



Mining Claim Activity on Federal Land for the Period 1976 through 2003

By J. Douglas Causey

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Contents

Conventions.....	2
Summary	3
Introduction.....	3
Acknowledgements.....	4
Overview of Data Files.....	4
Data Sources and Processing	9
Data Sources	9
Mine Claim Data.....	9
Spatial Data	11
Processing Procedures.....	11
Mine Claim Data.....	11
Public Land Surveys.....	12
Statistical Data Discussion	14
GIS Documentation	19
User procedures	19
Obtaining Digital Data	22
References Cited	22
Appendix A – Table Design SQL (Structured Query Language).....	23
Appendix B – Access 2000 Table Design.....	25

Conventions

Database table names are in small caps; for example CASE_TBL.

Database field names are in italics; for example *mtrs*.

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Summary

Previous reports on mining claim records (Campbell, 1996, Campbell and Hyndman, 1996, Hyndman, 1999) provided information and statistics (number of claims) using data from the U.S. Bureau of Land Management's (BLM) Mining Claim Recordation System. Since that time, BLM converted their mining claim data to the Legacy Repost 2000 system (LR2000).

This report describes a process to extract similar statistical data about mining claims from LR2000 data using different software and procedures than were used in the earlier work. A major difference between this process and the previous work is that every section that has a mining claim record is assigned a value. This is done by proportioning a claim between each section in which it is recorded. Also, the mining claim data in this report includes all BLM records, not just the western states.

LR2000 mining claim database tables for the United States were provided by BLM in text format and imported into a Microsoft® Access2000 database in January, 2004. Data from two tables in the BLM LR2000 database were summarized through a series of database queries to determine a number that represents active mining claims in each Public Land Survey (PLS) section for each of the years from 1976 to 2002

For most of the area, spatial databases are also provided. The spatial databases are only configured to work with the statistics provided in the non-spatial data files. They are suitable for geographic information system (GIS)-based regional assessments at a scale of 1:100,000 or smaller (that is, 1:250,000).

Introduction

The U.S. Bureau of Mines (USBM) initiated a process of examining exploration activity on Federal Lands using the U.S. Bureau of Land Management (BLM) mining claim recordation system. After the closure of the USBM in 1995, that activity was continued by the U.S. Geological Survey. Campbell (1996) described the procedure used to process the data using ESRI® ArcInfo and dBASE® software. Results current to 1996 were published for Washington, Idaho, and Oregon by Campbell and Hyndman (1996) and an update of those states plus Arizona, California, Colorado, Montana, Nebraska, New Mexico, Nevada, South Dakota, Utah, and Wyoming was published by Hyndman (1999).

Demand for information about mining claim activity by Federal Land Managing agencies, along with computer hardware and software improvements has spurred the development of a system that will allow regular updates of mining claim statistics in a timely manner. This report describes a new system to accomplish that task.

BLM records four types of location notices in their database: lode claim, placer claim, tunnel site, and mill site. Almost 85% of the notices are for lode claims, and about 12.8% are for placer claims. Mill sites make up less than 2.2% of the locations notices, and about 0.06% are tunnel sites. Throughout this report all these notices are referred to as claims.

One of the main uses of the data is in spatial analysis. In order to provide the user with appropriate spatial data, a search for public domain PLS spatial databases was included in this project. BLM's effort to create high quality PLS spatial databases is far from completion. Many other Public Domain spatial databases are incomplete or contain numerous errors. Although most of the claims in South Dakota are in the western part of the state, the only publicly available PLS spatial data covers the eastern half of the state.

Public spatial databases are provided for most states in which mining claims have been recorded. The exceptions are South Dakota, which did not have spatial data for the area containing claims; and North Dakota, which only has two claims. The PLS sections, except in the Dakotas, in which at least part of a mining claim was listed as being active by BLM in 2003 are shown in figure 1.

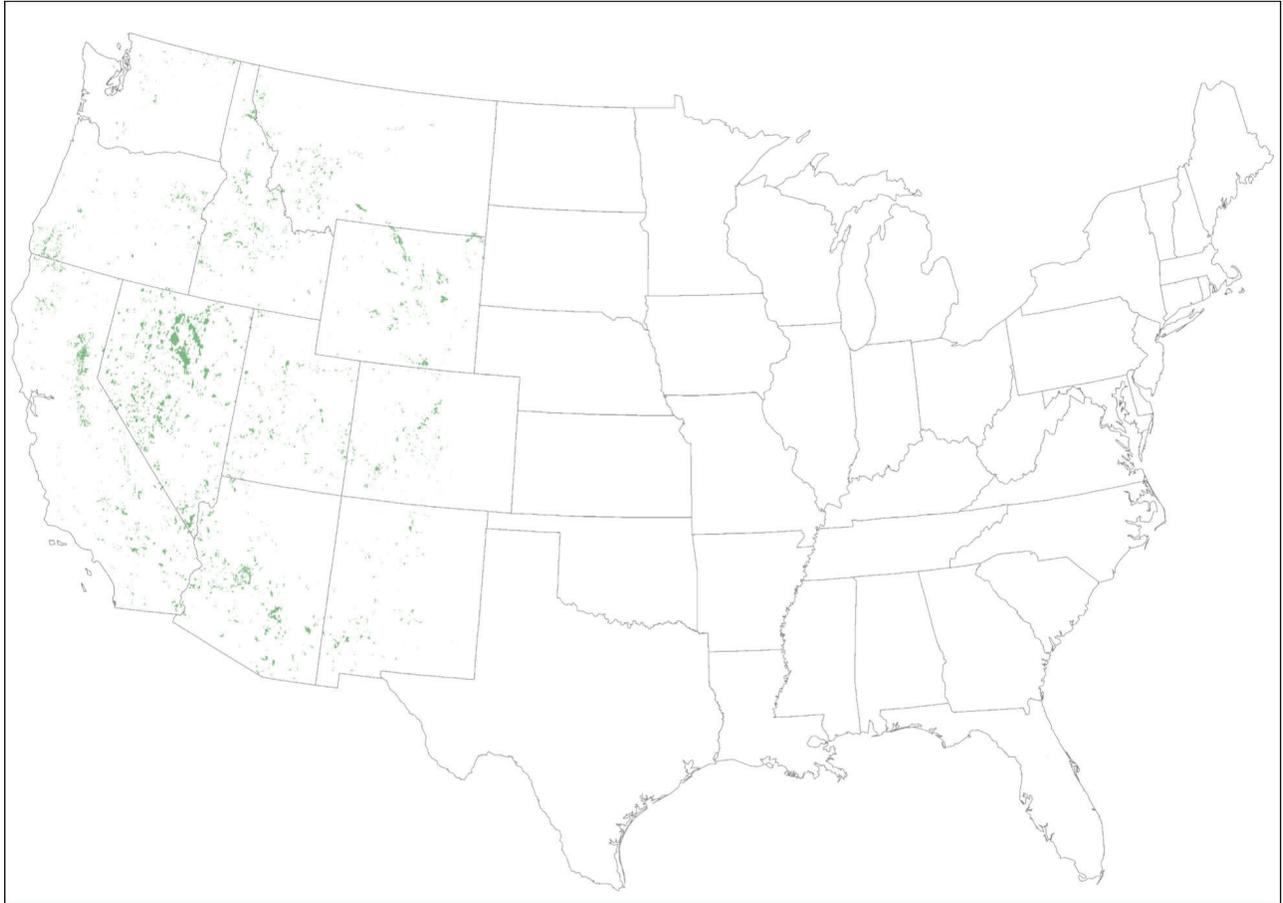


Figure 1. Public Land Survey sections (green colored) in which there was a mining claim in 2003.

Acknowledgements

I would like to thank Cheryl Laudenbach and Leslie Cone, BLM for providing the LR2000 data. I also thank Dave Frank and Gary Raines for their technical review of the report.

Overview of Data Files

The data for mining claim activity are provided in several files organized by state that are listed and briefly described in table 1. The dBASE (.dbf) and ASCII (.txt) files provide two versions of the same statistical summary data in a proprietary and non-proprietary format, respectively.

The summary non-spatial data files include:

- number of all claims (sum of lode, placer, tunnel site, and mill site) in each section, by year (for example, files az_claim.dbf, az_claim.txt),
- number of lode claims in each section, by year (for example, files az_lode.dbf, az_lode.txt),

- number of placer claims in each section, by year (for example, files az_placr.dbf, az_placr.txt), and
- total number of claims in each section by status (active or closed) at end of 2003 and type (lode, placer, mill site, tunnel site) (for example, files az_total.dbf, az_total.txt).

While the data was processed using Access, neither the original data nor the Access databases used for this analysis are supplied with this report. There are two practical reasons to not include the source data. First, the data is time stamped. It is a snapshot of the BLM LR2000 database that is only valid for January, 15, 2004 when it was extracted. Another extraction of data will produce different statistics. Second, the data is massive. The files provided by BLM exceeded 700 MB (megabytes), compressed. The Access databases created from this data total 4 gigabytes (GB) in size, the largest, Nevada, being 1.2 GB. These Access databases will only compress to about 530 MB.

State spatial databases provide PLS section polygons to which a user can attach data from the summary tables. The spatial databases are in shapefile format. FGDC-compliant¹ metadata provides information about the spatial databases and includes information about data sources, data quality, projection, and how to obtain the data on the World Wide Web, in addition to providing a data dictionary (metadata) for the information in the database tables. All spatial databases contain metadata that can be read in ESRI's ArcCatalog module².

Table 1. List of digital files provided in this data release.

File Name	File Description
Spatial Databases	
Shapefile filenames are listed as they are displayed and viewed in ArcCatalog (for example, az_pls_03.shp) ESRI shapefiles consist of a collection of files with the extensions dbf, mtrs.atx, prj, sbn, shp, shp.xml, and shx. ArcCatalog only displays the shp extension (and hides all the others) in a directory listing, whereas the operating system directory listings will show the complete collection of files.	
az_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Arizona (ESRI shapefile format)
ar_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Arkansas (ESRI shapefile format)
ca_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in California (ESRI shapefile format)
co_pls_03.shp	Public Land Survey System section in which mining claims have been recorded with BLM in Colorado (ESRI shapefile format)
fl_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Florida (ESRI shapefile format)
id_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Idaho (ESRI shapefile format)
mt_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Montana (ESRI shapefile format)
ne_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Nebraska (ESRI shapefile format)
nm_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in New Mexico (ESRI shapefile format)
nv_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Nevada (ESRI shapefile format)
or_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Oregon (ESRI shapefile format)
ut_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Utah (ESRI shapefile format)
wa_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Washington (ESRI shapefile format)

¹ Federal Geographic Data Committee (<http://www.fgdc.gov>)

² ArcGIS, version 8 (<http://www.esri.com>)

File Name	File Description
wy_pls_03.shp	Public Land Survey System sections in which mining claims have been recorded with BLM in Wyoming (ESRI shapefile format)
Metadata	
State-specific metadata files are provided in two different file formats: embedded shapefile format (.shp.xml filename extension) and HTML format (.htm filename extension).	
Metadata.txt	General description of information in the spatial mining claim databases (shapefiles) in a parseable ASCII text format. (Information specific to each state's spatial data base is provided in separate metadata files for each state.)
az_pls_03.shp.xml, az_pls_03.htm	Description of information specific to the Arizona spatial database (az_pls_03.shp).
az_claims.pdf	Graphic image, created in ArcGIS, showing sections in Arizona where claims have been active between 1976 and 2003.
ar_pls_03.shp.xml, ar_pls_03.htm	Description of information specific to the Arkansas spatial database (az_pls_03.shp).
ar_claims.pdf	Graphic image, created in ArcGIS, showing sections in Arkansas where claims have been active between 1976 and 2003.
ca_pls_03.shp.xml, ca_pls_03.htm	Description of information specific to the California spatial database (az_pls_03.shp).
ca_claims.pdf	Graphic image, created in ArcGIS, showing sections in California where claims have been active between 1976 and 2003.
co_pls_03.shp.xml, co_pls_03.htm	Description of information specific to the Colorado spatial database (az_pls_03.shp).
co_claims.pdf	Graphic image, created in ArcGIS, showing sections in Colorado where claims have been active between 1976 and 2003.
fl_pls_03.shp.xml, fl_pls_03.htm	Description of information specific to the Florida spatial database (az_pls_03.shp).
fl_claims.pdf	Graphic image, created in ArcGIS, showing sections in Florida where claims have been active between 1976 and 2003.
id_pls_03.shp.xml, id_pls_03.htm	Description of information specific to the Idaho spatial database (az_pls_03.shp).
id_claims.pdf	Graphic image, created in ArcGIS, showing sections in Idaho where claims have been active between 1976 and 2003.
mt_pls_03.shp.xml, mt_pls_03.htm	Description of information specific to the Montana spatial database (az_pls_03.shp).
mt_claims.pdf	Graphic image, created in ArcGIS, showing sections in Montana where claims have been active between 1976 and 2003.
ne_pls_03.shp.xml, ne_pls_03.htm	Description of information specific to the Nebraska spatial database (az_pls_03.shp).
ne_claims.pdf	Graphic image, created in ArcGIS, showing sections in Nebraska where claims have been active between 1976 and 2003.
nm_pls_03.shp.xml, nm_pls_03.htm	Description of information specific to the New Mexico spatial database (az_pls_03.shp).
nm_claims.pdf	Graphic image, created in ArcGIS, showing sections in New Mexico where claims have been active between 1976 and 2003.
nv_pls_03.shp.xml, nv_pls_03.htm	Description of information specific to the Nevada spatial database (az_pls_03.shp).
nv_claims.pdf	Graphic image, created in ArcGIS, showing sections in Nevada where claims have been active between 1976 and 2003.
or_pls_03.shp.xml, or_pls_03.htm	Description of information specific to the Oregon spatial database (az_pls_03.shp).
or_claims.pdf	Graphic image, created in ArcGIS, showing sections in Oregon where claims have been active between 1976 and 2003.
ut_pls_03.shp.xml, ut_pls_03.htm	Description of information specific to the Utah spatial database (az_pls_03.shp).
ut_claims.pdf	Graphic image, created in ArcGIS, showing sections in Utah where claims have been active between 1976 and 2003.

File Name	File Description
wa_pls_03.shp.xml, wa_pls_03.htm	Description of information specific to the Washington spatial database (az_pls_03.shp).
wa_claims.pdf	Graphic image, created in ArcGIS, showing sections in Washington where claims have been active between 1976 and 2003.
wy_pls_03.shp.xml, wy_pls_03.htm	Description of information specific to the Wyoming spatial database (az_pls_03.shp).
wy_claims.pdf	Graphic image, created in ArcGIS, showing sections in Wyoming where claims have been active between 1976 and 2003.
Non-Spatial Data Files	
Each database is provided in two different file formats: dBASE format (.dbf file name extension) and ASCII text format (.txt file name extension).	
az_claim.dbf, az_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Arizona, 1976-2003.
az_lode.dbf, az_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Arizona, 1976-2003.
az_placr.dbf, az_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Arizona, 1976-2003.
az_total.dbf, az_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, mill site, tunnel site), and claims status (Active or Closed) at end of 2003 for Arizona.
ar_claim.dbf, ar_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Arkansas, 1976-2003.
ar_lode.dbf, ar_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Arkansas, 1976-2003.
ar_placr.dbf, ar_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Arkansas, 1976-2003.
ar_total.dbf, ar_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, mill site, tunnel site), and claims status (Active or Closed) at end of 2003 for Arkansas.
ca_claim.dbf, ca_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for California, 1976-2003.
ca_lode.dbf, ca_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for California, 1976-2003.
ca_placr.dbf, ca_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for California, 1976-2003.
ca_total.dbf, ca_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for California.
co_claim.dbf, co_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Colorado, 1976-2003.
co_lode.dbf, co_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Colorado, 1976-2003.
co_placr.dbf, co_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Colorado, 1976-2003.
co_total.dbf, co_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Colorado.
fl_claim.dbf, fl_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Florida, 1976-2003.
fl_lode.dbf, fl_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Florida, 1976-2003.
fl_placr.dbf, fl_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Florida, 1976-2003.

File Name	File Description
fl_total.dbf, fl_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Florida.
id_claim.dbf, id_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Idaho, 1976-2003.
id_lode.dbf, id_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Idaho, 1976-2003.
id_placr.dbf, id_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Idaho, 1976-2003.
id_total.dbf, id_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Idaho.
mt_claim.dbf, mt_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Montana, 1976-2003.
mt_lode.dbf, mt_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Montana, 1976-2003.
mt_placr.dbf, mt_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Montana, 1976-2003.
mt_total.dbf, mt_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Montana.
ne_claim.dbf, ne_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Nebraska, 1976-2003.
ne_lode.dbf, ne_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Nebraska, 1976-2003.
ne_placr.dbf, ne_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Nebraska, 1976-2003.
ne_total.dbf, ne_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Nebraska.
nm_claim.dbf, nm_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for New Mexico, 1976-2003.
nm_lode.dbf, nm_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for New Mexico, 1976-2003.
nm_placr.dbf, nm_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for New Mexico, 1976-2003.
nm_total.dbf, nm_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for New Mexico.
nv_claim.dbf, nv_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Nevada, 1976-2003.
nv_lode.dbf, nv_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Nevada, 1976-2003.
nv_placr.dbf, nv_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Nevada, 1976-2003.
nv_total.dbf, nv_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Nevada.
or_claim.dbf, or_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Oregon, 1976-2003.
or_lode.dbf, or_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Oregon, 1976-2003.

File Name	File Description
or_placr.dbf, or_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Oregon, 1976-2003.
or_total.dbf, or_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Oregon.
ut_claim.dbf, ut_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Utah, 1976-2003.
ut_lode.dbf, ut_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Utah, 1976-2003.
ut_placr.dbf, ut_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Utah, 1976-2003.
ut_total.dbf, ut_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Utah.
wa_claim.dbf, wa_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Washington, 1976-2003.
wa_lode.dbf, wa_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Washington, 1976-2003.
wa_placr.dbf, wa_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Washington, 1976-2003.
wa_total.dbf, wa_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Washington.
wy_claim.dbf, wy_claim.txt	Database of mining claim intensity: total for all claim types (lode, placer, tunnel site, and mill site), by PLS section and year for Wyoming, 1976-2003.
wy_lode.dbf, wy_lode.txt	Database of mining claim intensity totaled for lode claims, by PLS section and year for Wyoming, 1976-2003.
wy_placr.dbf, wy_placr.txt	Database of mining claim intensity totaled for placer claims, by PLS section and year for Wyoming, 1976-2003.
wy_total.dbf, wy_total.txt	Database of all mining claims for the period 1976-2003; by PLS section, claim type (lode, placer, tunnel site, and mill site), and claims status (Active or Closed) at end of 2003 for Wyoming.

Data Sources and Processing

Data Sources

There are two kinds of data provided with this report – statistics derived from BLM mining claim records in two formats (dBASE III and ASCII), and spatial databases of Public Land Surveys in shapefile format obtained from a variety of sources. The BLM data contains records of mining claims located on Federal Lands in the United States between 1976 and 2003.

Mine Claim Data

Mining claim data was extracted from the BLM's LR2000 Oracle® database for the United States on January 15, 2004. One set of files was extracted for each of BLM's 11 administrative areas (Arizona, California, Colorado, Eastern States, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, and Wyoming). These administrative areas include 16 states in which mining claims have been recorded (Arizona, Arkansas, California, Colorado, Florida, Idaho, Montana, Nebraska, New Mexico, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming). Arkansas and Florida data are included in the Eastern States administrative area, Nebraska in the Wyoming administrative area, North and South Dakota in the Montana administrative area, and Washington in the Oregon administrative area.

Data from 15 tables³ was extracted by BLM in ASCII format with | (pipe) delimiters between fields. The SQL (Structured Query Language) statements BLM used to create the tables from which the mining claim data were extracted are included in Appendix A.

At the time the data was extracted from LR2000, there were 3,102,428 claim records in the database. The number of records for each state is shown in table 2. The numbers for each state may not be entirely correct because there are errors in the LR2000 data *geo_state* field, from which most of these statistics were extracted. A correction to the determination of number of sections with claims in Wyoming and Nebraska was made. The *geo_state* field in the LR2000 data for Wyoming listed only 18 records in Nebraska. In fact, fifty-eight PLS locations (using *mtrs* field) are in Nebraska.

Table 2. Number of mining claim records in LR2000 database January 15, 2004 for each state.

State	Number of claim records in LR2000
Arizona	358,438
Arkansas	11,571
California	280,494
Colorado	251,486
Florida	439
Idaho	184,673
Montana	167,213
Nebraska	788
Nevada	852,463
New Mexico	168,678
North Dakota	2
Oregon	104,946
South Dakota	40,730
Utah	369,430
Washington	52,581
Wyoming	258,506
U.S. TOTAL	3,102,438

There are 28 mining claim records that do not have a location within the BLM data. These are an insignificant part of the total claim record. The number of claims for each BLM administrative area that do not have a PLS location are shown in table 3. (This is shown by administrative area because some of the claims are in administrative areas that include multiple states and do not have any information on which state the claim is in.)

³ Tables included: action, case_adm_agency, case_county, case_cust_sum, case_dist_ra, case_land, case_status, case_tbl, customer, decode, decode_master, legal_land_desc, status_support, remarks, and usr_commod.

Table 3. Claim records in LR2000 database CASE_TBL table on January 15, 2004 that do not have a location record in the CASE_LAND table.

BLM Administrative Area	Number of claims in LR2000 without a location
Arizona	5
California	2
Colorado	8
Eastern States	1
Idaho	0
Montana	2
Nevada	5
New Mexico	1
Oregon	1
Utah	1
Wyoming	2
TOTAL	28

North Dakota only has two placer claims, both active for one year only (1997). They were located in Township 139 North, Range 102 West, Section 10. These are not included in the statistical data.

Spatial Data

PLS data in a usable format do not exist in the Public Domain for the entire area covered by the LR2000 data. However, spatial datasets were obtained from a variety of sources for most of the area, although the Colorado PLS used in this project is not Public Domain. For this reason, all identifying information was stripped out of the spatial data supplied with this report and all polygons that do not have claims were deleted. The source of the individual PLS datasets is described in the associated metadata for that PLS.

Processing Procedures

Mine Claim Data

Microsoft® Access2000 was used for this project because it is the desktop database software supplied to USGS employees. Data provided by BLM were processed by BLM administrative state to create 11 relational databases.

The procedure used to convert BLM LR2000 data to an Access database and extract statistical information was:

1. Open the compressed file obtained from BLM and extract the individual files containing the data for their respective tables⁴.
2. Rename the files to a Windows-based 3-digit extension filename such as the following (where xx is a 2 digit state identifier)⁵:
 - a. xx.case_land.load to xx_case_land.txt
 - b. xx.case_tbl.load to xx_case_tbl.txt
3. In Access, create tables and fields with the same names and data structure as used in LR2000. See Appendix B for table names, field names, and structure used in this project.

⁴ The files provided by BLM are in a Unix tar compress format. BLM uses a custom query to extract data from LR2000 that provides data from 12 tables, one file for each table. Only the two files listed here (a. and b.) are used in this analysis.

⁵ The files must be renamed because the Access import wizard only recognizes files based on specific 3-digit extensions.

Always check the SQL document⁶ provided by BLM for the latest version of the data structure. I have noticed changes in the number of fields, field names, and sizes of fields over the last few years.

4. In Access, import (File/Get external data/Import) the BLM data to the blank tables created in step 3.
5. Create statistics from the raw data. This process involves running a series of queries to extract the relevant information. This can be done entirely with Access2000 built-in functions so no programming is required. Two types of queries were used to process the raw LR2000 data for use in this study. The first set of queries, called “action queries”, created a new table (MTRS_UNIQUE) and added data to four special fields in CASE_TBL table. The second type of query is a select query used to extract specific summary information from the data. The processing used after creation of the new databases with the structure of CASE_TBL shown in table B-1 was:
 - a. Update *location_yr* with the first four numbers from the *mc_loc_dt* field in CASE_TBL.
 - b. Update *disposal_yr* with data from two fields. When value in *last_assess_yr* = 0000, use the first four numbers in the *disp_dt* field. Otherwise, update *disposal_yr* field with data from *last_assess_yr* field in CASE_TBL.
 - c. Query CASE_LAND table for a count of the number of sections in which a claim is registered and divide that number into one. Save the results in two fields, *no_sec* (count of number of sections) and *fraction* (fractional value) in CASE_TBL.
 - d. Create a table of unique *mtrs* values (called MTRS_UNIQUE). (Most of the statistical queries are linked to this table.)
 - e. Next determine the number of active mining claims in each section for a particular year. Check first that a claim was active by comparing the location year (*location_yr*) and abandonment year (*disposal_yr*). Then sum the *fraction* field values for all claims within each section.
 - f. Combine the yearly queries into a summary query for the years 1976 to 2003.
 - g. Export the result of this summary query to dBASE III and ASCII format files.

Public Land Surveys

The PLS spatial datasets were acquired from a variety of sources, which are documented in the metadata. Formats included both ArcGIS coverages and shapefiles in different projections. The associated polygon attribute tables had a wide range of field types and data, but all contained Public Land Survey information, to the section level. However, not all polygons contained PLS information for all polygon objects. In some spatial databases not all polygons represented a Public Land Survey grid. Such things as Land Grants, lakes, rivers, etc., when included, did not contain PLS information. A .pdf (portable document format) image is provided with each of the spatial databases showing sections that contained mining claims.

BLM data has a field (*mtrs*) containing an 18-character string value for the meridian, township, range, and section of any mining claim. The PLS spatial datasets that were acquired for this project did not have a field with the same meridian-township-range-section data-type as LR2000 data except for Nevada (field name *lrmtrs*). For those datasets, a general procedure used was to create a standardized meridian-township-range-section value in a field named *mtrs*, although the process to create this field varied slightly depending on the way the meridian, township, range, and section data was stored in the original database.

The field, *mtrs*, in each spatial database was populated by concatenating meridian, township, range, and section information. The string is in the format MM TTTTTT RRRRRR SSS

⁶ File provided by BLM called “extract_lrdb_ddl.sql” is an ASCII file. I don’t know if this will always be the name.

where MM is a 2-digit numeric code for meridian, TTTTT is township value, RRRRR is range value, and SSS is a section number for any valid Public Land Survey values. Township and range are 5 characters of the form XXXYZ where X is a numeric, Y is 0 or 2, and Z is N or S for township and E or W for range. A Y value of 2 means that the township or range is a fractional township or range; otherwise the value is 0. Section is a 3-digit numeric. Any number that contains less than the maximum number of digits is left padded with zero(s) (for example, section 2 would be entered as 002, meridian 1 as 01, township 10 as 010). All fields in the spatial database except the *mtrs* field were then deleted.

The other standardization that was done was to project all the coverages to a common projection. For this project, the coordinate system used is geographic, and datum is set to NAD27.

There was no attempt to resolve boundary mismatches or correct coding errors between the states, with the exception of the Idaho and Montana boundary. For Idaho and Montana, spatial databases provided by Paul Hyndman in which he had modified the boundaries so that no gaps or overlaps remained and some data errors were corrected, were used.

A whole township was labeled incorrectly in the Nevada PLS spatial database. Those township labels were corrected, but not the other *mtrs* label errors, of which there are at least 500. Also, the resolution is supposed to be 100,000 scale, but there are instances where fractional townships are displayed on the 100,000 scale maps, but do not have polygons in this spatial database.

The *mtrs* field in the LR2000 data was then joined to the spatial data databases using ArcMap®. Only sections in the PLS spatial database that had corresponding sections in the mining claim database were exported to new Arc format shapefiles by state. Not all mining claim records had a corresponding spatial database polygon. Table 4 shows the number of claim records that did not have a polygon for each state. These new spatial databases for Arizona, Arkansas, California, Colorado, Florida, Idaho, Montana, Nebraska, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming are provided with this publication.

Table 4. Discrepancies in claim locations between BLM claim records and Public Land spatial databases included with this report. (NA = PLS spatial database not available).

State	Number of sections with claim records in LR2000	Number of matching sections in PLS spatial database	Number of claim sections not in PLS spatial database	Percent of claim sections without polygons
Arizona	19,411	19,384	27	0.14
Arkansas	537	439	98	18.25
California	23,192	21,883	1,309	5.64
Colorado	14,965	14,958	7	0.05
Florida	22	22	0	0.00
Idaho	12,251	12,251	0	0.00
Montana	9,645	9,637	8	0.08
Nebraska	58	48	10	17.24
Nevada	35,334	35,328	6	0.00
New Mexico	9,191	8,856	335	3.64
North Dakota	1	NA	NA	NA
Oregon	7,748	7,586	162	2.09
South Dakota	1,633	NA	NA	NA
Utah	20,092	18,488	1,604	7.98
Washington	3,736	3,517	219	5.74
Wyoming	13,672	13,551	121	0.89
U.S. TOTAL	171,488	165,948	3,906	2.30

* Calculated from U.S. TOTAL minus North and South Dakota

The unmatched records are probably due to one of several factors:

1. Errors and omissions in the spatial databases.
2. Data entry errors in the BLM records.
3. Location errors by the mining claimants.

Mislabeled and missing section polygons are the main reasons that all of the statistical data can not be shown spatially using the spatial databases included with this report. Most of the spatial databases had some polygons that did not contain a PLS value (*mtrs*). Many parts of National Forests, National Parks, and National Wildlife Refuges are unsurveyed. Claimants are required to enter a PLS value which may have been based on a projection they made that might not correspond to a Cadastral Survey projection. The Von Schmidt Boundary survey along the California-Nevada border resulted in meridians that do not conform to state boundaries and could have confused claimant when filing location notices. The PLS database for Arkansas only covered a small portion of the state probably accounting for most of the unmatched data.

Note that these shapefiles are only for use with the associated statistical data. BLM data is always changing and claims may be located in areas where BLM did not previously have a record of activity. New shapefiles should be created for any analysis involving another extraction of mining claim data from BLM's LR2000 database.

Statistical Data Discussion

Historical mining claim information has been used by industry and government to examine interest in federal land for deposits of valuable minerals. Since the early 1800's, Congress has dealt with interest by the general public in obtaining mineral rights on Federal land. In 1866 a set of rules and regulations (41 Stat.251) was promulgated that formalized the requirements for establishing a claim. The General Mining Law of May 10, 1872 established a system that is basically intact today defining four types of mining claims: lode, placer, tunnel site, and mill site.

The size of a lode mining claim is defined as "may equal, but shall not exceed, one thousand five hundred feet in length...shall extend no more than three hundred feet on each side of the middle" and "The end-lines shall be parallel to each other." The Placer Act of 1870 was amended so that "no such location shall include more than twenty acres for each individual claimant." However, an association of up to eight claimants may add 20 acres per partner to a claim up to one hundred and sixty acres total. Tunnel site claims do not directly invest a right to any acreage. A mill site can encompass up to 5 acres.

A lode claim can be up to 20.66 acres in size (1500 by 600 feet). In practical terms, a claimant will stake claims slightly smaller than the maximum size so as to prevent invalidation of some portion of a claim. Most placer claims are 20 acres because the claimants locate the claims by legal subdivision. Gulch placer claims and association placers may be smaller or larger.

Lode and placer claims are the only claims located on ground that is supposed to contain valuable minerals. Mill sites are supposed to cover only "non-mineral land" used for "mining and milling purposes" and tunnel site claims provide a right to drive a tunnel up to 3000 feet looking for "veins or lodes... not previously known to exist." (17 Stat. 91, The General Mining Law of 1872)

Previous work by Campbell (1996), Campbell and Hyndman (1996), and Hyndman (1999) analyzed BLM claim records and created a statistic they called "mine claim density." This statistic used a counting technique that assigned a claim record to a PLS section of land. When a claim occurred in more than one section, the count was assigned to only one of the sections. Because a claim in the CASE_TBL table that had more than one section would have multiple records in the CASE_LAND table, their technique selected the section in the first record encountered while looping through the data. In this manner, they assigned a count number to PLS sections, but in so doing did not always attach a value to all the sections in which there are claims.

The procedure followed here uses a different approach in examining the BLM claim record data. The statistic created here is designed to convey a more accurate areal picture while not over-counting the number of claims. As such, it has its own set of assumptions. These are:

1. A claim that was reported as occurring in more than one section has a significant part of the claim in each section,
2. Based on number 1, the areal extent of a claim can be proportioned (weighted) between all the sections in which it occurs.
3. Without additional information, the only solution is to equally proportion a claim between each section in which it occurs. For example, if a claim occurred in 2 sections, half of its value would be assigned to one section and half to another.

Since the sample populations are large and the area represented by each sample is small, the error introduced by these assumptions should be minor. It should be considered more important that the spatial distribution is accurately represented, than the weighting being perfect. This allows a user to analyze spatial relationships more accurately.

It is important to realize that these statistics represent a different analysis of the BLM mine claim data than the “density” numbers created by Campbell and Hyndman (1996) and Hyndman (1999). This process may produce fractional numbers since claims occurring in multiple sections will be proportioned between all the appropriate sections. It may also produce whole numbers that represent a summation of fractional values. These numbers, can be called “claim equivalency” values, and could be considered surrogates for the area encompassed by mining claims.

Another reasonable assumption that can be made, which affects interpretation of the statistics, is that each lode or placer claim encompasses about 20 acres⁷. Therefore a value of 0.5 assigned to a section would imply that claims cover approximately 10 acres of the 640 acres that make up an ideal section. Likewise, a value of 5.0 could be created by a variety of scenarios from 5 whole claims to a combination of whole and fractional claims. No matter what combination of whole and partial numbers is used to create a value of 5.0, this number can imply that 5 times 20 or 100 acres of the section have claim coverage. In this way the statistic serves a dual role. It is an indicator of how much of a section may be mineralized, while also providing a measure of intensity of interest in that section, which is more realistic than density values created by previous authors.

In the density statistics methodology, it is possible for a value of 10 to be attached to one section, with no indication that claims in that section lap into adjoining sections. That procedure gives one section extra value, while devaluing the adjoining sections. By using a weighting process, better representation of the spatial distribution of claims can be portrayed and artificial high and low values can be minimized, producing a better measure of the intensity of interest within a section.

The data used to create the statistics is imperfect. If it was perfect, there should be no more than 32 claims within a section during any year. The fact that the data has some sections with more than this number of “claim equivalents” demonstrates some of the problems. Factors that contribute to values in excess of 32 include:

- Over-staking of existing claims by other claimants,
- Claims that cover inter-claim gaps
- Claims that are smaller than twenty acres in size,
- Errors in reporting claim locations,
- Data entry errors

Large numbers usually indicate intensity of interest in the mineral potential of a section. Over-staking is common during staking rushes associated with new discoveries and around major mineral deposits. There is one known exception in Idaho. A person taught classes in staking and

⁷ Be aware that there are fractional lode claims that are much smaller than 20.66 acres and placer claims as much as 160 acres, but these constitute a small percentage of the total number of claims.

recording mining claims. The individual used a single section for recording purposes, creating an anomalously high value for that section.

Other factors that could contribute to large values in the statistics have a minor effect. Since the law now requires yearly payment to BLM for claimants holding more than 10 claims, there is little incentive to locate fractional claims. There are also some errors in reporting claim locations, since large parts of the National Forests and BLM lands are unsurveyed and claimants have to project the Public Land Survey over the area they stake. Data entry errors also occur such as case_id 8839738 in Arizona that is listed as being in 6 sections in non-adjacent townships. BLM makes a diligent effort to correct those mistakes, but they still occur.

Another problem is the determination of what constitutes an active claim. BLM lists claims as “active” or “closed” in the *case_disp_txt* field. This tells whether or not BLM has closed the case file, not whether the claim is active. However, they also record the last year for which assessment work was filed in the *last_assess_yr* field. Since the claimants must file each year, failure to file an assessment work document should void a claim. For this reason, the statistics in this report assume that the assessment year data is the best indicator of whether a claim is still active. In cases where the *last_assess_yr* field was blank or listed as “0000,” it was necessary to use a surrogate value. In these cases, the year in the *disp_dt* field was used. For the most part the action associated with this date was “ABANDONMENT CLAIM VOID”, “CASE CLOSED”, “RELQ FILED (IN TOTAL)”, or “DECLARED NULL & VOID” so that this is considered the last possible year in which a claim was active.

In this analysis, three types of statistics were produced from LR2000 data. One type is specific to the kind of claim. There are separate yearly statistics for both active lode and placer mining claims (by PLS section). Another type of statistic is a yearly summation of all “claim” types. The numbers of each type of claim in each PLS section are added to produce a total number of active claims per section. The claim types that are summed are: lode claims, placer claims, tunnel sites, and mill sites. In a strict sense, only lode and placers are claims. It should be noted that tunnel sites are more properly considered a “means of exploration” (Maley, 1985, p. 99). Mill sites may be called “claims.” However, they are mining law related actions specifically designed for “nonmineral land” (Maley, 1985, p. 104).

The third type of statistic provided with this report is a summation of the whole BLM mine recordation history; a current snapshot of activity. Three pieces of information for each PLS section are included in this statistic:

1. Activity status at end of 2003 (active or closed),
2. Claim type (lode, placer, tunnel site, or mill site),
3. Number of claim equivalents

This provides the ability to simultaneously examine relationships between activity status, claim type, and intensity of activity for the most recent data. For each PLS section up to eight records are possible; any combination of the two activity types with the four “claim” types.

The results of the statistical analysis are included with this report as four sets of database files for each state. They contain the statistical output from the respective databases created by summation queries of the data. A dBASE III (.dbf) format and a comma delimited ASCII (text) format file were created for each set of statistics. The fields and a description of the data in the associated dBASE and text files are provided in Tables 5 to 8.

Table 5. Descriptions of fields in az_claim.dbf, ar_claim.dbf, ca_claim.dbf, co_claim.dbf, fl_claim.dbf, id_claim.dbf, mt_claim.dbf, ne_claim.dbf, nm_claim.dbf, nv_claim.dbf, or_claim.dbf, sd_claim.dbf, ut_claim.dbf, wa_claim.dbf, wy_claim.dbf and respective text files (.txt extension).

xx_claim.dbf and xx_claim.txt	
Tables	
Field name	Description
MTRS	Meridian, township, range, and section concatenated string
CLM_CT_76	Number of active claim equivalents within a Public Land Survey section in 1976
CLM_CT_77	Number of active claim equivalents within a Public Land Survey section in 1977
CLM_CT_78	Number of active claim equivalents within a Public Land Survey section in 1978
CLM_CT_79	Number of active claim equivalents within a Public Land Survey section in 1979
CLM_CT_80	Number of active claim equivalents within a Public Land Survey section in 1980
CLM_CT_81	Number of active claim equivalents within a Public Land Survey section in 1981
CLM_CT_82	Number of active claim equivalents within a Public Land Survey section in 1982
CLM_CT_83	Number of active claim equivalents within a Public Land Survey section in 1983
CLM_CT_84	Number of active claim equivalents within a Public Land Survey section in 1984
CLM_CT_85	Number of active claim equivalents within a Public Land Survey section in 1985
CLM_CT_86	Number of active claim equivalents within a Public Land Survey section in 1986
CLM_CT_87	Number of active claim equivalents within a Public Land Survey section in 1987
CLM_CT_88	Number of active claim equivalents within a Public Land Survey section in 1988
CLM_CT_89	Number of active claim equivalents within a Public Land Survey section in 1989
CLM_CT_90	Number of active claim equivalents within a Public Land Survey section in 1990
CLM_CT_91	Number of active claim equivalents within a Public Land Survey section in 1991
CLM_CT_92	Number of active claim equivalents within a Public Land Survey section in 1992
CLM_CT_93	Number of active claim equivalents within a Public Land Survey section in 1993
CLM_CT_94	Number of active claim equivalents within a Public Land Survey section in 1994
CLM_CT_95	Number of active claim equivalents within a Public Land Survey section in 1995
CLM_CT_96	Number of active claim equivalents within a Public Land Survey section in 1996
CLM_CT_97	Number of active claim equivalents within a Public Land Survey section in 1997
CLM_CT_98	Number of active claim equivalents within a Public Land Survey section in 1998
CLM_CT_99	Number of active claim equivalents within a Public Land Survey section in 1999
CLM_CT_00	Number of active claim equivalents within a Public Land Survey section in 2000
CLM_CT_01	Number of active claim equivalents within a Public Land Survey section in 2001
CLM_CT_02	Number of active claim equivalents within a Public Land Survey section in 2002
CLM_CT_03	Number of active claim equivalents within a Public Land Survey section in 2003

Table 6. Descriptions of fields in az_lode.dbf, ar_lode.dbf, ca_lode.dbf, co_lode.dbf, fl_lode.dbf, id_lode.dbf, mt_lode.dbf, ne_lode.dbf, nm_lode.dbf, nv_lode.dbf, or_lode.dbf, sd_lode.dbf, ut_lode.dbf, wa_lode.dbf, wy_lode.dbf and respective text files (.txt extension).

xx_lode.dbf and xx_lode.txt	
Tables	
Field name	Description
MTRS	Meridian, township, range, and section concatenated string
LD_CT_76	Number of active lode claim equivalents within a Public Land Survey section in 1976
LD_CT_77	Number of active lode claim equivalents within a Public Land Survey section in 1977
LD_CT_78	Number of active lode claim equivalents within a Public Land Survey section in 1978
LD_CT_79	Number of active lode claim equivalents within a Public Land Survey section in 1979
LD_CT_80	Number of active lode claim equivalents within a Public Land Survey section in 1980
LD_CT_81	Number of active lode claim equivalents within a Public Land Survey section in 1981
LD_CT_82	Number of active lode claim equivalents within a Public Land Survey section in 1982
LD_CT_83	Number of active lode claim equivalents within a Public Land Survey section in 1983
LD_CT_84	Number of active lode claim equivalents within a Public Land Survey section in 1984
LD_CT_85	Number of active lode claim equivalents within a Public Land Survey section in 1985
LD_CT_86	Number of active lode claim equivalents within a Public Land Survey section in 1986
LD_CT_87	Number of active lode claim equivalents within a Public Land Survey section in 1987
LD_CT_88	Number of active lode claim equivalents within a Public Land Survey section in 1988

LD_CT_89	Number of active lode claim equivalents within a Public Land Survey section in 1989
LD_CT_90	Number of active lode claim equivalents within a Public Land Survey section in 1990
LD_CT_91	Number of active lode claim equivalents within a Public Land Survey section in 1991
LD_CT_92	Number of active lode claim equivalents within a Public Land Survey section in 1992
LD_CT_93	Number of active lode claim equivalents within a Public Land Survey section in 1993
LD_CT_94	Number of active lode claim equivalents within a Public Land Survey section in 1994
LD_CT_95	Number of active lode claim equivalents within a Public Land Survey section in 1995
LD_CT_96	Number of active lode claim equivalents within a Public Land Survey section in 1996
LD_CT_97	Number of active lode claim equivalents within a Public Land Survey section in 1997
LD_CT_98	Number of active lode claim equivalents within a Public Land Survey section in 1998
LD_CT_99	Number of active lode claim equivalents within a Public Land Survey section in 1999
LD_CT_00	Number of active lode claim equivalents within a Public Land Survey section in 2000
LD_CT_01	Number of active lode claim equivalents within a Public Land Survey section in 2001
LD_CT_02	Number of active lode claim equivalents within a Public Land Survey section in 2002
LD_CT_03	Number of active lode claim equivalents within a Public Land Survey section in 2003

Table 7. Descriptions of fields in az_placr.dbf, ar_placr.dbf, ca_placr.dbf, co_placr.dbf, fl_placr.dbf, id_placr.dbf, mt_placr.dbf, ne_placr.dbf, nm_placr.dbf, nv_placr.dbf, or_placr.dbf, sd_placr.dbf, ut_placr.dbf, wa_placr.dbf, wy_placr.dbf and respective text files (.txt extension).

xx_placr.dbf and xx_placr.txt Tables	
Field name	Description
MTRS	Meridian, township, range, and section concatenated string
PC_CT_76	Number of active placer claim equivalents within a Public Land Survey section in 1976
PC_CT_77	Number of active placer claim equivalents within a Public Land Survey section in 1977
PC_CT_78	Number of active placer claim equivalents within a Public Land Survey section in 1978
PC_CT_79	Number of active placer claim equivalents within a Public Land Survey section in 1979
PC_CT_80	Number of active placer claim equivalents within a Public Land Survey section in 1980
PC_CT_81	Number of active placer claim equivalents within a Public Land Survey section in 1981
PC_CT_82	Number of active placer claim equivalents within a Public Land Survey section in 1982
PC_CT_83	Number of active placer claim equivalents within a Public Land Survey section in 1983
PC_CT_84	Number of active placer claim equivalents within a Public Land Survey section in 1984
PC_CT_85	Number of active placer claim equivalents within a Public Land Survey section in 1985
PC_CT_86	Number of active placer claim equivalents within a Public Land Survey section in 1986
PC_CT_87	Number of active placer claim equivalents within a Public Land Survey section in 1987
PC_CT_88	Number of active placer claim equivalents within a Public Land Survey section in 1988
PC_CT_89	Number of active placer claim equivalents within a Public Land Survey section in 1989
PC_CT_90	Number of active placer claim equivalents within a Public Land Survey section in 1990
PC_CT_91	Number of active placer claim equivalents within a Public Land Survey section in 1991
PC_CT_92	Number of active placer claim equivalents within a Public Land Survey section in 1992
PC_CT_93	Number of active placer claim equivalents within a Public Land Survey section in 1993
PC_CT_94	Number of active placer claim equivalents within a Public Land Survey section in 1994
PC_CT_95	Number of active placer claim equivalents within a Public Land Survey section in 1995
PC_CT_96	Number of active placer claim equivalents within a Public Land Survey section in 1996
PC_CT_97	Number of active placer claim equivalents within a Public Land Survey section in 1997
PC_CT_98	Number of active placer claim equivalents within a Public Land Survey section in 1998
PC_CT_99	Number of active placer claim equivalents within a Public Land Survey section in 1999
PC_CT_00	Number of active placer claim equivalents within a Public Land Survey section in 2000
PC_CT_01	Number of active placer claim equivalents within a Public Land Survey section in 2001
PC_CT_02	Number of active placer claim equivalents within a Public Land Survey section in 2002
PC_CT_03	Number of active placer claim equivalents within a Public Land Survey section in 2003

Table 8. Descriptions of fields in az_total.dbf, ar_total.dbf, ca_total.dbf, co_total.dbf, fl_total.dbf, id_total.dbf, mt_total.dbf, ne_total.dbf, nm_total.dbf, nv_total.dbf, or_total.dbf, sd_total.dbf, ut_total.dbf, wa_total.dbf, wy_total.dbf and respective text files (.txt extension).

xx_total.dbf and xx_total.txt Tables	
Field name	Description
MTRS	Meridian, township, range, and section concatenated string
CASE_DISP	Case disposition – Active (A) or closed (C)
CASETYPE_T	Type of mining claim – LODE CLAIM (claim that contains a vein or lode), LODE CLAIM-NP (lode claim in a national park), PLACER CLAIM (claim on all forms of mineral deposit not covered by lode claims), MILL SITE CLAIM (claim on non-mineral land used for mining or milling purposes), or TUNNEL SITE (entrance to a tunnel used for exploration of hidden veins or lodes)
CLAIM_EQUIV	Number of claim equivalents in the section.

GIS Documentation

All the spatial datasets are shapefiles containing polygons; and are in geographic coordinates, NAD27 datum. The shapefiles are named az_claims03, ar_claims03, ca_claims03, co_claims03, fl_claims03, id_claims03, mt_claims03, ne_claims03, nm_claims03, nv_claims03, or_claims03, ut_claims03, wa_claims03, and wy_claims03. The shapefiles contain one field, *mtrs*, which is in the same format as the *mtrs* field in the associated relational databases and text files (table 9). General metadata applicable to all the datasets is in Appendix C. Individual metadata for each shapefile is included as an .xml file embedded in the respective shapefile.

Table 9. Description of additional field in az_pls_03.dbf, ar_pls_03.dbf, ca_pls_03.dbf, co_pls_03.dbf, fl_pls_03.dbf, id_pls_03.dbf, mt_pls_03.dbf, ne_pls_03.dbf, nm_pls_03.dbf, nv_pls_03.dbf, or_pls_03.dbf, ut_pls_03.dbf, wa_pls_03.dbf, wy_pls_03.dbf.

Field Name	Description
MTRS	Meridian, township, range, and section concatenated string

User procedures

In order to use the data in a spatial context, the relational data must be joined to the spatial databases in a geographic information system. There are two ways to connect the databases: join or relate/link. In ArcMap, data can be joined or relate/linked, using either the dBASE format or ASCII⁸ (text) format files, to the appropriate spatial database on the common field (*mtrs*). All of the files with names like xx_claim, xx_lode, and xx_placer should be connected using a join. The files xx_total should be connected in a geographic information system using link or relate since they have a one-to-many relationship.

Statistical data joined to spatial data allows the visual presentation of the statistical data. Variation in both distributions of claims and intensity of activity can be displayed and used for analysis. For example, with lode mine claim intensity statistical data (az_lode.dbf) joined to the Arizona spatial data (az_pls_03) you can symbolize and display individual years. The variation between 1979 and 1992 is shown in figure 2. Note the mining claim interest in northwest Arizona was small in the 1970's, very intense in the 1980's, and declined rapidly in the 1990's. This data shows not only where there is mining interest during a particular year, but also shows the change in interest over time.

⁸ Generally the text format files process much slower in spatial database software.

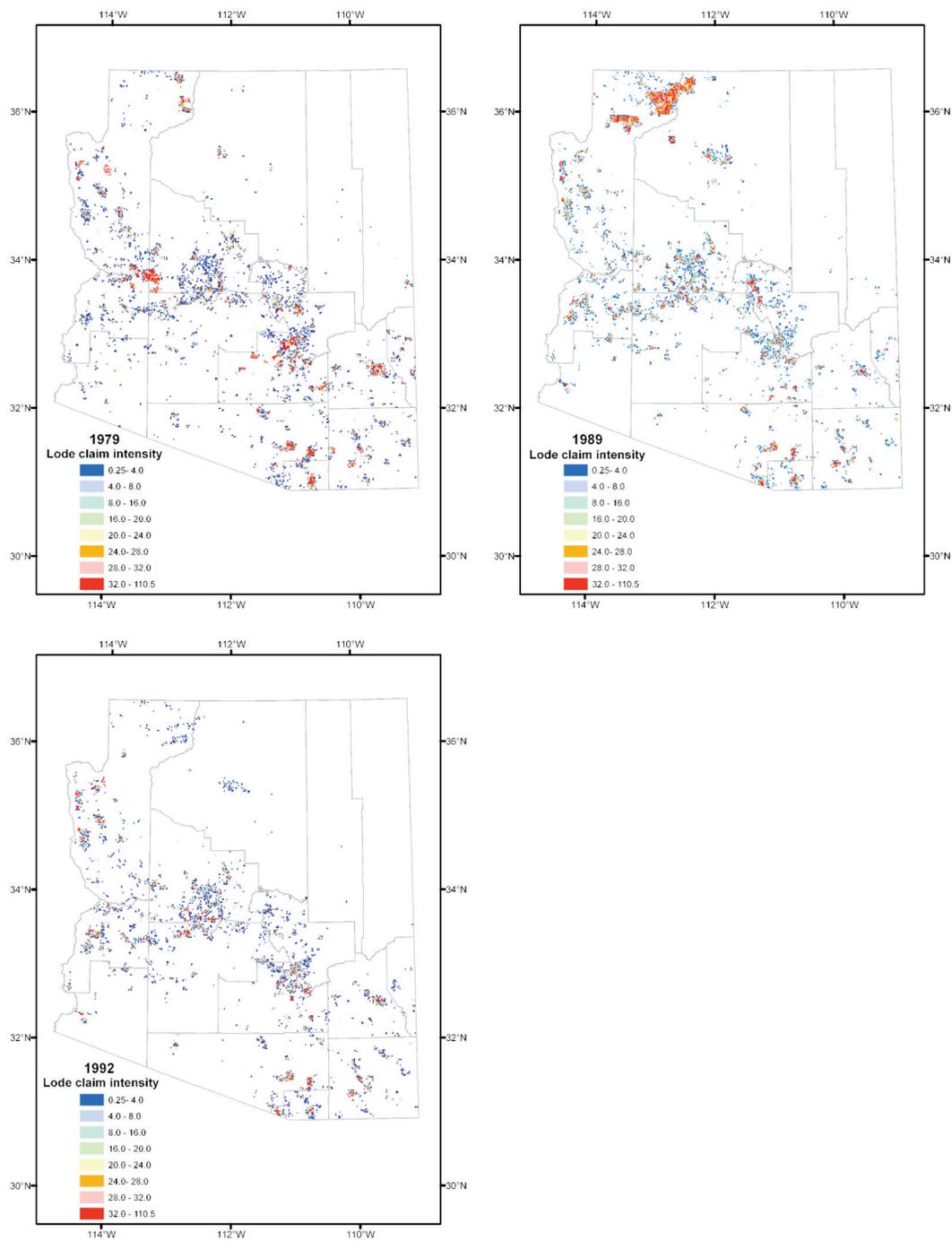


Figure 2. Areas in Arizona containing active lode mining claims in 1979, 1989, and 1992 categorized by intensity (number of claims) within a Public Land Survey section.

The totals data allows queries to show the location of claims meeting specific criteria at the end of 2003. For example, linking id_total.dbf to the Idaho PLS (id_pls_03) provides the ability to ask a question such as “where are all sections that have had more than 4 mill sites that have been abandoned before 2003?” The results of such a query are shown in figure 3. Other questions can be asked such as: “where are all sections that have closed claims in 2003” or “which sections contain both mill site and lode claims?”



Figure 3. Public Land Survey sections in Idaho containing more than 4 mill site claims that were abandoned before 2004.

The above descriptions are examples of some of the kinds of information that can be extracted from BLM mining claim records. Some compromises have to be made due to data limitations, but at regional scales, trends and patterns can be discerned that allow this data to be useful for analysis. It can also be combined with similar resolution data to answer a myriad of other questions.

Obtaining Digital Data

The spatial databases are available in shapefile format with associated data files. The spatial data is maintained in:

Projection: Geographic

Units: Decimal Degrees

Datum: NAD27

Spheroid: Clarke1866

To obtain copies of the digital data:

- Download from the USGS World Wide Web site: URL = <http://pubs.usgs.gov/ds/124>
Note that the uncompressed files take over 400 megabytes of space.

These Internet sites contain the spatial data, associated .dbf and .txt format tables, and metadata for the state PLS spatial databases (see listing of files in Appendix D). Formatted metadata (Federal Geographic Data Committee-compliant) is included with each spatial database.

To manipulate the spatial databases, you must have software that is capable of reading shapefile format.

References Cited

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Appendix A – Table Design SQL (Structured Query Language)

The following SQL statement provided by BLM shows how the case_tbl and case_land tables were created in LR2000 and table structure as it existed on January 15, 2003. This SQL is Oracle® specific. The SQL language may have to be modified to create the same tables in other relational database programs.

BLM did not provide any description or definitions for the fields in their database. Questions concerning metadata and definitions for the tables and fields in LR2000 should be directed to the BLM (<http://www.blm.gov/lr2000/>).

```
create table case_tbl
(
  case_id                DECIMAL(16)                not null,
  system_id              CHAR(2)                      ,
  serial_nr_full         CHAR(17)                     ,
  serial_nr_prefix      CHAR(4)                       ,
  number_prefix         CHAR(1)                       ,
  serial_nr_num_part    INTEGER                       ,
  serial_nr_suf         CHAR(2)                       ,
  admin_state           CHAR(2)                       ,
  geo_state             CHAR(2)                       ,
  last_assess_yr        CHAR(4)                       ,
  last_assess_cd        CHAR(3)                       ,
  ttl_case_acres       DECIMAL(12,3)                  ,
  commodity             CHAR(3)                       ,
  commodity_txt         VARCHAR(25)                   ,
  case_disp             CHAR(1)                       ,
  case_disp_txt         VARCHAR(25)                   ,
  case_disp_gp         VARCHAR(25)                   ,
  disp_act_cd          CHAR(3)                       ,
  disp_act_txt         VARCHAR(25)                   ,
  disp_dt              TIMESTAMP                      ,
  case_modif_dt        TIMESTAMP                      ,
  casetype             CHAR(6)                       ,
  casetype_txt         VARCHAR(25)                   ,
  last_action_cd       CHAR(3)                       ,
  last_action_txt      VARCHAR(25)                   ,
  last_action_dt       TIMESTAMP                      ,
  mc_claim_nm          VARCHAR(20)                    ,
  cr_legal_ref         VARCHAR(40)                    ,
  mc_lead_case_ser_nr  VARCHAR(21)                    ,
  mc_county_bk_pg     VARCHAR(30)                    ,
  mc_loc_dt            TIMESTAMP                      ,
  mc_cert_issue_dt    TIMESTAMP                      ,
  mc_cert_canc_dt     TIMESTAMP                      ,
  chargeable_acres_flg CHAR(1)                       ,
  case_group           CHAR(2)                       ,
  lease_auth_dt       TIMESTAMP                      ,
  action_669_flg      CHAR(1)                       ,
  reinstatement_flg   CHAR(1)                       ,
  loadts_dt           TIMESTAMP
);
create table case_land
(
  case_id                DECIMAL(16)                not null,
```

```

blm_adm_st          CHAR(2)          not null,
geo_state          CHAR(2)          ,
land_id           DECIMAL(16)       not null,
cty_dist_ra_id    DECIMAL(16)       not null,
system_id         CHAR(2)          ,
ser_nr_full       CHAR(17)         ,
withdrawal_flg    CHAR(1)          ,
meridian_cd       CHAR(2)          ,
meridian_txt      VARCHAR(25)      ,
mer_twp_rng       CHAR(14)         ,
township          CHAR(5)          ,
range             CHAR(5)          ,
twp_rng_dir       CHAR(2)          ,
entire_twp_flg    CHAR(1)          ,
st_entire_twp_exc_flg CHAR(1)      ,
st_indemn_lands_flg CHAR(1)      ,
st_twp_loc_unkn_flg CHAR(1)      ,
section           CHAR(3)          ,
entire_sec_flg    CHAR(1)          ,
st_sec_loc_unkn_flg CHAR(1)      ,
mtrs              CHAR(18)         ,
geost_county_cd   CHAR(5)          ,
county_txt        VARCHAR(25)      ,
admst_dist_ra_cd CHAR(6)          ,
district_txt      VARCHAR(25)      ,
ra_txt            VARCHAR(25)      ,
adm_agency        CHAR(8)          ,
adm_agency_txt    VARCHAR(25)      ,
st_set_id         SMALLINT         ,
aliquot_part      CHAR(25)         ,
cong_dist         CHAR(4)          ,
ls_inc            CHAR(1)          ,
sur_nr            CHAR(5)          ,
sur_suffix        CHAR(2)          ,
survey_type       CHAR(1)          ,
sur_type_txt      VARCHAR(25)      ,
sur_sort          CHAR(2)          ,
case_land_acres   DECIMAL(8,3)     ,
st_sur_note       CHAR(1)          ,
);

```

Appendix B – Access 2000 Table Design

ASCII text files supplied by BLM were imported into a Microsoft Access 2000 database. Using the names and data types provided in the table creation SQL supplied by BLM (Appendix A), a similar data design was created in Access. Additional fields necessary for statistical processing were also added to the design. The Access design is provided in tables B-1 and B-2. Fields created specifically for this project are described in the Description column. The remaining fields were supplied by BLM without any definitions.

Data for one look-up table (*case_disp*, table B-3) was also provided that gives values for codes in the *case_disp* field of the CASE_TBL table.

The following tables can be used to reconstruct the Access 2000 database used to create the information provided with this report. Since BLM is constantly updating their data and correcting errors in older data, new downloads of the database may provide slightly different yearly results from those included in this data release.

Table B-1. CASE_TBL table structure

Field Name	Type	Size	Description
Case_id	Number	Long Integer	BLM defined field
System_id	Text	2	BLM defined field
Serial_nr_full	Text	17	BLM defined field
Serial_nr_prefix	Text	4	BLM defined field
Number_prefix	Text	1	BLM defined field
Serial_nr_num_part	Number	Long Integer	BLM defined field
Serial_nr_suf	Text	2	BLM defined field
Admin_state	Text	2	BLM defined field
Geo_state	Text	2	BLM defined field
Last_assess_yr	Text	4	BLM defined field
Last_assess_cd	Text	3	BLM defined field
Ttl_case_acres	Number	Double	BLM defined field
Commodity	Text	3	BLM defined field
Commodity_txt	Text	25	BLM defined field
Case_disp	Text	1	BLM defined field
Case_disp_txt	Text	25	BLM defined field
Case_disp_gp	Text	25	BLM defined field
Disp_act_cd	Text	3	BLM defined field
Disp_act_txt	Text	25	BLM defined field
Disp_dt	Text	25	BLM defined field
Case_modif_dt	Text	25	BLM defined field
Casetype	Text	6	BLM defined field
Casetype_txt	Text	25	BLM defined field
Last_action_cd	Text	3	BLM defined field
Last_action_txt	Text	25	BLM defined field
Last_action_dt	Text	25	BLM defined field
Mc_claim_nm	Text	20	BLM defined field
Cr_legal_ref	Text	40	BLM defined field
Mc_lead_case_ser_nr	Text	17	BLM defined field
Mc_county_bk_pg	Text	30	BLM defined field
Mc_loc_dt	Text	25	BLM defined field
Mc_cert_issue_dt	Text	25	BLM defined field
Mc_cert_canc_dt	Text	25	BLM defined field
Chargeable_acres_flg	Text	1	BLM defined field
Case_group	Text	2	BLM defined field
Lease_auth_dt	Text	25	BLM defined field
Action_669_flg	Text	1	BLM defined field

Field Name	Type	Size	Description
Reinstatement_flg	Text	1	BLM defined field
load_dt	Text	25	BLM defined field
location_yr	Number	Integer	Year (four-digit form) mining claim was located (non-BLM field)
disposal_yr	Number	Integer	Last year (four-digit form) mining claim was active (non-BLM field)
no_sec	Number	Integer	Number of sections in which the claim is situated. (non-BLM field)
fraction	Number	Double	1/no_sec (non-BLM field)

Table B-2. CASE_LAND tables structure

Field Name	Type	Size	Description
Case_id	Number	Long Integer	BLM defined field
Blm_adm_state	Text	2	BLM defined field
Geo_state	Text	2	BLM defined field
Land_id	Number	16	BLM defined field
Cty_dist_ra_id	Number	16	BLM defined field
System_id	Text	2	BLM defined field
Ser_nr_full	Text	15	BLM defined field
Withdrawal_flg	Text	1	BLM defined field
Meridian_cd	Text	2	BLM defined field
Meridian_txt	Text	25	BLM defined field
Mer_twp_rng	Text	14	BLM defined field
Township	Text	5	BLM defined field
Range	Text	5	BLM defined field
Twp_rng_dir	Text	2	BLM defined field
Entire_twp_flg	Text	1	BLM defined field
St_entire_twp_exc_flg	Text	1	BLM defined field
St_indemn_lands_flg	Text	1	BLM defined field
St_twp_loc_unkn_flg	Text	1	BLM defined field
Section	Text	1	BLM defined field
Entire_sec_flg	Text	3	BLM defined field
St_sec_loc_unkn_flg	Text	1	BLM defined field
Mtrs	Text	18	BLM defined field
Geostate_county_cd	Text	5	BLM defined field
County_txt	Text	25	BLM defined field
Admst_dist_ra_cd	Text	6	BLM defined field
District_txt	Text	25	BLM defined field
Ra_txt	Text	25	BLM defined field
Adm_agency	Text	8	BLM defined field
Adm_agency_txt	Text	25	BLM defined field
St_set_id	Number	Integer	BLM defined field
Aliquot_part	Text	25	BLM defined field
Cong_dist	Text	4	BLM defined field
Ls_inc	Text	1	BLM defined field
Sur_nr	Text	5	BLM defined field
Sur_suffix	Text	2	BLM defined field
Survey_type	Text	1	BLM defined field
Sur_type_txt	Text	25	BLM defined field
Sur_sort	Number	2	BLM defined field
Case_land_acres	Number	Double	BLM defined field
St_sur_note	Text	1	BLM defined field

Table B-3. Mining claim case_disp codes in CASE_TBL table

case_disp	case_disp_txt
A	CASE IS ACTIVE
C	CASE IS CLOSED, NO FURTHER ACTION
I	INSUFFICIENT INFORMATION ON CASE
V	SERIAL NUMBER HAS BEEN VOIDED