



Standard Operating Procedures  
NOAA Firebird Project  
Version 5.1 (last updated November 17 2022)

## Vegetation Sampling SOP

We are measuring the vegetation of wetlands that are being surveyed for birds so that we can understand the response of the vegetation to the prescribed fire management, and also bird abundance or occupancy.

## Safety

### NOAA Firebird Project Priorities

1 - Human Safety, 2 - Bird Safety, 3 - Equipment Safety, 4 - Data Collection.

**Human Safety** - Care should be taken to ensure that people are not collecting data during hazardous weather conditions (afternoons on very hot days, during thunderstorms, etc). Those traveling by boat to sites will wear life jackets as appropriate whenever on a moving boat. A first aid kit will be kept in the vehicle/boat. When traveling by boat, a float plan should be completed and filed with at least one person, located on the mainland, who will serve as the primary contact should an emergency occur. Float plans should include, at a minimum, contact phone numbers and emergency contacts for all persons on the boat, launch location, description, including license plate number, of the vehicle used to pull the boat/trailer and expected return time, etc. For sites where venomous snakes are present, snake chaps should be worn. If at any time a person doing fieldwork feels unsafe continuing, they get to say so, and fieldwork stops, be that person a volunteer, a field tech, or a PI. No one will be punished for making a safe choice.

**Black Rail Nest Safety** Eastern black rails emit the nest defense diversion call ("tch-tch-tch" in Conway 2011, "ink-ink-ink" according to Sibley guides) when people approach within several meters of an active nest. Whenever encountering this, crews shall assume that they are within several meters of an active BLRA nest. Crews will not approach the BLRA or attempt to locate the nest, but will record a gps coordinate with estimated distance and bearing instead and leave the area immediately using the same route they used to approach the coordinates. Crews will not return to attempt sampling for 3 weeks past that date. Crews will observe a 50-m radius buffer around the gps coordinates for all activities within the sampling area until 3 weeks have passed. Crews will be provided auditory examples of this distress call so that they are able to identify it.

Crews will be trained to recognize BLRA chirps and growl calls, so that they are aware of vocalizing individuals in close proximity to them. Crews will not attempt to approach vocalizing birds or engage them, and should be observant of the potential for tended chicks to be present whenever they hear these calls. When traveling through vegetated habitats, they will walk slowly, listen for these vocalizations, be vigilant for broods in transit, and carefully move away from broods if observed. Vegetation plots will not be set up and sampled to encompass stationary broods if present. However, crews may sample vegetation the same day if they hear chirps or growls or kee calls but are given no indication that stationary broods or active nests are present within their intended vegetation plot.

## Equipment

- First aid kit
- Sunglasses or safety goggles to prevent eye injury from juncus
- Cell phone or tablet with Avenza maps loaded with call survey points OR GPS Unit, with appropriate maps loaded and Batteries
- Clipboard sheet holders
- Field datasheets on *Rite-in-the-rain* paper
- Writing utensil- #2 lead pencil (including pencil sharpener or extra leads) or *Rite-in-the-rain* waterproof pen
- Light gloves (some veg can be sharp and/or pokey)
- Sighting (mirrored) compass
- Grass clippers of choice (pruners, shears, saw, weed eater with brush blade attachment)
- Robel Pole
  - A two-meter tall, half-inch PVC pipe, with 10 cm increments marked along its length in alternating black and white strips. A rope or cord of 4 meters in length should also be attached halfway up the Robel pole. This should be accompanied by a meter stick, to aid the observer in being far enough away, and at the right height for observation.
- Quadrat (25 cm incorporated into 50 cm quadrat)
  - 3-sided PVC quadrat, ½ meter to a side, with the connection piece divided into 2, 25 cm segments, forming a “W” or “M”. For transport, a rope or elastic can be run through the pieces, to allow them to be broken down and set back up more easily.
- Disc pasture meter
  - A ¾ inch thick disc 12 inches in diameter, with a ¾ inch hole in the center. All discs should weigh 1 kg. A one-meter tall ½ inch PVC pipe is marked with 1 cm marks along its length and is inserted through the center.

## Procedures

### Selecting Vegetation Plot Locations

#### Google Earth:

Open Google Earth (GE) and set the Lat/Long to decimal degrees (Tools > 3D View tab > Show Lat/Long > radio box Decimal Degrees click Apply). Then navigate to the location of your call broadcast survey (breeding season) or rope drag unit (non-breeding season). For the non-breeding surveys you can either import a geo-referenced polygon file or shapefile of a polygon of the rope drag survey area. Denote the furthest extent of your survey area in the 4 cardinal directions or top/bottom and left/right (e.g. N/top: 30.334705; W/left: -89.239557; E/right: -89.236572; S/bottom: 30.330756).

Using your web browser, navigate to the Zonum Solutions online KML-Toolbox and the “KML-Random Points” tool (<http://www.zonums.com/> > KML-Toolbox > KML-Random Points). Once there, enter the number of random points you wish to generate (we’ll be selecting 5 locations for each rope drag polygon during the non-breeding season), extents of your survey area, and set the elevation to 0 (see figure below). Then click generate points. The tool will look like it has frozen saying “Wait, generating random points...” Ignore the message and click on “Download KML File”, which will download a KML file of your random points. Navigate to wherever you store your web downloads and double-click the

file to open the random points in GE. Because many of our survey areas are not perfect rectangles, make sure that ALL of the random points fall within the boundaries of the survey area. If one or more fall outside of the area, repeat, saving points until you have the number you need to satisfy the SOP for whichever season you're generating points for. These will be the locations where you will set up your vegetation plots.

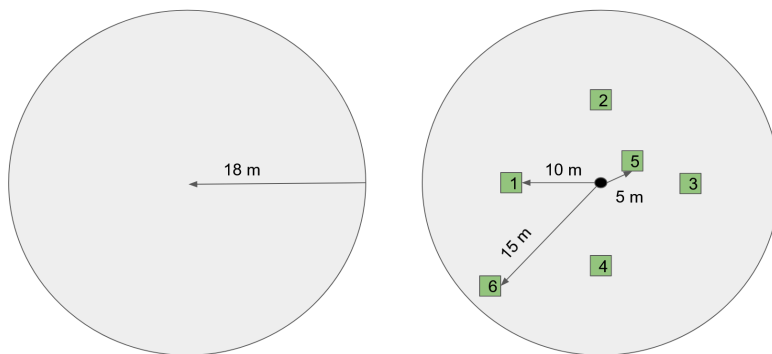
Once you have the Lat/Long for the vegetation plots be sure to enter their Lat/Long information into the Firebird database using the Locations data entry form. You can get the Lat/Long information by right clicking on the point in GE. Once you have the a lat/long information for your vegetation site, be sure to assign each plot an ID using the following convention:

XX(state)-XXXX(site)-XXXX(route)-VEGE(survey type)-###(number)

(e.g., MS-HANC-BACA-VEGE-001; HANC = Hancock Co. Marsh Coastal Preserve; BACA = Bayou Caddy area; VEGE = vegetation survey; 001 = plot number 1).

### Survey Tasks

The vegetation data collected is the same, regardless of the season or point type (random or place where a bird was detected). DO NOT perform vegetation surveys if there is standing water > 5cm in depth over more than 1/4 of the plot. Come back and sample when there is less/no standing water and you can see where vegetation is entering the ground. If your vegetation plot (or point) falls within a patch of poison ivy adjust the measurement such that it avoids the poison ivy and document what you did to relocate it (e.g. large stand of poison ivy on measurement point 5, moved the measurement to the east to avoid). If the plot falls such that it would negatively impact a nesting bird, move the plot such that sampling no longer impacts nesting birds and notate how the plot was relocated. Data should be collected in the following order to minimize disturbance to the vegetation. Use the codes found in table 1 at the end of this document when identifying vegetation to species.



Plot = the 18m radius circle

Subsample = the place where measurements (see below) C-F are taken

Subsample 1,2,3 and 4 are each 10 m from the central point in the 4 cardinal directions

Subsample 5 is 5 meters from the central point to the NE

Subsample 6 is 15 meters from the central point to the SW

### Measurements

A. Habitat Type from the central point - Entire plot

- B. Visual Estimation for Percent Cover from the central point - Entire plot
  - a. At the data collectors discretion this could be collected last if exploring the plot while doing the sub sample would help with this estimation.
- C. Quadrat for Percent Canopy Cover - once in each subsample
- D. Robel Pole for Visual Obstruction - once in each subsample
- E. Disc Pasture for Duff Layer - once in each subsample
- F. Clip plot - once in each subsample

### Habitat Type from the central point

Stand at the center of the sample plot and classify the dominant (>50% of the cover) habitat type into one of the following categories (see below). The habitat classes and descriptions are from the SHARP avian point-count circle - [Plant Communities and Habitats protocol/datasheet](#) and Correll et al. (2018)

#### Low Marsh

- Regularly flooded by daily tides
- Dominated by tall form *Spartina alterniflora* (50+ cm/20+ in) or *Spartina cynosuroides*

#### High Marsh

- Flooded only by greater than mean high tide
- Often dominated by *Spartina patens*, *Distichlis spicata*, *Spartina spartinae*
- Includes areas of short form *Spartina alterniflora* (1 - 35 cm/0.4 - 14 in) as well as *Juncus roemerianus*, *Scirpus pungens*, *Scirpus robustus*, *Limonium nashii*, *Aster tenuifolius*, and *Triglochin maritimum*

#### Salt pools/pannes

- Depressed, bare areas with sparse vegetation cover and extremely high soil salinities. Generally, pools retain water between high tides while pannes do not.

#### Terrestrial Border

- Area infrequently flooded by storm and spring tides and can include areas of marsh with fresh/brackish water due to a high water table and/or runoff from impervious surfaces.
- Most common: *Typha angustifolia*, *Iva frutescens*, *Scirpus robustus*, *Baccharis halimifolia*, *Solidago sempervirens*, *Panicum virgatum*, and *Spartina pectinata*

#### Phragmites

- The various forms (genotypes) of *Phragmites australis*.

#### Mudflat

- Exposed muddy areas free of vegetation.

#### Open Water

- Larger areas of water such as bays, channels, rivers, ponds.

#### Upland

- All non-marsh terrestrial cover, which includes non-marsh land uses that could either be natural (e.g., agriculture, pasture, grassland) or developed.

#### Beach

- Areas of open sandy ground.

### **Visual Estimation for Percent Cover from the central point**

While standing at the center of the plot, visually estimate the % coverage of the different plant species with a minimum of  $\geq 5\%$  coverage within the plot (the area within the 18 m radius circle around the point). Dead vegetation should be recorded as its own separate category but does not include vegetation that is on the ground and decomposing. Include water if the plot has  $\geq 5\%$  open water and wrack categorized as either tidal or hurricane wrack if  $\geq 5\%$ . If you are sampling during the wintertime, senescent herbaceous plants are “living” and should be identified to species. Percent cover of salt pannes and bare ground should also be separately recorded if either is  $>5\%$ . The estimate may not sum to 100% if for instance there is 60% juncus, 35% bare ground and 5% a mixture of other things, you would not record the mixture of other things.

### **How to locate the sub sample location**

The robel pole can be used to estimate distance from the central point to the sub sample points while walking in a straight line from the central point. The central point is located with a GPS unit.

### **Quadrat for percent canopy cover**

Slide the quadrat along the ground and into place, doing your best place the subsample location at the set distance from the central point. The missing side of the quadrat allows this to be done without flattening vegetation. Look at the 50 cm X 50 cm quadrat from above, and estimate, to the closest 5%, what percentage of the ground is covered by vegetation, not including dead vegetation.

### **Robel Pole for Visual Obstruction**

For visual obstruction, readings will be taken at a distance of 4 meters  $90^\circ$  to the east of the robel pole, such that the surveyor’s eyes are at a height of 1 meter above the ground. Starting at the ground, scan up until you can see the robel pole, and record which stripe is first visible (e.g. if the first 3 intervals are completely obscured and a portion of the fourth interval is partially visible, record 40 cm).

For someone working solo, bring a piece of rebar to stick in the ground and keep the rebar upright when you step away the 4 meters distance.

### **Disc pasture for duff layer**

Hold the PVC rod perpendicular to the ground, with the bottom of the blue weighted disc 1.5 m (marked by an orange band of tape) above the ground level. Then release the disc and allow it to drop under its own weight. Record the settling height of the disc by placing your fingers on the pole at the top of the disc apparatus. Pull the pole out of the disc and use the meter stick to measure from the bottom of the pole to the surveyor’s fingers.

### **Clip plots**

Once the location of the clip plot has been identified, place the quadrat on that point. Use the outline of the 25 X 25 cm quadrat (highlighted with red on the PVC) to delineate the boundaries of the clip plot. Use a hand tool to trim the area within the 25 X 25 cm quadrat to 3” (~8 cm) above ground level. The clippings from the plot will not be kept. Now assess the % coverage of the plot by estimating

coverage to the nearest 5%.

### **Post-Survey Tasks**

Ideally data should be entered on the day it is collected but at least once a week. Enter the data into the Firebird database using the Vegetation form (see Firebird data entry reference guide for information regarding data entry). Once data is entered, scan, photocopy, or take pictures of the data sheets and send them to Auriel Fournier. For those without internet access, data will be entered into the excel sheet provided by Auriel Fournier, with built-in rule sets to help catch data entry errors quickly. Each time data entry is completed, the excel sheet, and scans/photos of the paper datasheets will be sent to Auriel Fournier for incorporation into the project-wide database.

Calculating clip plot % cover: It is up to the discretion of the state leads whether to have the technicians run the script to calculate % cover, but it is recommended that whoever is responsible for this is familiar with R. The script to calculate the % cover of vegetation can be found on the Firebird Google Drive [here](#):

<https://drive.google.com/file/d/1RmhNSabfvT1t45PfczcoBa-tmZf9oGip/view?usp=sharing>. Before running the script be sure to place all of the “traced” images into the same folder and make that your working directory. After you run the script there will be a new folder in your working directory named “countColors\_output”. In that folder you’ll find your “processed” pictures, which should have the “filled” areas changed to cyan. You will also find a .csv file named “CalculatedClipPlotResults” in that folder, which contains the name of the image file with another 2 columns that have the percentage of the image that is covered by vegetation. Be sure to provide this information to your technicians to add these values to the corresponding datasheet(s) or add them yourself, and make sure that they get entered into the database.

### **References**

Correll M.D., Hantson, W., Hodman, T.P., Cline, B.B., Elphick, C.S., Shriver, W.G., Tymkiw, E.L., and Olsen, B.J., 2018, Fine-Scale Mapping of Coastal Plant Communities in the Northeastern USA: Wetlands v. 39, p. 17- 28, <https://doi.org/10.1007/s13157-018-1028-3>.

**If this protocol needs to be changed/updated, please contact Auriel Fournier ([auriel@illinois.edu](mailto:auriel@illinois.edu); 419.307.6261).**

**Table 1.**

USGS codes, and common and scientific names of plants commonly found in high marsh habitat along the Gulf Coast. (<https://plants.usda.gov/home>)

USGS code	Common name	Scientific name
MYCE	Wax myrtle	<i>Myrica</i> ( <i>Morella</i> ) <i>cerifera</i>
BAHA	Baccharis or Sea myrtle	<i>Baccharis</i> <i>halimifolia</i>
IVFR	Marsh elder	<i>Iva frutescens</i>
SPAL	Smooth cordgrass	<i>Spartina</i> <i>alterniflora</i> ( <i>Sporobolus</i> <i>alterniflorus</i> )
SPPA	Salt-meadow cordgrass	<i>Spartina</i> <i>patens</i> ( <i>Sporobolus</i> <i>pumilus</i> )
SPSP	Gulf cordgrass	<i>Spartina</i> <i>spartinae</i>
JURO	Black or needle rush	<i>Juncus</i> <i>roemerianus</i>
DISP	Salt grass	<i>Distichlis</i> <i>spicata</i>
ANGL	Bushy bluestem	<i>Andropogon</i> <i>glomeratus</i>
PAVI	Switch or panic grass	<i>Panicum</i> <i>virgatum</i>
CLMA	Saw or cut-grass	<i>Cladium</i> <i>mariscus</i>
BAMA	Saltwort/Batis	<i>Batis maritima</i>
BOFR	Sea oxeye	<i>Borrchia</i>

	daisy	<i>frutescens</i>
TYLA	Broadleaf cattail	<i>Typha latifolia</i>
SABI	Annual glasswort	<i>Salicornia bigelovii</i>
SAVI	Perennial glasswort	<i>Salicornia virginica (depressa)</i>
SCAM	Three-square bulrush	<i>Schoenoplectus americanus (olneyi)</i>
SCRO	Seacoast bulrush	<i>Schoenoplectus (Bolboschoenus) robustus</i>
ILVO	Yaupon holly	<i>Ilex vomitoria</i>
PEBO	Redbay	<i>Persea borbonia</i>
PEPA	Swamp bay	<i>Persea palustris</i>
MOLI	Shore grass	<i>Monanthochloe littoralis</i>
SADE	Virginia glasswort	<i>Salicornia depressa</i>

USGS Code	Common name	Scientific name	Seen in only this state
ALPH	Alligator Weed	Alternanthera	TX



		philoxeroides	
AMAR	Sandhill amaranth	Amaranthus arenicola	
AMPS	Cuman ragweed	Ambrosia psilostachya	
ANAR	Scarlet Pimpernel	Anagallis arvensis	TX
ANGL2	Bushy bluestem	Andropogon glomeratus	
ANVI4	Green silkyscale	Anthenantia villosa	?
AVGE	Black mangrove	Avicennia germinans	FL
BACOP	Waterhyssop	Bacopa sp.	TX
BAHA	Eastern baccharis	Baccharis halimifolia	
BAMA5	Turtleweed	Batis maritima	
BOFR	Sea oxeye daisy	Borrichia frutescens	
BOLBO	Bulrush	Bolboschoenus sp.	TX
BREAKWATER			
CAGL5	Southern Waxy Sedge	Carex glaucescens	MSAL
CALO5	Long's sedge	Carex longii	MSAL
CAREX	Sedge	Carex sp.	TX

CASEA	Casearia		FL?
CEER2	Erect Spadeleaf	Centella erecta	TX
CIRSI	Thistle	Cirsium sp.	TX
CLMA10	Saw or cut-grass	Cladium mariscus	
COAR	Florida silver palm	Coccothrinax argentata	MSAL
CYDA	Bermudagrass	Cynodon dactylon	TX
DEAD	Dead plants		
DEPA6	Panicled-leaf ticktrefoil	Desmodium paniculatum	LA
DISP	Salt grass	Distichlis spicata	
DIVI3	Virginia Buttonweed	Diodia virginiana	TX
ELOB2	Blunt spikerush	Eleocharis obtusa	
ELEOC	Spikerush	Eleocharis sp.	TX
FISP	Fringe rush?	Fimbristylis sp.	hot spring fimbry? but that is FITH...what about hurricane grass FICY in FL
FICA3	Carolina Fimbry	Fimbristylis castanea	MSAL
GATI	Stiff marsh	Galium tinctorium	MSAL

	bedstraw		
GAPU	Indian Blanket	Gaillardia pulchella	
GROUND	Bare ground/mud		
HYBO	Largeleaf pennywort	Hydrocotyle bonariensis	
ILVO	Yaupon holly	Ilex vomitoria	
IMCY	Cogonrass	Imperata cylindrica	MSAL
IVFR	Jesuit's bark	Iva frutescens	
JUEF	Common Rush	Juncus effusus	TX
JUNCU	Rush	Juncus sp.	TX
JURO	Black or needle rush	Juncus roemerianus	
JUVA2	Roundhead Rush	Juncus validus	TX
LEERS	Cutgrass	Leersia	TX
LEMI3	Common duckweed	Lemna minor	MSAL
LIPU2	Prairie Dogshade	Limnoscium pumilum	TX
LUGR9	Large-flower primrose-willow	Ludwigia grandiflora	TX

LYCA2	Carolina desert-thorn	Lycium carolinianum	
LYLI2	Wand lythrum	Lythrum lineare	MSAL
MicroForb			TX
MIMOS	Sensitive plant	Mimosa sp.	TX
MOLI	Shoregrass	Monanthochloe littoralis	
MOCE2	Wax myrtle	Myrica (Morella) cerifera	
NOBI2	Crowpoison	Nothoscordum bivalve	TX
PANO2	Bahiagrass	Paspalum notatum	
PARE3	Torpedograss	Panicum repens	
PARE3	Torpedograss	Panicum repens	TX
PASPA2	Crowngrass	Paspalum sp.	TX; LA
PAVI2	Switch or panic grass	Panicum virgatum	
PEBO	Redbay	Persea borbonia	
PEPA37	Swamp bay	Persea palustris	
PHAU7	Common reed	Phragmites australis	

PHCA6	Carolina Canarygrass	Phalaris caroliniana	TX
PHAM3	American Pokeweed	Phytolacca americana	MSAL
PHNO2	Turkey tangle fogfruit	Phyla nodiflora	LA
PIEL	Slash Pine	Pinus elliottii	MSAL
PIPA2	Long Leaf Pine	Pinus palustris	MSAL
PLANT	Plantain	Plantago sp.	TX
POSA5	Arrowleaf tearthumb	Polygonum sagittatum	MSAL
RUTR	Southern Dewberry	Rubus trivialis	MSAL
SABI	Annual glasswort	Salicornia bigelovii	
SANIC4	American Black Elderberry	Sambucus canadensis	MSAL
SACA3	Texas-star, Prairie rose-gentian	Sabatia campestris	TX
SADE10	Virginia glasswort	Salicornia depressa	same as SADE10 TX
SAGRA	Hogwood	Sagraea sp.	FL

SALA	Common arrowhead	Sagittaria latifolia	FL; SALA is Sagittaria lancifolia can't find Sagittaria latifolia
SARU			MSAL
SAST5	Rose of Plymouth	Sabatia stellaris	MSAL
SADE10	Virginia glasswort	Salicornia virginica (depressa)	
SCAM	Three-square bulrush	Schoenoplectus americanus (olneyi)	Originally SCOL...USDA says is SCAM
SCCY	Woolgrass	Scirpus cyperinus	FL
SCLA14	Common clubrush	Schoenoplectus lacustris	LA
SCPUL4	Common threesquare	Schoenoplectus pungens var. longispicatus	TX
BORO5	Seacoast bulrush	Schoenoplectus (Bolboschoenus) robustus	
SOCA6	Canada Goldenrod	Solidago canadensis	MSAL
SOME3	Seaside Goldenrod	Solidago mexicana	MSAL
SOSEM	Seaside goldenrod	Solidago sempervirens	

SPAL	Smooth cordgrass	Spartina alterniflora (Sporobolus alterniflorus)	
SPART	Cordgrass	Spartina	TX
SPCY	Big Cordgrass	Spartina Cynosuriodes	MSAL
SPPA	Salt-meadow cordgrass	Spartina patens (Sporobolus pumilus)	
SPSP	Gulf cordgrass	Spartina spartinae	
SPVI3	Seashore dropseed	Sporobolus virginicus	FL
STHE9	Amberique-bean	Strophostyles helvola	
TRSE9	Chinese tallow	Triadica sebifera	MS/AL
TYLA	Broadleaf cattail	Typha latifolia	
UNPL	Unknown/unidenti fied plant		
DISC3	Velvet panicum	Dicanthelium scoparium	
VICIA	Vetch	Vicia sp.	TX
WATER	Water		
WRACK	Wrack		

