

Appendix 3: Editorial Comments

Review of the Delta Risk Management Strategy Report, Phase 1 (Draft 4)

During the review process, some IRP members made detailed editorial comments on the draft. These individual comments, which identified inconsistencies, errors, organization problems, repetitions, and omissions, were collated by CALFED Science Program staff and are provided below.

General Comments

Each section from 6 to 14 is in great need of a bolded summary up front that gives the reader the bottom line from the chapter. What are the main methods and findings in each area?

Section 1

This is a fairly clear explanation of what, who, and why. No major modifications needed.

A definition of risk would be useful in Section One.

Section 1.2 Last paragraph, last sentence: Please eliminate the “etc,” which suggests that only selected management practices are being considered. [this is not a significant point, but one that needs to be addressed throughout the revised report].

1.2.2 Human safety should be added to the list of consequences.

1.2.2, 1.2.3, 1.2.4 Suggest that these introductory statements about report content specifically refer to the supporting reference; e.g., “see, for example, Chapters x and y.” Such editorial notation will direct the interested reader to the specific chapter of interest, rather than requiring continual reference to the Table of Contents.

1.3.1 Recommend first spelling out the name of the agency, then immediately (in parentheses) provide the acronym; e.g., DWR. . .).

1.3.2 The topic sentence needs editorial revision. “Steering Committee members are policy advisors *who* [rather than “that”]. . . “

The word “Delta” appears three times in the same sentence. Please rewrite.

1.3.4 Third sentence: Suggest use of present tense: “The IRP *is* [rather than “was”] composed. . .”

1.3.5 Paragraph on PSHRP: Suggest referring to appendix or other technical document that provides the specific names of USGS and CGS “representatives” who provided the

PSHA comments. Presumably these names are provided in the PSHRP Technical Memorandum?

Page 1 – 8 I would prefer W. F. Marcuson III to Bill Marcuson and my affiliation is with W. F. Marcuson III and Associates not ASCE.

1.3.6 End of first paragraph: Now that Phase I work is still continuing, how about providing a new, estimated completion date?

Page 1 – 9 C. Allin Cornell is deceased. I suggest they add deceased behind his name. The same comment applies to Figure 1 - 3.

1.3.8 Topic sentence: Suggest rewrite to avoid using word “team” twice.

1.5 “Section 2 proves a general overview of the Delta and Suisun Marsh. It is based. . .” This suggested rewrite eliminates an unintended, but slight demeaning tone to the existing topic sentence.

Fig. 1-1 Please eliminate all the “etc” in the lowermost row of boxes. As is, the reader must guess what is included.

Section 2

The historical facts are good. Sea level rise is accurately reflected from climate change TM. Section 2.6 (summary of previous studies) seems out of place within Section 2.

2.1 The introductory descriptive sentences really need editing to reduce redundancy. An example for improvement is the topic sentence, which can be shortened to: “The Sacramento-San Joaquin Delta. . . basins, which drain about 40 percent of California.”

Please rewrite the second sentence to eliminate three of the four “deltas” contained therein.

2.2 Technical memoranda say that late Pleistocene sea levels were ~350 ft below present, not the numbers given in the topic sentence. Probably not a significant issue, but is an example of inconsistency between some TM’s and summary in Introductory sections.

2.4 Key observations: Changes in agriculture management . . . may [increase] Delta elevations. Is this true? Island elevations might rise? Not obviously apparent as to why. Please explain this, perhaps by citing an appropriate TM.

2.6 This section is a valuable addition to the report; it helps to provide context for this study and its results.

2.6.2 Suggest “about 40 percent” instead of “about 39.5 percent.”

Section 3

The focus on sea level rise in this discussion is on the lower IPCC range rather than the more accurate range presented in the Climate Change TM. This should be remedied. Also section 3.6 does not appear to have been revised in response to our earlier comments.

Introduction: Suggest including some discussion about expressing risk as the expected consequence of failure, which includes the possible consequences and their respective probabilities. It would help for context here and when the results are presented to discuss the expected consequences since they are useful for decision making and relatively easy to understand for the general public.

Page 3 – 3 Under the Section entitled " Global Climate Change and Sea Level Rise " --- In the last sentence "seal" should be "sea".

3.4 Delta Improvements: Please update “2006” information in this section (page 3.5).

3.7 Suggest using “assessing” instead of estimating since risk (specifically probability) cannot be measured.

Section 4

This section is a valuable addition to the report in explaining how the analysis was conducted.

Section 4.0 (introduction): Please rewrite topic sentence to eliminate two of the three “risk” terms.

4.1.1 Last sentence: Please rewrite to eliminate the “fuzzy” and rather nebulous expression of “the environment and those who live and work there, (*etc.*), *include but are not limited to*: [really now, this is legal verbiage and has no place in, ostensibly, a technical document].

Meteor strikes: What is the probability of meteor strike causing a catastrophic failure in the Delta? Is it really worth listing?

4.2 Hazard Analysis, First paragraph: Suggest moving the last sentence to the first sentence of the paragraph.

4.3.1 First paragraph: Probability and frequency are used interchangeably here – suggest being careful to distinguish between these terms and to be clear and consistent in how they are used.

Equations 4-1 and 4-2 These are not equations – again, here it would help to start with the expected consequence of failure to show how consequence, frequency and probability are included in assessing risk. A simple illustrative example would be very helpful.

4.3.3 Fourth paragraph: Define “these issues” in the first sentence.

Equation 4-4 Suggest stating explicitly that this equation assumes that the occurrences of different hazards are statistically independent.

4.4.3 Fourth paragraph: Uncertainty in an estimated frequency from a historic record is typically modeled with a gamma distribution (assuming that the frequency is a Poisson process) – suggest explaining why a lognormal distribution was used.

Equation 4-9 Please indicate the subscript that is being summed. Also, the conditional symbol should be a vertical line, not a slanted line.

Page 4 – 19 Two sentences before equation 4 - 12 Is there a difference between levee failure and levee breach? If so, please explain the difference. If not, reword and delete one. They are the same to me.

Equations 4-11 and 4-12 The notation here is difficult to follow: suggest including parenthesis to make it clear which terms are included in each summation. Also, the result is a “frequency of failure” but the summation is of a probability of failure – please be consistent.

Equation 4-13 How is $P(R1 \text{ intersect } R2 | \text{ground motion})$ calculated?

4.4.7 Human safety consequences should be included here.

Page 4 – 23 Third line from the bottom mitigate should be mitigated.

Figure 4 – 4 The numbers on the vertical axis are too small and hard to read.

Section 5

Section 5 seems strangely out of place. There is a lot of overlap with Section 2. Strongly recommend the two be combined and placed up front.

Figure 5 – 6 Is the Mokelumne Aqueduct shown on this figure?? I can not find it.

Section 6

Introductory paragraphs: Please be consistent in use of adjectives to describe relative magnitude of earthquakes. For example, last sentence in first paragraph refers to a “severe” earthquake; then first sentence of next paragraph says “large” earthquakes. Check this throughout the section.

6.1.1 First bullet item, top of page 6.2: Presumably all seismic sources that *could* [reasonably or expected to] impact the Delta.

6.1.3 Last paragraph on page 6-3: “date of last rupture, *recent* seismicity rates. . . Does “recent” refer to historic, instrumental? Please clarify.

Page 6 – 19 Top of the Page I find no North arrow on Figures 6.61, 6.62, 6.63 so I do not know which way is south. Also is the deformation discussed in this paragraph horizontal or vertical.

Page 6 – 20 Table at the top of the page under Observations "pots" should be "post".

Page 6 – 21 The "water level in the slough and rivers" paragraph last word "deterministic" should be "deterministically" ---- same comment top of page 6 - 22.

Page 6 – 25 The 5th bullet under step 4 is not a bulleted item delete the bullet.

6.2.6.1, second paragraph: Where is the boundary between the stiff and dense deposits and the more recent alluvial deposits generally located?

Figure 6-58 Were drained conditions assumed for the peat? What is the relevance of phi and c (versus phi' and c') in the table?

6.2.6.7 The addition of this section is very helpful. It would be very helpful to analyze how the existing levee system would have responded to all of the relevant historical earthquakes back to 1850.

Page 6 – 27 Top of the page: I think Section 6.2.6 should be Section 6.2.7.

Section 6.2.7, 4th line from the top: "knows" should be "known".

Figures 65 thru 68 It would help to show the water surface on the up-stream sides.

Figure 6 – 69 In your title somewhere it would be helpful to tell the reader where the time history is located --- say under the center-line of the levee.

Figure 6 – 87 Please specify the displacement units (ft or m).

Figure 6 – 131 Are the displacements horizontal or vertical??

Sections 7-9. None of these chapters provide more than a very brief, cursory mention of how climate change is expected to affect flood, wind/wave, and sunny day risk, and some not even that. Only section 9 gives any kind of bottom line or summary.

Page 7 – 5, 3rd paragraph that starts with "Daily average flows
----. I suggest that you delete the word "that" between "and" and "most" in
the 1st sentence.

Section 7.6 Last paragraph 1st sentence: The word "again" should be
"against".

Section 7.7 First paragraph 3rd sentence: The word "variable" should
be plural.

Page 7 – 10 Paragraph Aquifer Thickness: I can not see what you are
discussing in the figure you site. I think you have the wrong figure numbers.

Page 7 – 11 Paragraph Drainage Ditches 5 lines from the bottom: "ffot" should be "foot".

Page 7 – 12 Paragraph Levee Geometry: Do you have data or calculations that show ---
"The effects of the levee geometry on under seepage "is" ---- this word should be "are" --
-- mostly controlled by levee crest elevation."? What about change in side slope?? This
will control the horizontal distance the water must travel. Is this not significant?

Page 7 - 19 Paragraph that starts "Table 7 - 14 and Figure 7 - 40 ----"the last sentence ---
I like it !!! Could you not make a similar recommendation regarding either filling the
ditches in with soil or moving the ditches away from the levee toes.

Page 7-19 First paragraph: The words “increase” and “decrease” need to be interchanged
(the sentence says the opposite of what is in the Table and Figure).

Page 7 – 20 Section under Grand Island 3rd paragraph -- 3 sentences from the end --
The word "start" should be "starts".

Page 7 – 24 Second paragraph, 1st line: The word "a" should be "as".

Page 7 - 25 Section 7.8 The 1st word should be "Calculations".

Page 7 - 26 Section 7.9 Some explanation of how Figure 7 – 75 was developed is
required.

Page 7 – 28 Equations (1) and (2): Please put a subscript to indicate which variable (i, j
or k) is being summed. Also, it would help if the conditional probabilities were expressed
using the conventional notation with a vertical line instead of subscripts. As discussed in
our review for the first draft of the DRMS report, the basis for this approach is not strong.
It essentially gives that the probability of at least one reach failing is a weighted average
of the probability values for individual reaches. While this overall result is reasonable,
particularly since it can be calibrated with all of the historical failure frequencies, the
methodology to get to this result is not sound. For example, if the conditional

probabilities of two individual reaches failing in a particular flood event are 1 and 0.9, respectively, the total probability that at least one reach fails is 0.95 because there is only a 53 percent chance that the first reach (with a probability of failure of 1 for the flood event) is the weakest link. How can the probability that it is the weakest link be less than 1 if the reach is certain to fail in the flood event? I would prefer to see this approach developed by explicitly considering correlations between individual reach failures. However, the final results would likely not change even if a different approach were used.

Page 7 – 29 Equation (4): The paragraph following this equation is extremely confusing because it includes both what you wanted to do and what you actually did. I think it would help to just state how it was done.

Section 7.9 In the 2nd paragraph under this section 1st line the word "erode" should be "erodes".

Figure 7.2 The figure is too small to be meaningful and/or useful.

Figure 7 - 24 a and b should be Figure 7 - 25 a and b.

Section 12

On page 12-32, the authors introduce the term "consumer surplus" in explaining how they measured lost recreation values. This term will not be familiar to the average reader. I suggest they either 1) define the term or 2) simply say that the economic values (costs) they assign to lost recreational opportunities are borrowed from the economic literature. The latter approach seems simplest and is consistent with what the economic group did to get the cost numbers.

Section 13

Overall, this section is vastly improved from the first draft. Four suggestions in finalizing it:

1. It would be very helpful to calculate and discuss the expected consequences of failure, and also to discuss these results by providing some contextual information for comparison (such as other levee systems, dams, other impacts due to earthquakes, etc.).
2. The frequency for fatalities due to flood events seems high (Figure 13-22 in the DRMS report) based on the historical record. Specifically, frequency of having an event with at least 10 fatalities is estimated to be greater than once every ten years. In contrast, we are not aware of any flood events with fatalities that have occurred in the past 100 years in the Delta (our understanding is that the examples of fatalities due to flooding given in the report are not events that occurred in the Delta itself). Additional discussion and explanation of the estimated risk in the context of the historical performance is warranted here.
3. Due to the complexity of the components and the overall linked models that are used to assess the risk, additional sensitivity studies are warranted to

inform the user of these results about what is driving the risk. For example, if all of the Vulnerability Class 1 and 2 levees are removed from the analysis, what happens to the seismic risk?

Page 13 – 8 I find no figure 13 - 13a in my copy.

Section 14

Table 14-12 is a highly satisfactory response to our initial comments regarding the need to clearly assess the uncertainty involved in these estimates. However, the conclusions on p. 14-17 are unclear and downright confusing.

page 14 - 30 Section 14.3.3.6 Potential Loss of Life The paragraph that follows and the only paragraph in this Section says absolutely nothing about this topic.

Section 15

Vastly improved from previous draft.

Section 16

References (Section 16): Several incorrect or incomplete citations impact reader perception of quality control. This is particularly important should this document be treated as a “baseline reference.” There are many problems here; and only a few representative ones are specifically noted; e.g.:

Adam, P., 1990: Typically a complete reference includes the number of pages in the document; not so indicated here and for many others too.

Alameda Zone 7, 2005: Please provide a more complete reference so that an interested reader can find the original. If this document be on a web site, so indicate as such.

Atwater, B. F., 1982: Usually number of maps and scale are also given. See, for example, the citation for Jennings, C. W., 1994.

Baecher, G. B., and J. Christian, 2003: Publisher location (e.g., New York), and number of pages in book?

Gregor et al., 2007: (What is this? Incomplete citation?)

Grimaldo, L, 2000: Incomplete citation; needs volume and page numbers; see, for example, following Grimaldo and Hymanson citation).

Herbold et al., 1992: A more complete reference needed here. Where can the reference be obtained?

HTE, 2003: Is this a company report? If so, where is company located ?

R.S. Means, 2005: What is this? Surname is "R.S."? I doubt it. Please provide complete reference.

Ramillien, G. et al, 2007: Who are the *et al*? Please provide complete and correct reference.

Schlemon (*sic*), R. J., and E. L. Begg, 1973: Misspelled citation and date. Correct one given in the Subsidence Technical Memorandum, viz:

Shlemon, R. J., and E. L. Begg, 1975, Late Quaternary evolution of the Sacramento-San Joaquin Delta, California: in Suggate, R. P., and Cresswell, M. M. (eds.), *Quaternary Studies, Bulletin 13*, The Royal Society of New Zealand, Wellington, New Zealand, p. 259-266.

Shelmon, R. J., and Begg, E. L., 1975: Here, too, misspelling of author's name and incorrect citation. See above for correct one.

Stephens, J. C., et al, 1984: Incomplete citation. Please provide volume number and appropriate pages. Easy reference to find, and the editor, T. L. Holzer, is often cited.

Veliconga, I, and J. M. Wahr, 2005, 2006a, 2006b: How about some titles for these three papers? Complete reference properly.

Yahoo Maps: What kind of reference is this?

Zwally, H., J., et al, 2005: Need title, and complete list of the "et al." authors.

Appendix A

Middle of page 3 - 3 of App. A entitled --- "I R P Comments on June 26, '07 , Draft on the Risk Analysis Report and the Response of the Consulting Team (Dated 11/2/07)" - IRP asks them to rephrase their 1st bullet to ---"Death and Injuries to Humans" so as to be consistent. In their reply in blue (same page 3 - 3) they say they will make the change. See page 3 -7 under Section 3.6 of their current Draft 4 Report and look at the 1st bullet – change not made. It says "Death or Injury of People."

On page 7 - 8 near the bottom of the page they claim they will add comparisons to Corps stage curves and historic data. Historic data I can find in their Draft 4. I can not find comparisons to Corps data.

On page 7 - 14 near the middle They say --- "When expert elicitation is used we will provide a detailed description --- ." I believe expert elicitation was used for levee failure by overtopping (see Page 7 - 26) but not mentioned.