Both the high phosphorus (P) content and P bioavailability of the animal feed coproducts of the corn-ethanol industry could potentially contribute to increased manure and soil P levels and associated environmental issues (e.g., eutrophication). Therefore, a detailed modeling of total P mass flow to the coproducts (i.e., dry distillers grains with solubles, DDGS) was performed. Distribution of P between inorganic P and phytase-hydrolyzable P forms was quantified for selected coproducts (thin stillage, DDGS, modified DDGS [mDDGS]). The P mass balance indicated that although corn is the major P contributor to the coproducts (80.2%), a substantial portion (19.4%) comes from yeast addition. Of the two components constituting DDGS, wet distillers grains and condensed solubles, the latter contributes to only one-third of the mass but, importantly, yields 70.9% of P. The phytase enzyme used, Aspergillus ficuum, was very effective in hydrolyzing the nonorthophosphate P components of thin stillage, DDGS and mDDGS. Our results would help track P movement during various dry-grind processing steps and formulate strategies for phytase enzyme supplementation to various postfermentation coproducts from corn-ethanol plants.