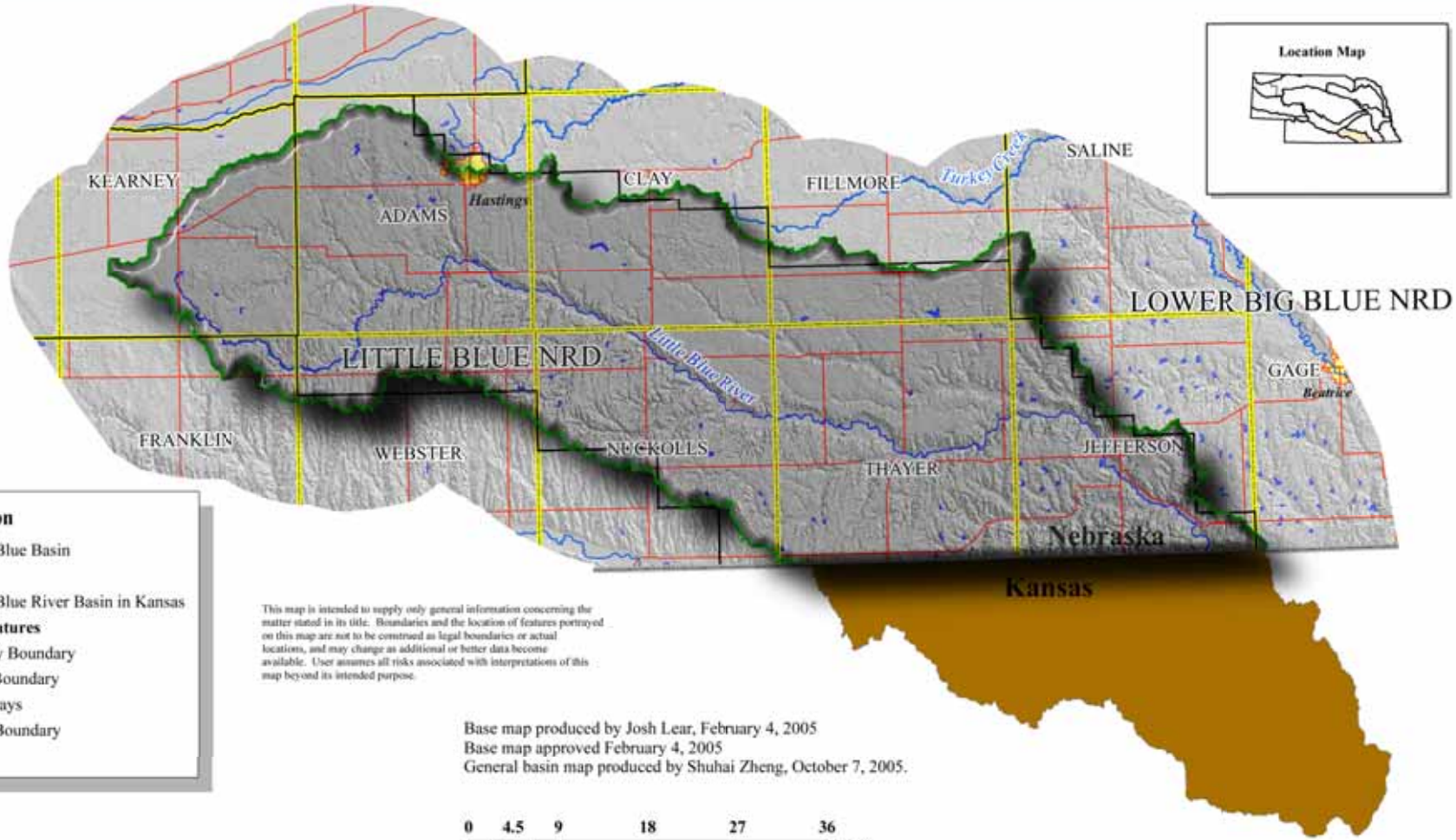
Planning and Assistance Division

GENERAL BASIN MAP

LITTLE BLUE RIVER BASIN



Explanation

- Little Blue Basin
- Lakes
- Little Blue River Basin in Kansas

Cultural Features

- County Boundary
- State Boundary
- Highways
- NRD Boundary
- Cities

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
General basin map produced by Shuhai Zheng, October 7, 2005.

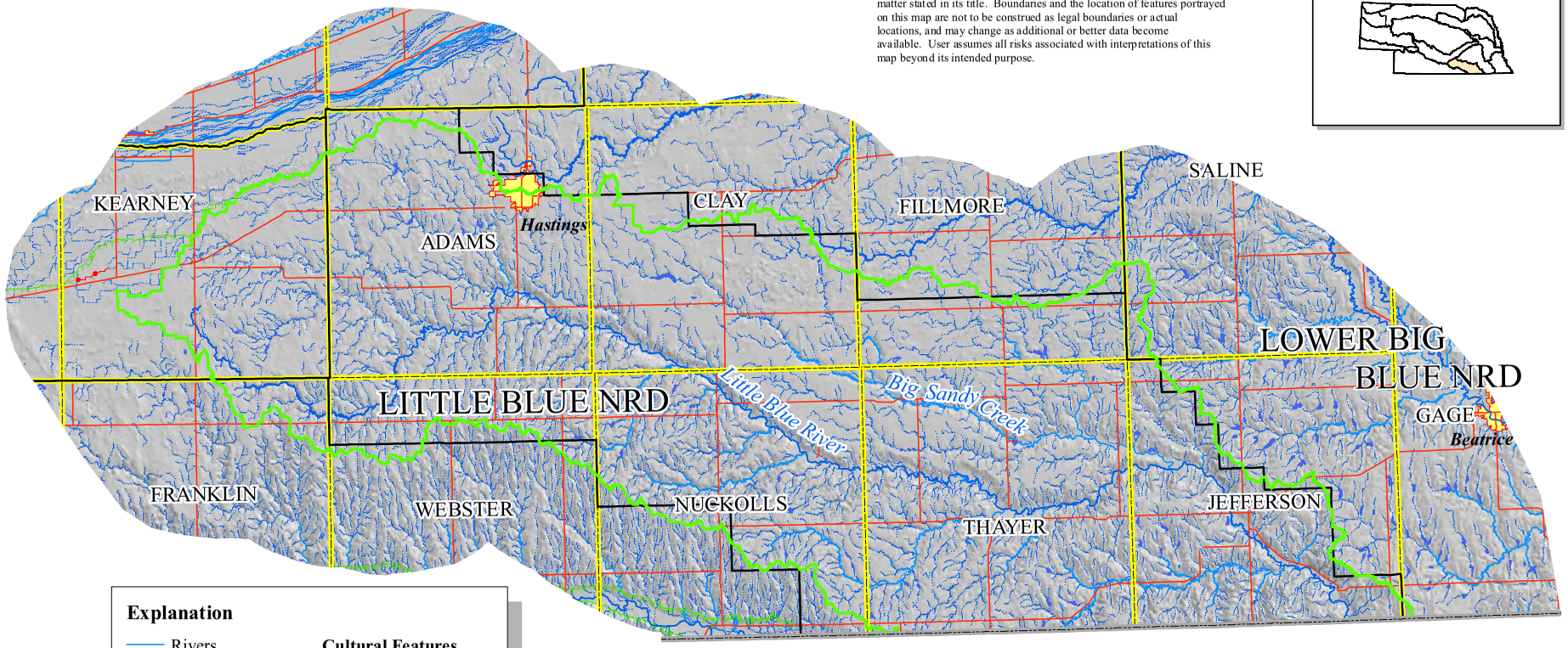
0 4.5 9 18 27 36 Miles

Figure LB-1.

Planning and Assistance Division

General Surface Water Features

LITTLE BLUE RIVER BASIN



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Location Map

Explanation

- Rivers
- Intermittent Streams
- Canals/Ditches
- Pipelines
- Lakes
- Little Blue Basin

Cultural Features

- County Boundary
- State Boundary
- Highways
- NRD Boundary
- Cities

0 4 8 16 24 32 Miles

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
General surface water features map produced by Shuhai Zheng, October 7, 2005.

Figure LB-2.

Figure LB-3. Annual Precipitation at Clay Center, Nebraska.

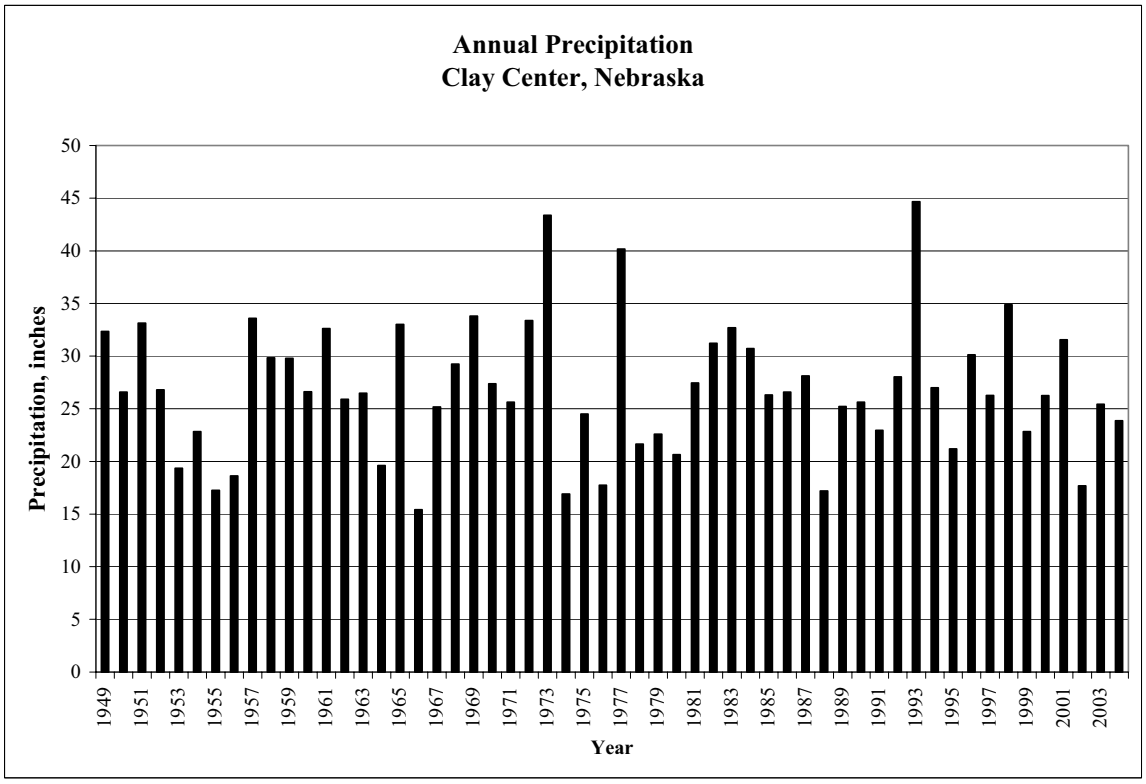
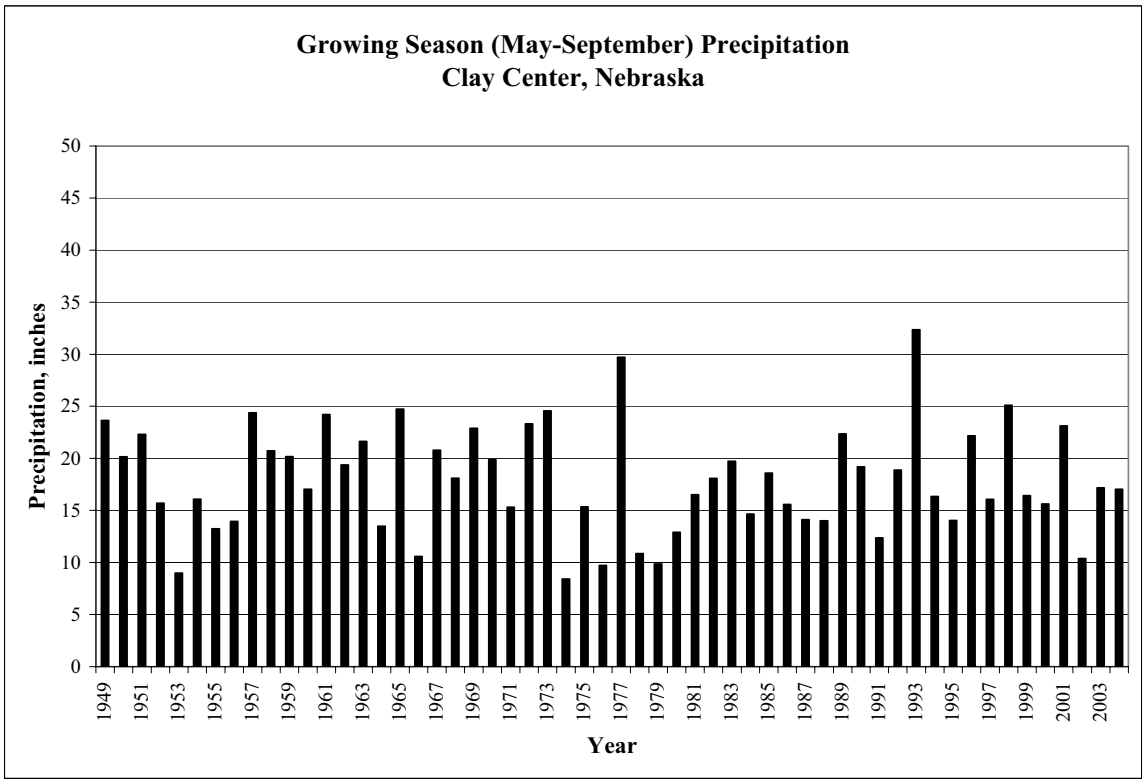


Figure LB-4. Growing Season (May-September) Precipitation at Clay Center, Nebraska.



Source: High Plains Climate Center

Figure LB-5. Annual Precipitation at Fairbury, Nebraska.

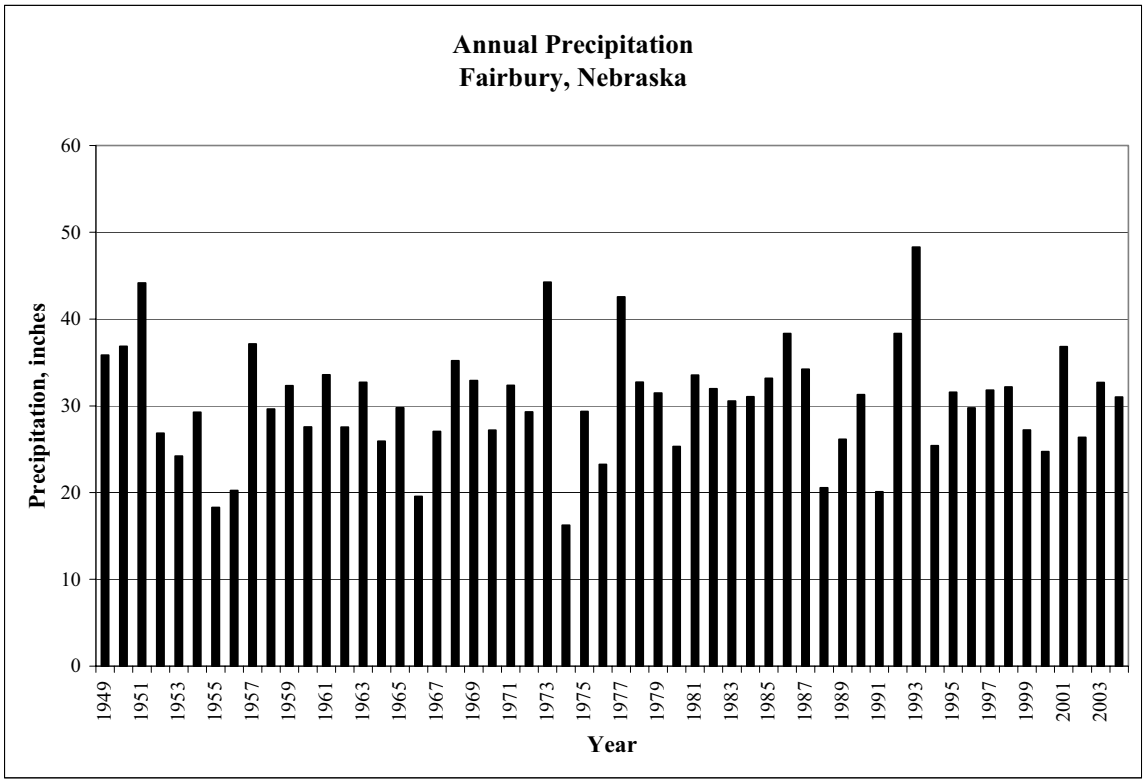
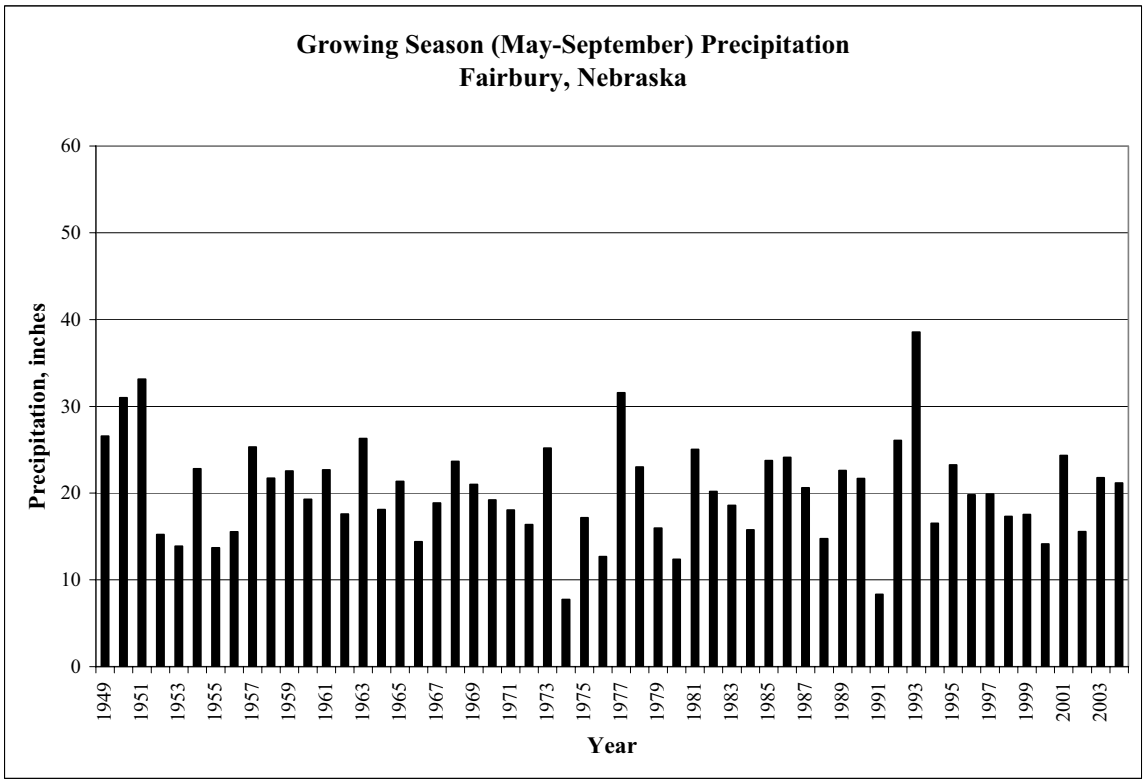


Figure LB-6. Growing Season (May-September) Precipitation at Fairbury, Nebraska.



Source: High Plains Climate Center

Figure LB-7. Annual Precipitation at Hastings, Nebraska.

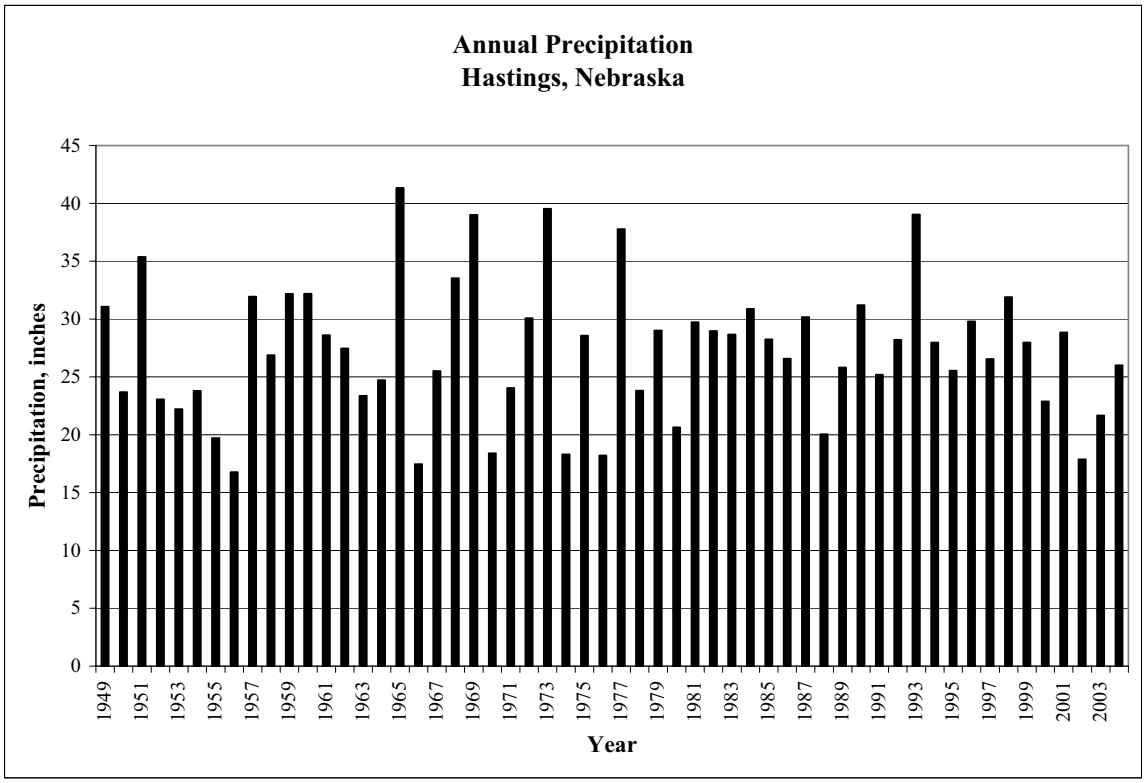
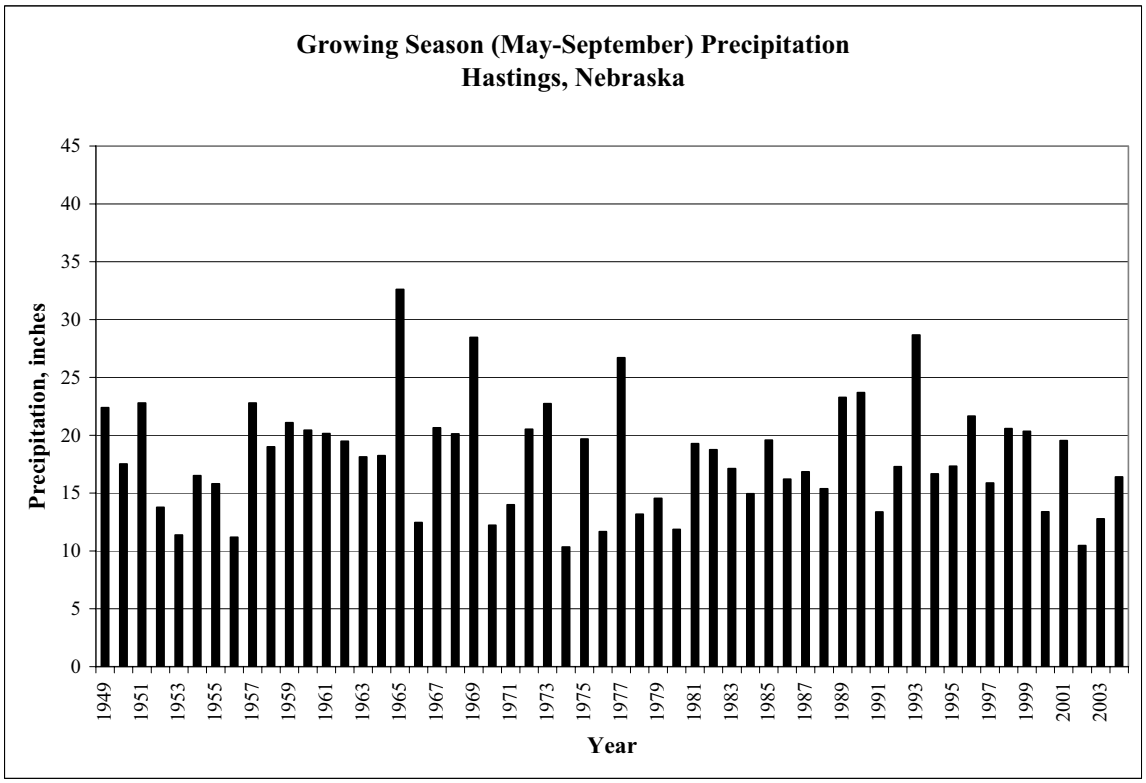


Figure LB-8. Growing Season (May-September) Precipitation at Hastings, Nebraska.



Source: High Plains Climate Center

Figure LB-9. Annual Precipitation at Hebron, Nebraska.

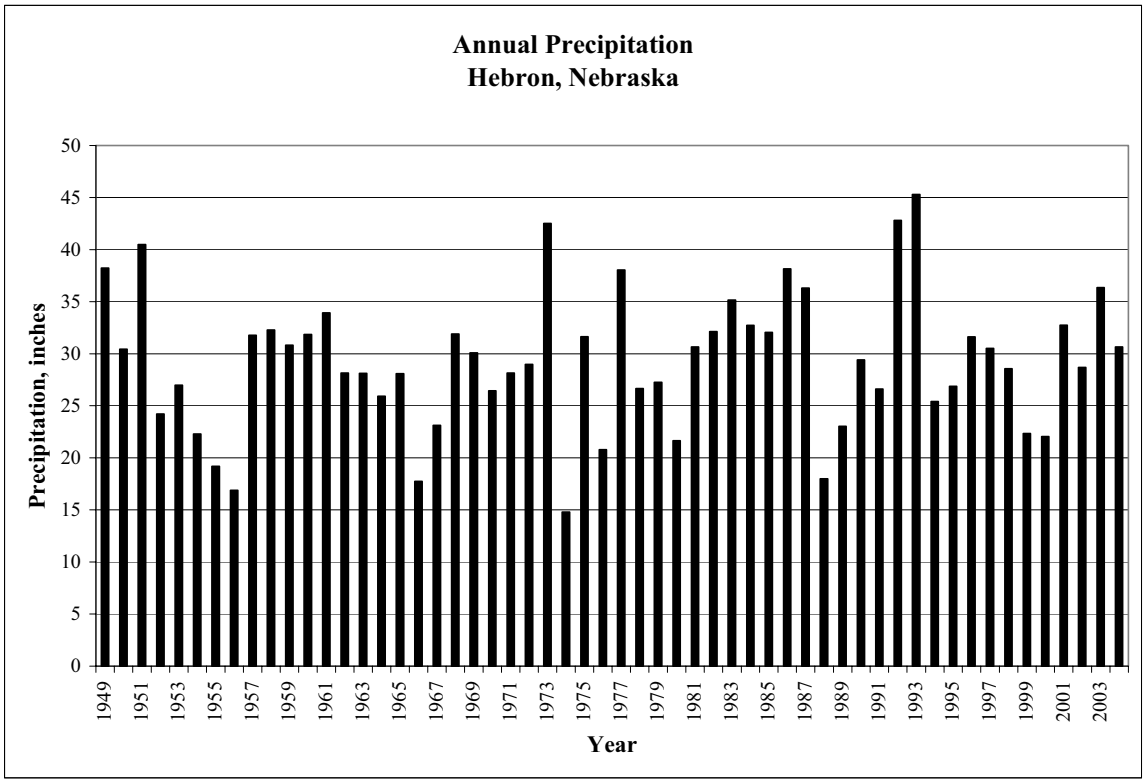
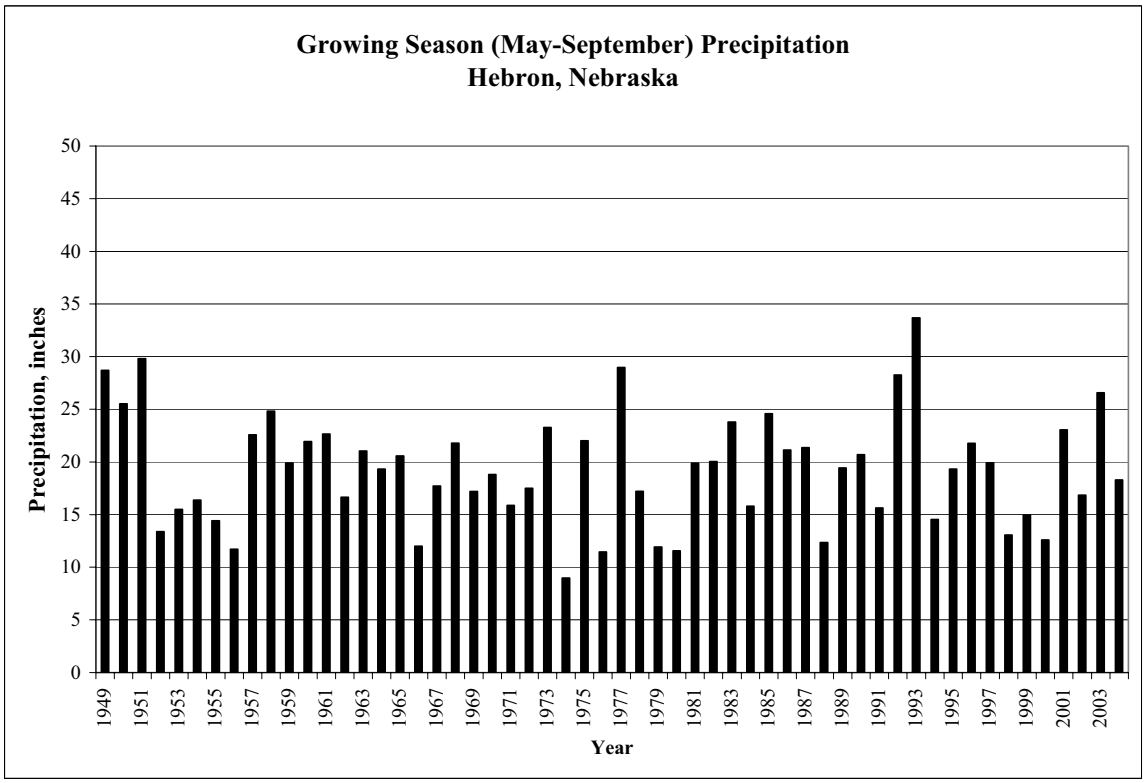


Figure LB-10. Growing Season (May-September) Precipitation at Hebron, Nebraska.



Source: High Plains Climate Center

Figure LB-11. Annual Precipitation at Nelson, Nebraska.

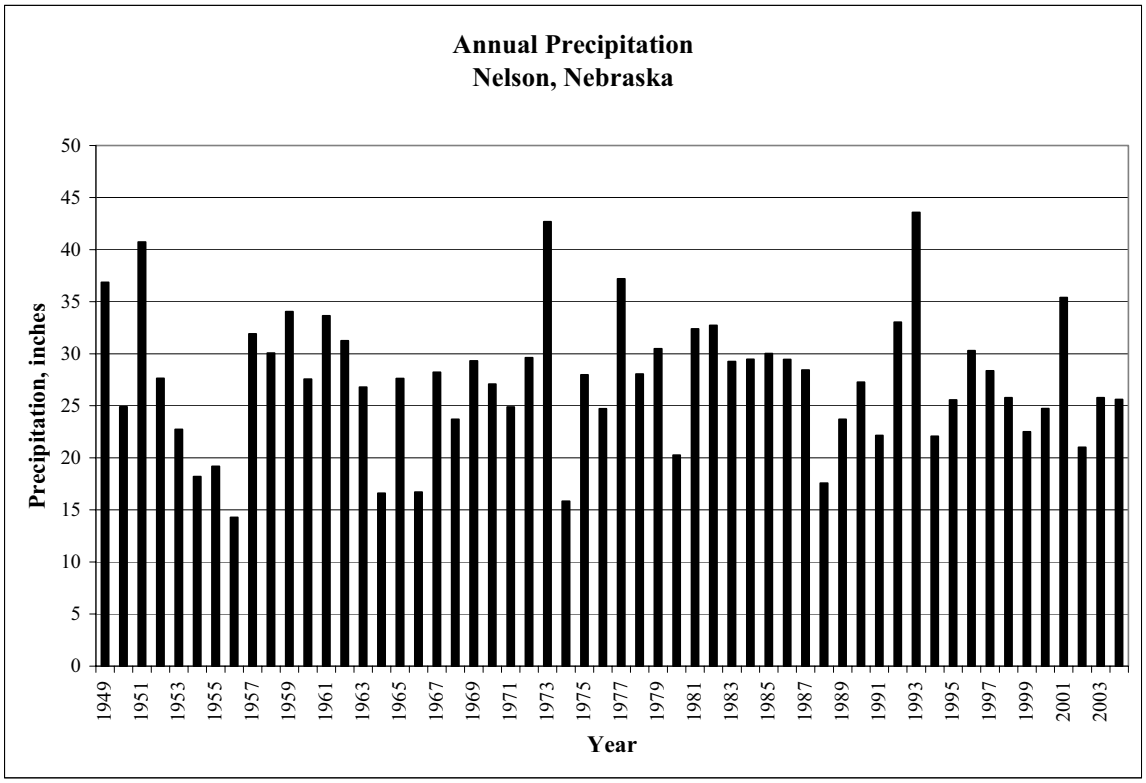
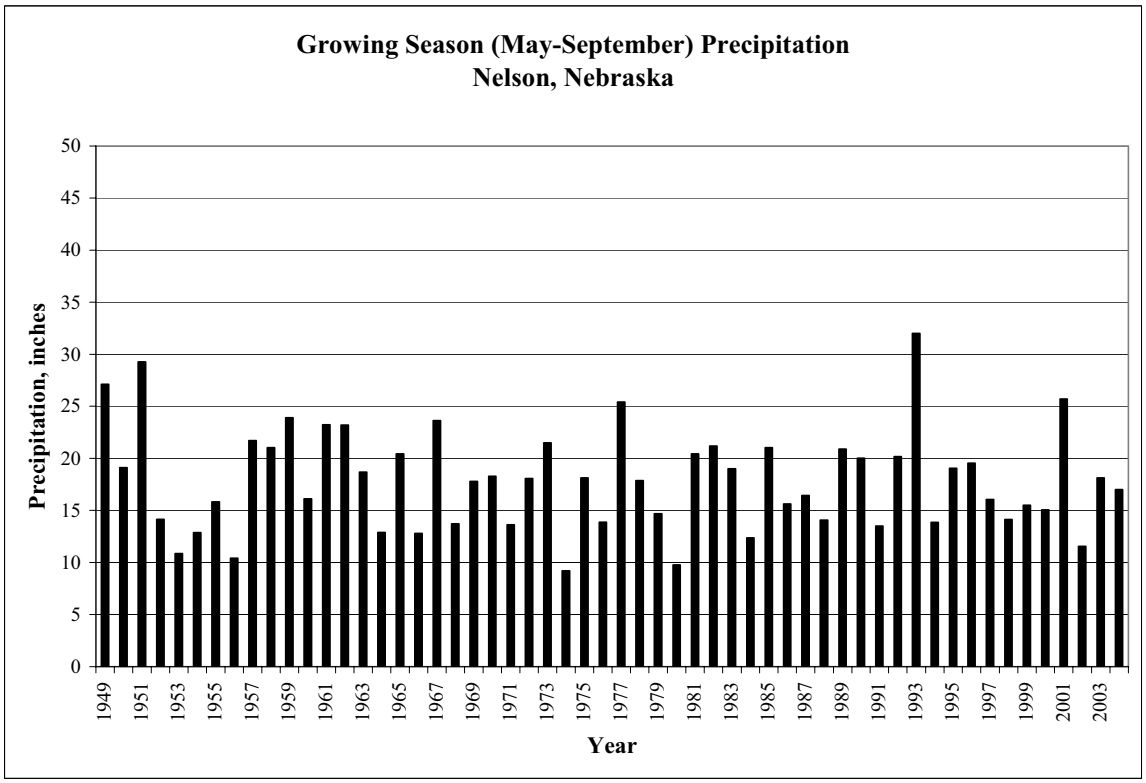


Figure LB-12 Growing Season (May-September) Precipitation at Nelson, Nebraska.

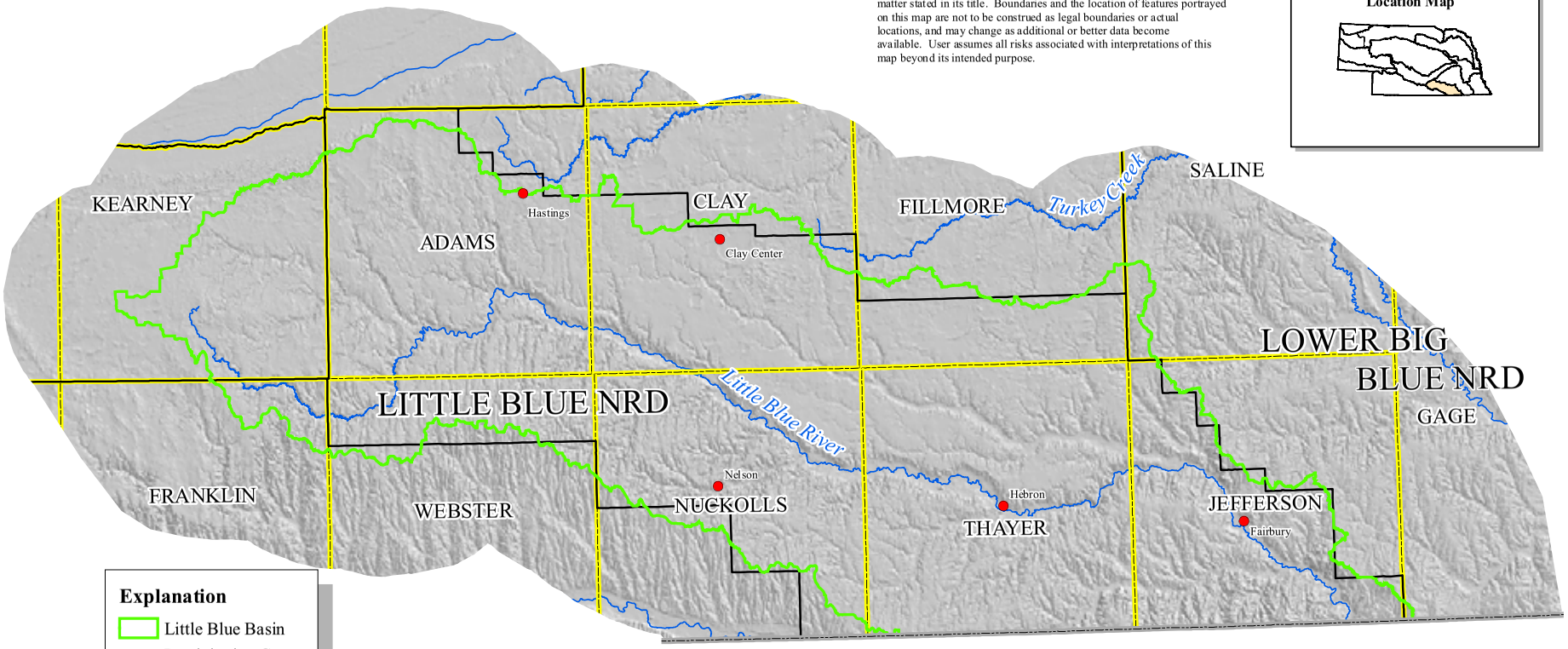


Source: High Plains Climate Center

Planning and Assistance Division

Precipitation Gages

LITTLE BLUE RIVER BASIN



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Location Map

Explanation

- Little Blue Basin
- Precipitation Gages
- Major Streams

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

0 4 8 16 24 32 Miles

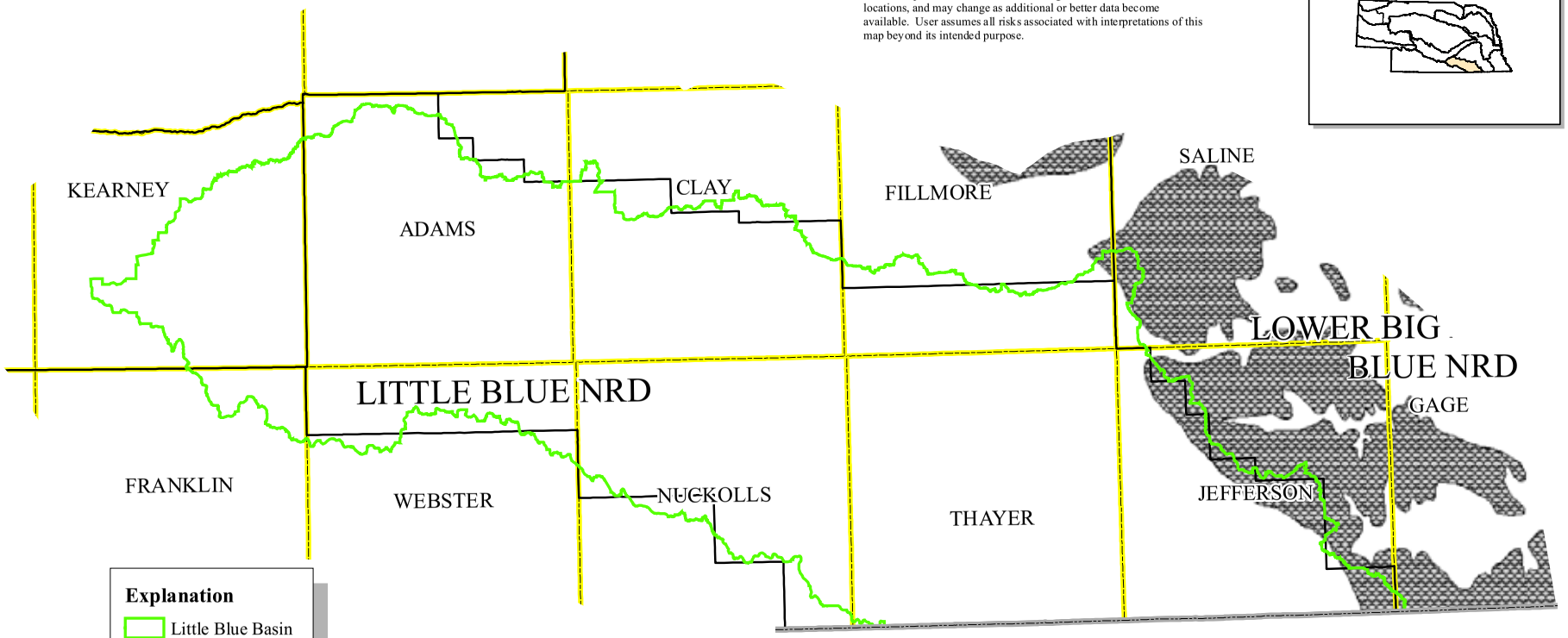
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Precipitation gages map produced by Jeff Shafer, October 19, 2005.

Figure LB-13.

Planning and Assistance Division

Glacial Till

LITTLE BLUE RIVER BASIN



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Location Map

Explanation

- Little Blue Basin
- Glacial Till

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

0 4 8 16 24 32 **Miles**

Glacial till information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Glacial till map produced by Kevin J. Schwartman, October 8, 2005

Figure LB-14.

Table LB-1 – Aquifers in unconsolidated surficial deposits (modified from Keech and Dreeszen, 1959, 1968)

System	Hydrogeologic unit	Character and description	Maximum thickness, in feet	Hydrogeologic characteristics
Quaternary	Undifferentiated fluvial and terrace deposits, Todd Valley sand.	Clay, silt, sand and fine gravel; underlies valley-side terraces and valley floor of drainage courses. Sand and gravel valley and terrace deposits, mostly along stream valleys.	30	Generally saturated, wells yield water at a moderate rate.
	Crete Formation, Undifferentiated fluvial, lacustrine and eolian deposits.	Sand and gravel channel-fill deposits. Silt, sand and gravel restricted to broad valleys.	130	Generally saturated where thick and coarse textured, wells yield water at a high rate.
	Sappa Formation	Stratified deposits of silt, clay sand and gravel.	60	Sand lenses yield water at a slow rate in wells.
	Grand Island Formation	Stream deposited sand and gravel with a persistent aqueous-eolian deposited silt and clay layer.	200	Yields abundant water to wells.
	Red Cloud sand and gravel and Holdrege Formation Undifferentiated	Stream deposited sand and gravel with non-persistant silt and clay, probably of aqueous-eolian origin.	200	Yields abundant water to wells.

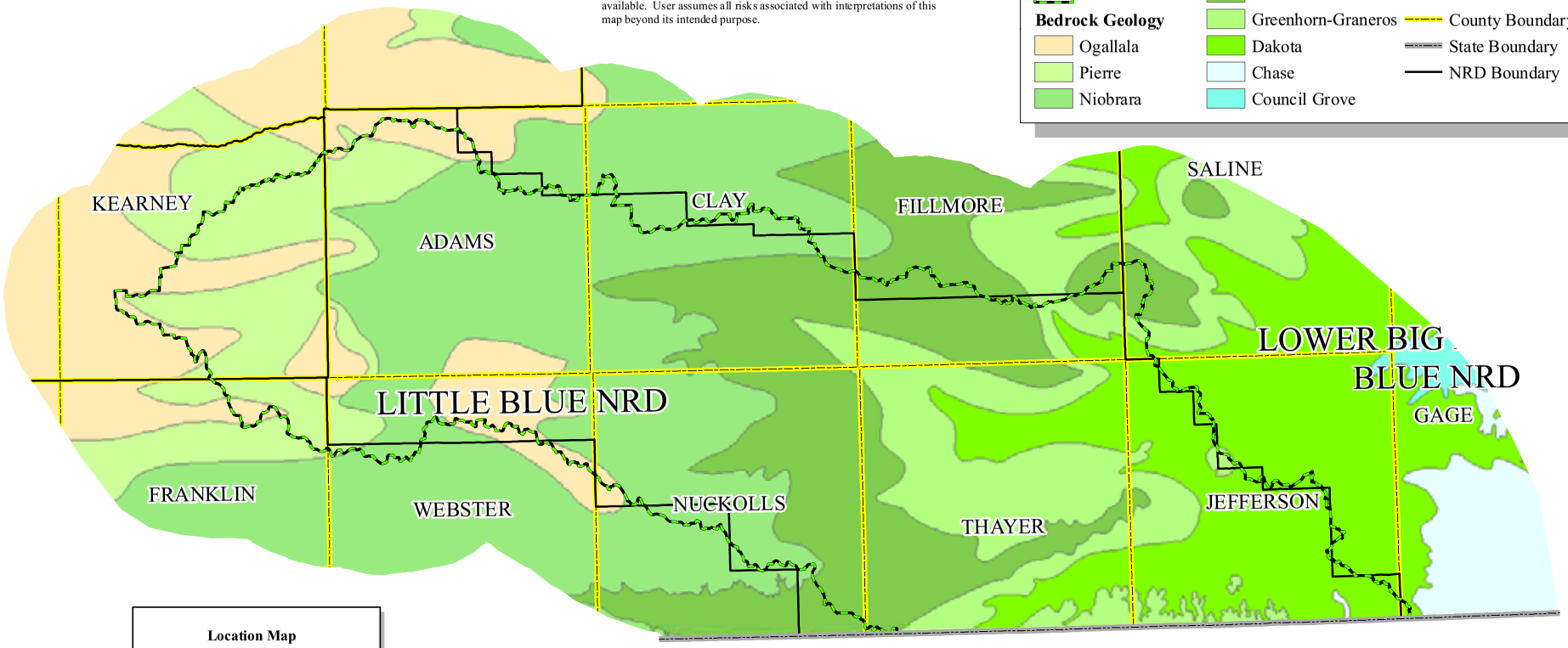
Table LB-2 – Characteristics of bedrock aquifers (modified from Keech and Dreeszen, 1959, 1968; LBNRD, 1995)

System	Hydrogeologic unit	Character and description	Maximum thickness, in feet	Hydrogeologic characteristics
Tertiary	Ogallala Group	Silt, sandy and clayey silt with lenses of sand and gravels, partly calcareous.	<100	Only used as a secondary aquifer, used mostly for stock and domestic wells.
Cretaceous	Niobrara Formation	Chalky shale, weathered in parts.	380	Yields water to wells at a moderate rate where creviced.
	Greenhorn-Graneros Formations (Undifferentiated)	The Graneros is non-calaceous shale with thin limestone layer in the upper part. The Greenhorn is limestone to shaley limestone.	100	Not known to be a major source of water to wells, but some stock and domestic wells may get water from joints in the Greenhorn Limestone.
	Dakota Sandstone	Interbedded clay shale, sandy shale and sandstone.	600	Moderately to highly mineralized water, salinity appears to increase with depth. Sandstone layers yield water at a moderate rate to wells.
Permian	Undifferentiated limestone and shales	Interbedded limestone and shales.	700	Limestone used as minor aquifers, yields water to wells where secondary porosity has developed.

Planning and Assistance Division

Bedrock Geology

LITTLE BLUE RIVER BASIN



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Explanation

- Little Blue Basin

Bedrock Geology

- Ogallala
- Pierre
- Niobrara
- Carlile
- Greenhorn-Graneros
- Dakota
- Chase
- Council Grove

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map

0 4 8 16 24 32 Miles

Bedrock geology information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Bedrock geology map produced by Kevin J. Schwartman, October 8, 2005

Figure LB-15.

Planning and Assistance Division

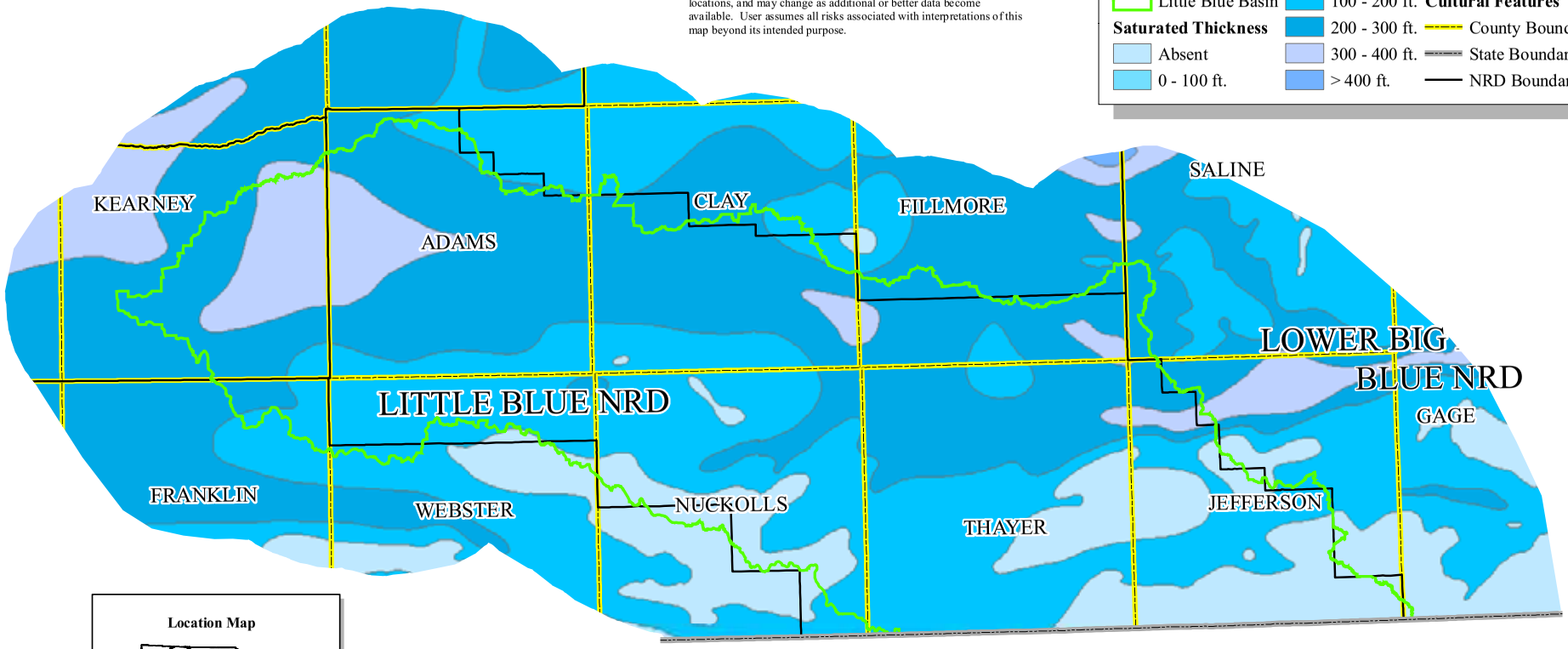
Saturated Thickness

LITTLE BLUE RIVER BASIN

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Explanation

Little Blue Basin	100 - 200 ft.	**Cultural Features**
Saturated Thickness	200 - 300 ft.	County Boundary
Absent	300 - 400 ft.	State Boundary
0 - 100 ft.	> 400 ft.	NRD Boundary



Location Map

Saturated thickness information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

0 4 8 16 24 32 Miles

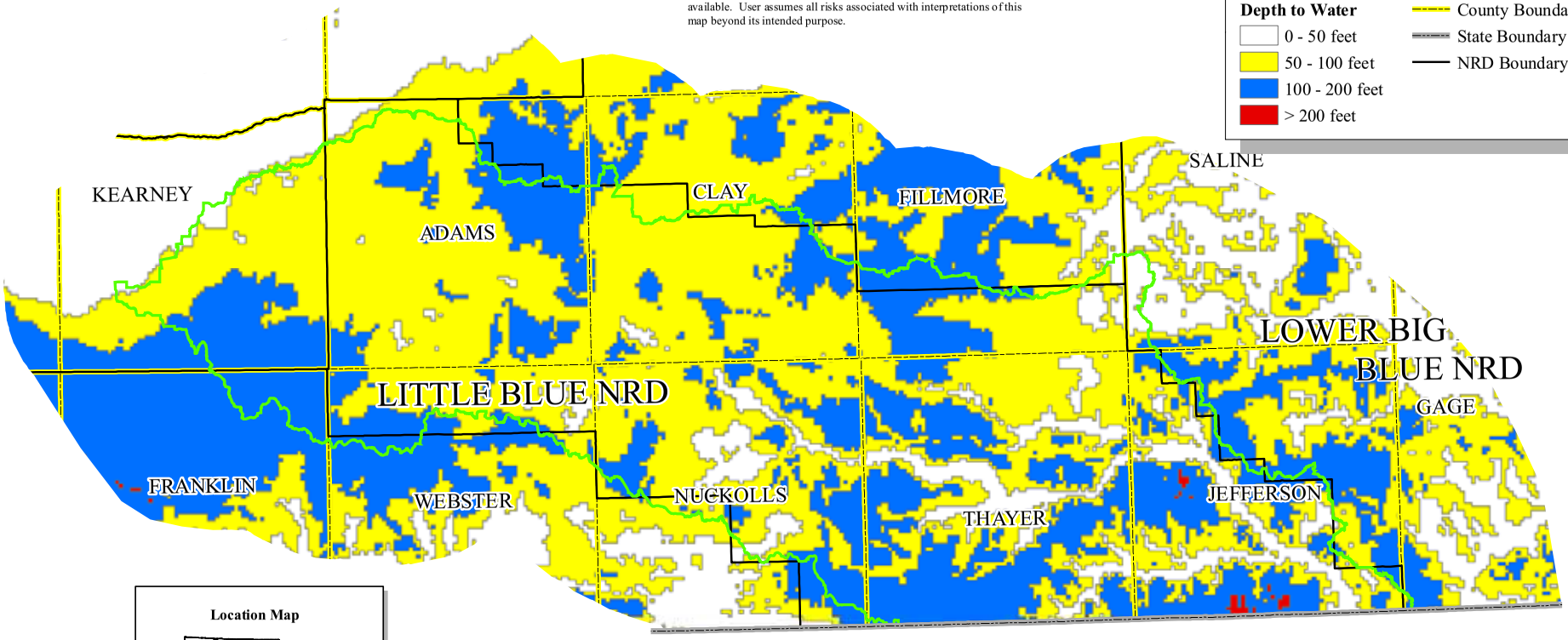
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Saturated thickness map produced by Kevin J. Schwartman, October 8, 2005

Figure LB-16.

Planning and Assistance Division

Depth to Water

LITTLE BLUE RIVER BASIN



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Explanation

Little Blue Basin

Depth to Water

- 0 - 50 feet
- 50 - 100 feet
- 100 - 200 feet
- > 200 feet

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

Location Map

0 4 8 16 24 32 Miles

Depth to water information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Depth to water map produced by Kevin J. Schwartman, February 22, 2005

Figure LB-17.

Planning and Assistance Division

Transmissivity

LITTLE BLUE RIVER BASIN

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Explanation

Little Blue Basin

Transmissivity

Thousands of gal/day/ft

20

50

100

150

200

250

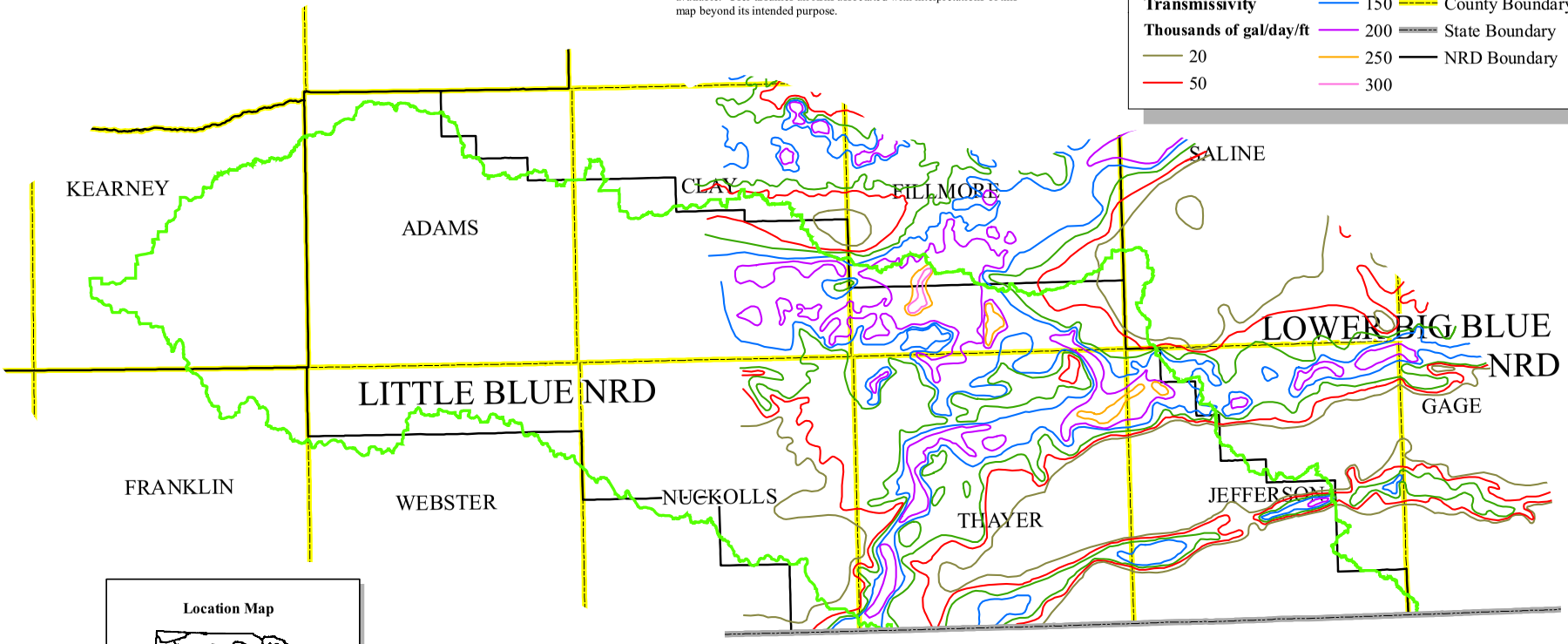
300

Cultural Features

County Boundary

State Boundary

NRD Boundary



Location Map

Transmissivity information provided by the UNL Conservation and Survey Division in: Summerside, S., Olafsen-Lackey, S., Goeke, J., and Myers, W., 2005, Mapping of Aquifer Properties – Transmissivity and Specific Yield – for Selected River Basins in Central and Eastern Nebraska.

0 4 8 16 24 32 Miles

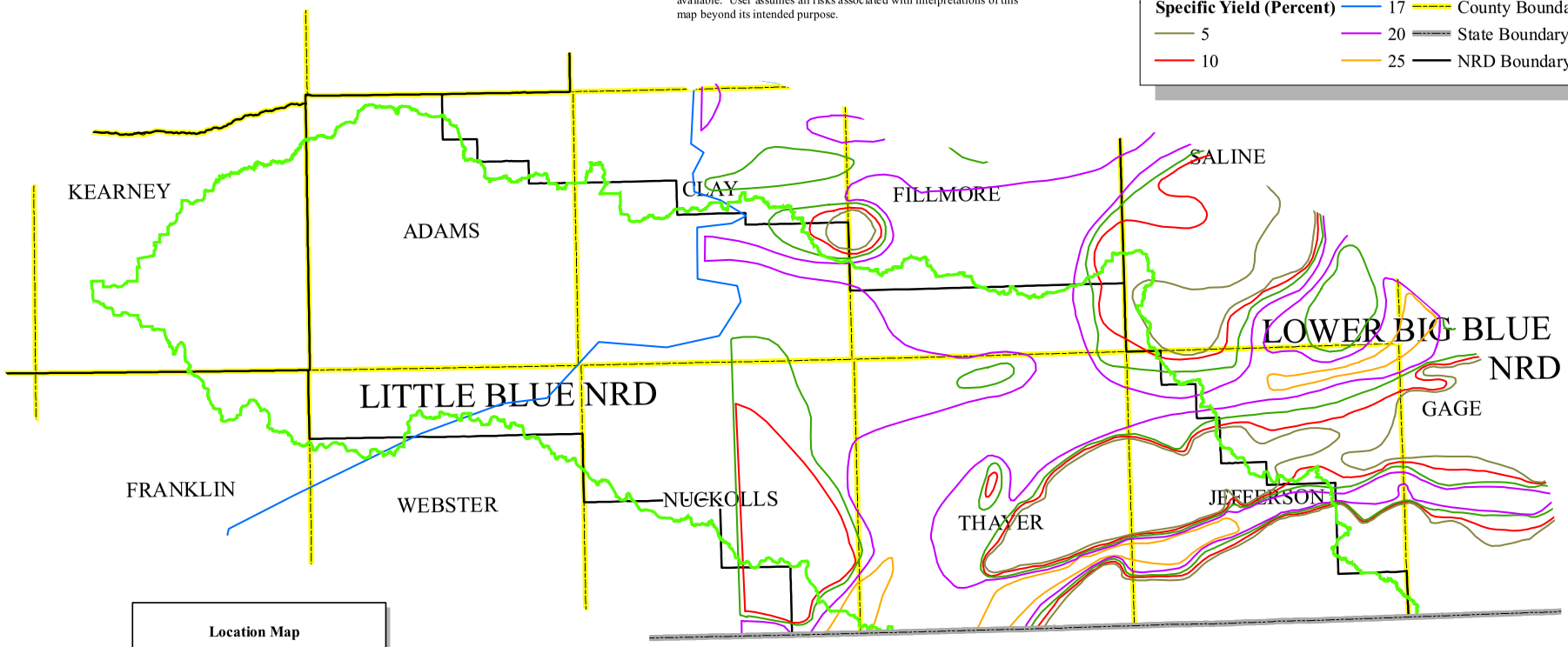
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Transmissivity map produced by Kevin J. Schwartman, October 8, 2005

Figure LB-18.

Planning and Assistance Division

Specific Yield

LITTLE BLUE RIVER BASIN



Specific yield information provided by the UNL Conservation and Survey Division in: Summerside, S., Olafsen-Lackey, S., Goeke, J., and Myers, W., 2005, Mapping of Aquifer Properties – Transmissivity and Specific Yield – for Selected River Basins in Central and Eastern Nebraska.

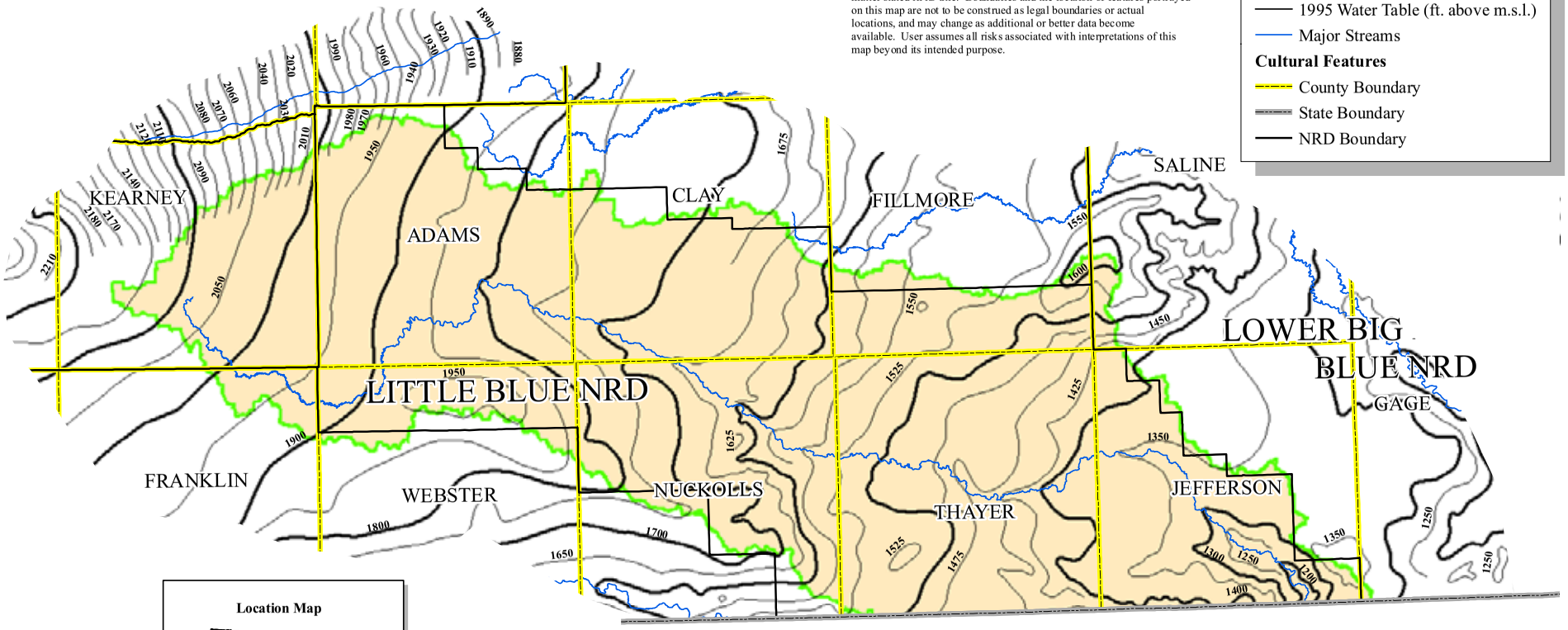
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Specific yield map produced by Kevin J. Schwartman, October 8, 2005

Figure LB-19.

Planning and Assistance Division

1995 Ground Water Table

LITTLE BLUE RIVER BASIN



Explanation

- Little Blue Basin
- 1995 Water Table (ft. above m.s.l.)
- Major Streams

Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Location Map

0 4 8 16 24 32 Miles

Water table information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Water table map produced by Kevin J. Schwartman, October 8, 2005

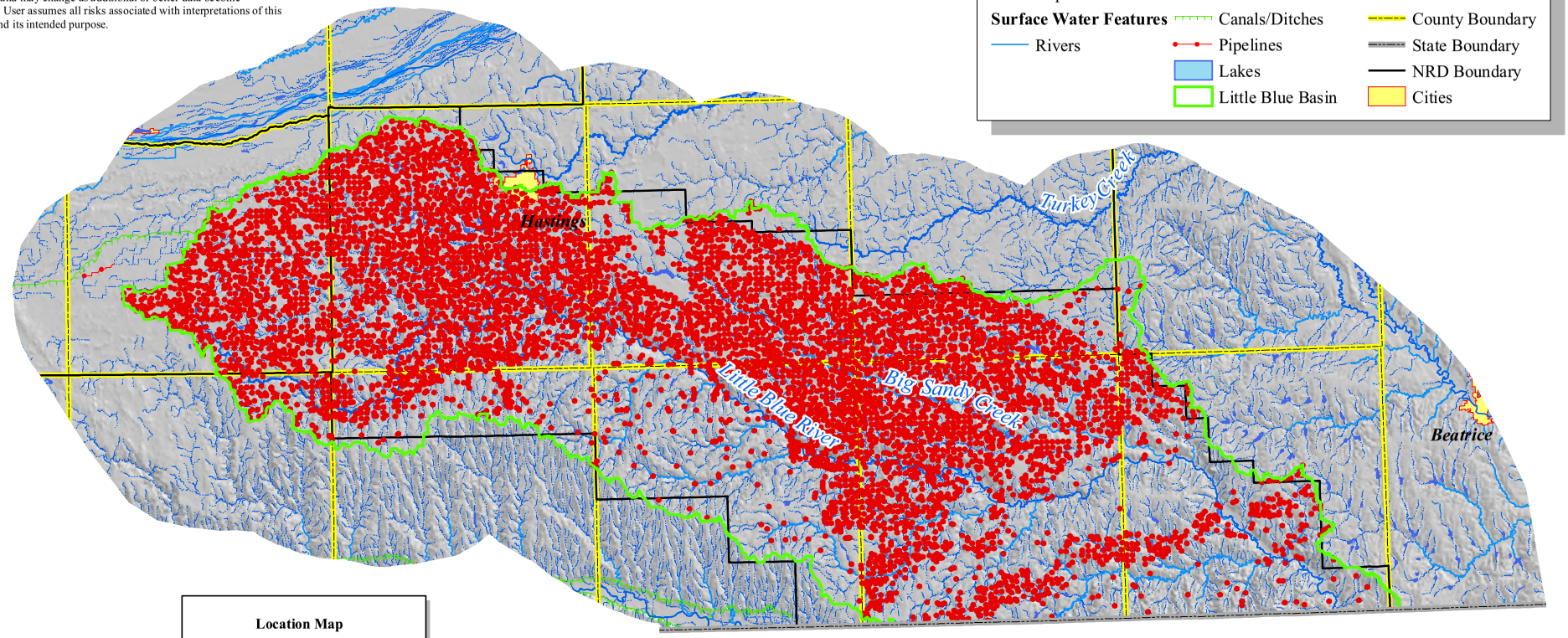
Figure LB-20.

Planning and Assistance Division

Depletive Ground Water Wells

LITTLE BLUE RIVER BASIN

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.



Explanation

- Depletive Wells
- **Surface Water Features**
  - Rivers
  - Intermittent Streams
  - Canals/Ditches
  - Pipelines
  - Lakes
  - Little Blue Basin
- **Cultural Features**
  - County Boundary
  - State Boundary
  - NRD Boundary
  - Cities

Location Map

Depletive well infomation is from the DNR Registered Ground Water Well Database, as of October 1, 2005, and includes wells used for aquiculture, commercial, domestic, irrigation, public water supply, dewatering, stock and others except wells for non-consumptive uses.

0 4 8 16 24 32 Miles

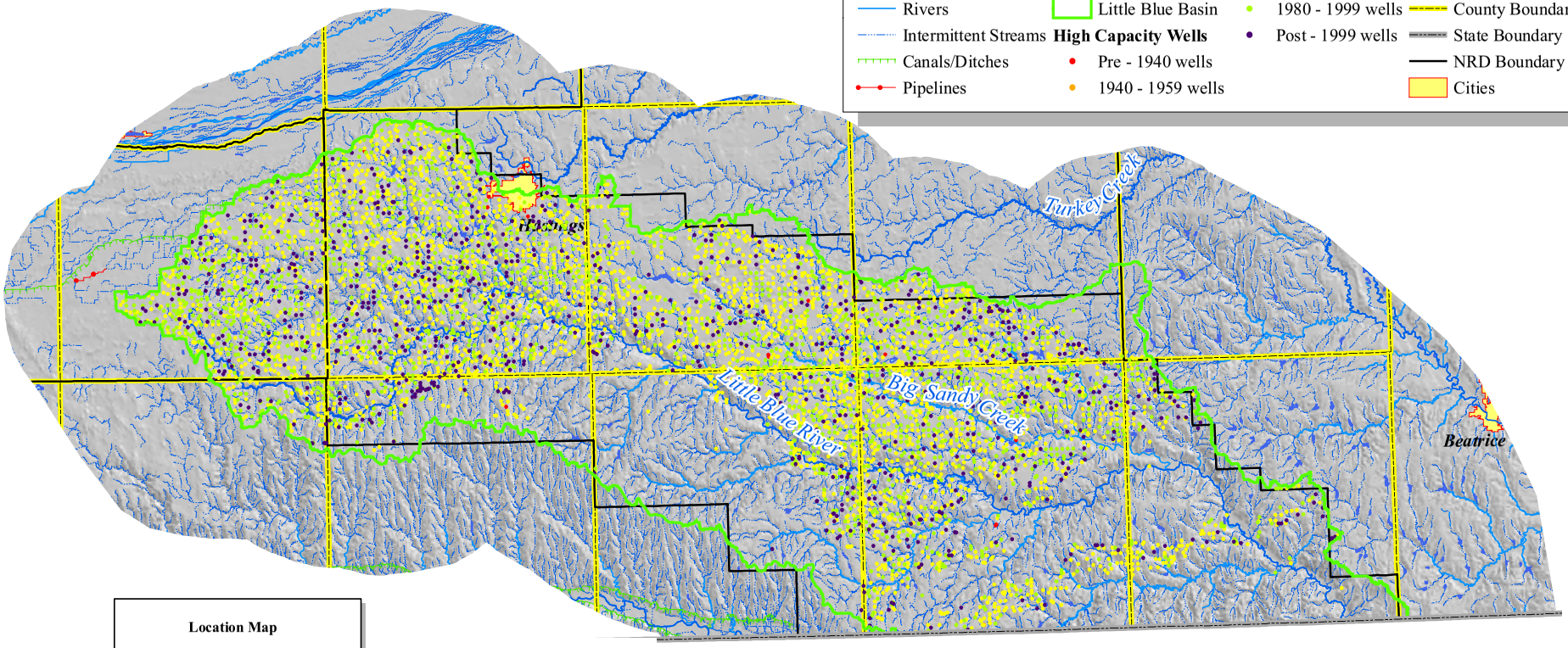
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Depletive ground water wells map produced by Shuhai Zheng, October 8, 2005.

Figure LB-21.

Planning and Assistance Division

High Capacity Wells by Completion Date

LITTLE BLUE RIVER BASIN



Location Map

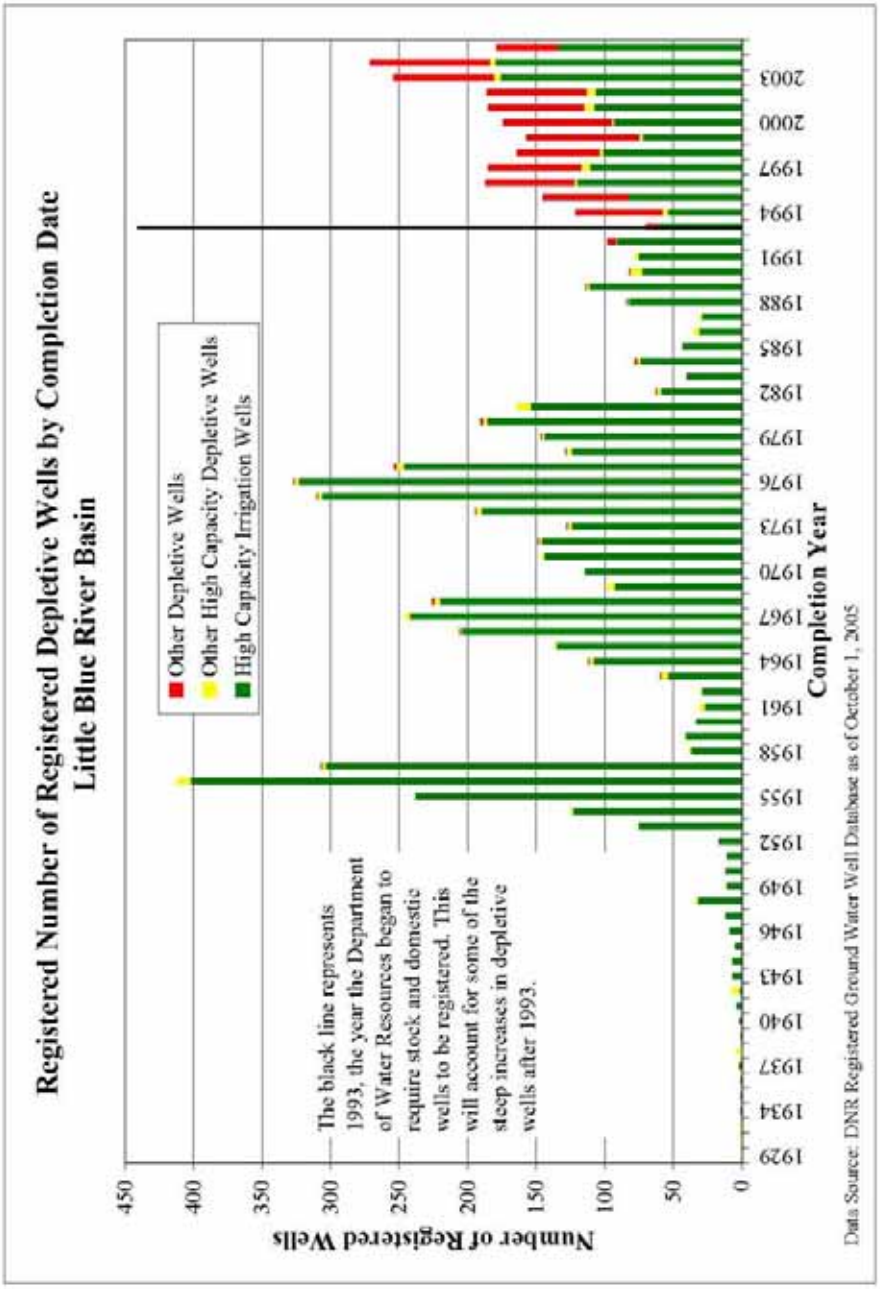
High capacity well infomation is from the DNR Registered Ground Water Well Database, as of October 1, 2005 and includes depletive wells with registered pumping rates equal to or greater than 50 gpm.

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

0 4 8 16 24 32 Miles

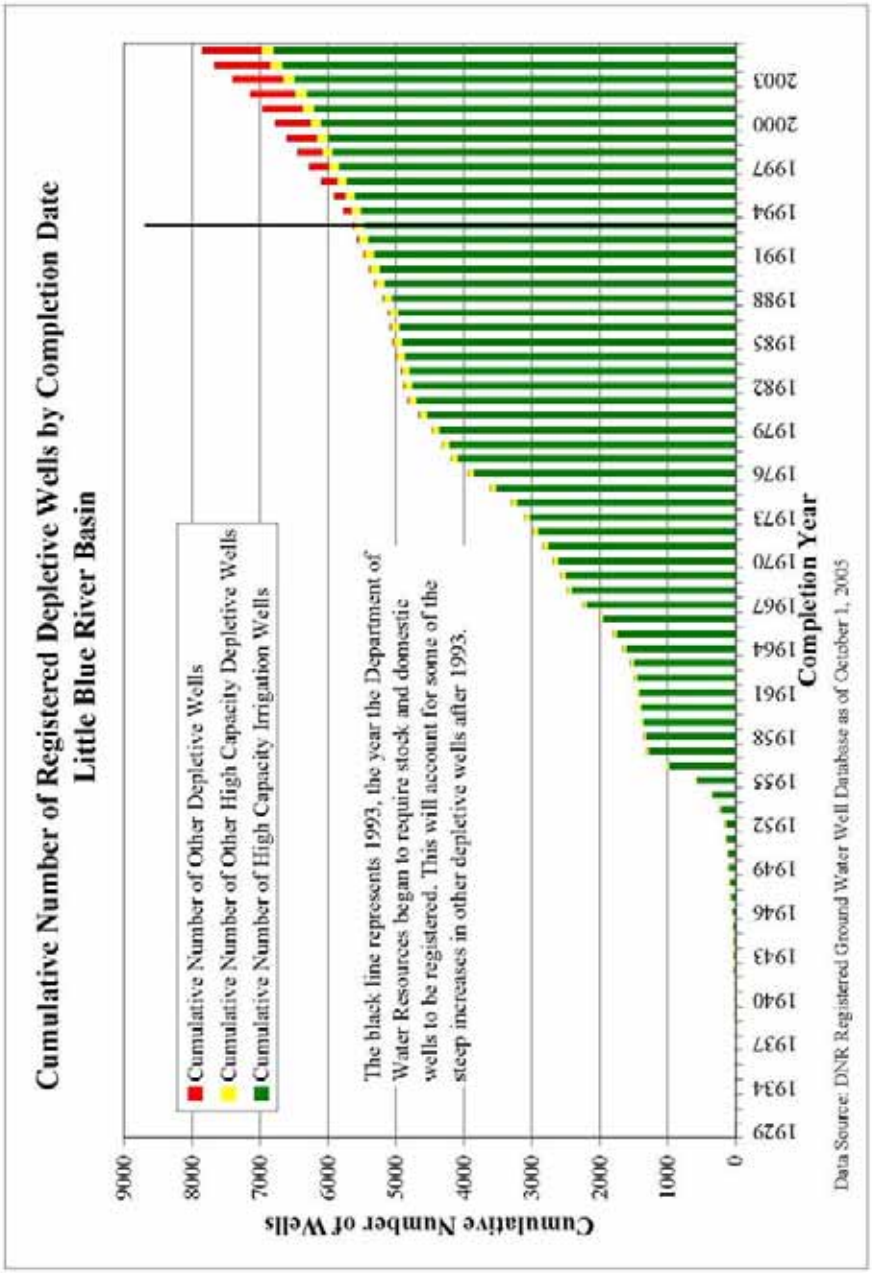
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
High capacity wells map produced by Shuhai Zheng, November 10, 2005.

Figure LB-22



By Shuhai Zheng, 10/1/2005

Figure LB-23



By Shuhai Zheng, 10/1/2005

Figure LB-24

Table LB-3 Average Irrigated Acreage 1950-2003 for Counties Fully or Partially in the Little Blue River Basin

	Estimated Average Irrigated Acreage by County						
County Name	*Percent of County in Little Blue Basin*	*1950-1959*	*1960-1969*	*1970-1979*	*1980-1989*	*1990-1999*	*2000-2003*
Adams	82	22264	61615	111238	152700	187060	207475
Clay	55	29905	78883	130291	170860	184410	190275
Fillmore	29	23749	69542	125433	164980	192560	203450
Franklin	7	10369	27791	52251	72030	84870	94625
Gage	<1	2719	15576	36687	45190	49700	57275
Jefferson	57	2457	13277	34948	52920	58380	67850
Kearney	45	40407	72317	128504	165480	190820	207250
Nuckolls	66	11755	26306	40191	51050	55820	62525
Saline	3	6762	27831	56187	70740	80140	89875
Thayer	100	12316	41839	75456	102060	121410	134225
Webster	25	4216	11142	25024	35490	45540	54200
Total		**166919**	**446119**	**816210**	**1083500**	**1250710**	**1369025**
% Change from Previous 10 Years			167.27%	82.96%	32.75%	15.43%	9.46%

* The percentage is the percentage of the county area which is in the Little Blue Basin. It does not necessarily represent the percentage of irrigated county acreage in the Little Blue River Basin.

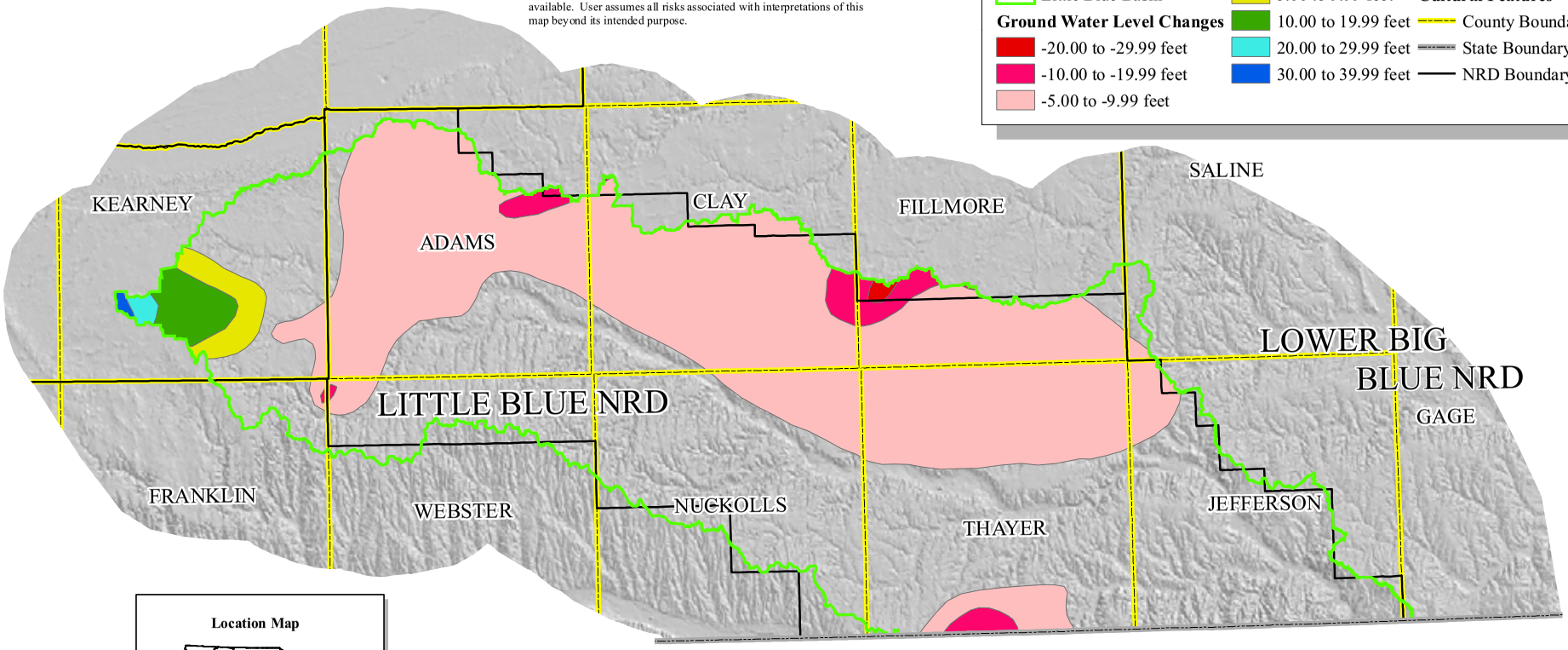
Data Source: http://www.usda.gov/nass/, National Agricultural Statistics Service, **U.S. Department of Agriculture**

Shuhai Zheng, November 23, 2005

Planning and Assistance Division

Ground Water Level Changes Predevelopment to Spring 2005

LITTLE BLUE RIVER BASIN



Ground water level changes information provided by the UNL Conservation and Survey Division: http://csd.unl.edu/general/gis-datasets.asp.

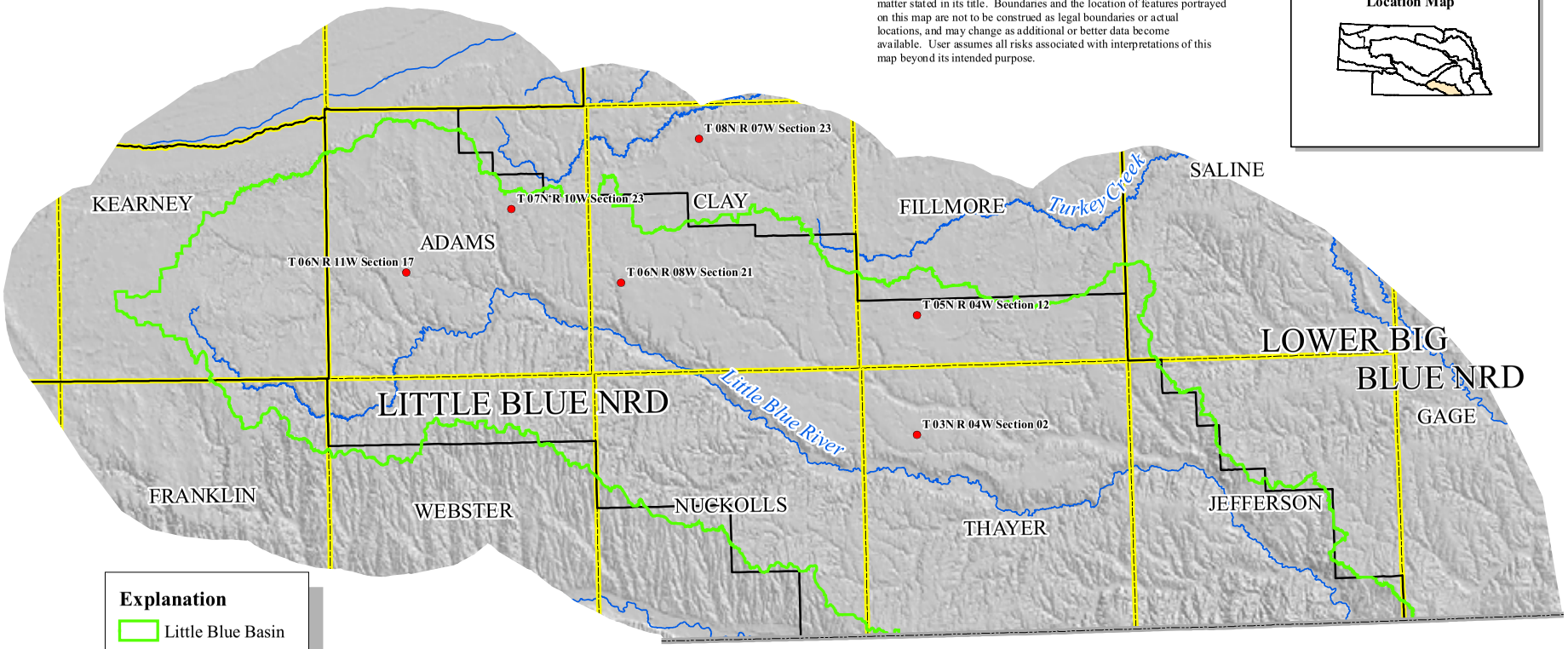
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Ground water level changes added by Shuhai Zheng, October 13, 2005

Figure LB-25.

Planning and Assistance Division

Ground Water Hydrograph Locations

LITTLE BLUE RIVER BASIN



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Location Map

Explanation

- Little Blue Basin
- Well Hydrographs
- Major Streams

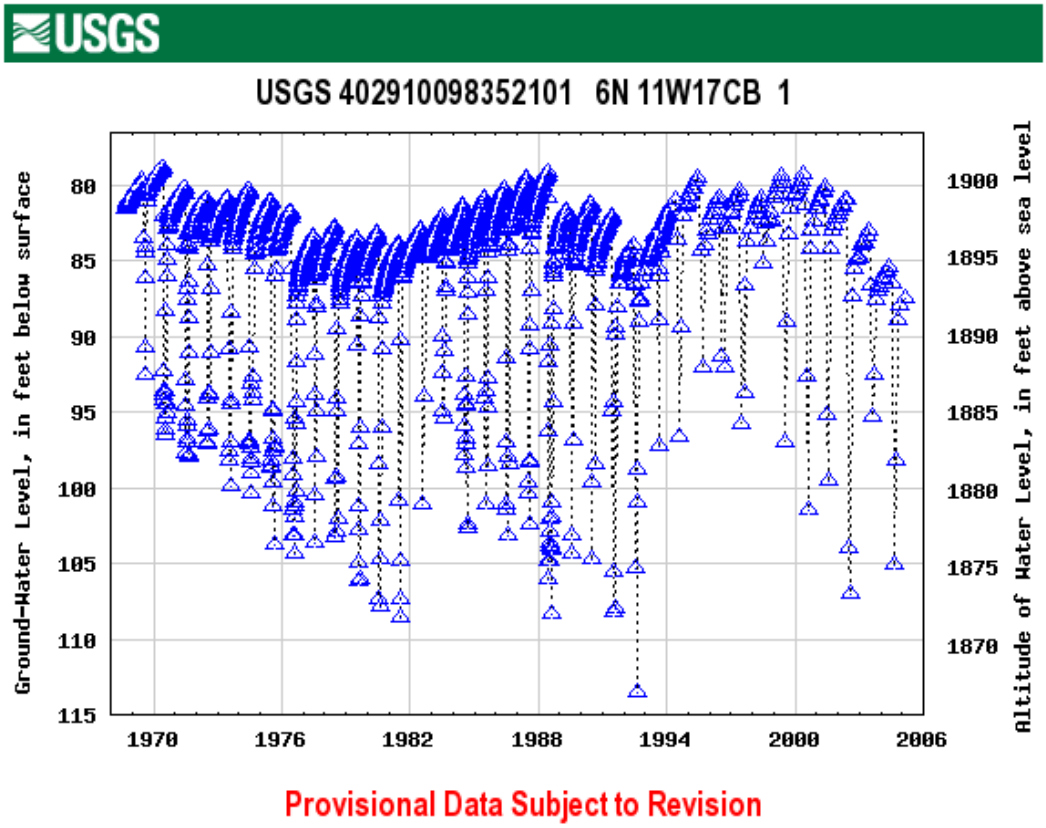
Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

0 4 8 16 24 32 Miles

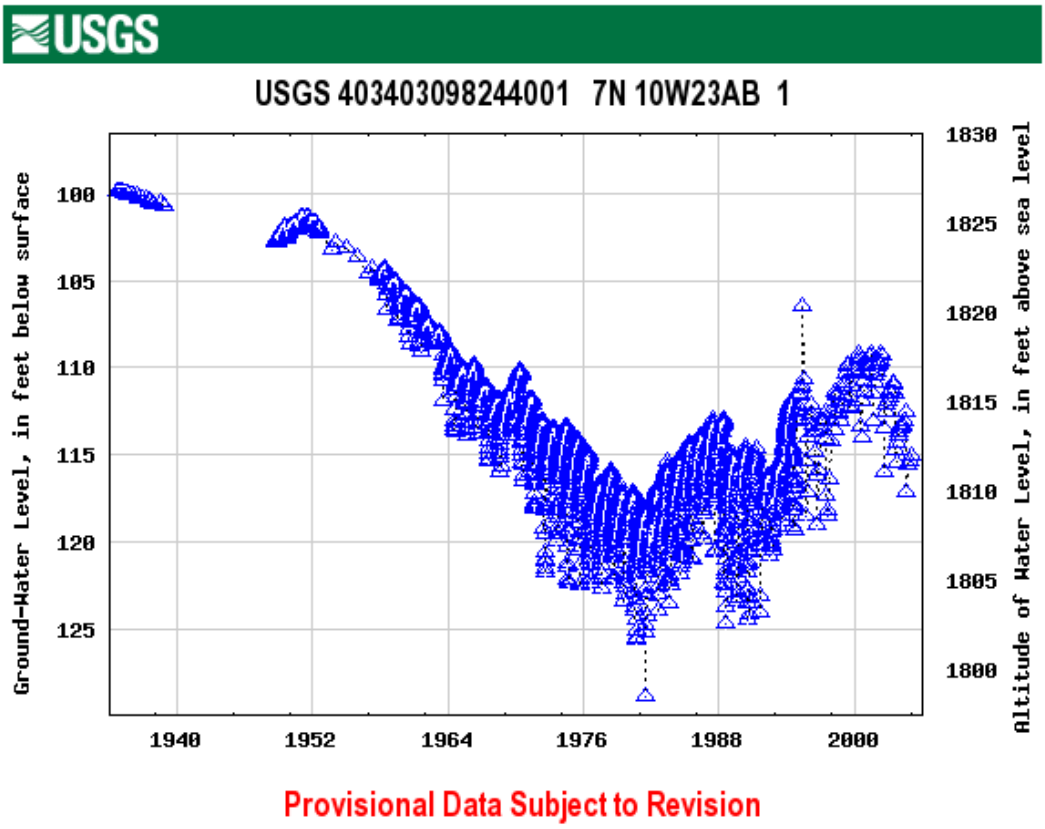
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Ground water hydrograph map produced by Kevin J. Schwartman, November 1, 2005.

Figure LB-26.



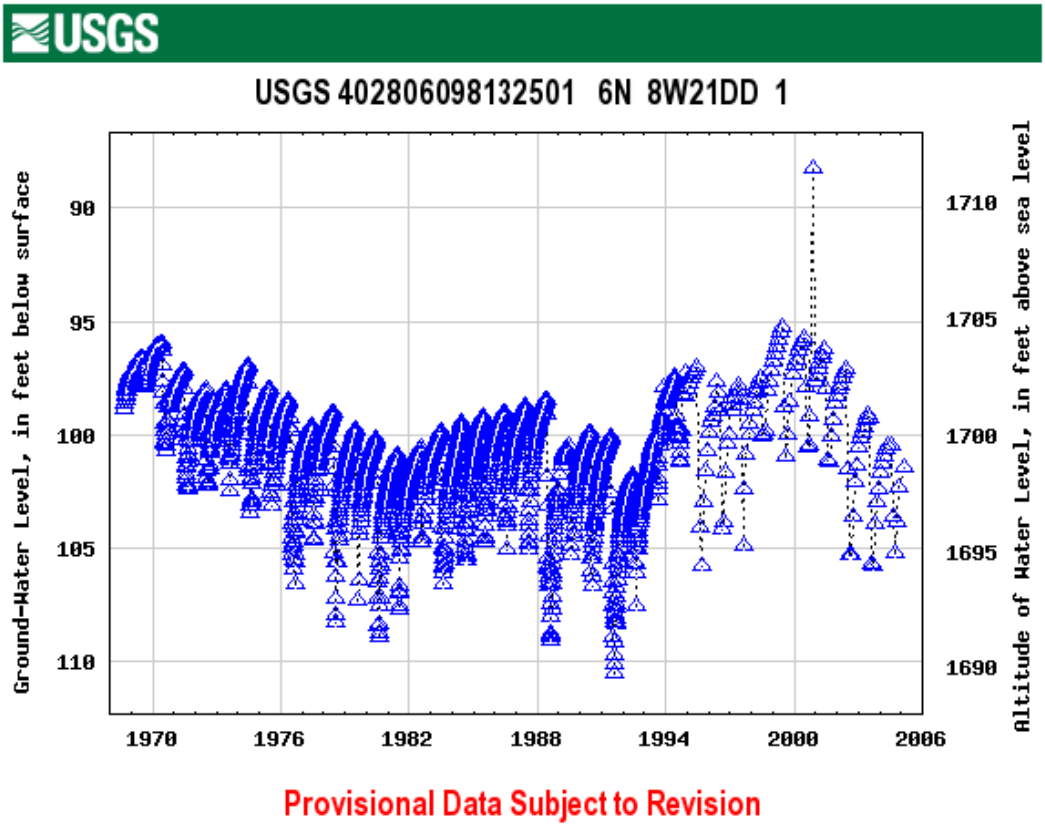
Adams County, Nebraska
Hydrologic Unit Code 10270206
Latitude 40°29'10", Longitude 98°35'21" NAD27
Land-surface elevation 1,980. feet above sea level NGVD29
The depth of the well is 210 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure LB-27 (T 06N R 01W Section 17)



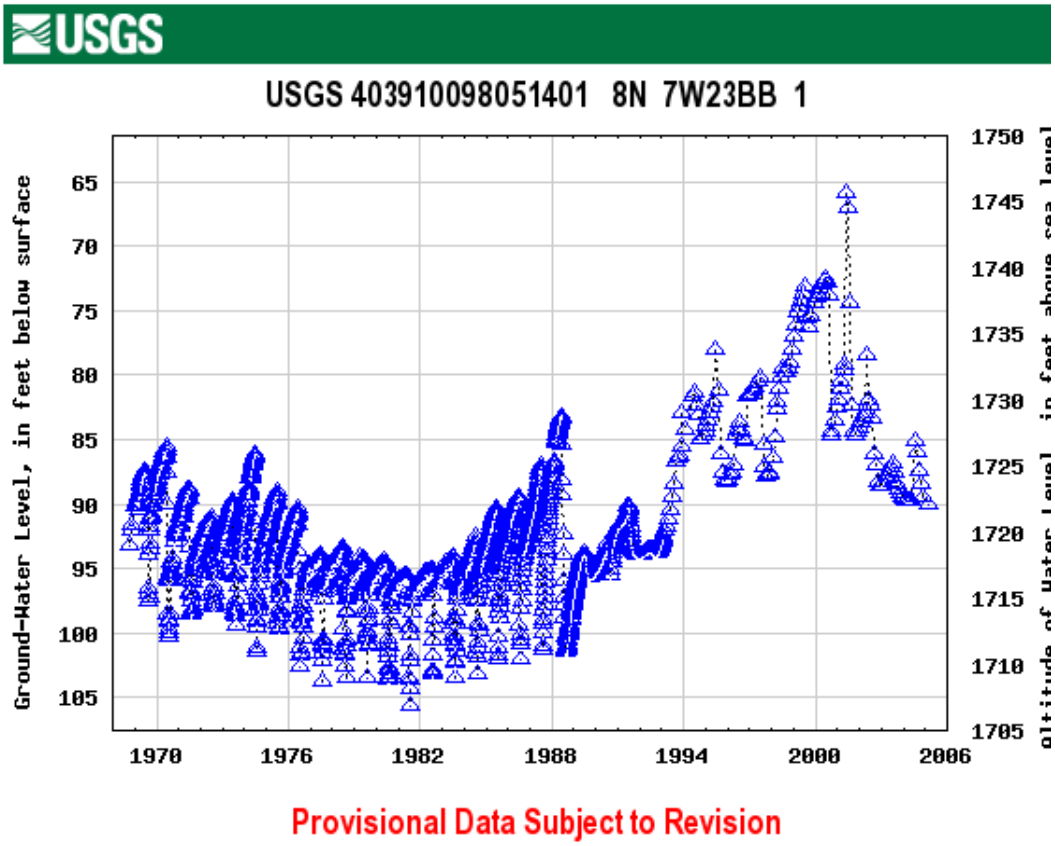
Adams County, Nebraska
Hydrologic Unit Code 10270206
Latitude 40°34'03", Longitude 98°24'40" NAD27
Land-surface elevation 1,927. feet above sea level NGVD29
The depth of the well is 155 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure LB-28 (T 07N R 10W Section 23)



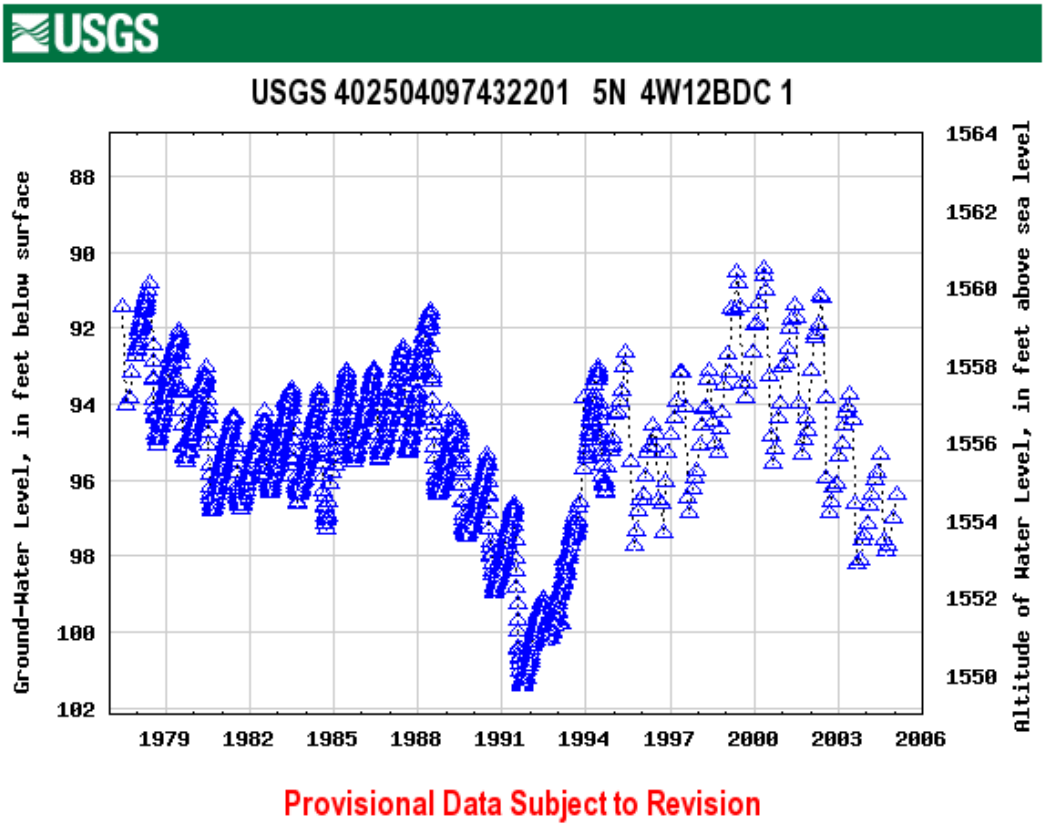
Clay County, Nebraska
Hydrologic Unit Code 10270206
Latitude 40°28'06", Longitude 98°13'25" NAD27
Land-surface elevation 1,800. feet above sea level NGVD29
The depth of the well is 205 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure LB-29 (T 06N R 08W Section 21)



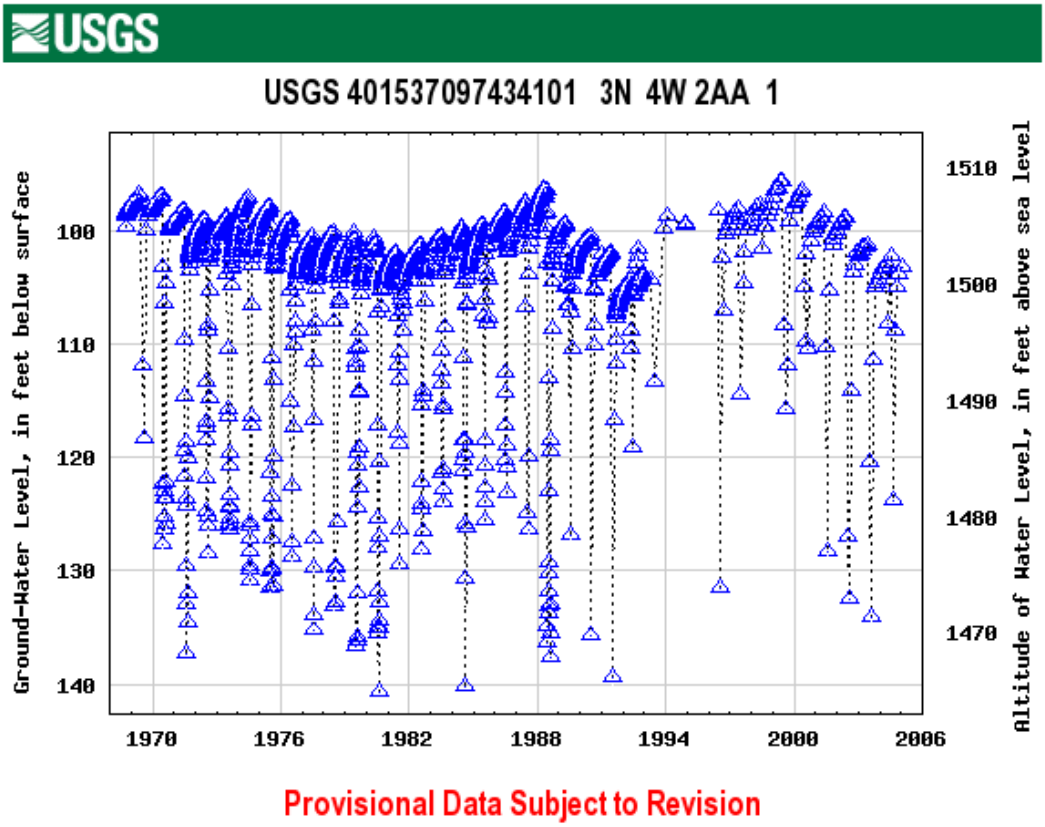
Clay County, Nebraska
Hydrologic Unit Code 10270203
Latitude 40°39'10", Longitude 98°05'14" NAD27
Land-surface elevation 1,812. feet above sea level NGVD29
The depth of the well is 206 feet below land surface.
This well is completed in the This well is completed in the
QUATERNARY SAND AND GRAVEL DEPOSITS
(112SDGV) local aquifer.

Figure LB-30 (T 08N R 07W Section 23)



Fillmore County, Nebraska
Hydrologic Unit Code 10270206
Latitude 40°25'04", Longitude 97°43'22" NAD27
Land-surface elevation 1,651. feet above sea level NGVD29
The depth of the well is 260 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure LB-31 (T 05N R 04W Section 12)



Thayer County, Nebraska
Hydrologic Unit Code 10270206
Latitude 40°15'37", Longitude 97°43'41" NAD27
Land-surface elevation 1,605.00 feet above sea level NGVD29
The depth of the well is 195 feet below land surface.
This well is completed in the QUATERNARY SAND AND GRAVEL DEPOSITS (112SDGV) local aquifer.

Figure LB-32 (T 03N R 04W Section 02)

Figure LB-33. Annual Flows, Big Sandy Creek at Alexandria.

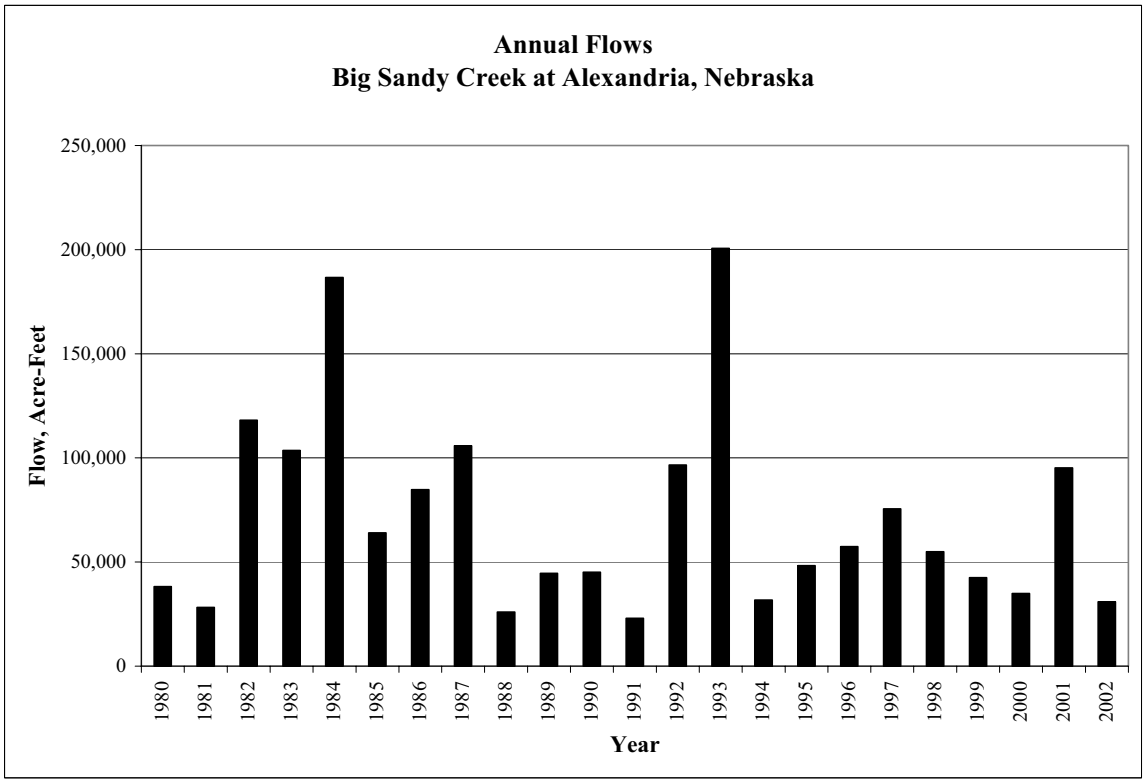
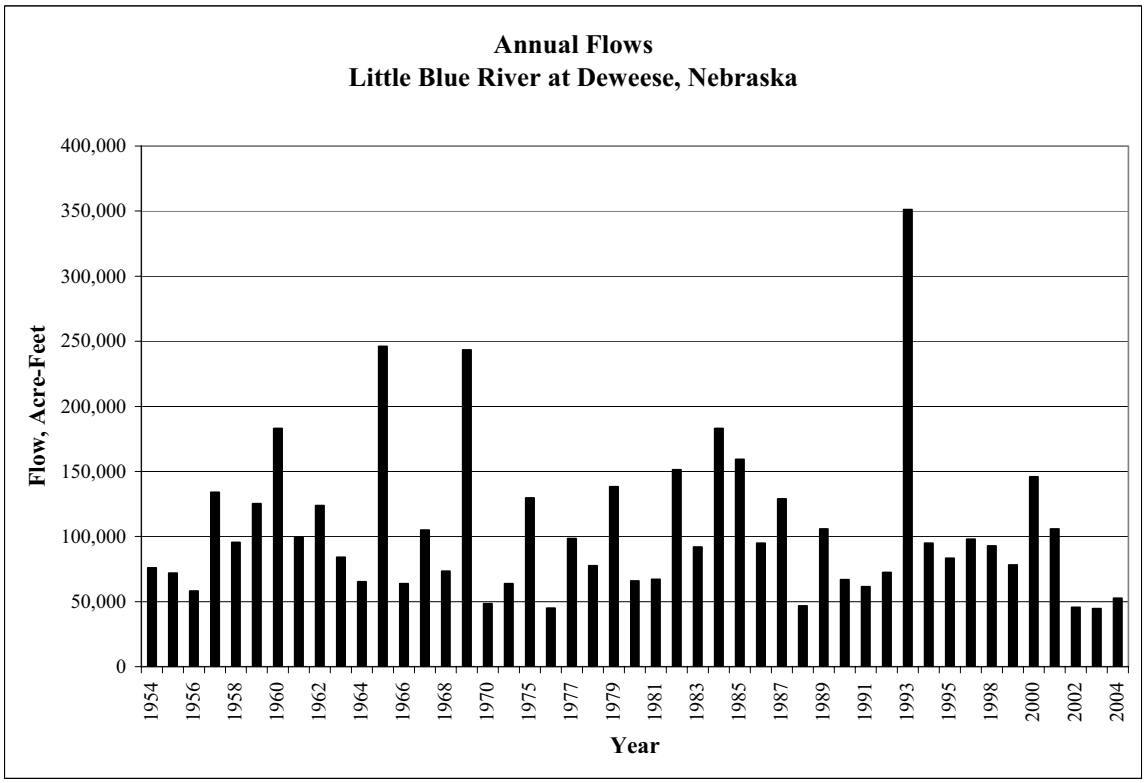


Figure LB-34. Annual Flows, Little Blue River at Deweese.



Data from: US Geological Survey and NE Department of Natural Resources

Figure LB-35. Annual Flows, Little Blue River at Alexandria.

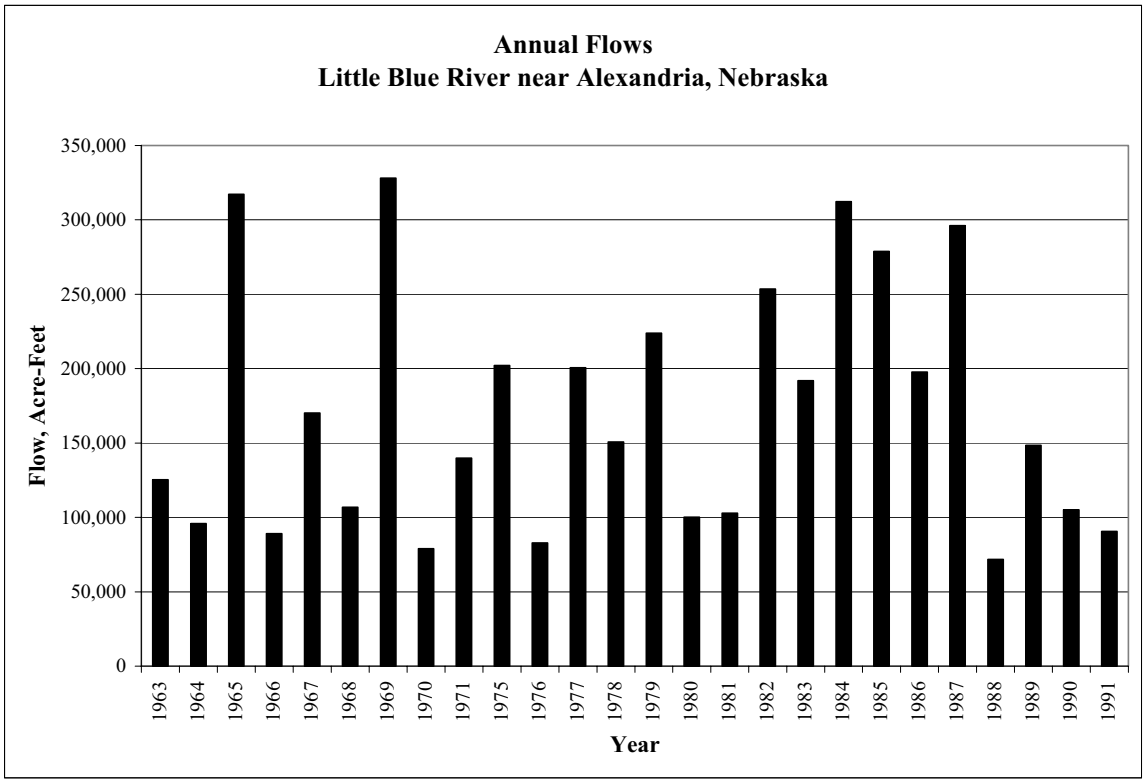
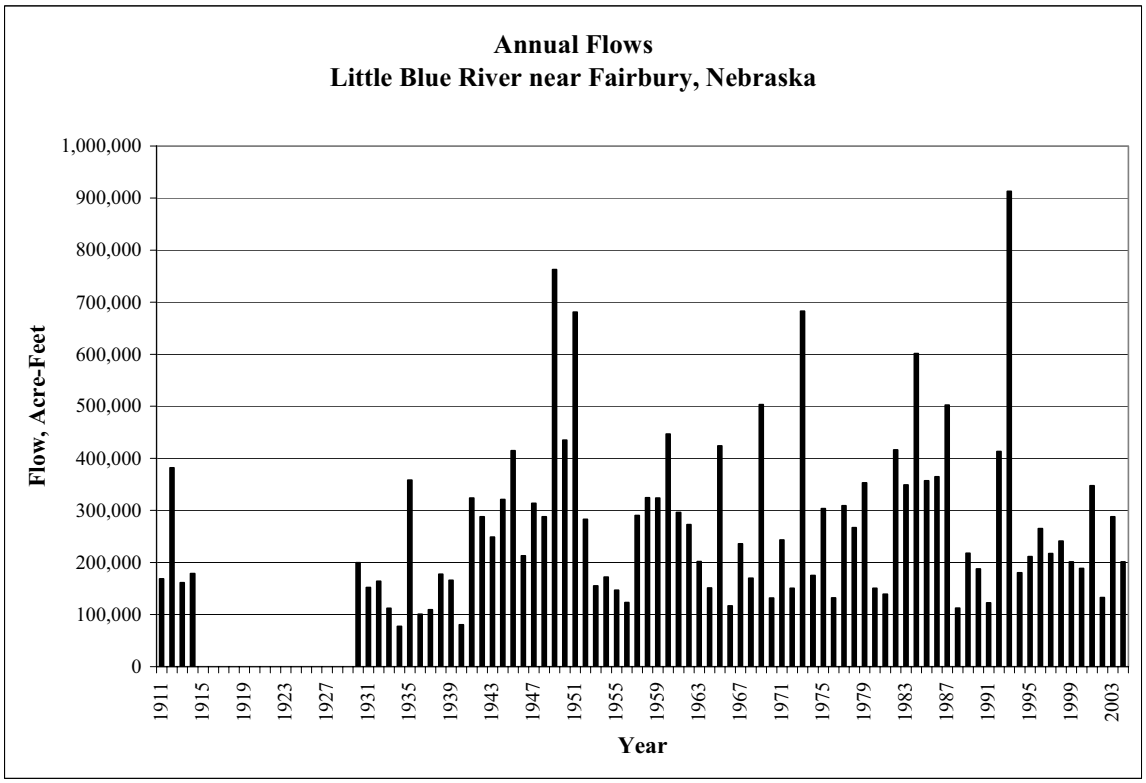
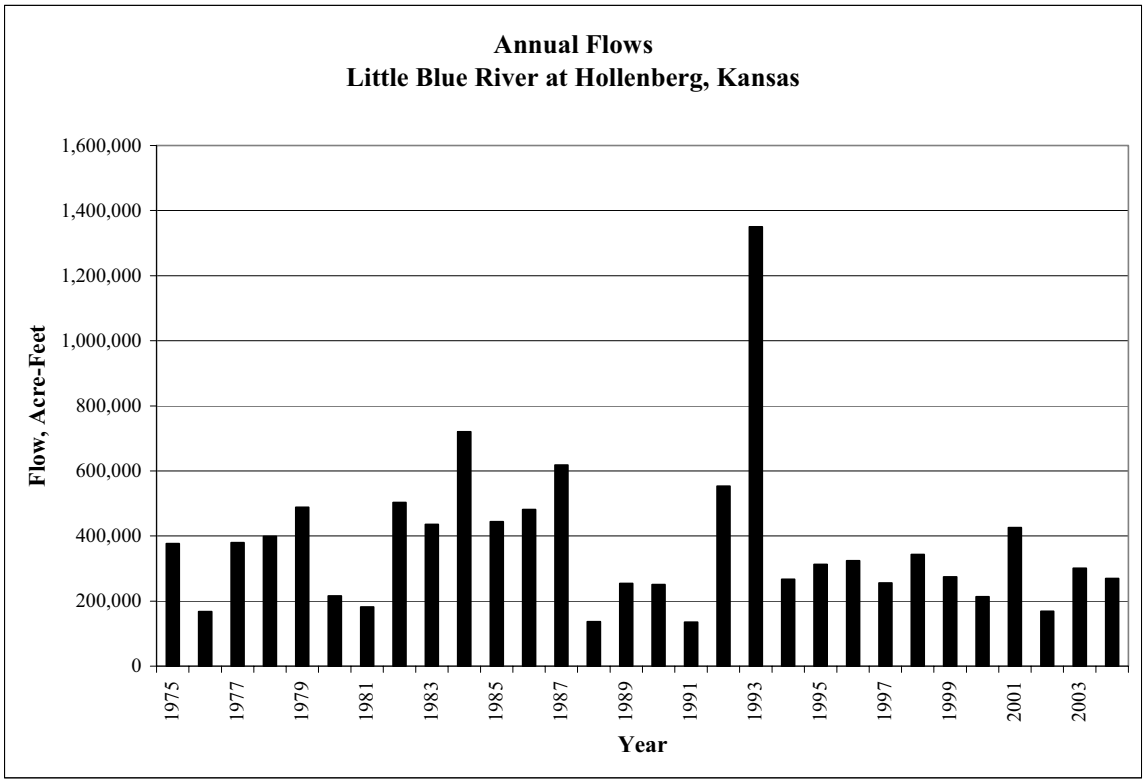


Figure LB-36. Annual Flows, Little Blue River near Fairbury.



Data from: US Geological Survey and NE Department of Natural Resources

Figure LB-37. Annual Flows, Little Blue River at Hollenberg, Kansas.

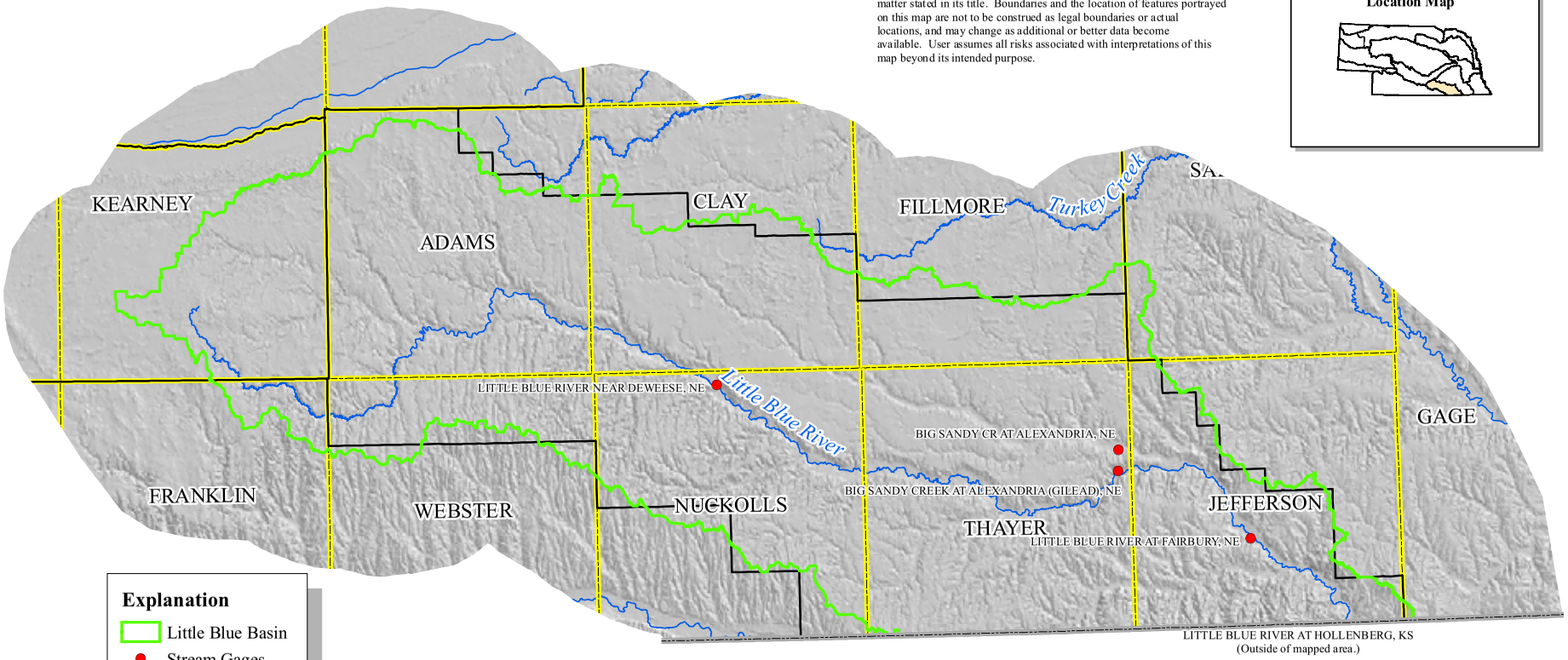


Data from: US Geological Survey and NE Department of Natural Resources

Planning and Assistance Division

Stream Gages

LITTLE BLUE RIVER BASIN



This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.

Location Map

Explanation

- Little Blue Basin
- Stream Gages
- Major Streams

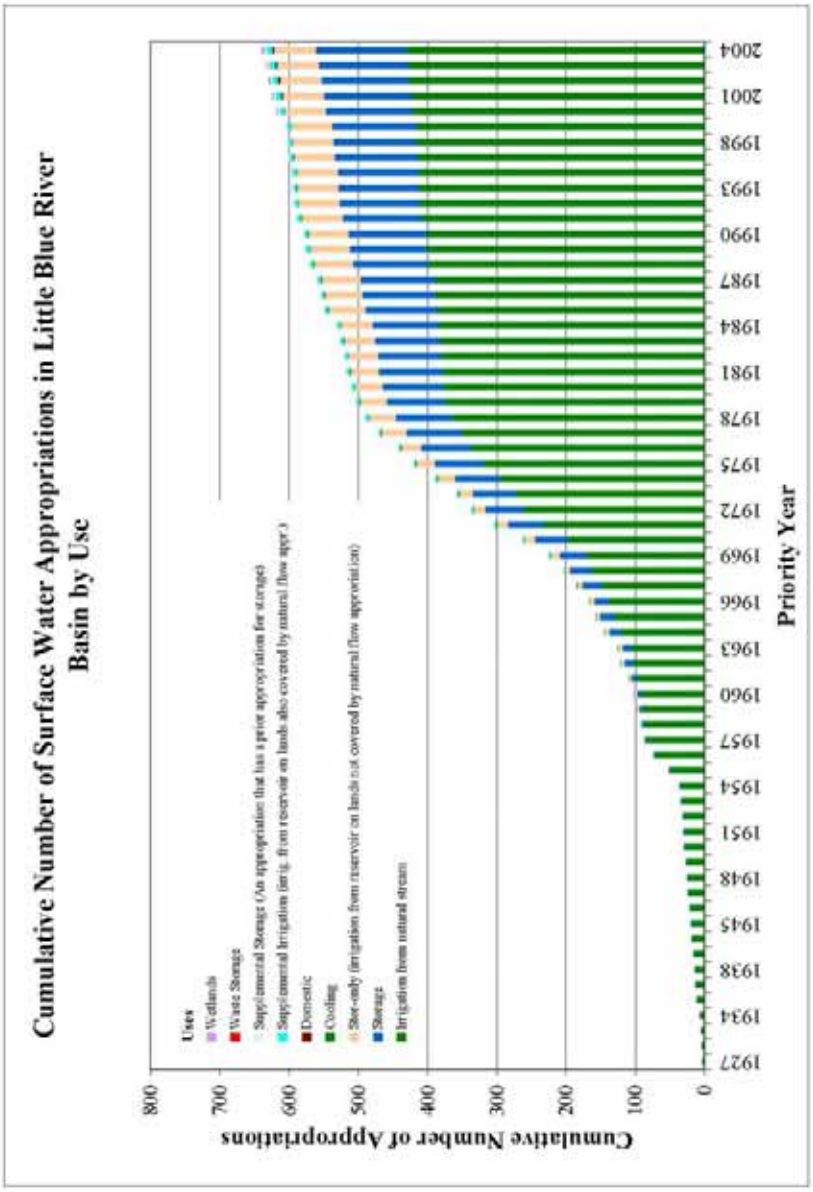
Cultural Features

- County Boundary
- State Boundary
- NRD Boundary

0 4 8 16 24 32 **Miles**

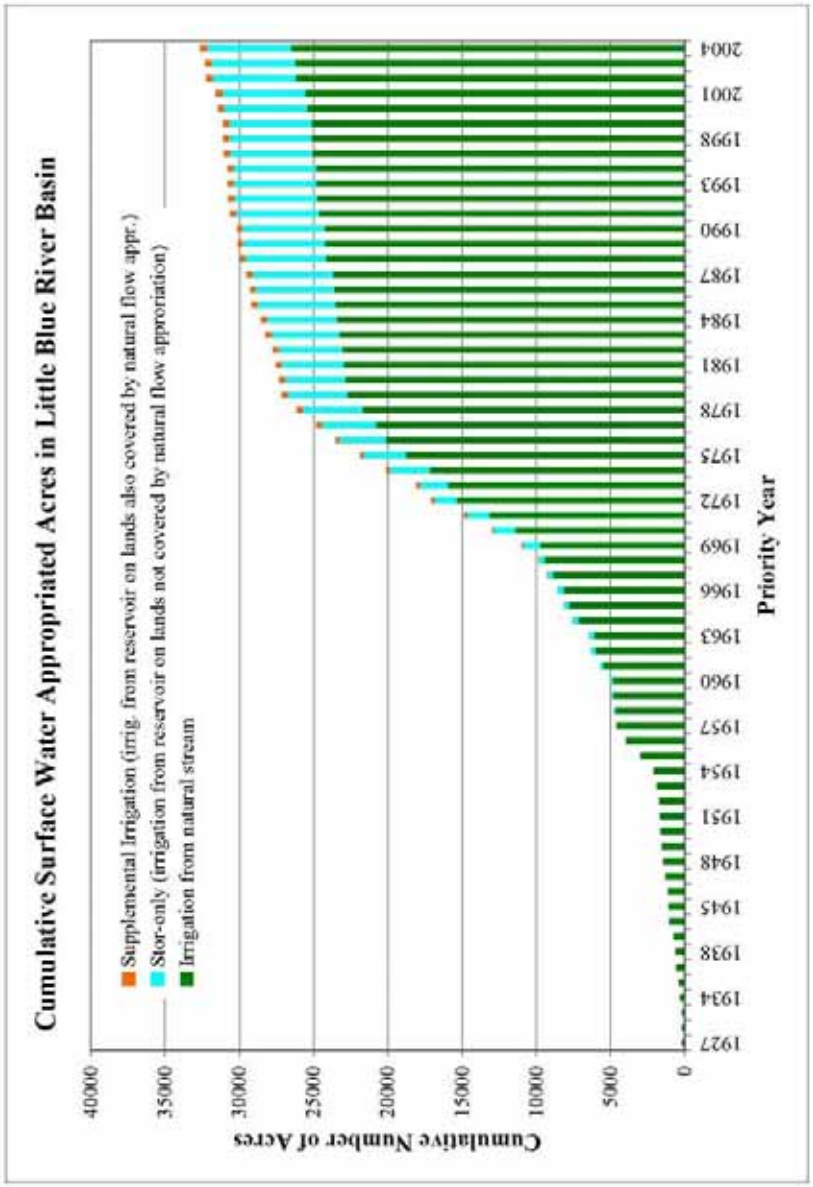
Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Stream gages map produced by Jeff Shafer, October 19, 2005.

Figure LB-38.



11/23/2005 by Shuhai Zheng

Source: DNR Surface Water Rights Database
Figure LB-39



11/23/2005 by Shuhai Zheng

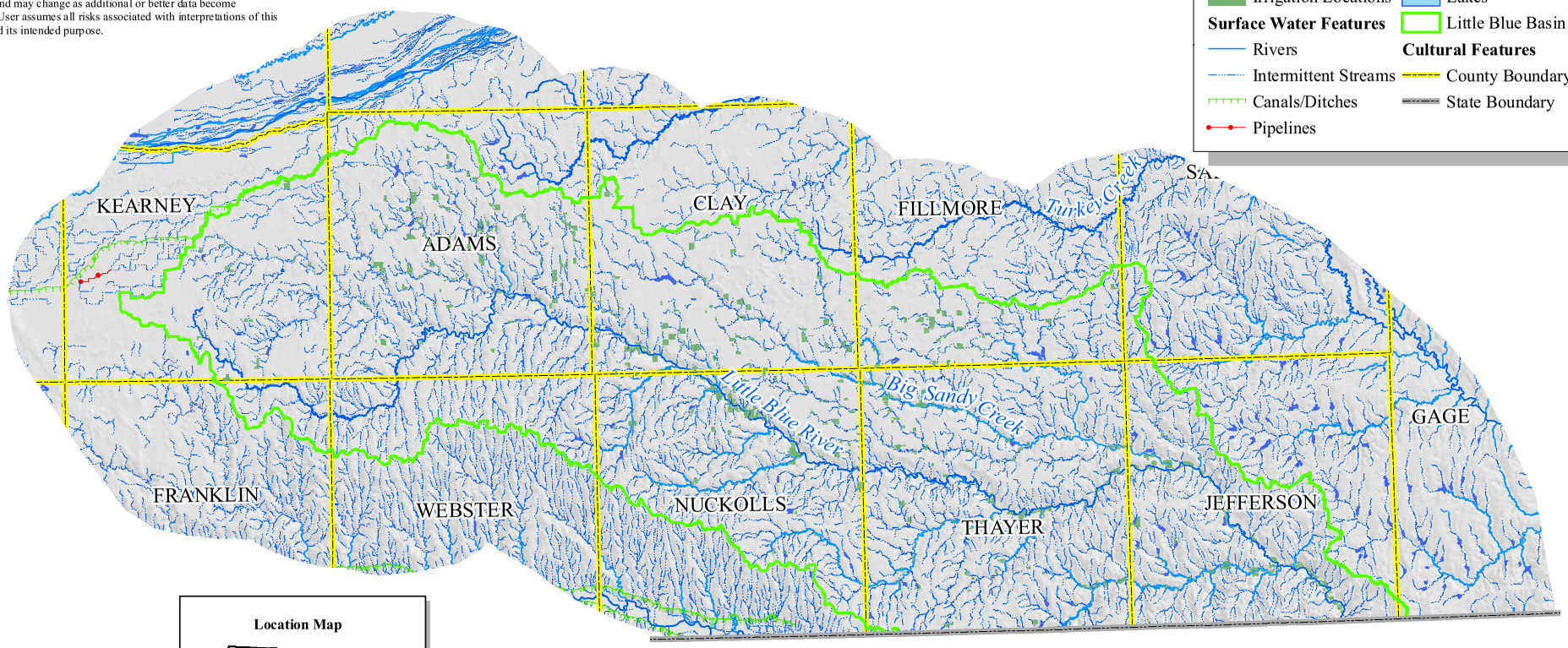
Source: DNR Surface Water Rights Database
Figure LB-40

Surface Water Irrigation Locations

LITTLE BLUE RIVER BASIN

Planning and Assistance Division

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.



Explanation

- Irrigation Locations
- Lakes
- **Surface Water Features**
- Little Blue Basin
- Rivers
- **Cultural Features**
- Intermittent Streams
- County Boundary
- Canals/Ditches
- State Boundary
- Pipelines

Location Map

Surface water irrigation location information digitized by DNR staff from surface water irrigation application maps.

0 4 8 16 24 32 Miles

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Surface water irrigation locations map produced by Jeff Shafer, October 12, 2005

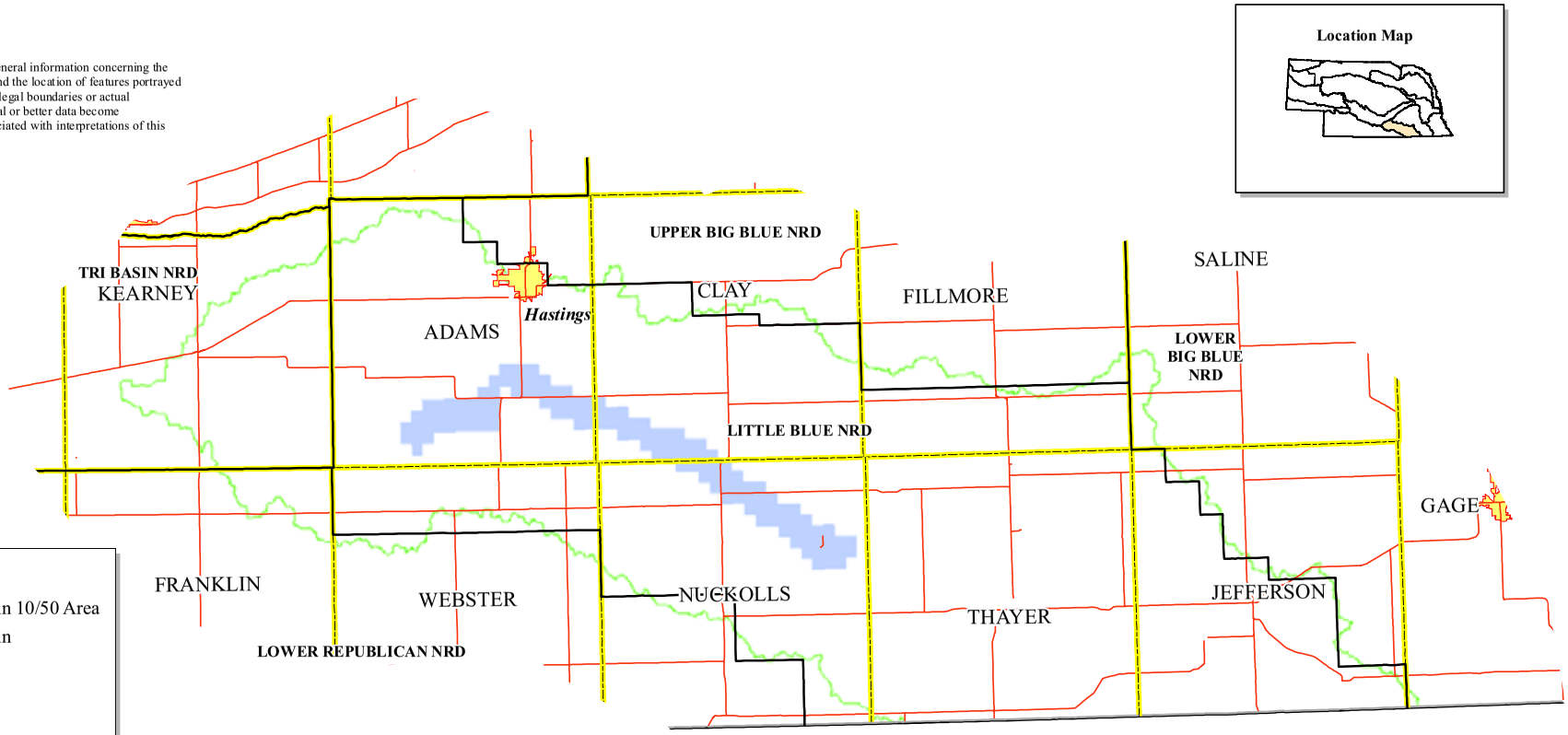
Figure LB-41.

Planning and Assistance Division

Map of Geographic Area within which Surface Water and Ground Water Are Hydrologically Connected For Purposes of the Determination of Fully Appropriated

NEBRASKA DEPARTMENT OF NATURAL RESOURCES
LITTLE BLUE RIVER BASIN

This map is intended to supply only general information concerning the matter stated in its title. Boundaries and the location of features portrayed on this map are not to be construed as legal boundaries or actual locations, and may change as additional or better data become available. User assumes all risks associated with interpretations of this map beyond its intended purpose.



Explanation

- Little Blue River Basin 10/50 Area
- Little Blue River Basin

Cultural Features

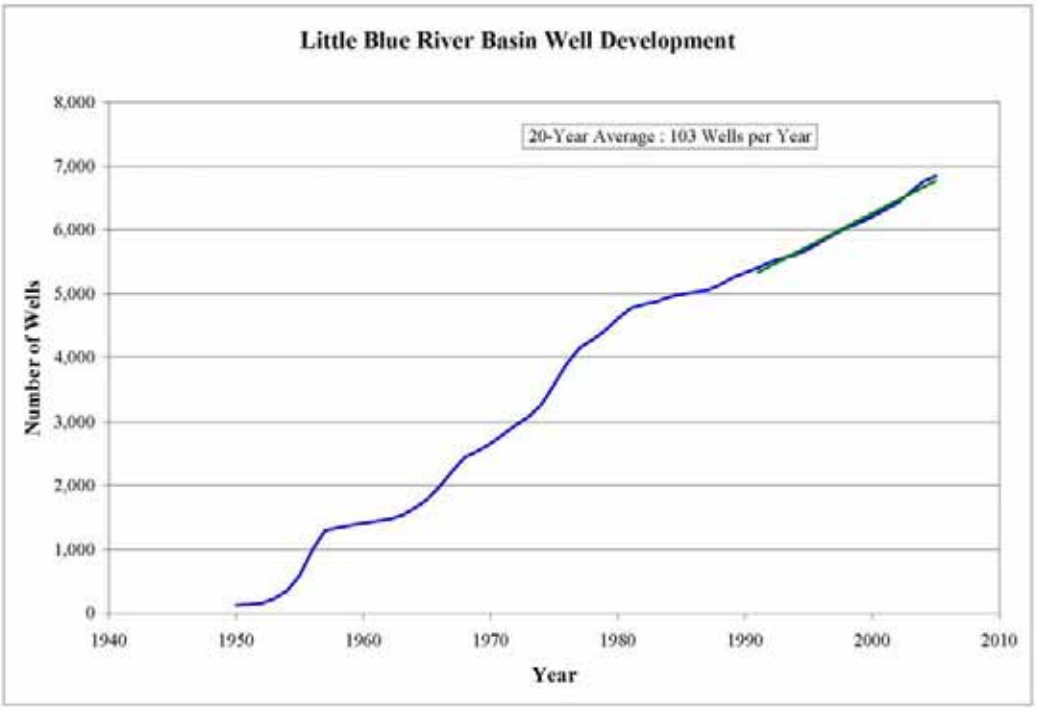
- County Boundary
- State Boundary
- Highways
- NRD Boundary
- Cities

Figure LB-42.

0 4 8 16 24 32 Miles

Jeff Shafer, Nebraska Department of Natural Resources
September 26, 2005

Figure LB-43. Historic High Capacity Well Development in the Little Blue River Basin.

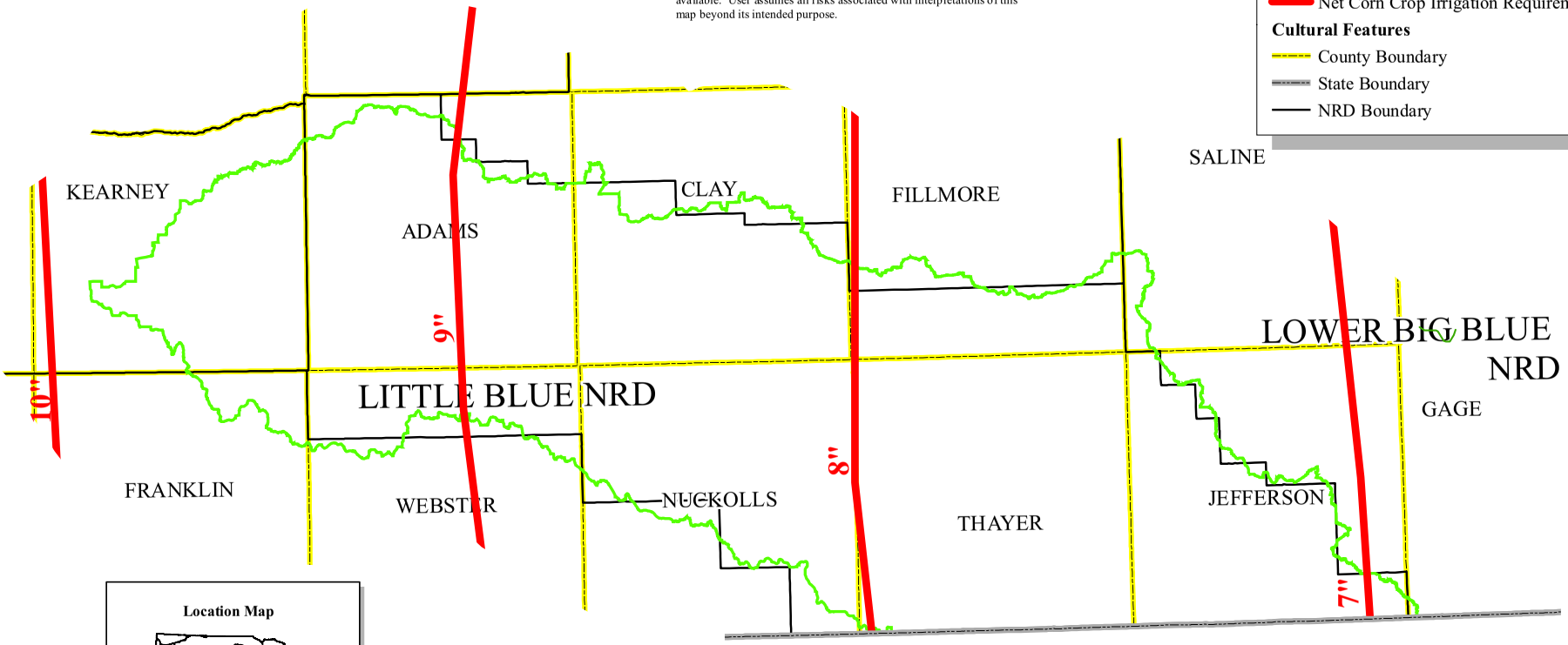


Source: DNR Registered Ground Water Well Database

Planning and Assistance Division

Net Corn Crop Irrigation Requirement

LITTLE BLUE RIVER BASIN



Source: Martin, 2005; Appendix C

Base map produced by Josh Lear, February 4, 2005
Base map approved February 4, 2005
Corn crop irrigation requirement map produced by Kevin J. Schwartman, December 7, 2005

Figure LB-44.

Bibliography of Hydrogeologic References for Little Blue Basin

Citation

Bartz, P.A., and Peckenpaugh, J.M., 1986, Hydrologic data for the south-central area, Nebraska: U.S. Geological Survey Open-File Report 86-246, 78 pages.

Citation

Bentall, R.& Hamer, T., 1980, Stream-Aquifer Relationships in Nebraska: UNL Conservation and Survey Division and Nebraska Department of Water Resources, 102 pages, 171 illustrations.

Citation

Boohar, J.A., and Provaznik, Mary Kay, 1996, Peak flows for the period of record for current and discontinued streamflow stations in Nebraska: U.S. Geological Survey Open-File Report 96-101, 518 pages.

Citation

Carlson, M.P., 1993, Geology, Geologic Time and Nebraska: Conservation and Survey Division Educational Circular No. 10, August 1993, 60 pages.

Citation

Channel, C.B., 1901, Third Biennial Report of the State Engineer, Secretary of the State Board of Irrigation to the Governor of Nebraska 1899 abd 1900: Hunter Woodruff Printing Co. Lincoln, Nebraska, 220 pages.

Citation

Chen, H.H. and Druliner, A.D., 1987, Nonpoint-source agricultural chemicals in ground water in Nebraska—Preliminary results for six areas of the High Plains aquifer: U.S. Geological Survey Water-Resources Investigations Report 86-4338, 68 pages.

Citation

Chen, X.H., 2004, Streambed Hydraulic Conductivity for Rivers in South-Central Nebraska, Journal of the American Water Resources Association (JAWRA) 40(3):561-573.

Citation

Diffendal, R.F., 1987, Geology of Rock Creek Station State Historical Park. Lincoln: Conservation and Survey Division, IANR, University of Nebraska, [1987?]

Citation

Dreeszen, V.H., 1950, A subsurface study of the Pleistocene deposits in Kearney County and adjoining parts of Adams, Franklin, and Webster Counties, Thesis (M.S.)--University of Nebraska (Lincoln campus)-1950.

Citation

Druliner, A.D., Chen, H.H., and McGrath, T.S., 1996, Relations of nonpoint-source nitrate and atrazine concentrations in the High Plains aquifer to selected explanatory variables in six Nebraska study areas:
U.S. Geological Survey Water-Resources Investigations Report 954202, 51 pages.

Citation

Dugan, J. T., 1984, Hydrologic characteristics of Nebraska soils: U.S. Geological Survey Water-Supply Paper 2222, 19 pages, 12 pls.

Citation

Dugan, J.T., and Zelt, R.B., 2000, Simulation and analysis of soil-water conditions in the Great Plains and adjacent areas, central United States, 1951-80: U.S. Geological Survey Water-Supply Paper 2427, 81 pages.

Citation

Ellis, M.J., 1981, Analysis of stream-aquifer system interrelationships in the Big Blue and Little Blue River Basins in Gage and Jefferson Counties, Nebraska: U.S. Geological Survey Water-Resources Investigations Report 81-29, 49 pages.

Citation

Ellis, M.J., Engberg, R.A., Kastner, W.M., and Steele, E.K., Jr., 1985, Nebraska ground-water resources, in National Water Summary 1984-hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, pages 291-296.

Citation

Emery, P.A., 1964, Basin-Data Report Saline County, Nebraska: Prepared cooperatively by the U.S. Geological Survey and the University of Nebraska Conservation and Survey Division, Nebraska Water Survey Paper Number 15, July 1964, 29 pages.

Citation

Emery, P.A., 1965, Effect of ground-water pumping on streamflow and ground-water levels, Blue River Basin, Nebraska, Lincoln, Neb. :
U.S. Dept. of the Interior, Geological Survey Open-File Report, May 1965, 11 pages.

Citation

Emery, P. A. 1965. Effect of Ground Water Pumping on Streamflow and Ground Water Levels, Blue River Basin, Nebraska (OFR-0).

Citation

Emery, P. A., 1966 (RS-1082). Use of Analog Model to Predict Streamflow Depletion, Big and Little Blue River Basin, Nebraska. Ground Water 4(4): 7 pages. October 1966.

Citation

Emery, P.A., 1966, Geohydrology of Saline County, Nebraska: U.S. Geological Survey Hydrologic Atlas HA-216.

Citation

Fischer, B.C., Kollasch, K.M., and McGuire, V.L., 2000, Digital data set of water-level changes in the High Plains aquifer in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming, 1980 to 1997: U.S. Geological Survey Open-File Report 00-96,
(http://water.usgs.gov/lookup/getspatial?OFR0096).

Citation

Hassan, K.M., 1998, Environmental changes within the last 5,000 years from geochemical and stable isotopic compositions in sediment cores from Swan Lake, Nebraska, USA, Thesis (Ph.D.)--University of Nebraska--Lincoln, 1998.

Citation

Hedman, E. R., Engel, Glenn B., 1989, Flow characteristics for selected streams in the Great Plains subregion of the central Midwest regional aquifer system and selected adjacent areas--Kansas and Nebraska, and parts of Colorado, Iowa, Missouri, New Mexico, Oklahoma, South Dakota, Texas and Wyoming: Hydrologic Atlas 708.

Citation

Heimes, F.J., and Luckey, R.R., 1980, Evaluating methods for determining water use in the High Plains in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming, 1979: U.S. Geological Survey Water-Resources Investigations Report 80-111, 118 pages.

Citation

Heimes, F.J., and Luckey, R.R., 1982, Method for estimating historical irrigation requirements from ground water in the High Plains aquifer in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Water-Resources Investigations Report 82-40, 64 pages.

Citation

Heimes, F.J., and Luckey, R.R., 1983, Estimating 1980 ground-water pumpage for irrigation on the High Plains in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Water-Resources Investigations Report 83-4123, 36 pages.

Citation

Helgesen, J.O., Leonard, R.B., and Wolf, R.J., 1993, Hydrology of the Great Plains Aquifer System in Nebraska, Colorado, Kansas, and Adjacent Areas: U.S. Geological Survey Professional Paper 1414-E, 80 pages, 10 plates (photocopy).

Citation

Hiergesell, R.A., 1984, Descriptive, geologic, and borehole geophysical logs for 23 test holes in south- central Nebraska: U.S. Geological Survey Open-File Report 84-073, 143 pages.

Citation

Joeckel, R. M., and others. 2001. Dakota Formation (Cretaceous, Albian) Fluvial to Estuarine Sediments in the Lowermost Platte Valley, Nebraska (OFR-61). 52 pages.

Citation

Johnson, C.R., 1960, Geology and ground water in the Platte-Republican Rivers watershed and the Little Blue River basin above Angus, Nebraska: U.S. Geological Survey Water-Supply Paper 1489, 142 pages.

Citation

Kastner, W.M., Schild, D.E. and Spahr, D.S., 1989, Water-level changes in the High Plains aquifer underlying parts of South Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Oklahoma, and Texas--Predevelopment through nonirrigation season 1987-88: U.S. Geological Survey Water- Resources Investigations Report 89 4073, 61 pages.

Citation

Keech, C.F., 1957, Water levels in observation wells in Nebraska during 1956: U.S. Geological Survey Open File Report 57-61,123 pages.

Citation

Keech, C.F., and Dreeszen, V.H., 1959, Geology and ground-water resources of Clay County, Nebraska: U.S. Geological Survey Water-Supply Paper 1468, 157 pages.

Citation

Keech, C.F., 1960, Wells in Fillmore County, Nebraska: Prepared cooperatively by the U.S. Geological Survey and the University of Nebraska Conservation and Survey Division, Nebraska Water Survey Paper Number 8, November 1960, 39 pages.

Citation

Kowalski, J.F., 1959, The Pre-Pleistocene geology of Thayer county, Nebraska, Thesis (M.S.)--University of Nebraska (Lincoln campus)1959.

Citation

Lichtler, W.F., Stannard, D.I., and Kouma, E., 1980, Investigation of artificial recharge of aquifers in Nebraska: U.S. Geological Survey Open-File Report 80-93, 112 pages.

Citation

Little Blue Natural Resources District, 1977, Groundwater in the Little Blue Basin: An Informational Series.

Citation

Little Blue Natural Resources District, 1980 (?), Groundwater Management in the Little Blue Basin: Informational Series II.

Citation

Lugn, A.L., and Wenzel, L.K., 1938, Geology and ground-water resources of south-central Nebraska, with special reference to the Platte River Valley between Chapman and Gothenburg: U.S. Geological Survey Water-Supply Paper 779, 242 pages.

Citation

Martin, L.D., 1969, A medial Pleistocene fauna from near Angus, Nuckolls county, Nebraska, Thesis (M.S.)--University of Nebraska (Lincoln campus)-1969.

Citation

McGrath, T.S., and Dugan, J.T., 1993, Water-level changes in the High Plains aquifer--Predevelopment to 1991: U.S. Geological Survey Water-Resources Investigations Report 93-4088, 53 pages.

Citation

McGuire, V.L., and Sharpe, J.B., 1997, Water-level changes in the High Plains aquifer, 1980 to 1995: U.S. Geological Survey Fact Sheet FS-068-97, 4 pages, http://www-ne.cr.usgs.gov/highplains/hpfs95_txt.html

Citation

McGuire, V.L., and Fischer, B.C., 1999, Water-level changes, 1980 to 1997, and saturated thickness, 1996 97, in the High Plains aquifer: U.S. Geological Survey Fact Sheet FS-124-99 4 pages http://www-ne.cr.usgs.gov/highplains/hp97_web_report/fs-124-99.htm

Citation

McGuire, V.L., 2001, Water-level changes in the High Plains aquifer, 1980 to 1999: U.S. Geological Survey Fact Sheet FS-029-01, 2 pages.

Citation

McGuire, V.L., 2003, Water-level changes in the High Plains aquifer, predevelopment to 2001, 1999 to 2000, and 2000 to 2001: U.S. Geological Survey Fact Sheet 078-03, 4 pages. http://water.usgs.gov/pubs/fs/FS078-03/

Citation

McGuire, V.L., Johnson, M.R., Schieffer, R.L., Stanton, J.S., Sebree, S.K., and Verstraeten, I.M., 2003, Water in storage and approaches to ground-water management, High Plains aquifer, 2000: U.S. Geological Survey Circular 1243, 51 pages, http://pubs.water.usgs.gov/circ1243

Citation

McGuire, V.L., 2004, Water-level changes in the High Plains aquifer, predevelopment to 2002, 1980 to 2002, and 2001 to 2002: U.S. Geological Survey Fact Sheet 2004-3026, 6 pages, http://water.usgs.gov/pubs/fs/2004/3026/

Citation

McLean, J.S., Chen, H.H., and Goeke, J.W., 1997, Simulation of ground-water flow in the High Plains aquifer, southern sandhills area, west-central Nebraska: U.S. Geological Survey Open-File Report 96 206, 16 pages.

Citation

Miller, R.D., Van Horn, R., Dobrovolny, E., and Buck, L. P., 1964, Geology of Franklin, Webster, and Nuckolls Counties, Nebraska:
U.S. Geological Survey Bulletin 1165, 91 pages.

Citation

Miller, J.A., and Appel, C.L., 1997, Ground water atlas of the United States—Segment 3, Kansas, Missouri, Nebraska: U.S. Geological Survey Hydrologic Atlas HA 730-D, 24 pages.

Citation

Morganwalp, D. W., and Aronson, D. A., 1996, US Geological Survey Toxic Substances Hydrology Program; proceedings of the technical meeting, Colorado Springs, Colorado, September 20-24, 1993: .S. Geological Survey Water-Resources Investigations Report 94-4015, 1113 pages.

Citation

Mundorff, J. C., and Waddell, K. M., 1966, Fluvial sediment and chemical quality of water in the Little Blue River basin, Nebraska and Kansas: U.S. Geological Survey Water-Supply Paper 1819-H, 45 pages.

Citation

Nebraska Department of Natural Resources, 1983, Report on the Big and Little Blue River Basins Area Planning Study Technical Appendices: Nebraska Department of Natural Resources Planning Division Comprehensive Planning Section.

Citation

Nebraska Department of Natural Resources, 2004, Irrigation and Reclamation Districts and Water Delivery Companies, September 2004, 32 pages.

Citation

Nebraska Game and Parks Commission, 1983, NEBRASKAland Magazine's Nebraska Rivers: Published by the Nebraska Game and Parks Commission, Vol. 61, No. 1, January-February 1983, 146 pages.

Citation

Nebraska Natural Resources Commission, 1976, Little Blue River Basin Water Quality Management Plan: Prepared by Nebraska Natural Resources Commission for implementation by Nebraska Department of Environmental Control in Cooperation with the Nebraska State Office of Planning and Programming, February 1976.

Citation

Nebraska Natural Resources Commission, 1986, Policy Issue Study on Integrated Management of Surface Water and Groundwater, State Water Planning and Review Process Nebraska Natural Resources Commission, April 1986, 139 pages.

Citation

Nebraska Natural Resources Commission, 1998, Estimated Water Use In Nebraska, 1995: Prepared in Cooperation with the U.S. Geological Survey, April 1998, 64 pages.

Citation

Nebraska Water Resources Center University of Nebraska-Lincoln, 1982, Water Resources Publications Related to the State of Nebraska, Fifth Edition, NWRC Publication No. 7, 165 pages.

Citation

Noffke, M.H., Axthelm, D.D. and Mulliner, H.R., 1975, Benedict project, An Investigation of Voluntary Groundwater Allocation in the Blue River Basin of Nebraska: Prepared and Distributed by the Blue River Association of Groundwater Conservation Districts, November 1975, 33 pages.

Citation

Pettijohn, R.A., and Chen, H.H., 1983b, Hydraulic conductivity, specific yield, and pumpage-High Plains aquifer system, Nebraska: U.S. Geological Survey Water-Resources Investigations Report 82 4014, scale 1:175,000, 3 sheets.

Citation

Pettijohn, R.A., and Chen, H.H., 1983a, Geohydrology of the High Plains aquifer system in Nebraska: U.S. Geological Survey Open-File Report 82-502, scale 1:175,000, 3 sheets.

Citation

Reed, E.C. and Dreeszen, V.H., 1965, Revision of the Classification of the Pleistocene Deposits of Nebraska: Nebraska Geological Survey Bulletin, No. 23 June 1965, Published by the University of Nebraska Conservation and Survey Division, 65 pages.

Citation

Spalding, M. E. 1988. An Appraisal of the Effects of Artificial Recharge on Groundwater at Structure 35-5-2 in the Big Sandy Creek Watershed (OFR-40).

Citation

Stamer, J.K., Jordan, P.R., Engberg, R.A. and Dugan, J.T., 1987, Surface Wter-Quality Assessment of the Lower Kansas River Basin, Kansas and Nebraska: Project Description: U.S. Geological Survey Open-File Report 87-105, 36 pages.

Citation

Steele, E., 1973, Groundwater Withdrawal Studies for Clay, Hamiltion, Seward, and York Counties in Nebraska: U.S. Geological Survey (unpublished ?).

Citation

Stoffey, P.S., 1968, Transmissibility of the Little Blue River basin in southeastern Nebraska, Thesis (M.S.)--University of Nebraska (Lincoln campus)-1968.

Citation

Swinehart, J.B., Souders, V.L., DeGraw, H.M., and Diffendal, R.F. Jr., 1985, Cenozoic Paleogeography of Western Nebraska: Rocky Mountain Paleogeography Symposium 3, Rocky Mountain Section - S.E.P.M. Cenozoic Paleogeography of the West-Central U.S., R.M. Flores and SS Kaplain, Editors: Denver, CO 1985, pp 209 - 230.

Citation

Tanner, D.Q., Sanzolone, R.F., and Zelt, R.B., 1990, Surface-water-quality assessment of the lower Kansas River Basin, Kansas and Nebraska--Concentrations of major metals and trace elements in streambed sediments, 1987: U.S. Geological Survey Open-File Report 90-581, 73 pages.

Citation

Tanner, D.Q., 1995, Surface-water-quality assessment of the lower Kansas River basin, Kansas and Nebraska--Distribution of trace-element concentrations in dissolved and suspended phases, streambed sediment, and fish samples, May 1987 through April 1990: Lawrence, Kansas, U.S. Geological Survey Water-Resources Investigations Report 94-4201, 31 pages.

Citation

U.S. Bureau of Reclamation, 1962, Report on the Little Blue Unit, Nebraska Missouri River Basin Project Part 1 Revised: Region 7 Denver Colorado.

Citation

U.S. Bureau of Reclamation, 1962, Report on Little Blue Unit, Nebraska: Missouri River Basin Project, Volume 3 - Water Supply, May 1962.

Citation

U.S. Bureau of Reclamation, 1964, Summary of Kansas River BasinDepletion With Full Development of Proposed Federal Projects, Volume 4 Blue Division: Region 7 - Denver Colorado, May 1964.

Citation

U.S. Bureau of Reclamation, 1971, Little Blue Unit, Nebraska Feasibility Report: Blue Division Pick-Sloan Missouri River Basin Program, April 1971.

Citation

U.S. Bureau of Reclamation, 1981, Concluding Report Little Blue Unit: Blue Division Pick-Sloan Missouri River Basin Program, December 1981, 21 pages.

Citation

U.S. Dept. of Agriculture, 1972, Little Blue River Basin, Nebraska, water and related land resources / prepared by U.S. Dept. of Agriculture, Economic Research Service, Forest Service, Soil conservation Service, in cooperation with Niobrara River Association, Nebraska Natural Resources Commission. [Lincoln, Neb. : U.S. Soil Conservation Service, Dept. of Agriculture], 1972.

Citation

U.S. Geological Survey, 1988, National water summary 1986; hydrologic events and ground-water quality: U.S. Geological Survey Water-Supply Paper 2325, 560 pages.

Citation

University of Nebraska-Lincoln, 1987, The decade of North American Geology. Field guides for Nebraska: University of Nebraska-Lincoln, Nebraska Geological Survey, Conservation and Survey Division, IANR, the Department of Geology and the Nebraska State Museum, 42 pages.

Citation

UNL Conservation and Survey Division, 1998, The Groundwater Atlas of Nebraska: UNL Conservation and Survey Division, Resource Atlas No. 4a/1998 Second (revised) edition, 44 pages.

Citation

Veatch, M.D., 1969, Ground-water occurrence, movement and hydrochemistry within a complex stratigraphic framework, Jefferson County, Nebraska, Thesis (Ph.D.)--Stanford University, 1969.

Citation

Weeks, J.B., and Gutentag, E.D., 1981, Bedrock geology, altitude of base, and 1980 saturated thickness of the High Plains aquifer in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Hydrologic Investigations Atlas HA-648, scale 1:2,500,000, 2 sheets.

Citation

Weeks, J.B., Gutentag, E.D., Heimes, F.J., and Luckey, R.R., 1988, Summary of the High Plains regional aquifer system-System analysis in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Professional Paper 1400-A, 30 pages.

Citation

Wen, F.J., Chen, X.H., 2005, Streamflow Trends and Depletion Study in Nebraska - With a Focus on the Republican River Basin, Water Resources Research (In Review).

Citation

Winter, T.C., Harvey, J.W., Franke, O.L. and Alley, W.M., 1998, Ground water and surface water; a single resource: U.S. Geological Survey Circular 1139, 79 pages.