

BIOLOGICAL INVENTORY– BIRDS AT
JOSHUA TREE NATIONAL PARK
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EXECUTIVE SUMMARY

The goal of this effort was to organize existing information and collect new information via data mining in support of the inventory of avian species at Joshua Tree National Park. To achieve this goal, records from museums, Breeding Bird Surveys, Christmas Bird Counts, published literature, and Personal Observation Record logs from the Park were reviewed to document the occurrence of avian species and subspecies within the present-day boundaries of the Park. Emphasis was placed on locating voucher specimens.

Voucher specimens or other documentation exist that demonstrate the occurrence of 249 species of birds within the Park. These 250 species include 115 species that are represented by one or more documented subspecies (147 documented subspecies total). In addition, there are 57 species of birds that may be expected to occur within the Park, but have yet to be reliably documented as occurring there.

Presently, 81.4 % of all species that are expected to occur within Joshua Tree National Park have been documented (or vouchered) as doing so. Of species that are known to breed or might be expected to breed in the Park, 92.1 % have been documented.

Future field inventory efforts should emphasize documentation of remaining probable breeding species; other efforts should include re-surveys of several museums likely to contain appropriate specimens, but whose collections were unavailable for examination.

INTRODUCTION

The National Park Service acts as steward for nearly 80 million acres of public land, preserving and protecting some of the world's most scenic and important natural resources. To meet these stewardship responsibilities, especially in the face of a wide variety of increasing environmental impacts and alterations, park managers and superintendents must have solid natural resource information at their disposal (USDI National Park Service 1996). Only by having reliable scientific information can park managers take corrective actions before those impacts severely degrade ecosystem integrity or become irreversible. One of the most fundamental pieces of information is an inventory, a list of species documented to occur at a specific place. A reliable inventory forms the basis for all subsequent monitoring, and provides a baseline against which the effects of management activities can be assessed.

Joshua Tree National Park has identified inventory of bird species as one of their highest inventory priorities. The most recent prior assessment of avian inventory completeness indicated that 172 (53%) of 322 potentially occurring bird species have been verified within the park. However, a significant number of additional bird species may be documented through evaluation and organization of park observation records, directed searches of museum collections, and additional searching of published literature. Preliminary examination of park observation card records suggests that up to 72% of the master bird list may be verified. Moreover, at least 90% of breeding birds within the park may be documented through organization of existing data and additional data mining activities.

The basic goal of this project was to provide a current inventory of bird species occurring within the boundaries of Joshua Tree National Park, especially to identify the source of information about each species so as to determine the reliability of each observation. The principal objectives were to:

1. Document the occurrence of breeding birds currently estimated to occur within Joshua Tree National Park, with the goal of providing vouchered information on at least 90% of those species proposed.
2. Determine the existing level of vouchering for each potentially occurring bird species, using a modification of the criteria used by the California Birds Records Committee.
3. Undertake additional “data-mining” activities to increase the level of vouchering/documentation for each species currently lacking an appropriate museum specimen.
4. Update National Park Service NPSpecies and NPbib databases with the results of these efforts.

METHODS

SOURCES OF INFORMATION

Sources of information queried to obtain the list of documented (i.e., vouchered or confirmed) species fell into four categories: museum records, observation records, literature records, and survey records.

Museum records. Museum records of bird specimens collected within the Park were obtained by querying on-line databases maintained by individual museums, or by making direct inquiries to curatorial staff associated with regional museums. Because on-line databases are easily searched, all readily available on-line databases were queried regardless of the expectation that a particular museum, because of its geographical location, would have records relevant to this work. Museums that might be expected to

hold relevant records whether or not their catalog of specimens appeared on-line were also queried; these included regional museums or museums renowned for their ornithological collections.

Observation records. Because sight records of species can be problematic, we confined our collection of this type of data to observations reported by qualified professional and avocational ornithologists. Thus, as an additional step the reliability of any observer reporting sightings had to be qualified as well. Observation records themselves were obtained from two sources: (1) a summary of the Personal Observation Record (POR) log for Joshua Tree National Park, and (2) observation records come from Chuck Adams personal bird list from 1955 and 1956. PORs are observation records made informally by park staff and visitors. Since individual observers vary greatly in identification skills, only records from observers of known qualifications were accepted as verifying a species' occurrence. Bill Truesdell, retired from the National Park Service and a skilled birder, verified the qualifications of 11 observers reporting PORs; we verified the qualifications of one additional observer and Harold De Lisle of one other (see Table 1). Chuck Adam's two lists are archived at Joshua Tree National Park's library.

Table 1: List of observers whose observation records were considered to demonstrate the occurrence of a bird species in Joshua Tree National Park.

Observer	Qualified by:
Bill Truesdell	JOTR Staff
J. Freilich	B. Truesdell
G. Cardiff	B. Truesdell
C. Adams	B. Truesdell
B. Prescott	B. Truesdell
J. Zarki	B. Truesdell
B. Leitner	B. Truesdell
J. Wise	B. Truesdell
D. Black	B. Truesdell
A. Siebecker	B. Truesdell
D. Knuckles	B. Truesdell
P. Knuckles	B. Truesdell
E. Van Zandt	H. De Lisle
J. Atwood	T. Redman

Literature searches. Literature searches for relevant bird records were conducted primarily through BIOSIS Previews (Ovid Technologies 2003) available from the Library of the University of California. This database permits the user to search all ornithological journals back to 1969. The holdings on the shelves of the Science Library, University of

California, Riverside, were manually searched. Additional relevant references were obtained from the library at Joshua Tree National Park, and the Cooper Ornithological Society's searchable on-line archives of *The Condor*.

Survey records. Survey records from the Breeding Bird Survey 1970-2000 (U.S. Fish and Wildlife Service) and Christmas Bird Count 1967-1999 (Audubon Society) that included areas within or immediately adjacent to Park boundaries were reviewed. This information had been already been compiled by De Lisle (2000) through 1999.

An additional list of potential-but-unverified species from PORs was created for those observation where the qualifications of the observer(s) could not be verified as indicated above. Additional species not appearing in the Personal Observation Records were also noted because they have been reported as occurring in the Mojave Desert, usually as transients or vagrants, by Garrett and Dunn (1981) or Sibley (2000).

DATA PROCESSING

Species documented as occurring in Joshua Tree National Park were assigned distribution and abundance categories following the Park Service's NPSpecies convention, using information provided by De Lisle (2002) or Miller and Stebbins (1964). However, potential-but-unverified species were not assigned abundance and distribution categories since in most cases these would be "occasional" and "vagrant," respectively. Potential-but-unverified species that might breed within the park, even if with only a very small chance of doing so, were indicated.

Information from these sources was entered into an Excel Workbook (Microsoft 2000).

RESULTS

MUSEUM RECORDS

OBSERVATION RECORDS

LITERATURE SEARCH

SURVEY RECORDS

Suitable records document the occurrence of 249 species within Joshua Tree National Park. Of these, 115 species are represented by one or more subspecies. One hundred and forty-nine subspecies total have been verified.

When considering species as the taxonomic unit of interest 81.4% of all potentially occurring bird species have been documented for Joshua Tree National Park. If subspecies is the unit of interest then 83.2% of subspecies have been documented if we assume that all species are represented by at least one subspecies.

At this time, 57 species have been identified that use the park for breeding. Five species, which appear on the potential-but-unverified list, are known to breed regionally near the

park. As a consequence, it is indicated that these species might potentially use habitats within the park for breeding although we believe this to be unlikely.

In most cases, subspecies designation can be verified by characteristics that are observable only when a bird is in-hand. Because of this, the use of subspecies is potentially misleading. Therefore, we recommend that subspecies designations be used conservatively (i.e. do not assume an individual belongs to a given subspecies because that subspecies commonly occurs).

Queries of museums yielded 1033 records that provide documentation for 128 species. Nine of the 20 museums that were queried (see Table 2) held relevant records. Regional museums, by far, made the largest contributions. However, some museums from outside California and the U. S. Southwest also had records to contribute.

Table 2. Summary of museums queried.

Museum	Number of Records	Comments
American Museum of Natural History	0	No response
California Academy of Sciences	131	Also searched egg and nest collection.
Canadian Museum of Nature	0	
Cornell University - Laboratory of Ornithology	0	
Florida Museum of Natural History	0	
Harvard - Museum of Comparative Zoology	0	
Joshua Tree National Park Museum	78	
Los Angeles County Museum of Natural History	22	
Louisiana State University - Museum of Natural History	1	
Museum for Southwest Biology	0	
Provincial Museum of Alberta	0	
San Bernardino County Museum	0	Records unavailable at time. Should query this source in future
Smithsonian Institution - National Museum of Natural History	0	Unsuccessful. On-line search engine failed on multiple occasions.
University of California, Berkeley - Museum of Vertebrate Zoology	771	
University of Kansas	0	
University of Michigan - Museum of Zoology	9	
University of Puget Sound - Slater Museum	0	
University Texas, El Paso - Laboratory for Environmental Biology	0	
Western Foundation for Vertebrate Zoology	14	Egg and nest records not yet fully searchable. Should query source in future.
Yale Peabody Museum	6	
TOTAL	1033	

Observation records demonstrate the occurrence of 221 species within Joshua Tree National Park. For reasons cited above, subspecies designations from observation records were ignored. Thirteen qualified observers were responsible for 1721 records. Though more than one observer may have been involved, records as entered on the

“Observation” worksheet (see Appendix) indicate only the lead observer (assumed to be the person reporting the observation).

Eleven literature sources document the occurrence of 187 species for Joshua Tree National Park. Eight of these sources appear as published documents (primary or secondary literature), while the three remaining sources appear as reports to an institution (see Table 3). Where possible, Simon Kingston, converted these references to observation records for NPSpecies purposes. A total of 4061 observations were created from these sources. Many times specific observations or specimens will be cited in more than one source.

Table 3. Summary of references in the literature.

Source	Literature Type	Number of records
Barrows 1988	Primary	1
Boarman and Coe 2002	Primary	1*
Carter 1937	Primary	353
Camp and Knight 1998	Primary	32
England and Laudenslayer 1989	Report	12
Mc Kernan et al. 1984	Report	337
Miller 1946	Primary	3
Miller and Stebbins 1964	Secondary	3267
Peterson 1990	Primary	180
Pitelka 1951	Secondary	1
Sakai and Hogg 2000	Report	282
	TOTAL	4061

* This source contains a thorough account of the historical distribution of the Common Raven (*Corvus corax*) in Joshua Tree National Park. The information from this source was not converted into individual observation records due to the amount of time that would be required to do so for one species.

Records from the Breeding Bird Survey and Christmas Bird Count report the occurrence of 74 and 134 species, respectively, for Joshua Tree National Park. One important note about the Breeding Bird Survey and Christmas Bird Count is that both are volunteer based efforts and the skills of individual volunteers are not necessarily substantiated. Consequently, these surveys are prone to suffer from identification errors. There is a record for the Veery (*Catharus fuscescens*) from the Christmas Bird Count that we view suspiciously.

Both the Breeding Bird Survey and Christmas Bird Count occur along a linear route. For the Breeding Bird Survey each route is standardized to a length of 24.5 miles. The lengths of Christmas Bird Count routes are at the participant’s discretion. In either case, it is usually not possible to determine the location of an observation from the information reported by these surveys.

Simon Kingston, the NPSpecies Coordinator, National Park Service, received three separate spreadsheets; one for each type of record under the categories museum, observation, and literature. Simon Kingston uploaded these to the NPSpecies database. These records were reviewed following their upload and areas where the “fine-tuning” of information should occur were noted.

In total, 6814 separate records from these sources have been uploaded to NPSpecies.

Future Directions

Maintaining a list of potential bird species for Joshua Tree National Park should be viewed as an ongoing endeavor. As time progresses it can be expected that species will be added to the list of those verified and others will be removed from the list of potential-but-unverified.

Some goals for the near future should include obtaining a list of specimens from the San Bernardino County Museum. Many expect that this institution probably holds numerous specimens that were collected from within the park's boundaries. Museum staff informed us that this collection is currently unavailable for query, but that within the next year, electronic queries will be possible.

Subsequent observations from the Personal Observation Record log at Joshua Tree National Park should be evaluated and incorporated with this work annually. Information that has been uploaded from the attached spreadsheets should be reviewed as it appears in the NPSpecies database. We have noted that there exists some duplicate museum records and that "Species Presence Information" needs to be completed for many species.

We believe that most of the species that are using Joshua Tree National Park on a regular basis have been appropriately demonstrated to occur there. We expect that efforts to document additional species, those appearing on the potential-but-unverified list, will prove difficult and costly with little reward. While these species may potentially occur in Joshua Tree National Park, most we expect are not regular visitors and may only occur once every decade or so, for example.

We believe that the best strategy for documenting most of these potential-but-unverified species would be to let the local bird enthusiasts continue to report their observations. In this way, resources can be retained for more pressing needs.

Literature Cited

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