Calibration test case

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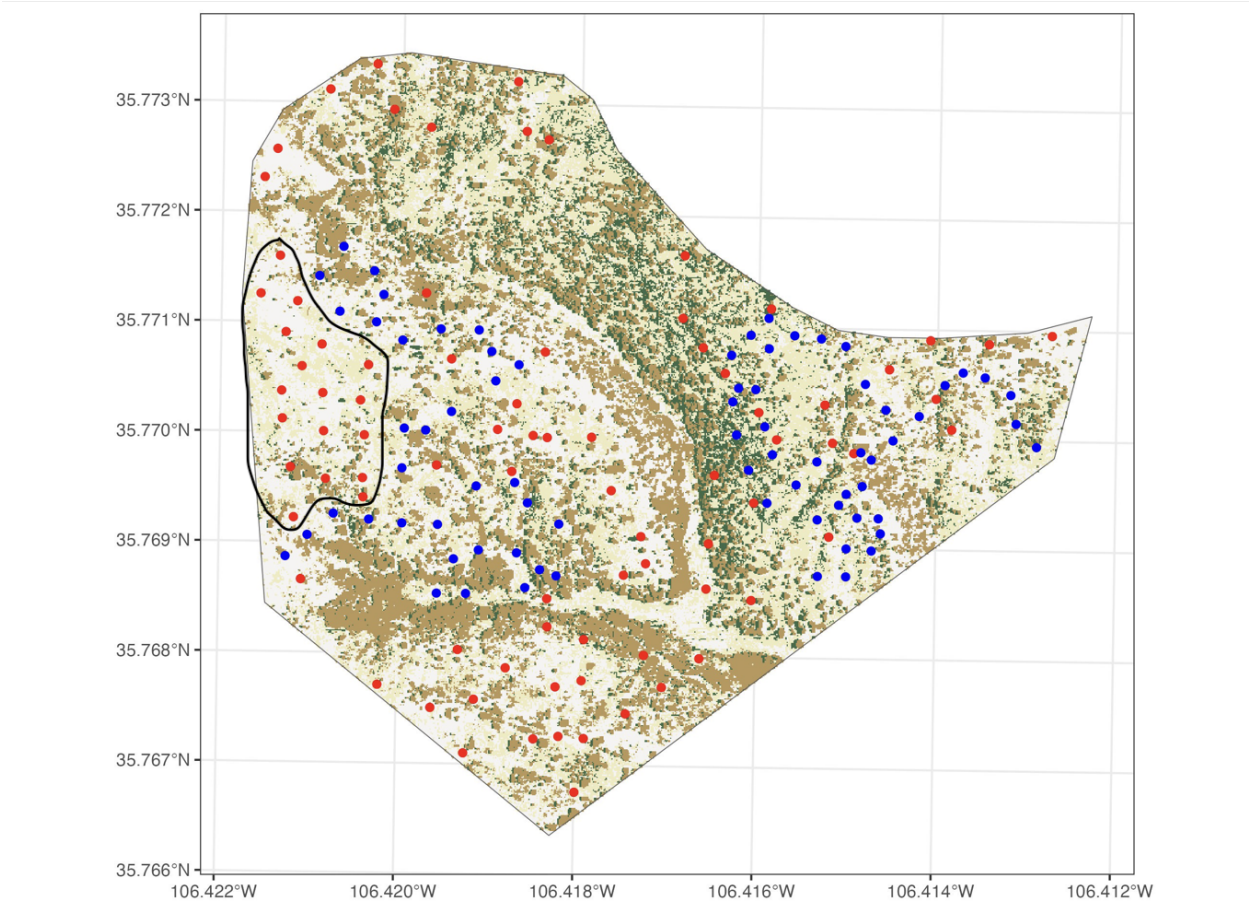
For this test case we will attempt to constrain model parameters using a small subset of 17 scans from the west side of this plot. These scans appear to be somewhat uniform in their characteristics in that they are all in a sparse grassy area.



Three of these scans only contain a single shrub, so they must be dropped from the calibration as we cannot compute our metric sets with only a single point. The 14 remaining scans used for calibration are shown below on a $30 \times 30(m)$ grid.

Looking at the shrubs, we see that these scans do exhibit a fair degree of variability. Prior to calibration I would expect parameter uncertainty will be large as shrub size, density, and heterogeneity are quite variable over the 14 scans.

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## Loading required package: foreach
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Here are the resulting posterior distributions along with their prior distributions and empirical estimates.

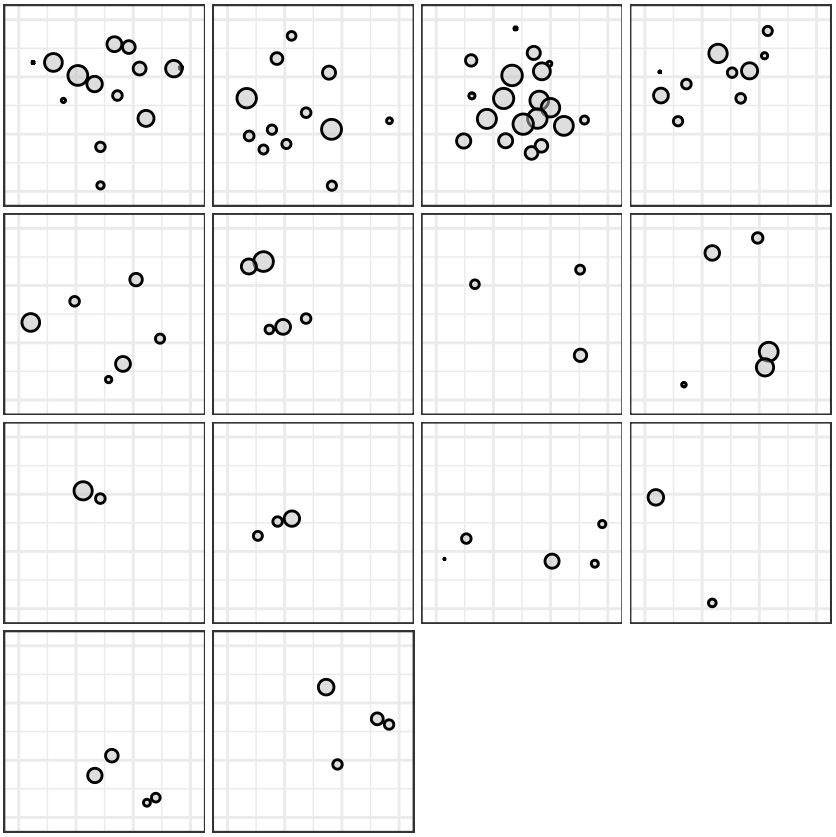

Figure 1: Fuel maps used for calibration.

The heterogeneity parameter ρ is unable to be constrained. That is not surprising given the sparsity seen in the scans. While within plot heterogeneity in sparse regions will not be well constrained by observed shrub locations alone, an important next question to address is the use of landscape scale spatial covariates to inform heterogeneity over larger scales domains.

Posterior distributions for the other 3 parameters are reasonable constrained compared to their prior distributions and are fairly centers at the empirical estimates.

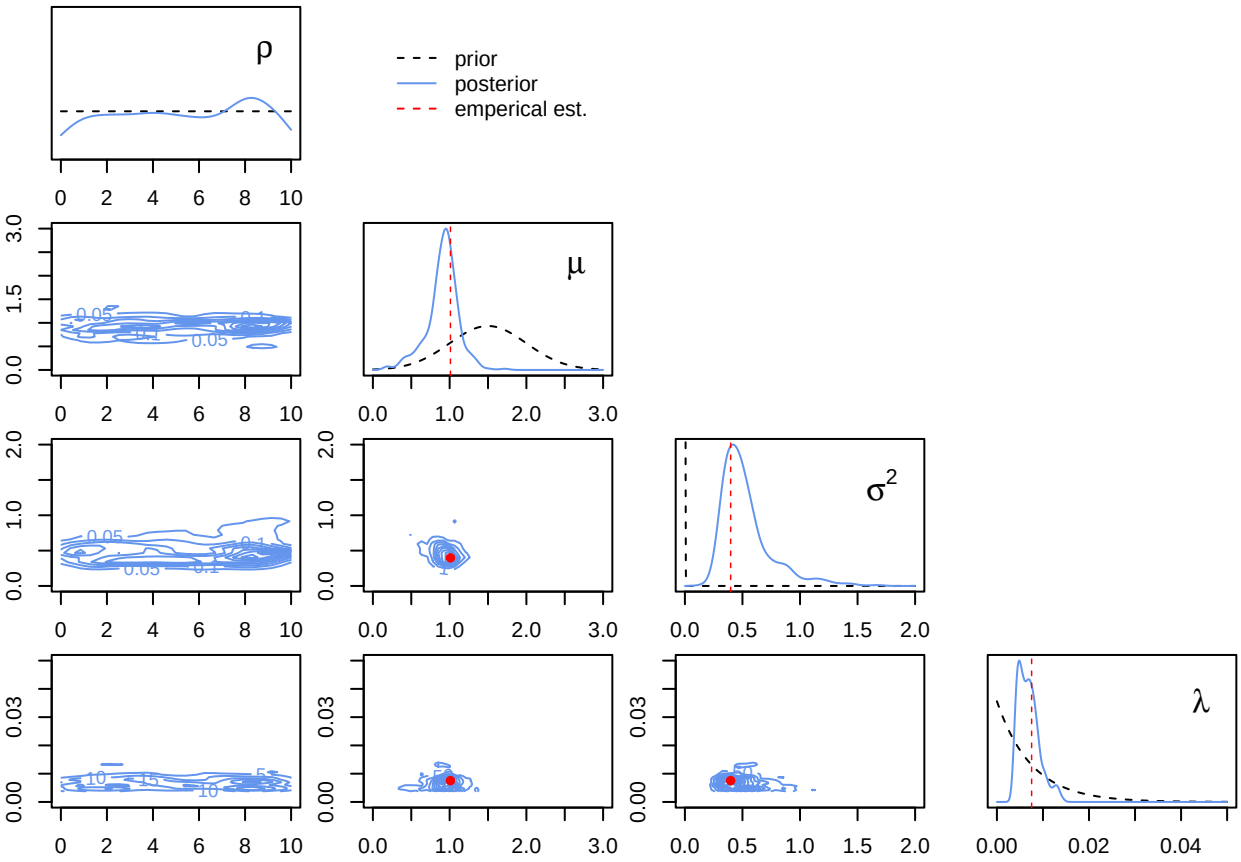

Figure 2: Parameter prior and posterior distributions.

Below we show 25 posterior generated fuel maps, one for each of 25 samples from the above posterior distributions. Generated fuels seem to reasonable represent the calibration fuels.

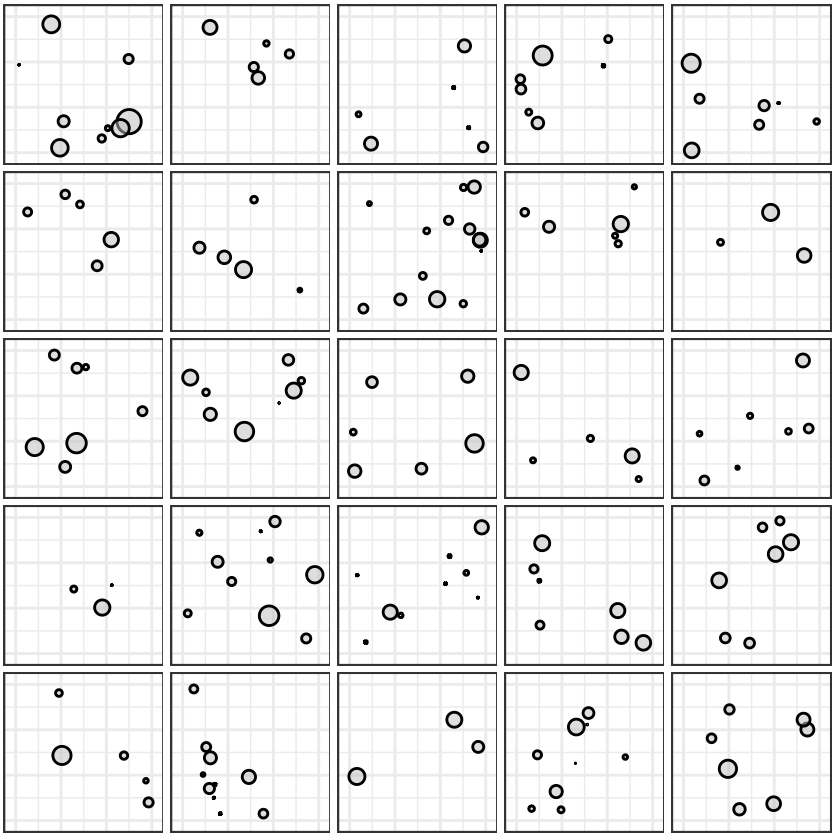

Figure 3: Fuels generated using parameters drawn from posterior distributions.