



SOUTH DAKOTA MAPS

What Is A Map?

A map is a graphic representation of a portion of the earth. Maps use a combination of colors, lines, and symbols to detail various kinds of information useful to people. Whether on paper or on a computer screen, a map is an excellent tool to represent and examine the various features on or beneath the land surface. Cartographers (or map makers) make a wide variety of maps that serve many different purposes for the people of South Dakota.

What Are Common Map Types And What Do They Show?

The two most widely used maps are the familiar *planimetric map* or highway map and the *topographic map*. Highway maps (*planimetric maps*) show the roadways, help locate cities and towns, give mileages between towns, and provide information on population. *Topographic maps* use *contour lines* to show the hills and valleys of the land surface. By definition, a *contour line* connects all points on the map that have the same elevation above or below sea level. Both the *topographic map* and the *planimetric map* show features such as water bodies, vegetation, roads, buildings, political boundaries, and place names.

Planimetric and *topographic maps* can be used as a base for developing specialty

maps. For example, *geologic maps* provide information about the distribution, ages, and types of materials that make up the earth. *Hydrologic maps* give information about surface and ground water. A hydrologic map may show information such as the extent of drainage basins, depth to water in an *aquifer*, elevation of the *aquifer* surface, *aquifer* extent, *aquifer* thickness, and water quality. Soil maps show the distribution of different soil types found at land surface. Land-use and land-cover maps detail the different ways land is used in South Dakota. Land-use refers to human uses of the land such as agriculture, industry, forestry, mining, and housing. Land-cover describes items such as vegetation and water on the land surface.

Most maps are limited to some type of geographic boundary such as those associated with a state, county, city, or a *quadrangle*. *Quadrangle* maps cover areas bounded by certain distances of measured latitude and longitude.

What Is Map Scale?

Maps are scale models, like toy cars or boats, that are smaller versions of the real things. Maps depict the surface of the earth, often large areas of it. A map scale relates the distance on the map to the actual distance on the land surface. There are several ways to indicate the scale of a map: a fractional scale, a verbal scale, and a graphic or bar scale.

TABLE 1. Some Common Map Size and Scale Relationships

Map Area Latitude x Longitude	Approximate Land Size (miles)		Approximate Map Size (inches)		Fractional Scale	Verbal Scale
	North-South Distance	East-West Distance	North-South Distance	East-West Distance		
7.5 x 7.5 minute	9	6	22	16	1:24,000	1 inch = 2,000 feet
7.5 x 15 minute	9	12	22	32	1:25,000	1 inch = 2,083 feet
15 x 15 minute	17	12	17	12	1:62,500	1 inch = 1 mile
30 x 60 minute	34	50	22	31	1:100,000	1 inch = 1½ miles
1 degree x 2 degree	70	100	17	25	1:250,000	1 inch = 4 miles
State Map	State Map		26	47	1:500,000	1 inch = 8 miles
State Map	State Map		13	24	1:1,000,000	1 inch = 16 miles

With a fractional scale of 1:24,000 for example, 1 inch on the map represents 24,000 inches on the land surface. Since 24,000 inches is the same as 2,000 feet, 1 inch on the map represents 2,000 feet on the land surface. The verbal scale for a map with a fractional scale of 1:24,000 would thus be 1 inch equals 2,000 feet or 1 inch equals about four-tenths of a mile.

A graphic or bar scale is the scale used on highway maps and is familiar to most people. The bar scale, usually printed in the lower margin or legend of a map, graphically compares the map distance (usually in inches) to the land distance (in miles, feet, or kilometers).

Maps are printed on a variety of different sized pieces of paper. Map scale determines how much actual land area can be depicted on any given piece of paper. For example, in fractional and verbal scales, the larger the second number of a particular scale, the more land area can be depicted on any given piece of paper (the smaller the map scale). Table 1 illustrates the relationships between some common map size and scale.

How Are Maps Made?

Prior to the 1940's, most maps were made using a classic mapping technique called *planetable* surveying. A *planetable* is essentially a portable drawing board on a tripod with a sighting device. The person mapping an area would carry the *planetable*, climb to the best vantage point, and carefully plot on the map those features that could be seen and measured.

Today maps are made with the use of aerial photographs and *photogrammetry*. *Photogrammetry* is the science of obtaining reliable information by measuring and interpreting aerial photographs.

Why Are Maps Important?

Maps are used daily by a wide variety of people. Almost everyone has used a highway map to find their way to a favorite vacation spot. *Topographic maps* are used for geologic and *hydrologic* mapping, energy exploration, natural resource conservation, environmental management, city planning, and outdoor activities like hiking, camping, hunting, and fishing.

Information found on specialty maps (such as *geologic maps*, *hydrologic maps*, soils maps, and land-use and land-cover maps) is very valuable for many of the decisions that affect our daily lives. Federal, state, and local governments, along with private companies, find a wide variety of uses for these maps such as energy and mineral resource evaluation and management, ground water assessments, geologic hazards (earthquakes) evaluation, land-use planning, and urban zoning. Other uses include the siting of dams, reservoirs, nuclear plants, waste-disposal areas, landfills, lagoons, water works, and transportation and utility routes.

Where Can Information On S.D. Maps Be Obtained?

Map information may be obtained at the state office of the U.S. Geological Survey Earth Science Information Center (ESIC). The state ESIC is located in Vermillion and will answer questions on the availability of maps. Map indexes, catalogs, order forms, and many other information pamphlets may be obtained at the ESIC. The address and telephone number of the state ESIC are:

Division of Geological Survey
Department of Environment and Natural Resources
Science Center, USD
414 East Clark St.
Vermillion, SD 57069-2390
(605) 677-5227

Where Can South Dakota Maps Be Purchased?

Map selections may vary with each dealer: **(A)** local coverage only, **(B)** county coverage, **(C)** area (regional) coverage, **(D)** state coverage, **(E)** multi-state coverage, and **(F)** special maps.

CUSTER:

Western Real Estate, **(A)**
731 Mount Rushmore
Custer, SD 57730
(605) 673-4482

DEADWOOD:

A B C Business Supply **(A)**
30 Lee Street
Deadwood, SD 57732
(605) 578-3636

HOT SPRINGS:

Black Hills Parks and Forest Assoc.
Wind Cave National Park **(A) (F)**
Hot Springs, SD 57747
(605) 745-4600

MILBANK:

Midland Atlas Co. **(B)**
101 North Main
P.O. Box 283
Milbank, SD 57252
(605) 432-5534

PIERRE:

South Dakota Tourism
711 East Wells Avenue
Pierre, SD 57501-3369
(605) 773-3301
(official state highway map)

S.D. Dept. of Transportation
Map Sales **(B)**
700 East Broadway
Pierre, SD 57501
(605) 773-3249

RAPID CITY:

Department of Geology **(C)**
SD School of Mines and Technology
501 East St. Joseph
Rapid City, SD 57701
(605) 394-2374

Everybodies Bookstore **(C)**
515 6th Street
Rapid City, SD 57701
(605) 341-3224

Horizons, Inc. **(C)**
1635 Deadwood Avenue
Rapid City, SD 57702
(605) 343-0280

SIOUX FALLS:

Ace Hardware **(C)**
41st & Minnesota
Sioux Falls, SD 57105
(605) 336-6474

Mathison Company **(E) (F)**
109 South Indiana Avenue
Sioux Falls, SD 57103
(605) 336-2437
1-800-952-3939 (in South Dakota)

Siouxland Heritage Museums (C)
200 West Sixth Street
Sioux Falls, SD 57102
(605) 335-4210

DENVER, COLORADO:

Map Distribution (E) (F)
U.S. Geological Survey
Box 25286, Federal Center
Denver, CO 80225
1-800-USA-MAPS

ROLLA, MISSOURI:

Mid-Continent Mapping Center
U.S. Geological Survey (E) (F)
1400 Independence Road
Rolla, MO 65401
(314) 341-0851.

Where Can South Dakota Maps Be Borrowed?

Libraries at the following locations in South Dakota have been designated as depositories for many of the maps published by the U.S. Geological Survey.

BROOKINGS:

South Dakota State University

PIERRE:

South Dakota State Library
800 North Illinois Street

RAPID CITY:

S. D. School of Mines and Technology

SPEARFISH:

Black Hills State University

VERMILLION:

University of South Dakota

Glossary

Aquifer - a water bearing layer of rock, sand, or gravel which can yield significant quantities of water to wells and springs.

Contour lines - lines on a map that connect all points having the same elevation.

Geologic map - a map showing geologic information, such as the distribution, nature, and age relationships of rock units, and the occurrence of structural features (folds, faults, joints), mineral deposits, and fossil localities.

Hydrologic map - a map that displays information about surface and ground water.

Photogrammetry - a science of obtaining reliable information by measuring and interpreting photographs.

Planetable - a simple surveying instrument on which one can plot the lines of survey directly from observation.

Planimetric map - a map which presents only the horizontal positions of the features represented.

Quadrangle - the area of land included on each of the atlas sheets published by the U.S. Geological Survey.

Topographic map - a map which presents both the vertical and horizontal positions of the features represented.

Glossary terms are adapted from Bates and Jackson, 1987, *Glossary of Geology*, American Geological Institute, Alexandria, Virginia.

Outreach (Resource Agency Personnel)

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