COLORADO PARKS & WILDLIFE

Identification of Band-tailed Pigeon Flock Areas in Colorado, 1969-1981

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FRONT COVER PHOTOS
Main photo: Band-tailed pigeon (Todd A. Sanders)
Bottom left: Band-tailed pigeons at capture site (Clait E. Braun)
Bottom right: Band-tailed pigeons captured with a cannon net (Clait E. Bruan)

BACK COVER PHOTO
Band-tailed pigeon (Todd A. Sanders)

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IDENTIFICATION OF BAND-TAILED PIGEON FLOCK AREAS IN COLORADO, 1969–1981

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EXECUTIVE SUMMARY

Band-tailed pigeons (*Patagioenas fasciata*) occur in two populations in North America and are annually hunted without full knowledge of their population status. In Colorado, we identified 'flock areas' used by Interior Population band-tailed pigeons, which included sources of food from farming practices, provisioning by homeowners, and with suitable native habitat (forests and shrubs) for roosting. Most of these sites were in close proximity to small grain fields and livestock operations where relatively large numbers of pigeons consistently occurred. During 1969–1981, we leg-banded 26,460 band-tailed pigeons at 99 different sites, and also recorded recaptures of previously banded pigeons at each site in subsequent years. These 99 sites were contained within 17 identifiable flock areas in 24 counties, primarily in western Colorado and along the eastern edge of the Front Range foothills.

Total recaptures (3,565) included 2,866 recaptured at the same 'flock area' as original capture, 513 recaptured in different 'flock areas' in Colorado, 126 recaptured in an adjacent state, and 60 that were originally banded in an adjacent state, but recaptured in Colorado. Fidelity to individual flock areas (percentage of recaptures of pigeons banded in a flock area that occurred in that flock area) ranged from 62 to 96% (not counting 2 flock areas with < 10 recaptures); across all flock areas, fidelity was 80.4%.

Most interchange of recaptured individuals among flock areas was latitudinal (south to north or vice versa) along the Front Range north from LaVeta (including Fort Garland) to Beulah, to Manitou Springs, to Evergreen, and to Niwot-Estes Park (or in reverse order). Some movements were likely related to migration. The patterns in western Colorado were for affinities with the closest 'flock area' but with little relationship to the distribution of recaptures north of the southern 'flock areas' at Rio Grande, Durango, and Stoner. This despite large flocks on the Uncompahgre Plateau (Montrose-Sanborn Park) and near Salida. The smallest 'flock areas' were at Meeker in northwest Colorado, Collbran-Molina on the edge of Grand Mesa, at Arboles, and immediately south (Aspen-Carbondale) of the Colorado-Eagle River system. Although extensive land use changes have occurred in Colorado since this study (e.g., substantial reduction of small grain farming), delineation of 'flock areas' could be useful in conserving and managing band-tailed pigeons through specific regulations, habitat management practices, and monitoring programs.

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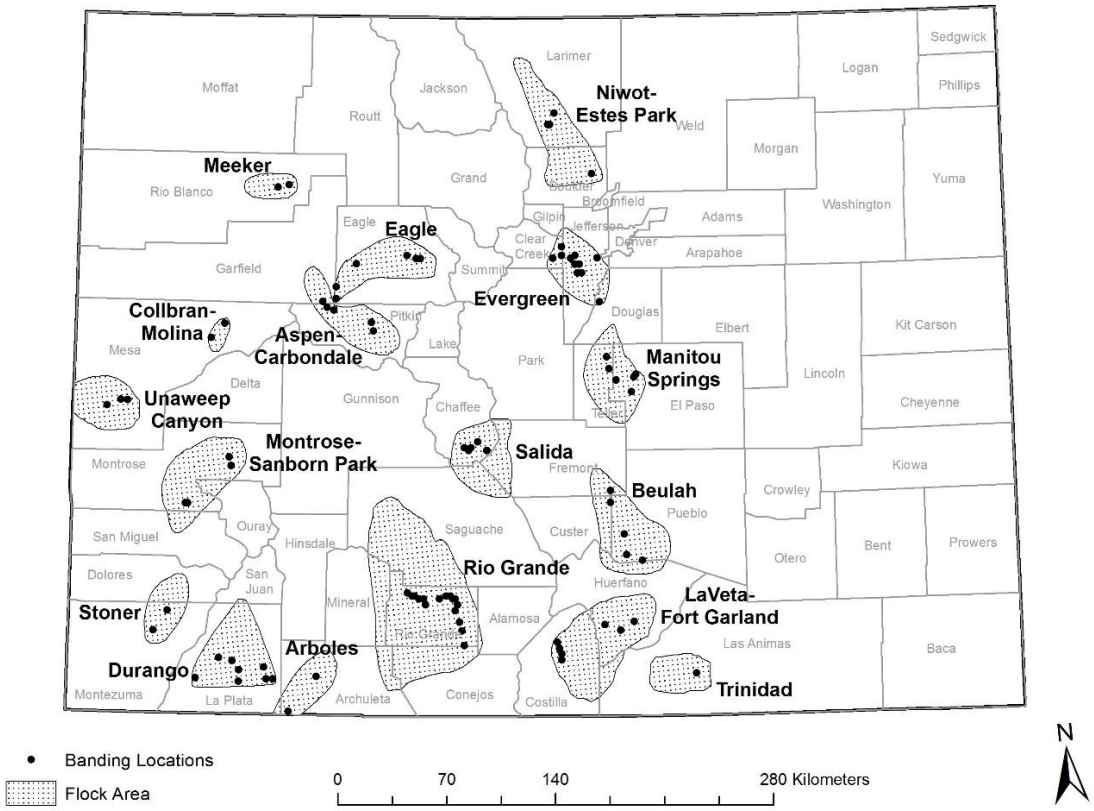
ACKNOWLEDGMENTS

Many field personnel of the Colorado Division of Wildlife reported the presence of pigeons which helped increase our knowledge of where larger groups were feeding. We especially thank R. F. McDonald, Area Supervisor in Durango for help in locating groups in 1969 and 1970. H. D. Funk of the Colorado Division of Wildlife ably provided logistical support. This study was initially supported through the U.S. Fish and Wildlife Service's Accelerated Research Program for Migratory Shore and Upland Game Birds through the active support of W. W. Sandfort of the Colorado Division of Wildlife and D. D. MacDonald of the U.S. Fish and Wildlife Service. Continuing support was through Federal Aid Project W-88-R of the Colorado Division of Wildlife. Numerous seasonal employees contributed to capture of band-tailed pigeons including C. McCord and M. Watkins in 1969, M. Kautz, and M. Stromberg, as well as graduate students P. D. Curtis, J. E. Kautz, and J. A. White. We especially appreciate the approval from private landowners in allowing access for baiting and trapping on their properties. J. H. Gammonley, Avian Research Leader, edited and facilitated the publication of this Technical Report. This is a contribution from Federal Aid to Wildlife Restoration Project W-88-R.

INTRODUCTION

Band-tailed pigeons (*Patagioenas fasciata*) occur in two populations north of Mexico (Braun 1994, Keppie and Braun 2000). These populations are commonly referred to as the Coastal (British Columbia, California, Oregon, Washington, and the western edge of central Nevada) and the Interior (Arizona, Colorado, New Mexico, and Utah with a few in the Davis Mountains in west Texas) (Neff 1947, Braun et al. 1975, Braun 1994). Band-tailed pigeons north of Mexico are considered seasonally migratory as well as nomadic (Neff 1947, Gutiérrez et al. 1975). Some pigeons of both populations migrate south into Mexico, usually during late summer and autumn and return north the following spring (Keppie and Braun 2000). Both populations are currently hunted.

Figure 1. Distribution of band-tailed pigeon flock areas within Colorado, 1969–1981.



The distribution of band-tailed pigeons in Colorado has been identified (Braun 1973) as have survival rates (Kautz and Braun 1981). However, little has been published about movements within Colorado (but see Schroeder and Braun 1993) other than flocks appear to be nomadic in some locales and as regular seasonally breeding birds in other areas (Neff 1947, MacGregor and Smith 1955, Jarvis and Passmore 1992). Initial recapture data from band-tailed pigeons leg-banded in Colorado indicated some band-tailed pigeons had fidelity to specific areas within and among years, and Braun (1972) used the term 'flock area' to describe these areas. Banding and recapture efforts continued through 1981 allowing additional flock areas to be identified in Colorado. Schroeder and Braun (1993) analyzed this banding and recapture data to describe movements of band-tailed pigeons from Colorado to Mexico and return. Our objectives in this paper are to report the distribution of 'flock areas' used by band-tailed pigeons in Colorado during 1969–1981, their relationships to other flock areas, and distances between flock areas.

METHODS

Flock areas were defined as the area which encompassed the known feeding area (usually where

Table 1. Flock areas and band-tailed pigeon banding sites (n = 99) in 24 Colorado counties, 1969–1981, based on recaptures of banded birds.

Flock Area	Counties (number of sites)[1]	Years of capture (number of years)
Arboles	Archuleta (2)	1972–1974 (3)
Aspen-Carbondale	Garfield (1), Pitkin (4)	1972–1974 (3)
Beulah	Custer (1), Fremont (1), Pueblo (3)	1969–1973 (5)
Collbran-Molina	Mesa (2)	1973–1974 (2)
Durango	LaPlata (8)	1969–1974 (6)
Eagle	Eagle (6)	1970, 1972–1974 (4)
Evergreen	Clear Creek (4), Douglas (1), Jefferson (11)	1969–1981 (13)
LaVeta-Fort Garland	Costilla (4), Huerfano (4)	1970–1975 (6)
Manitou Springs	El Paso (4), Teller (2)	1971–1978 (8)
Meeker	Rio Blanco (2)	1970, 1973–1974 (3)
Montrose-Sanborn Park	Montrose (4)	1970, 1972–1974 (4)
Niwot-Estes Park	Boulder (2), Larimer (3)	1970–1981 (12)
Rio Grande	Rio Grande (19)	1969–1975 (7)
Salida	Chaffee (5)	1969–1971, 1973–1974 (5)
Stoner	Montezuma (2)	1970–1974 (5)
Trinidad	Las Animas (1)	1974 (1)
Unaweep Canyon	Mesa (3)	1971–1974 (4)

[1]Detailed descriptions of banding sites in each county are presented in Braun (1976).

waste grain was available or food was provided by people feeding birds) of band-tailed pigeons in a given area and which included nesting habitat in forests dominated by pines (*Pinus* spp.) and oaks (*Quercus* spp.). Spatial distribution of recaptures around banding sites was also used to help define the area.

Band-tailed pigeons were located at feeding sites in each flock area, captured, and leg-banded (Braun 1976). we recorded the location of all recaptures of banded pigeons, and measured the distance (km) between original capture site and each recapture location.

We developed a listing of all recaptured pigeons from 1969 through 1981, but following initial capture and leg-banding, if a bird was recaptured multiple times in a flock area during a year, we only included one of the first recaptures in our analysis. In most cases, multiple recaptures in a year at the same flock area occurred in the year and flock area where a bird was initially captured and banded. Thus, including all of these recaptures would bias the distribution of recaptures toward the flock area of banding. We measured fidelity to a flock area as the number of recaptures in the flock area from pigeons banded in the flock area divided by the total number of recaptures anywhere from bandings in the flock area.

We calculated distances for capture and recapture locations for individual band-tailed pigeons captured after the year of original capture.

RESULTS

Band-tailed pigeons were captured and banded at 99 sites in 24 counties in Colorado flock areas during 1969–1981 (Fig. 1, Table 1). Detailed descriptions of banding sites in each county are presented in Braun (1976). A total of 26,460 pigeons was leg-banded (Table 2). There were 6,201 recaptures of band-tailed pigeons banded in Colorado and recaptured between 1969 and 1981. This number was reduced to 3,505 when pigeons recaptured multiple times at the same location during the same year were eliminated from the analysis. A total of 60 band-tailed pigeons that were originally banded in states other than Colorado were recaptured in Colorado during our study (Table 2); these recaptures were not included in subsequent analyses.

We identified 17 flock areas in Colorado, with an average radius of about 32 km. Across all flock areas, about 80% of recaptures were banded and recaptured in the flock area of initial capture. Only 639 of the band-tailed pigeons recaptured were outside of their flock area of banding, including birds recaptured in different states (Table 2).

There was little overlap in distances for birds recaptured in the same flock areas where they were captured, and those captured in different flock areas (approximate dividing line between the 2 groups of 50 km) (Fig. 2).

Table 2. Number of band-tailed pigeons newly banded and recaptured by year, 1969–1981, in Colorado. Recaptures do not include any 'repeats' of birds captured at the trap site or specific trapping area in the year of original capture.

Year	Number banded	Total recaptured	Recaptured in same area	Recaptured in different area	Recaptured in different state	Banded in different state[1]
1969	1,600	0	0	0	0	0
1970	3,292	71	65	5	0	1
1971	4,006	299	237	44	5	13
1972	7,251	841	678	119	22	22
1973	3,537	929	768	117	37	8
1974	3,960	1,136	948	134	39	16
1975	422	188	163	14	9	2
1976	309	24	0	13	11	0
1977	360	15	0	12	3	0
1978	416	13	0	13	0	0
1979	778	35	6	29	0	0
1980	205	7	1	6	0	0
1981	324	7	0	7	0	0
Totals	26,460	3,565	2,866	513	126	62

[1]Originally banded in an adjacent state but recaptured in Colorado, not included in original sample of 26,460 pigeons.

DISCUSSION

Many (3,523) leg-banded band-tailed pigeons were recaptured during 1969–1981 but only 639 (~ 18%) were outside of their specific flock areas. Thus, fidelity to original capture flock area was high (up to 95.5%). Schroeder and Braun (1993) found, using the same banding data set, that 87.6% of 4,840 recapture locations of pigeons recaptured in succeeding years after banding were <50 km from the location of capture. Average distance between capture and recapture locations was 16.0 km for adult males, 20.8 km for adult females, 26.0 km for immature males, and 36.7 km for immature females (Schroeder and Braun 1993).

It was not possible to find and trap in all foraging areas used by band-tailed pigeons in each year. No recent knowledge was available prior to 1969 and pigeons were only located and captured in 5 areas (Beulah, Durango, Evergreen, Rio Grande, and Salida) in that year (Braun 1976) that were later identified as flock areas. In contrast, pigeons were captured at 30 sites (17 flock areas) in 1974, the last year of intensive banding. We did not commonly find areas where band-tailed pigeons were feeding on native foods such as buds and floral parts of deciduous trees in spring, and acorns and berries in late summer and fall. Those sites noted were in areas where trapping would have been difficult or not possible.

All but one of the largest flock areas were along the east side of the Front Range from LaVeta-Fort Garland to Manitou Springs to Evergreen to Niwot-Estes Park. The largest populations west of the Front Range were at Rio Grande, on the Uncompahgre Plateau (Montrose-Sanborn Park), Durango, Salida, and Aspen-Carbondale. The smallest flock areas were on Grand Mesa (Collbran-Molina) and in the White River Basin (Meeker). Numbers of pigeons decreased north of the Colorado-Eagle River and pigeons were largely absent in South Park and the Gunnison Basin as well as in North Park and Moffat County. We could not locate pigeons and or suitable foraging areas in these large intermountain basins or in arid sagebrush (*Artemisia* spp.) steppe. Band-tailed pigeons were essentially absent east of Interstate 25 with the exception of Trinidad. This absence was most likely due to the lack of pine-oak forests. Remarkably, band-tailed pigeons were not readily observed in migration in spring or fall. Numbers kept either increasing (spring) or decreasing (fall). Large flocks were most notable at

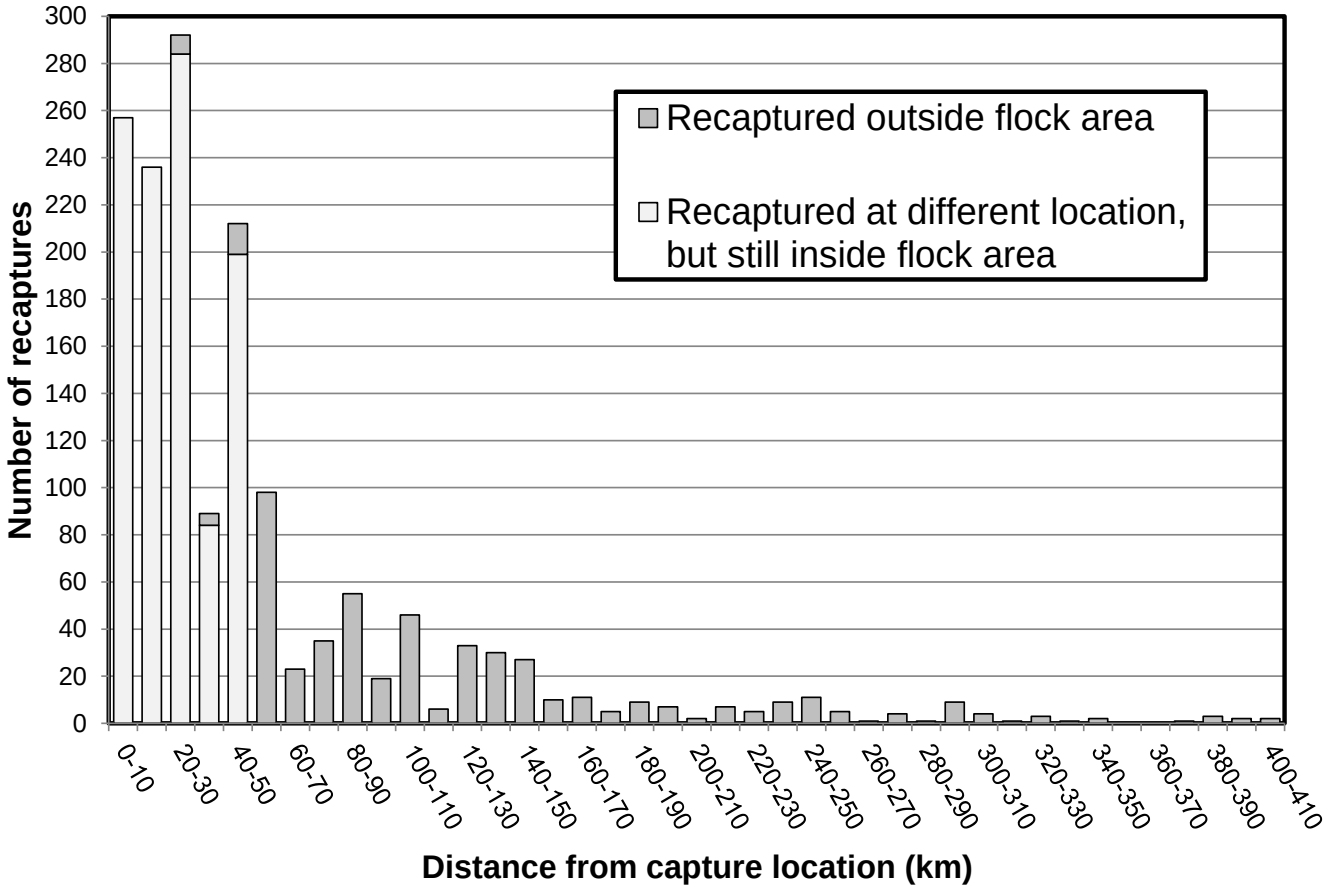
Table 3. Distribution of recaptures of band-tailed pigeons leg-banded at each flock area, and percentage of total recaptures of pigeons banded at a flock area that occurred in that flock area (% fidelity). Recaptures in New Mexico (113), Utah (13), and Arizona (2) are included. The total number banded does not include 2 individuals included in Table 2, because their exact flock area of banding was not identified. The total number of recaptures is greater than in Table 2 because here we include pigeons that were recaptured in different flock areas in different years.

			Number of recaptures at each flock area																		
Flock area of banding	# banded	# recaptures	Arboles	Aspen	Beulah	Collbran	Durango	Eagle	Evergreen	LaVeta	Manitou	Meeker	Montrose	Niwot	Rio Grande	Salida	Stoner	Trinidad	Unaweep	Outside CO	% fidelity
Arboles	494	**79**	**55**				8	1					1	2	7					5	**69.6**
Aspen	940	**74**		**63**		1	3	5				1	1								**85.1**
Beulah	1,146	**109**		2	**67**				3	10	9			4	1	5				8	**61.5**
Collbran	138	**3**				**0**		1	1											1	**0.0**
Durango	2,918	**196**	15	2		2	**131**	1		2			12	6	7	2	4		1	11	**66.8**
Eagle	503	**61**		3				**53**	2							1		1		1	**86.9**
Evergreen	2,509	**439**			1				**351**	6	36			39	1	1				4	**80.0**
LaVeta	3,601	**427**	1	2	12		2	3	4	**309**	11			8	10	6		14		45	**72.4**
Manitou	2,196	**478**		1	1				17	6	**431**			14	2					6	**90.2**
Meeker	320	**10**				1						**7**								2	**70.0**
Montrose	2,241	**162**		3		2	3	1		2	1		**136**	1	1		6			6	**84.0**
Niwot	2,865	**465**		1					49	2	10			**401**	2						**86.2**
Rio Grande	3,779	**593**	7			1	11	2	1	17	2		4	1	**505**	12		1		29	**85.2**
Salida	1,317	**173**		4	2				2	8	3			4	6	**139**				5	**80.3**
Stoner	690	**98**					2					2	11		2		**78**		1	2	**79.6**
Trinidad	231	**1**									1							**0**			**0.0**
Unaweep	570	**155**		1					1				2						**148**	3	**95.5**

foraging areas, especially in livestock feeding areas such as at Montrose where there may have been at least 2,000 birds present on several days.

Use of the flock area concept has merit for conserving and or managing harvest of band-tailed pigeons, at least in Colorado. Concern (Jeffrey et al. 1977, Case and Hughes 2011, Sanders 2013) has been expressed about the status of this species in its' Interior range. Harvest has not been identified as a major cause of the apparent decline in this area, but managing for pigeons could focus on food availability within existing flock areas.

Figure 2. Distances moved, in 10-km intervals, between capture and recapture locations for 1,573 band-tailed pigeons in Colorado. 1969-1981. This sample includes only individual recaptures after the year in which they were originally captured.



MANAGEMENT RECOMMENTATIONS

Large (up to at least 2,000 individuals) concentrations of band-tailed pigeons were relatively easy to locate, attract to baited sites, and capture during 1969–1981. Their attraction to waste agricultural grains and to grain placed to attract smaller birds, increases opportunities to observe and trap samples as needed for management and research studies. Thus, management strategies that incorporate knowledge of specific flock use areas and the lack of native foods during spring and early summer suggest possible development of standardized surveys to routinely assess status of this species within specific areas. Band-tailed pigeons primarily forage in flocks which increases opportunities for annual or periodic estimation of population status.

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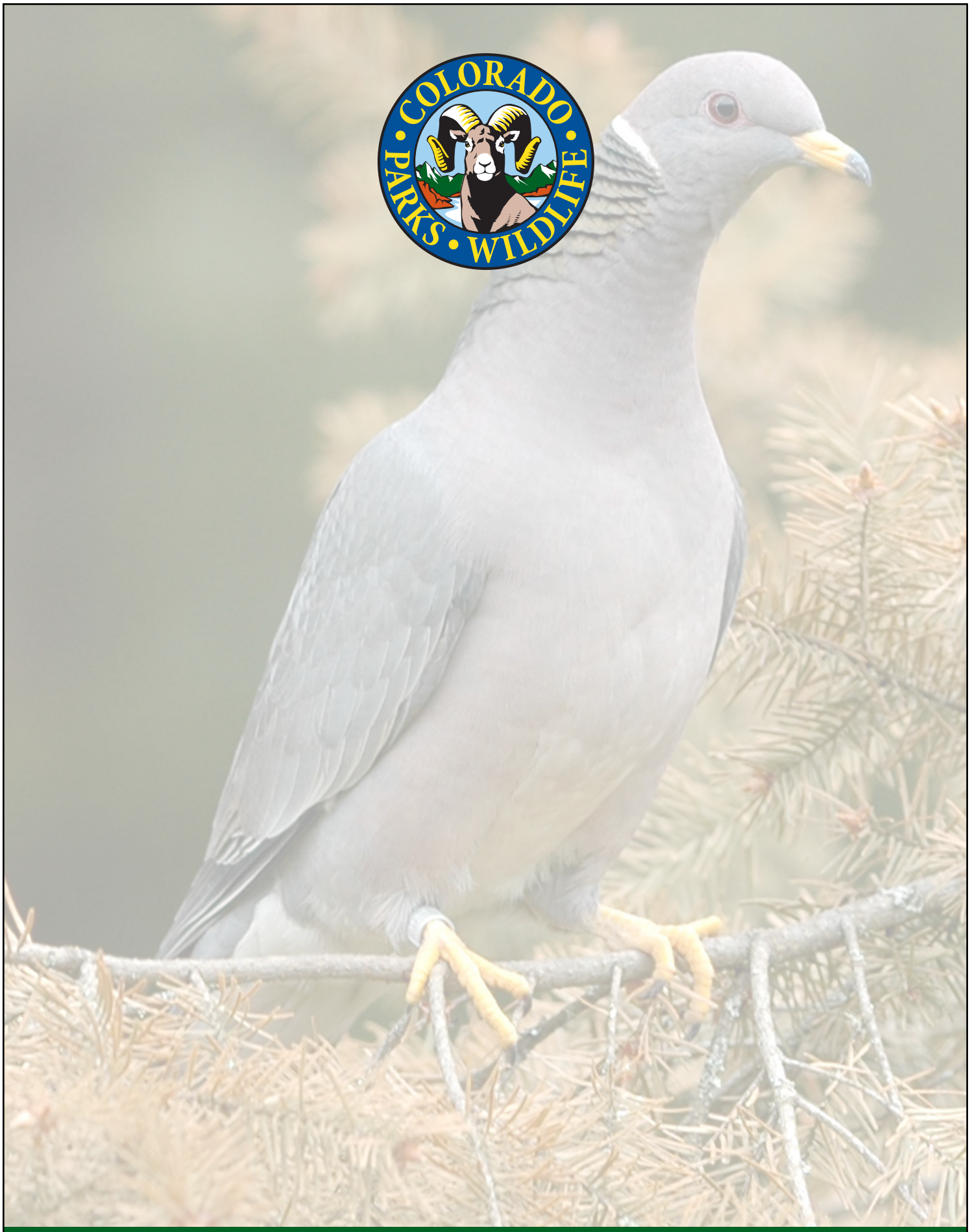

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