

PODs-based risk analytics to support strategic fire planning and vegetation management

The Colorado Forest Restoration Institute (CFRI) developed a new approach to evaluate wildfire risk reduction that leverages Potential Operational Delineations (PODs; see the [PODs StoryMap](#) for more information) with [Suppression Difficulty Index \(SDI\)](#) and transmitted risk. This approach was piloted with the Ashley National Forest and Forest Service Region 4 (R4) fire analysts to complement existing [R4 Risk Monitor products](#) and help prioritize fuels management along POD lines. Products display the SDI, change in SDI after treatment (delta SDI), and transmitted risk to the highly valued resources and assets (HVRAs) housing, infrastructure, and surface drinking water. Together, the R4 Risk Monitor products and the POD line analytics provide a comprehensive picture of wildfire risk to HVRAs and treatment effectiveness that can be used to inform vegetation management and integrate pre-fire mitigation with incident response.

Components of risk analytics

There are two components of the PODs-based risk analytics.

- [Delta SDI](#) - models the change in SDI after a patch cut treatment is applied along POD lines. Delta SDI is calculated by subtracting the baseline SDI (no treatment) from the post-treatment SDI.
- [Transmitted risk](#) - assesses where fires start and spread across POD lines to impact nearby HVRAs. The transmitted risk data are then summarized along the POD lines that are crossed.

Using the products to inform vegetation management

We now explore the application of PODs, delta SDI, and transmitted risk on the Ashley National Forest. Figure 1 includes baseline SDI (top left) and delta SDI (i.e., treatment effectiveness) following a simulated patch cut treatment (top right) summarized along POD lines. High delta SDI values (dark green) depict areas where vegetation management could reduce modeled suppression difficulty. These areas are where fuels are the primary driver of suppression challenges, and where treatments may offer the greatest return on investment. High transmitted risk POD lines (Figure 1, bottom left panel) have a higher likelihood of fires starting and breaching the POD line to negatively impact adjacent sensitive HVRAs.

Combining delta SDI with transmitted risk analyses can help further winnow down candidates for POD boundary hardening (Figure 1, bottom right panel). Managers can use the bivariate plot in Figure 1 and R4 Risk Monitor products to support a strategic, multi-pronged vegetation management portfolio applying localized treatments near HVRAs, POD boundary hardening, or both, depending on wildfire risk and treatment effectiveness. For example:

- POD lines with high transmitted risk and delta SDI (Figure 1, right panel, black) represent strategic locations to prioritize POD boundary hardening to prevent undesirable fire spread into nearby sensitive HVRAs and improve suppression opportunities. Localized fuels treatments around sensitive HVRAs is also advised.
- POD lines that have high transmitted risk, but low delta SDI (Figure 1, right panel, orange) depict areas where suppression difficulty may already be low or may be influenced by factors other than fuels (e.g., slope or access). Treatments may offer limited benefit. In these locations, localized fuels treatments around nearby HVRAs may be most beneficial.

Combining PODs, delta SDI, and transmitted risk analyses can help identify strategic fuelbreak locations to strengthen pre-defined control features in places where:

- there is a high likelihood of fire spread to nearby values at risk; and
- vegetation management can make meaningful differences in reducing suppression difficulty and improving suppression opportunities.

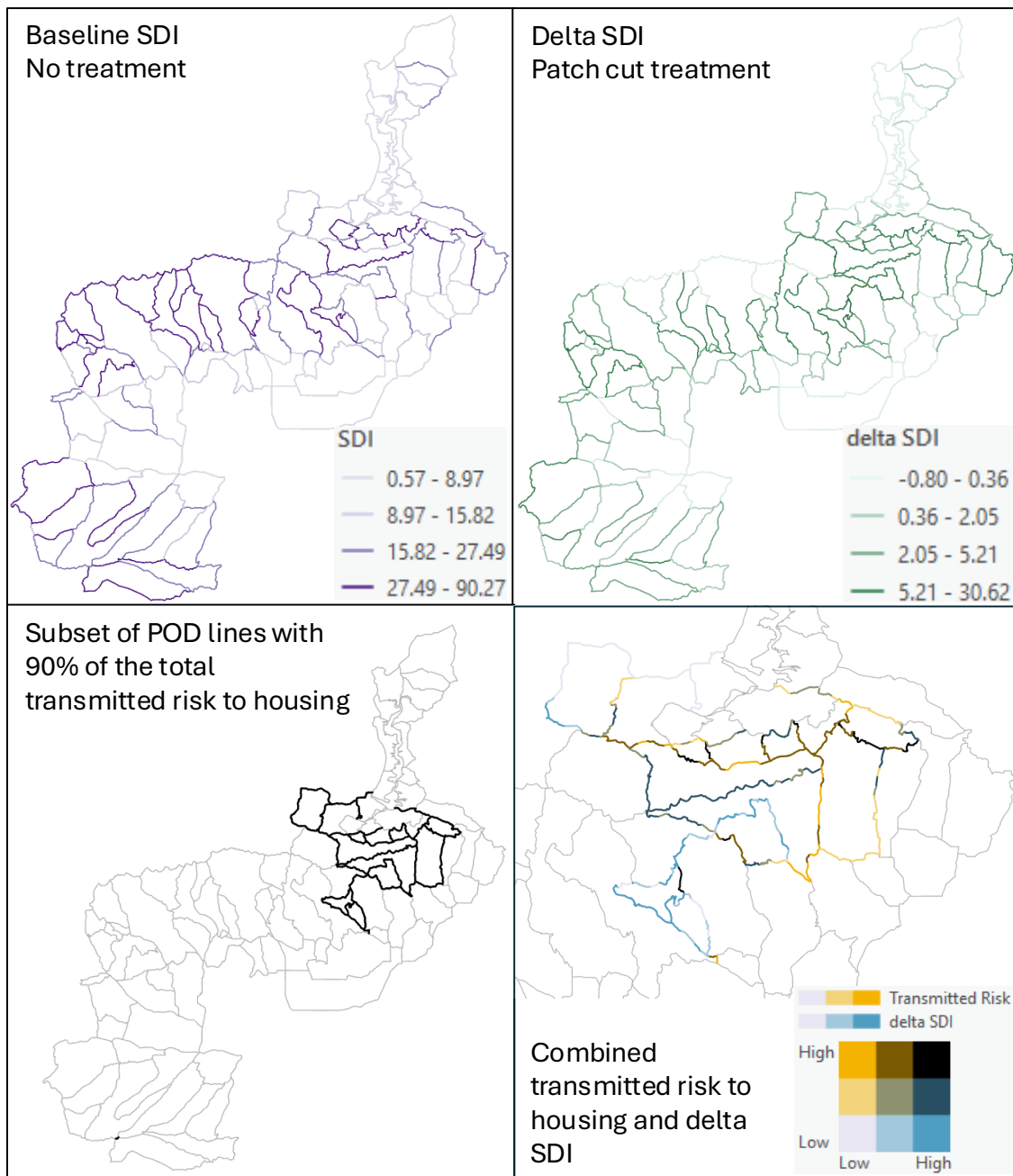


Figure 1: Top left panel: Baseline SDI (90th percentile). Top right panel: delta SDI following simulated patch cut treatment. Bottom left panel: Transmitted risk, representing 90% of total transmitted risk for the Housing HVRA. Bottom right panel: Bivariate classification of transmitted risk by delta SDI.

Conclusions

This analysis demonstrates how new risk-based analytics can support strategic fire planning. The approach is appropriate for mid-scale planning. It can help prioritize work where high-risk areas overlap with places where managers can make a meaningful difference in suppression opportunities. However, the approach is not meant to replace local project planning. This approach is scalable and can be tailored to local management priorities and conditions.



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For more information, see technical report here: <https://cfri.box.com/s/3jvktw7sfyf4icotdp085bt8ujdrsvyi>.



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