After the Fire - Immediate Actions

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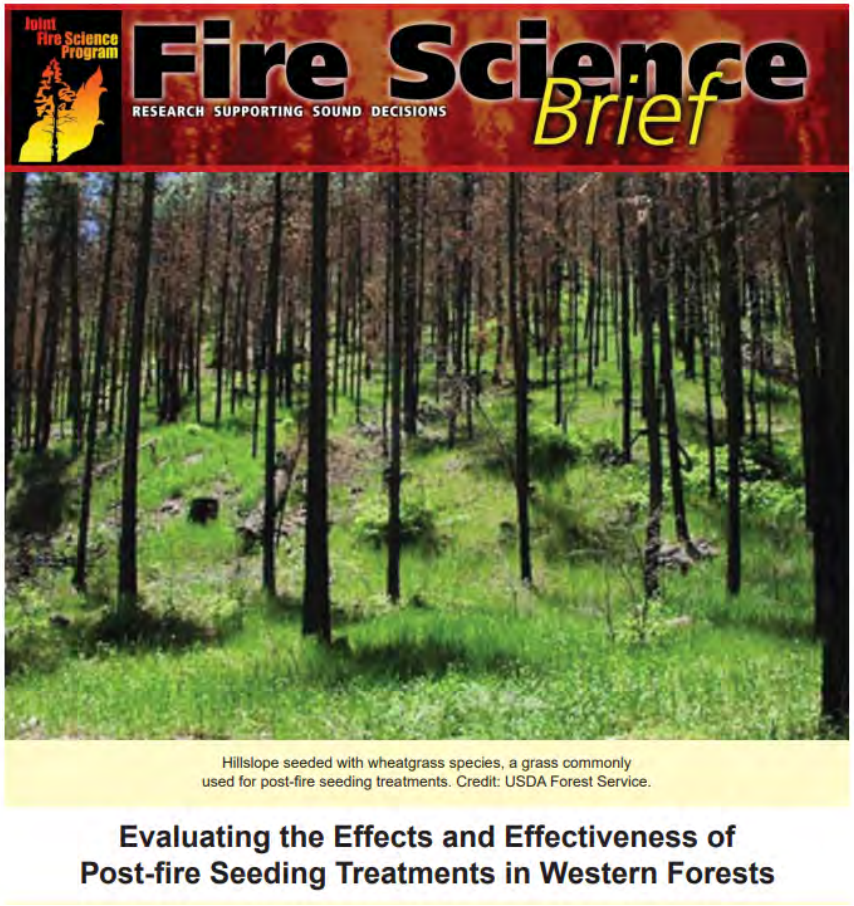
Studies conducted over the past decade have identified the most important factors in determining post-fire erosion rates:

- the degree of burn severity
- the amount of bare soil,
- the rainfall intensity
- the amount and degree of post-fire soil water,
- and the time since the fire

Controversy over Post-burn Seeding



2011 Review of scientific articles, theses, and government publications

to address questions on:

- soil erosion,
- non-native plant invasion, and
- native plant community recovery

Fire Science Brief Issue 147 December 2011
www.firescience.gov

Key Findings

Fire Science Brief Issue 147 December 2011 www.firescience.gov

- Seeded versus unseeded controls, 78 percent revealed that seeding did not reduce erosion.
  - Even when it significantly increased vegetative cover - insufficient to stabilize soils within first two years after fire.
- 60% of studies reported that seeding deterred native plant recovery in the short-term - "he who gets there first, wins".
- 11 papers evaluated curtailment of non-native plant invasions,
  - 55 percent stated that seeding treatments were effective
  - 45 percent stated they were ineffective.
- 40 papers and 67 Burned Area Reports between 1970 and 2006
  - revealed an increased use of native species and annual cereal grains/hybrids, with native species dominating seed mixes.
- From 2000 to 2007, total Burned Area Emergency Response (BAER) seeding expenditures have increased, reaching an average of $3.3 million/year - a 192 percent increase over the previous 30 years [and more now]

Potential Positive Effects of Seeding Grasses in Wildfire Areas

1. Native or sterile non-native grasses can reduce non-native and invasive plant encroachment via competition
2. Seeding can increase infiltration and reduce surface runoff and resulting soil erosion.
3. Seeding may be used purposely to reduce shrub regrowth on range and pasture lands (herbaceous competition).
4. Seeding with proper specifications can help reduce runoff, surface erosion, and sedimentation in the first and/or second winter following wildfire. Specifications include: species that fit the site, seedbed preparation, and care and maintenance. Site factors include: soil/site conditions, seed selection, time of planting, irrigation availability, seedbed protection, etc.

Potential Negative Effects of Seeding Grasses in Wildfire Areas

1. Studies have shown that seeding has marginal to no effect on soil erosion in the first years following fire – the most erosive years
2. Annual species generally have shallower root systems and thus less effect on slope stability – than perennial herbaceous species, shrubs and trees.
3. Grasses increase infiltration which can have a negative effect on slopes prone to sliding – resulting in slope saturation, slides and risk of debris flows.
4. Seeded species can compete with and/or slow regeneration of pre-existing perennial native vegetation

Potential Negative Effects of Seeding Grasses in Wildfire Areas

5. Seeding uses soil moisture and may reduce regrowth of native plants that regenerate from a resident seed bank in the soil (herbaceous, shrubs and trees)..
6. Seeding may have long term negative effects on the ecosystem by changing plant community composition over time; especially where seed contains noxious or aggressive weeds
7. Seeding is often not cost effective and does not guarantee safety to human life or property.
8. Seeding can give property owners a false sense of security.

Potential Negative Effects of Seeding Grasses in Wildfire Areas

9. Seeding that is successful, especially in the unburned wildland interface, can become a fire hazard in following fire seasons (increase of fine fuels).
10. Native grass seeding may cause gene pollution of resident native grasses especially if the grasses sowed were of different gene types and collected in other areas of the state.
11. Seeding can attract pocket gophers/ground squirrels, therefore more soil piping and “dry erosion”. Studies show that seeding can increase pocket gopher activity by 4.5%.
12. Seedbed preparation can cause disturbance to slopes, soil, pre-existing vegetation/seedbank, etc.

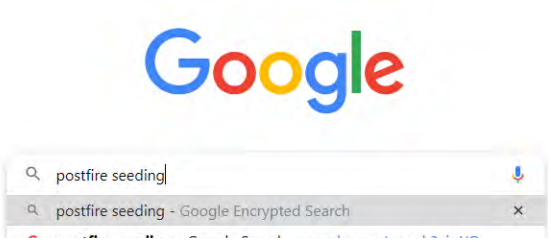
Mulching Studies

- Suggest at least 60% ground cover is needed to reduce post-fire hillslope erosion rates
- Needle cast from burned trees may provide substantial amounts of ground cover in low or moderate burn severity and likely contribute to the lower post-fire sediment yields
- Post-fire wheat straw mulch treatment reduced erosion rates 48-99% in 1st two years; greatest when mulch provided 70% or more ground cover
- Wood strand mulch can reduce sediment yield (by up to 97%) was the most long-lived (7 years) and reduced erosion for 4 years
- Hydromulch generally fails to reduce sediment, is costly, and lasts about 1 year
- Con - Straw mulch can blow around and cause problems
- Con - Thick mulch can prevent sunlight from reaching the soil surface and obstruct emerging natural and seeded vegetation
- Post-fire mulching for runoff and erosion mitigation: Part I: Effectiveness at reducing hillslope erosion rates

Mulches

- Reduce rain splash erosion
- Increase surface roughness and thus reduces overland flow and may result in more infiltration
- Can increase sediment deposition
- Moisture barrier - Shade the soil and protect it from wind, resulting in lower soil temperatures, lower evaporation rates and increases in soil water retention. (why we use it with plantings)

Controversy over Seeding and other treatments following Fires



Fire Severity Should Direct Immediate Actions

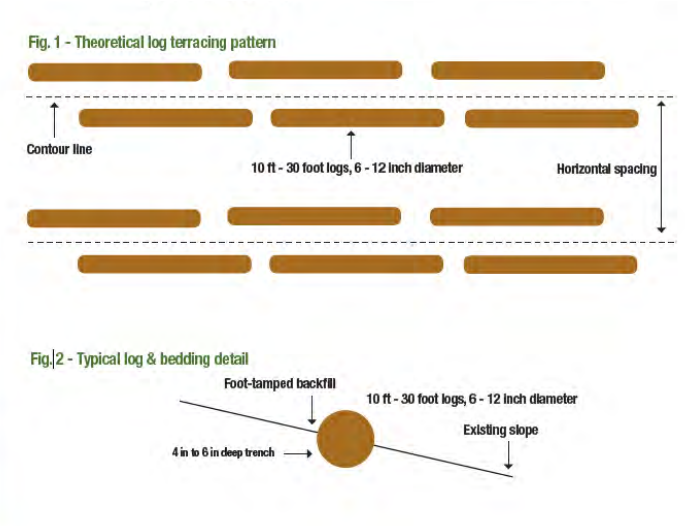
- Light/low intensity fire = ~ prescribed fire – generally do nothing = "fertilizer effect" – stimulates "bloom events" postfire
- Soil is an excellent insulator for roots – the roots are often still alive! (and the seeds on and in the soil, too) – probably already regreening now
- Make a map of fire severity and % slope for individual properties – to help address what needs to happen where; where are water bodies?
- Good or Bad - the herbaceous vegetation will typically be back – a pre-burn high cover site is generally occupied
- Most non-conifer trees and shrubs re-sprout following fire – so they aren't necessarily dead either
- Hazard/Dead tree assessment, especially conifers – guide-sheets for this

Key Immediate Erosion-Control Actions

- Leave leaf material and other material that is covering the soil and doesn't pose a problem for entering streams and rivers creating debris jams (exacerbate flooding issues)
- Do not cut trees/shrubs or make any major soil/slope disturbances until spring or summer unless hazard trees pose an immediate danger
- When removing hazard trees, do retain stumps/roots – they will hold soil for several years as they decompose.
- Seeding quick-germinating annuals (Cover Crop) may be appropriate in high severity/bare soil areas, where duff has been mostly consumed and/or when steep slopes; especially near streams/rivers)– species include annual ryegrass, winter wheat, winter barley, Regreen – preferably with straw mulch placed over it – not more than 2"
- Prior to and after broadcast seeding – may rake/harrow surface and raking/harrowing/rolling after = seed to soil contact

Key Immediate Erosion-Control Actions

- Straw bales and wattles placed across slope
- Cut log placement across slope
- Water bars on trails and temporary roads



Best Management Practices - Immediate actions

- Low Severity – generally can leave alone – duff layer or vegetation not consumed (60%+ remaining)
- Moderate to High Severity – Erosion Reduction
  - Hazard tree removal – ideally directionally felled and used to stabilize slope; or chipped and spread as mulch
  - Heavy levels of slash – will need to be addressed
  - Potentially Seeding
  - Straw mulching
  - Straw Wattles and Bales
  - Water bars
- Longer-Term
  - Seeding of perennial plants may be needed for plant and soil recovery. This would ideally be determined after assessment of vegetation recovery. Seeding should occur at appropriate timing – warmer soil temperatures.

Near Leaburg Dam – Holiday Farm Fire

- Leaf litter on burned area
- Green-up evident

Hillside, Good Pasture Road – Holiday Farm Fire

- Moderate slope
- Plant green-up evident
- Sawdust mulch

Santiam Canyon, Detroit

- Plant green-up
- Human devastation

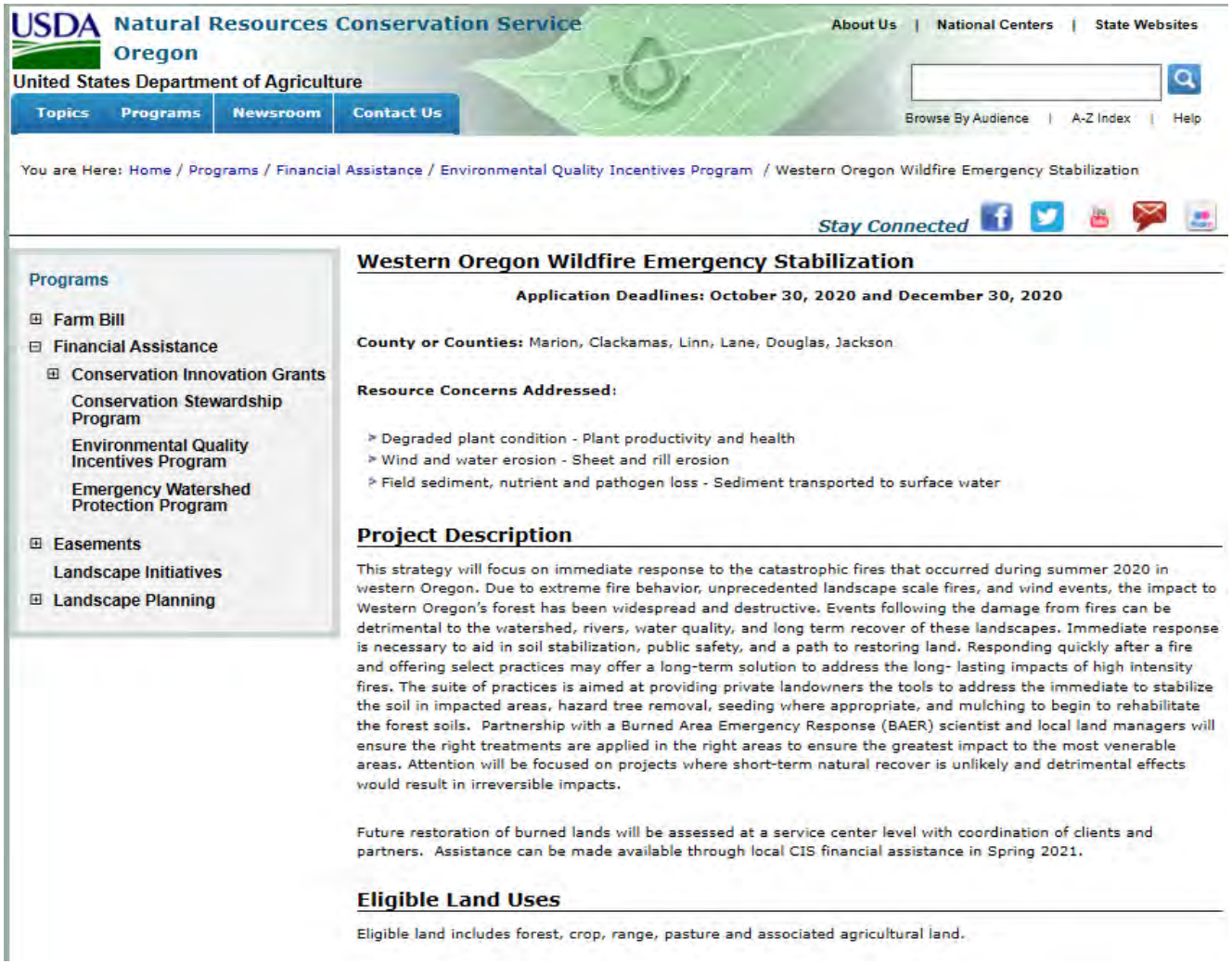
NRCS Emergency EQIP

Post Wildfire Response

Andrew Owen

NRCS State Forester

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/programs/financial/eqip/?cid=nrcseprd1660818



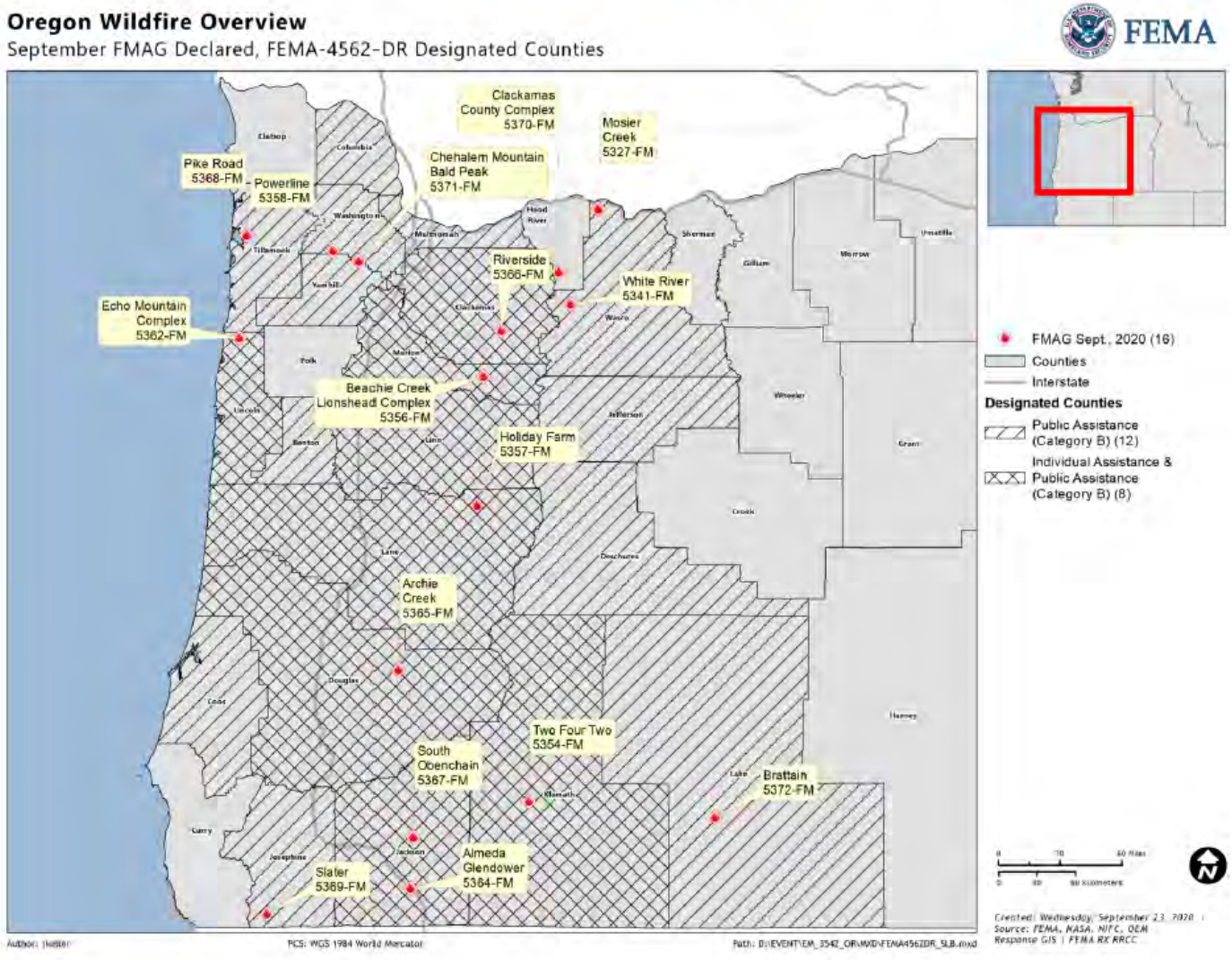
Emergency EQIP Western Oregon

- Conservation practices being offered (10/30 & 12/30)-

- Conservation Cover (327)
- Cover Crop (340)
- Woody Residue Treatment (384)
- Mulching (484

Emergency EQIP Eastern Oregon

- **Practices**
- 327-Conservation Cover
- 340-Cover Crop
- 384-Woody Residue Treatment
- 484-Mulching
- 315-Herbaceous Weed Treatment
- 550-Range Planting



Emergency EQIP Fire Locations

Rapid Assessments

- 1. Think safety- Look Up, Down, and Around
- 2. Think about safety again
- 3. Compassion for people's loss
- 4. Triage the properties in need of assistance
  - Burn severity maps, fire line intensity, fire progression
- 5. Triage the individual property for immediate need and future need.
- Conduct understory and overstory assessments
  - erosion potential
  - Hazard tree
  - Impacts to nearby streams, rivers, trails

Figure 6. Deep char on Douglas-fir where outer bark species characteristics are lost (left arrow) and completely burned away to expose wood (right arrow).

The following information will be collected and mapped in the field and will be most useful when applied to a specific forest stand or other homogenous unit.

Burn severity. All assessment and management decisions after a burn will be based on burn severity. You most likely will have a mosaic of burn severities throughout a unit. Determine and map burn severities. Indicate areas of low (green), moderate (yellow), and high (red) burn severities using the

Table 1. Burn severity classification*.

Soil and Litter Parameters	Burn severity		
	Low	*Moderate*	*High*
Surface Organic Horizons (litter, humus and rotten wood)	Scorched, charred, blackened but with definable plant parts; 40 to 85 percent litter cover remains.	Partially consumed; less than 40 percent litter cover remaining, much covered with black char.	No surface litter remains.
Small Woody Debris (<3" diameter)	Surface burned; some unburned areas.	Charred; partially to wholly consumed.	Fully consumed.
Large Woody Debris (>3" diameter)	Blackened with unburned areas.	All blackened; char goes into wood.	Only large, deeply charred logs are left.
Stumps	Stumps intact but blackened.	Burned deep enough to form charcoal.	Stumps gone; hole in ground where stumps and root systems were.
Soil Heat Pulse	32° to 350°F (0 to 177°C)	125° to 750°F (50 to 400°C)	350° to >575°F (177 to >300°C)
Mineral Soil/Ash	Exposed mineral soils may be unchanged or blackened, with isolated areas gray to orange where downed logs burned.	Black, gray, and/or orange mineral soil dominates area, with little to no unburned areas; gray ash present in patches covering <20 percent of area.	Black, gray and orange mineral soil dominates area; gray ash layers may be deep and extensive.
Indicates:			
Soil Organisms	Soil microbes and organisms intact.	Soil microbes and organisms absent except in isolated	Little to no soil organisms remain.

Webinar Registration

Topic	After the Fire - Now what?
Description	Have you been affected by wildfire? Not sure what to do next? In this webinar, presenters will talk to you about where to start and how to prepare an assessment consistent with funding agencies and land management plans. Our agency partners will be on the line to connect you with information on technical/financial assistance. Presenters: Stephen Fitzgerald, Forestry & Natural Resources Extension Silviculture Specialist; Daniel Leavell, Forestry & Natural Resources Extension Fire Specialist; and representatives from agency partners (ODF, FSA, NRCS, ODA, OWEB). Audience: Those affected by wildfire with natural resources related issues or questions.
Time	Oct 1, 2020 03:00 PM in Pacific Time (US and Canada)