In a previous paper (Gorur-Shandilya et al 2017), we showed that Drosophila ORNs adapt their gain according to the Weber-Fechner law of psychophysics. Here we investigate the implications of this front-end mechanism for odor coding capacity in natural environments, where the intensity and timescales of odor signals can span several orders of magnitude, and odors can mix together. We find that ORN adaptation promotes the reconstruction of odor identity from dynamic odor signals, even in the presence of confounding background odors and rapid intensity fluctuations. These enhancements are further aided by known downstream transformations in the antennal lobe and mushroom body. Our results, which are applicable to various odor classification and reconstruction schemes, stem from the fact that ORN adaptation is not intrinsic to the receptor involved. Instead it results from transduction downstream of olfactory ion channel activity, dynamically adjusting receptor sensitivity in accordance with the Weber-Fechner law.