California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group

Wet Meadow

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Vegetation

Structure-- Wet Meadows at all elevations generally have a simple structure consisting of a layer of herbaceous plants. Shrub or tree layers are usually absent or very sparse; they may, however, be an important feature of the meadow edge. Within the herbaceous plant community a microstructure is frequently present. Some species reach heights of only a few centimeters while others may grow a meter or more tall (> 3 ft). Except where broken by boulders, canopy cover is dense (60-100%). At the substrate surface, distances between individual shoots may vary from 1 or 2 mm (0.04-0.08 in) to as much as 2 or 3 cm (0.81.2 in) depending upon the species present.

Composition-- Wet Meadows occur with a great variety of plant species; therefore, it is not possible to generalize species composition. Species may differ, but several genera are common to Wet Meadows throughout the State. They include Agrostis, Carex, Danthonia, Juncus, Salix, and Scirpus. Important grass and grasslike species include thingrass, abruptbeak sedge, beaked sedge, Nebraska sedge, tufted hairgrass, needle spikerush, fewflowered spikerush, common spikerush, baltic rush, Nevada rush, iris-leaf rush, pullup muhly, and panicled bulrush. Important forbs include Anderson aster, Jeffrey shootingstar, trailing Saint-Johnswort, hairy pepperwort, primrose monkeyflower, western cowbane, American bistort, cows clover, and small white violet. Willow and bilberry are the only shrubs found in much abundance. Fewer species occur as surface water depth increases during spring runoff.

Other Classifications-- Poorly drained, closed-basin and moderately drained, closed-basin Wet Meadows were defined by Hormay (1943b). Bennett (1965) divided Wet Meadows into the Sphagnum, Coarse-leaved Sedge, Fine-leaved Sedge, and Grass subtypes. Subalpine or Alpine Moist-to-wet, Tule, and Wet meadow subformations were described by Hall (1979). Several series similar to this Wet Meadow classification occur within his subformations: Wet Meadow-Tall Sedge, Nebraska Sedge, Wet Meadow-Short Sedge, Wet Meadow-rush, and Wet Meadow-Spikesedge. Sedge and Wiregrass series were included in the graminoid subformation of the herbaceous formation in southern California (Paysen et al. 1980). Ratliff (1982) described five montane Wet Meadow series: Beaked Sedge, Ephemeral-lake, Hillside Bog, Nebraska Sedge, and Fewflowered Spikerush. Some of those series occurred in the subalpine as well. The most important subalpine Wet Meadow series was, however, the Shorthair Reedgrass.

Habitat Stages

Vegetation Changes--1;2:S-D. Generally, Wet Meadow communities succeed bog communities. In turn, Wet Meadows are succeeded by mesic meadows and by dry meadows or forest. Mesic and dry meadows may have a sparse cover of shrubs. Succession to coniferous forest is frequent at montane and subalpine elevations. At lower elevations, succession to broad leaved trees or shrubs, particularly sagebrush, may occur. Wood (1975) showed that succession of open meadow to forest and succession of forest to open meadow has occurred at the same location over geologic time. Therefore, Wet Meadows need not necessarily succeed to forest. Most Wet Meadow plant species are perennial, and a substantial change in the plant community may develop slowly. Differences in species composition between observations of Wet Meadow communities may therefore represent temporal fluctuations rather than successional trends. Perturbations that alter the Wet Meadow environment are usually necessary to set successional changes in motion. Overgrazed Wet Meadows have more forbs and fewer grasses and grasslike species than properly grazed or ungrazed (by livestock) meadows, and taller species are replaced by lower growing types. Channel erosion lowers the water table, causing succession to species of dryer habitats.

Duration of Stages-- The single most important characteristic of a Wet Meadow is its hydrology. Seasonality and reliability of yearly water inflows and outflows largely determine the vegetational stability of Wet Meadows. Therefore, Wet Meadow habitats exist indefinitely unless the hydrologic regimes are altered. Some meadows in the Sierra Nevada are at least 1200 years old (Wood 1975).

Biological Setting

Habitat-- Wet Meadows usually occur as ecotones between Fresh Emergent Wetlands (FEW) and Perennial Grassland (PGS) or mesic meadow types. Mesic meadows contain some species in common with Wet Meadows, and the distinction between wet and mesic meadows is not always clear. Where Wet Meadows merge with Fresh Emergent Wetlands, slight differences in water depth control the species present.

Wildlife Considerations-- In late summer, small mammals may visit Wet Meadows that have dried. However, the meadows are generally too wet to provide suitable habitat for small mammals. Mule deer and elk may feed in Wet Meadows, seeking especially forbs and palatable grasses. Waterfowl, especially mallard ducks, frequent streams flowing through Wet Meadows. Yellow-headed and red-winged blackbirds occasionally nest in Wet Meadows with tail vegetation and with adequate water to discourage predators (Storer and Usinger 1963). The striped racer is the common snake of Wet Meadows in the Sierra Nevada and Cascade Range. Various frog species are abundant in Wet Meadows throughout California. Six species of trout (Brown, cutthroat, golden, rainbow, eastern brook, and Mackinaw) inhabit streams of the Sierra Nevada (Storer and Usinger 1963), and presumably may occur in perennial streams of wet meadows. In the

southern Sierra Nevada, the golden trout is the important fish of meadow habitats at high elevations.

Physical Setting

Wet Meadows occur where water is at or near the surface most of the growing season, following spring runoff. Hydrologically, they occupy lotic, sunken concave, and hanging sites (Ratliff 1985). Lotic sites (Gosselink and Turner 1978) are those with main input flow (other than precipitation) from upstream sources; at least early in the growing season, water flows across them at depths of 10 to 20 cm (4-8 in). Downstream runoff is the principal output flow. Lotic sites are topographic basins but have a slight slope, which permits drainage of surface water. Percolation is nil due to the saturated or slowly permeable nature of underlying materials. Sunken concave sites also receive water input from upstream sources, but evapotranspiration is the main output flow. Percolation is slowed by heavy-textured soils and/or shallow bedrock; however, in contrast to lotic and hanging sites, soil of sunken concave sites may dry to considerable depth by fall. Hanging sites are watered by hydrostatic flows as springs or seeps. They frequently occur on rather steep slopes, and downstream runoff is the main output flow. Surface flows, although constant, are usually no more than 1 cm (0.4 in) deep.

Distribution

Wet Meadows occur throughout virtually every forest type of the Sierra and Pacific Northwest floristic provinces and as inclusions in the northern coastal prairie and sagebrush steppe (Barbour and Major 1977). Where conditions are favorable, Wet Meadows occur in the Transverse and Peninsular ranges of Southern California. In the Sierra Nevada and Cascade ranges, Wet Meadows usually occur above 1200 m (3940 ft) in the north and above 1800 m (5900 ft) in the south. In the Klamath Mountains, Wet Meadows occur in the California red fir zone at 1400 m (4600 ft) to 1950 m (6400 ft) elevation. Swales in the valley and foothill grasslands occasionally provide conditions suitable for Wet Meadow species. However, because the vegetation is composed mostly of annual grasses and forbs and because the sites dry rapidly, these swales are not considered true Wet Meadows.

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