

## Managing Bird Populations for Disease Control

By John Taylor

Managing large migratory bird populations is one of the most challenging and gratifying experiences in the wildlife management field. As with other wildlife, habitat is the key to management. This association can be complex with many species, but is fairly straight forward with migratory and wintering water birds. During mild weather, birds require natural foods obtained from shallowly flooded wetlands free from disturbance. These conditions also provide water for drinking and resting. Shorelines also provide loafing areas. During cold winter months, migratory birds can only remain at more northern latitudes when energy rich agricultural foods are available. Many species develop daily roost to feeding area flights returning each evening to wetlands for drinking and resting. These requirements and use patterns are familiar sights at Bosque del Apache from September to April.

Birds concentrated through the production of food resources also invite disease. Two avian diseases are of prime concern at Bosque del Apache. Avian botulism is a bacterial disease which causes progressive paralysis leading to ultimate failure of the respiratory system. The bacteria persist in wetland substrates as a spore and manifests under high environmental temperatures and low oxygen levels. These conditions result in vegetation decay which in turn spark invertebrate blooms. The toxin is passed to invertebrates under such conditions and is in turn passed to migratory birds which feed on invertebrates. Fly reproductive cycles are tied to decomposing carcasses as birds succumb

to botulism. Flies lay their eggs in rotting carcasses and these eggs mature into maggots. Other birds feed on the maggots and the outbreak spreads rapidly. Botulism outbreaks are averted at Bosque by maintaining oxygen rich, fresh water in wetlands. This is accomplished through active water circulation within and among wetlands. Shallow water levels and an abundance of invertebrates are important habitat attributes which assure use by migratory birds. We are able to provide these conditions, yet avert botulism outbreaks by such proactive water management efforts. Other regional wetlands used by migratory birds often do not have such capabilities. When outbreaks occur on these areas our regional disease response team moves quickly to gather dead birds from affected wetlands for incineration. The toxin cycle is thus broken and botulism is controlled until cool weather and lower temperatures arrive.

Avian cholera is by far the most serious disease affecting migratory birds at Bosque del Apache. The disease is a highly infectious bacterial disease. Currently, debate among experts is high as to the source of the disease. Some experts insist the disease is of environmental origin, that is, it persists in wetland substrates by some as yet unknown mechanism. A larger number of experts suggest the disease is enzootic in some individuals, that is, the disease is carried by birds and is manifested during stressful periods. At Bosque, lesser snow and Ross's geese (light geese) are carriers of the disease. Conditions up and down the flyway can influence how stressed these birds are. One thing we do know is

that light goose populations have increased exponentially over the last 30 years to the point that they are literally destroying Arctic breeding habitats. Framed with such a background, local stress factors such as migration, drought, cold weather, and food shortages can spark an outbreak. Birds affected by the disease exude bacteria rich fluids from their bills and vents into water bodies where other birds drink and rest. Dead birds are often scavenged by crows and eagles which open body cavities and further spread the bacteria. Under such conditions the disease can spread among hundreds or thousands of other geese in a matter of hours. Losses in some parts of the country have been in the thousands in a single day. Maximum losses at Bosque under similar conditions have been up to 500. Cholera is difficult to control once water bodies are contaminated with the disease. The operative word for control is dilution of the bacteria and isolation of problem wetlands from other wetlands. Again, water circulation is a key element for control. In cases of cholera, increasing the amount of water in a wetland can aid dilution. Unfortunately, cholera can occur in wetlands where the production of natural foods is high. By increasing water depths, other waterfowl and cranes are precluded from feeding due to this excessive depth and the food resource is ultimately lost. Cholera can also be controlled by reducing the numbers of light geese using the refuge. Generally, experience has shown that cholera is chronic when over 25,000 light geese are using the refuge. Subtle changes in corn manipulations can move large numbers of birds north to state refuges and alleviate food shortages locally. When outbreaks are extremely serious due to food stress, large amounts

of corn can be manipulated to help control the outbreak. Although corn is produced on the refuge to support cranes, reserve production is built into our management program as insurance for just such an occurrence. As with botulism, prompt bird pickup and incineration is a standard control action. Fortunately, cholera primarily affects light geese. Ducks and cranes can be susceptible when light goose losses are high, and the incidence of infection in raptors, particularly eagles, is rare.

At Bosque, active management to meet water bird requirements for feeding and resting in a disturbance-free environment attracts tremendous flocks of waterfowl and sandhill cranes. Acre for acre, our management supports some of the highest densities of these species on the continent. Habitat management practices which concentrate birds ultimately contribute to disease occurrence. One might ask then, why should birds be concentrated at levels which spark disease outbreaks? The short answer is that productive wetland habitat capable of supporting migratory bird resources is in short supply. The loss of wetlands across the country is one of the very reasons the national wildlife refuge system was established. These losses are forcing managers to support more birds on smaller amounts of wetland habitat each year. What can you do? Support congressional bills which protect wetlands from drainage and support bills which maintain the most progressive corridor for migratory birds in the world, the national wildlife refuge system.