Variable Circular Plot Bird Survey Standard Operating Procedures

USGS Western Ecological Research Station SFBE

Modified from: Conway, C. J. 2008. Standardized North American Marsh Bird Monitoring Protocols. Wildlife Research Report #2008-01. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, AZ.

Suggested citation: US Geological Survey. 2012. Variable circular plot bird survey standard operating procedures. Unpublished protocols. USGS, Western Ecological Research Center, San Francisco Bay Estuary Field Station, Vallejo, CA.

Disclaimer: Any use of trade, product, or firm names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. government.

Purpose/Objective:
Variable circle plot (VCP) surveys are used to determine densities of breeding songbirds and secretive marsh birds. Surveys should be conducted monthly between April and July to encompass the breeding season for song birds and the pre-breeding season for marsh birds.

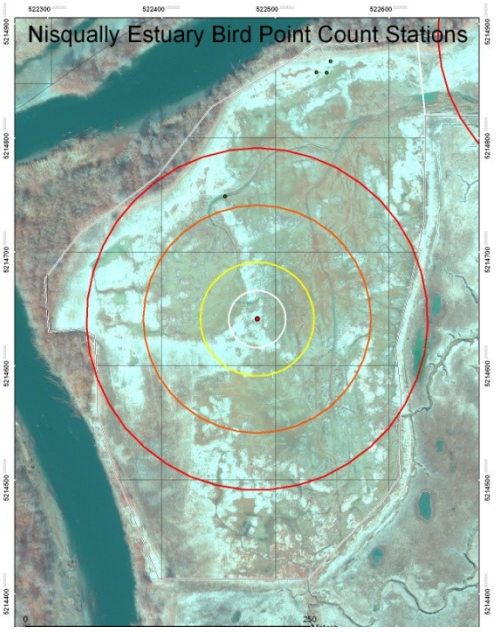

Figure 1. Point count and 25, 50, 100 and 150 meter buffer circles, Nisqually estuary.

Office Preparation:
New point count stations can be determined and established in the field, but office preparation prior to surveys will help field work to be more efficient.

1.Using aerial photos in ESRI ArcGIS or GoogleEarth, identify the location of the new point count station.

2. Create point shapefile in ArcGIS and add points for each new point count station.

3. Use the Buffer tool in ArcGIS to create 25, 50, 100 and 150 meter buffer circles around each point. These buffer circles will help you reference the location in which birds are detected.

5. Print a map with the aerial photograph overlain with the point count stations and buffer circles.

Field Equipment:
binoculars and/or spotting scope
datasheet and pencils
GPS
site map showing sampling points with coordinates
watch/timer
wind/temperature meter

Field Methods:
1. Surveys should be conducted at similar tide heights each month. The tidal stage selected should be based on when the highest numbers of marsh birds are likely to be detected in your area.

2. Surveys are conducted 30 minutes before sunrise to 3 hours following sunrise, just prior to when marsh birds cease calling.

3. VCP surveys consist of an initial 2-minute settling period followed by 8 minutes of data collection whereby all birds seen or heard within 150-m are recorded.

4. Data recorded during this period consists of: date, start and end time, observer, point/grid number, GPS coordinates, weather (wind speed, %cloud cover, and temperature), species, number and distance to detected individuals by species, habitat, and behavior.

Weather: wind (0 = 0-5mph; 1 = >5-15 mph; >15mph)
sky (% cloud cover)
precip (0 = no rain, 1 = mist/drizzle, 2 = light rain, 3 = moderate to heavy rain)

Habitat**:** MF = mudflat (exposed during low tide), MP = marsh plain, BD = bare dirt, OW = open water, SH = shallow water, UL = upland, LV = levee or dike PO = pond or pooled water, AE = aerial, CE = channel edge, CW = in channel water, SC = dry or seasonal channel, RV-CK = river or creek, OP = outside project (still in grid), UNK = unknown, note if on manmade structure

Behavior**:** FO = foraging, RO = roosting, CA = calling, SO = song, FL = flyover, SW = swimming, PR = preening, AL = alert, CD = courtship display, CN = carrying nest material, CF = carrying food, AG = aggressive display, UN = unknown, SI = just sighted

5. Species are recorded using standard North American 4-letter bird codes. Check for updated versions at least once per year. If you are unable to make a positive identification, record family, group, etc. (ex. SPAR=sparrow, RAPT=raptor, shorebird = SHOR, swallow = SWAL). Note juveniles on the data sheet when seen or heard.

6. Identify those individuals that are flyovers as zero distance. If individuals are flying over but appear to be using the area (e.g., aerial foraging), please note this on the data form.

Data Entry and Analysis:
New bird species should be added to the master bird list in the bird database. Seasonal estimates of bird density by species should be calculated using the program DISTANCE when sample size allows (Figure 2; Thomas 2010). If numbers (#ha) of certain species are inadequate to produce density estimates, mean number of birds per point should be reported. Density estimates are based on the area of a circle with radius *r.* The selection of *r* should be determined by plotting the number of birds observed by distance bands (#10-m). The maximum radius of the circle should be at the distance where a noticeable decline in detections occurs. Species richness should also be extracted from the data (species by point, season, year, master project list).

Once summarized, bird survey data can be used in multiple analyses. Examples include:

1. Change in bird composition over time, season, and/or since restoration action (Figure 3).
2. Spatial distribution of birds throughout and between study sites and in relation to vegetation and hydrological conditions.
3. Differences in bird behaviors by guild, season and/or study site.
4. Differences in habitat usage by guild, season, and/or study site.

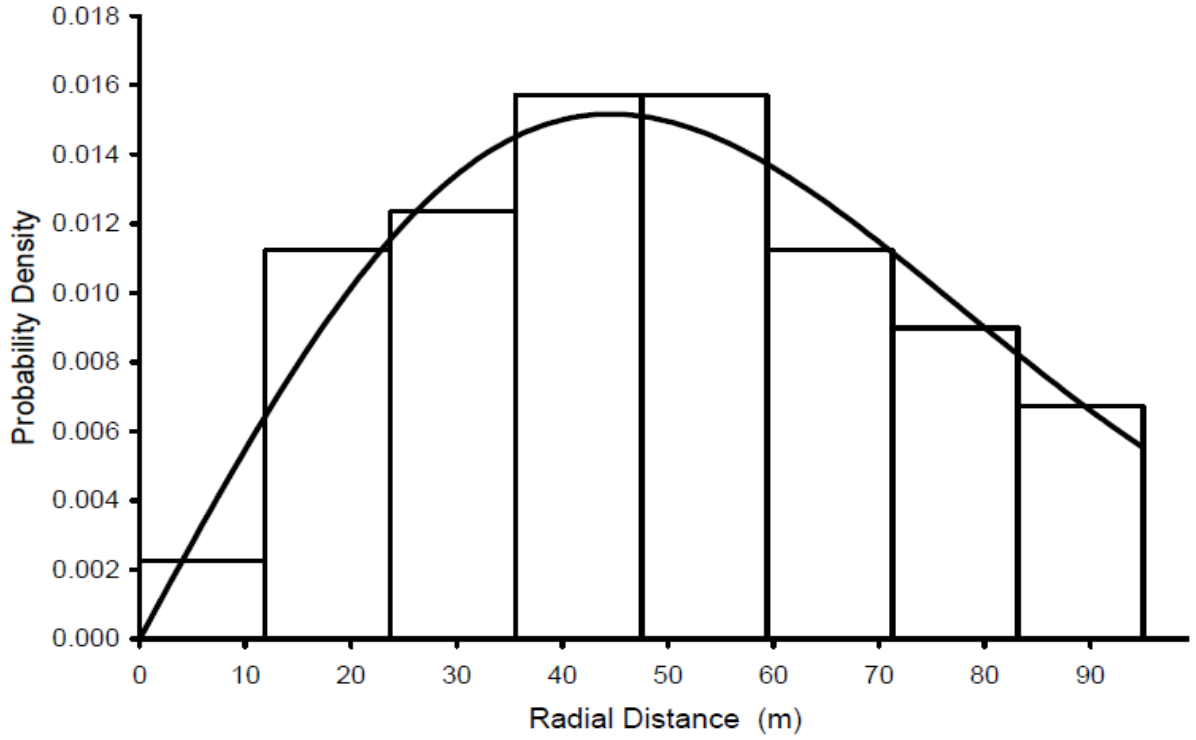

Figure 2. Example graph representing the probability that a particular bird will be detected at a given distance using the DISTANCE program (figure from Greene 2010; Thomas 2010).

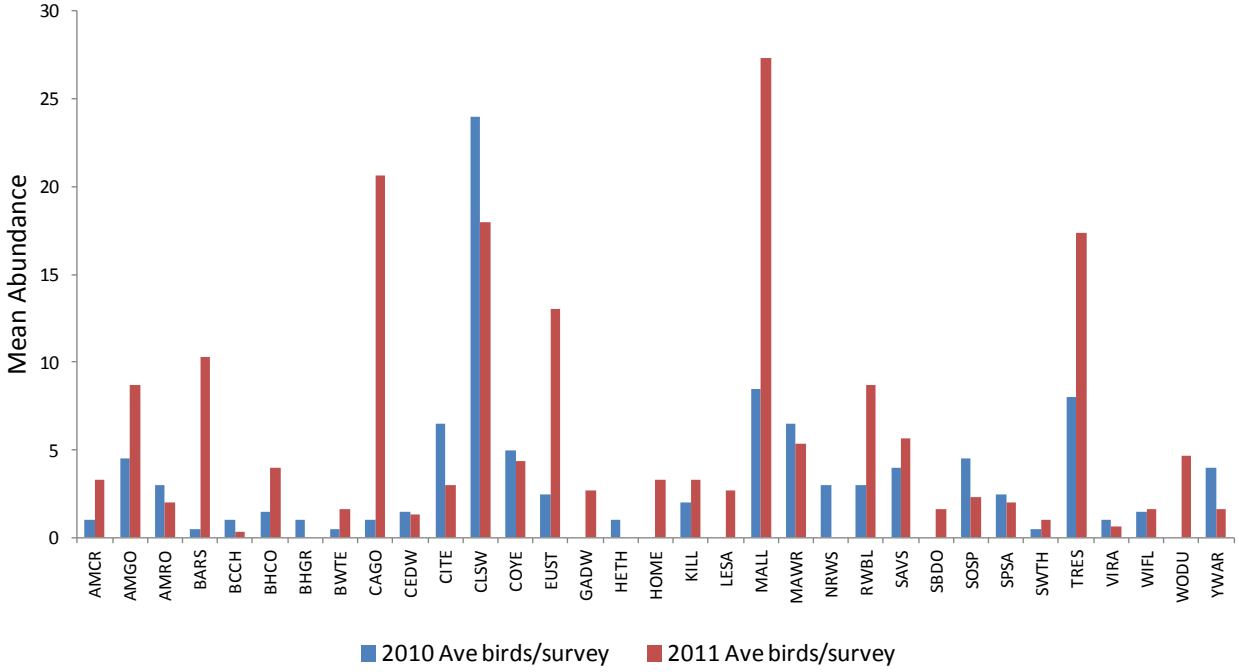

Figure 3. Average abundance of birds from VCP surveys in 2010 and 2011, Nisqually NWR freshwater marsh (Woo et al. 2011).

References:

Greene, T., A. Jones, G. Dennis, and T. Sachtleben. 2010. Distance sampling to determine kaka (*Nestor meridionalis septentrionalis*) density within Waipapa Ecological Area, Pureora. New Zealand Journal of Ecology 34 (3): 297 – 305.

Thomas, L., S.T. Buckland, E.A. Rexstad, J. L. Laake, S. Strindberg, S. L. Hedley, J. R.B. Bishop, T. A. Marques, and K. P. Burnham. 2010. Distance software: design and analysis of distance sampling surveys for estimating population size. Journal of Applied Ecology 47: 5-14. DOI: 10.1111/j.1365-2664.2009.01737.x

Woo, I., K. Turner, A. Smith, P. Markos, and J. Y. Takekawa. 2011. Assessing habitat development in response to large scale restoration at the Nisqually River Delta. Unpublished data summary report to the National Fish and Wildlife Foundation, Puget Sound Marine Conservation Fund #2006-0180-017. USGS Western Ecological Research Center, San Francisco Bay Estuary Field Station, Vallejo, CA. 21 pp.

Variable Circular Plot Bird Survey Datasheet pg._____of_____

Station	Month	Day	Year	Visit

Observers

Habitat/Environment: MF = mudflat (exposed during low tide), **MP** = marsh plain, **BD** = bare dirt, **OW** = open water, **SH** = shallow water, **UL** = upland, **LV** = levee or dike **PO** = pond or pooled water, **AE** = aerial, **CE** = channel edge, **CW** = in channel water**, SC** = dry or seasonal channel, **RV-CK =** river or creek**, UNK** = unknown, note if on manmade structure

Behavior: FO = foraging, **RO** = roosting, **CA** = calling, **SO** = Song, **FL** = flyover, **SW** = swimming, **PR** = preening, **AL** = alert, **CD** = courtship display, **CN** = carrying nest material, **CF** = carrying food, **AG** = aggressive display, **UN** = unknown, **SI** = just sighted

Point #		Time				Species				S/C/V Song/Call /Visual	0-25	25-50	50-100	100-150	Habitat	Behavior	Notes

Weather: Please estimate temperature, cloud cover (% of sky covered by clouds), and approximate wind speed.

_____˚ F or C (circle one) _____% _____ mph, knots, or kmph (circle one)

Temperature **Cloud Cover** **Wind Speed**