Appendix A

GIS Map Layers

Riparian Corridors

South Dakota SAP Project: Layer 1

Legend

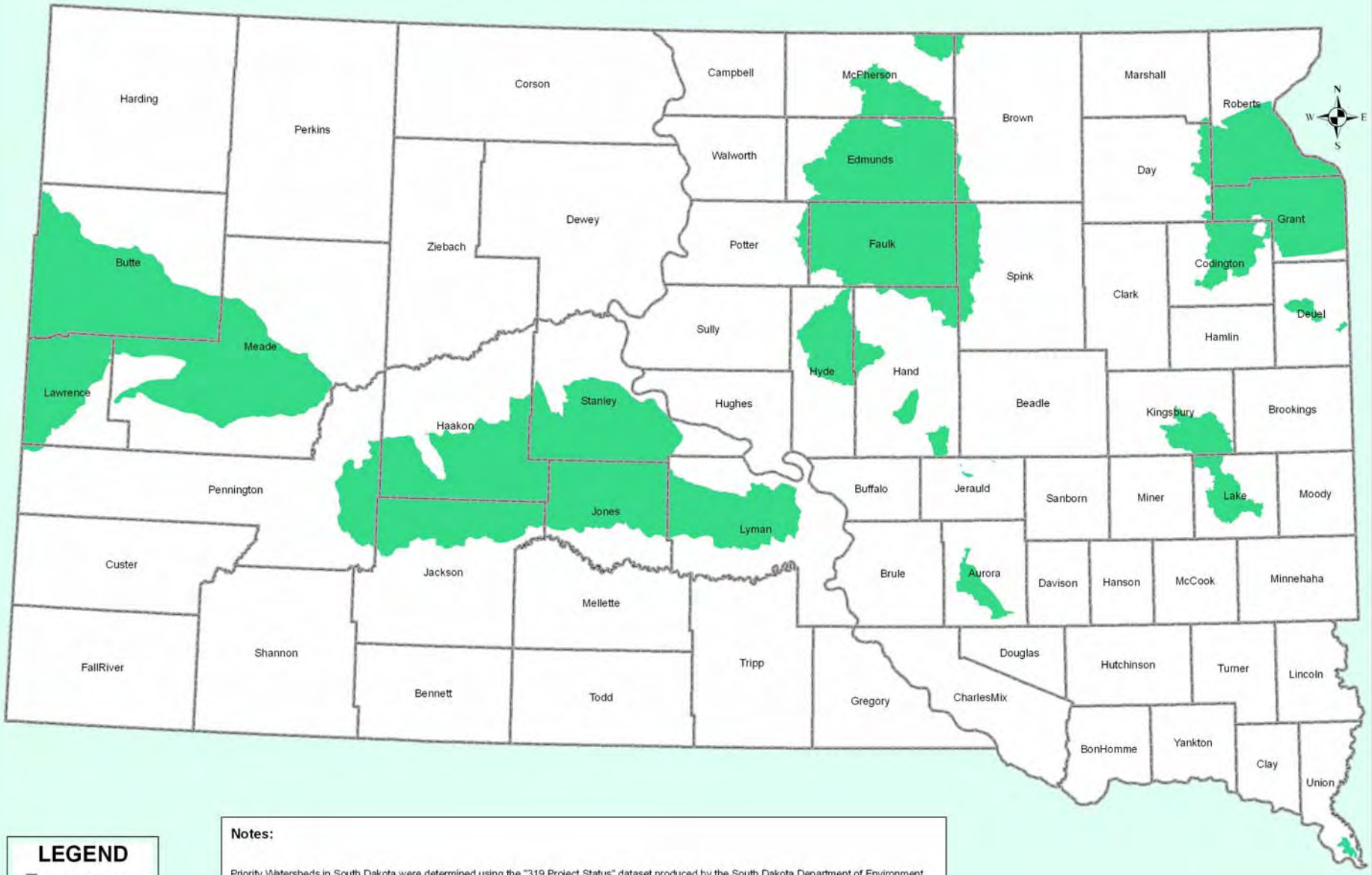
- South Dakota Boundaries
- Non Riparian Areas (NoData)
- Riparian Buffer Zone

Notes:

The riparian corridors dataset was derrived from the "U.S. Rivers and Streams" dataset which was privided by ESRI. The "U.S. Rivers and Streams" dataset provides a database of linear water features that interconnects and identifies the stream segments or reaches, that comprise the surface water drainage system of United States. The "U.S. Rivers and Streams" dataset was digitized from 1:24,000 scale U.S. Geological Survey topographic maps (tens of thousands of maps, all across the US). For South Dakota we extracted the rivers and stream data that covered the State of South Dakota. This data was then queried to select all the major streams, all the perrenial streams and those key intermittant streams that remain flowing during "normal" rainfall years. Then this data was buffered by a selected distance (minimum 50 SMZ each side) to produce a buffered dataset. This buffered dataset was then converted to a ESRI Grid to produce the final data layer (raster).

Priority Watersheds

South Dakota SAP Project: Layer 2



LEGEND

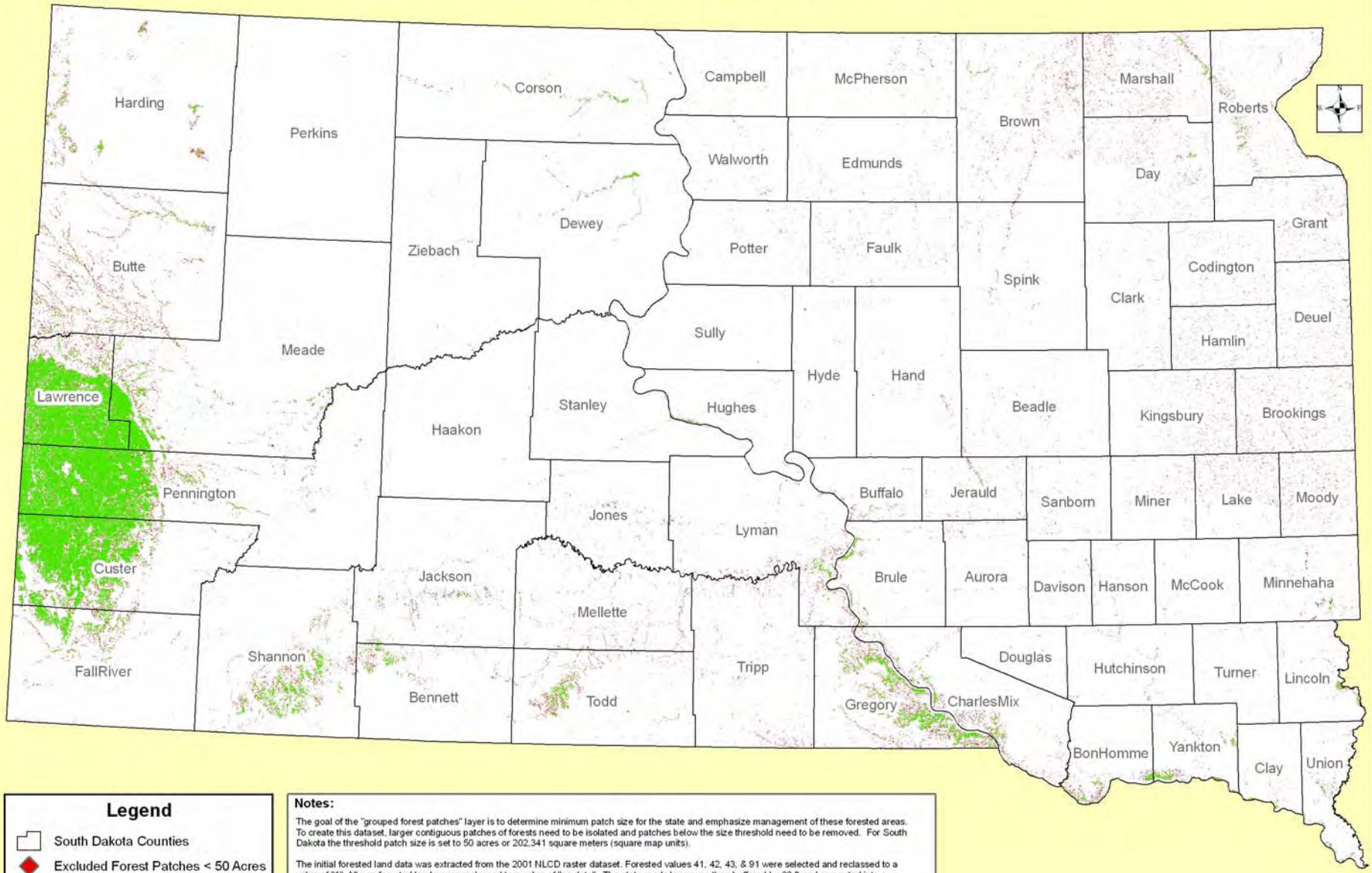
- South Dakota Counties
- No Data
- Priority Watersheds

Notes:

Priority Watersheds in South Dakota were determined using the "319 Project Status" dataset produced by the South Dakota Department of Environment and Natural Resources (DENR). SD DENR created this dataset from a combination of HUC 11 Watershed datasets, scanned DENR project maps, and for new data HUC 12 watersheds. This data is always being updated. The key attribute in this dataset is DENR Status, in which there are 4 watershed categories: Assessed, Assessing, Implemented, and Implementing. For South Dakota SAP only the "Implementing" DENR Status category is considered as "priority watersheds."

Minimum Forest Patch Size: South Dakota

South Dakota SAP Project: Layer 3



Legend

- South Dakota Counties
- Excluded Forest Patches < 50 Acres
- Non Forest
- Large Forest Patches >= 50 Acres

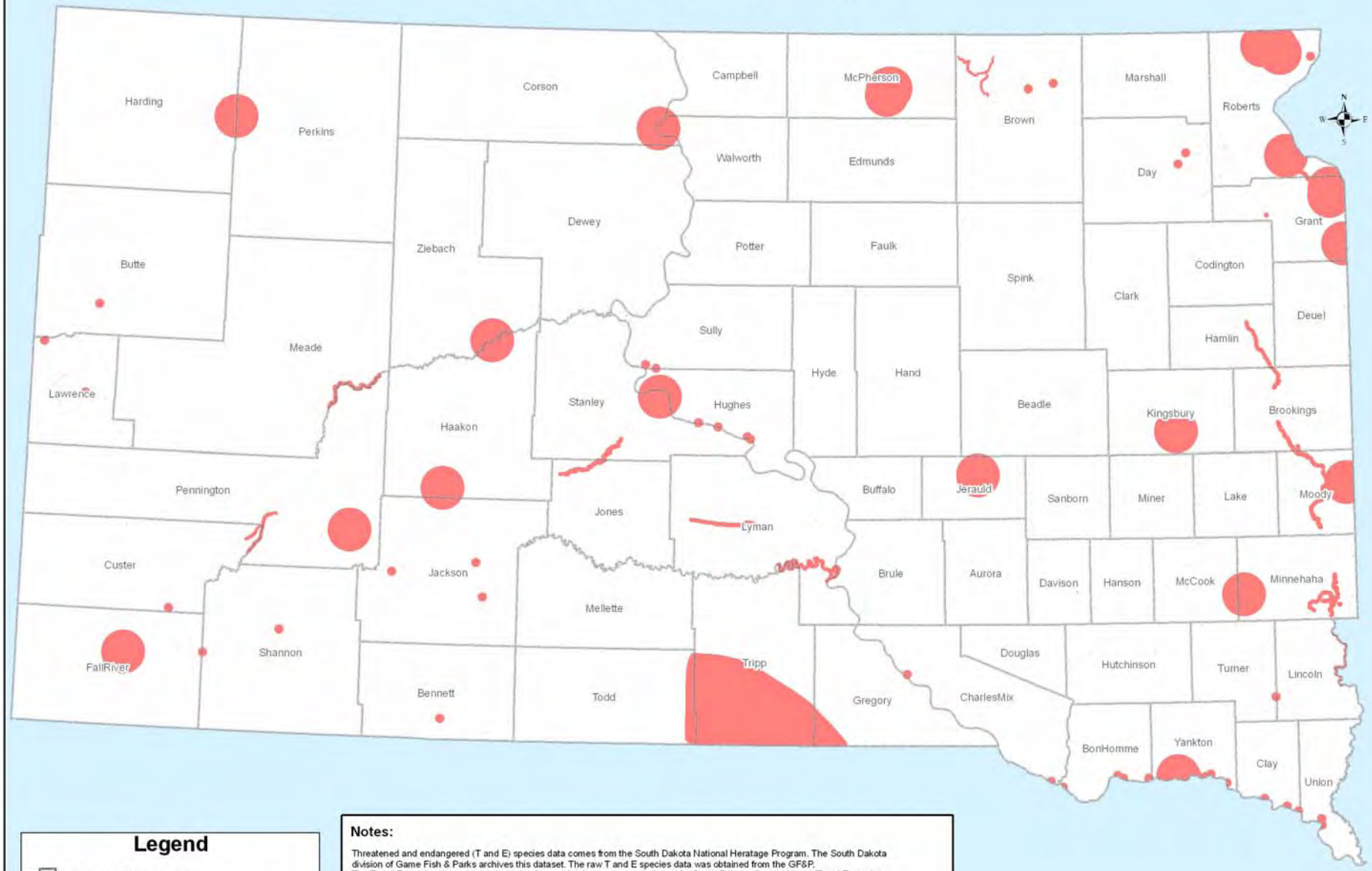
Notes:

The goal of the "grouped forest patches" layer is to determine minimum patch size for the state and emphasize management of these forested areas. To create this dataset, larger contiguous patches of forests need to be isolated and patches below the size threshold need to be removed. For South Dakota the threshold patch size is set to 50 acres or 202,341 square meters (square map units).

The initial forested land data was extracted from the 2001 NLCD raster dataset. Forested values 41, 42, 43, & 91 were selected and reclassed to a value of "1". All non forested lands were reclassed to a value of "no data". The state roads layer was then buffered by 66 ft and converted into a raster layer. This buffered roads raster layer was subtracted from the forested land raster layer to create the initial unorganized forest patches layer. This layer is then processed in "Spatial Analyst" with the "RegionGroup" command which classifies each "forest patch". Next the "ZonalGeometry" tool is used to add an "Area" attribute to the data layer. Finally the "ExtractByAttributes" tool is used to select all large forested patches that are larger than 50 acres. This results in the grouped forest patches data layer.

Threatened and Endangered Species

South Dakota SAP Project: Layer 4



Legend

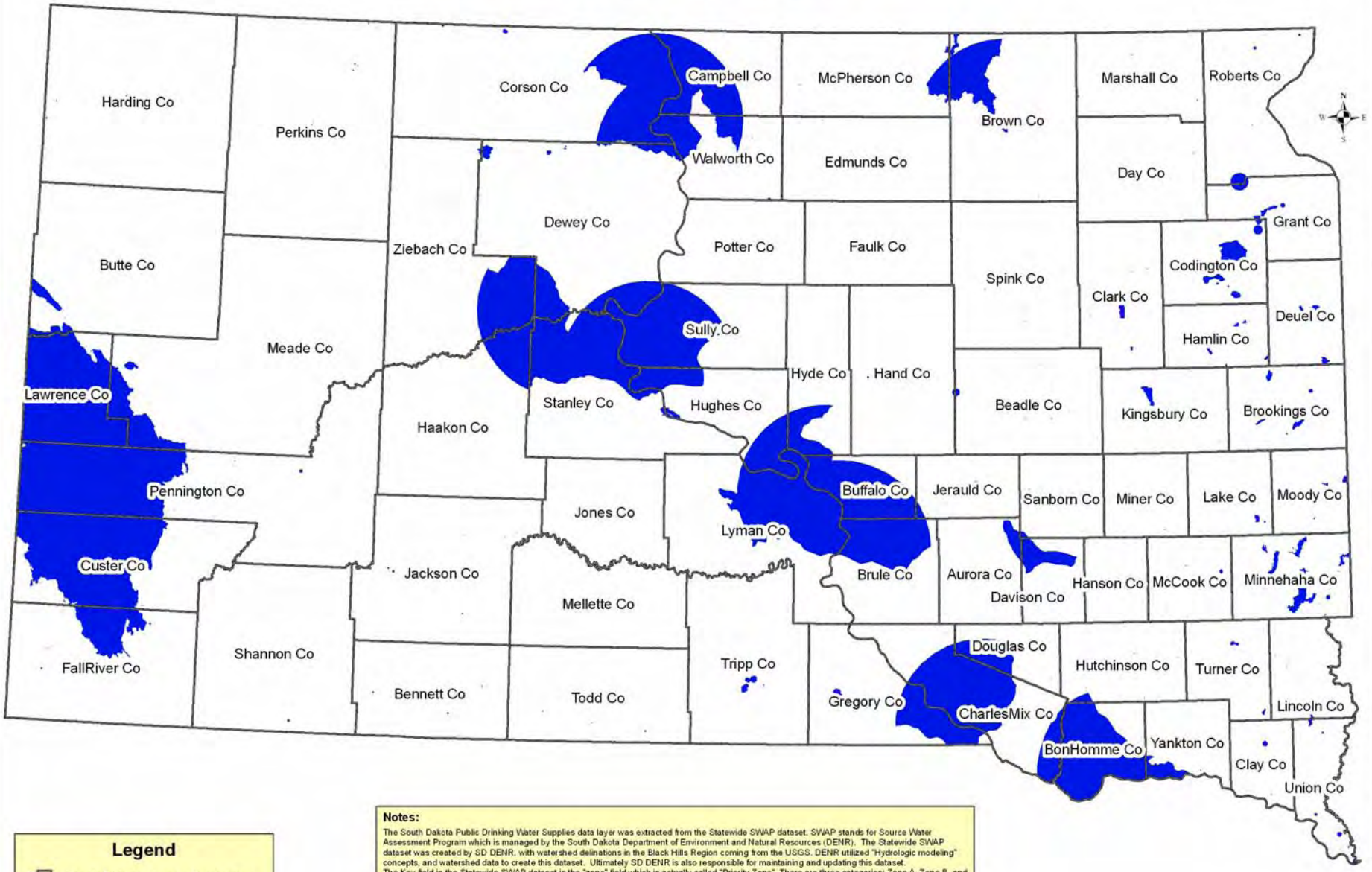
- County Boundaries
- No Data
- Threatened and Endangered Species

Notes:

Threatened and endangered (T and E) species data comes from the South Dakota National Heritage Program. The South Dakota division of Game Fish & Parks archives this dataset. The raw T and E species data was obtained from the GF&P.
The T and E species dataset contains point, line, and polygon vector attributes for South Dakota. Some of these T and E species sites are active and some are inactive.
Key T and E species sites were selected by querring and selecting all state endangered and state protected species, and by querring and selecting all federally endangered, federally threatened, and canidate species. Also active T and E species sites were selected by querring the data field "Last Observed"and selecting observation dates from 1980 and later. This active T and E species vector dataset was then converted to a grid (raster dataset) for the final T and E species layer.

Public Drinking Water Supply Sources

South Dakota Sap Project: Layer 5



Legend

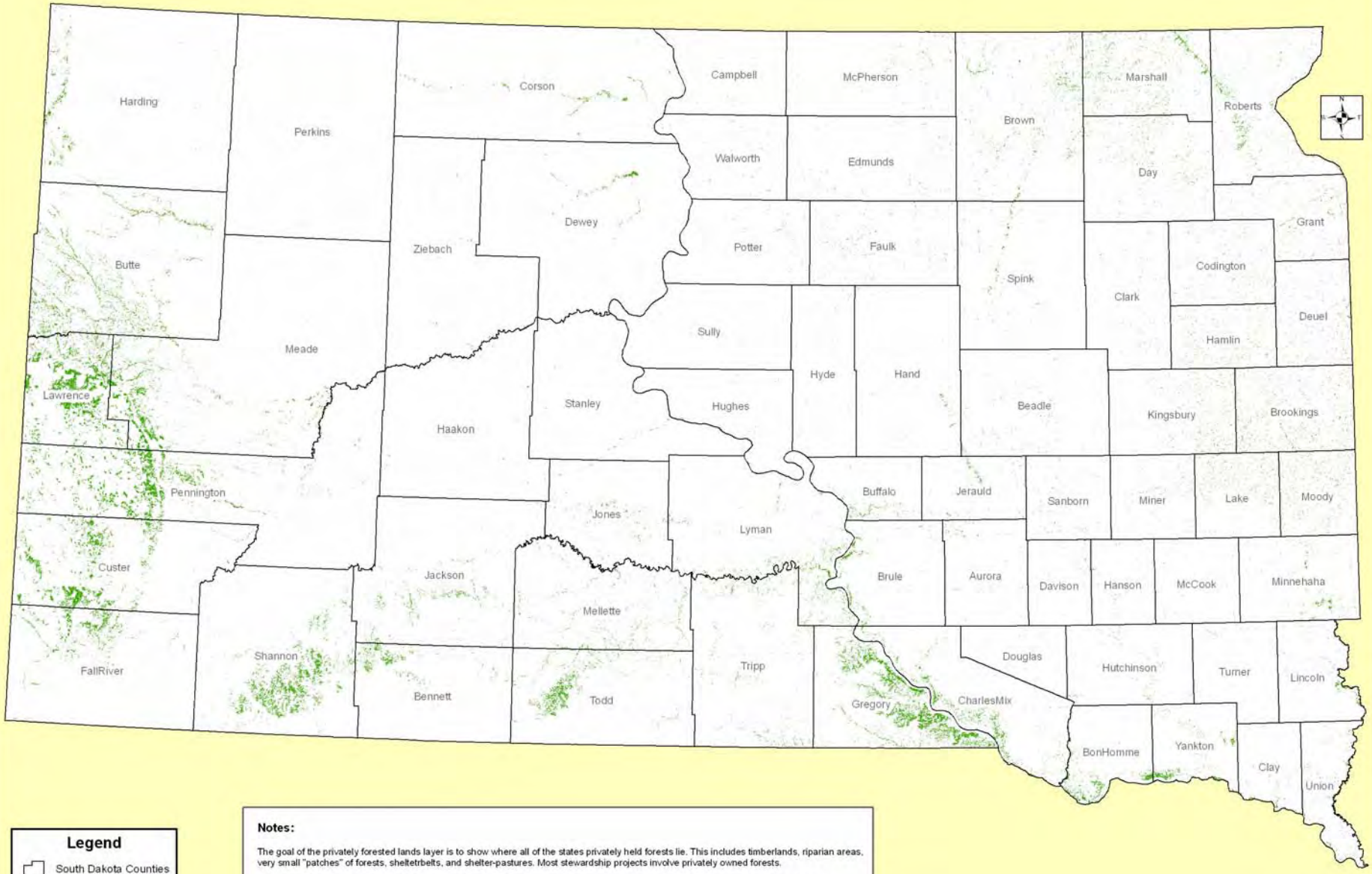
- South Dakota County Boundaries
- No Data
- Key Public Drinking Water Supplies

Notes:

The South Dakota Public Drinking Water Supplies data layer was extracted from the Statewide SWAP dataset. SWAP stands for Source Water Assessment Program which is managed by the South Dakota Department of Environment and Natural Resources (DENR). The Statewide SWAP dataset was created by SD DENR, with watershed delinations in the Black Hills Region coming from the USGS. DENR utilized "Hydrologic modeling" concepts, and watershed data to create this dataset. Ultimately SD DENR is also responsible for maintaining and updating this dataset.
The Key field in the Statewide SWAP dataset is the "zone" field which is actually called "Priority Zone". There are three categories: Zone A, Zone B, and Zone C. Zone "A" is considered the critical zone, it is where the drinking water for the community originates. In the Black Hills area this includes recharge areas for wellheads and 1/4 mile buffers around perrenial streams that feed these watersheds. In the greater Missouri river watersheds zone A includes 1/4 mile buffers around wellheads and perrenial streams feeding communities up to 10 miles upstream. Zone B is not as critical as zone A but is important because groundwater in zone B watersheds flows into zone A. Zone B is the remaining priority watersheds in the Black Hills area. In the greater Missouri watersheds zone B is buffered within 25 miles of the wellheads, within the confines of the watershed boundaries. Zone C is the remainder of the greater Missouri River watersheds and is not considered critical or a priority.
For the purpose of SAP only zone A and zone B will be used to build the "Public Drinking Water Supplies" layer.

Privately Owned Forested Lands: South Dakota

South Dakota SAP Project: Layer 6



Legend

- South Dakota Counties
- No Data
- Private Forested Lands

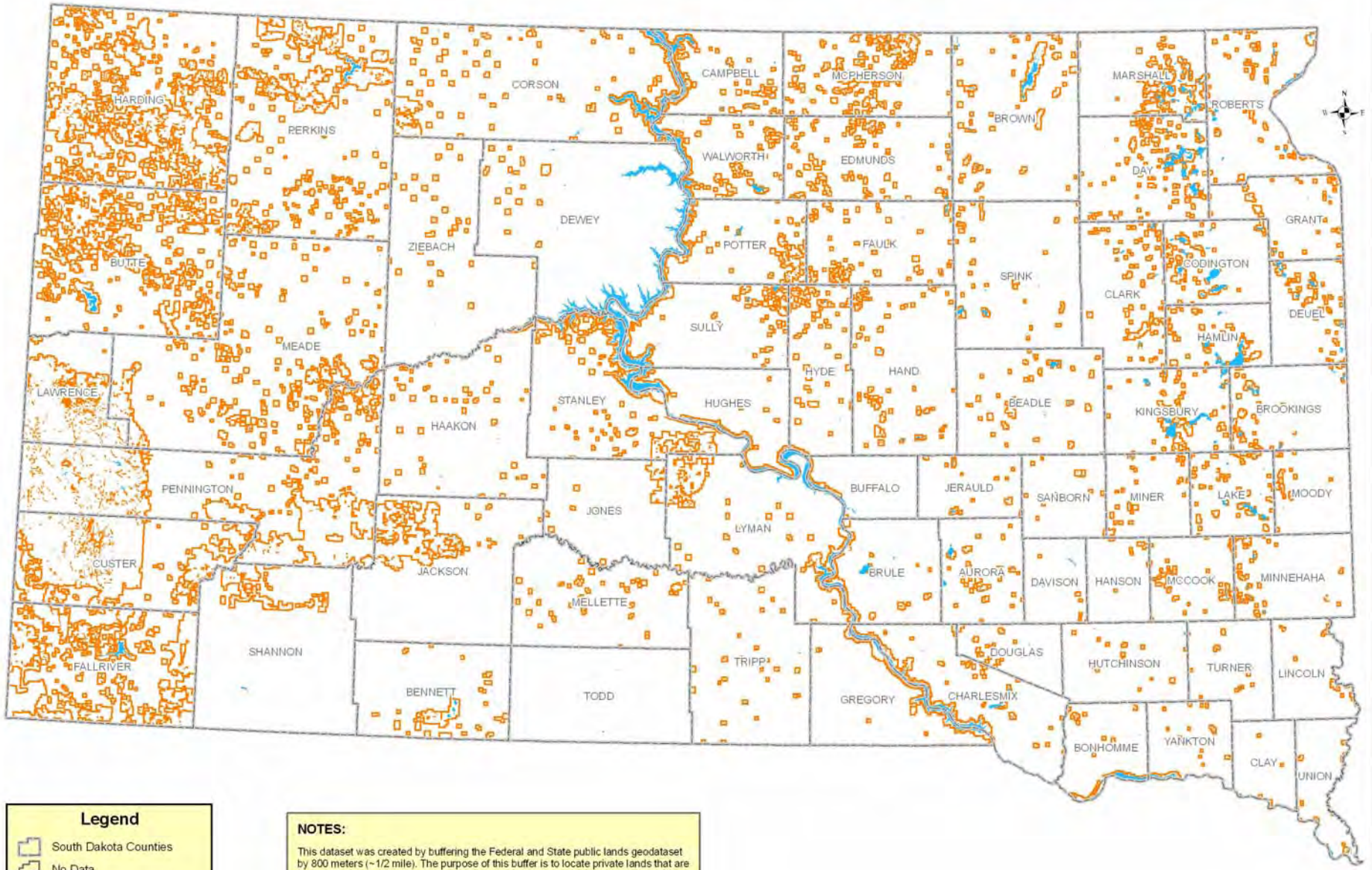
Notes:

The goal of the privately forested lands layer is to show where all of the states privately held forests lie. This includes timberlands, riparian areas, very small "patches" of forests, sheltetrbelts, and shelter-pastures. Most stewardship projects involve privately owned forests.

This data was extracted from the NLCD2001 landcover raster dataset. Forested values 41, 42, 43, & 91 (Deciduous Forest, Conifer Forest, Mixed Forest, and Woody Wetlands) were selected and reclassed 1 for forest lands, 0 for all other lands. Then the analysis mask (Layer 13) was used to mask out all of the publicly owned forestlands. The resulting grid includes only the privately owned forestlands.

Proximity to Public Lands

South Dakota SAP Project: Layer 7



Legend

- South Dakota Counties
- No Data
- Public Lands Proximity Buffer
- Lakes & Reservoirs

NOTES:

This dataset was created by buffering the Federal and State public lands geodataset by 800 meters (~1/2 mile). The purpose of this buffer is to locate private lands that are in close proximity to public lands. Land owners who live next to public lands can be affected by weeds, insects, wildfire, etc. that originate on those lands.

The Federal and State public lands dataset is a subset of the analysis mask layer, minus the census water bodies and urban areas.

Forested Wetlands

South Dakota Spatial Analysis Project Layer 8

Legend

- County Boundaries
- No Data
- Forested Wetlands

Notes:

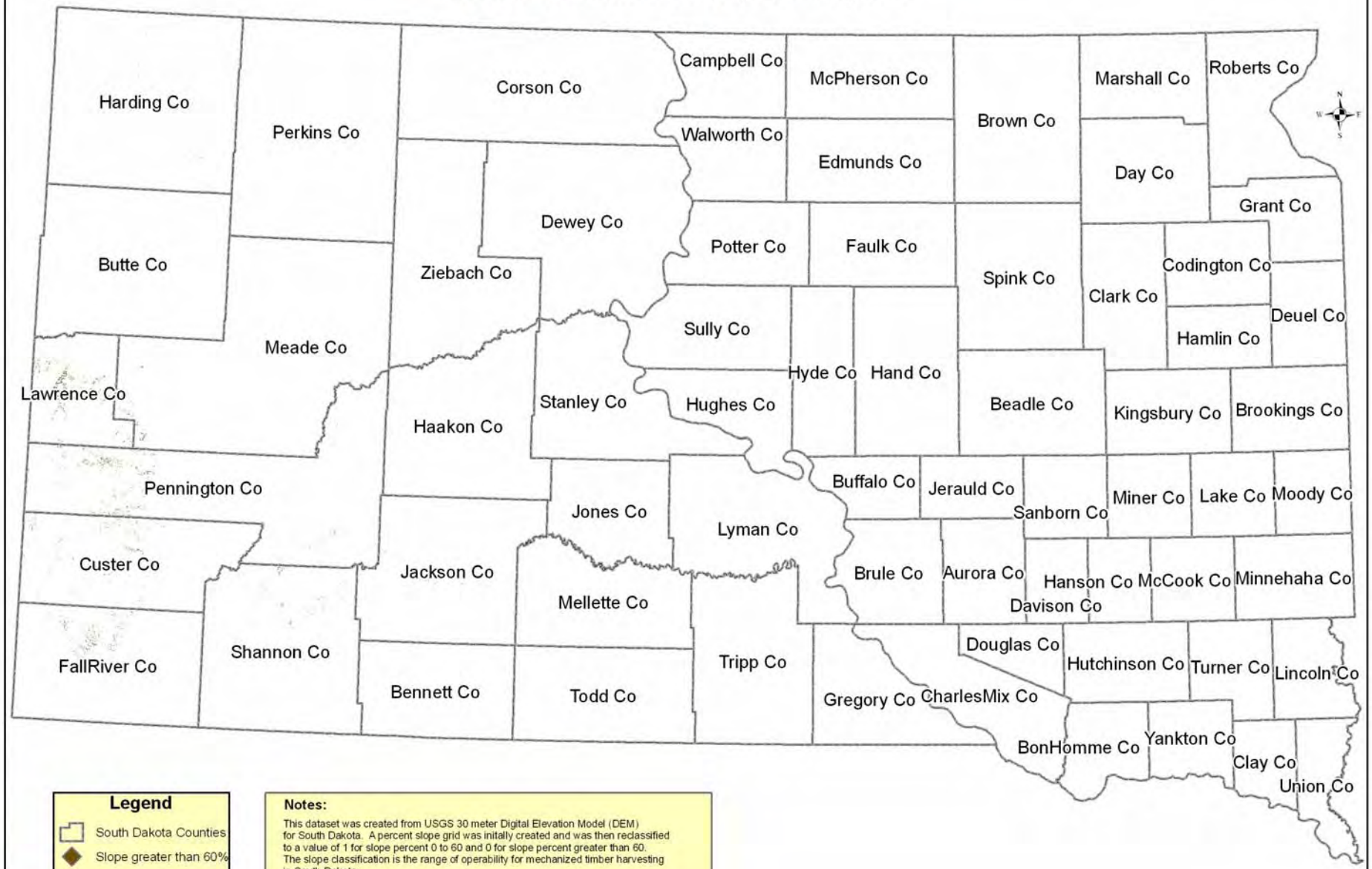
The data for South Dakota's Forested wetlands came from a 30M Raster version of the National Wetlands Inventory (NWI) dataset covering the entire state of South Dakota. NWI data was created by the U.S. Fish and Wildlife Service to produce information on the characteristics, locations and extent of the nation's wetlands and deepwater habitats. Currently digital NWI data exists for the entire state of South Dakota at 1:24,000 scale in both vector and raster form.

The current NWI classification scheme takes a hierarchical approach to classifying different wetland types. This involves "systems", "subsystems", "classes", "subclasses", and "additional modifiers". South Dakota has only three wetland systems, Lacustrine, Palustrine, and Riverine. For SAP analysis we are concerned with those wetland systems that contain forested "classes". These "classes" include 'Forested Wetlands' and 'Scrub Shrub Wetlands'.

From the NWI Wetlands raster dataset the final "Forested Wetlands" dataset was created by reclassifying those wetland classes titled 'Forested Wetlands' and 'Scrub Shrub Wetlands' as "1" and all other wetland classes and systems were reclassed as "0". This produced the final raster dataset titled "Forested Wetlands".

Topographic Slope: 0% to 60%

South Dakota SAP Project: Layer 9



Legend

- South Dakota Counties
- Slope greater than 60%
- Slope of 60% and less

Notes:

This dataset was created from USGS 30 meter Digital Elevation Model (DEM) for South Dakota. A percent slope grid was initally created and was then reclassified to a value of 1 for slope percent 0 to 60 and 0 for slope percent greater than 60. The slope classification is the range of operability for mechanized timber harvesting in South Dakota.
NED DEM data can be found online at http://ned.usgs.gov .

Forest Health Issues: Bark Beetles, Borers, Etc.

South Dakota Sap Project: Layer 10

Legend

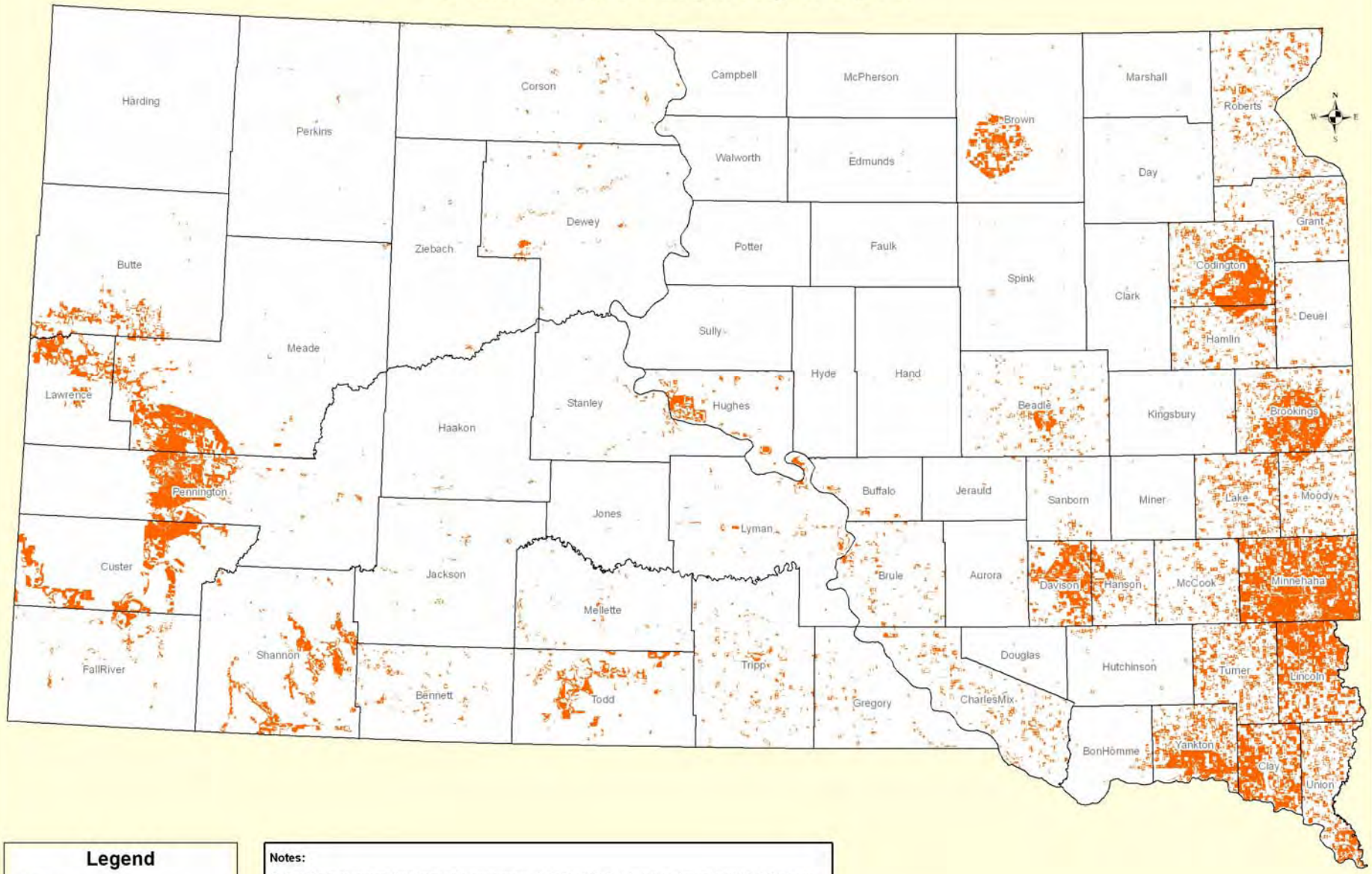
- County Boundaries
- No Data
- Bark Beetles, Borers, Weather, Etc.

Notes:

Pine bark beetle epidemics are by far the largest resource threat to South Dakota's Forests. This Forest health layer was produced using USFS Region 2 Forest Health (FHM) Aerial Survey data (Online source: ftp://ftp2.fs.fed.us/incoming/r2/aerial_survey/) Aerial survey from the past three years (2005, 2004 and 2003) were used to better illustrate the bark beetles extent. DCA1 codes of 11006, 11029, 11030, and 11055 were selected to show areas of bark beetle activity. DCA1 codes of 15005, 24022, and 25000 were selected to show areas of twolined chestnut borer, DED and other defoliator issues. Other DCA1 codes selected are 30000 (fire damage), 50000 series (various weather damages), and 70000 series (man caused damages). These datasets were then converted to raster form (ESRI Grid) and merged together.

Developing Areas

South Dakota Spatial Analysis Project: Layer 11



Legend

- County Boundaries
- Areas of Non Concern
- Developing Areas of Concern

Notes:

Dr. David Theobald produced the housing density layer used for South Dakota SAP analysis (and other western states SAP analysis). This data is an updated version of the US Housing Density dataset produced for his "Forest on the Edge" study. The data is produced by masking out state and federal lands and census water from the 2000 census block data and calculating acres per house. Next housing density was projected forward by Dr. Theobald using current development trends. For SAP purposes, the 2030 density projections were subtracted from the 2000 density to determine areas under pressure from development. Finally the "developing areas" raster layer is reclassed so cells representing development return a "1" value, and cells not representing development return a "0" (NoData) value.