

BIG GAME HARVEST SURVEY RESULTS 2000-01 THRU 2015-16

WHITE-TAILED DEER

MULE DEER

JAVELINA

COMPILED BY JON PURVIS TEXAS PARKS AND WILDLIFE DEPARTMENT REVISED 25 JULY 2016

PWD RP W7000 0718B

SURVEY PURPOSE

The main purpose of the survey is to track hunter and harvest trends for white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), and javelina (*Pecari tajacu*) at statewide and ecoregion (n = 10) levels. The survey asks if the recipient hunted the targeted species, county/counties hunted in, number of days spent hunting in each county, and sex and date of harvest of each individual harvested. Additionally, weapon usage and harvest tag usage is tracked for white-tailed deer. Harvest chronology and the demographics of license buyers and survey respondents are also analyzed.

HISTORY AND SURVEY CHANGES

Prior to the 1972-73 deer hunting season, harvest estimates for white-tailed deer and mule deer were derived from a variety of methods, with only one having statistical validity. They were derived from landowner surveys, game warden estimates, shooting preserve record books, and antlerless deer permit utilization. The one historic method that utilized statistical theory was based on interviews with randomly selected landowners who provided harvest estimates for their property.

The big game harvest survey in its current format was first done after the 1972-73 hunting season. Through the 1977-78 season, harvest data on white-tailed deer, mule deer, and the fall season of wild turkey (*Meleagris gallopavo*) was collected. Starting with the 1978-79 hunting season, harvest data on javelina was also collected. Wild turkey was removed after the 2004-05 hunting season, as it was also being surveyed on the Game Bird Harvest Survey, and the duplication was seen as unnecessary. Starting with the 1999-00 hunting season, a question regarding types of weapons (rifle, archery, muzzleloader, and other) used in white-tailed deer hunting was added to the survey. Starting in 2015-16, the type of hunting tag used on white-tailed deer was asked.

Prior to the 1997-98 hunting season, the sample frame was license buyers from the previous year. Since the 1997-98 season, the point-of-sale license database has allowed us to draw the sample from the current year's buyers. There is a correction factor built into the analysis that accounts for this change in order to make the historic and current estimates comparable. Telephone follow-up of a limited number of non-respondents was performed in 1973, 1974, 1975, and 1977, and again in 2006 and 2007 in order to correct for non-response bias. The correction calculated in 2007 was retroactively applied back to the 2000-01 hunting season data, and thus data before the 2000-01 season is not strictly comparable with that from later seasons.

All data has been lost for the 1975-76 season. In order to give a continuous trend line, estimates before the 1976-77 season are not reported unless specifically requested. Similarly, most reports start with the 2000-01 hunting season so that all estimates are comparable..

SURVEY METHODOLOGY

The current mail survey (see Appendix 1) was developed by Big Game and Technical Programs staff. It is printed on the standard generic survey form used by the Wildlife Division. This is a two-fold, pressure-sealed, postage-paid form with the return address printed on it. The sample frame was all 2015-16 hunting season license buyers through 22 February 2016 that had bought a license that qualified them to hunt deer or javelina. Of the 1,182,378 that had bought a license by this date, 25,000 with a U. S. mailing address were randomly chosen to receive a survey. The 20,629 non-respondents were sent a second mailing on 29 March 2016. Non-respondents were not contacted through other means. The survey was closed on 7 June 2016.

Technical Program staff entered the data from returned mail surveys using custom data entry programs written in Delphi XE6. All analysis was done using custom programs written in SAS 9.2. The data was stored in an MS-SQL 2008 database (server = tpwd-aav-sqlpro\wltech; database = Surveys; tables = BGSample, BGHunted, BGHarvest).

ANALYSIS METHODOLOGY

A demographic analysis of the complete sample frame was run. Gender, age (distribution, mean, juvenile vs adult), location (TX county, state, and country, rural vs urban), license type purchased, and date of purchase were analyzed Proc SurveyMeans and Proc Freq. The same analyses were run on survey respondents to check for differences in response rates and possible selection bias. Harvest analysis was done at the statewide, ecoregion (n=10), administrative region (n = 4), and administrative district (n = 8) levels using custom code. No analysis of the comments written on the surveys were made, but all such surveys were separated and given to Big Game staff to read.

For each species and geographic unit combination, 9 estimates and the 90% confidence intervals on the estimates are computed. The estimates are: hunters, hunter days, total harvest, male game harvest, female game harvest, mean kill per hunter, mean kill per licensee, mean days per hunter, and mean days per licensee. The subunit estimates are a portion of the statewide estimate, except the hunter estimate, and sums up to statewide estimate at each level. These estimates are calculated by proportioning out the statewide estimate based on statistics of returned survey samples. Subunit hunter estimates are calculated differently because many hunters hunt in more than one subunit. To calculate the correct hunter estimate for each subunit, the number of hunters from returned survey samples for a subunit is divided by total number of hunters in the survey sample and then multiplied by the statewide hunter estimate.

NON-RESPONSE BIAS CORRECTION

To correct non-response biases generally associated with mail-out surveys, telephone follow-ups were performed during the 1972-73, 1973-74, 1974-75, and 1976-77 hunting season surveys. Correction factors were developed based on the information obtained through the returned survey questionnaires and telephone follow-ups during those years and incorporated into the analysis. A telephone follow-up was also done after the 2005-06 and 2006-07 seasons and the correction factor was recalculated. This recalculation has caused a small, but noticeable change, in some estimates from the previous years. It was decided that the correction factor calculated in 2007 would be used for the data starting with the 2000-01 season, while the older correction factor would be used through the 1999-00 season. This methodology change means the two periods are not strictly comparable.

Before 1997, survey samples were selected from previous year's licensed hunters. The implementation of POS system in 1997 made current year license data available. A study was conducted for 2 years during which dual sampling using current year and previous year license data was performed. Using data from the 2 sampling regime, regression adjustment formulas were derived for subsequent use with surveys using current year license data to ensure consistency and comparability with historical survey estimates. The adjustment formulas are:

Total harvest = (789867 * Mean kill per respondent + 30) * Total number of licensees/1074968;

Total hunters = (1013839 * (Hunters in sample/Total number of respondents) + 128) * Total number of licensees/1074968;

Total hunter-days = (906976 * (Sample hunter-days/Total number of respondents) + 2503) * Total number of licensees/1074968.

RESULTS

A subset of the results is shown in this report. For additional results, please contact Texas Parks and Wildlife Department at hunt@tpwd.texas.gov.

Ecological Areas of Texas as Classified by Counties for White-Tailed Deer Management



10. Trans Pecos, Mountains and Basins

Appendix 1. Big Game Harvest Survey form. Note that some white space has been removed in order to fit the form into this report.

GAME HARVEST SURVEY

IMPORTANT - PLEASE REPLY

Dear Sportsman:

In order for Texas Parks and Wildlife Department to provide the best possible management of our wildlife resources, we need to determine deer and javelina harvests in Texas during the hunting season just completed. To obtain this information, we need your help. Please fill out and return this postage-paid form.

Your assistance will help ensure sound and practical game management programs for the future and will materially assist Texas Parks and Wildlife Department in its efforts to properly manage and wisely use our wildlife resources throughout the state. With your support these and other wildlife resources in the state will continue to prosper.

It is essential that you reply, even if you did not hunt or kill any deer or javelina during the season just completed. Thank you for your cooperation!

This survey card should reflect the hunting activity of ONLY the person to whom it was addressed. Please complete and return immediately, EVEN if you did not hunt or kill any deer or javelina during the hunting season just completed (including archery, early, regular, and late seasons).

Remove top portion along this perforation before sealing

WHITE-TAILED DEER

Did you hunt white-tailed deer during the hunting season just completed? YES NO If you answered YES, please fill out the appropriate blanks below pertaining to white-tailed deer. Do not report the kills from other members of your hunting party, employees, or guests. When telling us what equipment was used to kill each animal, please use A (archery), M (muzzleloader), R (rifle), or O (other). When telling us what kind of tag was placed on each animal, please use A (ADCP), H (hunting license), L (LAMPS), M (MLDP), or W (WMA / public hunting).

	White-tailed Deer																
										Kills (if any	/)						
)ays		1					2					3			
	County Hunted	Hunted	Doe*	Buck	Kill Date Month- Day	Equip- ment#	Tag†	Doe*	Buck	Kill Date Month- Day	Equip- ment#	Tag†	Doe*	Buck	Kill Date Month- Day	Equip- ment#	Tag†
1																	
2																	
3																	
4																	
5																	
6																	
* C	* Doe - includes all antlerless deer # (A)rchery, (R)ifle, (M)uzzleloader, (O)ther																
	† (A)DCP, (H)unting license, (L)AMPS, (M)LDP, or (W)MA / public hunting																

Regardless of success, if you hunted white-tailed deer during the season just completed, please tell us how many days you used each type of equipment:

Rifle____

Archery (including crossbow)_____

Muzzleloader_____ Other____

MULE DEER

Did you hunt mule deer during the hunting season just completed? YES_ NO

If you answered YES, please fill out the appropriate blanks below pertaining to mule deer. Do not report the kills from other members of your hunting party, employees, or guests.

			Mul	e D	eer							
		D			Kills (i	f any)					
		ays	1 2									
	County Hunted	Hunted	Doe*	Buck	Kill Date Month- Day	Doe*	Buck	Kill Date Month- Day				
1												
2												
3	3											
4	4											
* D	oe - includes all an	tlorlog	ah aa	or								

JAVELINA

Did you hunt javelina during the hunting season just completed? YES_ NO

If you answered YES, please fill out the appropriate blanks below pertaining to javelina. Do not report the kills from other members of your hunting party, employees, or guests.

			Jav	elir	na*						
		Da		Kills (if any)							
		syt			1	2					
	County Hunted	Hunted	Sow	Boar	Kill Date Month- Day	Sow	Boar	Kill Date Month- Day			
1											
2											
3											
4											
* D	* Do not include feral hogs										

Date first mailing	22-Feb-2016
Date second mailing	29-Mar-2016
Date survey closed	7-Jun-2016
Unique license buyers	1,182,378
First mailing size	25,000
Second mailing size	20,629
First mailing responses	4,506
Second mailing responses	1,896
Undeliverable	1,035
Non-responses	17,563
Return rate	26.71%

Season	Successful		Hunters			Days		Т	Total Harvest			
		Estimate	L90CI	U90CI	Estimate	L90CI	U90CI	Estimate	L90CI	U90CI		
2000-01	59.78%	639,036	629,366	648,706	5,319,977	5,122,792	5,517,162	561,534	540,875	582,193		
2001-02	57.04%	596,021	585,604	606,438	5,437,732	5,204,748	5,670,716	515,215	492,926	537,504		
2002-03	59.83%	635,498	624,960	646,036	5,647,206	5,415,515	5,878,897	575,317	551,752	598,882		
2003-04	61.14%	616,576	606,016	627,136	5,493,294	5,266,869	5,719,719	570,706	546,095	595,317		
2004-05	60.54%	616,698	605,917	627,479	5,102,990	4,892,816	5,313,164	566,482	539,123	593,841		
2005-06	61.16%	628,043	616,914	639,172	5,003,292	4,779,697	5,226,887	584,385	555,690	613,080		
2006-07	61.00%	621,105	609,937	632,273	4,950,693	4,731,790	5,169,596	604,800	579,386	630,214		
2007-08	60.45%	578,864	567,231	590,497	4,707,551	4,480,537	4,934,565	512,852	489,494	536,210		
2008-09	62.30%	645,450	634,005	656,895	5,439,386	5,193,241	5,685,531	619,700	591,138	648,262		
2009-10	56.89%	648,686	637,659	659,713	6,059,605	5,802,942	6,316,268	559,357	530,590	588,124		
2010-11	60.89%	673,730	662,712	684,748	6,144,311	5,891,817	6,396,805	640,934	614,212	667,656		
2011-12	58.45%	658,819	647,691	669,947	5,970,036	5,729,899	6,210,173	574,810	546,642	602,978		
2012-13	60.33%	636,325	624,217	648,433	5,661,106	5,407,383	5,914,829	546,360	520,630	572,090		
2013-14	58.39%	700,449	686,615	714,283	6,595,096	6,283,747	6,906,445	625,577	559,789	691,365		
2014-15	56.27%	704,365	690,393	718,337	6,703,436	6,386,958	7,019,914	590,112	555,228	624,996		
2015-16	56.96%	655,006	640,596	669,416	5,568,893	5,284,207	5,853,579	574,508	505,127	589,889		
Average	59.46%	640,917	629,365	652,469	5,612,788	5,367,185	5,858,391	576,416	544,919	604,538		

Table 2. Texas white-tailed deer harvest estimates.*

* Estimates not comparable to those before 2000-01 due to methodology changes.



Ecoregion	Successful		Hunters			Days		To	Fotal Harvest		
-		Estimate	L90CI	U90CI	Estimate	L90CI	U90CI	Estimate	L90CI	U90CI	
Blackland Prairies	35.71%	14,735	10,436	19,034	117,198	79,205	155,191	5,662	3,155	8,169	
Cross Timbers	55.09%	75,780	66,508	85,052	661,074	555,785	766,363	53,949	44,975	62,923	
Edwards Plateau	72.03%	191,906	178,712	205,100	1,481,778	1,333,859	1,629,697	222,400	188,450	256,350	
Gulf Prairies	60.58%	18,243	13,473	23,013	164,046	112,642	215,450	12,897	8,844	16,950	
High Plains	33.33%	2,105	464	3,746	11,042	2,194	19,890	786	0	1,745	
Pineywoods	38.33%	92,445	82,352	102,538	919,605	792,840	1,046,370	42,939	35,305	50,573	
Post Oak	45.64%	94,550	84,362	104,738	915,819	788,054	1,043,584	56,937	46,406	67,468	
Rolling Plains	57.62%	57,537	49,331	65,743	436,931	362,437	511,425	42,467	34,585	50,349	
South Texas	63.39%	105,425	94,772	116,078	851,147	729,479	972,815	108,212	89,019	127,405	
Trans-Pecos	38.46%	2,280	573	3,987	10,253	1,488	19,018	1,258	0	2,708	

Table 3. Texas white-tailed deer harvest estimates by ecoregion.

Table 4.	Reported	weapon	usage by	white-tailed	deer hunters,	regardless o	f success.

Weapon	Count	Percent	L90CI	U90CI
Archery	407	20.43%	18.66%	22.20%
Muzzleloader	32	1.61%	1.05%	2.16%
Other	9	0.45%	0.16%	0.75%
Rifle	1,894	95.08%	94.13%	96.03%

Table 5. Reported weapon each weapon was used, regardless of success.

Weapon	Count	Min	Max	Mean	L90CI	U90CI
Archery	407	1	90	11.33	10.11	12.55
Muzzleloader	32	1	16	5.38	3.79	6.96
Other	1,894	1	120	10.17	9.72	10.61
Rifle	9	2	30	6.89	0.08	13.69

Table 6. Reported weapon used to harvest white-tailed deer.

Weapon	Count	Percent	L90CI	U90CI
Archery	324	9.29%	8.32%	10.25%
Muzzleloader	12	0.34%	0.15%	0.54%
Other	6	0.17%	0.03%	0.31%
Rifle	3,147	90.20%	89.21%	91.18%

Table 7. Tags reported being used on white-tailed deer.

Тад	M	ales	Fe	males	Unk	nown	1	otal
	Count Percent		Count	Percent	Count	Percent	Count	Percent
ADCP	10	0.60%	11	0.74%	0	0.00%	21	0.66%
Hunting License	1,457	86.99%	1,028	69.37%	7	77.78%	2,492	78.71%
LAMP	9	0.54%	27	1.82%	0	0.00%	36	1.14%
MLDP	191	11.40%	397	26.79%	2	22.22%	590	18.64%
WMA	8	0.48%	19	1.28%	0	0.00%	27	0.85%

Table 8. Texas m	ule deer harvest estin	nates.*								
Season	Successful		Hunters			Days		Total Harvest		
		Estimate	L90CI	U90CI	Estimate	L90CI	U90CI	Estimate	L90CI	U90CI
2000-01	31.82%	19,292	16,470	22,114	87,996	66,606	109,386	6,467	4,740	8,194
2001-02	26.57%	17,330	14,515	20,145	86,296	64,029	108,563	4,605	3,144	6,066
2002-03	39.38%	19,569	16,566	22,572	90,336	71,039	109,633	8,072	6,017	10,127
2003-04	36.91%	18,301	15,389	21,213	78,497	56,929	100,065	6,878	5,051	8,705
2004-05	35.06%	18,684	15,760	21,608	78,785	61,685	95,885	7,037	5,025	9,049
2005-06	39.75%	21,287	18,033	24,541	101,516	80,085	122,947	9,652	7,031	12,273
2006-07	35.56%	23,355	19,981	26,729	82,861	65,854	99,868	8,563	6,443	10,683
2007-08	36.52%	23,929	20,453	27,405	105,542	85,281	125,803	9,141	6,883	11,399
2008-09	37.02%	24,334	20,829	27,839	121,654	89,915	153,393	9,276	7,034	11,518
2009-10	42.93%	25,618	22,153	29,083	118,592	94,971	142,213	12,746	9,718	15,774
2010-11	43.67%	28,408	24,777	32,039	126,252	100,500	152,004	13,150	10,523	15,777
2011-12	30.43%	23,493	20,136	26,850	118,414	94,139	142,689	8,044	5,798	10,290
2012-13	34.07%	18,976	15,802	22,150	94,811	73,750	115,872	10,261	3,075	17,447
2013-14	35.88%	22,418	18,615	26,221	114,138	82,343	145,933	8,386	5,952	10,820
2014-15	30.34%	24,838	20,836	28,840	124,417	98,683	150,151	8,565	5,845	11,285
2015-16	35.43%	23,492	19,447	27,537	129,317	92,908	165,726	9,804	6,550	13,058
Average	35.71%	22,083	18,735	25,430	103,714	79,920	127,508	8,790	6,177	11,404

* Estimates not comparable to those before 2000-01 due to methodology changes.



Table 9. Texas mule deer harvest estimates by ecoregion.*

Ecoregion	Successful	Hunters			Days			Total Harvest		
		Estimate	L90CI	U90CI	Estimate	L90CI	U90CI	Estimate	L90CI	U90CI
Blackland Prairies	100.00%	182	0	2,724	378	0	1,103	189	0	552
Cross Timbers	25.00%	728	0	5,753	3,776	0	8,034	189	0	552
Edwards Plateau	44.44%	3,278	0	13,323	27,562	3,215	51,909	1,697	495	2,899
High Plains	50.00%	4,006	0	14,909	14,914	7,204	22,624	2,262	906	3,618
Pineywoods	0.00%	364	0	3,945	3,209	0	8,695	0	0	0
Post Oak	50.00%	364	0	3,945	4,153	0	9,816	189	0	552
Rolling Plains	21.88%	5,827	0	18,347	31,527	16,845	46,209	1,320	361	2,279
South Texas	50.00%	364	0	3,945	5,286	0	14,415	189	0	552
Trans-Pecos	32.61%	8.377	0	22.262	38.512	25.722	51.302	3.771	1.423	6.119

* Although some ecoregions are obviously invalid, we cannot know if they reported the wrong location, or they were actually

white-tailed deer. The results are reported in this way so that the reader may decide how to handle the issue.

Season	Successful	Hunters			Days			Harvest		
		Estimate	L90CI	U90CI	Estimate	L90CI	U90CI	Estimate	L90CI	U90CI
2000-01	58.47%	38,803	34,842	42,764	283,601	232,687	334,515	34,089	28,968	39,210
2001-02	52.90%	33,449	29,571	37,327	261,981	213,181	310,781	25,450	20,853	30,047
2002-03	50.94%	32,656	28,802	36,510	232,611	186,226	278,996	26,173	21,096	31,250
2003-04	57.02%	28,864	25,227	32,501	221,449	173,357	269,541	23,705	19,173	28,237
2004-05	53.28%	29,603	25,942	33,264	201,597	161,036	242,158	23,537	18,990	28,084
2005-06	59.24%	27,898	24,185	31,611	231,057	171,184	290,930	33,055	20,030	46,080
2006-07	51.60%	28,415	24,703	32,127	198,734	150,552	246,916	20,760	16,393	25,127
2007-08	56.73%	27,962	24,212	31,712	176,465	136,621	216,309	25,408	19,668	31,148
2008-09	56.28%	31,056	27,110	35,002	203,414	158,003	248,825	33,207	24,786	41,628
2009-10	57.95%	32,990	29,072	36,908	241,804	186,594	297,014	28,367	23,189	33,545
2010-11	54.11%	28,656	25,010	32,302	198,579	155,536	241,622	24,811	19,611	30,011
2011-12	57.41%	27,578	23,948	31,208	195,349	148,848	241,850	26,174	20,220	32,128
2012-13	61.35%	22,912	19,431	26,393	184,135	140,200	228,070	21,225	16,420	26,030
2013-14	62.12%	22,590	18,773	26,407	151,327	110,057	192,597	24,472	14,646	34,298
2014-15	55.15%	28,264	24,001	32,527	175,043	132,170	217,916	22,782	17,796	27,768
2015-16	51.53%	30,151	25,581	34,721	256,830	188,921	324,739	22,752	17,174	28,330
Average	56.01%	29,490	25,651	33,330	213,374	165,323	261,424	25,998	19,938	32,058

Table 10. Texas javelina harvest estimates.*

* Estimates not comparable to those before 2000-01 due to methodology changes.



Ecoregion	Successful	Hunters			Days			Harvest		
		Estimate	L90CI	U90CI	Estimate	L90CI	U90CI	Estimate	L90CI	U90CI
Blackland Prairies	50.00%	375	0	3,586	750	0	1,775	188	0	551
Cross Timbers	20.00%	1,873	0	8,870	9,936	1,351	18,521	376	0	889
Edwards Plateau	33.33%	4,495	0	14,819	36,744	16,628	56,860	1,692	490	2,894
Gulf Prairies	50.00%	375	0	3,586	12,185	0	34,014	376	0	1,101
High Plains	50.00%	375	0	3,586	1,312	0	3,517	376	0	1,101
Pineywoods	27.27%	2,060	0	9,374	23,433	1,846	45,020	1,692	0	4,013
Post Oak	33.33%	1,685	0	8,345	9,748	1,595	17,901	564	0	1,192
Rolling Plains	60.00%	936	0	5,965	26,808	0	64,457	564	0	1,192
South Texas	67.47%	15,544	1,057	30,031	126,353	86,785	165,921	15,795	11,253	20,337
Trans-Pecos	30.77%	2,435	0	10,333	9,561	3,552	15,570	1,128	0	2,274

Table 11. Texas javelina harvest estimates by ecoregion.*

* Although some ecoregions are obviously invalid, we cannot know if they reported the wrong location, or they were actually feral hogs. The results are reported in this way so that the reader may decide how to handle the issue.

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