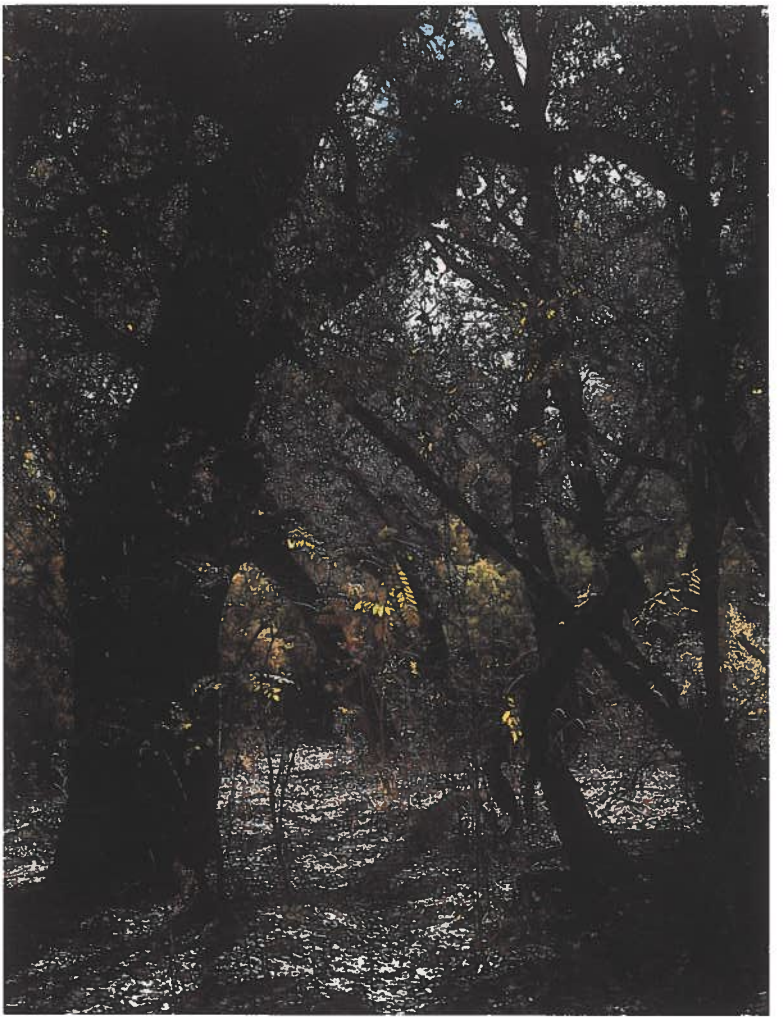
The Corrales Bosque Preserve



by James S. Findley
Professor Emeritus
Department of Biology
The University of New Mexico

Published by direction of the Village of Corrales Bosque Advisory Commission with the support of the Friends of the Corrales Bosque Preserve.

Spring, 2005

The Corrales Bosque Preserve

What is the Bosque? Why is it important?

The Corrales Bosque is a narrow riverside strip of Rio Grande Valley cottonwood forest growing between the river and the levee that helps protect Corrales from seasonal floods. Valley cottonwoods grow well only where their roots can reach underground water (plants with this requirement are called phreatophytes), and their seeds germinate only in wet places. As a result valley cottonwoods are limited to places with permanent water supplies. The word "bosque", pronounced boh-skay, is Spanish. A similar English word is "bosk", pronounced bah-sk. Both probably derive from Latin boscum, a woods or brushy place. Related words in other languages are the French "bois" and English "bush."

The flood plains of most low elevation New Mexican rivers supported bosques of valley cottonwoods at one time. Because these flood plains are favored places for irrigated farming, most of the forests have been cleared away, and the cottonwoods persist, if at all, only between the river banks and the riverside flood control levees. Before the development of farming in Corrales, the bosque extended westward across the flood plain to approximately the Corrales Main Canal. Conditions suitable for bosque growth (a shallow water table) prevail in much of the Village.

Flood plains in many parts of the United States support Valley Cottonwoods (Populus deltoides), but those living along the Pecos, Rio Grande, San Juan, and Gila rivers are a distinctive kind, Rio Grande Valley Cottonwood, Populus deltoides wislizenii. The range of this tree includes, besides New Mexico, adjacent parts of Texas, Chihuahua, Sonora, Arizona, Utah, and Colorado. The bosques which formerly occurred in these places have been reduced by human activities, such as farming and river control projects, so that today the only extensive ones are found along the Rio Grande in central New Mexico. Here, from approximately Espanola south to the Socorro area, may be found the few remaining large stands of Rio Grande Cottonwood forest. Even within this stretch the bosque is severely stressed by human use. Fires, woodcutting, dumping, and other destructive uses have made many parts unsuitable for wildlife or for enjoyment by people. That section of bosque within the limits of the Village of Corrales has received minimal impact because of limited human population and limited vehicular access.

The Village of Corrales, which incorporated in 1971, recognized the value of the bosque as a site for passive recreation for its residents and as an example of a fast-disappearing kind of natural area. The bosque was annexed into the Village in 1975, and in 1978 was declared a protected area to which Village fire and police protection were extended. The Corrales Bosque Advisory Commission, established as a Task Force in 1978 and as a Commission in 1980, is charged with advising the Village Government on matters pertaining to use and management of the Corrales Bosque Preserve. Village of Corrales Ordinance No 234, the "Corrales Bosque Preserve Ordinance" defines the Preserve and sets forth limitations on its use.

The position of the Village has been that the Bosque Preserve is a place for passive, non-destructive, recreation, including such things as hiking, jogging, fishing, and horse-back and bicycle riding, but excluding hunting, wood-cutting, fires, camping, and the use of motorized vehicles.

In 1984 the Nature Conservancy, a national non-profit organization dedicated to the preservation of natural areas, entered into an agreement with the Village of Corrales whereby the Conservancy made available the interest on a sum of money which it raised for the purpose of providing gates, fencing, and police protection. The Corrales Bosque Preserve is thus a protected area under the joint stewardship of the Village and the Conservancy.

The Life of the Bosque

The Trees

Early in the spring, about April, the valley cottonwoods bloom. The flowers are not very showy because they are pollinated by the wind and do not have to be attractive to insect pollinators. Each tree is either a male or a female (they are spoken of by biologists as being dioecious). Males bloom first. The reddish catkins, locally called sammies, produce pollen which is broadcast by the spring winds and produces uncomfortable reactions in people who suffer from hay fever. The female flowers, which are a light chartreuse in color, open slightly after the sammies, and to their sticky receptive surfaces adheres the pollen which by then is abundant in the air. Thus fertilized, the female flowers transform into grapelike clusters of green fruits known in New Mexico as tatones. Concurrently the leaves begin to appear. When ripe the tatones burst open releasing quantities of cotton-like fluff. To each bit of cotton is attached a minute cottonwood seed, in reality a baby cottonwood. When the wind blows the cotton is carried far and wide. Some of it may travel many miles and ascend to great altitudes before settling to the earth. Only those seeds settling on the water or wet earth survive and germinate. Cotton landing in the river floats and is carried downstream until it is washed ashore or onto a sandbar. There germination takes place, and the young tree quickly puts down a taproot which rapidly descends to stay in contact with the soil moisture. In favorable riverside places the youngster may grow up to a foot before the end of the summer. In deep shade, or in places where the soil dries completely to a great depth, the tree does not survive. Thus most cottonwoods succeed in establishing themselves in the open along the banks of permanent rivers or lakes. But because the seeds are carried so far by the wind, occasional trees may appear at isolated springs in the middle of arid grasslands and deserts. Only along large rivers, however, do the impressive woodlands called bosques develop.

Valley cottonwoods are broad-leaved trees, and this is unusual in an arid region where most plants have reduced their leaf surfaces in order to reduce water loss, and also to prevent heat buildup in the leaf. Cottonwoods don't have to worry about water loss, but the broad leaves, exposed to the midday sun of a New Mexican July day, could become intolerably hot. To avoid the overheating each leaf has a stem or petiole that is flattened in cross-section such that the broad surface of the leaf tends to be tilted away from the horizontal plane. As a result the rays of the morning or afternoon sun may strike the leaf surface perpendicularly, but the mid-day rays do not, and maximum heating does not take place. Because most of the leaves are arranged in this way, with their edges pointing vertically, cottonwoods do not cast a deep shade, and if you look upward through the foliage the sky can readily be seen. This arrangement has consequences for the way in which cottonwoods grow. Since the amount of light striking the leaf surface is reduced at best, when the leaf is lightly shaded by other leaves its photosynthetic activity is reduced: the leaves are not very shade tolerant. Consequently lower, shaded branches eventually die, and the tree prunes itself from below. Most of the photosynthetic action thus takes place in the crown layer of foliage. Trees have the option of growing up or out. In a closed bosque most growth is upward, but trees growing in the open may develop nearly spherical crowns and grow laterally as much as upward.

The growth of large cottonwoods slows for a variety of reasons. Decay and insects attack the trunk which becomes weakened and subject to wind damage, and the remaining living tissues may not carry enough water and nutrients for so large an organism. For whatever reason, after a hundred or more years of life cottonwoods gradually senesce and die.

In the bosque, areas that are open enough to permit the growth of youngsters, and that are subject to flooding, may be seeded with new stands of trees. In this way an undisturbed bosque may be a mosaic of stands of trees of different ages.

Although valley cottonwoods are the only native trees in our central New Mexican bosques, an introduced tree, Siberian Elm, Ulmus pumila, has become quite common. The elm was introduced into this area from Asia in the early part of the 20th century. This species is native to a region marked by aridity and low winter temperatures, and seems pre-adapted to our rigorous climate. Both female and male parts are included in each elm flower (biologists refer to plants with this condition as being monoecious). Like cottonwoods elms are wind-pollinated and the seeds, flattened wafer-like disks known as samaras, are likewise distributed by the wind. Like cottonwoods, elms favor moist riverside situations, but they are not dependent on open water for germination, and may be started simply by a good rain. Elms flower earlier in the spring than cottonwoods, and by the time the sammies are ripening, the young elms may already be growing, even in shaded places, and their parents may be in full leaf. Siberian Elms are aggressive, successful trees, and it is not surprising that they are becoming more and more common in our bosque. Since they are not dependent upon flooding for germination, they may in time replace cottonwoods in those places where flood control has reduced the normal flooding of the bosque. Elm flowers are eaten by at least two common Bosque birds: Dark-eyed Juncos and

White-crowned Sparrows.

The Shrubs

Several native and several introduced species of shrubs are common in our bosque, and contribute to its characteristic appearance.

Among native species, New Mexico Olive, Forestiera neomexicana, is one of the most beautiful. The light green foliage and yellowish-green bark are distinctive. In early spring small yellow flowers appear which later produce large quantities of small dark-blue fruits. Forestiera is most common in the shade of mature bosque. Also common is Silver-leaf Buffaloberry, Shepherdia argentea, which is marked by small gray-green leaves and small red fruits. New Mexico Olive and Buffaloberry probably depend upon birds for their dispersal. Birds eat the fruits, then drop the undigested seeds. Several species of willow are also abundant. Coyote Willow, Salix exigua, is a small shrubby species with very narrow gray-green leaves, which is most common in open, unshaded places. Tree willows, Salix of several closely similar species, have broader leaves, may grow to small tree size, and prefer more shaded sites. All willows in our bosques are phreatophytes, have separate male and female plants, and produce a cotton-like material for the dispersal of seeds. Like cottonwoods, they are dependent upon flooding and bare soil for germination.

Two of the most conspicuous shrubs or small trees in our bosque are non-native species: Russian Olive, Eleagnus eleagnifolia, and Saltcedar or Tamarisk, Tamarix chinensis. Both are natives of central Asia. Both are phreatophytes and are especially well-adapted to life in riverside habitats. Russian Olive has narrow silver-gray foliage, and in spring produces thousands of small, yellow, very fragrant flowers. These mature into grayish fruits which are avidly consumed by many species of birds and a variety of mammals including Raccoons. Russian olives are able to tolerate partial shade, and may grow within mature woodlands. Saltcedar has very narrow, scale-like leaves and reddish bark. In spring it produces rod-like clusters of pinkish blooms, and later fruits that are attached to cotton-like tufts. In some areas honey bees harvest the nectar for honey production. Saltcedar grows best and most densely in the open close to the river itself. It has become extremely common along all the desert and grassland rivers of the Southwest, often blocking channels and using up great amounts of underground water. It is the object of much of the phreatophyte control work in our region. But Saltcedar does not do well in shade, and when it is overtopped by growing cottonwoods it begins to fail. Tamarix is thus replaced by cottonwood forest in time, and since the cottonwoods are large trees with much less leaf area than the saltcedars, they withdraw and transpire less water into the air per acre. In the Corrales reach Saltcedar is not the problem that it is south of Albuquerque. Some additional less common shrubs include False Indigo (Amorpha fruticosa), a native with beautiful, though small, purple flowers, and Wild Licorice (Glycyrrhiza lepidota), the roots of which produce the flavoring for licorice. Passing birds, especially

robins, occasionally drop the seeds of junipers, which provide a touch of evergreen color in winter. All the shrubs mentioned provide good cover for wildlife, and all except saltcedar provide food as well. It has been shown that a forest with foliage growing at different heights all the way to the crown foliage is a richer wildlife habitat, supporting more species of birds, for example, than a woodland with only one layer of foliage. Thus shrubs are an important indication of the worth of a bosque as an environment for animals in general.

Other Plants

Over 200 kinds of plants have been found in the bosques of the Middle Rio Grande Valley. Some more conspicuous smaller species that help give our Bosque its distinctive appearance include the following. Virginia creeper, Parthenocissus inserta, is a common vine with leaves divided into five finger-like leaflets (sometimes called Five-fingered Ivy). It produces blue berries in late summer, and the leaves turn brilliant red in fall.

In some parts of the bosque one encounters stands of Yerba de Mansa, Amenopsis californica, a low-growing herb which bears a white cone-like flower on the end of a stem which grows up from a basal rosette of leaves. The roots of the plant are said to have valuable curative properties, and the dried leaves in fall have a wonderful spicy odor.

Along the borders of the Clear Ditch (officially the Corrales Riverside Drain) grow aquatic plants such as Cattails, Speedwell, Sedges, Duckweed, Watercress, and others.

The Historic Vegetation of the Bosque.

In the early 1930's the Middle Rio Grande Conservancy District built a system of drainage ditches, flood control levees and improved irrigation canals to better manage the distribution and use of water in the Middle Valley. From that date the water table in Corrales assumed its present level (5-8 feet) and the land in the Village became more reliably available for farming and human occupation. Also from that date the Bosque could develop naturally only between the levee and the river. Prior to the 1930's much of the Bosque in Corrales was cleared for irrigated farming, but periodic floods swept the area, especially during the spring period of snowmelt. In its unrestrained condition the Rio Grande roamed widely over the valley, building up its channel through sedimentation, then switching channels to entirely new routes. Strips of cottonwood and willow were planted by the floods, at first growing along the banks of the river, then being abandoned as the river changed its course. In places abandoned loops of the river formed oxbow lakes which gradually turned into cattail marshes with communities of aquatic animals. In places not visited by the river for considerable periods desert-grassland vegetation crept in, including Four-winged Saltbush, Sand Sage, and Wolfberry. Thus in earlier periods, when humans did not control the flow of the river so closely, the floodplain traversed by the Rio Grande was an ever-changing mosaic of plant

communities, cottonwood stands of different ages alternating with marshes, grasslands, and shrublands. This diverse habitat was home to a rich assemblage of plant and animal species.

At present, in the Corrales Bosque Preserve, natural reproduction of cottonwoods and willows is limited to very small areas along the edge of the river, and there are no remaining marshes. Under the present river management regimen which seeks to dampen high water flows through controlled release from impoundment areas, the prospects for long-term health of the Bosque are questionable. Serious attention is being given to the possibility of larger water releases to provide some flooding in the Bosque itself.

Animal Life

Birds

More than 250 kinds of birds have been detected in our part of the Rio Grande valley. Eighty five or more kinds have been recorded as breeding here. Fewer kinds are commonly seen, and still fewer are really characteristic of bosque, and would disappear if the bosque were seriously damaged. But an observant person walking for a couple of miles along the Clear Ditch road bordering the Bosque can always see twenty or thirty kinds. Not only are there many kinds of birds in the Bosque, but the numbers of individuals is high as well. In a recent study of our valley it was estimated that 300 to 600 birds per 100 acres was an average figure for cottonwood habitats.

Some of the commonest breeding species in or on the edges of the Bosque are as follows:

Mourning Dove
Black-chinned Hummingbird
Lesser Goldfinch
Spotted Towhee
Blue Grosbeak
Starling
Robin
Indigo Bunting
Bewick's Wren
Black-capped Chickadee
Cooper's Hawk
Bullock's Oriole
Black-headed Grosbeak
Flicker
Ash-throated Flycatcher
Brown-headed Cowbird
Yellow-billed Cuckoo
Lazuli Bunting
Downy Woodpecker
Yellow-breasted Chat
White-breasted Nuthatch
Horned Owl

In winter commonly seen species include the following:

White-crowned Sparrow
Brown Creeper
Hermit Thrush
American Goldfinch
Ruby-crowned Kinglet
Robin
Yellow-rumped Warbler
Dark-eyed Junco
Bewick Wren
Song Sparrow
Crow
Flicker

Species often seen on or over the adjacent Rio Grande include:

Great Blue Heron	Black-crowned Night Heron
Red-tailed Hawk	Mallard
Gadwall	American Wigeon
Common Merganser	Canada Goose
Kildeer	Spotted Sandpiper
Double-crested Cormorant	Turkey Vulture

Finally, if one enters the Bosque at night, and has good eyes and ears, one may detect the presence of the Screech Owl, or, more rarely, the Great Horned Owl.

Mammals

Mammals are much more difficult to see than birds, since many of them are active chiefly at night and hide in their shelters during the day. But a person with knowledge of what to look for can detect evidence of the existence of a number of common species.

Beavers are perhaps the commonest large mammals in the bosque. Most live along the Clear Ditch or along the bank of the river. Their shelters are in burrows which they excavate at the water's edge, and their presence can often be detected by the piles of cut sections of willow or other shrubs that accumulate at certain feeding sites. One can also see places that look like slides leading into the water where the beavers have dragged vegetation. If one watches quietly in the evening, one may see the beaver itself swimming along the surface of the water. Beavers rarely build dams or stick houses in our valley. Sometimes they attack larger trees, but only if they are quite close to the water.

Muskrats look like small beavers without flattened tails. They live in the same places, and also shelter in holes in the bank of the ditch or river. It is easy for a quiet observer to see these animals swimming along the surface of the drain ditches or sitting on the bank munching aquatic vegetation.

Frequently one may see the hand-like tracks of Raccoon in the mud along the water's edge or in the dust of the road. Coons live underground, or by preference in the hollows of large cottonwoods. These animals spend much of the night hunting for small prey, such as fish or crayfish, although 'coons are quite omnivorous and eat many kinds of vegetable food as well. Once in awhile a sleeping raccoon may be spotted high in one of the larger cottonwoods.

Careful attention to the tracks left in dust and mud will reveal the signs of other common carnivores: Coyotes, Gray Foxes, Badgers, and Striped Skunks. Once in awhile Coyotes may be heard or seen trotting along the Bosque trail. Gray Foxes are quite arboreal, and may sometimes be seen peering over a branch high in a cottonwood. Badgers move at dusk, seeking out the burrows of Pocket Gophers and Rock Squirrels which they excavate to get at their prey. In summer, Striped Skunks are also active in the evening, and may often be seen foraging

for insects along roadsides and woods edges.

Rarely Black Bears leave the nearby mountains and enter the Bosque. These occasional visitors enjoy gathering windfall apples in the nearby orchards, and bear droppings, seen along the bosque trail, are often packed with apple skins and cores.

Porcupines are common Bosque residents, and are most often spotted during the daytime perched near the top of a cottonwood. When the porkys are seeking mates, and spending more time on the ground, roaming dogs often end up in the local veterinary's office to have quills extracted from their faces.

If you walk through the Bosque after one of our rare snowfalls, you may see the tracks of the Cottontail Rabbit, or perhaps even flush the rabbit itself from a thicket of willows or other shrubs. Most cottontails in lowland New Mexico are Desert Cottontails (Sylvilagus auduboni). Cottontails in the mountain forests belong to two other species. Those living in the Corrales bosque appear not to be the desert variety, but mammalogists have not yet worked out what they are. Our Preserve may harbor one of the mountain species, or conceivably a kind not yet recognized by biologists.

Smaller mammals include Valley Pocket Gophers, burrowing rodents which throw up mounds of earth that are quite conspicuous on the forest floor. A rare small mammal which most people will never see is the Desert Shrew, a tiny, mouse-like creature with a long pointed nose and almost invisible eyes which lives among the debris on the ground where it hunts for insects and other tiny animals.

At least eight kinds of bats are known to forage or reside in the Bosque. In spring and fall Hoary and Silver-haired Bats migrate through in considerable numbers. In summer Yuma Bats join Free-tailed Bats in coursing up and down over the water of the Clear Ditch in search of a drink or insect prey. And sometimes the huge-eared Desert Pallid Bats forage along the levees and forest edges, at times landing on the ground to pursue terrestrial insects. Pallid and Free-tailed Bats once raised their young in the Old San Ysidro Church.

Reptiles and Amphibians

The most commonly seen amphibians in the Bosque are the Woodehouse Toad, the Bullfrog, the Leopard Frog, and the Spadefoot Toad. The Woodhouse toads are often heard trilling in the spring or early summer when they seek mates and lay their eggs. They are common around gardens where they consume large quantities of insects. Woodehouse Toads may be recognized by their warty skins and a light colored line down the middle of the back. Spadefoot Toads show up only after heavy summer thunderstorms when they congregate in flooded places and call for mates. The sound of males when a number are calling from the same pond may be heard for a mile or more. Formerly Leopards Frogs were the commonest frogs inhabiting our ditches. They are green with black spots. However in recent years the Bullfrog has nearly replaced the Leopard Frogs which are now quite uncommon. Bullfrogs are a solid green color, are larger than the Leopards, and make the familiar "jug-o-rum" call at night. All species of frogs and toads have experienced marked population declines throughout the world. Woodehouse Toads were once abundant in Corrales,

but are now rather uncommon. The most commonly seen reptile in the Bosque is probably the common Fence Lizard. These scaly grayish lizards are usually seen scurrying through the leaves or climbing on the trunk or branch of a tree. Other common lizards are the Whip-tails or Racerunners, which have black and yellow stripes and often a blue tail. Racerunners are almost always seen on the ground. The Red-sided Garter Snake, a water-loving species, is the commonest snake. They are usually seen in or near one of the ditches. When picked up this species emits a bad-smelling fluid from glands near its cloacal opening, and may bite, but they are not venomous. Also common is the Bull Snake, with a light tan body and brownish blotches. Bull snakes reach six feet or more in length. Though they are capable of biting, they are usually quite gentle, and soon become accustomed to being handled. Bull Snakes feed chiefly on warm-blooded prey, such as pocket gophers, mice, and other rodents.

Conservation and the Future

Human management of the Bosque and other riverside communities has diverse goals which affect the Bosque in different ways. The needs of agriculture dictate that as much water as possible be allowed to flow downstream to enter the channels of various irrigation systems. The economic welfare of farmers depends upon this flow. Since phreatophytes use water, some control programs have concentrated on phreatophyte eradication. Agricultural and residential lands in the flood plain of the river are subject to periodic flooding, in spring when the snow in the northern mountains melts, and in summer when thundershowers drop large quantities of water on arroyos entering the Rio Grande. Flood control involves the construction of dams across the river and on some of the larger arroyos, as well as the building of levees along the river itself. It is between these levees and the river that the modern Bosque is able to survive. Finally, to lower the water table in the flood plain, formerly at the surface of the ground in many places, drainage ditches have been constructed which carry ground water back into the river. The principal drainage ditch in Corrales is called the Corrales Riverside Drain, or, as it is known locally, the Clear Ditch. Many kinds of plants and animals which are dependent upon wet habitats survive only along the banks of the various drainage ditches.

As more and more people come to live in the flood plain, the area of the formerly more extensive Bosque, additional human values come to bear upon the management of the river. The Bosque in Corrales is seen as an important recreational resource, a place to escape the pressures and noise of modern life, to commune with one's self and with nature, and to engage in healthful outdoors exercise and relaxation. Moreover, the beautiful green border of the Bosque along the east side of the village adds immeasurably to the attractiveness, not to mention the monetary value, of the land in the village. Thus a high priority of the Village of Corrales has been to preserve and protect the Bosque from destructive uses.

Increased use by people has increased the likelihood of fire in the bosque. Many parts of the bosque are thickly grown with native and non-native shrubs as well as with cottonwoods and non-native trees. Such places, if ignited, may burn vigorously. To reduce fire danger a recent trend in the Middle Rio Grande valley has been to thin or remove shrubs, thus producing a more open forest, one that provides less suitable habitat for many species of birds and other wildlife. In clearing some parts of the Corrales Bosque that are considered especially susceptible to fire danger, an effort has been made to spare native shrub species, and also some individuals of Russian Olive. The 1970 Manierre Fire, approximately opposite Manierre Road, resulted in the death of a large stand of old cottonwoods, but the site of the fire is now occupied by dense thickets of Buffaloberry and New Mexico Olive, and provides nesting shelter for the rarely seen Gray Catbird, among other species.

A world-wide goal of conservationists, scientists, and nature-lovers has been to preserve examples of the natural environments of the earth before they are irreparably altered by human development. Because the Corrales Bosque represents one of the best examples of Rio Grande cottonwood forest, a goal of the Village of Corrales and the Nature Conservancy is to reduce human alteration to the minimum possible level, in the hope that the Corrales Bosque Preserve will continue to provide recreational and educational opportunities for future generations.

Village of Corrales
Mailing Address: PO Box 707
Physical Address: 4324 Corrales Road
Corrales, New Mexico 87048
Phone: 505-897-0502
Fax: 505-897-7217
E-mail: info@corralesnm.org
Website: http://www.corralesnm.org