



Oklahoma City Audubon Society

OKC-AUDUBON.ORG

March 2011

Scissor-tailed Flycatcher Nesting Success and Paternity: Relationships with Morphology and Habitat

The guest speaker at the March 21 meeting of the Oklahoma City Audubon Society will be Diane Landoll, a Lawton native who attended Cameron University as an undergraduate. She loved the Biology program and was inspired by several professors to chase birds -- and then to chase the biological processes that drive the patterns and variations she saw in birds. Since then she has been pursuing avian ecology and breeding biology.

Diane is currently attending the University of Oklahoma as a Master's Student. Her thesis research deals with Scissor-tailed Flycatcher nesting success and extra-pair paternity across a habitat/land use gradient, as well as how extra-pair paternity relates to morphology. She was just accepted into the University of Oklahoma's Ecology and Evolutionary Biology Ph.D. program and will start in May.

She will be speaking to our group about the results from three summers of work on the spectacular Scissor-tailed Flycatcher (*Tyrannus forficatus*), the state bird of Oklahoma and a beautiful master of the skies. Although it is a mesquite/oak savannah species, Scissor-tailed Flycatchers seem to nest in any area that is structurally similar to savannah, as seen in the land use gradient in which they are commonly found. But does this species have similar nesting success in all land use types? Diane investigated how land use and habitat components affected nesting success. She was also interested in what the rates of extra-pair paternity were in this species and how they might be affected by land use. Because Scissor-tailed Flycatchers are sexually dimorphic, and tail length in both males and females is so variable, she wanted to look at the relationship of morphology to extra-pair paternity, as well.



Come out and bring a friend for a good evening of camaraderie and birds and great refreshments. Our meetings are held September through June on the third Monday of each month. They begin at 7:00 p.m. at the Will Rogers Garden Center, I-44 and NW 36th Street. Visitors are always welcome.

Cookie Patrol

Refreshments for the March meeting will be provided by: John Shackford, Steve Davis & Matt Jung.

Welcome

We welcome Doris Wheeler and Ed Holzberger to the Oklahoma City Audubon Society!

President's Perspective

By Bill Diffin

This year on the Arnett CBC, I asked several local people about the decline of Lesser Prairie-chickens. Their opinion is that changes in agriculture are to blame -- LPC were much more common when sorghum crops were important in the area. When wheat and cattle replaced the sorghum, LPC's declined. This thinking follows a common theme when discussing the former abundance of Greater Prairie-chickens in northeastern Oklahoma -- they were hunted mercilessly as they flew into and out of sorghum fields in the morning and evening. It is interesting to consider how long PC's have been making use of cultivated crops. One reason sometimes cited for PC decline is the increase in the density of cultivation since colonial times. Cultivation on the frontier was patchier than it is today so that a healthier mix of plant foods was available to chickens. But what about Pre-Columbian times? In reading on the patterns and extent of land use by the Indians, I found a surprising story totally outside my education. The story has three themes:



1. Extensive Use of Fire to Modify Landscapes - Indians used fire to improve the habitat for themselves, to clear areas for agriculture, and to increase access to the wild plants and animals they fed on. Before and coincident with more formal gardening and farming, they used fire to selectively remove unproductive plants and encourage food-producing plants, especially berry bushes and nut trees. They burned areas as an antidote to insects, snakes, ticks, and noxious growths of briars, shrubs and weeds. Much of what we think of as naturally forested areas, or areas that should contain forest, were maintained as open woods or savannahs, grasslands dotted with trees.

2. Early Development of Agriculture - When the de Soto expedition explored the southeastern United States and up into Arkansas in the early 1540's, they encountered an intact civilization of settled agriculture known as the Mississippian Culture. Archeological findings suggest the Mississippian civilization emerged and spread during the period from 800 to 1200 AD and was primarily based on the growing of maize (Indian corn). Squash, gourds and sunflowers were carried over from previous cultures and beans were

introduced a couple of hundred years before European contact. In 1585, Thomas Harriot, on an expedition funded by Walter Raleigh, traveled to Roanoke Island off North Carolina and made extensive observations of the Indian way of life. He observed the farming of maize, beans, peas (of American origin), pumpkins, squash, gourds, and sunflowers in extensive community plots. He also described an herb he identified as a type of Orage (aka orache), a name for members of the goosefoot/saltbush family, which produced seeds that were cooked into a porridge. This may have been chenopod, a cultivar of a native plant similar to lamb's quarters. Maize, beans and pumpkins were all developed as agricultural crops in Mexico and were transplanted to eastern North America. But the culture which preceded the Mississippian had an agriculture of its own called the Eastern Agricultural Complex (EAC). The cornerstones of the EAC were domesticated versions of native plants, chenopod (starchy seeds), marshelder (oily seeds), sunflower, pepo squash and gourd. These crops coalesced as an agricultural complex around 3800 BP (1800 BC). A number of non-domesticated plants were grown including maygrass, little barley, erect knotweed and probably giant ragweed.

3. A Large Population with a Settled Farming Culture - The de Soto expedition of 1539 to 1543 traveled from Florida through the interior southeastern United States and as far west as Arkansas and Texas. (cont. pg. 8)

Oklahoma City Audubon Society

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The Oklahoma City Audubon society is neither a chapter of nor affiliated with National Audubon.

For Oklahoma City Audubon news between newsletters and meetings, be sure to log onto:

OKC-Audubon.org

Bird of the Month

By John Shackford



Recently I received notecards as a gift, with small copies of Audubon paintings on the front. Of the 4 different paintings featured, my favorite is the 1 of a pair of Cedar Waxwings (*Bombycilla cedrorum*). I suspect that the beauty of this species was an inspiration to Audubon that led him to paint a particularly exquisite and accurate

picture.

The Cedar Waxwing has subtle changes from one color to the next, from brown on the bird's head fading into gray on the rump and tail; from brown on the upper breast to yellow on the belly. One would not expect such shadings, particularly of 2 dull colors like brown and gray, to be very fascinating, but they are. Along with the beautiful colors, the crest and the black triangle of a facemask surrounding each eye help give the bird an appearance of being in "formal attire." Add the yellow line across the end of the tail and, on some birds, the red "waxwing" on the end of some of the secondary wing feathers, and you end up with one beautiful bird. I once heard a renowned architect say that he looked at bird pictures to get ideas for colors to use with his designs; he could have done a lot worse than to use the Cedar Waxwing as a model.

The nesting range of the Cedar Waxwings, roughly speaking, is from mid-Canada to the mid-U.S. Directly north of us their normal nesting range comes southward to near the South Dakota-Nebraska line, but there are a handful of nesting records for Oklahoma. One of these was for Oklahoma City, by Vic Vacin, a longtime member of our club in its earlier years.

Cedar Waxwings usually lay 3-5 eggs and build a fairly substantial nest, generally placed in a horizontal fork of a limb between 3-50 feet above ground. Edward R. Ford, quoted in Bent (Life histories of North American Wagtails, Shrikes, Vireos, and their Allies, 1965) notes the "habit of the cedar waxwing of taking material from active nests of other species of birds, for use in its own nest." He saw such behavior on 3

[Eastern?] Kingbird and 1 Yellow-throated Vireo nests, and other people have reported similar behavior on other species.

During the breeding season, according to a Cornell University web site (http://www.allaboutbirds.org/guide/Cedar_Waxwing/lifeistory) "[t]he Cedar Waxwing is one of the few North American birds that specializes in eating fruit, such as cherries and mulberries. It can survive on fruit alone for several months. Brown-headed Cowbirds that are raised in Cedar Waxwing nests typically don't survive, in part because the cowbird chicks can't develop on such a high-fruit diet."

In Oklahoma we see the Cedar Waxwing primarily as a



wintering species: they winter from about the U. S.-Canadian border south to northern South America. For most of their life—except when nesting—waxwings tend to travel in flocks, and their wanderings can be quite erratic.

During the winter in Oklahoma, Eastern redcedar berries are doubtless the major food eaten by waxwings. The average number of wintering waxwings we have found on Christmas Bird Counts in recent years, although varying widely from year to year, appears to be increasing. This is likely be-

cause of the tremendous spread of redcedar. Like robins, waxwings can strip a berry bush bare of berries in fairly short order.

The Cedar Waxwing has a slightly larger relative called the Bohemian Waxwing that lives further north, on average, than Cedar Waxwings, even reaching Alaska in the breeding season. The Bohemian Waxwing can be distinguished from the Cedar Waxwing by white and yellow in the wing, and chestnut on the undertail coverts (whitish on the Cedar Waxwing). We have 1 Christmas Bird Count record of a Bohemian Waxwing coming all the way south to Oklahoma City—a single bird seen on 30 December 1961. I remember a few of the years around that time when, on rare occasion, we found a flock of Bohemian Waxwings or a single Bohemian mixed in with Cedar Waxwings during winter in Oklahoma. But in recent decades this one-time hope has receded into, primarily, a fond memory. Perhaps Bohemian Waxwings are showing the effects of global warming by shifting their winter range further north.

Minutes of the February 21, 2011 Meeting

President Bill Diffin called the meeting to order and asked for an introduction of visitors. Mark Dunn was welcomed back after a long absence.

President Diffin asked for any corrections or changes to the January minutes as published in the February newsletter. Motion was made, seconded and approved.

Treasurer's Report:

Treasurer, Nancy Vicars, presented the February Treasurer's Report:

Cash on Hand 1/24/2011	\$5,914.03
Deposits	291.24
Disbursements	99.20
Cash on Hand 2/21/2011	\$6,106.07

Treasurer's Report accepted as read.

Field Trips:

Jimmy Woodard presented a display of birding pamphlets for all to enjoy.

Upcoming field trips include:

- The March 5 field trip to Tenkiller Lake is a joint trip with Tulsa Audubon.
- March 19 field trip to Stinchcomb, led by Jim Bates.
- March 26 trip to Norman at the South Jenkins location, led by Dick Gunn.
- April 9 field trip, Behind the Scenes Birding, will be at the OKC Zoo.

New Business:

Nancy Vicars made a motion to reimburse Jim Shackford for the Christmas Bird Count fees in the amount of \$85.00. Nealand Hill seconded the motion. Motion was unanimously approved.

Nealand Hill advised he has six hats for sale in the amount of \$15.00 per hat. This will be the last production of Scissor-tailed hats for sale.

Terri Underhill will be setting up feeding stations for birding at the Manchester House senior community. Contact Terri if you would like to support her in this project.

Bob Cooper, a resident from Bend, Oregon, requested a guide to look for specific birds in Oklahoma; Bill Diffin volunteered.

Doug Eide asked if all field trips are to be announced in the newspaper. Bill Diffin responded yes.

Doug proposed a project to invite children and their parents to our meetings. He would like to coordinate with the local schools on this project. A discussion followed concerning who should be contacted and possible activities for youth (i.e. field trips during the day, parents attending the club meetings with their child, etc.).

Bill is giving a presentation to a 4-H club at Martin Park on February 22. Earth Fest will be hosted in the month of April. Martin Park would appreciate our support at Earth Fest.

Nancy Vicars has more calendars to sell. Tonight she will sell two calendars for the price of one.

Patti Muzny requested an e-mail notification by Friday, February 25, for those attending the Woodcock Watch.

Adjourn for snacks.

Warren Harden announced our March speaker will be Diane Landoll. Diane's presentation is on Scissor-tailed Flycatcher.

Tonight's speakers are our very own John Shackford and Jimmy Woodard who gave an outstanding program with photographs and geological information of the Black Mesa. Many of the bird photos were courtesy of Dan Robinson.

Nancy Reed, Recording Secretary



Baby Barn Owls

Checkout this website to view a nesting Barn Owl with 6 babies!!!

<http://www.ustream.tv/channel/owlceanside>

Byars Woodcock Field Trip

By Patti Muzny

On Saturday, February 26, 2011, a little covey of hardy birders went face-to-face with a chilly, extremely foggy morning. Several of us met near our home in south Oklahoma City and proceeded to Purcell City Lake. Birding along the highway was not productive because of heavy fog.

We arrived at the lake and somebody made a remark about not bothering to set up any scopes. A few feet along the edge of the water was the extent of our visibility. We parked our vehicles, layered up our clothing and set out to see if my favorite "Snipe Spot" was still there. Sure enough! We flushed two and I think everyone got a pretty good view of them as they flew and on the ground.

We saw and heard a few of the expected woodland and grassland birds. As we drove slowly around the south edge of the lake, I noticed a bird perched on a utility wire beside the road. We pulled over to check it out, because it was a swallow-like bird. It was wet and the fog wasn't helping with the identification process.

Too big for a Barn Swallow. Could that be a Purple Martin? Soon it flew to another wire and positive ID was made. It was probably the first Purple Martin of the spring!



We continued on around the lake where we saw most of the expected birds in this type of woodland edge with water habitat. A Hairy Woodpecker made an appearance, along with Downy and Red-bellied Woodpeckers and Flickers. Nothing unexpected, but nice looks at several species, including Field, Harris's and Song Sparrows, Bewick's Wren and White-breasted Nuthatch. John and Marion spotted and photographed a lone Pied-billed Grebe at the edge of the lake.

We arrived at our Byars property around 2:00 PM. We hiked around our 80 acres at our leisure, hoping to possibly startle a Woodcock out of the thickets in daylight, but that was not to be. But...among the incredible highlights of this wonderful day was Bill Diffin's and Charles Douglas's sighting of a Prairie Falcon as it flew strong and fast over our cabin! Everyone got a look at it and it was positively identified. What a rare

and unexpected treat! We are in far eastern McClain County in the Crosstimbers region of Oklahoma. This bird did NOT read the book.

Doug Eide spotted an adult Bald Eagle soaring very high over the neighbor's property to the east and we also spotted Wood Ducks. A very tame pair of Yellow-bellied Sapsuckers flitted around the cabin area until I think everyone had good looks.

After chatting and hiking and just enjoying being out in the woods, the sun began to slump low on the horizon and we began plotting our strategy for stalking Woodcocks.

The wind was down and a night of displaying was a very strong possibility. As the group scattered about in the pasture to listen and scan the woodland edges near our creek, we spotted a high-flying Snipe. I don't think I've ever seen a Snipe using the air space of a Red-tailed Hawk! Suddenly the distinctive "peent" of the Woodcock was heard, followed by another behind us. Show time!

We had to bring into play a fair amount of patience, but were finally rewarded by a couple of good displays after sunset. One bird flew nearly past our heads. Some of our group added a fascinating "lifer" on this trip and some had seen the bird, but never the courtship display. Bill and Charles walked closer to the highway where they heard several more calling in the pasture across the highway from our property.

Sometimes when birders invite friends to share a birding experience, the bird may or may not remember the night of a party, but we were fortunate on this lovely Saturday night. It was a memorable and fun day of birding with friends – both old and new – and I'd do it again in a heartbeat!

Birders were: Patti and Brian Muzny, Nancy and Richard Reed, Shane Woolbright, Bob Funston, Bill Diffin, Charles Douglas, Douge Eide, John Cleal and Marion Homier, Ed Holzberger and Jane Boren of Norman, who was with us for the Lake Purcell portion of our day.

On Sunday (my husband and Brian and I spent the night on Saturday) a male and female Purple Finch came to our feeder and we had our own Hairy Woodpecker. We also had a female Cardinal with a nearly white head.

Thanks to our sharp-eyed birding friends, we added a Prairie Falcon to our property birding list of 30+ years. I think we're up to around 175 species.

Recorders Report: February 2011

In like a lion; out like a lamb

February started out with two historical three-prong storms. By the end of the storm on the 1st, a record 12.1 inches had fallen at Will Roger's Airport with winds up to 40 mph whipping the snow into drifts up to 6 foot tall. Then arctic air arrived, and on the 3rd temperatures in the Panhandle dipped into lows not seen since 1984. A week later another ferocious storm arrived with less snow and smaller drifts but colder temperatures. In the end, all that snow adding little moisture to a drought stricken area.

On the 1st during the height of the blizzard in south Oklahoma City, Patti Muzny enjoyed birding from the warmth of her cozy den but many of the birds weren't so comfortable. Some of her visitors were Golden-crowned Kinglet, Brown Creeper, a possible Tree Sparrow and a Copper's Hawk. Her husband brought in an American Robin that looked near death, and even though it was inside warming up, it died. Dave McNeely and John Shackford in Edmond and L.D. Flores in Norman had Brown Thrashers at their feeders. In Stillwater, Tim O'Connell heard some cackley goose honks and looked up to see about 16 Greater White-fronted Geese battling the winds and poor visibility. On the 2nd Dick Gunn had his first Fox Sparrow at his feeder in Norman.

On the 4th Susan Prescott in Nichols Hills watched a Cooper's hawk catch and dine on an Eurasian Collared Dove. Dave found a covey of Northern Bobwhites just east of MacArthur on 150th in a small, short grass pasture. On the 5th Angie Holt discovered two Snow Geese in a flock of over 800 Canada Geese in the 10 Mile Flats area, 3 Trumpeter Swans on Summit Lake and 1 immature Glaucous Gull on Lake Thunderbird.

On the 8th Elvind Vamraak and Bill Diffin birded Lake Hefner and located a Thayer's Gull, Lesser Black-backed Gull, Glaucous Gull, Long-tailed Duck, Cackling Geese, and Ross's Geese.



On the 9th C.J. Metcalf noticed a first-ever Spotted Towhee at his back yard feeder. On the 10th along South Jenkins Dick found Green-winged Teal, Wood Ducks, Wilson's Snipe, a Greater Yellowlegs, and Lincoln's Sparrow. On the 12th at Lake Hefner Joe Grzybowski had Common Loons, Greater Scaup, and one probable 2nd-cycle Glaucous Gull, one 1st-cycle Thayer's, and one first-cycle Lesser Black-backed Gull, 3 Long-tailed Ducks, and 2 Greater Scaup. At Stinchcomb Wildlife Refuge on the 14th Matt Jung heard a Barred Owl, and on the 17th he located an Orange-crowned Warbler, Yellow-bellied Sapsucker and Field Sparrow.

On the 18th Dale Kane decided to check the northwest end of Lake Stanley Draper in Midwest City at the large dirt lot where the equestrians unload their horses and discovered several American Woodcocks doing their dances. On the 20th James Hubbell heard a melee of about 150 Cedar Waxwings in a berry tree three doors from his home. While looking for quail in Payne County, Dwayne Elmore flushed 3 Long-eared Owls off a roost in a red cedar tree.

In Payne County on the 22nd and 23rd John Polo had good American Woodcock displays. He was joined on the 23rd by his girlfriend and a few of Tim's ornithology students. Meanwhile Alcia Riddle and her husband watched American Woodcocks in their neighborhood east of Arcadia. Matt walked the Coffey Dam and discovered Blue-winged Teal. On the 24th Jim Jorgensen observed his first bat of the season. On the 25th Jimmy Woodard and Nadine visited Lake Stanley Draper and saw 35 Sandhill Cranes flying over the lake and later enjoyed a great woodcock display, and Joe found a Ferruginous Hawk in the 10 Miles Flat area.

On the 26th Patti Muzny led the OCAS field trip to Lake Purcell and her cabin in Byers where they saw the first Purple Martin, a Bewick's Wren, and White-throated Sparrow. In Tuttle Esther Key heard a Western Meadowlark and had a Brewer's Blackbird visit her feeder. On the 27th along South Jenkins Dick Gunn heard a Fish Crow, saw a Turkey Vulture and Jennifer Kidney reported a LeConte's Sparrow.

During February a total of 110 bird species were reported increasing the 2011 Central Oklahoma area total to 138 species. I appreciate those who help provide the history of central Oklahoma birds by providing reports. I can be contacted by e-mail at emkok@earthlink.net. Esther M. Key, Editor.

HAVE YOU OVERLOOKED PAYING YOUR 2011 DUES???

It's not too late but please renew soon before your membership lapses!

Dues for 2011 are \$15 and can be paid at the March meeting. If you'd like the convenience of paying by credit card and paying online, we have a secure payment option for you. Simply go to the Oklahoma City Audubon Society website and use our secure PayPal shopping cart system.

Here's the address to the form:
<http://okc-audubon.org/?p=121>

Rare Ducks at Canton

By Bill Diffin

On January 22 the OCAS field trippers went to Canton Lake. We had set up along the south shore to observe but had already seen Lesser Black-backed Gull, Thayer's Gull, Herring Gull, Common Goldeneye, and Bald Eagle. Then Jimmy Woodard announced he had found a couple of Long-tailed Ducks and we all directed our optics where his scope was pointed. Doug Eide asked me to try and find the ducks with the 20x80 Garrett binoculars he had set up on a tripod; I began scanning around and spotted an entirely black duck among a flotilla of Common Goldeneye. My first thought was that it was a White-winged Scoter, but then it rolled out of its preening position and showed the white face mark, line of white windows along the back, short bill, and steep forehead of a Barrow's Goldeneye. Since the Barrow's was a life bird for me I was eager to show it someone with the experience to verify it. But several attempts to show the prospect to Jimmy and Doug through the high-powered binoculars were unsuccessful, and in just a couple of minutes, the fast swimming raft disappeared behind a line of trees along the bank. I was left in that awkward position known to most birders of having announced a rare sighting while having no prior field experience with the species, no photo evidence, and no witness.



We moved to another spot on the shore of the first inlet where Jimmy again found the Long-tailed Ducks and gave everyone a good luck through his scope. We then drove to the dam and headed north along the top. At the first turnout, Jimmy spotted a female Black Scoter. Although it kept diving out of sight, he patiently relocated it until everyone had a good look. Then we went on to the turnout in the middle of the dam where a raft of ducks was floating near the riprap. The ducks took flight as we exited the vehicles but came back down within scope range and it wasn't long before Jimmy found the Barrow's Goldeneye. All the birders, Carla Brueggen, Karen Barker, Marion Holmier, John Cleal, Charles Douglas and I had good looks at the rare duck through Jimmy's scope. We contacted Eivind Vamraak who immediately posted the sighting on OK-Birds.

Torre Hovick (*pictured right*), a Ph.D. candidate at OSU focusing on grassland bird ecology, saw Eivind's post on the Barrow's Goldeneye and went birding at Canton Lake the next day. He was able to take photos of both the Barrow's Goldeneye and the Long-tailed Ducks.



Birding the Rio Grande

By Sharon Henthorn

My husband and I returned March 6th, 2011 from a week of birding along the Lower Rio Grande Valley in south Texas. I'd highly recommend both Santa Ana NWR south of Alamo, TX, and Estero Llano Grande at Weslaco, TX. We counted around 90 species on our trip, and had some great birding tours at the Estero. Santa Ana is still flooded since last summer's levee break, creating an additional ecosystem to witness.



Noted sightings in the area were the Plain Chachalaca, Crested Caracara, Great Kiskadee, Green Jay, Common Yellowthroat, Clay-colored Thrush, Cave Swallows, Purple Martins, Buff-bellied Hummingbird, Wilson's Snipe, Snowy Plovers, Black-necked Stilts, Sora, Anhinga, Black-Crowned Night Herons, White Tailed Kite, White Ibis, Common Pauraque, Curve-billed Thrashers, Fulvous Whistling Ducks, Snowy Egrets, Green Herons, Tricolored Herons and Little Blue Herons, Northern Shovelers, and more teal varieties than I could have imagined within close range. We were blessed to see javelina (wild pigs), alligators, indigo snake, rabbits, and a Texas spiny lizard.

Also noted absences were American Robin, Crow, Blue Jay, Eurasian Collared Doves, Mallards, Canada Geese, Red-tailed Hawks.

This was my husband Randy's first ever birding experience outside our backyard, and he was just as excited as I was. He's hooked!

In Sympathy

We send our heartfelt sympathies to Esther Key and her entire family on the tragic loss of her son and grandsons.

Oklahoma City Audubon Society
c/o Patricia Velte
1421 NW 102nd Street
Oklahoma City, OK 73114

Field Trip Schedule: [*watch for updates on the website and future newsletters*]

Mar 19: **Stinchcomb WMA.** Leader is Jim Bates. meet at Jim's Restaurant and NW 39th and Council at 8AM.

Mar 26: **South Jenkins St/Norman.** Leader is Dick Gunn. Dick wants to meet at 8:00 a.m. at the compost piles on Jenkins Street, just south of the Water Treatment Plant. Dick will be parked along the road. .

Apr 9: **OKC Zoo Behind the scenes birding.** Leader is Nadine Varner. We will meet at the main entrance at 8AM. You must RSVP for this trip because attendance may be limited for the behind-the-scenes tour part of the field trip. Contact Nadine for more information: gallinuleofpurple@yahoo.com.

Apr 15-17: **LPC Festival at Woodward.** Contact John Kennington for more details at johnkennington@gmail.com.

Apr 29: **Salt Plains Bird Festival.**

May 13 - 15: **Oklahoma Ornithological Society spring meeting** at Black Mesa State Park in Cimarron County. contact Doug Wood at dwood@se.edu for more details.

May/June **Club picnic and Nightjar walk at Lake Draper.** details TBA.

President's Perspective (continued)

It found multi-polity chiefdoms and the Mississippian form of settled agriculture in many places. Entire communities planted their crops over large contiguous areas of cleared land, especially along the rivers. Archeologists have discovered that the mound-building culture of the Mississippians was in serious decline by that time, and the population maximum of the Indians had already passed. By the time of the explorations of the French in the Mississippi drainage starting with Marquette and Joliet in 1673, the Indian population had collapsed. References follow. Wikipedia articles on Hernando de Soto, Native American use of fire, Mississippian Culture, Woodland Culture, Pre-Columbian savannas of North America, and Eastern Agricultural Complex.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2666091/pdf/zpq6561.pdf>

<http://encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?entryID=544>

<http://www.cas.sc.edu/anth/gardening/AncientGardening.html>

<http://www.virginiaplaces.org/agriculture/natagri.html>

<http://docsouth.unc.edu/nc/hariot/hariot.html> (page 14)