Spearfish Sample Database

ABSTRACT

The *spearfish* sample database is being distributed to provide users with a solid database on which to work for learning the tools of GRASS. This document provides some general information about the database and the map layers available.

With the release of GRASS 4.1, the GRASS development staff is pleased to announce that the sample data set *spearfish* is also being distributed. The *spearfish* data set covers two topographic 1:24,000 quads in western South Dakota. The names of the quads are Spearfish and Deadwood North, SD. The area covered by the data set is in the vicinity of Spearfish, SD and includes a majority of the Black Hills National Forest (i.e., Mount Rushmore). It is anticipated that enough data layers will be provided to allow users to use nearly all of the GRASS tools on the *spearfish* data set.

A majority of this *spearfish* database was initially provided to USACERL by the EROS Data Center (EDC) in Sioux Falls, SD. The GRASS Development staff expresses acknowledgement and thanks to: the U.S. Geological Survey (USGS) and EROS Data Center for allowing us to distribute this data with our release of GRASS software; and to the U.S. Census Bureau for their samples of TIGER/Line data and the STF1 data which were used in the development of the TIGER programs and tutorials. Thanks also to SPOT Image Corporation for providing multispectral and panchromatic satellite imagery for a portion of the *spearfish* data set and for allowing us to distribute this imagery with GRASS software. In addition to the data provided by the EDC and SPOT, researchers at USACERL have developed several new layers, thus enhancing the *spearfish* data set.

To use the *spearfish* data, when entering GRASS, enter *spearfish* as your choice for the current location.

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_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

LOCATION:..................      spearfish_________________

MAPSET:....................      your login-name___________

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Available map layers for the *spearfish* database are detailed on the following page.

Raster files:*

CELL MAP LAYERS			
FILENAME	TITLE	categories	bytes
aspect	Aspect	25 15 degrees per category	294978
bugsites	Mountain Pine Beetle Damage	1	26600
density	Forest Density	1-4	26600
elevation.dem	Digital Elevation Model (7.5 minute)	1066-1840	589956
elevation.dted	Digital Terrain Elevation Data (DTED-1)	1-241,243,245-251,254,255	26600
erode.index	Erosion Index (ratio of K factor/T factor)	12	10389
fields	SCS Farm Fields	63	2849
geology	Geology	9	26600
landuse	Land Use	8	26600
owner	Ownership	1-2	26600
quads	Quads	2	26600
railroads	Railroads	2	1191
roads	Roads	5	46583
rstrct.areas	Restricted Areas	4	26600
rushmore	Camp Rushmore	1	1529
slope	Slope (degrees)	0-48,50,53-54,82-85,87-89	295388
slope.7	Slope (reclassed to percent rise)	7	16
soils	Soils	54	75517
soils.Kfactor	Soil K factors (surface layer)	7	16
soils.Tfactor	T soil erosion factor	5	16
soils.br.depth	Depth to Bedrock(inches)	5	16
soils.ph	PH for Soils	5	16
soils.range	Range Type	12	16
soils.texture	Soil Texture-USDA	17	16
spot.image	Spot multispectral band composite		1330000
streams	Hydrography	4	35200
strm.dist	Proximity Analysis-Distance from Streams	2	26600
tractids	Census Tracts for Lawrence County (from vector)	193368725	3825
transport.misc	Miscellaneous Transportation Features	2	1381
trn.sites	Training Sites(Camp Rushmore)	18	2701
vegcover	Vegetation Cover	1-6	26600

Note: In some map layers, there are gaps in the data and large areas of no data. Do not infer this to be a problem with the GRASS software. The source of the gaps and "no data" areas is within the map layer itself.

Note: "aspect" and "slope" were derived from "elevation.dem" using the program **r.slope.aspect** under GRASS4.0. They can be reclassed to suit the user. "slope.7" is a reclass of the "slope" layer containing seven categories of percent rise.

Note: "erode.index" was derived using r.mapcalc ((soils.Kfactor*100/soils.Tfactor)/100)

Note: Camp Rushmore is a **fictitious** installation created for demonstration purposes. "rushmore" is the

boundary of this **fictitious** installation.

Note: In the file "slope", categories 83, 85, 88 and 89 actually represent areas in the NW and SE corners of the Spearfish database in which no elevation data exists. They appear as very steep slopes in the "slope" layer, because they are on the very edges of the data set; at the points where they occur, the data appears to drop off very sharply (to nothingness). In the file "slope.7" these categories were reclassed into the "no data" category.

Note: Mixed resolution within the data set reflects original data sources. The resolution can be changed, although higher resolutions will require more disk space.

DIG files:

Layer name:	Layer description
fields	SCS farm fields
quads	USGS 1:24000 quads
railroads	Railroads
roads	Spearfish Roads
rstrct.areas	Restricted areas in Camp Rushmore
sections	Square mile sections
streams	Spearfish streams
t.9961.100	Blockgroup 100 - Census tract 9961
t.9961.100.all	All Tiger data - blockgroup 100
t.9961.100.bks	All blocks - blockgroup 100
t.9961.200	Blockgroup 200 - Census tract 9961
t.9961.200.all	All Tiger data - blockgroup 200
t.9961.200.bks	All blocks - blockgroup 200
t.9961.300	Blockgroup 300 - Census tract 9961
t.9961.300.all	All Tiger data - blockgroup 300
t.9961.300.bks	All blocks - blockgroup 300
t.9961.400	Blockgroup 400 - Census tract 9961
t.9961.400.all	All Tiger data - blockgroup 400
t.9961.400.bks	All blocks - blockgroup 400
t.9961.500	Blockgroup 500 - Census tract 9961
t.9961.500.all	All Tiger data - blockgroup 500
t.9961.500.bks	All blocks - blockgroup 500
t.county	Lawrence county boundary
t.hydro	Lawrence county hydrology
t.powerlines	Lawrence county powerlines
t.rails	Lawrence county railroads
t.roads	Lawrence county roads
t.roads.prime	Lawrence county primary highways
t.roads.second	Lawrence county secondary roads
t.tracts	Lawrence county census tracts
tractids	Lawrence county census tract id numbers
tracts	
transport.misc	Miscellaneous transportation features
trn.sites	Training sites in Camp Rushmore
twp.range	Township and Range lines

Note: rstrct.areas and trn.sites are **fictitious** DIG files for Camp Rushmore created for demonstration purposes.

Note: "streams" is a result of combining two separate DLG files from Spearfish and Deadwood North quads, first by converting to GRASS vector files using **v.import**, and then patching the files together using **v.patch**.

Note: The vector files "tracts" and "tractids" were derived from U.S. Bureau of the Census Tiger files using the version 4.1 importing routines (see separate tutorial for a detailed explanation of importing

methods)

Note: All vector files beginning with a 't.' prefix denote that they were derived from U.S. Bureau of the Census Tiger files using the original version 4.0 importing routines that work with the RIM dbms. The TIGER file, developed by the Bureau of the Census, is a digital map of the entire United States and contains such features as roads, railroads, rivers, boundaries for census tracts and blocks, political areas such as cities and townships, feature names and classification codes, alternate feature names, and within metropolitan areas, address ranges and ZIP Codes for streets.

The information contained within the TIGER file is unique within the United States and is broken down by state. Within each state, the TIGER information is further divided by county. For each county their are up to twelve files or record types containing information relevant to that county.

Type 1 Lines with end nodes and basic attributes and geographic area codes
Type 2 Shape points between the end nodes
Type 3 Additional geographic area codes
Type 4 Additional feature identifier pointers
Type 5 Complete feature identifier list
Type 6 Additional address range and ZIP Code information
Type 7 Landmark features
Type 8 Area landmarks
Type I Area boundaries
Type P Polygon locations
Type A Additional polygon geographic area codes
Type R Record number range

GRASS vector files derived from TIGER data were created using the import routine **(v.in.tig.rim)fR which uses a database manager RIM**, and the GRASS interface program, **v.db.rim** (which allows interactive use of RIM in the GRASS environment). A RIM database was created for Lawrence County. Using **v.db.rim**, different maplayers were then extracted out of the RIM database and converted into GRASS vector files.

The Spearfish data set is within Lawrence County, SD, and several maplayers for the county are included in the Spearfish mapset. All of the files listed below extend beyond the Spearfish DEFAULT region, and therefore, users should change their current geographic region to 'county' before viewing these files. 'county' is one of the GRASS geographic regions stored in the spearfish data set.

t.county Lawrence County boundary
t.hydro All bodies of water within Lawrence County
t.powerlines All power transmission lines within Lawrence County
t.rails All railroad tracks within Lawrence County
t.roads All roads contained within Lawrence County
t.roads.prime All interstate roads within Lawrence County
t.roads.second All U.S. Highways within Lawrence County
t.tracts Census tract boundary outlines for tracts with the county

In addition, several vector files are included for a sample census tract within Lawrence County. The tract, 9961, lies to the north and east of Spearfish and can be viewed after changing the current GRASS geographic region to '9961', which is also stored in the spearfish data set. The different '9961' vector files are break outs of the tract into three different formats. These files exist for census block-groups 100-500 within census tract 9961. The files and their naming schemes adhere to the following format.

t.9961.100 The outline of blockgroup 100 within tract 9961
t.9961.100.all Contains all of the TIGER data with blockgroup 100
t.9961.100.bks Outlines all of the blocks within the blockgroup 100

Imagery files:

File name	File description
gs14.1	Low Altitude Aerial Photograph
nhap.1	NHAP blue raw band file
nhap.2	NHAP green raw band file
nhap.3	NHAP red raw band file
spot.comp	SPOT 3 band composite
spot.p	SPOT panchromatic band (10m)
spot.1.ms	Band 1- SPOT image (20m-green)
spot.2.ms	Band 2 - SPOT image (20m-red)
spot.3.ms	Band 3 - SPOT image (20m-near infrared)

Note: Imagery files are found in LOCATION:imagery and MAPSET:spearfish, which is an x,y coordinate system.

Note: Imagery commands must be used to view these files. Please refer to the GRASS Imagery Tutorial.

Note: "gs14.1" is a low altitude aerial photograph which can be ortho-rectified using the GRASS module **i.ortho.rectify**. Also included in this location is "gscam", a camera file containing information about the camera used to take the photograph. This file was created using **i.ortho.rectify**.

Note: NHAP and SPOT imagery are left as raw band files so that the user may georeference them to a desired coordinate system. The SPOT 3-band composite has been rectified to a UTM coordinate system and is located in LOCATION:spearfish and MAPSET:PERMANENT.

Site lists files:

File name	File description	# of sites
archsites	Potential historic and archaeological sites	25
bugsites	Beetle Sites	90

Note: Note: "bugsites" has also been converted into a cell file. Analysis can only be done with cell files.

Three alternate regions for the data set are also provided. There are two subregions named 'subregion.NW' and '9961' and one extended region (larger than the default) named 'county'. Users may change their current GRASS geographic region to one of these subregions within GRASS by using the GRASS command **g.region**.

Raw data files:

With the release of GRASS 4.1, three sets of raw data are also being distributed with the sample database. These sets of data will allow the user to test out and learn some of the importing routines included in GRASS.

These raw data files are contained in three directories which are located under the spearfish location and the PERMANENT mapset. The three directories are Census, Informix, and TIGER.

TIGER files:

tgr46081.f41
tgr46081.f42
tgr46081.f43
tgr46081.f44
tgr46081.f45
tgr46081.f47
tgr46081.f48
tgr46081.f4a
tgr46081.f4i
tgr46081.f4p
tgr46081.f4r

These are the TIGER data files of type 1,2,3,4,5,7,8,a,i,p, and r. (See description earlier in this document.) They can be used with the GRASS programs **v.in.tig.basic** and **v.in.tig.lndmk** to create GRASS vector files.

Census file:

spear.140

This file contains another type of data from the U.S. Bureau of the Census known as stf data. The stf files contain attribute data, such as demographic information.

Informix files:

mk_tiger.sql
stf1_house.asc
stf1_main.asc
stf1_person.asc
type1.asc

These files are for use with the *.inf programs in in GRASS, which are tools that link to Informix, a proprietary software package. These data files and the *.inf dbtools can only be implemented with the use of the Informix package. For more information on the use of these files, see the README.inf text file within the directory.