



## **Geologic and Structure Maps of the Wallace 1° x 2° Quadrangle, Montana and Idaho: A Digital Database**

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Miscellaneous Investigations Series Map I-1509-A  
Digital database, version 1.0

2000  
(map originally published in 1986)

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U.S. DEPARTMENT OF THE INTERIOR  
U.S. GEOLOGICAL SURVEY

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## Introduction

The geologic map of the Wallace 1° x 2° quadrangle (Harrison and others, 1986) was originally digitized by staff at the Earth Resources Observation Systems (EROS) Data Center prior to 1994 and completed by U.S. Geological Survey staff and contractors at the Spokane Field Office (WA) in 2000 for input into a geographic information system (GIS). The resulting digital geologic map database can be queried in many ways to produce a variety of geologic maps. Digital base map data files (topography, roads, towns, rivers and lakes, etc.) are not included: they may be obtained from a variety of commercial and government sources. This database is not meant to be used or displayed at any scale larger than 1:250,000 (e.g., 1:100,000 or 1:24,000). The digital geologic map graphics and plot files (wal250k.gra/.hp) that are provided in the digital package are representations of the digital database. They are not designed to be cartographic products.

The map area is located in north Idaho and western Montana (Fig. 1). This report describes the methods used to convert the geologic map data into a digital format, the ArcInfo GIS file structures and relationships, and explains how to download the digital files from the U.S. Geological Survey public access World Wide Web sit on the Internet.

We thank Karen S. Bolm (USGS) for her review of the manuscript and digital data.

## Data Sources, Processing, and Accuracy

Staff at the U.S. Geological Survey EROS Data Center (Sioux Falls, SD) digitized contacts and faults from Harrison and others (1986) prior to 1994. It is not known if the data was digitized from a mylar, film, or paper map. U.S. Geological Survey staff and contractor at the Spokane Field Office acquired the unpublished digital dataset in 1999 and edited it to faithfully represent the geology shown on the published paper geologic map (Harrison and others, 1986). Missing lines (predominantly folds) were digitized from the folded paper published map. The digital files were then augmented with an interim geologic map data model (or database), further attributed and edited, and then plotted and compared with the original published map to check for digitizing and attributing errors. All processing by the U.S. Geological Survey in Spokane was done in ArcInfo version 7.2.1 installed on a Sun Ultra workstation.

The overall accuracy (with respect to the location of lines) of the digital geologic map (see Figs. 2 and 3 for page-size versions) is probably no better than +/- 60 meters. This digital database is not meant to be used or displayed at any scale larger than 1:250,000 (e.g., 1:100,000 or 1:24,000).

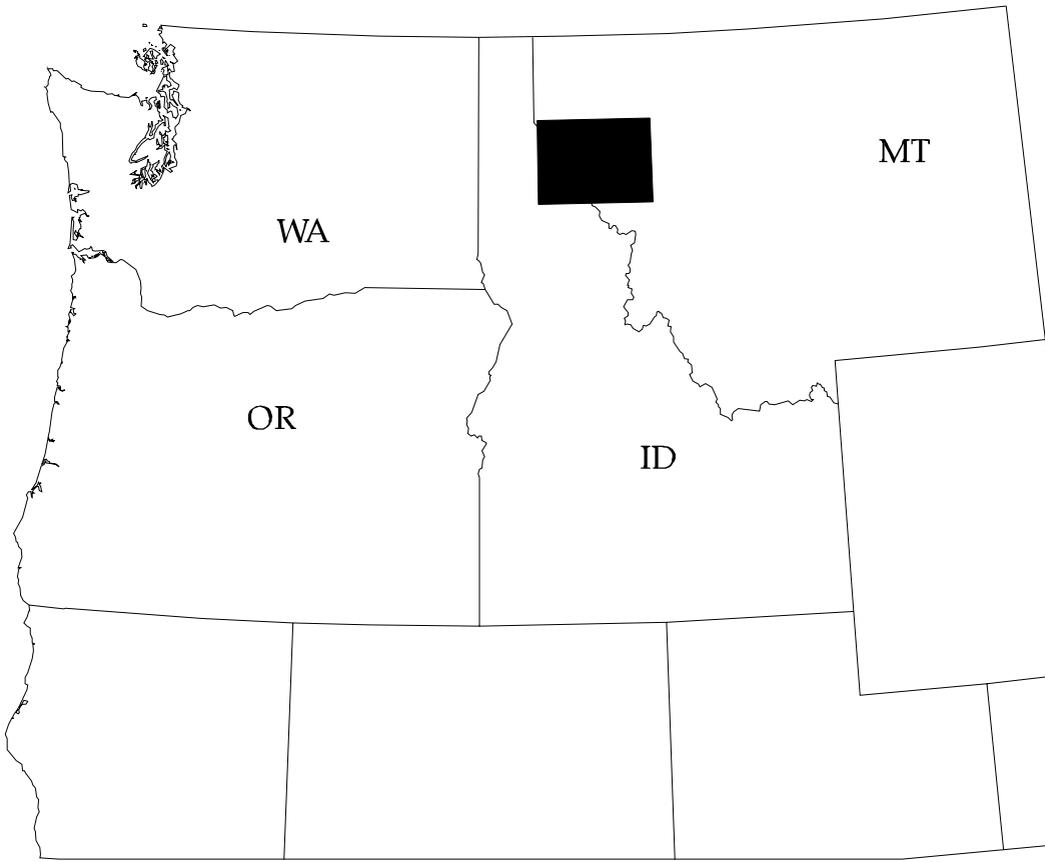


Figure 1. Index map showing the geographic extent of the Wallace quadrangle (black fill) with respect to the Pacific Northwest.



**Figure 2. Explanation for the Simplified Digital Geologic Map of the Wallace 1:250,000 quadrangle, Montana & Idaho**



## GIS Documentation

The digital geologic map of the Wallace 1° x 2° quadrangle, Montana and Idaho includes a geologic (linear features) arc attribute table, WAL250K.AAT, that relates to the WAL250K.CON, WAL250K.ST2, WAL250K.LGU, and WAL250K.REF files; a rock unit (areal features) polygon attribute table, WAL250K.PAT, that relates to the WAL250K.RU and WAL250K.REF files; and a breccia outcrop point attribute table, WAL250BC.PAT, that relates to the WAL250BC.REF file (see Fig. 4). These data files are described below.

### Linear Features

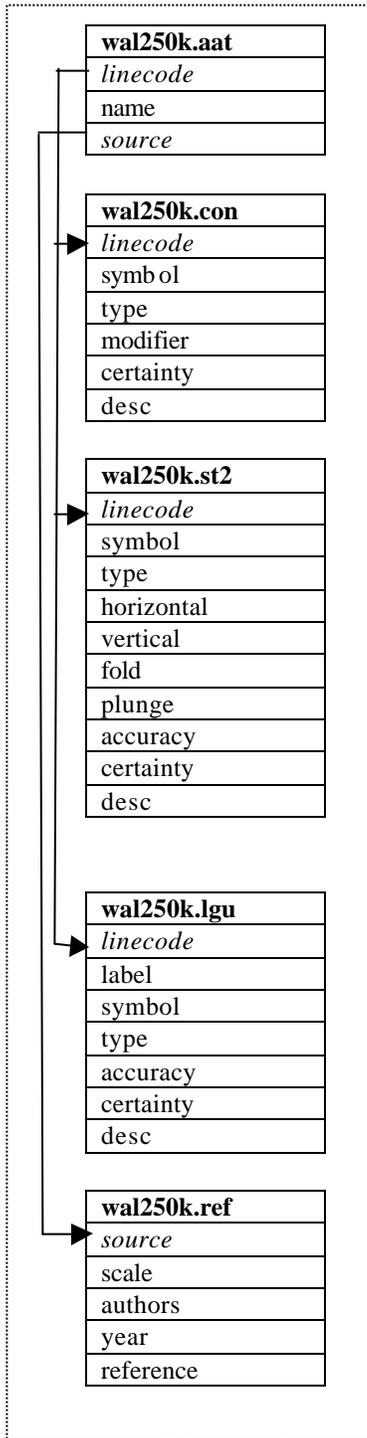
Descriptions of the items identifying linear features such as contacts, boundaries (e.g., lines of latitude and longitude, state boundaries) and structures in the arc attribute table, WAL250K.AAT, are as follows:

WAL250K.AAT			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>linecode</b>	integer	3	Numeric code used to identify type of linear feature. Linecodes < 100 are used for contacts and boundaries which are described in the WAL250.CON file. Linecodes > 100 and < 600 represent structural features which are described in the WAL250K.ST2 file. Linecodes > 800 refer to linear geologic units (dikes and sills) which are described in the WAL250K.LGU file.
<b>name</b>	character	30	Name given to structural feature.
<b>source</b>	integer	4	Numeric code used to identify the data source for the linear feature. Complete references for the sources are listed in the WAL250K.REF file.

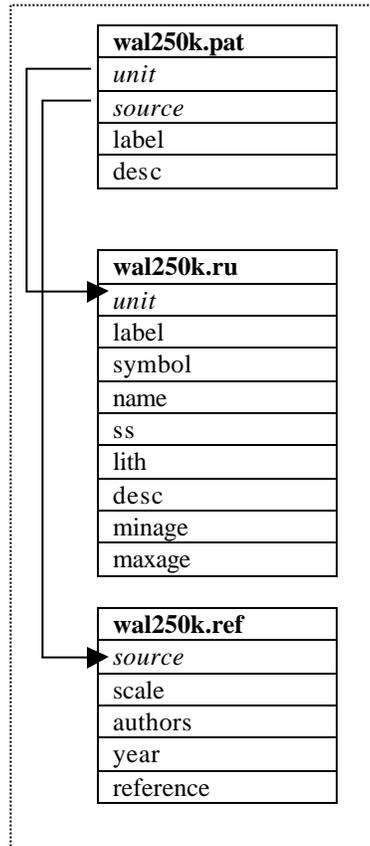
Attribute descriptions for items in the contact (and boundary) look-up table, wal250k.con (for use with the GEOL\_SFO.LIN lineset), are as follows:

WAL250K.CON			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>linecode</b>	integer	3	Numeric code (a value < 100) used to identify type of contact or boundary. (This item also occurs in WAL250K.AAT).
<b>symbol</b>	integer	3	Line symbol number used by ArcInfo to plot line. (Symbol numbers refer to the <b>GEOL_SFO.LIN lineset</b> )
<b>type</b>	character	10	Major type of line, e.g., contact, state boundaries, lines of latitude and longitude used for neatlines.
<b>modifier</b>	character	20	Line type modifier, i.e., approximate, concealed, gradational. No entry implies 'known.'
<b>certainty</b>	character	15	Degree of certainty of contact or boundary, i.e., inferred, uncertain. No entry implies 'certain.'
<b>desc</b>	character	100	Written description or explanation of contact or boundary.

Arc attribute table and related look-up tables:



Polygon attribute table and related look-up tables:



Point attribute table and related look-up tables:

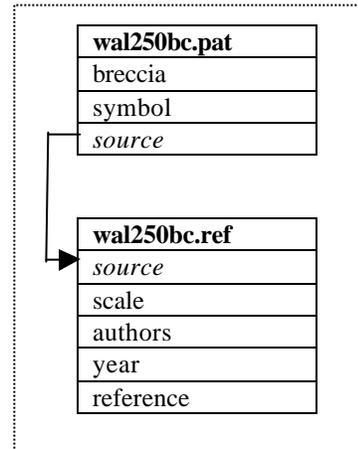


Figure 4. Relationships between feature attribute tables and look-up tables.

Attribute descriptions for items in the structure look-up table, WAL250K.ST2 (for use with the GEOL\_SFO.LIN lineset), are as follows:

<b>WAL250K.ST2</b>			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>linecode</b>	integer	3	Numeric code (a value > 100 and < 600) used to identify type of structural feature. (This item also occurs in WAL250K.AAT).
<b>symbol</b>	integer	3	Line symbol number used by ArcInfo to plot line (symbol numbers refer to the <b>GEOL_SFO.LIN lineset</b> ).
<b>type</b>	character	10	Major type of structure, i.e., fault, fracture, fold, other.
<b>horizontal</b>	character	20	Type of horizontal fault movement, e.g., left-lateral, right-lateral. No entry implies 'unknown.'
<b>vertical</b>	character	20	Type of vertical fault movement, e.g., normal. No entry implies 'unknown.'
<b>fold</b>	character	15	Type of fold, e.g., anticline, syncline.
<b>plunge</b>	character	15	Type of plunge on fold, i.e., horizontal, plunging, plunging in, plunging out.
<b>accuracy</b>	character	15	Line type modifier indicating degree of accuracy, i.e., approximately located, concealed, gradational. No entry implies 'known.'
<b>certainty</b>	character	15	Degree of certainty of contact or boundary, i.e., inferred, uncertain. No entry implies 'certain.'
<b>desc</b>	character	100	Written description or explanation of structural feature.

Attribute descriptions for items in the linear geologic unit look-up table, WAL250K.LGU (for use with the GEOL\_SFO.LIN lineset), are as follows:

<b>WAL250K.LGU</b>			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>linecode</b>	integer	3	Numeric code (a value > 800) used to identify type of linear geologic unit. (This item also occurs in WAL250K.AAT).
<b>label</b>	character	10	Map label used in the map proper to identify map unit.
<b>symbol</b>	integer	3	Line symbol number used by ArcInfo to plot linear geologic unit. (Symbol numbers refer to the <b>geol_sfo.lin lineset</b> )
<b>type</b>	character	10	Major type of linear geologic unit, e.g., dike, vein, or other.
<b>accuracy</b>	character	15	Line type modifier indicating degree of accuracy, i.e., approximate, concealed, gradational. No entry implies 'known.'
<b>certainty</b>	character	15	Degree of line type certainty, i.e., inferred, uncertain. No entry implies 'certain.'
<b>desc</b>	character	100	Written description or explanation of linear geologic units.

## Areal Features

Descriptions of the items identifying geologic units in the polygon attribute table, WAL250K.PAT, are as follows:

<b>WAL250K.PAT</b>			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>unit</b>	integer	4	Numeric code used to identify the rock unit which is described in the WAL250K.RU look-up table (this item also occurs in the WAL250K.RU table).
<b>source</b>	integer	4	Numeric code used to identify the data source for the rock unit. Complete references for the sources are listed in the WAL250K.REF file.
<b>label</b>	character	10	Rock unit label (abbreviation) used to label unit on the map. (This item was joined from the WAL250K.RU look-up table.)
<b>desc</b>	character	100	Formal or informal unit name.(This item was joined from the WAL250K.RU look-up table.)

Attribute descriptions for items in the lithology (rock unit) look-up table, WAL250K.RU (for use with the calcomp1.shd shadeset), are as follows:

<b>WAL250K.RU</b>			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>unit</b>	integer	4	Numeric code used to identify rock unit (this item also occurs in WAL250K.PAT).
<b>label</b>	character	10	Rock unit label (abbreviation) used to label unit on the map.
<b>symbol</b>	integer	3	Shadeset symbol number used by ArcInfo to plot a filled/shaded polygon. The symbol numbers used in this file refer to the CALCOMP1.SHD shadeset.
<b>name</b>	character	7	The prefix portion of the rock unit label that does not include subscripts. If subscripting is not used in the original unit label, then the 'name' entry is the same as the 'label' entry.
<b>ss</b>	character	3	The suffix portion of the rock unit label that includes subscripts.
<b>lith</b>	character	20	Major type of lithostratigraphic unit, i.e., unconsolidated sediments, sedimentary rocks, metasedimentary rocks, intrusive rocks, extrusive rocks, metamorphic rocks, water, ice.
<b>desc</b>	character	100	Formal or informal unit name
<b>minage</b>	character	7	Minimum stratigraphic age of lithologic unit, i.e., CRET, TERT, PCY, etc.
<b>maxage</b>	character	7	Maximum stratigraphic age of lithologic unit.

### **Point Features**

Descriptions of the items identifying breccia outcrops are given in the point attribute table, WAL250BC.PAT, which is defined as follows:

<b>WAL250BC.PAT</b>			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>breccia</b>	character	3	<b>B</b> indicates brecciated rock
<b>symbol</b>	integer	3	Marker symbol number used by ArcInfo to plot a symbol (triangle) to represent a breccia outcrop. Symbol numbers refer to the ArcInfo USGS.MRK markerset.
<b>source</b>	integer	4	Numeric code used to identify the data source for the location of the breccia outcrop. Complete references for the sources are listed in the WAL250BC.REF file.

### **Source Attributes**

Descriptive source or reference information for the WAL250K and WAL250BC ArcInfo datasets is stored in the WAL250K.REF and WAL250BC.REF files, respectively. Attribute descriptions for items in these files are as follows:

<b>WAL250K.REF / WAL250BC.REF</b>			
ITEM NAME	ITEM TYPE	ITEM WIDTH	ATTRIBUTE DESCRIPTION
<b>source</b>	integer	4	Numeric code used to identify the data source. (This item also occurs in the WAL250K.AAT, WAL250K.PAT, and WAL250BC.PAT files.)
<b>scale</b>	integer	8	Scale of source map. (This value is the denominator of the proportional fraction that identifies the scale of the map that was digitized or scanned to produce the digital map.)
<b>authors</b>	character	200	Author(s) or compiler(s) of source map entered as last name, first name or initial, and middle initial.
<b>year</b>	integer	4	Source (map) publication date
<b>reference</b>	character	250	Remainder of reference in USGS reference format.

## Obtaining Digital Data

The complete digital version of the geologic map is available in ArcInfo exchange (\*.e00) format with associated data files. These data and map images are maintained in a Transverse Mercator map projection:

Projection:	TRANSVERSE
Units:	METERS
Spheroid:	CLARKE1866
Datum:	NAD27
Parameters:	
scale factor at central meridian:	1.00000000
longitude of central meridian	-115 0 0.00
latitude of origin	0 0 0.000
false easting (meters)	0.00000
false northing (meters)	0.00000

To obtain copies of the digital data, do the following:

1. Download the digital files from the USGS public access World Wide Web site on the internet: URL = <http://pubs.usgs.gov/imap/i1509a/>

The Internet site contains the digital geologic map of the Wallace 1° x 2° quadrangle, Montana and Idaho both in ArcInfo exchange-format files (wal250k.e00 and wal250bc.e00) and as a HPGL2 plot file (wal250k.hp) of the map area, as well as the associated data files and ArcInfo macro program which is used to plot the map at a scale of 1:250,000.

To manipulate this data in a geographic information system (GIS), you must have a GIS that is capable of reading ArcInfo exchange-format files.

## Obtaining Paper Maps

Paper copies of the digital geologic map are not available from the USGS. However, with access to the Internet and access to a large-format color plotter that can interpret HPGL2 (Hewlett-Packard Graphics Language), a 1:250,000-scale paper copy of the map can be made, as follows:

1. Download the plot file of the map, **wal250k.hp**, from the USGS public access World Wide Web site on the Internet using the URL = <http://pubs.usgs.gov/imap/i1509a/>
-

This file can be plotted by any large-format color plotter that can interpret HPGL2. The finished plot is about 43 by 28 inches.

Paper copies of the map can also be created by obtaining the digital files as described above and then creating a plot file in a GIS, using the ArcInfo macro language (AML) program, wal250k.aml, included in the data package.

## **References Cited**

Harrison, J.E., Griggs, A. B., and Wells, J. D., 1986, Geologic and structure maps of the Wallace 1° x 2° quadrangle, Montana and Idaho: U.S. Geological Survey Miscellaneous Investigations Series Map I-1509-A, 2 sheets (scale 1:250,000).

## Appendix A - List of digital files in the Wallace GIS

- Use the 'importfile.aml' to IMPORT all of the \*.E00 files for use in ArcInfo.
- Use the ArcInfo 'DRAW' command to plot the \*.GRA file to your screen. (Make sure the display is set with the ArcInfo 'DISPLAY' command.)
- Use the ArcInfo 'HPGL2' command to create a HPGL2 file from the \*.GRA file.
- Use the UNIX 'lpr -P<plotter\_name> wal250k.hp' command to send the wal250k.hp file to a large-format color plotter that can interpret Hewlett-Packard Graphics Language.
- To re-create the \*.GRA file, enter '&run wal250k' at the Arc prompt.

### Primary ArcInfo exchange-format (\*.e00) and metadata (\*.met.txt) files for the digital geology:

- wal250k.e00 – line and poly GIS
- wal250bc.e00 – point GIS
- wal250kmet.txt - metadata

### ArcInfo graphics (\*.gra) and HPGL2 map plot (\*.hp) files for the geologic map sheet:

- wal250k.gra /.hp

### Additional ArcInfo exchange - format files (\*.e00) necessary to re-create the geologic map sheet:

- calcomp1.shd.e00 - shadeset
- geol\_sfo.lin.e00 - lineset
- usgs.mrk.e00 - markerset
- wal250tm.e00 - exterior boundary of the Wallace quadrangle

### AML, graphics, key, symbolset and text files necessary to re-create the geologic map sheet:

- scale2a.aml – program to plot scale bar
- wal250k.aml - program to create graphics file of the geologic map.
- indx\_wal.gra - index map graphic file.
- usgslogo.gra – USGS visual identity

- wa\_line.key - lineset symbol values and descriptive text for lines on the map sheet
- wa\_line2.key – more lineset symbol values and descriptive text for lines on the map sheet
- wa\_pol.key - shadeset symbol values and descriptive text for geologic map units on the map sheet
- wa\_point.key – markerset symbol values and descriptive text for breccia outcrops
- geo.prj - a text file used to identify real-world (geographic) coordinates - for use in adding latitude and longitude notation around the margins of the Wallace quadrangle
- tvn.prj - a text file to identify Transverse Mercator projection - for use in adding latitude and longitude notation around the margins of the Wallace quadrangle.
- walcrd.txt - text file listing map credits
- waldisc.txt – text file for USGS disclaimer
- walref.txt - text file listing map references

## Appendix B - ArcInfo Macro Language program (wal250k.aml) used to plot the geologic map of the Wallace quadrangle

```

/* wal250k.aml, 9/5/00, bk/pd

/* to plot the digital geologic map of the
Wallace 1ø x 2ø quadrangle in color (scale
1:250,000)
/*****
/* This Arc/Info Macro Language (AML)
program will plot a geologic map for the
Wallace 1ø x 2ø quadrangle.
/* To run this AML:
/* 1. type '&r wal250k' at the Arc: prompt,
/* 2. Run the Arc/Info HPGL2 command to
convert the GRA file to an HPGL2 file, i.e.,
hpgl2 wal250k wal250k.hp # 1.0 opaque # 0 # #
# cal.dat
/* 3. Execute the UNIX 'lpr' command to print
the 1:250,000-scale geologic map on your
plotter, i.e., lpr -Ppicasso wal250k.hp
/*****
arcplot
display 1040
wal250k.gra

clear
clearselect

pagesize 35.0 28.0
pageunits inches
mapunits meters
mapscale 250000
mapposition ll 0.75 6.0
mapangle 0.2

&set cover wal250k
&set quad wal250tm
&set key1 wa_pol.key
&set key2 wa_line.key
&sv key3 = wa_point.key
&sv key4 = wa_line2.key
&s credits walcrd.txt
&s disclaimer waldisc.txt
&sv logo = usgslogo.gra
&sv points = wal250bc
&sv reference = walref.txt

/* -->where 'cover' contains contacts and
structures and rock units and 'quad' is the
quadrangle boundary.

&label step_one
mape %cover%
maplimits 0.0 2.4 26 26

/*draw outside box
linesymbol 9
linecolor 1
box 0.5 0.5 34.5 27.5
textquality proportional
textfont 94021
linedelete all

/* cut marks
markerset plotter
markersymbol 1
markersize 0.1
marker 0 0
marker 0 28
marker 35 0
marker 35 28

&label shadepolys
/* color polygons for geologic rock units
shadedelete all
shadeset calcomp1.shd
polygonshade %cover% unit %cover%.ru

&label contacts
lineset geol_sfo.lin
res %cover% arcs linecode gt 0 and linecode lt
40
arclines %cover% linecode %cover%.con
asel %cover% arcs
linedelete all
lineset geol_sfo.lin
res %cover% arcs linecode gt 40 and linecode lt
100 and linecode ne 41
arclines %cover% linecode %cover%.con
asel %cover% arcs
lineset plotter.lin
res %cover% arcs linecode = 41
arclines %cover% linecode %cover%.con

```

```

asel %cover% arcs

&label structure
/* plot faults with line patterns
linedelete all
lineset geol_sfo.lin
res %cover% arcs linecode gt 100 and linecode
lt 600 and linecode ne 425 and linecode ne 428
arclines %cover% linecode %cover%.st2
asel %cover% arcs
lineset plotter.lin
res %cover% arcs linecode = 425 or linecode =
428
arclines %cover% linecode %cover%.st2
asel %cover% arcs

&label lgu
linedelete all
lineset geol_sfo.lin
res %cover% arcs linecode >= 800
arclines %cover% linecode %cover%.lgu
asel %cover% arcs

&label breccia
markerdelete all
markerset usgs.mrk
pointmarkers %points% symbol

&label mapquad
/* plot quadrangle boundary
linedelete all
lineset plotter
linesymbol 5
arcs %quad%

&label geolabels
textsize 0.10
res %cover% poly area gt 3000000
labeltext %cover% unit %cover%.ru cc
asel %cover% poly

&label titles
plot %logo% box 2 25.75 5 26.75
textfont 93715
textquality kern
textsize 0.35
move 5.5 26.35
text 'U.S. Department of the Interior'
move 5.5 25.85
text 'U.S. Geological Survey'
move 33.5 26.35

text 'Miscellaneous Investigations Series Map I-
1509-A' lr
move 33.5 25.85
text 'Database, version 1.0' lr
textfont 93711
textsize 0.4
move 13.75 6.0
text 'Geologic and Structure Maps of the
Wallace 1ø x 2ø Quadrangle, Montana and
Idaho: A Digital Database' lc
textsize 0.3
move 13.75 5.4
text 'By' lc
move 13.75 4.95
text 'Jack E. Harrison, Allan B. Griggs, and John
D. Wells' lc
move 13.75 4.5
text 'Digital database by' lc
move 13.75 4.05
text 'William N. Kelley, Pamela D. Derkey, and
EROS Data Center' lc
move 13.75 3.60
text '2000' lc
move 13.75 3.15
text '(map originally published in 1986)' lc

&label explan
/* plot explanation - geologic units
shadedelete all
shadeset calc omp1.shd
textfont 93711
textsize 0.25
move 27 24.25
text 'Explanation'
textsize 0.12
textquality proportional
textfont 94021
keyarea 27 7 34 24
keybox 0.6 0.35
keyseparation 0.2 0.2
keyshade %key1%

&label linekey
linedelete all
lineset geol_sfo.lin
/*keyarea 34.65 4.3 39.9 22.5
keybox 1 0
keyline %key2% nobox
lineset plotter.lin
keybox 1 0
keyline %key4% nobox

```

```
&label pointkey
markerdelete all
markerset usgs.mrk
keybox 0.15 0.15
markerscale 0.25
keymarker %key3% nobox
```

```
&label disclaimer
textfont 93713
textquality proportional
textsize 0.12
move 29 2.2
textfile %disclaimer%
```

```
&label credits
textfont 93713
textquality proportional
textsize 0.12
move 21.75 7.1
textfile %credits%
```

```
&label proj
textfont 93713
textquality proportional
textsize 0.12
move 2.0 7.0
text 'map projection: Transverse Mercator'
```

```
&label scale
linedelete all
lineset plotter
textfont 94021
textsize 0.12
&r scale2a 13.75 2.25 other 250000
```

```
&label references
textfont 93711
textsize 0.25
```

```
textcolor 1
move 29 6.25
text 'References'
move 29 6
textsize 0.12
textquality proportional
textfont 94021
textfile %reference%
```

```
&label index-map
plot indx_wal.gra box 29 3.25 32 5.25
textfont 93713
textquality proportional
textsize 0.12
move 29 3.125
text 'Index map showing Wallace quadrangle'
```

```
&label lat-long
mape %quad%
linecolor 1
mapprojection geo.prj tvn.prj
neatline -116 47.0 -114 48.0 geo.prj
neatlinehatch 0.25 0.25 0.2 0 geo.prj
textset font.txt
textsymbol 1
textsize 8 pt
textstyle typeset
textoffset -0.35 0.15
neatlinelabels 0.25 top all geo.prj dms
textoffset -0.75 0.0
neatlinelabels 0.25 left all geo.prj dms
```

```
&label done
quit
display 9999 3
draw wal250k
&return
```

## Appendix C - Metadata file (wal250kmet.txt) for the Wallace GIS

### Identification\_Information:

#### Citation:

##### Citation\_Information:

##### Originator:

Harrison, J.E., Griggs, A.B., Wells, J.D., Kelley, W.N.,  
Derkey, P.D., and EROS Data Center

Publication\_Date: 2000

##### Title:

Geologic and structure maps of the Wallace 1- x 2- degree  
quadrangle, Montana and Idaho: a digital database

Edition: version 1.0

Geospatial\_Data\_Presentation\_Form: map

##### Series\_Information:

Series\_Name: Miscellaneous Investigations Series

Issue\_Identification: Map I-1509-A

##### Publication\_Information:

Publication\_Place: Menlo Park CA

Publisher: U.S. Geological Survey

Online\_Linkage: <http://pubs.usgs.gov/imap/i1509a/>

### Description:

#### Abstract:

This dataset was digitized by the U.S. Geological Survey EROS Data Center and U.S. Geological Survey Spokane Field Office for input into an Arc/Info geographic information system (GIS) The digital geologic map database can be queried in many ways to produce a variety of derivative geologic maps.

#### Purpose:

This dataset was developed to provide a geologic map GIS of the Wallace 1 x 2 degree quadrangle for use in future spatial analysis by a variety of users.

This database is not meant to be used or displayed at any scale larger than 1:250,000 (e.g., 1:100,000 or 1:24,000)

#### Supplemental\_Information:

This GIS consists of two major and Arc/Info datasets: one line and polygon file (wal250k) containing geologic contacts and structures (lines) and geologic map rock units (polygons), and one point file (wal250bc) containing breccia outcrops.

### Time\_Period\_of\_Content:

#### Time\_Period\_Information:

##### Single\_Date/Time:

Calendar\_Date: 2000

Currentness\_Reference: publication date

### Status:

Progress: complete

Maintenance\_and\_Update\_Frequency: As needed

Spatial\_Domain:

Bounding\_Coordinates:

West\_Bounding\_Coordinate: -116.0

East\_Bounding\_Coordinate: -114.0

North\_Bounding\_Coordinate: 48.0

South\_Bounding\_Coordinate: 47.0

Keywords:

Theme:

Theme\_Keyword\_Thesaurus: none

Theme\_Keyword: geology

Theme\_Keyword: geologic map

Place:

Place\_Keyword\_Thesaurus: none

Place\_Keyword: Shoshone County

Place\_Keyword: Sanders County

Place\_Keyword: Flathead County

Place\_Keyword: Lake County

Place\_Keyword: Mineral County

Place\_Keyword: Missoula County

Place\_Keyword: Idaho

Place\_Keyword: Montana

Place\_Keyword: Wallace

Place\_Keyword: Pacific Northwest

Place\_Keyword: USA

Use\_Constraints:

This digital database is not meant to be used or displayed at any scale larger than 1:250,000 (e.g., 1:100,000 or 1:24,000).

Any hardcopies utilizing these datasets shall clearly indicate their source. If users modify the data in any way they are obligated to describe the types of modifications they have performed on the hardcopy map. User specifically agrees not to misrepresent these datasets, nor to imply that changes they made were approved by the U.S. Geological Survey.

Point\_of\_Contact:

Contact\_Information:

Contact\_Person\_Primary:

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Contact\_Organization: U.S. Geological Survey

Contact\_Position: geologist

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Address\_Type: mailing and physical address

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Postal\_Code: 99201

Country: USA

Contact\_Voice\_Telephone: 1-509-368-3114

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**Data\_Set\_Credit:**

Staff at EROS Data Center digitized the geologic map and prepared minimally attributed Arc/Info exchange-format files; R.J. Miller, R. Vandiver, M.C. Koenig (Eastern Washington University), and S.R. Munts (contractor) all participated in the initial edits of the dataset. William N. Kelley (contractor) completed the editing and attributing of arcs and polygons, and digitized the breccia point coverage (wal250bc).

**Native\_Data\_Set\_Environment:**

SunOS, 5.7, sun4u UNIX ARC/INFO  
version 7.2.1

**Access\_Constraints:** none**Data\_Quality\_Information:****Attribute\_Accuracy:****Attribute\_Accuracy\_Report:**

Attribute accuracy was verified by manual comparison of the source with hard copy printouts and plots.

**Logical\_Consistency\_Report:**

Polygon and chain-node topology present. Polygons intersecting the neatline are closed along the border. Segments making up the outer and inner boundaries of a polygon tie end-to-end to completely enclose the area. Line segments are a set of sequentially numbered coordinate pairs. No duplicate features exist nor duplicate points in a data string. Intersecting lines are separated into individual line segments at the point of intersection. Point data are represented by two sets of coordinate pairs, each with the same coordinate values. All nodes are represented by a single coordinate pair which indicates the beginning or end of a line segment. The neatline was generated by mathematically generating the four sides of the quadrangle, densifying the lines of latitude and projecting the file to Transverse projection.

**Completeness\_Report:**

All geologic units were captured from Harrison and others (1986) at a scale of 1:250,000.

**Positional\_Accuracy:****Horizontal\_Positional\_Accuracy:****Horizontal\_Positional\_Accuracy\_Report:**

Arcs and points are probably no more accurate than 58 meters based upon measurements taken by comparing a paper plot with an original plate from the Harrison and others (1986) report.

**Lineage:****Source\_Information:****Source\_Citation:****Citation\_Information:**

Originator: Harrison, J.E.

Originator: Griggs, A.B.

Originator: Wells, J.D.

Publication\_Date: 1986

Title:  
 Geology and structure maps of the Wallace 1- x 2-degree quadrangle, Montana and Idaho  
 Geospatial\_Data\_Presentation\_Form: map  
 Series\_Information:  
 Series\_Name: Miscellaneous Investigations Series  
 Issue\_Identification: Map I-1509-A  
 Publication\_Information:  
 Publisher: U.S. Geological Survey  
 Source\_Scale\_Denominator: 250,000  
 Type\_of\_Source\_Media: paper map  
 Source\_Time\_Period\_of\_Content:  
 Time\_Period\_Information:  
 Single\_Date/Time:  
 Calendar\_Date: 1986  
 Source\_Currentness\_Reference: publication date  
 Source\_Citation\_Abbreviation: Harrison and others, 1986  
 Source\_Contribution: This is the source for all the datasets  
 Process\_Step:  
 Process\_Description:  
 Geologic map (Harrison and others, 1986) was digitized by USGS EROS Data Center and given minimal attributing. Dataset was edited and attributed by USGS Spokane Field Office staff and contractors.  
 Process\_Date: 1999 - 2000  
 Spatial\_Data\_Organization\_Information:  
 Direct\_Spatial\_Reference\_Method: Vector  
 Point\_and\_Vector\_Object\_Information:  
 SDTS\_Terms\_Description:  
 SDTS\_Point\_and\_Vector\_Object\_Type: Point  
 Point\_and\_Vector\_Object\_Count: 5817  
 SDTS\_Point\_and\_Vector\_Object\_Type: String  
 Point\_and\_Vector\_Object\_Count: 14617  
 SDTS\_Point\_and\_Vector\_Object\_Type: GT-polygon composed of chains  
 Point\_and\_Vector\_Object\_Count: 5818  
 Spatial\_Reference\_Information:  
 Horizontal\_Coordinate\_System\_Definition:  
 Planar:  
 Map\_Projection:  
 Map\_Projection\_Name: Transverse Mercator  
 Transverse\_Mercator:  
 Scale\_Factor\_at\_Central\_Meridian: 1.00000  
 Longitude\_of\_Central\_Meridian: -115  
 Latitude\_of\_Projection\_Origin: 0  
 False\_Easting: 0.00000  
 False\_Northing: 0.00000  
 Planar\_Coordinate\_Information:  
 Planar\_Coordinate\_Encoding\_Method: coordinate pair  
 Coordinate\_Representation:  
 Abscissa\_Resolution: 0.0001  
 Ordinate\_Resolution: 0.0001

Planar\_Distance\_Units: Meters

Geodetic\_Model:

Horizontal\_Datum\_Name: North American Datum of 1927

Ellipsoid\_Name: Clarke 1866

Semi-major\_Axis: 6378206.4

Denominator\_of\_Flattening\_Ratio: 294.98

Entity\_and\_Attribute\_Information:

Overview\_Description:

Entity\_and\_Attribute\_Overview:

The "Geologic and structure maps of the Wallace 1- x 2-degree quadrangle, Montana and Idaho: a digital database" report (wal250k.pdf) contains a detailed description of each attribute code and a reference to the associated map symbols on the map source materials. The database includes a geologic linework arc attribute table, wal250k.aat, that relates to the wal250k.con (contact look-up table), wal250k.st2 (structure look-up table), wal250k.lgu (linear geologic unit look-up table), and wal250k.ref (source reference look-up table) files; a rock unit polygon attribute table, wal250k.pat, that relates to the wal250k.ru (rock unit look-up table) and wal250k.ref (source reference look-up table) files; and a breccia point attribute table, wal250bc.pat, that relates to the wal250bc.ref (source reference look-up table) files.

Entity\_and\_Attribute\_Detail\_Citation:

See the wal250k.pdf file (available at <http://pubs.usgs.gov/imap/i1509a/>) for detailed descriptions of items in the database.

Distribution\_Information:

Distributor:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization: U.S. Geological Survey

Contact\_Instructions:

This report is only available in an electronic format at the following URL = <http://pubs.usgs.gov/imap/i1509a/>

Distribution\_Liability:

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This digital geologic map GIS of the Wallace 1 x 2 degree quadrangle, Montana and Idaho, is not meant to be used or displayed at any scale larger than 1:250,000 (e.g., 1:100,000 or 1:24,000).

Metadata\_Reference\_Information:

Metadata\_Date: 20000727

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Metadata\_Standard\_Name:

FGDC Content Standards for Digital Geospatial

Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998

Metadata\_Access\_Constraints: none

Metadata\_Use\_Constraints: none