Supplementary Materials: Spatiotemporal prescribed fire patterns in Washington State, USA

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1. Data filtering

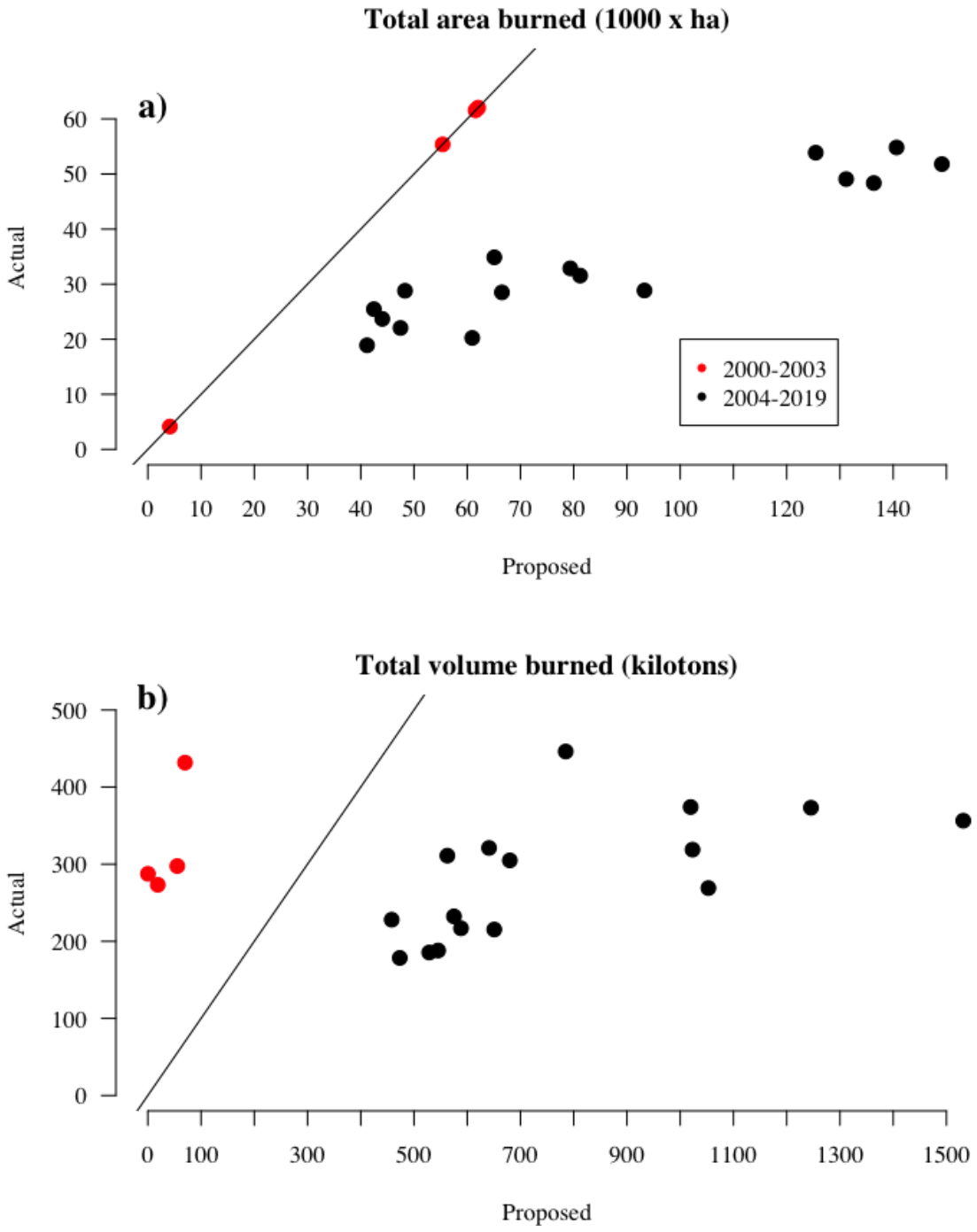

Figure S1. Scatterplot of actual versus proposed area (a) and volume (b) with a 1-1 line overlaid.

2. Accomplished versus proposed burn levels

Although ideally accomplished acreage and tonnage would be used, for practical purposes, the analysis used proposed area burned and tonnage. The data available suggested that in many cases, for whatever reason, the accomplished levels of burning differed from that which was proposed. It is then prudent to determine the level at which these quantities differ as to contextualize our results that were based on the proposed quantities. In some regions the assumption that the proposed levels of burning is approximately equivalent to the accomplished levels is reasonable. In the NW for instance, the accomplished burned area was equal to the proposed burned area in 87 percent of the requests with data, and the accomplished burned volume was equivalent to the proposed volume in 86 percent of requests with data. In contrast, in the SE it was fairly common that the accomplished burning levels were smaller than the proposed, with only 46 percent of fires accomplishing the proposed area burned and only 43 percent of fires accomplishing the proposed biomass burned. Hence, the suitability of this assumption varied regionally (Figure S2). However, in all but region, >53 percent of the burns had exact agreement between the accomplished and proposed burning levels. Additionally, in every region, the expected ratios between accomplished and proposed values - for both area and volume - were greater 0.6. In other words, on average more than >60 percent of what was proposed by fire managers was actually burned in all regions. Hence, if complete accomplished data were available, the revised quantities would likely be only nominally less than those already reported in most cases. Additionally, with only a few exceptions, the ratio between accomplished and proposed quantities did not vary strongly across years or the season. In a few rare cases, the accomplished quantity burned exceeded what was proposed, resulting in individual years with higher ratios than what would be expected relative to other years. Seasonal biases associated with interpreting proposed quantities as accomplished also occurred, particularly in the SE where the ratio between accomplished and proposed burning commonly dipped in the summer (Figure S3). Although this could lead to biases, the burning during this time was already very low compared to the rest of the year, and we would expect to draw similar conclusions to those already reported if the accomplished quantities were consistently available.

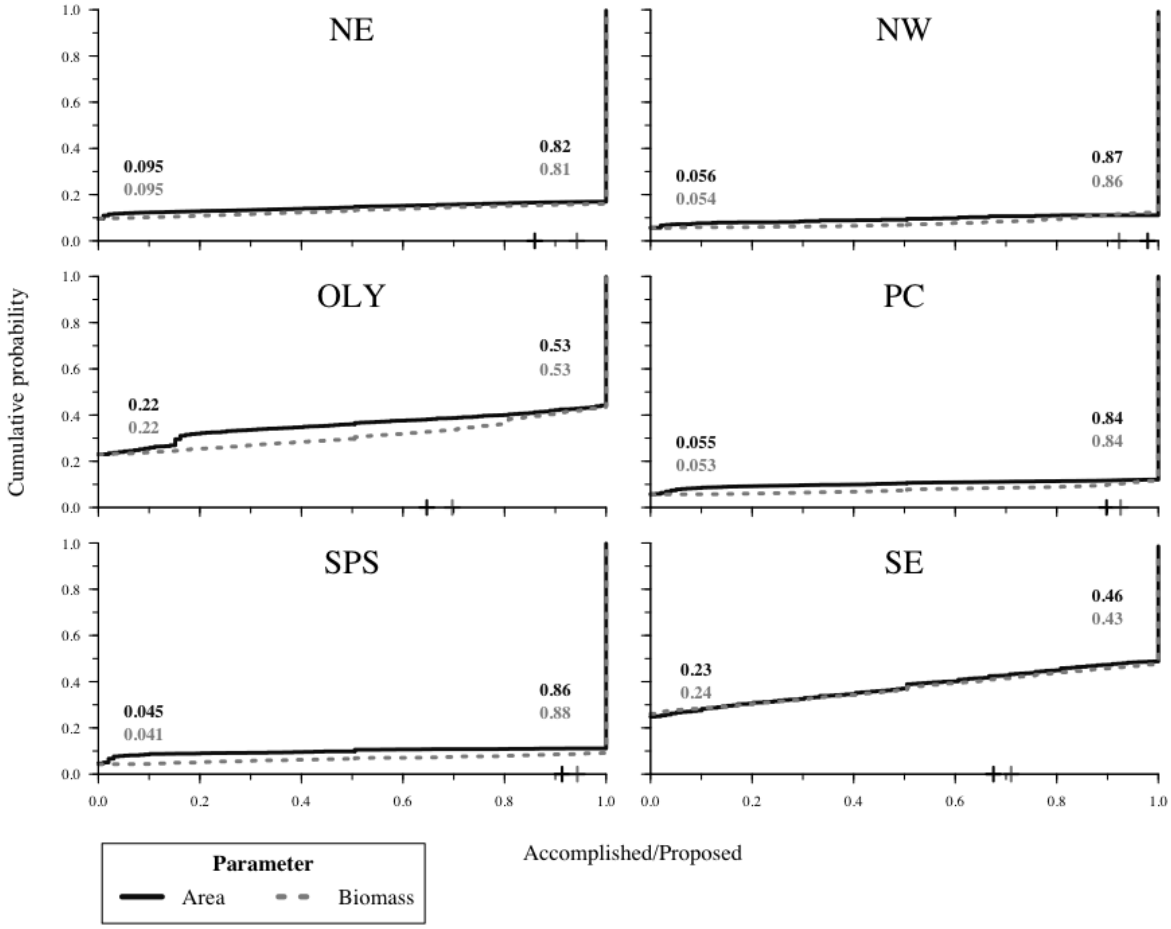

Figure S2. The empirical cumulative distribution function of the ratio between accomplished and proposed burn area and burned volume for each region. The probability that an approved fire burns nothing is denoted on the left of each panel, and the probability that an approved fire burns all of what was proposed is denoted on the right of each panel. The expected ratio is identified with a plus sign on the x-axis. Note Northeast (NE), Northwest (NW), Olympic (OLY), Pacific Coast (PC), South Puget Sound (SPS), and Southeast (SE).

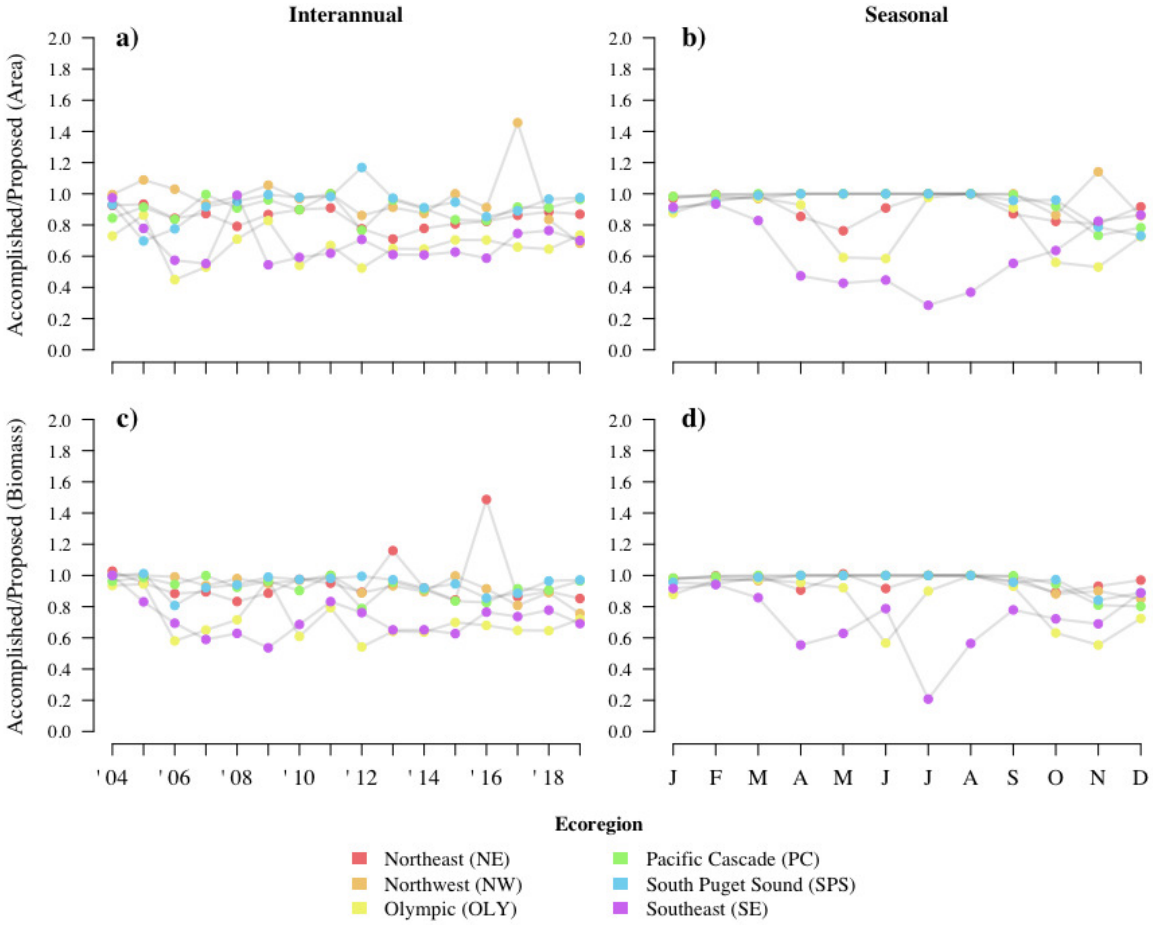

Figure S3. The expected ratio between accomplished and proposed area at annual (a) and monthly (b) timesteps and the expected ratio between accomplished and proposed volume disaggregated by year (c) and month (d).

3. Interannual boxcox analysis

Table S1. Best data transformation in five prescribed fire parameters from 2004-2019 for each DNR administrative region (Northeast (NE), Northwest (NW), Olympic (OLY), Pacific Coast (PC), South Puget Sound (SPS), and Southeast (SE)). The percent change in the unadjusted R^2 when substituting the nonlinear model for the linear one are reported in the parenthesis. Note that the data-transformations rarely improved the ability of the models to predict historical prescribed fire data.

Region	Area	Burn days	Biomass	Approvals	Pile
NE	log (-7.39%)	identity (0%)	inverse (-24.84%)	identity (0%)	identity (0%)
NW	log (-66.28%)	identity (0%)	log (-8.39%)	log (0%)	identity (0%)
OLY	log (-20.41%)	inverse (0.04%)	identity (0%)	identity (0%)	identity (0%)
PC	identity (0%)	identity (0%)	sqrt (-9.43%)	identity (0%)	identity (0%)
SPS	inverse (-194.25%)	log (0.04%)	inverse (-107.71%)	sqrt (0%)	identity (0%)
SE	inverse (18.14%)	identity (0%)	log (-6.5%)	log (0%)	squared (0%)