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FINAL

Thunder Basin Phase II Watershed Management Plan
Level I Watershed Study
Lance and Lightning Creek

Submitted to:

Wyoming Water Development Commission

Prepared by:

Olsson Associates

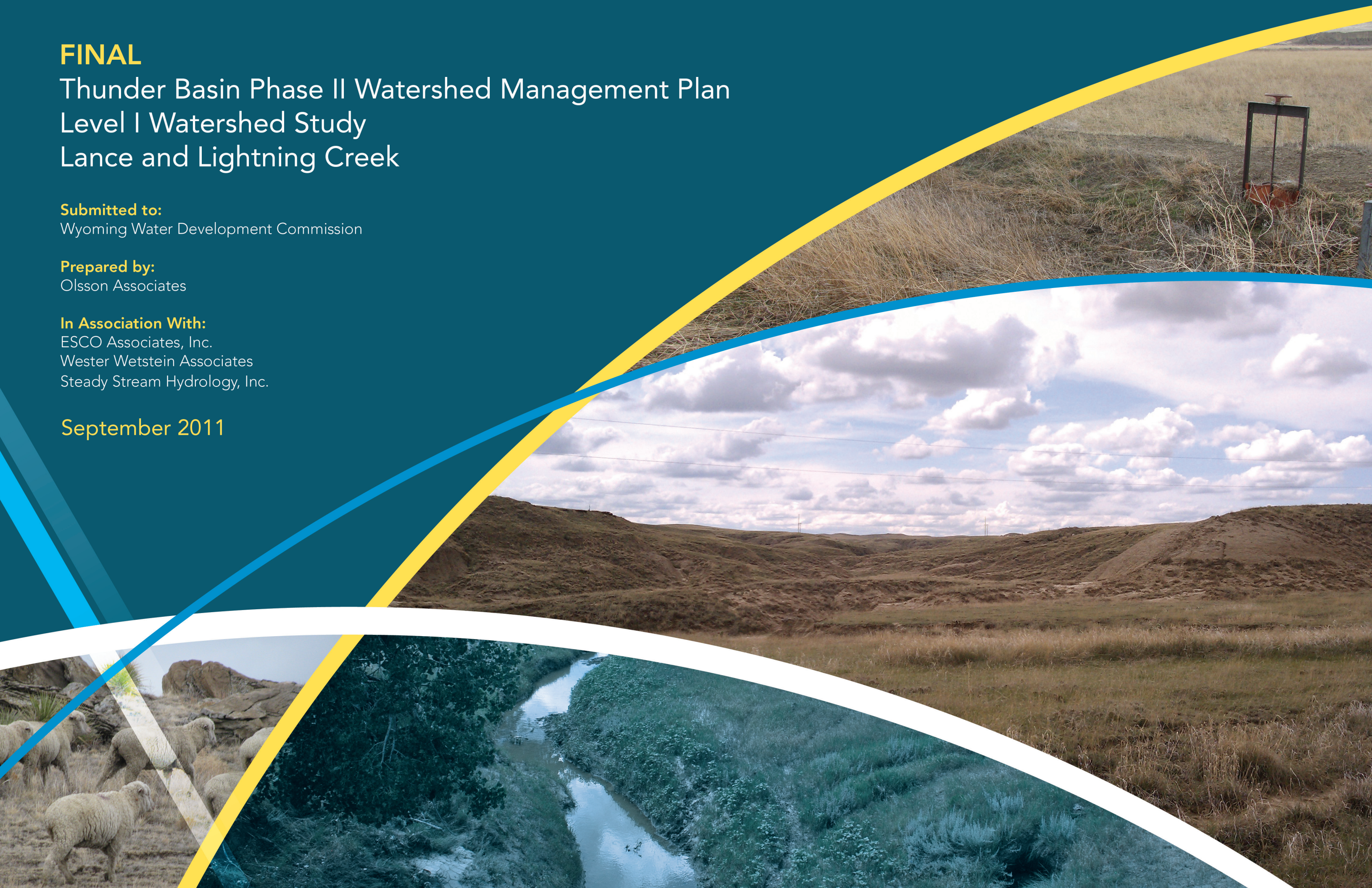
In Association With:

ESCO Associates, Inc.

Wester Wetstein Associates

Steady Stream Hydrology, Inc.

September 2011



FINAL

**Thunder Basin Phase II
Watershed Management Plan**

Level I Watershed Study

WWDC Contract Number 05SC0294198

September 14, 2011

Prepared for

Wyoming Water Development Commission

Prepared by

Olsson Associates

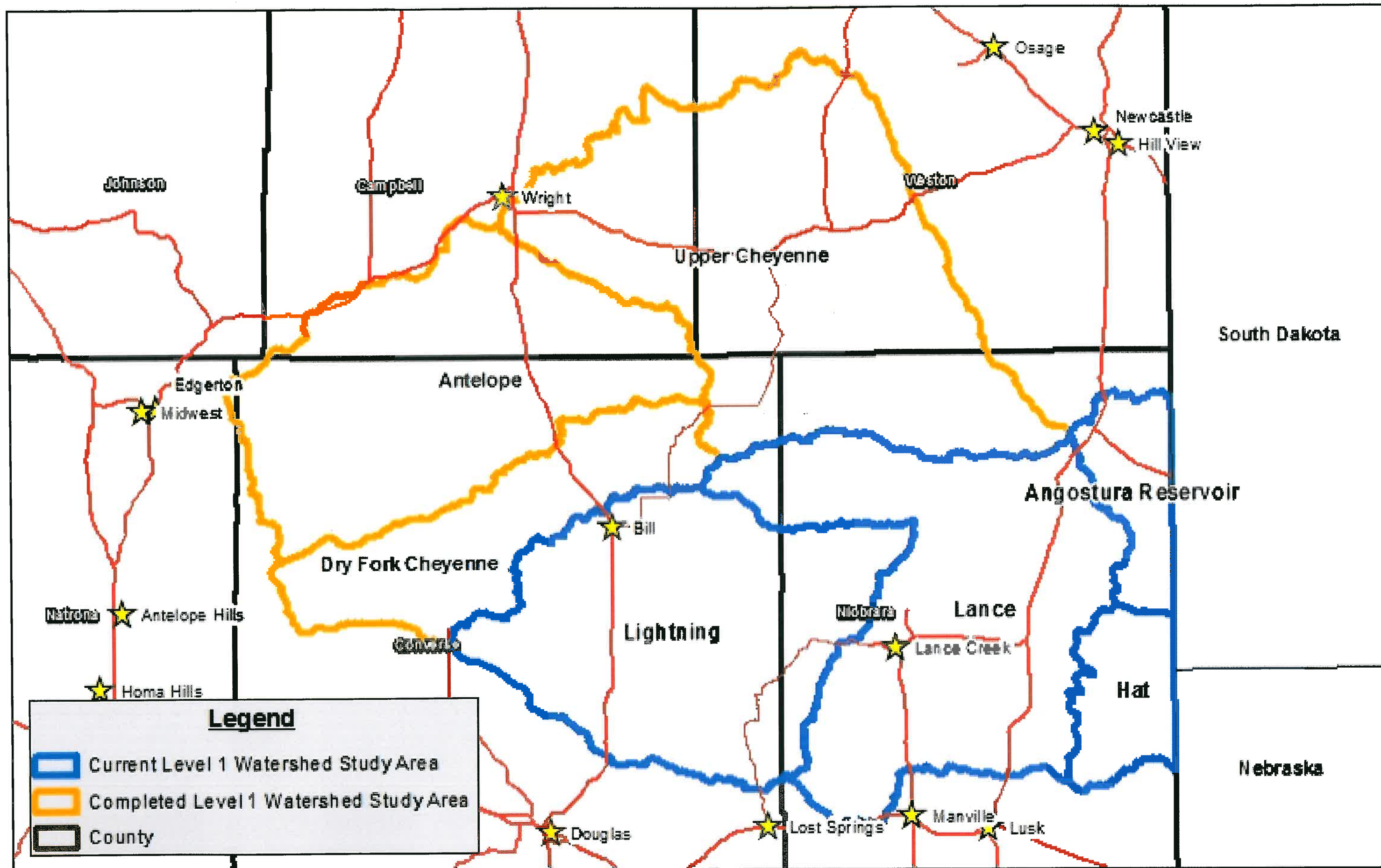
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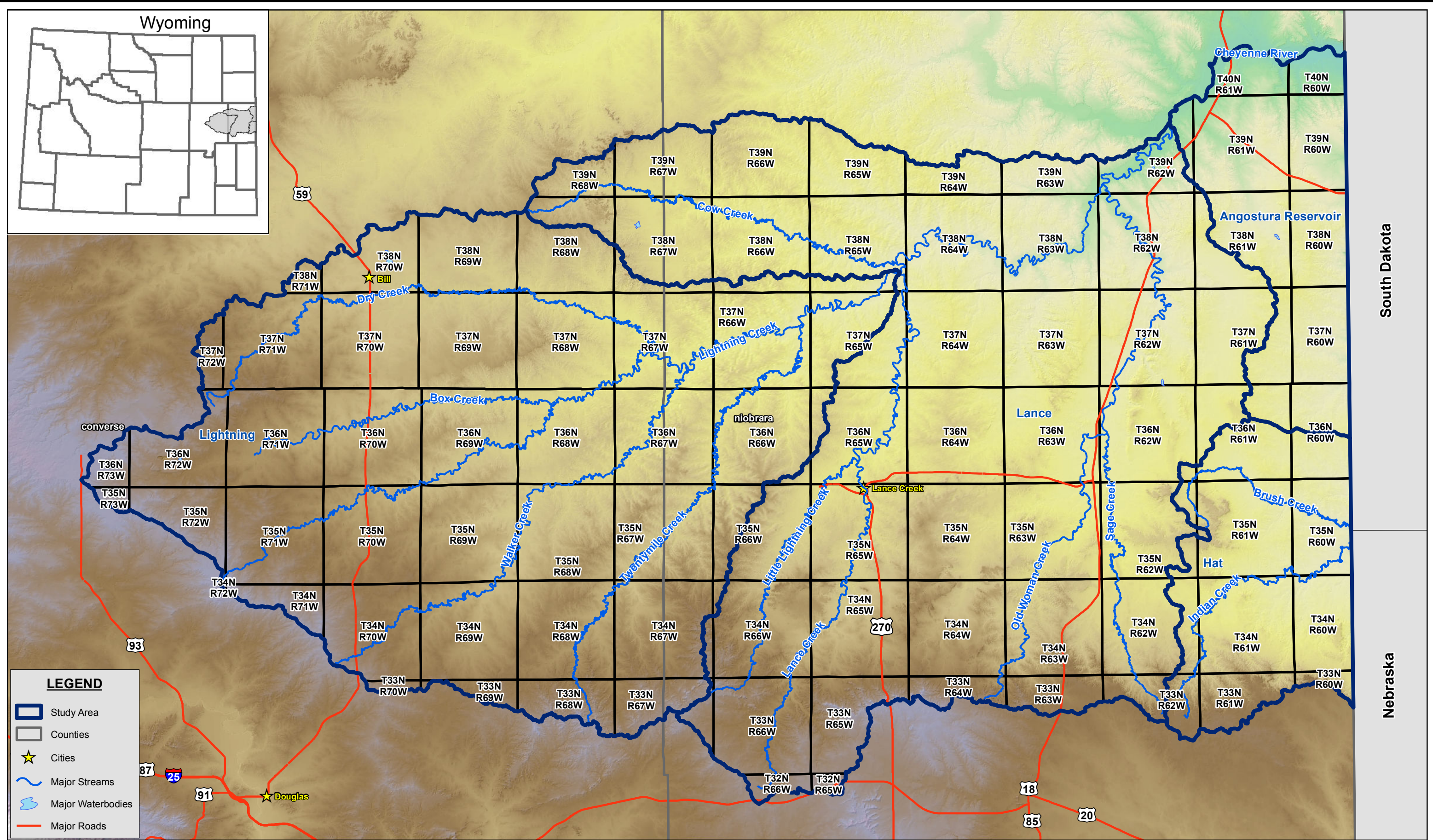
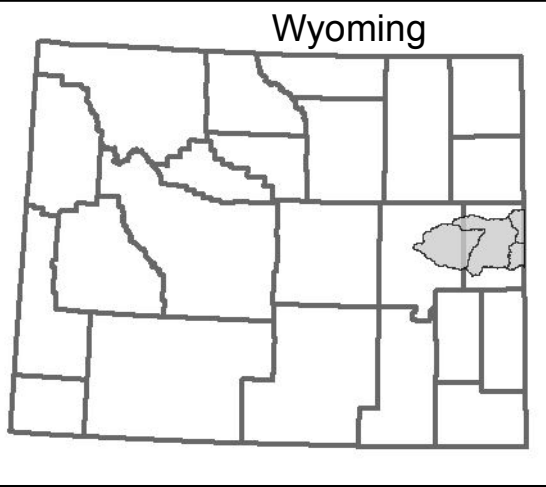
**ESCO Associates, Inc.
Wester Wetstein Associates
Steady Stream Hydrology, Inc.**

Volume II

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LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ⊡ Major Waterbodies
- Major Roads

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Watersheds, 1999, USGS; County, 1997, WyGIS; Cities, 1996, WyGIS; Major Streams, 1996, WyGIS; Major Waterbodies, 1996, WyGIS; Major Roads, 1997, WyGIS; Townships, 2005, WyGIS; DEM-Hillshade, 2009, USGS

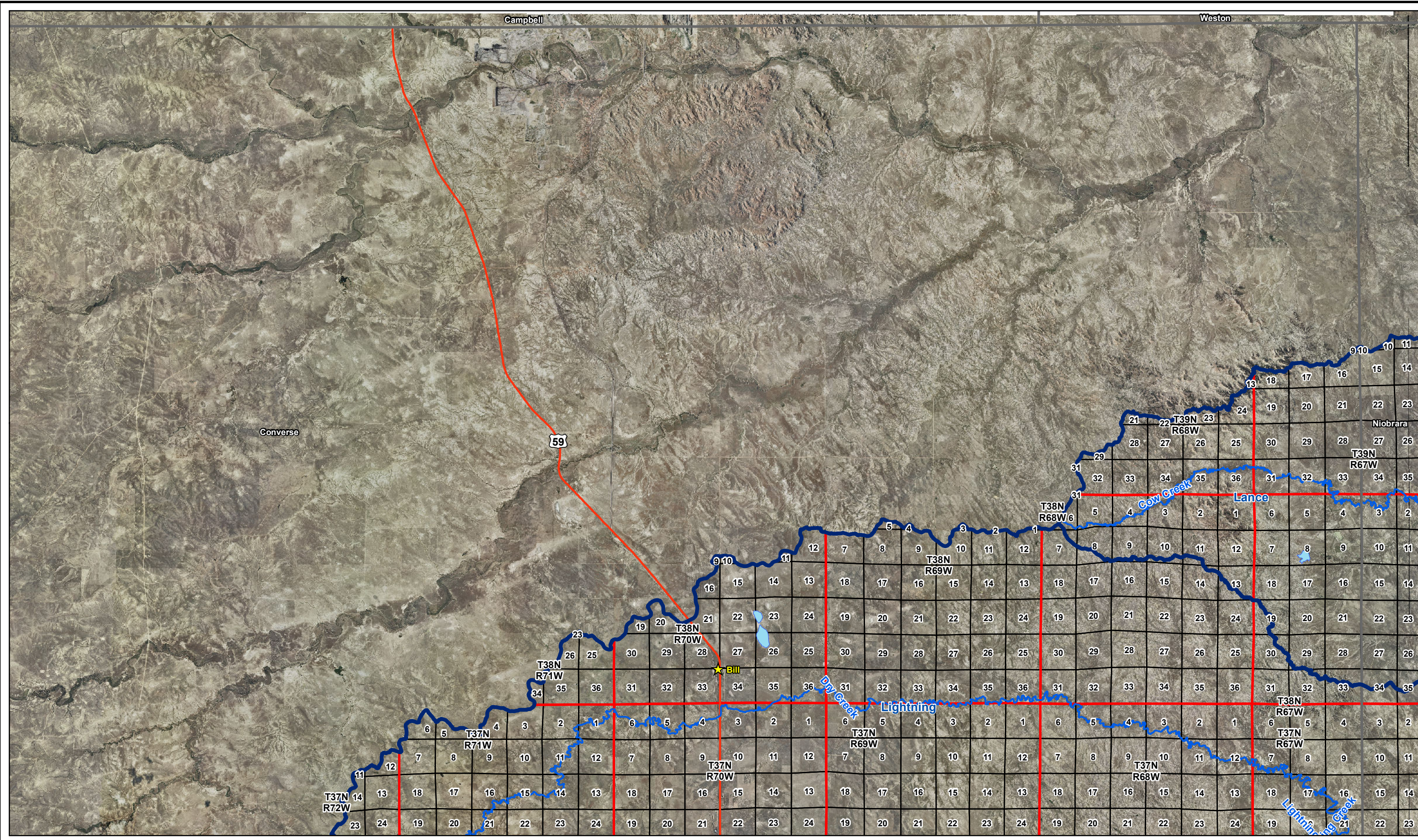


STUDY AREA LOCATION
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
1a

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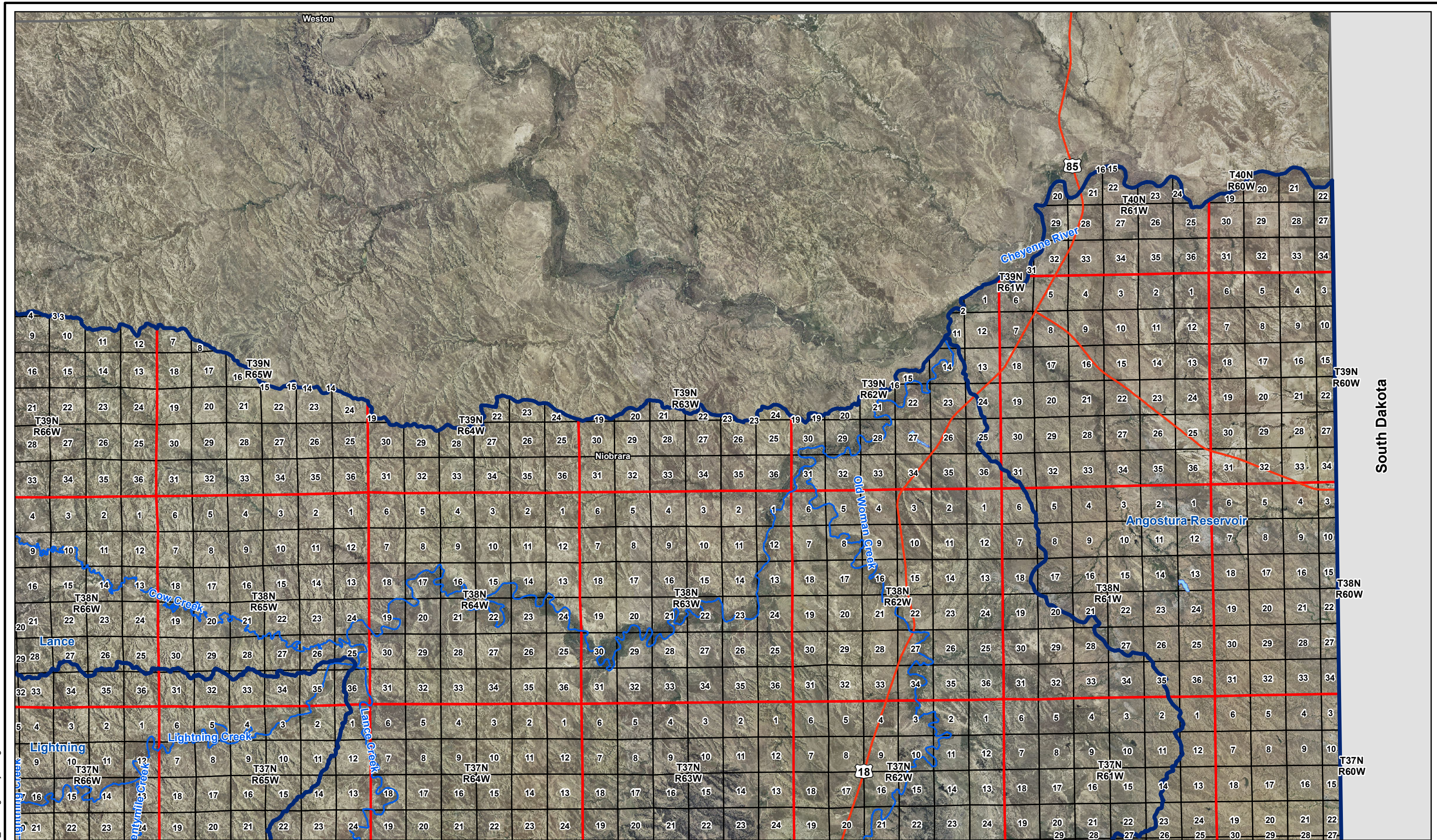
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



STUDY AREA LOCATION (Northwest Quadrant)
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



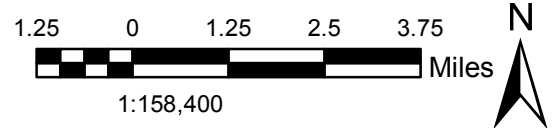
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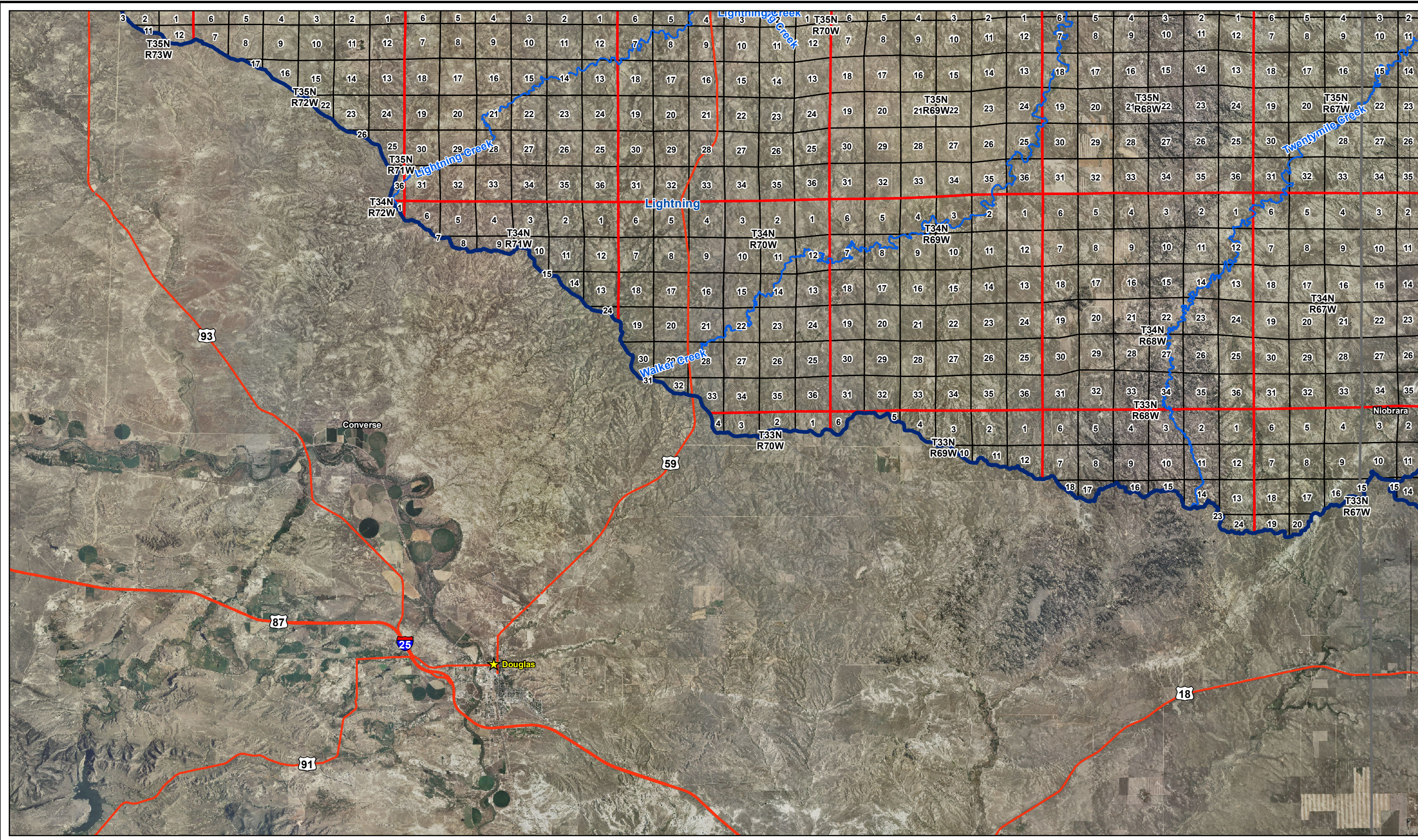
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 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



STUDY AREA LOCATION (Northeast Quadrant)
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



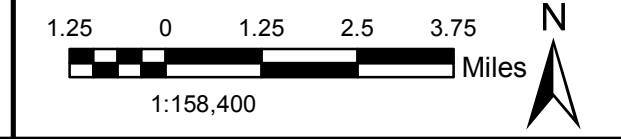
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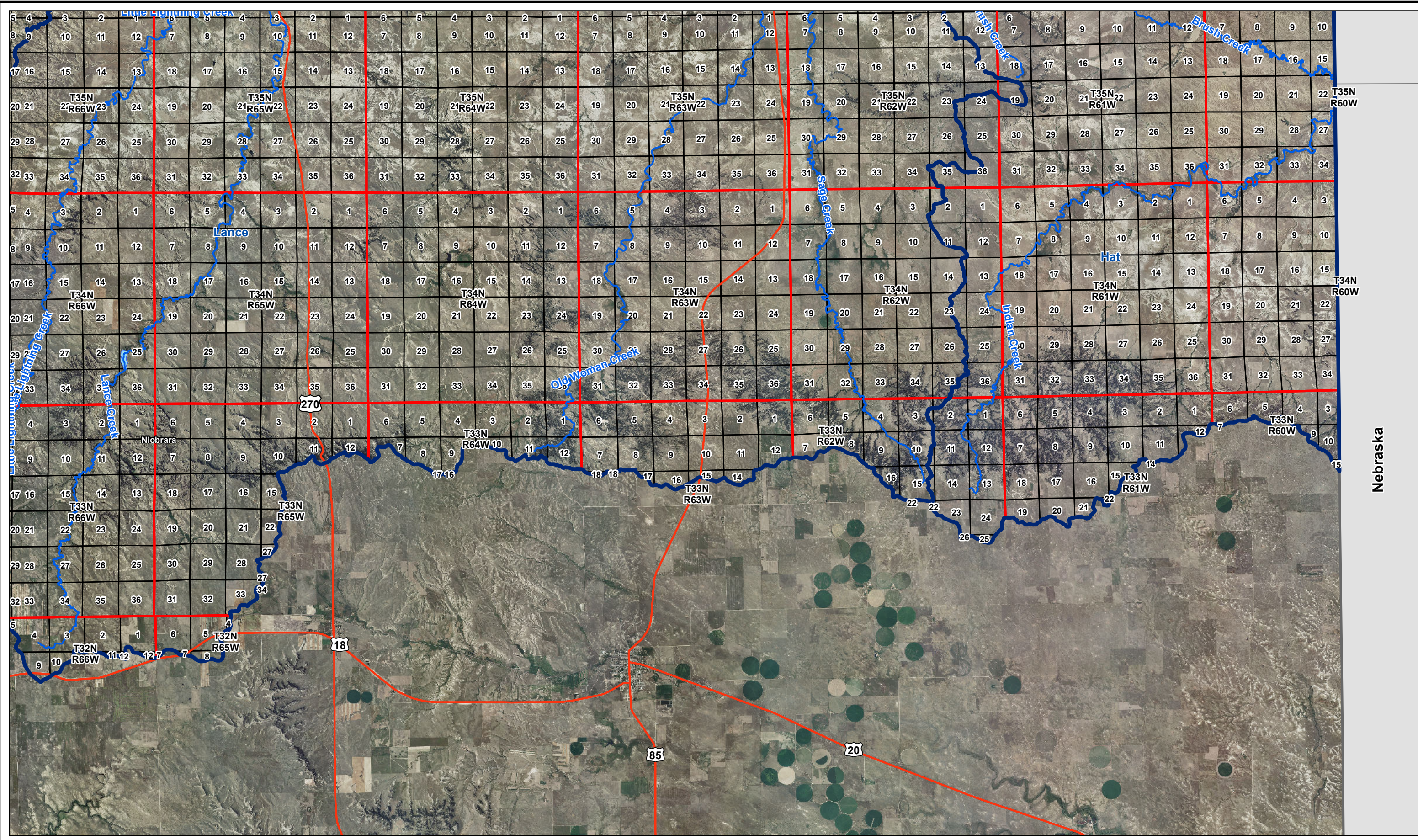
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 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



STUDY AREA LOCATION (Southwest Quadrant)
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



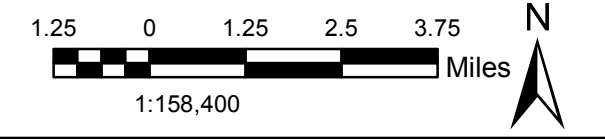
MAP
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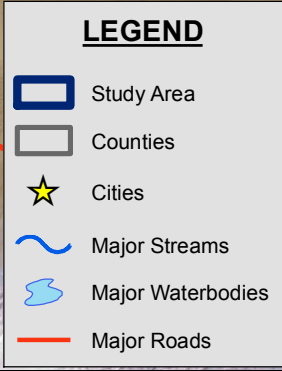
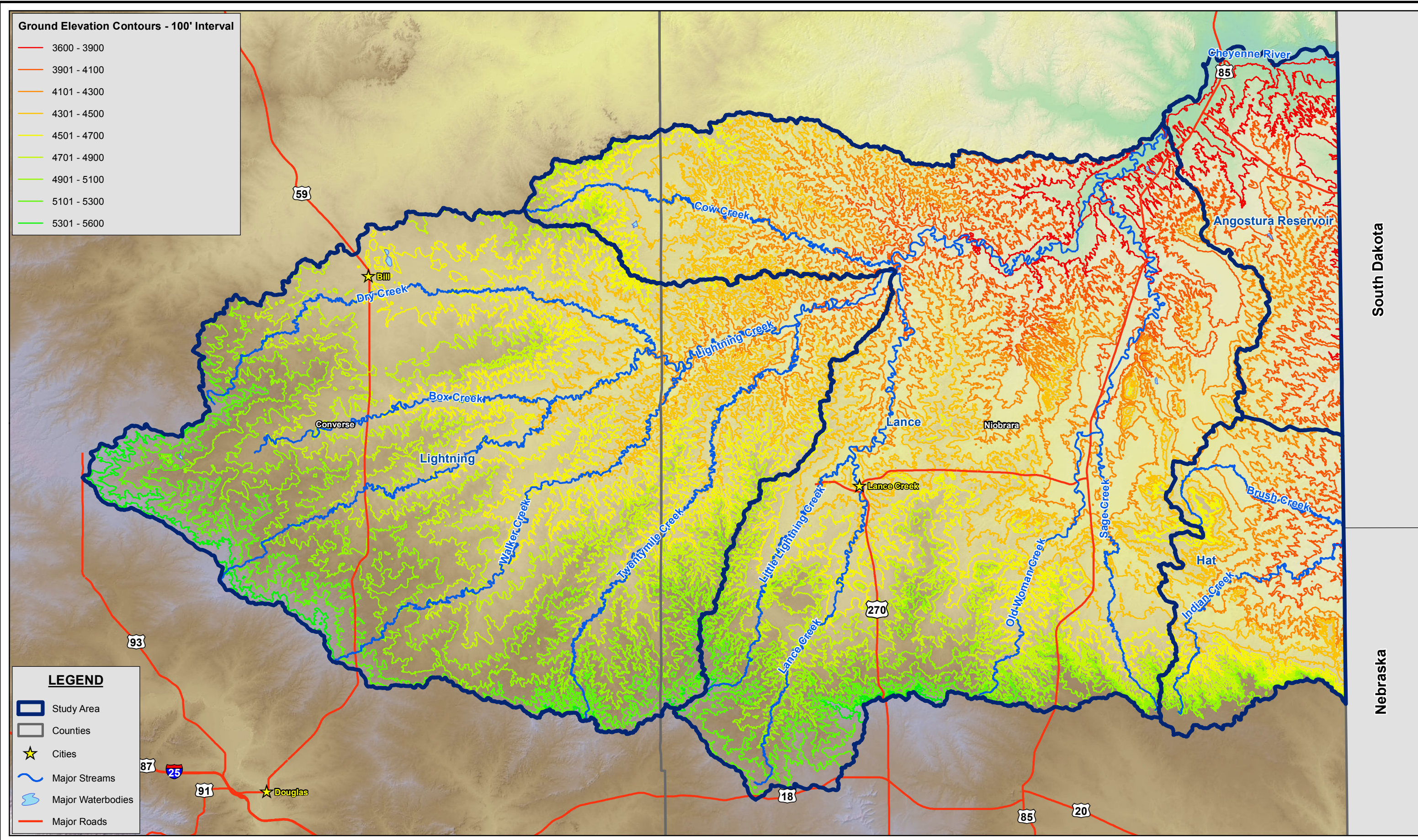
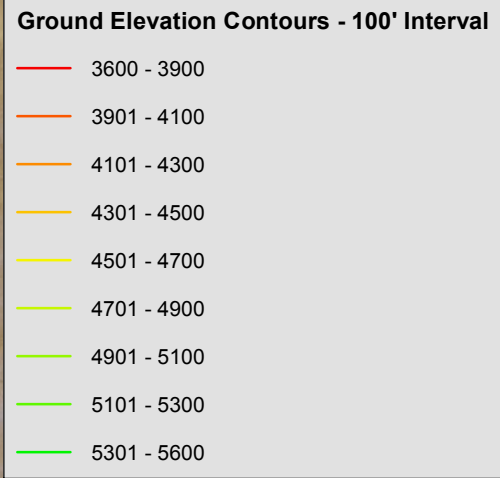
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



STUDY AREA LOCATION (Southeast Quadrant)
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
1e



South Dakota

Nebraska

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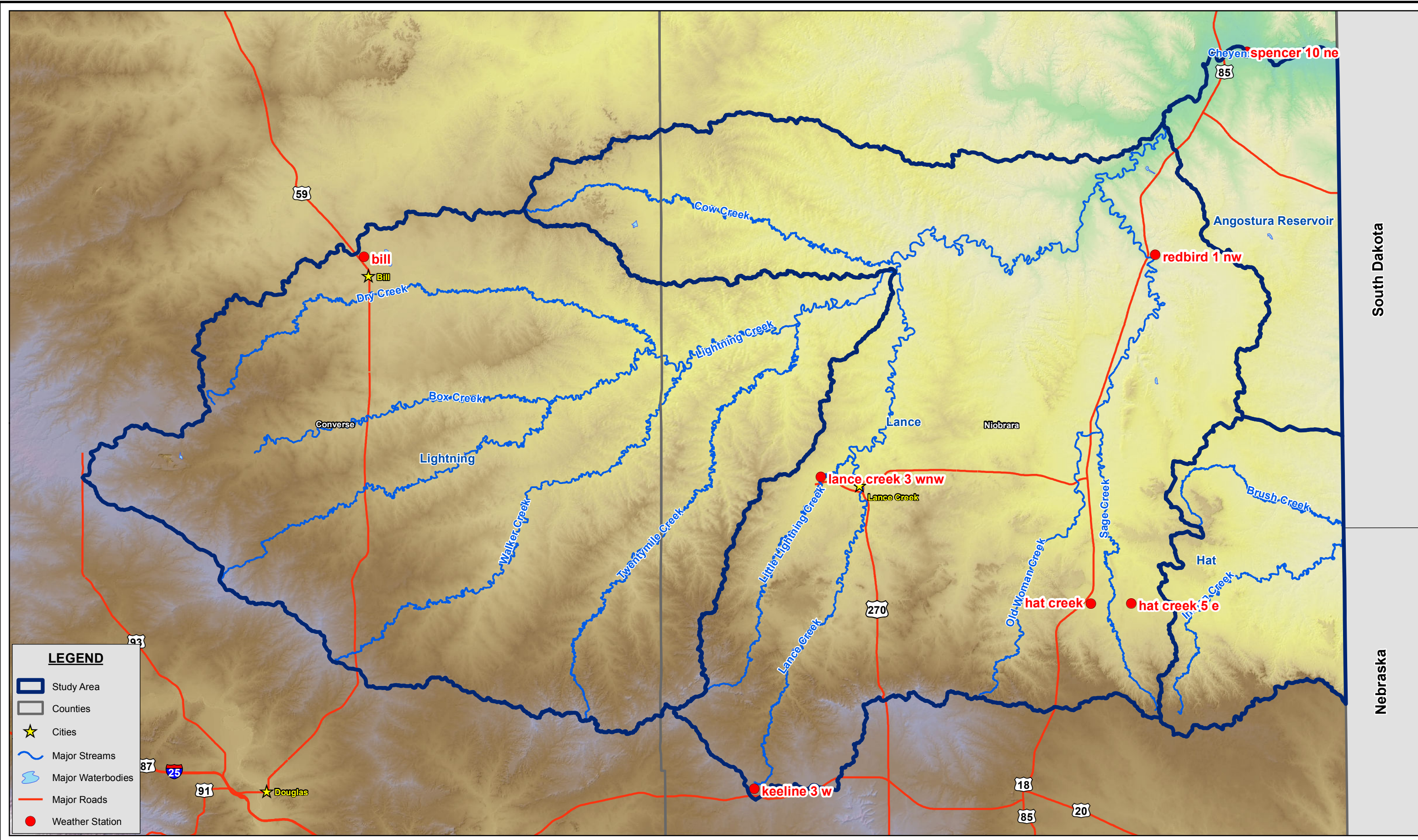
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS



GROUND ELEVATION MAP
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
2



LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads
- Weather Station

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Weather Stations, 2008, NOAA



WEATHER STATIONS
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties

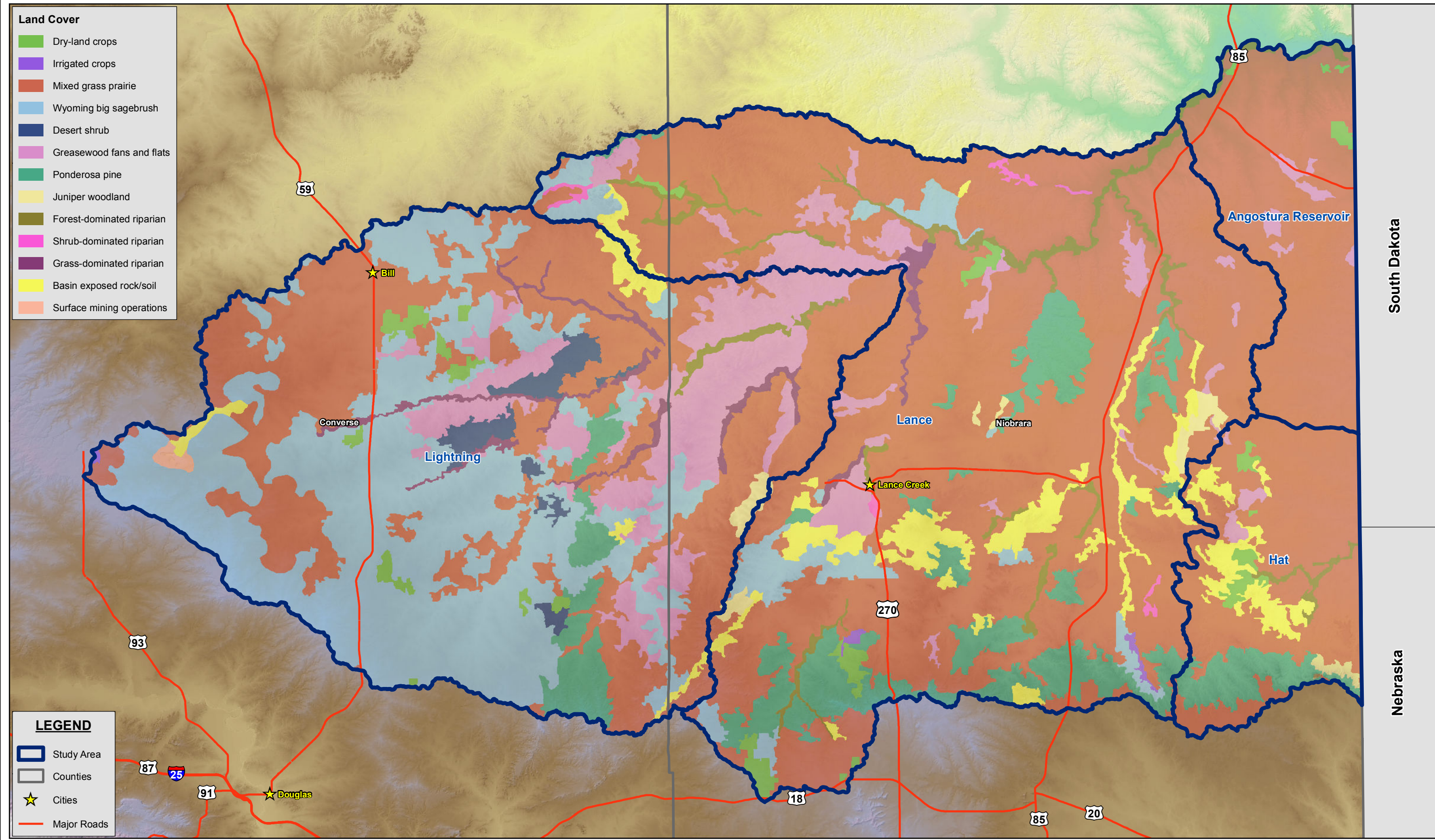


MAP
3

South Dakota
Nebraska

- Land Cover**
- Dry-land crops
 - Irrigated crops
 - Mixed grass prairie
 - Wyoming big sagebrush
 - Desert shrub
 - Greasewood fans and flats
 - Ponderosa pine
 - Juniper woodland
 - Forest-dominated riparian
 - Shrub-dominated riparian
 - Grass-dominated riparian
 - Basin exposed rock/soil
 - Surface mining operations

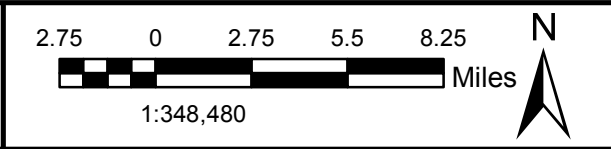
- LEGEND**
- Study Area
 - Counties
 - Cities
 - Major Roads



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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Land Cover, 2007, USDA NRCS

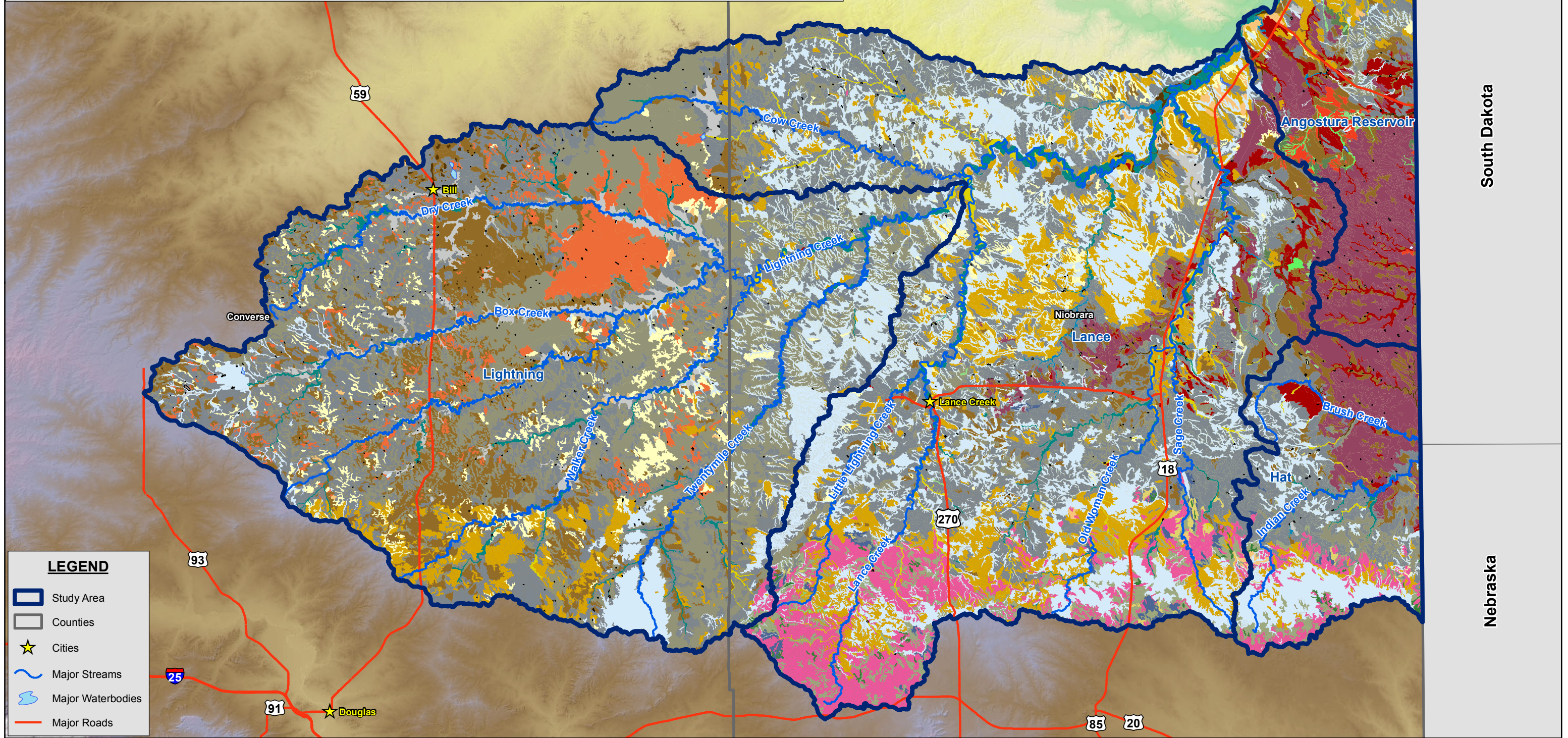


LAND COVER/VEGETATION
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
4

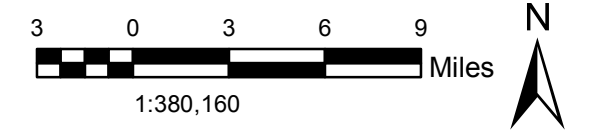
Ecological Sites			
	CLAYEY (10-14NP)		SANDS (15-17SP)
	CLAYEY OVERFLOW (10-14NP)		OVERFLOW (10-14NP)
	DENSE CLAY (10-14NP)		POROUS CLAY (10-14NP)
	LOAMY (10-14NP)		SANDY (12-17SP)
	LOAMY (12-17SP)		ROCK OUTCROP
	LOAMY (15-17SP)		SALINE LOWLAND (10-14NP)
			SALINE UPLAND (10-14NP)
			SHALLOW CLAYEY (10-14NP)
			SHALLOW POROUS CLAY (10-14NP)
			SHALLOW SANDY (10-14NP)
			SHALLOW SANDY (15-17SP)
			SUBIRRIGATED (10-14NP)
			VERY SHALLOW (10-14NP)
			WATER
			SHALLOW LOAMY (10-14NP)



LEGEND	
	Study Area
	Counties
	Cities
	Major Streams
	Major Waterbodies
	Major Roads

PROJECT: 010-1333
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Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS









ECOLOGICAL SITES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties

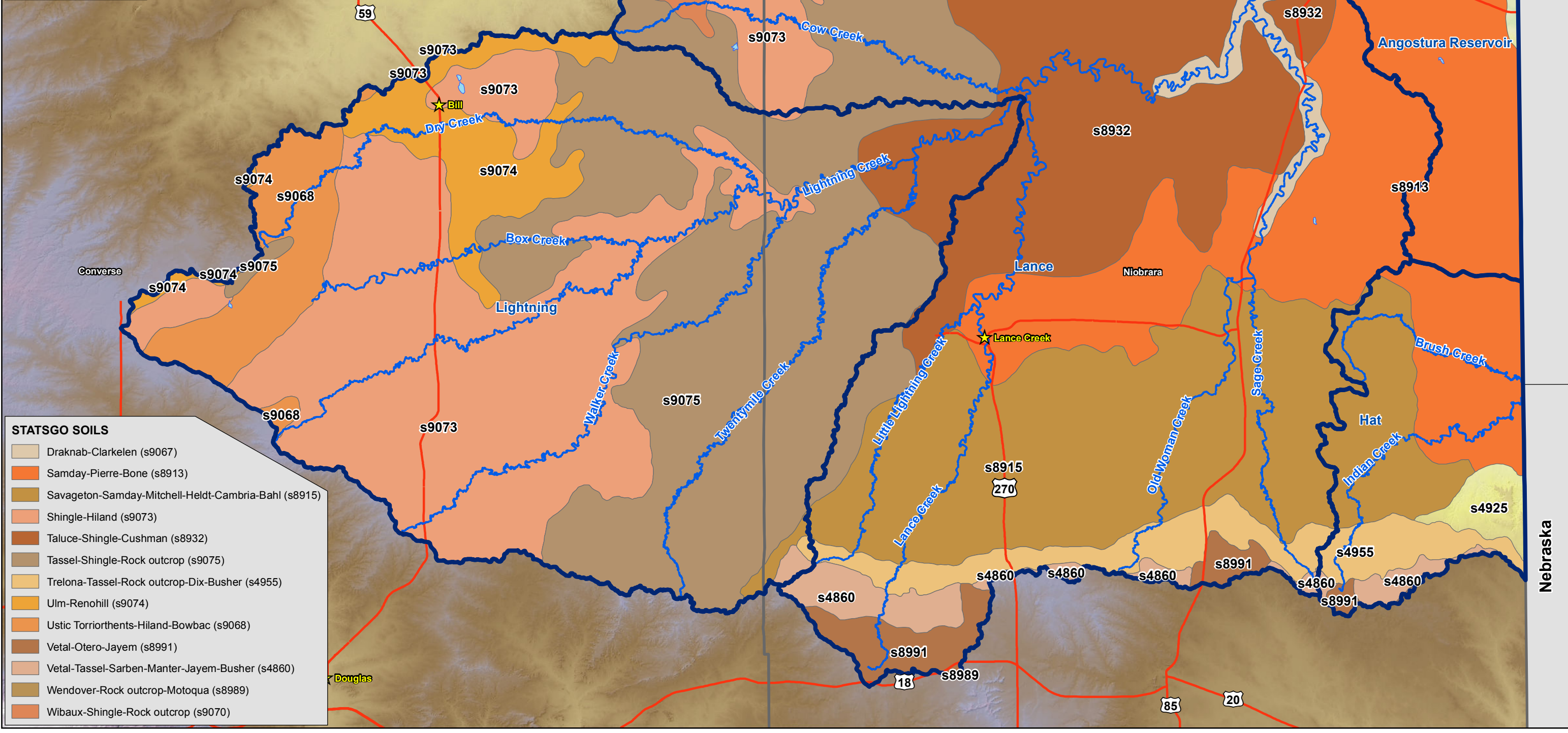


MAP
5














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LEGEND

-  Study Area
-  Counties
-  Cities
-  Major Streams
-  Major Waterbodies
-  Major Roads



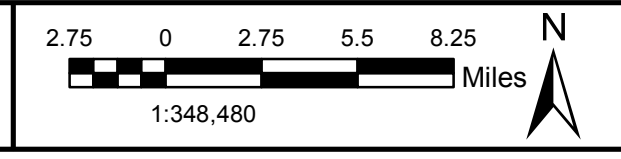
STATSGO SOILS

-  Draknab-Clarkelen (s9067)
-  Samday-Pierre-Bone (s8913)
-  Savageton-Samday-Mitchell-Heldt-Cambria-Bahl (s8915)
-  Shingle-Hiland (s9073)
-  Taluce-Shingle-Cushman (s8932)
-  Tassel-Shingle-Rock outcrop (s9075)
-  Trelona-Tassel-Rock outcrop-Dix-Busher (s4955)
-  Ulm-Renohill (s9074)
-  Ustic Torriorthents-Hiland-Bowbac (s9068)
-  Vetal-Otero-Jayem (s8991)
-  Vetal-Tassel-Sarben-Manter-Jayem-Busher (s4860)
-  Wendover-Rock outcrop-Motoqua (s8989)
-  Wibaux-Shingle-Rock outcrop (s9070)

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PROJECT: 010-1333
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Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 STATSGO Soils, 2007, USDA

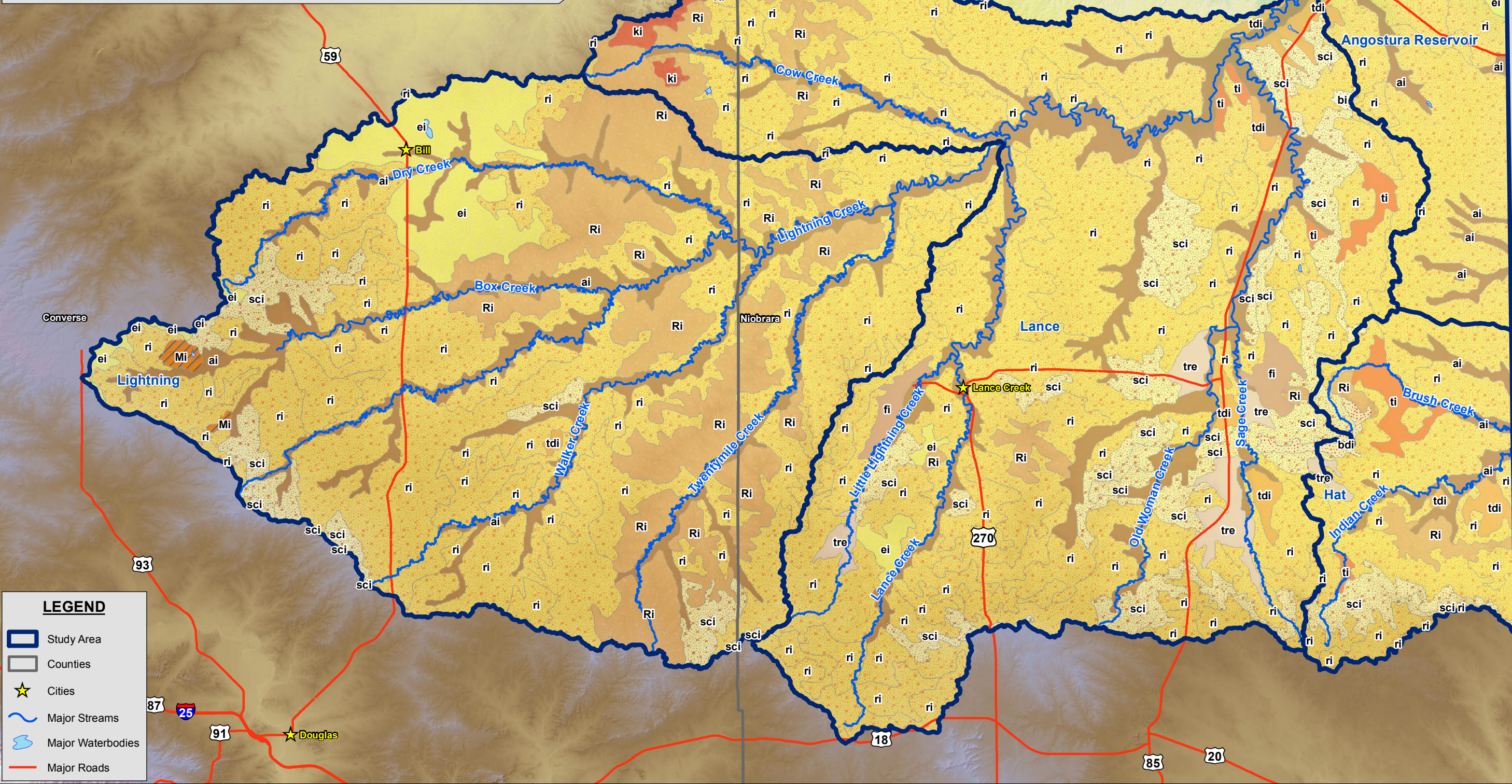


STATSGO SOILS MAP
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
6

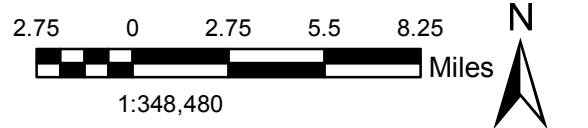
Bedrock/Residuum/Mined	River valley deposits	Upland deposits
Mi: Mined areas	ai: Alluvium w/ terrace and slopewash	ei: Eolian w/ scattered alluvium
ri: Residuum mixed with alluvium and eolian	tre: Shallow terrace deposits	bdi: Dissected bench
ki: Clinker	ti: Terrace deposits	sci: Slopewash
Ri: Bedrock	tdi: Dissected terrace deposits	bi: Bench
	fi: Alluvial fan	



LEGEND	
	Study Area
	Counties
	Cities
	Major Streams
	Major Waterbodies
	Major Roads

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Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Surficial Geology, 2002, WWDC



SURFICIAL GEOLOGY
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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Bedrock Geology

Quaternary

- Qa, Alluvium and colluvium
- Qt, Gravel, pediment, and fan deposits

Tertiary

- Tw, Wasatch Formation, main body
- Twr, White River Formation
- Tfl, Fort Union Formation: Lebo member
- Tft, Fort Union Formation: Tullock member
- Tmo, Lower Miocene and Upper Oligocene Rocks

Cretaceous

- Kcl, Carlile shale
- Kp, Pierre shale
- Kns, Newcastle sandstone and Skull Creek shale
- Kn, Niobrara Formation
- Kl, Lance Formation
- Kgbm, Greenhorn Formation
- Kfh, Fox Hills sandstone

Jurassic

- KJ, Cloverly and Morrison Formations
- Jsg, Sundance and Gypsum Spring Formations

Paleozoic

- P&h, Hartville Formation
- MDg, Guernsey Formation

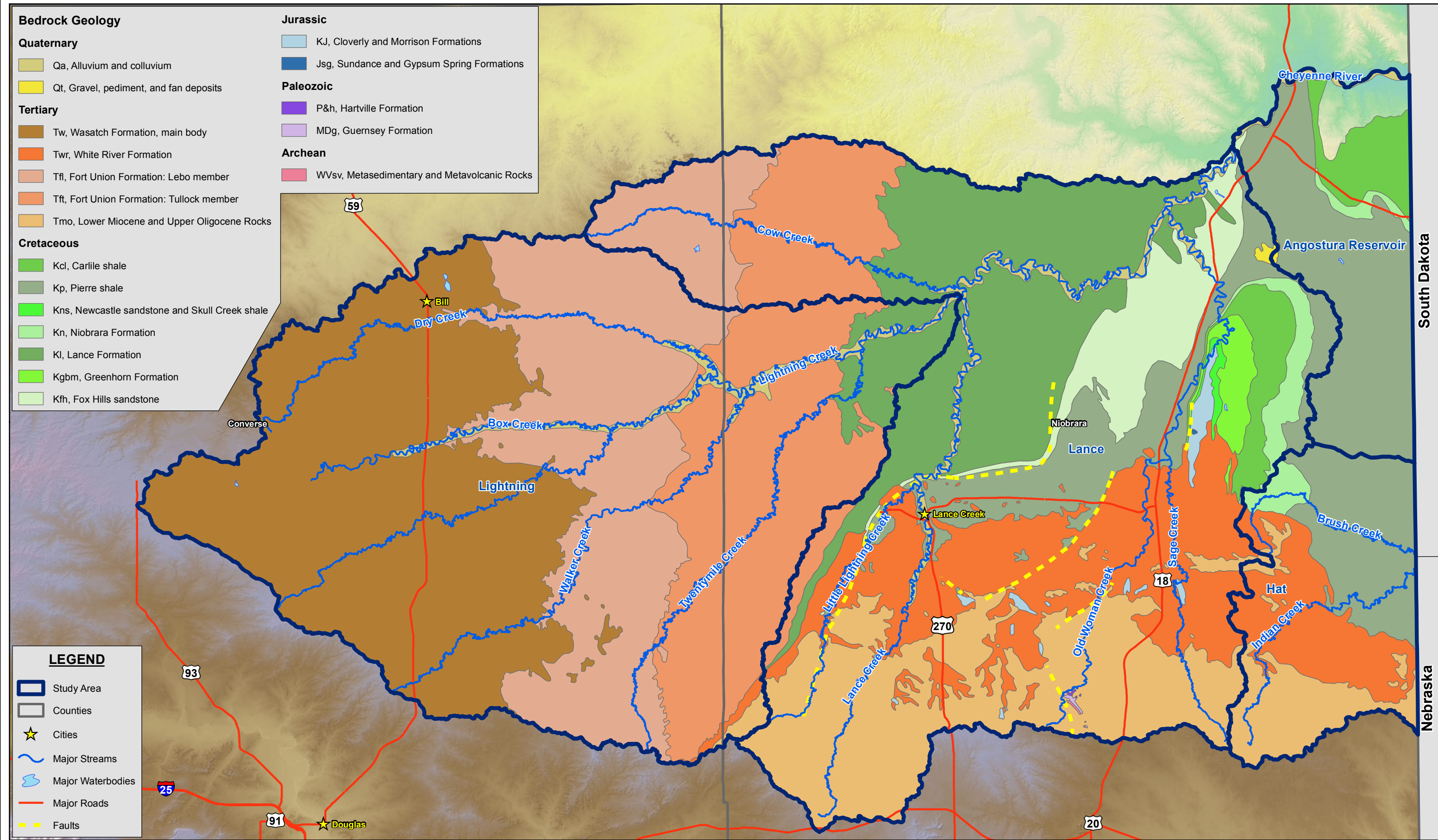
Archean

- WVsv, Metasedimentary and Metavolcanic Rocks

LEGEND

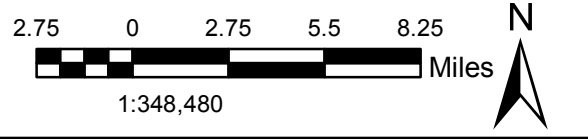
- Study Area
- Counties
- Cities
- Major Streams
- Major Waterbodies
- Major Roads
- Faults

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Source: Streams, 2006, ESRI; Watershed, 2002, WYGISC; DEM, 2008, USGS; Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI; Bedrock Geology, 2002, WWDC

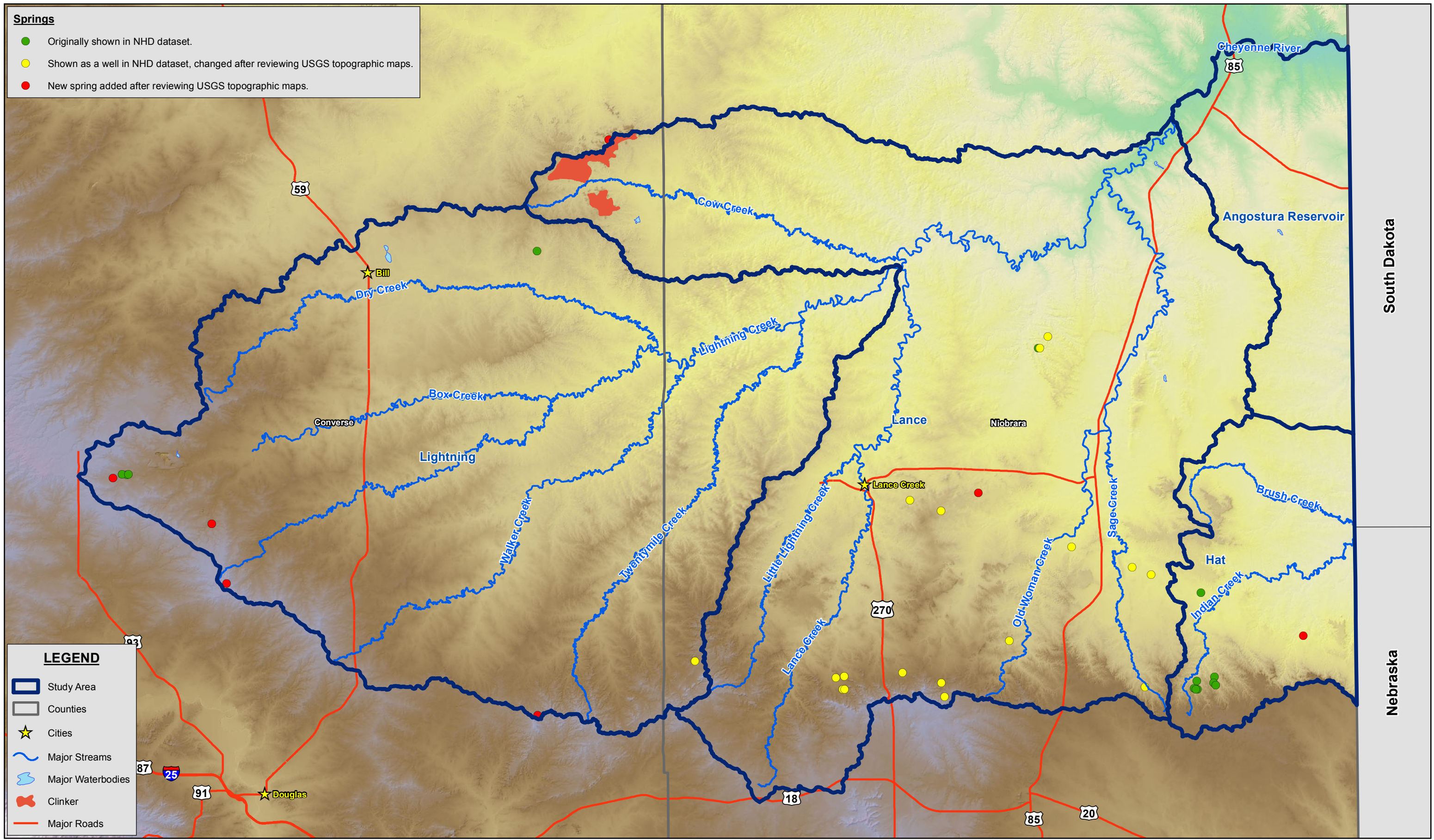


BEDROCK GEOLOGY
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 8

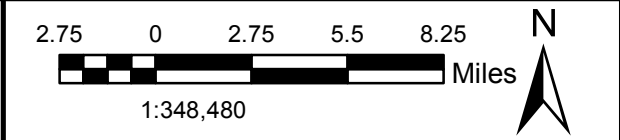
- Springs**
- Originally shown in NHD dataset.
 - Shown as a well in NHD dataset, changed after reviewing USGS topographic maps.
 - New spring added after reviewing USGS topographic maps.



- LEGEND**
- Study Area
 - Counties
 - Cities
 - Major Streams
 - Major Waterbodies
 - Clinker
 - Major Roads

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 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Springs, 2007, NHD

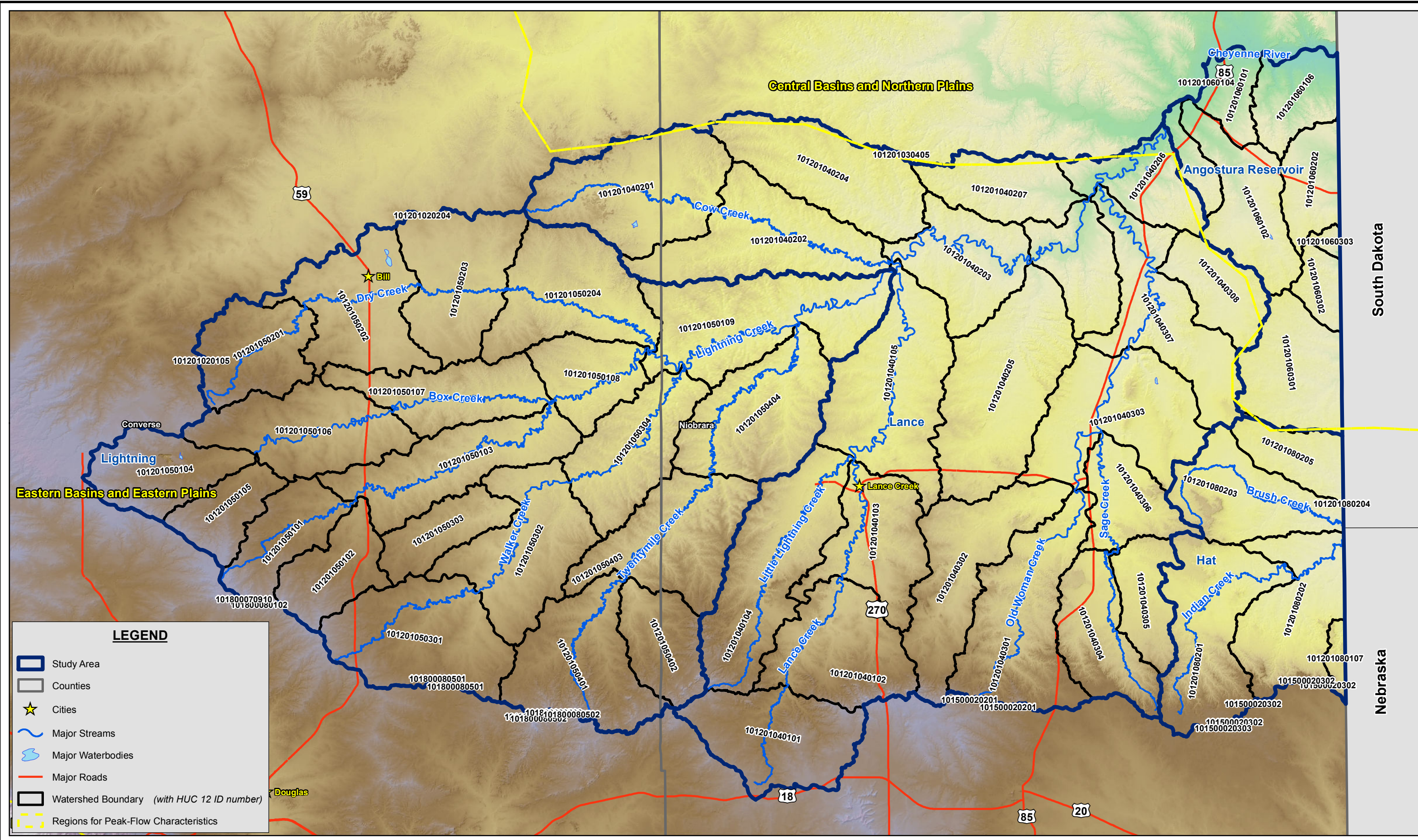


SPRINGS
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 9

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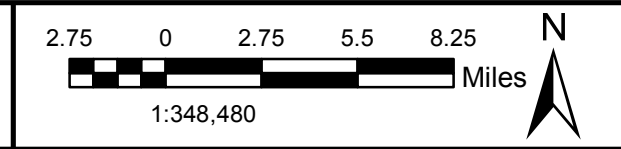


LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads
- Watershed Boundary (with HUC 12 ID number)
- Regions for Peak-Flow Characteristics

PROJECT: 010-1333
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 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

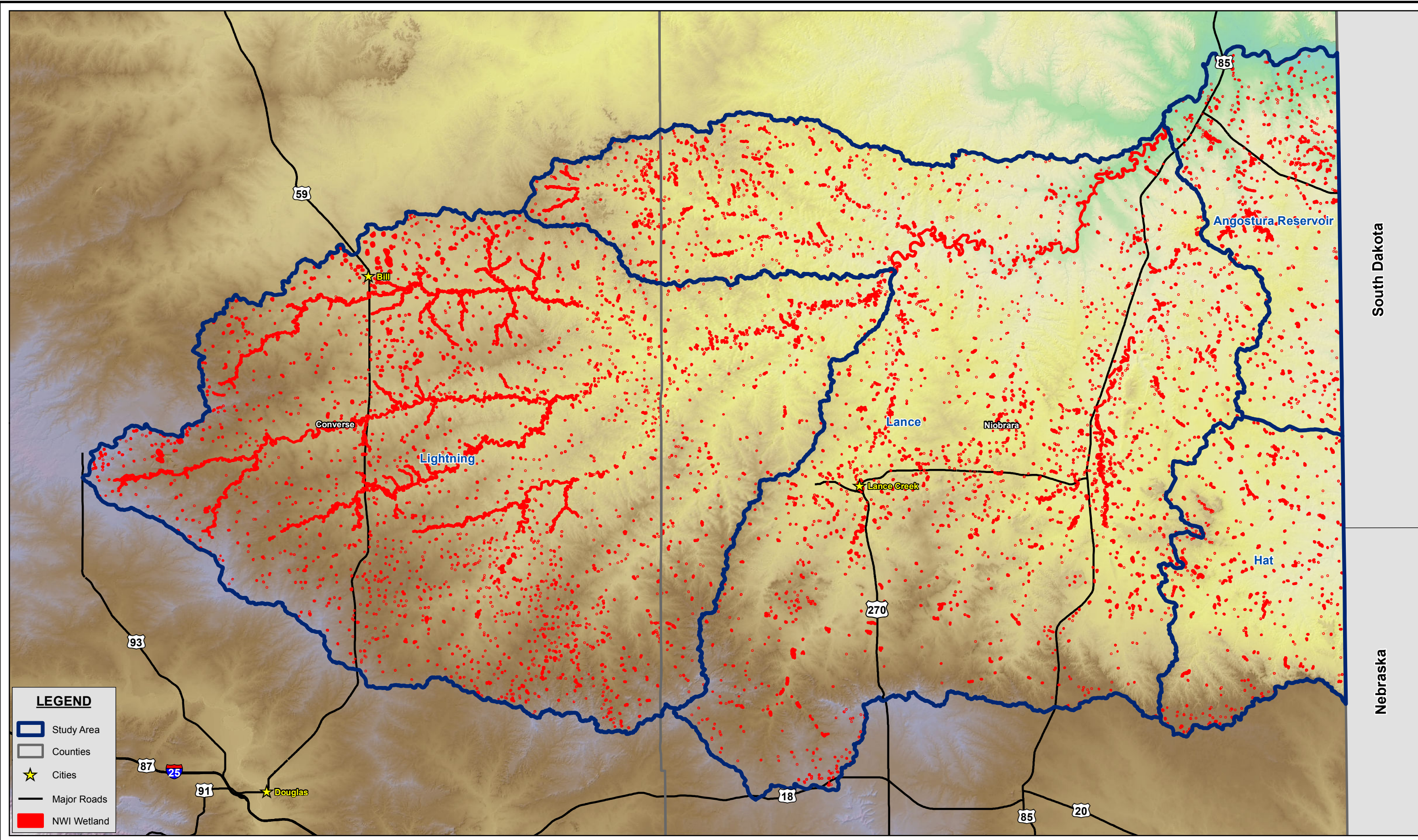


WATERSHED HYDROLOGIC FEATURES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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South Dakota

Nebraska

LEGEND

- Study Area
- Counties
- Cities
- Major Roads
- NWI Wetland

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Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 NWI, 2002, USFWS
 Note: Digital NWI Map Data is not Available for the Entire Area









NATIONAL WETLAND INVENTORY MAP
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties









MAP
11

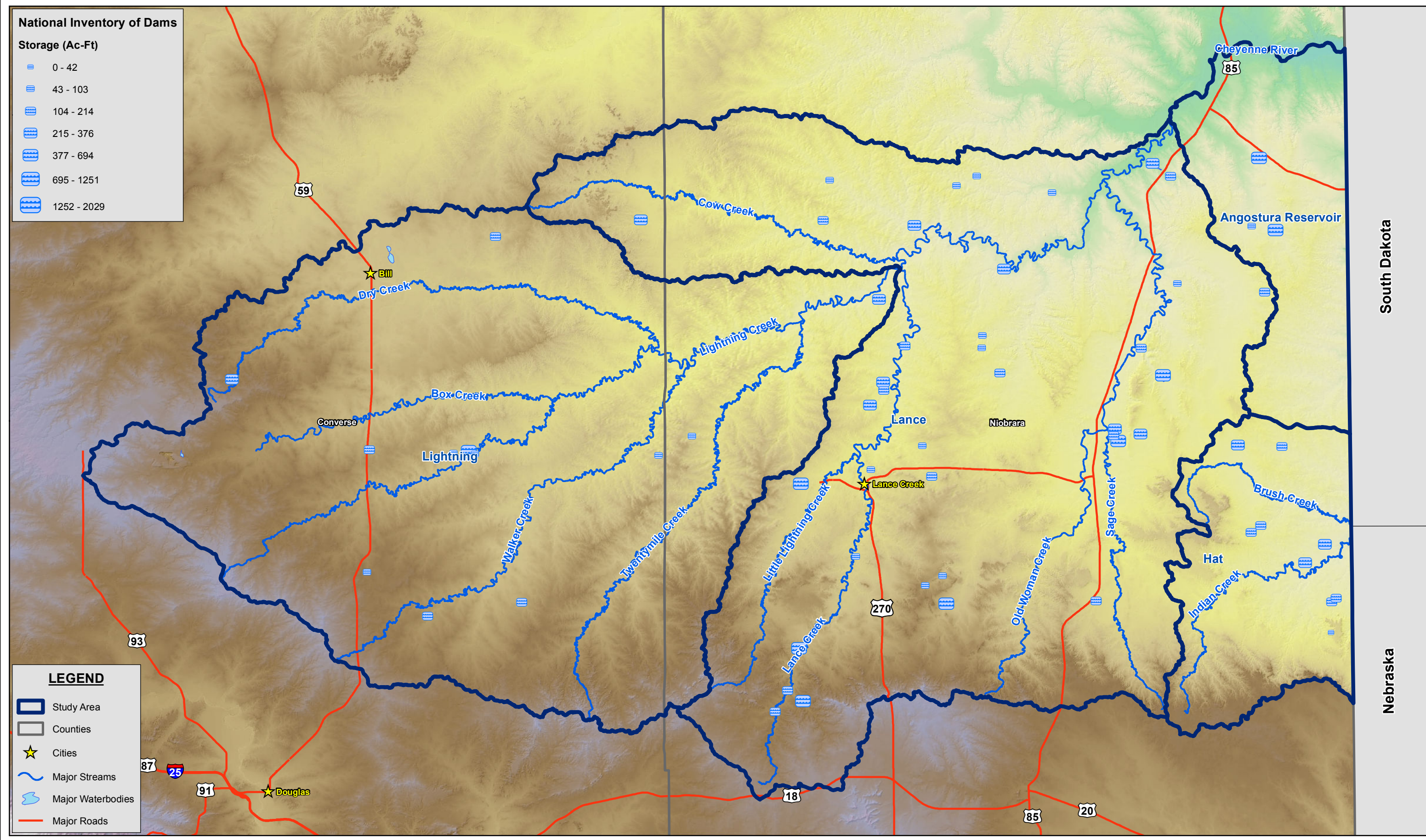
National Inventory of Dams

Storage (Ac-Ft)

-  0 - 42
-  43 - 103
-  104 - 214
-  215 - 376
-  377 - 694
-  695 - 1251
-  1252 - 2029

LEGEND

-  Study Area
-  Counties
-  Cities
-  Major Streams
-  Major Waterbodies
-  Major Roads



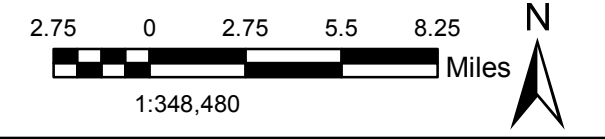
South Dakota

Nebraska

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

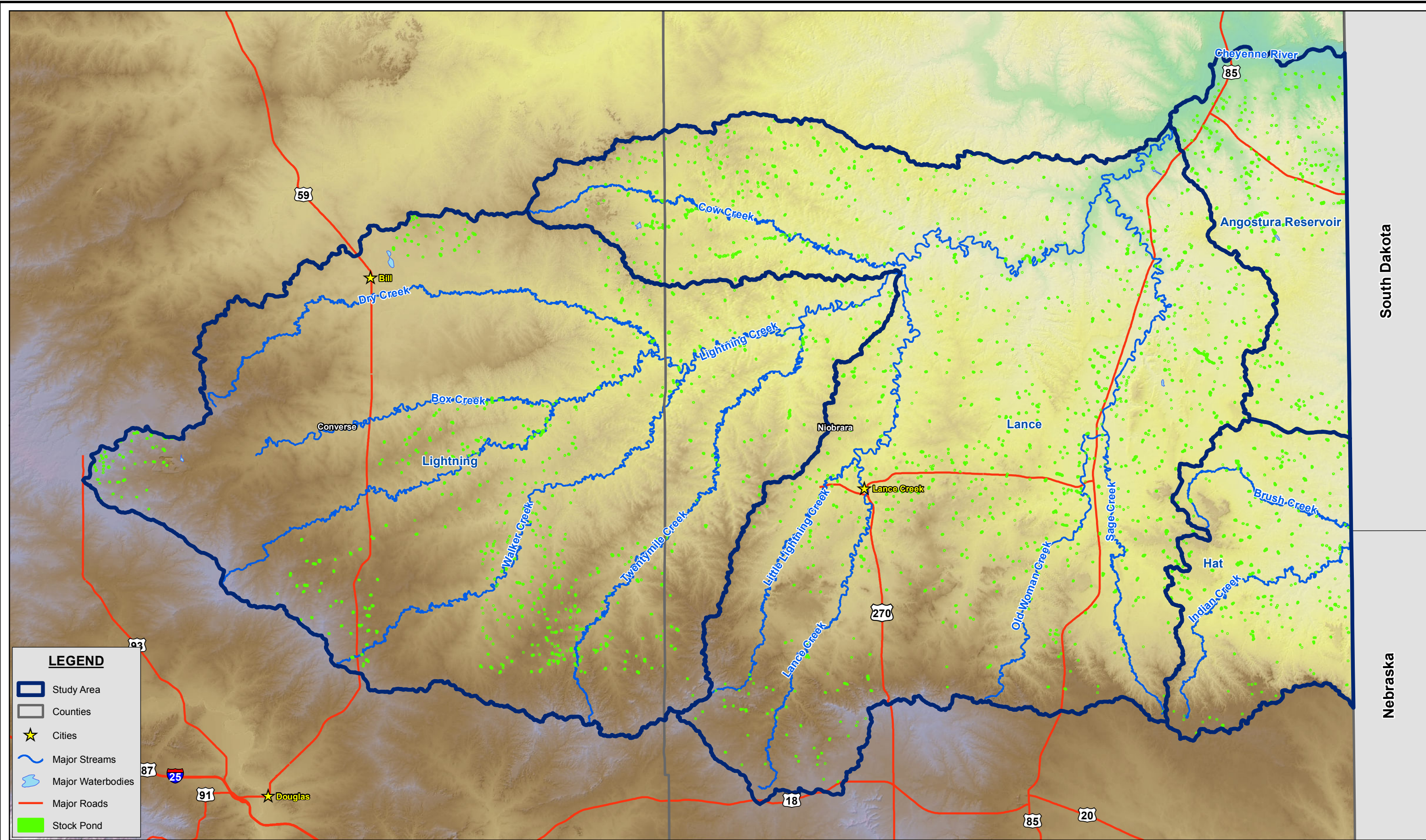
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS



NATIONAL INVENTORY OF DAMS
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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LEGEND

- Study Area
- Counties
- Cities
- Major Streams
- Major Waterbodies
- Major Roads
- Stock Pond

South Dakota

Nebraska

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

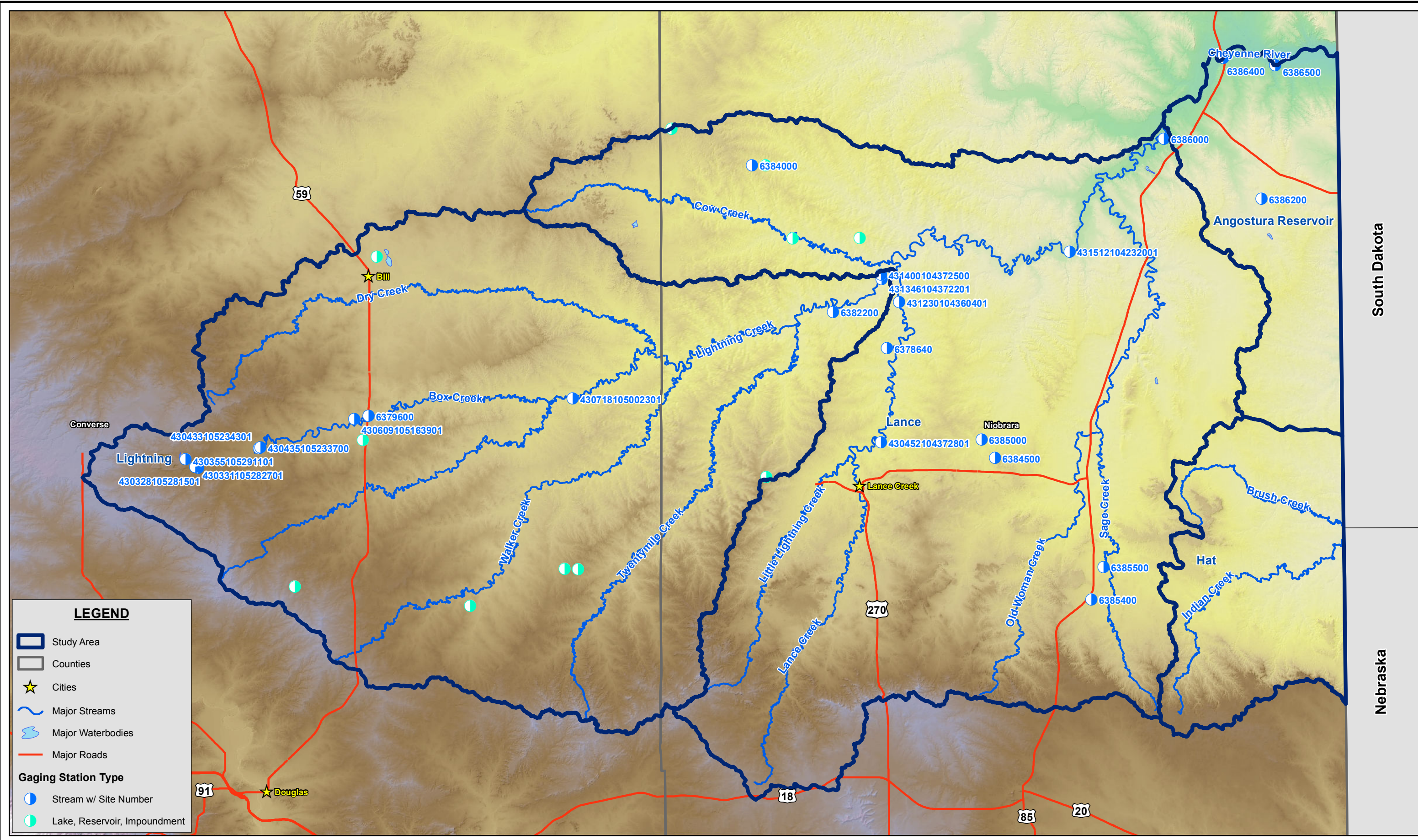
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



STOCK/WILDLIFE PONDS
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
13



LEGEND

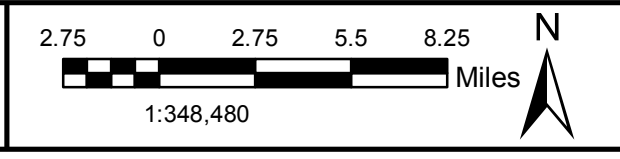
- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads

Gauging Station Type

- Stream w/ Site Number
- Lake, Reservoir, Impoundment

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Gauging Stations, 2008, USGS

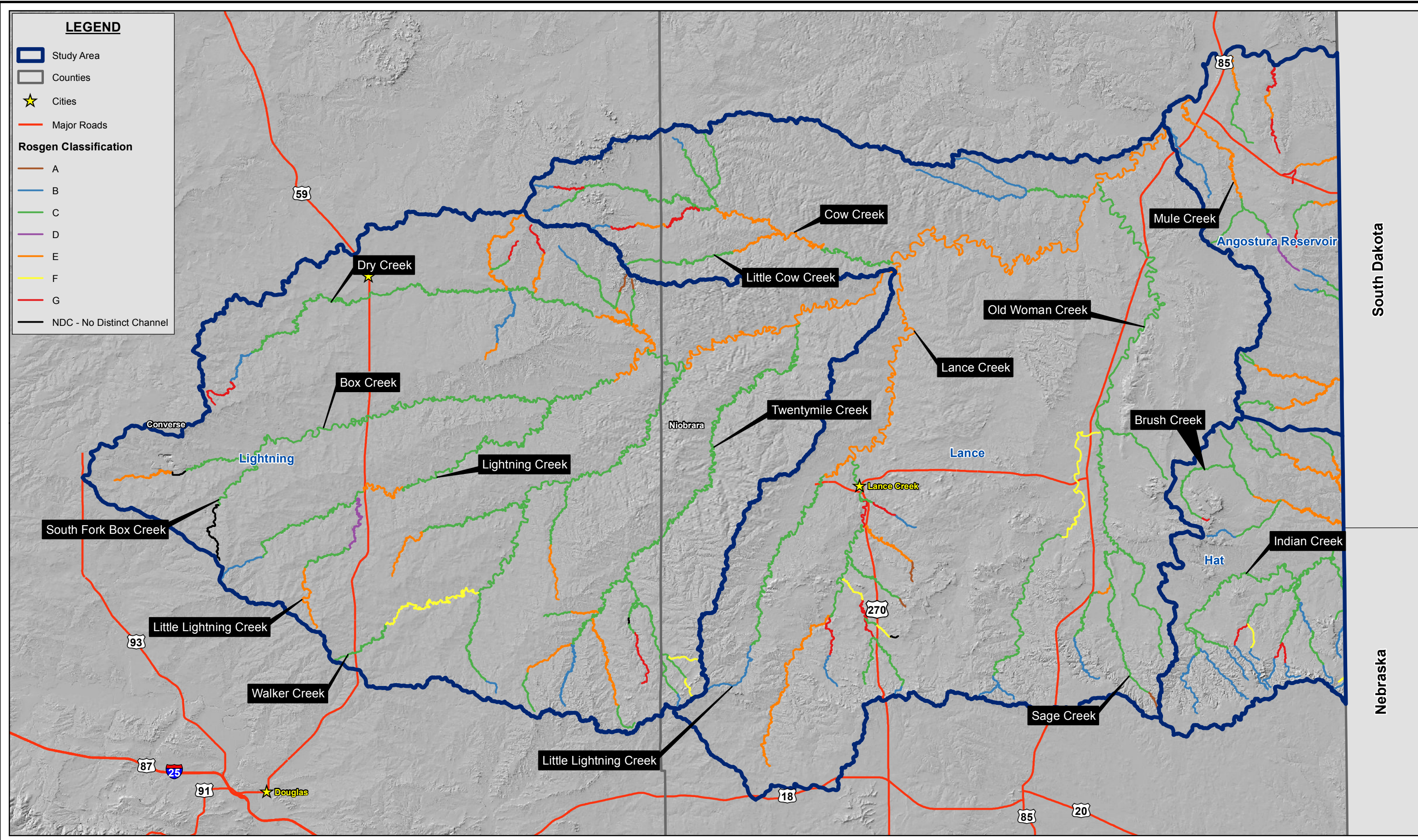


GAGING STATIONS AND STREAMFLOW/SAMPLING SITES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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LEGEND

- Study Area
- Counties
- ★ Cities
- Major Roads

Rosgen Classification

- A
- B
- C
- D
- E
- F
- G
- NDC - No Distinct Channel

South Dakota

Nebraska

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

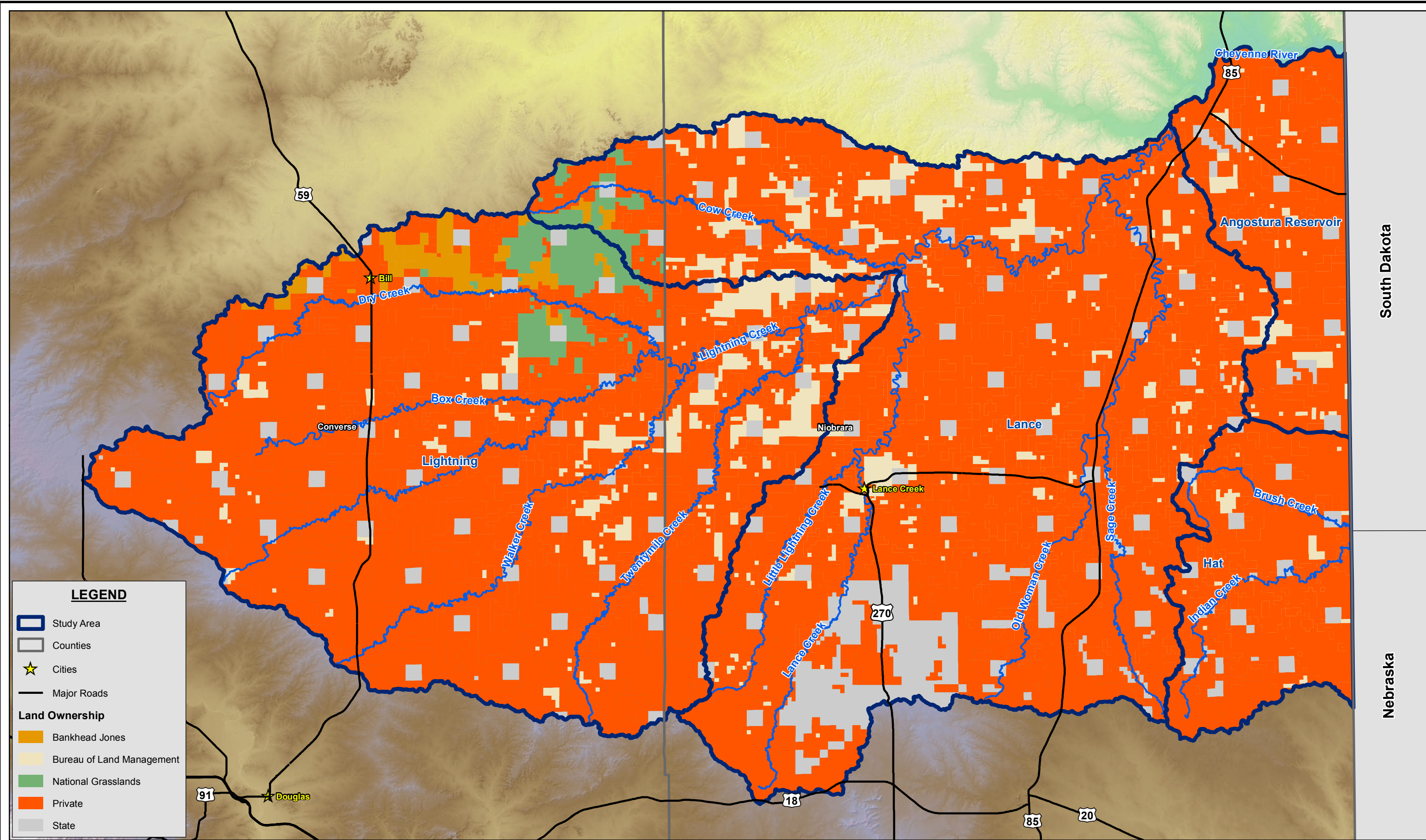
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 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS



MAJOR STREAMS WITH ROSGEN CLASSIFICATION
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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LEGEND

- Study Area
- Counties
- ★ Cities
- Major Roads

Land Ownership

- Bankhead Jones
- Bureau of Land Management
- National Grasslands
- Private
- State

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI; Watershed, 2002, WYGISC; DEM, 2008, USGS Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI; Land Ownership, 2003, BLM

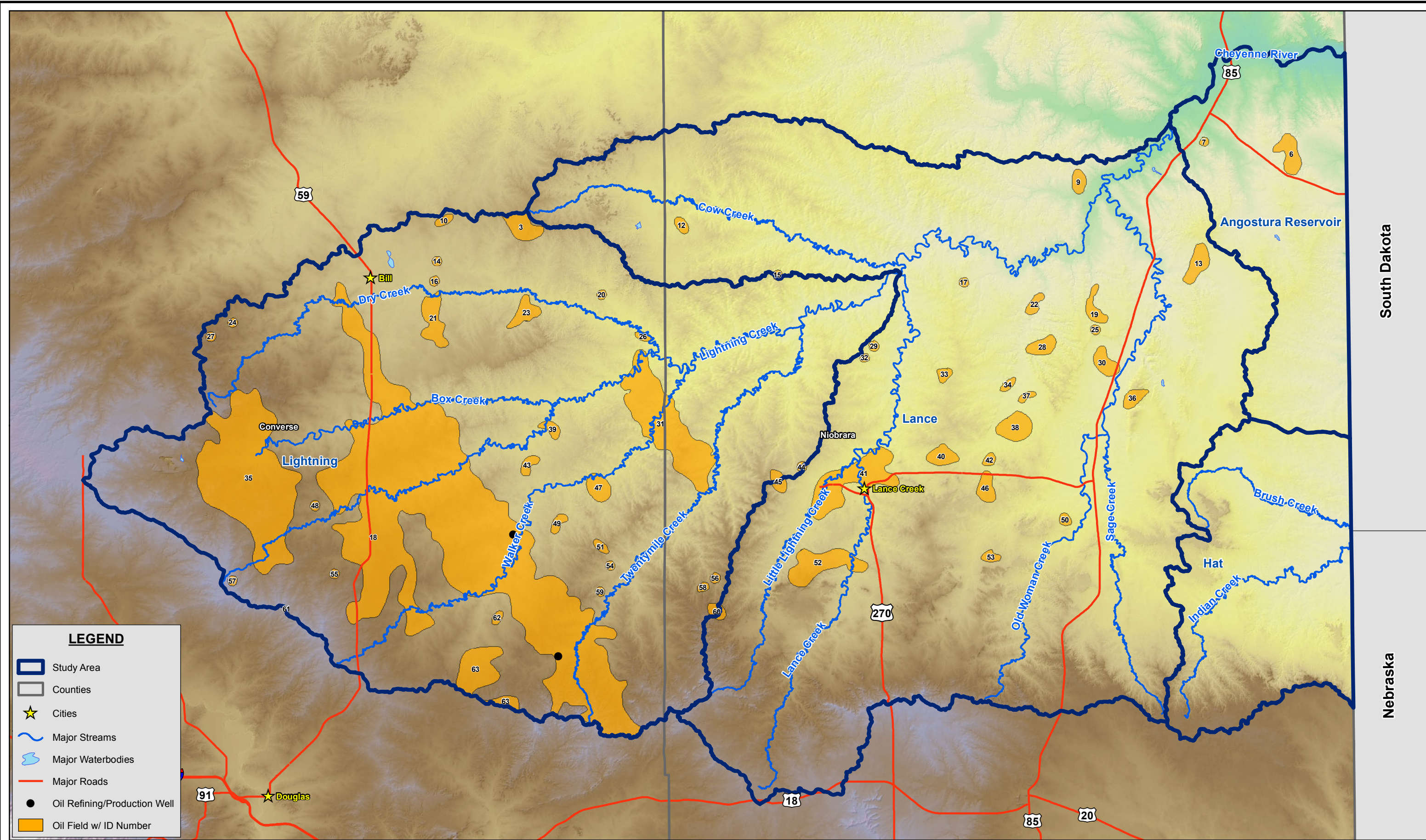


LAND OWNERSHIP
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
16

South Dakota
Nebraska



LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads
- Oil Refining/Production Well
- Oil Field w/ ID Number

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Oil Fields, 1990, WyGIS

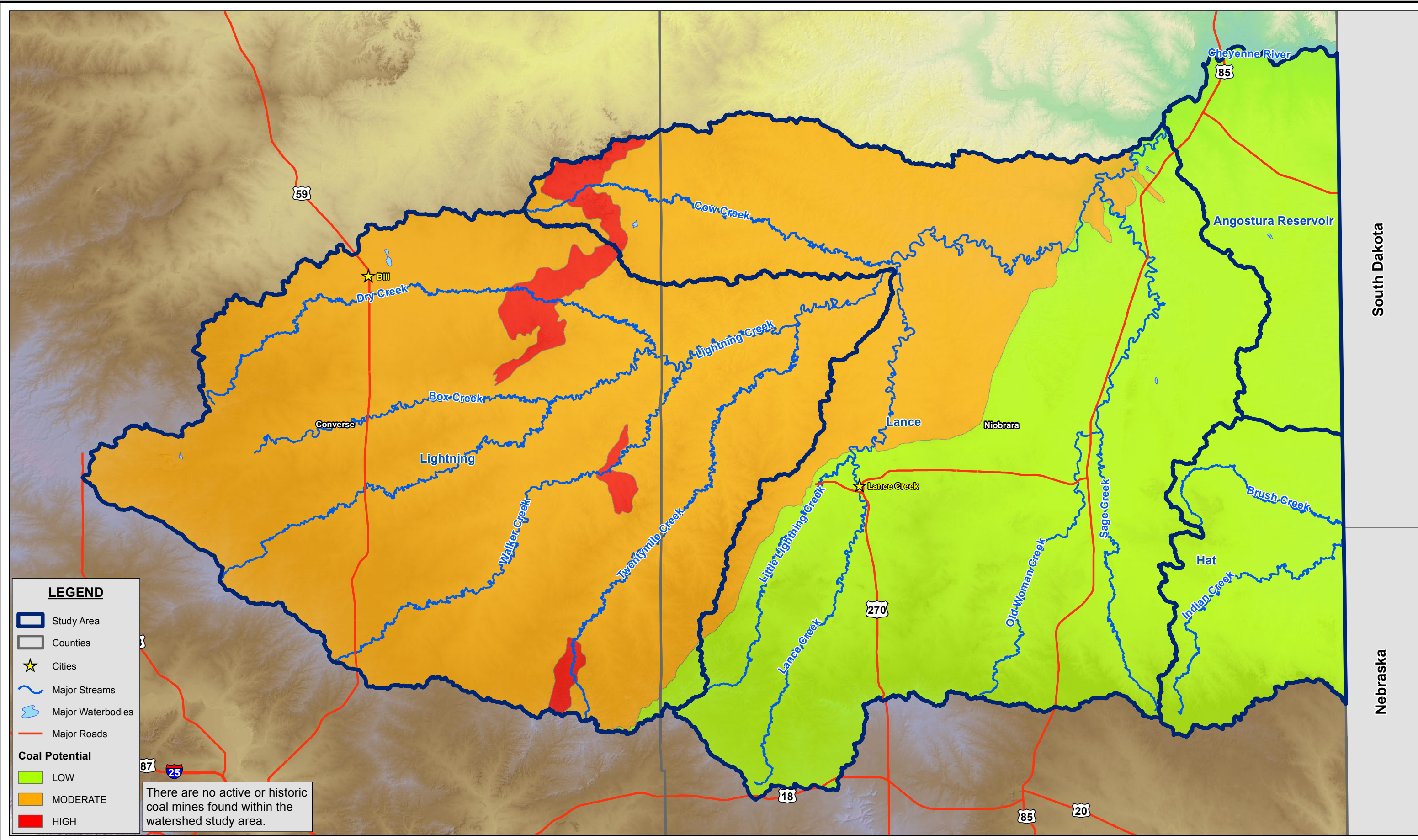


OIL AND GAS WELLS/FIELDS
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties

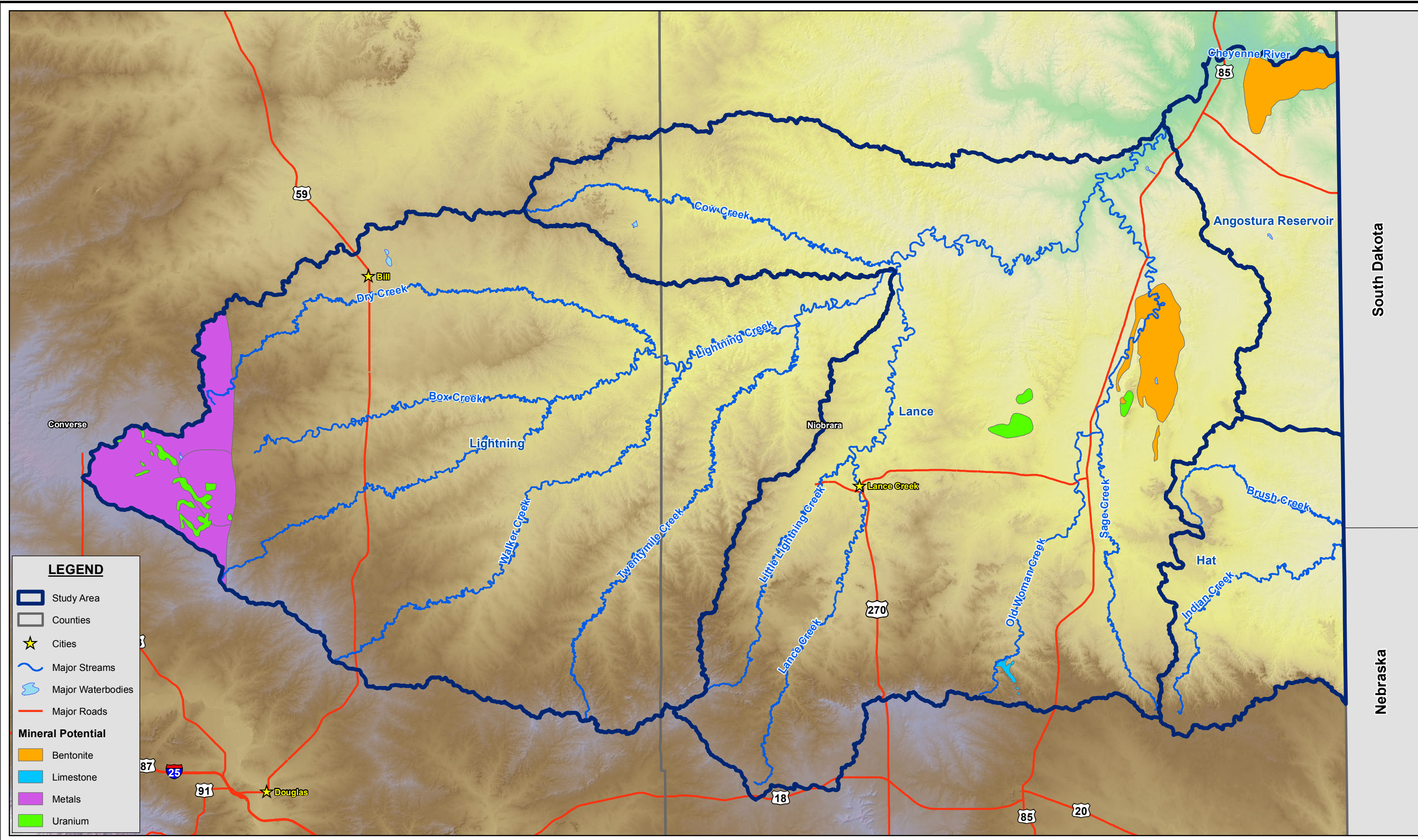


MAP
18

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LEGEND

- Study Area
- Counties
- Cities
- Major Streams
- Major Waterbodies
- Major Roads

Mineral Potential

- Bentonite
- Limestone
- Metals
- Uranium

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Mines, 1990, WYGISC



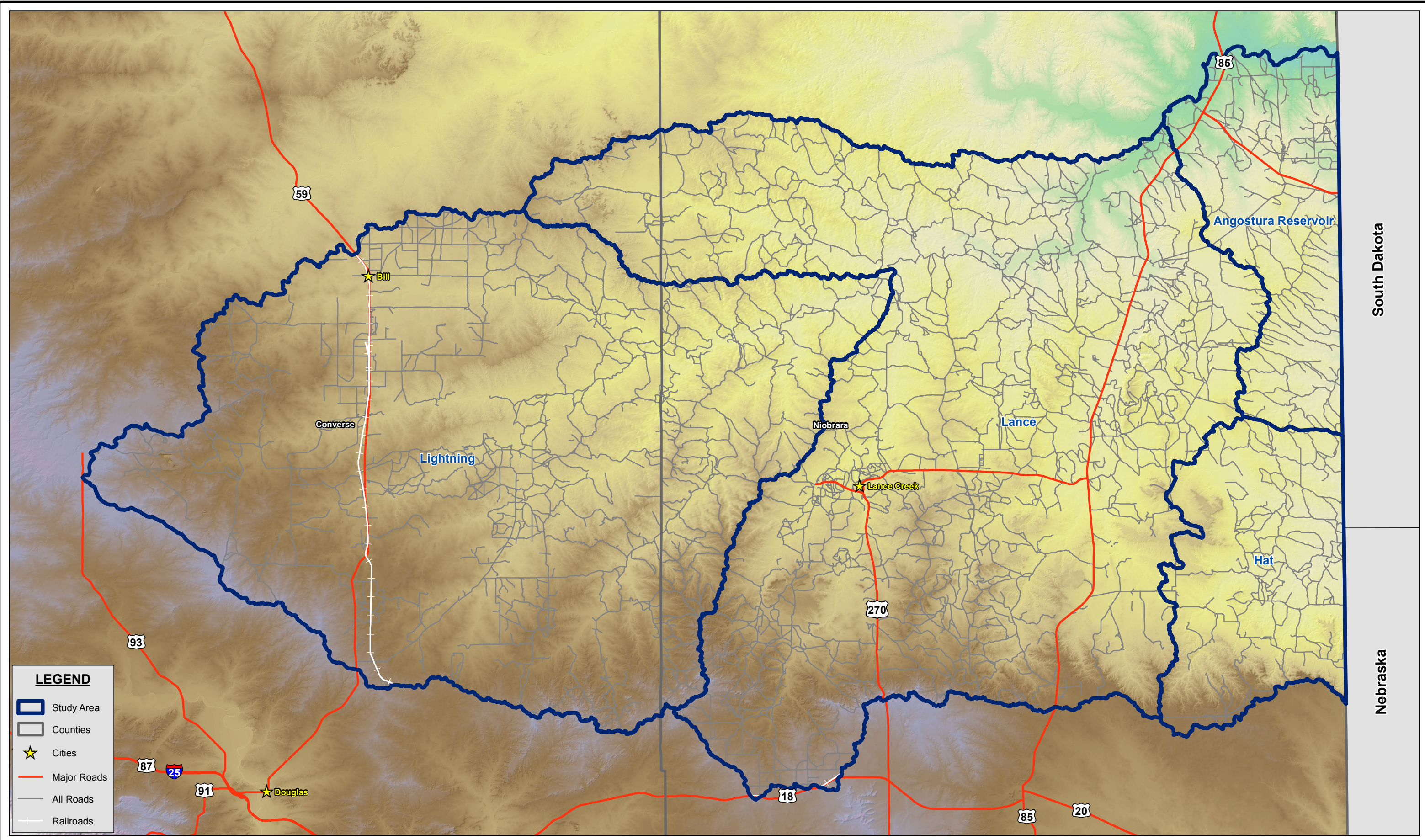
OTHER MINE SITES AND MINERAL POTENTIAL
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
20

South Dakota
Nebraska

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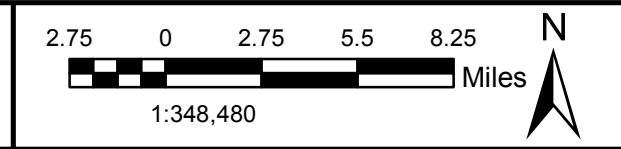


LEGEND

- Study Area
- Counties
- ★ Cities
- Major Roads
- All Roads
- Railroads

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Railroads, 2002, WSGS

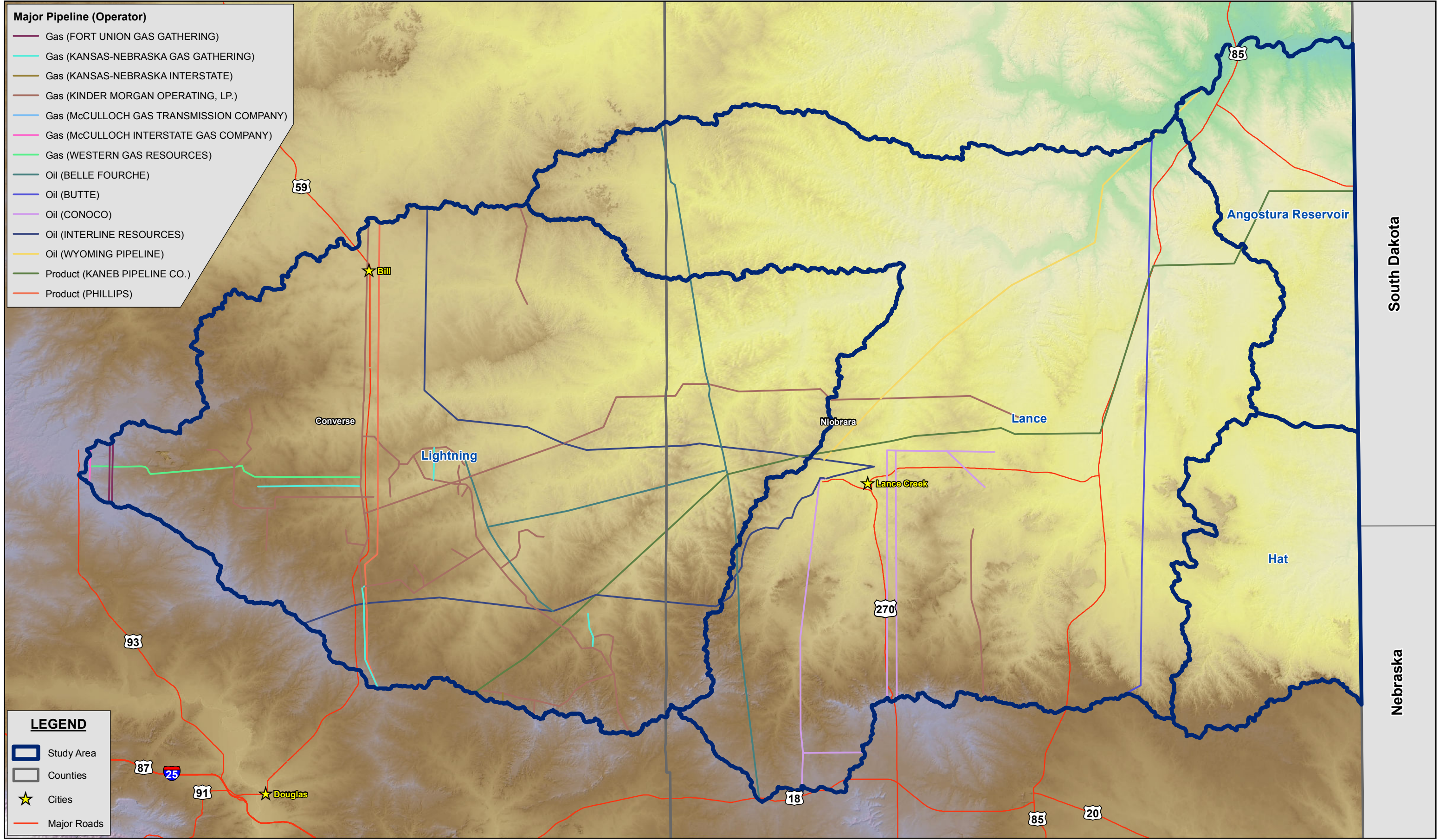


MAJOR ROADS AND RAILROADS
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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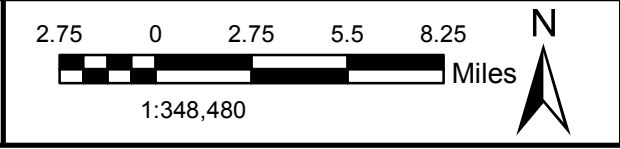
- Major Pipeline (Operator)**
- Gas (FORT UNION GAS GATHERING)
 - Gas (KANSAS-NEBRASKA GAS GATHERING)
 - Gas (KANSAS-NEBRASKA INTERSTATE)
 - Gas (KINDER MORGAN OPERATING, LP.)
 - Gas (McCULLOCH GAS TRANSMISSION COMPANY)
 - Gas (McCULLOCH INTERSTATE GAS COMPANY)
 - Gas (WESTERN GAS RESOURCES)
 - Oil (BELLE FOURCHE)
 - Oil (BUTTE)
 - Oil (CONOCO)
 - Oil (INTERLINE RESOURCES)
 - Oil (WYOMING PIPELINE)
 - Product (KANEB PIPELINE CO.)
 - Product (PHILLIPS)



- LEGEND**
- Study Area
 - Counties
 - Cities
 - Major Roads

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Pipelines, 2002, WSGS

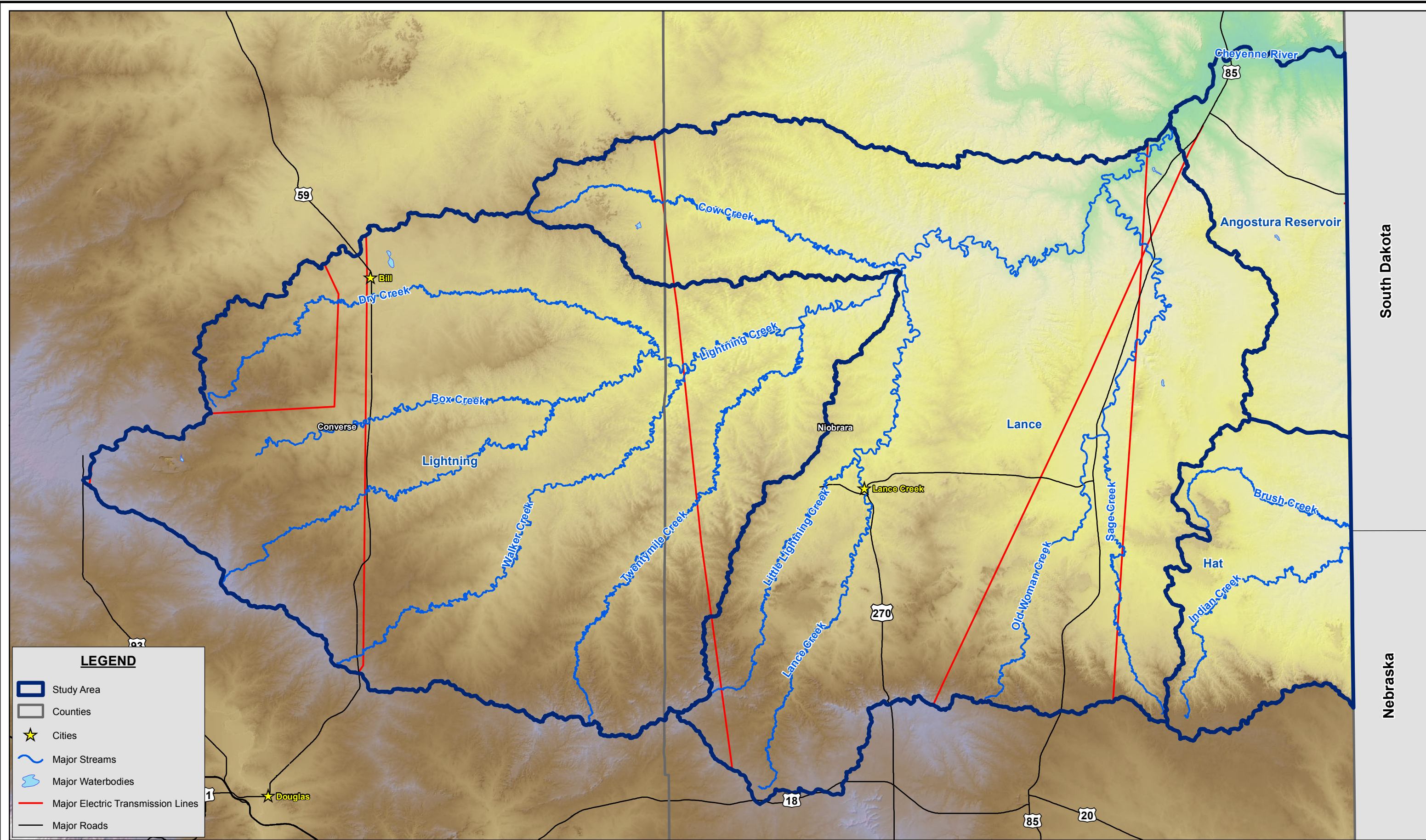


MAJOR PIPELINES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties

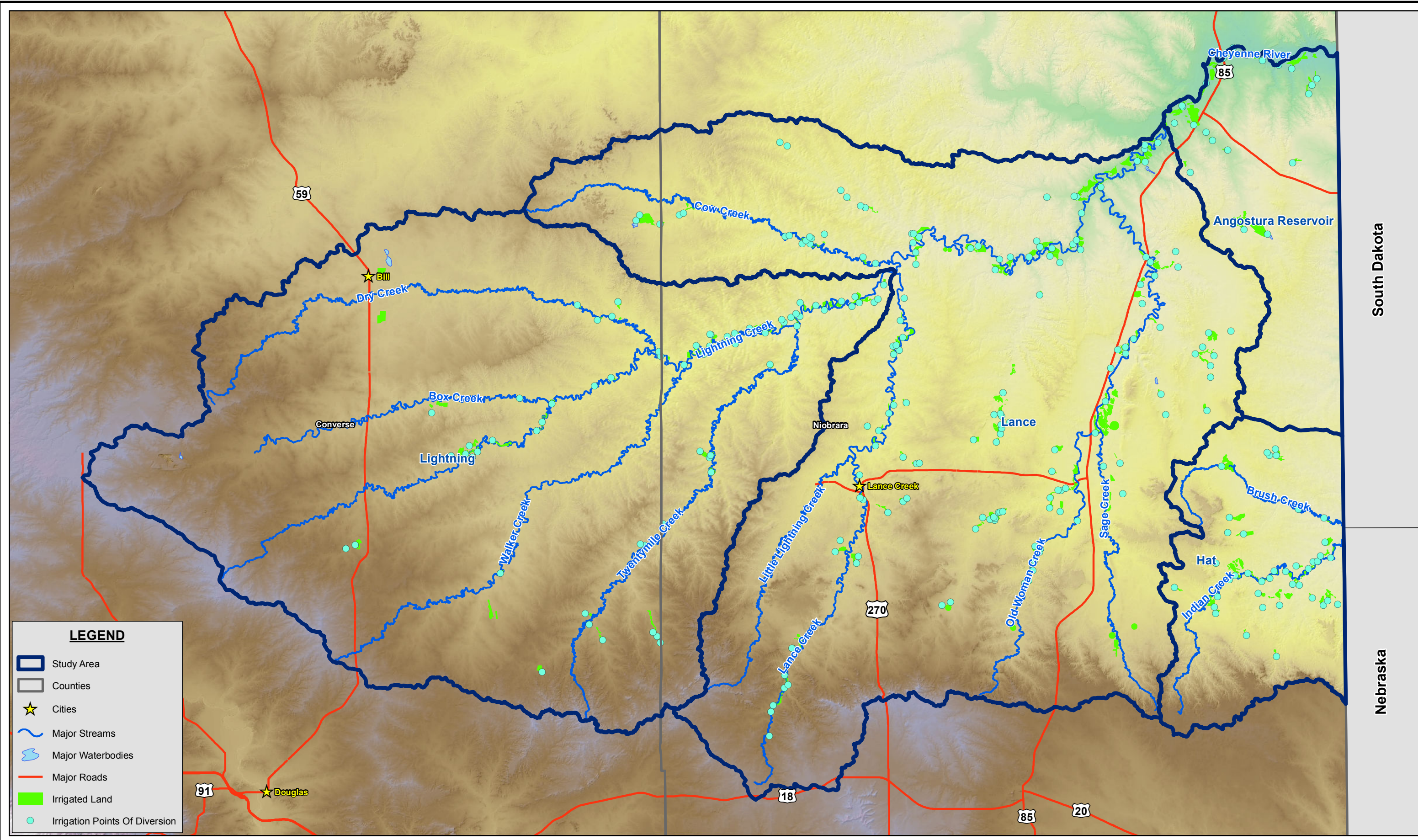


MAP
22

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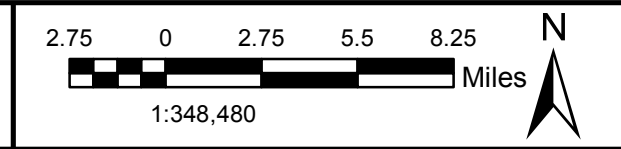
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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI; Watershed, 2002, WYGISC; DEM, 2008, USGS; Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI; Irrigated Lands, 2002, WWDC; Points of Diversion, 2002, WWDC



IRRIGATED LANDS
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties












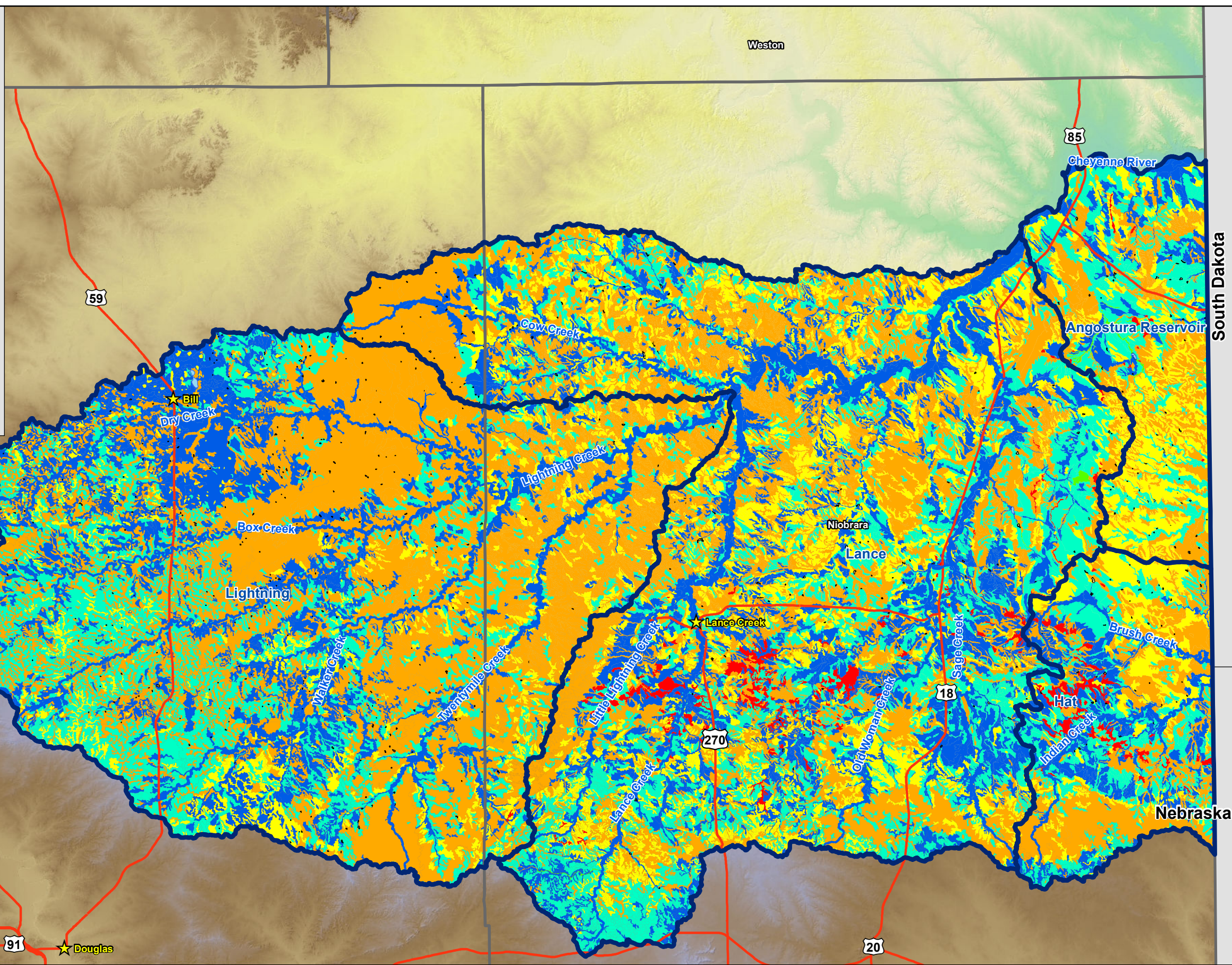
MAP
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South Dakota







Nebraska

Irrigated Land Capability Classes

	Water (1,864 ac)	
	Class I (0 ac)	Soils have slight limitations that restrict their use.
	Class II (0 ac)	Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
	Class III (339,480 ac)	Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
	Class IV (381,843 ac)	Soils have very severe limitations that restrict the choice of plants or require very careful management, or both.
	Class V (1,533 ac)	Soils have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
	Class VI (217,280 ac)	Soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
	Class VII (614,615 ac)	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife.
	Class VIII (15,650 ac)	Soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for esthetic purposes.

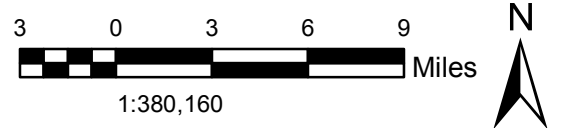


LEGEND

	Study Area
	Counties
	Cities
	Major Streams
	Major Waterbodies
	Major Roads

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS



IRRIGATED LAND CAPABILITY CLASSES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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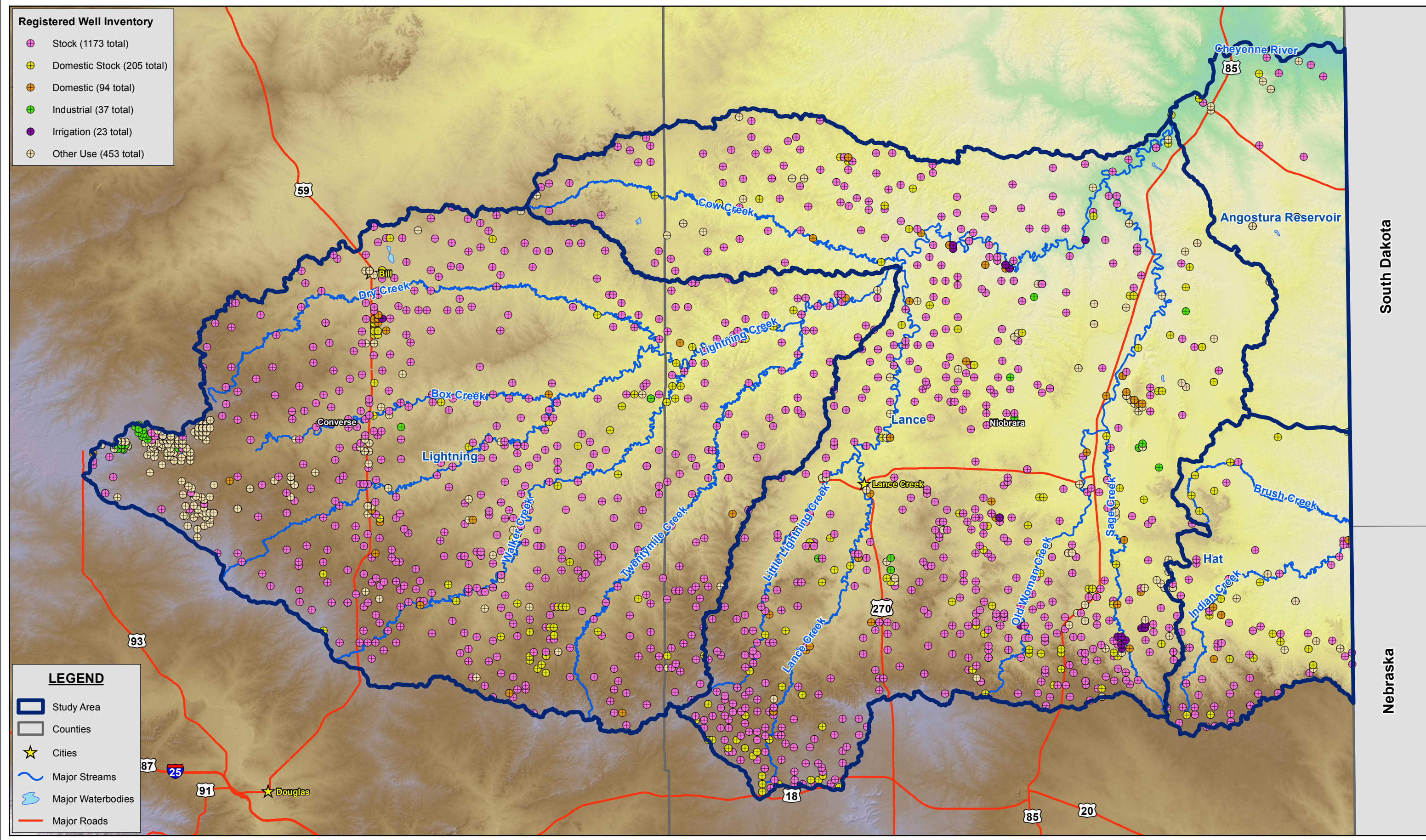
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Registered Well Inventory

- ⊕ Stock (1173 total)
- ⊕ Domestic Stock (205 total)
- ⊕ Domestic (94 total)
- ⊕ Industrial (37 total)
- ⊕ Irrigation (23 total)
- ⊕ Other Use (453 total)

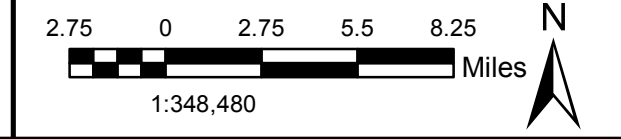
LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads



PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

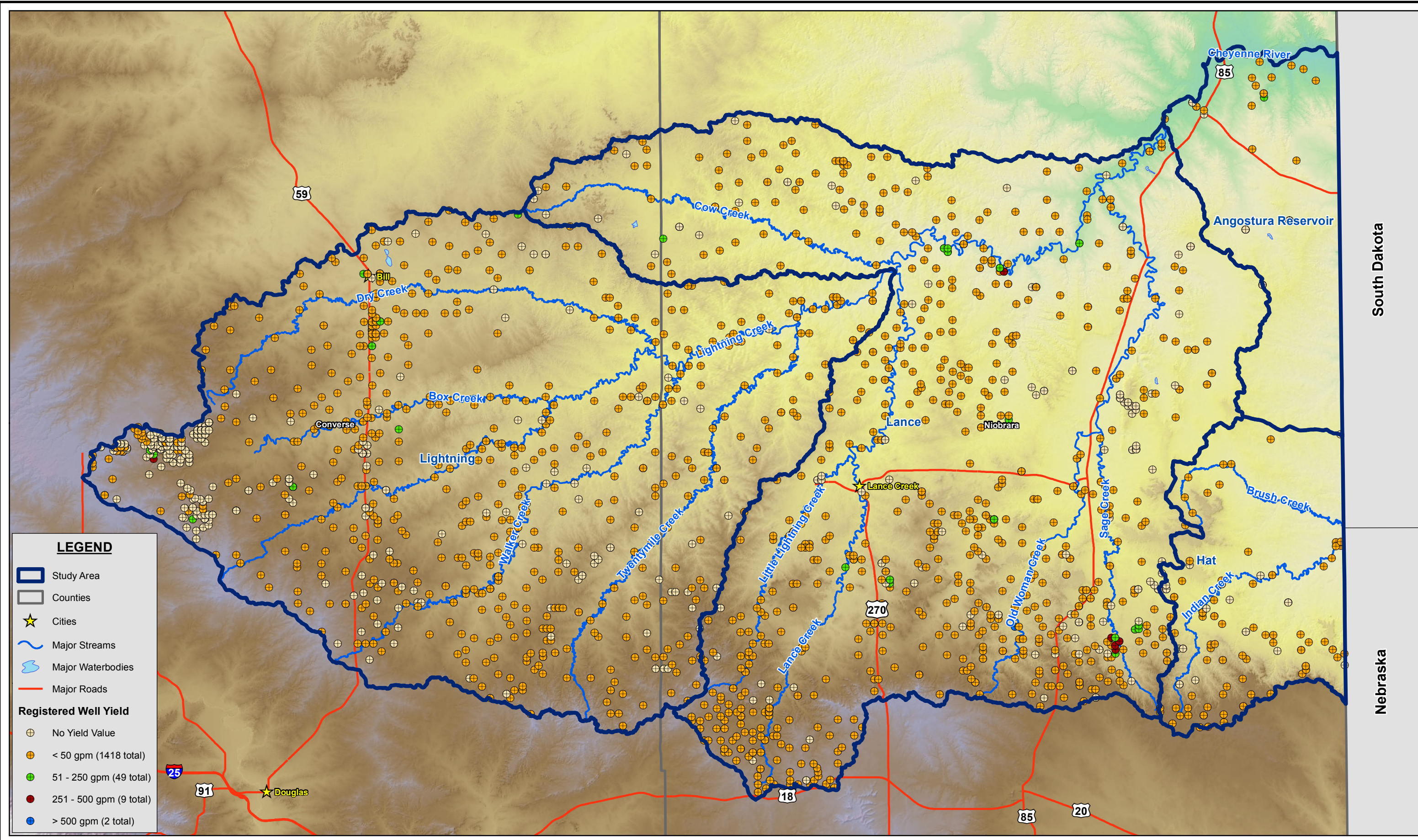


GROUNDWATER REGISTERED WELL INVENTORY MAP
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads

Registered Well Yield

- ⊕ No Yield Value
- ⊕ < 50 gpm (1418 total)
- ⊕ 51 - 250 gpm (49 total)
- ⊕ 251 - 500 gpm (9 total)
- ⊕ > 500 gpm (2 total)

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

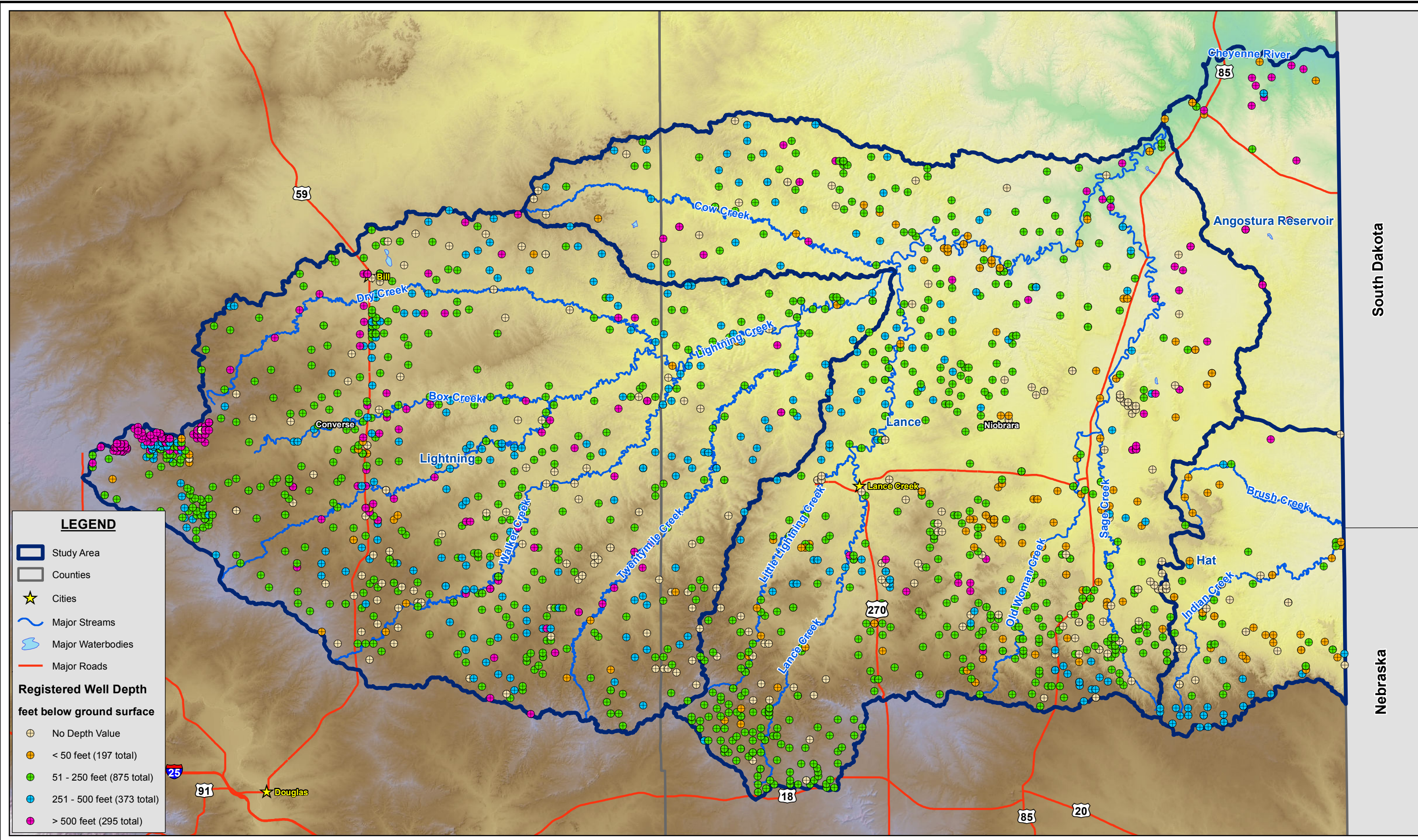


GROUNDWATER REGISTERED WELL YIELD MAP
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
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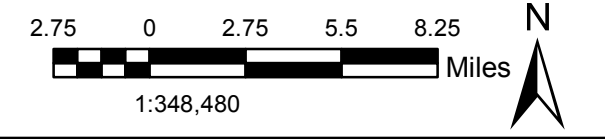
South Dakota
Nebraska



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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS



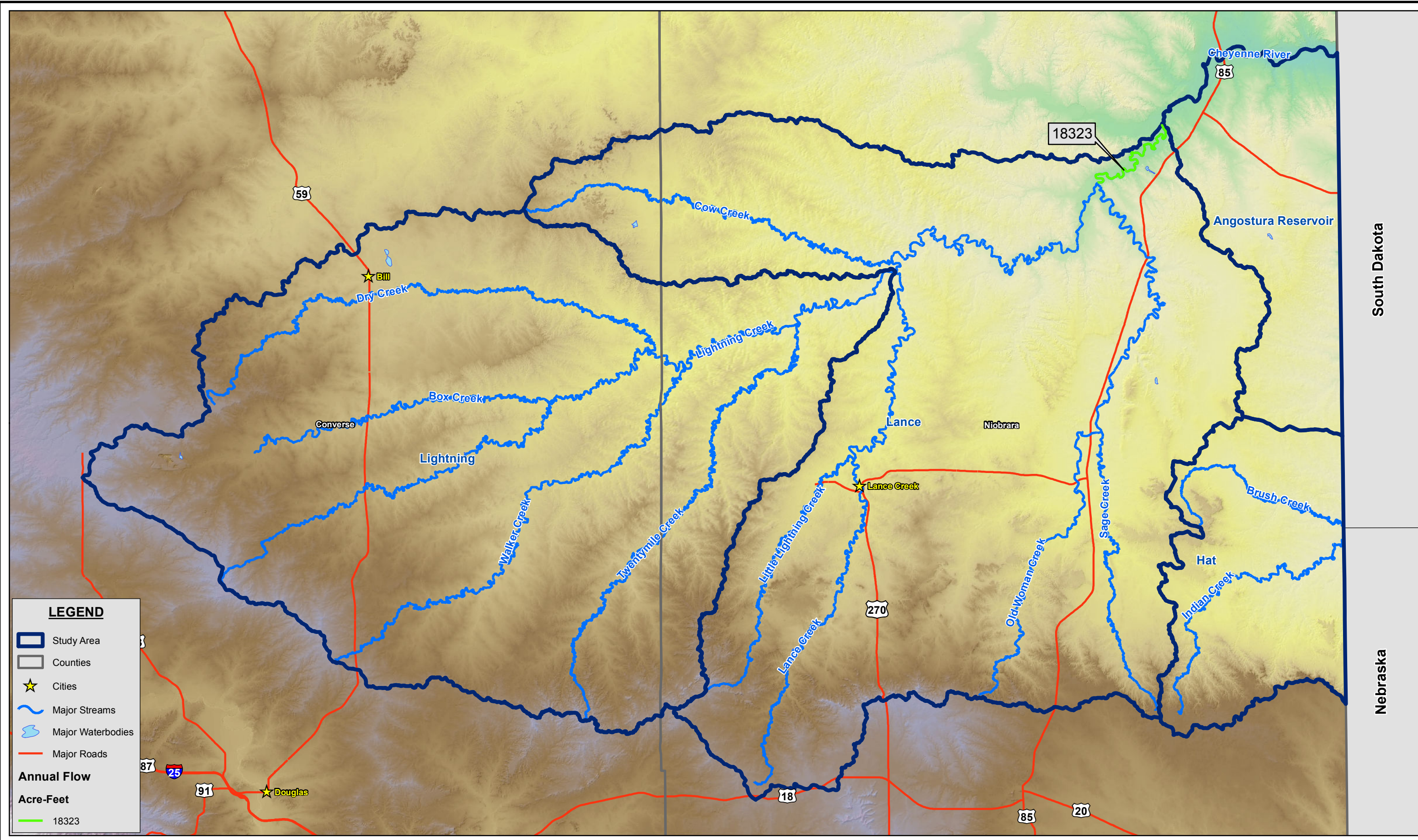
GROUNDWATER REGISTERED WELL DEPTH MAP
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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South Dakota

Nebraska



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LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads

Annual Flow

Acre-Feet

- 18323

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

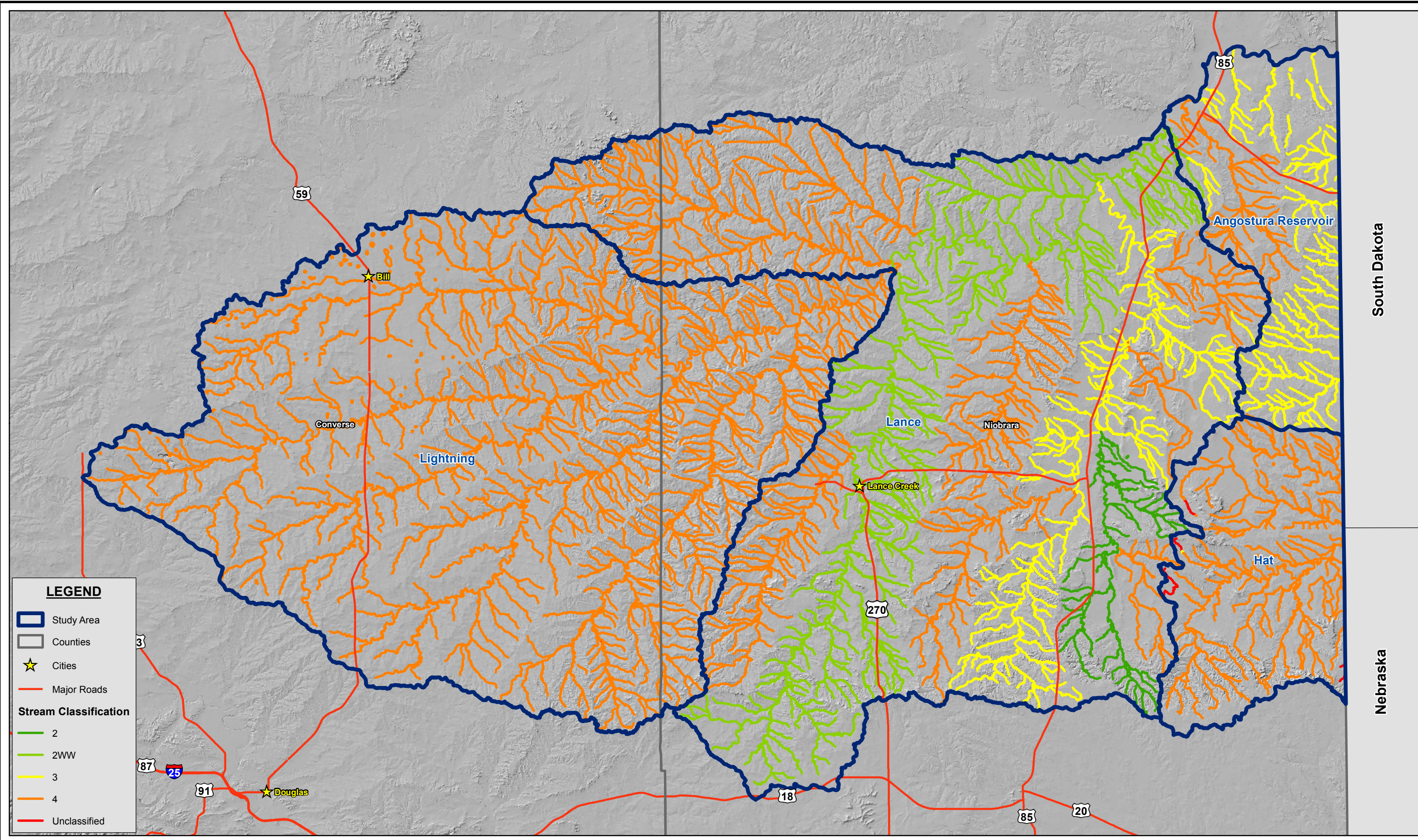


AVAILABLE SURFACE WATER
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
29

South Dakota
Nebraska



LEGEND

- Study Area
- Counties
- ★ Cities
- Major Roads

Stream Classification

- 2
- 2WW
- 3
- 4
- Unclassified

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Oil Fields, 1990, WYGISC

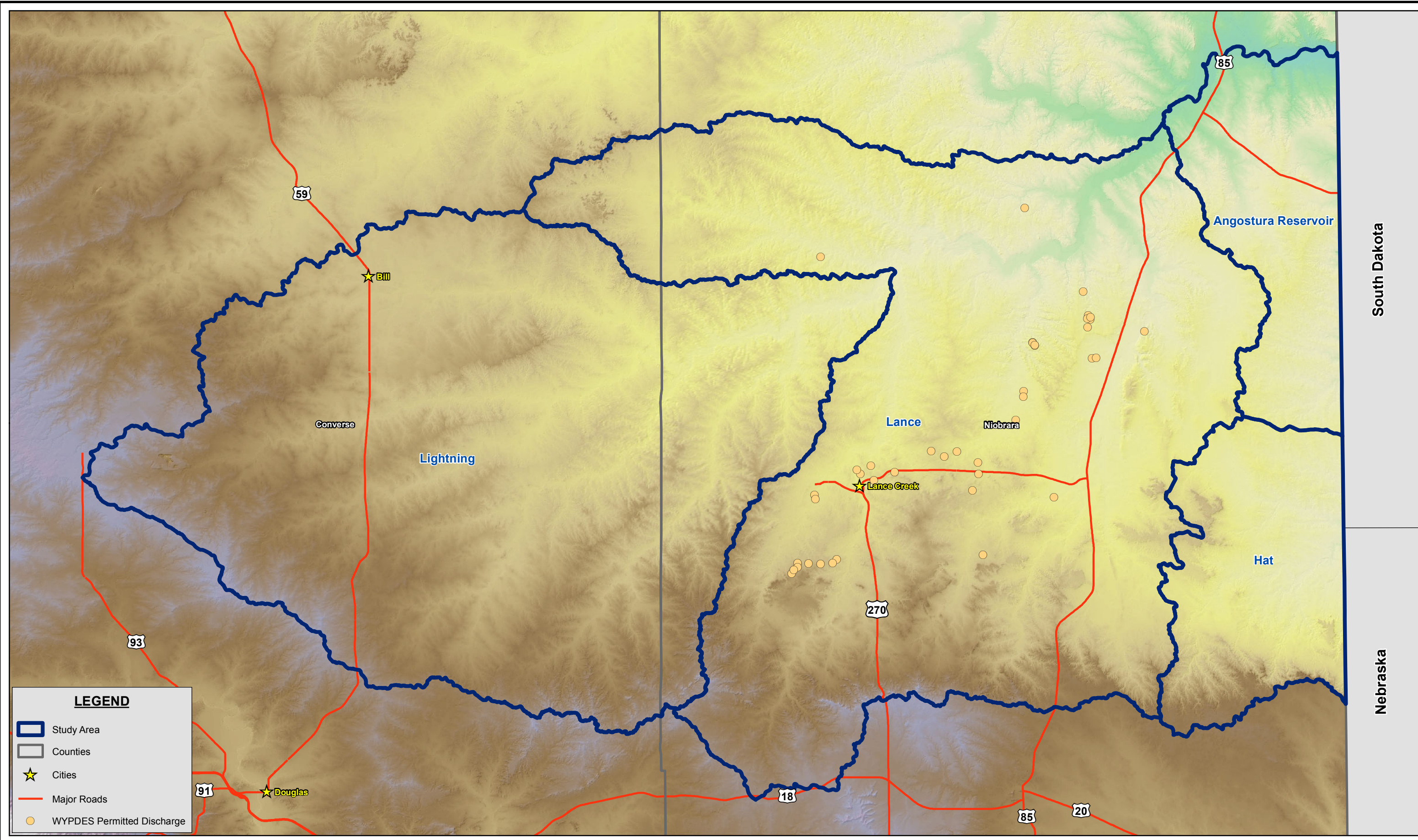


WDEQ STREAM CLASSIFICATIONS
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
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South Dakota
Nebraska



LEGEND

- Study Area
- Counties
- Cities
- Major Roads
- WYPDES Permitted Discharge

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Oil Fields, 1990, WyGIS



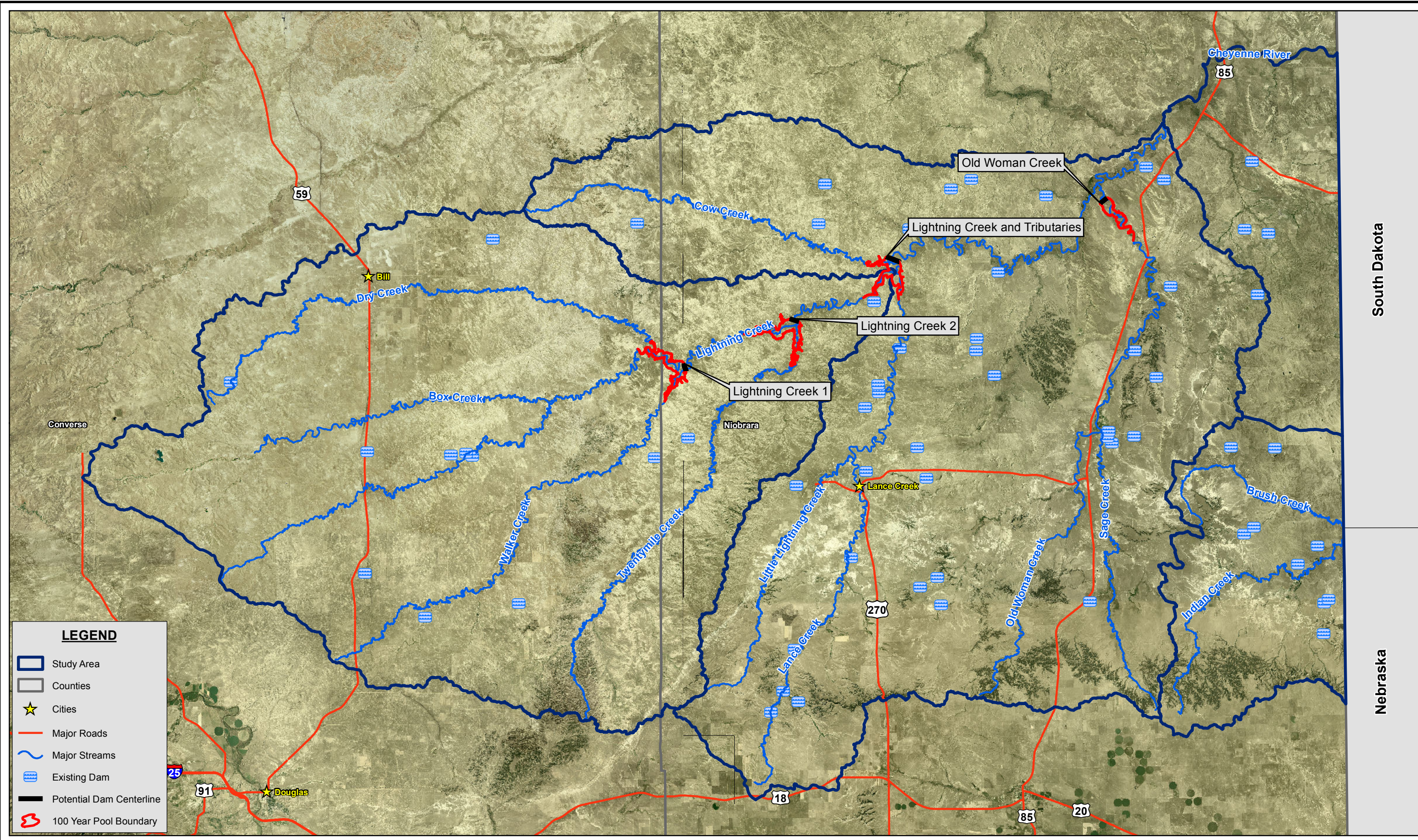
WYPDES PERMITTED DISCHARGES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
31

South Dakota

Nebraska



South Dakota

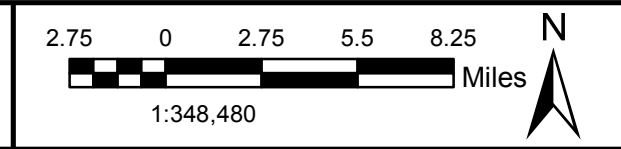
Nebraska

LEGEND

- Study Area
- Counties
- ★ Cities
- Major Roads
- Major Streams
- Existing Dam
- Potential Dam Centerline
- 100 Year Pool Boundary

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;

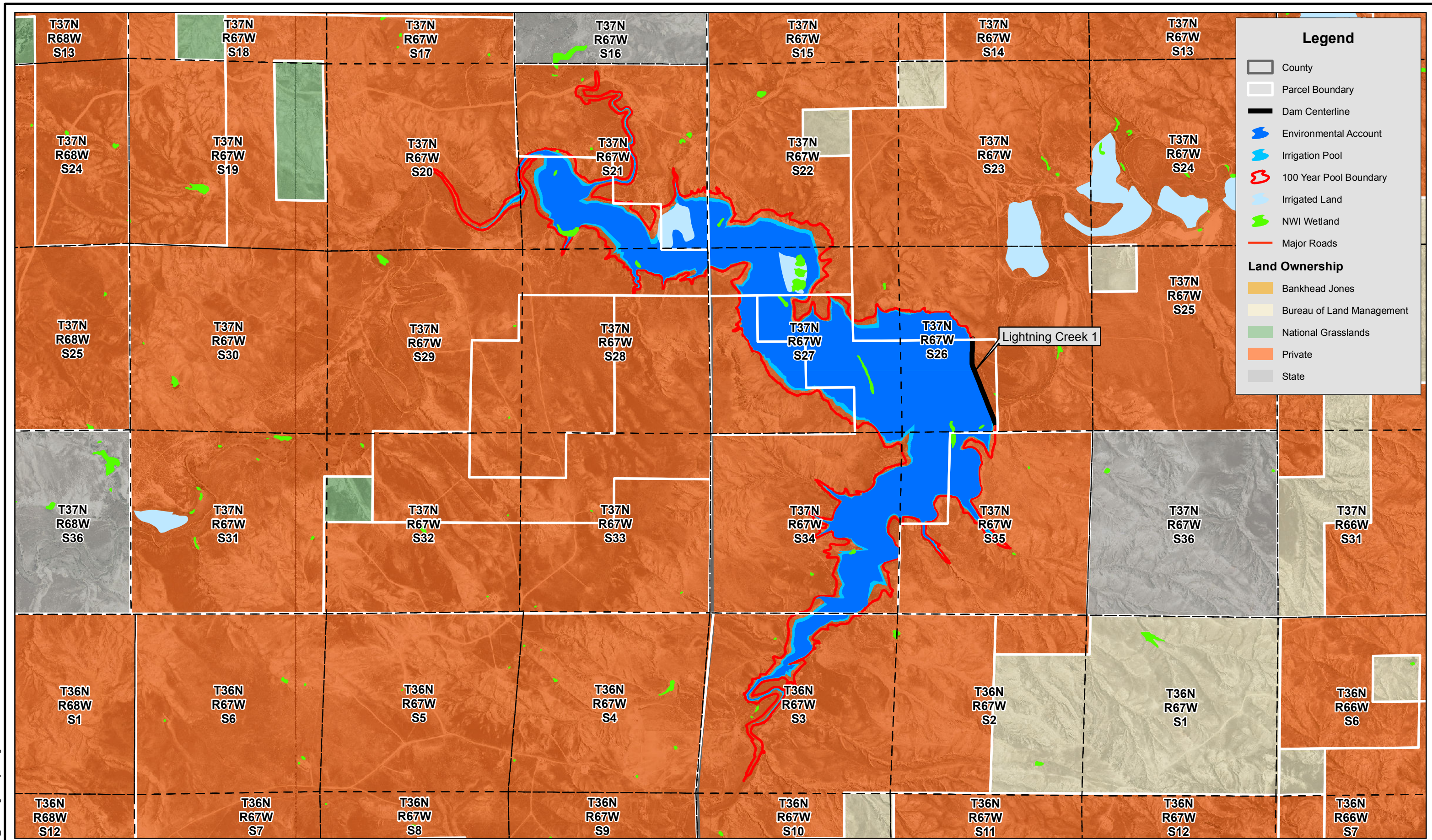


POTENTIAL SURFACE WATER STORAGE SITES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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Legend

- County
- Parcel Boundary
- Dam Centerline
- Environmental Account
- Irrigation Pool
- 100 Year Pool Boundary
- Irrigated Land
- NWI Wetland
- Major Roads

Land Ownership

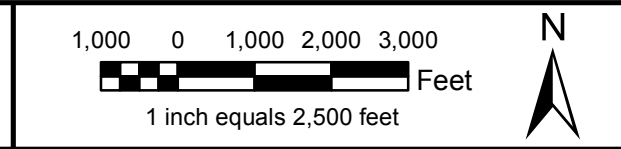
- Bankhead Jones
- Bureau of Land Management
- National Grasslands
- Private
- State

Lightning Creek 1

F:\Projects\010-1333_GOHY\gis\Project Figures.mxd

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

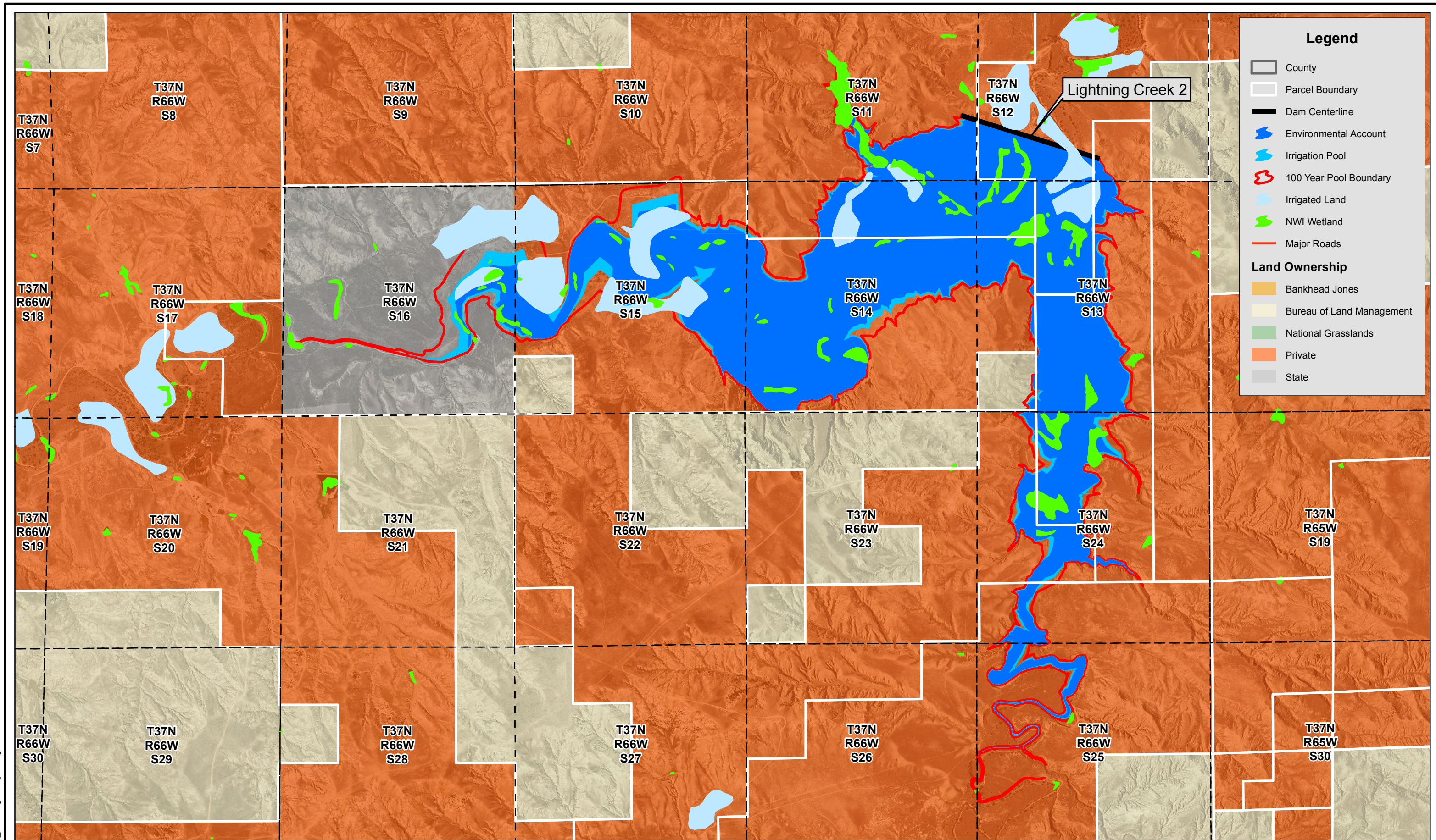
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



PROPOSED LIGHTNING CREEK 1 SITE
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
33a



Legend

- County
- Parcel Boundary
- Dam Centerline
- Environmental Account
- Irrigation Pool
- 100 Year Pool Boundary
- Irrigated Land
- NWI Wetland
- Major Roads

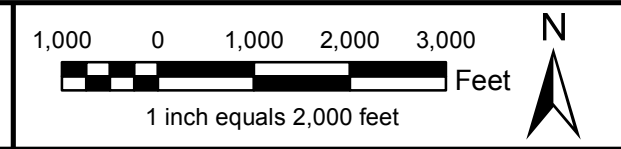
Land Ownership

- Bankhead Jones
- Bureau of Land Management
- National Grasslands
- Private
- State

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

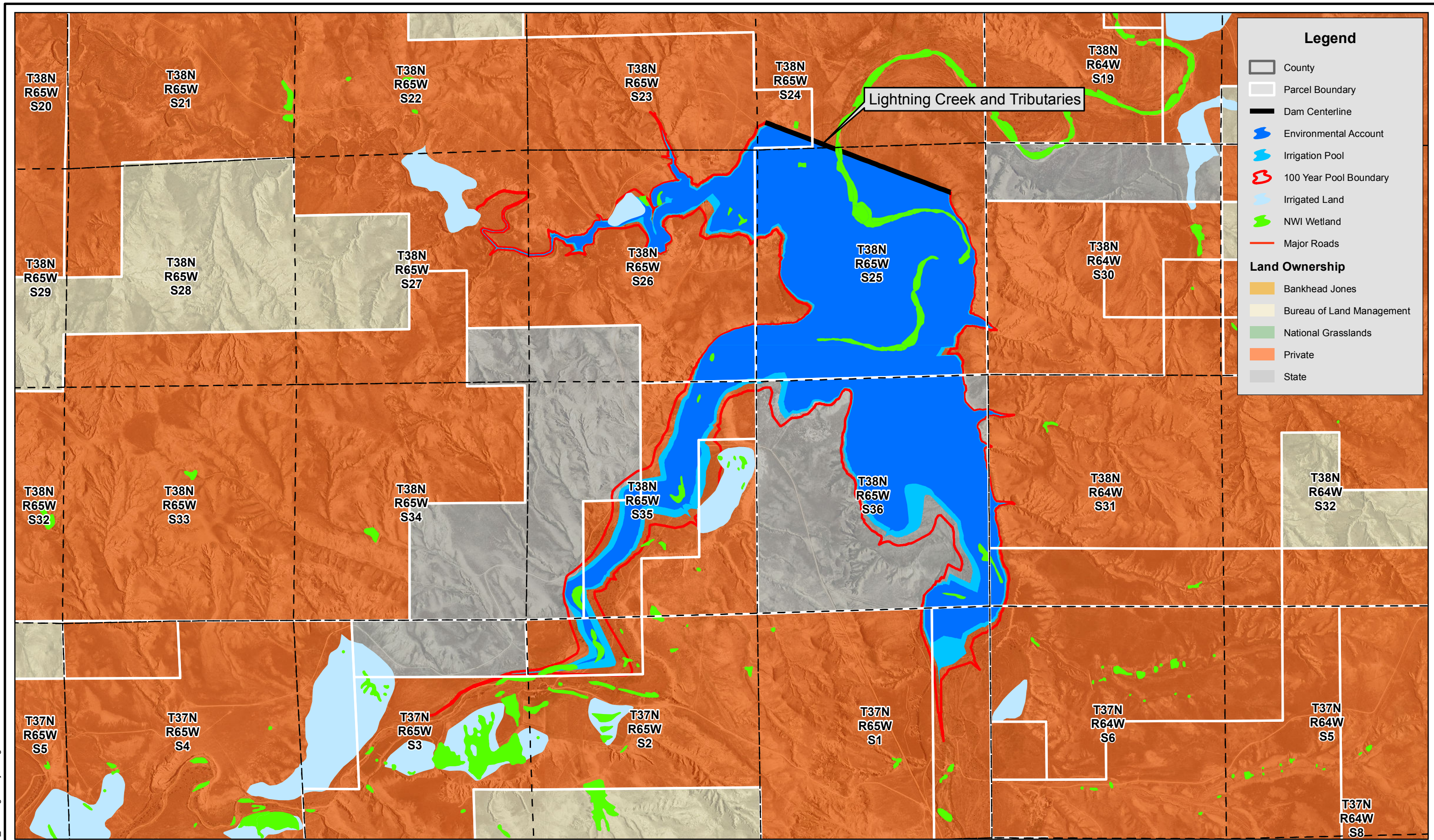
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



PROPOSED LIGHTNING CREEK 2 SITE
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
33b



Lightning Creek and Tributaries

Legend

- County
- Parcel Boundary
- Dam Centerline
- Environmental Account
- Irrigation Pool
- 100 Year Pool Boundary
- Irrigated Land
- NWI Wetland
- Major Roads

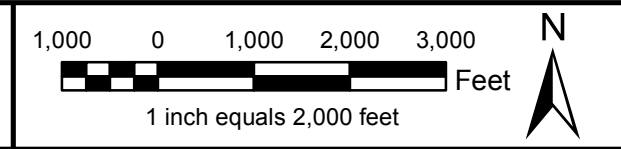
Land Ownership

- Bankhead Jones
- Bureau of Land Management
- National Grasslands
- Private
- State

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

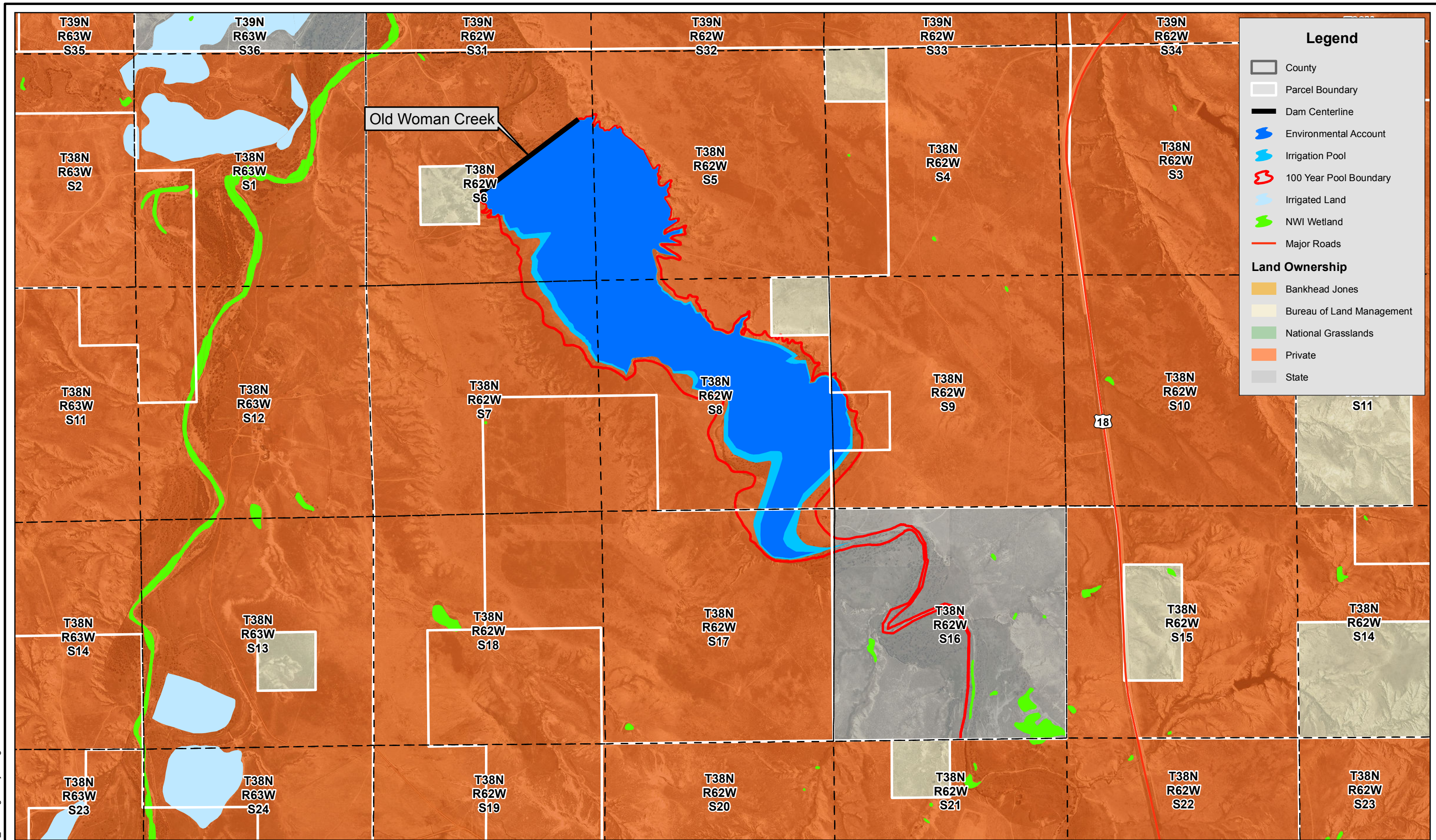
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



PROPOSED LIGHTNING CREEK AND TRIBUTARIES SITE
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
33c



Legend

- County
- Parcel Boundary
- Dam Centerline
- Environmental Account
- Irrigation Pool
- 100 Year Pool Boundary
- Irrigated Land
- NWI Wetland
- Major Roads

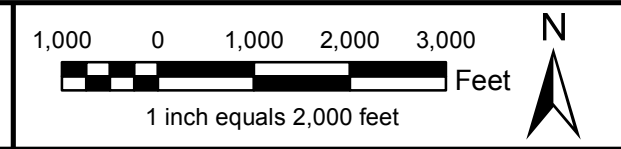
Land Ownership

- Bankhead Jones
- Bureau of Land Management
- National Grasslands
- Private
- State

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

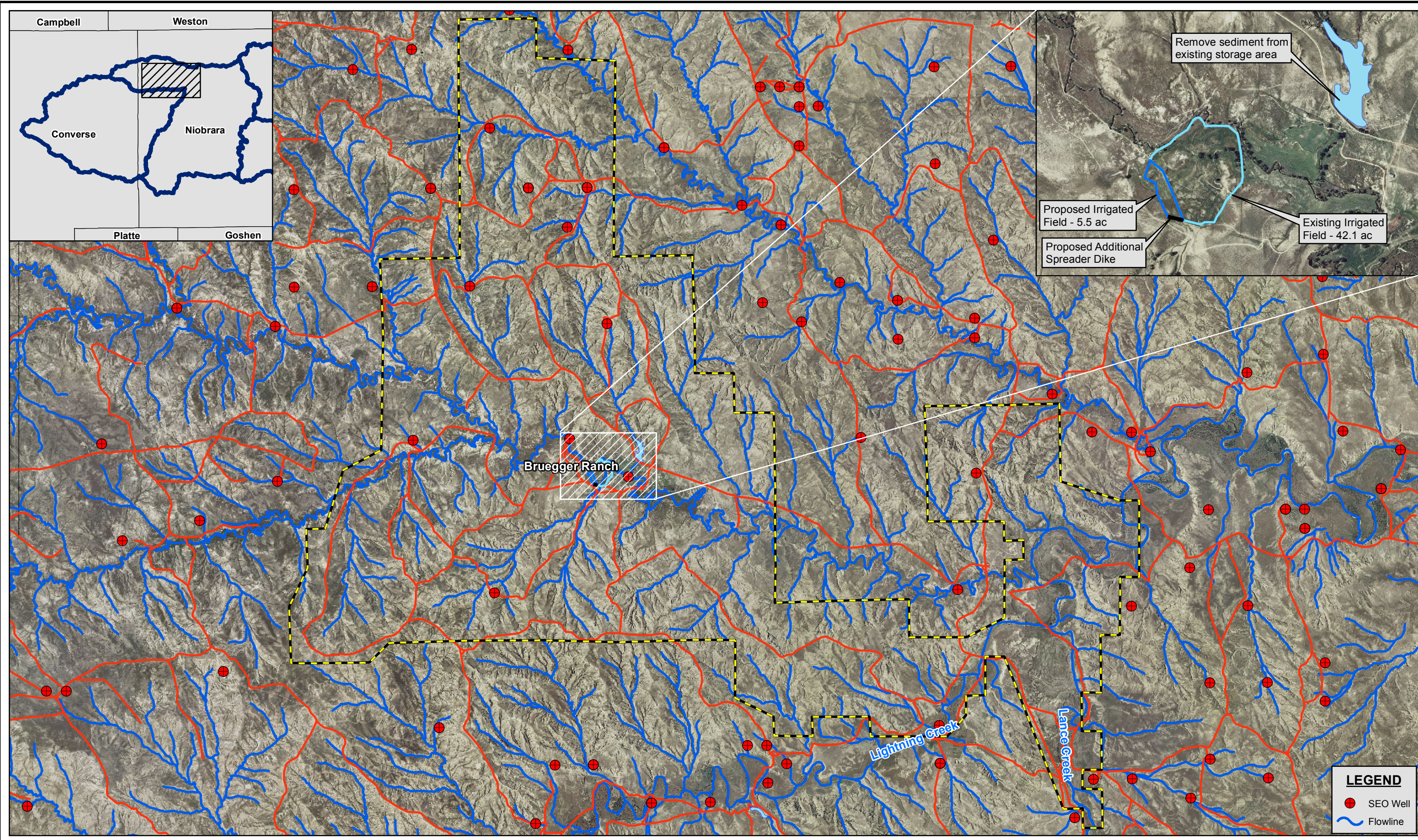
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;



PROPOSED OLD WOMAN CREEK SITE
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
33d



LEGEND

- SEO Well
- Flowline

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N

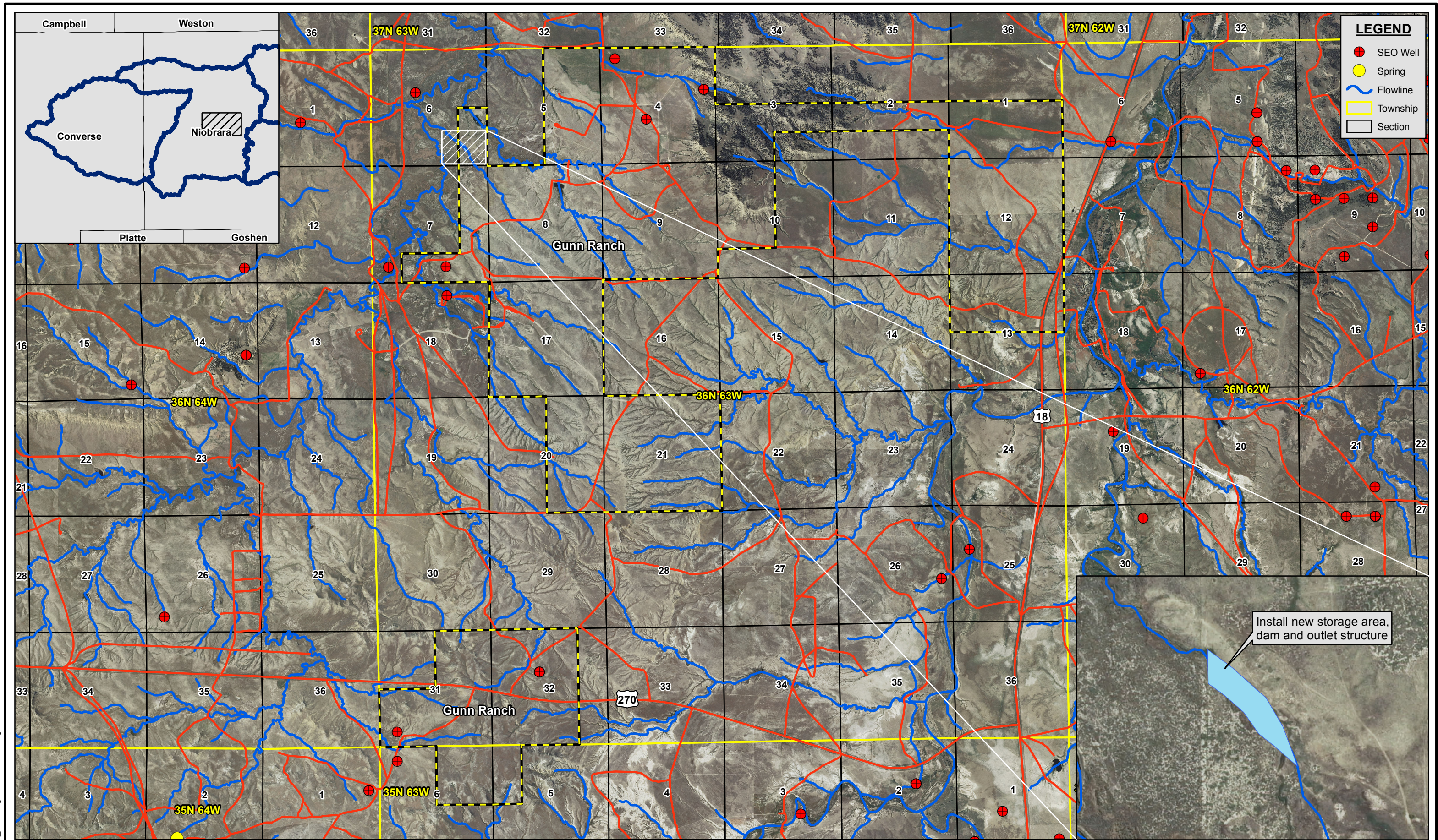
 1 inch equals 6,000 feet

BRUEGGER RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34a

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

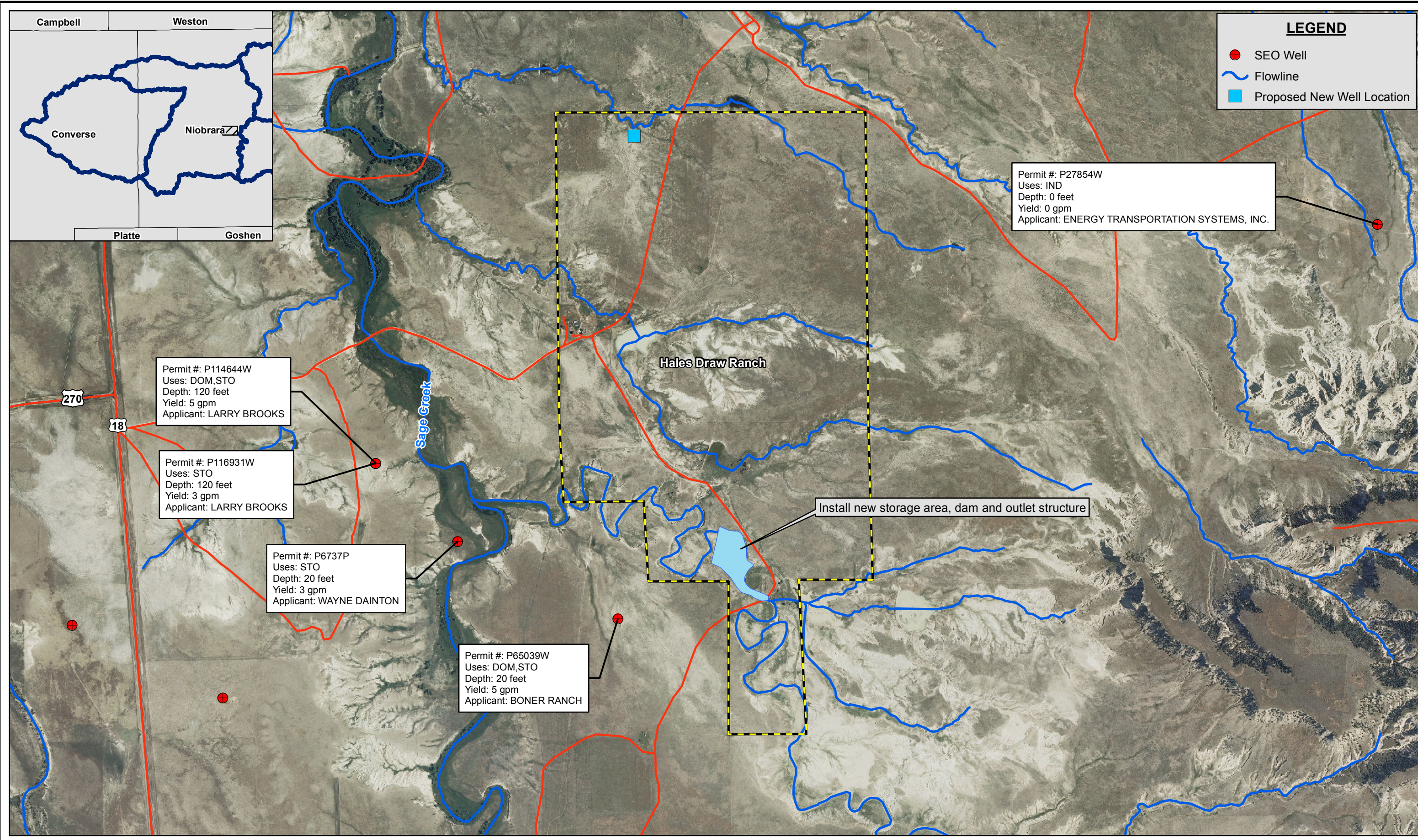
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 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 4,000 feet

GUNN RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties

OLSSON
 ASSOCIATES

MAP
 34b



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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 1,500 feet

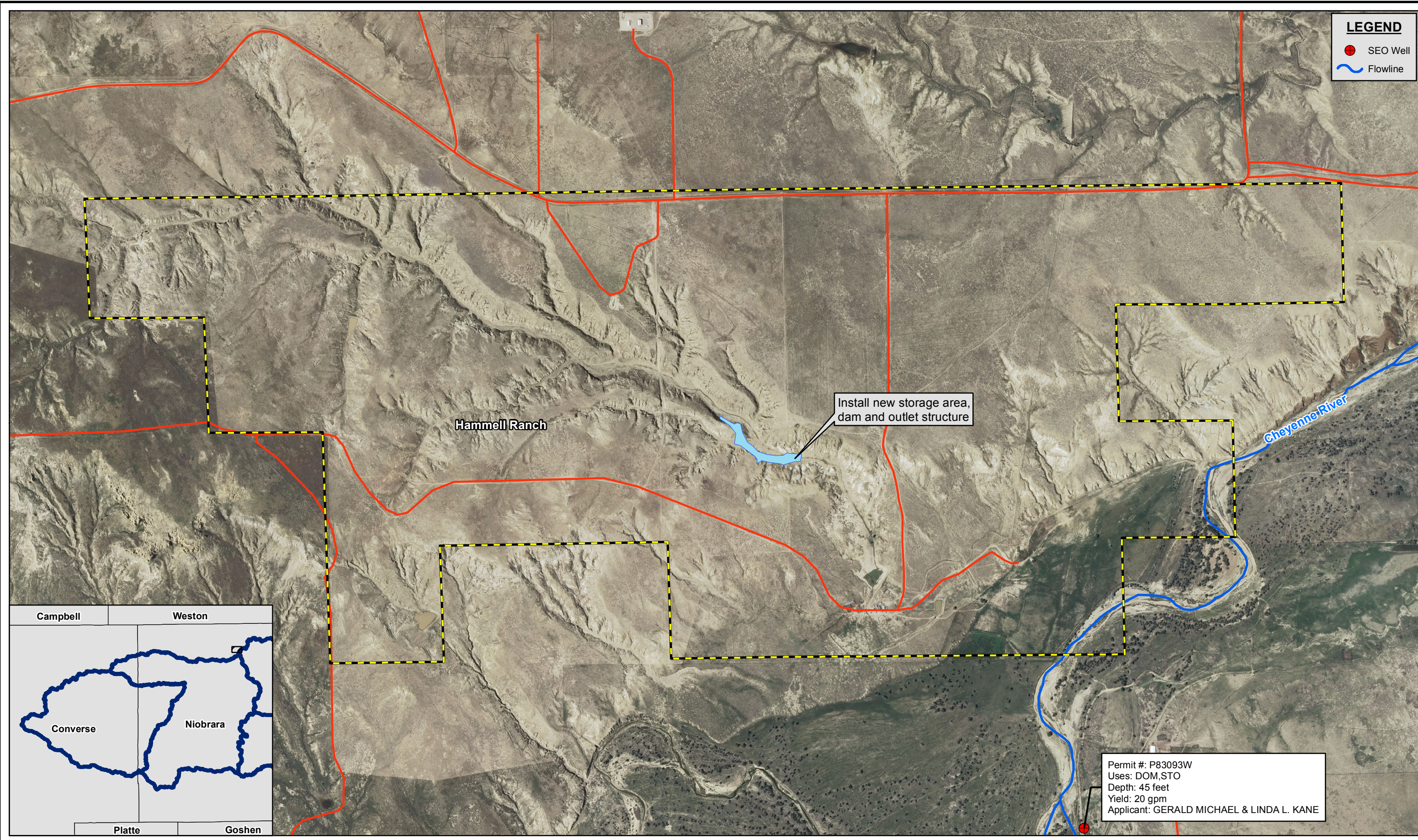
HALES DRAW RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34c

LEGEND

- SEO Well
- Flowline

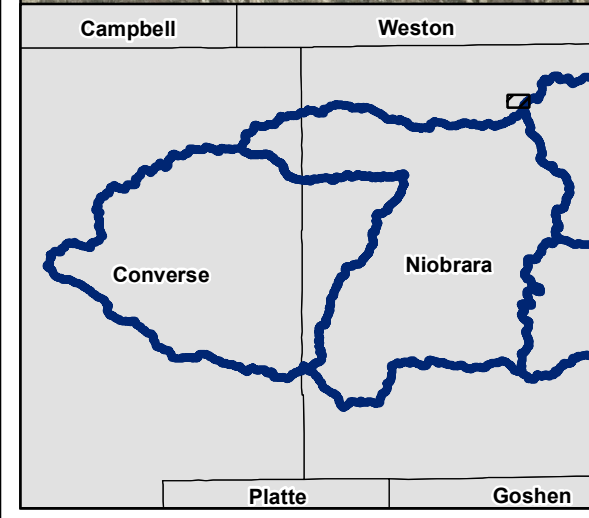


Install new storage area,
dam and outlet structure

Hammell Ranch

Cheyenne River

Permit #: P83093W
 Uses: DOM,STO
 Depth: 45 feet
 Yield: 20 gpm
 Applicant: GERALD MICHAEL & LINDA L. KANE



PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

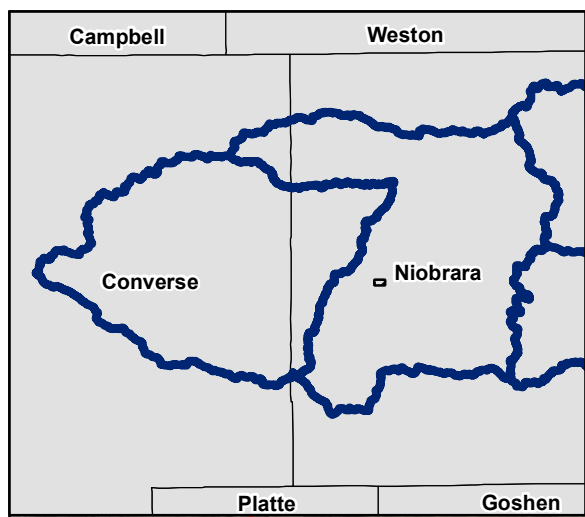
N
 1 inch equals 1,000 feet

HAMMELL RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34d

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LEGEND

- SEO Well
- ~ Flowline



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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

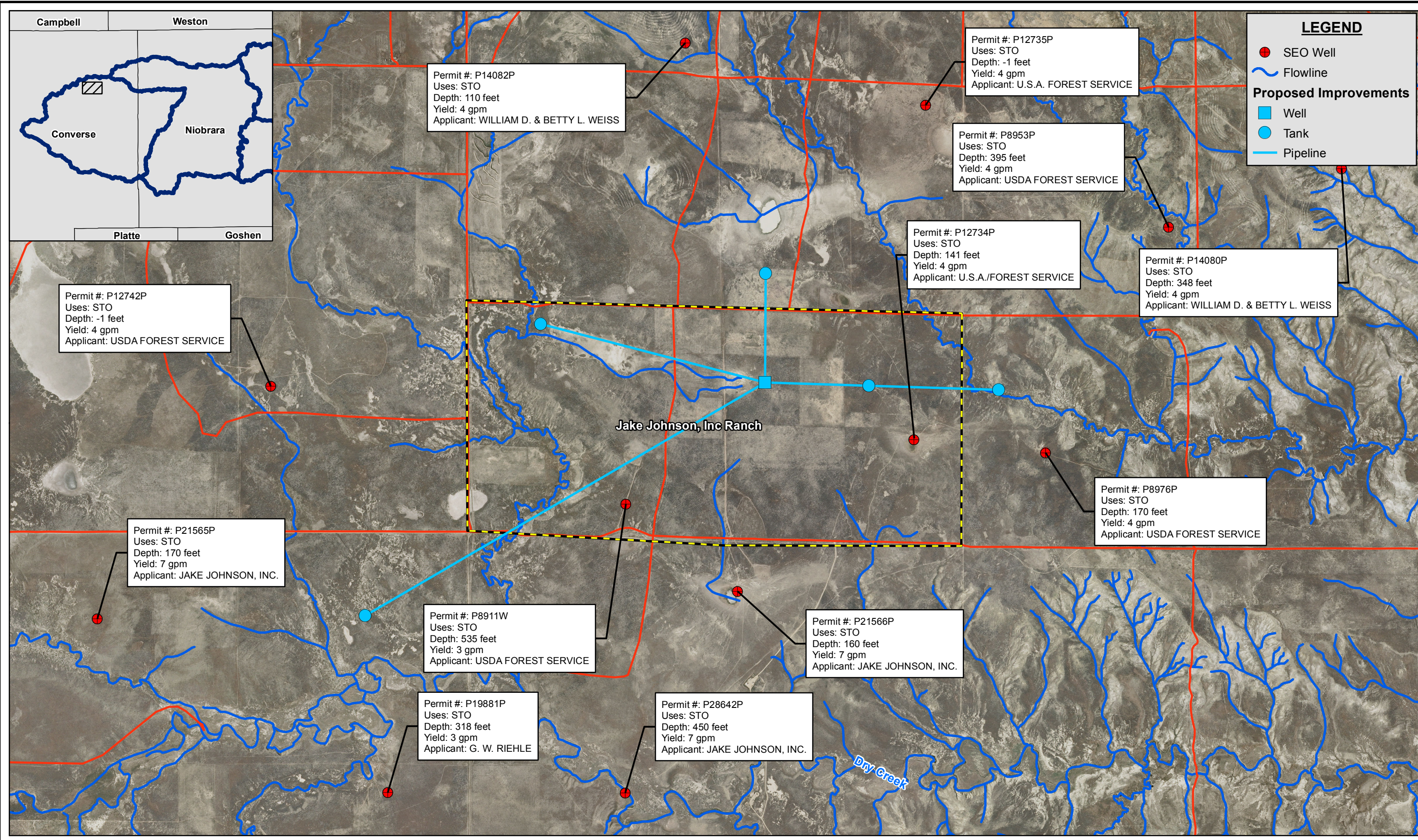
N

 1 inch equals 500 feet

JENSEN RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34e



F:\Projects\010-1333_GOHY\gis\Final Ranch Figures.mxd

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

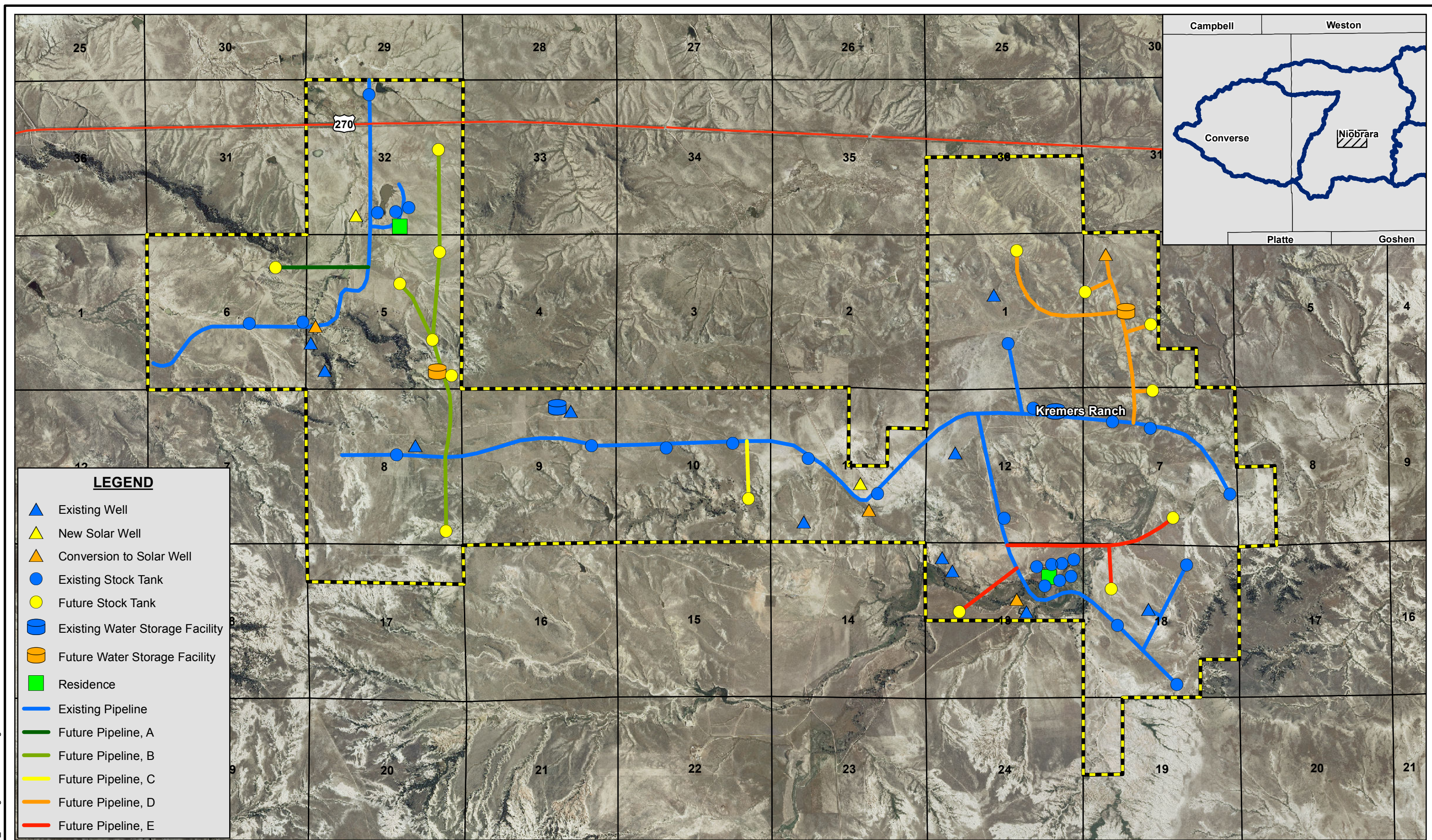
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 2,000 feet

JOHNSON RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34f



LEGEND

- ▲ Existing Well
- ▲ New Solar Well
- ▲ Conversion to Solar Well
- Existing Stock Tank
- Future Stock Tank
- Existing Water Storage Facility
- Future Water Storage Facility
- Residence
- Existing Pipeline
- Future Pipeline, A
- Future Pipeline, B
- Future Pipeline, C
- Future Pipeline, D
- Future Pipeline, E

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

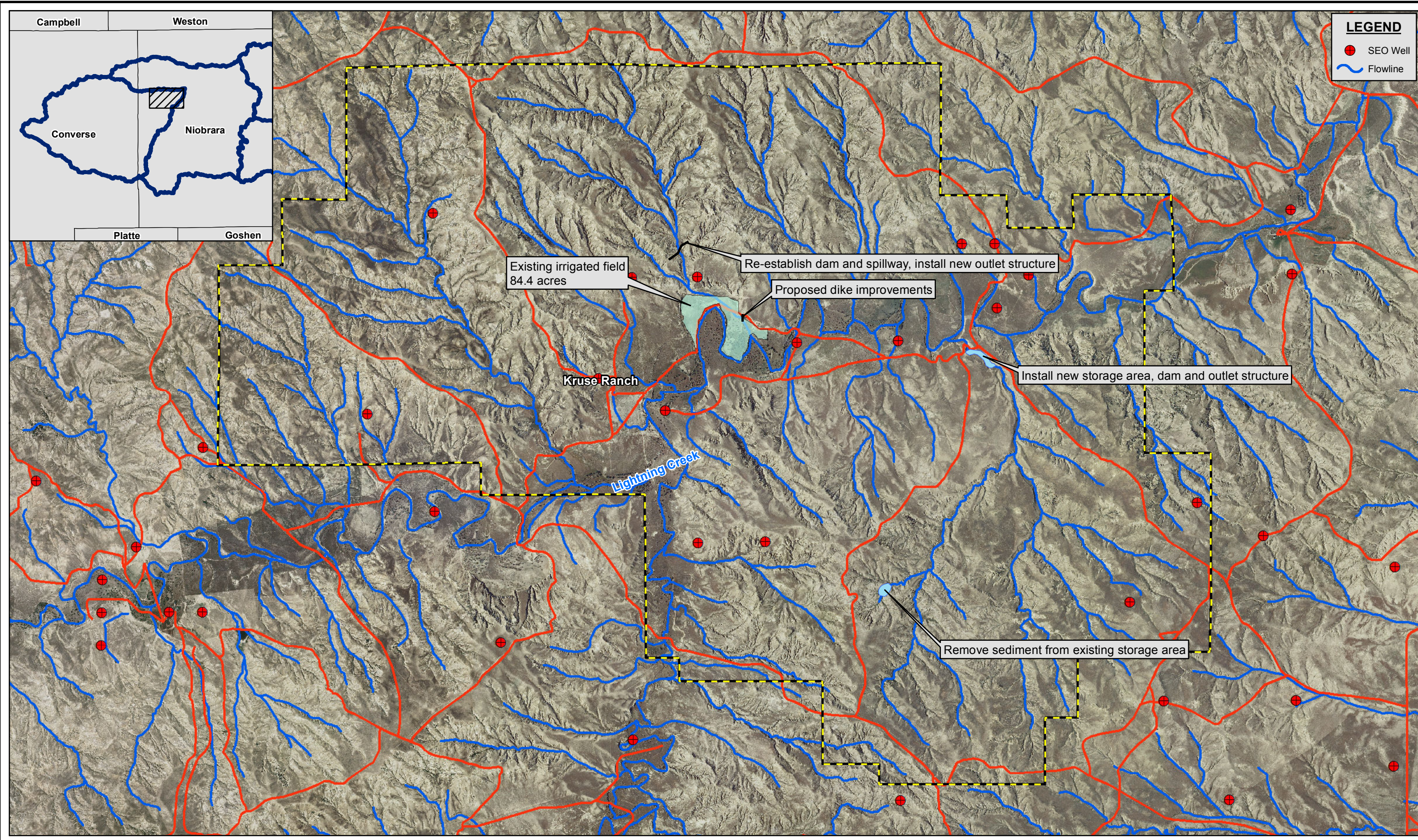
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 3,000 feet

KREMERS RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
34g



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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

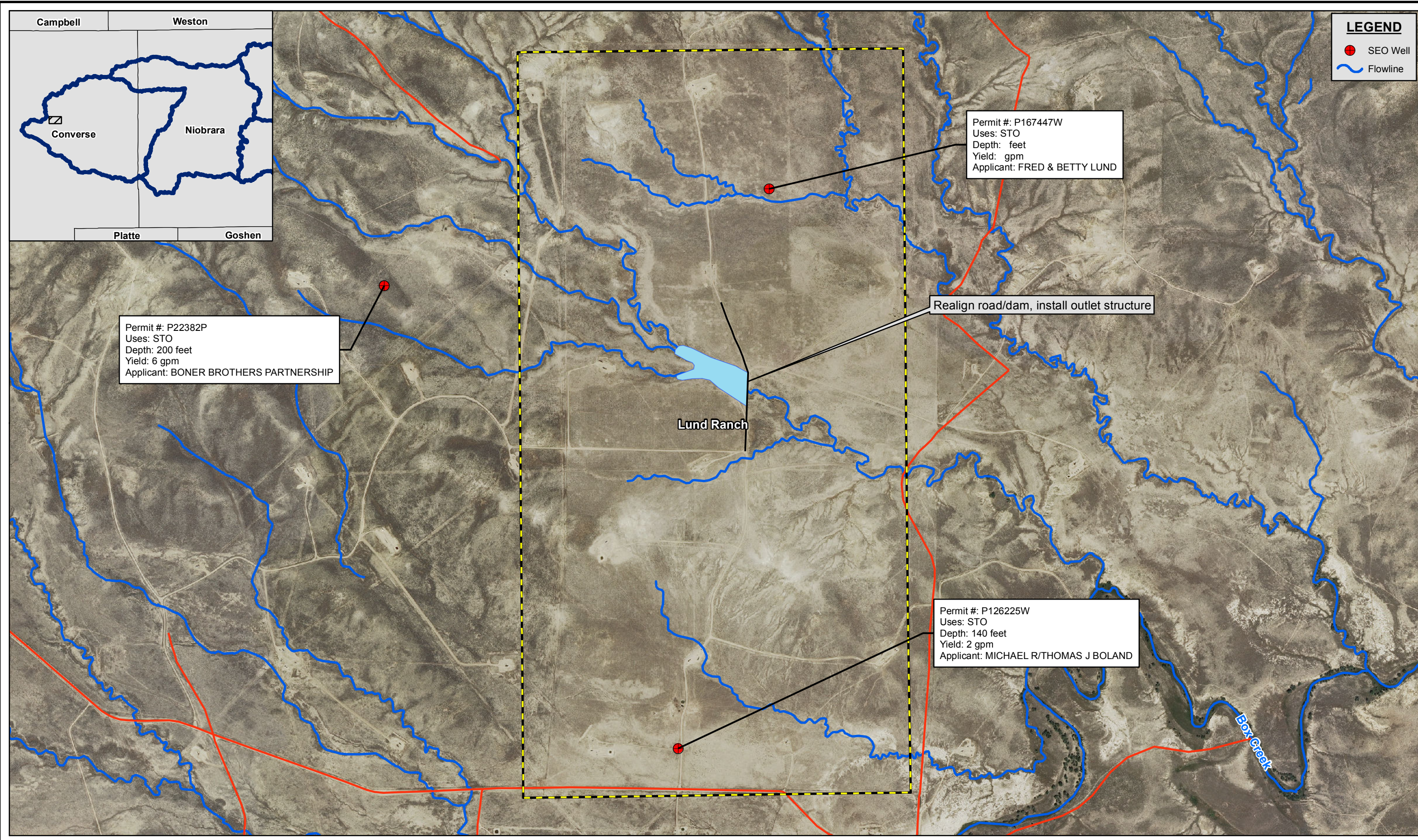
N

 1 inch equals 3,500 feet

KRUSE RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties

OLSSON
 ASSOCIATES

MAP
 34h



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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

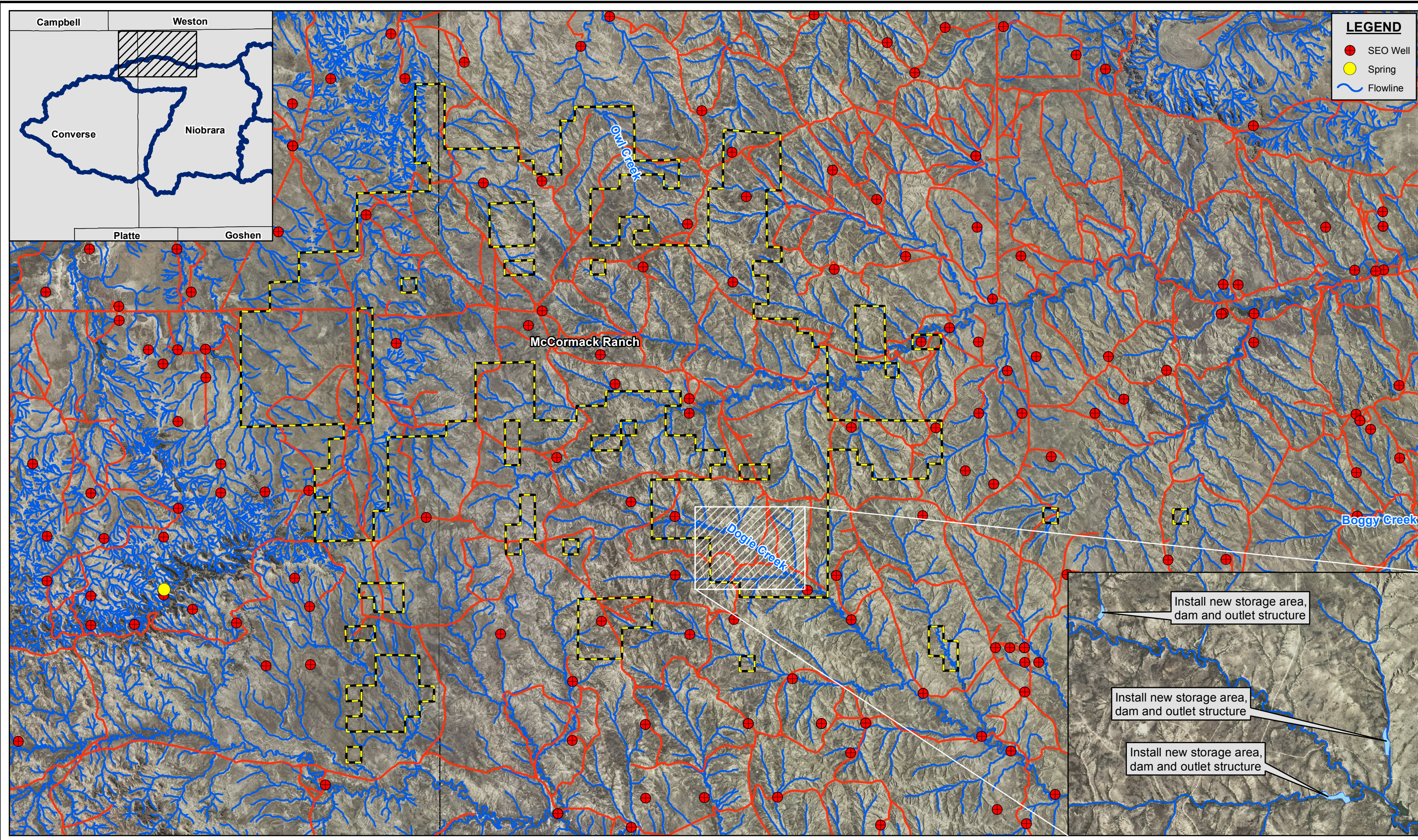
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 1,250 feet

LUND RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34i



LEGEND

- SEO Well (Red circle with cross)
- Spring (Yellow circle)
- Flowline (Blue line)

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

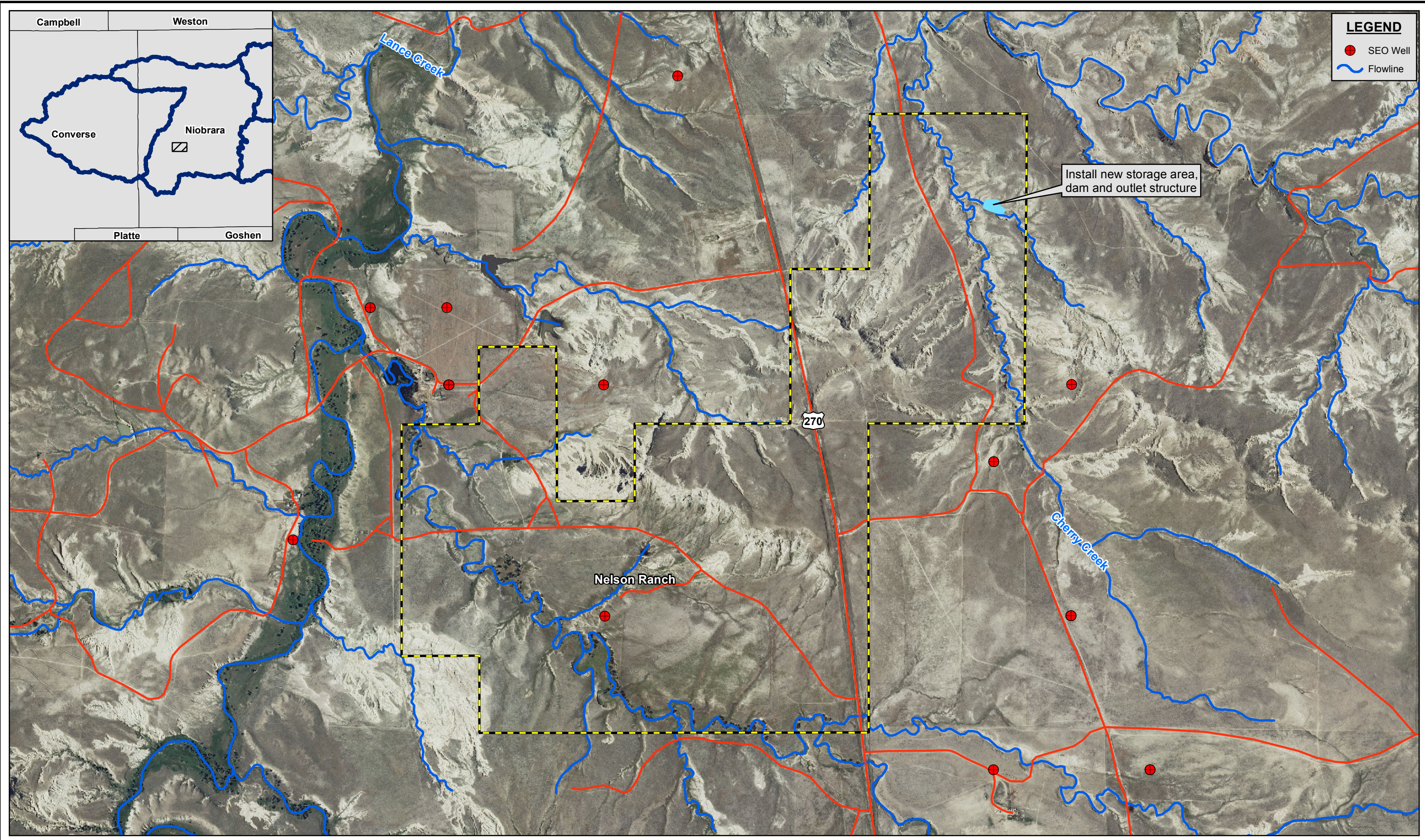
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 8,000 feet

MCCORMACK RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34j



LEGEND

- SEO Well
- ~ Flowline

Install new storage area, dam and outlet structure

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N

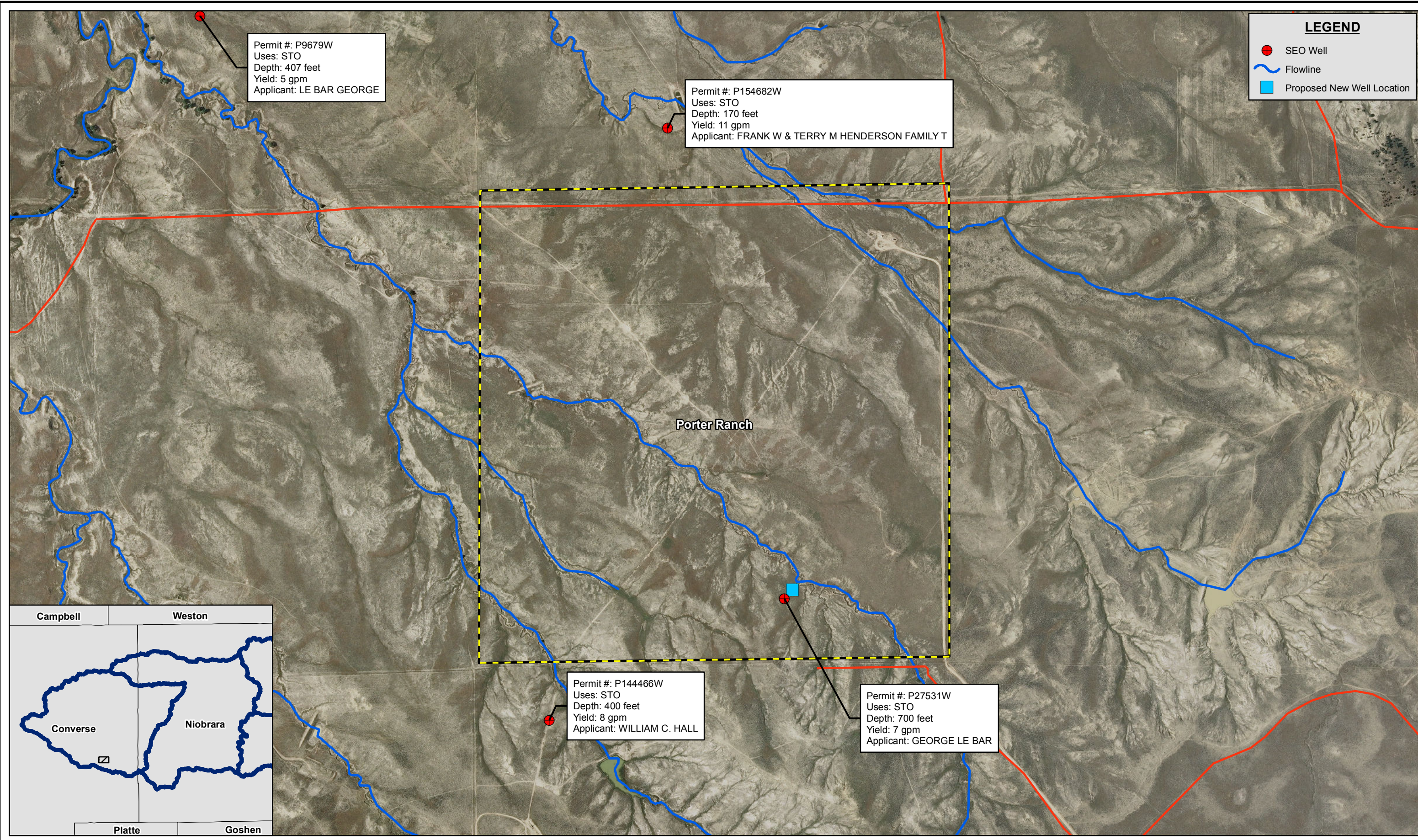
 1 inch equals 1,500 feet

NELSON RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34k

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

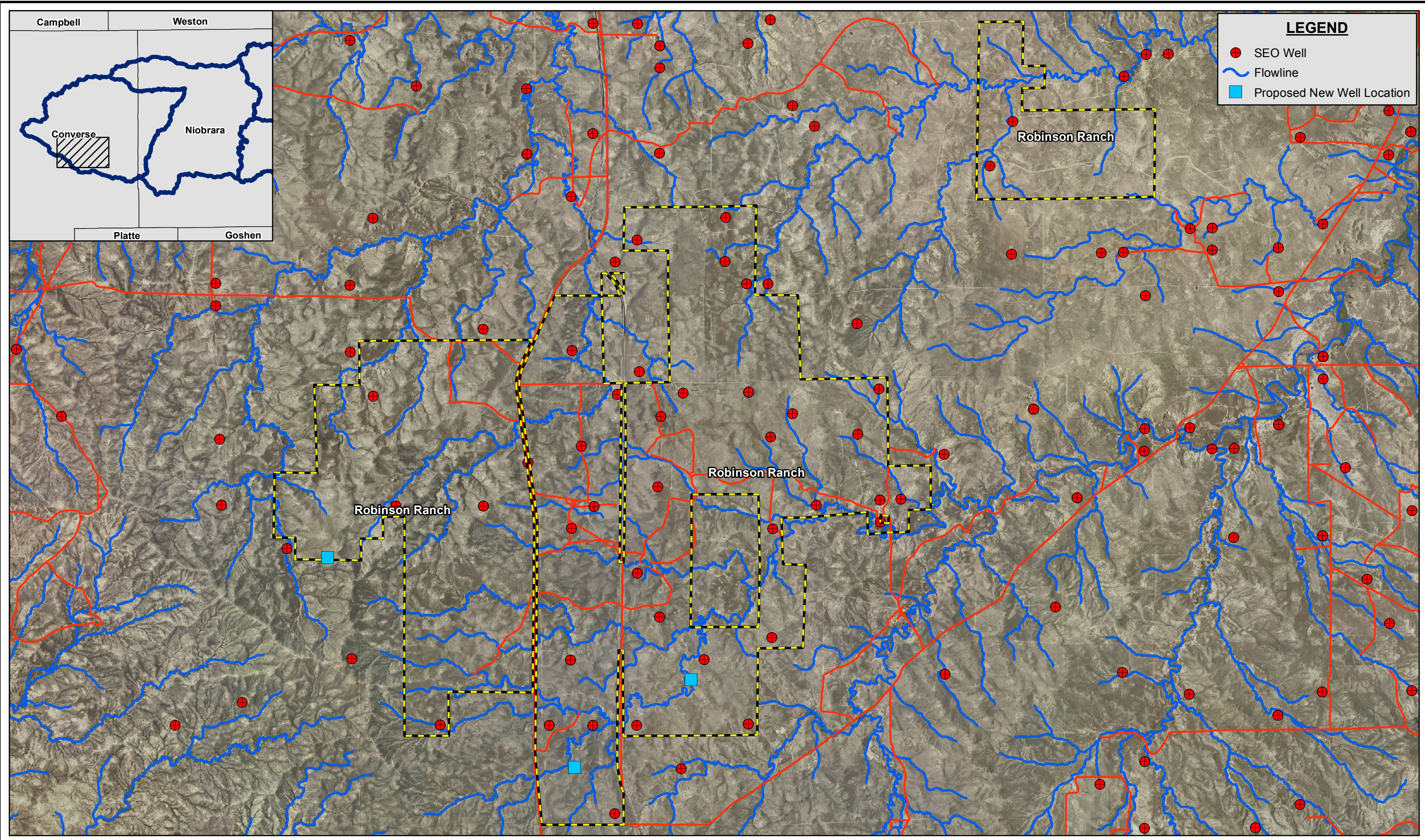
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 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 1,000 feet

PORTER RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34I



LEGEND

- SEO Well
- ~ Flowline
- Proposed New Well Location

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

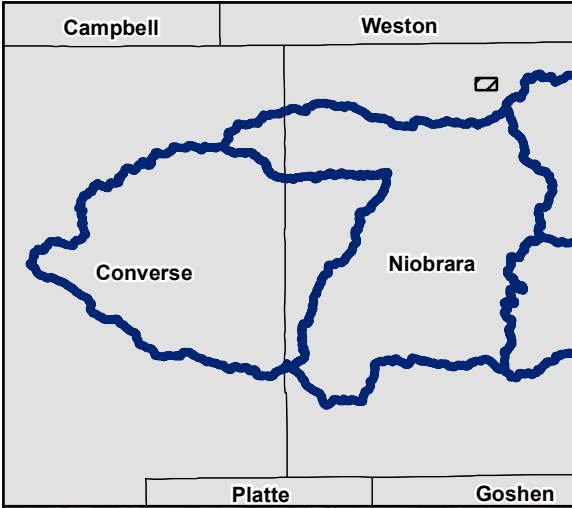
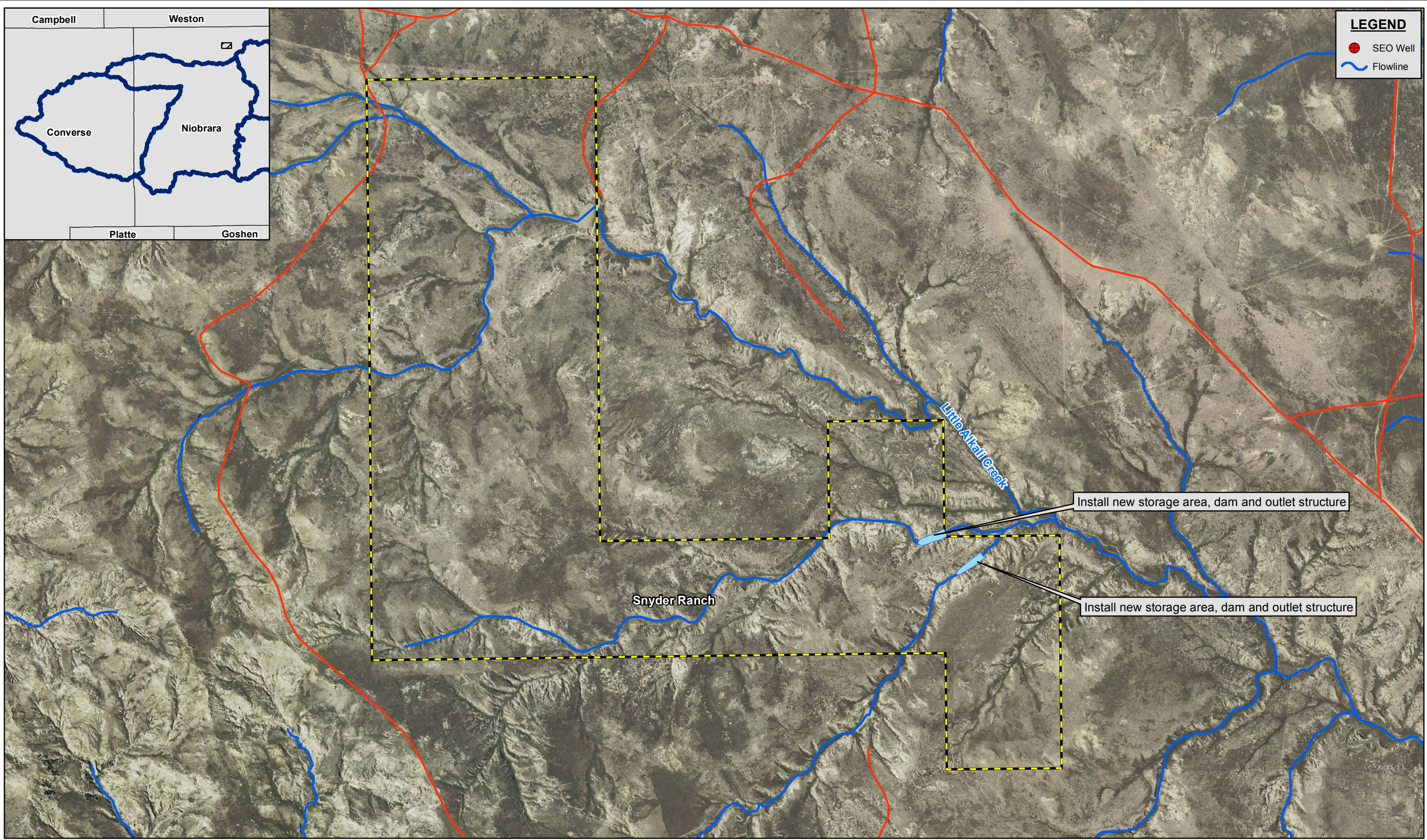
N
 1 inch equals 5,280 feet

ROBINSON RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34m

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LEGEND

- SEO Well
- Flowline

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: September 12, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

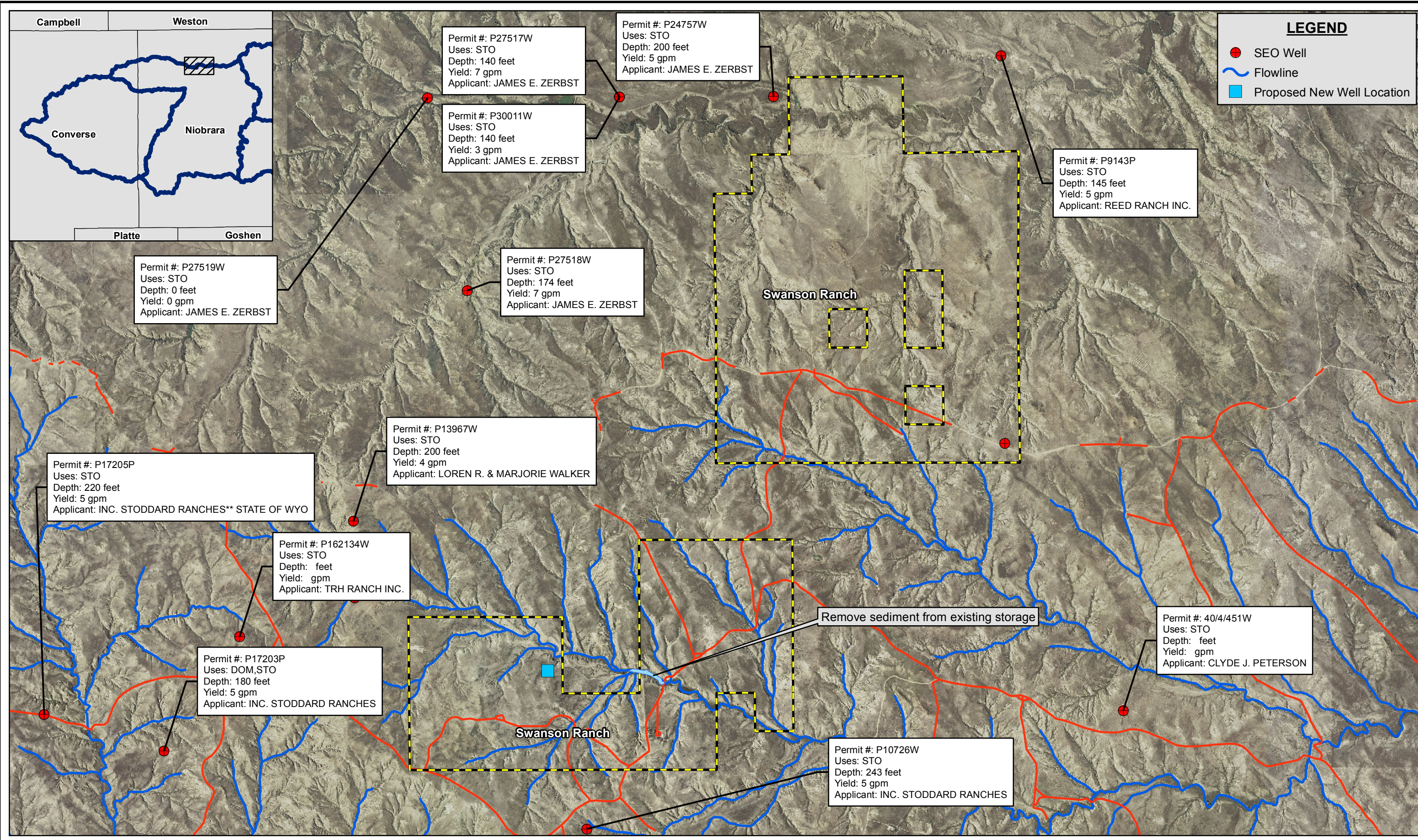
N

 1 inch equals 1,000 feet

SNYDER RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 34n



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PROJECT: 010-1333
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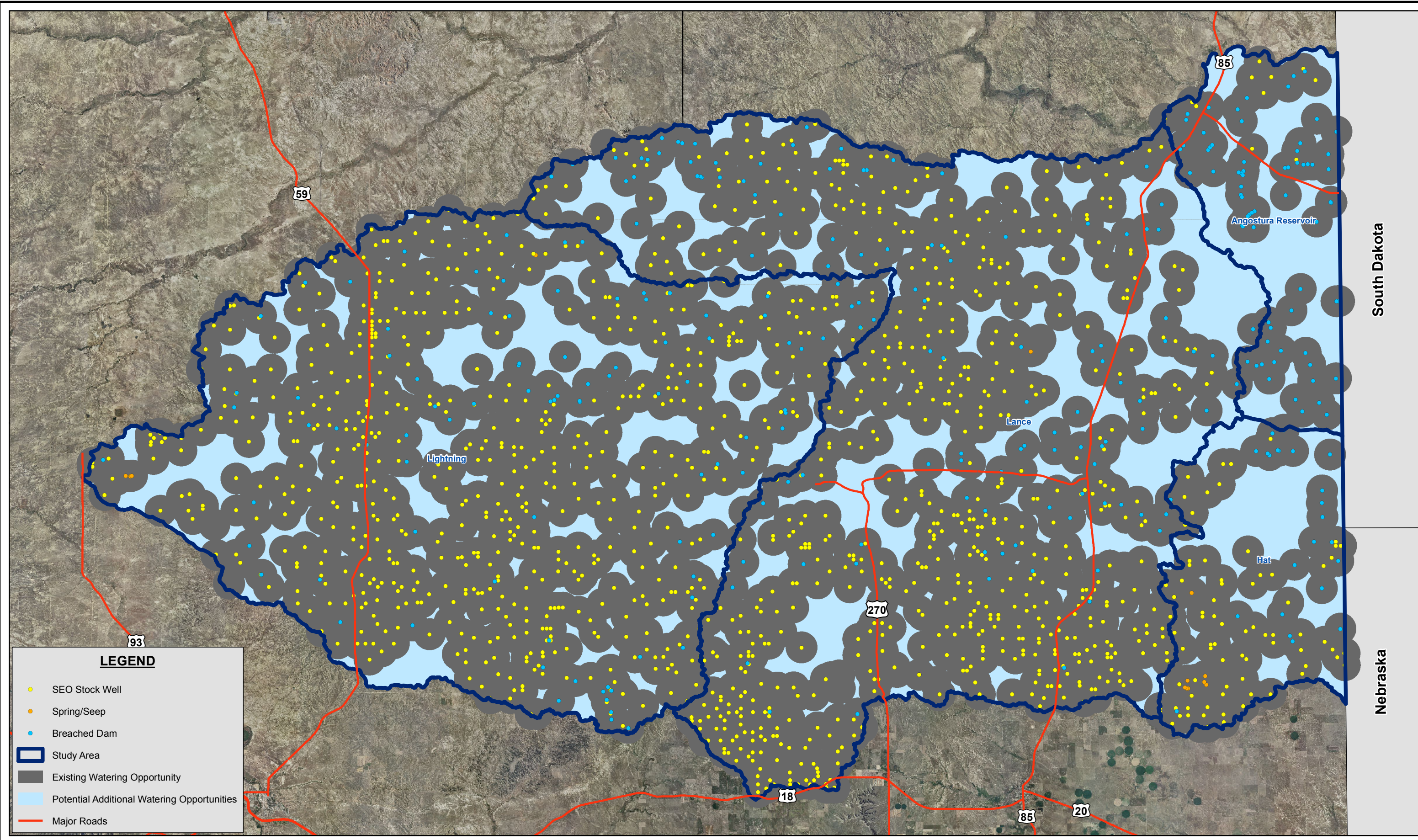
Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

N
 1 inch equals 3,000 feet

SWANSON RANCH
 Thunder Basin L&LC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
 340



LEGEND

- SEO Stock Well
- Spring/Seep
- Breached Dam
- Study Area
- Existing Watering Opportunity
- Potential Additional Watering Opportunities
- Major Roads

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;

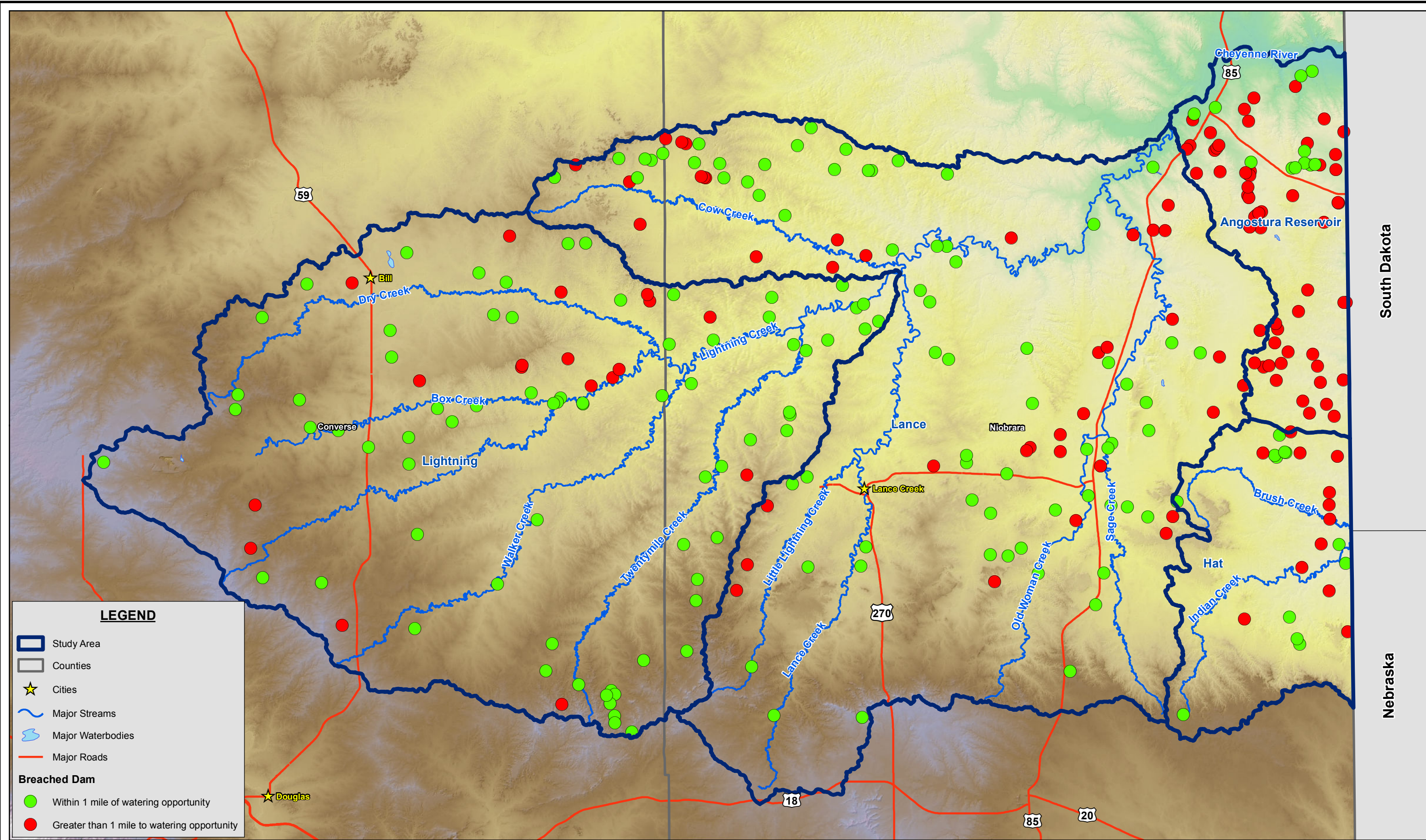


EXISTING WILDLIFE/LIVESTOCK WATERING OPPORTUNITIES
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
35

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LEGEND

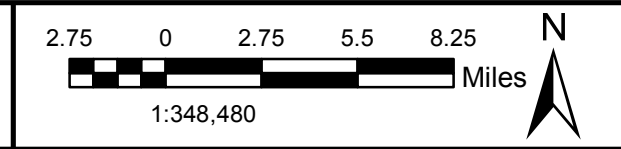
- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads

Breached Dam

- Within 1 mile of watering opportunity
- Greater than 1 mile to watering opportunity

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Watershed Boundaries, 2005, USGS

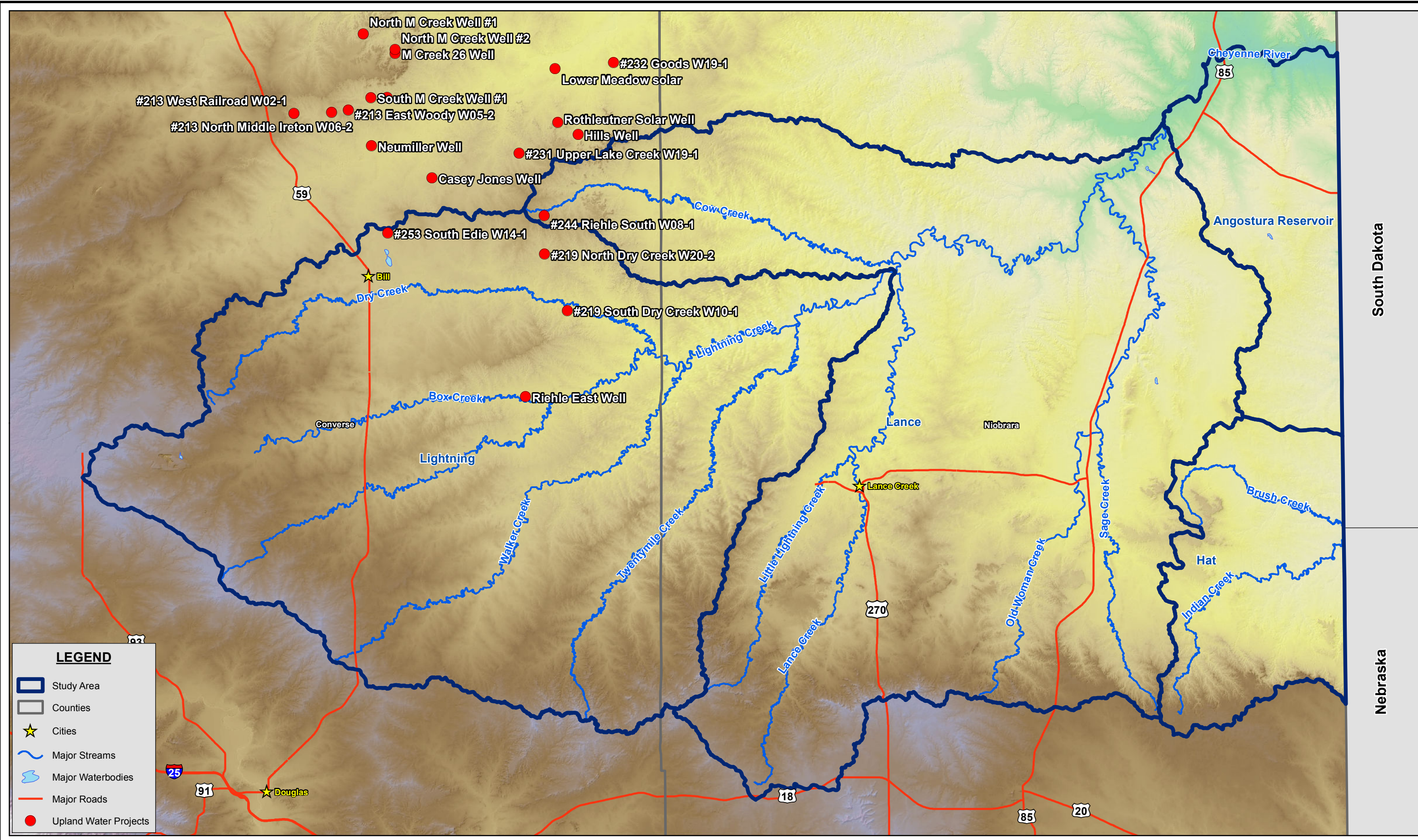


BREACHED DAM LOCATION MAP
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
36

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LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads
- Upland Water Projects

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Upland Water Projects, Thunder Basin Grazing Association (TBGA)

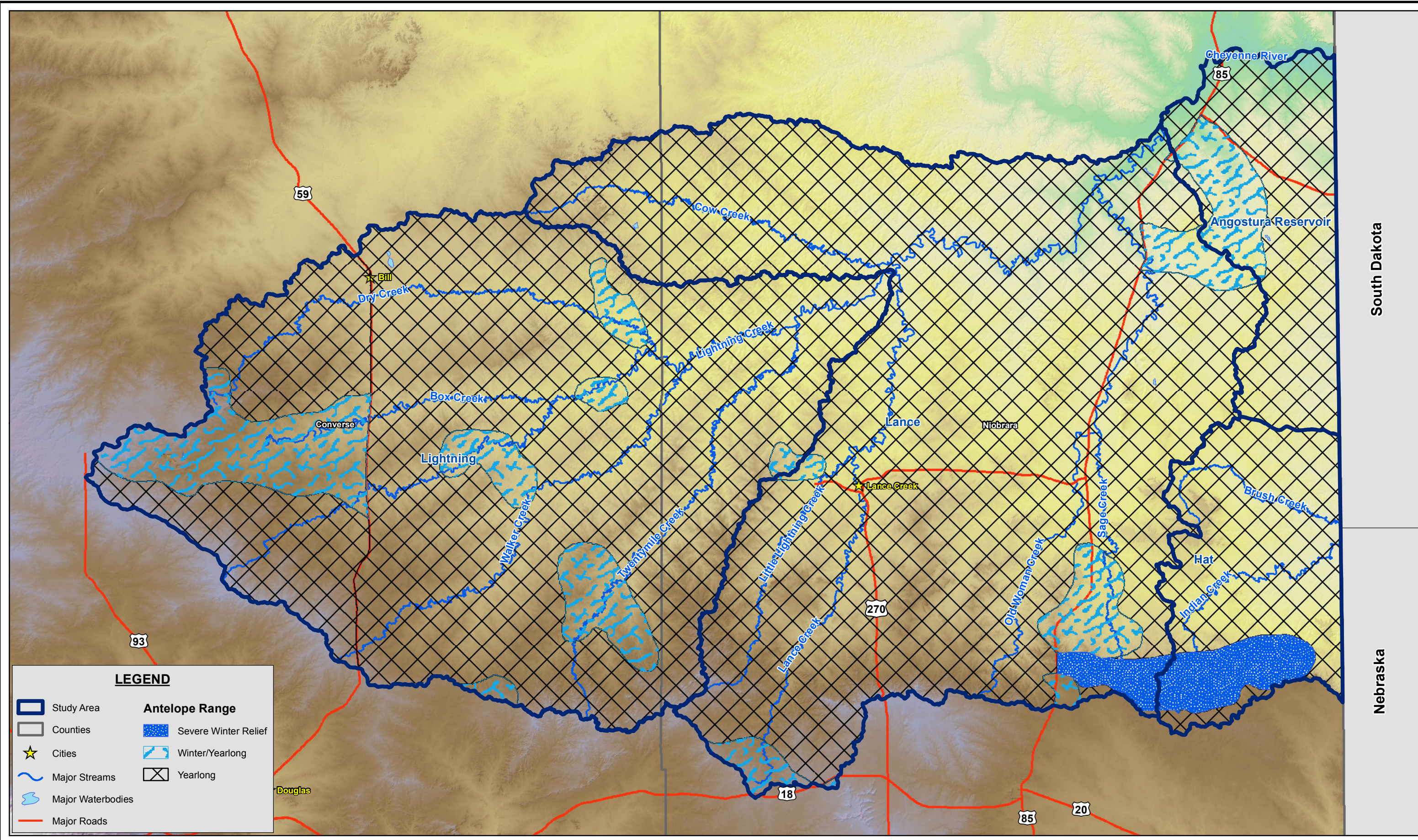


CURRENT WATER DEVELOPMENT PROJECTS
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
37

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South Dakota

Nebraska

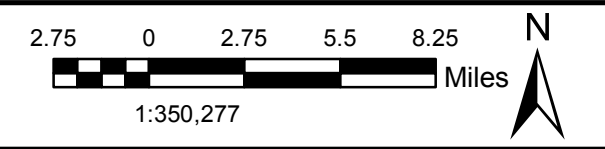
LEGEND

Study Area	Antelope Range
Counties	Severe Winter Relief
Cities	Winter/Yearlong
Major Streams	Yearlong
Major Waterbodies	
Major Roads	

Douglas

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI; Watershed, 2002, WYGISC; DEM, 2008, USGS; Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI; Antelope Range, 2002, WY G&F

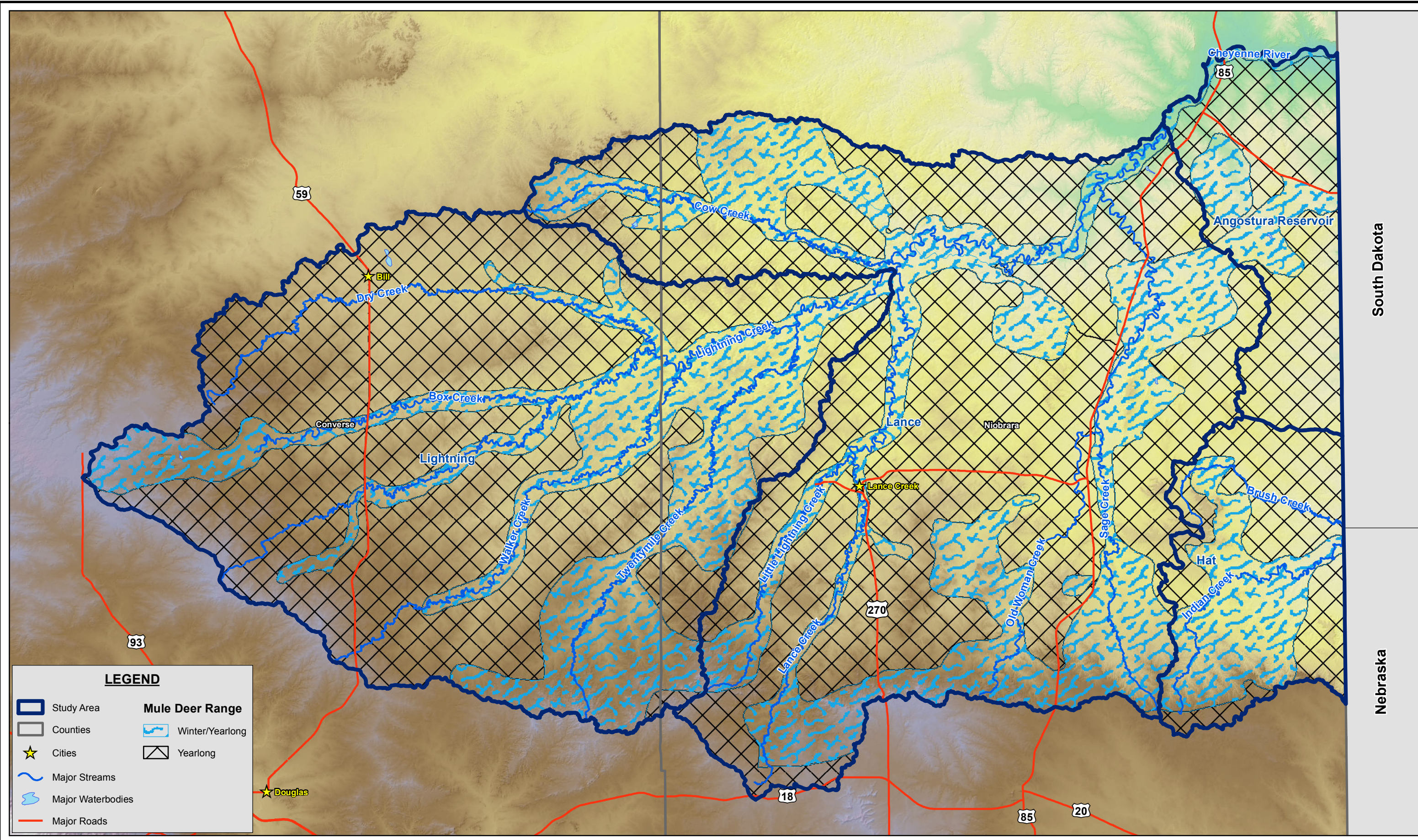


ANTELOPE RANGE
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
38

F:\Projects\010-1333_GOHY\gis\Project Figures.mxd

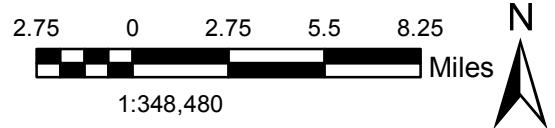


South Dakota

Nebraska

LEGEND

Study Area	Mule Deer Range
Counties	Winter/Yearlong
Cities	Yearlong
Major Streams	
Major Waterbodies	
Major Roads	



MULE DEER RANGE
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties

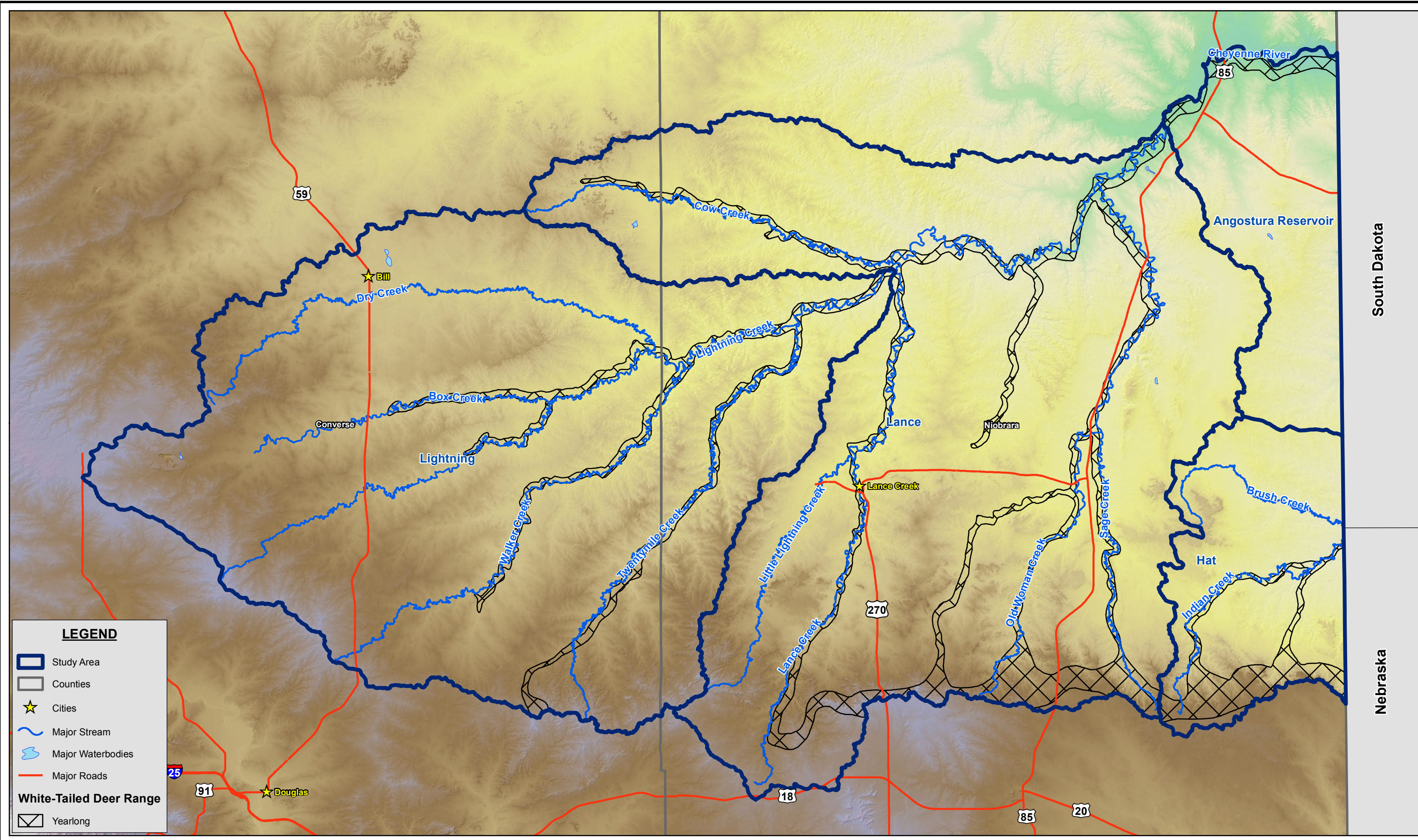


MAP
39

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Mule Deer Range, 2002, WY G&F



LEGEND

- Study Area
- Counties
- Cities
- Major Stream
- Major Waterbodies
- Major Roads

White-Tailed Deer Range

- Yearlong

South Dakota

Nebraska

F:\Projects\010-1333_GOHY\gis\Project Figures.mxd

PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

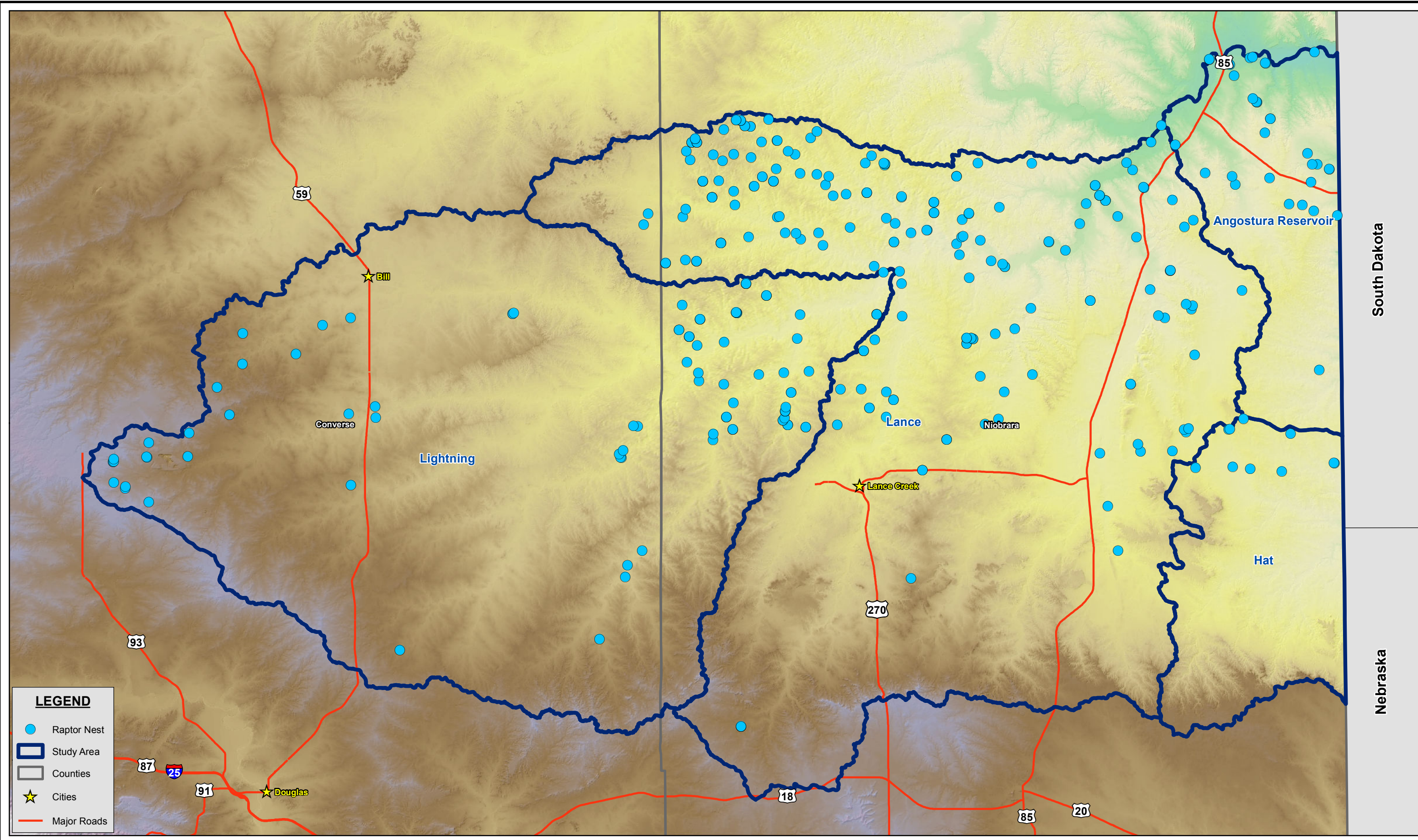
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 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Whitetail Deer, 2002, WY F&G



WHITETAIL DEER RANGE
Thunder Basin LLC Watershed Management Plan
Level I Watershed Study
Converse and Niobrara Counties



MAP
40



LEGEND

- Raptor Nest
- Study Area
- Counties
- ★ Cities
- Major Roads

South Dakota

Nebraska

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

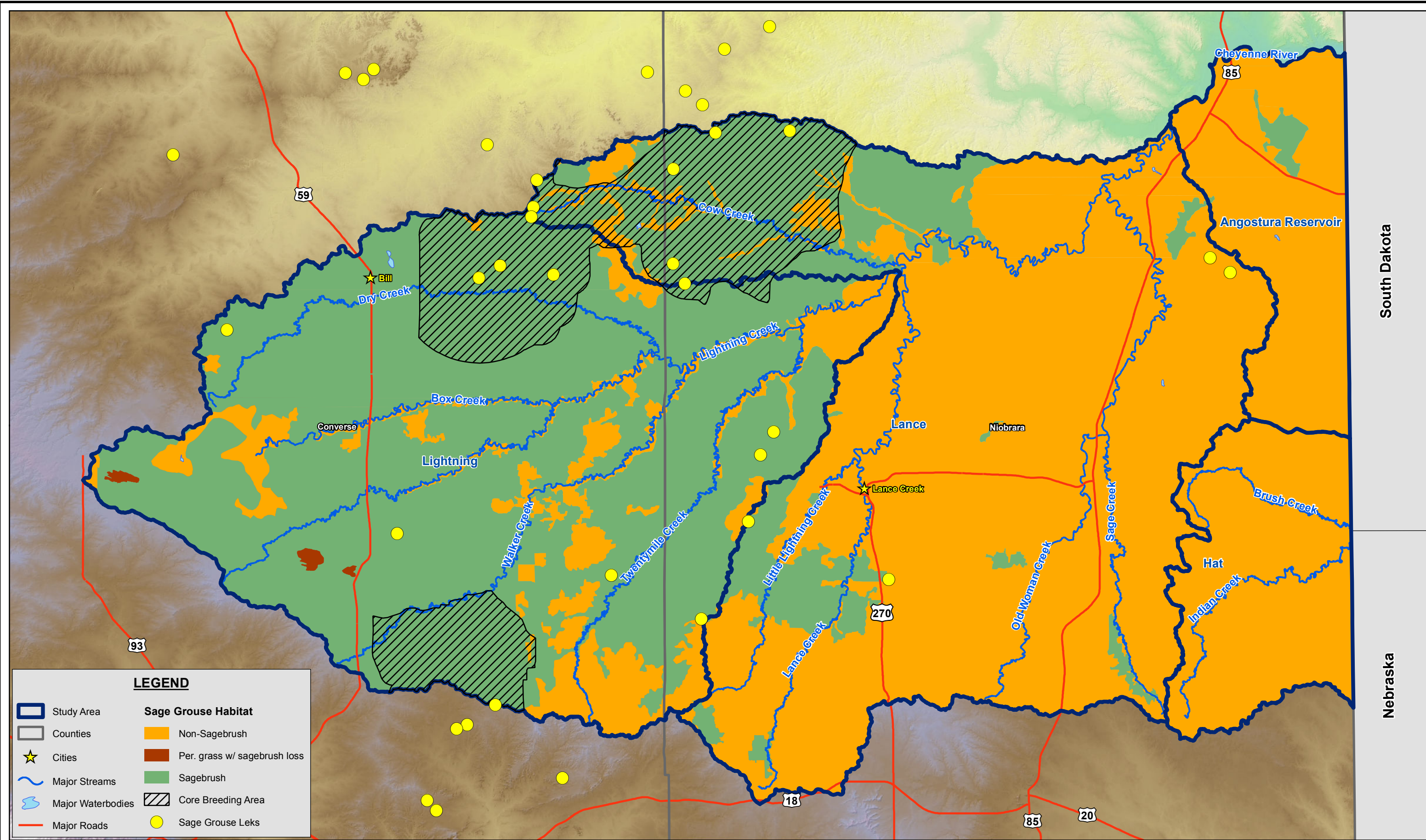
Source: Streams, 2006, ESRI; Watershed, 2002, WYGISC; DEM, 2008, USGS; Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI; Watershed Boundaries, 2005, USGS; Raptor Nesting Areas, 2009, USFWS



RAPTOR NESTING AREAS
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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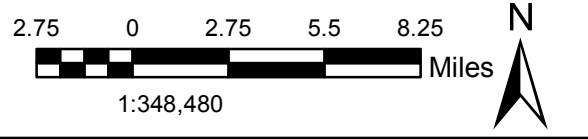
LEGEND

- | | |
|-------------------|------------------------------|
| Study Area | Sage Grouse Habitat |
| Counties | Non-Sagebrush |
| Cities | Per. grass w/ sagebrush loss |
| Major Streams | Sagebrush |
| Major Waterbodies | Core Breeding Area |
| Major Roads | Sage Grouse Leaks |

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Sage Grouse, 2007, BLM and
 Thunder Basin Grazing Association (TBGA)

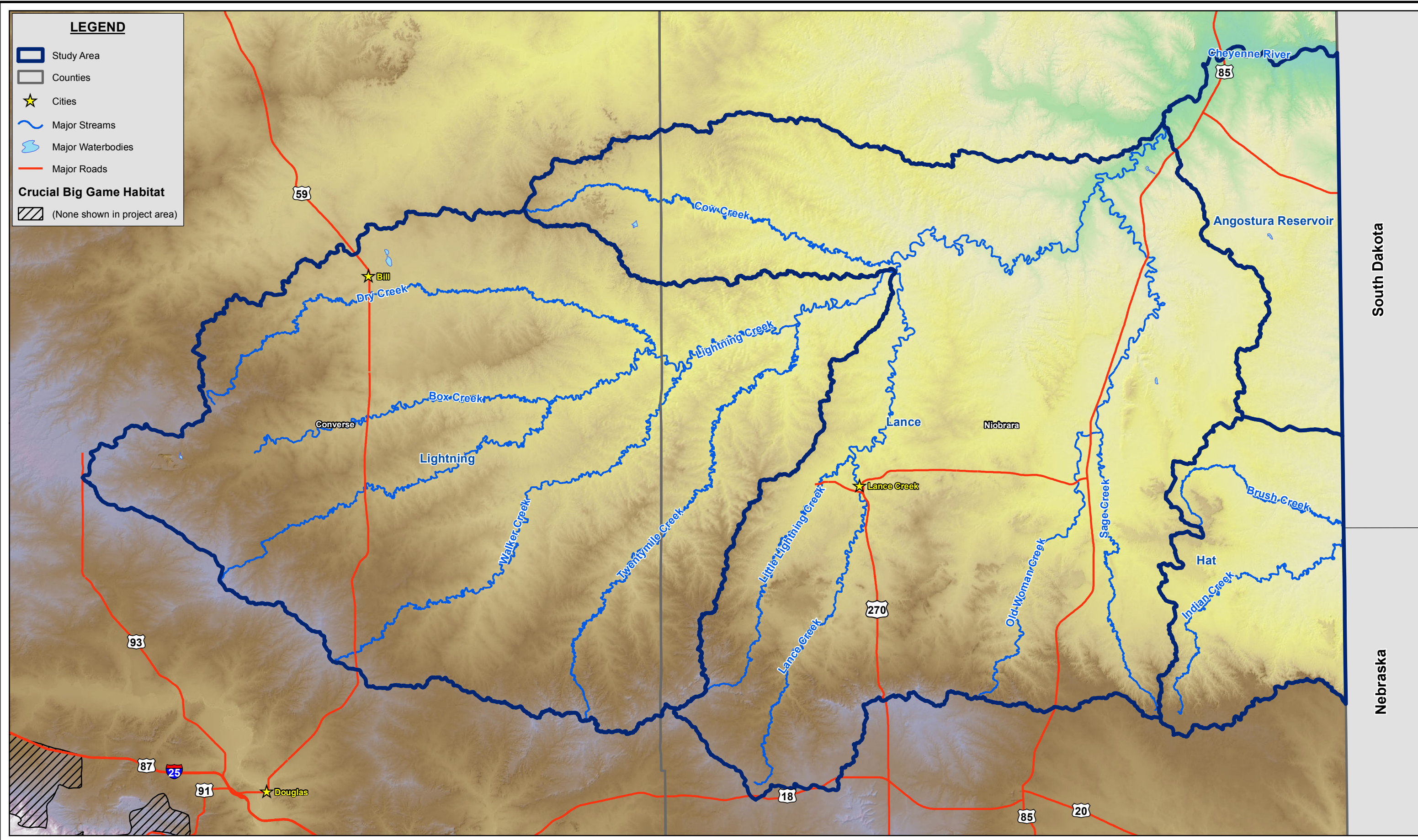


SAGE GROUSE LEKS
 Thunder Basin LLC Watershed Management Plan
 Level I Watershed Study
 Converse and Niobrara Counties



MAP
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South Dakota
Nebraska



LEGEND

- Study Area
- Counties
- ★ Cities
- ~ Major Streams
- ~ Major Waterbodies
- Major Roads

Crucial Big Game Habitat

- (None shown in project area)

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PROJECT: 010-1333
 DRAWN BY: RD
 DATE: August 8, 2011

Source: Streams, 2006, ESRI;
 Watershed, 2002, WYGISC; DEM, 2008, USGS
 Roads, 1997, TIGER; Counties, 2007, SDVC; Cities, 2006, ESRI;
 Big Game Crucial Ranges, 2002, WY F&G



CRUCIAL BIG GAME HABITATS
 Thunder Basin LLC Watershed Management Plan
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MAP
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South Dakota
Nebraska