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MEMORANDUM

To: Secretary John Laird, California Natural Resources Agency

From: Emily Wasley, Nitin Natarajan, Arianne Neigh, Trevor Clifford, Geoff Morrison, Cadmus

Subject: Draft Safeguarding California Plan: 2017 Update

Date: June 23, 2017

Dear Secretary Laird and Staff,

Thank you for the opportunity to review and provide comments on the draft report, *Safeguarding California Plan: 2017 Update*. We are encouraged by the hard work that the Natural Resources Agency has put in to California's updated adaptation strategy, the steps the state has already taken to prepare for and adapt to its changing climate, and the recommended actions outlined throughout the plan as next steps. We are also very pleased that clear metrics have been developed and included in this update so as to assess progress over time. We hope that the results from monitoring and evaluating these actions and measuring their effectiveness against these metrics will be transparent and clearly reported so that other members within the adaptation community can learn from the excellent work California is doing and see where adjustments are needed.

The suggestions and comments we've included in this memo were generated by several subject matter experts within Cadmus who have extensive knowledge of and on-the-ground California-based experience working in the sectors listed within the updated plan. Cadmus provides professional consulting services that help clients achieve their goals and create social and economic value today and for future generations. By applying exceptional technical expertise and a highly collaborative approach, we deliver customized solutions that address complex challenges facing the realms of natural and built environments, energy, public health, climate, homeland security, and international development. Cadmus' more than 500 consultants serve government, commercial, and nongovernmental organizations in the United States and abroad.

We hope that you find these useful and look forward to working with you in the future to realize these actions. Please reach out to me directly if you have any questions.

Sincerely,

Emily A. Wasley

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General Comments on the Draft Report

This section highlights some of our general comments to enhance the overall draft report, *Safeguarding California Plan: 2017 Update*.

1. **Opportunities associated with investing in adaptation actions need to be emphasized to illustrate the immense benefits of resilient communities:** The plan introduction and throughout focuses heavily on the risks and vulnerabilities associated with climate change. However, there is very little discussed about the economic, social, and environmental opportunities associated with investing in adaptation for long-term healthy and resilient communities. We recommend that along with identifying the various risks associated with our changing climate in the great state of California, the immense opportunities (e.g., new markets, technological advances, healthier communities, etc.) that exist when we invest in adaptation actions.
2. **Identifying and prioritizing financial resources and incentives for action would strengthen the plan and its transparency:** It's not clear how the next steps or ongoing actions outlined in the plan have or will be funded and through what source. Perhaps that's yet-to-be-determined, but it would be helpful if in an Appendix, there was a matrix that aligned the ongoing actions with the funding sources so the financing of adaptation is transparent. Often times, funding for adaptation is not a standalone source – instead it's incorporated into other existing programs or policies. We prefer this as it helps to ultimately institutionalize climate change into ongoing activities that need to consider the impacts. However, it would help to include a list of programs that fund these actions to illustrate not only the integration of climate into programs and projects, but also the overall return on investment over time.
3. **California uses climate science for action, but the sequence of the state climate assessments and the state adaptation plan updates is misaligned:** It's our understanding that California conducts a state climate change assessment every 4-5 years while the adaptation plan updates occur every 3 years. Is there a way to align the climate change assessment findings/reports to occur prior to the plan updates so that the latest science can truly inform the latest state adaptation plan? We helped to make this happen for the Federal government so that each Federal Agency's Adaptation Plan would be submitted to the Council on Environmental Quality and Office of Management and Budget a year after the National Climate Assessment (NCA) was released so the Agency Adaptation Plans would be informed by the latest information from the NCA. For more details on the sequence of this, see Section 5(b) of *Executive Order 13653, Preparing the Unites States for the Impacts of Climate Change*: https://sftool.gov/learn/annotation/427/executive-order-13653-preparing-united-states-impacts-climate-change-archived
4. **There is a need for cross-sectoral chapters (or a section that describes how the sectors are incredibly interdependent):** Given the fact that climate change impacts systems, it's critical that California consider the cross-sectoral and interdependent actions needed to prepare for and adapt to its ever changing climate. For example, a cross-sectoral chapter on the energy-water-land nexus would help to integrate these sectors more effectively and identify how they're working collaboratively to identify risks and promote market opportunities for sustainable and resilient solutions.
5. **Actions related to education and training are lacking and should be integrated throughout each sectoral chapter:** Our current and next generation leaders will need to be educated and trained on policy, technology, legal, social, scientific, and other areas so critical to effective adaptation actions. With every action associated with a sector, it's critical that educational and training opportunities are also incorporated to ensure that the transition from the "old way of planning communities" where stationarity once existed and to the "new way of planning communities" where stationarity is dead. Our climate is getting hotter, wetter, drier, extreme events are occurring in higher frequencies and intensity, our seas are

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rising, while our state population is growing, we have clusters of economic disparities, increasing globalization, and a variety of other stresses that need to be considered and prepared for. Education and training is essential.

6. **Climate needs to be considered in the context of other shocks and stresses to illustrate co-benefits:** The current draft plan focuses very heavily on climate change in isolation and how it will affect each sector. In reality, climate change exacerbates existing and future shocks and stresses so the actions that are included in the plan should be considered in the context of other shocks and stresses such as power grid failure, physical and cyber security attacks, aging populations, lack of social inclusion and affordable housing, etc. It's possible to do this by developing scenarios that incorporate climate considerations into real-life situations, which will help to identify concrete actions that will provide co-benefits when implemented.
7. **Clear collaboration and partnerships with the private sector and other non-governmental entities on actions is missing:** In the current draft, there is the occasional mention of collaborating with the private sector and other non-governmental entities – mostly in the description of the Technical Advisory Group. We recommend that there be clear actions where the private sector and other non-governmental entities can play a role in adaptation.
8. **Prioritizing actions that serve adaptation and mitigation purposes would be ideal:** Given the importance to invest in both adaptation and mitigation actions these days, it would be helpful to prioritize actions that serve to both reduce greenhouse gas emissions and protect communities, infrastructure, and organizations from the impacts of climate change. This nexus should also help to identify other co-benefits to investing in adaptation and mitigation actions.
9. **Citations are critical and are currently missing throughout:** Given this update is based on research conducted through California's Climate Change Assessment process, it would behoove the authors of this report to include specific citations throughout the document so it is clearly backed up by concrete data. The investments were already made to use climate science for action – why not clearly connect it and give the science credit and transparency through citations?

Chapter Recommendations and Comments

This section highlights in greater detail our recommendations and comments for improving the draft report chapters in *Safeguarding California Plan: 2017 Update*.

Executive Summary

- We recommend changing this sentence in the Executive Summary since the report focuses on adaptation only (not mitigation) "This document…is a programmatic survey across state government of what California is doing to adapt to climate change, what needs to be done, and how we will achieve those goals."

Emergency Management

Key Recommendations

- We recommend that there be some mention of climate change needing to be considered in the context of other shocks and stresses. In reality, climate change exacerbates existing and future shocks and stresses so the actions that are included in the Emergency Management chapter of the plan should be considered in the context of other shocks and stresses such as power grid failure, physical and cyber security attacks, aging populations, lack of social inclusion and affordable housing, etc. It's possible to do this by developing scenarios that incorporate climate considerations into real-life situations, which will help to identify concrete actions that will provide co-benefits when implemented. Emergency Managers and Hazard Mitigation Planners plan for and exercise a variety of non-climate related shocks that could incorporate climate shocks (e.g., heatwaves, floods, storm surge, etc.) and stresses (e.g., higher temperatures, sea level rise, changing precipitation patterns, etc.) into their scenarios and tabletop exercises.

Chapter Comments

- Recommendation EM-2 – Ongoing Actions: On the last bullet of this recommendation, we recommend that the action incorporate education so as to read as follows: "Expand training and education opportunities to include…"

- Recommendation EM-3 – Ongoing Actions: We believe that CalOES conducts exercises on a regular basis. If they are already conducting climate exercises or incorporating climate considerations into their regular exercises, this should be included as an action. If they are not, we recommend this be added as a next step for consideration.
- Recommendation EM-4: It's critical to understand the current capacity for communities to adapt to a changing climate. However, it's not clear whether this recommendation includes information from a capacity needs assessment to understand the baseline capacity of California to provide access and functional capacity to those who are most vulnerable to changing climatic conditions. We recommend that an action to better understand the local capacity and gaps of communities – whether it's being provided by the government, private sector, NGO, university, or other entity – it's important to understand the existing capacity to adapt and what gaps need to be filled and where.

Land Use and Community Development

Key Recommendations

- We recommend changing the Transit-Oriented Housing for Resilient Communities narrative to one that explicitly deals with climate adaptation. Although TOD does contribute to community resilience, the narrative is more about accessibility and inclusivity than adaptation or even mitigation.
- Recommendation L-3: We suggest that this recommendation be highlighted in the chapter introduction, as zoning ordinances and codes are one of the most powerful and legally binding tools available to local government.
- Recommendation L-4: We suggest that this recommendation be amended to include climate adaptation business support for small and medium-sized enterprises as they employ a significant amount of the work force, and often have the fewest resources to plan for and adapt to climate change for long-term resilience; e.g. business continuity planning.

Chapter Comments

- Recommendation L-6.1a: This recommendation highlights the role of social capital in building climate resilient communities. We recommend the importance of this be highlighted throughout the entire chapter.

Public Health

Key Recommendations

- In the second paragraph of the Introduction, the threats to public health are discussed but the impacts to physical infrastructure are not mentioned. If sea levels rise, what's the impact to healthcare facilities in coastal areas? Do any of the threats listed have an impact on physical access to care? Are buildings more susceptible to damage, at times long-term, due to extreme weather events or gradual climate change? If so, what's the public health impact to the loss of a medical facility in the short- and long-term in the community, especially rural communities with less redundancy? We recommend that these questions be considered and accounted for through adaptation actions in the updated plan.
- In the Introductory call out box, the second paragraph talks about specific facts but it doesn't talk about the outcomes or impacts. What is the impact of a decline of rainfall of 5-7 inches? It leaves the reader with the need to make assumptions, so providing tangible impacts that the reader can relate to would make these facts more powerful.

Chapter Comments

- Recommendation P-4:
    - Overall, this recommendation needs more detail. It doesn't provide the reader any information on the benefits of completing that work or the impacts if it is not done.
    - A significant omission is the benefit of synthesis of data across systems. The recommendation talks about the various efforts but does not mention the need or benefit to integrate analysis across those various systems.
- Recommendation P-5:
    - Recommendation P-5.1 only discusses health care facilities but not the broader healthcare enterprise that is involved in ensuring the community has access to healthcare. Impacts to dialysis centers, home care organizations,

and laboratory services will all have an impact as well. The recommendation also focuses on extreme events but is there any linkage to long term issues? Perhaps not, but if so it would be helpful to mention.

- Recommendation P-6:
    - Suggest enhancing the benefits to "enhancing health" as mentioned in the middle of the third paragraph.

Transportation

Key Recommendations

- In the introductory text of the Transportation chapter, we recommend including more discussion about which of the transportation sector's assets are more vulnerable to climate change. Currently, the list starting in paragraph 4 (starting with the words "Climate change impacts….") is just a list. It would be helpful to know which impacts should be the highest priority.
- Very few of the recommendations specifically address prioritization of adaptation and resiliency efforts. The state should consider adding recommendations that help decision-makers allocate resources between two or more locations or transportation assets.

Chapter Comments

- Recommendations T-1 and T-2: We recommend better differentiating Recommendations T-1 and T-2. As written, it appears T-1 is more concerned with understanding impacts and T-2 is more concerned with vulnerability. This difference could be made clearer. Additionally, it would make more intuitive sense to first discuss vulnerability then discuss impact.
    - We recommend removing this sentence because it is redundant with the following sentence: "The State's transportation infrastructure is a global gateway for products entering and leaving the United States."
    - We recommend including a citation to a paper or report in the call-out box discussing the Laurel Curve. To the uniformed reader, the change in fauna habitat could be attributed to the human encroachment (i.e., new housing developments) rather than climate change.
- Recommendation T-2: We recommend including additional on-going actions for T-2.
- Recommendation T-3: We recommend being more specific about this on-going action "Caltrans is ensuring the consideration and incorporation of climate change and vulnerabilities across divisions.
- Recommendation T-5.2a: We recommend correcting the indentation of this recommendation.

Agriculture

Key Recommendations

- The focus and justifications provided in the document on greenhouse gas (GHG) emissions reduction seems misplaced and forced at times when adaptation would be a better fit. Is there a reason to target mitigation rather than adaptation here?
- There is no indication of target zones or target value chains for the agricultural climate interventions (e.g., the Central Valley) or whether there is a prioritization system. It is not clear that the entirety of the California agricultural industry has been considered including wine growing regions, higher elevation orchards, and specialty horticulture crops. Are these also a target of the next steps and grants programs? Will the resulting support programs consider cost-benefits and prioritize (e.g., selecting areas where GHG reductions will be greatest, or where the largest land areas come under improved management)? Without clear indicators associated with the next steps objectives, the targets of the interventions are unclear. Also, there is also no indication that certain water intensive crops or crops considered ill-suited for new climate realities would be considered for grants funding. Prioritization of specific value chains are zones of interest may be useful from a cost standpoint and to maximize impact.

Chapter Comments

- We recommend that the chapter title and introduction section clearly state that the section covers livestock as well as horticulture and row crops.
- As it stands now, the introduction section (pg. 69), while notably a summary, does not mention some important issues regarding climate change and agriculture such as temperature extremes may exceed those suitable for germination of

certain varieties. Also, the effect of erratic rain on soil structure, top soil retention, and slope stability is not mentioned as a critical consideration. We recommend that these factors be considered and integrated into this chapter.

- How were GHG reduction funds used for increasing available drip irrigation (see call out box pg. 69)? Was this a correct statement? GHG emissions are reduced because of the conversion of diesel motors to more efficient or solar pumping systems? We recommend that these questions be considered and integrated into this chapter.
- Recommendation A-1.4: University extension units and local conservation districts often provide these demonstrations. How will this effort supplement or fill gaps beyond what those organizations are already doing? If demonstration projects are funded, they should be targeted at climate adaptation that compliments but does not duplicate already well known soil and water conservation measures.
- Recommendation A-1.3: How will the grants programs utilize existing federal programs which are regionally or locally managed such as those through the Natural Resource Conservation Service of USDA or the local Soil Conservation Districts. Since these already provide funding and extension resources for farmers they should be crossed linked with these grant and collaboration other efforts.
- Recommendation A-2:
    - First sentence: The Mediterranean climate is an incredibly productive zone primarily for dry zone crops, but for the broader production in which it engages, it relies heavily on irrigation systems sometimes transferred from long distances. This thinking that it is naturally suited to food production masks the inherent climate vulnerabilities of agricultural activities in these agro-ecological zones. In fact, these low precipitation areas are naturally better suited for livestock grazing rather than crop production.
    - Next Steps: The next steps for addressing reduced water availability or access does not mention competition or clearly tie to other sections of the strategy related to domestic and household uses of water.
    - Recommendation A-2-1: Again, the focus is on GHG emissions. Is the major input from diesel pumps? If the system is supplied by solar power or utilizes solar pumps, then the emission reduction would be minimal.
- Recommendation A-3: Yes, the flexibilities in choosing incentives have been shown to be critical in successful and long-term sustainability is linked to flexibility and self-selection.
    - The next steps appear to mostly address GHG emission reduction at the end of the value chain in manure management and energy efficiency in milk processing and production. It does not appear to address efficiencies in digestion and reduction in methane emission through analysis of fodder products and combinations that improve digestion and reduce emission as well as vitamin additions, etc. This is a missed opportunity for the strategy.
- Recommendation A-4: Farmland conservation will have consider long time horizons in order to be effective with at least 30 years cycles rather than 10 year agreements often the target of land conservation programs. Substantial benefits will only be realized after these longer periods, and the shorter time horizons are also more prone to swings in markets and political climates. Longer horizons are more insulated from these swings.
    - Local zoning offices must also be engaged because the economic benefit to an individual for converting farmland to commercial or residential development likely far outweighs the economic benefit of conservancy programs. Solidifying urban planning that includes retention of farm conservancies will be important in balancing development objectives with conservation objectives.
- Recommendation A-5: Farmer-to-farmer efforts can be extremely useful. These conversations should also leverage the relationships and expertise of local extension agents. Agro-input suppliers and workers in the industry should also be engaged and educated as part of the target audience.

Biodiversity and Habitat

Chapter comments:

- The strategy notes the importance of expanding efforts to observe, measure, and evaluate the climate impacts on species and minimizing those impacts. This effort will be critical to establishing the baseline conditions of species' density and range so that gains can be weighed against investments and the effect of climate change can be tracked through changes in species patterns.

- Recommendation B-1: The integration of climate into existing conservation frameworks is an excellent and worthy step. In order to effectively conduct that integration, there will likely need to be support, capacity building, and in some cases technical assistance to gather information on climate projections and to translate those projections into actionable tasks within the conservation plans (partially addressed in B-5). Implementation plans or frameworks on how to do this will be critical for action on the ground. It should be acknowledged that the capacity is likely to differ significantly among the stakeholders involved.
    - The entities that have already integrated climate change (e.g., Dept. of Fish and Wildlife's State Wildlife Action Plan) into conservation plans should convene to share information on lessons learned and best practices for integration and to make collective recommendations on appropriate modes to implement their action plans.
- Call-out box pg. 77: While the project is interesting, the storage of carbon is notably not addressed in as much detail in this section (see pg. 75). This box seems misplaced and either should be in the introduction section or it should be replaced with an example from the aforementioned wildlife action plans.
- Recommendation B-2: The idea of considering habitat connectivity is an excellent idea. The strategy should also consider valuation of these corridors and how they may factor into ecosystems services discussions as well as conservation planning noted in other section.
- Recommendation B-3: The strategy should also consider the collateral impact that invasive species have on degraded systems and collectively tackle exotic/invasive species with climate considerations (both positive impacts and negative impacts). This would include acknowledgement and tracking of their spread given predicted temperature and precipitation schemes as well as establishment and proliferation on degraded habitats (for exotics, there may even by some benefits through use in soil conditioning and retention prior to reintroduction of native plants).
- Recommendation B-3.2: Prioritization of areas is an excellent recommendation to address highly vulnerable systems first.
- Recommendations B-3.3 and B-4: Standards and measures for successful restoration efforts related to climate change is a critical need in order to appropriately distribute funding, target interventions, and comparatively weigh the effect of the interventions. However, the indicators and methods for doing so have not been well established, and the outcomes cannot be truly vetted for another 50-100 years. These are aspects of adaptation monitoring and evaluation that can begin to be addressed but will offer formidable challenges to accomplish. A long-term fund to pay for the evaluation in e.g., 50 years, should be considered under this next step.