Western Wildland Environmental Threat Assessment Center

"Early detection and prediction of the potential effects of multiple, interacting threats and stresses across a range of spatial and temporal scales"
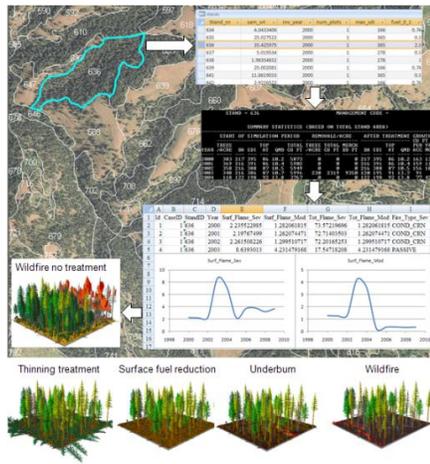
ArcFuels

Vegetation and fuel management planning is a complex problem that requires advanced vegetation and fire behavior modeling and intensive spatial data analyses. Both the benefits and potential impacts of proposed treatments must be clearly demonstrated in the context of land management goals and public expectations. Potential fire behavior metrics, including fire spread, intensity, likelihood, and ecological risk need to be analyzed for proposed treatment alternatives.

ArcFuels was built to streamline the fuel management planning process, and provide tools for quantitative wildfire risk assessment. ArcFuels is a toolbar implemented in ArcMap which creates a trans-scale (stand to large landscape) interface to apply pre-existing forest growth (e.g., Forest Vegetation Simulator) and fire behavior models (e.g., FlamMap) to aid in vegetation management, fuel treatment planning, wildfire behavior modeling, and wildfire risk assessments. The ArcMap framework helps users incorporate data from a variety of sources to address project-specific issues that typify many fuel treatment projects. ArcFuels was built to accommodate ArcGIS raster data (such as LANDFIRE data) and/or forest inventory data. ArcFuels10 provides a logical flow from stand to landscape analyses of vegetation, fuel, and fire behavior, using a number of different models in a simple user interface within ArcMap.
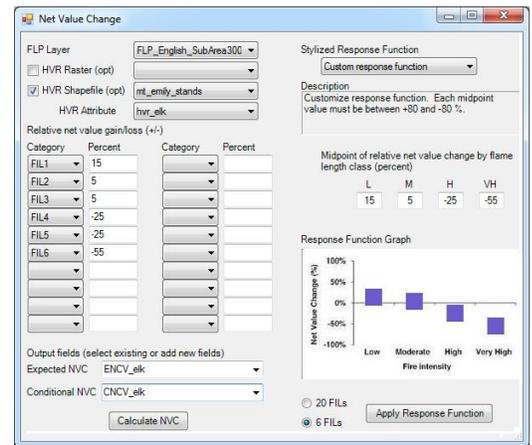
ArcFuels is available for both ArcGIS 9 and 10. Forest Service users do not need ArcGIS loaded on their computers; ArcFuels and the associated programs are fully functional in the Citrix environment.
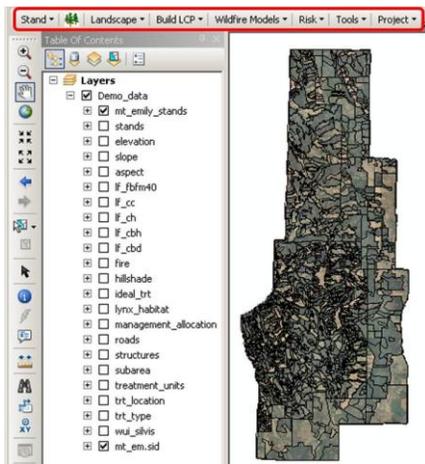
ArcFuels tool bar in ArcGIS 10.0 with the demonstration data loaded.

Stand level simulation using FVS/FFE-FVS and SVS.

ArcFuels form to calculate the Net Value Change using stylized response functions in the Risk menu.

Program & Tutorial

The program, tutorial, and demonstration data can be downloaded from the project website:
http://www.fs.fed.us/wwetac/arcfuels

Citations

Ager, A.A.; Vaillant, N.M.; Finney, M.A. 2011. Integration of fire behavior modeling tools and GIS for wildland fire risk assessment and fuel management planning. Journal of Combustion. Article ID 572452, 19 p.

Vaillant, N.M.; Ager, A.A.; Anderson, J. 2013. ArcFuels10 system overview. Gen. Tech. Rep. PNW-GTR-875. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 65 p.

Vaillant, N.M.; Ager, A.A.; Anderson, J.; Miller, L. 2013. ArcFuels User Guide and Tutorial: for use with ArcGIS 9. Gen. Tech. Rep. PNW-GTR-877. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 256 p.

For more information about ArcFuels contact Alan Ager, aager@fs.fed.us, or Nicole Vaillant, nvaillant@fs.fed.us.