American Kestrel Survey

In 2003, the Endangered and Nongame Species Program (ENSP) began receiving reports of declining numbers of American kestrels. In response, ENSP decided to conduct a statewide point count survey for this species. The survey would rely on Geographic Information Systems (GIS) to aid in the design of the routes. The two main goals of the survey were to gather baseline data for New Jersey's kestrel population and to see how accurate GIS are at delineating kestrel habitat.

Survey routes were created via GIS by generating random points throughout New Jersey then snapping them to the nearest road. From each snapped point, the road was then "clipped" by 5 kilometers in each direction for a total of 10 kilometers. This clipped road segment became a survey route. Along each route, eleven points were generated at 1-kilometer intervals. In order to categorize the routes by habitat suitable for kestrels, each route was buffered by 300 meters and Land Use Land Cover data (1995 NJDEP LULC) was extracted within this buffer. The resulting LULC was then separated into two categories: open (demonstrating potential habitat) versus closed (non-potential habitat). Finally, the percent of open LULC for each route was quantified into the following categories: 0-14.99, 15-29, 30-44, 45-59, 60-74, & 75-89 and 90-100. One hundred routes were selected for the survey with twenty falling within each open habitat category. The lowest and highest categories were not surveyed. Surveyors traveled each route, stopping at each of the 11 points to conduct a 3-minute point count. All kestrels observed during the point counts or along the route while driving were recorded. Surveys were conducted twice during the May-June kestrel breeding period.

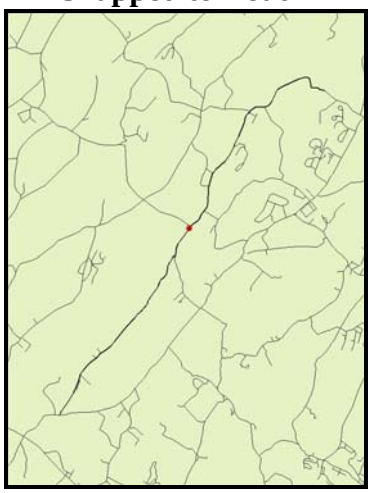
American kestrel foraging habitat

Survey Route Creation

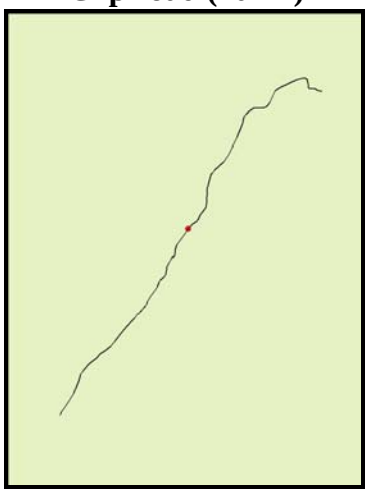
Random Points

Overlay Roads

Snapped to Road

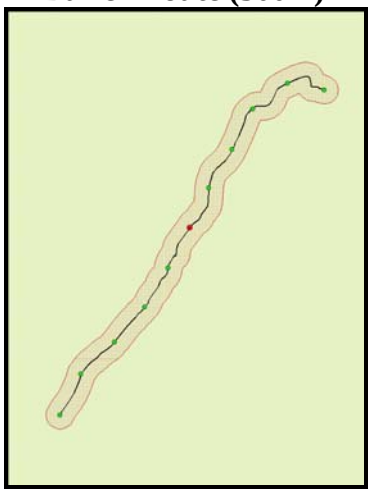


Clip road (10km)

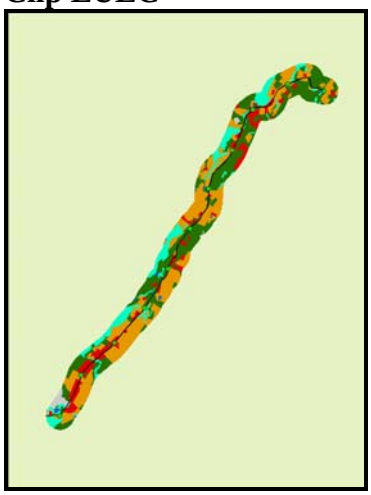


Place points (1km)

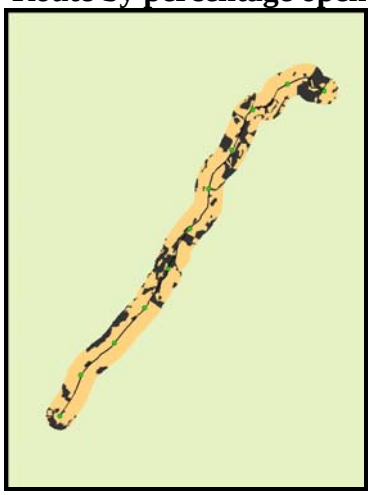
Buffer Route (300m)



Clip LULC



Route by percentage open



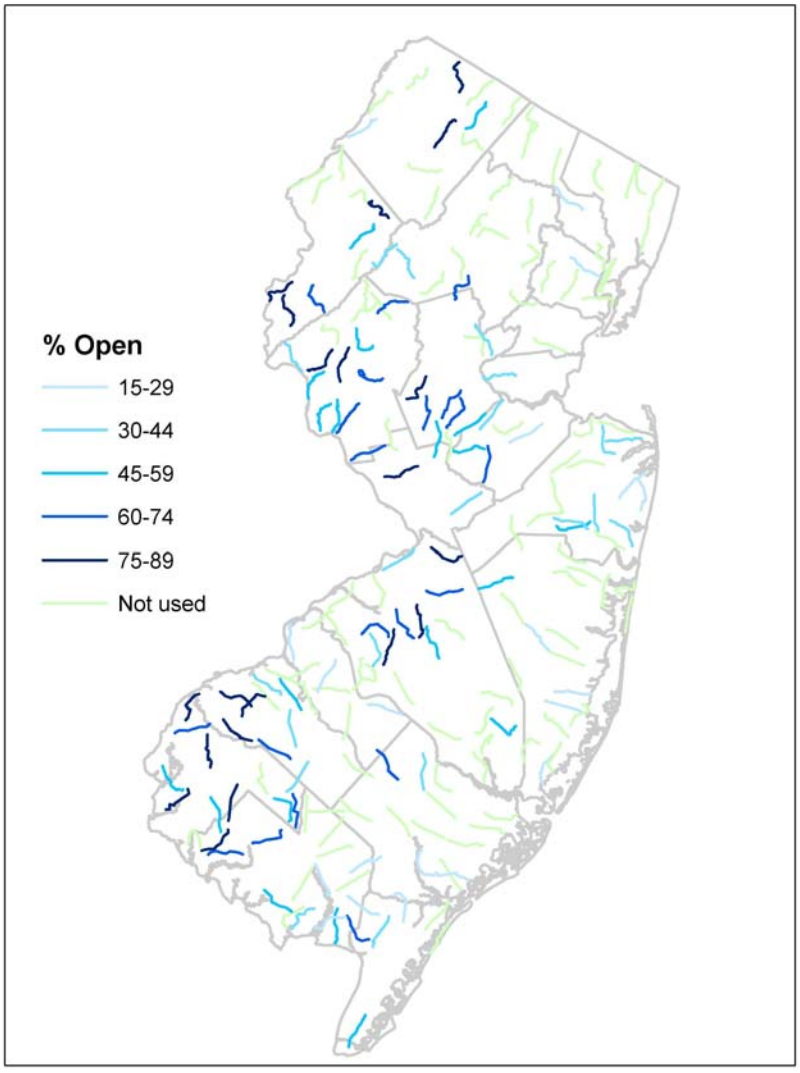
LULC categorized by “openness”

LU02	LABEL02	TYPE02	Open
1140	RESIDENTIAL, RURAL, SINGLE UNIT	URBAN	TRUE
1211	MILITARY INSTALLATIONS	URBAN	TRUE
1214	FORMER MILITARY, INDETERMINATE USE	URBAN	TRUE
1440	AIRPORT FACILITIES	URBAN	TRUE
1461	WETLAND RIGHTS-OF-WAY	WETLANDS	TRUE
1463	UPLAND RIGHTS-OF-WAY UNDEVELOPED	URBAN	TRUE
1499	STORMWATER BASIN	URBAN	TRUE
1700	OTHER URBAN OR BUILT-UP LAND	URBAN	TRUE
1741	PHRAGMITES DOMINATE URBAN AREA	URBAN	TRUE
1750	MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	WETLANDS	TRUE
1800	RECREATIONAL LAND	URBAN	TRUE
1804	ATHLETIC FIELDS (SCHOOLS)	URBAN	TRUE
1850	MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA	WETLANDS	TRUE
2100	CROPLAND AND PASTURELAND	AGRICULTURE	TRUE
2140	AGRICULTURAL WETLANDS (MODIFIED)	WETLANDS	TRUE
2150	FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UP)	WETLANDS	TRUE
2200	ORCHARDS/VINEYARDS/NURSERIES/HORTICULTURAL AREAS	AGRICULTURE	TRUE
2300	CONFINED FEEDING OPERATIONS	AGRICULTURE	TRUE
2400	OTHER AGRICULTURE	AGRICULTURE	TRUE
4120	DECIDUOUS FOREST (>50% CROWN CLOSURE)	FOREST	TRUE
4410	OLD FIELD (< 25% BRUSH COVERED)	FOREST	TRUE
4411	PHRAGMITES DOMINATE OLD FIELD	FOREST	TRUE
4420	DECIDUOUS BRUSH/SHRUBLAND	FOREST	TRUE
4430	CONIFEROUS BRUSH/SHRUBLAND	FOREST	TRUE
4440	MIXED DECIDUOUS/CONIFEROUS BRUSH/SHRUBLAND	FOREST	TRUE
4500	SEVERE BURNED UPLAND VEGETATION	FOREST	TRUE
6110	SALINE MARSHES	WETLANDS	TRUE
6111	SALINE MARSH (LOW MARSH)	WETLANDS	TRUE
6112	SALINE MARSH (HIGH MARSH)	WETLANDS	TRUE
6120	FRESHWATER TIDAL MARSHES	WETLANDS	TRUE
6130	VEGETATED DUNE COMMUNITIES	WETLANDS	TRUE
6141	PHRAGMITES DOMINATE COASTAL WETLANDS	WETLANDS	TRUE
6210	DECIDUOUS WOODED WETLANDS	WETLANDS	TRUE
6220	CONIFEROUS WOODED WETLANDS	WETLANDS	TRUE
6231	DECIDUOUS SCRUB/SHRUB WETLANDS	WETLANDS	TRUE
6232	CONIFEROUS SCRUB/SHRUB WETLANDS	WETLANDS	TRUE
6233	MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)	WETLANDS	TRUE
6234	MIXED SCRUB/SHRUB WETLANDS (CONIFEROUS DOM.)	WETLANDS	TRUE
6240	HERBACEOUS WETLANDS	WETLANDS	TRUE
6241	PHRAGMITES DOMINATE INTERIOR WETLANDS	WETLANDS	TRUE
6500	SEVERE BURNED WETLANDS	WETLANDS	TRUE
7400	ALTERED LANDS	BARREN LAND	TRUE
7430	DISTURBED WETLANDS (MODIFIED)	WETLANDS	TRUE
7500	TRANSITIONAL AREAS	BARREN LAND	TRUE
7600	UNDIFFERENTIATED BARREN LANDS	BARREN LAND	TRUE

Female American kestrel

Male American kestrel

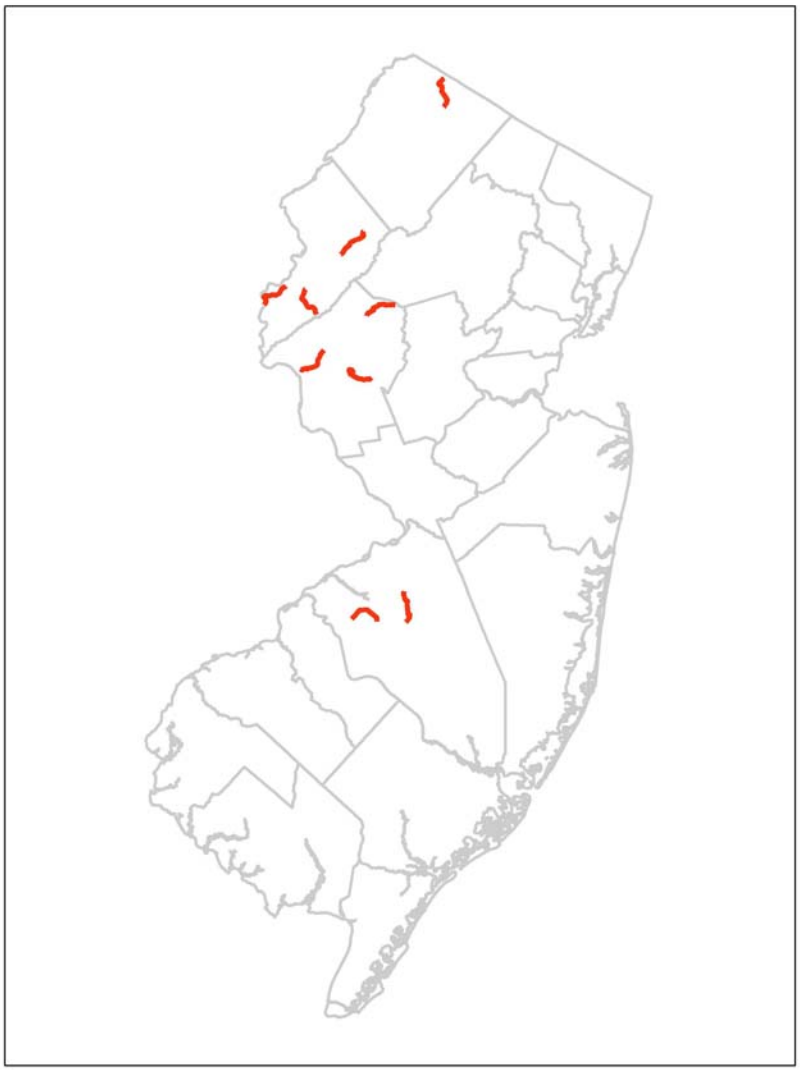
Statewide Survey Routes



Survey Results

Results of the survey were discouraging. Of the 100 routes surveyed, only nine were positive for American kestrels. Of the 1,086 points surveyed (14 points were not reported on), only eight were positive for kestrels. One kestrel was also observed on a route between points, making for nine positive routes. Eight of the nine positive survey routes were in the top two categories for open habitat: 60-74 % and 75-89. Overall, eighteen kestrels were observed.

Positive Survey Routes



Discussion

We found fewer kestrels than anticipated. This may be due to limited time spent conducting the surveys and/or difficulties with detectability of kestrels. Detectability could be addressed in the future by increasing time spent at each point in addition to surveying more frequently. Those issues aside, the GIS depiction of habitat positively predicted kestrel occurrences in open habitat. Selection of suitable habitats could be further refined by selecting habitats with herbaceous cover.