Arkansas Game and Fish Commission Aerial Waterfowl Survey Report

November 13-19, 2015

November 2015 Survey Summary

Arkansas Game and Fish Commission biologists conducted the Nov. 2015 aerial waterfowl survey Nov. 13 in southwest Arkansas, Nov. 16-19 in the Mississippi Alluvial Valley (Delta) and Nov. 19 in the Arkansas River Valley. Observers estimated 889,191 ducks in the Delta, including 261,912 mallards (Table 1), and a total of only 27,379 ducks in the Arkansas River Valley, including 10,126 mallards (Table 2). The southwest Arkansas duck population estimate was slightly over 37,000, including over 21,000 mallards (Table 2). Observers in the Delta encountered relatively low numbers of light (lesser snow and Ross's) geese, but over 677,000 greater white-fronted geese.

The Delta mallard population estimate is about half the unusually high 2014 November estimate and below the 2009-2015 long-term November average. The November duck population estimate is similar to 2014 and the long-term average (Figure 1). Most mallards in the Delta were distributed over four survey zones: Bayou Macon, Cache, Lower White and Lower St. Francis (Figure 6). The Arkansas River Valley estimates for all ducks and mallards were low, with the only noticeable concentration in the Holla Bend survey zone which contains Holla Bend National Wildlife Refuge. The majority of mallards in southwest Arkansas were along the Red River corridor from Highway 82 to Sulphur River.

Over 35 percent of mallards in the Delta were observed in rice fields with about 30 percent in other agricultural fields, while nearly 18 percent were in buttonbush (buckbrush) reservoirs. In the Arkansas River Valley, most mallards were using oxbow lakes at the time of the survey, with lesser numbers along the river.

Last November, unusually cold conditions brought good numbers of mallards to the state despite noticeably dry conditions during that survey period. In contrast, this survey period was preceded by dry, warm conditions, but those conditions quickly changed before completion of the survey. By far the heaviest rains so far this fall caused widespread flooding and provided extensive waterfowl habitat. Unseasonably warm temperatures appear to have been tempered by unusually high habitat availability to result in duck numbers about average for November in Arkansas. Forecast cooler temperatures and north winds may move ducks from points north our direction and boost duck numbers during the upcoming first week of Arkansas's duck season. However, the same weather system that brought extensive rains to Arkansas did the same in many regions of the Mississippi and Central Flyways, so many ducks, particularly mallards, may continue to linger as they take advantage of newly flooded habitat along their migration route.

Table 1. Waterfowl abundance estimates in Arkansas during the late November (Nov), mid-December (Dec), early-January Midwinter Survey (MWS) and late-January (Jan) aerial waterfowl survey periods, 2009-2015, in the Mississippi Alluvial Valley (MAV) using stratified random sampling of transects.

			Survey Zone											
			Bayou Bartholomew - Bayou Boeuf	Bayou Macon	Bayou Meto - Lower Arkansas	Big Creek	Black - Upper White	Cache	L' Anguille	Lower White - Bayou Des Arc	Little River Ditches	Lower St. Francis	Lower White	MAV Total
Survey Period	Nov-09	Mallards												124,065
		Total Ducks												794,405
	Dec-09	Mallards												648,955
		Total Ducks												2,046,969
	MWS-10	Mallards												2,309,453
		Total Ducks												2,887,810
	Jan-10	Mallards												2,063,243
		Total Ducks												3,153,410
	Nov-10	Mallards												180,198
		Total Ducks												1,133,126
	Dec-10	Mallards												1,247,697
		Total Ducks												1,860,894
	MWS-11	Mallards												671,982
		Total Ducks												1,192,518
	Jan-11	Mallards												1,311,245
		Total Ducks												1,786,677
	Nov-11	Mallards	4,750	-	15,717	66	9,968	47,902	7,577	10,896	2,432	36	32,736	132,080
		Total Ducks	52,662	19,346	174,725	1,367	32,914	77,686	36,010	78,700	40,038	61	114,332	627,841
	Dec-11	Mallards	39,569	2,136	90,328	10,161	73,576	226,861	48,173	206,485	367,290	122,032	283,418	1,470,029
		Total Ducks	135,903	14,267	298,196	32,799	171,366	306,191	94,423	360,232	417,990	247,685	339,894	2,418,946
	MWS-12	Mallards	7,956	989	110,141	87,360	35,244	318,991	51,493	43,618	51,721	8,604	37,862	753,979
		Total Ducks	29,124	2,318	161,830	161,081	51,447	368,370	89,139	60,802	75,241	51,660	65,861	1,116,873
	Jan-12	Mallards	22,365	5,917	48,569	82,272	47,069	102,400	38,682	232,214	80,546	11,193	82,291	753,518
		Total Ducks	47,985	17,165	87,045	114,331	128,018	162,763	105,318	321,724	86,482	70,673	122,334	1,263,838
	Nov-12	Mallards	2,543	7,176	44,732	5,298	50,797	112,327	97,712	14,306	19,136	36,967	51,127	442,121
		Total Ducks	11,037	38,220	95,784	34,352	79,726	171,744	164,874	68,621	25,852	66,825	75,764	832,799
	Dec-12	Mallards	37,887	11,126	40,660	4,525	157,624	54,417	45,467	8,517	29,542	8,993	17,448	416,206
		Total Ducks	121,538	22,648	70,813	18,267	233,838	81,262	95,628	30,981	35,021	45,649	31,270	786,915
	MWS-13	Mallards	30,438	12,508	75,690	16,112	48,272	57,409	32,133	20,437	48,267	4,633	105,865	451,764
		Total Ducks	54,951	19,145	120,222	22,876	60,929	84,871	68,389	27,503	56,231	7,511	142,842	665,470
	Jan-13	Mallards	28,836	8,921	90,090	36,204	93,035	62,369	26,058	7,344	3,511	93,337	27,036	476,741
		Total Ducks	128,058	48,672	127,548	48,364	138,314	103,878	52,116	9,588	3,665	145,229	32,483	837,915
	Nov-13	Mallards	13,582	2,841	24,371	2,900	25,948	66,501	54,163	-	13,242	1,445	39,840	244,833
		Total Ducks	200,157	38,409	107,960	18,100	148,225	111,257	99,517	49,598	46,545	4,206	114,572	938,546
	Dec-13	Mallards	73,158	20,062	71,142	7,904	72,485	25,429	63,845	54,023	37,107	27,422	22,806	475,383
		Total Ducks	154,707	31,980	145,453	26,009	98,951	36,088	122,202	77,353	47,533	33,835	60,612	834,723
	MWS-14	Mallards	104,455	33,520	164,150	3,070	66,080	216,061	934	56,508	25,124	13,835	123,399	807,136
		Total Ducks	114,764	44,313	182,263	3,070	75,082	247,069	1,196	80,835	25,124	17,143	136,817	927,676
	Nov-14	Mallards	9,409	17,100	136,741	22,901	34,196	19,077	3,454	22,216	128,948	69,511	84,007	547,560
		Total Ducks	83,914	51,660	234,759	80,425	70,814	29,520	12,382	45,023	171,835	80,469	132,448	993,249
	Dec-14	Mallards	81,653	48,048	53,377	7,836	159,637	12,105	36,370	8,308	23,966	16,198	172,746	620,244
		Total Ducks	107,261	50,700	168,894	12,430	212,520	18,005	72,920	15,300	24,196	46,082	251,119	979,427
	MWS-15	Mallards	113,960	29,818	162,687	99,270	110,723	25,064	31,083	10,033	8,855	162,042	172,026	925,561
		Total Ducks	130,296	30,988	188,203	106,124	148,309	39,287	55,675	18,601	8,855	321,514	180,142	1,227,994
	Nov-15	**Mallards**	**3,599**	**43,200**	**17,915**	**19,253**	**15,382**	**46,418**	**7,625**	**15,597**	**9,093**	**40,889**	**42,941**	**261,912**
		Total Ducks	**203,640**	**120,492**	**126,942**	**25,333**	**49,581**	**149,017**	**18,051**	**22,088**	**14,459**	**43,547**	**116,041**	**889,191**

Table 2. Waterfowl abundance estimates in western Arkansas during the late November (Nov), mid-December (Dec), early-January Midwinter Survey (MWS) and late-January (Jan) aerial waterfowl survey periods, 2009-2015. Beginning in Jan. 2013, surveys in the Arkansas River Valley (ARV) were conducted using stratified random sampling of transects, while past ARV surveys and surveys in southwest Arkansas were conducted using "cruise" surveys.

			Survey Zone										
			Bigelow - Lake Conway	Cadron	East Dardanelle Reservoir	Fourche La Fave	Frog Bayou	Holla Bend	Petit Jean	Pt. Remove - Plumerville	West Dardanelle Reservoir	Arkansas River Valley Total	Southwest Arkansas Total
Survey Period	Nov-09	Mallards										13,731	5,480
		Total Ducks										31,416	19,140
	Dec-09	Mallards										18,580	19,230
		Total Ducks										31,304	31,820
	MWS-10	Mallards										58,815	34,590
		Total Ducks										81,685	36,060
	Jan-10	Mallards										14,359	19,840
		Total Ducks										20,336	27,705
	Nov-10	Mallards										96	14,010
		Total Ducks										5,966	30,300
	Dec-10	Mallards										25,064	2,390
		Total Ducks										28,054	21,106
	MWS-11	Mallards										26,318	15,027
		Total Ducks										40,470	21,267
	Jan-11	Mallards										41,850	-
		Total Ducks										60,635	-
	Nov-11	Mallards										12,225	-
		Total Ducks										19,870	-
	Dec-11	Mallards										21,389	-
		Total Ducks										40,919	-
	MWS-12	Mallards										7,264	-
		Total Ducks										13,339	-
	Jan-12	Mallards										13,900	-
		Total Ducks										21,000	-
	Nov-12	Mallards										1,182	13,090
		Total Ducks										7,732	21,935
	Dec-12	Mallards										13,975	10,245
		Total Ducks										22,417	17,105
	MWS-13	Mallards										16,893	8,165
		Total Ducks										26,058	14,630
	Jan-13	Mallards	-	408	10,000	372	1,837	630	627	1,843	917	16,634	-
		Total Ducks	-	1,428	10,180	372	1,971	990	902	3,687	7,857	28,011	-
	Nov-13	Mallards	240	187	4,660	800	0	144	0	754	253	7,038	4,455
		Total Ducks	320	187	14,320	1,920	0	1,080	528	965	3,307	22,627	19,145
	Dec-13	Mallards	576	245	5,472	1,728	358	162	1,320	3,429	2,176	15,466	10,130
		Total Ducks	1,604	2,713	8,672	1,728	1,836	3,132	1,501	4,329	3,941	29,456	29,070
	MWS-14	Mallards	11,767	816	2,898	4,800	-	2,160	715	13,703	3,449	40,306	18,385
		Total Ducks	14,441	816	8,711	5,124	-	2,934	957	22,177	6,087	61,247	35,875
	Nov-14	Mallards	926	7,140	12,114	704	924	4,518	10,428	7,125	392	44,271	15,890
		Total Ducks	5,040	10,540	45,485	4,256	3,248	4,518	19,932	12,039	624	105,682	29,790
	Dec-14	Mallards	720	224	1,028	640	373	3,006	2,541	1,343	299	10,174	21,200
		Total Ducks	1,242	530	33,805	1,296	373	4,194	4,059	6,991	299	52,789	29,400
	MWS-15	Mallards	3,929	143	5,813	221	-	11,138	0	2,107	3,531	26,882	19,245
		Total Ducks	10,594	755	18,649	221	-	13,455	224	2,107	9,871	55,876	28,695
	Nov-15	**Mallards**	**270**	**-**	**1,867**	**-**	**149**	**2,430**	**561**	**4,785**	**64**	**10,126**	**21,580**
		Total Ducks	**270**	**449**	**2,898**	**-**	**1,170**	**14,760**	**726**	**7,042**	**64**	**27,379**	**37,060**

Figure 1. Duck abundance estimates in the Mississippi Alluvial Valley (Delta) of Arkansas during the late November (Nov), mid-December (Dec), early-January Midwinter Waterfowl Survey (MWS) and late-January (Jan) aerial waterfowl survey periods, 2009-2015.

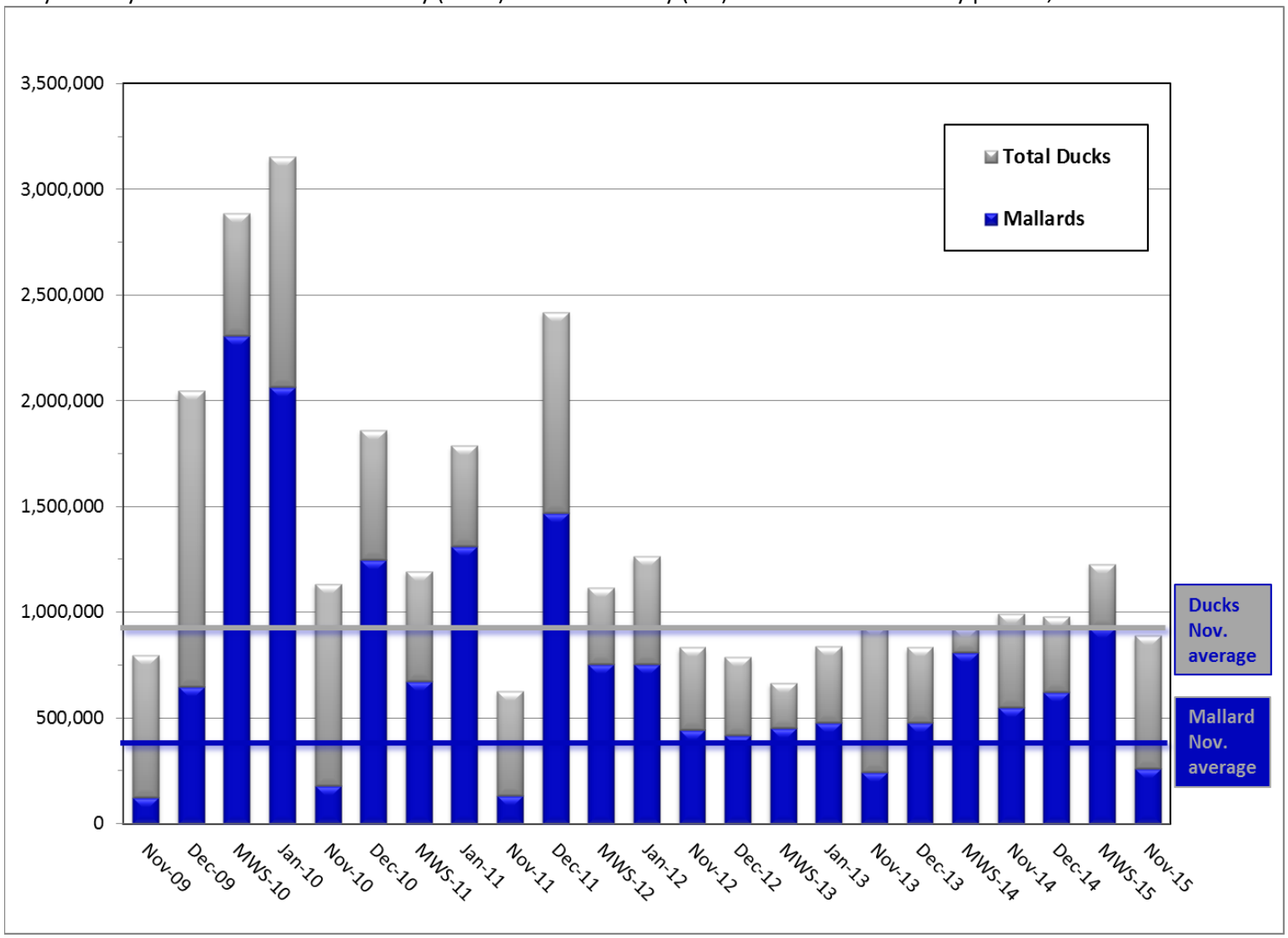


Figure 2. Duck distribution in the Mississippi Alluvial Valley of Arkansas during the November 2015 aerial waterfowl survey period.

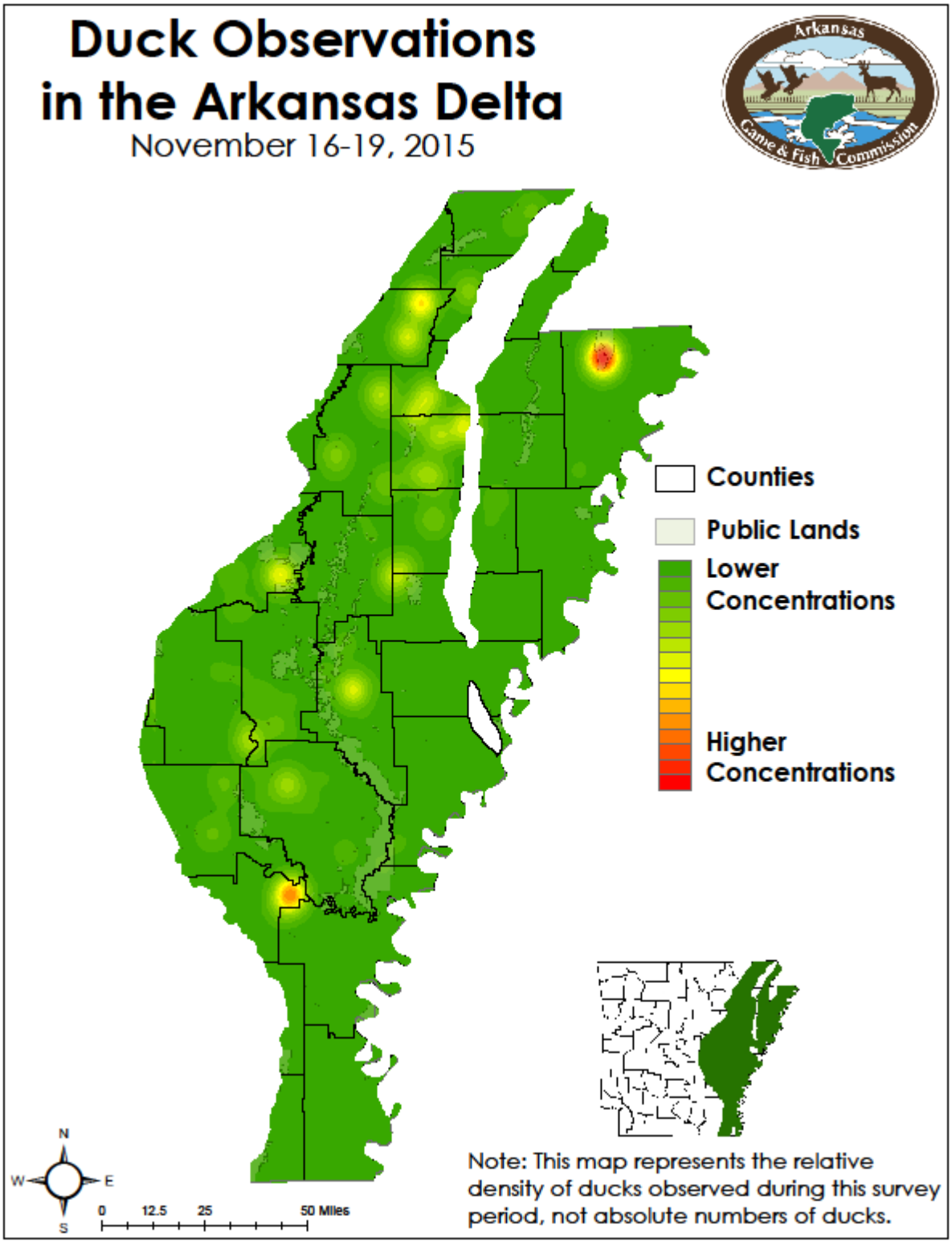


Figure 3. Mallard distribution in the Mississippi Alluvial Valley of Arkansas during the November 2015 aerial waterfowl survey period.

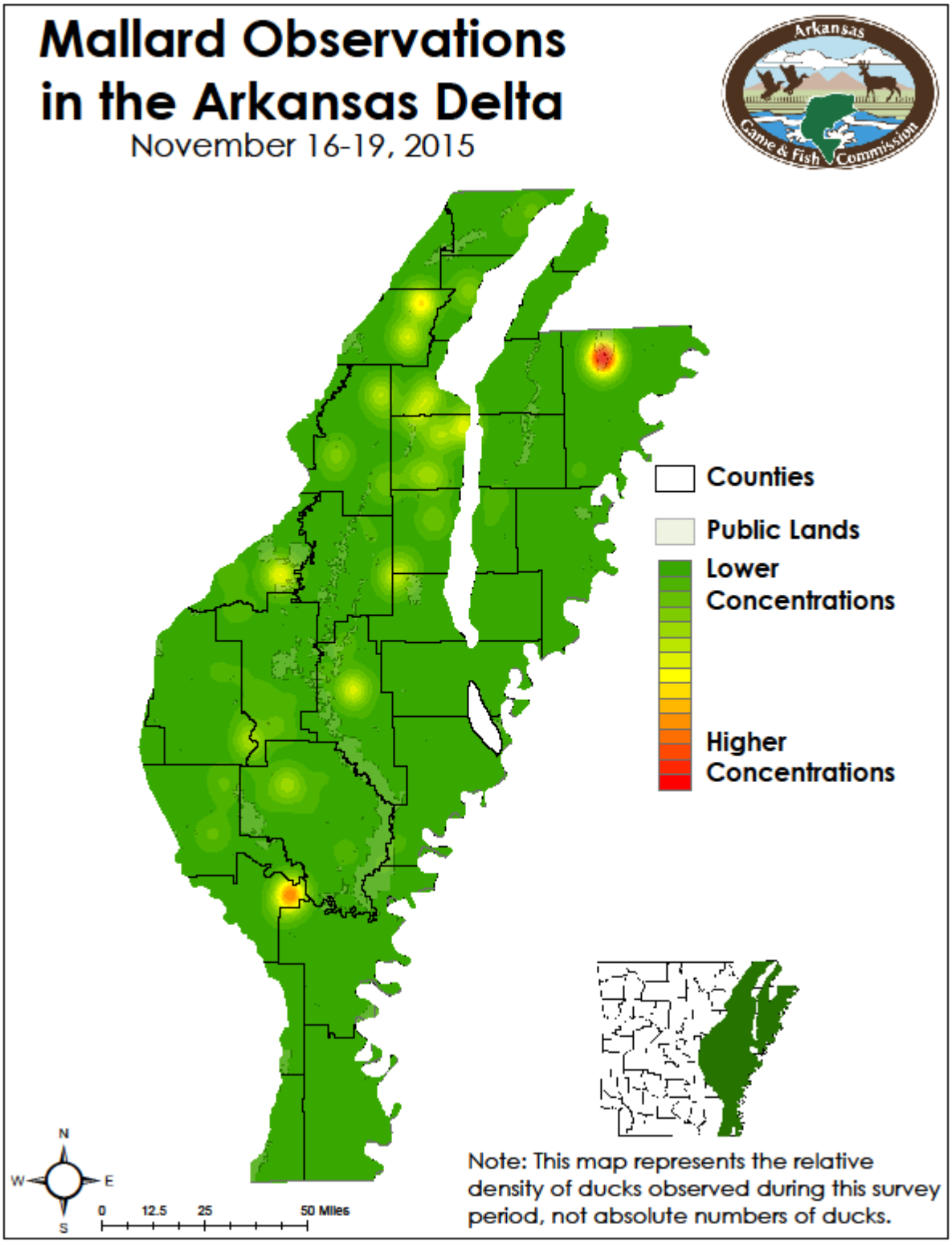


Figure 4. Duck distribution in the Arkansas River Valley (ARV) of Arkansas during the November 2015 waterfowl survey period.

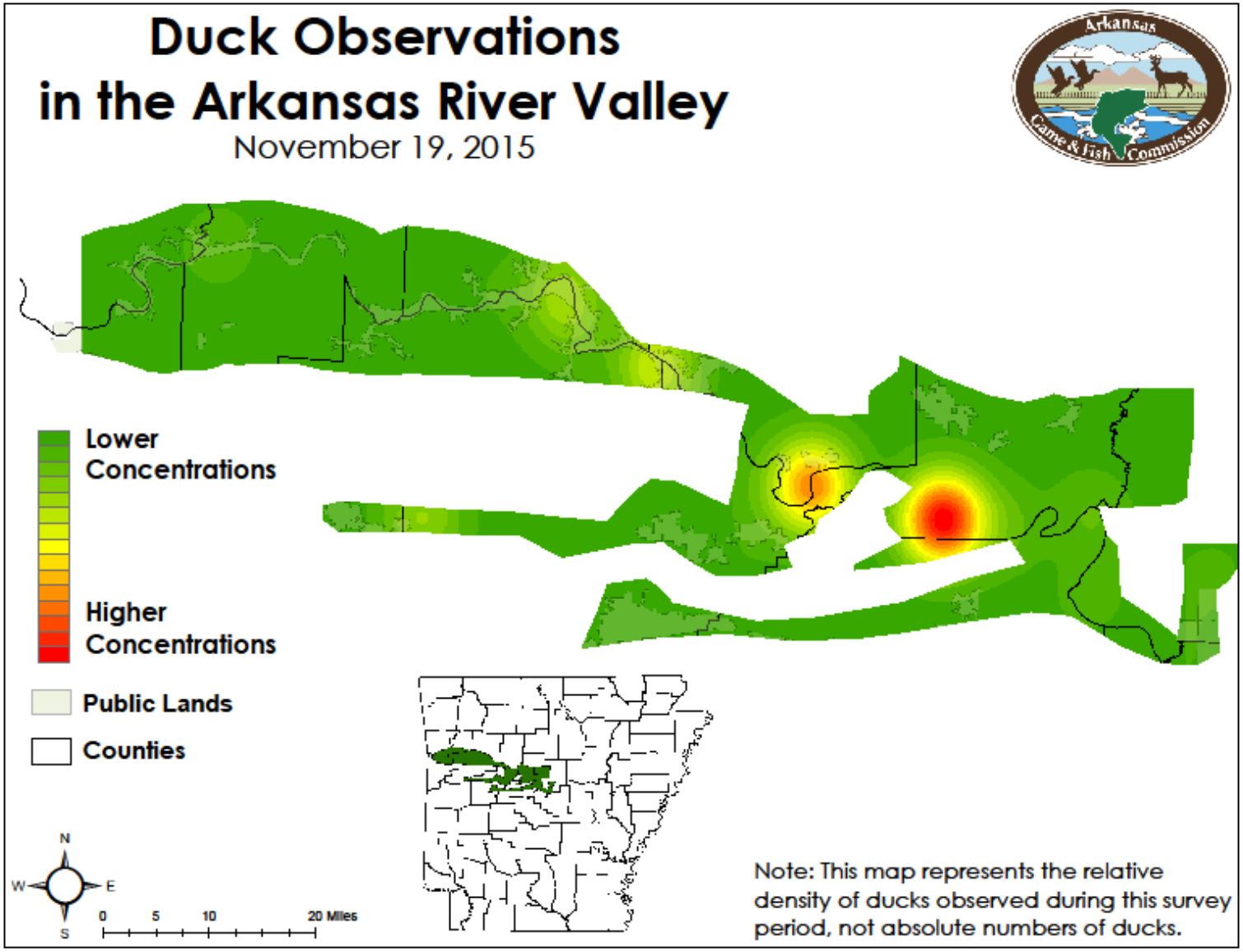
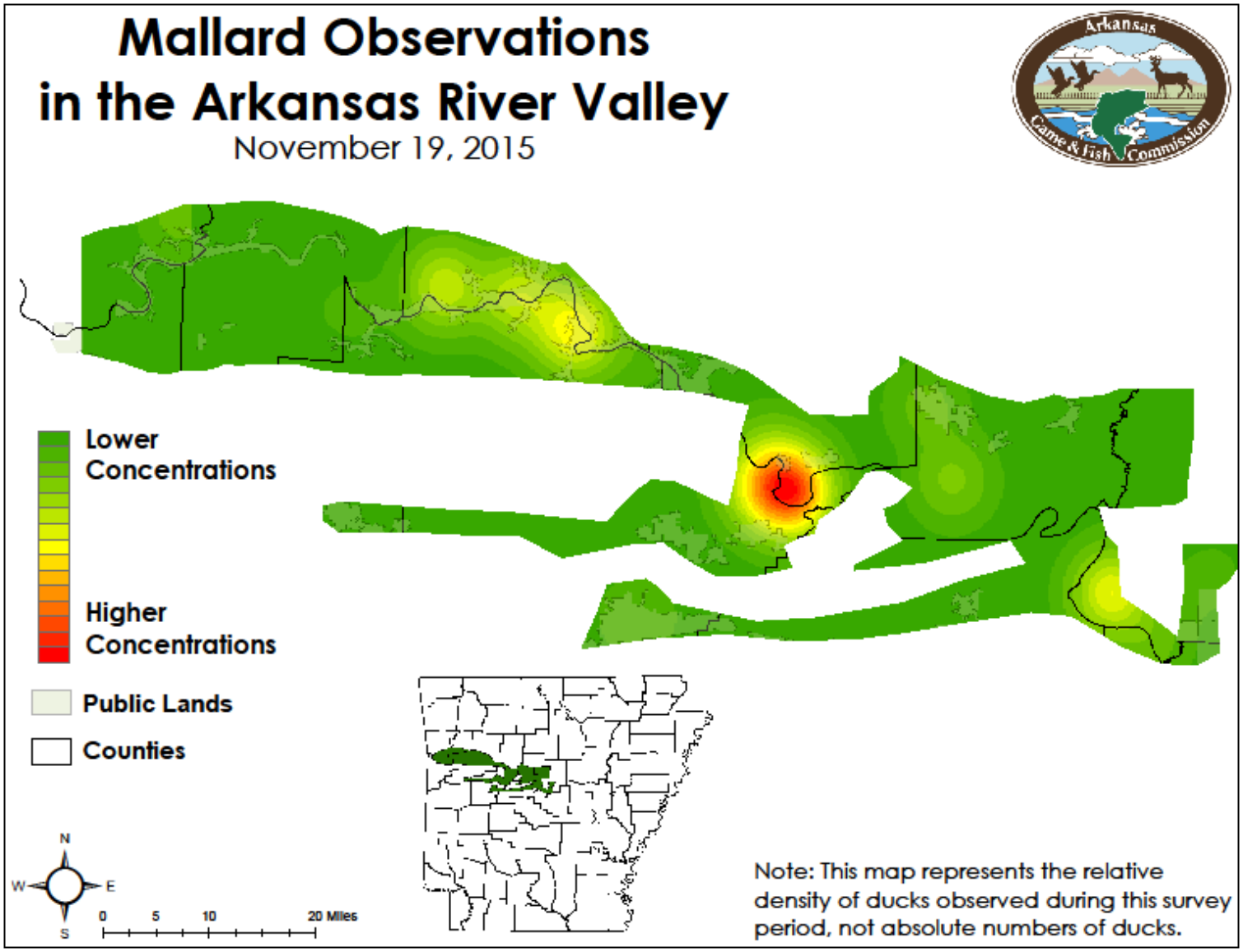


Figure 5. Mallard distribution in the Arkansas River Valley (ARV) of Arkansas during the November 2015 waterfowl survey period.



Survey Design Background

The Mississippi Alluvial Valley is an area of continental significance for migrating and wintering waterfowl, as outlined in the North American Waterfowl Management Plan, and the single most important region for wintering mallards. Habitats found in western Arkansas, including the Arkansas River Valley and southwest Arkansas, such as the Red and Sulphur River floodplains, provide additional critical habitat for migrating and wintering waterfowl. Biologists conduct regular waterfowl surveys in these regions by aircraft up to four times each wintering period.

Winter waterfowl surveys, including the Midwinter Waterfowl Survey, have been conducted across much of the United States since 1935. Many different counting techniques have been used, and recently AGFC and partners have conducted surveys in the MAV using stratified random sampling of aerial fixed width (250m) strips, or transects, that have the advantages of extensive coverage (i.e., no area is excluded from the sample), increased accuracy by counting on fixed strips rather than traditional "cruise" surveys only counting waterfowl on large concentration areas, and availability of measures of sampling error.

Beginning in 2011 in the MAV, survey strata – or sampling zones – follow watershed boundaries (Figure 4). Watersheds in this case are simply land areas that are occupied by a drainage system consisting of a portion of a surface stream and all the tributary surface streams feeding it. For example, the Cache River strata includes lands surrounding and tributaries flowing into the Cache River from the Missouri border on the north to the Cache River's junction with the White River on the south. At the root of this sampling design is the idea that habitat within these zones will share common weather and flooding patterns and, knowing that ducks are keyed in on such patterns, duck distribution will vary among watersheds. This is not a concept foreign to those who follow ducks, particularly duck hunters, as they frequently discuss habitat and duck numbers in terms of conditions in the "Cache River bottoms," for instance. Systematically conducting aerial waterfowl surveys using this design will allow for more efficient allocation of sampling effort and provide precise estimates of waterfowl abundance in the MAV. Such a design offers an opportunity to track changes in abundance in response to changes in land use, flooding patterns or weather conditions, for example.

Before each survey period, transects to be flown are randomly selected within each strata. Biologists spend many hours in the air flying each of these transects – totaling over 3,500 miles each survey – recording all waterfowl observations using specialized computer software that collects location information in flight. Biologists also collect habitat information for each duck observation to track trends in habitat use. These data can then be used to generate population estimates for each strata and the entire MAV and develop visual representations of duck distribution (i.e., duck density maps).

Figure 6. Aerial waterfowl survey strata in the Mississippi Alluvial Valley (Delta) of Arkansas.

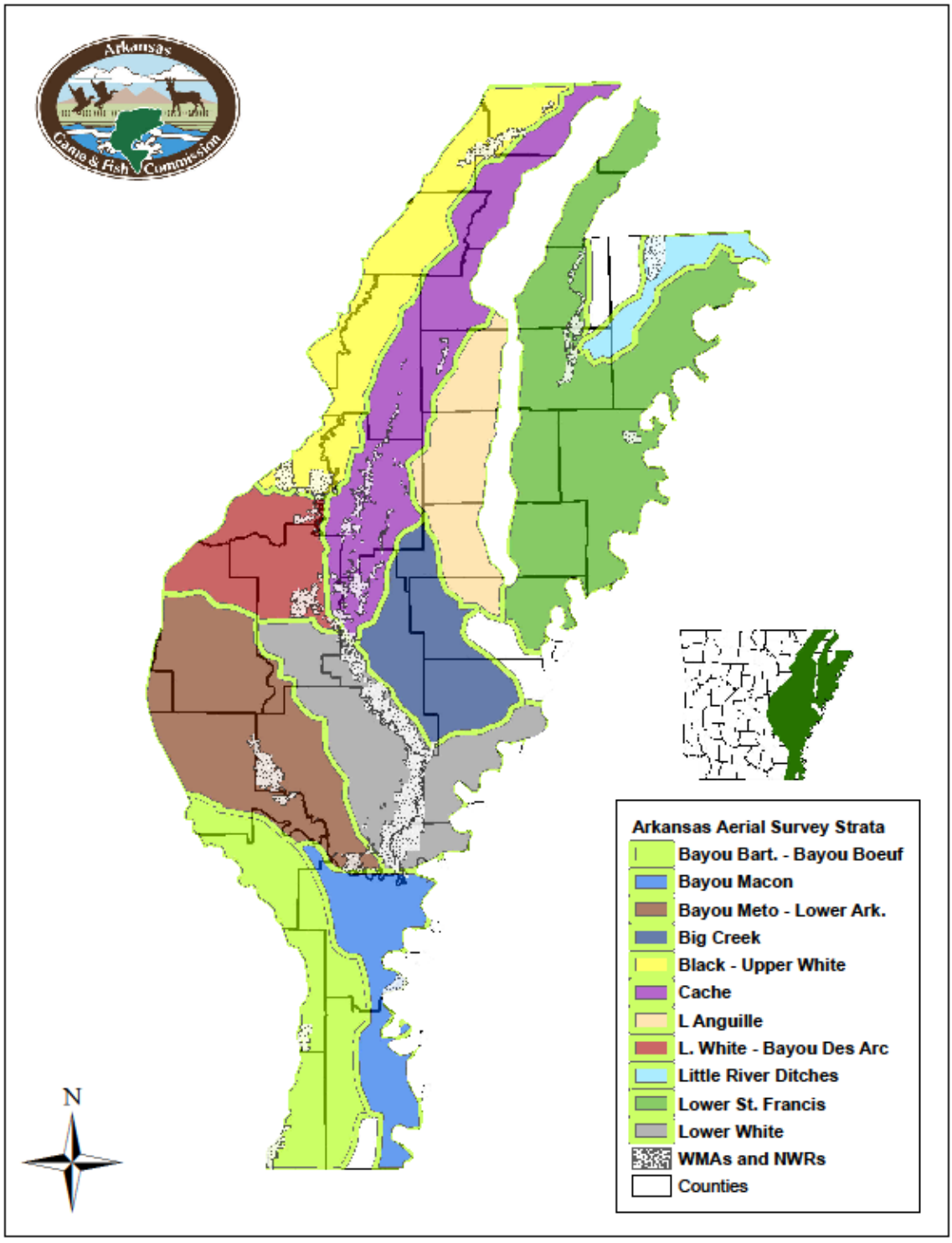


Figure 7. Aerial waterfowl survey strata in the Arkansas River valley (ARV) of western Arkansas.