

Comment	Section	Page	Line	Reviewer	Comment	Response
731	General	0	0	Beavers	Beavers suggested that the social sciences should be further explored in this report.	Added section on social science research needs to Part VI and highlighted in Executive Summary. Overall, Mark Crowell's concerns about Chapter 9 were mostly about how the NFP is explained. To a large extent, the "errors" he refers to resulted from author's attempt to explain the program to someone not well-verse in the program, which required simplification or a longer section. The last draft went with simplicity. Author met with senior FEMA actuary. Given FEMA's concern, the author revised the section which made it longer—but previous email traffic with the DFO shows that Crowell appears to be satisfied, provided that the section stays in as written in the existing draft. In the end, the longer explanation makes it clear that program revenues can increase as sea level rise increases the risk, which may not have been clear in the draft. However, the revised draft still maintains—with additional detail—that in some cases the current rate structure prevents rates from rising in proportion to the increased risk, due to a cross-subsidy within a given class. The FEMA actuary agreed with author that there is a cross-subsidy.
732	General	0	0	Crowell	Chapter 8 should be modified as per the specific comments below. Chapters 9 and 11 present numerous factual errors about the National Flood Insurance Program. As noted below, these chapters require extensive revisions. Recommend that the report not be made final until these errors are fixed.	See response to comment 865.
733	General	0	0	Hunkins	The panel should consider the recent reports cited above when making recommendations on future research needs, tool development and communication/education.	
734	General	0	0	Hunkins	The discussion of the impacts to transportation in this document seem focused on specific localized impacts to transportation facilities and not the system as a whole. The transportation systems (roads, bridges) should also be evaluated as a system, not as individual roads serving access to a few properties. Transportation facilities often serve as the life-line to communities and if one transportation facility is impacted by sea level rise, then an entire community can be lost. Vulnerability assessments should be conducted, as a minimum, at a regional level with regard to the affects of sea level rise on the transportation system, to determine the viability of the transportation system as a whole.	
735	General	0	0	Rudolph	In our conversation on March 18th, I mentioned the impacts of navigation dredging and offshore disposal in both; (1) general terms and (2) specific to Morehead City Harbor. It would be great to include verbiage mentioning the implications of dredging and removing sand from the littoral zone, the increase susceptibility of coasts to sea-level because of this practice, and methodologies to prevent or mitigate this practice from continuing. There are many sections in the document where anthropogenic influences on beaches are mentioned, and again this would provide a nice place to insert additional verbiage (e.g., pg 439, 2nd paragraph, pg. 456, last paragraph, pg 104, section 2.4.4).	Section on RSM and BSMP have been added to point out the need to conserve coastal sediments.
736	General	0	0	Rudolph	In respect to Morehead City Harbor, the technical body of work is embodied in two reports: (1) is a report prepared by Olsen Associates, Inc. in 2006 for Carteret County, N.C. The document can be accessed chapter by chapter at the very bottom of the webpage - <a href="http://www.protectthebeach.com/smp/smp.htm">http://www.protectthebeach.com/smp/smp.htm</a> . There is a very large technical appendix section that we can mail if needed. (2) the second report was prepared by the U.S. Army Corps of Engineers in 2001 (June), entitled "Final Section 111 Feasibility Report, Morehead City Harbor, N.C." Both of these reports document the volume of sand dumped offshore and the impacts to the ebb tide delta and near shore profiles, among other implications.	Useful references, but more detail than needed for the scope of this report. The importance, however, of the issue is covered.
737	General	0	0	Schultz	The report content and format should be reviewed to ensure it is appropriate for the intended audience. The current version is written for a mixed audience and is not very user-friendly. It should be streamlined. In addition, since most people will read only those sections of the report that are relevant to them, it would help if each of the sections could stand on its own.	Authors and editors have tried to incorporate this suggestion to the extent possible.
738	General	0	0	Schultz	The units of measure need to be consistent throughout the report. Also, since most of the general public, planners, etc. use the English system, please include a conversion table in the report.	Conversion table is being included and authors/editors revised for consistency of units.
739	General	0	0	Schultz	This report does not provide a forecast of future rates of sea-level rise. Instead, it evaluates the implications of three sea level scenarios using elevation data. While this is valuable information, it would be helpful if future reports and studies would address the timing issue so that government planners and others would know what changes to expect by a certain year (e.g., 2020, 2050, etc.).	Agree, times are given.

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740	General	0	0	Schultz	This report (as noted on page 372) did not catalogue the activities undertaken for other reasons that might also be justified on the basis for rising sea level. Future studies should include this type of information since it is likely to be the most reasonable approach to addressing sea level rise.	Agree--this is acknowledged in the report.
741	General	0	0	Schultz	As mentioned on page 330, for several types of impacts, the cost of preparing now is very small compared to the cost of reacting later. Do we really know how the costs compare? What are the costs of "no action"? This report should recommend that this type of analysis be undertaken. This recommendation could also be added to page 469.	Added text on social science activities in Part VI that mentions the need for increased and more holistic economic analysis.
742	General	0	0	Pearsall	I'm not sure where to put it, but somewhere early in this report we should acknowledge that our economic, ecological, and regulatory systems do not and cannot receive any signal from the future, so no adjustment to present policy on any front can be expected except where people deliberately apply the Precautionary Principle in the absence of such a signal. Capitalists and bureaucrats are not very good futurists.	Simplified version is expressed in Executive Summary.
743	General	0	0	Pearsall	I find essentially no acknowledgement that, even if ecosystems survive rising seas by accretion or migration [I like "translocation" better, as migration in the context of ecology usually implies seasonal behavior], they certainly won't be the same ecosystems they are now. Changes in seasonality, temperature, and rainfall inputs will cause ecosystem translation as well. I don't ask the authors to predict the nature of these translations, but they need to acknowledge them throughout.	Noted the potential for changes in habitat productivity with migration. Due to substantial literature on wetland "migration", we kept that terminology. (already discussed in tidal marshes section)
744	General	0	0	Pearsall	Future research need: predicting ecosystem translation as the result of range changes resulting from the variables listed above, plus changes in the substrate as ecosystems attempt to translocate upslope and inland. Also, factor in consideration of which native species are likely to become invasive (simplifying), which non-native species are likely to arrive, and which of them are likely to be invasive.	The research plan in Part VI is intended to be somewhat generalized, hence this level of specificity unbalanced that part of the report so was not added. However, these kinds of studies are hopefully implicit if not explicit within the broad geologic and biologic research themes already described in the report.
745	General	0	0	Pearsall	There isn't much in the report about what people can do to assist the translocation and translation processes to avoid simplification of composition, structure, and function over space and time. There are exceptions, e.g., the mention of sills and living shoreline strategies in chapter 4, and the couple of pages at the beginning of chapter 10.	Because of the large number of topics that this report addresses, no single topic will be addressed in great detail. Much of the report addresses what is at risk, and what people are doing, rather than what can be done. Nevertheless, the report does have sections on living shorelines (moved to chapter 5), policies for promoting retreat (chapters 5, 10, 11), and institutional capacity of the wetland protection program to move away from the historic preference for hard shore protection (chapters 9, 11).
746	General	0	0	Pearsall	Future research need: From the point of view of public and private conservation entities, this is the single most important question we have: What existing technologies exist that can help us help ecosystems adapt? What challenges can't be met by existing technologies and, thus, what new technologies must be developed?	The research plan in Part VI is intended to be somewhat generalized, hence this level of specificity unbalanced that part of the report so was not added. However, these kinds of studies are hopefully implicit if not explicit within the broad geologic and biologic research themes already described in the report.
747	General	0	0	Pearsall	Rolling Easements generally, and see: lines 4726-4729, 6163, 6674, 6866, 6905-6933, Figure 9.1, 7319-7325, 7593-7594, Table 11.1, 8149-8155, 15812-15816 – The Nature Conservancy could not find a single land owner who would even consider selling, much less giving, such an easement to TNC. The very low NPV of an appraisable rolling easement that will not be exercised until some years out may be perceived as an advantage by the potential buyer – the state – but it is not perceived favorably by the landowner who is being asked to give up all future value of his land for his heirs while accepting a steeply discounted price in the present. Thus, the low NPV is only a benefit if the buyer has the ability and the will to condemn the property. Rolling easements will under other circumstances be limited to two situations I can think of: 1) pre-established covenants (Lines 8139-8147); and 2) highly conservation motivated landowners who, if tempted to donate or sell such an easement, are likely to donate or sell a much more comprehensive conservation easement or the fee instead.	A complete response to this comment requires a complete rewrite of TNC's experience. One would need to know the price offered and the terms, as well as the expectations of the landowner. Also, how did the price offered for a rolling easement compare with the price offered for a conservation easement or fee simple absolute? One must be careful to overgeneralize from one case at a particular place and point in time. . . But more broadly: in areas where shore-protection is cost-effective but a retreat is environmentally preferred, the alternative to a rolling easement is outright acquisition (or in the regulatory setting, the alternative to a rolling easement is a setback). Those approaches have their limitations as well--especially in areas where development is expected. Hopefully enough cases will emerge for a useful analysis to be published, to further the dialogue. Much of the academic literature appears focused on the question of regulation v. acquisition. Rolling easement raises a different question: can we plan around the assumption that land can be developed and later abandoned to
748	General	0	0	Pearsall	All photos should have photo credits.	Noted. Editors will take care of this before the final report is made public.
1024	Preface	12	414	Pratt	Change "expressed" to "included" and "expressions" to "terms"	Change made
1025	Preface	13	441	Pratt	Change "position" to "elevation"	Change made

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1026	Preface	13	448	Pratt	add, "-- up to ___ cm by 2100"	Addition made
1027	Preface	14	458	Pratt	Why this arbitrary about scenario by 2100?	Sea-level rise scenarios and reasoning for choosing them explained in Context section.
1028	Preface	14	461	Pratt	Citation for "conservative estimate ... model estimates"--or is this somebody's opinion?	See Context for discussion.
749	ES	0	0	Nechame n	Bill Nechamen said he thought that the impacts on the built environment are treated well in the report.	No response necessary
750	ES	0	0	Beavers	Rebecca Beavers noted that because the different chapters were written by a variety of different authors, there are stylistic differences between them. She suggested that the report receive a thorough technical edit, especially to make sure that terminology is consistently used and redundancies are eliminated in the final product.	Report edited to ensure consistent terminology and eliminate redundancies.
751	ES	0	0	Davidson	Davidson agreed with the idea of a technical edit and suggested further that particular attention should be paid to making the executive summary comprehensive but digestible.	Executive Summary has been rewritten/reorganized
752	ES	0	0	Schultz	Gwynne Schultz raised a questions as to which information was included in the report, specifically with regard to a cut off date for publication, and how the authors determined scientific consensus. Jim Titus responded that the cut off date was when the public review draft of the report was released, so many of the references are from January 2008. He noted further that he thought in certain cases, scientific consensus may have emerged through preparation of this document.	No response necessary
753	ES	0	0	Pearsall	Sam Pearsall suggested that the context section should specifically acknowledge that experts have published opinions that are different than what is considered the worst case in the report, and more generally that the scientific community does not agree on what the worst case is. Davidson added that while reference is made to the Intergovernmental Panel on Climate Change (IPCC) noting that the data is deemed to be conservative, specific studies should be cited to strengthen that point. Williams will revise accordingly.	Agree, changes have been made.
754	Context	31-32	0	Pratt	Tony Pratt noted that the text pertaining to landforms on pages 31 and 32 is more pejorative than the associated technical text and that these sections should be better synchronized. Jeff Williams responded that these sections would be reviewed and revised accordingly.	Done
755	Context	0	0	Schultz	Schultz suggested that the authors add interpretive contextual language to Figure C-2, that indicates the current state of affairs. Ben Gutierrez will clarify.	Done
1031	Context	31		Pratt	Pratt's note on left side of page cut off, see PDF	Comment not clear. No change.
1029	Context	31	804	Pratt	Line 1100-1101 here?	Comment not clear. No change.
1030	Context	31	809-810	Pratt	does not agree with Fig. C.1	ok
1032	Context	31	814	Pratt	sea level has risen over the last 14,000 years	Changes made.
1033	Context	31	816	Pratt	shouldn't we include a mention of the other forces that result in shore erosion and landward movement-- storms, sediment movement and sinks?	Agree, text has been changed.
1035	Context	32	826-	Pratt	pejorative statement not good science; use could, may, etc.	ok
1034	Context	32	827	Pratt	"increase in melting"	ok
1036	Context	32	834	Pratt	compare to... [historical trend?]	ok
1037	Context	32	838-839	Pratt	citation	ok
1038	Context	33	849-850	Pratt	assumes no adaptive mgf?	yes
1039	Context	34	877-	Pratt	Kraft -- citations: citation to graph needed	ok
1040	Context	35	879	Pratt	"most credible and comprehensive" according to whom?	ok
756	Context	35	886	Schultz	Figure C.2 is confusing. Please revise.	Done.
1041	Context	37	962-964	Pratt	This will reduce storm impacts to the Mid-Atlantic region to fewer Hatteras 'bombs'	ok
757	Context	41	1053	Schultz	Figure C.5 -- We have used this figure in various presentations and the audience usually asks why the meters start at a minus number instead of zero. It may help your report if you provide that information.	Not sure of the reason for the comment, but hopefully the figure is clearer.

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758	Context	41	1058	Pearsall	Section C.2.1 - I think evaluating a 10 mm/year "worst case" which combines a base case of 3 mm/year average for the study region with 7 mm/year increase is probably too optimistic. However, I think it is likely the worst case for which we can plan. I'm not asking for the report to respond to the real worst case, but I do think the report should generally acknowledge that Jim Hansen and others now think we have a higher than even chance of experiencing an increase of 40+ mm/year averaged over the next 100 years.	Agree. We have to stick to the 3 scenarios, but discuss that higher rates are real possibilities.
1042	Context	43	1100-1101	Pratt	state up front	This point is now stated early in the Context section.
1043	Context	44	1119-	Pratt	redundant with earlier text	ok
1044	Context	45	1150	Pratt	more objective than the earlier sections--consistency!!!	Context has been revised to remove any subjectivity
1045	Context	46	1169-	Pratt	compare to lines 847-850	Comment not clear. No change.
1046	Context	46	1172	Pratt	"shoreline change does not occur directly as a result of sea-level rise" -- good!	ok
759	Context	48	1212-14	Schultz	Should this statement be included in the beginning of the report instead of page 48?	no
760	Context	49	1229	Schultz	With regard to the terms "mitigate" and "adapt": The coastal zone management community uses the term adapt when referring to those actions that reduce the impact of sea level rise. Mitigate refers primarily to the reduction of greenhouse gases. This report should use the term "adapt."	Both terms are used
761	Context	49	1246	Schultz	"...management practices, economic setting..." should be deleted from the list of "...effects of climate change..."	Agree, change made.
1047	Context	49	1246	Pratt	warmer weather overall and a northerly migration of species	Comment not clear. No change.
1048	Context	50	1248-	Pratt	well stated!	No response necessary.
762	Context	50	1261	Schultz	Please clarify: "Follow-on efforts will examine..."	Corrected.
763	Context	51	1275	Schultz	Please clarify "increased storms." Are you referring to intensity?	yes, not frequency
764	P1	0	0	Pearsall	Pearsall suggested that Section 1.3 include a simple summary of findings. Beavers agreed adding that the section contains a lot of acronyms.	The text with the acronyms was moved to Chapter 3. The Part Overviews are designed to introduce the material of each part. The summary of findings is provided in the Executive Summary and at the beginning of each chapter in each part. Consequently, no summary of findings was added to Part I Overview.
765	P1	0	0	Pratt	Pratt encouraged the authors to clarify the difference between changes in tracking versus frequency versus intensity of storms.	The discussion of future storminess has been revised according to the findings in SAP 3.3. The discussion of this topic is generally confined to the Context Chapter in this report.
766	P1	58-59	1481-1492	Beavers	The use of acronyms in the Wetlands Sustainability section should be replaced by a simple summary of the report findings related to wetlands.	The description of geomorphic settings, which included acronyms, was removed and placed in Chapter 3. The role of the several Part Overviews is to introduce the topics covered in that part, not to provide a summary of findings, which are provided in the Executive Summary and at the beginning of each chapter.
767	P1	59	1482-1492	Pearsall	technical terms need explanation, e.g. thalweg, transgressive, back barrier.	The text where these terms were used was removed from Part I Overview. The term thalweg was removed from the report, and the term transgressive was replaced by landward migration, inland migration, or some similar descriptive term. The use of technical terms was reviewed for the entire report.
1122	1		102-111	Pearsall	should include aerosols (salt spray)	there was no mention of aerosols in any of the 3 references cited for this list
1123	1		236	Pearsall	should specify "horizontal" resolution and generally horizontal and vertical resolution should be better distinguished throughout.	text edited to address this suggestion
1124	1		Line 827 et seq.	Pearsall	Text box 1.1 should distinguish between figure 1.4A and 1.4B. So should the figure label and caption. The explanation of this wonderful illustration is very poor. It took me a minute to figure out what I was actually looking at. That said, with adequate labeling, the figure is an outstanding illustration of an important point. I hereby request a high-resolution JPG of same.	text edited to address this suggestion
1125	1		1453	Pearsall	should show the NAVD 88 line in bold or otherwise plainly indicate that it is the baseline.	NAVD88 is not always the baseline used in SLR studies, so it would be misleading to single it out here

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1126	1		1459 et seq.	Pearsall	Table 1.3 should include Poulter and Halpin 2007. Generally, the argument against the bathtub approach appears over and over, and it is quite true in the sense that it is presented. But while the bathtub model is very imprecise, it really is a cheap, good, and spatially extensive / comprehensive first cut. Closer looks at the punctuated equilibrium that characterizes the very local interfaces between SLR, erosibility, and accretion will take years, will lose relevance almost as they are done, and will in the end not yield dramatically different results. I strongly discourage any suggestion that planners should not begin making decisions now using best available data, e.g., bathtub models. I have recently had the chance to compare a high resolution run of the SLAMM model versus Ben Poulter's LIDAR-based bathtub model on the Albemarle, and while the former produces a more fractal edge and yields much higher precision, I'm left wondering "to what end?"	the study is cited several times later in the chapter; it is more of a study on techniques and thus is not the same as the others in the table
1127	1			Pearsall		the chapter really does not make an argument against the "bathtub" approach; instead it makes recommendations to use better and more accurate data in such an approach and to specifically account for the vertical uncertainty of elevation data used in such analyses
1128	1			Pearsall	See also my comments on the CESLAC report about hyper-precision in the face of gross uncertainty.	not sure what is meant here, but this may not be applicable to Ch. 1
1129	1			Pearsall	That said, I do share the authors' enthusiasm for LIDAR and a national LIDAR-based DEM. It would have many virtues (including better bath-tub models!). It could be done very quickly, and compared to many of the other ways we seem to be hemorrhaging money, it would be very cheap.	agreed; the chapter does show how lidar data use improves "bathtub" models
1130	1			Pearsall	And all of that said, I found this new chapter to be incredibly informative, potentially useful, and very much in need of editing to remove redundancy. Some ideas come up over and over.	at least 2 other FAC members commented that they saw no redundancy problems, and that some repetition is necessary to emphasize key issues; because no consensus came from the FAC on the redundancy issue, no changes were made based on the comment
1131	1			Beavers	CCSP 4.1 Chapter 1 is a very informative chapter and well-written. Several key points are emphasized multiple times and in multiple ways, hence my earlier discussion of redundancy. Given the author's statement today that the introduction is intentionally repetitive, these statements may not need to be changed to meet the authors' desired effect of repetition to reinforce some concepts. I have highlighted some areas where some data topics are covered multiple times. Lidar is given a separate section in this Chapter and discussed throughout the text.  Inundation Key Findings, bullets 1-4 1.1, multiple paragraphs 1.3.4, paragraph 2 1.3.4, item 5 1.4, item 1 1.5, paragraph 4  Lidar Key Findings, bullet 10 1.1, paragraph 8 1.2.2, Lidar Elevation Data 1.3.4, item 3 1.4, item 2 Text Box 1.1 1.5, paragraph 4	yes, some important concepts discussed later in the chapter were also purposely mentioned up front in the introduction section to highlight them in case a reader looks in detail at only the introductory material; at least 2 other FAC members commented that they saw no redundancy problems, and that some repetition is necessary to emphasize key issues; because no consensus came from the FAC on the redundancy issue, no changes were made based on the comment
768	1	0	Section 1.3	Pearsall	Section 1.3 seems needlessly complicated in its approach. The message is simple -- that there is much less land available for new estuaries than is occupied currently by estuaries.	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
769	1	62	1544-48	Schultz	The information in the "Key Findings" section should be able to stand alone. Therefore, please clarify that you are referring to the ocean (vs. bays and estuaries) coast of the Mid-Atlantic. Also, please define "low-lying land."	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
1049	1	64	1582	Pratt	"wetland vertical deposition"	Rewrite of Chapter 1 has addressed the collective comments made on the original text.

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770	1	69	1663	Schultz	Does the entire report (or just this chapter) use the "spring high water" reference?	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
771	1	76	1785	Schultz	Table 1.2 should be simplified.	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
772	1	83	1869	Schultz	Tables 1.3a, b and c should be simplified.	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
773	1	85	1884-1885	Pearsall	Why are NC data poorly suited...? Needs explanation.	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
774	1	87	1917	Schultz	Table 1.4 should be simplified.	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
775	1	88	1918	Schultz	Figure 1.5: The use of the word "vulnerability" in the legend seems out of place as it relates to the rest of the message.	Rewrite of Chapter 1 has addressed the collective comments made on the original text.
776	2	0	0	Beavers	Beavers asked the authors to include long shore and cross shore currents in the discussion of physical properties.	The discussion of physical properties has been revised to describe the importance of nearshore currents.
777	2	0	0	Pratt	Pratt questioned whether there was enough emphasis on the roll of sediment sinks in coastal systems, and enough discussion of sediment supply and estuaries as sediment sources. Further a better understanding of sediment volumes should be included. Davidson added that the report should address how greater intensity of storms could impact this issue. Beavers stated that it is important to address the issue of regional sediment management. What the policy implications are, how to prioritize off shore sand resources, and sediment transport on a regional scale are all issues that should be addressed.	The sections on 'Sediment Supply' and 'Human Impacts' have been revised to mention the effects of tidal inlet management on sediment sinks. A section on Regional Sediment Management was added to Chapter 5. At present, we are unable to expand on how increasing storm intensity could affect the sediment budget as there is not an adequate basis in the literature at this time.
778	2	0	0	Beavers	Beavers stated that the discussion of threshold behaviors in section 2.7 is good.	Noted.
779	2	0	0	Schultz	Schultz asked whether it would be appropriate to include a discussion of the potential impact on wind power in the region. Davidson indicated that this might be an appropriate area for further research to be mentioned in the federal advisory committee (FAC) report.	Noted.
1050	2	93		Pratt	Should this be prefaced with... in the absence of any human intervention to offset natural forces?	We considered this caveat earlier in the writing process but felt that it could be interpreted as a policy recommendation.
1051	2	95		Pratt	sediment sinks	The importance of sediment sources and sinks is described in section 2.4.3, but refer to this generally as 'sediment availability' in this section.
1052	2	97	2151	Pratt	Delmarva Coastal Management rep?	Dr. Art Trembanis from the of Univ. of Delaware represented Delaware as a coastal geologist.
1053	2	100	2214	Pratt	sediment sinks natural and artificial	We've attempted to address the importance of sediment in terms of 'sediment supply' or more generally as 'sediment budget'. Section 2.4.3 briefly describes the importance of sediment availability in natural systems while section 2.4.4 briefly addresses the affect of human impacts on the sediment budget.
1054	2	101	2243	Pratt	wave ref. diff	Wave processes are treated in section 2.4.2.
780	2	102-103	2260-2279	Beavers	The discussion of nearshore currents should include a discussion of the role of longshore and cross-shore currents and their relationship to sediment transport pathways.	We have revised the section on physical processes in section 2.4.2 to explain very basically the importance of waves and tidal currents in nearshore settings.
1055	2	103		Pratt	should include sediment sink discussion and discussion of sand moving from one area to another with perhaps system quantity balance	Sediment sinks are described in terms of the overall sediment budget of a coastal area.
1056	2	104	2302	Pratt	and practices such as inlet stabilization or creation	See chapter 5.
1057	2	104	2305	Pratt	The principle behind adding sand to the beach is expressed in lines 2284 and 2285	Noted.
1058	2	106	2236	Pratt	sediment sink example	Noted.
1059	2	109	2405-2406	Pratt	Nikiting et al 1999?	We note the reference to Nikitina et al. 2000 regarding relative sea-level rise in Delaware. The discussion of sea-level rise has been moved to the Context chapter to reduce redundancy and shorten the report.
1060	2	111	2242	Pratt	if bluff erosion is a significant supply of littoral sediment	Over the long-term, the erosion of headland portions of the coast along Montauk, Monmouth Co. New Jersey, and along Delaware are thought to supply sediment to sustain adjacent beaches and barrier islands (e.g., Kana, 1995; Schwab et al., 2000)
1061	2	111	2246	Pratt	"storm overwash may occur more frequently" - ??? Based on an assumption of more frequent storms or the next sentence conclusion	Paragraph revised for clarity.

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1062	2	112	2460	Pratt	What about the statement in line 962-964 - Northeasters may track more northerly - less overwash?	IPCC results suggest that extra-tropical storm tracks may be more northerly; there is also some discussion concerning potential changes in the number of extratropical storms. For both northeasters and hurricanes, there will still be the potential for overwash during storms as sea-level continues to rise.
781	2	112	2461	Schultz	I thought recent studies made the connection of climate change and hurricane intensity?	The discussion of future storm trends has been revised and placed in the Context chapter. Revision is based on the findings of recent IPCC and CCSP reports. These reports suggest a link between increasing sea surface temperatures and storm intensity, but also state that the potential for this trend to continue and become more pronounced is debated.
782	2	112	2463	Pearsall	shouldn't it be "limit the strengthening of"	This discussion has been revised and this phrasing has been removed.
783	2	113-119	2493-2551	Beavers	The discussion of threshold behavior has important implications for land managers responsible for stewardship of these areas.	Noted.
1063	2	114	2515	Pratt	modifiers before "sea-level rise"	Noted.
1064	2	115	2539	Pratt	A product of littoral interruption by a stabilized inlet -- how many [ ] embargoes in [ ] shoals?	The case of Assateague Island is discussed more thoroughly in the text box 2.1.
1065	2	116		Pratt	Mgt. emphasis on building and maintaining a frontal dune and [ ] that eliminates overwash compromises the ability of back-bay marshes to elevate in time.	Noted.
					I find little discussion of two facts that seem plain to me: 1) the process by which SLR overwhelms marsh accretion is a punctuated equilibrium process; that is, accretion and SLR are not very far apart, but during storms, large areas of marsh can disappear; and 2) the public perception of this process is that the storms are "disasters," and the disappearances of marsh are "erosional events" that are not recognized as the periodic manifestation of SLR. A paradigm shift is needed before people can actually see this situation as the inevitable result of SLR.	To clarify the gradual manner by which a marsh surface falls behind sea level and eventually becomes submerged, we revised the first paragraph of Section 3.2. The new text clearly spells out the gradual nature of the change in marsh elevation relative to sea level. We also added a section of text (section 3.3) on wetland migration that describes the relationship between sea level rise, vertical accretion, erosion of the marsh seaward boundary, and inland migration. We did not use the phrase punctuated equilibrium to describe either process of wetland loss (vertical accretion deficit and shore erosion) because we felt that would introduce jargon that would not lend any further clarity to the issue.
784	3	0	0	Pearsall	Pearsall suggested that the introduction to Chapter 3 should include a discussion of accretion and sea level rise as a punctuated process of equilibrium, and issues of public perception associated with this timing (e.g., that the public tends to think of disasters as opposed to a gradual deterioration). Davidson suggested moving discussion of this up to the executive summary. Carl Hershner thought it would be helpful to note Ramsdorf here.	Pearsall, see response to comment #1 above. Davidson, we did not add a discussion of punctuated equilibrium to the Ex Sum for the reasons stated in comment #1. Hershner, we did not add Ramsdorf here, because the projected rates of slr are presented in the Context chapter, to which Chapter 3 refers.
785	3	0	0	Pearsall	Pratt asked whether changed climate would result in greater biomass production. He suggested that this could be an issue for further investigation.	Increased CO2 and temperatures, along with changes in freshwater and sediment inputs, and salinities could affect biomass production. Generalizations about productivity (i.e., systematically increase biomass across the marsh) are difficult to make given the wide variation in biomass within a marsh, variations in local settings, and the range of wetland types. See response to comment #17. We added text on the influence of climate change on organic matter accumulation in response to comment #10. So clearly, as we have indicated in the text, this is an area for future investigation.
786	3	0	0	Pratt		
787	3	0	0	Pearsall	Pearsall reiterated the need for a careful read through to address redundancies and suggested that some of the description of simple points is too elaborate. Hershner added the authors should consider the value of the section on case studies.	Pearsall, the redundancies have been removed as a result of the revision of Chapter 1 and the integration of all wetland text into Chapter 3. Hershner, the authors agreed to keep the case studies. The expert panel approach provides findings of low to moderate confidence that could not be obtained today in any other way. The strengths and weaknesses of the expert panel approach are clearly described in the chapter. Additional references have been provided to support the panel's findings, including those regarding tidal fresh marshes.
788	3	0	0	Davidson	Davidson said she liked the section on data needs in this chapter.	The section on data needs was retained in this chapter.

Comment	Section	Page	Line	Reviewer	Comment	Response
789	3	142	Table 3.1	Pearsall	I would add green ash to the list of dominants for nontidal forests. Conspicuously absent from this table are nontidal pocosins (waxy-leaved shrubs and small trees and Smilax on saturated peat soils, often with emergent pond pines and cohort stands of Atlantic white cedar). The islands at the mouth of the Lower Roanoke and most of the Alligator River NWR in NC are great examples.	Green ash was added to the list of dominants of nontidal forests.
790	3	145	3068 et seq.	Pearsall	I think the role of dams and their regulation of flows should be more thoroughly addressed here. Dam operations may limit sediment transport, increase erosion, move bed load sediments less or more than normal, and increase or decrease the salinity of the estuaries at the mouths of rivers. Ditto impervious surface in the upstream watershed. These two influences are often profound and are felt in almost all east coast estuaries.	Text describing the influence of flow regulation (i.e., dams and impervious surfaces) was edited out of earlier versions. References to dams and impervious surfaces were added back to the introduction and section 3.2.2. Warmer climates will affect plant growth, as this chapter describes, which in turn could hypothetically affect wetland elevation. It is difficult to generalize about biomass production, however, given the wide variation within a marsh (barren to > 2,000 g/m2), regardless of climate change. Temperature and its affect on plant production is only one of many factors affecting long-term wetland survival.
1066	3	146	3106	Pratt	Will a warmer climate result in greater annual biomass production?  need reference(s)	The sentence was revised to clarify that the factors are suggested contributors to marsh dieback: "There likely are biotic factors, in addition to insufficient accretion, that have been suggested to contribute to sudden marsh dieback, including fungal diseases and overgrazing by animals such as waterfowl, nutria, and snails. Interacting factors may cause marshes to decline even more rapidly than we would predict from one driver such as sea-level rise." There are few publications on these factors, and other than the websites cited in the previous sentences. Comment not clear. No change.
791	3	149	3147-	Pearsall	"Wetlands identified as marginal or lost..."	We believe sentence is clear as stated; the suggested change was not made.
1067	3	157	3287	Pratt	change "at" to []	This suggestion has been passed on to the editor.
1068	3	158	3285	Pratt	is very important and should be expanded to the entire page for legibility.	Due to space limitations, a figure was not added.
792	3	164	Figure 3.3	Pearsall	need an illustrating figure.	With the exception of one or two marshes on the Atlantic coast (for example North Inlet marshes in South Carolina (Morris et al. 2002)), we do not know this threshold. The Morris model estimates that North Inlet marshes can tolerate a four-fold increase in sea-level up to 12 mm/yr.
793	3	166	3414-3423	Pearsall	Do we know the threshold of daily tidal inundation Mid-Atlantic wetlands can endure? This may be an indicator of future # of years of marsh productivity.	Given the sheer magnitude of state-listed species, we instead provide the reader with a table describing how to obtain NHP data for each of the mid-Atlantic states. (Box 4.2 in text)
1069	3	171	3517	Pratt	generally, this is a good chapter. However, the Natural Heritage Programs for all the states in the study should have been asked to provide lists of federal and state listed species at risk in each of the covered habitats. They can do that easily, and the resulting tables sorted by habitat and state would be very useful. Is it too late to take this simple step? Listed species can motivate action for conservation when other species can't.	Given the sheer magnitude of state-listed species, we instead provide the reader with a table describing how to obtain NHP data for each of the mid-Atlantic states. This includes a discussion of the Nature Serve search capabilities. (Box 4.2 in text)
794	4	0	0	Pearsall	Pearsall suggested using natural heritage program data in this section because it offers a unique blend of state and federal vulnerable species listings and substituting some identification of vulnerabilities into the habitat discussion. This comment was seconded by Hershner. Thus questioned the appropriate place in the document to include such a discussion. Pearsall encouraged a by habitat listing of species in this section. He suggested that the authors ask states to pull together such information but noted that this could also be accomplished by contacting Nature Serve (www.natureserve.org).	Revised to state "in many cases, shore protection will reduce available sediment."
795	4	0	0	Pearsall	What about shore protection that adds sediment to the system?	Revised to state that other sensitive habitats may be encroached on, which won't be able to migrate due to further inland development (e.g. marsh encroaching on hardwood swamp, which might back on developed areas.)
1070	4	180	3733-3737	Pratt	Isn't this the background condition?	
1071	4	180	3740	Pratt		



Comment	Section	Page	Line	Reviewer	Comment	Response
1072	4	180	3745-3751	Pratt	is there a net biological loss or a change in opportunity for species? One niche replaces another	Implication was that degraded habitats (such as marsh undergoing rapid submersion) would not be able to export productivity at the same rates. No change.
1073	4	181	3770	Pratt	"how sea-level rise and shoreline hardening" -- is this automatically hand in hand?	No, but paragraph was intended to address the cases where they do occur hand in hand, in which case they may have additive impacts on nearby habitats. Language clarified.
1074	4	181	3775	Pratt	"shore protections" supposedly synonymous with hardening?	No, shore protection was not intended to be synonymous with hardening. There are few studies that address both sea level rise and any types of shore protection together. Language clarified.
796	4	181	3786-3787	Pearsall	I have no particular reason to believe this statement is true. Why are salt marshes more threatened than beach and dune environments or near shore submerged environments? References needed.	Statement eliminated during editing.
1075	4	186	3851	Pratt	"mammalian predators" -- fox?	Added "such as red fox and raccoons" in parentheses
1076	4	190	3923	Pratt	will new islands be created just as they have historically as uplands []?	Nobody has indicated that they are being formed - just that current islands are being lost. But it's a good point.
797	4	190	Figure 4.4	Pearsall	looks like swamp black gum to me. I can provide a picture of cypress along the Roanoke. The text implies that the photo might also include pocosin, which it definitely doesn't. I can provide an image of pocosin if needed.	Images added.
1077	4	194	4016	Pratt	"revetments" -- or vertical walls rubble revetments usually dampen wave energy	Yes - revetments was not the intended type. All three references discuss bulkheads or sea walls.
798	4	195	4040-41	Schultz	The statement regarding the cost for these projects should be revisited. Although a very limited survey conducted by Maryland Department of the Environment indicates that in some cases, nonstructural projects could end up costing less than structural projects, the Department of Natural Resources advises that in general, construction costs for nonstructural projects are about 20% higher than construction costs for structural projects.	We indicate that costs may be lower or higher. Source of data in document was MD DNR.
799	4	198	417	Pearsall	caption is too flip. The bulkhead is the subject.	Agreed.
1078	4	199	4112-4113	Pratt	"Areas with bulkheads ... straight line." ???	This sounds much clearer if you have the picture from the article in front of you. Section eliminated as part of editing.
1079	4	199	4117	Pratt	"armored" should be bulkheaded [?]	Yes, change made.
1080	4	200	4125	Pratt	"if there are sufficient sources" and political/economic will to do so	Yes, duly noted.
1081	4	200	4126	Pratt	opportunity to link with navigation projects	Comment not clear. No change.
1082	4	202	4162	Pratt	Also eliminates [] sed. source for beach and littoral system	Yes, added that aspect to discussion.
1083	4	202	4168-4171	Pratt	as well as reduction in beach sediment	Yes, added that aspect to discussion.
1084	4	203	4195	Pratt	will SLR create more islands? We need to identify where this may happen and protect future islands	Brief discussion added noting that no information is available about this.
800	4	211	4394	Pearsall	Here and in the places this reference is cited, the acronym should be VNHP, not VNHR.	Change made.
801	P2	0	0	Pratt	Pratt indicated that he liked that overview to Section II.	n/a
1085	P2	213	4431	Pratt	Good tone -- intro should follow this tone	n/a
1086	5	219	4558	Pratt	or what societal expectations might be in the coming decades	moot. This paragraph was dropped as part of the chapter revision.
1087	5	220	4576	Pratt	"rather than the shore itself" -- adding sediment to replace lost sediment	Passage has been edited.
1088	5	221	4583	Pratt	"elevating land surfaces" -- nourishment?	Nourishment is an example of elevating--as detailed in subsequent section.
802	6	0	0	Schultz	Schultz noted that different sections of the report describe different scenarios differently. Titus noted that sometimes different parameters were used in reference to different questions because they were more applicable to the relevant issue (e.g., some chapters look at rates of sea level rise [SLR] while others look at magnitude). Steve Gill said he would ensure things were cross referenced appropriately.	scenarios used have been simplified to just a 100 cm rise -
803	6	0	0	Garcia	Andrew Garcia noted that the discussion of populations in section 6.2 seems to talk about a magnitude but says rate.	text edited to reflect this point
804	6	0	0	Necham	Necham suggested that the authors expand the discussion of human health and safety. In particular it is important to note where evacuation routes will no longer be available.	references added that discuss human health and safety
805	6	0	0	Hershner	Hershner recommended that the authors try and make tables and data in this chapter simpler, because the basic five points the chapter is trying to make get lost in the appropriate referencing of uncertainty. Schultz agreed.	tables have been greatly simplified

Comment	Section	Page	Line	Reviewer	Comment	Response
1089	6	240		Pratt	might want to repeat intro to caveats	caveats have been added throughout chapter
1090	6	240	4943	Pratt	"may potentially be affected"	edited
1091	6	241	4976	Pratt	"impacted" – what?	Chapter no longer includes this statement.
806	6	243	5000	Schultz	Figure 6.1 – the label Existing Actions on Shore Protection ...are they really existing or should it be titled Likely Actions on Shore Protection? See line 5067.	shore protection analysis has been eliminated from the discussion and the figure
807	6	247	5140	Schultz	Table 6.1b – This table should be simplified.	tables have been simplified
808	6	253	5174	Schultz	Define the standard estimate.	standard estimate eliminated from tables
809	6	258	5183	Schultz	Table 6.5 – Can the numbers be rounded to the nearest whole number?	numbers have been rounded
810	6	265	5266	Schultz	Correct the following statement: "...increase in the number of hurricanes..."	section deleted
1121	6	0	0	Crowell	In Chapter 6 (and anywhere else in the Report if happens to be there), I strongly recommend that you remove any reference to the Crossett population report (and the 53% of the population lives in coastal counties) and accompanying datasets. The Crossett "coastal county" dataset is based on the presence of coastal watersheds and includes way too many counties that would not be directly impacted by rising sea levels (please see my attached editorial published in the Journal of Coastal Research). The Culliton population numbers and data (for example, the table on page 5 of chapter 6) DO NOT belong in this report!!	Crossett tables have been removed. Crossett statistics are now in appropriate context to characterize the socioeconomic stressor that population patterns are projected to bring to the coast and are not characterized as the counties and populations that will be at directly at risk to inundation. The Crowell et al paper is referenced and the definition of a coastal county in that study is explained.
811	7	276	5493-5498	Beavers	Beavers noted that the last two sentences with reference to public trust doctrines on lines 5493-5498 are unclear.	Sentences clarified.
1092	7	277	5527	Pratt	very limited in Delaware	Unclear what reviewer was suggesting, but text does explain that Delaware is a low water state.
812	8	0	0	Garcia	Garcia asked that the authors address the effects of waves and storm surges. Section 8.1 mentions the highest water level during a hurricane, but it might also make sense to mention the increased frequency of extra-tropical storms (nor'easters) because they tend to last longer. Nechamen noted that the impacts of nor'easters are generally felt in bays where water can get in but not out.	added text and references
813	8	0	0	Nechamen	Nechamen noted that the costs of flood mapping are based on 1991 figures, which have become much greater in the interim. Crowell will try and find an average price per county for flood mapping.	crowell added subsequent information
814	8	0	0	Crowell	FEMA will be conducting a \$500 thousand study to look at how climate change will impact flood insurance, which will start by the end of 2008.	text added
815	8	288	5749	Crowell	need to insert a reference for the 1991 FEMA study. Suggest (even though it is redundant): "in a 1991 FEMA study (FEMA, 1991), it was found..."	edited to include point
816	8	288	5749	Crowell	Page 288, line 5749 and the box on pages 301-302, an SLR data clarification was provided and it was noted that the summary fails to discuss the conclusions, which should be included.	edited to include conclusions
817	8	288	5749-5759	Crowell	the summary notes that, from the 1991 FEMA study, sea level rise and projected population increases would result in a significant increase in flood damage and related increases in flood insurance rates. One thing that is not mentioned is that the 1991 study concludes that (from the executive summary) "Based on these findings, the aspects of flood insurance rate-making that already account for the possibility of increasing risk, and the tendency of new construction to be built more than one foot above the base flood elevation, the NFIP would not be significantly impacted under a 1-foot rise in sea level by the year 2100. For a high projection of a 3-foot rise, the incremental increase of the first foot would not be expected until the year 2050. The 60-year timeframe over which this gradual change occurs provides ample opportunity for the NFIP to consider alternative approaches to the loss control and insurance mechanisms of the NFIP and to implement those changes that are both effective and based on sound scientific evidence. Because of the present uncertainties in the projections of potential changes in sea	summary added to text box
818	8	288	5754	Crowell	"58 percent" should actually be "36-58 percent" and "200 percent" should actually be "102-200 percent."	edited to include point

Comment	Section	Page	Line	Reviewer	Comment	Response
819	8	299	5959	Crowell	The text states: "Given the potential for increased flooding with rising sea levels, there is a need for floodplain maps that take sea-level rise into account." This statement is somewhat simplistic. Why is there a need for FEMA (through the NFIP) to produce floodplain maps that take sea-level rise into account? As noted above, the 1991 study concluded that "there are no immediate program changes needed." Also, we periodically revise our FIRMs to reflect new engineering, scientific, and imagery data. In addition, under Map Mod and post-Map Mod FEMA intends to assess the integrity of the flood hazard data by reviewing the flood map inventory every five years. Where the review indicates the flood data integrity has degraded the flood maps, updates or new studies will be performed. In any event, whenever we update or remap coastal areas, changes that had occurred in the interim due to sea level rise will be accounted for. It is important to note, however, that the upcoming Impact of Climate Change on the NFIP study (scheduled to begin at the end of fiscal year 2008 and last 1.5 years) may come up	the text has been revised to reflect this input
820	8	299	5969	Crowell	Page 299, line 5969, the authors were encouraged to expand this section. It should specifically address why flood plane maps should take SLR into account. FEMA cannot make requirements based on future conditions and the text should address what the agency realistically can and can't do.	text edited to account for this suggestion
821	8	301	Box 8.1	Crowell	The title of the report should be noted somewhere within the box.	added title in Box
822	8	301	Box 8.1	Crowell	The text that reads "This would lead to actuarial increases in insurance premiums for building subject to sea-level rise of 58 percent for a 1-foot rise and 200 percent for a 3-foot rise," should actually be "This would lead to actuarial increases in insurance premiums for building subject to sea-level rise of 36-58 percent for a 1-foot rise and 102-200 percent for a 3-foot rise."	text changed per comment
823	8	301	Box 8.1	Crowell	Overall the box provides a detailed summary of the report, but again misses the most important aspect of the study—the conclusions! See comments for lines 5749-5759, above. Recommend including a summarization of the conclusions in this box.	conclusions added to text box
824	8	306	0	Pratt	Pratt liked the no adverse impacts concept discussion on page 306, and noted that it should look at the addition of some "free board" to the established 100 year flood level. Value to taking into account future levels and then surge on top of future levels. Section 309 opportunities under the coastal enhancement program should take into account SLR paying particular attention to the issues discussed in this meeting. The same is true of the 309 enhancement grants.	this comment is noted and referred for discussion in policy chapter
825	8	311	6148-6149	Crowell	sentences read: "When FEMA remaps an area, they take into account subsidence and erosion as they exist at the time of the study. However, future conditions subsidence and erosion are not considered." Recommend adding the following to the end of this passage: "as this would require statutory and regulatory changes to the NFIP."	this phrase has been added to the end of the sentence
826	8	313	0	Nechame	Nechamen also noted in reference to page 313 that while the Federal Emergency Management Agency (FEMA) conducts a flood mapping inventory review every 5 years, it has not been done well in the past, and the picture is more complex than what is presented in the text. Crowell said the goal is to improve that program in the future.	this has been revised per Crowell recommendations to reflect this
827	8	323	6436	Schultz	Date for the final report has been delayed to July 2008. Please revise.	revised
828	8	325	6453	Crowell	"Mike Crowell" should be "Mark Crowell."	edited out
1093	P3	329	6532	Pratt	"without regard to the fact" – You don't know this... it may just be an accepted risk. The investment profit supports building in the threatened coastal zone.	This is a neutral statement that does not say whether development should or should not take place. But actually, the three chapters described in this brief overview show that those who erected the settlements were not considering the fact that the sea is rising. In fact, there is substantial evidence that until tide gauges were installed, analyzed, and results widely discussed, most people did not even realize that the sea was rising—much less factor it into the design of coastal development
1094	P3	330	6551	Pratt	"additional monetary and political cost"	no change made. Chapter 9 focuses on economic cost, not political cost
829	9	0	0	Pratt	Pratt stated that in all likelihood there will be an increasing willingness to expend more money for shore protection that is not evident in this report.	Reviewer's comment referred to Chapter 5. Originally Chapter 5 presented the results of the EPA planning study, which is no longer discussed in the report. We have no other report to readily justify the reviewer's hunch, even though the author agrees it is probably correct.

Comment	Section	Page	Line	Reviewer	Comment	Response
					Overall, Mark Crowell's concerns about Chapter 9 were mostly about how the NFIP is explained. To a large extent, the "errors" he refers to resulted from author's attempt to explain the program to someone not well-versed in the program. Hence, the draft often says that "rates do not rise" when we mean that rates do not rise directly as a result of sea level rise. We also say "rates are fixed" or "rates do not respond to sea level rise" when the more precise explanation would have said that "assumed risk in calculating the rate does not respond...". For the points that are being made here, it does not matter whether the actual rate or the assumed risk does not respond to sea level rise--the point is the same in either case. The author was hoping that by using the short-hand term "rate" he could avoid the complexity. Given FEMA's concern, the author gave up on that hope and revised the text to explain both assumed risk and rates... Even in the places where text had specifically focussed on how the risk was fixed--but not discussed rates--reviewer appears to want both discussed. Text has been discussed in chapter 5	
830	9	0	0	Crowell	Crowell suggested that the authors look again at the actuarial review done by Hayes, Spafford, and Boone. He will submit a link to Jack Fitzgerald to pass on to the authors.	
1095	9	335	6667	Pratt	best sediment management practices ". there is no need to anticipate sea-level rise in the construction of port facilities (NRC 1987)." This statement should be re-evaluated. The construction of new port facilities should take into consideration sea-level rise in their siting and elevations. In addition, the connectivity of ports to transportation systems that enable the movement of goods is essential.	
831	9	336	6688-6689	Hunkins		This sentence was clarified.
1096	9	337	6707	Pratt	["wetland protection, shore protection"] -- natural resources	No change. Text is simply enumerating the subsequent subsections of the chapter.
1097	9	337	6707	Pratt	["long-lived structures, elevating homes, and floodplain management"] -- human environment	No change. Text is simply enumerating the subsequent subsections of the chapter.
1098	9	337	6717	Pratt	"homeowners or corporations" -- and government?	Sentence revised
1099	9	337	6721	Pratt	Within this context, the idea of planning time horizon needs to be included. Homeowner and corp. seek short term investment protection and profit, while government perspective more longer visioned.	Time horizon addressed in following sections--this paragraph is simply trying to warn the reader that the economic paradigm is key to this chapter.
1100	9	337	6722	Pratt	"(for a homeowner and corporation)"	done
1101	9	338	6739	Pratt	Investment in coastal real estate is sophisticated economics. We should describe the investment expectation and list the owner benefits -- this tends directly into why short term decision making is chosen. Homeowner risk: fire, coastal storms, beach erosion, sea level rise, burglary, renter damage, functional obsolescence (lack of most modern amenities), downturn in market	Added costs to box, such as taxes and insurance. Beyond that, the box would be too complicated.
1102	9	338	6744-6745	Pratt	I don't agree with this. Check average ownership life for coastal properties ~ 7 yrs. This is a major contributor to the disconnect on long term management issues.	Added paragraph to put this issue into context, specifically addressing the ramifications of property owners having a shorter-term perspective.
1103	9	338	6748	Pratt	include [] and tax breaks from debt, also capitol gains avoidance Tony Pratt asserted that Chapter 9 is very important because it is where the report starts to give information on what to do. Box 9.1 on page 338 includes a conceptual framework with a time horizon of 50 years or more. Experience in Delaware has been that there is about a seven year time horizon for turnover in shore property, and Pratt suspects that this type of short term ownership is standard. Thus it will be important for the government to intercede in favor of shore protection. He thinks that sea level rise (SLR) is about eighth or ninth on the list of risks that homeowners consider. Pratt will submit written comments to this effect. Jim Titus responded that the authors would clarify that the 50 year time horizon is meant as a logical paradigm, not necessarily predictive of human behavior. This distinction will be clarified.	Added costs to box, such as taxes and insurance. Beyond that, the box would be too complicated.
832	9	338	Box 9.1	Pratt	in lines 6745-6750 there is a discussion on investment expectation and market value of coastal properties. While this is an important component to understanding the mind set and expectation of coastal property investors, the analysis should be more complete. It is important to the process of decision making because it help explains why it is so difficult to make changes in the way we do business based on impacts that will not likely be bad for several decades. I strongly urge that three things be considered to add to the credibility of this very important break out box.	See comment 1102
833	9	338	Box 9.1	Pratt		See comments that follow.

Comment	Section	Page	Line	Reviewer	Comment	Reponse
834	9	338	Box 9.1	Pratt	Provide a fuller consideration of the value provided to a coastal property homeowner. In addition to rental income and "imputed rent", a property owner typically gains the best return on the real estate investment dollar on coastal property through additional means such as annual tax relief when a primary residence is no longer claimed on a tax return and a second home ownership can be a tax benefit, and an investment of capitol gains when other assets sell. I have seen these cited by coastal residents as the reason they invested at the coast.	Text includes costs
835	9	338	Box 9.1	Pratt	The average turnover rate for coastal property is reported to be relatively high. I do not have a citation for this but a real estate association may be a source for the data. In any event, short average ownership duration puts issues, like sea level rise that may take decades to be a problem, fairly low on the list of property owners' concerns. Their short term concerns, which vary with location, are fire, theft, renter damages, coastal storms/hurricanes, an economic downturn in the rental/sales market, functional obsolescence of the structure, and loss of beach. Somewhere in the list sea level rise will appear, but it is not currently talked about in coastal communities as a top concern deserving immediate attention. At least acknowledging that this is a factor contributing to decision making raises the credibility of the box discussion.	Text clarified to include costs.
836	9	338	Box 9.1	Pratt	Long range decision making and policy development is up against some very real circumstances that consistently challenge resource managers dealing with long term issues. Wildlife and fisheries managers experience this all too routinely and sea level rise is faced with the same constraints. Given 2.4 and 6 year elected term periods and one year budget cycles, people in a position to allocate resources (political, human and fiscal) most often seek the short term return on expenditure. To divert political and fiscal decisions to problems that will not be realized for several decades is not currently popular. Perhaps the best (worst) example of this is the reluctance of the nation to divert funding to infrastructure maintenance. No one argues that we need to look after aging utility and transportation infrastructure but new construction still trumps maintenance nearly every time. This is the political conundrum that sea level rise management faces.	This comment is about barriers. Referred to Chapter 11. Chapter 11 Introduction revised to include brief mention of the short time horizons being a barrier.
837	9	338	Box 9.1	Pratt	I know that the points I raise are not new text to be placed in Box 9.1, but perhaps the chapter author(s) can take a point or two from this and add it/them to the box.	Changes made to text where possible
1104	9	339	6781	Pratt	or (c) where postponing the expenditure to the next owner is wise	Text addresses the question about preparing now compared with preparing later, two paragraphs later. Before looking at whether a decision is better done later, we start by excluding preparation that is not worthwhile at all.
1105	9	339	6782-6787	Pratt	depends on perspective... changes to a structure, for instance, may make it less desirable for rental or resale, compared to other structures in the same market -- who goes first?	This comment seems to apply to other text. These five lines are simply making the very generic point that the administrative costs are greater than the benefit of preparing for a tiny rise in sea level.
1106	9	342	6838	Pratt	9.1.1. short description of each bullet	Done. Mauriello comments led to additions to last two bullets.
1107	9	342	6840	Pratt	9.1.2. more descriptive... are these subtly preferred?	No--these items just were less self-evident.
1108	9	342	6844	Pratt	this is not []	Comment garbled?
838	9	342	6844-6849	Pratt	The discussion on setting a new home back is not real, as observed by this 28 year coastal construction regulator. My front line experience is that home equity equates to having a view as good as you neighbor. That means 180 degrees. Being the only, or one of a few, home/s that is/are landward of the plain established by existing homes is considered by property owners to be a detriment to their enjoyment, the rent-ability and resale value of the house. Construction setbacks make complete sense but have become increasingly difficult to newly enact. This response does not necessarily cost "little or nothing" and "makes sense even if the sea does not rise (lines 6842-6843).	Added "panorama" to clarify that we do not mean simply the two houses on either side. Changed "even if the sea does not rise" to "less than expected.
839	9	343	6858-6859	Hunkins	Change to: "Building the bridge higher initially is inexpensive compared with rebuilding it later." [Add "initially" and "later".]	done
1109	9	343	6859	Pratt	this is also a [] approach to land use	Comment unclear.
1110	9	343	6858-6859	Pratt	Depends on the expected life service of the original construction -- can we hind cast this assumption?	The statement as written is true. If we had more space, we could discuss the detail that the reviewer mentions, which is that the extra expense may not be worthwhile if bridge has relatively short lifetime--but we deal with that issue elsewhere in the chapter.

Comment	Section	Page	Line	Reviewer	Comment	Response
1111	9	344	6876-6879	Pratt	it [] a stronger instrument--administrations, congresses, legislatures etc. changes very often and policies can change too easily	reviewer is correct. This point comes out somewhat in the discussion of rolling easements. Comment, in effect, tempers assertion made in text. In this case, given the space constraint we can probably omit this additional discussion. The point is simply that planning can help. Reviewer comment does not dispute that--only that ability to plan is limited. that issue belongs inmore in chapter 11.
1112	9	344	6898	Pratt	CBRA?	Text box revised, CBRA not addressed here.
840	9	344	6899	Crowell	The text states: "The Heinz Center (200 p. 135) estimated that federal flood insurance and other government hazards programs had increased development densities about 30 percent over what it would otherwise be." This takes an (apparently) negative passage (with respect to the NFIP) from the Heinz Center report (page 135) and does not present the offsetting positive passages (and more comprehensive picture) that follow. As such the text appears to show an unfounded bias against the NFIP. For example, on page 135 of the HC report the text notes favorably that "Although development density has increased, total flood damage is lower than what it would have been if the program had never been enacted...because of the program's building code requirements." Later, on page 138 of the HC report it states that "the density of structures built in the V Zone after 1981 may be 15% higher than it would have been if the NFIP had not been adopted. However, the expected [flood and erosion] damage to these structures dropped close to 35%." Thus the overall damage to V Zone structures built Page 344, line 6899, this box needs a better, more comprehensive depiction of the Heinz study. Overall damages on impacted areas have been lower than it would seem based on this text because of adaptation.	This box has been revised to put the Heinz Center study into the larger context of studies that have examined impacts of flood insurance. It is not one of six studies cited on the issue, and hence the reader should attribute less significance to its finding on that point. (Note however, that the purpose of the box is to look at the induced development from federal programs, not to examine whether the programs are good or bad.)
841	9	344	6899	Crowell		Same as previous comment.
842	9	344	6905	Beavers	Beavers asked that an example of rolling easements be provided near page 344 line 6905. Titus responded that this will be addressed by expanding the description of rolling easements in Chapter 5.	Comment referred to Chapter 5. Additional text and citations were added for the section on rolling easements, to clarify what they are and some of the cases where they have been implemented by regulation. The economic impacts on adjacent properties--as well as those immediately behind the shorefront owners--could be addressed. A key aspect of rolling easement is that the shorefront premium is transferred to the next house back, so that the net social cost of shore erosion is less than the cost to the shorefront owner. That fact is a key justification for the argument that rolling easements may repair a market inefficiency. However, such a discussion is not directly necessary to support the answers to the prospectus questions, and other authors are concerned about the length of this report.
1113	9	345	6915	Pratt	Can you cite examples of rolling easements in use successfully?	Chapter 5 provides a more expanded discussion of rolling easements.
1114	9	348	6965	Pratt	What is gained? SAV habitat?	Discussion simplified. Part III is social science and not the place for detailed discussion of wetland processes (issue discussed in Chapter 4.)
843	9	352	0	Pratt	Pratt also noted with reference to page 352, that there has been a growing trend to look holistically at sediment budgets and that this trend will allow for regional management of sediments in economically advantageous ways. This could apply both in terms of the ocean shore and estuaries. Titus asked that Pratt consider where this discussion should be placed within the document.	Pratt worked with Williams to add a paragraph on the topic--but it was added to Chapter 5 instead as part of the discussion of shore protection sustainability.
844	9	352	Box 9.3	Pratt	Pratt also discussed Box 9.3 on page 352. He suggested use of the term "best sediment management practices" as opposed to regional sediment management. He suggested an acknowledgement that there are many sources of sediment, and that it would be good to track sediment cradle to grave. Margaret Davidson suggested that this might be appropriate as a federal advisory committee (FAC) recommendation. Pratt will try to insert language on this topic into Box 9.3. Titus said that citations would also be helpful. Jeff Williams indicated that this is a concept beginning to get attention in the Gulf of Mexico. Andrew Garcia offered some background on the term regional sediment management, noting that it was introduced to avoid project-by-project sediment management. Williams asserted that these concepts reflect new scientific understanding of coastal system connectivity. Pratt noted that sediment should be treated as a valuable resource as opposed to a waste product. Mark Mauriello added that in New Jersey they require suitable dredging materials to be put on a beach. Titus noted that this discussion might be better located in Chapter 5, which discusses methods for shore protection, and then	See response to comment 843

Comment	Section	Page	Line	Reviewer	Comment	Response
845	9	352	Box 9.3	Beavers	I also discussed the need to emphasize Regional Sediment Management during this call, although it was not noted in the meeting minutes. I strongly recommend that the report include a discussion of regional sediment management/ best sediment management practices as a way of maximizing the potential of coastal areas' limited sediment budgets and resiliency in the face of sea level rise.	See response to comment 843
1115	9	353		Pratt	New term! Best sediment management practices! Need to link this discussion to ongoing navigation needs	See response to comment 843
1116	9	353		Pratt	inlet shoals -- a supply for beaches and wetlands	Outside scope of this chapter. Overall, Corps absence from this report limits our ability to address these types of issues.
1117	9	353		Pratt	Part 6 and Part II -- sed and I/O strategy	Comment not clear. No change.
846	9	353	Para. starting on line 7061	Pratt	This discussion of Corps' policies and practices is okay here but a second treatment of it might be worthy of inclusion in Chapter 11, Institutional Barriers. This could well lead to a FAC recommendation. The text should be along these lines (perhaps someone from the Corps like Jeff Waters or Lynn Martin could expand on this). Current authorities, policies and practices for shore management are, by and large, the product of as-needed problem solving determined by past administrations, congresses with the input of agencies. A better management approach might stem from more comprehensive analysis of the physical shore system that includes analysis of forces that mobilize sediment, natural sediment inputs into the shore, direction and rate of sediment movement along the shore, and sediment sinks. Managing sediment budgets on a chosen shore area should be done with a concept of Best Sediment Management Practices that includes how human intervention may have disturbed natural processes and how we can mitigate for that disturbance. We should also consider sediment to be a valuable resource that is always used beneficially when it is removed from areas in which it is creating a problem. There is Add BSMP to this 2-3 sentences with citation.	See response to comment 843
1118	9	353	7079	Pratt	The NFIP does raise rates for existing structures. Flood insurance rates are modified every year based on the annual "Actuarial Rate Review." Rates can either be increased, decreased, or stay the same, for any given flood insurance class. The rates for post-FIRM policies are adjusted based on the risk involved and accepted actuarial principals. As part of this rate adjustment, hydrologic models are used to estimate loss exposure in flood-prone areas. These models are run every year. Also note that the rates for pre-FIRM (subsidized) structures are also modified every year based in part on a determination of the "historical average loss year." The goal of the NFIP is for subsidized policyholders to pay premiums "that [are] sufficient, when combined with the premium paid by actuarially priced [post-FIRM] policyholders, to provide the Program sufficient revenue to pay the losses associated with the historical average loss year." Thus, while there are statutory limits on the amount by which rates on existing structures can be raised, it is inaccurate to say that they are not raised. Also note that FEMA has raised	See response to comment 843
847	9	358-359	7194-7196	Crowell	Section 9.6.3 Federal Flood Insurance Rates: The entire section includes too many errors or misstatements and should be rewritten entirely, or completely scrapped. True, rates for individual policies may be grandfathered; that is a post-FIRM structure originally constructed in an A Zone at one foot above BFE will continue to pay A Zone rates at one foot above BFE, even if the structure is later remapped in a V Zone at, say, 2 feet below BFE. However, rates for the entire A or V Zone (or any flood zone) can increase each year up to a maximum of 10% (rates can also stay the same or decrease). Also note that it is the intent of the NFIP to try and make each insurance class actuarially sound with respect to post-FIRM policies. In short, this approach does not "prevent property owners from feeling the 'market signal' of increased risks." Finally, it should be noted that the NFIP also has some "Preferred Risk Policies" where rates are not grandfathered even when the zone changes.	Clarified. However, author believes that it should be clear that in this context, we are talking about the rates rising due to sea level rise. We are not denying that rates might rise for unrelated reasons, such as the annual adjustment designed to ensure that a given class paid an actuarial rate. The point here is simply that if sea level rises a meter, the owner will continue to pay a rate based on the risk calculated before the sea rose a meter--and that elevating the home a meter later on will not save the owner any money in general. See also comment 830.
848	9	359-361		Crowell	Rewrote to make all these points clear. Nevertheless, author notes that reviewer comments also include oversimplifications, albeit with different implications. The fact that rates for the entire A or V zone can increase up to 10% per year does not mean that they will increase by that much--and in fact they ought not increase by that much if the risk to the entire class is rising by a lower rate. In short, the policies do prevent some property owners from feeling the market signal of the increased risk, as explained in the text. (Text does not address the preferred risk policies. It is not feasible to address every aspect of the program.) See also comment 830.	Rewrote to make all these points clear. Nevertheless, author notes that reviewer comments also include oversimplifications, albeit with different implications. The fact that rates for the entire A or V zone can increase up to 10% per year does not mean that they will increase by that much--and in fact they ought not increase by that much if the risk to the entire class is rising by a lower rate. In short, the policies do prevent some property owners from feeling the market signal of the increased risk, as explained in the text. (Text does not address the preferred risk policies. It is not feasible to address every aspect of the program.) See also comment 830.
849	9	359	7209-7258	Crowell	Recommend scrapping or rewriting this section	Rewrote to make all these points clear
850	9	360	7226	Crowell	"So whether or not a property owner feels the market signal of increased rates depends on the expected frequency of reconstruction compared with the time it will take for a significant increase in the risk." This is way too simplistic. All properties will feel a market signal when rates are increased. See comments above.	Passage cut during rewrite of section

Comment	Section	Page	Line	Reviewer	Comment	Response
851	9	360	7229	Crowell	"FEMA's Report to Congress assumed, in effect, that reconstruction occurs rapidly compared to the rate at which risk increases, so relatively few people will have an artificially low insurance rate due to sea-level rise (FEMA, 1991). Other studies have reached the opposite conclusion. The National Academy of Sciences has recommended..." The FEMA study investigated sea level rise and concluded that "the aspects of flood insurance rate-making that already account for the possibility of increasing risk, and the tendency of new construction to be built more than one foot above the base flood elevation, the NFIP would not be significantly impacted under a 1-foot rise in sea level by the year 2100....The 60-year timeframe over which this gradual change occurs provides ample opportunity for the NFIP to consider alternative approaches to the loss control and insurance mechanisms of the NFIP and to implement those changes that are both effective and based on sound scientific evidence. Because of the present uncertainties in the projections of potential changes in sea level and the ability of the rating system to "NAS pointed out that Congress has explicitly included storm-related erosion as part of damages covered by flood insurance..." This is correct, but it is also true that (1) the NFIP insures against damages caused by flood-related-erosion, (2) the probability of flood-related erosion is considered in defining the landward limit of V Zones, and (3) flood insurance rates in the V Zone are generally much higher than A Zone rates. Part of the reason for this is consideration of the potential for flood-related erosion.	Author disagrees with reviewer suggestion that author was deliberately misleading anyone. Implications of erosion and sea level rise are very similar, so it is hardly disingenuous to discuss the well-researched issue of erosion in a report on sea level rise--especially given the relative absence of studies focussed on sea level rise. Nevertheless, as mentioned previously, entire section was rewritten. Part of this passage was cut and other parts presented in different context after rewrite of section. See also comment 830.
852	9	360	7236	Crowell	"...and that FEMA's regulations...already defined special 'erosion zones' Note that "erosion zones" as defined in the regulations refer to "flood-related erosion", not "long-term gradual erosion." The NAS study and the Special Issue of the Journal of Coastal Research focus on "long-term gradual erosion."	Added qualifiers so that it is clear when we are talking about long-term and when we are talking about storm-related erosion.
853	9	360	7237	Crowell	There are way too many misstatements of fact here. Note that (and I am repeating myself) insurance rates are not kept fixed and the NFIP does adjust rates to reflect changing risks. Ratings of individual structures are kept fixed (unless the policy lapses), but even so we have some Preferred Risk Policies where the flood insurance policy is not grandfathered. Also note that FEMA is revisiting the issue of the impact of sea level rise on the NFIP. We will be conducting a study on this beginning sometime towards the end of fiscal year 2008.	Added qualifiers so that it is clear when we are talking about long-term and when we are talking about storm-related erosion.
854	9	361	7243-7258	Crowell	"Bukley" should be "Buckley"	Rewritten. See also comment 830.
855	9	365	7347	Crowell	Page 368, line 7194, needs to be clarified because the NFIP does increase rates if floods increase over time.	OK
856	9	368	7194	Crowell	Page 369, line 7212, other commentators should be specifically identified.	Comment is actually on page 358. Thos duplicates comment 847
857	9	369	7212	Crowell	Page 369, line 7221, should be revised to reflect the fact that insurance rates do read to past rise. A clear distinction needs to be made between the classification and rates for an individual property, and for an entire insurance class.	Comment is actually on page 359. Hopefully the rewrite makes this clear.
858	9	369	7221	Crowell	Page 369, line 7233, the National Academy of Science report is mentioned in a confusing way.	Comment is actually on page 359. Hopefully the rewrite makes this clear.
859	9	369	7233	Crowell	Davidson asked if it would be appropriate to include the Government Accountability Office (GAO) report on Climate and Public Land. She will distribute the link.	Comment is actually on page 359. Hopefully the rewrite makes this clear.
860	10	0	0	Davidson	Julie Hunkins noted a new transportation study on the potential impacts of climate change, and suggested that it might contain useful recommendations to consider.	This relates directly to 7563-71, which implies that DOI is implementing secretarial order to prepare for climate change. GAO says it is not. Author toned down the language in chapter 10 that overstated compliance with secretarial order, and added the GAO critique to chapter 11 discussion of institutional barriers.
861	10	0	0	Hunkins	Sam Pearsall asked if there was a plan in place to replace public land along the coast in the event of SLR. Pearsall asserted that it should be noted that such a plan does not exist and one of the FAC recommendations should be to develop such a plan. Beavers added that the comments from NPS address this issue as well.	The issue of recommendations applies to the FAC report, but not this report which does not make recommendations. (See also response to similar comment by Julie Hunkins below.)
862	10	0	0	Pearsall		This is mostly a comment addressed to the fac. Chapter 9 does say that there is no plan by either regulatory or management agencies to allow wetlands to migrate inland. The more indepth demonstration of how little land is currently available for wetland migration was deleted from the report in response to Sam Pearsall's suggestion.



Comment	Section	Page	Line	Reviewer	Comment	Response
863	10	0	0	Schultz	<p>Schultz asserted that most people are not concerned with SLR specifically, thus actions in other programs that address SLR indirectly are very important and should be documented in the report. Thus responded that an attempt was made to address this issue with examples, but that it might be an important enough point to make directly in the Executive Summary.</p> <p>Excellent discussion as far as it goes. However, I think two very significant public policy issues need more attention. I don't think resolution or detailed exposition can be included, but I think these need more than an overview discussion. Recommendations for future engagement should be proposed. These are:</p> <p>1) What happens to private property as it is submerged. Normally and under current law, it becomes public trust land, but there will be tremendous pressure to make some sort of accommodation as the rate of conversion increases. Jim's rolling easement strategy works for the public agency that wants to control lands in advance of rising seas and is willing to condemn lands or legislate to make it happen, but there should be some discussion of the public policy debate coming about what happens behind rising seas.</p> <p>2) As the national investment in seashores, e.g., Cape Hatteras National Seashore, is overtaken by rising seas, will there be subsequent public investment in new, protected, publicly owned coasts? How and where?</p>	<p>The second paragraph (as well as the CCSP question) clearly enunciates that the focus of this chapter is specific measures taken to prepare for sea level rise. Chapters 9 and 11, however, both examine the relationship between existing policies enacted for other reasons and ongoing responses to sea level rise. Box moved here from appendix F also draws attention to the relationship (as do boxes added to chapter 5 from appendices D and F). The appendices (now part IV) discuss how policies motivate for other reasons constitute, to some extent, the response to sea level rise. Comment also addressed in Executive Summary.</p>
864	10	0	0	Pearsall	<p>General comment on 10.2: There are many efforts underway to address climate change (including sea level rise) on transportation. In particular, two studies have been released since this CCSP 4.1 report was released for public review: Transportation Research Board's Special Report 290 entitled Potential Impacts of Climate Change on U.S. Transportation and the US Department of Transportation and US Climate Change Science Program's (CCSP) report entitled Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study, Phase 1. Both of these reports discuss sea level rise impacts on transportation and provide recommendations and options on how this can be addressed; some of the conclusions and recommendations from these reports seem to be applicable to the study area of the subject report. I understand that these reports were not released at the time of publication of this draft report for public review; however, to the extent practicable, this report should reference and summarize the applicable results of those studies.</p>	<p>This looks like a few topics for the FAC report, which can go beyond the issues addressed in our report. The questions in the prospectus did not directly get at these issues--and Chapter 10 is supposed to address only what people are doing now, not the consequences. (Consequences are for chapters 9, 11.) They would have been implications of chapter 5 had the planning studies not been removed from the report (especially second issue). But since those studies were excluded we no longer have the analysis that would bring us up to these issues.</p>
865	10	0	0	Hunkins	<p><a href="http://mlis.state.md.us/2008rs/bills/hb/hb0973e.pdf">http://mlis.state.md.us/2008rs/bills/hb/hb0973e.pdf</a> Please note that Maryland's Legislature just passed the Living Shoreline Protection Act of 2008 that requires the use of living shorelines vs "hard" techniques, unless the applicant can meet certain criteria. This act was passed to help address the impacts from sea level rise (see the Preamble)</p>	<p>Author quickly skimmed the report and agrees that they are useful reports. Reports do not report concrete action already being taken to prepare for climate change, so it would not really fit Chapter 10. Time did not permit folding CCSP findings into this chapter, but comment has also been forwarded to authors of chapters 6, 9, and 11, where they may also be on point. In particular, chapter 6 already deals with infrastructure. Added a sentence on transportation citing TRB report in the section on long-lived infrastructure in Chapter 9 and added three sentences based on TRB report in the paragraph in Chapter 11 that focuses on how planning horizons are short compared to the useful lifetimes of some infrastructure.</p>
866	10	373	7545-46, 7556	Schultz	<p>USGS has assisted NPS to examine coastal vulnerability of approximately 25 of its coastal parks, not all coastal parks as stated here.</p>	<p>Added a few sentences to that effect.</p>
867	10	374	7569	Beavers	<p>It's nice to see The Nature Conservancy's work reported in chapter 10. Thanks. However the NC reference should be:</p> <p>Pearsall, S. H. III and B. Poulter. 2005. Adapting Coastal Lowlands to Rising Seas. Pp. 366-370 in M. J. Groom, G. K. Meffe, and C. R. Carroll (eds.), Principles of Conservation Biology, 3rd edition. Sinauer Associates, Sunderland, MA. xix + 779 pp.</p>	<p>Made change. Also sent USGS email for cite.</p>
868	10	375, 379	7590, 7685-7688	Pearsall	<p>There are other NGOs working on adaptation. In NC these include the NC Coastal Federation and the NC Coastal Land Conservancy. TNC is not the only NGO dog in the fight by any means.</p>	<p>Added reference. Left the other reference in because it may be more accessible. No citations available for discussion of other conservancies responding to sea level rise.</p>
869	10	377	7635	Pratt	<p>Pratt referenced page 377, line 7635, and stated that Delaware had recently received a fellow from the National Oceanic and Atmospheric Administration's Coastal Service Center who would be developing an adaptation plan for SLR.</p>	<p>Comment referred to Appendix D and E. Hiring an intern is too minor to be included in Chapter 10.</p>
1119	10	377	7635	Pratt	<p>DE adaptation strategy -- citation</p>	<p>Author assumes this comment duplicates 869.</p>
870	11	0	0	Pearsall	<p>This is a very good chapter addressing important issues -- many of them elephants in the living room. Kudos to Jim.</p>	<p>n/a</p>

Comment	Section	Page	Line	Reviewer	Comment	Response
871	11	0	0	Pearsall	Pearsall suggested that the report acknowledge somewhere early on that three options for shore protection (armor, elevation, retreat) are not mutually exclusive. Titus responded that this type of information might belong in Chapter 5.	Note that the first sentence on page 397 had said that combinations are possible. We also refer comment to chapter 5 to add more detail if appropriate. A new subsection (under hybrid options) was added to section 5.1 to address the various issues Sam Pearsall raised, which included both contemporaneous use of soft and hard, as well as intertemporal shifts in strategy (e.g. protect at first but retreat later).
872	11	0	0	Pratt	Pratt suggested that the issue of NFIP's grandfathering policy could be a FAC recommendation. He also noted that mitigating strategies should not change risk zones because they should be considered temporary measures.	Comment relates to FAC's report. Note that this issue has been consolidated into chapter 9.
873	11	0	0	Davidson	Davidson recommended that the cost benefit analysis used by U.S. ACE be reexamined. This should be a recommendation of the FAC more generally. Pratt agreed. Garcia agreed as well but noted that certain issues, particularly mandatory cost sharing to keep undeveloped land from being developed would need to be addressed. U.S. ACE is mandated to cost share, but this would be difficult without revenues from developed land.	Comment relates to FAC's report.
874	11	0	0	Pearsall	Pearsall is working in a tax incentive for soft protection that he will send to Fitzgerald for distribution to the group soon.	Comment relates to FAC's report.
875	11	0	0	Rudolph	Greg Rudolph reiterated that in the current framework for cost benefit analysis more benefits are generally allocated to developed areas.	This is consistent with comment chapter makes.
1120	11	381		Pratt	submitted comments for new text in this chapter	n/a
876	11	383	Section 11.1	Pearsall	But we need to provide specific recommendations for resolving the institutional barriers and biases, e.g., the nationwide permit for bulkheads should be rescinded.	Comment relates to FAC's report.
877	11	383	Section 11.1	Pearsall	Dare we point out that USACE has another powerful incentive for structural responses, with more complexity and higher costs preferred? USACE overhead charges and billable hours on public works projects provide the revenues for keeping the lights on in the non-enforcement side of district offices. USACE domestic Public Works is functionally a quasi-public consulting and engineering firm dependent, in large part, on non-federal sponsors to raise funds from federal ear-marks and local (mainly state) sources.	We need a paper to this effect before we can add this point.
878	11	386	7883	Crowell	"Upton-Jones Act" should be replaced with "Upton-Jones Amendment to the National Flood Insurance Act of 1968."	done
879	11	386	7820, 7821	Crowell	Need a published reference regarding the statement that FEMA funded beach nourishment projects are a significant portion of total beach nourishment along Florida coasts that receive frequent hurricanes (I am not aware of this).	Communicated with FEMA on this issue.
880	11	389	7887	Davidson	Davidson cited page 389, line 7887, noting it is unclear how policies that fund relocation encourage shore protection.	Sentence at issue cut as unnecessary.
881	11	390	0	Davidson	Davidson also referenced page 390, and said that the Army Corps of Engineers (U.S. ACE) should consider nation-wide permits for soft shore protection measures. This could be a recommendation of the FAC. Pearsall noted that an alternative would be for the U.S. ACE to rescind the nation-wide permits for bulkheads.	Comment relates to FAC's report.
882	11	392	0	Crowell	The following bulleted comments pertain to section 11.1.3 Coastal Development. There are many errors or misstatements of fact regarding the NFIP in this section and I recommend either an extensive revision, or scrapping it entirely. Nonetheless, following are specific comments.	The text on NFIP was substantially revised in this section, to be consistent with the revised chapter 9.
883	11	392	7977	Crowell	Crowell referenced page 392, line 7977, noting that conflicting examples could be provided indicating that the National Flood Insurance Program (NFIP) does not encourage development. He also noted that on line 7983 there is a subsidy for preFIRM (pre flood insurance rate map) properties. Crowell gave a brief overview of the NFIP structure and provided some specific detail as to how the program has operated in the past. He stated that Federal Emergency Management Agency (FEMA) has not yet decided how to incorporate catastrophic events into insurance rates. Crowell, Titus, Williams, Pratt, and Mike Salmon engaged in a detailed discussion of the NFIP and flood insurance rate structures in particular.	The text on NFIP was substantially revised in this section, to be consistent with the revised chapter 9.
884	11	392	7978	Crowell	Platt (2007) does not argue that the NFIP encourages coastal development. His article criticizes the NFIP Evaluation Reports for not answering the question "has the NFIP made vulnerability to floods better or worse?" Recommend deleting this reference and perhaps find another reference from Platt on this issue.	Cut this reference and added several other references.

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885	11	392	7977-7978	Crowell	Several commentators have also concluded that the NFIP does not encourage coastal development (e.g., Leatherman, 1997; Cordes and Yezer, 1998), or that the benefits of better construction as per the NFIP's floodplain management and building code requirements offset the detriments of increased coastal development (e.g., Heinz Center 2000 study). Also note that a comprehensive literature review titled "National Flood Insurance Program: Issues Assessment" was prepared by Dixie Shipp Ewalt in 1999. The author examined 36 studies or reports published between 1976 and 1998 that investigated the relationship between flood insurance availability through the NFIP and floodplain development. The author concludes that "none of the studies offer irrefutable evidence that the availability of flood insurance is a primary factor in floodplain development today. Neither does the empirical evidence lend itself to the opposite conclusion. When this body of work is read together, however, several themes do emerge. (1) The factors affecting decisions to develop floodplains differ for riverine and coastal areas. (2) Development How do you know that without the availability of flood insurance that "people would tend to build farther away from the shore"? Recommend providing data or a solid reference to back up this assertion, or delete passage.	Moot. The text on NFIP was substantially revised in this section, to be consistent with the revised chapter 9.
886	11	393	7980-7982	Crowell	This issue is more complex than what is stated here. From 1986 through 2003 the premiums collected were greater than the claims paid for combined subsidized and non-subsidized policies. From 1986 through 2004, or from 1986 through 2005, the premiums collected were less than the claims paid for combined subsidized and non-subsidized policies. Recommend paraphrasing page 25 of Crowell, Hirsch, and Hayes (2007) starting at the paragraph that begins "A review of the NFIP's actuarial database..." and ends "...and cash on hand of \$189 million." Perhaps this could be put in a box.	Revised this sentence to be clearer that it is simply a truism to help the other explanations.
887	11	393	7982-7986	Crowell	Recommend replacing "FEMA has not decided whether to raise flood insurance rates to completely account for the risk of another storm like Katrina[]" and replace it with "FEMA has not yet decided how to incorporate the impact of catastrophic flood events such as Katrina into the models used to set insurance rates."	Moot. This text was cut as part of the revision to be consistent with the revised chapter 9.
888	11	393	7988-7990	Crowell	General comment from Ed Pasterick (Risk Insurance Division) regarding Katrina: We have to be careful not to draw overly-broad coastal conclusions from Katrina. The bulk of Katrina damage occurred in New Orleans due to the failure of the levees. Remove New Orleans from the equation and the results may well be shown to be within predictable and tolerable limits with respect to the NFIP.	Moot. This text was cut as part of the revision to be consistent with the revised chapter 9.
889	11	393	7988-7990	Crowell	The text states: "Currently, FEMA does not adjust rates to reflect new information when flood risks increase, but rather 'grandfathers' the assumed risk." As noted above, FEMA does adjust rates to reflect new information—as an example, preferred risk policy holders see large increases as they lose preferred risk policy eligibility. And even though some policies are grandfathered, the NFIP strives to charge an average premium for that grandfathered group that is actuarially-based. In order to maintain actuarial premiums, the rates for grandfathered premiums are periodically adjusted. Recommend rewriting or deleting this passage.	Moot. This text was cut as part of the revision to be consistent with the revised chapter 9.
890	11	394	8002-8003	Crowell	The text states: "But as shore erosion and rising sea level make the property more vulnerable, rates do not rise to reflect the increased risk from erosion until the property is substantially improved (Heinz Center, 2000)." Note that FEMA has raised rates close to the maximum allowed by law most years since the release of the 2000 Heinz Center study (see Actuarial Rate Review). A major reason for this was in recognition of the results obtained from the HC study which noted that an increased risk of coastal flooding caused by erosion that would likely occur in the future. See also comment for lines 8002-8003, above. Recommend rewriting or deleting this passage.	Moot. This text was cut as part of the revision to be consistent with the revised chapter 9.
891	11	394	8004-8006	Crowell	The text states: "Under current policy, an increase in total claims would cause an across-the-board increase in rates (Crowell et al. 2007)." This sentence is incorrect. Hydrologic models are used to determine actuarial rate adjustments. Rates are reviewed annually and adjusted based on the results of hydrologic models. Actual loss experience is used by NFIP actuaries as additional information in selecting the parameters of the hydrologic model. Recommend rewriting or deleting this passage.	Moot. This text was cut as part of the revision to be consistent with the revised chapter 9.
892	11	394	8012-8013	Crowell		Moot. This text was cut as part of the revision to be consistent with the revised chapter 9.

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893	11	394	8013-8016	Crowell	The text states: "The ability of the NFIP to recover losses from Katrina through a general rate increase would be analogous to the program's ability to adjust rates in response to accelerated sea-level rise or other consequences of changing climate." We disagree. We do not have the authority to recover losses (by raising rates based on events like Katrina) in this manner. The 1968 Act specifies what items can be contemplated in setting rates and recouping past losses is not one of those items. FEMA believes that it is inappropriate to surcharge policy holders for past losses. Insurance premiums should be prospective in nature, reflecting the risks for the period the insurance contract is in force. In this regard, flood insurance is consistent with all other types of insurance. As far as sea level rise is concerned, rates are adjusted to reflect increased risk for the length of the policy. It is inappropriate to charge increased premiums to this years policyholders to pay for losses that will occur 10 to 20 or more years in the future. Instead the NFIP believes that premiums should be increased as the risk increases. Recommendation should be "shoreline hard armoring" to distinguish it from the soft armoring that are not mentioned in this section.	Moot. This text was cut as part of the revision to be consistent with the revised chapter 9. No change made. Shoreline armoring is clearly defined as hard structures in both chapter 5 and the glossary. Research to date treats these options as divergent pathways, for the reasons explained below. Elevation and dike/pumping are very different ways to hold back the sea. Reviewer makes the valid point that in the very long run, protection may give way to retreat. But on a century time scale-- or a meter or two of sea level rise--protection is viable in many areas (especially along estuaries). Still because this is a valid long-term point, a new paragraph was added to make clear that these pathways are not necessarily locked in forever.
894	11	396	8062	Pearsall	I don't see these three options as mutually exclusive, and in fact, I think "retreat" is the inevitable (long-term in most cases) outcome of any armoring or elevating scheme that does not involve massive investment in armoring AND elevating AND pumping, e.g., Dutch polders.	
895	11	396	Section 11.2.1	Pearsall	Schultz cited page 398 and noted that storm water programs are trying to leave more water on site, and that use of storm water retention ponds in currently being phased out, when appropriate, to encourage percolation. She asked if the discussion under "Coastal Drainage Systems" is in conflict with this approach. Mauriello noted that these storm water management strategies are in the context of doing away with impervious surfaces, and are consistent with the concepts of low impact design. Titus suggest that the basic question is how SLR impacts standing water policies.	
896	11	398	0	Schultz	"Crowell, M.H. and T.L. Hayes, 2007: Marine Technology Society Journal, 41(1), 18-27." Should actually be "Crowell, M., E. Hirsch, and T.L. Hayes, 2007: Marine Technology Society Journal, 41(1), 18-27."	corrected
897	11	403	8183	Crowell	Hershner suggested that this section might be preferable to having all appendices in the interest of brevity.	Noted; Appendices have been shortened and added to Part IV instead of highlights from Appendices.
898	P4	0	0	Hershner	Beavers thought it was slightly unclear that this section provides a summary.	All local-scale information is now contained entirely within Part IV.
899	P4	0	0	Beavers	Titus said that the value of this section is to provide an overview for federal policy makers, while the appendices provide more regional detail for local planners. Hershner liked the synthesis part of this chapter, but thought that the appendices do not contain enough detail to be truly useful to local policy makers.	
900	P4	0	0	Hershner	Davidson suggested locating the discussion of national scale impacts before local impacts because this is a national document.	Part IV and the Appendices have been combined and consolidated. Local scale discussion kept before national scale because it is an elaboration of Chapters 4 and 9.
901	P4	0	0	Davidson	Beavers asked whether part V could be seen as redundant when compared to part I.	Agree. Text has been edited to reduce redundancy.
902	P5	0	0	Beavers	Pratt restated the need for a technical editor.	Report received full editing before final draft.
903	P5	0	0	Pratt	Rudolph was also concerned with the mismanagement of sediment, taken mechanically out of land. He will provide references on this topic.	Agree. RSM and BSMP have been added.
904	P5	0	0	Rudolph	It was also mentioned that in lines 8877 – 8879 (pg.439), the reference to limited sand in the Outer Banks should be omitted or placed with a caveat. There are offshore sand resources in paleo-fluvial channels and shoals that could be mined for beach nourishment. This is well documented, including all the fine work the USGS and research institutions have done associated with the North Carolina project ( <a href="http://woodshole.er.usgs.gov/project-pages/northcarolina/">http://woodshole.er.usgs.gov/project-pages/northcarolina/</a> ). Whether the local the Federal and local constituency is interested in spending the financial resources to utilize the sand and exactly what the realistic volumetric need is up for speculation. This seems like a minor point, but the real sediment starved corridor of the N.C. coast is south of the study area in Onslow and Raleigh Bay where Miocene, Oligocene, and Eocene rock formations outcrop as hard-grounds or are buried by a relatively thin veneer of sediments (Crowson, R.A., 1980, Riggs, S.R. et al., 1988). As mentioned in the phone conference call, the CCSP Report's southernmost range ends at roughly Cape Lookout and most readers not familiar with North Carolina will believe the entire State is driven by those processes and	Agree that the processes and geology is quite different between Outer Banks and southern NC coast. This CCSP report does not cover in any detail the southern portion.
905	P5	439	8877-8879	Rudolph		

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906	P5	439	8879	Rudolph	Rudolph cited page 439, line 8879 and stated that the report is very focused on the Outer Banks, which does not represent all of North Carolina. He was concerned that all of North Carolina will be lumped together.	Agree, wording has been changed to clarify.
907	P5	440	0	Schultz	Schultz referenced page 440 and asked what the consequences of this report are when compared to previous reports on SLR. Titus stated that this report is a reassessment of what has been done in the past.	Much of this comparison text has been edited out.
908	P5	442-443	V.5.1	Rudolph	In Section V.5.1 (pg 442 & 443), there is a reference to shore protection costs – no time scale is provided, i.e., "A 1 m rise, EPA estimated, would entail shore protection costs of \$143-\$305 billion." – is that over a decade?, a year?, a century?.	This text has been removed.
909	P6	0	0	Davidson	Davidson clarified the distinction between data needs and suggestions for future research.	I believe this comment was made in response to FAC discussion during its meeting, rather than as a point of correction for the text. The text has a distinct subheading and discussion of the need for baseline coastal zone data.
910	P6	0	0	Beavers	Effective land management strategies to adapt to sea level changes will best be advised by accurate and current social science studies.	Figure VI. 1 modified to include several items for future social science research. Text modified and expanded to include discussion of social science research as part of an overall science strategy for sea-level rise.
911	P6	469	0	Schultz	Schultz referenced page 469 and noted the need for more cost analysis to allow the authors to present a detailed discussion of the costs associated with inaction.	Added text on social science activities that mentions the need for increased and more holistic economic analysis.
912	Appendices	0	0	Beavers	The National Park Service would be pleased to provide more specific information where needed, especially for units of the National Park System covered by this report. Some National Park Service employees such as George Frame (Appendix B- Gateway National Recreation Area) and Courtney Schupp (Appendix E- Assateague Island National Seashore) are mentioned or cited by name and can provide more specific references or clarification for certain areas of the report if needed.	Noted.
913	E	605	12078-81	Schultz	<a href="http://www.nps.gov/asis/naturescience/resource-management-documents.htm">http://www.nps.gov/asis/naturescience/resource-management-documents.htm</a> The information regarding the beach nourishment project should be updated. A link containing additional information has been provided.	text has been updated to reflect this
914	E	606	12104-12108	Schultz	<a href="http://www.dnr.state.md.us/bay/czrm/wc_slr_model_final_report_nov2006.pdf">http://www.dnr.state.md.us/bay/czrm/wc_slr_model_final_report_nov2006.pdf</a> The text should be updated since the project has been completed.	edited and new reference added
915	F	0	0	Schultz	Section F.1 examines coastal elevations and vulnerable habitat. Since the author did not have access to LIDAR and the detailed elevation information for the entire region, rough estimates were used for some reaches (line 13588). Unfortunately, the analysis of vulnerable habitat and populations is based on these rough estimates. To ensure that the reader understands the level of uncertainty, each Table in this section should have a footnote (instead of in the general text) that states the quality of the data. Section F.2 summarizes policies related to the impacts of sea level rise. Some of this information is already outdated and some general conclusions have been made that are not well documented. Section F.3 looks at development and shore protection issues. I'm not sure that there is value added to including all the information in this section. If it is retained, the text should be streamlined and the general conclusions should be well documented.	sections have been streamlined and zoe johnson has updated the MD information
916	F	636	12546	Schultz	<a href="http://shoreslines.dnr.state.md.us/sc_online.asp">http://shoreslines.dnr.state.md.us/sc_online.asp</a> Please include information in this and other appropriate sections that let the reader know that Maryland has mapped the areas vulnerable to sea level rise for the 0-2 foot, 2-5 foot and 5-10 rise. The information is available on our website and can be used as an interactive mapping application.	references updated that refer to this tool
917	F	668	13126	Schultz	<a href="http://mlis.state.md.us/2008rs/bills/hb/hb0973e.pdf">http://mlis.state.md.us/2008rs/bills/hb/hb0973e.pdf</a> Please note that Maryland's Legislature just passed the Living Shoreline Protection Act of 2008 that mandates the use of living shorelines first, unless the applicant can meet certain criteria. Language should be revised since it will not be "easier" to obtain a permit for structural options.	updated by zoe johnson
918	F	676	13290-92	Schultz	The Shore Erosion Control Program no longer provides financial assistance for structural projects.	updated statement
919	F	685	13472	Schultz	There are a number of broad general statements that are not documented. They should be deleted or additional documentation should be provided.	section streamlined

Comment	Section	Page	Line	Reviewer	Comment	Response
920	F	686	13475	Schultz	This statement implies that the entire Western Shore, instead of just Calvert County, has this policy in place. Please revise.	section edited
921	F	686	13489	Schultz	Category 3 only applies to cliff areas within the County's jurisdiction, not the entire Chesapeake Bay. Please revise.	section has been streamlined and revised
922	F	687	13504	Schultz	References to the ocean don't add anything to the report.	section edited and sentence deleted
923	F	687	13512	Schultz	Need to clarify how a structure eventually eliminates the beach. While you have included this analysis earlier in the report, most people will only read the sections relevant to their activities.	referenced chapter 5
924	F	690	13575	Schultz	This section regarding land acquisition by the state should be updated.	updated by zoe johnson
925	G	0	0	Pearsall	Pearsall noted an issue with footnotes in the North Carolina appendix. Titus will follow up.	Fixed for final draft.
926	G	0	0	Pearsall	We still see footnote numbers (but no footnotes) and author-date citations. Sometimes they are both present, and sometimes it looks like the number needs to be replaced with a missing author-date citation.	Fixed for final draft.
927	G	0	0	Pearsall	And finally, I can't remember where in the text this occurred, but wherever the impacts of salt water and its activation of sulfate-reducing bacteria are mentioned, the citations should include Hackney and Yelverton 1990, the original source others rely on.	This citation has been added to Section G.1.
928	G	728	14220-14221	Pearsall	Net SLR in the Albemarle-Pamlico coast of NC is 4.3 mm according to gauges at the Duck Pier and Hampton Roads (Permanent Service for Mean Sea Level). This number falls off in the southern geological zone described by Riggs and Ames, and so is lower at the Wilmington gauge. In the northern geological zone, we estimate that 1.3 mm/year is post-Pleistocene isostatic rebound (subsidence) and 3 mm is actual SLR. The 4.3 mm net value is the value that wetlands have to meet to break even (the 4.3 mm value was collected in 2005; more recent access seems to indicate a slightly higher number, perhaps 4.4 - 4.5 mm). In NC, vertical accretion rates of 2.4-3.6 mm/year have been recorded (Craft et al. 1993), but in general, we don't have a good handle on these rates. Meanwhile, we can see and document the gradual reduction in extent of marshes. This reduction in extent is not gradual, but seems to occur during storms, and thus is often credited as "erosional events." I believe that the periodic erosional events are actually the direct result of marshes gradually, sometimes imperceptibly drowning, with storms coming along often enough to punctuate the equilibrium. See Poulter 2005.	Text presenting this information has been added.
929	G	728	Table G.2, last row	Pearsall	It seems to me like the total should apply to Percent of Shoreline, but I don't see how it can apply to maximum rates (the 3rd and 4th columns). Thus, the "total" in the last column (2.7) doesn't make much sense. In column 1, the two ?s should be zeros, or the total will be more than 100%	The question marks were changed to <1%. There is nothing listed in the row called Total for Maximum rate per year (3rd column), but in the final column, a value is reported that reflects the average rate of erosion across the entire estuarine shoreline, based on data available at the time.
930	G	730	14271-14273	Pearsall	There are few places where the interiors of coastal marshes are not penetrated by ditches and channels. During high wind tides, mainland shore marshes may be entirely submerged for a while. I think we can't really say that large areas of interior marsh are truly isolated from the "aquatic portions of the estuary."	The text was changed in accordance with this suggestion.
931	G	733	14310 et seq.	Pearsall	Salt water intrusion via ditches is by no means confined to agricultural lands, and in fact, represents a greater threat to pocosins and non-riverine swamps with humid soils. Tide gates represent a very temporary solution. In fact, in most cases, these gates are or will be essentially at present sea level. Eventually we need to fill the ditches to restore sheet flow hydrology pending the hoped-for and probably assisted establishment of new brackish and salt marshes.	The text was changed to reflect that plugging ditches could help restore sheet flow and that tide gates only temporarily address the problem. A reference to potential for saltwater to cause peat to collapse was added. If a reference to non-riverine swamps is to be added, this should occur as part of the next draft.
932	G	735	14337 et seq.	Pearsall	Note that set-back and armoring rules do not apply to sound shores.	The text was changed in accordance with this suggestion.
933	G	745	Box G.2.	Pearsall	1st paragraph, 2nd sentence - I am not aware of any bluffs on the Albemarle Peninsula. I think Riggs and Ames are referring to other places. In the last sentence, it should be one third. You can cite me, personal communication	The text was changed in accordance with these suggestions.
934	G	745	Box G.2.	Pearsall	5th paragraph, sentence beginning "in 2007" add National Audubon, Conservation Fund, and US Fish and Wildlife Service to the list of founders. Replace "Albemarle Conservation Partnership" with "Albemarle-Pamlico Conservation and Communities Collaborative (AP3C)." Again, you can cite me, personal communication.	The text was changed in accordance with these suggestions.
935	G	745	Box G.2.	Pearsall	6th paragraph - in the 3rd line, Heath 1975 is the wrong citation for this information. Please use Pearsall and Poulter 2005. In the last line, please add "oyster reefs" in between the words "establishing" and "submerged." Please add Pearsall and Poulter 2005 to the citations.	The text was changed in accordance with these suggestions.