

THE IMPORTANCE OF LOWER MISSISSIPPI RIVER ALLUVIAL VALLEY REFORESTATION AND WETLAND RESTORATION SITES TO WINTERING MIGRATORY BIRDS

2002 ANNUAL REPORT



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INTRODUCTION

Significant efforts have been initiated in the Lower Mississippi River Alluvial Valley (LMAV, Fig. 1) from within both the U.S. Departments of Interior and Agriculture to restore/enhance wetlands, improve natural hydrology and reestablish bottomland hardwood forests. These programs were instigated because most palustrine-forested wetlands have been either lost or altered and the rate of forested wetland loss continues to increase in the region (Hefner et al. 1994). These restoration initiatives have many goals, one of which is the management of habitats for the benefit of migratory birds. While some management techniques are currently available for land managers to pursue these objectives, to date, few evaluations of the success of these programs have been made with respect to migratory birds. Also, evaluations of the use of these lands by migratory birds have not been made, nor have the management methods employed there been evaluated from the standpoint of bird use.

One assemblage of migratory birds that occurs in the LMAV, birds preferring early-successional habitats (also referred to as grassland and scrub-successional birds), is of special interest to wildlife managers for two primary reasons. First, as a whole, this group of birds has experienced widespread population declines and range reductions (Sauer et al. 1999). Second, the habitats preferred by these birds require perturbations at regular intervals to set succession back to an earlier stage (Krementz and Christie 1999). Thus, knowledge of management techniques for public-owned lands, as well as private lands managed by federal assistance, is required. Furthermore, understanding the wintering requirements of early-successional species

range from as much as 10 – 15 years to as little as one year. Typically the sites have been planted in a variety of bottomland hardwood trees (principally Nuttall Oak [*Quercus nuttallii*]) and left to regenerate without further post-planting management. The one post-planting treatment that has been used on a number of sites that have had extensive mortality of seedlings is to simply replant, often several times over. Additionally, hydrologic restoration in various forms have been implemented on a number of the study sites, particularly those enrolled in the Wetland Reserve Program (WRP). A complete array of management histories for each site have been collected from the various land managers for use in analysis of the influence of management practices on bird species populations.

Avian community surveys

Line transect surveys (Bibby 2000) were used for surveying the winter bird communities. Line transects were conducted by using two persons walking abreast, 10 m apart (5 m either side of the centerline). One person was responsible for keeping pace and used a compass to keep the transect line straight while the other person recorded data. Birds were counted when flushed from between observers and particular care was taken not to double-count individuals. Observers recorded birds up to 75 m away on either side opposite the centerline. This method gave intense coverage of the birds immediately in front of the observers and insured that species visible within the entire 150-m wide strip were recorded. For each site, transects were placed across habitats at 150 m intervals and no closer than 75 m to a site's edge. All transects within units of each site were placed parallel to each other and were positioned so as to give maximize coverage to all habitat variation within the site. Observers also recorded the birds' approximate distance (± 5 m) from the transect centerline. The program DISTANCE (Thomas et al. 1998) will use these perpendicular distance data to estimate wintering bird densities. Bird species density estimation is currently underway using this program. This analysis will incorporate three years of data for contrast and comparison.

Crepuscular flight surveys (Glasgow 1958) were also used to survey bird species that become active during the crepuscular periods of the day (primarily American Woodcock and Short-eared Owl). These surveys were conducted during periods of suitable weather (air temperature $>0^{\circ}$ C, no precipitation, and within two days of a full moon). From sunset to approximately 40 min after sunset, observers were positioned along a field edge, >100 m apart,

high grass species diversity. Population numbers for Short-eared Owl and Le Conte's Sparrow recorded in 2002 were lower when compared to those in the previous two winters. Numbers of Sedge Wrens were nearly identical to that recorded in the previous winters, possibly indicating a relative population stability for this species. Additionally, habitat-specific data for these three species were collected in winter 2002 for the purpose of better understand their wintering habitat preferences. The measurements obtained were primarily of vertical and horizontal vegetation structure. Using a modification of the methods developed by Whitmore (1981), approximately 25 samples for each species were collected from throughout the study area. These data are currently being analyzed.

One of the more interesting features of the data across the three field seasons is that of great fluctuations in overall bird populations. In 2000, some 9,350 birds were tallied while only 5,576 were censused in 2001, a 40% reduction in overall numbers. In 2002 there were 8,148 birds recorded. This later total represents a 68% increase over the previous year but still 13% lower than the 2000 total.

Table 3 displays a comparison between the number of species observed by site and by year. For sites that had repeat visits in 2002, the change in species richness is indicated along with the number of species detected that were the same across the three years. Little variation existed in species richness between years (2000 mode = 8; 2001 mode = 6; 2002 mode = 8), the difference being that there were approximately two fewer species encountered per site in 2001 than in 2000 and 2002.

Also shown in Table 3 is an index of relative bird abundance for every site across all years. These indices were calculated by dividing the total number of birds counted per site by the total time spent on transects. The resulting values indicate the number of birds encountered per minute. In 2002 an increase in bird abundance was generally encountered, compared to 2001 levels. This increase was seen on 43 of 61 sites (about 70%). This is in contrast to changes between 2000 and 2001 in which bird abundance declined at almost all sites. These observed fluctuations in overall bird abundance, across all sites, may be related to adverse weather conditions experienced throughout the LMAV during the early part of the 2000-2001 winter.

The five most numerous bird species remain the same in winter 2002 as compared to the previous two winters. The only change is that of each species' rank. As mentioned above, in 2002 the most numerous species was Red-winged Blackbird (n = 2477). This was followed by

winter 2000 $N = 68.9$ ($SE = 7.7$); winter 2001 $N = 58.0$ ($SE = 4.2$); and winter 2002 $N = 57.0$ ($SE = 4.2$). Confidence intervals overlapped among all three estimates indicating that species richness in the LMAV did not vary over time among years. This suggests that all sites had the same pool of species from which a particular plot's species richness was drawn.

As can be seen in Table 3, species richness between individual sites was highly variable, ranging from as high as 22 (Bayou Macon WMA – E in 2000) to as little as 2 species (McLemore in 2001 and Gray Prairie – W in 2002). The number of species held common between sites ranged from as much as 11 (Oakwood) down to as few as 0 (Chesser – N). The modal number of common species across the study area was 4. Some sites experienced high fluctuations of species richness—such as the range from 4 to 13 at Trainor 228—while other sites maintained a fairly constant richness across the three years. This high variability could be due to a variety of a variety of factors, two of which initially stand out as being most likely—plot size and vegetation characteristics. An in-depth analysis of the factors affecting bird species richness in these early-successional habitats is underway.

Vegetation sampling

General habitat measurements were made from 13 January – 27 February 2002. In total, the remaining 29 of the 69 sites were sampled using the following methods: for each bird transect, stops were made at 100-m intervals following the same line. At each stop one person stood at the 100 m interval on the transect line while the other person walked out 10 m in each of the cardinal directions with a density board (Noon 1980). The observer at the stationary point recorded the amount of vegetation volume in the 0.0-0.3, 0.3-1.0, and 1.0-2.0 m height classes as seen against the board. At the same time, the person carrying the density board estimated percent ground cover using a 0.5 x 0.5-m quadrat (Daubenmire 1959). Ground cover types were placed into the following categories: grasses, forbs, woody stems, litter, bare ground, and other (which typically included moss, rushes or water). Both measurements resulted in four readings at each stop along the transect line.

A three-year total of 69 sites have had vegetational characteristics measured. This completes the collection of general structural vegetation data. Analysis of the vegetation data and its relationship to bird species richness, composition and population structure is currently underway.

FUTURE WORK

With the field data collection portion of this project complete, the analysis for those data collected in 2000, 2001 and 2002 is currently ongoing. These analyses include the overall estimates from distance sampling, habitat associations (both general and species-specific), influence of landscape variables, and bird population relationships to climate patterns, to name a few. We anticipate that all analyses and associated conclusions will be complete by spring 2003 with a final report ready for distribution in summer 2003.

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Figure 1. The Lower Mississippi River Alluvial Valley physiographic region.



Figure 3. Approximate locations of Louisiana study sites for 2002 field season. Numbers correspond to sites in Table 1.



Table 1. Early-successional (including reforestation and wetland restoration) tracts in the Lower Mississippi River Alluvial Valley of Arkansas, Louisiana and Mississippi surveyed during winter 2000, 2001 and 2002. Map numbers refer to corresponding locations on Figures 2 – 4.

Site Name	State	Ownership	Map No.
Ainsworth	AR	USF&WS (Overflow NWR)	3
Augusta	AR	Private (WRP)	8
Bald Knob NWR (6 sites)	AR	USF&WS	19-24
Bayou DeView Ltd.	AR	Private (WPR)	9
Chesser (N & S)	AR	Private (WRP)	10-11
Cole (E, N & W)	AR	Private (WRP)	12-14
DeYampert	AR	USF&WS (Overflow NWR)	1
Gray Prairie	AR	Private	16
Gray Prairie - West	AR	Private	16A
Konecny Prairie Natural Area	AR	ANHC – Private (easement)	18
Mariana Farms	AR	Private (WRP)	15
McCord	AR	Private (WRP)	17
Oakwood	AR	USF&WS (Felsenthal NWR)	2
Roth Prairie Natural Area	AR	ANHC	4
Round Pond	AR	USF&WS (Wapanocca NWR)	5
South Ladd	AR	USF&WS (Overflow NWR)	6
Wapanocca NWR	AR	USF&WS	7
West Point	AR	Private (WRP)	25
Adcock (2 sites)	LA	USF&WS (N. Louisiana Refuge Complex)	26
Bayou Macon WMA (E & W)	LA	LDW&F	27-28
Big Colewa Bayou WMA	LA	LDW&F	29
Burress	LA	USF&WS (N. Louisiana Refuge Complex)	30
Chatman	LA	USF&WS (Tensas River NWR)	31
Cooper	LA	USF&WS (Tensas River NWR)	32
Creasy	LA	USF&WS (N. Louisiana Refuge Complex)	33
Ezell	LA	USF&WS (Tensas River NWR)	34
Grand Cote NWR	LA	USF&WS	35
Handy Brake NWR	LA	USF&WS	36
K & I North	LA	USF&WS (N. Louisiana Refuge Complex)	37
Kifer	LA	Private (WRP)	43
King	LA	USF&WS (N. Louisiana Refuge Complex)	38
Klueppel	LA	Private (WRP)	44
Lewis	LA	USF&WS (N. Louisiana Refuge Complex)	39
McCann	LA	Private (WRP)	45
McGraw	LA	USF&WS (Tensas River NWR)	41
McLemore	LA	USF&WS (Tensas River NWR)	40
Small Adcock	LA	USF&WS (N. Louisiana Refuge Complex)	42
Bass 277	MS	USF&WS (N. Mississippi Refuge Complex)	46
Bowling 170	MS	USF&WS (N. Mississippi Refuge Complex)	49
Coldwater River NWR (S & W)	MS	USF&WS	47-48
Goss 543	MS	USF&WS (N. Mississippi Refuge Complex)	50

Table 2. Bird species detected in winter 2000, 2001 and 2002 from transect sampling of early-successional sites throughout the Lower Mississippi River Alluvial Valley of Arkansas, Louisiana and Mississippi. Numbers in parentheses indicate percentage of annual total.

Species	2000 Freq.	2001 Freq.	2002 Freq.	Species	2000 Freq.	2001 Freq.	2002 Freq.
American Bittern (<i>Botaurus lentiginosus</i>)	0	1 (0.02)	2 (0.03)	Marsh Wren (<i>Cistothorus palustris</i>)	4 (0.06)	1 (0.02)	7 (0.09)
Great Blue Heron (<i>Ardea herodias</i>)	1 (0.01)	1 (0.02)	1 (0.01)	Ruby-crowned Kinglet (<i>Regulus calendula</i>)	1 (0.01)	4 (0.07)	4 (0.05)
Turkey Vulture (<i>Cathartes aura</i>)	0	1 (0.02)	3 (0.04)	Eastern Bluebird (<i>Sialis sialis</i>)	0	0	5 (0.06)
Gadwall (<i>Anas strepera</i>)	13 (0.19)	0	0	American Robin (<i>Turdus migratorius</i>)	0	0	1 (0.01)
Mallard (<i>Anas platyrhynchos</i>)	92 (1.32)	33 (0.59)	95 (1.17)	Brown Thrasher (<i>Toxostoma rufum</i>)	0	0	1 (0.01)
Northern Shoveler (<i>Anas clypeata</i>)	0	0	7 (0.09)	Northern Mockingbird (<i>Mimus polyglottos</i>)	7 (0.10)	10 (0.18)	18 (0.22)
Northern Harrier (<i>Circus cyaneus</i>)	48 (0.69)	73 (1.31)	81 (0.99)	European Starling (<i>Sturnus vulgaris</i>)	7 (0.10)	0	0
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	1 (0.01)	0	2 (0.03)	American Pipit (<i>Anthus rubescens</i>)	17 (0.24)	1 (0.02)	1 (0.01)
Cooper's Hawk (<i>Accipiter cooperii</i>)	1 (0.01)	0	2 (0.03)	Orange-crowned Warbler (<i>Vermivora celata</i>)	0	2 (0.04)	0
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	17 (0.24)	17 (0.30)	28 (0.34)	Yellow-rumped Warbler (<i>Dendroica coronata</i>)	2 (0.03)	16 (0.29)	4 (0.05)
American Kestrel (<i>Falco sparverius</i>)	0	3 (0.05)	1 (0.01)	Palm Warbler (<i>Dendroica palmarum</i>)	1 (0.01)	0	1 (0.01)
Northern Bobwhite (<i>Colinus virginianus</i>)	0	8 (0.14)	28 (0.34)	Common Yellowthroat (<i>Geothlypis trichas</i>)	2 (0.03)	1 (0.02)	1 (0.01)
Killdeer (<i>Charadrius vociferus</i>)	22 (0.32)	2 (0.04)	12 (0.15)	Eastern Towhee (<i>Pipilo erythrophthalmus</i>)	0	4 (0.07)	13 (0.16)
Common Snipe (<i>Gallinago gallinago</i>)	36 (0.52)	66 (1.18)	37 (0.45)	American Tree Sparrow (<i>Spizella arborea</i>)	0	12 (0.22)	0
American Woodcock (<i>Scolopax minor</i>)	22 ^a (0.30)	12 ^a (0.22)	3 ^a (0.04)	Chipping Sparrow (<i>Spizella passerina</i>)	1 (0.01)	0	0
Mourning Dove (<i>Zenaidura macroura</i>)	43 (0.62)	28 (0.50)	91 (1.12)	Field Sparrow (<i>Spizella pusilla</i>)	17 (0.24)	16 (0.29)	54 (0.66)
Barn Owl (<i>Tyto alba</i>)	1 (0.01)	0	0	Vesper Sparrow (<i>Pooecetes gramineus</i>)	1 (0.01)	0	1 (0.01)
Short-eared Owl (<i>Asio flammeus</i>)	49 (0.70)	71 (1.27)	37 (0.45)	Savannah Sparrow (<i>Passerculus sandwichensis</i>)	536 (7.74)	1137 (20.4)	859 (10.54)
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	0	2 (0.04)	0	Le Conte's Sparrow (<i>Ammodramus leconteii</i>)	77 (1.11)	83 (1.5)	41 (0.5)
Red-bellied Woodpecker (<i>Melanerpes carolinus</i>)	1 (0.01)	0	1 (0.01)	Fox Sparrow (<i>Passerella iliaca</i>)	21 (0.30)	2 (0.04)	14 (0.17)
Downy Woodpecker (<i>Picoides pubescens</i>)	1 (0.01)	6 (0.11)	5 (0.06)	Song Sparrow (<i>Melospiza melodia</i>)	1024 (14.7)	496 (8.9)	936 (11.49)
Northern Flicker (<i>Colaptes auratus</i>)	5 (0.07)	40 (0.72)	18 (0.22)	Lincoln's Sparrow (<i>Melospiza lincolni</i>)	1 (0.01)	0	0
Eastern Phoebe (<i>Sayornis phoebe</i>)	4 (0.06)	4 (0.07)	7 (0.09)	Swamp Sparrow (<i>Melospiza georgiana</i>)	1955 (28.07)	715 (12.8)	1478 (18.14)
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	18 (0.26)	32 (0.57)	23 (0.28)	White-throated Sparrow (<i>Zonotrichia albicollis</i>)	30 (0.43)	4 (0.07)	10 (0.12)
Blue Jay (<i>Cyanocitta cristata</i>)	0	6 (0.11)	0	White-crowned Sparrow (<i>Zonotrichia leucophrys</i>)	4 (0.06)	4 (0.07)	40 (0.45)
American Crow (<i>Corvus brachyrhynchos</i>)	0	1 (0.02)	0	sparrow sp.	789 (8.44)	133 (2.38)	582 (7.14)
Horned Lark (<i>Eremophila alpestris</i>)	1 (0.01)	0	0	Northern Cardinal (<i>Cardinalis cardinalis</i>)	5 (0.07)	56 (1.0)	52 (0.64)
Carolina Chickadee (<i>Poecile carolinensis</i>)	9 (0.13)	20 (0.36)	26 (0.32)	Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	1295 (18.59)	1261 (22.7)	2477 (30.4)
Tufted Titmouse (<i>Baeolophus bicolor</i>)	1 (0.01)	3 (0.05)	0	Eastern Meadowlark (<i>Sturnella magna</i>)	492 (7.06)	782 (14.0)	785 (9.63)
Carolina Wren (<i>Thryothorus ludovicianus</i>)	3 (0.04)	2 (0.04)	31 (0.38)	Rusty Blackbird (<i>Euphagus carolinus</i>)	22 (0.32)	16 (0.29)	7 (0.09)
Bewick's Wren (<i>Thryothorus bewickii</i>)	1 (0.01)	0	0	blackbird sp.	2 (0.03)	47 (0.84)	1 (0.01)
House Wren (<i>Troglodytes aedon</i>)	0	1 (0.02)	0	Common Grackle (<i>Quiscalus quiscula</i>)	105 (1.51)	0	0
Winter Wren (<i>Troglodytes troglodytes</i>)	0	1 (0.02)	0	Brown-headed Cowbird (<i>Molothrus ater</i>)	0	2 (0.04)	0
Sedge Wren (<i>Cistothorus platensis</i>)	166 (2.38)	164 (2.9)	171 (2.1)	American Goldfinch (<i>Carduelis tristis</i>)	0	58 (1.04)	0

^a includes birds counted during crepuscular flight surveys.

Table 3. Continued.

Site name	No. of species 2000	No. of species 2001	No. of species 2002	No. of species common across years	Abundance index 2000	Abundance index 2001	Abundance index 2002
K & I North	8	5	9	4	1.11	* 0.33	1.03
Kifer	-	6	7	3	-	0.54	0.7
King	10	5	7	4	0.8	0.32	0.64
Klueppel	-	9	14	5	-	0.75	0.65
Konecny Prairie Natural Area	-	8	7	3	-	1.14	0.98
Lewis	12	12	7	4	1.31	0.48	0.43
Lindsey 204	4	-	8	2	* 0.17	-	0.74
Mabus 416	10	10	9	4	0.48	* 0.26	0.42
MaGraw	12	9	8	3	0.85	0.43	0.67
Marianna Farms	-	6	8	2	-	* 0.2	0.71
McCann	-	9	9	4	-	0.57	0.44
McCord	-	5	3	2	-	0.58	1.06
McLemore	6	2	3	2	3.06	0.52	0.29
Morgan Brake NWR	8	12	12	6	0.96	0.29	0.94
Oakwood	16	16	18	11	0.71	0.43	2.19
Peoples	-	6	8	5	-	0.35	0.71
Redray	-	7	9	5	-	0.24	1.72
Roth Prairie Natural Area	8	6	6	2	2.0	0.59	0.51
Round Pond	8	12	12	3	0.87	0.28	0.61
Sharkey	-	-	19	-	-	-	0.55
Snake Creek Brake	12	-	-	-	0.69	-	-
Scott 226	8	11	8	5	0.83	0.46	0.43
Scott 90	6	4	-	4	1.52	0.42	-
Scott 80	7	-	8	6	1.1	-	0.91
South Ladd	5	7	8	4	* 1.05	0.39	1.27
Trainer 219	11	6	5	1	0.83	0.17	0.39
Trainer 228	4	8	13	4	0.31	* 0.28	1.1
Wapanocca NWR	12	10	10	4	1.12	0.46	0.5
Watts 214	6	7	8	5	0.4	0.33	0.82
West Point	-	8	4	3	-	0.89	0.57
Willow Break	-	11	8	6	-	0.59	1.81
WPP	-	5	-	-	-	0.3	-

Note: Sites where data are unavailable, a result of site inaccessibility or prior to the addition of this study, are noted by a dash (-). Asterisks (*) indicate that index calculations included estimates of survey time due to missing data.