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Protecting nature. Preserving life.™

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July 13, 2017

Re: Draft 2017 Safeguarding California Plan

The Nature Conservancy welcomes the opportunity to provide comments on the Safeguarding California Plan 2017 Update ("SCP" or "the Plan"). The mission of The Nature Conservancy ("TNC" or "the Conservancy") is to conserve the lands and waters on which all life depends, and the Conservancy is working to preserve ecologically important lands for nature and people in California and around the globe. The SCP is an important addition to the significant body of climate change plans and activities underway to reduce climate-driven risks to the state's economy, environment, and human well-being.

In an effort to provide comprehensive and constructive input to this planning process, the Conservancy is submitting two letters to the Natural Resources Agency. One is a group letter submitted on June 23rd that addresses high-level general themes and provides high level recommendations. This second letter here, provides sector-specific comments in some detail. Collectively, we hope this input from the Conservancy will help the Natural Resources Agency produce a final plan that will help California respond to the escalating impacts of a changing climate.

Our general comments follow, many of which are expanded upon in the relevant sectors:

- Throughout the SCP, additional actions necessary to make further progress on adaptation are called out, but few specific commitments are made. The SCP should clarify who is responsible for each of these actions, a timeline, and the source of funding or capacity to get these actions underway.

- TNC is pleased to see the inclusion of metrics and indicators in the SCP. Both are essential to track progress as the state implements this plan. TNC recommends that you develop the indicators more fully and align them with the Environmental Goals and Policy Report as you prepare the final draft. In additions, the final Plan should specify that metrics and indicators be updated on the three-year cycle for SCP. This alignment between the strategies is essential to ensure efficient use of resources and avoid duplicative efforts. Additionally, metrics for each sector should track the directives in EO B 30-15 and AB 1482 (Gordon), including prioritizing natural infrastructure and focusing on vulnerable populations.
- As directed by EO B-30-15 and AB 1482, specific direction to give priority to natural infrastructure solutions should be incorporated throughout the document. Unfortunately, the Ocean and Coastal Chapter is the only chapter the explicitly references "natural infrastructure." TNC recommends that each sector include a discussion of natural infrastructure opportunities and highlight these strategies to ensure they are prioritized.
- Future resources should be contingent upon implementing this report. While this report itself does not have resources attached to its goals and policies, billions of dollars are provided for the implementation of state and local projects for housing, development, transportation, and other infrastructure projects every year. Yet, at times, these projects are not tied to climate adaptation projects or goals. Therefore, moving forward, our state adaptation goals should be tied to the funding for infrastructure development and improvement. Emphasis should be placed on the needs of vulnerable communities and identifying specific funding for community efforts.
- The Nature Conservancy recommends that in the final plan, the CNRA strengthens the processes for transparency and accountability to effectively measure achievements under the report. The success of the goals of this report are contingent upon strong forward movement by all sectors and improved systemic practices towards climate adaptation and mitigation. Yet the responsible actors in the Plan are unclear and should be clarified to ensure everyone understands who to hold accountable for future efforts. In addition, it is critical that the report emphasize how sectors will be held accountable for achieving the goals through an ongoing, regular feedback process as well as how agencies will improve collaboration with each other, local governments, and community environmental justice efforts. Finally, rather than only connecting with the public through updates of this report, the state should identify opportunities to regularly connect with communities, especially at the local and regional levels, to track and monitor progress, best practices, and provide updates to community partners, organizations, and other interested parties.
- The draft plan contains a suite of "Recommendations," not targeted at any specific entity. The final Plan should contain "Priorities" or "Commitments," rather than "Recommendations," underscoring the importance of achieving them. These Priorities should be assigned to a specific responsible entity who is primarily accountable for achieving them. In the absence of this, the path to implementation is unclear.

- TNC recommends creating a cross-sectoral strategy and establishing a workgroup to coordinate various state agencies and share staff resources and funding to promote state level adaptation work. This group should identify opportunities where cross sectoral work would enhance the resilience outcome and work with relevant state agencies to promote cross-sectoral collaboration.
- In addition, the document should clarify how the state will achieve coordination between state agencies, local municipalities, and others working on adaptation issues. The Plan should encourage greater collaboration among state and local agencies and departments on developing recommendations. In addition to working across sectors to tackle these impending challenges, state and local agencies should be encouraged to work together to inform goals and recommendations, especially given local governments' planning authority. State and local governments should also share data and other useful information helpful in developing more informed recommendations.
- The Plan should identify health, equity, anti-displacement, and environmental justice solutions in each chapter. Each sector provides an important vision for moving forward, however, there is a lack of focus on the most vulnerable communities and the health impacts of climate change. Therefore, a recommendation going forward is to thread priorities such as health, equity, anti-displacement, and environmental justice through each of the sectors to ensure that there is a prioritization of action directed at the most impacted communities, those with the least resources to address climate change.
- The Plan should expand tools to identify vulnerable communities and update the data as new climate adaptation policies are developed. The Safeguarding Plan requires a system to identify vulnerable populations and communities that are disproportionately affected by climate change impacts. Suggested tools to use include: CalEnviroScreen, the Environmental Justice Screening Method and the Health Disadvantage Index1 to identify climate change threats.
- State agencies and departments should be directed to identify actions that meet goals of both climate mitigation and climate adaptation. Projects funded by the Greenhouse Gas Reduction Fund can have adaptation co-benefits for vulnerable communities. The state must seek funding opportunities from private and public sources to make meaningful climate adaptation investments. Sectors should implement actions that can simultaneously reduce GHG emissions and also make communities more resilient.
- Safeguarding California must prepare for unintended, adverse consequences and include adaptive management strategies. Every sector plan must incorporate strategies that prepare for unintended negative consequences, such as displacement, that may occur when vulnerable communities are forced to relocate during extreme weather events. A

[1] The HDI identifies communities that may be missed by CES because they do not experience as much toxics exposure, but have numerous social, economic and place-based inequities, making them a climate vulnerable community. http://phasocal.org/ca-hdi/.

model to follow is the Scoping Plan that ARB is required to prepare under AB 32 to explain California's approach to climate mitigation. The Plan requires ARB to evaluate the environmental and public health impacts of the Scoping Plan. Safeguarding California needs to include a similar mechanism that assesses impacts resulting from climate adaptation policies. Mechanisms such as adaptive management strategies can help address unintended negative impacts and allow for flexible changes in the future.

- Incorporating the following policy recommendations into the Plan will provide more concrete actions towards achieving the key goals outlined in the report and are discussed below:
    - In the next SCP update, the Natural Resources Agency should report on the work of the cross-sectoral strategy committee, discussed above.
    - The Plan should generate a process to streamline permitting processes for natural infrastructure projects.
    - The final SCP should explicitly call for a full evaluation of managed retreat as a strategy for preserving ecological function along California's beaches, including a feasibility study and cost-benefit assessment of the alternatives.
    - The final SCP should include a recommendation that the Coastal Commission study and report on options to protect undeveloped uplands in order to facilitate habitat migration.
    - The SCP should recommend that the state create a Climate Service Center to provide technical guidance and staff support state departments and regional and local governments to prepare vulnerability analyses and integrate them into local plans and ordinances.
    - The OPC should lead an integrated social-ecological climate vulnerability assessment for California's marine fisheries and fishing communities, tailoring existing methodologies developed at federal and state levels or described in scientific literature to the state of California so that results can be integrated into climate-ready management strategies. plans and ordinances.

Agriculture

Climate change-driven loss of biodiversity poses a number of risks to California agriculture, including: lack of pollination, loss of soil biodiversity and capacity for nutrient cycling, and loss of natural biological control leading to potential new pest outbreaks. At the same time, the agriculture sector plays an important role in maintaining biodiversity by providing critical habitat and linking migration corridors, which will become more essential as the climate changes. The Agriculture section in the SCP should explicitly acknowledge this important connection and include diversification practices as way to build resilience.

Additionally, understanding costs and benefits is key. The Plan mentions suitability and impact on urban areas but should also include an assessment of urban agriculture as way to more

efficiently meet demand as the state loses suitable cropland in the Delta and Central Valley, in particular.

The introduction of this section (page 69) focuses on resiliency and the threat of climate change to agriculture (i.e. more irrigation needs, and opportunities for supporting agriculture in a changing climate), however, the recommendations are all strategies for GHG emissions reductions that point out how agriculture can contribute to GHG reduction goals. TNC urges that the recommendations are more closely tied to the introduction and vice versa.

There is a good outline of specific agricultural practices that could be useful to GHG emissions reduction, however, agricultural lands also have a lot of potential for other climate resiliency functions such as flood attenuation, biodiversity adaptation, and water supply management. Additional practice recommendations that are explicit about how agriculture can contribute to climate change adaptation and resiliency could provide a fuller picture of the potential for climate adaptation on agricultural lands. To that end, TNC encourages the following adaptation practices be incorporated into the final Plan:

- Agriculture lands, like natural lands, within floodplains have the potential to attenuate floods and reduce flood risk to urban centers – this might require encouragement/incentives to allow flooding.
- Encourage natural habitat riparian buffers along agriculture lands so that agriculture lands better contribute to wildlife movement for climate change adaptation and shade for stream cool water refugia. Agriculture could be important for species moving in response to climate change, however, management of the land plays a large role in how useful the agriculture land will be to species movement.
- Practices on-farm that improve habitat for pollinators could help make agricultural lands more resilient to climate change.
- Encourage fallowing in drought years to protect groundwater supply.

Biodiversity and Habitat

In general, the Biodiversity & Habitat Sector Plan provides a good summary of actions taken and underway by the California Department of Fish & Wildlife (DFW).

General comments:

The chapter should incorporate climate change into conservation planning (p 76). This is somewhat vague and is open to interpretation, for example, in some plans considering climate change just results in text that explains general changes that are expected and how those changes might impact the species or habitat in the plan, but often climate change adaptation or vulnerability data is NOT included in the Plan from the start. Incorporating this data spatially could influence the conservation plan (e.g. avoiding development in areas that are particularly resilient, protecting corridors more likely to be useful for range shifts in addition to current connectivity). The final SCP could be strengthened by making this more specific.

B.12 under next steps – identifying data and developing guidance on how to use it is key, but instead of a next step, the plan can include general types of data that can be cataloged in the "next step" and explain generally how they can inform planning processes. For example, data types could include: refugia, landscape resilience, connectivity to facilitate range shifts, species range shifts, species range contractions, vulnerability assessments, etc. Including general guidance would be useful, for example, priority areas should include areas that are resilient or provide refugia, and connectivity should be prioritized to facilitate range shifts.

In addition to refugia and climate smart corridors (p 76 next steps), the Plan should include landscape resilience. Refugia and resilient areas are both being important areas to support biodiversity in a changing climate especially because they have the potential to function at different scales.

TNC is very supportive of B-4.1 "continue fine-scale vegetation mapping efforts for CA." It is very important because this data serves as a baseline for species distribution models and connectivity modeling and will help improve accuracy and reliability of vulnerability assessments and planning that use vegetation and land cover as a base.

Emergency Management

California is already seeing the effects of climate change and the amplification it causes on the hazards we face. It is essential that the state account for climate change in planning for future disasters. In this respect, TNC encourages more emphasis be given to prevention of and preparation for these events in the final SCP, rather than focusing on how to respond once an event takes place. One key strategy is to expand the role for nature in this section. Nature can play an essential role in risk reduction and prevention, and as mentioned in our general comment letter of June 23rd, we recommend that the final Plan prioritize natural infrastructure over engineered actions, where feasible, for the Emergency Management section.

Additional General Comments:

Improve mapping to include future conditions and natural infrastructure: Currently maps, such as those used for flood management, do not consistently include information on the most vulnerable areas to sea level rise, erosion and increased storm surge potential nor on important natural features that provide disaster risk reduction benefits. Ensuring this information is consistently available will help communities to effectively incorporate natural infrastructure in their planning and will help align federal funding sources to these efforts.

Begin with the state: map state facilities at risk from climate-amplified extreme weather events including wildfire, flood and sea level rise and coastal hazards. Tools like CalAdapt exist for the state to augment the final Plan by identifying all state facilities as well as critical community resources like hospitals, water and waste water treatment plants and schools at-risk. This action will facilitate integration of climate change into the State's emergency planning and management and should also apply cross sector.

Prioritize conservation and restoration land protection so investments in open space and conservation also contribute to reduce risk and vulnerability. Funding criteria used by agencies with land protection programs should include criteria that prioritize natural areas that also provide disaster risk reduction benefits. Restoring natural conditions is an effective strategy with multiple benefits that should be given priority wherever feasible. For example, TNC is involved in, the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project along the Sacramento River, where a century-old levee is being set back and natural conditions are being restored to reduce flood risk to the community. (See https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/california/ca-green-vs-gray-report-2.pdf)

Energy

The Energy sector should also prioritize natural infrastructure solutions, where feasible, as directed by EO B 30-15 and AB 1482 (Gordon). These solutions include:

- Protecting species and habitat when developing Natural Community Conservation Plans and other mitigation measures for power plants; and
- The roles of trees, especially in urban forests, should be highlighted and cross-sector collaboration with the forestry and other sector should be explored (see below). Trees remove pollutants from the air and keep our cities cooler, and play an important role in lowering demand for energy consumption and improving the quality of our neighborhoods.
- The Desert Renewable Energy Conservation Plan is a valuable tool to help facilitate the construction of renewable energy facilities in least conflict zones and is a good model of effective cross-sector planning to enhance resiliency of several priority

Additional cross-sector impacts and opportunities for the Energy Sector should be identified and adopted, where feasible. Potential cross-sector collaborations for the Energy Sector with various other sectors should include:

- **Emergency preparedness**: it will be critical for the energy sector to have a plan for emergency response. Impacts of climate change on energy facilities are critical to consider in this cross-sector analysis.
- **Water**: water conservation, increased risk to hydropower, and the role of hydropower facilities in water storage and runoff should all be addressed by both the water and energy sectors in a coordinated effort.
- **Forestry**: increased frequency and severity of high intensity wildfire poses a great risk to the energy sector. Actions taken in forests like forest thinning and biomass harvest can affect the reliability and transmission of power and demonstrating the need for coordinated planning between the forestry and energy sectors.
- **Biodiversity**: protecting habitat, migration corridors and sensitive species is essential when citing new power facilities and undertaking mitigation measures. All decisions for citing of new energy facilities should include an analysis of climate change impacts over

time. Salmon and other fish should be considered when considering new hydropower facilities.

- **Public health**: identifying and aiding vulnerable communities who are disproportionately affected by high heat days and ensuring energy security and are important for both the public health and energy sectors.

These should all be addressed by the cross sectoral working group discussed above.

Forestry

California's forests provide a multitude of benefits including the capacity to help regulate the climate by storing vast amounts of carbon. Maintaining this benefit helps both emissions reduction and climate response (mitigation and adaptation). Forests also have important co-benefits with water management as well as biodiversity and habitat.

Given the uncertainties of quantifying greenhouse gas (GHG) reductions associated with forest management, thinning, biomass and defining baseline assumptions for catastrophic fire at a project scale, the Conservancy recommends that the State undertake demonstration efforts to approach the issue of fire risk reduction and GHG reductions differently and that the Final SCP include this recommendation. Pilot projects should be recommended in the Sierra and Klamath region forests that should be at a jurisdictional (or regional scale) and should incorporate the broad suite of actions that impact GHG emissions, including (but not limited to) wildfire and actions to reduce wildfire risk.

Specifically, TNC recommends that these demonstration efforts do the following:

1) Be regional in scale (e.g., a jurisdiction, county, group of counties or other region);

2) Establish GHG baseline scenarios that are objective and incorporate historic trends and the suite of human and natural impacts to carbon (i.e., not just fire);

3) Reduce fire risk for the long-term through sustained ecological thinning, managed wildfire, improved land use and other activities;

4) Seek to reduce GHG emissions in the region through a suite of actions, including, but not limited to restoration, conservation, thinning, controlled burning and other changes in land use and management;

5) Incorporate federal lands;

6) Set long-term GHG reduction goals that incorporate objectives to protect and enhance other public benefits, including climate resilience, water quality, habitat for fish and wildlife, biodiversity, recreation and timber production.

7) Incorporate and assess the co-benefits associated with the demonstration (e.g., water quality, habitat, climate resilience, etc.)

By approaching the fire risk reduction and GHG reduction issue through this broader frame, the State may be able to reduce the uncertainty and debate often associated with the catastrophic wildfire/thinning/GHG reduction conundrum. It may also broaden the policy discussion and set

of solutions identified for how to manage and protect forests for their suite of climate and other public benefits. This approach is taken in *Climate Action Through Conservation*, discussed below.

Land Use and Community Development

TNC is pleased to see the addition of the Land Use and Community Development sector. As the Plan notes, land use and community development policies play a significant role in bolstering the state's resilience to climate impacts. TNC encourages further integration of state, regional and local efforts moving forward as the state implements the SCIP and SB 246 (Wieckowski)

Principles should include a prioritization for natural infrastructure, per EO B-30-15 and AB 1482 (Gordon). The following text is recommended for the SCP:

Prioritize natural infrastructure over engineered actions, where feasible. Agencies should establish a preference for green or nature-based responses to the maximum extent feasible including restoration, conservation and projects on agricultural land, forests, wetlands, and grasslands. This policy is a good mechanism to catalyze cross-sector, cost-effective action. Green responses can provide many benefits in addition to reducing risk to people and resources from climate driven extreme events. For example, green responses like forest conservation can provide benefits to the atmosphere and help regulate the climate by reducing or avoiding emissions of greenhouse gas (GHG) and increasing carbon sequestration over time as the trees continue to grow while also protecting drinking water supply and quality. Green responses can also provide economic, recreational, habitat, and cultural benefits. Often they can be cheaper and quicker to implement then engineered, or grey, responses. Green responses can also be used as a first step, delaying the time and the extent of an eventual grey response. Priority should be given to these multi-benefit actions.

Climate Action through Conservation

TNC urges this sector highlight the *Climate Action through Conservation* framework and tool. This initiative helps counties address climate change through natural resource conservation and changes in land use. Forests and other natural and working landscapes, through changes in their management and conservation, can provide significant climate benefits by means of carbon sequestration and avoidance of greenhouse gas emissions and enhanced resilience to climate change. Yet, few tools and incentives exist to enable counties and other government entities to properly manage and account for these resources from a climate change perspective. This project provides the analytical framework and incentives that counties need to overcome these obstacles and effectively engage in climate change solutions. For more information, see: http://scienceforconservation.org/dl/CATC_Final_Jan2016.pdf.

Ocean and Coast

General comments on Ocean and Coastal chapter:

- TNC is pleased that the draft SCP explicitly promotes the use of natural infrastructure as an adaptation response. Indeed, natural infrastructure isn't just a good idea – it's the law! For example, SB 379 (Jackson), requiring cities and counties to include climate adaptation in their general plans, includes identification of natural infrastructure actions. AB 1482 (Gordon), requiring all state agencies to prepare for climate change impacts, calls for the promotion of natural infrastructure. Finally, Executive Order B-30-15 requires state agencies' planning and investment to employ flexible and adaptive approaches and prioritize natural infrastructure solutions. TNC's 4th Climate Assessment project – in partnership with Point Blue and Environmental Sciences Associates – will fill awareness and scientific gaps in the deployment of Natural Coastal Infrastructure for sea level rise adaptation, helping to advance these goals. However, an additional hurdle – the regulatory one – needs to be surmounted. Specifically, agencies tasked with permitting natural infrastructure often require a higher standard of performance and many years of post-project monitoring before allowing coastal natural infrastructure projects to proceed. This creates a much higher bar to using natural infrastructure for coastal adaptation than for use of seawalls or rock revetments, for which permitting is much simpler. The final SCP should include a specific recommendation that this unduly burdensome process be changed in favor of a more streamlined permitting process for natural infrastructure.

- The draft SCP has a welcome focus on state entities, in addition to local governments, that has been missing from previous iterations. For far too long, the State has focused its reports, guidance and other documents on the need for local governments to adapt to sea level rise. While true, this ignores the fact that nearly a third of the coastline is managed by a state agency – State Parks – which lacks any meaningful framework for adaptation. The State Lands Commission, too, manages tidelands in the absence of a specific guiding framework for sea level rise adaptation. Further, a great many local coastal management decisions are impacted by the management of the Pacific Coast Highway by Caltrans. It is important now that the state led by example, TNC recommends that the Final SCP specifically recommends that these agencies develop a coordinated framework for integrating sea level rise into their management of public trust resources. Recommendations O-1.3 and O-1.7a touch on this notion, but they are insufficiently specific to enhance resilience of state resources.

- The draft SCP rightly highlights the need to ensure that disadvantaged communities are not unfairly burdened by the impacts of climate change, or – presumably – with the impacts of adapting to it. However, Recommendation O-1.4 goes only so far as to suggest equity in grantmaking. Although important, this is insufficient by itself. It is critical that disadvantaged communities are empowered with a powerful voice in development decision-making and other agency action in which sea level rise adaptation is an issue. For example, the City of Oxnard – a disadvantaged community – has repeatedly passed Resolutions opposing to power plant development and relicensing on its shoreline, where

sea level rise and coastal hazards are likely to have an impact. Despite these Resolutions, state agencies – such as the CPUC and CEC – have pursued formal licensing processes that take little account of this local opposition. The Final SCP should prioritize the integration of disadvantaged communities into formal decision-making in order to ensure that adaptation responses do not inequitably impact these groups. This is also discussed above, in our general comments.

- The Introduction repeatedly mentions the importance of understanding and quantifying the impacts of ocean change. TNC agrees, and California should be very proud of its contributions to understanding climate change impacts regionally. With the expansion of CoSMoS and its derivative reports, there are powerful new scientific tools that give us an ever-greater ability to assess our vulnerability. However, it is increasingly apparent that our understanding of the science is vastly outpacing our efforts to prepare for and address these changes. Often, increased understanding leads to the need to make very difficult choices, and this should be specifically discussed. Creating coastal resilience in the face of climate change will require significant commitment of financial resources and political capital. There is no avoiding this. However, our iconic and important coastline – and the remarkable economic engine it drives – is well worth it.

- Vitousek et al. (2017) found that up to 67% of southern California beaches will be lost to sea level rise by 2100, along with the enormous economy supported by those beaches. This is a problem of enormous consequence, which the draft SCP touches on in Recommendation O-2.1, but in a vague, nonspecific way. As the draft SCP acknowledges, in order to avoid losing our beaches there will need to be investment in nourishment or managed retreat. However, the document fails to recognize the magnitude of the required response: investment in either or both will have to be massive. Sea level rise will exacerbate coastal erosion – already a problem for the majority of California's shoreline – and make sand increasingly scarce and expensive. The volumes required for nourishment will increase over time, as the land-sea interface creeps landward. Managed retreat may, in fact, be the most cost-effective option long-term, but few agencies have committed to evaluating this as an option, much less pursuing it. The final SCP should explicitly call for a full evaluation of managed retreat as a strategy for saving California's beaches, including a feasibility study and cost-benefit assessment of the alternatives.

- The draft SCP includes specific mention of preserving undeveloped open space landward of coastal habitat to ensure that habitat migration is able to occur (intro to Recommendation O-2 and O-4.3); this is a welcome addition to the state's policy framework. TNC's work on identifying and protecting "undeveloped uplands" – the locations into which habitat migration can occur - should provide the start of a blueprint for prioritizing this action. However, acquisition alone will be insufficient; given the incredibly high cost of coastal land in California, there simply isn't enough money. Therefore, a robust strategy for protecting undeveloped uplands will also need to include land use management, reducing the incentive to armor or develop undeveloped uplands, and preserve them in an undeveloped state in order to facilitate habitat migration. The

final SCP should include a recommendation that the Coastal Commission study and report on options to accomplish this.

- Recommendation O-4 advises that California continue to invest in vulnerability assessments, tools and analyses. TNC agrees, but suggest that this recommendation go further. For many of our local government partners, the LCP grants support the production of robust vulnerability assessments, leaving the local planners with little idea of what to do with the information. The state should provide technical guidance and staff support to guide turning vulnerability information into plans and ordinances.

Comments related to Marine Fisheries

Although TNC commends the progress towards acknowledging marine fisheries in the Ocean and Coast Chapter, the importance of these critically important natural resources and the communities they support is significantly understated. Climate change poses pervasive ecological and socio-economic challenges to marine fisheries. It is critical that the state make greater progress more rapidly to more effectively manage marine resources, given the vulnerability of species and coastal ecosystems to changing ocean conditions. The state has an important opportunity to address these challenges by including strong recommendations for solutions and next steps in the Safeguarding California 2017 update. Below are succinct suggestions for the appropriate and feasible inclusion of marine fisheries in each of the six recommendations (O-1 through O-6). Suggested additions are in red.

Chapter Introduction

In the introduction of the Oceans and Coastal chapter, TNC suggests the inclusion of a paragraph after the paragraph that addresses impacts of ocean warming:

"Marine fisheries and fishing communities are also increasingly impacted by climate change, specifically through ocean acidification, ocean warming, and increased frequency of extreme events. The subsequent disruption of marine food webs, shifts in species' suitable habitats, and changes in fish productivity not only threaten our ocean ecosystems, but also endanger the livelihoods of the fishing communities dependent upon a stable stream of income generated by California's marine resources. Additionally, exacerbation of natural phenomena, such as increased duration of harmful algal blooms, exemplifies the increasing uncertainty facing California fishing industry. Solutions to these challenges demand the use of adaptive, responsive fisheries management, informed by real-time, high quality data, to improve economic outcomes for harvesters and ensure long-term conservation of marine resources."

Recommendation O-1: Leverage regulatory, permitting, and planning authority to preserve coastal communities and resources by adapting infrastructure and other development to be more resilient to sea level rise and extreme events.

TNC recommends including explicit language that addresses threats to fishing operations and harbor/port infrastructure used by the valuable fishing and seafood industries. TNC suggests changing O1.7a to read:

O1.7a. "…Provide guidance and technical assistance to assist non-state entities to begin planning to address critical infrastructure at risk from sea level rise, including those at harbors and ports necessary for commercial and recreational fishing operations."

Also, the phrase "Use regulatory authority to reduce risk" in **O-1.7** is unclear, and the plan should elaborate slightly on what type of regulatory authority is recommended.

Recommendation O-2: Support natural infrastructure, living shorelines, and other adaptations that protect and rehabilitate coastal and marine ecosystems and beaches.

Marine protected area (MPA) networks, such as California's extensive MPA network, can be thought of as marine natural infrastructure that can be used to improve fisheries management and support improved information-gathering needed to manage fisheries under climate change. In this way, marine reserves are effective tools for promoting ecological resilience of marine fisheries. TNC suggests changing O-2.5 to read:

O-2.5. Research and explore the extent to which Marine Protected Areas (MPAs) buffer marine resources against the negative impacts of climate change and consider climate impacts in MPA management; explore applications of California MPAs in monitoring and management planning that directly support marine fisheries ecological resilience and assist managers in decision-making; continue to ensure adequate enforcement of MPA regulations.

Suggestion to add the following "Ongoing Action":

- Current projects to better integrate the Marine Life Management Act and the Marine Life Protection Act will provide direct mechanisms to utilize MPAs in the type of nimble, fisheries management required under changing ocean conditions.

Recommendation O-3: Develop actionable science that reflects the latest and evolving trends over a range of spatial and temporal scales.

In the Ongoing Action section, TNC commends progress on the Master Plan update, but acknowledge that climate change is not addressed in the current Ecological Risk Assessment information gathering project, which presents a major knowledge gap in community and ecosystem climate change vulnerability (linked to Recommendation O-4). For actionable science to best inform proactive preparation for climate change impacts, TNC recommends that the Ocean Protection Council encourage the inclusion of climate change in all of these initiatives, or support methods to include climate science as it becomes available. Specifically, TNC recommends editing the following bullets in "Ongoing Actions":

- "The Ocean Protection Council is supporting the following information gathering projects: Climate Change and Fisheries working group, peer review for Fishery Management Plans, Productivity and Susceptibility Analysis (PSA) and Ecological Risk Assessment (ERA), as well as supporting the development of socioeconomic guidance for fisheries management.

Climate change information should be prioritized for inclusion in any existing or future frameworks or tools resulting from certain information gathering projects.

- [Make a new bullet:] "The Southern California Coastal Ocean Observing System……"

Recommendation O-4: Assess community and ecosystem vulnerability through the use of decision support tools and analyses.

Community and ecosystem climate vulnerability assessments (CVAs) form the critical foundation for understanding predicted changes in social-ecological marine fisheries systems and developing subsequent management and conservation actions to promote resilience. Therefore, TNC strongly encourages including specific language to support a social-ecological marine fisheries CVA, which has not been conducted for state-managed marine fisheries to date. TNC suggests the following improvements, or the addition of O-4.1c below:

O-4.1c. Conduct an integrated social-ecological climate vulnerability assessment for California's marine fisheries and fishing communities, tailoring existing methodologies developed at federal and state levels or described in scientific literature to the state of California so that results can be integrated into climate-ready management strategies.

Recommendation O-5: Widely communicate guidance, data, and resources for ocean and coastal adaptation strategies, further outreach and education efforts, and provide pathways for meaningful community engagement.

TNC suggests the small improvement to **O-5.4**. "Conduct relevant outreach directly to specific marine resource users and sector communities, like fishers and seafood industry, who may be impacted by climate change".

Recommendation O-6: Coordinate across agencies and with external partners to ensure efficient problem solving to address climate change impacts.

As the National Marine Fisheries Service (NMFS) has been a leader in developing tools and practices to address impacts of climate change on marine fisheries, specifically those that cross static boundaries, TNC suggests highlighting the importance of federal-state collaboration in the introductory paragraph:

"State agencies that work with ocean issues are continuously collaborating and exchanging information to address changing ocean and coastal conditions due to climate change. Because ocean currents and resources are not bounded by traditional jurisdictional lines, it is critical that agencies collaborate across their jurisdictions in order to safeguard the health of our ocean and coastal ecosystems and resources, with a particular focus on safeguarding vulnerable populations. Impacts such as sea-level rise, ocean acidification and hypoxia, and storm surge and severe storm events vary in severity along the California coastline, and require effective coordination and planning to ensure successful adaptation of our coastal communities, ecosystems and economies." These impacts affect the entire California Current, and mitigation measures will necessitate both interstate and federal collaboration, particularly to address range shifts by marine fisheries. Many state agency working groups and task forces are targeting specific climate change issues on the ocean and coast to address climate change impacts on our

ecosystems, resources, and communities, and to ensure successful adaptation within the state. ~~to the impacts of climate change.~~

Public Health

TNC is pleased to see that Public Health sector prioritizes vulnerable and disadvantaged communities. As discussed in our group letter of June 23rd, climate change results in a disproportionate impact on vulnerable populations and disadvantaged communities thus strategies that benefit these communities should be prioritized, as required by AB 1482 and EO B 30-15.. The Plan should require that low-income people and disadvantaged communities benefit from the full advantage of adaptation strategies (such as energy retrofits, green buildings and green infrastructure, urban forestry) that have up-front costs and health, economic, and cultural co-benefits longer-term.

To that end, TNC is also pleased to see the priority given to urban greening and urban forestry and recommend that this natural infrastructure strategy be prioritized, especially in vulnerable and disadvantaged communities. Urban greening illustrates how conservation of nature and forests can help communities respond to increased temperatures, while also sequestering carbon, lowering energy demand, creating more livable communities, and providing habitats for birds and animals. Given the important role urban greening plays in the public health, energy and forestry sectors, this should be included in the cross-sectoral work group discussed above a more robust urban forestry program in California.

Transportation

The Transportation chapter provides a good overview of many of the climate change related impacts California's transportation system faces. This section could be improved by including a discussion of nature-based solutions, as directed in EO B-30-15.

Connect Transportation and Natural Systems

This chapter would benefit from a more holistic view of what impacts our transportation system faces and the solutions to address them. For example, how the changes in hydrologic regimes will impact roadways (to this end, the Department of Water Resources should be listed as a state agency in this sector). TNC recommends this topic be addressed by the cross sectoral working group, discuss above.

Additionally, our roadways impact essential habitat throughout the state. The Plan should require specific actions to preserve connectivity both dealing with habitat connectivity actions and reducing or mitigating fragmentation, including retrofitting existing structures that are current barriers to migration. TNC recommends a provision for new construction and repairs to address habitat connectivity and migration corridors as well.

Natural infrastructure can play an important role in reducing risk for the transportation sector and should be discussed in this chapter. Specifically, TNC recommends the following language be added to the SCP in recommendation T-2: "Prioritize multi-benefit actions and promote natural

system function and services, where feasible." To help achieve this outcome, a long term, life cycle analysis of all proposed solutions (both green and grey) should be conducted before selecting an action. This analysis should account for the ecosystem service and habitat benefits provided by natural solutions including changes in carbon stored and greenhouse gas emissions avoided.

TNC encourages the inclusion of language that would encourage transportation planning agencies to incorporate "greenprints" into their planning process to disclose the benefits and tradeoffs of different project footprints on conservation values like carbon sequestration, biodiversity, water resources, recreation, and agriculture. More information about greenprints can be found here: www.bayareagreenprint.org

Additional comments:

- T1/T2 (pg. 61): Consider the impact that climate change will have on different species migration patterns and incorporate into habitat connectivity planning.
- T-3: TNC appreciates the focus on climate change and resilience considerations early in the planning process and through the project-delivery process.

Water

General Comments and Key Recommendations:

- In recommendations W-3/5, the Plan should urge increasing "above-the-dam" regional natural water storage system. The Nature Conservancy notes that "above the dam" storage using natural, ecosystem-based processes plays an essential role in preparing for, and responding to impacts of climate change. In addition to helping stabilize the state's water supply, these conservation-oriented actions provide multiple, cross sector benefits, as noted, to forests, biodiversity, fire risk reduction and meadow conservation.

- For W-7, TNC urges the enhancement of data and monitoring by creating a California water accounting system. As previously mentioned in this letter and our group letter of June 23rd, the Plan should explicitly identify resources and policies needed to successfully carry out the action items identified in the SCP. One of these needs is to enhance data and monitoring, and we urge creating a water accounting system to help accomplish this. This will promote results and send a message to relevant stakeholders, including the legislature and private investors, on the need to mobilize resources in support of climate adaptation in California.

Appendix B: Measuring Climate Change Adaptation

An integral component of proactively preparing for and mitigating the impacts of climate change is the selection and tracking of appropriate metrics that track the trajectory of climate impacts and reflect how state agencies have responded to these changes. Although developing a list of measurable metrics is an important first step, in their current form these metrics are not adequate and will likely prove to be ineffective. Effective metrics must be measurable, tracking progress

and proscribing actions to be taken if certain thresholds are not met. Additionally, details on tracking and reporting of these metrics must be clarified.

To this end, TNC strongly urges the California Natural Resources Agency revise Appendix B on metrics to include the following recommendations:

1. Clearly explain how metrics will be tracked and reported. Before each of the two categories of metrics - (1) changing climate conditions and (2) resilience outcomes - it is essential to provide guidance on how each metric will be tracked and reported, the responsible agency, and whether reporting results will be publicly accessible. The default option should be to make them public.
2. Better integrate the metrics with the 10 chapters of the 2017 Safeguarding California Update. For example, within the two categories of (1) changing climate conditions and (2) resilience outcomes, the metrics should be sorted by relevant Safeguarding Chapter, so that scores for each metric reflect the necessary next steps and recommendations needed to ensure progress towards climate readiness.
3. Assign a state agency or entity responsible for tracking or publishing progress on each metric. It should be clear which agency or entity is responsible for determining how often each metric will be reviewed and updated and where progress against these metrics will be published.
4. Further investigate which metrics (if any) that state agencies are currently using to track their progress on climate change resilience actions, and adopt or synthesize these into the Safeguarding California 2017 update, assigning the relevant agency to tracking progress as stated above in recommendation (3).
5. Establish a quantitative threshold or explicitly adopt a measurable definition of success that allows agencies to track their progress. Many metrics have a numeric value or percentage, which is only relevant if a threshold for action or success is pre-determined. If a hard threshold is not appropriate, then expected or desired progress each year should be established. For example, under resilience outcomes, the "Healthy Soils Program projects" metric should include additional information on the number of projects or percentage of project coverage that defines successful resilience.
6. Specific to marine ecosystems, the California Multivariate Ocean Climate Indicator (MOCI) should be included as a metric to track changing climate conditions in Safeguarding California. This indicator combines multiple environmental parameters (García-Reyes & Sydeman 2017) to track dynamic ocean and climate conditions relevant to the California marine ecosystem.

Example elements for an improved metrics table:

Climate Impact Metric	**Context and Rationale**	**Participating Agency(ies) and Role**	**Threshold or Action**	**Relevant Safeguarding Chapter(s)**

References

García-Reyes, M., & Sydeman, W. J. (2017). California Multivariate Ocean Climate Indicator (MOCI) and marine ecosystem dynamics. *Ecological Indicators*, *72*, 521-529.

The recently released Measures Guidebook for Flood & Storm Risk Reduction Projects (https://www.researchgate.net/publication/315065811_Measures_Guidebook_for_Flood_and_Storm_Risk_Reduction_Projects_North_America_Risk_Reduction_and_Resilience_Priority) , demonstrates the benefits of natural infrastructure for flood risk reduction by tracking the success (not just implementation) of these projects. This is a critical part of the process of building the case for nature-based adaptation.

The Plan includes reduction in rate of land consumed for development, however, it would be great to subset it to specifically important areas for climate adaptation, mitigation, and resilience (see proposed list below). Also in addition to **rate**, **total acres remaining** would be useful.

- Reduction in rate of land consumed for development in floodplains
    - benefit: flood risk attenuation
- Reduction in rate of land consumed for development in sea-level rise inundation zone
    - benefit: flood risk attenuation
- Reduction in rate of land consumed for development in riparian buffers
    - benefit: flood risk attenuation, cooler stream temperatures from shaded rivers and streams, wildlife movement
- Reduction in rate of land consumed for development in hydrogeologically vulnerable areas
    - benefit: protect groundwater supply from contaminants, protect soils and geology over groundwater basins that have higher potential rates of recharge
- Reduction in rate of land consumed for development on natural lands
    - Benefit: GHG emissions reductions through avoided conversion and continued sequestration, habitat,
- Reduction in rate of land consumed for development on agricultural lands
- Reduction of rate of land consumed for development in connectivity corridors
    - Benefit: wildlife movement
- Reduction of rate of land consumed for development in the top % of resilient sites
- Reduction of rate of land consumed for development in lands identified as refugia

Thank you for your leadership and hard work in preparing the Safeguarding California Plan and the opportunity to submit these comments. We share your goal that the Final SCP increases California's preparedness to address the escalating impacts of climate change. Please do not hesitate to contact Louis Blumberg, lblumberg@tnc.org or Alex Leumer, aleumer@tnc.org, if you have any questions.

Sincerely,
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