The following are my comments on Carpinteria’s “Draft Sea Level Rise Vulnerability Assessment and Adaptation Plan”. I appreciate the opportunity to review the document and give feedback.

In early August of 2018 I submitted comments on the first part of this document (the “Vulnerability Assessment”, including the Executive Summary and Chapters 1 through 6). Those parts of the document appear to be unchanged. I will not repeat those comments here, but I’ll note that the main areas of improvement I suggested for those parts of the document were:

- a more concise and useful Executive Summary, in particular one that does a better job highlighting key information for decision makers, and
- a clearer discussion of scenario selection and future SLR scenarios and probabilities in Chapter 4, including line graphs depicting predictions for future SLR in the Santa Barbara region as given in the OPC 2018 report.

I look forward to seeing the revised version of those parts of the document. The rest of this comment relates to the new parts of the document (the “Adaptation Plan”), specifically Chapters 7 (“Adaptation Overview”) and 8 (“Adaptation & Resiliency Building Strategies”).

I’m impressed with the work that went into the Adaptation Plan. At the same time, I believe the current draft of the document is inadequate. While it does a good job describing the risks Carpinteria faces due to sea level rise (SLR), it fails to articulate a set of strategies that would be adequate to deal with those risks. The document reads as if it reflects two distinct points of view: One from the perspective of someone who understands the nature and urgency of the problem SLR represents, and another from the perspective of someone who mistakenly believes SLR is a problem that can be addressed with short- and medium-term solutions only, in the hope that more fundamental, longer-term responses will prove unnecessary. This second point of view is especially apparent in the document’s treatment of managed retreat, where the proposed strategies fall short of what the Adaptation Plan’s own risk analysis shows to be both timely and necessary.

In its current form the Adaptation Plan deserves a grade of “Incomplete”. It should be revised to present a set of managed retreat strategy options that would be adequate to deal with the risks it describes.

In the following comments I go through the Adaptation Plan section by section, suggesting ways this issue can be addressed. I also offer suggestions for addressing a number of less fundamental but still significant shortcomings. These include:

- The benefits and costs of the current winter berm program should be clarified.
- The discussion of the USACE feasibility study does not adequately address the problem
of that study’s failure to consider SLR.

- The discussion of “living shoreline” principles is not adequately tied to the specific circumstances of Carpinteria’s Beach Neighborhood.
- I am concerned that there could be an inappropriate conflict of interest, or at least the appearance of a conflict of interest, in the city’s internal decision making.

Finally, at the end of my comments is a list of minor corrections/typos that I noticed.

Thank you.

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Maladaptation

I want to begin by pointing to Chapter 7’s definition of maladaptation. I thought this concept was well presented. It was very helpful to me in understanding why the document’s later vagueness and timidity on the subject of long-term adaptation strategies (especially managed retreat) is a problem.

Maladaptation is defined on pages 7-9 and 7-10 as “adaptation measures that reduce the ability of people and communities to address and respond to climate change over time.” A maladaptive strategy is one that leads in a direction that “reduces incentives to adapt while it simultaneously diminishes the capacity to adapt in the future.” For example, an over-reliance on protective measures at the expense of managed retreat can lead to “a more rigid system with a false sense of security” that can “reduce incentives to adapt,” both characteristics of maladaptation.

This is precisely the mistake that I believe Chapter 8 of the Adaptation Plan makes. In the discussion below I go through Chapter 8 section by section, giving more details about this shortcoming and suggesting ways it could be addressed.

Adaptation Plan Matrix

Figure 8-1 (“Carpinteria Adaptation Plan Matrix”) (p. 8-4) provides an important summary of the Adaptation Plan’s list of proposed strategies. I’ve included it below:
I have two main concerns about Figure 8-1. The first is that it dramatically limits and oversimplifies the possible “retreat” strategies. Later in the Adaptation Plan, in the discussion of a “Coastal Adaptation Overlay”, that zoning change is described as possibly including elements of a retreat strategy. The document’s treatment of that aspect of a coastal adaptation overlay is cursory, though, and insufficient to support meaningful decision making. The only other retreat strategy included in Figure 8-1 or in the subsequent Adaptation Plan discussion is “Repetitive Loss Program”. As discussed in more detail below, however, a repetitive loss program is essentially reactive, and by itself is insufficient to constitute a proactive managed retreat process.

The second concern I have about Figure 8-1 is timing. By lumping all retreat strategies into those last two rows, then identifying the “trigger” (to initiate planning and implementation) as “0 feet SLR” (i.e., today) and the “tipping point” (when SLR critically affects vulnerable assets, resources, or infrastructure) as “~2 feet SLR”, the document oversimplifies the relevant timing for the managed retreat strategy, and risks confusing decision makers about the importance of early action before we reach the tipping point.

To understand this concern it is helpful to back up a bit. The Vulnerability Assessment that
makes up the first part of this document identifies the state’s OPC 2018 report as containing the best available guidance on SLR for the Santa Barbara region. In my August comments I recommended adding line charts illustrating that guidance; I’ve included those charts below.

These predictions show that according to the best available science Carpinteria faces:

- a remote but real chance of ~2 feet SLR by the 2040s (H++ scenario),
- a 1-in-200 chance of ~2 feet SLR by the 2050s (RCP 8.5, 0.5% probability),
• a 1-in-20 chance of ~2 feet SLR by the 2060s (RCP 8.5, 5% probability),
• a 1-in-6 chance of ~2 feet SLR by the 2070s (RCP 8.5, 17% probability), and
• a 1-in-2 chance of ~2 feet SLR by the 2090s (RCP 8.5, 50% probability).

As discussed later in the Adaptation Plan, a new residential structure has an expected life of roughly 75 years (see Table 8-9, p. 8-27). That means that under an RCP 8.5 scenario, new development taking place today in the Beach Neighborhood has an even chance of experiencing the ~2-foot tipping point before the end of its useful life, and a smaller but still significant chance of experiencing it sooner. Protection and accommodation measures can help avoid some of those impacts, at least for a while, but only by incurring significant impacts in terms of reduced beach access and recreation and harm to sensitive coastal resources. Over time the cost of protection and accommodation measures will increase while the effectiveness of those measures will decrease. Eventually the only viable option will be retreat.

It’s useful to think of this in terms of the military origins of the “retreat” concept. In a military context, if a defending force’s leaders recognize early enough that they face a losing battle they can move back to a more defensible position at relatively low cost. If they wait until the enemy is upon them, though, the retreat can turn into a rout, with heavy losses.

Carpinteria still has time to carry out an orderly retreat from the Beach Neighborhood. With each year that passes, though, and with each additional dollar invested in Beach Neighborhood development, we make our ultimate retreat more costly. The “Adaptation Plan Matrix” shown in Figure 8-1, and the limited discussion of managed retreat that follows it, obscure that fact. This information should be included in the Adaptation Plan so decision makers have the information they need to make informed choices about SLR.

**Winter Storm Berm**

The presentation of the costs and benefits of the current winter storm berm program (pp. 8-5 to 8-7) should be clarified. Table 8-1 (p. 8-6) lists the following benefits and costs.

Under **benefits** the table says:

• Protection of recreation resources (City Beach, public parking, bike facilities, and restrooms) between Ash Avenue and Linden Avenue
• Retain the Citywide economic benefits of beach recreation for the period during which the berm program is effective

Under **costs** it says:

• Potential loss of available sandy beach during winter
• Potential impacts to beachside aesthetics
In that the berm actually makes the beach less suitable for beach recreation during the time it is in place, why is "City Beach" listed as a benefit of the berm in the cost/benefit table? In what sense is the berm contributing to retaining the “Citywide economic benefits of beach recreation”, as distinct from protecting beachfront property and infrastructure (parking lots, bathrooms) from flooding and storm damage? The relationship between the winter berm and beach recreation should be clarified.

Similarly, why are the costs of the berm described as “potential” loss of available sandy beach and “potential” impacts to beachside aesthetics, when those losses and impacts are real and ongoing? It sounds as if the document is trying to cast the winter berm in a more favorable light by using this language. But effective planning requires accurate and objective characterization of costs and benefits. To the extent the report engages in salesmanship to maximize the perceived benefits and minimize the perceived costs of the winter berm it undermines the report’s effectiveness as a decision-making and policy-setting tool. The use of this language should be reviewed.

USACE Feasibility Study

Pages 8-7 through 8-9 discuss the US Army Corps of Engineers (USACE) Storm Damage and Shoreline Protection Feasibility Study. The fact that this study makes no provision for SLR limits its usefulness for the SLR-containing future that we know is coming. In light of this, why is further funding of this study by the city justified? To what extent are the study’s results still useful given the reality of future SLR?

The Adaptation Plan addresses this concern somewhat with this statement:

As a next step, the City intends to closely coordinate with USACE to integrate relevant findings of this Report into the Feasibility Study. Inclusion of this Report’s sea level rise modeling data and City-identified adaptation priorities (e.g., a living shoreline project), would provide an up-to-date framework for continued USACE investigations and project implementation, and could significantly offset ultimate project costs.

My concern is that the desire to continue the study may be based in part on the money that has been previously spent rather than on an objective assessment of the value of further expenditures. Is there a sunk-cost fallacy influencing the decision to continue funding the study? It would be helpful if the Adaptation Plan included additional discussion of why continued investment in the study is justified.

Proposed Adaptation Strategies

In Chapter 8, pp. 8-11 through 8-29 include the section headed "Proposed Adaptation
Strategies”.

Under this heading the following subsections (only) appear:

- Living Shoreline
- Sediment Management
- Sand Retention Structures
- Storm Drain Improvements
- Coastal Adaptation Overlay
- Repetitive Loss Program

This list of strategies is heavily weighted toward the "Protect" and "Accommodate" categories. (This can also be seen in section 8.4, "Area Specific Approaches”, under the heading "Area 1: Beach Neighborhood” on pp. 8-37 to 8-41, where the only strategy listed under the "Managed Retreat” heading is "Repetitive Loss Program"). In particular, there appears to be no mention of strategies corresponding to the following areas listed in the CCC Sea-Level Rise Policy Guidance on managed retreat (see Chapter 7, p. 7-8):

- Develop a plan to remove or relocate structures that become threatened to coastal hazards.
- Plan to replace loss of land uses that could be lost to inundation or damage associated with sea level rise.

Transfer of Development Rights (TDR), in which the city creates a market that compensates Beach Neighborhood property owners for helping shift development from areas of high SLR risk to areas of lower risk, is not mentioned in the proposed strategies in Chapter 8. What was the basis for excluding it from discussion?

Earlier in the document (Executive Summary, under “Positive Findings”, p. 8) there was a mention of Bluffs 0, which the report says “represents an opportunity for future redevelopment when the site is remediated and repurposed.” Later, under “Recommended Future Studies”, p. 9, the Executive Summary says, “Bluffs 0 is located in a highly desirable area on the coast which could potentially be redeveloped following remediation of soil and groundwater resources with land uses that are subject to coastal hazards in other areas of the City.” Finally, under the heading “ES.4 Adaptation Planning and Next Steps” (p. 10), in the bullet point on “Managed Retreat strategies”, the Executive Summary says that “these strategies can include a range of policies and programs that incentivize relocation such as repetitive loss programs, acquisition and buy-out programs, and transfer of development rights programs. The key is doing it in a proactive, phased and orderly manner to avoid expensive emergency responses.” With the exception of repetitive loss programs, none of these strategies are explored in Chapter 8. Why weren’t they?

Why does the discussion of future strategies in Chapter 8 not reference the timeline and
projected probabilities of future amounts of SLR, as discussed above in my comments on Figure 8-1? Where is the discussion of how we might proactively remove or relocate structures from the Beach Neighborhood before the community experiences repetitive losses? A repetitive loss program would do little to incentivize early migration of residential development out of the Beach Neighborhood. It would simply recognize and respond after-the-fact to losses that had already occurred.

This is inadequate. It is maladaptive, according to the definition in Chapter 7. By allowing continued development in the Beach Neighborhood while failing to explore a full range of strategies for managed retreat, the city would constrain Carpinteria’s future options for dealing with SLR, increase the community’s vulnerability, and reduce its adaptive capacity. Such an approach would privilege the short-term financial interests of a relatively small group of Beach Neighborhood property owners over the community’s interest in minimizing coastal hazards, maintaining beach recreation, and preserving our small beach town character. These facts should inform an expanded discussion of managed retreat strategy options in Chapter 8 so decision makers have the information they need to respond effectively to SLR.

**Living Shoreline**

The Adaptation Plan includes extensive discussion of the “living shoreline” concept. See Chapter 8, under the section “Living Shoreline”, pp. 8-11 to 8-16. That discussion includes the following passage:

*Historically, the City’s western one mile of shoreline supported a large dune field which buffered low-lying areas from wave attack and flooding. The former dune system has been eroded over the last 90 years, largely due to human impacts (or influences), and the dune system has not recovered.*

The concept of a restored living shoreline, with a dune system comparable to the one that existed before the construction of beachfront housing, is a good one. I believe that removing residential development from the Beach Neighborhood via a managed retreat process, then restoring the pre-existing dune system and wetland, is the best long-term solution to minimize losses and retain Carpinteria’s small beach town character in the face of SLR. The sooner we acknowledge that and plan for it the better our chances of making that transition in a cost-effective manner.

In this document, though, that living shoreline concept is being confused with a very different concept: the creation of a reduced version of a living shoreline that I refer to as “living shoreline lite”. In the portion fronting the Beach Neighborhood this would consist of a relatively small dune located between the current development and the water. Such a “living shoreline” would be more accurately described as a permanent version of the current winter berm with some additional living shoreline elements. Because it would be permanent, such a structure could include things like native dune vegetation and a rocky cobble substrate that the current
temporary berm doesn’t have. But it would also cause significant ongoing loss of public trust resources and beach recreation.

Table 8-4 on p. 8-12 summarizes the pros and cons of the living shoreline strategy.

It lists as benefits:

- Protection of roadways and infrastructure in the Beach Neighborhood
- Protection of shoreline residences and short-term rentals between Ash Avenue and Linden Avenue
- Protection of recreational resources (Carpinteria State Beach, Linden Field, trails)
- Protection of public infrastructure including roadways, public parking, bike facilities, and public restrooms
- Restoration of sensitive coastal habitat native to the area
- Retention of economic benefits associated with beach recreation and State Beach

It lists as costs:

- Construction costs (>$2.2 million)
- Moderate ongoing maintenance costs required (roughly $100,000 per year, though costs increase with time)
- Less effective over time with increasing rates of sea level rise, particularly as sea level rise nears 5 feet, which may result in more frequent overtopping of an installed dune system
- Potential loss of private views

This mixes together the two versions of a living shoreline (the full-scale restoration of something comparable to the original coastal dune and wetland, and the creation of a smaller permanent berm with living-shoreline elements) in a manner that is unhelpful for good planning. Some protection of the Beach Neighborhood would be accomplished by either version of the "living shoreline" concept. But a full-scale restoration would only be possible by first removing the current beachfront development on the historic dune. The smaller “living shoreline lite”, on the other hand, would cause significant losses to beach recreation. Those costs aren't listed, and would undo several of the listed benefits of the strategy, such as “Protection of recreational resources” and “Retention of economic benefits associated with beach recreation.”

Both of these living shoreline concepts have the potential to be important parts of the city’s plan for dealing with SLR. But they are different strategies with different costs and benefits. Mixing them together as the draft Adaptation Plan does is a bad idea. It might make it easier to sell the “living shoreline lite” concept to the public, since it can be associated with the greater long-term benefits of a true living shoreline. But that would be misleading.

It is important as we plan our response to SLR that we look at the actual conditions of our
specific situation and how proposed strategies would work there, rather than at generic idealized versions of those strategies that don't match local circumstances.

Figures 8-2 and 8-3 (on pp. 8-13 and 8-14) are key to understanding this concern. I reproduce them below.
Figure 8-2 makes clear that the city is proposing creation of a section of the proposed "living shoreline" dune on the ocean side of the current edge of development along Sandyland Road between Ash and Linden. But looking at Figure 8-3, and considering the nature of that section of beach when the winter berm is in place, it is clear that there isn't room to create a true "living shoreline" there, at least not of the type illustrated in Figure 8-3.

The residential development along the south side of Sandyland Road was constructed atop the original dune system. (That was the first part of the Beach Neighborhood to be developed. It was only later that the marsh inland from the dunes was drained and filled to allow construction of the rest of the neighborhood.) As with the current winter berm, in order to construct a year-round “living shoreline lite” dune, that dune would need to be placed on top of the portion of the shoreline labeled “BEACH” in Figure 8-3.

Here is an updated version of Figure 8-3 that more accurately shows how the different elements would appear with a "living shoreline lite" dune:
As you can see, the combination of the beachfront housing having been built on top of the original dune system, and the loss of beach that has resulted from things like harbor and revetment construction and the capture of sediment in flood-control debris basins, means that a "living shoreline lite" protective dune would in effect permanently occupy and eliminate most of the Carpinteria City Beach above the high tide line (as happens with the winter berm today).

This does not mean that a "living shoreline lite" would be a bad idea. The creation of a year-round dune between Ash and Linden to replace the current winter berm may well be justified as a short-term strategy to protect beachfront development, and the inclusion of living shoreline features such as dune vegetation would have benefits that the current winter berm lacks. But this strategy would also involve a significant loss of beach recreation and public trust values, and those facts should be reflected in the Adaptation Plan’s discussion.

There is another aspect of the "living shoreline" concept as presented in the Adaptation Plan that is potentially problematic: To the extent it is viewed as a means of "buying time" to avoid pursuing managed retreat "for decades", allowing managed retreat to be treated as a "last resort" (statements that were made to me recently in private conversation by the city’s community development director), such a policy would be a maladaptive prioritization of
protection strategies over long-term managed retreat.

Retreat is not a “last resort” in the sense of being something we can reasonably hope to avoid. We know it is coming. The only question is whether we plan for it ahead of time or deal with it only after suffering catastrophic losses.

Coastal Adaptation Overlay and Managed Retreat

The discussion of a Coastal Adaptation Overlay on pp. 8-24 to 8-28 is good, but fails to adequately discuss how managed retreat strategies could be facilitated by zoning changes.

In the initial discussion of a coastal adaptation overlay on p. 8-24, the following appears:

*The Coastal Adaptation Overlay Zone could also provide a framework to transition at-risk development away from coastal hazards. The overlay zone may implement the concepts of managed retreat over time, by including standards for gradual relocation of development away from the increasingly hazardous surf and coastal flooding areas.*

After that, though, the Adaptation Plan’s discussion of the coastal adaptation overlay concept makes no mention of managed retreat. Later, in the area-specific discussion of adaptation strategies for the Beach Neighborhood (pp. 8-37 to 8-41), a coastal adaptation overlay is described only in terms of its use as part of an accommodation strategy, with no discussion of how it could be used to proactively encourage relocation of development. There is no exploration of the tradeoffs between maintaining property values via short-term protection measures on the one hand, and limiting exposure to coastal hazards via long-term managed retreat on the other. With the exception of a repetitive loss program, the concept of managed retreat simply disappears from the discussion. Given the information presented earlier in the document that vanishing act is remarkable.

Table 8-8 ("Proposed Adaptation Strategy - Coastal Adaptation Overlay Zone") states that the trigger for action is "Near-term, based on sea level rise elevation and lead time for adoption and implementation.” It appears, though, both from the discussion in the Adaptation Plan and from the community development director’s recent remarks to me about the living shoreline concept buying the city "decades” of additional time and making managed retreat a "last resort" strategy, that there is no expectation that this near-term planning activity would include elements of managed retreat.

In the section of the table labeled "Next Steps" there is no mention of incentivizing beach neighborhood property owners or exploring transfer of development rights as a way to accelerate relocation from the Beach Neighborhood. Nor is there any mention of the need for replacement residential zoning to allow managed retreat to happen under the constraints of the city’s Regional Housing Needs Assessment (RHNA) obligations.
There is no discussion of the timing of the movement of residential development out of the
beach neighborhood. There is no discussion of the projected probabilities of different amounts
of sea level rise across different time spans, and how that relates to Beach Neighborhood
vulnerabilities at ~2 feet of SLR.

All of these omissions should be corrected. The discussion obviously cannot include specifics of
precisely how and when managed retreat strategies will be implemented. But it should include
discussion of a range of strategies that are commensurate with the scale of the problem and
explore those strategies in enough detail for decision makers to meaningfully evaluate them.
Only in that way can the Adaptation Plan do its job.

Beach Neighborhood property owners have a strong financial incentive to maximize the value
of their property. But the costs to the community of allowing continued development in the
Beach Neighborhood are high, and will go higher. The information contained in the Adaptation
Plan makes it clear that the clock is ticking, and that every year that goes by without actively
pursuing a managed retreat process increases the community’s future costs. Because of the long
lead times needed for managed retreat, waiting until we are closer to the ~2-foot tipping point
to begin meaningfully preparing for it would be a maladaptive choice. The vulnerability
assessment in Chapters 1 through 6 and the adaptation overview in Chapter 7 make that clear.
The discussion of future adaptation strategies in Chapter 8 should be expanded to reflect that
reality.

Repetitive Loss Program

Repetitive loss programs are discussed on pp. 8-28 and 8-29.

Strategies tied to FEMA’s repetitive loss program would be insufficient to proactively address
the risks to Carpinteria due to SLR. By the time repetitive losses have taken place we already
will have missed the opportunity to avoid those losses. A repetitive loss program, to the extent
we end up needing to rely on it, will be an admission that we’ve failed to plan adequately. It
certainly is worthwhile to include it in the Adaptation Plan. But it should be presented as part of
a larger package that includes more proactive managed retreat strategies, rather than being the
only long-term retreat-related strategy discussed.

The following passage on p. 8-29 is a key part of the document. I’m going to quote it at length
because I think is a dramatic example of the two competing points of view that I spoke about in
my introduction:

As a mid-to-long term adaptation strategy, the City may choose to implement a repetitive loss program
that allows properties subject to repetitive loss to be downsized, moved away from the shoreline, or in
extreme cases with frequent and severe damages, may even grant the City, State, or other public agency
the right of first refusal to purchase the property and restrict for open space uses. Any such program would be designed to be consistent with FEMA’s repetitive loss program. In accordance with the CCC Draft Residential Adaptation Guidelines (2018), the City could choose to adopt a policy within the GP/LCP Update that provides a mechanism for such a program to be developed.

Implementation of a repetitive loss program, when combined with policies that prohibit seawalls or hard armoring along the sandy beach, would over time result in the downzoning of property directly abutting the shoreline. Currently, 79 residential structures are vulnerable to damage and flooding from coastal hazards; an additional 164 residential structures become vulnerable with approximately 1 foot of sea level rise, 234 additional residential structures become vulnerable with approximately 2 feet of sea level rise, and 264 additional residential structures become vulnerable with approximately 5 feet of sea level rise, for a total of 769 structures (refer to Table 6-1). This translates to over 45 acres of residential land uses. It is anticipated that over time, sea level rise would result in repetitive loss to at least a portion of these structures, triggering relocation or removal, and potentially the change in land use to open space.

It is important to note, however, that the City’s intent is to combine this adaptation strategy with other protection strategies, such as a living shoreline and beach nourishment, which could provide an additional buffer for private development from coastal hazards in the nearterm. Nonetheless, in the mid- to long term and with higher elevations of sea level rise, protection strategies may be less effective and could result in loss or damage to private property. Implications of a repetitive loss program include increasingly high insurance rates for flood premiums, which could impact property values and local tax revenues. In addition, in the long term, the City may experience a loss of housing units and short-term rentals, resulting in economic losses to the City in the form of tax revenue and transient occupancy tax (TOT) from hotels and short-term rentals. Further, given the extremely high land value in coastal areas of the City, public acquisition of private property could be cost-prohibitive for the City to pursue. Prior to implementation of a repetitive loss program, the City would continue to monitor triggers such as storm frequency and sea level rise and evaluate the effectiveness of this measure with consideration to social, economic, and environmental effects.

As I said above, two conflicting perspectives appear to be competing with each other here. One perspective, which is evident in the document’s vulnerability assessment and adaptation overview, is that without taking significant proactive steps the community will be subject to dramatic negative consequences. The second perspective, though, which only emerges here at the end of the document, emphasizes the uncertainties in the vulnerability assessment, the difficulties of shifting development out of the Beach Neighborhood, and the role of protection and accommodation measures in providing a buffer against those impacts.

This new voice appears to be shying away from addressing the need for a long-term solution. Its approach is too timid. The managed retreat strategies it offers are vague and nonspecific, in effect kicking the issue down the road for future generations of Carpinterians to deal with. But as discussed above, and as the Vulnerability Assessment makes clear, that response is profoundly maladaptive.
The Adaptation Plan should resist the urge to soften the language of predicted impacts through statements like "with higher elevations of sea level rise, protection strategies may be less effective and could result in loss or damage to private property" (emphasis added). Such language runs counter to the evidence provided earlier in the document and in the referenced guidance materials. With higher elevations of SLR the described protection strategies will be less effective and will result in loss or damage. We know that. It's not a matter of opinion, and should not be mischaracterized through the use of hedging language.

As a community we must face the issue of SLR head on. We must devise and implement strategies that are commensurate with the scale of the problem. Sea level rise will result in the Beach Neighborhood experiencing increased coastal hazards and frequent flooding. The only question is how soon and under what circumstances that happens. Some of those factors are uncertain. But only by being honest with ourselves about the nature of the risk and the scale of the required response can we hope to protect the community not just in the short term but in the long run as well.

An Adequate Discussion of Managed Retreat

The Vulnerability Assessment makes it clear that a bold, proactive response to SLR in Carpinteria is needed if disastrous impacts to the Beach Neighborhood and to the community’s small beach town character are to be avoided. As discussed in my comments above, the Adaptation Plan’s current discussion is inadequate to help develop such a response. Especially in the area of managed retreat, the Adaptation Plan’s treatment is cursory and vague. That should be corrected, and it should be corrected in this update cycle, not foisted off on future generations of Carpinterians. What might be included in such an expanded discussion?

Land use replacement: Under state law Carpinteria is responsible for meeting Regional Housing Needs Assessment (RHNA) targets. Any plan to shift residential zoning out of the Beach Neighborhood will need to be balanced by the creation of new residential zoning somewhere else. The Adaptation Plan’s long-range strategy discussion should address this issue. One site mentioned earlier in the document is the Bluffs 0 parcel (until recently the site of an oil and gas processing facility and currently undergoing decommissioning). That possibility should be explored in more detail.

Incentivization: The current long-range strategy discussion in the Adaptation Plan largely shies away from discussing how to shift development out of the Beach Neighborhood. The only real discussion is in the passage I quoted above from p. 8-29, describing a scenario in which repeated losses and rising insurance rates drive property values down and the city potentially could purchase the property. As the discussion notes, though, “public acquisition of property could be cost-prohibitive.” Further, the timing of such an approach would be maladaptive, since it would
play out only after losses had already occurred. The discussion should be expanded to explore strategies that would incentivize Beach Neighborhood property owners to take proactive steps in support of managed retreat. One such approach might be transfer of development rights (see below).

**Transfer of development rights:** Under a transfer of development rights (TDR) program, the city would not need to compensate Beach Neighborhood property owners directly to facilitate managed retreat. Instead, the city would create a system where Beach Neighborhood owners receive some kind of “coastal development credits” in return for taking specified actions in support of managed retreat. The city would then require developers of new housing at higher elevation to purchase those credits in order to build, in effect creating a market in which the profits from new development compensate Beach Neighborhood property owners for losses due to SLR.

A TDR system would allow decision makers the flexibility to incentivize different types of actions to different degrees and according to different milestone events. For example, they might decide that replacing beachfront development along Sandyland Road to create a full-scale living shoreline dune system was a priority. To facilitate that they could use a zoning overlay to compensate beachfront property owners with a relatively large number of credits in return for actions in support of that restoration. Other Beach Neighborhood owners further from the shoreline might receive a smaller number of credits in return for accommodation actions such as converting a structure to sit atop elevated caissons, or removing a structure entirely and letting the property revert to a tidal wetland.

**Triggers:** The long-range strategy discussion in the Adaptation Plan would benefit from more discussion of the ways in which specific events (“triggers”) could be tied to specific milestones in the managed retreat process. What would the specific steps in a managed retreat process be, and by what amounts of SLR would they need to be accomplished in order to avoid specific types of impacts? The Vulnerability Assessment provides detailed information that makes such planning possible. The Adaptation Plan should take advantage of that information to provide a more specific idea of what an effective managed retreat process would look like.

I’m sure the city’s professional planning staff and expert consultants can do a better job than I can of coming up with strategy options for managed retreat. Any plan they suggest will then go through more changes as decision makers, affected stakeholders, and the larger community engage with it. The initial version of such a plan does not need to be perfect. But it needs to exist. It needs to at least try to lay out a roadmap to address the challenges identified in the Vulnerability Assessment, including strategies to achieve managed retreat from the Beach Neighborhood within the timeframe dictated by the best available evidence on future SLR. The current version of the Adaptation Plan doesn’t do that.

**Potential Conflict of Interest**
A key issue that our community will grapple with in the years ahead is the inherent conflict between Beach Neighborhood property rights and the larger community’s right to protect itself from coastal hazards and the potential loss of public beach due to SLR. It is hard to avoid noticing a potential conflict of interest, in that the city’s Director of Parks and Recreation, Matt Roberts, who has been a key player in developing the Adaptation Plan, is a member of a family with a long history of owning and managing beachfront property along Sandyland Road.

I want to be clear that I’m not making an accusation of wrongdoing. I don’t know the specifics of Matt’s current ownership or management interests, if any, in the Beach Neighborhood. More importantly, I’ve known Matt for many years, consider him a friend, and know that he is a dedicated city employee who has demonstrated many times over that he is a faithful steward of the community’s interests. I believe his vision and energy are a key asset for the community in addressing the challenges we face due to SLR.

At the same time, I come back to the principle stated in the Adaptation Plan’s Chapter 7, p. 7-9:

One of the most controversial trade-offs of adaptation is associated with the longterm preservation of a beach, which often pits private and public interests against each other with strong overtures to social justice and community inequality... Good adaptation planning considers these trade-offs and how adaptation measures implemented to alleviate vulnerability in one sector may affect other sectors.

As the community deals with this difficult balancing act, even the appearance of a conflict of interest could cause some to question the fairness of the city’s decision making.

I don’t have any specific recommendation on this issue. My hope is that I’m badly mistaken about the underlying legal/ethical concern, and that Matt’s significant contributions in this area can continue unimpeded. I feel that I owe it to the people engaged in this process to give them my honest feedback, though, and to suggest that at least in some cases it may make sense for him to step back from a direct role to avoid even the appearance of a conflict.

Conclusion

In the predawn hours of December 10, 2017, I stood on my street with my family and neighbors watching the hills above Carpinteria burn. For me it was one of the scariest moments of the Thomas Fire.

I didn’t learn until later that the fire we watched was a backfire that had been intentionally set by firefighters. That effort was successful; with the exception of some outlying homes the main parts of Carpinteria were saved.

I mention it because I think the events of that night are a useful metaphor for the situation we
face with sea level rise. In some ways the two situations could not be more different. One involves fire, the other destructive storm waves and floods. A wildfire burning toward a city plays out in a few hours; sea level rise will take decades. Indeed, it would take a combination of very bad luck (for us to experience a worst-case SLR scenario) and very good luck (for me to live longer than actuarial tables say is likely) for me to see two feet of sea level rise during my lifetime.

But in other respects the situations are similar. Each involves a destructive natural force beyond our control. Each features an opportunity for decision makers to see that destructive force coming and make choices about how to prepare for it. Finally, each presents an opportunity for bold action that, while difficult, holds the promise of avoiding much worse losses in the future.

Managed retreat is the sea-level-rise equivalent of a backfire. I encourage the preparers of the Adaptation Plan to give decision makers the information they need to recognize that opportunity and take advantage of it.

Minor Typos/Fixes/Questions

p. 7-6: "Offshore artificial reefs are used to dissipate wave energy consist of fill in the surf zone that reduces wave energy and anchors sand to the beach, slowing the rate of transport; kelp bed restoration may have similar effects." The sentence appears to be ungrammatical; maybe it should have a comma and the word "and" added after "wave energy".

p. 8-5 says the winter berm is up approximately 3 months of the year, from Nov. 25 to Mar. 5. Subsequent discussion in the report says the berm is pushed back down "by Memorial Day each year," which would be closer to the end of May. What is the actual schedule of the winter berm’s creation and removal?

p. 8-9: Under "Pending Projects", the following appears: "The following programs under by BEACON are pending but have not yet been initiated." The sentence is ungrammatical. Maybe delete the word "under"?

In Table 8-2 (p. 8-8) and again in Table 8-3 (p. 8-10) there is a mention in the row for "Permitting and Coordinating Agencies" of an agency with the acronym "CLSC". I’ve been unable to find that acronym expanded in the document. For example, it does not appear in the list of "Acronyms and Abbreviations" on page xi. Is it a typo? Or is it maybe a reference to a government agency that should be defined somewhere in the document?

p. 8-24, under "Coastal Adaptation Overlay", the following appears: "The overlay zone may implement the concepts of managed retreat overtime...” "Overtime" should be split into two words.
p. 8-37, under "8.4 Area Specific Approaches": The following text appears: "This section is organized using a spatial approach, which outlines regional strategies adaptation measures focused within the following three Areas.". The phrase "regional strategies adaptation measures" is awkward. Maybe just say "regional strategies" or "regional adaptation measures"?