Species distribution models used to understand change over space and time have rapidly evolved over the last decade, and these approaches have seen wide use in application to terrestrial and marine species. In addition to advances in modeling approaches, a number of summary statistics have been developed as metrics to quantify and communicate spatial change over the entire range of a species, including the center of gravity and range boundaries. A limitation in all of these metrics is that change may not be heterogeneous. We develop a new modeling approach to explicitly estimate a spatial trend, alongside spatial and spatiotemporal components, to compare inferred spatial shifts to those indicated by conventional metrics. To demonstrate the utility of this new approach, we focus on the application of this model to a community of well-studied marine fish species on the U.S. West Coast. Results from conventional model selection indicate that the use of the model explicitly accounting for a spatial trend is justified in 17 of 19 cases. In addition to making more parsimonious and accurate predictions, we illustrate how the estimated spatial trend field can be used to classify regions within the species range where change is relatively heterogeneous or homogenous. Using cluster analysis to identify regions of homogenous change resulted in support for 2 or 3 regions for most species. Conventional summary metrics can then be calculated for each region. We use this approach to illustrate that change is more nuanced than what is expressed via global metrics. Using arrowtooth flounder (*Atheresthes stomias*) as an example, the observed southward shift over time in the global center of gravity is not reflective of a uniform shift in densities, but decreasing density in the northern region and rapidly increasing density in the central region, at the range edge.