Wildfire Moneyball: Analytics for the New Normal

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What do I mean by Moneyball?

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1. That our collective wisdom regarding wildfire over the past century is subjective and often flawed

2. Analytics can offer new perspectives otherwise masked by business as usual

3. Beneficial to lead with analytics, but should not substitute experiential knowledge
How Fire Helps Forestry
The Practical vs. The Federal Government’s Theoretical Ideas
By George L. Hoxie, C. E. Sunset (1910)

The Torch in the Timber
It May Save the Lumberman’s Property, But It Destroys the Forests of the Future
By Henry T. Graves Sunset (1920)

What is the Truth?
The Forest Service and Stewart Edward White Agree to Study Forest Fire Damage
By Paul G. Redington Sunset (1920)
“PIUTE FORESTRY” OR
THE FALLACY OF LIGHT BURNING

BY WILLIAM B. GREELEY, ASSISTANT FORESTER, UNITED STATES
FOREST SERVICE FROM THE TIMBERMAN, MARCH 1920
Fire As An Ecological and Silvicultural Factor in the Ponderosa-Pine Region of the Pacific Slope

Harold Weaver¹

This article presents evidence in support of the author’s belief that complete prevention of forest fires in the ponderosa-pine region of the Pacific Slope has certain undesirable ecological and silvicultural effects. He emphasizes the fact that conditions are already deplorable and are becoming increasingly serious over large areas, and urges intensive research on the problem.

Journal of Forestry, 1943
Contemporary climate

Average Summer Temperature (July - September)

Average Summer Precipitation (July - September)

Prism Climate Group - http://www.prism.oregonstate.edu/
Initial attack (IA) “Success” & Implications

IA Efficiency largely unchanged, but:
- Fire are more expensive
- Fires now cause more damage
- Fuel conditions dramatically changed (stand-landscape)

IA success never be 100%. We will always have big fires.
Modern Fire Regime

Mild and moderate fires are extinguished......in all vegetation zones

Most area burned under extreme conditions (3% fires burn 95% area)

Dry, windy, spotting

Suppression forces overwhelmed / ineffective
2009 Black Saturday bushfires, Australia
2016 Ft. McMurray Fire, Canada
2018 Attica Fires, Greece

Mati, Greece
Paradise, CA

2018 Camp Fire
Australia, 2019 - 2020

This map from Geoscience Australia shows the hot spots across Australia on Jan. 14, 2020.

~46 million acres burned, 5900 structures burned, 34 people killed
Australia, 2019
Fire is both a problem and solution

National Cohesive Wildland Fire Management Strategy vision:

To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire.
A social-ecological system

Communities

Ecosystems  Response

Social system

Ecological system  Fire mgmt. system
Adapting homes and communities
Adapting homes and communities
Adapting ecosystems

Before

After
Adapting wildfire management

2019 - 204 Cow Fire, Malheur NF – photo by D. Hannibal
Learning to live with fire

Suppress fire where needed

Expand more of the “right” kind of fire at the “right” place at the “right” time for the “right” reasons

Foster resilience and adaptation to fire
The Tools

Potential Control Location Atlas (PCLs)

Quantitative Wildfire Risk Assessment (QRA)

Suppression Difficulty Index (SDI)

https://www.youtube.com/watch?v=NMbzXNY9RU8&index=4&t=0s&list=PLNsZX2SBTlVn1ce0I9-0C6CCbIDOj2kwn
The U.S.F.S. Rocky Mountain Research Station presents:

**PARTNERING for SOLUTIONS:**

**NEW TOOLS for SPATIAL FIRE PLANNING**
Informing wildfire response

Strategic and tactical response objectives and actions
Strategic response

PODs – Potential wildfire Operational Delineations

Strategic response commensurate with values

Supports both initial attack and campaign fire decisions
Potential Control Locations

Suppression Difficulty Index
Targeting mitigation: Where, when, why, and who?
Targeting mitigation – POD boundaries
Targeting mitigation - Difficult fire management landscapes
Targeting mitigation – Communities

Potential Control Lines

Suppression Difficulty Index

Quantitative Risk Assessment

Ashland, OR
Targeting mitigation – Shared responsibility

Potential Control Lines

Suppression Difficulty Index

Quantitative Risk Assessment

Grants Pass, OR

Legend:

- Roads
- Private ownership
- Probability
- Index value

0 - 0.1
- 0.15 - 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00

0 - 0.1
- 0.15 - 0.25
- 0.25 - 0.45
- 0.45 - 1.00
- 1.00 - 2.38

0 - 1.0
- 1.0 - 2.38
- 2.38 - 5.0
- 5.0 - 10.0
- 10.0 - 25.0

Kilometers
Concluding thoughts

1. Adapting fire management to the new fire reality is as or more important as adapting communities and ecosystems

2. Requires cultural change, within and external the management agencies

3. Actions must recognize shared responsibility and co-management in land management to support more prudent fire management

4. Not a substitute for local and experiential knowledge, rather complementary
Planning and response
PODs in action

**Protect:** Current conditions are such that HVRAs are at high risk of loss from unwanted wildfire

**Restore:** Current conditions are such that HVRAs are at moderate risk of loss from wildfire

**Maintain:** Current conditions are such that HVRAs are at low risk of loss from wildfire, and many natural resources may benefit from fire

**Exclude:** Current conditions are such that HVRAs are at high risk of loss from wildfire

**High complexity:** Current conditions are such that HVRAs are at high risk of loss from wildfire, depending on ignition location and weather conditions
Planning and response

POD Applications

Tonto N.F.

(A) Brooklyn wilderness fire

(B) Highline WUI fire

(C) Pinal resource benefit fire
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