ATTACHMENT 3
COMMENTS ON DRAFT LEVEL 1 ASSESSMENT

To: Joy Michaud

From: Lee Hansmann, Deputy Director of Community Development

CC: Sara Martin

Date: 4/19/01

Re: Level I Assessment comments

The following are comments on the Draft Level I Assessment Report, Technical Summary, Subbasin Assessment, and Data Gaps/Recommendations sections of the Envirovision report based on input from CBP/TAC members. Many of these comments may also apply to the Technical Appendices, not reviewed by TAC.

The pages referenced below coincide with the September 2000 version of the Draft Level I Assessment.

Section 1: Introduction

- Page 1-2: First paragraph: The sentence "Results and ideas from the workshop were used ..." is awkward. A possible rewrite is: "Results and ideas from the workshop were used to formulate a specific watershed assessment approach, which approved by the CBP. (Is this what was meant?)

- Page 1-3: 5th line from bottom "River" should be "rivers"

Section 2: Technical Summary

- Page 2-1: The Chehalis Basin does have several distinct geologic regions, with their own unique geologic history. This section would be clearer if it discussed geology in this context. For instance, the headwaters of the Chehalis arise out of the Willapa Hills, which are made up primarily of marine volcanic and sedimentary rocks and have no significant glacial history. Other regions might include the Black River/Scatter Creek/Skookumchuck glacial valleys, and the Olympic Peninsula drainages. It would also be useful to discuss the broad geologic history of the basin, in terms of the tectonic, glacial, and fluvial processes that have

shaped the watershed and river valleys. For instance, much of the basin is underlain by old ocean floor material that was dragged up with the Olympic Mountains. The hills and valleys were carved into these slabs of oceanic rock by erosion, resulting in our low rounded hills and ravines. At the end of the ice ages meltwater from the Puget Sound glaciers flowed down the Black River and Lower Chehalis, forming a river that was about the size of today's Columbia River. After the ice ages ended, sea levels rose by several hundred feet and flooded the mouth of the Chehalis. This created Grays Harbor, and caused the river valleys to fill in with sediment. A process-oriented narrative can be used to explain many of the characteristics of our rivers and aquifers.

- Page 2-1 (Paragraph 4): The last sentence of this paragraph could be misread to imply that groundwater and surface water in the Chehalis Basin are not connected. Older wells in the basin are often drilled into valley-floor alluvium, where groundwater is definitely connected to river flows. Newer wells are usually close to 100-feet deep, and are often set in confined bedrock. In the valley floors these bedrock formations lie well below the river bed and are probably not connected to surface flows. However, wells drilled into bedrock on the ridges and hillslopes may very well be tapping groundwater units that are eventually intercepted by rivers and streams. This is especially true in the steeper streams and river headwaters, where valleys are downcutting through slabs of sedimentary and volcanic bedrock

- Page 2-3: Define "greatly" as in "... greatly exceeds the gaged mean monthly flows ..." Is there a numerical measurement (about a 1000 cfs?) that can be used rather than the subjective "greatly"?

- Page 2-5: Why was the flow at Montesano chosen? Tidal influence goes up to the Satsop River. If Montesano is correct, the Wynooche is west of Montesano and would still be within tidal influence. Would it be better to exclude the flow from the Wynooche, as then there would not be tidal influence? Also, the Wynooche flow has been affected by construction of the dam, and the changes in dam management? Traditionally, the USGS has used the formula of taking the flow measurement at Ground Mound, adding the flow from the Satsop River, and multiplying by 1.5 to estimate the flow in the reach just east of Montesano. How would what you obtain doing that compare to what is in the report? If we are really trying to get at stream flow versus water allocations, what makes the best sense to do in the lower Chehalis? How important is it to determine natural flows, with flow data that includes unknown (because they haven't been measured) takings?

- Page 2-6: Table 2.2-1. Print "Exceedance" correctly.

- Page 2-7 (Analysis of Natural Climatic Variability): In addition to identifying adherence to regional patterns, this section should also provide some insight into how representative our period of record is. Relative to long-term trends, is our period of record unusually wet or dry? Is it representative of what we can expect in the future?

- Page 2-7 (Analysis of Natural Flows): This section should include a clear definition of what you mean by "natural" flows. It seems to me you are referring to unregulated flows, in which you have subtracted out the effects of diversions and storage facilities. This is not really a "natural" flow, since it does not reflect the massive changes in natural hydrology due to timber cutting, land clearing, and development. Developing a true natural flow estimate is probably beyond the scope of this work, but you should be precise in defining what you are working with.

- Page 2-7: Energy Northwest can provide data from Elma for 1940-1977 (obtained from the National Weather Service), and for the Satsop site from 1977-present. The conclusion would probably be the same, but it would give an interim point in the basin. **Comment for future reference only.**

- Page 2-10: Table 2.3-1 (and whatever text is appropriate). As indicated in the Appendix, the report does not correctly identify the water allocation for the Satsop site. Energy Northwest (formerly Washington Public Power Supply System), currently holds a water authorization for 9.5 cfs for power generation using a combustion turbine. The Grays Harbor Public Development Authority has a water right for 20 cfs, which was transferred from the City of Aberdeen. The 80 cfs referred to in the appendix is no longer current (and hasn't been since 1996). It's also not clear if the water authorization for the raw water well is included. That was 1007 gpm until 1996, when it was reduced to 300 gpm. This is DOH water system source well, ID #18777V. (The well has never pumped more than 300 gpm, which brings into question use of rights and authorizations - is the intent to try and determine natural flows throughout the basin, or is the intent to determine if there is enough water in all areas of the basin, or is it both?) At any rate the table and associated text probably needs to be revised. Page 2-11 & 2-12: The Office of Financial Management has developed population projections for local counties and cities that carry into at least the year 2015. No need to redo your analysis, but you could use the OFM projections as a check on your population estimates in Table 2.3-2.

- Table 2.3-3 lists the sum of the per-capita demands for WRIAs 22 and 23 as the TOTAL per-capita demand for the watershed. What you really want here is some kind of weighted average of the 22 and 23 values – the sum of per capita demands does not have any meaning.

- It should be noted in this section that irrigated agriculture is not only in decline – it is being replaced by residential uses. The water rights for residential use are often obtained by transferring agriculture water rights. **Concern clarified during TAC meeting discussion.**

- It would be useful to include here a rough estimate of what proportion of residents in the basin are on exempt wells. Exempt wells are by far the most common source of water for rural residents. **Concern clarified during TAC meeting discussion.**

- Page 2-12: Middle of the page. They talk about "not insubstantial." (The phase is awkward.) That needs to be defined, and put into context. For example, 70 cfs is what percent of an Ecology base flow for the time in question; 17 cfs is what percent of base flow? As above, be objective, not subjective. The accuracy of flow measurements needs to be talked about somewhere. For example, for the Satsop site area, USGS had determined that the accuracy of the proposed gauge would be such, that a difference in 2 cfs could not be measured. In other areas it may be more, or less, depending on the physical characteristics of the river at the gauge station. In that context 17 cfs may or may not be "not insubstantial".

- Page 2-13: 2nd paragraph. Is the report talking about the Chehalis basin, or several basins.

- Page 2-13: Methods. Just a note to let someone know that as part of the Satsop site development, lots of environmental studies were done, including Chehalis River water quality, as well as fish studies. This information is all public and can be made available. There is also data that has been collected to support the Chehalis Generating Station (proposed natural gas fired combustion turbine in Chehalis), and it may be possible to obtain that data - URS in Seattle is the environmental consultant for Chehalis Generating Project. **Comment for future reference only.**

- Page 2-13 : In paragraph 2 it states that the last 3 years of each decade were used to equalize data sets. Was any analysis done of how well these 3 years

represented the entire decade? It seems to me that by arbitrarily picking the last 3 years of each decade you could end up comparing a very wet series of years in one decade to a drought period in another decade. **Concern clarified during TAC meeting discussion.**

- Beginning on page 2-14: The different water quality criteria classes are often very confusing to lay people. It needs to be stated very clearly that the Classes are defined based on beneficial uses, and do not reflect actual water quality. When you say that Class A means excellent waters, it implies that all Class A waters have excellent water quality, when you really mean that Class A waters have very high standards (that they may or may not be meeting).

  This section focuses only on conventional pollutants, primarily because these are what DOE has monitored. This does not mean that there might be other kinds of water quality problems. Pesticides are widely used throughout the basin for agricultural, commercial, and residential purposes. Some qualitative discussion of possible impacts would be appropriate (possible referring to the results of some of the recent Puget Sound studies by the USGS). We also have several Superfund sites in the basin, where volatile organics have migrated into nearby aquifers like the Fords Prairie aquifer (one of the largest water bearing units in the upper basin). Urban drainages in Chehalis, Centralia, Aberdeen, and other cities contribute a variety of metals, organic pollutants, and hydrocarbons. For all of these there is probably not enough data for detailed analysis, but these should be identified as important data gaps.

- Page 2-14: Is it the "Chehalis Reach" or the "Centralia Reach" (as on p. 2-16)? Is there a map in the document (one of the appendices that can be referenced in the text) to show where everything is, like common names of areas, one for where all the sub-basins are, and another for mile posts? Is there a map of the river and/or basin to show where the different Class waters are?

- Page 2-15: Is there a map (or maps) for where the impaired segments are?

- Page 2-16: "Chehalis Reach" or "Centralia Reach"?

- Beginning on page 2-16: The figures that describe River Miles need to include a point a reference. Such as River Mile 10 is _____. This was very confusing for TAC members to understand the chart and the data.

- Page 2-17: 1st full paragraph. Clarify the next to last sentence, "As previously described, the slow-flowing Centralia Reach represents a natural condition that is at largely responsible for the temperature and DO problems."

- Page 2-17: last paragraph. Which river, the Black?

- Page 2-18: top of page. What other segments have FC exceedances?

- Page 2-18: 1st full paragraph. Fecal coliform sources are located downstream of RM 101 (Doty) to what river mile?

- Page 2-20: 1st sentence is awkward. Not certain what that paragraph is trying to say. When reviewing the data, it doesn't look like the TSS's are fairly close (and what is fairly close - statistically insignificant?).

- Page 2-20: The authors should clarify what they mean by the following sentence: "the pollutant load for all three parameters did increase with downstream distance in the dry season, indicating that this difference may represent a baseline condition." To what difference are they referring, and how would it be used to identify a baseline condition? What is meant by baseline?

  In much of this section the authors discuss trends. Were any statistical tests used to test the significance of observed trends?

- Page 2-21: Ist paragraph - What is "by sing"? Probably a typo.

- Page 2-21: Discharge monitoring reports could be used to determine what the actual loading was, and compare to projected loading based on NPDES permit authorizations. Is there a reason for the steady TSS loading increase at the upper station?

- Page 2-22: middle of the paragraph. Nooksack is spelled incorrectly.

- Beginning on page 2-23: This section should provide a more detailed discussion of land use patterns in the basin, and a tie-in to what kinds of pollutants would be expected from these land uses (this may be in the Appendix. There is data from other basins that could shed light on expected pollutant loadings from agriculture, timber, rural residential, and

urban land uses. Again, there should at least be some qualitative discussion of other pollutants like pesticides, heavy metals, and toxic organics.

- Page 2-24: TSS loads are strongly tied to temperature and dissolved oxygen problems, and are therefore equally critical with respect to fish habitat.

Section 3: Selected Subbasin Assessment

- Page 3-1: Report should include a map delineating subbasins and identifing name and number for all 30 subbasins.

- Page 3-2: Include map of subbasins with the document.

- Page 3-4: 1st full paragraph: What is a minor diversion? How can the flow records without adjustment be considered "natural flow" when the diversions could total up to 6.6 cfs (21.3% of the base/instream flow for September). Even with some return (say 75% for the best case), the consumptive use would be 1.65 cfs or 5% of the base/instream for September. These amounts withdrawn could be considered significant.

- Page 3-4: On tables, state that 50% exceedance means average flow as measured by USGS.

- Page 3-4 (and throughout the document): For the Ecology flow, use the word "base" rather than shortening to instream, or just continue using base/instream. Somewhere in the document explain that these flows come from WAC 173-522-020, what they mean, and how they were derived, as they are idealized desired flows at any given location, and true natural flows could be less than what Ecology desires.

- Pages 3-4, 3-8, and 3-9: As an alternative to averaging the base/instream flow (which oversimplifies the data) and using the 50% and 90% exceedance, you could use the number of days each month that the flow as measured by the USGS was below the base/instream flow as specified by Ecology. (For power plant operations this is what we have to do, so we have a better idea of when, and how long, we would have to cease operations or provide sufficient storage to carry operations past the low flow period.)

- Page 3-5: Correct Table 3.2-2 with the data you have (and explain on page 3-6), so that 3.84 cfs becomes 2.5 cfs. The CD provided to Grays Harbor County contained incorrect information. It would be helpful to reader to show this chart in a pie chart format.

- Page 3-6: It would be good to stay either in cfs or gpm throughout the document.

- Page 3-6: The location of your title for "Residential Water Use" should be placed after the third paragraph, and a new heading entitled "Public water system" should start the section. That is because public water systems can serve more than residential customers - your text indicates that this is the case for Pe Ell. Where the public water system provides commercial or industrial water, do not repeat the information.

- Page 3-7: What is important about the first full paragraph?

- Page 3-7: Leave out the speculation under Commercial and Industrial Water Use. Show this as a data gap instead.

- Page 3-7: 2nd paragraph under Irrigation: The last sentence has awkward phrasing.

- Page 3-7 and 3-8: Rewrite the last paragraph on page 3-7, to explain why using the Aberdeen data is important. If Centralia is not indicative of what could be expected, then don't mention it at all, and exclude it from your figure.

- Page 3-10: First and second paragraphs: For this subbasin in particular, is it fair to say that the measured USGS flow is the natural flow, when you know there are diversions, and the diversions could be a significant number? If you knew what the actual consumptive use was to match the flow record, then you could provide percentages.

- Page 3-11: Define LWD with the first use of the abbreviation (1st full paragraph).

- Page 3-11: What percent of bank protection / riprap was observed? (All your other numbers are in percent.)

- Sections 3.3, 3.4, 3.5, and 3.6 (Many of the comments on Pages 3-2 through 3-11 apply to the other sub-basin sections; therefore, no need to repeat. A

better way is needed to get out how much of a problem over-allocation may be in comparison to the base / instream flow in each of the sub-basins.)

- Page 3-21: State that you have a "calculated" natural flow, as you don't really know what the natural flow is.

- Page 3-25 (and wherever in the document you talk about power): The nonconsumptive power use is for hydropower. All other power uses (thermal power plants such as coal, nuclear, natural gas) have consumptive water use.

- Page 3-27: If you haven't already done so, check with WSU Cooperative Extension to obtain Grays Harbor County data on irrigation and crops. Further investigation regarding changes in crops might be a next step or data gap.

- Page 3-30: As Vance and Newman creeks are not in this sub-basin, you need to separate the data if you can. If you can't separate out their data, explain up-front that they are included only because the data can't be separated, and that they were included in the USFWS / WDFW data base that way.

- Page 3-31 (and throughout Section 3.5): Change subheadings to reflect Section 3.5 (you use 3.3).

- Page 3-31: The average rainfall for the Satsop site is closer to 70 inches per year (1940-1999 records). Therefore the 59 inches seems low. Where did that number come from?

- Page 3-32: How does your calculated flow compare to the USGS formula of using flow recorded at Grand Mound and Satsop and multiplying by 1.5? There was a temporary gage put in downstream of the Satsop River (where the nuclear plants were supposed to discharge) for a one year period in the 1980's. That data could be used as a comparison to any calculated flow.

- Page 3-35: Washington Public Power did have an authorization for 1007 gpm for water withdrawal. However, that was for industrial as well as domestic (in fact 1000 gpm was for construction and 7 gpm was for potable). The authorization was modified in 1996 to 300 gpm for construction, restoration, domestic, and fire protection services. It is not used for any residential purposes. The actual maximum withdrawal, even with the 1007 gpm authorization, was 300 gpm.

- Page 3-36: Do you know what Briggs Nursery's pattern of use is. The water is used within greenhouses, with a gravel floor. Would this affect the return rate?

- Page 3-39: There was water quality and aquatic (including fish) data collected on this stretch of the river to support the nuclear plants. The data is available through Energy Northwest. Fuller and Purgatory creeks would also be within this sub-basin but are not mentioned here. Why is it important to compare inorganic nitrogen levels in this sub-basin (or any sub-basin) with the data from Puget Sound?

- Page 3-40: Most of the railroad grade has been abandoned, and therefore, is being allowed to slide.

- Page 3-40: Fourth full paragraph: Most of the information is not needed here, as the sub-basin as you defined it, ends at the Satsop River.

- Page 3-41: Humptulips is not a town and is not incorporated. It is a community in Grays Harbor County.

- Clarify water claims and water rights.

- Define or better describe 50% exceedance and 90 % exceedance.

- Include tables used by Joy during 10-26-00 meeting in the report.

Section 4: Data Gaps/Recommendations

- Section 4.2, Geology and Hydrology: The groundwater / surface water study should include assessment of well records and other geologic information to identify key water bearing units and their relationships with specific rivers and streams. Water balance analysis and preliminary groundwater flow modeling should then be used to begin quantifying surface water / groundwater interactions for each watershed and hydrogeologic unit. For larger-scale aquifers and priority watersheds a detailed hydrogeologic modeling effort will be needed.

  Under Hydrology you recommend continued natural flow investigation. You should include here a recommendation for the best way to approach ungaged watersheds (Modeling? Additional gages?).

You recommend investigation of land use changes. You should identify why this is needed – are you looking at the influence of land use changes on hydrology? Will this eventually be used in land use decisions? I think this is a good idea, but we should expect to find that land use throughout the basin has been radically altered from historic conditions, and massive hydrologic changes have occurred. Given our relatively low population and water use, these land-use related impacts are probably much more substantial than the impacts of simple consumptive water use.

- Page 4-1: There is geological and hydrological information on the Chehalis Basin that is contained in the Final Safety Analysis Report for the nuclear plants. This is available through Energy Northwest or the Grays Harbor Public Development Authority.
- Page 4-2: To determine natural flow, more than information on dam regulation is required.
- Page 4-2: Make the last bullet under Hydrology a very low priority (and it is not really related to hydrology).
- Page 4-2: 4.3.1: Punctuation error.
- Page 4-3: Not only should you map water rights, but you should also find out when withdrawals actually started and how much. This is really important in sub-basins where withdrawals are a substantial portion of the flow.
- Page 4-3: Rank all sub-basins for further study based upon how many days the base/instream flow is not met, first just from a "natural flow" standpoint, and then from a "base/instream plus allocation" standpoint.
- Page 4-3: Match up rights with sub-basins before doing refinements and investigations. Do the highest ranking sub-basins first.
- Page 4-3: Start with historical photos of the area to determine actual irrigation, then do communication. Photos would help determine if there has been a change in land use.
- Page 4-3: Why do we need to do additional mapping of water rights for sub-basins with larger allocations (just do priority sub-basins).

- Section 4.4 Water Quality: Some member of the group are having trouble seeing where our water quality effort is going. The study efforts described don't really seem related to potential management decisions that the CBP will be making, and it does not establish a clear tie-in to the existing Upper Chehalis TMDLs for Non Point Source Pollution and Temperature. The recommendations should be more of a sequence of actions, rather than a simple list of things we'd like to know.

- It seems that the CBP needs a much stronger tie-in between pollutant yields / loads and impairments. In other words, we need to use the pollutant yield to identify major sources of non point source pollution, and use this information to prioritize improvement actions. Level 2 recommendations might include the following (which include some of yours):

    - Monitor water quality in rivers where data are not adequate (South Shore of GH, Wynooche, Wishkah, etc.).
    - Identify priority basins subbasins based on level of impairment
    - Develop pollutant yield estimates for priority subbasins using Level 2 hydrologic data
    - Identify and rank sources of pollution in priority subbasins (what kinds of land use or activities are causing the most degradation?). Use this information to prioritize improvement actions.
    - Establish long-term water quality monitoring stations to represent baseline conditions. These should include stations on major rivers to identify long-term basin-wide improvements, and stations on smaller representative watersheds to identify impacts of typical BMPs.

- With respect to the IN yield, don't get too hung up on this. Our watershed is so different from anything in the Puget Sound.

- Revisit the limited set of water quality parameters . Realizing that the CBP / TAC decided to focus on these conventional pollutants, but it seems we should take at least a preliminary look at toxics, pesticides, and other things to make sure we are not missing a real problem. Some kind of biologic monitoring program might help here (Benthic Macroinvertebrates?). There is a lot of local interest in volunteer monitoring of this type, so there could be a good tie in with public outreach efforts.

- Page 4-4: There is some data on Grays Harbor. Might check with Grays Harbor College to see if they know what has been collected.

- Page 4-4: Why update monitoring on Wynooche and Wishkah rivers and not others?

- Page 4-5: Could increase levels of inorganic nitrogen be a result of fertilization techniques, soil types?

- Page 4-6: How did you reach your recommendation for the specific rivers mentioned?

General comments on Sections 4:

Many reviewers felt the Data Gaps/Recommendations Section needed to include a strategic discussion relating where the CBP is now in Level 1 to where the CBP needs to be at the end of Level 2 to begin Phase 3 planning. This would help provide context to the recommendations for Level 2. This discussion could begin with a summary of what kinds of decisions we will be making in Phase 3 related to water quantity, quality, and fish habitat. Then identify what kinds of data are needed for these decisions. A rough example is as follows:

In Phase 3 the CBP will develop a watershed-wide plan to improve water quantity, water quality, and fish habitat in the Chehalis Basin. The CBP will make important decisions on issues such as:

- *Management of groundwater withdrawals in areas where groundwater/surface water interactions are important and surface water flows are over-allocated.*
- *Identification of water sources to meet projected population growth in the basin, based on comparison of water availability to existing allocations.*
- *Augmentation of flows in rivers where instream flows targets are not being met.*
- *Targeting areas for water quality improvement through Best Management Practices, based on estimated loadings and identified impairments.*
- *Etc.*

To make these decisions, the CBP will need to understand:

- *The interaction of groundwater and surface water flows in each watershed*
- *The degree to which surface water flows are over or under allocated in each watershed*

- *Existing and projected water used, based on population growth and changes in land use*
- *The extent to which water rights are actually being used, especially in areas where agriculture is declining (which is pretty much everywhere here).*
- *The degree to which water quality is impaired in each watershed*
- *Sources and magnitude of pollutant loading in each watershed*
- *Etc.*

Level 1 identified existing data, and performed preliminary analyses to begin understanding how well the data met our needs. In Level 2 we need to refine both the data and the analyses, to provide a more rigorous and defensible understanding of water quantity, water quality, and fish habitat in the Chehalis basin. A discussion like this could serve as the introduction to Section 4, and would lead easily into existing discussions on each subject area.

Recommendations are sometimes a bit soft – you use words like "may" and "could". This section is really the key work product of Level 1, and the scope of work for Level 2 should literally jump out of the recommendations. If Envirovision thinks something needs to be done, say it outright and leave off the qualifiers.

General Comments

- Envirovision's map presented during the meeting October 12, 2000 contained a big mistake or needs clarification. Salzer Creek drains a small basin roughly northeast of Chehalis and southeast of Centralia. It hooks up with the Chehalis River near the fairgrounds. Coal Creek ties in with Salzer before its confluence with the mainstem and is considered part of the Salzer drainage. On the map Coal Creek was just a little blue squiggle that did not connect to anything. It stopped before reaching Salzer Creek. There was a subbasin division running through this gap, so maybe Coal Creek is in the next subbasin south of Salzer.

- The report did not include maps referenced in the report. It would be nice to examine the maps while reviewing the report.

- Each Appendix included a separate Reference Section at the end of each respective Section. The report also contained a section on references.

Consolidated the references into one section. Some TAC members would like a bibliography for the basin.

- The report needs a list of acronyms.
- The glossary could use some additions as suggested by Joy.
- Consistently reference Chehalis Basin or Chehalis basin.
- Define or describe Chehalis basin and Chehalis River Basin.
- Change reference to WDOE to Ecology. WDOE may imply to some the Department of Energy.
- Develop a four-page “fact sheet” for public outreach.