California Air Resources Board

Co-benefit Assessment Methodology for Climate Adaptation

California Climate Investments Greenhouse Gas Reduction Fund



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Section A. Introduction

The goal of California Climate Investments is to reduce greenhouse gas (GHG) emissions and further the objectives of the California Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. The California Air Resources Board (CARB) is responsible for providing guidance on reporting and quantification methods for all State agencies that receive appropriations from the Greenhouse Gas Reduction Fund (GGRF). Guidance includes developing methodologies for estimating GHG emission reductions and other economic, environmental, and public health benefits of projects, referred to as "co-benefits."

The Center for Resource Efficient Communities at the University of California, Berkeley (UC Berkeley), in consultation with CARB staff, developed this Co-benefit Assessment Methodology to estimate climate adaptation co-benefits for relevant California Climate Investments programs.

Co-benefit Assessment Methodologies are intended for use by administering agencies, project applicants, and/or funding recipients to estimate the outcomes of California Climate Investments. Co-benefit estimates can be used to inform project selection and track results of funded projects. In addition to this methodology, general guidance on assessing California Climate Investment co-benefits is available in CARB's Funding Guidelines for Agencies Administering California Climate Investments (Funding Guidelines) available at www.arb.ca.gov/cci-fundingguidelines.

Climate Adaptation Co-benefit Description

Climate adaptation refers to activities that improve resiliency to the impacts of climate change. The *Safeguarding California Plan: 2018 Update*¹ provides the following definition of climate adaptation:

Adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Data indicate that climate change leads to increased occurrence of extreme heat effects, drought, sea level rise, flooding, and wildfire, among other significant impacts.

California Climate Investments can cause positive or negative climate adaptation co-benefits. These co-benefits may accrue directly (as a central objective of the project) or indirectly (as a consequence of project activities).

A *positive* climate adaptation co-benefit results when a California Climate Investments project reduces vulnerabilities posed by climate change through climate adaptation

¹ California Natural Resources Agency. *Safeguarding California Plan: 2018 Update.* (2018). <u>http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf</u>

oriented improvements to homes, communities, natural and working lands, and infrastructure.

A *negative* climate adaptation co-benefit results when a California Climate Investments project increases the vulnerability of a community to the effects of climate change. For example, developing buildings or structures in floodplains or changing permeable surfaces to paved surfaces.

Climate Adaptation Co-benefit Project Categories

This Co-benefit Assessment Methodology may apply to California Climate Investments² projects that involve:

- Changes in water use;
- Changes in natural and working land practices;
- Restoration and conservation of natural and working lands and habitat;
- Promotion of soil health;
- Urban tree or vegetation planting;
- Green infrastructure;
- Wildfire prevention;
- Shoreline protection; and
- Construction and new development.

California Climate Investments that result in climate adaption co-benefits generally address one of the following six topic areas covered by this Co-benefit Assessment Methodology: extreme heat, drought, sea level rise and inland flooding, agricultural productivity³ and conservation, species habitat, and wildfire.

A single California Climate Investments project may provide benefits in multiple topic areas. In such cases, users should evaluate the project using the assessment methods outlined for each relevant topic area to estimate the total climate adaptation co-benefit.

Methodology Development

UC Berkeley developed this Co-benefit Assessment Methodology, consistent with the guiding principles of California Climate Investments. The methodology is developed to:

- Support calculating the applicable co-benefits for individual projects;
- Apply to the project types proposed for funding;
- Provide uniform methods that can be applied statewide and are accessible by all applicants and funding recipients;

² This list is based off of project types funded by the Greenhouse Gas Reduction Fund as of April 2018 and may be modified as California Climate Investments evolve or expand.

³ Productivity refers to resiliency of the land to sustain crop yields in the face of climate change. It is not intended to solely refer to crop yields.

- Use existing and proven tools or methods, where available;
- Include the expected period of time for when co-benefits will be achieved; and
- Identify the appropriate data needed to calculate co-benefits.

UC Berkeley assessed peer-reviewed literature and consulted with experts, as needed, to identify:

- The direction and magnitude of the co-benefit;
- Project types to which the co-benefit is relevant;
- The limitations of existing empirical literature;
- Existing assessment methods and tools; and
- Knowledge gaps and other issues to consider in developing co-benefit assessment methods.

This work is summarized in a literature review on this co-benefit, which can be found at: <u>www.arb.ca.gov/cci-cobenefits.</u> UC Berkeley also considered ease of use, specifically the availability of project-level inputs from users for the applicable California Climate Investments programs.

CARB released the Draft Climate Adaptation Co-benefit Assessment Methodology for public comment in April 2018. This Final Climate Adaptation Co-benefit Assessment Methodology has been updated to address public comments, where appropriate. CARB staff periodically review each methodology to evaluate its effectiveness and update methodologies to make them more robust, user-friendly, and appropriate to the projects being quantified.

Program Assistance

For assistance with this Co-benefit Assessment Methodology, send questions to: <u>GGRFProgram@arb.ca.gov</u>. For more information on CARB's efforts to support implementation of California Climate Investments, see: <u>www.arb.ca.gov/auctionproceeds</u>.

Section B. Co-benefit Assessment Methods

This section describes how users assess climate adaptation co-benefits by topic area. Overall, the methods for assessing the climate adaptation co-benefits are qualitative, involving a checklist for each topic area that will record the presence or absence of an expected outcome (a "yes/no" approach). This approach enables users to identify whether a project is contributing to a positive or negative climate adaptation co-benefit, but does not characterize the magnitude of that contribution. "Not applicable" options are also available for measures that are not relevant to the project. Guidance for users on how to answer each question is provided in Section C.

Topic Area 1. Extreme Heat

Topic Area 1 includes projects that moderate (or exacerbate) extreme heat effects. Measures may include implementing urban greening in strategic locations that provide shade to homes, buildings, and vehicles, implementing green space, and promoting green infrastructure, including cool roofs. Users will evaluate a project against the criteria in Table 1. The table is followed by further explanation of the conditions under which users would check the box for each question (see page 11).

Table 1. Potential measures for extreme heat effects moderation		
Measure	Assessment (Y/N)	
Is the project planting trees that will provide shade to buildings, homes,	□ Yes	
sidewalks, streets, or parking lots?	□ No	
	□ N/A	
Is the project enhancing insulation of homes?	□ Yes	
	□ No	
	□ N/A	
Is the project installing cool roofs?	□ Yes	
	□ No	
	□ N/A	
Is the project reducing electrical grid demand and household costs	□ Yes	
associated with cooling?	🗆 No	
	□ N/A	
Is the project preventing conversion of agricultural lands (croplands,	□ Yes	
rangelands, or pasturelands) or natural land cover (trees, grasslands,	□ No	
shrublands, watersheds, or wetlands) to pavement or buildings?	□ N/A	
Is the project adding permeable land cover?	□ Yes	
	🗆 No	
	□ N/A	
Is the project replacing agricultural lands (croplands, rangelands, or	□ Yes	
pasturelands) or natural land cover (trees, grasslands, shrublands,	🗆 No	
watersheds, or wetlands) with pavement or buildings? (negative co-benefit)	□ N/A	

Topic Area 2. Drought

Topic Area 2 includes projects that mitigate (or exacerbate) the effects of drought, such as efforts to reduce water consumption and improve infiltration and groundwater recharge. Users will evaluate a project against the criteria in Table 2. The table is followed by further explanation of the conditions under which users would check the box for each question (see page 13).

Table 2. Potential measures for drought effects moderation		
Measure	Assessment (Y/N)	
Is the project setting up an ongoing mechanism to conserve water?	□ Yes	
	🗆 No	
	🗆 N/A	
Is the project promoting improved soil health, soil quality, or soil stability?	□ Yes	
	🗆 No	
	□ N/A	
Is the project restoring wetlands, watersheds, or riparian buffers?	□ Yes	
	🗆 No	
	🗆 N/A	
Is the project planting native, drought-tolerant vegetation?	□ Yes	
	🗆 No	
	🗆 N/A	
Is the project changing permeable surfaces to paved surfaces?	□ Yes	
(negative co-benefit)	🗆 No	
	🗆 N/A	
Is the project increasing water use?	□ Yes	
(negative co-benefit)	🗆 No	
	□ N/A	

Topic Area 3. Sea Level Rise and Inland Flooding Adaptation

Topic Area 3 includes projects that mitigate the effects of sea level rise and the frequency and severity of inland flooding. Measures may include providing wetland or riparian buffers for coastal areas and promoting watershed management to lessen flood peaks, reduce sedimentation, temporarily store floodwaters and recharge aquifers, and restore environmental flows.⁴ Users will evaluate a project against the criteria in Table 3. The table is followed by further explanation of the conditions under which users would check the box for each question (see page 15).

Table 3. Potential measures for sea level rise and inland flooding adaptation		
Measure	Assessment (Y/N)	
Does the project include floodplain restoration or protection?	□ Yes	
	□ No	
	□ N/A	
Does the project include forest/tree restoration or protection in a	□ Yes	
flood-prone or flood hazard area?	□ No	
	□ N/A	
Does the project include improved soil health in a flood-prone or	□ Yes	
flood hazard area?	□ No	
	□ N/A	
Does the project include rainwater capture and/or infiltration	□ Yes	
systems as part of urban green efforts in a flood-prone or flood	□ No	
hazard area?	□ N/A	
Does the project include additional infrastructure, including natural	□ Yes	
infrastructure, to protect against flooding in a flood-prone or flood	□ No	
hazard area?	□ N/A	
Is the president mitigation the office to of and level vice (localing in a	□ Yes	
Is the project mitigating the effects of sea level rise/hooding in a region at risk for sea level rise/flooding?	□ No	
	□ N/A	
Is the project developing buildings or structures in floodplains?	□ Yes	
(negative co-benefit)	🗆 No	
	□ N/A	

⁴ California Department of Water Resources. (2008). Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water.

Topic Area 4. Agricultural Productivity and Conservation

Topic Area 4 includes projects that support the ability of agricultural lands to remain productive in a changing climate. Measures may include land conservation, improving soil health, and reducing on-farm groundwater consumption. Users will evaluate a project against the criteria in Table 4. The table is followed by further explanation of the conditions under which users would check the box for each question (see page 17).

Table 4. Potential measures for agricultural productivity and conservation		
Measure	Assessment (Y/N)	
Is the project conserving Prime Farmland, Farmland of Statewide	□ Yes	
Importance, Unique Farmland, Grazing Land, or Farmland of Local	🗆 No	
Importance?	□ N/A	
Is the project promoting improved soil health, soil quality, or soil	□ Yes	
stability?	🗆 No	
	□ N/A	
Is the project reducing on-farm water consumption?	□ Yes	
	🗆 No	
	□ N/A	
Is the project converting Prime Farmland, Farmland of Statewide	□ Yes	
Importance, Unique Farmland, Grazing Land, or Farmland of Local	🗆 No	
Importance to urban or other development? (negative co-benefit)	□ N/A	

Topic Area 5. Species Habitat

Topic Area 5 includes projects that mitigate the effects of climate change on wildlife and biodiversity conservation. Measures may include increasing the extent of protected areas, designing new restoration sites, protecting movement corridors, and focusing efforts on endangered species. Users will evaluate a project against the criteria in Table 5. The table is followed by further explanation of the conditions under which users would check the box for each question (see page 18).

Table 5. Potential measures for species habitat	
Measure	Assessment (Y/N)
Is the project restoring or conserving habitat that contains Species	□ Yes
of Greatest Conservation Need, including threatened or endangered	🗆 No
species?	□ N/A
Is the project restoring or conserving historical habitat for Species of	□ Yes
Greatest Conservation Need, including threatened or endangered	□ No
species?	□ N/A
Is the project constructing or conserving wildlife corridors and/or	□ Yes
habitat connectivity?	□ No
	□ N/A
Is the project disturbing wetlands, waterways, tidelands, or wildlife	□ Yes
corridors?	□ No
(negative co-benefit)	□ N/A
Is the project developing land, or otherwise disturbing habitat, that	□ Yes
contains threatened or endangered species?	🗆 No
(negative co-benefit)	□ N/A

Topic Area 6. Wildfire

Topic Area 6 includes projects that seek to reduce fire hazards and increase forest resilience, which refers to "the ability to cope with stress, the capacity to recover from the effects of disturbance, and the capability to adapt to stress and change."⁵ Measures may include forest treatments such as fuel reduction and other measures that reduce fire risk, size, or severity. Users will evaluate a project against the criteria in Table 6. The table is followed by further explanation of the conditions under which users would check the box for each question (see page 20).

Table 6. Potential measures for wildfire mitigation			
Measure	Assessment (Y/N)		
Does the project involve fuels management work to maintain	□ Yes		
ecosystem health in a high priority landscape?	□ No		
	□ N/A		
Does the project involve rehabilitation work in a high priority	□ Yes		
landscape impacted by wildfire?	🗆 No		
	□ N/A		
Does the project involve fire hazard prevention work to mitigate	□ Yes		
wildfire threats to communities?	🗆 No		
	□ N/A		
Is the project implementing other types of forest or other ecosystem	□ Yes		
management treatments to reduce wildfire intensity or reduce	🗆 No		
potential impacts of wildfires?	□ N/A		
Is the project implementing other fire mitigation or prevention	□ Yes		
measures for non-forested habitats that may be impacted by wildfire?	🗆 No		
	□ N/A		
Does the project involve new construction in a high priority landscape	□ Yes		
for reducing or preventing wildfire threats?	🗆 No		
(negative co-penetit)	□ N/A		

⁵ United Nations Food and Agriculture Organization. <u>http://www.fao.org/docrep/017/i3084e/i3084e09.pdf</u>

Assessment

To determine the overall Climate Adaptation Co-benefit, users will assess the checklist responses within each topic area and across the six project topic areas.

First, tally the number of "yes" responses in each topic area checklist. Each positive co-benefit will count as +1 and each negative co-benefit will count as -1. The negative co-benefits are labeled for clarity. If there is a net positive of at least 1 for the topic area, then the project is considered as providing "climate adaptation co-benefits" for that topic area.

Next, determine how many of the topic areas have a net positive number of climate adaptation co-benefits.

- If at least one topic area has net positive climate adaptation co-benefits, the overall classification is "Climate Adaptation Co-benefits."
- If two or three topic areas have net positive climate adaptation co-benefits, the overall classification is "High Climate Adaptation Co-benefits."
- If four or more topic areas have net positive climate adaptation co-benefits, the overall classification is "Exceptional Climate Adaptation Co-benefits."

Section C. Data Requirements and Tools

This section provides guidance for users on how to answer questions in Section B and identifies the tools required for the Climate Adaptation Co-benefit Assessment Methodology. The data that a user will need to provide to apply the methods above will vary by project category and largely be available from project proposals and/or CARB GHG Quantification Methodologies and Calculator Tools.

Guidance on answering questions in Table 1

Is the project planting trees that will provide shade to buildings homes, sidewalks, streets, or parking lots?

Check the "yes" box if the project plants trees at the correct orientation and distance from the structure to provide shade to buildings or plants trees within or surrounding paved surfaces, including parking lots, streets, and sidewalks.

Is the project enhancing insulation of homes?

Check the "yes" box if the project enhances insulation of homes, including insulating windows. The enhanced insulation should be intended to reduce cooling demand for the building.

Is the project installing cool roofs?

Check the "yes" box if the project Installs cool roofs. The cool roofs should use reflective and emissive materials, so as to reduce surface temperature of roofs and air temperatures nearby.

Is the project reducing electrical grid demand and household costs associated with cooling?

Check the "yes" box if the project reduces electrical grid demand and household costs associated with cooling. The reduction should reduce demand on the system while enabling residents to remain more comfortable without additional cost.

Is the project preventing conversion of agricultural lands or natural land cover to pavement or buildings?

Check the "yes" box if the project prevents or protects natural land cover from being converted to pavement or buildings. Agricultural lands may include croplands, rangelands, or pasturelands. Natural land cover may include trees, grasslands, shrublands, watersheds, or wetlands.

Is the project adding permeable land cover?

Check the "yes" box if the project adds permeable land cover to replace formerly impermeable land cover.

Is the project replacing agricultural lands or natural land cover with pavement or buildings? (negative co-benefit)

Check the "yes" box if the project replaces agricultural or natural land cover with

pavement or buildings. Agricultural lands may include croplands, rangelands, or pasturelands. Natural land cover may include trees, grasslands, shrublands, watersheds, or wetlands. Only check the "yes" box if the project results in a net conversion (i.e., if mitigation measures resulted in 1:1 conservation on other lands of equal value do not check the "yes" box).

Guidance on answering questions in Table 2

Is this project setting up an ongoing mechanism to conserve water? Check the "yes" box if the project achieves positive co-benefits according to the Water Savings Co-benefit Assessment Methodology.⁶

- The project reduces irrigation water use or improves irrigation efficiency;
- The project produce installs more efficient water appliances or measures in residential, commercial, or institutional facilities (e.g., dishwashers, clothes washers, faucets); or
- The projects establishes green infrastructure specifically intended for water capture and infiltration.

Is this project promoting improved soil health, soil quality, or soil stability? Check the "yes" box if the project achieves positive co-benefits according to the Soil Health and Conservation Co-benefit Assessment Methodology.⁶

- The project applies practices that meet United States Department of Agriculture's Natural Resources Conservation Service Conservation Practice Standards (USDA-NRCS CPS) applicable to California Department of Food and Agriculture (CDFA) Healthy Soils Program and/or compost application in accordance with CDFA-supported Compost Application Rates;
- The project conserves or protects cropland, rangeland, grassland, watershed, or forest soils from conversion and development through easements, conservation agreements, or other protective measures; or
- The project improves soils indirectly by diverting organic matter from waste streams and using it for production of compost that is applied to cropland or grassland outside of the project area.

Is this project planting native, drought-tolerant vegetation? Check the "yes" box if the project plants native, drought-tolerant vegetation.

- Is this project restoring wetlands, watersheds, or riparian buffers? Check the "yes" box if the project restores wetlands, watersheds, or riparian buffers in a manner that is likely to enhance long-term water availability for ecosystem or human use. This could include creating new areas of wetlands or other surface water bodies, enhancing infiltration of water into soils and groundwater aquifers, or changing timing of runoff from watersheds into streams and receiving water bodies (including reservoirs) in a manner beneficial to ecosystems or humans.
- Is the project changing permeable surfaces to paved surfaces? (negative co-benefit) Check the "yes" box if the project changes surfaces from permeable to impermeable paved or otherwise impervious surfaces.

⁶ Available at: <u>www.arb.ca.gov/cci-cobenefits</u>

Is the project increasing water use? (negative co-benefit)

Check the "yes" box if the project increases water use. Users may use the Water Savings Co-benefit Assessment Methodology⁶ or the existing GHG Quantification Methodologies and Calculator Tools⁷ required for the specific programs to determine whether the project increases water consumption. Examples could include converting urban, suburban, or populated rural community parcels (developed or undeveloped) into vegetated open spaces that require irrigation above the baseline water use and planting trees or other aboveground biomass that requires increased irrigation, among others.

⁷ Available at: <u>www.arb.ca.gov/cci-quantification</u>

Guidance on answering questions in Table 3

This topic area refers is applicable to projects in areas subject to flooding and/or sea level rise. To be eligible to answer "yes" to the questions, users must first refer to the CoSMoS mapping system⁸ to determine whether the project location qualifies. Except when noted below, set the map to the following settings:

- Topics: Flooding, which shows the inundation due to sea level rise, waves, and storm surge.
- Amount of Sea Level Rise: 0 cm.
- Storm Scenario Frequency: None.

Projects located in "Flood-prone Low-lying" areas or "Flood Hazard" areas are eligible.

If the CoSMoS mapping system does not include the project area, refer to the Federal Emergency Management Agency (FEMA) Flood Map Service Center.⁹ Users will enter the address or location of their project. Projects located in "Special Flood Hazard Areas" or "Other Areas of Flood Hazard" as identified in the flood map are eligible

Does the project include floodplain restoration or protection? Check the "yes" box if the project includes restoration or protection activities. Floodplain restoration refers to the reestablishment of the structure and function of ecosystems and floodplains to return the ecosystem as closely as possible to its natural conditions and functions prior to being developed.¹⁰ Floodplain protection refers to activities that maintain the natural function of the wetland. Examples include protecting existing vegetation and preventing development of floodplains.

Does the project include forest/tree restoration or protection in a flood-prone or flood hazard area?

Check the "yes" box if the project performs any of the following activities:

- Planting trees that prevent soil erosion,
- Planting trees in flood-prone areas, or
- Protecting trees in flood-prone area.

Does the project include improved soil health in a flood-prone or flood hazard area? Check the "yes" box if the project achieves positive co-benefits according to the Soil Health and Conservation Co-benefit Assessment Methodology.⁶

 The project applies practices that meet United States Department of Agriculture's Natural Resources Conservation Service Conservation Practice Standards (USDA-NRCS CPS) applicable to California Department of Food and Agriculture (CDFA) Healthy Soils Program and/or compost application in accordance with CDFA-supported Compost Application Rates;

⁸ <u>https://walrus.wr.usgs.gov/coastal_processes/cosmos/index.html</u>

⁹ <u>https://msc.fema.gov/portal/search</u>

¹⁰ Federal Emergency Management Agency. 2015. Floodplain and Stream Restoration Fact Sheet. <u>https://www.fema.gov/media-library-data/1487161136815-</u> ecad1c0312eda2111ffa28735a4d06ad/FSR Fact Sheet Feb2017 COMPLIANT.pdf.

- The project conserves or protects cropland, rangeland, grassland, watershed, or forest soils from conversion and development through easements, conservation agreements, or other protective measures; or
- The project improves soils indirectly by diverting organic matter from waste streams and using it for production of compost that is applied to cropland or grassland outside of the project area.

Does the project include rainwater capture and/or infiltration systems as part of urban green efforts in a flood-prone or flood hazard area?

Check the "yes" box if the project implements rainwater capture or infiltration systems as part of urban greening efforts.

Does the project include additional infrastructure with the primary purpose of protecting against flooding in a flood-prone or flood hazard area?

Check the "yes" box if the project constructs new infrastructure or rebuilds, or supports existing infrastructure designed to protect against flooding, such as levees or dams to protect flood-prone areas.

Is the project mitigating the effects of sea level rise/flooding in a region at risk for sea level rise impacts, according to the CoSMoS mapping tool?

Refer to the CoSMoS mapping system⁹ to determine whether the project is located in a region at risk for sea level rise. Set the maps to the following settings:

- Topics: Flooding, which shows the inundation due to sea level rise, waves, and storm surge.
- Amount of Sea Level Rise: 25 cm¹¹ (default) or the 2050 "low-risk aversion" projected sea level rise for the project area according to the Ocean Protection Council's 2018 Update of the State of California Sea-Level Rise Guidance.¹²
- Storm Scenario Frequency: None.

Check the "yes" box if the project is located in "Flood-prone Low-lying" areas or "Flood Hazard" areas and involves sea level rise/flooding mitigation activities. Examples of adaptation strategies for sea level rise include constructing new infrastructure (e.g., building flood barriers to protect infrastructure or relocating facilities to higher elevations); protecting, constructing or restoring coastal tidal wetlands; implementing measures designed to reduce the long-term need for shoreline modification, and implementing saltwater intrusion barriers and aquifer recharge, among other activities.

Is the project developing buildings or structures in floodplains? (negative co-benefit) Check the "yes" box for if the project develops buildings or structures in "Flood-prone Low-lying" areas or "Flood Hazard" areas.

 ¹¹ Several different climate experts project a 25 cm sea level rise will occur between approximately 2040 and 2060, with some variation. <u>http://data.pointblue.org/apps/ocof/tools/compare/</u>
¹² <u>http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-</u>
<u>A_OPC_SLR_Guidance-rd3.pdf</u>

Guidance on answering questions in Table 4

Is the project conserving Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, or Farmland of Local Importance?

Check the "yes" box if the project places conservation easement on land classified as Prime Farmland or Farmland of Statewide Importance per the Department of Conservation Farmland Mapping and Monitoring Program.¹³

Is this project promoting improved soil health, soil quality, or soil stability? Check the "yes" box if the project achieves positive co-benefits according to the Soil Health and Conservation Co-benefit Assessment Methodology.⁶

- The project applies practices that meet United States Department of Agriculture's Natural Resources Conservation Service Conservation Practice Standards (USDA-NRCS CPS) applicable to California Department of Food and Agriculture (CDFA) Healthy Soils Program and/or compost application in accordance with CDFA-supported Compost Application Rates;
- The project conserves or protects cropland, rangeland, grassland, watershed, or forest soils from conversion and development through easements, conservation agreements, or other protective measures; or
- The project improves soils indirectly by diverting organic matter from waste streams and using it for production of compost that is applied to cropland or grassland outside of the project area.

Is this project reducing on-farm water consumption?

Check the "yes" box if the project reduces on-farm water consumption. Projects that are eligible for this question are likely to have already estimated water savings from the GHG Quantification Methodology and Calculator Tool used to estimate GHG emission reductions. Other projects that may involve water use on farms may complete the existing tool to determine if proposed activities will reduce water consumption.

Is the project converting Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, or Farmland of Local Importance to urban or other development? (negative co-benefit)

Check the "yes" box if the project converts land classified as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, or Farmland of Local Importance per the Department of Conservation Farmland Mapping and Monitoring Program¹⁴ to urban or other development. Only check the "yes" box if the project results in a net conversion (i.e., if mitigation measures resulted in 1:1 conservation on other lands of equal value do not check the "yes" box).

¹³ California Important Farmland Finder. <u>https://maps.conservation.ca.gov/DLRP/CIFF/</u>

Guidance on answering questions in Table 5

Is this project restoring or conserving habitat that contains Species of Greatest Conservation Need, including threatened or endangered species?

Check the "yes" box if the project area restores or conserves habitat that contains:

- A species included in the California Department of Fish and Wildlife's 2015 California State Wildlife Action Plan (see Table C-8: Species of Greatest Conservation Need by Province and Ecoregion);¹⁴ or
- A species that has been classified as Endangered or Threatened by the California Fish & Game Commission or by the U.S. Secretary of the Interior or the U.S. Secretary of Commerce.¹⁵ Use the California Natural Diversity Database QuickView Tool¹⁶ to determine if Endangered or Threatened species exist on the land, as described in Appendix B.

Is the project restoring or conserving historical habitat for Species of Greatest Conservation Need, including threatened or endangered species?

Check the "yes" box if the project helps to restore or conserve an endangered or threatened species in its historical habitat. Find the ecoregion of endangered and threatened species in the California Department of Fish and Wildlife's 2015 California State Wildlife Action Plan (see Table C-8: Species of Greatest Conservation Need by Province and Ecoregion).¹⁵

Is this project constructing or conserving wildlife corridors and/or habitat connectivity? Check the "yes" box if the project constructs or conserves a wildlife corridor and/or habitat connectivity.¹⁷ Refer to the California Department of Fish and Wildlife's Essential Habitat Connectivity Network map¹⁸ to determine if the project is located in an Essential Connectivity Area or an area with Potential Riparian Connections.

Is the project disturbing wetlands or waterways, leading to loss of natural resource services from landscapes? (negative co-benefit)

Check the "yes" box if the project encroaches on or otherwise interferes with the functioning of wetlands or waterways.

Is this project developing land, or otherwise disturbing habitat, that contains threatened or endangered species? (negative co-benefit)

Check the "yes" box if the project area will develop land that contains a species that has been classified as Endangered or Threatened by the California Fish & Game Commission or by the U.S. Secretary of the Interior or the U.S. Secretary of Commerce.¹⁶ Use the California Natural Diversity Database QuickView Tool¹⁷ to

¹⁴ <u>https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109224&inline</u>

¹⁵ https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109405&inline

¹⁶ https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data#43018410-cnddb-quickview-tool

¹⁷ Habitat connectivity includes movement on land and water and as necessary to maintain viable ecosystem function, healthy wildlife populations, wildlife movement, and gene flow. Wildlife movement entails searches for food, shelter, and mates; dispersal as young find new territories; seasonal migration; and shifts to new ranges in response to climate change.

¹⁸ <u>https://www.wildlife.ca.gov/conservation/planning/connectivity/CEHC</u>

determine if Endangered or Threatened species exist on the land, as described in Appendix B. Changes in land management supported by the project such as fallowing fields or tree removal can also result in disturbances to habitat and should be evaluated.

Guidance on answering questions in Table 6

Does the project involve fuels management work to maintain ecosystem health in a high priority landscape?

Check the "yes" box if the project conducts fuels management work in a "high" priority landscape for preventing wildfire threats to maintain ecosystem health. Refer to the Map of Priority Landscape for Preventing Wildfire Threats to Maintain Ecosystem Health¹⁹

to determine if their project area is considered high priority.

Does the project involve rehabilitation work in a high priority landscape impacted by wildfire?

Check the "yes" box if the project conducts rehabilitation work in a "high" priority area for restoring wildfire impacted areas to maintain ecosystem health. Refer to the Map of Priority Landscape for Restoring Wildfire Impacted Areas to Maintain Ecosystem Health²⁰ to determine if their project area is considered high priority. Check the "yes" box if the project is conducting rehabilitation work in an area impacted by fire since the publication of the referenced map as documented on the CAL FIRE's Fire Map Archives.²¹

Does the project involve fire hazard prevention work to mitigate wildfire threats to communities?

Check the "yes" box if the project conducts fire hazard prevention in a "high" priority landscape for preventing wildfire threats for community safety. Refer to the Map of Priority Landscape for Preventing Wildfire Threats for Community Safety²² to determine if their project area is considered high priority.

Is the project implementing other types of forest or other ecosystem management treatments to reduce wildfire intensity or reduce potential impacts of wildfires?

Check the "yes" box if the project conducts forest or other ecosystem treatments that can have indirect impacts on wildfire such as pest management.

Is the project implementing other fire mitigation or prevention measures for non-forested habitats that may be impacted by wildfire?

Check the "yes" box if the project conducts fire mitigation or prevention measures for non-forested habitats that could be impacted by wildfire. Proposed activities could include:

- Preventing residential development in a community at risk from wildfire, as determined by the Map of Communities at Risk from Wildfire;²³
- Using fire-resistant building materials and design in a community at risk from wildfire, as determined by the Map of Communities at Risk from Wildfire;²⁵

¹⁹ http://frap.fire.ca.gov/data/assessment2010/maps/PL_21_1.pdf

²⁰ http://frap.fire.ca.gov/data/assessment2010/maps/PL_21_2.pdf

²¹ http://www.fire.ca.gov/general/firemaps

²² http://frap.fire.ca.gov/data/assessment2010/maps/PL 21 3.pdf

²³ http://frap.fire.ca.gov/data/frapgismaps/pdfs/comrisk_map.pdf

- Defensible space inspections or fire prevention education in a community at risk from wildfire, as determined by the Map of Communities at Risk from Wildfire;²⁵ and
- Conducting fuels management in grasslands and other non-forested habitats.

Does the project involve new construction in a high priority landscape for reducing or preventing wildfire threats? (negative co-benefit)

Check the "yes" box if the project involves new construction in priority landscapes. Use the following maps to determine "high priority" landscapes:

- Priority Landscape for Preventing Wildfire Threats to Maintain Ecosystem Health;²¹
- Priority Landscape for Preventing Wildfire Threats for Community Safety;²⁴ and
- Map of Communities at Risk from Wildfire.²⁵

Tools

The mapping tools and resources used to determine the applicability of particular co-benefit measures to the project area are listed in Table 7. Examples of how to use the tools are provided in Appendices A, B, C, and D.

Table 7. Summary of CCI Project Categories and Applicable Tools/Resources		
Relevant Topic Areas	Tools/Resources	
Topic Area 3. Sea Level	CoSMoS mapping system ⁹	
Rise and Inland Flooding	FEMA Flood Map Service Center ¹⁰	
Topic Area 4. Agricultural Productivity and Conservation	Department of Conservation Farmland Mapping and Monitoring Program California Important Farmland Finder ¹⁴	
	State and Federally Listed Endangered & Threatened Animals of California ¹⁶	
Topic Area 5. Species	California Natural Diversity Database QuickView Tool ¹⁷	
Habitat	Essential Habitat Connectivity Network map ²⁰	
	State Wildlife Action Plan tables of Species of Greatest Conservation Need by Province and Ecoregion ¹⁵	
	Map of Priority Landscape for Preventing Wildfire Threats to Maintain Ecosystem Health ²¹	
Topic Area 6. Wildfire	Map of Priority Landscape for Restoring Wildfire Impacted Areas to Maintain Ecosystem Health ²²	
	Map of Priority Landscape for Preventing Wildfire Threats for Community Safety ²⁴	
	Map of Communities at Risk from Wildfire ²⁵	

Appendix A. Example Tool Use for Topic Area 3

Users assessing a project's impact on sea level rise and inland flooding adaptation will use the CoSMoS mapping system

(<u>https://walrus.wr.usgs.gov/coastal_processes/cosmos/index.html</u>) to determine whether a project is located in a region at risk for flooding or sea level rise. Step-by-step instructions for using this tool are provided below.

This example is applicable to the determination of whether a project is mitigating the effects of sea level rise/flooding in a region at risk for sea level rise impacts.

Step 1: Navigate to a Region or Enter an Address or Place Name Open the CoSMoS website and navigate to the "Our Coast, Our Future" flood mapper via the link circled in yellow in Figure 1.



Figure 1. Screenshot of USGS CoSMoS Home Screen

Then click on the "Explore Flood Map" link.



Select the region of interest and further refine the search by entering a specific address or place name for the project location.

Figure 2	. Screenshot	of Navigate t	to a Region Screen
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			B POINT OF
Nav	vigate to a Region		
y v	Where do you want to explore? 'ou can easily move to other parts of Calif	fornia by zooming and panning with the	map tool.
	North	South	1
	Northern California	Southern California	
	Alameda	Los Angeles	
	Contra Costa	Orange	
	Marin	San Diego	
	Mendocino	Santa Barbara	
	Napa	Ventura	
	San Francisco		
	San Mateo	Regional Projects	8
	Santa Clara	Russian River	
	Solano		
	Sonoma		

Step 2: Define the Parameters for the Simulation

Once the region has been selected, set the parameters for the simulation. Select the Flooding under "Choose a topic," 25 cm (default) project area-specific level under "Choose an amount of sea level rise," and None under "Choose an Event." The tool will determine if the defined area is in a "flood-prone low-lying" area or a "flood hazard area."



Figure 3. Screenshot of CoSMoS Output Screen

Flood-prone Low-lying Areas 000cm SLR + Wave 000

Flood Hazard 000cm SLR + Wave 000

Flood Depth 000cm SLR + Wave 000



If the CoSMoS mapping system does not include the project area, applicants/funding recipients may refer to the Federal Emergency Management Agency (FEMA)'s Flood Map Service Center (<u>https://msc.fema.gov/portal/search</u>). Step-by-step instructions for using this tool are provided below.

Step 1: Enter the Area of Interest

Select the region of interest and further refine the search by entering a specific address or place name for the project location.

Figure 4. Screenshot of FEMA Flood Map Service Center Search By Address Screen

FEMA Flood Map Service Center: Search By Address

Enter an address, place, or coordinates: 😢

Enter an address, place, or coordinates

Search

Whether you are in a high risk zone or not, you may need <u>flood insurance</u> because most homeowners insurance doesn't cover flood damage. If you live in an area with low or moderate flood risk, you are 5 times more likely to experience flood than a fire in your home over the next 30 years. For many, a National Flood Insurance Program's flood insurance policy could cost less than \$400 per year. Call your insurance agent today and protect what you've built.

Learn more about steps you can take to reduce the risk flood damage.



Step 2: Determine Flood Areas

Read map output to determine if project area is in "Special Flood Hazard Areas" or "Other Areas of Flood Hazard."



Figure 5. Screenshot of FEMA Flood Map Service Center Output Screen

Appendix B. Example Tool Use for Topic Area 4

Users assessing if a project is conserving or converting Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, or Farmland of Local Importance will use the Department of Conservation Farmland Mapping and Monitoring Program California Important Farmland Finder

(<u>https://maps.conservation.ca.gov/DLRP/CIFF/</u>). Step-by-step instructions for using this tool are provided below.

Step 1: Agree to the Terms and Conditions

Read the data disclaimer and check the box to accept the terms and conditions. Click OK to proceed to the tool.

Figure 6. Screenshot of California Important Farmland Finder Home Screen



Step 2: Enter project location

Type the location of the project into the search bar at the upper left corner of the map. Select the location and map view will adjust to the location entered.



Figure 7. Screenshot of California Important Farmland Finder Search Screen

Figure 8. Screenshot of California Important Farmland Finder Results



Step 3: Use Map Legend to Determine Land Classification of the Project Area Click on the legend in the task bar (shown in yellow circle in Figure 9) to show the map legend. For the purposes of this assessment methodology, determine if the farmland conserved or converted is Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, or Farmland of Local Importance (shown in red box in Figure 9).



Figure 9. Screenshot of California Important Farmland Finder Results & Legend

Appendix C. Example Tool Use for Topic Area 5

Users assessing a project's impact on species habitat will use a variety of tools to determine whether their project is located in a region that contains threatened or endangered species, historical habitat of an endangered species, or wildlife corridors.

Users assessing whether a project is restoring land that contains threatened or endangered species will first use the California Natural Diversity Database QuickView Tool (<u>https://map.dfg.ca.gov/bios/?tool=cnddbQuick</u>) to determine if the project is located in a region that contains threatened or endangered species. Step-by-step instructions for using this tool are provided below.

Step 1: Open the QuickView Tool Click "Ok, Open the QuickView Tool"

Figure 10. Screenshot of CNDDB QuickView Tool Introductory Screen *IMPORTANT:*

The CNDDB QuickView Tool provides public access to basic information taken from the <u>California Natural</u> <u>Diversity Database (CNDDB</u>). A subscription is required to obtain the full, detailed information available in the CNDDB. The CNDDB QuickView Tool results contain "Mapped" and "Unprocessed" CNDDB data at the 7.5' quad and county levels. The "Unprocessed" CNDDB data has NOT been quality controlled and may contain errors. Neither the CNDDB QuickView data, nor the full version of the CNDDB, are to be substituted for preproject review or for on-site surveys. Please see the <u>CNDDB QuickView Tool user guide</u> for additional information.

OK, open the QuickView tool

Step 2: Select the Desired Tool

Select the tool that best matches the geographic scope of the project (i.e., county, quad, etc.). Below is a brief tutorial for listing CNDDB species by quadrant.

Figure 11. Screenshot of CNDDB QuickView Tool Selection Screen

Zoom	to a Quad	٢
Select a	a tool below and click on the map	
8	List CNDDB Species for a Quad	
	List CNDDB Species for 9 Quads	
	List CNDDB Species for a County	
	View CNDDB Quad Data by Species	
Type ii	nto the text box to search for species	

Step 3: Select the Desired County or Quadrant

Select the County or quadrant(s) that contain the project area by choosing from the drop down list or zooming into the map and selecting your project location. A table will appear at the bottom of the screen, as shown in the image below.



Figure 12. Screenshot of CNDDB QuickView Location Selection Screen

Step 4: Review endangered or threatened species results

Click the "up" arrow at the top right of the table to increase the table size.



Click on either "Federal_Status" or "State_Status" columns to sort species and determine if any are endangered or threatened.

Figure 13. Screenshot of CNDDB Quad Species List

	Element_Type	Scientific_Name	Common_Name	Element_Code	Federal_Status	State_Status
1	Animals - Amphibians	Rana boylii	foothill yellow-legged frog	AAABH01050	None	Candidate Threatened
2	Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered
3	Animals - Birds	Sternula antillarum browni	California least tern	ABNNM08103	Endangered	Endangered
4	Animals - Birds	Rallus obsoletus obsoletus	California Ridgway's rail	ABNME05016	Endangered	Endangered
5	Animals - Mammals	Reithrodontomys raviventris	salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered
6	Plants - Vascular	Holocarpha macradenia	Santa Cruz tarplant	PDAST4X020	Threatened	Endangered

If the search produces results, there are threatened or endangered species in the region and the user can go on to answer the questions regarding the project's impact on the species accordingly. Users assessing whether a project is conserving land that is historical habitat for an endangered or threatened species will first use the Table C-8: Species of Greatest Conservation Need by Province and Ecoregion in the California State Wildlife Action Plan (SWAP) (<u>https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109224&inline</u>) to determine if the project is in a province with a species of greatest conservation need. Step-by-step instructions for using this tool are provided below.

If there is a species of greatest conservation need in the province (see Figures 14 and 15) in which the project is located, the user can go on to answer the questions regarding the project's impact on historical habitat accordingly.

Table C-8 S	pecies of	fGr	eatest	Cons	erva	atio	n Ne	ed	by P	rovinc	e an	d Eco	oreg	ion							
Common Name		North Coast and Klamath				Cascades and Modoc Plateau		Bay Delta and Central Coast		Central Valley and Sierra Nevada		South Coast		Desert				Marine			
		Northern California Coast	Northern California Coast Ranges	Northern California Interior Coast Ranges	Klamath	Southern Cascades	Modoc Plateau	Northwest Basin and Range	Central California Coast	Central California Coast Ranges	Great Valley	Sierra Nevada Foothills	Sierra Nevada	Southern California Coast	Southern California Mountain and Valleys	Mono	Mojave Desert	Sonoran Desert	Colorado Desert	Southeastern Great Basin	Marine and Offshore Islands
agile (=Pacific) kangaroo rat									Х	Х	Х	Х	Х	Х	Х						
Alameda Island mole									Х												
Alameda song sparrow									Х												
Alameda striped racer (whipsnake)									Х	X											
alpine chipmunk													Х								
Amargosa vole																	Х				
American badger		Х	X	X	Х	Х	Х	Х	Х	X	Х	Х	Х	Х	X	Х	Х	Х	Х	Х	
American pika						Х	Х	Х					Х			х				Х	
American white pelican						Х	Х	Х			Х		Х				Х	х	Х		
Arizona Bell's vireo																	Х	Х	Х		
Arizona myotis																	Х	Х	Х		
arroyo toad										Х				Х	X						
ashy storm-petrel		Х							Х					Х							Х
Baja California coachwhip														Х	X						
Bakersfield legless lizard										Х	Х										
bald eagle		Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	X	х	Х	Х	Х	Х	
bank swallow		Х		Х	Х	Х	Х	Х	Х	X	Х	Х	Х	Х		х					
Barrow's goldeneye			1								_				-			_	_		

Figure 14. Species of Greatest Conservation Need by Province and Ecoregion

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Figure 15. Map of State Wildlife Action Plan (SWAP) Provinces

Available at: <u>https://www.wildlife.ca.gov/SWAP</u> or GIS map available at: <u>https://hub.arcgis.com/datasets/076ccc71fc1143a69cd90df79802b9a0_0?selectedAttrib</u> <u>ute=Province</u>



Users assessing whether a project will construct or conserve wildlife corridors and/or habitat connectivity will use the Essential Habitat Connectivity Network map to determine whether their project is located in a region with an essential connectivity area or potential riparian connections.²⁰ The map is reproduced below.





If the project is located in a yellow, orange, red, or blue area on the map, the user can go on to answer the questions regarding the project's impact on wildlife corridors and/or habitat connectivity.

Appendix D. Example Tool Use for Topic Area 6

Users assessing a project's impact on wildfire will use a variety of maps to determine whether their project is located in a priority landscape for: preventing wildfire threats to maintain ecosystem health, restoring wildfire impacted areas to maintain ecosystem health, or preventing wildfire threats for community safety or in an area designated as a community at risk from wildfire. These maps are reproduced below.

Figure 17. Map of Priority Landscape for Preventing Wildfire Threats to Maintain Ecosystem Health

Available at: http://frap.fire.ca.gov/data/assessment2010/maps/PL_21_1.pdf



Figure 18. Map of Priority Landscape for Restoring Wildfire Impacted Areas to Maintain Ecosystem Health

Available at: http://frap.fire.ca.gov/data/assessment2010/maps/PL_21_2.pdf



Figure 19. Map of Priority Landscape for Preventing Wildfire Threats for Community Safety

Available at: http://frap.fire.ca.gov/data/assessment2010/maps/PL_21_3.pdf



Figure 20. Map of Communities at Risk from Wildfire

Available at: http://frap.fire.ca.gov/data/frapgismaps/pdfs/comrisk_map.pdf



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