Carbon Inventory Potential in California’s National Forests

California Rapid Assessment

National Forests Climate Change Workshop
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National Forest Carbon Inventory Scenarios for the Pacific Southwest Region (California)

Region 5 Climate Change Interdisciplinary Team

Report Submitted to:
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Where it all fits

Ecosystem Management

Ecosystem Services

Carbon Sequestration Climate Mitigation

Forests

Amenities

Water

Biodiversity

Hazardous Fuels Reduction/Bioenergy

Conservation

Improved Forest Management

Afforestation/Reforestation

Urban Forestry
Overview

• Background/Context for the Rapid Assessment
• Purpose and Deliverables
• Methods
• Outcomes
• Lessons Learned
• Closing thoughts for the work ahead
Forest Service Lands in California
Why did we conduct the analysis (What were we thinking?)

- Convergence of drivers:
- Chiefs commitment to Forest GHG Reductions
- CA Assembly Bill 32- Global Warming Solutions Act
- @ Table developing Forestry Carbon Protocols for Climate Action Registry
- $64K? What role Public Forest Lands in GHG Reductions?
Sources of CA’s Climate Change Emissions
1990 – 2002

Expressed in Terms of CO₂ Equivalent (CO₂e)

- Transportation 41.2%
- Electric Power 19.6%
- Industrial 22.8%
- Agriculture & Forestry 8.0%
- Others 8.4%

Source: California Energy Commission 2005
Potential Reductions of Greenhouse Gasses (187.2MMTCO₂e) by 2020

Source: California Climate Action Team 2006
California Rapid Assessment Deliverables

- Determine the capability of CA National Forests to sequester carbon under a range of management scenarios
- “Quick Assessment”-Using readily available data
- Costs/potential market value
- Impacts on ecosystem services
- Develop Public Forest Lands Carbon Accounting Protocols
  - Baseline
  - Additionality
  - Leakage
  - Permanence
R5 Project TEAM

• Bruce Goines-Team lead- State and Private Forestry
• Mark Nechodom-Team lead PSW Research Station
• Klaus Barber-Regional Analyst, Strategic Decision Support
• Chris Fisher- FACTS, R5 RO
• Nancy Mulligan- Silviculture, Mendocino NF
• Scott Conway- Fire and Fuels, Tahoe NF
• Brad Burmark- Regional Planner/Economist
• Karen Jones- Ecosystem Management, Tahoe NF
• Martha Maciel- RF’s Office of Communication
• Mike Landram- Regional Silviculturist
• Gary Thompson- Regional Fire & Aviation Management
• Tony Tooke- WO Liaison
Challenges

- Defining the Baseline Scenario
- Defining Management Footprint
- Predicting Growth and Disturbance
- Veg and Disturbance Data Challenges
- Defining Management Costs
- Modeling Impacts on Ecosystem Services
Baseline/BAU Management Footprint

Database Challenges

Comparison of Different Queries of FACTS database related to Reported Acres

- Q1_Total
- Q2_Total
- Q3_Total
- WFU-RBF

Year:
- 1989
- 1991
- 1993
- 1995
- 1997
- 1999
- 2001
- 2003
- 2005
- 2007

Acres:
- 0
- 25000
- 50000
- 75000
- 100000
- 125000
- 150000
- 175000
- 200000
- 225000
Disturbance from Wildfire

Wildfire Acres - All Region 5 and NWFP & SNFP Forests only

- R5_Acres
- All Forest except SoCal
- Poly. (R5_Acres)
- Linear (All Forest except SoCal)

Year

Acres Burned

[Graph showing the number of acres burned by wildfires over several years, with data points and trend lines for different categories of forests.]
Fire Severity in Region 5

R² = 0.353, P (Linear) = 0.011
R² = 0.1617
R² = 0.7981
R² = 0.8357

Percent High Severity

Year


% High Severity
10Yr Moving Avg
Predicted
Linear (10Yr Moving Avg)
Power (10Yr Moving Avg)
Poly. (% High Severity)

(reference in report on web)
Management Footprint-Reforestation Needs vs. Funding/Accomplishments

Trend in Reforestation Needs and Accomplishments on California National Forests

Fiscal Year


Acres

0 50,000 100,000 150,000 200,000 250,000 300,000 350,000

Needs
Accomplishments
Management Footprint-Pre-commercial Thinning Needs vs. Funding/Accomplishments

Trend in Precommercial Thinning Needs vs. Accomplishments on California National Forests

- Needs
- Accomplishments

Fiscal Year
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006

Acres
- 0
- 50,000
- 100,000
- 150,000
- 200,000
- 250,000
- 300,000
Fuels Management Needs vs. Funding/Accomplishments

R5 Capabilities =
Additional 65,000 acres/year
R5 Capabilities = Additional 30,000 acres/year Commercial Thinning
Management Scenarios
R5 Assessment

– What scenarios speak to contemporary resource and program management issues?
  – Business as Usual
  – Business as Usual + Reforestation
  – Existing LMPS-as written and amended
  – Maximum Forest Resiliency
  – Minimum Canopy Disturbance

– Reflected management activities under current discussion

– Theoretical scenarios to “Bound the Discussion”
Results: Business As Usual*

*Includes above ground live biomass, wood products, bioenergy
Business as Usual - Carbon Pools

Above Ground Live Biomass
Harvested Wood Products
Bioenergy Use
Results-Maximum Forest Resilience*

*Includes above ground live biomass, wood products, bioenergy
Maximum Forest Resilience-Carbon Pools

Above Ground Live Biomass

Harvested Wood Products

Bioenergy Use

- MaxFR
- Periodic Product
- Accum Product
- MaxFR with Wood Prd
- Biomass Fuels
- MaxFR with Wood Prd + Fuel

M[t] Carbon

2020 2040 2060 2080 2100 2120
BAU, BAU+Reforestation, LMP, MFR
What we learned

• Forests will play significant role in Climate mitigation/ GHG balances under AB32
• BAU reacts to disturbance, treats highest priority landscapes with minimal effects
• Important questions for Region 5:
  – Are R5 veg/fuel strategies correct?
  – Are current Rx’s Adequate?
  – Are we treating enough acres?
  – Are we creating healthy and resilient landscapes?
More lessons ...

• Sustainability of “carbon sink” dependent upon interactions of growth, management and disturbances

• Projections relied heavily upon the professional judgment and experience of research and forestry/fire/fuels managers

• Carbon projections significantly lower without full accounting of carbon pools
Lessons Learned

– Peer Review Comments
  • Friendly fire
  • Incorporated suggestions as timeframes and resources allowed
  • Lots of substantive questions - Task of this workshop!

– Environmental Community Response
  • Supportive and interested in participating in future design

– Leadership Response
  • Findings provide platform for communication with public interested in public resource values
Closing Thoughts

• How to set baseline?
• How to model future disturbance, esp. with climate change?
• What is a reasonable range of management scenarios?
  • Implement LMP
  • MFR-Resilience-Realistic?
  • Others?
• Are you responding to contemporary resource management issues?
• Do you want to treat this analysis as an opportunity for a dialogue with public?
Closing Thoughts-Baseline

• Significant challenges defining and modeling baseline
• Management Footprint
• Nature of treatments
• Effect on future growth and resistance to disturbance
Closing Thoughts-Predicting Disturbance

- Significant Challenges modeling disturbance
- Basis for Projections?
  - Fire
  - Drought
  - Insects & Disease
- Relies upon limited research and development of professional consensus
- Opportunity to engage wide range of interests including the environmental community
Data Quality

• Defining our management footprint” is challenging-requires careful analysis of data
• Challenges associated with quantifying/tracking carbon pools over time
  • FIA inventory conversion to carbon pools-
  • Solid Wood Products and bioenergy
• Peer reviewers wanted a much more thorough accounting of all carbon pools over time
  • LCA/Deterioration
CA Findings and Recommendations

- Significant critical review
- Earnest critique and constructive input from environmental community
- Serves as a platform for dialog over long term implications of current management activities
- Involve broad forest community in design
Closing Thoughts

• Quick overview of R5 Carbon Capability Analysis “Experience”
• Conference is an opportunity to examine historic and projected management activities, look ahead, formulate baselines and alternatives that will affect resilience of our ecosystems
• Speak of forestry in contemporary terms
• The Adventure begins