#	Ch	From Page	From Line	To Page	To Line	Comment
1	26	0	0	0	0	Greater indigenous and other participant observations of local scale changes should be brought into the information gathering and assessment process in a robust manner. Adaptation decision-making could be greatly enhanced through coordinated communication (Burleson, Elizabeth, Pace University School of Law)
2	26	0	0	0	0	My FOD comments have been mostly addressed in the SOD. Overall, I am happy with the revised draft. Specific comments provided below are mostly minor or clarification type. These comments may be helpful in preparing the final draft. (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)
3	26	0	0	0	0	The writing team is to be commended by the continuous improvement of the chapter from the ZOD and FOD to the current draft. While parts of the chapter are quite strong, other sections are more a listing of study findings with no obvious assessment (value added). It is particularly difficult to link these weaker sections with the Executive Summary and associated confidence statements. Figure 26-6 provides a strong opportunity for value-added analysis that is not really exploited. There are several subsections that could be shortened or deleted, freeing up space for additional analysis. In final revision the writing team is encouraged to pay particular attention to the Executive Summary and ensure that these statements are clear, substantive, and accurately reflect the supporting literature. Be clear whether statements apply equally to the whole of North America, or if they only apply to one of the three countries comprising the region. (Lemmen, Don, Canada National Study)
4	26	0	0	0	0	A glaring omission from this Chapter is the lack of presentation of any results from studies using the RCP2.6 scenario. Policymakers would benefit from seeing impacts from an array of scenarios. (UNITED STATES OF AMERICA)
5	26	0	0	0	0	Add reference to Glossary somewhere in chapter. (UNITED STATES OF AMERICA)
6	26	0	0	0	0	At several points in the Chapter, it is unclear whether claims refer to local areas or to the entire continent of North America. It is suggested that this distinction be made more clear; otherwise some statements may be misleading. Specific examples include: Box 26-1 regarding ozone and PM10 emissions; section 26.3.1 where most flood studies are of local regions; section 26.6.1.6 regarding vector borne diseases, and section 26.4 regarding beetles that are specific to the US and Canada. (UNITED STATES OF AMERICA)
7	26	0	0	0	0	Attribution of impacts to climate change needs to be made clear in both the "Current Trends" and the "Projected Impacts" sections. An explicit non-climate change counterfactual is most preferable, however it understood that this counterfactual may not be available or may be inconsistent in the existing literature. Specific examples on this ambiguity are found in sections 26.3.1 regarding the impacts of floods; 26.3.3.1 regarding the water scarcity; 26.5 where the connection between climate change and crop prices is vague; 26.7.3.2 where it is unclear how much of a driver climate change is for electricity demand; and 26.7.5.2.1 where most of the cited costs to the transportaion system are not attributable to climate change. (UNITED STATES OF AMERICA)
8	26	0	0	0	0	Avoid language like 'sensitive wetlands', 'fragile ecosystems', or 'climate-sensitive urban areas,' unless these are describing a subset of wetlands that are fragile, a subset of urban areas that are climate-sensitive and so on. (UNITED STATES OF AMERICA)

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#	Ch	From Page	From Line	To Page	To Line	Comment
9	26	0	0	0	0	Because this chapter is trying to provide a North America-specific discussion of vulnerabilities and adaptation, without duplicating material in other WGII chapters, it is understood that the authors chose to highlight a small number of topics within each sector. However, there is insufficient information provided as to why the topics that are covered were chosen, and why other topics were left out. This could be partially addressed by providing more links to other WGII chapters, although those sector-specific chapters do not always indicate which studies come from North America so it is not always a simple process to pull out the North America-specific information in those sector-specific chapters. It could also be better addressed by providing a slightly more expanded explanation of why the highlighted topics were chosen (and the expense of other potential topics). We suggest that the authors reviewing WGII Chapter 4 p. 34 Lines 20-26 for an example of a more thorough way to justify a narrowed focus for the remainder of a section/chapter. Examples of specific places to provide this type of explanation, and increased references to other WGII chapters, within Chapter 26 are included in other comments provided with this review. (UNITED STATES OF AMERICA)
10	26	0	0	0	0	Headers are too brief. For example: "26.3.1 Observed impacts on water resources". Observed impacts of what ? Does not say climate change and many of the observed changes described in the section are not attributed to climate change. Similarly, "26.4.2.1 Observed Impacts" does not say impacts of what. (UNITED STATES OF AMERICA)
11	26	0	0	0	0	In adaptation sections, more consistent discussion of trade-offs is required for each adaptation strategy. Some strategies exacerbate climate change, some are very expensive, others will have non-climate environmental impacts. Specific examples where discussion of trade-offs is needed are 26.3.4 where the distinction between "hard" and "soft" strategies, as cited in the executive summary, is ambiguous and does not specifically address possible negative effects of adaptation; 26.4 where there may be significant detriments to ecosystems from adaptation strategies; 26.5.3.1 where organic practices are not necessarily greenhouse gas reducing; and 26.7.1.3 where air condition is cited as an adaptation though it may also exacerbate greenhouse gas emissions. Individual comments are included for each of these examples. (UNITED STATES OF AMERICA)
12	26	0	0	0	0	It does not appear that there are significant inconsistencies in the conclusions provided in Chapters 26 and 11 with regard to impacts on human health (globally in Chapter 11 and for North America in Chapter 26). Nevertheless, there are overlaps in the discussions of Chapter 26 and Chapter 11 as well as more specific discussions of health issues in Chapter 11 and it would be useful to cross reference issues raised in Chapter 11 that support findings in Chapter 26. In particular for issues such as water and air quality changes as well as the exacerbation of disease vectors, it would be useful to identify the extent to which the overall findings about human health laid out in Chapter 11 are relevant and play out in North America. (UNITED STATES OF AMERICA)
13	26	0	0	0	0	It is often unclear whether impacts are the result of mean effects or variability effects. This is particularly salient in the current physical trends section 26.7.2.2, however attribution of impacts to mean effects or extreme events could be better throughout the document. (UNITED STATES OF AMERICA)
14	26	0	0	0	0	It would be helpful for the reader if there were some indication, using either maps or verbal descriptions, of what areas of North America are being referred to when, for example, one says northern North America or Eastern Canada. It can become particularly confusing referring to more northern parts of North America, and it is not quite clear whether North Alaska and Arctic Canada are included here, or covered primarily in Chapter 28 on Polar Regions. (UNITED STATES OF AMERICA)
15	26	0	0	0	0	It would be preferable if maps could show the entire North American continent. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	TO Line	Comment
16	26	0	0	0	0	Recommended citiations for literature on non-modern adaptation.Recommended citiations:\nConstanza, Robert, Lisa J. Graumlich, and Will Steffen, eds. 2007 Sustainability or Collapse? An Integrated History and Future of People on Earth.MIT Press, Cambridge, MA.\nCooper, Jago, and Payson Sheets, eds. 2012 Surviving Sudden Environmental Change: Answers from Archaeology. University Press of Colorado, Boulder.\nCrumley, Carole, ed. 1994 Historical Ecology.School of American Research Press, Santa Fe, NM.\nDugmore, et al. 2007 The Role of Climate in Settlement and Landscape Change in the North Atlantic Islands: An Assessment of Cumulative Deviations in High-Resolution Proxy Climate Records. Human Ecology 35: 169 - 178.\nFisher, C T., J. Brett Hill, and G M. Feinman. 2009. The Archaeology of Environmental Change: Socionatural Legacies of Degradation and Resilience. University of Arizona Press, Tucson.\nHornberg, A. J. R. McNeill, and J Martinez-Alier, eds. 2007. Rethinking Environmental History: World System History and Global Environmental Change. Altamira, Lanham, MD.\nKirch, Patrick V. 1997. Microcosmic Histories: Island Perspectives on "Global Change.\nAmerican Anthropologist99(1): 30-42.\n2007 Hawaii as a Model System for Human Ecodynamics.American Anthropologist 109(1): 8 - 26.\nKohler, Timothy A., and Sander van der Leeuw, eds. 2007. The Model-Based Archaeology of Socionatural Systems. School of American Research Press, Santa Fe, NM.\nMarks, Robert B. 2007. The Origins of the Modern World: A Global and Ecological Narrative from the Fifteenth to the TwentyFirst Century,2nd ed. Rowman and Littlefield, Toronto.\nMcGovern, T H., et al. 2007. Landscapes of Settlement in Northern Iceland: Historical Ecology of Human Impact and Climate Fluctuation on the Millennial Scale. American Anthropologist 109(1): 27 - 51.\nNorberg, J, J Wilson, B Walker, and E Ostrom. 2008. Diversity and Resilience of Social-Ecological Systems. In Complexity Theory for a Sustainable Future, ed. Jon Norberg and Graeme S. Cumming. Columbia Universi
17	26	0	0	0	0	Suggest that references be inserted immediately after the relevant comment is made, for clarity. For example, p. 15, line 43-45 cites a Mexican source and a Canadian source, but the INA source should be brought forward in the sentence. (UNITED STATES OF AMERICA)
18	26	0	0	0	0	Terms "early" and "late" are used to modify 21st Century without definition. (UNITED STATES OF AMERICA)
19	26	0	0	0	0	The chapter should use either US or USA consistently (not switch back and forth between the two acronyms (UNITED STATES OF AMERICA)
20	26	0	0	0	0	The coverage of adaptation as presented feels haphazard - it appears more a collection of randomly selected examples than as a methodologically representative sample of what is happening. Much action on adaptation is not represented in the peer review literature - due to both the nature of adaptation (often serendipitous/indirect and also too soon to evaluate) and because the academic literature prioritizes new and novel contributions to theory and many adaptations are simply more of the same in terms of improving environmental governance. The result is that drawing only from the peer-reviewed literature will overlook a large number of actions that are in progress and only represent those that academics have selected. (UNITED STATES OF AMERICA)
21	26	0	0	0	0	The Executive summary, water, ecosystems, and other sections report recently observed changes/trends, with the implication that those changes were due to climate change, but they do not state explicitly whether the changes/trends are attributed to climate change or what the trend has do with climate change. In addition, there is a lack of climate counterfactua: , in other words, how does reader know that the cited impacts or adaptation activities would not have occurred without climate change? There is language and protocol for this in the volume, but many sections of Chapter 26 do not address the counterfactual. (UNITED STATES OF AMERICA)
22	26	0	0	0	0	The phrase sustainability is used without definition. (UNITED STATES OF AMERICA)

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#	Ch	From Page	From Line	To Page	To Line	Comment
23	26	0	0	0	0	The references to adaptation-mitigation co-benefits are welcome, although the discussion is quite scant here (and in 26.8.4.3, which
						consists of only 4 sentences) (UNITED STATES OF AMERICA)
24	26	0	0	0	0	The trans-boundary discussion is very welcome. Some treatment of the Canada-US dynamic would also be of value. Perhaps selecting
						the issue of electricity transfers (vulnerable to changes in hydroelectric power), or commerce in forest products would be a useful case
						study. (UNITED STATES OF AMERICA)
25	26	0	0	0	0	The two boxes in the chapter are a good idea, but they need to have a clear narrative structure and ideally should make points that
						could not be made without such a box (UNITED STATES OF AMERICA)
26	26	0	0	0	0	There is extensive discussion of snow and snowpack, but no discussion of the loss of glacial mass. (UNITED STATES OF AMERICA)
27	26	0	0	0	0	There seem to be gaps in coverage between the Polar Chapter and the North America Chapter, where Native peoples are concerned,
						including fishing, sea ice impacts on coastal resources, hunting and gathering livelihoods, and other topics. (UNITED STATES OF
						AMERICA)
28	26	0	0	0	0	Throughout, the sections on adaptation focus on modern examples. These generally involve an attempt to respond to one problem,
						and lack sufficient time depth to determine if 1) the response was effective in solving the original problem, 2) if the response created
						additional problems in the near-term, 3) if the response was sustainable in the long term, and 4) if the response created path
						dependencies that created cascading problems worse than the original problem. There is a growing body of research on what might be
						called long-term human ecodynamics, primarily by archaeologists, environmental historians and paleoecologists, which is directed not
						only at understanding the past, but providing information which can be used to make choices that support a sustainable future and
						increase resilience in the face of environmental changes, fast or slow (Constanza, Graumlich, and Steffen 2007: Cooper and Sheets
						2012: Crumley 1994: Dugmore et al. 2007: Fisher, Hill, and Feinman 2009: Hornberg, McNeill, and Martinez-Alier 2007: Kirch 1997.
						2007: Kohler and van der Leeuw 2007: Marks 2007: McGovern et al 2007: Norberg et al. 2008: Redman et al. 2004: Rick and Frlandson
						2008: Sabloff 1998) It would seem that this literature should be considered in the sections on adaptation, even if just to recommend
						that this approach be utilized in planning where at all possible \nRecommended citiations are provided in a separate cell. (UNITED
						STATES OF AMERICA)
		-	-	-	-	
29	26	0	0	0	0	While Box 26.1 focuses on the US-Mexico border, there is a good story to be told about cross-border cooperation with respect to the US
						and Canada, as well - and perhaps this can be included as a new, separate box. While there are myriad concerns about hydropower,
						water quality and even water quantity (especially the Great Lakes Region), a treaty has been successfully negotiated between the two
						Parties to manage water rights and could serve as a model for other trans-boundary water (and other) resources. The Columbia River
						treaty (http://www.crt2014-2024review.gov) relates to trans-boundary water issues between the US and Canada and is a good
20	26	0	0	0	0	example (UNITED STATES OF AMERICA) The authors have answered and addressed my provious questions from the first round of review. (Caffrey, Maria, National Bark Service)
50	20	U	U	U	U	and University of Colorado, Boulder)

#	Ch	From Page	From Line	To Page	To Line	Comment
31	26	0	0	0	0	I was surprized that chapter 18 had more thorough informatin than chapter 26 on risks to boreal and permafrost systems. It should especially be looked into whether warming of permafrost soils might lead to a major loss in carbon storage worldwide. There are warming experiments that have been performed in the arctic, this evidence is still shallow but it's something. At the very least it would be worth more elaboration on the lack of data available or potential risks. Allison S., and KK Treseder. (2008) Warming and drying suppress microbial activity and carbon cycling in boreal forest soils. Global Change Biology 14:2898-2909. DOI: 10.1111/j.1365- 2486.2008.01716.x; http://www.eeescience.utoledo.edu/faculty/weintraub/csas.htm; Chapin, F. S. III, M. Sturm, M. C. Serreze, J. P. McFadden, J. R. Key, A. H. Lloyd, A. D. McGuire, T. S. Rupp, A. H. Lynch, J. P. Schimel, J. Beringer, W. L. Chapman, H. E. Epstein, E. S. Euskirchen, L. D. Hinzman, G. Jia, C. L. Ping, K. D. Tape, C. D. C. Thompson, D. A. Walker, and J. M. Welker. 2005. Role of Land-Surface Changes in Arctic Summer Warming. Science 310: 657-660. Schimel, J.P. and F.S. Chapin III. 2006. Microbial processes in the Alaskan boreal forest. In: Alaska's Changing Boreal Forest. Chapin, F.S. III, M.W. Oswood, K. van Cleve, L.A. Viereck, and D.L. Verbyla (Eds.) Oxford University Press. Pp. 227-240.\nChapin, F.S. III, M.O. McGuire, R.W. Ruess, M.W. Walker, R. Boone, M. Edwards, B. Finney, L.D. Hinzman, J.B. Jones, G.P. Juday, E.S. Kasischke, K.Kielland, A.H. Lloyd, M.W. Oswood, CL. Ping, E. Rexstad, V. Romanovsky, J. Schimel, F. Sparrow, B. Sveinbjornsson, D.W. Valentine, K. Van Cleve, D.L. Verbyla, L.A. Viereck, R.A. Werner, T.L. Wurtz, and J. Yarie. 2006. Summary and synthesis: Past and future changes in the Alaskan boreal forest. In: Alaska's Changing Boreal Forest. Chapin, F.S. III, M.W. Oswood, K. van Cleve, L.A. Viereck, and D.L. Verbyla (Eds.) Oxford University Press. Pp. 332-338. Schimel, J.P., J. Fahnestock, G. Michaelson, C. Mikan, CL. Ping, V.E. Romano
32	26	0	0	0	0	Similar to my comment about permafrost systems, this chapter would be served very well by having a "soil quality" or "soil resources" section as was done for water resources- see Chapter 28 as a nice example for that. This could then combine ideas of ersosion, agricultural food productivity, changes in soil C stocks, and changes in boreal landscapes due to warming. As is stands now these issues are sort of scattered and never thoroughly addressed. (Gutknecht, Jessica, Helmholtz Centre for Environmental Research-UFZ)
33	26	0	0	0	0	Traceable account for ES findings need to be clear and easy to follow. At present sections provided with ES findings direct readers to a very broad section, it will be useful for readers if specific relevant sections are given here. Many ES findings do not have any traceable accounts. (Chatterjee, Monalisa, IPCC WGII TSU)
34	26	0	0	0	0	1) Overall The chapter team has developed a strong assessment in its 2nd-order draft. In the final draft, the chapter team is encouraged to continue its prioritization of compact and rigorous assessment, effective figures, and clear writing. (Mach, Katharine, IPCC WGII TSU)
35	26	0	0	0	0	2) Coordination across Working Group II In developing the final draft of the chapter, the chapter team should continue to ensure coordinated assessment, both in the chapter text and at the level of key findings. As appropriate, cross-references to the sections of other chapters and/or their assessment findings should be used, reducing overlaps and harmonizing assessment. (Mach, Katharine, IPCC WGII TSU)
36	26	0	0	0	0	3) Harmonization with the Working Group I contribution to the AR5 In developing the final draft, the chapter team should also ensure all cross references to the Working Group I contribution are updated, with discussion of climate, climate change, and climate extremes referencing the assessment findings in that volume. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
37	26	0	0	0	0	4) Tightening the assessment and supporting a maximally rigorous executive summary In developing the final draft, the chapter team
						is encouraged to revise each section so that the core nuanced key findings emerge clearly from each section with full and traceable
						support. Revision geared towards highlighting the key findings will further support an executive summary that richly communicates the
						assessment. (Mach. Katharine. IPCC WGII TSU)
38	26	0	0	0	0	5) Characterization of future risks In characterizing future risks for North America, to the degree appropriate the chapter team should
						indicate the extent to which risks (or key risks) can be reduced through mitigation, adaptation, development, poverty reduction, etc.
						That is, is it possible to indicate how specific risks may increase as the level of climate change increases or, potentially, to indicate the
						relative importance of changes in mean conditions, as compared to changes in extreme events, as compared to potential non-linear
						changes associated with biome shifts or tipping points? And then, how much can risks be reduced through adaptation or development,
						in the near-term and long-term? How are factors or stressors that multiply risks relevant in this context? Complementing the summary
						provided already in 26.10.1, to what degree can the same type of information be provided for specific risks and specific adaptive
						responses? As supported by its assessment of the literature and as already framed in the sectoral assessment in 26.10.1, the author
						team should consider communicating specific risks for the era of climate responsibility (the next few decades, for which projected
						temperatures do not vary substantially across socioeconomic/climate scenarios) and for the era of climate options (the 2nd half of the
						21st century and beyond). As might be helpful to the chapter, the framing of table SPM.4 could be considered in characterization of
						future risks, along with the key and emergent risk typology of chapter 19. The chapter 25 executive summary and table 25-8 may also
						be relevant. For example, the chapter team might consider presenting a table of specific risks for the region, as a further complement to
						26.10.1, which provides great overall assessment summary for the region. (Mach, Katharine, IPCC WGII TSU)
39	26	0	0	0	0	6) Informing the summary products To support robust and insightful summary products for the report, the chapter team is
						encouraged to maximize nuance and traceability in its key findings, continuing to use calibrated uncertainty language effectively. In
						addition to nuanced characterization of future risks (see the previous comment), the chapter team is encouraged to consider themes
						emerging across chapters, indicating for example how extreme events have demonstrated adaptation deficits and vulnerabilities to
						date and may relate to future risks, how limits to adaptation may be relevant in the context of this chapter, how multidimensional
						inequality is relevant in the context of climate change, how adaptation experience has been relevant to date, and how interactions
						among mitigation, adaptation, and sustainable development may occur. (Mach, Katharine, IPCC WGII TSU)
40	26	0	0	0	0	7) Report release The chapter team should be aware that the final drafts of the chapters will be posted publicly at the time of the
						SPM release, before final copyediting has occurred. Thus, the chapter team is encouraged to continue its careful attention to refined
						syntax and perfected referencing. (Mach, Katharine, IPCC WGII TSU)
41	26	0	0	0	0	8) "Observed impacts" in the chapter subheadings Where the chapter team refers to "observed impacts" within subheadings of the
						chapter, it often seems that the assessment is actually broader, looking at observed impacts and also trends, sensitivities, and
						vulnerabilities more broadly. The chapter team is encouraged to consider using a broader phrase within the chapter subheadings, such
						as "observed impacts and vulnerabilities." (Mach, Katharine, IPCC WGII TSU)
42	26	0	0	0	0	9) Specificity in characterization of observations and projections In most parts the chapter, the chapter team uses high specificity in
						characterizing examples. Continued attention to providing sufficient information to enable the reader to fully understand each example
						is encouraged. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
43	26	0	0	0	0	GENERAL COMMENTS: I congratulate the author team for all their work on an interesting and informative SOD. When considering the suite of review comments, please look for opportunities to continue to hone and focus the text in revision even further, reducing length where possible. Please see my detailed comments for suggestions related to specificity of ES findings and traceable accounts, refining figures and tables, and specific clarifications. In addition, where likelihood terms are used ("likely," "very likely," etc.), it is also not always clear whether they are intended as calibrated language or notplease carefully check this and avoid casual usage. (Mastrandrea, Michael, IPCC WGII TSU)
44	26	0	0	0	0	SUMMARY PRODUCTS: In preparing the final draft of your chapter and particularly your executive summary, please consider the ways in which your chapter material has been incorporated into the draft SPM and TS. For Chapter 26, this includes presentation of observed impacts and vulnerabilities in section A.i, adaptation experience in section A.ii, sectoral and regional risks in section C.i, and interactions between adaptation and mitigation in section D.ii, as well as related figures and tables. Are there opportunities for presenting chapter findings and material in a way that further supports broad themes highlighted in the summary products and that facilitates additional cross-chapter synthesis in specific findings or figures/tables? Do the existing summary product drafts suggest additional coordination that should occur between Chapter 26 and other chapters at LAM4? (Mastrandrea, Michael, IPCC WGII TSU)
45	26	1	1	1	1	The tile"North America" is hanging. Let the title capture the sprit of the underlying text in the entire document. In otherwords, the title always prepares the reader what he expects in the text of the document (KENYA)
46	26	3	0	5	0	The ES is highly impactful. But it comes across very choppy as if one is reading a list of bullet points. One way to improve comprehension of the information would be to increase the structure and organization of the topics. The organization of topics in each paragraph appear arbitrary. (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
47	26	3	24	0	0	Regional Key Risks in the Executive Summary The chapter team is strongly encouraged to present clearly the key regional risks for North America within the executive summary. For the key risks, how do they vary with level of climate change, and what is the potential for adaptation to reduce the risks? What are the risks in the near-term (which can be considered an era of climate responsibility) versus the long-term (which can be considered an era of climate options)? The framing of SPM table SPM.4 or the framing of chapter 25's executive summary and table 25-8 could be considered. Identifying key risks more specifically would enable the chapter team to maximize the nuance and traction of the executive summary. (Mach, Katharine, IPCC WGII TSU)
48	26	3	24	0	0	Format of the Executive Summary For each paragraph, the chapter team should present 1st a key finding in bold font, followed by supporting non-bold sentences. (Mach, Katharine, IPCC WGII TSU)
49	26	3	24	0	0	Likelihood versus Confidence Wherever the chapter team presents likelihood terms with key findings, the authors should make sure that assignment of the likelihood term is supported by a probabilistic basis in the underlying evidence. Where assignment is not fully supported by assessment of probabilistic information, the chapter team should instead consider presenting a level of confidence. (Mach. Katharine, IPCC WGILTSU)
50	26	3	24	0	0	The Starting Point for each Conclusion The chapter team should carefully consider each finding in the executive summary, making sure that the starting point of each conclusion is clear. That is, is a given finding referring to sensitivity to weather (without asserting projections of future outcomes due to climate change), vulnerabilities to climate change, specific observed outcomes, specific projected outcomes, etc.? The executive summary will be much clearer if such nuance is fully communicated for each finding. (Mach, Katharine, IPCC WGILTSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
51	26	3	24	0	0	Conditionality of Conclusions In discussing future outcomes, the chapter team could be more explicit about what given conclusions are conditional on. That is, do expected outcomes hinge on potential evolutions of socio-economics, on trends in extreme events due to climate change, on changes in other stressors, etc.? How does the author team's degree of certainty about changes in drivers, impacts, and responses differ? (Mach. Katharine, IPCC WGII TSU)
52	26	3	24	0	0	Executive Summary: I would recommend further thought as to how the executive summary can most clearly communicate the findings of the chapter. The current draft contains good material, but I feel that the clarity and specificity of the presentation can be improved. For example, currently there is a mixture of statements about projected impacts and risks over specific timeframes and statements about impacts and risks associated with specific magnitudes of temperature increase. In section 26.2.2.2 (p. 11) there is discussion of how these framings relate (e.g., when North America is projected to reach specific magnitudes of climate change under different scenarios), but this is not clear in the context of the executive summary. Please consider ways to present projections consistently across the executive summary as a whole. And to the extent possible as supported by the literature, please emphasize what risks are projected to emerge over different time horizons (e.g., mid-century vs. end-of-century), as well as the potential or lack of potential for mitigation and adaptation to reduce them. In addition, there are a few cases where support in the chapter text is not clear. For example, please ensure clarity and support for the attribution statements that are presented here (see specific comments). (Mastrandrea, Michael, IPCC WGII TSU)
53	26	3	24	3	36	No mention of the recent persitent cold winters. The tempoeratures are falling , not rising (Gray, Vincent, Climate Consultant)
54	26	3	24	5	23	While you are somewhat constrained by the fact that this a an Executive Summary rather than a statement of Key Findings, please consider the fact that these will be most used part of the chapter - many readers will never go deeper. It is very important to spend the time deciding what point is being made with each paragraph, and then assessing to see if that point is being made clearly. While individual statements need to be strong and clear, it would also be helpful for there to be an overarching narrative to the Executive that is evident to those who are not reading the chapter. Simply using the phrase (For example" would help demonstrate that you are not providing comprehensive summaries. There is no sense of flow to the current Executive Summary, and no hint as to the criteria used to decide what findings warrant elevating to this level. (Lemmen, Don, Canada National Study)
55	26	3	26	0	0	First sentence would be more accurate if it referred to "changes in climate" rather than "changes in climate trends". (Lemmen, Don, Canada National Study)
56	26	3	26	3	26	Changes in climate trends is redundant here - it should either be "changes in climate" or "climate trends" (Fleming, Sean, Meteorological Service of Canada)
57	26	3	26	3	28	To be clearer, begin sentence with the word "Observed". (UNITED STATES OF AMERICA)
58	26	3	26	3	28	Please clarify the these are observed changes, as this is not immediately clear from the framing here. (Mastrandrea, Michael, IPCC WGII TSU)
59	26	3	28	0	0	highly likely is not one of the accepted terms in the IPCC guidance note on uncertainty. Do the authors mean "very likely"? (CANADA)
60	26	3	28	3	0	This is the first time the terms for uncertainty are used. Suggest the the authors refer the reader to the glossary or other souce of definition. (UNITED STATES OF AMERICA)
61	26	3	28	3	28	In place of "highly likely" the chapter team should choose one of the likelihood terms defined in the guidance for authors. Perhaps "very likely" is meant? (Mach, Katharine, IPCC WGII TSU)
62	26	3	28	3	28	Please clarify what calibrated uncertainty term is meant here, instead of "highly likely." (Mastrandrea, Michael, IPCC WGII TSU)

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#	Ch	From Page	From Line	To Page	To Line	Comment
63	26	3	28	3	36	" global average increase in temperature of at least 2 degree C". Some rewording of this line is needed. Because, at present this line conveys that until 2 degree C increase in global temperature, things are fine in North America. During 20th century we have experienced 0.8 degree C warming, i.e., we can keep pumping more greenhouse gasses in the atmosphere until 2 degree C warming is reached.\n" global warming of approximately 4 degree C": same comments as given above. (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)
64	26	3	30	3	30	The word "frequent" is ambiguous. If the point is that the frequency will increase, then please clarify the statement accordingly. (UNITED STATES OF AMERICA)
65	26	3	30	3	38	In discussing attribution here and throughout the chapter, very careful attention should be paid to assignment of the cause. That is, attribution to anthropogenic climate change is asserted here, but in many cases within this chapter and across the working group 2 report, attribution is only made to climate change. (Mach. Katharine, IPCC WGII TSU)
66	26	3	31	3	36	It may be clearest to merge this material into a single paragraph. (Mach, Katharine, IPCC WGII TSU)
67	26	3	35	3	36	While factually correct you need to consider how these statements will be used. This is the only place in the Executive Summary where a warming of 4C is addressed and the conclusion is that "some places will get wetter and some get drier"??? Need to decide if this bullet is about precipitation patterns, in which case it should be expressed that way, or is it about a 4C scenario, in which case it needs to be much stronger and more nuanced. (Lemmen, Don, Canada National Study)
68	26	3	35	3	36	Can this statement be augmented to address the expected changes in extremes (rather than averages as currently formulated)? (UNITED STATES OF AMERICA)
69	26	3	35	3	36	Specific line-of-sight references to the supporting chapter section should be provided for this statement in order to indicate its traceable account. (Mach, Katharine, IPCC WGII TSU)
70	26	3	35	3	36	Currently, this statement seems to imply that changes in annual precipitation will only occur for warming of 4C, and what happens for other levels of warming is unclear. Can more be said here (e.g., based on 26.2.2.2)? Also, are the changes mentioned in the previous paragraph associated with 2C warming also relevant for 4C? Right now this is also unclear. Please specify line of sight here as well. (Mastrandrea, Michael, IPCC WGII TSU)
71	26	3	38	3	41	Please provide clear support and line of sight for this statement, ensuring that the chapter text explains the basis for attribution to anthropogenic climate change. The basis for attribution is not clear in all of these cases in the current draft. In addition, please ensure clear distinctions between climate change and anthropogenic climate change here and in relevant discussions in the chapter text. (Mastrandrea, Michael, IPCC WGII TSU)
72	26	3	39	3	40	For these impacts named, the geographic and temporal extent of impacts that have been attributed to anthropogenic climate change or to climate change should be clarified. (Mach, Katharine, IPCC WGII TSU)
73	26	3	39	3	41	forest dieback and pest outbreaks have ben associated with warming that promoted drought stress and more directly insect population explosion but ALSO with forest condition (even age, high density, monospecific) so the very high confidence in the attribution of this category to anthropogenic climate change may be an overstatement. Many managers blame fire suppression more than changes in climate conditions. (Bachelet, Dominique, Conservation Biology Institute)
74	26	3	43	3	44	How is increased salinity of coastal water supplies an impact of climate variability? It is certainly strongly affected by other anthropogenic drivers (withdrawls), but its linkage to climate variability, if any, is far less obvious than for floods and drought. (Lemmen, Don, Canada National Study)
75	26	3	43	3	45	This finding could be clarified. Are the anthropogenic drivers referred to factors other than climate change? Is a role of climate change being asserted at all in this statement? If not, it is definitely fine to make an assertion about the impacts of climate variability and extremes, but clarity should be ensured. Also, over what time frame have the described impacts been observed? (Mach, Katharine, IPCC WGII TSU)

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#	Ch	From Page	From Line	To Page	To Line	Comment
76	26	3	43	3	45	This statement is not clearly supported in the specified chapter text. Please provide clear line of sight. (Mastrandrea, Michael, IPCC WGII TSU)
77	26	3	43	3	47	It may be useful to mention some of the hard and soft approaches that seem to work for water supply deficits issues. (Chatterjee, Monalisa, IPCC WGII TSU)
78	26	3	44	3	45	if these are observed why is there a confidence level and there needs to be one, why isn't it the highest possible (Bachelet, Dominique, Conservation Biology Institute)
79	26	3	45	3	46	It would be preferable to indicate more specifically what types of "hard and soft approaches" are currently available. (Mach, Katharine, IPCC WGII TSU)
80	26	3	46	3	47	Please provide evidence or reconsider the assertion that adaptive responses to flooding and water quality concerns are more limited than adaptive responses to water quantity. In+C10 the Adaptation section of section 26.3, several adaptation responses to changes in flooding are mentioned (e.g., larger culverts, adjusting coastal flood control systems, storm water control during more intense storms, etc.). See also the cross-chapter Box CC-EA which discusses Ecosystem-Based Adaptation and provides an example of how natural vegetation systems can provide flood regulation services (among other water-related ecosystem services) in light of climate change.
81	26	3	47	3	47	If not fully supported by a probabilistic basis in the underlying evidence, a level of confidence would be preferable. (Mach, Katharine, IPCC WGII TSU)
82	26	3	47	3	52	To what extent are these changes due to climate change (and how would they differ across scenarios of climate change) as compared to changes in exposure and vulnerability? (Mach, Katharine, IPCC WGII TSU)
83	26	3	47	3	52	In line with my previous comments, how do these impacts projected for the 21st century intersect with the impacts associated with 2C and 4C increase earlier in the executive summary? (Mastrandrea, Michael, IPCC WGII TSU)
84	26	3	48	3	48	The specified chapter text does not discuss droughts in this contextplease provide clear line of sight. (Mastrandrea, Michael, IPCC WGII TSU)
85	26	3	48	3	49	Some recent studies have questioned drought and climate change linkages (e.g. Sheffield et al. 2012). Have you considered these studies while making this conclusions.\nReference: Sheffield, J., E.F. Wood, and M. L. Roderick (2012), Little change in global drought over the past 60 years, Nature, doi:10.1038/nature11575. (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)
86	26	3	50	3	52	The sentence is confusing as written. Does the "except for" indicate that the following areas are expected to experience increased water supplies? If not, please clarify. (UNITED STATES OF AMERICA)
87	26	3	50	3	52	Would it be clearer to specify the areas where this is projected to occur, rather than the areas where it is not? (Mastrandrea, Michael, IPCC WGII TSU)
88	26	3	51	0	0	Why is "southern Mexico" italicized? (CANADA)
89	26	3	52	3	52	west and east Canada Sorry, but this is vague to the point of being useless. Canada is a big country (by area, anyway) with many climates; please be more specific. (Fleming, Sean, Meteorological Service of Canada)
90	26	4	1	4	2	A 2C increase is not mentioned explicitly in 26.4. Please include explanation of this aspect of the finding in the chapter text. (Mastrandrea, Michael, IPCC WGII TSU)
91	26	4	1	4	5	The 1st sentence of this paragraph implies that climate change is affecting many ecosystems with high confidence in attribution. It may be preferable to indicate more specifically the types of impacts that have been observed for ecosystems, even at the summary statement level, also with acknowledgment of the relative importance of other factors affecting ecosystems. (Mach, Katharine, IPCC WGII TSU)
92	26	4	2	4	2	It would be preferable to indicate more specifically what is meant by "widespread adverse impacts." (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
93	26	4	2	4	5	This paragraph could be more nuanced to focus on the commonalities rather than simply stating facts. Forests, like coasts, are affected by multiple and often interacting climate (and non-climate stresses). The reader will wonder why there is no reference to other ecosystems previously assessed as being sensitive (e.g. alpine, grasslands). (Lemmen, Don, Canada National Study)
94	26	4	2	4	5	How big has the role of climate change been compared to other factors? Over what time frame have observed impacts that can be
95	26	4	3	4	3	attributed to climate change been observed? (Mach, Katharine, IPCC WGII ISU) Change "other climate-related stresses" to "other climate-influenced stresses", because forest management practices have a lot to do with forest pasts & fires. (Eleming, Sean, Meteorological Service of Canada)
96	26	4	4	4	4	Consider adding increased sediment load from runoff in this list. (UNITED STATES OF AMERICA)
97	26	4	4	4	5	This sentence would make more sense if were written as\n"_ocean acidification, coral reef bleaching, sea level rise, storms, and storm surges." (UNITED STATES OF AMERICA)
98	26	4	5	4	5	The text in section 26.4 does not address the potential effects of climate change stresses on biodiversity and ecosystem services so it is not clear what the evidence is for the sentence "Climate stresses will likely reduce biodiversity and ecosystem services". WGII Chapter 4 does indicate that "There is very high confidence that projected climate changes imply increased extinction risk for a substantial fraction of species during and beyond the 21st Century, especially as climate change interacts with other pressures" and indicates other types of effects on biodiversity (e.g., species range shifts and altered species interactions) and ecosystem services (e.g., carbon storage). We recommend that this sentence either be removed from Chapter 26 since the text does not really address the topic, or that appropriate sections of Chapter 4 are cited to support this statement (and the language clarified in terms of "likely" vs. "very high confidence"). (UNITED STATES OF AMERICA)
99	26	4	5	4	5	Is the term 'environmental services' more appropriate? I have seen this term used in place of 'ecosystem services' increasing in the literature. (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
100	26	4	7	4	8	It would be preferable to specify the levels/scenarios of climate change to which this statement applies. Additionally, what "projected changes" are meantfor what types of extremes? What does "notable" mean? (Mach, Katharine, IPCC WGII TSU)
101	26	4	7	4	11	Is the first confidence estimate of "very high" internally consistent with the very closely related second (lower) one of "medium", given that the statement includes any adjustment for potential adaptation? (UNITED STATES OF AMERICA)
102	26	4	7	4	13	Several questions on this paragraph. Does the "very high confidence" apply regardless of climate change scenario considered? What does "without adaptation" means in the context of the agriculture sector, which is continuously adapting under business as usual? If this is simply a statement that "you won't be able to grow the same amount of the same thing in the same place", it does not warrant elevation to the Executive Summary. The statement regarding "substantial investments in adaptation" is not supported by Section 26.5. If this represents additional analysis, what does "substantial" mean? Clarity around "institutional support mechanisms" is needed. The only examples provided in text are credit and insurance. Is this an issue outside of Mexico?? (Lemmen, Don, Canada National Study)
103	26	4	7	4	13	Without adaptation should be specified, because a certain level of adaptation is always present. Farmers can and will adjust planting dates, irrigation schemes and crop varieties, or even crops to prevent a decrease of farm income due to climate change. (see also Ch26 p21 L10, Table 4 in SMP and TS p41-42)\n\n (NETHERLANDS)
104	26	4	7	4	13	Just a bit of clarification is in order here, even for a brief summary. Farmers switch out their crops all the time, depending on what is most economic etc. Climate change will no doubt reduce the productivity of some crops, but won't it often open up new opportunities from an agricultural perspective as well? Please explain, as this is an obvious question that many readers may have. (Fleming, Sean, Meteorological Service of Canada)

#	Ch	From Page	From Line	To Page	To Line	Comment
105	26	4	7	4	13	In line with my previous comments, how do these impacts projected for the 21st century intersect with the impacts associated with 2C
						and 4C increase earlier in the executive summary? (Mastrandrea, Michael, IPCC WGII TSU)
106	26	4	10	4	10	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
107	26	4	11	4	11	"there will likely be a negative effect on global food security". This formulation is biased and not supported. The effect of a change (or
						decrease) of food production in North America on global food security is complex. Theoretically a decrease of food production in North
						America could even have a positive impact on global food security, e.g. if it would stimulate food production and self suffiency in other regions.\n\n (NETHERLANDS)
108	26	4	11	4	11	Is it possible to describe more specifically what types of adaptive responses are meant here? (Mach, Katharine, IPCC WGII TSU)
109	26	4	15	0	0	Replace "heat extremes" with "extreme heat events" to be capture the concept of cumulative impacts. (Lemmen, Don, Canada National Study)
110	26	4	15	0	0	Why is "health impacts" italicized? (CANADA)
111	26	4	15	4	15	Is this a statement primarily about current vulnerability to extremes? It could be helpful to present within the bold finding more
						information on what such vulnerabilities reveal about current adaptation deficits. Also, it would be preferable to avoid italics of "health impacts." (Mach. Katharine, IPCC WGII TSU)
112	26	4	15	4	16	For the described increases in mortality and morbidity, are they a result of trends in vulnerability and exposure, or is there a rigorous
						attribution of increased impacts to climate change? (Mach, Katharine, IPCC WGII TSU)
113	26	4	15	4	23	Many other health effects are not addressed, notably respiratory and cardiopulmonary considerations due to increased pollen, reduced
						air quality, and vector-borne diseases (which are discussed at length in the body of the chapter). (UNITED STATES OF AMERICA)
114	26	4	15	4	23	It is vital to also include climate change impacts on water quality as another important concern to human health. (Sosa-Rodriguez,
						Fabiola S., University of Waterloo)
115	26	4	16	4	16	"that vary by age, (I would include by location) and socioeconomic factors. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
116	26	4	16	4	17	same comment as above: why level of confidence for observations? (Bachelet, Dominique, Conservation Biology Institute)
117	26	4	17	4	18	It would be preferable to briefly indicate what is meant by "direct and indirect pathways." (Mach, Katharine, IPCC WGII TSU)
118	26	4	20	4	20	What types of adaptive responses are relevant here, both where "pace of adaptation" and "current levels of adaptation" are
						mentioned? (Mach, Katharine, IPCC WGII TSU)
119	26	4	20	4	21	Is it possible to provide more information on areas particularly affected? Additionally, a level of confidence may be more appropriate
						than a likelihood term here. (Mach, Katharine, IPCC WGII TSU)
120	26	4	21	4	23	This last statement of the paragraph does not appear in section 26.6. Please provide line of sight. (Mastrandrea, Michael, IPCC WGII TSU)
121	26	4	22	4	22	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. Also, is it possible to indicate more specifically the human
						health risks meant here? (Mach, Katharine, IPCC WGII TSU)
122	26	4	22	4	23	Final phrase - "there are likely to be continued human health risks in the absence of specific adaptation planning" - is misleading
						because there will ALWAYS be human health risks associated with storms. It is very important for the readers to understand that the
						objective of adaptation is to reduce negative impacts, not eliminate them. (Lemmen, Don, Canada National Study)
123	26	4	25	4	25	What kinds of social and economic impacts are meant here? (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
124	26	4	25	4	25	Please specify what impacts are meant here. (Mastrandrea, Michael, IPCC WGII TSU)
125	26	4	25	4	26	With respect, this bold statement is so obvious it does not warrant inclusion. With the phrase "climate-related processes" basically says
						that weather has social and economic affects in communities. No one would argue against that. If the phrase "to climate-related
						processes" were revised to read "to climate change", the statement becomes relevant and significant. However it is not clear that the
						literature supports attributing "several" social and economic impacts to climate change. (Lemmen, Don, Canada National Study)
126	26	4	25	4	28	Throughout this paragraph, it would be helpful to be clear about the role of climate change versus vulnerabilities to hazards for which a
427	26		20	4	26	role of climate change is not being asserted. (Mach, Katharine, IPCC WGII TSU)
127	26	4	26	4	26	Inis statement is confusing. The bold text says "different degrees of uncertainty" while the italicized confidence language says (high
128	26	Λ	26	Δ	26	Confidence). How is this possible? (UNITED STATES OF AMERICA)
120	20	4	20	4	20	Sean Meteorological Service of Canada)
129	26	4	26	4	28	Here and elsewhere, please clearly differentiate between climate change, climate variability and extremes, and their interactions. This
						list currently mixes them. (Mastrandrea, Michael, IPCC WGII TSU)
130	26	4	30	4	31	Is it possible to provide any further information on the types of impacts meant here and the ways in which they are context specific?
						(Mach, Katharine, IPCC WGII TSU)
131	26	4	30	4	38	The first two sentences of this paragraph don't say anything of value. The third sentence is useful, but readers will wonder why the
						term "risks" is used for urban setting and "vulnerability" for rural. While indigenous people are certainly highly vulnerable, this relates
						to many factors in addition to their "unique history and ties to the land", including lower levels of education, training and income, and
						greater reliance on a subsistence economy. With respect to profiling Mexico City, again there is no question of its high vulnerability,
						but the chapter does not present analysis to allow comparison with other vulnerable cities (e.g. New Orleans). (Lemmen, Don, Canada
132	26	4	30	4	38	National Study) In addition to indigenous groups, another vulnerable group is noor people settle in risk areas illegally. This is a more common problem
						in Mexico than in the rest of North America. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
133	26	4	30	4	38	Throughout this paragraph, the chapter team should explore opportunities to make more nuanced and rich statements. (Mach,
						Katharine, IPCC WGII TSU)
134	26	4	31	4	32	Where processes and stresses are mentioned, it would be preferable to indicate which, more specifically, are meant. (Mach, Katharine, IPCC WGII TSU)
135	26	4	36	4	36	It would be preferable to remove the bold font for this statement. Also, what are the geographic areas relevant to the described
						indigenous peoples? (Mach, Katharine, IPCC WGII TSU)
136	26	4	36	4	38	suggeted change: Among the most vulnerable are indigenous peoples due "to their complex relationship with land their ancestral
						lands, the wide variablity in migratory patterns, and their range of adpative capacity given their highly diverse human settlemt patterns.
						" (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services.)
137	26	4	36	4	38	The suggested change is based on the analysis in the the attached supporting document : Indigenous Health Impacts from Climate
						Change expert reviewer Blake Gentry. See section: III. A Strategies for Adaptation Planning with Indigenous Communities , pages See
						pages 1-2, 5-8. (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services.)
138	26	4	36	4	38	Please be more specific as to the sources of vulnerability mentioned here. (Mastrandrea, Michael, IPCC WGII TSU)
139	26	4	37	4	37	It would be preferable to indicate more specifically which socioeconomic and environmental sources of probability are meant. (Mach,
						Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
140	26	4	37	4	38	It is not clear why Mexico City is the only location to be called out as having the most significant vulnerability to climate change due to population density combined with socio-economic and environmental sources of vulnerability. Is this the only urban region or urban population in North America with this situation? (UNITED STATES OF AMERICA)
141	26	4	40	4	40	It would be preferable to specify what types of infrastructural elements are meant here. (Mach, Katharine, IPCC WGII TSU)
142	26	4	40	4	44	In Mexico, infrastructure has not received maintenance and has not been updated during the last decades. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
143	26	4	42	0	0	Recognizing that the entire volume will be edited, please use the word "infrastructure" to refer to both the singular and plural in the next draft, and leave it to the editors to decide whether the "s" is to be used throughout. (Lemmen, Don, Canada National Study)
144	26	4	42	4	42	The electricity grid is also vulnerable and deteriorating, which deserves mention. Note treatment of this in the 2nd US National Climate Assessment, where data were provided on increases in observed power outages. (UNITED STATES OF AMERICA)
145	26	4	42	4	42	Is it possible to indicate more specifically the locations and types of water- and transport-related infrastructure meant here? (Mach, Katharine, IPCC WGII TSU)
146	26	4	42	4	44	The unbold sentences supporting the key findings need to explain the ways in which infrasructures are deteriorating are worse of than the strengthened ones. (Chatterjee, Monalisa, IPCC WGII TSU)
147	26	4	44	0	0	I have strong concerns about the last sentence as it downplays the significance of risk to infrastructure in Canada and the US. If risks are greatest in Mexico that is because it currently has the greatest infrastructure deficit. But this chapter should be trying to highlight issues of shared concerns, and the fact that risks to infrastructure are one of the, if not the, issue of greatest concern in all three should be the take home point from this paragraph. (Lemmen, Don, Canada National Study)
148	26	4	46	4	47	Is this statement being asserted independent of climate change? Is it possible to specify the timeframe meant? Is it possible to provide more nuance and richness in the conclusion? (Mach, Katharine, IPCC WGII TSU)
149	26	4	46	4	50	Instead of 'proactive adaptation anticipating future climate impacts' should read "proactive adaptation anticipating future climate change impacts' since in North America there has been significant public and private sector investments in the form of storm sewers, levees, dams, habitat restoration, and shoreline stablization to adapt to the impacts of hurricanes, floods and intense rainfall. (Webb, Robert NOAA OAB FSRI)
150	26	4	46	4	50	This finding requires more information on observed losses, etc., before moving on to adaptation issues. (Chatterjee, Monalisa, IPCC WGII TSU)
151	26	4	47	4	49	This states that there are a few examples of 'infrastructure that have begun proactive adaptation to climate change', but this is not found in the body of the chapter. In fact, on Chapter 26 page 26 line 48, refering to infrastructures it states that "only an emerging consideration of proactive adaptation in anticipation of future global warming" suggests that proactive adaptation has not begun, and is only beginning to be considered. \n\n (NETHERIANDS)
152	26	4	52	4	53	The recognition of the strongly inter-connected nature of the North American economy and the vulnerability of supply chains is extremely important, however it is not captured will by the phrase "dislocation in one sector"> Revise that phrase and add a supporting sentence or two after the bolded statement. (Lemmen, Don, Canada National Study)
153	26	4	52	4	53	Is a role of climate change being asserted in this statement? The intended meaning of the statement may not be fully clear. What type of dislocation is meant? How should the pairing of "emerging concern," "may," and "medium confidence" be interpreted? Is this an emerging risk in the sense of emerging risks in chapter 19? (Mach, Katharine, IPCC WGII TSU)

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154	26	4	52	4	53	Please flesh out this finding and be specific as to the relevance of climate change to this issues. Please also provide clear support in the chanter text (Mastrandrea, Michael, IPCC, WGILTSLI)
155	26	5	1	0	0	Change "melt" to "thaw". Permafrost refers to a thermal state that is independent of the presence of ice. Ice melts, permafrost (and
						chicken) thaws. Should drought be considered a slow-onset event? And if so, it is very different sea level rise and permafrost
						degradation. In Canada we prefer to consider drought an extreme event (even though it may last for several years) rather than a slow-
						onset event. (Lemmen. Don. Canada National Study)
156	26	5	1	5	1	Use the term "permafrost thaw" instead of "permafrost melt" which is incorrect terminology. Note that it is only the ice in the frozen
						ground (permafrost) that melts, not the soil or rock. (Smith, Sharon, Geological Survey of Canada)
157	26	5	2	5	3	While there is likely more literature about adaptation to extreme weather events, I don't feel it's accurate to say that there is little
						published literature about impacts and adaptation experience to either sea level rise or permafrost thaw. Much of that information is
						contained in government or consultants reports, but is also being increasing shared through case studies (e.g. Richardson 2010) or on-
450	26	-	-	-	-	line communities of practice. (Lemmen. Don. Canada National Study)
158	26	5	5	5	5	Various" may be a better first word for this sentence than "Different". (UNITED STATES OF AMERICA)
159	26	5	5	5	9	This paragraph seems to suggest that local adaptation is not a government response. There are multiple orders of government in all
						three countries of concern. Perhaps the final sentence is supposed to refer to "national" government responses? Given the first
						sentence of the paragraph there should also be reference to adaptation in the private sector. Readers should not be left with the
						impression that adaptation is strictly a task for governments. (Lemmen, Don, Canada National Study)
160	26	5	5	5	13	It would be preferable to structure these paragraphs to each start with a full sentence in bold presenting the core conclusion, followed
						by non-bold supporting statements. (Mach, Katharine, IPCC WGII TSU)
161	26	5	11	5	13	Try to find an alternative phrase to "path dependency". Also strongly question the inclusion of top-down decision-making as a barrier
						to effective adaptation. Most people would consider the UK to be among the leaders of OECD countries with respect to adaptation,
						and almost all will point to top-down decision making in terms of the UK Climate Change Act as a key enabler. Obviously community
						ownership and action is imperative for effective action, but to suggest that adaptation can be addressed through bottom-up decision-
						making alone is likely incorrect. (Lemmen, Don, Canada National Study)
162	26	5	11	5	13	Define if those are barriers or constraints. In other chapters of the AR5, these examples are defined as constraints. (Sosa-Rodriguez,
						Fabiola S., University of Waterloo)
163	26	5	11	5	13	The term 'path dependency' is not intuitive in this list of barriers to adaptation. Would it be possible to explain this term parathetically?
						It would make this statement more accessible to the layperson. (Hernandez, Rebecca R., Stanford University / Carnegie Institution for
164	26	E	11	-	10	Science) The authors should consider coordinating this discussion on contraints with shanter 16 framings of contraints, limits and antions
104	20	5	11	5	13	(Chatteries, Monalies, IPCC WCILTSU)
165	26	5	11	5	13	Is it possible to indicate how these barriers differ with geography and context? (Mach. Katharine, IPCC WGII TSU)
166	26	5	15	5	15	Is progress toward sustainability different from sustainable development or climate-resilient nathways? If one of the latter terms is
100	20		15	5	15	meant it might be clearer to use it (Mach Katharine IPCC WGII TSU)
167	26	5	15	5	17	I recognize that the Executive Summary mirrors the organization of the underlying chapter. But this is a case of an important, clear
						statement that provides important context for much of what has been discussed previously. If the writing team has the lisence to
						organize teh Executive Summary in the way that can most effectively communicate a story, then this is an example of a element thta
						should be presented early in text. (Lemmen, Don, Canada National Study)
			1			

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168	26	5	15	5	17	The support for this paragraph is not completely clear in the chapter text. Please ensure clear traceability. (Mastrandrea, Michael, IPCC WGII TSU)
169	26	5	19	5	20	This statement is too broad and inclusive. The authors might consider which combination(s) is/are most interesting, important,
						influential, or unexpected, and focus on those. (UNITED STATES OF AMERICA)
170	26	5	19	5	23	Great paragraph, however, the style (using an example) seems to stand out as different than the rest of the ES. Additionally, it is unclear
						if these processes are actually happening (i.e., reduced air pollution and sea walls negatively affecting coastal ecosystems). (Hernandez,
						Rebecca R., Stanford University / Carnegie Institution for Science)
171	26	5	22	5	23	Sea walls can also transfer to or enhance the hazard to other coastal communities with fewer financial resources making them even
				_		more at risk (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
172	26	5	30	5	30	Replace "frozen tundra" with Arctic tundra or alpine tundra. Currently, meaning is not clear because the phase immediately follows a
						sentence which states that the North American Arctic will be covered in Chapter 28 and not in Chapter 26. (UNITED STATES OF
		-	24	-	24	AMERICA)
173	26	5	31	5	31	I prefer adding the additional comma here. Otherwise, it could be interpreted as 'governance cultures'. (Hernandez, Rebecca R.,
174	26	-	22	-	22	Stanford University / Carnegie Institution for Science)
174	20	<u>с</u>	33	5	33	Do you mean social characteristics? (Sosa-Rounguez, Fabiola S., Oniversity of Waterioo)
175	26	5	34	77	0	Table 26-1: this table is extremely incomplete. For example, sea level rise affects more than just the health sector. It affects natural
						systems (salt intrusion in freshwater coastal marshes, disappearance of salt marshes), agriculture (ex. Tillamook cheese fatory) and
						fisheries (oysters, clams, shrimp) along estuaries, as well as individual and communal infrastructure; note the danger SLR and storm
						surges might have on near-shore nuclear power plants (Nathalie Kopytko's thesis at Evergreen College, Olympia WA, report on this very
						real danger). The entire table needs much expansion and additions. (Bachelet, Dominique, Conservation Biology Institute)
176	26	5	37	5	39	Wording here could perhaps be refined. This chapter is providing a comprehensive assessment of the literature, identifying core
						conclusions for the region. This perhaps could be better reflected. (Mach, Katharine, IPCC WGII TSU)
177	26	5	38	5	39	Is there no equivalent report on the USA climate that could be cited to provide a greater level of country-specific information? What
						about the US National Climate Assessment? (UNITED STATES OF AMERICA)
178	26	5	39	0	0	By "Canadian Climate Report" I trust you are referring to Lemmen et al. (2008) - already included I the reference list. (Lemmen, Don,
						Canada National Study)
179	26	5	39	5	0	Please provide a reference for the Canadian report and name the US and Mexican reports in the text (UNITED STATES OF AMERICA)
180	26	5	39	5	39	Regarding the reference to "Canadian Climate Report", there is no such reference in reference list. A suitable general reference for
						coverage of climate change impacts, vulnerabilities and adaptations for Canada would be the work of Lemmen, D. S. et al. (in the
						reference list already). (CANADA)
181	26	5	39	5	39	Kindly remove first parenthesis (Monterroso, Alejandro, Universidad Autonoma Chapingo)
182	26	5	39	5	39	The other documents are: the National Communication of Mexico to the United Nations Framework Convention on Climate Change
						(UNFCCC) and the US National Climate Assessment. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
183	26	5	47	0	0	Change "city" and "state" to "local" and "sub-national". While the US and Mexico have "states", Canada has provinces and territories.
						Not all local governments are cities. (Lemmen, Don, Canada National Study)
184	26	5	49	5	53	As Box 26-1 appears first in the text, it should probably be noted as "The first". (Lemmen, Don, Canada National Study)
185	26	5	49	5	53	It is a bit confusing that the order of the 1st and 2nd case studies described here does not reflect their numbering within the chapter.
						(Mach, Katharine, IPCC, WGII, TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
186	26	6	5	7	11	As presented, this section interrupts the flow of the chapter and the information presumably overlaps considerably with that presented in the Fourth Assessment. Readers are left to untangle where the two assessments differ. It may be more useful (and take less space) to enumerate places where this assessment differs from the last. If there are points from AR4 that are not deemed to require reassessment, perhaps those could be identified as well. (UNITED STATES OF AMERICA)
187	26	6	28	6	28	This appears to contradict page 4, lines 7-13. (UNITED STATES OF AMERICA)
188	26	6	28	6	28	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
189	26	6	40	6	49	Casual usage of "likely" should be avoided, as it is a reserved likelihood term; this applies to lines 40, 41, 42, 43, and 49. (Mach, Katharine, IPCC WGII TSU)
190	26	6	43	7	2	the same sentence is repeated on both of these pages. (Bachelet, Dominique, Conservation Biology Institute)
191	26	6	44	6	47	The final sentence of this paragraph is repeated exactly in the first paragraph on p.7 (lines 4 - 6). The two paragraphs should be combined (because they predominantly focus on health issues) and the repetition deleted. (Lemmen, Don, Canada National Study)
192	26	6	49	6	50	26.1 : This should read "wildfire and forest insect pest outbreaks in large areas of Canada and the US" because the statement is not universally true, for example in some coastal regions (where moisture is expected to increase) and some near-desert regions (where wildfire probability is expected to decrease). (UNITED STATES OF AMERICA)
193	26	6	50	6	51	Some species or populations of plants do not have the genetic plasticity to be adapted to long summer daylight/short dark growing seasons and are lattitudinally restricted. (example Lodgepole pine) (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
194	26	7	1	7	3	There is something wrong with the structure of the sentence. It is clear that early warning and surveillance systems, air conditioning, and access to healthcare are all things that can be considered countermeasures. Pollution, storm-related fatalities and injuries, and infectious diseases are not things that one would consider countermeasures. If the authors meant to suggest that investment in amelioration of these things constitutes countermeasures, the sentence should be reworded to indicate that. If, on the other hand, pollution, storm-related fatalities and injuries, and infectious diseases are things that one would consider countermeasures have been been been been been been been be
195	26	7	3	7	3	Health impacts of extreme weather are not limited to US and Canada. For instance, Mexico City has experienced severe heat waves recently (UNITED STATES OF AMERICA)
196	26	7	3	7	3	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
197	26	7	4	7	6	These are repeated lines from Page 6, Line 44 to 47. (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)
198	26	7	4	7	6	The same sentence is provided on page 6, lines 44-47 (UNITED STATES OF AMERICA)
199	26	7	8	7	11	Mention the chapters (Sosa-Rodriguez, Fabiola S., University of Waterloo)
200	26	7	14	7	14	A more descriptive header might be "Key Trends Influencing Vulnerability and the Need for Adaptation". (UNITED STATES OF AMERICA)
201	26	7	14	7	14	Might this section discuss trends in efforts at adaptation and building resilience? (UNITED STATES OF AMERICA)
202	26	7	23	7	23	For clarity, say "percent per year" (UNITED STATES OF AMERICA)
203	26	7	27	7	29	Please add a phrase providing examples of the types of climate risks that can be exacerbated by expanding peri-urban populations. Note that the phrase "peri-urban" is unlikely to resonate in Canada. (Lemmen, Don, Canada National Study)
204	26	7	31	7	31	" infrastructure and (???) sectors" Which sector? (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)

#	Ch	From Page	From Line	To Page	To Line	Comment
205	26	7	31	7	32	You need to be clear why some factors are deemed "a source of risk" and others "a source of sensitivity". They all seem to relate to risk and if so then you should use consistent language. (Lemmen, Don, Canada National Study)
206	26	7	32	7	49	Risks here is used in a very vague sense. What are the risks, specifically? (UNITED STATES OF AMERICA)
207	26	7	37	7	0	Sentence should state something like "food price increases will contribute to poverty in urban areas and some rural areas, depending on agricultural response to local effects of climate change." Unclear that all rural areas will be negatively affected. Citation (Lobell et al 2011) estimates that some areas may see net increases in yields. Together with higher prices, certain food-surplus rural areas may benefit. Sentence as it reads is overly simplistic. (UNITED STATES OF AMERICA)
208	26	7	40	7	43	Figure 26-1 is not very effective. The differences in the two maps are minor - basically saying that current areas of high population are going to get larger. "Total population" is a very unusual parameter to present graphically, population density would make a lot more sense. Vancouver / Seattle seem to have disappeared until the bold coastline. Strongly suggest this figure be replaced with a table in which "total population" makes more sense, and provide absolute numbers for defined areas (e.g. Mexico City, NE US coast, Great Lakes). (Lemmen, Don, Canada National Study)
209	26	7	40	7	43	The Figure caption for 26-1 and the same text in body of chapter (Page 7, line 31-32) is unclear in several ways. It appears that "risk"being is contrasted with "sensitivity" where the text reads "concentrations of growing populations, infrastructures and sectors in urban areas can be a source of risk" versus "geographic isolation of can be a source of sensitivity." Because the Figure is about population, the terms risk and sensitivity need clarification (for example is this risk from climate change and how is sensitivity different than vulnerability?) unless it can always be assumed that these terms are used on accordance with the glossary. Finally, the meaning of high dispersion levels is ambiguous. Consider substituting low density if that is meaning. (UNITED STATES OF AMERICA)
210	26	7	48	7	50	This sentence is a little awkward. It could be re-phrased for clarity. (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
211	26	8	0	0	0	Box 26.1 Comments - Please consider adding these water/transboundary citations: \nGetches, D.H. (2003). Impacts in Mexico of Colorado River management in the United States: a history of neglect, a future of uncertainty. Climate and water: transboundary challenges in the Americas. H.F. Diaz and B.J. Morehouse. The Netherlands, Kluwer Academic Publishers: 163-191. ; \nComrie, A.C. (2003). Climate doesn't stop at the border: U.SMexico climatic regions and causes of variability. Climate and water: transboundary challenges in the Americas. H.F. Diaz and B.J. Morehouse. The Netherlands, Kluwer Academic Publishers: 291-316. ; \nMagana, V.O. and C. Conde (2003). Climate variability and climate change, and their impacts on the freshwater resources in the border region: a case study for Sonora, Mexico . Climate and water: transboundary challenges in the Americas. H.F. Diaz and B.J. Morehouse, D.R., M.D. Dettinger, K.T. Redmond, G.J. McCabe, N. Knowles and D.H. Peterson (2003). The transboundary setting of California's water and hydropower systems: linkages between the Sierra Nevada, Columbia, and Colorado hydroclimates. Climate and water: transboundary challenges in the Americas. H.F. Diaz and B.J. Morehouse. New York, NY, Springer: 237-262. (UNITED STATES OF AMERICA)
212	26	8	0	0	0	Box 26.1 Comments - The discussion is focused almost exclusively on the long but narrow geographical border area. Additional trans- boundary issues operating at wider geographic scales deserve attention, e.g., tourism or the trade of climate-sensitive goods between the countries. These potentially affect many more people and larger portions of the respective national economies. (UNITED STATES OF

#	Ch	From Page	From Line	To Page	To Line	Comment
213	26	8	0	0	0	Box 26-1 Comments - This section cites Wilder and Varady disproportionately. It should cite and incorporate additional literature on the challenges of the US-Mexico border region that are applicable to climate change, for example on how transboundary water is governed on the US-MX border. Literature examples: (A) Fischhendler, I. (2004). Legal and Institutional Adaptation to Climate Uncertainty: A Study of International Rivers. Water Policy, 6, 281-203. Discusses the implications of treaties and responding to climate change. (B) Mumme, S. P. (1999). Managing acute water scarcity on the US-Mexico border: Institutional issues raised by the 1990's drought. Natural Resources Journal, 39(1), 149-166. Discussion of how the bilateral treaty has recently been updated in light of advances in our scientific understanding is worth highlighting (see work of the Inter-Boundary Water Commission) (UNITED STATES OF
214	26	8	1	9	14	The objective - or take home message - of Box 26.1 is not clear. It is a very interesting issue and region, but there is a need to take the analysis beyond "will likely bring significant consequences". The text does an excellent job of description, but stops short of analysis and identification of findings that can be transferred to other transboundary issues. (Lemmen, Don, Canada National Study)
215	26	8	3	9	12	Consider to include the discussion presented in Vasquez-Leon, West and Finan (2003). A comparative assessment of climate vulnerability: agriculture and (Sosa-Rodriguez, Fabiola S., University of Waterloo)
216	26	8	3	9	12	ranching on both sides of the US–Mexico border. Global Environmental Change 13: 159-173. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
217	26	8	3	9	12	Consider to include the discussion presented in Feng S; Krueger AB (2010). Linkages among climate change, crop yields and Mexico–US cross-border migration. Proceedings of the US National Academy of Sciences. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
218	26	8	5	8	6	Reconcile statement here that this is "one of the longest" borders between middle and high income countries with the statement on p.5 (line 52) that this is the longest border in the world between middle and high income countries. (Lemmen, Don, Canada National Study)
219	26	8	9	8	9	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
220	26	8	10	8	11	Is conflict between countries or are more localized issues being referred to here? (Mach, Katharine, IPCC WGII TSU)
221	26	8	10	8	12	Box 26-1 : This box characterizes the US-Mexico cross-boundary relationship in a manner that is not particularly useful or relevant. In fact, recent agreements have demonstrated cross-border cooperation, etc. (e.g. the Colorado River Compact) that are actively contested by various parties (governmental, indigenous, etc.) to bolster this claim. (UNITED STATES OF AMERICA)
222	26	8	21	8	0	The term 'maquiladoras' should probably be defined (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
223	26	8	21	8	21	Page 8, row 21. Please define "maquiladoras" on first use and if italics are to be used, they should be used consistently. (UNITED STATES OF AMERICA)
224	26	8	21	8	23	What is a maquialdora? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
225	26	8	21	8	23	define maquiladoras and use or not italics, be consistent (Bachelet, Dominique, Conservation Biology Institute)
226	26	8	23	8	0	The term 'maquiladoras' here is italicized but was not previously. (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
227	26	8	23	8	23	Provide references (Sosa-Rodriguez, Fabiola S., University of Waterloo)
228	26	8	24	8	24	Reconsider use of word "explosive." Reword to avoid implying there is an expectation that very rapid economic and population growth would create adaptive capacity. (UNITED STATES OF AMERICA)
229	26	8	25	8	27	Should differences between urban areas in Mexico and US be described? (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
230	26	8	31	8	31	Please be more specific about the period of the "current drought" (UNITED STATES OF AMERICA)
231	26	8	31	8	33	Woodhouse et al. (2010) address the long-term history of drought in the area. Perhaps they should be cited in the discussion of drought history. (UNITED STATES OF AMERICA)
232	26	8	34	0	0	Nakaegawa et al. (2013) supported the results for the Rio Grande River: Annual river discharges in the main stream Rio Grande Riveris projected to increase but is not robust (Nakaegawa et al. 2013).\nakaegawa, T., A. Kitoh, M. Hosaka. 2013: Discharge of major global rivers in the late 21st century climate projected with the high horizontal resolution MRI-AGCMs -overview Hydrological Processes. 27. DOI: 10.1002/hyp.9831 (Nakaegawa, Toshiyuki, Meteorological Research Institute)
233	26	8	37	8	37	You can also cite these papers for projections of future North American drought.\nThe Hoerling et al paper criticizes the other 3 as they are based on the Palmer Index. Nonetheless, a drying in the US/Mexican border region is seen in that study as well.\nMichael Wehner, David R. Easterling, Jay H. Lawrimore, Richard R. Heim Jr., Russell S. Vose, Benjamin Santer (2011) Projections of Future Drought in the Continental United States and Mexico. Journal of Hydrometerology 12, 1359-1377. doi: http://dx.doi.org/10.1175/2011JHM1351.1 \nChristopher R. Schwalm, Christopher A.Williams, Kevin Schaefer, Dennis Baldocchi,T. Andrew Black, Allen H. Goldstein, Beverly E. Law,Walter C. Oechel, Kyaw Tha Paw U, and Russel L. Scott (2012) Reduction in carbon uptake during turn of the century drought in western North America, Nature Geoscience 5, 551-555 DOI: 10.1038/NGE01529\nMARTIN P. HOERLING, JON K. EISCHEID, XIAO-WEI QUAN, HENRY F. DIAZ, ROBERT S. WEBB, RANDALL M. DOLE and DAVID R. EASTERLING (2012) Is a Transition to Semipermanent Drought Conditions Imminent in the U.S. Great Plains? J. Climate 25, 8380-8386, DOI: 10.1175/JCLI-D-12-00449.1\nAiguo Dai (2012) Increasing drought under global warming in observations and models, Nature Climate Change, 3, 52-58 DOI: 10.1038/NCLIMATE1633 (UNITED STATES OF AMERICA)
234	26	8	39	8	45	very short section it seems; there are issues with migration corridors, fire spread, invasives etc (Bachelet, Dominique, Conservation Biology Institute)
235	26	8	40	8	45	Consider to include that there are endemic species of flora in these areas under the risk of extinction (Sosa-Rodriguez, Fabiola S., University of Waterloo)
236	26	8	41	8	0	California saga' should be 'California sage scrub'. (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
237	26	8	41	8	42	This section "Ecosystems" I have a lot to comment on and suggestions for improvement. I am attaching a separate word document for this (Hernandez Rehecca R. Stanford University / Carnegie Institution for Science)
238	26	8	42	8	42	There are consistent numbers for endangered species (IUCN) across the US and Mexico which would could be added to the EPA-specific numbers here. (UNITED STATES OF AMERICA)
239	26	8	48	8	53	The points in this paragraph about health do not appear to be climate-related, and thus it is not clear why they are included in the discussion. Consider making this more clear for example joining this paragraph more explicitly with the following paragraph. (UNITED STATES OF AMERICA)
240	26	8	51	8	51	It is unclear from this sentence whether the ozone of PM10 violations are severe relative to other parts of the US, Mexico, and Canada. If they are not, this sentence does not support increased vulnerability at the border. Also, whether these air quality incidents are related to the trucking is unclear. (UNITED STATES OF AMERICA)
241	26	9	0	10	0	Box on US-Mexico Border had many weak elements. The writing tone is less crisp and objective than other sections. Needs better organization, with like kinds of information (e.g., climate, population) grouped together. (UNITED STATES OF AMERICA)
242	26	9	1	9	1	It would be helpful to clarify the phrase "as climate change enters the equation," as climate change is already occurring. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
243	26	9	2	0	0	Add citation here. Possible sources: Griffen et al. 2001 (Global Change and Human Health 2:20-33, "Dust in the wind: Long range transport of dust in the atmopshere and its implications for global public and ecosystem health") and Pepper et al. 2009 (Environmental Science and Technology 39:416-432), (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
244	26	9	2	9	2	Replace "draught" by "drought" (Sosa-Rodriguez, Fabiola S., University of Waterloo)
245	26	9	6	9	12	A potential example to cite is the recent US/Mexico International Boundary and Water Commission agreement (http://www.ibwc.state.gov/Files/Press_Release_112012.pdf) that addresses water issues between the two countries. This agreement demonstrates a 'success story' in international relations as it relates to trans-boundary climate adaptation/planning. (UNITED STATES OF AMERICA)
246	26	9	7	9	12	Is there not more to say here? Are there any potential issues regarding transmission of infectious diseases, agricultural pests, etc.? (UNITED STATES OF AMERICA)
247	26	9	10	9	10	The description of "conflicts" in this box is casual. It is recommended that this paragraph be rewritten for clarity and use of more literature sources. (UNITED STATES OF AMERICA)
248	26	9	10	9	10	Barriers or constrains? (Sosa-Rodriguez, Fabiola S., University of Waterloo)
249	26	9	10	9	12	the examples in this final sentence represent challenges (as per section heading) but they should not be considered barriers (in the sense of something that should be broken down). There are good reasons why countries have different governance structures and why institutional fragmentation exists. In most circumstances these are things we simply have to learn to deal with, rather than try to change. (Lemmen, Don, Canada National Study)
250	26	9	22	0	0	Define elderly - (Over age 60, 65, 70??) (Lemmen, Don, Canada National Study)
251	26	9	23	9	24	Delete reference to Figure 26-2 as it is not needed or appropriate in a section about Demographic and Socioeconomic Trends. The point of the sentence is the enhanced sensitivity of the elderly to heat waves. That sensitivity is independent of projected changes in heat waves. (Lemmen, Don, Canada National Study)
252	26	9	25	9	26	Why do increases in female-headed households exacerbate vulnerability? It is not justified to assume this or assert it as a logical statement. Recommend that this statement be deleted or that citations are added that represent breadth of literature. In addition, if the number of single-person households is projected to increase, a citation should be given. (UNITED STATES OF AMERICA)
253	26	9	26	9	26	You haven't demonstrated why female-headed households per se should beexceptionally vulnerable to extreme weather events. Is the intervening variable relative poverty and access to adequate housing? If so, say so. Perhaps the bigger point is poverty, not female -headedness. (Scott, Michael, Pacific Northwest National Laboratory)
254	26	9	27	9	28	26.2.1.2 : The statement "institutional capacity may also be limited by challenges posed by aging populations a resulting stress on health and economic performance" is not supported by evidence in the text. Recommend that this statement be deleted or that citations are added that represent breadth of literature. In addition it is not worded logically, as the institutional capacity will not be" limited by a challenge"; it may be "limited relative the to the challenge posed by" or "challenged by the demands posted by." (UNITED STATES OF AMERICA)
255	26	9	30	9	33	This figure should be moved to section 26.2.2.2 which deals with climate change projections. Inclusion of a figure that is "forthcoming" is problematic. (Lemmen, Don, Canada National Study)
256	26	9	35	10	7	You have made the point that economic disparity and poverty is forecasted to increase in Mexico but do not say why this is important for impacts. My understanding of recent economic activity in Mexico and the United States (past two-three years) suggests that immigration to the United States from Mexico has abated considerably in part due to improvement of the Mexican economy and convergence of opportunity. My point is that the situation may be more mixed than you suggest. (Scott, Michael, Pacific Northwest National Laboratory)

#	Ch	From Page	From Line	To Page	To Line	Comment
257	26	9	39	9	41	There be helpful to clarify why these changes are expected. (Mach, Katharine, IPCC WGII TSU)
258	26	9	41	9	41	Are habitats vs ecosystems defined in early chapter? (UNITED STATES OF AMERICA)
259	26	9	41	9	42	A citation is needed for, "Education is a key determinant of adaptive capacity." (UNITED STATES OF AMERICA)
260	26	9	45	9	45	More explanation of the Gini index needed - it appears that the lower the number the better? An explanation of the number scale is needed: Is 1 "bad" and 0 "good"? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
261	26	9	46	9	47	Suggest rewording sentence about economic growth being insufficient. (UNITED STATES OF AMERICA)
262	26	9	48	9	51	Please list drivers of Mexico's especially high projected poverty increases. (UNITED STATES OF AMERICA)
263	26	9	53	10	7	This paragraph was very had to follow and needs to be rewritten for clarity. (UNITED STATES OF AMERICA)
264	26	10	0	10	0	Figure 26-3 Comments - this figure pertains to future climate projections, yet it is found in the section on current trends. This figure should be moved to the appropriate section (26.2.2.2). Also, the Figure does not support the claim in the text (lines 30-32) that the "warming hole" is more pronounced over the last century relative to the last three decades. It does not show the warming hole or past climate information. (UNITED STATES OF AMERICA)
265	26	10	1	10	2	The implication seems to be that urban areas are more sensitive than non-urban areas. This should be clarified including the apparent contradiction with other statements in chapter. (UNITED STATES OF AMERICA)
266	26	10	1	10	7	The authors do not give evidence their for assertion that health and safety are a driver of migration resulting from climate change. In addition, regarding lines 5-7 it seems that lower socio-economic status itself would restrict migration because of lack of capital or resources to do so; could this also be addressed briefly? (UNITED STATES OF AMERICA)
267	26	10	2	10	3	Outmigration of agricultural populations from the Prairies in both Canada and the USA during the droughts of the 1930's (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
268	26	10	4	10	4	Clarify, migration from where to where? (UNITED STATES OF AMERICA)
269	26	10	4	10	5	Gilbert and McLeman (2010) does not talk about historic Mexican droughts, and therefore reference is inappropriate here. The reference might work if you changed the reference from Mexican droughts to droughts in North America. Relevant papers specifically related to Mexican droughts include: 1 - R. J. Nawrotzki, F. Riosmena, L. M. Hunter, Do Rainfall Deficits Predict U.SBound Migration from Rural Mexico? Evidence from the Mexican Census, Population Research and Policy Review (2012), doi:10.1007/s11113-012-9251-8; and 2 - S. F. Feng, A. B. Krueger, M. Oppenheimer, Linkages among climate change, crop yields and Mexico-US cross-border migration, Proceedings of the National Academy of Science 107, 14257-14262 (2010).\n (Lemmen, Don, Canada National Study)
270	26	10	5	10	7	If indeed there is a reasonable case to be made that climate shocks have accelerated northward migration, then it needs to be explicitly expanded upon, because it would be quite important. As it stands, there is an oblique reference made to it. (UNITED STATES OF AMERICA)
271	26	10	12	10	16	This list should also include WGI Chapter 4 (Observations: Cryosphere) because of the importance of glaciers for water supply, as well as snow and ice cover. Permafrost is more relevant to the Polar Regions chapter. (Lemmen, Don, Canada National Study)
272	26	10	21	10	21	No mention of changes to variance. This is an important omission. (UNITED STATES OF AMERICA)
273	26	10	21	10	21	It would be preferable to delete the 1st sentence of this paragraph, simply retaining the material that follows. (Mach, Katharine, IPCC WGII TSU)
274	26	10	21	10	32	Would it make sense to also provide within figure 26-3 the maps of observed changes in North America, to complement this text? (Mach. Katharine, IPCC WGII TSU)

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#	Ch	From Page	From Line	To Page	To Line	Comment
275	26	10	27	0	0	cooling over central NA and eastern US yet Vose et al. 2012 (GRL Vol 39) state that "For the conterminous United States as a whole, all
						trends in mean annual temperature are positive and statistically significant". t would be good to precisely say the trend comes from
						NOAA records 1901-2005 and covers mostly the SE USA (http://www.ncdc.noaa.gov/cmb-faq/globalwarming.html). (Bachelet,
						Dominique. Conservation Biology Institute)
276	26	10	27	0	32	The authors may wish to clarify what "this warming hole" refers to. Suggest ensuring consistent language with the WGI report.
						(CANADA)
277	26	10	27	10	30	It is very difficult to see the stated pattern in Fig 2.22. Relative cooling in central N.A. and eastern U.S. does not stand out in the LH
						panels of Fig 2.22. What is more noticeable in the Figure is the relative lack of warming in central and western Canada and the U.S. over
						the 1979-2011 time period. Also, Fig 26.3 is not an appropriate reference for these statements about past trends as the Figure shows
270	20	10	20	10	20	future projections. (CANADA)
2/8	26	10	28	10	28	Please clarify whether "central North America" is restricted to U.S. territory or whether it extends into Canada. Even though this may be
						a term for a general geographic region, Canadian readers will want to know if it applies to them in general, or not. (CANADA)
279	26	10	29	10	30	Figure 26-3 provides no support for this statement, as it presents projected changes and this statement refers to historic trends.
						(Lemmen, Don, Canada National Study)
280	26	10	34	10	45	This figure does not belong in a section on Current Trends, as it deals with projections. IF it is moved to section 26.2.2.2 you should
						revise the caption to first draw attention to the most statistically significant elements of the figure (colors without circles), then work
						your way backwards using the likelihood language that is standard for the report. (Lemmen, Don, Canada National Study)
281	26	10	35	10	45	The caption for Figure 26.3 is extremely confusing. It would help to indicate that this is the average of an ensemble of x models in
						CMIP5 (or however it is derived). THe temerature panel shows no white or gray, so percentage agreement between models must mean
						only precipitation, right? Also, despite references to what circles mean, my copy of the figure doesn't show any circles. (Scott, Michael,
						Pacific Northwest National Laboratory)
282	26	10	47	10	51	Since cross-reference is provided to the relevant chapter sections in the working group 1, it would be clearer to delete "WGI notes"
202	26	10	54		2	from lines 47 and 51. (Mach, Katharine, IPCC WGII TSU)
283	26	10	51	11	2	I would have expected this discussion to include mention of WGI findings with respect to glacier cover and the impact on summer / fall
204	26	11	1	11	1	flows in rivers originating in the western Cordillera. (Lemmen, Don, Canada National Study)
284	26	11	1	11	1	Note (2006) and some later attempted corrections (and attacks) led to some controversy in the popular press. My understanding is
						that the fundamental result in Mote 2006 (historical decline of the Western US showpack) has not been overturned, but it is probably a
						good idea to cite additional key articles and characterize the debate in at least one sentence. Or if the debate appears elsewhere in in
						ARS, cite that chapter: (Scott, Michael, Pacific Northwest National Laboratory)
285	26	11	2	11	11	Wherever sentences begin with working group 1 as the subject of the sentence, it would be preferable to simply give the key findings
						with appropriate specific cross-references as already provided. (Mach, Katharine, IPCC WGII TSU)
286	26	11	17	12	38	This whole section is very focused on changes in mean temperature and precipitation. The only mention of climatic extremes is in the
						final paragraph, which only cites literature from Diffenbaugh et al. Certainly, there is a broader literature on climatic extremes in N
						America that would be worth referencing in this section. This issue is particularly salient in the current physical trends section, 26.2.2.2;
207	26	11	10	17	20	(UNITED STATES OF AMERICA)
201	20	TT	10	12	ōč	University of Waterloo)
288	26	11	19	11	19	Replace "processes important" by "important processes" (Sosa-Rodriguez, Fabiola S., University of Waterloo)

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#	Ch	From Page	From Line	To Page	To Line	Comment
289	26	11	22	11	40	Along with mean warming, you may also want to put the range. Because, at regional scale observed warming has not followed the mean warming rate e.g. Figure 26.4; also see relevant Figures 3 and 4 in Kumar et al. 2012. \nAlso. You may want to remind the reader about this. In kumar et al. 2013, we found that at local/regional scales multi-model mean generally provides a conservative estimate of trends (Figures 3 and 6 in Kumar et al. 2013), because long-term trends from different models are not significantly correlated at local/regional scales (See Figures 5 and 8 in Kumar et al. 2013) \n(1) Kumar, S., J. Kinter III, P. Dirmeyer, Z. Pan, and J. Adams (2012). Multi-decadal Climate Variability and the "Warming Hole" in North America - results from CMIP5 20th and 21st Century Climate Simulations. J. Climate. doi:10.1175/JCLI-D-12-00535.1, in press.\n(2) Kumar S., V. Merwade, J. Kinter III, D. Niyogi (2013). Evaluation of Temperature and Precipitation Trends and Long-term Persistence in CMIP5 20th Century Climate Simulations. Journal of Climate. doi:10.1175/JCLI-D-12-00259.1, in press.\n\nFurther, Figure 26.4 can be improved by doing 5 or 10 years moving average of anomaly. (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)
290	26	11	23	11	30	RCP2.6 should also be discussed. Average temperatures over North America are +2C or higher at the middle of the 21st century and stabilize thereafter. Potential source is IPCC AR5 WG1, figure 12.11. (UNITED STATES OF AMERICA)
291	26	11	23	11	50	Wherever likelihood terms are used, for example on lines 23, 41-44, 46, 48, and 50, they should be italicized. (Casual usage should be avoided.) (Mach, Katharine, IPCC WGII TSU)
292	26	11	24	0	0	Figure 26-4 presents both historic trends and future projections, The historic trends elements on this figure is never utilized. (Lemmen, Don, Canada National Study)
293	26	11	24	11	25	Where mean warming is referred to on these lines (and also on line 27), should it be specified that this is mean annual warming? (Mach, Katharine, IPCC WGII TSU)
294	26	11	27	11	29	Language is incorrect: 6 degrees C of annual warming? This makes it sound like a rate per year, which would be enormous. (UNITED STATES OF AMERICA)
295	26	11	27	11	30	These statements would be more effective with a supporting map. Current Figure 26-3 would likely serve the purpose. (Lemmen, Don, Canada National Study)
296	26	11	29	11	30	Says "smallest mean warming" on Pacific Coast of U.S. Whereas page 12, line 25 says Western U.S. emerges as prominent area of aggregate climate warming". Appears contradictory. (Also, the term 'aggregate climate warming' is not defined. (UNITED STATES OF AMERICA)
297	26	11	30	11	30	Would it be beneficial to also indicate where largest/smallest warming as compared to natural variability occurs? (Mach, Katharine, IPCC WGII TSU)
298	26	11	33	0	0	Figure 26-4 had data going beyond the axis (Bachelet, Dominique, Conservation Biology Institute)
299	26	11	41	11	51	This paragraph can be deleted (or greatly reduced) because it repeats the same information presented graphically in figures 26-3 and 26-4. (Lemmen, Don, Canada National Study)
300	26	11	41	11	51	I find these qualifiers 'Likely changes' and 'Very likely changes' as written to be somewhat confusing. What is the difference between them? Are these IPCC terms? (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
301	26	11	51	0	0	wide-spread to widespread (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
302	26	11	53	11	54	What is the" 2016-2035 period of RCP2.6"? Isn't this the same period as RCP8.5 and RCP4.5? (Scott, Michael, Pacific Northwest National Laboratory)
303	26	11	53	12	11	26.2.2.2 : The final paragraph of this section only cites the work of Diffenbaugh et al. Is there a broader literature on signal-to-noise ratios of climate projections over N America that can be included here? (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
304	26	11	53	12	11	26.2.2.2 : The first sentence of this paragraph is logically unrelated to the rest, which addresses signal-to-noise ratio as measure of
						climate change robustness. Please provide some interpretation of these results. Does the finding of lower signal-to-noise ratio over the
						central US imply that climate change there will be less significant? Or does it mean that it will simply be harder to detect given high
						natural variability. (UNITED STATES OF AMERICA)
305	26	12	1	12	11	The signal to noise discussion is more appropriate for WGI. If retained here it should be simplified down tp the key messages.
						(Lemmen, Don, Canada National Study)
306	26	12	4	12	7	The CMIP5 and CMIP3 ensembles suggests that the response of warm-season temperatures to elevated radiative forcing exhibits higher
						signal-to-noise ratio than the response of cold-season temperatures (Diffenbaugh and Scherer, 2011; Kumar et al., 2012), which
						means? Instead of going into another statement, I think these two statements should be explained so that the reader knows what
						this means. (Hernandez, Rebecca R., Stanford University / Carnegie Institution for Science)
307	26	12	13	0	38	The two paragraphs appear to provide contradictory information. The first paragraph states that CMIP5 projects that winter
						precipitation in Canada and Alaska will increase and the second paragraph states that the same model projects substantial decreases in
						snow accumulation in Canada. The authors should clarify this information. (CANADA)
308	26	12	13	12	16	26.2.2.2 : Unclear how NAO affects climate impacts. (UNITED STATES OF AMERICA)
309	26	12	22	12	23	"not all CMIP5 models simulate the(Kumar et al. 2012)". Kumar et al. 2012 is not the right reference for this. The right reference is
						Kumar et al. (2013).\nReference: \nKumar S., V. Merwade, J. Kinter III, D. Niyogi (2013). Evaluation of Temperature and Precipitation
						Trends and Long-term Persistence in CMIP5 20th Century Climate Simulations. Journal of Climate. doi:10.1175/JCLI-D-12-00259.1, in
						press (Kumar. Saniiv. Center for Ocean-Land-Atmosphere Studies)
310	26	12	22	12	23	what is the proportion of CMIP5 models that do simulate the observed recent hydrologic trend in western North America? Important to
						know whether it is most or only a small fraction (Bachelet, Dominique, Conservation Biology Institute)
311	26	12	25	12	25	It is not clear what is meant by "aggregate climate change" in this sentence. (UNITED STATES OF AMERICA)
312	26	12	25	12	25	It would be helpful to specify what is meant by "aggregate" here. (Mach, Katharine, IPCC WGII TSU)
313	26	12	25	12	27	26.2.2.2 : Please clarify why Mexico and the Western US are singled out here. Figures 26-3 and 26-4 indicate the greatest levels of
						mean temperature and precipitation change over Canada, not Mexico and the Western US. Does this statement relate to the signal-to-
						noise findings mentioned above? To changes in extreme values? The rest of the paragraph discusses extreme climate changes in
						Canada, so this appears to be an inaccurate lead sentence for the paragraph. (UNITED STATES OF AMERICA)
314	26	12	27	12	26	These sentences are not clear to me. For example " 20th century maximum during the 2070-2099 period". How 2070-2099 can be
						associated with the 20th century? Please clarify. (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)
315	26	12	30	12	31	For these projected outcomes, is it possible to also specify the ranges/uncertainties around the central estimates? The same applies to
						lines 34-37. (Mach, Katharine, IPCC WGII TSU)
316	26	12	41	12	43	26.3.3.1 : There are more than two relevant citations for this topic - suggested additions are listed in the recommended citations for this
						entire section (comment below). (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
317	26	12	41	15	50	26.3 : Please distinguish, as much as possible, between impacts that are attributed to climate change, and those that may occur without climate change. This is a difficult distinction, but some disscusion is needed. For example, it would be helpful to label the cited studes as to whether they contain "direct", "indirect" or "related example" of climate change impacts/adaptations, defined as follows: (1) Direct are directly linked to climate change (e.g. a study of climate change induced impacts on water resources); 2) Indirect are indirectly linked to climate change (e.g., the types of temperature changes projected to occur with climate change have an impact on a water resources); 3) Related, are not linked to climate change (explicitly), but provide an example of a likely climate change outcome based on related factors (e.g. temperate increases, reduced snowpack, increased rainfall). (UNITED STATES OF AMERICA)
318	26	12	43	0	0	Section 26.3.1. Should this section further address the observed impacts related to precipitation trends, more than done on the top of page 13? (Mach, Katharine, IPCC WGII TSU)
319	26	12	43	13	3	I have several comments on this section:\n1) The section is too narrowly focused. Consider adding observed impacts on surface runoff (including the volume and timing) and precipitation.\n2) Greater consistency is needed when describing impacts on water resources. For example, the water quality section describes the impacts on water quality and how those impacts affect water systems (as a secondary impact). The flooding section focuses almost entirely on the frequency and intensity of flooding with little discussion on how that can then affect water systems.\n3) Consider changing the "instream uses" to water demand. Water demand will also be affected by climate change and that should be made more explicit. (UNITED STATES OF AMERICA)
320	26	12	43	13	4	Consider to include the analysis from: (Sosa-Rodriguez, Fabiola S., University of Waterloo)
321	26	12	43	13	4	Murdock et al. (2007). Preliminary Analysis of Climate Variability and Change in the Canadian Columbia River Basin: (Sosa-Rodriguez, Fabiola S., University of Waterloo)
322	26	12	43	13	4	Focus on Water Resources. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
323	26	12	43	13	4	Bruce, J; Burton, I; Martin, H; Mills, B; Mortsch, L (2002). Vulnerability and Adaptation to Climate Change. Final Report. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
324	26	12	45	12	0	26.3.1 : Given projections that storm tracks will shift poleward as a result of climate change, one might not expect a continental scale trend in drought. This sentence implies that the lack of a continental drought trend is inconsistent with projections. Please rephrase or clarify that this is the intended message. (UNITED STATES OF AMERICA)
325	26	12	45	12	45	26.3.1 : Please highlight which studies of drought are showing climate-induced drought (or some level of attribution) versus those numerous studies that are observational without climate change attribution. (UNITED STATES OF AMERICA)
326	26	12	45	12	48	What direction do these local trends have? Do they suggest increasing or decreasing drought occurrence? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
327	26	12	45	12	48	Line 46: No section 26.2.2.1.1 - change to 26.2.2.1. Lines 46-48: None of the references provided are suitable for statements about trends in drought for the Canadian Prairies. Recent studies of drought in the Canadian Prairies have tended to emphasize multi-decadal variability (see for example (Bonsal, B.R. et al., 2011. Drought research in Canada: A Review. Atmosphere-Ocean 49(4): 303-319; Bonsal, B.R. et al., 2012. An assessment of Canadian prairie drought: past, present and future. Climate Dynamics. Published online 28 June 2012). Dai et al., 2011 (Drought under global warming; a review. Wiley Interdisciplinary Reviews: Climate Change. Vol 2 Issue 1 pp 45-65) state that "recent regional trends towards more severe drought conditions were identified over southern and western Canada". (CANADA)
328	26	12	45	12	48	How likely are the local trends reported here to be anomalous or within the bounds of long-term drought patterns? It would be useful here to add a statement expressing the likelihood that the local observations of drought are within or outside of long-term drought cycles. (UNITED STATES OF AMERICA)

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#	Ch	From Page	From Line	To Page	To Line	Comment
329	26	12	45	12	48	Would be wise to include something in here about possible changes in the severity and/or duration of seasonal drought. Seasonal (summer) droughts are becoming longer and more severe as snowpacks decrease and melt earlier, and summer ET losses increase. One example is the Cowichan region of southwestern Canada, where implications for migrating salmon have become acute. It also bears explicitly mentioning in this passage of the text that such climate change-related increases in seasonal drought may often be compounded by water management and urbanization issues. (Fleming, Sean, Meteorological Service of Canada)
330	26	12	52	12	54	26.3.1 : It seems that this sentence is implying that increased rain/flood events can not be attributed to climate change. If this is not the intent, re-phrase; if this is the intent, authors should cite the literature that supports this position. (UNITED STATES OF AMERICA)
331	26	13	2	13	3	Following additional reference may be helpful here.\nKumar, S., V. Merwade, J. Kam and K. Thurner (2009), Streamflow trends in Indiana: effects of long term persistence, precipitation and subsurface drains, Journal of Hydrology, Vol. 374 (1-2), pp. 171–183 (Kumar, Sanijy, Center for Ocean-Land-Atmosphere Studies)
332	26	13	2	13	3	26.3.1 : There are many studies on climate change and stream flow trends, particularly in the US arid west; there should be more than one citation. If there is only to be one citation, unique results from this particular study should be mentioned. (UNITED STATES OF AMERICA)
333	26	13	2	13	3	A more complete description of streamflow trends with more literature citations is required for the US; and streamflow trends for Canada and Mexico are missing altogether from this section! This is a glaring error that really needs to be fixed. (Fleming, Sean, Meteorological Service of Canada)
334	26	13	6	13	20	This section seems out of place here. Consider starting section 26.3 with an overview on water resource conditions in the U.S., including demand, quality, and status of infrastructure. Acknowledge that population and economic growth, decaying infrastructure, declining water quality, etc. are putting pressure on water resources and that climate change will exacerbate this. (UNITED STATES OF AMERICA)
335	26	13	6	14	34	26.3.2 and 26.3.3.1 : Please consider these water supply related citations for 26.3.3.1 for Mexico: Mexico: Metcalfe, S. and S. Davies (2007). "Deciphering recent climate change in central Mexican lake records." Climatic Change 83(1-2): 169-186. Mendoza, V. M., E. E. Villanueva and J. Adem (1997). "Vulnerability of basins and watersheds in Mexico to global climate change." Climate Research 9: 139-145. Liverman, D.M. and K.L. O'Brien (1991). "Global warming and climate change in Mexico." Global Environmental Change 1(5): 351-364. (UNITED STATES OF AMERICA)
336	26	13	6	14	34	26.3.2 and 26.3.3.1 : Please consider these water supply related citations for 26.3.3.1. US National: Brian H. Hurd et al., "Climatic Change and U.S. Water Resources: From Modeled Watershed Impacts to National Estimates," JAWRA Journal of the American Water Resources Association 40, no. 1 (2004): 129-148, doi:10.1111/j.1752-1688.2004.tb01015.x. Hauer, F. R., J. S. Baron, D. H. Campbell, K. D. Fausch, S. W. Hostetler, G. H. Leavesley, P. R. Leavitt, D. M. McKnight and J. A. Stanford (1997). "Assessment of Climate Change and Freshwater Ecosystems of the Rocky Mountains, USA and Canada." Hydrological Processes 11(8): 903-924. Mulholland, P. J., G. R. Best, C. C. Coutant, G. M. Hornsberger, J. L. Meyer, D. J. Robinson, J. R. Stenberg, R. E. Turner, F. Vera-Herrera and R. G. Wetzel (1997). "Effects of Climate Change on Freshwater Ecosystems of the South-Eastern United States and Freshwater Ecosystems of the South Eastern United States and the Gulf Coast of Mexico." Hydrological Processes 11: 949-970. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
337	26	13	6	14	34	 26.3.2 and 26.3.3.1 : Please consider these water supply related citations for 26.3.3.1. US Regions: Western US: Mohammad Safeeq et al., "Coupling Snowpack and Groundwater Dynamics to Interpret Historical Streamflow Trends in the Western United States," Hydrological Processes 27, no. 5 (2013): 655-668, doi:10.1002/hyp.9628. Wilkins, D. E. (1997). Studies of Basin Reponse to Abrupt Climate Change: the Trans-Pecos Closed Basin, West Texas and South-Central New Mexico. Department of Geography, University of Utah. California, US: Cayan, D., A. Luers, M. Hanemann, G. Franco and B. Croes (2006). Scenarios of climate change in California: an overview. San Diego, CA, California Climate Change Center, Scripps Institution of Oceanography: 53. Vicuna, S., E.P. Maurer, B. Joyce, J.A. Dracup and D. Purkey (2007). "The sensitivity of California water resources to climate change scenarios." Journal of the American Water Resources Association 43(2): 482. Joyce, B., S. Vicuna, L. Dale, J. Darcup, M. Hanemann, D. Purkey and D. Yates (2006). Climate change impacts on water for agriculture in California: a case study in the Sacramento Valley. San Diego, CA, California Climate Change Center, Scripps Institution of Oceanography: 85. Medellin, J., J. Harou, M. Olivares, J. Lund, R. Howitt, S. Tanaka, M. Jenkins, K. Madani and T. Zhu (2006). Climate warming and water supply management in California. San Diego, CA, California Climate change impacts and freshwater systems: focusing the adaptation research agenda." International Journal of Sustainable Development 6(3): 265. Lund, J.R., R.E. Howitt, M.W. Jenkins, T. Zhu, S.K. Tanaka, M. Pulido, M. Tauber, R. Ritzema and I. Ferriera (2003). Climate warming and California's Water Resources Acails's Energy Commission; Center for Environmental and Water Resources Engineering, UC Davis: 86. California Climate Scenarios Assessment, accessed April 22, 2013, http://www.springer.com/earth-sciences+and+geography/atmospheric+science Jamie Anderson et al., "Progress on Incorporating Clima
338	26	13	8	13	20	There is not an explicit connection to climate change in this section. The discussion of current conditions needs a link to vulnerability. (UNITED STATES OF AMERICA)
339	26	13	13	13	13	Please do not start the sentence with number (10%) (Monterroso, Alejandro, Universidad Autonoma Chapingo)
340	26	13	13	13	13	"10% to 30% of the water quality monitoring sites in Mexico have polluted or heavily polluted water" This information is related only to surface water. There are different percentages for groundwater. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
341	26	13	13	13	17	this paragraph is about water quality not water use as the title indicates (Bachelet, Dominique, Conservation Biology Institute)
342	26	13	13	13	17	26.3.2 : Please explain how water quality/pollution relates to climate change, and/or change text to: "The current level of water pollution is not, in whole, attributable to climate change that has occured. The entirety of water pollution is important as context to understand the impacts of future cliamte change. This distinction should be made clear." This is related to other comments on this chapter requesting consistent distinction between impacts that are attributed to climate change and those that are not. (UNITED STATES OF AMERICA)
343	26	13	13	13	17	There are three different nations' methods of characterizing water quality here, so the meaning of the comparison is not clear. Can we put them on any sort of common footing? How does the Canadian "fair" relate to Mexico's "polluted" or USEPA's "supports fishing and swimming"? (Scott Michael Pacific Northwest National Laboratory)

#	Ch	From Page	From Line	To Page	To Line	Comment
344	26	13	13	13	17	Over what years do these statistics apply? (Mach, Katharine, IPCC WGII TSU)
345	26	13	14	14	0	26.3.2 and 26.3.3.1 : Please consider these water supply related citations for 26.3.3.1 for Canada. Arctic, CAN: Ford, J.D., B. Smit, and J. Wandel (2006). Vulnerability to climate change in the Arctic: a case study from Arctic Bay, Canada. Guelph, Ontario (Canada): 55. Alberta, CAN: Ryan J. MacDonald et al., "Modelling the Potential Impacts of Climate Change on Snowpack in the North Saskatchewan River Watershed, Alberta," Water Resources Management 26, no. 11 (September 1, 2012): 3053-3076, doi:10.1007/s11269-012-0016-2. Canada: Pelley, J. (2004). "Climate change threatens Canadian water supply." Environmental Science & Technology 38(11): 200A-200A. (UNITED STATES OF AMERICA)
346	26	13	16	13	17	in Canada's 16 most populated drainage basins reported Good - this point is worth mentioning. However, the author may also wish to note that it may be a less meaningful statistic than it seems. This is because some of the strongest water quality issues in Canada may be associated with natural resource extraction and processing industries, and much of that activity takes place in extremely remote parts of the country having very low populations, with implications more for ecosystems, fisheries, and tourism, and for safe water supply in small remote (rural, northern, and/or aboriginal) communities. I suggest doing a little more digging into the literature here. (Fleming, Sean, Meteorological Service of Canada)
347	26	13	19	13	20	How much variation is seen across geographies and contexts? (Mach, Katharine, IPCC WGII TSU)
348	26	13	25	14	8	The publication The 1999-2005 Canadian Prairies Drought:Acience, Impacts and Lessons- R.Stewart & R. Lawford editors published by the Drought Research Initiative and CFCAS, 2011 looks at many of the aspects of cliamte processes that contributed to this drought event and pathways for portential adaptations. The drought was the worst expierneced in western Canada and resulted in significnat economic loss. http://www.meteo.mcgill.ca/dri/The%201999-2005%20Canadian%20Prairies%20Drought%20-%20Science,%20Impacts,%20and%20Lessons.pdf (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
349	26	13	25	14	8	This section mixes impacts and adaptation options. For example, the discussion about transfers should be in the adaptation section. (UNITED STATES OF AMERICA)
350	26	13	30	13	39	Sosa-Rodriguez (2013) identified that "in the central region of Mexico, the mean annual temperature is likely to increase by up to 2.8 °C and the annual precipitation to decrease by 10.4 % from the 2020s to 2070s. These changes in temperature and precipitation may magnify pre-existing vulnerabilities arising from unmet water, energy and food demands, high demographic and economic activity, deforestation, and dependence on distant water sources". (Sosa-Rodriguez, Fabiola S., University of Waterloo)
351	26	13	30	13	39	Reference: Sosa-Rodriguez FS (2013). From Federal to City Mitigation and Adaptation: Climate Change Policy in Mexico City. Mitigation and Adaptation Strategies for Global Change Journal. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
352	26	13	41	13	41	26.3.3.1 : It is unclear which impacts listed in this paragraph are attributable to climate change, versus which are important context for future effects of climate change. Please differentiate. (UNITED STATES OF AMERICA)
353	26	13	41	13	43	The "southwest" United States is mentioned. Is there anything specific to California in the recnet literature? (Scott, Michael, Pacific Northwest National Laboratory)
354	26	13	43	13	45	For this projection, it would be preferable to specify the relevant scenarios of climate change and the ranges/uncertainties associated with the estimates. (Mach, Katharine, IPCC WGII TSU)
355	26	13	45	0	0	The value of nearly 30% is reinforced by 24.1% in Table III in Nakaegawa et al. (2013)\nNakaegawa, T., A. Kitoh, M. Hosaka. 2013: Discharge of major global rivers in the late 21st century climate projected with the high horizontal resolution MRI-AGCMs -overview Hydrological Processes. 27. DOI: 10.1002/hyp.9831 (Nakaegawa, Toshiyuki, Meteorological Research Institute)

#	Ch	From Page	From Line	To Page	To Line	Comment
356	26	13	45	13	46	26.3.3.1 : This needs a citation. Some references, and examples from California, US: \nH. J. Vaux Jr and Richard E. Howitt, "Managing
						Water Scarcity: An Evaluation of Interregional Transfers," Water Resources Research 20, no. 7: PP. 785-792, accessed September 27,
						2010, doi:198410.1029/WR020i007p00785.\nBrent M. Haddad, Rivers of Gold: Designing Markets to Allocate Water in California (Island
						Press, 2000).\nMorris Israel and Jay R Lund, "Recent California Water Transfers: Implications for Water Management," Natural
						Resources Journal 35 (1995): 1. (UNITED STATES OF AMERICA)
357	26	13	45	13	46	Change to "water transfers may entail" rather than "will entail" or justify the certainty. (UNITED STATES OF AMERICA)
358	26	13	46	13	47	It is not clear what is meant by social and cultural attributes here. Therefore, it is not apparent how or why they might be reduced by
						transferring water. Would the suggested reduction apply to both the area from which the water was transferred and the area to which
						the water was transferred? Changes in water availability certainly may lead to changes in social and cultural systems, but these might
						better be referred to as changes rather than reductions. Drier places do not have less culture per se. (UNITED STATES OF AMERICA)
359	26	13	46	13	47	The "attributes" here are ambiguous. It is not clear what is meant by social and cultural attributes here. Therefore, it is not apparent
						how or why they might be reduced by transferring water. Would the suggested reduction apply to both the area from which the water
						was transferred and the area to which the water was transferred? Changes in water availability certainly may lead to changes in social
						and cultural systems, but these might better be referred to as changes rather than reductions. Drier places do not have less culture per
						se. (UNITED STATES OF AMERICA)
360	26	13	52	14	1	The logical contrast of these statements could perhaps be enhanced by inserting a transition such as "nonetheless" into "can remain"
264	26					on line 54. (Mach, Katharine, IPCC WGII TSU)
361	26	14	1	14	4	26.3.3.1 : There are many studies on these impacts, and the listed impacts also pertain to the US west coast, not just the US east coast
						(as stated). Some recommendations are provided in the list of recommendations for this entire section (below). If only two citation are
						to be used to summarize this large list of impacts, for which there are many studies, please consider whether or not these two are the
262	26	14	4	1/	8	most comprehensive, or recent. (UNITED STATES OF AMERICA) There have been quite a few other studies in various parts of Canada examining future runoff under climate change. At an absolute
302	20	14	4	14	0	minimum I suggest additionally consulting the prolific work done by the Pacific Climate Impacts Consortium (PCIC) in British Columbia
						which has a very distinct climate from the rest of Canada. More broadly, it seems fair to say that some additional digging into the
						literature noods to be done. (Eleming, Sean, Meteorological Service of Canada)
						interature needs to be done. (Fierling, Sean, Meteorological Service of Canada)
363	26	14	13	14	34	26.3.3.2. For as many of the projected impacts described in this section as possible, it needs to give a sense of where (what regions of
						NA), when (e.g., what part of century), and what level of climate change. (UNITED STATES OF AMERICA)
364	26	14	18	0	0	Chen et al. 2011 does not refer to the point cited. Suggest reviewing. (CANADA)
365	26	14	19	14	19	What does "hypolimnetic" mean? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change &
						Environmental Risks Unit)
366	26	14	28	14	29	26.3.3.2 : How are the changes in "biological parameters and micropollutants" connected to climate change? (UNITED STATES OF
						AMERICA)
367	26	14	33	14	3	Please clarify if this means "coastal" sewage collection systems (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
368	26	14	37	14	47	 26.3.3.3 : Please consider these rainfall intensity and flood related citations for 26.3.3.3. Flooding: US: Cynthia Rosenzweig et al., "Increased Crop Damage in the US from Excess Precipitation Under Climate Change, "Global Environmental Change 12, no. 3 (October 2002): 197-202, doi:10.1016/S0959-3780(02)0008+0. Roger A. Pielke and Mary W. Downton, "Precipitation and Damaging Floods: Trends in the United States, 1932-97," Journal of Climate 13, no. 20 (October 2000): 3625-3637, doi:10.1175/1520-0442(2000)013<2625:PADFTI>2.0.CO;2. South-eastern US (Florida) and the US and Mexican Gulf Coast: Dingbao Wang, Scott C. Hagen, and Karim Alizad, "Climate Change Impact and Uncertainty Analysis of Extreme Rainfall Events in the Apalachicola River Basin, Florida," Journal of Hydrology 480 (February 14, 2013): 125-135, doi:10.1016/j.jhydrol.2012.12.015. Patrick J. Mulholland et al., "Effects of Climate Change on Freshwater Ecosystems of the South-Eastern United States and the Gulf Coast of Mexico," Hydrological Processes 11, no. 8 (1997): 949-970, doi:10.1002/(SICI)1099-1085(19970630)11:8<949::AID-HYP513>3.0.CO;2-G. California, US: Add flood impacts from (Hayhoe et al., 2004), already cited elsewhere in document. Michael Dettinger, "Climate Change, Atmospheric Rivers, and Floods in California - A Multimodel Analysis of Storm Frequency and Magnitude Changes," JAWRA Journal of the American Water Resources Association 47, no. 3 (2011): 514-523, doi:10.1111/j.1752-1688.2011.0054.x. Daniel R. Cayan et al., "Climate Change Projections of Sea Level Extremes Along the California Coast," Climatic Change 87, no. 1 (March 1, 2008): 57-73, doi:10.1016/j.1544-007-9376-7. Tapash Das et al., "Potential Increase in Floods in California's Sierra Nevada Under Future Climate Projections," Climatc Stores flooding and Climage On Urban Transportation: A Systemwide Performance Assessment of the Boston Metro Area," Transportation Research Part D: Transport and Environment 10, no. 3 (May 2005): 231-244, doi:10.1016/j.trd.2005.04.007.
369	26	14	39	14	39	26.3.3.3 : Unclear whether citations are studies of North America or multiple case studies within North America (UNITED STATES OF AMERICA)
370	26	14	43	0	0	Unclear what "southern Quebec basin" is referring to (possibly Peribonka River watershed, Minville et al 2010??). There should be references associated with this sentence. (Lemmen, Don, Canada National Study)
371	26	14	43	14	43	After" e.g. Quebec", I would have expected to find a citation. (Scott, Michael, Pacific Northwest National Laboratory)
372	26	14	43	14	47	What about flooding by hurricanes as happened in New York with Hurricane Sandy? Are there any projections of how events like this
						may change in the future? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
373	26	14	47	14	47	It may be clearest to indicate explicitly "business as usual emissions scenario" here if that is what is meant. (Mach, Katharine, IPCC WGII

#	Ch	From Page	From Line	TO Page	TO Line	Comment
374	26	14	50	15	7	26.3.3.4 : Please consider additional citations provided in recommendations for section 26.3.3.1 Water Supply, and also references specifically to hydropower in: Joshua H. Viers, "Hydropower Relicensing and Climate Change1," JAWRA Journal of the American Water Resources Association 47, no. 4 (2011): 655-661, doi:10.1111/j.1752-1688.2011.00531.x. ; CCSP (2007). Effects of Climate Change on Energy Production and Use in the United States . A Report by the U.S. Climate Change Science Program and the subcommittee on Global change Research. Wilbanks, T.J., V. Bhatt, D.E. Bilello, S.R. Bull, J.Ekmann, W.C. Horak, Y.J. Huang, M.D. Levine, M.J. Sale, D.K. Schmalzer, and M.J. Scott. Department of Energy, Office of Biological & Environmental Research, Washington, DC, USA. (UNITED STATES OF AMERICA)
375	26	15	0	15	0	The text states that "Most of the project-level adaptation actions are no-regret actions" but this claim is not supported and does not need to be made. The examples in the text could be considered no-regret, but they aren't necessarily, such as deeper water docks, extra capacity culverts. It would be better to reorganize this section by type of action. The section already has reducing leaks/encouraging efficiency, addressing infrastructure capacity (rainwater capture/culverts), and institutional shifts/agreements. Others are left out, such as many adaptations in the water sector include managing for uncertainty and anticipatory governance. References include o Quay, R. (2010) Anticipatory Governance. Journal of the American Planning Association 76, 496-511. (Denver and two other cities planning for future change) o Groves & Lempert (96) apply RDM to long-range water planning in California. (UNITED STATES OF AMERICA)
376	26	15	1	15	5	It would be helpful to indicate how changes in projected hydropower generation relate to demand, both today's demand and the projected demand, if that information is available, (UNITED STATES OF AMERICA)
377	26	15	1	15	5	For projections given on lines 1-2 and 4, it would be preferable to specify the ranges/uncertainties for the projected values. What
					_	scenarios of climate change are relevant, additionally? (Mach, Katharine, IPCC WGII TSU)
378	26	15	1	15	/	Changes in water cycle are described without saying what the level of climate change was for these predictions. (UNITED STATES OF AMERICA)
379	26	15	6	15	6	State 'low river levels during droughts' to make the point clearer. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
380	26	15	10	15	23	I note there is no mention of water withdrawls for energy production- fracking, Athabasca tar sands etc. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
381	26	15	10	15	23	This section should also mention Cooley et al. 2011, which evaluates how relying more heavily on energy efficiency, low water use renewables, and dry cooling systems can dramatically reduce water withdrawals and consumption for electricity generation.\nCooley, H., Fulton, J., & Gleick, P.H. (2011). Water for energy: future water needs for electricity in the Intermountain West. Pacific Institute: Oakland, CA.\nAlso, should mention other factors that may increase the energy requirements for water systems: more rigorous water quality requirements, more energy intensive supplies (e.g., desalination), and population and economic growth in dry regions. \nAlso need to discuss how conservation and efficiency can save both water and energy. It is thus an adaptation and mitigation strategy. (UNITED STATES OF AMERICA)
382	26	15	14	15	15	26.3.3.5 : Nowhere in this document does it mention a prediction of climate change affecting thermoelectric power generation to back up the claim that it makes. If this claim is to be made, the authors need to provide a citation for this - it's not in Kenny et al, 2009. A possible source: USGCRP (2009). Global Climate Change Impacts in the United States . Karl, T.R., J.M. Melillo, and T.C. Peterson (eds.). United States Global Change Research Program. Cambridge University Press, New York, NY, USA. Otherwise, a suggested rephrasing is: "Cooling of USA thermoelectric power plants may affect thermoelectric generation where surface water supplies are reduced in the eastern U.S." [this would be the IPCC's words unless they found a citation for this]. 84% of total U.S. thermoelectric withdrawals are from eastern states, and total thermoelectric withdrawals accounts for 49% of non-consumptive water withdrawals (Kenny et al., 2009)." (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
383	26	15	14	15	15	26.3.3.5. This statement needs to be clarified, otherwise it is misleading and alarming in terms of priorities for water management with climate change. First, 84% of thermoelectric water withdrawals occur in eastern states. Second, consumptive use of water withdrawals for thermoelectric is a small percentage of the total withdrawn. (See p.38 in Kenny et al.) Much of thermoelectric water withdrawals are returned to streams and reused downstream. (UNITED STATES OF AMERICA)
384	26	15	21	15	23	Saying "energy production mitigation measures" does not make sense. The goal is to mitigate climate change, not energy production. Also, the examples provided here are technology options, they are not measures (i.e., a technology is not a measure per se; a measure is something that facilitates the deployment of these technologies). Finally, not all climate change mitigation options will exacerbate stress on water supply (e.g. wind energy does not impact water supply). Therefore, suggest rephrasing the sentence to: "However, some climate change mitigation options related to energy production, such as carbon capture and storage, nuclear power, and some biofuels will exacerbate stresses on water supplies and quality." (CANADA)
385	26	15	26	15	50	This section, and most of the others in this chapter with the same subheading, is really just a listing of examples of adaptation actions being taken with no significant analysis / assessment. In this case the first sentence is the limit of the analysis. As such, it is difficult to conclude much more than "some adaptation is happening". If the literature supports stronger conclusions, these should be made. (Lemmen, Don, Canada National Study)
386	26	15	26	15	60	Suggested addition to this section: Furniss et al. 2010 is an excellent climate/water resource for the forest sector to cite and discuss. It provides several suggestions for water-related adaptation principles that could be summarized in a forest sector sentence or two.\nFurniss, Michael J.; Staab, Brian P.; Hazelhurst, Sherry; Clifton, Cathrine F.; Roby, Kenneth B.; Ilhadrt, Bonnie L.; Larry, Elizabeth B.; Todd, Albert H.; Reid, Leslie M.; Hines, Sarah J.; Bennett, Karen A.; Luce, Charles H.; Edwards, Pamela J. 2010. Water, climate change, and forests: watershed stewardship for a changing climate. Gen. Tech. Rep. PNW-GTR-812. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 75 p. (UNITED STATES OF AMERICA)
387	26	15	28	15	28	In the Adaptation context, terms have specific meanings. Please define what a "project" is and what "project-level" adaptations refers to. (UNITED STATES OF AMERICA)
388	26	15	28	15	28	The term "no regret" is used in different ways by different audiences so we recommend that it be defined if used. (UNITED STATES OF AMERICA)
389	26	15	28	15	28	Given terminology used in the report, would "low-regret policies" be a preferable phrase? (Mach, Katharine, IPCC WGII TSU)
390	26	15	28	15	29	When the Dam was last upgraded 1n the 1960s it resulted in extensive public opposition in British Columbia re the areas of the Skagit Valley that were being flooded. Raising the dam would back the reservoir up further into BC. The area is now a provincial park. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
391	26	15	28	15	41	26.3.4 : Requires a definition of "hard" and "soft" adaptations (reference to the executive summary) as well as "no regret" adaptation with cited examples of each. (UNITED STATES OF AMERICA)
392	26	15	28	15	50	This section begins with a statement that most of the project-level adaptation actions are no-regret policies. This is not necessarily true. Desalination is an energy intensive process but some coastal communities are considering it as a way to improve reliability. Likewise, some are discussing increased reliance on seawalls and levees, which may increase vulnerability in the long term. The use of the term "no-regret" is not clear; it's not informative to simply state "no-regrets" without adequate context about related costs and benefits.

#	Ch	From Page	From Line	To Page	To Line	Comment
393	26	15	32	15	33	Better references for the Regina example are Sauchyn and Kulshreshtha (2008 - citation to follow) and Richardson 2010 (already in reference list). Citation - Sauchyn, D. and Kulshreshtha, S. (2008): Prairies; in From Impacts to Adaptation: Canada in a Changing Climate 2007, edited by D.S. Lemmen, F.J.Warren, J. Lacroix and E. Bush; Government of Canada, Ottawa, ON, p. 275-328. (Lemmen, Don. Canada National Study)
394	26	15	35	15	35	Please use SI units of measurement throughout the report. (Rock, Joachim, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)
395	26	15	43	15	50	26.3.4 : Please consider these water supply related citations for 26.3.4. Adaptations: Canada: Shepherd, P. , J. Tansey and H. Dowlatabadi (2006). "Context matters: what shapes adaptation to water stress in the Okanagan?." Climatic Change 78(1): 31-62. Crabbe, P. and M. Robin (2006). "Institutional adaptation of water resource infrastructures to climate change in Eastern Ontario." Climatic Change 78(1): 103-133. Cohen, S., D. Neilsen, S. Smith, T. Neale, B. Taylor, M. Barton, W. Merritt, Y. Alila, P. Shepherd, R. McNeill, J. Tansey, J. Carmichael and S. Langsdale (2006). "Learning with local help: Expanding the dialogue on climate change and water management in the Okanagan region, British Columbia, Canada." Climatic Change 75(3): 331-358. Resource Futures International (RFI) (2004). Walpole Island First Nation: evaluation of climate change impacts and adaptation options. Ottawa, Ontario, Resource Futures International (RFI); Natural Resources Canada: 40. Bruce, J.P., H. Martin, P. Colucci, G. McBean, J.McFougall, D. Shrubsole, J. Whalley, R. Halliday, M. Alden, L. Mortsch and B. Mills (2003). Climate change impacts on boundary and transboundary water management. Ottawa, Ontario (Canada), Natural Resources Canada: 307. (UNITED STATES OF AMERICA)
396	26	15	43	15	50	 26.3.4 : Please consider these water supply related citations for 26.3.4. Adaptations: US: Brikowski, T. and W. Anderson (2006). Droughts and reservoirs: finding storage space underground. Managing Drought & Water Scarcity in Vulnerable Environments: Creating a Roadmap for Change in the United States. Longmont, CO, Geological Society of America (GSA). California, US: David R. Purkey et al., "Integrating a Climate Change Assessment Tool into Stakeholder-driven Water Management Decision-making Processes in California," in Integrated Assessment of Water Resources and Global Change, ed. Eric Craswell et al. (Springer Netherlands, 2007), 315-329, http://link.springer.com/chapter/10.1007/978-1-4020-5591-1_19. Lach, D., H. Ingram and S. Rayner (2003). Coping with climate variability: municipal water agencies in southern California. Climate and water: transboundary challenges in the Americas. H.F. Diaz and B.J. Morehouse. The Netherlands, Kluwer Academic Publishers: 59-81. Tanaka, S. K. , T. Zhu, J. R. Lund, R. E. Howitt, M. W. Jenkins, M. A. Pulido, M. Tauber, R. S. Ritzema and I. C. Ferreira (2006). "Climate warming and water management adaptation for California." Climatic Change 76(3-4): 361-387. California Department of Water Resources (2006). Progress on incorporating climate change into management of California's water resources. Sacramento, CA, California Department of Water Resources: 339. The Pacific Institute, California Farm Water Success Stories (Oakland, CA: The Pacific Institute, December 2011), http://www.pacinst.org/reports/success_stories/index.htm. ; Juliet Christian-Smith and Peter H. Gleick, A Twenty-First Century U.S. Water Policy (Oxford University Press US, 2012), http://www.oup.com/us/catalog/general/subject/Sociology/EnvironmentTechn Laura J. Stroup, "Adaptation of U.S. Water Management to Climate and Environmental Change," The Professional Geographer 63, no. 4 (2011): 414-428, doi:10.1080/00330124.2011.604010. (UNITED STATES OF AMERICA)
397	26	15	43	15	50	26.3.4 : Please consider these water supply related citations for 26.3.4. Adaptations: Mexico: Eakin, H., V. Magana, J. Smith, J.L. Moreno, J.M. Martinez and O. Landavazo (2007). "A stakeholder driven process to reduce vulnerability to climate change in Hermosillo, Sonora, Mexico." Mitigation and Adaptation Strategies for Global Change online. Levina, E. (2006). Domestic policy frameworks for adaptation to climate change in the water sector - part II: non-annex I countries - lessons learned from Mexico, India, Argentina and Zimbabwe. Paris, Organisation for Economic Co-operation and Development (OECD): 70. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
398	26	15	43	15	50	26.3.4 : There is an entire literature (in water management, hydrology, soil and agricultural science, and economics fields) on water use efficiency in urban, industrial, and agricultural settings. If water efficiency is to be mentioned, the broad literature on this topic should be represented - at least in the form of multiple citations. (UNITED STATES OF AMERICA)
399	26	15	48	0	0	Change "Quebec Province" to either "Province of Quebec" or simply "Quebec". (Lemmen, Don, Canada National Study)
400	26	15	48	15	48	Replace the phrase "Quebec Province" with "The province of Quebec" (CANADA)
401	26	15	48	15	48	Change "Quebec Province" to "The province of Quebec" or "Quebec, Canada" (Fleming, Sean, Meteorological Service of Canada)
402	26	16	1	16	4	The citation provided is quite limited for the breadth of the statement; suggest using Vose et al. 2012.\nVose, James M.; Peterson, David L.; Patel-Weynand, Toral 2012. Effects of climatic variability and change on forest ecosystems: a comprehensive science synthesis for the U.S. Gen. Tech. Rep. PNW-GTR-870. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 265 p. (UNITED STATES OF AMERICA)
403	26	16	1	18	0	26.4 : This section would be more useful if it took into account the different biomes of North America, and at the least was more comprehensive across the different forest types. Other ecosystems of concern include the North American Mediterranean forest / chaparral ecosystem, which is a large fire concern, contains 5M housing units, and is the only biodiversity hotspot in NA outside the tropics according to the IUCN. Also, text should distinguish between temperate, broad-leaved forests in the northeast, subtropical forests of Florida, and so on. Consider citing: Hammer RB, Radeloff VC, Fried JS, Stewart SI (2007) Wildland-urban interface housing growth during the 1990s in California, Oregon, and Washington. International Journal of Wildland Fire 16, 255-265. Askins, RA, F Chavez-Ramarez, BC Dale, CA Haas, JR Herkert, FL Knopf and PD Vickery. (2007). Ornithological Manuscripts, No. 64, Conservation of Grassland Birds in North America: Understanding Ecological Processes in Different Regions: Report of the AOU Committee on Conservation, pp. iii-viii, 1-46. (UNITED STATES OF AMERICA)
404	26	16	1	18	49	26.4 : Please address the negative effects and co-benefits climate change mitigation/adaptation measures may have on ecosystems and biodiversity. (UNITED STATES OF AMERICA)
405	26	16	2	16	32	Consider to include the study of Peterson et al. (2002). Future projections for Mexican faunas under global climate change scenarios. Nature. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
406	26	16	2	16	32	Consider to include the study of Gomez-Mendoza and Arriaga (2007). Modeling the effect of climate change on the distribution of oak and pine species of Mexico. Conservation Biology. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
407	26	16	3	16	32	While the final paragraph of this section provides the rationale for focusing on forests and coasts, it would be worth acknowledging in the preceding paragraphs the large number of vulnerable ecosystems in North America. Two that jump out are alpine, noting the absence of "adaptation space", and grasslands because of the role of other anthropogenic drivers. (Lemmen, Don, Canada National Study)
408	26	16	4	16	4	Could the phrase "consistent with warming trends" be added to send of first sentence? If not, what is connection to climate change? (UNITED STATES OF AMERICA)
409	26	16	7	16	8	Do the citations in the previous statement also apply to the final sentence in this paragraph? If not, then citations should be inserted to support the statement about the interaction between climate-related range shifts and land use changes. (UNITED STATES OF AMERICA)

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#	Ch	From Page	From Line	To Page	To Line	Comment
410	26	16	10	16	11	The citation provided is quite limited for the breadth of the statement; suggest using Glick et al. 2011. Also, the USDA Forest Service National Roadmap for Responding to Climate Change includes a Performance Scorecard that provides guidance for climate change vulnerability assessment and adaptation implementation in National Forests.\nGlick, P., Stein, B. A., & Edelson, N. A. (Eds.). (2011). Scanning the conservation horizon: A guide to climate change vulnerability assessment. Washington, DC: National Wildlife Federation. (UNITED STATES OF AMERICA)
411	26	16	12	16	12	Replace "shift(Sholze et al)" by shift_(Sholze et al)" (Sosa-Rodriguez, Fabiola S., University of Waterloo)
412	26	16	12	16	14	This appears to suggest that droughts and floods are playing an increasing role in sea level rise and hurricanes, which is presumably not the intent of the authors. For example it would more clear as: "Building upon results presented in the AR4, studies have identified a more prominent role of extreme events (e.g., droughts and floods, infestation by fungi, sea level rise, hurricanes) in influencing North American ecosystems". (UNITED STATES OF AMERICA)
413	26	16	15	16	18	It would be useful to know if this projected reduction in primary production of carbon is expected to change North American forests from a net carbon sink to a carbon source. (UNITED STATES OF AMERICA)
414	26	16	24	16	24	For the sentence: "Risk studies on 134 species in U.S." What kinds of species were modeled (Trees? Animals? Other types of species?) (UNITED STATES OF AMERICA)
415	26	16	29	16	32	This paragraph should include more explanation of why only forests and coastal systems are covered in this section on Ecosystems and Biodviersity. In particular, it is not clear what is meant by "where research advances since AR4 justify further exploration". Given the extensive focus of WGII Chapter 4 on forests (pages 35-42), it is also not entirely clear why the North America chapter also focuses almost entirely on forests. In particular, Box 4.2 in Chapter 4 (page 36) covers "Tree Mortality and Climate Change", a topic also discussed in Chapter 26. Care should be taken to make sure those sections are not redundant, and are well-coordinated. In Lines 31-32, the sentence should probably read "Additional synthesis of climate change impacts on ecosystems in general and terrestrial, coastal and ocean in particular can be found in Chapter 8 of the U.S. National Climate Assessment (Groffman et al. 2013) and AR5 WGII Chapters 4, 5 and 6". (UNITED STATES OF AMERICA)
416	26	16	37	0	0	Section 26.4.1.1: As mentioned in the context of the executive summary, this section does not provide clear support for the attribution to anthropogenic climate change discussed there (Mastrandrea, Michael, IPCC WGII TSU)
417	26	16	39	16	42	The timeframe of these observations should be specified. (Mach, Katharine, IPCC WGII TSU)
418	26	16	45	16	45	Conafor is a federal institution of Mexico, please change to CONAFOR (Monterroso, Alejandro, Universidad Autonoma Chapingo)
419	26	16	48	16	50	It would be helpful to specify how much the average mortality rate increased as appropriate. (Mach, Katharine, IPCC WGII TSU)
420	26	16	49	16	50	26.4.1 : Is this a percentage increase of the baseline average mortality rate or an increase in the absolute percentage of trees that die each year? Please list the baseline as well. (UNITED STATES OF AMERICA)
421	26	17	4	17	8	To the best of my knowledge there has been no Mtn. Pine Beetle yet in Alaska - instead the Spruce Bark Beetle has resulted in major outbreaks in the southwest Yukon and parts of Alaska such as the Kenai Penninsula(I have searched the web to try and find something to prove Mt.Pine Beetle has been detected Alaska). Both beetles are the same genera but different species. However the current outbreak of the Mountain Pine Beetle is moving north out of south central British Columbia and in 2012 was detected as far north as 80 kilometers south of the 60th parrallel (the Yukon border). Forest Health Report 2012 Yukon Energy Mines and Resources http://www.emr.gov.yk.ca/forestry/pdf/forest_health_report_2012_web.pdf pages 8-15. Mountain Pine Beetle ishas also crossed the Rocky MOuntains are infecting boreal and mountane forsests in Alberta. The concern is that they will spreadfurther east. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
#	Ch	From Page	From Line	To Page	To Line	Comment
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422	26	17	4	17	8	Suggest that the last two sentences of this paragraph be revised to read "An estimated 18,177 km2 of U.S. forests have been affected (Williams et al. 2010). British Columbia, Canada experienced an even larger impact (Brown et al. 2010a), with mortality in over 7 million acres (Aukema et al. 2006)". It would be better if the last statement clarified whether the mortality in those 7 million acres was complete (i.e., all trees died) or elevated (i.e., higher mortality than in non-infected stands). (UNITED STATES OF AMERICA)
423	26	17	4	17	8	Over what time frames have these impacts been observed? (Mach, Katharine, IPCC WGII TSU)
424	26	17	6	17	8	Given the rapid nature of the MPB outbreak I recommend you use the most recent statistics available to describe the size of the outbreak. In British Columbia the May 2012 figures were 18.1 million hectares of forest affected and 710 cubic metres of timber killed (http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/Updated-Beetle-Facts_May2012.pdf). (Lemmen, Don, Canada National Study)
425	26	17	11	17	31	Individual tree species have large climatic ranges, put provenances within a species can have a much narrow range and thus can become maladapted to the new climate.\nThis will influence their growth and succeptibility to disease.\nThere is an extensive literature on this subject and it is a major driver behind using assisted migration of commercial conifer as an adaptation option to avoid maladaptation. As to which of the climates they may experience over their 60-100 year life is, of course, the big question.\nRehfeldt, G. E., C. C. Ying, D. L. Spittlehouse, and D. A.Hamilton. 1999. Genetic responses to climate in Pinus contorta: niche breadth, climate change, and reforestation. Ecological Monographs 69:375–407.\nLeites, L.P., A.P. Robinson, G.E. Rehfeldt, J.D. Marshall and N.L. Crookston. 2012.Height-growth response to climatic changes differs among populations of Douglas-fir: a novel analysis of historic data. Ecological Applications 22:154–165.\nAitken, S.N., S. Yeaman, J.A. Holliday, T. Wang, and S. Curtis-McLane. 2008. Adaptation, migration or extirpation: Climate change outcomes for tree populations. Evol. Appl. 1:95-111.\nRehfeldt, G.E., and B.C. Jaquish. 2010. Ecological impacts and management strategies for western larch in the face of climate-change. Mitig. Adapt. Strateg. Glob. Change 15:283-306. (Spitttlehouse, Dave, BC Ministry Forests, Lands and Natural Resource Operations)
426	26	17	13	17	14	Which ecosystems are meant by "these ecosystems" should be explicitly stated. (Mach, Katharine, IPCC WGII TSU)
427	26	17	16	17	18	For what scenario of climate change is this outcome expected? (Mach, Katharine, IPCC WGII TSU)
428	26	17	20	17	22	26.4.1.1 : Clarify first sentence. Unclear what "major changes" will occur in forest soil. And what are the decreases in growing season "subsequent" to? (UNITED STATES OF AMERICA)
429	26	17	20	17	22	It not clear what this sentence is trying to say. Consider splitting into two sentences or otherwise rewording. (UNITED STATES OF AMERICA)
430	26	17	20	17	22	The logic of this sentence could be clarified a bit. The growing season decrease is "subsequent" why? (Mach, Katharine, IPCC WGII TSU)
431	26	17	26	17	26	For an unfamiliar reader, it could be helpful to indicate "expansion of disease" is the type of expansion that is meant. (Mach, Katharine, IPCC WGII TSU)
432	26	17	30	0	0	Delete Latin names as they are not used for other forest pests (or indeed for any species in this section of the chapter). (Lemmen, Don, Canada National Study)
433	26	17	30	17	30	Please include the common name for the two species listed. If they are the bark beetle refered to earlier, then the Latin names should be included when the beetles are first mentioned. (UNITED STATES OF AMERICA)
434	26	17	30	17	30	Is there a common name for these species that could be given? Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
435	26	17	36	17	36	This sentence should probably include the "Gulf Coast" in addition to the "East and West coasts" of North America. (UNITED STATES OF AMERICA)

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436	26	17	38	0	0	Expand the wording beyond "hurricanes" to indicate the other kinds of large storms that threaten coastal areas. Extra-tropical cyclones and other major storms cause large impacts. (e.g. Brunner and Lynch2010:118-128). Citation: Ronald D. Brunner and Amanda H. Lynch (2010) Adaptive Governance and Climate Change.American Meterological Society. Boston. (UNITED STATES OF AMERICA)
437	26	17	43	0	0	much research summarized for Oregon - Ruggiero P., C.A. Brown, P. D. Komar, J.C. Allan, D.A. Reusser, S. Rumrill. Contributor: P. Corcoran, H. Baron, H. Moritz, and J.A. Saarinen. 2010. Chapter 6. Impacts of climate change on Oregon's coasts and estuaries. In Oregon Climate Change Research Institute, Oregon Climate Assessment Report, K.D. Dello and P.W. Mote (eds). College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis, OR. (Bachelet, Dominique, Conservation Biology Institute)
438	26	17	43	0	0	Section 26.4.2.1. The section title could be considered. Would "observed impacts and vulnerabilities" be more inclusive of all material assessed? (Mach, Katharine, IPCC WGII TSU)
439	26	17	45	18	14	26.4.2.1. It is not quite clear from all of these descriptions which of the observed impacts are attributed to climate change. Also a threat is a glimpse into the future and not an observation. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
440	26	17	47	17	47	26.4.2.1 : What are seagrass and mangroves affectations? (UNITED STATES OF AMERICA)
441	26	17	47	17	47	The word choice of "affectations" is a bit unclear. (Mach, Katharine, IPCC WGII TSU)
442	26	17	48	17	50	Over what time frame have these observations been made? (Mach, Katharine, IPCC WGII TSU)
443	26	17	52	17	53	A comma appears to be missing. The term species cannot be applied to "the metabolism of many organisms". (UNITED STATES OF AMERICA)
444	26	17	54	18	1	What is the relative importance of climate variability versus climate change? This could be specified. (Mach, Katharine, IPCC WGII TSU)
445	26	18	0	18	0	Consider Citing: Mawdsley, J. R., O'MALLEY, R. O. B. I. N., & Ojima, D. S. (2009). A review of climate_change adaptation strategies for wildlife management and biodiversity conservation. Conservation Biology, 23(5), 1080-1089. (UNITED STATES OF AMERICA)
446	26	18	0	18	0	The forest Service is conducting vulnerability assessments http://www.fs.fed.us/rm/grassland-shrubland-desert/products/species-vulnerability/ (UNITED STATES OF AMERICA)
447	26	18	0	18	0	There are myriad lawsuits that are resulting in increased consideration of climate change as part of enforcement of US federal environmental laws. Consider citing: LEGAL STUDIES RESEARCH PAPER SERIES Working Paper Number 12-16 August 6, 2012 NEPA and Climate Change Mark Squillace University of Colorado Law School Alexander Hood Toward Justice NEPA and Climate Change in The NEPA Litigation Guide 261 (American Bar Ass'n, 2d ed. 2012), Also consider citing the Endangered Species Act, and the Clean Water Act (UNITED STATES OF AMERICA)
448	26	18	1	18	1	Please clarify if this means MARINE mammals. (UNITED STATES OF AMERICA)
449	26	18	5	0	0	The confidence statement here comes out of the blue as there are no other examples in the chapter (outside of the Executive Summary). Supporting references are needed. Reference to Will Box CC-OA be included in the chapter and if it isn't, you need to clearly state where it can be found (technical Summary, Chapters 5, 6). (Lemmen, Don, Canada National Study)
450	26	18	5	18	5	The sentence on acidification is not clear, where it states that "There is confidence about acidification". About what is there confidence - - that is already occurring? That it will occur? That it will have a negative impact? (UNITED STATES OF AMERICA)
451	26	18	5	18	7	26.4.2.1. sentence structure needs repair (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)

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452	26	18	5	18	7	These statements could be clarified. What aspect of ocean acidification is being referred to in the 1st sentence? Additionally, the 2nd sentence should be refinedwhat is the geographic scope of the example as well? (Mach, Katharine, IPCC WGII TSU)
453	26	18	12	18	13	What are the timelines for recovery following such events? (Mach, Katharine, IPCC WGII TSU)
454	26	18	19	18	38	26.4.2.2. can you provide confidence levels for statements? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
455	26	18	19	18	38	26.4.2.2. one wonders whether coverage is complete (enough). What about specific issues along the West coast associated with upwelling? what about specific issues along the East coast, e.g. fish distribution, and fisheries? or in the American Arctic? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
456	26	18	20	18	20	It would be helpful to specify the mechanism through which flood tolerance is reduced. (Mach, Katharine, IPCC WGII TSU)
457	26	18	21	18	22	It would also be helpful to clarify what is meant by "their recovery is almost impossible." Also, what are the relevant scenarios of climate change for the projections described on these lines? What drivers are relevant, and what are the ranges/uncertainties associated with the estimates? (Mach. Katharine. IPCC WGII TSU)
458	26	18	27	18	28	40% refers to chinook only (one species of salmon) under only 1 GCM scenario (GFDL) is comes only from Battin's paper not Crozier. Battin's conclusions are also much more nuanced than this blunt statement. (Bachelet, Dominique, Conservation Biology Institute)
459	26	18	27	18	28	For the described projected impact, the full range should be specified instead of "up to 40%," it would also be preferable to specify the relevant scenario of climate change and other relevant drivers if pertinent to this projection. (Mach, Katharine, IPCC WGII TSU)
460	26	18	29	0	0	this is not well phrased: it should mention seasonal as well as regional differences (Bachelet, Dominique, Conservation Biology Institute)
461	26	18	29	18	29	For clarity, consider editing this sentence to read "at the southern end of their range while doing the opposite at the northern end of their range". (UNITED STATES OF AMERICA)
462	26	18	31	18	34	The relative importance of temperature change versus ocean acidification should be discussed as supported by available literature. Material in Chapter 6, 5, and 30 is relevant here. (Mach, Katharine, IPCC WGII TSU)
463	26	18	36	18	36	The findings of working group 1 should be cross-referenced here, with consistency ensured. (Mach, Katharine, IPCC WGII TSU)
464	26	18	36	18	38	Mangroves were dealt with three paragraphs above. This single sentence paragraph should probably be combined with those paragraphs. (UNITED STATES OF AMERICA)
465	26	18	37	18	37	Please clarify what is mean by "over a period of at least 25 years" (UNITED STATES OF AMERICA)

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466	26	18	41	19	16	Citations for comment on forest adapation. Citations are separated by square brackets. Citations: [Gleeson, J., P. Gray, A. Douglas, C. J. Lemieux, and G. Nielsen. 2011. Practitioner's Guide to Climate Change Adaptation in Ontario's Ecosystems. Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR), Sudbury.] [Ogden, A. E., and J. L. Innes. 2009. Application of structured decision making to an assessment of climate change vulnerabilities and adaptation options for sustainable forest management. Ecology and Society 14:11.] [NOAA. 2010. Adapting to Climate Change: A Planning Guide for State Coastal Managers. National Oceanic and Atmospheric Administration (NOAA), Office of Ocean and Coastal Resource Management. http://coastalmanagement.noaa.gov/climate/adaptation.html (accessed May 2012).] [Halofsky, J. E., D. L. Peterson, K. A. O'Halloran, and C. Hawkins-Hoffman. 2011. Adapting to climate change at Olympic National Forest and Olympic National Park. Gen. Tech. Rep. PNW-GTR-844. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 130 p.] [Weeks, D., P. Malone, and L. Welling. 2011. Climate change scenario planning: A tool for managing parks into uncertain futures. ParkScience 28:26- 33.] [Poiani, K. A., R. L. Goldman, J. Hobson, J. M. Hoekstra, and K. S. Nelson. 2011. Redesigning biodiversity conservation projects for climate change: Examples from the field. Biological Conservation 20:185-201.] [Cross, M. S., P. D. McCarthy, G. Garfin, D. Gori, and C. A. F. Enquist. 2013. Accelerating adaptation of natural resource management to address climate change. Conservation Biology 27:4-13.] [Cross, M. S., E. S. Zavaleta, D. Bachelet, M. L. Brooks, C. A. F. Enquist, E. Fleishman, L. Graumlich, C. R. Groves, L. Hannah, L. Hansen, G. Hayward, M. Koopman, J. J. Lawler, J. R. Malcolm, J. Nordgren, B. Petersen, E. L. Rowland, D. Scott, S. L. Shafer, M. R. Shaw, and G. M. Tabor. 2012. The Adaptation for Conservation Targets (ACT) framework: A tool for incorporating clim
467	26	18	41	19	16	We suggest that this section make reference to a growing number of climate change adaptation planning approaches that are being applied to the conservation of biodiversity and ecosystems in the US and Canada. Possible text could include: "In the United States and Canada, a number of adaptation planning approaches have been proposed and applied to support the development of adaptation strategies for the conservation of biodiversity and ecosystems (e.g., Ogden and Innes 2009; NOAA 2010; Gleeson et al. 2011; Halofsky et al. 2011; Weeks et al. 2011; Poiani et al. 2011; Cross et al. 2012; Cross et al. 2013). Many of these approaches emphasize the value of collaborative dialogue between scientists and practitioners to develop science-based adaptation strategies based on a combination of local knowledge and climate change projections." Citations are provided below. (UNITED STATES OF AMERICA)
468	26	18	43	18	44	it is unclear what is meant by "the biodiversity and conservation of habitats and food chains" in the context of the rest of the sentence. (UNITED STATES OF AMERICA)
469	26	18	43	18	45	I would add the genetic capacity of various species (biological ecosysem components) to adapt to in situ changes or if they move to tolerate bio physical conditions in potentail new habitat. For instance Scott Green (http://scottgreenunbcca.ipage.com) and otehrs have found some forest species do notcurrently have the genetic elsticity to move north because they cannot adpat to the long summer daylight period(they dehydrate). Further to page 18 lines 52 page 19-line 5 he along with his colleagues have been investigating the potential of various more southern tree species to be used to colonize forests further north. The message is that there may be constraints other than climate and distance to migrations. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)

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470	26	18	43	18	46	This statement should be qualified: the resilience of ecosystems to climate change depends on much more than biodiversity, habitat conservation, and landuse change. Perhaps use "including" as a qualifier, allowing for other more specific factors such as structure, predominance of species at the margins of their ranges, and susceptibility to factors that interact with climate change (pests/disease, ozone, fire, frost, hail, etc). See Swanston et al. 2011 and 2012 (and citations therein) for a list of ecosystem vulnerabilities, characteristics and accommodate change, and strategies for climate change resilience. \nSwanston, C.W., M. Janowiak, L. Iverson, L. Parker, D. Mladenoff, L. Brandt, P. Butler, M. St. Pierre, A. Prasad, S. Matthews, M. Peters, and D. Higgins. 2011. Ecosystem Vulnerability Assessment and Synthesis: A Report from the Climate Change Response Framework Project in Northern Wisconsin, Version 1. Gen. Tech. Rep. NRS-82. U.S. Department of Agriculture, Forest Service, Northern Research Station, Newtown Square, Pennsylvania.142p.\nSwanston, C.W., and M.K. Janowiak. 2012. Forest Adaptation Resources: Climate change tools and approaches for land managers. Gen. Tech. Rep. NRS-87. U.S. Department of Agriculture, Forest Service, Northern Research Station, Newtown Square, Pennsylvania. 108p. (UNITED STATES OF AMERICA)
471	26	18	43	19	5	Adaptation responses in Mexico to promote forest conservation and the benefits forests provide in terms of environmental services (e.g., carbon sequestration) include "the integration of the (Special Climate Change Programe (SCCP) with previous forest programs focused on reducing the number of forest fires, diversifying forest uses, advancing agroforestry, and developing the Mexican market for carbon sequestration, in addition to assessing climate impacts on biodiversity such as the Natural Protected Areas Program, Forest Development Program, Forest Conservation and Restoration Program, and ProArbol (Sosa-Rodriguez, 2013). (Sosa-Rodriguez, Fabiola S., University of Waterloo)
472	26	18	43	19	5	Sosa-Rodriguez (2013) identified some constrains that reduce the effectiveness of adaptation strategies on this sector. For example, "lack of knowledge and administrative capacity for sustainable forest management, excessive regulation, and poverty within local communities have promoted illegal?and sometimes legal?forest overexploitation. Payment for environmental services (PES) provided by forests to local communities has been reduced to subsidies for not deforesting. This approach avoids local capability building and effective community participation in managing its natural resources". (Sosa-Rodriguez, Fabiola S., University of Waterloo)
473	26	18	45	18	46	Bhatti et al., 2006 is absent in reference list.\n\n (NETHERLANDS)
474	26	18	45	18	46	26.4.3 : Add "water-use changes" to sentences; these changes can happen independently of land use changes (e.g. increased irrigation withdrawals to cope with drought). (UNITED STATES OF AMERICA)

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475	26	18	46	18	48	Suggested additional examples of successful indigenous adaptation proejcts are cited in the attached supporting document: Indigenous Health Impacts from Climate Change expert reviewer Blake Gentry. See pages 10-11. The suggested additional language follows here: " indigenous living on ancestral lands remain key to biodiversity through CO2 CDM off-set programs, and to maintaining food security. In Chiapas, Mexico, for example, the Scolel Te Project has improved reforestation and provided sustainable timber sales, organic coffee, and other agroforestry products to local farmers . \nIn the semiarid Sonoran Desert region zone of NW Mexico, regional warming has reduced cattle and grain production, prompting SEMARNAT to fund adaptation projects. Hydroponic greenhouses for growing food, such as the one in Lomas de Bacum, Sonora, Mexico, are administered as an agricultural coop by Yaqui indigenous women . \nSmall local technology driven projects designed to promote sustainable energy and livelihoods are applicable to migratory, resettled, and permanently settled climate vulnerable indigenous. The use of appropriate technology improves environmental management, sustains development project interventions, and improve livelihood benefits which builds reliance in indigenous communities to multi-factors causing displacement including climate change impacts. Case examples are micro-hydro for agro processing (Bolivia –I), bio-digesters in rural communities (Costa Rica –I), and solar electrification via micro enterprises (Dominican Republic-3), plus 43 more reviewed the UN Global Energy Facility small grants program. "\n (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services.)
476	26	18	50	18	51	it is unclear what is meant by "increases in plant community composition". (UNITED STATES OF AMERICA)
477	26	18	50	19	5	no mention of adapting seed source and genomic (adaptive traits) - work by Glenn Howe, Brad StClair (OSU), Tongli Wang, Sally Aitken (UBC) etc (Bachelet, Dominique, Conservation Biology Institute)
478	26	18	52	0	0	Assisted migration for commercial tree species likely more useful than breeding for resistance. See references above (Note his comment on Pg 17, Line 11 for references) (Spittlehouse, Dave, BC Ministry Forests, Lands and Natural Resource Operations)
479	26	18	53	18	54	Proper reference for chapter 4 of Canadian Assessment is Vasseur and Catto (2008). Citation - Vasseur, L. and Catto, N. (2008): Atlantic Canada; in From Impacts to Adaptation: Canada in a Changing Climate 2007, edited by D.S. Lemmen, F.J.Warren, J. Lacroix and E. Bush; Government of Canada, Ottawa, ON, p. 119-170. (Lemmen, Don, Canada National Study)
480	26	19	0	19	0	26-2 Box : Should discuss strategies for plant communities that are fire dependent versus those not adapted to fire separatelythe ecological effects of fire are different for these two cases. (UNITED STATES OF AMERICA)
481	26	19	5	0	0	Camille Parmesan and colleagues published a paper giving criteria for assisted migration that could be cited here: Ove Hoegh-Guldberg, Lesley Hughes, Sue McIntyre, David Lindenmayer, Camille Parmesan, Hugh Possingham & Chris Thomas. Moving with the times: assisted colonization and rapid climate change. Science, July 18, 2008\n (Bachelet, Dominique, Conservation Biology Institute)

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482	26	19	7	19	10	This statement is valid, but unduly limited why is only "protected area"planning and management mentioned? Most ecosystems are not protected and also require better planning and climate-adaptive management. Simply maintaining forests as forests, especially if well managed, has a carbon benefit even is additional sequestration is not the primary management goal. If this paragraph is really about carbon management, it should be clearer from the beginning, and the necessity to consider adaptation when planning mitigation should be clarified. Millar et al. 2013 and Peterson et al. 2011 should be cited in this paragraph.\nMillar, C.I., K.E. Skog, D.C. McKinley, R.A. Birdsey, C.W. Swanston, S.J. Hines, C.W. Woodall, E.D. Reinhardt, D.L. Peterson, and J.M. Vose. 2012. Adaptation and mitigation, p. 125-192, In J. M. Vose, et al., eds. Effects of climatic variability and change on forest ecosystems: a comprehensive science synthesis for the U.S. forest sector, Gen. Tech. Rep. PNW-GTR-870. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.\nPeterson, David L.; Millar, Connie I.; Joyce, Linda A.; Furniss, Michael J.; Halofsky, Jessica E.; Neilson, Ronald P.; Morelli, Toni Lyn. 2011. Responding to climate change in national forests: a guidebook for developing adaptation options. Gen. Tech. Rep. PNW-GTR-855. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 109 p. (UNITED STATES OF AMERICA)
483	26	19	9	19	10	This statement regarding a 2C threshold needs to be supported by stronger references than currently provided. Mansourian et al (2009) is a descriptive paper that includes no analysis of impacts associated with various warming scenarios. This is an important statement and the assessment of the literature needs to be strengthened. (CANADA)
484	26	19	11	0	0	References to CDM and REDD+ will be meaningless to most readers. (Lemmen, Don, Canada National Study)
485	26	19	11	19	11	What do CDM and REDD+ stand for? These acronyms need expanding. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
486	26	19	15	19	0	Suggested additional language in single quotes inside original text in double quotes. "recognizing the rights of indigneous people 'through prior consent'" (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services.)
487	26	19	20	20	25	Wildfire Box could mention fire suppression. Possible Cite: Fried, J.S., J.K. Gilless, W.J. Riley, T.J. Moody, C. Simon de Blas, K. Hayhoe, M. Moritz, S. Stephens, M.S. Torn. 2008. Predicting the effect of climate change on wildfire behavior and initial attack success. Climatic Change 87:251-264. (UNITED STATES OF AMERICA)
488	26	19	22	19	22	It is suggested that the first sentence of this paragraph should read "Large wildfire activity in North America has markedly increased" (UNITED STATES OF AMERICA)
489	26	19	23	19	23	The scientific paper by Gillett et al. 2004 should be provided as a reference for the increasing fire activity in Canada instead of the report by Williamson. Gillett, N.P., Weaver, A.J., Zwiers, F.W., Flannigan, M.D., 2004. Detecting the effect of climate change on Canadian forest fires. Geophysical Research Letters 31, L18211. (CANADA)
490	26	19	26	19	27	I agree with the statement but a couple of examples might help the reader (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
491	26	19	26	19	27	box 26.4 : Federal and state fire policy in the US is changing over to more of a "Let Burn" Policy where possible in recognition of the negative effects of large-scale fire suppression. In that light, this sentence could be rewritten as "Legacies of forest management, including large-scale fire suppression, also play a substantial role in wildfire risk across systems. Consider citing: Cohesive Wildland Fire Management Strategy. H.R.2996 Appropriations Bill of the Department of the Interior: Section 503. The Cohesive Wildfire Management Strategy (UNITED STATES OF AMERICA)
492	26	19	26	19	27	Legacies of forest management statement: I suggest that you supply a citation for this statement. (Scott, Michael, Pacific Northwest National Laboratory)

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493	26	19	30	19	31	box 26.5 : It is suggested that this paragraph contain a statement that recognizes the critical role that fire plays in maintaining ecosystem integrity. Many North American ecosystems have evolved with fire and many native plant and animal species depend on fire for success. Wildfire is a natural process, critical to nutrient cycling, and the promotion of biodiversity and fire-adapted species. Climate change will result in natural fire cycles changing their usual aspects, including seasonality, size, frequency, and intensity. With these changes, and mediated by the presence of invasive species, wildfires burning outside their range of historic variability are changing the dominant vegetation types and community structure in many regions. Consider citing: Bond, WJ and and B.W. van Wilgen. Fire and Plants. Chapman and Hall, New York. 1996. White, PS, and Jentsch A. 2001. The search for generality in studies of disturbance and ecosystem dynamics. Progress in Botany 62:399-450. (UNITED STATES OF AMERICA)
494	26	19	32	0	0	fire suppression and forest condition drive the response of western forests to fire - using climate only as the driver of western fires is inaccurate (Bachelet, Dominique, Conservation Biology Institute)
495	26	19	33	19	33	It is suggested that this sentence should read "Human use of fires in forests not prone to fires, such as tropical forests, can have devastating impacts that are strongly related to frequency of such human-caused fires" (UNITED STATES OF AMERICA)
496	26	19	35	19	36	box 26-2 : The assertion that forests affected by fire are less effective carbon sinks is overgeneralized. Many fire-maintained systems burn at lower intensities, thereby releasing less carbon overall (e.g., Longleaf pine savanna, Sierra mixed-conifer; see for example North et al, 2012). Avoid the term "healthy forests," which is not defined here, and is evocative of destructive forest policies of the past (see Davis, 2004). Consider citing: North, M., B.M. Collins, and S.L. Stephens. 2012. Using Fire to Increase the Scale, Benefits and Future Maintenance of Fuels Treatments. In press at Journal of Forestry. Davis, Jesse B. (2004) Healthy Forests Initiative: Unhealthy Policy Choices in Forest and Fire Management, The Symposium: Public Lands Management at the Crossroads: Balancing Interests in the 21st Century: Comment. 34 Envtl. L. 1209. (UNITED STATES OF AMERICA)
497	26	19	35	19	37	box 26.2 : This sentence needs a citation or to be reconsidered if there is not a literature to base it on. (UNITED STATES OF AMERICA)
498	26	19	35	19	45	box 26.3 : The fire management considerations are under-represented in this box. Suggested Text: "Minimizing adverse effects of wildfires involves short-term and long-term considerations. Attention must be given to the suppression of fires where required, fuels treatments, use of fire-safe materials in construction, community planning, and reduction of arson. Additionally, changing circumstances of stakeholders, landscapes and ecosystems must be incorporated for successful planning. Not all negative consequences of fire, especially unplanned fire, can be avoided, though a mixture of techniques can be used to try to minimize adverse effects. Application of possible minimization techniques will vary due to assets involved and geographic considerations, but can be the basis for policy considerations at local, state and federal levels." Consider citing: Gill, A. Malcolm, Scott L. Stephens, and Geoffrey J. Cary. 2013. The worldwide "wildfire" problem. Ecological Applications 23:438-454. (UNITED STATES OF AMERICA)
499	26	19	36	0	0	emissions shoud be replaced by carbon loss; however one should also mention that fire reduces population levels of pests and pathogens thus reducing future carbon losses due to disease and pest outbreaks. Fire also reduces competition and increases biodiversity in certain cases (bird population for ex.). (Bachelet, Dominique, Conservation Biology Institute)
500	26	19	42	0	0	Assume the Canadian statistics do not include deaths of people engaged in fire suppression activiteis such as aircraft crashes- I can think of several during my career. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)

#	Ch	From Page	From Line	To Page	To Line	Comment
501	26	19	49	19	51	Some references for the impact of drought on fire activity in Canada and Eurasia should be added. Notably these three papers: Girardin, M.P., Ali, A.A., Carcaillet, C., Mudelsee, M., Drobyshev, I., Hély, C., Bergeron, Y. 2009. Heterogeneous response of circumboreal wildfire risk to climate change since the early 1900s. Global Change Biology 15, 2751–2769, doi: 10.1111/j.1365-2486.2009.01869.x // Girardin, M.P., Ali, A.A., Carcaillet, C., Gauthier, S., Hély, C., Le Goff, H., Terrier, A., Bergeron, Y. 2013. Fire in managed forests of eastern Canada: Risks and options, Forest Ecology and Management, Special Issues on Mega Fires Vol 294: 238-249. //Groisman PYa, Sherstyukov BG, Razuvaev VN et al. (2007) Potential forest fire danger over Northern Eurasia: changes during the 20th century. Global and Planetary Change, 56, 371–386. (CANADA)
502	26	19	51	19	53	The following paper by Girardin and Sauchyn 2008 specifically deals with relating fire activity in northwestern North America to sea surface temperatures and this over a much longer period (1880-1998; see their Figure 6) than reported by references cited in the current text. The conclusion of Girardin and Sauchyn study is heavily in favor of the statement made in this report "As in previous studies, the current findings suggest that AAB [annual area burned] is correlated to seasonal land/ocean temperature variability and that future warming could lead to greater AAB". Girardin, M.P., and Sauchyn, D. 2008. Three centuries of annual area burned variability in northwestern North America inferred from tree rings. The Holocene 18: 205-214. // Also consider adding these references by Le Goff et al. 2007 and Girardin 2007 in relation to large-scale atmospheric processes driving historical fire activity in Canada : Le Goff, H., Flannigan, M.D., Bergeron, Y., Girardin, M.P. 2007. Historical fire regime shifts related to climate teleconnections in the Waswanipi area, central Quebec, Canada. International Journal of Wildland Fire 16(5): 607–618 //Girardin, M.P. 2007. Interannual to decadal changes in area burned in Canada from 1781 to 1982 and the relationship to Northern Hemisphere land temperatures. Global Ecology and Biogeography 16(5): 557-566, doi: 10.1111/j.1466-8238.2007.00321.x. \n\n\n (CANADA)
503	26	20	0	0	0	26.5 : There is no mention of the existence or proposed use of 1) new crop varieties, 2) traditional crop breeding, or 3) non-traditional crop breeding (e.g. GMO) for climate change 'resilient' agricultural crops. Given that both drought- and heat- resistant crops are being researched and developed (see, e.g.: J. Chen et al., "Characterization of Maize Inbred Lines for Drought and Heat Tolerance," Journal of Soil and Water Conservation 67, no. 5 (September 1, 2012): 354-364, doi:10.2489/jswc.67.5.354.), and because GMO crops are cultivated primarily in North America. This topic deserves a balanced (positive and negative potential outcomes) mention in the report. An example of a negative potential outcome of the use of GMO technologies in agriculture: David Quist and Ignacio H. Chapela, "Transgenic DNA Introgressed into Traditional Maize Landraces in Oaxaca, Mexico," Nature 414, no. 6863 (November 29, 2001): 541-543, doi:10.1038/35107068. Other discussions of general use, and both positive and negative potential outcomes of use of GMO technologies in agriculture for the 21st Century," Science (New York, N.Y.) 327, no. 5967 (February 12, 2010): 833-834, doi:10.1126/science.1186834. ; Agriculture for Development. World Bank; Washington, DC: 2008. http://siteresources.worldbank.org/INTWDR2008/Resources/WDR_00_book.pdf. ; Reaping the Benefits: Science and the Sustainable Intensification of Global Agriculture. Royal Society; London: 2009. http://royalsociety.org/Reapingthebenefits. (UNITED STATES OF AMERICA)

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504	26	20	3	20	5	Could authors be more precise about the trends observed in drought conditions in southern and western Canada (which season, where exactly)? This is raised because such trends were not detected in trend analyses of fire danger indices across Canada conducted over the period approximating 1950-2000 or so. From reading the cited report, these statements were apparently drawn from the analysis of the PDSI. But the PDSI is potentially flawed in snowy regions. See the papers by Amiro et al. 2004 and Girardin and Wotton 2007: Amiro, B.D., K. A. Logan, B. M. Wotton, M. D. Flannigan, J. B. Todd, B.J. Stocks, and D. L. Martell, 2004: Fire weather index system components of large fires in the Canadian boreal forest. Int. J. Wildland Fire, 13, 391–400.//Girardin, M.P. and Wotton, B.M. 2009. Summer moisture and wildfire risks across Canada. Journal of Applied Meteorology and Climatology 48: 517-533. (CANADA)
505	26	20	9	20	23	How about managing forests to decrease fire disturbance risks at wildland-urban interfaces? Manipulation of vegetation composition and stand structure has been proposed as a strategy for offsetting climatic change impacts on wildfires in Canada. Given that harvesting takes place in the boreal forest, there may be opportunities for using planned manipulation of vegetation for management of future wildfire risks. The concept has a long history, and its potential effect has been demonstrated through model simulation experiments and recently found empirical support. In particular cases, this could also provide an additional benefit to the use of assisted species migration. See these two recent papers: Terrier, A., Girardin, M.P., Périé, C., Legendre, P., Bergeron, Y. 2013. Potential changes in forest composition could reduce impacts of climate change on boreal wildfires, Ecological Applications 23: 21-35. Girardin, M.P., Ali, A.A., Carcaillet, C., Blarquez, O., Hély, C., Terrier, A., Genries, G., Bergeron, Y. In press. Vegetation limits the impact of a warm climate on boreal wildfires. New Phytologist (http://www.cef-cfr.ca/uploads/Membres/girardin-new-phytol.pdf) .//The following paper in Forest Ecology and Management also provide options for adapting to high fire risks under climate change: Girardin, M.P., Ali, A.A., C., Gauthier, S., Hély, C., Le Goff, H., Terrier, A., Bergeron, Y. 2013. Fire in managed forests of eastern Canada: Risks and options, Forest Ecology and Management, Special Issues on Mega Fires Vol 294: 238-249.\n\n\n (CANADA)
506	26	20	10	20	10	Is statement about "attention to population growthis an important aspect of adaptation planning" sufficiently objective and justified with literature? (UNITED STATES OF AMERICA)
507	26	20	10	20	11	Do not start this section with research needs, as that is not an adaptation strategy (Lemmen, Don, Canada National Study)
508	26	20	13	20	14	limiting vegetation around structures work in certain areas but not all. Look at Alex Sypard's work in S California. Wind carries ambers and Santa Ana winds are a certainty every year. developers are simply building structures in a fire prone environment that should burn frequently. The "stupid zone" that was described in the 70s in Coloroda has just spread everywhere. (Bachelet, Dominique, Conservation Biology Institute)
509	26	20	13	20	14	Also construction design andmaterials and infrastructure operations which are less succeptable to wild fire (example roofing materials) (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
510	26	20	16	20	17	There is a substantial literature addressing adaptations (mitigation and preparedness) to wildfire risk among communities and homeowners in North America. Although not all of them can be considered here, addition of some more recent references that address community adaptation to wildfire threat is suggested: Brunson et al. 2004; Jakes et al. 2007; McCaffrey et al. 2012; McFarlane et al. 2011. (CANADA)
511	26	20	20	20	20	There has been considerable research on the role of trust and communication in public acceptance of pest and fuels management. Some of this literature should be included: McFarlane et al. 2012; Shindler et al. 2003; 2009; Toman et al. 2011. (CANADA)

#	Ch	From Page	From Line	To Page	To Line	Comment
512	26	20	20	20	20	The report recognizes that indigenous peoples are among the most vulnerable to climate change. A good example of this in North America is the risk posed by changes in wildfire regimes. In Canada, for example, indigenous communities are often located in remote, forested areas that may experience more frequent, intense wildfires. Indigenous peoples historic relationship with fire, community capacity and culture can present unique challenges and opportunities in developing adaptation strategies. Indigenous peoples' adaptation to wildfire risk in North America is beginning to receive attention in the literature. The risk posed to indigenous peoples and the emerging literature should be recognized in the report. Inserting the following "Indigenous peoples may be at higher risk from wildfire and may have unique requirements for adaptation strategies (Carroll et al. 2004; 2010; Christianson et al. 2012a; 2012b; Raish et al. 2004; Goographic variation in social acceptability of wildland fuels management in the western United States. Society and Natural Resources 17: 661-78. Carroll, Matthew S., Patricia J. Cohn, and Keith A. Blatner. 2004. Private and tribal forest landowners and fire risk: A two-county case study in Washington state. Canadian Journal of Forest Research 34: 2148-58. Carroll, Matthew S., Patricia J. Cohn, Travis B. Paveglio, Donna R. Drader, and Pamela J. Jakes. 2010. Fire burners to firefighters: The Nez Perce and fire. Journal of Forestry 2: 71-6. Christianson, Amy, Tara K. McGee, and Lorne L'Hirondelle. 2012a. How historic and current wildfire experiences in an aboriginal community influence mitigation preferences. International Journal of Forest form. Authew S., Patricia J. Cohn, and Keith A. Blatner. 2012. Social science research related to wildfire fire mangement: A overview of recent findings \hand future research and Evavine Métis settlement, Alberta, Canada. Environmental Hazards 11(3): 177-193. doi: 10.1080/17477891.2011.649710\nlakes, Pamela, Linda Kruger, Martha Monroe, Kristen Nelson, and V
513	26	20	28	23	25	For residents, particularly indigenous peoples, of the Canadian and Alaskan subarctic, food security is only loosely connected to agriculture. (UNITED STATES OF AMERICA)
514	26	20	30	0	0	The paragraph needs to cross-reference chapter 7 findings. (Yao, Xiangjun, Food and Agriculture Organization of the United Nations (FAO))
515	26	20	30	20	31	it is odd to just cite nelson here, which is a non-peer reviewed study. probably better to just refer to chapter 7 which has a section discussing projected changes on global prices (Lobell, David, Stanford University)
516	26	20	30	20	31	Sentence implies that Climate Change (alone) will cause diversion of arable land to biofuels. That is not justified. (UNITED STATES OF AMERICA)

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#	Ch	From Page	From Line	To Page	To Line	Comment
517	26	20	30	20	32	it seems odd to mention biofuel driven changes in price as caused by climate change. biofuels are driven by many factors, one of which is sometimes concern about climate change. also, biofuels really effects demand, not supply. (Lobell, David, Stanford University)
518	26	20	30	20	36	26.5 : The connection between climate change and crop prices is too vague. Climate change alters the environmental and market conditions for different agricultural sectors, and indirectly affects prices. Introductory sentence could reference another chapter of WG2 or include a summary of direct climate change impacts on agriculture such as increases in extremes, variability, and seasonal timing, impacts on water availability, functionality of herbicides, pesticides, pest population changes, yield and crop quality changes (UNITED STATES OF AMERICA)
519	26	20	31	0	0	mention that biofuels will only be possible if water remains available (Bachelet, Dominique, Conservation Biology Institute)
520	26	20	36	20	36	"may have implications for global food security". This neutral formulation is correct. It would be appropriate to also include a statement about risks for regional food security in line with statement on P22-L9 about risks for small holder subsistence farming in Mexico.\n\n (NETHERLANDS)
521	26	20	39	20	53	The section on Observed Impacts (26.5.1) is weak. As written, it is unclear in the first paragraph whether these are observed impacts or not. For example, the second paragraph clearly states "yield variances over time have been attributed" and "Events have also had notable negative effects". These two sentences in the second paragraph are the only observed impacts that I can decipher from this section. To discover whether there are any documented impacts for North America, I read Chapter 7 on Food Security and Food Production Systems. Chapter 7 indicates a number of studies that documented impacts of climate trends on food production, along with confidence levels. I suggest two things for section 26.5.1. First, visit Chapter 7, summarize impacts for North America that are provided in Chapter 7, and place the main summary points in Section 26.5.1. Second, consider rewriting the first paragraph in Section 26.5.1 to reflect the fact that these are changes that have been observed. If they are not changes that have been observed, and are instead background information, then this information belongs in the prior section (26.5) and not in this section (26.5.1). (UNITED STATES OF AMERICA)
522	26	20	41	0	0	It is not clear if the paragraph's discussion is region-specific as geographical area is not specificed in many cases. (Yao, Xiangjun, Food and Agriculture Organization of the United Nations (FAO))
523	26	20	41	21	2	Consider to include the discussion presented in Feng S; Krueger AB (2010). Linkages among climate change, crop yields and Mexico–US cross-border migration. Proceedings of the US National Academy of Sciences. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
524	26	20	42	20	43	increases in crop yield are attributed to "high precipitation"; should be "higher". Wording as "in part" and "historic" could be more specific. Suspect that the most important causes of increased yields are modernization and intensification (synthetic fertilizer, pesticides etc.). A clearer distincion between effects in differrent North American regions and a more quantitative underpinning for the net effect on Nort America as a whole would be helpful (and distinction between 2oC en 4oC scenario)\n\n (NETHERLANDS)
525	26	20	44	0	0	optimal temperatures already reached for grapes - cite Greg Jones'w work along the West coast of the US. (Bachelet, Dominique, Conservation Biology Institute)
526	26	20	46	0	0	increased temperatures and drought can slow decompoistion and allow carbon to remain longer in soils; more frequent fires in dry conditions will also add slow decomposing charcoal to soils. (Bachelet, Dominique, Conservation Biology Institute)
527	26	20	49	20	49	a more recent reference for fruits and nuts is Lobell, D., & Field, C. (2012). California perennial crops in a changing climate. Climatic Change, 109, 317-333\n (Lobell, David, Stanford University)
528	26	20	51	20	51	Please, to insert the Almaraz et al., 2008 study in the reference list.\n\n (NETHERLANDS)

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529	26	21	6	21	7	Here is one more study showing gains in yields in the absence of water constraints that might be mentioned: Claudio O. Stöckle, Roger
						L. Nelson, Stewart Higgins, Jay Brunner, Gary Grove, Rick Boydston, Mathew Whiting, Chad Kruger. 2010. Assessment of climate
						change impact on Eastern Washington agriculture. Climatic Change (2010) 102:77–102. DOI 10.1007/s10584-010-9851-4. And your
						reference Vano et al. 2010b shows adverse impacts on agricultural yields from water shortages in the same region. (Scott, Michael,
530	26	21	7	21	0	Pacific Northwest National Laboratory) Is this an outcome projected across scenarios of climate change and time frames? (Mach. Katharine, IPCC WGILTSU)
530	20	21	11	21	0	For the projections described on these lines, it would be preferable to specify the ranges/uncertainties of the projections, especially
221	20	21	14	21	10	where "up to 58%" is mentioned on line 14 (the full range should be given, not just the upper bound). (Mach, Katharine, IPCC WGII TSU)
532	26	21	18	21	19	An example of a very helpful statement that arises from assessment of the available literature. Value-added. It would be useful to have
552	20	~-	10	~ 1	15	more such statements throughout the chapter. (Lemmen, Don, Canada National Study)
533	26	21	18	21	21	26.5.2 : Figure 26-5 does not support the statement that precedes its reference. In particular, time is not a component of Figure 26-5,
						but the preceding sentence indicates that major crops are projected to experience declines by 2099. (UNITED STATES OF AMERICA)
534	26	21	19	21	20	What are the scenarios of climate change relevant to these projections? (Mach, Katharine, IPCC WGII TSU)
535	26	21	22	21	24	Check sentence structure (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
536	26	21	23	0	0	however Washington and Oregon wines do better under climate change (Jones et al.) (Bachelet, Dominique, Conservation Biology
537	26	21	39	21	39	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
538	26	21	39	21	41	Are these outcomes driven by climate change, socioeconomic trends, or other factors? (Mach, Katharine, IPCC WGII TSU)
539	26	21	39	21	46	Following additional reference may be useful, because it provides CMIP5 results for changes in soil moisture (Figure 2 in the
						reference).\nDirmeyer, P., Y. Jin, B. Singh, and X. Yan, 2013: Evolving land-atmosphere interactions over North America from CMIP5
						simulations. J. Climate. doi:10.1175/JCLI-D-12-00454.1, in press. (Kumar, Sanjiv, Center for Ocean-Land-Atmosphere Studies)
540	26	21	42	21	42	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
541	26	21	48	0	0	It is not clear if the paragraph's discussion is region-specific as geographical area is not specificed in many cases. (Yao, Xiangjun, Food
						and Agriculture Organization of the United Nations (FAO))
542	26	21	48	21	48	Replace "andstorm" by "and storm" (Sosa-Rodriguez, Fabiola S., University of Waterloo)
543	26	21	51	21	52	Please, to insert the Wu et al., 2011 study in reference list.\n\n (NETHERLANDS)
544	26	21	52	21	54	missing references: Wu, and Jackson (Bachelet, Dominique, Conservation Biology Institute)
545	26	22	5	0	0	not all weeds are created equal: this statement is much too general (not all weeds nor all crops have been tested under high CO2 and in
						competition) (Bachelet, Dominique, Conservation Biology Institute)

#	Ch	From Page	From Line	To Page	To Line	Comment
546	26	22	11	0	0	The first paragraph in section "A closer look at Mexico" argues that agriculture in Mexico is vulnerable to the impacts of climate change. A group of colleagues and I have publish in the journal Mitigation and Adaptation Strategies for Global Change (this 2013) a paper that evaluate two methods for vulnerability assessment in the agricultural sector of Mexico. According to this paragraph and our results, I put to your consideration to add the next sentence at the end of line 18 page 22: "Particularly, the agricultural sector in México is vulnerable to climate change effects (Monterroso et al, 2013)" The correct reference is "Monterroso Rivas A.I., Conde Álvarez C., Gay García C., Gómez Díaz J.D., y López J. 2013. Two methods to assess vulnerability to climate change in the Mexican agricultural sector. Mitigation and Adaptation Strategies for Global Change. doi: 10.1007/s11027-012-9442-y" (Monterroso, Alejandro, Universidad Autonoma Chapingo)
547	26	22	11	22	18	What is the share of subsistence farmers with regard to total production? Why are impacts to farmers with relatively low production/small holdings important? Is it a production issue? An equity issue? Both? Please explain. If small farmers have different capacity to adapt, and if different countries have different capacities to adapt, it follows that food production in countries with higher and lower proportions of small farmers is more or less vulnerable to climate change. (UNITED STATES OF AMERICA)
548	26	22	12	22	12	Does 2.1 million refer to the number of farmers, farming households, etc.? (Mach, Katharine, IPCC WGII TSU)
549	26	22	16	22	16	In place of "up to 30%" the full range, not just the upper bound, should be specified. (Mach, Katharine, IPCC WGII TSU)
550	26	22	17	0	0	Magana reference missing (Bachelet, Dominique, Conservation Biology Institute)
551	26	22	17	22	17	Replace "Magana" by "Magaña" (Sosa-Rodriguez, Fabiola S., University of Waterloo)
552	26	22	18	22	18	Explain why it is limited (Sosa-Rodriguez, Fabiola S., University of Waterloo)
553	26	22	21	22	21	Before: (Monterroso Rivas et al., 2011b)2011a, After: (Monterroso-Rivas et al., 2011a, 2011b) (Monterroso, Alejandro, Universidad Autonoma Chapingo)
554	26	22	21	22	21	Change the")" by a ";" (Sosa-Rodriguez, Fabiola S., University of Waterloo)
555	26	22	21	22	21	Is livestock heat stress meant here? (Mach, Katharine, IPCC WGII TSU)
556	26	22	22	22	22	What is the "dangerous zone"? (Mach, Katharine, IPCC WGII TSU)
557	26	22	26	22	26	Is "varieties" a term preferable to "races"? What is the mechanism underpinning the elimination? (Mach, Katharine, IPCC WGII TSU)
558	26	22	27	22	27	Please, to insert the Ureta et al., 2012 study in reference list and change et al by et al.,.\n\n (NETHERLANDS)
559	26	22	28	22	29	It would be preferable to specify the ranges for these projections. (Mach, Katharine, IPCC WGII TSU)
560	26	22	32	23	25	The use of results of truly long term studies as inputs to decisions about adaptation options should be considered. There are some examples of use of such information in a modern sustainable development context (e.g. Ravesloot, et al. 2009). At least one volume (Cooper and Sheets 2012) has sections written specifically for non-specialists to assist in such use. Possible citations are:\nCooper, Jago, and Payson Sheets, eds.\n2012\tSurviving Sudden Environmental Change: Answers from Archaeology. University Press of Colorado, Boulder.\nRavesloot, John C. J. Andrew Darling and Michael R. Waters\n2009\tHohokan and Pima-Maricopa Irrigation Agriculturalists. In The Archaeology of Environmental Change: Socionatural Legacies of Degradation and Resilience. Eds. Christopher T. Fisher, J. Brett Hill, and Gary M. Feinman University of Arizona Press, Tucson. (UNITED STATES OF AMERICA)
561	26	22	34	0	0	This paragraph's discussion is very general and does not seem to be region specific. Geographical areas should be specified. It should also cross reference the chapter that deals mainly with this topic. (Yao, Xiangjun, Food and Agriculture Organization of the United Nations (FAO))
562	26	22	40	22	40	Please, to insert the Mercer et al 2012 study in reference list and change et al by et al.,.\n\n (NETHERLANDS)

#	Ch	From Page	From Line	To Page	To Line	Comment
563	26	22	45	22	50	26.5.3.1 : Add Mexican Government Insuring Farmers To help maintain government budget stability. This is pretty innovative. Fuchs, A. & Wolff, H. "Concept and Unintended Consequences of Weather Index Insurance: The Case of Mexico." American Journal of Agricultural Economics. 93(2): 505-511 Also add that adaptation, particularly for small-scale farmers, is going to be affected by the linkages across the global market. Eakin, H., Winkels, A., & Sendzimir, J. (2009). Nested vulnerability: exploring cross-scale linkages and vulnerability teleconnections in Mexican and Vietnamese coffee systems. Environmental Science & Policy, 12(4), 398-412. (UNITED STATES OF AMERICA)
564	26	22	46	22	46	It would be helpful to specify why these mechanisms are not optimal. (Mach, Katharine, IPCC WGII ISU)
565	26	22	54	22	55	It appears that the Suddick et al. reference refers only to biogenic carbon. If this section is limited to climate impacts on biogenic carbon, then it is fine as written. Otherwise, consider changing the text to "reduce biogenic and geogenic greenhouse gas emissions (Suddick et al, 2010; Nelson et al. 2009)." Many agricultural practices impacts fossil fuel emissions (i.e., geogenic emissions) as well as soil C and N2O emissions (i.e., biogenic emissions).C170\nNelson, R.G., C.M. Hellwinckel, C.C. Brandt, T.O. West, D.G. De La Torre Ugarte, and G. Marland. 2009. Energy use and carbon dioxide emissions from cropland production in the United States, 1990-2004. Journal of Environmental Quality 38: 418-425. (UNITED STATES OF AMERICA)
566	26	23	5	23	5	26.5.2 and 25.5.3.1 : On page 21, line 54 and page 23, line 5 there are references to Jackson and Wheeler, 2010. However, this paper does not appear in the list of references. Please correct. (UNITED STATES OF AMERICA)
567	26	23	5	23	5	26.5.3.1 : While some organic practices may lower greenhouse gas emissions, others, such as flame cultivation, could increase emissions. This blanket statement seems unjustified given the diversity of practices that meet the definitions of both conventional and organic agriculture. It is not possible to judge the support provided by the Jackson and Wheeler reference as the full citation is not listed in the references section. Please correct the reference and use more qualified language or drop this statement about the greenhouse gas impacts of organic agriculture. (UNITED STATES OF AMERICA)
568	26	23	9	0	0	Revise subtitle to refer to barriers and enablers of adaptation. There is nothing here that constitutes criteria. (Lemmen, Don, Canada National Study)
569	26	23	10	23	25	Examples of adaptation strategies in Mexico include: "Promote soil remediation programs and crop insurance; use climate information systems; change temporal range of crops and select crops resistant to droughts; diversify the activities of farmers; and capture rainwater and extend the drip irrigation infrastructure", among others (Sosa-Rodriguez, 2013). (Sosa-Rodriguez, Fabiola S., University of Waterloo)
570	26	23	11	23	25	This section (26.5.3.2) mentions market forces and communication as being key criteria for adaptation. It also recognizes that market forces are not always sufficient. While communication is important, the section does not state what should be communicated. I suggest adding a statement regarding the need for information on optimum crop management practices, including production inputs and optimum geographic locations for given crops, and how this information could be used to guide adaptation practices. If a study has been conducted comparing current global crop yields to how those yields may change in the future, this would be a good study to cite here. We need information on these changes to help guide adaptation efforts. (UNITED STATES OF AMERICA)
571	26	23	12	23	12	Casual usage of "unlikely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
572	26	23	31	23	32	For Canada, in addition to reference to Lemmen et al (2008) it is extremely important to include reference to Séguin (2008). Citation - Séguin, J. (editor) 2008. Human Health in a Changing Climate: A Canadian assessment of Vulnerabilities and Adaptive Capacity; Health Canada, Ottawa, ON., 484 p. (Lemmen, Don, Canada National Study)
573	26	23	41	0	0	Section 26.6.1. The title of this section should be revised to fully reflect the scope of material considered"observed impacts, vulnerabilities, and trends"? (Mach, Katharine, IPCC WGII TSU)
574	26	23	45	23	54	Should other storm-related impacts, such as those associated with high winds, be discussed? (Mach, Katharine, IPCC WGII TSU)

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575	26	23	49	0	0	Another indirect risk often not considered is that if most major health infrastructure including hospitals and transportation to coastal cities is damaged it puts populations dependent on both health and other services (like transportation of food stuffs) in the "hinterland" at risk. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
576	26	24	1	24	4	An important additional reference is bethel et al. (2011) as it provides further evidence of mental health outcomes from natural hazards specifically. Citation - Bethel, J. W., Foreman, A. N., & Burke, S. C. (2011). Disaster preparedness among medically vulnerable populations. American Journal of Preventive Medicine, 40(2), 139-143. (Lemmen, Don, Canada National Study)
577	26	24	8	0	0	work on heat related illness being done at Oregon State University particularly focusing on latino farm workers by Jeff Bethel (Bachelet, Dominique, Conservation Biology Institute)
578	26	24	10	24	13	For these described sensitivities, is it possible to specify the time frames and geographic regions over which they have been observed, as well as the mechanisms of the effects? (Mach, Katharine, IPCC WGII TSU)
579	26	24	11	24	12	It would be useful to add relevant canadian references to this list. They would include Kovats and Hajat (2008), Kenny et al. (2010), hajat and Kosatsky (2010). Citations - Kovats, R. S., & Hajat, S. (2008). Heat stress and public health: A critical review. Kenny, G. P., Yardley, J., Brown, C., Sigal, R. J., & Jay, O. (2010). Heat stress in older individuals and patients with common chronic diseases. CMAJ, 182(10), 1053-1060. Hajat, S., & Kosatky, T. (2010). Heat-related mortality: A review and exploration of heterogeneity. Journal of Epidemiology and Community Health, 64(9), 753-760. \n (Lemmen, Don, Canada National Study)
580	26	24	16	0	0	Throughout chapter avoid describing studies as "recent". In the context of this chapter, 2008 is not recent. (Lemmen, Don, Canada National Study)
581	26	24	28	24	30	26.6.1.3 : The statement that forest fires can lead to respiratory diseases immediately follows a statement that climate has no as-yet identified relation to air quality. If forest fires are mentioned as a link between emissions sources, climate, and health, that needs to be spelled out. (UNITED STATES OF AMERICA)
582	26	24	32	24	33	A useful reference for this currently unsupported statement might be Potera (2011) Citation - Potera, C. (2011). Indoor Air Quality: Climate Change Impacts Indoor Environment. Environmental Health Perspectives, 119(9), A382. (Lemmen, Don, Canada National Study)
583	26	24	32	24	33	Where "likely" is used here, a level of confidence seems more appropriate and should be considered by the author team. Alternatively, a synonym such as "expected" could be used. (Mach, Katharine, IPCC WGII TSU)
584	26	24	43	24	47	This sentence does not make sense. Some text is missing here. (UNITED STATES OF AMERICA)
585	26	24	49	0	0	what reference for earlier pollen season in the US? can cite national phenology network reporting earlier blooms (Bachelet, Dominique, Conservation Biology Institute)
586	26	25	1	25	14	It is important to also note that severe storms and other extreme water events have a significant impact on water-borne diseases. One useful reference is Thomas et al. (2006). Citation - Thomas, M. K., Charron, D. F., Waltner-Toews, D., Schuster, C. J., Maarouf, A. R., & Holt, J. D. (2006). A role of high impact weather events in waterborne disease outbreaks in Canada. International Journal of Environmental Health Research, 16(3), 167-180. (Lemmen, Don, Canada National Study)
587	26	25	17	25	35	26.6.1.6 : It seems that other sections have stuck to categorizing place specific outcomes; this section aggregates the potential vector- borne diseases to apply to all North America. Is this the case or should they be disaggregated (e.g., it would be surprising to see chikungunya in the US, line 34) (UNITED STATES OF AMERICA)
588	26	25	25	0	0	reports of mosquitoes, ticks moving in elevation: villages now dealing with insects that did not use to be at those elevations so human populations maladapted and now vulnerable (Bachelet, Dominique, Conservation Biology Institute)

#	Ch	From Page	From Line	To Page	To Line	Comment
589	26	25	30	25	31	For references discussing Lyme disease, add Koffi et al. (2012) and Leighton et al. (2012) - which documnet the increasing number of cases of Lyme disease in Canada and show how teh Lyme disease vectors are spreading along climate-determined trajectories. Citation - Koffi, J. K., Leighton, P. A., Pelcat, Y., Trudel, L., Lindsay, L. R., Milord, F., & Ogden, N. H. (2012). Passive surveillance for Ixodesscapularis ticks: Enhanced analysis for early detection of emerging Lyme disease risk. Journal of Medical Entomology, 49(2), 400-409. Leighton, P. A., Koffi, J. K., Pelcat, Y., Lindsay, L. R., & Ogden, N. H. (2012). Predicting the speed of tick invasion: An empirical model of range expansion for the Lyme disease vector Ixodes scapularis in Canada. Journal of Applied Ecology, 49(2), 457-464. (Lemmen, Don, Canada National Study)
590	26	25	49	25	54	A useful additional reference here is Kelley et al. (2012). That analysis shows that declining air quality associated with increased temperatures can be offset, partially or completely, through measures taken to limit emission of pollutants. Citation - Kelly, J., Makar, P. A., & Plummer, D. A. (2012). Projections of Mid-Century Summer Air-Quality for North America: Effects of Changes in Climate and Precursor Emissions. Atmospheric Chemistry and Physics, 12, 3875-3940. doi:10.5194/acpd-12-3875-2012. (Lemmen, Don, Canada National Study)
591	26	25	51	28	51	Dell et al. 2013 citation does not appear in the reference list. (Scott, Michael, Pacific Northwest National Laboratory)
592	26	25	53	26	1	What does the literature on PM2.5 report? Are there any projections of future effects of PM2.5 on health? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
593	26	26	6	26	6	Where "likely" is used here, a level of confidence seems more appropriate and should be considered by the author team. Alternatively, a synonym such as "expected" could be used. (Mach, Katharine, IPCC WGII TSU)
594	26	26	7	26	7	Projected to change due to climate change or due to other drivers? (Mach, Katharine, IPCC WGII TSU)
595	26	26	22	26	35	Examples of adaptation strategies in Mexico include: "Prevent and treat climate-related diseases by distributing oral serum and through organizing vaccination campaigns; improve diagnosis, treatment and prevention of gastrointestinal diseases by raising people's awareness about symptoms, treatments and preventive actions; implement early warning systems to avoid disease spread; protect the most vulnerable people during extreme heat/cold periods; and improve water quality and its monitoring" (Sosa-Rodriguez, 2013). (Sosa Rodriguez, Eabiola S., University of Waterloo)
596	26	26	22	26	35	Examples of adaptation strategies in Canada include: "The Toronto's Heat Health Alert System". Reference: Adapting to Climate Change. An introduction for Canadian Municipalities. 2010. Government of Canada. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
597	26	26	24	26	24	It could be helpful to specify the range of health-related impacts for which early warning and response systems are most relevant. (Mach, Katharine, IPCC WGII TSU)
598	26	26	24	26	35	26.6.3 Why is early warning under temperature but not floods? Seems out of place in the ordering. Line 34 talks about tree planting initiatives (could cite Springfield, Edmonton etc) but neglects to mention there may be drawbacks to trees/green infrastructure. E.g., They need water, they may not survive extreme heat. Suggest that the authors explain that he impacts of climate change on health are not evenly distributed. Morello-Frosch, R. (n.d.). The Climate Gap: Inequalities in How Climate Change Hurts Americans and How to Close the Gap. Selected pages 5-17. (UNITED STATES OF AMERICA)
599	26	26	34	26	35	26.6.3 : Citation needed. (UNITED STATES OF AMERICA)
600	26	26	38	32	8	Parallel structure is needed throughout this section (Energy and Transportation currently lack sections on adaptation). Length of subsections should be proportionate with information available. A sequencing that parallels that of Chapter 10 would be more logical (and could be used as the rationale for that structure). In that case this section would start with energy, transportation, mining, manufacturing, construction, tourism and insurance. Tourism warrants its own section. Cross-references to findings of Chapter 10 would be useful. (Lemmen. Don. Canada National Study)

#	Ch	From Page	From Line	To Page	To Line	Comment
601	26	26	40	26	49	26.7 : Suggest that section discuss how different sectors are related. See Kirshen, P., M. Ruth, et al. (2008). "Interdependencies of Urban Climate Change Impacts and Adaptation Strategies: a Case Study of Metropolitan Boston USA." Climatic Change 86(1-2): 105-122. Also suggest that this section mention changes in building/infrastructure design codes, See Heather Auld, E. C. (2010). The Changing Climate and National Building Codes and Standards. In Ninth Symposium on the Urban Environment. Also (UNITED STATES OF AMERICA)
602	26	26	46	26	48	Where evidence and literature are described here, the chapter team might consider use of calibrated uncertainty language, such as summary terms for evidence and agreement. (Mach, Katharine, IPCC WGII TSU)
603	26	27	1	27	49	26.7.1 : Should discuss the difficulty in cataloging adaptation from the private sector (see reading from work) Agrawala, S. et al. (2011), "Private Sector Engagement in Adaptation to Climate Change: Approaches to Managing Climate Risks", OECD Environment Working Papers, No. 39, OECD Publishing. http://dx.doi.org/10.1787/5kg221jkf1g7-en (UNITED STATES OF AMERICA)
604	26	27	3	0	0	Section 26.7.1.1. The title of this section should be revised to fully reflect the scope of material considered perhaps "observed impacts, vulnerabilities, and trends"? (Mach, Katharine, IPCC WGII TSU)
605	26	27	5	27	17	One of the largest challenges alluded to here is the notion of on time delivery commonly used in manufacturing but also aspects of retail and the delivery of crtical materials suchas food. I served far a few years as the Superintendent of Yoho National Park in Canada. The park situated inthe Rocky Mountains was responsible for the TransCanada Highway, sections of which were vulnerable to avalanches. (we also hosted teh mainline of the Canadian Pacific Railway). During meetings with the trucking in 1987 we were informed that unlike in the past a closure of more than 4 hours could not be tolerated because all grocery warehousing now occured in Calgary Alberta and anymore of a delay disrupted supply of food stuffs to British Columbia. The challenge was that between Calgary and Vancouver most road routes passed through at least 4 mountian passes vulnerable to closures. Now living in the Yukon I see similar bottlenecks at work. During June of 2012 all the road routes connecting most Yukon communities with regular outside supply in southern Canada and emergenecy supply from Alaska (a totalof 5 corridors) were shut down by floods and landslides/debris flows. Store shelves emptied and gorceries were being flown in. Likewise in our modern world disruption of critical telecommunications can seriously dirupt the security of individuals and business. Again in the Yukon there is only one fibre optic link to theoutside and it is also routed on into the Mackenzie Delta communities in the NWT. It is not uncommon to have that link severed shutting down all services including the ability of retailers utilizing "outside" server banks and the financial industry. It is not uncommon to find tourists stranded because they cannot access utile card or banking services. There is also a concern for industries such as mining when located in relatively isolated areas or at teh end of a single transportation corridor. For instance during the June 2012 event the single access road from the Yukon to the mine in Tungsten NWT washed out and th

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#	Ch	From Page	From Line	To Page	To Line	Comment
606	26	27	20	27	36	26.7.1.2 : What does the economics literature say about the distributional effects of negative shocks to US manufacturing? Climate change will affect shareholders, consumers, and employees differently. For example, the effects on shareholders vs. consumers depends on how much of increased costs can be passed through to customers. The effects on employment may be different than the effect on firms because firms can pick up and move more easily than employees. One possible starting place for this literature on US manufacturing is this paper and the citations in the introduction: http://faculty.haas.berkeley.edu/rwalker/research/walker_transitional_co (UNITED STATES OF AMERICA)
607	26	27	22	27	31	26.7.1.2 Manufacturing, Projected Impacts : Backus et al is cited numerous times, and the approach of the paper is described, but no results are included. Does the study find significant effects? Why not include them? (UNITED STATES OF AMERICA)
608	26	27	25	27	28	If possible, the scenarios of climate change used in this study should be specified. (Mach, Katharine, IPCC WGII TSU)
609	26	27	30	27	31	Lately there has been considerable press coverabe of the disruption of barge trafffic on the Mississippi because of low water (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
610	26	27	39	27	49	26.7.1.3 : Long-run adaptation strategies also include sourcing raw materials from different, less affected regions. And moving manufacturing plants to different areas (UNITED STATES OF AMERICA)
611	26	27	41	27	43	Where evidence is described here, the chapter team may wish to consider assigning summary terms for evidence and agreement. (Mach, Katharine, IPCC WGII TSU)
612	26	27	43	27	44	26.7.1.3 Manufacturing Adaptation : Is this an appropriate place to bring up trade-offs between mitigation and adaptation? Increasing AC as an adaptation will also likely increase emissions from electricity production. (UNITED STATES OF AMERICA)
613	26	28	3	0	0	Section 26.7.2.1. Should the title of this section be revised to fully reflect the scope of material considered, for example "observed impacts, vulnerabilities, and trends"? (Mach, Katharine, IPCC WGII TSU)
614	26	28	8	28	22	I am not sure if the following report is eligible gray literature for citation, but it provides updates to Wilbanks et al 2008: Wilbanks, Tom; Bilello, Dan; Schmalzer, David; Arent, Doug; Buizer, Jim; Chum, Helena; Dell, Jan; Edmonds, Jae; Franco, Guido; Jones, Russell; Rose, Steve; Roy, Nikki; Sanstad, Alan; Seidel, Steve; Weyant, John; and Wuebbles, Don"Climate Change and Energy Supply and Use: Technical Report for the U.S. Department of Energy in Support of the National Climate Assessment." Oak Ridge National Laboratory, Oak Ridge, Tennessee.2012. (Scott, Michael, Pacific Northwest National Laboratory)
615	26	28	19	28	19	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
616	26	28	35	28	36	Where evidence is described here, the chapter team may wish to consider assigning summary terms for evidence and agreement. (Mach, Katharine, IPCC WGII TSU)
617	26	28	39	28	40	the Canadian Government ammended the Candain Environmental Assessment Act in 2012 - many feel seriously weakening the act. http://laws-lois.justice.gc.ca/PDF/C-15.21.pdf. The words "climate"& "weather" do not appear. A procedural guidance document prepared by a committee of federal/ provincial and territorial managers (which I sat on) responsible for environmental assessment published in November 2003 still appears on the Canadian Environmental Assessment Agency web site Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners http://www.ceaa.gc.ca/default.asp?lang=En&n=A41F45C5-1&offset=&toc=hide Most EAs are now conducted under provicial/ territorial or legislation origianting from First Nation / Inuit Final Agreements. The authors may want to check with the Canadian Environmental Assessment Agency (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)

#	Ch	From Page	From Line	To Page	To Line	Comment
618	26	28	45	29	22	The Energy section requires considerable work. The importance of seasonal changes in energy demand and implications for different subsectors (electricity / oil and gas) is understated. Projected impacts deal largely with energy supply, and should be supplemented by projected changes in energy demand as well as on transmission systems (frequently a critical vulnerability). Reference needs to be made to the Energy-Water Nexus discussion of section 26.3.3.5 (and consider moving that discussion into this section). Most importantly there needs to be a section on adaptation that includes documented initiatives related to energy efficiency (e.g. Scott, M. J., Dirks, J. A., and Cort, K. A. (2008). The value of energy efficiency programs for US residential and commercial buildings in a warmer world. Mitigation and Adaptation Strategies for Global Change, 13(4), 307-339) and adaptive management in the hydroelectricity sector (e.g. Georgakakos, A. P., Yao, H., Kistenmacher, M., Georgakakos, K. P., Graham, N. E., Cheng, FY., Spencer, C., and Shamir, E. (2012). Value of adaptive water resources management in northern California under climatic variability and change: Reservoir management. Journal of Hydrology, 412-413, 34-46). Useful general references include 1 - Schaeffer, R., Szklo, A. S., Pereira de Lucena, A. F., Moreira Cesar Borba, B. S., Pupo Nogueira, L. P., Fleming, F. P., Trocolli, A., Harrison, M., and Boulahya, M. S. (2012). Energy sector vulnerability to climate change: A review. Energy, 38(1), 1-12; and 2 - Ebinger, J., and Vergara, W. (2011). Climate impacts of energy systems: key issues for energy sector adaptation; The World Bank, Washington, DC, 178 p. (Lemmen, Don, Canada National Study)
619	26	28	47	0	0	Section 26.7.3.1. Should the title of this section be revised to fully reflect the scope of material considered, for example "observed impacts, vulnerabilities, and trends"? (Mach, Katharine, IPCC WGII TSU)
620	26	28	49	28	49	The first sentence of this paragraph "The energy is particularly sensitivedistributed among countries." doesn't make sense to me. We don't know what the authors want to say here so we cannot suggest an alternative phrasing. \n\n (NETHERLANDS)
621	26	28	49	28	52	This paragraph has typing errors. First sentence should read "The energy sector"\nLine 51 also has reference typo. (UNITED STATES OF AMERICA)
622	26	28	50	28	51	Characterization of energy demand for the last 40 years: Citations are need for this statement. (Scott, Michael, Pacific Northwest National Laboratory)
623	26	29	1	0	0	no mention of siting solar panels, wind turbine and the huge impact on wildlife habitat, local wind patterns, bat and bird migration etc; also should mention the extensive work by Dennis Lettenmaier's group on impacts in Columbia river basin (Bachelet, Dominique, Conservation Biology Institute)
624	26	29	1	29	22	26.7.3.2 : Should also discuss impacts on electricity transmission and distribution infrastructure Consider citing: Scripps Institute of Oceanography held a workshop in 2011 titled the "California Climate Extremes Workshop." The published workshop report has lots of great info on projected climate impacts. Available at http://sio.ucsd.edu/extreme_climate/CA_climate_extremes_report_SIO_Dec20 (UNITED STATES OF AMERICA)
625	26	29	1	29	22	The section on Energy impacts describes the direct effects of altered temperature and precipitation on energy generation and demand. Consider adding some discussion of the effect of climate change (SLR, extreme events) on energy infrastructure (UNITED STATES OF AMERICA)
626	26	29	3	29	3	As currently written, the sentence is not correct (i.e., appears to be total energy demand and it is only one model simulation). Suggest adding the word "residential" in the phrase so it reads decrease in annual residential energy demand" (CANADA)
627	26	29	3	29	3	Suggest that the sentence convey clearly that climate change impacts will result in a decrease in energy demand, but that total energy demand will continue to growth. In other words, climate change will partially offset the growth in energy demand that will occur in Canada. (CANADA)
628	26	29	3	39	3	First sentence makes no sense something is missing. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
629	26	29	4	29	4	26.7.3.2 : The claim that electricity demand will change - 15 to + 4 percent by 2080 seems to be confounding ongoing decreases in demand due to energy efficiency gains with the additional effects of climate change. The right question is not just what electricity consumption will be in 2080, but how much climate change will cause it to be different than what it would otherwise be in a world without climate change. (In other words, please clarify your assumptions about the baseline without climate change). Consider Citing: (1) Auffhammer, M and Anin Aroonruengsawat. 2011. Simulating the Impacts of Climate Change, Prices and Population on California's Residential Electricity Consumption. Climatic Change. 109(S1): 191-210. (2) Deschennes, O. and M. Greenstone. 2011. Climate Change, Mortality, and Adaptation: Evidence from Annual Fluctuations in Weather in the U.S. (with M. Greenstone), American Economic Journal: Applied Economics, 3(4): 152-185 (UNITED STATES OF AMERICA)
630	26	29	4	29	5	It would be preferable to specify the scenarios of climate change for this projection as well as the importance of other drivers. For example, it is not clear if any of the statements in this paragraph pertain to effects due to climate change or due to other drivers. (Mach, Katharine, IPCC WGII TSU)
631	26	29	5	29	5	Delete one of the "," after 2008),, (CANADA)
632	26	29	5	29	5	Typo (Sosa-Rodriguez, Fabiola S., University of Waterloo)
633	26	29	8	29	9	Hydropower is a form of energy production; therefore, the text cannot say that rising temperatures will affect both energy production and hydropower. Please consider revising this sentence. (CANADA)
634	26	29	8	29	22	26.7.3.2 Energy, Projected Impacts : The whole section cites Wilbanks et al. 2008 for many general statements. Wilibanks et al. 2008 is already a synthesis report and it is unclear what is a studied effect and what is a reasonably assumed effect. It would be nice to see these statements referenced to citations within Wilbanks et al. 2008. (UNITED STATES OF AMERICA)
635	26	29	16	29	18	The figures in this sentence apply to the Peribonka River only and cannot be used to describe the impacts on the entire St. Lawrence and Great Lakes region. (CANADA)
636	26	29	16	29	18	For these projections, it would be helpful to specify the scenarios of climate change and ranges of projected values. (Mach, Katharine, IPCC WGII TSU)
637	26	29	25	0	0	a comparison of insurance companies in North America vs western Europe would be useful. Climate change insurance available in a "package" in Europe while individual event insurance is the norm in the USA - for greater profits less social benefots. (Bachelet, Dominique, Conservation Biology Institute)
638	26	29	25	30	27	(1) Given how lightly this section touches on the insurance issue, a cross reference to the more in-depth discussion in 10.7 may be constructive. (2) The significant presence and role of public insurance (e.g., Crop [USDA] and Flood [FEMA] in the US) is not mentioned. (3) Significant un-insured or underinsured segments of the market should be mentioned, and this trend is worsening (increasing vulnerability). [Reference is made for the case of Mexico on page 7, line 36 and elsewhere, but no parallel discussion is offered for Canada or the US). While it may be argued that that is an issue for insurance customers rather than insurers, it is clear that the industry is responding (adapting) by limiting availability of its products in some cases (or that its pricing responses are or will make insurance unaffordable to some). Similarly, raising deductibles has shifted exposure from insurers to their customers. (4) Focus of this section is strictly on underwriting. For completeness, the massive "asset management" side of this industry should be discussed (vulnerability/adaptation), as about 1/3 of global investment is done by insurers. (5) Munich Reinsurance Company's new study on severe weather events in North America should be reviewed for relevance to this section. See http://www.munichreamerica.com/ks_severe_weather_na_order.shtml (UNITED STATES OF AMERICA)
639	26	29	27	0	0	Section 26.7.4.1. The title of this section could be revised to more fully reflect the scope of material considered"observed impacts, vulnerabilities, and trends"? (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
640	26	29	32	29	34	This literature does not contain definitive work on adaptation. The balance of causal factors is not quantitatively understood. Care should be taken that the level of certainty implied by the statements does not extend beyond what the literature supports. If the treatment of this issue differs from that in AR4, explanation should be given. The treatment of these issues in sections 2.3.3.2 and 10.7.3 are a bit more appropriately nuanced. (UNITED STATES OF AMERICA)
641	26	29	36	29	38	26.7.4.1 Insurance, Observed Impacts : A citation is needed for this paragraph (UNITED STATES OF AMERICA)
642	26	29	36	29	38	Citations should be provided to fully support these statements. (Mach, Katharine, IPCC WGII TSU)
643	26	29	41	29	47	26.7.4.2 : Flood insurance in the US is provided only by the federal government, so increased flood claims will be felt by taxpayers unless premiums are adjusted. What about other major risks fire, etc? (UNITED STATES OF AMERICA)
644	26	29	45	29	47	26.7.4.2 : Frequency, area and severity are all separate, somewhat independent aspects of natural disturbances. Consider rewriting as: "There is also an expectation that some weather events in North America will increase in severity, such as storm class of Atlantic hurricanes, others in area affected, such as the area burned by wildfire (Karl et al., 2008; Balshi et al., 2009), and others in frequency, including intense rainfall events (Field et al., 2012)." Consider Citing: Balshi, M. S., A. D. McGuirez, P. Duffy, M. Flannigan, J. Walsh, and J. Melillo. 2009. Assessing the response of area burned to changing climate in western boreal North America using a Multivariate Adaptive Regression Splines (MARS) approach. Global Change Biology 15:578-600. (UNITED STATES OF AMERICA)
645	26	29	45	29	47	Cross-reference to findings from the working group 1 contribution to the 5th assessment report, the special report on extremes, and earlier chapter sections should be made to enable a more precise statement here. (Mach, Katharine, IPCC WGII TSU)
646	26	29	50	29	54	26.7.4.3 : Justin Gallagher has a paper about what affects homeowner decisions whether or not to purchase flood insurance. It could be cited here, and it may also include citations to other relevant papers, http://faculty.weatherhead.case.edu/ipg75/pdfs/floods_082712.pdf (UNITED STATES OF AMERICA)
647	26	29	50	30	24	26.7.4.3 : This is missing one important adaptation strategy: Reform of insurance premiums (especially federal flood insurance) to reflect the actuarial risk of living in flood-prone places (e.g. coastal floodplains). Currently homeowners don't face appropriate incentives because of the availability of artificially low-cost federal flood insurance. (UNITED STATES OF AMERICA)
648	26	29	53	29	53	Better citations are: Mills, E. 2005. "Insurance in a Climate of Change," 309, 1040-1044 and Mills, E. 2012. "The Greening of Insurance," Science 338, 1424 -1425. Note that Mills 2012 suggest increasing evidence for insurer engagement in adaptation in other countries. (UNITED STATES OF AMERICA)
649	26	29	53	30	8	Little of this applies in the case of Mexico. The distinction should probably be made. (UNITED STATES OF AMERICA)
650	26	30	10	30	10	Reference needed for this sentence. (UNITED STATES OF AMERICA)
651	26	30	10	30	18	26.7.4.3 Insurance, Adaptations : 1) There is no (clear) citation for the Bank of International Settlements study and 2) it is unclear how much information in the following sentences are attributed to this study. (UNITED STATES OF AMERICA)
652	26	30	10	30	24	Reference needs to be provided for the Bank of International Settlements study. The final sentence of this section can be deleted with no loss of substantive content. (Lemmen, Don, Canada National Study)
653	26	30	15	30	15	Replace "In contrast Mexico" By "In contrast, Mexico" (Sosa-Rodriguez, Fabiola S., University of Waterloo)
654	26	30	15	30	15	Remove parenthesis (Sosa-Rodriguez, Fabiola S., University of Waterloo)
655	26	30	19	30	19	Add a space to separate the two paragraphs (CANADA)
656	26	30	27	32	8	26.7.5 : As they are discussed in this section neither construction and housing nor transportation are service industries. (UNITED STATES OF AMERICA)
657	26	30	29	30	30	The two references provided (Ford et al., 2010, 2011) are focused on the mining sector and do not support the sentence they appear in. (Lemmen, Don, Canada National Study)

#	Ch	From Page	From Line	To Page	To Line	Comment
658	26	30	29	30	37	It is not clear why discussion of tourism is limited to this overview paragraph, especially when there is more published literature on
						tourism than most of the other industries discussed here. If space is the issue, the case could be made for other industries such as
						manufacturing and construction should be treated in the same way that tourism is in this draft. (Lemmen, Don, Canada National Study)
659	26	30	42	0	0	Section 26.7.5.1.1. The title of this section could be revised to more fully reflect the scope of material considered"observed impacts, vulnerabilities, and trends" (Mach. Katharine, IPCC WGILTSU)
660	26	30	45	30	46	Should the start of the sentence in line 46 be moved-up to line 45? (CANADA)
661	26	30	46	30	49	This paragraph has no references. It makes claims that should be substantiated by references, such as "Studies indicate that the
662	26	30	47	30	49	26.7.5.1.1 There is no citation for the "private data" (UNITED STATES OF AMERICA)
663	26	31	3	31	8	This section on projected impacts requires references (Lemmen, Don, Canada National Study)
664	26	31	3	21	0	This paragraph has no references. It makes claims that should be substantiated by references, such as "Most studies project a
004	20	51	5	21	0	significant further increase in damage to homes"\n\n (NETHERIANDS)
665	26	31	3	31	8	26.7.5.1.2. Construction and Housing, Observed Impacts : There is no citation for this paragraph (UNITED STATES OF AMERICA)
666	26	31	5	31	5	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
667	26	31	13	31	27	See comments on NISI re comments regarding northern construction which includes the boreal (7 provicial norths in Canada) Chapter
						28 Page 52 lines 44-54 above (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
668	26	31	21	31	22	The phrase "change is under way in the design and construction of new homes in reaction to recent hurricanes" requires a reference. (Lemmen, Don, Canada National Study)
669	26	31	30	32	8	This section on transportation is weak and lacks any discussion of adaptation. (Lemmen, Don, Canada National Study)
670	26	31	32	0	0	Section 26.7.5.2.1. The title of this section could be revised to more fully reflect the scope of material considered"observed impacts, vulnerabilities, and trends". (Mach. Katharine, IPCC WGII TSU)
671	26	31	34	31	40	Suggest changing to "thawing" permafrost. This should be consistent throughout the report. In Chapter 26, the authors use the phrase "melting permafrost" while in Chapter 28 "thawing permafrost" is used. Other chapters might need to be adjusted as well. Thawing permafrost is the preferred language. (CANADA)
672	26	31	36	31	36	Use the term "thawing permafrost" instead of "melting permafrost" (see above) (Smith, Sharon, Geological Survey of Canada)
673	26	31	36	31	40	26.7.5.2.1. Transportation, Observed : These are observations about the transportation infrastructure are not fully attributable to climate change. This should be made clear, otherwise a reader may think that all of this cost to the transportation system is attributed to current cliamte change. (UNITED STATES OF AMERICA)
674	26	31	39	31	40	I have not been able to get a copy of Mirza and Haider (2003) but expect that the figure they present refers to infrastructure as a whole, not just transportation infrastructure. Please double check the original paper. For the infrastructure deficit as a whole, a more recent estimate for Canada is \$145M, although I leave it to the writing team to assess the reliability of the source (http://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office/2013/01/Canada's%20Infrastructure%20 Gap.pdf). (Lemmen, Don, Canada National Study)

#	Ch	From Page	From Line	To Page	To Line	Comment
675	26	31	45	31	54	Alaska has somewhat different climate impact issues than other U.S. states, facing infrastructure issues more like Canada's. One recnt article on the costs and impacts in Alaska is Peter H. Larsen, Scott Goldsmith, Orson Smith, Meghan L. Wilson, Ken Strzepek, Paul Chinowsky, Ben Saylor. 2008. Estimating future costs for Alaska public infrastructure at risk from climate change. Global Environmental Change 18(3): 442-457. (Scott, Michael, Pacific Northwest National Laboratory)
676	26	31	51	31	54	Sentence needs clarification because it makes no sense- seems to be referring to several issues. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
677	26	32	4	32	4	Instead of "up to 100,000 bridges" it would be preferable to specify the full range, not just the upper bound. (Mach, Katharine, IPCC WGII TSU)
678	26	32	7	32	8	What is the timeframe for these projected costs? (Mach, Katharine, IPCC WGII TSU)
679	26	32	11	40	13	This section (26.8) would benefit greatly from being restructured - it stands out from the rest of the chapter (not in a good way) and it is difficult for the reader to follow the logical flow. I would recommend that there just be two major subheadings - Urban Settlements and Rural Settlements - with both having parallel internal structure. The previous structure of "Observed Impacts", "Projected Impacts" and:"Adaptation" will work but there will need to be addition subheadings under Adaptation, to capture to current useful discussion on vulnerability (including non-climate drivers) and adaptive capacity. The purpose should be less of comparing urban and rural settlements and more on providing clear analysis of both - possibly with a concluding section that draws out the similarities. There is no need to repeat content presented elsewhere in the chapter (many aspects of the "Extreme Events" section, but there should be more cross-references to other sections of this chapter as well as to other chapters of the report. (Lemmen, Don, Canada National Study)
680	26	32	15	32	17	Attribution to "climate variability and change" is not helpful - and the phrase "with different degrees of certainty" is confusing. There is likely value in distinguishing between changes in mean conditions (referred to Executive Summary as "slow-onset events") but attribution is just a red herring. (Lemmen, Don, Canada National Study)
681	26	32	20	0	0	Section 26.8.1.1. Would an expanded title be more appropriate here"changes in mean conditions and their impacts"? (Mach, Katharine, IPCC WGII TSU)
682	26	32	22	32	22	"storm surges have reduced development options and increased hazard risk". Could suggest a trend. Friesinger et al. (2010) present a survey into trends and perceived causes and risks of coastal erosion in relation to climate change. They conclude that coastal erosion increases but for most of the surveyed cases no increase of storm frequency was "perceived". Major causes of increased coastal erosion were earlier thaw of coastal material in spring and an increase of frequency of storm surges.\n\n (NETHERLANDS)
683	26	32	31	0	0	Section 26.8.1.2. Would an expanded title be more appropriate here"Extreme events and their impacts"? (Mach, Katharine, IPCC WGII TSU)
684	26	32	35	0	0	Argued to be is inappropriate language for a science assessment. This would be a good place to use confidence language - "likely" or "very likely". (Lemmen, Don, Canada National Study)
685	26	32	40	32	40	suggest adding: "sucha s the Rurarmuri of Chihuahua (Imison,2012). Perhas the first violent death of water occurred during a prolonged drought in Durango state of NW Mexico when a nine year old indigenous girl was shot when she was taking water from a well in a neighboring community. (La Jornada, 9, june, 2012. Asesinan a niña indígena por tomar agua de pozo en Durango. (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services.)
686	26	32	43	32	43	Insert "in part" or perhaps "in large part", between "event attributed" and "to climate change". This is because a variety of factors, including forestry practices and fire suppresion policies, apparently also contributed significantly to this outbreak. (Fleming, Sean, Meteorological Service of Canada)

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#	Ch	From Page	From Line	To Page	To Line	Comment
687	26	33	2	33	2	What metric of "heat" is relevant heredaily extremes versus heat waves? (Mach, Katharine, IPCC WGII TSU)
688	26	33	4	33	6	I suggest digging into this a little more and/or refining the wording slightly. The MPB outbreak in British Columbia actually contributed
						to a (short-term) economic boom in many forestry communities, due to the burst of salvage logging that ensued. If that isn't
						recognized here, it seems likely the passage will lose credibility. (Fleming, Sean, Meteorological Service of Canada)
689	26	33	4	33	6	Presumably the economic crisis also played a role in this trend? If so, should it be acknowledged? (Mach, Katharine, IPCC WGII TSU)
600	26	22			-	Last phrase "woods are more." sooms out of place and is part of sontones on page 21 line 52 52 (Church, Jan, Capadian Foundation for
690	20	33	5	U	U	Climate and Atmospheric Science/ IPY Canada)
691	26	33	9	33	12	What are the time frames for these examples? (Mach, Katharine, IPCC WGII TSU)
692	26	33	29	33	30	The information in this Table should be presented in a Figure. For a Table there is the assumption that both the rows and columns are
						important. But in this case there is no significance to the rows. It would be much more effective as a figure. (Lemmen, Don, Canada National Study)
693	26	33	33	34	43	While it is probably too early for much scholarly literature on lessons concerning vulnerability from Hurricane Sandy, there should be a
						consdierable number of government reports that could provide additional citations for this section by the time the next draft of this
						chapter is completed. Because of its salience in North Amercia, it would be a good idea to incorporate as much material as possible
						from that experience in the relevant sections of this chapter. (Scott, Michael, Pacific Northwest National Laboratory)
694	26	33	35	33	41	What I don't see discussed here is the compounding of vulnerabilitiy caused by multiple hazards. As a simple example I would the risk
						of seal level rise in areas that are protected by dykes and which are also succeptible toextreme seismic events such as along the Pacific
						Coast of USA and Canada - a specific example would be Richmond British Columbia. IN this case rebuilidng protective sea defences
						following rupture by an earthquake could take a long time. Other examples could disruptions of crtical infrastructure including
						transportation /communication corridors or reservoirs in steep terraine that could slide or slump both on its own or in response to
						weatherr or seismic events. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
695	26	33	36	33	37	Replace "Of particular concern" with "Cities of concern include" to make clear that this is not a comprehensive list and that there has
						not been a systematic analysis of relative vulnerability. For example, Wittrock et al note the vulnerability of Canadian prairie cities, but
						there has never been an analysis to compare that vulnerability to cities in other regions of Canada. (Lemmen, Don, Canada National
	4					Study)
696	26	34	17	34	20	Strongly recommend these be characterized as "challenges" for urban adaptation planning rather than barriers. The term barriers
						should be limited to things that should be broken down. In the case of fragmented governance, it may be a pain for planners but it
						exists for other, likely very important, reasons. In most cases it is something that planners must adapt to rather than change. Top-
						down decision-making also should not be viewed as a barrier, as in some cases it can serve as an enabler of adaptation planning.
697	26	24	40	21	41	(Lemmen, Don, Canada National Study)
057	20	74	40	54	41	of the US (Lemmen Don Canada National Study)
698	26	34	40	34	42	To what degree is this effect being observed in Mexico versus the US versus Canada? (Mach, Katharine, IPCC WGII TSU)
699	26	34	52	0	0	Andrachuk and Pearce (2010) is not an appropriate reference for this chapter as it deals with Innuvialuit communities that are part of
000		5.		Č	C	the Polar Regions chapter (Lemmen Don Canada National Study)

#	Ch	From Page	From Line	To Page	To Line	Comment
700	26	35	5	35	7	Discussion of Indigenous communities may benefit from reference to Lemmen et al. (2008). The following is quoted from the report Synthesis: "Aboriginal communities are particularly vulnerable to climate changes Aboriginal communities, many of which retain strong linkages to the land for both economic and cultural well-being, are also particularly vulnerable to climate change (Chapters 3–8). The subsistence economy may constitute up to 50% of the total income in these communities (Chapter 2) The adaptive capacity of many Aboriginal communities\nis presently being eroded by social, cultural, political and economic changes taking place in response to a range of stresses (Chapter 3). Significant impacts on traditional ways of life are unavoidable (Chapters 3, 4, 5, 7 and 8)." (Lemmen, Don, Canada National Study)
701	26	35	9	35	12	In many indigenous communities, what modern infrastructure exists was designed and sited by non-resident engineers who lacked any knowledge of historical climate hazards. In many cases this resulted in extreme vulnerability of critical infrastructure. This problem continues. (UNITED STATES OF AMERICA)
702	26	35	9	35	36	A challenge for rural communities is a combined product of spatial spread (tansportation is mentioned) and capacity to provide critical response (adaptatin) resources- both physical and human to respond to hazards such as wild and structural fire response, disruption of critical services such as relecommunications (water & electrical supply is mentioned) etc. Tourism based communities are often seasonal resulting in a lack of continuity in human capacity to provide critical services. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
703	26	35	12	0	0	Suggest changing to " communication services compromises hazard AND EMERGENCY response capacity" (CANADA)
704	26	35	26	0	0	Doesn't make sense: a few words presumably lost (Ingram, William, Met Office)
705	26	35	26	35	27	This sentence does not make sense - I think there is at least one missing word ("fiscal constraints necessary to support"??) (Lemmen, Don, Canada National Study)
706	26	35	29	35	39	This section might be more usefully framed as "Comparing human and social capital" and moved towards the end of the section as it is the type of information that is essential to inform effective adaptation. You may consider adding reference to Walker and Sydneysmith (2008) who contrast of human and social capital of urban and remote communities in coastal BC in addressing sea level rise. (Lemmen, Don, Canada National Study)
707	26	35	35	35	35	suggest adding: " hasd stripped indigneous communities of [add: land and] many soruces of human and social capital." (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services.)
708	26	35	38	35	38	suggest changing "espouse" to 'possess' (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services.)
709	26	35	38	35	39	Might the word "espouse" be replaced by "possess"? Also, it should perhaps be noted that, at least in more northern communities, residents' experience is that their existing local and experiential knowledge is or can be less applicable to changing conditions. (UNITED STATES OF AMERICA)
710	26	35	42	36	28	26.8.3 : Two recent economics papers estimate the projected impacts of climate change on people's enjoyment of the weather in various US metropolitan areas by end of century. They are not perfect, but represent the best available economics thinking on the subject. Consider citing: http://www-personal.umich.edu/~kelloggr/NBERw18925.pdf and http://www.nber.org/papers/w18756.pdf (UNITED STATES OF AMERICA)
711	26	35	44	35	44	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
712	26	35	47	0	0	SLR which I assume is sea level rise- Is this in a glossary? Seems to me it would make it easier for the reader to spell it out. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
713	26	35	47	35	47	26.8.3 : Please ensure that SLR was defined as an acronym for sea level rise. (UNITED STATES OF AMERICA)
714	26	35	47	35	47	The chapter team should consider if a level of confidence would be more appropriate than the likelihood term used here ("very likely"). (Mach. Katharine, IPCC WGII TSU)

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#	Ch	From Page	From Line	To Page	To Line	Comment
715	26	35	48	0	0	Millerd (2011) is not relevant to this sentence. (Lemmen, Don, Canada National Study)
716	26	35	52	35	52	The chapter team should consider if a level of confidence would be more appropriate than the likelihood term used here ("very likely").
						(Mach, Katharine, IPCC WGII TSU)
717	26	36	1	36	2	Need to clarify that Scott and McBoyle only refers to the ski industry. In other seasons and locations warming may decrease outdoor
	26		-	+	<u> </u>	activities. (Lemmen, Don, Canada National Study)
718	26	36	6	36	6	The chapter team should consider if a level of confidence would be more appropriate than the likelihood term used here ("likely").
719	26	26	Q	26	٥	(Mach, Katharine, IPCC WGII ISU) Should refer to WGI report for changes in hurricane frequency (Lemmen, Don, Canada National Study)
720	20	26	0	20	0	The findings of the working group 1 contribution chould be carefully considered for this statement about hurricanes. The relevant
720	20	50	0	30	9	The findings of the working group 1 contribution should also be described. (Mach. Katharine, IPCC WGII TSU)
721	26	36	17	36	18	Do these estimated losses differ across time frames and levels of climate change? (Mach, Katharine, IPCC WGII TSU)
722	26	36	23	36	28	This short section identifies some key impacts, but under the heading of "essential services" one is anticipating a structured discussion
/	20	50	23	50	20	of things like health services, emergency response, etc. (Lemmen, Don, Canada National Study)
723	26	36	24	36	24	Constraints to adapt in Mexico and Mexico City include "lack of understanding of the strategies' objectives, process and outcomes by
						governmental agencies and inhabitants, as well as a lack of participation and public awareness about climate change. These problems
						have resulted in poor coordination and collaboration among these participants to address climate change impacts. Indeed, various
						levels of government have refused to allocate resources to reducing sectoral and local vulnerability. Furthermore, illegality and
						corruption stand in the way of developing adaptation capacity." (Sosa-Rodriguez, 2013). (Sosa-Rodriguez, Fabiola S., University of
724	26	26	26	26	20	Waterloo) The range for this prejection should be specified, and the lovel of presidence could be considered for the percentage given. (Mach
/24	20	30	20	30	28	The range for this projection should be specified, and the level of precision could be considered for the percentage given. (Wach,
725	26	36	31	0	0	no mention of rolling easements along coastlines yet much discussed: (Bachelet, Dominique, Conservation Biology Institute)
				Ŭ	Ŭ	
726	26	36	31	0	0	Section 26.8.4. In developing the final draft of this section, the chapter team should continue to tighten the section as much as possible
						and should ensure the focus is sharply on examples and context relevant to North America. (Mach, Katharine, IPCC WGII TSU)
707	26	26	25	-		
727	26	36	35	0	0	Section 26.8.4.1.1. As a note for this section title, as well as the title of the subsequent subsection, the adaptation chapters have been
						ravoring the terminology of "incremental" and "transformational" adaptation. (Mach, Katharine, IPCC WGII ISU)
728	26	36	40	36	42	Please provide examples of such regions within North America. (Lemmen, Don, Canada National Study)
729	26	36	49	0	0	Section 26.8.4.1.2. Is "authorities" the clearest word here? Would "governments" be clearer? (Mach. Katharine. IPCC WGII TSU)
			1.5		Ũ	
730	26	36	50	37	21	Examples of actions undertaken by federal and city authorities in Mexico and Mexico City can be found in Sosa-Rodriguez (2013). (Sosa-
						Rodriguez, Fabiola S., University of Waterloo)
731	26	36	51	0	0	Delete "leadership". Adaptation planning is more visible locally because that is where all planning is most visible. However leadership
						can be in the form of resources, enabling policy etc that frequently comes from higher orders of government. (Lemmen, Don, Canada
722	26	26	E 1	77	21	National Study)
/32	20	30	21	37	21	20.8.4.1.2 Please consider cling: ICLEI survey of what urban municipalities are doing to respond to climate change:
733	26	37	8	0	0	there is a recent European study of green roofs contradicts positive effects from a handful of studies in the US: (Bachelet, Dominique
						Conservation Biology Institute)

#	Ch	From Page	From Line	To Page	To Line	Comment
734	26	37	19	0	0	could mention the role of climate deniers in power in many states and now even in Canada - reduces opportunities for preparation, information communication let alone adaptation measures and long term vision; (Bachelet, Dominique, Conservation Biology Institute)
735	26	37	21	0	0	A term that has been recently used more often than "state" and that is more encompassing is "sub-national"- ie can include states, provinces, territories, regional jurisdictions and local jurisdictions such as cities and municipalities. (Church, Ian, Canadian Foundation
736	26	37	46	37	47	for Climate and Atmospheric Science/ IPY Canada) What are "adaptation services"? Sentence remains correct, and is more understandable, if you simply state " combined with higher costs of supplying services". (Lemmen, Don, Canada National Study)
737	26	37	47	37	49	A challenge for more "developed " lands such as in cities is that to upgrade infrastructure so as to be better adapted is often much more complex because of the restriction of other infrastructure and systems- ie upgrading one system often means large changes to many. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
738	26	38	1	38	8	The benefits of participation go beyond getting information and create legitimacy. Participatory processes foster the development of the adaptive capacity of stakeholders involved and strengthen the outcomes of adaptational planning because they solicit a multiplicity of viewpoints. The paragraph constrains the benefits of participatory processes too narrowly.\n\n (NETHERLANDS)
739	26	38	21	0	0	Section 26.8.4.3. Is all material in this section focused on North America? It would be preferable to specify what applies more broadly as compared to in North America alone. (Mach, Katharine, IPCC WGII TSU)
740	26	38	27	38	28	Need better references for the maladaptive impacts of sea walls than Richardson (2010). There is an abundance of solid biophysical research documenting this (see references in chapters 5 and 14. Richardson (2010) is a series of case studies for planners. (Lemmen, Don, Canada National Study)
741	26	38	27	38	28	Seawalls and other forms of coastal protection may protect the area directly behind them, but often do so in a manner that disrupts normal coastal processes. They generally displace damage, rather than preventing it, in addition to the ecosystem damage they do. A possible citation would be:\nOwen Mason, William J. Neal, and Orrin H. Pilkey, with chapters by Jane Bullock, Ted Fathauer, Deborah Pilkey and Douglas Swanston. Living with the Coast of Alaska. 1997. Duke University Press. Durham and London. \nChapter 6 might be most pertinent. (UNITED STATES OF AMERICA)
742	26	38	31	38	32	(Doves, 2009) reference is not located in the reference list at the end of the chapter: "in some cases (Eakin et al., 2010; Romero- Lankao, 2012)(Doves 2009)"\n\n (NETHERLANDS)
743	26	38	37	0	0	Badjeck is spelled with a "ck" - make correction here and in references. (Lemmen, Don, Canada National Study)
744	26	38	43	36	44	For mapping of vulnerability e.g. cite also Kienberger et al 2012, who reviewed 20 vulnerability assessments in regard to its spatial, temporal and themtic characteristics Kienberger, S., Blaschke, T., Zaidi. R.Z., (2012). A framework for spatio-temporal scales and concepts from different disciplines: the 'vulnerability cube'. Natural Hazards (online). http://dx.doi.org/ 10.1007/s11069-012-0513-x (Kienberger, Stefan, University of Salzburg)
745	26	38	46	38	46	Facts about indigenous mobility as a stratey in the United States are cited in the attached supporting document: Indigenous Health Impacts from Climate Change expert reviewer Blake Gentry. See page12 (see text below). I suggest adding "eduction [add: and harnessing the rural-urban mobility of indigneous to secure technical resources for building adaptaive capacity in rural indigenous communities' and economic development. (Blake, Gentry, Institution no 1: Gente de litoi A.C., non-profit in Mexico. Dir. of Health Services)
746	26	38	46	38	46	Providing small centers staffed with bi-lingual indigenous liaisons can vastly improve implementation of projects after local participatory planning has taken place. This strategy takes into account that, for example in the United States 27% of Native Americans move between rural and urban areas for the highest within-state migration rates in the United States of any ethnicity (Blake, Gentry, Institution po 1: Gente de litoi A C pop-profit in Mexico. Dir. of Health Services)

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#	Ch	From Page	From Line	To Page	To Line	Comment
747	26	39	12	39	12	This statistic could be clarified. What does "these efforts" refer to, and the total budget expenditures are for what? (Mach, Katharine, IPCC WGII TSU)
748	26	39	18	39	20	In most cases I am aware of it is not of the focus shifting from mitigation to adaptation, but rather of expanding from exclusively on mitigation to consideration of both mitigation and adaptation. (Lemmen, Don, Canada National Study)
749	26	39	22	39	24	If you want to complete the tripartite storyline you could mention that David Cadman, Vancouver Councilor, is the president of the ICLEI (Local Governments for Sustainability) Global Executive Committee. (Lemmen, Don, Canada National Study)
750	26	39	34	39	37	Not sure that the lack of jurisdictional control of New York City over surrounding states is an example of "fragmentation" this seems to imply that cities ought to be the locus of decision-making over non-urban areas. A similar statement implying that the USA ought to have jurisdictional control over Mexico and Canada would not make sense or be well-received. \n\n (NETHERLANDS)
751	26	39	42	39	43	A challenge int eh Vacouver region (Lower Mainland) is that even if the city of Vancouver takes action can it bring with it linked action with the regional districts and municpalities outside the city or does it push pressures such as more affordable accomodation resulting in more commuting into these other jurisdictions (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
752	26	40	16	40	16	State level does not speak to Canadians. (Lemmen, Don, Canada National Study)
753	26	40	25	41	9	26.9.1 : The report mentions Canada and Mexico programs by name. Why not be specific about the US programs, such as Executive Order 13154 and Interagency Climate Action Task Force. Consider citing the following. Glicksman, R. L. (2012). Chapter 12: Governance of Public Lands, Public Agencies, and Natural Resources. The Law of Adaptation to Climate Change: U.S. and International Aspects. M. B. Gerrard and K. F. Kuh, American Bar Association: 441-480. There have also been challenges to federal agencies conducting/implementing adaptation action: Jantarasami, L. C., J. J. Lawler, and C. W. Thomas. 2010. Institutional barriers to climate change adaptation in U.S. national parks and forests . Ecology and Society 15(4): 33. [online] URL: http://www.ecologyandsociety.org/vol15/iss4/art33/ . (UNITED STATES OF AMERICA)
754	26	40	42	40	51	Change first phrase from "Canada is working towards creating a National"to "Canada has a National" - the framework has been in place for more than a year. Please replace outdated text regarding past programming "lines 44-47" with description of current initiatives available at http://www.nrcan.gc.ca/earth-sciences/climate-change/community-adaptation/platform/11958. on line 44, singling out a specific government department (Environment Canada) is inappropriate. (Lemmen, Don, Canada National Study)
755	26	40	47	40	51	These are two of several climate change adaptation programs that were financially supported by the Government of Canada in 2011. Suggest clarifying the language here and adding in other programs as appropriate. See:
756	26	41	5	41	9	A notable omission from this paragraph is the USDA Forest Service National Roadmap for Responding to Climate Change (2010; already in the lit cited), begun in 2008 and implemented in 2010, which actually includes performance elements related to vulnerability assessment and adaptation planning and implementation that all National Forests are required to meet in response to climate change. (UNITED STATES OF AMERICA)
757	26	41	5	41	9	Another example of of specific adaptation efforts in the United States is the 2013 release of the inter-agency National Fish, Wildlife and Plants Adaptation Strategy (National Fish, Wildlife and Plants Climate Adaptation Partnership. 2012. National Fish, Wildlife and Plants Climate Adaptation Strategy. Association of Fish and Wildlife Agencies, Council on Environmental Quality, Great Lakes Indian Fish and Wildlife Commission, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service. Washington, DC, USA)

#	Ch	From Page	From Line	To Page	To Line	Comment
758	26	41	14	41	20	I am pleased that this text for Canadian provinces leads with "For example". However the level of detail the authors have chosen to provide gives a misleading impression about the level of effort. Ontario, like many jurisdictions, has an ambitious strategy but has not yet indicated how it will be implemented. Quebec, on the other hand, has a strategy that extends to 2020 and the commitment of \$200M to foster adaptation (http://www.budget.finances.gouv.qc.ca/Budget/2012-2013/en/documents/climate.pdf). British Columbia's initiatives are much broader than water (check out http://www.env.gov.bc.ca/cas/adaptation/) and include innovative sea dyke guidelines to address sea level rise. I reiterate my concern on previous drafts that this type of policy and program information does not fit well within a scientific assessment. (Lemmen, Don, Canada National Study)
759	26	41	20	0	0	Bc has recently released a climate change action plan for forest management:\nhttps://www.for.gov.bc.ca/het/climate/actionplan/index.htm\nThere are also plans developed and being developing for US National Forests (Spittlebouce, Dave, BC Ministry Forests, Lands and Natural Recourse Operations)
760	26	41	22	41	31	Check the correct year for Bierbaum et al. 2012 in text and References section. Should it be 2013? Also, it is suggested that the authors consider including the following information in this paragraph: "As of the end of 2012, at least 14 states have completed or started a state-wide adaptation plan and 8 more have recommended that an adaptation plan be developed (Bierbaum et al. 2013)". Also check these URLs for citations: http://www.georgetownclimate.org/adaptation/state-and-local-plans http://www.c2es.org/us-states-regions/policy-maps/adaptation http://www.climateaccess.org/sites/default/files/Bierbaum%20et%20al_A%20comprehensive%20review%20of%20climate%20adaptati on.pdf (UNITED STATES OF AMERICA)
761	26	41	41	0	0	While you talk about governments at various levels it seems to me that the work of NGO's and academic instittuions are also important. I can think of organizations such as the Canadian Foundation for Climate and Atmospheric Sceince (CFCAS) now renamed as the Canadian Climate Forum (http://www.climateforum.ca), The Climate Registry which operates in all 3 countries at the sub national and other levels (www.theclimateregistry.org/),Ouranos (CONSORTIUM ON REGIONAL CLIMATOLOGY AND ADAPTATION TO CLIMATE CHANGE) in Quebec http://www.ouranos.ca/en/ and the Pacific Climate Impacts Consortium (http://pcic.uvic.ca)and the Pacific Institue for Climate Solutions (http://pics.uvic.ca) in British Columbia and the Northern Climate Exchange (http://www.yukoncollege.yk.ca/research/programs/northern_climate_exchange) in the Yukon as examples. I would also suggest aborigianl organizationsand governmetns that deserve specific attention such as the Arctic Athabascan Council, Council of Yukon First Nations, Inuit Circumpolar Council etc. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
762	26	41	45	42	4	In Canada provinces are separte "Crowns" with responsibilities assigned through the Constitution and the federal government cannot assign them responsibilities. While not an citizen of the USA I know the states have similar independence though especially in the western states there is more federalland that falls under federal jurisdiction. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ JPY Canada)
763	26	42	3	42	4	This statement does not accurately describe all sectors; notably forest sector adaptation planning focuses primarily on supporting adaptive capacity at this point in time. See Millar et al. 2013. Suggested correction is to note that different sectors are focusing on different adaptation responses, and perhaps provide examples to illustrate the variety.\nMillar, C.I., K.E. Skog, D.C. McKinley, R.A. Birdsey, C.W. Swanston, S.J. Hines, C.W. Woodall, E.D. Reinhardt, D.L. Peterson, and J.M. Vose. 2012. Adaptation and mitigation, p. 125-192, In J. M. Vose, et al., eds. Effects of climatic variability and change on forest ecosystems: a comprehensive science synthesis for the U.S. forest sector, Gen. Tech. Rep. PNW-GTR-870. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
764	26	42	11	42	29	The legend for Figure 26-6 is incomplete. The colored bars are not explained and it is unclear why some wedges are blank, so it is impossible to fully interpret the figures and the associated text on page 42 (UNITED STATES OF AMERICA)
765	26	42	11	42	50	Figure 26-6 and associated analysis is potentially very useful, but by reading this page you get the distinct impression that the writing team is not at all comfortable with including it! The text addresses abounds with notes of caution and highlights the limitations of the figure, but makes no effort to communicate what the figure says! Yet there are important messages here about the ability of adaptation and mitigation to work together to reduce levels of future risk. (Lemmen, Don, Canada National Study)
766	26	42	15	42	15	projections may be a preferable word here as compared to "predictions." (Mach, Katharine, IPCC WGII TSU)
767	26	42	18	42	18	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
768	26	42	23	42	29	Caption needs to explain the significance (if any) of the colours purple, orange and red. It also needs to explain why some "slices" are left blank and (most curiously) why Livelihoods and Poverty and Urban Areas have been assessed for a 2C scenario but not for a 4C scenario. (Lemmen. Don. Canada National Study)
769	26	42	44	42	44	Casual usage of "very likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
770	26	42	47	42	50	Delete bracketed italicized text (era of climate responsibility and era of climate options) as per comments provided on whole of WGII report through Government Review process. (Lemmen, Don, Canada National Study)
771	26	42	48	42	50	Are these terms defined somewhere and are they utilizzed in other chapters? I didn't note them in Chapter 28 the era of climate responsibility or climate options (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
772	26	43	4	0	0	Replace "state" with "subnational" (Lemmen, Don, Canada National Study)
773	26	43	17	43	30	Significant issue for locations that are for the most part not self suficeint and that depend on transportation, communications and utility corridors or networks to meet crtical human sustainability needs or supplies that may be critcal to maintaining systems that can protect life, protect the environment etc. Often there is little or no redundancy in these lines and if the centre of supply suffers a short or long term shock or anywhere along the line is shocked these "outposts that are increasingly hosting relatively large populationscan be put at risk. The Arctic or isolated camps such as mines are an examples. (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
774	26	43	33	44	34	The "FAQ" formulation seems a bit contrived. There is no clear indication that these four questions are among the most frequently asked or by whom. The section could be renamed "Key Questions". (UNITED STATES OF AMERICA)
775	26	43	35	0	0	what makes North America different is that it has the technology, the know-how, but total inretia in preparing for climate change; climate deniers have been very effective at preventing progress; compared to other continents North America should be able to adapt the best because of its wealth and technological advantage yet when extreme events occur (ex. Katrina / New orleans) scenes that remind one of developing countries - mortality, army intervention, looting - are the norm due to the inertia of the authorities and the lack of preparation. Missed opportunities for leadership. (Bachelet, Dominique, Conservation Biology Institute)
776	26	43	35	43	42	Rephrase question or delete entirely. "especially unique" is an unfortunate phrase - something is unique or it isn't. While all regions are unique, it is not clear that the range of variability observed in the parameters listed here is any great in North America than it would be, for example, in Asia. (Lemmen, Don, Canada National Study)
777	26	43	35	43	42	FAQ 26.1 All regions will be unique in terms of diversity, perhaps a better question would be about unique types of impacts and risks in the region (Chatterjee, Monalisa, IPCC WGII TSU)
778	26	43	44	0	0	FAQ 26.2 Some specific information may be useful take away points for readers. (Chatterjee, Monalisa, IPCC WGII TSU)
779	26	43	44	43	51	In addition to discussing spatial differences in precipitation patterns I would also expect discussion of seasonal changes. (Lemmen, Don, Canada National Study)

IPCC WGII AR5 Chapter 26 , SECOND ORDER DRAFT

#	Ch	From Page	From Line	To Page	To Line	Comment
780	26	43	44	43	51	FAQ 26.2: We have serious concern with the focus of this FAQ as the assessment needed to answer such a question is primarily within WG and the evidence future precipitation changes in the regions is covered in the WGI contribution to AR5. With the current focus of this FAQ, there is a serious risk here of cross-working group inconsistency and overlap that is best avoided. We thus suggest this FAQ to focus on the consequences of this for exposure, vulnerability, impacts, etc. (Plattner, Gian-Kasper, IPCC WGI TSU)
781	26	44	1	0	0	factors leading to vulnerability: abruptness of change, tipping points and unknown thresholds; inertia despite scientific knowledge; (Bachelet, Dominique, Conservation Biology Institute)
782	26	44	1	44	16	What was the analysis undertaken to determine the relative vulnerability of sectors / regions. While I am comfortable stating that those listed are vulnerable, I am not comfortable with saying that they are more vulnerable than other not listed. An example of a vulnerable region that is not listed is alpine ecosystems, despite the fact that they will almost certainly be extirpated in some areas.
783	26	44	2	44	5	At this point I note that no where in the text is there mention of the constaints on water avaialbility in some of the inter mountain regions of the western Cordilleran in all 3 countries. Examples the Okanagan Valley- the Okanogan watershed is heavily regualted; The Grand Coulee region of the Columbia Basin - the purpose of the project was to irrigate the desert. You do mention the Colorado though I don't recall mention of some of the agricultural basins in California. MOst mention is of the Great Pains and parts of Mexico (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
784	26	44	3	44	3	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
785	26	44	4	44	4	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
786	26	44	7	44	7	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
787	26	44	10	44	10	The sentence "Mention something about the wet tropical south" seems like a note an author made to him/herself and forgot to remove.\n\n (NETHERLANDS)
788	26	44	11	0	0	FAQ 26.3 Some specific information on location or intensity of wildfire, pest outbreaks will be useful. (Chatterjee, Monalisa, IPCC WGII TSU)
789	26	44	18	0	0	This FAQ is quite general and does not make reference to "North America". Does it belong in this chapter? Suggest specifying that the FAQ refers to lessons learned from adaptation actions specific to North America or moving this FAQ elsewhere in the report. (CANADA)
790	26	44	18	20	22	FAQ 26.4 These sentences are a repeat from ES finding. Authors may wish use the term constraints in framing this question. (Chatterjee, Monalisa. IPCC WGII TSU)
791	26	49	21	49	21	Conafor is a federal institution of Mexico, please change to CONAFOR (Monterroso, Alejandro, Universidad Autonoma Chapingo)
792	26	50	9	0	0	Wilbanks, Tom; Fernandez, Steve; Backus, George; Garcia, Pablo; Jonietz, Karl; Kirshen, Paul; Savonis, Mike; Solecki, Biill; Toole, Loren; Allen, Melissa; Bierbaum, Rosina; Brown, Teresa; Brune, Nancy; Buizer, Jim; Fu, Joshua; Omitaomu, Olufemi; Scarlett, Lynn; Susman, Megan; Vugrin, Eric; and Zimmerman, Rae"Climate Change and Infrastructure, Urban Systems, and Vulnerabilities: Technical Report For The U.S. Department of Energy in Support of the National Climate Assessment." Oak Ridge National Laboratory, Oak Ridge, Tennessee.2012.\nAvailable online at http://www.esd.ornl.gov/eess/EnergySupplyUse.pdf (UNITED STATES OF AMERICA)
793	26	50	51	50	52	This citation is wrong. The correct citation is in page 53 line 50 (Monterroso, Alejandro, Universidad Autonoma Chapingo)
794	26	52	19	52	21	Please change names and year as: Sanchez-Torres E.G., Ospina-Noreña, J.E., Gay-García C., and Conde C. 2011. (Monterroso, Aleiandro, Universidad Autonoma Chapingo)

#	Ch	From Page	From Line	To Page	To Line	Comment
795	26	53	43	0	0	Bales, J., D. Raff, C. McNutt, M. Brewer, T. Johnson, and T. Brown, 2012: Water Resources Sector Technical Input Report in Support of the U.S. Global Change Research Program, National Climate Assessment, 2013.\nN.B. this report is expected to appear as a USGS technical report in ~July 2013. (UNITED STATES OF AMERICA)
796	26	53	50	53	52	Please change the citation to: Gómez-Díaz J.D., Monterroso-Rivas, A.I., Tinoco-Rueda, J.A., Toledo-Medrano M.L., Conde-Álvarez, C., and Gay-García C. 2011. Assessing current and potential patterns of 16 forest species driven by climate change scenarios in México. Atmósfera 24(1), 31-52 (Monterroso, Alejandro, Universidad Autonoma Chapingo)
797	26	54	19	0	0	Staudinger, M.D., N. B. Grimm, S. A, S. L. Carter, F. S.Chapin III, P.Kareiva, M. 4 Ruckelshaus, and B.A. Stein, 2012: Impacts of Climate Change on Biodiversity, 5 Ecosystems, and Ecosystem Services: Technical Input to the 2013 National Climate 6 Assessment. Cooperative Report to the 2013 National Climate Assessment., 296 pp. 7 [Available online at http://downloads.usgcrp.gov/NCA/Activities/Biodiversity-Ecosystems-and-Ecosystem-Services-Technical-Input.pdf (UNITED STATES OF AMERICA)
798	26	63	6	63	7	Please consider the following citation: Monterroso-Rivas A.I., Conde-Álvarez C., Rosales-Dorantes G., Gómez-Díaz J.D., and Gay-García C. 2011a. Assessing current and potential rainfed maize suitability under climate change scenarios in México. Atmósfera 24(1), 53-67 (Monterroso, Alejandro, Universidad Autonoma Chapingo)
799	26	63	8	63	9	The text in page 22 line 14 refers to this citation, kindly change it: Monterroso-Rivas A. I., Gómez-Díaz J.D., Toledo-Medrano M.L., Tinoco-Rueda J.A., Conde-Álvarez C., and Gay-García C. 2011b. Simulated dynamics of net primary productivity (NPP) for outdoor livestock feeding coefficients driven by climate change scenarios in México. Atmósfera 24(1), 69-88 (Monterroso, Alejandro, Universidad Autonoma Chaningo)
800	26	64	3	0	0	This citation is for the full draft report of the NCADAC as a "suggestion to review these other reports". We suggest removing NCADAC 2013. (UNITED STATES OF AMERICA)
801	26	75	17	0	24	Duplicate of Williamson et al 2009a reference. Do not need the "a" after 2009 here and in text, e.g., page 16 line 48. (Spitttlehouse, Dave, BC Ministry Forests, Lands and Natural Resource Operations)
802	26	77	0	0	0	Table 26-1 Initially I found this tableconfusing since I assumed there must be a realtionship across rows- which it appears there is not. The introductory text to this table suggests it highlights key sources vulnerability for urban and rural systems. Page 33 Line 26-27. There seems to be no differentialtion between urban and rural systems indicated in the table. Did someone copy the wrong table? (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
803	26	77	0	0	0	Table 26-1. It would be helpful for the reader if the intended interpretation of this table were clarified. Presumably the lines of the table are not meant to be read from left to right? Instead, does each column present a series of relevant examples? (Mach, Katharine, IPCC WGII TSU)
804	26	77	0	77	0	Table 26-1 Comments - Layout of table is confusing: encourages reading across rows, which is not the intent. Is there a better (clearer) term than "Hinterland" (urban/rural is the intended distinction). Columns seem to be incomplete in some cases (e.g., agriculture are not included yet there are a whole sections later in the chapter). As much insurance activity takes place at the corporate/industrial level, it would be better to move that from the "Individual" column to the "System/Sector" columns (or include in both). Better to improve table than to retain limitations of the primary source (and say adapted from Romero-Lanka). (UNITED STATES OF AMERICA)
805	26	77	0	77	0	Table 26-1 CommentsThe design of this table, with the horizontal lines encasing each box, could be taken to suggest that the hazard of sea level rise has effects only on health, with those impacts relating to disease, and that the determinants of adaptive capacity/resilience against sea level rise are land-use planning and age of the individual. This is obviously not what is intended. Perhaps a redesign of the graphic, emphasizing the vertical columns rather than the horizontal lines, would be helpful here. (UNITED STATES OF

#	Ch	From Page	From Line	To Page	To Line	Comment
806	26	78	0	0	0	Figure 26-1 I assume the population is toatal within each pixel- what is the the area represented by a pixel- ie population per x square
						kilometers? Figure 26-2 Is the rate of change just a realtive number or is it the projected increase per year/ decade or? (Church, Ian,
						Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
807	26	78	0	0	0	Figure 26-2. It would be preferable to avoid "present-day" in describing both parts of this figure, since 1980-1999 isn't quite present-
						day. (Mach. Katharine, IPCC WGII TSU)
808	26	78	0	78	0	Figure 26-1 Comments - If possible, consistent with printing constraints, it would be preferable if maps could show the entire North
					-	American continent. (UNITED STATES OF AMERICA)
809	26	78	0	78	0	Figure 26-1 The legend is very very difficult to read. Perhaps some hotspots could be emphasized. In comparisn to the space it is taking,
						the figure at present is giving very little information to readers. (Chatteriee, Monalisa, IPCC WGII TSU)
810	26	78	0	78	0	Figure 26-2 Color differences are difficult to see especially in case of categories 3-4 and 4-5. (Chatterjee, Monalisa, IPCC WGII TSU)
811	26	79	0	0	0	Figure 26-3: The boldness of the black dots (circles) make it harder to see the background information on the map. (Estrada, Yuka, IPCC
						WGII TSU)
812	26	79	0	0	0	Figure 26-3. Should maps of observed changes for North America be presented as well? The caption, approach to stippling, and other
						features of this figure of course should be updated to match the final versions. (Mach, Katharine, IPCC WGII TSU)
813	26	79	0	0	0	Figure 26-3: Please consider ways to refine the clarity of this figure and caption, particularly the descriptions of categories of results
						displayed. The TSU can assist with this process if desired. (Mastrandrea, Michael, IPCC WGII TSU)
814	26	79	0	79	0	Figure 26-3 Comments - It will be confusing if the stippling method to represent confidence in projections of future change is different
						for AR5WG2 than for AR5WG1. This issue is discussed at length in AR5 WG1 chapter 12. Suggest that all projection figures in this report
						use color scales and stippling/hatching methods consistent with WG1 to lessen confusion. The choice to use what is used in the WG1
						chapters or the WG1 Annex is up to the WG2 authors. However, one advantage of using the choice of the chapters is that regions
						where the changes are small compared to 20 year variability are explicitly noted. (UNITED STATES OF AMERICA)
815	26	79	0	79	0	Figure 26-3 Comments - It is common practice in the literature for markings to indicate areas of greater confidence than unmarked
						areas. In this figure, circles indicate less confidence than unmarked colored regions. This could be a source of confusion for readers.
						(UNITED STATES OF AMERICA)
816	26	80	0	0	0	Figure 26-4 can be improved in following ways:\n(1) Use transparency while drawing the overlapping time series.\n(2) May be applying
						5-years moving average to the anomaly will be helpful.\n(3) You may want to show only historical and not the natural, because
						differences between historical and natural runs will be extensively covered in WGI reports. (Kumar, Sanjiv, Center for Ocean-Land-
						Atmosphere Studies)
817	26	80	0	0	0	Figure 26-4. It would be preferable to adjust the Y axes of these plots so that the plumes are fully contained within the plots. Also,
						within the caption, presumably the range of years should be 1986-2005? (Mach, Katharine, IPCC WGII TSU)
818	26	80	0	80	0	Figure 26-4 Comments - Data go off scale. Also, If possible, add "contiguous" to label for United States. (UNITED STATES OF AMERICA)
010	26	00	-		-	
819	26	80	U	80	U	Figure 20-4 comments - The use of the term "natural" with respect to the blue shading is terribly qualitative. Presumably this is the
						envelope of projections without human impacts (GHG emissions, land use, etc.) included. If so, best to say this directly. Secondly, it is
						surprising to see no distinction between red and blue for the historical record. Does not the literature tell us that we have significant
						changes in precipitation? Perhaps the distinction is between total and that falling in torrential events. If so, the chart may be redrawn
						to reflect the extreme events (which are more material to the discussion of adaptation than averages or totals). (UNITED STATES OF

#	Ch	From Page	From Line	To Page	To Line	Comment
820	26	80	1	0	0	Some of the data exceeds the range of the axes in these figures. They should be replotted to avoid this problem. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
821	26	80	1	80	30	The record is running off below all of the projections and you are programmed to ignore it (Gray, Vincent, Climate Consultant)
822	26	81	0	0	0	Figure 26-6: I am not sure if I understand this figure. One example is: you use gray color bar as the risk key, then what does blue, orange, and red color represent? One suggestion could be: use different colors to represent different level of risk, and do not use gray color scale. (Kumar, Saniiv, Center for Ocean-Land-Atmosphere Studies)
823	26	81	0	0	0	Figure 26-6 Is there an error in the +2 degree plot for biodiversity? I can't see why the risk should drop between the first plot and this one. Similar comments for the Coastal Reegion and the Infrastructure/ Key Economic Sectors (Church, Ian, Canadian Foundation for Climate and Atmospheric Science/ IPY Canada)
824	26	81	0	0	0	Figure 26-6 It is also important for policymakers to understand risks estimated for the mid-term, or the period in between the era of climate responsibility (2030-2040) and era of climate options (2080-2100); and therefore, a figure should be included for global average warming of 3 degrees Celsius above preindustrial. Furthermore, given the diversity of regional risks and effective adaptation, the risk levels provided relate to different phenomena and adaptation choices are difficult to compare; and therefore, the figure should be revised to provide examples of the projected risks and adaptation choices considered in producing the figure and to include comparable numerical values. (JAPAN)
825	26	81	0	0	0	It is unclear initially why there are different colors in each of the radial graphs. We assume that the size of the colored blocks (purple, yellow and orange) within each wedge of the graphs indicates the range of estimates, or uncertainty within each sector. This should be stated in the caption so that the reader doesn't need to stare at it for a while to figure it out on their own. (Then the caption of the graph should be modified in the SPM and the TS also). For a good example of how this was done, see the legend of Figure SPM.5 on page 39 of the SPM, specifically the 'Interpretation of risk for a sector' legend entry.\n\n (NETHERLANDS)
826	26	81	0	0	0	Figure 26-5: Figure caption is inadequate to explain the complexity of the plots. A few more sentences would help. (Estrada, Yuka, IPCC WGII TSU)
827	26	81	0	0	0	Figure 26-5. A much more extensive caption should be provided to fully explain this figure. (Mach, Katharine, IPCC WGII TSU)
828	26	81	0	81	0	Figure 26-5 Comment - On both pages 21 and 81, the caption for Figure 26-5 does not provide enough information for the reader to understand its content. What does the histogram at the bottom of each panel represent? What does the X axis represent? Mean growing season temperature? Also, please explain the source of the data and the different curves used to fit the data. (UNITED STATES OF AMERICA)
829	26	81	0	81	0	Figure 26-5 Comment - The connection between the (green) bottom bar plot to the multi-colored yield plot on the top is not clear - nor is the y-axis label legible. Also, the caption should be modified to add "crop" to make "crop yields". Moreover, effort should be made to heavily revise this figure to simplify it from the primary source in a way that is more comprehensible. Additionally, the discussion of this figure in the text is lacking in sufficient detail to relay its key findings. (UNITED STATES OF AMERICA)
830	26	81	0	81	0	Figure 26-6 Comment - It is hard to understand this Figure and elements of the Figure are not defined by the caption or legend. Moreover, though, this figure is not clear, seems to be subjective and the concepts of "era of climate responsibility" and "era of climate options" are not intuitive. It should be considered for deletion and, perhaps, replaced with a table that states a given impact, associated confidence and how much risk is associated with that risk under different scenarios. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
831	26	81	0	81	0	Figure 26-6 Comments - Several elements of this figure need to be significantly clarified and made easier to read (here and in the SPM). The slice labels are illegible, and the reasons for varied font colors (brown, green, blue) are not clear. It is not clear what the three shading colors mean (purple, orange, and red); if they are used only to differentiate among the time periods it would be less distracting to use a single color (as the differences are indicated by the titles and temperature labels). Also, why are the color shadings sometimes indicated by a line at the margin between risk levels while others shade the entire risk-level "band"? The meanings of the subtitles are not at all clear (what is the distinction between "Era of Climate Responsibility" and that of "Climate Options"? (UNITED STATES OF AMERICA)
832	26	81	0	81	0	Figure 26-6 Comments - The key should include an explanation of the colors. (UNITED STATES OF AMERICA)
833	26	81	0	81	0	Figure 26-5 The information provided in the legend is not useful for readers who are not familiar with the differences in these methods. Authors should consider adding descriptions in the figure caption. (Chatterjee, Monalisa, IPCC WGII TSU)
834	26	81	1	0	0	This figure is unclear. 1) What do the grey and coloured areas represent? 2) Why is there no risk assessed for human security or the oceans? 3) For 4 C many risk assessments are missing. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)