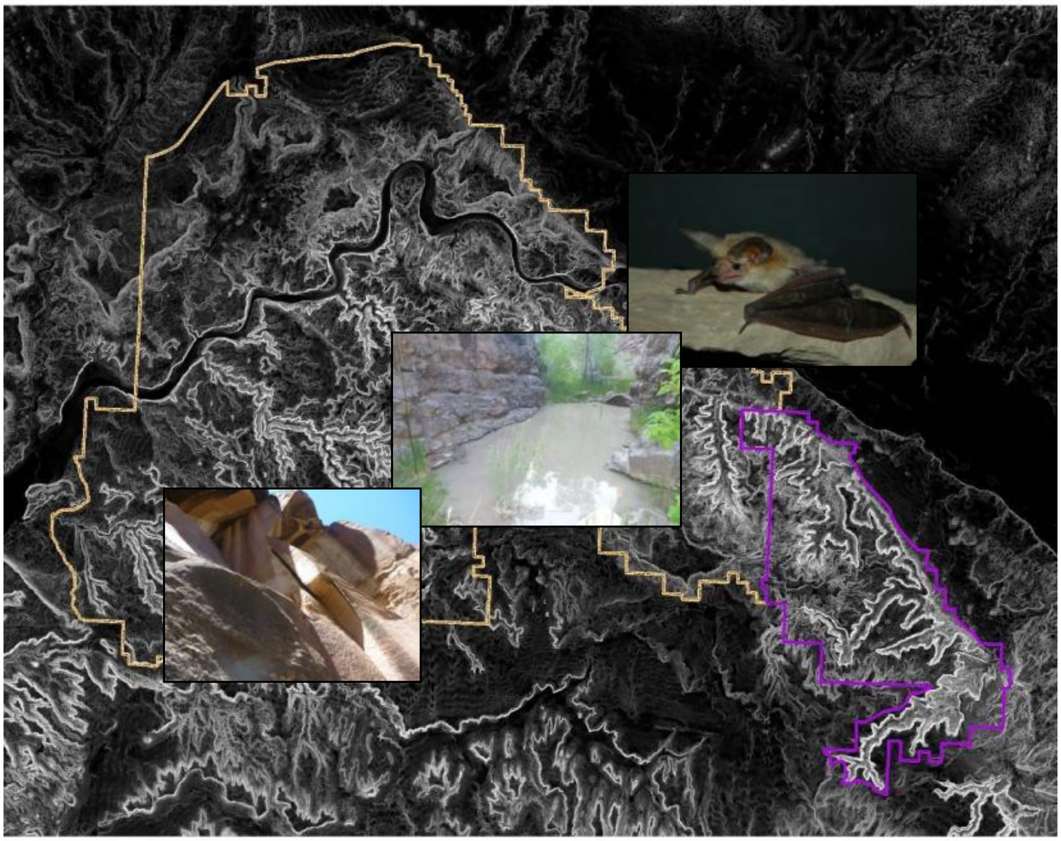
Bat Composition and Roosting Habits of Colorado National Monument & McInnis Canyons National Conservation Area: 2014 to 2016



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Introduction and Objectives

This report provides results and a summary of work for the study "Bat Composition and Roosting Habits of Colorado National Monument and McInnis Canyons National Conservation Area." This study was conducted by the Terrestrial Section of Colorado Parks and Wildlife at the request of Colorado National Monument (Project PMIS 197716) and the Bureau of Land Management (L14AC000). I include results of mist netting efforts, radiotelemetry findings, and acoustic recordings, collected from May through August of 2014, 2015, and 2016. In addition, results for museum and database searches of historic specimens and records for the study area are provided.

Pinyon-juniper forests and cliff-face crevices of Colorado's West Slope support the highest diversity of bat species in the state (Armstrong et al. 1994) and compose the major habitat type found in Colorado National Monument (COLM) and the McInnis Canyons National Conservation Area (MCNCA). Consequently, for bats utilizing the urbanized Grand Valley and its surroundings, COLM and MCNCA likely serve as an important refuge from a variety of anthropogenic induced threats, including but not limited to contaminants (Thies and McBee 1994, Clark 2001, O'Shea et al. 2001, O'Shea and Johnson 2009, Yates et al. 2014), noise (Bunkley et al. 2014), eviction (Neubaum et al. 2007), and harassment (Racey and Entwistle 2003). According to 2010 Census data (www.colorado.gov/demography) Mesa County was the fifth fastest growing county in Colorado from 2000 to 2010, experiencing a change of 26%. Rapid levels of urbanization undoubtedly leads to increased disturbance and a reduction in natural areas available for ecosystem functions, making refuges such as COLM and MCNCA even more important for bats.

Additional threats to bat species inhabiting this area may arise due to climate change. Periods of drought, as experienced over the last decade, have the potential to alter or eliminate ephemeral water sources and create high intensity fires, particularly where these threats are already exacerbated by historic management decisions. A good example of such landscape scale changes occurring in a similar setting in Colorado is that of Mesa Verde National Park. Eight large fires burned 21,630 hectares between 1930 and 2003, effectively removing large portions of the parks pinyon-juniper woodlands (Floyd et al. 2003a). Of those burns, 15,663 hectares, or 73% of the park area, occurred in the last two decades alone and comprise about three times the total area burned during the previous 100 years. The Bircher and Pony fires alone burned 12,864 hectares in 2000 (Floyd et al. 2003a).

Water sources, insect abundance, and roosting opportunities all stand to be altered by wildfire and may influence the bat fauna using them. The burns at Mesa Verde have released significant amounts of sediment that has filled many ephemeral water sources in the canyons and likely altered how bats use the landscape. O'Shea et al. (2011) suggested that some changes noted in the bat fauna after the big wildfires compared to studies conducted prior (Chung-MacCoubrey and Bogan 2003) could be attributed to a sampling bias resulting from changes in the availability of water sources where capture work was conducted. Use of different types of water sources by bat species varies based on characters such as size and surrounding clutter, as well as their prevalence and permanence (Geluso 1978, Jackrel and Matlack 2010). Changes to water sources may have repercussions on reproduction (Adams and Hayes 2008, Adams 2010), feeding ability (Pierson 1998), health tied to use of alternate water sources such as sewage lagoons (Pilosof et al. 2013), and roost selection (Rabe et al. 1998). Impacts on bat species from climate change and severe drought should be monitored long term (Geluso and Geluso 2012), suggesting the need to resurvey sites with historic data. Adams (1990, 1993) survey work at COLM focused capture efforts at a few ephemeral pools and artificial water sources, some of which are no longer functioning. Consequently, insight into how bats use ephemeral water sources that remain and potential impacts from drought and removal of artificial waters sources may help explain changes noted in this study from previous and future efforts.

The potential for high intensity fires to destroy or highly alter a large proportion of COLM and MCNCA's forests have been compounded by drought and intentional fuels reduction activities. Such changes at a landscape scale, in conjunction with changes in water availability, may alter where bats choose to roost and forage. Many of the bat species prviously found at COLM or expected to be there based on habitat associations have been documented using tree snags as roosts in piñon-juniper dominated forests (Chung-MacCoubrey 2005). When surveys for bats were conducted at Mesa Verde National Park after the large wildfires researchers were unsure where bats would be roosting. O'Shea et al. (2011) and Snider et al. (2013) found that bats were almost entirely using rock crevices for roosts, often in cliff faces. Consequently, it has been suggested that in areas where rock crevices are abundant bats may select for these features over other available options such as trees, as they offer a number of benefits including permanence, thermal advantages of releasing heat more slowly, and are potentially impacted by environmental changes, such as fire, to a lesser degree.

In addition to those threats already mentioned, White-nose syndrome (WNS), a fungal disease responsible for unprecedented mortality in hibernating bats at its origins in the northeastern U.S., has steadily progressed into mid-west portions of the country (Reeder and Moore 2013). WNS is estimated to have killed a minimum of 5.7 to 6.7 million bats in eastern North America since 2006 (Reeder and Moore 2016). This introduced disease has spread very rapidly since its discovery in January 2007, is now documented as close to Colorado as Eastern

Nebraska, Eastern Oklahoma, and the Texas panhandle. WNS has also been confirmed in Washington State from an area not known for having many cave resources. The spread of this disease into these Midwestern and Pacific states poses a considerable threat to hibernating bats throughout North America. As WNS spreads, the challenges for understanding and managing the disease continue to increase. Given that evidence of WNS has not been found in Colorado yet, a potentially small window of time may exist to collect baseline data for bat activity and habitat use prior to the fungus arriving. Such data allows for more informed management of bat species should WNS be found at COLM and MCNCA.

Previous knowledge pertaining to the roosting habits of bats at COLM and MCNCA is limited. A general inventory of mammals in COLM was conducted by Miller (1964) who opportunistically documented seven bat species and noted possible segregations by elevation. Two limited bat surveys were conducted intermittently at COLM from 1989 to 1993 (Adams 1990, Adams 1993) over relatively small time windows, and identified 9 of 17 species expected to occur in COLM based on habitat availability (Oliver 2000, Armstrong et al. 2011). These efforts added four new species to COLM from those initially confirmed by Miller (1964).

Improved technological advances in survey equipment are expected to aid Colorado Parks and Wildlife (CPW) investigators in adding several new species to the current bat species occurrence list for COLM and the first list for MCNCA. Mist netting over a longer period of the summer and at multiple sites, along with use of acoustic equipment, will help refine what we know about where species are occurring (spatial) and when (temporal), their reproductive patterns, and highlight whether or not segregations by species, sex, age, and/or elevation is occurring. Revisiting previously surveyed sites by Miller (1964) and Adams (1990, 1993) will identify if activity patterns of previously identified species are stable or have changed. Bats using the canyonlands of COLM and MCNCA for roosting may be making nightly migrations down canyon to capitalize on the abundant water and insect resources available along the Colorado River and its bottomlands. Other species, such as free-tailed bats (*Tadarida brasiliensis*), are known to forage in agricultural valley settings due to the abundance of insects associated with those areas (Svoboda and Choate 1987). Previous work at COLM by Miller (1964) observed bats flying down canyon along cliffs at dusk and suggested that such migrations may be occurring.

Survey work by Adams (1990) at COLM indicates several bat species use the historic road culverts and tunnels, which undergo regular maintenance activities, as night roosts. Refined information provided by this study will inform future management decisions to better protect sensitive roost sites, such as maternity colonies, located in cliff faces, trees, or anthropogenic structures. This information is time sensitive given COLM's upcoming planning documents including the Wilderness and Climbing Management Plan and other future management actions. Several species of bats known or expected to utilize COLM and the MCNCA are state or federal species of concern. In addition to the previously confirmed fringed myotis (*Myotis thysanodes*), the Townsend's big-eared bat (*Corynorhinus townsendii*), spotted bat (*Euderma maculatum*), and big free-tailed bat (*Nyctinomops macrotis*) are special status species at the federal level that would be expected in COLM and the MCNCA. Verifying use by these sensitive species will help aid management decisions.

The goal of this project was to address fundamental issues related to climate change and its effects on water resources and wildfire, collect baseline data regarding bat activity prior to WNS, and inform planning and on-the-ground conservation actions that promote bat stewardship. To increase information on bat species occurrence and roosting habits at COLM and MCNCA, this three-year assessment investigated how the bat community is utilizing the old-growth piñon-juniper woodlands and cliffs as roosting and foraging habitat. Investigators utilized acoustic detector surveys and radio telemetry to identify species occurrence, roost site selection, foraging habitat, and areas of concern (e.g. maternity roost locations) to inform planning and management decisions. Consequently, there were seven objectives of this study: (1) to compile, review, and synthesize historic records on the occurrence, status, roosting habits, and natural history of bats at and around COLM and the MCNCA; (2) identify water sources at and around COLM and the MCNCA where bats can be mist netted, and use these sites for assessing the current status of species occurrence and to obtain individuals for radio-tagging; (3) capture bats using mist nets and fit selected individuals with miniaturized radiotransmitters; (4) follow radio-tagged bats to their roosts and obtain data on emergence flights, species composition, and selection of maternity roosts; (5) utilize acoustic detectors to augment species occurrence information, determine possible use of habitat types by foraging bats, and use activity patterns to determine if nightly migrations between the canyon country and the Colorado River/Grand Valley are occurring; (6) compile, analyze, and synthesize all data gathered; and (7) provide a final report on the project, including recommendations for conserving bats.

Study Area

COLM and the MCNCA incorporate over 58,000 ha of contiguous habitat situated in western central Colorado adjacent to and south of the Grand Valley (Figure 1). The area is composed of a series of long linear mesas transected by deep canyons generally draining in a northerly direction and terminating at the Colorado River. Sheer canyon walls composed of sandstone stair-step up and away from the river and its tributaries, with elevations ranging from 1,320 m along the river up to 2,170 m on Black Ridge. Sample sites encompassed by habitat along the Colorado River through the Grand Valley and Ruby-Horsethief Canyons, including those in Colorado Parks and Wildlife State Wildlife Areas and State Parks, are composed of riparian vegetation such as cottonwood (*Populus fremontii*), boxelder (*Acer negundo*), and Russian olive (*Elaeagnus angustifolia*) trees, as well as tamarisk (*Tamarix* spp) and willow (*Salix* spp) shrubs. Lowland flats near the river are generally dominated by high-desert shrublands including sagebrush (*Artemisia tridentata*), greasewood (*Sarcobatus vermiculatus*), and prickly-pear cactus (*Opuntia polyacantha*). Montane forests are common across mesa tops, within canyon bottoms, and along scree slopes between cliff bands, with pinyon-juniper (*Pinus edulis*, *Juniper monosperma*), Gambel's oak (*Quercus gambelii*), and limited ponderosa pine (*Pinus ponderosa*) stands along drainages. Small riparian corridors exist in the larger canyons and may have cottonwood, boxelder, tamarisk, and willow as well. The river systems and their associated vegetation provide valuable foraging and drinking areas for a variety of bat species due to the prevalence of insects and flat water. A number of upland sites composed of impounded water and some natural ephemeral pools exist throughout COLM and MCNCA, and undoubtedly provide feeding and drinking opportunities in areas that normally would be less suitable for such use by bats. The climate in the study area is characterized as high desert with an annual precipitation of just over 23.9 cm and an average temperature of 12°C (1981-2010 data, National Oceanic and Atmospheric Administration National Climatic Data Center 2014). Summer temperatures can reach highs of over 38°C with winter lows falling below freezing (data downloaded from http://mesowest.utah.edu/, last viewed 8/29/2017).

Methods and Materials

Mist Netting

We sampled bat fauna by setting mist nets (Avinet, Inc., Dryden, NY) over calm water, flight corridors, and roosts to capture bats in hand following techniques described in Kunz et al. (2009). Nets were opened 20 minutes after sunrise or earlier if bats were observed in flight and run for four hours from that time. In 2016, netting duration was dependent upon captures for radio application and abbreviated if candidates were acquired prior to the four hour window. Water sources consisted of naturally formed ephemeral pools generally found in canyon bottoms, artificial impoundments, a sewage lagoon, and the Colorado River (Table 1). A night roost in the lower tunnel from the west entrance was surveyed for use and bats captured using a hand held H-net (Waldien and Hayes 1999). In addition, several drainage tunnels below the Rimrock Drive were checked for use by bats using butterfly nets. Mist netting effort was reported as "net-nights" or the total linear lengths of nets deployed each night divided by 9 m, the typical length of net set during this survey (range 2.5-18 m in length). Personnel working with bats wore leather gloves covered with surgical gloves and had pre-rabies exposure prophylaxis as described in capture and handling procedures outlined by the Colorado Parks and Wildlife Bat Capture and Handling Guidelines (2015) and approved by the National Park Service Institutional Animal Care and Use Committee. To reduce stress animals were generally held for a few minutes in cloth bags before being measured. Bats were weighed, forearms measured, and species determined. We followed criteria in Racey (2009) to determine sex and reproductive condition of each individual. Age was determined based on degree of ossification of the phalangeal epiphyses (Brunet-Rossinni and Wilkinson 2009) by holding the bats wing up to a light source to judge the degree of translucence of the joints. Bat specimens were collected only on rare occasions when an unexpected casualty occurred with vouchers retained at the Museum of Southwestern Biology (MSB), University of Albuquerque, New Mexico. Based on habitat and historic records for Colorado National Monument and Mesa County 17 species may be expected to have at least the potential of inhabiting the study area as a resident or occasional visitor (Table 2).

Historic Records

In this report I also provide a summary of efforts to compile the past records of bats at COLM and MCNCA through a literature survey, and search of museum and agency databases. I queried some museums directly (e.g. collections housed at COLM) as well as the Arctos database (http://arctosdb.org/). The latter provides online access to mammal collection data for a consortium of 84 natural history museums in the United States. The earliest source of data for bats of COLM came from records at the Museum of Natural History collection at the University of Colorado (UCM). Most of the specimens in this collection stem from general mammal surveys from 1961 to 1963 carried out by Miller (1964) while earning his Master of Science degree from Oklahoma State University (Appendix A, Table A1). The bulk of the specimens retained in the collection at COLM were collected and prepared in 1989, 1990, and 1993 by Adams (1990, 1993) during bat surveys of the Monument (Appendix A, Table A2). The Colorado Parks and Wildlife capture database contains records of bats collected locally that are generally not documented within the larger museum databases because data is collected for management or monitoring actions rather than as part of a research effort and specimens are not retained. Consequently, additional records for Mesa County are noted in the Colorado Parks and Wildlife capture databases (Appendix A, Table A3) to provide evidence of species expected to be found in the study area. All databases were referenced to provide the most complete set of records for COLM and MCNCA. Some records from the three databases are duplicates and therefore are not intended to provide a cumulative total. For a complete list of bat species previously confirmed or expected to use COLM and MCNCA along with their associated four letter abbreviations used in naming conventions for this effort see Table 2.

Radio Tracking Bats and Roost Information

Miniature radiotransmitters (0.3–0.5 g, model A2414 or A2415, Advanced Telemetry Systems, Isanti, Minnesota) were attached to bats on the dorsal skin between the scapulae using Perma-Type Surgical Cement (Perma-Type Company, Inc., Plainville, Connecticut). As suggested by Aldridge and Brigham (1988), a ''5% rule'' of transmitter mass in relation to body mass was followed, which has been shown to have no major adverse long-term effects on big brown bats (*Eptesicus fuscus*) in Colorado (Neubaum et al. 2005). Bats were held for approximately 20 minutes after attachment of transmitters to insure adhesion. We then tracked radiotagged bats to determine summer maternity roost locations, roosting habitat, and individual roost characteristics. We initially searched for radio signals using scanning-telemetry receivers (R-1000, Communication Specialists, Inc., Orange, CA) and a roof-mounted 5-element yagi or whip antenna on vehicles. In cases where signals were not found from the road, scanning commenced on foot utilizing high points and trails in the study area. In all cases, locations as precise as terrain allowed were determined on foot using a handheld 3-element antenna. In 2014, 2015, and 2016, one flight in a fixed-wing aircraft was taken over COLM and the adjacent MCNCA in an attempt to locate missing signals that could not be found from roads or trails. Once roosts were located via the radio telemetry signal, an accurate location was collected using a global positioning system (GPS) to acquire Universal Transverse Mercator coordinates (NAD 83, Zone 12) and used for development of a geographic information system (GIS) layer. The location layer was then used to calculate movement distances between capture and roost sites. Exit counts conducted at emergence were used to estimate numbers of bats using maternity roosts when possible.

Acoustic Detectors

To record bat vocalizations, ultrasonic acoustic detectors (Models SM2BAT or BAT+, Wildlife Acoustics, Inc., Concord, MA) were deployed at randomly stratified locations based on habitat type. Detectors were temporarily mounted to trees with the microphone affixed to a protruding branch and oriented in a direction where clutter was low to insure good recording quality. In 2014, call recordings were limited to low frequency species at or below 10 kHz using settings within the acoustic detectors. Two bat species, spotted and big-free tail bats, emit calls in this low frequency range but can be masked by calls from the remaining bat cohort or missed entirely due to less sensitive settings used to record the full spectrum of bat calls. Consequently, activity levels for these two species may not be accounted for in a reliable manner when full spectrum recording is used. Detector settings used to cover the full spectrum of bat species were collected in 2015 and 2016.

To ensure we met the assumptions that the amount of echolocation calls at a site reflects the amount of use by bats, sites were sampled more than once during the study and recorded throughout the entire night (Hayes 2000). Recordings were collected over a 10 night sampling window over two separate time periods, once in early summer (late May to early July) and once in late summer (mid July to late August) to address additional assumptions of spatial and temporal variability (Sherwin et al 2000). This schedule accounts for seasonal variation due to changes in weather patterns and increased numbers of individuals due to young of the year becoming volant (Table 3). Detector settings matched that of the North American Bat Monitoring protocol with recording initiated 15 minutes prior to sunset, running throughout the night, and stopping 15 minutes after sunrise. Calls were analyzed using SonoBat 3.1.5 (SonoBat, Arcata, CA) with vocalizations compared to reference bat calls from the Great Basin bat call library. SonoBat call analysis parameters were set to use a discriminant probability threshold of 0.9 and an acceptable call quality of 0.8 with a maximum of eight calls. The discriminant probability refers to the probability of a call sequence falling within the centroid of the multi-dimensional data space for reference calls for a species. Two outputs result from the analysis for assessing the likelihood of a call sequence matching reference calls from a particular species. The "sequence classification by vote" identifies the species by requiring that the species with the greatest number of calls classified be at least twice as prevalent as the sum of the second and third most abundant species classifications. The second output, the "mean sequence classification", is based on the mean parameter values of the most prevalent classification group which uses these mean values (minimum of two calls) in a decision tree engine. If the values fall below the minimum threshold for a classification group, the call is not attributed to that group, but instead is displayed with the species groups that sum to the thresholds for the last decision tree step attained. A consensus value is also generated, which indicates the species designation if determined by both methods. We report species determinations based on this consensus value. For data collected in 2015 and 2016, if a consensus value was not attained, we report the call as a general classification of high frequency (40–50 kHz) or low frequency (10–30 kHz) species. Analysis of data over all three years determined if the assumption that calls collected for all species and general classifications had an equal probability of detection.

In addition, all calls assigned a suspect identification based on species expected to occur in the region, referencing historic records and habitat suitability, were vetted manually. Good reference calls currently are not available to use as a comparison for big free-tailed bats when processing calls in automated software. It should be noted that most calls for this species were classified as the greater mastiff bat (*Eumops perotis)*, a sympatric species of the big free-tailed bat, with the nearest record in California. The greater mastiff bat is well represented in the call library used by the Sonobat software which led to the misclassification of this bat in our recordings. In addition, similarities between western red bats (*Lasiurus blossevillii*) and two other high frequency species, canyon bats (*Parastrellus hesperus*) and Yuma myotis (*Myotis yumanensis*), led to calls believed to be the latter two being misclassified as the former. Consequently, we checked a random sample of calls manually for these species and conferred with Sonobat's software engineer Joe Szewczak to confirm this logic before reclassifying recordings.

Statistical Analysis

Summary statistics (means, minimums, maximums, and ranges) and simple proportions were calculated as suggested by Johnson (1999) and Anderson et al. (2000, 2001). Data collected from bats captured in mist nets, including identification, and assessment of sex and reproductive condition, is compiled. Miller (1964) delineated an upper and lower life zone at an elevation break of 1,734 m (5,780 ft) based on elevations that coincided with canyon rims and vegetative communities. Comparisons to these upper and lower life zones were made to see if changes in species richness have occurred over time. In addition, a summary of past records of bats in or near COLM and MCNCA is included for comparison. Logistic regression (GLM function, Program R 3.1.3, 2015) was used to compare categorical data related to sex and reproduction proportions, across life zones and between years respectively, and an information-theoretic approach used to select between competing explanatory models (Burnham and Anderson 2002). The proportion of individuals in one category (P_1) was compared to the proportion in a second category (P_2) and modeled under the constraint $P_1 = P_2$ (all data pooled), and compared with a general model where $P_1 \neq P_2$ (allowing for a group effect). Akaike's Information Criterion corrected for sample size (AIC_c; Burnham and Anderson 2002) was used to rank models. AIC_c differences (Δ_i; difference in AIC_c score between i^{th} and top-ranked model) and Akaike weights (w_i; probability that the i^{th} model is the best approximating model among candidate models) were also calculated. The best fitting model was assumed to have the lowest AIC_c score with a competing model occurring only if separated by < 2 ΔAIC_c (Burnham and Anderson 2002). This report compares findings from three seasons of surveys on this study with those of Adams (1990, 1993) efforts using mist nets to see if similar trends in species composition and distribution hold. Further comparisons of use by bats of the pinyon-juniper system are made to studies conducted in similar habitats of the Colorado Plateau such as the Book Cliffs (Chung-MacCoubrey 2008), the La Sal National Forest (Wright 2012), Dinosaur National Monument (Bogan and Mollhagen 2009, Neubaum and Navo 2010), and Mesa Verde (O'Shea et al. 2011). A global information system (GIS) of capture and roost locations was used to determine minimum distances moved between these sites as well as those between multiple roost locations used by individual bats using the Point Distance tool in ArcMap (Esri, Redlands, CA).

Results

Mist Netting and Historic Records

Eleven sites were sampled for bats using mist nets in 2014 and successfully identified 14 of the 17 species of bats considered as possible to occur in the study area (Oliver 2000, Armstrong et al. 2011; Table 2). An additional 12 sites were sampled in 2015 and 2 in 2016 for a total of 25 sites visited over the three summers of the survey (Table 1). In 2015, the spotted and Brazilian free-tailed bats (*Tadarida brasiliensis*) were documented in hand; bringing the list to 16 species confirmed using mist net efforts (Table 2). Elevations of sites ranged from the highest site sampled on Black Ridge at 2,059 m to the lowest site along the Colorado River at 1,320 m. A total of 899 bats were captured over 94 nights between May 26 to August 14 2014, May 7 to August 27 2015 and May 24 to August 8 2016, for a total effort of 397 net-nights (Tables 4, 5, 6; Figure 2).

Species richness and abundance for mist-netted bats were fairly consistent across the first two years with big brown bats, Yuma myotis, and canyon bats accounting for the top three highest capture totals (Table 2; Figures 2, 3). Totals were biased towards Yuma myotis in 2016 as this species was the focus of capture efforts to increase roost sample sizes through radiotelemetry work. The long-legged myotis (*Myotis volans*) accounted for almost 10%, and the pallid bat (*Antrozous pallidus*) and silver-haired bats (*Lasionycteris noctivagans*) for 5% each of the total captures during 2014 - 2016 (Table 2; Figure 3). The remaining 10 species summed accounted for 12% of the total bats captured. Of the 16 species confirmed during the study, five were new to COLM (Table 2). One additional species, the Allen's big-eared bat (*Idionycteris phyllotis*), was confirmed in hand for the first time in Colorado, with the collection of a mummified female at the Fruita section of James M. Robb State Park in July of 2014 (Adams and Lambeth 2015). This species had previously been described in Colorado only from La Sal Creek near the Paradox Valley based on an acoustic recording (Hayes et al. 2009). Capture effort and numbers of bats caught in mist nets varied by site, date, and year on several notable occasions (Tables 4, 5, 6, 7). For example, in 2014, 34 silver-haired bats were caught in mist nets making this the fifth most common species captured in the study area that year. Numbers were heavily weighted towards males with nearly all captures occurring before July. In 2015, only nine silver-haired bats were caught despite increased capture efforts. Percentages of total captures for this species varied by year with 10.2% in 2014, 2.4% in 2015, and 0.9% in 2016 (Tables 4, 5, 6). The most extreme case of variation in capture totals by date occurred in 2015 with 65 big brown bats captured June 8 on Black Ridge while only five were captured there two weeks later on June 25. In general, capture success, as reflected by bats caught per hour, peaked in late June and declined from mid-July into August (Table 7).

Variation in species, sex, and age were also noted when considering lower and upper life zones delineated by elevation (above and below 1,734 m). Because all but two 2016 capture efforts occurred at lower elevation sites to target Yuma myotis for radiotracking work, data from this year was not considered in the analysis for variation by sex and life zone. Most species were documented at both lower and upper elevation sites from 2014 - 2015 (Tables 5, 6). Twice as many bats were captured at lower versus upper life zone sites (603 vs. 295), with 24% more of the total effort spent sampling at lower sites (lower = 299.0 net-nights vs. upper = 181.3 net-nights). Three species, the little brown myotis (*Myotis lucifugus*), fringed myotis, and big free-tailed bat, were captured only at lower elevation sites, and all but one capture for the pallid bat were at lower life zone sites. Conversely, the spotted bat, represented by one individual, was captured at an upper life zone site. Of the four most dominant species based on capture numbers, the Yuma myotis and canyon bats were captured in higher proportions at lower life zone sites, and big brown bats and long-legged myotis at upper life zone sites (Table 8). Higher proportions of silver-haired bats and western small-footed myotis (*Myotis ciliolabrum*) were found at upper life zones with pallid bats and the fringed myotis at lower life zone sites. Despite having a higher proportion of total big brown bat captures at upper life zone sites, this species was common across both life zones and the only species in 2014 where general models supported a difference in sex ratios by life zone, with more females at lower life zone sites (Table 9). In 2015, higher proportions of female canyon bats were captured at lower life zone sites (Table 9). All other species had competing models for sex ratios by life zone (Table 9) suggesting no difference in proportions. However, capture numbers for some species (e.g. Yuma myotis) were markedly lower for a given life zone, suggesting that the majority of individuals for that species, regardless of sex, are using the lower life zone (Table 8). In addition, age was strongly tied to life zone with 111 of the 123 juvenile bats of all species captured from 2014 - 2016 occurring at lower life zone sites (Table 8).

Of the 16 species captured in mist nets, females of 11 were confirmed to be reproductively active (Table 10). The earliest reproductive female, a pregnant big brown bat, was captured on May 27 in 2014. Pregnant bats continued to be caught into the last week of June or first week of July, depending on the species, when a distinct transition to lactating females occurred in all three years. Lactating bats were caught as early as June 22 and as late as August 10. Post-lactating females were first noted for eight species during the last week of July and first two weeks of August. Female big brown bats and long-legged myotis were first noted as post-lactating during the last week of July. Four other species were post-lactating by this time as well given that the first juvenile bats for them were noted during the last week in July (Table 10). Determination of lactation and post-lactation can be difficult to assess during the initial time of transition for adult female bats. Comparison of the proportions of reproductive females by species captured in 2014 – 2015 and 2015 - 2016 generally did not differ between years (Tables 11, 12). Based on an AIC difference > two and model weight of 0.85, the general model has weak support for Yuma myotis in 2014 versus 2015, suggesting a slightly higher proportion of reproductive females were captured in 2014 for this species. However, records pooled across species between years show strong support for the general model from 2014 to 2015 and week support from 2015 to 2016, suggesting at least some cumulative differences in proportions of reproductive females by year (Tables 11, 12).

Records for 79 bat specimens of 13 species collected from Mesa County were found by querying Arctos (Appendix A, Table A1). Most of these specimens are housed at the University of Colorado Museum of Natural History (UCM), and the Museum of Southwest Biology (MSB). Of these records, 20 were located in the study area and are composed of six species (Table 13). Currently, COLM houses 11 specimens composed of nine species as vouchers for the Monument and greater study area (Appendix A, Table A2). The two specimens labeled as little brown myotis appear to be long-legged myotis based on the presence of keeled calcars which would lower the number of voucher species to eight. An additional 775 capture records for 15 species were noted in the Colorado Parks and Wildlife bat database for Mesa County with 39 records composed of 11 species within the study area (Appendix A, Table A3). Many of these records originated from abandoned uranium mine surveys conducted in the Gateway/Uncompahgre Plateau country (Navo 2001). Three of the four species most commonly mist netted in 2014 - 2016 at COLM and MCNCA (big brown bats, long-legged myotis, and Yuma myotis) were among the species most numerous in this subset of the database. The notable exception is the canyon bat for which only one record was present. It is unclear why this species is not more prevalent in this database but may be tied to a sampling bias for those locations.

Radiotelemetry and Roost Selection

To investigate roost selection by bats at COLM and MCNCA, mist netting efforts were used to learn which species are most prominent in the study area and deployment of transmitters was then prioritized towards these species. However, an effort to track all species thought to be reproductive residents in the study area was made. Sixty bats of 11 species had radio transmitters affixed (53 reproductive females, 4 nonreproductive female, and 2 adult males and 1 juvenile male) during three summers (late June through mid-August 2014 – 2016; Table 14). Three times as many transmitters were deployed at lower versus higher elevations, with 45 and 15 transmitters respectively. Yuma myotis were the focal tracking species in 2016 and consequently had the most transmitters affixed of any species during the three year study (29 individuals or 48%). Big brown bats followed with eight individuals (13%), and long-legged myotis and canyon bats each with seven (12%). Numbers of small-sized bat species tracked, other than the canyon bats, were prioritized due to their prevalence, and were limited by transmitter size and availability, with transmitters affixed to one California myotis in 2014 and one western small-footed myotis in 2015. Finally, transmitters were affixed to three fringed myotis, two pallid bats, two Brazilian free-tailed bats, two Townsend's big-eared bats, and one big free-tailed bat. The relatively small number of captures and lack of reproductive females for the western long-eared myotis (*Myotis evotis*) did not allow for tagging of this species despite our interest given their past listings as a federal species of concern. In addition, hoary (*Lasiurus cinereus*) and silver-haired bats were not tracked as they are generally considered nonreproductive migratory species. Although silver-haired bats accounted for almost 5% of all captures, most records occurred early in the summer and nearly all were nonreproductive males.

Radiotracking efforts and incidental observations yielded 63 roosts for 46 tagged bats, with 14 bats never located after marking (Tables 14, 15; Figures 4, 5). Thirteen of the 46 bats were tracked to two or more roosts (Table 15). In addition, night roosts (roosts used for short resting periods during the night only) were located in two drainage tunnels under Rimrock Drive by Red Canyon (2014) and the Suction Point (2015) and reconfirmed in the lower tunnels above the east and west entrances (2014 - 2016). We suspect that the 13 bats we did not find were roosting within rock crevices in remote areas of COLM and the MCNCA or that signals were attenuated in directions away from roads, trails, and canyon rims used to look for missing individuals. In 2016, five of the 16 transmittered bats were tagged at the Granite Falls Pond site with no roosts located for any of these bats. Roost switching was confirmed for 6 of the 11 species we tracked with an average of 1 roost (median = 1, range = 1 to 4) located per bat (Table 15).

Minimum distances traveled by bats from capture sites to initial roosts varied by species but sample sizes were generally too small to draw strong conclusions (Table 16). Movements between capture sites where bats were fitted with transmitters and initial roosts varied by species but averaged 2.7 km (range 0.1 to 37.8 km). This distance was inflated by one outlier bat, a pregnant adult female Yuma myotis that flew almost 40 km from Echo Canyon to a roost along the Colorado River on the Colorado/Utah state line in two days. If this outlier is removed the average distance traveled by all tagged bats was lowered to 1.9 km (range 0.1 to 9.5 km). Nineteen secondary roosts, used by 13 bats that were tracked to more than one roost, averaged distances of 1.5 km (range 0.1 to 4.1 km) from the original capture sites. Distance moved between roosts varied by species, and is limited by sample size as well, but tended to be lower than the distances moved from capture sites (Table 16). Average distance moved between roosts used by the same bat was 0.6 km (range 0.007 to 1.7 km).

Bats appear to be selecting specific locations out of the wide range of available roosting habitat in COLM and surrounding areas. All but three roosts located during the maternity season were in rock crevices (Table 15) with the majority situated in the large Wingate sandstone cliffs, often facing east, southeast, or south. One Townsend's big-eared bat used a house in the adjacent Redlands, and two long-legged myotis used trees in the Redlands and Grand Valley where, in all three instances, transmitters appeared to have been shed. Eight roosts identified for the smaller species (canyon bat, western small-footed myotis and California myotis) were in rock crevices situated in small rock bands such as the Precambrian schist layer in a small box canyon within No Thoroughfare Canyon or in large boulders resting on scree slopes below cliff faces. Anecdotal groupings of roosts in the same general areas were noted for long-legged myotis in Upper Monument Canyon and for Yuma myotis in the greater Fruita, Wedding and Lower Monument Canyons, despite individuals being fitted with radios from different capture sites. In addition to roosts located using radiotransmitters, 10 roosts were identified opportunistically when audible "chittering" was heard while tracking signals or conducting emergence counts at known roosts. One roost, used by a juvenile big free-tailed bat, was on the exterior of the east entrance station and is considered a night roost that was likely used by the individual after getting caught in inclement weather during the previous night.

Roosts in cliffs were often situated towards the central or top third of the cliff face in which they were found but varied widely. Consequently, use of exit counts to determine colony sizes were sometimes unsuccessful due to the distance between observers and exiting bats. Some roost locations did yield counts that we feel are representative of the number of bats present for those colonies at the times of summer in which they were made (Table 15). In 2014, three California myotis were counted flying away from a small cliff band, including the radiotagged individual, but the actual exit point could not be confirmed. A big free-tailed bat roost on the east side of the Island in Lower Monument Canyon was monitored with telemetry equipment at emergence to confirm exit time of the marked individual and a minimum of 13 individuals were counted while exiting the cliff face. These bats utilized high speed drops parallel to the cliff face before banking away 5 to 10m above the ground. Attempts to watch an emergence for Yuma myotis below the Book Cliffs View in early July of 2014 and again in June of 2015 failed but large numbers of bats seen flying away from and circling in front of the cliff face during the first count suggest a colony numbering in the hundreds. In late June of 2015, a minimum of 189 Yuma myotis were counted at a colony near the Devils Kitchen area. Another roost just off Echo Canyon for this same species, observed in mid-August of 2014, numbered 24 individuals. The bats during this count were dropping out of a flaking slab situated on a somewhat smaller sandstone band. The radiotagged individual was no longer at the roost at the time of this emergence count suggesting that the colony had already begun to disband for the summer.   In August of 2015 a big free-tailed bat roost discovered opportunistically in Fruita Canyon yielded a minimum of 64 bats, as individuals could still be heard in the crevice when the count was stopped due to darkness. Along the same cliff face to the south, a colony of Brazilian free-tailed bats, also opportunistically located in 2015, were observed leaving the roost with approximately 50 bats dropping out of a long vertical crevice nearly simultaneously and flying off down canyon together, with another 30 individuals trickling out afterwards.

Acoustic Inventory

Acoustic data was collected at 11 locations in COLM and four in the MCNCA covering all major habitat types starting in May and ending in August, 2014 - 2016. An additional 15 locations were sampled along the river corridor in the Grand Valley on CPW state wildlife areas and state parks (Table 3). Detectors in 2014 were restricted to collecting calls from two low frequency species, the spotted bat and big free-tailed bat to ensure recordings for these two species were not masked by more abundant species. Detectors in 2015 and 2016 recorded the full spectrum of bats at COLM and the MCNCA. Each site was sampled for 10 days on two occasions during the summer for an average of 95.0 hours (range 91.0 - 101.8 hours) spent recording over the two sampling periods each. A total of 5,702 hours, or 2,778 hours for sampling period 1 (SP1) and 2,924 hours for sample period 2 (SP2), were recorded during the summer of 2015, yielding 175,299 bat calls (Tables 17, 18; Figure 6). In 2016, total hours recorded matched that collected during 2015, yielding 161,008 bat calls (28.2 calls/hr; Tables 19, 20; Figure 7). In both years 16 bat species were identified using acoustic methods during both sample periods. Of the expected species, only Allen's big-eared bat was not documented acoustically. This species is represented in the study area by only one mummified specimen collected in 2014 (Adams and Lambeth 2015). In addition, all 16 species were confirmed at lower and upper life zones in at least one of the two sample periods. Number of species identified by site varied widely in 2015 (SP1: Average 9, Range 6 – 15; SP2: Average 10, Range 4 - 16) with Water 2 detecting the most species (16) of any site (Tables 17, 18, 21; Figures 8, 9). Although total passes recorded in 2016 were slightly lower than the previous summer, the average number of species recorded and variation between sites was similar (SP1: Average 9, Range 2 – 14; SP2: Average 9, Range 3 – 13; Tables 19, 20, 21; Figures 10, 11). Species richness of bats during SP1 was slightly higher at lower life zone sites in 2015 where all 16 species were recorded. This metric was more even across sampling periods in 2016. In 2015 Townsend's big-eared bats, spotted bats, and western long-eared bats were absent at upper life zone sites but all three were recorded at these sites at least once in 2016 (Tables 17, 19). During SP2 species present at upper and lower life zones were nearly identical with the absence of only Townsend's big-eared bats at lower sites in 2015 and all species were detected at both life zones in 2016 (Tables 18, 20).

Sampling period two collected similar numbers of total passes to SP1 (within 1%) but had 13% more calls classified to species (Tables 17, 18) in 2015. In 2016, total passes for SP1 and SP2 were within 2% of each other. Total numbers of passes recorded at lower life zone sites (< 1,734 m, Table 3) were notably higher for 6 of the 16 species over both sampling periods in 2015 - 2016 (Tables 17 - 20). Five species had nearly twice as many passes recorded at higher life zone sites during at least one sampling period over the two summers but only the canyon bat exhibited such results in both years (Tables 17 - 20). Total passes classified to species varied widely by site in 2015 (SP1: Average 933, Range 28 – 4,967; SP2: Average 1,228, Range 13 – 9,748) with an upper life zone site, Water 2, collecting the most classified passes of any site during SP2 (Tables 17, 18; Figure 7, 8). Water 2 represents the Black Ridge Sewage Lagoons, a site where only modest captures occurred during mist netting (Table 8) but is in close proximity to many large maternity roosts (Table 15; Figure 5). Lower totals, still varying widely by site, were recorded in 2016 (SP1: Average 841, Range 3 – 7,234; SP2: Average 673, Range 21 – 3,132). River 4 collected the highest number of passes classified to species in 2016, this time during SP1, with totals nearly double that of the next closest site, River 5, during the same sampling period (Tables 19, 20; Figure 7).

Regardless of sampling period, life zone, or site, very few passes (< 20) were recorded for pallid bats and Townsend's big-eared bats over both years. Spotted bats and western long-eared myotis had few passes recorded relative to other species during SP1 in both years but passes recorded during SP2 in 2016 matched other species with lower activity level totals (Tables 17 - 20). The western small-footed myotis and canyon bat were detected at all 30 sites during both sample periods in 2015 and were absent from only three sites during SP1 and one site during SP2 in 2016. These two species consistently accounted for some of the highest number of passes recorded over both summers. While canyon bats accounted for the third highest percentage of captures in mist nets (Table 2), the western small-footed myotis accounted for only 2.7%. The second most commonly captured species in mist nets, the Yuma myotis, was detected at 23 sites during SP1 but rose to 30 sites in SP2 when pooled over both years. The most commonly captured species in mist nets, the big brown bat, was detected at 30 sites in both SP1 and SP2 respectively over 2015-2016. Other species with a notable breadth of locations where acoustic calls were collected include the little brown myotis (SP1 = 29, SP2 = 30) and Brazilian free-tailed bat (SP1 = 30, SP2 = 28). These two species only accounted for a total of ten captures in hand (Table 2) and were found at only one and five capture sites respectively (Table 8) from 2014 - 2016.

When sites are categorized by upland versus river locations rather than upper and lower life zones (determined by elevation), the river sites averaged more than twice as many passes classified to species across sites and sample periods in both years (Table 21). On average, acoustic sites at upland water sources collected several fold more passes than other upland habitat types, and were roughly equal to or surpassed those along the river in 2015 – 2016 (Table 21). Upland water and river sites accounted for 80% or more of all acoustic passes collected in both summers. Cliff, forest, riparian, and shrub sites combined accounted for only 10% of all passes. Despite the heavily weighted percent of passes being attributed to sites with water, species richness was relatively high across all habitat types with most averaging about 10 to 11 species in 2015 and 2016 respectively (Table 21). Upland water and river sites had the highest species richness detected by acoustic efforts with 16 and 15 species detected respectively in 2015 and 14 at both in 2016. Site specific variation within habitat types was apparent with river sites having the widest range in 2015 (4 - 15 species).

Call activity examined by hour was similar to patterns seen in other studies (Bogan et al. 2006, Neubaum and Navo 2011) with number of passes increasing for the first two hours after dark before generally decreasing and leveling off until morning when another increase occurred in 2015 and 2016 (Figures 12, 13). This pattern varied by species and sampling period. During both sampling periods big brown and canyon bats accounted for many of the early calls in both years. The western small-footed myotis showed surprisingly high numbers of passes throughout the night at a number of water and river sites in both years compared to other myotis species (Tables 17 – 20; Figures 14 - 17). However, this species had nearly 5 times fewer passes recorded later in the summer (SP2) in 2015 and roughly two-thirds fewer later in 2016 (Figures 14 - 17). Brazilian free-tailed bats also showed high levels of activity relative to other species with increased activity occurring in the late morning hours across sample periods and years (Tables 17 – 20; Figures 14 - 17). A similar trend was seen for canyon bats whose number of calls climbed sharply towards the later morning hours (Figures 14 - 17). Despite being one of the most common species captured in mist nets, numbers of passes for the Yuma myotis were moderate at best relative to the other species over both sampling periods and years (Tables 17 – 20; Figures 14 - 17).

Detectors in 2014 were restricted to collecting calls from two low frequency species, the spotted bat and big free-tailed bat, and with several sites occurring at different locations than those noted in Table 3. Call activity for these two species varied by sampling period and site for both species (Table 22). Sites where spotted bats were recorded at higher numbers varied by sampling period with totals increasing slightly overall as the summer progressed. The change in numbers of calls is small enough that it should be considered with caution. Big free-tailed bats had notably higher call activity recorded during SP1 (Table 22). By changing settings on the acoustic detector to block high frequency species, numbers of passes for these two species were multiple times higher than the total calls combined from 2015 and 2016 when the full spectrum of bats were recorded (Tables 17 – 20, 22).

Discussion and Recommendations

The Bat Fauna of Colorado National Monument and McInnis Canyons

COLM, MCNCA, and the CPW State Parks and State Wildlife Areas along the Colorado River support one of the most diverse communities of bat fauna in Colorado. We confirmed 16 of the 17 species thought to be residents or occasional visitors to the study area using mist nets from 2014 - 2016. One additional species, the Allen's big-eared bat, was confirmed through the collection of a mummified specimen (Adams and Lambeth 2015). The bat was collected at the Fruita Section of James M. Robb State Park in July of 2014 when a mummified non-reproductive female was found hanging from a picnic pavilion rafter. Collection of this specimen confirmed the presence of this species in Colorado and, in combination with other nearby records in Utah (Wright 2012) and acoustic calls (Hayes et al. 2009), suggests it is probably at least an occasional visitor to the area. Adams (1990) noted that the species identified during his survey efforts (9 species; Table 13) were "only a partial list of the bats which use COLM throughout the year". Our mist net efforts from 2014 - 2016 documented four additional species to COLM or just outside it in the MCNCA including the spotted bat, hoary bat, California myotis, and western long-eared myotis. In addition, the Townsend's big-eared bat, previously documented by Miller (1964) at COLM by sight only, was captured in-hand there in 2014 and 2016, and at MCNCA in 2015 and 2016. Given the difficulty associated with catching spotted and Townsend's big-eared bats in mist nets, it is not surprising that prior studies had not confirmed them in hand. Spotted bats have been noted in the Grand Valley previously with lactating females collected by the author from Loma and Fruita, and one additional sighting recorded in Grand Junction closer to the Book Cliffs. A spotted bat was captured on Black Ridge in the MCNCA in 2015.

Adams (1990) noted that one of the most important questions related to the bat community at COLM revolved around understanding how these species utilize surrounding water resources, many of which are intermittent or ephemeral in nature. Results from Adams survey led him to state "the abundance of water sources increases from east to west within Colorado National Monument". However, we found the opposite to be true during this study, with the majority of small ephemeral pools noted in the eastern half and only a few, mostly larger impounded water sources, situated in or near the western half of COLM. It is unclear if seasonal and yearly variation has affected the appearance of the smaller ephemeral pools sampled in this study from the time of Adams' work, or if knowledge of such sites was simply unknown at that time. Surface area and depth for many of the ephemeral water sources changed notably between survey years (2014 – 2016), particularly after flash flood events, and suggest that these resources are dynamic in nature. Such changes in these critical water sources have been noted for other locations, such as Mesa Verde after catastrophic fire events

(O'Shea et al. 2011), and may have important implications for bats and other wildlife using them. Adams (1990) noted that a higher richness of bat species was found in the western half of COLM but a strong sampling bias towards that portion of the Monument was acknowledged due to the limited number of water sources sampled on the eastern half. We found the species richness to be similar across COLM with differences in abundance and possibly segregation by elevation occurring at specific capture sites.

Adams (1990) also suggested that the ephemeral nature for many of COLM's water sources may play a role in regulating the population dynamics of bat species in this area. He states "cycling between water abundance and water deprivation may have been and may still be important to the population dynamics of the bat species occupying COLM". In 2014, we saw ephemeral pools that had supported decent levels of bat activity earlier in the summer dry up completely in July, with activity falling almost completely off after an unseasonably hot and dry June (Table 23; Figure 18). Consequently, bat species utilizing such water sources may capitalize on these sites while they are available, allowing shorter travel distances to drinking areas from some roosting locations. Shorter commuting distances from roosts to drinking and feeding habitat may be particularly beneficial to reproductive females who often return to maternity roosts multiple times a night to check on newborn pups. Once these ephemeral pools dry up the bats likely make longer distance movements to more permanent sources of water, such as irrigation impoundments in the adjacent Redlands community and the Colorado River. Mist netting results, radiotelemetry efforts, and acoustic data collected from 2014 - 2016 support this premise. Weather patterns, including temperature and precipitation play an important role in the subsistence of the ephemeral pools found in the study area. While average temperatures in 2014 and 2015 were both lower than the 73 year average (1940 – 2013) both minimum and maximum temperatures were more extreme (Table 23; Figure 18). Lower than average precipitation levels in June of 2014 led to complete loss of water at some ephemeral pools by July, but were then replenished by August monsoons. In 2015, higher than normal precipitation falling in May, June, and July continually replenished ephemeral pools (Table 23; Figure 18), showing the dynamic nature of these resources from year to year.

Bat fauna for COLM, the MCNCA, and the surrounding study area were characterized as common for four species (≥ 10% of total captures), uncommon for five species (2 – 9% of total captures) and rare for seven species (≤ 1% of total captures) based on mist netting efforts (Table 2; Figure 3). Acoustic work suggests that other species such as the Western small-footed Myotis and the Brazilian free-tailed bat may be more common than mist netting indicates (see the Trends Related to Acoustic Recordings section below). Two of the four common species are strongly associated with canyon country (Yuma myotis and canyon bat), one is a habitat generalist (big brown bat), and the remaining species (long-legged myotis), was predominantly found at higher locations, commonly associated with mid-elevation forests of the Rocky Mountain West (Armstrong 1982, Adams 2003, Armstrong et al. 2011).

Yuma myotis was the most commonly captured species in 2014 and 2016 (Tables 4, 6) and second in abundance in 2015 (Table 5) which is not surprising given this species strong association with lower elevation canyonlands and mesas (Armstrong et al. 2011). Efforts in 2016 were directed towards netting at sites from 2014 – 2015 that maximized capture of this species to increase the sample size of roosts found for this bat. Although Yuma myotis accounted for the most captures and were documented at nearly every site mist netted in 2014, their numbers were not dispersed evenly across sampling sites that year with a strong tendency towards lower elevations. Adams (1990) stated that Yuma myotis "only occur on the west side of the Monument" but mist net sampling from that effort was heavily biased towards that portion of COLM. Additional work by Adams (1993) revealed the species using the Devils Kitchen and telemetry work in 2015 identified one of the largest maternity roosts for any species found during the study adjacent to this feature. In addition to canyon country, Yuma myotis are thought to be strongly tied to riparian areas with open water sources such as rivers (Adams 2003), which may explain the strong bias this species exhibited towards low elevation capture sites during our study, rather than east or west portions of COLM. In most cases, low elevation capture sites were situated closer to the large riparian areas in the Grand Valley, and open water of the Colorado River along with the numerous irrigation ponds and lakes adjacent to it. The author has observed this species in abundance foraging just above the water over large eddies and backwaters on the Colorado River in McInnis Canyons National Conservation Area and the Green and Yampa Rivers in Dinosaur National Monument on multiple occasions. Capture work at these river sites is difficult due to their depth and width making use of acoustic sampling essential. The Yuma myotis was captured at more sites and in higher numbers than any species during surveys at lower elevation sites in southeastern Utah as well (Wright 2012).

Big brown bats represented the second highest number of individuals captured in 2014 and 2016, and the highest in 2015 (Tables 4 - 6), accounting for 29% of all captures during the study (Table 8). This bat would not represent the most captured species in the study area if not for one particularly productive capture night on Black Ridge that yielded 65 individuals, mostly reproductive females (Table 5, 8). This species is a habitat generalist known to utilize a broad spectrum of habitats in Colorado ranging from remote natural areas (Neubaum et al. 2006) to highly urbanized settings (Neubaum et al. 2007). Given that our study area directly abuts the urbanized interface of Grand Junction it is interesting to find this species so prevalent across all elevations and at all but five capture sites (Table 8).

High numbers of canyon bats (16%) were also captured as expected given the abundance of canyonlands available for use in COLM and the MCNCA. This species is similar to Yuma myotis in that it is tied to lower elevation canyon country (Bogan et al. 2006, O'Shea et al. 2011). Armstrong (1982) suggests that the canyon bat "may be the most abundant bat in the Canyon Country" and is "the most readily observed [because] it is the first species to emerge in evening to forage". The latter assumption is supported by acoustic data collected during this study (see the Trends Related to Acoustic Recordings section below).

The long-legged myotis composed almost 10% of all captures with higher proportions of individuals captured at high elevation sites (Table 8). Similar associations with higher elevations have been noted for this species by other studies in Colorado (O'Shea et al. 2011, Bogan and Mollhagen 2010) and southeastern Utah (Wright 2009). This species is known to occupy a wide range of forest types in Colorado including pinyon-juniper (Armstrong et al. 2011). O'Shea et al. (2011) found it to be the most common species captured in mist nets in the higher elevation plateau country of Mesa Verde. Storz and Williams (1996) noted this species using subalpine forests suggesting it is highly adaptable to a range of habitat types.

The prevalence of silver-haired bats in the study area in 2014 was surprising given the solitary nature of this tree roosting species. Although unsubstantiated, Barbour and Davis (1969) suggest that this species probably reaches its greatest abundance in the northern Rockies from Wyoming to Idaho. Given the close proximity of this study to the southern extent of this proposed range our data appears to support this assumption. Kunz (1982) notes, "In studies where relatively large numbers of silver-haired bats have been reported … summer populations are dominated by females except in the montane west." Mist net data collected in 2014 from our study yielded 34 captures of silver-haired bats with all but two individuals as males (Table 4). Silver-haired bats were the most abundant species collected in the Book Cliffs, accounting for half of all captures with a striking 98% being male bats (Chung-MacCoubrey 2008). Bogan and Mollhagen (2010) captured 182 individuals of this species in Dinosaur National Monument (DINO) from 2008 - 2009 (172 above and 10 below 1,829 m), all of which were males. Additional work by Neubaum and Navo (2011) at DINO supported these findings with silver-haired bats accounting for the most captures and acoustic passes. Of the 43 individuals captured during that effort, all were males from upper elevation sites. The upper canyons of COLM and MCNCA may provide locations where male silver-haired bats can concentrate to avoid competing for similar resources used by females. Segregation of sexes within a species has been noted for several bat species in different locations across western North America (Easterla 1973, Cryan 1997, Neubaum et al. 2006). Only five females were captured from 2014 – 2016 with four occurring at sites in the lower life zone. Percent of total captures for this species dropped from over 10% in 2014 (Table 4) to only 2% in 2015 (Table 5) and 3% in 2016 (Table 6). This difference was noted despite an increase in sampling effort during May of 2015, when migrating silver-haired bats would be expected in the area. Changes in weather patterns during this period in 2014 and 2015 (Table 23; Figure 18) may partially explain the variation in annual abundance across the lower elevation canyon country given the migratory nature of this species.

The pallid bat and California myotis tend to be associated with low elevation zones that are warmer and more arid. Although the percent of total captures for these two species were relatively small in comparison to most of the previously discussed species, selection for lower sites was apparent (Table 8). Wright (2012) noted a complete absence of pallid bats when surveying lower elevation sites in southeastern Utah but the California myotis was one of the most widespread across sampled sites. Relatively few individuals for these two species were noted from his work at higher elevations in the Manti-La Sal National Forest (Wright 2009).

The Brazilian free-tailed bat also tends to be associated with low elevation zones but no individuals were captured in 2014 and only nine individuals from 2015 - 2016. The species was previously confirmed in COLM night roosting in the lower tunnel from the west entrance (Adams 1993) and known from the area (Appendix A, Table A1 and A3). Brazilian free-tailed bats have been documented in the Grand Valley using large maternity colonies found in buildings (Hall 1997) and by the author in bridges. However, telemetry, emergence count, and acoustic data collected from this study in 2015 and 2016 indicate that roosting sites appear to be limited to lower elevations for this species and that its occurrence may be more widespread than mist-net work indicates. Low elevation sites sampled by Wright (2012) exhibited similar findings with relatively few bats captured in hand but acoustic recordings collected across a broad spectrum of locations.

A number of other species typical of the zones in which we sampled were captured in low numbers. Several of these species exhibit habits that make them less likely to be captured, such as foraging at heights above the ground that are well above typical mist net sets (spotted and big-free-tailed bats) or being adept at maneuvering and avoiding nets (Townsend’s big-eared and Allen’s big-eared bats). Spotted bats caught at Mesa Verde National Park (MEVE) were typically caught in the top rung of a standard net set or high in stack nets four meters or more above the ground (O’Shea et al. 2011). No spotted bats were captured by nets in 2014 or 2016 and only one was captured in 2015. However, audible chirps, presumed to be from this distinctive low frequency species, were regularly heard throughout the study area. A stack net was utilized on two occasions in both 2014 and 2015 at the Black Ridge Sewage Lagoons. Increased use of these higher net sets at additional sites may increase captures of spotted and big free-tailed bats, another fast, high flying bat preferring larger water sources situated in more open settings (Navo et al. 1992, Storz 1995, Navo and Gore 2001). Only one big free-tailed bat was captured in 2014 but two maternity roosts were opportunistically identified for this species in 2015 and a juvenile female was collected from the east entrance kiosk in August of that year. Interestingly, a specimen collected by Adams from the kiosk at the west entrance is housed in the COLM museum collection (Table A2). Additional records from the area include two specimens collected from Grand Junction (Table A1) and a rabies positive individual turned into the Colorado Department of Health from Mesa County (Shankar et al. 2005). Previous to the maternity roosts noted here only one other maternity colony had been identified in Colorado (Navo and Gore 2001). This species has also been confirmed from similar habitat close to our study area in Utah (Bosworth 2003, Wright 2012) and a maternity colony was located in Arches National Park (Haymond et al. 2002) suggesting that the species is a resident of COLM, MCNCA, and the surrounding canyonlands of Colorado.

The hoary bat is a highly migratory species that is more likely to be captured at the beginning and end of the season when our mist net sampling efforts were reduced. The majority of capture records for this species occurred in May or early June with all but one of 14 individuals being male. The lone female hoary bat was captured in late May of 2014 which corresponds with the migration window seen elsewhere in western North America for the species (Cryan 2001). Individuals were captured evenly at both lower and upper life zones (Table 8).

Several of the myotis species, including the western long-eared myotis, fringed myotis, western small-footed myotis, and little brown myotis were all captured in comparatively lower numbers than other species in 2014 and 2015. The paucity of some of these species at COLM is puzzling as the small ephemeral pools that we frequently utilized for mist netting often show capture biases for them (e.g. O'Shea et al. 2011). In 2015, mist netting at the McDonald Pour-off within the MCNCA over several nights yielded 19 fringed myotis, accounting for all but three individuals of this species for the entire study. Telemetry work revealed a maternity colony down canyon that was the likely reason for the inflated captures of this species at this site. Adams (1990) noted two individuals of this species from Ute Canyon, the same location referred to as Middle Ute Box in this study, but no fringed myotis were captured there despite 9 net-nights worth of effort in 2014 – 2015. The only record of a western long-eared myotis documented in COLM came from this site in 2014, a nonreproductive adult female (Table 4). However, records for this species are not uncommon from the broader area surrounding the Grand Valley suggesting the occurrence of this species may simply be patchy or interspecific competition may be limiting their presence (Armstrong et al. 1995; Appendix A, Table A1).

The western small-footed myotis was also captured in Ute Canyon in 1989 and 1993 by Adams (1990, 1993) and again by this study in 2014. Despite the relatively low numbers of captures for this species during this study, it was confirmed at seven sites across a wide elevation gradient with one notable night at Black Ridge Pond consisting of 12 individuals (Table 8). Acoustic data collected during this study for the western small-footed myotis suggest this species may be more common than mist net data indicate (see the Trends Related to Acoustic Recordings section below). The near absence of the little brown myotis, one nonreproductive adult male, from our capture efforts from 2014 -2016 is perhaps the most perplexing given its previous documentation at COLM and its widespread distribution in the state (Armstrong et al. 1995). Miller (1969) and Adams (1990, 1993) both documented this species at COLM and the surrounding area with 7 individuals captured. The two specimens housed in the COLM collection, however, are likely to be long-legged myotis due to the presence of keeled calcars and the remaining specimens housed at other locations were not examined by the author (Table 13). Given the prevalence of two sympatric species, the Yuma and long-legged myotis, documented in the study area from 2014 - 2016, it may be possible that the previous records for little brown myotis were misclassified or that interspecific competition has led to changes in abundance for the species in the study area. WNS, a disease known to have significantly reduced populations in infected portions of this bats range, is not known to occur in Colorado at the time of this writing and is therefore an unlikely reason for the noted absence of the species. In addition, acoustic calls classified as little brown myotis were common across numerous sites from 2015 – 2016 (Tables 17 - 20).

Chung-MacCoubrey (2008) noted a similar absence for this subset of myotis species in the Book Cliffs north of the Grand Valley, with relatively low numbers of captures for each, suggesting that they may not be common in and around the Grand Valley. However, these species have been documented from a number of captures south of the study area in Mesa County as shown by historic data (Appendix A). It is unclear if these numbers have changed over time and represent a concern or are simply an artifact of regional preference. Several of these species have taxonomically similar species, such as the California and Yuma myotis, that may be interspecific competitors.

Previous efforts to survey the bat fauna at COLM were conducted by Miller (1964) and Adams (1990, 1993). Miller (1964) documented seven bat species at COLM using mainly shotgun collection methods, and to a lesser degree mist nets (Table 13). Such methods, while typical for the time, were limited in their ability to account for many species as bats had to be visually spotted and then shot. Consequently, species that exit their roosts and visit feeding and drinking locations later at night would be less likely to be confirmed. Miller (1964) noted two species, the canyon and big brown bats, to be widespread throughout the Monument regardless of elevation. We found big brown and canyon bats to be among the top three species in terms of total individuals captured but only big brown bats were common across elevations from capture data. Canyon bats appeared to select for drinking sites at lower elevations in 2014 - 2016 with 92% of captures occurring below 1,700 m (5,780 ft) as established by Miller (1964). However, acoustic data discussed later suggests this species may be using a broader elevation range than shown by mist net data. Miller (1964) also noted canyon bats were numerous near canyon rims, appearing well before darkness, and migrated down canyon towards the Colorado River along with other bats. Adams (1990, 1993) captured only eight individuals of this species during surveys at COLM in the 1990's (Table 13) but this total represented the third most abundant species in that study. When the same locations surveyed by Adams were visited again from 2014 - 2016 a similar proportion of canyon bats were noted (Tables 4, 5, 6). Surprisingly absent from Miller's (1964) surveys were the Yuma myotis. This species accounted for more captures in-hand, with the exception of only big brown bats, than any other species from 2014 - 2016. Similar to our study, the Yuma myotis, closely followed by big brown bats, accounted for the most captures by Adams (1990, 1993). The majority of his captures for Yuma myotis came from one location, the settling ponds that were situated near the west entrance and visited nightly by nearby maternity colonies. These settling ponds are no longer in use as new sewage lagoons were installed above Fruita Canyon (referred to as Black Ridge Lagoons in this study). Yuma myotis accounted for the majority of captures at the new settling ponds and reproductive individuals were tracked just over the rim to multiple roosts in Fruita Canyon.

Chung-MacCoubrey (2008) found similar species of bats as our study, but in different proportions, in the Book Cliffs across the Grand Valley. Silver-haired bats were the most abundant species, accounting for nearly 50% of all captures. Other dominant species, including big brown bats, hoary bats, and long-legged myotis, accounted for 10% or more of the total captures during the Book Cliff study. The majority of big brown bats captured in the Book Cliffs were males (79%) as well, whereas sex ratios of this species at COLM were biased towards females (63%, Table 2). In contrast, captures of long-legged myotis in the Book Cliffs were predominantly female (83%). Abundance of long-legged myotis during COLM/MCNCA sampling from 2014 - 2016 was similar to those found in the Book Cliffs, accounting for 10% of all captures (Table 2; Figure 3). Higher captures of hoary bats during the Book Cliff study than we found from 2014 – 2016 in our study area may be the result of sampling more intensively along cottonwood corridors with perennial streams in that effort.

Mist netting work conducted within and on the periphery of the Manti-La Sal Mountains southwest of our study area identified a rich bat fauna of 17 species (Wright 2012). Wright also found the Yuma myotis to be the most abundant species at lower elevation sites, accounting for

20% of all captures and occurring at 52% of the sites sampled with mist nets. The western long-eared myotis accounted for 12% of all captures in that study with all occurring at sites over 1,900 m in elevation (22% of sites). All other species accounted for less than 10% of the total captures. Additional capture work southeast of COLM at the Gunnison Gorge National Conservation Area and Escalante Study Area (Hayes 2009), although limited in number of sampling nights, yielded species occurrences similar to those noted by this study as well, with Yuma myotis again accounting for the greatest number of captures.

Similar efforts to identify bat fauna using mist nets in habitat characterized by pinyon-juniper woodlands fragmented by large canyon country in western Colorado have also been made at Mesa Verde National Park (O'Shea et al. 2011), and Dinosaur National Monument (Bogan and Mollhagen 2010). Elevations at all three sites, while overlapping widely, vary, with MEVE tending to be higher (1,890 – 2,361 m), DINO ranging in the middle (1,459 – 2,263 m), and COLM/MCNCA dropping the lowest (1,320 – 2,059 m). Species richness and composition at COLM/MCNCA was comparable to DINO and MEVE with a large overlap in the species documented. Abundance of bat species showed some similarities between all three locations with some notable differences. Captures at MEVE were dominated by long-legged myotis followed by western long-eared myotis, whereas COLM was represented most heavily by Yuma myotis and big brown bats. DINO, the location with elevations in the middle of these two, was dominated by Silver-haired and big brown bats. Three additional species, the western long-eared, long-legged, and Yuma myotis, accounted for 10% or more of the captures at DINO. Similarly, three additional species at MEVE, silver-haired bats, big brown bats, and western small-footed myotis, accounted for 10% or more of captures. COLM followed these trends with two of the three species mentioned for the other two surveys (canyon bats, long-legged myotis, and silver-haired bats) accounting for 10% or more of the total captures. O'Shea (2011) noted that canyon bats and Yuma myotis are thought to be associated with lower elevation, warmer sites and this assertion holds when considering capture differences noted between MEVE and COLM. These differences may also be the result of variation in sample locations with most of the sites netted in MEVE being over large, permanent water sources, those in DINO being a mix of large and small sources, and the majority in COLM occurring at small, ephemeral sites. Efforts to sample at larger more permanent water impoundments adjacent to COLM in 2015 and 2016 did show the potential to alter species abundances for several bats (e.g. Western small-footed and long-legged myotis at Black Ridge Pond, Table 8).

Capture success peaked in June and declined in July and August for COLM and MCNCA in 2014 (Table 7) and MEVE in 2006 - 2007 (O'Shea et al. 2011). In 2015, COLM and MCNCA peaked again in June, saw a decline in activity in July likely due to volatile weather patterns with high levels of precipitation in the form of large thunderstorms each evening (Table 23; Figure

18), and increased slightly in August (Table 7). Consequently, the June peak in capture success for bats may be driven by greater water availability at ephemeral sites minus the large rainstorms that preclude bats from flying as well as our ability to sample for them. Monsoonal patterns undoubtedly play a role for presence of bats at a given site as, anecdotally, many of the ephemeral water holes that were drying up by July of 2014 refilled in August of that year in COLM and MCNCA. In 2016, capture success continued to rise into August despite decreased effort (Table 7). Capture results from this year are likely skewed in that sites where higher probability of capturing the Yuma myotis were targeted for telemetry purposes. Capture success of bats using smaller water sources sampled at COLM and MCNCA during periods when they held water were undoubtedly higher than experienced at larger bodies of water as more complete coverage of the water surfaces by mist nets was accomplished. In addition, as juvenile bats increased their ability to fly farther distances they may have become able to utilize a wider assortment of water sources such as the Colorado River, thus diluting captures of bats at any one given site.

Evidence of reproduction was documented for 11 of the 16 species captured in hand from 2014 - 2016 (Table 10). Additional captures for nonreproductive species collected in low numbers, other than migratory tree-bats, would likely reveal reproductive individuals as well (e.g. long-eared myotis). Lactating female spotted bats have been recorded by the author in the Grand Valley adjacent to the study area (Loma and Fruita), suggesting that reproduction is occurring for this species at COLM/MCNCA as well. Two migratory species, hoary and silver-haired bats, are not expected to be reproductive while occurring in the study area and were not found as such. Miller (1964) collected reproductive female pallid bats and Adams (1990, 1993) mist netted reproductive females for Yuma myotis, big brown bats, Brazilian free-tailed bats, western-small footed myotis, and canyon bats previously at COLM. In comparison to other pinyon-juniper dominated forests of western Colorado, the percentage of species expected to be reproductive and confirmed as such was higher in MEVE than COLM/MCNCA (100% vs. 79%) but sampling efforts were more intensive and larger elevation gradients sampled for the former. Lower elevations and slightly warmer temperatures, on average, may allow for an earlier reproductive period at COLM/MCNCA than seen at MEVE and DINO. Earlier reproductive dates noted in this study suggest that bat species may be initiating pregnancy at earlier dates than noted elsewhere in pinyon-juniper habitat of Colorado (Table 10). O'Shea et al. (2011) noted the first pregnancies in MEVE during the third week in June while reproductive females were first documented in late May and early June at COLM/MCNCA. Reproductive dates for DINO were not reported by Bogan and Mollhagen (2010) or Chung-MacCoubrey (2008), and capture work by Neubaum and Navo (2010) occurred too late in the summer to discern this information. Additional sampling in late spring and early summer of 2015 at COLM/MCNCA confirmed reproductively active females for a number of species earlier than noted by O'Shea et al. (2011) despite a cool, wet month of May (Tables 10, 22; Figure 18). In general, proportions of reproductive females did not appear to vary for any of the species between 2014 and 2015, with only the Yuma myotis showing a weak trend for slightly higher proportions of reproductive females in 2014 but general and constrained models were competing (Table 11). Higher than average precipitation coupled with lower than average minimum temperatures (Table 23; Figure 18) may have delayed dates of the first reproductive females noted during capture work in 2015 (Table 10). However, similar trends exhibiting only slightly lower precipitation levels in 2014 suggest that dates for reproductive female bats in COLM and the MCNCA have the potential to be even earlier during years with conditions that are warmer and drier. Proportions of reproductive females between 2015 and 2016 were similar to those in previous years with competing models for species with sample sizes large enough to analyze (Table 12).

Segregation of species, sex, reproductive class, and age were noted for several species between upper and lower elevation sites where mist-net work occurred from 2014 - 2016 (Tables 8, 9). The silver-haired bat, western small-footed myotis, and long-legged myotis tended to use higher elevation sites more often. The opposite was noted for pallid bats, fringed and Yuma myotis, and canyon bats, with these species using lower life zones (Table 8). Segregation of species may help reduce competition for limited resources such as food and suitable roosting sites (McGuire and Boyle 2013), and enhance reproductive cycles (Racey 1973, Kurta et al. 1989). Use of separate life zones by sex, with higher proportions of females found at lower elevations, was noted for two species, big brown (2014) and canyon bats (2015), at COLM and MCNCA in 2014 and 2015 (Table 9). Capture data from 2016 were not considered in this analysis since nearly all sites sampled during that year were from the lower life zone (Table 6). Segregation by sex has been noted for these species and others where notable elevation gradients occurred (Easterla 1973, Cryan et al. 2000, Neubaum et al. 2006, O'Shea et al. 2011). Female bats may be selecting lower elevation sites more often than males for foraging, drinking and roosting for a number of reasons. Lower elevations may provide greater availability or dependability of water for bats in July and August at locations such as irrigation ponds and the Colorado and Gunnison Rivers. Use of lower elevations may provide closer proximity to roost sites that provide a number of benefits to female bats (see roost discussion below). Racey and Swift (1981) found that warmer roosts provided a reproductive advantage to female bats through reduced gestation periods. Reduced gestation periods may allow pups to be born earlier in the season, providing them the advantage of a longer season in which to grow, perfect skills such as aerial hawking of insects, and potentially improve survival in their first year of life (O'Shea et al. 2010).

The importance of water source type (i.e. permanent or ephemeral, large or small) may play a critical role in influencing such segregations but will be difficult to discern due to sampling biases when mist netting such sites. Studies of bats at MEVE and DINO found evidence of segregation of sexes for many species. O'Shea et al. 2011 found disproportionate percentages of males for many species at higher elevations of canyons and mesas at MEVE. Sampling at upland sites by Neubaum and Navo (2010) occurred at artificial reservoir impoundments situated in portions of DINO that are known to be very dry or have only seasonal accumulations of standing water in depressions on cap rock that is typically short-lived in duration before evaporating. Most riparian sites sampled for this same study were situated along the Green and Yampa Rivers which encompass over 100 miles of often slow moving water that provides a wealth of drinking and feeding opportunities for bats. Given these characteristics it was expected that use at upland sites would be concentrated in nature while riparian sites would be diluted due to increased opportunities over long stretches of usable habitat. Capture data from that project and Bogan and Mollhagen (2010) support this assertion. Bogan and Mollhagen (2010), who sampled a number of water sources at lower elevations in DINO away from the larger rivers in addition to upland sites, also found segregations by sexes with more female Yuma myotis at low elevations and silver-haired males captured nearly entirely at higher elevations. Findings for these species were similar to those from our capture data at COLM/MCNCA. Segregations of sexes where females use lower elevation capture sites logically suggest that they are likely to be used by juvenile bats as well. Consequently, it is not surprising that the majority of individuals of that age cohort captured during our study were at sites in lower life zones (90%, Table 8).

Historic records and museum specimens collected from the study area appear to be fairly representative of mist net results yielded by our study (Table 13). Little brown myotis, generally a widespread and commonly occurring species in Colorado, are represented in these databases by relatively small numbers of individuals. Questions related to the identification of this species were previously noted here. No individuals of this species were captured in the Book Cliffs study and very few were noted by Bogan and Mollhagen (2010) in DINO either. It is the opinion of the author that this species may be tied more closely to higher elevations of Colorado's West Slope where records for them are common in both natural and anthropogenic settings. Knowing that relatively low numbers of little brown myotis already exist in the area should prevent alarms from arising if subsequent surveys are conducted in an environment where WNS has become established. However, as WNS has become established in the state of Washington, the first record for the sympatric species, the Yuma myotis, was recorded in 2017 (https://www.whitenosesyndrome.org/about/bats-affected-wns, accessed August 17, 2017). Given that the Yuma myotis is one of the most common species caught in the study area, it is possible that WNS could affect the abundance and species richness of local bat community here as seen for other abundant bat species already impacted by the fungus (Dobony et al. 2011).

Although rare, free-tailed bats are represented in historic collections and records. The Brazilian free-tailed bat was confirmed using the lower tunnel on the west side of COLM by Adams (1990), with one individual deposited as a voucher in the Monuments collection (Table A2). Three specimens for big free-tailed bats are also noted, with one collected from the kiosk building at the West entrance as previously noted (Table A2). A maternity colony of Brazilian free-tailed bats identified by the author using an overpass in the Grand Valley is thought to house several thousand individuals. Additional records from buildings in Grand Junction exist for both species, and combined with acoustic data and incidental roost discoveries in 2015, it is fair to suggest that these two species are likely more common than mist net data suggests.

Opportunistic sightings of fauna other than bats were made on 20 occasions in 2014, 47 in 2015, and 13 in 2016 (Appendix B, Table B1). Species identified included taxa from amphibians, birds, mammals, insects, and reptiles. Of notable interest in 2014 was the hatch of Dobsonfly's (*Protohermes grandis*) the second week in July. These Megalopteran's were incidentally caught in mist nets at the Black Ridge Sewage Lagoons and Lower Monument Pools by the dozens and could provide an opportunistic prey base for bats during the small window that they were available. In addition, two independent sightings of a ring-tailed cat (*Bassariscus astutus*) were made at the 1st Pool in No Thoroughfare Canyon.

Roost Selection by Bats

Data related to roosts used by bats in COLM and the MCNCA was relatively limited before this study. Miller (1964) incidentally encountered two canyon bats using cracks in fallen sandstone rocks as a day roost near the mouth of Monument Canyon. Adams (1990) noted use of the lower tunnel from the West entrance being used as a night roost for Yuma myotis, and to a lesser degree, Brazilian free-tailed bats. A few records of bats being collected from buildings at COLM have also been made (Appendix A, Tables A1 – A3). Based on observations of where bats seemed to first appear in the evening, Miller (1964) suggested that most bats found at COLM "probably use deep clefts in the sheer sandstone cliffs for daytime resting". Telemetry work done in 2014 identified the first maternity roosts at COLM for six bat species (Table 15; Figure 4). In 2015 and 2016, maternity roosts were identified for three additional species in COLM and one in MCNCA with a total of 65 roosts identified for 11 species over the three year period using radiotelemetry. An additional 10 roosts for four confirmed species were opportunistically located when chattering or squeaking was heard while searching for marked bats or conducting emergence counts at known roosts. All bats fitted with a transmitter from capture sites in the adjacent Redlands urban community selected roosts in cliff faces within

COLM providing support for the nightly down canyon migrations noted by Miller (1969). Use of roosts in COLM and MCNCA noted in this study heightens their importance as a refuge for bats in the Grand Valley.

Although some studies in pinyon-juniper forests have noted bats using trees for roosts (Chung-MacCoubrey and Bogan 2003), radiotracking results and incidental observations from this study revealed a strong selection for cliff faces by reproductive female bats, regardless of species (Table 15). Two roosts used by long-legged myotis in trees and one roost selected by a Townsend's big-eared bat in a house appear to have been temporary in nature with radiotransmitters shed at the sites. Cliff faces used by bats as maternity roosts in this study tended to exhibit east, southeast, and south aspects, which may benefit from early morning solar radiation by providing roosting locations that maintain warmer microclimates. O'Shea et al. (2011) and Snider (2013) noted several species of myotis selecting for rock crevices in MEVE where trees and rock crevices are both available. Snider (2013) suggested that bats may select for rock crevices because they exhibit higher levels of thermal conductivity than wood, provide warmer more stable microclimates, and are more permanent features on the landscape over the long term. Pinyon-juniper trees, particularly in old-growth systems that have not burned in recent times, regularly exhibit sloughing and falling bark. While these conditions create roosting opportunities for bats, they tend to be short-lived in nature (Floyd et al. 2003a). In addition, wood exhibits lower thermal conductivity and moderate heat capacity in comparison to stone (Simpson and TenWolde 1999). The benefits of warmer roost sites to female bats, as described previously, carry a number of benefits for the mothers and their pups (Racey and Swift 1981).

All bat species that were tracked to rock crevices in this study have previously been documented using such features for roosts during some portion of their annual life cycle (Bogan et al. 2003). Several species, including pallid bats, Yuma myotis, and canyon bats have been associated with use of rock crevices specifically as maternity roosts (Vaughan and O'Shea 1976, O'Shea and Vaughan 1977, Harvey et al. 2011). Cary (1911) discussed pallid bats in western Colorado, making several observations, including "At dusk each evening numbers of these large bats appeared about the cliffs…above the upper rim rock in quest of insect prey" and "invariably appeared first over the cliffs in the early twilight. Although none were seen actually emerging from the cliffs, the numerous cracks and crevices doubtless formed their retreat during the day." Schorr and Siemers (2013) noted use of rock crevices exclusively, with most in high cliffs, for males of this species in the pinyon-juniper canyon country of southeast Colorado. O'Shea et al. (2011) found long-legged myotis using rock crevices as maternity roosts in the pinyon-juniper dominated landscapes of MEVE. Cryan et al. (2001) tracked reproductive female long-legged myotis to both trees and rock crevices in the Black Hills of South Dakota, noting that all roosts tended to be have southerly aspects linked to thermal benefits.

Cryan et al. (2000) noted female bats of several species selecting maternity roosts at lower elevations than their male counterparts. We tracked three male bats during 2014 and 2015 and saw support for this idea of segregation by elevation. One adult male long-legged myotis in 2014 used a roost further up Monument Canyon than any other marked individual during the study and an adult male Brazilian free-tailed bat was located in the middle of Ute Canyon in 2015. A juvenile male pallid bat tagged in 2015 used a roost in Lower Monument Canyon very close to one located for a reproductive female of the same species in 2014. Consequently, it is likely that this bat was still with the maternity colony. Using telemetry to further explore segregation of the sexes by elevation could yield interesting results for other species.

Anecdotally, it appears that different species may have selected for specific portions or sub-regions of COLM to roost within but such findings may be attributed to a bias created by how many radiotransmitters were deployed at any given capture site. A large number of roosts for Yuma myotis were located in the northwest portion of COLM (Fruita, Wedding and Lower Monument Canyons) despite putting tags on this species at multiple capture sites (Figure 5). These findings are supported somewhat by Adams (1990) work where a Yuma myotis maternity colony was thought to be somewhere in the vicinity of the original settling ponds near the west entrance kiosk. While this reservoir no longer retains water, Yuma myotis still appear to be prevalent in the area based on numbers of roosts found in Fruita Canyon from which they can easily access the nearby Black Ridge Sewage Lagoons. Maternity roosts for this species were also identified in No Thoroughfare Canyon by the Devils Kitchen suggesting that if sampling continued other pockets of use would likely be identified. Concentrations of roost sites lower in the canyons that are closer to the Colorado River by this species are not surprising given its tendencies to roost near permanent water sources (Braun et al. 2015). In 2016, five transmitters were affixed to reproductive female Yuma myotis at the Granite Falls Pond capture site in the Redlands with no roosts identified for them. It is the belief of the author that these bats likely shared the same roost not far from the site based on capture times. Failure to locate this roost could easily occur if the rock crevice was oriented in such a way as to inhibit or attenuate the signal.

Emergence counts conducted at roosts in 2014 and 2015 did not always yeild colony size estimates due to the height on cliff faces in which many of the roosts were situated. Based on emergence counts at Book Cliffs View and Devils Kitchen, some maternity colonies of Yuma myotis appear to number into the hundreds by the time young-of-the-year are volant (Table

15). Counts later in the season for this species were lower suggesting that colony sizes vary in August as they begin to disband for the summer. Several roosts for both big and Brazilian free-tailed bats, that were discovered opportunistically, numbered from the mid to high double digits when found in late August, when juvenile bats are volant. Emergence counts of other species, such as pallid bats and California myotis were much lower (1 to 3 bats), but these findings may under-represent colony sizes for these species given the small number of counts made for them. For example, lactating female pallid bats were collected and numerous others observed making crepuscular migrations down Monument Canyon toward the Colorado River by Miller (1964) suggesting numbers of individuals for this species are likely higher than our emergence counts might suggest. Maternity colonies of pallid bats numbering well above 100 individuals have been noted using crevices in cliffs elsewhere (Vaughan and O'Shea 1976, O'Shea and Vaughan 1977) and probably occur in such numbers at our study area as well. Radiotracking more individuals of this species at COLM and the MCNCA is likely to yield larger colonies. In contrast, individuals of smaller species, such as the canyon bat, that often used crevices in boulders rather than on cliff faces were visually documented in the roost crevice on a number of occasions with only one other bat which was likely to be the juvenile young-of-the-year. Consequently, variation in colony size both within and between species can be expected.

Distances moved by marked bats between capture sites and roosts were generally < 2 km suggesting that bats captured and affixed with radiotransmitters were generally able to utilize either ephemeral or permanent drinking sites situated nearby to maternity colony locations (Table 16). O'Shea et al. (2011) reported distances close to or over 2 km between tagging sites and maternity roosts in MEVE which corresponds to the comparatively small number of water sources sampled in that study. Some water holes in MEVE that historically were sampled were lost after fires silted them in suggesting that large fires in COLM/MCNCA could create a similar response. Larger bodied species from that study, such as the spotted bat, moved greater distances as seen elsewhere in that species range (Chambers et al. 2011). Additional roosts used by the same bat in COLM/MCNCA tended to be close to the first one identified, with most < 1 km away (Table 16).

Several conclusions can be drawn from three summers of data collected from radiotracking bats at COLM/MCNCA. All species of bats using COLM, and likely MCNCA, appear to be selecting rock crevices, generally in large cliff faces, instead of potential tree or anthropogenic resources, for maternity roosts. These findings may affect decisions tied to recreational climbing and forest management, particularly in relation to wildfire. Consideration should be given to limited access of south or southeast facing cliffs during the summer season, especially in areas where maternity roosts have already been identified. As suggested by the number of opportunistic roosts discovered in 2015 (Table 15), there are undoubtedly many more roosts being utilized in similar cliff faces of COLM and MCNCA that weren't identified by our radiotracking efforts. Concerns that catastrophic wildfire (due to decades of suppression) would greatly reduce potential roosting habitat at COLM may be alleviated given the use of rock crevices by bats tracked in this study. Similar findings of bats using rock crevices for roosts in cliff faces at MEVE, where large wildfires in the last two decades have burned more than half the pinyon-juniper forests in the Park (Floyd et al. 2003a), were identified. Post fire surveys (O'Shea et al. 2011) have confirmed that bat populations remain diverse and continue to appear healthy at MEVE despite such dramatic changes to the landscape. However, Snider (2009) found that burned areas did have lower insect abundance, which may be attributed to non-native plant species that became established after these large fires, and may inhibit the insect community recovery. The response of bats to disturbance of forests on this type of scale may vary by species. Acoustic data collected in burned and unburned areas of MEVE found higher activity levels and more feeding buzzes in burned areas (O'Shea et al. 2007). Another concern tied to catastrophic wildfire described in MEVE is that of small ephemeral water sources being inundated by silt run-off during rain events after large fires occur. O'Shea et al. (2011) note that the species richness in the park may have changed from previous survey efforts of bats in the Park due to the loss of these ephemeral pools. In addition, where bats select roost sites may be driven by availability of water sources and travel distances as discussed previously.

A predictive roosting map based on telemetry locations from this study, along with several key physical variables, could be developed to address remote regions of COLM and the MCNCA that do not lend themselves to being surveyed. Given future climate change predictions, catastrophic wildfire and drought have the potential to alter the landscape bats are using today, changing how these areas are used by bats in decades to come. In terms of roosting habitat, bats using cliffs may be buffered somewhat from these effects. Theobald et al. (2015) used static abiotic variables to generate a physiographic platform in which different landform types can be analyzed to determine which are more likely to be impacted by climate change. Their study suggests that areas with cliff landforms may provide some of the most secure refugia as they are less vulnerable to conversion and natural disturbance.

Trends Related to Acoustic Recordings

Acoustic sampling in 2014 - 2016 was conducted throughout the summer starting in mid-May and continuing into mid-August (Table 3). Two distinct sampling periods were investigated to see if species richness and activity levels changed on a temporal scale, during pre and post volancy periods for young-of-the-year. Acoustic recordings confirmed 16 bat species, which matches findings from our mist netting efforts and includes all expected species from the area with the exception of the Allen's big-eared bat. Of the calls classified to species, call activity was highest for big brown bats, western small-footed myotis, Yuma myotis, canyon bats, and Brazilian free-tailed bats (Figures 8 - 11). Although call activity cannot be tied directly to abundance, several of these species accounted for the highest numbers of captures collected using mist nets as well (Figures 2, 3). The high call activity for western small-footed myotis in in both years is interesting given the relatively low number of captures this species constituted (Tables 17, 18). Number of calls for this species was moderated somewhat in relation to other species in 2016 but still accounted for the most calls of any species in SP1 of that year (Tables 19, 20). Surveys for bats conducted just west of COLM and MCNCA in and around the Manti-La Sal Mountains by Wright (2012) yielded similar results for this species with only two captures in mist nets at two sites but with acoustic calls collected at six sites. Acoustic calls collected from DINO (Neubaum and Navo 2011) identified western small-footed myotis as one of the species more commonly recorded despite only modest numbers captured in hand (Bogan and Mollhagen 2010). Similarly, Brazilian free-tailed bats accounted for some of the highest totals of passes for any species in our study (Tables 17 - 20) but were captured on only nine occasions (Table 8). In 2006, both acoustic and mist netting efforts were utilized to survey bats in MEVE with Brazilian free-tailed bats contributing the highest number of passes despite mist net totals for this species accounting for less than 1% of the total captures that year (O'Shea et al. 2007). Acoustic findings suggest that western small-footed myotis and Brazilian free-tailed bats may be good at detecting or avoiding mist nets and are likely to be more common in COLM and MCNCA than the later technique would imply. Call activity for the spotted and big free-tailed bats was lower in 2015 (0.01 and 0.02 calls/hr) and 2016 (0.001 and 0.03 calls/hr) when recordings occurred across the full spectrum of species than in 2014 (0.06 and 0.11 calls/hr) when detectors were set only to receive the low frequency portion of the spectrum (Tables 17-21). While a year effect may have altered call activity somewhat, it appears that lower frequency species might be getting washed out by competition from the abundance of higher frequency bat calls being collected by detectors at the same time. In addition, filters designed to reduce collection of noise often target the low frequency range that these two bats are emitting calls within. The absence of recordings for the Allen's big-eared bat may be due to similar issues as well.

All 16 species were detected during at least one sampling period at both upper and lower life zones, although activity levels often varied both within and across these zones (Tables 17 - 20). These findings suggest that while most species may be targeting specific life zones or habitat types within those zones, at least some plasticity is occurring. Use of areas not typically associated with bats, such as sites within shrub dominated habitat, may still provide foraging opportunities and act as travel corridors for bats migrating between roosts in the cliffs to productive foraging areas in the Grand Valley and along the Colorado River. Upland water sites generally collected higher numbers of passes than the other habitat types recorded in upland areas during the same dates (Table 21). Given that water sites serve the dual purpose of providing both drinking and foraging opportunities for bats these results are not surprising. In addition, it is not uncommon for bats to circle repeatedly when drinking and foraging which would inflate call activity totals at these sites.

Average activity levels pooled across the full spectrum of bat species for all sites were higher during the second half of the summer (SP1= 31 vs. SP2 = 42 calls/hr) in 2015. The opposite occurred in 2016 with higher activity levels during the first half of the summer (SP1= 30 vs. SP2 = 27 calls/hr). The peak of bat activity usually occurs roughly from late June to mid-July for most western U.S. locations but is dependent upon variables such as insect availability and temperature levels (Hayes 1997). Our mist netting data from 2014 – 2016 and acoustic data from 2016 suggests that peak activity for this area is also occurring from around mid June to early July (Table 7). The increase in numbers of calls during SP2 in 2015 is largely attributable to two sites, Water 2 and River 4, which had numbers of passes two to four times higher than those exhibited in 2016. This activity reflects the large variation that may be expected when interpreting acoustic call activity of bats and should be considered with caution. While the late summer sampling period offers the possible advantage of acoustically detecting more migratory species and capturing more juveniles during mist netting efforts, it likely represents a time of reduced activity levels at any one given location for most species in the study area. Such findings may indicate that bats are spreading out more at this time of the summer given that juveniles can fly farther by that time and adults are not tied to an area close to maternity roosts to care for pups. Evidence for this supposition was notable when looking at river versus upland sites. River sites exhibited higher levels of activity during both sampling periods than upland sites in both 2015 and 2016. In addition, calls/hr increased at river sites later in the summer in 2015 and 2016 by 4% and 10% respectively, suggesting that bats were spending more time foraging and drinking in those areas as the summer progressed. The ability for acoustic detectors to be placed across a broader spatial landscape and sample across longer temporal ranges (i.e. all night long) may allow them to show that activity by bats is actually spreading out by early July rather than peaking as mist net data would suggest.

Telemetry data supports this assumption as well, with the longest movements of marked bats occurring in August (Table 16, e.g. outlier Yuma myotis). The Colorado River and surrounding water impoundments that come in the form of flooded gravel pits and irrigation ponds provide ideal conditions suited for such requirements. Acoustic data collected at upland and river locations in DINO showed higher activity levels for bats at upland sites along the Yampa Bench versus river sites (Neubaum and Navo 2010). However, these concentrations in bat activity were attributed to the limited water sources found in the upland areas for that study. Water sites away from the river sampled in COLM and MCNCA also exhibited higher call activity than nearly all other upland sites in both years. River sites tended to higher in call activity than upland sites with the exception of the upland Water sites 2 and 3. Riparian site activity levels in DINO were variable between sites and the large stretches of open water along river systems in deep canyons that make up most of the riparian habitat there were thought to dilute the activity that acoustic monitoring was capable of collecting in comparison to that of the isolated water sources of upland sites. Ultimately, the type and availability of the water sources may be found to be driving the selection and use of these areas by bats.

Bat passes varied widely both within and between habitat types within COLM and MCNCA during 2015 and 2016 (Table 21). The lowest call activity tended to occurred at shrub and forest habitat types where foraging and roosting opportunities are likely to be limited or not used due to better options in the study area. Activity levels along the river, while having higher call activity than most upland sites on average, still showed notable variation both within sample and between periods. This variation in call activity suggests that some sites along the river are more productive for bats than others and likely exhibit differences in habitat at finer scales than noted here.

Although caution should be used in making comparisons between acoustic data collected from 2014 to that from 2015 - 2016 due to changes in detector settings, it is worth noting a couple trends. Numbers of passes for both spotted and big free-tailed bats were several magnitudes higher in 2014 when detector settings allowed for the two low frequency species to be focused on, suggesting that these species are more common in the study area than mist netting would imply. Only one big free-tailed bat and no spotted bats were captured using mist nets in 2014. In 2015, a spotted bat was captured at an upland site in the MCNCA and two maternity roosts for big free-tailed bats were discovered in COLM. Numbers of captures for these species in hand are often low given that these bats are thought to fly and forage higher than the typical 1 to 2 m net set heights. Consequently, detector setups may need to filter out higher frequency species that wash out lower frequency bat calls when abundant and be placed higher up off of the ground to capture more accurate activity levels for these two species as has been seen elsewhere with other species (Kalko and Handley 2001).

Implications for Bat Populations

Implications of drought and wildfire have the potential to alter bat use at COLM and the MCNCA. Patrick and Stevens (2014) used a novel phylogenetic approach to discern how desert bat communities respond to the harsh conditions created by those similar to ones found in our study area. Their findings suggest that an ecological pressure such as drought is likely to impact the entire bat community with all species responding in similar ways, rather than being completely determined by driving forces such as competition for limited resources. Ephemeral water holes were used by most bat species in the study area, providing an important water source in close proximity to roost sites. Water sources that are easily accessible to maternity roosts could be highly beneficial to lactating female bats, as they are likely to be dehydrated and need to check on young in roosts multiple times throughout a night (Adams and Hayes 2008). While roosts in rock crevices are likely to be stable from environmental changes such as drought and wildfire, their proximity to such water sources may not be. Management actions that help maintain ephemeral pools, such as removal of exotic plant species known to consume large amounts of water (e.g. tamarisk) may also help maintain bat populations inhabiting those areas. In the event that a catastrophic wildfire occurs, excavation of known pools that become filled with silt may be an option for maintaining availability of these vital resources by allowing them to continue serving as water catchments. However, caution should be used in implementing such measures as the dynamic nature of these ephemeral pools means that they are already filling with sediment on occasion after flash flood events as part of a regular process. During the study the author observed ephemeral capture sites dry up completely and refill after large rain events in the same year. Pools were scoured out, to more than triple their size in one case (Lower Echo Pour-off, 2015), and filled in (Lower Echo Pour-off reduced back to its original size in 2015 and the Suction Point reduced by half in 2016) by flash flood events. Learning more about how the deposition and scouring of sediments at these ephemeral sites occurs over the long-term prior to large scale fires could be informative in guiding such actions.

Recreational pressure may create disturbance at maternity colonies using rock crevices in cliff faces and should be monitored. Disturbances posed from recreational climbing on bats are not well understood. Bats may abandon use of roosts that offer optimal microclimates for maternity colonies if climbing pressure becomes too high. The degree of disturbance from recreational climbing that might cause abandonment of a roost is unclear. However, simple measures, such as seasonal restrictions for routes in areas of known roosts or on cliff faces with eastern to southern aspects that lend themselves to use by reproductive bats during the summer months, may prevent disturbances while continuing to allow recreational climbing. In addition, partnering with the active climbing community at COLM may provide opportunities to learn about more cliff roosts as seen by pilot efforts from Climbers for Bat Conservation (http://www.climbersforbats.colostate.edu/, Accessed August 18, 2017).

Finally, baseline data along with comparisons of long-term trends for bat species using COLM and MCNCA is now available in advance of the arrival of white-nose syndrome. If the disease does reach western Colorado monitoring work is likely to reveal notable differences to bat populations if large scale die-offs occur. In addition, data collected by this study constitutes the first formal baseline information for bats available for reference in the MCNCA. While comparisons of long-term trends can be somewhat difficult due to ever changing techniques, level of effort, and year-to-year effects, many of the findings from this study reflect trends noted during earlier survey efforts at COLM by Miller (1964) and Adams (1990, 1993) with no alarming changes in species richness or abundance. Efforts to monitor bat populations of COLM and the MCNCA should continue to be maintained as long-term datasets have the ability to reveal patterns of variability moving into a future when climate change and drought have the potential to greatly influence this arid environment.

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Tables & Figures

Table 1. Landownership, geographical coordinates, elevations, life zone categorization, and the stability and type of water source where bats were captured in hand using mist nets at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity from 2014 - 2016. Landowner status is National Park Service (NPS), Colorado Parks and Wildlife (CPW), private, or Bureau of Land Management (BLM). Sites are listed from lowest to highest elevation. Coordinates are in UTM Datum NAD83 Zone 12 and elevation (Elev) is depicted in feet (ft) and meters (m). Life zone includes lower and upper sites distinguished by an elevation cutoff of 1,734 m. Stability reflects the hydrologic character of the water source during the reproductive season for bats (May – August) with ephemeral sites periodically drying up and permanent sites continuously retaining water. Type represents how the site was created, either naturally or through artificial anthropogenic means.

Sample site	Landowner	Easting	Northing	Elev (ft)	Elev (m)	Life Zone	Stability	Type
Black Rocks 9	BLM	672908	4334585	4,331	1,320	Lower	Permanent	Natural
Cottonwood 4	BLM	681710	4339750	4,337	1,322	Lower	Ephemeral	Natural
McDonald Pour-off	BLM	670293	4335549	4,421	1,348	Lower	Ephemeral	Natural
Mee Canyon Pools	BLM	677145	4335931	4,443	1,354	Lower	Ephemeral	Natural
Horsethief River Pond	CPW	689683	4338007	4,447	1,355	Lower	Permanent	Artificial
Lower Monument Ponds	Private	699231	4330596	4,730	1,442	Lower	Permanent	Artificial
West Pollock Pool	BLM	688936	4334022	4,778	1,456	Lower	Ephemeral	Natural
Canyon Vista	Private	703309	4326492	4,783	1,458	Lower	Permanent	Artificial
Granite Falls Pond	Private	703046	4326109	4,788	1,459	Lower	Permanent	Artificial
Wedding Canyon Box	NPS	697137	4331322	4,798	1,462	Lower	Ephemeral	Natural
Tiara Rado Pond	Private	710399	4327991	4,807	1,465	Lower	Permanent	Artificial
East Entrance Station	NPS	705040	4323330	4,956	1,511	Lower	Roost	Artificial
Lower Echo Pour-off	NPS	705660	4322055	5,005	1,526	Lower	Ephemeral	Natural
Echo Canyon Pool	NPS	705935	4321673	5,063	1,543	Lower	Ephemeral	Natural
No Thoroughfare 1st Pool	NPS	704222	4322043	5,112	1,558	Lower	Ephemeral	Natural
Middle Monument Box	NPS	698211	4328184	5,282	1,610	Lower	Ephemeral	Natural
No Thoroughfare 1st Waterfall	NPS	703496	4321347	5,308	1,618	Lower	Ephemeral	Natural
Lower Tunnel West Entrance	NPS	695781	4331836	5,358	1,633	Lower	Roost	Artificial
MISC-4-15	NPS	695645	4331259	5,370	1,637	Lower	Roost	Natural
Ute Canyon Black Box	NPS	701990	4325258	5,494	1,675	Lower	Ephemeral	Natural
Black Ridge Lagoon	NPS	695327	4330977	5,728	1,746	Upper	Permanent	Artificial
Middle Ute Box	NPS	698992	4323146	5,838	1,779	Upper	Ephemeral	Natural
Rough Canyon Tank	BLM	706416	4317829	6,154	1,876	Upper	Ephemeral	Artificial
Suction Point Upper Pour-off	NPS	696856	4324364	6,284	1,915	Upper	Ephemeral	Natural
Black Ridge Pond	BLM	689451	4329038	6,755	2,059	Upper	Ephemeral	Artificial

Table 2. Scientific names, species abbreviations, and common names of 16 bat species considered residents and one species, *Idionycteris phyllotis*, considered an occasional visitor at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity as confirmed by historic and recent mist net sampling efforts. Species abbreviations are based on the first two letters of the genus and species. Total bats captured (N), percent of total captures (%), overall sex ratios of adults (males: females or M:F), evidence for reproduction (Repro) in females (Y = yes, N = no), numbers of juveniles captured (N juvs), and numbers of bats with unknown age or sex (N unk) for all capture records across all sites combined from 2014 - 2016.

Species	Abbrev	Common name	N	%	M:F	Repro	N juvs	N unk	Confirmed
Antrozous pallidus	ANPA	Pallid bat	45	5.0	28:17	Y	6	0	Yes
Corynorhinus townsendii [1]	COTO	Townsend's big-eared bat	7	0.8	3:4	Y	2	0	Yes - New[a]
Eptesicus fuscus	EPFU	Big brown bat	257	28.6	95:159	Y	14	3	Yes
Euderma maculatum	EUMA	Spotted bat	1	0.1	1:0	Y	0	0	Yes - New[b]
Idionycteris phyllotis	IDPH	Allen's big-eared bat	-	-	-	-	-	-	Yes – New[c]
Lasiurus cinereus	LACI	Hoary bat	14	1.6	13:1	N	0	0	Yes - New
Lasionycteris noctivagans	LANO	Silver-haired bat	46	5.1	41:5	N	0	0	Yes
Myotis californicus	MYCA	California myotis	19	2.1	10:9	Y	3	0	Yes - New
Myotis ciliolabrum[2]	MYCI	Western small-footed myotis	24	2.7	6:18	Y	1	0	Yes
Myotis evotis	MYEV	Western long-eared myotis	2	0.2	1:1	N	0	0	Yes - New
Myotis lucifugus	MYLU	Little brown myotis	1	0.1	1:0	N	0	0	Yes
Myotis thysanodes	MYTH	Fringed myotis	23	2.6	4:19	Y	6	0	Yes
Myotis volans	MYVO	Long-legged myotis	88	9.8	45:43	Y	9	0	Yes
Myotis yumanensis	MYYU	Yuma myotis	220	24.5	118:101	Y	62	1	Yes
Nyctinomops macrotis	NYMA	Big free-tailed bat	4	0.4	0:4	Y	1	0	Yes
Parastrellus hesperus[3]	PAHE	Canyon bat	139	15.5	56:82	Y	19	1	Yes
Tadarida brasiliensis	TABR	Brazilian free-tailed bat	9	1	7:2	Y	0	0	Yes

[1] Formerly referred to as *Plecotus townsendii*; see Tumlinson and Douglas (1992) and Bogdanowicz et al. (1998). [2] Formerly referred to as *Myotis subulatus*; see Van Zyll de Jong (1984) and Holloway and Barclay (2001). [3] Formerly referred to as *Pipistrellus hesperus*, western pipistrelle; see Hoofer et al. (2006). [a] Species noted previously by possible visual sightings only. [c] Reproductive females captured by author in adjacent Grand Valley in 2011 and 2016 as noted in Colorado Parks and Wildlife Bat database. Species noted previously by possible visual sightings only. [c] Specimen of species collected for first time in Colorado at James M. Robb Colorado River State Park, Fruita Section (Adams and Lambeth 2015).

Table 3. Site type, sampling windows with hours sampled, and locations for acoustic detectors deployed in Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife properties from 2014 - 2016. Coordinates were collected in NAD 83 Zone 12. An * indicates the location changed from 2014 to 2015. Total hours sampled across both sampling periods are given (# hrs sampled).

	Sampling Window										
Site Type	May 22 - 31	Jun 5 - 14	Jun 19 - 28	Jul 10 - 19	Jul 24 - Aug 2	Aug 7 - 16	Location	Easting	Northing	Elev (m)	# hrs sampled
Upland											
Cliff 1	93.8			93.5			COLM	697131	4326313	1,892	187.3
Forest 1	93.8			93.5			COLM	697508	4329234	1,629	187.3
Riparian 1	93.8			93.5			COLM	696686	4323981	1,934	187.3
Shrub 1	93.8			93.5			COLM	702132	4322535	1,910	187.3
Water 1*	93.8			93.5			COLM	704245	4322023	1,568	187.3
Cliff 2		93.0			97.1		COLM	700951	4326431	1,788	190.1
Forest 2		93.0			97.1		COLM	700767	4322414	1,956	190.1
Riparian 2		93.0			97.1		COLM	700242	4317859	1,975	190.1
Shrub 2		93.0			97.1		COLM	701409	4325454	1,709	190.1
Water 2		93.0			97.1		COLM	695299	4330939	1,750	190.1
Cliff 3			91.0			101.8	MCNCA	690452	4331665	1,769	192.8
Forest 3			91.0			101.8	MCNCA	687752	4331479	1,868	192.8
Riparian 3			91.0			101.8	MCNCA	693592	4333961	1,425	192.8
Shrub 3			91.0			101.8	MCNCA	681355	4340623	1,484	192.8
Water 3*			91.0			101.8	MCNCA	689430	4329010	2,056	192.8
River											
River 1	93.8			93.5			Connected Lakes SP	706684	4328691	1,382	187.3
River 2	93.8			93.5			Walter Walker SWA	703883	4330310	1,378	187.3
River 3*	93.8			93.5			Walter Walker SWA	702745	4331144	1,374	187.3
River 4	93.8			93.5			Fruita SP	694760	4336213	1,364	187.3
River 5	93.8			93.5			Horsethief SWA	689893	4338016	1,355	187.3
River 6		93.0			97.1		Connected Lakes SP	706408	4328568	1,382	190.1
River 7		93.0			97.1		Leatha Jean SWA	702141	4331224	1,373	190.1
River 8		93.0			97.1		Horsethief SWA	691434	4337161	1,361	190.1
River 9		93.0			97.1		Walter Walker SWA	703555	4330731	1,376	190.1
River 10		93.0			97.1		Horsethief SWA	693099	4336642	1,361	190.1
River 11			91.0			101.8	Connected Lakes SP	706239	4328733	1,382	192.8
River 12			91.0			101.8	Walter Walker SWA	703336	4330123	1,377	192.8
River 13			91.0			101.8	Horsethief SWA	691974	4336516	1,360	192.8
River 14			91.0			101.8	Walter Walker SWA	701986	4331869	1,373	192.8
River 15			91.0			101.8	Horsethief SWA	689785	4338307	1,355	192.8

Table 4. Bats caught in mist nets at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity by date in 2014. Sites are listed from lowest to highest elevation. Number of net-nights (Effort), sex ratios of adults by species (male:female) and by site (M:F), numbers of juveniles captured (# Juvs), total number of bats captured, and total species captured are given by location and date. Species abbreviations are found in Table 2. Individuals with unknown sex appear in parenthesis.

Location	Date	Effort	ANPA	COTO	EPFU	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	M:F	# Juvs	Total Bats	Total Species
Lower (1,320 - 1,675)																				
Horsethief River Pond	5/27/14	3.3	-	-	0:2 (1)	0:1	7:1	-	-	1:0	-	-	1:0	-	-	-	9:4	0	14	5
	7/24/14	3.3	1:0	-	0:2	-	1:0	-	-	-	-	-	1:0	2:0	-	-	5:2	0	7	5
Lower Echo Pour-off	6/26/14	0.9	-	-	-	-	-	1:0	-	-	-	-	-	1:1	-	1:3	3:4	0	7	3
Lower Monument Ponds	6/25/14	9.0	1:2	-	4:5	1:0	1:0	1:0	-	-	1:0	-	1:0	6:1	-	3:1	19:9	0	28	9
	7/9/14	7.0	-	-	-	-	-	-	-	-	-	-	-	1:1	0:1	2:4	1:2	0	9	3
	7/30/14	6.7	-	-	3:10	-	-	0:1	-	-	-	-	0:1	11:6	-	1:1	15:19	12	34	5
	8/14/14	5.8	-	-	3:1	-	-	-	-	-	-	-	0:1	6:13	-	3:1	3:4	12	28	4
Echo Canyon Pool	5/29/14	1.9	1:0	-	-	1:0	-	1:0	-	-	-	-	1:0	-	-	-	4:0	0	4	4
	6/11/14	1.9	-	-	-	-	-	-	-	-	-	-	-	1:0	-	3:2	2:1	0	6	2
	8/11/14	4.3	-	-	0:1	-	-	-	-	-	-	-	-	1:1	-	2:0	3:2	3	5	3
No Thoroughfare 1st Pool	6/6/14	1.7	-	-	1:4	1:0	2:0	-	-	-	-	-	-	7:2	-	-	11:6	0	17	4
	6/18/14	2.7	-	-	5:2	-	-	-	0:1	-	-	1:0	1:1	-	-	-	7:4	0	11	4
	6/30/14	1.7	-	-	1:0	-	-	1:0	-	-	-	-	-	5:0	-	4:6	11:6	0	17	4
	7/31/14	1.7	-	-	-	-	-	1:0	-	-	-	-	1:0	2:0	-	3:7 (1)	1:1	8	15	4
Lower Tunnel W Entrance	7/28/14	0.3	-	-	-	-	-	-	-	-	-	-	-	5:5 (1)	-	-	1:1	7	11	1
Ute Canyon Black Box	6/2/14	1.3	-	-	0:1	-	-	-	-	-	-	-	-	-	-	-	0:1	0	1	1
	6/24/14	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
Upper (1,746 – 2,059)																				
Black Ridge Lagoon	5/28/14	8.7	-	-	0:1	-	-	-	-	-	-	-	-	-	-	-	0:1	0	1	1
	6/23/14	11.7	-	-	1:2	-	-	-	-	-	-	-	-	2:1	-	0:1	1:1	0	7	2
	7/8/14	12.4	-	-	-	-	-	-	-	-	-	-	0:1	0:1	-	0:1	0:3	0	3	3
	8/5/14	8.0	-	-	-	-	-	-	-	-	-	-	-	1:3	-	-	1:3	1	4	1
Middle Ute Box	6/5/14	1.3	-	-	7:1	1:0	2:0	-	-	-	-	-	2:1	1:0	-	-	13:2	1	15	5
	6/19/14	1.3	-	0:1	6:1	-	5:0	-	1:0	0:1	-	-	6:0	2:0	-	1:0	21:3	0	24	8
	7/7/14	0.9	-	-	4:1 (1)	-	-	-	-	-	-	-	1:0	-	-	-	4:1	0	7	2
	8/6/14	1.3	-	-	1:0	-	-	-	-	-	-	-	-	-	-	-	1:0	0	1	1

Table 4. Continued.

Location	Date	Effort	ANPA	COTO	EPFU	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	M:F	# Juvs	Total Bats	Total Species
Rough Canyon Tank	5/26/14	2.7	-	-	-	-	4:0	-	-	-	-	-	-	-	-	-	4:0	0	4	1
Suction Pt Upper Pour-off	6/3/14	2.3	-	-	2:4	-	6:1	-	-	-	-	-	-	-	-	-	8:5	0	13	2
	6/17/14	2.3	-	-	4:1	-	3:0	-	-	-	-	-	3:1	1:0	-	-	11:2	0	13	4
	7/1/14	1.7	1:0	-	4:1	1:0	1:0	-	1:1	-	-	-	5:5	1:0	-	-	2:1	0	21	7
	8/7/14	2.3	-	-	2:1	-	-	1:0	-	-	-	-	2:0	-	-	-	5:1	1	6	3
Total Bats/Species			6	1	91	6	34	7	4	2	1	1	36	92	1	51	203:126	45	333	14
% Total of All Captures			1.8	0.3	27.4	1.8	10.2	2.1	1.2	0.6	0.3	0.3	10.5	27.7	0.3	15.4				

Table 5. Bats caught in mist nets at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity by date in 2015. Sites are listed from lowest to highest elevation. Number of net-nights (Effort), sex ratios of adults by species (male:female) and by site (M:F), numbers of juveniles captured (# Juvs), total number of bats captured, and total species captured are given by location and date. Efforts abbreviated by weather are denoted with an *. Species abbreviations are found in Table 2. Individuals with unknown sex appear in parenthesis.

Location	Date	Effort	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	M:F	# Juvs	Total Bats	Total Species
Lower (1,320 - 1,675)																						
Black Rocks 9	7/31/15	4.0	1:0	-	-	-	-	-	-	-	-	-	-	-	1:2-	-	-	-	1:1	3	4	2
Cottonwood 4	7/30/15	6.0	1:0	-	0:1	-	-	-	-	-	-	-	-	-	-	-	-	-	1:1	1	2	2
McDonald Pour-off	5/29/15	1.3	1:0	0:1	-	-	-	-	1:2	-	-	-	-	0:2	0:1	-	0:2	-	1:4	0	10	6
	6/17/15	0.7	6:2	-	2:0	-	-	-	-	0:1	-	-	0:2	1:1	5:2	-	1:5	-	15:13	0	28	7
	7/1/15	0.7	2:6	1:0	-	-	-	-	-	0:2	-	-	0:9	-	-	-	1:2	-	4:19	0	23	5
	8/6/15	0.7	5:6	2:0	-	-	-	-	2:2	-	-	-	2:6	-	-	-	0:3	-	11:17	14	28	5
Mee Canyon Pools	5/13/15	1.3	2:0	-	2:0	-	-	-	-	-	-	-	-	-	0:4	-	2:1	-	6:5	0	11	4
Horsethief River Pond	5/19/14	4.3	-	-	-	-	-	-	-	-	-	-	-	-	0:2	-	-	-	0:2	0	2	1
Lower Monument Ponds	5/27/15	6.3	-	-	0:1	-	-	0:2	-	-	-	-	-	-	0:1	-	0:1	-	0:5	0	5	4
	6/24/15	6.3	-	-	2:5	-	2:0	1:0	-	-	-	-	-	-	1:2	-	0:3	-	3:5	0	16	5
	7/7/15	7.3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	7/13/15	7.3*	-	-	0:1	-	-	-	-	-	-	-	-	-	2:1	-	1:2	-	3:4	0	7	3
	8/4/15	8.7	1:0	-	2:3	-	-	-	-	-	-	-	-	-	2:6	-	0:1	-	1:2	8	15	4
West Pollock Pool	5/7/15	1.3	-	-	2:1	-	-	-	-	-	-	-	-	-	-	-	-	-	2:1	0	3	1
	6/17/15	1.3	2:1	-	1:2	-	-	-	-	-	-	-	-	-	-	-	-	-	1:1	0	6	2
	8/6/15	1.7	1:0	-	1:0	-	-	-	-	-	-	-	-	-	4:2	-	2:1	-	8:3	9	11	4
Canyon Vista	6/23/15	11.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2:1	1:0	3:1	0	4	2
	7/22/15	9.3	-	-	0:1	-	-	-	-	-	-	-	-	-	0:2	-	0:1	-	0:4	2	4	3
Tiara Rado Pond	6/11/15	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
East Entrance Station	8/27/15	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0:1	-	-	0:1	1	1	1
Lower Echo Pour-off	6/22/15	0.7	-	-	-	-	-	-	0:1	-	-	-	-	-	5:9	-	1:3	-	6:13	0	19	3
	7/22/15	1.7	-	-	-	-	-	-	-	-	-	-	-	-	2:0	-	1:2	-	3:2	2	5	2
Echo Canyon Pool	5/26/15	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	6/9/15	2.3	-	-	-	-	-	1:0	-	-	-	-	-	-	0:1	-	1:0	1:0	3:1	0	4	4
	6/22/15	2.0	-	-	-	-	-	-	-	-	-	-	-	-	0:2	-	-	-	0:2	0	2	1
	7/28/15	1.7	-	-	0:2	-	-	-	-	-	-	-	-	-	2:2	-	0:1	-	2:5	4	7	3
No Thoroughfare 1st Pool	5/20/15	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0

Table 5. Continued.

Location	Date	Effort	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	M:F	# Juvs	Total Bats	Total Species
	6/2/15	2.0	-	-	-	-	-	-	-	-	-	-	-	-	2:0	-	-	-	2:0	0	2	1
	6/29/15	2.0	-	-	-	-	-	-	-	-	-	-	-	-	5:0	-	1:1	-	6:1	0	7	2
	7/27/15	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1:0	-	1:0	1	1	1
Middle Monument Box	7/1/15	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2:1	-	2:1	0	3	1
	7/28/15	1.0	-	-	1:0	-	-	-	-	1:0	-	-	-	4:1	-	-	-	-	6:1	4	7	3
NT 1st Waterfall	7/27/15	1.7	-	-	8:1	-	-	-	-	-	-	-	-	2:0	1:1	-	0:3	-	11:5	1	16	4
	8/10/15	1.7*	-	-	1:1	-	-	-	-	-	-	-	-	-	2:0	-	3:2	-	6:3	7	9	3
Lower Tunnel W Entrance	7/2/15	0.3	-	-	-	-	-	-	-	-	-	-	-	-	0:5	-	-	1:0	1:5	0	6	2
	7/7/15	0.3	-	-	-	-	-	-	-	-	-	-	-	-	0:1	-	-	1:0	1:1	0	2	2
	8/5/15	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1:0	1:0	0	1	1
MISC-4-15	8/11/15	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	0:2	-	-	0:2	0	2	1
Ute Canyon Black Box	6/4/15	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
Upper (1,746 – 2,059)																						
Black Ridge Lagoon	6/16/15	13.7	-	-	0:1	-	-	-	-	-	-	-	-	-	2:0	-	-	-	2:1	0	3	2
	7/10/15	9.0*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	8/5/15	11.0	-	-	-	-	-	-	-	-	-	-	-	0:1	2:3	-	1:0	-	3:4	6	7	3
Middle Ute Box	6/1/15	1.3	-	-	2:1	-	-	2:0	-	-	-	-	-	2:1	-	-	1:0	-	7:2	0	9	4
	6/18/15	1.3	-	-	5:0	-	1:0	1:0	-	-	-	-	-	1:1	1:0	-	4:0	-	13:1	0	14	6
	7/24/15	1.3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	8/3/15	1.6*	-	-	-	-	-	-	-	-	-	-	-	0:1	1:0	-	-	-	1:1	2	2	2
Suction Pt Upper Pour-off	6/3/15	2.7	-	-	1:2	-	3:0	1:0	-	-	-	-	-	1:0	0:1	-	-	-	2:1	0	9	5
	6/15/15	2.3	-	-	1:1	-	-	-	1:0	-	-	-	-	1:1	-	-	-	-	3:2	0	5	3
	6/30/15	2.7	-	-	1:0	-	-	-	-	-	-	-	-	3:3	-	-	-	-	4:3	0	7	2
	7/23/15	2.7	-	-	-	-	-	-	-	0:1	-	-	-	-	-	-	-	-	0:1	0	1	1
	8/3/15	2.3*	-	-	1:0	-	-	-	-	-	-	-	-	0:4	-	-	-	-	1:4	1	5	2
Black Ridge Pond	6/8/15	8.0	-	-	3:62	-	1:0	3:0	-	2:5	-	-	-	2:6	-	-	-	1:0	12:73	0	85	6
	6/25/15	7.7	-	-	1:3	1:0	1:0	-	0:1	0:5	-	-	-	2:9	-	-	-	0:1	5:19	0	24	7
	7/21/15	8.0*	-	-	0:1	-	-	-	-	-	-	-	-	-	-	-	-	0:1	0:2	0	2	2
	8/13/15	8.7	-	-	-	-	-	-	0:1	-	-	-	-	-	-	-	1:1	-	1:2	0	3	2
Total Bats/Species			37	4	127	1	8	11	11	17	0	0	19	50	90	3	63	8	180:269	66	449	16
% Total of All Captures			8.2	0.9	28.3	0.2	1.8	2.4	2.4	3.8	0.0	0.0	4.5	11.1	19.8	0.7	14.0	1.8				

Table 6. Bats caught in mist nets at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity by date in 2016. Sites are listed from lowest to highest elevation. Number of net-nights (Effort), sex ratios of adults by species (male:female) and by site (M:F), numbers of juveniles captured (# Juvs), total number of bats captured, and total species captured are given by location and date. Efforts abbreviated by weather are denoted with an *. Species abbreviations are found in Table 2. Individuals with unknown sex appear in parenthesis.

Location	Date	Effort	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	M:F	# Juvs	Total Bats	Total Species
Lower (1,320 - 1,675)																						
McDonald Pour-off	7/6/16	0.7	1:0	0:1	(1)	-	-	-	0:1	1:1	-	-	0:1	-	1:0	-	0:1	-	3:5 (1)	0	9	8
Horsethief River Pond	5/24/16	6.0	-	-	-	-	-	0:1	-	-	-	-	-	-	0:1	-	-	-	0:2	0	2	2
	7/18/16	3.3	-	-	-	-	-	0:2	-	-	-	-	0:1	0:1	-	-	0:1	-	0:5	0	5	4
Lower Monument Ponds	6/13/16	7.0	-	-	0:11	-	-	-	-	-	-	-	-	-	4:1	-	1:0	1:0	1:2	0	18	4
	7/5/16	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2:2	-	1:1	0	4	1
	7/7/16	10.3	-	-	2:2	-	-	-	-	0:1	-	-	-	-	2:2	-	2:5	-	3:5	0	16	4
	8/1/16	8.3	1:0	-	4:3	-	-	-	-	-	-	-	-	1:0	3:1	-	0:2	-	3:2	7	15	5
Granite Falls Pond	6/27/16	8.0	-	-	0:2	-	-	-	-	-	-	-	-	-	4:2	-	-	-	2:2	0	8	2
	7/25/16	6.0	-	-	0:3	-	-	-	-	-	-	-	-	-	3:4	-	-	-	3:7	2	10	2
Wedding Canyon Box	8/8/16	0.7	-	-	-	-	-	-	-	-	-	-	-	-	2:1	-	0:2	-	2:3	3	5	2
Lower Echo Pour-off	6/20/16	0.9	-	0:1	-	-	-	-	-	-	-	-	-	-	2:1	-	1:2	-	3:4	0	7	3
	7/13/16	0.9	-	-	-	-	-	-	-	-	-	-	-	-	1:2	-	-	-	1:2	0	3	1
No Thoroughfare 1st Pool	6/21/16	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0:3	-	0:3	0	3	1
NT 1st Waterfall	7/11/16	2.0	-	-	4:5	-	-	-	-	-	-	-	-	-	1:0	-	0:1	-	5:6	0	11	3
Lower Tunnel W Entrance	8/8/16	0.1	-	-	-	-	-	-	-	-	-	-	-	-	0:1	-	-	-	0:1	0	1	1
Upper (1,746 – 2,059)																						
Black Ridge Lagoon	6/15/16	10.6*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	6/28/16	10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
Total Bats/Species			2	2	37	0	0	3	1	3	0	0	2	2	39	0	25	1	11:18 (1)	12	117	11
% Total of All Captures			1.7	1.7	33.3	0.0	0.0	2.6	0.9	2.6	0.0	0.0	1.7	1.7	33.3	0.0	21.4	0.9				

Table 7. Rates of bat captures in mist nets in relation to month and netting effort at Colorado National Monument, McInnis Canyons National Conservation Area, and the surrounding study area during the summers of 2014 - 2016.

	2014			2015			2016		
Month/Year	**# bats**	**Net effort**	**Bats/ effort hr**	**# bats**	**Net effort**	**Bats/ effort hr**	**# bats**	**Net effort**	**Bats/ effort hr**
May	23	16.6	1.4	31	18.8	1.6	2	6.0	0.3
June	161	39.4	4.1	244	77.6	3.1	36	38.5	0.9
July	107	34.0	3.1	90	65.7	1.4	58	32.2	1.8
August	44	21.7	2.0	84	37.4	2.2	21	9.1	2.3
Total	335	111.7	3.0	449	199.5	2.3	117	85.8	1.4

Table 8. Bats caught at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity by site from 2014 - 2016 with totals for Lower and Upper life zones (see Table 1). Sites are listed from lowest to highest elevation and include several roosts where capture work occurred. Sex ratios of adults by site (M:F) and for life zones, numbers of juveniles captured (# Juvs), total number of bats captured by site (N Bats) and species (Total Bats), total number of species captured (# Spp), and relative abundance (% Total). Abbreviations for species are found in Table 2. Individuals with unknown sex appear in parenthesis beside sex ratios.

Location	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	M:F	# Juvs	N Bats	# Spp
Lower (1,320 - 1,675)																				
Black Rocks 9	1	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	1:1	3	4	2
Cottonwood 4	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1:1	1	2	2
McDonald Pour-off	29	5	3	-	-	-	8	5	-	-	20	4	9	-	15	-	35:62 (1)	14	98	9
Mee Canyon Pools	2	-	2	-	-	-	-	-	-	-	-	-	4	-	3	-	6:5	0	11	4
Horsethief River Pond	1	-	5	-	1	12	-	-	1	-	1	3	5	-	1	-	14:15 (1)	0	30	9
Lower Monument Ponds	5	-	62	-	3	4	2	1	-	1	-	4	73	1	38	1	86:109	39	195	12
West Pollock Pool	4	-	7	-	-	-	-	-	-	-	1	-	5	-	3	-	13:7	9	20	5
Canyon Vista	-	-	1	-	-	-	-	-	-	-	-	-	2	-	4	1	3:5	2	8	4
Granite Falls Pond	-	-	5	-	-	-	-	-	-	-	-	-	13	-	-	-	7:11	2	18	2
Wedding Canyon Box	-	-	-	-	-	-	-	-	-	-	-	-	3	-	2	-	2:3	3	5	2
Tiara Rado Pond	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
East Entrance Station	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0:1	1	1	1
Lower Echo Pour-off	-	1	-	-	-	-	2	-	-	-	-	-	24	-	14	-	12:29	2	41	4
Echo Canyon Pool	1	-	3	-	1	1	1	-	-	-	-	1	10	-	9	1	4:3	7	28	9
No Thoroughfare 1st Pool	-	-	13	-	1	2	2	1	-	-	1	3	23	-	27	-	1:1 (1)	9	73	9
Middle Monument Box	-	-	1	-	-	-	-	1	-	-	-	5	-	-	3	-	4:1	4	10	4
NT 1st Waterfall	-	-	20	-	-	-	-	-	-	-	-	2	5	-	9	-	11:7	8	36	4
Lower Tunnel W Entrance	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	3	2:3 (1)	7	21	2
MISC-4-15	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	0:2	0	2	1
Ute Canyon Black Box	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0:1	0	1	1
Upper (1,746 – 2,059)																				
Black Ridge Lagoon	-	-	5	-	-	-	-	-	-	-	-	2	15	-	3	-	9:16	7	25	4
Middle Ute Box	-	1	30	-	2	10	-	1	1	-	-	16	5	-	6	-	61:10 (1)	3	72	9
Rough Canyon Tank	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	4:0	0	4	1
Suction Pt Upper Pour-off	1	-	26	-	4	12	2	3	-	-	-	29	3	-	-	-	52:28	2	80	8
Black Ridge Pond	-	-	70	1	2	3	2	12	-	-	-	19	-	-	2	3	18:96	0	114	9
Total Bats/Species	45	7	255	1	14	48	19	24	2	1	23	88	220	4	139	9	428:465 (5)	123	899	16
% Total of All Captures	5.0	0.8	28.4	0.1	1.6	5.3	2.1	2.7	0.2	0.1	2.6	9.8	24.5	0.4	15.5	1.0	47.1/52.3 (0.6)	-	-	-
Lower Life Zone (Total M:F)	27:17	3:3	49:74(2)	-	5:1	15:4	8:7	2:6	1:0	1:0	4:19	14:10	104:92(1)	0:4	48:79(1)	6:0	285:317 (4)	111	603	15
Upper Life Zone (Total M:F)	1:0	0:1	46:84(1)	1:0	8:0	28:1	2:2	4:12	0:1	-	-	31:33	14:9	-	8:3	1:2	144:148 (1)	12	295	13

Table 9. Rankings by Akaike's information criterion adjusted for small sample size (AIC_c; Burnham and Anderson, 2002) of top logistic regression models (GLM function in program R 3.1.3, 2015) comparing sex ratios of bats caught at Colorado National Monument and McInnis Canyons National Conservation Area in 2014 and 2015 in comparison with lower and upper life zones. Juvenile bats were pooled with females. Symbols: Δ_i is the difference in AIC_c value between the i^{th} and top-ranked model; w_i is the Akaike weight (probability that the i^{th} model is the best approximating model among the candidate models). The proportion of individuals of each trait (i.e., P_1, P_2, $1\text{-}P_1$, $1\text{-}P_2$), was modeled under the constraint $P_1 = P_2$ (i.e., all data pooled), and compared with a general model where $P_1 \neq P_2$ (i.e., allowing for a group effect).

Species and Model	***K***	**AIC_c**	**Δ_i**	**w_i**
2014				
Eptesicus fuscus adult sex ratios by life zone				
General	2	12.40	0.00	0.99
Constrained	1	21.35	8.95	0.01
Lasionycteris noctivagans adult sex ratios by life zone				
Constrained	1	6.19	0.00	0.74
General	2	8.26	2.07	0.26
Myotis volans adult sex ratios by life zone				
Constrained	1	8.36	0.00	0.75
General	2	10.61	2.25	0.25
Myotis yumanensis adult sex ratios by life zone				
Constrained	1	11.72	0.00	0.75
General	2	11.92	0.20	0.68
Parastrellus hesperus adult sex ratios by life zone				
Constrained	1	7.95	0.00	0.75
General	2	10.11	2.16	0.26
2015				
Eptesicus fuscus adult sex ratios by life zone*				
Constrained	1	10.13	0.00	0.71
General	2	11.88	1.75	0.29
Lasionycteris noctivagans adult sex ratios by life zone				
General	2	7.46	0.00	2.50
Constrained	1	9.29	1.83	1.00
Myotis californicus adult sex ratios by life zone				
Constrained	1	6.52	0.00	0.77
General	2	8.99	2.47	0.23
Myotis ciliolabrum adult sex ratios by life zone				
Constrained	1	5.87	0.00	0.67
General	2	7.31	1.44	0.33
Myotis volans adult sex ratios by life zone				
Constrained	1	9.00	0.00	0.74
General	2	11.05	2.05	0.26
Myotis yumanensis adult sex ratios by life zone				
Constrained	1	9.33	0.00	0.74
General	2	11.42	2.09	0.26
Parastrellus hesperus adult sex ratios by life zone				
General	2	10.73	0.00	0.93
Constrained	1	15.94	5.21	0.07

* Abnormally high captures of this species on one sampling date were considered an outlier and removed from analysis.

Table 10. Dates of capture of adult female bats at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity from 2014 – 2016, according to stage of reproduction for the earliest and latest dates a bat was caught at each stage. These data have biases based on effort and location, and may be limited by small sample sizes (see tables 4, 5, and 6). They are intended to provide a rough indication of the season of reproductive activity for females of those species of bats that reproduce at or near the study area. Dashes indicate that no observations were made. Date of 1st juvenile is the earliest date a volant juvenile of either sex was captured in flight.

Species	**1st pregnant**			**Last pregnant**			**1st lactating**		
	2014	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
Antrozous pallidus	-	17-Jun	-	-	17-Jun	-	25-Jun	1-Jul	-
Corynorhinus townsendii	19-Jun	-	20-Jun	19-Jun	-	20-Jun	-	-	6-Jul
Eptesicus fuscus	27-May	8-Jun	13-Jun	1-Jul	25-Jun	7-Jul	7-Jul	7-Jul	11-Jul
Euderma maculatum	-	-	-	-	-	-	-	-	-
Lasiurus cinereus	-	-	-	-	-	-	-	-	-
Lasionycteris noctivagans	-	-	-	-	-	-	-	-	-
Myotis californicus	-	25-Jun	-	-	25-Jun	-	30-Jul	22-Jun	-
Myotis ciliolabrum	18-Jun	8-Jun	6-Jul	1-Jul	25-Jun	6-Jul	-	1-Jul	7-Jul
Myotis evotis	-	-	-	-	-	-	-	-	-
Myotis lucifugus	-	-	-	-	-	-	-	-	-
Myotis thysanodes	-	17-Jun	-	-	17-Jun	-	-	1-Jul	6-Jul
Myotis volans	17-Jun	18-Jun		1-Jul	25-Jun		1-Jul	30-Jun	18-Jul
Myotis yumanensis	6-Jun	22-Jun	13-Jun	26-Jun	2-Jul	7-Jul	25-Jun	22-Jun	13-Jul
Nyctinomops macrotis	-	-	-	-	-	-	-	-	-
Parastrellus hesperus	11-Jun	17-Jun	20-Jun	30-Jun	1-Jul	7-Jul	30-Jun	29-Jun	5-Jul
Tadarida brasiliensis	-	-	-	-	-	-	-	21-Jul	-

Species	**Last lactating**			**1st post-lactating**			**1st juvenile**		
	2014	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
Antrozous pallidus	25-Jun	6-Aug	-	-	6-Aug	-	-	30-Jul	-
Corynorhinus townsendii	-	-	6-Jul	-	-	-	-	6-Aug	-
Eptesicus fuscus	7-Aug	4-Aug	25-Jul	11-Aug	27-Jul	1-Aug	30-Jul	4-Aug	25-Jul
Euderma maculatum	-	-	-	-	-	-	-	-	-
Lasiurus cinereus	-	-	-	-	-	-	-	-	-
Lasionycteris noctivagans	-	-	-	-	-	-	-	-	-
Myotis californicus	30-Jul	22-Jun	-	-	6-Aug	-	-	6-Aug	-
Myotis ciliolabrum	-	23-Jul	7-Jul	-			-	28-Jul	
Myotis evotis	-	-	-	-	-	-	-	-	-
Myotis lucifugus	-	-	-	-	-	-	-	-	-
Myotis thysanodes	-	6-Aug	18-Jul	-	6-Aug	-	-	6-Aug	-
Myotis volans	8-Jul	3-Aug	18-Jul	-	28-Jul	-	30-Jul	28-Jul	-
Myotis yumanensis	30-Jul	5-Aug	25-Jul	5-Aug	-	8-Aug	28-Jul	22-Jul	25-Jul
Nyctinomops macrotis	-	-	-	-	11-Aug	-	-	27-Aug	-
Parastrellus hesperus	31-Jul	10-Aug	1-Aug	14-Aug	6-Aug	8-Aug	31-Jul	27-Jul	1-Aug
Tadarida brasiliensis	-	21-Jul	-	-	-	-	-	-	-

Table 11. Rankings by Akaike's information criterion adjusted for small sample size (AIC_c; Burnham and Anderson, 2002) of top logistic regression models (GLM function in program R 3.1.3, 2015) comparing proportions of reproductive female bats caught at Colorado National Monument and McInnis Canyons National Conservation Area in 2014 versus 2015. Symbols: Δ_i is the difference in AIC_c value between the i^{th} and top-ranked model; w_i is the Akaike weight (probability that the i^{th} model is the best approximating model among the candidate models). The proportion of individuals of each trait (i.e., P_1, P_2, $1-P_1$, $1-P_2$), was modeled under the constraint $P_1 = P_2$ (i.e., all data pooled), and compared with a general model where $P_1 \neq P_2$ (i.e., allowing for a group effect).

Species and Model	***K***	**AIC_c**	**Δ_i**	**w_i**
All species reproductive rates pooled in 2014 vs. 2015				
General	2	14.21	0.00	1.00
Constrained	1	30.36	16.15	0.00
Antrozous pallidus reproductive rates in 2014 vs. 2015				
Constrained	1	5.93	0.00	0.71
General	2	7.68	1.74	0.29
Eptesicus fuscus reproductive rates in 2014 vs. 2015*				
General	2	11.44	0.00	0.52
Constrained	1	11.61	0.17	0.48
Myotis californicus reproductive rates in 2014 vs. 2015				
Constrained	1	5.76	0.00	0.85
General	2	9.22	3.46	0.15
Myotis ciliolabrum reproductive rates in 2014 vs. 2015				
Constrained	1	6.96	0.00	0.62
General	2	7.97	1.01	0.38
Myotis volans reproductive rates in 2014 vs. 2015				
General	2	9.99	0.00	0.57
Constrained	1	10.58	0.59	0.43
Myotis yumanensis reproductive rates in 2014 vs. 2015				
General	2	11.29	0.00	0.85
Constrained	1	14.74	3.45	0.15
Parastrellus hesperus reproductive rates in 2014 vs. 2015				
General	2	10.11	0.00	0.59
Constrained	1	10.83	0.72	0.41

* Abnormally high captures of this species on one sampling date in 2015 were considered an outlier and removed from the analysis

Table 12. Rankings by Akaike's information criterion adjusted for small sample size (AIC_c; Burnham and Anderson, 2002) of top logistic regression models (GLM function in program R 3.1.3, 2015) comparing proportions of reproductive female bats caught at Colorado National Monument and McInnis Canyons National Conservation Area in 2015 versus 2016. Symbols: Δ_i is the difference in AIC_c value between the i^{th} and top-ranked model; w_i is the Akaike weight (probability that the i^{th} model is the best approximating model among the candidate models). The proportion of individuals of each trait (i.e., P_1, P_2, $1-P_1$, $1-P_2$), was modeled under the constraint $P_1 = P_2$ (i.e., all data pooled), and compared with a general model where $P_1 \neq P_2$ (i.e., allowing for a group effect).

Species and Model	***K***	**AIC_c**	**Δ_i**	**w_i**
All species reproductive rates pooled in 2015 vs. 2016				
General	2	14.12	0.00	0.83
Constrained	1	17.31	3.19	0.17
Eptesicus fuscus reproductive rates in 2015 vs. 2016*				
Constrained	1	9.43	0.00	0.75
General	2	11.59	2.15	0.25
Myotis yumanensis reproductive rates in 2015 vs. 2016				
Constrained	1	9.67	0.00	0.71
General	2	11.44	1.77	0.29
Parastrellus hesperus reproductive rates in 2015 vs. 2016				
Constrained	1	9.02	0.00	0.73
General	2	11.03	2.01	0.27

* Abnormally high captures of this species on one sampling date in 2015 were considered an outlier and removed from the analysis

Table 13. Representation of species collected for specimens or captured and released at Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife State Wildlife Areas and State Parks in the immediate vicinity.

Species	**Arctos database**	**COLM collection**	**CPW database**	**Miller 1964**	**Adams 1990, 1993**
Antrozous pallidus	3	-	1	4[a]	-
Corynorhinus townsendii	-	-	-	2[a]	-
Eptesicus fuscus	4	1	10	4	22
Lasiurus cinereus	-	-	-	-	-
Lasionycteris noctivagans	-	1	1	-	3
Myotis californicus	-	-	1	-	-
Myotis ciliolabrum	-	1	1	1	6
Myotis evotis	-	-	1	-	-
Myotis lucifugus	1	2[b]	2	2	5
Myotis thysanodes	-	1	1	-	2
Myotis volans	-	-	8	2	1
Myotis yumanensis	1	1	12	-	25
Nyctinomops macrotis	2	1	-	-	-
Parastrellus hesperus	9	2	1	15	8
Tadarida brasiliensis	-	1	-	-	1

[a] Records determined by visual sighting only.

[b] Specimens likely to be *Myotis volans* based on presence of keeled calcars.

Table 14. Bat species, by reproductive class, fitted with a radiotransmitter at Colorado National Monument, McInnis Canyons National Conservation Area, or the immediate vicinity during the summers of 2014 - 2016. Numbers of bats successfully tracked to a roost site after release is denoted in parenthesis. Two tagged bats were males (*) and one bat a juvenile (†).

Species	Reproductive status												Total
	Non reproductive			Pregnant			Lactating			Post-lactating			
	2014	2015	2016	2014	2015	2016	2014	2015	2016	2014	2015	2016	
Antrozous pallidus	-	1*†(1)	-	-	-	-	1 (1)	-	-	-	-	-	2 (2)
Corynorhinus townsendii	-	-	-	1 (0)	-	1 (1)	-	-	-	-	-	-	2 (1)
Eptesicus fuscus	-	-	-	-	1(1)	-	2 (2)	2 (1)	-	2 (2)	1(1)	-	8 (7)
Myotis californicus	-	-	-	-	-	-	1 (1)	-	-	-	-	-	1 (1)
Myotis ciliolabrum	-	-	-	-	-	-	-	1 (1)	-	-	-	-	1 (1)
Myotis thysanodes	-	-	-	-	-	-	-	1 (1)	2 (1)	-	-	-	3 (2)
Myotis volans	1*(0)	-	-	1 (1)	1 (1)	-	2 (2)	1 (1)	-	-	1 (1)	-	7 (6)
Myotis yumanensis	-	-	3 (2)	2 (2)	-	5 (3)	3 (3)	5 (5)	3 (1)	3 (2)	-	2 (1)	26 (19)
Nyctinomops macrotis	1 (1)	-	-	-	-	-	-	-	-	-	-	-	1 (1)
Parastrellus hesperus	-	-	-	-	2(2)	-	2 (1)	3 (2)	-	-	-	-	7 (5)
Tadarida brasiliensis	-	1*(1)	-	-	-	-	-	1 (0)	-	-	-	-	2 (1)
Total	2 (1)	2 (2)	3 (2)	4 (3)	4 (4)	6 (4)	11 (10)	14 (11)	5 (2)	5 (4)	2 (2)	2 (1)	60 (46)

Table 15. Location of day roosts for bat species tracked or opportunistically identified from 2014 - 2016 at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity. Roost ID (radio frequency-roost #-year), species (Sp., Table 2), sex, reproductive condition (Repro), capture date, capture location where tag was affixed (Table 1), date roost found, roost coordinates (NAD 83 Zone 12), elevation of roost (Elev.), roost substrate where bat was located, and emergence count date(s) and numbers of bats (N) if counted. Miscellaneous roosts found opportunistically, rather than by radiotelemetry, are identified by the "Misc" label used in the Roost ID.

Roost ID	Sp.	Sex	Repro	Capture date	Capture Location	Roost found	Roost Location	Easting	Northing	Elev. (m)	Roost substrate	Emergence Count	
												Date	N
831-1-14	Anpa	F	L	6/25/14	Lower Monument Ponds	6/27/14	Lower Monument Canyon	697903	4330630	1590	large cliff	6/28/14	≥ 2*
831-2-14	-	-	-	-	-	7/10/14	Lower Monument Canyon	698070	4330553	1584	large cliff		
830-1-15	Anpa	M	NR	8/4/15	Lower Monument Ponds	8/5/15	Lower Monument Canyon	698003	4330590	1563	large cliff		
646-1-16	Coto	F	P	6/20/16	Lower Echo Poor-off	6/30/16	House in Redlands	704742	4328856	1420	building		
5085-1-14	Epfu	F	PL	8/11/14	Echo Canyon Pool	8/15/14	Echo Canyon - BLM	706681	4321804	1650	boulder		
6335-1-14	Epfu	F	L	8/7/14	Suction Pt Upper Pour-off	8/9/14	Upper Ute Canyon	697912	4324192	1880	large cliff		
6335-2-14	-	-	-	-	-	8/14/14	Upper Ute Canyon	697481	4324271	1872	large cliff		
6335-3-14	-	-	-	-	-	8/19/14	Upper Ute Canyon	696799	4324406	1952	large cliff		
648-1-14	Epfu	F	L	7/7/14	Middle Ute Box	7/13/14	Middle Ute Canyon	699992	4323988	1765	large cliff		
8055-1-14	Epfu	F	PL	8/14/14	Lower Monument Ponds	8/15/14	Middle Monument Canyon	698505	4328654	1719	large cliff		
723-1-15	Epfu	F	P	6/24/15	Lower Monument Ponds	6/25/15	Middle Monument Canyon	697759	4328422	1725	large cliff	7/2/15	0
723-2-15	-	-	-	-	-	6/27/15	Middle Monument Canyon	697714	4328154	1654	large cliff		
749-1-15	Epfu	F	L	7/13/15	Lower Monument Ponds	7/14/15	Middle Monument Canyon	697192	4329009	1682	large cliff		
749-2-15	-	-	-	-	-	7/20/15	Middle Monument Canyon	697301	4329002	1676	large cliff		
781-1-15	Epfu	F	PL	7/27/15	NT 1st Waterfall	7/28/15	No Thoroughfare Canyon	703258	4321315	1734	large cliff		
449-1-14	Myca	F	L	7/30/14	Lower Monument Ponds	8/2/14	Grand View, above Rd.	696463	4328728	1807	large cliff	8/2/14	≥ 3*
449-1-15	Myci	F	L	7/24/15	Suction Pt Upper Pour-off	7/24/15	Upper Ute Canyon	697175	4324592	1982	boulder		
Misc-1-15	Mysp	N/A	N/A	N/A	N/A	6/23/15	Echo Canyon, pour-off	706015	4321715	1568	small cliff	7/24/15	10
635-1-15	Myth	F	L	8/6/15	McDonald Pour-off	8/7/15	McDonald Canyon	670507	4334408	1392	large cliff		
635-2-15	-	-	-	-	-	8/10/15	McDonald Canyon	670526	4334240	1350	large cliff		
635-3-15	-	-	-	-	-	8/13/15	McDonald Canyon	670729	4334121	1393	large cliff		
749-1-16	Myth	F	L	7/6/16	McDonald Pour-off	7/7/16	McDonald Canyon	670585	4334188	1346	large cliff		
749-2-16	-	-	-	-	-	7/9/16	McDonald Canyon	670589	4334182	1345	large cliff		
5588-1-14	Myvo	F	P	6/17/14	Suction Pt Upper Pour-off	6/25/14	Coke Ovens area	696707	4327866	1813	large cliff		
584-1-14	Myvo	F	L	7/1/14	Suction Pt Upper Pour-off	7/3/14	Squaw Fingers area	696990	4326941	1786	large cliff		
6835-1-14	Myvo	F	L	7/8/14	Black Ridge Lagoons	7/9/14	Fruita Canyon	696160	4331605	1560	large cliff		
6835-2-14	-	-	-	-	-	7/10/14	Near visitor center	695485	4330014	1801	small cliff		

* Indicates a bat with a radiotransmitter was present at the roost when the emergence count was conducted.

Table 15. Continued.

Roost ID	Sp.	Sex	Repro	Capture date	Capture Location	Roost found	Roost Location	Easting	Northing	Elev. (m)	Roost substrate	Emergence Count Date	N
549-1-15	Myvo	F	P	6/18/15	Middle Ute Box	6/25/15	Tree in Redlands	705605	4327778	1466	tree		
586-1-15	Myvo	F	PL	7/28/15	Middle Monument Box	8/5/15	Tree in Grand Valley	703043	4336319	1402	tree		
610-1-15	Myvo	F	L	6/30/15	Suction Pt Upper Pour-off	7/1/15	Middle Monument Canyon	697734	4327257	1729	large cliff		
522-1-14	Myyu	F	PL	8/5/14	Black Ridge Lagoons	8/6/14	Fruita Canyon	695470	4331104	1722	large cliff		
535-1-14	Myyu	F	P	6/23/14	Black Ridge Lagoons	6/24/14	Fruita Canyon	695624	4331321	1717	large cliff		
535-2-14	-	-	-	-	-	6/26/14	Wedding Canyon	696534	4330796	1687	large cliff		
535-3-14	-	-	-	-	-	6/28/14	Fruita Canyon	695825	4331779	1562	large cliff		
535-4-14	-	-	-	-	-	6/29/14	Fruita Canyon	695494	4331113	1659	small cliff		
547-1-14	Myyu	F	L	7/28/14	Lower Tunnel W Entrance	7/29/14	Fruita Canyon	695848	4332017	1622	large cliff		
571-1-14	Myyu	F	PL	8/11/14	Echo Canyon Pool	8/12/14	Near Echo Canyon	705321	4321334	1697	small cliff	8/18/14	0
												6/26/15	1
621-1-14	Myyu	F	L	6/25/14	Lower Monument Ponds	6/26/14	Wedding Canyon	696534	4330796	1687	large cliff	7/2/14	> 100*
												6/12/15	0
660-1-14	Myyu	F	L	7/30/14	Lower Monument Ponds	8/1/14	Lower Monument Canyon	697806	4330600	1618	large cliff		
673-1-14	Myyu	F	P	6/26/14	Lower Echo Poor-off	6/28/14	CO River near state line	669132	4331752	1326	large cliff		
Misc-1-14	Myyu	N/A	N/A	N/A	N/A	8/18/14	Near Echo Canyon	705332	4321353	1710	small cliff	8/18/14	14
												6/26/15	1
560-1-15	Myyu	F	L	7/7/15	Lower Tunnel W Entrance	7/8/15	Fruita Canyon	695825	4331778	1562	large cliff		
560-2-15	-	-	-	-	-	7/10/15	Kodels Canyon	694542	4332385	1607	large cliff	7/13/15	21*
560-3-15	-	-	-	-	-	8/6/15	Fruita Canyon	695848	4332017	1545	large cliff		
623-1-15	Myyu	F	L	6/22/15	Lower Echo Pour-off	6/23/15	Devils Kitchen	704990	4322116	1597	small cliff	6/26/15	≥ 189*
648-1-15	Myyu	F	L	7/13/15	Lower Monument Ponds	7/14/15	Kissing Couple area	696598	4329009	1703	large cliff		
661-1-15	Myyu	F	L	7/2/15	Lower Tunnel W Entrance	7/3/15	Fruita Canyon	696203	4331729	1645	large cliff	8/7/15	3
710-1-15	Myyu	F	L	8/5/15	Black Ridge Lagoon	8/6/15	Fruita Canyon	695566	4331151	1639	large cliff	8/7/15	≥ 1*
710-2-15	-	-	-	-	-	8/9/15	Fruita Canyon	695733	4331732	1656	large cliff		
509-1-16	Myyu	F	NR	7/13/16	Lower Echo Poor-off	7/14/16	Devils Kitchen	704980	4322110	1563	large cliff		
546-1-16	Myyu	F	PL	8/8/16	Lower Tunnel W Entrance	8/9/16	Fruita Canyon	695671	4331410	1638	large cliff		
571-1-16	Myyu	F	L	7/13/16	Lower Echo Poor-off	7/14/16	Devils Kitchen	705199	4322039	1604	large cliff		
600-1-16	Myyu	F	NR	7/7/16	Lower Monument Ponds	7/8/16	Wedding Canyon, Pipe Organ	696527	4330179	1622	large cliff		
600-2-16	-	-	-	-	-	7/18/16	Upper Wedding Canyon	696272	4329898	1670	large cliff		
609-1-16	Myyu	F	P	6/20/16	Lower Echo Poor-off	6/21/16	Devils Kitchen	704999	4322115	1581	large cliff		
609-2-16	-	-	-	-	-	6/22/16	Near Devils Kitchen	704914	4322134	1622	large cliff		

* Indicates a bat with a radiotransmitter was present at the roost when the emergence count was conducted.

Table 15. Continued.

Roost ID	Sp.	Sex	Repro	Capture date	Capture Location	Roost found	Roost Location	Easting	Northing	Elev. (m)	Roost substrate	Emergence Count	
												Date	N
672-1-16	Myyu	F	P	6/13/16	Lower Monument Ponds	6/14/16	Lower Monument Canyon	698429	4330577	1501	large cliff		
685-1-16	Myyu	F	P	7/7/16	Lower Monument Ponds	7/9/16	Wedding Canyon, Pipe Organ	696627	4330214	1603	large cliff		
782-1-14	Nyma	F	NR	7/9/14	Lower Monument Ponds	7/10/14	Lower Monument Canyon	698175	4330519	1589	large cliff	7/9/14	≥ 13*
Misc-4-15	Nyma	F	PL	N/A	Fruita Canyon roost	8/7/15	Fruita Canyon	695629	4331261	1636	large cliff	8/11/15	64
Misc-6-15	Nyma	N/A	N/A	N/A	N/A	8/12/15	Echo Canyon	705937	4321713	1577	large cliff	8/12/15	≥ 15
												8/20/15	30
Misc-9-15	Nyma	F	NR	N/A	East Entrance Station	8/27/15	East Entrance Station	705040	4323330	1511	building		
4095-1-14	Pahe	F	L	6/30/14	No Thoroughfare 1st Pool	7/1/14	No Thoroughfare Canyon	704452	4322724	1590	schist cliff		
412-1-15	Pahe	F	L	6/29/15	No Thoroughfare 1st Pool	6/30/15	Coke Ovens area	704509	4322672	1552	schist cliff		
461-1-15	Pahe	F	P	7/1/15	Middle Monument Box	7/2/15	Middle Monument Canyon	697838	4328049	1655	boulder		
511-1-15	Pahe	F	P	6/22/15	Lower Echo Pour-off	6/23/15	Echo Canyon	705760	4321739	1613	large cliff		
600-1-15	Pahe	F	L	8/4/15	Lower Monument Ponds	8/5/15	Highland View area	696710	4327340	1913	boulder		
600-2-15	-	-	-	-	-	8/7/15	Highland View area	696796	4327335	1895	boulder		
600-3-15	-	-	-	-	-	8/14/15	Highland View area	696814	4327329	1873	boulder		
Misc-8-15	Pahe	N/A	N/A	N/A	N/A	7/20/15	Coke Ovens area	696694	4327851	1980	large cliff		
685-1-15	Tabr	M	NR	6/23/15	Canyon Vista	6/25/15	Middle Ute Canyon	699322	4323638	1809	large cliff		
Misc-3-15	Tabr	N/A	N/A	N/A	N/A	8/7/15	Fruita Canyon	695607	4331180	1645	large cliff	8/7/15	≥ 80
Misc-2-15	Unk	N/A	N/A	N/A	N/A	7/4/15	Fruita Canyon	696193	4331717	1590	large cliff		
Misc-5-15	Unk	N/A	N/A	N/A	N/A	8/12/15	McDonald Canyon	670407	4335091	1333	large cliff		
Misc-7-15	Unk	N/A	N/A	N/A	N/A	8/26/15	Wedding Canyon	696531	4330832	1642	large cliff		

* Indicates a bat with a radiotransmitter was present at the roost when the emergence count was conducted.

Table 16. Average distance traveled in kilometers by all bats pooled and by species between capture locations and the first roost ($CapR^1$) with number of bats tracked to a roost (n^{R1}), between capture sites and the second or later roosts ($CapR^{2+}$) with number of bats tracked to multiple roosts (n^{R2+}), and between multiple roosts used by individual bats (RoostsRr) with number of roost to roost moves by an individual bat (n^{Rr}). Bats were tracked from 2014 - 2016 at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity. Associated standard deviations (SD) are given when roosts were found for more than one individual of a species. One roost for *M. yumanensis* was considered an outlier and when removed lowers average distances significantly (distances with outlier removed in parenthesis).

Species	n^{R1}	$CapR^1$ ± SD (km)	n^{R2+}	$CapR^{2+}$ ± SD (km)	n^{Rr}	RoostsRr ± SD (km)
Pooled across species	46	2.7 ± 5.7	19	1.5 ± 1.2	26	0.6 ± 0.5
(outlier removed)	(45)	(1.9 ± 2.1)	--	--	--	--
Antrozous pallidus	2	1.3 ± 0.1	1	1.2	1	0.2
Corynorhinus townsendii	1	6.9	--	--	--	--
Eptesicus fuscus	7	1.5 ± 0.9	4	1.5 ± 1.4	5	0.5 ± 0.4
Myotis californicus	1	0.4	--	--	--	--
Myotis ciliolabrum	1	1.2	--	--	--	--
Myotis thysanodes	2	1.3 ± 0.2	3	1.4 ± 0.1	4	0.2 ± 0.1
Myotis volans	6	4.6 ± 3.4	1	1.0	1	1.7
Myotis yumanensis	20	3.0 ± 8.5	8	1.1 ± 0.9	12	0.7 ± 0.5
(outlier removed)	(19)	(1.0 ± 1.0)	--	--	--	--
Nyctinomops macrotis	1	1.1	--	--	--	--
Parastrellus hesperus	5	1.3 ± 1.6	2	4.1 ± 0.0	3	0.1 ± 0.0
Tadarida brasiliensis	1	4.9	--	--	--	--

Table 17. Acoustic bat call totals recorded during Sample Period 1 by site at Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife properties (Table 3) in 2015. Calls were classified to species or placed into high or low clades (e.g. HiF Sp, SonoBat) if some information for an ID existed but not enough to assign a species. Total passes classified to species (N_{Sp}), total estimated passes per site (N_{Passes}), number of species detected by site ($N_{Sp/Site}$), number of sites per species ($N_{Site/Sp}$), number of passes per species ($N_{Passes/Sp}$), and total passes by lower and upper life zones (1,734 m cutoff) are given.

Species/Site	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	HiF Sp[1]	LoF Sp[2]	N_{Sp}	N_{Passes}	$N_{Sp/Site}$	Calls/hr
Cliff 1	0	0	5	0	1	0	0	3	0	4	0	0	0	0	3	20	32	53	36	85	6	0.91
Forest 1	0	0	6	0	0	0	9	8	0	0	0	2	0	0	12	29	70	103	66	173	6	1.84
Riparian 1	0	0	13	0	1	3	1	10	0	5	1	6	0	0	6	26	160	120	72	280	10	2.99
Shrub 1	1	0	11	0	1	2	5	5	0	0	0	1	0	0	2	7	33	37	35	70	9	0.75
Water 1	0	0	4	0	1	4	5	103	0	3	1	1	1	0	55	17	402	123	195	525	11	5.60
Cliff 2	0	0	13	0	2	1	26	11	0	38	0	5	6	0	104	145	1678	418	351	2096	10	22.54
Forest 2	1	0	11	0	1	2	5	5	0	0	0	1	0	0	2	7	33	37	35	70	9	0.75
Riparian 2	0	0	0	0	0	1	1	9	0	1	1	3	0	0	12	0	539	27	28	566	7	6.09
Shrub 2	0	0	23	1	3	15	23	86	0	4	0	5	0	10	46	111	397	309	327	706	11	7.59
Water 2	0	0	417	0	9	4	56	17	0	1	1	0	110	0	385	335	3417	1877	1335	5294	10	56.92
Cliff 3	0	0	5	0	1	0	2	8	0	14	0	7	16	2	168	76	1278	411	299	1689	10	18.56
Forest 3	0	0	2	0	2	1	0	5	0	0	0	0	0	14	13	39	63	116	76	179	7	1.97
Riparian 3	1	0	101	0	3	1	12	45	0	22	1	0	16	5	349	154	860	649	710	1509	12	16.58
Shrub 3	0	0	0	0	1	0	5	8	0	4	0	0	5	0	104	10	233	89	137	322	7	3.54
Water 3	0	0	5	0	0	0	26	2919	0	26	0	66	91	0	656	10	12349	95	3799	12444	8	136.75
River 1	0	0	19	0	17	7	32	1132	0	12	0	2	105	0	23	197	3637	887	1546	4524	10	48.23
River 2	0	0	4	0	5	2	3	710	0	81	0	1	17	0	51	48	3222	256	922	3478	10	37.08
River 3	1	0	395	0	8	644	6	179	0	11	0	11	11	0	17	218	674	2920	1501	3594	11	38.32
River 4	0	0	378	1	19	66	71	3984	0	21	0	0	49	1	74	303	8865	2042	4967	10907	11	116.28
River 5	0	0	731	0	13	60	220	111	8	54	11	2	152	0	1533	193	8572	1839	3088	10411	12	110.99
River 6	0	0	7	0	4	4	5	476	0	9	0	9	11	0	46	165	3166	783	736	3949	10	42.46
River 7	0	0	0	0	0	0	9	89	0	2	0	6	11	0	48	0	1222	107	165	1329	6	14.29
River 8	0	0	0	0	0	0	6	12	1	1	0	2	7	0	64	0	710	11	93	721	7	7.75
River 9	0	1	2	0	0	0	8	903	0	6	0	48	10	0	110	13	2895	280	1101	3175	9	34.14
River 10	0	0	1	0	0	0	174	886	0	1	0	12	13	0	96	2	5899	69	1185	5968	8	64.17
River 11	0	0	43	0	19	7	4	42	0	9	0	0	8	17	30	425	705	1581	604	2286	10	25.12
River 12	0	0	170	0	20	15	18	2815	1	10	0	1	35	2	38	197	4662	899	3322	5561	12	61.11
River 13	1	2	134	0	26	6	256	131	1	6	3	23	128	1	92	203	2132	1063	1013	3195	15	35.11
River 14	0	0	3	0	5	1	0	43	0	5	2	0	21	0	32	70	440	387	182	827	9	9.09
River 15	0	0	19	0	2	0	1	5	3	3	20	0	8	0	10	6	501	491	77	992	10	10.90
$N_{Site/Sp}$	5	2	26	2	23	20	27	30	5	26	9	21	22	8	30	27	30	30	-	-	-	-
$N_{Passes/Sp}$	5	3	2522	2	164	846	989	14760	14	353	41	214	831	52	4181	3026	68846	18079	28003	86925	-	-
Calls/hr	0.00	0.00	0.91	0.00	0.06	0.30	0.36	5.31	0.01	0.13	0.01	0.08	0.30	0.02	1.51	1.09	24.78	6.51	-	-	-	-
Lower	3	3	2040	2	146	832	867	11768	14	264	38	125	608	36	2830	2361	49264	14888	21937	64152	16	-
Upper	2	0	482	0	18	14	122	2992	0	89	3	89	223	16	1351	665	19582	3191	6066	22773	13	-

[1] High frequency species: MYCA, MYCI, MYEV, MYLU, MYVO, MYYU, and PAHE

[2] Low frequency Species: ANPA, COTO, EPFU, EUMA, LACI, LANO, MYTH, NYMA, and TABR

Table 18. Acoustic bat call totals recorded during Sample Period 2 by site at Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife properties (Table 3) in 2015. Calls were classified to species or placed into high or low clades (e.g. HiF Sp, SonoBat) if some information for an ID existed but not enough to assign a species. Total passes classified to species (N_{Sp}), total estimated passes per site (N_{Passes}), number of species detected by site ($N_{Sp/Site}$), number of sites per species ($N_{Site/Sp}$), number of passes per species ($N_{Passes/Sp}$), and total passes by lower and upper life zones (1,734 m cutoff) are given.

Species/Site	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	HiF Sp[1]	LoF Sp[2]	N_{Sp}	N_{Passes}	$N_{Sp/Site}$	Calls/hr
Cliff 1	1	0	13	0	1	0	3	9	0	10	0	0	1	3	36	69	177	351	146	528	10	5.65
Forest 1	1	0	11	0	0	1	8	10	1	3	0	1	3	4	114	50	211	295	207	506	12	5.41
Riparian 1	2	1	549	0	9	1	0	42	5	35	0	1	5	3	10	44	3328	960	707	1960	13	20.96
Shrub 1	0	0	21	0	1	0	36	56	2	1	1	1	1	2	2	58	186	182	182	368	12	3.94
Water 1	0	0	45	2	5	2	5	69	0	11	3	1	12	2	519	147	440	1082	823	1522	13	16.28
Cliff 2	0	0	5	0	2	0	1	3	0	15	0	1	0	3	20	122	1365	2302	172	336	9	3.46
Forest 2	0	0	6	0	0	0	10	16	0	1	1	0	1	0	17	13	91	138	65	229	8	2.36
Riparian 2	0	0	29	0	6	2	15	100	1	79	26	25	1	0	20	27	451	1236	331	1687	12	17.37
Shrub 2	0	0	32	0	0	1	11	53	0	8	0	0	13	1	124	104	463	616	347	1079	9	11.11
Water 2	2	1	318	30	16	19	164	38	2	2	3	3	270	16	3151	472	4028	846	4874	13482	16	138.85
Cliff 3	0	0	2	3	10	2	10	13	0	17	0	6	2	8	183	143	323	521	399	854	12	8.39
Forest 3	1	0	0	1	0	0	1	10	0	3	0	0	1	1	47	16	118	166	81	284	9	2.79
Riparian 3	0	0	2	0	2	0	0	12	0	12	0	0	6	0	318	39	560	1053	391	1613	7	15.84
Shrub 3	0	0	1	1	2	0	4	5	2	3	0	0	2	3	269	57	290	400	349	690	11	6.78
Water 3	0	0	6	1	2	2	31	500	2	10	3	2	1	13	590	51	221	2109	1214	2330	14	22.89
River 1	0	0	175	0	86	2	68	558	0	24	0	0	99	0	27	535	795	755	1550	5558	9	59.44
River 2	0	0	76	0	25	2	9	254	1	6	0	5	33	4	31	533	1955	1332	979	3287	12	35.16
River 3	0	0	19	0	29	4	5	115	0	26	0	1	11	4	15	599	1447	825	828	2272	11	24.30
River 4	1	0	745	0	91	2	57	927	0	148	0	1	542	0	270	1142	1996	1981	3977	11911	11	127.39
River 5	1	0	683	0	6	3	12	6	6	17	10	4	3	0	1199	102	1579	2346	2052	3943	13	42.17
River 6	0	0	237	0	17	6	0	8	1	8	0	0	27	0	87	860	2978	692	1251	7958	9	81.96
River 7	0	0	15	0	8	0	11	47	0	2	1	1	36	4	54	310	1388	742	489	2130	11	21.94
River 8	0	0	216	0	0	0	16	6	4	3	5	4	25	0	43	17	1089	1069	339	2158	10	22.22
River 9	3	0	493	2	39	36	31	137	0	206	0	40	29	0	309	1001	2733	2801	2326	5534	12	56.99
River 10	0	0	0	0	0	0	2	11	0	0	0	1	3	0	29	0	46	0	46	1367	5	14.08
River 11	0	0	2	0	0	0	4	8	0	0	0	0	11	0	10	43	595	2302	78	2897	6	28.46
River 12	0	0	30	0	3	1	8	81	0	12	0	3	34	0	69	38	476	1819	279	3670	10	36.05
River 13	3	0	275	0	18	12	61	22	3	19	5	11	95	5	311	315	2732	1568	1155	4300	14	42.24
River 14	0	0	23	0	5	0	12	206	1	58	0	2	9	0	47	378	1139	1411	741	2550	10	25.05
River 15	0	0	0	0	0	0	0	3	0	0	0	4	3	0	3	0	14	1357	13	1371	4	13.47
$N_{Site/Sp}$	9	2	27	7	22	17	25	30	14	27	10	20	29	16	28	28	30	28	-	-	-	-
$N_{Passes/Sp}$	15	2	4236	40	383	103	587	3252	32	735	58	115	1272	76	7732	8107	16707	14664	27363	88374	-	-
Calls/hr	0.01	0.00	1.45	0.01	0.13	0.04	0.20	1.11	0.01	0.25	0.02	0.04	2.64	0.03	2.64	2.77	5.71	5.02	-	-	-	-
Lower	9	0	3287	5	336	77	316	2465	20	562	24	76	989	27	3684	7092	10637	12563	19192	66316	15	-
Upper	6	2	949	35	47	26	271	787	12	173	34	39	283	49	4048	1015	6070	2101	8171	22058	16	-

[1] High frequency species: MYCA, MYCI, MYEV, MYLU, MYVO, MYYU, and PAHE

[2] Low frequency Species: ANPA, COTO, EPFU, EUMA, LACI, LANO, MYTH, NYMA, and TABR

Table 19. Acoustic bat call totals recorded during Sample Period 1 by site at Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife properties (Table 3) in 2016. Calls were classified to species or placed into high or low clades (e.g. HiF Sp, SonoBat) if some information for an ID existed but not enough to assign a species. Total passes classified to species (N_{Sp}), total estimated passes per site (N_{Passes}), number of species detected by site ($N_{Sp/Site}$), number of sites per species ($N_{Site/Sp}$), number of passes per species ($N_{Passes/Sp}$), and total passes by lower and upper life zones (1,734 m cutoff) are given.

Species/Site	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	HiF Sp[1]	LoF Sp[2]	N_{Sp}	N_{Passes}	$N_{Sp/Site}$	Calls/hr
Cliff 1	0	0	7	0	2	0	3	8	0	3	0	0	0	0	5	61	156	129	89	285	7	3.04
Forest 1	0	0	4	0	0	2	7	20	1	2	0	0	0	0	48	190	162	264	274	426	8	4.54
Riparian 1	0	0	6	0	2	3	1	22	1	7	1	5	0	0	4	8	174	72	60	246	11	2.62
Shrub 1	0	0	4	0	2	0	18	19	0	0	2	0	0	0	0	56	81	118	101	199	6	2.12
Water 1	0	0	3	0	1	2	24	185	2	5	13	0	15	0	167	18	857	154	435	1011	11	10.78
Cliff 2	0	0	25	0	7	13	35	32	0	213	0	63	48	7	492	550	5027	945	1485	5972	11	64.22
Forest 2	0	0	3	0	1	0	22	94	0	0	0	0	0	0	2	10	180	39	132	219	6	2.35
Riparian 2	1	0	8	0	6	5	7	18	160	9	0	2	0	1	3	13	598	257	233	855	12	9.19
Shrub 2	0	0	30	0	5	4	81	109	0	33	0	6	10	5	250	145	1166	492	678	1658	11	17.83
Water 2	1	0	628	2	39	15	31	75	0	8	2	9	47	2	1873	531	3995	3526	3263	7521	14	80.87
Cliff 3	0	0	9	1	6	0	1	11	0	13	0	0	17	33	157	354	646	965	602	1611	10	17.70
Forest 3	0	0	2	0	1	0	0	0	0	0	0	1	0	6	7	22	37	93	39	130	6	1.43
Riparian 3	1	1	14	0	0	0	8	10	0	10	0	0	6	2	223	34	403	196	309	599	10	6.58
Shrub 3	0	0	2	0	0	1	5	7	0	1	1	0	0	5	141	93	296	408	256	704	9	7.74
Water 3	0	1	78	0	5	15	35	756	3	103	2	20	21	2	213	191	6055	1042	1445	7097	14	77.99
River 1	0	0	6	0	2	5	4	225	0	3	0	0	32	0	93	307	2063	2382	677	4445	9	47.39
River 2	0	0	1	0	0	0	2	41	0	2	0	0	0	0	20	26	570	103	92	673	6	7.17
River 3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	286	40	3	326	2	3.48
River 4	1	0	39	0	61	3	11	6330	0	67	0	5	60	0	186	471	18183	2478	7234	20661	11	220.27
River 5	0	0	1459	0	1	6	674	193	4	3	1	12	67	0	700	961	4331	4394	4081	8725	12	93.02
River 6	0	0	16	0	3	4	1	114	0	2	0	0	7	0	25	194	1510	1374	366	2884	9	31.01
River 7	0	0	3	0	0	0	1	9	0	11	0	0	2	0	9	3	469	32	38	501	7	5.39
River 8	0	0	12	0	0	0	4	11	4	0	4	13	46	0	30	8	773	301	132	1074	9	11.55
River 9	0	0	179	0	3	1	1	60	0	12	0	11	16	1	14	242	773	301	540	2608	11	28.04
River 10	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	112	1	3	113	2	1.22
River 11	0	0	37	0	26	3	0	29	0	13	0	1	39	1	66	606	1892	2414	821	4306	10	47.32
River 12	0	0	193	0	5	1	0	147	0	9	0	1	26	0	20	232	899	1125	634	2024	9	22.24
River 13	1	0	46	0	6	3	85	50	0	1	8	10	36	1	115	159	1146	962	521	2108	13	23.16
River 14	0	0	179	0	12	1	1	31	0	2	0	0	3	0	23	251	636	2401	503	3037	9	33.37
River 15	0	0	89	2	0	2	5	15	2	6	4	0	7	0	18	38	200	421	188	621	11	6.82
$N_{Site/Sp}$	5	2	28	3	21	19	25	28	8	24	10	14	20	12	29	28	30	30	-	-	-	-
$N_{Passes/Sp}$	5	2	3082	5	196	89	1067	8622	177	538	38	159	506	66	4908	5774	53676	27429	25234	82639	-	-
Calls/hr	0.00	0.00	1.11	0.00	0.07	0.03	0.38	3.10	0.06	0.19	0.01	0.06	0.18	0.02	1.77	2.08	19.32	9.87	-	-	-	-
Lower	3	1	2312	2	125	38	914	7587	13	182	31	59	373	15	2152	3978	36727	20243	17785	58504	16	-
Upper	2	1	770	3	71	51	153	1035	164	356	7	100	133	51	2756	1796	16949	7186	7449	24135	16	-

[1] High frequency species: MYCA, MYCI, MYEV, MYLU, MYVO, MYYU, and PAHE

[2] Low frequency Species: ANPA, COTO, EPFU, EUMA, LACI, LANO, MYTH, NYMA, and TABR

Table 20. Acoustic bat call totals recorded during Sample Period 2 by site at Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife properties (Table 3) in 2016. Calls were classified to species or placed into high or low clades (e.g. HiF Sp, SonoBat) if some information for an ID existed but not enough to assign a species. Total passes classified to species (N_{Sp}), total estimated passes per site (N_{Passes}), number of species detected by site ($N_{Sp/Site}$), number of sites per species ($N_{Site/Sp}$), number of passes per species ($N_{Passes/Sp}$), and total passes by lower and upper life zones (1,734 m cutoff) are given.

Species/Site	ANPA	COTO	EPFU	EUMA	LACI	LANO	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	NYMA	PAHE	TABR	HiF Sp[1]	LoF Sp[2]	N_{Sp}	N_{Passes}	$N_{Sp/Site}$	Calls/hr
Cliff 1	0	0	30	0	0	0	2	6	0	6	0	4	4	0	32	21	612	214	105	826	8	8.83
Forest 1	0	0	15	0	1	1	15	6	0	489	0	10	12	11	154	89	1899	346	803	2245	11	24.01
Riparian 1	2	0	342	0	2	7	18	135	4	38	0	4	6	1	80	169	849	1214	808	2063	13	22.06
Shrub 1	0	0	12	0	7	2	35	94	0	2	0	1	1	6	10	108	290	209	278	499	11	5.34
Water 1	0	0	2	0	0	0	2	22	0	5	0	0	8	0	355	1	573	55	395	628	7	6.47
Cliff 2	0	0	10	0	10	10	11	10	0	19	0	3	23	13	906	437	2226	1207	1452	3433	11	35.36
Forest 2	0	0	0	0	0	0	1	5	0	0	0	0	0	0	15	0	137	0	21	137	3	1.41
Riparian 2	0	0	1	0	0	0	12	119	18	10	11	9	9	0	30	0	2204	142	219	2346	9	24.16
Shrub 2	0	0	1	0	0	0	7	28	0	0	0	2	8	0	91	0	757	40	137	797	6	8.21
Water 2	0	0	0	0	0	0	26	4	0	1	0	0	120	0	638	0	4057	0	789	4057	5	41.78
Cliff 3	0	0	8	1	17	1	5	3	0	9	0	0	1	7	178	211	288	561	441	849	11	8.34
Forest 3	0	0	1	0	5	0	7	14	0	0	0	0	0	7	45	29	128	278	108	406	7	3.99
Riparian 3	0	1	10	1	2	0	8	20	0	6	0	0	2	0	209	11	428	86	270	514	10	5.05
Shrub 3	1	0	11	0	16	0	5	9	0	2	0	1	0	3	237	133	325	267	418	592	10	5.82
Water 3	0	0	0	0	10	0	7	96	0	8	1	1	4	15	101	45	685	199	288	884	10	8.68
River 1	0	0	28	0	1	0	15	164	0	2	0	1	85	0	355	74	2233	1198	725	3431	9	36.70
River 2	0	0	292	0	4	4	7	122	1	23	0	0	40	21	72	380	1021	1276	966	2297	11	24.57
River 3	0	0	7	0	0	0	4	15	0	6	0	1	34	0	32	62	591	348	161	939	8	10.04
River 4	0	0	174	1	32	0	13	789	0	76	1	1	305	1	348	679	5207	2858	2420	8065	12	86.26
River 5	1	0	46	0	0	0	0	0	2	0	0	0	1	0	619	20	2285	801	689	3086	6	31.78
River 6	0	0	144	0	4	1	2	9	0	8	0	0	24	0	183	200	2277	1419	575	3696	9	38.06
River 7	0	0	35	0	1	0	5	7	0	6	0	2	31	0	179	225	1025	1003	491	2028	9	20.89
River 8	0	0	179	0	0	0	2	4	0	11	0	0	14	0	30	3	777	464	243	1241	7	12.78
River 9	0	0	317	0	3	1	219	96	0	168	0	16	136	0	137	182	4256	1824	1275	6080	10	62.62
River 10	0	0	29	0	0	0	44	52	0	7	0	0	10	0	99	44	2531	839	285	3370	7	34.71
River 11	2	1	276	0	43	4	2	76	0	25	0	1	59	2	176	2465	3185	6001	3132	9186	13	90.24
River 12	0	0	261	0	1	0	6	345	0	20	1	3	45	0	31	163	2019	1382	876	3401	10	33.41
River 13	0	0	538	0	2	0	102	51	4	15	0	13	171	0	366	137	4932	2276	1399	7208	10	70.81
River 14	0	0	1	0	0	0	1	42	0	6	0	0	5	0	23	7	1075	137	85	1212	7	11.91
River 15	0	0	274	0	5	0	3	18	3	2	2	0	2	1	6	33	987	1866	349	2853	11	28.03
$N_{Site/Sp}$	4	2	27	3	19	9	29	29	6	26	5	17	27	12	30	26	30	27	-	-	-	-
$N_{Passes/Sp}$	6	2	3044	3	166	31	586	2361	32	970	16	73	1160	88	5737	5928	49859	28510	20203	78369	-	-
Calls/hr	0.00	0.00	1.04	0.00	0.06	0.01	0.20	0.81	0.01	0.33	0.01	0.02	0.40	0.03	1.96	2.03	17.05	9.75	-	-	-	-
Lower	4	2	2640	2	115	11	462	1875	10	877	4	51	992	39	3702	4908	38383	24486	15694	62869	15	-
Upper	2	0	404	1	51	20	124	486	22	93	12	22	168	49	2035	1020	11476	4024	4509	15500	16	-

[1] High frequency species: MYCA, MYCI, MYEV, MYLU, MYVO, MYYU, and PAHE

[2] Low frequency Species: ANPA, COTO, EPFU, EUMA, LACI, LANO, MYTH, NYMA, and TABR

Table 21. Total, average, minimum, and maximum number of passes and species by habitat type recorded using acoustic detectors at Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife properties during summers of A) 2015 and B) 2016. Percent of total passes collected by habitat type is also provided. Sampling periods 1 and 2 are combined for each year.

A)

2015	**# passes**					**# species**			
Habitat type	**Total**	**Average**	**Min**	**Max**	**%**	**Total**	**Average**	**Min**	**Max**
Cliff	5,588	931	85	2,096	4	13	10	6	12
Forest	1,441	240	70	506	1	15	9	6	12
Riparian	7,615	1,269	280	1,960	5	15	10	7	13
Shrub	3,235	539	70	1,079	2	15	10	7	12
Water	35,579	5,932	525	13,482	24	16	12	8	16
Total Upland	66,958	2,232	70	26,964	32	16	10	6	16
River	90,978	3,032	721	11,911	63	16	10	4	15

B)

2016	**# passes**					**# species**			
Habitat type	**Total**	**Average**	**Min**	**Max**	**%**	**Total**	**Average**	**Min**	**Max**
Cliff	12,976	4,325	1,111	9,405	8	12	10	9	11
Forest	3,563	1,188	356	2,671	2	12	9	6	12
Riparian	6,623	2,208	1,113	3,201	4	16	13	12	14
Shrub	4,449	1,483	698	2,455	3	13	12	11	12
Water	21,198	7,066	1,639	11,578	13	16	13	11	14
Total Upland	48,809	3,254	356	11,578	30	16	11	6	14
River	112,199	7,480	1,265	28,726	70	16	11	7	14

Table 22. Number of acoustic bat calls recorded for EUMA and NYMA at Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife properties in 2014. Calls were grouped into the broad low-frequency category (LoF Sp) if some information for ID existed but not enough to assign a species. Sites were sampled during the first (SP1) and second (SP2) half of the summer (see Table 3 for sampling dates and locations), and total passes by lower and upper life zones (> 1,734 m = Upper) are given.

Species/Site	EUMA		NYMA		LoF Sp		Calls/Hr	
	SP1	SP2	SP1	SP2	SP1	SP2	SP1	SP2
Cliff 1	0	0	0	0	0	0	0.00	0.00
Forest 1	28	1	76	7	1	0	1.12	0.09
Riparian 1	1	8	1	0	1	5	0.03	0.14
Shrub 1	1	2	2	5	2	4	0.05	0.12
Water 1	20	2	2	2	13	39	0.37	0.46
Cliff 2	1	0	1	0	4	0	0.06	0.00
Forest 2	0	0	0	0	0	0	0.00	0.00
Riparian 2	0	1	0	0	4	1	0.04	0.02
Shrub 2	7	5	5	5	0	0	0.13	0.10
Water 2	2	8	0	7	5	6	0.08	0.22
Cliff 3	0	13	30	16	1	4	0.33	0.32
Forest 3	0	1	0	1	0	3	0.00	0.05
Riparian 3	0	5	39	1	2	1	0.44	0.07
Shrub 3	9	101	46	14	3	41	0.62	1.53
Water 3	6	5	2	0	1	5	0.10	0.10
River 1	22	2	15	0	6	2	0.46	0.04
River 2	16	3	73	29	7	10	1.02	0.45
River 3	14	2	28	14	2	9	0.47	0.27
River 4	9	5	50	7	6	4	0.69	0.17
River 5	35	14	218	25	4	12	2.74	0.55
River 6	9	4	6	1	1	0	0.17	0.05
River 7	13	12	44	48	10	7	0.72	0.69
River 8	5	5	41	1	1	8	0.51	0.14
River 9	4	4	3	1	1	4	0.09	0.09
River 10	6	21	2	8	1	9	0.10	0.39
River 11	3	4	10	0	7	4	0.21	0.08
River 12	8	3	0	0	0	7	0.09	0.10
River 13	7	18	58	0	2	3	0.71	0.21
River 14	3	5	13	0	4	2	0.21	0.07
River 15	6	26	4	0	4	12	0.15	0.37
$N_{Site/Sp}$	24	27	24	18	25	24	-	-
$N_{Passes/Sp}$	235	280	769	192	93	202	-	-
Calls/hr	0.08	0.10	0.28	0.07	0.03	0.07	-	-
Lower	160	128	565	134	56	93	-	-
Upper	75	152	204	58	37	109	-	-

Table 23. Average, minimum (Min) and maximum (Max) temperatures (°C), and total precipitation (cm) collected by year at Colorado National Monument during May through August of 2014 - 2016. Average values for the previous 73 years are also presented for comparison.

Year/Month	Average (°C)	Min (°C)	Max (°C)	Precipitation (cm)
2014				
May	13	-1	32	4.72
June	20	6	34	0.20
July	23	14	38	2.87
August	18	9	34	9.40
2015				
May	12	0	28	6.43
June	21	8	38	4.04
July	20	10	39	5.74
August	21	13	37	1.32
2016				
May	13	2	29	3.73
June	22	9	40	1.14
July	22	14	39	1.96
August	19	8	35	4.83
1940-2013				
May	16	9	24	2.23
June	22	14	30	1.72
July	25	17	33	2.06
August	24	16	31	3.23

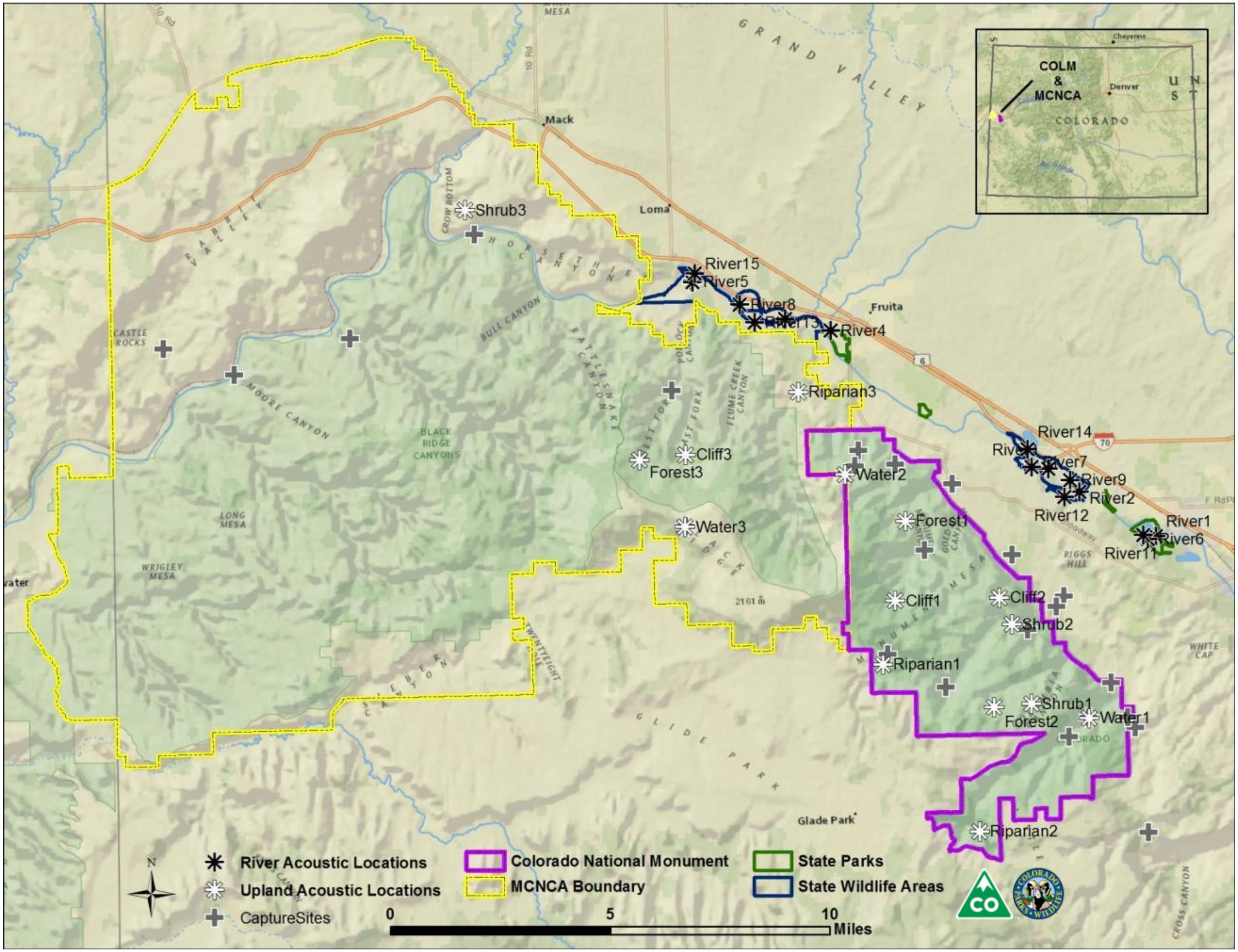

Figure 1. Mist net and acoustic monitoring sites sampled in Colorado National Monument, McInnis Canyons National Conservation Area, Colorado Parks and Wildlife properties, and their immediate vicinity from 2014 - 2016.

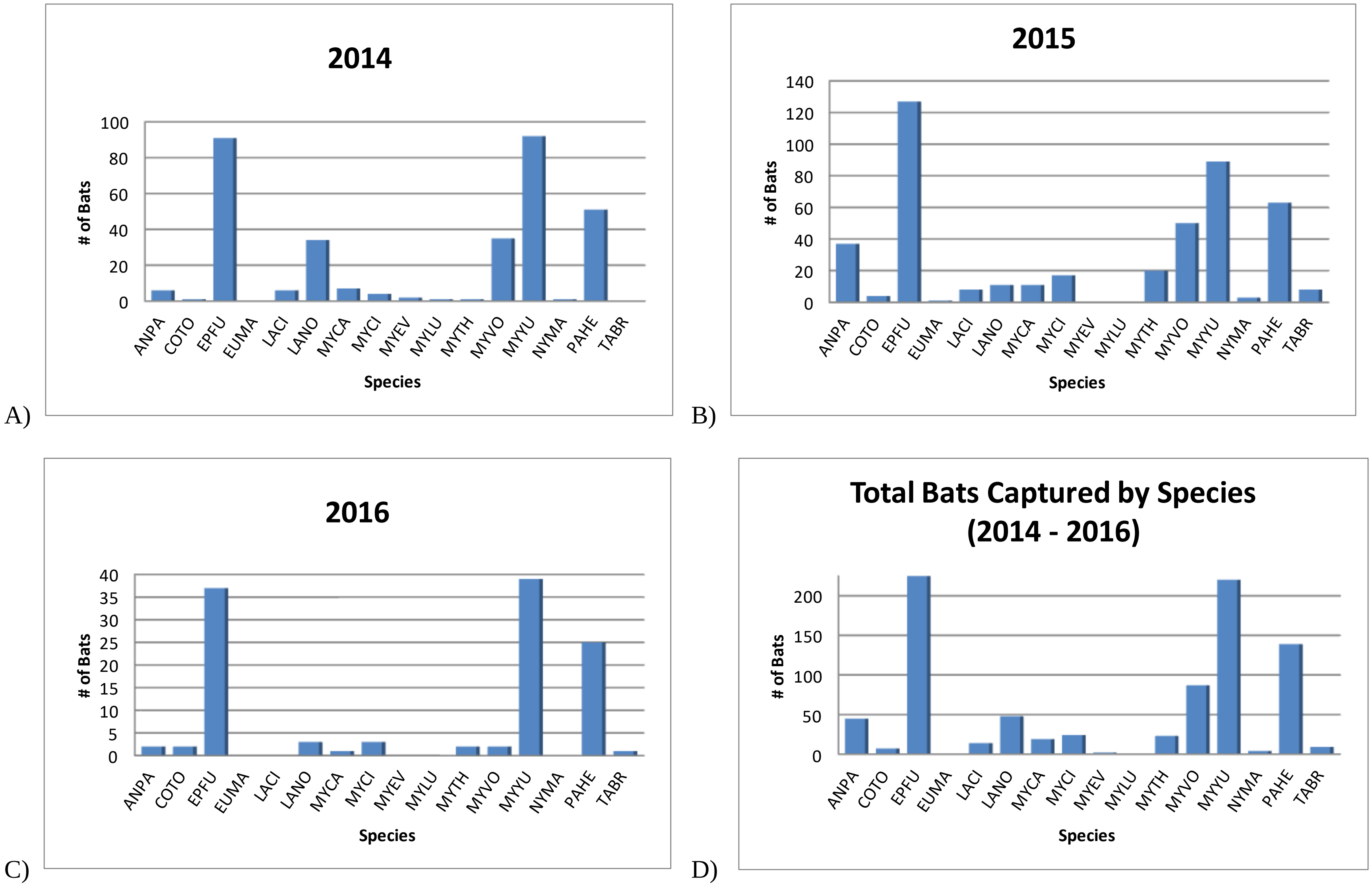

Figure 2. Total bats captured by species at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity in A) 2014, B) 2015, C) 2016, and D) combined (see Table 2 for full species name).

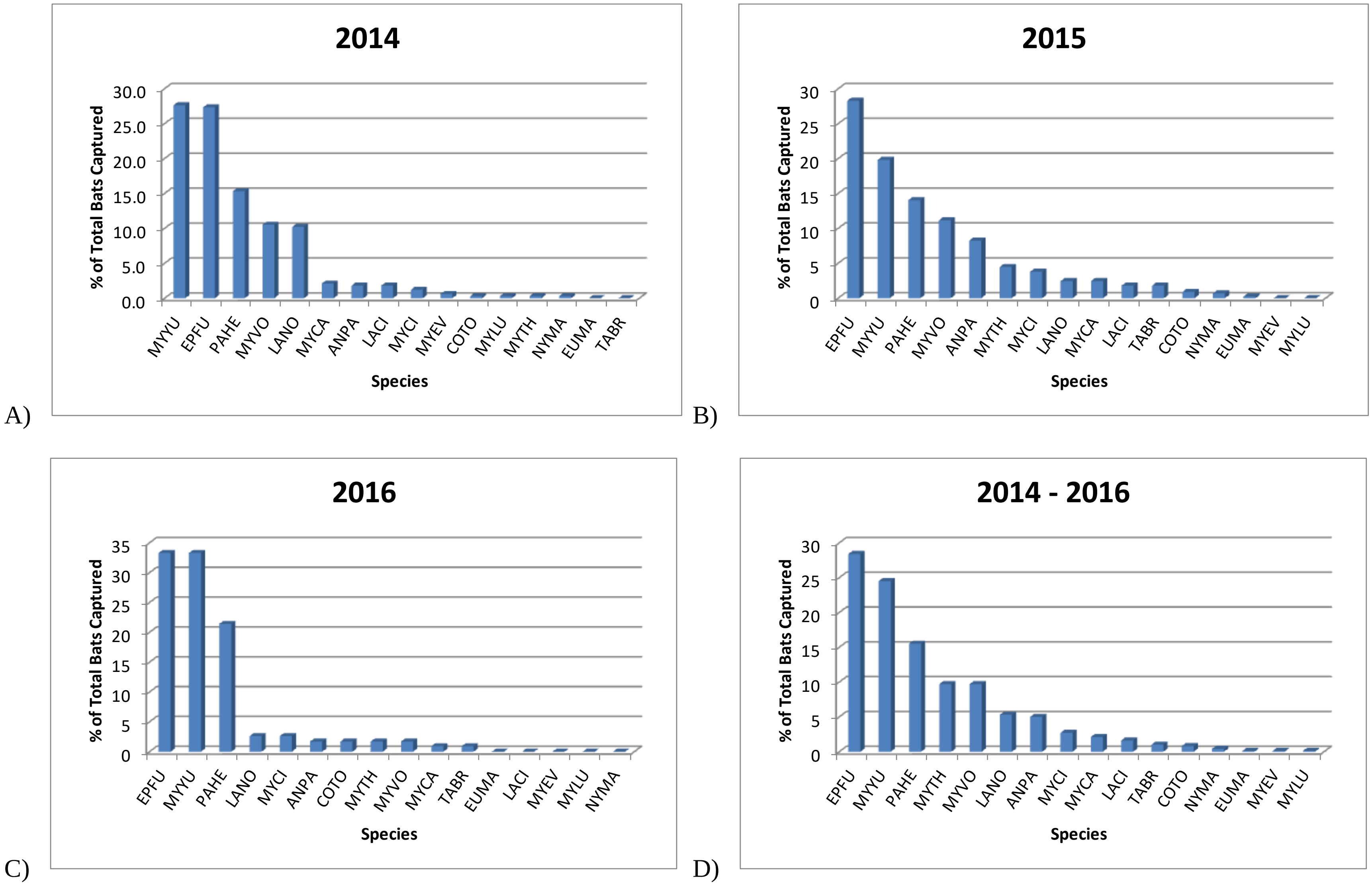

Figure 3. Proportion of total bats captured by species at Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity in A) 2014, B) 2015, C) 2016, and D) combined (total captures = 332 bats identified to species in 2014, 449 in 2015, and 117 in 2016; see Table 2 for full species name).

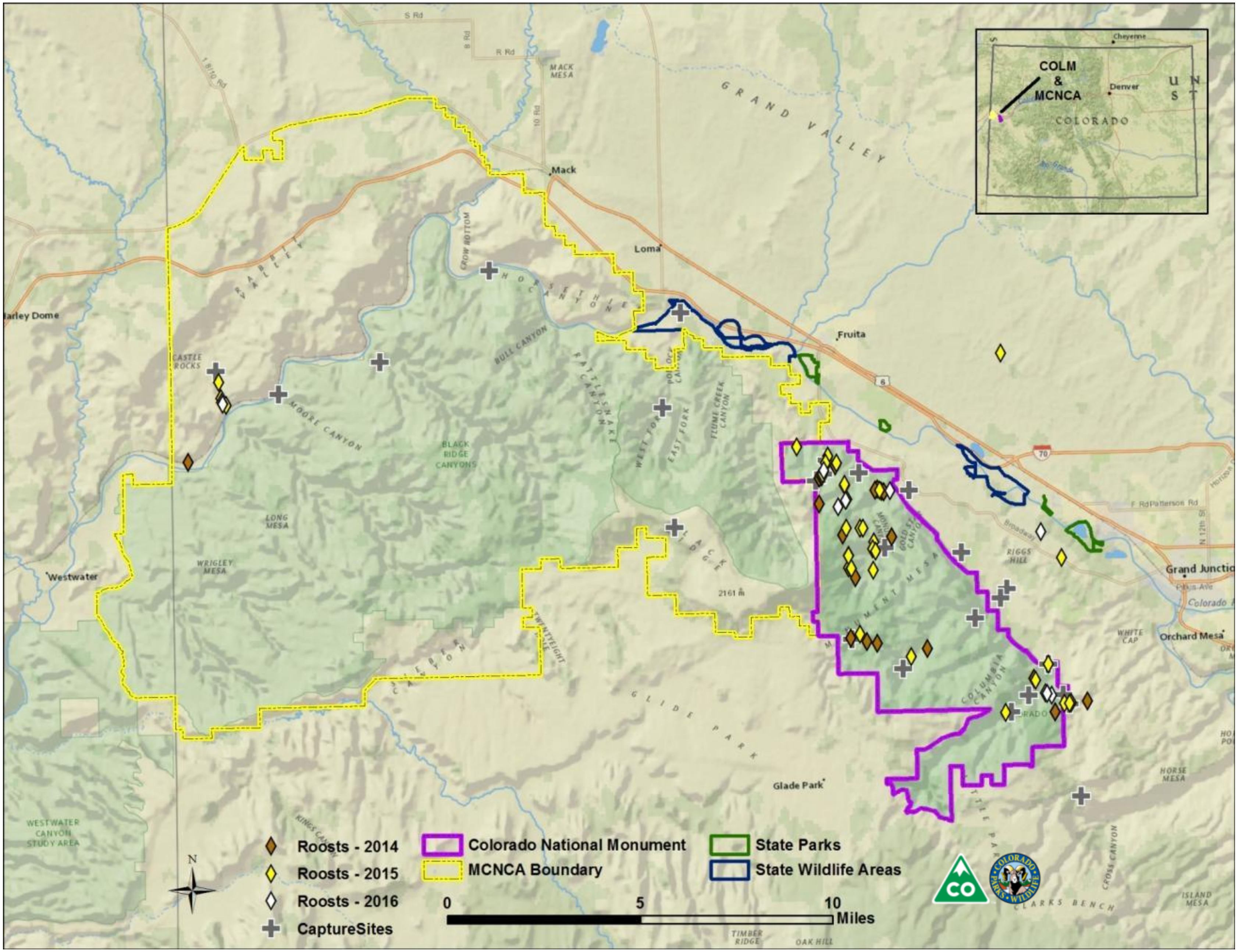

Figure 4. Mist net sites and roost locations identified for bats at in Colorado National Monument, McInnis Canyons National Conservation Area, and their immediate vicinity from 2014 - 2016.

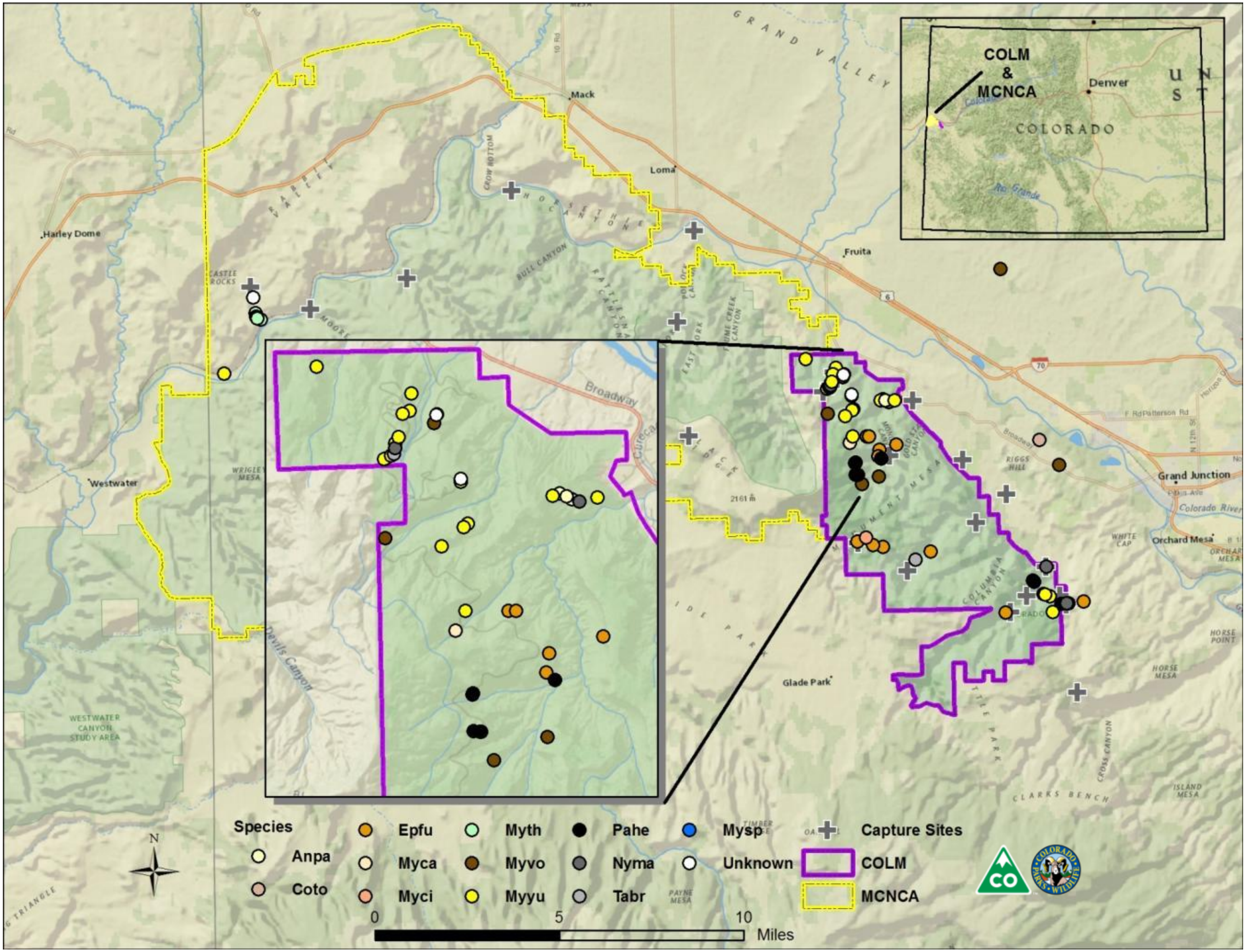

Figure 5. Locations for bats, by species, tracked to summer roosts or opportunistically identified in Colorado National Monument and McInnis Canyons National Conservation Area, and their immediate vicinity from 2014 - 2016.

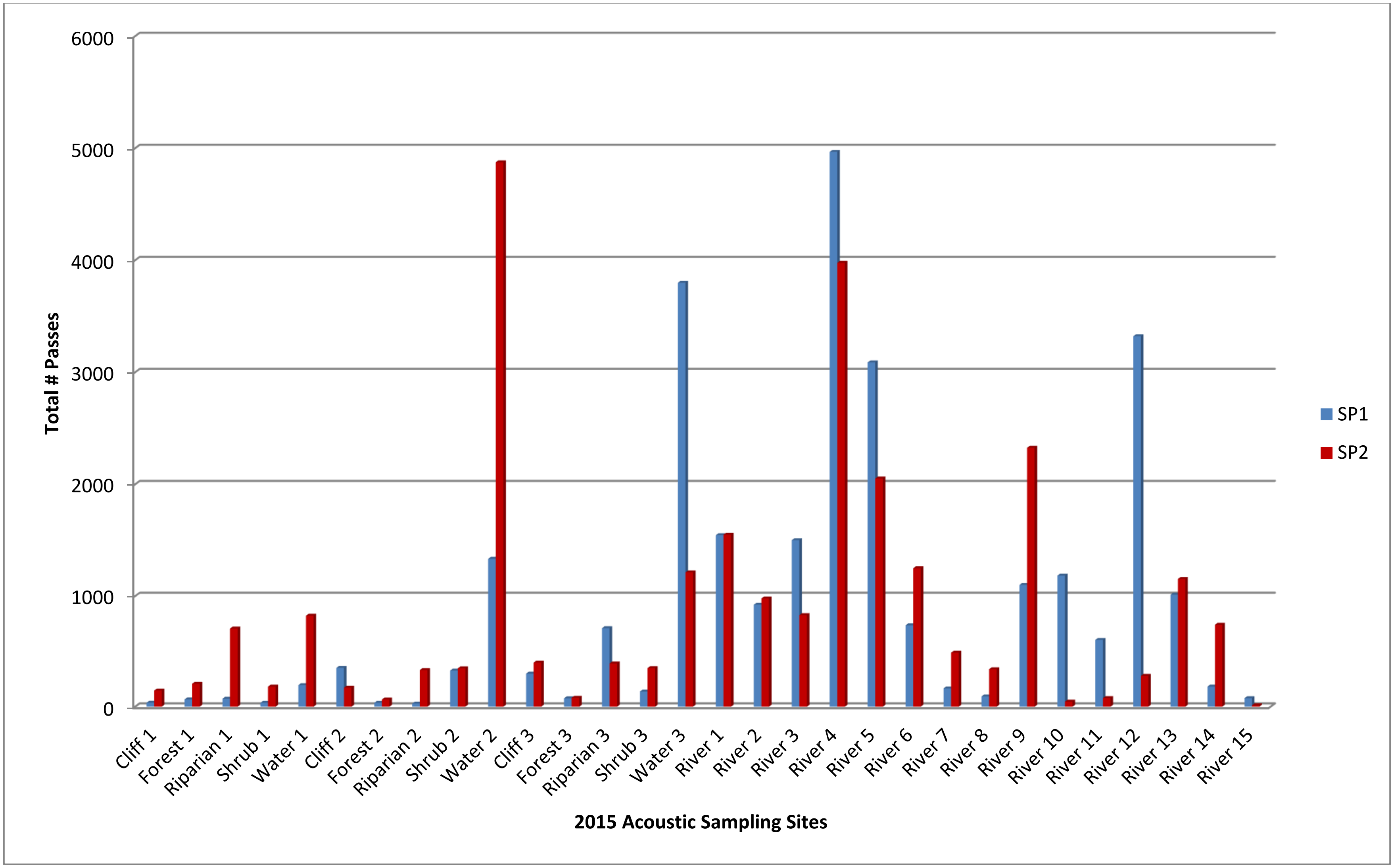

Figure 6. Acoustic call activity represented by the total passes classified to species (Total # Passes) by site for all bat species recorded during Sample Periods 1 (blue) and 2 (red) in Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2015.

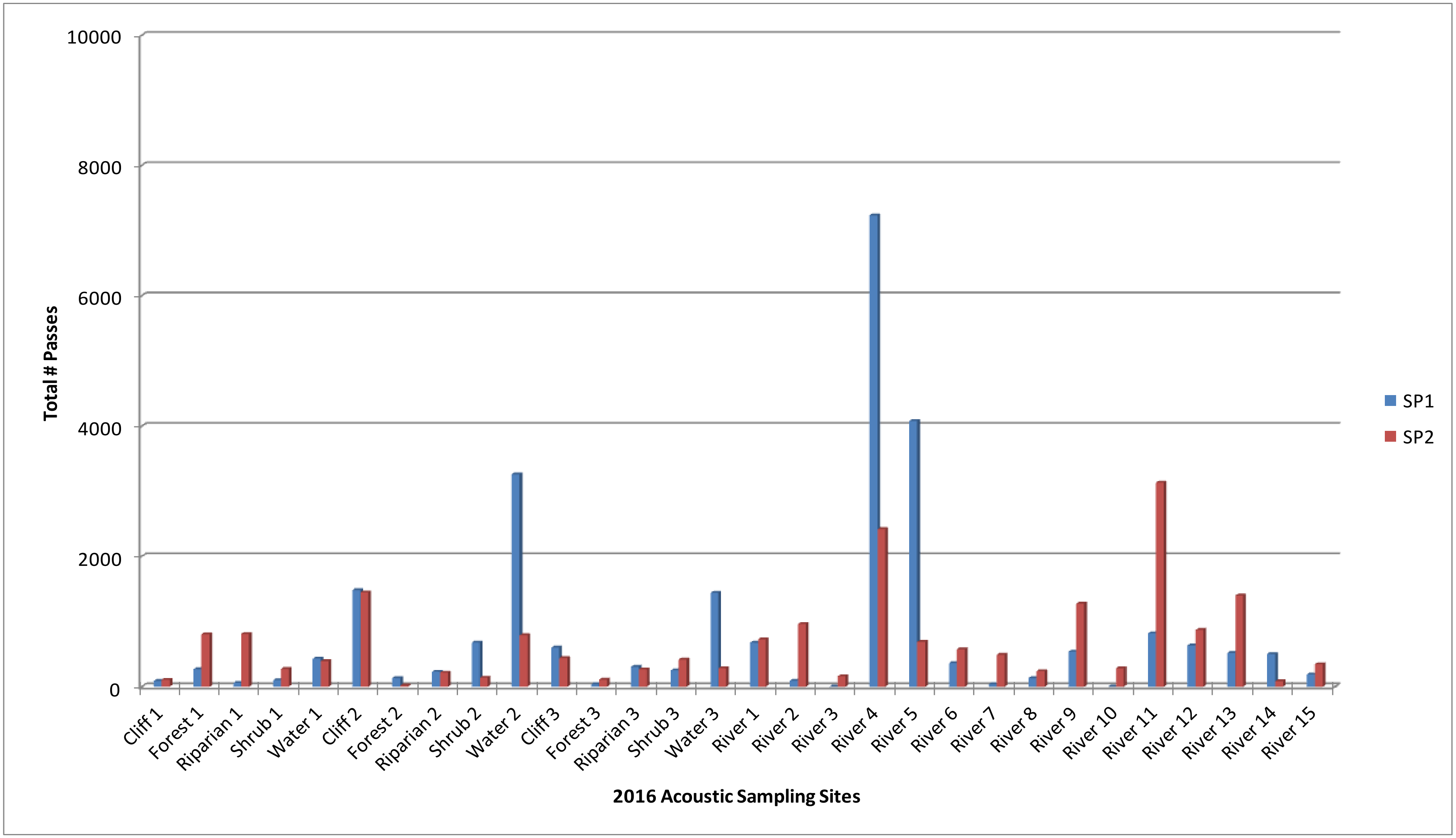

Figure 7. Acoustic call activity represented by the total passes classified to species (Total # Passes) by site for all bat species recorded during Sample Periods 1 (blue) and 2 (red) in Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2016.

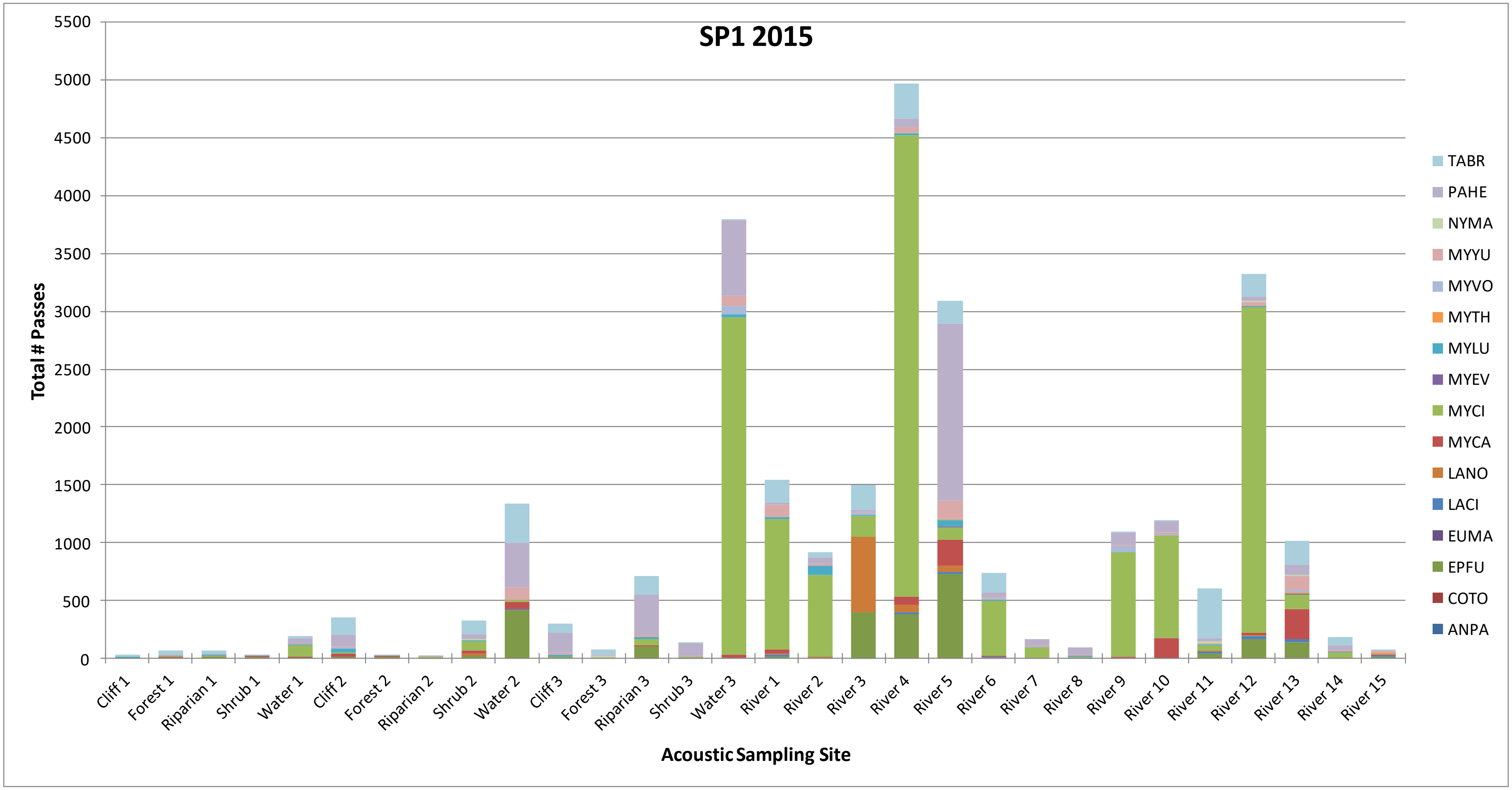

Figure 8. Acoustic call activity represented by the total passes classified to species (Total # Passes) by site and bat species recorded during Sample Period 1 in Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2015. Note the scale difference for number of passes between sample periods and years.

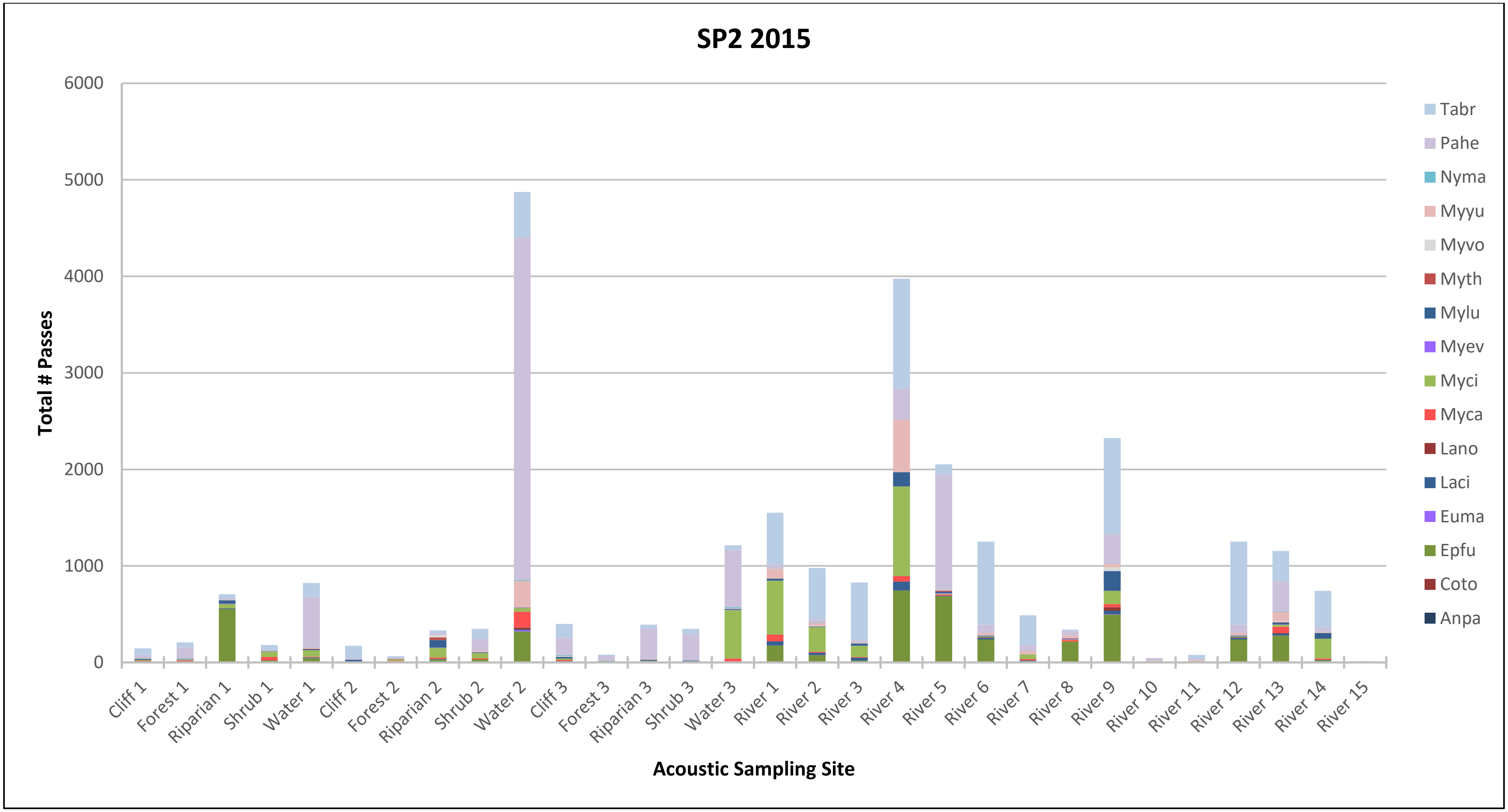

Figure 9. Acoustic call activity represented by the total passes classified to species (Total # Passes) by site and bat species recorded during Sample Period 2 in Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2015. Note the scale difference for number of passes between sample periods and years.

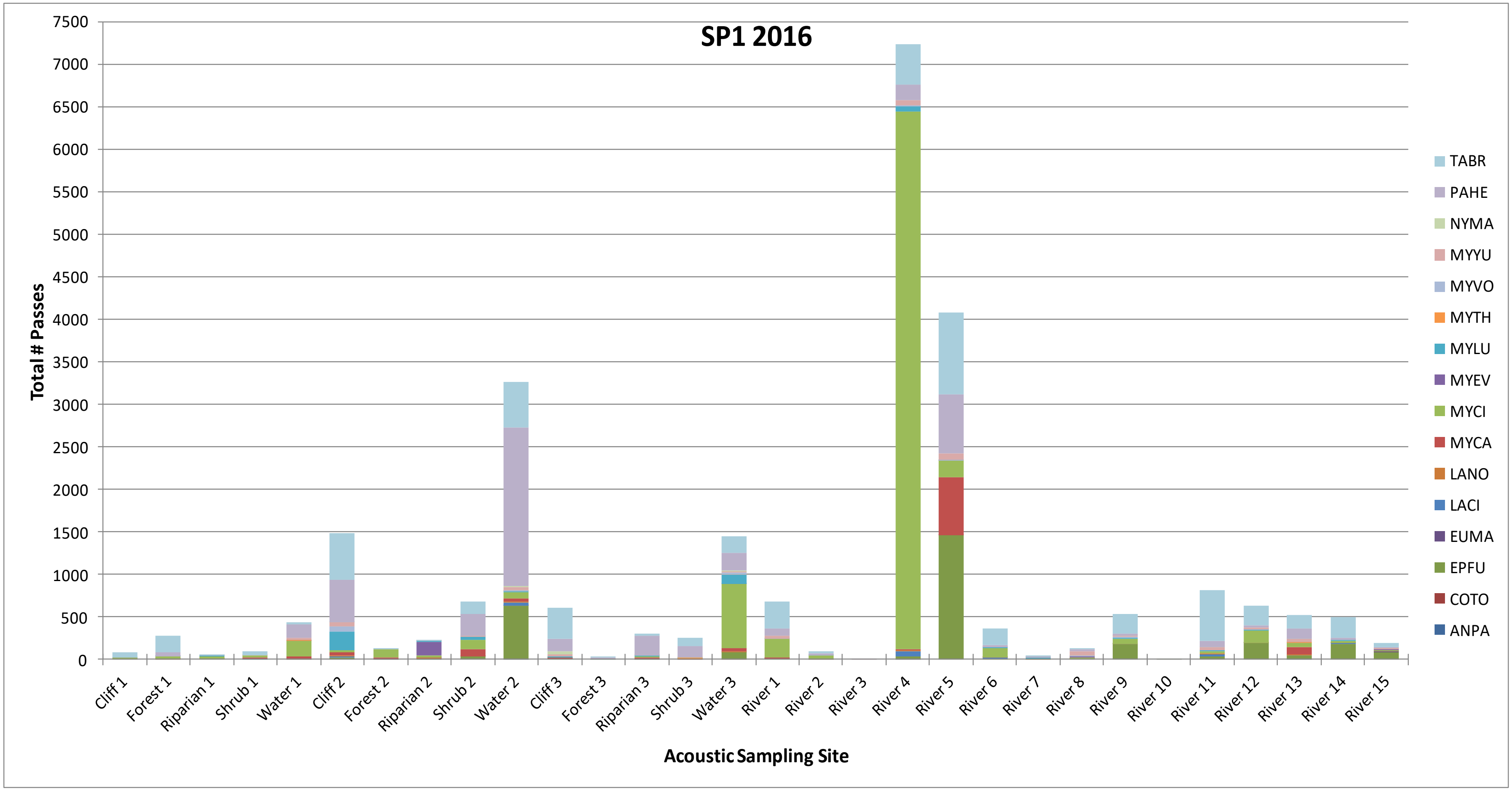

Figure 10. Acoustic call activity represented by the total passes classified to species (Total # Passes) by site and bat species recorded during Sample Period 1 in Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2016. Note the scale difference for number of passes between sample periods and years.

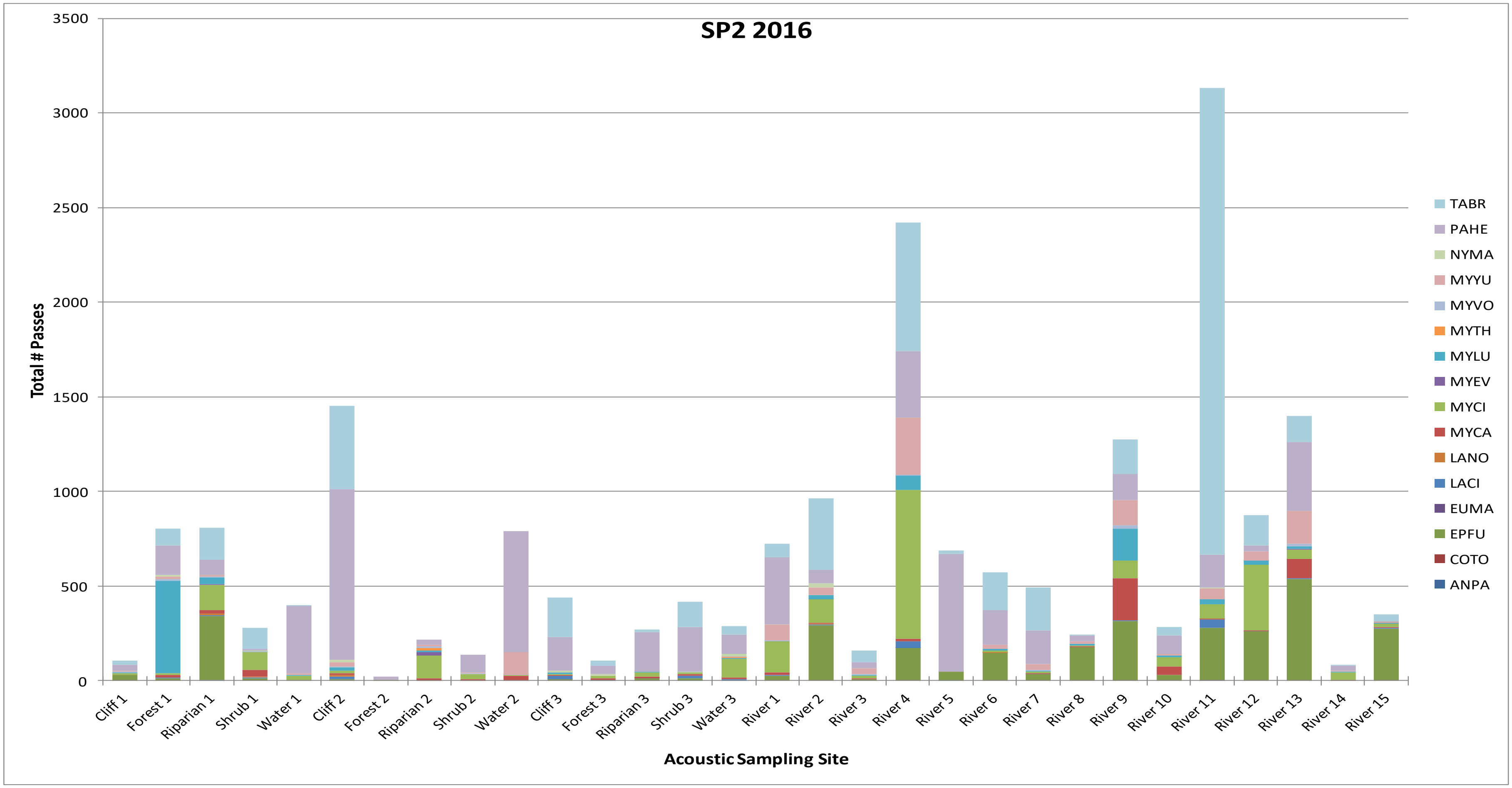

Figure 11. Acoustic call activity represented by the total passes classified to species (Total # Passes) by site and bat species recorded during Sample Period 2 in Colorado National Monument, McInnis Canyons National Conservation Area, and Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2016. Note the scale difference for number of passes between sample periods and years.

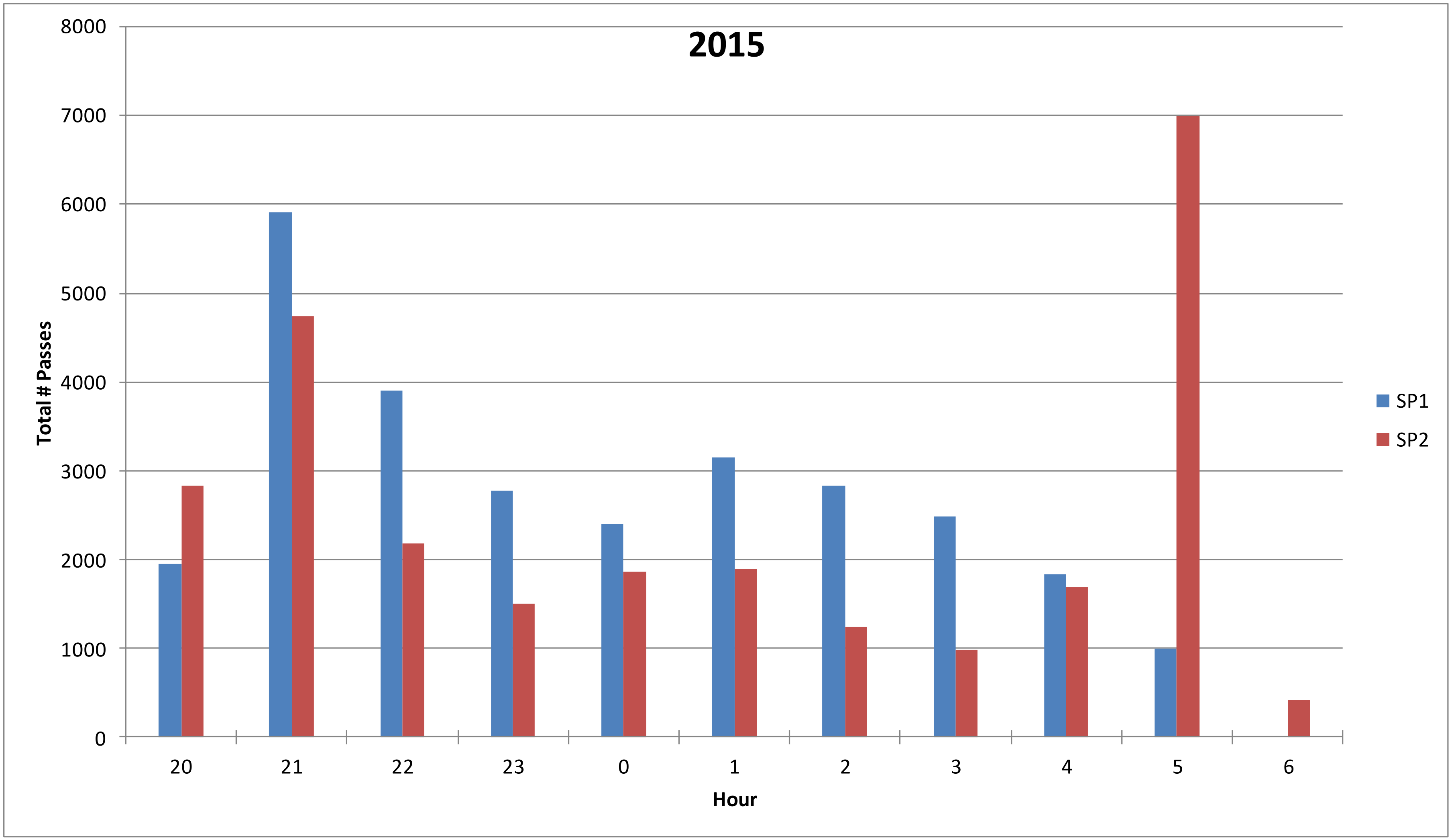

Figure 12. Acoustic call activity represented by the total passes classified to species (Total # Passes) identified for bats recorded by hour during sample period 1 (blue) and 2 (red) in Colorado National Monument, McInnis Canyons National Conservation Area, and river sites in Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2015. Hours represent only those occurring after sunset and before sunrise with zero equal to the midnight hour. Recording periods for each site are delineated in Table 3.

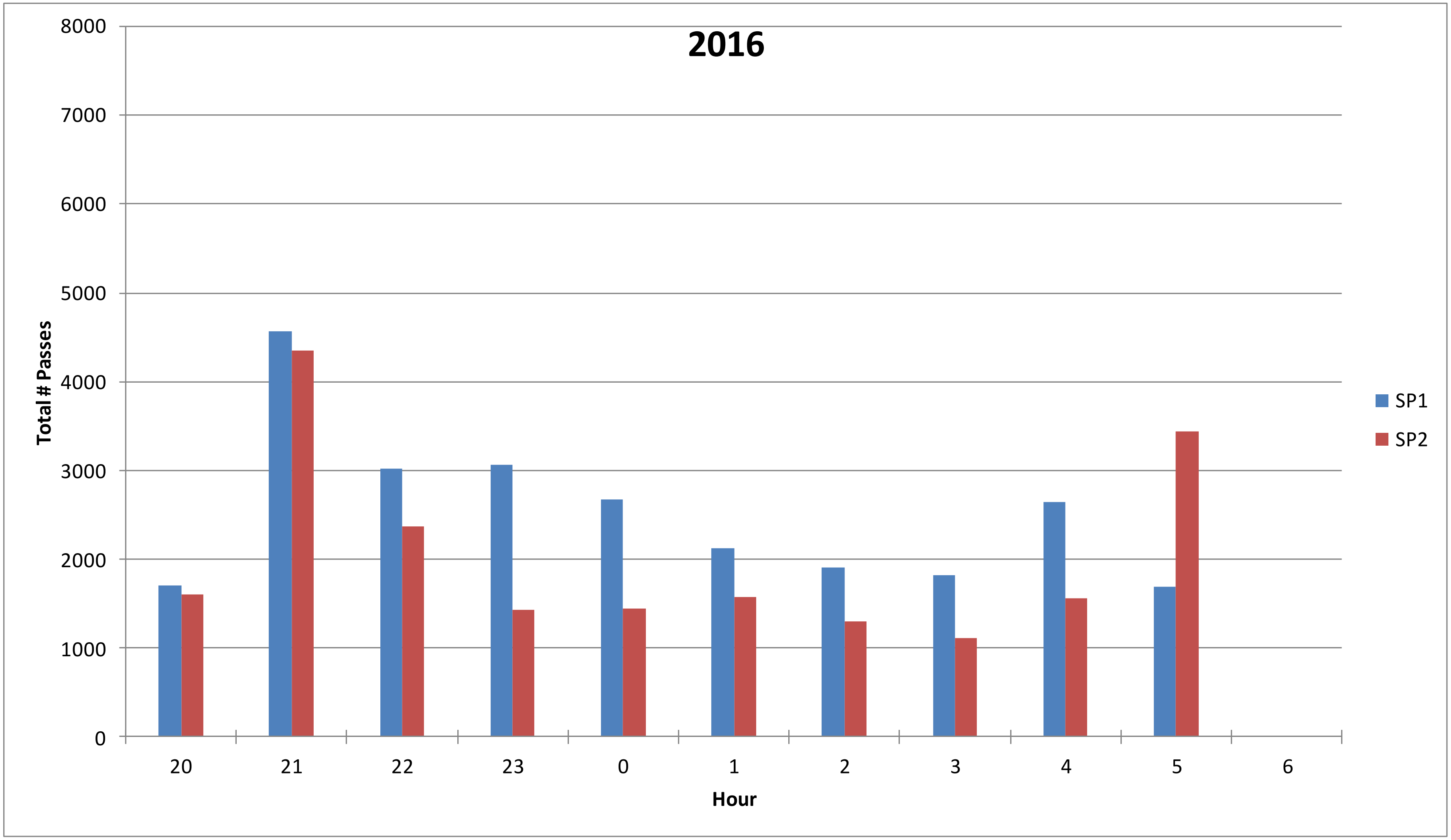

Figure 13. Acoustic call activity represented by the total passes classified to species (Total # Passes) identified for bats recorded by hour during sample period 1 (blue) and 2 (red) in Colorado National Monument, McInnis Canyons National Conservation Area, and river sites in Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2016. Hours represent only those occurring after sunset and before sunrise with zero equal to the midnight hour. Recording periods for each site are delineated in Table 3.

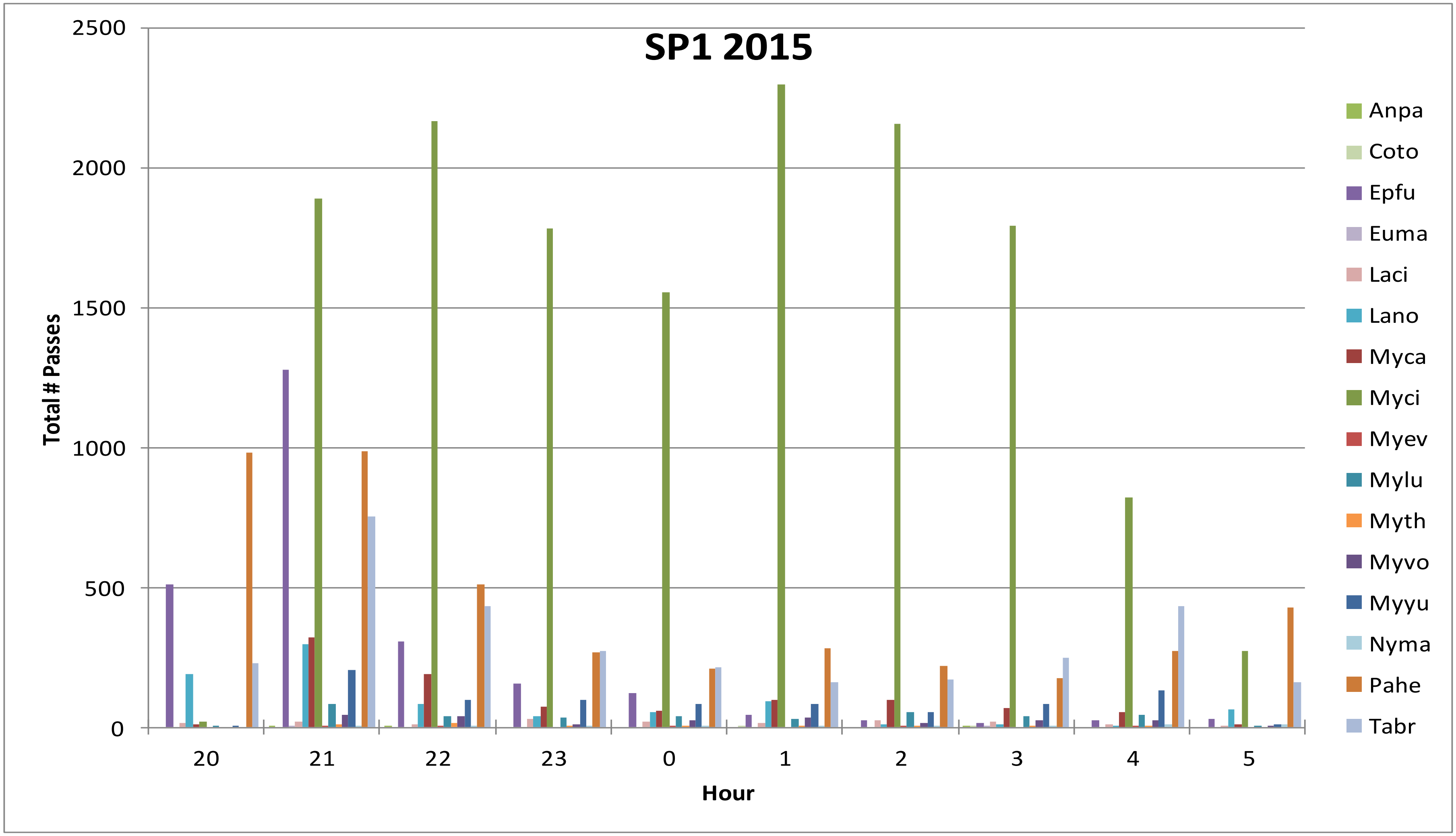

Figure 14. Total acoustic calls identified for bats recorded by hour during Sample Period 1 (Table 3) in Colorado National Monument, McInnis Canyons National Conservation Area, and river sites in Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2015. Hours represent only those occurring after sunset and before sunrise with zero equal to the midnight hour. Note the scale difference for number of passes between sample periods and years.

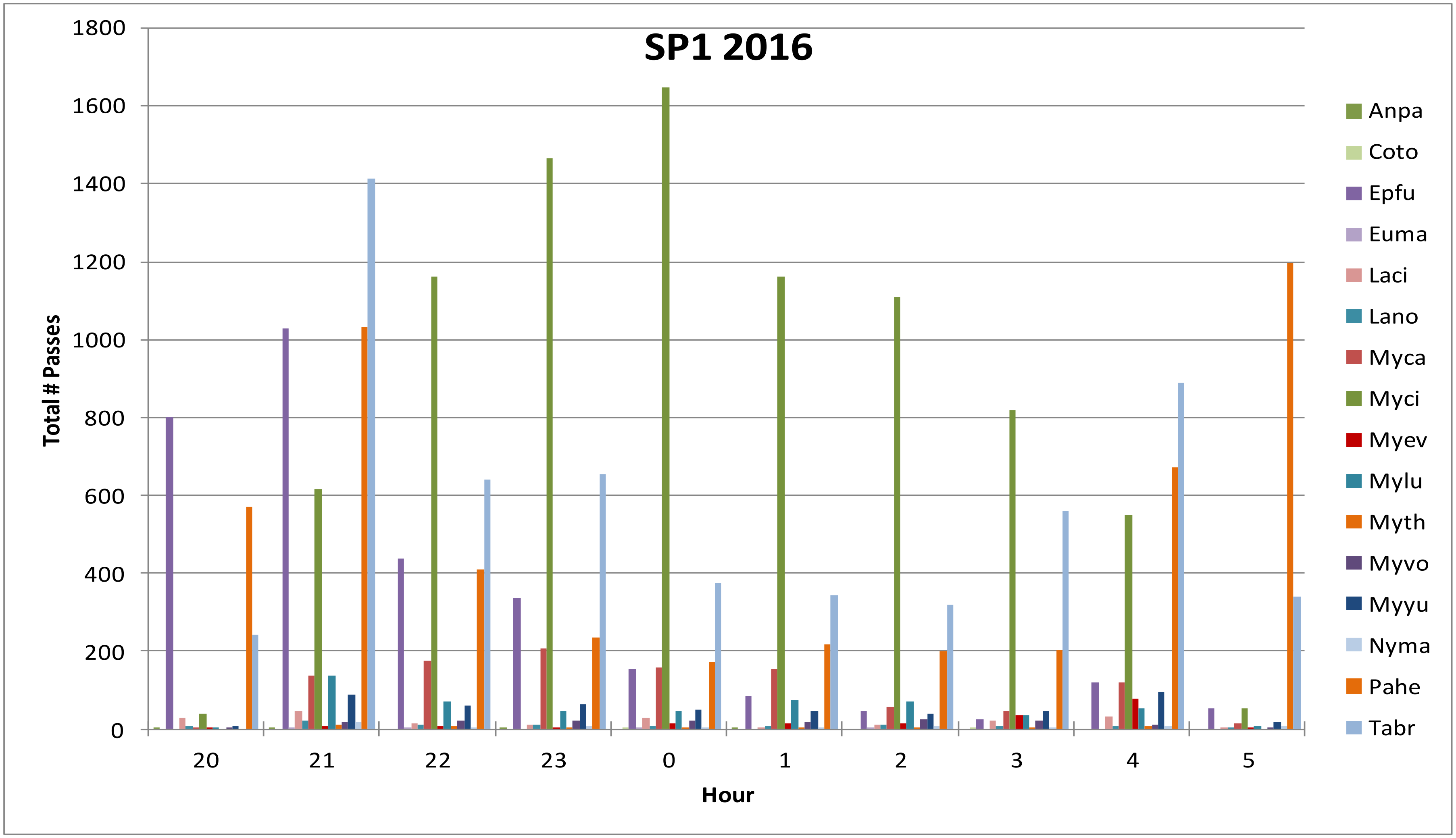

Figure 15. Total acoustic calls identified for bats recorded by hour during Sample Period 1 (Table 3) in Colorado National Monument, McInnis Canyons National Conservation Area, and river sites in Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2016. Hours represent only those occurring after sunset and before sunrise with zero equal to the midnight hour. Note the scale difference for number of passes between sample periods and years.

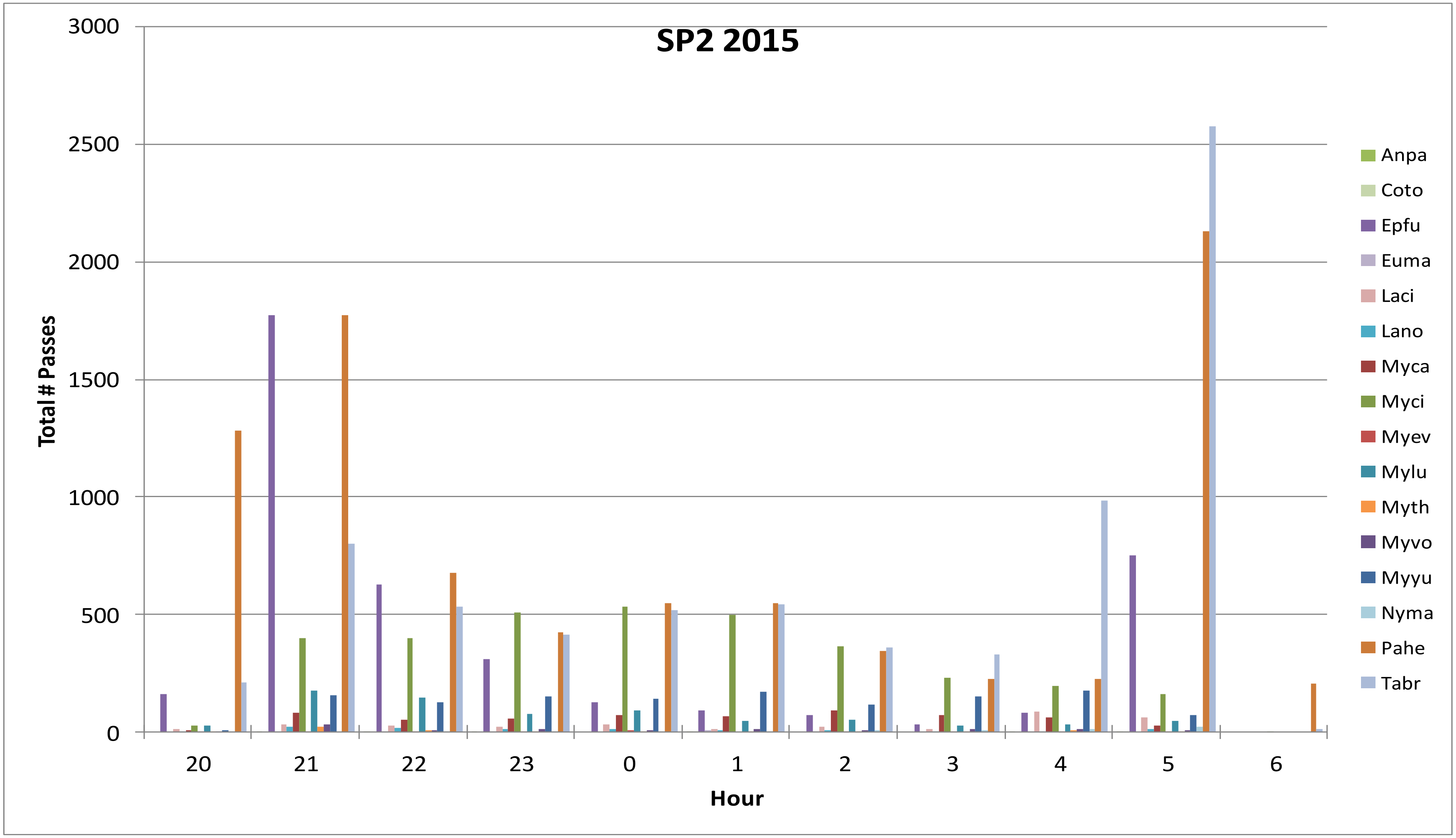

Figure 16. Total acoustic calls identified for bats recorded by hour during Sample Period 2 (Table 3) in Colorado National Monument, McInnis Canyons National Conservation Area, and river sites in Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2015. Hours represent only those occurring after sunset and before sunrise with zero equal to the midnight hour. Note the scale difference for number of passes between sample periods and years.

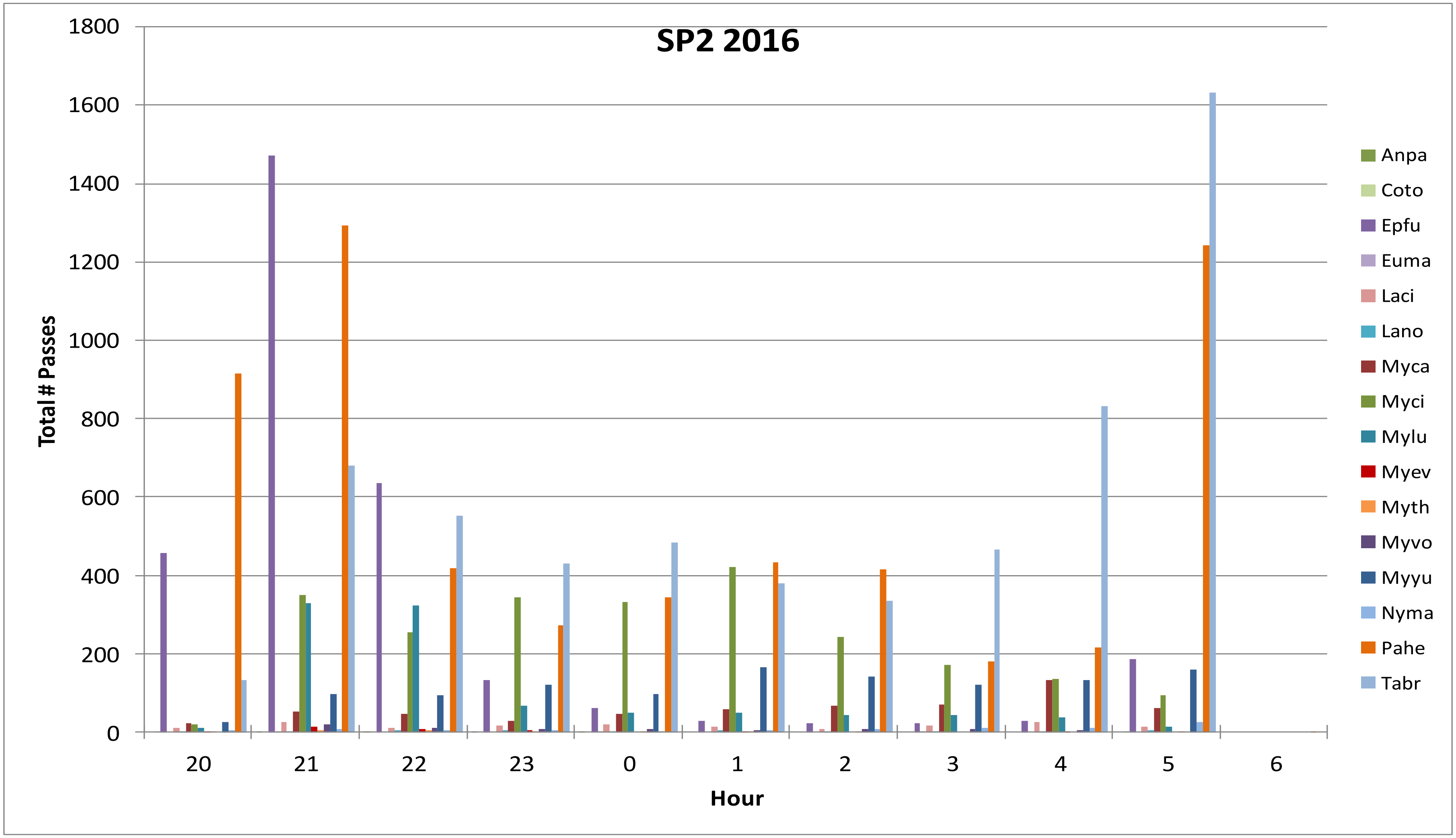

Figure 17. Total acoustic calls identified for bats recorded by hour during Sample Period 2 (Table 3) in Colorado National Monument, McInnis Canyons National Conservation Area, and river sites in Colorado Parks and Wildlife State Parks and State Wildlife Areas in 2016. Hours represent only those occurring after sunset and before sunrise with zero equal to the midnight hour. Note the scale difference for number of passes between sample periods and years.

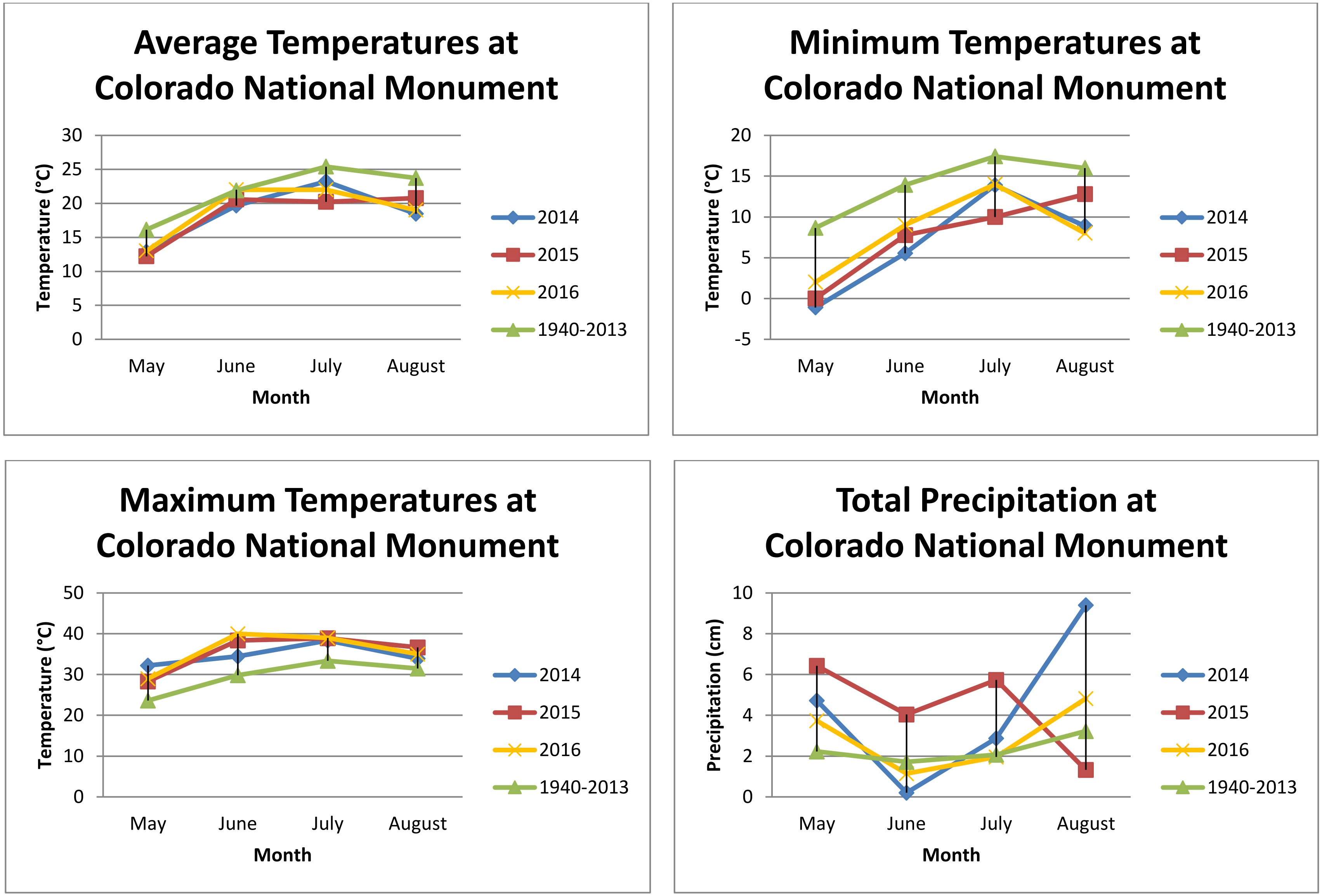

Figure 18. Summer monthly average, minimum and maximum temperatures (°C), and total precipitation (cm) collected by the weather station at Colorado National Monument by year from 2014 to 2016, and averaged across years from 1940 - 2013. Data was downloaded from http://mesowest.utah.edu/ (last viewed 8/29/2017).

Appendices

Appendix A. Museum Records

Table A1. Museum specimens collected from Mesa County, Colorado as identified by the Museum of Southwestern Biology Arctos database, http://arctosdb.org/ (accessed January 21st, 2015). Museum abbreviations under Catalog # are Denver Museum of Nature and Science (DMNS, 22 specimens), Museum of Southwest Biology (MSB, 24), and University of Colorado Museum of Natural History (UCM, 33).

SCIENTIFIC NAME	CAT #	DATE	STATE	County	LOCALITY	COLLECTORS
Antrozous pallidus	UCM:Mamm:11512	9-Jul-63	Colorado	Mesa	Colorado National Monument, East Monument Canyon, 4800'	C. J. McCoy
Antrozous pallidus	UCM:Mamm:11513	9-Jul-63	Colorado	Mesa	Colorado National Monument, East Monument Canyon, 4800'	C. J. McCoy
Antrozous pallidus	UCM:Mamm:12897	9-Jul-63	Colorado	Mesa	Colorado National Monument, East Monument Canyon, 4800'	C. J. McCoy
Corynorhinus townsendii	UCM:Mamm:19846	Fall 1960	Colorado	Mesa	Unaweep Canyon, 2 mi S of Taylor Ranch, East Canyon wall	James A. Richardson
Eptesicus fuscus	DMNS:Mamm:14136	8/15/2012	Colorado	Mesa	Grand Junction, 2098 W Sequoia	CDPHE
Eptesicus fuscus	DMNS:Mamm:14135	7/24/2012	Colorado	Mesa	Mesa County, CO	Greg Waidmann, CDPHE
Eptesicus fuscus	DMNS:Mamm:10054	21-Aug-98	Colorado	Mesa	No specific locality recorded	CDPHE
Eptesicus fuscus	DMNS:Mamm:10052	16-Apr-98	Colorado	Mesa	Grand Junction	CDPHE
Eptesicus fuscus	UCM:Mamm:11450	6-Aug-62	Colorado	Mesa	Colorado National Monument, mouth of N Monument Canyon	Miller
Eptesicus fuscus	DMNS:Mamm:9094	2-Aug-96	Colorado	Mesa	No specific locality recorded	John W. Pape, CDPHE
Eptesicus fuscus	UCM:Mamm:11447	11-Aug-62	Colorado	Mesa	Colorado National Monument, near mouth of Monument Canyon	Miller
Eptesicus fuscus	UCM:Mamm:11448	22-Aug-62	Colorado	Mesa	Colorado National Monument, near mouth of Monument Canyon	Miller
Eptesicus fuscus	DMNS:Mamm:10092	11-Jun-98	Colorado	Mesa	No specific locality recorded	CDPHE
Eptesicus fuscus	UCM:Mamm:11440	2-Jul-62	Colorado	Mesa	Colorado National Monument, North Monument Canyon	C. J. McCoy
Eptesicus fuscus	MSB:Mamm:119975	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Eptesicus fuscus	UCM:Mamm:18422	1979-1980?	Colorado	Mesa	4 mi E Gateway on Hwy 141	J. Freeman
Eptesicus fuscus	DMNS:Mamm:10064	24-Aug-94	Colorado	Mesa	No specific locality recorded	CDPHE
Eptesicus fuscus	MSB:Mamm:119984	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Eptesicus fuscus	MSB:Mamm:119983	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Eptesicus fuscus	DMNS:Mamm:10053	13-Aug-97	Colorado	Mesa	No specific locality recorded	CDPHE
Lasionycteris noctivagans	MSB:Mamm:119976	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Lasionycteris noctivagans	MSB:Mamm:119985	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Lasionycteris noctivagans	DMNS:Mamm:11460	8-Aug-07	Colorado	Mesa	Pinon Mesa, 13 km S of Glade Park	Jay Miller
Lasionycteris noctivagans	MSB:Mamm:119992	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, 3.7 mi (by rd) NW Dominguez Recreation Site	Ernest W. Valdez
Lasionycteris noctivagans	DMNS:Mamm:9218	18-Sep-96	Colorado	Mesa	No specific locality recorded	John W. Pape, CDPHE
Lasionycteris noctivagans	MSB:Mamm:119977	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Lasionycteris noctivagans	UCM:Mamm:15829	26-Jul-78	Colorado	Mesa	West Creek, 4 miles northeast of Gateway (T1S, R103W)	J. Freeman
Lasiurus cinereus	UCM:Mamm:18514	28-Jul-77	Colorado	Mesa	Highline Lake	S. R. Ellinwood, G. Berlin
Myotis ciliolabrum	DMNS:Mamm:10289	5-Sep-98	Colorado	Mesa	No specific locality recorded	John W. Pape, CDPHE
Myotis ciliolabrum	UCM:Mamm:11097	5-Oct-51	Colorado	Mesa	Fruita, born on Aspen Street	Miller, Stark
Myotis ciliolabrum	MSB:Mamm:119986	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Myotis ciliolabrum	MSB:Mamm:119993	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, 3.7 mi (by rd) NW Dominguez Recreation Site	Ernest W. Valdez
Myotis evotis	UCM:Mamm:15870	26-Jul-78	Colorado	Mesa	West Creek, 4 mi NE of Gateway T15S, R103W	J. Freeman
Myotis evotis	MSB:Mamm:119978	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Myotis evotis	MSB:Mamm:119979	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Myotis evotis	MSB:Mamm:119987	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Myotis evotis	MSB:Mamm:119988	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Myotis lucifugus	DMNS:Mamm:9505	22-Jun-97	Colorado	Mesa	Grand Junction	CDPHE

SCIENTIFIC NAME	CAT #	DATE	STATE	County	LOCALITY	COLLECTORS
Myotis lucifugus	UCM:Mamm:11086	20-Aug-61	Colorado	Mesa	Colorado National Monument, headquarters	P. H. Miller
Myotis thysanodes	MSB:Mamm:119994	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, 3.7 mi (by rd) NW Dominguez Recreation Site	Ernest W. Valdez
Myotis thysanodes	MSB:Mamm:119989	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Myotis volans	UCM:Mamm:18366	22-Jul-78	Colorado	Mesa	T12S, R96W, sec 15. 1 mi N Lands End Rd. Grand Mesa	J. Freeman
Myotis volans	MSB:Mamm:119981	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Myotis volans	MSB:Mamm:119990	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Myotis volans	UCM:Mamm:11118	Sep-60	Colorado	Mesa	Debeque Canyon	P. H. Miller
Myotis volans	MSB:Mamm:119980	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Myotis volans	MSB:Mamm:119995	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, 3.7 mi (by rd) NW Dominguez Recreation Site	Ernest W. Valdez
Myotis volans	MSB:Mamm:119991	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, ca. 3 mi (by rd) NW Dominguez Recreation Site	E. A. Allard
Myotis volans	DMNS:Mamm:10131	17-May-98	Colorado	Mesa	No specific locality recorded	CDPHE
Myotis yumanensis	UCM:Mamm:18737	28-Jul-77	Colorado	Mesa	Highline Lake Spillway	S. R. Ellinwood
Myotis yumanensis	UCM:Mamm:18528	28-Jul-77	Colorado	Mesa	Highline Lake	S. R. Ellinwood, G. Berlin
Myotis yumanensis	MSB:Mamm:119982	15-Jul-93	Colorado	Mesa	Dominguez Recreation Site, Dominguez Canyon	E. A. Allard
Myotis yumanensis	UCM:Mamm:18529	28-Jul-77	Colorado	Mesa	Highline Lake spillway	S. R. Ellinwood, G. Berlin
Myotis yumanensis	DMNS:Mamm:10132	25-Aug-98	Colorado	Mesa	No specific locality recorded	CDPHE
Myotis yumanensis	MSB:Mamm:119996	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, 3.7 mi (by rd) NW Dominguez Recreation Site	Ernest W. Valdez
Myotis yumanensis	UCM:Mamm:18530	28-Jul-77	Colorado	Mesa	Highline Lake	S. R. Ellinwood, G. Berlin
Myotis yumanensis	MSB:Mamm:119974	16-Jul-93	Colorado	Mesa	Colorado National Monument, settling pond	Ernest W. Valdez
Myotis yumanensis	UCM:Mamm:18387	26-Jul-78	Colorado	Mesa	5 mi N Gateway beside Hwy141	J. Freeman
Nyctinomops macrotis	DMNS:Mamm:10000	22-Aug-00	Colorado	Mesa	Sinbad Valley	Kirk W. Navo, J. Gore
Nyctinomops macrotis	UCM:Mamm:17050	4-Dec-96	Colorado	Mesa	Grand Junction, 1907 Monument Canyon Drive	Joe Hall
Nyctinomops macrotis	DMNS:Mamm:12734	7-Nov-00	Colorado	Mesa	Grand Junction, Tiara Rado Gulf Course	Kirk W. Navo
Parastrellus hesperus	UCM:Mamm:7598	26-Jul-62	Colorado	Mesa	0.5 miles S of Fruita Bridge (Colorado River) on Hwy. 340	C. J. McCoy
Parastrellus hesperus	UCM:Mamm:15918	16-Jun-79	Colorado	Mesa	North Fork Escalante Creek, Escalante Canyon, T51N, R14W, sec 34	J. Freeman
Parastrellus hesperus	DMNS:Mamm:3339	21-Jul-38	Colorado	Mesa	One mile southwest of Fruita	Robert L. Landberg
Parastrellus hesperus	UCM:Mamm:7600	Aug-62	Colorado	Mesa	near mouth of Colorado National Monument Canyon	P. H. Miller
Parastrellus hesperus	UCM:Mamm:7596	23-Apr-62	Colorado	Mesa	Colorado National Monument, Lower Fruita Res., 4670'	P. H. Miller
Parastrellus hesperus	UCM:Mamm:7593	6-Aug-61	Colorado	Mesa	Colorado National Monument, headquarters area	C. J. McCoy
Parastrellus hesperus	UCM:Mamm:7594	6-Aug-61	Colorado	Mesa	Colorado National Monument, headquarters area	C. J. McCoy
Parastrellus hesperus	UCM:Mamm:7597	26-Jul-62	Colorado	Mesa	0.5 miles S of Fruita Bridge (Colorado River) on Hwy. 340	C. J. McCoy
Parastrellus hesperus	UCM:Mamm:7595	23-Apr-62	Colorado	Mesa	Colorado National Monument, 100 yds W, Distant View Overlook, 5750'	P. H. Miller
Parastrellus hesperus	UCM:Mamm:7599	Aug-62	Colorado	Mesa	near mouth of Colorado National Monument Canyon	P. H. Miller
Tadarida brasiliensis	DMNS:Mamm:12665	1999 (Summer)	Colorado	Mesa	Grand Junction, 2401 North Ave, back side of Hobby Lobby store behind bricks	Elaine Kehm
Tadarida brasiliensis	DMNS:Mamm:10175	6-Nov-99	Colorado	Mesa	Grand Junction	Kim M. Potter
Tadarida brasiliensis	UCM:Mamm:18447	27-Mar-79	Colorado	Mesa	Grand Junction, Mercantile Building, Main Street between 5th and 6th Streets	J. Freeman
Tadarida brasiliensis	DMNS:Mamm:8762	3-Jan-97	Colorado	Mesa	Grand Junction, 4th and White Street	Van Graham
Tadarida brasiliensis	MSB:Mamm:119997	18-Jul-93	Colorado	Mesa	Dominguez Recreation Site, 3.7 mi (by rd) NW Dominguez Recreation Site	Ernest W. Valdez
Tadarida brasiliensis	DMNS:Mamm:9272	17-Sep-96	Colorado	Mesa	No specific locality recorded	John W. Pape, CDPHE
Tadarida brasiliensis	DMNS:Mamm:9087	2-Oct-96	Colorado	Mesa	No specific locality recorded	John W. Pape, CDPHE
Tadarida brasiliensis	UCM:Mamm:18445	27-Mar-79	Colorado	Mesa	Grand Junction, Mercantile Building, Main Street between 5th and 6th Streets	J. Freeman

Table A2. Museum specimens retained in the collection at Colorado National Monument. The species identification for COLM 1848 is assumed to be *Myotis volans* based on a keeled calcar and pelage characteristics.

SPECIES	ID NUMBER	DATE	LOCATION	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Parastrellus hesperus	COLM 553	8/12/1961	Headquarters area		J. A. Richardson	F	A	Lactating
Myotis ciliolabrum	COLM 2760	6/22/1989	Over stream in base of Ute Canyon, T12SR2W	5000	R. Adams	F	A	NL
Parastrellus hesperus	COLM 2761	8/6/1989	COLM, Fruita Reservoir, 1/4 mi south of west entrance station		R. Adams	M	A	Scrotal
Myotis lucifugus	COLM 744	8/11/1962	Mouth of North Monument Canyon		P. Miller, C. J. McCoy	F		
Myotis thysonades	COLM 1847	6/5/1990	Over stream in base of Ute Canyon, T12SR2W	5600	R. Adams	M	A	NR
*Myotis lucifugus**	COLM 1848	6/5/1990	Over stream in base of Ute Canyon, T12SR2W	5600	R. Adams	M	A	NR
Lasionycteris noctivagans	COLM 1849	6/7/1990	Fruita Reservoir, West gate, T2W, R1N, S32	4640	R. Adams	M		
Tadarida brasiliensis	COLM 2762	8/2/1989	Lower tunnel, approximately 2.2 miles above West entrance of Monument on road		R. Adams	F	A	Lactating
Eptesicus fuscus	COLM 2763	6/20/1989	Over stream in base of Ute Canyon, T12SR2W	5000	R. Adams	M	A	S
Nyctinomops macrotis	COLM 3715	6/12/1996	COLM West entrance kiosk		R. Adams	F		
Myotis yumanensis	COLM 2759	8/7/1989	COLM, Fruita Reservoir, 1/4 mi south of west entrance station		R. Adams	F	A	Lactating

Table A3. Records of species occurrence collected from Mesa County, Colorado as identified by the Colorado Parks and Wildlife capture database (accessed January 21st, 2015). The database includes mist net and some acoustic records. The majority of records arise from abandoned mine surveys conducted in the southern portion of the county (Navo 2001).

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Antrozous pallidus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Antrozous pallidus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	U	TENL
Antrozous pallidus	BBLUE9923	7/20/1999	Blue Creek 43 A1	690624	4270521	5951	Wilkey	M	A	NONB
Antrozous pallidus	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Antrozous pallidus	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Antrozous pallidus	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Antrozous pallidus	BGJBM0061	5/5/2011	Mee Camp 2	678175	4335626	-	Neubaum	M	A	NONB
Antrozous pallidus	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	UNKN
Antrozous pallidus	BTMBM0001	8/31/1995	Tenderfoot Camp Spg	159525	4285594	6881	Navo	M	A	NONB
Antrozous pallidus	BBLUE9928	7/19/1999	Blue Creek 44 A1	690625	4270179	5936	Wilkey	M	A	NONB
Antrozous pallidus	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	U	U	UNKN
Corynorhinus townsendii	DUNWP9203	11/5/1992	Up1 Hobo	712070	4303640	6900	Graham	M	A	NONB
Corynorhinus townsendii	BUNWP9402	8/10/1994	Amethyst Queen 3	713600	4302900	6400	Navo	M	A	NONB
Corynorhinus townsendii	BLUMS0035	10/7/2000	Lumsden 88	671040	4285300	6520	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0038	2/8/2000	Century East	669950	4279910	6840	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0042	6/14/2000	Nielson Upper	677180	4275350	6580	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0042	6/14/2000	Nielson Upper	677180	4275350	6580	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0044	6/14/2000	Ridgetop Ne	676500	4278770	6600	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BELIZ0011	5/26/2000	Elizabeth 50a1	694320	4268480	6140	Ingersoll	F	A	PREG
Corynorhinus townsendii	BELIZ0011	5/26/2000	Elizabeth 50a1	694320	4268480	6140	Ingersoll	F	A	LACT
Corynorhinus townsendii	BELIZ0011	5/26/2000	Elizabeth 50a1	694320	4268480	6140	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9902	1/19/2003	Hubbard East	669860	4279525	6835	Wilkey	U	U	UNKN
Corynorhinus townsendii	BLUMS9903	1/19/2003	Pack Rat Main	670005	4279265	6820	Wilkey	U	U	UNKN
Corynorhinus townsendii	BLUMS9903	1/19/2003	Pack Rat Main	670005	4279265	6820	Wilkey	U	U	UNKN
Corynorhinus townsendii	BOUTL9847	9/23/1998	Outlaw Mesa 15	689960	4276720	-	Ingersoll	F	A	NONB
Corynorhinus townsendii	BOUTL9848	9/23/1998	Outlaw Mesa 4	690638	4277474	-	Navo	M	A	TENL
Corynorhinus townsendii	BOUTL9856	10/8/1998	Outlaw Mesa 34 Main	687095	4273090	-	Ingersoll	M	A	NONB
Corynorhinus townsendii	BOUTL9855	10/8/1998	Outlaw Mesa 35	688640	4272710	-	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BOUTL9855	10/8/1998	Outlaw Mesa 35	688640	4272710	-	Ingersoll	F	J	NONB
Corynorhinus townsendii	BBLUE9913	9/12/1999	Blue Creek 39 A1	691549	4272508	6752	Ingersoll	F	A	POST
Corynorhinus townsendii	BBLUE9912	9/14/1999	Blue Creek 38 A2	692176	4272204	6608	Inger/Will	F	A	POST
Corynorhinus townsendii	BBLUE9907	9/14/1999	Blue Creek 37 A7	691724	4272158	6518	Inger/Will	M	A	TENL
Corynorhinus townsendii	BBLUE9903	9/14/1999	Blue Creek 37 A3	691735	4272161	6335	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BBLUE9903	9/14/1999	Blue Creek 37 A3	691735	4272161	6335	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BBLUE9918	9/13/1999	Blue Creek 40 D1	691023	4272153	6529	Ingersoll	F	J	NONB
Corynorhinus townsendii	BBLUE9924	9/15/1999	Blue Creek 43 D1	690640	4270576	6056	Wilkey	M	A	TENL

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Corynorhinus townsendii	BUNWP9202	1/20/1995	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BUNWP9202	1/20/1995	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BUNWP9202	3/11/1994	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BUNWP9202	3/11/1994	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BBLUE9913	9/21/2002	Blue Creek 39 A1	691549	4272508	6752	Wilkey	M	A	TENL
Corynorhinus townsendii	BBLUE9921	9/20/2002	Blue Creek 41 A1	691152	4272015	6039	Wilkey	F	J	NONB
Corynorhinus townsendii	BDPTM9527	8/31/1995	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	M	A	NONB
Corynorhinus townsendii	BAMQN9502	8/5/1995	Amethyst Queen 9	711970	4301590	6520	Ingersoll	M	A	NONB
Corynorhinus townsendii	BAMQN9502	8/5/1995	Amethyst Queen 9	711970	4301590	6520	Ingersoll	M	A	NONB
Corynorhinus townsendii	BAMQN9504	8/6/1995	Amethyst Queen 6	713280	4302060	6460	Ingersoll	M	J	NONB
Corynorhinus townsendii	BUNWP9402	8/7/1995	Amethyst Queen 3	713600	4302900	6400	Ingersoll	M	A	NONB
Corynorhinus townsendii	BDPTM9506	10/13/1995	Tenderfoot Mesa 5a	683820	4282580	6700	Ingersoll	M	A	TENL
Corynorhinus townsendii	BDPTM9506	10/14/1995	Tenderfoot Mesa 5a	683820	4282580	6700	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BDPTM9507	10/14/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	10/8/1999	La Sal Fan	670130	4279150	6800	Ingersoll	M	A	TENL
Corynorhinus townsendii	BUNWP9202	1/20/1995	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BUNWP9202	1/20/1995	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BLUMS9917	2/8/2000	Rajah 49-2 Fan	670835	4279045	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9917	2/8/2000	Rajah 49-2 Fan	670835	4279045	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9917	2/8/2000	Rajah 49-2 Fan	670835	4279045	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9920	2/8/2000	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9920	2/8/2000	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9920	2/8/2000	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	2/8/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	2/8/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	2/8/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9918	2/8/2000	Rajah 49-3	670820	4279055	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0003	2/15/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0003	2/15/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0003	2/15/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9920	3/6/2000	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9920	3/6/2000	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9916	3/4/2000	Rajah 49-1	670970	4279170	6795	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9908	3/4/2000	Rajah Point 2	670680	4279400	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	3/4/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9902	6/17/2000	Hubbard East	669860	4279525	6835	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BELIZ0010	6/5/2000	Elizabeth 51a1 E	694130	4268210	6080	Navo	U	U	UNKN
Corynorhinus townsendii	BELIZ0010	5/26/2000	Elizabeth 51a1 E	694130	4268210	6080	Ingersoll	F	A	PREG
Corynorhinus townsendii	BELIZ0001	10/14/2000	Elizabeth 49a1	693980	4268950	6180	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BBLUE9928	5/27/2000	Blue Creek 44 A1	690625	4270179	5936	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0013	5/27/2000	Yellowbird 46a3	693240	4270220	6220	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0044	10/6/2000	Ridgetop Ne	676500	4278770	6600	Ingersoll	U	U	UNKN

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Corynorhinus townsendii	BLUMS0045	10/5/2000	Ridgetop Sw2	675730	4277930	6700	Ingersoll	M	J	TENL
Corynorhinus townsendii	BLUMS0046	10/5/2000	Ridgetop Sw1	675720	4277910	6700	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0036	10/6/2000	Lumsden 84 (Old October)	675420	4276380	6700	Ingersoll	F	A	POST
Corynorhinus townsendii	BLUMS0038	10/4/2000	Century East	669950	4279910	6840	Navo	M	A	TENL
Corynorhinus townsendii	BDPTM9512	7/26/1995	Tenderfoot Mesa 4b	681410	4281670	6900	Ingersoll	M	A	NONB
Corynorhinus townsendii	BELIZ0002	5/25/2000	Elizabeth 49d1	693960	4269640	6350	Ingersoll	F	A	LACT
Corynorhinus townsendii	BELIZ0005	10/14/2000	Elizabeth 49d4	693900	4269330	6250	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BELIZ0001	5/26/2000	Elizabeth 49a1	693980	4268950	6180	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BELIZ0001	5/26/2000	Elizabeth 49a1	693980	4268950	6180	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0003	10/14/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	F	U	UNKN
Corynorhinus townsendii	BYELL0003	10/14/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	F	U	UNKN
Corynorhinus townsendii	BLUMS0128	10/17/2001	Sunspot East Mine	151177	4284999	-	Navo	F	A	POST
Corynorhinus townsendii	BOUTL9718	10/1/1997	Outlaw Mesa 66d3	685634	4276439	6540	Ingersoll	F	J	NONB
Corynorhinus townsendii	BOUTL9731	10/1/1997	Outlaw Mesa 70a2	685569	4276583	6510	Ingersoll	M	U	TENL
Corynorhinus townsendii	BOUTL9702	9/30/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	M	U	TENL
Corynorhinus townsendii	BOUTL9702	9/30/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	M	U	NONB
Corynorhinus townsendii	BOUTL9728	10/18/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	M	A	TENL
Corynorhinus townsendii	BDPTM9507	9/24/1998	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	F	J	NONB
Corynorhinus townsendii	BDPTM9507	9/24/1998	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Corynorhinus townsendii	BOUTL9851	9/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Ingersoll	F	A	UNKN
Corynorhinus townsendii	BOUTL9849	10/20/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Ingersoll	F	J	UNKN
Corynorhinus townsendii	BBLUE9924	7/20/1999	Blue Creek 43 D1	690640	4270576	6056	Wilkey	M	U	UNKN
Corynorhinus townsendii	BOUTL9730	8/27/1999	Outlaw Mesa 70a1	685502	4276562	6490	Ingersoll	M	A	UNKN
Corynorhinus townsendii	BBLUE9913	6/8/1999	Blue Creek 39 A1	691549	4272508	6752	Wilkey	U	U	UNKN
Corynorhinus townsendii	BBLUE9913	6/8/1999	Blue Creek 39 A1	691549	4272508	6752	Wilkey	U	U	UNKN
Corynorhinus townsendii	BOUTL9701	8/28/1999	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	A	POST
Corynorhinus townsendii	BELIZ0011	6/8/2008	Elizabeth 50a1	694320	4268480	6140	Navo/Piaggio	F	A	LACT
Corynorhinus townsendii	BUNWP9202	10/7/1992	Up12	713050	4302070	6480	Navo	M	A	TENL
Corynorhinus townsendii	DUNWP9201	10/6/1992	Up13 Farley	713630	4302750	6400	Navo	M	A	TENL
Corynorhinus townsendii	BUNWP9210	3/11/1994	Nancy Hanks Decline	712350	4303140	6800	Navo	U	U	UNKN
Corynorhinus townsendii	BBLUE9921	6/23/1999	Blue Creek 41 A1	691152	4272015	6039	Wilkey	M	A	NONB
Corynorhinus townsendii	BLUMS9920	10/7/1999	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	10/8/1999	La Sal Fan	670130	4279150	6800	Ingersoll	F	J	NONB
Corynorhinus townsendii	BLUMS9901	10/8/1999	Hubbard West	669850	4279525	6840	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9901	10/8/1999	Hubbard West	669850	4279525	6840	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9901	10/8/1999	Hubbard West	669850	4279525	6840	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9901	10/8/1999	Hubbard West	669850	4279525	6840	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BBLUE9928	9/13/1999	Blue Creek 44 A1	690625	4270179	5936	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BBLUE9921	9/13/1999	Blue Creek 41 A1	691152	4272015	6039	Ingersoll	M	U	TENL
Corynorhinus townsendii	BBLUE9914	9/12/1999	Blue Creek 39 A2	691520	4272513	6390	Ingersoll	M	A	TENL
Corynorhinus townsendii	BCOPP0101	10/16/2001	Copper Rivet Mines	153360	4272327	-	Navo	F	A	POST
Corynorhinus townsendii	BCOPP0101	10/16/2001	Copper Rivet Mines	153360	4272327	-	Navo	U	U	UNKN
Corynorhinus townsendii	BELIZ0011	6/8/2008	Elizabeth 50a1	694320	4268480	6140	Navo/Piaggio	F	A	LACT
Corynorhinus townsendii	BBFDM1102	10/4/2011	Bfd 2	671263	4281877	6847	Neubaum	U	U	UNKN
Corynorhinus townsendii	BDPDP9401	9/20/1994	Deppression Nw Stope	681830	4274360	6160	Ingersoll	F	A	NONB
Corynorhinus townsendii	BAMQN9502	3/18/1995	Amethyst Queen 9	711970	4301590	6520	Ingersoll	M	A	NONB
Corynorhinus townsendii	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Corynorhinus townsendii	BYELL0003	2/15/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	U	U	UNKN

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Corynorhinus townsendii	BELIZ0001	10/17/2000	Elizabeth 49a1	693980	4268950	6180	Ingersoll	U	U	
Corynorhinus townsendii	BLUMS0035	10/7/2000	Lumsden 88	671040	4285300	6520	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0034	3/18/2000	Lumsden 86	673250	4279150	6720	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BELIZ0011	5/26/2000	Elizabeth 50a1	694320	4268480	6140	Ingersoll	F	A	PREG
Corynorhinus townsendii	BELIZ0007	5/24/2000	Elizabeth 49d7	693600	4269010	6150	Ingersoll	F	A	LACT
Corynorhinus townsendii	BBLUE9913	9/21/2002	Blue Creek 39 A1	691549	4272508	6752	Wilkey	F	A	NONB
Corynorhinus townsendii	BLUMS9903	1/19/2003	Pack Rat Main	670005	4279265	6820	Wilkey	U	U	UNKN
Corynorhinus townsendii	BOUTL9847	9/23/1998	Outlaw Mesa 15	689960	4276720	-	Ingersoll	F	J	NONB
Corynorhinus townsendii	BOUTL9848	9/23/1998	Outlaw Mesa 4	690638	4277474	-	Navo	F	A	NONB
Corynorhinus townsendii	BOUTL9856	10/8/1998	Outlaw Mesa 34 Main	687095	4273090	-	Ingersoll	M	J	TENL
Corynorhinus townsendii	BBLUE9913	9/12/1999	Blue Creek 39 A1	691549	4272508	6752	Ingersoll	F	A	NONB
Corynorhinus townsendii	BBLUE9912	9/14/1999	Blue Creek 38 A2	692176	4272204	6608	Inger/Will	M	A	TENL
Corynorhinus townsendii	BBLUE9911	9/14/1999	Blue Creek 38 A1	692105	4272248	6592	Inger/Will	M	A	TENL
Corynorhinus townsendii	BBLUE9903	9/14/1999	Blue Creek 37 A3	691735	4272161	6335	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BBLUE9923	9/15/1999	Blue Creek 43 A1	690624	4270521	5951	Wilkey	F	A	POST
Corynorhinus townsendii	BUNWP9202	3/11/1994	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BBLUE9913	9/21/2002	Blue Creek 39 A1	691549	4272508	6752	Wilkey	M	A	TENL
Corynorhinus townsendii	BDPTM9513	9/19/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	M	A	TENL
Corynorhinus townsendii	BDPTM9515	10/3/1995	Tenderfoot Mesa 10a	680860	4278800	6700	Ingersoll	M	A	TENL
Corynorhinus townsendii	BDPTM9517	10/14/1995	Tenderfoot Mesa 12	680500	4279490	6500	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BDPTM9504	10/14/1995	Tenderfoot Mesa14d	680600	4278710	6600	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BUNWP9202	1/20/1995	Up12	713050	4302070	6480	Navo	U	U	UNKN
Corynorhinus townsendii	BLUMS9917	2/8/2000	Rajah 49-2 Fan	670835	4279045	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9920	2/8/2000	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	2/8/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	2/8/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9903	2/8/2000	Pack Rat Main	670005	4279265	6820	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BELIZ0001	2/11/2000	Elizabeth 49a1	693980	4268950	6180	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0001	2/15/2000	Yellowbird 46a5	693380	4270180	6300	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0002	2/15/2000	Yellowbird 46a4	693270	4270180	6220	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0003	2/15/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9920	3/6/2000	Rajah 49-5	670790	4279140	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9914	3/4/2000	Rajah Point 8	670350	4279330	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	3/4/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9906	3/4/2000	La Sal Fan	670130	4279150	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0031	7/21/2000	Lumsden 87 Mag	671640	4279190	6800	Ingersoll	M	J	NONB
Corynorhinus townsendii	BBLUE9903	3/6/2000	Blue Creek 37 A3	691735	4272161	6335	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0013	5/27/2000	Yellowbird 46a3	693240	4270220	6220	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0036	10/6/2000	Lumsden 84 (Old October)	675420	4276380	6700	Ingersoll	F	J	NONB
Corynorhinus townsendii	BLUMS0040	10/6/2000	Old October Sw Prospect	675580	4276610	6700	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	NONB
Corynorhinus townsendii	BDPTM9501	6/1/1995	Tenderfoot Mesa 14a	680530	4278750	6580	Ingersoll	M	A	NONB
Corynorhinus townsendii	BELIZ0001	5/26/2000	Elizabeth 49a1	693980	4268950	6180	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BYELL0003	10/14/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	M	U	UNKN

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Corynorhinus townsendii	BBLUE9928	5/27/2000	Blue Creek 44 A1	690625	4270179	5936	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BOUTL9719	9/25/1998	Outlaw Mesa 65	686005	4276955	6560	Navo	U	U	UNKN
Corynorhinus townsendii	BOUTL9732	10/8/1997	Outlaw Mesa 72	687571	4274778	6240	Ingersoll	M	A	TENL
Corynorhinus townsendii	BOUTL9741	10/2/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BOUTL9731	10/1/1997	Outlaw Mesa 70a2	685569	4276583	6510	Ingersoll	M	U	TENL
Corynorhinus townsendii	BOUTL9737	10/21/1997	Outlaw Mesa 62a1	686850	4276941	6680	Ingersoll	F	A	POST
Corynorhinus townsendii	BDPTM9507	9/24/1998	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	F	J	NONB
Corynorhinus townsendii	BOUTL9845	9/27/1998	Outlaw Mesa 73a2	687355	4273090	-	Ingersoll	F	A	PREG
Corynorhinus townsendii	BOUTL9849	10/20/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Ingersoll	F	A	UNKN
Corynorhinus townsendii	BBLUE9928	7/19/1999	Blue Creek 44 A1	690625	4270179	5936	Wilkey	M	J	NONB
Corynorhinus townsendii	BELIZ0011	6/8/2008	Elizabeth 50a1	694320	4268480	6140	Navo/Piaggio	F	A	LACT
Corynorhinus townsendii	BELIZ0011	6/8/2008	Elizabeth 50a1	694320	4268480	6140	Navo/Piaggio	F	A	LACT
Corynorhinus townsendii	BUNWP9202	10/7/1992	Up12	713050	4302070	6480	Navo	M	A	TENL
Corynorhinus townsendii	DUNWP9201	10/6/1992	Up13 Farley	713630	4302750	6400	Navo	M	A	TENL
Corynorhinus townsendii	BOUTL9855	6/20/1998	Outlaw Mesa 35	688640	4272710	-	Ingersoll	F	J	UNKN
Corynorhinus townsendii	BLUMS9907	10/7/1999	Rajah Point 1	670695	4279370	6800	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS9901	10/8/1999	Hubbard West	669850	4279525	6840	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BBLUE9928	9/13/1999	Blue Creek 44 A1	690625	4270179	5936	Ingersoll	U	U	UNKN
Corynorhinus townsendii	BLUMS0042	7/28/2004	Nielson Upper	677180	4275350	6580	Olson/Mosc	F	A	LACT
Corynorhinus townsendii	BDPDP9403	9/20/1994	Deppression NW Stope	681790	4274350	6160	Ingersoll	M	A	TENL
Corynorhinus townsendii	BOUTL9740	6/26/1997	Outlaw Mesa 55d3	687106	4276684	6660	Ingersoll	M	A	NONB
Corynorhinus townsendii	BYELL0003	2/15/2000	Yellowbird 46a1	693220	4270140	6220	Ingersoll	U	U	UNKN
Eptesicus fuscus	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	M	J	NONB
Eptesicus fuscus	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	M	J	NONB
Eptesicus fuscus	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	M	J	NONB
Eptesicus fuscus	BOUTL9845	6/20/1998	Outlaw Mesa 73a2	687355	4273090	-	Ingersoll	M	A	UNKN
Eptesicus fuscus	BGJBM0001	7/18/2000	Devil's Canyon Pond	174770	4338577	-	Navo	F	A	NONB
Eptesicus fuscus	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	TENL
Eptesicus fuscus	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	NONB
Eptesicus fuscus	BDPTM9511	7/26/1995	Tenderfoot Mesa 4c	681400	4281700	6900	Ingersoll	M	A	TENL
Eptesicus fuscus	BGJBM0059	7/8/2009	Rough Canyon Pond	706416	4317829	6102	Navo Nuebaum	M	A	NONB
Eptesicus fuscus	BGJBM0058	7/9/2009	Black Ridge Pond	689451	4329038	6755	Navo Nuebaum	M	A	UNKN
Eptesicus fuscus	BDPTM9527	7/31/1997	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	U	U	UNKN
Eptesicus fuscus	BDPTM9502	8/1/1997	Tenderfoot Mesa 14b	0	0	-	Ingersoll	M	A	NONB
Eptesicus fuscus	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	M	U	UNKN
Eptesicus fuscus	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	M	A	NONB
Eptesicus fuscus	BGJBM0048	8/22/2001	Lumsden Pond 1	150503	4281900	-	Navo/Neubaum	M	A	TENL
Eptesicus fuscus	SSWAHT001	8/18/1999	Horsethief Canyon Swa	694983	4335558	4468	Navo	F	A	POST
Eptesicus fuscus	BGJBM0001	7/18/2000	Devil's Canyon Pond	174770	4338577	-	Navo	F	A	LACT
Eptesicus fuscus	BGJBM0001	7/18/2000	Devil's Canyon Pond	174770	4338577	-	Navo	M	J	NONB
Eptesicus fuscus	BLUMS0031	3/5/2000	Lumsden 87 Mag	671640	4279190	6800	Ingersoll	U	U	UNKN
Eptesicus fuscus	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	NONB
Eptesicus fuscus	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	NONB
Eptesicus fuscus	BDPTM9513	6/24/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	M	A	NONB
Eptesicus fuscus	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Eptesicus fuscus	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	M	A	NONB
Euderma maculatum	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo	U	U	UNKN
Euderma maculatum	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	U	U	UNKN

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Euderma maculatum	BGJBM0002	8/6/2002	Sinbad Valley Spring	153110	4271574	5390	Navo	U	U	UNKN
Euderma maculatum	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	U	U	UNKN
Euderma maculatum	BGJBM0002	8/25/2001	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	A	POST
Euderma maculatum	BGJBM0002	8/25/2001	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	U	U	UNKN
Euderma maculatum	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	U	U	UNKN
Euderma maculatum	BGJBM0004	6/14/2006	North Mesa Creek	171019	4273743	-	Navo/Crew	U	U	UNKN
Euderma maculatum	BGJBM0046	6/6/2000	Outlaw Mesa Pond	689313	4275749	-	Navo	U	U	UNKN
Euderma maculatum	BGJBM0002	8/25/2001	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	J	NONB
Euderma maculatum	MCONM0001	9/4/1997	Colo Natl Monument	177494	4328440	-	Navo/Gore	U	U	UNKN
Lasionycteris noctivagans	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Lasionycteris noctivagans	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	M	J	NONB
Lasionycteris noctivagans	PFRPR0001	3/10/1993	Fruita	695975	4336824	-	P.Creeden	U	U	UNKN
Myotis californicus	BDPTM9527	8/31/1995	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	M	J	NONB
Myotis californicus	BDPTM9527	8/31/1995	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	M	A	NONB
Myotis californicus	BDPTM9526	10/3/1995	Tenderfoot Mesa 15a	681200	4277900	6500	Ingersoll	F	A	POST
Myotis californicus	BTMBM0001	8/31/1995	Tenderfoot Camp Spg	159525	4285594	6881	Navo	F	A	POST
Myotis californicus	BOUTL9701	8/28/1999	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	U	U	UNKN
Myotis californicus	BOUTL9852	6/23/1998	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	M	A	NONB
Myotis californicus	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis californicus	BOUTL9845	6/20/1998	Outlaw Mesa 73a2	687355	4273090	-	Ingersoll	M	A	NONB
Myotis californicus	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	A	NONB
Myotis californicus	BBLUE9921	6/23/1999	Blue Creek 41 A1	691152	4272015	6039	Wilkey	F	A	LACT
Myotis californicus	BOUTL9711	6/7/2000	Outlaw Mesa 59	686439	4276708	6580	Navo	M	U	NONB
Myotis californicus	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Myotis californicus	BOUTL9715	10/20/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	M	A	TENL
Myotis californicus	BOUTL9727	10/18/1997	Outlaw Mesa 67a2	685115	4276598	6400	Ingersoll	M	A	NONB
Myotis californicus	BOUTL9729	10/18/1997	Outlaw Mesa 67a3	685079	4276660	6300	Ingersoll	M	A	
Myotis californicus	BOUTL9728	10/18/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	F	A	NONB
Myotis californicus	BOUTL9723	10/19/1997	Outlaw Mesa 69a3	684770	4276463	6400	Ingersoll	M	A	TENL
Myotis californicus	BOUTL9725	10/19/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	M	A	TENL
Myotis californicus	BOUTL9849	6/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Navo/Gore	F	A	NONB
Myotis californicus	BOUTL9849	6/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Navo/Gore	F	A	LACT
Myotis californicus	BOUTL9850	6/22/1998	Outlaw Mesa 61 D1	686455	4277058	6400	Navo/Gore	M	A	NONB
Myotis californicus	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	NONB
Myotis californicus	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	M	U	NONB
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	A	NONB
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	A	PREG
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	A	PREG
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	U	U	UNKN
Myotis californicus	BDPTM9527	7/31/1997	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	F	A	LACT
Myotis californicus	BDPTM9527	7/31/1997	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	M	A	TENL
Myotis californicus	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Myotis californicus	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Myotis californicus	BOUTL9715	6/6/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	M	A	NONB
Myotis californicus	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	M	A	NONB
Myotis californicus	BOUTL9708	6/5/1997	Outlaw Mesa 57a3	686420	4276518	6560	Ingersoll	M	A	NONB
Myotis californicus	BOUTL9725	6/20/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	U	U	UNKN

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Myotis californicus	BDPTM9527	8/31/1995	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	F	A	POST
Myotis californicus	BDPTM9522	9/18/1995	Tenderfoot Mesa 13	680320	4278800	6500	Ingersoll	M	J	NONB
Myotis californicus	BTMBM0001	8/31/1995	Tenderfoot Camp Spg	159525	4285594	6881	Navo	U	U	UNKN
Myotis californicus	BELIZ0005	5/25/2000	Elizabeth 49d4	693900	4269330	6250	Ingersoll	M	A	UNKN
Myotis californicus	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	J	NONB
Myotis californicus	BOUTL9719	10/20/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	M	J	TENL
Myotis californicus	BOUTL9725	10/19/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	M	A	TENL
Myotis californicus	BOUTL9849	6/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Navo/Gore	M	A	NONB
Myotis californicus	BOUTL9849	6/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Navo/Gore	M	A	NONB
Myotis californicus	MCONM0001	5/15/1992	Colo Natl Monument	177494	4328440	-	Navo	M	A	NONB
Myotis californicus	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	M	A	NONB
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	U	U	UNKN
Myotis californicus	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	M	A	NONB
Myotis californicus	BDPTM9527	7/31/1997	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	F	A	NONB
Myotis californicus	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Myotis californicus	BOUTL9715	6/6/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	F	A	PREG
Myotis californicus	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	M	A	NONB
Myotis californicus	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Myotis californicus	BOUTL9725	6/20/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BBLUE9918	9/13/1999	Blue Creek 40 D1	691023	4272153	6529	Ingersoll	F	J	NONB
Myotis ciliolabrum	BDPTM9527	8/31/1995	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	M	J	NONB
Myotis ciliolabrum	BBLUE9935	9/13/1999	Blue Creek 42	691324	4271718	6040	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BBLUE9935	9/13/1999	Blue Creek 42	691324	4271718	6040	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BELIZ0011	5/26/2000	Elizabeth 50a1	694320	4268480	6140	Ingersoll	F	A	UNKN
Myotis ciliolabrum	BELIZ0007	5/24/2000	Elizabeth 49d7	693600	4269010	6150	Ingersoll	M	A	UNKN
Myotis ciliolabrum	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis ciliolabrum	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis ciliolabrum	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis ciliolabrum	BOUTL9848	6/23/1998	Outlaw Mesa 4	690638	4277474	-	Ingersoll	M	A	NONB
Myotis ciliolabrum	BBLUE9913	9/21/2002	Blue Creek 39 A1	691549	4272508	6752	Wilkey	F	A	POST
Myotis ciliolabrum	BBLUE9913	9/21/2002	Blue Creek 39 A1	691549	4272508	6752	Wilkey	M	A	TENL
Myotis ciliolabrum	BOUTL9846	6/21/1998	Outlaw Mesa 75	687312	4273405	-	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9846	6/21/1998	Outlaw Mesa 75	687312	4273405	-	Ingersoll	M	A	NONB
Myotis ciliolabrum	DOUTLPOND	8/1/1998	Outlaw Mesa Pond	688390	4276560	-	Ingersoll	F	A	LACT
Myotis ciliolabrum	BOUTL9845	6/20/1998	Outlaw Mesa 73a2	687355	4273090	-	Ingersoll	M	A	UNKN
Myotis ciliolabrum	BOUTL9704	6/6/2000	Outlaw Mesa 32a2	689295	4275806	6580	Navo	M	A	NONB
Myotis ciliolabrum	BOUTL9713	6/7/2000	Outlaw Mesa 64d1	686226	4276840	6580	Navo	F	A	LACT
Myotis ciliolabrum	BLUMS0031	10/3/2000	Lumsden 87 Mag	671640	4279190	6800	Navo	M	A	TENL
Myotis ciliolabrum	BUNWP9402	8/7/1995	Amethyst Queen 3	713600	4302900	6400	Ingersoll	F	A	LACT
Myotis ciliolabrum	BUNWP9402	8/7/1995	Amethyst Queen 3	713600	4302900	6400	Ingersoll	F	A	LACT
Myotis ciliolabrum	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	J	NONB
Myotis ciliolabrum	BBLUE9907	7/9/1999	Blue Creek 37 A7	691724	4272158	6518	Wilkey	F	A	NONB
Myotis ciliolabrum	BBLUE9908	7/21/1999	Blue Creek 37 A8	691812	4272174	6472	Wilkey	F	U	UNKN
Myotis ciliolabrum	BBLUE9921	6/23/1999	Blue Creek 41 A1	691152	4272015	6039	Wilkey	F	A	LACT
Myotis ciliolabrum	BLUMS0029	7/21/2000	Cherokee Adit (Liberty)	669920	4278680	7040	Ingersoll	M	A	UNKN
Myotis ciliolabrum	BLUMS0054	7/21/2000	Lumsden 87 Main	671670	4279210	6800	Ingersoll	M	J	NONB
Myotis ciliolabrum	BLUMS0054	7/21/2000	Lumsden 87 Main	671670	4279210	6800	Ingersoll	M	A	NONB

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Myotis ciliolabrum	BLUMS9908	6/15/2000	Rajah Point 2	670680	4279400	6800	Ingersoll	M	A	NONB
Myotis ciliolabrum	BLUMS9908	6/15/2000	Rajah Point 2	670680	4279400	6800	Ingersoll	M	A	NONB
Myotis ciliolabrum	BLUMS9908	6/15/2000	Rajah Point 2	670680	4279400	6800	Ingersoll	M	A	NONB
Myotis ciliolabrum	BLUMS9908	6/15/2000	Rajah Point 2	670680	4279400	6800	Ingersoll	M	A	NONB
Myotis ciliolabrum	BLUMS0037	6/16/2000	Century West	669550	4279640	6920	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9742	7/30/1997	Calamity Fp1	687742	4275629	6460	Ingersoll	M	A	UNKN
Myotis ciliolabrum	BDPTM9513	6/24/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	M	U	NONB
Myotis ciliolabrum	BOUTL9736	10/21/1997	Outlaw Mesa 62d11	686828	4276912	6660	Ingersoll	M	A	TENL
Myotis ciliolabrum	BOUTL9725	10/19/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	M	A	TENL
Myotis ciliolabrum	BOUTL9846	6/21/1998	Outlaw Mesa 75	687312	4273405	-	Ingersoll	F	A	PREG
Myotis ciliolabrum	BOUTL9846	6/21/1998	Outlaw Mesa 75	687312	4273405	-	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9854	8/1/1998	Outlaw Mesa Ne2	688390	4276560	-	Ingersoll	F	A	LACT
Myotis ciliolabrum	BOUTL9855	6/20/1998	Outlaw Mesa 35	688640	4272710	-	Ingersoll	F	J	UNKN
Myotis ciliolabrum	BGJBM0048	7/23/2001	Lumsden Pond 1	150503	4281900	-	Navo	M	A	NONB
Myotis ciliolabrum	BDPDP9412	9/19/1994	Deppression Main	681750	4274230	6200	Ingersoll	M	A	TENL
Myotis ciliolabrum	BDPDP9412	9/19/1994	Deppression Main	681750	4274230	6200	Ingersoll	M	A	TENL
Myotis ciliolabrum	BDPTM9515	7/22/1995	Tenderfoot Mesa 10a	680860	4278800	6700	Ingersoll	M	A	NONB
Myotis ciliolabrum	BDPTM9513	6/24/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	M	A	NONB
Myotis ciliolabrum	BDPTM9513	6/24/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	M	A	NONB
Myotis ciliolabrum	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	A	NONB
Myotis ciliolabrum	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	A	NONB
Myotis ciliolabrum	BDPTM9512	7/26/1995	Tenderfoot Mesa 4b	681410	4281670	6900	Ingersoll	M	J	NONB
Myotis ciliolabrum	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Myotis ciliolabrum	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Myotis ciliolabrum	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	M	U	NONB
Myotis ciliolabrum	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	F	A	UNKN
Myotis ciliolabrum	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	F	U	NONB
Myotis ciliolabrum	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	U	NONB
Myotis ciliolabrum	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	PREG
Myotis ciliolabrum	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	PREG
Myotis ciliolabrum	BOUTL9715	9/20/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	F	J	NONB
Myotis ciliolabrum	BGJBM0058	7/9/2009	Black Ridge Pond	689451	4329038	6755	Navo Nuebaum	F	A	UNKN
Myotis ciliolabrum	BUNWP9402	8/10/1994	Amethyst Queen 3	713600	4302900	6400	Navo	F	A	NONB
Myotis ciliolabrum	BUNWP9402	6/26/1995	Amethyst Queen 3	713600	4302900	6400	Navo	F	A	NONB
Myotis ciliolabrum	BOUTL9730	6/23/1997	Outlaw Mesa 70a1	685502	4276562	6490	Ingersoll	F	U	UNKN
Myotis ciliolabrum	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	F	A	PREG
Myotis ciliolabrum	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	F	A	LACT
Myotis ciliolabrum	BOUTL9735	6/25/1997	Outlaw Mesa 76	687041	4275970	6360	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9735	6/25/1997	Outlaw Mesa 76	687041	4275970	6360	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9737	6/26/1997	Outlaw Mesa 62a1	686850	4276941	6680	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9742	7/30/1997	Calamity Fp1	687742	4275629	6460	Ingersoll	M	A	UNKN
Myotis ciliolabrum	BOUTL9742	7/30/1997	Calamity Fp1	687742	4275629	6460	Ingersoll	F	A	NONB

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Myotis ciliolabrum	BOUTL9741	7/30/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	M	A	UNKN
Myotis ciliolabrum	BOUTL9741	7/30/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	F	A	LACT
Myotis ciliolabrum	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Myotis ciliolabrum	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Myotis ciliolabrum	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	TENL
Myotis ciliolabrum	BOUTL9715	6/6/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9714	6/6/1997	Outlaw Mesa 64d2	686173	4276881	6580	Ingersoll	F	A	PREG
Myotis ciliolabrum	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	U	NONB
Myotis ciliolabrum	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	M	U	NONB
Myotis ciliolabrum	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	U	NONB
Myotis ciliolabrum	BOUTL9708	6/5/1997	Outlaw Mesa 57a3	686420	4276518	6560	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	A	LACT
Myotis ciliolabrum	BOUTL9725	6/20/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BOUTL9725	6/20/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BBLUE9906	9/14/1999	Blue Creek 37 A6	691768	4272175	6330	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BLUMS9924	10/11/1999	Rajah 30	671190	4276440	6960	Ingersoll	M	A	TENL
Myotis ciliolabrum	BBLUE9911	7/22/1999	Blue Creek 38 A1	692105	4272248	6592	Wilkey	M	A	NONB
Myotis ciliolabrum	BBLUE9913	6/8/1999	Blue Creek 39 A1	691549	4272508	6752	Wilkey	F	U	NONB
Myotis ciliolabrum	BBLUE9925	9/15/1999	Blue Creek 43 A2	690576	4270691	5755	Wilkey	M	A	TENL
Myotis ciliolabrum	BOUTL9852	6/23/1998	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis ciliolabrum	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis ciliolabrum	BDPTM9506	9/24/1998	Tenderfoot Mesa 5a	683820	4282580	6700	Ingersoll	U	U	UNKN
Myotis ciliolabrum	BOUTL9844	9/27/1998	Outlaw Mesa 73a1	687355	4273080	-	Ingersoll	M	A	NONB
Myotis ciliolabrum	BBLUE9907	7/9/1999	Blue Creek 37 A7	691724	4272158	6518	Wilkey	F	A	LACT
Myotis ciliolabrum	BLUMS0054	7/21/2000	Lumsden 87 Main	671670	4279210	6800	Ingersoll	M	J	NONB
Myotis ciliolabrum	BLUMS0054	7/21/2000	Lumsden 87 Main	671670	4279210	6800	Ingersoll	F	A	NONB
Myotis ciliolabrum	BLUMS9908	6/15/2000	Rajah Point 2	670680	4279400	6800	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9728	10/18/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	M	A	TENL
Myotis ciliolabrum	BOUTL9724	10/19/1997	Outlaw Mesa 69a2	684737	4276468	6400	Ingersoll	M	A	TENL
Myotis ciliolabrum	BOUTL9849	6/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Navo/Gore	M	A	NONB
Myotis ciliolabrum	BOUTL9846	9/27/1998	Outlaw Mesa 75	687312	4273405	-	Ingersoll	F	A	NONB
Myotis ciliolabrum	BDPDP9406	9/20/1994	Deppression Nw Stope	681760	4274270	7600	Ingersoll	M	A	TENL
Myotis ciliolabrum	BDPTM9513	6/24/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	F	A	PREG
Myotis ciliolabrum	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	A	NONB
Myotis ciliolabrum	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	J	NONB
Myotis ciliolabrum	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	A	UNKN
Myotis ciliolabrum	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	M	A	NONB
Myotis ciliolabrum	BUNWP9402	8/10/1994	Amethyst Queen 3	713600	4302900	6400	Navo	F	J	NONB
Myotis ciliolabrum	BOUTL9716	6/22/1997	Outlaw Mesa 66d1	685593	4276271	6540	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9717	6/22/1997	Outlaw Mesa 66d2	685612	4276394	6500	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	F	A	PREG
Myotis ciliolabrum	BOUTL9740	6/26/1997	Outlaw Mesa 55d3	687106	4276684	6660	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9742	7/30/1997	Calamity Fp1	687742	4275629	6460	Ingersoll	F	A	LACT
Myotis ciliolabrum	BOUTL9741	7/30/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	M	A	UNKN
Myotis ciliolabrum	BDPTM9502	8/1/1997	Tenderfoot Mesa 14b	0	0	-	Ingersoll	M	A	TENL

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Myotis ciliolabrum	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9716	10/1/1997	Outlaw Mesa 66d1	685593	4276271	6540	Ingersoll	F	J	NONB
Myotis ciliolabrum	BOUTL9702	9/30/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	F	A	POST
Myotis ciliolabrum	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	U	NONB
Myotis ciliolabrum	BOUTL9706	6/5/1997	Outlaw Mesa 56a1	686655	4276408	6520	Ingersoll	F	A	UNKN
Myotis ciliolabrum	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	A	UNKN
Myotis ciliolabrum	BOUTL9742	7/30/1997	Calamity Fp1	687742	4275629	6460	Ingersoll	F	A	LACT
Myotis ciliolabrum	BOUTL9722	6/20/1997	Outlaw Mesa 68 Main Adit	684674	4276242	6400	Ingersoll	M	A	NONB
Myotis ciliolabrum	BOUTL9728	6/21/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	M	A	NONB
Myotis ciliolabrum	BDPTM9517	7/25/1995	Tenderfoot Mesa 12	680500	4279490	6500	Ingersoll	M	J	NONB
Myotis evotis	BBLUE9912	7/22/1999	Blue Creek 38 A2	692176	4272204	6608	Wilkey	F	U	UNKN
Myotis evotis	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	NONB
Myotis evotis	BDPTM9527	8/31/1995	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	F	A	POST
Myotis evotis	BDPTM9526	8/31/1995	Tenderfoot Mesa 15a	681200	4277900	6500	Ingersoll	F	A	POST
Myotis evotis	BDPTM9503	9/18/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	POST
Myotis evotis	BDPTM9504	9/18/1995	Tenderfoot Mesa14d	680600	4278710	6600	Ingersoll	U	U	UNKN
Myotis evotis	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	F	A	POST
Myotis evotis	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	M	A	NONB
Myotis evotis	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	F	J	NONB
Myotis evotis	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	F	J	NONB
Myotis evotis	BOUTL9852	5/30/1999	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9852	5/30/1999	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	PREG
Myotis evotis	BELIZ0011	5/26/2000	Elizabeth 50a1	694320	4268480	6140	Ingersoll	U	U	UNKN
Myotis evotis	BELIZ0007	5/24/2000	Elizabeth 49d7	693600	4269010	6150	Ingersoll	F	A	LACT
Myotis evotis	BELIZ0002	5/25/2000	Elizabeth 49d1	693960	4269640	6350	Ingersoll	F	A	NONB
Myotis evotis	BOUTL9852	6/23/1998	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	NONB
Myotis evotis	BOUTL9852	6/23/1998	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	NONB
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	M	A	NONB
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	PREG
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	NONB
Myotis evotis	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	F	J	NONB
Myotis evotis	BDPTM9503	6/10/2003	Tenderfoot Mesa 14c	680600	4278800	6600	Navo	F	A	NONB
Myotis evotis	BDPTM9503	6/10/2003	Tenderfoot Mesa 14c	680600	4278800	6600	Navo	F	A	NONB
Myotis evotis	BOUTL9719	6/7/2000	Outlaw Mesa 65	686005	4276955	6560	Navo	M	A	NONB
Myotis evotis	BOUTL9735	6/7/2000	Outlaw Mesa 76	687041	4275970	6360	Navo	F	A	NONB
Myotis evotis	BOUTL9703	6/6/2000	Outlaw Mesa 32a1	689326	4275850	6600	Navo	F	A	LACT
Myotis evotis	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	LACT
Myotis evotis	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	U	U	UNKN
Myotis evotis	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	POST
Myotis evotis	BOUTL9851	9/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Ingersoll	M	A	UNKN
Myotis evotis	BBLUE9908	7/21/1999	Blue Creek 37 A8	691812	4272174	6472	Wilkey	F	U	UNKN
Myotis evotis	BBLUE9921	6/23/1999	Blue Creek 41 A1	691152	4272015	6039	Wilkey	F	A	PREG

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Myotis evotis	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	J	UNKN
Myotis evotis	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	A	TENL
Myotis evotis	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	PREG
Myotis evotis	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	A	TENL
Myotis evotis	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	PREG
Myotis evotis	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	F	J	NONB
Myotis evotis	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9715	6/6/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	F	A	NONB
Myotis evotis	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	A	F	NONB
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	A	F	PREG
Myotis evotis	BGJBM0059	7/8/2009	Rough Canyon Pond	706416	4317829	6102	Navo Nuebaum	F	A	LACT
Myotis evotis	BOUTL9718	6/22/1997	Outlaw Mesa 66d3	685634	4276439	6540	Ingersoll	M	I	UNKN
Myotis evotis	BOUTL9718	6/22/1997	Outlaw Mesa 66d3	685634	4276439	6540	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9730	6/23/1997	Outlaw Mesa 70a1	685502	4276562	6490	Ingersoll	F	U	UNKN
Myotis evotis	BOUTL9730	6/23/1997	Outlaw Mesa 70a1	685502	4276562	6490	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9731	6/23/1997	Outlaw Mesa 70a2	685569	4276583	6510	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9731	6/23/1997	Outlaw Mesa 70a2	685569	4276583	6510	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	F	A	PREG
Myotis evotis	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9735	6/25/1997	Outlaw Mesa 76	687041	4275970	6360	Ingersoll	F	A	PREG
Myotis evotis	BOUTL9736	6/26/1997	Outlaw Mesa 62d11	686828	4276912	6660	Ingersoll	M	A	NONB
Myotis evotis	BOUTL9741	7/30/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	F	J	NONB
Myotis evotis	BOUTL9741	7/30/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	F	J	UNKN
Myotis evotis	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	F	A	LACT
Myotis evotis	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	F	A	POST
Myotis evotis	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	F	A	LACT
Myotis evotis	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	M	A	NONB
Myotis evotis	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	A	LACT
Myotis evotis	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9742	7/30/1997	Calamity Fp1	687742	4275629	6460	Ingersoll	M	J	UNKN
Myotis evotis	BOUTL9742	7/30/1997	Calamity Fp1	687742	4275629	6460	Ingersoll	F	A	LACT
Myotis evotis	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	F	A	NONB
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	M	J	NONB
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9722	6/20/1997	Outlaw Mesa 68 Main Adit	684674	4276242	6400	Ingersoll	F	A	PREG

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Myotis evotis	BOUTL9727	6/21/1997	Outlaw Mesa 67a2	685115	4276598	6400	Ingersoll	M	A	NONB
Myotis evotis	BOUTL9728	6/21/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	M	A	NONB
Myotis evotis	BOUTL9728	6/21/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	F	A	NONB
Myotis evotis	BOUTL9728	6/21/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	U	U	UNKN
Myotis evotis	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	M	J	NONB
Myotis evotis	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	M	J	NONB
Myotis evotis	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	M	A	NONB
Myotis evotis	BOUTL9852	5/30/1999	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9852	5/30/1999	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	UNKN
Myotis evotis	BELIZ0007	5/24/2000	Elizabeth 49d7	693600	4269010	6150	Ingersoll	F	A	LACT
Myotis evotis	BOUTL9852	6/23/1998	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	LACT
Myotis evotis	BOUTL9852	6/23/1998	Outlaw Mesa 74	687400	4271990	5600	Ingersoll	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	LACT
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	PREG
Myotis evotis	BOUTL9851	6/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Navo/Gore	F	A	PREG
Myotis evotis	BDPTM9503	6/10/2003	Tenderfoot Mesa 14c	680600	4278800	6600	Navo	M	A	NONB
Myotis evotis	BDPTM9503	6/10/2003	Tenderfoot Mesa 14c	680600	4278800	6600	Navo	F	A	NONB
Myotis evotis	BOUTL9705	6/6/2000	Outlaw Mesa 33	689312	4275749	6580	Navo	F	A	NONB
Myotis evotis	BOUTL9704	6/6/2000	Outlaw Mesa 32a2	689295	4275806	6580	Navo	F	A	NONB
Myotis evotis	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	POST
Myotis evotis	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	POST
Myotis evotis	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	J	NONB
Myotis evotis	BOUTL9713	6/6/1997	Outlaw Mesa 64d1	686226	4276840	6580	Ingersoll	F	A	PREG
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	PREG
Myotis evotis	BOUTL9855	6/20/1998	Outlaw Mesa 35	688640	4272710	-	Ingersoll	F	A	LACT
Myotis evotis	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	PREG
Myotis evotis	BDPTM9503	6/23/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	A	PREG
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	PREG
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	A	F	NONB
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	A	F	PREG
Myotis evotis	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	A	F	PREG
Myotis evotis	BOUTL9730	6/23/1997	Outlaw Mesa 70a1	685502	4276562	6490	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	F	U	UNKN
Myotis evotis	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	F	A	PREG
Myotis evotis	BOUTL9735	6/25/1997	Outlaw Mesa 76	687041	4275970	6360	Ingersoll	F	A	LACT
Myotis evotis	BOUTL9736	6/26/1997	Outlaw Mesa 62d11	686828	4276912	6660	Ingersoll	M	A	NONB
Myotis evotis	BOUTL9741	7/30/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	F	A	LACT
Myotis evotis	BDPTM9527	7/31/1997	Tenderfoot Mesa 15b	681220	4277850	6500	Ingersoll	F	A	NONB
Myotis evotis	BDPTM9502	8/1/1997	Tenderfoot Mesa 14b	-	-	-	Ingersoll	F	J	NONB
Myotis evotis	BDPTM9505	8/3/1997	Tenderfoot Mesa 6a	-	-	-	Ingersoll	F	A	LACT

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Myotis evotis	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	F	A	POST
Myotis evotis	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	U	U	UNKN
Myotis evotis	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9706	6/5/1997	Outlaw Mesa 56a1	686655	4276408	6520	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	F	U	NONB
Myotis evotis	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	F	A	UNKN
Myotis evotis	BOUTL9728	6/21/1997	Outlaw Mesa 67a1	685161	4276686	6400	Ingersoll	F	A	PREG
Myotis lucifugus	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	M	J	NONB
Myotis lucifugus	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	M	J	NONB
Myotis lucifugus	MCONM0001	5/15/1992	Colo Natl Monument	177494	4328440	-	Navo	F	A	NONB
Myotis lucifugus	BGJBM0059	7/8/2009	Rough Canyon Pond	706416	4317829	6102	Navo Nuebaum	M	A	NONB
Myotis spp	BDPTM9503	6/10/2003	Tenderfoot Mesa 14c	680600	4278800	6600	Navo	U	U	UNKN
Myotis spp	BLUMS9903	1/19/2003	Pack Rat Main	670005	4279265	6820	Wilkey	U	U	UNKN
Myotis spp	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	U	U	UNKN
Myotis spp	BLUMS9903	1/19/2003	Pack Rat Main	670005	4279265	6820	Wilkey	U	U	UNKN
Myotis spp	BDPTM9513	6/24/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	U	U	UNKN
Myotis thyanodes	BOUTL9844	9/27/1998	Outlaw Mesa 73a1	687355	4273080	-	Ingersoll	F	A	NONB
Myotis thysanodes	BGJBM0048	8/22/2001	Lumsden Pond 1	150503	4281900	-	Navo/Neubaum	M	A	NONB
Myotis thysanodes	BAMQN9502	8/5/1995	Amethyst Queen 9	711970	4301590	6520	Ingersoll	M	A	NONB
Myotis thysanodes	BOUTL9851	9/22/1998	Outlaw Mesa Dixie 2	687205	4275697	6200	Ingersoll	M	A	TENL
Myotis thysanodes	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	NONB
Myotis thysanodes	BOUTL9849	9/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Ingersoll	F	A	NONB
Myotis thysanodes	BDPTM9513	6/24/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	M	A	NONB
Myotis thysanodes	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9712	6/6/1997	Outlaw Mesa 60	686374	4276722	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9713	6/6/1997	Outlaw Mesa 64d1	686226	4276840	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9715	6/6/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9701	6/4/1997	Outlaw Mesa 30	689523	4276110	6680	Ingersoll	M	A	NONB
Myotis thysanodes	BDPTM9502	8/1/1997	Tenderfoot Mesa 14b	-	-	-	Ingersoll	M	A	NONB
Myotis thysanodes	BDPTM9505	8/3/1997	Tenderfoot Mesa 6a	-	-	-	Ingersoll	F	J	NONB
Myotis thysanodes	BOUTL9716	10/1/1997	Outlaw Mesa 66d1	685593	4276271	6540	Ingersoll	M	A	NONB
Myotis thysanodes	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	F	A	PREG
Myotis thysanodes	BDPTM9526	10/3/1995	Tenderfoot Mesa 15a	681200	4277900	6500	Ingersoll	M	A	NONB
Myotis thysanodes	BLUMS0031	10/3/2000	Lumsden 87 Mag	671640	4279190	6800	Navo	M	J	NONB
Myotis thysanodes	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9713	6/6/1997	Outlaw Mesa 64d1	686226	4276840	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9712	6/6/1997	Outlaw Mesa 60	686374	4276722	6580	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	PREG
Myotis thysanodes	BOUTL9715	9/20/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	F	A	NONB
Myotis thysanodes	BOUTL9719	9/20/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	U	U	UNKN
Myotis thysanodes	BOUTL9733	6/25/1997	Outlaw Mesa 53	686972	4276190	6580	Ingersoll	F	A	UNKN
Myotis thysanodes	BOUTL9741	7/30/1997	Calamity Fp2	687845	4275583	6440	Ingersoll	F	A	LACT
Myotis volans	BBLUE9912	7/22/1999	Blue Creek 38 A2	692176	4272204	6608	Wilkey	F	A	PREG
Myotis volans	BDPTM9526	8/31/1995	Tenderfoot Mesa 15a	681200	4277900	6500	Ingersoll	M	J	NONB
Myotis volans	BDPTM9513	9/19/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	U	U	UNKN
Myotis volans	BDPTM9526	10/3/1995	Tenderfoot Mesa 15a	681200	4277900	6500	Ingersoll	M	A	TENL

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Myotis volans	BTMBM0001	8/31/1995	Tenderfoot Camp Spg	159525	4285594	6881	Navo	F	A	NONB
Myotis volans	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	M	J	NONB
Myotis volans	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	F	J	NONB
Myotis volans	BBLUE9928	7/19/1999	Blue Creek 44 A1	690625	4270179	5936	Wilkey	M	A	NONB
Myotis volans	BOUTL9848	6/23/1998	Outlaw Mesa 4	690638	4277474	-	Ingersoll	F	A	LACT
Myotis volans	BOUTL9848	6/23/1998	Outlaw Mesa 4	690638	4277474	-	Ingersoll	U	U	UNKN
Myotis volans	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	F	A	NONB
Myotis volans	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	F	A	POST
Myotis volans	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	F	J	NONB
Myotis volans	BGJBM0048	8/22/2001	Lumsden Pond 1	150503	4281900	-	Navo/Neubaum	M	A	NONB
Myotis volans	BOUTL9845	6/20/1998	Outlaw Mesa 73a2	687355	4273090	-	Ingersoll	M	A	UNKN
Myotis volans	BOUTL9719	8/27/1999	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	POST
Myotis volans	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	F	J	NONB
Myotis volans	BOUTL9861	9/23/1998	Outlaw Mesa Fraction	690040	4276530	6840	Navo	M	A	NONB
Myotis volans	BLUMS9908	6/15/2000	Rajah Point 2	670680	4279400	6800	Ingersoll	M	A	NONB
Myotis volans	BOUTL9717	6/22/1997	Outlaw Mesa 66d2	685612	4276394	6500	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9715	9/20/1997	Outlaw Mesa 64d3	686257	4276907	6580	Ingersoll	M	A	NONB
Myotis volans	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	F	A	LACT
Myotis volans	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	NONB
Myotis volans	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	F	A	PREG
Myotis volans	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	NONB
Myotis volans	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	F	A	PREG
Myotis volans	BOUTL9849	6/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Navo/Gore	F	A	NONB
Myotis volans	BDPDP9412	9/19/1994	Deppression Main	681750	4274230	6200	Ingersoll	F	U	NONB
Myotis volans	BDPTM9518	7/26/1995	Tenderfoot Mesa 1	682590	4283370	7200	Ingersoll	F	A	PREG
Myotis volans	BDPTM9520	7/26/1995	Tenderfoot Mesa 2a	680680	4282890	6900	Ingersoll	F	A	PREG
Myotis volans	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	F	A	PREG
Myotis volans	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9711	6/6/1997	Outlaw Mesa 59	686439	4276708	6580	Ingersoll	F	A	PREG
Myotis volans	BOUTL9703	6/4/1997	Outlaw Mesa 32a1	689326	4275850	6600	Ingersoll	M	A	NONB
Myotis volans	BOUTL9704	6/4/1997	Outlaw Mesa 32a2	689295	4275806	6580	Ingersoll	M	A	NONB
Myotis volans	BOUTL9702	6/4/1997	Outlaw Mesa 31	689465	4276074	6680	Ingersoll	M	A	NONB
Myotis volans	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	UNKN
Myotis volans	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9724	6/20/1997	Outlaw Mesa 69a2	684737	4276468	6400	Ingersoll	F	A	PREG
Myotis volans	BOUTL9724	6/20/1997	Outlaw Mesa 69a2	684737	4276468	6400	Ingersoll	F	A	PREG
Myotis volans	BOUTL9719	9/20/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	M	A	TENL
Myotis volans	BDPTM9505	8/3/1997	Tenderfoot Mesa 6a	-	-	-	Ingersoll	M	A	TENL
Myotis volans	BDPTM9507	8/3/1997	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	F	J	NONB
Myotis volans	BOUTL9731	10/1/1997	Outlaw Mesa 70a2	685569	4276583	6510	Ingersoll	F	A	POST
Myotis volans	BOUTL9849	9/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Ingersoll	F	J	NONB
Myotis volans	BOUTL9724	6/20/1997	Outlaw Mesa 69a2	684737	4276468	6400	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9725	6/20/1997	Outlaw Mesa 69a1	684718	4276427	6400	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9717	6/22/1997	Outlaw Mesa 66d2	685612	4276394	6500	Ingersoll	M	A	NONB
Myotis volans	BDPTM9517	7/25/1995	Tenderfoot Mesa 12	680500	4279490	6500	Ingersoll	M	J	NONB
Myotis volans	BDPTM9513	9/19/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	F	A	POST
Myotis volans	BDPTM9513	9/19/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	F	J	NONB

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Myotis volans	BDPTM9513	9/19/1995	Tenderfoot Mesa 3	680720	4281720	6700	Ingersoll	M	A	TENL
Myotis volans	BDPTM9503	9/19/1995	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	U	U	UNKN
Myotis volans	FUNNF0002	8/24/2004	Cow Creek Pond	696150	4284401	9122	Navo/Crew	M	J	NONB
Myotis volans	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	M	J	NONB
Myotis volans	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	F	J	NONB
Myotis volans	BBLUE9913	9/21/2002	Blue Creek 39 A1	691549	4272508	6752	Wilkey	M	A	TENL
Myotis volans	BAMQN9502	8/5/1995	Amethyst Queen 9	711970	4301590	6520	Ingersoll	F	A	PREG
Myotis volans	BDPTM9503	6/15/1996	Tenderfoot Mesa 14c	680600	4278800	6600	Ingersoll	M	J	NONB
Myotis volans	BOUTL9847	9/23/1998	Outlaw Mesa 15	689960	4276720	-	Ingersoll	M	A	TENL
Myotis volans	BBLUE9921	6/23/1999	Blue Creek 41 A1	691152	4272015	6039	Wilkey	F	A	PREG
Myotis volans	BLUMS0037	6/16/2000	Century West	669550	4279640	6920	Ingersoll	M	A	NONB
Myotis volans	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	F	A	NONB
Myotis volans	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	U	U	UNKN
Myotis volans	BOUTL9849	6/22/1998	Outlaw Mesa 61 D2	686435	4277097	6400	Navo/Gore	F	A	NONB
Myotis volans	BDPTM9507	7/25/1995	Tenderfoot Mesa 5b	681890	4279600	6700	Ingersoll	U	U	UNKN
Myotis volans	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	F	A	POST
Myotis volans	BTMBM0002	6/14/1996	Tenderfoot Pond	161818	4287636	-	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9719	6/19/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	PREG
Myotis volans	BOUTL9719	9/20/1997	Outlaw Mesa 65	686005	4276955	6560	Ingersoll	F	A	POST
Myotis volans	BGJBM0059	7/8/2009	Rough Canyon Pond	706416	4317829	6102	Navo Nuebaum	M	J	NONB
Myotis volans	BOUTL9732	6/23/1997	Outlaw Mesa 72	687571	4274778	6240	Ingersoll	F	A	PREG
Myotis volans	BOUTL9707	6/5/1997	Outlaw Mesa 56a2	686684	4276420	6540	Ingersoll	M	A	NONB
Myotis volans	BOUTL9724	6/20/1997	Outlaw Mesa 69a2	684737	4276468	6400	Ingersoll	U	U	UNKN
Myotis volans	BOUTL9727	6/21/1997	Outlaw Mesa 67a2	685115	4276598	6400	Ingersoll	M	A	NONB
Myotis yumanensis	BSPRI0201	5/28/2002	Spring Creek 81	670839	4309381	6956	Ingersoll	M	A	NONB
Myotis yumanensis	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	F	A	POST
Myotis yumanensis	SSWAHT001	8/18/1999	Horsethief Canyon Swa	694983	4335558	4468	Navo	M	J	NONB
Myotis yumanensis	SSWAHT001	8/18/1999	Horsethief Canyon Swa	694983	4335558	4468	Navo	F	J	NONB
Myotis yumanensis	BGJBM0001	7/18/2000	Devil's Canyon Pond	174770	4338577	-	Navo	F	J	NONB
Myotis yumanensis	BGJBM0001	7/18/2000	Devil's Canyon Pond	174770	4338577	-	Navo	M	J	NONB
Myotis yumanensis	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	F	A	LACT
Myotis yumanensis	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	F	A	NONB
Myotis yumanensis	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	U	U	UNKN
Myotis yumanensis	BGJBM0059	7/8/2009	Rough Canyon Pond	706416	4317829	6102	Navo Nuebaum	M	A	NONB
Myotis yumanensis	BGJBM0005	9/6/2005	North Mesa Creek Site	694401	4268178	-	Navo/Crew	F	A	POST
Myotis yumanensis	BGJBM0002	8/6/2002	Sinbad Valley Spring	153110	4271574	5390	Navo	M	A	NONB
Myotis yumanensis	SSWAHT001	8/18/1999	Horsethief Canyon Swa	694983	4335558	4468	Navo	M	J	NONB
Myotis yumanensis	BGJBM0001	7/18/2000	Devil's Canyon Pond	174770	4338577	-	Navo	M	J	NONB
Myotis yumanensis	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	F	A	PREG
Myotis yumanensis	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	U	U	UNKN
Nyctinomops macrotis	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	J	NONB
Nyctinomops macrotis	BGJBM0002	8/6/2002	Sinbad Valley Spring	153110	4271574	5390	Navo	U	U	UNKN
Nyctinomops macrotis	BCPBM0001	8/20/1998	Cactus Park	200490	4319308	-	Navo	U	U	UNKN
Nyctinomops macrotis	BGJBM0003	10/4/2000	Lumsden Canyon	-	-	-	Navo	U	U	UNKN
Nyctinomops macrotis	BGJBM0002	7/17/2003	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	U	U	UNKN
Nyctinomops macrotis	BGJBM0002	8/25/2001	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	U	U	UNKN
Nyctinomops macrotis	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	J	NONB
Nyctinomops macrotis	BDRBM0005	8/20/1998	Gateway	154183	4295510	-	Navo	U	U	UNKN

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Nyctinomops macrotis	BUWBM0001	8/20/1998	Unaweep Canyon	189704	4304612	-	Navo	U	U	UNKN
Nyctinomops macrotus	SCDHE0001	11/21/2000	Mesa Co CDHE	710993	4324901	-	Unk	F	J	UNKN
Nyctinomops macrotus	SCDHE0001	10/1/2003	Mesa Co CDHE	710993	4324901	-	Unk	M	A	UNKN
Nyctinomops macrotus	SCDHE0001	11/24/2000	Mesa Co CDHE	710993	4324901	-	Unk	M	U	UNKN
Nyctinomops macrotus	SCDHE0001	7/20/2002	Mesa Co CDHE	710993	4324901	-	Unk	F	J	UNKN
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/6/2002	Sinbad Valley Spring	153110	4271574	5390	Navo	F	J	NONB
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	A	POST
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	A	POST
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	J	NONB
Pipistrellus hesperus	PLDPR0001	6/24/1998	Little Dolores Canyon	150634	4325722	-	Navo/Gore	M	A	NONB
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	A	NONB
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	A	POST
Pipistrellus hesperus	BGJBM0047	8/25/2004	Dominquez Canyon	721856	4297112	5772	Navo/Crew	M	J	NONB
Pipistrellus hesperus	BGJBM0002	8/23/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	J	NONB
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	M	A	TENL
Pipistrellus hesperus	BGJBM0002	8/22/2000	Sinbad Valley Spring	153110	4271574	5390	Navo/Gore	F	J	NONB
Pipistrellus hesperus	BGJBM0048	7/23/2001	Lumsden Pond 1	150503	4281900	-	Navo	M	A	NONB
Pipistrellus hesperus	BBLUE9921	6/23/1999	Blue Creek 41 A1	691152	4272015	6039	Wilkey	F	A	PREG
Tadarida brasiliensis	PHOBB0017	5/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	A	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	U	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	A	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	U	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB

SPECIES	ID NUMBER	DATE	SITE	XCOORD	YCOORD	ELEVATION	BIOLOGIST	SEX	AGE	REPRODUCTIVE
Tadarida brasiliensis	PHOBB0017	5/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	A	NONB
Tadarida brasiliensis	LGJDM0022	11/3/2000	Grand Junction	710507	4327329	-	K Potter	U	U	UNKN
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PGJPR0001	1/3/1997	Grd Junct 4th&White	710269	4327058	-	Navo	F	U	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	10/15/2001	Hobby Lobby	713080	4327852	-	Navo	F	J	NONB
Tadarida brasiliensis	PHOBB0017	5/15/2001	Hobby Lobby	713080	4327852	-	Navo	M	A	NONB

Appendix B. Incidental Species Observations

Table B1. Incidental species observations noted by Colorado Parks and Wildlife personnel while conducting surveys at Colorado National Monument and McInnis Canyons National Conservation Area from 2014 - 2016. Coordinates were collected in NAD 83 Zone 12.

Common Name	Species	Date	Location	Easting	Northing	Observer(s)*	Classification	Comments
Canyon tree frog	*Hyla arenicolor*	5/21/14	Ute Canyon, Black Box	701990	4325258	DN, CD	Adults and eggs	Photos
Red-spotted toad	*Bufo punctatus*	5/21/14	Ute Canyon, Black Box	701990	4325258	DN, CD	Three adults	All dead, killed by raccoon? Photos
Canyon tree frog	*Hyla arenicolor*	6/5/2014	Middle Ute Box	698992	4323146	JP, DN	Many	Visual and audible confirmation
Peregrine falcon	*Falco peregrinus*	6/5/2014	Middle Ute Box	698992	4323146	JP, DN	One adult	One adult seen flying over head
Canyon tree frog	*Hyla arenicolor*	6/6/2014	No Thoroughfare Canyon, 1st pool	704222	4322043	DN	Tadpoles & adults	Nice pool for the tadpoles
Great Basin spadefoot	*Spea intermontana*	6/11/2014	Echo Canyon Pour-off pool	705935	4321673	DN	One adult	Photo
Canyon tree frog	*Hyla arenicolor*	6/19/2014	Middle Ute Box	698992	4323146	DN	One adult	Photo
Red-spotted toad	*Bufo punctatus*	6/24/2014	Ute Canyon, Black Box	701990	4325258	DN	Juvenile	Was caught near a shallow pool
Canyon tree frog	*Hyla arenicolor*	6/24/2014	Ute Canyon, Black Box	701990	4325258	DN	Adults	They were heard but no visual
Great horned owl	*Bubo virginianus*	6/24/2014	Ute Canyon trail near jct. with Liberty Cap trail.	701912	4326057	DN, CD, JP	2 juveniles	Two juvenile owls on opposite sides of the trail were calling back and forth
Ermine	*Mustela erminea*	6/27/2014	Monument Canyon view point	697590	4328544	DN	1 Adult?	Seen crossing the road from vehicle
Desert bighorn sheep	*Ovis canadensis nelson*	6/28/2014	Monument Canyon, near trail	698019	4330298	DN	2 Adult rams	Seen butting heads and chasing each other
Woodhouse toad	*Bufo woodhousii*	6/30/2014	No Thoroughfare Canyon, 1st pool	704222	4322043	DN	Many	
Red-spotted toad	*Bufo punctatus*	6/30/2014	No Thoroughfare Canyon, 1st pool	704222	4322043	DN	1	
Canyon tree frog	*Hyla arenicolor*	6/30/2014	No Thoroughfare Canyon, 1st pool	704222	4322043	DN	2	
Longnose leopard lizard	*Gambelia wislizenii*	6/30/2014	No Thoroughfare Canyon	704991	4322478	DN	1	On the hike in to the pool, photo
Collard lizard	*Crotaphytus collaris*	6/30/2014	No Thoroughfare Canyon	704933	4322423	DN	1	On the hike in to the pool, photo
Bull snake	Pituophis catenifer	6/30/2014	No Thoroughfare Canyon	704991	4322478	DN	1	On the hike in to the pool, photo
Northern scorpion	*Paruroctonus boreus*	6/30/2014	No Thoroughfare Canyon	704252	4322057	DN	1	About the size of a carabineer, photo
Dobsonfly	*Corydalus texanus*	7/8/2014	Black Ridge Sewage Lagoons	695327	4330977	DN	Dozens	
Longnose leopard lizard	*Gambelia wislizenii*	6/15/15	Mouth of Ute Canyon	701906	4325456	JP		
Canyon tree frog	*Hyla arenicolor*	5/7/15	West Pollock Canyon	688936	4334022	JP, DN	Many	Visual and audible confirmation
Canyon tree frog	*Hyla arenicolor*	5/13/15	Mee Canyon	677145	4335931	JP		Audible only, no visual.
W. terrestrial garter snake	*Thamnophis elegans*	5/20/15	No Thoroughfare Canyon, 1st pool	704222	4322043	GB, JP		Killed by a human?
Short-horned lizard	*Phrynosoma hernandesi*	5/20/15	Shrub 1 acoustic monitoring site	702321	4322518	JP	Adult	
Desert bighorn sheep	*Ovis canadensis nelson*	5/27/15	Mouth of Wedding Canyon	697239	4331574	GB, JP		30+ Sheep in the group
Collard lizard	*Crotaphytus collaris*	5/27/15	Monument and Wedding Canyons	696997	4329964	JP		
Canyon tree frog	*Hyla arenicolor*	6/1/15	Middle Ute Box	698992	4323146	DN		Could be heard up canyon. No visual
Desert bighorn sheep	*Ovis canadensis nelson*	6/2/15	No Thoroughfare Canyon, 1st pool	704222	4322043	GB, JP	6 rams	
Woodhouse toad	*Bufo woodhousii*	6/2/15	No Thoroughfare Canyon, 1st pool	704222	4322043	GB		
Red-spotted toad	*Bufo punctatus*	6/2/15	No Thoroughfare Canyon, 1st pool	704222	4322043	GB		
Ringtail cat	*Bassariscus astutus*	6/2/15	No Thoroughfare Canyon, 1st pool	704222	4322043	GB, JP		
Canyon tree frog	*Hyla arenicolor*	6/2/15	No Thoroughfare Canyon, 1st pool	704222	4322043	GB		
Canyon tree frog	*Hyla arenicolor*	6/4/15	Mouth of Ute Canyon	701990	4325258	JP		
Northern saw-whet owl	*Aegolius acadicus*	*6/15/15*	Suction Point Upper Pour-off	696856	4324364	DN		*Audible only*
Canyon tree frog	*Hyla arenicolor*	6/16/15	Black Ridge Sewage Lagoons	695327	4330977	DN		Audible only
Canyon tree frog	*Hyla arenicolor*	6/17/15	West Pollock Canyon	688936	4334022	JP		Seen throughout the canyon
Desert bighorn sheep	*Ovis canadensis nelson*	6/25/15	Just N. of Independence Monument	697053	4329982	JP	1 ram, 2 ewes, 1 lamb	
Common nighthawk	*Chordeiles minor*	6/25/15	Black Ridge Pond	689451	4329038	DN		A couple caught in nets

Table B1. Continued.

Common Name	Species	Date	Location	Easting	Northing	Observer(s)*	Classification	Comments
Common poorwill	*Phalaenoptilus nuttallii*	6/25/15	Black Ridge Pond	689451	4329038	DN		A couple caught in nets
Bushy-tailed woodrat	*Neotoma cinerea*	6/26/15	South of Echo Canyon	705935	4321673	DN		Running on ledge below overhang
Ringtail cat	*Bassariscus astutus*	6/29/15	No Thoroughfare Canyon, 1st pool	704222	4322043	GB		
Collard lizard	*Crotaphytus collaris*	6/29/15	Black Ridge, Near Cliff3 and Forest 3	685740	4335211	JP		
Canyon tree frog	*Hyla arenicolor*	6/29/15	No Thoroughfare Canyon, 1st pool	704222	4322043	JP		4 huddled together above the pool
Red-spotted toad	*Bufo punctatus*	7/1/15	Middle Monument Box	698211	4328184	DN		Many toads in pool
Northern scorpion	*Paruroctonus boreus*	7/2/15	Monument Canyon near Coke Ovens	697463	4327834	DN		4 seen along the trail on the hike out
Black-chinned hummingbird	*Archilochus alexandri*	7/7/15	Lower Monument ponds	699231	4330596	JP	Adult male	Was caught in the net
Desert bighorn sheep	*Ovis canadensis nelson*	7/13/15	West Pollock Canyon	688936	4334022	JP	1 ram, 1 ewe	
Peregrine falcon	*Falco peregrinus*	7/21/15	Upper No Thoroughfare Rip 2	703496	4321347	DN	Adults	2 adults
Red-spotted toad	*Bufo punctatus*	7/22/15	Echo Canyon	705935	4321673	DN		Audible only
Red-spotted toad	*Bufo punctatus*	7/27/15	Upper No Thoroughfare	703496	4321347	DN		Visual
Canyon tree frog	*Hyla arenicolor*	7/27/15	Upper No Thoroughfare	703496	4321347	DN		Visual
Woodhouse toad	*Bufo woodhousii*	7/27/15	Upper No Thoroughfare	703496	4321347	DN		Visual
Midget faded rattlesnake	*Crotalus oreganus concolor*	7/28/15	Echo Canyon Upper Pour-off	705935	4321673	GB, JP		
Canyon tree frog	*Hyla arenicolor*	7/28/15	Middle Monument Canyon	698211	4328184	DN		Audible only
Canyon tree frog	*Hyla arenicolor*	7/30/15	Mouth of Mee Canyon	676639	4336377	JP		Visuals
Canyon tree frog	*Hyla arenicolor*	7/30/15	Rattlesnake Canyon	684625	4337178	DN		Visual of two adults
W. terrestrial garter snake	*Thamnophis elegans*	7/30/15	Rattlesnake Canyon	684625	4337178	DN		Visual of two individuals
Northern leopard frog	*Rana pipiens*	7/30/15	Rattlesnake Canyon	684625	4337178	DN	Two adults	Visual
Desert bighorn sheep	*Ovis canadensis nelson*	7/31/15	Co River at Salt Creek River Camp	679828	4340845	DN		Group with ewes, rams and lambs
Bald eagle	*Haliaeetus leucocephalus*	7/31/15	Co River at Salt Creek River Camp	679866	4341736	DN	Adult	Perched on river left
Black bear	*Ursus americanus*	8/1/15	Colorado River by CO/UT line	670956	4333278	DN	Two juveniles	One had a red ear tag. Possible siblings
Peregrine falcon	*Falco peregrinus*	8/3/15	Ute Canyon	701990	4325258	DN	Adult	Seen chasing a Golden Eagle
Golden eagle	*Aquila chrysaetos*	8/3/15	Ute Canyon	701990	4325258	DN	Adult	Seen being chased by a Peregrine
Peregrine falcon	*Falco peregrinus*	8/4/15	West rim of No Thoroughfare	704222	4322043	JP		A pair was observed. Location is where observed from.
Tiger salamander	*Ambystoma tigrinum*	8/13/15	Black Ridge Pond	689451	4329038	GB		
Bull snake	Pituophis catenifer	6/6/16	McDonald Canyon Trailhead	669855	4336213	SW		
Peregrine falcon	*Falco peregrinus*	6/8/16	Monument Canyon	696811	4327008	SW	Two adults	One incubating, one eating.
Peregrine falcon	*Falco peregrinus*	6/8/16	Ute Canyon Overlook	699084	4323225	SW		
Red-winged black bird	*Agelaius phoeniceus*	6/13/16	Lower Monument ponds	699231	4330596	DN		Multiple
Cooper's hawk	*Accipiter cooperii*	6/27/16	Granite Falls Pond	703046	4326109	DN		
Bullfrog	*Rana catesbeiana*	6/27/16	Granite Falls Pond	703046	4326109	DN		
Great Basin spadefoot	*Spea intermontana*	7/6/16	McDonald Canyon Pour-off	670293	4335549	DN		
Red-spotted toad	*Bufo punctatus*	7/6/16	McDonald Canyon Pour-off	670293	4335549	DN		
Woodhouse toad	*Bufo woodhousii*	7/6/16	McDonald Canyon Pour-off	670293	4335549	DN		
Red-spotted toad	*Bufo punctatus*	7/9/16	Wedding Canyon Box	697052	4330926	DN	Multiple toadlets	
Longnose leopard lizard	*Gambelia wislizenii*	7/14/16	No Thoroughfare, near Devils Kitchen	705095	4322611	DN, MP	Juvenile	
Peregrine falcon	*Falco peregrinus*	8/1/16	Ute Canyon	699500	4323800	DN	Young	Young on nest begging.
Longnose leopard lizard	*Gambelia wislizenii*	8/1/16	Liberty Cap Trail on flats	702159	4326847	DN		

Observer(s)* = Celsey Duritsa (CD), Dan Neubaum (DN), Galen Burrell (GB), Jacob Pelham (JP), Melissa Peterson (MP), Steve Wenger (SW).