

**EXECUTIVE SUMMARY [NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]:** State **in layman's terms** the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project relevant to California. Reduced phosphorus (P) compounds are widely used industrially and in agricultural practices as chemical reductants, fungicides and fertilizers, yet surprisingly little is known of what happens to these potentially toxic compounds once they are introduced into the environment. Furthermore, how the introduction of such compounds to the environment alters soil bacterial communities, P bioavailability and therefore plant communities, has not been explored. The long-term goals of this project are to examine the distribution and diversity of bacterial pathways for the conversion of reduced P compounds to phosphate in the environment. This will be achieved by: 1) determining the prevalence of already described pathways among reduced P metabolizing soil bacteria, 2) investigating the evolution of these pathways among soil bacteria, and 3) characterizing previously unknown pathways for the degradation of these compounds. We propose to achieve these goals by examining many environmental bacteria with the ability to degrade reduced P compounds. The bacterial isolates will be characterized using molecular techniques to elucidate the diversity and evolution of their metabolic pathways. From these studies, we hope to better understand the fate and ecological effects of reduced P compounds introduced into the environment and to add to our knowledge of bacterial pathways that convert these compounds to the nutrient phosphate. This knowledge should be incorporated into agricultural and conservation practices across California.