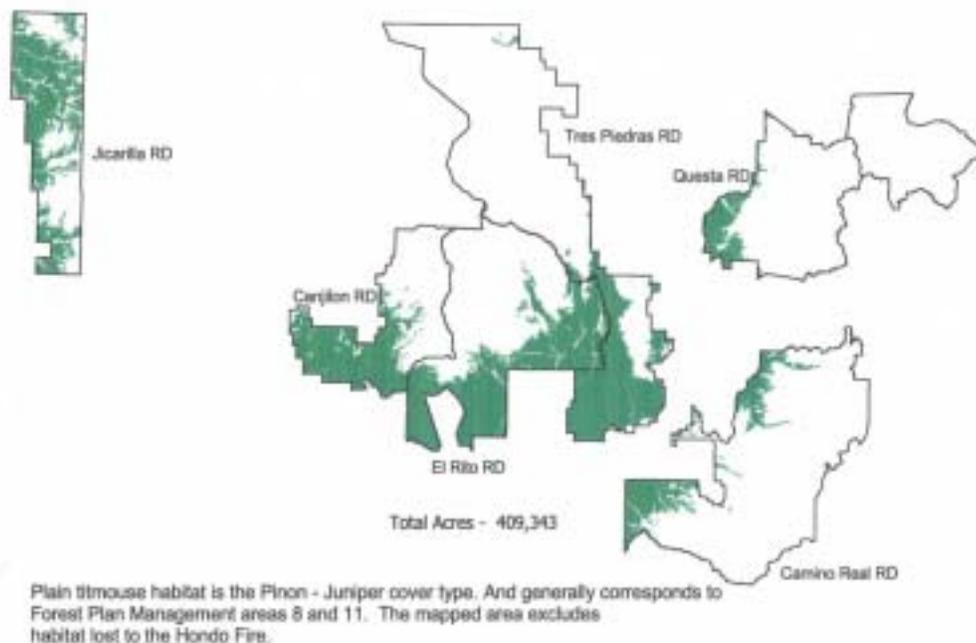


Juniper (Plain) Titmouse (*Baeolophus ridgwayi*)

Indicator Species Habitat

The plain titmouse is an indicator species for piñon-juniper (PJ) canopies (USDA 1986a, p.97). Also known as “juniper” titmouse, the plain titmouse is a resident of deciduous or mixed woodlands, favoring oak and piñon-juniper (Ehrlich et al. 1988). The titmouse usually nests in natural cavities or old woodpecker holes primarily in oak trees, but it is capable of excavating its own cavity in rotted wood. The species feeds mainly on insects, seeds and occasional fruits, and is also a bark gleaner. As a cavity nester, large, older trees are an important habitat feature.

Based on the current GIS vegetation cover data, the Carson National Forest currently contains approximately 355,409 acres of plain titmouse habitat. As displayed below on a map of the Carson National Forest, the potential habitat for the plain titmouse is abundant and well distributed across the forest. It should be noted that these acres include all existing piñon-juniper as well as potential natural vegetation types as determined by Terrestrial Ecosystem Survey data. Thus there are slightly more acres on the potential habitat map than actual current cover type.



Map 1. Plain Titmouse Potential Habitat Distribution on the Carson National Forest (USDA 1987)

Management Activities or Natural Events That May Affect Habitat

Negative: Mechanical removal of piñon and juniper trees and wildfire in PJ woodlands.

Positive: Encroachment of piñon and juniper trees into sagebrush and grasslands.

Plans, Regulations and Guidelines Supporting, Maintaining or Improving Habitat

- *Carson National Forest Land and Resource Management Plan, Forest-wide Wildlife and Fish (1986)*, requires that

for nontimber species, such as piñon-juniper, oak and sagebrush, standards and guidelines are established for the maximum size, dispersal and duration of created openings. These standards and guidelines are designed to address concerns for wildlife and plant species.

In the piñon-juniper type, created openings in areas that have been identified as big-game winter range will be designed so that an animal will be no more than 600 feet from hiding cover at any location within the opening (USDA 1986c, p. Wildlife & Fish – 6).

The desired condition for Management Area 8 is described as, “good habitat for plain titmouse. Maintain an average of 50 percent or more of piñon acres in a balanced age class distribution. In juniper areas there will be at least 10 large trees per acre. The trees will have greater than 25 percent living crown.” (USDA 1986c, p. 8. Piñon-Juniper - 1).

Habitat Condition And Trend On The Carson National Forest

Forest Plan EIS identifies piñon-juniper as the habitat type for this species. The key feature used in the EIS to track occupied or quality plain titmouse habitat was “piñon-juniper canopies” (USDA 1986, p. 97). At the time the Forest Plan was implemented, 364,900 acres of plain titmouse habitat were determined for the Forest. Since that time stands have grown, some have been harvested, wildfires and disease have changed the landscape to a limited degree and data to estimate conditions and cover types has also improved or changed in methods.

Several factors are used to determine habitat trend. Management activities (primarily timber sales) and wildfire have reduced certain habitats to unsuitable conditions. High intensity wildfire and certain harvest prescriptions such as overstory removal, seed cuts and shelterwood harvests are examples of areas that are deducted from the total acres of titmouse habitat. Total stand acres are not deducted. Only the actual acres treated that are estimated to result in acres becoming unsuitable are subtracted. Appendix A explains in more detail how habitat trend is determined.

Suitable stands (2,620 ac) that had experienced wildfire or prescribed fire were removed from titmouse habitat. Suitable habitat lost to fuelwood cutting (4,060 ac) was also deducted.

Table 1. Titmouse Suitable Habitat Acres: Change from Wildfire, Logging, and Tree Growth 1986-2002

Ranger District	Total PJ Acres	Habitat Acres Reduced by Wildfire & Rx Burning	Habitat Acres Reduced by Fuelwood Cutting	Habitat Acres Reduced by Bark Beetles	Total Acres Reduced	Remaining Acres of Titmouse Habitat
D1, D2, D6 ¹	204,328	20	1,500	*	1,520	202,808
D3	87,301	400	2,400	*	2,800	84,501
D4	41,444	100	60	*	160	41,284
D7	22,336	2,100	100	*	2,200	20,136
Total	355,409	2,620	4,060	*	6,680	348,729

Table 1 does not include an ingrowth factor, since this habitat grows very slowly and is not likely to be significant enough to consider. Also fuelwood harvest, as with logging practices, changed during the period of the Forest Plan. Overstory removal was fairly common in the 1980's for fuelwood, in order to remove older trees and release the younger growth. Thus the assumption the Forest Plan EIS makes that fuelwood harvesting would result in a downward trend in habitat. This was in part reversed by the early 1990's to maintain the larger trees and remove the crowding in the understory. The latter treatment would not affect the suitability of habitat for the juniper titmouse. The numbers above are estimated to reflect that trend. The table still reflects any harvest that would have removed or resulted in unoccupied habitat.

In this case, the trend in acres of habitat shows a decrease in acres from 364,900 to 348,729. However, it should be noted that the difference between 364,900 acres in the Forest Plan and the 355,409 identified in the vegetation cover data (see Table 1) is due to a variation in habitat typing. There are often variations especially in the piñon-juniper sagebrush communities. For example, sagebrush may be the dominant species in an area but scattered piñon and juniper may actually provide the structural difference necessary to influence species diversity. There are no set criteria for observers to break out this particular transitional portion of the community.

A downward trend of an estimated 6,680 acres or about two percent of available plain titmouse habitat has occurred on the Carson National Forest since 1986. An additional reduction in habitat over time is expected as bark beetle impacts of the 2002 summer and fall are realized, especially if drought conditions continue on the Forest through 2003. A column was included in Table 1, but data are not yet available to reflect this impact.

¹ D1 = Canjilon, D2 = El Rito, D3 = Jicarilla, D4 = Camino Real, D6 = Tres Piedras, D7 = Questa

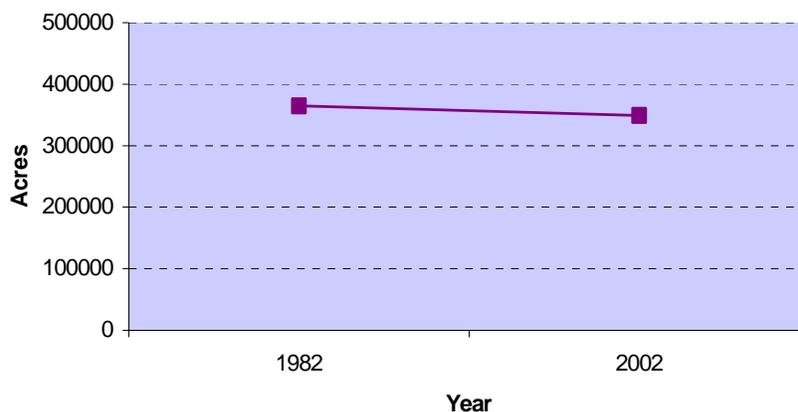


Figure 1. Changes in Plain Titmouse Suitable Habitat on the Carson National Forest from 1986 to 2002.

Forest Management Activities

There are several significant activities that have shaped or affected plain titmouse habitat over the past several hundred years in northern New Mexico. Prior to 1848, many of the areas now occupied by dense woodlands were predominately open, diverse communities of trees, shrubs and perennial grasses and forbs (Dahms et al. 1997). By the mid-1800's, local use of woodlands for timber and fuelwood had a significant effect (Betancourt et al. 1993). Early settlers used the areas closest to their communities to support their primary agricultural and transportation tools -- horses and burros. Heavy grazing from these livestock led to a reduction in the number and intensity of wildfires, resulting in a significant expansion of piñon and juniper trees (Wright 1990). In addition, the larger trees and snags were commonly used as firewood. Fire suppression during the last century also contributed to increased density of piñon-juniper stands. Since the historic period, coniferous woodlands have aged and generally become more dense and extensive, primarily by expansion into grasslands. It is likely that the existing amount of plain titmouse habitat is greater than what historically existed. However the quality of the habitat (small trees, densely growing together) is not as good as when trees were larger and growing further apart, providing better trees for cavity nesting and more grass in the understory to support a forage base of insects.

The most significant management activity in the Southwest that altered or destroyed habitat for the plain titmouse was the plowing, chaining, dozer piling, tree crushing and hand clearing with chainsaws of piñon-juniper woodlands to create forage areas for livestock grazing. Beginning in the 1940's and continuing until the early 70's, there was a widespread effort to convert woodlands to grassland.

The Carson Forest Plan defines approximately 83,000 acres on the Forest that were chained and reseeded as Revegetation Areas -- Management Area (MA). About half of these type-converted acres were once piñon-juniper woodlands and the other half were in sagebrush. Although Forest Plan standards and guidelines for MA 11 direct the Forest to maintain these revegetation areas, the Carson has focused prescribed burning on mostly the acres that would naturally revert back to sagebrush. Piñon and juniper trees have gradually reestablished into many of the sites where PJ was once dominant. This management trend is likely to continue. Across the Carson National Forest, the acreage of piñon-juniper woodland has either remained stable or increased since the inception of the Forest Plan (1986).

Limiting factors for the plain titmouse include cavities in snags and hollow trees. With about 348,729 acres of suitable woodland vegetation type on the Carson National Forest, cavities are expected to be abundant for this species. This is particularly true during this current period of drought, which has caused noticeable infections of insects and disease in piñon trees across the entire Forest, creating numerous snags.

The Forest Plan projected a harvest level in piñon-juniper of 9200 cords per year (USDA 1986a). Since the inception of the Forest Plan in 1986, the actual harvest level of piñon and juniper trees on average has been approximately 1300 cords per year. This translates into treatment of an estimated 650 acres of piñon-juniper woodland on the Carson National Forest each year.

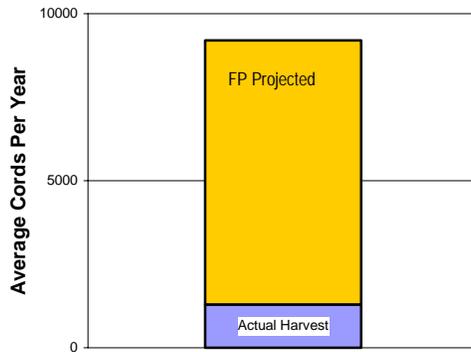


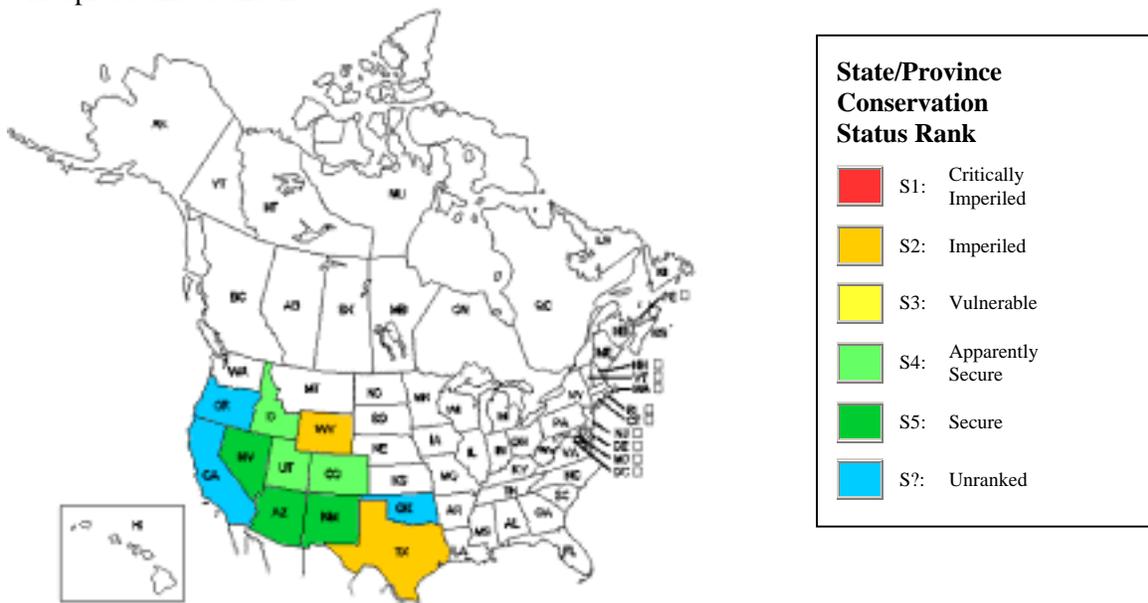
Figure 2. Comparison of Forest Plan Projections and Actual Harvest of Piñon-Juniper on the Carson

On the Jicarilla Ranger District, some trees are cut in piñon-juniper for the purpose of gas well development (road and well pad construction), and are then sold as fuelwood. However, the purpose of treating most of the piñon-juniper woodland on the Forest is to thin dense stands. Large trees are left for cavities and a more open understory supports a better forage base, therefore improving overall habitat for the titmouse.

To stimulate trees to grow larger and improve understory forage, thinning and prescribed burning in Management Area 8 are priority treatments over the next ten years. These activities in PJ woodlands will continue to benefit the plain titmouse. The primary threat to this species’ habitat is wildfire and bark beetle.

Population Trend And Viability

Throughout its range, the plain titmouse is listed as G5, (i.e., globally secure and common, widespread, and abundant) (NatureServe 2002). It is not vulnerable in most of its range. Species with this rank typically occur in more than 100 localities, and number more than 10,000 individuals. Within the United States, it is listed as N5, that is, it is secure and common, widespread and abundant.



Map 2. Distribution of Plain Titmouse in North America (NatureServe Explorer 2002)

Regionally (Arizona, New Mexico and Texas), the North American Breeding Bird Survey (BBS) has compiled estimated trends for the plain (juniper) titmouse within three guilds, successional/scrub habitat, cavity nesters, and mid-story or canopy nesters (Sauer et al. 2001). Analyzing species within guilds (groups with similar life history traits) can provide additional insight into patterns of population trends. These trend estimates have been adjusted in order to take into account the relative precision of the estimated trends and provide a better ranking of change for the species relative to other species in the same guilds. The three adjusted trend estimates for the plain titmouse (across 39 routes) each indicated a significant regional decline (Sauer et al. 2001).

Table 2. Trend Estimates (across 39 routes) in Arizona, New Mexico and Texas (Sauer et al. 2001)

Guild	Adjusted Trend Estimate	P Value	Declining or Increasing
Successional/scrub breeding	-2.1706	P<0.1	Significant Decline
Cavity nesters	-2.2457	P<0.1	Significant Decline
Canopy nesters	-2.0102	P<0.1	Significant Decline

New Mexico

The plain titmouse is a year-round resident of New Mexico, and breeds during the summer months (Schwarz 1995). The plain titmouse occurs almost statewide, and is considered rare to common. Its eastern limits are the dry Cimarron Valley, the lower Canadian Basin and the southeastern mountains. The species occurs to the southwest of the Peloncillo and Organ Mountains, is common on the Zuni Indian Reservation, and rare, accidental (or casual) permanent-residents at the White Sands National Monument, in Dona Ana and Otero counties. It is also known to occur on the Animas Mountains in summer (Hubbard 1987). In conversation with Greg Schmidt with the New Mexico Department of Game and Fish (June 1999), the species is widely distributed and fairly common.

In New Mexico, the plain titmouse is listed as S5, meaning it is secure, common, widespread, and abundant (NatureServe 2002). However, monitoring information from the North American Breeding Bird Surveys in New Mexico from 1968 to 1999 indicate population and trends are slightly down for the entire state (Sauer et al. 2001).

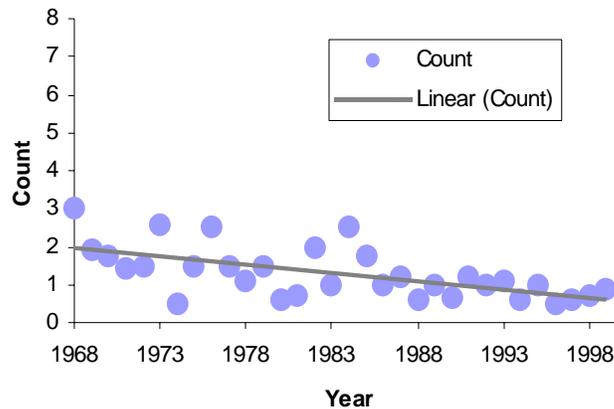
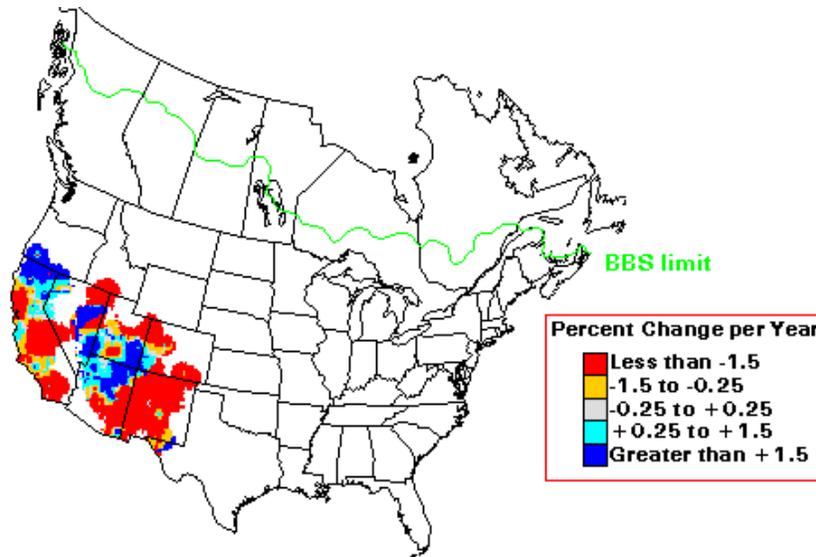


Figure 3. Estimated Trend for Plain Titmouse in New Mexico (Sauer et. al 2001)

Breeding Bird Survey results allow an analysis of trend by species and state. For the plain titmouse in New Mexico from 1966 through 2000, the estimated trend is -2.8 percent change per year. This trend estimate is a summary of the population change from 1966 to 2000, and does not provide information on other patterns of population change (such as cycles) over time. Twenty-two survey routes² were used in this analysis, and the relative abundance of plain titmouse observed per route was 1.12. There can be a variety of possible problems with estimates of population change from BBS data, however the above data contain at least 14 samples in the long term, are of moderate precision, and of moderate abundance on routes. These results corroborate the declining trend seen in the nation-wide and regional data above.



Map 3. Percent Change in Breeding Bird Survey Trend Per Year for Plain Titmouse

² Numbers reflect the abundance of the species near the survey route. They are averages of the total counts along the route for the period 1989-1998. Because each survey route is 24.5 mi long, and consists of 50, 3-minute counts along the length of the route, the abundance estimate represents the number of birds that a very good birder would encounter in about 2.5 hours of roadside birding in the area near the BBS route (Sauer et al. 2001).

Carson National Forest

The plain titmouse is a common inhabitant of the Carson National Forest primarily in the piñon-juniper woodlands. Occasionally, it is observed within ponderosa and mixed conifer forest types. Incidental observations made by Forest Service biologists have found that it is regularly seen and well distributed during the spring and summer months.

Formal population surveys for the species have not been conducted on the Carson National Forest; however Eagle Environmental conducted a prey base analysis study in the spring and summer of 1985 in an area just west of the Questa Ranger District on public lands administered by the Bureau of Land Management (BLM) (Stahlecker et al. 1989). Data for this species comes from the piñon-juniper and wooded canyon bench habitat, similar to the piñon-juniper woodland and transition zone between the piñon-juniper and ponderosa pine type prevalent across the Carson National Forest. The wooded canyon bench habitat contains a mix of juniper, piñon and ponderosa pine. Stahlecker recorded 61 breeding pairs per square kilometer in the piñon-juniper woodland and 22 breeding pairs per square kilometer in the wooded canyon benches. There is a high degree of similarity between BLM piñon-juniper woodlands and adjacent Forest habitats.

Two Breeding Bird Survey routes have been used to evaluate trend on the Carson National Forest. Both the Cebolla (near La Placitas) and Ojo Sarco routes (Rt. 3 and 4 respectively) are located on the Forest. The plain titmouse was regularly detected on the Ojo Sarco route from 1968 to 2000, but was detected less frequently on the Cebolla route from 1973 to 2000, which is primarily along riparian habitat. An average of 2.27 titmice were found along these transect lines annually. This data does document that the species regularly occurs on the Carson. Individual route trend estimates are seen in the table below.

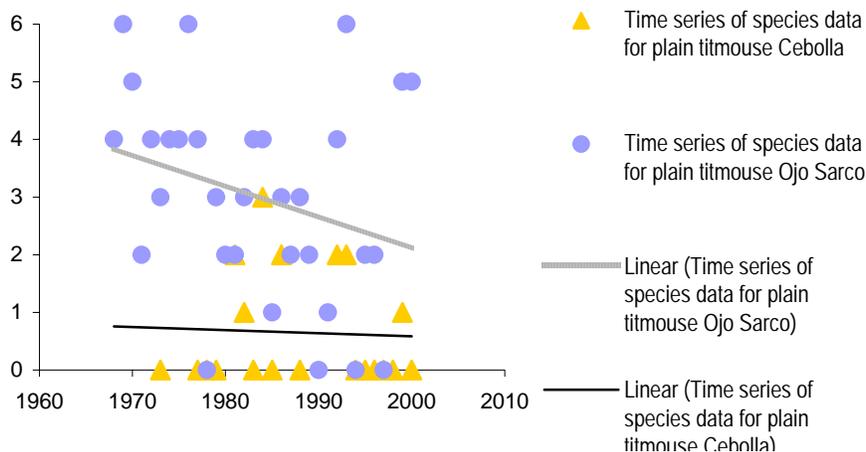


Figure 4. Time Series of Plain Titmouse Data for Ojo Sarco and Cebolla Survey Routes

Survey estimates for Ojo Sarco and Cebolla indicate a declining trend in plain titmouse populations on the Carson National Forest. Analyzing population change on survey routes is probably the most effective use of BBS data, however these data do not provide an explanation for the causes of population trends (Sauer et al. 2001).

Table 3. Breeding Bird Survey Estimates for Plain Titmouse

BBS Route	Trend Estimate	P value	Number of Years	Average Count
Cebolla	-40.13	0.01110	20	.65
Ojo Sarco	-3.40	0.00994	32	3.00

The removal of piñon and juniper trees in large blocks was likely related to a decrease in plain titmouse populations in the past. Breeding bird surveys show that a significant decline (-16.2%) of the plain titmouse in New Mexico occurred between 1966 and 1979 (Sauer et al. 2001). This was likely due to the large areas of piñon-juniper that were type converted to grasslands throughout the Southwest during that period. More recent surveys show that from 1980 through 2000 the decline in population has decreased to -3.2 percent. As more piñon and juniper trees reestablish into the man-made grasslands, habitat for the plain titmouse should trend towards stabilization.

The Final Environmental Impact Statement for the Carson Forest Plan analyzed seven alternatives (USDA 1986a). The Carson Forest Plan decision alternative is described relative to projected impacts on management indicator species over the life of the plan. In other words, the effects analysis to implement the Carson Forest Plan not only took into account annual sawtimber volume to be harvested from the Forest over the next 10 to 20 years, but also the estimated number of cords removed from piñon-juniper woodlands each year. The FEIS describes that,

The Proposed Action will over time provide moderate to high amounts and quality of most habitat components within the suitable timberlands and other management areas. Requirements for management of old growth, cover, vegetative diversity, raptor nesting habitat and many other habitat components receive greater emphasis and specific direction than other alternatives. Populations of all indicator species, with the possible exception of certain rare animals, will be managed at levels greatly exceeding minimum viable populations (USDA 1986a, p.152).

The projected harvest level of piñon-juniper over the period of the Forest Plan was 9200 cords per year. Since the inception of the Forest Plan in 1986, the actual harvest level of piñon and juniper trees on average has been 1300 cords per year which translates to approximately 0.15 percent of the 364,900 acres of piñon-juniper woodland on the Carson National Forest (refer to graph in *Habitat* section). Since the FEIS determined that MIS would be managed at levels greatly exceeding viable populations at the projected harvest levels, and the actual harvest level has averaged only about 14 percent of the projected and only 0.15 percent of the potential habitat, it is assumed that the Forest is well within its ability to maintain viable populations for plain titmouse.

Although trends from the two survey routes on the Forest indicate a declining trend for the plain titmouse, the cause(s) of this decline are unknown. This may be in part related to the existing dense stand conditions that may be reducing the forage base. Management activities impacting piñon-juniper, such as mechanical thinning and prescribed burning, would continue to reduce fuels and competition in the PJ and enhance the quality of the species' habitat. As long as snags and large trees are protected, thinning and burning would generate more understory grasses and forbs, which in turn would support more insects for a forage base. These management practices would also promote larger trees more quickly, providing better cavity opportunities for nesting

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