By a theorem of Akbulut and King, every smooth compactifiable manifold $N$ (that is, $N$ is diffeomorphic to the interior of a smooth compact manifold with boundary) is diffeomorphic to a non-singular real algebraic set. We say that $N$ admits an algebraic model. We discuss the definability of the diffeomorphism under the assumption that the underlying set of $N$ is definable in an expansion of the real field. In general, every definably compactifiable differentiable ($C^k$ for finite $k$) manifold admits definably an algebraic model. For structures expanding the real exponential field we obtain stronger results. There, definably compactifiable smooth manifolds admit definably and smooth algebraic models.