WESTCARB Annual Business Meeting

Terrestrial Sequestration Pilots

John Kadyszewski
WESTCARB Lead for Terrestrial Pilots and Characterization
Winrock International
jkadyszewski@winrock.org

Scottsdale, AZ
September 16, 2009

Terrestrial Sequestration Phase II Activities

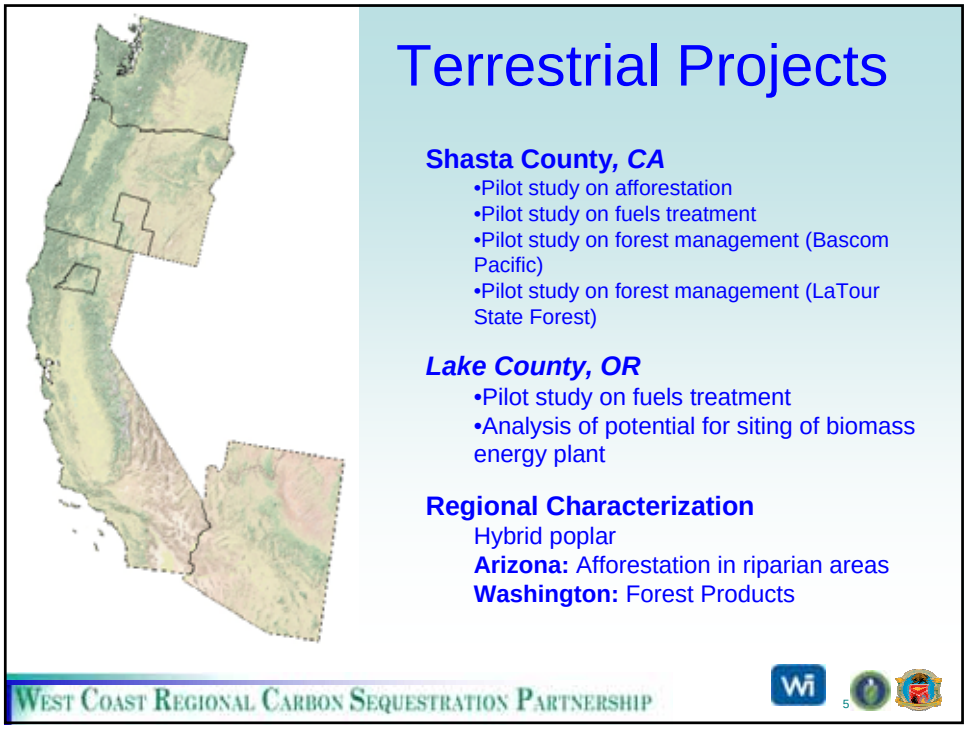
1. Shasta County pilot
2. Lake County pilot
3. Develop methodology to determine carbon credits from improved fuels management
4. Ongoing regional characterization and identification of future pilot sites
5. GIS carbon reporting

Shasta County Partners

- Western Shasta RCD
- WM Beaty and Associates
- Pacific Forest Trust
- Wheelabrator Shasta
- California Climate Action Registry
- Climate Trust
- California Department of Forestry and Fire Protection
- California Energy Commission
- California Forest Products Commission
- US Forest Service
  - Pacific Southwest Research Station
  - Pacific Northwest Research Station (Pacific Wildland Fire Sciences Laboratory, FERA)
  - Shasta Trinity National Forest
- National Park Service
  - Whiskeytown National Recreation Area
  - Lassen Volcanic National Forest
- Bureau of Land Management
- Pacific Gas & Electric
- Bascom Pacific LLC

Lake County Partners

- Lake County Resources Initiative
- Oregon Department of Forestry
- Oregon State University
- Greenwood Resources
- California Climate Action Registry
- Climate Trust
- Oregon Forest Resources Institute
- Collins Company
- Jeld-Wen Timber and Ranch
- US Forest Service, Fremont National Forest
- Bureau of Land Management


Terrestrial Projects
Shasta County, CA
•Pilot study on afforestation
•Pilot study on fuels treatment
•Pilot study on forest management (Bascom Pacific)
•Pilot study on forest management (LaTour State Forest)
Lake County, OR
•Pilot study on fuels treatment
•Analysis of potential for siting of biomass energy plant
Regional Characterization
Hybrid poplar
Arizona: Afforestation in riparian areas
Washington: Forest Products
West Coast Regional Carbon Sequestration Partnership
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West Coast Regional Carbon Sequestration Partnership
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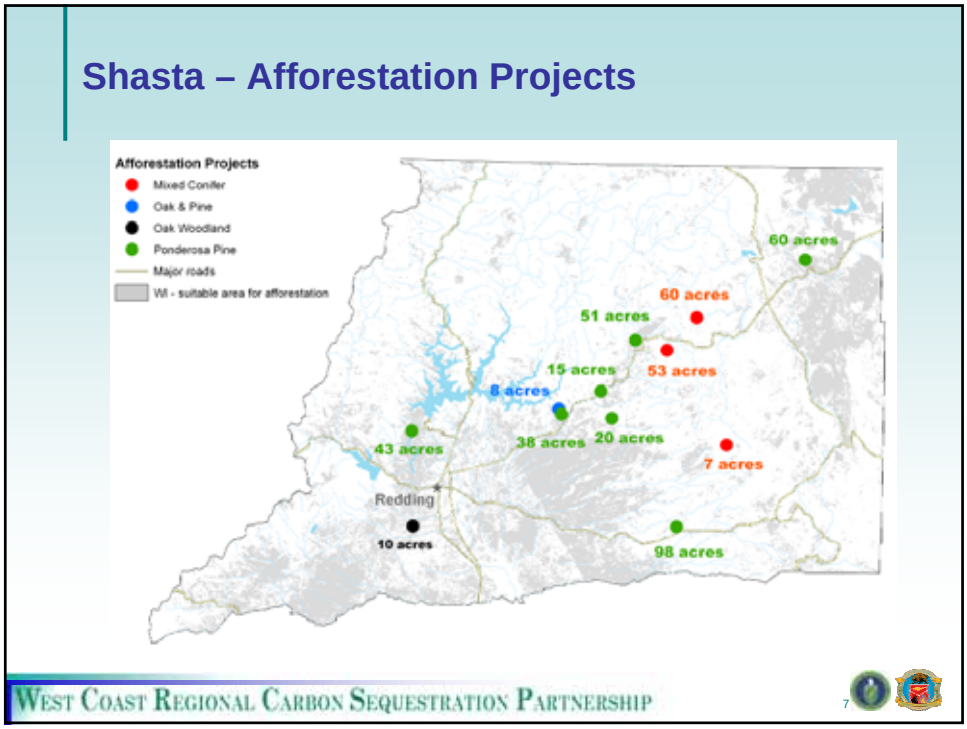
Shasta – Afforestation Projects
Afforestation Projects
Mixed Conifer
Oak & Pine
Oak Woodland
Ponderosa Pine
Major roads
WI - suitable area for afforestation
60 acres
60 acres
51 acres
53 acres
15 acres
8 acres
43 acres
38 acres
20 acres
7 acres
Redding
10 acres
98 acres
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Wilson, 15 acres, manzanita baseline, $1,213/ac, ponderosa pine planted

Red River, 98 acres,
manzanita baseline, $832/ac,
Ponderosa pine planted

Lammers, 53 acres,
mechanical site prep, $809/ac,
Ponderosa pine planted

Sivadas, 40 acres,
manzanita baseline, $895/ac,
Ponderosa pine planted

Lakey, 60 acres,
recent burn, $482/ac
Ponderosa pine planted

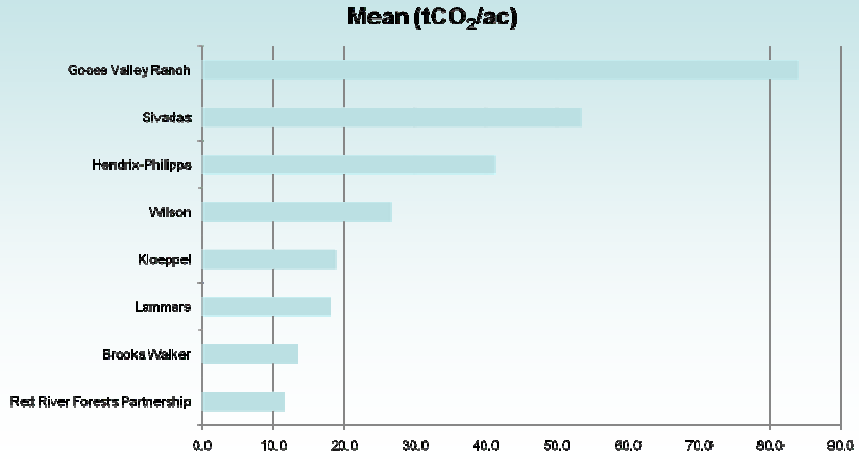
Afforestation Costs

Project	Acreage	Total Cost	Cost per Acre
Lakey	60	$28,919	$482
Frase	43	$25,812	$600
Lammers	53	$42,885	$809
Red River Forests	98	$81,532	$832
Eilers	8	$7,084	$886
Sivadas	40	$35,805	$895
Kloeppel	51	$45,870	$899
Goose Valley	60	$61,958	$1,033
Wilson	15	$18,198	$1,213
Hendrix-Phillips	20	$24,453	$1,223
Brooks Walker	7	$8,854	$1,265
BLM	10	$13,160	$1,316

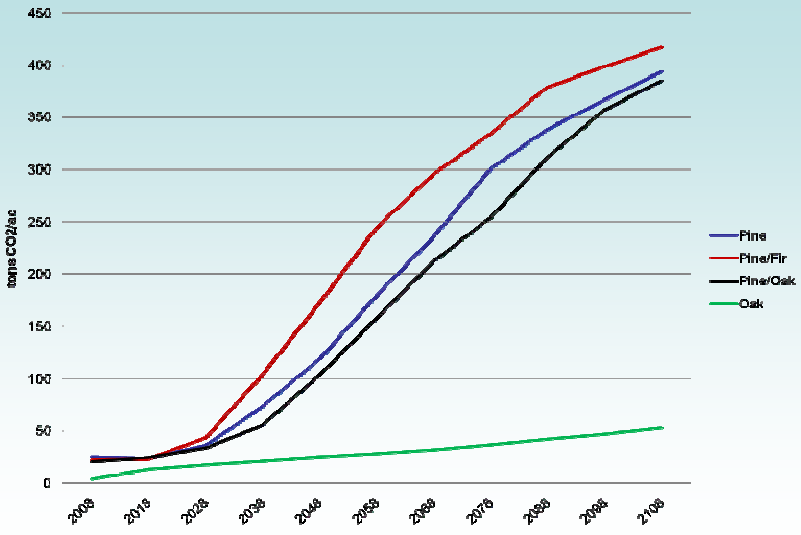
Itemized costs

Project	acreage	seedlings/ acorns	site prep	planting	post tx spraying	total cost	cost per acre
Lakey	60	$1,840	$6,338	$11,967	$8,775	$28,919	$482
Frase	43	$1,980	$11,235	$7,517	$5,080	$25,812	$600
Lammers	53	$3,331	$34,350	$5,204		$42,885	$809
Red River Forests	98	$6,000	$49,240	$9,900	$16,392	$81,532	$832
Eilers	8	$1,545		$2,459	$3,080	$7,084	$886
Sivadas	40	$1,890	$21,805	$7,210	$4,900	$35,805	$895
Kloeppel	51	$3,300	$26,370	$9,550	$6,650	$45,870	$899
Goose Valley	60	$3,640	$26,280	$6,370	$25,668	$61,958	$1,033
Wilson	15	$755	$9,725	$4,693	$3,025	$18,198	$1,213
Hendrix-Phillips	20	$1,200	$11,200	$7,700	$4,353	$24,453	$1,223
Brooks Walker	7	$500	$7,804	$550		$8,854	$1,265
BLM	10	$1,300		$8,660	$3,200	$13,160	$1,316

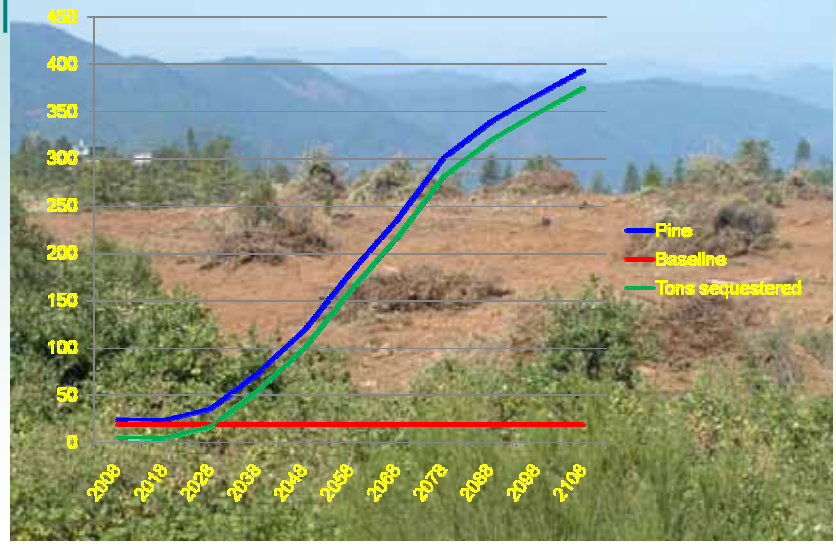
Shasta Afforestation Preliminary Baseline



Growth Projections



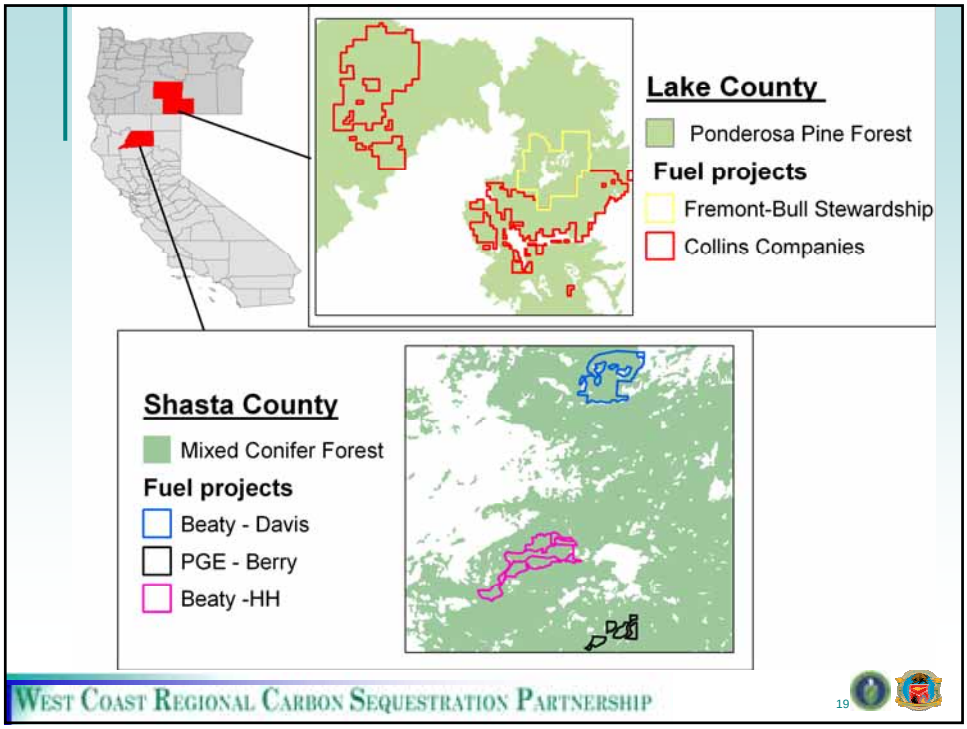
Kloeppel, 51 acres, greenleaf & deerbrush



Shasta County fuels management

		Trees*	Litter*	Understory*	10/100 hour fuels*	1000 hour fuels*
Davis	pre-treatment	89.5	18.1	0.3	7.4	14.9
	post-treatment	72.2	12.2	0.3	7.8	20
HH	pre-treatment	121	15.2	0.1	6.4	15.6
	post-treatment	89.1	15.2	0	4.4	20.2
PG&E	pre-treatment	122.1	22.1	0.2	4.4	25
	post-treatment	88.8	3.9	0	6.2	16.9

*metric tons C/ha



Probabilities of Fire

WHR Class	Annual burn probability (%)
Red Fir	0.14
Montane Chaparral	0.42
White Fir	0.34
Klamath Mixed Conifer	0.36
Montane Hardwood	0.43
Ponderosa Pine	0.50
Douglas-Fir	0.43
Mixed Chaparral	0.50
Annual Grassland	0.48
Montane Hardwood-Conifer	0.43
Montane Riparian	0.35
Wet Meadow	0.46
Subalpine Conifer	0.11
Sierran Mixed Conifer	0.41
Closed-Cone Pine-Cypress	0.47
Eastside Pine	0.39
Juniper	0.53
Sagebrush	0.50
Blue Oak-Foothill Pine	0.52
Lodgepole Pine	0.28
Jeffrey Pine	0.52
Blue Oak	0.51
Valley Oak	0.38
Chamise-Redshank Chaparral	0.67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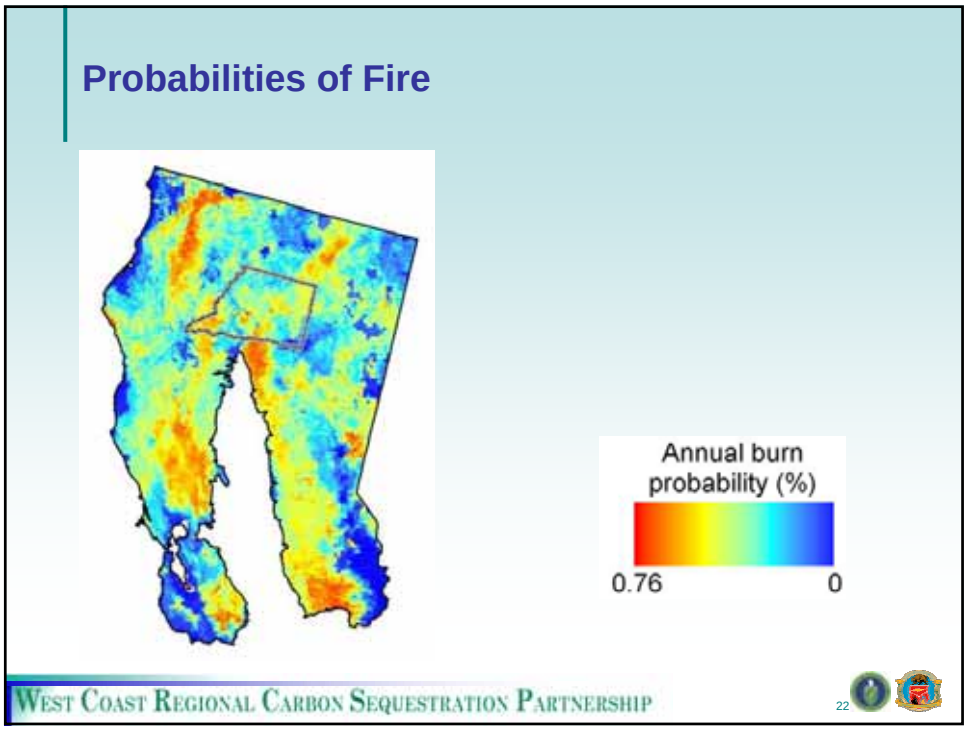
Probabilities of Fire
Annual burn probability (%)
0.76
0
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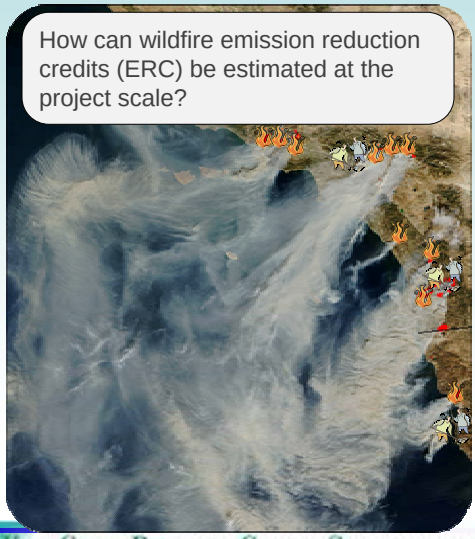
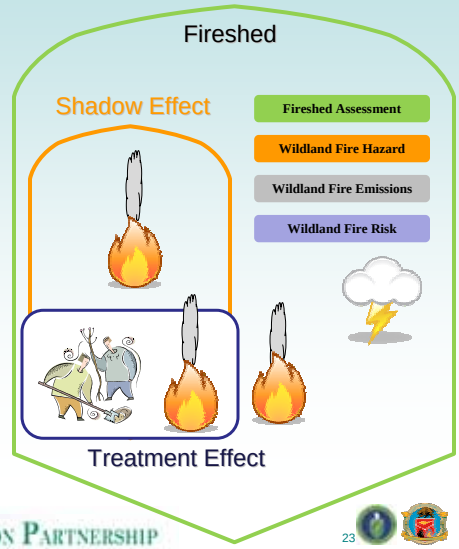
Question…

How can wildfire emission reduction credits (ERC) be estimated at the project scale?

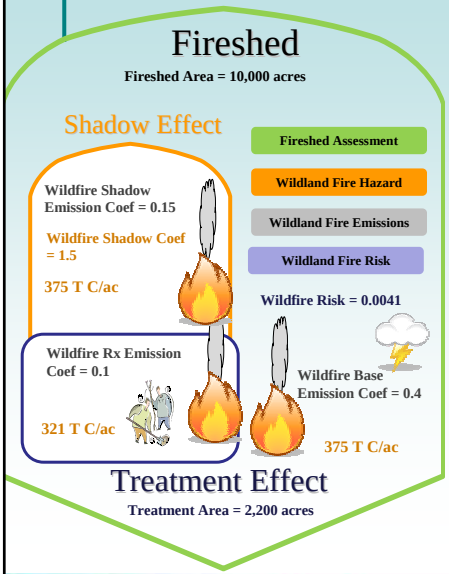


ERC = w/o project – w/project



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 23

ERC Framework



ERC = w/o project – w/project

Without Project
FIRE EMISSION
= (375 T C / ac * 3.66 CO_2 / T C * 10,000 ac * 0.4 * 0.0041)
= 22,509

With Project
FIRE EMISSION
[375 T C / ac * 3.66 CO_2 / T C * (10,000 ac – 2200 ac – (1.5 * 2200)) * 0.4 * 0.0041]] = 10,129

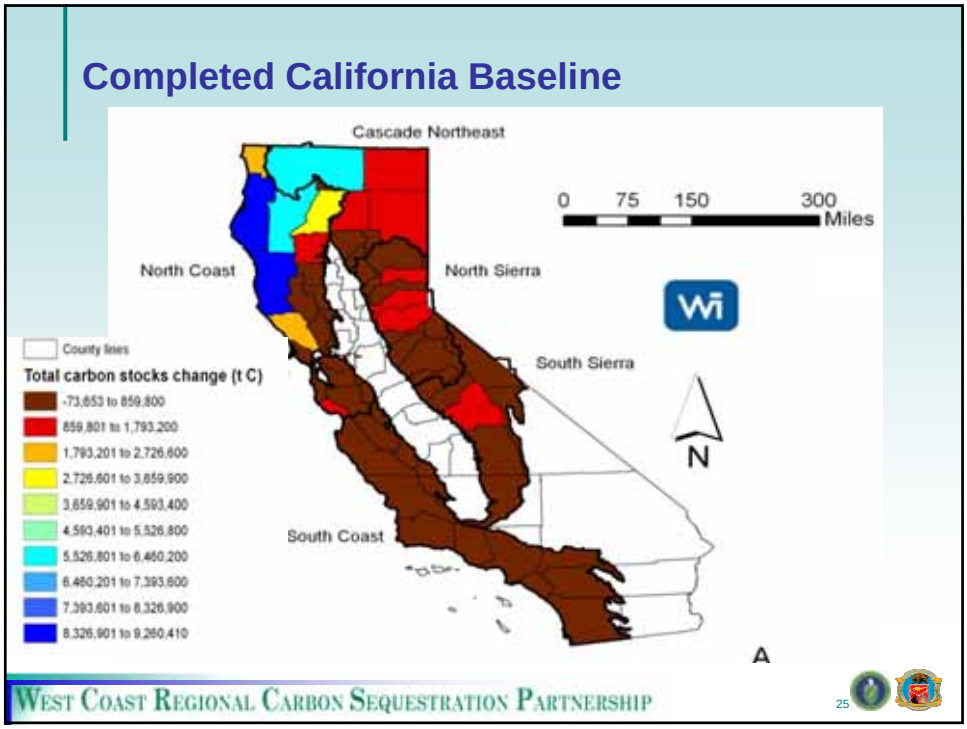
SHADOW AREA FIRE EMISSION
+ [375 T C / ac * 3.66 CO_2 / T C * (1.5 * 2200) * 0.15* 0.0041]
= 2,786

TREATED AREA FIRE EMISSION
+ [321 T C / ac * 3.66 CO_2 / T C * 2200 * 0.1 * 0.0041] = 1,060

ERC = 22,509 – 13,975 = 8,534 CO_2 / year

Does not account for treatment emissions of 54 T C/ac (118,800 T C total), wood use, decay rates, and growth following treatment

WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 24


Completed California Baseline
Cascade Northeast
North Coast
North Sierra
South Sierra
South Coast
0 75 150 300
Miles
N
County lines
Total carbon stocks change (t C)
-73,653 to 859,800
859,801 to 1,793,200
1,793,201 to 2,726,600
2,726,601 to 3,659,900
3,659,901 to 4,593,400
4,593,401 to 5,526,800
5,526,801 to 6,460,200
6,460,201 to 7,393,600
7,393,601 to 8,326,900
8,326,901 to 9,260,410
A
WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP
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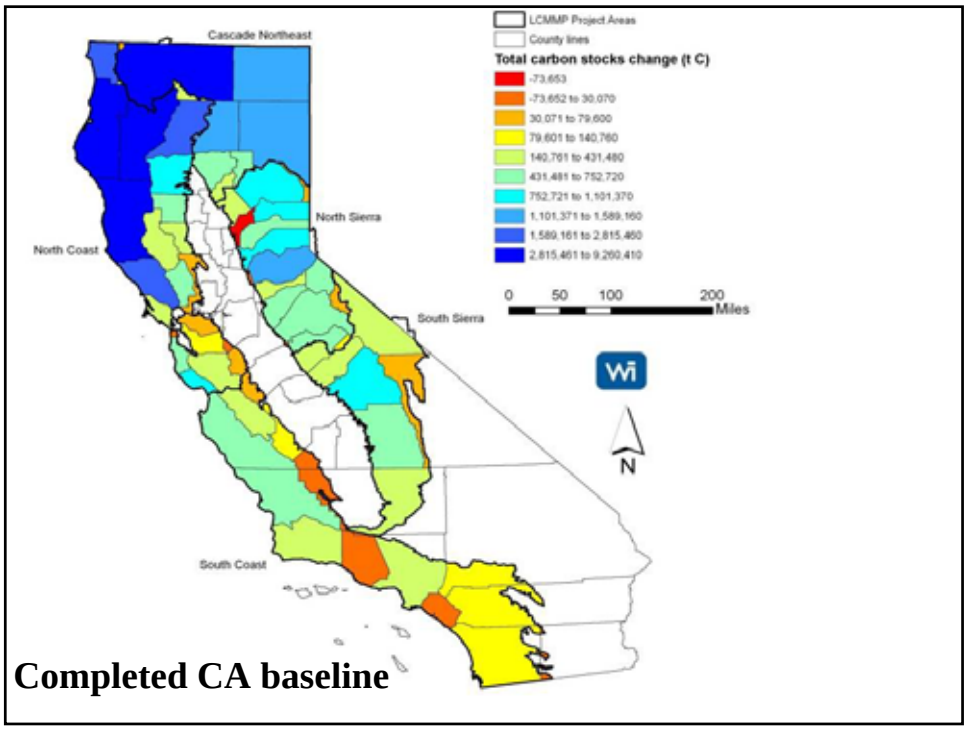
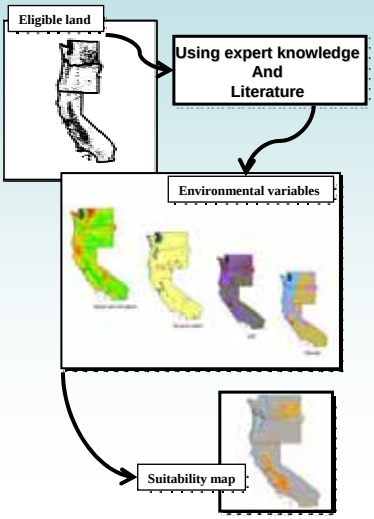

Cascade Northeast
North Sierra
North Coast
South Sierra
South Coast
LCMMP Project Areas
County lines
Total carbon stocks change (t C)
-73,653
-73,652 to 30,070
30,071 to 79,600
79,601 to 140,760
140,761 to 431,480
431,481 to 752,720
752,721 to 1,101,370
1,101,371 to 1,589,160
1,589,161 to 2,815,460
2,815,461 to 9,260,410
0 50 100 200
Miles
N
Completed CA baseline

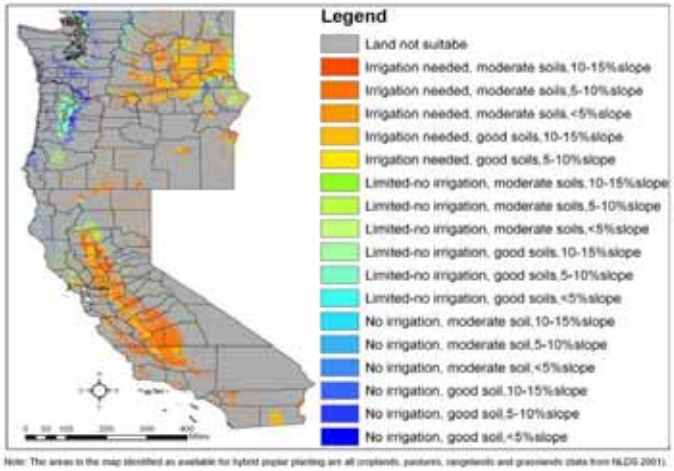
Development of hybrid poplar suitability map for the Western United States



- Eligible land cover types
- Slope
- Available water table
- Soil
- Climate
  - Growing season precipitation – potential evapotranspiration: 240-375mm and >375mm.

Suitability map for hybrid poplar plantations:

Suitable lands include all croplands, rangelands and grasslands based on NLCD 2001.



Note: The areas in the map identified as available for hybrid poplar planting are all croplands, pastures, rangelands and grasslands (data from NLCD 2001).

Arizona Riparian Areas

Analysis on potential riparian areas for afforestation

1. Modeling the extent of riparian areas
2. Defining geophysical likelihood for woody riparian vegetation

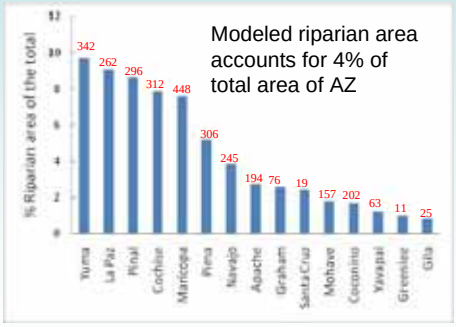
Arizona – Regional Characterization on Riparian Areas

Modeling the extent of riparian areas

Rivers

Elevation

Slope



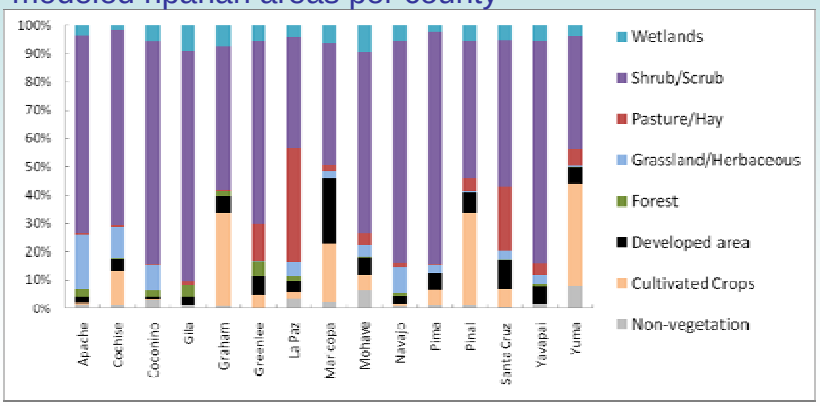
Modeled riparian area accounts for 4% of total area of AZ

County
Water
Modeled Riparian Area

- Numbers above the bars represent thousands of acres of modeled riparian area per county

Arizona – Regional Characterization on Riparian Areas

Percentage of land cover categories (NLCD 2001) for modeled riparian areas per county

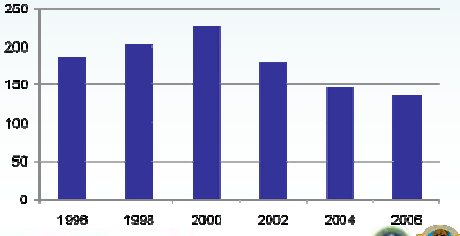


Washington State: Carbon footprint of timber supplies

- Analyze differences in the atmospheric impacts of specific wood products
- Compare the carbon footprint of various timber products produced in Washington

Source: www.nnrg.org/about

Number of Timber Product Mills in Washington State 1996 - 2006



Bascom Pacific Summary

- CAR Improved Forest Management Project near Mt. Shasta, CA
- 9,202 acre Sierra mixed conifer forest
- CA Forest Practices baseline compared to Conservation Easement project
- Summary Results
  - Reductions of ~ 1 Million metric tons CO_2e
  - Effect of wood products on ERs is minimal
  - Revised CAR protocols may reduce total ERs

Contact info

John Kadyszewski
Winrock International
(703) 525-9430, ext.618
jkadyszewski@winrock.org