Research recommendations for understanding the decline of American Kestrels (*Falco sparverius*) across much of North America

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Falco sparverius
American Kestrel

Breeding

Year-round

Winter
American Kestrel

Photo: Rob Palmer
Declines are steady, widespread, and enigmatic

Year

Kestrels per BBS route
0.0 0.5 1.0 1.5 2.0 2.5

43% Decline
Declines are steady, widespread, and enigmatic
Declines are steady, widespread, and enigmatic

47% Decline
Declines are steady, widespread, and enigmatic

- **BBS** (Smallwood et al. 2009, Sauer et al. 2014, Balgiano et al. 2015)
- **Christmas Bird Count** (Paprocki et al. 2014, Balgiano et al. 2015)
- **Migration Counts** (Farmer and Smith 2009, Balgiano et al. 2015)
- **Nest Boxes** (Smallwood et al. 2009)
WHY?
Declines are steady, widespread, and enigmatic.
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Threats: Recent arrivals or increasing over time...

- West Nile Virus (Smallwood 2009)
- Neonicotinoids
- Increased Cooper’s Hawk
- Climate change

...do not explain a long-term, steady decline...
Declines are steady, widespread, and enigmatic
A Path Forward

• Monitoring
• Studies of survival
• Studies of reproduction
• Full annual cycle
A Path Forward: Monitoring

- Phenology changes may induce false trends

Study migratory connectivity
  - Population genetics
Breeding range population structure (Ruegg et al. 2012)
A Path Forward: Monitoring

- Phenology changes may induce false trends

Study migratory connectivity
  - Population genetics
  - Tracking devices (& technology)

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A Path Forward: Monitoring

- Changes in availability of unmonitored nest sites may induce false trends
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- Changes in availability of unmonitored nest sites may induce false trends

Develop methods to test scenarios
  - Demographic models
A Path Forward: Monitoring

- Limited historical reach

Historic accounts & atlas data
A Path Forward: Studies of Survival

- Increased mortality during non-breeding (Smallwood 2009)

Study survival during non-breeding
  - Yearly survival: adults and young
  - Overwinter and migration survival
  - South of the US border

University of North Texas, Jim Bednarz
A Path Forward: Studies of Reproduction

- MANY nest monitoring programs

Protocol standardization
- Shared protocol
- Kestrel data base
- American Kestrel Partnership
A Path Forward: Studies of Reproduction

- Lack of consensus or data for some issues

Examine drivers of success and failure
- Roadside boxes
- Box placement
- Predator guards
A Path Forward: Full annual cycle

- Survival & reproduction do not act in isolation

Study rates of entrance and exit
  - Band and monitor reproduction and annual return to population
  - Individual-based models
A Path Forward: Summary

- Build upon methods that have been used in the past,
- Expand to understudied regions,
- Incorporate new technology, and
- Increase focus on kestrels beyond the breeding season.
QUESTIONS?

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