Comment No.	Agency	Section	Page #, Paragraph, Sentence*	Comment	Comments about response
1	CWCB	Annex B, Section 6 Agricultural Sector	B.75	Define green industry (it may be elsewhere in the report)	Added the definition that appears later in the report to this page
2	CWCB	Annex B, Section 6 Agricultural Sector	B.75	Third bullet under key recommendations, add water availability after "specific analysis of irrigated crops **and water availability**"	Added 'and water availability'
3	CWCB	Annex B, Section 6 Agricultural Sector	B.75	Consider a recommendation that encourages the alternative transfer methods	Added recommendation under Section 6.6.1, "Adaptation to Drought."
4	CWCB	Annex B, Section 6 Agricultural Sector	B.92	last bullet- in most instances, the use of alternative methods will require storage to provide a more reliable water supply	Added a bullet with this text
5	CWCB	Annex B, Section 6 Agricultural Sector	B.93	first bullet on the page- suggested re-wording "A firming of ag supplies may be necessary, requiring additional storage, infrastructure, and advanced water treatment."	Re-worded bullet per this suggestion
6	CWCB	Annex B, Section 6 Agricultural Sector	B.93	Unclear what "annual water deliveries are preserved" is describing, please elaborate	Reviewed SWSI for context, decided that "annual water deliveries are preserved" did not fit with what the paragraph was conveying, deleted the bullet.
7	CWCB	Annex B, Section 6 Agricultural Sector	B.93	Last bullet, I would suggest re-wording	Reviewed SWSI for context, decided that the reference to groundwater did not fit with what the paragraph was conveying, deleted the bullet.
8	CWCB	Annex B, Section 6 Agricultural Sector	B.93	The Rio Grande is reducing their gw voluntarily and not due to permanent transfers of water rights	Changed text to reflect this
9	CWCB	Annex B, Section 6 Agricultural Sector	B.93	2nd paragraph- I would add that ag water efficiency measures (drip, sprinklers) can also increase a crop's consumptive use of water, with the net effect of leaving less water for the next water right in priority.	Added recommended text
10	CWCB	Annex B, Section 6 Agricultural Sector	B.99	Last bullet on the page, for a farmer to transition to a higher value crop, the farmer will need to have the flexibility in operations. Machinery, etc may be difficult to go from say alfalfa to onions.	Added text noting these difficulties
11	CWCB	Annex B, Energy Sector		Consider renaming section to be Energy and Extraction Sector	The name "Energy Sector" was agreed upon by the project team and several workshop groups
12	CWCB	Annex B, Energy Sector	Table 7.1	Consider defining produced versus dewatering groundwater and clarifying that language. Also add that hydro power needs flow for power generation.	This table is reproduced from another document. A sentence was added to the text to make it more clear that this is a reproduced document
13	CWCB	Annex B, Energy Sector	B.123	Third complete paragraph. You might also want to mention that switching away from coal to natural gas uses a lot less water. And could be a way to reduce vulnerability.	Added the following text: " reducing the use of conventional coal-fired power plants and increasing reliance on certain types of renewable energy , combined cycle natural gas plants, and advanced cooling systems (like dry cooling) could reduce the amount of water used for electricity generation in the state"
14	CWCB	Annex B, Energy Sector	B.123	Last paragraph needs to be updated with the new information coming out of phase II energy report, which is 120 KAF, not 378 KAF for oil shale. In addition, Western Resource Advocates is citing the energy phase I study, and the original should be used since it was CWCB funded research and the original.	The number was updated to 120 KAF and the most recent memo is cited.
15	CWCB	Annex B, Energy Sector	B.124, Table 7.2	Typo first line, second column. "diversity" should be "diversify"	Changed text to 'diversify'
16	CWCB	Annex B, Energy Sector	B.126 and 127, Figures 7.6 and 7.7	Consider adding "n=x" for how many respondents for each basin and/or bar	Not addressed due to resource constraints
17	CWCB	Annex B, Energy Sector	B.128	Should cite Final 2010 Demands to 2050 Report and revise numbers accordingly in this section	Changed citation
18	CWCB	Annex B, Energy Sector	B.128	You might mention that the Phase I study is WSRA grant funded by CWCB. Also, the Draft results are in for the Phase II study.	Added text to this effect
19	CWCB	Annex B, Energy Sector	B.131	These numbers should be revised to reflect the new oil shale numbers.	Added a note explicitly saying that oil shale is not included in the oil and gas estimates
20	CWCB	Annex B, Energy Sector		Generally, there may be a bit of inconsistency with our work on this same area. I'm not sure that really matters, and I hope to have time (some day!) to compare your water use figures for mining and power production with ours. Let us know if you've done this already.	Agreed, this sort of comparison would be valuable in the future.
21	CWCB	Annex B, Environmental Sector	B.157	Second paragraph, need citation for $8.5 to $15 billion figures	Citation added
22	CWCB	Annex B, Environmental Sector	B.157	Third paragraph, second sentence, perhaps replace the word "environmental" with "ecological"	Replaced words
23	CWCB	Annex B, Environmental Sector	B.157	Third paragraph, broken reference	Fixed reference
24	CWCB	Annex B, Environmental Sector	B.161	May mention the Watershed Flow Evaluation Tool. There are also some published rules of thumb relating flow metrics to vulnerability, whether from the Rio Grande Compact work (50% peak; 80% base flow) to other work by Brian Richter, etc. Generally, this section is fine, but could mention that there are flow metrics that could be used to further refine the risk.	We agree that flow metrics would be suitable for a full drought risk assessment (future work).
25	CWCB	Annex B, Environmental Sector	B.162	First paragraph, sentence starting "for wildlife, a species ability…" should read For wildlife, a species' ability…"	Text has been corrected
26	CWCB	Annex B, Environmental Sector	B.162	In some examples of drought impacts, a bullet could be added in addition to winter flows that indicates late summer is a very limiting time period for fish in times of drought. This is in regards to both flow and temperature, especially for coldwater fish. In the WFET work, the professors and TNC decided summer flows were more limiting during low flow times than winter base flows.	Added a bullet to this effect
27	CWCB	Annex B, Environmental Sector	B.163	Second full sentence, the word "to" should be removed prior to the word "for"	Removed the word 'to'
28	CWCB	Annex B, Environmental Sector	B.163, Table 8.1	Second row, under the fourth impact, the first letter in the word "In" is bolded when it should not be.	Got rid of bold formatting
29	CWCB	Annex B, Environmental Sector	B.164	Throughout the document and found several times on this page, SWSI phases are listed as Phase I or Phase II. These are historically Phase 1 and Phase 2 (not in roman numerals). This should be revised for consistency.	All instances of "Phase I" or "Phase II" have been replaced with "Phase 1" and "Phase 2"
30	CWCB	Annex B, Environmental Sector	B.165	First full paragraph, the word "concentration" is not fully accurate for all basins, but I'm not sure that this matters too much for your purposes	Changed the wording to presence instead of concentration

31	CWCB	Annex B, Environmental Sector	B.165	I'm not sure what page this should go under, but the General Assembly revised the instream flow statutes to allow irrigators to temporarily "loan" unused water to CWCB for instream flow purposes at times when the Governor declared a drought (Colo. H. 03-1320, 64th Gen. Assembly, 1st Reg. Sess. [June 5, 2003]). In 2005 this section was again revised to allow for such loans in three out of every ten years, thus eliminating the requirement that the Governor declare an emergency (Colo. H. 05-1039, 65th Gen. Assembly, 1st Reg. Sess. [Mar. 25, 2005]). (http://www.roaringfork.org/pub/collaborative/Appendix%202%204%20CWCB%20Instream%20Flow%20Background.pdf)	This information was added to Table 8.2
32	CWCB	Annex B, Environmental Sector	B.169	last line of page, I don't think you mean "…other stream nad riparian…" perhaps "and." :)	Changed to 'other stream and riparian'
33	CWCB	Annex B, Environmental Sector	B.174	Second paragraph, the USDA should be mentioned, as they are the ones that produce the noxious weed books and provide major support to the county level weed guys.	Added a reference to USDA and noted the noxious weed books they provide
34	CWCB	Annex B, Environmental Sector	B.174	Last paragraph, second sentence "currently" should be "current."	Changed to 'current'
35	CWCB	Annex B, Environmental Sector	B.177	Instream flow rights. This is fine, but we do have ISF rights that are "truncated or limited." This means that they were cut short at a diversion or those that have more than two seasons or were reduced because of flow availability. These three classes of ISFs likely indicated increased vulnerability during times of drought for those species they are meant to protect. The Priority Waters team also produces some additional metrics. Perhaps these should be listed as research to be incorporated into future work.	Good recommendation. Future work should include coordination with the Priority Waters team and CWCB to enhance future metrics.
36	CWCB	Annex B, Environmental Sector	B.177	Riparian habitat. I'm not sure this metric is the best. Probably too late to change, but we have an extensive GIS database of riparian habitat, including its rarity and its ranking with regard to health. This is pulled from CNHP, which, understandably, is not a fully complete dataset, as they have not surveyed everywhere, but counts per county could be used.	Good recommendation. More detailed information such as the recommended riparian data should be used in future work, if possible.
37	CWCB	Annex B, Environmental Sector	B.183	Second line, space before period	Added a space before the period
38	CWCB	Annex B, Environmental Sector	B.183	Here and elsewhere you refer to evaluating NCNA findings in a consistent manner. I don't disagree, but you should be aware that we tried to do this and got significant push back from the roundtables. The Priority Waters team went and did the analysis using the same data layers constantly statewide, and got a 90% overlap with the roundtable process.	This is not meant as a criticism of the data used in NCNA, which, as discussed above, appears to be detailed and well organized. Rather we are simply stating that data categories are sometimes different from those used in the Drought Vulnerability Study, or are not the same from one basin to another. The challenge of using the NCNA results directly is something that should be considered in the next drought vulnerability assessment. We have modified the text to get rid of the term inconsistent
39	CWCB	Annex B, Environmental Sector	B.185, Table 8.4	Might want to mention watershed groups and other local environmental groups as being potential partners	Added a row to the table noting watershed groups and other local environmental groups
40	CWCB	Annex B, Environmental Sector		Mitigation strategies: if you would like to indicate some additional mitigation strategies, Chris and Jacob could most likely help brainstorm additional actions that could reduce the risk. For instance, the 700+ projects and methods identified by NCNA Phase II include several items that are critical to ensuring healthy ecologies that can withstand times of drought	Unfortunately this is outside the timing of this project but should be done in future work.
41	CWCB	Annex B, M&I Sector	B.191	Footnote: should cite Final 2010 Demands to 2050 Report and revise numbers accordingly (also on page B.192)	Changed citation
42	CWCB	Annex B, M&I Sector	B.191	Change "webpage" to "website"	Changed to 'website'
43	CWCB	Annex B, M&I Sector	B.194	Footnote: typo "a s" to "as". Footnote shouldn't flow onto next page.	Changed to 'as'
44	CWCB	Annex B, M&I Sector	B.205	Change "Northern Colorado Water Conservation District" to "Northern Colorado Water Conservancy District"	Changed to 'Northern Colorado Water Conservancy District'
45	CWCB	Annex B, M&I Sector	B.207	Figure 9.6 Legend - typo "statewide" to "statewide" (same for Figure 9.8, 9.10, 9.12, 9.14, 9.16, 9.18)	Changed to 'statewide'
46	CWCB	Annex B, M&I Sector	B.211	Footnote: should cite Final 2010 Demands to 2050 Report and revise numbers accordingly in this section	Changed citation
47	CWCB	Annex B, M&I Sector	B.214	change "Southeastern Colorado Water Conservation District" to "Southeastern Colorado Water Conservancy District"	Changed to 'Southeastern Colorado Water Conservancy District'
48	CWCB	Annex B, M&I Sector	B.218	Footnote shouldn't flow onto next page	Changed formatting
49	CWCB	Annex B, M&I Sector	B.222	Footnote: should cite Final 2010 Demands to 2050 Report and revise numbers accordingly in this section	Changed citation
50	CWCB	Annex B, M&I Sector	B.222	Since there are no major IPP's, delete last sentence of 1st paragraph: "These projects will be instrumental…"	Deleted last sentence
51	CWCB	Annex B, Recreation Sector	B.246	Wildlife viewing. Although the wildlife viewing maps may not have made it into the final report, the process was completed for every basin in a very consistent manner. The only real inconsistency in the NCNA process was in the final "focus area" stage. The base layers were, except for a few minor exceptions, produced under a common technical platform that is relatively uniform for every basin.	See NCNA comment above
52	CWCB	Annex B, Recreation Sector	B.246	Last paragraph, should have a space after "(USGS)," prior to "that."	Text has been corrected
53	CWCB	Annex B, Recreation Sector	B.263	Table 10.6, third paragraph, second sentence. The word "believing" could be offensive to Joe (and maybe a few other folks). Perhaps replace with "identifying."	Re-worded sentence per suggestion
54	CWCB	Annex B, Recreation Sector	B.265, 266, 277	Throughout the document and found several times on this page, SWSI phases are listed as Phase I or Phase II. These are historically Phase 1 and Phase 2 (not in roman numerals). This should be revised for consistency.	All instances of "Phase I" or "Phase II" have been replaced with "Phase 1" and "Phase 2"
55	CWCB	Annex B, Recreation Sector	B.269	Second full paragraph, fifth sentence, remove the word "the" after the word "removed."	Removed word
56	CWCB	Annex B, Recreation Sector	B.269	Third full paragraph, fifth sentence, remove the word "a" after the word "reach."	Removed word
57	CWCB	Annex B, Recreation Sector	B.273	Third full paragraph, fourth sentence, insert the word "that" between "acres" and "are."	Inserted word
58	CWCB	Annex B, Recreation Sector	B.275	Last paragraph, second to last sentence, replace the word "is" with the word "are" - "To add to the complexity, reservoir operations are generally…"	Corrected sentence
59	CWCB	Annex B, Recreation Sector	B.276	Paragraph beginning "This approach", remove extra space prior to semi colon.	Corrected
60	CWCB	Annex B, Recreation Sector	B.277	Top of the page, what is Section 0?	Sentence is referring to Figure 10.11. Reference has been corrected.
61	CWCB	Annex B, Recreation Sector	B.278	Last sentence, suggest listing all of the counties in this category	The counties listed in the paragraph are for illustration purposes; all counties contained in this category are listed in Table 10.8 above.
62	CWCB	Annex B, Recreation Sector	B.288	Figure 10.21, why is Douglas County not in the 3-3.9 category. This and the table and text should be consistent.	Tables, figures, and text have been cross-checked for accuracy and corrections made when applicable.

63	CWCB	Annex B, Recreation Sector	B.291	Wildlife viewing - again, the NCNA did assess this for all basins	See response to NCNA comment (#38) above
64	CWCB	Annex B, Recreation Sector	B.291	Third paragraph. Not a big deal, but the fishing layers were fairly consistent, and we have backup data that is quite consistent. CDM digitized fishing maps across the state and included any CDOW reaches as well. This data could be used alone, although in later versions some roundtable members added fishing areas that the guidebooks missed, or removed some that are no longer used. We can get you the layers, if it would be helpful, but probably for next time. Consider adapting the language slightly.	See response to NCNA comment (#38) above
65	CWCB	Annex B, Recreation Sector	B.292	The above comment applies to rafting as well.	See response to NCNA comment (#38) above
66	CGS	Mitigation Plan	Table 20	CGS has experience and studies in these areas (see Section 4.4 Mitigation Actions) to contribute to the technical knowledge.	Changes made per suggestions, see below:
67	CGS	Mitigation Plan	Table 20	Specific additions to Table 20 - State Drought Mitigation Actions Summary Goal 1: Recommended Action - collect climatologic data at mid and lower elevations; add CAIC to agency list - Collect data to monitor snowpack sublimation; add CAIC to agency list - Coordinate input of groundwater monitoring; add DWR and CGS to agency list; include coordination with CGS and DWR to implementation column Goal 3: Recommended Action - Explore technologies for water supply banking, aquifer recharge, ...; add CGS to agency list; reference "Statewide Aquifer Recharge Study," "Upper Black Squirrel Creek," and "Lost Creek" projects to implementation column. - Construction of water storage facilities on state land: include coordination with CGS for underground storage to implementation column.	CAIC, DWR, and CGS added to agency lists per suggestions; reference projects added; coordination with CGS added.
68	CGS	Mitigation Plan		CGS has no direct involvement or responsibilities under the Drought Mitigation and Response Plan. Consequently, applicable comments are more along the lines of ancillary functions. CGS could play a role in the planning process by participation in the Drought Mitigation and Response Planning Committee (DMRPC). The DMRPC consists of representatives from several state agencies (all divisions within DNR except CGS) as well as federal agencies (USGS is represented). CGS could provide input, technical assistance, and data (particularly CAIC) to the process.	Added CGS to list of agencies and noted intent to participate in future efforts.
69	Defenders of Wildlife	Annex B, Environmental Sector	B.174	The Environmental Sector starts out with a good, but sector-specific, explanation of the components of vulnerability. We offer that in its place, the Drought Plan employ a more general framework that will promote assessment of the exposure, sensitivity, and adaptive capacity of each sector: "Vulnerability is a function of the *sensitivity* of a system to changes in climate (the degree to which a system will respond to a given change in climate, including beneficial and harmful effects), *adaptive capacity* (the degree to which adjustments in practices, processes, or structures can moderate or offset the potential for damage or take advantage of opportunities created by a given change in climate), and the degree of *exposure* of the system to climatic hazards." (Citation: Intergovernmental Panel on Climate Change, *Climate Change 2001: Impacts, Adaptation and Vulnerability* 89 [James J. McCarthy et al. eds., 2001].)	Chapter 1 of Annex B Drought Vulnerability Assessment Technical Information contains an introductory discussion of the components of vulnerability similar to what this comment is suggesting. This chapter sets the framework for the sector-specific vulnerability assessments that follow.
70	Defenders of Wildlife	Annex B, Environmental Sector		The Drought Plan could benefit from some explanation as to how and why some sub-sectors and vulnerability metrics were chosen. It is not clear from the Drought Plan if the sub-sectors and metrics that were used were chosen because, for example, they were the best representation of vulnerability or were the metrics for which some, if any, information was available.	Chapter 1 of Annex B discusses the selection of quantitative data, and states that broad definitions of drought "impacts" and "vulnerabilities" during data collection were necessary to gather all relevant information and to encourage inclusion of sometimes only marginally relevant efforts.
71	Defenders of Wildlife	Annex B, State Assets Sector		In the State Assets section, it is not clear if there are 5 or 6 sub-sectors. Compare Drought Plan at 61, id. at 60, id at 79, id at B.24-25, id at B.46 (alternating between 5 and 6 sub-sectors and using some combination of instream flows, fish hatcheries, aquatic habitat, and DOW). Compare also Drought Plan at 60, id at B.24-25, id at B.27 (same, and alternating among state lands, State Parks, State Land Board, and DOW). Compare also Drought Plan at B.63 and B.175 (not defining yet using Protected Areas as a metric for two sectors).	There are and should be six subsectors but only five impact categories. The impact categories are defined starting on B.60.
72	Defenders of Wildlife	Annex B, Environmental Sector		Recommend the addition of snowpack and groundwater-dependent habitats to the habitats considered in the Environmental Sector.	This is an interesting suggestion that would require further evaluation and could be considered in future work.
73	Defenders of Wildlife	Annex B, Environmental Sector		Recommend that the Drought Plan include within the "snowpack" category (see comment above) its use as wildlife habitat, for species such as lynx, snowshoe hare, and wolverine that rely on snowpack for some part of their life cycle.	This is an interesting suggestion that would require further evaluation and could be considered in future work.
74	Defenders of Wildlife	Annex B, Environmental Sector		Recommend that the Drought Plan include within the "groundwater" category (see comment above) its use as wildlife habitat/vegetation to encompass groundwater-dependent vegetation.	This is an interesting suggestion that would require further evaluation and could be considered in future work.
75	Defenders of Wildlife	Annex B, Environmental Sector	B.161	The vulnerability assessment for the Environmental Sector, which focuses on riparian areas, would benefit from consideration of wildlife habitats dependent on all forms of precipitation.	There is a general lack of information about drought impacts to the environment as a whole and to species and areas that are not heavily managed. Riparian areas were selected for their direct vulnerability to drought; however, consideration of other habitat is a suggestion that could be considered in future work.
76	Defenders of Wildlife	Annex B, State Assets Sector	B.53	Recommend the presence of instream flows is not only a spatial metric but also an impact metric. The lack of instream flows in a county should be considered a vulnerability in and of itself.	This is something that would require further evaluation and could be considered in future work.
77	Defenders of Wildlife	Annex B		Clarify what data and expertise was used in compiling drought impacts and describe the strengths and weaknesses of the data. For example, the drought plan relies on the 2002 drought for much of the impact data. The vulnerability assessment would benefit from discussion of whether impact data was selected because it is representative, a worst-case scenario, or simply available.	Because this is new work, and the scope required multiple sectors to be assessed in a consistent manner, we selected data that was applicable and in a readily usable format. Discussion of the data selection process is included in Chapter 2 of Annex B and throughout the specific sector write-ups.
78	Defenders of Wildlife	Annex B		Distinguish between exposure and sensitivity in evaluating potential drought impacts to various sectors.	This project is a vulnerability assessment which focuses on sensitivity to drought. Drought exposure relates more to hazard of drought and should be considered in future risk assessment work.
79	Defenders of Wildlife	Annex B	B.62, B.177	Concern that the vulnerability assessment inaccurately characterizes instream flows as an adaptive capacity based on the intention of instream flows to protect species and habitat, without support that instream flows are an effective adaptive capacity, particularly during drought.	We recognize that our approach has limitations and that instream flows are not a perfect metric. Future work should analyze this issue further.
80	Defenders of Wildlife	Annex B		Clearly and explicitly identify when and how any qualitative information was used to adjust the impact scores.	This level of detail is available in the workbooks where calculations were made
81	Defenders of Wildlife	Annex B		Clearly flag and describe the uncertainty associated with the sources of data, other expertise, and the impact metrics. (See Defenders letter, 2nd- and 3rd-to-last paragraphs, for suggestions.)	We did attempt to note large sources of uncertainty, however a thorough uncertainty assessment was beyond the scope of this project
82	CDOW	Mitigation Plan	Table 20	CDOW would like to be included among the CWCB and others for the following Recommended Actions: "Enact policy to allow for greater flexibility…" pg 100 "Assess how the hydrograph will change due to…" pg 104	CDOW added to "Lead Agency/Entity" cell per comment.
83	CDOW	Mitigation Plan	Table 20	Proposed restatement in the document (extensive)	These suggestions are interesting and could be considered for future work.

84	CDOW	Annex B, State Assets Sector	B.171, immediately prior to paragraph on ISF	Extensive edits- see printed sheet	Inserted additional text to State Assets and Environmental sectors.
85	DOC	Annex B, State Assets Sector		Suggest Colorado Department of Corrections be asked to participate in any future drought planning efforts.	Incorporated information from DOC email into State Assets Sector
86	Western Resource Advocates	Annex B, Energy Sector		Be clear when talking about consumptive use vs. withdrawals	Searched these terms in the document and added clarifying text where necessary
87	GCSAA	Annex B, Recreation Sector (Golf)	B.262, Table 10.5	Focus on golf course aesthetics is not a fair or accurate portrayal of impact of drought on golf course turf grass (see explanation and suggested textual fix, printed copy)	Modified text in Table 10.5 to recognize other impacts than aesthetics as listed in the comment
88	GCSAA	Annex B, Recreation Sector (Golf)	B.264, Table 10.7	Misleading text, "golf courses would need to increase their irrigation by about 25% to offset the effects…" Suggested re-wording and justification.	Modified text in Table 10.7 to address comment, additionally modified text in subsequent paragraph about golf to address concerns
89	GEO	Annex B, Energy Sector		Change text to say "Amendment 37, adopted by a vote of the people of Colorado in 2004, required large utilities to obtain 10% of their energy from renewable resources by 2015. The Amendment 37 standard was modified by the…"	Changed text
90	GEO	Annex B, Energy Sector	p. 118	In the Energy Sector portion, p. 118, there is a reference to Amendment 37/HB1001. There is a reference to HB 1001 under the fourth Pdf - Appendices - Appendix D, Drought Mitigation Capabilities Summary, p. 15 as well. There are inconsistencies in these three references.	Only two references were found. They were checked for consistency
91	GEO	8-16-10 presentation	Slide #13	Change "OEMC" to "GEO"	Not applicable. This comment relates to a public presentation
92	GEO		Renewable Energy Development Opportunities	Text states "none of this development has actually begun and specific development plans have yet to be determined." This should be changed to read "1246 MW of wind generation capacity has been installed in Colorado as of the end of 2009. In addition there are two PV sites near Alamosa with a combined capacity of 25 MW."	Updated text to reflect this suggestion
93	GEO	Annex B, Energy Sector		Suggest that GEO/PUC take co-chair roles as Lead Agencies for the Energy Impact Task Force	This is too late to change at this point but the CWCB will take this recommendation into consideration
94	GEO	Annex B, Energy Sector	References (7.7 see p. 154)	For the entry "Connecting Colorado's Renewable…" The attribution should be to the Colorado Governor's Energy Office.	Changed citation
95	GEO	Annex B, Energy Sector	B.121	There is a missing coal-fired thermo electric power plant located in Lamar. It is owned by the Arkansas River Power Authority with a capacity of 39.5 MW. This should be noted on Figure 7.4.	Map is from a 2005 report and the plant in question wasn't up and running until 2009. A footnote was added to clarify date of the map
96	GEO	Annex B, Energy Sector	Table 7.2	Put in Renewable Energy-Wind, Solar, Geothermal- as an Adaptive Capacity in the list of options. If you agree to do so, ask GEO for help with the wording of the option.	Added this suggestion to the list
97	WWA	Mitigation Plan	11	2nd-to-last Bullet Item: "Western States Gov Association" should be "Western Governors' Association" [JL]	Changed text
98	WWA	Mitigation Plan	12	"Play Lakes Joint Venture" should be "Playa Lakes Joint Venture" [JL]	Changed text
99	WWA	Mitigation Plan	12	National Renewable Energy Laboratory should be listed under "Federal Agency" (DOE), not under "Other Organizations". [JL]	Moved to "Other Federal Agencies" list
100	WWA	Mitigation Plan	13	Table 3: "Western Water Assessment/CIRES" should be "CU-NOAA Western Water Assessment" [JL]	Changed text
101	WWA	Mitigation Plan	17	Figure 2: This is an important figure; I recommend that a higher-resolution copy of it be obtained from the State Engineer's Office [JL]	The maps department of the SEO was contacted and we were informed no higher-resolution copy of the figure was available online. For future work a higher-resolution copy of the figure can be purchased.
102	WWA	Mitigation Plan	19	Sentence 1: I recommend deleting "cycle" as it implies cyclical (i.e. predictable) behavior of Colorado's climate, which is not correct. [JL]	Deleted text
103	WWA	Mitigation Plan	22	Figure 5: The figure's start date of 1850 is misleading. The Drought Impact Reporter does not appear to list any drought impacts for Colorado prior to 1930, so the figure at least should be modified so that it reflects 1930-2010. Even better would be to constrain it to 2000-2010, since in fact nearly all of the data is from the past 10 years (the caption understates the bias towards recent data). [JL]	Figure has been updated to show search date of 1935-2010 (the DIR was reviewed for impacts and none were found prior to 1935)
104	WWA	Mitigation Plan	22	Sentence 4: "data points" is not used correctly and should be replaced with "indicators of drought conditions" [JL]	Replaced text
105	WWA	Mitigation Plan	24	The description of the SPI value is a little muddled. I recommend replacing with "The SPI values are based on the probability, calculated from the long-term precipitation record for a given location, of recording a given amount of precipitation over the stated time period, and these probabilities are standardized so that a value of zero always indicates the median precipitation amount." [JL]	Replaced text
106	WWA	Mitigation Plan	30	Sentence 1 under 3.2.4: Change to "Several times since the late 1800's, Colorado has experienced widespread, severe drought." As written it is too broad. [JL]	Changed text
107	WWA	Mitigation Plan	33	Figure 10: The figure roughly depicts the "Dust Bowl"--i.e., the region of most severe impacts from the 1930s drought, but does not indicate the much larger area ("much of the United States", as the text says) affected by the 1930s drought. I recommend this figure be used instead: http://www.drought.unl.edu/whatis/palmer/pdi3439.gif. This figure uses a drought index to objectively assess the regions most affected by severed drought conditions from 1934-39, and is commensurate with a figure that appears later in the plan. [JL]	Reviewed the suggested figure but decided to retain the original figure as it relates to the text.
108	WWA	Mitigation Plan	35	The discussion of the "2002 drought" needs to take into consideration the temporal dimension of drought (i.e., duration). For example, the blanket statement that the 2002 drought was the "worst drought" in Colorado's history lacks substance unless conditioned by duration. It would be more accurate to say that "on a statewide basis, 2002 was the most intense single year of drought in Colorado's history". It is also important to describe 2002 as an extremely dry year embedded in a longer dry period (2000-2006), similar to 1934 being an extremely dry year embedded in a longer (1931-39) drought. Note that the Doesken and Pielke paper, on which this section is adapted, was released in late 2003, and so was not able to place 2002 in the context of the full dry spell (2000-2006) of which 2002 was a part. [JL]	Updated text
109	WWA	Mitigation Plan	35	Footnote 6: "McKee and Doesken" should be "Doesken and Pielke" [JL]	Footnote corrected
110	WWA	Mitigation Plan	41	It seems misleading to have a section (3.2.5) titled "Future Probability of Droughts" which discusses only the historical drought probability and seasonal drought forecasting, but not climate change. The following section (3.2.6, Other Drought Implications in Colorado) does have a "Climate Change" subsection, which correctly notes that drought frequency is expected to increase under climate change. Climate Change needs to be integrated into any material under the heading of "Future Drought Probabilities". [JL]	Added a sentence at the end of Section 3.2.5 to lead into the climate change section
111	WWA	Mitigation Plan	43	A summary of the main findings from CRWAS detailed in Appendix C should be provided here, in the main body of the plan, which is more likely to be read by users than the appendices. [JL]	The project team decided this would remain in the appendix
112	WWA	Mitigation Plan	49	Table 9: See comments on p.22, Figure 5, above [JL]	Table changed to more accurately reflect dates of reported drought impacts

113	WWA	Mitigation Plan	49	Table 9: The presentation of this table, and to a lesser extent Table 8, reflects apparent misunderstanding about the nature of the Drought Impacts Reporter (DIR) data. It is clear from Table 9 that historically, most individual impacts reports have been entered at the state level, so that the individual "impact" so entered is "reported" for every county in the state, whether the actual impact occurred in that county or not. Accordingly, the DIR is a poor tool for discerning which counties have had the greatest vulnerability to different types of impacts, because state-level data is mixed in with, and dominates, the "true" county-level data. The data from 2007-2010 (Table 8) seems to reflect more county-level data and less state-level data, but is still susceptible to the mixing of data. For example, the "Fire" impacts data appears to reflect 1 state-level impact entry from 2007-2010 and several individual county-level data entries. [JL]	Removed Table 9 and modified discussion
114	WWA	Mitigation Plan	47,49	Tables 8 and 9: Per the above comment, the "Totals" provided at the bottom of each column in each table are very misleading, because the state-level impact entries create large overcounts of county impacts when the data are summed by county. I recommend deleting the "Totals" row in these two tables. [JL]	Deleted "totals" row
115	WWA	Mitigation Plan	51	The text in the first two paragraphs reflects the difficulty of using the DIR data in Tables 8 and 9 for assessing relative vulnerability of impacts at the county level. The sentence which begins "Regardless of whether or not assumptions of vulnerability can be made from the data in these tables" finally concedes the inadequacy of the data for this purpose, but still argues that they are a "valuable tool". They may be valuable for other purposes, but they should not be presented this way in a section titled "Assessing Vulnerability by Jurisdiction". Recommend deleting at least Table 9. [JL]	Removed Table 9 and modified discussion
116	WWA	Mitigation Plan	55, 59	Text on p. 55 and Figure 17: While the expectation that faster-growing counties may have greater vulnerability to drought seems reasonable as a generalization, given the number of other county-level variables at play (use of surface vs. groundwater, portfolio of water rights, over- or under-allocation of rivers, storage, etc.), it seems premature to leap from that generalization to an explicit quantitative "Impact Rating" (elsewhere called "Impact Score" or "Impact ranking"). The name of the rating/ranking/score (and the red colors in Figure 17) implies that those counties with higher values already do or will have greater drought impacts--but there's no empirical basis for that implication. I recommend eliminating the Impact Rating/Ranking/Score and instead simply show differences in growth rates and population sizes in Figure 17. [JL]	Modified the figure legend to read "Population Growth (2009-2035)" instead of "Impact Rating" to reflect the population change data being shown in the figure.
117	WWA	Mitigation Plan	82	Figure 24: The figure should be replotted so that the shading to show the values of the CSFS Wildfire Susceptibility Index is legible across the range of values. As shown, only the lower ("Moderate") values shown by the black shading are visible, and the "High" areas, which are more important, can't be discerned. Also, there are apparent discontinuities in the data at some county lines (e.g., Moffat/Routt), but this may be an issue with the CSFS dataset, not the plotting of it. [JL]	Note added to the text in Section 3.5.4 to clarify that the "low" susceptibility index values were filtered out to bring the map focus on the "moderate" to "high" values.
118	WWA	Appendix B	B.1	Paragraph 1: "drought profiles" is an unusual phrase with an unclear meaning. "Drought characteristics" or "drought risk" would be preferable. [JL]	Changed wording
119	WWA	Appendix B	B.1	Paragraph 1: Sentence 1: Water demands are high for hydropower, but are higher for energy production; suggest rephrasing as "water demands for energy production" Sentence 2: Needs a "?" [KA]	Can't find these sentences anywhere in Appendix B or the vulnerability annex
120	WWA	Appendix B	B.1	Paragraph 2: Sentence 1: Change "predicted" to "projected". (The IPCC reports avoid the use of the word "predict", since all of GCM output is based on subjectively selected emissions scenarios and should not be taken as predictions.) [JL]	Changed wording
121	WWA	Appendix B	B.1	Paragraph 2: Sentence 1: Reference is IPCC 2007; Bibliography says IPCC 2001 [KA]	Updated bibliography
122	WWA	Appendix B	B.1	Paragraph 4: I suggest changing the definitive framing of climate projections (e.g. "will happen") as it seems to communicate a message about what one should adapt to. However, there is the real possibility of no change for quite a while with respect to some future possibilities (e.g. snow vs. rain at high elevation). At the least, I suggest careful incorporation of timescales in association with the sentences including projections, and emphasis of Page B.2, Paragraph 1 (regional differences in climate change) in the context of the content in Paragraph 4. [KA]	Changed wording from 'would' to 'could'
123	WWA	Appendix B	B.2	2nd bullet item: "the 1950-1990 baseline" should be changed to "the 1950-1999" baseline [JL]	Changed year from 1990 to 1999
124	WWA	Appendix B	B.2	Paragraph 2: The "peer-review" portion of this is not quite accurate. The synthesis contained a lot of information from peer-reviewed literature, but about half were new analyses, and these new analyses were critical to the conclusions. Yes, the Report was reviewed by peers, but it wasn't formally "peer-reviewed" in the academic sense. [KA]	Got rid of the term 'peer-review'
125	WWA	Appendix B	B.2	Bullet List: Given that the report came out two years ago, I suggest putting dates on several of the bullets (e.g. increase in temp of X "from 1977-2006", instead of "in the past 30 years"). Alternatively, you might explicitly state that the report covers x to y time period. [KA]	Added text 'from 1977-2006'
126	WWA	Appendix B	B.2	5th bullet item: The phrase "timing and intensity of streamflows" should be changed to "timing of streamflows". It's unclear what "intensity" means here—if it is used to mean "magnitude", then the statement is not quite accurate. [JL]	Changed bullet text to refer only to the timing of streamflows
127	WWA	Appendix B	B.4	In the sentence following the heading "Preliminary Colorado River Water Availability Study Findings", the following should be added to the end of the sentence: "within western Colorado." Otherwise, a reader unfamiliar with the scope of CRWAS might conclude that the study results summarized after this sentence refer to the entire Colorado River basin. [JL]	Added text 'within western Colorado'
128	WWA	Appendix B	B.4	1st bullet item under "Natural Flows": This implies that the cases in which projected flows decreased and increased were roughly equal, which is misleading. I recommend changing this to "Annual flow decreases under most of the climate change scenarios, and increases under some of the scenarios." [JL]	This text is directly from the Draft Water Availability executive summary. We maintain consistency with this draft.

129	WWA	Appendix B	B.8-B.17	The "Average Drought Length Exceedance Probabilities" analyses, and associated figures and tables, have a flawed basis such that the results do not have the meaning given to them in the text. The "maximum observed drought" (ranging from 4 to 6 years in the examples shown in the tables) is a single realization from a very small sample (56 years), and thus its variation between gages and (sub)basins is fairly arbitrary and not necessarily reflective of the long-term hydrology. But the analyses use that value as the benchmark for calculating exceedance probabilities for future drought, and thus they lead to faulty inferences about the nature of future drought. For example, the Yampa River at Steamboat Springs happened to have a relatively long maximum observed drought (6 years), and the exceedance probabilities for projected future drought are thus calculated as 36%-43% for the six future scenarios. The San Juan River at Pagosa Springs happened to have a relatively short maximum observed drought (4 years), and the calculated exceedance probabilities are much higher (76-89%) than for the Yampa--even though the "average length of maximum drought" for the future scenarios for the San Juan are slightly shorter than those for the Yampa. In other words, the "exceedance probabilities" are largely an artifact of the stochastic nature of the short observed drought record, and do not represent something meaningful about future drought risk. One really can't conclude, as the text asks us to on p.B.8, that the probabilities <50% represent "wetter" conditions, and those >50% represent "dryer" [sic] conditions. On the August 16 webinar, Jim Verdin (USGS/NIDIS) and one other person commented on the apparent spatial incongruities in the drought exceedance maps (Figures 1-1 to 1-5), with large red dots (>>50%) co-occurring with small green dots (<<50%) in the same basin, sub basin, and even stream—quite contrary to one's expectation, given the strong spatial correlation of climate and streamflow variability within basins. I believe this counterintuitive pattern seen in the maps is likewise an artifact of the methodology. [JL]	This comment contradicts points made later by this commenter who notes that; "our collective understanding of what constitutes "drought" for a given basin/gage is based on the observed hydrology, and the infrastructure and allocation of water was also based on that hydrology." This study chose to calculate exceedance probabilities relative to the observed period of record to make our results relevant and easily understandable for decision makers. However, the observed period of record is limited and was constrained to the 50 year period considered for the Water Availability Study. While it is true that the spatial variability is largely a function of changes in drought length in the observed hydrology, this variability is not 'arbitrary'. Rather it is a result of the natural variability in droughts. This does limit the results but it is not a fundamental flaw. Changed the map to just show selected points on the main rivers and added a comment on uncertainty.
130	WWA	Appendix B	B.6-B.17	On p. B.6., the text states that "…the likelihood of experiencing maximum drought duration longer than the longest drought in the 56 year period of record was calculated by counting the number of traces, out of 100, with a maximum drought length above this threshold. This is also referred to as the exceedance probability." Thus, one would expect that the exceedance probability value calculated for any one gage for any one scenario will be a whole number (e.g., 58% = 58/100 traces). However, the exceedance probabilities given in tables 1-1 through 1-5 have one significant digit, e.g., 58.3%. This suggests either that the exceedance probabilities are not being calculated as the text describes, or the values provided in Tables 1-1 through 1-5 are something other than exceedance probabilities. [JL]	There are a myriad of ways to analyze drought and visualize results. We built our analysis directly off the Water Availability Study and present our results in a consistent manner.
131	WWA	Appendix B	B.8-B.17	Per the comments above, I recommend replacing the "Average Drought Length Exceedance Probabilities" analyses with tables and figures which compare the distribution of drought lengths (i.e. histograms of frequency of drought of N length) for the observed and future scenarios. This would make the point that the observed record contains only a sample of the potential drought events seen when more ensemble members are generated. (Also see next comment.) [JL]	There are a myriad of ways to analyze drought and visualize results. We built our analysis directly off the Water Availability Study and present our results in a consistent manner.
132	WWA	Appendix B	B.16-B.17	The four sentences at the bottom of p. 16 and top of p. 17 explain that the calculation of drought length for the 6 future climate scenarios was done relative to the mean (runoff) of each scenario, and if the calculations were re-done using the observed mean, the wetter scenarios would "probably" show shorter, less severe droughts, and the drier scenarios would "probably" show longer, more severe droughts. While this caveat is correct, and important to make, it would be much better to follow through and re-do the calculations using the observed mean, as this would allow a more common-sense and useful comparison of observed droughts with future droughts. Our collective understanding of what constitutes "drought" for a given basin/gage is based on the observed hydrology, and the infrastructure and allocation of water was also based on that hydrology. If the hydrology shifts to drier (or wetter) conditions, then it is important to know the new frequency of drought as defined using the "old" mean hydrology. Using the mean of each future scenario as the basis for drought calculation tends to obscure the true effect of future hydrologic change on drought frequency, and for those scenarios (i.e., most of them) which project lower mean flows in 2040, using the mean of the scenario will under represent real future drought risk. (An earlier statement in the draft plan (p. B.6) clearly articulates the embedded assumption of using the projected means as the baseline: "In other words, it assumes that a given climate scenario has come true and that systems are now operating with respect to the mean of the given scenario." In other words, the systems are assumed to have perfectly adjusted to the new mean flow, and so "risk" in this context is limited to departures from the new mean. I think this assumption is unrealistic, and also inconsistent with the purposes the State Drought Plan.) [JL]	For the current project we were limited by the data produced for the Water Availability Study. However, the State has recognized this issue and is funding additional work to conduct analysis relative to the historical means.
133	WWA	Appendix B	B.18-B.21	In Figures 1.6-1.9, the labels on the x-axis indicates that the data in the rightmost three bars represent the "2 Driest Years", "5 Driest Years", and "10 Driest Years", respectively. This phrasing implies that these "years" are not necessarily consecutive—that they are the driest individual years from the 56-year model period. To avoid confusion, and to be consistent with the text, the labels should be changed to "Lowest 2-year average flow", etc. [JL]	These charts were copied directly from the Water Availability Study. Added a description paragraph from the study.
134	WWA	Appendix B	B. 24	The citation to "(Woodhouse and Lucas)" should be changed to "(Woodhouse and Lukas 2006)". [note change in spelling] And the following reference should be added to B.4, Bibliography, on page B.29: Woodhouse, C., and J. Lukas. 2006. Streamflow Reconstructions for Boulder Creek, South Boulder Creek, and the Colorado River. Report to City of Boulder and Hydrosphere Resource Consultants, January 2006. [JL]	Changed reference and updated bibliography
135	WWA	Appendix B	B. 26	Sentence 1: Per previous comment about "drought profiles", change "several possible future drought profiles" to "possible changes to drought risk in a future climate". [JL]	Changed text
136	WWA	Appendix B	B. 26	Sentence 2: The second clause is missing the critical word "not". I also recommend other changes for clarity and emphasis, to this: "While there is no way to be certain what future hydrology will look like, it is important for planners to be aware that the future is unlikely to repeat the observed hydrology, and it is likely that the state will experience more severe and sustained droughts than seen in the last 56 years." [JL]	Inserted recommended text

137	WWA	Appendix B	B. 26	Paragraph 2: Sentence 1: "It is important to note that the 2002 drought was a relatively moderate drought compared to historical hydrology." If "historical hydrology" refers to the tree-ring paleohydrology, then the statement is inaccurate. 2002 was an extraordinarily dry year even in the context of the 1200-year paleohydrology for the Upper Colorado River, and other paleohydrologies for Colorado basins, and was in no way "relatively moderate". To avoid a lengthy discursion into the characteristics of the paleohydrologic record, it would be best to delete the first two sentences of the 2nd paragraph. [JL]	Deleted sentences
138	WWA		B. 26	In several places in Appendix B, "historical hydrology" is used to refer to the tree-ring record of paleohydrology. This usage tends to create confusion with the observed hydrology. CRWAS actually uses the phrase "alternative historical hydrology" [emphasis mine] to refer to the tree-ring paleohydrology to avoid confusion with the "normal" (observed) historical hydrology. Either that phrase, or "tree-ring paleohydrology", or "paleohydrology", should be used instead of "historical hydrology". [JL]	Historical hydrology' refers to the 1950-1999 hydrology and "alternate historical hydrology" refers to historical hydrology that has been re-sequenced using the paleo record. Text was checked for consistency and where necessary clarification was added.
139	WWA		B.26-B.27	Section B.3 "Incorporating Climate Change into Planning", contains virtually no additional information or guidance on incorporating climate change into planning. I recommend either expanding this section so that it provides useful information and guidance to users of the Drought Plan, or leaving it out entirely. My thoughts on expanding this section: the text mentions the October 2008 Governor's conference; what lessons about incorporating climate change into planning were presented there? And here are other sources of information/guidance from which key messages could be extracted and re-framed as needed for state and local entities: - the CWCB/WWA *Climate Change in Colorado Report* , Chapter 6 - Water Utility Climate Alliance (WUCA) White paper: *Decision Support Planning Methods: Incorporating Climate Change Uncertainties into Water Planning* (Kaatz et al. 2010) - USGS Circular 1331: *Climate Change and Water Resources Management: A Federal Perspective* (Brekke et al. 2009) [JL]	Added a paragraph outlining the methods in the CWCB report chapter 6
140	CSU	Annex B, Agricultural Sector	B.75	3rd bullet under key findings, grazing lands are vulnerable to drought resulting in limited forage availability and disturbance of the managed ecosystem	Updated text to incorporate comment
141	CSU	Annex B, Agricultural Sector	B.75	4th bullet, change "plant loss" to "income and job loss"	Changed text
142	CSU	Annex B, Agricultural Sector	B.77	"This reliance on supplemental feed in the wintertime means that cattle ranchers are vulnerable to drought impacting the dryland crop sub-sector." *Much of the hay is irrigated ~ 1 million acres*	Changed text to read, "This reliance on supplemental feed in the wintertime (generally hay, which can be both irrigated or dryland) means that cattle ranchers are vulnerable to drought impacting the crop sub-sectors."
143	CSU	Annex B, Agricultural Sector	B.77	"Major dryland crops are winter wheat (grown on the eastern side of the State), pastureland, and beans [McKee et al. 2000]." *Doubt this (re: beans)*	Double-checked the document this came from, and it does state that major dryland crops in Colorado include "winter wheat and beans, as well as pastureland." (McKee et al. 2000, "A History of Drought in Colorado, Lessons Learned and What Lies Ahead," pg. 11.)
144	CSU	Annex B, Agricultural Sector	B.78	"proso millet, sudex, or sunflowers…" change to "…*and* sunflowers."	Changed text
145	CSU	Annex B, Agricultural Sector	B.78	"…located throughout the State, plant annual forage…" change to "…*commonly* plant annual forage."	Changed text
146	CSU	Annex B, Agricultural Sector	B.79	Table 6.1, 2nd bullet- change to "Winter wheat, *the* prominent dryland crop in Colorado, is *generally* planted on a 2-year…"	Changed text
147	CSU	Annex B, Agricultural Sector	B.83	Figure 6.4- *Dominant* Crop Types Grown per County - this map is very misleading	Crop information obtained from HAZUS database; the name of the figure was changed to "Dominant Crop Types Grown per County."
148	CSU	Annex B, Agricultural Sector	B.87	2nd paragraph- *junior* surface water rights can be *called* out of priority during a drought…	Changed text
149	CSU	Annex B, Agricultural Sector	B.87	General- important to note that grasslands may recover from drought and over-grazing very slowly. Invasive weeds and undesirable species may be favored by drought.	Incorporated note into text
150	CSU	Annex B, Agricultural Sector	B.95	Table 6.6, first bullet: "Cost of freight is *problematic"*	Changed wording
151	CSU	Annex B, Agricultural Sector	B.95	Table 6.6, crops-dryland, add: "Soil erosion due to decrease cover and blowing"	Added bullet
152	CSU	Annex B, Agricultural Sector	B.111	Lack of precip comes with decreased aquifer recharge; drought tends to come with more sun and heat therefore increased ET	Incorporated into text
153	CSU	Annex B, Agricultural Sector	B.111	Re: adaptation to drought- early warning is very important for adaptation	Incorporated into "adaptation to drought" text (Section 6.6.1)

*Please note the page numbers may have changed slightly from the public comment draft to the final draft.