

APPENDIX A. Vegetation sampling and metric imputation.

Vegetation surveys

At a subset of points in each cluster, we conducted detailed vegetation surveys. Several survey regions were laid out in reference to the point to be sampled. One, called here the *topbank*, was only used for stream-side points, and was a 10×5 m rectangle laid lengthwise along the top edge of the bank. The others, called *circles*, were circular plots with 10-m radius. They were randomly placed along a transect line perpendicular to the adjacent waterway, within 100 m of the point. For points on large waterways, only 2 *circles* were laid out. Where adjacent creeks were narrow, however, 1 or 2 additional *circles* were placed across the creek. Where a major transition in vegetation (such as from uniform *Spartina alterniflora* to a patch of *Juncus roemerianus*) crossed the transect line, we ensured that a *circle* fell in either habitat.

Several measurements were made within each *topbank* and *circle* region. All stems were identified to species and their heights measured, within 4 randomly placed 0.5×0.5 m quadrats. Canopy cover was estimated with a spherical densiometer (4 readings, averaged). Horizontal vegetation density was measured using a 2×0.5 m density cloth held vertically and flush with the ground (3 or 4 readings in cardinal directions at a distance of 10 m, averaged; Nudds 1977).

Within *circles* only, cover values of species occupying several height strata were estimated. The strata used were identified using the physiognomy of the particular habitat, and included "groundcover" (0.5 m and below), "shrub" (including taller marsh grass), "lower understory", "upper understory", "canopy". Cover was binned into classes: "1": 1-5%, "2": 6-

25%, "3": 26-50%, "4": 51-75%, "5": 76-100%.

Vegetation metric imputation

Vegetation sampling was done at 3 of the 6 points in each cluster, with several exceptions: four clusters had four points sampled, one had two sampled points, and one had a single sampled point. For all vegetation or plant community metrics, unsampled points were assigned the mean value of that metric at the sampled points in the same cluster. There were several exceptions, where clusters spanned a clear transition from one habitat type to another (often where a smaller water channel joined a larger one). Here, separate mean values were obtained for each of the habitats, and unsampled points were assigned values based on their spatial position within the cluster. The cluster with only a single sampled point was the furthest seaward (on the Wolf Island National Wildlife Refuge), and supported some of the most qualitatively homogeneous saltmarsh in our study region. We therefore extrapolated measurements at that sampled point to the rest of the cluster.

LITERATURE CITED

Nudds, T. D. 1977. Quantifying the vegetative structure of wildlife cover. *Wildlife Society Bulletin*. 5:113–117.