

## Experimental predator management at kite nests in eastern Arkansas

The Swallow-tailed Kite is of extreme conservation concern in Arkansas and elsewhere. Only one pair exists in Arkansas and has repeatedly failed to produce young probably due to predation. We propose to use predator excluding devices (PEDs) at a sample of Mississippi Kite nests (>20 nests) and compare reproductive success between these and control nests (without PEDs). This experiment would test if nest predation is the limiting factor on kite populations and would allow us to evaluate a possible management approach that could restore the Swallow-tailed Kite population.

### Project Leader

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Total Requested: \$54,300

Total Match: \$54,300

- A. **Funding Priorities.** This project addresses funding priority Number 11 for 2008 State Wildlife Grants. Specifically, the management of forests to benefit Species of Greatest Conservation Need. Also, this project integrates Arkansas Wildlife Action Plan priorities with other land-use or natural resource efforts at the local, state, and federal levels. Further, this proposed project addresses a critical Species of Greatest Conservation Need while also benefiting other fish and wildlife. The Swallow-tailed Kite (*Elanoides forficatus*) may be the most endangered bird in Arkansas, in that only one pair is known to exist (Anich et al. 2007). Also, recent research has documented that the population in the U.S. is a genetically unique subspecies (Washburn et al. 2007). Thus, the priority conservation score for this species (currently = 23 out of 100) in the Arkansas list of Species of Greatest Conservation Need should be updated and substantially increased. Importantly, this species does not seem to be habitat limited in Arkansas, but rather seems to be limited by poor reproductive performance (Bader and Bednarz 2006). Here, we propose to employ innovative predator management in a forest habitat that will address this likely limiting factor. Extraordinarily high rates of nest predation seem to be pervasive for many species of conservation concern throughout the Mississippi bottomland forest habitats in Arkansas, including Swainson's Warblers (*Limnithlypis swainsonii*), Mississippi Kites (*Ictinia mississippiensis*), and Pileated Woodpeckers (*Dryocopus pileatus*) (Bader and Bednarz 2006, Benson et al. 2007, B. Noel and Bednarz Unpubl. data). Our proposed experiment will further assess this adverse factor affecting many species of conservation concern in the Mississippi River bottomland forests and implement a management practice that may potentially control the impact of this factor for some species of greatest conservation concern

Additionally, this proposed project focuses on the conservation and population restoration of the Swallow-tailed Kite which addresses the integrated priorities of the State Wildlife Action Plan, the priorities of the U.S. Fish and Wildlife Refuge system (specifically the White River National Wildlife Refuge), and the priorities of the newly formed international conservation group, the Swallow-tailed Kite Conservation Alliance.

Finally, the Swallow-tailed Kite is a high-profile species of substantial interest to bird watchers and the general public. In the past our kite work has received strong support from local Audubon groups and bird watchers, and will likely attract additional media coverage in the future. In this way, support of the proposed kite study will further publicize and raise the profile of the Arkansas Action Plan with elected officials, interested parties, and the general public.

- B. **Ecoregion.** This research and management project will be conducted in the Mississippi Alluvial Plain ecoregion. Specifically, work will be done in the White River National Wildlife Refuge (WRNWR) in Arkansas, Desha, Monroe, and Phillips counties and primarily be conducted in high and low Mississippi River bottomland forest habitat. We have been monitoring the Swallow-tailed Kite pair and Mississippi Kite population in this study area since 2002 (Bader and Bednarz 2006).
- C. This proposed project would continue addressing several research and conservation objectives that are being supported by a current SWG project. These objectives include: (1) locate nest sites of Swallow-tailed and Mississippi kites breeding in the WRNWR and adjacent lands, (2) monitor the success of all kite nests located, and (3) document the aerial or terrestrial predators that cause nest failures. We have successfully collected these data in the past, but because of the difficulty of working with kites and in remote bottomland hardwood swamps, our sample sizes in any given year are limited. Thus, we propose to continue addressing these objectives for 2 additional years to provide a scientifically rigorous sample size. Moreover, finding and monitoring kite nests is necessary before we can implement the

proposed objective of using predator excluding devices (PEDs) on a sample of kite nests and assess the effectiveness of this management approach.

**Nest Searching.** We will begin searches for Swallow-tailed and Mississippi kites in early April. Searches will be conducted with an outboard motorboat, all-terrain vehicle, kayak, and by foot. The primary focus areas will be the locations of previous nests and sightings of both kite species (Bader and Bednarz 2006, Anich et al. 2007). Generally, our approach will be to locate and watch birds early in the morning until we observe nest building activities or the kites lead us to a nest (see Bader and Bednarz 2006).

**Predator Exclusion Devices.** Half the Mississippi Kite nests located will be randomly selected to have Predator Exclusion Devices (PEDs) affixed on the nest trees. PEDs will consist of lightweight aluminum flashing wrapped around the nest tree at ground level or up to 1.5 m above the ground (Withgott et al. 1995). We anticipate a total sample to exceed 30 Mississippi Kite nests. Thus, we will apply PEDs to at least 20 nests and the other 20+ nests will serve as controls. In addition, we will apply a PED immediately to any Swallow-tailed Kite nest located. However, surveys to date have documented the presence of only one pair of Swallow-tailed Kites attempting to breed in Arkansas (Anich et al. 2007).

**Nest Monitoring.** All Swallow-tailed and Mississippi kite nests located will be visited and monitored every 3 days with a spotting scope or binoculars, from a distance of approximately 50–100 m, so that kites will not be disturbed. Activities and behaviors at nests will be monitored for 1–2 hr during each visit to determine nest stages and to estimate hatching and fledging dates.

**Video Recording of Kite Nests.** We will use three specially-designed infrared video recording systems from Fuhrman Diversified Inc., (Seabrook, TX) to monitor nests. These systems are specially designed for use in the field 24 hours a day. This recording system uses Sony Color Ultra-High Resolution Versacam with infrared capabilities up to 23 m away. We also will employ three Supercircuits mono-power infrared video camera systems and Supercircuits VHS time-lapse recorders (Liberty Hill, TX) to monitor kite nests. After kites have been incubating at least 7 days we will climb nest trees using a harness, lanyard, and tree spikes and place camera at or above nest level. The camera systems need to be serviced every 3 days (tapes and batteries replaced) and will be left at nests until young fledge or the nest fails. The video tapes will be viewed on a monitor, data digitized, and the cause of any nest failures will be determined.

D. **Measurable Products.** Results will be summarized in one annual report after the 2009 field season and one final report completed in early 2011 after all field data are collected and the analyses are completed. Recommendations will be made regarding the use of or modification of PEDs and further conservation measures that may be implemented to foster the restoration of the Swallow-tailed Kite population in Arkansas. The data will also be presented during at least two state or regional scientific meetings and two national meetings. We also anticipate presenting aspects of this study during popular presentations open to the public (e.g., Audubon Society Meetings). In addition, the data and analyses will be included in a M.S. thesis of the primary student coordinating this study. Finally, the results will be reported in a peer-reviewed scientific journal.

E. **Existing Resources.** The Avian Ecology Laboratory at Arkansas State University contains a variety of basic field supplies (e.g., binoculars, spotting scopes, compasses, flagging) which

are available to the field team upon initiation of this study. Also, we have access to a motor boat, video camera systems, two ATVs, a backwater kayak, and a 4-wheel drive truck that were secured with previous funds to survey and study kites. This equipment will be maintained and used in the proposed next phase of this project. Also, the lab contains an up-to-date network of desktop computers with state of the art statistical and GIS software (e.g., SAS, DISTANCE, ArcGIS). The lab is also typically staffed with 10 or more experienced graduate and undergraduate students with extensive training in bird identification, avian ecology, and statistical analyses. This existing knowledge and experience base assists in the undertaking and adaptive refinement of ongoing projects. In addition, we have been working collaboratively on the kite research and conservation project with the U.S. Fish and Wildlife Service at WRNWR (primary refuge collaborators are Richard Hines and Steve Reagon). This partnership will continue during this proposed project. Further, this study will be coordinated with the international efforts of the Swallow-tailed Kite Conservation Alliance.

- F. For the most part, long-term continuation of the management aspects of this project can only be addressed after the results of this experimental study are available. If PEDs are successful, staff and managers of the WRNWR potentially will be able to maintain existing PEDs. Maintenance would require one brief annual visit to nest trees. Moreover, 15-20% of the nest trees are re-used by kites in successive years. Although we need additional data, re-use of the same super-emergent trees as nest sites is quite common over long periods (although not necessarily in successive years). At this point, we have records of over 50 individual super-emergent trees that have been used by either Swallow-tailed or Mississippi kites in the past. If the PEDs are successful, a reasonably economical follow-up management project could be implemented to erect PEDs at all documented nest trees in the WRNWR. Maintenance of all these sites could be done annually on a fairly economical basis potentially by the refuge staff.

**G. Budget: 24 months (1 January 2009 to 31 December 2010)\***

Salary and benefits	\$ 66,663
Travel	13,220
Supplies	<u>18,843</u>
Total operating expenses	32,063
Indirect costs	<u>9,874</u>
<b>Total Costs</b>	<b>\$108,600</b>
Amount requested from SWG	\$54,300
Cash match from AGFC (nongame – K. Rowe)	30,000
In-kind match from ASU	<u>24,300</u>
Total funds requested	<b>\$108,600</b>

\*A 6-month project extension would be required to allow us to implement this proposed project in the spring and summer of 2009 and 2010, and to prepare a final report in the fall of 2010.

## Qualifications:

**James Bednarz, Ph.D., Professor of Wildlife Ecology**, will manage the overall project and work closely with Scott Chiavacci (Graduate Research Assistant) to coordinate the field and analysis work on the project, and participate in the execution of the project from beginning to end. Jim will work with Scott in developing field data collection protocols, collecting the data, participating in the analysis and interpretation of the data and contributing to the writing of the report. Jim Bednarz has conducted research on six continents for over two decades emphasizing avian population ecology and conservation. Most of this work has been focused on birds of prey, woodpeckers, game birds, and songbirds, with significant emphasis on rare species. Topics of research have included effects of habitat and landscape fragmentation and other human activities on migratory bird population demography, impacts of hydroelectric development on wetland areas and wildlife, radiotelemetry and habitat use studies on a variety of wildlife species, development of endangered species conservation plans, design of mitigation plans for habitat and wildlife populations, and basic questions about avian ecology. Jim has published 36 journal articles or monographs, 5 contributions to books, 10 papers to conference proceedings, 4 published book reviews, and completed 55 funded project reports.

## Selected Publications

- 2007. Landscape use by Hairy Woodpeckers in managed forests of northwestern Washington. *J. Wildl. Manage.* 71:2612-2623. (with D. Ripper and D. E. Varland)
- 2007. Extra-pair copulation by Mississippi Kites. *J. Raptor Res.* 41:252-253 (with T. Bader and W. D. Edwards)
- 2005. Distribution and habitat use of Swainson's Warblers in eastern and northern Arkansas. Pages 576-588 in C.J. Ralph and T.D. Rich (Eds.), Proceedings of the Third International Partners in Flight Conference, Asilomar, CA. USDA Forest Service Gen. Tech. Tech. PSW-GTR-191. (with P. Stiller-Krehel, and B. Cannon)
- 2005. Use of group-selection and seed-tree cuts by three early-successional migratory species in Arkansas. *Wilson Bulletin* 117:353-363. (with L.E. Alterman and R.E. Thill)
- 2005. Population genetics of the Galápagos Hawk (*Buteo galapagoensis*): genetic monomorphism within isolated populations. *Auk* 122:1210-1224. (with J.L. Bollmer, N.K. Whiteman, M.D. Cannon, T. de Vries, and P.G. Parker)

**Scott Chiavacci, Graduate Research Assistant**, will conduct field research in order to collect, analyze, and interpret data. Scott received his B.S. in Wildlife Biology from Penn State University. His field experience includes assisting a Ph.D. candidate with research on the effects of acid rain deposition on nesting forest birds. This project involved intensive nest searching, spot-mapping, and vegetation, soil, and invertebrate sampling in central Pennsylvania's forests. Scott also assisted a Ph.D. candidate with research on the behavior, survival, and habitat selection of non-breeding Crested Caracaras in central Florida. This work involved trapping, banding, and radio tagging caracaras; locating instrumented birds and gathering land cover data via aerial telemetry; and making focal and group behavioral observations. In addition, Scott was involved in a seed dispersal study working under Dr. M. Steele at Wilkes University, in which he observed Blue Jays at feeding station, located radio-tagged birds, and implanted radio-tags in acorns.

**Karen Rowe, Nongame Migratory Bird Program Coordinator**, will closely work with and advise Jim and Scott during this project. Karen has more than 2 decades of experience working on the management and conservation of raptors and nongame species of birds.

## Appendix: Literature Cited

- Anich, N. M., S. Schaefer, J. C. Bednarz, and T. J. Bader. 2007. Reproductive success, causes of nesting failures, and habitat use of Swallow-tailed and Mississippi Kites in the White River National Wildlife Refuge, Arkansas. Unpubl. report. Arkansas State University, Jonesboro, AR.
- Bader, T. J., and J. C. Bednarz. 2006. Reproductive success, causes of nesting failures, and habitat use of Swallow-tailed and Mississippi Kites in the White River National Wildlife Refuge, Arkansas. Unpubl. report. Arkansas State University, Jonesboro, AR.
- Benson, T. J., N. M. Anich, and J. C. Bednarz. 2007. Habitat use and demography of Swainson's Warblers in Arkansas: research progress 2006. Unpubl. report. Arkansas State University, Jonesboro, AR.
- Meyer, K.D. 1995. Swallow-tailed Kite (*Elanoides forficatus*). In *The Birds of North America*, No. 138 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and the American Ornithologists' Union, Washington, D.C.
- Withgott, J.H., J.C. Neal, and W.G. Montague. 1995. A technique to deter climbing by rat snakes on cavity trees of Red-cockaded Woodpeckers. Pp. 394-400 in D.L. Kulhavy, R.G. Hooper and R. Costa, eds. *Red-cockaded Woodpecker: recovery, ecology and management*. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, TX.
- Washburn, A. M. Neiman, D.R. Taylor, K Norris-Caneda, A.E. Strong, and K.D. Meyer. 2007. Is cryptic cladogenesis facilitated by migration in the Swallow-tailed Kite. Abstract of paper presented at the 125<sup>th</sup> stated meeting of the American Ornithologists' Union. Laramie, WY.