Kaibab National Forest - south zone northern goshawk sampling design
PSU stratification scheme

Christopher T. Ray and Brett G. Dickson, September 2011

Goshawk territory occurrence model

The stratification scheme for the PSUs was based on a statistical model of goshawk territory occurrence. This spatially explicit model was derived using an information-theoretic and expert-based approach and used multiple logistic regression on existing known territory centers. The parameters in the model were selected in a formal expert-based process from a set of forest structure and topographic attributes developed for forested regions in northern and eastern Arizona. The model predicts the relative probability that a given point (i.e., pixel) on the landscape is the center of a goshawk territory.

Data preparation

We placed a grid of potential 600-ha PSUs across the Kaibab National Forest south zone over private land, wilderness, and project boundaries to extract only those that did not intersect these areas. We then selected only those PSUs that were at least 95% within the boundaries of the forest and woodland habitat mask used in the goshawk territory occurrence model.

We reclassified the probability of territory occurrence model into four data quartiles and computed the proportion of each candidate PSU in the 25^{th}, 25^{th} – 75^{th}, and 75^{th} quantiles. Each PSU was assigned an overall data class value (1 through 3, with 1 being the 25^{th} quantile) according to which data quantile occupied the majority (>50%) of the area in the PSU.

PSU stratification

The territory occurrence model was used as a weighted probability distribution to direct the placement of random points over the candidate PSU area. We restricted the placement of random points to an area where the probability of territory occurrence model had higher values than a uniform random surface. Because the model itself is not random, this area was concentrated around higher probabilities of territory occurrence. Therefore, random points were more likely to be placed in areas of high predicted goshawk territory occurrence. We intersected the random points with the candidate PSU grid to extract selected PSUs. This resulted in a distribution of 3 class 1 PSUs, 12 class 2 PSUs, and 15 class 3 PSUs.A minimum distance between random points was specified to avoid selection of adjacent PSUs.

Description of shapefile attributes

PercForest:	Proportion of PSU within the forest and woodland habitat mask
PropClass1,2, and 3:	Proportion of PSU within each of the 3 data class values
OveralCls:	Final data class assigned to each PSU according to the majority rule described above
MIN, MAX, MEAN, STD:	Minimum, maximum, mean, and standard deviation of probability of territory occurrence in the PSU

Coordinates (UTMs) for the centroid of each PSU are provided in the CENT_X and CENT_Y attribute columns. UTMs are also provided for each PSU corner (NW_X, NW_Y, etc.). All coordinates are in the NAD 1983 Zone 12N geographic coordinate system.