



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Migratory Bird Management
Population and Habitat Assessment Branch
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MEMORANDUM

TO: Ken Richkus

FROM: Todd A. Sanders

DATE: February 3, 2015

SUBJECT: Pacific Coast band-tailed pigeon harvest strategy assessment

This memo reports on the annual assessment of the status of Pacific Coast band-tailed pigeons as described in the Pacific Flyway management plan in support of the regulation setting process. It does not, however, represent a regulatory recommendation by the Fish and Wildlife Service or Flyway Councils. Based on the harvest strategy, current data, and this assessment, the prescribed regulatory alternative for the Pacific Coast states (California, Oregon, Washington, and Nevada) during the 2015 hunting season is the restrictive regulatory alternative. This represents no change from the previous year. More specific details of the harvest strategy and assessment follow.

A prescribed harvest strategy for Pacific Coast band-tailed pigeons was adopted in the cooperative management plan approved by the Pacific Flyway Council in July 2010. The harvest strategy is based on the results of the Mineral Site Survey (MSS).

The MSS was developed specifically to index abundance of Pacific Coast band-tailed pigeons. It was initiated on an experimental basis in 2001, 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 the total number of band-tailed pigeons visiting each site from one-half hour before sunrise to noon on 1 day during July at select mineral sites throughout the population's range. For analysis, counts were limited to those in July at sites naturally occurring with a known source of mineral, with at least 2 annual counts, and that would likely be accessible for counting in the future ($n = 51$ sites; 12 in California, 21 in Oregon, 14 in Washington, and 4 in British Columbia; see appendix A for specific sites).

The annual index of abundance is estimated range-wide using a log-linear hierarchical model and Bayesian analytical framework (see annual status report for more details). The annual indices are used to calculate the mean index of abundance during the first 5

years of the survey (2004–2008) as a reference period population objective and also over the most recent 3-year time interval. Markov-chain Monte Carlo methods are used to iteratively produce sequences of parameter estimates which form a posterior probability distribution (PPD) for each parameter, a natural and intuitive way to portray uncertainty in parameter estimates.

The PPD for the mean index of abundance over the most recent 3-year time interval is used in a decision analysis framework to establish quantitative criteria for harvest regulation change. Regulatory alternatives are prescribed based on the degree of confidence that the estimated recent 3-year mean index of abundance exceeds a given amount. Regulations (season frameworks) are established according to closed, restrictive (2-bird daily bag limit), and moderate (4-bird daily bag limit) regulatory alternatives. Alternative regulatory options involve only changes in daily bag limit, otherwise season frameworks are unchanged.

Specifically, the season is restrictive unless a closed or moderate season is prescribed. A closed season is prescribed when $\geq 80\%$ of the PPD for the recent 3-year mean abundance is at or below the closure threshold, and a moderate season is prescribed when $\geq 80\%$ of the PPD for the recent 3-year mean abundance is at or above the moderate threshold. The closed and moderate thresholds are established based on 25% below and above the population objective, respectively. The population objective is the 5-year mean index of abundance during the first 5 years of the MSS (2004–2008). Once the season is closed, an open season may be prescribed when $\leq 80\%$ of the PPD for the recent 3-year mean abundance is $\leq 15\%$ below the population objective (effectively the threshold between a closed and restrictive season is moved up 10% to reduce the likelihood of toggling between open and closed seasons annually). The estimated 5-year mean index value may change somewhat annually with additional count data as parameter estimates in the hierarchical model are updated.

Summary results of the assessment are provided in Table 1 and Figures 1–3.

Acknowledgements

Personnel of State wildlife agencies and the U.S. Fish and Wildlife Service (USFWS) cooperated in collecting the data presented in this memo. Special thanks to Levi Souza (CA), Brandon Reishus (OR), Don Kraege (WA), and Andre Breault (BC) for their role in coordination of the MSS and providing data. John Sauer (USGS) cooperated in development of the analytical framework for MSS data, and provided statistical support. Ken Richkus and Mark Seamans (USFWS) reviewed the technical assessment and a draft of this memo.

Table 1. Decision values and 95% credible intervals for elements in the harvest strategy assessment framework for Pacific Coast band-tailed pigeons (2004–2014).

Parameter	Value	Lower CI	Upper CI
Objective (first 5-year mean index)	172.9	129.1	259.9
Closed threshold	129.7		
Moderate threshold	216.1		
Reopen threshold	147.0		
Recent 3-year mean index	164.0	127.5	229.4
PPD (%) in closed	3.4		
PPD (%) in restrictive	91.6		
PPD (%) in moderate	5.0		
PPD (%) in closed after closure	20.9		

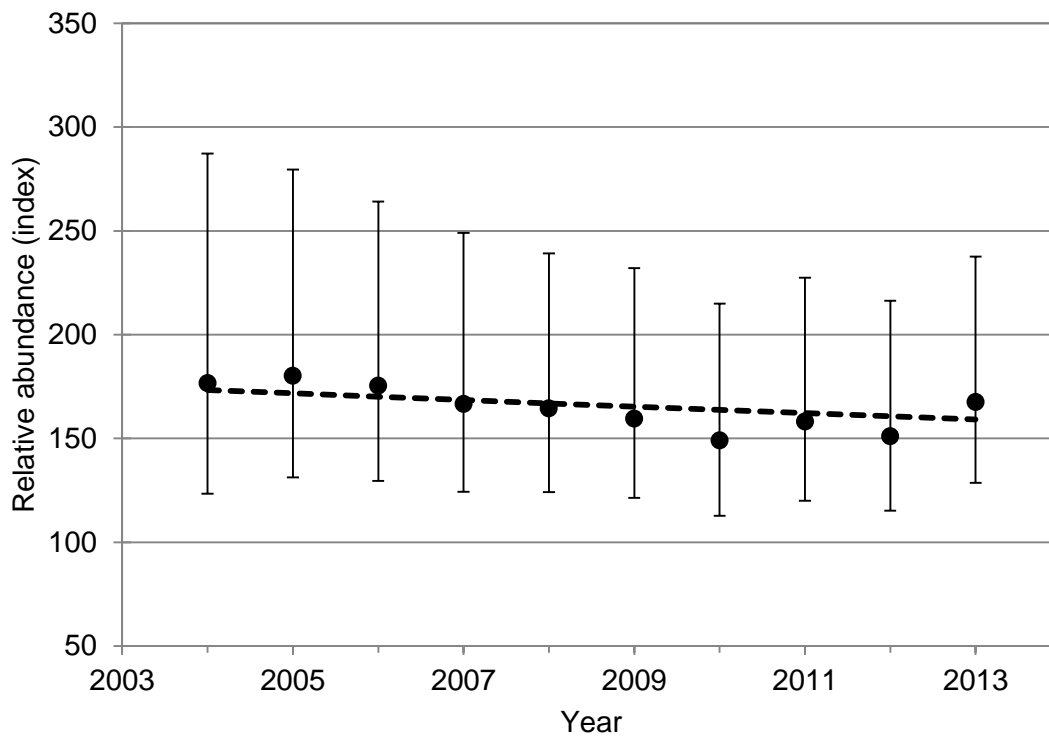


Figure 1. Annual abundance indices (and 95% credibility interval) for Pacific Coast band-tailed pigeons as indicated by the Mineral Site Survey, 2004–2014. The trend line is based on predicted values (exponentiated) from fitting a regression line through the log transformed annual indices.

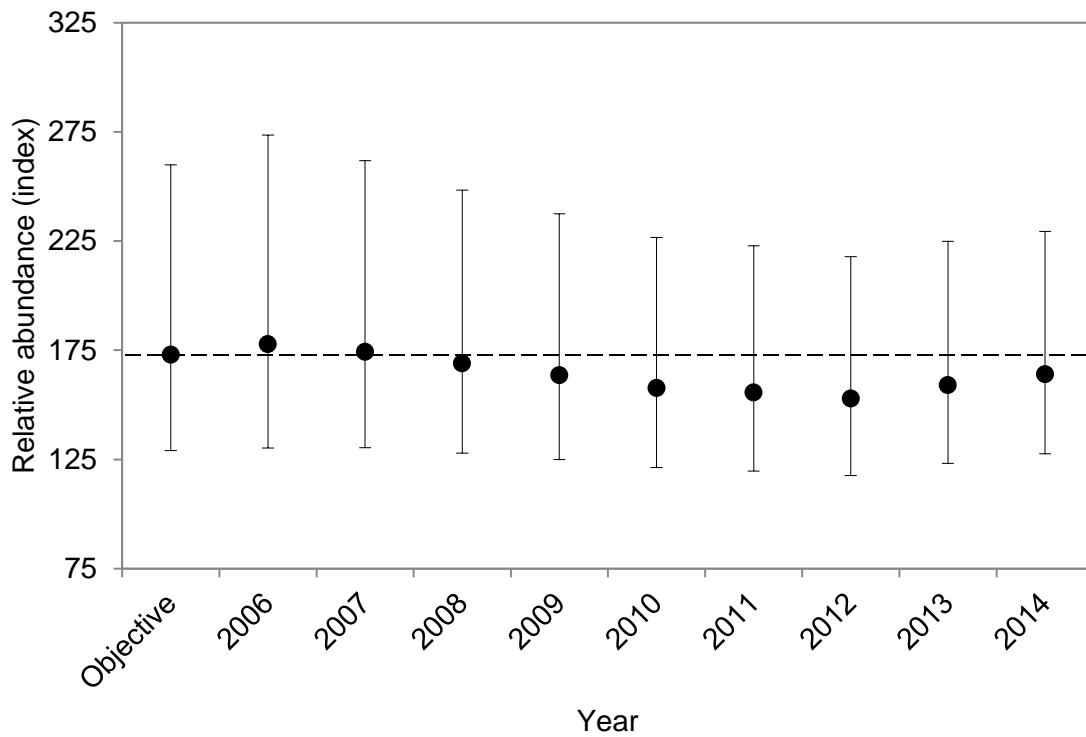


Figure 2. Moving 3-year mean abundance indices (and 95% credibility interval) for Pacific Coast band-tailed pigeons as indicated by the Mineral Site Survey relative to the population objective (dashed line), 2004–2014. The population objective is the estimated 5-year mean abundance index during the first 5 years of the survey (2004–2008).

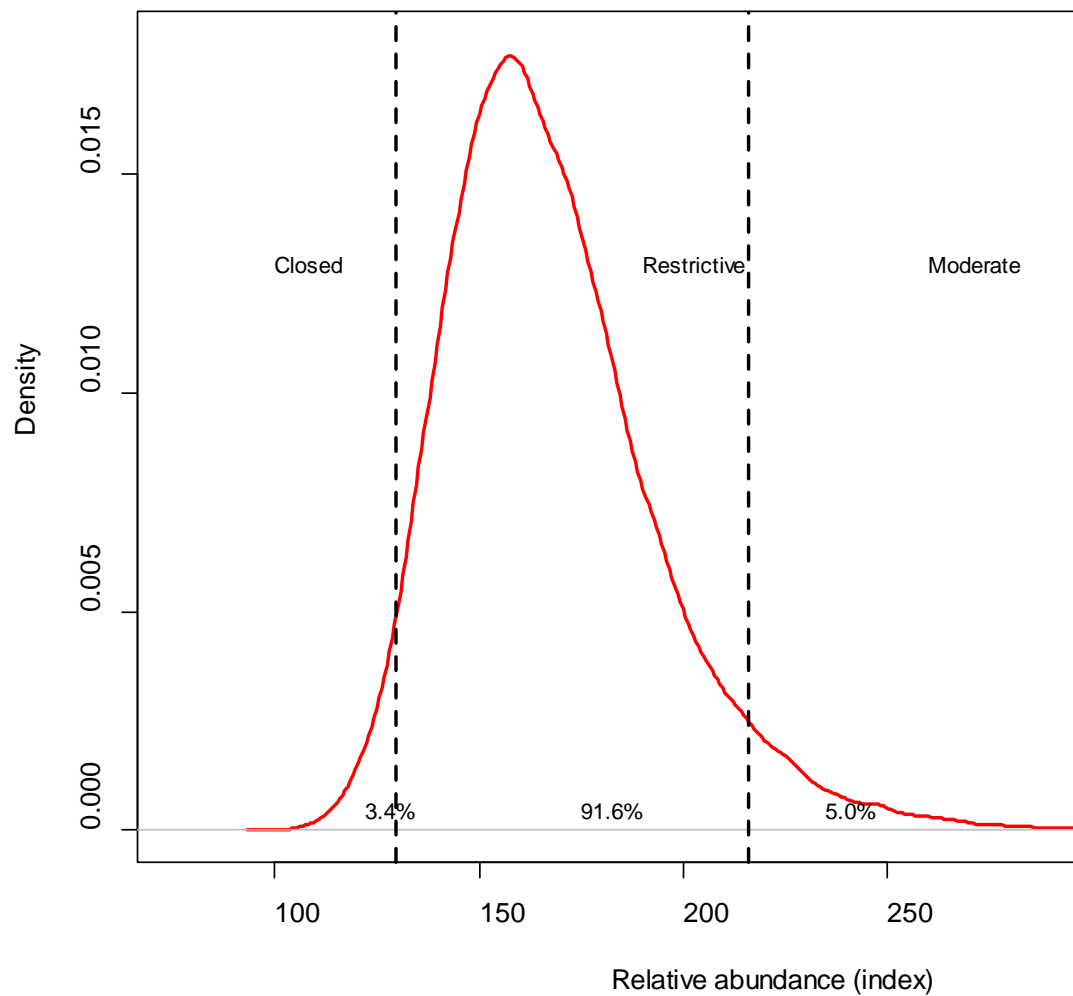


Figure 3. Posterior probability distribution for the estimated recent 3-year (2012–2014) mean index of abundance of Pacific Coast band-tailed pigeons as indicated by the Mineral Site Survey relative to thresholds 25% below and above population objective. Eighty percent of the distribution would have to be in the closed or moderate bin to result in prescribing that regulatory alternative. The population objective is the 5-year mean index of abundance during the first 5 years of the Mineral Site Survey (2004–2008).

Appendix A. Continued.

Site	Year									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Warm Beach	1	1	1	1	1	1	1	1	1	1
Oyster Bay							1	1	1	1
Soda Spring									1	1
Sumas	1		1					1	1	1
Grand total	32	40	38	39	41	41	45	44	45	51

