

The Effectiveness of Seeding for Mitigating Erosion Post-High Severity Wildfire

By: Jollee Perrier

Supervisor: Wendy Gardner



Outline

Introduction

- Fire and Impacts
- Rehabilitation and Erosion

Objectives

Methods

Results and discussion

Management recommendations

Fire and Impacts

- Fire severity definitions
- Environmental impacts
 - Water quality
 - Property
- Climate change

Measures of fire severity

Unburned/ low severity

Less than 25% tree mortality, limited effects on soils

Moderate severity

25-75% tree mortality, moderate effects on soils

High severity

Greater than 75% tree mortality, extensive mineral soil exposure

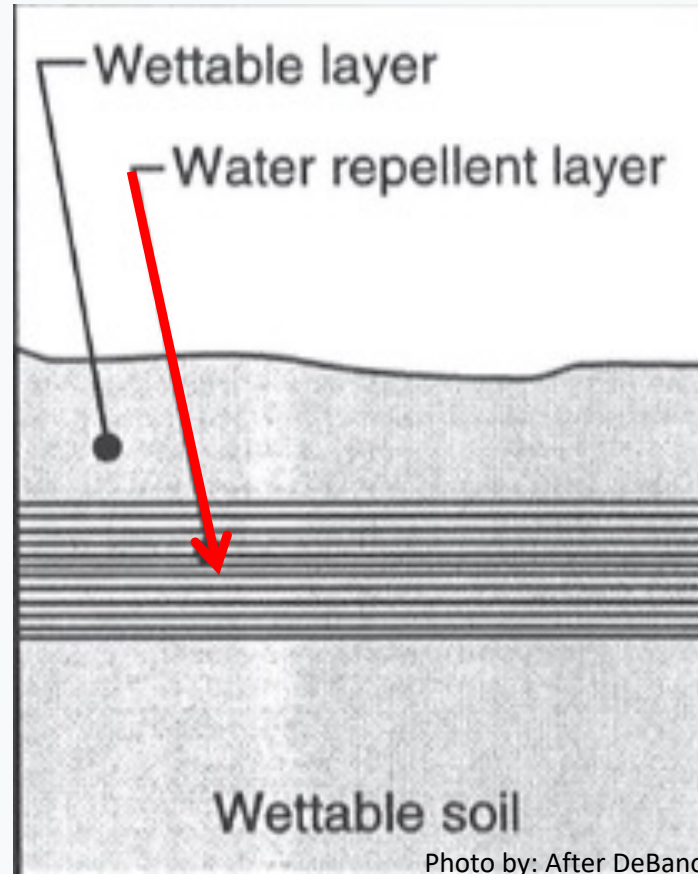




Photo by: Adelaide region bushfire risk



Photo by: DriveBC



Photo by: BC Government

Rehabilitation and Erosion

- Site Rehabilitation
 - Under the Wildfire Act and Regulation
 - Minimize surface erosion
- Seeding is an option
- Seed mixes raise environmental concerns



Photo by: USDA Forest Service

Objectives

Main objective:

To examine current literature to see if seeding post wildfire is effective in mitigating erosion

Secondary objective:

Assessed the plants ecology in the 2021/2022 BC post-wildfire seed mixes used for erosion control

Methods

Literature review approach

Key terms: seeding and wildfire, seeding and erosion etc.

Narrowed down 25 → 9 peer-reviewed articles

Used an adapted definition from Beyers et al. (2011) & Peppin et al. (2010) to determine **quality of evidence** and **seeding effectiveness**

Assessed the species in the 2021/2022 BC seed mixes using literature

Definitions

Seeding Effectiveness:

- Statistically effective
- Sufficient evidence

Quality of evidence:

- Statically robust
- Replicated, controlled and randomized

8 Categories:

- 1) Treatment type
- 2) Fire severity
- 3) Erosion measure used
- 4) Effectiveness
- 5) Seeding rate
- 6) Seed mix
- 7) Total plant cover % first year post-fire
- 8) Ecosystem type

Measuring Erosion

- Different ways of testing for erosion
- Seeding rates varied from 9kg/ha to 250 kg/ha
- Plant cover varied 5%-53%
- Studies in WN America and NW Spain
- Post 2000s > Pre 2000s quality of evidence



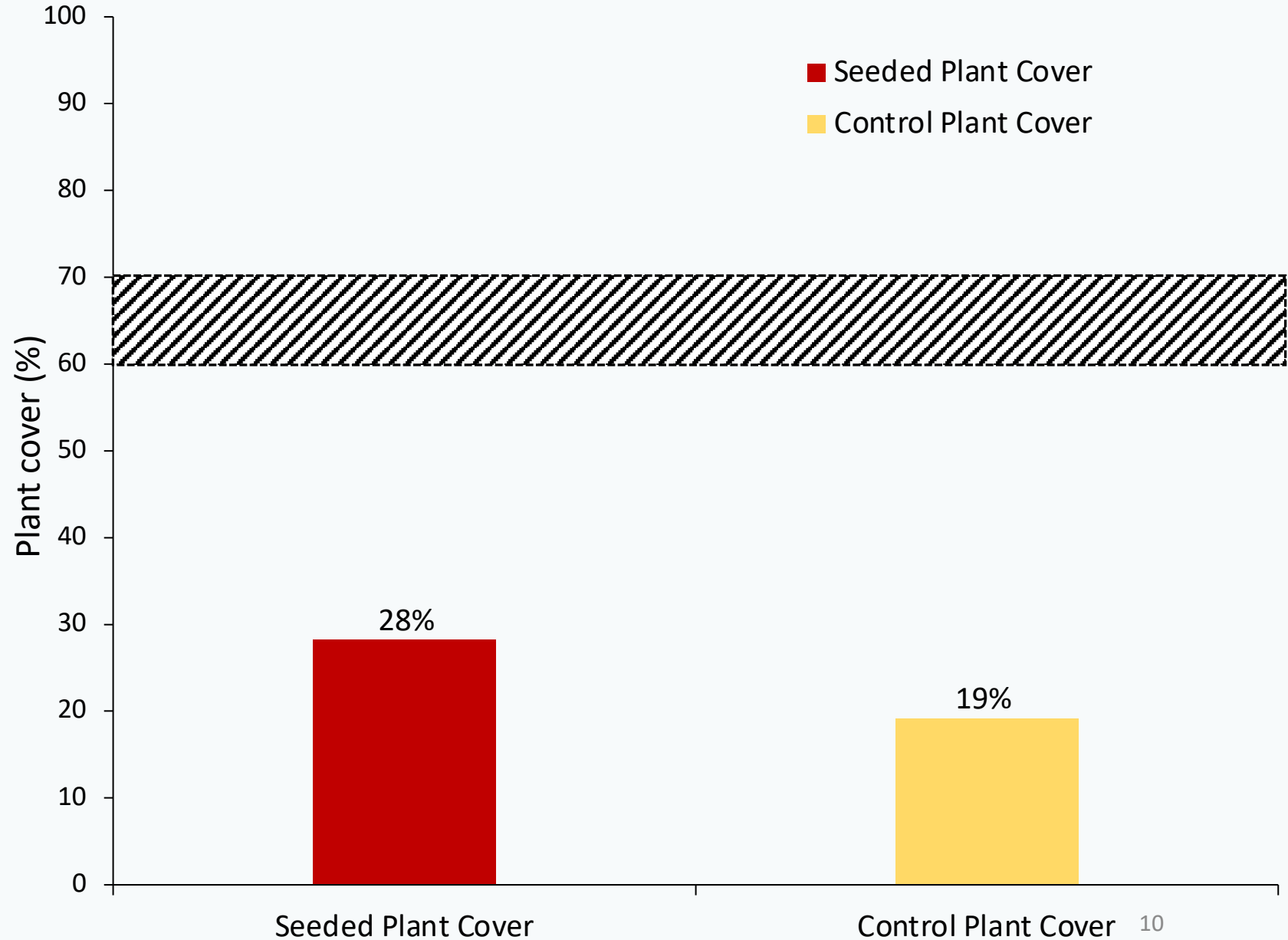
Photo by: Colorado State University



Photo by: Macdonald and Robichaud (2008)

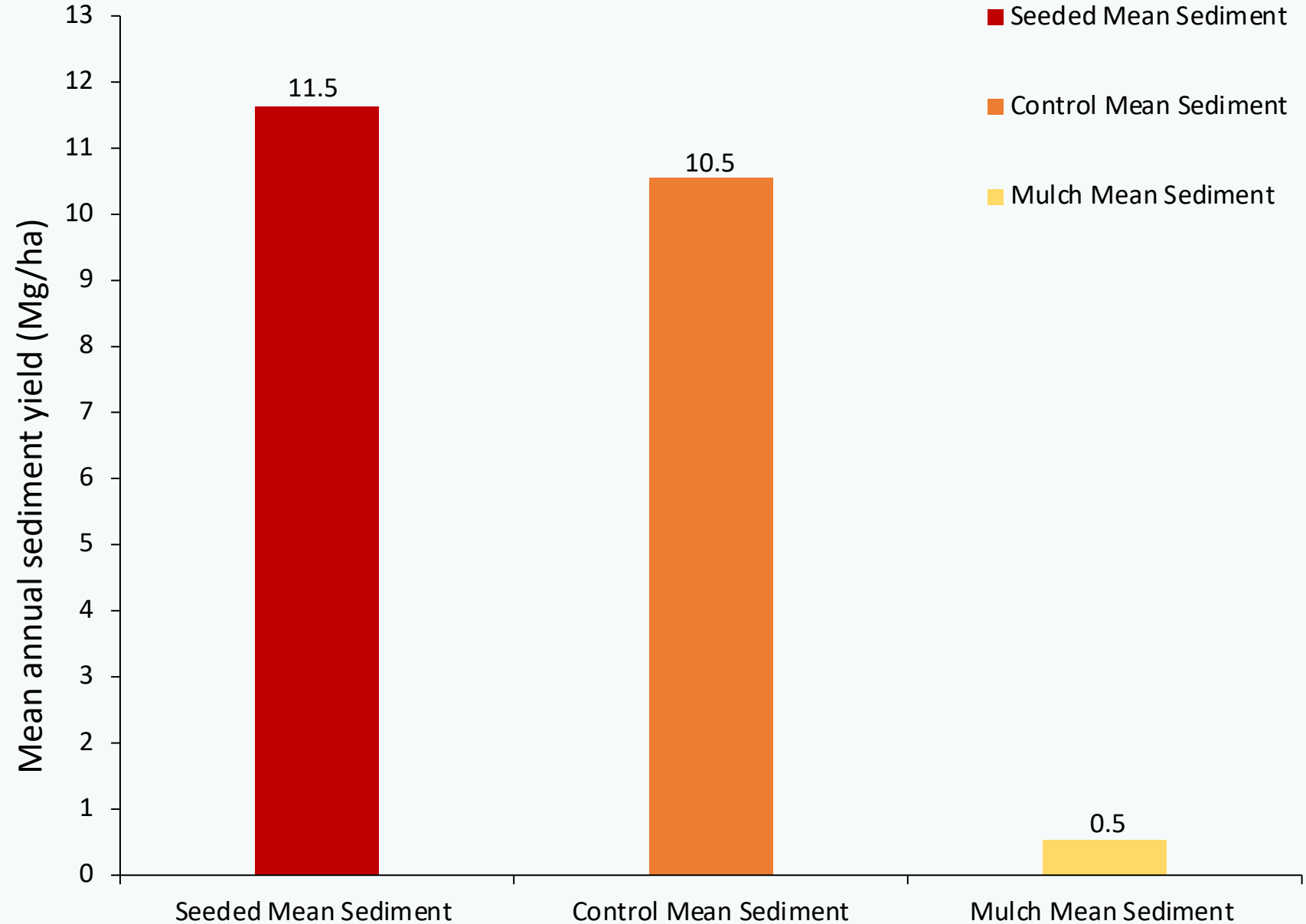
Seeding is NOT Effective

- Cover didn't reach 60-70%
- Highest cover (47-53%) only 10-20% was seeded species
- No difference of seeded to control sites
- **Low** cover from **low** establishment success



Sediment Fences

- Seeding and control sites had no significant difference
- Mulching treatment had the most effective results
 - 73-94%



Mulching

A) Straw mulch

B) Wood chips and pine needles

C) Wood straw

D) Hydromulch

- Low environmental concerns/impacts
- 70-80% cover goal



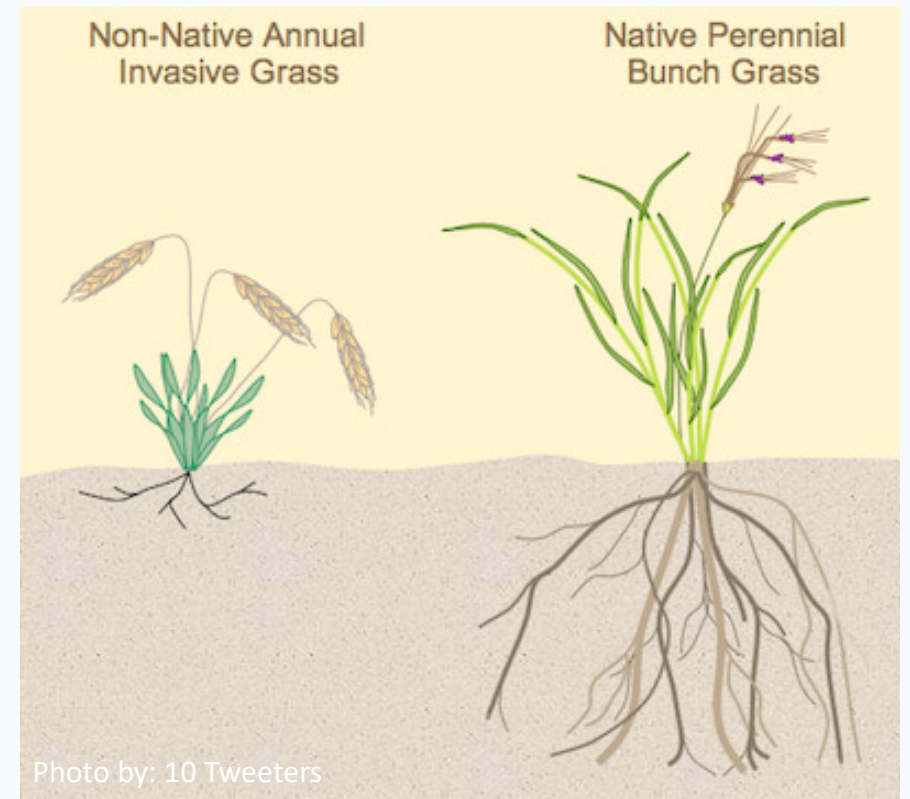
BC Seed Mixes

- **8/9** species non-native agronomic
 - Crested wheatgrass and chewings fescue
- **6/9** long-lived high persisting
- **2/9** short-lived and low persisting



Concerns:

- Long-lived persistent species
- Impacts on native plant community and nutrient cycling
- Substitute one issue with another



Management Recommendations

1) Avoid seeding for erosion

- If have to use short-lived and low persisting species

2) Mulch instead for immediate mitigation

- Can be 94% effective first and second year

Acknowledgements

My Supervisor, Wendy Gardner

My Family and Friends

...Thank-you!

A decorative graphic consisting of several overlapping, semi-transparent rings in shades of blue and green, arranged in a circular pattern around the central text.

Questions