

DETERMINING THE BASELINE STATUS OF BLACK-CAPPED VIREOS IN TEXAS

Report of surveys conducted by Texas A&M University on Big Bend National Park

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December 2009

INTRODUCTION

The purpose of the Statewide Project is to determine the distribution and abundance of the endangered black-capped vireo (*Vireo atricapilla*) (BCVI) throughout its breeding range in central Texas through the development of a BCVI occupancy model. Current population estimates for BCVI are highly variable and based on few sampling points relative to the extent and variability in potential breeding habitat (e.g., Wilkins et al. 2006). In the spring of 2009, we surveyed over 4000 points throughout the species' breeding range on both public and private properties in an effort to more accurately estimate the current BCVI distribution and abundance. Increasing the accuracy of population distribution and abundance estimates will allow for a better understanding of the trends in rangewide populations over time. The surveys and analyses will ultimately result in refined habitat suitability maps for BCVI breeding habitat in Texas, increased reliability of habitat availability predictions, and recommendations of sampling protocols for long-term monitoring.

In this report we outline the methods used, and present results of data collected on Big Bend National Park during the 2009 field season. Our current methods are not designed to provide detailed abundance estimates at the scale of the park. However, information gathered through sampling on each of the ranches will be incorporated into the overall Statewide Project data set and will provide valuable data for habitat modeling throughout the species' breeding range.

METHODS

Sample sites

Potential breeding habitat is difficult to delineate for BCVI (Gryzbowski 1995). As such, we delineated a coarse sampling frame for our 2009 surveys based on land use type and percent canopy cover using supervised classifications of Landsat Thematic Mapper images with ERDAS IMAGINE 9.2 (ERDAS Inc., Norcross, Georgia, USA) for the entire breeding range of BCVI across Texas. Based on an analysis of known vireo locations dating back to 1996, we focused our selection of sample sites to areas with 1-40% canopy cover in the Edwards Plateau-Cross Timbers ecoregions and >10% canopy cover in the Chihuahuan Desert ecoregion. Although black-capped vireos are not restricted to areas with this range of canopy cover, these areas often indicate transition zones of vegetation where the vireos may occur and provided us a general sampling frame in which to focus our field surveys. We then created a 5km x 5km sample grid over the entire vireo range in Texas. We removed squares from the sample grid that did not contain the aforementioned percent canopy cover. From the remaining squares in the grid we randomly chose ~200 squares as our random sample, the majority of which were comprised of private properties. In addition to the random samples on private properties, we supplemented our surveys with data collected on an assortment of public properties, both state and federal.

Black-capped vireo inventory surveys

Three pairs of observers conducted auditory and visual surveys for BCVIs in areas of potential vireo habitat on Big Bend NP during from 25 to 28 May 2009. The two observers in a pair covered the same general area in a day but did so independently of each other and thus we consider each survey as two separate efforts. They surveyed from sunrise until ~1300, traversing the property thoroughly and systematically and only avoiding areas of open grassland or dense woodland (i.e., >85% canopy cover). In addition, observers stopped every 20 minutes along their routes for a 5-minute point survey, during which time they continued to look and listen for black-capped vireos from that point. Observers did not broadcast recorded vireo calls during the survey. When a BCVI was detected, the observer went to where the bird was first detected and recorded its location using a hand-held GPS unit. Potential habitat across the park was surveyed over the course of 4 days. Note that individual birds may have been detected multiple times by separate observers; as such, the detection data is not equivalent to the number of unique birds detected. Additional details for the inventory surveys can be found in Appendix A.

Vegetation surveys

Vegetation surveys occurred in conjunction with BCVI surveys. We collected information on tree and shrub species and woody cover characteristics such as percent canopy cover, tree/shrub height, and height of the base of the vegetation. Vegetation surveys occurred at a subset of BCVI detections and point survey locations where BCVIs were not detected. Data from the vegetation surveys will be used to ground-truth our interpretations of the satellite imagery along with providing finer details of the habitat that cannot be inferred from the current satellite imagery (e.g., tree or shrub species, height of understory vegetation). The vegetation survey was designed for large-scale sampling, with relatively few survey points on any one property yet with thousands of survey points throughout central and west Texas; thus, our vegetation data for any given property may not be an accurate or precise estimate of the vegetation structure or species composition on that property. Additional details for the vegetation surveys can be found in Appendix B.

RESULTS

We conducted 179 5-minute point surveys and recorded location data for 20 BCVI (Figs. 1–3). Because we had 2 observers collecting data independent of each other, these vireo locations cannot be concluded as all belonging to unique individuals; in some cases, the same bird may have been recorded twice by separate observers. We collected vegetation information at 45 survey points and 14 BCVI locations. UTM coordinates for the survey points and BCVI locations are in the attached Excel file titled 2009StatewideSurveyData_BigBend. We will analyze all Statewide data throughout the 2009-2010 winter and develop a preliminary habitat model. Anticipated

field work in 2010 will involve additional surveys throughout central and west Texas and model validation.

LITERATURE CITED

- Gryzbowski, J. A. 1995. Black-capped vireo (*Vireo atricapilla*). Account 181 in A. Poole and F. Gill, editors. The birds of North America, The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C., USA.
- Wilkins, N., R. A. Powell, A. A. T. Conkey, and A. G. Snelgrove. 2006. Population status and threat analysis for the black-capped vireo. U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico, USA.

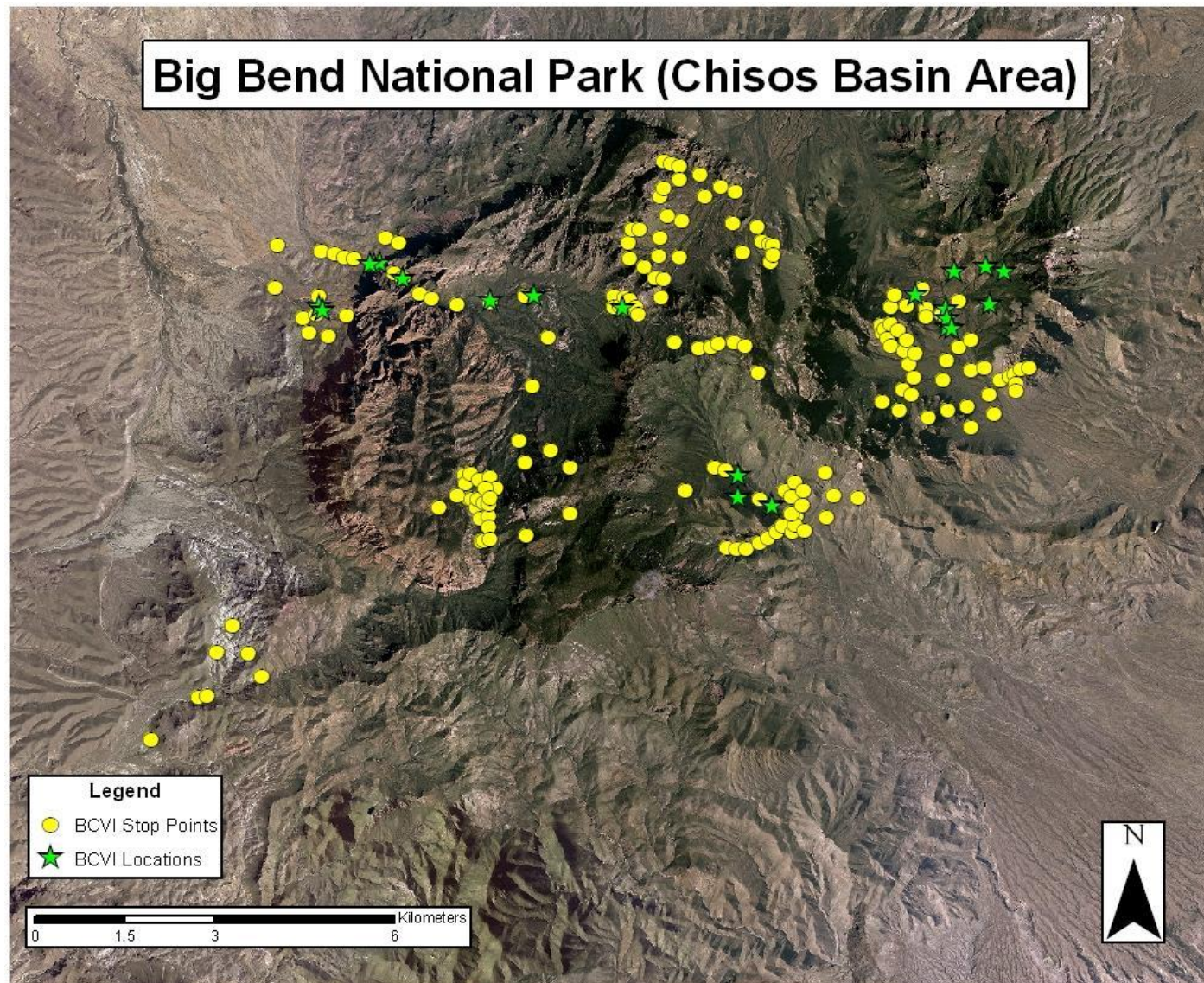


Figure 1. Texas A&M University's black-capped vireo surveys at Big Bend National Park, 25-28 May 2009. Yellow dots indicate 5-minute point survey locations; areas around and between points were traversed by the observers and likewise surveyed for vireos.

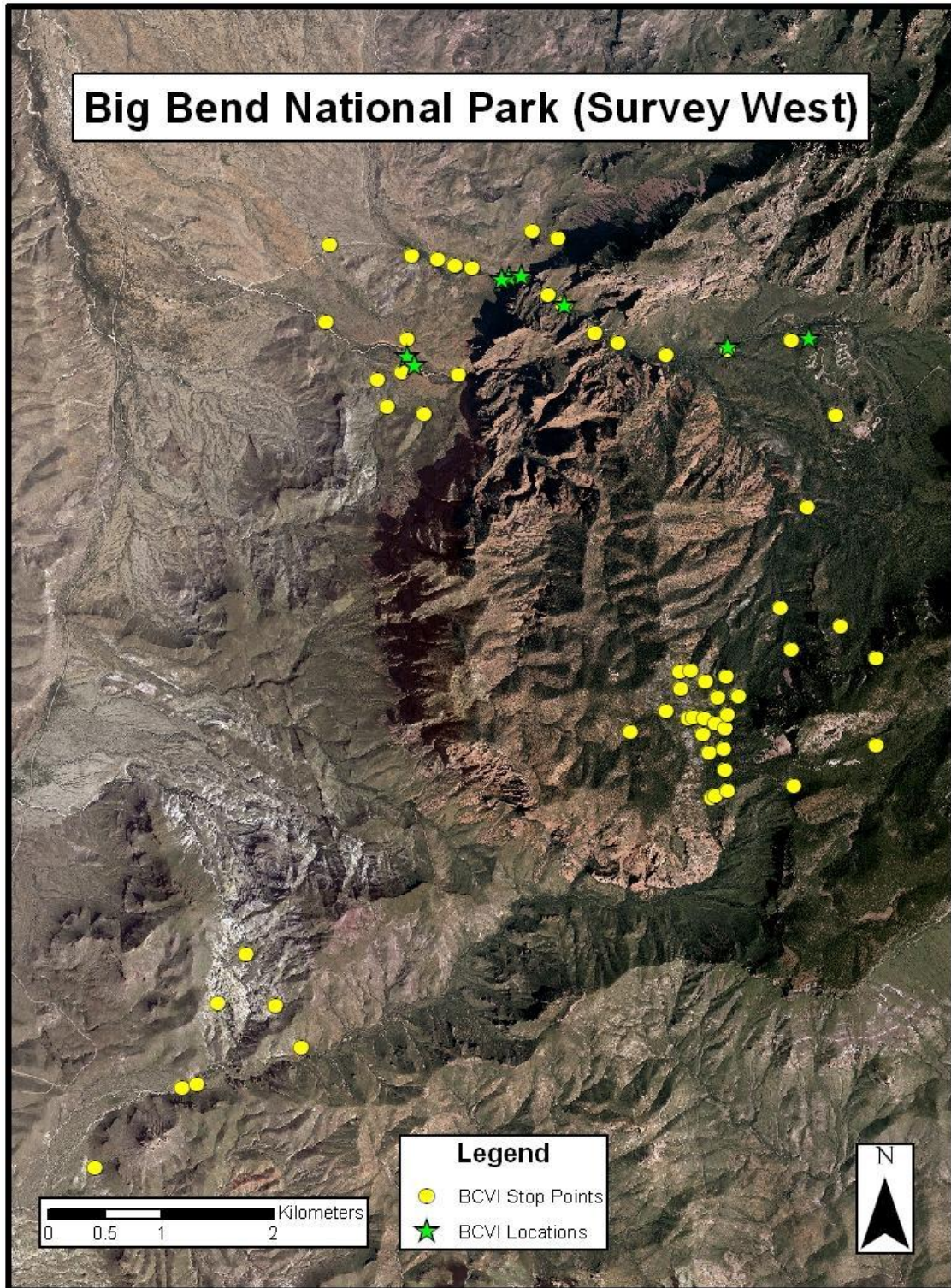


Figure 2: A close-up view of Texas A&M University black-capped vireo surveys in the western Chisos Basin of Big Bend National Park. Yellow dots indicate 5-minute point survey locations; areas around and between points were traversed by the observers and likewise surveyed for vireos.

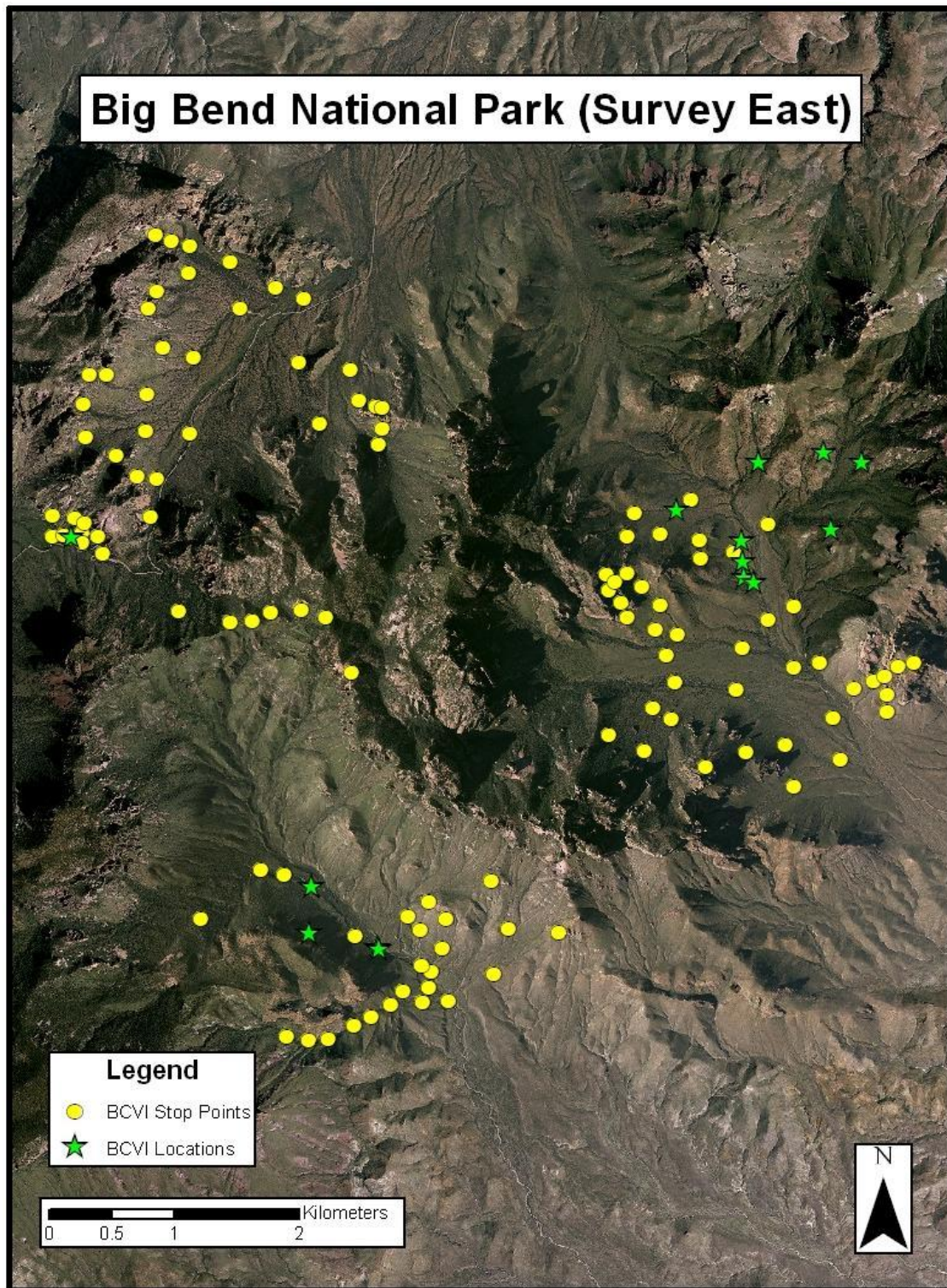


Figure 3: Figure 2: A close-up view of Texas A&M University black-capped vireo surveys in the eastern Chisos Basin of Big Bend National Park. Yellow dots indicate 5-minute point survey locations; areas around and between points were traversed by the observers and likewise surveyed for vireos.

Appendix A. Protocol used by Texas A&M University for statewide black-capped vireo inventory surveys, April–June 2009.

BCVI Inventory Protocol
Texas A&M University, 2009

OBJECTIVE To gather point location information for black-capped vireos throughout the Texas portion of their breeding range.

NECESSARY EQUIPMENT

GPS unit	binoculars	pencils	data sheets
2-way radio	compass	field notebook	clipboard
extra batteries	maps (local, state)	protocol	water

PROTOCOL

General:

- Surveys occur from sunrise until ~1300.
- Survey area = all accessible potential habitat within a 5km grid cell.
- Potential habitat = all pixelated portions of map and areas within ~100 m of pixels.
- 2 observers work simultaneously and independently in each survey area.
- Observers begin on opposite ends of the survey area and each observer surveys the entire area him/herself. Survey thoroughly and systematically (e.g., zigzag through the area), moving slowly.
- Do not communicate bird detections with the other observer.
- If one or more BCVIs are detected anywhere in the 5km grid by either observer, the area does not have to be revisited. However, if no BCVIs are detected during a visit, the patch must be revisited one more time for a total of 4 surveys (i.e., 2 visits with 2 observers each).
- Allow ~2 weeks to pass before revisiting the same survey area.
- **Resighting:** If you get a visual detection of either a GCWA or BCVI, check if the bird has leg bands (see Resight protocol). If you see bands, record the color combo in the Notes field.
- Do not survey during inclement weather (e.g., excessive rain or wind >12 mph), or any conditions that would inhibit either our ability to detect the birds.
- Check your partner's data sheet at the end of the survey period. Make sure all fields are filled in correctly; only the Notes field may be left blank at the end of the survey.

Survey route:

- Each observer marks his/her route through the survey area using the GPS tool. Maintain ~200 m spacing between the "zigs" and "zags" of each route.
- GPS the location of every BCVI you detect. Go to the location where the BCVI was first seen or heard and take a GPS reading at that point. Do not chase the bird around to determine its "exact" location; rather, estimate location without causing unnecessary disruption to the bird. Record info on Data Sheet #1.
- Conduct a vegetation survey at each BCVI GPS location (see Vegetation Survey protocol).
- If property boundaries or unsafe terrain impedes your ability to access the BCVI location, use the "Projecting a Waypoint" feature in the GPS unit, insert the appropriate distance and bearing when prompted, and record the projected waypoint UTM's on the data sheet. Record info on Data Sheet #1. Do not conduct veg surveys if you are forced to project a waypoint.
- If you detect golden-cheeked warblers (GCWA), record their locations on Data Sheet #1 or #2 as appropriate. However, do not let many GCWA detections disrupt the BCVI survey. If many GCWAs are in the area, gather a few GPS locations for them and continue focusing on BCVIs.

Stop points along route:

- Stop every 20 minutes along your route for a 5-minute point survey. GPS the point where you stop and record info on Data Sheet #2. If BCVIs are detected from that point, find and record their specific locations after the 5-minute period has ended (as noted for 'Survey route' and using Data Sheet #1).
- Conduct a veg survey at each stop point (see Vegetation Survey protocol).

30m-Radius Vegetation Survey
Texas A&M University, 2009

OBJECTIVE Estimate woody vegetation cover in areas containing potential GCWA or BCVI habitat to 1) compare areas of use versus available, and 2) ground-truth interpretations of satellite imagery.

NECESSARY EQUIPMENT

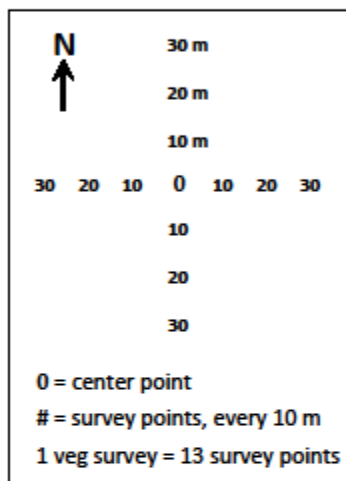
GPS unit	binoculars	protocol	tubular densiometer
2-way radio	compass	data sheets	clipboard
extra batteries	maps (local, state)	pencils	water

PROTOCOL

- Vegetation (veg) surveys occur at the following locations:
 - For GCWA
 - abundance survey point count stations ("D.O." protocol)
 - For BCVI
 - stop points along survey route at which BCVIs were not detected ("S.P." protocol)
 - individual BCVI locations ("R.T." protocol)
- For 1 and 2, the veg survey is centered at the survey point. For 3, the veg survey is centered on a BCVI location. If you are in a large cluster of BCVIs (>10 individuals), conduct veg surveys at every other individual.
- Veg surveys can occur concurrently with bird surveys. Conduct veg surveys with as little disturbance to the bird as possible.
 - For GCWA, veg surveys occur
 - after the 5-minute abundance point count survey
 - For BCVI, veg surveys occur
 - after each 5-minute stop-point survey if a BCVI was not detected
 - when you detect a BCVI

Or, if you have unlimited access to the property, you can conduct veg surveys at a later date than the bird surveys.

- Because UTMs are recorded on the respective bird survey data sheets, they are not recorded here.
- Record veg information at the center point and at every 10 m north, east, south, and west from the center point, out to 30 m (see figure above). Use magnetic north for bearings.
- Canopy cover:** At the center and every 10 m point, record presence (P) or absence (A) of canopy cover using the tubular densiometer.
- Vertical structure:** Imagine a line projecting vertically from each point and record P/A of live woody vegetation (i.e., leafy vegetation, not bare or dead branches) in each height class if the veg intersects that vertical line. If woody veg is present, record species for each height class; 1–3 species may be recorded per height class.
- Max/min height:** Imagine a line projecting vertically from the center point and a wall projecting vertically from the 10–30 m section of each 30-m transect. Record the maximum height of the veg and the minimum height of the base of the veg where the height intersects the vertical projections. Minimum base height may equal 0 m if base of veg reaches the ground. There will be 5 values for max and min heights for each veg survey area – center point and N, E, S, and W transects. Even if there is no veg at the 10-, 20-, or 30-m points along the transect, you may still have max and min values if veg occurs along the transect between those points.



30m-Radius Vegetation Survey Texas A&M University, 2009

Code sheet for 30m-Radius Vegetation Survey

D: 2-digit day of the month (e.g., the 8th of June = 08)

M: 2-digit month of year (e.g., June = 06)

Y: 4-digit year (already filled in)

County: 3-letter TX county code

Protocol: 2-letter abbreviation for the bird protocol used when determining the veg survey center point.

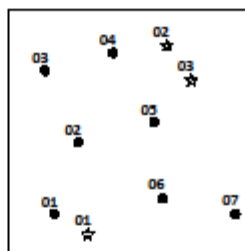
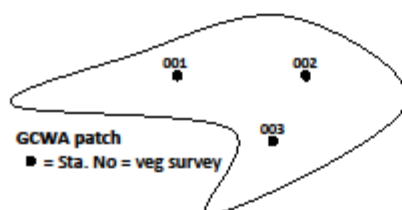
Enter: **DO** (for Double Observer protocol) if the veg survey is centered on a GCWA abundance survey point

SP (for Stop Point protocol) if the veg survey is centered on a stop point during a BCVI survey

RT (for Survey Route protocol) if the veg survey is centered on an individual BCVI location

Patch or Grid ID: 5-digit ID number of the GCWA patch or BCVI grid in which survey occurs (e.g., patch #118 = 00118)

Pt No.: 3-digit number of veg survey center point. See images below (not to scale!). For GCWA, this will be the 3-digit identification number used at each abundance survey point count station (aka, "Sta. No."). For BCVI, this will be either the 2-digit number used at each stop point along the route (aka, "Pt No.") or the 2-digit number used for BCVI identifications (aka, "Bird ID"); preface these 2-digit numbers with a zero (0) on the data sheet.



BCVI square

★ = Bird ID = veg survey
● = Pt No. = veg survey
(but only at those points from which BCVIs are not detected)

Sta. No, Bird ID, and Pt No are all differentiated by the Protocol abbreviations

Obs.: Record initials of Observer (first, middle, last).

Average height of browse line: Circle N/A if there is no browse line; circle appropriate height category if there is a browse line.

Canopy cover: If vegetation crosses the intersection of the crosshairs of the tubular densitometer, circle **P** (present), otherwise circle **A** (absent). See definition of Tubular Densitometer above for details.

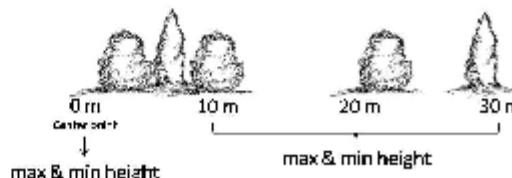
Vertical structure

0-2 m, 2-4 m, >4 m: Circle **P** (presence) or **A** (absence) of live, woody veg in each height class.

Species: Record up to 3 of the most dominant tree or shrub species that comprise each height class. Record **NO** for no species, **UN** for unknown species.

Max. height: Record maximum height of live, woody veg (estimated to the nearest 1 m) that intersects: 1) the center point, and 2) the 10–30 m segment of each 30-m transect. Record **0** for no woody veg.

Min. base height: Record minimum height of base of veg (estimated to the nearest 0.5 m) that intersects: 1) the center point, and 2) the 10–30 m segment of each 30-m transect. Record **0** for no woody veg.



Notes: Record additional observations pertaining to the veg survey, including general impressions of the survey area. For example, "dense-canopied riparian area", "rocky slope", "extensive dead vegetation".