets
14	5.2.1	*36*	Same comment as for WRA 13 - 2% of minimum flows, how was that arrived at?	CU Offsets
14	5.2.1.2	37	10% assumption for water rights - based on recent personal experience that seems high	CU Offsets
14	5.2.8.1	42	1st paragraph - "… no longer being unused." Do you mean "used" instead? Also, our experience with water system consolidations are the larger system wants to acquire the water rights of the smaller system	CU Offsets
14	5.2.8.1	42	2nd paragraph - seems like other projects that had a high degree of uncertainty weren't counted against the offset. Consider not counting this one, even though its small	CU Offsets
14	5.2.9.2, table 7	45	Table 7 - MAR costs of $3.1 million seem very low. Note that only 685 AFY have high readiness to proceed and 760 AFY offset is required	CU Offsets
14	5.3	48	I didn't follow this section easily as Table 9 contains different types of projects, but floodplain restoration is the only type of project described in the text. Also, there are type of projects seemingly unrelated to streamflow restoration such as shoreline projects, barrier removals (is it someone else's responsibility to remove the barriers already?)	CU Offsets
14	5.5.2	54	Costs for MAR projects are very low	CU Offsets
14	5.5.3	54	2nd paragraph - "water storage, stream augmentation, and water right acquisitions". Not the correct list of types of projects	CU Offsets
14	6.2.2	58	1st row is a WRA 13, not a WRA 14 project. Delete.	
14	5.3	48	It's not clear how these projects tie into NEB, referring to later NEB section and stating these projects were used to meet NEB. Or in NEB section refer back to this section so there is a connection. Right now, it just says 25 projects are listed, didn't say it is the 25 from section 5.3	NEB
14	2.2.1	13-14	The Puget Sound Watershed Characterization Project identifies the following goals including recommending identification of root causes of watershed issues and development of appropriate solutions is deficient. A predominant root cause of reduced summer base flow is past land use	NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
			practices and stormwater impacts. Past land use practices of removing wood from streams and draining wetlands resulted in reduced streambed and water table elevations. These land use practices coincided with increases in stormwater and associated water quality and quantity impacts. This does not appear to be appropriately identified and many solutions rely on further manipulation of natural systems instead of restoration of natural processes. Consider more solutions that address and enhance natural processes. Wood additions can accrete sediments and increase water table elevations. Include discussion of projects that raise streambed elevations to raise water table elevations. Accreted gravels in streams act as filter media and improve water quality. If wood additions are coupled with riparian plantings, lateral stream migration can be arrested. Water quality is improved by shading stream flows and fine sediments tend to deposit on floodplains with intact riparian corridors.	
14	2.3.2	16	The text identifies that local groundwater flows toward streams. It is important to note that past land use practices of removing wood from streams and excavating drainage ditches through wetlands were performed to lower the water table, remove water from the landscape, and influence local groundwater trends to expedite water flow out of our streams to salt water. Recognize root causes of reduced summer base flows and develop strategies for reversing root causes to improve NEB.	NEB
14	2.3.3	17	The text recognizes the importance of water tables' ability to sustain flows during extreme conditions. If we acknowledge reductions in streambed and water table elevations due to past land use practices and we acknowledge that our shallow aquifers as reservoirs to sustain flows during extreme conditions, we must recognize the capacity of these reservoirs have been reduced through past land use practices and storm water impacts and identify these conditions as root causes of reduced summer base flows. Recognize root causes of reduced summer base flows and develop strategies for reversing root causes to improve NEB.	NEB
14	3	20-22	Subbasin delineation appears appropriate	All
14	4.3	28-33	Consumptive use estimates appear reasonable	CU

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
14	5.1	35	The Beechie et al. 2013 citation appears misplaced, and it is not included in the References section. Check citations.	NEB
14	5.2.1.1	36	Many MAR facilitates source water from streamflows at high flow. Flow availability during such conditions appears to ignore the influence that turbid flows will have on operations and maintenance of MAR facilities. Feasibility analyses will likely reduce the number of days when diversion occurs due to the plugging effect of turbid flows. Consider the turbid waters' plugging effect on MAR facilities. Make estimates of turbidity during high flows. Evaluate if turbid flows can be allowed, or if they will increase operations and maintenance costs to such a level that the number of diversion days must be reduced.	CU Offset Development and Evaluation
14	5.2.1.3	37-38	LID projects directly address stormwater impacts to water quantity and quality. They also help address spatial disparities in CU impact and offset locations.	NEB
14	5.2.1.1	35	MAR offsets could be overestimated since there appears to be no consideration of turbidly effects on operations and maintenance costs. See comments on Appendices for further MAR comments. Consider turbid waters' plugging effect on MAR facilities. Make estimates of turbidity during high flows. Evaluate if turbid flows can be allowed or if they will increase operations and maintenance costs to such a level that the number of diversion days must be reduced.	CU Offset Evaluation
14	5.2.1.3	37 - 38	Mason County rooftop runoff infiltration delivers relatively clean stormwater to aquifers where future PE wells impact hydrology. There is likely no better source or location for aquifer recharge. Evaluate more opportunities for infiltration of stormwater.	CU Offset Development and NEB
14	6.2.2	59-60	Additional benefits to instream water resources bullet points are accurate, however, MAR benefits may be offset by impacts to natural resources. MAR projects appear to have a preference to use surface water withdrawals as a source of water. MAR project site descriptions do not identify if they will include land clearing and placement of berms to retain water. MAR project rehabilitation activities lack detail of operations and maintenance activities that could impact natural resources. Provide more detailed descriptions of MAR project concepts and anticipated operations and maintenance activities.	CU Offset Development and NEB
14	Appendix I	I-12	The Narrative Description for MAR projects mentions stormwater as a source for MAR projects. Yet, it is the only occurrence of the word "stormwater" in the entire description for Managed Aquifer Recharge Projects in WRIA 14, pages I-11 through I-24. Provide consideration of stormwater as a source for MAR projects.	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
14	Appendix I	I-14	"Proximity to potential source" only lists natural streams as water sources and that MAR facilities should be located. No stormwater sources are identified or appear to have been considered. Provide consideration of stormwater as a source for MAR projects.	CU Offset Development and NEB
14	Appendix I	I-14	The number of diversion days available to divert streams flows appears to be no consideration of turbidity associated with high flows and turbidity's effect on operations and maintenance of MAR facilities. Consideration of turbidity with high flows will likely reduce the number of delivery days to offset operations and maintenance costs of MAR facilities. Consider turbid waters' plugging effect on MAR facilities and operations and maintenance costs.	CU Offset Development and Evaluation
14	Appendix I	I-14 - 16	Many MAR facility locations are natural areas and there is no indication of natural resource impacts associated with the MAR. MAR sites could be an ecological benefit or impact depending on the MAR design. The MAR design could have passive controls that raise streambed elevations and increase floodplain inundation, or it could include forest clearing, berms for water retention and engineered diversions. Without a description of the design concept, NEB associated with MAR is difficult to determine. Improve description of MAR facilities to assist in determining NEB.	CU Offset Development and NEB
14	Table 2	I-18	There appears to be no consideration of turbidity associated with high flows and turbidity's effect on operations and maintenance of MAR facilities. Consideration of turbidity with high flows will likely reduce the number of delivery days to offset operations and maintenance costs of MAR facilities. Consider turbid waters' plugging effect on MAR facilities and operations and maintenance costs.	CU Offset Development and Evaluation
14	Figure 1	I-20	There appears to be favorable geology for MAR facilities in the area around Shelton, WA, WRIA 14's most densely populated area, which likely produces the most stormwater in WRIA 14. Although the Plan says it considers stormwater as a source for MAR facilities, it is not evident. Only stream withdrawals are considered. Provide consideration of stormwater as a source for MAR projects.	CU Offset Development and Evaluation

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
14	Appendix I	I-22	The Puget Sound Salmon Recovery Plan identifies the alteration of natural stream hydrology as a high priority limiting factor in WRIA 13 (NOAA 2007), and streamflow is important for supporting riparian vegetation and wetlands that provide shading, wildfire breaks, food web support, and flood and sediment attenuation functions." Solutions presented rely on further alteration of natural stream hydrology by removing surface water from natural streams during high flows. The Plan does not provide a convincing evaluation of using stormwater sources which would reduce alterations of natural stream hydrology. Develop and evaluate projects that reduce alterations of natural stream hydrology and avoid further manipulation of natural stream processes.	CU Offset Development and NEB
14	Appendix I	I-23	"The rates of diversion will be precisely maintained through engineering controls" does not consider the effects of sediment transport dynamics in natural alluvial systems.	CU Offset Development and NEB
14	Appendix I	I-23	"Groundwater recharge rate will be maintained through a program of periodic rehabilitation of the infiltration structure(s)." Rehabilitation could mean a number of things including excavating MAR facilities and screening out fines, which is not compatible with some of the natural areas identified as MAR locations. Description of operations and maintenance actions associated with MAR facilities is inadequate for assessing NEB.	CU Offset Development and NEB
14	Appendix I	I-25 - 32	Mason County rooftop runoff infiltration delivers relatively clean stormwater to aquifers where future PE wells impact hydrology. There is likely no better source or location for aquifer recharge. Evaluate more opportunities for infiltration of stormwater.	CU Offset Development and NEB

WRIA 15

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
15	all	all	Overall Summary: The plan identifies a total of 15 water offset and 31 habitat projects that would provide an anticipated offset of 2,873 AFY to benefit streamflows and enhance the watershed.	All
15	all	all	The plan projects 5,215 new permit-exempt domestic well connections (PE wells) over the planning horizon. Associated consumptive use with the new wells is 718 AFY	All
15		35	Kingston Treatment Plant Recycled Water – uses recycled water. This affects one small stream (Grovers Creek) on North Kitsap Peninsula.	CU Offset Development and NEB
15		35	Central Kitsap Treatment Plant recycle – Various uses Central Kitsap	CU Offset Development and NEB
15		36	Tahuya MAR OK, see appendix for feasibility.	CU Offset Development and NEB
15		36	South Hood Canal Lake Storage and MAR (Oak and Shoe Lakes) – This is a water storage project. Is raising elevation lakes and regulating them a good idea? I don't think it will change the ecology of the lakes. MAR seems theoretical.	CU Offset Development and NEB
15		36	Bainbridge Island MAR facilities –Bainbridge Island has low number of PE wells projected. Appendix, indicates It is sponsored and identified by city of Bainbridge Island thus it seems feasible.	CU Offset Development and NEB
15		37	Belfair Wastewater Treatment Plant – Currently operational and irrigates 70 AFY	CU Offset Development and NEB
15		37	Rocky Creek MAR – Seems to have detailed estimates in description, However, appendix indicates that project is conceptual and technical studies needed to determine feasibility.	CU Offset Development and NEB
15		38	M&E Stormwater Infiltration – conceptual? This is part of the City of Bainbridge MAR project. Seems feasible given proposed and outlined by City of Bainbridge.	CU Offset Development and NEB
15		39	Ridgetop Boulevard Stormwater – two of three phases completed	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
15		39	Mason County Rooftop Runoff Program – See WRIA 14 comments.	CU Offset Development and NEB
15		40	Beall Creek Flow Improvement –Based on appendix diversion that is a barrier to fish passage. Seems very feasible.	CU Offset Development and NEB
15		40	Stream Augmentation – Pumping groundwater to augment streams seems to defeat purpose. I would remove this one and the 632 AFY.	CU Offset Development and NEB
15		40-42	I agree acquiring forest land would be good, but is this really an offset? Does have 2100 acres identified by project sponsors. I think some additional justification for this approach would be helpful or ecology could clarify if they have this in other areas.	CU Offset Development and NEB
15		42	Rain Garden and LID Package – Perhaps an overestimate of how many and how much. I would be more conservative about estimate as it seems dependent upon homeowner acceptance which may wain with time unless the homeowners see some benefit.	CU Offset Development and NEB
15		43	Water Rights on Vashon-Maury and Bainbridge – are there more details on likelihood of this. Bainbridge and Vashon don't have a very high number of PE wells and offset needed, do they?	CU Offset Development and NEB
15	Table 11	45-60	Little Manzanita has more than 2000 feet of shoreline and 2.5 acres of tidelands. Good to protect, but I don't think that offsets consumptive use projects. Big Beef Creek has some estuarine. That being said, all these habitat projects have sponsors so they seem likely they will eventually be implemented. There appear to be many good habitat projects in this list and level of detail is much higher than other two plans (WRIA13 an14). I think the difference between WRIA 15 and 13 and 14 is the salmon recovery dollars being spent in area and entities involved in salmon habitat restoration. The last project "WRIA-wide Beaver Project is mainly an assessment.	CU Offset Development and NEB
15		63	Yes 1.4 million is likely a better average estimate of cost of projects.	CU Offset Development and NEB
15		64	Indicates that all projects in Table 6 have project sponsors and experience implementing these type of projects. However, Table 6 is just the summary of off-sets by basin, so I don't think the statement could really apply to all the types of water offset projects could it?	CU Offset Development and NEB
15		65	While I think there are number of projects in the offset list that have high probability of being implemented, there are others that I think the estimates should be more conservative (e.g., LIDs, forest acquisition) and I think the estimate of 2,873 is too optimistic. I would remove South Hood Canal Lakes MAR (62), Mason	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
			County Rooftop Runnoff (71), Raingardens and LID (188), Forests for streamflow (241), and stream augmentation (632).	
15	Table 13	68	Would be good to see this with the above projects removed.	CU Offset Development and NEB
15		69	Again I'm impressed that all the habitat projects have sponsors and thus have a high likelihood of being implemented.	CU Offset Development and NEB
15		80	While I think there are some projects that should not be counted for the offset of consumptive use (see comment on page 65), there still appears to be a net ecological benefit if that is being purely defined as difference between potential consumptive use of 718 AFY and offset projects.	CU Offset Development and NEB
15	Appendix E	137	Tahuya River Managed Aquifer Recharge Project – States that is currently at the conceptual level and additional studies needed to determine feasibility. Thus, it should not be considered as part of offset.	CU Offset Development and NEB
15	Appendix E	144	South Hood Canal Lake Storage – Increasing surface area/storage and regulating flow may increase fish barriers. I would remove this one from plan/consideration for offset.	CU Offset Development and NEB
15	Appendix E	161	Rocky Creek MAR – Indicates it is conceptual and studies needed to determine feasibility.	CU Offset Development and NEB
15	Appendix E	166	Mason County Rooftop Runoff for new rural residential developments of 5 acres or more – requires that proposed requirement is adopted. No indication of how likely this is.	CU Offset Development and NEB
15	Appendix E	192	Pumping groundwater to augment surface water and offset PE wells should be removed from consideration for offset.	CU Offset Development and NEB
15	Appendix E	198	Provides justification showing that young rapidly growing forests can transpire three times more than mature forests. So there is justification for this. The question is would these forests remain mature without protection?	CU Offset Development and NEB
15	Appendix E	211	Rain Garden and LID program. "Barriers to implementation of the WRIA 15 Rain Garden and LID Program include the availability of funding for new project construction and the willingness of private landowners to	CU Offset Development and NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
			participate in the program." I think this means that this program is not a guarantee. I would reduce the expected offset as I suspect as time goes on it may be harder to find landowners willing to participate.	
15	Appendix E	218	Water rights acquisitions Bainbridge and Vashon. "Barriers to project implementation could be the availability of project funding and the willingness of existing water right holders/property owners to sell their water rights and/or property." Thus, I think it is highly unlikely they will get an offset of 146 AFY.	CU Offset Development and NEB
15	2.1.3	11	Primary limiting factors of: channel and streambed degradation, increased peak flows, low streamflow loss of upland forest cover, loss of riparian forest, and loss of floodplain connectivity and habitats all speak to past land use practices. Past land use practices of removing wood from streams and draining wetlands resulted in reduced streambed and water table elevations. These land use practices coincided with increases in stormwater and associated water quality and quantity impacts. This does not appear to be appropriately identified and many solutions rely on further manipulation of natural systems instead of restoration of natural processes. Consider more solutions that address and enhance natural processes. Wood additions can accrete sediments and increase water table elevations. Include discussion of projects that raise streambed elevations to raise water table elevations. Accreted gravels in streams act as filter media and improve water quality. If wood additions are coupled with riparian plantings, lateral stream migration can be arrested. Water quality is improved by shading stream flows and fine sediments tend to deposit on floodplains with intact riparian corridors. NEB should be evaluated based on how offsets address root causes of watershed issues through restoration of natural processes.	NEB
15	2.2.1	13-14	The Puget Sound Watershed Characterization Project recommends Identifying root causes of watershed issues and develop appropriate solutions. A predominant root cause of reduced summer base flow is past land use practices and stormwater impacts. Past land use practices of removing wood from streams and draining wetlands resulted in reduced streambed and water table elevations. These land use practices coincided with increases in stormwater and associated water quality and quantity impacts. This does not appear to be appropriately identified and many solutions rely on further manipulation of natural systems instead of restoration of natural processes. Consider more solutions that address and enhance natural processes. Wood additions can accrete sediments and increase water table elevations. Include discussion of projects that raise streambed elevations to raise water table elevations. Accreted gravels in streams act as filter media and improve water quality. If wood additions are coupled with riparian plantings, lateral stream migration can be arrested. Water quality is improved by shading stream flows and fine sediments tend to deposit on floodplains with intact riparian corridors. NEB should be evaluated based on how offsets address root causes of watershed issues through restoration of natural processes.	NEB

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
15	2.3.3	17	"Practically all streams in WRIA 15 are augmented by groundwater discharge and many would go dry if groundwater recharge during precipitation became insufficient to maintain streamflow during dry periods (Ecology 1981)." This statement recognizes the importance of water tables' ability to sustain flows during extreme conditions. If we acknowledge reductions in streambed and water table elevations due to past land use practices and we acknowledge that our shallow aquifers as reservoirs to sustain flows during extreme conditions, we must recognize the capacity of these reservoirs have been reduced through past land use practices and storm water impacts and identify these conditions as root causes of reduced summer base flows. Recognize root causes of reduced summer base flows and develop strategies for reversing root causes to improve NEB.	NEB
15	5.2.2	40	Stream augmentation from pumping groundwater will rely on electricity to pump water for streamflow augmentation. Electric supplies will become more at risk during fire season as climate change worsens. Utilities may preemptively shut off power to avoid causing wildfires, or electricity may be cut off due to wildfires.	CU Offset Development and NEB
15	5.2.2	40-42	Forests for Streamflow Package addresses root causes of reduced base flow, but actual project implementation appears highly speculative with regard to project locations and sponsors.	
15	Appendix E	137 - 143	Tahuya River Managed Aquifer Recharge Project uses streamflow during the wet season as source water to feed infiltration galleries. Flows during the wet season will have a high incidence of turbidity and infiltration galleries will be prone to plugging effects of turbid flows. Maintenance of MAR facilities has not been adequately described and could be extensive. A viable alternative would be extensive large wood placements with the intent to raise streambed elevations in the main stem Tahuya River and tributaries to raise the water table and enhance habitat. This will also make valley bottoms more resilient to fire risk.	CU Offset and NEB
15	Appendix E	143 - 148	South Hood Canal Lake Storage and Managed Aquifer Recharge South Hood Canal Lake Storage and Managed Aquifer Recharge relies on water control structures to be "precisely maintained through engineering controls." Engineered controls can fail, they typically require upgrading, operations and maintenance costs are undervalued, and fish and wildlife habitat value is diminished.	CU Offset Development and Evaluation
15	Appendix E	150	The Manzanita Creek Miller Road Parcel Infiltration Project should establish clarity of whether the tributary is a natural stream or constructed drainage feature.	CU Offset and NEB
15	Appendix E	161 - 165	Rocky Creek Managed Aquifer Recharge Project diverts surface flows, which can be considered an impact to natural resources. Its benefits are highly uncertain.	CU Offset and NEB
15	4.3.1	26	CU calculation is fine, WRIA 13/14 say they use a weighted average but not explained in those documents. Nothing to change here, pointing out inconsistency	CU Offset
15	5.1	30	Use of "reasonable" - reasonable assurance used in document. "Reasonable benefit" not used and the use of reasonable in 2 places close to each other is confusing. Would replace 2nd use of reasonable with adequate or something similar - section 5.2 has another filter - "greatest potential for implementation"	CU Offset

WRIA	Section/ Fig/ Table	Page	Comment	Tech Aspect
15	5.1	31	1st paragraph. Other WRIA plans used 10% of identified water rights as possible acquisitions. This plan didn't appear to use same approach	CU Offset
15	5.2	32	note cost of MAR - more reasonable than WRIA 14 plan	CU Offset
15	5.2.1	36	note different approach from WRA 13/14 on MAR quantities in Tahuya River project	CU Offset
15	5.2.1	37	Belfair project - list MAR offset of 70 AFY to be consistent with other project descriptions. Just lists plant capacity now	CU Offset
15	5.2.1	37	Rocky Creek MAR - MAR quantities not consistent with WRIA 13/14 approach	CU Offset
15	5.2.2	43	Water Rights - consistency with other WRIAs? 10% used in WRIA 14	CU Offset