

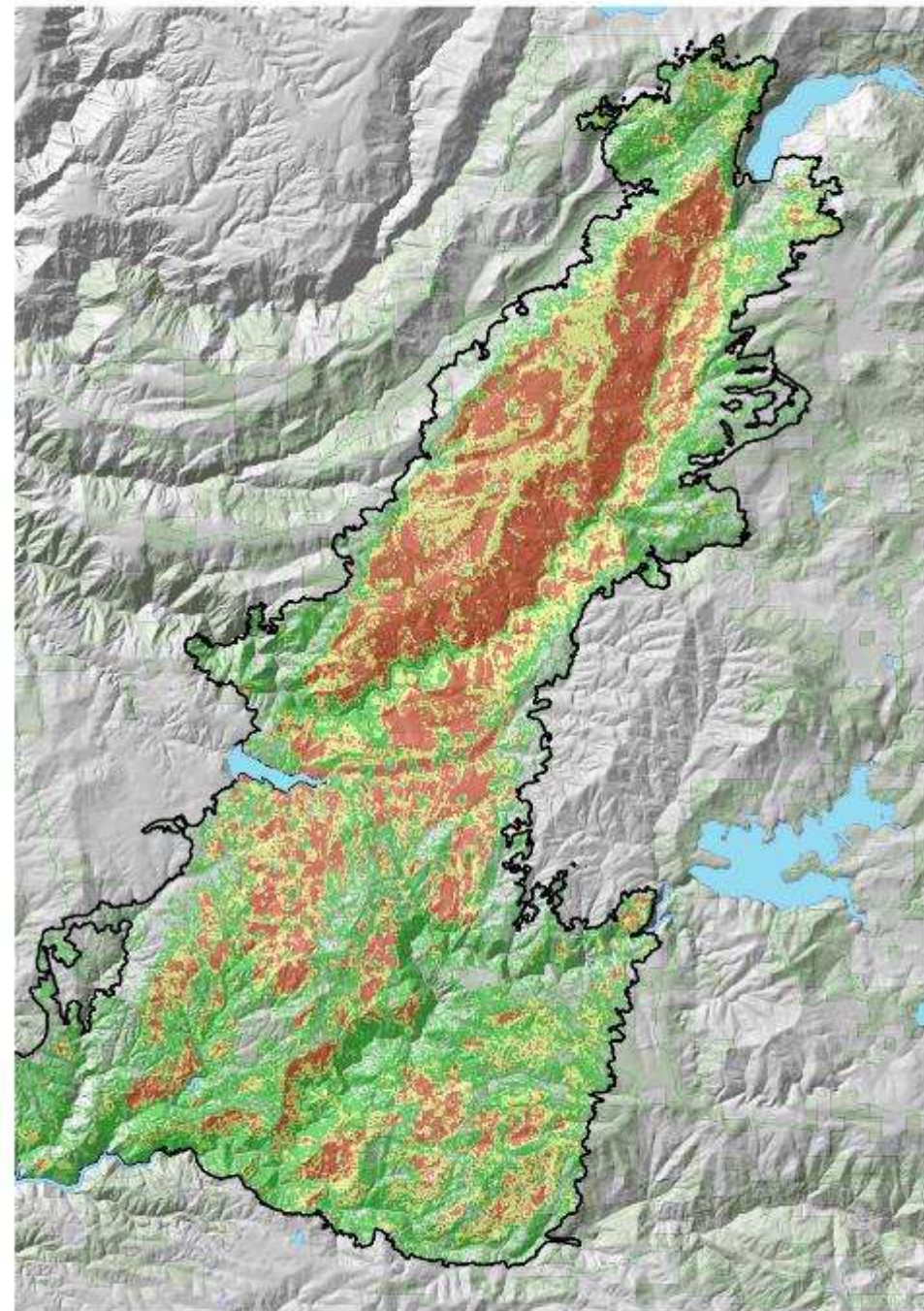
King Fire Aerial Mulching Inspections, Monitoring, & Lessons Learned



Blake Engelhardt, Eldorado NF
Steve Popovich, Arapaho-Roosevelt NF



King Fire Soil Burn Severity



King Fire

Sept- Oct 2014

Eldorado NF

97,717 acres

Soil Burn Severity

High: 23%

Moderate: 23%

Rubicon River Canyon & Eleven Pines Rd

Date & Time: Tue Oct 7 14:28:33 PDT 2014

Position: 10 N 716692 4912875

Altitude: 1595m

Azimuth/Bearing: 008° N08E 0058mils (True)

Elevation Angle: -12.5°

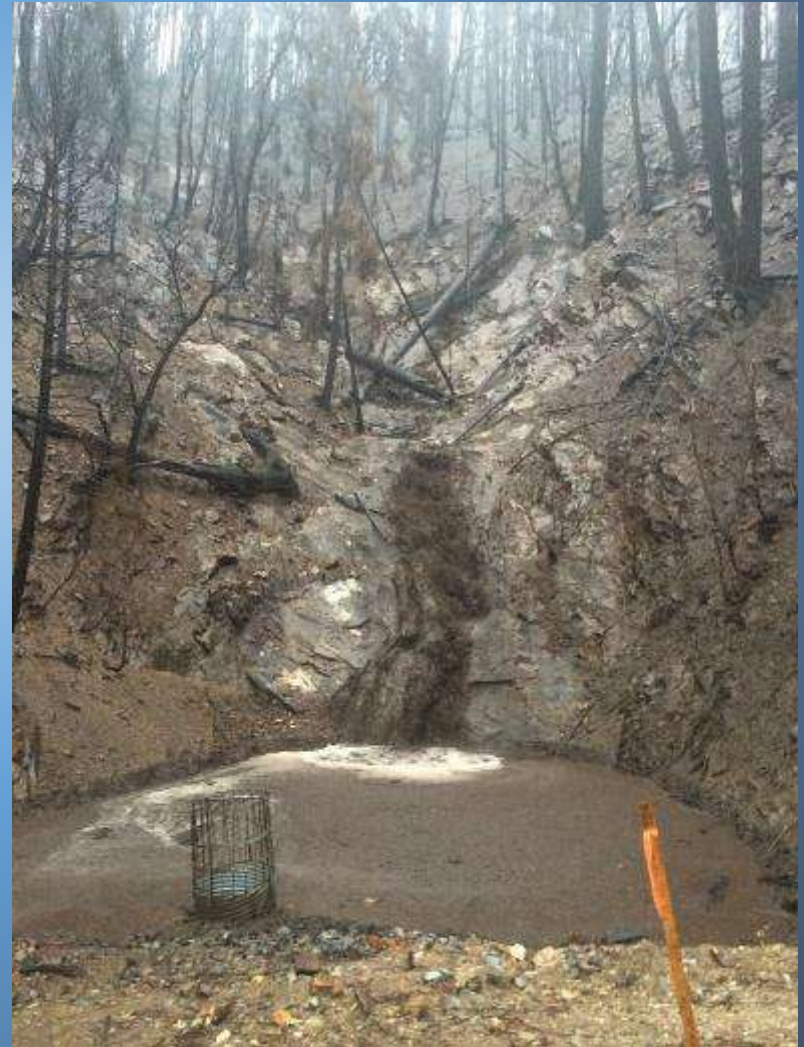
Horizon Angle: +03.5°

Zoom: 1X



BAER “Values at Risk”

- Eleven Pines Rd- key travel corridor
- 2 Reservoirs (hydropower)



BAER Proposal:

- **Aerial Mulching with straw**
- **1,013 acres above Eleven Pines Rd**
- **250 acres above Brush and Slab Creek Reservoirs**
- **\$\$\$ for straw inspections + 3 years monitoring/treatment for noxious weeds**

- **Wood shred considered but rejected due to higher cost**

Contracting Specs are key!

- CA certified weed-free rice straw
- Contractor shall provide original Certificate of Inspection
- Bales from outermost swathes of field are excluded
- Bales from bottom bale layer in stackyards are excluded unless stored in enclosed weed-free facility
- USFS inspections may occur at any phase of the straw acquisition

SPECIES covered in contract

- Federal & CA State Nox Weed & Seed lists
- NAISMA list
- Aggressive Non-Native CA rice field weeds (UC Davis/Rice Production Manual)
- Cheatgrass or other weedy annual brome grasses
- Kochia, Russian thistle, or smooth brome
- Eldorado NF Invasive Species List

USFS may request that bales be voluntarily excluded from use by contractor if containing non-native aggressive weedy species not listed above that USFS deems harmful to specific application and/or ecological integrity of implementation areas.

Pre-Work

- Formed USFS inspection team led by Steve Popovich
- Discussed certification procedures with several counties
- Recommended not purchasing straw from one county, inspectors targeted limited number of species
- Inspected straw at multiple stackyards at several properties:
 - Stack 1: Rejected floor and north face layers; Johnsongrass, morning glory, quackgrass
 - Stack 3: Rejected floor layer; yellow starthistle
- Approved a total of 3,580 tons for use (~7600 bales)

Stackyard Inspection



USFS inspections at staging area

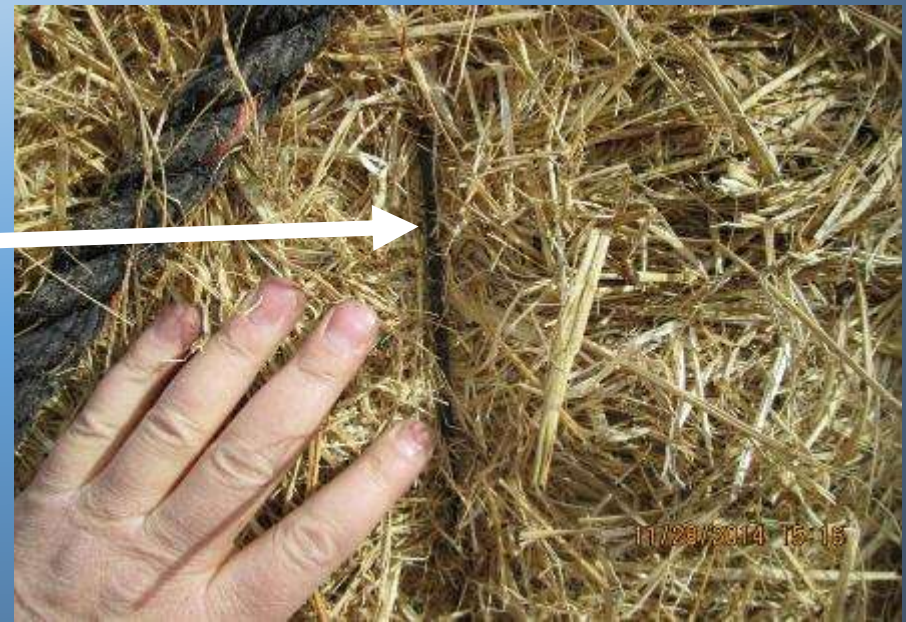


- Producers brought unpurchased straw to staging area for final inspection
- USFS staff inspected straw (weeds, fiber length, moisture)
- Approved straw was purchased on site by contractor and offloaded, rejected straw went back down the hill

Inspections at staging area



- **Black twine voluntarily used by one producer to indicate their weed-free straw**





- *Cyperus difformis* – smallflower umbrella sedge
- Common nuisance weed of CA rice fields
- 11 bales voluntarily withheld by producer

- Rice crop seed found in mulch
- Accepted these bales



Inspection Findings

“Original” King BAER:

- 11/24/14 - 11/28/14, 3-6 inspectors
- Inspected 992 tons, 2181 bales, 45 trucks
- 1 bale rejected for single johnsongrass seed
- 11 bales voluntarily withheld for smallflower umbrella sedge

“New” King BAER:

- 3/7/15 – 3/14/15, 5 inspectors
- Inspected 1024 tons, 2165 bales, 45 trucks
- 1 bale voluntarily withheld for redstem and cattail (possibly from outer swath)
- 1 bale rejected for excessive moisture

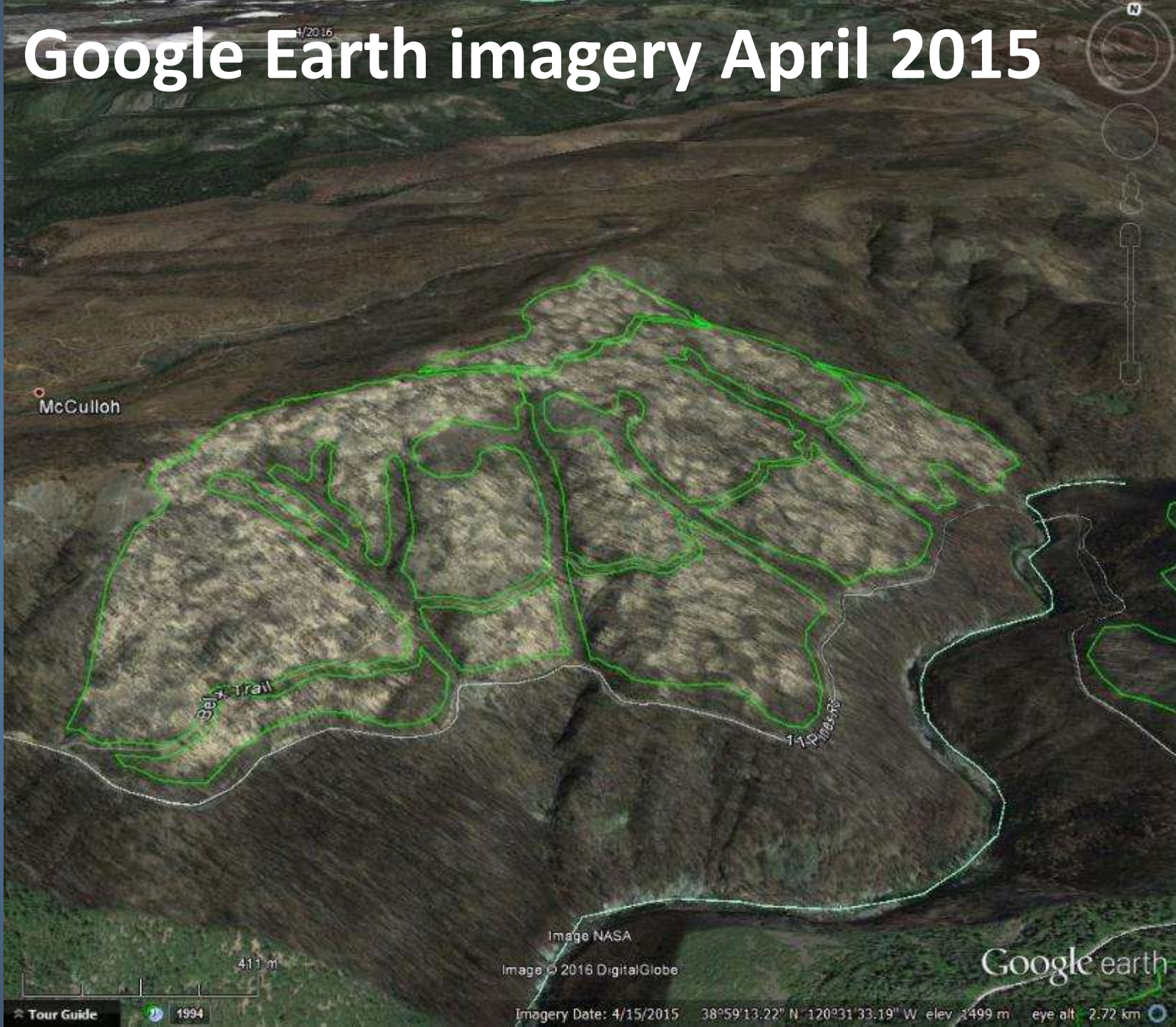
Mulch Processing & Application



Immediately after application



Google Earth imagery April 2015



McCulloh

Belt Trail

149 Pinnacles

411 m

Image NASA

Image © 2016 DigitalGlobe

Google earth

Tour Guide

1994

Imagery Date: 4/15/2015 38°59'13.22" N 120°31'33.19" W elev 3499 m eye alt 2.72 km

1st Season Post-Application (2015)



- Understory vegetation recovery beginning
- Initial weed surveys (June-July)
- Additional survey and hand-digging (July-October)
- Local botanists, Eldorado NF botany crew, CNPS volunteer days, Generation Green/YCC crew (920 hours)

Noxious Weeds: Johnson grass*



* Also one roadside yellow starthistle plant- inconclusive whether from mulch or other vector

Nuisance Weeds

Bristley ox-tongue



Barnyard grass



Crab grass



Plus: Sprangletop, domestic rice, lady's thumb, domestic wheat, wild oats, smooth barley, prickly lettuce, sow thistle, bull thistle

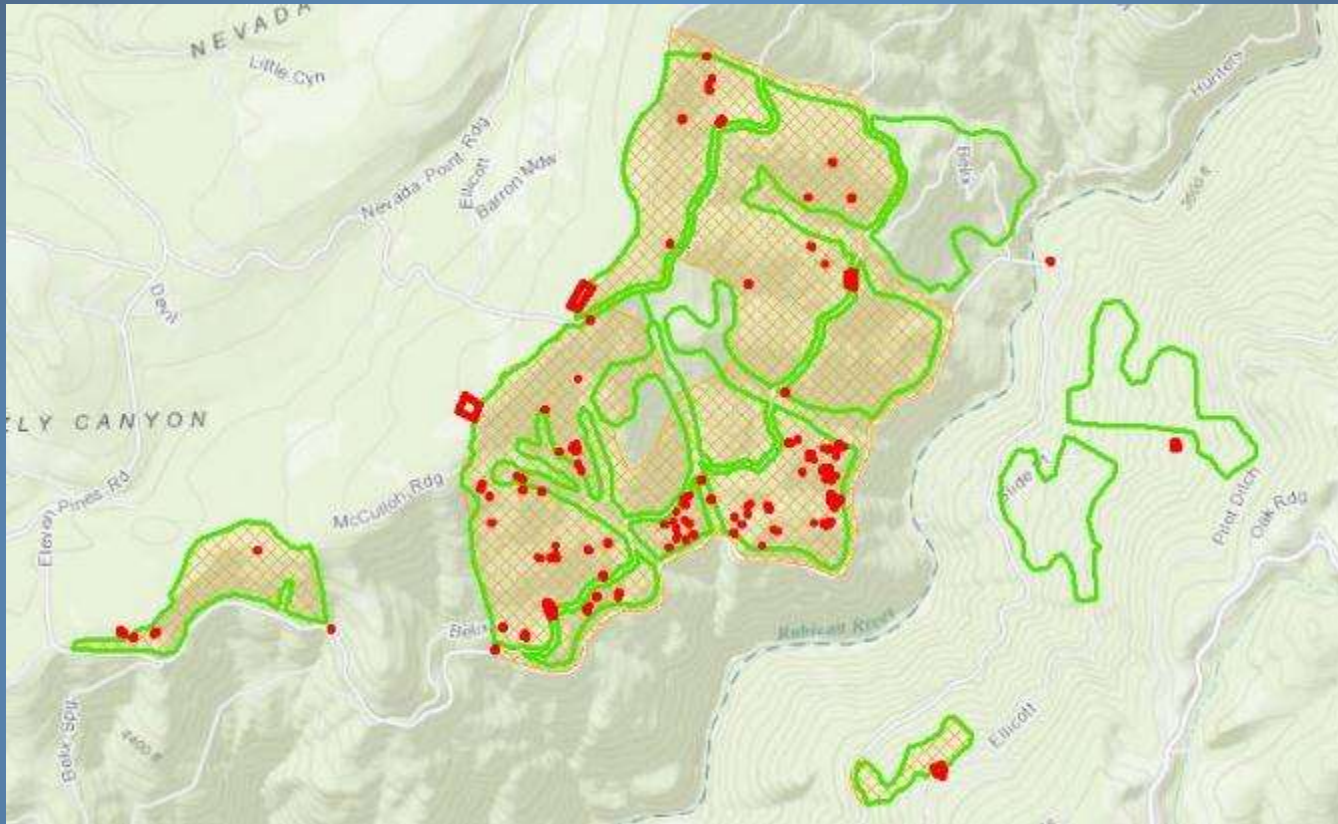
2nd Season Post-Application (2016)



- Weed surveys & treatment (June-Sept) focusing on Johnsongrass only
- Hand-digging & limited herbicide application (glyphosate only)
- Eldorado NF botany crew, Gen Green/YCC crews, CNPS (1,122 hrs)



2nd Season: Johnsongrass locations



- **Johnsongrass:**
 - 17 of 19 (89%) sites hand-treated in 2015 did not have plants in 2016
 - 40 new infestations in 2016, ~750-800 plants
- **Yellow starthistle:** two infestations in 2016

Issues with Certification

- Counties inspect at varying intensities; may focus only on species they commonly encounter
- Certification only inspects for listed Nox Weeds, not listed Noxious Weed Seeds
- Many undesirable non-native species are not inspected for under any program – cheatgrass, sweetclover, etc.
- No physical chain of custody in CA- must trust producers
- Certification form may not cite the specific field inspected, - ex: “John’s farm, various fields”

Issues with Bale Inspections

- Limited to outer ½-inch of 1-2 sides of bale and outer faces of stack; can't see bale interiors
- = Less than 1% of straw hitting ground was inspected
- Time versus thoroughness (esp. for large operations)
- Difficult to reject after bales are purchased or unloaded
- Relying on trust- no physical chain of custody- such as twine or tags

Lessons Learned

- Always use certified weed-free. Could have been worse!
- Certified weed-free = certified “reduced-weed.” Assess the risk/consequences for each project.
- Determine the species you are not willing to accept and clearly spell out in contract/specs before purchase.
- Call county inspectors! Which weeds are inspected for, which weeds are commonly found, which producers have a positive history.
- Inspect prior to purchase and before unloading, including at stackyards (w/ landowner permission).
- Do not accept bales from outer (1-2) field swaths, possibly floor and face layers in stackyards.

A few more suggestions...

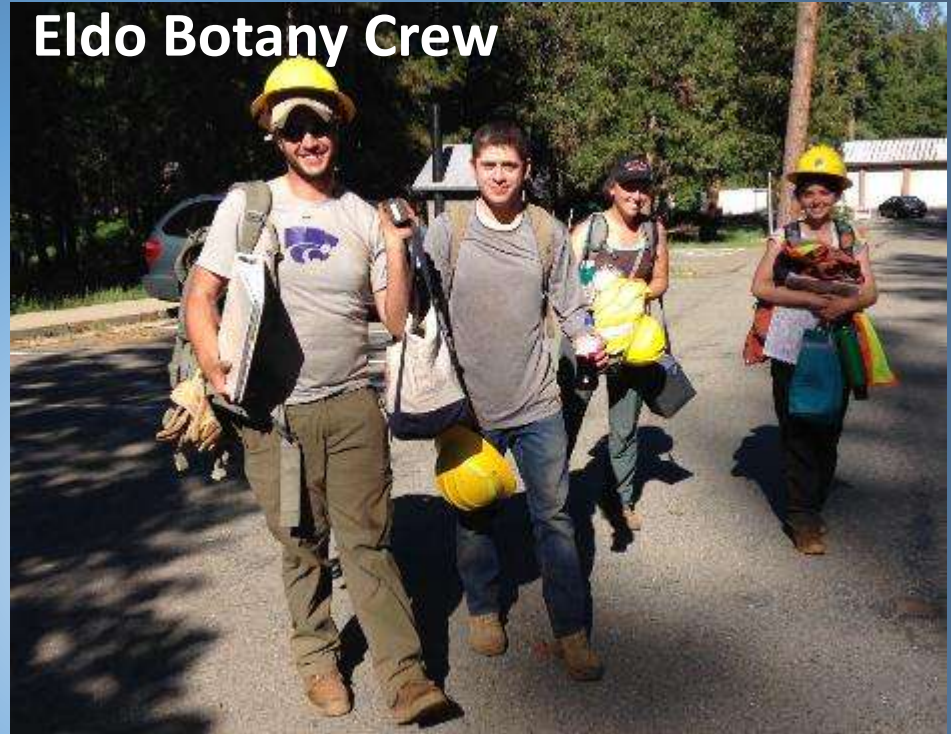
- Include adequate funding for inspections, monitoring and treatment.
- Don't re-invent the wheel! Save time and get help from those that have done this before.
- Take the opportunity to train additional people.

Steve P. & team



Thank you!

Eldo Botany Crew



CNPS Volunteers



Generation Green

