

Draft Aquatic Life Report Comment/Response Summary

Task	No.	Date Received	Comment Source	Deliverable	Comment	Response
6	1	07/03/13	LWA	Task 6 Draft Report	General Comment: The conclusions and recommendations section does not identify specific salinity-related WQOs for the protection of aquatic life beneficial uses in Central Valley. Instead, three general approaches/options for generating salinity/TDS related WQOs for the protection of aquatic life in the Central Valley are identified. The "standard" approach used in California for establishment of aquatic life criteria (the use of toxicity data and the development of criteria values based on USEPA methodologies) is not recommended. Criteria values for chloride based on a Canadian methodology are cited as preferred values, but it is not clear that the described methodology or the cited criteria values would be deemed defensible or appropriate in California. The LWA Team is charged with identifying the potential ranges of WQOs that would protect the beneficial uses designated for the Lower San Joaquin River (LSJR). This effort is to be based on a number of CV-SALTS criteria studies, including the Aquatic Life Study. <i>As a result, we are recommending that the report be modified to clearly state that no WQOs for salinity or major ions for the protection of aquatic life beneficial uses are recommended.</i>	I provided some directions that could be taken to develop objectives. I included potential ranges of values based on existing toxicity studies. However, these data are for simple salts because EPA and other entities have not supported a robust research program in major ion toxicity. Any WQOs adopted would be based on uncertain science and stakeholder consensus. Still, I do not recommend inaction on this topic. See section 4.3
6	2	07/03/13	LWA	Task 6 Draft Report	Pages 1-1, 1-5 - When referring to the document that will be developed for the Central Valley, the report should consistently use the phrasing "Salt and Nitrate Management Plan" instead of "Salt and Nutrient Management Plan". Please update this throughout the document as needed	Comment addressed
6	3	07/03/13	LWA	Task 6 Draft Report	Page 2-1, Section 2.1.1 – First sentence; Edit "As a general points of reference"..... delete the "s" from points	Comment addressed
6	4	07/03/13	LWA	Task 6 Draft Report	Page 2-12 - The legend in the figure seems to be missing some items within the bar chart.	Shading of bars was made consistent
6	5	07/30/13	Michael Johnson	Task 6 Draft Report	General – I did not see that all of the tasks were covered in the report. Specifically, there was no mention of any search of the Ecotox database, and no review of any policies from other Regional Water Boards.	Ecotox analysis of sulfate and borate data have been incorporated. Email requests were sent to each Water Board specific to salinity objectives for the protection of aquatic life. None were found. Text has been added to reflect this finding
6	6	07/30/13	Michael Johnson	Task 6 Draft Report	General - Very few criteria are provided and it is not clear that sufficient information is available in this review to allow CV SALTS and the LSJRC in particular, to set objectives. The summary chapter should include a table of criteria that pulls together all of the various criteria discovered.	This is because so few criteria for salts exist for aquatic life protection; A table has been added to Section 4.
6	7	07/30/13	Michael Johnson	Task 6 Draft Report	Table 2-1. The column that includes the effects has several effects that are not specified. Many of the rows include endpoints such as LC50 which are clear, but others reference an EC50 value where it is not clear what the effect is. In order for the context of the measurement to be understood, the actual effect should be included, e.g. growth or reproduction.	EPA uses multiple endpoints - lethality, growth, reproduction, etc in the determination of water quality criteria
6	8	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-4. The first paragraph is not clear. Does the IDNR document say the claim should be rejected or does the author say that the IDNR analysis is flawed?	Text changed
6	9	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-4. In the second paragraph who is the "we"? I believe anecdotal information should be removed from the analysis because it does not address numeric criteria.	Text changed

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6	10	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-4. In the 3 rd paragraph, there is a sentence that states "would entail." Is this "would entail" or "does entail"?	Text changed
6	11	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-4. In the 3 rd paragraph, last sentence, it is not clear what the "it" refers to. In fact, the entire last sentence is unclear.	Text changed
6	12	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-5. In the first paragraph and in numerous places beyond, there is discussion of Central Appalachian Mountain objectives for EC that are supposed to apply only to ecoregions 68-70 because the region has specific water quality conditions. If this is true, it's not clear that the information is relevant to the Central Valley.	CV-SALTS requested the review of this document for this project.
6	13	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-6. There should be some sort of summary for the TDS/EC criteria or lack thereof. The Australia/New Zealand and South African criteria really are not criteria but if there are any toxicity/criteria anywhere, those concentrations should be presented in a summary table.	There are summary tables in the report where criteria were found
6	14	07/30/13	Michael Johnson	Task 6 Draft Report	Table 2-2. What was the form of the chloride in the studies cited (e.g. NaCl, KCl, etc.)?	Text clarified
6	15	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-14. Although some objectives (levels of concern) are provided for boron, no criteria are found in this discussion and the reader is required to take the author's decision that boron will not drive any objectives.	No boron specific criteria could be found in the literature; however, information has been added from which criteria may be derived.
6	16	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-15. The second sentence in the next to last paragraph needs to be clarified. It's not clear what "these data" refers to, and it's not clear what "apparent subtle effects" means.	Text changed
6	17	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-17. The last two bullet points under the Boron Summary are irrelevant to the review.	Text changed for bullet point 3. The lack of insect data is important since insects are the primary invertebrates found in biomonitoring datasets and are the primary basis for how streams are evaluated. The lack of insect data creates considerable uncertainty regarding the protectiveness of a calculated criterion based on EPA-established methods
6	18	07/30/13	Michael Johnson	Task 6 Draft Report	Page 2-18. It's not clear if there are any sulfate criteria that do not include corrections for chloride and hardness. If there are sulfate criteria that do not require correction, those should be provided.	All sulfate criteria that were found were reported here; similar to boron information has been added from which criteria could be derived.
6	19	07/30/13	Michael Johnson	Task 6 Draft Report	Table 3-2 should be organized to reflect only the data from the dissolved fraction. Also, when the data points are located on a map, only a few points are on the Valley floor. Those points should be the ones presented in the table, and it may also be of interest to segregate the data by those in the Sacramento Valley, San Joaquin Valley, and the Tulare Basin.	Table 3-2 has been revised to only show dissolved data. The commenter is correct; most of the data points are not from the valley floor. Figures have been incorporated to illustrate this finding.
6	20	8/11/2013	Dennis Westcot	Task 6 Draft Report	General Comment - A number of references in the text are not in the reference list; comment includes references shown in tables reprinted from other documents.	References from text have been updated; but references from copied tables from other publications are not included. Reader will need to refer to the referenced documents.

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6	21	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-1, Regarding, relationship between TDS and EC: The best discussion of the relationship between EC and TDS in normal waters is given in Diagnosis and Improvement of Saline and Alkali Soils by the US Salinity Laboratory Staff (Agricultural Handbook No 60 USDA, 1954 (pages 69-72). In this document, they recommend that a ratio of 0.64 be used based on testing of hundreds of natural waters from the western United States.	Text changed to include this information
6	22	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-2, next to last paragraph, first sentence: not sure what the phrase, "environmentally relevant high TDS concentrations", means	Text deleted
6	23	8/11/2013	Dennis Westcot	Task 6 Draft Report	Table 2-1: I am not sure that I understand what EC50 means. The definition says that it is the concentration effecting 50% of the population. What type of effects? How do you compare that to LC50? I completely do not understand ICO but I am sure others will.	A definition for EC ₅₀ has been included in the list of definitions.
6	24	8/11/2013	Dennis Westcot	Task 6 Draft Report	Table 2-1: My biggest concern with this table is that all the studies were done with a single salt mix which would not occur under natural conditions in the Central Valley unless it was a specific brine discharge. Most of the natural waters in the Central Valley are multi-mixed salts and are balanced. Even people can not drink a single salt water without consequences.	Yes, this is a major source of uncertainty, and this is pointed out in the text. Some might view single salt tests as a worst case scenario, and deem any values based on them to be conservative. Others would argue that in combination, we don't know enough about the toxicity of major ions. The limited data I have seen suggests that adding additional salts can be modestly ameliorative
6	25	8/11/2013	Dennis Westcot	Task 6 Draft Report	Table 2-1: None of the references in Table 2-1 are shown in the reference list. Also none of the footnotes are cited with the associated footnote number.	See response to Comment 20
6	26	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-4, second paragraph, second sentence: Who is we? Is this the author or the people who developed the original information?	Text fixed
6	27	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-4, third paragraph, last sentence: What or who is "it"?	Text fixed
6	28	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-5, top of page, regarding sentence: "Importantly, this benchmark is intended only to apply to ecoregions 68-70 where the ionic composition is dominated by sulfate/bicarbonate salts": If this is true, it is difficult to see how this information would apply to the Central Valley of California. Is it the approach that is being pushed here and can it apply or be used under Central Valley conditions, especially the highly modified streams on the Valley Floor in the San Joaquin River Basin.	See response to Comment 12
6	29	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-6, first paragraph in Section 2.2.1: A chief concern that I have in reading this entire document is that none of the areas where water quality criteria has been developed and recognized as appropriate reflect the same or even closely similar climatic conditions to what we have in the San Joaquin Valley.	While climatic conditions could be considered, water quality criteria are typically developed from available data from all taxa regardless of source population origin. This is inherent in the "established" methodologies; however, this is also why EPA allows consideration of development of site-specific criteria taking in to account regional or site-specific factors. The challenge of course if having sufficient regional or local data to justify an alternative number.
6	30	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-6, second paragraph in Section 2.2.1, regarding "See Appendix A, Table A-3": I cannot find an Appendix A, Table A-3). Is one being developed?	Table A-3 is in the document; it is a brief table and possibly missed?
6	31	8/11/2013	Dennis Westcot	Task 6 Draft Report	Table 2-2: Did the three criteria documents cite a particular chloride salt the the concentration is based on or is it just chloride in general in a balanced water?	Text in table clarified

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6	32	8/11/2013	Dennis Westcot	Task 6 Draft Report	Table 2-2, right column, regarding "see text below": I am not sure what text I am to be referring to.	Text below refers to the worked examples and descriptions of the approach that follow
6	33	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-7, description of rationale for acute chloride values, regarding phrase, "aquatic ecosystem tem structure": Don't know what this term means or whether it is a typo?	The "tem" is a typo and has been removed.
6	34	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-9, first paragraph, last sentence: I know of no information that show that such an organism exists in the Lower San Joaquin River System.	This information was provided to illustrate how freshwater mussels influenced the calculation of the chloride water quality criterion. Use of broad-based guidelines typically incorporate such data. If such species are not present, then it may be possible to calculate a regional or site-specific criterion by removing these species from the statistical calculation. Success in doing this likely require a demonstration that there are no mussels in the LSJR system (regardless of species) and that there is not another species that may have similar sensitivity. This can be challenging to do.
6	35	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-9, second paragraph, regarding "chronic", first sentence: is the "... " a typo?	No, this text is quoted from the Canadian Guidelines; however, it was abbreviated for the purposes of this report. The "... " represents where text was removed from the original.
6	36	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-9, third paragraph, regarding "Appendix 2": is this Appendix A?	Yes, text has been corrected.
6	37	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2,9, fifth paragraph that begins, "Another study based...": What is this study? Maybe should give a reference?	Reference added
6	38	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-10, last paragraph, reference Khangarot (1991) is different in the references. Is this the correct reference or a different paper?	Reference cited
6	39	8/11/2013	Dennis Westcot	Task 6 Draft Report	Figure 2-5, What do the different shading or color mean in the chart?	Shading has been fixed
6	40	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-14, second paragraph, first sentence: I am not sure why such a strong statement is being made. The US EPA method has been used for years and is well recognized. The Canadian method is putting in several local species to derive the criteria. Whether those species, especially the freshwater mussels, may or may not be present in other environments. I would really be cautious of applying Canadian conditions on the San Joaquin River Basin as the climate, temperature and ambient water quality are totally different.	The 1985 methodology ignores considerable advances in science. It ignores the fact that organisms eat and receive exposures via their food. The methodology also makes assumptions about the representativeness of species that have been shown to be highly flawed. The Canadian approach is not much different from EPA's. Both use most of the toxicity data available to create criteria without much consideration for local conditions (see other responses to comments above). That is, the Canadian approach does not focus on local taxa.
6	41	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-14, Section 2.2.3, second bullet: same comment as previous comment	See response to Comment 41 above
6	42	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-15, first paragraph below Table 2-5, reference to study funded by U.S. Borax: This comment shows bias and I question whether this review was being done objectively.	Reference of funding source removed
6	43	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-15, first paragraph below Table 2-5, last sentence: Is there any information on salmon or steelhead who move freely between freshwater and the ocean (the latter known to be high in boron)?	This is an important question, however, I was not specifically asked to explore this topic, and I did not come across such information in my readings
6	44	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-15, third paragraph below Table 2-5, regarding, "Aspects of these data are similar to those in other studies": What do "these data" refer to?	Text changed

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6	45	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-15, third paragraph below Table 2-5, regarding, "where there are apparent subtle affects at lower concentrations": Can we describe these "apparent subtle effects"? Were they measured or described anywhere?	In different studies, sometimes very low treatment concentrations perform worse than controls for different endpoints, but raising the concentration doesn't seem to worsen effects. This is not typical of dose response relationships and it is questionable if it is indeed toxicity.
6	46	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-15, last paragraph, last two sentences: I am not sure whether this is a true statement or not as boron is highly soluble and does not appear to bind itself strongly in the food chain. The role of selenium was by its substitution for sulfur in the DNA or protein molecules. I don't think boron has the same mechanism. I understand that a food source with elevated boron can be a significant part of the diet of certain species but present understanding is that boron, being highly soluble, is flushed from the system quite easily.	Original text deleted because it was too speculative
6	47	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-15, last paragraph, last sentence: This statement would need to be justified.	Text added to justify statement
6	48	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-17, Section 2.3.2, second bullet: I would want to see better justification and evidence before we put this conclusion as part of the report.	Boron text has been substantially revised to incorporate ECOTOX data which has resulted in an updated summary.
6	49	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-17, last paragraph, regarding, "...the Illinois approach", which, in my professional opinion, contains many factual errors and omissions": This is a pretty strong statement. Did this come out during the hearing on the adoption process or did the Illinois group acknowledge this? If not, I would want better justification and discussion since it is 7 years since the adoption and many more years since they were developed and this is the first instance I have seen showing this short coming	Text is changed with supporting data from ECOTOX database analysis
6	50	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-18, top of page, regarding, "This is highly questionable": Is there evidence to support this statement?	Text has been revised see previous comment
6	51	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 2-18, Section 2.5, second sentence, is the word "tasting" correct?	Text corrected
6	52	8/11/2013	Dennis Westcot	Task 6 Draft Report	Section 3, General Comment: In reviewing this document it is difficult to imagine that we can come up with one set of criteria for the entire Central Valley. There are such marked differences between the flow regimes just between the Sacramento Valley and the San Joaquin Valley. The authors brings this point out in their second paragraph below but does not lead us to a conclusion on its application. Just as troubling is to imagine how data from species in British Columbia would be applicable to the San Joaquin Valley. There the flow regime is constant while in the San Joaquin Valley, the flow is feast or famine based on snow melt and many times the streams go partially dry or very low flow making adaptation to this condition critical vs a more steady regime in Canada.	I agree with these observations.
6	53	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 3-1, third paragraph, first sentence: While this statement is true, it is not necessarily degraded. Often the distribution of irrigation water using natural channels has allowed flow to remain in these waterbodies year round verses only during the rainy periods. Often a unique aquatic ecosystem has developed.	I'm sure there are several opinions about this topic which are important when considering criteria development
6	54	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 3-1, third paragraph, last sentence: Where has this occurred (streams receiving elevated TDS) in the Central Valley? I know of none.	Comment unclear

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6	55	8/11/2013	Dennis Westcot	Task 6 Draft Report	Section 3.2 Title, General Comment: This title implies that the discussion to follow is to be about the Central Valley of California. Yet the entire discussion is centered on the San Joaquin River Basin. The San Joaquin River Basin is unique in itself and does not represent conditions in the Sacramento Valley, Delta or the Tulare Lake Basin. Suggest you try to broad this discussion and include information from other parts of the Central Valley.	The report provides the best information that could be identified
6	56	8/11/2013	Dennis Westcot	Task 6 Draft Report	<p>Page 3-2, second paragraph under first bullet ("salinity has important geographic features"), last sentence: These actually were measured and there is a report on them. It can be found at the Regional Board's SWAMP report website as: http://www.waterboards.ca.gov/centralvalley/water_issues/swamp/historic_reports_and_faq_sheets/bckgrnd_streams/salt_trace_elmnt_laod.pdf</p> <p>The information on boron in the Westside streams can be found in Table 9 and salt concentrations can be found in Table 10. Tables 12 and 13 estimate the total annual loadings. The basic finding is that the salt and boron are there in fairly high concentrations but the majority of the load comes out during the rainy season which also is the high flow season for the San Joaquin River. Appendix A to the report also contains the breakdown of the various salts that occur (Na, Ca, P, K, Cl, SO4, CO3, HCO3, etc).</p>	This document was not provided as an item to review, thought perhaps it should have been. My reading of the report suggests that the values reported are as "total recoverable" , which is different from a dissolved sample. Data such as these (if dissolved) could be highly useful in looking at site specific situations that could inform local, site specific objectives in the future
6	57	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 3-2, first sub-bullet under second bullet ("Biological communities respond to salinity gradients"): Any misbalanced water becomes a bad actor. Sulfate in combination with certain cations becomes a buffer to certain impacts. For example during the salinity investigations, it was shown that CaSO4 minimized the impacts of selenium and is a good agricultural water supply to reduce the impacts of Na. The real issue is whether the water is balanced or not	Text changed
6	58	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 3-4, first bullet under Figure 3-2: This leaves us a bit dismayed as this says that roughly 35 – 40% of the small streams in California sampled in 1990 for a study of natural background conditions would not support a full aquatic life beneficial use. Either the data set used here is wrong, misinterpreted or it contains aquatic life organisms that are not present in California. Some one should try to interpret this in light of the finding in the California Stream survey conducted in 1990 which confirmed the results of two previous studies of similar conditions. The 1990 report can be found at: http://www.waterboards.ca.gov/centralvalley/water_issues/swamp/historic_reports_and_faq_sheets/bckgrnd_streams/trace_element_synoptic_survey.pdf	These taxa are all from the San Joaquin basin. The cited report only reports the data found.
6	59	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 3-4, second bullet under Figure 3-2: This may be the answer to our discomfort with the previous statement.	Comment noted
6	60	8/11/2013	Dennis Westcot	Task 6 Draft Report	Table 3-2: We agree with the comment provided by Michael Johnson LLC on Table 3-2.	Comment noted

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6	61	8/11/2013	Dennis Westcot	Task 6 Draft Report	Section 3, General Comment: Seems in this section (previous 6 pages) that everything was focused on the San Joaquin River Basin while this study is suppose to be about the Central Valley. Unfortunately there is wide variability in conditions and water quality between the Sacramento, San Joaquin and Turlare Lake basins. Prior to reading the next section on recommendations, there should only be one recommendation. That is to set up a monitoring program for Cl, SO4, Na, Ca, etc to see where we are in relationship to flow and EC. This should be the baseline and we should not let anything get any worse until we get a better handle on whether there is a need to prepare any water quality objectives in the future. Right now there just isn't enough information to make a decision.	The focus on the San Joaquin was the result of there being a good study to report on from that area. Other areas appear to lack robust studies or data.
6	62	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-1, Section 4.1.2, second bullet: This is a critical statement. We need to take this as a direction to develop the correct information on water quality before we start on a program of testing tolerance of biotic communities.	Comment noted
6	63	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-1, Section 4.1.3, second bullet: Based on this and the previous statement, I would not recommend moving forward with salinity objectives for aquatic life until there is a better understand of the water quality variation in the system.	It would be wise to ascertain what is attainable prior to setting objectives
6	64	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-2, Section 4.2.1, first paragraph, last sentence: Do not agree as the system was altered almost a century ago and we can not go back to where we were. We need to focus first on protection of the species that are present, not some that were present prior to water development.	Improving water quality conditions will likely result in increased biodiversity. We cannot know which species previously occurred. However, managing a highly disturbed ecosystem to simply maintain the facultative/tolerant organisms that currently occur is probably setting the bar a bit low.
6	65	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-2, Section 4.2.1, second paragraph, first sentence: Do not agree as the species are completely different as well as the climate and surrounding condtions.	This will always be the case for criteria based on all available data
6	66	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-2, Section 4.2.1, second paragraph, next to last sentence: Agree with this statement	Great
6	67	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-2, Section 4.2.1, second paragraph, last sentence: What is the basis for this statement. Can it be justified?	Please see updated text
6	68	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-3, Section 4.2.2, first paragraph, last sentence: This leads us to the conclusion we proposed of monitoring where we are and not letting it get any worse	I think a robust monitoring program is an important first step to make
6	69	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-3, Section 4.2.2, second paragraph, last sentence: Not sure what the AZN approach does. Could it be explained a little better here	Approach described in text
6	70	8/11/2013	Dennis Westcot	Task 6 Draft Report	Page 4-4, Section 4.2.4, regarding "Hybrid Approaches to Setting Water Quality Objectives": This needs to be discussed as it is not completely understood.	Not clear how to clarify further.