

Incorporating Future Values into Analysis of Current Wildfires

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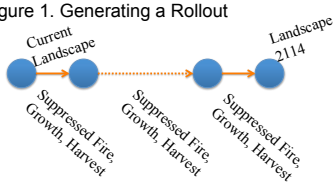
Why Future Value?

Today's wildfires determine the fuel composition of the landscape in future years. Good suppression decisions can produce benefits in future suppression costs, timber production, ecological value, and recreational value that will be realized in the decades to come. Evaluating the "future value" of a current wildfire allows for a complete analysis of the tradeoffs in suppression decisions.

Methodology: Simulations

We linked together standard growth and fire spread models to produce a wild land simulator for 100-year periods. The simulator takes a suppression policy as input to determine responses to fires. The simulator then produces many "rollouts" (figure 1). See reference 1 for details.

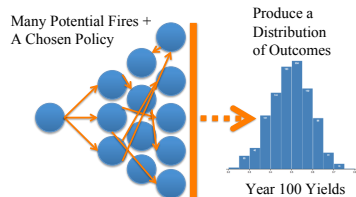
Figure 1. Generating a Rollout



Many Years Produces Many Potential Outcomes

We can't predict what the landscape will look like in 100 years, but we can produce a **distribution of potential landscapes**.

Figure 2. Dataset production



We need your **help** to **build** **tools** that **matter**

How You Can Help Us Build the Tools

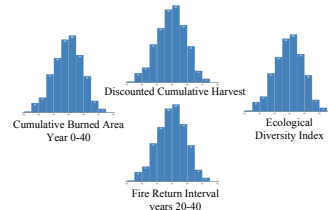
- Are you involved in shaping policies or making decisions about fire management? Are you willing to be involved in a focus group? Please take the time to talk with us and leave your contact information.
- There are things we think we know (see "Challenges for Visualizations")?
- Are we missing anything? Are we emphasizing the wrong information?
- What information would make your job easier?

Supporting decision making through visualization

The resultant distribution of landscapes is difficult to interpret with standard statistical tools (figure 3). We seek to utilize visualization as a means of exploring the set of potential wildfire policies.

- Visualization makes the distribution of futures accessible
- Visualization may help decision makers form mental models for longer time horizons
- Visualization may allow stakeholders to interact with proposed policy documents

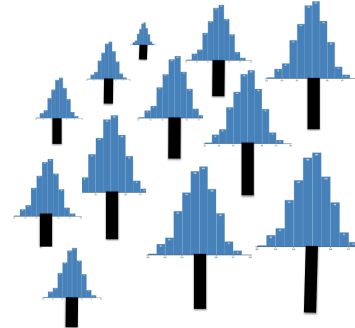
Figure 3. Distribution of Simulated Outcomes (mockup)



Challenges For Visualizations

- Creating something that is useful for policy makers and managers, while addressing the fact that the future is highly uncertain, so single outcomes are meaningless.
- How do we show the distribution of outcomes while not losing the detail of individual outcomes (figure 4)?
- How do we incorporate both the spatial and temporal aspects of current decisions into visualizations.

Figure 4. Seeing the Forest AND the Trees



Example: Comparing Policies

- We allow policy makers to define arbitrary policies in a process of "what-if" analysis.
- Figures 5 and 6 show a mockup of a landscape's burn frequency under two different policies and figure 7 shows their difference.

Figure 5. Burn Frequencies in Year 40, Suppress All Fires (Mockup). [Frequent, less frequent, rare]

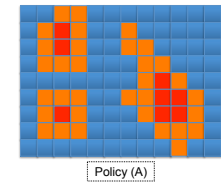


Figure 6. Burn Frequencies in Year 40, Let Burn All Fires (Mockup) [Frequent, less frequent, rare]

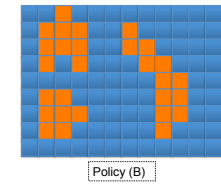
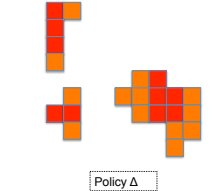


Figure 7. Delta in Policies, Figure 5 – Figure 6 [Much more frequent, More frequent]



References

1. Houtman, R. M., et al. "Allowing a wildfire to burn: estimating the effect on future fire suppression costs." *International Journal of Wildland Fire* 22.7 (2013): 871-882.

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