



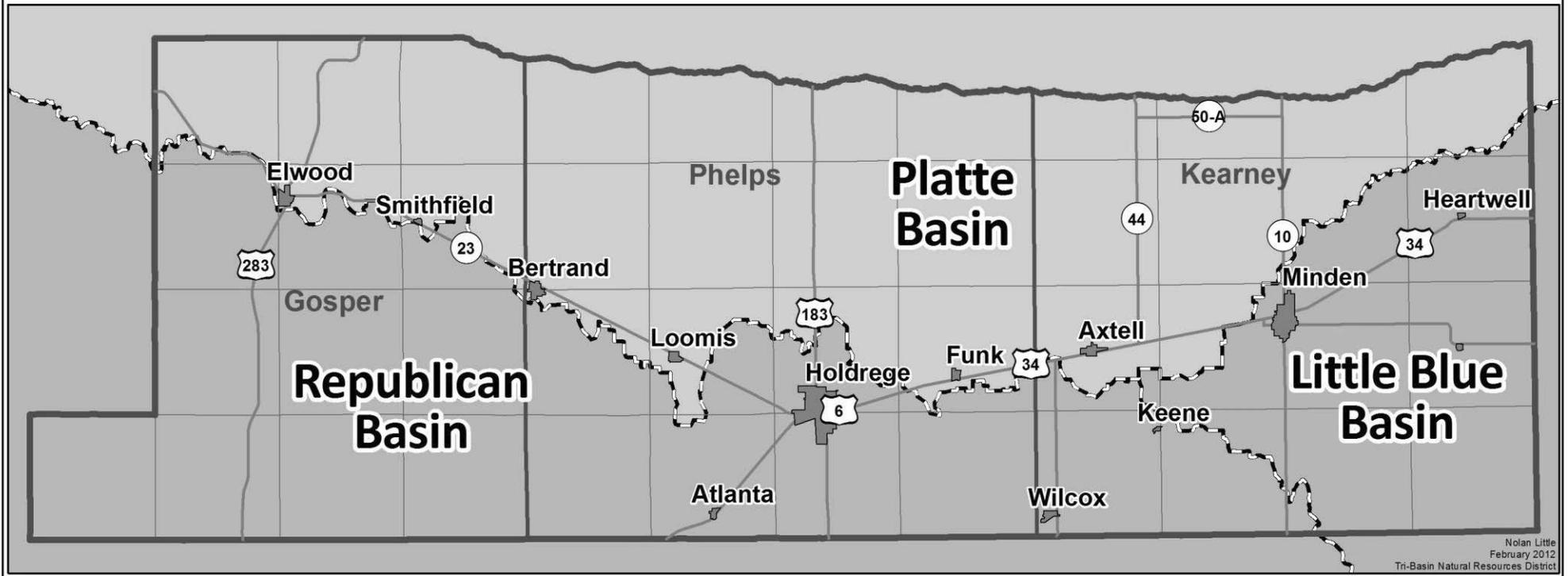
*Natural Resources District*

# Tri-Basin NRD

- Responsible for protecting soil and water resources of Gosper, Phelps and Kearney counties
- Governed by a 13-member board of directors
- District includes portions of Platte, Republican and Little Blue river basins

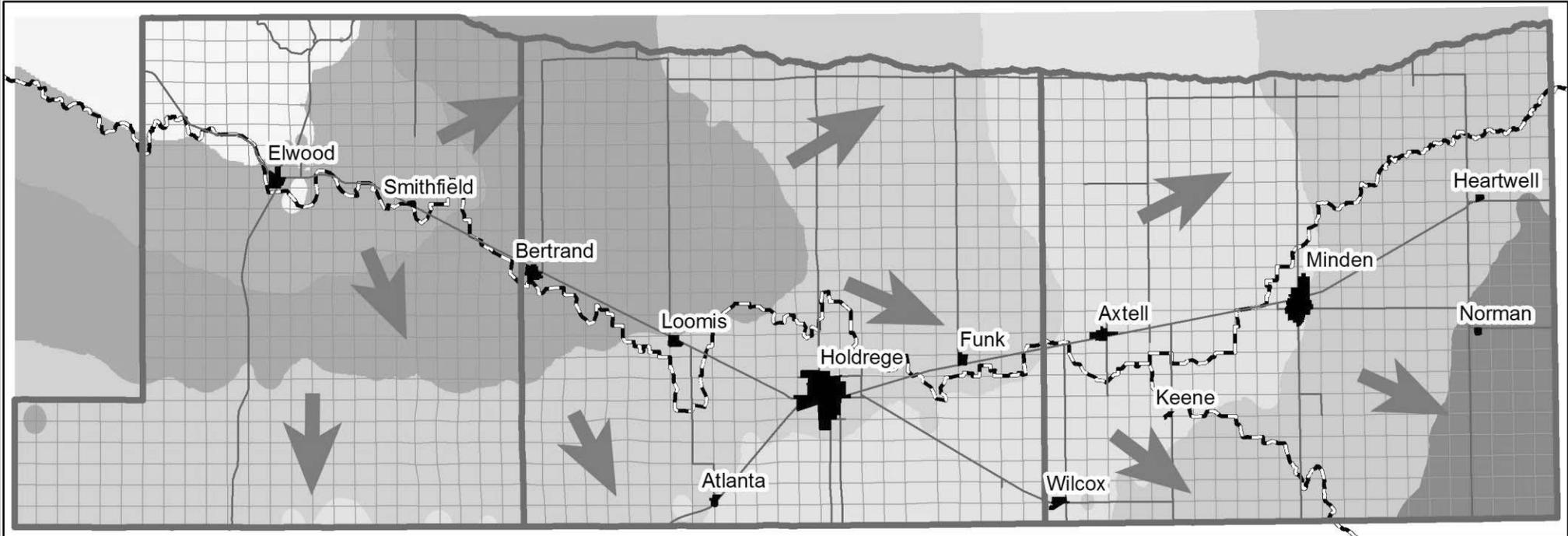
# Tri-Basin Natural Resources District

## Basin Boundaries

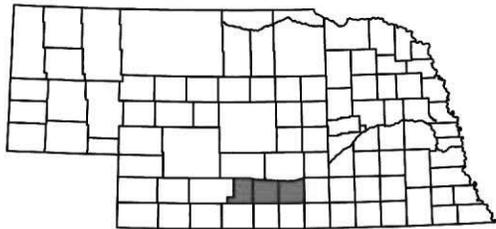


# Tri-Basin Natural Resources District

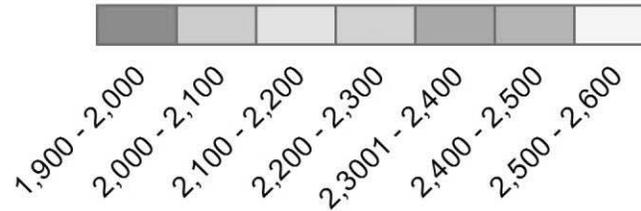
## Groundwater Elevation



Represented Area



Groundwater Elevation in Feet



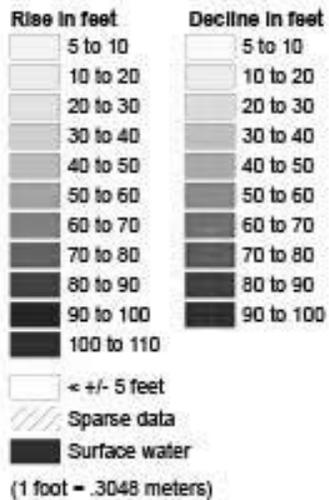
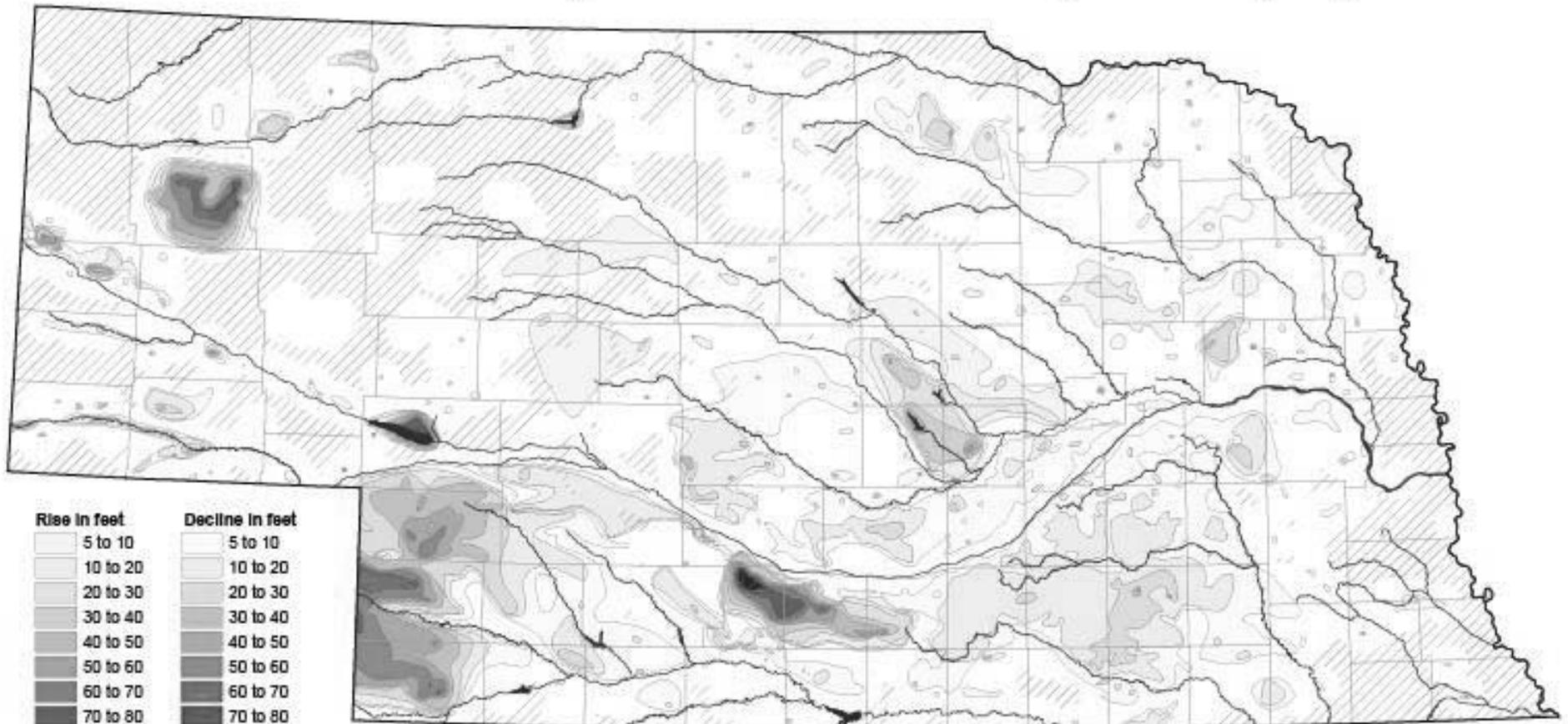
- Community
- Paved Road
- Drainage Basin
- Section
- County Boundary



Nolan Little  
January 2013  
Tri-Basin Natural Resources District



# Groundwater-level Changes in Nebraska - Predevelopment to Spring 2014



CONSERVATION AND SURVEY DIVISION (<http://snr.unl.edu/csd>)  
 School of Natural Resources (<http://snr.unl.edu>)  
 Institute of Agriculture and Natural Resources  
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U.S. Geological Survey  
 Nebraska Water Science Center

U.S. Bureau of Reclamation  
 Kansas-Nebraska Area Office

Nebraska Natural Resources Districts

Central Nebraska Public Power and Irrigation District

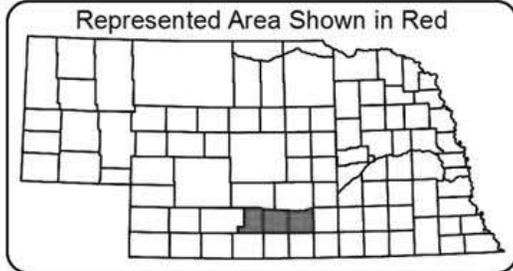
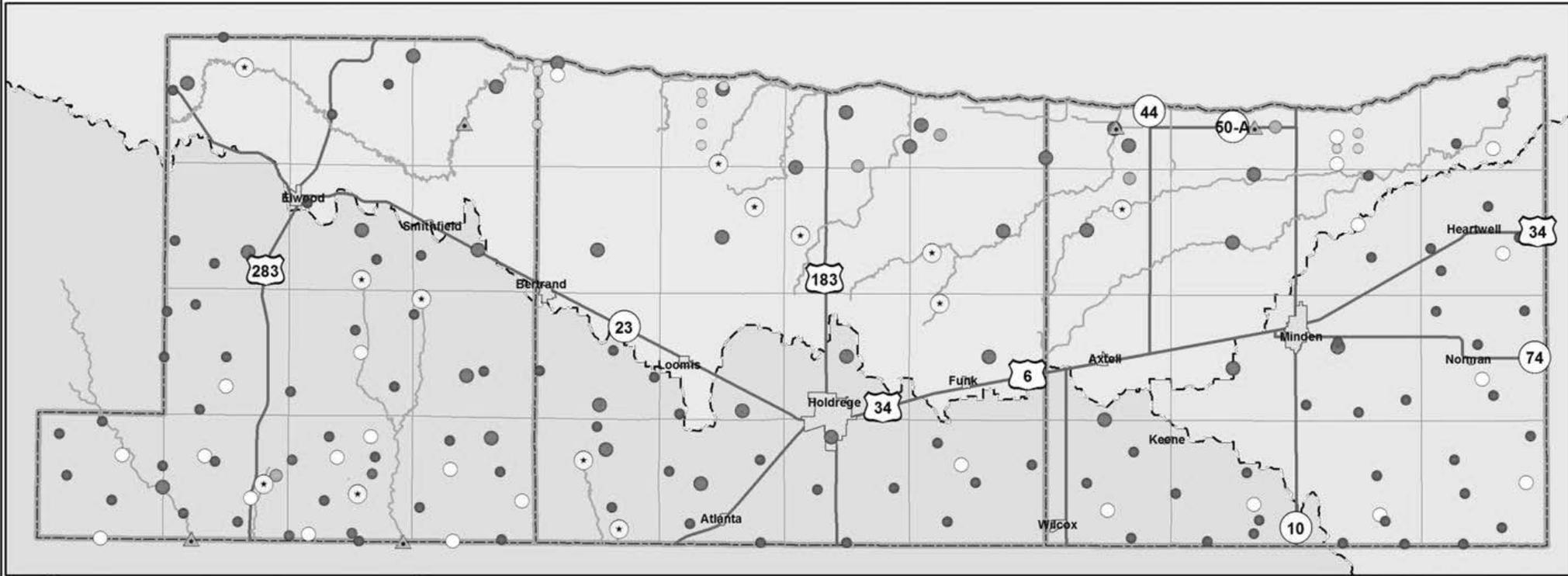
School of Natural Resources  
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December 2014

# Tri-Basin Natural Resources District

## Observation Well Network & Stream Gages



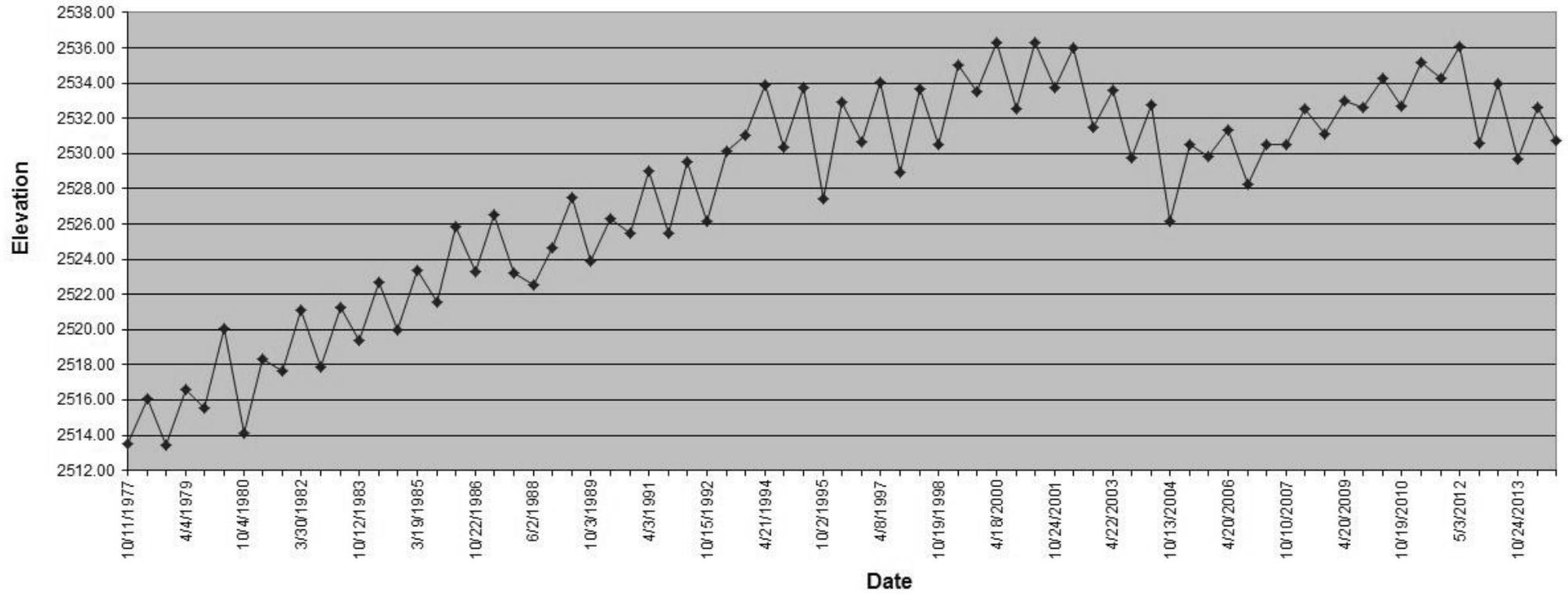
- |                   |                      |                      |
|-------------------|----------------------|----------------------|
| ● Cluster Well    | ▲ Stream Gage        | ▭ County Boundary    |
| ○ Single Well     | ⊙ Headwater Location | ▭ Township Boundary  |
| ● Irrigation Well | ~ Stream             | ○ Republican Basin   |
| ● Transect Well   | — Highway            | ○ Little Blue Basin  |
| ● Other Well      | ⊕ Community          | ○ Platte River Basin |



Nolan Little  
 February 2012  
 Tri-Basin Natural Resources District

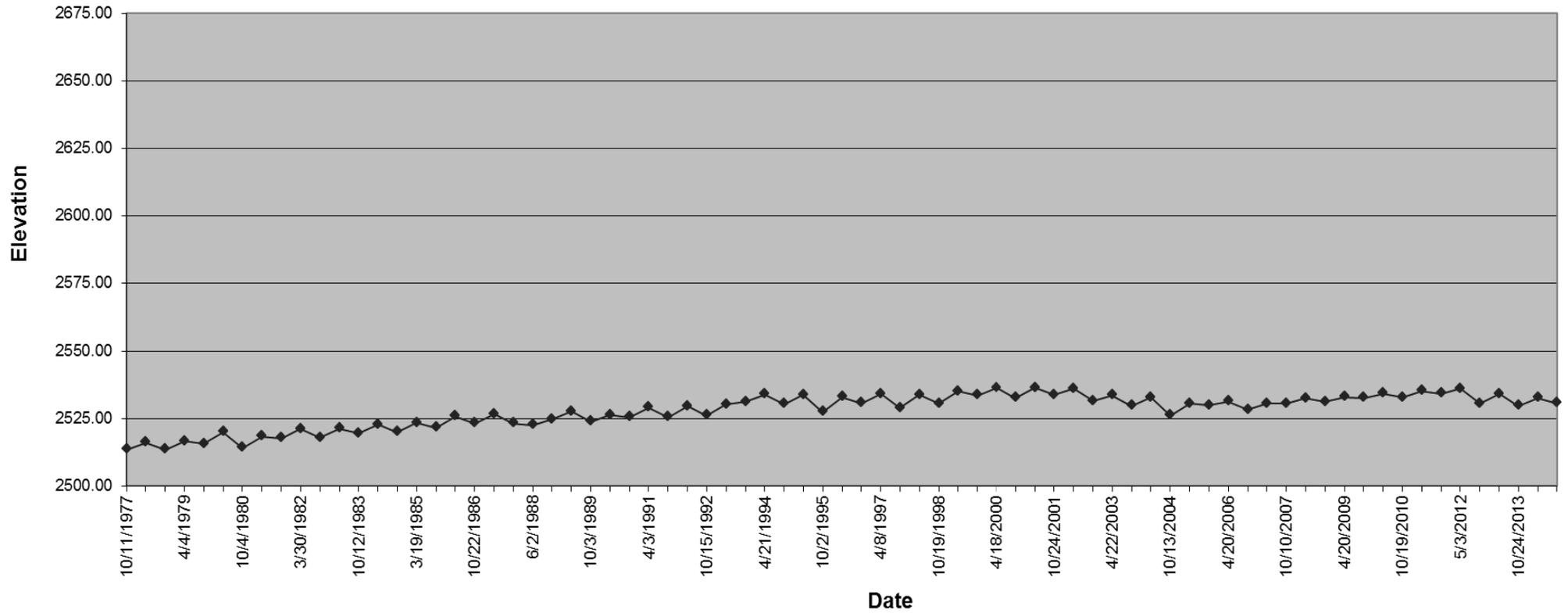
Surface Elevation  
2667.10'

### NESW 18-8N-23W / G-05



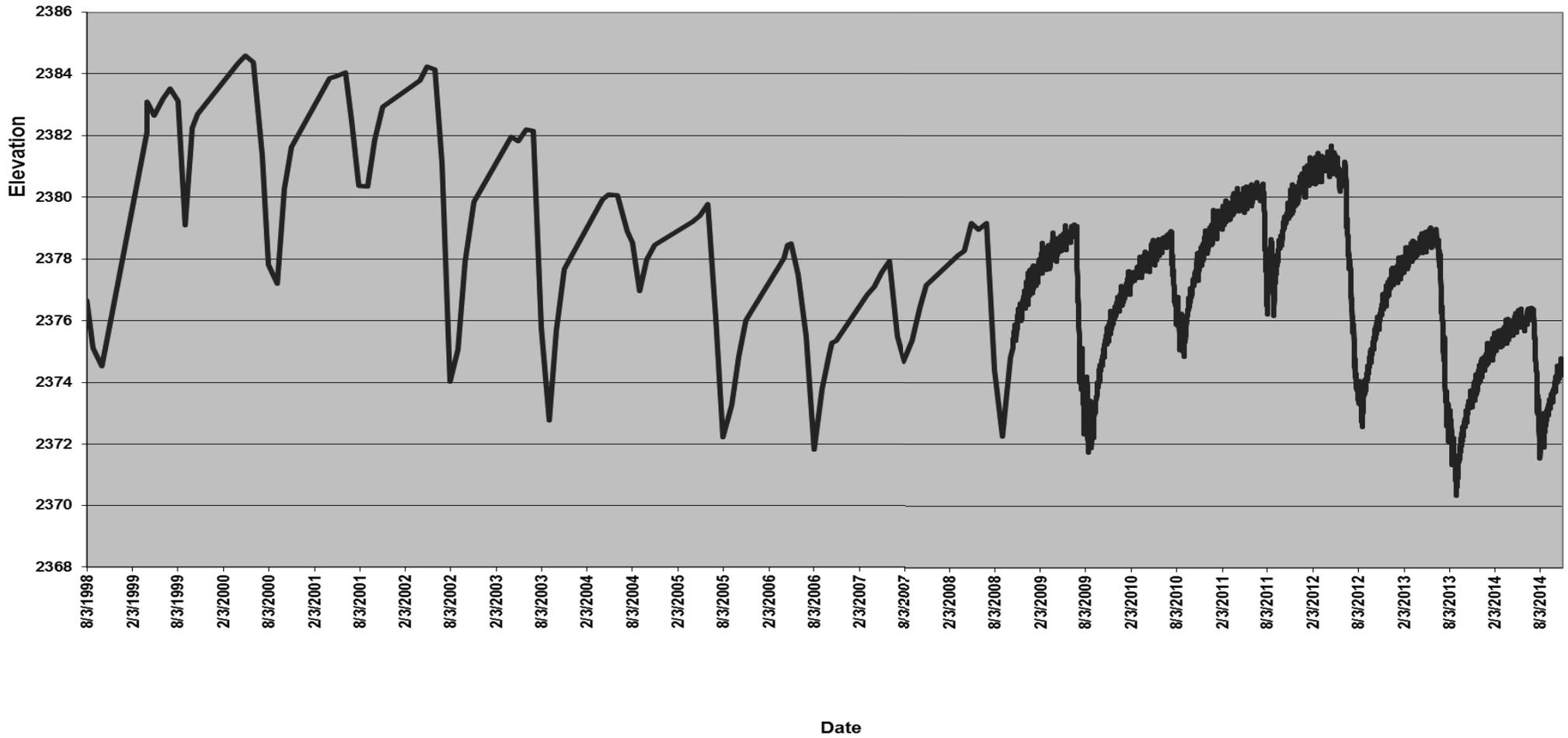
Surface Elevation  
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### NESW 18-8N-23W / G-05



# SESE 24-8N-21W G-100

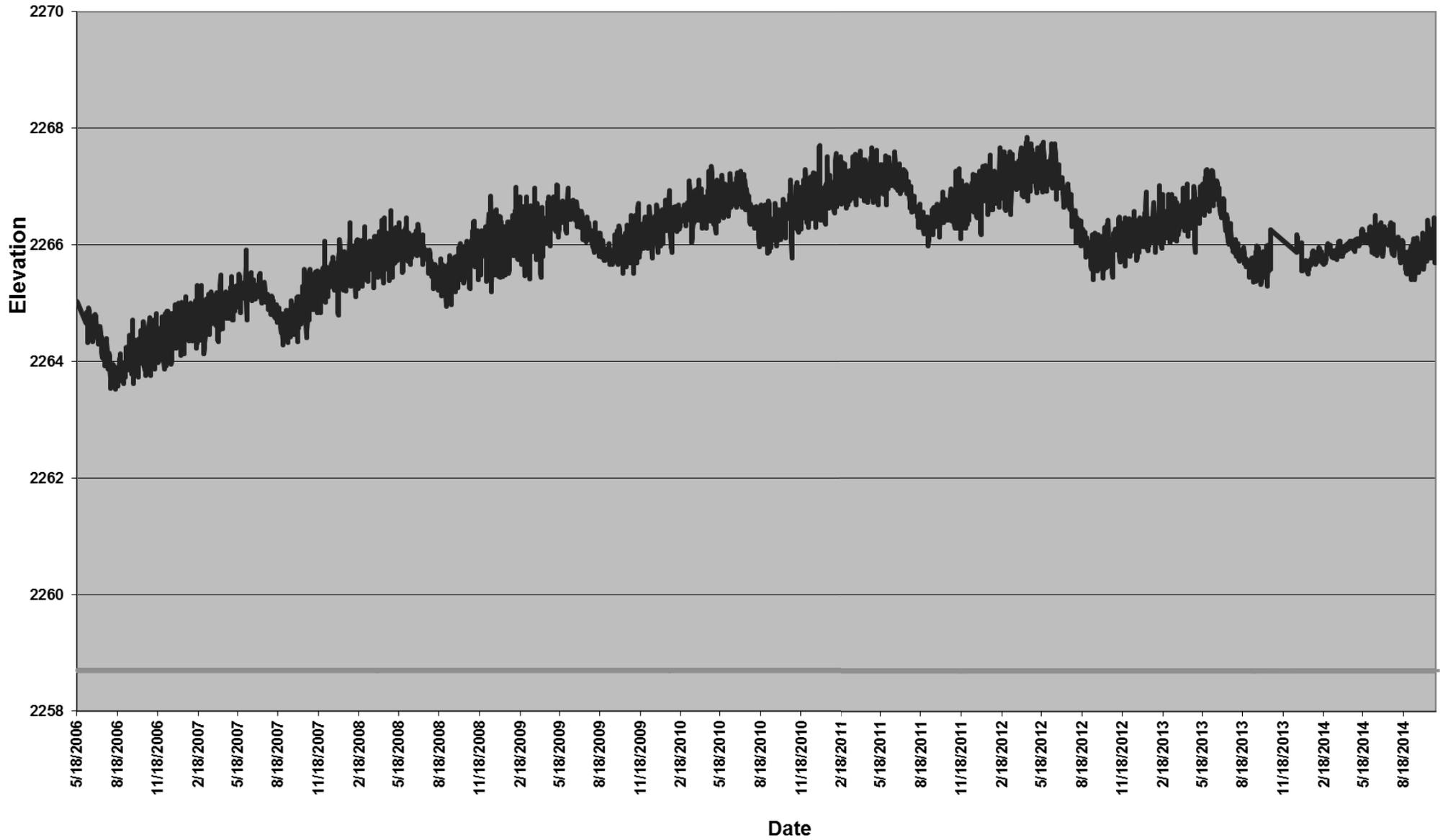
Surface Elevation  
2460.50'



— Series1

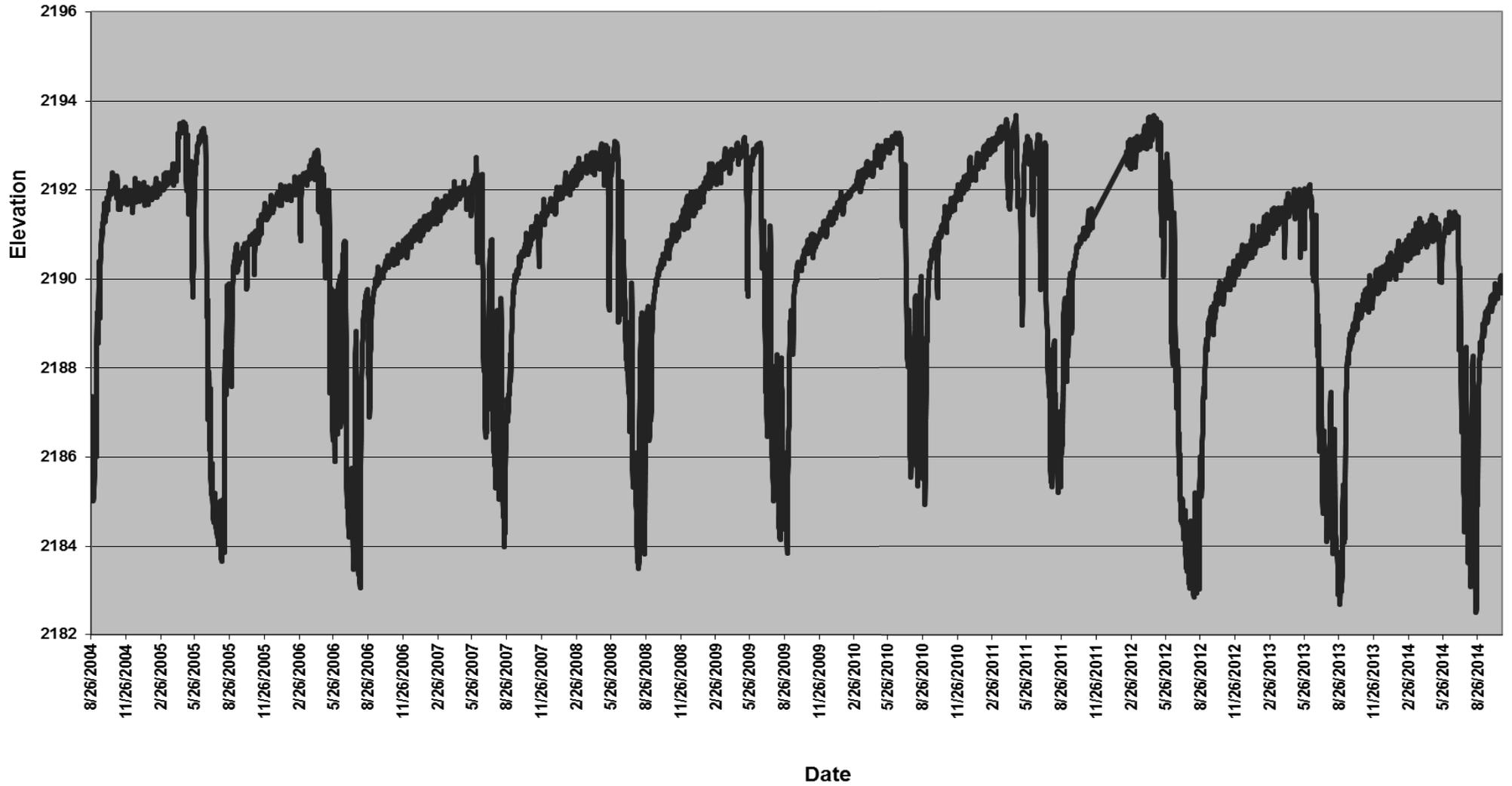
Surface Elevation  
2407.78'

# SW4 2-5N-22W G-115



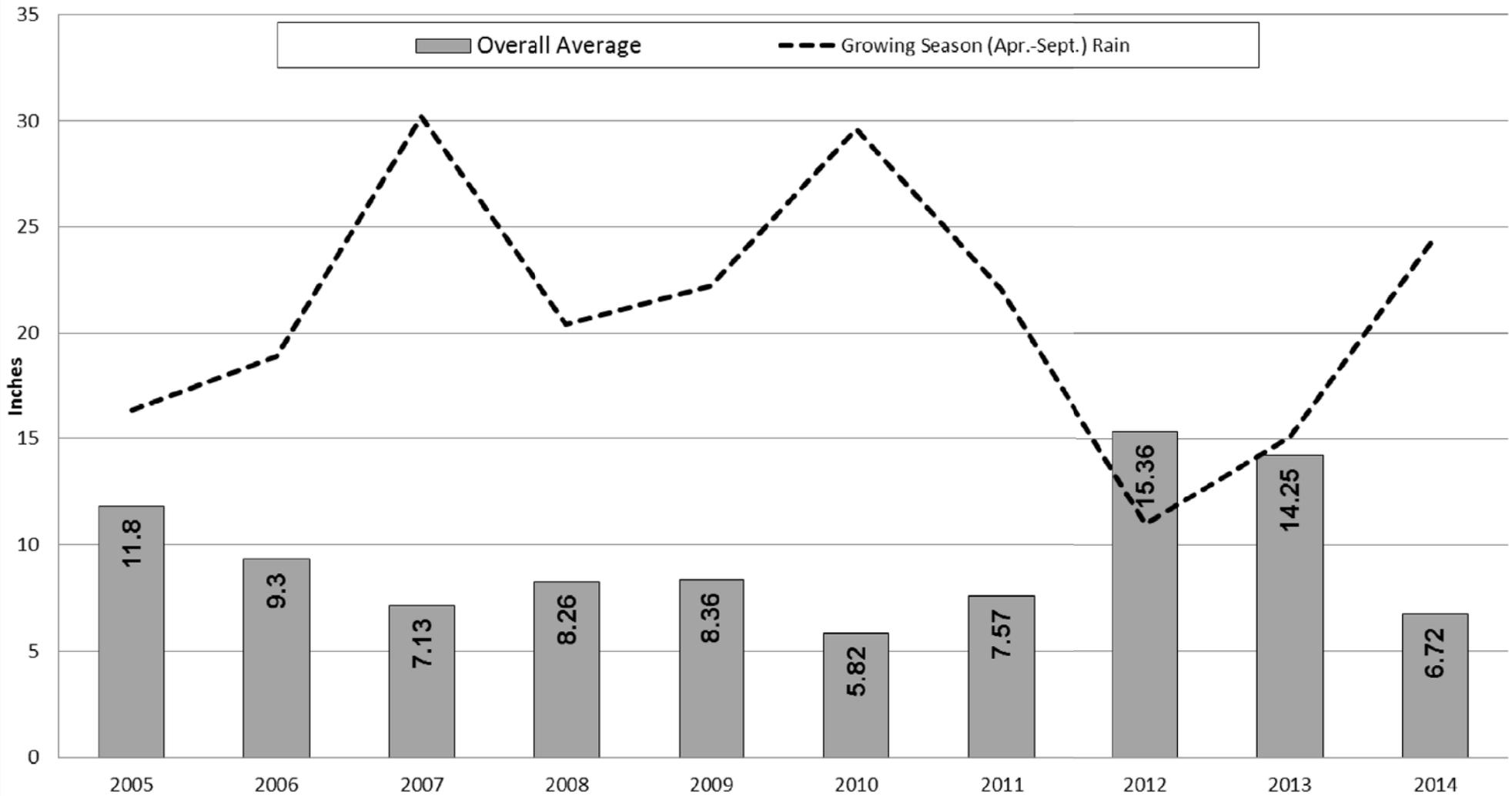
Surface Elevation  
2328.40'

### SW4 32-5N-22W G-106

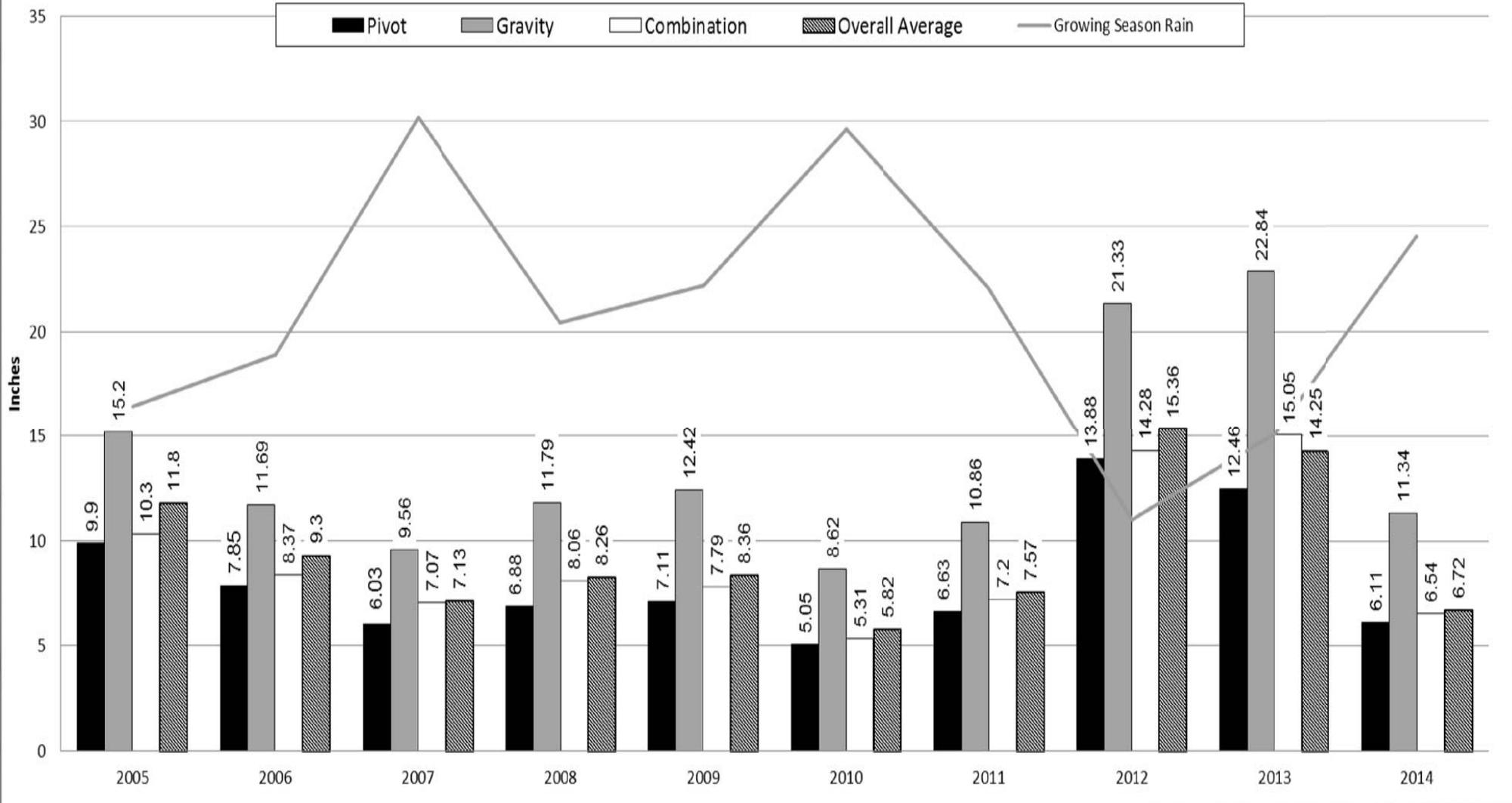


— Groundwater Elevation

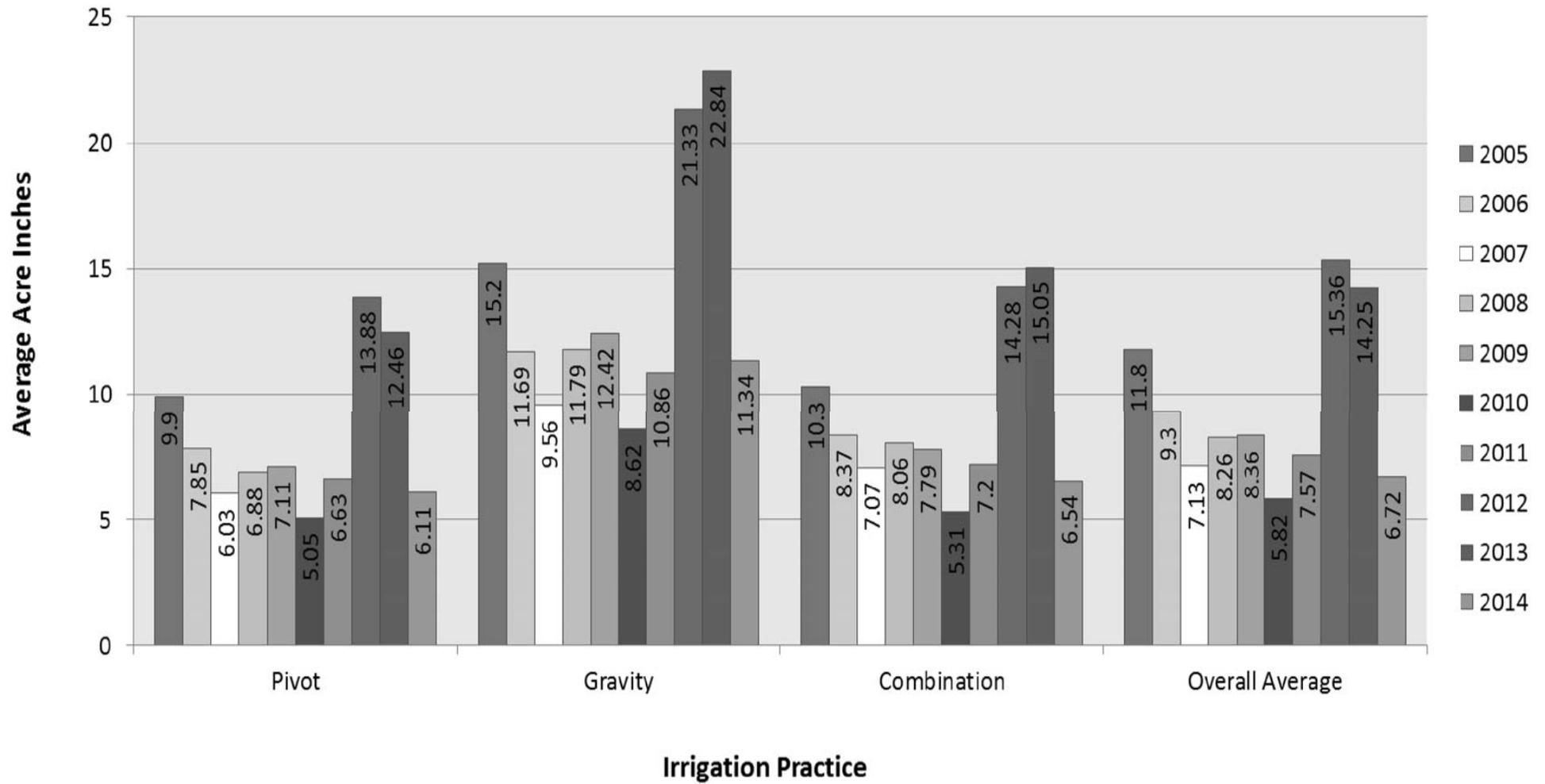
# Tri-Basin NRD Republican Basin Average Irrigation Pumping



# Tri-Basin NRD Republican Basin Average Irrigation Pumping

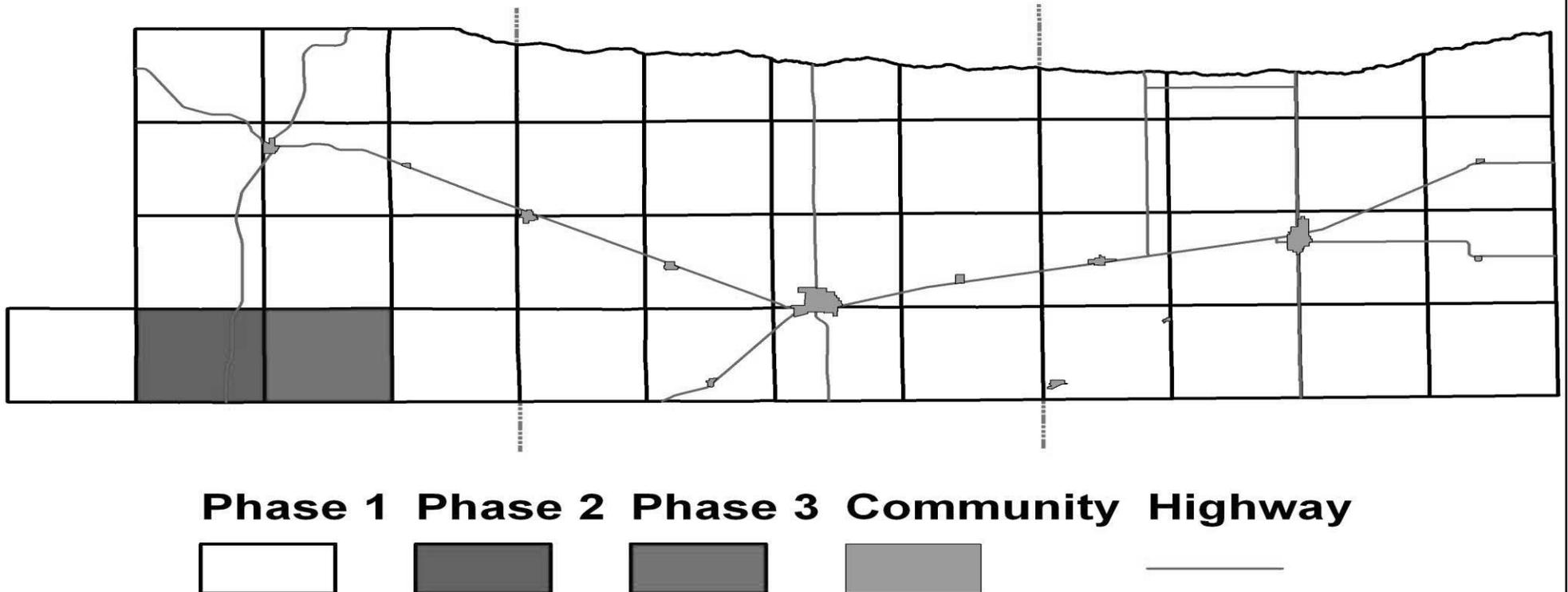


# Tri-Basin NRD Republican Basin Irrigation Water Pumping



# Groundwater Quantity Management Area Rules and Regulations

## Tri-Basin NRD Township Allocation



# TBNRD regulatory actions to protect groundwater quantity

- No increase in certified irrigated acres.
- New groundwater transfers (pumping GW onto other parcels) require NRD permits.
- Supplemental wells for surface water-irrigated fields permitted only if landowner agrees to retain surface water contract for life of well.
- Flowmeters required on all wells irrigating more than 14 acres (Rep. Basin only), new and conditional replacement wells district-wide.

# TBNRD regulatory actions (continued)

- Groundwater levels are protected from declines below 1981-85 average levels.
- TBNRD has designated Elk Creek township Phase 2 and Union Township Phase 3 for groundwater quantity management.
- TBNRD has limited pumping in Union Township in Gosper County to 27" per acre over three years.

# Integrated water resources management

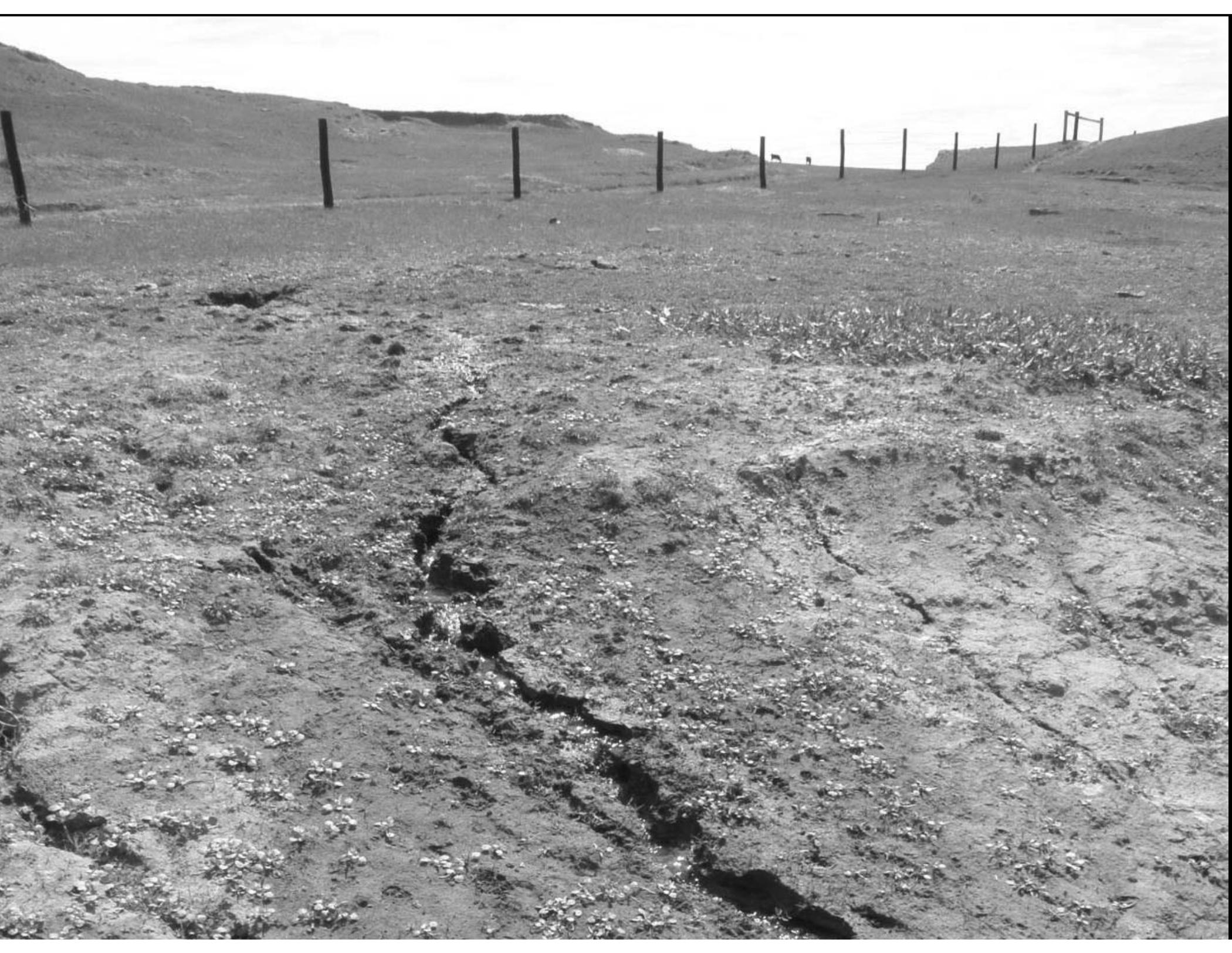
- Managing groundwater to protect streamflows.
- Required by state law (LB 962-2004)
- Also required to help Nebraska meet requirements of interstate agreements (e.g., Republican River Compact)

# Integrated water resources management (continued)

- Regulation is based on meeting requirements of joint integrated management plans (IMPs) in Platte and Republican basins.
- Current Platte IMP runs through 2019.
- Current Rep. Basin IMP runs through 2021.



**Turkey Creek  
West Branch**



# TBNRD regulatory actions to protect streamflows

- All groundwater-irrigated acres must be certified.
- Transfers of certified irrigated acres are regulated.
- Transfers of certified irrigated acres are pro-rated if the destination field has higher rate of stream depletion than originating field.
- Increases in water use for large commercial and industrial uses are also regulated and must be offset.
- TBNRD agrees to offset depletions to streamflows resulting from groundwater pumping as part of our IMPs.

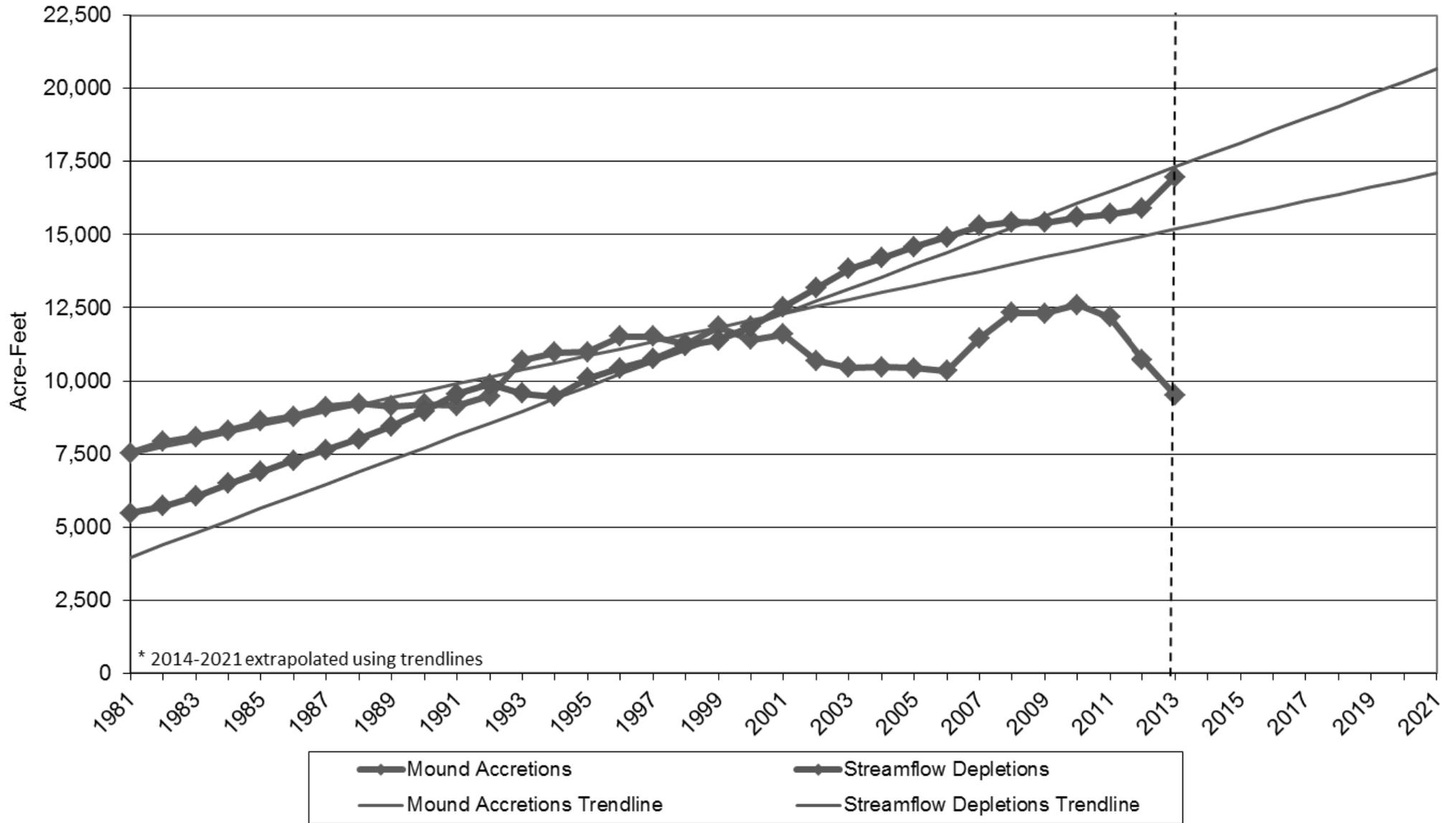
# TBNRD Platte Basin IMP requirements

- TBNRD includes both overappropriated and fully appropriated portions of Platte basin.
- TBNRD IMP streamflow depletion reduction requirements to return to 1997 levels of depletions:
  - **OA Basin** (W of US Hwy. 183) **1775 a-f/Yr.** by 2020
  - **FA Basin** (E of US Hwy. 183) **1760 a-f/Yr.** by 2020
  - **Total** offset requirement= **3535 a-f/Yr.** by 2020

# TBNRD Republican Basin IMP Requirements

- TBNRD needs to maintain positive balance between imported water and depletions to streamflows
- TBNRD maintains this balance in three ways:
  - Maintain GW levels at or above 1981-85 levels
  - Regulate irrigated crop production
  - Augment streamflows

# Tri-Basin NRD Streamflow Depletions and Imported Water (Mound) Accretions at Tri-Basin NRD Southern Boundary





Tri-Basin depletion  
offset projects

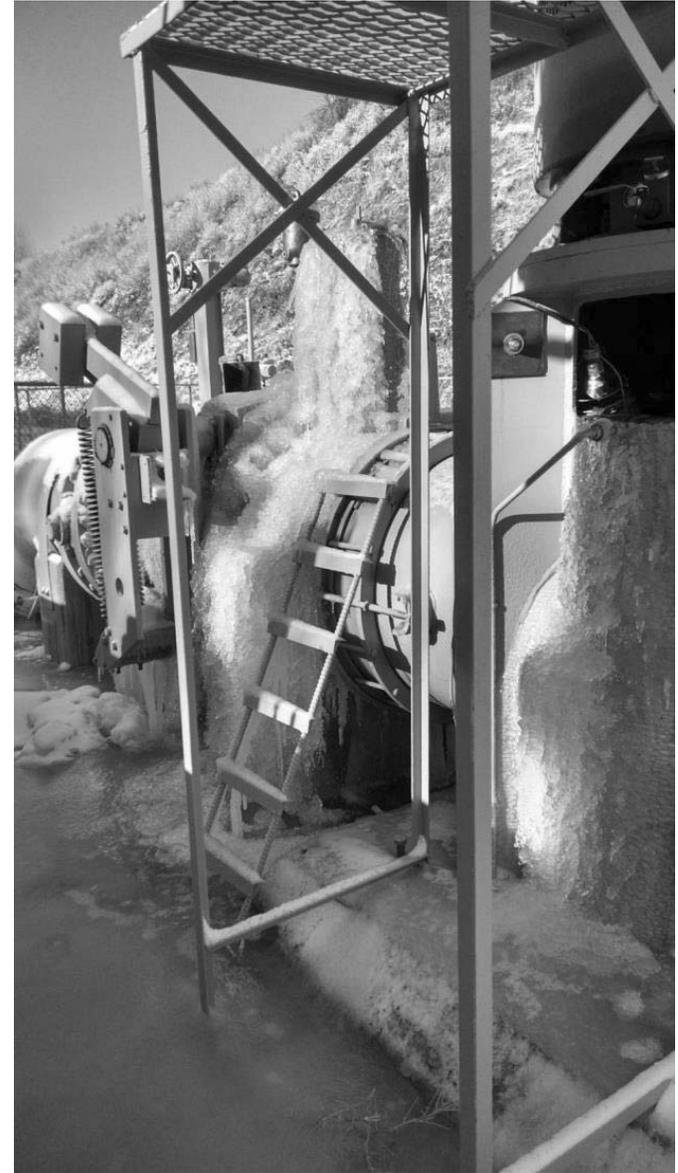
# Streamflow augmentation vs. Regulation

- Augmentation can be accomplished directly or indirectly.
- Direct augmentation=pumping water into a stream or releasing water from a reservoir.
- Indirect augmentation=diverting water into canals and reservoirs and allowing it to seep into the ground.

# What are alternatives to augmentation?

- Pay farmers not to irrigate
  - Needed reductions can be achieved by acquiring easements
  - Easements can be acquired from willing sellers or by eminent domain (using condemnation enables targeting areas of greatest benefit)
  - NRD would need to retire irrigation on at least 50,000 acres in Platte basin and 10,000 acres in Rep. Basin
  - Cost=at least \$4000/ acre, \$24 million total

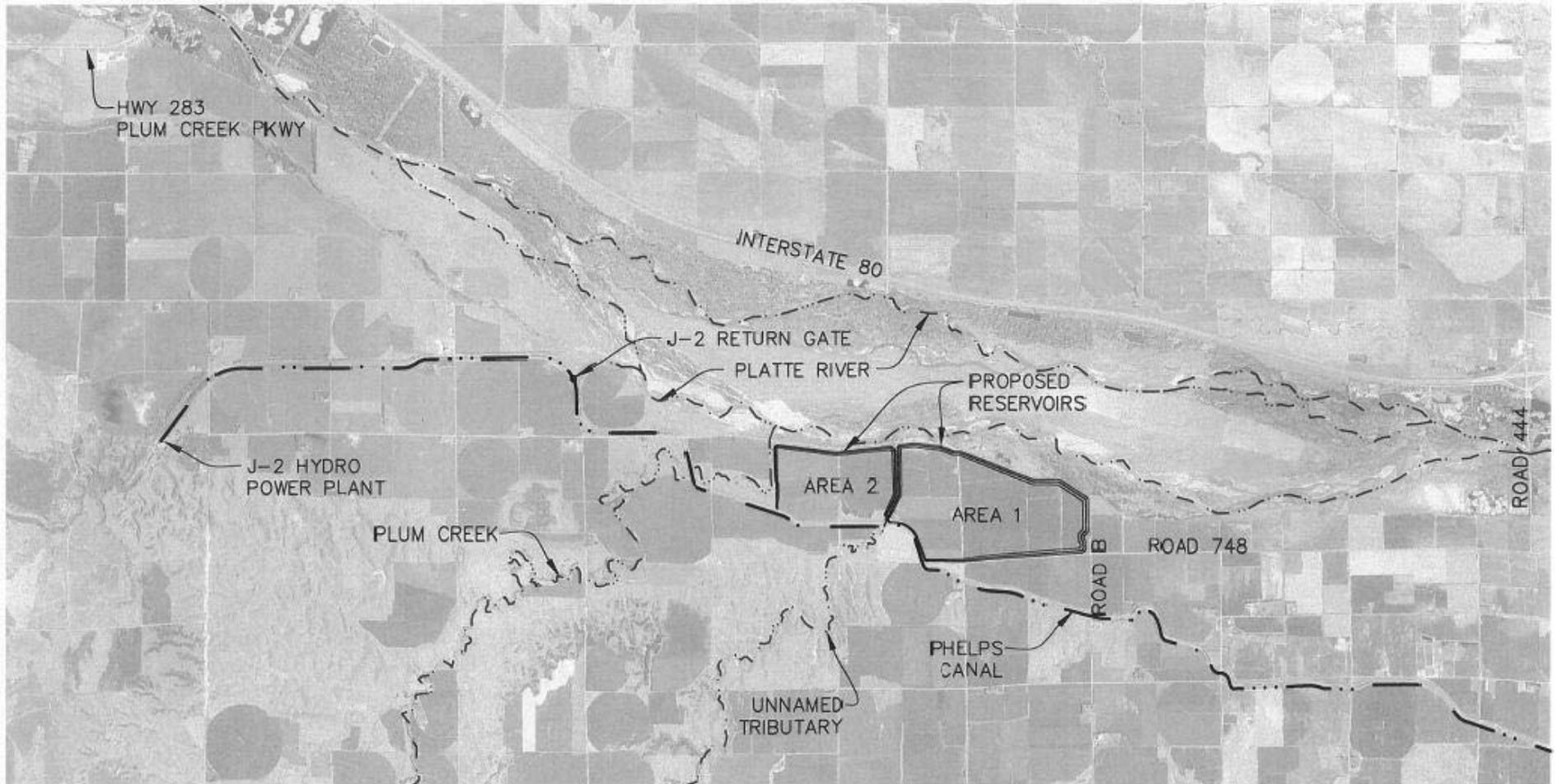
# Elwood Reservoir



# CNPPID High Flow Diversions

- TBNRD works with CNPPID to divert high Platte flows into canals, Elwood reservoir.
- Over 46,000 acre-feet diverted since first diversions in 2008.
- Over 36,000 creditable a-f at NRD cost of \$8-\$24 per a-f (DNR pays half cost).
- Diversions into Elwood Reservoir and E-65 Canal benefit both Platte and Republican Basins.

# J-2 Reservoirs



# J-2 Reservoirs

- Partner in J-2 reservoirs project.
- NRD cost = \$1,571,661 over three years.
- 2000 creditable a-f per year.
- 50 year agreement.
- Cost = \$15 per creditable acre-foot.

# North Dry Creek Streamflow Augmentation Project



# Tri-Basin Natural Resources District

## North Dry Creek Streamflow Augmentation Project



# North Dry Creek Streamflow Augmentation Project

- TBNRD developed first streamflow augmentation well project in Nebraska.
- Located on North Dry Creek (Platte Trib. Near Kearney).
- First well completed in 2011, second well in 2014.
- DNR paid 50% of cost.
- Anticipate \$11-12 per creditable a-f cost.

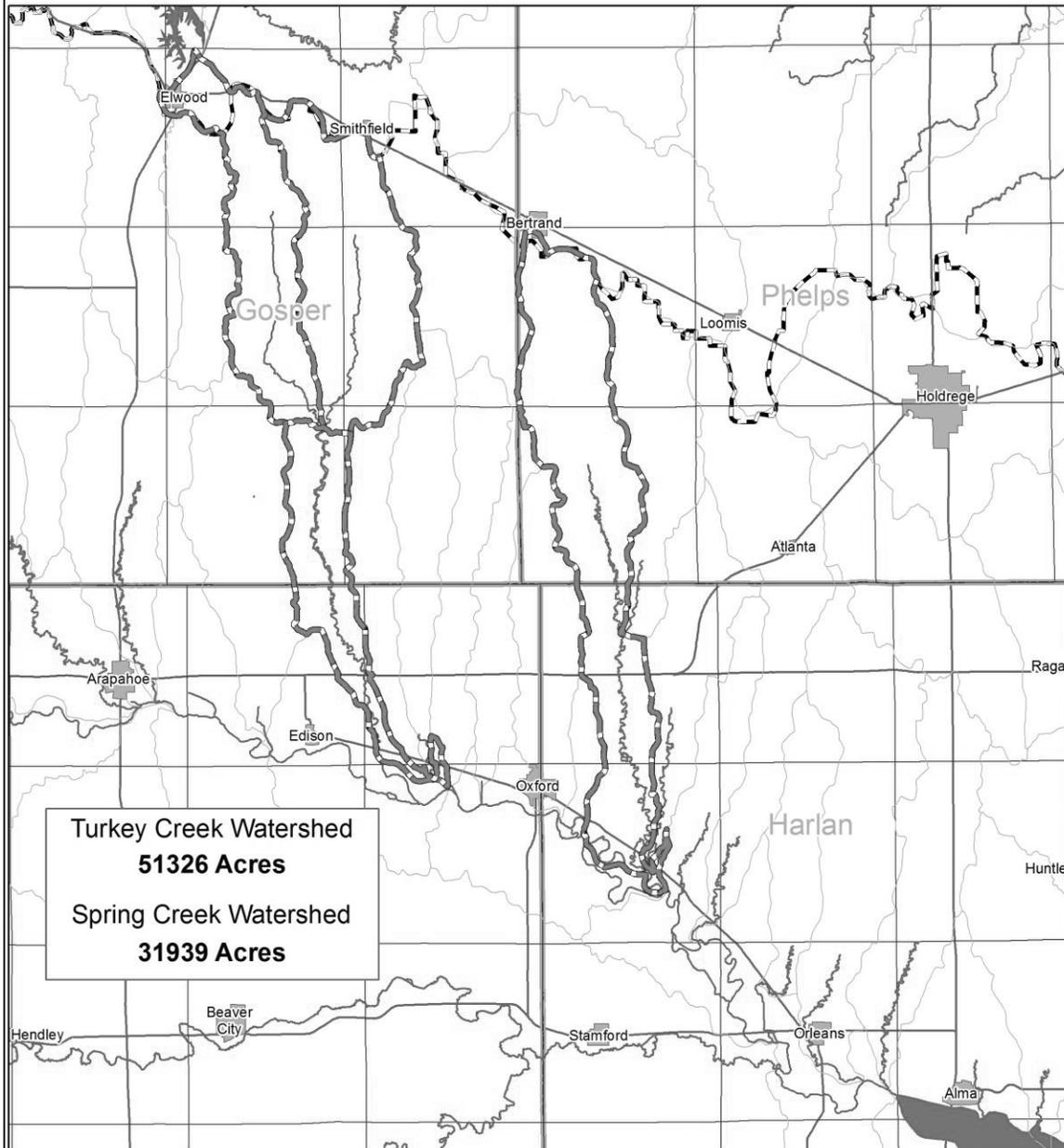
# Rep. Basin Aug. Project

- Current plan is to drill two pumping wells which will be located along Turkey Creek in Gosper County.
- Each well will be accompanied by at least one observation well.
- First observation well will be drilled this spring
- First production well will be drilled next winter (2015-16).

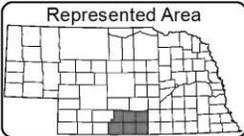
# Rep. Basin Aug. Project (Cont.)

- A second production well is planned for 2019.
- Expected pumping rate is 1200 gpm per well.
- Expected output is 1000 acre-feet per well per year.
- Pumped water will be replaced by recharge into Elwood reservoir and E-65 canal.
- Most pumping will occur during spring and fall.
- NRD will assist with maintaining Turkey Creek in immediate vicinity of wells.

# Spring and Turkey Creek Watersheds



Turkey Creek Watershed  
**51326 Acres**  
 Spring Creek Watershed  
**31939 Acres**



- Stream
- Lake
- Road
- Community
- Selected Watershed
- HUC Watershed Boundary
- Township
- County Boundary

**Tri-Basin**  
*Natural Resources District*

Nolan Little  
 September 2012  
 Tri-Basin Natural Resources District

# EQIP Special Initiative



# USDA-EQIP Special Initiative

- Worked with USDA-NRCS on EQIP Special initiative to convert center pivot corners to grass, habitat (5-year contracts) starting in 2008.
- Total of 28 contracts (364 acres) enrolled.
- Created good upland game habitat.
- Not very effective as offset project (45 creditable a-f per year) because most corners enrolled were in low-depletion areas.