Healthy Landscapes 2030:
California's Climate Change Vision and Goals
for Natural and Working Lands

Discussion Paper for Public Comment to Inform Development of the 2030 Target Scoping Plan Update

This Discussion Paper presents initial ideas, concepts, and draft goals that will be considered and evaluated as part of California's 2030 climate change vision and strategy for the Natural and Working Lands sector. This Discussion Paper will serve to inform continued development of the AB 32 Scoping Plan to reflect Executive Order B-30-15, which establishes a mid-term greenhouse gas (GHG) reduction target for California of 40 percent below 1990 levels by 2030. Agencies are seeking input on this Discussion Paper, and specifically on the Discussion Topics and Questions at the end of this paper, some of which will be brought up for discussion at the March 23rd, 2016 public workshop on natural and working lands.

Vision

California's natural and working lands provide significant environmental benefits to the State. Forests, rangelands, farms, wetlands, riparian areas, deserts, coastal areas and the ocean store substantial carbon in biomass and soils. These lands support clean air, wildlife and pollinator habitat, and vibrant rural economies. They are home to the largest and most diverse sources of food and fiber production and renewable energy in the United States. And they are the foundation of the state's water supply, with more than two-thirds of California's water supply originating in the Sierra Nevada.

Natural and working lands are integral to the State's climate change strategy. Storing carbon in trees, plants, aquatic vegetation, and in the soil is the most effective way to remove climate pollution from the atmosphere. Climate change policies and programs must prioritize protection and enhancement of California's landscapes, including urban landscapes, for all of the benefits these resources provide the state. In addition, climate strategy must explore and pursue opportunities to increase "blue carbon," carbon stored in the form of biomass and sediments. The major threats to these systems include land conversion to more intensive uses; management practices that undermine system health and resilience; extreme events such as storms, wildfires, drought and heat; and the expected longer-term impacts of climate change.

California's natural and working lands climate change strategy aims to promote robust, resilient carbon storage and reduce GHG emissions from land use and management while preparing these systems for future conditions. Implementing this vision will build on existing conservation and habitat restoration programs and policies as well as technical and financial support for best management practices on farmland, rangeland, and timberland. Partnerships with private, federal, and local landowners are essential to maximizing sustainable carbon storage and a wide range of other benefits;

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for example, California's globally important agricultural production requires flexible approaches to deal with changes in economic as well as climatic conditions.

In practice, as we look to 2030, 2050, and beyond, this means that California will:

- **Protect** farmland, rangeland and forests from conversion so that these landscapes can continue to provide carbon storage, jobs, food, fiber, wildlife habitat, and clean water and air. Protection strategies will differ by land type and region, as each faces localized productivity, stability and development threats.
- **Enhance the ecological function** of natural areas, working lands and urban environments so that management activities are aligned with carbon storage goals while contributing to climate change adaptation objectives for water quality and supply, cropping patterns, biodiversity, and communities.
- **Innovate solutions** for biomass utilization and other activities that support stewardship of natural and working lands and complete carbon and waste lifecycles. Seek creative synergies between this and other sectors that optimize system-wide climate benefits, including opportunities to incorporate carbon, water and other ecosystem values into land use and management decisions in the private and public sectors.
- **Increase the use of green infrastructure in urban areas** to enhance carbon sequestration potential in the urban landscape in a manner that improves the energy efficiency of the built environment and transportation systems, reduces the urban heat island effect, improves water capture and storage and provides direct, long-lasting benefits to disadvantaged communities.

Guiding Principles

The following principles and objectives will guide policymaking and public and private investments in California's natural and working lands and in other sectors – energy, waste, transportation, and housing – that serve to support economically and ecologically sustainable landscapes.

- Achieve durable, resilient carbon storage and GHG emission reductions on and from natural and working lands and waters. Identify and design GHG mitigation efforts to enhance the multiple benefits to the environment and public that ecologically robust, resilient lands and waters provide.
- Align natural and working lands and natural resource management goals with the economic realities of private land use and management, for provision of food and fiber as well as carbon sequestration, water quality, and wildlife protection.
- Balance demand for housing, transit, food production, and commercial development with the need for natural and working lands to remain healthy and resilient to provide the intrinsic benefits and services Californians need today, and to adapt to future climate conditions.
- Engage local communities, both rural and urban, and align climate mitigation activities with community needs. Community and landowner support will improve the stewardship outcomes and

success rates for voluntary land management and restoration activities, as well as urban forestry and greening.

- Share science and implementation across disciplines and the state, and seek to disseminate science and coordinate solutions with local jurisdictions, landowners, and federal partners. Success will depend on implementation of the best local and regional land use planning and management models, and engagement with private as well as local, state and federal landowners. This necessitates landscape and watershed scale conservation and management planning while working with local land use decision-makers.
- Consider full-life cycle cost accounting in policy development and planning, as mandated by Executive Order B-30-15. Agencies are working to integrate land use modeling and account for the land use and management impacts of development, transportation and housing policies into this Scoping Plan Update.
- Promote state, regional and local models nationally and internationally. Aligning these carbon sequestration and GHG emission goals with the state's climate adaptation plan, *Safeguarding California: Reducing Climate Risk*, is a particularly valuable export.
- Provide support for regional plans to integrate land use climate impacts to reflect their role in providing ecological and health benefits, agricultural and forest products, recreational opportunities, and wildlife habitat.
- Maximize funds available for natural and working lands strategies through alignment and leverage of federal, state, and private funds for public and private land conservation, infrastructure, and development.

Draft Goals

The 2030 Target Scoping Plan Update will refine these initial goals and implementation mechanisms, and subsequent efforts will build robust frameworks for quantifying and incorporating rapidly progressing science in this area. Therefore, the draft goals for natural and working lands are not expressed in terms of tons of greenhouse gas emissions reduced or sequestered. Rather, they are expressed as reducing the rate of land converted to development or acres under management. As quantification work progresses, the goals and targets will be converted to more specific estimates.

In addition to setting important goals for forest management, agricultural lands protection, and otherwise, this listing cross-references land protection, management and restoration activities in existing natural resource management plans that are expected to increase stored carbon resiliency and reduce GHG emissions. The goals – from the California Water Action Plan, the State Wildlife Action Plan, the San Francisco Baylands Ecosystem Habitat Goals report, San Francisco Bay Subtidal Habitat Goals Project, Integrated Regional Watershed Management Plans, and others – are being pursued for primary objectives other than GHG emission reductions. Nonetheless, achievement of these goals will produce climate co-benefits. This Discussion Draft acknowledges these contributions to ensure wise allocation of state funds and seek synergies with existing investment plans.

Draft goals and strategies for Natural and Working Lands fall into four categories:

1. Protection of land and land use
2. Enhance carbon resilience and ecological function through management and restoration
3. Innovation to improve ecosystem health and agricultural efficiencies
4. Urban forestry and green infrastructure

1. Land Protection and Land Use

Objective: Increase protections on natural and working lands to reduce the rate of conversion to intensified uses, to both preserve lands' sequestration potential and promote infill and compact development.

Implementation:

- Promote and provide incentives for infill development, revitalization of urban core and declining neighborhoods, and support for conservation easements and working lands and habitat acquisition paired with stewardship plans.
- Promote the development of regional conservation plans, or greenprints, and climate action plans that promote infill and compact development. Promote the adoption of proven natural and working lands preservation policies and strategies to implement those plans.
- Provide technical assistance for counties and cities to prepare agricultural land conservation plans and partner with agricultural conservation organizations and landowners to conserve critical lands.
- Prioritize state conservation investments in working lands and habitat conservation that are identified in county and regional conservation plans, including Sustainable Communities Strategies, Regional Advanced Mitigation Plans, Natural Community Conservation Plans, and Habitat Conservation Plans.
- Increase habitat acreage protected or restored by 5% above 2015 levels by 2020 for all habitat types identified in the State Wildlife Action Plan, as outlined in that Plan. This acreage may include farmlands, rangelands or working forest lands that have habitat values consistent with the objectives identified in the State Wildlife Action Plan.
- Prioritize agricultural and open space conservation investments on lands that are under the greatest threat of conversion or otherwise contribute to land use plans to reduce sprawl of development, focusing initially on those regions where conversion pressures are highest.
- Coordinate state-funded land and easement acquisition and management among departments within the Natural Resources Agency, including the Department of Parks and Recreation, Department of Conservation, Department of Fish and Wildlife, Department of Forestry and Fire Protection, Department of Water Resources, Wildlife Conservation Board, and State Conservancies, to effectively leverage state resources to meet common goals.
- Support ocean management actions that result in protection of subtidal habitats such as eelgrass and kelp, to avoid loss of these systems that sequester carbon and provide habitat benefits.
- Design planning and implementation for conservation strategies to be effective at the watershed or other regionally relevant large landscape scale.

2. Enhance: Management and Restoration

Objective: Manage and restore land to increase carbon storage and minimize GHG emissions in a sustainable manner so that the carbon bank is resilient and grows over time.

Management practices, land ownership patterns, and policy frameworks vary widely across different land types, so this category has been broken into different sections accordingly. Implementation across the landscape will, however, share the following common strategies and considerations:

- Engage local communities and private and public landowners to implement best practices to improve soil and biomass carbon sequestration rates, restore wetlands and other natural systems, and reduce the risk of wildfire. Support implementation with technical assistance.
- Use the State Wildlife Action Plan, the California Water Action Plan, and other broad resource conservation strategy documents to prioritize investments for climate-driven projects.
- Design planning and implementation for management and restoration strategies to be effective at appropriate scales, include the watershed or other regionally relevant large landscape scale.
- Build consensus around carbon sequestration and GHG emission quantification methodologies for the activities and strategies identified below, and establish a statewide inventory and accounting framework that is compatible with project- and/or program-scale accounting.

Wetlands and Riparian Areas

Draft Goals:

- Promote healthy wetland and riparian ecosystems along streams, rivers, deltas, bays, and coastal zones to provide long-term carbon sequestration benefits.
- Restore an additional 10,000 acres of managed wetlands in the Sacramento-San Joaquin Delta by 2030 that are unrelated to compliance obligations. This goes beyond the existing EcoRestore goal of restoring 3,500 acres by 2020.

Implementation:

In addition to setting new, climate goals for wetlands and riparian habitat restoration, Agencies will compile existing restoration targets, assess them for progress, and prioritize them for completion in a manner that captures the net carbon sequestration benefits of those activities. A number of statewide and regional resource strategy documents already set ambitious targets for wetlands and riparian restoration; see Figure 1 for a partial listing. These restoration activities may increase resilient

Figure 1: Examples of Existing Wetland and Riparian Habitat Restoration Goals

California Water Plan Roadmap for Action
Reestablish 1,000,000 acres of contiguous natural riparian, wetland, and floodplain habitat that is subject to periodic flooding

The Central Valley Flood Protection Plan
Restore 7,100 acres of riparian habitat in the Sacramento Basin and 7,900 acres in the San Joaquin Basin

San Francisco Baylands Goals
Restore 30,000 acres of publicly owned coastal wetlands in the San Francisco Bay Area

Southern California Wetland Recovery Project Workplan
Restore 5,000 acres of riparian habitat and 11,000 acres of coastal wetlands

carbon sequestration and/or reduce GHG emissions, although the investments do not target these benefits and are not required to report them. These existing strategies and programs offer a ready roadmap for restoration activities expanded beyond their additional scope, through existing public-private partnerships and using scientific methods proven to work within existing systems.

Forests

Draft Goals:

- Scale up forest management planning and implementation activities such that, by 2030, each year, 500,000 acres of nonfederal forestlands will be brought under plans oriented towards advancing forest health, including resilient carbon storage, and managed to advance those plans.
    - This goal is a challenge match to the U.S. Forest Service, which is committed to restoring 500,000 acres/year of National Forest lands.

Implementation:

The Forest Carbon Plan will help to identify priority areas for establishing plans and implementing projects. Planning and implementation will be designed for effectiveness at the watershed or other regionally relevant large landscape scale. This program will integrate forest management and restoration activities taking place through a number of existing statewide and regional programs and new or modified ones currently under development. The Governor's Tree Mortality Task Force is a current example of efforts to coordinate activities on both federal and nonfederal forest lands at the landscape or watershed level for maximum leverage, including areas of the state currently suffering from extraordinary levels of tree mortality.

Existing plans and their update processes should be used as a mechanism for implementation of California's forest health and carbon management objectives, and supplemented as necessary to fill gaps, utilize shared science and management resources, and implement strategies. Existing plans include but are not limited to the California Strategic Fire Plan, the Sierra Nevada Watershed Improvement Program, the Region 5 Forest Service Ecological Restoration Plan, and National Forest, National Park Service, and Bureau of Land Management resource plans, and the new Community and Watershed Resilience Program. Many large private forestland managers have ownership-wide or watershed-wide management plans, habitat conservations plans, Nonindustrial Timber Management Plans, Program Timberland Environmental Impact Reports, sustained yield plans, or water quality permits that can serve as implementation mechanisms. At a smaller scale, forest stewardship plans prepared under the California Forest Improvement Program (CAL FIRE), Environmental Quality Incentives Program (Natural Resources Conservation Service), or American Tree Farm Program can provide a mechanism for forest carbon planning and project implementation. For additional detail, see Forest Carbon Plan Concept Paper (March 2016).[1]

[1] Forestry Climate Action Team. California Forest Carbon Plan Concept Paper: Managing our Forest Landscapes in a Changing Climate (DRAFT). Available at http://www.fire.ca.gov/fcat/

Oceans and Coast

Draft Goals:

- Identify opportunities for "blue carbon" projects to sequester carbon in coastal and ocean waters.
- Implement a range of "blue carbon" projects along the entire coastline of the state to analyze carbon sequestration outcomes across a range of conditions, and pair those projects with green infrastructure climate change work.

Implementation:

The world's oceans are a significant carbon sink, absorbing approximately 30% of global atmospheric carbon dioxide. California has long supported coastal wetland restoration and numeric targets exist in a number of resource strategy documents and regional plans; see Figure 1 for examples of goals that guide existing ongoing coastal wetlands efforts. Restoration is supported by federal and state agencies, which own extensive coastal wetlands, and local government and nonprofit partners.

The plans identified in Figure 1 and others can serve as templates for ocean-based management and restoration activities, and new strategies are in development both inside and outside of California. New projects being planned in several locations in California will include combined restoration of eelgrass and tidal wetlands habitats in an integrated, multi-habitat living shorelines approach with biological, physical, and climate adaptation goals. These efforts are a key action to comply with Governor Brown's directive to prioritize natural infrastructure solutions and actions that reduce emissions and build climate preparedness. Policy will need to draw on existing and emerging science to build consensus around blue carbon this year, and going forward, to protect the existing capacity of these systems to store carbon and grow it over time.

Farmlands and Ranchlands

Draft Goals:

- Fulfill the Healthy Soils Initiative, an interagency plan announced by Governor Brown in 2015, to reduce GHG emissions and improve drought resiliency by updating farm and ranchland practices to build soil organic matter.
- Promote on-farm and ranch management practices that sequester carbon or reduce GHGs.

Implementation:

Agencies in California are currently developing a suite of programs and tools to enhance carbon sequestration on farm and ranchlands and reduce GHG emissions across diverse agricultural systems. These and other activities, coupled with agricultural land protection, form the basis of Climate Smart Agriculture in California, an integrated approach to both achieving GHG reductions and ensuring food security in the face of climate change. This work is supported by federal partnership with the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) and in-state research and dissemination through Resource Conservation Districts, University of California Cooperative Extension, and other organizations. These collaborations will need to be scaled up to implement projects

and programs, particularly those have multiple benefits, such as contributing to watershed and habitat values. The Comet-Farm and Comet-Planner tools that incorporate USDA NRCS technical guidelines will be valuable resources. And, the participation of private farm and ranchland owners and operators is essential to success.

The USDA NRCS Conservation Practice Standards have been assessed to have climate benefits that can be promoted at the state and federal levels. California's Healthy Soils Initiative offers an opportunity to incentivize the management of farmland for climate and co-benefits. The Healthy Soils Initiative also intersects with climate strategies related to organic waste diversion, renewable energy, and fuel production. Figure 2 lists some of the land management activities to be pursued for increasing carbon sequestration on farm and ranchlands.

Figure 2: Agricultural Land Management Practices

- Planting cover crops
- Reducing tillage
- Retaining crop residue
- Composting
- Managed grazing
- Reforestation and restoration of riparian areas and meadows

3. Innovate

Objective: Seek synergies that optimize contributions from natural and working lands while sustaining lands and local economies by researching and developing appropriate bioenergy, food crop, water system and waste management technology, as well as product manufacturing, that serves to support sustainable resource management.

Strategies that reduce GHG emissions or increase sequestration in the natural and working lands sector overlap and have synergies with other sectors. The water-energy nexus, particularly with respect to agriculture, offers many opportunities to decrease carbon emissions while improving ecological and economic outcomes. As discussed in the Draft Short-Lived Climate Pollutant Reduction Strategy, California must also transform management of organic waste and woody biomass from the municipal, agricultural, and forestry sectors. Cross-sector synergies can be created through the utilization of these organic waste materials, including opportunities to improve soil health, increase renewable energy generation, and enhance market support for non-commercial products and waste. Research and development for diversified wood products and wood waste markets could lead to diversified revenue streams for forestland management practices that promote forest health on both public and private lands.

Draft Goals:

- Build out to supply the 50MW of forest-fueled bioenergy mandated by SB 1122 by 2020, sited and sized to service local and regional biomass waste disposal needs.
- Employ a suite of ready-to-implement practices, such as managing manure in dairies, and increasing the efficiency of on-farm water and energy use to increase net carbon sequestration and reduce GHG emissions across diverse agricultural systems.

Implementation:

- Support research and development and pathways to market for wood-derived biofuels.
- Support research and development and pathways to market for wood products made from non-merchantable timber.
- Support research and development and pathways to market for dairy digesters, including pipeline injection and interconnection.
- Support research and development and pathways for dairies to convert to manure management systems that reduce methane emissions, including dry scrape, solids separation, converting to pasture-based systems, and other technologies to help meet ARB's proposed methane reduction goals on dairies.
- Support research and development for quantification of the methane emission reduction effectiveness of manure management technologies at dairies.

4. Urban Forestry and Green Infrastructure

Objective: Harness nature's benefits through urban greening to reduce GHG emissions and increase carbon storage in urban landscapes; cool urban heat islands (UHI); encourage active transportation, reduce air and water pollution; allow for groundwater recharge; improve energy efficiency, and; improve human health and community resiliency.

Urban areas contain approximately 95% of the California's population, despite taking up less than 10% of the land area. Urban landscapes are dominated by buildings and pavement, which offer few, if any, environmental benefits. Hard pavement, which takes up an average of 35% of urban areas, prevents groundwater recharge, necessitates stormwater treatment, and contributes to the UHI.

Draft Goals and Implementation:

- Reduce the UHI differential by 3**°**F degrees between urban core and surrounding rural areas, versus current UHI impacts in major metropolitan areas. CalEPA's Urban Heat Island Index Maps acts as a tool to establish baselines for 31 urban areas.[2] The U.S. Environmental Protection Agency (EPA) encourages cities to set quantitative goals. For example, the City of Los Angeles's The Sustainable City pLAn aims to reduce the temperature difference between the urban core and the surrounding rural areas by 1.7 **°**F by 2025 and 3.0**°**F by 2035.
- Increase urban tree canopy statewide by 5% by 2030 with strategic consideration to disadvantaged communities. By planting trees now, projects can result in a projected 20% increase in urban tree canopy by 2050.

[2] The Index is calculated as a positive temperature differential over time between an urban census tract and nearby upwind rural reference points at a height of two meters above ground level, where people experience heat - See more at: http://www.calepa.ca.gov/UrbanHeat/Index.htm#sthash.SZkxGYlA.dpuf. CalEPA concludes daytime temperatures in urban areas are on average 1-6° F higher than in rural areas, while nighttime temperatures can be as much as 22° F higher as the heat is gradually released from buildings and pavement.

- Promote improved stormwater management and capture for groundwater infiltration, such as replacing paved sidewalks, walkways, driveways or parking areas with permeable pavement or natural landscapes, where feasible given active transit mobility needs.
- Increase the percentage of people, particularly in disadvantaged communities, that live within ¼ mile and ½ mile of open spaces, community gardens, parks, green alleyways and other green infrastructure projects.
- Promote streetscape projects with green infrastructure and transportation co-benefits, such as those that use trees to both sequester carbon and provide shade for people using the sidewalk and bikeways.
- Increase the number of community gardens, parks, green alleyways and other green infrastructure spaces within ½ mile of disadvantaged communities.

Related Activities

Make Science Actionable

Integrating land use and natural and working lands into California's climate strategy necessitates intake and processing of considerable data and science to ensure that policies and practices can measurably increase resilient carbon storage and reduce GHG emissions from land use and management. California leads the way in science-based policymaking for climate change in many subject areas; this commitment to incorporating best available science must extend to land use and natural and working lands. A standardized review process to assess and incorporate new science and data from a variety of sources into government decision-making can effectively and efficiently engage scientific and analytical expertise across state agencies and external research partners.

Discussion Topics and Questions for Public Input

Quantitative Targets for the 2030 Scoping Plan Update

- For the 2030 Target Scoping Plan Update, Agencies are working toward developing appropriate quantitative goals/targets relating to natural and working lands. These targets would de designed to ensure the sector is directionally on the path to achieving the mid-and long-term goal for the sector – to manage natural and working lands, including forests, rangelands, farms, wetlands, and soils, so they can store carbon. For each land type (agricultural lands, rangelands and grasslands, wetlands and riparian areas, urban forests, and oceans), on what metrics should these quantitative goals be based? How should Agencies measure progress towards meeting targets?
- What is the appropriate scale for targets – e.g., statewide, regional, subregional?
- What is the appropriate timescale, and what principles will be applied in choosing timeframes over which outcomes are assessed?
- What implementation mechanisms already exist to advance the draft goals included in this document, and where are new implementation mechanisms needed? What sort of implementation mechanisms – policy, regulation, incentive-based programs, tax credits, etc. – should be employed to advance natural and working lands goals?

Engaging Local Communities through Innovation

- What strategies and innovation opportunities relating to natural and working lands should Agencies promote to achieve carbon benefits, support resource stewardship, and enhance economic development in local communities?

Land Use Valuation and Co-Benefits

- The conservation and stewardship of natural lands, farmland and forests can both promote carbon sequestration and generate economic benefits, both to governments and individuals. How should Agencies quantify the economic benefits of conservation and stewardship? What analytical tools are available?
- The conservation and stewardship of natural resources can also generate many co-benefits that do not typically have market values, such as clean and plentiful water, clean air, wildlife habitat, and recreational benefits that promote human health. How can these co-benefits be monitored and measured alongside climate benefits of conservation and stewardship? How should Agencies evaluate the non-market benefits of conservation and stewardship? What analytical tools are available?
- How should Agencies balance the climate benefits of conservation stewardship activities with other environmental objectives?
- What strategies should Agencies promote to ensure that the economic value of natural and working lands (and the co-benefits they provide) is taken into account in land use planning decisions?