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Comments on Global Climate Change Impacts in the United States
U.S. Climate Change Science Program, Unified Synthesis Product,

I. Background Information

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II. Comments

General comment. The fine layout and graphics in the draft report contributed much to the ease of reading. The layout did not cause difficulty in locating and referencing comments.
Philip Keillor - ASFPM Member

General comment. The organization and fluid and sequential layout in the draft report contributed to the ease of reading. The layout allowed for an easier approach to addressing specific sections for comment. However, it would have been easier, for review purposes only, to have had a lined format for quick reference for suggested changes for those collating these comments.
Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

General Comment. This report lacks a discussion about Federal emergency initiatives underway since 1968 through the Federal Emergency Management Agency’s (FEMA’s) National Flood Insurance Program (NFIP) and emergency management efforts through the Stafford Act. Both of these programs have funded mandates and mitigation grant programs that address many of the impacts of climate change mentioned in this report, such as flooding; sea level rise and coastal inundation; the need for better building standards and building locations; heavy downpours; hurricane intensity and frequency; cold season storms; and greater wind speeds, rain fall rates, and storm surge levels. The Stafford Act in particular mandates that both States and local communities complete all-hazards mitigation plans that integrate potential and past hazards that may impact their communities, and address those hazards through mitigation actions including zoning, building standards, and other means to reduce the damages caused by storm events. In the event that these plans are not completed, public disaster monies will not be awarded to those communities and States that do not have a FEMA-approved hazard mitigation plan.
Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

General comment regarding Arid Regions Passages. This document must be very careful with the repeated factual assertions that human-induced global warming has already severely impacted the region. While many people believe that (both highly respected scientists as well as the public), this is not an indisputable fact. It may even be very likely, but presenting it as fact is very problematic. The largest source of problems in recent years has been a widespread, regional, sustained drought in western areas. This is not the worst drought on record by far (as properly stated in the document), and it is impossible to link it to global warming in an absolute sense, although it (probably properly) could be argued that it is somewhat heightened due to likely climate change. This reviewer is not arguing with what is being presented here (the belief is that it is likely true), but the report needs to be careful in presenting even well-accepted theories as proven facts. This is a common problem in these sections on the west. It is, however, proper to report what will happen should climate change occur or worsen and what human activities should be undertaken now to mitigate this threat, regardless of what has already happened or the causes of this climate change.
Kevin Houck, P.E., CFM - ASFPM Arid Regions Committee
Executive Summary, Page 4. The Future is in Our Hands paragraph. The second sentence of this opening paragraph is unclear – what is meant by warming being “locked in”? The future climate seems to be in our hands during the decades until warming is “locked in” and the momentum of rising emissions and greenhouse gases concentrations pushes the atmosphere and oceans past tipping points and thresholds. If the future lies directly in our hands, can we still make changes despite the impacts of climate change (i.e., warming) being “locked in”? When warming becomes “locked in,” does that not imply that the future is therefore out of our hands? Isn’t the point of these various national reports on the impacts of climate change to not only deliver critical information pertaining to the impacts of climate change, but more importantly, to relay that information to the very practitioners that can help implement those changes? To clarify, we suggest changing the wording of the second sentence to read, “Since past and present emissions will continue to influence climate change for many years, associated impacts on our economy, security, and quality of life will increase in the decades to come.” Additionally, we suggest changing the wording of the third sentence to further clarify this concept to read, “However, the future is largely in our hands beyond the next few decades, during which some measure of warming is irreversible due to human activities to date.”

Philip Keillor - ASFPM Member; Sam Riley Medlock, CFM, JD - ASFPM Program Manager; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Executive Summary, Page 4. Beneficial and Detrimental Impacts paragraph. There is reference made to “some benefits in some sectors of society in the early stages of warming.” This appears to be in direct conflict with earlier reports (National Water Program Strategy: Response to Climate Change: Office of Water, U.S. Environmental Protection Agency, March 2008). This should include a brief example as was used for the detrimental impacts. It would be valuable to see the change from the beneficial to the detrimental. Specifically, specify to what sectors of society these impacts would be beneficial, and why.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Executive Summary, Page 4. Irreversible Losses paragraph. Add to the list; land inundated by rising sea levels. Change “soil losses from downpours” to “soil losses from major runoff and floods”.

Philip Keillor - ASFPM Member

Executive Summary, Page 4. Irreversible Losses paragraph. Add to the list: loss and damage of aging infrastructure located close to the shoreline (coastal highways linking east and west coasts in Hawaii, for example); land inundated by rising sea levels; and structures, water, and sewage facilities inundated by increased coastal and riverine flooding. Change “soil losses from downpours” to “soil losses from heavy precipitation (or downpours) are resulting in flashfloods, increases in rainfall runoff, and floods.”

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Executive Summary, Page 4. Urgency of Action paragraph. How urgent? Make this paragraph compatible with The Future is in Our Hands paragraph as well as the rest of the report.

Philip Keillor - ASFPM Member

Executive Summary, Page 4. Urgency of Action paragraph. This report does a fine job of describing short-term versus long-term actions that can be taken, and the results. It also explains that the science is not available to adequately quantify the timing and scope of what these impacts may be. This is a solid point but how will urgency affect the impacts of climate change?

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair
Southwest, Page 4, final paragraph. Again, it is too simplistic to state that “rising temperatures are reducing the flow in major rivers.” This is only one of many factors, and a direct cause-effect relationship has not been proven, although this is a well accepted theory. What is definitely reducing the flow in rivers are factors such as regional drought and increased diversions due to explosive population growth.
Kevin Houck, P.E., CFM - ASFPM Arid Regions Committee

Southwest, Page 4, final paragraph. Suggest softening the language that states that “projections for the rest of this century make it clear that rising temperatures will continue to be the norm”. Suggest language that it is “likely,” not “clear.”
Kevin Houck, P.E., CFM - ASFPM Arid Regions Committee

Executive Summary. Page 5. Tipping Points paragraph. The passing of tipping points and crossing of thresholds may also cause irreversible changes, trigger feedbacks that will accelerate climate changes, or bring abrupt climate changes.
Philip Keillor - ASFPM Member

Executive Summary, Page 5. Tipping Points paragraph. Not clear exactly what the tipping point for climate change is. Does it mean that when there is a complexity of cross-impacts of human systems and natural detrimental impacts from climate change that cannot be reversed, we cannot change the effects? Have we surpassed the threshold, so there is nothing we can do? If so, identify those tipping points. Is the result irreversible changes?
Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Executive Summary. Page 5. Rates of Change paragraph. Rates of climate change are also of great concern to human societies which have problems with making rapid adaptations. What do you mean by “change that occurs very quickly”? The message in this paragraph should match the tone of the Urgency of Action paragraph.
Philip Keillor - ASFPM Member

Executive Summary, Page 5. Limits to Adaptation paragraph. Limits include more than the challenge of a moving target. The rates of climate change may exceed the possible rates of adaptation. There are other limits as well that should be drawn from the body of the report. What is the difference between adaption and mitigation? This should be clarified. Are there regulatory programs in which adaption could be enforced, as with mitigation? It is a strong and valid point that adaptation addresses the “moving target associated with climate change,” particularly in light of the point that this report makes: the fact that we do not know the timing or scope of the effects of climate change.
Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair
Executive Summary, Page 5. What is missing is a paragraph on FEMA-supported mitigation options. Mitigation is defined as reducing the potential damages caused by more severe and frequent storm events and is mentioned throughout this report. Through FEMA tremendous amounts of Federal and State funding, policies, Executive Orders, and regulations have been dedicated to reducing the effects of the very impacts mentioned in this report: flooding, sea level rise, coastal erosion, storm surge, coastal inundation, and how these impacts damage vulnerable structures built in special flood hazard areas. It has been FEMA’s goal to attain community sustainability through various programs and policies by reducing community vulnerability to the damages resulting from extreme flooding and storm events. Local communities and all 50 States are required to identify the risks and vulnerabilities to natural hazard threats that may result in these negative impacts. Additionally, they are mandated to identify and implement mitigation actions to reduce the potential impacts of these natural hazard events in the future.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Executive Summary, Page 6. Key Finding No. 2. Add accelerating sea level rise to the bullets that support the statement: “Many climatic changes are occurring faster than projected even a few years ago.”

Philip Keillor - ASFPM Member

Executive Summary, Page 6. Key Finding, No. 2. As a result of “changes occurring faster than projected a few years ago,” and with mention of Arctic sea ice and large ice sheets in Greenland and parts of Antarctica melting faster than expected, would it not be prudent to also mention accelerated sea level rise? Add accelerating sea level rise to the bullets that support the statement: “Many climatic changes are occurring faster than projected even a few years ago.”

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Extreme Weather and Climate are Having Increasing Impacts on Society, Page 6. This section is missing a very important economic point: how the intensity and frequency of storm events, as well as wildfires and drought (all insurable), will continue to be disruptive. Shouldn’t insurance also be mentioned? Perhaps it is the only mechanism in which these natural events are channeled through this sector, as a risk-segregating and risk-spreading vehicle for society and a window into the variety of ways in which the costs of climate change will manifest themselves and indirectly affect a large segment of the population. The author has cited some very impressive economic figures that should be highlighted here. “In an average year about 90% of the insured catastrophic losses worldwide are weather-related and the magnitude of these losses is growing.” Other impressive facts include private and Federal insurers paying more than $320 billion in claims on weather-related losses in the United States from 1980 to 2005.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Executive Summary, Page 7, Key Finding No. 8. Add a bullet for river corridors that have been settled and developed without consideration for increased flood levels and erosion associated with more frequent and heavy downpours.

Sam Riley Medlock, CFM, JD - ASFPM Program Manager
Executive Summary, Page 7, Key Finding No. 9. Add a bullet for development decisions and standards that are based on engineering and planning models that do not incorporate climate change. Existing development may have been placed in harm’s way, and future development must be sited higher and farther back from water resources than previously allowed.

Sam Riley Medlock, CFM, JD - ASFPM Program Manager

Summary of Impacts on Sectors, Page 8. Transportation. The first sentences should mention other critical facilities, such as hospitals and sewage and water treatment facilities, in need of higher design standards, perhaps at or above the 500-year flood level. When rebuilding facilities, they should not be located near the coast or in a FEMA Zone V or Zone AE if at all possible. This would provide a more sustainable approach for rebuilt as well as new construction. Storm surge, coastal inundation, and sea level rise would ultimately force these communities to repair these facilities again, on top of previous FEMA disaster assistance.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Response Strategies. Page 12. Paragraph 1. Add to second paragraph, “what will be needed is a variety of approaches to respond to the human-induced problem of climate change.”

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Response Strategies. Page 12. Paragraph 2. The concept of mitigation (per FEMA’s definition: “actions that can be taken to reduce damages from natural hazards in the future”) needs to be included here. There is considerable confusion about this term. In the discipline of emergency management, floodplain management, and wetlands and watershed management, “mitigation” is a very well known and practiced term. It is also instituted by FEMA’s Stafford Act through the Disaster Mitigation Act of 2000, in which all 50 States and territories, as well as all communities throughout this country, are mandated to prepare and implement hazard mitigation plans if they are to receive any public disaster assistance in the future. The objective is to identify all natural hazards that pose a risk to their communities, and identify mitigation measures to reduce those threats and vulnerabilities that will cause future damage from storms and other natural hazards. This overlaps or duplicates the objectives of “adaptation,” except that “mitigation” is backed by several Federal agencies and five Federal grant programs (the Hazard Mitigation Grant Program [HMGP], Severe Repetitive Loss Program [SRL], Repetitive Flood Claims Program [SRL], the Flood Mitigation Grants Program [FMA], and the Pre-Disaster Mitigation Grants Program [PDM]). The objective of all of these programs is to minimize damages from flooding and for some programs, other natural hazards. This is particularly true for losses caused by coastal inundation, sea level rise, and other impacts caused by climate change. Mitigation plans are constantly being updated, and now must account for changes in sea level rise. There should be mention of FEMA’s institutionalization and practice of mitigation as one of the four critical cycles of emergency management.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair
**Response Strategies. Page 12. Paragraph 4.** Add another paragraph before paragraph 5. The NFIP already mandates that member communities implement building standards that elevate structures above the base flood elevation; implement building codes to better withstand winds and floods; use the best available information so as to not locate structures or build in special flood hazard areas; and strongly advocates better integrated planning for sustainability, so that States and communities can withstand the potential damages from storm events and recover much more quickly. The NFIP also has a voluntary program, the Community Rating System (CRS), which goes further to motivate communities to “raise the bar” to minimize damages from flooding and sea level rise, coastal inundation, and inland flooding by awarding insured properties discounts on their flood insurance premiums. The NFIP, CRS, and FEMA’s various mitigation grant programs advocate smart planning and design by reducing risk and vulnerability, and should therefore be recognized in this report. Additionally, they are funded programs that are under-utilized.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

**Response Strategies. Page 13. Paragraph 1.** As a result of the similarities between mitigation and adaptation, examples should be given explaining the differences. The report refers to the different synergies between mitigation and adaptation, but it remains unclear as to what they are.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

**Response Strategies. Page 13. Paragraph 5.** Regarding the sample strategies communities can implement to adapt to climate change, such as updating levees and water and sewer systems, preserving wetlands, and preventing wetlands loss, which can therefore prevent property damage and loss of life by taking advantage of natural ecosystem services—all are examples of FEMA-driven mitigation grant programs.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

**Response Strategies. Page 13. Paragraph 7.** Add “While adaptation and mitigation take place at the local scale...” Since 1996 mitigation has been a national strategy implemented and institutionalized by FEMA through grants and regulations, and is meant to be regulated through local government. Mitigation occurs most effectively through local government, where local land use decisions are made. Adaptation appears to be a concept which would be most effective on a global scale.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair


Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

**Global Climate Change. Page 19. Paragraph 2.** Here is the first mention and example of a “feedback loop” in this report. Readers may not understand the meaning and significance of feedback loops and need to be acquainted with the feedback loop concept and with other feedback loops that contribute to more rapid or extreme, climate changes than would otherwise take place. The feedbacks of thawing Arctic land and melting sea ice are additional examples to use. Mention significant feedback loops that seem likely to lessen the impacts of warming. The report’s avoidance of adjectives “positive” and “negative” in identifying feedbacks seems wise, since the meanings of those terms are counter-intuitive to many people.

Philip Keillor - ASFPM Member
Global Climate Change. Page 21. Paragraphs 2 and 3. The accelerating and higher-than-expected emissions of carbon dioxide and other greenhouse gases need some explanation. Why do these emissions exceed the emissions scenarios used by the IPCC in the 2007 assessment reports? Have nations’ economic growth exceeded assumptions used when emissions scenarios were developed? Has Arctic melting begun to release methane and other greenhouse gases trapped in permafrost?
Philip Keillor - ASFPM Member

Global Climate Change. Page 23. Paragraph 2. Something more needs to be said about changing global circulation patterns and what features influence these patterns and contribute to climate changes. How do periodic features such as El Nino and La Nina, the Pacific Decadal Oscillation and quasi-stationary features such as the Aleutian Low and the Azores High influence circulation patterns of storms? What do the jet streams have to do with storm tracks? Much of society and many environments depend upon climate variability and suffer from droughts or floods when the variability is lost. How does global climate change affect persistence and variability of circulation patterns including storm tracks?
Philip Keillor - ASFPM Member

Global Climate Change. Page 28. Paragraph 2. On the subject of emissions, provide a companion graphic on emissions to the graphic on observed and projected global average temperature. Show with horizontal lines or bars the best estimates of heat-trapping gas concentrations in the atmosphere at which “dangerous human interference with the climate system” can be avoided. The proximity of present gas concentrations to those thresholds, and the rate of increasing concentrations provide necessary, compelling support for the opening statements of the Executive Summary on pages 4 and 5 that call for urgent action.
Philip Keillor - ASFPM Member

Global Climate Change. Page 29. Paragraphs 5 and 6. These paragraphs are extremely important, but the information is understated. There is presently no consensual upper bound for sea level rise in this century: a problem for planners and those with management responsibilities for many coastal lands. In an IPCC report, the authors stated: “Because understanding of some important effects driving sea level rise is too limited, this report does not assess the likelihood, nor provide a best estimate or an upper bound for sea level rise.” (Page 7 in Climate Change 2007: Synthesis Report, Summary for Policymakers. An Assessment of the Intergovernmental Panel on Climate Change.) With all of the modeling that has been done to assess the impacts of sea level rise on the coasts around the country, there must be some results of the effect sea level rise in terms of upper bounds, otherwise there will be no ability to plan for the future. How will construction setbacks from the coast be determined? Information on the upper bounds of sea level rise needs to be stated as a critical driver of future planning efforts. As mentioned in earlier sections on adaptation, sea level rise is a moving target and must be addressed as such.
Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Global Climate Change. Page 31. Abrupt Climate Change. Paragraph 1. The section needs additional discussion and clarification of past and anticipated “abrupt” and “rapid” climate change. Put the subject in a context useful for those with responsibilities for planning adaptation strategies and measures. Who is responsible for abrupt climate change—what are the measures to be taken? What measures should be taken for rapid climate change, and what would be the effects and impacts on emissions?
Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Philip Keillor - ASFPM Member

National Climate Change. Storms. Page 38. Paragraph 3. Shifting extra-tropical storm tracks (and the accompanying graphic on the same page: Projected Changes in Strong Non-Tropical Storms). This important information needs augmentation. How have the jet streams shifted over North America in response to climate change to date and how do the jet streams affect storm tracks? Does climate change alter the pace in the cross-continent progression of loops in the jet stream? How are future shifts in the jet streams and storm tracks expected to alter the frequency, persistence, and intensity of future storms and precipitation patterns? Use a few examples that led to droughts and floods. Readers need more help in grasping the significance of this aspect of climate change, and realizing that the modeling of such changes is extremely challenging.

Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

National Climate Change. U.S. Emissions of Heat-trapping Gases. Page 40. Paragraph 2. It is unclear whether natural carbon dioxide sinks have been growing or declining in the United States.

Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

National Climate Change. U.S. Emissions of Heat-trapping Gases. Page 41. Paragraph 2. Does melting permafrost depend on warmer Arctic winters? Has the melting of permafrost and the accompanying release of methane and carbon dioxide to the atmosphere already begun in Alaska and Canada, as has occurred in Siberia? If not, what threshold of temperature rise in arctic warming is expected to bring significant release of these gases?

Philip Keillor - ASFPM Member

National Level Climate Impacts. Page 42. Bullet 4. It is true that the insurance industry is particularly vulnerable to increasing extreme weather events, but explain how they can help society manage the risks. For example, mention that property owners taking the initiative to mitigate their homes should receive financial incentives; market forces should be used to both spread and aggregate the risk. We should mention up front the critical financial role that the insurance industry plays in risk.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

National Level Climate Impacts. Page 42. Bullet Missing. Add a bullet on the importance of protecting critical facilities against the impacts of climate change. Critical facilities are defined as shelters, hospitals, first responders, nuclear sites, and wastewater and sewage treatment plants. These facilities need extra protection to the 500-year design standard, and obviously every precaution should be taken to locate them out of all areas subject to flooding, coastal erosion, coastal inundation, and riverine flooding.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair
National Level Climate Impacts – Society. Page 44. Graphic: U.S. Population and Growth Trends Change in county population, 1978 – 2030. The view perspective of this important graphic needs to be altered with a steeper angle from the horizontal, and shorelines made darker to reveal the coasts, particularly the coasts of the Great Lakes which are hidden behind growth bars in the existing graphic. Much of the growth occurred along the nation’s coasts.

Philip Keillor - ASFPM Member

National Level Climate Impacts – Society. Page 45. Paragraph 3. The tone of this paragraph that begins with a statement about development choices is oddly out of step with the sobering information provided earlier in this chapter and elsewhere in this draft report. The development choices made by individuals, corporations and other institutions, influenced by government, seem in many places to be on a “collision course” with some of the consequences of climate change (storms, floods, droughts, sea level rise, etc.). This stronger tone, commonly used by natural hazard experts, seems as appropriately applied to rapidly-growing cities in the dry Southwest as it is commonly applied to development in coastal areas.

Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

National Level Climate Impacts – Society. Page 48. Paragraphs 2, 4, 5, and Page 49, Paragraph 1. Throughout these paragraphs is scattered quantitative information on the incidence of urban heat island effects, heat waves, floods (inland and coastal) before and after projected climate change. Collectively, this information provides a powerful sense of the challenge of Adaptation without Mitigation and the scale of a few climate change challenges facing North Americans. This quantitative information bears repeating in the Executive Summary.

Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

National Level Climate Impacts – Society, Page 51, Paragraph 5. 4th sentence regarding increased losses were the 1993 Midwest Floods to recur should be updated to provide the local and regional costs associated with the 2008 Midwest Floods, even if preliminary.

Sam Riley Medlock, CFM, JD - ASFPM Program Manager

Wildfires, Page 58. It is too simplistic to simply state “wildfires are already increasing due to warming”. There are many issues at play, including questionable forest management practices, recent droughts (unrelated to warming), large population growth in arid regions, and encroachment into the urban-wildland interface. Also, it should be noted that post-wildfire conditions greatly increase the threat to flooding, including mudflows. In fact, in many western states, the most flood prone areas are not necessarily the classic riverine threats, but rather post-wildfire floods downstream of burn scars.

Kevin Houck, P.E., CFM - ASFPM Arid Regions Committee

National Level Climate Impacts – Transportation, Page 77. The first partial paragraph needs to discuss the issue of aging transportation infrastructure, especially bridges and roads, and resulting increased vulnerability to damage or destruction in even moderate floods that the infrastructure may withstand if properly designed and maintained. Although discussed on p. 80 in the context of hurricanes, the issue warrants discussion here, as well.

Sam Riley Medlock, CFM, JD - ASFPM Program Manager
National Level Climate Impacts – Water Resources. Page 90. Paragraph 2. Mention the regions where rapid or major population growth is expected to 2025…not just the region with the highest expected rate of growth. Is major population growth expected to continue in coastal areas? What about the arid regions in the west and southwest?

Philip Keillor - ASFPM Member; Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

National Level Climate Impacts – Water Resources. Page 92. Paragraph 1. Line 15. The reference to “new methods for incorporating climate change impacts and the resulting additional uncertainty” …”well developed in academic case studies”…….refers to what aspects of water planning? I’m not aware of such accomplishments. The profoundly important statement at the head of this page poses a challenge to all who engage in water planning (including academics): “The past century is no longer a reasonable guide to the future for water management.” We suggest adding an endnote to direct readers to the cited academic case studies and experimental methods.

Philip Keillor - ASFPM Member; Sam Riley Medlock, CFM, JD - ASFPM Program Manager

National Level Climate Impacts – Water Resources. Page 92. Paragraph 3. An added bullet in the list of barriers to changes in water management that account for climate change is the lack of regional climate models (regional atmospheric circulation models) to interface with global models and provide a credible indication of anticipated climate change at the regional level. Reference the mention of this issue in the later section; Pathways to Improved Decision Making.

Philip Keillor - ASFPM Member

National Level Climate Impacts – Natural Environment and Biodiversity, Page 111. The section on invasive plants needs material added regarding the role of invasive aquatic species such as Hydrilla verticillata (hydrilla) and Hygrophila polysperma (hygrophila) in increasing flood heights due to loss of valley storage taken up by invading plant colonies, in addition to its effects in shading out natural vegetation, reducing oxygen level, and increasing the amount of sediments. Additionally, invasive aquatic species impact flood damage reduction structures such as dams by clogging emergency spillways and flood gates.

Sam Riley Medlock, CFM, JD - ASFPM Program Manager

Southwest, Page 136, Second Paragraph. It is strongly cautioned against making the strong statement – “Climate change is well underway in the Southwest”. While many experts believe it, this has not been conclusively proven, and stating this as fact is dangerous. It is not unanimous that this is not simply a “hot spell” not unlike those experienced in the past. While many experts will probably agree with this statement as written, it is inappropriate as stated here. In the following paragraph, the same comment goes for “human-induced warming is also causing a decline in spring snowpack and Colorado River flow”. This should not be stated as fact. There is no direct evidence that climate change is responsible for declines in snowpack. This has not been observed in a true cause-and-effect sense, and it is only a theory regarding future conditions. The only absolute inference that can be made is that climate change would alter the timing of snowmelt. The same comment can be made for Colorado River flows. While there is no question that flows into Lake Powell have been significantly reduced in recent years, this appears to be more related to a fairly substantial regional drought (which may or may not be related to climate change) than proven climate change. This should not be presented as fact as stated.

Kevin Houck, P.E., CFM - ASFPM Arid Regions Committee
Regional Climate Change Impacts – Coasts. Page 152. Paragraph 3. The sea level rise problem for the coasts includes more than “significant sea level rise”. It is overshadowed by the present perceived instabilities and potential breakdown in the Greenland ice cap and parts of the Antarctic ice sheets. An IPCC (2007) report stated: “This (breakdown of either polar ice sheet) questions both the long-term viability of many coastal settlements and infrastructure (e.g. nuclear power stations) across the globe and the current trend of increasing human use of the coastal zone, including a significant coastward migration. This issue presents a challenge for long-term coastal spatial planning.” (Page 41 in Parry, M.L., O.F. Canziani, J.P. Palutikof and Co-authors 2007; Technical Summary. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. vander Linden and C.E. Hanson, Editors. Cambridge University Press, Cambridge, U.K.). The information on ice sheet instability available to planners is limited by a number of factors that are probably spelled out in the USCCP’s second draft report on Abrupt Climate Change (April 2008).

Philip Keillor - ASFPM Member

Coasts. Page 153. Paragraph 1. When mentioning the susceptibility of Boston and New York to sea level rise, we must mention the critical nature of the vulnerability of their intermodal transportation systems—these transportation systems are among the largest in the world, moving people by subway, bus, and highway. The most vulnerable transportation components to sea level rise and storm surge are the underground subway systems. It would take very little water rise to cripple these transportation systems. The economic impact on these cities would be devastating. Recovery of these large metropolitan areas would take a very long time and thus have a severe detrimental effect on their economy.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

Coasts. Page 155. Adaption Strategies. Shaded Box at Bottom of Page. Please do NOT mention or advocate the use of hard structures such as levees or sea walls as a means to stave off the impacts of sea level rise or coastal inundation. If that is not your intention in this section, then it is very confusing and must be clarified because it is not a wise adaption strategy. Much of the damage to the coast is because of the construction of these very structures: sea walls, groins, jetties, armorng, and levees, just to name a few. Progressive States such as Rhode Island have realized how harmful these “hardened” structures are and have placed moratoriums on permitting them, with good reason. Even the U.S. Army Corps of Engineers has pulled away from hard structures in favor of “soft solutions” such as acquisition and enhancing of wetlands and habitat restoration. In addition to the negative impacts that these hardened structures create as a response measure to climate change and to protect property and infrastructure from coastal flooding, when such structures are built they require operation and maintenance, which can be very costly and a problem for most communities. Federal agencies do not provide grants for the operation and maintenance of these structures, and in the event of their damage during a disaster; FEMA public disaster funds or even mitigation funds do not pay for the repair or replacement of these structures.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair
**Bark Beetle Infestations, Page 158.** Winter temperatures paragraph: It is reported that -40 degrees temperatures for several days is needed to kill off the beetles. This is not a common assessment. Some studies have shown that sustained -20 degree temperatures for two weeks will kill the insects. Other studies have shown that -30 degree temperatures for five consecutive days will do it. Finally, a study exists that shows -40 degrees for only twelve consecutive hours kills the insect. For this application, it is recommended that the exact temperature reported be dropped and replaced with “bitter cold temperatures sustained for several days”.

Kevin Houck, P.E., CFM - ASFPM Arid Regions Committee

**Response Adaption Strategies Revisited: Focus on Adaption. Page 160.** Shaded Box at the Bottom of the page: “Insurance and Adaption.” Add a section titled “Local Insurance Incentives: the FEMA Community Rating System.” You discuss the role of insurance on a national/global scale, but not in a way that would really make the reader care, because they don’t understand how it affects them. However, the CRS can be briefly described here and explained that it would provide reduced annual insurance premiums. It is directly related to providing a financial incentive to the local community officials for better response strategies through management, zoning, building codes, implementation of stormwater and watershed regulation, and purchasing open space; in essence, better floodplain management above the basic regulations of the NFIP. The CRS rewards those communities that take steps to reduce the damages caused by floods by awarding points—the more points earned, the greater the reduction to the homeowner’s annual insurance premium. In Rosemont, CA, they have done so well that all of the property owners in that community receive a 45 percent savings on their annual insurance premiums. This is just one measure that can reduce the impact of increased flooding from climate change. This program is a win-win example of a response strategy for local officials, politicians, and homeowners to actively respond to the impacts of increased damages in their community caused by flooding and storm surge created by climate change.

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair

**Pathways to Improved Decision Making. Page 162.** Add a new key question: What is a best-estimate, upper bound for sea level rise over the present century and beyond, assuming a continuation (or acceleration) of the present apparent instabilities in Greenland and Antarctic ice sheets? Coastal planners and coastal engineers need a gathering of experts to critically examine available evidence and form a consensus approach to answering this question. The continuing absence of an upper bound for expected sea level rise in this century and beyond is unacceptable in planning, constructing and maintaining coastal communities and facilities.

Philip Keillor - ASFPM Member

**Pathways to Improved Decision Making. Page 162.** This discussion and diagram is missing any mention of mitigation. FEMA has recently improved their benefit-cost analysis methodologies and has also developed a Losses Avoided methodology for communities to use when they have been hit by natural hazards and previously mitigated areas suffer no damage. This is valuable data that should be mentioned and shared. In your diagram, from the bubble “Impacts to Adaption” there should be a line “Losses Avoided.” To the right of the “Adaptation” box, two bullets should be added: “Better understanding of the effectiveness of mitigation,” and “Benefits of mitigation.”

Pamela Pogue, CFM - ASFPM Coastal Committee Co-Chair