

## 10. FORESTS

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**This sector includes the following measures:**

### **Recommended Actions**

#### **(F-1) Sustainable Forest Target**

- **Regulatory and Statutory Capacity**

  - Forest Practice Rules Mechanism*

  - CEQA Mechanism*

### **Opportunities for Additional Reductions**

Forest Conservation

Forest Management

Afforestation/Reforestation

Urban Forestry

Fuels Management

ARB worked closely with the CAT and its sector-specific subgroups in developing the measures included in this Plan. This input was evaluated and analyzed by ARB and is reflected in the measures included in this sector.

### **Overview**

California's forests play a critical role in the State's carbon balance, with the unique capacity to remove CO<sub>2</sub> from the air and store it long-term as carbon. The forest sector is the only sector included in the Scoping Plan that provides a net removal of GHGs.

Under the Sustainable Forest Target (Measure F-1), Board of Forestry and Fire Protection will use its existing authority over sustainable forestry, post-harvest restocking, fire hazard reduction and fire safety, timberland conversion, and existing forest improvement assistance programs to ensure sustainable management practices and, at a minimum, to maintain current carbon sequestration levels. Coordination of these efforts with federal forest land managers is essential to the target of maintaining carbon sequestration levels. Other opportunities exist to not only maintain but enhance the capacity for forests to sequester and store more carbon through measures such as additional voluntary actions, offsets, expanded assistance programs and markets.

Current net forest sector emissions are approximately -5 MMTCO<sub>2</sub>E (2002-2004 average). This net number is negative because the gross emission rate from disturbances such as fires, harvesting, land conversion, and decomposition of wood and other forest products is less than the gross atmospheric uptake and sequestration of carbon from forest growth. Forests also provide multiple ecological benefits (for example, habitat, structure, and nutrient cycling), as well as a suite of other human benefits or services on which we depend (for example, water storage, soil stability, air and water quality, wood products, and recreation).

The 33 million acres of forest land in California cover one third of the State. Ownership is split about evenly between the public and private sectors. Fifty-two percent of forest land is managed

by the federal government, 45 percent by private landowners, and 3 percent is managed by the State. Stakeholders in the forest sector consist of private landowners, public land managers, non-profit organizations, agencies, local governments, and community-based groups. Forests can be characterized as tree-dominated landscapes which can support greater than ten percent tree canopy cover and include forestlands, woodlands, urban forests, and rangelands. The forest sector also includes all primary wood products, as well as wood fiber for bio-energy.

## Recommended Actions

### **(F-1) Sustainable Forest Target**

This measure recognizes that the current abundance of forest carbon stock in California is, in part, a result of rigorous forest practice rules that tightly control forest management across the State. The California Forest Practice Rules are the most stringent in the country. The goal of the Sustainable Forest Target is to maintain the current net forest sink of -5 MMTCO<sub>2</sub>E through 2020, using the mechanisms provided by the Forest Practice Rules, timberland conversion regulations, fire safety requirements, and forest improvement assistance programs, as well as the California Environmental Quality Act (CEQA) which mandates avoidance or mitigation of forest carbon losses to conversion. Establishing a sequestration target resonates internationally—deforestation is recognized as the single largest contributor to global GHG emissions—while also setting a precedent for the rest of the land base.

### **Regulatory and Statutory Capacity**

*Forest Practice Rules Mechanism:* Regulatory actions that affect carbon sequestration on private forest lands are enforced through the California Forest Practice Rules by the California Board of Forestry. For example, Forest Practice rule changes implemented in December 2004 will produce an additional annual 2.2 MMTCO<sub>2</sub>E reduction in 2020. The Board of Forestry and Fire Protection in conjunction with the Resources Agency, the California Department of Forestry and Fire Protection, and the Air Resources Board will evaluate how current regulations and programs address GHG emissions so that it can ensure achievement of the 5 MMTCO<sub>2</sub>E target. This assessment includes updating approaches to estimating the annual forest inventory, developing a statewide forest carbon monitoring and assessment plan, and a re-assessment of the current regulatory framework in the context of carbon benefits.

*CEQA Mechanism:* Private lands are strongly influenced by development pressures. Local Government has the primary land use authority under the CEQA and Government Code. While local government has land-use authority for non-timber lands, the Board of Forestry and Fire Protection has pre-emptive land use authority for timberland where the land use is to be changed to a non forest management use. The Public Resources Code (PRC 4621 et.seq.) requires Timberland Conversion Permits (TLC) where the land use change will occur, and these permits are subject to CEQA. The CEQA process provides further authority for the conversion permit process to require mitigation for these projects. Regulatory changes for the TLC process could help direct conversion away from forest lands that provide net GHG benefits and identify potential mitigations. CEQA guidelines are being revised to ensure evaluation of GHG emissions and climate change impacts which will strengthen the ability to require mitigation for the loss of carbon stocks through the conversion of timberlands.

California forests face the additional threat of the impacts of global warming. Uncertainty about how much the climate will change and how feedbacks will affect forests make it particularly difficult to predict future emissions for this sector. Achieving the goal of 5 MMTCO<sub>2</sub>E from the Forest sector by 2020 will require active participation by the private sector and local, state, and federal governments to fully implement. Jurisdiction or authority issues are a function of the land base and the specific actions needed to achieve the GHG benefits. Land-use conversion, and its impact on emissions, links the forest sector to the Land-Use and Local Government sectors under the Scoping Plan.

**Appendix C: Forests**  
**Table 30**

<b>Reduction Strategy</b>	<b>Potential 2020 Reductions MMTCO<sub>2</sub>E</b>	<b>Net Annualized Cost (\$ Millions)†</b>	<b>Proposed Lead Agency</b>	<b>Adoption/Implementation Timeframe</b>
Sustainable Forest Target	5	50	Board of Forestry and Fire Protection	Ongoing

## **Opportunities for Additional Reductions**

There are additional greenhouse gas reduction opportunities which can enhance the capacity of forests to sequester and store carbon in addition to the sustainable forest target and they include:

- 1) Forest Conservation
- 2) Forest Management
- 3) Afforestation/Reforestation
- 4) Urban Forestry
- 5) Fuels Management

The five opportunities for additional reductions above could potentially produce another 2 MMTCO<sub>2</sub>E benefits in 2020 over and above the 5 MMT sustainable forest target. Conservation and forest management approaches are already underway, and will provide reductions in 2020 through proposition funds 40, 50, and 84. Investment in afforestation/reforestation in the near-term will lead to significant long-term benefits of more than 23 MMTCO<sub>2</sub>E per year by 2050, though site preparation activities may result in emissions in 2020. Offset market opportunities for forest management activities have been identified for about 0.5 MMTCO<sub>2</sub>E of the total 2 MMTCO<sub>2</sub>E annual benefits in 2020 and up to 13 MMTCO<sub>2</sub>E in 2050 from both reforestation and forest management. The adoption of additional forestry protocols for actions under other strategies may enhance GHG benefits from markets. Strengthening the funding base for the California Forest Improvement Program (CFIP) will provide future consistency to support ongoing afforestation/reforestation and potentially emission reducing fuels treatment activities. Increased activity across the State, and the associated GHG reductions, could be maintained if the CFIP program funding were more continuous.

California’s forests will play a role in the State’s goal of reducing emissions but given the inherent uncertainty in quantifying emissions and sequestration in this sector, especially with

climate change, additional research and the development of pilot projects and quantification tools are necessary. Emissions reductions under this sector will require active participation by private landowners and local, state, and federal governments to fully implement and realize maximum GHG benefits. Strategies in the Forest sector will interact with those in other sectors including land use, waste management, agriculture, water, and electricity. Investing in research and quantification tools will be necessary to improve inventory and modeling accuracy.

### ***Reduction Opportunity: Forest Conservation***

California forests and woodlands continue to be developed and converted to non-forest uses. Cal Fire's Fire and Resources Assessment Program (FRAP) projects a conversion of 312,000 acres of forestland and 258,000 acres of woodlands between 2000 and 2020. In addition to residential and industrial development, forests and woodlands may also be converted for roads, power lines, rail, pipelines, agriculture and rights-of-way.

Tools available to prevent or mitigate conversion include land use planning, conservation easements, and mitigation banking. Agencies or non-governmental organizations may buy or accept donations of forestland (fee title) easements or other interests to preserve and enhance them for forest uses such as habitat, recreation, community forestry, and timber management. When easements or other interests are sold or donated, the landowner can have the property assessed for the purposes of lowering their tax liability. To ensure carbon sequestration over the long term, these forest and woodland land purchases generally require permanent retirement of development rights, preclude uses that would reduce carbon stocks or sequestration capacity, and include management geared toward maintaining or increasing carbon sequestration through conservation management projects. Mitigation banking for land conversion through tree planting is quantified under the Afforestation/Reforestation strategy

The following implementation approaches have already been funded or have a high likelihood of securing funding.

- Proposition 40 and 50 purchases of forest and woodland in 2005 and 2006: This implementation approach protected forests and woodlands from conversion through fee title or easements. These forests will continue to produce GHG benefits in the future as they mature.
- Proposition 84 purchases to conserve forest and oak woodland habitats
- Future funding: This measure assumes funding for forest and woodland conservation projects that is comparable to Proposition 84.

### ***Reduction Opportunity: Forest Management***

There are significant opportunities to increase the carbon storage on managed forest lands over the next few decades by increasing forest growth through healthy and fully stocked stands that utilize site potential for growth while resisting or minimizing emissions from fire, insects and disease. Stands on timberlands statewide are growing at approximately 2.4 percent per year and this represents about 70 to 75 percent of their potential. Many of the timberland owners in California could make voluntary choices to manage their forestlands at a level above the minimums of the Forest Practice Rules.

Implementation approaches include:

- **Riparian Zone Extension:** The voluntary extension of existing riparian protection zones currently required by the Forest Practice Rules.
- **Timber Stand Improvement:** These activities include 1) restoring conifer areas to full productivity by reduction of undesirable species and restocking with native species, 2) thinning stands to increase the growth rate for remaining trees, 3) optimizing rotation age from a carbon life cycle perspective, 4) planting additional trees where the existing stocks are not fully utilizing the biological potential of the site. The additional value of the carbon will provide the incentive for the private landowners to make the additional investment in their lands to better utilize the growth potential.

### ***Reduction Opportunity: Afforestation/Reforestation***

Forest activities can have both near-term and long-term GHG benefits. Tree planting has very significant long-term benefits. FRAP analysis shows that afforestation/reforestation planting activities over the next decade may reap more than 23 MMTCO<sub>2</sub>E annually by 2050. However, the near-term benefits provided by planting seedlings are minimal, since the removal of brush and replanting of trees initially produces a small increase of emissions.

Afforestation is the establishment of a forest in an area where the preceding vegetation was not forest. Reforestation is the establishment of native tree cover on lands that were previously forested, but have had less than ten percent tree canopy cover for a minimum of ten years.

Afforestation/reforestation emission reductions can be implemented through a number of separate approaches that cumulatively increase the acres of land that are forested annually. Implementation approaches include:

- **CFIP:** The California Forest Improvement Program administered through Cal Fire authorizes the Department to provide technical and other assistance (cost share funding) to private landowners with ownerships 5,000 acres and under. Through additional funding the existing cost share program would be able to increase the amount of afforestation and reforestation that is done on private lands.
- **State land reforestation:** On state lands, authority exists to implement afforestation/reforestation projects.
- **Federal land reforestation:** On U.S. Forest Service and other public lands, federal agencies have the authority to implement afforestation/reforestation projects.
- **Mitigation:** This measure analyzes potential GHG benefits of having CalFire and local government require reforestation mitigation of forest and woodland converted.
- **Offset Program:** Developing a market for GHG offsets will encourage landowners to reforest areas currently occupied with brush and other vegetative communities and to implement other conservation forest management practices.

### ***Reduction Opportunity: Urban Forestry***

Urban forestry can create GHG benefits through planting trees in urban areas by 1) sequestering carbon, 2) reducing energy demand due to shading, and 3) providing biomass for fossil fuel alternatives from urban “green” waste. Urban forests provide many co-benefits, such as reducing stormwater runoff, increasing property values, reducing VOC emissions, providing social benefits, among others. Many cities and organizations are actively involved in tree planting to expand the role of urban forests. In areas where urban development interfaces with

wild lands individual land owners are also engaged in tree planting and various forms of vegetation management affecting fire risk reduction, forest carbon sequestration, and energy savings.

Urban forestry projects are already being implemented through government actions and voluntary planting on private property and potentially could result in the planting of over nine million trees through 2010 using voluntary and incentive programs.

The implementation approaches include:

- Agency planting: The State supports efforts by private and public landowners, non-profit organizations, and local governments in urban areas to keep planting suitable species of trees in strategic locations to provide maximum benefits of shade, minimal long-term care costs, and low capacity to emit smog-forming constituents.
- Voluntary planting: As voluntary actions, homeowners commonly plant trees on their property for a variety of reasons. Education and marketing can help achieve the strategic planting of these trees to maximize survival and benefits and can result in an additional 1.2 million trees planted annually. Through city and community based organizations there are several major initiatives to increase voluntary tree planting in California.

The GHG emission reductions from sequestration are listed in Table 31. Reductions from shading benefits (reduced air conditioner use) and bio-power, roughly 0.8 MMTCO<sub>2</sub>E, are not included because they will be reported in the energy sector to avoid double counting.

### ***Reduction Opportunity: Fuels Management***

Emission reductions from forest fuels management could be achieved through two implementation approaches.

- State and federal fuels treatment: Fuels management strategies have the potential to reduce the risk of catastrophic fires. However, fuels management needs to be evaluated to determine whether, and if so under what circumstances, quantifiable greenhouse gas emission reductions are achieved.
- Forest biomass for use in bio-power and bio-fuel production: Utilization of forest biomass supports the goals of the Bioenergy Action Plan for California (2005) which targets biomass resources to produce transportation fuels, electricity generation, and biogas including enhancement of the supply of biomass through fuel hazard reduction.

**Appendix C: Forests—Opportunities for Additional Reductions Reportable  
by Forest Sector (Sequestration)††**

**Table 31**

Opportunities for Additional Reductions	Potential 2020 Reductions MMTCO <sub>2</sub> E	Net Annualized Cost (\$ Millions)	Proposed Lead Agency
<ul style="list-style-type: none"> <li>○ Forest Conservation</li> <li>○ Forest Management</li> <li>○ Afforestation/ Reforestation</li> <li>○ Urban Forestry</li> <li>○ Fuels Management</li> </ul>	Minimum 2	TBD	Cal Fire

†† Over 2 MMTCO<sub>2</sub>E in benefits that will accrue in 2020 from Forest Practice Act rules instituted in 2004 are also not included here since they are considered part of the Sustainable Forest Target.