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U. S. GEOLOGICAL SURVEY

OPEN-FILE REPORT
00-175

**GEOLOGIC MAP AND DIGITAL DATABASE
OF THE
COUGAR BUTTES 7.5' QUADRANGLE,
SAN BERNARDINO COUNTY, CALIFORNIA**

Version 1.0

README FILE

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Open-File Report 00-175, The Geologic Map and Digital Database of the Cougar Buttes 7.5' Quadrangle, San Bernardino County, California, has been approved for release and publication by the Director of the U.S. Geological Survey. The geologic map and digital database have been subjected to rigorous review and are a substantially complete representation of the current state of knowledge concerning the geology of the quadrangle, although the USGS reserves the right to revise the data pursuant to further analysis and review. This Open-File Report is released on the condition that neither the USGS nor the United States Government may be held responsible for any damages resulting from its authorized or unauthorized use.

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INTRODUCTION

Overview

Open-File Report 00-175 is a digital geologic data set that maps and describes the geology of the Cougar Buttes 7.5' quadrangle, San Bernardino County, California. The data set includes a digital geologic map database and supporting graphic, plot, readme, and metadata files. The database was created using ARC/INFO, version 7.2.1, a commercial Geographical Information System (GIS) designed by Environmental Systems Research Institute (ESRI), Redlands, California (<http://www.esri.com>). The database consists of the following ARC/INFO map coverages:

- a geologic map coverage showing geologic contacts and units
- 3 structure coverage layers showing attitudes, fold axes, and fold-axis symbols
- a scanned topographic base at a scale of 1:24,000
- supporting ARC/INFO symbol sets

Each coverage consists of an ARC map displaying locational data and INFO attribute tables that uniquely identify the features of the display (ESRI, 1992). All features (polygons, lines, and points) in the map and structure coverages are attributed with identifying geologic data that define and describe the features. The attribute tables can be related to other tables that contain additional descriptive information. In version 1.0, this additional tabular information is limited to dictionaries that contain the definitions of points and lines as described by Matti and others (1997a,b,c).

The database is accompanied by the following supporting and derivative files:

- this readme file (coug_readme.txt and .pdf versions)
- an FGDC-compliant metadata file (coug_met.txt version)
- a browse graphic of the geologic-map plot, 1:24,000 topographic base, and map margin explanatory information that includes a Description of Map Units (DMU), a Correlation of Map Units (CMU), and a key to point and line symbols (coug_browse.jpg file)
- a Portable Document Format plot graphic file of the geologic-map plot, 1:24,000 topographic base, and map margin explanatory information that includes a Description of Map Units (DMU), a Correlation of Map Units (CMU), and a key to point and line symbols (coug_map.pdf file)
- the DMU text (coug_dmu.pdf)
- the CMU diagram (coug_cmu.pdf)
- a PostScript graphics plot file of the geologic map and explanatory information (coug.ps)
- a summary pamphlet that describes and interprets the late Cenozoic geology of the Cougar Buttes quadrangle (coug_pamph.pdf)

The *readme* file describes the contents of the database, plot, and .pdf files that comprise the Cougar Buttes data set. It also explains how to obtain the various files, how to extract the database files and import them into ARC/INFO, and how to plot the map. The *metadata* file provides detailed technical descriptions of the digital data. The *browse graphic* (.jpg) file contains a navigable image of the geologic map, topographic base, Correlation of Map Units, Description of Map Units, and key to point and line symbols that is viewable at the web site. The Portable Document Format *graphic* file contains a full-resolution navigable image of the geologic map, topographic base, Correlation of Map Units, Description of Map Units, and key to point and line symbols. The PostScript *plot* file generates a paper plot of the map and explanatory information. The map is similar in format to a USGS Miscellaneous Field Studies (MF) map, but has not undergone formal editing for strict conformity with technical layout guidelines. The *summary pamphlet* file provides additional descriptive information and an interpretation of the geology of the Cougar Buttes quadrangle.

Geological information

The geologic map database contains original U.S. Geological Survey data generated by detailed field observation and by interpretation of aerial photographs, including low-altitude color and black-and-white photographs and high-altitude infrared photographs. The map was created by transferring lines from the aerial photographs to a 1:24,000 topographic base via a mylar orthophoto-quadrangle or by using a PG-2 plotter. The map was then scribed, scanned, and imported into ARC/INFO, where the database was built. Within the database, geologic contacts are represented as lines (arcs), geologic units as polygons, and site-specific data as points. Polygon, arc, and point attribute tables (.pat, .aat, and .pat, respectively) uniquely identify each geologic datum and can be related to other tables (.rel) that provide more detailed geologic information.

Within the geologic map database, map units are identified by standard geologic map criteria such as formation-name, age, and lithology. The authors have attempted to adhere to the stratigraphic nomenclature of the U.S. Geological Survey and the North American Stratigraphic Code, but the database has not received a formal editorial review of geologic names. Descriptions of the geologic map units, contacts, faults, fold axes, and structural data are coded into polygon, arc, and point attribute tables (.pat, .aat, and .pat, respectively) and related data tables. Detailed information and descriptions of units also can be obtained from the Description of Map Units that accompanies the geologic map (coug.ps or coug_map.pdf) and is available as a separate file (coug_dmu.pdf), and by consulting the summary pamphlet (coug_pamph.pdf).

Until uniform National geologic map accuracy standards are developed and adopted by the U.S. Geological Survey in cooperation with various state geological agencies, the SCAMP project has developed internal map-accuracy standards for 1:24,000-scale geologic maps produced by the project. Geologic lines and points on SCAMP 1:24,000 scale geologic maps are judged to meet the map-accuracy standard if they are located to within ± 15 meters, relative to topographic or cultural features on the base map. Lines and

points that meet (or may not meet) this map-accuracy standard are identified both in the digital database and on the geologic-map plot.

Purpose

The data set for the Cougar Buttes quadrangle has been prepared by the Southern California Areal Mapping Project (SCAMP), a cooperative project sponsored jointly by the U.S. Geological Survey and the California Division of Mines and Geology, as part of an ongoing effort to utilize a Geographical Information System (GIS) format to create a regional digital geologic database for southern California. This regional database is being developed as a contribution to the National Geologic Map Database of the National Cooperative Geologic Mapping Program of the USGS. Development of the database for the Cougar Buttes quadrangle has also been supported by the Mojave Water Agency.

The digital geologic map database for the Cougar Buttes quadrangle has been created as a general-purpose data set that is applicable to other land-related investigations in the earth and biological sciences. In cooperation with the Water Resources Division of the U.S. Geological Survey, we have used our mapping in the Cougar Buttes and adjoining quadrangles together with well log data to develop a hydrogeologic framework for the basin. In an effort both to understand surficial processes and to provide a base suitable for ecosystem assessment, we have endeavored to map surficial deposits on the basis both of lithologic characteristics and geomorphic setting. This effort has led us to differentiate surficial veneers on piedmont and pediment surfaces and to distinguish the various substrates found beneath these veneers. Currently, the geological database for the Cougar Buttes quadrangle is being applied in groundwater investigations in the Lucerne Valley basin (USGS, Water Resources Division), in biological species studies of the Cushenbury Canyon area (U.S. Forest Service, San Bernardino National Forest), and in the study of soils on various Quaternary landscape surfaces on the north piedmont of the San Bernardino Mountains (University of New Mexico).

Database resolution

The 7.5' Cougar Buttes database was developed at a scale of 1:24,000 and is not suitable for site-specific geologic evaluations at scales greater than 1:24,000 (1 in = 2,000 ft). Although the scale of the database coverage can readily be changed in GIS software, any enlargement of these digital coverages exceeds the spatial resolution of the data and should not be used in lieu of a detailed site map for purposes of land-use planning or geologic evaluations. Rather, this database should be used for representing the areal geologic setting of a site and as a basis for planning additional investigations at the site-specific level. The database is sufficiently detailed to identify and characterize many actual and potential geologic hazards represented by faults and landslides, but it is not sufficiently detailed for site-specific determinations or evaluations of these features. Faults shown do not take the place of fault-rupture hazard zones designated by the California State Geologist (see Hart, 1988).

Acknowledgments

Geologic mapping, topical studies, and digital preparation for this report were sponsored jointly by the following: (1) the National Cooperative Geologic Mapping Program of the U.S. Geological Survey, (2) California Division of Mines and Geology, and (3) Mojave Water Agency.

Our representation and interpretation of the surficial geology in the Cougar Buttes quadrangle has benefited from discussions about surficial processes in general and soils in particular with Leslie D. McFadden and Martha C. Eppes. Visits to soil pits dug by Martha C. Eppes and discussion of her findings in and around the Cougar Buttes quadrangle have contributed to our understanding of age and shallow subsurface relations among various units.

Interpretation of the subsurface geology was made possible by access to water-monitoring well records provided by the Water Resources Division of the U.S. Geological Survey and by water-monitoring and water well records provided by the Mojave Water Agency and the California Department of Water Resources. Roland Hall retrieved the available records from the latter two agencies. Our interpretation of subsurface relations was enhanced by discussions with Jill N. Densmore-Judy and Peter Martin.

In our mapping in the Cougar Buttes quadrangle, we were guided in part by the findings of previously published maps: (1) 1:24,000-scale mapping of the Blackhawk landslide by Shreve (1968), (2) 1:24,000-scale mapping of the quadrangle by Sadler (1982), and (3) 1:62,500-scale mapping of the quadrangle by Dibblee (1964).

We thank Fred K. Miller for his notes and observations on plutonic rocks at various localities on Cougar Buttes, and for scribing the geologic map in preparation for scanning. We thank James Messerich of the U.S. Geological Survey's Photogrammetric Plotter Laboratory in Denver, Colorado for his assistance in transferring geologic linework and point data from aerial photographs to a scale-stable cartographic base. This database was prepared in the USGS Mineral Resource Surveys Program GIS laboratory at the Spokane Field Office in Spokane, Washington. We thank Paul C. Hyndman in Spokane and Rachel Hauser of the SCAMP GIS laboratory at the University of California, Riverside for their assistance in digital preparation of the data set.

Technical reviews by Scott C. Lundstrom and John C. Tinsley, III have led to significant improvements in the database, the plot file, and in the discussion of the geology of the Cougar Buttes quadrangle in the accompanying summary pamphlet. David Bedford has examined the digital database file for internal logical consistency, has reviewed the metadata file, and tested the viability of digital products.

DATABASE CONTENTS

The data set for the Cougar Buttes 7.5' quadrangle consists of five sets of files:

1. Database files

- ARC/INFO database files that contain the ARC map coverages and the integral INFO feature attribute tables required to generate the coverages
- Additional INFO data tables that can be related to the feature attribute tables

The database files and their contents are as follows:

<i>ARC coverage</i>	<i>Associated INFO attribute tables</i>	<i>Content</i>
coug_geo	coug_geo.aat coug_geo.pat	Contacts, faults, map units, annotated geologic unit labels (subclass anno.geo), annotated fault names (subclass anno.fault) annotated township and range in map collar (subclass anno.twn_rnge)
coug_pts	coug_pts.pat	Attitudes (azimuth and dip data), annotated dip values (subclass anno.dip)
coug_ptsorn	coug_ptsorn.pat	Fold axis symbols (line ornamentation)
coug_str	coug_str.aat	Fold axes
coug_ldr	coug_ldr.aat	Leaders for annotated unit labels
<i>Related INFO data tables</i>		<i>Content</i>
lines.rel		Line dictionary
points.rel		Point dictionary

2. Files that support the database

coug.tif	Topographic base map layer imported as raster-scanned TIF image
geoSCAMP2.lin	Lines (lineset)
geoSCAMP2.mrk	Points (pointset)
SCAMP2.shd	Colors (shadeset)
geology2.shd	Patterns (shadeset)
coug_readme.txt	Readme file

- | | |
|--------------|--|
| coug_met.txt | Metadata file (contains detailed information on structure and content of database) |
|--------------|--|
3. PostScript plot file:
- | | |
|---------|---|
| coug.ps | Geologic map and marginal explanation, including CMU, DMU, and key to map symbols |
|---------|---|
4. Portable Document Format (.pdf) files
- | <u>.pdf file</u> | <u>Contents</u> |
|------------------|---|
| coug_map.pdf | Portable document format graphic image of geologic map and marginal explanation |
| coug_pamph.pdf | Summary pamphlet |
| coug_cmu.pdf | Correlation of Map Units diagram |
| coug_dmu.pdf | Description of Map Units |
| coug_readme.pdf | Readme file |
5. Browse-graphic (.jpg) file
- | | |
|-----------------|---|
| coug_browse.jpg | Browse graphic image of geologic map and marginal explanation |
|-----------------|---|

Database files

General.— The Cougar Buttes quadrangle lies between 116° 45' and 116° 52' 30" east longitude and 34° 22' 30" and 34° 30' north latitude. The 7.5-minute quadrangle is subdivided in latitude and longitude by a 2.5-minute tic grid that is marked on the topographic map. For the digital coverages, only the four corner tics that represent the geographic extent of the quadrangle have been generated mathematically in ARC/INFO. Geologic map information entered into ARC/INFO GIS has been spatially registered using these four corner tics. Both the database and the topographic base map are represented in polyconic projection referred to the NAD27 datum. (See metadata for detailed projection information.)

The geologic map database consists of ARC/INFO coverages and INFO data tables that relate to the map features. The coverages that comprise the data set consist of feature classes that include geologic lines (arcs), areas (polygons), and points.

Geologic lines.—In a GIS database, geologic lines such as contacts, faults, and fold axes constitute strings of arcs that are recorded and defined in arc attribute tables (**coug_geo.aat** and **coug_str.aat**). (See metadata for detailed descriptions of the structure and content of arc attribute tables.) In addition to ARC/INFO-generated items, the arc attribute

tables for SCAMP geologic map databases contain the following items (fields) that contain data that generate the geologic map coverage:

<i>Item</i>	<i>Content</i>
L-TAG	Relates line segments to definitions in the data table lines.rel
L-SYMB	Line symbol related to geoSCAMP2.lin
L-AGE	Geologic age of linear feature
L-AGECON	Confidence in assignment of geologic age
L-UNIQUE	Unique attributes of the line
L-NAME	Names of faults and folds
L-SOURCE	Sources of compiled data

Version 1.0 of the Cougar Buttes geologic map and database provides data in only the L-TAG, L-SYMB, and L-NAME items.

Lines in a geologic database fall into three groups: (1) linear geologic features that form boundaries between areas (polygons) of mapped units (e.g., contacts and faults); (2) linear geologic features at transect polygons boundaries without creating additional polygons (e.g., dikes, veins, fold axial-plane traces, fissures, strandlines, dune crest lines, metamorphic isograds); and (3) cartographic elements that convey geographic or locational information (e.g., map boundary, cross-section lines, annotation leaders, boundaries of bodies of open water). These distinctions, including the geologic identities of the unit boundaries, are recorded in the L-TAG item of the arc-attribute table. L-TAG also links line types to their coded definitions and geologic explanations in the INFO data table **lines.rel**. In the Cougar Buttes geologic database, contacts and faults are defined in **coug_geo.aat**. and fold axes are defined in **coug_str.aat**.

The L-SYMB item retrieves the appropriate symbol from the geologic line set (**geoSCAMP2.lin**) to display each type of line on the map-plot. Annotation labels for named faults, derived from the item L-NAME, are stored in the annotation subclass **anno.fault** of the polygon coverage **coug_geo**.

Geologic polygons .—In a GIS geologic map database, polygons represent areas where geologic-map units crop out at the Earth’s surface (or where they intersect a reference surface defined in the subsurface). Geologic map units (polygons) are bounded by lines (e.g., geologic contacts, faults, or boundaries between zones differing in degree of alteration, grade of metamorphism, etc.).

Polygons constitute arc-enclosed areas that are recorded and defined in a polygon attribute table (**coug_geo.pat**). (See metadata for detailed descriptions of the structure and content of polygon attribute tables.) In addition to ARC/INFO-generated items, the polygon attribute table for SCAMP geologic map databases contains the following items (fields) that contain data that generate the geologic map coverage:

<i>Item</i>	<i>Content</i>
LABL	Map unit labels
P-LABL	Map-unit labels for plot files
TAG	Reference labels for subgroups of polygons that are related to data tables
NAME	Geologic names of map units
UNIQUE	Unique attributes that distinguish subclasses of polygons within a map unit
POLYCON	Confidence in map-unit assignment of polygon
THICK	Thickness of map units
SHD	Alternative map unit color scheme that can be used without losing colors assigned in SHDPS
SHDFIL	Map unit fill pattern related to geology2.shd
SHDPS	Map-unit colors for plot files SCAMP2.shd
SOURCE	Sources of compiled data

Version 1.0 of the Cougar Buttes geologic map and database provides data in only the LABL, P-LABL, TAG, NAME, SHDFIL, and SHDPS items.

For version 1.0 of the Cougar Buttes database, data has been entered for the .pat attribute items that identify map unit polygons by unit name (NAME: e.g., Young fan deposits or Monzogranite of Cougar Buttes) and unit symbol (LABL: e.g., Qyf or Kcb). Question marks have been added to the unit symbol (LABL: e.g., Qmol?) where unit assignment based on interpretation of aerial photographs is uncertain. To locate these map-unit polygons in a search of database, the question mark must be included as part of the unit symbol. For polygons where more than one unit crops out in domains that are too small to distinguish at 1:24,000, unit symbols are combined using plus (+) signs in the LABL and P-LABL items (e.g., Qyas+Qye). Annotation labels for map units, derived from the item P-LABL, are stored in the annotation subclass **anno.geo** of the polygon coverage **coug_geo**. Traditional map-margin unit descriptions are shown in the Description of Map Units on the geologic map in the portable document format graphic (**coug_map.pdf**) and on the geologic map generated from the PostScript plot file (**coug.ps**). For a text list of map unit symbols and unit names, refer to the .pdf file of the DMU (**coug_dmu.pdf**).

SCAMP geologic maps can be further encoded with detailed geologic information about map units. All polygons of a given unit share the set of diagnostic descriptive characteristics (linked to the symbol field LABL) that define the unit. Additional descriptors that apply to some exposures (polygons) of a given unit, but not to all polygons, are identified in a separate database field (TAG). In this field, upper-case letters are appended to the unit symbol for a given polygon (e.g., KcbB, KcbC, etc.) to link it to various distinguishing characteristics. The qualifier "A" (e.g., KcbA) is reserved for those polygons that exhibit no characteristics that distinguish them from the shared set for the unit. Detailed encoding of polygons is not available in version 1.0 of the Cougar Buttes database and all units are given the "A" qualifier.

Geologic points.—In a GIS coverage, points are recorded as coordinate pairs and are defined in point attribute tables (.pat). (See metadata for detailed descriptions of the structure and content of point attribute tables.) In addition to ARC/INFO-generated items, the point attribute tables for SCAMP geologic map databases contain the following items (fields) that contain data that generate the geologic map coverage:

<u>Item</u>	<u>Content</u>
P-STRIKE	Azimuth of structural feature at a point
P-DIP	Dip of structural feature at a point
P-DIPDIR	Azimuthal irection of dip and plunge
P-PLUNGE	Plunge of structural feature at a point
P-TAG	Relates points to definitions in the data table points.rel
P-SYMB	Point symbol related to geoSCAMP2.mrk
P-AGE	Geologic age of point feature
P-AGECON	Confidence in assignment of geologic age
P-UNIQUE	Unique attributes of the point
P-SOURCE	Sources of compiled data

Version 1.0 of the Cougar Buttes geologic map and database provides data in the P-STRIKE, P-DIP, P-DIPDIR, P-PLUNGE, P-TAG and P-SYMB items.

Points in the geologic database constitute three groups: (1) quantitative data about the spatial orientation of planar features (e.g., bedding, foliation, cleavage, faults, and fold-axial planes), recorded as azimuth of a horizontal line in the plane (strike), inclination of the plane (dip), and azimuth of the direction of dip; and (2) quantitative data about the spatial orientation of linear features (e.g., fold-axes, stretched pebbles, slickensides, alignment of elongate minerals, trains of crushed minerals, paleocurrent direction), recorded as azimuth of the horizontal trend of the linear feature in the direction in which it plunges (strike) and inclination of the linear feature (plunge); and (3) descriptive information about location (e.g., stations, well sites, etc.) or map ornamentation symbols (e.g., fold-axis and fault symbols).

In the Cougar Buttes geologic database, measurements of spatial orientation of structural features are defined in **coug_pts.pat**. and ornamentation symbols for fold axes are defined in **coug_pts.orn**. P-TAG links point types to their coded definitions and geologic explanations in the INFO data table **points.rel**. The P-SYMB item retrieves the appropriate symbol from the geologic marker set (**geoSCAMP2.mrk**) to display each type of point on the map-plot. Annotation labels for dips of structural attitudes are stored in the annotation subclass **anno.dip** of the point coverage **coug_pts**. Annotation labels for map-margin township and range marks are stored in the annotation subclass **anno.twn_rnge** of the point coverage **coug_geo**.

Raster files

The database files are accompanied by a georeferenced raster file in GEOTIFF format (**coug.tif**) that contains a topographic base (monochromatic) from a 500-dpi scan of USGS Cougar Buttes 7.5' quadrangle, 1971.

Plot files

The file **coug.ps** is a PostScript plot file of the geologic map and its explanation. The PostScript file will plot a 1:24,000-scale, full-color geologic map of the Cougar Buttes quadrangle on its topographic base, including Correlation of Map Units diagram, Description of Map Units, and a key to line and point symbols. The plot is in a format similar to the U.S. Geological Survey's Miscellaneous Investigations (MF) map series, and is approximately 36 x 48 inches in size. It has been plotted successfully on Hewlett-Packard large-format plotters, models HP650C, HP755CM, and HP2500C.

The plot files have been prepared using line- and point-symbols, unit colors and patterns, and specialized geologic-age fonts located in the following marker, shade, and font sets:

geoSCAMP2.lin	Lines
geoSCAMP2.mrk	Points
SCAMP2.shd	Colors
geology2.shd	Patterns

These sets are included in the **coug.tar.gz** data package and are available at the Southern California Areal Mapping Project (SCAMP) web site (<http://geology.wr.usgs.gov/wgmt/scamp/attrib/attribute.html>). In addition, the plot files contain fonts of the Stratagem font group, version 1.4, which are not currently available as part of the data package.

PDF files

The following Portable Document Format (.pdf) files are available to assist in using the Cougar Buttes geologic-map database:

coug_readme.pdf	This document
coug_dmu.pdf	Description of Map Units
coug_cmu.pdf	Correlation of Map Units
coug_pamph.pdf	Summary pamphlet
coug_map.pdf	Navigable graphic of Cougar Buttes geologic map and explanation

The navigable graphic allows the user to examine a digital image of the Cougar Buttes geologic map and its legend at full resolution, but does not contain the database.

HOW TO OBTAIN AND ACCESS THE DATABASE

How to obtain the digital files

The complete data set for the Cougar Buttes 7.5' quadrangle (as described in the previous section) is contained in three groups of files stored on the USGS Western Region Geologic Information server:

<u>File name</u>	<u>Contents</u>
<i>1. Database files:</i>	
coug.tar.gz	Compressed tar file (2.0 MB) of database files coug.tar file contains: ARC/INFO interchange/export files (.e00) coug.tif coug_readme.txt coug_met.txt
<i>2. PostScript plot file:</i>	
coug.ps.gz	Compressed plot-file (5.1 MB) of the geologic map
<i>3. Portable Document Format and text files:</i>	
coug_map.pdf	Navigable graphic file (4.8 MB)
coug_pamph.pdf	Summary pamphlet
coug_cmu.pdf	Correlation of Map Units diagram
coug_dmu.pdf	Description of Map Units
coug_readme.pdf	Readme file

The files for the Cougar Buttes geologic map and database are available on the USGS Western Region Geologic Publication Server (<http://geopubs.wr.usgs.gov/>) where digital publications for the Western Region are stored. The Cougar Buttes geologic map and database can be obtained directly by either of the following paths:

- via the Web at <http://geopubs.wr.usgs.gov/open-file/of00-175>
This site stores USGS Open-File Reports that contain digital geologic maps of the Western Region
- by anonymous ftp from geopubs.wr.usgs.gov
The database files are located in the directory **/pub/open-file/of00-175**. To retrieve the files by ftp, follow these instructions:

<u>At UNIX prompt</u>	<u>Enter</u>	<u>To</u>
ftp	geopubs.wr.usgs.gov	- open ftp connection
user name	anonymous	to USGS server
password	your user name or email address	

geopubs command prompt	cd pub/open-file/of00-175	- change to directory that contains open-file
geopubs command prompt	binary	- change data transfer mode (text mode does not work for tar or compressed files)
geopubs command prompt	mget coug*	- copy all Cougar Buttes files to your directory
	get <file name>	- copy individual files
geopubs command prompt	quit	- close ftp connection

The Cougar Buttes geologic map and database can also be accessed through links to the Western Region Geologic Publication Server by any of the following paths:

- via the Web at <http://geology.usgs.gov/wgmt/scamp/scamp.html>
This site provides links to SCAMP-related digital geologic mapping in southern California. The site lists new releases by year and title
- via the Web at <http://geology.usgs.gov/open-file/maps.html>
This site provides links to all digital USGS Open-File Reports that contain digital map databases. The site lists the OFRs by number along with the title and author(s) of the report
- via the Web at <http://geo-nsdi.er.usgs.gov/cgi-bin/publication?open-file>
This site provides links to all digital USGS Open-File Report maps via their metadata files. The site lists the OFRs by number along with the title and of the report (see section below entitled “How to obtain metadata”)

How to access the geologic map database

How the digital files are packaged.—The Cougar Buttes database has undergone three steps to make it available for access on the server. First, the geologic-map database files have been exported from ARC/INFO as interchange/export (.e00) files and, second, bundled into a UNIX tar (tape archive) file named **coug.tar** (7.9 MB). The tar file contains eleven ARC/INFO interchange/export files that contain the database coverages and related tables. Third, the tar file **coug.tar** has been compressed using the utility Gzip to make the file **coug.tar.gz** (2.0 MB).

Extracting the database files from the tar file.—After the files are downloaded, they must be uncompressed and unbundled from the tar file. Tar and uncompress utilities are

included in most UNIX systems. Utilities also are available free of charge via Gnu Software's web page (<http://www.gnu.org/order/ftp.html>) or Internet Literacy's Common Internet File Formats web page (<http://www.matisse.net/files/formats.html>)—the latter web site has not been updated since December 1995 and is no longer maintained. For software that enables the user to uncompress and extract the database files on a Windows or Macintosh computer, go to the U.S. Geological Central Region server (<http://greenwood.cr.usgs.gov/maps/software.html>) or WinZip (<http://www.winzip.com>).

Cougar Buttes files that have a **.gz** file extension were compressed using Gnu zip (gzip) (<http://www.gzip.org>) and must be uncompressed using gzip on a UNIX computer (or a gzip utility on a Windows or Macintosh computer). After they are uncompressed, individual data files must be unbundled from **coug.tar** using a tar utility. On a UNIX platform, follow these instructions for extracting database files from the compressed tape archive file:

<u>Unix command prompt, enter</u> gzip -d coug.tar.gz (or use gzip utility of choice)	<u>To</u> Uncompress the tape archive file coug.tar (7.9 MB)
cd <local_directory>	Go to the local_directory that will hold the Cougar Buttes directory (if different from local_directory you are in)
tar-xvbv {path to tar file}/coug.tar (or use tar utility of choice)	Extract the Cougar Buttes directory from the tar file

This process creates a workspace (e.g., “coug/”) that at this stage contains the following items:

1. the ARC/INFO interchange files (**coug*.e00**) from which the Cougar Buttes geologic map and database will be extracted
2. INFO interchange files (**lines.rel, points.rel**) with line and point dictionaries
3. text files (**coug*.txt**) that contain this readme

Converting the ARC/INFO interchange/export files.—The ARC interchange/export (.e00) files are converted to ARC coverages and INFO tables using the ARC command IMPORT.

1. Change directories to the “coug/” directory
2. At the UNIX command prompt, launch ARC/INFO by typing “arc”
3. From the ARC command line type:
import <option> <interchange_file> <output>
(e.g., import auto coug _geo coug _geo; repeat for each .e00 file)

Consult the ARC/INFO command references manual in ESRI's software documentation for other <option> choices appropriate for importing the seven ARC/INFO coverage .e00 files and the two INFO table .e00 files.

After importing the Cougar Buttes interchange (.e00) files into ARC/INFO, the Cougar Buttes ARC workspace ("coug/" directory) contains an info/ directory, and coverages and appears as follows:

```
coug/  
  info/  
    coug_geo/  
    coug_pts/  
    coug_ptsorn/  
    coug_str/  
    coug_ldr/  
    coug.tif  
    coug_readme.txt  
    geoSCAMP2.lin  
    geoSCAMP2.mrk  
    SCAMP2.shd  
    geology2.shd
```

Importing the lineset, markersets, and shadeset files by this process makes them available to ARC/INFO in the local "coug/" workspace. They can also be installed with the native ARC/INFO symbol sets for system-wide availability.

ARC/INFO interchange files can be read by some other Geographic Information Systems, including ArcView (ESRI) and MapInfo (<http://www.mapinfo.com>) via ArcLink. Please consult your GIS documentation to see if your system recognizes ARC interchange files and follow the procedure to import them. (NOTE: the graphical symbols contained in the two symbol-sets "geoSCAMP2.lin" and "geoSCAMP2.mrk," referenced by the field **L-SYMB** in **coug_geo.aat** and **coug_str.aat** and the field P-SYMB in **coug_pts.pat**, and **coug_ptsorn.pat**, cannot be read in ArcView.)

How to access the PostScript plot file

The file **coug.ps.gz** (5.1 MB) is a gzip-compressed UNIX file that contains a PostScript plot file (**coug.ps**) of the geologic map and its explanation. To uncompress **coug.ps.gz** to **coug.ps** (26 MB) on a UNIX platform, at UNIX prompt type `gzip -d coug.ps.gz` (or use gzip utility of choice).

How to access the Portable Document Format (.pdf) files

The .pdf files are not compressed. They are accessed using Adobe Acrobat Reader software, available free of charge from the Adobe web site (<http://www.adobe.com>).

How to obtain metadata

Metadata for the Cougar Buttes geologic map database are available as part of the National Spatial Data Infrastructure via the Web through the U.S. Geological Survey Node of the National Geospatial Data Clearinghouse (<http://nsdi.usgs.gov/>). Within this site, Open-File Reports are located at

<http://geo-nsdi.er.usgs.gov/cgi-bin/publication?open-file>

where they are listed by OFR number along with the title. Because a text version of the metadata is difficult to read in comparison to the elegant and user-friendly compiled version available at this web site, we have not included one in the database package.

LIST OF URL_s CITED

U.S. Geological Survey database web sites

Southern California Areal Mapping Project (SCAMP) web site

GIS attributes: <http://geology.wr.usgs.gov/wgmt/scamp/attrib/attribute.html>

Databases: <http://wrgis.wr.usgs.gov/wgmt/scamp/scamp.html>

Western Region Geologic Publication Server

Open-File Reports:

<http://geopubs.wr.usgs.gov/open-file/of00-> (followed by the OFR number)

Miscellaneous Field Studies Maps:

<http://geopubs.wr.usgs.gov/map-mf/mf> (followed by the OFR number)

All Western Region USGS publications

<http://geopubs.wr.usgs.gov>

U.S. Geological Survey web site (<http://geology.usgs.gov>)

Open-File Reports

Digital maps: <http://geology.usgs.gov/open-file/maps.html>

Metadata: <http://geo-nsdi.er.usgs.gov/cgi-bin/publication?open-file>

Metadata (USGS Node of the National Geospatial Data Clearinghouse)

<http://nsdi.usgs.gov/>

Software web sites

GIS systems

Environmental Systems Research Institute (ESRI): <http://www.esri.com>

MapInfo: <http://www.mapinfo.com>

Compression and tar software

For UNIX computers

Common Internet File Formats web page:

<http://www.matisse.net/files/formats.html>

(Note: this web site has not been updated since December 1995)

Gnu tar and zip software: <http://www.gnu.org/order/ftp.html>

Gnu zip (gzip): <http://www.gzip.org>

For Windows or Macintosh computers

WinZip: <http://www.winzip.com>

U.S. Geological Central Region server

<http://greenwood.cr.usgs.gov/maps/software.html>

Portable document reader

Adobe web site: <http://www.adobe.com>

Software for uncompressing and extracting databases on a Windows or Macintosh computer

U.S. Geological Central Region server

<http://greenwood.cr.usgs.gov/maps/software.html>

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