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Digital geologic map of the Rosalia 1:100,000 quadrangle, Washington and Idaho: a digital database for the 1990 S.Z. Waggoner map

by

Pamela D. Derkey¹, Bruce R. Johnson², Beatrice B. Lackaff³, and Robert E. Derkey⁴

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the Spokane County Public Works, Utilities Department,
and the Washington Division of Geology and Earth Resources

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government. The digital database is not meant to be used or displayed at any scale larger than 1:100,000 (e.g., 1:62,500 or 1:24,000)

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¹ U.S. Geological Survey, Spokane, WA 99201

² U.S. Geological Survey, Reston, VA 20192

³ Spokane County Public Works, Utilities Department, Spokane, WA 99260

⁴ Washington Division of Geology and Earth Resources, Spokane, WA 99201

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Introduction

Geologic data from the geologic map of the Rosalia 1:100,000-scale quadrangle compiled by Waggoner (1990) were entered into a geographic information system (GIS) as part of a larger effort to create regional digital geology for the Pacific Northwest. The intent was to provide a digital geospatial database for a previously published black-and-white paper geologic map. This database can be queried in many ways to produce a variety of geologic maps. Digital base map data files 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 1:100,000 (e.g., 1:62,500 or 1:24,000).

The map area is located in eastern Washington and extends across the state border into western Idaho ([Fig. 1](#)). This open-file report describes the methods used to convert the geologic map data into a digital format, documents the file structures, and explains how to download the digital files from the U.S. Geological Survey public access World Wide Web site on the Internet.

We wish to thank J. Eric Schuster of the Washington Division of Geology and Earth Resources for providing the original stable-base mylar and the funding for it to be scanned. We also thank Dick Blank and Barry Moring of the U.S. Geological Survey for reviewing the manuscript and digital files, respectively.

Data Sources, Processing, and Accuracy

Plate 1 from Waggoner (1990) was the sole source of geologic data used to create the digital map. The original stable-base mylar of the geologic linework for the 1:100,000-scale geologic map (Waggoner, 1990, pl. 1) was electronically scanned to create a raster digital image. The resulting TIFF-format image (600 dot per inch resolution) was registered to a UTM grid and rectified in Arc/Info. The rectified raster image was then converted to a vector GIS layer using the GRIDLINE vectorization tool included in the Arc/Info GRID extension. Subsequent clean-up of the vector layer was done in PC Arc/Info. Linework for water bodies that obscured geologic contacts was converted from digital line graph (DLG) format files (U.S. Geological Survey, 1993) to PC Arc/Info so as to delineate discrete geologic unit boundaries. The resulting geologic map was attributed, converted to Arc/Info, and then plotted and compared to the original mylar to check for digitizing and attributing errors.

Point data (strike and dip of beds, etc.) were digitized from the original mylar into GSMP, ver. 9 (Selner and Taylor, 1993) as points in a UTM, zone 11 map projection. These data were output to Arc/Info GENERATE-format files using the GSMGIS utility (G.I. Selner, written commun., 1994). An Arc/Info point location map was then generated, attributed and annotated.

The overall accuracy (with respect to the location of lines and points) of the digital geologic map ([Figs. 2 and 3](#)) is probably no better than +/- 70 meters. This digital database is not meant to be used or displayed at any scale larger than 1:100,000 (e.g., 1:62,500 or 1:24,000).

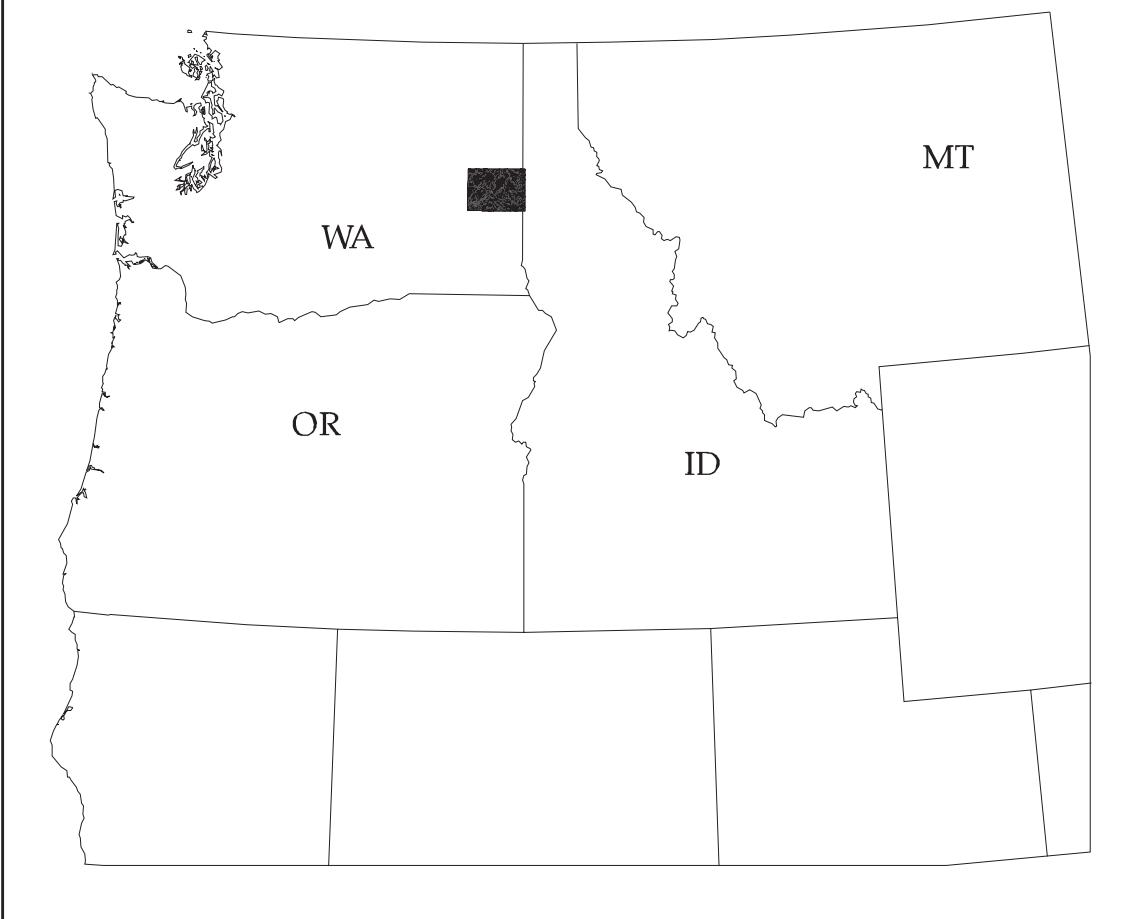


Figure 1. Index map showing the geographic extent of the Rosalia quadrangle (black fill) with respect to the Pacific Northwest. (Although the quadrangle extends into Idaho, it is not very apparent at this scale.)

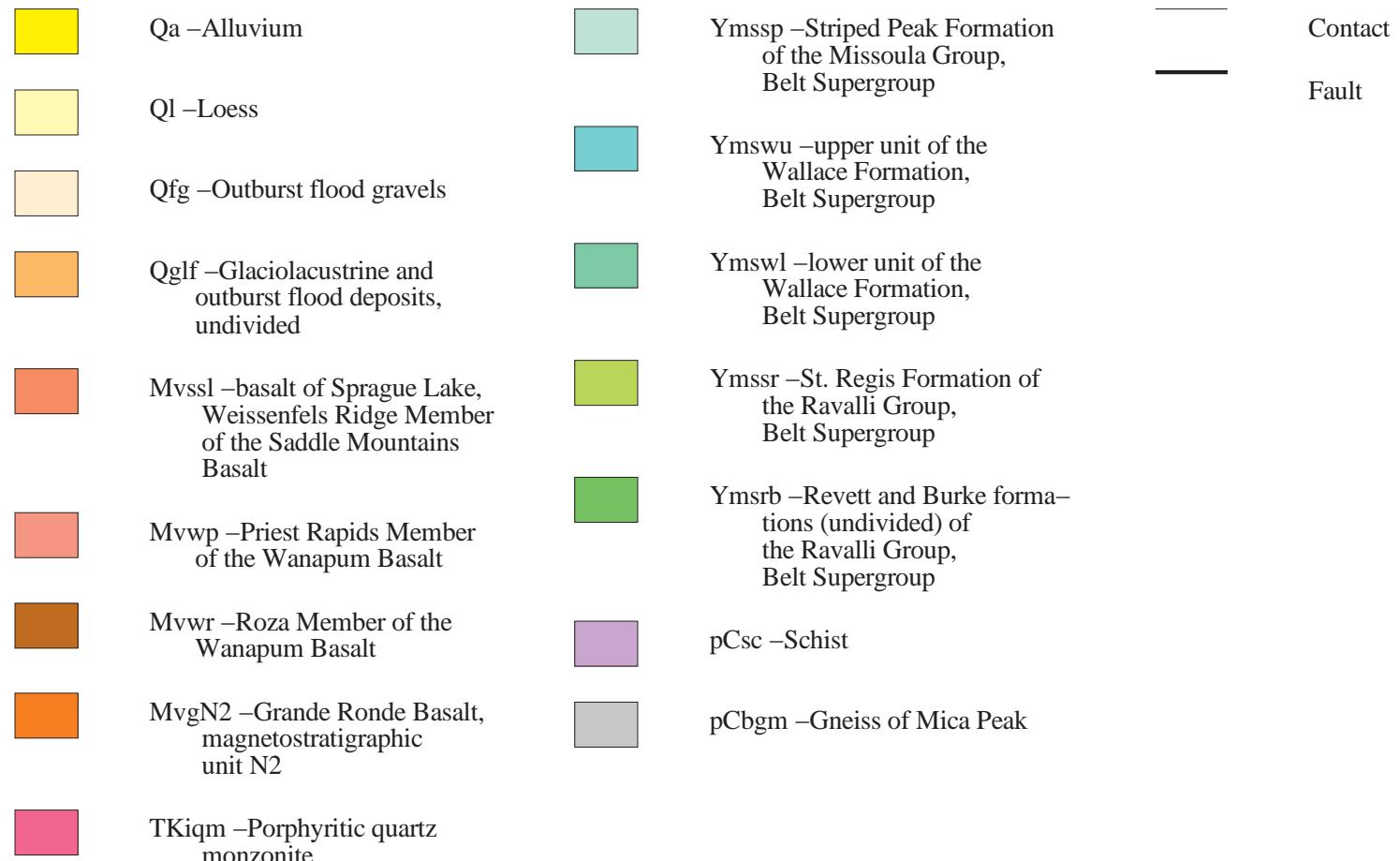


Figure 2. Explanation for the Digital Geologic Map of the Rosalia 1:100,000 quadrangle, Washington and Idaho

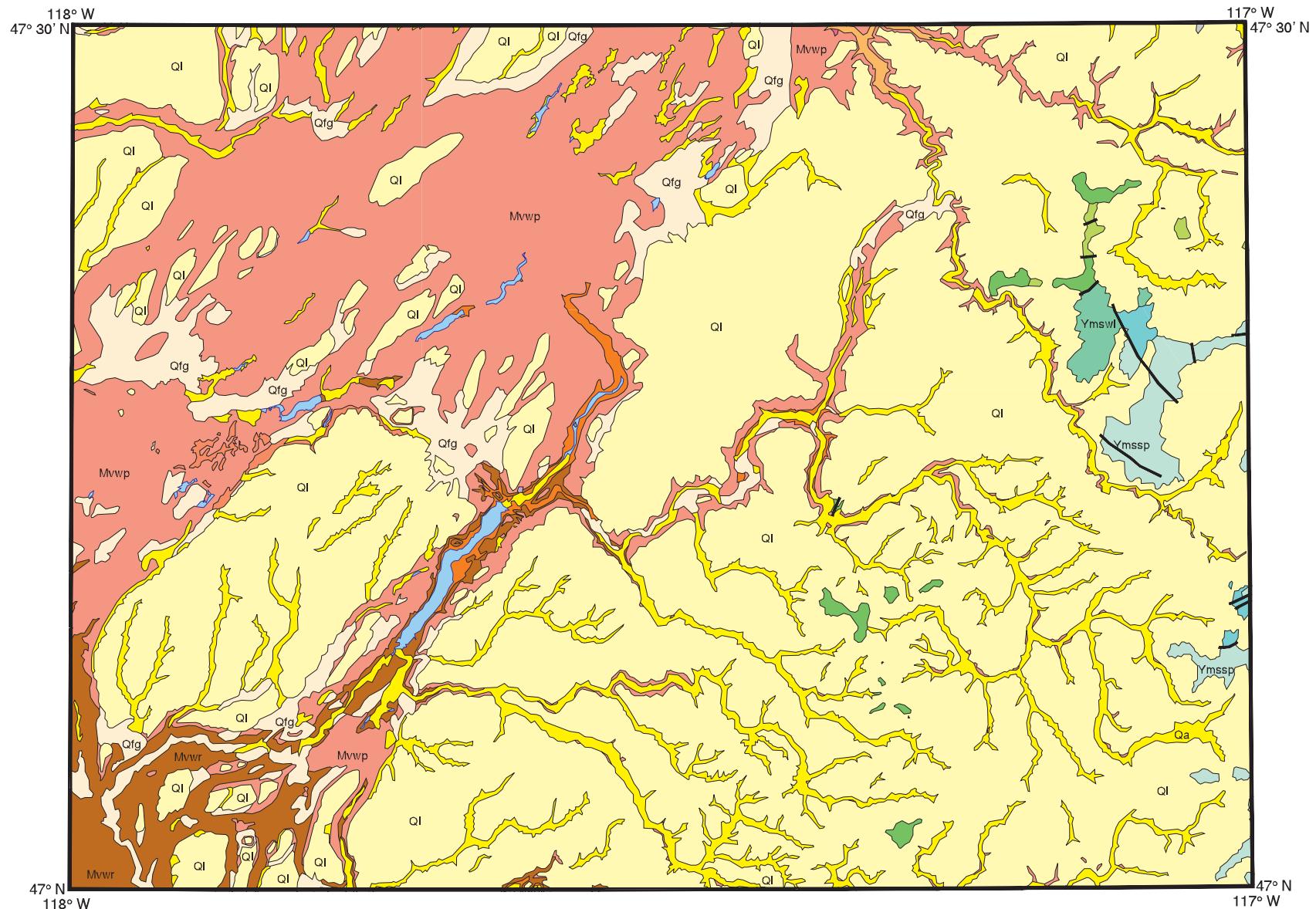


Figure 3. Digital Geologic Map of the Rosalia 1:100,000 quadrangle, Washington and Idaho

GIS Documentation

The digital geologic map of the Rosalia 1:100,000 quadrangle includes an arc (or line) attribute table, ROS100K.AAT, that relates to the ROS100K.CON, ROS100K.STR and ROS100K.REF files; a polygon attribute table, ROS100K.PAT, that relates to the ROS100K.RU and ROS100K.REF files; and a point attribute table, ROSPNT.PAT, that relates to the ROSPNT.ALC, ROSPNT.GEO and ROS100K.REF files (see Fig. 4).

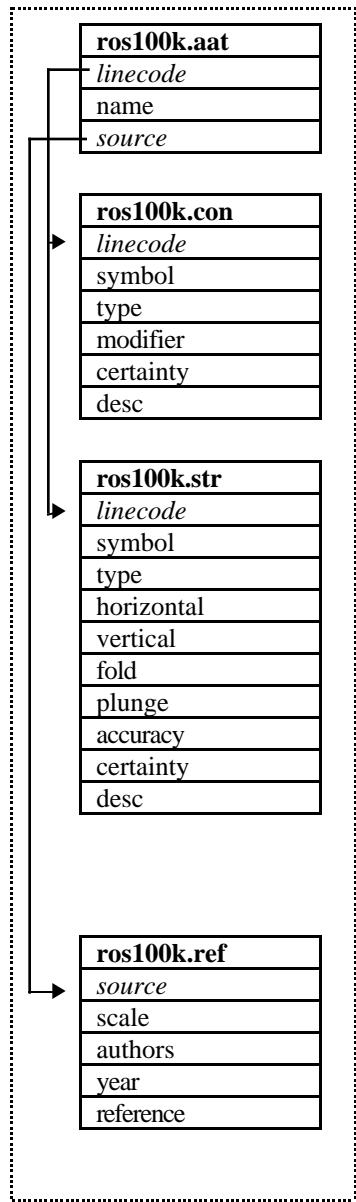
These data files are described below.

Linear Features

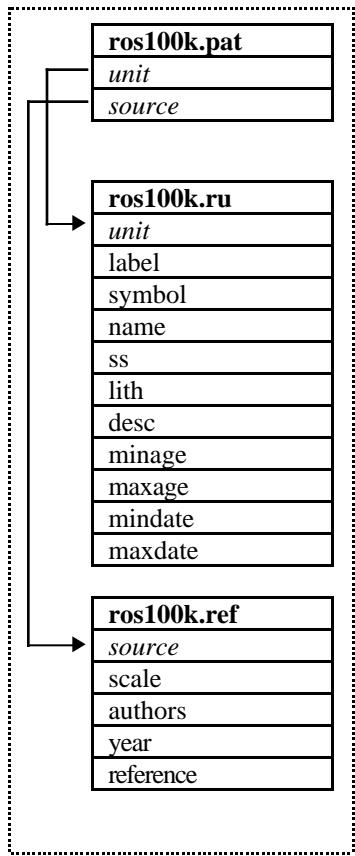
Descriptions of the items identifying linear features such as contacts, boundaries (e.g., shorelines, lines of latitude and longitude) and structures in the arc (or line) attribute table, ROS100K.AAT, are as follows:

ROS100K.AAT			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
linecode	integer	3	Numeric code used to identify type of linear feature. Linecodes < 100 are used for contacts and boundaries which are described in the ROS100K.CON file . Linecodes > 100 and < 600 represent structural features which are described in the ROS100K.STR file .
name	character	30	Name given to structural feature. No faults were named in the original source map, thus this item does not contain any names.
source	integer	4	Numeric code used to identify the data source for the linear feature. Complete references for the sources are listed in the ROS100K.REF file .

Arc attribute table and related look-up tables:



Polygon attribute table and related look-up tables:



Point attribute table and related look-up tables:

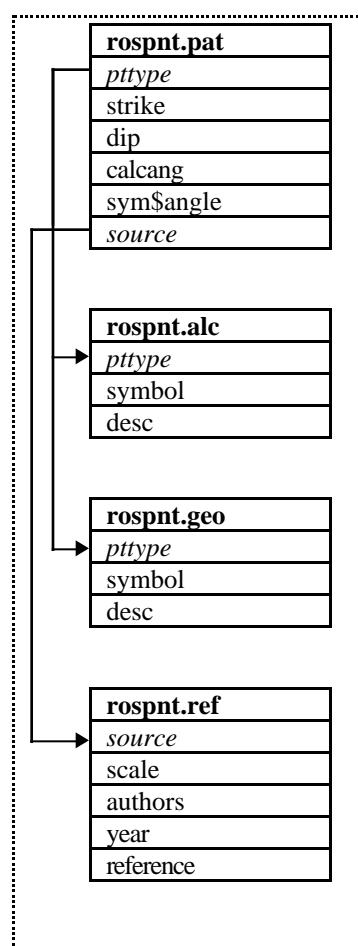


Figure 4: Relationships between feature attribute tables and look-up tables.

Attribute descriptions for items in the contact (and boundary) look-table, ROS100K.CON (for use with the PLOTTER.LIN lineset), are as follows:

ROS100K.CON			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
linecode	integer	3	Numeric code (a value < 100) used to identify type of contact or boundary. (This item also occurs in ROS100K.AAT .)
symbol	integer	3	Line symbol number used by Arc/Info to plot arc (line). (Symbol numbers refer to the PLOTTER.LIN lineset.)
type	character	10	Major type of line, e.g., contact, shoreline, lines of latitude and longitude used for neatlines.
modifier	character	20	Line type modifier, i.e., approximate, concealed, gradational
certainty	character	15	Degree of certainty of contact or boundary, i.e., inferred, uncertain. No entry implies ‘certain.’
desc	character	100	Written description or explanation of contact or boundary.

Attribute descriptions for items in the structure look-up table, ROS100K.STR (for use with the GEOLOGY.LIN lineset), are as follows:

ROS100K.STR			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
linecode	integer	3	Numeric code (a value > 100 and < 600) used to identify type of structural feature. (This item also occurs in ROS100K.AAT .)
symbol	integer	3	Line symbol number used by Arc/Info to plot arc (line). Symbol numbers refer to the GEOLOGY.LIN lineset (Fitzgibbon and Wentworth, 1991).
type	character	10	Major type of structure, i.e., fault, fracture, fold, other.
horizontal	character	20	Type of horizontal fault movement, e.g., left-lateral, right-lateral. No entry implies ‘unknown.’
vertical	character	20	Type of vertical fault movement, e.g., normal. No entry implies ‘unknown.’
fold	character	15	Type of fold, e.g., anticline, syncline.
plunge	character	15	Type of plunge on fold, i.e., horizontal, plunging, plunging in, plunging out.
accuracy	character	15	Line type modifier indicating degree of accuracy, i.e., approximately located, concealed, gradational.
certainty	character	15	Degree of certainty of contact or boundary, i.e., inferred, uncertain. No entry implies ‘certain.’
desc	character	100	Written description or explanation of structural feature.

Areal Features

Descriptions of the items identifying geologic units in the polygon attribute table, ROS100K.PAT, are as follows:

ROS100K.PAT			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
unit	integer	4	Numeric code used to identify the rock unit which is described in the ROS100K.RU look-up table. (This item also occurs in ROS100K.RU .)
source	integer	4	Numeric code used to identify the data source for the rock unit. Complete references for the sources are listed in the ROS100K.REF file .

Attribute descriptions for items in the lithology (rock unit) look-table, ROS100K.RU (for use with the CALCOMP1.SHD shadeset), are as follows:

ROS100K.RU			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
unit	integer	4	Numeric code used to identify rock unit. (This item also occurs in ROS100K.PAT .)
label	character	10	Rock unit label (abbreviation) used to label unit on map.
symbol	integer	3	Shadeset symbol number used by Arc/Info to plot a filled/shaded polygon. (The symbol numbers used in this file refer to the CALCOMP1.SHD shadeset .)
name	character	7	The prefix portion of the geologic unit label that does not include subscripts. (If no subscripts are used in the label, then the 'name' entry is the same as the 'label' entry.)
ss	character	3	The suffix portion of the geologic unit label that includes subscripts.
lith	character	20	Major type of lithostratigraphic unit, i.e., unconsolidated sediments, sedimentary rocks, metasedimentary rocks, intrusive rocks, extrusive rocks, metamorphic rocks, water, ice.
desc	character	100	Formal or informal unit name
minage	character	7	Minimum stratigraphic age of lithologic unit, i.e., CRET, TERT, PCY.
maxage	character	7	Maximum stratigraphic age of lithologic unit
mindate	integer	4	Minimum radiometric age (in millions of years) if determined.
maxdate	integer	4	Maximum radiometric age (in millions of years) if determined.

The reader is referred to Waggoner (1990) for detailed descriptions of map units.

Point Features

Descriptions of the items identifying geologic map symbols are given in the point attribute table, ROSPNT.PAT (for use with the ALCGEOL.MRK markerset), which is defined as follows:

ROSPNT.PAT			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
pttype	character	15	Type of point symbol, e.g., strike and dip of inclined bedding, strike and dip of inclined cleavage, geochemical sample location.
strike	integer	3	Strike of bedding, metamorphic foliation or cleavage; or geochemical sample number. Strike is an azimuthal angle (measured in degrees from 0 to 360 in a clockwise direction from North). Sample number refers to a rock sample used for geochemical analysis.
dip	integer	3	Dip of bedding, metamorphic foliation or cleavage. This value is an angle measured (in degrees from 0 to 90) down from the horizontal; thus a horizontal dip is 0 degrees and a vertical dip is 90 degrees.
calcang	integer	3	An interim value used to calculate sym\$angle. It turned out that the various structural map symbols in the ALCGEOL.MRK markerset had to be rotated by different amounts to achieve their proper map orientation. For the strike and dip symbols, calcang = strike - 270; for the lineation symbol, calcang = strike - 180 (however, lineation symbols were not used in this quadrangle map).
sym\$angle	integer	3	The angle used to complete the mathematical rotation of the structural map symbol to its proper orientation on the map. This value is the \$angle pseudoitem value for the point. For all of the map symbols, sym\$angle = 0 - calcang.
source	integer	4	Numeric code used to identify the data source for the geologic map symbol. Complete references for the sources are listed in the ROSPNT.REF file .

Attribute descriptions for items in the geologic map symbols look-up table, ROSPNT.ALC (for use with the ALCGEOL.MRK markerset), are as follows:

ROSPNT.ALC			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
pttype	character	15	Type of point symbol, e.g., strike and dip of inclined bedding, strike and dip of inclined cleavage, geochemical sample location. (This item also occurs in the ROSPNT.PAT file .)
symbol	integer	3	Marker symbol number used by Arc/Info to identify type of geologic map symbol. Symbol numbers refer to the ALCGEOLOGY.MRK markerset (Fitzgibbon and Wentworth, 1991).
desc	character	250	Written description or explanation of map symbol.

Attribute descriptions for items in an alternate geologic map symbols look-up table, ROSPNT.GEO (for use with the GEOLOGY.MRK markerset), are as follows:

ROSPNT.GEO			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
pttype	character	15	Type of point symbol, e.g., strike and dip of inclined bedding, strike and dip of inclined cleavage, geochemical sample location. (This item also occurs in the ROSPNT.PAT file .)
symbol	integer	3	Marker symbol number used by Arc/Info to identify geologic map symbol type in the GEOLOGY.MRK markerset (Fitzgibbon and Wentworth, 1991).
desc	character	250	Written description or explanation of map symbol.

Source Attributes

Descriptive source or reference information for the ROS100K and ROSPNT coverages is stored in the ROS100K.REF and ROSPNT.REF files, respectively.

Attribute descriptions for items in the ROS100K.REF and ROSPNT.REF data source files are as follows:

ROS100K.REF / ROSPNT.REF			
ITEM NAME	ITEM TYPE	ITEM LENGTH	ATTRIBUTE DESCRIPTION
source	integer	4	Numeric code used to identify the data source. (This item also occurs in the ROS100K.AAT , ROS100K.PAT , and ROSPNT.PAT files.)
scale	integer	10	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.)
authors	character	100	Author(s) or compiler(s) of source map entered as last name, first name or initial, and middle initial.
year	integer	4	Source (map) publication date
reference	character	250	Remainder of reference in USGS reference format.

Obtaining Digital Data

The complete digital version of the geologic map is available in Arc/Info EXPORT format with associated data files. These data and map images are maintained in a Universal Transverse Mercator (UTM) map projection:

Projection:	UTM
Zone:	11
Y-offset (false northing):	-5,000,000 meters
Units:	meters

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

1. Download the digital files from the USGS public access World Wide Web site on the Internet: **URL = <http://wrgis.wr.usgs.gov/open-file/of98-357/>**
or
2. Anonymous FTP from **wrgis.wr.usgs.gov**, in the directory
pub/open-file/of98-357/

The Internet sites contain the digital geologic map of the Rosalia 1:100,000 quadrangle both in Arc/Info EXPORT-format files (ros100k.e00 and rospnt.e00) and as an HPGL2 plot file (ros100k.hp), as well as the associated data files and Arc/Info macro programs which are used to plot the map at a scale of 1:100,000.

To manipulate this data in a geographic information system (GIS), you must have a GIS that is capable of reading Arc/Info EXPORT-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 1:100,000-scale paper copy of the map can be made, as follows:

1. Download the digital version of the complete map, **ros100k.hp**, from the USGS public access World Wide Web site on the Internet using the
URL = <http://wrgis.wr.usgs.gov/open-file/of98-357/>
or
2. Anonymous FTP the plot file, **ros100k.hp**, from: **wrgis.wr.usgs.gov**, in the directory:
pub/open-file/of98-357/
3. This file can be plotted by any large-format color plotter that can interpret HPGL2. The finished plot is about 29 inches by 39 inches.

Paper copies of the map can also be created by obtaining one of the versions of the digital files as described above and then creating a plot file in a GIS.

References Cited

- Fitzgibbon, Todd T. and Wentworth, Carl M., 1991, ALACARTE user interface – executable AML code and demonstration maps: U.S. Geological Survey Open-File Report 91-587A (as updated October 17, 1996 for version 3.1).
- Selner, G.I. and Taylor, R.B., 1993, GSMAP, and other programs for the IBM PC and compatible microcomputers, to assist workers in the earth sciences (version 9): U.S. Geological Survey Open-File Report 93-511, 363 p.
- U.S. Geological Survey, 1993, 1:100,000-scale digital line graph (DLG) data - hydrography and transportation, Area 13 - Northwestern states: U.S. Geological Survey, US GeoData (optional format), CD-ROM.
- Waggoner, S.Z., compiler, 1990, Geologic map of the Rosalia 1:100,000 quadrangle, Washington-Idaho: Washington Division of Geology and Earth Resources Open File Report 90-7, 20 p. and 1 plate (scale 1:100,000).

Appendix A - List of digital files in the Rosalia GIS

- Use the '00import.aml' to IMPORT all of the *.E00 files for use in Arc/Info.
- Use the Arc/Info 'DRAW' command to plot the *.GRA file to your screen. (Make sure the display is set with the Arc/Info 'DISPLAY' command.)
- Use the Arc/Info 'HPGL2' command to create a HPGL2 file from the *.GRA file.
- Use the UNIX 'lpr -P<plotter_name> ros100k.hp' command to send the ros100k.hp file to a large-format color plotter that can interpret Hewlett-Packard Graphics Language.
- To re-create the *.GRA file, open the ArcPlot module, enter 'display 1040', enter a new filename for the graphics file, enter '&run ros100k' (and enter 'quit' to exit the ArcPlot module).

Primary Arc/Info EXPORT-format

files (pnf*.e00) for the digital geology:

- ros100k.e00
- rospnt.e00

Arc/Info graphics (*.gra) and HPGL2 map plot (*.hp) files for the geologic map plate:

- ros100k.gra /.hp

Additional Arc/Info EXPORT-format files (*.e00) necessary to re-create the geologic map plates:

- calcomp1.shd.e00 - shadeset
- fnt038.e00 - font 38
- fnt039.e00 - font 39
- fnt040.e00 - font 40
- alcgeol.mrk.e00 - markerset
- geology.mrk.e00 - markerset
- rosnet.e00 - latitude and longitude neatline hatch marks

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

- scale2a.aml - plots scale bar on plate
- ros100k.aml - program that creates a graphics file of the geologic map of the Rosalia quadrangle, Idaho.

- index.gra - index map graphic displayed on map plate (showing location of the Rosalia quadrangle with respect to the Pacific Northwest).
- roslin.key - lineset symbol values and descriptive text for lines on the map plate
- rospol.key - shadeset symbol values and descriptive text for geologic map units on the map plate
- rospnt.key - markerset symbol values and descriptive text for map symbols (markers) on the map plate
- geology.lin - lineset
- ros.crd - text file listing map credits on the map plate
- ros.ref - text file listing map references on the map plate
- rosdisc.txt - text file for map disclaimer

Appendix B - Arc/Info Macro Language program (ros100k.aml) used to plot the geologic map of the Rosalia quadrangle

```

/* ros100k.aml, last updated 7/20/98, pd

/* hpgl2 ros100k ros100k.hp # 1.0
opaque # 0 # # # cal.dat
/* lpr -Ppicasso ros100k.hp

/* arcplot, :disp 1040 2, :ros100k, :&r
ros100k, :quit --for an Adobe PostScript
file.
/* ****
/* This Arc/Info Macro Language
(AML) program will plot the geologic
map plate for the Rosalia quadrangle.

/* To run this AML:
/*   1. Type 'ap' at the 'Arc:' prompt to
enter the ArcPlot module,
/*   2. Type 'display 1040' at the
'Arcplot:' prompt to create a GRA file,
/*   3. Enter a filename of your own
choosing at the 'Enter ARC/INFO
Graphics filename :' prompt for the
GRA to be created,
/*   4. Type '&run ros100k' at the 'Arc:''
prompt to start the program,
/*   5. Run the Arc/Info HPGL2
command to convert the GRA file to an
HPGL2 file, i.e., hpgl2 ros100k
ros100k.hp # 1.0 opaque # 0 # # #
cal.dat
/*   6. Execute the UNIX 'lpr' command
to print the 1:100,000-scale geologic map
plot on your plotter, i.e., lpr -Ppicasso
ros100k.hp
/* ****

clear
clearselect

pagesize 40 30

pageunits inches
mapunits meters
mapextent ros100k
mapscale 100000
mapposition ll 0.0 2.5
mapangle 0.35
maplimits 0.0 2.4 32.0 26.4

/* Draw outside box
linesymbol 9
linecolor 1
box .5 .5 38.3 29.0
/*
textquality proportional
textfont 94021
linedelete all
lineset plotter
lineset carto

/* cut marks
markerset plotter
markersymbol 1
markersize 0.1
marker 0 0
marker 0 29.5
marker 39.3 0
marker 39.3 29.5

/* plot geology
shadeset calcomp1
linedelete all
lineset plotter.lin
polygonshade ros100k unit ros100k.ru
res ros100k arcs linecode lt 100 and
linecode gt 0
arclines ros100k linecode ros100k.con
asel ros100k arcs
linedelete all
lineset geology.lin

```

```

res ros100k arcs linecode gt 100 and
linecode lt 800
arclines ros100k linecode ros100k.str
asel ros100k arcs

textsize 0.10
res ros100k poly unit = 202 or unit =
161
labeltext ros100k unit ros100k.ru cc
asel ros100k poly area gt 300000
/*labeltext ros100k unit ros100k.ru cc
overflow off
polygontext ros100k unit ros100k.ru
asel ros100k poly

/* plot points
&label points
markerdelete all
markerset alcgeol.mrk
pointmarkers rospnt pttype rospnt.alc
/* plot annotation
textset font.txt
annotext rospnt all

&label titles
textfont 93715
textquality kern
textsize 0.5
move 1.5 27.5
text 'U.S. DEPARTMENT OF THE
INTERIOR'
move 1.5 26.9
text 'U.S. GEOLOGICAL SURVEY'
move 37.3 27.5
text 'Open-File Report 98-357' lr
move 21.0 28.1
text 'Prepared in cooperation with the' lc
move 21.0 27.5
text 'SPOKANE COUNTY PUBLIC
WORKS, UTILITIES DEPARTMENT'
lc
move 21.0 26.9

text 'and the WASHINGTON
DIVISION OF GEOLOGY AND
EARTH RESOURCES' lc
textfont 93711
textsize 0.7
move 16.2 3.0
text 'Digital Geologic Map of the Rosalia
1:100,000 quadrangle, Washington and
Idaho' lc
textsize 0.5
move 16.2 2.3
text 'by Pamela D. Derkey, Bruce R.
Johnson, Beatrice B. Lackaff and Robert
E. Derkey' lc
move 16.2 1.6
text '1998' lc

/* draw map boundary box
res ros100k arcs linecode = 81
linesymbol 5
arcs ros100k
asel ros100k arcs

/* plot explanation/key
textfont 93711
textsize 0.25
move 33 24
text 'Geologic Units'
textsize 0.12
textquality proportional
textfont 94021
linesymbol 1
shadedelete all
shadeset calcomp1
keyarea 33 7.0 38.5 23.5
keybox 0.6 0.35
keyseparation 0.2 0.2
keyshade rospol.key

/* explanation - line key
textfont 93711
textsize 0.25
move 33 11.5

```

```

text 'Explanation'
linedelete all
lineset geology.lin
textsize 0.12
textquality proportional
textfont 94021
keyarea 33 5.5 38.5 11
keybox 0.6 0.0
keyline roslin.key nobox

/* more explanation - marker key
markerdelete all
markerset alcgeol.mrk
keymarker rospnt.key nobox
shadedelete all
shadeset calcomp1

/* plot references
textfont 93711
textsize 0.25
textcolor 1
move 33 6.35
text 'References'
move 33 6.1
textsize 0.12
textquality proportional
textfont 94021
textfile ros.ref

&label disclaimer
textfont 93713
textquality proportional
textsize 0.12
move 33 2.2
textfile rosdisc.txt

/* plot index map
plot index.gra box 33.0 1.0 37.0 4.5

/* plot credits
textfont 93713
textquality proportional
textsize 0.12

move 28.5 4.0
textfile ros.crd

/* plot projection
move 2.2 4.0
textfont 93713
textquality proportional
textsize 0.12
text 'UTM, zone 11 projection'
/* plot scale bars
linedelete all
lineset plotter.lin
&r scale2a 4.77 2.1 other 100000

/* plot lat/long tics
arcs rosnet

/* label corners and lat/long tics
textfont 93709
textquality proportional
textsize 0.10
textangle 0
/* west margin lat/long
move 1.6 26.13
text '118ø W' lc
move 1.55 26.05
text '47ø 30" N' cr
move 1.5 20.62
text '47ø 22" 30"" N' cr
move 1.49 15.14
text '47ø 15" N' cr
move 1.45 9.7
text '47ø 7" 30"" N' cr
move 1.42 4.24
text '47ø N' cr
move 1.47 4.14
text '118ø W' uc
/* north margin long
move 9.05 26.1
text '117ø 45" W' lc
move 16.47 26.1
text '117ø 30" W' lc
move 23.88 26.1

```

```
text '117ø 15" W' lc
/* east margin lat/long
move 31.3 26.12
text '117ø W' lc
move 31.34 26.06
text '47ø 30" N' ul
move 31.39 20.60
text '47ø 22" 30"" N' cl
move 31.42 15.14
text '47ø 15" N' cl
move 31.44 9.67
text '47ø 7" 30"" N' cl
move 31.47 4.17
text '47ø 30" N' ll
/* south margin long
move 8.97 4.08
text '117ø 45" W' uc
move 16.45 4.09
text '117ø 30" W' uc
move 23.94 4.07
text '117ø 15" W' uc
move 31.45 4.14
text '117ø W' uc
```

```
&label done
quit
display 9999 3
draw ros100k
&return
```

Appendix C - Metadata file (ros100k.met) for the Rosalia GIS

Identification_Information:

Citation:

Citation_Information:

Originator: Pamela D. Derkey

Originator: Bruce R. Johnson

Originator: Beatrice B. Lackaff

Originator: Robert E. Derkey

Publication_Date: 1998

Title:

Digital geologic map of the Rosalia 1:100,000 quadrangle,
Washington and Idaho: a digital database for the 1990

S.Z. Waggoner map

Edition: version 1.0

Geospatial_Data_Presentation_Form: map

Series_Information:

Series_Name: Open-File Report 98-357

Issue_Identification: ros100k

Issue_Identification: rospnt

Publication_Information:

Publication_Place: Spokane WA

Publisher: U.S. Geological Survey

Online_Linkage: URL = <http://wrgis.wr.usgs.gov/open-file/of98-357>

Description:

Abstract:

The geology of the Rosalia 1:100,000 quadrangle, Washington and Idaho was compiled and published as a paper product by the Washington Division of Geology and Earth Resources (Waggoner, 1990). The U.S. Geological Survey converted the geologic data to a digital geographic information system (GIS) format as part of a larger effort to create regional digital geology for the Pacific Northwest. 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 geologic map GIS of the Rosalia 1:100,000 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 1:100,000 (e.g., 1:62,500 or 1:24,000).

Supplemental_Information:

This GIS consists of two major Arc/Info datasets: one line and polygon file (ros100k) containing geologic contacts and structures (lines) and geologic map rock units (polygons), and one point file (rospnt) containing structural data.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998

Currentness_Reference: publication date

Status:

Progress: In progress

Maintenance_and_Update_Frequency:

Will update with new geologic map data model, perhaps in 1999.

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -118.0

East_Bounding_Coordinate: -117.0

North_Bounding_Coordinate: 47.50

South_Bounding_Coordinate: 47.00

Keywords:

Theme:

Theme_Keyword_Thesaurus: none

Theme_Keyword: geology

Theme_Keyword: geologic map

Place:

Place_Keyword_Thesaurus: none

Place_Keyword: Idaho

Place_Keyword: Washington

Place_Keyword: Rosalia

Place_Keyword: Adams County

Place_Keyword: Lincoln County

Place_Keyword: Spokane County

Place_Keyword: Whitman County

Place_Keyword: Pacific Northwest

Place_Keyword: USA

Access_Constraints:

Use_Constraints:

This digital database is not meant to be used or displayed at any scale larger than 1:100,000 (e.g., 1:62,500 or 1:24,00).

Any hardcopies utilizing these data sets shall clearly indicate their source. If the user has modified 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 data sets, nor to imply that changes they made were approved by the U.S. Geological Survey.

Data_Set_Credit:

Stephanie Z. Waggoner (1990) compiled the geology onto stable-base material;

A contractor (PacificCad Inc., Spokane, WA) scanned the original stable-base geologic map (provided by the Washington Division of Geology and Earth Resources) and provided the U.S. Geological Survey (USGS) with an uncompressed TIFF file (reverse image, scanned at 600 dots per inch);

Bruce R. Johnson (USGS) converted the image to a vector geographic information system (GIS);

Pamela D. Derkey (USGS) and Beatrice B. Lackaff edited the vector data;

Pamela D. Derkey generated a GIS file for the point data, attached and attributed an interim geologic map data model (database).

Robert E. Derkey (WA DGER) digitized the point data and provided it in an Arc/Info GENERATE format file.

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Pamela D. Derkey

Contact_Organization: U.S. Geological Survey

Contact_Position: geologist

Contact_Address:

Address_Type: mailing and physical address

Address: 904 W. Riverside Ave., Rm. 202

City: Spokane

State_or_Province: WA

Postal_Code: 99201

Country: USA
Contact_Voice_Telephone: 1-509-353-3173
Contact_Facsimile_Telephone: 1-509-353-0505
Contact_Electronic_Mail_Address: pderkey@usgs.gov

Native_Data_Set_Environment:

SunOS, 5.5.1, sun4u UNIX
ARC/INFO version 7.1.1

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 UTM zone 11 (with a y-shift).

Completeness_Report:

This digital dataset was produced from a previously published report (Waggoner, 1990), and is considered to be the best geologic map available for the area at a scale of 1:100,000.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The horizontal positional accuracy for the digital data may be no better than +/- 70 meters. It was tested by visual comparison of the source with hard copy plots.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Waggoner, S.Z.

Publication_Date: 1990

Title:

Geologic map of the Rosalia 1:100,000 quadrangle,

Washington-Idaho

Geospatial_Data_Presentation_Form: map

Publication_Information:

Publication_Place: Olympia, WA

Publisher: Washington Division of Geology and Earth Resources

Source_Scale_Denominator: 100,000

Type_of_Source_Media: stable-base film positive

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1990

Source_Currentness_Reference: publication date

Source_Citation_Abbreviation: Waggoner, 1990

Source_Contribution:

Waggoner (1990) is the sole source of geologic data
in this digital geographic information system (GIS).

Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Geological Survey

Publication_Date: 1993

Title:

1:100,000-scale digital line graph (DLG) data -

hydrography and transportation, Area 13 --

Northwestern states

Geospatial_Data_Presentation_Form: digital line graph (DLG) data

Series_Information:

Series_Name: US GeoData (optional format)

Publication_Information:

Publisher: U.S. Geological Survey

Source_Scale_Denominator: 100,000

Type_of_Source_Media: CD-ROM

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1993

Source_Currentness_Reference: publication date

Source_Citation_Abbreviation: USGS, 1993

Source_Contribution: This source provided hydrography in a digital format.

Process_Step:

Process_Description:

Stable-base geologic map was scanned at 600 dots per inch by a contractor (PacifiCad, Inc., Spokane, WA) and provided to the U.S. Geological Survey as reverse TIFF-format image.

The image was registered to a UTM grid and rectified in Arc/Info. Then it was converted to a vector GIS layer using the GRIDLINE vectorization tool included in the Arc/Info GRID extension. Subsequent clean-up of the vector layer was done in PC Arc/Info. Linework for water bodies that obscured geologic contacts was converted from digital line graph (DLG) format files (USGS, 1993) to PC Arc/Info so as to delineate discrete geologic unit boundaries. The resulting geologic map was attributed, converted to Arc/Info, and then plotted and compared to the original.

Point data were digitized from the original stable-base map into GSMP, ver. 9 (Selner and Taylor, 1993) as points in a UTM zone 11 map projection (with a y-shift of -5,000,000 meters).

These point data were output to Arc/Info GENERATE-format files using the GMSGIS utility (G.I. Selner, written commun., 1994). An Arc/Info point location map was then generated, attributed and annotated.

Process_Date: 1996-97

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: 630

SDTS_Point_and_Vector_Object_Type: String

Point_and_Vector_Object_Count: 1973

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains

Point_and_Vector_Object_Count: 631

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 11

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: implied

Longitude_of_Central_Meridian: implied

Latitude_of_Projection_Origin: implied

False_Easting: 0.000

False_Northing: -5,000,000 meters

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: not determined

Ordinate_Resolution: not determined

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 'Digital geologic map of the Rosalia 1:100,000 quadrangle...' Open-File Report 98-357 contains a detailed description of each attribute code and a reference to the associated map symbols on the map source materials.

The GIS includes a geologic linework arc attribute table, ros100k.aat, that relates to the ros100k.con (contact look-up table), ros100k.str (structure look-up table), ros100k.lgu (linear geologic unit look-up table) and ros100k.ref (source reference look-up table) files; a rock unit polygon attribute table, ros100k.pat, that relates to the ros100k.ru (rock unit look-up table) and ros100k.ref (source reference look-up table) files; and a geologic map symbol point attribute table, rospnt.pat, that relates to the rospnt.sym (structural point data look-up tables) and rospnt.ref (source reference look-up table) files.

Entity_and_Attribute_Detail_Citation: none

Distribution_Information:

Distributor:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: U.S. Geological Survey Information Services

Contact_Address:

Address_Type: mailing and physical address

Address: Open-File Reports, Box 25286

City: Denver

State_or_Province: CO

Postal_Code: 80225

Country: USA

Contact_Voice_Telephone: 1-303-202-4200

Contact_Facsimile_Telephone: 1-303-202-4695

Contact_Information:

Contact_Person_Primary:

Contact_Person: Pamela D. Derkey

Contact_Organization: U.S. Geological Survey

Contact_Position: Database Administrator

Contact_Address:

Address_Type: mailing and physical address

Address: 904 West Riverside, Rm. 202

City: Spokane

State_or_Province: WA

Postal_Code: 99201

Country: USA

Contact_Voice_Telephone: 1-509-353-3173

Contact_Facsimile_Telephone: 1-509-353-0505

Contact_Electronic_Mail_Address: pderkey@usgs.gov

Contact_Information:

Contact_Organization_Primary:

Contact_Organization:

U.S. Geological Survey - Earth Science Information
Office

Contact_Address:

Address_Type: mailing and physical address

Address: 904 West Riverside, Rm. 135

City: Spokane

State_or_Province: WA

Postal_Code: 99201

Country: USA

Contact_Voice_Telephone: 1-509-353-2524

Contact_Facsimile_Telephone: 1-509-353-2872

Contact_Electronic_Mail_Address: esnfic@mailmcn1.wr.usgs.gov

Hours_of_Service: 8:00 a.m. - 4:30 p.m., Pacific time zone

Distribution_Liability:

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This digital geologic map GIS of the Rosalia 1:100,000 quadrangle, Idaho, is not meant to be used or displayed at any scale larger than 1:100,000 (e.g., 1:62,500 or 1:24,000).

Metadata_Reference_Information:

Metadata_Date: 19980720

Metadata_Review_Date:

Metadata_Future_Review_Date:

Metadata_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: U.S. Geological Survey

Contact_Person: Pamela D. Derkey

Contact_Position: geologist

Contact_Address:

Address_Type: mailing and physical address

Address: 904 West Riverside Avenue, Rm. 202

City: Spokane

State_or_Province: WA

Postal_Code: 99201

Country: USA

Contact_Voice_Telephone: 1-509-353-3173

Contact_Facsimile_Telephone: 1-509-353-0505

Contact_Electronic_Mail_Address: pderkey@usgs.gov

Metadata_Standard_Name:

FGDC Content Standards for Digital Geospatial
Metadata

Metadata_Standard_Version: Version of June 8, 1994

Metadata_Access_Constraints: none

Metadata_Use_Constraints: none