Timing Is Everything- Juggling multiple burn objectives

Since its establishment in 1937, the Sacramento National Wildlife Refuge (NWR) Complex in northern California has been juggling multiple resource objectives to better benefit the American public. The approximate 35,000 acre complex includes the Sacramento, Delevan, Colusa, Sutter, Butte Sink and Sacramento River NWRs. The many managed wetlands, alkali meadows and vernal pools provide habitat for millions of waterfowl, shorebirds and other migratory birds. The vernal pools and alkali meadows are also home to a multitude of rare and indigenous plants as well as threatened and endangered invertebrates (Silvera 2000).

The timing and tactics of prescribed burns on the refuge can vary dramatically based on the best balance of project objectives (e.g, habitat enhancement, firefighter safety, structure protection, air quality). Much of the successful burning for cattail and bulrush management on the refuge occurs in the summer while burning to reduce non-native grasses is generally scheduled in the spring. In some cases, burning is used and timed in conjunction with other treatments such as disking within wetlands or grazing within vernal pools to better achieve and maintain habitat and species objectives.

The invasion of non-native annual grasses is a big issue for vernal pool management on the refuge. Invasive non-native plants compete for light and water and can alter the local hydrology affecting vernal pool function (Hanes and Stromberg 1998). The use of fire, cattle grazing or other tools to remove annual grasses and other standing dead vegetation can help improve water drainage and infiltration for vernal pool management (Barry 2001). Research has shown that spring burns timed prior to the seed production of non-native grasses can enhance the opportunities for vernal pools species which grow later in the season (Marty 2004). The following are just a few examples of prescribed burns on the refuge timed to balance multiple objectives including vernal pool management.

A 60-acre prescribed fire on the Sacramento NWR in March 2005 was designed to reduce hazardous fuels for the protection of adjacent private property and enhance wetland habitat. The project was also a critical step toward enhancing adjacent vernal pools. The area included overgrown cattails and hardstem bulrush (tules) which were reducing diversity and productivity of waterfowl in the marsh and beginning to invade the adjacent vernal pools and alkali meadows. While these aquatic emergents are desirable for many species within a managed wetland, they can be detrimental to vernal pools and alkali meadows by out-competing sensitive species (pers com Wolder). This rank vegetation had built up over many years creating a large volatile fuel load.

Prescribed burning at the Sacramento NWR Pool 7.a.3 to enhance wetland habitat and reduce hazardous fuels

Although a summer burn would have been ideal for the control of bulrush and cattails, the potential of fire escape was too great a risk to private property and firefighter safety.

The spring burn was successful in part by reducing the hazardous fuel load and in increasing the wetland habitat diversity; it did not meet vernal pool objectives. The extreme build up of rank vegetation will require a follow-up of disking and/or burning. Now that the hazardous fuels have been reduced additional projects can be better aimed at vernal pool objectives.

Another prescribed burn at the Sacramento NWR in September 2005 was designed to enhance vernal pool and alkali meadow habitat by reducing the invading bulrush. The invasion of these plants was due to excess water seepage into the unit from breaks in a drain ditch. The objectives of this project required a late-summer burn when the bulrush was completely dry and could be killed. When bulrush is removed, native grassland and vernal pool species are able to germinate in the winter and spring. The result thus far has been an increase in abundance and diversity of plants and wildlife.

Geese and pheasants foraging after a successful prescribed burn at the Sacramento NWR

A collaborative project on the Sacramento River NWR (Llano Seco) in June of 2005, between the refuge, The Nature Conservancy, and Llano Seco Ranch was designed to enhance vernal pool habitat by reducing invasive noxious weeds including Medusahead and annual ryegrass. Grazing was the desired management tool but cattle would not graze the Medusahead due its high silica content. A prescribed burn was timed during the summer when the Medusahead was dry enough to burn. Cattle were used after to help control ryegrass. This combination of burning and grazing has been successful in California at both restoring and maintaining vernal pool (Pollak and Kan 1998).

Prescribed burning at the Sacramento River NWR Llano Seco Tract to enhance native grassland and vernal pool habitat

Timing is everything when trying to balance multiple project objectives for prescribed burns on the refuge. These projects are examples of how varied timing, conditions and tactics are necessary in order to meet numerous objectives. Close planning and coordination between biologists and fire managers is a critical component to successful project implementation. And, although all resource objectives may not be met under individual treatments, they are critical components of the successful long term management strategy for the Sacramento NWR Complex.

For more information about the Sacramento National Wildlife Refuge fire program contact Perry Grissom, Fire Management Officer, at 530-934-2801.

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