**Priority Ecosystems Science:**

The mission of Priority Ecosystem Science, PES is to provide science in support of adaptive management of ecosystems that have near-term societal concern and significant long-term societal value. Studies are designed to serve local ecosystem management needs and to provide knowledge and approaches transferable to similar ecosystems across the Nation. PES efforts focus in areas where new integrated science approaches can be developed to address the needs of a diverse group of decision-makers and to meet Department of the Interior's responsibilities to manage the Nation's lands. Activities require collaboration and integration of expertise from the four USGS disciplines, Biology, Geology, Geography, and Water to achieve a system-scale understanding of the natural and anthropogenic factors affecting ecosystems and to better understand the interactive nature of resources and the environment. On a larger scale, PES efforts contribute to a broader capability needed to understand and assess the health of the Nation's ecosystems. Current PES study units include the Greater Everglades, San Francisco Bay, Chesapeake Bay, the Mojave Desert, and the Platte River. More information on each study unit can be found below.

**San Francisco Bay and Delta**

The vast San Francisco Bay and Delta region of California is located at the confluence of the Sacramento and San Joaquin Rivers. It is often referred to as the San Francisco Bay estuary. Since the discovery of gold in the Sierra Nevada foothills in 1848, this region has undergone rapid, large-scale, and permanent changes driven by population migration attracted to the region's natural setting and economic opportunities. The consequent land use changes, particularly urbanization, have resulted in the loss of wetlands, alteration of freshwater inflows, contamination of water, sediments and biota, and declines of fish and wildlife species. The USGS has maintained a broad program of multi-disciplinary research studies, both fundamental and applied, in the San Francisco Bay estuary and its watershed. The studies help us understand the extent and impact of these changes, and help decisionmakers use science to help mitigate adverse effects. PES studies often are conducted in cooperation with other Federal, State, and local agencies, and have been designed to increase our understanding of important issues including waste disposal, water flow management, harbor/channel dredging, wetland restoration, food web processes, exotic species impacts, natural hazards mitigation, and maintaining quality of life.

Tittle

Study area

Concept: the effect of nutrients (TN, TP) on Delta, talk about the major finding for the 2002 and 2012 SPARROW models.