



PRAIRIE PRECIPITATION

Prairie Precipitation

A South Dakota version of Project WILD's *"Rainfall and the Forest"*

Objectives and Method

Refer to the *"Rainfall and the Forest"* activity in your Elementary or Secondary Project WILD guides.

Background

Many natural systems contribute to wildlife population fluctuations and affect wildlife survival. An inch or two more rain per year may allow for the growth of forests instead of grasslands, thus creating habitat for forest wildlife. Extra rainfall may encourage or interfere with animal reproduction, depending on the wildlife species and the time and amounts of the rainfall. In South Dakota, the cycles of abundant moisture, followed by drought, often occur in periods of several years. Our native wildlife and plant species show adaptations that allow them to survive and reproduce under these conditions. Food, water, shelter, and space in the appropriate arrangement are all fundamental to wildlife populations. Plant distributions, upon which animals depend, are the result of many factors including precipitation, temperatures, soil types, elevation, and land use practices.

In South Dakota, the joint effects of precipitation and elevation in the distribution of plant communities can be effectively demonstrated. Twenty-four inches or more of moisture per year occur in the highest elevations of the Black Hills (4670'-7242'). In that part of the state, ponderosa pine, Black Hills spruce and aspen are the dominant trees. In contrast, the same amount of precipitation in the southeast, near Vermillion and Sioux Falls, (elevations 1190'-1420'), produces tall grass prairie with pockets of mixed deciduous forest. Each type of plant community supports a different community of animals. The pine/spruce/fir plant community is inhabited by elk, ruffed grouse and red squirrels. The tall grass prairie/ mixed deciduous forest supports white-tailed deer (bison before human settlement), greater prairie chickens, bobolink, and eastern fox squirrels.

Materials

For each group of two or three students you will need: one state highway map (available without charge from the S.D. Dept. of Tourism); one copy of each of the two enclosed maps (S.D. communities and vegetation zones); one copy of the elevations and precipitation list; 4 colored pencils, crayons, or markers (green, blue, brown, and red).

Procedure

1) Discuss the concept of interrelatedness with your students — the idea that all things, living and non-living, are connected. 2) Divide the class into teams of two or three students. Give each team a state highway map, a copy of the S.D. communities map and the list of elevation and precipitation for each community. 3) Using the state highway map as an aid, have the groups locate each community on their blank SD communities map, and color in the dot for each town using the following precipitation guidelines:

18.1" or less	red
18.2 - 20.6"	brown
20.7 - 24.7"	blue
Greater than 24.8"	green

Community names need not be written on the student group map. 4) Consolidate each set of dots into color zones representing precipitation amounts. Lines between areas should run between dots of different colors, not from dot to dot. Color the maps so that each color zone can be easily appreciated. 5) Set aside the highway maps. Issue, to each group, a vegetation zone map of South Dakota. Find similarities between the colored rainfall zones created on the student maps and the shapes and locations of the plant community zones on the vegetation maps. What rainfall level fits what vegetation type? Remember, your correlations will not be exact. Keep in mind that each student map has only 51 points of reference; thousands of data points were used to develop the vegetation zone map. The two maps will not be identical, but will be visually similar. Determine and list rainfall amounts for each plant community. 6) Discuss rainfall in South Dakota. From what direction do our storms come? What influences the precipitation patterns in our state? Does elevation play a role? Are there two communities on the map that have similar elevations, yet receive very different amounts of precipitation? Why is this? Discuss the concept of rain shadows. Would these rainfall/vegetation patterns and influences be similar in other parts of the world? (For

younger students you might want to use a simplified version of the vegetation map that eliminates the mixed grass with buffalo grass distinction and consolidates the Black Hills forest associations into "forest".)

Extensions

1) Obtain habitat maps for several mammal species in our state. (These maps will be available in *The Natural Source mammal fact sheets*). Are there correlations between these ranges and the vegetation zone and precipitation maps? (Start with animals that are herbivores or omnivores. Save carnivores for last.) Ranges for some reptiles and birds may also give good correlations. Have students make graphic representations, or write reports, about the interrelationships between precipitation, plant communities, and various species of animals. 2) Have students investigate other data that may show positive correlations with precipitation amounts. Some possibilities to explore include human population density, land use, crop types and yields, and economic development. The Crop Distribution Maps listed in the Resources section would be valuable aids. 3) A good research project would be to obtain rainfall averages from years before the Missouri Dams were in place and compare those totals to the average rainfall from 1951-1980.

References

- Jones, J.Knox Jr. 1983. Mammals of the Northern Great Plains. Univ. of Nebraska Press, Lincoln NE. 379 pp.
- National Oceanographic and Atmospheric Administration. 1951-1980. Monthly Normals of Temperatures, Precipitation, and Heating and Cooling Degree Days in S.D.
- S.D. Ornithologists' Union. 1991. The Birds of South Dakota, 2nd Ed. Aberdeen, SD. 411 pp.
- SDSU. 1982 Plants of South Dakota Grasslands, Bulletin 566. Agricultural Experiment Station, South Dakota State University, Brookings, SD.

Resources

- S.D. Crop Distribution Maps*, S.D. Agriculture Statistics Service, USDA, P.O. Box 5068, Sioux Falls, SD 57117-5068. Phone: 330-4527.

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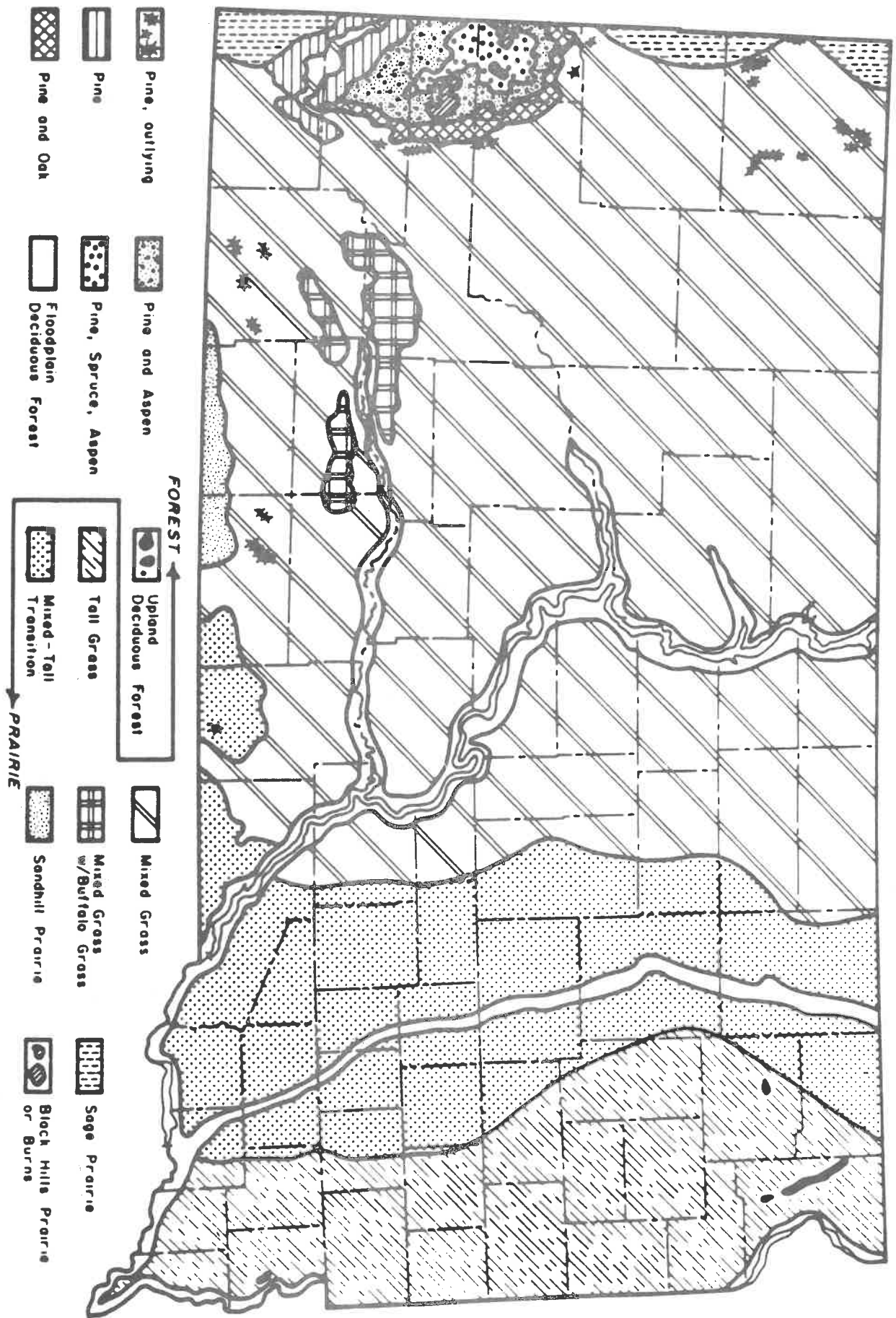
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The vegetation zone map is reproduced from The Birds of South Dakota with permission of the SDOU . It was prepared by Byron Harrell based on a map by Kuchler in 1964.

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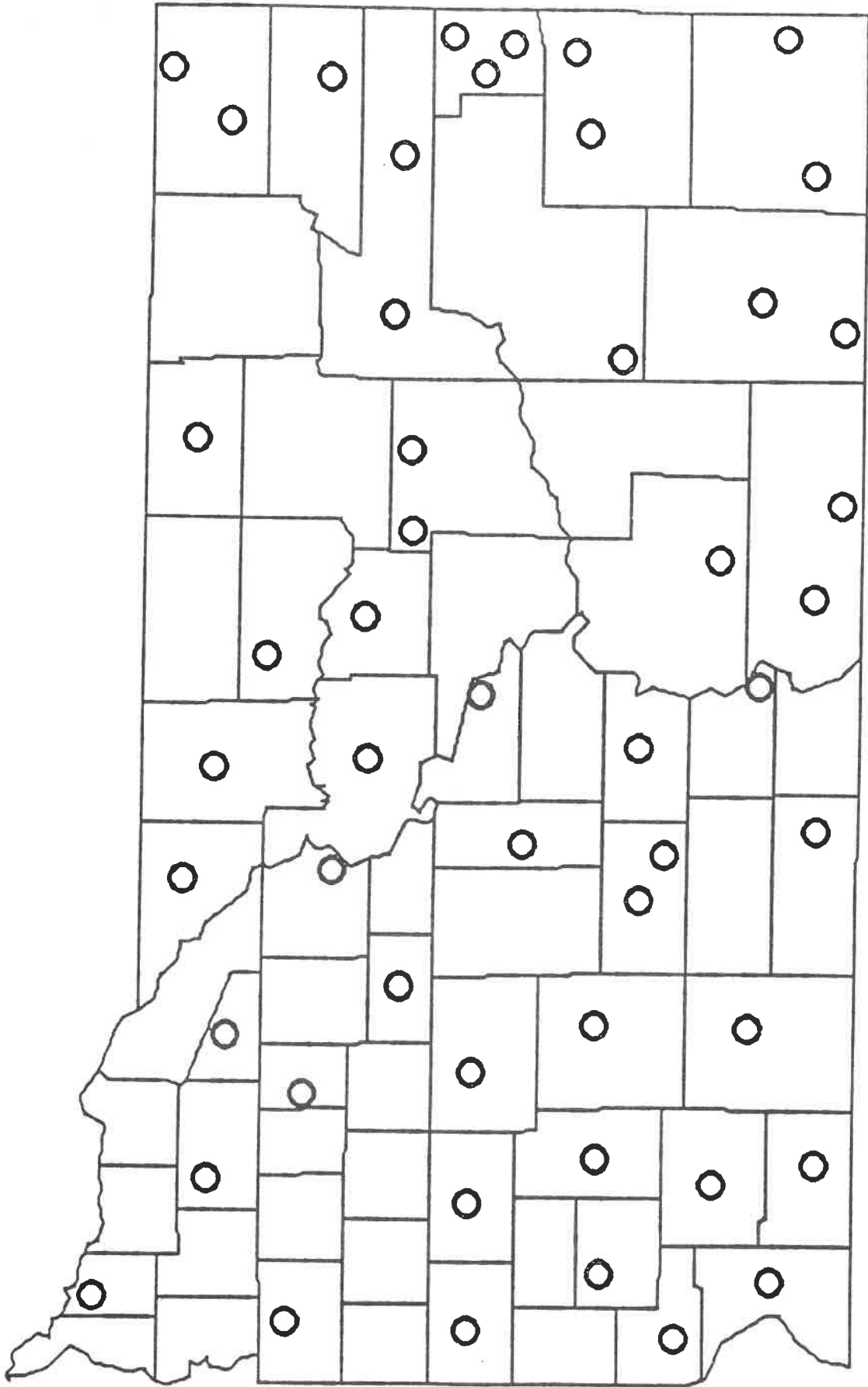
South Dakota Communities

Name	Elevation (at weather station)	Precipitation (30 yr. normals: 1951-1980)
Aberdeen	1296	17.8 inches
Ardmore	3550	15.2
Armour	1510	22.2
Belle Fourche	3017	14.9
Bison	2780	16.3
Britton	1340	18.0
Brookings	1623	21.7
Camp Crook	3120	13.6
Chamberlain	1400	19.9
Clark	1780	20.8
Custer	5322	18.2
Deadwood	4670	28.5
DeSmet	1726	22.8
Eureka	1884	17.0
Faith	2545	15.9
Faulkton	1565	18.0
Gettysburg	2080	18.0
Gregory	2001	22.8
Highmore	1890	18.3
Hot Springs	3535	15.1
Huron	1282	18.7
Kennebec	1700	17.0
Lead	5332	28.7
Lemmon	2596	17.8
Martin	3320	17.2
McIntosh	2310	16.7
McLaughlin	2000	17.0
Menno	1324	23.4
Midland	1890	15.8
Milbank	1145	21.4
Mitchell	1346	21.1
Mobridge	1668	17.1
Murdo	2300	17.1
Newell	2870	14.4
Onaka	1600	16.9
Philip	2205	15.2
Pierre	1734	18.1
Ralph	2800	14.9
Rapid City	3162	16.3
Redfield	1296	18.5
Sisseton	1200	21.1
Sioux Falls	1418	24.1
Spearfish	3675	21.1
Timber Lake	2150	17.6
Vermillion	1190	24.1
Wasta	2320	15.6
Watertown	1746	22.3
Webster	1850	20.7
Wessington Springs	1725	20.8
Winner	1965	22.2
Wood	2180	19.3



South Dakota Natural Vegetation Zones

Prairie Precipitation



SOUTH DAKOTA COMMUNITIES