2. PROJECT SETTING

Section 2 provides an overview of the study area. The section is written for persons who want to become familiar with the project setting, and provides maps, charts and tables that can be referred to from throughout this document. The study area was established by the COHYST sponsors to cover areas of surface water operations and groundwater management in three Natural Resource Districts - Twin Platte, Tri-Basin and Central Platte.

2.1 Physical Environment

The Platte River and its drainage basin are the focus of the COHYST study. **Figure 2.1-1** is a map showing the entire basin and its setting as part of the Missouri-Mississippi drainage system. The North Platte and South Platte Rivers join to form the mainstem Platte River near North Platte NE. Both streams originate in the Rocky Mountains of Colorado. The upstream gages used in the study are at Lewellen, NE on the North Platte, just above Lake McConaughy (records began July 1931, drainage area 28,600 mi^2) and at Julesburg, CO on the South Platte (records began April 1902, drainage area 23,821 mi^2). These major stream gages are just above the Twin Platte NRD boundary and measure the surface water flows available to the Surface Water Irrigations districts.

The downstream end of the study is the gaging station at Duncan NE, just above the confluence of the Platte with the Loup. The gaging record at Duncan extends back to 1895. The drainage area above the Duncan gage is listed by USGS as 60,900 mi^2, with 56,100 mi^2 that contributes directly to runoff. Non-contributing drainage occurs in small closed basins in the central and eastern part of the area. The study area extends to the east of Duncan to cover the Central Platte NRD Groundwater Management area but this gage represents the flows leaving the area.

Connections to the Platte River through groundwater occur with the adjoining three river basins Loup, Blue and Republican River. **Figure 2.1-2** shows these drainage basins. To compute a regional scale movement of groundwater within the 3 NRD's the adjoining rivers were established as the groundwater model boundary.

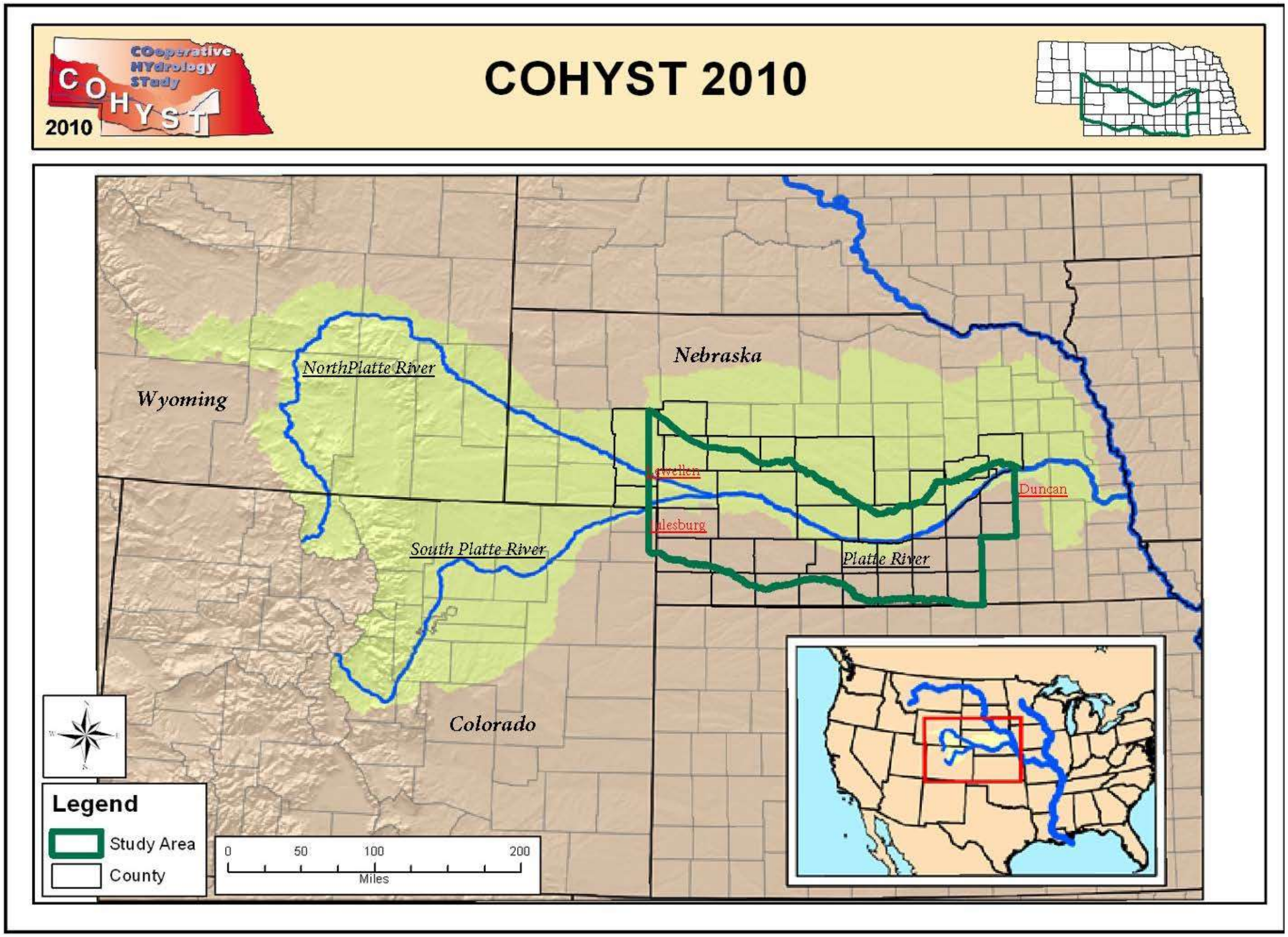

Figure 2.1-1. Platte River Drainage Basin (green shading).

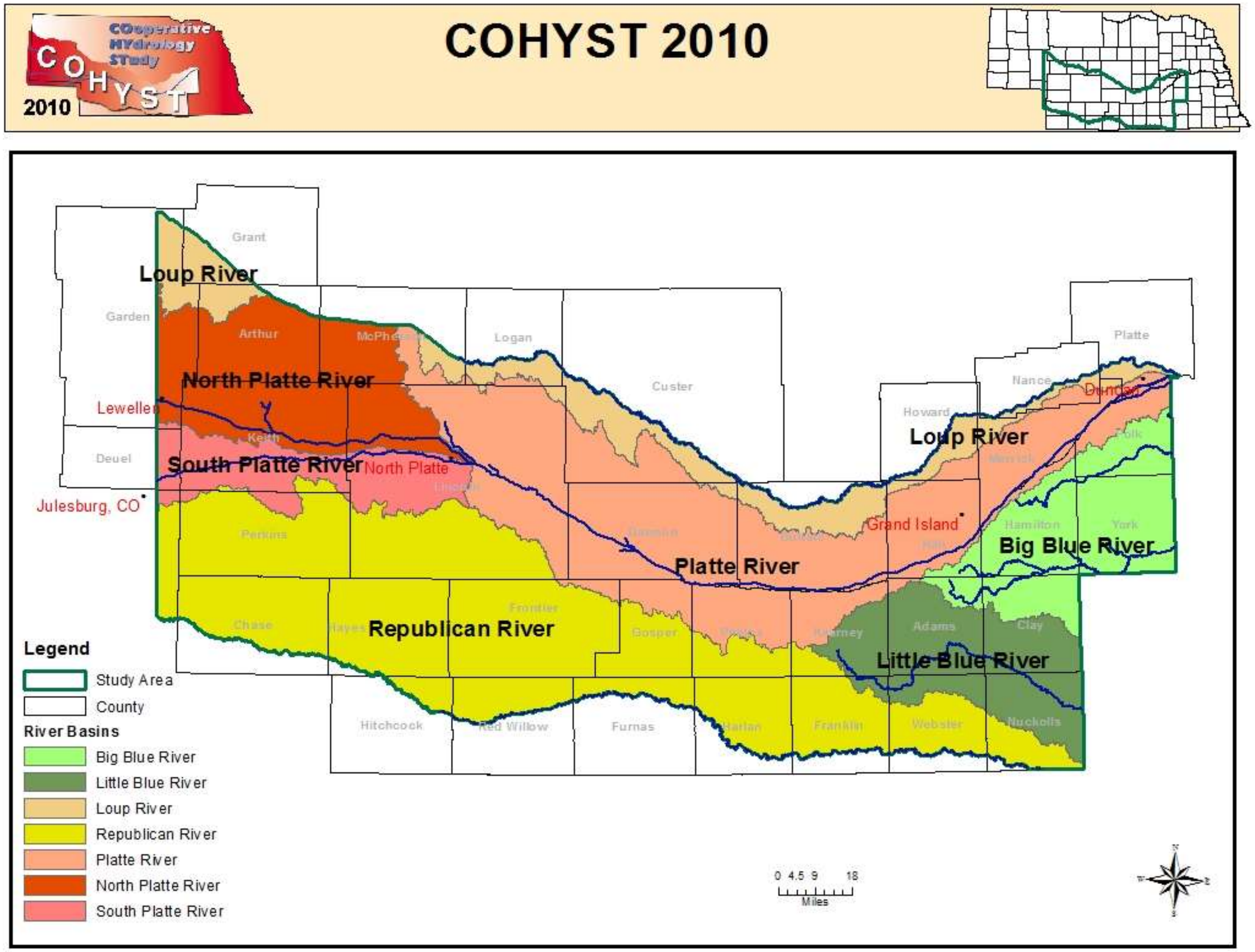

Figure 2.1-2. COHYST model boundary, including major river basins.

Elevations within the study area range from 4180 feet above mean sea level in the northwest to 1476 feet above mean sea level at the Duncan gage in the east. The eastward slope of the Platte River valley averages about 6 to 7 feet per mile. The topography in the study area varies from relatively flat areas, such as upland plains and the floodplain of the Platte River, to dissected plains of the Loup and Republican River basins. **Figure 2.1-3** is a map of topographic regions of the study area, based on mapping done by the Nebraska Conservation and Survey Division. **Table 2.1-1** provides descriptive information for each region.

Climate in the study area is important in determining the water needs of irrigated crops, the demand for surface water and pumping of wells, and the viability of dryland farming. The following are major aspects of the precipitation regime in the area.

- Average annual long-term precipitation grades from driest in the west part of the study area to wettest in the east. **Figure 2.1-4** is an isohyet map of the area based on data from 1985 through 2010. This west to east gradient occurs in the growing season as well: mean rainfall May thru September for Big Springs (West), Gothenburg (Central), and Grand Island (East) is 11.13”, 14.87”, and 16.44” respectively.
- Precipitation varies between years. Representative extremes range from as low as 10. 33 inches in 1974 at Big Springs in the west (compared to an average of 17.4 inches/year) to as high as 40.5 inches in 1993 at Columbus in the east (compared to an average of 28.5 inches/year). **Figure 2.1-5** is a bar chart showing annual precipitation at Grand Island over more than a century. Whereas Figure 2.1-4 indicates an average 1985-2010 precipitation at Grand Island of just over 25 inches/year, Figure 2.1-5 shows this amount of rainfall rarely occurs in any one year.
- Precipitation has a typical seasonal pattern, but this too can vary between years, and the rainfall in months of primary irrigation (July and August, with some watering in June and September) is inconsistent. **Figure 2.1-6** is a bar chart showing monthly precipitation at Grand Island, NE for three conditions: long-term average, a year in which the summer was unusually wet, and a year when the summer was particularly dry.

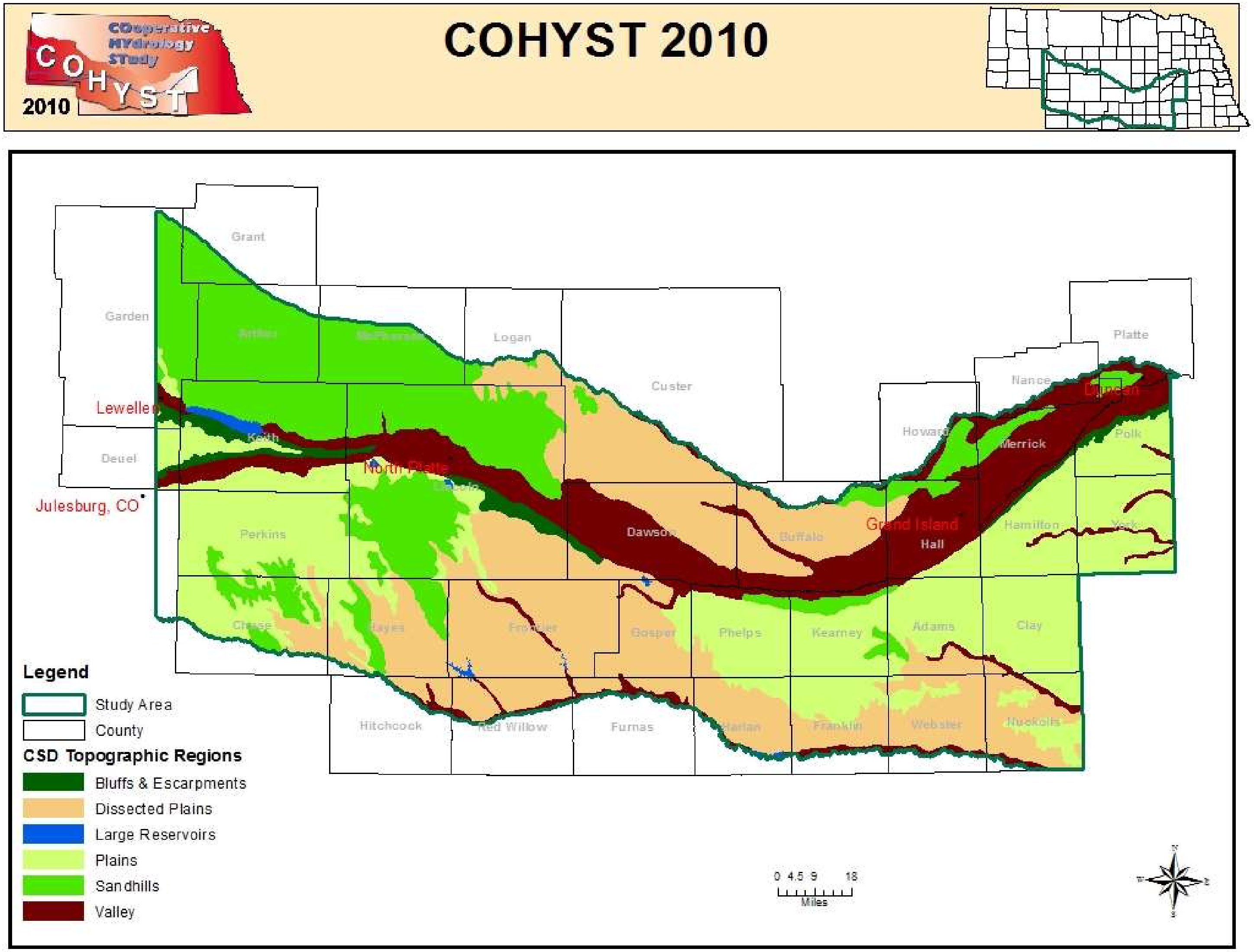

Figure 2.1-3. Study Area Map Showing Topographic Regions (See also Table 2.1-1).

Table 2.1-1. Topographic Regions.

Region (see Figure 2. 1-2)	Descriptive information
Bluffs and escarpments	Steep slopes associated with a large change in elevation are located along the Platte Valley in several areas. Geologic formations often outcrop. The land use is grassland and forest. There are no wells in this unit.
Dissected plains	Away from the valley, much of the central study area consists of rolling loess hills with canyons that are 30 to 160 feet deep and that are spaced at 10 to 20 mile intervals nearly perpendicular to the east-west trending rivers. The rolling loess hills between the canyons have moderate slopes and can be cultivated. The land use on the dissected plains is predominately pasture and hay. The development of the center pivot in the 1970's brought about irrigation development on the upland areas of the rolling loess hills. The depth to groundwater varies considerably from 50 to 300 feet.
Large reservoirs	Five reservoirs are shown on Figure 2. 1-2; each is discussed in more detail in other parts of this report.
Plains	Especially to the east and west, large areas south of the Platte are relatively flat are upland loess deposits with productive soils and moderate slopes. This area has been in row crop production for years with ground water irrigation development starting in the late 1940's. Currently these lands are predominately irrigated with center pivots. The depth to groundwater ranges from 40 to 200 feet.
Sandhills	Sand hills are found in 4 areas within the study area, mostly in the northwest. The land use is predominately grasslands that are grazed and hayed. The sandy soils along with poorly defined drainage provide for higher rainfall recharge amounts within the sand hills areas. The depth to groundwater is zero in the area of the sand hill lakes and 200 feet below the tops of dunes.
Valley	The Platte Valley is very wide compared to the Republican, Loup and Blue River valleys. It has highly productive soils that were developed as early as the late 1800s for irrigation because of the gentle slopes. The Platte valley tributaries are often sub-parallel to the Platte for many miles. The depth to groundwater is shallow under the valley lands. The Platte River itself was the prototype braided river prior to western settlement and surface water development; the stream now is often characterized by multiple channels separated by forested islands. Surface water irrigation systems are developed in many areas, and the depth to groundwater is typically a few feet to tens of feet.

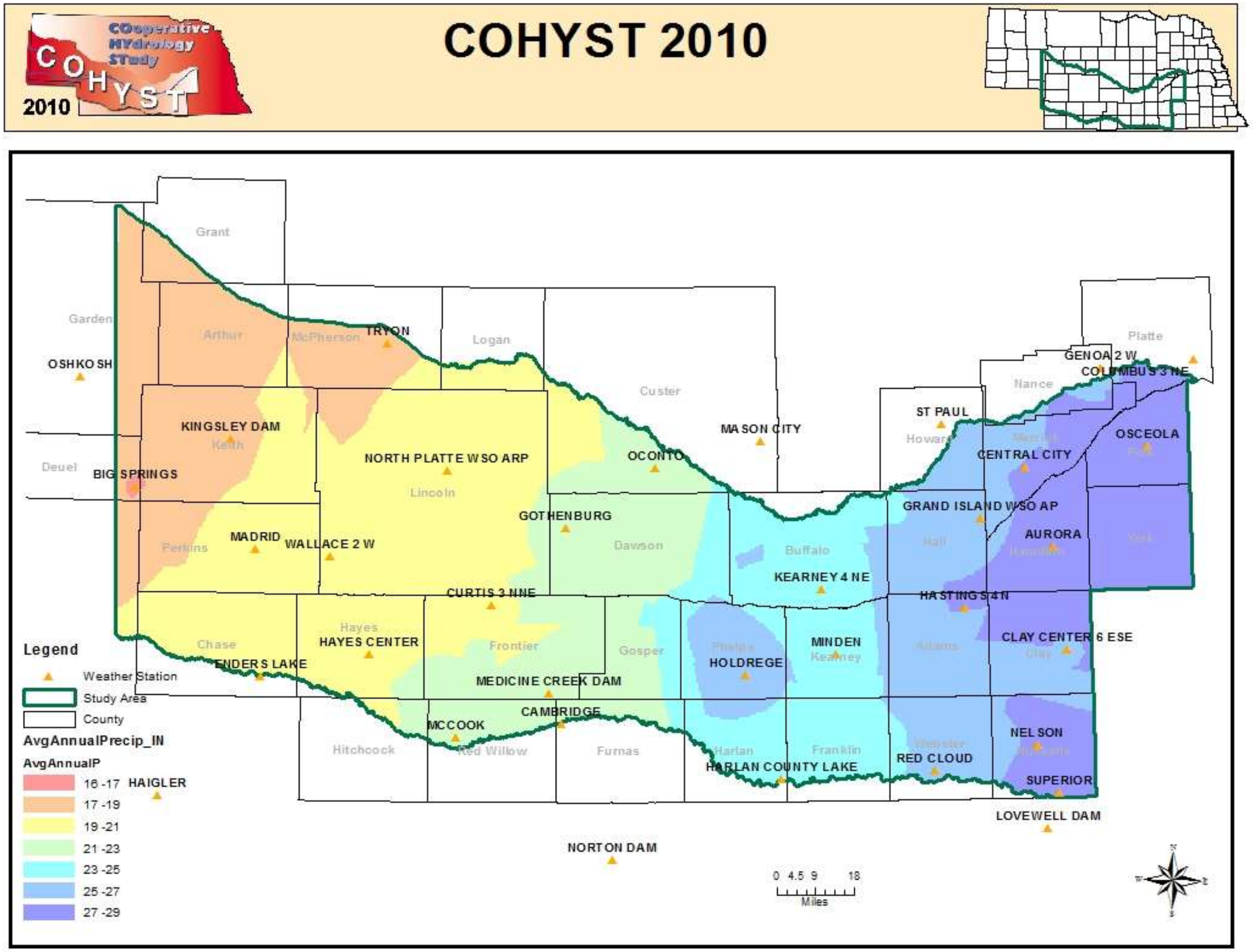

Figure 2.1-4. Isohyet Map of Annual Precipitation in COHYST Study Area.

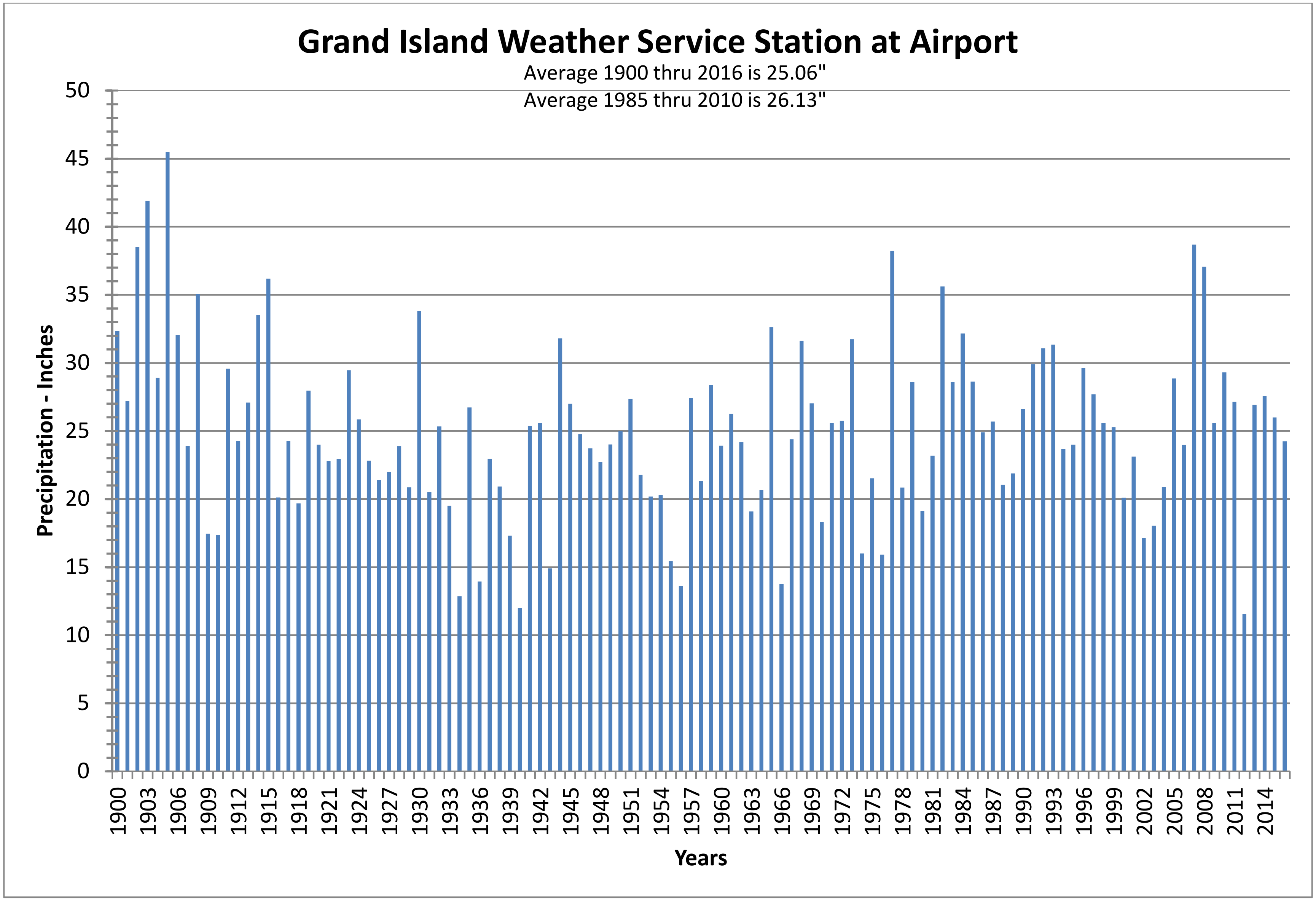

Figure 2.1-5. Annual Precipitation at Grand Island, NE, Showing Variations Between Wet and Dry Years.

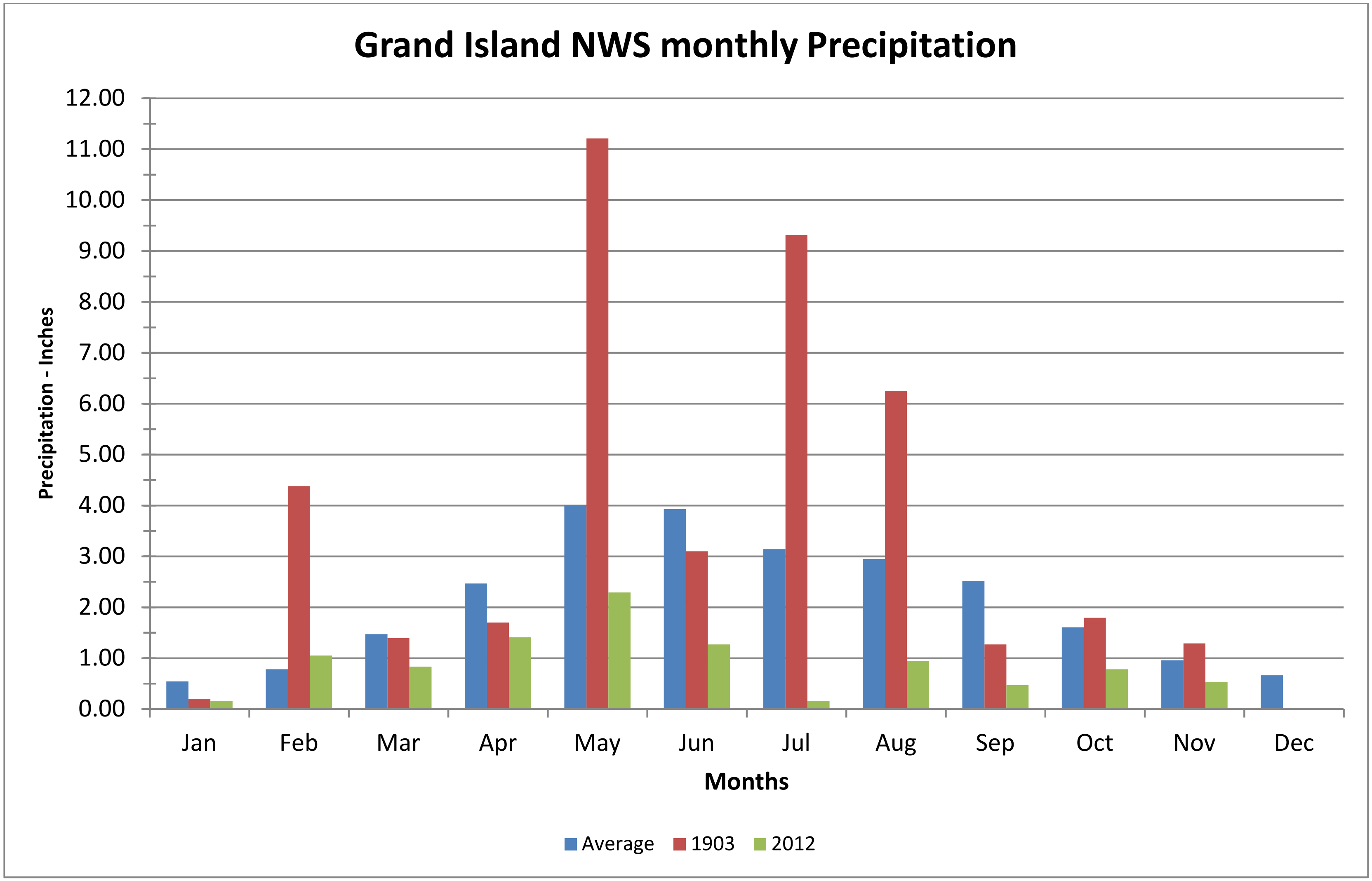

Figure 2.1-6. Grand Island Monthly Precipitation for an “Average” Year, a Year with a Wet July-August (1903) and One with a Dry July-August (2012).

Abundant sunshine, frequent winds, and low humidity contribute to a high rate of potential consumptive use of water by crops. Seasonal crop water evapotranspiration (ET or Consumptive use) for the study area varies by crop and maximum production is achieved when corn evaporates and transpires 23” to 27”, soybeans 20” to 23”, winter wheat 16” to 18”, and alfalfa 31” to 35”.

Soils in the study area are important to crop production and the management of water. Soils are mapped and classified by the U. S. Natural Resource Conservation Service (NRCS). Natural Resource Districts which manage groundwater resources in the study area use soil classification information, field slopes, and water holding capacity for determining where irrigation application is making full use of applied water. **Figure 2.1-7** shows the water holding capacity per foot of soil in the study area, and illustrates considerable variability in this condition. The effect of such variability shows up in the water budget components of ET, recharge, and runoff. Significant differences in recharge on grassland range from less than a one-half inch on deep silty loam soils to over 3 inches on shallow sandy loam soils.

In terms of hydrogeology, the water-bearing units that have been developed are part of the High Plains aquifer, which in this area consists of unconsolidated Quaternary-age deposits and the Tertiary age Ogallala group. The older Ogallala is found throughout the study area except in the eastern quarter. It is a heterogeneous mixture of sediments eroded from the uplift of the Rocky Mountains. It is usually a productive aquifer, but well yield can vary greatly over a short distance due to the varied nature of the materials.

The Quaternary materials variously include valley fill alluvium, dune sands, and a widespread loess deposit. These materials are found throughout the area, except in the southwest. In the east, Quaternary materials are the only aquifer. Elsewhere they overlay the Ogallala, and typically both units are developed. The materials are often coarse with water yield limited mainly by thickness.

Figure 2.1-8 shows a simplified map of these geologic units. **Figure 2.1-9a and b** are hydrogeologic cross sections developed for the COHYST study area as part of the

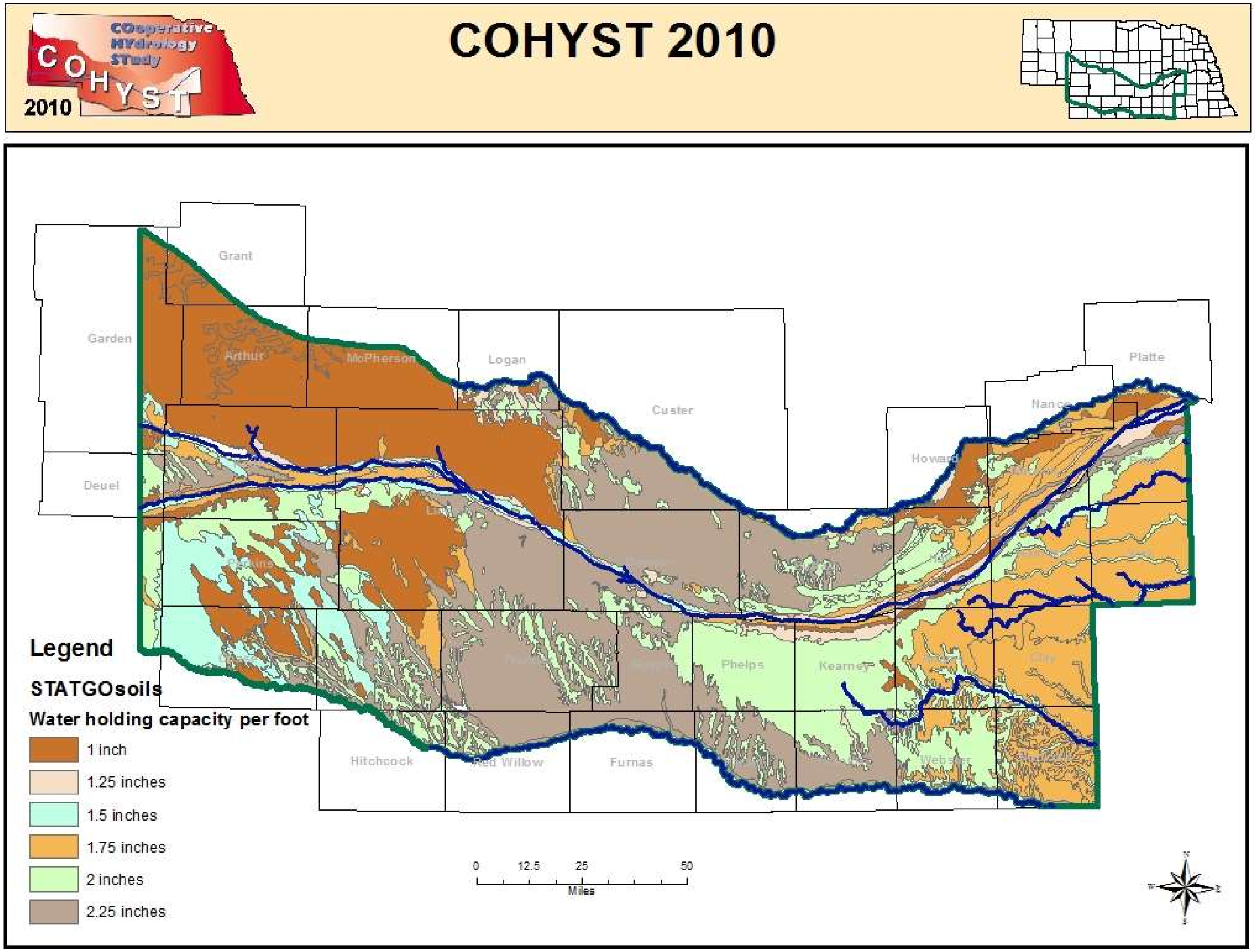

Figure 2.1-7. Study Area Map of Soil Type Showing Water Holding Capacity.

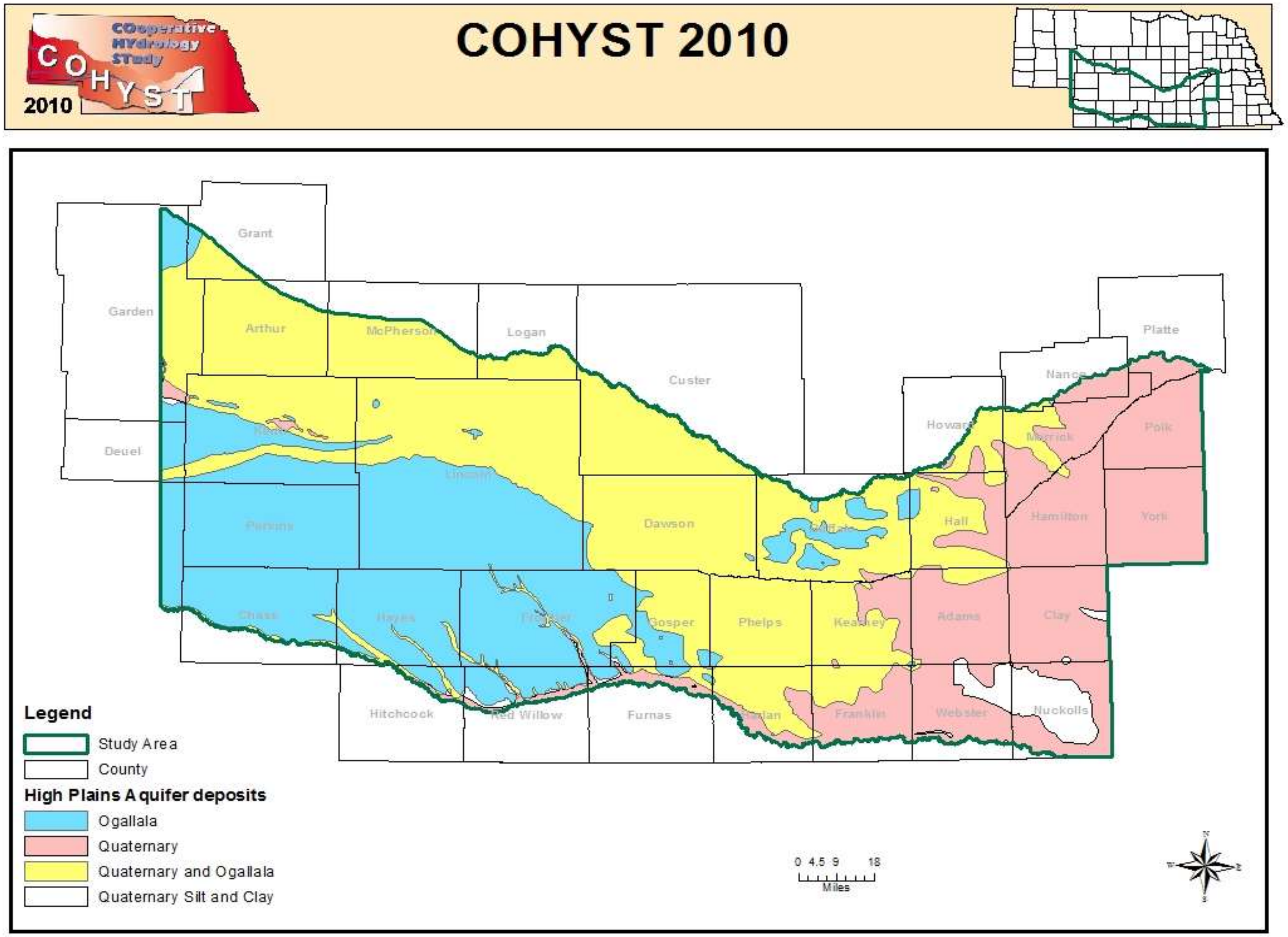

Figure 2.1-8. Study Area Map Showing the Location of Where Quaternary and Ogallala Formations Used as Groundwater Supply.

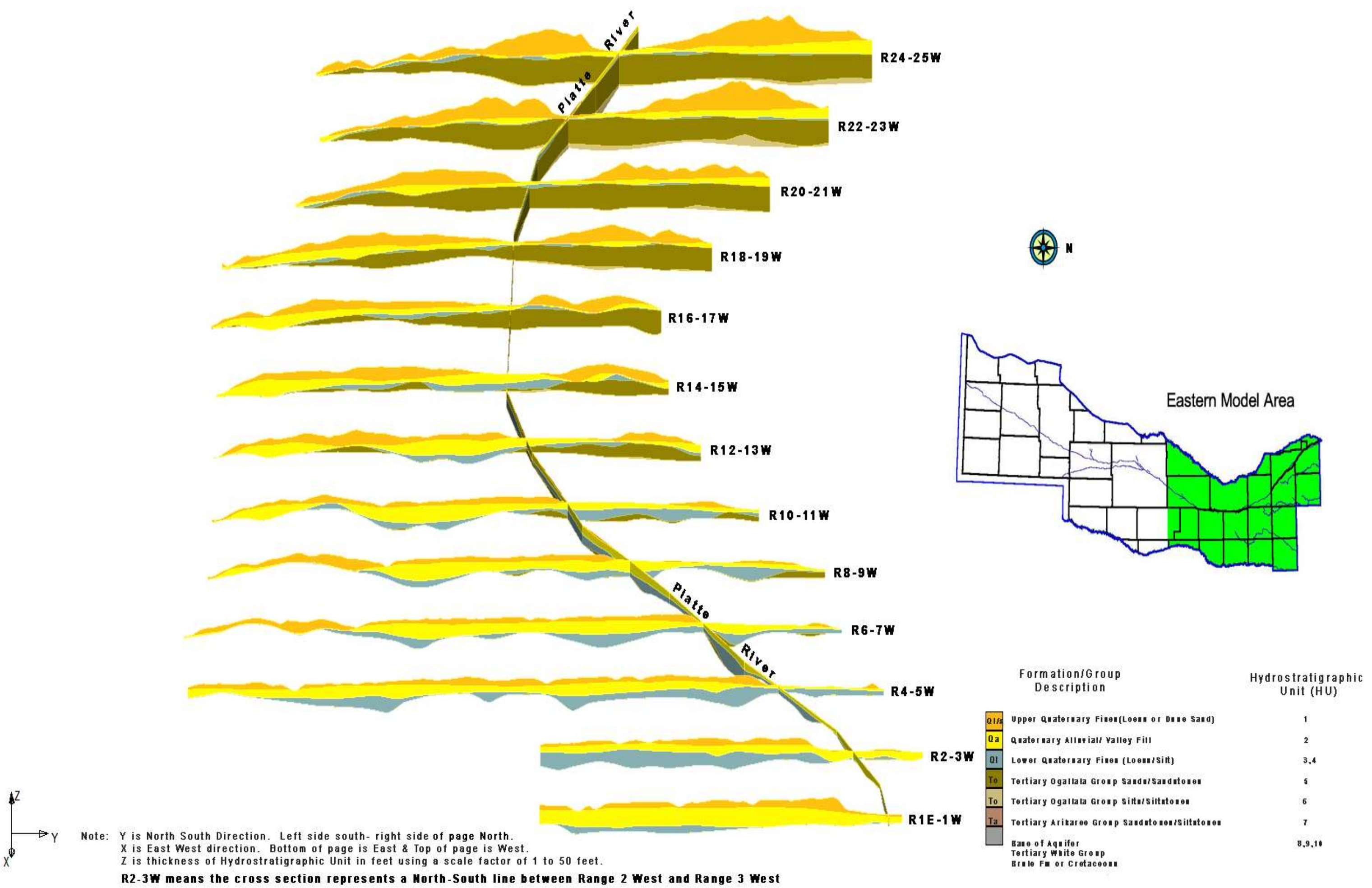

Figure 2.1-9a. Hydrogeology Cross Sections for the Eastern Half of the COHYST 2010 Model Area.

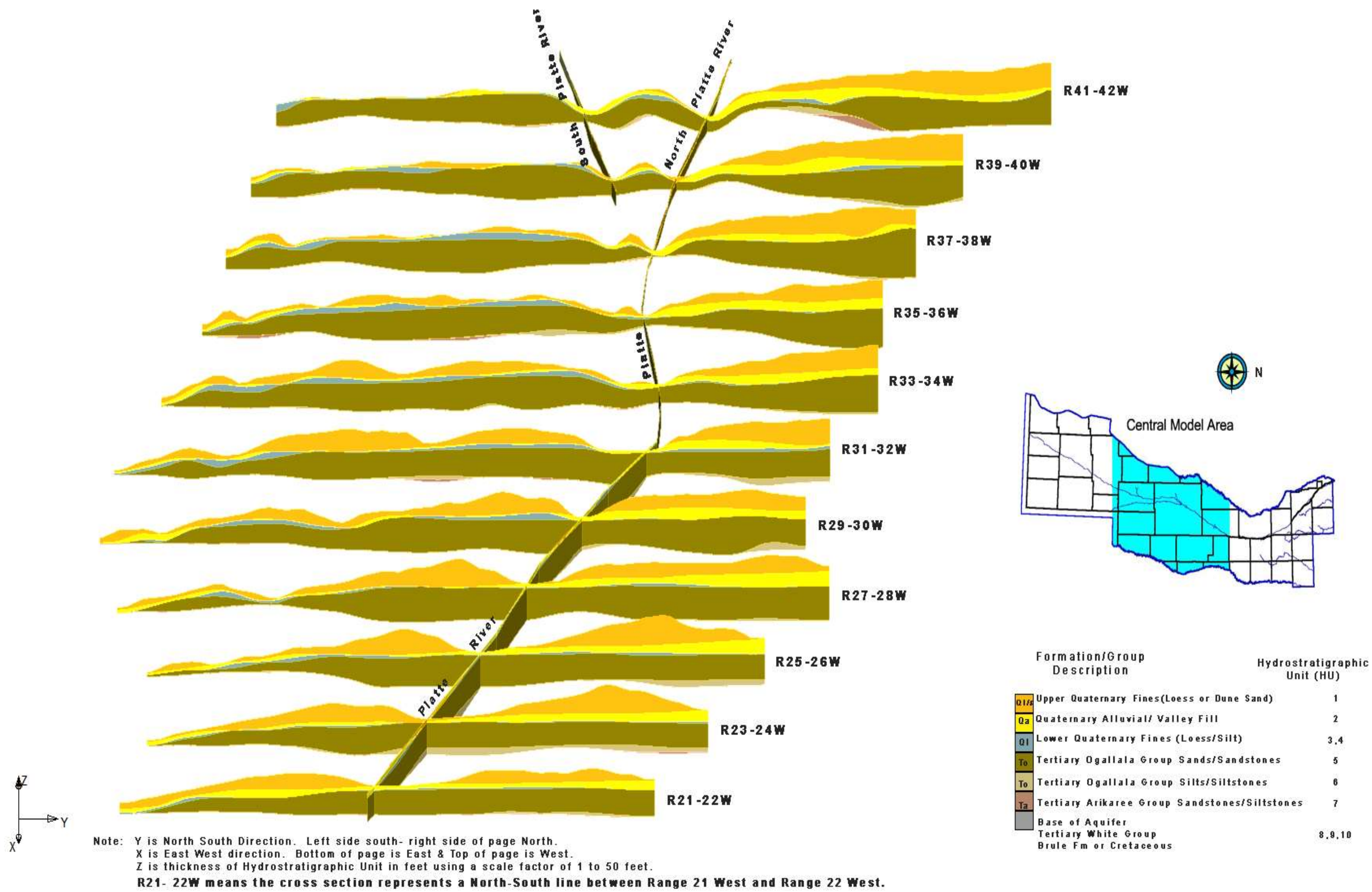

Figure 2.1-9b. Hydrogeology Cross Sections for the Western Half of the COHYST 2010 Model Area.

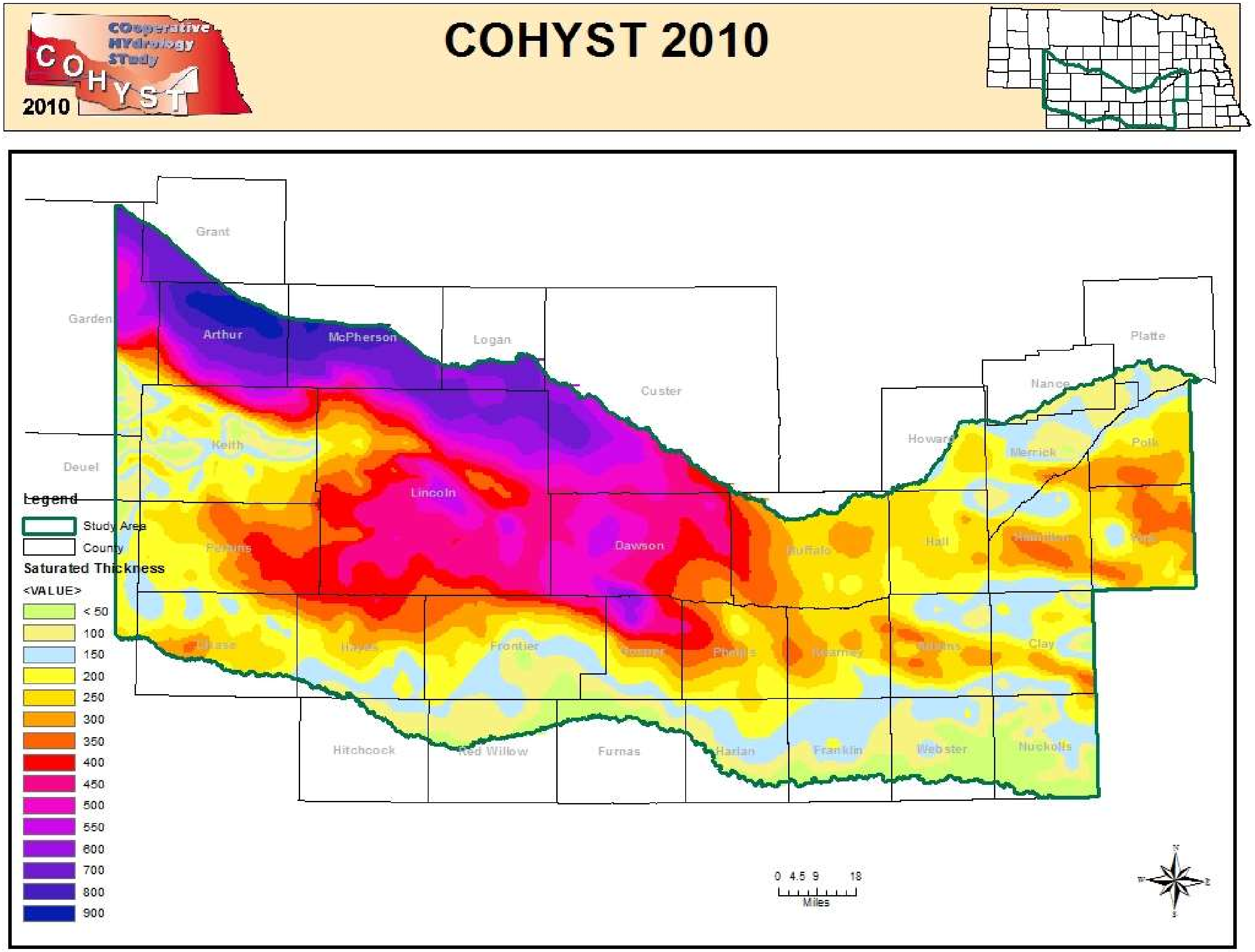

Figure 2.1-10. Study Area Map Showing the Saturated Thickness of the Aquifer.

Hydrostratigraphic Units and Aquifer Characterization Report in 2006. The cross sections extend south to north across the model area and up the Platte River. The sections illustrate changes in geologic materials from east to west as discussed above. Figure 2.1-10 is a map showing the total saturated thickness of the aquifer. The map was developed from the elevations for the bottom of the aquifer and the 1995 water table elevation developed by the Conservation Survey Division (CSD) at the University of Nebraska in Lincoln (UNL). The maximum saturated thickness of 870 feet is in Arthur County and the mean thickness across the study area is 283 feet.

2.2 Human Environment

The study area is predominantly rural. The largest cities (in order of 2010 census population) are Grand Island (48,520), Kearney (30,787), Hastings (24,907), and North Platte (24,733). Many smaller communities exist across the area. The study area covers all or part of 33 counties. **Figure 2.2-1** shows the counties in the area, as well as many communities and highways.

An important attribute of the area is the existence of Natural Resources Districts (NRDs) which have primary responsibility in the State for managing groundwater quantity and quality. **Figure 2.2-2** is a map of the study area showing the nine NRDs that exist entirely or partially within the study area. Three of these – Central Platte NRD, Tri-Basin NRD, and Twin Platte NRD - are COHYST 2010 Sponsors.

Agriculture is by far the dominant land use in the area. Agricultural lands include irrigated cropland, dryland cropped acreage, and areas used primarily for grazing. Agriculture makes extensive use of natural precipitation, stream flows, reservoir releases, and pumping of irrigation wells. Land use by county is reported by the United States Department of Agricultural (USDA) based on a Census taken every 5 years from producers. The census records date back in time to the 1880s. **Table 2.2-1** summarizes data from the 2007 census.

Figure 2.2-3 provides pie charts to show the amount and type of cropland in 2007 and in 1950. In 2007, there were more than 8 million acres of cropland, about half the total land in the study

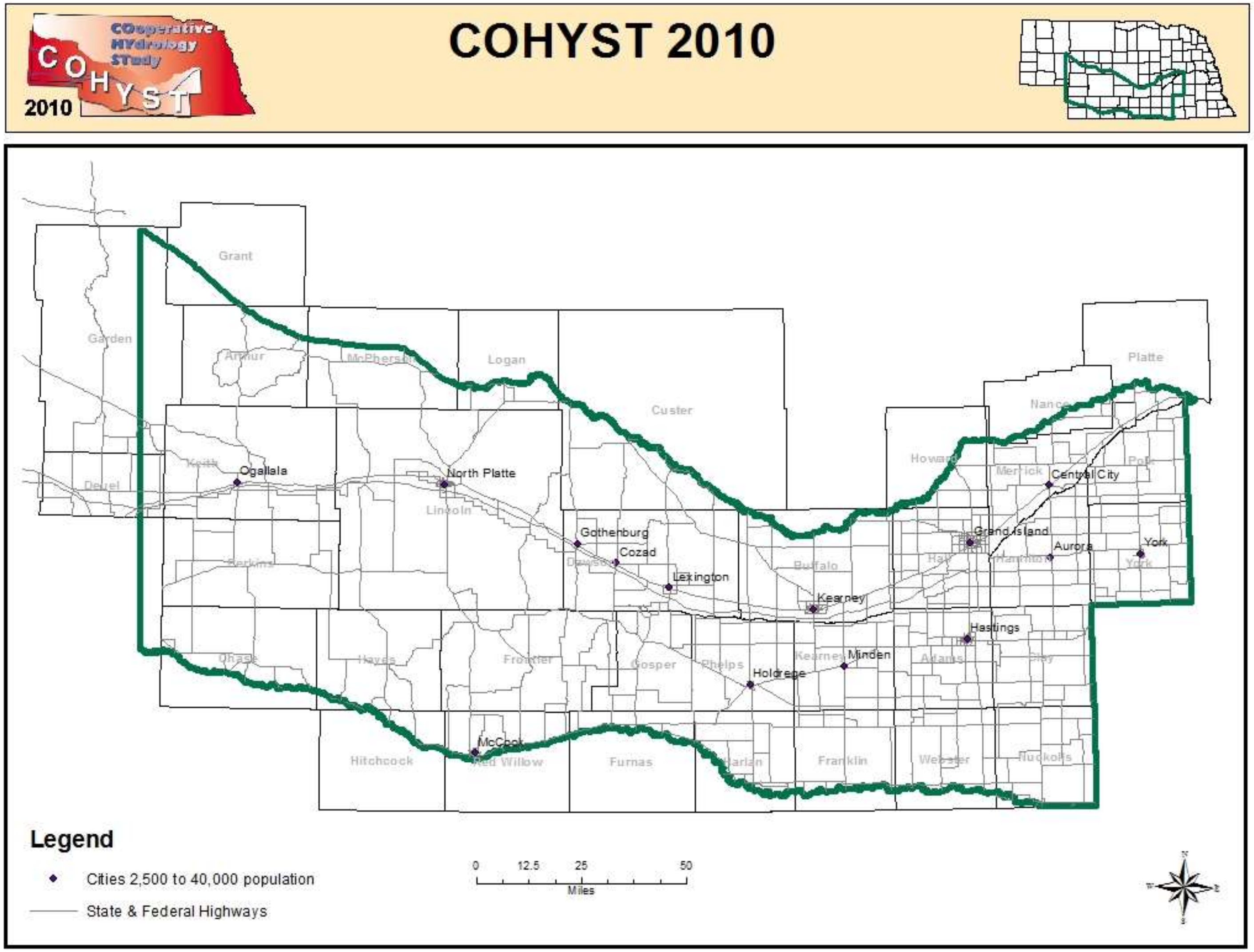

Figure 2.2-1. Study Area Map of Cities and Highways.

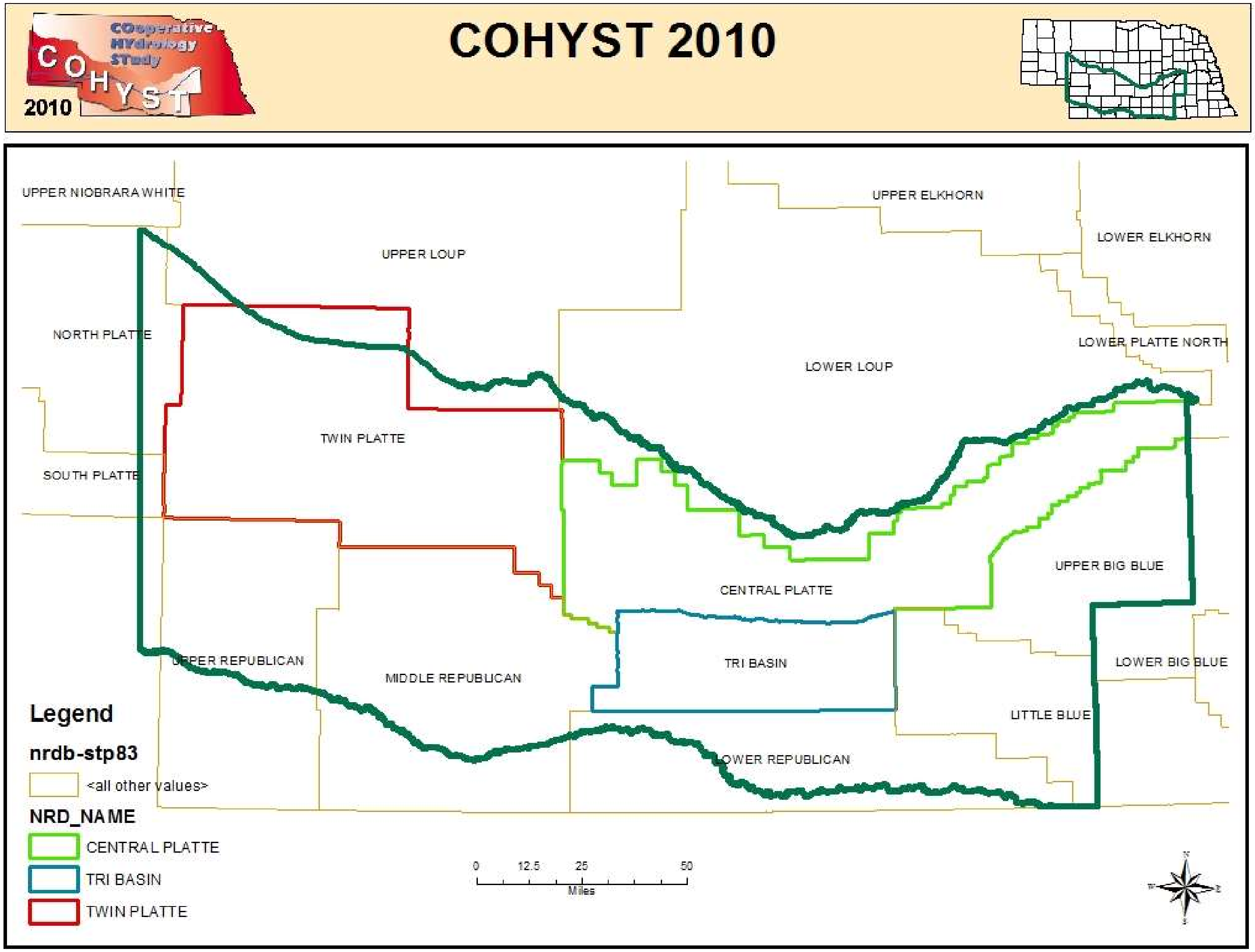

Figure 2.2-2. Study Area Map Showing Natural Resources Districts.

Table 2.2-1. Census of Agriculture Data Summary for 2007.

Census Data	Sum of Acres
Pasture	7,448,139
Fallow	534,062
Other Urban, Woodland, etc.	589,436
Non-Cropped Total	**8,571,637**
Irrigated land	4,403,482
Total cropland	**8,125,477**
Total COHYST Model Area*	**16,697,114**

Note: * The 2007 acreage data is the total for the 33 counties in the COHYST area.

,

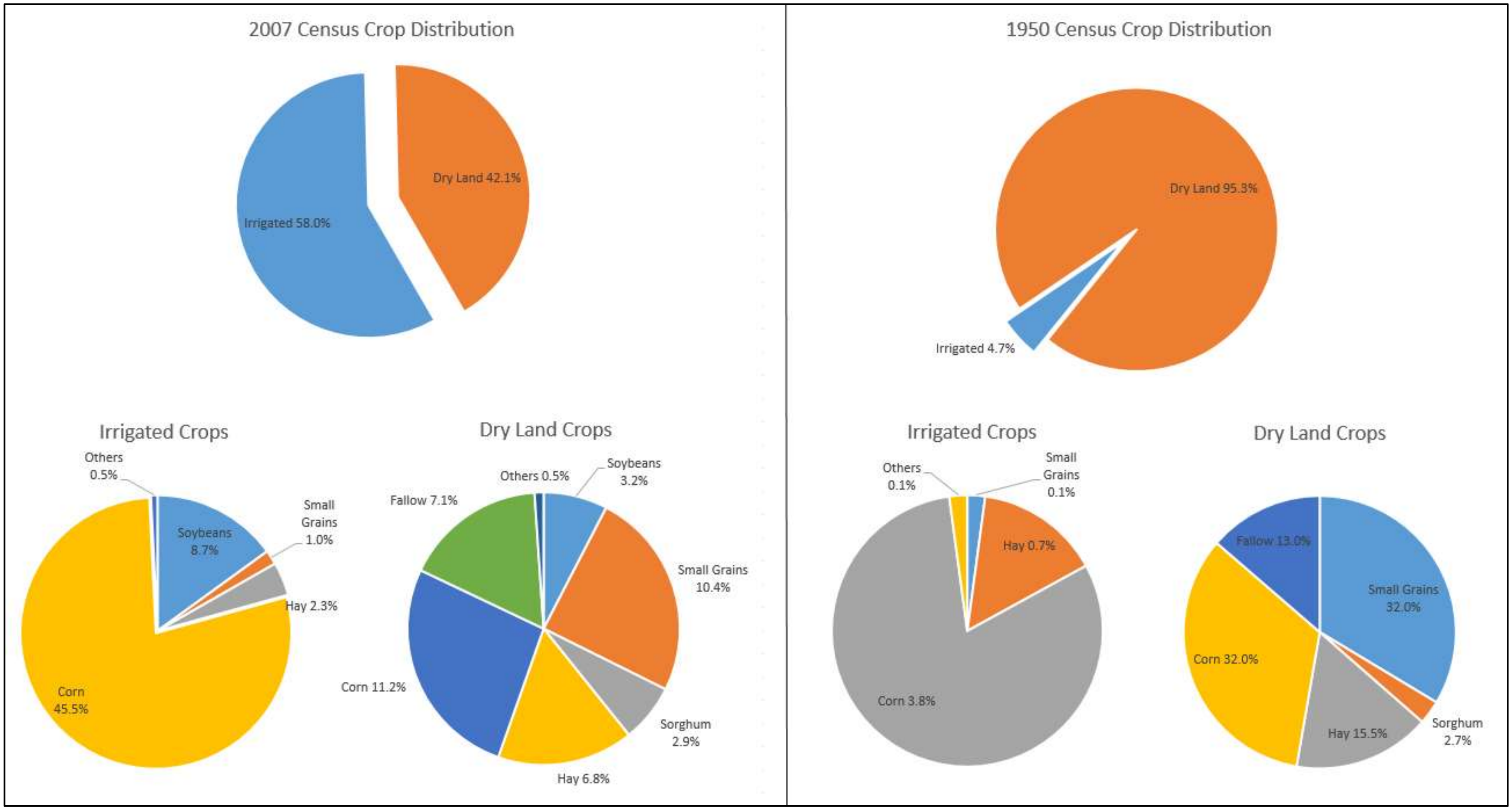

Figure 2.2-3. USDA Census of Agriculture Cropland Distribution.

area. Most of the cropland was actively harvested and more than half of that was irrigated. The remaining acreage was dominantly rangeland, with some acres as built areas, woodlands, or wetlands. In 1950 the total agricultural acreage is similar, but dryland.

Irrigation by surface water in the Central Platte Valley started in 1882 with a natural flow surface water right for Kearney Canal and today includes multiple irrigation and power generation canals. A summary of the surface water rights for irrigation water use from the North Platte, South Platte, and Platte River within the study area is provided in **Table 2.2-2** and a generalized layout map of the canal systems is shown in **Figure 2.2-4**. These existing canals can deliver water to 257,297 acres. Many of the canal systems also have incidental underground storage rights.

Lake McConaughy behind Kingsley Dam has 2 water rights to store 1,907,500 acre-feet, but is limited by FERC (Federal Energy Regulatory Commission) mandated Maximum Operating Levels. licensing rules. The reservoir stores and releases North Platte River water for a number of uses and is operated to meet irrigation and power needs while providing recreation and wildlife benefits. Most of the surface water irrigated lands are irrigated using gated pipe to deliver water to furrow ditches. The gated pipe at the head end of the field is an improved irrigation practice over open ditches and siphon tubes. Some surface water irrigators are using center pivots to improve farm delivery and efficiency.

Irrigation by groundwater began in the 1920s but the registration of irrigation wells within the State of Nebraska was not mandated till the mid 1950's. The yearly number of active and inactive registered irrigation wells in the study area over time is shown in **Figure 2.2-5**. There are around 45,800 irrigation wells being use in the study area thru 2010; these served about 3.4 million acres. Groundwater irrigation practices have changed with time from gravity furrow irrigation using open ditches and siphon tubes to gated pipe on gravity furrows. With the development of center pivots in the 1960s, groundwater irrigation has shifted away from

Table 2.2-2. Natural Flow Water Rights Below Lake McConaughy.

Canal Name	Granted Rate (CFS)	Earliest Date	Rate per Acre (cfs/ac)	Acres
North Platte River				
Cody-Dillon Canal	58	12/29/1893	70	4,066
Keith-Lincoln Canal	82	2/2/1894	70	5,739
North Platte Canal	193	5/31/1884	70	13,540
Paxton-Hershey Canal	87	2/12/1894	70	6,092
Suburban Canal	62	5/22/1894	70	4,336
Sutherland Canal	3	7/13/1951	75	121
Birdwood Canal	44	10/21/1893	70	4,391
Total North Platte	*Total CFS = 529*		*Avg. Rate per Ac = 70.02*	*38,285*
South Platte River				
Western Canal	147	6/14/1897	70	10,312
Total South Platte	*Total CFS= 147*		*Avg. Rate per Ac = 70*	*10,312*
Platte River				
Dawson County Canal	323	6/14/1894	70	22,634
Kearney Canal	47	9/10/1882	70	4,877
Gothenburg Canal	272	7/5/1890	70	20,088
Cozad Canal	231	12/28/1894	70	16,185
Thirty Mile Canal	189	9/7/1926	70	13,196
Six Mile Canal (transferring to TM canal)	24	10/22/1894	70	1,666
Orchard-Alfalfa Canal	62	1/23/1895	70	4,326
Tri-County Canal	1,211	1/13/1934	136	125,728
Total Platte River Canals	Total CFS = 2359		*Avg. Rate per Ac = 109.8*	*208,700*
Total Irrigation Water Rights	**Total CFS = 3035**		**Avg. Rate per Ac = 102.2**	**257,297**

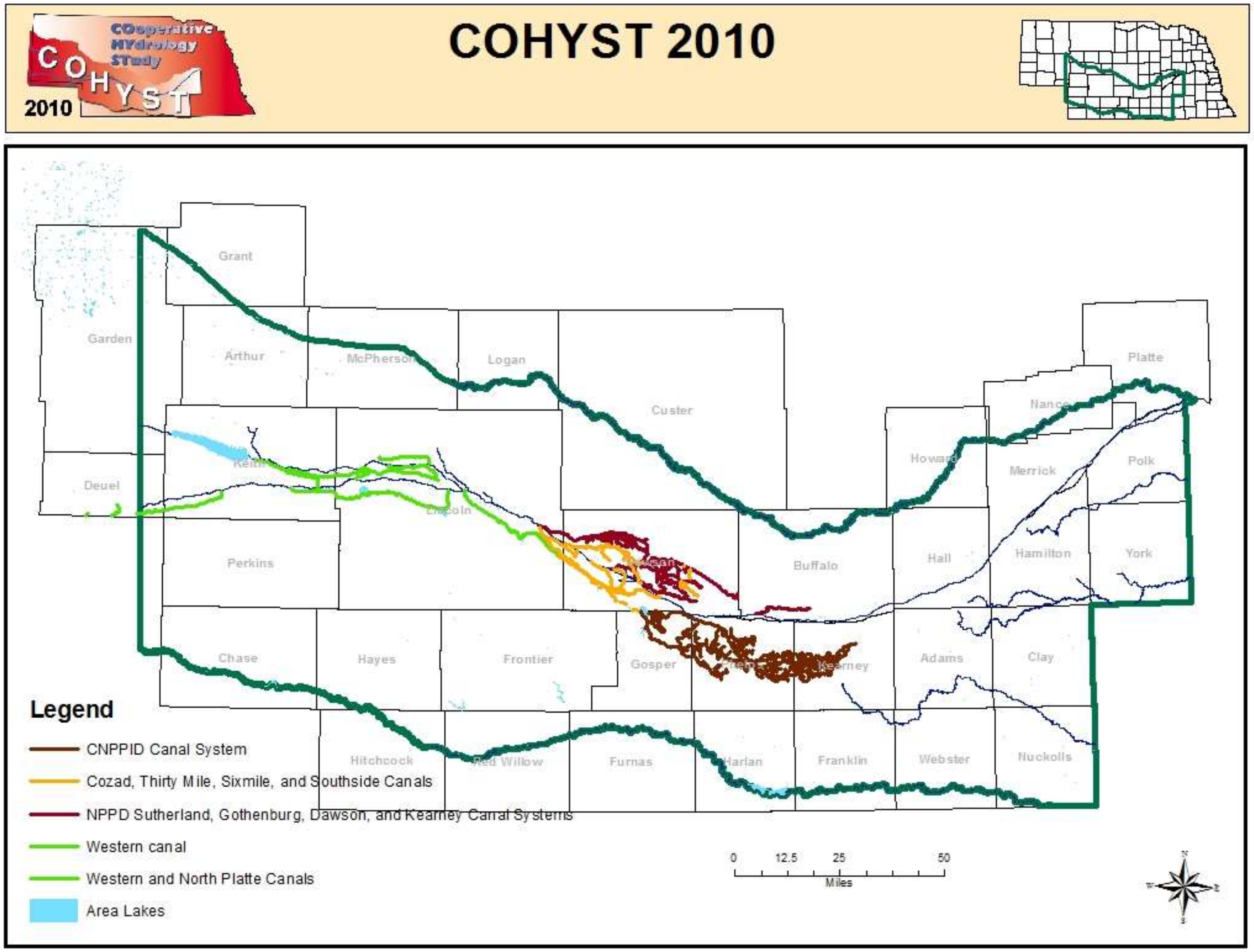

Figure 2.2-4. Map of COHYST Area Canal Systems.

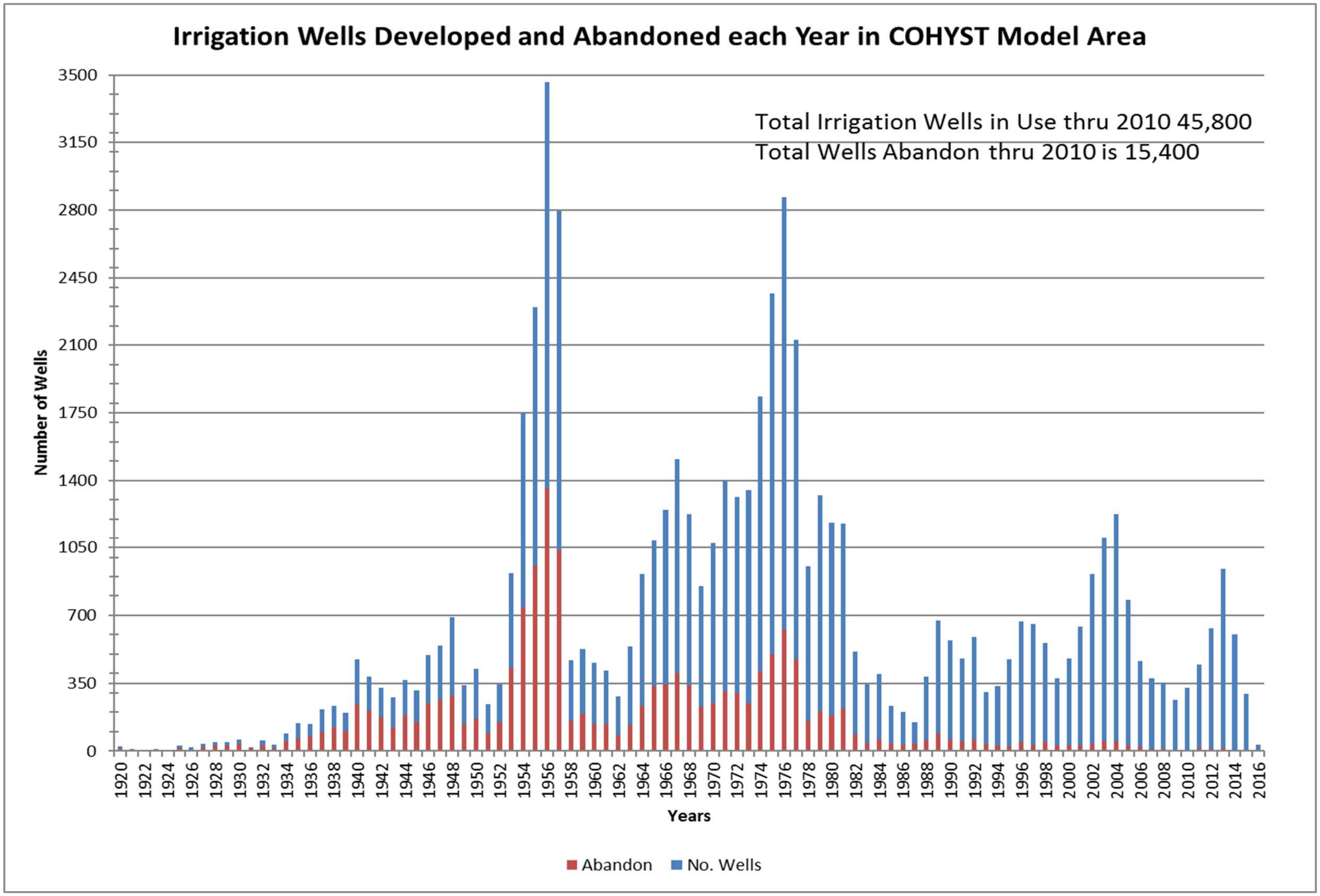

Figure 2.2-5. Study Area Irrigation Wells Developed Each Year.

gravity furrow irrigation.

Along with changes in irrigation practices over time, farming practices in general have improved. Cultivated land is no longer tilled as much and the plow has become obsolete. Minimum tillage and no-till are common practices on both dry and irrigated lands, and runoff from many dryland acreages is controlled by terracing. Crop productivity has increased substantially because of these changes in practices, along with the use of insecticides, herbicides, fertilizer, and good seed genetics.

Production of electricity is the primary industrial use of water in the area. There are several coal fired and natural gas fired power plants within the study area that utilize both groundwater and surface water resources for cooling. Gerald Gentleman Power Plant near Sutherland, NE is the largest coal-fired plant with a generating capacity of 1,365 megawatts of electrical power; for cooling it can use surface water from Sutherland Reservoir or pump local groundwater. Canaday Power Plant south of Lexington is a 119-megawatt gas-fired plant that uses surface water from the Johnson Hydro return canal for steam generation and cooling. The cities of Grand Island and Hastings have 5 power plants that utilize coal, natural gas, or fuel oil that can generate around 560 megawatts of power. Each plant uses groundwater as their cooling water source.

In years of abundant streamflow, diversions of surface water occur specifically for purposes of hydropower generation. At other times, such diversions are conjunctive with diversions for irrigation. Nebraska Public Power District and Central Nebraska Public Power and Irrigation District are the primary holders of hydropower water rights. The Sutherland Canal serves water to the North Platte Hydro ,Tri-County Canal severs water to Jeffery Hydro, J-1 Hydro, and the J-2 Hydro, and Kearney Canals serve water Kearney Hydro. The 50 MW Kingsley Hydro was built in 1984 at Lake McConaughy on the lake outlet structure. **Table 2.2-3** list the 6 hydro power plants rated generation and hydraulic head.

Table 2.2-3 Platte River Hydro Power Plant capacities.

Plant Name	Rated Generation Capacity (MW)	Unit Head (feet)	Water Right (CFS)	Owner and Operator
Kingsley	50	180	5720	CNPPID
North Platte	24	100	1075 NP 500 SP	NPPD
Jeffery	20	113	2200	CNPPID
J-1	20	113	2200	CNPPID
J-2	23	145	2200	CNPPID
Kearney	1.49	80	359	NPPD

Other industries in the study area are typically related to agricultural production and utilization of commodities. These include 14 Ethanol plants, 3 meat packing plants, several hundred grain storage elevators, T&L center pivot manufacture, Case New Holland plant that builds combines and windrowers, and many other smaller equipment, building and grain storage manufacturers.

2.3 Institutional Framework

The State Integrated Water Management requirements were put in place by passage of LB 962 in 2004. That bill was influenced by actions taken as a result of prior legislative activity. In 2002, the Nebraska Unicameral passed LB 1003, mandating the creation of a Water Policy Task Force to address conjunctive use management issues, inequities between surface water and groundwater users, and water transfers/water banking. The forty-nine Task Force members, appointed by Governor Mike Johanns from a statutorily specified mix of organizations and interests, were asked to discuss issues, identify options for resolution of issues, and make recommendations to the legislature and governor relating to any water policy changes deemed desirable. In December 2003, the Task Force provided the Legislature with the *Report of the Nebraska Water Policy Task Force to the 2003 Nebraska Legislature*. That report provided draft legislation and suggested changes to statutes.

The Legislature considered the Task Force recommendations in its 2004 session and subsequently passed LB 962, which incorporated most of the Task Force's recommendations. Governor Johanns signed the bill into law on April 15, 2004. The provisions of LB 962 require a proactive approach in anticipating and preventing conflicts between surface water and groundwater users. Where conflicts already exist, it establishes principles and timelines for resolving those conflicts. It also adds flexibility to statutes governing transfer of surface water rights to a different location of use and updates a number of individual water management statutes. Some key provisions of LB 962 that are part of current statutes and that potentially impact water management in the Platte Basin are summarized in **Table 2.3-1**.

Shortly after the passage of LB 962, a number of basins, sub-basins, or reaches were determined to be fully or over appropriated. These areas included portions of the Platte River Basin, Republican River Basin, Upper Niobrara River Basin, White River Basin, and Hat Creek Basin. **Figure 2.3-1** is a map of the area within the Platte River basin designated as over appropriated. Additionally, following the status change of the Lower Platte River Basin preliminary determination in April 2009, the legislature passed LB 483 and LB 54. Some of the key provisions of LB 483 and LB 54 that are relevant are included in Table 2.3-1.

Table 2.3-1. Key Provisions of LB 962, LB 483, and LB 54 that are Part of Current Statutes.

Key Provisions of LB 962, LB 483, and LB 54
The Department must make an annual determination by January 1, 2006, and by January 1 of each subsequent year, as to which basins, subbasins, or reaches not previously designated as fully appropriated or over appropriated have since become fully appropriated. The Department must specify by rule and regulation, the types of scientific criteria and other information to be utilized in the analysis, complete an annual evaluation of the expected long-term availability of hydrologically connected water supplies in the basins, subbasins, or reaches, and issue a report describing the results of the evaluation.
When a basin, subbasin, or reach is determined to be fully appropriated, stays on new uses of groundwater and surface water are automatically imposed. The Department and the NRDs involved are required to develop and implement jointly an integrated management plan (IMP) within three to five years of that designation.
A key goal of each IMP must be to manage all hydrologically connected groundwater and surface water for the purpose of sustaining a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare of the basin, subbasin, or reach can be achieved and maintained for both the near and long-term. In the over appropriated portions of the state, the IMP must provide for a planned incremental approach toward achieving a balance between water uses and water supplies.
IMPs may rely on a number of voluntary and regulatory controls, including incentives, allocation of groundwater withdrawals, rotation of use, and reduction of irrigated acres, among others.
If disputes between the Department and the NRDs over the development or implementation of an IMP cannot be resolved, the governor will appoint a five-member Interrelated Water Review Board to resolve the issue.
The NRDs affected by a status change (reversal of preliminary determination that a basin, subbasin, or reach is fully appropriated) of a basin, subbasin, or reach must develop rules to limit the total number of new groundwater irrigated acres annually for a period of at least four years following the status change.
The Department must approve the natural resources districts proposed number of new irrigated acres if the basin, subbasin, or reach would not be caused to be fully appropriated based on the most recent annual evaluation. Absent such approval, the natural resources districts must limit new irrigated acres to two thousand five hundred or twenty percent of the historically irrigated acres, whichever is less.
The Department must ensure that any new appropriation granted will not cause the basin, subbasin, or reach to be fully appropriated based on the most recent annual evaluation.
The Department must limit new natural flow surface water appropriations for irrigation within the basin, subbasin, or reach to ensure that there is not a net increase of more than 834 irrigated acres in each NRD during each calendar year of the four-year period.
The Department is not required to perform an annual evaluation for a river basin, subbasin, or reach during the four years following a status change in such river basin, subbasin, or reach.

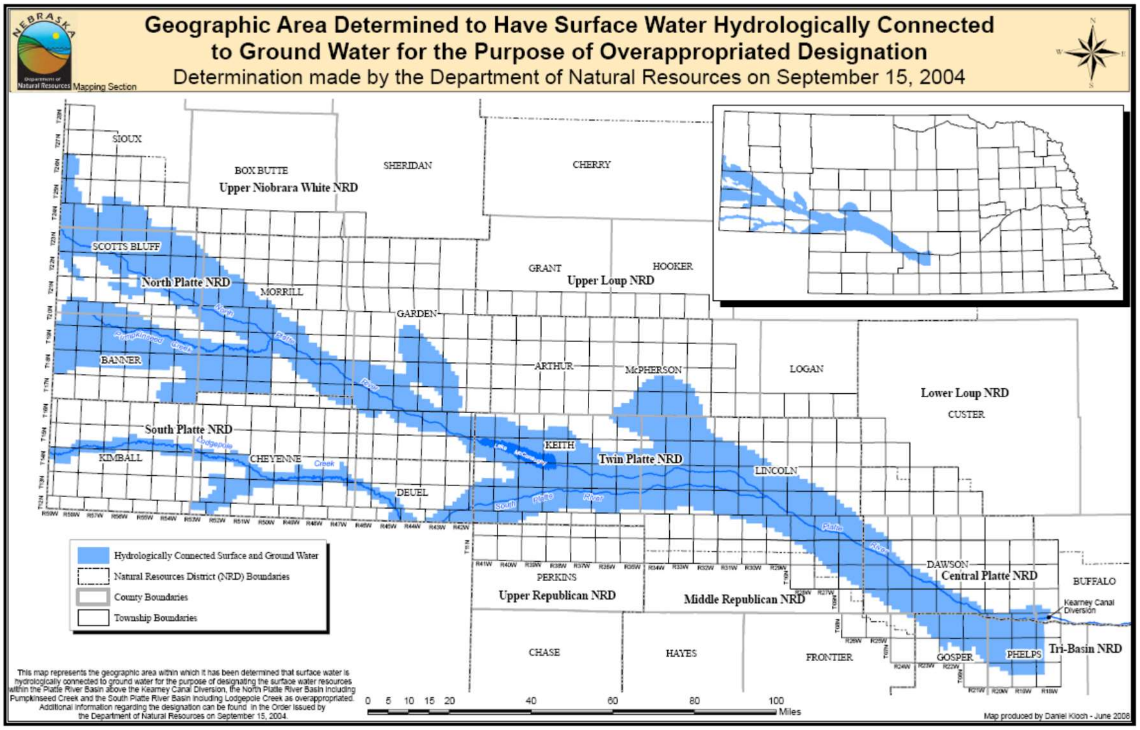

Figure 2.3-1. Platte River Basin Map of Hydrologically Connected Groundwater Area that is Considered Over-appropriated.

The Platte River Basin above the Kearney Canal diversion was designated as over appropriated by the Nebraska Department of Natural Resources (DNR) on September 15, 2004. This area is defined in the DNR's Order, which also defines the area in which groundwater is hydrologically connected to the over appropriated surface water basin. A basin wide plan for the integrated water resources management of the over appropriated portion of the Platte River was developed and enacted in 2009. The plan was adopted by the 5 NRDs and DNR with stakeholder input. The plan document is available on the DNR website http://dnr.nebraska.gov/ and lays out the goals and water management objectives for the basin. The plan utilized the June 10, 2008 COHYST analysis for each NRD to determine streamflow depletions during a 50-year period thru 2048 from groundwater irrigated acres developed in 1997 thru 2005 summarized in **Table 2 3-2**.

Table 2.3-2. Average Stream depletion by Natural Resources District in the Platte River Basin.

Period	Average stream baseflow depletion 1) by Natural Resources District (NRD), in thousands of acre-feet per year					
	North Platte NRD	South Platte NRD	Twin Platte NRD	Central Platte NRD	Tri-Basin NRD	All NRD's
Wyoming line to Chapman	**TOTAL**					
1998-2003	1. 0	0. 0	2. 1	0. 9	0. 5	4. 5
2003-2008	5. 5	0. 1	4. 8	1. 6	1. 5	13. 5
2008-2013	7. 2	0. 1	5. 7	1. 8	2. 4	17. 2
2013-2018	7. 5	0. 1	6. 2	2. 0	2. 9	18. 8
2018-2023	7. 7	0. 2	6. 4	2. 1	3. 3	19. 7
2023-2028	7. 7	0. 2	6. 4	2. 2	3. 7	20. 2
2028-2033	7. 8	0. 2	6. 5	2. 3	3. 9	20. 7
2033-2038	7. 8	0. 2	6. 6	2. 3	4. 1	21. 1
2038-2043	7. 9	0. 2	6. 6	2. 4	4. 2	21. 4
2043-2048	7. 9	0. 2	6. 7	2. 4	4. 4	21. 6

Note: 1) The depletion is due to gained and lost irrigated land in the Hydrologically Connected Area of the Over-Appropriated Basin and the Eastern Analysis Area between July 1, 1997, and June 30, 2006. Period begins and ends May 1 of indicated year. Total may be different from sum of numbers because of rounding.

The NRD's have each developed an Integrated Management Plan (IMP) for their district. The plans became effective on September 15, 2009. Each district's IMP has a chapter that discusses fully appropriated and over appropriated area plans. The plans include goals, objectives, and action items to be implemented for the area. The action items to be implemented are both regulatory and non-regulatory. Each NRD continues to put in place rules and regulations to accomplish the goals and objectives.

The Platte River Recovery Implementation Program (Program) started in 2007 with a cooperative agreement signed by the Department of Interior and the 3 states (Nebraska, Colorado, and Wyoming). The October 24, 2006 program document provides the framework for the work that is ongoing today. The program document states the purposes as follows:

1. The purpose of this Program is to implement certain aspects of the U. S. Fish and Wildlife Service's (USFWS) recovery plans for the target species that relate to their associated habitats by providing for the following:

a. securing defined benefits for the target species and their associated habitats to assist in their conservation and recovery through a basin-wide cooperative approach agreed to by the three states and Department of Interior;

b. providing Endangered Species Act (ESA) compliance for existing and new water related activities in the Platte River basin;

c. helping prevent the need to list more basin associated species pursuant to the ESA;

d. mitigating the adverse impacts of new water related activities on (1) the occurrence of USFWS target flows and (2) the effectiveness of the Program in reducing shortages to those flows, such mitigation to occur in the manner and to the extent described in the document and in the approved depletions plans; and

e. establishing and maintaining an organizational structure that will ensure appropriate state and federal government and stakeholder involvement in the implementation of the Program.

2. When doing so will not reduce resources available to target species, the Program will also manage Program lands to benefit non-target listed species and non-listed species of concern and to reduce the likelihood of future listing. When feasible, the Program will provide regulatory certainty with respect to those non-target, listed species.

The Platte River Program as developed had three key water plan components. They include the Colorado's Tamarack I project, Wyoming's Pathfinder Modification project, and Nebraska's Environmental Account (EA) for Reservoir Storage. These projects and their management are discussed in the Program Water Plan document dated October 24, 2006. The EA storage water resides in Lake McConaughy and is defined in the Water Plan along with who and how it will be operated. The operation of the account is accomplished by defined hydrologic conditions on the Platte River for purposes of managing wildlife habitat. Real time operation of current and proposed future Program water projects requires the Program USFWS target flow at Grand Island be defined year round and used in project analysis.

A methodology for defining the real-time hydrologic condition ("wet" versus "normal" versus "dry") was developed in 2003-2004 with input from a subgroup of the Platte Cooperative Agreement Water Management Committee (USFWS, 2004).

Table 2.3-3 shows the USFWS Target Flows by hydrologic conditions and **Table 2.3-4** (next page) shows the hydrologic conditions that have occurred for the 1985 thru 2010 COHYST model development time period. The 1985 thru 2006 period includes 5 dry years, 7 normal years, and 10 wet years. The 2007 thru 2010 period computes the hydrologic condition by month and (wet, normal, and dry) conditions can occur during the course of a year.

Table 2.3-3. Platte River Program USFWS Target Flows by Hydrologic Conditions.

Flow values in CFS	Condition		
Period	**Wet**	**Normal**	**Dry**
Jan 1 – Jan 31	1,000	1,000	600
Feb 1 – Feb 14	1,800	1,800	1,200
Feb 15 – Mar 15	3,350	3,350	2,250
Mar 16 – Mar 22	1,800	1,800	1,200
Mar 23 – May 10	2,400	2,400	1,700
May 11 – May 19	1,200	1,200	800
May 20 – June 20	3,700	3,400	800
June 21 – Sept 15	1,200	1,200	800
Sept 16 – Sept 30	1,000	1,000	600
Oct 1 – Nov 15	2,400	1,800	1,300
Nov 16 – Dec 31	1,000	1,000	600

Table 2.3-4. Platte River Program Hydrologic Conditions for the Model Development Time Period.

Water Year	Hydrologic Condition**	Water Year	Months	Hydrologic Condition**
1985	Wet	2007	May	Dry
1986	Wet		June	Normal
1987	Wet		July	Normal
1988	Normal		Aug-Sept	Normal
1989	Normal		Oct-Nov	Normal
1990	Normal		Dec	Dry
1991	Dry	2008	Jan-Feb	Dry
1992	Normal		Mar-Apr	Normal
1993	Wet		May	Dry
1994	Normal		June	Wet
1995	Wet		July	Normal
1996	Wet		Aug-Sept	Normal
1997	Wet		Oct-Nov	Normal
1998	Wet		Dec	Normal
1999	Wet	2009	Jan-Feb	Normal
2000	Wet		Mar-Apr	Normal
2001	Normal		May	Normal
2002	Dry		June	Normal
2003	Dry		July	Normal
2004	Dry		Aug-Sept	Normal
2005	Dry		Oct-Nov	Wet
2006	Normal		Dec	Normal
		2010	Jan-Feb	Normal
			Mar-Apr	Normal
			May	Normal
			June	Wet
			July	Normal
			Aug-Sept	Normal
			Oct-Nov	Wet
			Dec	Normal

Notes:

* Flow at Grand Island is used in the USFWS Classification, not Overton.

** Calculations of year designations by Don Anderson of the USFWS using method described in the PRRIP Document. Dry and Wet/Normal designations also shown in PRRIP Document Attachment 5 Section 11 (Water Plan Reference Materials).