National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

Landbird Monitoring Protocol Narrative for Park Units in the Northern Colorado Plateau Network

Version 1.04

Natural Resource Report NPS/NCPN/NRR—2020/2119



ON THE COVER

Common raven (*Corvus corax*), Canyonlands National Park. NPS/A.W. Biel.

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April 2020

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

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Please cite this publication as:

Daw, S., M. Beer, and S. L. Garman. 2020. Landbird monitoring protocol narrative for park units in the Northern Colorado Plateau Network: Version 1.04. Natural Resource Report NPS/NCPN/NRR—2020/2119. National Park Service, Fort Collins, Colorado.

NPS 960/168607, April 2020

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Protocol Narrative

Revision History Log

Previous version #	Revision date	Author	Changes made	Reason for change	New version #
1.00	5/10/2007	S. L. Garman	Corrected numbers of transects established, updated site-selection procedures, documented locations/descriptions of monitoring locations	To document procedures actually used to select sites, to document monitoring locations, incorporate peer-review suggestions	1.01
1.01	2/26/2009	D. Perkins	Added SOP 10 for PISP bird monitoring program	To add bird monitoring at PISP	1.02
1.02	3/8/2016	A. W. Biel	Minor editorial	Preparation for publication	1.03
1.03	4/10/2020	S. Roberts	Updates to data-collection summaries and partner information, other minor edits.	Methods and partners have changed since protocol was previously published.	1.04

1 Background and Objectives

This sampling protocol consists of this protocol narrative and the following standard operating procedures (SOPs), available at https://irma.nps.gov/DataStore/Reference/Profile/2238031:

- SOP 1: Before the Field Season
- SOP 2: Training Observers
- SOP 3: Using Global Positioning System (GPS) Units
- SOP 4: Establishing and Marking Sampling Plots
- SOP 5: Conducting the Survey
- SOP 6: Documenting Habitat Variables
- SOP 7: Data Management
- SOP 8: After the Field Season
- SOP 9: Revising the Protocol Narrative and SOPs
- SOP 10: Pipe Spring National Monument Bird Monitoring Program

1.1 Issue and rationale for monitoring landbird populations

Landbirds are a key component of the Northern Colorado Plateau Network (NCPN). Landbirds occupy various levels in the food web and play an important functional role in the flow of energy through ecosystems. Landbirds consume insects as nestlings, rely on insects and plant components for food as adults, and serve as food resources for higher-trophic bird and mammal species. Landbirds also have high public appeal.

Unlike many other animal taxa in the xeric NCPN, landbirds are mostly diurnal and thus, are more visible to park visitors. Public demand for bird-species information is common, ranging from requesting species lists for tracking birds during park visits to status-and-trend inquiries to interpretive staff.

Landbirds have been shown to be useful indicators of ecosystem integrity (as defined by Karr and Dudley 1981). Bryce and others (2002) successfully assessed riparian-habitat integrity in Oregon using a bird integrity index developed from abundance and species richness. In the Prairie Pothole Region of North Dakota, Browder and others (2002) developed an index from the presence and abundance of breeding-bird species that consistently predicted grassland integrity. In a literature review of 109 studies conducted

in the past 20 years, Bock and Jones (2004) found, with exceptions, a positive relationship between bird abundance and reproduction, confirming that bird counts are useful indicators of breeding habitat quality.

Continental and local declines in many bird species have led to concern for the future of migratory and resident species. Breeding Bird Survey (BBS) data suggest that long-term, large-scale declines in bird populations have occurred over large portions of North America (Robbins et al. 1989). Some declines have been regional. Others have occurred in suites of species, such as neotropical migratory birds. Loss of wintering and breeding habitat, agro-chemical pollution, and various other factors have been postulated as reasons for declines in bird populations.

The broad-scale inference of the BBS data, however, has been questioned by avian researchers. The difficulty associated with interpreting index counts (Sauer 2000), and other confounding factors (e.g., Robbins et al. 1986; James et al. 1996; Thomas 1996) have been highlighted as critical limitations of the BBS data. Also, because the BBS is a road-based survey, roadless areas and habitats not commonly adjacent to roads (e.g., riparian systems) are not surveyed (Norvell et al. 2003a). The BBS lacks an explicit habitat component, which limits the use of the data to understand responses to environmental change and management (Leukering et al. 2000). Given these shortcomings, regional habitat-based bird monitoring programs have been recommended to complement data generated by BBS (Leukering et al. 2000 and citations within, e.g., Sauer 2000; Sauer and Cooper 2000).

The Northern Colorado Plateau Network chose landbird communities as a vital sign because of the value of birds as indicators of ecosystem integrity, their potential population declines, and their high public appeal. Another key reason is the potential for NCPN to contribute to, and benefit from existing, regional breeding-bird monitoring programs (e.g., Leukering et al. 2000; Norvell et al. 2003a).

When developed, the NCPN used methods similar to those of the *Monitoring Colorado's Birds* (MCB) program. At the time, that program was administered by the Rocky Mountain Bird Observatory (RMBO), now the Bird Conservancy of the Rockies. Adopting methods similar to those of MCB allowed the NCPN program to provide information comparable to that from around 1,000 transects established in four other western states. Data from NCPN park lands provide status and trend information for relatively "natural" habitats, which allow useful comparisons with more-impacted areas.

Using comparable methods also helps with discerning between local and global effects on breeding-bird populations. Global factors, such as the loss of migratory and wintering habitat and widespread pollution, will influence breeding populations similarly among lands of different locations and ownership types. In such cases, trends in breeding-bird densities likely will be coincident across a large region. Conversely, local factors, such as breeding-habitat degradation, will manifest as site-specific or management-unit specific trends. Distinguishing between NCPN and extra-regional trends in breeding-bird populations, and between large-scale and local effects, is critical to recommending effective management actions.

1.2 Historical development of NCPN bird monitoring

A variety of projects have monitored birds in NCPN park units (Appendix A). Raptor surveys have been conducted in several park units. Waterfowl and shorebird surveys have been conducted at Curecanti National Recreation Area. Park units participate or have participated in national monitoring programs, such as Monitoring Avian Productivity and Survivorship (MAPS), BBS, Breeding Bird Census (BBC), and Christmas Bird Count (CBC). Several park units conduct their own long-term (6+ years) point-count or line-transect monitoring of landbirds.

These long-term monitoring programs focus primarily on riparian (Daw 2002) and pinyon-juniper habitats. These monitor-

ing efforts have attempted to follow state or national monitoring-program protocols. However, most were not designed to achieve specific levels of change, and notably lack random site selection. Inference in these studies is generally limited to the sampled areas.

The NCPN landbirds monitoring protocol was originally based on the MCB protocol as it was in 2007. Subsequent changes to the SOPs for data collection on birds and habitat were based on the Point Transect Protocol produced by RMBO for the NCPN in 2014. The details of this protocol are summarized in this document. Detailed instructions can be found in the SOPs.

This protocol uses a systematic sample of habitat patches (see SOP #4). This ensures that monitored patches are spatially distributed across the NCPN units where birds are monitored. Three habitats are monitored: sagebrush and pinyon-juniper, which dominate the NCPN landscape, and riparian habitat. Riparian areas are biodiversity "hotspots" in dryland systems. They are highly vulnerable to adjacent land-use activities (e.g., water diversion) and to changes in climatic regimes. The sites selected for monitoring are shown in Appendix B.

1.3 Measurable objective

The objective of this protocol is to determine the status and trends in breeding-bird species density in sagebrush, pinyon-juniper, and riparian habitats.

NCPN's collaboration with MCB was intended to provide access to regional trends, as well as trend information based solely on locations in park units. Thus, the unit of analysis for this objective is both the regional scale and the sites within NCPN park units. The sampling objective of this protocol is an 80% probability of detecting a 3% decline in species density over a 30-year period, with a Type I error rate of 10%.

2 Sampling Design

2.1 Rationale

The NCPN landbirds protocol uses a combination of two distance-sampling methods to survey breeding birds: transect and point-count sampling (see SOP #5). Fifteen transects are used to sample a focal habitat, with transects randomly distributed within habitat patches. A total of 15 point-count stations spaced 250 meters apart are located on each transect. Observers walk the transect, stopping at each point for five minutes, and record information for each detected bird. Species, sex, method of detection, minute of detection, and radial distance from the observer to the first detection of an individual are recorded. All birds detected from a station are recorded, regardless of the distance from the observer.

The point-count stations are effectively variable circular plots. While walking between stations on the transect, observations are recorded for low-density, rare, or unusual species. Distance and bearing are recorded for individuals detected on the line transect, instead of just radial distance. The time-dependent, distance-based sampling at point-count stations provides a standard sampling effort within and among habitats. The majority of trend information is derived using data from the point-count stations. The line-transect component is designed to generate a larger sample size for low-density species. Although survey methods permit trend assessments for low-density species, the line-transect component ensures that at least status information is collected for uncommon and rare species.

Including a distance measurement to the point-count and line-transect methods permits derivation of a species-specific density estimate adjusted by a species' detectability (Ralph et al. 1995). A measure of relative abundance (e.g., # observations/visits/area sampled) has been widely used in previous studies (e.g., Chambers et al. 1999; Hansen et al. 1995). Inherent in this mea-

sure is the assumption that the proportion of birds detected is the same among species and observers. Adjusting for detectability eliminates these assumptions and, overall, reduces a significant source of variation in trend data (Norvell et al. 2003b). Density is not intended as an end product, but rather as an index of population trend that is not confounded by detectability issues. The Distance program is used to derive detection functions and, ultimately, density estimates (Thomas et al. 1998). Each transect is treated as a sample; point-count stations are sub-samples.

Other bird-sampling methods employ area-based searches or point counts without consideration of detection probabilities. Programs such as MAPS, BBC, and BBIRD (Breeding Biology Research & Monitoring Database) involve intensive monitoring of fixed-sized plots (e.g., 20-ha) and, collectively, involve marking individuals, mapping nests and territories, and recording fledging success through repeat visits. These approaches provide detailed information about relatively small areas, and are relatively expensive. Also, the scope of inference of these methods is dependent on the network of similarly monitored plots. The CBC and BBS are point-count methods with inherent limitations due to the lack of an explicit habitat component, and the use of index counts rather than detectability-adjusted density estimates. Habitat-based, point-count distance sampling is a cost-effective method to survey diurnal breeding-bird populations when demographic information is not required. This protocol emphasizes diurnal breeding-bird species. Nocturnal species are not considered.

2.2 Site selection

Park units included in landbird monitoring were determined by availability of target habitat. Sagebrush, pinyon-juniper, and riparian habitats are monitored in NCPN park units using 15 transects per habitat type. Details on site selection are provided in SOP #4.

Sagebrush and pinyon-juniper habitat types are identified on land-cover maps from the Southwest Regional Re-GAP Analysis Project or using vegetation-association maps. Areas on or are only accessible by traversing >50% slopes are excluded from consideration. For each park unit included in landbird monitoring, a gridded sampling frame is overlaid on the land-cover maps, and the UTM coordinates of grid points (i.e., centroid of a 500-m grid cell) included in sagebrush and pinyon-juniper habitats are recorded.

This protocol emphasizes monitoring and inference on a habitat level, not a park level. Thus, points corresponding to each habitat type are combined across the park units selected for monitoring. From this collection of points, 30 points are randomly selected for each habitat, and ordered in the selection order. This ordering provides a sequential list for evaluating the suitability of points for monitoring transects. Points are mapped onto topographic and habitat maps to double-check accessibility and patch size, and to determine if a transect originating from the point overlaps a transect of a previously selected point. Transects originating from previously selected points are estimated using ArcMap drawing and distance tools. If the three suitability criteria are not met, then the point is discarded and the next sequential point is evaluated. This process continues until 15 suitable transects are identified per habitat type.

Riparian habitats in the NCPN are limited to wadeable streams, which excludes the Green, Colorado, Gunnison, and Virgin rivers. Given the limited number of streams, riparian systems for monitoring are hand-picked.

After habitat patches and riparian corridors have been selected, protocol procedures are used to determine the location of each transect. Access points from roads and trails are determined during the initial visit. The start of a transect is determined by randomly determining a bearing from the access point if the habitat patch is adjacent, or by walking until reaching the patch if it is located away from the access point. Transect orientation follows the initial randomly selected bearing from the access point to the habitat patch.

An exception occurs when monitoring linear habitats, such as riparian areas. In such cases, a transect is located in the middle of the habitat and follows the orientation of the habitat. The 15 point-count stations are spaced 250 meters apart, using the "waypoints" feature on the GPS unit to ensure the correct straight-line distance. Point-count stations are not physically marked, so it is imperative that waypoints are accurate and recorded in the GPS, as well as on the UTM datasheet (see SOP #4).

Monitoring locations are established in three habitat types (Appendix C). The coordinates and descriptions of each location are available to authorized personnel by contacting the NCPN.

2.3 Population being monitored

Monitoring will be limited to the bird-breeding season (early May to early July), and include those species that may potentially breed in the selected habitat types. The emphasis of this protocol is to monitor breeding-bird species at a habitat level over the NCPN region, not at a park level. Sample sites for each of the three habitat types may be distributed over multiple NCPN park units, with only a minority of samples in any one park unit. Inference at the park level likely will not be appropriate. Thus, this protocol is designed to provide inference to the populations of breeding-bird species that occur in each of the three monitored habitat types within the collection of selected park units.

2.4 Sampling frequency and replication

Three habitat types will be surveyed annually. Observers will complete one transect per field day. Sampling effort may be adjusted to accommodate the ability to derive credible detection functions for density estimation. Buckland and others (1993) recommend 60–80 detections per species for adequate estimation of a detection function. This sample-size requirement can be met by pooling data from NCPN units among years, or by pooling data from other surveys in similar habitats. In an effort to meet this number of detections, transects were visited twice per year from 2005 to 2013. From 2014 to present, transects were only visited once per year.

3 Field Methods

3.1 Field season preparations, field schedule, and equipment setup

It is important for field technicians to become familiar with (or review) the bird species likely to be observed in the NCPN park units. Reference materials and guides for the NCPN area are documented in SOP #1. Equipment should be organized prior to the field season to ensure availability and that necessary repairs are made (see SOP #1). Observers working in NCPN park units will be provided with a GPS unit for initially recording transect waypoints, and for subsequent navigating. Instructions for using GPS units are provided in SOP #3. Before going into the field, waypoints of established transects must be uploaded into the GPS. Also, transect-location information should be transcribed to the field-data sheets (see SOP #5). A number of field-data sheets should be copied onto Rite-in-the-Rain paper.

Observers should aim to conduct all surveys during peak breeding season, after all migratory species have returned to an area. Scheduling transects for monitoring must be done prior to the field season.

3.2 Sampling methods

Methods for locating transects are detailed in SOP #4. Survey locations are not physically marked but must be relocated using previously recorded UTM coordinates. The use of a GPS to mark and navigate to survey transects and point-count stations is critical, and described in SOP #3.

General survey procedures are described in SOPs #5 and #6. Surveys should only be conducted in weather conditions that allow for birds to be adequately heard and seen. Counts should be stopped if winds exceed 13–18 mph (raising dust, leaves, loose paper; small branches in motion) and if precipitation exceeds a drizzle. Surveys begin approximately one half-hour before sunrise and end no later than five hours after official sunrise.

3.3 Conducting the survey

3.3.1 Five-minute point counts

Details of how to conduct point counts during the breeding season, and for filling in the data form, are given in SOP #5. Upon reaching a point-count station, habitat data are first collected following procedures described in SOP #6, and summarized below. Bird observations are then recorded during a five-minute period. All birds, regardless of distance from the observer, are recorded. The species, method of detection, sex, minute of detection, and distance from station center to the individual are recorded. Species that usually occur in flocks are recorded as a cluster unit.

The distance from the station center to the first detection of an individual is a key variable. Distance is used to derive a detection function that is subsequently used to derive density estimates with the program Distance (Thomas et al. 1998). Using a rangefinder, distances are to be measured to the nearest 1 meter. Rounding (e.g., to the nearest 5 or 10 meters) is to be avoided because this introduces bias in a detection function. A key assumption of distance-based sampling is that birds located at station center have a 100% probability of being detected. It is thus critical to record the distance from station center to birds that moved away from the center upon arriving at a point-count station. While at the station center, observers should avoid movement, making loud noises, and other actions that would encourage nearby birds to move away without being detected. It is also important not to attract birds to the station center because this inflates the probability of detectability.

After the count is completed and the data sheet filled out, the GPS unit and written instructions are used to navigate to the next sample plot.

3.3.2 Line-transect component for low-density target species

The line-transect component of the survey is conducted by continuously recording detections of low-density target bird species as the observer travels between point-count stations. In order to obtain an accurate density estimate, detections of low-density target species—either at the point-count station or while traveling between stations—must have an associated radial distance and bearing from the observer to the bird. Specific guidelines are detailed in SOP #5. A list of low-density species for each habitat type is provided in SOP #5. This list may change over time, depending on population trends.

3.3.3 Transects in linear habitat

Two adjustments are necessary to accommodate transects through linear habitats (e.g., riparian habitats). First, the start of the transect is strategically placed near the end of the habitat to ensure the entire length of the survey is accommodated. Second, the transect does not follow a prescribed bearing, but instead is located in the middle of the habitat and follows the orientation of the habitat.

3.4 Collecting habitat data

Habitat data are collected annually to aid in understanding potential reasons for trends in breeding-bird densities. These potential relationships may have practical applications in the management of habitat. Habitat data are collected within a 50-meter radius circular plot centered on each bird survey. Habitat variables collected at each plot center around overstory and shrub-layer characteristics (% cover, mean height, and dominant species composition), as well as percent cover of groundcover classes. Habitat data are collected at point-count stations before starting a bird count. Habitat data-collection instructions are described in detail in SOP #6.

4 Data Management

Data management procedures are detailed in SOP #7.

4.1 Data processing overview

Landbird monitoring data are stored in a relational database. Data collected on field data sheets are entered into the database after a field survey is completed. Data verification immediately follows data entry and involves checking the accuracy of the computerized records against the original source. Data validation is then performed, which involves reviewing the data for range and logic errors.

4.2 Metadata procedures

Each table and field in the database is defined and documented in a data dictionary and/or in Section 5 of a Federal Geographic Data Committee (FGDC)-compliant metadata file. FGDC-compliant metadata are created for all spatial data.

4.3 Data archiving procedures

Digital data are archived in their native database format at the end of each field season after all data have been verified and validated. In addition, a platform-independent copy of the database tables in ASCII format is also archived. All archived files are designated as read-only and stored on a secure server with regular backup routines that include an off-site storage rotation. All final landbird monitoring data and data products, both digital and hard copy formats, are archived at the Western Archeological and Conservation Center after each field season.

5 Analysis and Reporting

The MCB and NCPN programs use distance-based estimates of species density in trend assessments. Population trends are analyzed using density estimates as an index that is not confounded by detectability issues. Detection functions employed in estimating density require a minimum number of observations. Sample-size needs often cannot be achieved without pooling among surveys. Where necessary, data from similar habitats could be pooled among NCPN and other surveys to derive credible detection functions for NCPN species.

Status and trend information are analyzed at multiple levels for comparisons. Levels include ecoregion, management unit (NCPN park units vs. others), and habitat. Annual summaries of observations, as well as periodic trend analyses, are produced. These reports and publications are available online and published by the NCPN in the NPS Natural Resource Report series.

6 Personnel Requirements and Training

6.1 Roles and responsibilities

An NCPN ecologist is responsible for coordinating the implementation of this monitoring protocol. The ecologist is specifically responsible for obtaining copies of all data collected in NCPN park units. The NCPN data manager is responsible for data archiving, data security, dissemination, and metadata procedures.

6.2 Qualifications and training

Observer bias can have a strong influence on trend analysis of songbird populations (Peitz et al. 2002; Scott et al. 1986; Sauer et al. 1994; Kendall et al. 1996). Thus, the most essential component for the collection of credible, high-quality data on birds is a competent observer.

7 Operational Requirements

7.1 Annual workload and field schedule

Monitoring will occur within a three-week timeframe (e.g., mid-May to mid-June) that corresponds to when all migratory species have returned to an area. The exact timeframe for each habitat type or transect will be determined by NCPN. Observers are required to attend a five-day training workshop that covers protocol procedures.

7.2 Facility and equipment needs

Facility needs include normal office space from the project partner to administer the program, and use of the data management work station at NCPN headquarters for metadata and archival purposes. SOP #1 lists equipment needs for one observer.

7.3 Revising the protocol and archiving previous versions

Revisions to the protocol narrative and SOPs will be inevitable over time. Explicit documentation of these changes is critical for proper interpretation and analysis of bird-survey data. Procedures for changing the protocol narrative and related SOPs are documented in SOP #9. The protocol narrative and all SOPs are labeled with version numbers, and include a revision history log. Changes to either document type are to be accompanied by changes in version numbers; version numbers and dates, the changes, reasons for the changes, and the author of the changes are to be recorded in the revision history log. The updated version numbers must be recorded in the landbirds master version table (MVT) (see SOP #9) and conveyed to the NCPN data manager for proper updating of the master version table database. Previous versions of the protocol narrative and SOPs must be archived in the NCPN Landbirds protocol library (X:\Active_Monitoring_Projects\Landbirds\Protocol\PDF).

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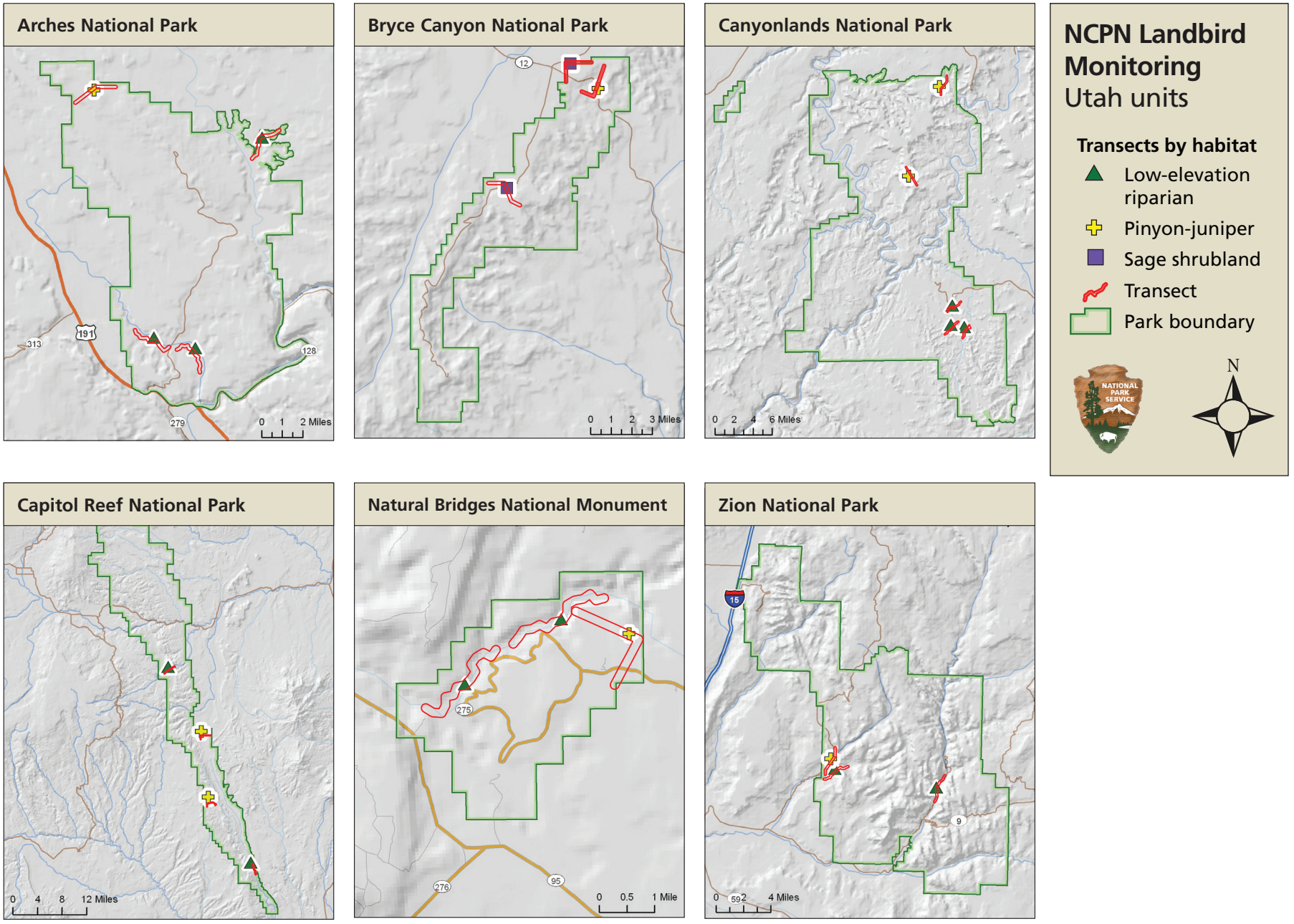
Appendix A. Avian Monitoring in NCPN Park Units

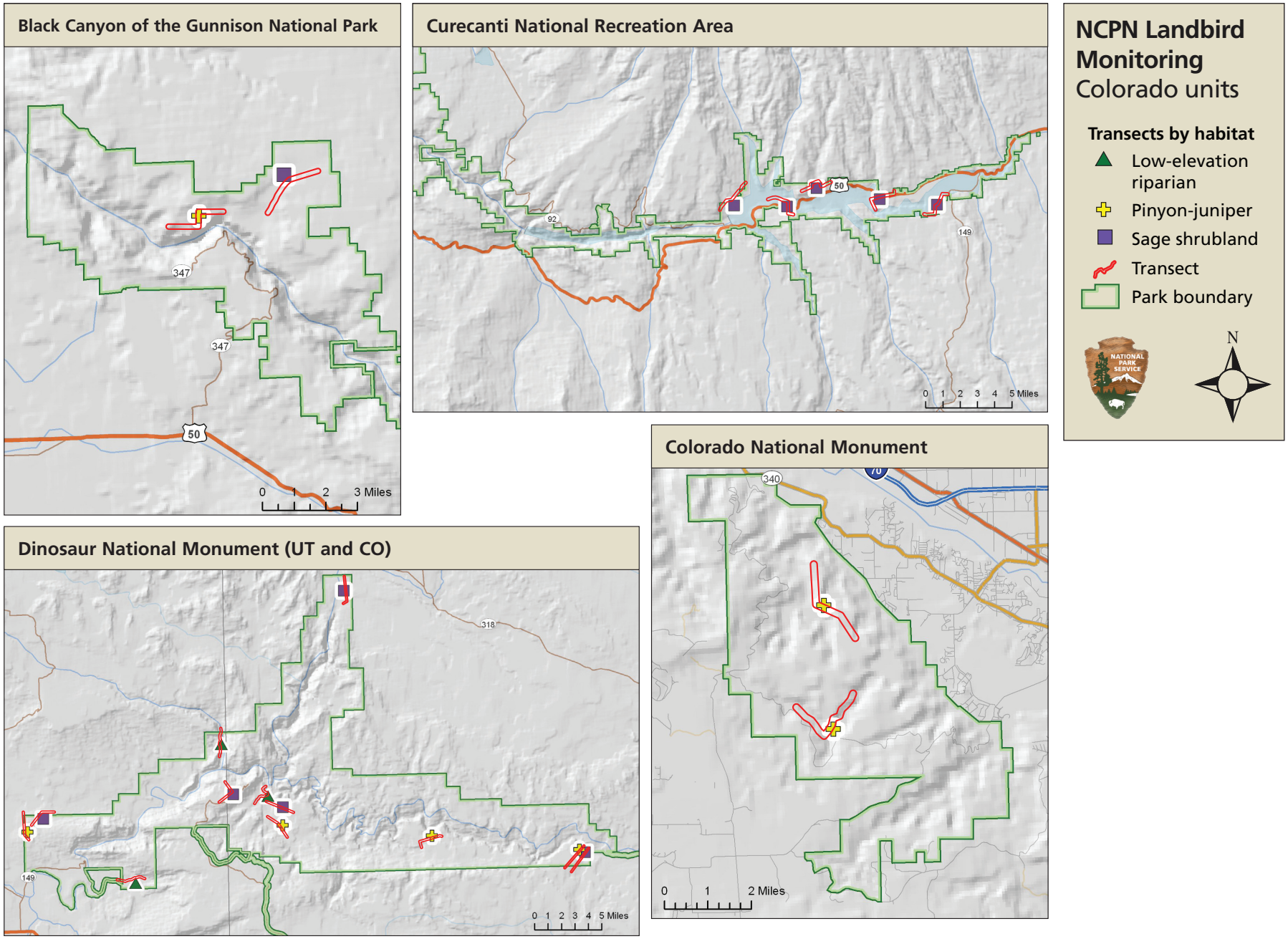
Information is current as of December 12, 2002. Years of monitoring are shown where known; an "X" indicates intermittent monitoring or monitoring of unknown duration; Historic indicates monitoring that was discontinued by 2002.

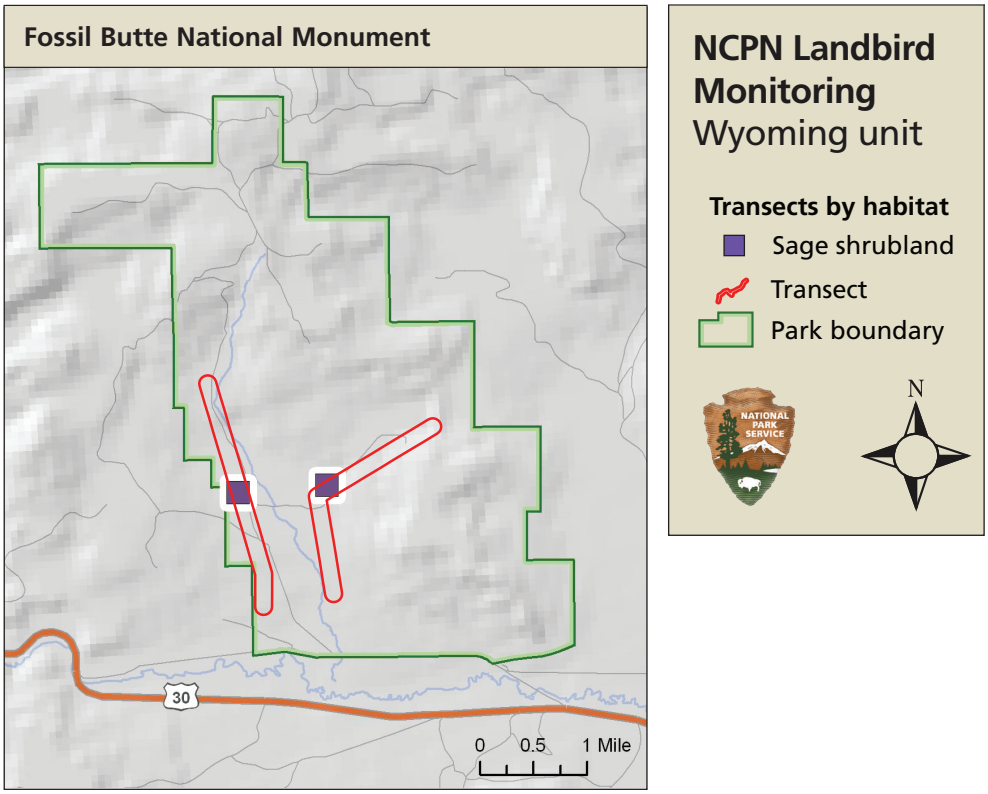
	National programs				Local programs		
Park	MAPS[1]	BBC[2]	BBS[3]	CBC[4]	General raptor surveys	General point counts or line transects	Species-specific
ARCH	–	19 yrs pinyon–juniper	13 yrs	X	X	10 yrs riparian	great blue heron
BLCA	–	–	–	–	X	6 yrs	Gunnison sage grouse, peregrine falcon
BRCA	–	–	Historic	Historic	–	Historic	southwestern willow flycatcher, northern goshawk, peregrine falcon
CANY	–	11 yrs pinyon–juniper	11 yrs	–	X	10 yrs riparian	Mexican spotted owl, southwestern willow flycatcher, peregrine falcon
CARE	7 yrs riparian	–	12 yrs	–	X	10 yrs riparian by Utah Division Wildlife Resources	Mexican spotted owl, peregrine falcon
CEBR	–	–	–	–	X	–	peregrine falcon
COLM	–	–	–	X (1946–2002) data distinguished for COLM since 1992	1990–2002 mainly peregrine falcon	–	Gray vireo, plumbeous vireo, peregrine falcon
CURE	–	–	–	–	X	10 yrs	Gunnison sage grouse, great blue heron, peregrine falcon, migratory waterfowl, shorebirds
DINO	–	–	–	X	–	ca. 20 yrs fire–effects monitoring	Canada goose, peregrine falcon
FOBU	–	–	–	–	–	–	sage grouse
GOSP	–	–	–	–	–	Historic	–
NABR	–	–	–	–	X	10 yrs riparian	peregrine falcon
PISP	–	–	–	X	–	–	–
ZION	–	–	–	X	X	4 yrs	Mexican spotted owl, peregrine falcon, northern goshawk, bald eagle, southwestern willow flycatcher

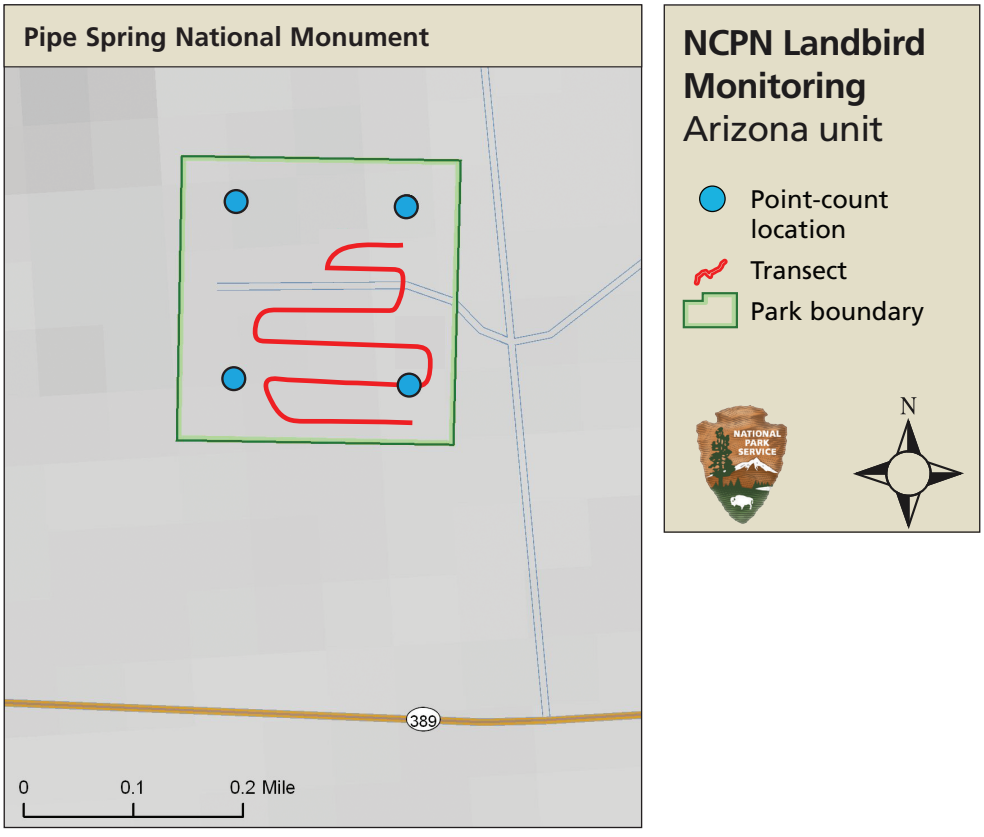
[1]Monitoring Avian Productivity and Survivorship; mist-netting; [2]Breeding Bird Census; territory/spot mapping; [3]Breeding Bird Survey; point counts; [4]Christmas Bird Count; area search
ARCH=Arches National Park (NP), BLCA=Black Canyon of the Gunnison NP, BRCA=Bryce Canyon NP, CANY=Canyonlands NP, CARE=Capitol Reef NP, CEBR=Cedar Breaks National Monument (NM), COLM=Colorado NM, CURE=Curecanti National Recreation Area, DINO=Dinosaur NM, FOBU=Fossil Butte NM, GOSP=Golden Spike National Historic Site, NABR=Natural Bridges NM, PISP=Pipe Spring NM, ZION=Zion NP

Appendix B. Sampling Locations




Black Canyon of the Gunnison National Park
347
347
50
0 1 2 3 Miles
Curecanti National Recreation Area
92
50
149
0 1 2 3 4 5 Miles
Colorado National Monument
340
70
0 1 2 Miles
Dinosaur National Monument (UT and CO)
318
149
0 1 2 3 4 5 Miles
NCPN Landbird Monitoring
Colorado units
Transects by habitat
Low-elevation riparian
Pinyon-juniper
Sage shrubland
Transect
Park boundary
NATIONAL PARK SERVICE
N


Fossil Butte National Monument
30
0 0.5 1 Mile
NCPN Landbird Monitoring
Wyoming unit
Transects by habitat
Sage shrubland
Transect
Park boundary
N


Pipe Spring National Monument
389
0 0.1 0.2 Mile
NCPN Landbird Monitoring
Arizona unit
Point-count location
Transect
Park boundary
N

Appendix C. List of Established Bird-Monitoring Transects by NCPN Park Unit and Habitat Type

Transect name	Park unit	Habitat type
CP-LR-01	ARCH	Low-elevation Riparian
CP-LR-02	ARCH	Low-elevation Riparian
CP-LR-03	ARCH	Low-elevation Riparian
CP-LR-04	CANY	Low-elevation Riparian
CP-LR-05	CANY	Low-elevation Riparian
CP-LR-06	CANY	Low-elevation Riparian
CP-LR-07	CARE	Low-elevation Riparian
CP-LR-08	CARE	Low-elevation Riparian
CP-LR-09	DINO	Low-elevation Riparian
CP-LR-10	DINO	Low-elevation Riparian
CP-LR-11	DINO	Low-elevation Riparian
CP-LR-12	NABR	Low-elevation Riparian
CP-LR-13	NABR	Low-elevation Riparian
CP-LR-14	ZION	Low-elevation Riparian
CP-LR-15	ZION	Low-elevation Riparian
CP-PJ-01	ARCH	Pinyon-Juniper
CP-PJ-02	BLCA	Pinyon-Juniper
CP-PJ-03	BRCA	Pinyon-Juniper
CP-PJ-04	CARE	Pinyon-Juniper
CP-PJ-05	CARE	Pinyon-Juniper
CP-PJ-06	COLM	Pinyon-Juniper
CP-PJ-07	COLM	Pinyon-Juniper
CP-PJ-08	DINO	Pinyon-Juniper
CP-PJ-09	DINO	Pinyon-Juniper
CP-PJ-10	DINO	Pinyon-Juniper
CP-PJ-11	DINO	Pinyon-Juniper
CP-PJ-12	NABR	Pinyon-Juniper
CP-PJ-13	ZION	Pinyon-Juniper
CP-PJ-14	CANY	Pinyon-Juniper
CP-PJ-15	CANY	Pinyon-Juniper
CP-SA-01	BLCA	Sage Shrubland
CP-SA-02	BRCA	Sage Shrubland
CP-SA-03	BRCA	Sage Shrubland
CP-SA-04	CURE	Sage Shrubland
CP-SA-05	CURE	Sage Shrubland
CP-SA-06	CURE	Sage Shrubland
CP-SA-07	CURE	Sage Shrubland
CP-SA-08	CURE	Sage Shrubland
CP-SA-09	DINO	Sage Shrubland
CP-SA-10	DINO	Sage Shrubland
CP-SA-11	DINO	Sage Shrubland
CP-SA-12	DINO	Sage Shrubland
CP-SA-13	DINO	Sage Shrubland
CP-SA-14	FOBU	Sage Shrubland
CP-SA-15	FOBU	Sage Shrubland

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 960/168607, April 2020

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U.S. Department of the Interior

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