1106-VN-1503 **Ron Gould**, **Victor Larsen*** (vlarsen@emory.edu) and **Luke Postle**. *Asymptotic density of k-critical graphs.*

A graph G is *k-critical* if $\chi(G) = k$ and every proper subgraph $H \subsetneq G$ has $\chi(H) \leq k-1$. Thus, a k-critical graph can be viewed as a minimal k-chromatic graph. A natural question about a minimal k-chromatic graph is how small such a graph can be. For a fixed number of vertices, n, let $f_k(n)$ denote the minimum number of edges in a k-critical graph on n vertices. The Hájos construction (and its generalization, the Ore construction) implies that $f_k(n+k-1) \leq f_k(n)+(k-1)\left(\frac{k}{2} - \frac{1}{k-1}\right)$. Therefore, the asymptotic density φ_k of a k-critical graph as we increase the number of vertices is at most $\frac{k}{2} - \frac{1}{k-1}$. In a 2012 paper, Kostochka and Yancey were able to confirm that $\varphi_k = \frac{k}{2} - \frac{1}{k-1}$, by providing a lower bound on $f_k(n)$. We examine the graphs that attain this bound (the *k-extremal* graphs) and identify key subgraphs. This allows us to obtain an asymptotic density of $\varphi_k + \epsilon$ on k-critical graphs that do not contain these subgraphs. (Received September 13, 2014)