1058-13-270 **Scott T Chapman*** (scott.chapman@shsu.edu), Sam Houston State University, Department of Mathematics and Statistics, Box 2206, Huntsville, TX 77341-2206, and **William W Smith** (wwsmith@email.unc.edu), University of North Carolina at Chapel Hill, Department of Mathematics, Phillips Hall, Chapel Hill, NC 27599-3250. *Erdős-Zaks All Divisor Sets.*

Let $\mathbb{Z}_n$ be the finite cyclic group of order n and $S \subseteq \mathbb{Z}_n$. We examine the factorization properties of the Block Monoid $\mathcal{B}(\mathbb{Z}_n, S)$ when S is constructed using a method inspired by a 1990 paper of Erdős and Zaks. For such a set S, we develop an algorithm in Section 2 to produce and order a set $\{\mathfrak{M}_i\}_{i=1}^{n-1}$ which contains all the non-primary irreducible Blocks (or atoms) of $\mathcal{B}(\mathbb{Z}_n, S)$ and use this set to argue that $\mathcal{B}(\mathbb{Z}_n, S)$ is weakly half-factorial. After developing some basic properties of the set $\{\mathfrak{M}_i\}_{i=1}^{n-1}$, we examine in Section 3 the connection between these irreducible blocks and the Erdős-Zaks notion of "splittable sets." In particular, the Erdős-Zaks notion of "irreducible" does not match the classic notion of "irreducible" for the commutative cancellative monoids $\mathcal{B}(\mathbb{Z}_n, S)$. We close with a detailed discussion of the special properties of the blocks $\mathfrak{M}_1$ with an emphasis on the case where the exponents of $\mathfrak{M}_1$ take on extreme values. (Received February 16, 2010)