
AVIAN INVENTORY OF CANYON DE CHELLY NATIONAL MONUMENT

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ABSTRACT

The Navajo Natural Heritage Program of the Navajo Nation Department of Fish and Wildlife contracted the primary author to complete two years of avian inventories at Canyon de Chelly National Monument as part of the National Park Service Inventory and Monitoring Program. The goals of this study were to document at least 90% of the extant breeding and migrant birds through visual and/or aural observations; and to provide baseline information, and make recommendations, as warranted, for development of future management of zoological resources within the Monument. Prior to field studies, it was estimated that 96 avian species could potentially occur at the Monument based on species-area models.

Breeding bird inventories were conducted from 14 May to 30 June 2003, and 11 May to 29 June 2004 with the completion of 94 point count surveys, 10 transects, and recording of incidental sightings. Migrant and wintering birds were inventoried on 17-19 September 2004, 4, 16, and 17 December 2003. We performed triple-replicate, 7-minute point count surveys at 94 sites and 10 different transects, and performed 178 hours of area searches.

We documented a total of 152 avian species at the Monument, of which 99 were confirmed as breeding or probable breeders. Our survey efforts detected 158.3% of the number of species (96) estimated to occur there based on species-area models, and 103.1% of those were confirmed or probable breeders within the Monument. We estimated that 112 species could potentially breed in the Monument based on habitat preferences and species ranges. We confirmed 88.4% of these based on observations of bird behavior or nest detections.

Seven-minute point count surveys alone detected a total of 83 species. An analysis of these point count surveys, revealed that 90.4% (75) of the 83 species were accounted for during the first 3 minutes. A total of 51 species were detected along transects, all of which were detected during point count surveys. The 5 transects in riparian habitats produced, on average, more species (12.2) and

individual birds (36.5) than those in pinyon-juniper habitats (8.9 species, 20.6 individuals). Fall area searches added an additional 69 species to the total list of species, most of which were migrants or winter residents.

The Ash-throated Flycatcher was the most commonly detected species with point count surveys (169 detections of 180 individuals); the Black-throated Gray Warbler was also commonly detected (105 detections of 108 individuals). The 20 most commonly detected species comprised 70.3% of total detections, while 44 species were detected 10 or fewer times during point counts.

A considerable disparity was found for the habitat determinations at the 94 pre-selected point count sites. In addition, 16 habitats were identified at point count sites, rather than the 6 predicted. The richest habitats, based on point count surveys, were pinyon-juniper (47 species), desert-scrub (41 species), and riparian (39 species). Most combinations of habitats that included a pinyon-juniper or desert-scrub component also yielded high species diversity (27-39 species). A number of species showed strong affinity to one habitat type, while others were generalists using a variety of habitats.

Four Navajo- and/or federally-listed endangered and threatened species were detected during this inventory. An additional eight Navajo-listed candidate species were found. Eight species listed as Wildlife of Special Concern by the state of Arizona were also detected.

The winter survey of the Russian olive-dominated lower-canyon riparian woodlands documented significant bird use of this habitat type. The large number of wintering birds, in conjunction with mammals that feed on the Russian olive fruits, are likely contributing to the accelerating establishment and spread of this invasive exotic plant throughout the de Chelly canyon system.

Key Words: avian, bird, Canyon de Chelly National Monument, inventory, Inventory and Monitoring Program, National Park Service, Southern Colorado Plateau Network, point count surveys, transect surveys.

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INTRODUCTION

The National Park Omnibus Management Act, passed by the U.S. Congress in 1998, has provided federal support for a “program of inventory and monitoring of National Park Service (NPS) resources to establish baseline information and to provide information on the long-term trends in the condition of National Park Service resources.” This Act also provides the basis for Congressional funding for the NPS-Servicewide Inventory and Monitoring Program (I&M). This nationwide I&M program is currently compiling and organizing existing resource data for 265 NPS units, and completing inventory and monitoring data to fill data gaps in existing information. The I&M program will provide NPS land managers with comprehensive, scientifically-based information about the nature and status of natural resources within their jurisdictions for the purposes of management decision-making, scientific research, and public education.

The Navajo Natural Heritage Program (NNHP) of the Navajo Nation Department of Fish and Wildlife agreed with the NPS to perform vertebrate and plant inventories of the three national parks that are contained within Navajo Nation lands in Arizona. These parks include Canyon de Chelly National Monument (CACH) and Hubbell Trading Post National Historic Site (HUTR) in Apache County, and Navajo National Monument (NAVA) in Navajo and Coconino counties. The Navajo Nation is situated within the south-central part of the Colorado Plateau, and has an elevation range between 853 m (2,800 ft) at the mouth of the Little Colorado River, to 3,175 m (10,416 ft) at the summit of Navajo Mountain. Within this elevation range, there are three recognized ecological zones of (1) cold temperate mountain forest and woodland, (2) intermediate steppe grassland, and (3) arid desert lands. These zones are composed of mosaics of the following biotic communities (Brown 1982): petran sub-alpine and petran montane conifer

forest types; Great Basin desert-scrub and conifer woodlands; and plains and Great Basin Grasslands and sub-alpine grasslands. Annual precipitation ranges from an average of 15 cm (6 in) per year in the desert lands to over 61 cm (24 in) per year in the mountainous areas.

Canyon de Chelly National Monument includes the deep-canyon sections of three major tributaries to southeastern Chinle Wash; those being Whiskey, Wheatfields, and Tsaile creeks. The boundaries encompass the canyons of de Chelly, del Muerto, Monument, and Black Rock. This NPS unit comprises a total of 33,930 ha (83,840 ac) of sandstone cliffs and canyons, perennial and intermittent riparian habitats, and desert scrub and conifer woodlands above the canyon rim. The elevation climbs over 457 m (1,500 ft) from CACH's lower canyons to its upper canyons, with an overall elevation range of 1,750 m (5,742 ft) to 2,353 m (7,720 ft [E. Leslie, pers. comm.]). This NPS unit has evidence of occupation by Native Americans as far back as 350 A.D., and still today receives considerable usage by local Navajo people for seasonal home-sites, farming, livestock grazing, and recreation.

A diverse array of biotic communities are recognizable within the boundaries of CACH; these include montane riparian wetlands, Great Basin desertscrub, Great Basin conifer woodland, Rocky Mountain conifer forest of both ponderosa pine and mixed-conifer community types (Brown 1982). Seven major vegetative communities have been identified in CACH: These include canyon-bottom communities; talus communities; springs, seeps and other wet places; pinyon-juniper continuum; lower-shrub-grasslands communities; sagebrush communities; and canyon rim, cliff and ledge communities. These communities form a complex mosaic and often grade into one another, particularly in the heads of canyon where several communities form a continuum (E. Leslie, pers. comm.). The pinyon-juniper continuum comprises the largest vegetative community, covering approximately 57% of the Monument. Within this community

type, considerable variation exists in tree cover (10% to 60%), composition (pinyon increases relative to juniper as tree cover increases), and understory (big sagebrush replaces rabbitbrush, snakeweed, and grasses, and becomes more common as tree cover increases [E. Leslie, pers. comm.]). While the “springs, seeps, and other wet places” vegetative community covers only a small proportion of the land base (0.5%), small units of this community are scattered throughout the Monument and support a number of wetland-type plants that do not occur elsewhere in CACH (E. Leslie, pers. comm.).

A number of reports have addressed the status and distribution of birds in the region (Woodbury and Russell 1945, Phillips et al. 1964, Brown et al. 1984, Jacobs 1986, Rosenberg and Terrill, 1986, LaRue 1994, Rosenberg and Witzeman 1998 and 1999, Sogge et al. 1998, Rosenberg 2001, Corman and Wise-Gervais 2005). Only two partial inventories of birds were found of CACH (Burgess 1970, Hasty and Fletcher 1981). Burgess (1970) provided documentation on 47 species of birds observed and/or collected between 15 June and 28 August 1970 (Table 1). Since this work was done in the spring and summer, we consider it to represent primarily breeding species. In addition, a checklist of the wildlife of CACH by Hasty and Fletcher (1981) lists 143 birds compiled from records and sightings in CACH and the surrounding area; this list includes a number of migratory and vagrant species. More recently, the Arizona Breeding Bird Atlas project (Corman and Wise-Gervais 2005) surveyed five blocks that included parts of CACH. This work yielded a total of 86 species. Data from these sources have been combined in Table 1, along with our predictions of species with potential to occur at CACH. Finally, McKusick (1986) documented prehistoric bird remains from Antelope House in Canyon del Muerto.

While the general bird distribution and habitat association for the region is known, CACH has never been completely inventoried. The objectives of this portion of the NPS I&M inventories were to: 1) document at least 90 percent of the avian species occurring within Canyon de Chelly National Monument using existing, verifiable documentation and tax-specific, field surveys with methodologies consistent with other NPS units in the Southern Colorado Plateau Network; 2) complete and transfer all documentation of species presence, and collected data in hard-copy and digital formats usable by the NPS; complete NPS's database with these data; and 3) identify species of concern, provide baseline information, and make recommendations, as warranted, for development of future management and monitoring schemes of avian resources within the Monument. These objectives emphasized inventory of the breeding birds within CACH, with a minor focus on migratory and wintering birds.

METHODS

Based on species-area models, Stuart (2000) predicted that there were 96 avian species likely to occur at CACH. We developed a list of birds with potential to occur as breeding species within CACH (included in Table 1). In addition to the bird survey reports associated with CACH that are cited above, our list of birds was based on knowledge of habitat types within CACH and inventories from other regions of the Colorado Plateau (Andrews and Righter 1992, Atwood et al. 1980, Behle 1960, Behle and Higgins 1959, Behle et al. 1958, Behle et al. 1985, Bradfield 1974, Brotherson et al. 1981, Brown et al. 1984, LaRue et al. 2001, Mayes 1977). From this collection of knowledge we estimated that there were 112 species (Table 1, marked as "B" and "P") with a high potential to breed there.

We employed standardized inventory methods that were used at other NPS units in the Southern Colorado Plateau, following a stratified-sampling scheme (by habitat) as outlined in Stuart (2000). We used the following survey techniques to inventory avian species at CACH: triple-replicated point count (PCSs) and transect surveys during May and June to document breeding birds, supplemented with area searches and incidental record-keeping. Area searches were also performed during September to December to document migrant and wintering birds. Most effort was placed on inventory of breeding birds as this was the emphasis of the inventory; detecting non-breeding birds during the migration and wintering periods was the secondary goal.

Point counts are a type of Variable Circular Plot (VCP) count, which are preferred to line transects under a variety of conditions, including: For habitats types that are more ‘patchy’ throughout the landscape, for correlating habitat measures with bird species, and for dense or rugged terrain. Plot counts may provide more representative data if points are well-spaced within the study area (Bibby et.al. 1992). Ideally, points were located at least 250 m apart to minimize the chance of double-counting of birds, and points were placed with a 200 m buffer between habitat types to maximize accurate habitat/species correlations (Stuart, 2000).

The PCSs were performed by one person recording all detections of birds that were heard or seen at a pre-selected location for a total of seven minutes. Bird detections were segmented into 3 periods of 0-3, 3-5, and 5-7 minutes. Extreme care was taken during each point count survey to not double-count individual birds within and between survey periods. The distance to each detection was determined using a rangefinder and/or simple estimates. Initially the rangefinder was used extensively; but later, distance estimates were based on previous experience with its use. Birds flying-over the survey point were recorded; however, distance to the bird was not estimated. Additional notes on weather conditions, habitat variables, and the

type of observation (visual, aural, or both) were also recorded. Each point was sampled three times in one year during the months of May and June, the peak time to determine breeding status for most species in northeastern Arizona. Further, to maximize the potential of detecting birds, PCSs were performed during the peak activity period for diurnal birds of between 05.00 and 09.00 hrs.

The number and locations of PCS sample sites were selected, and provided to NNHP, by the I&M Planning Team. The number of sites needed was estimated as the number of sample points needed to detect 90% of the estimated number of species. Sample points were then stratified within the vegetation classification system so that an appropriate number were placed within each vegetation type (see Stuart [2000] for details). A total of 105 PCS locations were determined necessary for CACH. The 105 sites were assigned to one of six representative habitat types, including riparian, agriculture, grassland, desert scrub, pinyon-juniper, and ponderosa pine.

We performed PCSs at 94 of the provided locations (Figure 1, Appendices B, C, and D) and documented the actual habitat components to accurately identify the habitat type. Eleven of the pre-selected sites were not surveyed because of accessibility difficulties due to inadequate roads, locked gates, and/or difficult terrain. Point count surveys were performed during 14-16 May, 20-23 May, 4-9 June and 25-30 June in 2003, and during 11-16 May, 26 May, 1-5 June, and 24-29 June in 2004. A Garmin Etrex GPS (Global Positioning System) unit was used to navigate to, and confirm location of, each survey point. During 2003, the PCSs were completed in the eastern region of CACH, Middle, and Little Middle, Mesa areas, and the north rim of Canyon del Muerto to near Antelope House Overlook. The remainder of the PCSs within the

canyons, along the south rim, and the remainder of those on the north rim were completed in 2004 (Figure 1).

Transect surveys were performed by recording all birds heard or seen while walking along a pre-selected route at least 0.8 km (0.5 mi) in length. Transects were designed to connect PCS plots so that a number of transect surveys could be efficiently performed while hiking between PCS plots. A total of 10 transects (Figure 1) were surveyed with 3 replicate visits each during the same dates that PCSs were completed. Transects range in length from 0.8 km (0.5 mi) to 2.9 km (1.8 mi). Five transects were completed in 2003, each of which were dominated by pinyon-juniper habitat. In 2004, five additional transects were completed (three in Canyon de Chelly and two in Canyon del Muerto), each were dominated by riparian habitat. All birds detected during transect surveys were recorded; however, unlike PCSs, the distance to each detection was not recorded. An attempt was made to record only those species that were utilizing either the pinyon-juniper or riparian habitats.

Diurnal and nocturnal area searches, including incidental record-keeping, were effective at detecting birds not documented by other methods, and were used primarily for collecting presence/absence data and increasing the species list. An attempt was made to sample areas and habitats not represented, or under-represented, by other survey methods. These surveys were systematic and/or opportunistic in nature and were conducted outside of the peak activity period for birds. Nocturnal inventories were conducted from camp sites to detect birds, especially owls, active during the night. Additionally, included as part of the incidental data are records obtained in May, June, and July 2004 during Willow Flycatcher and Yellow-billed Cuckoo surveys under a separate project with the primary author.

Non-breeding area searches were performed during fall and winter to detect migratory and wintering birds. A number of survey trips were conducted during these times, including 16-19 September, 4 and 16-17 December in 2003, and 6-8 October in 2004. These surveys were concentrated in the canyons and riparian areas of CACH. A brief visit on 4 December 2003 in the Russian olive-dominated riparian groves of the lower canyons found that many species and individuals of birds concentrated in these habitats. Consequently a two-day set of area searches was conducted in this area on 16-17 December 2003. Eleven groves of varying sizes were sampled downstream beginning near White House Ruin in Canyon de Chelly and near Twin Trail in Canyon del Muerto.

Close observation of bird behavior was used to determine breeding status. These behaviors include: Actual nests or nest-building, adults carrying food, defensive and/or distraction behavior of adults, observations of fledglings (including remains), vocalizations of fledglings, etc. These determinations are further mediated by the known breeding status and habitat preferences for birds in this region.

RESULTS

A total of 2,242 minutes (37.41hours) over 39 days were spent performing PCSs in 2003 and 2004 (Table 2). An additional 800 minutes were spent conducting line transect surveys. Lastly, a total of 178 hours were spend performing area searches at CACH, with some individual searches lasting up to 5 hours or more.

We documented the presence of 152 avian species (Table 3, Appendix A) at CACH, of which 99 species were confirmed or probable breeders (Table 1). When including migrant and wintering birds, this inventory detected 158.3% of the number of species (96) estimated to occur

by Stuart (2000). The total number of confirmed and probable breeding species from this inventory was 103.1% of the 96 species that Stuart (2000) estimated to occur at CACH. Of the 112 total species we determined to be potential breeders at CACH (Table 1, “B” and “P”), 88.4% were detected during this inventory and confirmed as a breeding, or probable breeding, species at CACH.

The PCSs alone yielded a total of 83 species (Table 3), which was 83.8% of the confirmed or probable breeders. Survey period analyses (Table 3, footnotes) revealed that 90.4% of these (75 species) were detected during at least 1 first-survey-period (0-3 min). The first and second (3-5 min) survey periods accounted for 95.2% of the 83 species detected by point count surveys. Further analyses of survey periods (Figure 2) were performed to compare bird detection rates between the three habitats with the largest sample size of point counts (desert scrub, pinyon-juniper, and riparian). Each habitat showed the predicted decline in detections of unique (previously uncounted) individuals in the second and third survey periods. However, bird detection rates were greatest for riparian habitat (6.72 birds were detected, on average, in first survey period), and lowest for desert scrub habitats (3.65 birds in survey period 1). An average of 4.48 unique birds were detected within the first survey period in pinyon-juniper habitats (Figure 2).

A total of 51 species were detected during line transect surveys, but these surveys added no additional species to the total list. Transect surveys (Table 4) performed in pinyon-juniper habitats yielded a range of 0 to 14 species and a mean of 8.9 species, and 20.6 individuals, per transect. Transects in riparian habitats yielded a range of 7 to 21 species, with a mean of 12.2 species, and 36.5 individuals, per transect.

Non-breeding area searches conducted during the fall and winter detected a total of 91 bird species (Table 3), and were effective at detecting a large number of migrating birds. Area searches, plus keeping records of incidental sightings during all parts of the year, added another 69 bird species to the total list.

We derived species accumulation curves (Figure 3a,b,c) based on the cumulative number of species versus the number of survey days, survey hours and number of PCSs. Despite changes to the unit measured, the number of species accumulated during this inventory show the same trend. A large number of species were detected in the early stages of inventory, followed by the largest and sharpest increase early in 2003. The number of species plateaus in 2003 at around 10 days, 40 hours, or 33 PCSs. The curve exhibits a small increase early in 2004. The species number then significantly flattens thorough the remainder of 2004.

Total CACH-wide bird detections pooled for all habitats are presented in Table 5. The 20 most frequently detected species comprise 70.3% of the total detections, and 71.0% of total individuals. These 20 species may be considered the core of the breeding avifauna of CACH. However, this assessment could be broadened to include a number of additional species. The Ash-throated Flycatcher and Black-throated Gray Warbler were the most commonly detected species with PCSs (Table 5). A total of 44 species were detected 10 or fewer times, with 14 species of these being detected only once.

Although all pre-selected PCS sampling points were identified and distributed across six habitat types, we defined habitats more selectively during habitat analyses (Table 6). A total of 16 habitat types were identified and 15 of these were inventoried with PSCs during this inventory. Habitat categories were defined by the dominant habitat type and the subcomponents that are important to avian species. We found considerable disparity in the

predicted habitat for two habitat types, those being grasslands and ponderosa pine. No pre-selected locations of PCS sites were actually within grasslands habitat, and of the 19 points identified as ponderosa pine in the planning stages, only 2 were recognized as pure ponderosa pine during the inventory. Sites predicted to be ponderosa pine were often found to actually be desert scrub habitat upon survey. Also, it should be noted that one habitat type, Douglas Fir dominated mixed-conifer forest, was omitted during the planning process and therefore received no PCS plots.

Upon examining habitat associations for specific bird species (Table 7), we found strong associations for pinyon-juniper habitats with Bewick's Wren, Black-throated Gray Warbler, Gray Flycatcher, Gray Vireo, Juniper Titmouse, and Pinyon Jay. Strong associations for riparian habitat were noted for Plumbeous Vireo, Spotted Towhee, Virginia's Warbler, Warbling Vireo, and Yellow-breasted Chat. Other species were widespread in a number of habitats (i.e. habitat generalists); these included: American Robin, Ash-throated Flycatcher, Blue-gray Gnatcatcher, Chipping Sparrow, Common Raven, House Finch, and Mourning Dove.

The avian assemblage of each habitat (Table 8) revealed that the richest habitats were pinyon-juniper, riparian, and desert-scrub. Pinyon-juniper habitats had the greatest number of PCS points (27) and also yielded the greatest number (47) of species. Two other habitat types with pinyon-juniper as the major component, P-J/desert scrub and P-J/sandstone bedrock, also had large species diversity relative to the number of survey points with 36 and 31 species, respectively. A total of 39 species were detected in riparian habitats, while desert-scrub-dominated habitats yielded 41 species.

The preliminary winter bird surveys in the Russian olive dominated-riparian groves of lower canyons de Chelly and del Muerto documented 30 species (Table 9) and 842 individuals

on 16-17 December 2003 (15 to 60 minutes per patch, 392 minutes total survey time). A core suite of 6 species accounted for 66% of all individuals detected; these included: Northern Flicker, Western Bluebird, Yellow-rumped Warbler, Spotted Towhee, Dark-eyed Junco and House Finch. The large number of Yellow-rumped Warblers (93) and Hermit Thrushes (12) were unusually high winter counts for these species on the Navajo Nation (Monson and Phillips 1981, Jacobs 1986). With but a few winter records from the Interior Western U.S., and perhaps no prior winter records from the Colorado Plateau, the Western Tanager detected on these counts was also notable. A flock of 5,000 European Starlings were also seen in lower Canyon de Chelly outside of the study patches summarized in Table 9. This flock was the largest aggregation of birds found throughout this inventory.

A number of Navajo Nation-listed endangered, threatened, and candidate (Navajo Nation Department of Fish and Wildlife, 2005) was detected during this inventory. One species listed as endangered (Group 2), Southwestern Willow Flycatcher, was detected as a migrant in 2004. Three threatened species (Group 3) were detected as breeding species within CACH; these included Golden Eagle, Mexican Spotted Owl, and American Dipper. Candidate species that were determined to be confirmed or probable breeders included: Clark's Grebe, Flammulated Owl, Northern Pygmy-Owl, Peregrine Falcon, and Yellow Warbler. Three additional candidate species, (Belted Kingfisher, Hammond's Flycatcher, Tree Swallow) were detected as migrants.

A total of eight species currently listed as Wildlife of Special Concern by the Arizona Game and Fish Department's Heritage Data Management System (Arizona Game and Fish Department 2006) were detected during this inventory. They included four migrant species (Belted Kingfisher, Osprey, Snowy Egret, and Southwestern Willow Flycatcher) and four

confirmed- or potentially-breeding species (including Bald Eagle, Clark's Grebe, Mexican Spotted Owl, and Peregrine Falcon).

DISCUSSION

The inventory plan and protocol detected the majority of the breeding birds occurring in Canyon de Chelly National Monument. This inventory was successful in the primary objective of documenting at least 90% of the bird species predicted by species-area models. Perhaps the best measure of success is the detection of, and breeding status determination for, 88.4% of the species that we predicted for CACH based on avian ranges and habitat preferences. The point count methodology was largely adequate for this effort with the additional survey methods (area searches, transects, nocturnal bird surveys, and incidental records) supplementing the surveys. The general leveling of the species accumulation curves, independent of three units examined (survey days, hours, and PCSs), is a strong indication that the number of species detected was reaching its maximum. We feel that the results of this work, and the results presented, make a strong foundation for the creation of an updated checklist of the birds of CACH.

Nearly all of the breeding species (90.4%) were detected at least once during the first survey periods of PCSs. Further, 95% of them were detected with the first and second periods. We suspect this resulted from the large sample size and diverse habitats represented by the PCS sites. This result suggests that shortening the length of time spent at each site to five, or even three, minutes may benefit future monitoring efforts in terms of greater efficiency. However, we caution that the sample size of PCS sites must be sufficient so that a balance is reached between the number of survey minutes and the number of points to yield the desired results.

Area searches during the fall and winter were crucial for detecting migrant and wintering birds, and yielded a large number of species not found breeding at CACH.

Nocturnal bird species were detected by the evening monitoring of vocalizations at campsites. These species included Common Nighthawk, Common Poorwill, Flammulated Owl, Northern Pygmy-Owl, Great Horned Owl, and Western Screech-Owl. The Spotted Owl was detected on area searches. Northern Saw-whet Owl and Long-eared Owl were not detected although their occurrence was expected based on their known distribution in the region. Additional surveys, complying with Tribal and Federal permit requirements, and following standardized protocols and/or appropriate methodologies, would be necessary to detect these species, or if additional specific biological information is needed.

The pool of species detected, and their habitat associations, were as expected based on prior regional surveys and the known bird distribution in the Navajo Nation region (Woodbury and Russell 1945, Phillips et al. 1964, Jacobs 1986, LaRue 1994, Corman and Wise-Gervais 2005), and at CACH specifically (Burgess 1970, Hasty and Fletcher 1981). No unusual breeding species or migrants were detected. The breeding species richness of the various habitats and the avian community structure were generally as expected, except as noted below. However, in the context of the entire Navajo Nation, CACH represents a significant center of bird biodiversity. The variety of floristic, structural, and topographic components of its habitats provide many niches for a diverse array of avian species. As a center of regional avian diversity, CACH is comparable to the Chuska Mountains (Corman and Wise-Gervais 2005), northern Black Mesa (LaRue 1994), and Navajo Mountain (Woodbury and Russell 1945) on the Navajo Nation.

The number of individual birds detected in the first 3 minutes of PCSs were greater within riparian habitats, even though the total number of species here was lower than several

other habitats. This may be a result of more individual birds, but a lower number of habitat-specialist species, using riparian habitats. Or more likely it may be a result of differences in PCS sample size, or an increased number of detections of fly-over and peripheral species, within the more open habitats of pinyon-juniper and desert-scrub. Transect surveys clearly revealed a larger number of individual and species within riparian habitats compared to pinyon-juniper.

The habitat distribution, structure, and composition were relatively complex. Bird community composition is often significantly influenced by these variables (MacArthur and MacArthur 1961, MacArthur 1964, Karr and Roth 1971, Willson 1974, Roth 1976), and we further stratified the habitats based on them. Also the habitats were often interdigitated and exhibited frequent grading of 1 type into another. The pinyon-juniper woodland and associations with a pinyon-juniper component formed a particularly variable assemblage of habitats. Also, the desert scrub habitats, in sum, yielded a large number of species primarily due to these gradation and interdigitation issues. Desert scrub habitats in other locations typically support only three or four breeding species per site (Rotenberry and Wiens 1980).

The discrepancy between the predicted and actual habitat was often significant. For example many of the points in the eastern portions of CACH were stratified to fall within a predicted habitat of ponderosa pine woodland, but actually were in extensive flats of desert scrub. Although grassland habitat was predicted to be present and sampled, no actual grassland habitat was encountered based on assessment of the perennial plant composition at the point locations (Appendices B, C, and D). These points were all determined to be within big sagebrush communities.

A significant habitat type, the extensive Douglas Fir-dominated mixed-conifer forests of the upper canyons was largely missed by the inventory protocol and plan. Although few, if any,

point count sites contained this habitat, other inventory methods (area searches and incidental record-keeping) were employed to survey this forest type. Several species such as Cordilleran Flycatcher, Hermit Thrush, and Spotted Owl may be largely restricted to this type at CACH.

Within the desert scrub habitat type was the locally-distinct big sagebrush community. This community was not recognized by the inventory protocol and plan yet was inadvertently well sampled by the point counts. As noted above it was largely the habitat predicted to be ponderosa pine in the eastern portions of CACH. It was distributed north and south of Palisades Creek and around the head of Wheatfields Creek and Canyon de Chelly. Two typical species were found breeding in this community type: Brewer's Sparrow and Sage Thrasher. This community was further affected by past land management practices where apparent disking and seeding with crested wheatgrass was evident south of Palisades Creek. Such practices were not evident north of Palisades Creek, and the habitat appeared unaltered. These differences affected the bird community with the altered site mostly supporting Western Meadowlarks and Vesper Sparrows.

A few species appear to be notably absent as breeding species from CACH. Loggerhead Shrike, Bendire's Thrasher, Black-throated Sparrow, and Scott's Oriole were not detected during this inventory. Based on the available habitat within CACH, and their known distribution and habitat affinities in northern Arizona, we anticipated their occurrence in desert scrub and open pinyon-juniper habitats of the lower western portions of CACH. All four of these species were also not detected in Arizona Breeding Bird Atlas survey blocks that fell within CACH (T. Corman pers. comm.). Their apparent absence (or perhaps very limited occurrence within CACH) may be partly explained by the fact that most of CACH represents upland-type habitats, while these species prefer lowland habitats. We located at least three old American Dipper nests within the

canyon bottoms of upper Tsaille and Whiskey creeks. No American Dippers (an obligate breeder of clear-running streams) were seen during this inventory. The lack of flowing water due to drought conditions and/or water management practices at Tsaille and Wheatfields lakes may be responsible for the, hopefully temporary, abandonment of the upper canyons by this species.

The limited winter inventory of the Russian olive-dominated riparian communities of the lower canyons revealed a large numbers of individuals and species of birds utilizing this tree. The suite of birds utilizing Russian olive fruit in winter may be acting as a collective dispersal agent for the seeds. Although a core group of 6 species comprised 66% of the individuals, a number of other species may also be especially important in olive seed dispersal because of their apparent large daily ranges. These species include: American Crow, American Robin, Cedar Waxwing, Common Raven, and European Starling. The single flock of 5,000 starlings in 2003, for example, would be capable of massive seed dispersal events on a daily basis during their occupancy in the canyon. This indicates that a synergistic dynamic between this introduced, exotic plant and the wintering bird assemblage relying on the fruit is likely occurring. As the Russian olives become more widely established throughout the canyons, the increasing number of birds consuming and subsequently dispersing the seeds in their droppings accelerates the spread of the tree. The spread of this species is illustrated by Rink (2003) and is a current management concern of the NPS. Therefore, the current efforts to remove or control this species will not only reduce its distribution in the monument but should also slow the rate of its spread.

RECOMMENDATIONS

- 1) When an updated vegetation/habitat map is produced, supplemental bird inventory efforts would be helpful to fully inventory the monument's birds by sampling in habitats weakly

sampled in this inventory. An emphasis of this effort would be to stratify and sample in the ponderosa pine and mixed-conifer woodlands.

- 2) Efficiency in future monitoring efforts may be gained by shortening the length of point count surveys to five, or even three minutes, provided that a sufficient number of points are surveyed.
- 3) Transects are not necessary to inventory birds if point counts are the primary survey method.
- 4) The Canyon de Chelly bird field checklist should be revised to incorporate the information obtained as a result of this inventory. Additional information such as the Arizona Breeding Bird Atlas database could be incorporated. Additionally an annotated checklist addressing the status, distribution, and ecology of the birds of the monument has not been done and this inventory could form the basis of such a document.
- 5) Additional surveys for nocturnal birds, complying with Tribal and Federal permit requirements, and following standardized protocols and/or appropriate methodologies, would be necessary to fully complete the list of nocturnal species, or if additional specific biological information is needed.
- 6) Since this inventory emphasized the breeding birds, non-breeding surveys addressing migrants and wintering birds would help to fully inventory the year-round bird assemblage in the monument. Related to this would be to further examine the extent of use of the Russian olive-dominated riparian communities.

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Table 1. Summary of species detected during previous studies (Burgess [1970], Corman and Wise-Gervais [2005] -AZBBA, and Hasty and Fletcher [1981]) at Canyon de Chelly National Monument.

FAMILY	Common Name	AZBBA¹	Other² Lists
ANATIDAE			
	Mallard	Yes	--
PHASIANIDAE			
	Wild Turkey	Yes	Yes
PODICIPEDIDAE			
	Eared Grebe	--	Yes
CATHARTIDAE			
	Turkey Vulture	Yes	Yes
ACCIPITRIDAE			
	Sharp-shinned Hawk	Yes	--
	Cooper's Hawk	Yes	Yes
	Northern Goshawk	--	Yes
	Red-tailed Hawk	Yes	Yes
	Golden Eagle	Yes	Yes
FALCONIDAE			
	American Kestrel	Yes	Yes
	Peregrine Falcon	Yes	--
	Prairie Falcon	Yes	Yes
CHARADRIIDAE			
	Killdeer	Yes	Yes
COLUMBIDAE			
	Rock Pigeon	--	Yes
	Mourning Dove	Yes	Yes
STRIGIDAE			
	Flammulated Owl	Yes	--
	Great-horned Owl	Yes	Yes
	Northern Pygmy-Owl	Yes	--
	Spotted Owl	Yes	--
	Long-eared Owl	Yes	--
CAPRIMULGIDAE			
	Common Nighthawk	Yes	Yes
	Common Poorwill	Yes	--
APODIDAE			
	White-throated Swift	Yes	Yes
TROCHILIDAE			
	Black-chinned Hummingbird	Yes	B
	Broad-tailed Hummingbird	Yes	Yes

Table 1. continued.

FAMILY	Common Name	AZBBA¹	Other² Lists
<hr/>			
PICIDAE			
	Lewis's Woodpecker	Yes	Yes
	Acorn Woodpecker	--	Yes
	Williamson's Sapsucker	--	Yes
	Red-naped Sapsucker	--	Yes
	Downy Woodpecker	--	Yes
	Hairy Woodpecker	Yes	Yes
	Northern Flicker	Yes	Yes
TYRANNIDAE			
	Western Wood-Pewee	Yes	Yes
	Willow Flycatcher	--	Yes
	Gray Flycatcher	Yes	--
	Dusky Flycatcher	Yes	--
	Cordilleran Flycatcher	Yes	Yes
	Say's Phoebe	Yes	Yes
	Ash-throated Flycatcher	Yes	Yes
	Cassin's Kingbird	Yes	Yes
	Western Kingbird	--	Yes
LANIIDAE			
	Loggerhead Shrike	--	Yes
VIREONIDAE			
	Gray Vireo	Yes	Yes
	Plumbeous Vireo	Yes	Yes
	Warbling Vireo	Yes	Yes
CORVIDAE			
	Steller's Jay	Yes	Yes
	Western Scrub-Jay	Yes	Yes
	Pinyon Jay	Yes	Yes
	Clark's Nutcracker	Yes	Yes
	American Crow	Yes	Yes
	Common Raven	Yes	Yes
ALAUDIDAE			
	Horned Lark	Yes	Yes
HIRUNDINIDAE			
	Violet-green Swallow	Yes	Yes
	Northern Rough-winged Swallow		Yes --
	Cliff Swallow	Yes	Yes
	Barn Swallow	--	Yes
PARIDAE			
	Mountain Chickadee	Yes	Yes
	Juniper Titmouse	Yes	Yes
AEGITHALIDAE			
	Bushtit	Yes	Yes

Table 1. continued.

FAMILY	Common Name	AZBBA¹	Other² Lists
<hr/>			
SITTIDAE			
	Red-breasted Nuthatch	Yes	--
	White-breasted Nuthatch	Yes	Yes
	Pygmy Nuthatch	Yes	Yes
CERTHIIDAE			
	Brown Creeper	Yes	Yes
TROGLODYTIDAE			
	Rock Wren	Yes	Yes
	Canyon Wren	Yes	Yes
	Bewick's Wren	Yes	Yes
	House Wren	Yes	Yes
CINCLIDAE			
	American Dipper	Yes	--
REGULIDAE			
	Ruby-crowned Kinglet	--	Yes
SYLVIIDAE			
	Blue-gray Gnatcatcher	Yes	Yes
TURDIDAE			
	Western Bluebird	Yes	Yes
	Mountain Bluebird	Yes	Yes
	Townsend's Solitaire	Yes	Yes
	Hermit Thrush	Yes	Yes
	American Robin	Yes	Yes
MIMIDAE			
	Northern Mockingbird	--	Yes
	Sage Thrasher	--	Yes
STURNIDAE			
	European Starling	--	Yes
PARULIDAE			
	Orange-crowned Warbler	--	Yes
	Virginia's Warbler	Yes	Yes
	Yellow Warbler	--	Yes
	Yellow-rumped Warbler	Yes	Yes
	Black-throated Gray Warbler	Yes	Yes
	Grace's Warbler	Yes	Yes
	MacGillivray's Warbler	--	Yes
	Yellow-breasted Chat	Yes	Yes
THRAUPIDAE			
	Western Tanager	Yes	Yes
EMBERIZIDAE			
	Green-tailed Towhee	Yes	Yes
	Spotted Towhee	Yes	Yes
	Chipping Sparrow	Yes	Yes
	Brewer's Sparrow	Yes	Yes
	Vesper Sparrow	Yes	--

Table 1. continued.

FAMILY	Common Name	AZBBA¹	Other² Lists
<hr/>			
EMBERIZIDAE (continued)			
	Lark Sparrow	Yes	Yes
	Black-throated Sparrow	--	Yes
	Sage Sparrow	--	Yes
	Dark-eyed Junco	Yes	Yes
CARDINALIDAE			
	Black-headed Grosbeak	Yes	Yes
	Blue Grosbeak	Yes	Yes
	Lazuli Bunting	Yes	Yes
ICTERIDAE			
	Red-winged Blackbird	--	Yes
	Western Meadowlark	Yes	Yes
	Yellow-headed Blackbird	--	Yes
	Brewer's Blackbird	Yes	Yes
	Brown-headed Cowbird	Yes	Yes
	Bullock's Oriole	--	Yes
	Scott's Oriole	--	Yes
FRINGILLIDAE			
	House Finch	Yes	Yes
	Red Crossbill	Yes	--
	Pine Siskin	Yes	Yes
	Lesser Goldfinch	Yes	Yes
PASSERIDAE			
	House Sparrow	--	Yes
<hr/>			

¹ Corman and Wise-Gervais (2005)² includes Burgess (1970) and/or Hasty and Fletcher (1981)

Table 2. Sampling effort in minutes and hours for Point Count Surveys at Canyon de Chelly National Monument in 2003 and 2004.

Date	Sampling Effort in: minutes	hours
5/14/2003	48	0.80
5/15/2003	63	1.05
5/16/2003	78	1.30
5/20/2003	78	1.30
5/21/2003	76	1.27
5/22/2003	55	0.92
5/23/2003	49	0.82
6/4/2003	112	1.87
6/5/2003	87	1.45
6/6/2003	72	1.20
6/7/2003	71	1.18
6/8/2003	62	1.03
6/9/2003	56	0.93
6/22/2003	7	0.12
6/25/2003	115	1.92
6/26/2003	98	1.63
6/27/2003	71	1.18
6/28/2003	75	1.25
6/29/2003	63	1.05
6/30/2003	56	0.93
5/3/2004	7	0.12
5/11/2004	42	0.70
5/12/2004	21	0.35
5/13/2004	77	1.28
5/14/2004	42	0.70
5/15/2004	56	0.93
5/16/2004	28	0.47
5/26/2004	14	0.23
6/1/2004	42	0.70
6/2/2004	74	1.23
6/3/2004	49	0.82
6/4/2004	56	0.93
6/5/2004	56	0.93
6/24/2004	55	0.92
6/25/2004	42	0.70
6/26/2004	56	0.93
6/27/2004	14	0.23
6/28/2004	70	1.17
6/29/2004	49	0.82
Total: 39 days	2,242 min.	37.41 hrs.

Table 3. List of birds detected at Canyon de Chelly National Monument during 2003 and 2004, including status categories and means of detection for each species. Species are listed in the A.O.U. check-list order (American Ornithologists' Union 2006).

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Point Count	Method of Detection		
					Transect	Area Search	Incidental ¹
ANATIDAE							
Canada Goose	Summer	Water	Aquatic	--	--	Yes	Yes
Gadwall ³	Migrant	Water	Aquatic	--	--	Yes	Yes?
American Wigeon ³	Migrant	N/A	Aquatic	--	--	Yes	--
Mallard	Summer	Ground	Aquatic	--	--	Yes	Yes
Blue-winged Teal	Migrant	N/A	Aquatic	--	--	Yes	--
Cinnamon Teal ³	Migrant	Water	Aquatic	--	--	Yes	Yes
Northern Shoveler	Migrant	N/A	Aquatic	--	--	Yes	--
Green-winged Teal	Migrant	N/A	Aquatic	--	--	Yes	--
Redhead	Migrant	N/A	Aquatic	--	--	Yes	--
Ruddy Duck	Migrant	N/A	Aquatic	--	--	Yes	Yes
PHASIANIDAE							
Wild Turkey	Permanent	Ground	Ground	Yes	Yes	--	--
PODICIPEDIDAE							
Pied-billed Grebe	Summer	Ground	Aquatic	--	--	Yes	Yes
Eared Grebe	Summer	Ground	Aquatic	--	--	--	Yes
Western Grebe	Summer	Ground	Aquatic	--	--	Yes	Yes
Clark's Grebe	Summer	Ground	Aquatic	--	--	Yes	--
ARDEIDAE							
Great Blue Heron	Summer	N/A	Aquatic	--	--	Yes	--
Snowy Egret	Migrant	N/A	Aquatic	--	--	Yes	--
THRESKIORNITHIDAE							
White-faced Ibis	Migrant	N/A	Aquatic	--	--	--	Yes ²
CATHARTIDAE							
Turkey Vulture	Summer	Ledge	Predator/Scavenger	Yes	--	Yes	--

Table 3. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Point Count	Method of Detection		
					Transect	Area Search	Incidental ¹

ACCIPITRIDAE							
Osprey	Migrant	N/A	Predator/Scavenger	--	--	--	Yes ²
Bald Eagle	Migrant	N/A	Predator/Scavenger	--	--	--	Yes ²
Sharp-shinned Hawk ³	Migrant	Foliage	Predator/Scavenger	--	--	--	Yes
Cooper's Hawk	Permanent	Foliage	Predator/Scavenger	Yes	--	Yes	--
Red-tailed Hawk	Permanent	Ledge	Predator/Scavenger	Yes	--	Yes	--
Golden Eagle	Permanent	Ledge	Predator/Scavenger	Yes	Yes	--	--
FALCONIDAE							
American Kestrel	Permanent	Ledge	Predator/Scavenger	Yes	Yes	Yes	--
Peregrine Falcon	Summer	Ledge	Predator/Scavenger	Yes	--	--	--
RALLIDAE							
American Coot	Summer	Ground	Aquatic	--	--	Yes	--
CHARADRIIDAE							
Killdeer	Summer	Ground	Ground	--	--	Yes	Yes
SCOLOPACIDAE							
Spotted Sandpiper ³	Migrant	N/A	Aquatic	--	--	--	Yes?
Western Sandpiper	Migrant	N/A	Aquatic	--	--	Yes	--
Baird's Sandpiper	Migrant	N/A	Aquatic	--	--	Yes	--
LARIDAE							
Franklin's Gull	Migrant	N/A	Aquatic	--	--	--	Yes ²
California Gull	Migrant	N/A	Aquatic	--	--	--	Yes ²
Common Tern	Migrant	N/A	Aquatic	--	--	Yes	--
COLUMBIDAE							
Rock Pigeon	Permanent	Ledge	Ground	Yes	--	--	--
Eurasian Collared-Dove	Permanent	Foliage	Ground	--	--	--	Yes
White-winged Dove	Summer	Foliage	Ground	--	--	--	Yes ²
Mourning Dove	Summer	Foliage	Ground	Yes	Yes	Yes	--
CUCULIDAE							
Greater Roadrunner	Migrant	N/A	Ground	--	--	Yes	--

Table 3. continued.

FAMILY	Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Point Count	Method of Detection		
						Transect	Area Search	Incidental ¹
STRIGIDAE								
	Flammulated Owl	Summer	Cavity	Predator/Scavenger	--	--	--	Yes
	Western Screech-Owl	Permanent	Cavity	Predator/Scavenger	--	--	Yes	Yes
	Great-horned Owl	Permanent	Ledge	Predator/Scavenger	--	--	--	Yes
	Northern Pygmy-Owl	Permanent	Cavity	Predator/Scavenger	Yes	--	--	--
	Spotted Owl	Permanent	Ledge	Predator/Scavenger	--	--	--	Yes
CAPRIMULGIDAE								
	Common Nighthawk	Summer	Ground	Aerial	--	--	--	Yes
	Common Poorwill	Summer	Ground	Sallying	--	--	Yes	Yes
APODIDAE								
	White-throated Swift	Summer	Ledge	Aerial	Yes	Yes	Yes	--
TROCHILIDAE								
	Black-chinned Hummingbird	Summer	Foliage	Nectar	Yes	Yes	--	--
	Broad-tailed Hummingbird	Summer	Foliage	Nectar	Yes	Yes	Yes	--
ALCEDINIDAE								
	Belted Kingfisher	Migrant	N/A	Aquatic	--	--	Yes	--
PICIDAE								
	Williamson's Sapsucker	Permanent	Cavity	Bark Gleaning	Yes	--	Yes	--
	Red-naped Sapsucker	Migrant	N/A	Bark Gleaning	--	--	Yes	--
	Hairy Woodpecker	Permanent	Cavity	Bark Gleaning	Yes	Yes	--	--
	Northern Flicker	Permanent	Cavity	Bark Gleaning	Yes	Yes	Yes	--
TYRANNIDAE								
	Olive-sided Flycatcher	Migrant	Foliage	Sallying	Yes	--	--	--
	Western Wood-Pewee	Summer	Foliage	Sallying	Yes	Yes	--	--
	Willow Flycatcher ³	Migrant	Foliage	Sallying	--	--	--	Yes
	Hammond's Flycatcher	Migrant	Foliage	Sallying	--	--	Yes	--
	Gray Flycatcher	Summer	Foliage	Sallying	Yes	Yes	--	--
	Dusky Flycatcher	Summer	Foliage	Sallying	Yes	--	Yes	--
	Cordilleran Flycatcher	Summer	Ledge	Sallying	Yes	Yes	--	--
	Black Phoebe	Summer	Ledge	Sallying	--	--	--	Yes

Table 3. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Point Count	Method of Detection		
					Transect	Area Search	Incidental ¹
TYRANNIDAE (continued)							
Say’s Phoebe	Summer	Ledge	Sallying	Yes	Yes	Yes	--
Ash-throated Flycatcher	Summer	Cavity	Sallying	Yes	Yes	--	--
Cassin’s Kingbird	Summer	Foliage	Sallying	Yes	--	--	--
Western Kingbird	Summer	Foliage	Sallying	--	--	--	Yes
VIREONIDAE							
Gray Vireo	Summer	Foliage	Foliage Gleaning	Yes	--	--	--
Plumbeous Vireo	Summer	Foliage	Foliage Gleaning	Yes	Yes	--	--
Cassin’s Vireo	Migrant	N/A	Foliage Gleaning	--	--	--	Yes ²
Warbling Vireo	Summer	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
CORVIDAE							
Steller’s Jay	Permanent	Foliage	Ground	Yes	Yes	Yes	--
Western Scrub-Jay	Permanent	Foliage	Ground	Yes	Yes	Yes	--
Pinyon Jay	Permanent	Foliage	Ground	Yes	Yes	Yes	--
Clark’s Nutcracker	Permanent	Foliage	Ground	Yes	--	--	--
American Crow	Permanent	Foliage	Ground	Yes	--	Yes	--
Common Raven	Permanent	Ledge	Predator/Scavenger	Yes	Yes	Yes	--
ALAUDIDAE							
Horned Lark	Permanent	Ground	Ground	Yes	--	--	--
HIRUNDINIDAE							
Purple Martin ³	Summer	Cavity	Aerial	--	--	--	Yes?
Tree Swallow	Summer	N/A	Aerial	--	--	Yes	--
Violet-green Swallow	Summer	Ledge	Aerial	Yes	--	Yes	--
N.Rough-winged Swallow	Summer	Cavity	Aerial	--	--	Yes	Yes?
Bank Swallow	Migrant	N/A	Aerial	--	--	Yes	--
Cliff Swallow	Summer	Ledge	Aerial	Yes	--	Yes	--
Barn Swallow	Summer	N/A	Aerial	--	--	Yes	--
PARIDAE							
Mountain Chickadee	Permanent	Cavity	Foliage Gleaning	Yes	Yes	Yes	--
Juniper Titmouse	Permanent	Cavity	Foliage Gleaning	Yes	Yes	Yes	--

Table 3. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Point Count	Method of Detection		
					Transect	Area Search	Incidental ¹

AEGITHALIDAE							
Bushtit	Permanent	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
SITTIDAE							
Red-breasted Nuthatch	Permanent	Cavity	Bark Gleaning	Yes	--	Yes	--
White-breasted Nuthatch	Permanent	Cavity	Bark Gleaning	Yes	Yes	--	--
Pygmy Nuthatch	Permanent	Cavity	Bark Gleaning	Yes	Yes	--	--
CERTHIIDAE							
Brown Creeper	Permanent	Cavity	Bark Gleaning	--	--	Yes	Yes
TROGLODYTIDAE							
Rock Wren	Summer	Ledge	Ground	Yes	Yes	Yes	--
Canyon Wren	Permanent	Ledge	Ground	Yes	Yes	Yes	--
Bewick's Wren	Permanent	Cavity	Foliage Gleaning	Yes	Yes	Yes	--
House Wren	Summer	Cavity	Foliage Gleaning	Yes	Yes	--	--
Marsh Wren	Migrant	N/A	Foliage Gleaning	--	--	Yes	--
CINCLIDAE							
American Dipper	Permanent	Ledge	Aquatic	--	--	--	Yes
REGULIDAE							
Ruby-crowned Kinglet	Migrant	N/A	Foliage Gleaning	--	Yes	Yes	--
SYLVIIDAE							
Blue-gray Gnatcatcher	Summer	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
TURDIDAE							
Western Bluebird	Permanent	Cavity	Ground	Yes	Yes	Yes	--
Mountain Bluebird	Permanent	Cavity	Ground	Yes	Yes	Yes	--
Townsend's Solitaire	Permanent	Ledge	Foliage Gleaning	Yes	Yes	Yes	--
Hermit Thrush	Permanent	Foliage	Ground	Yes	--	Yes	--
American Robin	Permanent	Foliage	Ground	Yes	Yes	Yes	--
MIMIDAE							
Gray Catbird	Migrant	N/A	Foliage Gleaning	--	--	--	Yes ²
Northern Mockingbird	Summer	Foliage	Ground	Yes	Yes	--	--
Sage Thrasher	Summer	Foliage	Ground	Yes	--	--	--

Table 3. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Point Count	Method of Detection		
					Transect	Area Search	Incidental ¹
STURNIDAE							
European Starling	Permanent	Cavity	Ground	--	--	Yes	--
BOMBYCILLIDAE							
Cedar Waxwing	Winter	N/A	Foliage Gleaning	--	--	--	Yes ²
PARULIDAE							
Orange-crowned Warbler	Migrant	N/A	Foliage Gleaning	Yes	--	Yes	--
Nashville Warbler	Migrant	N/A	Foliage Gleaning	--	--	Yes	--
Virginia’s Warbler	Summer	Ground	Foliage Gleaning	Yes	Yes	Yes	--
Yellow Warbler	Summer	Foliage	Foliage Gleaning	--	--	--	Yes
Yellow-rumped Warbler	Permanent	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
Black-throated Gray Warbler	Summer	Foliage	Foliage Gleaning	Yes	Yes	--	--
Townsend’s Warbler	Migrant	Foliage	Foliage Gleaning	--	--	Yes	--
Grace’s Warbler	Summer	Foliage	Foliage Gleaning	Yes	--	--	--
Black-and-White Warbler	Migrant	N/A	Foliage Gleaning	--	--	--	Yes ²
MacGillivray’s Warbler ³	Migrant	N/A	Foliage Gleaning	--	--	Yes	--
Common Yellowthroat	Summer	Foliage	Foliage Gleaning	Yes	--	Yes	--
Wilson’s Warbler	Migrant	N/A	Foliage Gleaning	Yes	Yes	--	--
Yellow-breasted Chat	Summer	Foliage	Foliage Gleaning	Yes	--	--	--
THRAUPIDAE							
Western Tanager	Summer	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
EMBERIZIDAE							
Green-tailed Towhee	Summer	Ground	Ground	Yes	--	--	--
Spotted Towhee	Permanent	Ground	Ground	Yes	Yes	Yes	--
Chipping Sparrow	Summer	Foliage	Ground	Yes	Yes	Yes	--
Brewer’s Sparrow	Summer	Foliage	Ground	Yes	--	Yes	--
Vesper Sparrow	Summer	Ground	Ground	Yes	--	Yes	--
Lark Sparrow	Summer	Ground	Ground	Yes	Yes	--	--
Sage Sparrow	Migrant	N/A	Ground	--	--	Yes	--
Lincoln’s Sparrow	Migrant	N/A	Ground	--	--	Yes	--
White-throated Sparrow	Winter	N/A	Ground	--	--	Yes	--

Table 3. continued.

FAMILY Common Name	Seasonal Status	Nesting Substrate	Foraging Guild	Point Count	Method of Detection		
					Transect	Area Search	Incidental ¹
EMBERIZIDAE (continued)							
White-crowned Sparrow	Winter	N/A	Ground	Yes	--	Yes	--
Dark-eyed Junco	Permanent	Ground	Ground	Yes	Yes	Yes	--
CARDINALIDAE							
Black-headed Grosbeak	Summer	Foliage	Foliage Gleaning	Yes	Yes	--	--
Blue Grosbeak	Summer	Foliage	Foliage Gleaning	Yes	--	Yes	--
Lazuli Bunting	Summer	Foliage	Ground	Yes	Yes	Yes	--
Indigo Bunting	Summer	Foliage	Ground	--	--	--	Yes
ICTERIDAE							
Red-winged Blackbird	Summer	Foliage	Ground	Yes	--	--	--
Western Meadowlark	Summer	Ground	Ground	Yes	--	--	--
Yellow-headed Blackbird ³	Migrant	Foliage	Ground	--	--	Yes	--
Brewer's Blackbird	Summer	Ground	Ground	Yes	--	--	--
Brown-headed Cowbird	Summer	Foliage	Ground	Yes	--	--	--
Bullock's Oriole	Summer	Foliage	Foliage Gleaning	Yes	Yes	--	--
FRINGILLIDAE							
Cassin's Finch	Winter	N/A	Foliage Gleaning	--	--	Yes	--
House Finch	Permanent	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
Red Crossbill	Permanent	Foliage	Foliage Gleaning	--	--	--	Yes
Pine Siskin	Permanent	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
Lesser Goldfinch	Summer	Foliage	Foliage Gleaning	Yes	Yes	Yes	--
American Goldfinch	Winter	N/A	Foliage Gleaning	--	--	Yes	--
PASSERIDAE							
House Sparrow	Permanent	Cavity	Ground	Yes	--	--	--

¹Only potential/known breeding species that were not detected by other survey means are listed²Not expected to breed in CACH, but only detected by incidental observation³Breeding status in CACH is unclear; more information needed

Table 4. Summarized results of 10 Line Transect Surveys (with 3 repetitions) performed at Canyon de Chelly National Monument during 2003 and 2004.

Transect Name	Beginning Location	End Location	Length	No. Species Each Survey	No. Birds Each Survey
<u>Survey Year = 2003; Habitat = Pinyon-Juniper</u>					
Big P.J.	660301E 4001690N	661444E 4001184N	1.2 km	7, 8, 0	23, 24, 0
Black Rock	646529E 4000409N	645776E 4000911N	0.8 km	5, 1, 4	7, 2, 6
Gridline	645000E 4005000N	645000E 4004000N	1.3 km	6, 5, 4	11, 9, 8
Sonsela Butte	666141E 3996514N	666034E 3996096N	1.1 km	7, 9, 6	8, 12, 6
Wheatfield Mesa	663898E 4000244N	664106E 4000931N	0.8 km	12, 10, 14	18, 17, 16
				----- Mean = 8.9	20.6
<u>Survey Year = 2004; Habitat = Riparian</u>					
Draper's Orchard	649801E 4012170N	651293E 4012151N	1.6 km	18, 19, 16	50, 40, 42
Poison Ivy	652277E 4012412N	653787E 4013013N	1.5 km	11, 11, 18	22, 21, 44
Red Clay	651100E 3998372N	652291E 3998400N	1.6 km	10, 7, 10	29, 21, 28
Spider Rock	648556E 3997501N	650312 3997639N	1.9 km	14, 13, 16	34, 57, 72
Upper DeChelly	653444E 3998297N	656057E 3998239N	2.9 km	21, 17, 17	97, 55, 77
				----- Mean = 12.2	36.5

Table 5. Avian species detected during Point Count Surveys in Canyon de Chelly National

Monument during 2003 and 2004, including number of individuals and detections for each.

Common Name	Number of Detections	Number of Individuals
Ash-throated Flycatcher	169	180
Black-throated Gray Warbler	105	108
Spotted Towhee	88	91
House Finch	79	101
Chipping Sparrow	77	86
Bewick's Wren	65	66
Vesper Sparrow	63	70
White-throated Swift	61	119
Common Raven	60	68
Mourning Dove	56	62
Gray Flycatcher	54	55
Violet-green Swallow	53	80
Pinyon Jay	49	78
Rock Wren	48	53
Warbling Vireo	44	47
Juniper Titmouse	41	42
American Robin	40	43
Plumbeous Vireo	37	39
Virginia's Warbler	37	37
Western Tanager	35	36
Blue-gray Gnatcatcher	34	35
White-breasted Nuthatch	29	30
Western Scrub Jay	27	30
Black-headed Grosbeak	24	24
Green-tailed Towhee	24	24
Cliff Swallow	24	37
Bushtit	21	30
Mountain Bluebird	21	32
Mountain Chickadee	21	23
Lark Sparrow	20	20
Say's Phoebe	18	18
Western Meadowlark	17	19
Hairy Woodpecker	15	16
Black-chinned Hummingbird ¹	14	15
Northern Flicker	14	17
Canyon Wren	13	13
Northern Mockingbird	13	13
Western Bluebird	13	15
Pygmy Nuthatch	11	16
American Crow	10	11

Table 5. continued.

Common Name	Number of Detections	Number of Individuals
Gray Vireo	10	10
Steller's Jay	10	10
Townsend's Solitaire	9	9
Dark-eyed Junco	8	8
Brewer's Sparrow	7	7
American Kestrel	6	7
Grace's Warbler	6	6
Lesser Goldfinch	6	6
Yellow-breasted Chat	6	6
Yellow-rumped Warbler	6	7
Blue Grosbeak	5	6
Brewer's Blackbird	5	8
Bullock's Oriole	5	6
Hermit Thrush	5	5
Wild Turkey	5	5
Turkey Vulture	4	4
Western Wood-Pewee	4	4
Broad-tailed Hummingbird	3	3
Brown-headed Cowbird	3	3
Dusky Flycatcher	3	3
Northern Pygmy-Owl	3	3
Peregrine Falcon	3	3
Common Yellowthroat	2	2
Horned Lark ¹	2	2
House Wren	2	2
Lazuli Bunting	2	3
Red-tailed Hawk	2	2
Rock Pigeon	2	3
Sage Thrasher	2	2
Cassin's Kingbird ^{1,2}	1	1
Clark's Nutcracker	1	1
Cooper's Hawk ^{1,2}	1	1
Cordilleran Flycatcher	1	1
Golden Eagle	1	1
House Sparrow ^{1,2}	1	1
Olive-sided Flycatcher	1	1
Orange-crowned Warbler ¹	1	1
Pine Siskin	1	1
Red-breasted Nuthatch	1	1
Red-winged Blackbird ¹	1	1
White-crowned Sparrow	1	1
Williamson's Sapsucker ^{1,2}	1	1
Wilson's Warbler	1	1

¹Species not detected at least once during any first survey period (0-3 min.)²Species only detected during third survey period (5-7 min.)

Table 6. Distribution of 94 Point Count Survey sites by ‘predicted’ habitat type versus ‘actual’ habitat types found at each site at Canyon de Chelly National Monument; amount and percent of differences are also included.

Habitat Type	No. of Predicted	% of Predicted	No. of Actual	% of Actual	Amount of Differ.	% Differ.
Riparian	11	11.7	13	13.8	+2	+18.2
Grassland	13	13.8	0	0	-13	-100.0
Agriculture	1	1.1	1	1.1	0	0
Desert Scrub	16	17.0	16	17.0	0	0
Pinyon-Juniper	34	36.2	27	28.8	-7	-20.6
Ponderosa Pine	19	20.2	2	2.1	-17	-89.5
Sandstone Bedrock	0	0	3	3.2	+3	
PJ/Sandstone Bedrock	0	0	7	7.4	+7	
PJ/Desert Scrub	0	0	8	8.5	+8	
PJ/Shrub	0	0	3	3.2	+3	
Oak-PJ Riparian	0	0	1	1.1	+1	
Oak Riparian	0	0	1	1.1	+1	
PJ-Ponderosa	0	0	2	2.1	+2	
Desert Scrub-PJ	0	0	7	7.4	+7	
Ponderosa-PJ	0	0	2	2.1	+2	
Ponderosa/Oak	0	0	1	1.1	+1	
Total	94	100	94	100		

Table 7. Habitat associations of each bird species found during Point Count Surveys in Canyon de Chelly National Monument in 2003 and 2004.

Common Name	Habitat Type	Number of Individuals
American Crow	Agricultural	1
	Desert Scrub	5
	Desert Scrub/P-J	1
	P-J/Desert Scrub	1
	Sandstone Bedrock	3
American Kestrel	Desert Scrub	3
	Desert Scrub/P-J	1
	P-J/Sandstone Bedrock	1
	Sandstone Bedrock	2
American Robin	Desert Scrub	1
	Desert Scrub/P-J	4
	Oak P-J/Riparian	1
	Oak/Riparian	1
	Pinyon-Juniper	8
	P-J/Desert Scrub	3
	P-J/Shrub	2
	Ponderosa Pine	2
	Ponderosa Pine/P-J	3
	Riparian	18
Ash-throated Flycatcher	Agricultural	4
	Desert Scrub	6
	Desert Scrub/P-J	4
	Oak P-J/Riparian	3
	Oak/Riparian	4
	Pinyon-Juniper	69
	P-J/Desert Scrub	11
	P-J/Ponderosa Pine	3
	P-J/Sandstone Bedrock	9
	P-J/Shrub	4
	Ponderosa Pine	5
	Ponderosa Pine/Oak	1
	Ponderosa Pine/P-J	4
	Riparian	46
	Sandstone Bedrock	5
Bewick's Wren	Pinyon-Juniper	43
	P-J/Desert Scrub	15
	P-J/Sandstone Bedrock	6
	Ponderosa Pine/Oak	1
	Riparian	1

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Black-chinned Hummingbird	Oak P-J/Riparian	2
	Pinyon-Juniper	4
	P-J/Sandstone Bedrock	2
	P-J/Shrub	1
	Riparian	5
	Sandstone Bedrock	1
Black-headed Grosbeak	Desert Scrub	1
	Oak P-J/Riparian	2
	Pinyon-Juniper	1
	P-J/Shrub	3
	Riparian	15
	Sandstone Bedrock	2
Black-throated Gray Warbler	Desert Scrub	3
	Desert Scrub/P-J	2
	Oak/Riparian	1
	Pinyon-Juniper	59
	P-J/Desert Scrub	17
	P-J/Ponderosa Pine	5
	P-J/Sandstone Bedrock	3
	P-J/Shrub	1
	Ponderosa Pine	2
	Ponderosa Pine/Oak	3
	Ponderosa Pine/P-J	6
	Riparian	6
Blue Grosbeak	Agricultural	2
	Oak/Riparian	1
	Sandstone Bedrock	2
Blue-gray Gnatcatcher	Desert Scrub	2
	Desert Scrub/P-J	4
	Oak P-J/Riparian	2
	Pinyon-Juniper	9
	P-J/Desert Scrub	1
	P-J/Sandstone Bedrock	4
	P-J/Shrub	6
	Riparian	7
Brewer's Blackbird	Desert Scrub	2
	Desert Scrub/P-J	6
Brewer's Sparrow	Desert Scrub	5
	Desert Scrub/P-J	2

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Broad-tailed Hummingbird	Desert Scrub	1
	Desert Scrub/P-J	1
	P-J/Desert Scrub	1
Brown-headed Cowbird	Desert Scrub/P-J	1
	Pinyon-Juniper	2
Bullock's Oriole	Desert Scrub	2
	P-J/Sandstone Bedrock	1
	Riparian	1
	Sandstone Bedrock	2
Bushtit	Desert Scrub/P-J	2
	Oak P-J/Riparian	2
	Pinyon-Juniper	9
	P-J/Desert Scrub	3
	P-J/Sandstone Bedrock	5
	P-J/Shrub	2
	Riparian	7
Canyon Wren	Oak P-J/Riparian	1
	Pinyon-Juniper	2
	P-J/Sandstone Bedrock	2
	P-J/Shrub	4
	Riparian	4
Cassin's Kingbird	Pinyon-Juniper	1
Chipping Sparrow	Agricultural	1
	Desert Scrub	7
	Desert Scrub/P-J	6
	Oak P-J/Riparian	1
	Oak/Riparian	1
	Pinyon-Juniper	12
	P-J/Desert Scrub	16
	P-J/Ponderosa Pine	1
	P-J/Sandstone Bedrock	6
	Ponderosa Pine	2
	Ponderosa Pine/P-J	2
	Riparian	31
Cliff Swallow	Desert Scrub	16
	Desert Scrub/P-J	8
	Pinyon-Juniper	1
	P-J/Desert Scrub	2
	Riparian	3
	Sandstone Bedrock	7

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Clark's Nutcracker	Ponderosa Pine/P-J	1
Common Raven	Agricultural	3
	Desert Scrub	15
	Desert Scrub/P-J	3
	Oak P-J/Riparian	2
	Pinyon-Juniper	15
	P-J/Desert Scrub	7
	P-J/Ponderosa Pine	1
	P-J/Sandstone Bedrock	8
	P-J/Shrub	3
	Ponderosa Pine	1
	Ponderosa Pine/P-J	2
	Riparian	8
Common Yellowthroat	Desert Scrub	2
Cooper's Hawk	Pinyon-Juniper	1
Cordilleran Flycatcher	Riparian	1
Dark-eyed Junco	P-J/Ponderosa Pine	3
	Ponderosa Pine	3
	Ponderosa Pine/P-J	2
Dusky Flycatcher	Desert Scrub/P-J	2
	Pinyon-Juniper	1
Golden Eagle	Riparian	1
Grace's Warbler	P-J/Desert Scrub	1
	Ponderosa Pine	4
	Ponderosa Pine/Oak	1
Gray Flycatcher	Desert Scrub	2
	Pinyon-Juniper	39
	P-J/Desert Scrub	4
	P-J/Ponderosa Pine	1
	P-J/Sandstone Bedrock	6
	Ponderosa Pine/P-J	3
Gray Vireo	Pinyon-Juniper	8
	P-J/Desert Scrub	1
	P-J/Sandstone Bedrock	1
Green-tailed Towhee	Desert Scrub	11
	Desert Scrub/P-J	13

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Hairy Woodpecker	Oak/Riparian	1
	Pinyon-Juniper	2
	P-J/Ponderosa Pine	1
	P-J/Sandstone Bedrock	2
	P-J/Shrub	2
	Ponderosa Pine	4
	Riparian	4
Hermit Thrush	Pinyon-Juniper	2
	Ponderosa Pine	2
	Ponderosa Pine/Oak	1
Horned Lark	Desert Scrub	2
House Finch	Agricultural	2
	Desert Scrub	15
	Desert Scrub/P-J	1
	Oak P-J/Riparian	1
	Pinyon-Juniper	32
	P-J/Desert Scrub	17
	P-J/Sandstone Bedrock	9
	P-J/Shrub	3
	Riparian	16
	Sandstone Bedrock	5
House Sparrow	Desert Scrub	1
House Wren	Oak/Riparian	1
	Sandstone Bedrock	1
Juniper Titmouse	Pinyon-Juniper	29
	P-J/Desert Scrub	4
	P-J/Sandstone Bedrock	8
	Riparian	1
Lark Sparrow	Desert Scrub	13
	Desert Scrub/P-J	2
	Pinyon-Juniper	1
	P-J/Desert Scrub	3
	P-J/Sandstone Bedrock	1
Lazuli Bunting	Desert Scrub/P-J	2
	P-J/Shrub	1
Lesser Goldfinch	Agricultural	1
	Desert Scrub	1
	Desert Scrub/P-J	1
	Riparian	2
	Sandstone Bedrock	1

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Mountain Bluebird	Desert Scrub	13
	Desert Scrub/P-J	4
	Pinyon-Juniper	5
	P-J/Desert Scrub	7
	Ponderosa Pine/P-J	2
	Sandstone Bedrock	1
Mountain Chickadee	Desert Scrub/P-J	1
	Oak/Riparian	1
	Pinyon-Juniper	4
	P-J/Desert Scrub	5
	P-J/Ponderosa Pine	4
	Ponderosa Pine	2
	Ponderosa Pine/Oak	3
	Ponderosa Pine/P-J	2
	Riparian	1
Mourning Dove	Agricultural	1
	Desert Scrub	4
	Desert Scrub/P-J	7
	Oak P-J/Riparian	1
	Pinyon-Juniper	15
	P-J/Desert Scrub	6
	P-J/Sandstone Bedrock	9
	P-J/Shrub	2
	Ponderosa Pine/P-J	2
	Riparian	14
	Sandstone Bedrock	1
Northern Flicker	Desert Scrub	1
	Desert Scrub/P-J	3
	Pinyon-Juniper	3
	P-J/Sandstone Bedrock	1
	P-J/Shrub	2
	Ponderosa Pine	1
	Ponderosa Pine/Oak	5
	Ponderosa Pine/P-J	1
Northern Mockingbird	Desert Scrub	2
	Pinyon-Juniper	5
	P-J/Desert Scrub	3
	P-J/Sandstone Bedrock	2
	Sandstone Bedrock	1
Northern Pygmy-Owl	Desert Scrub/P-J	1
	Pinyon-Juniper	1
	Ponderosa Pine/P-J	1

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Olive-sided Flycatcher	P-J/Ponderosa Pine	1
Orange-crowned Warbler	P-J/Shrub	1
Peregrine Falcon	Oak P-J/Riparian	1
	P-J/Shrub	1
	Riparian	1
Pine Siskin	P-J/Desert Scrub	1
Pinyon Jay	Desert Scrub	8
	Desert Scrub/P-J	18
	Pinyon-Juniper	27
	P-J/Desert Scrub	15
	P-J/Ponderosa Pine	3
	P-J/Sandstone Bedrock	4
	P-J/Shrub	1
	Ponderosa Pine	1
	Riparian	1
Plumbeous Vireo	Desert Scrub/P-J	3
	Oak/Riparian	1
	Pinyon-Juniper	5
	P-J/Desert Scrub	2
	P-J/Shrub	3
	Ponderosa Pine	7
	Riparian	18
Pygmy Nuthatch	Desert Scrub/P-J	1
	P-J/Ponderosa Pine	2
	Ponderosa Pine	6
	Ponderosa Pine/Oak	2
	Ponderosa Pine/P-J	5
Red-breasted Nuthatch	Pinyon-Juniper	1
Red-tailed Hawk	Pinyon-Juniper	1
	P-J/Sandstone Bedrock	1
Red-winged Blackbird	Riparian	1
Rock Dove	Desert Scrub	3
Rock Wren	Agricultural	3
	Desert Scrub	5
	Desert Scrub/P-J	11
	Oak P-J/Riparian	1
	Pinyon-Juniper	9

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Rock Wren (continued)	P-J/Desert Scrub	2
	P-J/Sandstone Bedrock	11
	P-J/Shrub	5
	Riparian	4
	Sandstone Bedrock	2
Sage Thrasher	Desert Scrub	2
Say's Phoebe	Agricultural	2
	Desert Scrub	4
	Desert Scrub/P-J	1
	P-J/Sandstone Bedrock	3
	P-J/Shrub	3
	Riparian	3
	Sandstone Bedrock	2
Spotted Towhee	Desert Scrub	6
	Desert Scrub/P-J	5
	Oak P-J/Riparian	6
	Pinyon-Juniper	3
	P-J/Desert Scrub	9
	P-J/Shrub	3
	Ponderosa Pine	2
	Ponderosa Pine/Oak	3
	Ponderosa Pine/P-J	2
	Riparian	51
	Sandstone Bedrock	1
Steller's Jay	Pinyon-Juniper	4
	P-J/Shrub	1
	Ponderosa Pine/Oak	1
	Ponderosa Pine/P-J	4
Townsend's Solitaire	Desert Scrub/P-J	1
	P-J/Ponderosa Pine	1
	Ponderosa Pine/P-J	7
Turkey Vulture	Desert Scrub	1
	P-J/Sandstone Bedrock	2
	Sandstone Bedrock	1
Vesper Sparrow	Desert Scrub	46
	Desert Scrub/P-J	20
	Pinyon-Juniper	1
	P-J/Desert Scrub	3

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Violet-green Swallow	Desert Scrub	7
	Desert Scrub/P-J	3
	Pinyon-Juniper	30
	P-J/Desert Scrub	9
	P-J/Ponderosa Pine	1
	P-J/Sandstone Bedrock	14
	Ponderosa Pine	3
	Ponderosa Pine/P-J	1
	Riparian	4
	Sandstone Bedrock	8
Virginia's Warbler	Oak/Riparian	3
	Pinyon-Juniper	3
	P-J/Sandstone Bedrock	1
	P-J/Shrub	2
	Ponderosa Pine	3
	Ponderosa Pine/Oak	3
	Riparian	22
Warbling Vireo	Oak P-J/Riparian	1
	Oak/Riparian	4
	P-J/Shrub	7
	Riparian	34
	Sandstone Bedrock	1
Western Bluebird	Desert Scrub	1
	Pinyon-Juniper	2
	P-J/Desert Scrub	1
	Ponderosa Pine	7
	Riparian	4
Western Meadowlark	Desert Scrub	15
	Desert Scrub/P-J	3
	P-J/Desert Scrub	1
Western Scrub Jay	Desert Scrub	5
	Pinyon-Juniper	10
	P-J/Desert Scrub	4
	P-J/Sandstone Bedrock	4
	P-J/Shrub	2
	Riparian	4
	Sandstone Bedrock	1
Western Tanager	Agricultural	1
	Desert Scrub	3
	Oak P-J/Riparian	2
	Oak/Riparian	1
	Pinyon-Juniper	4

Table 7. continued.

Common Name	Habitat Type	Number of Individuals
Western Tanager (continued)	P-J/Desert Scrub	2
	P-J/Ponderosa Pine	1
	P-J/Sandstone Bedrock	1
	P-J/Shrub	2
	Ponderosa Pine	3
	Ponderosa Pine/P-J	1
	Riparian	16
Western Wood-Pewee	Pinyon-Juniper	1
	P-J/Ponderosa Pine	1
	Riparian	1
	Sandstone Bedrock	1
White-breasted Nuthatch	Desert Scrub	1
	Desert Scrub/P-J	2
	Pinyon-Juniper	9
	P-J/Desert Scrub	2
	P-J/Ponderosa Pine	6
	Ponderosa Pine	7
	Ponderosa Pine/P-J	1
	Riparian	2
White-crowned Sparrow	Riparian	1
White-throated Swift	Desert Scrub	15
	Desert Scrub/P-J	1
	Oak/Riparian	1
	Pinyon-Juniper	32
	P-J/Desert Scrub	8
	P-J/Sandstone Bedrock	37
	P-J/Shrub	12
	Riparian	11
	Sandstone Bedrock	2
	Pinyon-Juniper	1
Wild Turkey	P-J/Desert Scrub	1
	P-J/Ponderosa Pine	1
	Ponderosa Pine	2
	Desert Scrub/P-J	1
	Sandstone Bedrock	1
Williamson's Sapsucker	Desert Scrub/P-J	1
Wilson's Warbler	Sandstone Bedrock	1
Yellow-breasted Chat	Riparian	6
Yellow-rumped Warbler	Desert Scrub/P-J	1
	Pinyon-Juniper	2
	P-J/Desert Scrub	3
	Sandstone Bedrock	1

Table 8. Number of individuals of each bird species found in each habitat at Canyon de Chelly National Monument, along with their nesting substrate, foraging guild and residency status.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
<hr/>					
Agricultural	11 species	1 PCS	(Percent Cover = 5.0; Mean Height = 1.0)		
	American Crow	1	Foliage	Ground	Permanent
	Ash-throated Flycatcher	4	Cavity	Sallying	Summer
	Blue Grosbeak	2	Foliage	Foliage Gleaning	Summer
	Chipping Sparrow	1	Foliage	Ground	Summer
	Common Raven	3	Ledge	Predator/Scavenger	Permanent
	House Finch	2	Foliage	Foliage Gleaning	Permanent
	Lesser Goldfinch	1	Foliage	Foliage Gleaning	Summer
	Mourning Dove	1	Foliage	Ground	Summer
	Rock Wren	3	Ledge	Ground	Summer
	Say's Phoebe	2	Ledge	Sallying	Summer
	Western Tanager	1	Foliage	Foliage Gleaning	Summer
Desert Scrub	41 species	16 PCSs	(Percent Cover = 15.4; Mean Height = 1.1)		
	American Crow	5	Foliage	Ground	Permanent
	American Kestrel	3	Cavity/Ledge	Predator/Scavenger	Permanent
	American Robin	1	Foliage	Ground	Permanent
	Ash-throated Flycatcher	6	Cavity	Sallying	Summer
	Black-headed Grosbeak	1	Foliage	Foliage Gleaning	Summer
	Black-throated Gray Warbler	3	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	2	Foliage	Foliage Gleaning	Summer
	Brewer's Blackbird	2	Ground	Ground	Summer
	Brewer's Sparrow	5	Foliage	Ground	Summer
	Broad-tailed Hummingbird	1	Foliage	Nectar	Summer
	Bullock's Oriole	2	Foliage	Foliage Gleaning	Summer
	Chipping Sparrow	7	Foliage	Ground	Summer
	Cliff Swallow	16	Ledge	Aerial	Summer
	Common Raven	15	Ledge	Predator/Scavenger	Permanent
	Common Yellowthroat	2	Foliage	Foliage Gleaning	Summer
	Gray Flycatcher	2	Foliage	Sallying	Summer
	Green-tailed Towhee	11	Ground	Ground	Summer
	Horned Lark	2	Ground	Ground	Permanent
	House Finch	15	Foliage	Foliage Gleaning	Permanent
	House Sparrow	1	Cavity	Ground	Permanent
	Lark Sparrow	13	Ground	Ground	Summer
	Lesser Goldfinch	1	Foliage	Foliage Gleaning	Summer
	Mountain Bluebird	13	Cavity	Ground	Permanent
	Mourning Dove	4	Foliage	Ground	Summer
	Northern Flicker	1	Cavity	Bark Gleaning	Permanent
	Northern Mockingbird	2	Foliage	Ground	Summer
	Pinyon Jay	8	Foliage	Ground	Permanent

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
Desert Scrub (continued)					
	Rock Dove	3	Ledge	Ground	Permanent
	Rock Wren	5	Ledge	Ground	Summer
	Sage Thrasher	2	Foliage	Ground	Summer
	Say's Phoebe	4	Ledge	Sallying	Summer
	Spotted Towhee	6	Ground	Ground	Permanent
	Turkey Vulture	1	Ledge	Predator/Scavenger	Summer
	Vesper Sparrow	46	Ground	Ground	Summer
	Violet-green Swallow	7	Ledge	Aerial	Summer
	Western Bluebird	1	Cavity	Ground	Permanent
	Western Meadowlark	15	Ground	Ground	Summer
	Western Scrub Jay	5	Foliage	Ground	Permanent
	Western Tanager	3	Foliage	Foliage Gleaning	Summer
	White-breasted Nuthatch	1	Cavity	Bark Gleaning	Permanent
	White-throated Swift	15	Ledge	Aerial	Summer
Desert Scrub/P-J	39 species	7 PCSs	(Percent Cover = 20.0; Mean Height = 2.1)		
	American Crow	1	Foliage	Ground	Permanent
	American Kestrel	1	Cavity/Ledge	Predator/Scavenger	Permanent
	American Robin	4	Foliage	Ground	Permanent
	Ash-throated Flycatcher	4	Cavity	Sallying	Summer
	Black-throated Gray Warbler	2	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	4	Foliage	Foliage Gleaning	Summer
	Brewer's Blackbird	6	Ground	Ground	Summer
	Brewer's Sparrow	2	Foliage	Ground	Summer
	Broad-tailed Hummingbird	1	Foliage	Nectar	Summer
	Brown-headed Cowbird	1	Foliage	Ground	Summer
	Bushtit	2	Foliage	Foliage Gleaning	Permanent
	Chipping Sparrow	6	Foliage	Ground	Summer
	Cliff Swallow	8	Ledge	Aerial	Summer
	Common Raven	3	Ledge	Predator/Scaveng	Permanent
	Dusky Flycatcher	2	Foliage	Sallying	Summer
	Green-tailed Towhee	13	Ground	Ground	Summer
	House Finch	1	Foliage	Foliage Gleaning	Permanent
	Lark Sparrow	2	Ground	Ground	Summer
	Lazuli Bunting	2	Foliage	Ground	Summer
	Lesser Goldfinch	1	Foliage	Foliage Gleaning	Summer
	Mountain Bluebird	4	Cavity	Ground	Permanent
	Mountain Chickadee	1	Cavity	Foliage Gleaning	Permanent
	Mourning Dove	7	Foliage	Ground	Summer
	Northern Flicker	3	Cavity	Bark Gleaning	Permanent
	Northern Pygmy-Owl	1	Cavity	Predator/Scavenger	Permanent
	Pinyon Jay	18	Foliage	Ground	Permanent
	Plumbeous Vireo	3	Foliage	Foliage Gleaning	Summer
	Pygmy Nuthatch	1	Cavity	Bark Gleaning	Permanent

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
Desert Scrub/P-J (continued)					
	Rock Wren	11	Ledge	Ground	Summer
	Say's Phoebe	1	Ledge	Sallying	Summer
	Spotted Towhee	5	Ground	Ground	Permanent
	Townsend's Solitaire	1	Ledge	Foliage Gleaning	Permanent
	Vesper Sparrow	20	Ground	Ground	Summer
	Violet-green Swallow	3	Ledge	Aerial	Summer
	Western Meadowlark	3	Ground	Ground	Summer
	White-breasted Nuthatch	2	Cavity	Bark Gleaning	Permanent
	White-throated Swift	1	Ledge	Aerial	Summer
	Williamson's Sapsucker	1	Cavity	Bark Gleaning	Permanent
	Yellow-rumped Warbler	1	Foliage	Foliage Gleaning	Permanent
Oak P-J/Riparian 16 species 1 PCS (Percent Cover = 25.0; Mean Height = 2.0)					
	American Robin	1	Foliage	Ground	Permanent
	Ash-throated Flycatcher	3	Cavity	Sallying	Summer
	Black-chinned Hummingbird	2	Foliage	Nectar	Summer
	Black-headed Grosbeak	2	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	2	Foliage	Foliage Gleaning	Summer
	Bushtit	1	Foliage	Foliage Gleaning	Permanent
	Canyon Wren	1	Ledge	Ground	Permanent
	Chipping Sparrow	1	Foliage	Ground	Summer
	Common Raven	2	Ledge	Predator/Scavenger	Permanent
	House Finch	1	Foliage	Foliage Gleaning	Permanent
	Mourning Dove	1	Foliage	Ground	Summer
	Peregrine Falcon	1	Ledge	Predator/Scavenger	Summer
	Rock Wren	1	Ledge	Ground	Summer
	Spotted Towhee	6	Ground	Ground	Permanent
	Warbling Vireo	1	Foliage	Foliage Gleaning	Summer
	Western Tanager	2	Foliage	Foliage Gleaning	Summer
Oak/Riparian 13 species 1 PCS (Percent Cover = 35.0; Mean Height = 4.0)					
	American Robin	1	Foliage	Ground	Permanent
	Ash-throated Flycatcher	4	Cavity	Sallying	Summer
	Black-throated Gray Warbler	1	Foliage	Foliage Gleaning	Summer
	Blue Grosbeak	1	Foliage	Foliage Gleaning	Summer
	Chipping Sparrow	1	Foliage	Ground	Summer
	Hairy Woodpecker	1	Cavity	Bark Gleaning	Permanent
	House Wren	1	Cavity	Foliage Gleaning	Summer
	Mountain Chickadee	1	Cavity	Foliage Gleaning	Permanent
	Plumbeous Vireo	1	Foliage	Foliage Gleaning	Summer
	Virginia's Warbler	3	Ground	Foliage Gleaning	Summer
	Warbling Vireo	4	Foliage	Foliage Gleaning	Summer
	Western Tanager	1	Foliage	Foliage Gleaning	Summer
	White-throated Swift	1	Ledge	Aerial	Summer

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
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Pinyon-Juniper	47 species	27 PCSs	(Percent Cover = 20.4; Mean Height = 3.2)		
	American Robin	8	Foliage	Ground	Permanent
	Ash-throated Flycatcher	69	Cavity	Sallying	Summer
	Bewick's Wren	43	Cavity	Foliage Gleaning	Permanent
	Black-chinned Hummingbird	4	Foliage	Nectar	Summer
	Black-headed Grosbeak	1	Foliage	Foliage Gleaning	Summer
	Black-throated Gray Warbler	59	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	9	Foliage	Foliage Gleaning	Summer
	Brown-headed Cowbird	2	Foliage	Ground	Summer
	Bushtit	9	Foliage	Foliage Gleaning	Permanent
	Canyon Wren	2	Ledge	Ground	Permanent
	Cassin's Kingbird	1	Foliage	Sallying	Summer
	Chipping Sparrow	12	Foliage	Ground	Summer
	Cliff Swallow	1	Ledge	Aerial	Summer
	Common Raven	15	Ledge	Predator/Scavenger	Permanent
	Cooper's Hawk	1	Foliage	Predator/Scavenger	Permanent
	Dusky Flycatcher	1	Foliage	Sallying	Summer
	Gray Flycatcher	39	Foliage	Sallying	Summer
	Gray Vireo	8	Foliage	Foliage Gleaning	Summer
	Hairy Woodpecker	2	Cavity	Bark Gleaning	Permanent
	Hermit Thrush	2	Foliage	Ground	Permanent
	House Finch	32	Foliage	Foliage Gleaning	Permanent
	Juniper Titmouse	29	Cavity	Foliage Gleaning	Permanent
	Lark Sparrow	1	Ground	Ground	Summer
	Mountain Bluebird	5	Cavity	Ground	Permanent
	Mountain Chickadee	4	Cavity	Foliage Gleaning	Permanent
	Mourning Dove	15	Foliage	Ground	Summer
	Northern Flicker	3	Cavity	Bark Gleaning	Permanent
	Northern Mockingbird	5	Foliage	Ground	Summer
	Northern Pygmy-Owl	1	Cavity	Predator/Scavenger	Permanent
	Pinyon Jay	27	Foliage	Ground	Permanent
	Plumbeous Vireo	5	Foliage	Foliage Gleaning	Summer
	Red-breasted Nuthatch	1	Cavity	Bark Gleaning	Permanent
	Red-tailed Hawk	1	Ledge	Predator/Scavenger	Permanent
	Rock Wren	9	Ledge	Ground	Summer
	Spotted Towhee	3	Ground	Ground	Permanent
	Steller's Jay	4	Foliage	Ground	Permanent
	Vesper Sparrow	1	Ground	Ground	Summer
	Violet-green Swallow	30	Ledge	Aerial	Summer
	Virginia's Warbler	3	Ground	Foliage Gleaning	Summer
	Western Bluebird	2	Cavity	Ground	Permanent
	Western Scrub Jay	10	Foliage	Ground	Permanent
	Western Tanager	4	Foliage	Foliage Gleaning	Summer
	Western Wood-Pewee	1	Foliage	Sallying	Summer
	White-breasted Nuthatch	9	Cavity	Bark Gleaning	Permanent
	White-throated Swift	32	Ledge	Aerial	Summer
	Wild Turkey	1	Ground	Ground	Permanent
	Yellow-rumped Warbler	2	Foliage	Foliage Gleaning	Permanent

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
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P-J/Desert Scrub	36 species	8 PCSs	(Percent Cover = 18.8; Mean Height = 2.6)		
	American Crow	1	Foliage	Ground	Permanent
	American Robin	3	Foliage	Ground	Permanent
	Ash-throated Flycatcher	11	Cavity	Sallying	Summer
	Bewick's Wren	15	Cavity	Foliage Gleaning	Permanent
	Black-throated Gray Warbler	17	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	1	Foliage	Foliage Gleaning	Summer
	Broad-tailed Hummingbird	1	Foliage	Nectar	Summer
	Bushtit	3	Foliage	Foliage Gleaning	Permanent
	Chipping Sparrow	16	Foliage	Ground	Summer
	Cliff Swallow	2	Ledge	Aerial	Summer
	Common Raven	7	Ledge	Predator/Scavenger	Permanent
	Grace's Warbler	1	Foliage	Foliage Gleaning	Summer
	Gray Flycatcher	4	Foliage	Sallying	Summer
	Gray Vireo	1	Foliage	Foliage Gleaning	Summer
	House Finch	17	Foliage	Foliage Gleaning	Permanent
	Juniper Titmouse	4	Cavity	Foliage Gleaning	Permanent
	Lark Sparrow	3	Ground	Ground	Summer
	Mountain Bluebird	7	Cavity	Ground	Permanent
	Mountain Chickadee	5	Cavity	Foliage Gleaning	Permanent
	Mourning Dove	6	Foliage	Ground	Summer
	Northern Mockingbird	3	Foliage	Ground	Summer
	Pine Siskin	1	Foliage	Foliage Gleaning	Permanent
	Pinyon Jay	15	Foliage	Ground	Permanent
	Plumbeous Vireo	2	Foliage	Foliage Gleaning	Summer
	Rock Wren	2	Ledge	Ground	Summer
	Spotted Towhee	9	Ground	Ground	Permanent
	Vesper Sparrow	3	Ground	Ground	Summer
	Violet-green Swallow	9	Ledge	Aerial	Summer
	Western Bluebird	1	Cavity	Ground	Permanent
	Western Meadowlark	1	Ground	Ground	Summer
	Western Scrub Jay	4	Foliage	Ground	Permanent
	Western Tanager	2	Foliage	Foliage Gleaning	Summer
	White-breasted Nuthatch	2	Cavity	Bark Gleaning	Permanent
	White-throated Swift	8	Ledge	Aerial	Summer
	Wild Turkey	1	Ground	Ground	Permanent
	Yellow-rumped Warbler	3	Foliage	Foliage Gleaning	Permanent
P-J/Ponderosa Pine	17 species	2 PCSs	(Percent Cover = 30.0; Mean Height = 6.5)		
	Ash-throated Flycatcher	3	Cavity	Sallying	Summer
	Black-throated Gray Warbler	5	Foliage	Foliage Gleaning	Summer
	Chipping Sparrow	1	Foliage	Ground	Summer
	Common Raven	1	Ledge	Predator/Scavenger	Permanent
	Dark-eyed Junco	3	Ground	Ground	Permanent
	Gray Flycatcher	1	Foliage	Sallying	Summer
	Hairy Woodpecker	1	Cavity	Bark Gleaning	Permanent

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
P-J/Ponderosa Pine (Continued)					
	Mountain Chickadee	4	Cavity	Foliage Gleaning	Permanent
	Olive-sided Flycatcher	1	N/A	Sallying	Migrant
	Pinyon Jay	3	Foliage	Ground	Permanent
	Pygmy Nuthatch	2	Cavity	Bark Gleaning	Permanent
	Townsend's Solitaire	1	Ledge	Foliage Gleaning	Permanent
	Violet-green Swallow	1	Ledge	Aerial	Summer
	Western Tanager	1	Foliage	Foliage Gleaning	Summer
	Western Wood-Pewee	1	Foliage	Sallying	Summer
	White-breasted Nuthatch	6	Cavity	Bark Gleaning	Permanent
	Wild Turkey	1	Ground	Ground	Permanent
P-J/Sandstone Bedrock 31 species 7 PCSs (Percent Cover = 11.4; Mean Height = 1.9)					
	American Kestrel	1	Cavity/Ledge	Predator/Scavenger	Permanent
	Ash-throated Flycatcher	9	Cavity	Sallying	Summer
	Bewick's Wren	6	Cavity	Foliage Gleaning	Permanent
	Black-chinned Hummingbird	2	Foliage	Nectar	Summer
	Black-throated Gray Warbler	3	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	4	Foliage	Foliage Gleaning	Summer
	Bullock's Oriole	1	Foliage	Foliage Gleaning	Summer
	Bushtit	5	Foliage	Foliage Gleaning	Permanent
	Canyon Wren	2	Ledge	Ground	Permanent
	Chipping Sparrow	6	Foliage	Ground	Summer
	Common Raven	8	Ledge	Predator/Scavenger	Permanent
	Gray Flycatcher	6	Foliage	Sallying	Summer
	Gray Vireo	1	Foliage	Foliage Gleaning	Summer
	Hairy Woodpecker	2	Cavity	Bark Gleaning	Permanent
	House Finch	9	Foliage	Foliage Gleaning	Permanent
	Juniper Titmouse	8	Cavity	Foliage Gleaning	Permanent
	Lark Sparrow	1	Ground	Ground	Summer
	Mourning Dove	9	Foliage	Ground	Summer
	Northern Flicker	1	Cavity	Bark Gleaning	Permanent
	Northern Mockingbird	2	Foliage	Ground	Summer
	Pinyon Jay	4	Foliage	Ground	Permanent
	Red-tailed Hawk	1	Ledge	Predator/Scavenger	Permanent
	Rock Wren	11	Ledge	Ground	Summer
	Say's Phoebe	3	Ledge	Sallying	Summer
	Turkey Vulture	2	Ledge	Predator/Scavenger	Summer
	Violet-green Swallow	14	Ledge	Aerial	Summer
	Virginia's Warbler	1	Ground	Foliage Gleaning	Summer
	Western Scrub Jay	4	Foliage	Ground	Permanent
	Western Tanager	1	Foliage	Foliage Gleaning	Summer
	White-throated Swift	37	Ledge	Aerial	Summer
	Yellow-rumped Warbler	1	Foliage	Foliage Gleaning	Permanent

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
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P-J/Shrub	27 species	3 PCSs	(Percent Cover = 18.3; Mean Height = 2.3)		
	American Robin	2	Foliage	Ground	Permanent
	Ash-throated Flycatcher	4	Cavity	Sallying	Summer
	Black-chinned Hummingbird	1	Foliage	Nectar	Summer
	Black-headed Grosbeak	3	Foliage	Foliage Gleaning	Summer
	Black-throated Gray Warbler	1	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	6	Foliage	Foliage Gleaning	Summer
	Bushtit	2	Foliage	Foliage Gleaning	Permanent
	Canyon Wren	4	Ledge	Ground	Permanent
	Common Raven	3	Ledge	Predator/Scavenger	Permanent
	Hairy Woodpecker	2	Cavity	Bark Gleaning	Permanent
	House Finch	3	Foliage	Foliage Gleaning	Permanent
	Lazuli Bunting	1	Foliage	Ground	Summer
	Mourning Dove	2	Foliage	Ground	Summer
	Northern Flicker	2	Cavity	Bark Gleaning	Permanent
	Orange-crowned Warbler	1	N/A	Foliage Gleaning	Migrant
	Peregrine Falcon	1	Ledge	Predator/Scavenger	Summer
	Pinyon Jay	1	Foliage	Ground	Permanent
	Plumbeous Vireo	3	Foliage	Foliage Gleaning	Summer
	Rock Wren	5	Ledge	Ground	Summer
	Say's Phoebe	3	Ledge	Sallying	Summer
	Spotted Towhee	3	Ground	Ground	Permanent
	Steller's Jay	1	Foliage	Ground	Permanent
	Virginia's Warbler	2	Ground	Foliage Gleaning	Summer
	Warbling Vireo	7	Foliage	Foliage Gleaning	Summer
	Western Scrub Jay	2	Foliage	Ground	Permanent
	Western Tanager	2	Foliage	Foliage Gleaning	Summer
	White-throated Swift	12	Ledge	Aerial	Summer
Ponderosa Pine	21 species	2 PCSs	(Percent Cover = 20.0; Mean Height = 8.0)		
	American Robin	2	Foliage	Ground	Permanent
	Ash-throated Flycatcher	6	Cavity	Sallying	Summer
	Black-throated Gray Warbler	2	Foliage	Foliage Gleaning	Summer
	Chipping Sparrow	2	Foliage	Ground	Summer
	Common Raven	1	Ledge	Predator/Scavenger	Permanent
	Dark-eyed Junco	3	Ground	Ground	Permanent
	Grace's Warbler	4	Foliage	Foliage Gleaning	Summer
	Hairy Woodpecker	4	Cavity	Bark Gleaning	Permanent
	Hermit Thrush	2	Foliage	Ground	Permanent
	Mountain Chickadee	2	Cavity	Foliage Gleaning	Permanent
	Northern Flicker	1	Cavity	Bark Gleaning	Permanent
	Pinyon Jay	1	Foliage	Ground	Permanent
	Plumbeous Vireo	7	Foliage	Foliage Gleaning	Summer
	Pygmy Nuthatch	6	Cavity	Bark Gleaning	Permanent
	Spotted Towhee	2	Ground	Ground	Permanent

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
Ponderosa Pine (continued)					
	Violet-green Swallow	3	Ledge	Aerial	Summer
	Virginia's Warbler	3	Ground	Foliage Gleaning	Summer
	Western Bluebird	7	Cavity	Ground	Permanent
	Western Tanager	3	Foliage	Foliage Gleaning	Summer
	White-breasted Nuthatch	7	Cavity	Bark Gleaning	Permanent
	Wild Turkey	1	Ground	Ground	Permanent
Ponderosa Pine/Oak 11 species 1 PCS (Percent Cover = 30.0; Mean Height = 6.0)					
	Ash-throated Flycatcher	1	Cavity	Sallying	Summer
	Bewick's Wren	1	Cavity	Foliage Gleaning	Permanent
	Black-throated Gray Warbler	3	Foliage	Foliage Gleaning	Summer
	Grace's Warbler	1	Foliage	Foliage Gleaning	Summer
	Hermit Thrush	1	Foliage	Ground	Permanent
	Mountain Chickadee	3	Cavity	Foliage Gleaning	Permanent
	Northern Flicker	5	Cavity	Bark Gleaning	Permanent
	Pygmy Nuthatch	2	Cavity	Bark Gleaning	Permanent
	Spotted Towhee	3	Ground	Ground	Permanent
	Steller's Jay	1	Foliage	Ground	Permanent
	Virginia's Warbler	1	Ground	Foliage Gleaning	Summer
Ponderosa Pine/P-J 20 species 2 PCSs (Percent Cover = 25.0; Mean Height = 7.5)					
	American Robin	3	Foliage	Ground	Permanent
	Ash-throated Flycatcher	4	Cavity	Sallying	Summer
	Black-throated Gray Warbler	6	Foliage	Foliage Gleaning	Summer
	Chipping Sparrow	2	Foliage	Ground	Summer
	Clark's Nutcracker	1	Foliage	Ground	Permanent
	Common Raven	2	Ledge	Predator/Scavenger	Permanent
	Dark-eyed Junco	2	Ground	Ground	Permanent
	Gray Flycatcher	3	Foliage	Sallying	Summer
	Mountain Bluebird	2	Cavity	Ground	Permanent
	Mountain Chickadee	2	Cavity	Foliage Gleaning	Permanent
	Mourning Dove	2	Foliage	Ground	Summer
	Northern Flicker	1	Cavity	Bark Gleaning	Permanent
	Northern Pygmy-Owl	1	Cavity	Predator/Scavenger	Permanent
	Pygmy Nuthatch	5	Cavity	Bark Gleaning	Permanent
	Spotted Towhee	2	Ground	Ground	Permanent
	Steller's Jay	4	Foliage	Ground	Permanent
	Townsend's Solitaire	7	Ledge	Foliage Gleaning	Permanent
	Violet-green Swallow	1	Ledge	Aerial	Summer
	Western Tanager	1	Foliage	Foliage Gleaning	Summer
	White-breasted Nuthatch	1	Cavity	Bark Gleaning	Permanent

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
Riparian	39 species	13 PCSs	(Percent Cover = 35.0; Mean Height = 4.5)		
	American Robin	18	Foliage	Ground	Permanent
	Ash-throated Flycatcher	46	Cavity	Sallying	Summer
	Bewick's Wren	1	Cavity	Foliage Gleaning	Permanent
	Black-chinned Hummingbird	5	Foliage	Nectar	Summer
	Black-headed Grosbeak	15	Foliage	Foliage Gleaning	Summer
	Black-throated Gray Warbler	6	Foliage	Foliage Gleaning	Summer
	Blue-gray Gnatcatcher	7	Foliage	Foliage Gleaning	Summer
	Bullock's Oriole	1	Foliage	Foliage Gleaning	Summer
	Bushtit	7	Foliage	Foliage Gleaning	Permanent
	Canyon Wren	4	Ledge	Ground	Permanent
	Chipping Sparrow	31	Foliage	Ground	Summer
	Cliff Swallow	3	Ledge	Aerial	Summer
	Common Raven	8	Ledge	Predator/Scavenger	Permanent
	Cordilleran Flycatcher	1	Ledge	Sallying	Summer
	Golden Eagle	1	Ledge	Predator/Scavenger	Permanent
	Hairy Woodpecker	4	Cavity	Bark Gleaning	Permanent
	House Finch	16	Foliage	Foliage Gleaning	Permanent
	Juniper Titmouse	1	Cavity	Foliage Gleaning	Permanent
	Lesser Goldfinch	2	Foliage	Foliage Gleaning	Summer
	Mountain Chickadee	1	Cavity	Foliage Gleaning	Permanent
	Mourning Dove	13	Foliage	Ground	Summer
	Peregrine Falcon	1	Ledge	Predator/Scavenger	Summer
	Pinyon Jay	1	Foliage	Ground	Permanent
	Plumbeous Vireo	18	Foliage	Foliage Gleaning	Summer
	Red-winged Blackbird	1	Foliage	Ground	Summer
	Rock Wren	4	Ledge	Ground	Summer
	Say's Phoebe	3	Ledge	Sallying	Summer
	Spotted Towhee	51	Ground	Ground	Permanent
	Violet-green Swallow	4	Ledge	Aerial	Summer
	Virginia's Warbler	22	Ground	Foliage Gleaning	Summer
	Warbling Vireo	34	Foliage	Foliage Gleaning	Summer
	Western Bluebird	4	Cavity	Ground	Permanent
	Western Scrub Jay	4	Foliage	Ground	Permanent
	Western Tanager	16	Foliage	Foliage Gleaning	Summer
	Western Wood-Pewee	1	Foliage	Sallying	Summer
	White-breasted Nuthatch	2	Cavity	Bark Gleaning	Permanent
	White-crowned Sparrow	1	N/A	Ground	Winter
	White-throated Swift	10	Ledge	Aerial	Summer
	Yellow-breasted Chat	5	Foliage	Foliage Gleaning	Summer

Table 8. continued.

Habitat	Species	Number	Nest Substrate	Foraging Guild	Resident Status
<hr/>					
Sandstone Bedrock	25 species	3 PCSs	(Percent Cover = 6.0; Mean Height = 0.7)		
	American Crow	3	Foliage	Ground	Permanent
	American Kestrel	2	Cavity/Ledge	Predator/Scavenger	Permanent
	Ash-throated Flycatcher	5	Cavity	Sallying	Summer
	Black-chinned Hummingbird	1	Foliage	Nectar	Summer
	Black-headed Grosbeak	2	Foliage	Foliage Gleaning	Summer
	Blue Grosbeak	3	Foliage	Foliage Gleaning	Summer
	Bullock's Oriole	2	Foliage	Foliage Gleaning	Summer
	Cliff Swallow	7	Ledge	Aerial	Summer
	Hairy Woodpecker	1	Cavity	Bark Gleaning	Permanent
	House Finch	5	Foliage	Foliage Gleaning	Permanent
	House Wren	1	Cavity	Foliage Gleaning	Summer
	Lesser Goldfinch	1	Foliage	Foliage Gleaning	Summer
	Mountain Bluebird	1	Cavity	Ground	Permanent
	Mourning Dove	2	Foliage	Ground	Summer
	Northern Mockingbird	1	Foliage	Ground	Summer
	Rock Wren	2	Ledge	Ground	Summer
	Say's Phoebe	2	Ledge	Sallying	Summer
	Spotted Towhee	1	Ground	Ground	Permanent
	Turkey Vulture	1	Ledge	Predator/Scavenger	Summer
	Violet-green Swallow	9	Ledge	Aerial	Summer
	Warbling Vireo	1	Foliage	Foliage Gleaning	Summer
	Western Scrub Jay	1	Foliage	Ground	Permanent
	Western Wood-Pewee	1	Foliage	Sallying	Summer
	White-throated Swift	3	Ledge	Aerial	Summer
	Wilson's Warbler	1	N/A	Foliage Gleaning	Migrant

Table 9. Birds detected during winter Area Searches at random patches of riparian habitat Canyon de Chelly National Monument.

SPECIES	Patch Number - 16 December 2003					Patch Number - 17 December 2003						Number Birds	Number Patches
	1	2	3	4	5	1	2	3	4	5	6		
Sharp-shinned Hawk	0	1	0	0	1	0	0	0	0	0	0	2	2
Red-tailed Hawk	0	0	0	1	0	0	0	0	0	0	0	1	1
Red-naped Sapsucker	0	0	1	0	0	0	0	0	0	0	0	1	1
Northern Flicker	3	6	9	1	8	4	6	12	0	13	0	37	9
Steller's Jay	1	0	0	0	0	0	0	0	0	0	0	1	1
Western Scrub-Jay	0	3	4	0	0	0	1	0	0	2	0	10	4
American Crow	0	0	3	0	0	0	0	0	0	0	50	53	2
Common Raven	5	2	15	0	0	0	0	0	0	0	42	64	4
Mountain Chickadee	2	0	1	1	2	0	2	6	1	2	0	17	8
Juniper Titmouse	0	0	0	0	0	0	0	0	0	2	0	2	1
Bushtit	11	0	0	0	0	0	10	0	0	1	0	22	3
White-breasted Nuthatch	0	0	0	1	0	1	0	0	0	0	0	2	2
Brown Creeper	0	0	0	0	0	0	0	1	0	0	0	1	1
Canyon Wren	0	0	1	0	0	0	1	0	0	0	0	2	2
Ruby-crowned Kinglet	0	0	0	0	2	0	4	0	0	2	0	8	3
Western Bluebird	17	42	13	5	0	0	19	3	1	3	0	103	9
Townsend's Solitaire	0	0	0	0	0	0	0	0	1	1	0	2	2
Hermit Thrush	1	0	0	1	2	1	1	5	0	1	0	12	7
American Robin	0	23	0	0	7	0	0	0	0	6	0	36	3
European Starling	5	0	0	0	0	0	0	0	0	0	0	5	1
Cedar Waxwing	28	0	0	0	0	0	0	0	0	0	0	28	1
Yellow-rumped Warbler	10	12	28	23	4	1	7	4	0	0	4	93	9
Western Tanager	0	0	0	1	0	0	0	0	0	0	0	1	1
Spotted Towhee	8	9	29	3	16	8	6	3	0	5	2	89	10
Song Sparrow	0	0	2	0	0	0	0	0	0	2	0	4	2
White-throated Sparrow	0	1	0	0	0	0	0	0	0	0	0	1	1
White-crowned Sparrow	0	0	13	0	0	0	7	0	0	0	0	20	2
Dark-eyed Junco	14	7	11	20	29	14	55	19	0	15	0	184	9
House Finch	15	20	31	44	11	0	3	6	3	4	0	37	9
Pine Siskin	0	0	0	0	0	0	0	0	0	4	0	4	1
Total Number of Birds:	120	126	161	101	82	29	122	59	6	63	98	842	
Number of Survey Minutes:	45	58	60	17	35	15	30	22	40	35	35	392	

Figure 2. Survey period analysis for Point Count Surveys of three habitats with greatest numbers of sample points, Desert Scrub, Pinyon-Juniper, and Riparian.

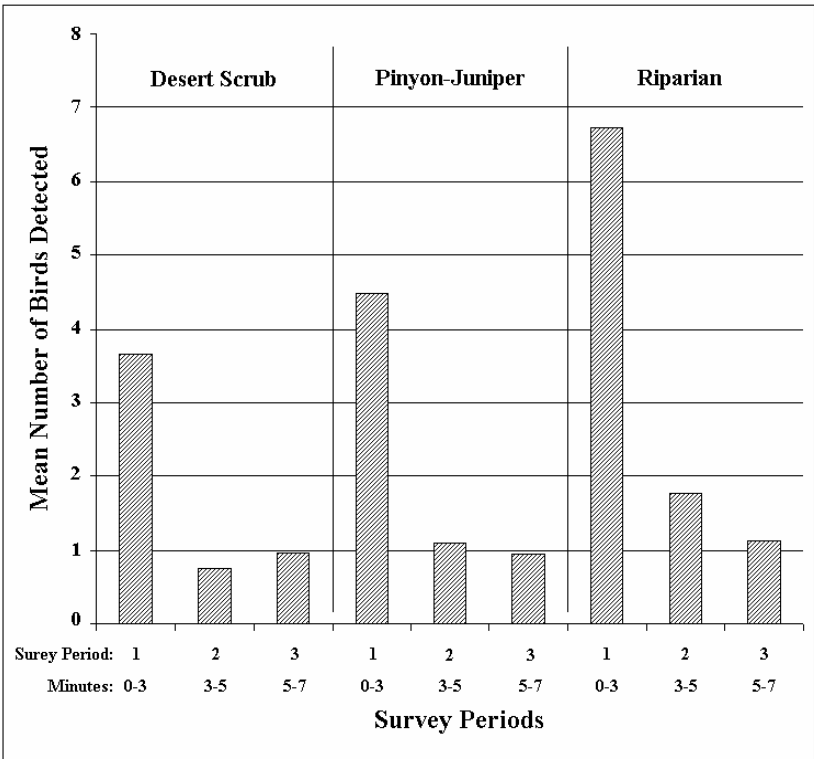


Figure 3. Species accumulation curve by: a) survey days, b) survey hours, and c) number of point counts for birds documented by Point Count Surveys at CACH during 2003 and 2004.

Figure 3.a.

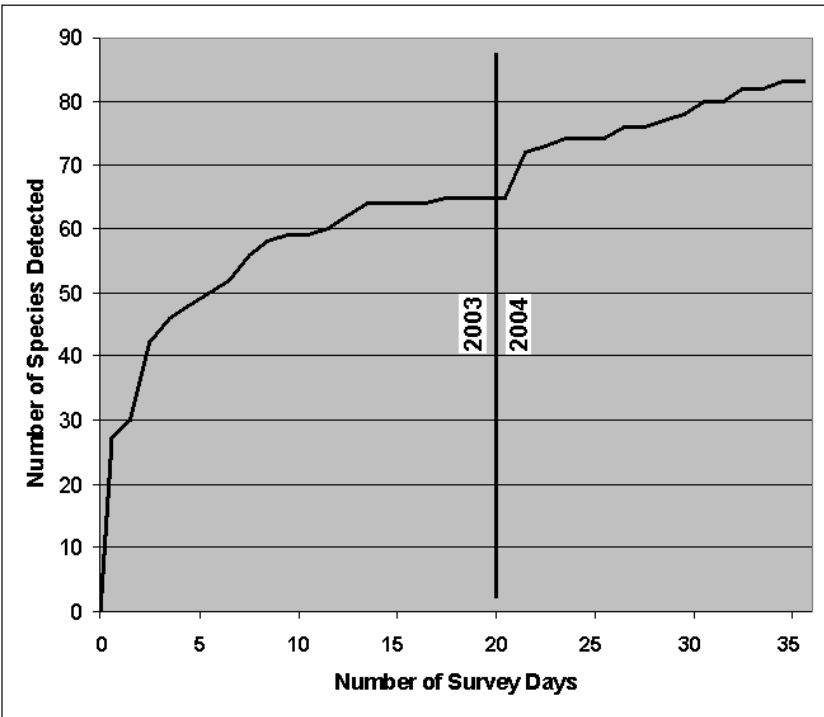


Figure 3. Continued

Figure 3.b.

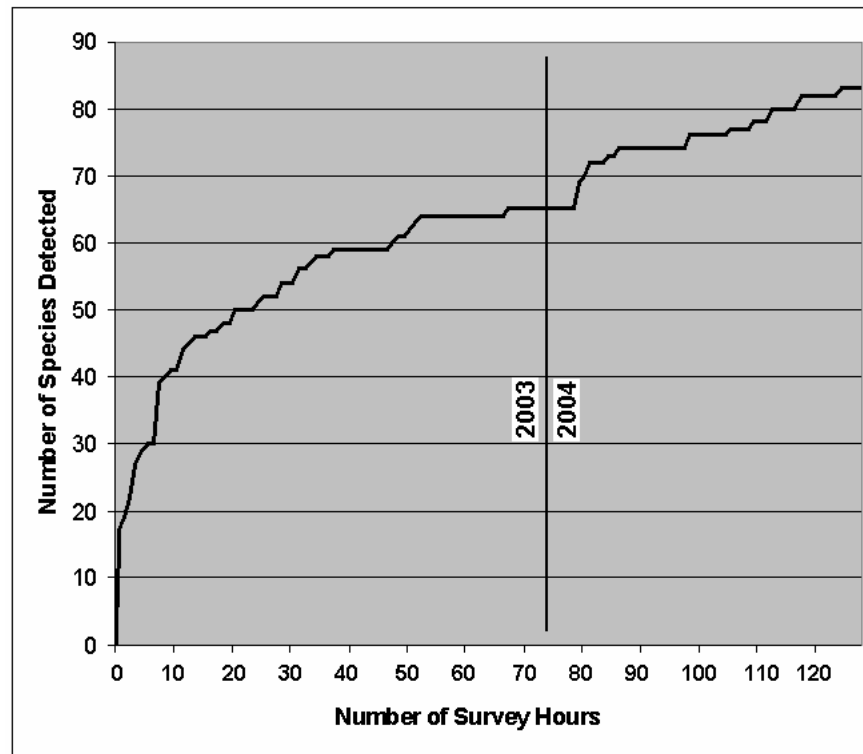


Figure 3.c.

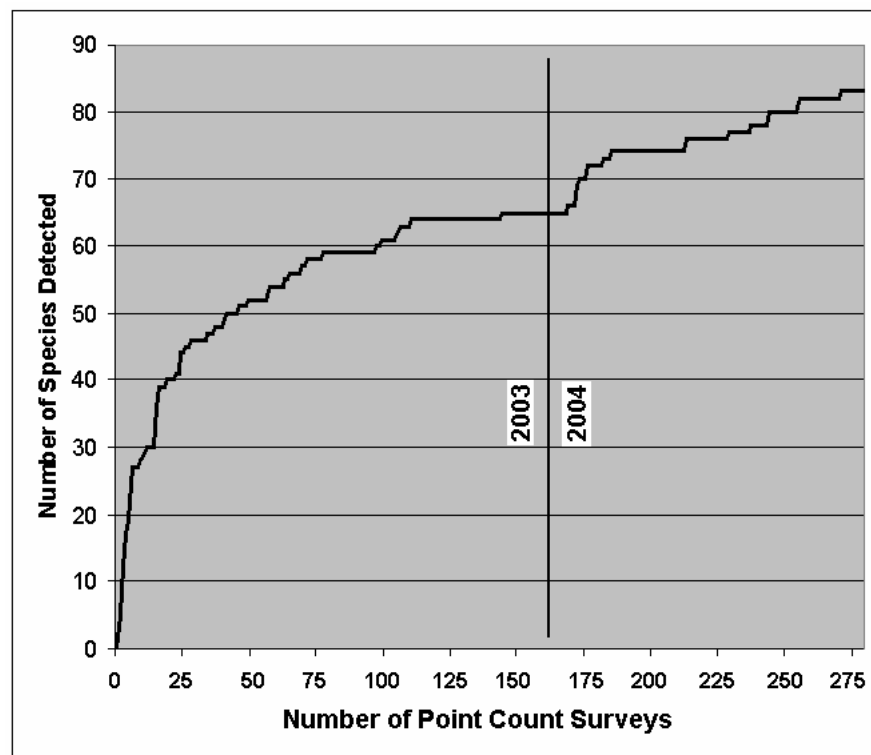


Figure 4. Desert Scrub Habitat at Canyon de Chelly National Monument



Figure 5. Desert Scrub/P-J Habitat at Canyon de Chelly National Monument



Figure 6. Oak/Riparian Habitat at Canyon de Chelly National Monument



Figure 7. Oak-P/J/Riparian Habitat at Canyon de Chelly National Monument



Figure 8. Pinyon-Juniper Habitat at Canyon de Chelly National Monument



Figure 9. P-J/Desert Scrub Habitat at Canyon de Chelly National Monument



Figure 10. P-J/Ponderosa Habitat at Canyon de Chelly National Monument



Figure 11. P-J/Sandstone Bedrock Habitat at Canyon de Chelly National Monument



Figure 12. P-J/Shrub Habitat at Canyon de Chelly National Monument



Figure 13. Ponderosa Pine Habitat at Canyon de Chelly National Monument



Figure 14. Ponderosa Pine/P-J Habitat at Canyon de Chelly National Monument



Figure 15. Sandstone Bedrock Habitat at Canyon de Chelly National Monument



Figure 16. Riparian Habitat at Canyon de Chelly National Monument



Appendix A. Index of common and scientific names, and species codes for birds in this report
(species are listed in American Ornithologists' Union (A.O.U.) order).

Common Name	Scientific Name	Species Code
<hr/>		
ANATIDAE		
Canada Goose	<i>Branta canadensis</i>	CAGO
Gadwall	<i>Anas strepera</i>	GADW
American Wigeon	<i>Anas americana</i>	AMWI
Mallard	<i>Anas platyrhynchos</i>	MALL
Blue-winged Teal	<i>Anas discors</i>	BWTE
Cinnamon Teal	<i>Anas cyanoptera</i>	CITE
Northern Shoveler	<i>Anas clypeata</i>	NOSH
Green-winged Teal	<i>Anas crecca</i>	GWTE
Redhead	<i>Aythya americana</i>	REDH
Ruddy Duck	<i>Oxyura jamaicensis</i>	RUDU
PHASIANIDAE		
Wild Turkey	<i>Meleagris gallopavo</i>	WITU
PODICIPEDIDAE		
Pied-billed Grebe	<i>Podilymbus podiceps</i>	PBGR
Eared Grebe	<i>Podiceps nigricollis</i>	EAGR
Western Grebe	<i>Aechmophorus occidentalis</i>	WEGR
Clark's Grebe	<i>Aechmophorus clarkia</i>	CLGR
ARDEIDAE		
Great Blue Heron	<i>Ardea herodias</i>	GBHE
Snowy Egret	<i>Egretta thula</i>	SNEG
THRESKIORNITHIDAE		
White-faced Ibis	<i>Plegadis chihi</i>	WFIB
CATHARTIDAE		
Turkey Vulture	<i>Cathartes aura</i>	TUVU
ACCIPITRIDAE		
Osprey	<i>Pandion haliaetus</i>	OSPR
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BAEA
Sharp-shinned Hawk	<i>Accipiter striatus</i>	SSHA
Cooper's Hawk	<i>Accipiter cooperii</i>	COHA
Red-tailed Hawk	<i>Buteo jamaicensis</i>	RTHA
Golden Eagle	<i>Aquila chrysaetos</i>	GOEA
FALCONIDAE		
American Kestrel	<i>Falco sparverius</i>	AMKE
Peregrine Falcon	<i>Falco peregrinus</i>	PEFA
RALLIDAE		
American Coot	<i>Fulica americana</i>	AMCO
CHARADRIIDAE		
Killdeer	<i>Charadrius vociferous</i>	KILL

Appendix A. Continued.

Common Name	Scientific Name	Species Code

SCOLOPACIDAE		
Spotted Sandpiper	<i>Actitis macularius</i>	SPSA
Western Sandpiper	<i>Calidris mauri</i>	WESA
Baird's Sandpiper	<i>Calidris bairdii</i>	BASA
LARIDAE		
Franklin's Gull	<i>Larus pipixcan</i>	FRGU
California Gull	<i>Larus californicus</i>	CAGU
Common Tern	<i>Sterna hirundo</i>	COTE
COLUMBIDAE		
Rock Pigeon	<i>Columba livia</i>	ROPI
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	EUCD
White-winged Dove	<i>Zenaida asiatica</i>	WWDO
Mourning Dove	<i>Zenaida macroura</i>	MODO
CUCULIDAE		
Greater Roadrunner	<i>Geococcyx californianus</i>	GRRO
STRIGIDAE		
Flammulated Owl	<i>Otus flammeolus</i>	FLOW
Western Screech-Owl	<i>Megascops kennicottii</i>	WSOW
Great-horned Owl	<i>Bubo virginianus</i>	GHOW
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	NPOW
Spotted Owl	<i>Strix occidentalis</i>	SPOW
Long-eared Owl	<i>Asio otus</i>	LEOW
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	NSWO
CAPRIMULGIDAE		
Common Nighthawk	<i>Chordeiles minor</i>	CONI
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	COPO
APODIDAE		
White-throated Swift	<i>Aeronautes saxatalis</i>	WTSW
TROCHILIDAE		
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	BCHU
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	BTHU
ALCEDINIDAE		
Belted Kingfisher	<i>Ceryle alcyon</i>	BEKI
PICIDAE		
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	WISA
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	RNSA
Hairy Woodpecker	<i>Picoides villosus</i>	HAWO
Northern Flicker	<i>Colaptes auratus</i>	NOFL
TYRANNIDAE		
Olive-sided Flycatcher	<i>Contopus cooperi</i>	OSFL
Western Wood-Pewee	<i>Contopus sordidulus</i>	WWPE
Willow Flycatcher	<i>Empidonax traillii</i>	WIFL
Hammond's Flycatcher	<i>Empidonax hammondii</i>	HAFL
Gray Flycatcher	<i>Empidonax wrightii</i>	GRFL

Appendix A. Continued.

Common Name	Scientific Name	Species Code

TYRANNIDAE (continued)		
Dusky Flycatcher	<i>Empidonax oberholseri</i>	DUFL
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	COFL
Black Phoebe	<i>Sayornis nigricans</i>	BLPH
Say's Phoebe	<i>Sayornis saya</i>	SAPH
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	ATFL
Cassin's Kingbird	<i>Tyrannus vociferans</i>	CAKI
Western Kingbird	<i>Tyrannus verticalis</i>	WEKI
VIREONIDAE		
Gray Vireo	<i>Vireo vicinior</i>	GRVI
Plumbeous Vireo	<i>Vireo plumbeus</i>	PLVI
Cassin's Vireo	<i>Vireo cassinii</i>	CAVI
Warbling Vireo	<i>Vireo gilvus</i>	WAVI
CORVIDAE		
Steller's Jay	<i>Cyanocitta stelleri</i>	STJA
Western Scrub-Jay	<i>Aphelocoma californica</i>	WESC
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	PIJA
Clark's Nutcracker	<i>Nucifraga columbiana</i>	CLNU
American Crow	<i>Corvus brachyrhynchos</i>	AMCR
Common Raven	<i>Corvus corax</i>	CORA
ALAUDIDAE		
Horned Lark	<i>Eremophila alpestris</i>	HOLA
HIRUNDINIDAE		
Purple Martin	<i>Progne subis</i>	PUMA
Tree Swallow	<i>Tachycineta bicolor</i>	TRES
Violet-green Swallow	<i>Tachycineta thalassina</i>	VGSW
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	NRWS
Bank Swallow	<i>Riparia riparia</i>	BANS
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	CLSW
Barn Swallow	<i>Hirundo rustica</i>	BARS
PARIDAE		
Mountain Chickadee	<i>Poecile gambeli</i>	MOCH
Juniper Titmouse	<i>Baeolophus ridgwayi</i>	JUTI
AEGITHALIDAE		
Bushtit	<i>Psaltiriparus minimus</i>	BUSH
SITTIDAE		
Red-breasted Nuthatch	<i>Sitta canadensis</i>	RBNU
White-breasted Nuthatch	<i>Sitta carolinensis</i>	WBNU
Pygmy Nuthatch	<i>Sitta pygmaea</i>	PYNU
CERTHIIDAE		
Brown Creeper	<i>Certhia americana</i>	BRCR

Appendix A. Continued.

Common Name	Scientific Name	Species Code
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TROGLODYTIDAE		
Rock Wren	<i>Salpinctes obsoletus</i>	ROWR
Canyon Wren	<i>Catherpes mexicanus</i>	CAWR
Bewick's Wren	<i>Thryomanes bewickii</i>	BEWR
House Wren	<i>Troglodytes aedon</i>	HOWR
Marsh Wren	<i>Cistothorus palustris</i>	MAWR
CINCLIDAE		
American Dipper	<i>Cinclus mexicanus</i>	AMDI
REGULIDAE		
Ruby-crowned Kinglet	<i>Regulus calendula</i>	RCKI
SYLVIIDAE		
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	BGGN
TURDIDAE		
Western Bluebird	<i>Sialia mexicana</i>	WEBL
Mountain Bluebird	<i>Sialia currucoides</i>	MOBL
Townsend's Solitaire	<i>Myadestes townsendi</i>	TOSO
Hermit Thrush	<i>Catharus guttatus</i>	HETH
American Robin	<i>Turdus migratorius</i>	AMRO
MIMIDAE		
Gray Catbird	<i>Dumetella carolinensis</i>	GRCA
Northern Mockingbird	<i>Mimus polyglottos</i>	NOMO
Sage Thrasher	<i>Oreoscoptes montanus</i>	SATH
STURNIDAE		
European Starling	<i>Sturnus vulgaris</i>	EUST
BOMBYCILLIDAE		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	CEWA
PARULIDAE		
Orange-crowned Warbler	<i>Vermivora celata</i>	OCWA
Nashville Warbler	<i>Vermivora ruficapilla</i>	NAWA
Virginia's Warbler	<i>Vermivora virginiae</i>	VIWA
Yellow Warbler	<i>Dendroica petechia</i>	Yewa
Yellow-rumped Warbler	<i>Dendroica coronata</i>	YRWA
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	BTGW
Townsend's Warbler	<i>Dendroica townsendi</i>	TOWA
Grace's Warbler	<i>Dendroica graciae</i>	GRWA
Black-and-White Warbler	<i>Mniotilta varia</i>	BWWA
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	MAWA
Common Yellowthroat	<i>Geothlypis trichas</i>	COYE
Wilson's Warbler	<i>Wilsonia pusilla</i>	WIWA
Yellow-breasted Chat	<i>Icteria virens</i>	YBCH
THRAUPIDAE		
Western Tanager	<i>Piranga ludoviciana</i>	WETA

Appendix A. Continued.

Common Name	Scientific Name	Species Code
<hr/>		
EMBERIZIDAE		
Green-tailed Towhee	<i>Pipilo chlorurus</i>	GTTO
Spotted Towhee	<i>Pipilo maculatus</i>	SPTO
Chipping Sparrow	<i>Spizella passerina</i>	CHSP
Brewer's Sparrow	<i>Spizella breweri</i>	BRSP
Vesper Sparrow	<i>Pooecetes gramineus</i>	VESP
Lark Sparrow	<i>Chondestes grammacus</i>	LASP
Sage Sparrow	<i>Amphispiza belli</i>	SASP
Song Sparrow	<i>Melospiza melodia</i>	SOSP
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	LISP
White-throated Sparrow	<i>Zonotrichia albicollis</i>	WTSP
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	WCSP
Dark-eyed Junco	<i>Junco hyemalis</i>	DEJU
CARDINALIDAE		
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	BHGR
Blue Grosbeak	<i>Passerina caerulea</i>	BLGR
Lazuli Bunting	<i>Passerina amoena</i>	LABU
Indigo Bunting	<i>Passerina cyanea</i>	INBU
ICTERIDAE		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	RWBL
Western Meadowlark	<i>Sturnella neglecta</i>	WEME
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	YHBL
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	BRBL
Brown-headed Cowbird	<i>Molothrus ater</i>	BHCO
Bullock's Oriole	<i>Icterus bullockii</i>	BUOR
FRINGILLIDAE		
Cassin's Finch	<i>Carpodacus cassinii</i>	CAFI
House Finch	<i>Carpodacus mexicanus</i>	HOFI
Red Crossbill	<i>Loxia curvirostra</i>	RECR
Pine Siskin	<i>Carduelis pinus</i>	PISI
Lesser Goldfinch	<i>Carduelis psaltria</i>	LEGO
American Goldfinch	<i>Carduelis tristis</i>	AMGO
PASSERIDAE		
House Sparrow	<i>Passer domesticus</i>	HOSP
<hr/>		

Appendix B. Locations (UTM Zone 12) and year of survey for 94 sites at which 7-minute Point-Count Surveys were conducted for birds at Canyon de Chelly National Monument, including the predicted and actual habitat type for each site.

Point ID	Easting	Northing	Year	Predicted Habitat	Actual Habitat
474	631980	4001409	2004	Desert Scrub	Desert Scrub
610	632222	4001664	2004	Grassland	Sandstone Bedrock
881	632724	4001915	2004	Grassland	Sandstone Bedrock
1010	632975	4000409	2004	Grassland	Desert Scrub
1149	633226	4001413	2004	Grassland	Desert Scrub
1151	633226	4001915	2004	Desert Scrub	Riparian
1551	633979	4000660	2004	Grassland	Sandstone Bedrock
1955	634732	4000409	2004	Desert Scrub	Riparian
2097	634983	4002166	2004	Grassland	P-J/Sandstone Bedrock
2363	635485	4001162	2004	Grassland	P-J/Sandstone Bedrock
3443	637493	4001162	2003	Grassland	P-J/Sandstone Bedrock
3980	638497	4000409	2003	Grassland	Pinyon-Juniper
4666	639752	4003170	2003	Desert Scrub	Pinyon-Juniper
5055	640505	3999154	2003	Desert Scrub	Pinyon-Juniper
5071	640505	4003170	2003	Desert Scrub	Pinyon-Juniper
5179	640756	3996393	2004	Pinyon-Juniper	Pinyon-Juniper
5189	640756	3998903	2003	Desert Scrub	P-J/Desert Scrub
5334	641007	4001413	2003	Pinyon-Juniper	P-J/Desert Scrub
5340	641007	4002919	2003	Desert Scrub	P-J/Sandstone Bedrock
5343	641007	4003672	2003	Desert Scrub	Pinyon-Juniper
5750	641760	4004174	2003	Desert Scrub	Pinyon-Juniper
5881	642011	4003170	2003	Desert Scrub	P-J/Sandstone Bedrock
6267	642764	3998401	2003	Grassland	P-J/Desert Scrub
6432	643015	4005931	2004	Desert Scrub	P-J/Desert Scrub
6523	643266	3994887	2004	Grassland	Pinyon-Juniper
6566	643266	4005680	2004	Desert Scrub	P-J/Sandstone Bedrock
6839	643768	4006433	2004	Desert Scrub	Pinyon-Juniper
7244	644459	4006633	2004	Pinyon-Juniper	Pinyon-Juniper
7376	644772	4005680	2004	Grassland	Agricultural
7503	645023	4003672	2003	Pinyon-Juniper	P-J/Sandstone Bedrock
7509	645023	4005178	2003	Desert Scrub	Pinyon-Juniper
7897	645776	4000911	2003	Pinyon-Juniper	Pinyon-Juniper
8051	646027	4005680	2004	Grassland	P-J/Shrub
8300	646529	4000409	2003	Pinyon-Juniper	Pinyon-Juniper
8313	646529	4003672	2003	Pinyon-Juniper	Pinyon-Juniper

Appendix B. Continued.

Point ID	Easting	Northing	Year	Predicted Habitat	Actual Habitat
8406	646780	3993130	2004	Pinyon-Juniper	Pinyon-Juniper
8447	646780	4003421	2003	Pinyon-Juniper	Pinyon-Juniper
8820	647533	3995389	2004	Pinyon-Juniper	Pinyon-Juniper
8990	647784	4004174	2003	Pinyon-Juniper	Pinyon-Juniper
9383	648477	4001360	2003	Pinyon-Juniper	Pinyon-Juniper
9545	648788	4007939	2003	Pinyon-Juniper	Pinyon-Juniper
9607	649039	3989616	2004	Pinyon-Juniper	P-J/Desert Scrub
9701	649039	4013210	2004	Riparian	Riparian
9922	649480	4001113	2003	Pinyon-Juniper	Pinyon-Juniper
9968	649541	4012457	2004	Riparian	Riparian
10102	649792	4012206	2004	Riparian	Riparian
10314	650294	3997648	2004	Riparian	Riparian
10563	650796	3992377	2004	Pinyon-Juniper	Pinyon-Juniper
10584	650796	3997648	2004	Riparian	Oak P-J/Riparian
10719	651047	3997648	2003	Riparian	Riparian
10912	651298	4012206	2004	Pinyon-Juniper	Riparian
11006	651487	4002116	2003	Pinyon-Juniper	P-J/Desert Scrub
11047	651549	4012206	2004	Riparian	Riparian
11182	651800	4012206	2004	Riparian	Riparian
11397	652302	3998401	2004	Agriculture	Riparian
11588	652553	4012457	2004	Riparian	Riparian
11817	653055	4002166	2003	Pinyon-Juniper	Desert Scrub
11936	653306	3998150	2004	Pinyon-Juniper	P-J/Shrub
12031	653557	3988110	2004	Pinyon-Juniper	Pinyon-Juniper
12039	653557	3990118	2004	Pinyon-Juniper	Pinyon-Juniper
12265	653808	4012959	2004	Riparian	Oak/Riparian
12828	655063	3984847	2004	Pinyon-Juniper	Ponderosa Pine
12964	655314	3985098	2004	Pinyon-Juniper	Ponderosa Pine/Oak
13422	656067	3998401	2004	Pinyon-Juniper	P-J/Shrub
10449	650545	3997648	2004	Riparian	Riparian
15238	659330	4013712	2003	Pinyon-Juniper	P-J/Desert Scrub
15730	660334	4001664	2003	Pinyon-Juniper	Pinyon-Juniper
16188	661087	4014967	2003	Pinyon-Juniper	Desert Scrub
16406	661589	4001915	2003	Pinyon-Juniper	P-J/Ponderosa Pine
17082	662844	4002166	2003	Pinyon-Juniper	P-J/Ponderosa Pine
17614	663840	4000162	2003	Ponderosa Pine	Pinyon-Juniper
17618	663848	4001162	2003	Ponderosa Pine	Ponderosa Pine
18032	664601	4003421	2003	Pinyon-Juniper	Desert Scrub/P-J
18161	664854	4001913	2003	Ponderosa Pine	Desert Scrub
18162	664857	4002161	2003	Ponderosa Pine	Desert Scrub
18404	665354	3995138	2003	Pinyon-Juniper	Desert Scrub/P-J

Appendix B. Continued.

Point ID	Easting	Northing	Year	Predicted Habitat	Actual Habitat
18537	665605	3994636	2003	Pinyon-Juniper	P-J/Desert Scrub
18550	665607	3997897	2003	Ponderosa Pine	Desert Scrub
18682	665850	3997200	2003	Desert Scrub	Desert Scrub/P-J
18694	665856	4000158	2003	Ponderosa Pine	Desert Scrub/P-J
18811	666107	3995640	2003	Ponderosa Pine	Ponderosa Pine/P-J
18812	666050	3996100	2003	Ponderosa Pine	Ponderosa Pine/P-J
18817	666110	3997143	2003	Ponderosa Pine	Desert Scrub
18818	666168	3997396	2003	Ponderosa Pine	Desert Scrub
18821	666168	3998149	2003	Ponderosa Pine	Pinyon-Juniper
18822	666110	3998399	2003	Ponderosa Pine	Desert Scrub
18826	666110	3999404	2003	Ponderosa Pine	Desert Scrub
18842	666110	4003418	2003	Ponderosa Pine	Desert Scrub/P-J
18957	666361	3998400	2003	Ponderosa Pine	Desert Scrub/P-J
18961	666358	3999405	2003	Ponderosa Pine	Desert Scrub
19092	666612	3998399	2003	Ponderosa Pine	Desert Scrub
19094	666613	3998902	2003	Ponderosa Pine	Desert Scrub/P-J
19365	667172	3999153	2003	Pinyon-Juniper	Desert Scrub
19385	667108	4004169	2003	Ponderosa Pine	Desert Scrub

Appendix C. Summarized results of 7-minute Point Count Surveys (with 3 repetitions) at 94 randomly-selected sites at Canyon de Chelly National Monument, with habitat variables and a comparison of predicted versus actual habitat at each site.

Point I.D.	Predicted Habitat	Actual Habitat	Survey Year	Percent Cover	Average Height (m)	No. Species Each Survey	No. Birds Each Survey
474	Desert Scrub	Desert Scrub	2004	05	2.0	5, 5, 7	5, 5, 8
610	Grassland	Sandstone Bedrock	2004	05	0.3	8, 5, 8	9, 8, 11
881	Grassland	Sandstone Bedrock	2004	03	0.2	5, 4, 7	5, 4, 8
1010	Grassland	Desert Scrub	2004	05	0.2	1, 4, 5	1, 5, 14
1149	Grassland	Desert Scrub	2004	08	0.4	3, 1, 2	4, 1, 3
1151	Desert Scrub	Riparian	2004	80	4.0	15, 9, 14	19, 11, 24
1551	Grassland	Sandstone Bedrock	2004	10	1.0	1, 1, 4	1, 1, 7
1955	Desert Scrub	Riparian	2004	95	6.0	4, 4, 6	4, 7, 8
2097	Grassland	P-J/Sandstone Bedrock	2004	10	1.0	8, 5, 5	8, 10, 10
2363	Grassland	P-J/Sandstone Bedrock	2004	05	1.0	2, 4, 3	2, 4, 3
3443	Grassland	P-J/Sandstone Bedrock	2003	15	3.0	7, 5, 2	8, 6, 3
3980	Grassland	Pinyon-Juniper	2003	15	3.0	5, 4, 1	7, 6, 1
4666	Desert Scrub	Pinyon-Juniper	2003	15	2.0	6, 7, 5	8, 8, 11
5055	Desert Scrub	Pinyon-Juniper	2003	20	3.0	6, 8, 7	9, 8, 10
5071	Desert Scrub	Pinyon-Juniper	2003	15	2.0	6, 1, 5	6, 1, 5
5179	Pinyon-Juniper	Pinyon-Juniper	2004	15	2.0	5, 8, 5	5, 9, 7
5189	Desert Scrub	P-J/Desert Scrub	2003	20	3.0	6, 6, 3	6, 9, 4
5334	Pinyon-Juniper	P-J/Desert Scrub	2003	20	2.0	7, 7, 2	8, 11, 2
5340	Desert Scrub	P-J/Sandstone Bedrock	2003	10	2.0	5, 3, 6	5, 4, 10
5343	Desert Scrub	Pinyon-Juniper	2003	15	3.0	7, 5, 6	10, 5, 11
5750	Desert Scrub	Pinyon-Juniper	2003	15	2.0	7, 7, 6	9, 18, 8
5881	Desert Scrub	P-J/Sandstone Bedrock	2003	10	2.0	4, 3, 4	4, 3, 7
6267	Grassland	P-J/Desert Scrub	2003	20	3.0	5, 6, 6	7, 8, 7
6432	Desert Scrub	P-J/Desert Scrub	2004	15	2.0	6, 4, 3	9, 6, 7
6523	Grassland	Pinyon-Juniper	2004	15	2.5	7, 7, 9	9, 9, 14
6566	Desert Scrub	P-J/Sandstone Bedrock	2004	10	1.0	11, 5, 7	11, 7, 12
6839	Desert Scrub	Pinyon-Juniper	2004	10	2.0	8, 7, 10	11, 11, 12
7244	Pinyon-Juniper	Pinyon-Juniper	2004	15	2.0	3, 1, 2	5, 1, 2
7376	Grassland	Agricultural	2004	05	0.5	5, 5, 7	6, 6, 9

Appendix C. Continued.

Point I.D.	Predicted Habitat	Actual Habitat	Survey Year	Percent Cover	Average Height (m)	No. Species Each Survey			No. Birds Each Survey		
7503	Pinyon-Juniper	P-J/Sandstone Bedrock	2003	20	3.0	12,	7,	9	17,	9,	13
7509	Desert Scrub	Pinyon-Juniper	2003	10	2.0	5,	3,	7	5,	4,	9
7897	Pinyon-Juniper	Pinyon-Juniper	2003	25	4.0	1,	2,	0	1,	2,	0
8051	Grassland	P-J/Shrub	2004	15	2.0	5,	4,	4	5,	5,	5
8300	Pinyon-Juniper	Pinyon-Juniper	2003	30	5.0	4,	5,	5	5,	5,	6
8313	Pinyon-Juniper	Pinyon-Juniper	2003	25	3.0	3,	4,	5	3,	4,	8
8406	Pinyon-Juniper	Pinyon-Juniper	2004	15	3.0	5,	7,	2	9,	9,	2
8447	Pinyon-Juniper	Pinyon-Juniper	2003	25	3.0	7,	5,	6	9,	8,	6
8820	Pinyon-Juniper	Pinyon-Juniper	2004	20	2.5	5,	7,	3	9,	7,	3
8990	Pinyon-Juniper	Pinyon-Juniper	2003	25	2.0	14,	9,	5	14,	12,	5
9383	Pinyon-Juniper	Pinyon-Juniper	2003	25	3.0	5,	4,	3	6,	6,	5
9545	Pinyon-Juniper	Pinyon-Juniper	2003	30	4.0	1,	4,	5	1,	6,	5
9607	Pinyon-Juniper	P-J/Desert Scrub	2004	25	4.0	4,	5,	4	7,	6,	4
9701	Riparian	Riparian	2004	20	2.0	7,	8,	12	9,	10,	16
9922	Pinyon-Juniper	Pinyon-Juniper	2003	25	3.0	6,	2,	1	8,	3,	1
9968	Riparian	Riparian	2004	20	10.0	7,	4,	9	12,	6,	12
10102	Riparian	Riparian	2004	10	4.0	8,	9,	11	12,	14,	14
10314	Riparian	Riparian	2004	45	3.0	7,	5,	6	9,	7,	12
10449	Riparian	Riparian	2004	10	2.0	4,	5,	7	5,	7,	13
10563	Pinyon-Juniper	Pinyon-Juniper	2004	20	3.0	0,	3,	3	0,	5,	9
10584	Riparian	Oak P-J/Riparian	2004	25	2.0	5,	5,	11	11,	5,	12
10719	Riparian	Riparian	2004	50	4.0	7,	6,	6	11,	8,	7
10912	Pinyon-Juniper	Riparian	2004	25	4.0	5,	11,	8	5,	14,	12
11006	Pinyon-Juniper	P-J/Desert Scrub	2003	25	3.0	6,	6,	9	9,	7,	11
11047	Riparian	Riparian	2004	20	6.0	4,	7,	4	4,	9,	5
11182	Riparian	Riparian	2004	30	5.0	4,	9,	6	4,	11,	7
11397	Agriculture	Riparian	2004	30	4.0	8,	8,	4	10,	11,	6
11588	Riparian	Riparian	2004	20	4.0	3,	7,	8	3,	8,	11
11817	Pinyon-Juniper	Desert Scrub	2003	20	1.0	9,	5,	10	11,	5,	11
11936	Pinyon-Juniper	P-J/Shrub	2004	25	3.0	8,	8,	12	12,	8,	12
12031	Pinyon-Juniper	Pinyon-Juniper	2004	30	10.0	3,	7,	6	4,	7,	8
12039	Pinyon-Juniper	Pinyon-Juniper	2004	20	2.0	3,	6,	6	5,	7,	8

Appendix C. Continued.

Point I.D.	Predicted Habitat	Actual Habitat	Survey Year	Percent Cover	Average Height (m)	No. Species Each Survey			No. Birds Each Survey		
12265	Riparian	Oak/Riparian	2004	35	4.0	5,	5,	8	6,	5,	10
12828	Pinyon-Juniper	Ponderosa Pine	2004	15	6.0	5,	6,	9	7,	6,	12
12964	Pinyon-Juniper	Ponderosa Pine/Oak	2004	30	6.0	2,	6,	8	2,	10,	12
13422	Pinyon-Juniper	P-J/Shrub	2004	15	2.0	8,	6,	8	8,	7,	8
15238	Pinyon-Juniper	P-J/Desert Scrub	2003	05	1.5	7,	8,	5	7,	10,	6
15730	Pinyon-Juniper	Pinyon-Juniper	2003	30	5.0	5,	6,	3	6,	6,	3
16188	Pinyon-Juniper	Desert Scrub	2003	25	3.0	9,	9,	6	12,	13,	11
16406	Pinyon-Juniper	P-J/Ponderosa Pine	2003	30	5.0	7,	3,	1	11,	3,	1
17082	Pinyon-Juniper	P-J/Ponderosa Pine	2003	30	8.0	7,	7,	3	9,	7,	5
17614	Ponderosa Pine	Pinyon-Juniper	2003	20	4.0	6,	5,	4	6,	8,	6
17618	Ponderosa Pine	Ponderosa Pine	2003	25	10.0	12,	13,	11	15,	16,	16
18032	Pinyon-Juniper	Desert Scrub/P-J	2003	20	1.0	8,	4,	5	14,	11,	6
18161	Ponderosa Pine	Desert Scrub	2003	20	0.8	2,	8,	8	3,	11,	9
18162	Ponderosa Pine	Desert Scrub	2003	20	0.8	5,	5,	2	8,	6,	3
18404	Pinyon-Juniper	Desert Scrub/P-J	2003	25	2.0	8,	11,	9	10,	11,	10
18537	Pinyon-Juniper	P-J/Desert Scrub	2003	20	1.5	10,	11,	6	17,	14,	9
18550	Ponderosa Pine	Desert Scrub	2003	18	0.5	2,	2,	3	2,	2,	3
18682	Desert Scrub	Desert Scrub/P-J	2003	20	2.0	8,	6,	6	9,	6,	7
18694	Ponderosa Pine	Desert Scrub/P-J	2003	25	3.0	7,	5,	6	9,	11,	6
18811	Ponderosa Pine	Ponderosa Pine/P-J	2003	25	7.0	6,	5,	5	8,	7,	5
18812	Ponderosa Pine	Ponderosa Pine/P-J	2003	25	8.0	11,	10,	6	14,	12,	8
18817	Ponderosa Pine	Desert Scrub	2003	15	0.8	1,	3,	5	1,	4,	10
18818	Ponderosa Pine	Desert Scrub	2003	15	0.8	5,	0,	2	8,	0,	4
18821	Ponderosa Pine	Pinyon-Juniper	2003	25	4.0	7,	6,	4	8,	9,	5
18822	Ponderosa Pine	Desert Scrub	2003	15	0.7	2,	3,	0	2,	4,	0
18826	Ponderosa Pine	Desert Scrub	2003	20	0.5	3,	1,	3	3,	1,	5
18842	Ponderosa Pine	Desert Scrub/P-J	2003	20	0.5	6,	3,	3	7,	6,	4
18957	Ponderosa Pine	Desert Scrub/P-J	2003	15	1.0	9,	2,	1	13,	2,	1
18961	Ponderosa Pine	Desert Scrub	2003	20	0.8	4,	2,	6	7,	2,	6
19092	Ponderosa Pine	Desert Scrub	2003	10	0.8	2,	4,	5	2,	5,	11
19094	Ponderosa Pine	Desert Scrub/P-J	2003	15	5.0	1,	3,	4	3,	3,	4
19365	Pinyon-Juniper	Desert Scrub	2003	10	0.8	0,	3,	2	0,	3,	6
19385	Ponderosa Pine	Desert Scrub	2003	20	0.5	3,	4,	2	6,	6,	2

Appendix D. Vegetation parameters for Point Count Survey sites for Canyon de Chelly
National Monument.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-474	05	2.0	<i>Ericameria nauseosa</i>	45
			<i>Gutierrezia sarothrae</i>	45
			Other	10
CACH-610	05	0.3	Other	100
CACH-881	03	0.2	Other	95
			<i>Juniperus osteosperma</i>	5
CACH-1010	05	0.2	<i>Atriplex confertifolia</i>	30
			<i>Gutierrezia sarothrae</i>	30
			<i>Pleuraphis jamesii</i>	30
			Other	10
CACH-1149	08	0.4	<i>Ericameria nauseosa</i>	70
			Other	20
			<i>Juniperus osteosperma</i>	5
			<i>Yucca angustissima</i>	5
CACH-1151	80	4.0	<i>Elaeagnus angustifolia</i>	34
			<i>Populus fremontii</i>	33
			<i>Salix exigua</i>	33
CACH-1551	10	1.0	Other	80
			<i>Juniperus osteosperma</i>	10
			<i>Pinus edulis</i>	10
CACH-1955	95	6.0	<i>Elaeagnus angustifolia</i>	80
			<i>Populus fremontii</i>	20
CACH-2097	10	1.0	<i>Amelanchier utahensis</i>	30
			<i>Juniperus osteosperma</i>	30
			<i>Pinus edulis</i>	30
			Other	10
CACH-2363	05	1.0	<i>Juniperus osteosperma</i>	40
			<i>Pinus edulis</i>	40
			<i>Amelanchier utahensis</i>	10
			<i>Cercocarpus ledifolius</i>	10

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-3443	15	3.0	<i>Pinus edulis</i>	60
			<i>Juniperus osteosperma</i>	35
			Other	5
CACH-3980	15	3.0	<i>Juniperus osteosperma</i>	80
			<i>Pinus edulis</i>	20
CACH-4666	15	2.0	<i>Juniperus osteosperma</i>	60
			<i>Pinus edulis</i>	35
			Other	5
CACH-5055	20	3.0	<i>Pinus edulis</i>	70
			<i>Juniperus osteosperma</i>	20
			<i>Amelanchier utahensis</i>	10
CACH-5071	15	2.0	<i>Juniperus osteosperma</i>	45
			<i>Pinus edulis</i>	45
			Other	10
CACH-5179	15	2.0	<i>Artemisia tridentata</i>	30
			<i>Juniperus osteosperma</i>	30
			<i>Pinus edulis</i>	30
			Other	10
CACH-5189	20	3.0	<i>Artemisia tridentata</i>	40
			<i>Juniperus osteosperma</i>	30
			<i>Pinus edulis</i>	30
CACH-5334	20	2.0	<i>Artemisia tridentata</i>	34
			<i>Juniperus osteosperma</i>	33
			<i>Pinus edulis</i>	33
CACH-5340	10	2.0	<i>Juniperus osteosperma</i>	45
			<i>Pinus edulis</i>	45
			Other	10
CACH-5343	15	3.0	<i>Juniperus osteosperma</i>	40
			<i>Pinus edulis</i>	40
			<i>Purshia stansburiana</i>	10
			Other	10
CACH-5750	15	2.0	<i>Juniperus osteosperma</i>	50
			<i>Pinus edulis</i>	50

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-5881	10	2.0	<i>Cercocarpus ledifolius</i>	30
			<i>Juniperus osteosperma</i>	30
			<i>Pinus edulis</i>	30
			Other	10
CACH-6267	20	3.0	<i>Pinus edulis</i>	40
			<i>Artemisia tridentata</i>	30
			<i>Juniperus osteosperma</i>	30
CACH-6432	15	2.0	<i>Pinus edulis</i>	40
			<i>Artemisia tridentata</i>	30
			<i>Juniperus osteosperma</i>	30
CACH-6523	15	2.5	<i>Pinus edulis</i>	50
			<i>Juniperus osteosperma</i>	45
			<i>Artemisia tridentata</i>	5
CACH-6566	10	1.0	<i>Juniperus osteosperma</i>	45
			<i>Pinus edulis</i>	45
			<i>Artemisia tridentata</i>	5
			<i>Cercocarpus ledifolius</i>	5
CACH-6839	10	2.0	<i>Juniperus osteosperma</i>	40
			<i>Cercocarpus intricatus</i>	30
			<i>Pinus edulis</i>	30
CACH-7244	15	2.0	<i>Pinus edulis</i>	60
			<i>Juniperus osteosperma</i>	35
			Other	5
CACH-7376	05	0.5	Other	100
CACH-7503	20	3.0	<i>Juniperus osteosperma</i>	55
			<i>Pinus edulis</i>	40
			Other	5
CACH-7509	10	2.0	<i>Pinus edulis</i>	80
			<i>Amelanchier utahensis</i>	10
			Other	10
CACH-7897	25	4.0	<i>Juniperus osteosperma</i>	60
			<i>Pinus edulis</i>	25
			<i>Artemisia tridentata</i>	15

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-8051	15	2.0	<i>Fendlera rupicola</i>	25
			<i>Juniperus osteosperma</i>	25
			<i>Pinus edulis</i>	25
			<i>Quercus turbinella</i>	25
CACH-8300	30	5.0	<i>Pinus edulis</i>	60
			<i>Juniperus osteosperma</i>	30
			<i>Artemisia tridentata</i>	10
CACH-8313	25	3.0	<i>Juniperus osteosperma</i>	45
			<i>Pinus edulis</i>	45
			<i>Artemisia tridentata</i>	10
CACH-8406	15	3.0	<i>Juniperus osteosperma</i>	50
			<i>Pinus edulis</i>	50
CACH-8447	25	3.0	<i>Pinus edulis</i>	65
			<i>Juniperus osteosperma</i>	35
CACH-8820	20	2.5	<i>Pinus edulis</i>	60
			<i>Artemisia tridentata</i>	20
			<i>Juniperus osteosperma</i>	20
CACH-8990	25	2.0	<i>Pinus edulis</i>	50
			<i>Juniperus osteosperma</i>	35
			<i>Rhus trilobata</i>	5
CACH-9383	25	3.0	<i>Juniperus osteosperma</i>	70
			<i>Pinus edulis</i>	30
CACH-9545	30	4.0	<i>Juniperus osteosperma</i>	50
			<i>Pinus edulis</i>	50
CACH-9607	25	4.0	<i>Pinus edulis</i>	45
			<i>Artemisia tridentata</i>	35
			<i>Juniperus osteosperma</i>	20
CACH-9701	20	2.0	<i>Ericameria nauseosa</i>	80
			<i>Populus fremontii</i>	20
CACH-9922	25	3.0	<i>Pinus edulis</i>	60
			<i>Juniperus osteosperma</i>	30
			<i>Artemisia tridentata</i>	10

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-9968	20	10.0	<i>Elaeagnus angustifolia</i>	45
			<i>Populus fremontii</i>	45
			Other	10
CACH-10102	10	4.0	<i>Elaeagnus angustifolia</i>	45
			<i>Populus fremontii</i>	45
			<i>Salix exigua</i>	10
CACH-10314	45	3.0	<i>Elaeagnus angustifolia</i>	85
			<i>Populus fremontii</i>	15
CACH-10449	10	2.0	<i>Opuntia polyacantha</i>	50
			<i>Juniperus monosperma</i>	20
			<i>Pinus edulis</i>	20
			<i>Elaeagnus angustifolia</i>	10
CACH-10563	20	3.0	<i>Juniperus osteosperma</i>	40
			<i>Artemisia tridentata</i>	30
			<i>Pinus edulis</i>	30
CACH-10584	25	2.0	<i>Juniperus osteosperma</i>	30
			<i>Pinus edulis</i>	30
			<i>Quercus gambelii</i>	30
			Other	10
CACH-10719	50	4.0	<i>Elaeagnus angustifolia</i>	no
			<i>Quercus gambelii</i>	data
CACH-10912	25	4.0	<i>Artemisia tridentata</i>	15
			<i>Elaeagnus angustifolia</i>	15
			<i>Juniperus osteosperma</i>	15
			<i>Populus fremontii</i>	15
			<i>Quercus gambelii</i>	15
			<i>Salix exigua</i>	15
			<i>Pinus edulis</i>	10
CACH-11006	25	3.0	<i>Artemisia tridentata</i>	50
			<i>Pinus edulis</i>	50
CACH-11047	20	6.0	<i>Artemisia tridentata</i>	25
			<i>Elaeagnus angustifolia</i>	25
			<i>Populus fremontii</i>	25
			Other	25

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-11182	30	5.0	<i>Quercus gambelii</i>	40
			<i>Elaeagnus angustifolia</i>	35
			<i>Populus fremontii</i>	15
			<i>Salix exigua</i>	5
			Other	5
CACH-11397	30	4.0	<i>Populus fremontii</i>	40
			<i>Pinus edulis</i>	20
			<i>Juniperus osteosperma</i>	15
			<i>Purshia stansburiana</i>	15
			<i>Quercus turbinella</i>	10
CACH-11588	20	4.0	Other	40
			<i>Quercus gambelii</i>	20
			<i>Pinus edulis</i>	15
			<i>Populus fremontii</i>	15
			<i>Elaeagnus angustifolia</i>	10
CACH-11817	20	1.0	<i>Artemisia tridentata</i>	95
			<i>Pinus edulis</i>	5
CACH-11936	25	3.0	Other	45
			<i>Pinus edulis</i>	25
			<i>Pseudotsuga menziesii</i>	10
CACH-12031	30	10.0	<i>Pinus edulis</i>	60
			<i>Juniperus osteosperma</i>	40
CACH-12039	20	2.0	<i>Pinus edulis</i>	70
			<i>Juniperus osteosperma</i>	30
CACH-12265	35	4.0	<i>Quercus gambelii</i>	50
			<i>Juniperus scopulorum</i>	20
			<i>Populus fremontii</i>	20
			<i>Betula occidentalis</i>	10
CACH-12828	15	6.0	<i>Pinus ponderosa</i>	70
			<i>Purshia tridentata</i>	20
			<i>Juniperus scopulorum</i>	5
			<i>Pinus edulis</i>	5
CACH-12964	30	6.0	<i>Pinus ponderosa</i>	50
			<i>Quercus gambelii</i>	50

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-13422	15	2.0	<i>Pinus edulis</i>	40
			<i>Juniperus osteosperma</i>	30
			Other	30
CACH-15238	05	1.5	<i>Artemisia tridentata</i>	40
			<i>Juniperus scopulorum</i>	40
			<i>Pinus edulis</i>	20
CACH-15730	30	5.0	<i>Pinus edulis</i>	60
			<i>Juniperus osteosperma</i>	40
CACH-16188	25	3.0	<i>Artemisia tridentata</i>	70
			<i>Pinus edulis</i>	25
			<i>Juniperus osteosperma</i>	5
CACH-16406	30	5.0	<i>Juniperus osteosperma</i>	30
			<i>Pinus edulis</i>	30
			<i>Pinus ponderosa</i>	30
			<i>Artemisia tridentata</i>	5
			<i>Quercus gambelii</i>	5
CACH-17082	30	8.0	<i>Pinus edulis</i>	50
			<i>Juniperus osteosperma</i>	25
			<i>Pinus ponderosa</i>	20
			<i>Quercus gambelii</i>	5
CACH-17614	20	4.0	<i>Pinus edulis</i>	80
			<i>Juniperus osteosperma</i>	10
			<i>Purshia stansburiana</i>	10
CACH-17618	25	10.0	<i>Pinus ponderosa</i>	80
			<i>Juniperus scopulorum</i>	10
			<i>Pseudotsuga menziesii</i>	10
CACH-18032	20	1.0	<i>Artemisia tridentata</i>	80
			<i>Pinus edulis</i>	10
			<i>Pinus ponderosa</i>	10
CACH-18161	20	0.8	<i>Artemisia tridentata</i>	92
			<i>Juniperus osteosperma</i>	4
			<i>Pinus edulis</i>	4
CACH-18162	20	0.8	<i>Artemisia tridentata</i>	100

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-18404	25	2.0	<i>Artemisia tridentata</i>	65
			<i>Pinus edulis</i>	30
			<i>Juniperus osteosperma</i>	5
CACH-18537	20	1.5	<i>Artemisia tridentata</i>	50
			<i>Pinus edulis</i>	50
CACH-18550	18	0.5	<i>Artemisia tridentata</i>	100
CACH-18682	20	2.0	<i>Artemisia tridentata</i>	60
			<i>Pinus edulis</i>	35
			<i>Juniperus osteosperma</i>	5
CACH-18694	25	3.0	<i>Artemisia tridentata</i>	60
			<i>Pinus edulis</i>	40
CACH-18811	25	7.0	<i>Pinus edulis</i>	65
			<i>Pinus ponderosa</i>	35
CACH-18812	25	8.0	<i>Pinus ponderosa</i>	50
			<i>Pinus edulis</i>	25
			<i>Artemisia tridentata</i>	20
			<i>Juniperus osteosperma</i>	5
CACH-18817	15	0.8	<i>Artemisia tridentata</i>	100
CACH-18818	15	0.8	<i>Artemisia tridentata</i>	100
CACH-18821	25	4.0	<i>Juniperus scopulorum</i>	95
			<i>Pinus edulis</i>	5
CACH-18822	15	0.7	<i>Artemisia tridentata</i>	100
CACH-18826	20	0.5	<i>Artemisia tridentata</i>	100
CACH-18842	20	0.5	<i>Artemisia tridentata</i>	95
			<i>Juniperus scopulorum</i>	3
			<i>Pinus edulis</i>	2
CACH-18957	15	1.0	<i>Artemisia tridentata</i>	40
			<i>Pinus edulis</i>	40
			<i>Juniperus osteosperma</i>	20

Appendix D. Continued.

Point ID	Total Cover (%)	Mean Height (m)	Relative Cover (%)	
CACH-18961	20	0.8	<i>Artemisia tridentata</i>	100
CACH-19092	10	0.8	<i>Artemisia tridentata</i>	98
			<i>Juniperus scopulorum</i>	2
CACH-19094	15	5.0	<i>Artemisia tridentata</i>	75
			<i>Juniperus scopulorum</i>	25
CACH-19365	10	0.8	<i>Artemisia tridentata</i>	100
CACH-19385	20	0.5	<i>Artemisia tridentata</i>	95
			<i>Juniperus scopulorum</i>	5

Appendix E. An Annotated List of Species is presented with brief sketches of the status and results of this inventory for each species; emphasis is given for breeding records and behaviors.

Order Anseriformes
Family Anseridae

Canada Goose (*Branta canadensis*). Migrant and breeder. One was seen at upper Whiskey Reservoir on 14 May 2003. Two pairs with broods of three large young each were seen at Tsaile Lake on 3 June 2003. Eight were noted at Tsaile Lake on 26 June 2003. One was at Tsaile Lake on 17 September 2003.

Gadwall (*Anas strepera*). Migrant and possible breeder. One was seen at Whiskey Reservoir on 15 May 2003. Five pairs were observed at Tsaile Lake on 3 June 2003. Birds were seen again at Tsaile Lake on 8 June 2003, 24, 29 June 2003. On 30 June 2003, 14 individuals were seen at Tsaile Lake. Twenty five were counted at Tsaile Lake on 17 September 2003.

American Wigeon (*Anas americana*). Migrant. Three were seen at Tsaile Lake on 17 September 2003.

Mallard (*Anas platyrhynchos*). Migrant and breeder. A nest with 12 eggs was found in the canyon bottom of Palisades Creek on 14 May 2003. Females, with ten young each, were seen on Tsaile Lake and along Tsaile Creek in uppermost Canyon del Muerto on 22 May 2003. A female with 12 small young were seen on upper Whiskey Reservoir on 3 June 2003 and this bird with large young was seen there again on 24 June 2003. Females with 15 and 10 young each were seen at Tsaile Lake on 30 June 2003, along with an additional 49 birds. An alarmed female was seen along Tsaile Creek just above Mummy Cave, Canyon del Muerto, on 8 June 2003.

Blue-winged Teal (*Anas discors*). Migrant. Two males were seen at Tsaile Lake on 8 June 2003, six birds were there on 30 June 2003 and five were seen there on 17 September 2003.

Cinnamon Teal (*Anas cyanoptera*). Migrant and possible breeder. A pair was seen at Tsaile Lake on 24 June 2003.

Northern Shoveler (*Anas clypeata*). Migrant. One was seen at Tsaile Lake on 8 June 2003 and 23 were there on 17 September 2003.

Green-winged Teal (*Anas crecca*). Migrant. Ten were seen at Tsaile Lake on 17 September 2003.

Redhead (*Aythya americana*). Migrant. One was seen on Whiskey Reservoir on 4 June 2003 and one was seen at Tsaile Lake on 24 June 2003.

Ruddy Duck (*Oxyura jamaicensis*). Migrant and breeder. Ten adults, with two broods of two and one small young, were seen at Tsaile Lake on 3 June 2003. Seven birds were seen at Tsaile Lake on 30 June 2003. Fifteen were seen at Tsaile Lake on 17 September 2003.

Order Galliformes
Family Phasianidae

Wild Turkey (*Meleagris gallopavo*). Permanent resident in the upper canyons and adjacent canyon rims. Three were heard on 14 May 2003 in upper Coyote Wash. Tracks and feathers were seen in Palisades Creek on 15 May 2003. One was heard on the mesa above the Wheatfields and Whiskey creek confluence on 16 May 2003. One was heard along the north rim of upper Canyon de Chelly on 20 May 2003. Feathers were found in upper Canyon del Muerto below Tsaille Dam on 22 May 2003. One was heard along the north rim of upper Canyon de Chelly on 6 June 2003. Tracks were seen on Middle Mesa near the rim of upper Black Rock Canyon on 27 June 2003. Tracks, feathers, and remains of two birds, were seen in upper Monument Canyon on 27 June 2004. Tracks were seen near the rim of upper Monument Canyon on 10 May 2004. Molted feathers were seen at the bottom of the Black Rock Trail, and 0.5 mile above the bottom of the Black Rock Trail, upper Canyon de Chelly, on 14 May 2004. Tracks were seen in upper Monument Canyon on 24 May 2004. Tracks and feathers were seen in upper Canyon del Muerto on 23 June 2004

Order Podicipediformes
Family Podicipedidae

Pied-billed Grebe (*Podilymbus podiceps*). Migrant and breeder. Found as a breeding species at Tsaille Lake where an adult on a nest, and an adult with 5 young, were seen on 8 June 2003, an adult with young was seen on 24 June 2003, and seven adults, including three on nests, were seen on 30 June 2003.

Eared Grebe (*Podiceps nigricollis*). Migrant and breeder. Found as a breeding species at Tsaille Lake where seven were seen on 3 June 2003, 15 were seen on 24 June 2003, and 23, including three on nests, were seen on 29 June 2003.

Western Grebe (*Aechmophorus occidentalis*). Migrant and breeder. Found as a breeding species at Tsaille Lake where 41 to 71 individuals were counted from 3 June to 30 June 2003. Up to 38 nests were counted during this period. Twenty seven were seen at Tsaille Lake on 17 September 2003.

Clark's Grebe (*Aechmophorus clarkii*). Migrant and breeder. An adult with a juvenile was seen at Tsaille Lake on 17 September 2003.

Order Ciconiiformes
Family Ardeidae

Great Blue Heron (*Ardea herodias*). Migrant. Three were at Tsaille Lake on 30 June 2003, one was seen there on 17 September 2003.

Snowy Egret (*Egretta thula*). Migrant. Two were seen at Tsaille Lake on 17 September 2003.

Family Threskiornithidae

White-faced Ibis (*Plegadis chihi*). Migrant. Four were seen at Tsaille Lake on 27 June 2003.

Family Cathartidae

Turkey Vulture (*Cathartes aura*). Summer resident and likely breeder throughout the Monument.

Order Falconiformes

Family Accipitridae

Osprey (*Pandion haliaetus*). Migrant. Single birds were noted at Tsaille Lake on 22 May 2003 and 30 June 2003.

Bald Eagle (*Haliaeetus leucocephalus*). Migrant. An immature was seen at Tsaille Lake on 3 June 2003.

Sharp-shinned Hawk (*Accipiter striatus*). Migrant, winter resident and possible breeder. One was seen in upper Black Rock Canyon on 27 June 2003. One was seen in upper Canyon del Muerto on 23 June 2004. One was seen at the mouth of Spring Canyon on 3 June 2004. One was seen near White House Ruin on 2 December 2003.

Cooper's Hawk (*Accipiter cooperi*). Permanent resident. An immature female and adult male were seen in upper Canyon del Muerto on 8 June 2003. One was seen in upper Canyon del Muerto on 15 May 2004. One was seen at the mouth of Canyon de Chelly on 25 May 2005. A displaying male was seen about a mile up Canyon de Chelly on 2 June 2004. One was seen at the bottom of the Red Clay Trail on 3 June 2004. One was on a nest near Sleeping Duck on 11 June 2004 and a mixed-age pair (immature-plumaged female and an adult-plumaged male) was seen there on 22 June 2004, and four nestlings 30 to 25 days old were noted on 16 July 2004. An adult carrying food was seen at the top of the Twin Trail on 24 June 2004. One was seen near Spider Rock overlook on 25 June 2004. One was seen in upper Monument Canyon on 27 June 2004. Three were seen in Canyon de Chelly on 18 September 2004.

Northern Goshawk (*Accipiter gentilis*). Not found in this inventory but may occur as a breeding species in ponderosa, mixed-conifer, and large-stature, higher-elevation pinyon-juniper woodlands. A Steller's Jay was heard mimicking this species along the rim of upper Monument Canyon on 27 June 2004, which suggests that goshawks occur in this area.

Red-tailed Hawk (*Buteo jamaicensis*). Permanent resident. An agitated adult was seen vigorously driving away a raven at the top of the Red Clay Trail in upper Canyon de Chelly on 6 June 2003. One was seen near Massacre Cave overlook on 8 June 2003. One was seen in Canyon de Chelly on 19 September 2003. One was seen in lower Canyon de Chelly on 16 December 2003. One was seen in lower Canyon de Chelly on 24 May 2004. One was heard in Coyote Wash on 24 June 2003.

Golden Eagle (*Aquila chrysaetos*). Permanent resident. One was seen over uppermost Canyon de Chelly on 20 May 2003. One was seen in upper Canyon del Muerto on 8 June 2003 and another was seen there on 4 June 2004.

Family Falconidae

American Kestrel (*Falco sparverius*). Permanent resident. One was seen in Coyote Wash on 14 May 2003. An adult carrying food was seen near the Massacre Cave overlook on 24 June 2003. A female soliciting food from a male was seen near Stranding Rock, lower Canyon del Muerto and another female was seen near the rim up upper Canyon del Muerto below Tsaile Dam on 30 June 2003. One was seen at Tsaile Lake on 17 September 2003. Nestlings were heard in a cottonwood at the campground on 30 June 2004. One was seen in upper Canyon del Muerto on 1 July 2004.

Peregrine Falcon (*Falco peregrinus*). Summer resident. This species was observed in numerous locations throughout the Monument. The number and distribution of records represent about eight pairs. Perhaps as many as 15 to 20 pairs are present in the Monument. Locations include Twin Trail Canyon, Massacre Cave area, upper Canyon del Muerto, Wheatfields/Whiskey creeks confluence, upper Monument Canyon, Newspaper Rock, Spider Rock, and Black Rock Well Number 2. An eyrie with two young 21 to 23 days old was noted near Twin Trail on 8 June 2003. An eyrie with three young 19-21 days old was noted near Massacre Cave on 24 June 2003. Adults with at least one fledgling were seen near Newspaper Rock on 22 June 2004. Nestlings, presumably this species and not Prairie Falcons, were heard in upper Monument Canyon on 27 June 2004. A prey exchange between two adults was observed near Black Rock Well Number 2 on 29 June 2003. An adult female was seen capturing an American Robin in upper Canyon de Chelly just below Cave Ruin on 29 June 2004. A pair was seen at the top of the Hanging Ladder Trail, Canyon del Muerto, on 1 July 2004.

Order Gruiformes

Family Rallidae

American Coot (*Fulica americana*). Migrant and summer resident. All the records are from Tsaile Lake where 44 were counted on 3 June 2003; 20, including one on a nest, were seen on 24 June 2003; 42 were counted on 30 June 2003; and 94 were seen on 17 September 2003.

Order Charadriiformes

Family Charadriidae

Killdeer (*Charadrius vociferus*). Migrant and summer breeder. Adults with large fledglings were seen at Whiskey Reservoir on 25 June 2003.

Family Scolopacidae

Spotted Sandpiper (*Actitis macularia*). Migrant: one was seen at Whiskey Reservoir on 14 May 2003, three were seen at Tsaile Lake on 3 June 2003, and one was there on 24 June 2003.

Western Sandpiper (*Calidris mauri*). Migrant at pond shores. Fifteen were seen at Tsaile Lake on 17 September 2003.

Baird's Sandpiper (*Calidris bairdii*). Migrant at pond shores. Six were seen at Tsaile Lake on 17 September 2003.

Family Laridae

Franklin's Gull (*Larus pipixcan*). Migrant. One was seen at Tsaile Lake on 16 May 2003.

California Gull (*Larus californicus*). Migrant. Three were seen at Tsaile Lake on 3 June 2003.

Common Tern (*Sterna hirundo*). Migrant. One was seen at Tsaile Lake on 17 September 2003.

Order Columbiformes

Family Columbidae

Rock Dove (*Columba livia*). Permanent resident. Seen in the vicinity of the campground. A molted tail feather was seen near Sleeping Duck, lower Canyon de Chelly, on 22 June 2003. None were seen in the canyons.

Eurasian Collared-Dove (*Streptopelia decaocto*). Permanent resident. One was seen at the NPS housing on 12 May 2004. This exotic and invasive species has become resident in virtually all of the communities of the Navajo Nation (as elsewhere in Arizona) since about 2002.

White-winged Dove (*Zenaida asiatica*). Migrant and possible breeder. One was heard at Junction on 12 May 2004. D. Mikesic recorded one near Sleeping Duck on 30 May 2003. This Sonoran Desert species has become more frequent as a spring migrant overshoot in northern Arizona in recent years.

Mourning Dove (*Zenaida macroura*). Summer resident. A nest on a bank and under a serviceberry shrub (*Amelanchier utahensis*) was seen on the rim of upper Cherry Canyon on 13 May 2004. A nest in a hackberry (*Celtis* sp.) was seen near Justin's corrals on 14 May 2004. Spring migration may last until early June as indicated by a tight flock of seven birds flying steadily north across the large sage flats near Whiskey Reservoir.

Order Cuculiformes

Family Cuculidae

Greater Roadrunner (*Geococcyx californianus*). Likely a permanent resident. Fresh tracks were seen in Canyon del Muerto near the confluence of Black Rock Canyon on 7 October 2004. Interviews with local residents indicate this species is occasionally seen in the canyons.

Order Strigiformes

Family Strigidae

Flammulated Owl (*Otus flammeolus*). Summer resident. Two were heard on the north rim of upper Canyon de Chelly on 5 June 2003. One was heard on the south rim of upper Canyon del Muerto below Tsaile Lake on 30 June 2003.

Appendix E. Continued.

Western Screech-Owl (*Otus kennicottii*). Permanent resident. One was heard in pinyon-juniper woodland above the head of Many Cherry Canyon on 22 May 2003. One was heard on south rim of Upper Canyon del Muerto below Tsaile Dam on 9 June 2003. An adult with 1 or 2 fledglings was seen along the creek in Russian olives above Spider Rock on 29 June 2004. An adult with fledglings was seen in cottonwoods and Russian olives at Junction on 15 July 2004.

Great Horned Owl (*Bubo virginianus*). Permanent resident. One heard on mesa summit between confluence of Wheatfields and Whiskey creeks on 16 May 2003. Remains of a fledgling were seen along Tsaile Creek below Tsaile Dam in upper Canyon del Muerto on 22 May 2003. One was heard at the head of many Cherry Canyon, Canyon del Muerto on 22 May 2003. A molted feather was seen in upper Black Rock Canyon on 28 June 2003. A fledgling was seen near the rim of upper Monument Canyon on 27 June 2004. One heard at the top of the Middle Trail, Canyon del Muerto, on 1 July 2004.

Northern Pygmy-Owl (*Glaucidium gnoma*). Permanent resident. Eight detections of this species were recorded. One (presumable the same individual) was heard on the western-most slopes of Sonsela Buttes on 14 May, 4 June, and 25 June 2003. One was heard on the mesa summit between the confluence of Wheatfields and Whiskey creeks on 16 May 2003. One was heard along the rim of upper Black Rock Canyon on 20 May 2003. Another was heard on the upper northern slopes of Canyon de Chelly below the confluence below Tsaile Lake in upper Canyon del Muerto on 21 May 2003. One was seen below Tsaile Lake in upper Canyon del Muerto on 29 June 2003. A molted feather was seen in upper Monument Canyon on 1 June 2004.

Spotted Owl (*Strix occidentalis*). Permanent resident. One was seen in upper Black Rock Canyon on 24 May 2004. This individual was in the same location where this species was first recorded in Canyon de Chelly in May 1986. A pair was seen in a side canyon off of upper Monument Canyon on 27 June 2004.

Order Caprimulgiformes
Family Caprimulgidae

Common Nighthawk (*Chordeiles minor*). Summer resident. One was seen over Sonsela Buttes on 4 and 25 June 2003. One was seen over the mesa summit between the confluence of Wheatfields and Whiskey creeks on 5 June 2003. Birds were detected near the top of the Baby Trail, lower Canyon del Muerto, on 5 and 27 June 2003. One was heard over the north rim of upper Canyon de Chelly on 6 June 2003. Individuals were seen along the south rim of upper Canyon del Muerto below Tsaile Lake on 6, 8, and 30 June 2003. One was seen near Spider Rock Overlook on 2 June 2004. One was detected at the top of Middle Trail on 25 June 2004 and 1 July 2004. One was seen over the mesa of upper Monument Canyon on 27 June 2004.

Common Poorwill (*Phalaenoptilus nuttallii*). Summer resident. One heard on the mesa summit along upper Monument Canyon on 10 May 2004. One heard on the south rim of upper Canyon del Muerto below Tsaile Lake on 8 June 2003. One heard at the top of the Hanging Ladder Trail, Canyon del Muerto, on 26 May 2004, one heard at the top of Middle Trail, Canyon del Muerto, on 26 June 2004, and 3-4 heard calling on the mesa top along upper Monument Canyon on 26 and 27 June 2004. Birds were heard at the base of Spider Rock on 19 September 2003. and 2 June 2004.

Order Apodiformes
Family Apodidae

White-throated Swift (*Aeronautes saxatalis*). Summer resident. A common summer resident at cliff scarps and canyons. It migrates widely throughout the region. Dates of occurrence range from 16 March (1995 on Black Mesa-CTL) to 27 October (1984 at Many Farms Lake-Jacobs 1986).

Family Trochilidae

Black-chinned Hummingbird (*Archilochus alexandri*). Summer resident and migrant. This is the low-elevation hummingbird during June in riparian habitats and brushy canyon slopes. Two nests in cottonwoods were seen near Sleeping Duck on 24 May 2004.

Broad-tailed Hummingbird (*Selasphorus platycercus*). Summer resident and migrant. This is the high-elevation hummingbird in June in mixed-conifer and ponderosa pine woodlands.

Order Coraciiformes
Family Alcidiidae

Belted Kingfisher (*Ceryle alcyon*). Migrant. One was seen at Tsaile Lake on 17 September 2003.

Order Piciformes
Family Picidae

Williamson's Sapsucker (*Sphyrapicus thyroideus*). Permanent resident. One was heard drumming in Coyote Wash on 4 June 2003. One was seen in upper Canyon del Muerto on 17 September 2003, and a male and female were seen in lower Monument Canyon on 18 September 2003.

Red-naped Sapsucker (*Sphyrapicus nuchalis*). Migrant and winter resident. One was seen at Junction on 4 and 16 December 2003. Two were seen in riparian woodlands in lower Canyon de Chelly on 7-8 October 2004.

Hairy Woodpecker (*Picoides villosus*). Permanent resident in woodland habitats. An alarmed adult was seen in cottonwoods in upper Canyon de Chelly on 6 June 2003.

Northern Flicker (*Colaptes auratus*). Permanent resident in woodland habitats. It is conspicuous in the riparian groves in winter where 37 were counted in the lower canyons on 16-17 December 2003.

Order Passeriformes
Family Tyrannidae

Olive-sided Flycatcher (*Contopus cooperi*). Migrant. One was heard singing on the north rim of upper Canyon de Chelly on 21 May 2003. One was seen near Sleeping Duck on 25 May 2004.

Appendix E. Continued.

Western Wood-Pewee (*Contopus sordidulus*). Migrant and summer resident in woodland habitats.

Willow Flycatcher (*Empidonax traillii*). Migrant. One was seen near Sleeping Duck on 25 May 2005.

Hammond's Flycatcher (*Empidonax hammondi*). Migrant. A single migrant was seen in Canyon de Chelly on 18 September 2003 and two were seen on 19 September 2003.

Dusky Flycatcher (*Empidonax oberholseri*). Summer resident in mixed brushy mixed-conifer of the upper canyons. Migrates throughout the Monument. Among the breeding records obtained are five heard singing in upper Coyote Wash on 14 May 2003, one heard singing at the head of Twin Trail Canyon on 22 May 2003, an alarmed pair seen on the Spanish Trail, upper Canyon del Muerto on 8 June 2003, birds heard singing near the top of the northern arm of Twin Trail, Canyon del Muerto, on 22 May 2003, an adult feeding a fledgling noted in a southern tributary of upper Coyote Wash on 25 June 2003, and birds singing near the rim of upper Monument Canyon on 24 May and 1 June 2004. Migrants were noted in pinyon-juniper on 11 May 2004, and in riparian vegetation in upper Canyon de Chelly on 14 May 2004, in Canyon del Muerto at Twin Trail Canyon on 15 May 2004, in lower Canyon de Chelly on 26 May 2004, and between Many Cherry and Twin Trail canyons in Canyon del Muerto on 26 May 2004.

Gray Flycatcher (*Empidonax wrightii*). A summer obligate bird of pinyon-juniper woodlands. Near-full-sized fledglings were seen along the Antelope House Overlook road on 30 June 2003. An adult in riparian vegetation near Sleeping Duck gives an indication of the timing of early fall movement away from breeding habitats.

Cordilleran Flycatcher (*Empidonax occidentalis*). Summer resident of the cool, shaded mixed-conifer woodlands of the upper canyons. One heard singing on the mesa summit above lower Whiskey Creek on 16 May 2003. One bird and an old nest observed in uppermost Canyon del Muerto below Tsaille Dam on 22 May 2003. Ten + heard and/or seen along Whiskey Creek from Coyote Wash to Wheatfields Creek on 4 June 2003. Three nests containing 2, 3, and 4 large young, respectively, were noted in upper Black Rock Canyon below the big waterfall on 27 June 2003. A nest with three small young was seen in upper Black Rock Canyon above the large waterfall on 28 June 2003. Two were seen in a side canyon off of upper Monument Canyon on 1 June 2004. Ten noted in uppermost Canyon del Muerto on 23 June 2004.

Black Phoebe (*Sayornia nigricans*). Summer resident. The only records include one used nest found in upper Coyote Wash above Palisades Creek on 15 May 2003, and one bird seen near Newspaper Rock on 11, 22 and 30 June 2004. Two additional birds were seen in Lower Canyon de Chelly on the latter date.

Say's Phoebe (*Sayornis saya*). Summer resident. A nest with three large young was found in an abandoned outhouse near Black Rock on 6 June 2003. Adult with three fledglings was seen in upper Black Rock Canyon on 27 June 2003.

Ash-throated Flycatcher (*Myiarchus cinerascens*). Summer resident. This was the most commonly detected bird on point counts, occurring throughout the Monument in all wooded habitats, especially in pinyon-juniper and riparian woodlands. Nestlings were heard in a cavity in a boxelder (*Acer negundo*) in upper Canyon del Muerto on 23 June 2004.

Appendix E. Continued.

Cassin's Kingbird (*Tyrannus vociferans*). Summer resident. The only record is from near the top of Twin Trail, along the rim of Canyon del Muerto.

Western Kingbird (*Tyrannus verticalis*). Migrant and possible summer resident. One was seen in upper Canyon de Chelly on 14 May 2003

Family Laniidae

Loggerhead Shrike (*Lanius ludovicianus*). Not detected in this inventory but may occur.

Family Vireonidae

Gray Vireo (*Vireo vicinior*). An inconspicuous summer resident of open pinyon-juniper woodlands. One was heard on lower Middle Mesa on 20 May 2003. Four were noted on survey points off the Antelope House Overlook road on 23 May 2003 where detections were also made on 9 and 30 June 2003. Two were seen near the top of the Twin Trail, Canyon del Muerto on 16 May 2004. One was heard singing near the road to Sliding House Overlook on 2 June 2004.

Plumbeous Vireo (*Vireo plumbeus*). Summer resident in pinyon-juniper, ponderosa pine, mixed-conifer, and, particularly, riparian woodlands. Adults carrying nesting material were seen at Whiskey Creek on 15 May 2003.

Cassin's Vireo (*Vireo cassinii*). Migrant. One was seen in riparian woodland in Canyon de Chelly on 19 September 2003.

Warbling Vireo (*Vireo gilvus*). Summer resident in riparian groves. This species is widely distributed in aspen groves throughout the Colorado Plateau, and its strong association with the riparian groves in the Monument is somewhat of an anomaly. An adult feeding fledglings was seen at the bottom of the Hanging Ladder Trail, Canyon del Muerto, on 24 June 2004.

Family Corvidae

Steller's Jay (*Cyanocitta stelleri*). Permanent resident at the higher elevations. It may descend in winter to the lower canyons where three were seen near Junction on 4 December 2003 and one was seen there on 16 December 2003.

Western Scrub-Jay (*Aphelocoma californica*). Permanent resident primarily in pinyon-juniper woodlands. A full-sized fledgling was seen on Middle Mesa on 8 June 2003.

Pinyon Jay (*Gymnorhinus cyanocephalus*). Permanent resident primarily in pinyon-juniper woodlands. Begging juveniles were seen along the Antelope House overlook road on 30 June 2003.

Appendix E. Continued.

Clark's Nutcracker (*Nucifraga columbiana*). Permanent resident in the uppermost canyons. One was heard on Sonsela Buttes on 4 June 2003. On 25 June 2003, two were heard on the summit between Wheatfields and Whiskey creeks, one was seen at the top of the Horse Trail, and one was heard on the north rim of upper Canyon de Chelly where another was heard the next day.

Black-billed Magpie (*Pica hudsonia*). Although it was not found during this inventory, reports from local residents indicate that this species may stay/wander during the winter into the lower canyon from its northern Arizona breeding range along Chinle Wash north of the Monument. McKusick (1986) reported it from prehistoric deposits at Antelope House in lower Canyon del Muerto.

American Crow (*Corvus brachyrhynchos*). Permanent resident. The breeding distribution appears to be disjunct with one group breeding in Tsai Lake (and similar areas?), and in the riparian groves of extreme lower Canyon de Chelly. An adult on a nest was seen in a cottonwood at the campground on 16 May 2003. Two were seen at the mouth of Canyon de Chelly on 13 May 2004. A territorial pair was seen in upper Canyon del Muerto on 22 May 2003. A family group was seen in upper Canyon del Muerto on 23 June 2004. Two adults and a fledgling were seen in lower Canyon de Chelly on 16 July 2004. Winter sees concentrations of birds (perhaps northern migrants and not locally derived, i.e. Navajo Nation/Defiance Plateau/Chuska Mountains) in the lower canyons. Notable concentrations were 39 in Canyon de Chelly at Junction on 4 December, 50 there on 17 December 2003 and 58 in the middle reaches of Canyon del Muerto near Standing Cow Ruin on 17 December 2003.

Common Raven (*Corvus corax*). Permanent resident. Found throughout the Monument. A nest in a ponderosa was seen below Tsai Lake on 3 June 2002. A nest with large noisy young was seen on a cliff at Mummy Cave on 8 June 2003. A nest with large young was seen on a cliff in Black Rock Canyon on 28 June 2003. A third cliff nest with young was seen in a small canyon near the head of the Twin Trail on 16 May 2004. A family group was seen in upper Canyon del Muerto on 23 June 2004. Recently fledged young were seen in upper Black Rock Canyon on 28 June 2003.

Family Alaudidae

Horned Lark (*Eremophila alpestris*). Permanent resident. An adult carrying food was seen near Whiskey Reservoir on 25 June 2003.

Family Hirundinidae

Purple Martin (*Pogon subis*). Migrant and possible summer resident. Four were seen at, and just below, Tsai Lake on 3 June 2003.

Tree Swallow (*Tachycineta bicolor*). Migrant. One was seen at Tsai Lake on 17 September 2003.

Violet-green Swallow (*Tachycineta thalassina*). Summer resident found along canyon rims, and frequently foraging over pinyon-juniper woodlands, throughout the Monument.

Appendix E. Continued.

Northern Rough-winged Swallow (*Stelgidopteryx serripennis*). Migrant and possible summer resident. Three were seen at Tsaile Lake 3 June 2003. Five were seen there on 17 September 2003.

Bank Swallow (*Riparia riparia*). Migrant. A late northbound migrant was seen at Tsaile Dam on 3 June 2003, and 10 were seen at Tsaile lake on 17 September 2003.

Cliff Swallow (*Petrochelidon pyrrhonota*). Summer resident. Eighteen nests were counted below Whiskey Reservoir on 14 May 2003. Adults gathering mud in the canyon floor near Sleeping Duck were observed on 24 May 2004.

Barn Swallow (*Hirundo rustica*). Migrant and possible summer resident. One was seen over upper Wheatfields Creek on 20 May 2003 and 15 were seen at Tsaile Lake on 17 September 2003.

Family Paridae

Mountain Chickadee (*Poecile gambeli*). Permanent resident. Found in higher elevation pinyon-juniper woodlands and in ponderosa pine and mixed-conifer woodlands. An adult carrying food was seen at the confluence of Wheatfields and Whiskey creeks on 25 June 2003. A fledgling was seen in upper Black Rock Canyon on 27 June 2003. In fall and winter it may move down into riparian woodlands: one was seen in lower Canyon de Chelly on 8 October 2004 and 17 were seen on 16-17 December 2003 in the lower canyon.

Juniper Titmouse (*Baeolophus ridgwayi*). Permanent resident almost exclusively in pinyon-juniper woodlands.

Family Aegithalidae

Bushtit (*Psaltirparus minimus*). Permanent resident. An adult with two fledglings was seen at the top of the Baby Trail, lower Canyon del Muerto, on 27 June 2003. A family group of eight was noted on 26 June 2003 on the north rim of upper Canyon de Chelly. An adult with two fledglings was seen at the top of the Baby Trail, lower Canyon del Muerto on 27 June 2003. A family group of six was seen on Middle Mesa on 28 June 2003.

Family Sittidae

Red-breasted Nuthatch (*Sitta canadensis*). Permanent resident in very small numbers. One was heard on the mesa summit between Wheatfields and Whiskey creeks on 16 May 2003. One was seen in riparian woodland in lower Canyon de Chelly on 8 October 2003.

White-breasted Nuthatch (*Sitta carolinensis*). Permanent resident primarily in higher elevation pinyon juniper woodlands and in ponderosa pine woodlands.

Pygmy Nuthatch (*Sitta pygmaea*). Permanent resident restricted to ponderosa pine woodlands and adjacent large-stature, high-elevation pinyon-juniper woodlands.

Family Certhiidae

Brown Creeper (*Certhia americana*). Permanent resident in small numbers. Perhaps more frequent in fall and winter. One was heard singing in pinyon-juniper woodland on the mesa summit between the confluence of Wheatfields and Whiskey creeks on 5 June 2003. One was seen in riparian woodland near Antelope House, Canyon del Muerto on 17 December 2003. Two were seen in riparian woodlands near Junction on 7-8 October 2004.

Family Troglodytidae

Rock Wren (*Salpinctes obsoletus*). Summer resident and possibly present in winter. Family groups of three and four were seen in Coyote Wash on 25 June 2003, Two family groups were noted in upper Canyon del Muerto on 23 June 2003. A nest with four young was seen at the mouth of Many Cherry Canyon on 26 May 2004.

Canyon Wren (*Catherpes mexicanus*). Permanent resident. A family group of five was seen on the Middle trail on 4 June 2004 and family group was seen in upper Canyon del Muerto on 23 June 2004.

Bewick's Wren (*Thryomanes bewickii*). Permanent resident. A characteristic bird of pinyon-juniper woodlands.

House Wren (*Troglodytes aedon*). Migrant and possible summer resident. One was seen in upper Canyon del Muerto on 15 May 2004.

Marsh Wren (*Cistothorus palustris*). Migrant. One was seen in lower Canyon de Chelly on 19 September 2003.

Family Cinclidae

American Dipper (*Cinclus mexicanus*). Three old nests were seen although no birds were detected during the inventory. One nest, seen on 4 June 2003, was on Whiskey Creek just below the confluence of Coyote Wash. Two nests were seen on 23 June 2004 in upper Canyon de Muerto below Tsaille Dam at UTM 12 (NAD27 datum) 660095E 4014734N and UTM 12 (NAD27 datum) 659860E 4014570N.

Family Regulidae

Ruby-crowned Kinglet (*Regulus calendula*). A migrant and winter resident. One was seen in Canyon de Chelly on 19 September 2006. Eight were found wintering in the Russian olive-dominated riparian woodlands of the lower canyons on 16-17 December 2003.

Family Sylviidae

Blue-gray Gnatcatcher (*Polioptila caerulea*). Summer resident primarily in pinyon-juniper woodlands throughout the monument.

Family Turdidae

Western Bluebird (*Sialia mexicana*). Permanent resident. A fledgling was seen at Middle Trail Canyon, upper Canyon del Muerto, on 8 June 2003. Nestlings were heard in nest in a cottonwood at the mouth of Middle Trail Canyon, upper Canyon del Muerto on 26 June 2004. Frequent in Russian olives of the canyons in winter. On 16-17 December 2003, 103 were counted in the lower canyons.

Mountain Bluebird (*Sialia currucoides*). Permanent resident. A family group(s) of 12 was seen near Upper Wheatfields Creek on 26 June 2003. Fledglings were seen at Tsaile Lake on 30 June 2003.

Townsend's Solitaire (*Myadestes townsendi*). Permanent resident. Three were noted on 14 May 2003 on Sonsela Buttes. A used nest was found in upper Wheatfields Creek on 5 June 2003. One was noted in upper Monument Canyon on 1 June 2004. One was seen near Spider Rock on 19 September 2003.

Hermit Thrush (*Catharus guttatus*). Summer resident. Winters in Russian-olive dominated riparian groves of the lower canyons. Breeds in mixed-conifer woodland of the upper canyons. One was seen carrying food in upper Black Rock Canyon on 28 June 2003.

American Robin (*Turdus migratorius*). Permanent resident. An adult with a fledgling was seen in upper Black Rock Canyon on 27 June 2003. A fledgling was seen in lower Canyon de Chelly near Sleeping Duck on 11 June 2004. A fledgling was seen in upper Canyon del Muerto on 23 June 2004.

Family Mimidae

Gray Catbird (*Dumetella carolinensis*). Transient. One was seen near Newspaper Rock on 11 and 30 June 2004.

Northern Mockingbird (*Mimus polyglottos*). Summer resident primarily in open pinyon-juniper habitats.

Sage Thrasher (*Oreoscoptes montanus*). Summer resident. Breeds in the extensive sage flats bordering upper Wheatfields Creek, Whiskey Creek and Coyote Wash.

Family Sturnidae

European Starling (*Sturnus vulgaris*). Permanent resident. A flock of about 5,000 individuals was seen in lower Canyon de Chelly on 16 December 2003.

Family Bombycillidae

Cedar Waxwing (*Bombycilla cedrorum*). Migrant and winter resident. Forty-eight were seen at the ranger's office on 24 May 2004. Six were seen in lower Canyon de Chelly on 25 May 2004. Twenty-eight were seen in lower Canyon de Chelly on 16 December 2003.

Family Parulidae

Orange-crowned Warbler (*Vermivora celata*). Migrant. Records include one in Canyon de Chelly on 18 September 2003, two in Canyon de Chelly on 19 September 2003, one in upper Canyon de Chelly on 14 May 2004, and one in lower Canyon de Chelly on 8 October 2004.

Nashville Warbler (*Vermivora ruficapilla*). Migrant. One was seen in Canyon de Chelly on 19 September 2003.

Virginia's Warbler (*Vermivora virginiae*). Migrant and summer resident of brushy canyon slopes and perhaps also in riparian woodlands. A nest with 4 eggs was found above the head of Many Cherry Canyon on 21 May 2003. Distraction display near the Wheatfields and Whiskey creeks confluence was noted on 25 June 2003. Adults with full-sized fledglings were noted in upper Black Rock Canyon on 27 and 28 June 2003.

Yellow Warbler (*Dendroica petechia*). Although primarily a migrant across most of the interior of the Navajo Nation, singing males which were likely breeding birds were seen several times at Junction in 2004: five singing males on 12 May, single birds singing there on 24 May, 11 and 22 June and two singing there on 30 June.

Yellow-rumped Warbler (*Dendroica coronata*). Summer resident along the upper canyons in ponderosa pine and mixed-conifer woodland. Winter resident of Russian olive-dominated riparian groves of the lower canyons. Sixty-five were counted in lower Canyon de Chelly on 4 December 2003 and 93 were counted in the lower canyons on 16-17 December 2003.

Black-throated Gray Warbler (*Dendroica nigrescens*). Summer resident of pinyon-juniper woodlands. A fledgling was seen in upper Canyon del Muerto on 23 June 2004. This was the second most frequently detected bird on point counts during this inventory.

Townsend's Warbler (*Dendroica townsendi*). Migrant. One was seen at the confluence of Monument and Bat canyons on 18 September 2003, one was seen in Canyon de Chelly on 19 September 2003, and one was seen at the confluence of Black Rock Canyon and Canyon del Muerto on 7 October 2004.

Grace's Warbler (*Dendroica graciae*). Summer resident along the rims of the upper canyons in ponderosa pine woodlands.

Black-and-White Warbler (*Mniotilta varia*). Transient. One was seen singing in lower Canyon de Chelly on 30 June 2004 (B. Marshall and CTL). This is the first mid-summer record of this eastern North American species from the Navajo Nation.

Appendix E. Continued.

MacGillivray's Warbler (*Oporornis tolmiei*). Migrant. One was seen in upper Canyon del Muerto on 17 September 2003 and one was seen in Canyon de Chelly on 19 September 2003. Two were seen in upper Canyon del Muerto on 15 May 2004. A late migrant/singing male was seen near Sleeping Duck on 11 June 2004.

Common Yellowthroat (*Geothlypis trichas*). Summer resident and migrant. One was heard singing along the shore of Tsale Lake on 23 May and 6 June 2003. One was seen in lower Canyon de Chelly on 7 October 2004.

Wilson's Warbler (*Wilsonia pusilla*). Migrant. One was seen in Canyon de Chelly on 19 September 2003. Two were seen in lower Canyon de Chelly on 24 May 2004. One was seen in Canyon de Chelly on 25 May 2004.

Yellow-breasted Chat (*Icteria virens*). Summer resident in dense riparian brush of the lower canyons.

Family Thraupidae

Western Tanager (*Piranga ludoviciana*). Summer resident of the upper canyons. Migrant found in woodlands throughout the Monument. An exceptional sighting was one in the Russian olive near White House Ruin on 16 December 2003. A late northbound migrant was seen near Sleeping Duck on 11 June 2004. An adult carrying food was seen in upper Black Rock Canyon on 28 June 2003.

Family Emberizidae

Green-tailed Towhee (*Pipilo chlorurus*). Migrant and summer resident. The breeding population occurs in the extensive sage flats adjacent to upper Wheatfields and Whiskey creeks.

Spotted Towhee (*Pipilo maculatus*). Permanent resident. One of the most frequently detected species during this inventory. It was the most frequently detected species in riparian habitat but also occurs in pinyon-juniper habitats. It breeds throughout the length of the canyons from their head to the mouth. A fledgling was seen in lower Canyon de Chelly on 11 June 2004. On 16-17 December 2003, 89 were counted in riparian vegetation in the lower canyons.

Chipping Sparrow (*Spizella passerina*). Summer resident primarily in pinyon-juniper habitats but also occurs frequently in riparian habitat. Family groups and fledglings were noted on 25 June 2003.

Vesper Sparrow (*Pooecetes gramineus*). Migrant and summer resident. This is a characteristic bird of the extensive sage flats adjacent to upper Wheatfields and Whiskey creeks.

Lark Sparrow (*Chondestes grammacus*). Summer resident in open pinyon-juniper woodlands and desert scrub habitats. A family group was seen on Middle Mesa on 28 June 2003.

Sage Sparrow (*Amphispiza belli*). Migrant.

Appendix E. Continued.

Song Sparrow (*Melospiza melodia*). Winter resident and migrant in riparian vegetation.

Lincoln's Sparrow (*Melospiza lincolnii*). Migrant. One was seen in Canyon del Muerto on 17 September 2003.

White-throated Sparrow (*Zonotrichia albicollis*). A sparse migrant and winter resident. One was seen in lower Canyon de Chelly on 7 October 2004 and another was seen on 8 October 2004. One was seen in lower Canyon de Chelly on 16 December 2003.

White-crowned Sparrow (*Zonotrichia leucophrys*). Migrant and winter resident. Winter birds seem to be restricted to riparian brush and trees.

Dark-eyed Junco (*Junco hyemalis*). Permanent resident. This was the most abundant species in the riparian brush and trees of the lower canyons on 16-17 December 2003 when 184 were recorded.

Family Cardinalidae

Black-headed Grosbeak (*Pheucticus melanocephalus*). Migrant and summer resident. A fledgling was seen in upper Black Rock Canyon on 27 June 2003. Occurs primarily in riparian habitat.

Blue Grosbeak (*Passerina caerulea*). Summer resident in riparian and adjacent habitats primarily in the lower canyons.

Lazuli Bunting (*Passerina amoena*). Summer resident in riparian habitat. A female feeding a fledgling was seen in lower Canyon de Chelly on 22 June 2004. Although relatively few were detected these were distributed from Palisades Creek to the lower canyon.

Indigo Bunting (*Passerina cyanea*). Summer resident. One was seen at the campground on 16 May 2004 (C. Babbitt pers. com.). A singing male was seen near Sleeping Duck on 22 June 2004.

Family Icteridae

Red-winged Blackbird (*Agelaius phoeniceus*). Likely a permanent resident. Breeds at Tsaille Lake and possibly near Newspaper Rock in the lower canyon. An alarmed pair was seen immediately below Tsaille Lake on 22 May 2003.

Western Meadowlark (*Sturnella neglecta*). Summer resident. Found during the 2003 inventory season in the extensive sage flats and the converted sagebrush flats east of upper Coyote Wash, north to Wheatfields Creek.

Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*). Migrant and possible breeder at Tsaille Lake.

Appendix E. Continued.

Brewer's Blackbird (*Euphagus cyanocephalus*). Summer resident along the open creek bottoms above the upper canyon heads. An alarmed pair was seen just below Tsaille Dam on 22 May 2003.

Brown-headed Cowbird (*Molothrus ater*). Summer resident.

Bullock's Oriole (*Icterus bullockii*). Summer resident. Seemingly less common than anticipated given the extent of the development of riparian habitat in the canyons.

Family Fringillidae

Cassin's Finch (*Carpodacus cassinii*). Winter resident and migrant. One was seen in lower Canyon de Chelly on 8 October 2004.

House Finch (*Carpodacus mexicanus*). Permanent resident. One of the most frequently detected and widespread species in this inventory. It was most often detected in pinyon-juniper woodlands.

Red Crossbill (*Loxia curvirostra*). Permanent resident. One was seen in upper Canyon del Muerto on 23 June 2004.

Pine Siskin (*Carduelis pinus*). Permanent resident. One was detected on the rim of Wheatfields Creek on 21 May 2003, one was in upper Canyon de Chelly on 8 June 2003, and several were seen in lower Canyon de Chelly on 8 October 2003.

Lesser Goldfinch (*Carduelis psaltria*). Summer resident and migrant. Twenty-five were seen in lower Canyon de Chelly on 8 October 2004.

American Goldfinch (*Carduelis tristis*). Migrant and possible winter resident. One was seen in lower Canyon de Chelly on 10 May 2004.

Family Passeridae

House Sparrow (*Passer domesticus*). Permanent resident. Found at the housing and campground area at the mouth of the canyon.

Figure 1. Map of Canyon de Chelly National Monument including survey points and routes.

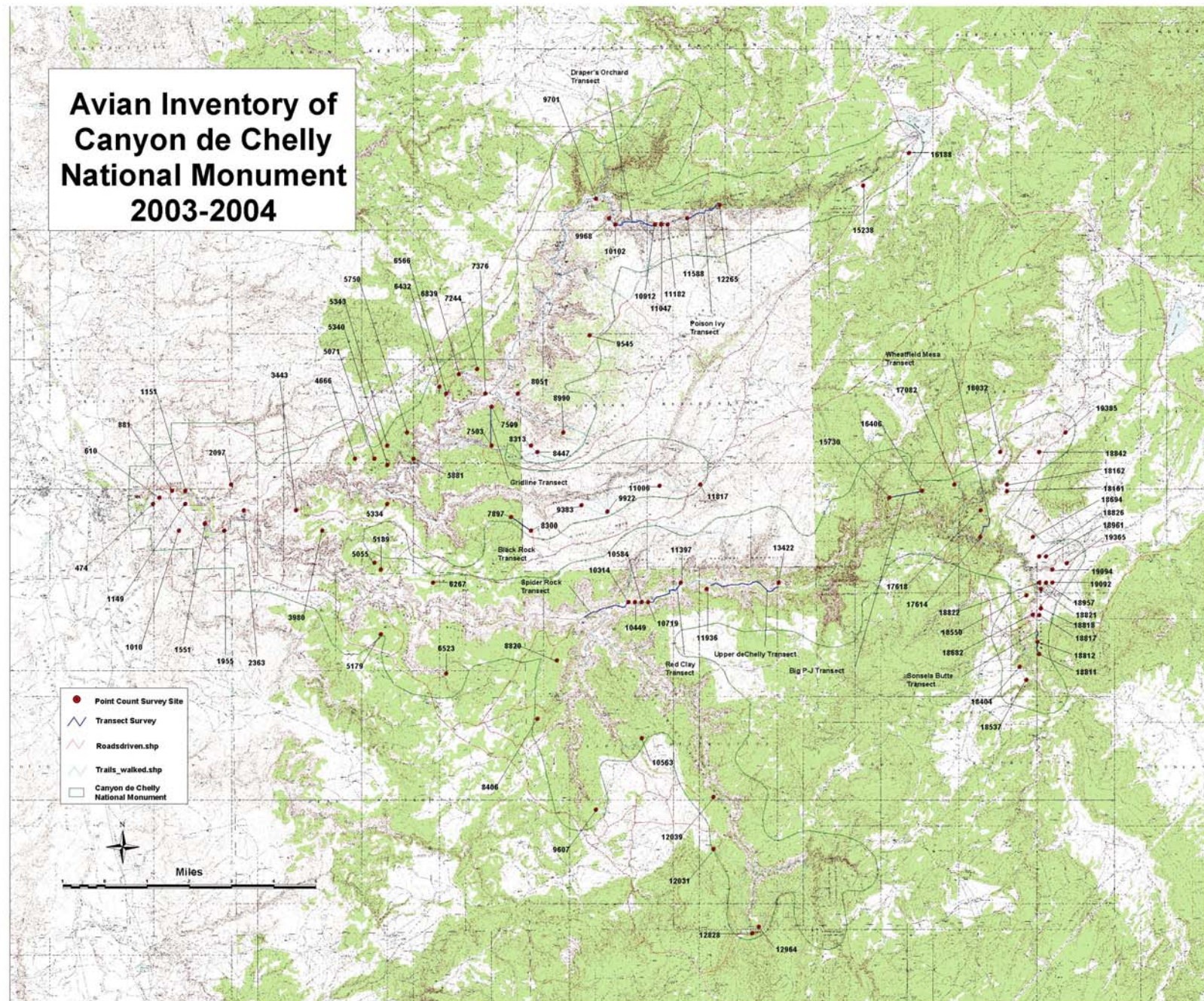


Figure 1