UC SANTA BARBARA

THE Current

August 2, 2004
Gail Gallessich

Pocket Gophers Serve as 'Ecosystem Engineers'

(Portland, Ore.) –– Love them or hate them, pocket gophers have an important effect on the soil and plants where they live. They serve as small "ecosystem engineers" generating major impacts on the physical environment.

Jim Reichman, director of the National Center for Ecological Analysis and Synthesis (NCEAS) at UC Santa Barbara, will present findings on North American pocket gophers, entitled "Bioturbation by subterranean mammalian herbivores and its impact on ecosystems," at the annual meeting of the Ecology Society of America in Portland, Ore., the first week in August. Eric Seabloom of NCEAS is a co-author.

Pocket gophers are named for their fur-lined pouches located on the outside of their mouths. They use the pouches to carry food, hence the name. The rodents vary in length from six to 13 inches. As with most burrowing mammals, pocket gophers have poor eyesight. However, they compensate for this with other, well-developed senses, such as large whiskers, which are sensitive to movement and help them in dark tunnels. They have powerful claws and teeth for digging. They are vegetarian, or herbivores, surviving mostly on roots.

"Gophers live below ground so people don't think much about them, but they change the landscape and the nutrient availability of the soil," said Seabloom. "They act like little rototillers, loosening and aerating the soil. They loosen the soil and the speed at which plants decompose, causing higher production of plants, and they

may be important to the biodiversity of plants. They definitely have an important effect."

Reichman explained that gophers were part of the natural system historically, a major part of the natural habitat. "Gophers were part of the ecosystem before grazing and before people arrived," he said. He is researching the differential effect that gophers have on native plants versus invasive species. This research is contributing to efforts to restore native habitats.

In his presentation he will explain that gophers have an energetically "expensive" life habit in which burrowing through the soil costs 360 to 3,400 times as much energy as walking the same distance on the surface. To keep up with this output they consume large amounts of vegetation, primarily roots, which significantly impacts plants.

"Excavation behavior, which involves construction of long burrows by displacing soil into mounds on the surface, generates major impacts on the physical environment," said Reichman. "These produce a complex mosaic of nutrients and soil conditions that results in vertical mixing (through burrow collapse and moving deep soil to the surface) and horizontal patchiness (in relation to the hollow burrows, refilled burrows, surrounding soil matrix and surface mounds)."

This research may lead to a better understanding of native ecological communities in California, and perhaps even allow for opportunities to restore native grasslands. He explained that ecological conditions on the planet have deteriorated, but now ecologists are learning more about how natural systems work. He noted that marine reserves are an example of one action that is already improving an ecosystem.

"Ecologists have been known for ‘gloom and doom,' but now we are making recommendations for things that can be done," he said.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we

draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.