INFERRING FIRE REGIMES FROM DATA YOU MAY ALREADY HAVE: ASSESSING LANDFIRE FIRE REGIME MAPS USING LOCAL PRODUCTS

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Extended abstract—The determination of fire regime and condition class on federally owned land is needed for prescribed and wildland fire management. Determining historic fire regimes for large areas can be difficult without fire-scar records from old-growth forests or sediment charcoal from paleoecological sites. Large-scale efforts to map fire regimes have been made incorporating fire ecology of tree species to assign fire regimes (Nowacki and Abrams 2008), fire scars from dendrochronology studies (Guyette and others 2006), and climate and chemistry (Guyette and others 2012). Early nationwide maps incorporated many lines of evidence to map the role of fire in forested ecosystems. Frost (1998) compiled fire histories from across the contiguous United States and, combined with landform characteristics, created a map of pre-European settlement fire regimes. Using current and potential vegetation, ecological regions, and expert opinion, Schmidt and others (2002) mapped historical natural fire regimes for the contiguous United States at a coarse resolution.

To help identify areas where prescribed burning is appropriate for restoration purposes, two local mapping products were created for the Monongahela National Forest. The first used the fire ecology of current and potential vegetation to map fire-adapted vegetation and directly convert this to fire regime groups (FRG) (Thomas-Van Gundy and others 2007). The second used witness trees from early land surveys to create a continuous surface depicting percentages of pyrophilic tree species (Thomas-Van Gundy and Nowacki 2013). Cells with pyrophilic percentages of 60–100 were assigned to FRG I, those with 40–60 percent pyrophilic species were assigned to FGR III, and cells of 0–40 percent pyrophilic were assigned to FRG V. Fire regime groups derived from both mapping products were compared to LANDFIRE (LANDFIRE 2013) fire regime groups for assessment and comparison.

The cell-by-cell comparison of the rule-based map and LANDFIRE showed that the two versions of FRGs agree on about 57 percent of the Monongahela National Forest. Most of the departures (about 36 percent of the area) were positive 2 or 4 meaning the rule-based map FRGs were greater than LANDFIRE; about 8 percent of the area was in departures of negative 2 or 4.

Creating FRGs from the witness tree-based map resulted in about 30 percent of the study area classified as FR I, about 14 percent as FR III, and about 56 percent as FR V (fig. 1). The fire regime groups inferred from the witness tree data matched LANDFIRE on about 61 percent of the area. Departures from LANDFIRE from the witness tree-based map were more evenly distributed above and below zero (compared to departures between LANDFIRE and the rule-based map) with about 22 percent of the area with a difference of positive 2 or 4 and about 17 percent in negative 2 or 4 differences.

The grids resulting from these calculations spatially depict where the agreements and departures occur. All three versions of FRGs for the study area identify the higher elevations in the mountainous center of the study area as an area of low fire frequency. The influence of subsection boundaries is more obvious in the LANDFIRE estimation of FRG and was a main contributor to departures from the two locally derived maps.

The mapped differences between the two locally derived FRGs and LANDFIRE FRGs are a useful starting point for detailed, site-specific reviews for project planning. The methods described here are applicable to other landscapes and should be useful for others trying to define areas to restore fire-adapted vegetation. Managers should not limit themselves to one product—witness trees, historical records, potential natural vegetation mapping, fire scars, responses to prescribed fire—all can inform options for restoring fire as a disturbance regime.

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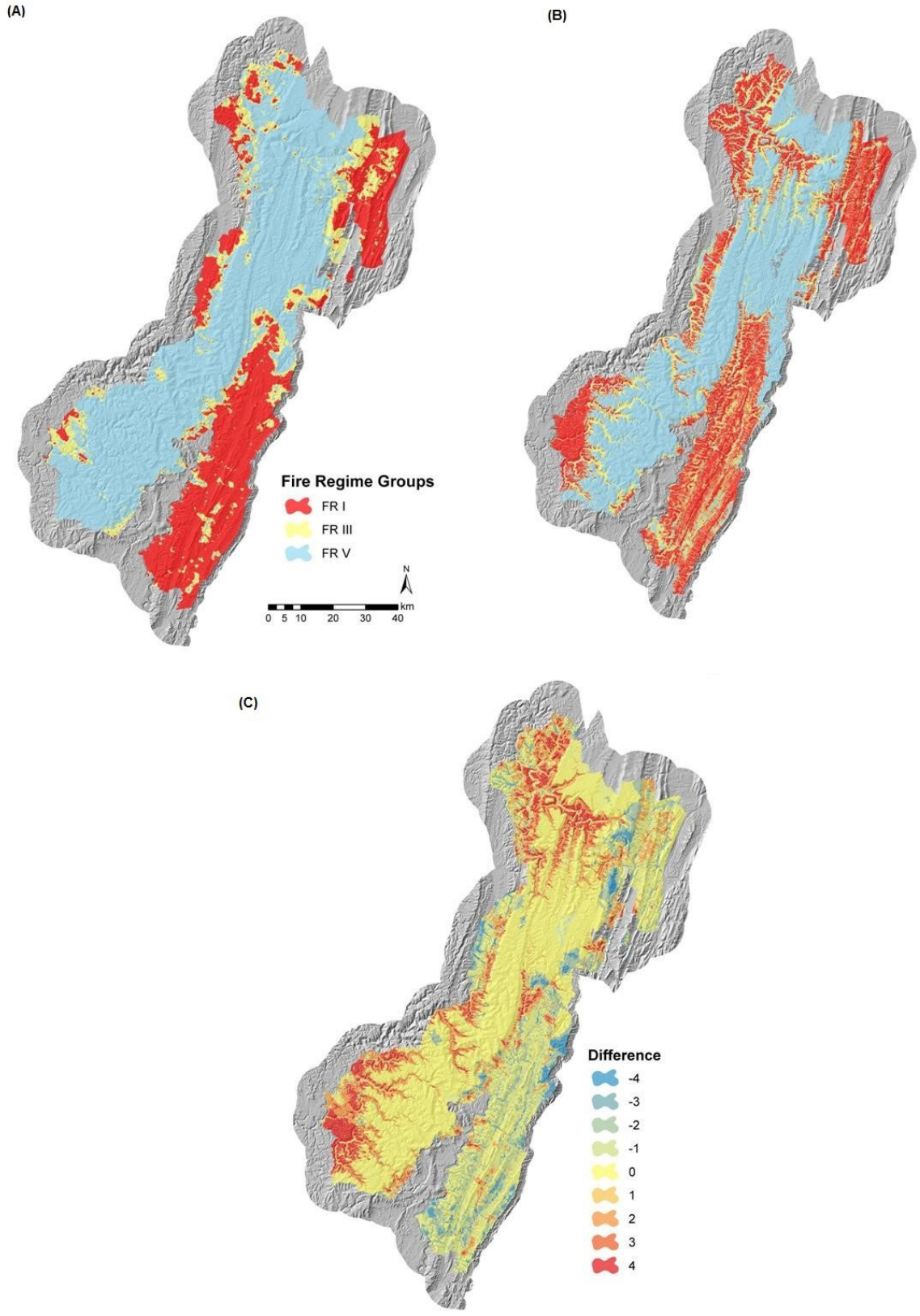

Figure 1—Fire regime group maps derived from (A) the witness tree-based map (Thomas-Van Gundy and Nowacki 2013), (B) LANDFIRE, and (C) the difference between them.

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