Nonlocal Potentials in Nuclear Reactions LUKE TITUS, FILOMENA NUNES, Michigan State University — In this work we investigate the effect of nonlocality for single-channel bound and scattering states, as well as in transfer $(p,d)$ cross sections. We solve the scattering and bound state equations for nonlocal interactions of the Perey-Buck type [1]. Using the distorted wave Born approximation, we construct the $T$ matrix for $(p,d)$ on $^{17}$O, $^{41}$Ca, $^{49}$Ca, $^{127}$Sn, $^{133}$Sn, and $^{209}$Pb at 20 and 50 MeV. If local optical potentials are used in the analysis of experimental $(p,d)$ cross sections, as compared to the analysis with nonlocal potentials, the spectroscopic factors can be affected by approximately 20%. The Perey correction factor does offer an improvement over taking a direct local equivalent solution. However, if the desired accuracy is to be better than 10%, the exact solution of the nonlocal equation should be pursued.