

Investigating the Role of Location-Allocation Models in
Planning the Locations of Dry Fire Hydrants

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ABSTRACT

The absence of water mains in rural areas has the potential to seriously complicate rural wildfire and structure fire suppression. The installation of dry fire hydrants can tremendously reduce these difficulties. But fire managers must then decide where to place these hydrants to efficiently and effectively serve their area of concern. This thesis investigates the role of GIS location-allocation model (LAMs) as a tool to aid fire managers in planning the locations of numerous dry hydrants. LAMs are designed to place central service facilities in a configuration that optimally serves geographically dispersed demand. One of the objectives of this thesis is to determine whether or not this optimization is achieved based on the management needs of the Virginia Department of Forestry. Many variations of LAMs are examined and the most appropriate model, the Maximal Covering Location Problem (MCLP), is selected. The flexibility of the MCLP model is then tested by imposing fine manipulations of hydrant demand weighting schemes.

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