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Title: Ecological management of serpentine grasslands in the face of nitrogen deposition and invasive grasses.

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Abstract:

Coyote Ridge contains approximately 7000 acres of nutrient-poor serpentine soil in South San Jose, CA and supports unique native wildflower displays and core populations of the threatened bay checkerspot butterfly (*Euphydryas editha* ssp. *bayensis*). Atmospheric nitrogen deposition, estimated at 10-20 kg-N ha⁻¹ year⁻¹, drives dense annual grass invasions that can overrun bay checkerspot host plants and nectar sources. Local development projects have been required to mitigate for indirect N-deposition impacts through habitat acquisition and long-term management funding. Moderate cattle grazing is effective management, because cattle prefer nitrogen-rich annual grasses and create open sites favored by native annuals. In 2006, annual grass cover averaged 24.6% at grazed sites, compared to 47.1% on nearby ungrazed sites. Annual forbs, including host and nectar plants for the butterfly, averaged 29.5% at the grazed site, and 8.1% at the ungrazed site. Burning is effective for short-term reduction of annual grasses. The year following an accidental spring burn, annual grass cover was 37.4% on burned and 72.1% on adjacent unburned sites. Annual forb cover was 35% on burned and 7.5% on unburned plots. A new threat to serpentine grassland is barb goatgrass (*Aegilops triuncialis*). This silica-rich grass is unpalatable to cattle and can invade even in the absence of nitrogen deposition. Treatment strategies include burning, herbicides, and mechanical control.

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