

# **Land Value Premiums for Effective Irrigation Retirement**

**Steven Shultz & Nick Schmitz  
University of Nebraska**

**Phase I:  
Mapping & Modeling  
Ag & Irrigation Values**



**Phase II:  
Determining Premiums  
Required by Landowners to  
Retire Irrigation**



# The Republican Watershed



# **‘Kansas Wants Cash & Action from Nebraska’**

- **83,000 to 200,000 acre-feet of extra water (settlement)**
- **Immediate Payments? \$6.8 to \$12 Million**
- **Solutions Being Pursued in Nebraska**
  - 2006, NRCS/DNR Retirement of 2000 irrigated acres
  - LB 701: \$25 million per year of irrigation purchases/retirement
- **Worse Case Scenario:**

The shutdown of all irrigation wells within 2.5 miles of the Republican River and its tributaries, plus any wells in the entire basin drilled since 2000. Those wells water 500,000 acres in the basin.

# Possible Approaches to Estimate Irrigation Values

- Market Transactions (purchases or retirements)
- Experimental Auctions
- Difference between the sale price of dry versus irrigated parcels
- Hedonic Price Modeling

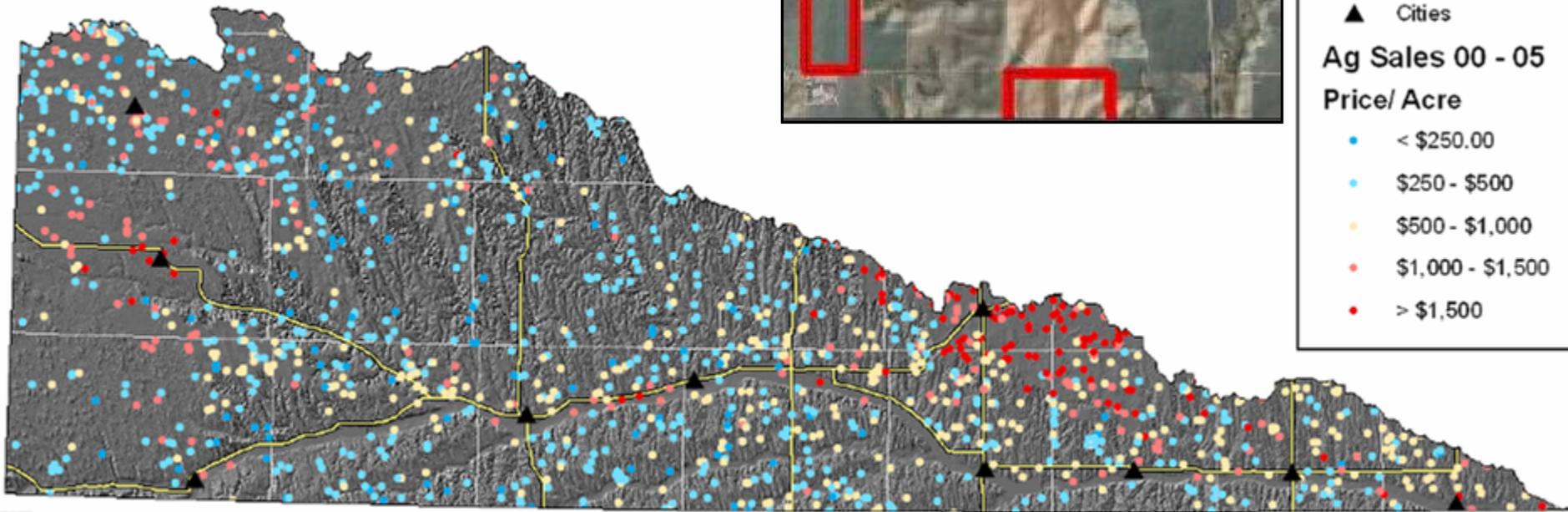
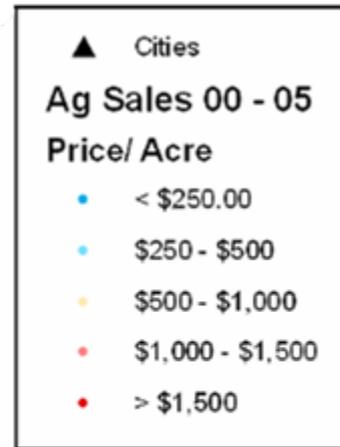
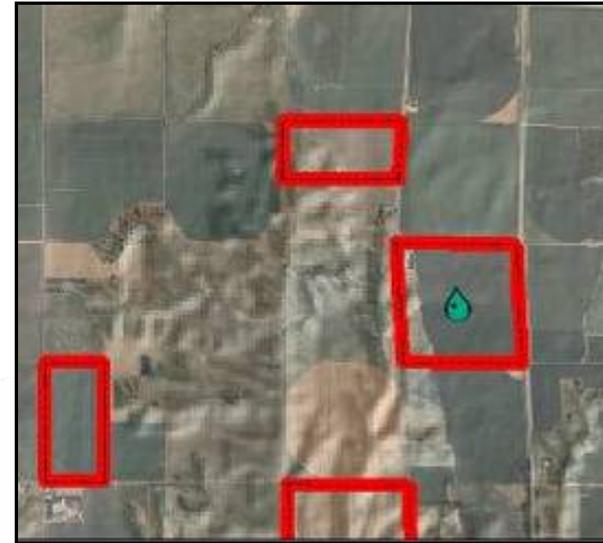
# Digitizing Land Sales into a GIS



# Case Study # 3. Predicting Parcel-Level Land & Irrigation Values for Cost-Effective Irrigation Retirement

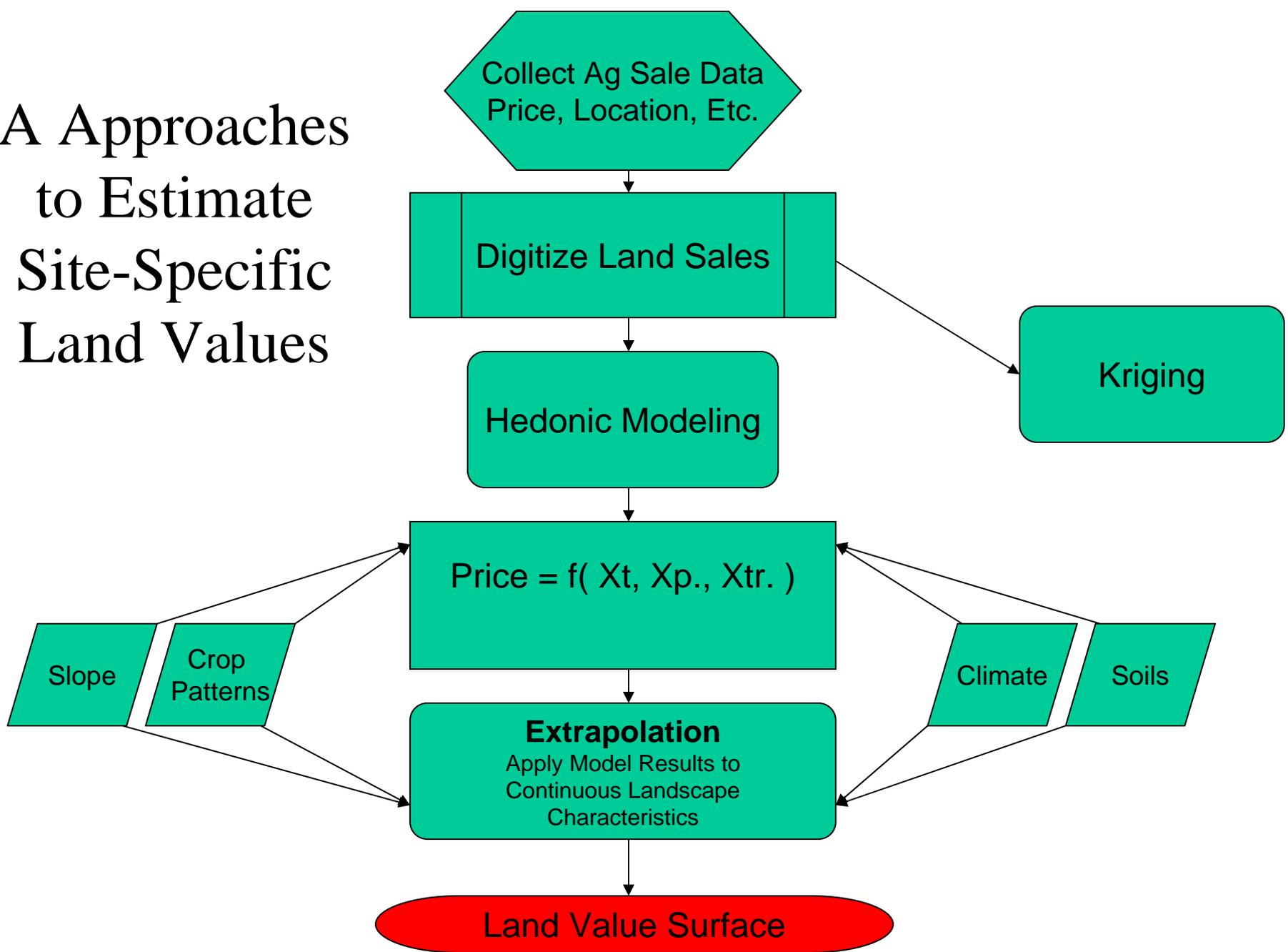
## Hedonic Price Modeling

$$P_{\text{land}} = f(X_{\text{uses}}, X_{\text{prod}}, X_{\text{loc}})$$



Republican Watershed Ag. Land Sales (2000-2005)

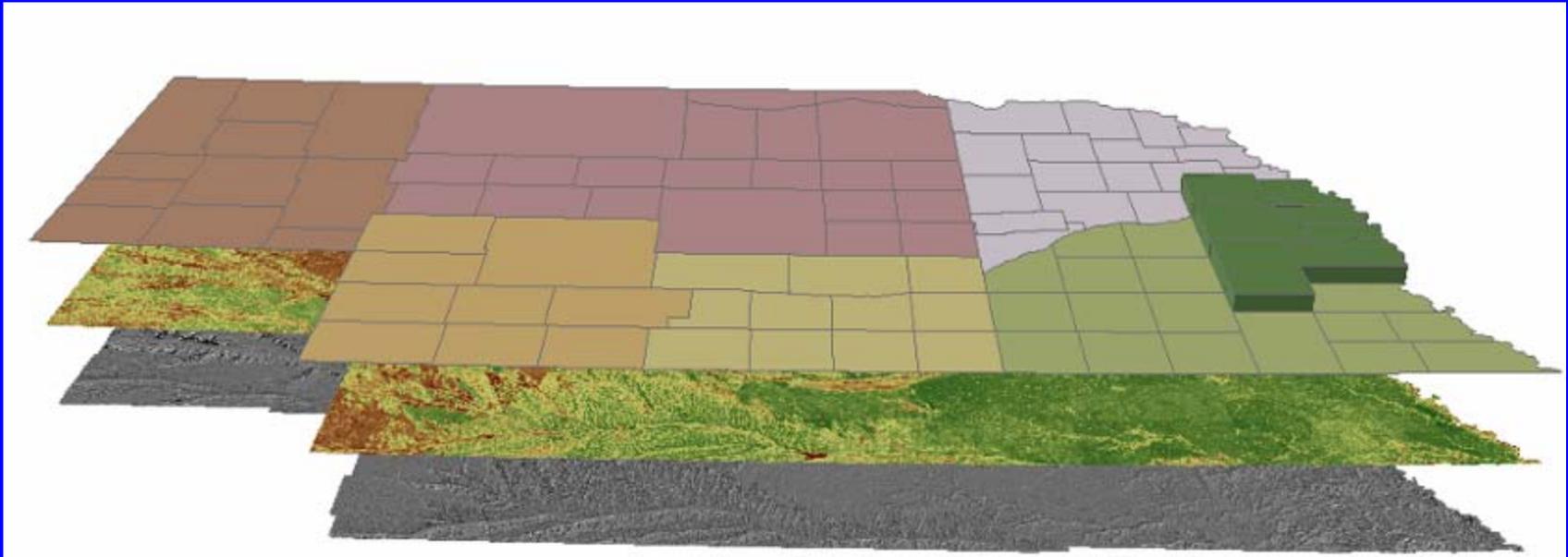
# A Approaches to Estimate Site-Specific Land Values



# GIS-based Multiple Regression to Quantify Irrigation Values

(Sale Price is a function of parcel & irrigation characteristics)

Results:  $R^2 = .72$  (95% of all explanatory variables are statistically significant)



**A summary of the GIS-based explanatory variables used:**

Soil productivity

Cropping Patterns & Parcel Size

Parcel Slope

Distances to towns & grain elevators

Aquifer thickness

Well Pumping capacity (GPM)

**The key interaction variable (%Crop\_Irrig):**

**(The value of an acre of irrigated acre of actually cropped land)**

# PRELIMINARY RESULTS:

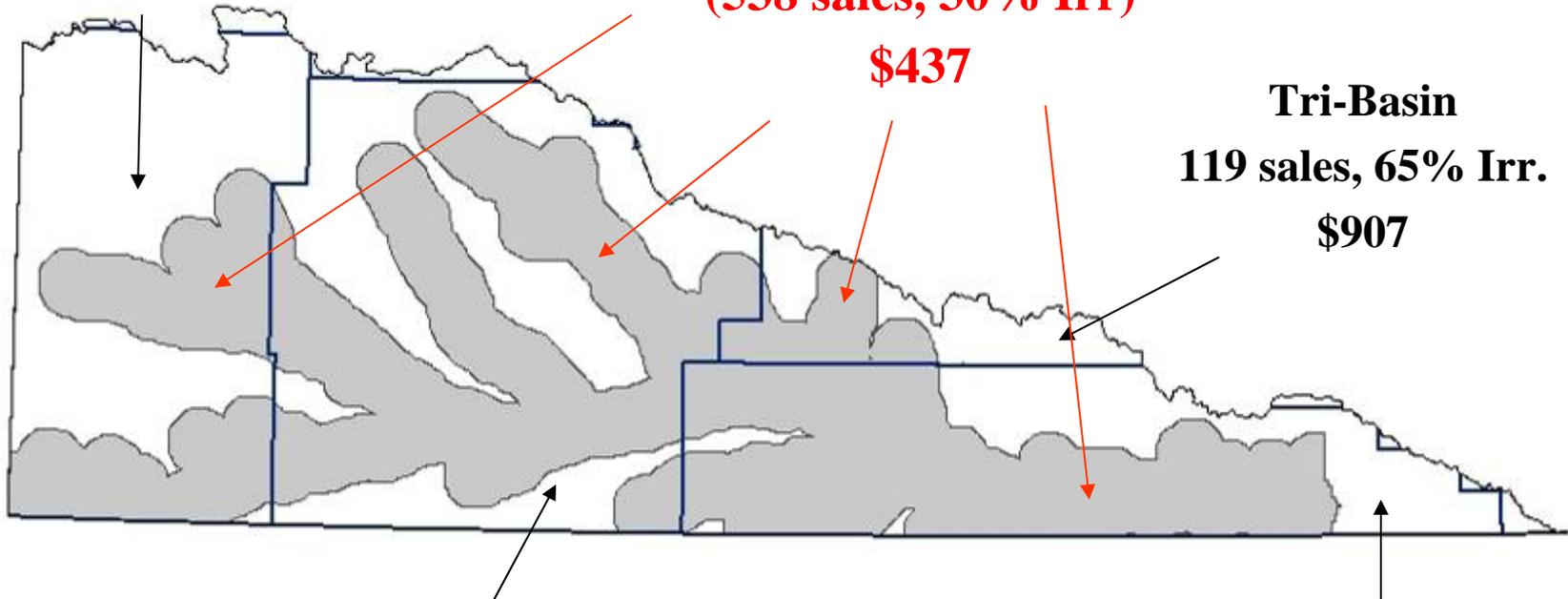
## Marginal Value Irrigation (\$/Acre): 2000-2005 Data

1) Entire watershed: n = 1,107 (40 % Irrigated): \$622

**Upper Rep.**  
244 sales, (53% Irr.)  
\$619

**All EQIP (GREY) Areas**  
(538 sales, 30% Irr)  
\$437

**Tri-Basin**  
119 sales, 65% Irr.  
\$907

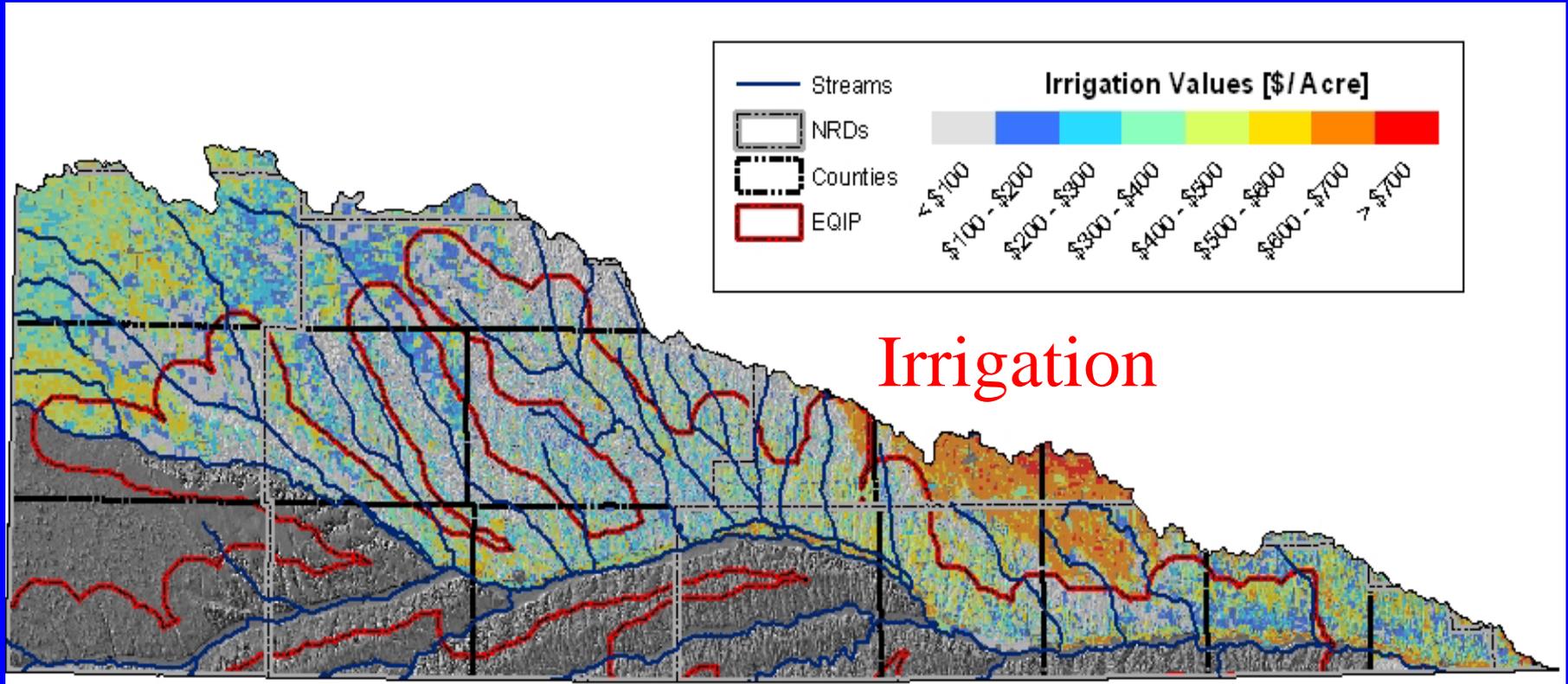


**Middle Rep.**  
314 sales. 28% Irr.  
\$438

**Lower Republican**  
411 Sales 34% Irr.  
\$559

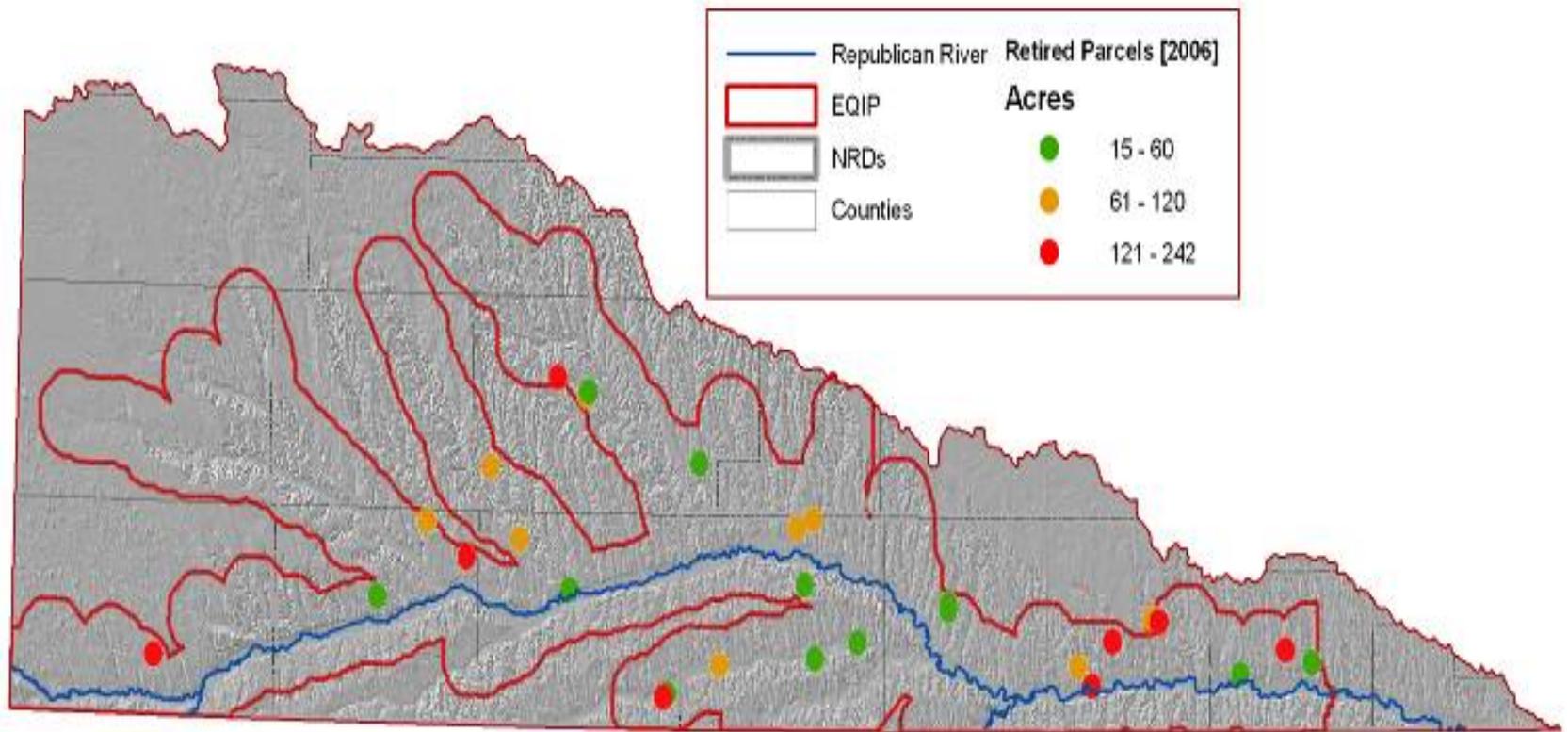
# Cost Estimates to Retire 100,000 Acre-feet Based on NRD-Level Hedonic Estimates

Original Values Using Regional Land Values (Irrigated Vs Dry)	\$64.8 Million
Middle Republican Only (lowest irrigation values)	\$40.4 Million
Hedonic Values Retired Evenly Across the Wshed	\$61.2 Million
EQIP Areas	\$43.7 Million 33% Cheaper!



# Phase II: Will Landowners Require Extra Premiums to Retire Irrigation Rights?

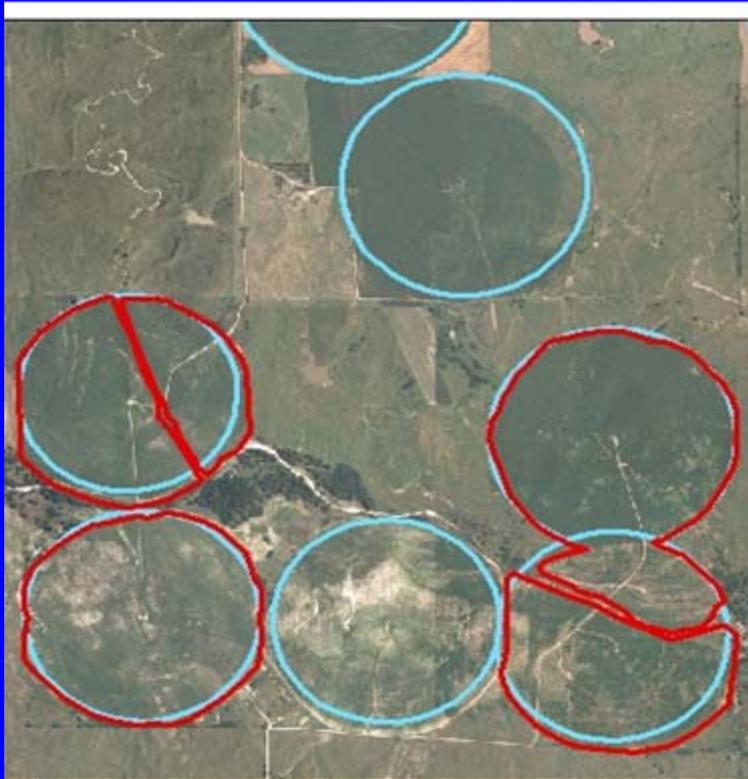
Funded by USDA/NRI (Water & Watersheds Program)



# Specific Questions Related to the Retired 2400 acres of Irrigation

- How does retired irrigation acreage differs from other nearby parcels
- Do retired irrigation acreage values (estimated) differ from \$625 actually paid
- Survey retiree/participants?
- Will the inclusion of estimated make irrigation retirement economically infeasible?

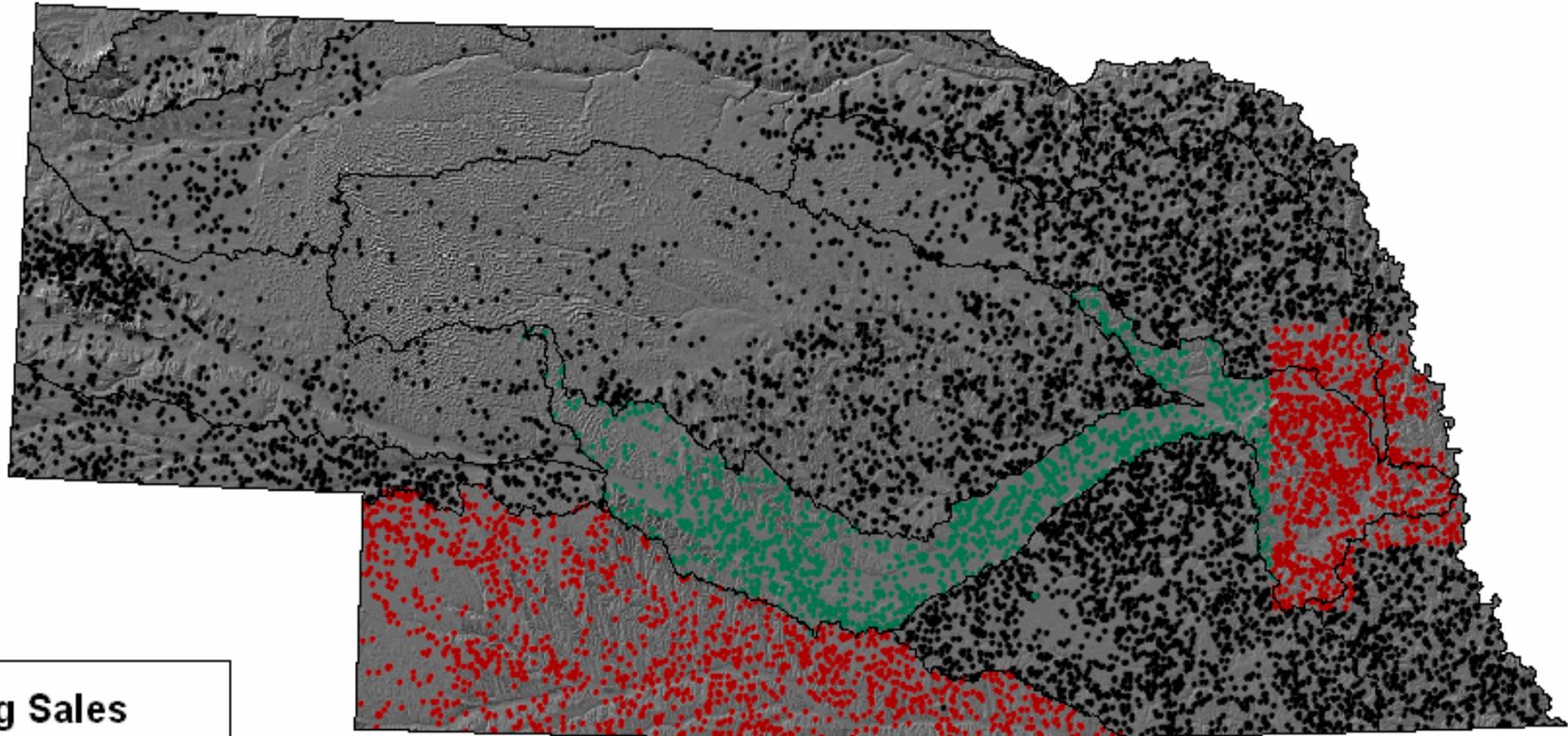
# How Retired irrigation acreage differs from other nearby parcels (preliminary results)



# Follow-Up Research

- Precise estimates of premiums required (estimated irrigation values of retired parcels with otherwise similar non-retired parcels)
- Surveys to determine if these premiums are potentially too high
- Add premiums to all irrigation value estimates across the watershed
- Replicate the Research in other Nebraska Watersheds where irrigation retirements are also being proposed

# All Digitized Ag. Land Sales in Nebraska



**Ag Sales**

Status