RESTORATION OF DRY, MONTANE MEADOWS THROUGH PRESCRIBED FIRE, VEGETATION AND FUELS MANAGEMENT: A PROGRAM OF RESEARCH AND ADAPTIVE MANAGEMENT IN WESTERN OREGON

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Fig. 1. Restoration of dry, montane meadows through prescribed fire, vegetation and fuels management: A program of research and adaptive management in western Oregon.

Fig. 2. A Chronosequence Approach

Study 1. Vegetation Responses to Conifer Encroachment

Questions: What are the abundance, richness, and composition of ground species change during the transition from open meadow to old forest? Are compositional trends correlated to changes in forest structure?

Conifer encroachment leads to dramatic changes in ground flora (Fig. 4). Cover of meadow species declines sharply once tree density reaches a threshold (Class 2); densities of meadow species decline more gradually. Forest species recruit early (Class 1) and continuously through stand development.

Study 2. Dynamics of the Soil Seed Bank

Questions: To what extent do meadow species contribute to the soil seed bank? Do the density and diversity of seeds decline as meadow is replaced by forest?

Soils in general support a well-developed seed bank. 43% of species emerged from 60% of meadow species comprised of 23% of species (11 species). For seedbank analysis, encroachment classes were grouped as "open meadow" (Class 0-1), "young forest" (Class 2-3), and "old forest" (Class 6).

Richness and density of meadow species did not vary significantly among meadow and early forest classes, but richness was high within each stage (Fig. 7). Gymnema species associated with open meadow included common meadow taxa, Chrysanthemum and Achillea. Species associated with all forest included ruderal materials, Lactuca and Papaveraceae.

Study 3. The Restoration Experiment

The experiment addresses three questions:

1. How do biomass, productivity, and meadow dominance change as fire frequency and intensity are increased?

Experimental units include the four plots from retrospective studies and five additional plots sampled similarly for vegetation.燃气壁的印刷工艺，控制的火灭后在的复燃，和reet forest species (Fig. 1).

The results of our retrospective studies point to a number of features that may limit the potential for restoration of dry, montane meadows: (1) significant decline in abundance and progressive loss of species diversity with time; (2) absence of a seed bank for most meadow taxa, and (3) potential inability of meadow and ruderal species to compete for resources and suitable sites. These limitations are likely to be most evident where forests have been present the longest.