Forest Resource Evaluation Method – Analysis Guide
Background: FCAT guidance for evaluating forest carbon and co-benefits.
Phase I Objective: Identify priority areas for enhancing carbon storage, reducing GhG emissions, and enhancing co-benefits; along with establishing desired management actions, planning targets and level of investment needed.

Phase II Objective: Evaluate cost effectiveness of policy options and management actions that make up the investment choices in priority areas. To be conducted by UC through an Interagency Agreement.

Steps (Phase I)

1. Determine which co-benefits are most important to include. Identify priority areas through individual or combined priority landscapes.
2. Report on extent of priority area by ownership group
3. Establish management actions appropriate for addressing improvements in priority areas
4. Set planning targets to enhance carbon storage, emission avoidance, and enhancing co-benefits
5. Determine level of investment. Summarize investment choices by region (i.e. portfolio)
6. Monitoring and reporting

1. Identify core set of co-benefits and supporting Priority Landscapes
Lead: Co-Benefits Subcommittee
Objective: Identify priority areas for supporting forest carbon and co-benefit. Choose a single priority landscape that best represents the co-benefit or combine several into a composite priority area layer. The following is provided as an example to demonstrate how co-benefits (i.e. shown in bold) can be linked to priority landscapes. See Appendix for complete list of priority landscapes and a viewer.

Climate: Carbon Storage and Emissions Avoidance
a. Enhancing Forest Carbon Stocks
b. Forest stands impacts by pest and disease
c. Forest stands impact by high severity wildfire
d. Forest biomass utilization

Priority Landscapes: Forest Pest Impacted Areas to Maintain Ecosystem Health, Restoring Impacted Timberlands, Restoring Wildfire to Impacted Areas to Maintain Ecosystem Health, Population Growth & Development, Biomass Energy for Ecosystem Health

Water Resources and Watershed Protection
a. Water Capture – amount of water originating on forest lands
b. Water Filtration – providing clean water; reducing treatment costs
c. Water Regulation – flood protection

Priority Landscapes: Water Supply, Water Quality, Preventing Wildfire Impacts for Ecosystem Health

Biodiversity and Wildlife Habitat
a. Conserving Extent of Habitat
b. Protecting Ecologically Significant Areas (Hot Spots)

Priority Landscapes: Preventing Wildfire Impacts to Maintain Ecosystem Health, Wildfire Threat to Areas Important for Wildlife Habitat, Population Growth & Development

Forests – Recreation, Open Space and Cultural Services

a. Tribal lands
b. Parks and Recreational Areas
c. Reserves and Protected Lands

Priority Landscapes: Conserving Green Infrastructure, Maintaining Green Infrastructure

2. Report on extent of priority area by ownership group

Lead: Co-Benefits Subcommittee

Objective: For each benefit and co-benefit report on the amount of priority area by ownership group. This represents an estimate of the amount of highly valued forest resources that have a high threat risk of loss from one or more types of disturbance. The following table is an example of using three priority landscapes (i.e. Impacted Timberlands, Water Resource, and Wildlife Habitat) to estimate the amount of priority area by ownership group.

Table 1 – Estimated Acres of Priority Area by Ownership Group (example)

Ownership Group	**Priority Area - Restoring Impacted Timberlands (ac)**	**Priority Area - Water Resources (ac)**	**Priority Area - Wildfire Threat to Wildlife Habitat (ac)**
Federal	1,000,000	1,000,000	1,000,000
Private	700,000	700,000	700,000
State	100,000	100,000	100,000
Non-Profit	100,000	100,000	100,000
Local	100,000	100,000	100,000
Sub Total	2,000,000	2,000,000	2,000,000

3. Management Actions

Lead: Co-Benefits and State & Public Lands Subcommittee

Objective: Develop a matrix of management actions that can applied to each co-benefit category. Estimate the propose acres treated by management action. Report annual treatment acres over a 10 year time horizon (i.e. 2005 – 2015) by management action and ownership group.

Table 2 – Management Actions and Supported Co-benefits (example)

Management Action	**Potential Acres Treated**	**Co-Benefits**					
		Carbon Storage & Emission Avoidance	Water Resources & Protection	Healthy Forest	Biodiversity & Wildlife Habitat	Recreation & Cultural	Job Creation
Reforestation		*V*	*V*		*V*	*V*	*V*
Conservation		*V*	*V*		*V*	*V*	
Stand Improvement				*V*	*V*		
Fuels Management		*V*		*V*			*V*
Urban Forestry		*V*					*V*

Table 3 – Treatment Acres by Management Action (2005 – 2015)
Note: Categories for management classes will be refined by Subcommittee leads

Management Action	State	Federal USFS	Federal BLM	Federal NPS	Federal Other	Non-Profit	Local	Private
Reforestation								
Conservation								
Forest Health								
Fuels Management								
Urban Forestry								
Biomass Utilization								
Prescribed Burn								

4. Planning Targets

Lead: Policy Subcommittee and State & Public Lands

Objective: Set planning targets for climate (carbon storage & emissions avoidance) and other co-benefits. Utilize information from table 1 (i.e. priority area by ownership group) and information from the inventory subcommittee to estimate the magnitude of the area where management actions are most needed. Planning targets will likely be revised based on economic evaluation done under Phase II.

Table 4 – Planning Targets (example)

Carbon and Co-Benefits	Planning Target	Acres Treated	Tons CO2eq Sequestered	Description - Action
Climate: Carbon Storage & Emissions Avoidance				
	10%			increase in carbon storage by 2030 through reforestation
	20%			reduction of forest area at considered at high risk for catastrophic wildfire by 2025
Water Resources & Watershed Protection				
	15%			reduction in forest lands with water quality impairments
	10%			increase in meadow restoration to support groundwater recharge
	10%			reduction in soil impacts from high severity burns
Biodiversity				
	15%			increase in cover by each vegetation class
	25%			increase in protected of rare or threatened vegetation communities
Forests - Recreation & Cultural				
	10%			increase in visitors to State and National Parks

5. Level of Investment

Lead: Policy Subcommittee

Objective: Estimate the level of investment needed to meet planning targets for carbon storage/emissions avoidance and other co-benefits. The estimate should be based on the planning target (i.e. percentage of the priority area to be treated) and the acreage to be treated by each management action. This can be done statewide and for each of the major ecological reporting units. Each ecological reporting unit will have a unique portfolio that consists of a range of investments and supporting management actions to reach planning targets. In addition, determine any major constraints or changes to policy and regulations that influence meeting planning targets. The following table provides an example for estimating a level of investment needed that would treat 25% of the priority area for Restoring Impacted Timberlands.

Table 5 – Estimated Cost of Investment to Achieve Planning Target (example)

Priority Area - Restoring Impacted Timberlands (ac)	Planning Target (25%)	Reforestation Target (50%)	Cost Reforestation - per ac	Cost Reforestation - subtotal	Stand Improvement Target (50%)	Cost Stand Improvement - per ac	Cost Stand Improvement - subtotal	Monitoring – per ac
2,000,000	500,000	250,000			250,000			
Federal Ownership	300,000	150,000	$ 400.00	$ 60,000,000	150,000	$ 800.00	$ 120,000,000	
Private Ownership	175,000	87,500	$ 300.00	$ 26,250,000	87,500	$ 650.00	$ 56,875,000	
State Ownership	25,000	12,500	$ 400.00	$ 5,000,000	12,500	$ 800.00	$ 10,000,000	
Sub Total				$ 91,250,000			$ 186,875,000	

6. Monitoring and Reporting

Lead: Inventory Subcommittee

Objective: Provide information on forest carbon storage for FCAT subcommittees. Estimates from FIA and other sources should be provided statewide and by ecological reporting units. In addition, provide recommendations for reporting and monitoring requirements that can be used to evaluate progress on implementation. Information needs include, but are not limited to the following.

a. Forest carbon inventory tables
b. Activity reporting: CalMAPPER (CAL FIRE), Federal activity tracking databases
c. Monitoring: Forest Inventory Analysis (FIA), fire history and forest health data sets.

Reporting and monitoring requirements will vary for each project type. Monitoring requirements also vary with landscape level monitoring and project level monitoring. Both are needed to validate treatment effectiveness for individual projects and larger scale environmental benefits. For CAL FIRE funded projects most activities will be captured in CalMAPPER; federal agencies have a comparable activity tracking system. The GHG reduction benefits will be estimated following ARB guidelines or other accepted methodologies. Monitoring will rely on forest inventory data (FIA), other field based monitoring, and supplemented with other remote sensing and GIS based data sets. To the extent possible estimate per acre monitoring costs for Table 5.

Appendix A
List of Priority Landscapes from the 2010 Forest and Rangeland Assessment Report

Priority Landscapes http://egis.fire.ca.gov/priority_landscapes/ (web viewer)

1. Population Growth & Development
2. Risk Reduction on Forestlands
3. Restoring Impacted Timberlands
4. Preventing Wildfire Threats to Maintain Ecosystem Health
5. Restoring Wildfire to Impacted Areas to Maintain Ecosystem Health
6. Preventing Wildfire Threats for Community Safety
7. Forest Pest Impacted Areas to Maintain Ecosystem Health
8. Restoring Forest Pest Impacted Communities for Public Safety
9. Water Supply
10. Water Quality
11. Urban Tree Planting for Energy Conservation and Air Quality
12. Urban Tree Maintenance for Energy Conservation and Air Quality
13. Community Planning to Reduce Wildfire Risks
14. Biomass Energy for Ecosystem Health
15. Wildfire Threat to Areas Protected for Wildlife Habitat
16. Conserving Green Infrastructure
17. Managing Green Infrastructure
18. Forest Carbon – Threats from Wildfire, Insects and Disease
19. Forest Carbon – Threats from Development