King Fire Aerial Mulching
Inspections, Monitoring, & Lessons Learned

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King Fire
Sept- Oct 2014
Eldorado NF
97,717 acres
Soil Burn Severity
High: 23%
Moderate: 23%
Rubicon River Canyon & Eleven Pines Rd
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
• Rice crop seed found in mulch
• Accepted these bales

• Cyperus difformis – smallflower umbrella sedge
• Common nuisance weed of CA rice fields
• 11 bales voluntarily withheld by producer
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
Immediatly after application
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.
Thank you!

Steve P. & team

Eldo Botany Crew

CNPS Volunteers

Generation Green