

LINCOLN COUNTY PASSIVE REHYDRATION PREFEASIBILITY REPORT COMMENT RESPONSE TABLE TO ECOLOGY COMMENTS

Comment Number	Comment Submitted By:	Comment	Comment Response
1	Ecology - ERO	The report establishes “As originally proposed, the objective of the Feasibility Study-Pilot Project was to evaluate the possibility of diverting excess Columbia River water for stream rehydration and aquifer storage in the Columbia River Basin (CRB) aquifer system, and if feasible conduct a pilot scale demonstration project.” The analysis does not quantify or project what those needs might be. The report notes “long term operational requirements for instantaneous and annual quantities are not known at this time” (section 4.1). Thus, an initial assessment of project feasibility is not possible.	Edits made to draft report: The introduction to the report was revised to more clearly describe the overall project concept and its phases, from pre-feasibility to completion (as envisioned conceptually right now). The revised introduction now clearly states where this report fits into an overall concept of what the project intends to accomplish with this report, and what is intended to accomplish with subsequent phases, if they are authorized.
2	Ecology - ERO	The report suggests that the long term goal is to acquire and “recharge a minimum of 50,000 acre-feet” or “200,000 acre-feet” , or “to directly recharge the basalt aquifers that are a water source for multiple water users throughout the basin, and to indirectly replenish the surface water that eventually supplies water to the Columbia Basin Project “ (Section 4.1). Elsewhere, it shifts emphasis (section 5.7) to lake storage and Crab Creek flows, although, there is no attempt at quantification of the ability of any discussed drainage to receive additional flow. (Reference sections 5.1-5.3)	Edit made to report describing the water volumes/targets envisioned in each project phase and a differentiation between the surface water and groundwater goals, for all potential phases of the project.
3	Ecology - ERO	Lincoln County Conservation District (LCCD) needs to establish and describe specific goals and objectives for the project to permit assessment of alternative ways of achieving them. It should be clear at this point that a project that has the goal of reestablishing surface water flows in Lincoln County is significantly different than one that has the goal of rehydrating ground water supplies for the Odessa Sub-area. It is not clear which objective this project intends to achieve. Project objectives should be made clearer in the final draft of this report.	Edit made to report –The goals/objective statement will be clarified as part of the revised introductions noted in items 1 and 2 above.
4	Ecology - ERO	No attempt at a water right survey is present. While the discussion in section 4 presents an overview, the grant agreement contemplated assembling basic information on water rights in the Crab Creek drainage to determine water needs, and in the Columbia River to determine water availability. Much of that information should be available from the watershed plan for WRIA 43.	Edit made to report in Section 3.1 to address potential availability of water rights. The water rights sections address where water could come from for a pilot, and potential future large project. At this time we do not address consumptive uses in Crab Creek system because that is premature.
5	Ecology - ERO	No cost structure, or alternative structures are proposed in the governance section. Who pays?	Kevin – As written the grant states that a preliminary evaluation will be conducted so that preliminary scenarios can be developed to determine proposed management and cost operational cost structure. The preliminary evaluation was done. An operational structure will be defined in the feasibility phase, at which point funding structure, including who pays, will be able to be addressed.

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6	Ecology - ERO	No estimate of spatial, temporal, and volumetric water requirements for each candidate drainage to meet project objectives is prepared. (Task 3.1 (3)(b)) See above comment on project objectives.	Kevin – The report proposes 10 to 20 cfs for a pilot project, likely done in the winter spring, preferably on Lake Creek. Since that is not clear to the reviewer, we will clarify that in the executive summary, introduction, and elsewhere. With respect to longer term needs the report describes the general targets (in section 1 and section 6).
7	Ecology - ERO	Place names are not located on maps, and figures are not located with places in the study area. Please thoroughly edit to ensure all place names in the document are located on a map, and all photographs are from named places within the study area.	Edits made in report throughout document.
8	Ecology - ERO	In Section 1.0: Please reference the “300,000 acres irrigated with groundwater” report. This figure seems high, and would need to include many irrigating with artificially stored groundwater or other water potentially subject to the Columbia Basin Project in the Quincy Basin, or the so-called “508-14” area.	Acreages checked, and revised as needed.
9	Ecology - ERO	In Section 2.0: Please revise objectives to reflect the grant contract. The basic objective of this project is to evaluate the feasibility of pumping surface water from Lake Roosevelt into the upper portion of a yet to be determined surface drainage in the northern portion of Lincoln County and then letting that water flow down that drainage, refilling currently dry or diminished lakes and recharging alluvial and basalt aquifers under natural conditions. The pre-feasibility project was to evaluate engineering, hydrogeologic, regulatory, permitting, ownership, water rights, and other issues related to developing a pumping and storage/infiltration project	Edits made in report as outlined in comment 1, 2, and 3.
10	Ecology - ERO	In Section 3.1: All geographic features named in the report should be located on a map. Also, “Pleistocene Cataclysmic Flood Waters” is a bit dramatic, and should not be capitalized.	Edits made in report to reflect Ecology’s request.
11	Ecology - ERO	In Section 3.1: The final paragraphs of this section, and the first two paragraphs of Section 3.2, are redundant to the remaining portions of the respective sections. Please edit.	Edit made in report to remove redundancy.
12	Ecology - ERO	In Section 3.2: Please discuss fish species.	Fish species of concern added to document in Section 2.2 for Crab Creek and Columbia River.
13	Ecology - ERO	In Section 3.3.2, page 12: The 4 th paragraph of this section does not make sense. Please revise.	Edit made to report for clarification.
14	Ecology - ERO	In Section 3.3.2, final paragraph: Please revise considering recharge seasonally rather than on an annual basis, or otherwise reflect the importance of spring snowmelt on recharge to shallow groundwater	Edits made to note that recharge is largely confined to the spring snowmelt and runoff season. The development of a more detailed hydrologic analysis in

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			the Feasibility Phase of the study will help to confirm seasonality.
15	Ecology -ERO	In Section 3.3.3.1: The dominant features on the maps of this document are a dike swarm inferred from one exposure and no mapped “tephra” deposits? Please factually justify the inferred boundary and extent of these features, and document their hydrogeologic significance.	Edits made to report to support the case that dikes are likely present in the area.
16	Ecology -ERO	In Section 3.3.3.1: Figure 19 indicates ring dikes are associated with Roza and Priest Rapids formations, and the symbol used indicates they are all the same size. Please revise so that text and figure are consistent.	Edits made to Figure and text.
17	Ecology -ERO	In Section 3.3.4: Steptoes are not “extruded”.	Typo corrected in text.
18	Ecology - ERO	In Section 3.3.5: Please reference any postulated structural origin for steptoes.	Addressed to extent we deem appropriate given purpose of report.
19	Ecology - ERO	In Section 3.3.5: Please reference any tectonic hypothesis for the structural and hydrologic divide in basalt in northern Lincoln County.	Addressed to extent we deem appropriate given purpose of report.
20	Ecology - ERO	In Section 3.3.6: Rewrite to distinguish between litho-and hydro-stratigraphic units. Substantial field evidence supports an upper, high-head aquifer system, and a lower, low head aquifer system generally hosted in the Grande Ronde Basalt. That hydrostratigraphic framework and nomenclature has been widely adopted and published by numerous researchers and organizations. Please discuss the commonly accepted hydrostratigraphic nomenclature of the Columbia Basin, as published by the USGS in the Regional Aquifer System Analysis program, culminating in: Bauer, H.H., and Hansen, A.J., Jr., 2000, Hydrology of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho: U.S. Geological Survey Water-Resources Investigations Report 96-4106, 61 p. as applied in the Lincoln County portion of the Columbia basin.	Report edited and citations provided as necessary to support project team’s conceptual model and related conclusions.
21	Ecology - ERO	In Section 3.3.6: Your interpretation of recharge mechanisms is consistent with some GWMA publications similarly authored by GSI, though does not acknowledge the deep percolation recharge mechanism Bolke and Vaccaro proposed in the 1980’s. Both interpretations have inconsistencies. Yours outlines the common criticisms of deep percolation; all current proposals suffer from a lack of field data. When data is available, it tends to suggest less significance than generally believed. For example, recent research in the Palouse and elsewhere indicates the marginal percolation notion may not be viable. See, for example Farley and others, 2006, Latah County Hydrogeologic Characterization Project, available at http://www.webs.uidaho.edu/pbac/pubs/HCP_FinalReport.pdf .	Report edited/revised the recharge discussion and conceptual model as needed to support project team’s conclusions/inferences.
22	Ecology - ERO	Page 19: “Members of the Grande Ronde Basalts have minimal surface	Reviewer judgement. Addressed to extent we deem

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		exposure within the study area and therefore the potential for direct passive recharge of these units is small. However, at least in the <u>Sentinel Bluffs, indirect recharge of Grande Ronde units could occur through erosionally thinned Wanapum units where they are deeply scoured by coulees.</u> Based on this statement it would appear that the goal of this project might be in jeopardy.	appropriate given purpose of report.
23	Ecology - ERO	In Section 4.0: Please complete this section in accordance with the grant requirements. See general comments on project goals and objectives. This prefeasibility report discussion should describe how the project would expect to obtain a water right and meet the four part test for issuance of a Temporary Permit or ultimately a permanent permit.	Edits made to water availability section to discuss obstacles and pathways to acquiring potential water rights for the pilot test and long range project.
24	Ecology - ERO	In Section 4.0: The report does not adequately explore or express the difficulties in obtaining a new water right from the Columbia River to consume 20,000 to 200,000 acre-feet of water out of the river. Even should water be physically available, a full SEPA evaluation would be required prior to issuance of a Temporary Permit. This report does not express the time and constraints of a full SEPA evaluation. Additionally, please include a discussion of the consultation process for new water rights from the Columbia.	Edits made to water availability section to discuss obstacles and pathways to acquiring potential water rights for the pilot test and long range project. SEPA will be addressed at conclusion of feasibility phase as that is when we have a defined project to evaluate. Discussion of consultation process for new water rights added to report in water availability section
25	Ecology - ERO	In Section 4.0: A Water Right Application in the amount requested would be subject to the Federal Withdrawal of unappropriated water subject to the Columbia Basin Project, the more recent Federal Withdrawal of Unappropriated Water above Priest Rapids Dam. In addition, this new water right application is subject to consultation under WAC 173-563. Please discuss the implications for the project of USBR's current Priest Rapids reserve.	Report edited to include a discussion on the USBOR application that is pending for unappropriated waters of the Columbia River above Priest Rapids dam. An overview of CR ISF also inserted in the water availability section, and a discussion of OCPI for issuance of a new water right (WAC 173-563-080) was added to the report.
26	Ecology - ERO	In Section 4.1: Include water availability as described in the Biological Opinion.	Report edited to include discussion of Bi-Op flows and water availability. Graphs added to support water availability.
27	Ecology - ERO	In Section 4.1: This proposal is going to require the filing of an Application for Permit and a request for a Temporary Authorization to use the water for testing purposes. The application should reflect the total quantity of the project, the request for Temporary Permit should reflect only the pilot amount. This is identified in Section 4.1.1.	Report edited to include a preliminary discussion on the path forward for submitting of water right applications for a temporary use authorization.
28	Ecology - ERO	In Section 4.1: Please summarize the consultant's opinion regarding water availability for this project, rather than indicating availability "will not be	Edits made to report in water availability section to summarize project team's opinion of potentially

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		addressed further”.	available water and potential obstacles.
29	Ecology - ERO	In Section 4.1, option 2: While lack of availability of Municipal and Industrial (M&I) water is attributed to the Bi-Op, please describe how in the absence of the Bi-Op this use could be envisioned as municipal or industrial use?	Report edited for clarification.
30	Ecology - ERO	<p>In Section 4.1, option 5: Preliminary Permits do not authorize the beneficial use of water. Please outline how a preliminary permit for a reservoir entitles one to a diversion on a stream. In addition, please describe how this project is a “reservoir” as defined in statute? The proposal does not include construction of a reservoir.</p> <p>The Application for Permit is not a Reservoir Application but should be a new application requesting authorization to divert water for an explicit, explained purpose. The water is not placed into a reservoir, but discharged to a basin and will be consumed, lost, percolated or evaporated. The application/Request for Temporary Permit must meet the four part test of a water right; water availability, no impairment, public interest, and beneficial use, to be issued. This prefeasibility report should address all four tests to adequately explore the issues in obtaining a new water right for this project.</p>	Edit made to document to proceed with temporary use authorization per Ecology’s recommendation. Preliminary permit discussion revised to not be preferred alternative. Clarification made in document to uncertainty of requirement of reservoir permit, and revised to not include as preferred alternative under Ecology’s recommendation that this project most likely will not require reservoir permit. Ecology is struggling with how to interpret reservoir regulations under scenario such as the passive infiltration proposal.
31	Ecology - ERO	In Section 4.2: Quantify, or reference “Extremely high water needs in this area”. This section suffers from a lack of focus on the objective. See general comment on purpose of project, and revise to reflect whether the purpose is aquifer recharge or stream flow enhancement, and evaluate compliance with RCW 90.90 against that purpose.	Edit and modifications made to document.
32	Ecology - ERO	In Section 4.3: Can Lincoln County PUD operate facilities outside the political boundaries of Lincoln County?	This is being reviewed concurrently, thus why we have several governance choices. Will be finalized in feasibility phase, priors to pilot, if the project moves forward.
33	Ecology - ERO	<p>In Section 5.0: These sections need focus. The document presents a qualitative assessment of these issues. The grant contemplated a more quantitative comparison. Outline criteria for discrimination between drainages. Map place names. Quantify existing water rights. Quantify land use and ownership. Estimate channel capacity.</p> <p>If you prefer to continue with a subjective qualitative assessment, indicate at least the issues of concern, their general weight between themselves, what elements of a qualitative criterion is bad or good, in an expansion of Table 5.</p>	Edit in document made to clarify qualitative assessment.

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34	Ecology - ERO	In Section 5.1.4: Postulated Roza Dikes would extend through the lithostratigraphic column. These, if present, would have the same hydrological effect regardless of depth. Please revise these sections accordingly.	Addressed to extent we deem appropriate given purpose of report.
35	Ecology - ERO	In Section 5.2.5: Please explain why construction on existing roads is preferred over open ground construction. Include analysis of costs for construction management, traffic control, and reconstruction.	Addressed to extent we deem appropriate given purpose of report. Second comment is beyond the scope of prefeasibility.
36	Ecology - ERO	In Section 5.2.6: The report states the Priest Rapids and Roza members of the Wanapum Formation are “completely eroded through in the middle to lower reaches [of] the central Lincoln County drainages, and in the case of the Priest Rapids, completely absent”. It also notes “Two Frenchman Springs units, the Sentinel Gap and Sand Hollow, are present but do not extend far into these drainages. Sentinel Gap and Sand Hollow are only present approximately half way to two-thirds of the way up these drainages (to northwest). To recharge these units, water would have to come far down these drainages. If that were to occur, any recharged groundwater would predominantly flow southwest until the units are truncated in the Crab Creek coulee around and west of Odessa. Therefore, if these were successfully recharged, they would likely discharge into Crab Creek valley. Coupled with suspected discontinuity at the inferred Roza dike locations, recharging the Grande Ronde is very problematic. Please review the text and make consistent with included figures and the conceptual model.	Addressed to extent we deem appropriate given purpose of report.
37	Ecology - ERO	In Section 5.7.5: These calculations suggest Lake Creek loses 19 cfs, likely independent of stream geometry. That corresponds to a maximum leakage to the aquifer systems of about 14,000 af/year. Please discuss this figure in light of achieving an aquifer recharge objective consistent with the range of values elsewhere in the report.	The 19 cfs of loss is the current estimate. This number will be refined during Feasibility Phase of project. If this loss is typical of the other drainages in the area, infiltrating 50,000 af/yr would likely require rehydrating about four streams.
38	Ecology - ERO	<u>In Summary Section:</u> The conclusion states : “Viable options for securing water rights to be used in supplying water for a proposed pilot scale project have been identified, and one or more delivery routes appear to be amenable to a potential project. Coupled with these conclusions this Prefeasibility Assessment does not identify fatal flaws in the passive rehydration concept with respect to geology, hydrogeology, routing, delivery pathways, regulatory and permitting issues, land ownership, water rights, and environmental concerns that could influence project implementation”.	No comment to respond to here. Reviewer just providing quote from report.
39	Ecology - ERO	At this stage of the draft, Ecology disagrees. The conceptual model lends	Document has been edited to address points 1 through

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		<p>significant doubt whether the drainages can discharge an amount necessary to remedy aquifer declines. The water rights section does not indicate if water is available, and who might own the water or what demands might be placed on it if it was secured. Environmental regulations and other program needs are not addressed at all, but are likely beyond the scope of the existing grant.</p> <p>In order to finalize this project, LCCD should</p> <ol style="list-style-type: none"> 1. Describe clear objectives for the project 2. Complete the water rights section (Task 2.1) Edit, and render internally consistent the geologic setting and conceptual models. 3. Establish range of considerations and weighting for qualitative drainage selection (3.2.2) 4. Identify potential sites for rehydration (Task 3.1.3) 	<p>4 in this comment as follows: Sections 1 and 6 describe both near term and long term project objectives. Water rights addressed with respect to potential sources for pilot project water. Consumptive use water rights from a pilot not addressed as that is not the goal of the pilot. If project moves beyond pilot, consumptive uses will be addressed as part of a larger project. Geology/hydrogeology clarified/simplified to the extent needed for prefeasibility assessment. Qualitative ratings further explained and expanded upon (most of section 4). Lake Creek defined as preferred pilot test target (potential recharge site). Specific assessment of Lake Creek details (for pilot recharge sites) will be done in feasibility.</p>