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Abstract

Agricultural land purchases by non-local buyers for hunting purposes (106 sales) were compared to nearby (comparable) land purchases of local agricultural producers (318 sales) in the Southwest and Prairie Pothole Regions (PPR) of North Dakota from 2000 to 2004. In the PPR (dominated by waterfowl hunting), it was demonstrated that non-locals do not pay a premium for agricultural land that they purchase for hunting purposes. In the Southwest Region (dominated by pheasant hunting), it was found that non-locals pay between 23 and 24 percent more for agricultural land based on mean differences, but that if median differences are evaluated, these premiums range from 19 (nearby sale comparisons) to -4 percent (county-wide comparisons). These discrepancies in mean and median price premiums are shown to result from the existence of several statistical outlier sales. These results imply that recent surges in agricultural land prices across the entire state of North Dakota cannot be attributed solely to non-local hunting purchases. It was also noted that most non-local purchasers of hunting land do restrict public hunting access and that they also usually lease their land to local producers.

Non-Local Purchases of Agricultural Land for Hunting Purposes

By Steven Shultz, Ph.D.

Introduction

A recent discussion of appreciating U.S. farmland values in a national weekly agricultural-based newspaper included the following quote by a rural appraiser: “Recreational aspects of land like wild game hunting, fishing, water activities, and wildlife and bird watching is now dominating southern and western states,” and “Recreation is definitely driving today’s market” (*AGWEEK* Wire Report, May 2, 2005 page 23). Such commentary has been frequent in the local press editorials and online hunting Web page forums in North Dakota in the last few years, particularly after a South Dakota newspaper reported that out-of-state hunters in South Dakota have been paying excessively high amounts for agricultural land resulting in increasing land values (Shouse and Hascall, 2004).

The South Dakota newspaper report findings were based on the comparisons of agricultural land prices paid by both locals and non-residents in eight counties from 2001 to 2004 (230 sales). Approximately 35 percent of those sales were to non-residents, and 93 percent of these buyers purchased land specifically for hunting purposes. In two counties dominated by pheasant hunting the non-residents paid a 40 percent price premium versus a 15 percent premium in four counties with a mix of pheasant and waterfowl hunting, and no observed price premiums in two other counties dominated by waterfowl hunting. No efforts were made to quantify (and control for) differences in the bio-physical characteristics of the sold hunting and agricultural parcels.



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In North Dakota it is widely assumed that non-resident or non-local purchases of agricultural land for hunting purposes are substantially greater than prices paid by local agricultural producers, and that these price premiums, have led to recent surges in agricultural land prices across the state. There are two other commonly raised concerns with non-local hunting purchases. First, that they reduce the supply of land available to young, early career farmers, and, second, that hunters will restrict public hunting access by “posting” their land. However, such claims, particularly the contention that non-local hunters are paying price premiums are considered suspect since they have been based on relatively small and non-random sample sizes, and because they have not always accounted for differences in the bio-physical characteristics of hunting versus nearby agricultural sales.

There exists an extensive body of literature focusing on agricultural land being purchased for residential developments near urban areas (Chicoine, 1981; Irwin, 2002; and Huang, et al., 2006). Additional research has demonstrated the importance of recreation-based amenities such as scenic views and access to wildlife habitat in influencing both migration to rural areas (Clendenning, Field, and Kapp 2005) and rural property values (Spahr and Sunderman, 1995; Bastian, et al., 2002; Paterson and Boyle 2002). However, no studies have yet quantified the impact of non-resident hunting-based purchases of agricultural land, and in particular, whether such purchases exceed prices paid by local agricultural producers which could subsequently lead to inflated agricultural land prices. This deficiency in the literature is likely due to the complex task of identifying the residency status and purchase intentions of agricultural land buyers, as well as difficulties in comparing the bio-physical characteristics of non-resident hunting versus agricultural parcels.

This present research involves comparing 106 agricultural land purchases by non-local persons for hunting purposes to nearby (comparable) land purchases by local agricultural producers (n=318) in the Southwest and PPR of North Dakota from 2000 to 2004. Both subject and comparable properties were mapped with geographic information system (GIS) technologies in order to quantify bio-physical differences between sold parcels. Comparable sale analyses (while accounting for the proximity of hunting sales to agricultural sales and various bio-physical

characteristics of parcels) were used to quantify price differences between non-local hunting and local agricultural sales in each region. Local agricultural sales are defined as purchases of land for the purposes of agriculture production.

Comparisons were made separately for two eco-regions: the Southwest and the PPR. Both regions have relatively low population densities. The Southwest region is characterized by un-glaciated, residual shale soils and dry conditions (rainfall in most areas is less than 10 inches per year). The production agriculture in this region is dominated by pastureland with some dry land wheat. Mild winters with low precipitation, particularly during spring breeding seasons, has resulted in high numbers of pheasants and a burgeoning hunting industry catering to residents from the central and eastern parts of the state (Bismarck, Grand Forks, and Fargo) as well as non-residents.

In contrast, the PPR is subject to higher levels of precipitation (12-16 inches per year), colder winters, and has landscape dominated by extensive quantities of depressional (glaciated) wetlands. The region encompasses a mix of agricultural production systems ranging from high value row crops in the east to lower valued small grains in the west. The wetlands of the region place limitations on production agriculture but create critical waterfowl habitat (springtime breeding and nesting) and waterfowl hunting opportunities. While waterfowl hunting pressure is relatively light in this part of North Dakota compared to other states, recent disputes between resident and non-resident hunters concerning hunting access and the timing and duration of non-resident hunting days have become commonplace in recent years.

Methods and Procedures

Statewide agricultural land sales from 2000 to 2004 were compiled by obtaining all arms-length, unimproved agricultural sale records from both the Office of the State Tax Commissioner and individual county tax assessors. An “arms-length sale” is defined as an open-market sale between two unrelated parties, both seeking to maximize their positions from the sale transaction, while an “unimproved sale” includes only land and not any buildings and/or equipment of substantial value. This database of 4,280 sales represents approximately 65 percent of all sales in the state since non-disclosed (confidential) sales are not available to the public and some of

the collected sales data had missing and/or erroneous data. Informal discussions with county tax directors across the study area (who work with both disclosed and non-disclosed sales data) confirmed that there are not substantial differences in either land sale values or residency status among disclosed and non-disclosed sales.

Agricultural sale transaction records were searched in counties in the Southwest region and PPR where hunting sale purchases were known to occur. As well, rural appraisers and real estate agents across the state were asked to provide information on known hunting sales. A possible non-local hunting sale in the state was defined as the buyer having a non-local address (i.e., either residing out of state or in one of the three main cities of the state: Bismarck, Grand Forks, or Fargo). These sales do not represent every possible non-local sale as the study only focused on counties where hunting activity was prevalent and/or where county tax directors and recorders offered assistance in searching deed records. Information obtained from the sale transaction data included legal descriptions, acreage, consideration, and buyer and seller names and addresses. All sales were cross-referenced with county tax assessor sale files to confirm that they were arms-length sales and did not include any non-land assets.

Non-local buyers were surveyed by both mail and telephone in order to identify whether their purchase was motivated by hunting, investment, or production agriculture. Investors who also hunted on their land were classified as hunting purchases. The surveys were also used to: 1) quantify purchaser motivations and preferences for hunting land; 2) assess whether they lease their land back to local producers; and 3) determine whether non-local buyers restrict public hunting access.

Local buyers of agricultural land were not surveyed as it was assumed that those local residents do not generally purchase land for hunting purposes. An exception to this would be the purchase of land by local hunting outfitters who run private hunting lodges, but the location of these operations are known and these did not appear to be in close proximity to any of our identified sample of 106 hunting sales over the 2000 to 2005 time-period.

Sale parcel boundaries were digitized into a GIS based on the reported legal description of the sale in conjunction with the

following background reference material: satellite imagery; the National Agricultural Statistics Service (NASS) cropland data layer (CDL); and common land unit (CLU) boundaries produced by the Farm Service Agency (FSA). This enabled the bio-physical characteristics of sold parcels to be quantified through the use of spatial “overlay” functions. Sale characteristics that were compared among hunting and agricultural sales included sale price and acreage, and a variety of bio-physical characteristics such as crop and wetland acreage, spring wheat yield, and miles of both perennial and intermittent streams within sold parcels. Cropland acreage was determined from the NASS-CDL. Soil productivity was extracted from the SSURGO digital soils database produced by the Natural Resource Conservation Service (NRCS) which used spring wheat yield measured in bushels as a proxy for soil productivity in the state. Wetland acreage was estimated using data from the National Wetland Inventory (NWI) of the United States Fish and Wildlife Service (USFWS).

Comparisons of the prices of non-local hunting sales with local agricultural sales (on a per acre basis) are performed at two levels of geographical scale and using alternative measures of central tendency (means and medians), and a non-parametric pair-wise tests to measure the statistical significance of differences in the population distributions of hunting and agricultural sales. Regarding the geographical scales of analyses, hunting sales are compared directly to a subset of nearby comparable (but agricultural) sales and then separately, to all non-hunting (agricultural) sales within the county. Comparable sales were chosen interactively for each particular hunting sale with the intent of obtaining nearby sales with similar soil productivity and cropping patterns that occurred in the same time-frame as the hunting sale (no longer than 18 months apart). Priority was given to comparables with sale dates as close as possible to hunting sale dates. For most hunting sales, two comparable sales were identified, while in a few cases as many as three comparables sales were used, and in a very few cases, only a single comparable sale was used.

In contrast, the county level analyses involved comparing hunting sales to all agricultural sales in a county (excluding known hunting sales) as long as the sales occurred in the same time frame (no longer than 18 months apart). This highly generalized county-level comparison approach is not expected to be as accurate as comparisons between specific hunting sales

and nearby comparables, but it is undertaken to mimic the county level comparison methodologies recently used in the popular press to evaluate differences in the prices of hunting and non-hunting sales.

In addition to reporting mean and median values of hunting, nearby agricultural, and county-wide agricultural sales, a Mann-Whitney U-Test (also known as a Wilcoxon Rank-Sum Test) was used to test the null hypothesis that differences in central tendency between two populations do not exist (Wilcoxon, 1945). The test is often referred to in the literature as a test of the significance between the medians of two samples, but a more appropriate definition is that it tests if the population distributions of two sets of paired observations are equal (Devore, 2000). This non-parametric test is used instead of a standard paired t-test since the variances of hunting, nearby agricultural comparable, and county-wide agricultural sales are not generally equal as discovered by running a series of “Bartlett-Tests of Equal Variances” and because the sample sizes of sales classes differ substantially from both comparable and county-wide sale numbers (Devore, 2000).

Results

The number and types of hunting sales analyzed

A total of 275 non-local sales over the 2000 to 2004 time-period were identified (145 sales in the Southwest and 130 sales in the PPR). From these, 165 surveys were obtained (a 60% response rate). Around half of the unsuccessful survey contacts were due to the inability to obtain accurate addresses or phone numbers for buyers while the remaining 20 percent of buyers declined to participate in the survey. Based on these surveys, it was determined that 106 sales were for hunting purposes (64% of all out of town address sales). Of the remaining sales (non-hunting out-of-town address sales), 49 were for investment purposes and 10 were solely for production agriculture.

More hunting sales were found in the Southwest Region compared to the PPR since hunting sales were not searched for in every county of the PPR due to its relative large size and fewer expected numbers of hunting sales. The characteristics and behavior of non-local hunter purchasers across the two regions differed substantially which justifies the decision to evaluate the Regions separately (Table 1). As expected, waterfowl (ducks and geese) were the primary species hunted in

the PPR which contained many wetlands versus pheasants in the Southwest Region which contains virtually no wetlands.

How non-locals use their hunting properties

Most (66%) of non-local owners of hunting land lease their land to local agricultural producers and this number is even higher in the Southwest (74%). The likely reason that fewer hunting land owners lease their land in the PPR is that such land is often covered by wetlands and is not highly productive (and sought after by local producers) in contrast to land in the Southwest which even when too marginal for crop production can usually be used for grazing cattle. This buyer survey also determined that most (89%) of non-local hunting owners actively restrict public hunting on their land by “posting” it.

The majority of hunting land purchases in each region was dominated by contained conservation practices such as Conservation Reserve Program (CRP) acreage, U.S. Fish and Wildlife Service (USFWS) wetland easements, and North Dakota Game and Fish (NDGF) habitat enhancements (67% in the PPR and 70% in the Southwest). This was expected as many of the advertisements for hunting land describe such habitat as positive amenities.

Differences between hunting and agricultural land sales

Average differences between the characteristics of non-local hunting sales and both nearby and county-wide agricultural sales are summarized in Table 2. In the PPR, hunting sales were smaller size parcels than both nearby and county-wide sales and contained less cropland (and more wetlands) than other sales. The hunting sales were also on slightly less productive land (as measured by spring wheat yield) yet they contain similar stream characteristics, as do the other sales. In the Southwest Region, hunting sales were larger and contained less cropland than both nearby and county-wide sales. These sales were also slightly less productive than other sales and contain higher amounts of stream and riparian habitat.

In the PPR, hunting sale prices on a per acre basis were on average identical to nearby (comparable-agricultural) sale values and only four percent higher than county-wide agricultural sale values. In the Southwest Region, hunting sale values are on average 24 percent higher than nearby sale values and 23 percent higher than county sale values. However, these average (mean) comparisons may be influenced by statistical

outliers. In fact, when median differences are evaluated, hunting sales are slightly lower than non-hunting sales in the PPR (5% for nearby sales and 3% for county-wide sales), versus 19 percent higher than nearby (comparable-agricultural) sales in the Southwest Region, and slightly lower than county-wide sales in the Southwest Region.

The existence of these outliers are shown in Figure 2 which contains “box-plots” that visually depict information about the center, spread, symmetry and outliers associated with observed hunting sale prices. The box area itself contains 50 percent of the observations while the line within the box indicates the median value. Outliers are denoted as points (more than 3 standard deviations from the mean which are denoted by the whisker lines at either end of the boxes). The Southwest Region has six of these outliers (all with higher sale prices) while the PPR has only two outliers. The Southwest Region outliers are on average smaller in size and have lower proportions of cropland than do other hunting sales. Similarly, Figure 3 graphs the frequency distribution of differences between hunting and comparable sales by region. In both regions sale price differences appear normally distributed with only a few outliers representing extremely high and low differences.

Conclusions

This study was able to differentiate prices paid for land purchased for hunting purposes by non-locals from both nearby (comparable) and county-wide agricultural sales in two distinct eco-regions of North Dakota. Contrary to recent public perception and local newspaper analyses based on anecdotal evidence, non-locals purchasing land for hunting *do not* always pay a premium for such land. In the PPR no striking or statistically significant differences in sale prices were noted at either the nearby (comparable), or county-wide levels of analysis. In the Southwest Region, the results were mixed: at the nearby (comparable) level of analysis, non-local hunting sale prices were 24 percent higher than agricultural sale prices based on means, and 19 percent higher using the median as a measure of central tendency. And, at the county-wide level of analysis (all agricultural sales), hunting sale prices were 24 percent higher than agricultural sales based on means, yet 4 percent lower than agricultural sales using median measures. As expected, based on the above reported means and medians, non-parametric Mann-Whitney indicated statistically significant

differences in the population distributions of hunting and agricultural land sales prices in the Southwest Region but not in the PPR. It is hypothesized that observed sale price differentials between hunting and agricultural sale prices are larger in the Southwest Region than the PPR due to a relative scarcity of pheasant hunting habitat in North Dakota (it is limited to the southwestern and southernmost fringes of the state), in contrast to the bountiful waterfowl hunting opportunities throughout large areas of the PPR.

The conflicting results at the county-wide level of analysis in the Southwest Region with respect to mean versus median differences in sale prices were shown to result from the existence of a few high valued statistical outliers. When such outliers occur, it is advisable to rely on median rather than means to compare differences between hunting and agricultural sale prices.

It appears that recent conjecture in the local news media (primarily in North and South Dakota), that non-local hunters are paying steep price premiums for agricultural land may be inaccurate (in some areas of the state) and misleading or exaggerated in others. This misinformation has most likely resulted from analyses relying on small sample sizes that are greatly influenced by outlier sales, or because they have compared hunting sales with county-wide sale prices without accounting for differences in the bio-physical characteristics of sales.

These results imply that recent surges in agricultural land prices across the entire state of North Dakota cannot be attributed solely to non-local hunting purchases. Based on the survey results of this study, even if the number of non-local hunting sales in the state continue to increase in the coming years, this will not likely reduce the quantity of land available for production agriculture since the clear majority of non-local hunting buyers lease their land to local producers. This would also make it difficult for the State of North Dakota to implement higher taxes for hunting-based land as most of it remains in agriculture. Finally, the only apparent negative impact of non-local hunting purchases are that they reduce the amount of land available for public hunting as most non-local hunters “post” (restrict access to) their land after purchasing it.

A major caveat or limitation with this research is that it has not attempted to measure the impact of non-local hunting buyers on the overall dynamics of the agricultural real estate market in the state. In other words, it might be the case that the existence of non-local purchasers has forced local agricultural producers to increase their own bids for agricultural land purchases. To quantify this potential impact, future researchers should evaluate the percentage of hunting and agriculture sales in particular markets, examine the competing bids for properties, and possibly to survey buyers and sellers of land to determine their perceptions of the existence of competition between non-local hunters and local agricultural producers. An evaluation of the characteristics of bidders and buyers of agricultural land in public land auctions would facilitate such research.

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Figure 1. The sample of non-local hunting and nearby comparable (agricultural) sales in North Dakota (2000-2004)

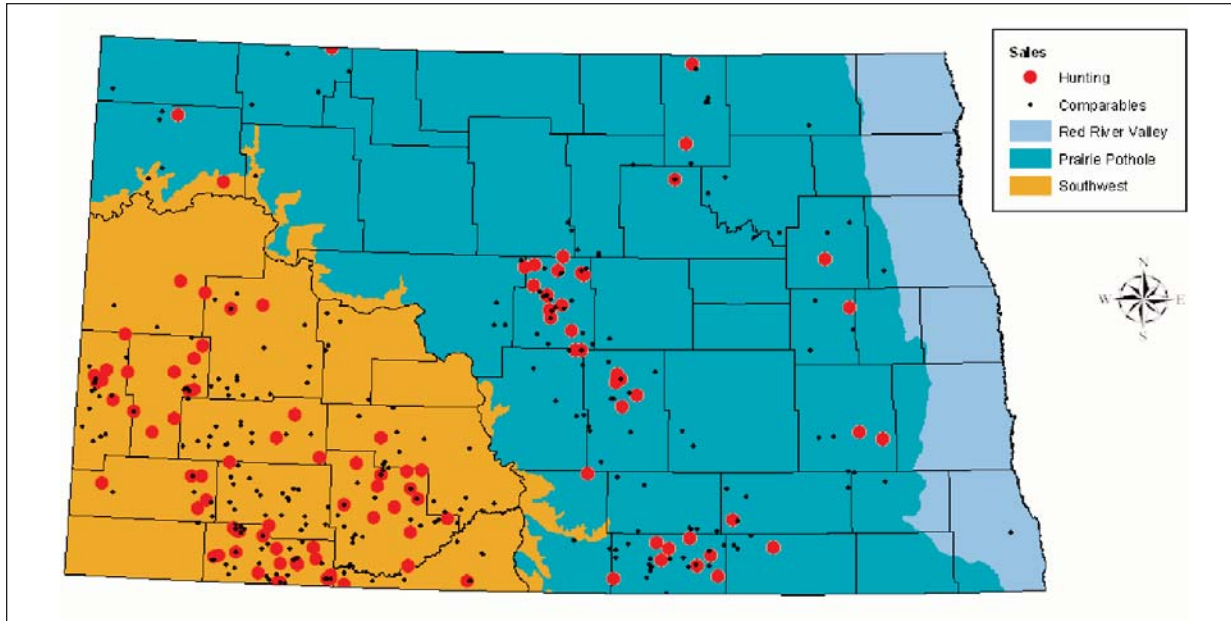


Figure 2. Box plot distributions showing the distribution of hunting sale prices and outliers

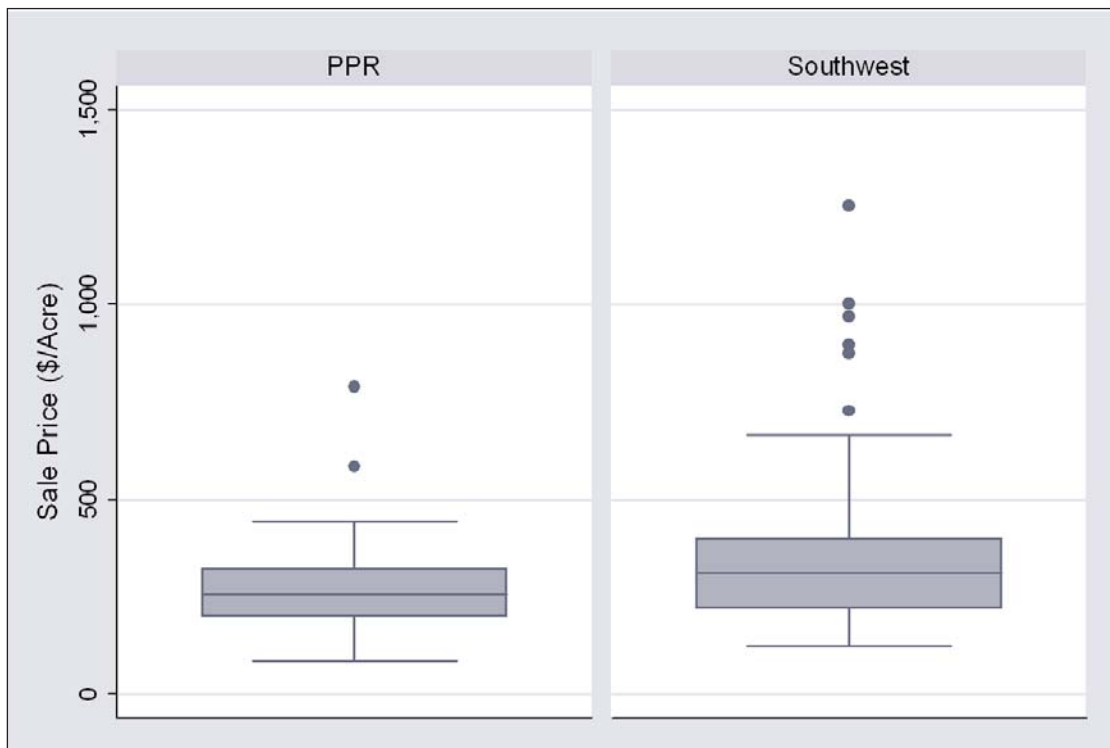


Figure 3. The distribution of differences between hunting and nearby (comparable) agricultural sale prices

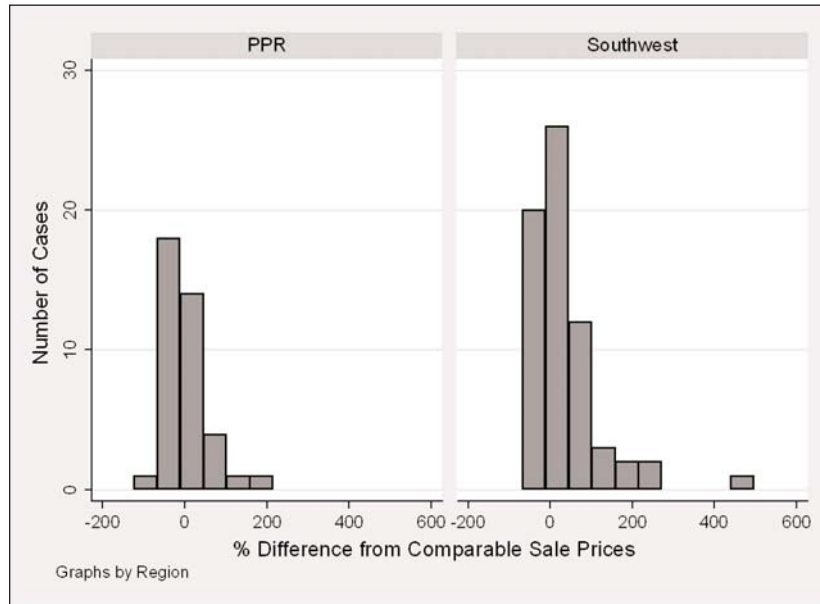


Table 1. Characteristics and behavior of non-local hunting land buyers in North Dakota (2000-2004)

| | All (n=106) | Prairie Pothole Region (n= 39) | Southwest (n= 67) |
|---|----------------|--------------------------------------|----------------------|
| Primary Species Hunted: | | | |
| -Pheasants | 67% | 28% | 86% |
| -Waterfowl | 19% | 50% | 1% |
| -Deer | 14% | 22% | 13% |
| Owners Leasing Land to Local Producers | 66% | 57% | 74% |
| Restricted Public-Hunting Access (Posted) | 89% | 86% | 90% |
| Sold Parcels Containing State or Federal Wildlife Habitat Improvement Programs | 68% | 66% | 70% |
| Home Location of Buyers | | | |
| -In-state (Fargo, Bismarck, Grand Forks) | 34% | 32% | 36% |
| -Minnesota | 30% | 43% | 22% |
| -Other Midwest State | 20% | 18% | 20% |
| -Other States | 16% | 7% | 22% |

Table 2. Differences between hunting, nearby (agricultural), and county-wide (agricultural) sales

| | Prairie Pothole Region | | | Southwest | | |
|---|------------------------|---------------------|-------------------------|---------------|---------------------|----------------------|
| | Hunting Sales | Nearby Agric. Sales | All County Agric. Sales | Hunting Sales | Nearby Agric. Sales | All County Ag. Sales |
| # Sales | 39 | 117 | 1,445 | 67 | 201 | 859 |
| Sale Size (acres) | 257 | 284 | 310 | 469 | 367 | 374 |
| % Cropland | 27% | 28% | 35% | 24% | 26% | 30% |
| % Wetlands | 13% | 10% | 8% | 0% | 0% | 0% |
| Spring Wheat Yield (Bushels/Acre) | 26 | 28 | 28 | 19 | 20 | 20.5 |
| Miles of Intermittent Streams (mean) | 0.33 | 0.35 | 0.32 | 2.56 | 1.69 | 1.75 |
| Miles of Perennial Streams (mean) | 0 | 0.01 | 0.1 | 0.15 | 0.09 | 0.08 |
| Mean Price (\$/Acre) | \$280 | \$282 (0%) | \$295 (+ 4%) | \$362 | \$291 (- 24%) | \$294 (- 23%) |
| Median Price (\$/Acre) | \$257 | \$269 (+5%) | \$265 (+3%) | \$291 | \$234 (-19%) | \$303 (+4%) |
| Different Population distributions? | | No* | No* | | Yes* | Yes* |

*Based on a paired Mann-Whitney U-test (also known as a Wilcoxon rank-sum test) at the 95% confidence level.