Outreach for Terrestrial Sequestration Afforestation/ Reforestation Projects

Lessons Learned from Efforts in Shasta County, CA

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

Multiple Audiences

- Landowners
- Land Managers
- General Public
- Local Government
- Agencies
- Local and Regional Organizations
- Environmental Advocates
- Education Community

Initial Outreach

- Stakeholder Meeting
- More than 400 Landowners Contacted Through Letters Sent to Landowners With 100+ Acres in Priority Areas
- Presentations at Local and Regional Meetings
- Word of Mouth

Let's Talk…

Is it true?

Is there really anything we can do about it?

Isn't it too late?

Isn't it natural?

Is it really a problem?

Carbon Sequest...what?

OK, Maybe I'm Interested… Survey Me!

+ 50 Landowners Interested & Interviewed
  - Willingness
  - Cost-sharing
  - Site Conditions
  - Acres
  - Species Preferences

Formal Surveys

Interview Data Sheet
Shasta County Landowner Willingness to Participate Survey

Interviewer name: _____
Date of interview: _____

This section to be completed before the interview:
Landowner name: _____
Site identifier: (RCD to use their own resources to positively identify the parcel(s) the owner(s) will discuss during the interview)
Land holding size: _____acres
Ownership strata: _____ Family-owned (A)
_____ Absentee/part-time occupant (B)
_____ Full-time occupant, first-generation (C)

Following information to be collected during the interview:

Question	Response
1. Confirm parcel information noted above, correct as needed	
2. What would you need in order to be willing to plant additional lands to trees on your land?	Circle all that apply: A. Nothing needed, plan to do anyway B. Cost-sharing for planting cost C. Cost-sharing for planting and maintenance cost D. Cost-sharing for irrigation, tree protector systems, or associated costs E. Opportunity to market wood products from project F. Opportunity to market carbon credits from project G. Seedlings H. Additional information I. Other:
3. If cost-sharing is required: What level of cost-sharing would you require?	_____ $ per acre or _____% of total cost
4. If everything specified above was provided (e.g. cost-sharing, information, seedlings, etc) how much land would you potentially be willing to plant with trees?	_____ acres or _____% of total holding
5. Willingness to participate in annual photo documentation and 2 page survey for 10 years	Yes or No

6. Landowner Objectives	Record landowner objectives in rough order of priority: A. Income production B. Aesthetics C. Recreation D. Timber production E. Homestead F. Other (list here):
7. If interested and prepared to do so, can you designate which parts of your land you would be willing to plant? [OPTIONAL]	[This question should only be asked if the landowner is strongly interested and ready to designate on the map of their landholding specific areas/vegetation types they would be willing to plant. Otherwise, this step can be done in a follow-up meeting with interested landowners.]
8. What is the current state of the proposed site?	Record any site description information available such as accessibility, slope, existing vegetation, etc.
9. Which tree species would you most like to plant on your lands?	Circle all that apply: A. Commercial hardwoods B. Commercial softwoods C. Mixed hardwoods/softwoods D. Non-commercial hardwoods E. Non-commercial softwoods F. Brush species to improve wildlife habitat and privacy G. No preference H. Not sure I. These species (list here):
10. What concerns do you have about tree planting on your property?	Circle all that apply: A. No Concerns B. Decreased forage C. Increased fire risk D. New Federal or state regulations E. Increased land management costs F. Other (list here):
11. Please feel free to add any other comments.	Record landowner's comments or concerns.

Landowner Outreach

- +50 interest surveys resulting in majority desk review for consideration
- 20 site visits resulting in 17 plans
- Contract negotiations including amendments adding additional acreage, revising herbicide prescription and extending agreements
- Measuring, site prep, planting, and monitoring activities
- Scheduling field trips and interviews
- Project updates individually and via landowner meetings

Involved Discussion: Site Visits, Telephone, Email

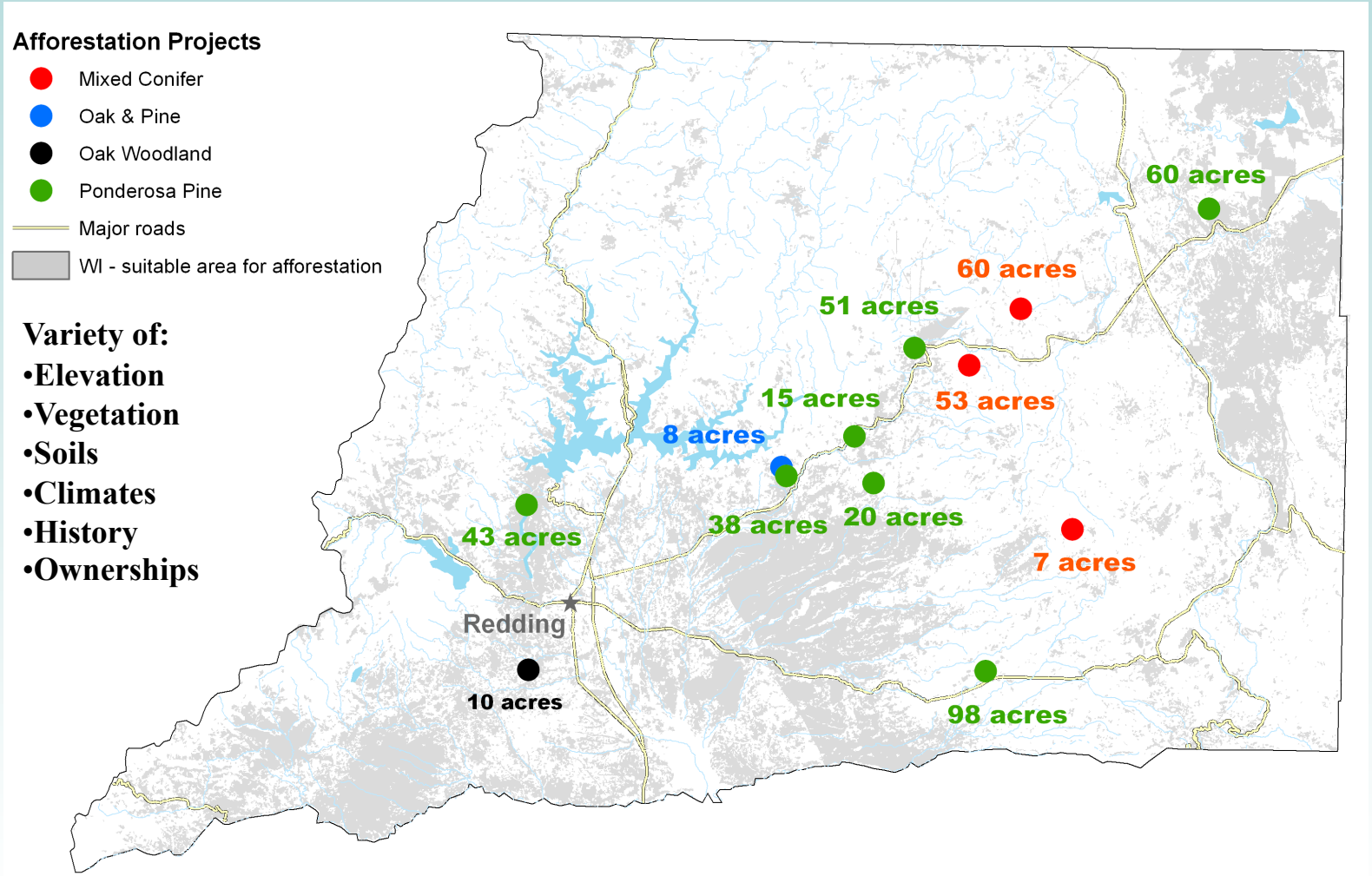
How much will it cost?

What's it going to look like?

What will it look like 5, 10, 50+ years from now?

What's a carbon credit?

Variety of Sites = Variety of Landowners



Landowner Education

- Climate Change
- Forestry 101
  - Site Conditions
  - Species
  - Site Prep
  - Herbicides
  - Maintenance

Continuing Communication

Community Outreach

- Local/Regional Meetings
- County Fairs and Festivals
- WSRCD Website
- Newsletter Articles
- Newspaper Articles
- Prairie Public PBS Documentary
- Natural Resource Conservation Service Success Story

Local and Regional Government and Organizations

- County Board of Supervisors
- City Council
- Electric Utilities
- Fire Safe Councils
- Local Forest Education Council
- Watershed Groups
- Local and Regional Land Management and Conservation Organizations

Each Landowner/Group is Unique

- Values
- Understanding of Natural Systems
- Concerns
- Goals

Challenges

- “Us against them” mentality
- Language barriers
- Passed down beliefs
- Landowners - Individual ownership / family trust
- Time investment

Traditional Outreach

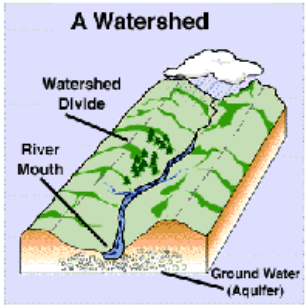
Volume 4, Issue 11
October 2007

Inside this issue:

What is a Local Watershed Group?

We all depend on watershed health for drinking water, flood protection, and healthy resources that improve the quality of life. Most people forget that the activities of people upstream from where you live impact the lives of people fisheries and wildlife downstream. The characteristics of each watershed are unique, which is why the trend across the nation is to bring residents, landowners and other interested agencies and parties together at the watershed level to make it healthier and sustainable in the long run. Forming watershed groups is one way of organizing everyone in a watershed to work cooperatively to conserve and improve the health of the environment, the overall knowledge of the watershed and ensure that humans, plants, and animals have good quality clean water. The goal is to create a sustainable physical, biological and human environment.

To learn more , please contact Kelly Miller, Western Shasta RCD at 530.365.7332 x-205 or email Kelly@westernshastarcd.org.



Watershed Group Interests

- Fire Safety
- Open Space
- Above and Underground Water Quantity and Quality
- Appropriate Recreation
- Wildlife Habitat and Corridors
- Invasive Species
- Planned Development

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

Bear Creek Watershed *Churn Creek Watershed* *Lower Clear Creek Watershed*

Here are a few of the beautiful watersheds in our area.

Can you name the watershed you live in?

Non-Traditional Outreach
“The Times They Are A Changing”~ Bob Dylan

- Website
- Festivals – Video Contests
- You Tube
- Facebook
- Webzines
- Blogs

Climate Stewardship - Windows Internet Explorer

http://westernshastarcd.org/climate_stewardship.html

Google

Favorites

Climate Stewardship

Climate Stewardship

solutions for future generations

September 12, 2009

- Climate Change Information
- California's Global Warming Solutions Act
- Latest Climate Change News
- You Tube Climate Change Videos
- What You Can Do
- Kids

Welcome

Folks from around the world are learning about climate change, and are discovering ways to reduce their impact on the climate as well as ways to adapt to a changing climate. Information and links provided on this website are intended to provide background on the climate issue, California's response to it, the latest news and opinions from around the world, and how the WSRCD is involved.

We especially hope you take the time to visit our "Carbon Sequestration" page to find out about some great research taking place in Shasta County. This research involves sequestration of the "terrestrial" type (growing trees for capturing and storing carbon dioxide).

One of the attractions of terrestrial sequestration is its lower initial cost (relative to other CO2 storage options) coupled with the potential for significant environmental, economic, and aesthetic co-benefits. These may include:

- Improving forest health
- Creating new wildlife habitat
- Preventing soil erosion and stream sedimentation
- Boosting local and regional economies
- Reclaiming poorly managed soils
- Increasing the recreational value of lands

Thanks for stopping by, and feel free to contact WSRCD Climate Stewardship Coordinator Leslie Bryan at leslie@westernshastarcd.org, or 365-7332 ext 215 for more information.

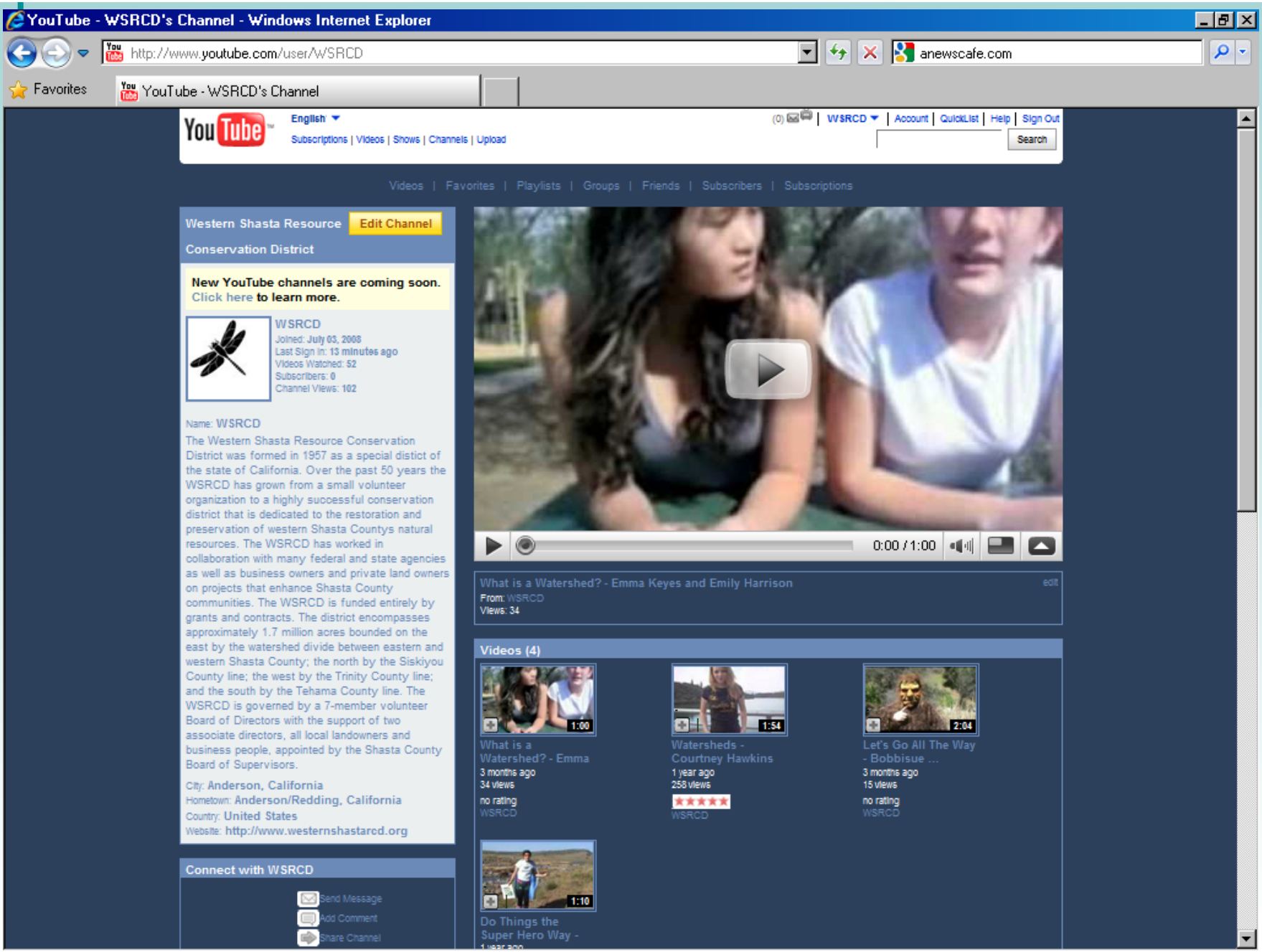
Carbon Sequest...what?

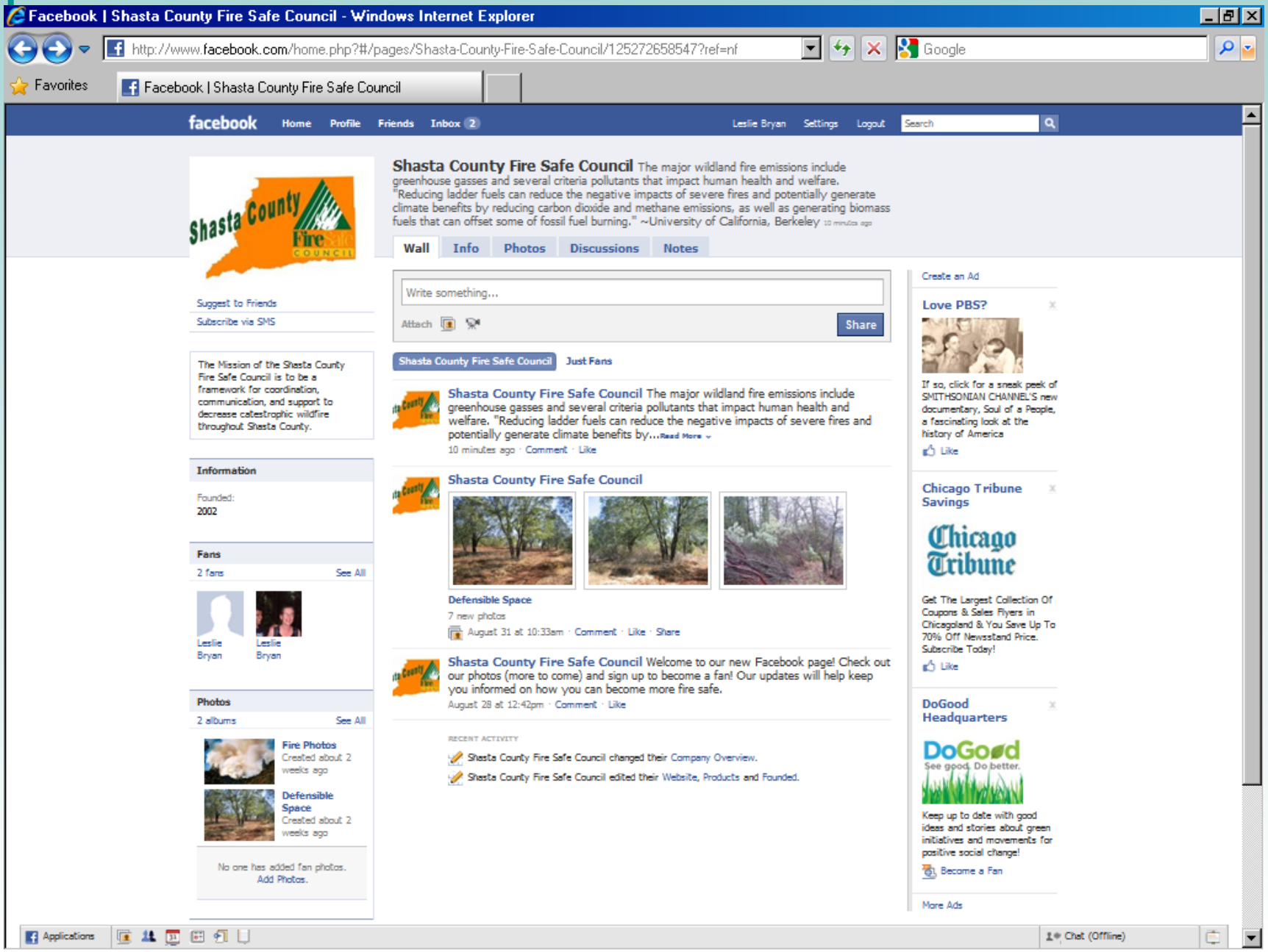
Carbon Sequestration

Presentations and Publications

2009 Whole Earth and Watershed Festival
Event Schedule

8:00am	**Site opens for Exhibitors and Vendors**
9:45am	**Exhibitors and Vendors are ready for the public**
10:00am	**Main Stage: Whole Earth and Watershed Festival Opening Ceremony**
10:15am	**Main Stage: Frank Meek, Meeks Lumber**
10:30am	**Community Room: Documentary Film: "The Bounty of Marin"**
11:00am	**Community Room: Meet your Local Farmer**
11:30am	**Main Stage: Jeff Lewis, Shasta College: "Sustainability"**
12:00pm	**Main Stage: Live Music begins**
1pm	**Community Room: Documentary Film: "State of Resolve: California Environmental Law"**
1:30pm	**Main Stage: Dr. Raymond L. John "Animal Recycling: The Role of Haven Humane"**
1:45pm	**Community Room: Student Video Contest Viewing**
2pm	**Community Room: Documentary Film: "Out of the Air-Into the Soil: Land Practices That Reduce Atmospheric Carbon Levels"**
2:30pm	**Main Stage: Shasta Conservation Fund Awards and Student Video Awards**
3pm	**2009 Whole Earth and Watershed Festival Closing**


YouTube - WSRCD's Channel - Windows Internet Explorer
http://www.youtube.com/user/WSRCD
anewscafe.com
Favorites
YouTube - WSRCD's Channel
English
Subscriptions | Videos | Shows | Channels | Upload
(0) | WSRCD | Account | QuickList | Help | Sign Out
Search
Videos | Favorites | Playlists | Groups | Friends | Subscribers | Subscriptions
Western Shasta Resource Conservation District
Edit Channel
New YouTube channels are coming soon.
Click here to learn more.
WSRCD
Joined: July 03, 2008
Last Sign In: 13 minutes ago
Videos Watched: 52
Subscribers: 0
Channel Views: 102
Name: WSRCD
The Western Shasta Resource Conservation District was formed in 1957 as a special distict of the state of California. Over the past 50 years the WSRCD has grown from a small volunteer organization to a highly successful conservation district that is dedicated to the restoration and preservation of western Shasta Countys natural resources. The WSRCD has worked in collaboration with many federal and state agencies as well as business owners and private land owners on projects that enhance Shasta County communities. The WSRCD is funded entirely by grants and contracts. The district encompasses approximately 1.7 million acres bounded on the east by the watershed divide between eastern and western Shasta County; the north by the Siskiyou County line; the west by the Trinity County line; and the south by the Tehama County line. The WSRCD is governed by a 7-member volunteer Board of Directors with the support of two associate directors, all local landowners and business people, appointed by the Shasta County Board of Supervisors.
City: Anderson, California
Hometown: Anderson/Redding, California
Country: United States
Website: http://www.westernshastarcd.org
Connect with WSRCD
Send Message
Add Comment
Share Channel
0:00 / 1:00
What is a Watershed? - Emma Keyes and Emily Harrison
edit
From: WSRCD
Views: 34
Videos (4)
1:00
What is a Watershed? - Emma
3 months ago
34 views
no rating
WSRCD
1:54
Watersheds - Courtney Hawkins
1 year ago
258 views
WSRCD
2:04
Let's Go All The Way - Bobbisue ...
3 months ago
15 views
no rating
WSRCD
1:10
Do Things the Super Hero Way -


Facebook | Shasta County Fire Safe Council - Windows Internet Explorer
http://www.facebook.com/home.php?#/pages/Shasta-County-Fire-Safe-Council/125272658547?ref=nf
Google
Favorites
Facebook | Shasta County Fire Safe Council
facebook
Home
Profile
Friends
Inbox 2
Leslie Bryan
Settings
Logout
Search
Shasta County Fire Safe Council
The major wildland fire emissions include greenhouse gasses and several criteria pollutants that impact human health and welfare. "Reducing ladder fuels can reduce the negative impacts of severe fires and potentially generate climate benefits by reducing carbon dioxide and methane emissions, as well as generating biomass fuels that can offset some of fossil fuel burning." ~University of California, Berkeley
Wall
Info
Photos
Discussions
Notes
Suggest to Friends
Subscribe via SMS
The Mission of the Shasta County Fire Safe Council is to be a framework for coordination, communication, and support to decrease catastrophic wildfire throughout Shasta County.
Information
Founded:
2002
Fans
2 fans
See All
Leslie Bryan
Leslie Bryan
Photos
2 albums
See All
Fire Photos
Created about 2 weeks ago
Defensible Space
Created about 2 weeks ago
No one has added fan photos.
Add Photos.
Write something...
Attach
Share
Shasta County Fire Safe Council
Just Fans
Shasta County Fire Safe Council The major wildland fire emissions include greenhouse gasses and several criteria pollutants that impact human health and welfare. "Reducing ladder fuels can reduce the negative impacts of severe fires and potentially generate climate benefits by...Read More
10 minutes ago · Comment · Like
Shasta County Fire Safe Council
Defensible Space
7 new photos
August 31 at 10:33am · Comment · Like · Share
Shasta County Fire Safe Council Welcome to our new Facebook page! Check out our photos (more to come) and sign up to become a fan! Our updates will help keep you informed on how you can become more fire safe.
August 28 at 12:42pm · Comment · Like
RECENT ACTIVITY
Shasta County Fire Safe Council changed their Company Overview.
Shasta County Fire Safe Council edited their Website, Products and Founded.
Create an Ad
Love PBS?
If so, click for a sneak peek of SMITHSONIAN CHANNEL'S new documentary, Soul of a People, a fascinating look at the history of America
Like
Chicago Tribune Savings
Chicago Tribune
Get The Largest Collection Of Coupons & Sales Flyers in Chicagoland & You Save Up To 70% Off Newsstand Price. Subscribe Today!
Like
DoGood Headquarters
DoGood
See good. Do better.
Keep up to date with good ideas and stories about green initiatives and movements for positive social change!
Become a Fan
More Ads
Applications
Chat (Offline)

Shasta County area on leading edge of climate-change research | A News Cafe dot com - Windows Internet Explorer

http://anewscafe.com/2008/12/15/shasta-county-area-on-leading-edge-of-climate-change-research/

anewscafe.com

Favorites | Shasta County area on leading edge of climate-change ...

Redding Weather Now

(click image for 7 day forecast)

(click image for wildfire map)

Towed Patio Boat Snags Overhead Redding Wires
Doni's Archive

Shasta County area on leading edge of climate-change research

By Guest Speaker December 15, 2008 | 4 Comments | Printer-Friendly | ShareThis

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

By Leslie Bryan

The Western Shasta Resource Conservation District is involved in a research project regarding climate change, a topic of great importance and interest. The project is pretty exciting as we here in Shasta County are on the very "cutting edge" of climate-change mitigation and how California may reach its goals set forth in AB32, the CA Global Warming Solutions Act.

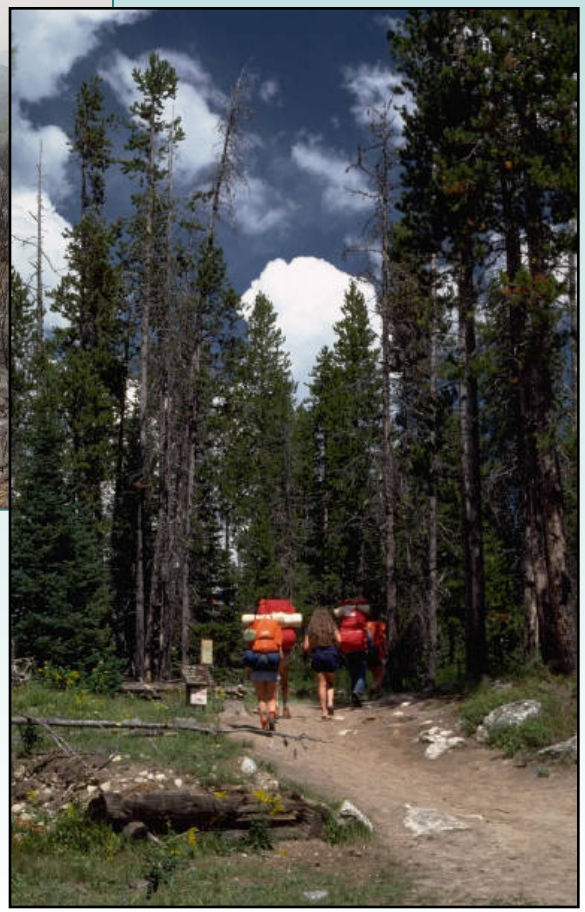
As part of the West Coast Regional Carbon Sequestration Partnership (WESTCARB), the district is in partnership with the non-profit organization Winrock International to implement a research project involving carbon sequestration. Carbon sequestration, simply put, is the capture and storage of the greenhouse gas, carbon dioxide (CO_2). The WESTCARB Team is made up of more than 80 organizations, public agencies, private companies and nonprofits and is working toward the goal of identifying and testing opportunities to keep CO_2 out of the atmosphere, thereby reducing humankind's impact on the climate.

Shasta County has been identified as an area capable of cost-effective carbon sequestration, and the district is actively involved in validating the science behind the idea. Sequestration options being investigated for Shasta County include

Education Community

- Community College
- ROP and Environmental Education Advisory Groups
- Local Museums
- Forest Foundation's Talk About Trees Program
- American Forest Foundation's "Project Learning Tree" Program

Common Issues Important To Landowners/Community



- Privacy
- Government Involvement
- Restrictions
- **Ecosystem Integrity**

Increasing Interest

- Biomass/Fire Safety (Maintenance)
- Reducing Footprint
- Carbon Markets
- Climate Stewardship Partnership
- Education

Message and Motto:
"Listen" and "*All Together Now*"
~ *Beatles*

- Tailor Message to Audience
- Develop Relationships
- Be open to mutual conversation
- Invest time for project success and ongoing far into the future for sustainability

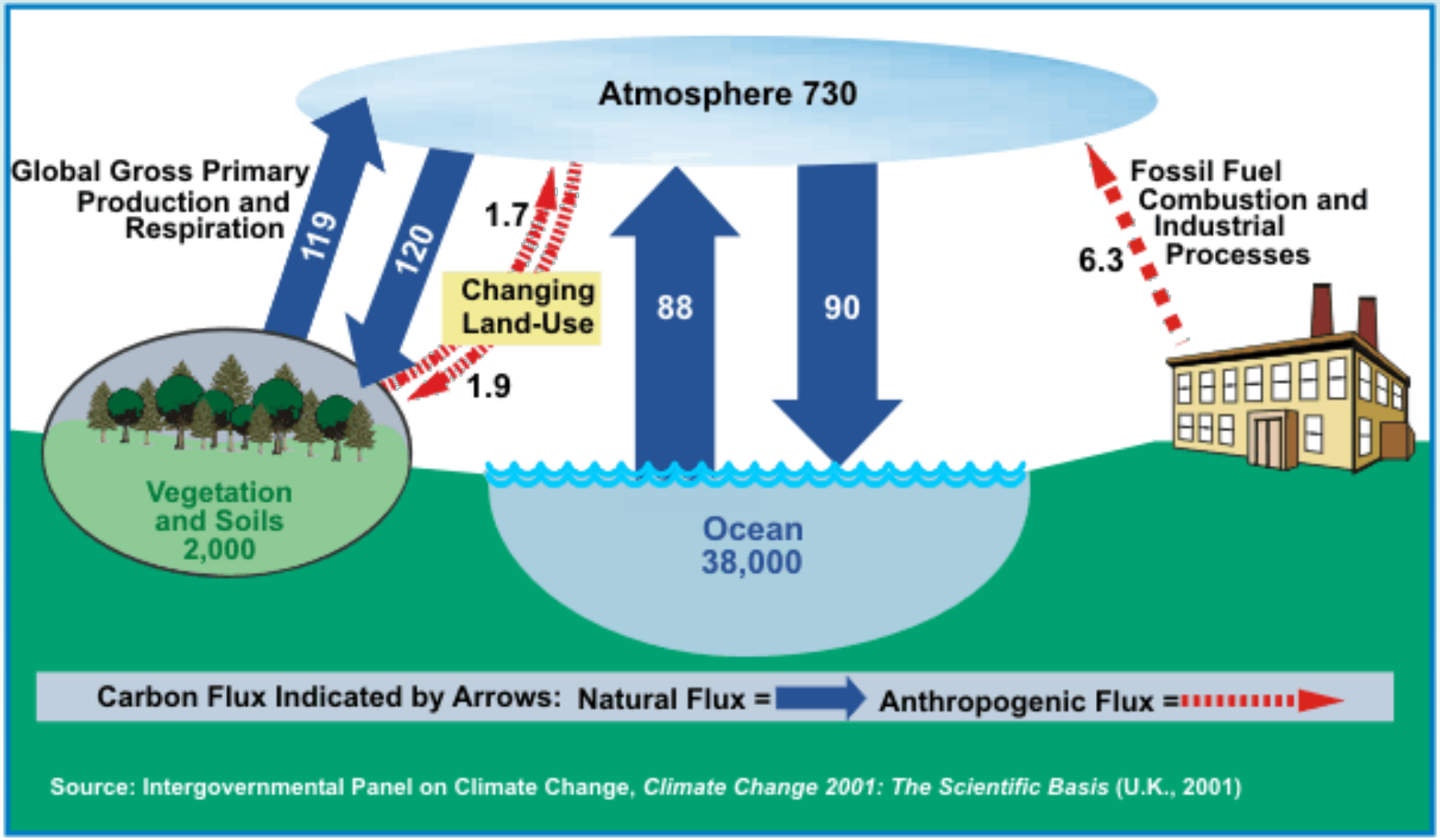
Thank You

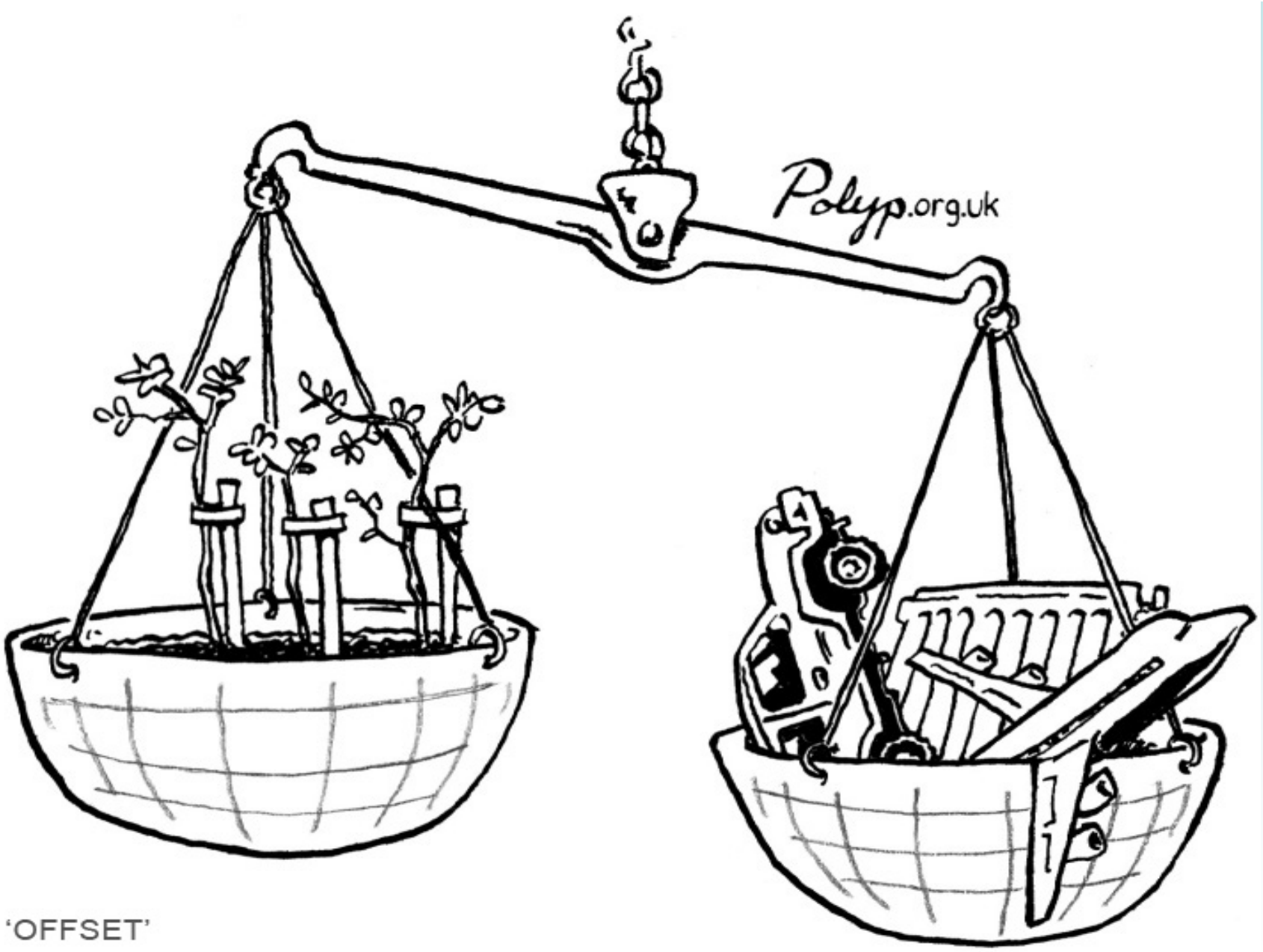
Forest Carbon

Basics of Terrestrial Offset Projects

Winrock International

Global Carbon Cycle



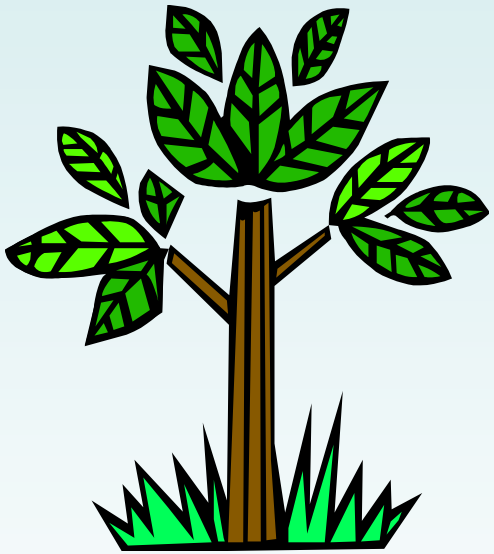


'OFFSET'

Carbon

- Carbon is a part of all living and dead biomass
- Biomass pools are comprised of consistent proportions of carbon (~50%)
- Carbon can be accurately estimated by establishing the mass of organic material

Carbon = ½ Biomass (Dry Weight)

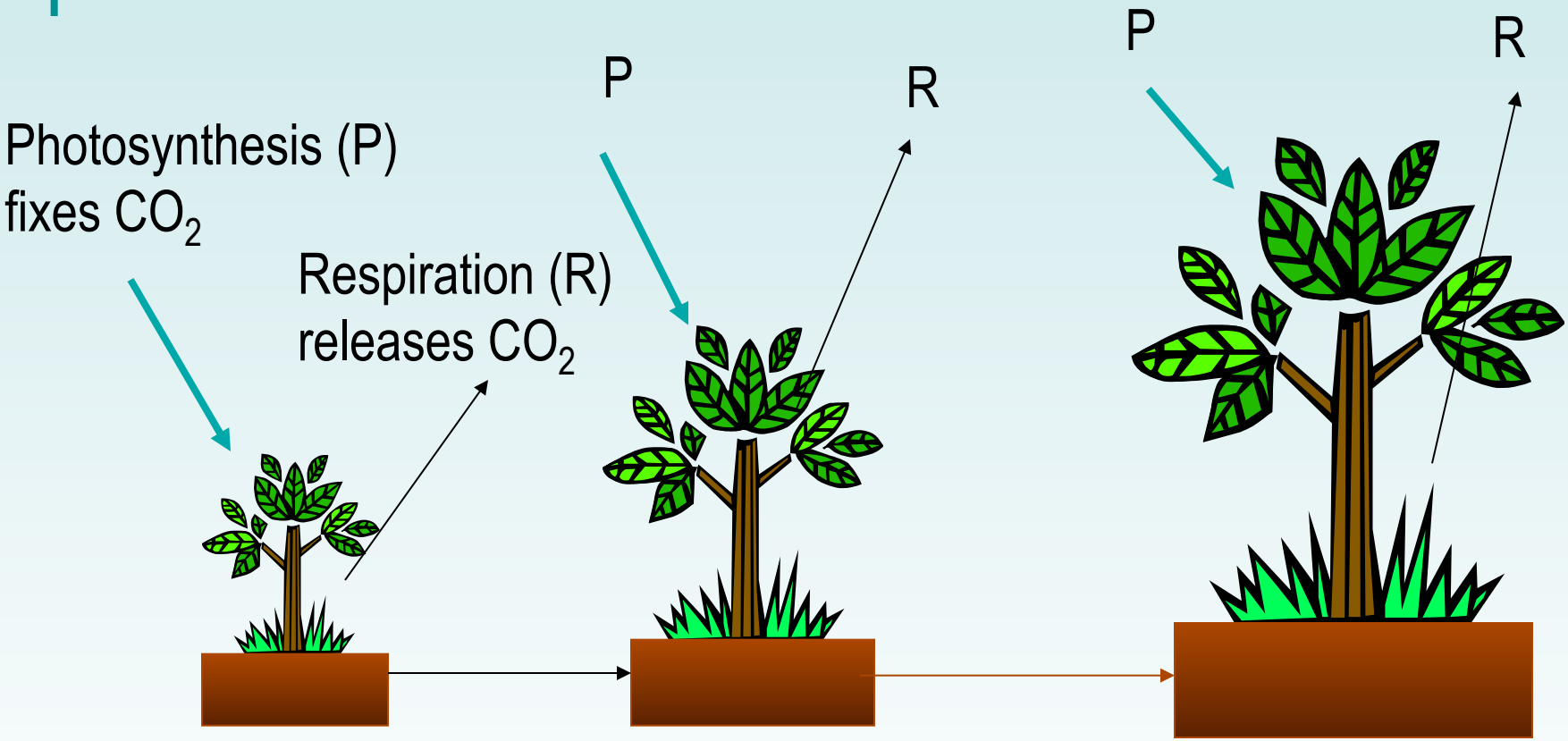


For example:
4 tons Biomass →
2 tons Carbon

Carbon Dioxide (CO_2)

- Carbon dioxide is a greenhouse gas comprised of carbon and oxygen
- Trees use CO_2 during photosynthesis, releasing oxygen and storing carbon.
- The amount of carbon in a tree can be converted to CO_2 by multiplying by 44/12 or 3.67.

How do Ecosystems Sequester Carbon?



Photosynthesis exceeds respiration, resulting in storage of carbon

What is a Terrestrial Carbon Sequestration Project?

- Activity focused on ecosystems resulting in less greenhouse gases (primarily CO_2) in the atmosphere
  - Avoid new emissions
  - Remove CO_2 from the atmosphere
- Project-based carbon benefits are the difference between the selected "carbon pools" in the with-project and without-project cases

Forestry Practices that Sequester or Preserve Carbon

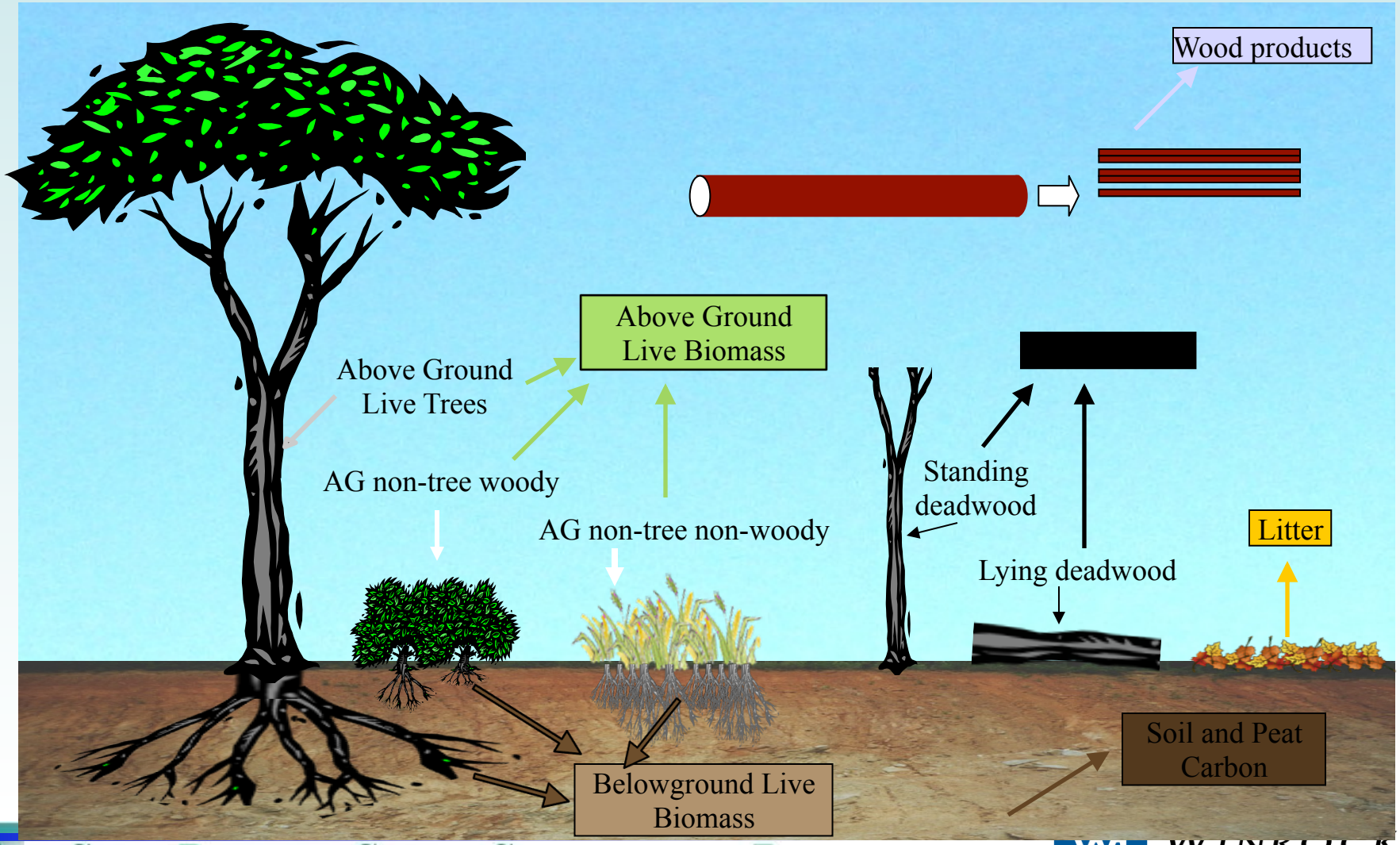
- Afforestation: tree planting on lands previously not in forest
- Reforestation: tree planting on previous forest lands
- Forest preservation or avoided deforestation: protection of threatened forest lands
- Forest management: modification of management practices

Where is Carbon Sequestered?

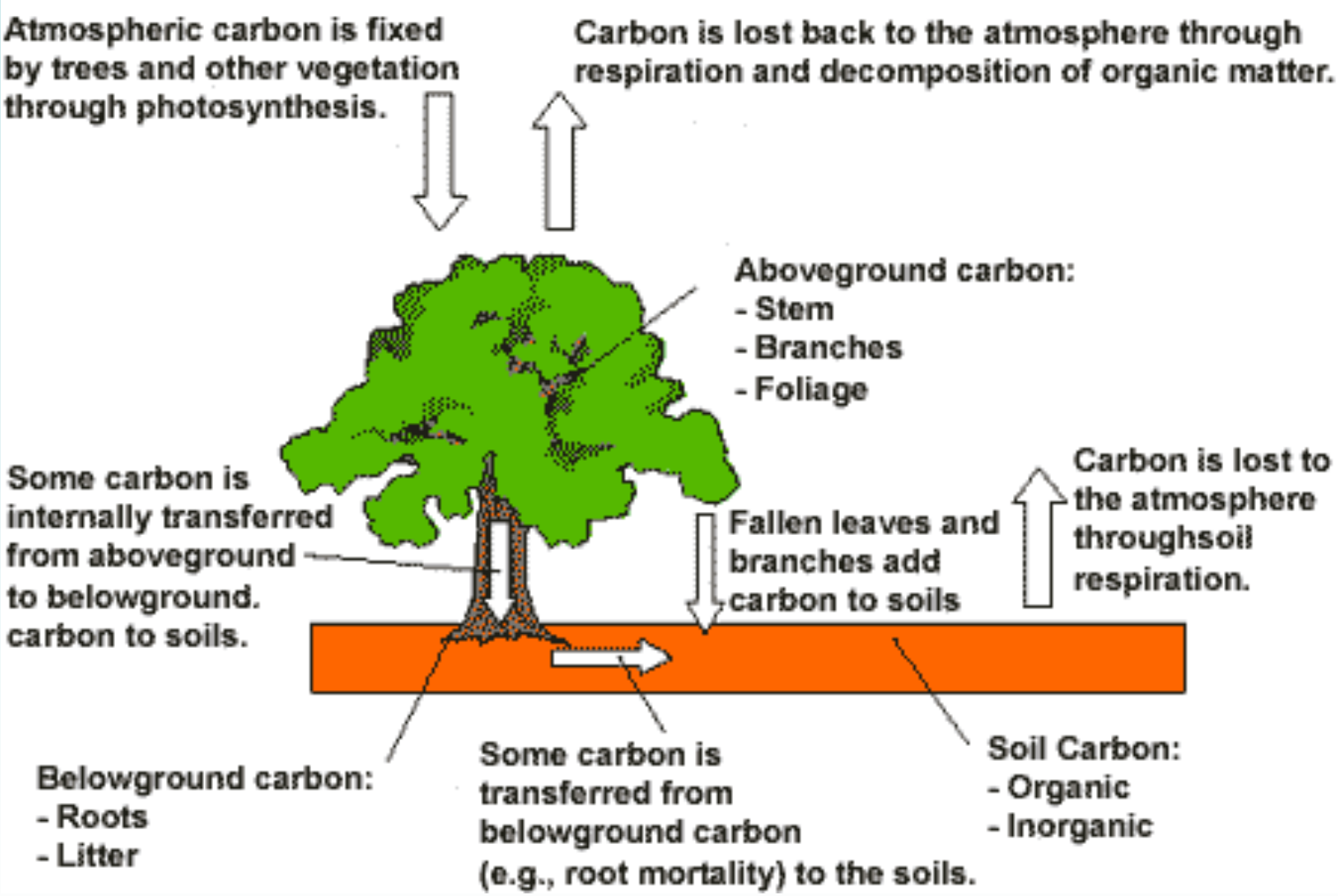
- Live biomass
  - Trees
  - Understory
  - Roots
- Dead biomass
  - Standing
  - Down
    - Coarse
    - Fine
- Wood products
- Soil

"Carbon Pools"

Carbon Pools



Carbon Storage in Trees



Source: US EPA http://www.epa.gov/sequestration/local_scale.html

Carbon Pools

- Selection of pools depends on:
  - Expected rate of change
  - Expected magnitude and direction of change
  - Availability of methods, accuracy and cost of methods to measure and monitor
- For A/R, REDD:
  - Always measure AG+BG biomass
  - Other pools: dependent on project

Current Land Use Dictates Sequestration Potential

- Sequestration is most attractive where low-value land is readily availably and has a high capacity for additional carbon storage (i.e. non-forest land)
- Co-benefits can be wide-ranging and add commercial value to sequestration projects as well as elevate project visibility and improve public perception
- Risks: Environmental factors can lead to lower-than-expected yields for sequestration projects

Offset Project Elements

- Additionality
- Baselines
- Leakage
- Reversibility (Permanence)
  - Duration
  - Risk of Loss
- Measurement and Monitoring

Additionality

A project activity is additional if the activity only takes place **because of the anticipation of a potential sale** of carbon credits

- e.g. An activity such as forest restoration would not have taken place without outside funds paying for the planting, etc. in anticipation of receiving carbon offsets
- e.g. If an enforced law prevents deforestation, credits should not be available for avoiding deforestation

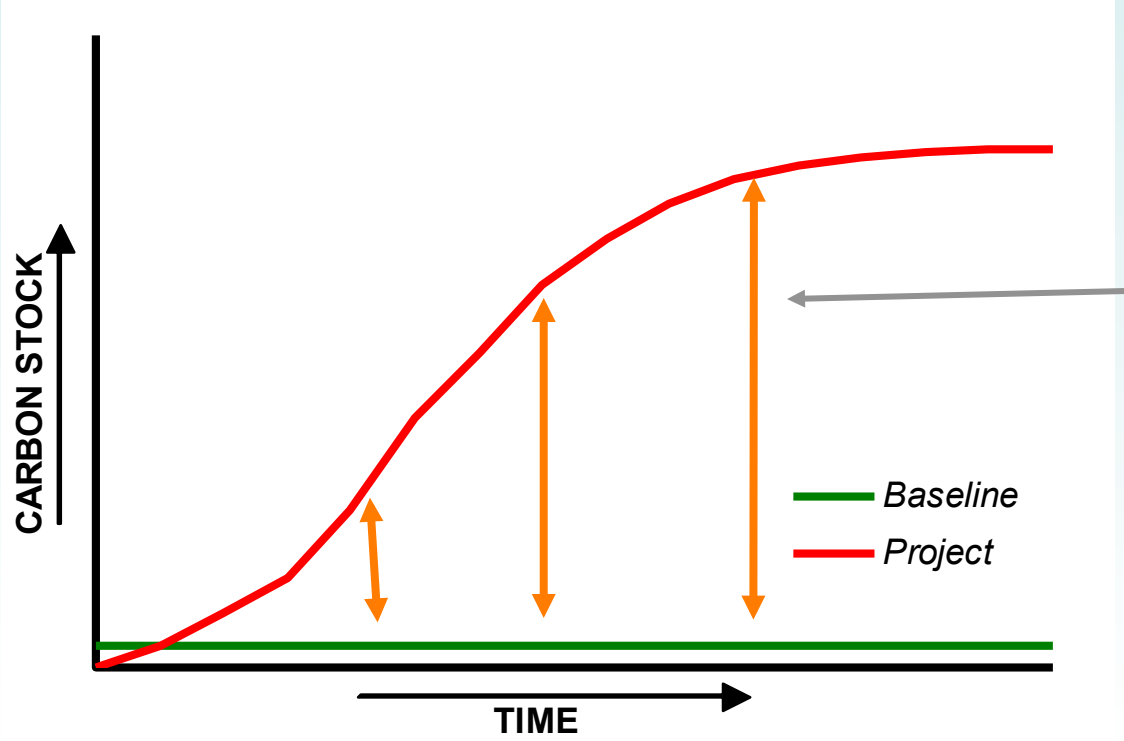
Baselines

- Setting a baseline requires projecting future activities in the absence of a project = What would have happened in the absence of the project activity
- Baseline has two components—land use/cover and corresponding carbon
- Must be prepared in a *transparent* and *conservative* manner

Baselines: Reforestation

- Credits from a project is:

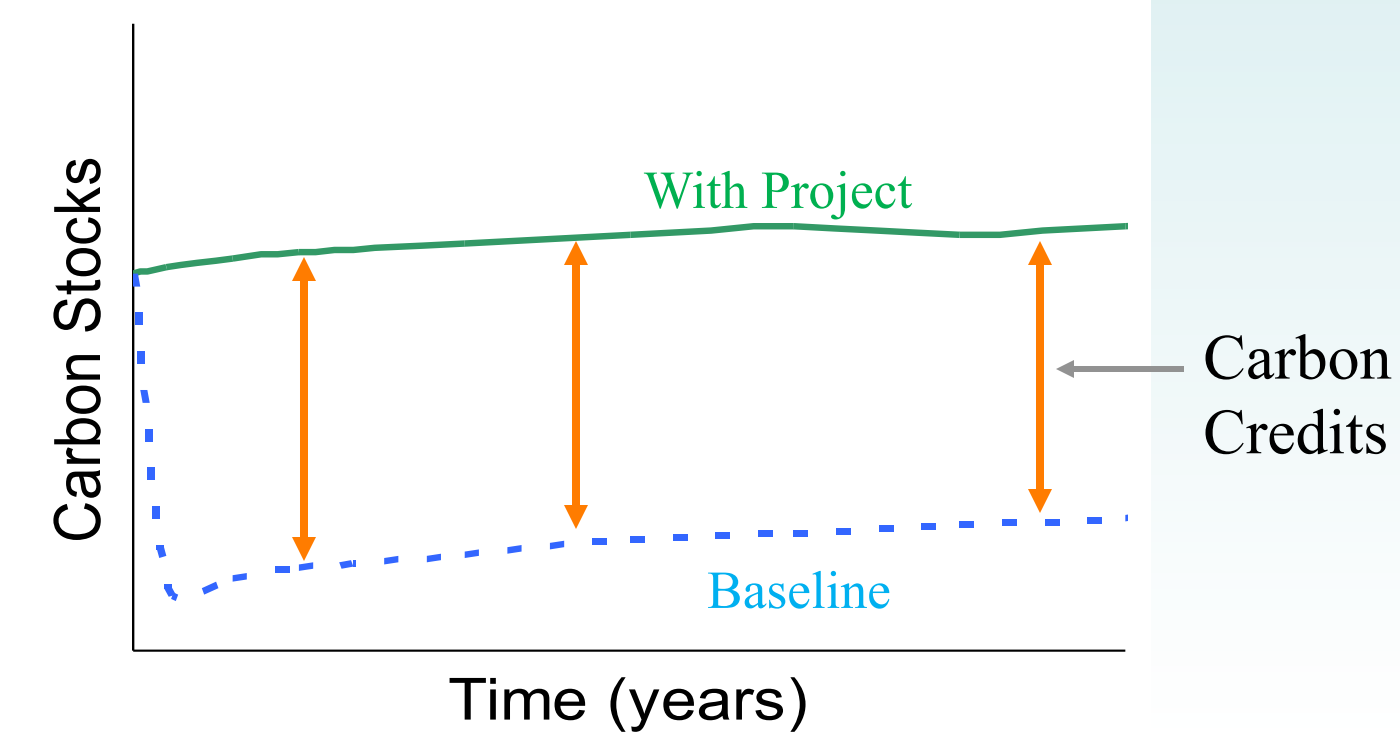
  Difference between C stocks with project and baseline C stocks



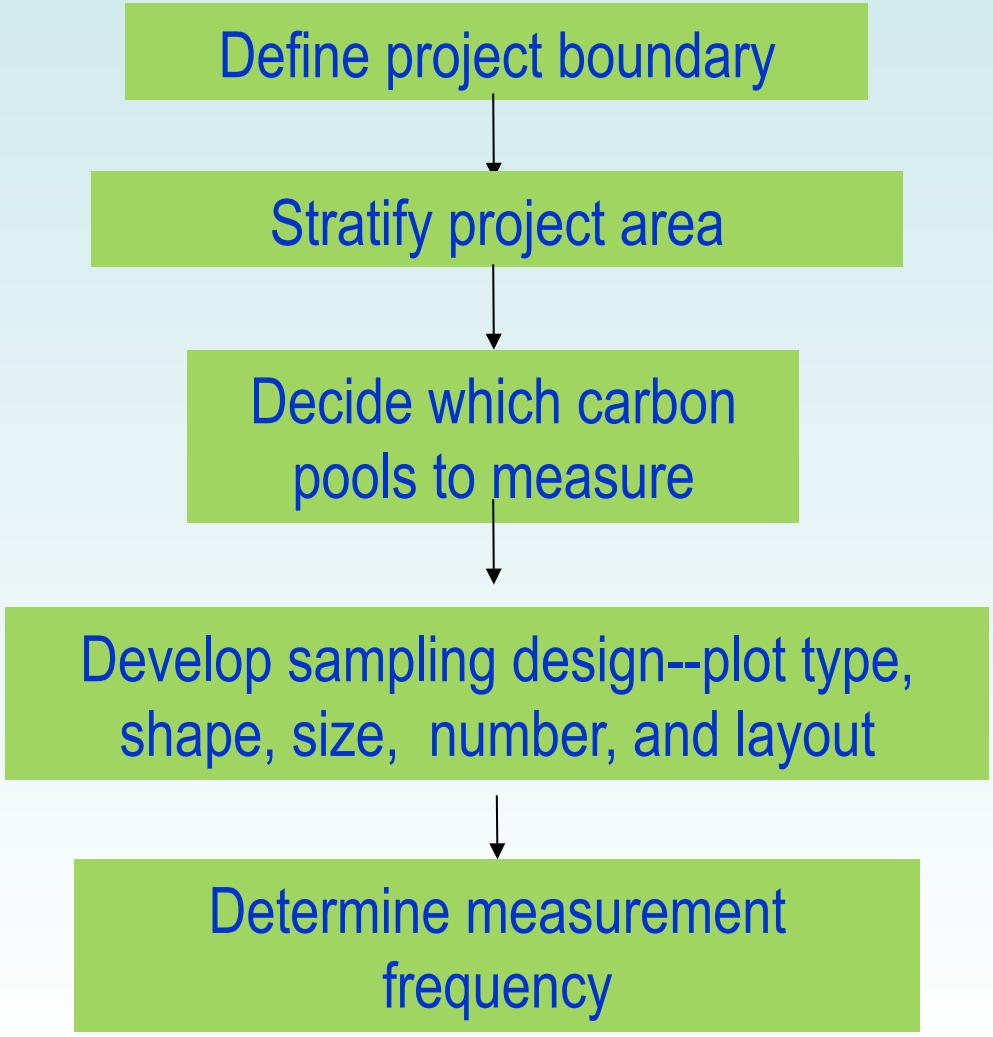
Baselines: Forest Management

- Credits from a project is:

  Difference between C stocks with project and baseline C stocks



Developing a measurement plan



Principles of monitoring carbon

- Methods for measuring carbon credits are based on measuring changes in carbon stocks
- Not practical to measure everything - so we sample
- Sample subset of land by taking relevant measurements of selected pool components in plots
- Number of plots measured predetermined to ensure both ***accuracy*** and ***precision***

Ecosystem benefits

- Forest conservation
- Wildlife habitat
- Water quality
- Timber management

Standards and Registries

Include:

- American Carbon Registry (ACR)
- Climate Action Reserve (CAR)
- Voluntary Carbon Standard (VCS)
- Regional Greenhouse Gas Initiative (RGGI)
- Chicago Climate Exchange (CCX)
- Section 1605(b)
- USEPA Climate Leaders
- Georgia Carbon Sequestration Registry
- WRI GHG Protocol

Reforestation Pilot Projects in Shasta County

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

W. M. BEATY & ASSOCIATES, INC.

Introduction to WESTCARB Afforestation

Project aims were to:

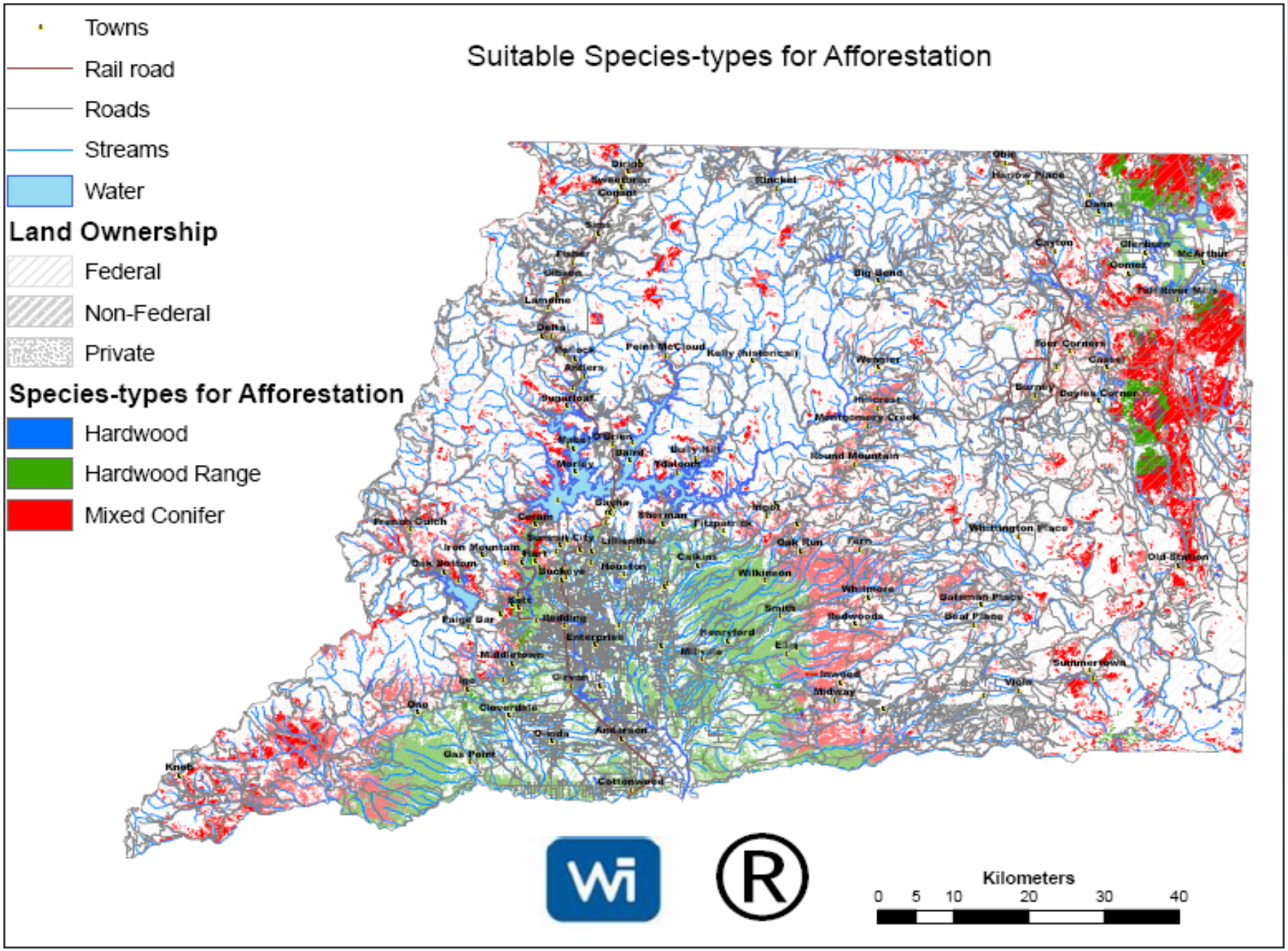
- Determine feasibility of producing carbon offsets from afforestation of private lands in Shasta County
- To enable maximization of land potential, additional income streams while not foregoing existing streams
  - Plus gives landowners the chance to impact climate change
- Encourage afforestation of rangelands
- Examine costs associated with afforestation
- Examine costs of monitoring plantings for carbon credit

1. Mixed Conifer Forest

- On lands currently dominated by shrubs such as manzanita
- Shrubs preventing return of forest
- Project will involve substantial site preparation: killing and removing shrubs
- High carbon yield expected

2. Native oak species

- The aim of this form of project was to return to an historic land cover without reducing forage yield
- No opportunity cost as grazing can continue both during establishment and beyond

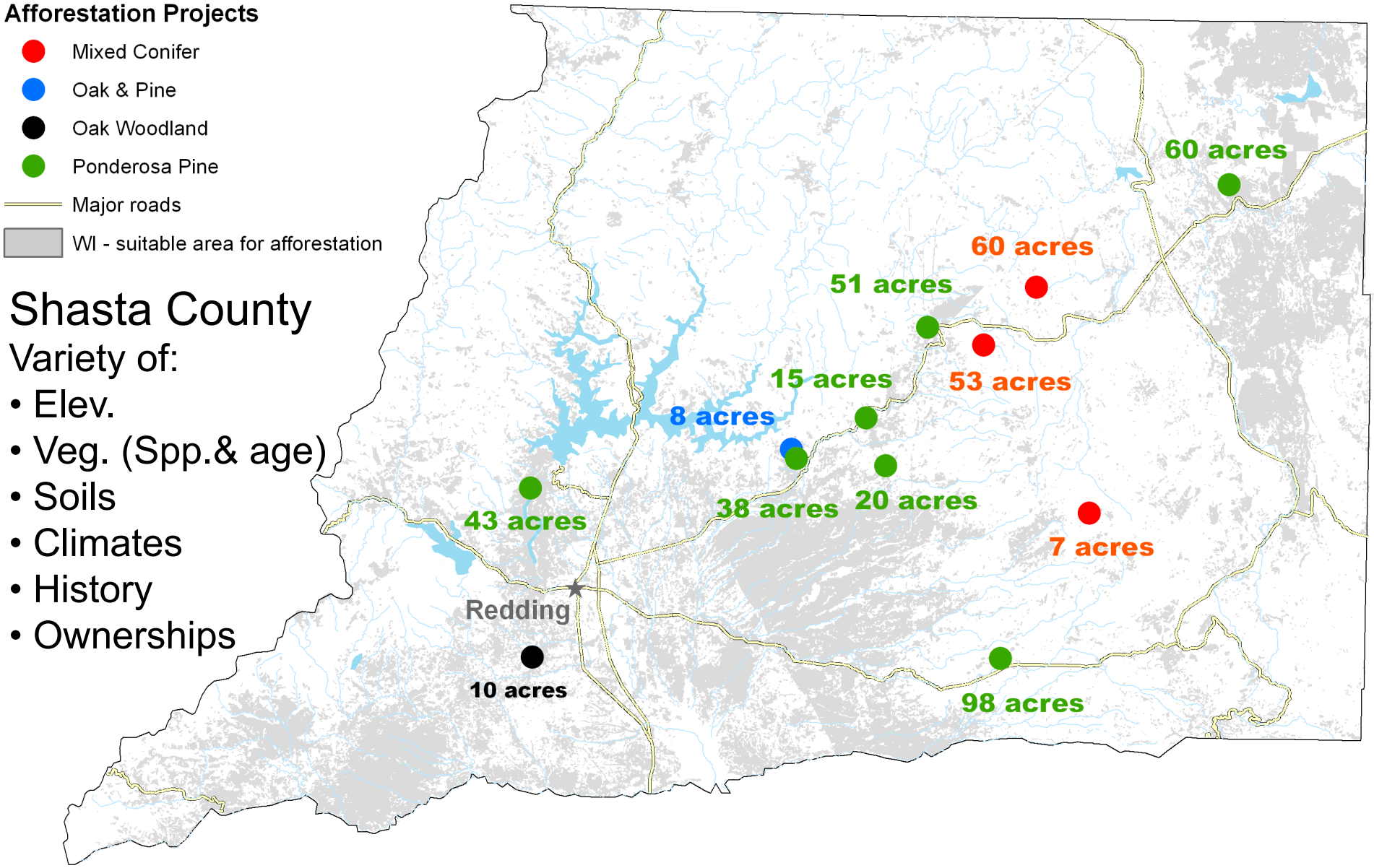

Towns
Rail road
Roads
Streams
Water
Land Ownership
Federal
Non-Federal
Private
Species-types for Afforestation
Hardwood
Hardwood Range
Mixed Conifer
Suitable Species-types for Afforestation
Kilometers
0 5 10 20 30 40

Office Evaluation of 50 Potential Projects

Criteria for Feasibility & Selection:

- CCAR Forestry Protocol eligibility (pre-2009):
  - < 10% Tree Canopy (used NAIP or GE photos)
  - > 10 yr. out of forest cover
- Seed Zone & Elevation
- NRCS Soil Surveys: Depth & AWC etc.
- Slope
- Access Roads (for equipment & crews)
- Easements & Property Corners/Lines
- Landowner's objectives
- Regulatory constraints: T& E, 1600 permits etc.
- Other Misc.

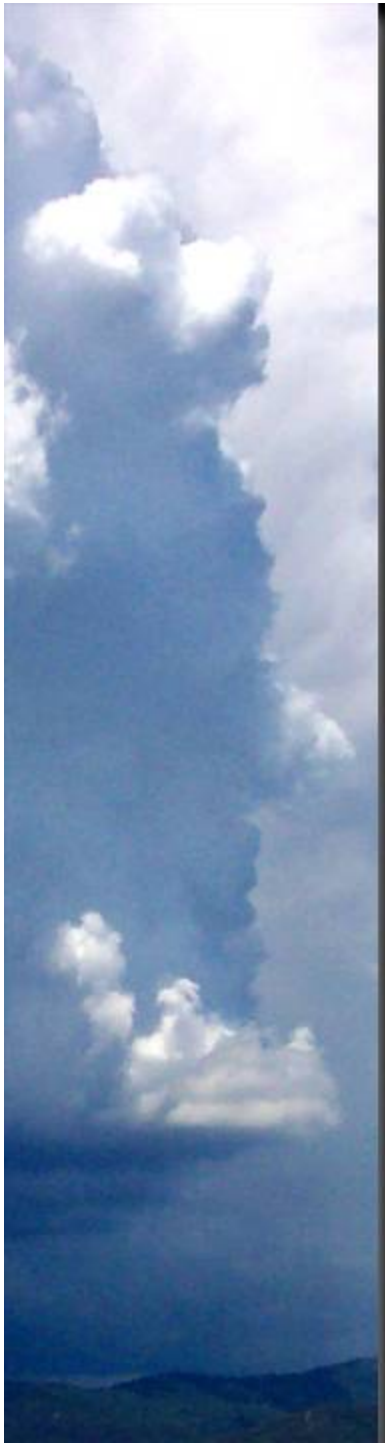
……*20 out of 50 selected for Site Visits*



12 projects / Landowner Agreements totaling 470 acres.

Shasta Afforestation Projects

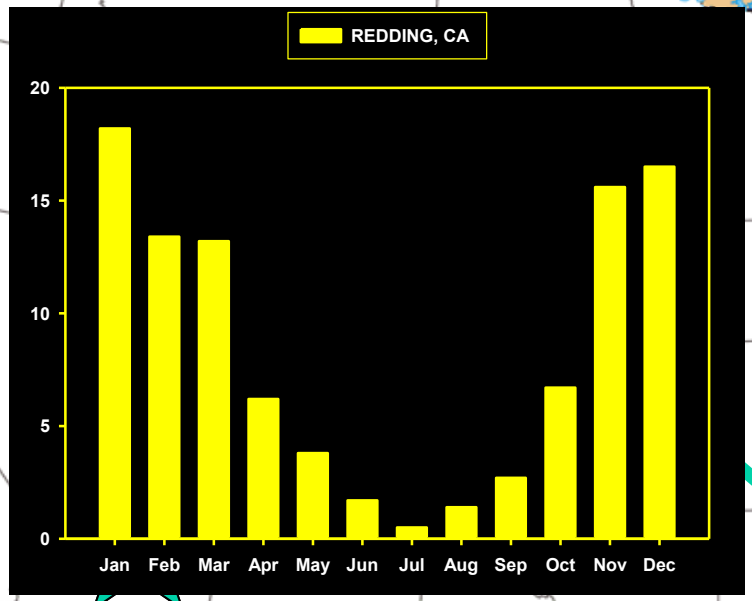
98 ac	Ponderosa pine afforestation, *brush removal for bioenergy*
7 ac	Mixed conifer afforestation – ponderosa pine and red fir
20 ac	Ponderosa pine afforestation, easement on property
60 ac	Mixed conifer afforestation – ponderosa pine, Douglas fir, incense cedar; past fire site
50 ac	Mixed conifer afforestation – ponderosa pine, Douglas fir; past fire site (1992)
43 ac	Ponderosa pine afforestation, affected by copper smelting in 1910
51 ac	Mixed conifer afforestation, - ponderosa pine and Douglas fir, past fire site (1992)
46 ac	Ponderosa pine afforestation
20 ac	Oak/pine afforestation
14 ac	Ponderosa pine afforestation
60 ac	Ponderosa pine afforestation, recent fire (2007)
7 ac	Oak woodlands

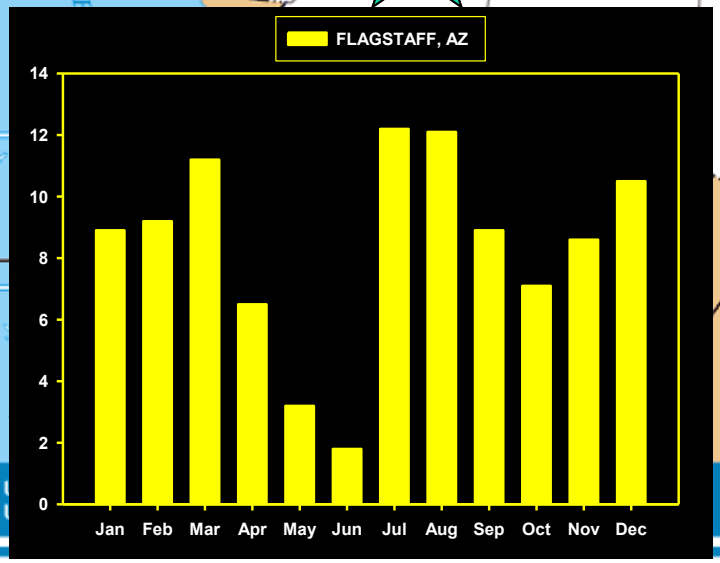


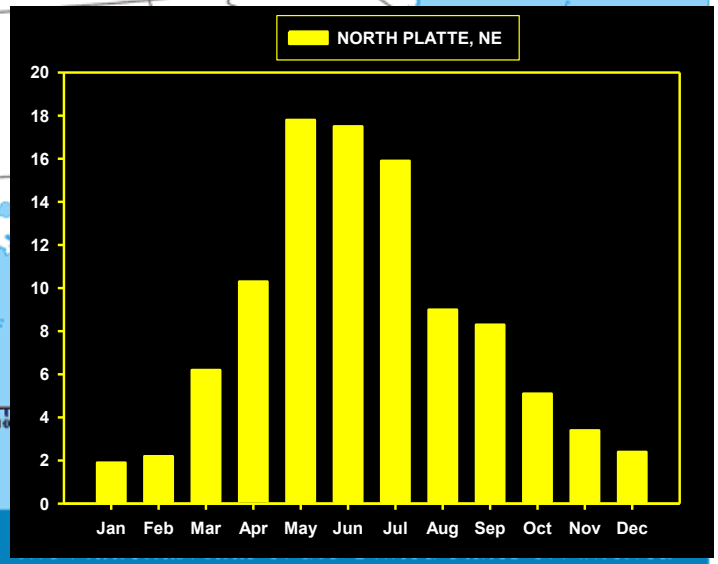
Mediterranean Climate

- Cool/wet Winters
  - Competing vegetation/fuel
- Warm/dry Summer
  - Annual fire season
  - Soil moisture is limiting factor for conifer seedling survival
- Lightning

Annual Precipitation Patterns

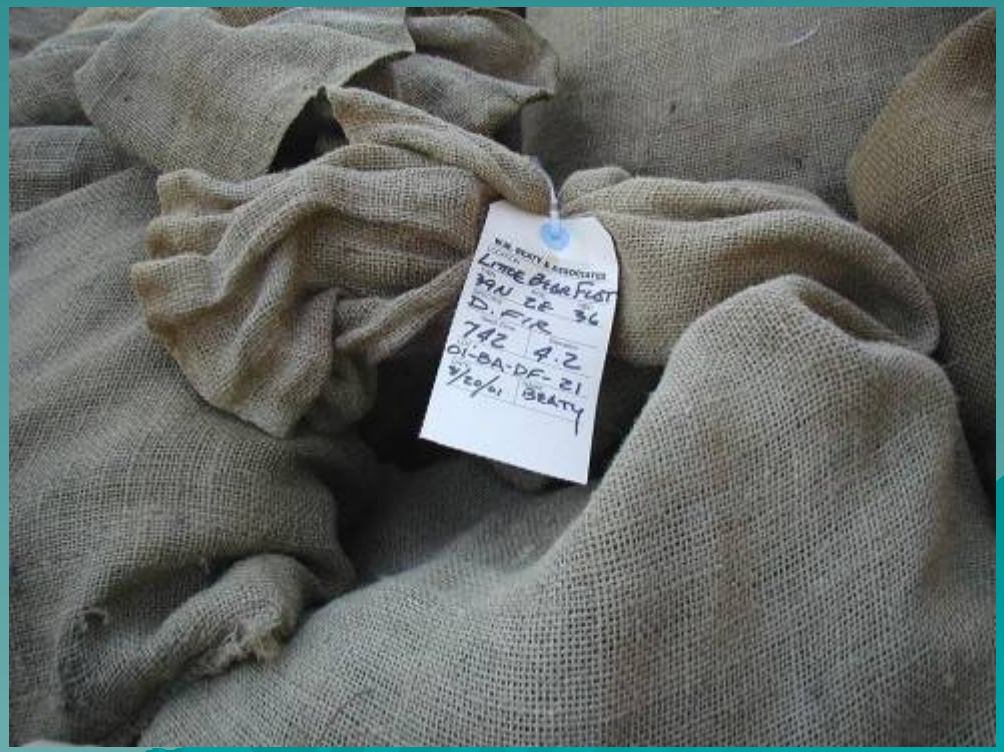






Conifer Seed from:
CAL FIRE, W.M. Beaty & SPI

Various:
- Species
- Elevations
- Seed Zones



CAL FOREST NURSERY
Sowing seeds into styro-block containers

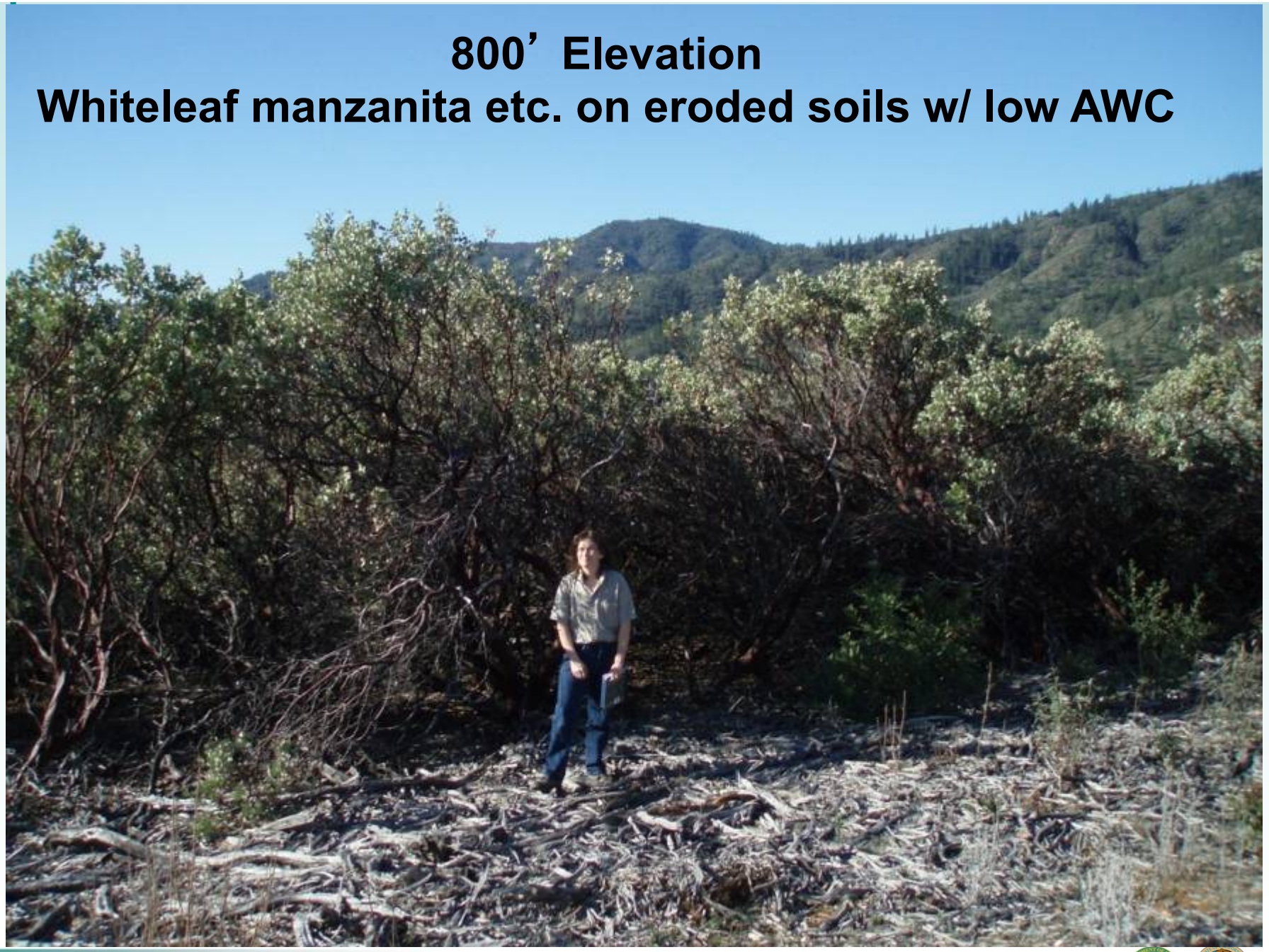

Seeds germinate into seedlings & grow
for one season at the nursery

Seedlings “lifted” from styro-blocks after growing season

Seedlings packed into boxes by seed lot, elevation, species, project name etc.

Seedlings must be kept in cold storage from lifting/packing until they are planted in the field

800’ Elevation
Whiteleaf manzanita etc. on eroded soils w/ low AWC

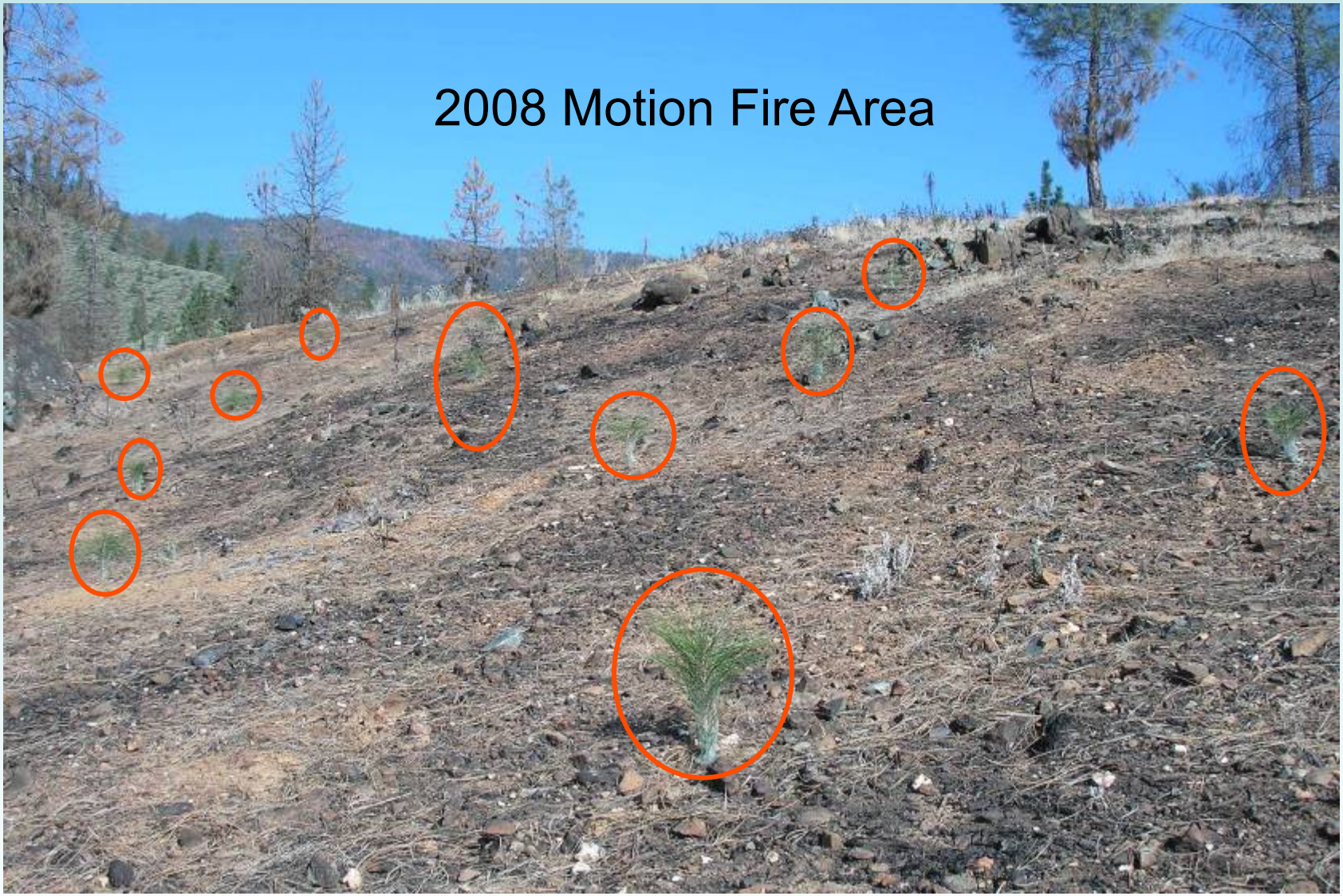


2008 Spray to prep site for planting in 2009

1/3 of project area burned 8 months prior to planting

How would soil & seedlings respond to loss of "mulch" on shallow soils at very low elevation w/ very high summer temps?

Planted: Feb 2009; picture: Sept 11, 2009
No rain from mid June through mid Sept 2009

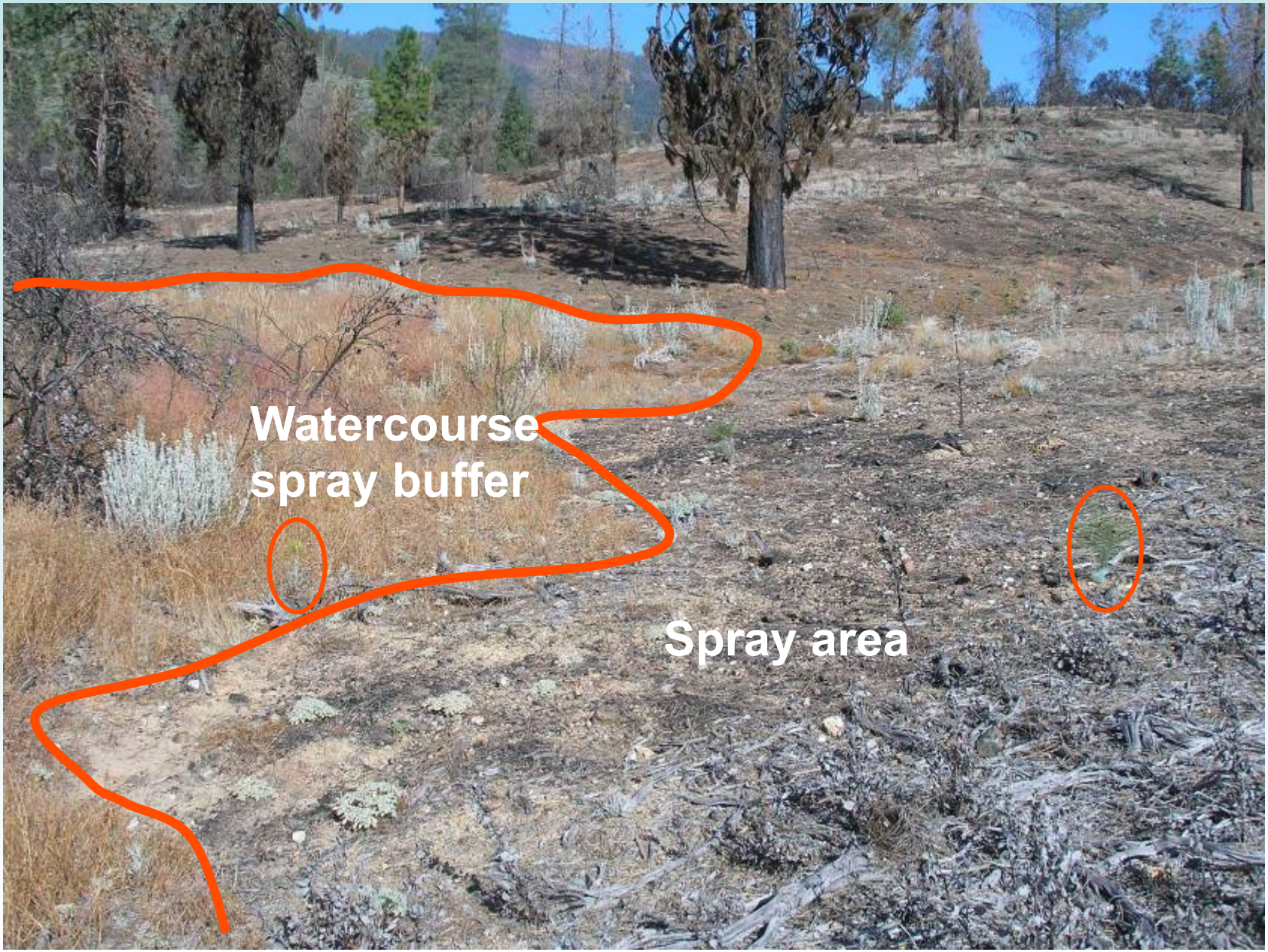


> 95% Survival w/ weed control

Masticated unburned area > 95% Survival

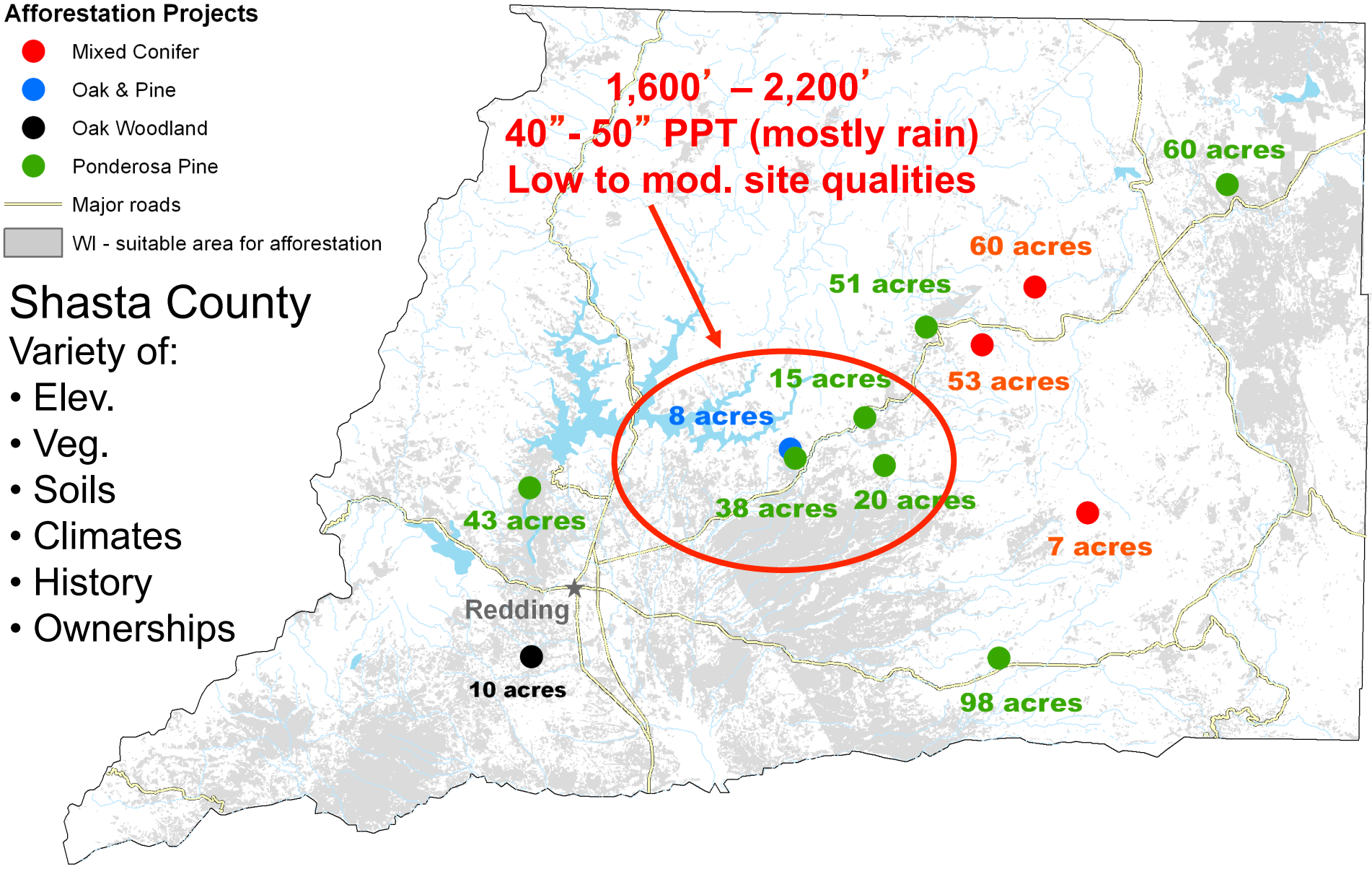
PP seedling under “sparse” canopy are less vigorous than….

…..open grown ponderosa pine seedlings


Watercourse
spray buffer
Spray area


Watercourse spray buffer area


Almost all seedlings died within watercourse buffer - no spray areas


Afforestation Projects
Mixed Conifer
Oak & Pine
Oak Woodland
Ponderosa Pine
Major roads
WI - suitable area for afforestation
Shasta County
Variety of:
• Elev.
• Veg.
• Soils
• Climates
• History
• Ownerships
1,600' – 2,200'
40"- 50" PPT (mostly rain)
Low to mod. site qualities
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


Manzanita etc. @ 2,300’
Cohasset Soils: > 40” deep &
mod/high AWC (10”-14”)

2008 Planting - Climatic Conditions During 1st Year of Seedling Establishment

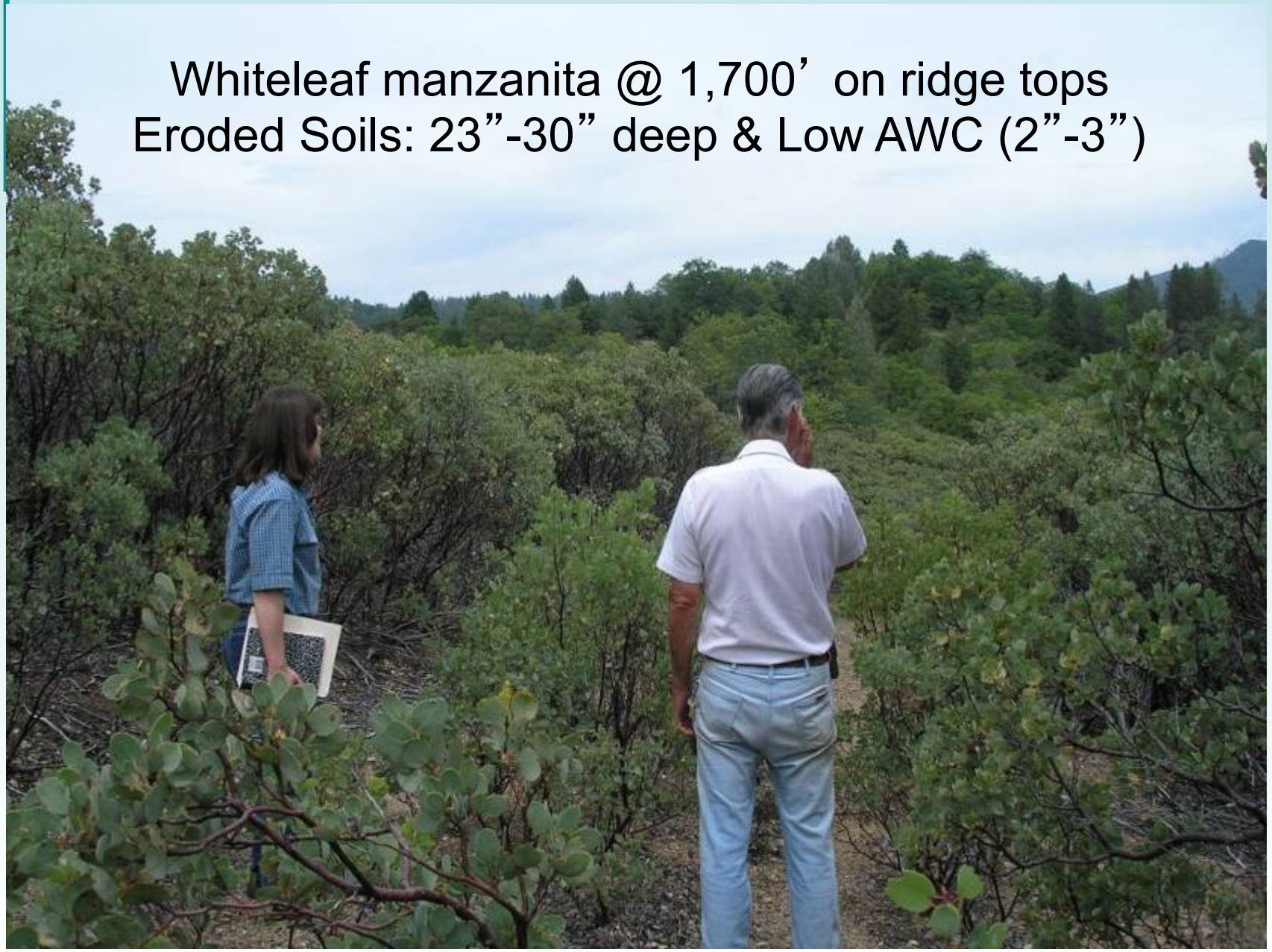
			Precip. Sept-June		Precip. March-June		
Project	Elev.	Date Planted	Normal	2007/08	Normal	2008	% of Normal
HP	2,300'	March 7	52.75"	34.08"	16.17	2.29	14.2%

PPT Data from: PRISM Group, Oregon State University, http://www.prismclimate.org, created 23 Sep 2008

Seedlings @ end of summer 2008
> 90% survival

2 ½ years after planting

Whiteleaf manzanita @ 1,700’ on ridge tops
Eroded Soils: 23”-30” deep & Low AWC (2”-3”)

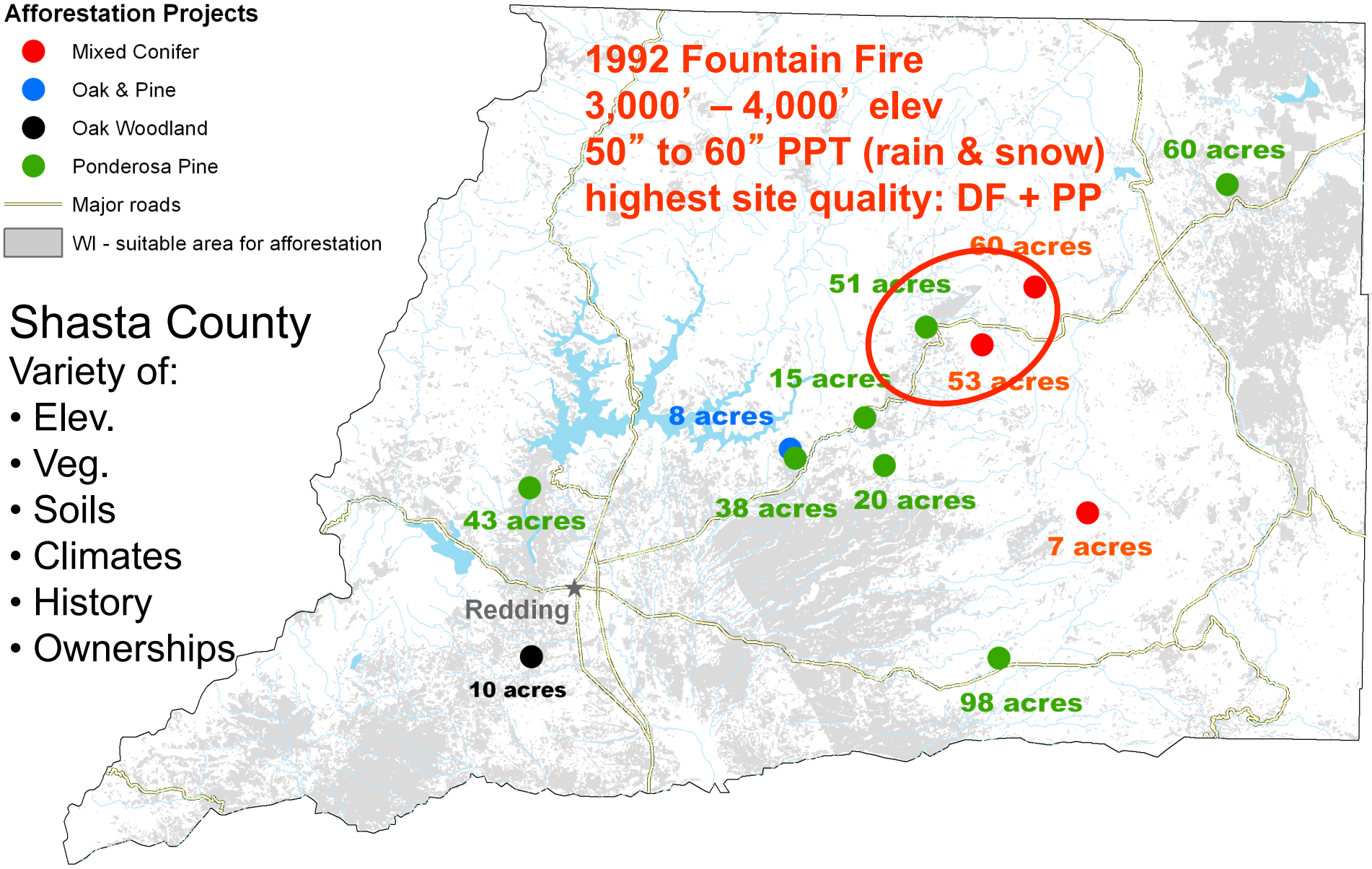


Site Prep 2008 & Plant Feb. 2009

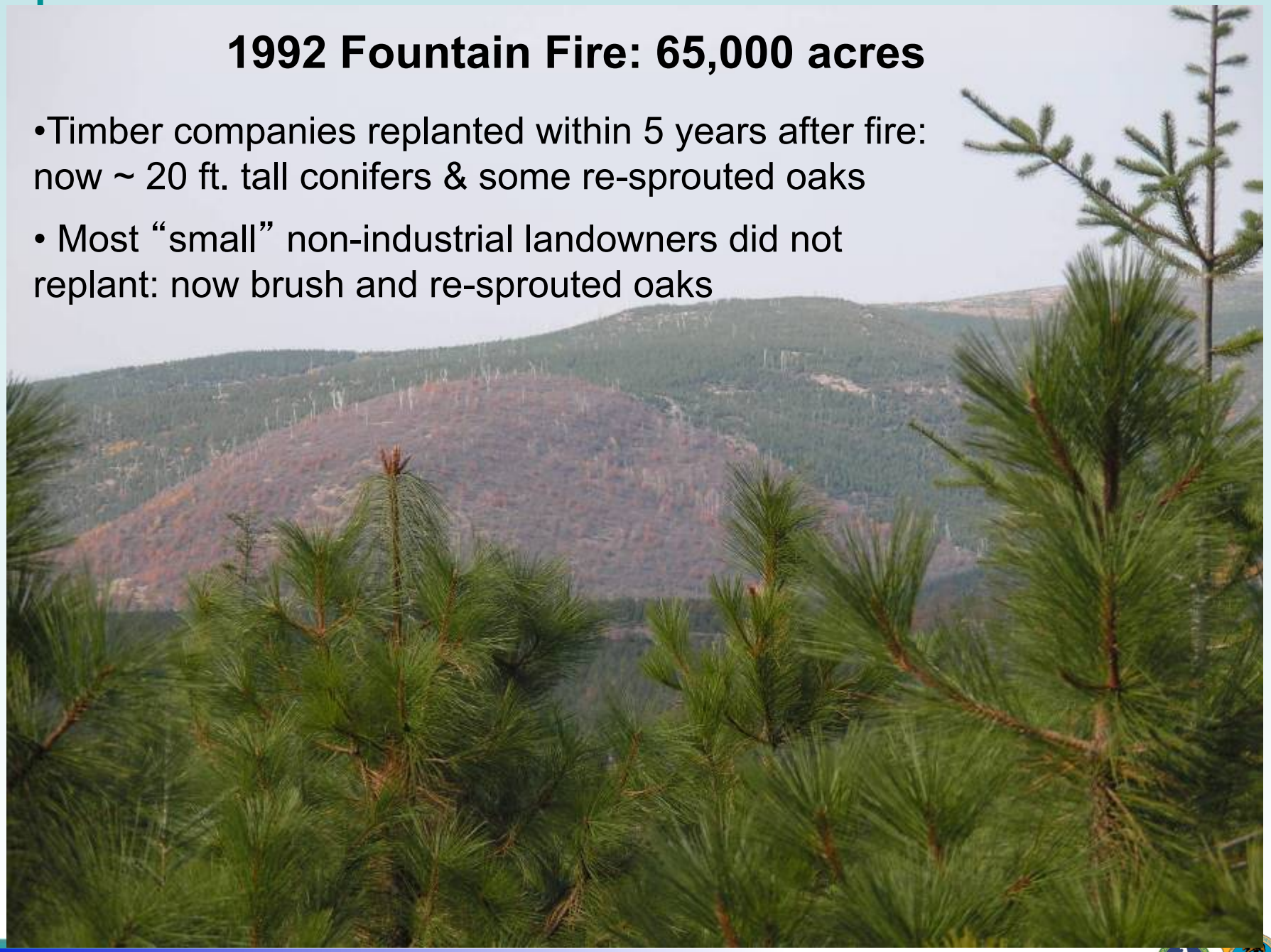
Ponderosa Pine seedling one month after planting &
Just prior to weed control treatment

Ponderosa Pine seedling 6 months after planting

Ponderosa Pine seedlings 18 months after planting

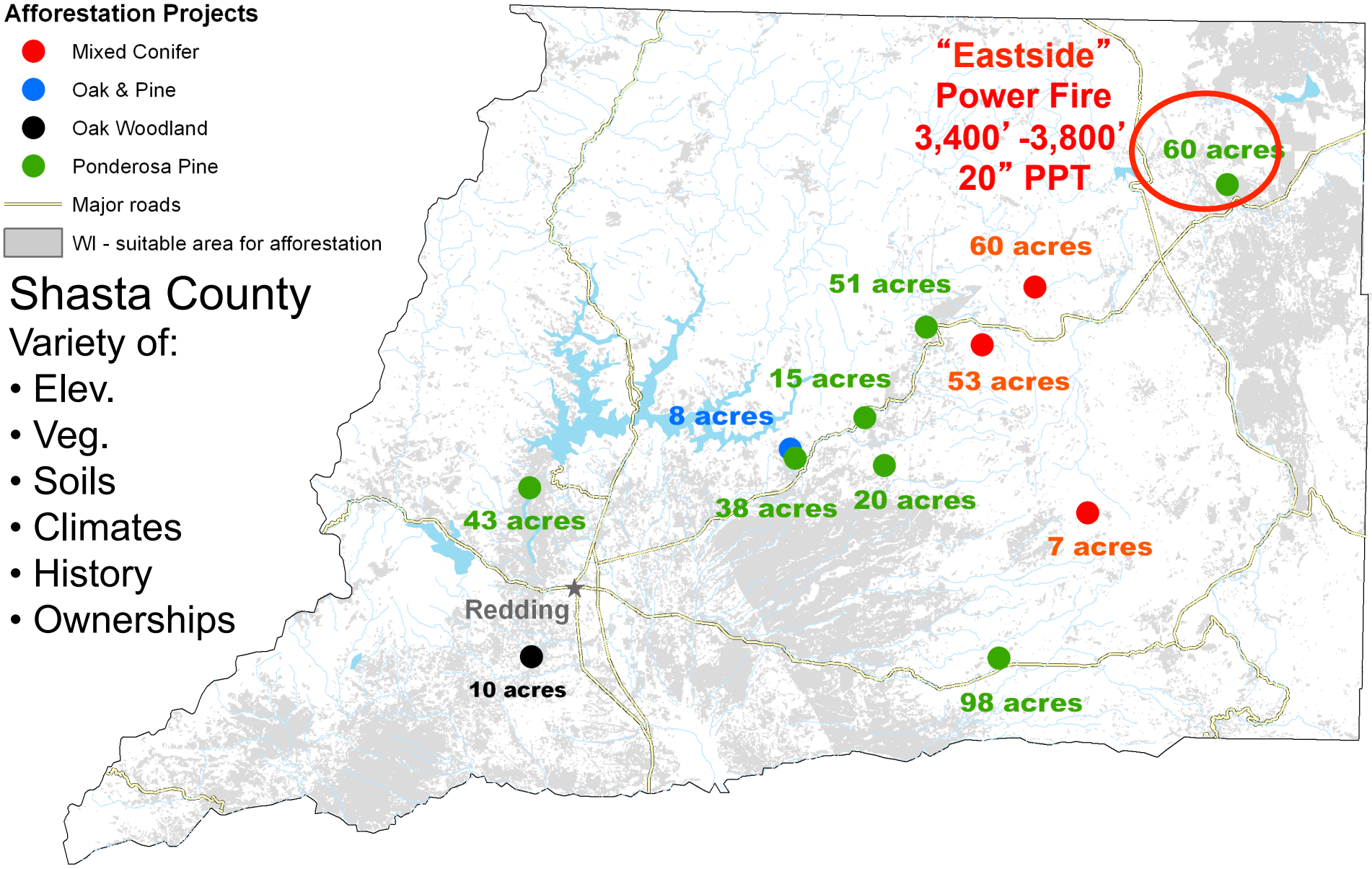

Afforestation Projects
Mixed Conifer
Oak & Pine
Oak Woodland
Ponderosa Pine
Major roads
WI - suitable area for afforestation
Shasta County
Variety of:
• Elev.
• Veg.
• Soils
• Climates
• History
• Ownerships
1992 Fountain Fire
3,000' – 4,000' elev
50" to 60" PPT (rain & snow)
highest site quality: DF + PP
60 acres
60 acres
51 acres
53 acres
15 acres
8 acres
38 acres
20 acres
43 acres
7 acres
Redding
10 acres
98 acres

1992 Fountain Fire: 65,000 acres



- Timber companies replanted within 5 years after fire: now ~ 20 ft. tall conifers & some re-sprouted oaks
- Most "small" non-industrial landowners did not replant: now brush and re-sprouted oaks

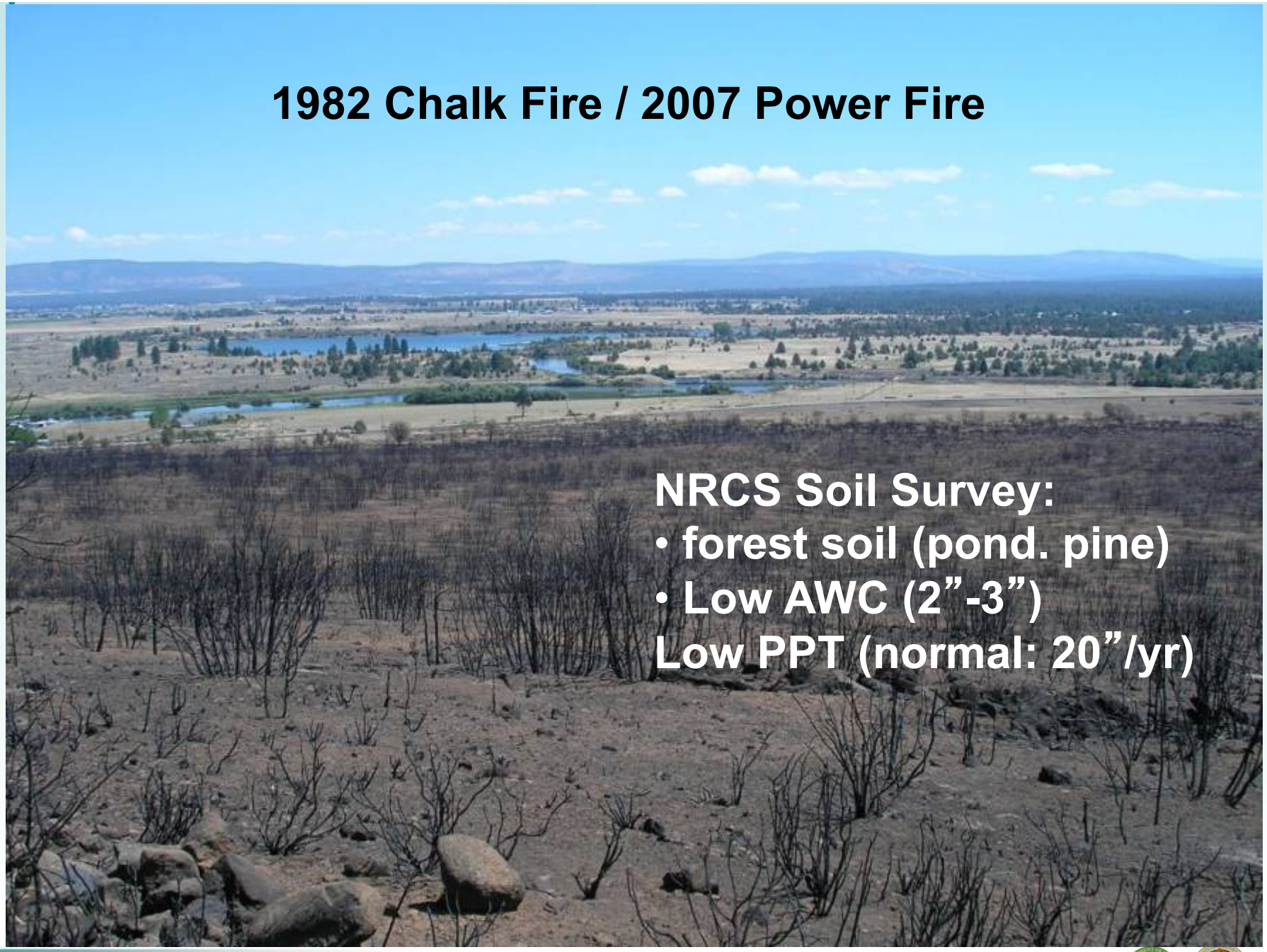
1992 Fountain Fire @ 4,000’ elev.
site prepped in 2008 & planted in 2009


Afforestation Projects
Mixed Conifer
Oak & Pine
Oak Woodland
Ponderosa Pine
Major roads
WI - suitable area for afforestation
Shasta County
Variety of:
• Elev.
• Veg.
• Soils
• Climates
• History
• Ownerships
"Eastside"
Power Fire
3,400' -3,800'
20" PPT
60 acres
60 acres
51 acres
53 acres
15 acres
8 acres
38 acres
20 acres
43 acres
7 acres
Redding
10 acres
98 acres

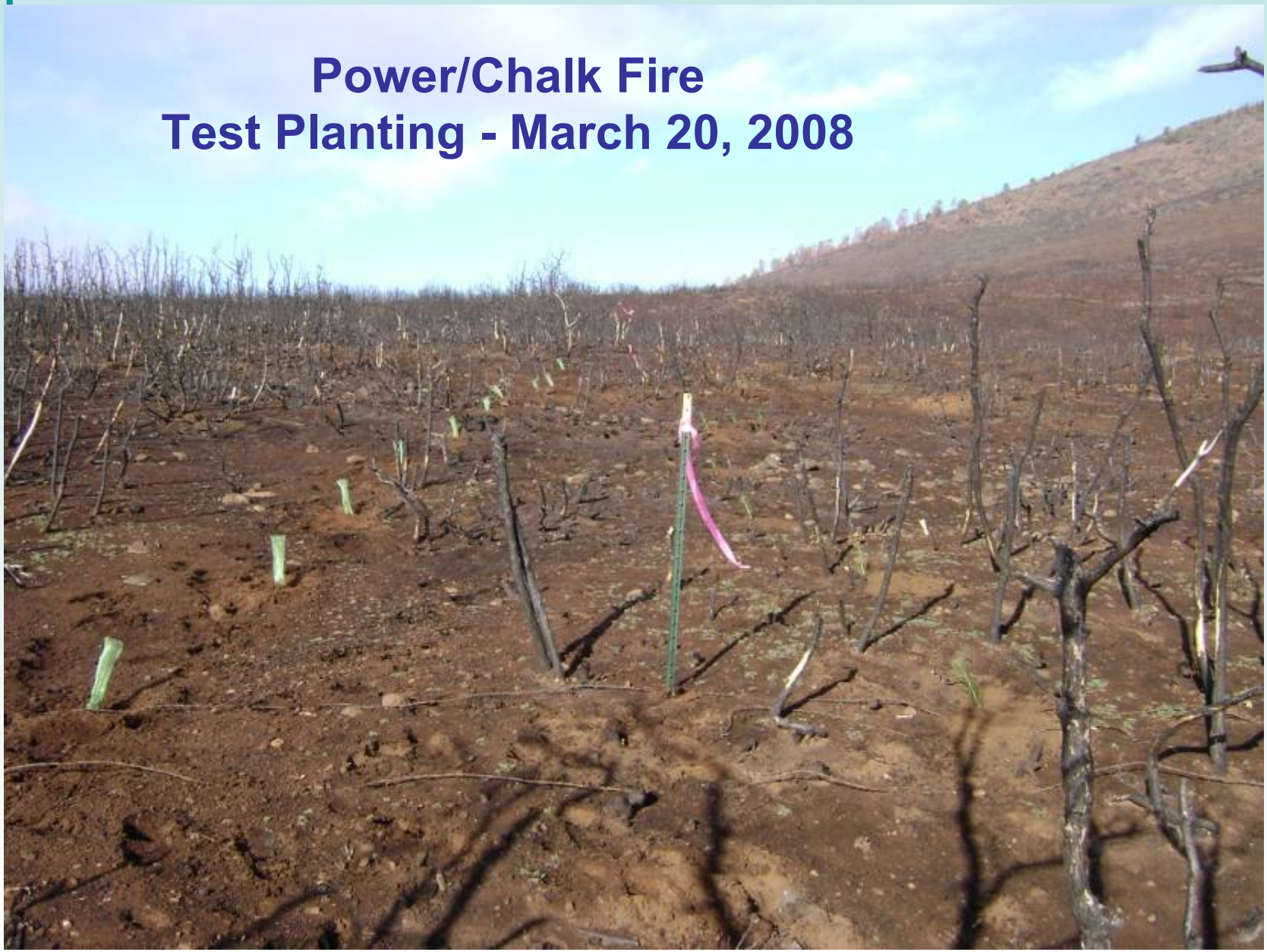
July 2007 *Power Wildfire*
NE Shasta County

Re-burned a portion of
1982 *Chalk Fire* area

1982 Chalk Fire / 2007 Power Fire



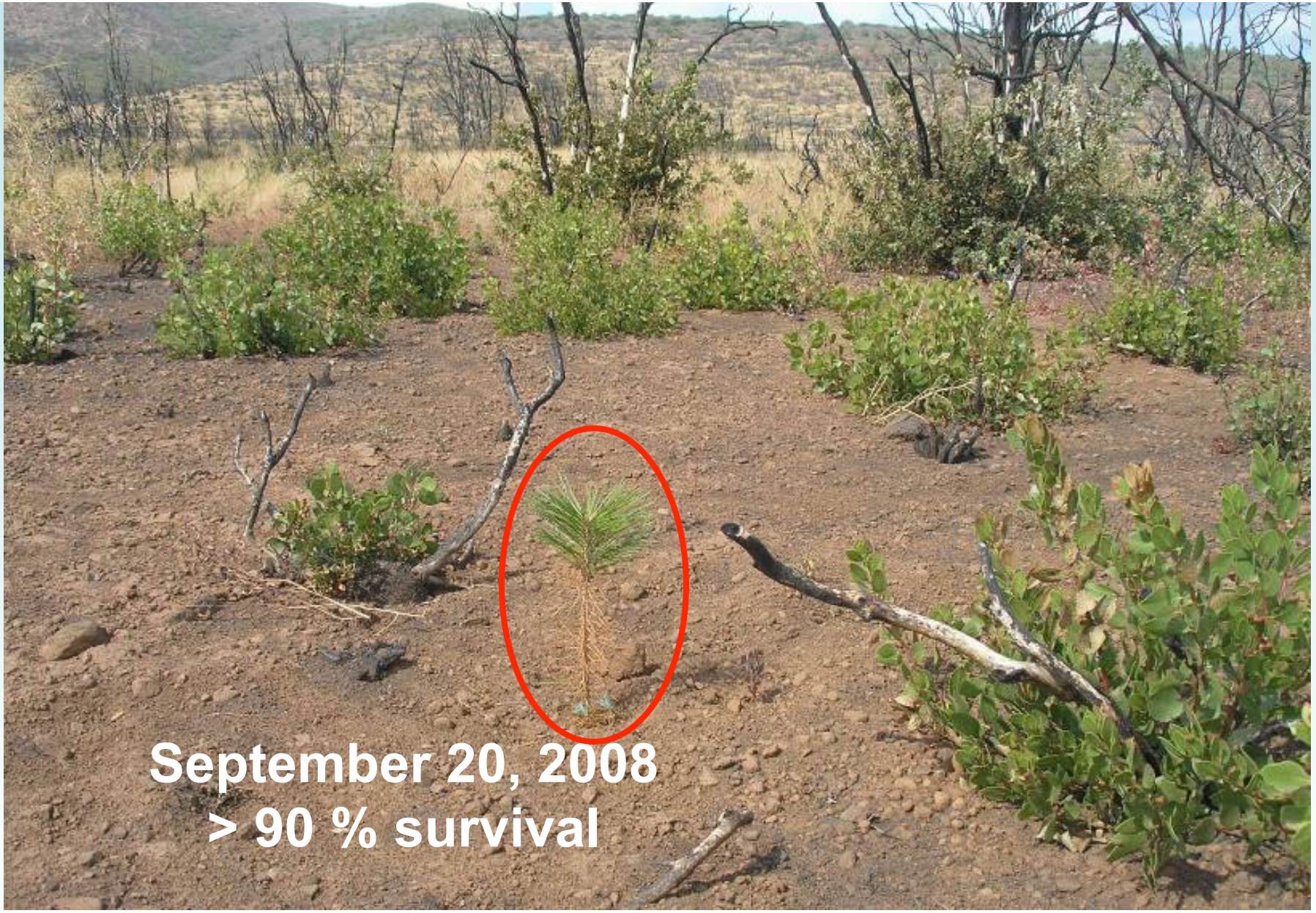
Power/Chalk Fire
Test Planting - March 20, 2008



2008 Planting - Climatic Conditions During 1st Year of Seedling Establishment

			Precip. Sept-June		Precip. March-June		
Project	Elev.	Date Planted	Normal	2007/08	Normal	2008	% of Normal
(Test - Power fire)	3,400' 3,800'	Mar. 20	20.03" 19.85"	13.89" 12.96"	6.74" 6.67"	1.99" 1.59"	29.5% 23.8%

PPT Data from: PRISM Group, Oregon State University, http://www.prismclimate.org, created 23 Sep 2008



March 20, 2008 Test Planting

No mechanical site prep

Directed foliar spray on re-sprouting brush

Power/Chalk Fire Project
2009 Operational Planting

Power/Chalk Fire Project
Seedling in Sept (3 months after last rain)

BLM – Redding – 500’
Canyon Live Oak

.

Gravelly sandy loam
24” – 60” deep
Low/Mod AWC (3.6”-6.6”)

Poor weed control = poor survival (~ 5%)

Canyon Live Oak 2009 Planting (one acorn / spot)

Survival ~ 5% (~ 40% no germ & ~ 55% seedling died during summer)

2 acorns per spot
Good weed control

Good Survival: ~ 86% spots w/ at least one oak seedling

1,600’ elev
Blue Oak 2009 Planting

SOME LESSONS LEARNED (*OR RE-CONFIRMED*)

- Must have a **good plan** & the **commitment** of all "partners" to follow through with the timely implementation of each sequential step over a multi-year project.
- **Quality control** and **oversight** at each step is critical to success.
- Need **good seed** that is adapted to the site. **Access to a well supplied and diverse seed bank is important**.
- Need good **quality nursery stock** and **quality control** during storage, handling and planting of seedlings.
- **Control of competing vegetation is critical to success.**
- **Cannot rely on "normal" rainfall patterns.**
- Non-industrial ownerships: higher costs/acre for many reasons. Many willing to pay 25% for conifers but not oaks

SOME LESSONS LEARNED (*OR RE-CONFIRMED*)

- Reforestation Project = Long term fuel management project
- Timely reforestation after wildfire:
  - Reduces costs
  - Reduces impacts to soils and environment
  - Increases the available acres (e.g. steep & rocky sites)
  - Faster net carbon gained in most accounting protocols
- Opportunities for artificial regen. of blue & live oaks (on non-conifer sites), but not needed for black oak (conifer sites).
- Mastication is viable alternative to clearing on sites w/ erodible soils and/or non-sprouting brush species
- Ponderosa pine success is good over wide range & variability in PPT and site conditions (w/ weed control!).
- Active management is needed to increase (or even maintain) acres of conifer forests in interior California

15 YEAR-OLD PLANTATION

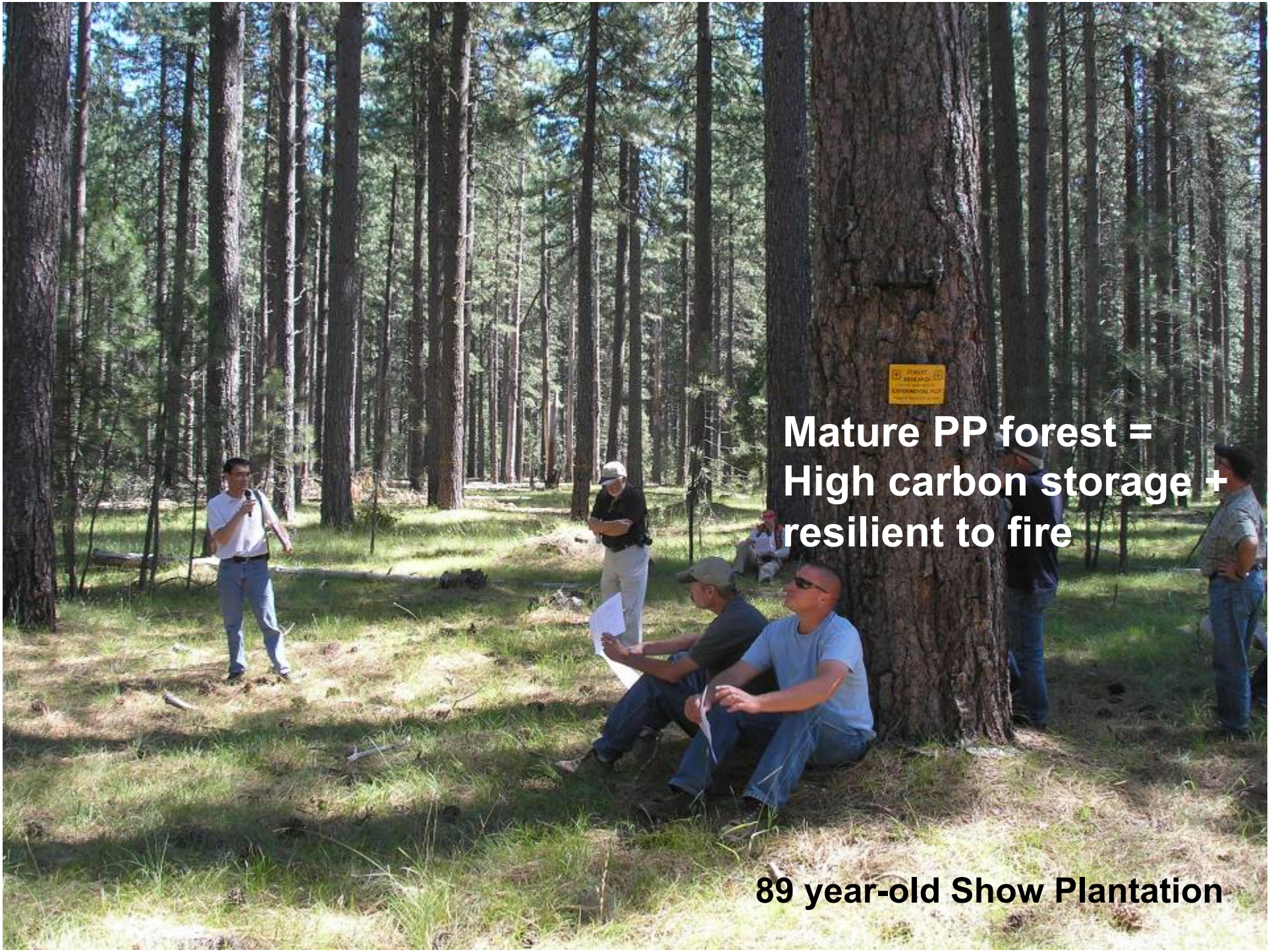
Established after wildfire in Northeastern California

Both areas were planted after the same wildfire but:

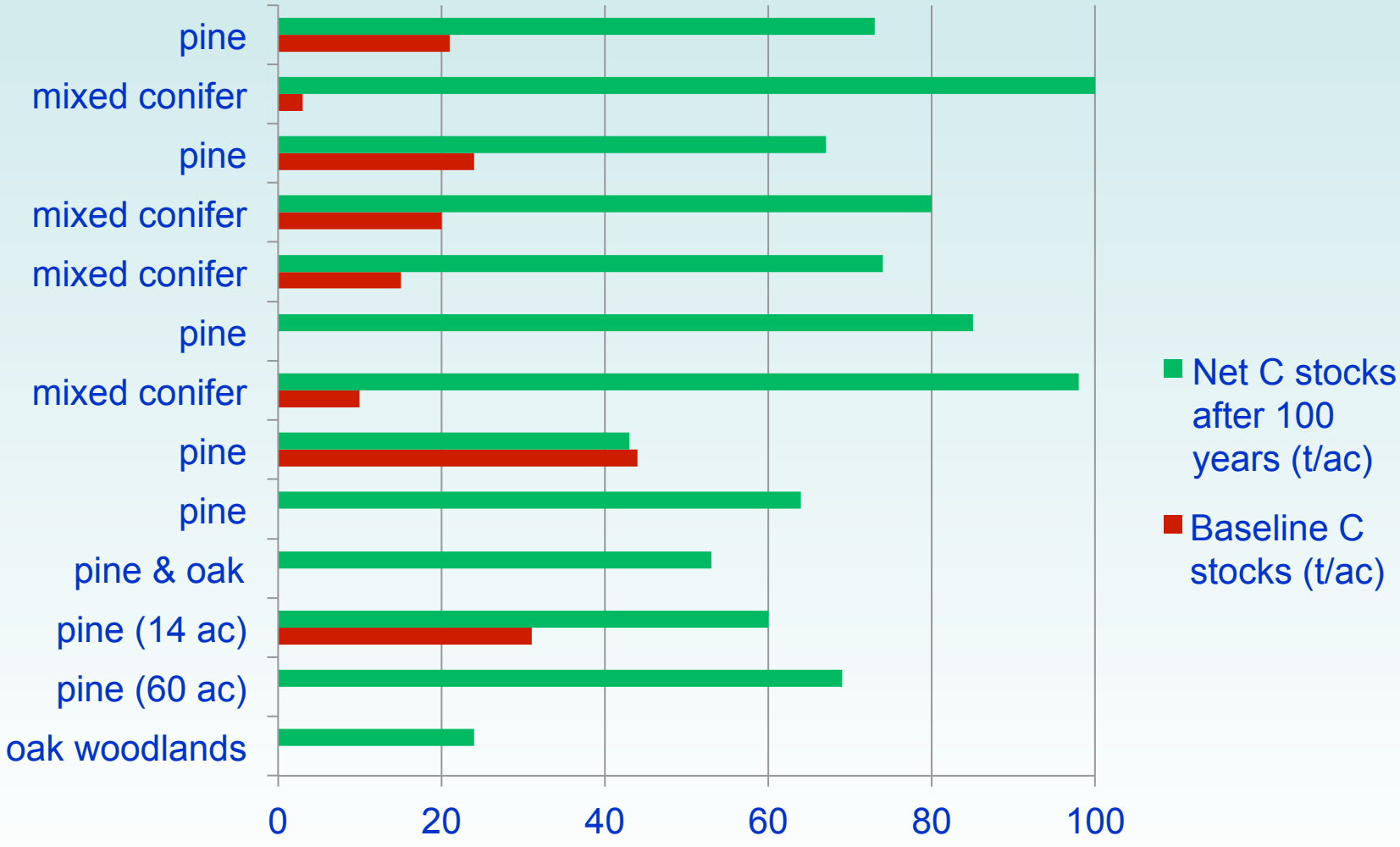
NO WEED CONTROL

WEED CONTROL

For the first 10 to 15 years both sites have equal amounts of total carbon, so there is a long wait to re-coup investment even though long term carbon/ climate benefits are huge: Brush/burn/brush etc. cycle vs. Fire resilient forest w/ large trees


Mature PP forest =
High carbon storage +
resilient to fire
89 year-old Show Plantation

Afforestation Baseline and Project Stocks



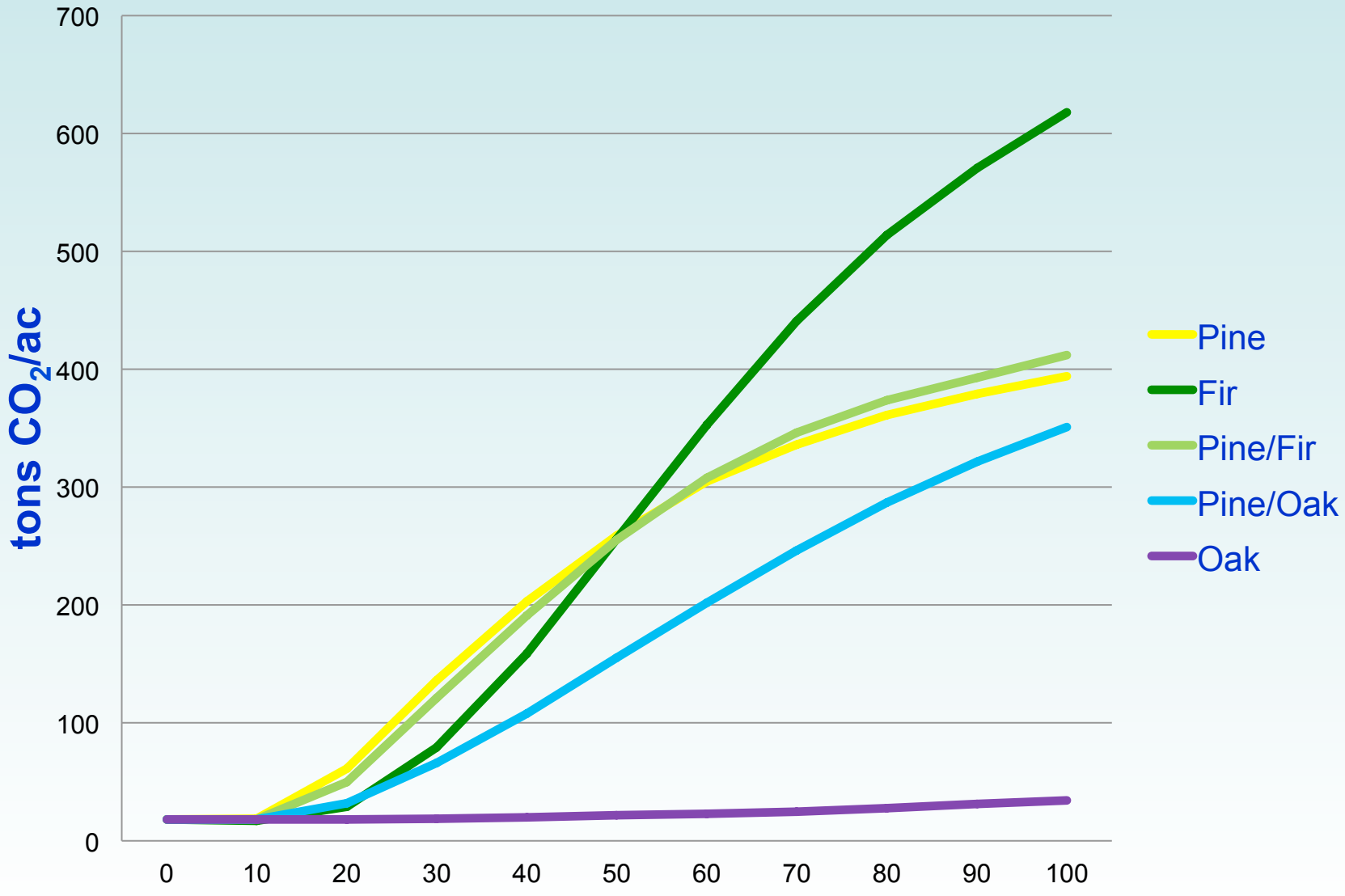
2nd year seedlings @ end of dry 2009 summer

W. M. BEATY & ASSOCIATES, INC.

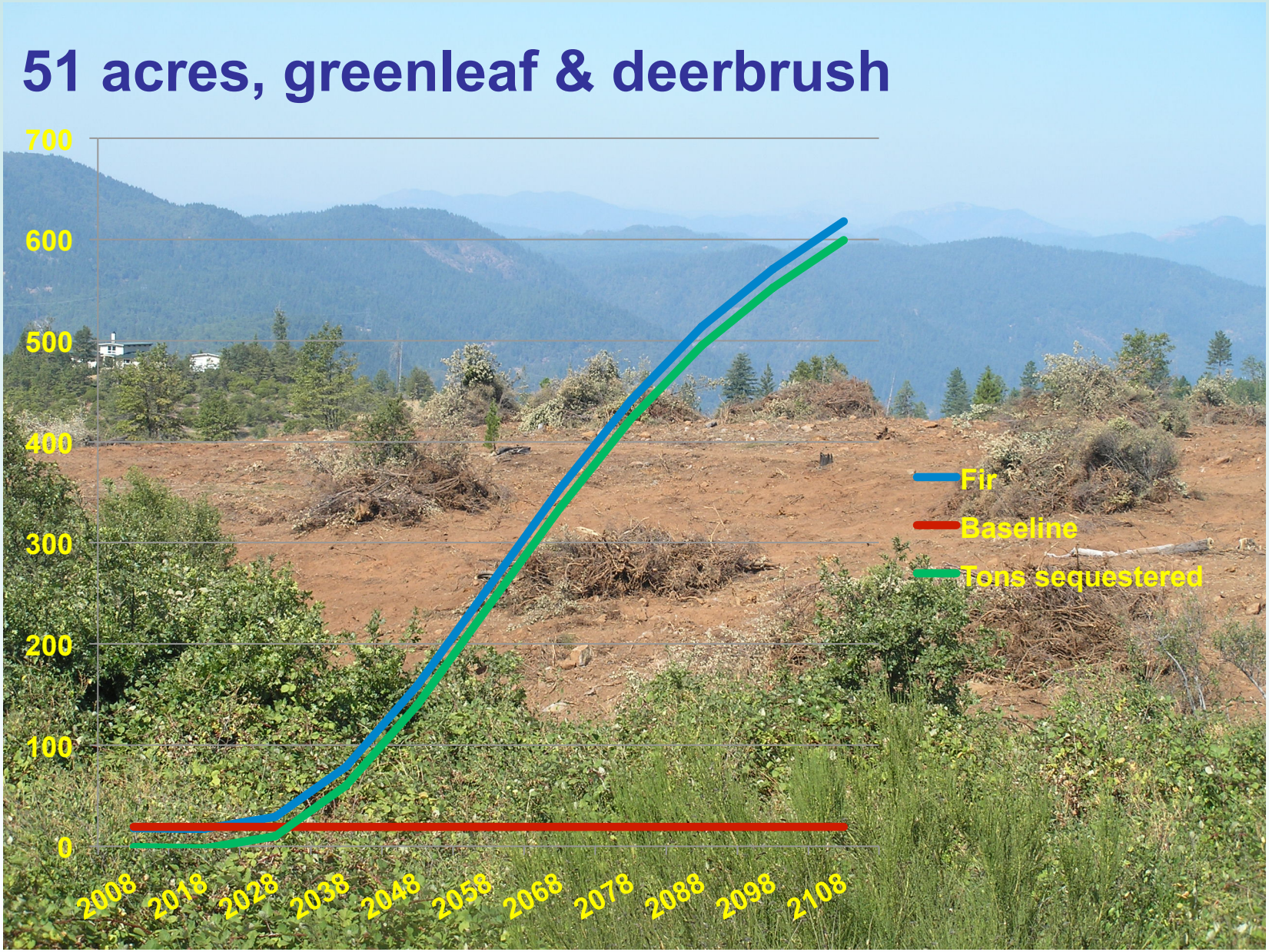
General Growth Projections

	tons CO_2/ac				
	Pine	Fir	Pine/Fir	Pine/Oak	Oak
Year	300 tpa	300 tpa	200/85 tpa	100/50 tpa	100 tpa
0	18	18	18	18	18
10	19	17	18	18	18
20	61	29	50	32	18
30	136	79	121	66	19
40	203	159	191	108	20
50	259	256	255	155	22
60	305	353	308	202	23
70	336	441	346	246	25
80	361	514	374	287	28
90	379	571	393	322	31
100	394	618	412	351	34

Growth Projections



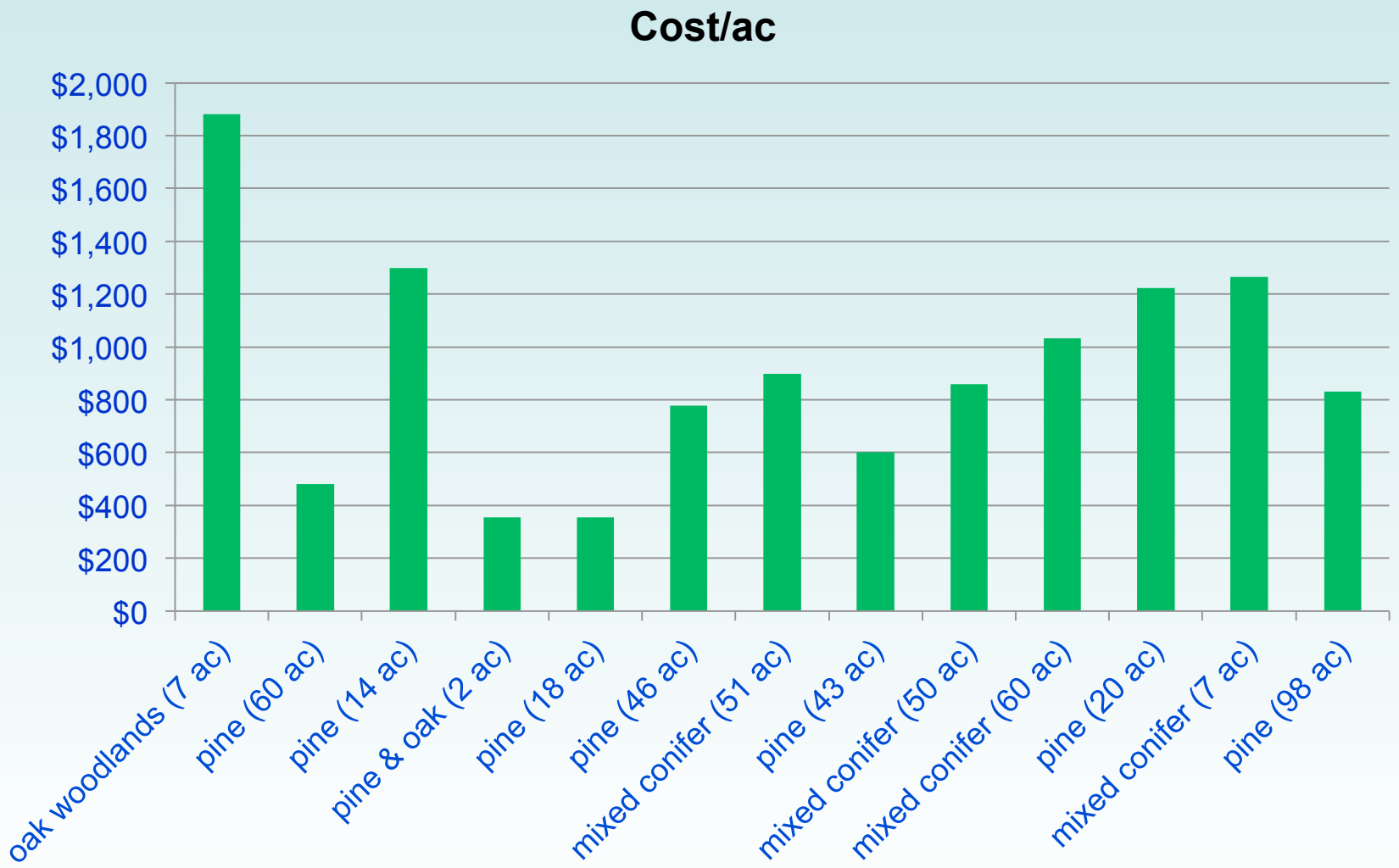
51 acres, greenleaf & deerbrush



Costs for Carbon Management Projects

- Establishment costs
  - Site preparation
  - Buying and planting seedlings
  - Easements
  - Validation
- Maintenance costs
- Measurement costs
  - Registry
  - Variability
  - Project area
- Opportunity costs
- Carbon alone rarely covers all costs

Afforestation Costs




14 acres, manzanita baseline,
$1,300/ac,
ponderosa pine planted


46 acres,
manzanita baseline, $778/ac,
Ponderosa pine planted


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

Overview of Forest Carbon Project

- Determine most likely "without project" activities
- Identify baseline condition for "without project" scenario
  - Forest inventory
  - Analysis to determine carbon stocks
- Site preparation
  - A loss in carbon will occur with the removal of shrubs and grasses
- Replant with mixed conifer species
- Determine projected growth and resulting "with project" carbon stocks
- Site maintenance
- Re-inventory approximately every 5 years

Contact info

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Winrock International

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Developing and Registering a Forest Carbon Project in Northern California

CELEBRATING 25 1985 - 2010

WINROCK INTERNATIONAL

American Carbon Registry®

Outline

1. What is an offset?
   - Offset quality criteria
   - What does an offset “registry” do?
2. Developing and registering a forest carbon project
   - Focus on ACR and CAR
3. Legislative and market update

What is an offset?

- Greenhouse gas emission reduction or removal used to compensate for emissions that occur elsewhere
- Project-based GHG reductions occurring in unregulated sectors, used by regulated entity for compliance
- Measured change vs. a baseline scenario
- Specific project type and vintage

Voluntary and pre-compliance offsets

Voluntary

- Value based on perceived quality
- Buyers want “the story” behind the project
- Marketing or reputational benefit
- Regulatory approval not necessary
- May not be verified, registered or retired
- Variable quality

Pre-compliance

- Value based on compliance recognition
- Registered in approved early action program
- Meet rigorous set of standards
- Independently verified
- Players want to gain experience, hedge against future requirements, help shape regulations

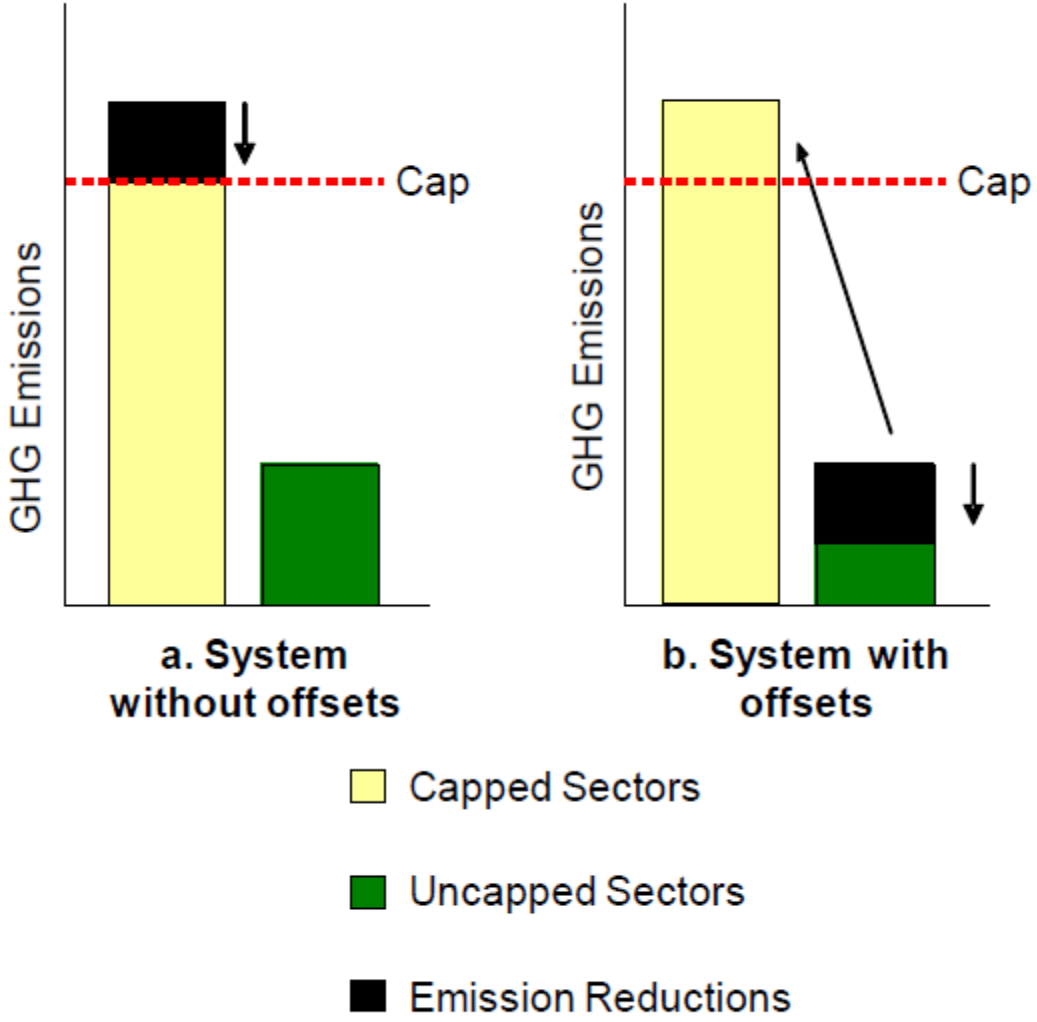
What is cap-and-trade?

Market-based mechanism to efficiently reduce emissions

- Government sets declining cap on emissions
- Program administrator (EPA, CARB) creates allowances and distributes via allocation or auction
- Each year capped entities must hold allowances = prior year emissions
- Compliance:
  - Reduce GHG emissions at covered facilities
  - Purchase allowances from other regulated entities
  - Purchase allowances from Government at auction
  - Purchase offsets

American Carbon Registry

Offsets in cap-and-trade



American Carbon Registry

Offset quality criteria

Additional	Reductions are beyond regulations, beyond common practice, beyond business-as-usual
Real	After-the-fact, measurable GHG reductions
Permanent	Atmospheric benefit is permanent, or reversal risk is assessed and mitigated to make non-permanent offsets fungible with other offsets, on-system reductions and allowances
Net of leakage	Emission increases outside project boundary, due to project, are mitigated
Verified	Reductions are verified by an approved, accredited third party Rules complied with and GHG assertion is without material discrepancy
Serialized	Transparent accounting and tracking ensures same reduction used only once

What does a registry do?

- Publish/approve standards, methodologies, tools
  - Public consultation and scientific peer review (ACR)
  - Stakeholder work groups (CAR)
- Act as gatekeeper on quality
  - Set standards and certify they have been met
  - Sellers know what is required, buyers have confidence offset is real/ has compliance value, public has confidence in results
- Provide transparent serialized tracking of issuances, transactions, retirements
- Make project documentation publicly accessible
- Oversee third-party verification

American Carbon Registry

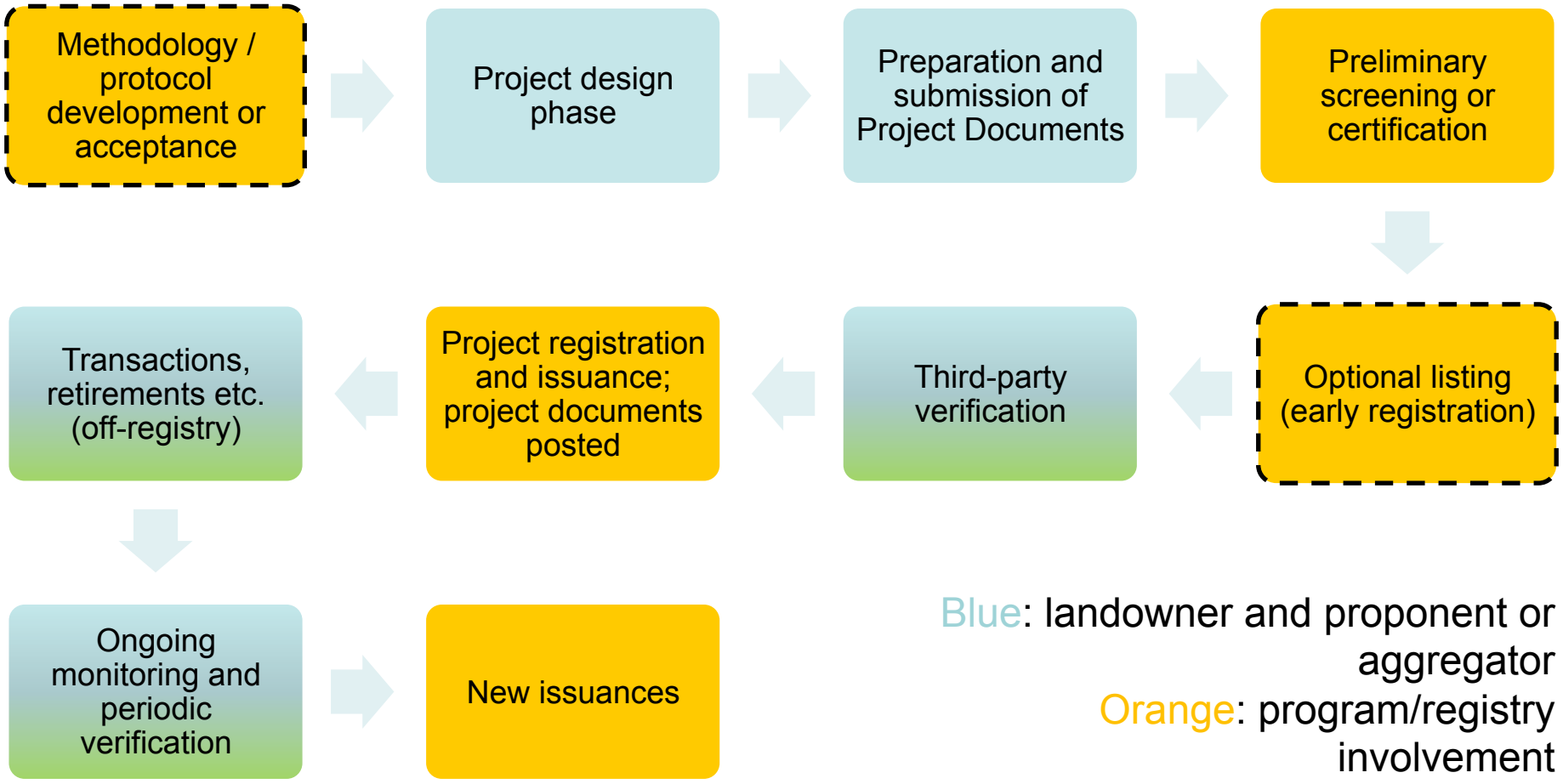
- First U.S. private voluntary GHG registry
  - Founded 1997 by Environmental Defense Fund and Environmental Resources Trust
  - 30 million tons issued
- Pioneered system of transparent on-line reporting and serialization of verified project-based offsets – now the industry standard
- Joined Winrock International in 2007
  - Founded 1984 as a “public benefit corporation” under Arkansas state law




What does developing a forest carbon project mean to you?

- Steps in the process
- Key players and their roles
- Basics of ACR and CAR forest carbon protocols
- Eligible activities
- Additionality
- Permanence and risk mitigation
- Aggregation

Steps in the process



Blue: landowner and proponent or aggregator
Orange: program/registry involvement
Green: third-party involvement

Parties involved

Party	Basic roles
Landowner	•Title to lands; offset title until transferred to proponent or buyer •May be required to sign long-term agreement •May have monitoring, verification, risk mitigation obligation
Proponent	•Project design, interface with registry •Take offset title, incur costs, market offsets… many models •May have monitoring, verification, risk mitigation obligation
Aggregator	•Aggregate landowners to spread transaction costs and diversify risk •Educational and organizational role
RPF	•Project design assistance
Offset program or registry	•Publish/approve protocols •Gatekeeper on quality •Transparent serialized tracking •Oversee verification
Verifier	•Third-party auditing against requirements of program •Opinion on whether GHG assertion is without material discrepancy
Offset buyer	•Entity purchasing and using offsets for voluntary, pre-compliance, or speculative purposes

Basics: ACR and CAR

	ACR	CAR
Scope	Worldwide	United States Mexico, Canada in future
Land ownerships	Private, all public, Tribal	Private and public (non-federal) for reforestation and IFM; private for avoided conversion
Eligible activities	•Afforestation/Reforestation •Improved Forest Management •Reducing Emissions from Deforestation (Avoided Conversion)	•Reforestation •Improved Forest Management •Avoided Conversion •Urban Forestry
Minimum term	40 years from start date	100 years after last credits issued
Risk mitigation	Buffer contribution (any ERTs) Insurance and other financial options	Buffer reserve

Basics: ACR and CAR

	ACR	CAR
Agreement with	Proponent	Landowner
Additionality	"Three-prong test" or performance standard	Performance standard approach Automatic for reforestation Based on baseline stocks for IFM
Crediting period (baseline validity)	20 years for A/R and most IFM	100 years
Other requirements		Sustainable harvesting, "natural forest management," age classes, max. 40-acre clearcuts…
Verification	By independent third-party verifiers accredited by ANSI for relevant sectoral scope	

Afforestation/Reforestation

- Establishing, increasing and restoring vegetative cover through the planting, sowing or human-assisted natural regeneration of woody vegetation
- Targets eventual establishment of forest
- Carried out on marginal agricultural or rangelands, brush fields, buffer areas, windbreaks, etc.
- Not cleared of forest in last 10 years solely to implement A/R project
  - Exceptions for fire, natural disturbance, brush removal for site preparation

Improved Forest Management

- Activities to reduce GHG emissions and/or enhance GHG removals, implemented on lands designated, sanctioned or approved for forest management
  - Extending rotation lengths in managed forest
  - Increasing forest productivity by thinning diseased or suppressed trees
  - Managing competing brush and short-lived forest species
  - Increasing buffers or other set-asides
  - Increasing the stocking of trees on understocked areas
  - Increasing carbon stocks in harvested wood products
  - Improving harvest or production efficiency
  - Shifting from shorter- to longer-term wood products

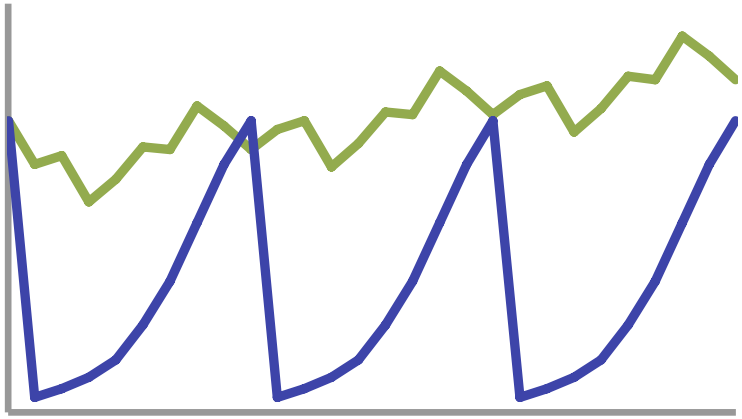
Additionality

- GHG reductions and removals exceed those that would have occurred under current forestry laws and regulations, current forest industry practices, and under a business-as-usual scenario
  - Regulatory surplus and exceeds performance standard
  - Three-prong test:
    - Regulatory surplus
    - Exceeds common practice for area, forest type, similar landowners
    - Faces at least one implementation barrier: financial, technological, institutional

Baselines and additionality

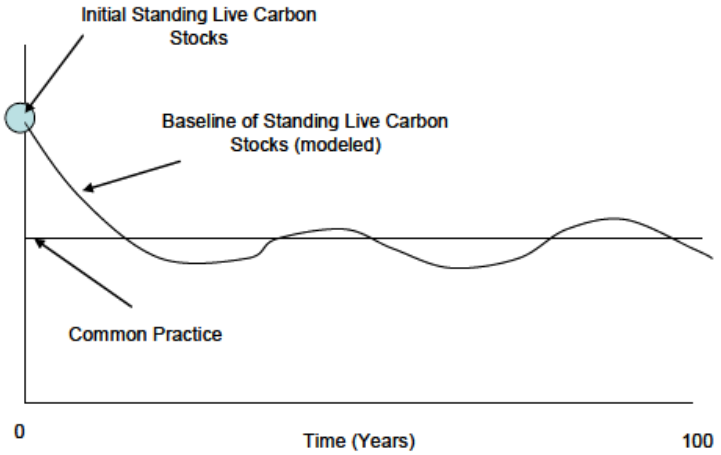
Project-specific

- More subjective, open to gaming
- Less efficient project approval process
- Rigorous tools available
- Less danger of over-crediting



Performance standard

- Less subjective
- Efficient to apply
- Heavy up-front data requirements
- Potential for over-crediting without under-crediting to balance



Permanence and risk mitigation (ACR)

- Minimum Project Term of 40 years
  - Ensure project activity maintained, monitored and verified over relevant timeframe
  - Balance time commitment with broad landowner participation
  - Required of Project Proponent only
- Risk assessment and mitigation makes forest offsets effectively permanent and fungible with other offsets, allowances and emission reductions
- Focus on mitigating reversals so atmosphere "made whole"

Risk mitigation options (ACR)

- Project-specific risk assessment
- Buffer contribution
  - From project itself
  - ERTs of any other type and vintage
- Unintentional reversal:
  - Proponent pays “deductible”; ACR retires buffer tons for remainder; “premium” goes up
- Intentional reversal (“buy-out option”):
  - Proponent replaces all issued ERTs for that portion of project
- Alternate risk mitigation options accepted
  - Insurance or other financial assurances to replace losses

Permanence and risk mitigation (CAR)

- PIA obligation of 100 years after last credits
  - Project monitoring, verification, reversal liability, harvest guidelines and “natural forest management”
  - Required of landowner (and successors, heirs, assigns, and new owners)
  - Superior to all other claims unless additional buffer contribution made
- Buffer CRTs canceled in event of reversals
  - Avoidable vs. unavoidable reversals
  - >1:1 penalty for any avoidable reversal before 50 yrs
- Focus on monitoring carbon stocks on site

Aggregation guidance (ACR)

- Key for transaction cost efficiencies (inventory, monitoring, verification) and risk diversification
- Agreement is still with Proponent (here aggregator)
  - Proponent commits to reversal risk mitigation, including exit of participating landowners
- For inventory and monitoring, precision targets applied at overall project level
  - ±10% of the mean at 90% confidence
  - Use stratification; does not require plots on every landholding
- Verification (reasonable assurance; ±5% materiality) also at project level
  - Risk-based approach and not all properties necessarily visited

Aggregation guidelines (CAR)

- "Aggregate" capped at 5,000 acres, 2 or more Forest Owners
- Each Forest Owner still has own PIA, liability for reversals, CAR account, baseline inventory, annual reports, etc.
- Aggregator provides services; *may* act as agent in transactions
- Goals:
  - Fewer plots to achieve ±5% at 90% confidence sampling error
  - Only half of properties verified each 6-year interval
- Constraints on leaving aggregate

Legislative and regulatory landscape

- No U.S. federal climate legislation
  - Scaling back from economy-wide cap-and-trade, to power sector cap-and-trade, to RES, to offshore oil etc., to nothing
  - Bills generally friendly to offsets, recognize cost containment and political value… but no bill
- EPA proceeds with regulation under Clean Air Act
  - Endangerment finding, mobile sources, stationary sources
  - Offsets and other market mechanisms unclear

Eligible offset types (Stabenow and Kerry-Lieberman)

- Projects that reduce, flare or use methane:
  - Methane from mines, landfills, natural gas
  - Reduce fugitive emissions in oil & gas sector
  - Manure management, anaerobic digestion, waste aeration
- Projects that reduce CO_2 emissions or increase sequestration in agriculture, livestock, forestry, land use:
  - Afforestation/reforestation, improved forest management, reduced deforestation, urban forestry
  - Agricultural, grassland, and rangeland sequestration and management
  - Avoided conversion of grassland/rangeland/forest
  - Management/restoration of peatlands and wetlands
  - Conservation of marine coastal habitats
  - N_2O emission reduction (fertilizer production and/or use)
  - Biochar production and use
- Recycling and waste minimization
- Carbon Capture & Storage (with or without enhanced oil recovery)
- Destruction of ozone-depleting substances
- Small off-grid renewable electricity
- Projects reducing the GHG intensity of agricultural production

"Qualified Early Offset Programs"

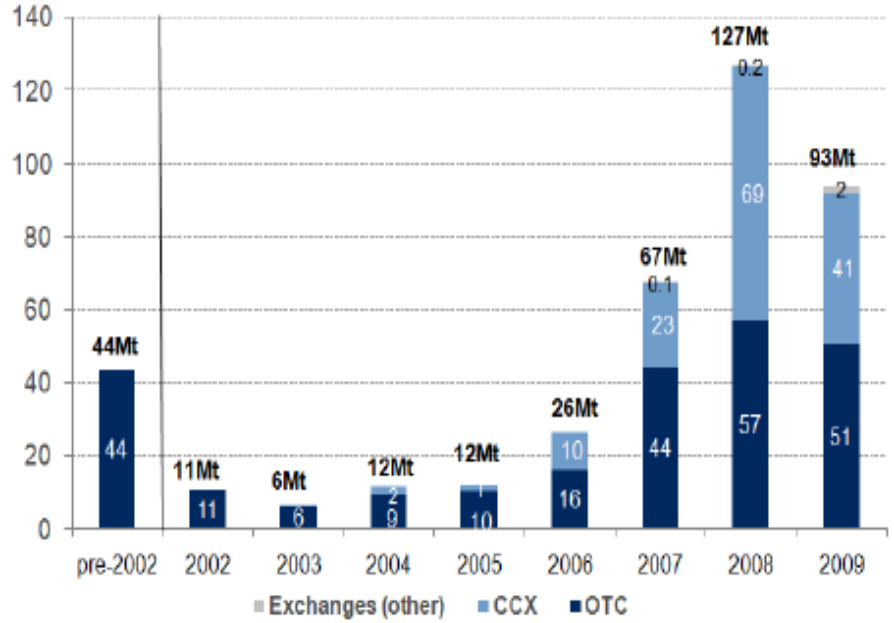
- Established before January 1, 2009
- Offset standards/methodologies/protocols must:
  - Be developed through public consultation or peer review
  - Require offsets be measurable, additional, verifiable, enforceable, permanent
  - Be made available to the public
- Require verification by accredited verifier
- Publicly accessible registry, serialized tons
- Financial assurance requirements
- No program involvement in project development

Legislative and regulatory landscape

- Focus shifts (back) to states and regional programs
- California AB32 cap-and-trade rule by end 2010
  - Proposition 23
- WCI released final cap-and-trade design
  - Not all original members participating
- Offsets seen as key
  - No clarity yet on which protocols will be recognized
  - Forestry a safe bet

Market landscape

- Marked decline in transaction volumes and prices
  - Voluntary activity down
  - Pre-compliance demand awaiting more clarity
  - U.S. carbon market players temporarily close U.S. desks
  - Scandals in CDM market
  - Uncertainty in post-Kyoto negotiations



Still… forest carbon remains a relatively safe bet

- Protocols are well established
- Generally cost-effective → offsets at an attractive cost per ton
  - Large potential supply
  - Attractive to both voluntary and pre-compliance buyers
- State and regional programs likely to recognize
  - Key to register on an established program
  - ACR, CAR, possibly VCS, possibly others
- Has become central to federal discussions

➢ Project development timeframe may be a year, more or less… pays to start now

Further Information

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Protocol development: ACR and CAR

	ACR	CAR
Established	1997 (Merged with Winrock 2007)	2008 (CCAR established 2001)
Protocol development process	•Both external (bottom up) and internal •Public consultation •Scientific peer review •Final approval and publication	•Top-down only •Protocol scoping •Multi-stakeholder workgroup •Public comment •Board adoption
	•Transparently developed, regulatory-quality protocols meeting criteria of federal legislation **•State and regional approvals in process**	

Protocols (existing and in progress)

ACR	CAR
•Forestry •AR •IFM •REDD •N_2O from fertilizer •Livestock methane •Landfill methane •Fugitive methane in oil & gas sector •Improved grazing land management •Wetland restoration and avoided loss	•Forestry •Reforestation •IFM •Avoided conversion •Urban forestry •Landfill methane •Livestock methane •Coal mine methane •Organic waste digestion •Ozone-depleting substances •Agriculture sector protocols under consideration

Reforestation: A Case Study of CAR Registration

Bob Rynearson
W.M. Beaty and Associates, Inc.
bobr@wmbeaty.com

W.M. Beaty & Associates, Inc.
Climate Action Registry (CAR)
Reforestation Projects

- 4 Reforestation Projects totaling 16,470 acres
- sizes: 191 acres to 11,637 acres
- 191 acres reforestation after clearing old brushfield
- 16,279 acres reforestation after wildfire
- Very early stages of registration w/ CAR
- Also exploring other registries e.g. ACR
- Maybe a 5th project for a 2008 wildfire on > 2,100 acres?

Climate Action Reserve (CAR)
Forest Protocol Version 3.1

www.climateactionreserve.org

- Conservation Easement not required.

However, requires a 100 Yr PIA

- 1:1 buy out to terminate Reforestation PIA
- Reforestation Project no longer required to be unstocked for 10 years
- For Reforestation Projects: verification can be postponed until Climate Reserve Tonnes (CRTs) are registered

Climate Action Reserve (CAR) Forest Protocol Version 3.1:

- Harvested Wood Products (HWP) now eligible for CRTs
- Natural Forest Mgt. restrictions allows for even age management
- Buffer pool for involuntary CRT reversals
- Only discretionary Reforestation projects qualify for CAR

3 CAR Forest Protocol Project Types

Improved Forest Management

Avoided Conversion

Reforestation:

- CRT start accumulating later (~ 10 years after planting) but increase at much higher rate than IFM over time.
- Much lower baseline than IFM so far greater % of tree biomass is “additional” for CRT credit
- Lower “risks”, costs & commitment of forest assets than IFM

5.1. Overview of the Project Submittal Process

Projects that result in the issuance of CRTs follow a number of steps that involve project developers or their authorized representatives, verifiers, and the Reserve administrator. Steps or other actions to be taken by a project developer under these Operating Procedures may generally also be taken by an account holder that is authorized to act on behalf of the project developer, as described in the Terms of Use agreement for the Reserve.

The general steps are:

1. The project developer or its authorized representative submits project and pays submittal fee
2. The Reserve reviews and approves the project
3. The project developer selects an approved verification body in the Reserve
4. The verifier submits a Notification of Verification Activities/Conflict of Interest (NOVA/COI) form
5. The Reserve approves the verification body
6. The project developer enters project data and submits the project for verification
7. The verifier completes the verification activities and submits project verification
8. The Reserve reviews and approves the project
9. The project developer pays the CRT issuance fee
10. The project developer transfers or retires CRTs

CLIMATE ACTION RESERVE

Revised 09/02/09

Forest Project Submittal Form

Instructions: Please complete all fields as thoroughly as possible. If the project in question is still in the planning/ development phase, all fields must be completed using best available data and estimates based on the proposed system design. This is an interactive Word form. Upon completion, please save this form as a PDF prior to uploading it to the Reserve. This will lock your answers and protect the document from any further changes. All fields must be completed, even if the answer is also provided elsewhere; if a field is not applicable insert N/A in the space provided. **Please note this project submittal form is only for projects submitted under Forest Project Protocol, Version 3.0.**

Section 1: Project Contact Information

Project Name: **Shingletown Reforestation**

Forest Owner (name of business entity as corporation, partnership, or individual): **Red River Forest Partnership**

Forest Owner Contact: **Robert Rynearson, W.M. Beaty & Associates, Inc.**

Technical Consultants who have assisted in Project Development (name of business entity as corporation, partnership, or individual): ***n/a***

Technical Consultant Contact: ***n/a***

Other Parties with a Material Interest: **n/a**

Date of Form Completion: **03/11/10 (revised on 4/12/10 to address CAR staff comments)**

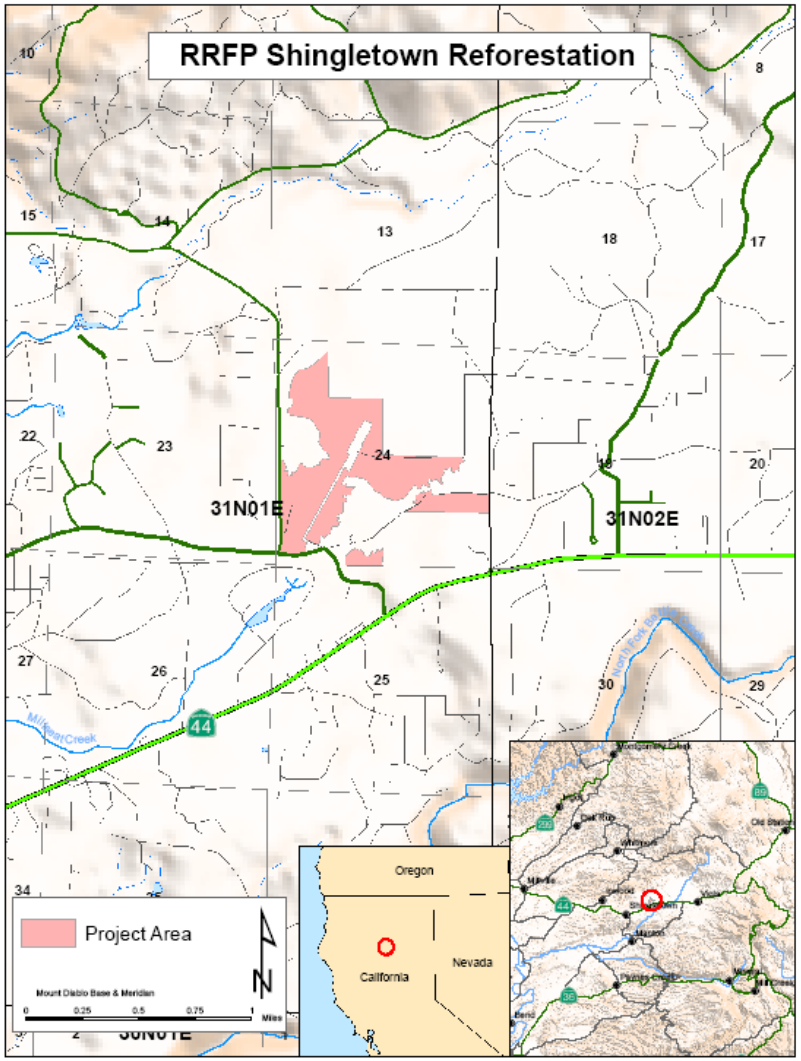
Form Completed By (name, organization): **Robert Rynearson, RPF # 1921, W. M. Beaty & Associates, Inc.**

Section 2: Ownership and Organization Summary

1. List the fee title owners of this land:

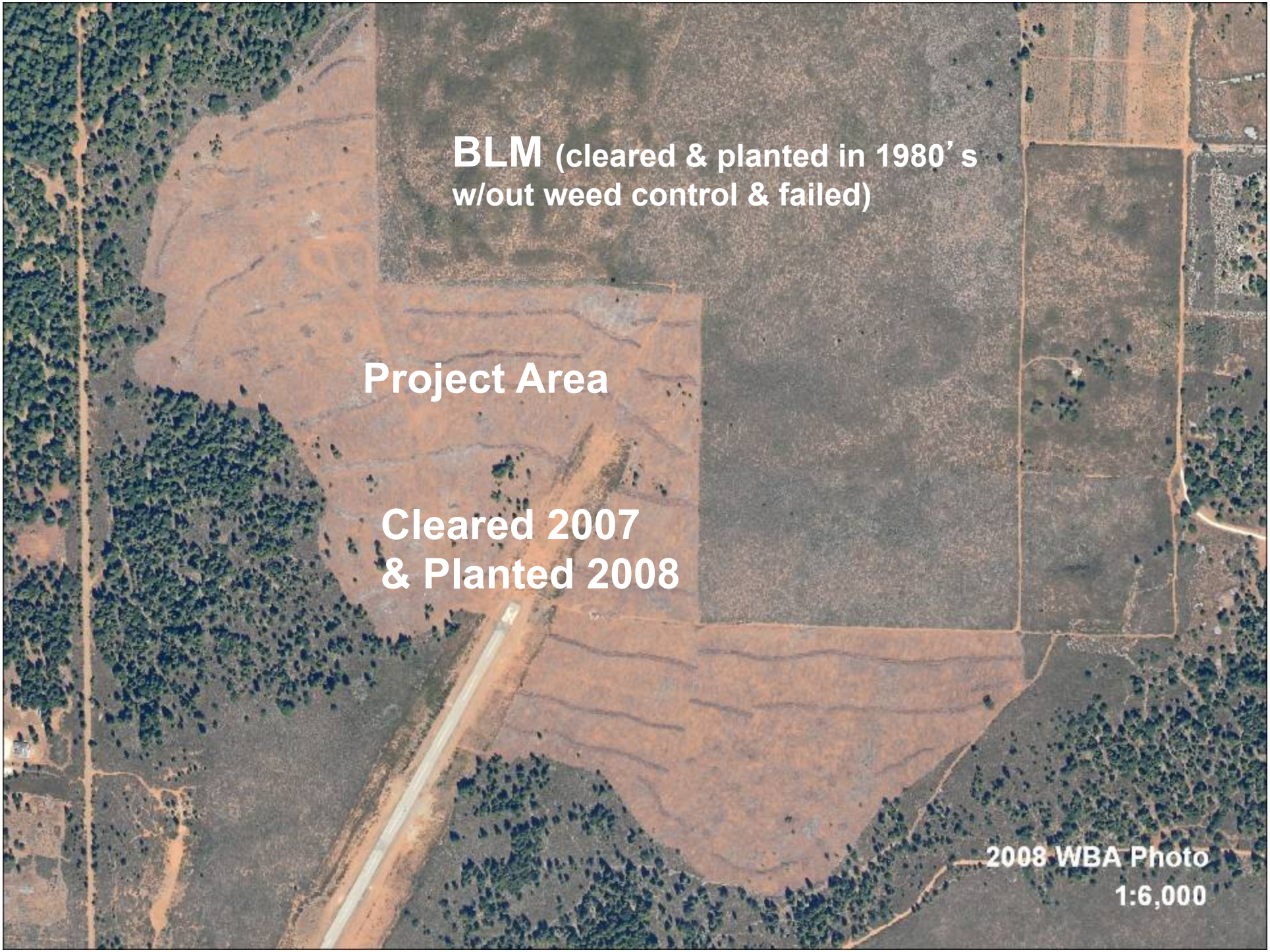
Names on Fee Title Record	% of Timber Ownership*	Management Role
Red River Forest Partnership (a California General Partnership)	100%	All Management Decision-making
*If ownership < 100%, list other owners and their respective ownership (%)		

1



http://www.climateactionreserve.org/how/projects/


➢140 year-old brush site
➢Forest soils, deep but low AWC
2006 NAIP Photo
1:6,000


BLM (cleared & planted in 1980's
w/out weed control & failed)
Project Area
Cleared 2007
& Planted 2008
2008 WBA Photo
1:6,000


D7 Cat w/ Brushrake


BLM
Private “forestland”
10/08/2007

20 acres of brush ground into wood-fuel

Estimated fossil fuel displacement benefit ~ 489 tCO2e (year 1)
...But no offset credit w/ CAR forestry

2008 Planting - Climatic Conditions During 1st Year of Seedling Establishment (>95% survival)

			Precip. Sept-June		Precip. March-June		
Project	Elev.	Date Planted	Normal	2007/08	Normal	2008	% of Normal
RRFP	3,880	April 1	47.63"	30.60"	15.07"	2.91"	19.3%

PPT Data from: PRISM Group, Oregon State University, http://www.prismclimate.org, created 23 Sep 2008

Ponderosa pine seedling at the end of a long, dry summer five months after planting on soils w/ low AWC

2½ years after planting. At this stage there is less carbon than brushfield, but will result in significantly more long term, stable carbon storage

W. M. BEATY &
ASSOCIATES, INC.

15 YEAR-OLD PLANTATION

Established after wildfire in Northeastern California

Both areas were planted after the same wildfire but:

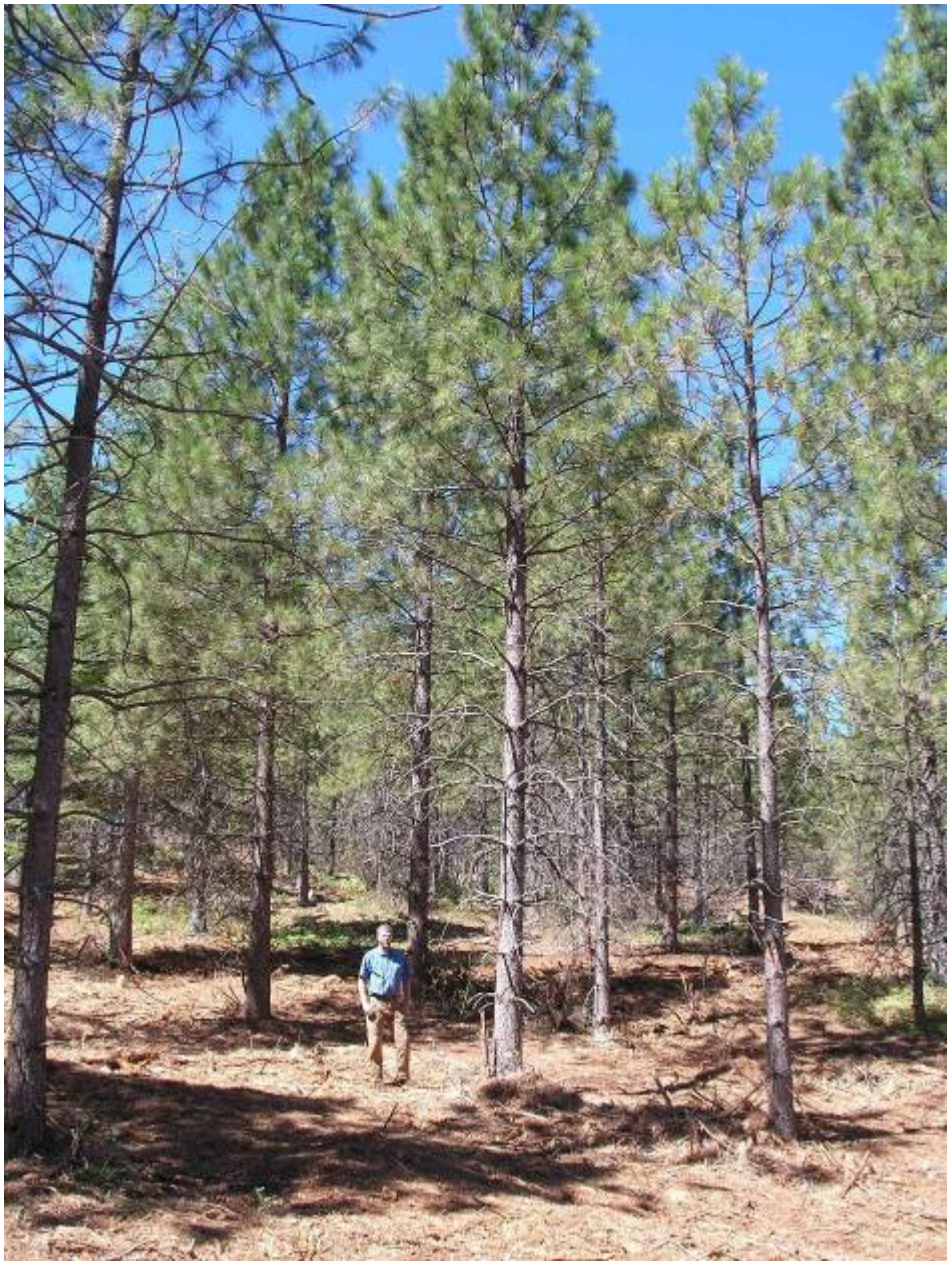
NO WEED CONTROL

WEED CONTROL

For the first 10 to 15 years both sites have equal amounts of total carbon, so there is a long wait to re-coup investment even though long term carbon/ climate benefits are huge: Brush/burn/brush etc. cycle vs. Fire resilient forest w/ large trees

28 year old pine plantation north of Shingletown

After pre-commercial thin

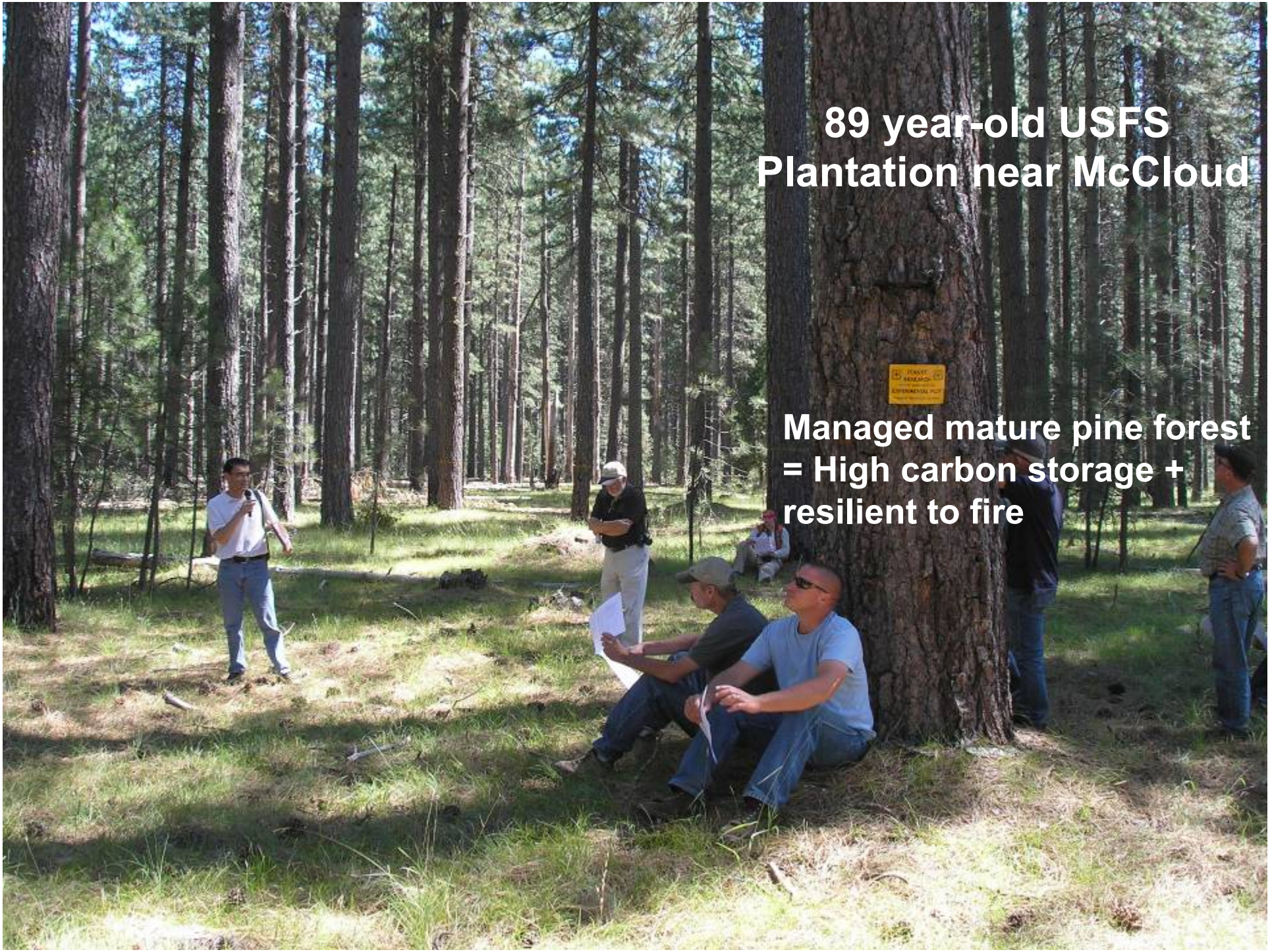


W. M. BEATY &
ASSOCIATES, INC.

42 year old USFS pine plantation – 135 trees / acre
Challenge Experimental Forest

42 year old USFS pine plantation @ 1,210 trees / acre
Challenge Experimental Forest

5-year Growth Increments


89 year-old USFS
Plantation near McCloud
Managed mature pine forest
= High carbon storage +
resilient to fire

Very Rough Estimates based on modeling, CRTs sold on actual

Shasta Co. | **Project 191 Acres**

Planted 2008-09	Est. standing @ end of 5 yr period:			Assume	Estimated	(avg. for preceding 5 yr period)	(avg. for preceding 5 yr period)
Period	tree+roots tCO2m/ac.	baseline** tCO2m/ac.	net tCO2m/ac.	buffer*** %	net CRTs/ac	Annual Net CRT/ac/yr	Annual Total net CRTs/yr
2011	2.8	11	-8.2	25%		0.00	0.00
2012-2016	5.3	11	-5.7	25%		0.00	0
2016-2021	16.3	11	5.3	25%	4.0	2.19	419
2022-2026	30.6	11	19.6	25%	14.7	2.87	548
2027-2031	61.8	11	50.8	25%	38.1	6.23	1,190
2032-2036	94.1	11	83.1	25%	62.3	6.47	1,235
3037-2041	143.7	11	132.7	25%	99.5	9.92	1,894
2042-2046	185.3	11	174.3	25%	130.7	8.31	1,588
2047-2051*	195.0	11	184.0	25%	138.0	1.95	372
2052-2056	208.3	11	197.3	25%	148.0	2.65	507
2057-2061	238.5	11	227.5	25%	170.6	6.04	1,154
2076	320.5	11	309.5				
2106	437.6	11	426.6				

** includes tCO2m from HWP generated from thinnings along with "tree+roots"*

*** baseline based upon Winrock measurements prior to clearing*

**** buffer contribution can range from 18% to 30+%*

Cost & Revenue "Guesstimates" through 2036
For 191 acre project in Shasta County

Costs:		
Establishment 2007-2010:	$109,000	$570/ac
Follow up release 2010 & 2011:	$ 19,000	$100/ac
Misc. plantation maint.:	$ 20,000	$105/ac
Subtotal	$148,000	$775/ac
Inventories/annual reporting:	$ 26,000	$136/ac
CAR submittal & annual fees:	$ 14,000	$ 71/ac
CAR Variance fee:	$ 1,500	$ 8/ac
Initial partial Verification:	$ 16,000	$ 84/ac
4 Verifications @ 6 yr. intervals:	$ 80,000	$419/ac
Subtotal	$137,000	$712/ac
TOTAL	**$285,000**	**$1,492/ac**

Cumulative Project Revenue through 2036:

@ $6.50/CRT = $110,00 $575/ac

@ $15.00/CRT = $254,350 $1,331/ac

@ $25.00/CRT = $423,900 $2,220/ac


2007 Wildfire
Red River Forests > 11,000 acres

2006 & 2007 Wildfires

11,637 acres

Planting: 2008-2011

- Pond Pine
- Jeff Pine
- Doug fir
- White fir
- Red fir
- Sugar pine
- Incense Cedar

Comparative Cost & Revenue Estimates through 2036

Project Site:	Brushfield	Wildfire
Project Size:	191 ac	11,637 ac
Establishment :	$570/ac	$250/ac
Follow up release:	$100/ac	$ 80/ac
Misc. plantation maint.:	$105/ac	$ 50/ac
Subtotal	$775/ac	$380/ac
Inventories/annual reporting:	$136/ac	$ 17/ac
CAR submittal & annual fees:	$ 71/ac	$ 1.20/ac
CAR Variance fee:	$ 8/ac	$ n/a
Initial partial Verification:	$ 84/ac	$ 1.35/ac
4 Verifications @ 6 yr. intervals:	$419/ac	$ 10/ac
Subtotal	$712/ac	$ 30/ac
TOTAL COSTS	**$1,492/ac**	**$ 410/ac**

Comparative Cost & Revenue Estimates through 2036

Project Site:	Brushfield	Wildfire
Project Size:	191 ac	11,637 ac
Planting yrs:	2008-09	2009-11
TOTAL COSTS	$ 1,492/ac	$ 410/ac
Est. Revenue:		
@ $6.50 / CRT	**$400/ac**	**$575/ac**
@ $15.00/ CRT	**$1,331/ac**	**$932/ac**
@ $25.00/CRT	**$2,220/ac**	**$1,540/ac**

CONCLUSIONS

- Reforesting brush-fields and/or wildfire damaged areas provide significant long term carbon sequestration benefits
- Financial attractiveness for landowners is limited by:
  - High upfront reforestation costs
  - Revenue stream starts much later (10 to 30 years into the future)
  - High uncertainty in future market value of CRTs
  - Uncertainties in CAR protocol interpretation & verification costs
  - Very long term PIA (> 100 years)

Obstacles for small landowner CAR Reforestation Project

- No annual income from timber to support Project development costs which cannot be recouped for a decade or two for revenue from CRTs
- Higher per acre fixed costs for reforestation activities
- Very high per acre fixed costs for CAR registration & verification
- Uncertainties in CAR protocol interpretation & verification
- Obligations of PIA very cumbersome
- Limited availability to a seed bank, reforestation expertise etc.
- CAR's "one size fits all" species diversity requirements disqualify most projects or require an expensive "variance"
- Uncertainty in market value when CRTs accrue (10 to 30 years into future)


Any Questions?
89 year-old Show Plantation