

## Instructions for completing the revised Yellow-billed Cuckoo Survey Summary Form

Draft Addendum to Appendices 1 to 3 for yellow-billed cuckoo survey protocol  
in Arizona, New Mexico, and Texas: in Halterman et. al. (2016)

June, 2021

### Suggested Citation:

*U. S. Fish and Wildlife Service and U.S. Bureau of Reclamation. 2021. Draft Addendum to Appendices 1 to 3 in Halterman, M.D., M.J. Johnson, J.A. Holmes and S.A. Laymon. 2016. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo: Draft. U.S. Fish and Wildlife Techniques and Methods. Prepared by Susan Sferra, Vicky Ryan, and Meghan White for USFWS, Arizona, New Mexico, and Texas, Albuquerque, New Mexico and U.S. Bureau of Reclamation, Denver Technical Center, Denver, Colorado.*  
<https://www.fws.gov/southwest/es/arizona/Yellow.htm>

Contacts for questions or comments: Susan Sferra at [susan\\_sferra@fws.gov](mailto:susan_sferra@fws.gov), Vicky Ryan at [Vicky\\_ryan@fws.gov](mailto:Vicky_ryan@fws.gov), or Meghan White at [mwhite@usbr.gov](mailto:mwhite@usbr.gov).

**Acknowledgements:** We thank Shannon McNeil, Diane Tracy, Troy Corman, Nick Beauregard, Steve Prager, Cathy Wise, Chrissy Kondrat-Smith, Charles Corson, Reis Lindley, Mary Anne McLeod, Amanda Moors, Jimmy Knowles, Barbara Raulston, Todd Baribault, Fernando Diaz, Jennifer Davis, and Carolyn Ronning for suggestions and comments on the current data forms and/or review of revised data forms and instructions. We thank Murrelet Halterman, Matt Johnson, Jennifer Holmes, and Steve Laymon for developing the original survey protocol, forms, and instructions, which have yielded a wealth of cuckoo information on which to base these revisions.

**Introduction:** These revised instructions are provided as guidance for completing the revised Yellow-billed Cuckoo (cuckoo) Survey Summary Form for Arizona, New Mexico, and Texas. The revised Excel Survey Summary data entry form automatically creates a database as data are entered. In addition to improvements in formatting and data storage, the instructions and form were revised to improve standardization of vegetation data and estimation of Possible, Probable, and Confirmed breeding territories.

**To apply for a federal permit (USFWS Recovery Permit Application):** To apply for a federal recovery permit, go to the following website: [https://fwsepermits.servicenowservices.com/fws?id=fws\\_kb\\_view&sys\\_id=881899b11b5f50101f45dbdbe54bcb33](https://fwsepermits.servicenowservices.com/fws?id=fws_kb_view&sys_id=881899b11b5f50101f45dbdbe54bcb33). If you have already applied for a federal permit, you may email [permitsR2ES@fws.gov](mailto:permitsR2ES@fws.gov) regarding the status of your application. Note that new federal permit applications submitted within the last few months may still be under review.

### To apply for a state permit:

Each state has different permitting and reporting requirements. To survey in Arizona, in addition to your federal permit, you must apply for a scientific collecting license from the

Arizona Game and Fish Department annually. A specific survey location is required at time of submission. Expect up to 30 days for review and processing. Currently, there is no fee for this process. For more information and the application:

<https://www.azgfd.com/license/speciallicense/scientificcollection/>.

Email [scpermits@azgfd.gov](mailto:scpermits@azgfd.gov) if you have questions.

No state permits are required for protocol surveys in New Mexico or Texas, but they are required for nest monitoring and handling cuckoos. Permit applications are available at: <http://www.wildlife.state.nm.us/download/enforcement/scientific-educational/scientific/Scientific-Collection-Permit-Application-or-Renewal-Form.pdf>. For any questions pertaining to New Mexico Department of Game and Fish permits, please email [dqf.permits@state.nm.us](mailto:dqf.permits@state.nm.us). For any questions pertaining to Texas Park and Wildlife Division permits, please email [wpoffice@tpwd.state.tx.us](mailto:wpoffice@tpwd.state.tx.us)

**Permit Reporting:** The appropriate contacts in your State and Federal permits are usually the State and USFWS Ecological Services Field Office yellow-billed cuckoo leads and the State and Federal permits coordinators. Prior to conducting surveys, email the name of the area you intend to survey to your USFWS Ecological Service Field Office cuckoo lead. This information is needed to avoid duplication of effort. Survey field forms are posted at <http://www.fws.gov/southwest/es/arizona/Yellow.htm>. Complete data forms (spreadsheets) for all sites surveyed, regardless of whether or not cuckoos were detected.

#### CHECK YOUR PERMIT – REPORTING REQUIREMENTS VARY BETWEEN REGIONS AND STATES

For annual reports, Permittees in Arizona, New Mexico, and Texas are required to submit digitally:

- (1) copies of all field data forms in Excel format (posted at <http://www.fws.gov/southwest/es/arizona/Yellow.htm>) with positive or negative survey results;
- (2) copy of USGS quad/topographical map or similar of survey area, survey route, outline of survey site, location of cuckoo detections by survey number or date, nests (if any), and estimated territories;
- (3) sketch or preferably an aerial photo showing survey area, survey route, outline of survey site location of cuckoo detections by survey number or dates, nests (if any), and estimated territories;
- (4) photos (if taken) of the interior of the patch, exterior of the patch, and overall site (may be compiled in pdf);
- (5) bird photos (if taken) (may be compiled in pdf); and
- (6) if available, GIS files (i.e., shapefile, personal or file geodatabase) of #2 above.

Excel forms (spreadsheets) must be emailed in Excel format. Maps and photos may be compiled into a pdf. Results must be submitted by October 15, following each survey season. Permittees will be responsible for making sure that they submit the data to the appropriate USFWS Ecological Services Field Office and state in which surveys were conducted. Permittees (federal) must send a copy to landowner/land manager where surveyors were conducted.

Federal permits (send to): Arizona: [jason\\_douglas@fws.gov](mailto:jason_douglas@fws.gov), New Mexico:

jennifer\_l\_davis@fws.gov , Texas: Michael\_Warriner@fws.gov.

State permits (follow state reporting requirements; also send a copy of federal annual report): Arizona: [scpermits@azgfd.gov](mailto:scpermits@azgfd.gov). New Mexico: [nhnm@unm.edu](mailto:nhnm@unm.edu). Texas: Texas Parks & Wildlife Department, Wildlife Division – Wildlife Permitting Office, 4200 Smith School Road, Austin, Texas 78744.

We recommend scanning or otherwise imaging field data sheets immediately after the day's survey is completed. In the event of loss or damage to the data sheet, the information can be salvaged.

### **Page 1 of Survey Summary Form for electronic submission**

**Site Name:** Standardized site names are provided by the cuckoo survey coordinators for each state and should be consistent with the naming of other sites that might be in the area. If the site is new, work with your state or USFWS cuckoo coordinator to determine suitable site names before the beginning of the survey season. If the site was previously surveyed, use the site name from previous years (which can be obtained from the state or USFWS cuckoo coordinator). If you are uncertain if the site was previously surveyed, contact your state or USFWS cuckoo coordinator.

**County:** Record the county where the site is located.

**Elevation (meters):** This can be obtained from a handheld GPS unit, USGS quad map, or a GIS elevation layer. Please use the most accurate information available. Please record data in meters. If elevation changed from start to finish, use the average elevation and include notes in the comments.

**State:** Record the state where the site is located.

**USGS Quad Name:** Provide the full quad name, as shown on the appropriate standard USGS 7.5-minute topographic maps. Please list the names of all USGS 7.5-minute topographic maps covered by the survey site. To find the name of the USGS map where a site is located, open the USGS 7.5-minute topographic map index at the following website:

<http://www.fws.gov/southwest/es/arizona/Yellow.htm>.

**Creek, River, Wetland, Canyon, or Lake Name:** Provide the name of the riparian feature, such as the lake or watercourse (including ephemeral washes), where the survey is being conducted. If the drainage or canyon name is different than the riparian feature, use the name of the riparian feature. For example, Bonito River instead of Rio Grande.

**Site Coordinates:** Provide the start and end points of the survey, which will indicate the linear, straight-line extent of survey area, based on Universal Transverse Mercator coordinates (UTMs). If the start and end points of the survey changed significantly among visits, enter separate coordinates for each survey in the Comments section. Note that we do not need the

coordinates for the detailed route taken by the surveyor(s) but see permit requirements for site outline and general survey route and associated geospatial files. A marked general survey route taken by the surveyor(s) on copies of a USGS quad/topographical map and aerial photo (or sketch if no aerial photo is available) will provide the needed information, especially for non-linear routes in wide expanses of habitat or side drainages. Surveyors may also provide additional points defining the area surveyed in the Comments section if the site is wide or nonlinear.

**UTM Zone:** Provide the appropriate UTM zone for the site, which is displayed along with the coordinates by most GPS units.

**Datum:** For uniformity of data, we prefer that you use NAD83.

**Magnetic North Declination:** The compass declination should be set to the magnetic declination of the survey area. Arizona ranges from 10-12° from east to west. New Mexico ranges from 9-10° from east to west within the range of the western yellow-billed cuckoo. Magnetic declination values can be located on USGS 7.5 minute quad maps, can be found using an internet search for “your state” + magnetic declination, or can be calculated on the following website at <https://www.ngdc.noaa.gov/geomag/declination.shtml>.

**Was site surveyed in previous year?** Click on drop down menu and select yes, no, or unknown.

**If yes, what site name was used?** If the site was surveyed in the previous year, record the site name used in the previous year.

**Survey #:** Survey 1 – 5.

See the protocol for an explanation of the number of required visits (also known as surveys) for each survey period. Note: A single survey is defined as a complete protocol-based survey that occurs over no more than one day. If a site is so large as to require more than a single day to survey, consider splitting the site into multiple sub-sites and use separate survey forms for each. At least four surveys are required for completion of a full season of protocol-level surveys at any site. Although not required, we encourage additional surveys through September in Arizona and New Mexico, especially when conducting surveys for proposed projects. Cuckoo nests and fledglings have been documented as late as early October. Surveys conducted 12 - 14 days apart are recommended, based on a population study on the lower Colorado River (McNeil et al. 2013). If surveys are conducted only 10 days apart, only 40 days of the breeding season are covered. In addition some cuckoos may remain onsite for 10 days prior to leaving area and may be counted on two surveys. If surveys are conducted more than 16 days apart, an entire cuckoo breeding cycle may be missed. Surveys conducted 15 days apart are acceptable, but are not as ideal as 12-14 days apart if start date of a breeding cycle is unknown. Some extenuating circumstances such as wind, rainfall, flooding, and access may require some surveys to be only 10 days apart.

Protocol surveys require morning visits, but you may also conduct supplemental evening

surveys if time permits. Casual, pre-season, supplemental, or follow-up visits to check on the status of a territory should not be listed in this column but should be documented in the comments section or in the Additional Yellow-billed Cuckoo Detections section.

**Observer(s):** Record your first initial(s) and last name(s).

**Date:** Indicate the date that the survey was conducted using the format mm/dd/yyyy.

**Start and Stop:** Record the start and stop time of the survey, given in 12-hour rather than 24-hour format (e.g., 4:00 am hours rather than 0400). You must use a semi-colon.

**Total hrs:** Calculate the total hours, rounded to the nearest quarter (0.25) hour based on time spent surveying the site and the number of surveyors. For single-observer surveys, or when multiple observers stay together throughout the survey, total the number of hours from survey start to end. If two or more observers surveyed different sections of one site concurrently and independently, sum the number of hours each observer spent surveying the site.

**Total Number of YBCUs Detected:** Record the total number of unique individual adult Cuckoos detected during this particular survey. When uncertain whether a detection represents a new individual, include comments on why you are uncertain (such as you were unsure whether the bird followed you or you were unsure whether the same bird was detected in different parts of the survey areas, or the bird was detected only briefly, or other cuckoo behavior). Do not count nestlings. (But do record whether nestlings or fledglings were found, in the Detection Comments section).

**YBCU #:** Record a sequential number, starting with the number 1 for the first observation of each survey, in the row pertaining to the broadcast - point in which the observation was made. Use this reference number for other note-worthy information in the note section on the datasheet - record the cuckoo number and detailed notes regarding your observations including breeding behavior. Keep track of different cuckoos in the Detection Comments section using both Survey # and YBCU #. Document any information in the Detection Comments that may indicate whether a cuckoo is the same or a different bird than documented previously.

**Time Detected:** Time of cuckoo detection. Report time in 12-hour rather than 24-hour format (e.g., 8:00 am rather than 0800). You must use a semi-colon.

**Detection Method:** Record whether the detection was "Incidental" (with a code of "I") if the cuckoo not was detected during the 6 minutes of each call playback survey point. If the cuckoo was detected during a Call playback survey, record it as a "P".

**Detection Type:** Record whether the detection was A = aural (you only heard a cuckoo), V = Visual (you only saw it), or B = both (you heard and saw it).

**Vocalization Type:** If the detection was aural, record the type of vocalization heard as “CN” = Contact/kowlp, “CO” = coo, “AL” = alarm (soft knocker call), “OT” = other (and describe the “other” vocalization under Detection Comments section.

**Number of 'kowlp' calls played prior to response:** Record the number of times the ‘kowlp’ call was played before the cuckoo responded. A cuckoo vocalizing prior to playback or responding immediately after playback number 1 was likely already nearby and may be near or at the center of its territory. Surveyors should be especially vigilant for signs of breeding behavior. Cuckoos that do not respond until after several calls are broadcast may be present but silent, may be approaching from other areas, or may be following surveyors. Counting the number of broadcast calls also helps the surveyor pay attention to the survey.

**Behavior Observed (refer to codes):** If observed, record the appropriate behavior code provided at the bottom of the first sheet or see all codes provided at the end of this document in Addendum Appendix 1. Surveyors should be familiar with these behaviors to help in assessing territory and breeding status. More than one code may be used. If a nest is inadvertently found while conducting surveys, observers should move away slowly to avoid startling the birds or force-fledging the young. Avoid physical contact with the nest or nest tree, to prevent physical disturbance and leaving a scent. Surveyors are not authorized to monitor nests (repeated visits within 20 meters of nest tree) unless specifically stated in your State and Federal permits. Habitat density, nest height, surveyor noise, and surveyor visibility play a role in the level of disturbance to cuckoos. Surveyors must be alert to behavioral signs of disturbance near a cuckoo nest, which include alarm calls given repeatedly while watching the intruder, broken wing displays, or flying in with prey and eating the prey item instead of going to the nest. If these occur, the observer has been the cuckoo is distressed, and the observer should move back (Halterman et al. 2016).

**Surveyor Detection Coordinates:** Enter the UTM Easting (E) and Northing (N) for the location of the surveyor when the cuckoo was detected. The direction (compass bearing) and distance to the detected cuckoo are estimated from this point.

**Distance (meters):** Estimate as accurately as possible, the distance in meters to the detected cuckoo. Periodically, double check your distance estimation accuracy with a measuring tape in the same habitat type between surveys.

**Bearing (in number degrees):** Estimate, as accurately as possible, the compass bearing in numerical degrees to the detected cuckoo from the surveyor location (such as 360 degrees rather than North). See Magnetic North declination above.

**Corrected Coordinates:** The Cuckoo location is calculated based on the surveyor’s location, distance, and bearing. You do not enter data into the Corrected Coordinates fields. This Excel data sheet contains a formula that will automatically calculate corrected coordinates and populate these fields.

**Survey Summary (REQUIRED):**

Surveyors MUST complete all fields in the Survey Summary section of the form. Surveyors have the best knowledge of the behavior, habitat, and location of birds detected on each survey visit, which are used to determine numbers of Possible, Probable, and Confirmed breeding territories. Guidance in estimating the numbers of breeding territories is provided in Table 1 below (updated and revised from Table 2 of the Survey Protocol). These estimates are important and are used by regulatory and land management agencies.

**Table 1. Possible, Probable, and Confirmed breeding territory estimation using cuckoo detections.** A site is occupied if at least one Possible breeding territory (PO), Probable breeding territory (PR), or Confirmed breeding territory (CO) is present. This table is revised and updated from Table 2 of the Survey Protocol, based on Holmes et al. (2008), McNeil et al. (2013), and Dillon et al. (2017).

Breeding Territory Estimation <sup>1</sup>	
Possible breeding territory (PO)	Detections within a 300 - 500 m area during at least 2 surveys and 12 - 14 days apart.
Probable breeding territory (PR)	Detections within a 300-500 m area during at least 3 surveys and 12-14 days apart; or PO territory plus purposeful food carry (single observation, bird does not eat food), stick carry (single observation), multiple incidents of alarm calls in same area, or PO territory plus pair exchanging multiple kowlp or alarm calls (not coos) within 100 m of one another.
Confirmed breeding territory (CO)	Observation of active nest (or multiple stick carries to nest being built), copulation, fledgling (unable to fly) with adult; or PR plus multiple food carries to same area; or distraction display (dropped wing).

<sup>1</sup> Surveys conducted 12 - 14 days apart are recommended, based on a population study on the lower Colorado River (McNeil et al. 2013). If surveys are conducted only 10 days apart, only 40 days of the breeding season are covered. In addition, some cuckoos may remain onsite for 10 days prior to leaving area and may be counted on two surveys. If surveys are conducted more than 16 days apart, an entire cuckoo breeding cycle may be missed. Surveys conducted 15 days apart are acceptable, but are not as ideal as 12-14 days apart if start date of a breeding cycle is unknown. Some extenuating circumstances such as wind, rainfall, flooding, and access may require some surveys to be only 10 days apart.

**Total Survey Hours:** The number of survey hours for the entire field season. The number of survey hours during each survey will be automatically summed and

entered into this field. If you conducted additional morning surveys and entered data on "Additional Yellow-billed Cuckoo Detections" page, you will need to manually add the number of hours to the page 1 total hours. For example, if you conducted 6 surveys, add the number of hours for the 6th survey to the Total Survey Hours.

**Total Number of Detections:** The number of individual cuckoos detected during each survey will be automatically summed and entered into this field. Example: If 3 cuckoos (unique individuals) were detected on the first survey, 2 cuckoos were detected on the 2<sup>nd</sup> survey, and no cuckoos were detected on surveys 3 and 4, the total number of cuckoo detections would be 5 even if the 2 cuckoos detected on the 2<sup>nd</sup> survey were 2 of the same individuals as on survey 1. If you conducted more than 5 morning surveys and entered data on "Additional Yellow-billed Cuckoo Detections" page, you will need to manually add the number of cuckoos detected during these additional surveys to the Total Number of Detections on page 1. For example, if you conducted 6 surveys, add the number of detections for the 6th survey to the Total Number of Detections.

**Number of PO Breeding Territories:** Record the total number of Possible breeding territories following protocol guidelines and Table 1 (revised from Table 2 in the Survey Protocol, also summarized on form).

**Number of PR Breeding Territories:** Record the total number of Probable breeding territories following protocol guidelines and revised Table 1 (revised from Table 2 in the Survey Protocol, also summarized on form).

**Number of CO Breeding Territories:** Record the total number of Confirmed breeding territories following protocol guidelines and revised Table 1 (revised from Table 2 in the Survey Protocol, also summarized on form).

**Number of Nests Found:** Record total number of nests found (if any encountered). Surveyors are not authorized to monitor nests within 20 meters of the nest tree unless specifically stated in your State and Federal permits.

**Detection Comments:** As described above, for each detection during which a cuckoo was observed, record the Survey # and YBCU # followed by detailed notes describing the observation(s), or other note-worthy information. If you find a nest, please enter nest UTM associated with Survey # and YBCU # in the comments. Attach additional pages or use the continuation sheet if needed. Attach additional pages or use the continuation sheet if needed.

### **Page 2 of Survey Summary Form for electronic submission**

**Site Name:** Same as for page 1 of the survey form.

**Date Report Completed:** Provide the date the form was completed in mm/dd/yyyy format.

**Name of Reporting Individual:** Indicate the full first and last name of the reporting individual (preferably the primary surveyor).

**Phone Number:** Provide the reporting individual's phone number; include the area code.

**Affiliation:** Provide the full name of the agency or other affiliation (which is usually the employer) of the reporting individual.

**Email:** Provide the reporting individual's email.

**U.S. Fish and Wildlife Service (USFWS) Permit #:** List the full number of the required federal permit under which the survey was completed.

**State Permit #:** If a State permit is required by the State in which the survey was completed, provide the full number of the State wildlife agency permit.

**Ownership: Primary:** Click on drop down menu and select from list.  
(BLM, BOR, NPS, USFWS, USFS, Tribal, State, Private, or other (Municipal/County)).

**Did you survey the same general area during each visit to this site this year?** Click on drop down and select Yes or No. If No, summarize in the comments section.

**If site was surveyed last year, did you survey the same general area this year?** Click on drop down and select Yes or No. If No, record the reason and how the survey varied in the comments section.

**Length of area surveyed (km):** Estimate the linear straight-line distance of the length of the area surveyed, in kilometers (km). This is not an estimate of the total distance walked throughout the survey site. Do not provide a range of distances.

**Overall Vegetation Characteristics:** This describes the overall vegetation characteristic for the site, namely which species predominantly comprise the tree/shrub layer. Check one of the following categories:

Native broadleaf plants - >75 % of the tree/shrub layer of the site is composed of native broadleaf plants.

Exotic/introduced plants - >75 % of the tree/shrub layer of the site is composed of exotic/introduced plants.

Mixed native and exotic plants (mostly native) - 51% -75% of the tree/shrub layer of the site is

composed of native broadleaf plants.

Mixed native and exotic plants (mostly exotic) – 51% -75% of the tree/shrub layer of the site is composed of exotic/introduced plants.

**Average Overstory/Canopy (where playback calls were used):**

Provide the scientific names of the five most common species in the overstory/canopy and proportion of overstory cover provided by each species in cuckoo breeding habitat (relative cover). Overstory may consist of more than one habitat type. For example, cottonwood/willow habitat bordered by mesquite may both be part of the breeding habitat. For relative percent cover, the total should equal 100%, even if more than five species are present. Appendix 2 at the end of this document and the dropdown menu on the form include most, but not all, of the species in southwestern cuckoo habitat. If one of the five most common species present is not included, click on “Other” and include the scientific name of the species in the Comments section.

**General Overstory/Canopy Characteristics:**

**Average Height (top of trees) of Overstory (meters; do not include a range):** Provide the best estimate of the average height of the top of the overstory/canopy throughout the survey in meters. Although canopy height can vary, give only a single (not a range) overall height estimate.

**Estimated Absolute (as opposed to relative) Canopy Cover (percent; may be < 100%):** Estimate of the absolute percent overstory/canopy cover of the site. This measure of cover is not equal to the species relative covers previously recorded and may be less than 100% if canopy openings are present. The open streambed should not be included in the estimate.

**Average Subcanopy (if present; where playback calls were used):** Fill out this section if two distinctive tree layers are present and can be differentiated into an overstory/canopy and subcanopy layer (as opposed to overstory/canopy and understory layers). Provide the scientific names of the five most common species in the subcanopy and proportion of average subcanopy cover provided by each species in cuckoo breeding habitat (relative cover). For relative percent cover, the total should equal 100%, even if more than five species are present. Appendix 2 at the end of this document and the dropdown menu on the form include most, but not all, of the species in southwestern cuckoo habitat. If one of the five most common species present is not included, click on “Other” and include the scientific name of the species in the Comments section.

**General Subcanopy Characteristics:**

**Average Height of Subcanopy (meters; do not include a range):** Provide the best estimate of the average height of the top of the subcanopy throughout the survey in meters. Although subcanopy height can vary, give only a single (not a range) overall

height estimate.

**Estimated Absolute (as opposed to relative) Subcanopy Cover (percent; may be < 100%):** Estimate the absolute percent overall subcanopy cover at the site. This measure of cover is not equal to the species relative covers previously recorded and may be less than 100% if subcanopy openings are present. The open streambed should not be included in the estimate.

**Average Understory (if present; where playback calls were used):** The understory comprises a distinct woody or herbaceous layer (that does not have to be present throughout the site) below the overstory canopy and subcanopy in cuckoo breeding habitat. This is the shrub or ground cover layer, including tree regeneration, perennial shrubs, grasses, and/or annual herbaceous growth. For example, a cottonwood overstory might have shrub-sized young cottonwoods or willows and shrubs directly below, immediately adjacent to, or in small patches in between the overstory. Or there may only be an overstory and subcanopy with no understory. List up to 5 species of understory and estimate proportion of understory cover of each species. Use scientific names. For percent cover the total should equal 100%, even if more than five species are present.

**General Understory Characteristics:**

**Average Height (top) of Understory (meters; do not include a range):** Provide the best estimate of the average height of the top of the understory throughout the site in meters. Although understory height can vary, give only a single (not a range) overall height estimate.

**Estimated Absolute (as opposed to relative) Understory Cover (percent; may be < 100%):** Estimate the absolute percent understory cover for the site. This measure of cover is not equal to the species relative covers previously recorded and may be less than 100% if openings are present. The open streambed should not be included in the estimate.

**Immediate Adjacent Habitat Along Entire Transect (Outside of survey site):** Categorize habitat adjacent to the survey area (e.g. rock outcrop, desert/scrub/thornscrub, urban/residential, agriculture/pasture, orchard, oak woodland, pinyon-juniper woodland, mixed conifer forest, grassland, marsh/wet meadow, open water, ditch/irrigation). Adjacent habitat should not be part of the breeding habitat. For example, if mesquite borders riparian habitat and contributes toward breeding habitat it is not considered adjacent habitat and should be included in the overstory and understory estimates. List up to 5 categories of adjacent habitat and estimate the proportion of percent cover (should equal 100%). If a category of adjacent habitat present is not included, click on "Other" and include the name of the adjacent habitat in the Comments section. Additional information on some of the adjacent habitat types:

- Desert/Scrub/Thornscrub is a broad category of habitat types that may contain creosote,

cacti, arid-adapted shrubs, and thorny trees such as mesquite, acacia, and grey thorn. Tree cover, if present, is generally shorter and sparser than in breeding habitat.

Examples: adjacent habitat along Agua Fria, Gila, lower San Pedro, Verde, Bill Williams, lower Colorado, Big Sandy, Santa Cruz rivers and tributaries in AZ and along ephemeral drainages in southeastern AZ.

- Orchard: pecan, almond, apple, pistachio. etc.
- Oak Woodland may include other trees and is primarily in the foothills and mountains of southeastern AZ. Example: Coronado National Forest.
- Mixed Conifer Forest. Example: Coronado National Forest.
- Grassland. Examples: along Gila R, Mimbres R, and Rio Grande in NM; Upper San Pedro R, Canelo Hills, and drainages in Buenos Aires National Wildlife Refuge, in AZ.

**Is the survey area or adjacent area (within 300 meters) dominated by surface water or saturated soil during at least two surveys?** Click on drop down menu and select Yes, No, or Unknown. Provide information in the Comments section if surface water or saturated soil changed between surveys.

**Perennial, intermittent, ephemeral drainage (or body of water):** Click on drop down menu and select Perennial, Ephemeral, or Intermittent. We are interested in whether the drainage (or body of water) supporting vegetation used by cuckoos is perennial, intermittent, or ephemeral during the breeding season. Tanks, ponds, lakes, cienegas, irrigation ditches, irrigation system, etc. would be characterized by the frequency and duration the water source is available during the breeding season. See the descriptions below. Provide information in the comments section of any changes in hydrology.

**Perennial** - water flowing year-round, mostly from upstream waters or groundwater. Or a lake with water during the entire breeding season.

**Intermittent** - water flowing during certain times of the year mostly from upstream waters and groundwater. Examples: A streambed that contains pools of water in between dry reaches throughout the breeding season. In artificial systems, water may be delivered on a schedule, such as one day per week, with gradual drying in between deliveries. An irrigation ditch that contains water for two days every week. An irrigation system supporting revegetated riparian habitat.

**Ephemeral** - water present or flowing only after precipitation, such as during the summer monsoon. Examples: A wash that is temporarily moist or flowing from a summer rain. A tank that holds water temporarily after a summer rain.

**Comments:** Provide comments regarding differences between survey patches or where cuckoos were detected within the site. For example, if the average canopy for the site is 30% cover, but within one patch it is 60%, describe this. Also note any significant differences between dominant overstory, subcanopy, and understory vegetation among patches within the site. Document these differences with photographs whenever possible and reference comments to photos number whenever available. Note potential threats (e.g., livestock, ORV, hunting, etc.) to the site. If *Diorhabda* beetles are observed, contact your USFWS and State

cuckoo coordinator immediately. Attach additional pages or use the continuation sheet if needed.

**Page 3 of Survey Summary Form for electronic submission**

**Yellow-Billed Cuckoo Survey Summary Form Page 3 (OPTIONAL).** Please use this form for additional detections, follow-up visits, evening visits, and any other circumstance when more detail is needed.

**Addendum to Literature Cited**

- Dillon, K., D. Moore, and D. Ahlers. 2017. Lower Rio Grande Yellow-billed Cuckoo Survey Results -2016. Selected Sites within the Lower Rio Grande Basin from Elephant Butte Dam, NM to El Paso, TX. Bureau of Reclamation, Technical Service Center, Fisheries and Wildlife Resources. Denver, CO.
- Halterman, M.D., M.J. Johnson, J.A. Holmes and S.A. Laymon. 2016. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo: Draft. U.S. Fish and Wildlife Techniques and Methods, 45 p.
- Holmes, J.A., C. Calvo, and M.J. Johnson. 2008. Yellow-billed cuckoo distribution, abundance, habitat use, and breeding ecology in the Verde River watershed of Arizona, 2004–2005. Final Report. Admin Rept. Arizona Game and Fish Dept. 34 pp.
- McNeil, S.E., D. Tracy, J.R. Stanek, and J.E. Stanek. 2013. Yellow-billed cuckoo distribution, abundance and habitat use on the lower Colorado River and tributaries, 2008–2012 summary report. Bureau of Reclamation, Multi-Species Conservation Program, Boulder City NV, by SSRS. [http://www.lcrmscp.gov/reports/2012/d7\\_sumrep\\_08-12.pdf](http://www.lcrmscp.gov/reports/2012/d7_sumrep_08-12.pdf).
- McNeil, S.E. and D. Tracy. 2019. Yellow-billed Cuckoo Behavior Codes. Southern Sierra Research Station. Weldon, CA.

**Appendix 1. Yellow-billed Cuckoo behavior codes (McNeil and Tracy 2019).**

<b>Behavior code</b>	<b>Description</b>	<b>Evidence of Breeding or Pair Activity?</b> (0=No, S=suggestive-need more evidence, P=probable, C=confirms)	<b>Note</b>
CAP	Capture (e.g. in mist net)	0	For banding studies
DT	Dropped Transmitter (radio-tagged birds only)	0	For telemetry studies
FLC	Flies Closer (response to playback)	0	Added for response/detection study. Also useful to ID a catchable cuckoo (flies toward playback).
FLU	Flush (possibly off nest)	S	Flush, possibly off nest in response to surveyor. (Normally cuckoos avoid being seen up close. If a cuckoo flies right in front of you, often it's because you just flushed it (made it fly) off nest.
NOS	No Signal (radio-tagged birds only)	0	For telemetry studies
PA	Pair	S	Useful to hone in on territory centers
PN	Possible Nest	S	Useful to hone in on territory centers, and reduce excessive point-taking
RC	Repeat Call (from same location)	S	Useful to hone in on territory centers, and reduce excessive point-taking
RO	Roost Site (nocturnal)	S	Location of calling birds pre-dawn. Useful to locate nests (incubating males often call from nest pre-dawn)
RS	Resight band	0	For banding studies
MA	Mistnet Attempt	0	For banding studies
TD	Territorial Display	S	Useful to hone in on territory centers
NV	No Visual	0	

**Draft Addendum - Instructions for completing the Yellow-billed Cuckoo Survey Summary Form**  
**USFWS and USBR**  
**June 2021**

<b>Behavior code</b>	<b>Description</b>	<b>Evidence of Breeding or Pair Activity?</b> (0=No, S=suggestive-need more evidence, P=probable, C=confirms)	<b>Note</b>
BW	Bill Wipe	0-S	Sometimes indicates agitated behavior near a nest
FS	Fecal Sac Carry	C	
AN	At Nest	C	
US	Used Nest	C	Nests inactive when found (active earlier in season)
CP	Catches Prey	0	
EF	Eats Food	0	
FLY	Flying	0	
FO	Forages	0	
JUV	Juvenile	C (in area)	Older than fledgling, able to fly.
PRE	Preening	0-S	Sometimes indicates agitated behavior near a nest
ST	Sitting	0	Useful for band/resight QA (resighting bands usually requires sitting birds)
FY	Feeds Young	C	
BI	Brooding or Incubating	C	
CF	Carry Food	0-S	Suggests but does not confirm breeding. Other evidence needed
MAT	Carry Nest Material	P	Best to find the nest to confirm breeding
COP	Copulation	C	Best to find the nest to confirm breeding
DD	Distraction Display	C	Best to find the nest to confirm breeding
FLG	Fledgling	C	Indicates a nest nearby (fledgling = unable to fly)
FM	Feeds Mate	S	
FN	Feeds Nestling	C	
NB	Nest Building	C	
VEX	Vocal (kowlp) Exchange	S	

**Appendix 2. Woody Plant Species List for Arizona, New Mexico, and Texas.**

<b>Veg Code</b>	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
ABCO	White fir	<i>Abies</i>	<i>concolor</i>
ABSP	Fir species	<i>Abies</i>	species
ACSP	Acacia species	<i>Acacia/Senegalia</i>	species
ACGR	Catclaw acacia	<i>Senegalia</i> (old genus is Acacia)	<i>greggii</i>
ACSP	Acacia Species	<i>Acacia</i>	species
ACGL	Rocky Mountain Maple	<i>Acer</i>	<i>glabrum</i>
ACNE	Boxelder	<i>Acer</i>	<i>negundo</i>
ACSP	Maple species	<i>Acer</i>	species
ALIN	Thinleaf Alder	<i>Alnus</i>	<i>incana ssp. tenuifolia</i>
ALOB	Arizona alder	<i>Alnus</i>	<i>oblongifolia</i>
ALRH	White alder	<i>Alnus</i>	<i>rhombifolia</i>
ALSP	Alder species	<i>Alnus</i>	species
AMFR	Indigobush	<i>Amorpha</i>	<i>fruticosa</i>
APCA	Dogbane	<i>Apocynum</i>	<i>cannabinum</i>
ARXA	Texas madrone	<i>Arbutus</i>	<i>xalapensis</i>
ARSP	Manzanita	Arctostaphylos	species
BASP	Baccharis species	Baccharis	species
BAMBOO	Bamboo	Bamboo	species
Burned	Burned	Burned	Burned
CACTUS	Cactus species	Cactus	species
CAIL	Pecan	<i>Carya</i>	<i>illinoensis</i>
CEEH	Desert hackberry Same species with 2 diff scientific names being used. Other name is <i>Celtis pallida</i> .	<i>Celtis</i>	<i>ehrenbergiana</i>
CELA	Sugar hackberry	<i>Celtis</i>	<i>laevigata</i>
CERE	Western hackberry Net-leaved hackberry Canyon hackberry	<i>Celtis</i>	<i>reticulata</i>
CESP	Hackberry species	<i>Celtis</i>	species
CRSP	Palo verde (2 species) Foothills Palo Verde ( <i>Cercidium microphyllum</i> ) or Blue Palo Verde ( <i>Cercidium floridum</i> )	<i>Cercidium</i>	species

**Draft Addendum - Instructions for completing the Yellow-billed Cuckoo Survey Summary Form**  
**USFWS and USBR**  
**June 2021**

<b>Veg Code</b>	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
CHLI	Desert willow	<i>Chilopsis</i>	<i>linearis</i>
CONIFER	Conifer species	Conifer	species
COX	Dogwood species	<i>Cornus</i>	species
CUAR	Arizona cypress	<i>Cupressus</i>	<i>arizonica</i>
ELAN	Russian Olive	<i>Elaeagnus</i>	<i>angustifolia</i>
FONE	New Mexico Olive, Privet, New Mexican Forestiera	<i>Forestiera</i>	<i>neomexicana</i>
FOPU	New Mexico Olive, Stretchberry	<i>Forestiera</i>	<i>pubescens</i>
FOX	New Mexico Olive species	<i>Forestiera</i>	species
FREX	European ash	<i>Fraxinus</i>	<i>excelsior</i>
FRVE	Arizona Ash, Velvet Ash	<i>Fraxinus</i>	<i>velutina</i>
FRSP	Ash	<i>Fraxinus</i>	species
JGX	Walnut species	<i>Juglans</i>	species
JUMA	Arizona walnut	<i>Juglans</i>	<i>major</i>
JUNI	Black walnut	<i>Juglans</i>	<i>nigra</i>
JURE	English walnut	<i>Juglans</i>	<i>regia</i>
JUMO	One-seed juniper	<i>Juniperus</i>	<i>monosperma</i>
JUPA	Alligator Juniper	<i>Juniperus</i>	<i>pachyphloea</i>
JUSC	Rocky Mountain Juniper	<i>Juniperus</i>	<i>scopulorum</i>
JUSP	Juniper species	<i>Juniperus</i>	species
LYSP	Wolfberry species	<i>Lycium</i>	species
MAX	Apple tree species	<i>Malus</i>	species
MIMO	Mimosa	<i>Mimosa</i>	species
MOAL	White mulberry	<i>Morus</i>	<i>alba</i>
MOMI	Texas mulberry	<i>Morus</i>	<i>microphylla</i>
MOSP (AZ)	Mulberry	<i>Morus</i>	species
N	None	None	none
Other	Other	Other	Other
OTLE	Ironwood	<i>Olneya</i>	<i>tesota</i>
PASP	Palo Verde	<i>Parkinsonia</i>	species
PIEN	Engelmann's spruce	<i>Picea</i>	<i>engelmannii</i>
PIPU	Blue spruce	<i>Picea</i>	<i>pungens</i>
PISP	Spruce Species	<i>Picea</i>	species
PIED	Pinyon pine	<i>Pinus</i>	<i>edulis</i>
PIPO	Ponderosa pine	<i>Pinus</i>	<i>ponderosa</i>
PICE	Mexican Pinyon Pine	<i>Pinus</i>	<i>cembroides</i>
PISP	Pine	<i>Pinus</i>	species

**Draft Addendum - Instructions for completing the Yellow-billed Cuckoo Survey Summary Form**  
**USFWS and USBR**  
**June 2021**

<b>Veg Code</b>	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
PLWR	Arizona Sycamore	<i>Plantanus</i>	<i>wrightii</i>
POAN	Narrowleaf Cottonwood	<i>Populus</i>	<i>angustifolia</i>
PODE	Rio Grande Cottonwood, includes subspecies <i>wislizenii</i>	<i>Populus</i>	<i>deltoides</i>
POFR	Fremont Cottonwood	<i>Populus</i>	<i>fremontii</i>
POSP	Populus species	<i>Populus</i>	species
PRGL	Honey mesquite	<i>Prosopis</i>	<i>glandulosa</i>
PRPU	Screwbean mesquite	<i>Prosopis</i>	<i>pubescens</i>
PRSP	Mesquite	<i>Prosopis</i>	species
PRVE	Velvet Mesquite	<i>Prosopis</i>	<i>velutina</i>
PNSP	Fruit trees- domestic (almond, prune, etc.	<i>Prunus</i>	species
PRVI	Chokecherry	<i>Prunus</i>	<i>virginiana</i>
PSME	Douglas-fir	<i>Pseudotsuga</i>	<i>menziesii</i>
PTTR	Hoptree	<i>Ptelea</i>	<i>trifoliata</i>
QUGA	Gambel's oak	<i>Quercus</i>	<i>gambelii</i>
QUGR	Grey oak	<i>Quercus</i>	<i>grisea</i>
QULO	Valley oak	<i>Quercus</i>	<i>lobata</i>
QUMU	Chinaquapin oak	<i>Quercus</i>	<i>muehlenbergii</i>
QUSP	Oak species	<i>Quercus</i>	species
RHMI	Gray littleleaf sumac	<i>Rhus</i>	<i>microphylla</i>
RHSP	Sumac species	<i>Rhus</i>	species
RHTR	Three-leaf sumac	<i>Rhus</i>	<i>trilobata</i>
RONE	New Mexico locust	<i>Robinia</i>	<i>neomexicana</i>
ROWO	Wild rose	<i>Rosa</i>	<i>woodsii</i>
ROSP	Rose species	<i>Rosa</i>	species
ROAR	Arizona Rose	<i>Rosa</i>	<i>arizonica</i>
RUSP	Blackberry	<i>Rubus</i>	species
SAAM	Peachleaf willow	<i>Salix</i>	<i>amygdaloides</i>
SABE	Bebb willow	<i>Salix</i>	<i>bebbiana</i>
SABO	Red Willow (Bonpland)	<i>Salix</i>	<i>bonplandiana</i>
SAEX	Coyote willow/ Sandbar Willow	<i>Salix</i>	<i>exigua</i>
SAGE	Geyer Willow	<i>Salix</i>	<i>geyeriana</i>
SAGO	Tree willow, Goodding's willow, Black willow	<i>Salix</i>	<i>gooddingii</i>

**Draft Addendum - Instructions for completing the Yellow-billed Cuckoo Survey Summary Form**  
**USFWS and USBR**  
**June 2021**

<b>Veg Code</b>	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>
SAIR	Bluestem willow, Sandbar willow	<i>Salix</i>	<i>irrorata</i>
SALA	Arroyo willow	<i>Salix</i>	<i>lasiolepis</i>
SALE	red willow	<i>Salix</i>	<i>laevigata</i>
SALU	Yellow willow	<i>Salix</i>	<i>lutea</i>
SAMO	Park willow	<i>Salix</i>	<i>monticola</i>
SANI	Black willow	<i>Salix</i>	<i>nigra</i>
SATA	Yewleaf willow	<i>Salix</i>	<i>taxifolia</i>
SASP	Willow species	<i>Salix</i>	species
SAME	Mexican elderberry	<i>Sambucus</i>	<i>mexicana</i>
SASA	Soapberry	<i>Sapindus</i>	<i>saponaria</i>
SNAG	Snag (any species)	SNAG	SNAG
TAAP	Athel tamarisk	<i>Tamarix</i>	<i>aphylla</i>
TACH	Five-stamen saltcedar	<i>Tamarix</i>	<i>chinensis</i>
TAPE	Saltcedar	<i>Tamarix</i>	<i>pentandra</i>
TARA	Saltcedar	<i>Tamarix</i>	<i>ramosissima</i>
TASP	Salt Cedar / Tamarisk (TACH, TARA, TAPE). Does not include athel tamarisk.	<i>Tamarix</i>	species ( <i>chinensis</i> / <i>ramosissima</i> / <i>pentandra</i> )
ULPA	Chinese Elm	<i>Ulmus</i>	<i>parvifolia</i>
ULPU	Siberian elm	<i>Ulmus</i>	<i>pumila</i>
ULSP	Elm species	<i>Ulmus</i>	species
U	Unknown	Unknown	Unknown
ZIOB	Grey Thorn Old name is <i>Condalia lycioides</i>	<i>Ziziphus</i>	<i>obtusifolia</i>