U.S. Fish & Wildlife Service

Band-tailed Pigeon

Population Status, 2010

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U.S. Fish and Wildlife Service
Division of Migratory Bird Management
Population and Habitat Assessment Branch
11510 American Holly Drive
Laurel, MD 20708-4002

June 2010

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Suggested citation:

Sanders, T. A. 2010. Band-tailed pigeon population status, 2010. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C.

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BAND-TAILED PIGEON POPULATION STATUS, 2010

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Abstract: This report summarizes information on the abundance and harvest of band-tailed pigeons (*Patagioenas fasciata*) in the western United States and British Columbia through 2009. The all-bird Breeding Bird Survey (BBS) provides and annual index to abundance of Interior and Pacific Coast band-tailed pigeons since 1966, while the MSS, implemented in 2004, was designed specifically to index abundance of Pacific Coast band-tailed pigeons. Harvest and hunter participation are estimated from the Migratory Bird Harvest Information Program. The BBS provided strong evidence that the abundance of Interior band-tailed pigeons decreased (4.0% per year, 95% credible interval = -8.3 to -0.8) over the long term (1966–2009). Also, abundance appeared to decrease during the recent 10 and 5 years, but credible intervals included zero. Current (2009) estimates of total harvest, active hunters, and total hunter days afield were 5,000 ± 1,250 (estimate ± SE) birds, 4,400 hunters, and 13,200 ± 2,829 days afield. Harvest comprised 8.3% hatching year birds during the 2009 season. For Pacific Coast band-tailed pigeons, the BBS provided strong evidence that abundance decreased (-2.6% per year, CI = -5.4 to -1.1) over the long term (1966–2009). Abundance appeared to decrease during the recent 10 and 5 years, but credible intervals included zero. The MSS, however, provided some evidence that abundance decreased (7.0% per year, CI = -14.0 to 0.0) over the recent 5 years. Current (2009) estimates of total harvest, active hunters, and total hunter days afield were 22,600 ± 3,113 birds, 9,700 hunters, and 24,400 ± 3,112 days afield. Composition of harvest was 21.3% hatching year birds during the 2009 season. Current estimates of the age-related vulnerability to harvest for these populations are unavailable.

Band-tailed pigeons are managed cooperatively by State wildlife agencies, British Columbia, the U.S. Fish and Wildlife Service, and Canadian Wildlife Service. Their management is detailed in population-specific (Interior and Pacific Coast) management plans (Pacific Flyway Study Committee and Central Flyway Webless Migratory Game Bird Technical Committee 2001, Pacific Flyway Study Committee 1994).

Maintenance of band-tailed pigeon populations in a healthy, productive state is a primary management goal. Management activities include population and harvest assessment, harvest regulation, and habitat management. Each year, counts of band-tailed pigeons heard and seen are conducted by state, provincial, federal, and other biologists in the western United States and British Columbia to monitor population status. The resulting information is used by wildlife administrators to set annual hunting regulations.

The primary purpose of this report is to facilitate the prompt distribution of timely information. Results are preliminary and may change with the inclusion of additional data.

DISTRIBUTION AND ABUNDANCE

Band-tailed pigeons are divided into six subspecies, only two of which occur north of Mexico, and each occupies a disjunct geographic distribution in western North America: Pacific Coast and U.S. Interior (Fig. 1). The coastal subspecies (*P. f. monilis*) breeds from extreme southeastern Alaska and western British Columbia south into Washington, Oregon, California, and extreme western Nevada, primarily west of the Cascade and Sierra Nevada ranges, into Baja California; and winters from central California into northern Baja California. Some in Mexico and southern California and the few wintering north of southern California may represent non-migratory population segments. The interior subspecies (*P. f. fasciata*) breeds from northern Colorado and eastcentral Utah south through Arizona, New Mexico, extreme western Texas into the Sierra Madre Occidental of Mexico; and winters from northern Mexico south to at least Michoacan. Some interchange occurs between races (Schroeder and Braun 1993).

Little is known about the demographics of band-tailed pigeon populations because their habits and habitat make it impractical to locate and observe or trap an adequate

Figure 1. Distribution of Pacific Coast (*P. f. monilis*) and Interior (*P. f. fasciata*) band-tailed pigeons in North America (after Braun et al. 1975).

sample of birds. However, in the early 1970s the total population size was approximated at 2.9–7.1 million birds in the Pacific Coast region and <250,000 birds in the Interior region (estimated from harvest reports and band recovery rates, Braun 1994), which demonstrates the likely sizes and disparity between the two populations.

ECOLOGY

Band-tailed pigeons primarily inhabit coniferous forests. Although they nest occasionally in hardwoods and shrubs, they prefer conifers within closed-canopy conifer or mixed hardwood and conifer forest stands. Nests are loosely constructed twig platforms. Placement is highly variable ranging from 6 to 120 feet above ground, but is generally near the bole and in dense foliage. Adults are presumably monogamous, and most clutches have one egg. Some nesting pairs, however, may complete up to three nesting cycles a year in mild climates providing long nesting seasons. Both parents incubate the egg and brood the squab. Nestlings are fed curd-like crop milk formed from the inside lining of the crop of both adults.

Band-tailed pigeons are highly mobile; individuals potentially travel long distances (up to about 32 miles) daily to feed and drink. Their diet includes buds, flowers, and fruits of deciduous trees and shrubs, especially oak, madrone, elder, dogwood, cherry, cascara, and huckleberry, but varies seasonally and with location. Early migrants are readily attracted to grain fields and fruit orchards dispersed below the forested hills where they nest, particularly before the onset of natural foods, which are preferred. Adults, especially in summer and particularly the Pacific Coast region, visit natural springs and water bodies high in mineral salts frequently where they drink and peck at the soil between long bouts of roosting in nearby trees.

Comprehensive material on the life history of the band-tailed pigeon may be found in Keppie and Braun (2000), Braun (1994), Jarvis and Passmore (1992), and Neff (1947).

MONITORING METHODS

The Breeding Bird Survey

The North American Breeding Bird Survey (BBS) is an all-bird survey that provides an annual index of abundance for both Interior and Pacific Coast populations of band-tailed pigeons (Sauer et al. 2007). The BBS started primarily in the eastern U.S. in 1966, central U.S. in 1967, and far west in 1968. The survey is based on thousands of routes distributed along secondary roads across the United States and Canada. Each route is 24.5 miles in length and consists of 50 stops or count locations at 0.5 mile intervals. At each stop, a 3-minute count is conducted whereby every bird seen within a 0.25 radius or heard is recorded. Surveys start one-half hour before local sunrise and take about 5 hours to complete. Data for birds heard and seen at stops are combined for BBS analyses.

Mineral Site Survey

The Mineral Site Survey (MSS) was developed to provide an annual index to abundance of Pacific Coast band-tailed pigeons. This survey is based on work by U.S. Geological Survey scientists who examined the effectiveness of existing survey methods in detecting long- and short-term population changes (but they did not determine which survey most accurately indexed population abundance) (Casazza et al 2005). Additional

research illustrated impacts of rainfall on mineral site surveys (Overton et al. 2005). Past monitoring efforts for the Pacific Coast population relied on the BBS, which includes all birds, and other band-tailed pigeon specific surveys in Oregon (visual counts at mineral sites in August) and Washington (audio counts along transects in June). There was no specific monitoring program in California or British Columbia. Their results suggested that counts of pigeons seen near mineral sites adopted from the Oregon protocol had the greatest power to detect short-term (3- to 5-year) trends in the data (Casazza et al. 2005). Additional work is needed, however, to determine the reliability of counts at mineral sites to index abundance of band-tailed pigeons.

The MSS was developed and initiated on an experimental basis in 2001 (Casazza et al. 2003), and became operational in 2004. The survey is a coordinated effort among state and provincial wildlife agencies in California, Oregon, Washington, and British Columbia, and the U.S. Fish and Wildlife Service and Canadian Wildlife Service. The MSS involves a visual count of band-tailed pigeons at select mineral sites throughout the population's range (n = 45; 10 in California, 19 in Oregon, 12 in Washington, and 4 in British Columbia) during July from one-half hour before sunrise to noon. These counts provide an index of abundance. Unfortunately, a similar survey for Interior band-tailed pigeons is not possible because the birds in this area do not use mineral sites (Sanders and Jarvis 2000).

Harvest Information Program

Wildlife professionals have long recognized that reliable harvest surveys are needed to estimate the magnitude of harvests and monitor the impact of hunting. In past years, a compilation of non-uniform, periodic state harvest surveys have been used to obtain rough estimates of the number of band-tailed pigeon hunters and birds killed. Thus, the data were of limited use at a population range level. Those data are no longer collected by states (with the possible exception of New Mexico).

Beginning in 1952, the U.S. Fish and Wildlife Service conducted an annual national harvest survey (Mail Questionnaire Survey), but it was based on a sampling frame that included waterfowl hunters and so harvest of non-waterfowl species could not be estimated reliably. To remedy this problem and challenges associated with combining state surveys, the U.S. Fish and Wildlife Service and state wildlife agencies initiated the national, Migratory Bird Harvest Information Program (HIP) in 1992. This Program was designed to enable the U.S. Fish and Wildlife Service to conduct nationwide surveys that provide reliable annual estimates of the harvest of migratory game birds including band-tailed pigeons. Under HIP, states provide the U.S. Fish and Wildlife Service with the names and addresses of all licensed migratory bird hunters each year, and then surveys are conducted to estimate harvest and hunter participation (total harvest, number of active hunters, days hunted, and seasonal harvest per hunter) in each state. All states except Hawaii have participated in HIP since 1998. Useable estimates of band-tailed pigeon harvest and hunter participation became available in 1999.

Parts Collection Survey

The Parts Collection Survey (PCS) is a secondary component of the national harvest survey, which began in 1961. The PCS is the primary means by which the composition (species, age, and sex) of the annual harvest is assessed. The survey selects a random sample of hunters registered with the program. These persons are sent envelopes in which to return one wing from each bird harvested. All wings received annually are examined at wing bees, one in each of the four flyways, in which the wings are categorized by species, age, and sex. Band-tailed pigeons were included in the PCS beginning in 1994.

Estimation of Trends in Abundance

For the first time in this annual report, BBS and MSS trends were estimated using a log-linear hierarchical model and Bayesian analytical framework (Sauer et al. 2008, Sauer et al. 2010) instead of the previously used route regression approach (Link and Sauer 1994). Both methods provide trend and annual index values that are generally comparable. The hierarchical model, however, has a more rigorous and realistic theoretical basis than the weightings used in the route regression approach, and the indices and trends are directly comparable as trends are calculated directly from the indices unlike the former analysis.

With the hierarchical model, the log of the expected value of the counts is modeled as a linear combination of strata-specific intercepts and trends, a random effect for each unique combination of route and observer, a year

effect, a start-up effect on the route for first year counts of new observers, and over-dispersion. Most of the parameters of interest are treated as random effects and some parameters are hierarchical in that they are assumed to follow distributions that are governed by additional parameters. The model is fit using Bayesian methods. Markov-chain Monte Carlo methods are used to iteratively produce sequences of parameter estimates which can be used to describe the distribution of the parameters of interest. Once the sequences converge, medians and credible intervals (CI, Bayesian confidence intervals) for the parameters are estimated from the subsequent replicates. Annual indices of abundance are defined as exponentiated year and trend effects, and trends are defined as ratios of the year effects at the start and end of the interval of interest, taken to the appropriate power to estimate a yearly change (Sauer et al. 2008). Trend estimates are expressed as the average percent change per year over a given time period, while indices are expressed as the number of pigeons seen and heard per route (BBS) or seen per site (MSS).

Annual indices of abundance were calculated for each state, province, and region (groups of states and provinces). Short- (recent 5-year period), intermediate- (recent 10-year period) and long-term (all years with data) trends were evaluated for each state or province and region. We present the median and 95th percentile credible intervals for estimates. The extent to which trend credible intervals exclude zero can be interpreted as the strength of evidence for an increasing or decreasing trend. Thus, there is evidence of a positive trend if the CI > 0 and there is evidence of negative trend if the CI < 0. If the CI contains 0, then there is inconclusive evidence about trend in abundance. The reported sample sizes are the number of routes or sites on which trend estimates are based, which includes any route or site on which band-tailed pigeons were ever encountered. For the MSS, we used only data starting in 2004 when the survey became operational. Also we limited sites to those naturally occurring with known source of mineral that would likely be accessible for counting in the future.

MONITORING RESULTS

The Breeding Bird Survey

Results of the BBS are presented in Tables 1–3. The trend in the median annual count of Interior band-tailed pigeons seen and heard per route since 1966 was -4.0% per year (CI = -8.3 to -0.8). Trends for Interior pigeons during the recent 10- and 5-year periods also suggest median annual counts per route have declined, but credible intervals include zero. Similarly for Pacific Coast band-tailed pigeons, the trend in the median annual count since 1966 was -2.6% per year (CI = -5.4 to -1.1). Trends for Pacific Coast pigeons during the recent 10- and 5-year periods also suggest median annual counts per route have declined, but credible intervals include zero. Caution should be used in interpreting results, particularly for the Interior region, because sample sizes (routes) and pigeon counts per route are low, variances are high, and coverage of habitat by BBS routes is poor.

Mineral Site Survey

Results from the MSS suggest that the trend in the median annual count of Pacific Coast band-tailed pigeons seen at mineral sites was -5.6% per year (CI = -18.1 to 4.4) since the survey became operationally in 2004 and 7.0% per year (CI = -14.0 to 0.0) over the past 5 years, but both credible intervals included zero (Tables 4 and 5). However, the credible intervals for the recent 5-year trend nearly exclude zero, and provide some evidence of a declining trend. Annual indices of Pacific Coast band-tailed pigeon abundance from the MSS are provided in Table 6.

The MSS and BBS show similar results for Pacific Coast pigeons over the recent 5 years (where data are comparable) in that the estimated trend in annual pigeon counts is negative and credible intervals include zero. However, there is considerable discrepancy in the apparent magnitude of the trend point estimate between these two surveys, but credible intervals overlap.

Harvest Information Program

Results of the HIP are presented in Tables 7–9 for Interior band-tailed pigeons and Tables 10–12 for Pacific Coast band-tailed pigeons. According to preliminary estimates from 2009, total harvest, active hunters, and total hunter days afield for Interior band-tailed pigeons were 5,000 ± 1,250 (estimate ± SE) birds, 4,400 hunters, and 13,200 ± 2,829 days afield, respectively. Total harvest, active hunters, and total hunter days afield for Pacific Coast band-tailed pigeons were 22,600 ± 3,113 birds, 9,700 hunters, and 24,400 ± 3,112 days afield,

respectively. The season was closed in Washington from 1991 through 2001.

Parts Collection Survey

Results of the PCS are presented in Tables 13 and 14. Composition of the Interior band-tailed pigeon harvest during 2009 was 8.3% hatching year birds, however, sample size was only 12 birds. Composition of Pacific Coast band-tailed pigeon harvest during 2009 was 21.3% hatching year birds based on a total sample of 333 birds. The season was closed in Washington from 1991 through 2001. Caution should be used in interpreting state-specific estimates with small sample sizes. Also, numbers are an index to recruitment and not adjusted for differential vulnerability to harvest between age classes. Consequently, the annual composition of the harvest may not be representative of the population.

There is not adequate data to evaluate current differential vulnerability rates between young and adult birds (young:adult). There is, however, some data for male and females combined during 1968–1976 for the Interior population and during 1962–1977 for the Pacific Coast population. Estimates of young per adult bird in the harvest are variable among years and range from 0.20 ± 0.20 to 5.62 ± 5.92 with a mean of 1.90 ± 0.60 for the Interior population and 0.55 ± 0.24 to 1.54 ± 0.81 with a mean of 1.05 ± 0.10 for the Pacific Coast population (T. A. Sanders, U.S. Fish and Wildlife Service, unpublished data). These results suggest that, on average, young are nearly twice as likely to be harvested compared to adults in the Interior population, whereas young and adult birds have nearly equal probability of harvest in the Pacific Coast population. The difference in age-related vulnerability between the populations may be related to the use of mineral sites by the Pacific Coast population and associated exposure to harvest. It is unknown whether these mean age-related vulnerability estimates apply to more recent years. If they do, then the proportion of young in the Interior population may be about half of that estimated from PCS, whereas the proportion of young in the Pacific Coast population may be as estimated from PCS.

ACKNOWLEDGMENTS

Personnel of state wildlife agencies and the U.S. Fish and Wildlife Service (USFWS) cooperated in collecting the data presented in this report. Special thanks to J. Garcia (CA), B. Reishus (OR), D. Kraege (WA), and A. Breault (BC) for their role in coordination of the MSS and providing data. J. R. Sauer (USGS) analyzed BBS data, cooperated in development of the analytical framework for MSS data, and provided statistical support. K. Richkus and Khristi Wilkins (USFWS) provided the HIP and PCS data. M. Koneff, R. Rau, K. Parker, P. Garrettson, F. Rivera-Milan (USFWS), and D. Dolton (USFWS, retired) reviewed a draft of this report.

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Table 1. Estimated trend[a] (percent change per year and lower and upper 95% credible intervals) in band-tailed pigeon abundance based on Breeding Bird Survey data for regions and states during a 44-year (1966–2009) period.

Region		Credible interval		
State	Trend	Lower	Upper	N
Interior	-4.0	-8.3	-0.8	64
Arizona	-1.8	-5.4	2.0	19
Colorado	-2.2	-8.7	4.1	25
New Mexico	-6.3	-12.3	-0.8	13
Utah	-2.1	-12.8	7.0	7
Pacific Coast	-2.6	-5.4	-1.1	252
British Columbia	-5.4	-8.5	-3.2	37
California	0.4	-1.3	1.9	134
Oregon	-0.5	-2.5	1.2	44
Washington	-0.1	-2.2	2.1	37

[a] Annual indices are estimated from exponentiated year effects derived from a log-linear hierarchical model fit using Bayesian methods.

Table 2. Estimated trend[a] (percent change per year and lower and upper 95% credible intervals) in band-tailed pigeon abundance based on Breeding Bird Survey data for regions and states during a 10-year (2000–2009) period.

Region		Credible interval		
State	Trend	Lower	Upper	N
Interior	-3.1	-10.8	4.5	58
Arizona	-1.9	-9.9	7.3	16
Colorado	-1.1	-18.0	17.9	23
New Mexico	-6.3	-20.2	8.4	13
Utah	-6.5	-46.4	9.9	6
Pacific Coast	-0.5	-2.9	3.4	211
British Columbia	-4.9	-8.6	2.1	29
California	1.1	-2.0	6.5	110
Oregon	0.5	-3.3	7.8	38
Washington	0.9	-4.9	8.3	34

[a] Annual indices are estimated from exponentiated year effects derived from a log-linear hierarchical model fit using Bayesian methods.

Table 3. Estimated trend[a] (percent change per year and lower and upper 95% credible intervals) in band-tailed pigeon abundance based on Breeding Bird Survey data for regions and states during a 5-year (2005–2009) period.

Region		Credible interval		
State	Trend	Lower	Upper	N
Interior	-6.4	-21.6	9.7	57
Arizona	-1.6	-16.8	19.3	15
Colorado	-16.5	-44.6	21.2	23
New Mexico	-6.5	-33.6	29.0	13
Utah	-2.4	-60.1	111.0	6
Pacific Coast	-0.3	-5.3	7.9	187
British Columbia	-5.2	-13.9	7.5	20
California	-0.2	-7.6	11.8	96
Oregon	0.9	-7.4	16.3	37
Washington	2.3	-8.7	19.8	34

[a] Annual indices are estimated from exponentiated year effects derived from a log-linear hierarchical model fit using Bayesian methods.

Table 4. Estimated trend[a] (percent change per year and lower and upper 95% credible intervals) in band-tailed pigeon abundance based on Mineral Site Survey data for regions and states during a 6-year (2004–2009) period.

Region		Credible interval		
State	Trend	Lower	Upper	N
Pacific Coast	-5.6	-18.1	4.4	234
British Columbia	-17.2	-36.5	19.5	18
California	3.6	-6.7	14.6	53
Oregon	0.7	-8.2	10.8	93
Washington	-4.7	-12.3	5.6	70

[a] Annual indices are estimated from exponentiated year effects derived from a log-linear hierarchical model fit using Bayesian methods.

Table 5. Estimated trend[a] (percent change per year and lower and upper 95% credible intervals) in band-tailed pigeon abundance based on Mineral Site Survey data for regions and states during a 5-year (2005–2009) period.

Region		Credible interval		
State	Trend	Lower	Upper	N
Pacific Coast	-7.0	-14.0	0.0	200
British Columbia	-17.7	-32.5	1.6	18
California	2.3	-9.3	13.6	44
Oregon	-1.9	-9.8	6.7	80
Washington	-7.2	-15.4	2.1	58

[a] Annual indices are estimated from exponentiated year effects derived from a log-linear hierarchical model fit using Bayesian methods.

Table 6. Estimated annual abundance indices[a] of band-tailed pigeons based on Mineral Site Survey data for the Pacific Coast region and states, 1966–2010.

Region			Credible interval	
State	Year	Index	Lower	Upper
Pacific Coast	2004	234.2	145.8	479.9
	2005	234.7	156.5	376.0
	2006	214.2	142.9	338.5
	2007	198.7	129.8	317.0
	2008	182.1	119.4	290.9
	2009	176.0	110.7	287.4
British Columbia	2004	310.6	73.3	1212.0
	2005	271.3	112.1	663.4
	2006	211.2	90.6	536.1
	2007	186.5	76.6	491.4
	2008	138.1	55.8	396.1
	2009	123.5	46.0	404.6
California	2004	91.8	38.8	203.5
	2005	100.5	47.3	209.1
	2006	109.1	52.6	222.7
	2007	111.7	54.4	229.6
	2008	118.0	56.9	246.0
	2009	109.4	49.4	238.3
Oregon	2004	193.5	93.6	431.6
	2005	216.7	111.4	437.4
	2006	208.7	109.3	420.4
	2007	213.2	114.2	418.1
	2008	189.7	103.2	371.5
	2009	201.5	108.6	386.9
Washington	2004	291.5	131.7	544.3
	2005	313.3	150.4	583.9
	2006	293.2	145.6	537.4
	2007	249.7	107.6	473.3
	2008	248.0	123.5	475.5
	2009	232.9	111.4	445.7

[a] Annual indices are estimated from exponentiated year effects derived from a log-linear hierarchical model fit using Bayesian methods.

Table 7. Total harvest estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) for Interior band-tailed pigeons based on Harvest Information Program data, 1999–2009.

	Arizona		Colorado		New Mexico		Utah		Total	
Year	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
1999	500	154	700	129	0	0	100	69	1,300	94
2000	2,300	110	1,700	147	400	122	300	192	4,600	78
2001	400	118	600	94	600	126	300	169	2,000	62
2002	1,000	153	100	117	600	158	400	149	2,100	89
2003	1,400	126	900	97	400	65	100	132	2,900	70
2004	1,400	120	500	57	700	115	200	136	2,800	68
2005	2,200	105	100	113	300	106	100	193	2,700	86
2006	500	56	600	76	100	109	400	95	1,600	42
2007	1,000	101	900	102	2,800	113	200	195	4,800	71
2008	1,600	122	2,500	83	600	95	†[a]	†	4,700	62
2009	2,300	76	1,400	100	1,300	79	†	†	5,000	49

[a] No estimate available.

Table 8. Active hunter estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) for Interior band-tailed pigeons based on Harvest Information Program data, 1999–2009.

	Arizona		Colorado		New Mexico		Utah		Total[a]	
Year	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
1999	700	105	100	113	100	121	<50	46	900	†[b]
2000	600	79	400	95	300	67	<50	192	1,300	†
2001	500	65	500	61	500	53	200	97	1,800	†
2002	400	85	200	101	300	81	200	98	1,000	†
2003	1,500	61	400	71	400	67	300	81		†
2004	900	56	300	29	100	103	50	92		†
2005	800	69	200	46	100	109	100	134		†
2006	600	73	900	52	100	172	200	92		†
2007	2,100	43	1,400	45	800	47	300	86	4,600	†
2008	1,300	55	2,300	40	600	52	300	143	4,500	†
2009	1,300	52	2,400	51	500	54	200	138	4,400	†

[a] Estimates in total may be biased high because the HIP sample frames are state-specific; therefore, hunters are counted multiple times if they hunt in more than one state.
[b] No estimate available.

Table 9. Total hunter days afield estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) for Interior band-tailed pigeons based on Harvest Information Program data, 1999–2009.

	Arizona		Colorado		New Mexico		Utah		Total	
Year	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
1999	2,000	97	300	122	300	158	100	50	2,700	76
2000	1,600	83	2,800	107	900	75	300	192	5,600	60
2001	1,000	71	800	54	1,800	64	700	133	4,300	39
2002	1,000	110	400	105	900	109	500	104	2,800	58
2003	3,700	77	2,100	89	1,400	75	600	136	7,900	47
2004	2,300	80	700	35	300	92	100	72	3,400	55
2005	1,600	74	300	51	400	140	200	142	2,500	54
2006	1,100	70	1,700	63	300	163	200	87	3,300	43
2007	5,000	57	3,800	56	3,600	62	400	73	12,800	33
2008	3,300	66	6,100	45	2,100	76	700	139	12,200	33
2009	4,100	68	6,100	70	2,300	72	600	166	13,200	42

Table 10. Total harvest estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) for Pacific Coast band-tailed pigeons based on Harvest Information Program data, 1999–2009.

	California		Oregon		Washington		Total	
Year	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
1999	19,300	101	3,800	42	†[a]	†	23,100	85
2000	12,200	65	4,100	92	†	†	16,300	54
2001	8,300	49	5,000	45	†	†	13,200	35
2002	4,200	39	4,000	36	†	†	8,200	27
2003	8,000	50	4,900	33	1,500	78	14,400	31
2004	14,300	45	3,300	44	300	160	17,900	37
2005	11,100	58	1,400	34	1,000	84	13,500	48
2006	12,500	40	1,500	25	900	97	14,900	34
2007	9,700	39	1,400	74	1,700	61	12,700	32
2008	27,500	35	500	18	2,100	87	30,200	32
2009	19,300	29	1,900	25	1,400	132	22,600	27

[a] No estimate available (the season in Washington was closed from 1991 through 2001).

Table 11. Active hunter estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) for Pacific Coast band-tailed pigeons based on Harvest Information Program data, 1999–2009.

	California		Oregon		Washington		Total[a]	
Year	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
1999	3,900	48	1,500	47	†[b]	†	5,400	†
2000	5,600	37	1,700	46	†	†	7,300	†
2001	2,600	34	1,700	31	†	†	4,200	†
2002	2,500	30	1,300	25	†	†	3,800	†
2003	4,600	38	1,800	24	1,000	23	†	†
2004	4,700	37	1,500	36	500	64	†	†
2005	3,900	39	500	14	700	58	†	†
2006	6,000	35	400	13	500	61	†	†
2007	4,900	33	700	113	900	44	6,500	†
2008	10,500	24	200	8	600	61	11,300	†
2009	8,200	25	600	12	1,000	68	9,700	†

[a] Estimates in total may be biased high because the HIP sample frames are state-specific; therefore, hunters are counted multiple times if they hunt in more than one state.

[b] No estimate available (the season in Washington was closed from 1991 through 2001).

Table 12. Total hunter days afield estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) for Pacific Coast band-tailed pigeons based on Harvest Information Program data, 1999–2009.

	California		Oregon		Washington		Total	
Year	Estimate	CI	Estimate	CI	Estimate	CI	Estimate	CI
1999	9,100	54	3,500	33	†[a]	†	12,600	40
2000	10,000	41	3,800	61	†	†	13,800	34
2001	7,500	39	4,700	39	†	†	12,200	28
2002	4,600	35	3,400	28	†	†	7,900	23
2003	11,500	52	5,100	29	1,600	58	18,300	34
2004	9,700	36	3,400	35	800	83	13,900	27
2005	8,800	47	1,300	21	1,000	62	11,000	38
2006	13,500	47	1,200	20	700	68	15,400	41
2007	10,600	37	1,200	69	1,800	60	13,500	30
2008	29,300	34	500	13	1,500	70	31,300	32
2009	20,100	29	1,800	19	2,500	85	24,400	25

[a] No estimate available (the season in Washington was closed from 1991 through 2001).

Table 13. Estimated age structure of Interior band-tailed pigeon harvest during September based on Parts Collection Survey data, 1994 to 2009. Values are percentage of hatch year birds (%), number of hatch year birds (n), and number of both hatch year and after hatch year birds examined (N).

	Arizona			Colorado			New Mexico			Utah			Total		
Year	%	n	N	%	n	N	%	n	N	%	n	N	%	n	N
1994	24.6	16	65	66.7	4	6	28.6	14	49	†[a]	0	0	28.3	34	120
1995	60.0	6	10	28.9	52	180	19.0	12	63	54.5	6	11	28.8	76	264
1996	0.0	0	1	38.5	5	13	34.1	15	44	†	0	0	34.5	20	58
1997	33.3	7	21	31.5	17	54	15.5	13	84	†	0	0	23.3	37	159
1998	48.4	15	31	20.0	2	10	10.0	2	20	16.7	1	6	29.9	20	67
1999	13.0	3	23	33.3	6	18	24.1	7	29	†	0	0	22.9	16	70
2000	41.7	30	72	11.8	2	17	26.9	18	67	0.0	0	3	31.4	50	159
2001	52.9	9	17	†	0	0	23.5	4	17	33.3	1	3	37.8	14	37
2002	53.9	55	102	27.3	3	11	50.8	32	63	8.3	1	12	48.4	91	188
2003	†	0	0	†	0	0	33.3	1	3	†	0	0	33.3	1	3
2004	34.8	8	23	†	0	0	40.0	4	10	†	0	0	36.4	12	33
2005	15.4	2	13	66.7	8	12	0.0	0	3	†	0	0	35.7	10	28
2006	11.5	6	52	20.0	4	20	29.9	20	67	†	0	0	21.6	30	139
2007	20.5	9	44	†	0	0	†	0	0	†	0	0	20.5	4	44
2008	18.2	2	11	†	0	0	†	0	0	†	0	0	18.2	2	11
2009	0.0	0	5	†	0	0	14.3	1	7	†	0	0	8.3	1	12

[a] No estimate available.

Table 14. Estimated age structure of Pacific Coast band-tailed pigeon harvest during September–December based on Parts Collection Survey data, 1994 to 2009. Values are percentage of hatch year birds (%), number of hatch year birds (n), and number of both hatch year and after hatch year birds examined (N).

	California			Oregon			Washington			Total		
Year	%	n	N	%	n	N	%	n	N	%	n	N
1994	44.6	226	507	22.9	131	571	†[a]	0	0	33.1	357	1078
1995	29.6	74	250	20.1	109	542	†	0	0	23.1	183	792
1996	27.9	68	244	15.1	38	252	†	0	0	21.4	106	496
1997	31.1	65	209	17.7	64	361	†	0	0	22.6	129	570
1998	32.0	81	253	18.4	45	244	†	0	0	25.4	126	497
1999	33.2	119	358	20.1	79	394	†	0	0	26.3	198	752
2000	32.1	69	215	17.5	58	332	†	0	0	23.2	127	547
2001	22.9	33	144	17.0	46	271	†	0	0	19.0	79	415
2002	31.5	52	165	14.1	33	234	3.8	22	180	18.5	107	579
2003	34.4	72	209	21.2	49	231	3.1	17	112	25.0	138	552
2004	25.2	33	131	19.6	38	194	2.6	9	27	22.7	80	352
2005	18.8	25	133	13.3	24	180	†	0	0	15.7	49	313
2006	18.1	47	260	19.0	48	253	13.6	6	44	18.1	101	557
2007	24.8	34	137	14.3	36	251	10.9	6	55	17.2	76	443
2008	29.8	39	131	20.0	22	110	31.0	9	29	25.9	70	270
2009	30.1	31	103	17.8	35	197	15.2	5	33	21.3	71	333

[a] No estimate available (the season in Washington was closed from 1991 through 2001).

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June 2010

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