

# Restoring Habitat Through Pesticide Management

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**A helicopter spraying pesticides**  
Photo by Brad E. Johns/USFWS

Six national wildlife refuges (NWR) in the Klamath Basin of northern California and southern Oregon are the remnants of what was once a vast wetland complex. Today, these refuges are vital to many species of wildlife. During spring and fall migrations, nearly 80 percent of all Pacific flyway waterfowl, totaling approximately 3 million birds, stop to rest and feed at these refuges. Overwintering bald eagles (*Haliaeetus leucocephalus*), which are currently listed as threatened in the lower 48 States, use these refuges for roosting and foraging. Other listed species that rely on the refuges include the peregrine falcon (*Falco peregrinus*) and two fish species, the Lost River sucker (*Deltistes luxatus*) and shortnose sucker (*Chasmistes brevirostris*).

Present day resource management in the Klamath Basin Complex reflects the public desire to conserve and protect valuable fish and wildlife habitat while, at the same time, sustaining agricultural activities that have a long history in the basin. For example, two of these refuges, Tule Lake and Lower Klamath NWRs, are managed under the Kuchel Act of 1964, which commits 22,000 acres (8,900 hectares) of the refuges to a commercial farm leasing program. Under a 1977 cooperative agreement with the Fish and Wildlife Service (FWS), agriculture management of these leased lands was transferred to the Bureau of Reclamation.

The Kuchel Act states that the Lower Klamath and Tule Lake NWRs are dedicated to "wildlife conservation for the major purpose of waterfowl management, but with full consideration to optimum agricultural use that is consistent therewith...." Agricultural activities

on these refuges provide a means for achieving one of the major management objectives of these refuges which is to maintain enough crops to encourage waterfowl to stopover and forage during their fall migration instead of flying further south in the Central Valley of California, where they can decimate crops just before harvest.

Agricultural and pest management practices have not always considered the benefits and costs of pesticides to natural resources. In the 1940's, the refuges began using insecticides (especially DDT compounds, endrin, and toxaphene) and rodenticides (strychnine and zinc phosphide) to control pests, and by the 1950's, wildlife die-offs were observed. By the early 1990's, even after DDT was banned, the fish and wildlife death tolls were increasing and contaminant studies conducted by the FWS revealed that pesticides were the cause.

As the devastating effects of pesticide contamination were becoming more and more apparent, the FWS and Bureau of Reclamation began to implement the Department of Interior's new pesticide policy. This policy emphasized the implementation of Integrated Pest Management (IPM) practices. The IPM approach incorporates cultural, biological, and physical pest control methods, and considers pesticides only as a last resort.

While some IPM practices were being used by leased land farmers, such efforts were not coordinated or widespread. In June 1993, Reclamation and the FWS agreed to prepare a comprehensive IPM plan for the leased land. As part of this comprehensive review, consultations are being completed

under section 7 of the Endangered Species Act on the potential impacts of each pesticide on endangered or threatened species. The IPM's centerpiece is required systematic, weekly crop inspections by each farmer. By detecting the presence of pests early, preventive methods less harmful to the environment can be attempted before infestation occurs and pesticides are needed. These alternative methods include mechanical or moisture management and biological controls.

The uncurtailed use of pesticides began to change in the Klamath refuges as the FWS and Reclamation involved lease land operators in the preparation of pesticide use proposals (PUPS). PUPS are subject to review by biologists from both agencies who have knowledge of farming and the effects of pesticides on fish and wildlife. All PUPS incorporate IPM techniques and eliminate or restrict risks from use of the most toxic chemicals. In many cases, toxic pesticides (including all those documented to have killed wildlife) have been eliminated on the leased lands. For those pesticides that are most toxic to aquatic species, buffers and other restrictions are required for aerial and ground spraying to limit the potential for aerial drift.

Pesticide application methods have also changed. For example, some pesticides previously applied by aerial spraying are now applied near sensitive habitats only by precision ground injection or other ground application methods. Also, an array of pesticides with low toxicity to wildlife have been approved, providing alternatives to more toxic chemicals. In addition, a series of pesticide monitoring studies have been initiated to evaluate pesticide concentrations in Tule Lake and refuge drainwaters, evaluate the effectiveness of buffers, and search for dead animals.

Since 1994, no pesticides have been found at concentrations known to cause toxicity to fish or wildlife, nor have any pesticide-related wildlife deaths been documented in the refuges. The future

of pesticide reductions rests not only on the IPM plan but also on sump rotation, whereby leased lands will be converted to new wetlands and the existing Tule Lake sumps will be rotated into croplands. Periodic flooding reduces the need for pesticides, increases use by a variety of birds, and benefits the endangered suckers.

The success of restoration efforts throughout the Klamath Basin is the result of people working together for natural resources. Karl Wirkus, Klamath Basin Area Office Manager for the Bureau of Reclamation; Tom Stewart, Klamath Basin Refuge Manager; and Klamath Fish and Wildlife Office Project Leader Steve Lewis agree that the collaborative effort of Reclamation, the FWS, and farmers is the key to success.

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**In addition to better pesticide management, other wildlife habitat improvement activities are taking place as well, such as the conversion of additional agricultural lands into wetlands (600 acres, or 240 hectares) and the restoration of deepwater habitats and migration corridors. These activities have encouraged reestablishment of a diverse wetland plant species community, replacing monospecific stands of bulrush now dominating Tule Lake. Reestablishment of Columbia yellow cress (*Rorippa columbiae*), a species of concern last seen in the Tule lake area in 1928, also has been observed. To date, there has been a significant rise in the number of waterfowl visiting the refuges, and breeding waterbirds also have increased.**

#### **Lower Klamath NWR**

*Photo by John and Karen Hollingsworth*

