Project Title: Implementing Forest Management Strategies in Red River Floodplain Forest to Benefit Species of Greatest Conservation Need

Project Summary:
The Arkansas Game and Fish Commission, in consultation with the Arkansas Natural Heritage Commission and The Nature Conservancy, will conduct wildlife stand improvement followed by prescribed burns on 330 acres of hardwood flatwoods habitat on Dr. Lester Sitzes III/Bois D'Arc WMA in Hempstead County. These forest management activities will return forest habitat composition and structure to historical parameters and benefit several Species of Greatest Conservation Need. Monitoring will evaluate the response of the habitat and bird communities to the habitat management implementation.

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Budget Summary: **Total Project Cost: $31,400**
Total SWG funding request: $15,700
Total matching funds: $15,700

Summary of Need: This project addresses two funding priorities outlined in the 2008 State Wildlife Grants RFP. The project will implement forest management through commercial harvest, stem injection (Wildlife Stand Improvement or WSI) and prescribed fire in wet hardwood flatwood habitat that will benefit species of greatest conservation need (SGCN). These management activities address the priority of restoring fire to fire-suppressed habitats and of implementing forest management for species of greatest conservation need. The project goal is to implement a forest management program on 330 acres at Dr. Lester Sitzes III/Bois D'Arc WMA. The project will restore a habitat of high conservation significance, wet hardwood flatwoods, and will serve as a demonstration area for managing this unique habitat in the Red River floodplain. Wildlife stand improvement followed by prescribed burns will occur during the two year project. Pre-and post-treatment monitoring will occur in the project area to evaluate the effectiveness of the management in achieving desired forest composition and structure and bird monitoring to measure progress towards desired ecological conditions.

Conservation Significance: Dr. Lester Sitzes III/Bois D'Arc WMA is in Hempstead County and lies within Ecoregion 35, the South Central Plains. The Red River floodplain forests have been greatly impacted from agricultural clearing, and the Arkansas wildlife action plan notes that much of this habitat in the Red River floodplain has been converted to row crops. Forests at the WMA were high-graded with oak removal approximately 50 years ago and has had a higher composition than historically occurred of cedar elm (*Ulmus crassifolia*) as a result. Additional tree species include sugarberry (*Celtis laevigata*), water oak (*Quercus nigra)*, willow oak (*Quercus phellos)*, overcup oak (*Quercus lyrata)*, delta post oak (*Quercus similis*), and green ash (*Fraxinus pennsylvanica*). The forest also has a component of bur oak (*Quercus macrocarpa*) and Durand oak (*Quercus sinuata*), more western species that are native to the Red River floodplain forests but are basically absent from the Mississippi Alluvial Plains. In addition to these species, Dr. Lester Sitzes III/Bois D'Arc WMA has a large population of Eve's necklace (*Sophora affinis)*, a small and rare shrub that occurs in the areas to be managed and should respond positively to the management scheme (Pers comm. Theo Witsell, ANHC). Other plant species of conservation concern in the area that are tracked by the ANHC include Wolf's spikerush (*Eleocharis wolfii*), Arkansas sedge (*Carex arkansana*), and least blue-eyed grass (*Sisyrinchium minus*). These three species are heliophytes, sun-loving plants that typically occur in prairies and open woodlands in Arkansas. They are indicators that the relatively closed canopy forest historically was more open habitat. At this WMA they are common in an area where the trees have been removed and that is kept open by occasional mowing, but become rare in the adjacent closed woods. WSI and prescribed fire will restore the species historical composition, reduce dominance by cedar elm, and reduce canopy closure, thereby increasing herbaceous cover and shrubby undercover to provide browse and cover for wildlife species. Fire will also produce conditions needed for regeneration of overstory species including soft mast producers such as sugarberry and persimmon as well as hard mast species.

Table 1. Terrestrial species of the Red River Floodplain forest that are considered Species of Greatest Conservation Need in the Arkansas State Action Plan (CWCS database).

Species	S Rank	G Rank	Species	S Rank	G Rank
Rusty Blackbird	G4	S5N	American Woodcock	G5	S2B,S4N
Bald Eagle	G4	S2B,S4N	Hooded Warbler	G5	S4B
Mississippi Kite	G5	S4B,S4N	Eastern Towhee	G5	S3
Snowy Egret	G5	S2B	American Black Duck	G5	S3N
Wood Thrush	G5	S4B	Northern Pintail	G5	S5N
Cerulean Warbler	G4	S3S4B	Kentucky Warbler	G5	S4B
Little Blue Heron	G5	S2B	Swallow-tailed Kite	G5T?	SH

Red-headed Woodpecker	G5	S4B,S4S5N	Long-tailed Weasel	G5	S3
Yellow-billed Cuckoo	G5	S4B	Southeastern Bat	G3G4	S3
Prothonotary Warbler	G5	S4B	Rafinesque's Big-eared Bat	G3G4	S3
Swainson's Warbler	G4	S3B	Duke's Skipper	G3	S1S2
Black-crowned Night-heron	G5	S2B,S3N	Yehl Skipper	G4	S1S3
Chimney Swift	G5	S4B, S5N	Gulf Crayfish Snake	G5T5	S3
Yellow-crowned Night-heron	G5	S3B	Southern Prairie Skink	G5	S2

The above table includes 28 species in the Arkansas State Wildlife Action Plan that are identified as SGCN and occur in the Red River floodplain forest. In particular, the forest management activities outlined in this plan should benefit several neotropical migratory bird species. Bird species composition can be impacted by forest composition, and some bird species are positively correlated with certain tree species for foraging (Twedt and Best 2004). Additionally, bird species are associated with certain forest structure attributes, such as high vertical structure, emergent trees, and a well-developed understory that can provide for nesting and foraging requirements (Twedt and Best 2004). The forest management outlined in this proposal would increase herbaceous cover and understory and reduce canopy closure to allow the regeneration of oak and other tree species. This increase in diversity and change in composition would benefit a larger suite of bird species including breeders and transient migrants that use this area as a stopover site during migration. Some species that are associated with a well-developed understory include Kentucky Warbler, Hooded Warbler, Swainson's Warbler, and Eastern Towhee. Furthermore, these management techniques would benefit a number of game species, including turkey, deer, and rabbits, by increasing herbaceous cover, browse, and mast-producing oak species.

Project Objectives/ Methods: The Lower Mississippi Valley Joint Venture (LMVJV) is currently focusing efforts on forest restoration and management in both the Mississippi Alluvial Valley and the West Gulf Coastal Plain. The LMVJV is emphasizing not only the amount of forest available for high priority species, but the important role that forest structure plays in meeting the habitat requirements of high priority species in the West Gulf Coastal Plain. The project's objectives line up well with the LMVJV effort to reach desired forest conditions and to evaluate how current and future conditions might support populations of high priority birds.

During this two year project, the Arkansas Game and Fish Commission (AGFC) will restore historical forest composition and structure to approximately 330 acres of wet hardwood flatwoods habitat at Dr. Lester Sitzes III/Bois D'Arc WMA through WSI and prescribed burns. This project will restore wet hardwood flatwood habitat and provide the opportunity to manage a habitat of high conservation significance for SGCN. Before conducting WSI and prescribed burns, AGFC will further consult with personnel from both the Arkansas Natural Heritage Commission (ANHC) and The Nature Conservancy (TNC) to outline the desired conditions and develop appropriate burn plans and thinning treatments to meet desired conditions. WSI will be contracted to a professional forestry consultant, burn plans will be developed by AGFC staff, and burns will be conducted by staff of AGFC with potential assistance from TNC. The major initial expense of this forest management project is the cost of stem injection, which will be covered by the grant. The AGFC will commit to the long-term maintenance of this project with prescribed burning at appropriate intervals done in-house and will continue monitoring to insure that desired forest conditions are met by the initial thinning and prescribed burns over time.

Proposed Timeline/Measurable Products

The WSI work will occur in the fall 2008 and the fall 2009. Prescribed burns will follow WSI work in the fall 2008/2009. Forest and bird inventory will occur prior to WSI treatments and post treatment monitoring will occur in spring/early summer 2010 before the grant ends in August of 2010.

- Develop in consultation with TNC and ANHC desired forest conditions (Months 1-6)
- Write burn plans and thinning prescriptions for the project area (Months 1-6)
- Conduct WSI by stem injection on 157 acres (Months 3-12)
- Conduct WSI by commercial harvest on 173 acres (Months 11-15)
- Implement burning on 330 acres of study site (Months 3-24)
- Pre and post treatment monitoring to include forest inventory and monitoring at plots 2) inventory of bird species occurrence and abundance (Months 1-24)

Estimated Costs: It is estimated that the total cost of this two year project will be $31,400. The grant share of $15,700 will cover the costs of WSI on 157 acres. The match for the project will be $15,700 (50%). Match will be provided by costs through prescribed burns, burn plan development, pre and post forest and bird monitoring. The budget details are as follows:

Item	Total	Match	Grant
Burn plans and injection prescriptions 330 acres @ $3.25/acre	**$1,073**	**$1,073**	**$0**
Burn site prep, 330 acres @ $7.25/acre	**$2,393**	**$2,393**	**$0**
Prescribed burns, 330 acres @ $20/acre	**$6,600**	**$6,600**	**$0**
WSI stem injection, 157 acres @ $100/acre by Grant	**$15,700**	**$0**	**$15,700**
Pre-and post-treatment monitoring including salary and travel	**$5,634**	**$5,634**	**$0**
Totals	**$31,400**	**$15,700**	**$15,700**

Literature Cited

Twedt, D. and C.Best. 2004. Restoration of floodplain forests for conservation of migratory landbirds. Ecological Restoration 22(3): 194-203.

Qualifications of project leaders and partners

The Arkansas Game and Fish Commission's mission is to wisely mange all the fish and wildlife resources of Arkansas while providing maximum enjoyment for the people. Arkansas Game and Fish Commission is engaged in bird initiatives including Partners in Flight, with goals to restore high quality habitat for high priority bird species.

Brad Townsend has worked as the Habitat Biologist for the Arkansas Game and Fish Commission since 2003. He received a B.S. degree in Forestry from the University of Arkansas at Monticello in 2003. His work area includes seven counties and Wildlife Management Areas located in the southwest region of Arkansas. He is a member of the Society of American Foresters and an Arkansas Register Forester.

Nicole Peterson has worked as a Wildlife Biologist for the Arkansas Game and Fish Commission since 2004. She received a B.S. degree in Wildlife Management from the University of Arkansas at Monticello in 2003. Her work area includes seven counties located in the southwest region of Arkansas

Catherine Rideout has worked as the Passerine Bird Program Coordinator at Arkansas Game and Fish Commission since 2003. She received a B.S. degree in Biology at Davidson College in North Carolina in 1994 and an M.S. degree in Biology from Boise State University in Idaho in 2003. She participates in Joint Ventures and Partners in Flight, serves as the co-chair of Southeast Partners in Flight, and is a member of the Bird Conservation Committee of the Association of Fish and Wildlife Agencies. She coordinates bird conservation and management of nongame birds for the agency.

Tom Foti is recently retired as Plant Community Ecologist and Chief of Research and Inventory of the Arkansas Natural Heritage Commission. His section was responsible for scientific evaluation of potential natural areas to guide protection and management, and review of potential environmental impacts of proposed state and federal development projects. He now serves in a part-time capacity as Natural Area Chief Planner of ANHC. He has published books and scientific papers on Arkansas natural history, including Arkansas and the Land by University of Arkansas Press. He has done natural community research, inventory and restoration in the state for over 40 years and currently serves on the Steering Committee of the Ivory-billed Woodpecker Recovery Team, led by the U.S. Fish and Wildlife Service.

Theo Witsell has been the staff botanist for the Arkansas Natural Heritage Commission since 2000. He has also worked as a contract botanist for the USDA Forest Service, the National Park Service, the United States Department of Defense, The Nature Conservancy, and the Gates Rogers Foundation. An active member of the Arkansas Vascular Flora Committee (a group of botanists writing the *Manual of the Vascular Flora of Arkansas*), he has just completed six years of field work documenting the flora and plant communities of Saline County, Arkansas. He has B.S. and M.S. degrees in biology from the University of Arkansas at Little Rock.

Jennifer Akin is a Natural Community Ecologist for the Arkansas Natural Heritage Commission. Jennifer received a B.S. in biology and a M.S. in botany both from the University of Arkansas at Fayetteville. Jennifer has worked for The Nature Conservancy documenting the recovery of restored wetland and uplands and the National Park Service performing surveys in over two hundred vegetation types in the Sierra Nevada Mountains for production of a vegetation map. She has published two scientific papers on algae in relation to aquatic vegetation in Arkansas.

Mark Clark is a project manager for The Nature Conservancy charged with facilitating protection and restoration efforts in the Blackland and Sandhill ecosystems of Arkansas. Mark previously held positions with Arkansas Game & Fish Commission and The Ross Foundation. He has personally overseen and participated in successful projects to restore at-risk ecological communities on private and state-owned lands.