Assessment Name:

National Wildfire Risk Assessment on Forest Service Lands

Presented by:

Greg Dillon

Scale:

National (NFS lands in the conterminous US)

Management issue:

The goals of a national wildfire risk assessment for Forest Service lands include:

- Providing a risk-based foundation for supporting budget allocation decisions at a national scale.
- Providing consistent baseline data for Regions in their allocations.
- Providing a valuable spatially-based communication tool to convey the potential risks (and benefits) of wildfire on Forest Service lands.

Project Management:

Primary analyst: Greg Dillon (RMRS, Fire Modeling Institute)

Direction and oversight: Elizabeth Reinhardt and Jim Menakis (WO FAM)

Advice and guidance: Joe Scott (Pyrologix), Matt Thompson and Jessica Haas (RMRS, Human Dimensions)

Time: Project initiated in the fall of 2013. Assembly of HVRA data, first draft of response functions, relative importance weights, and initial NVC calculations have taken just over a year to complete. This is one of several concurrent projects for the primary analyst (Greg), so progress has been intermittently sidelined for weeks or months at a time.

Funding: Fire Modeling Institute (which is funded by WO FAM and FS R&D).

Fuel and fire behavior modeling:

All wildfire simulation modeling was done by the Rocky Mountain Research Station (Karen Short) for FPA. Their inputs came directly from LANDFIRE. We acquired 270 m CONUS mosaics of BP and all FLPs directly from Karen Short.

HVRAs

We decided on five primary HVRAs: 1) Communities, 2) Infrastructure, 3) Municipal Drinking Water, 4) Ecosystem Function, and 5) Air Quality (see table). We started from the list of HVRAs that were included in the last national assessment (First Approximation, Calkin et al. 2010, RMRS-GTR-235). We then searched for available, nationally-consistent spatial data, using the following primary sources: Homeland Security Infrastructure Program (HSIP) 2013 Gold datasets; Wildland Fire Decision Support System (WFDSS); Forest Service Forest to Faucets data; the Forest Service Enterprise Data Warehouse (FS EDW); and LANDFIRE. From there, we followed an iterative process of consulting with Regional

fuels specialists and data stewards / subject matter experts for certain datasets to finalize our set of HVRA data.

	Highly Valued Resources and Assets (HVRAs)		
	Primary	**Secondary**	**Data Sources**
Assets	Communities	high density (>35 people/100 acres)	Residentially Developed Populated Areas (RDPA)
		moderate density (4 - 35 people/100 acres)	
		low density (0.05 - 4 people/100 acres)	
	Infrastructure	Powerlines	Homeland Security Infrastructure Program
		Communication Sites	Wildland Fire Decision Support System
		High Investment Buildings and developed recreation sites	USDA FS corporate spatial datasets for buildings and recreation sites
		Low/Moderate Investment Buildings and developed recreation sites	
Resources	Municipal Drinking Water	high importance (≥ 75th percentile)	Forests to Faucets index of importance to surface drinking water supply, by 12-digit Hydrologic Unit Code watersheds
		moderate importance (50th - 74th percentile)	
		low importance (10th - 49th percentile)	
	Ecosystem Function	Groups of ecological communities that have similar historic fire regimes and response to fire	LANDFIRE Biophysical Settings
	Air Quality		Potential PM2.5 emissions estimates, compiled from CONUS-wide emissions modeling outputs from research efforts at the USDA FS Rocky Mountain and PNW Research Stations

We took an initial pass at creating our own response functions (RFs) for all HVRAs. We did this with guidance from Joe Scott and Matt Thompson, and using RFs from all previous assessments as reference. Given the national scope of our assessment, a response function workshop typical of smaller-scale assessments was not feasible. Instead, we filled in RF values for all HVRAs and then engaged Regional fuels specialists and fire ecologists for feedback.

For relative importance weights, we engaged the Sustainable Land Management Board of Directors (SLMBOD). As a national leadership body within the Forest Service, we felt they had the authority to prioritize the HVRAs with respect to their importance to wildfire management. Rather than a full workshop typical of smaller-scale assessments, we were given 90 minutes on the agenda of a SLMBOD meeting to present the general risk assessment framework, describe what we needed, and elicit relative importance weighting value for primary HVRAs and sub-HVRAs.

How the results are being used

The analysis is still in progress, currently waiting on new FSim outputs. No results are available yet.

Highlights and lessons learned

Although the assessment is not complete, we've learned several lessons about the process:

- A national-scale assessment necessarily involves compromise. Given that spatial data for HVRAs must be nationally-consistent and available, it is difficult to a) include all the HVRAs that you might like, and b) have perfect spatial representation of your HVRAs. National GIS datasets are inherently generalized, less than fully complete, or prone to other problems that can make them seem inaccurate at finer scales.
- The workshop format for response functions and relative importance weighting that can be so fruitful at regional and local scales is less practical at the national scale. This is true for a number of reasons including:
    - the number of people needed and the difficulty of coordinating schedules
    - the broad differences in ecological and management issues across an area as large as the conterminous United States.
- The overall framework for wildfire risk assessment has been very well laid out in publications like RMRS-GTR-315 and others, but the practical details of implementing an assessment still require significant effort.
    - Determining the most appropriate spatial data for HVRAs, understanding their attributes, and processing them from their original format to raster datasets at the appropriate scale and resolution takes a lot of time and attention to detail.
    - Understanding relative importance weighting is not as straightforward as it may seem. Understanding the difference between relative importance per pixel vs. overall share of relative importance for each HVRA and sub-HVRA is tricky.