American kestrel Habitat Loss and Fragmentation

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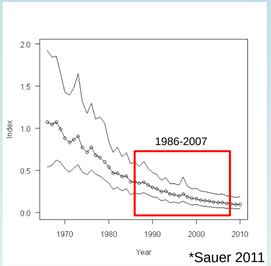
Introduction

The American kestrel (*Falco sparverius*) is North America's smallest and most widely distributed falcon. Kestrels occupy large open areas with short vegetation. They are second cavity nesters, utilizing cavities which are naturally occurring or excavated by woodpeckers. Population trend data from various sources (Farmer 2009, Sauer 2011, Smallwood 2009) have shown declines in kestrel numbers including the Northeast. In February of 2012 the Endangerd and Nongame Species Program (ENSP) listed the American kestrel as a State Threatened species within New Jersey

Possible reasons for decline

- **Nest site limited & competition from introduced species**
- **Habitat Loss and Fragmentation**
- **West Nile virus**
- **Cooper's Hawk Predation**
- **Pesticides**



*Sauer 2011

Objectives

To investigate one of the possible reasons for decline, ENSP examined kestrel habitat within New Jersey

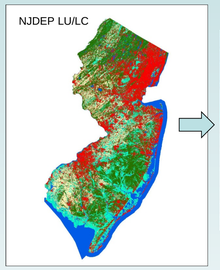
The New Jersey Department of Environmental Protection (NJDEP) has four year classes (1986, 1995, 2002 & 2007) of photo interpreted hand digitized Land Use/Land Cover (LU/LC) data.

Utilizing the NJDEP's LU/LC data,

- **create GIS layers of American kestrel habitat from each of the 4 eras available**
- **Compare the patch network of habitat across the eras**
- **Determine if kestrel habitat is being lost and if so is it also becoming more fragmented**

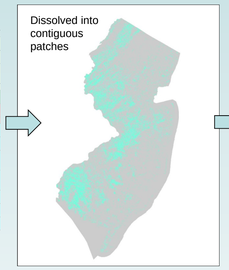
Methods

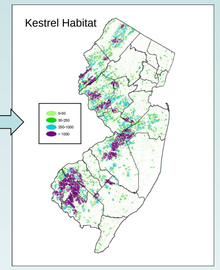
ENSP reclassified the NJDEP LU/LC at the modified Anderson III level based on the suitability of the classes for kestrels. Level III codes which represented open as well as herbaceous classes were recoded as kestrel habitat and extracted. These extracted classes were dissolved into contiguous patches of kestrel habitat. The process was repeated for each of the 4 eras of LU/LC available. Patches were displayed based on 3 size categories (0-250, 250 – 1000 and >1,000 ha)



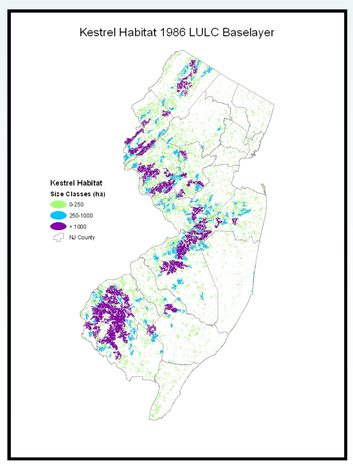
Level III classes = kestrel habitat

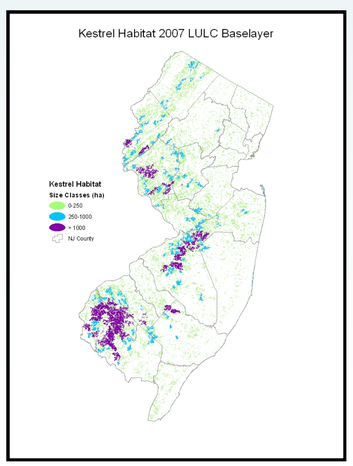
TYPE95	LABEL95	OPEN	HERBACEOUS
AGRICULTURE	CONFINED FEEDING OPERATIONS	Yes	Yes
AGRICULTURE	CROPLAND AND PASTURELAND	Yes	Yes
AGRICULTURE	ORCHARDS/VINEYARDS/NURSERIES/HORTICULT	Yes	Yes
AGRICULTURE	ANIMAL AREAS	Yes	Yes
AGRICULTURE	OTHER AGRICULTURE	Yes	Yes
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
URBAN/BUILT	ATHLETIC FIELDS (SCHOOLS)	Yes	Yes
URBAN/BUILT	RECREATIONAL LAND	Yes	Yes
WETLANDS	AGRICULTURAL WETLANDS (MODIFIED)	Yes	Yes
WETLANDS	HERBACEOUS WETLANDS	Yes	Yes
WETLANDS	MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA	Yes	Yes
WETLANDS	MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	Yes	Yes
WETLANDS	DESERTIFIED BURNED WETLANDS	Yes	Yes
WETLANDS	VEGETATED DUNE COMMUNITIES	Yes	Yes
WETLANDS	WETLAND RIGHTS-OF-WAY (MODIFIED)	Yes	Yes





Kestrel Habitat 1986-2007

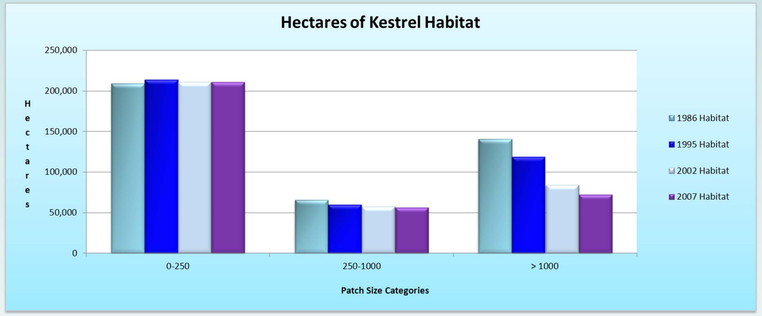


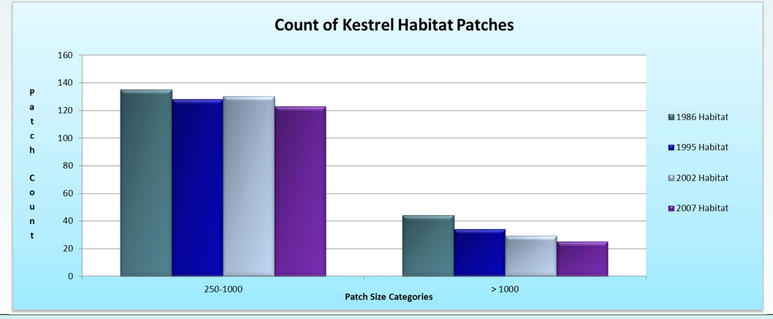


Conclusion

Potential Kestrel habitat as depicted through the NJDEP LU/LC from 1986-2007 has decreased and has become more fragmented

- **~75,402 ha of potential kestrel habitat was lost (~3,600 ha/year)**
- **Overall, the number of patches increased**
- **Within the top 2 categories (>250 ha, preferred kestrel habitat), the number of patches, sum and average patch size all decreased.**





References

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2010. Version 12.07.2011 USGS Patuxent Wildlife Research Center, Laurel, MD

Farmer, C.j., J.P.Smith,2009. Migration Monitoring indicates widespread declines of American kestrels (Flaco sparverius) in North America. J. Raptor Res. 43(40:263-273

Smallwood, J.A.,M.F. Causey, D.H. Mossop, J.R. Klucsarits, B. Robertson S. Robertson, J. Mason, M.J. Maurer, R.J. Melvin,R.D. Dawson, G.R. Bortolotti, J.W. Parrish, JR., T.F. Breen, and K. Boyd. 2009.Why are American Kestrel (Falcosparverius) populations declining in North America? Evidence from nest-box programs. J. Raptor Res. 43:274–282.

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