NORTHWEST OREGON ECOLOGY GROUP NEWSLETTER

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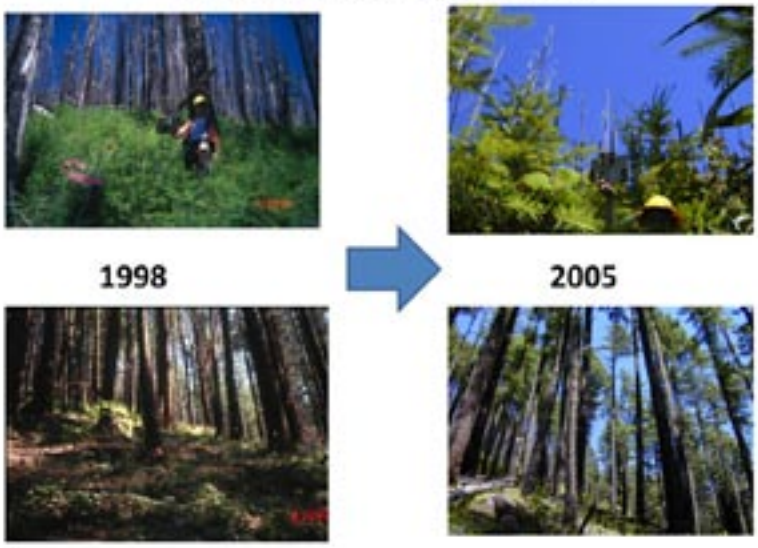
The Northwest Oregon Ecology Group is an association of ecologists with a wide range of interests from the Mt. Hood, Siuslaw and Willamette National Forests, the Columbia River Gorge National Scenic Area, and the Eugene and Salem Bureau of Land Management Districts. The group works from local to regional scales to provide tools, assessments, and analyses for ecological issues for planning, managing and monitoring forest ecosystems in Northwest Oregon. Through their own efforts, and affiliation with ecologists with Oregon State University, University of Oregon, Oregon Department of Fish and Wildlife, University of Washington, and private consultants, they have developed products most resource managers use every day.

Forest Dynamics After The Warner Fire

Martin Brown, Private Consultant: Jane Kertis, Ecologist, Siuslaw and Willamette National Forests; and Mark Huff, USDI Park Service

We monitored coarse woody debris dynamics and natural tree regeneration over 14 years following the Warner Creek fire, a 3631 hectare mixed-severity fire in the western Cascade Range of Oregon. Rates for tree mortality in the fire, post-fire mortality, snag fall, and snag fragmentation all showed distinct patterns by tree diameter and species, with Douglas-fir (*Pseudotsuga menziesii*) more likely to survive a fire, and to remain standing as a snag, than other common tree species. Natural seedling regeneration was abundant, rapid and highly variable in space. Densities of seedlings >10 cm height at 14 years postfire ranged from 1530 to 392,000 per hectare. Seedling establishment was not concentrated in a single year, and did not appear to be limited by the abundant growth of shrubs. The simultaneous processes of mortality, snag fall, and tree regeneration increased the variety of many measures of forest structure. The singular event of the fire has increased the structural diversity of the landscape. We hope to have a publication out later this year.

New Forests Growing and Older Forests Getting More Diverse at Warner Fire



Gopher Disturbance and Plant Community Dynamics In Montane Meadows

Madelon Case, Princeton University in collaboration with Charlie Halpern, University of Washingon and the Willamette National Forest

Pocket gophers (Geomyidae) are common agents of disturbance in grasslands throughout North America. By depositing excavated soil on the ground surface, they bury existing plants and initiate succession, potentially influencing community structure by favoring species that are less competitive but more tolerant of disturbance. Mazama pocket gophers (*Thomomys mazama*) are active in mountain meadows of the Pacific Northwest, but we know relatively little about their effects on meadow communities. For my senior thesis, I investigated the relationships between gopher disturbance and plant community structure in meadows at Bunchgrass Ridge, Oregon, building on previous studies of gopher-plant interactions in this system.

Old and fresh gopher mounds.

Gopher castings emerging from snow.

Gophers are active year-round, even under a deep winter snow pack. This results in two distinct forms of disturbance. During summer and fall, gophers excavate soil from tunnels to create mounds. During winter, they also tunnel into the snow or at the snow-soil interface and fill these tunnels with excavated soil. When the snow melts in the spring, it leaves raised tubes or "castings" on the soil surface. Effects of plant burial by mounds have been widely studied, but

castings are a unique feature of higher-elevation grasslands and have not been considered. In this study, I evaluated the contributions of both forms of disturbance to plant community patterns, focusing on relationships between degree of disturbance (cover of mounds and/or castings) and various community attributes, including cover of forbs and graminoids, species richness, and heterogeneity (spatial variability) of species composition. In each of four plots in meadows of differing composition, I sampled 20, 5-m transects for cover and richness of plant species and cover of mounds and castings.

Among transects, the average cover of mounds and castings ranged from 0% to as high as 40% (castings) or 50% (mounds). Total plant cover declined with disturbance (Fig 1). Both mounds and castings contributed to this decline, but had differing effects on forbs and graminoids. Mounds benefited forbs relative to graminoids by reducing graminoid cover to a greater extent. However, graminoid responses to castings were more variable: relationships were negative in three plots but neutral/positive in one plot. This variability may reflect differences among plots in the abundance of grass species with differing regenerative traits or sensitivities to disturbance. Effects of castings may also be less consistent than those of mounds because castings are smaller, less dense, and more ephemeral. Mounds and castings also had differing effects on species richness and heterogeneity of species composition. Richness increased significantly with cover of castings, but not mounds; heterogeneity increased with cover of mounds, but not castings. However, both richness and heterogeneity increased with total disturbance (summed cover of mounds and castings; Fig. 1).

This study contributes to our understanding of the dynamics of montane meadow communities in two notable ways. First, it documents for the first time the distribution and abundance of castings and their effects on plant community structure. Second, it describes the consequences of gopher disturbance for community patterns at spatial scales considerably larger (5-20 m) than previously studied (individual mounds). Gophers play critical roles in these disturbance-dependent systems, contributing positively to biological diversity, facilitating the persistence of less competitive species, and enhancing the spatial heterogeneity of species composition.

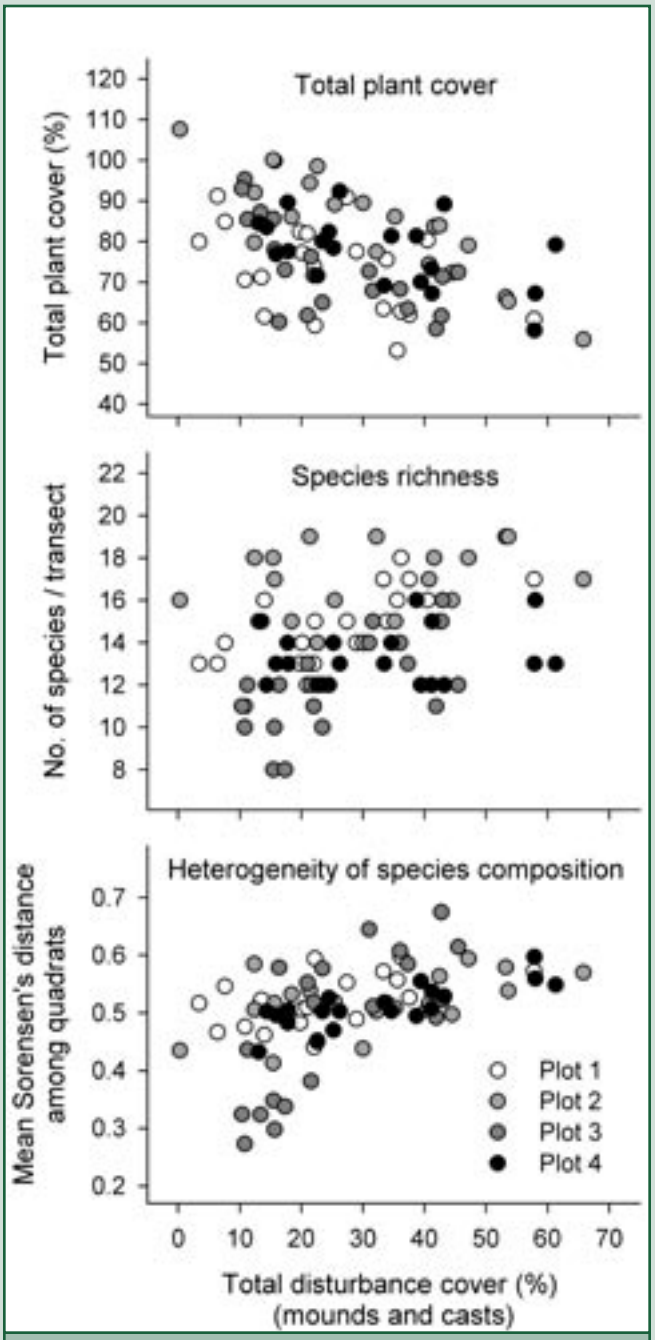


Fig. 1
Relationships between total disturbance (cover of gopher mounds and castings) and meadow community characteristics. Each of four plots was sampled with 20 transects.

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The Northwest Oregon Ecology Group relies on a variety of professionals throughout the area to support their activities. The following ecologists and biologists also contribute to the program.

Linda Geiser, Lichenologist and Air Quality Specialist,
Siuslaw National Forest.
Specialty: Lichens.

Tom O'Neil, Ecologist,
Northwest Habitat Institute.
Specialties: Oak restoration, wildlife habitat,
and biodiversity data management.

John Christy, Ecologist,
Oregon Natural Heritage Information Center.
Specialties: Wetland ecology and mosses.

Allison Reger, Analyst,
Willamette National Forest.
Specialties: VDDT modeling, and landscape analysis.

Stu Johnston, Forest Silviculturist,
Siuslaw National Forest.
Specialties: Forest Vegetation Simulation (FVS) modeling.

Laura Brophy, Estuarine Biologist,
Director, Estuary Technical Group, Institute for Applied Ecology.
Specialties: Wetland ecology.

Dirk Shupe, Fire Planner,
Willamette National Forest.
Specialites: Fire behavior modeling, landscape planning.

Marty Stein, Botanist,
Siuslaw National Forest.
Specialites: Invasive species management, dunes vegetation.