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# Exurban development and forest fires

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Exurban development in formerly rural or wild-land areas affects fire risks. Total fire suppression and major alterations in vegetation patterns can severely impact biodiversity and ecosystem processes.

We seek acceptable trade-offs between exurban development and manageable fire risks and build a simple lattice model of houses interspersed into a forest to do so. In this model, "houses" differ from "tree stands" by their combustibility and are distributed at random, with given density. We examine the fire risks as a function of combustibility p and density d. We show that the critical value of p decreases as a function of d, when the houses burn faster than the trees. When houses are less combustible than trees, burnt-area size S decreases rapidly with house density d. This asymmetric effect of d on the probability of large fires strongly recommends fire proofing of housing in forested areas. Our results obtain for fairly realistic values of p; they can be used, therefore, as a first approximation to assess relative levels of threat facing different exurban fire landscapes.