WESTCARB Annual Business Meeting

The Revised Forest Mgmt and Reforestation CCAR Protocols: A Case Study for Private and Public Lands

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Presentation Outline

- Changes to California Climate Action Registry (CCAR) Forestry Protocols
- Project Objectives
- Location
- Tools
- Results and Discussion

CCAR Protocols

- 4 Forest Protocols, 2 Considered
  - Reforestation
  - Forest Management
- Key Changes
  - Public Lands Inclusion
  - Forest Management Baseline
  - Permanence Definition
  - Carbon Pools Required
  - Inventory Requirements
  - Biomass Functions

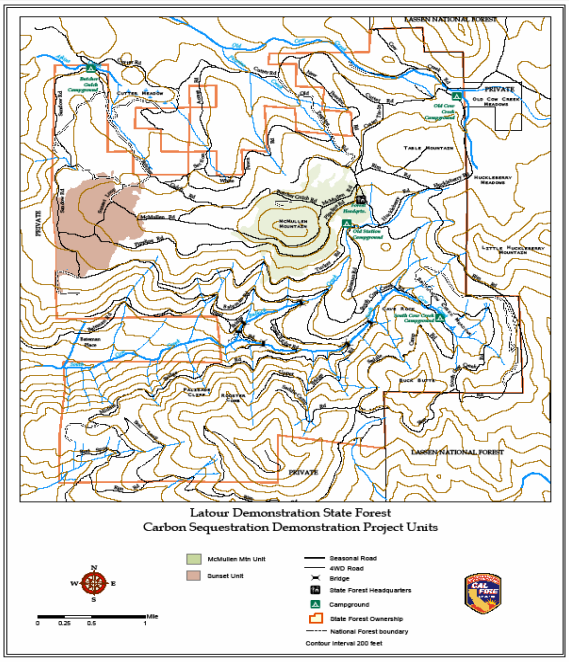
Project Objectives

- Demonstrate the Forest Management and Reforestation Project Protocols
- Provide Guidance to Landowners and Project Developers
  - Economic Valuations
  - Project Development
- Test the Protocols
- Unanticipated Benefits
  - Useful in Protocol Revisions
  - Legislative/Regulatory/Policy Analysis

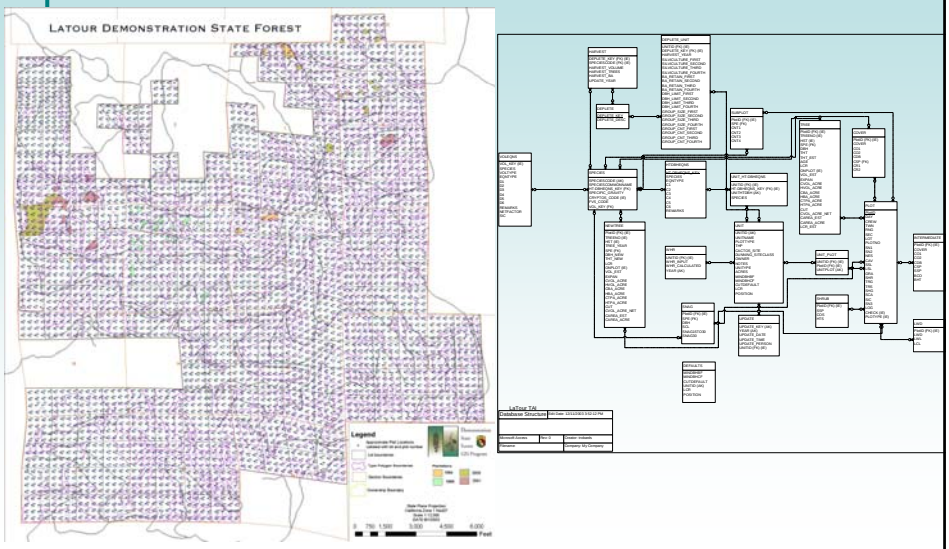
LaTour Demonstration State Forest
Shasta County, CA

LaTour DSF

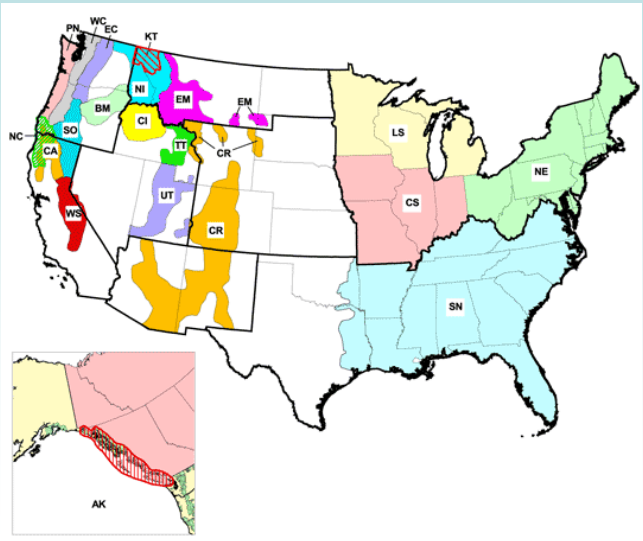
- Two Project Areas
  - McMullen Mtn
  - Sunset
- Evaluated
  - Private Land
  - Public Land
  - Reforestation
  - Forest Mgmt
- Costs
- Revenues
  - Timber & Carbon
- Rate of Return

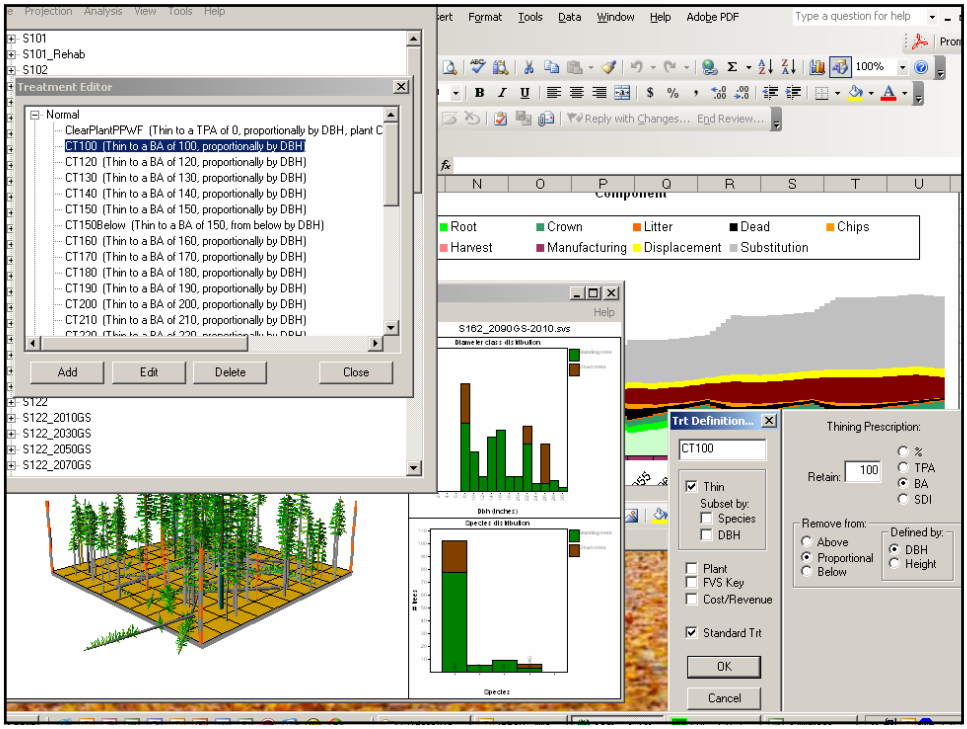


Inventory



Growth Model: Forest Vegetation Simulator (FVS)





Unit Characteristics

- McMullen unit higher elevation, heavy to true fir
- Sunset unit lower elevation, more pine
- McMullen has high biomass
  - FIA Mean: 38,481 tonnes
  - 57,557 tonnes (Jenkins)
    - 48 tonnes per acre
  - 64,701 tonnes (FIA)
    - 53 tonnes per acre
- Sunset has lower biomass
  - FIA Mean: 13,128 tonnes
  - 12,681 tonnes (Jenkins)
    - 30 tonnes per acre

Acres and aboveground, live (tree bole, bark and crown) carbon tonnes by forest type for McMullen Mountain Unit.

Forest Type	Reforest	Management	FIA Mean, Aboveground (C tonnes/ac)	FIA Based Total (C tonnes)
Ponderosa Pine	0.0	30.5	32.28	984.54
Mixed Conifer	8.5	104.4	32.28	3,370.03
White Fir	10.1	1,010.1	32.28	32,606.03
Red Fir	0.0	47.1	32.28	1,520.39
Total	**18.6**	**1,192.1**	**32.28**	**38,480.99**

Acres and aboveground, live (tree bole, bark and crown) carbon tonnes by forest type for Sunset Unit.

Forest Type	Reforest	Management	FIA Mean, Aboveground (C tonnes/ac)	FIA Based Total (C tonnes)
Ponderosa Pine	10.2	224.5	32.28	7,246.86
Mixed Conifer	0.0	7.8	32.28	251.78
White Fir	0.0	174.4	32.28	5,629.63
Red Fir	0.0	0.0	32.28	0.00
Total	**10.2**	**406.7**	**32.28**	**13,128.28**

Inventory Precision

- McMullen unit at 4.3% confidence bound at 90% confidence
  - No Contribution to Reserve
- Sunset unit at 8.8% confidence bound at 90% confidence
  - 3.8% Contribution to Reserve
  - Percentage of Biological Additionality
  - In addition to other reserve requirements

Reserve contribution based on sampling error.

Sampling Error no Greater than X% (Percentages Below) on Either Side of the Mean Estimate at the 90% Confidence Level (1 standard error x 1.645)	Contributions to Reserve from Included Pools
0 to 5%	0%
5.1 to 20%	Amount over 5.1% to the nearest 1/10th percentage
Greater than 20%	Unacceptable

Permanence Risk Analysis

- Financial Risk
  - Public Projects: 0%
  - Forest Management: 0% because less than 10 years to realize return
  - Reforestation: -40% because greater than 10 years to realize return
  - Greater than 10-year track record: 0%
  - Less than 10-year track record but capitalized: 25% X (0% or 40%) = 0% or 10%
  - Less than 10 years and funding not clear: 100% X (0% or 40%) = 0% or 40%

Permanence Risk Analysis

- Management Risk, Illegal Removals: 0% to 50%
- Management Risk, Conversion: Likelihood of conversion, lot sizes, topography, location, mitigation: 0% to 90%. 0% for LaTour, public and private.
- Management Risk, Over-harvesting: Timber Values, Public vs. Private Lands
  - Public: Mgmt Plan with Public Review: 5% X Timber Value Pct, 5% X 40% = 2%
  - Private: 100%—No restriction, 25%—Recorded Notice to Contract, 0%–3rd Party (cons easement); 25% X 40% = 10%
- Social Risks: Up to 5.5%

Permanence Risk Analysis

- Natural Disturbance Risk, Wildfire: High 20%, Moderate 10%, Low to None 0%; 10% for LaTour
  - Reforestation & Salvage: 25% Multiplier, Otherwise 100%
  - LaTour: 10% X 25% = 2.5%
- Natural Disturbance Risk: Disease or Insect Outbreak
  - High 10%, Moderate 5%, Low 0%
  - LaTour: White pine blister rust, beetles => 5%
  - Reforestation & Salvage: 25% Multiplier, Otherwise 100%
  - LaTour: 5% X 25% = 1.25%
- Other Natural Disturbances: 0%

Permanence Risk Analysis: Totals

- Public Lands
  - Forest Management (5.75%)
    - 0% Financial, 2% Management, 0% Social, 3.75% Disturb.
  - Reforestation (5.75%)
    - 0% Financial, 2% Management, 0% Social, 3.75% Disturb.
- Private Lands (Most Likely)
  - Forest Management (13.75%)
    - 0% Financial, 10% Management , 0% Social, 3.75% Disturb.
  - Reforestation (23.75%)
    - 10% Financial, 10% Management , 0% Social, 3.75% Disturb.

Leakage Risk Assessment for Forest Mgmt

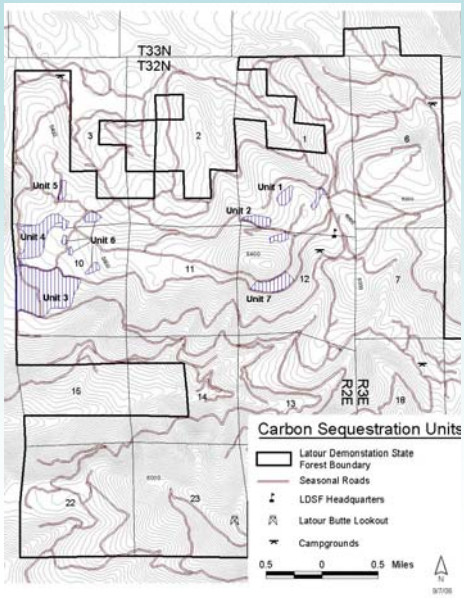
- Creation of new No Harvest Zones => 0
- Increasing Average Harvest Age of Commercial Species
  - Beyond culmination of biomass increment
  - This may be difficult to determine, depending on carbon pools considered
  - A guide table would be beneficial
  - Assuming zero since forest management goal is CMAI
- Planned management for units is part of larger forest management harvest schedule, so no activity shifting leakage

Leakage Risk Assessment for Reforestation

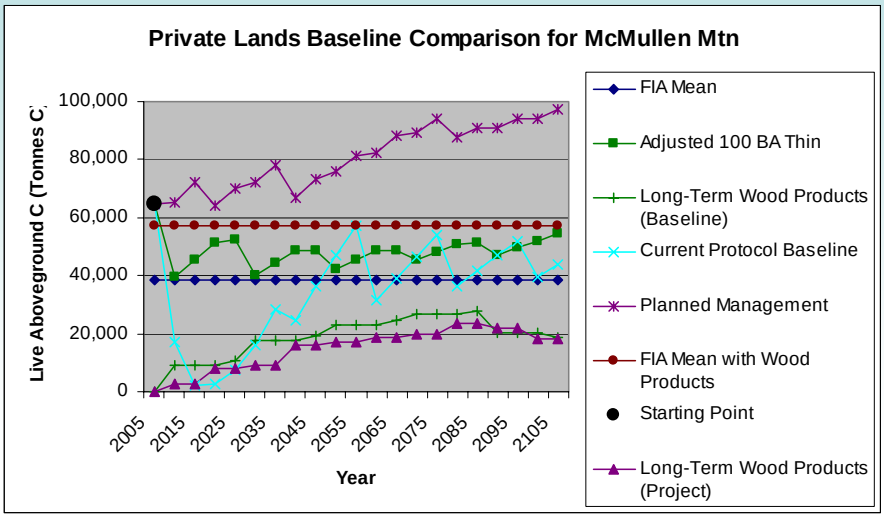
- Not active cropland
- Historic dominant economical activity has been timber harvest, but some areas may not have ever been harvested due to brush field burning cycle
  - Unharvested post-WWII
  - Health thinnings and small groups since
- Grazing and agriculture not dominant
- 0% Leakage Risk

Treatments

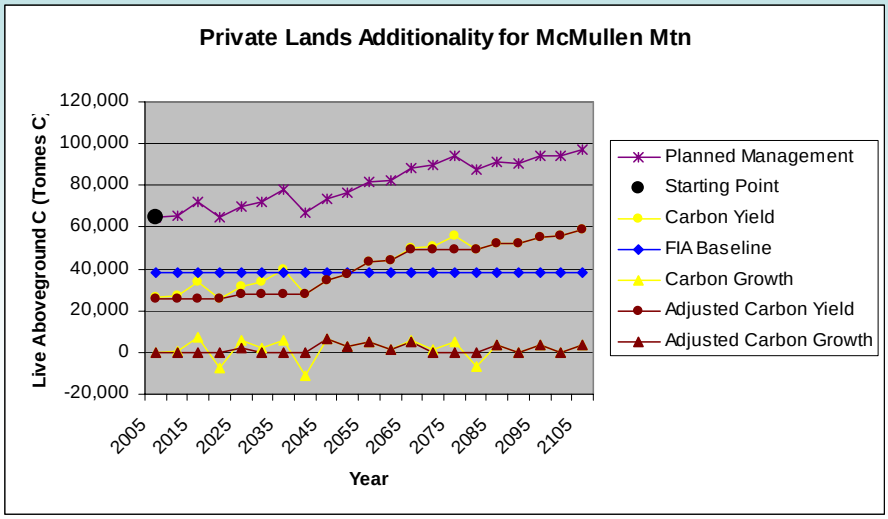
- Reforestation
- Timber Stand Improvement
- Shaded Fuel Break
- Partially Complete
- Seedlings in Nursery



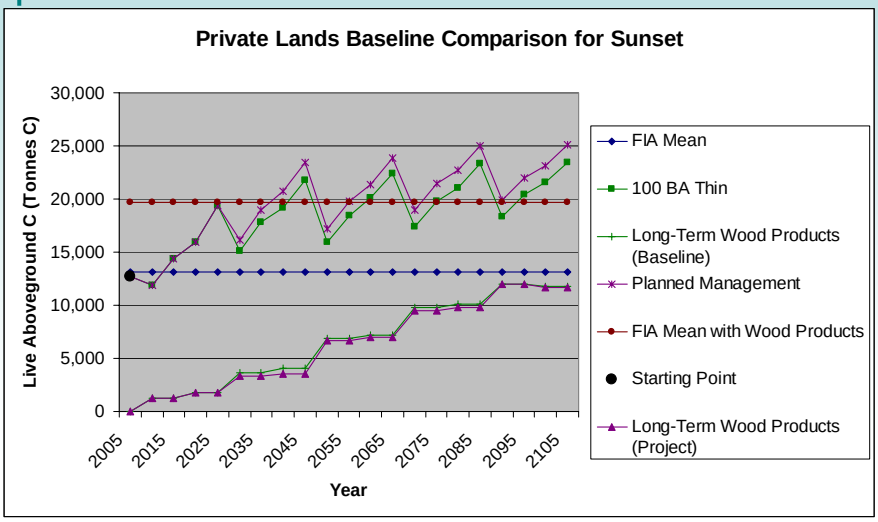
Baseline Calculation: McMullen Mountain



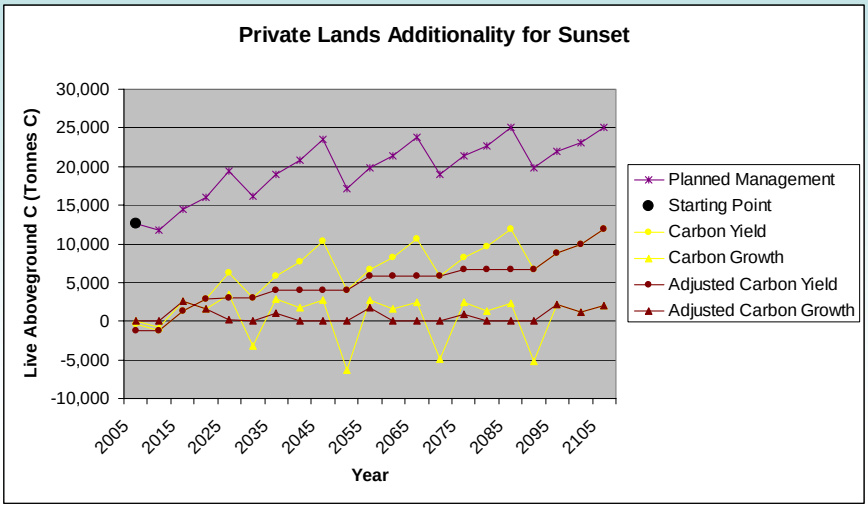
Biological Additionality: McMullen Mountain



Baseline Calculation: Sunset



Biological Additionality: Sunset



Pool Requirements

- Proportion of Biological Additionality that must be set aside and not sold
- Public Lands
  - Forest Management (9.55% Sunset, 5.75% McMullen)
    - 5.75% Permanence + 3.8% Inventory (Sunset) + 0% Leakage
  - Reforestation (9.55% Sunset, 5.75% McMullen)
    - 5.75% Permanence + 3.8% Inventory (Sunset) + 0% Leakage
- Private Lands
  - Forest Management (17.55% Sunset, 13.75% McMullen)
    - 13.75% Permanence + 3.8% Inventory (Sunset) + 0% Leakage
  - Reforestation (27.55% Sunset, 23.75% McMullen)
    - 23.75% Permanence + 3.8% Inventory (Sunset) + 0% Leakage

Carbon Yields Over Time (CO2e)

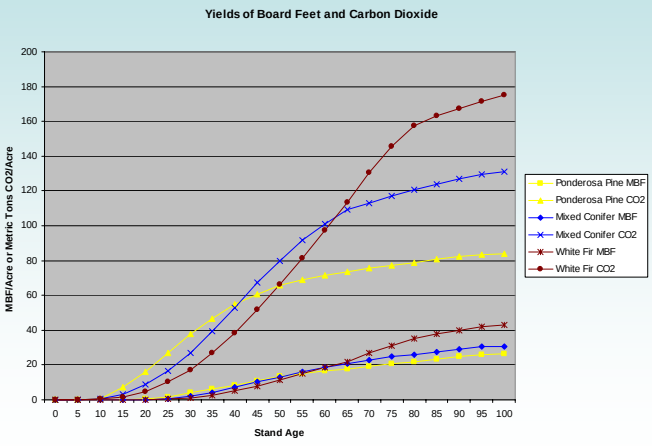
- Public Lands
  - Forest Management
    - Sunset: 5.9 K tonnes maximum from TSI investment (net of 9.55% reserve)
    - McMullen: 0, no increase over baseline
  - Reforestation
    - Sunset: 1.3 K tonnes at year 30, 2.9 K tonnes at year 60 (net of 9.55% reserve)
    - McMullen: 2.5 K tonnes at year 30, 5.6 K tonnes at year 60 (net of 5.75% reserve)
- Private Lands
  - Forest Management
    - Sunset: 17.6 K tonnes at year 50, 43.7 K tonnes at year 100 from increasing stocks (net of 17.55% reserve)
    - McMullen: 81.9 K tonnes immediately from being over FIA mean (net)
      - 139.3 K tonnes at year 50, 186.2 K tonnes at year 100 from initial and increasing stocks (net of 13.75% reserve)
  - Reforestation
    - Sunset: 1.1 K tonnes at year 30, 2.3 K tonnes at year 60 (net of 27.55% reserve)
    - McMullen: 2.1 K tonnes at year 30, 4.5 K tonnes at year 60 (net of 23.75% reserve)

Financial Return

- CO2e per Tonne Price: Low ($2.00), Medium ($10.00), High ($30.00)
- Public Lands
  - Forest Management
    - Sunset: $12K, $59K, $178K decades out, 200 acres treated (**DID NOT PAY)**
    - McMullen: NA
  - Reforestation: Sunset and McMullen
    - Requires about $25 per tonne CO2e price to break even at 4% IRR **(SUBSIDY?)**
    - Assumes $1,100 establishment cost, site III. Site II is $10-$14 a tonne.
- Private Lands
  - Forest Management
    - Sunset: $-32/ac, $-22/ac, $2/ac NPV at 10% IRR **(MAY BE WORTH IT)**
      - $16/ac, $109/ac, $342/ac NPV at 5% IRR
      - Smaller Property, higher cost per acre
    - McMullen: $207K, $877K, $2.6M NPV at 10% IRR with large immediate return
      - Per Acre NPV: $174, $736, $2,140 **(FIND NEAREST CONSULTANT!)**
  - Reforestation
    - Same as Public Lands but Higher Reserve so less cost effective
    - If public subsidy, who owns carbon?

Mitigation and Adaptation

- Shift to Pine
- Less Snow Storage of Water
- Fire Frequency?
- Growth Models are Climate Dumb
- Use Topography for Planning



QUESTIONS?