Geologic datasets for weights of evidence analysis in northeast Washington—1. Geologic raster data

By

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

[1] Spokane, Washington

Contents

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1. Download the digital file from the USGS public access World Wide Web site on the Internet: URL = http://geopubs.wr.usgs.gov/open-file/of00-495/

Or

2. Anonymous FTP from geopubs.wr.usgs.gov, in the directory pub/open-file/of00-495/.

The Internet sites contain the self-extracting zipped file (newagrid.exe) described in the previous section. To expand this file, use the Run command in Windows (95, 98, and NT) or type the file name and select? "enter" at the DOS prompt.

Abstract

A preliminary digital geologic map was digitally compiled for northeast Washington. Four thematic raster files (geologic map units, faults, folds, and dikes) were produced for use with ArcView software or other spatial analysis. Descriptions of the geologic map units were standardized, as were the map unit labels used to identify the units on visual outputs. The study area encompasses the area longitude 117-120° and latitude 48-49° and includes the six, 1:100,000-scale maps of Colville, Chewelah, Republic, Nespelem, Omak and Oroville.

Introduction

Preliminary digital geologic map databases for six 1:100,000-scale quadrangles in northeast Washington (fig. 1) were digitally compiled to produce four thematic raster files (geologic map units, faults, folds, and dikes) for use in future spatial analysis. Descriptions of the geologic map units were standardized, as were the map unit labels used to identify the units on visual outputs. Completion of the geologic mapping of these quadrangles at a scale of 1:100,000 during the early 1990's (Gulick and Korosec, 1990; Joseph, 1990a,b; Stoffel, 1990a,b; and Waggoner, 1990) greatly facilitated the digital processing.

The requirements of a proposed modeling procedure necessitated converting the vector data to gridded raster files. A new lithologic classification was also created to provide uniform terminology for rock units mapped within the study area. This report documents the gridded raster files created from the geologic vector data and the reclassification of the geologic map units (lithology). The raster files are in ArcInfo grid format and are available on an U.S. Geological Survey website (http://geopubs.wr.usgs.gov/open-file/of00-495). The digital geologic map files for each of the six quadrangles are available from the Washington Department of Natural Resources (WA DNR); however, additional work is ongoing for these areas and data obtained from WA DNR in the future might be modified from that which we used.

Data Processing

Preliminary vector data were obtained from the Washington Department of Natural Resources for the Colville, Chewelah, Nespelem, Omak, Oroville, and Republic 1:100,000-scale quadrangles (J.E. Schuster, written communication, 1997, 1998) -- an area bounded by 117° W longitude to 120° W longitude and by 48° N latitude to 49° N latitude (fig. 1). The vector data for each quadrangle included four databases that portrayed four types (or themes) of geologic information: geologic map units (lithologic units), faults, folds, and dikes.

Our processing of the WA DNR data did not alter the basic geologic content of the acquired databases: we assumed that the data were complete and accurate. We first imported the databases into ArcInfo coverages. The geologic map unit files for the six quadrangles were then

combined to create a single ArcInfo coverage (with both arc and polygon topology). Numerous intersection errors occurred during this procedure. Due to time constraints, the ArcInfo CLEAN command (with default tolerances) was used to rebuild the polygon topology rather than editing each individual intersection to eliminate the intersection errors. During the cleaning process some arcs were moved and unlabelled polygons were created. The resultant polygon label errors were not critical to the analysis for which these data were being prepared, so no attempt was made to correct these errors. The fault, fold, and dike coverages were processed in a similar manner. However, these only contain arc topology and there were no intersection errors.

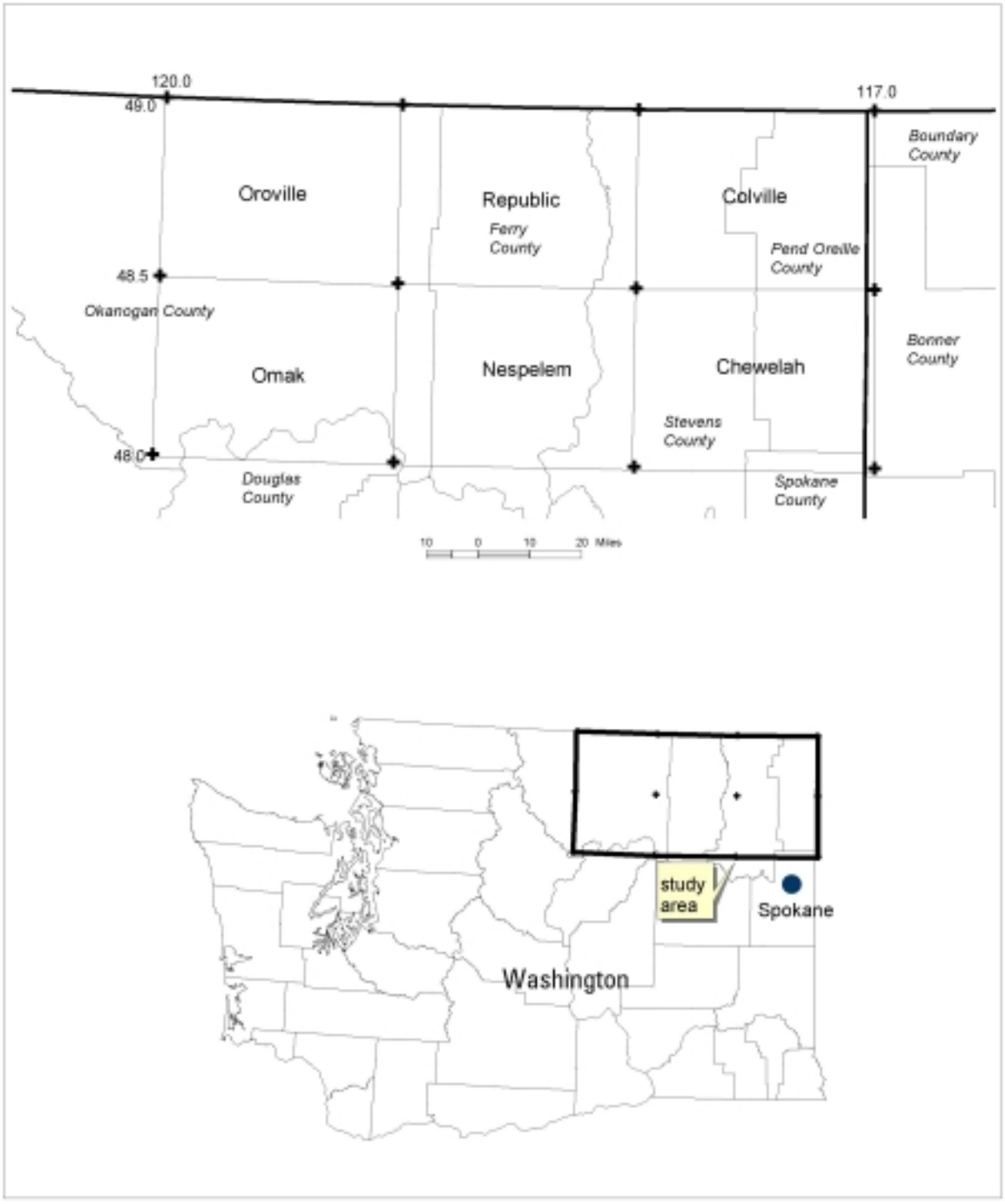

Figure 1. Location map

The next step was to simplify the geologic map unit database (lithologic units and map unit labels). The polygon attribute databases for each of the six original geologic map unit coverages contained a label field that corresponded to map unit labels used on published paper geologic maps. In some cases different labels were utilized on the various quadrangles for the same formation or lithologic map unit. The use of deposit models in future spatial analysis of these data made it necessary to simplify the map units based on similar lithologies and ages. A correlation table (Appendix A) was created in a spreadsheet and used to define a lithologic classification for the polygons in the geologic map unit compilation. This table shows how the lithologic data were simplified from approximately 660 map units and labels for the six quadrangles to 164 map units and labels for the study area. The equivalencies created in this table were used to standardize the attributes for the geologic map unit database. Data for the preliminary fault, fold, and dike datasets were consistent and did not need to be modified.

The final step was to convert the vector data for each theme (geologic map units, faults, folds, and dikes) to a raster image. This was done in ArcView (version 3.1) using the Spatial Analyst (version 1.0) extension. The convert-to-grid command was used for each of the theme coverages. Table 1 shows the parameters that were selected to make the conversion. The "value" item in the fault and fold grids contains a numeric code for the type of fault or fold. Tables listing the attribute and its description for the "value" item are given in Appendix B.

Table 1. Parameters for vector-to-raster conversion of ArcInfo coverages

Coverage theme	Output grid extent	Item (field name) in WA DNR vector data from which attributes were used to populate cell values in the raster (grid) file	Cell Size (meters)
geologic map unit (s_value)	Same as compiled vector coverage	gunit.label.cd (see Appendix A)	50
fault	Same as compiled vector coverage	gfltseq.type.cd (see Appendix B)	100
fold	Same as compiled vector coverage	gfoldseq.type.cd (see Appendix B)	50
dike	Same as compiled vector coverage	gunit.label.cd (see Appendix B)	200

Description of Digital Files

Five files were created for spatial modeling. They include four gridded raster files in ArcInfo interchange format: newageol.e00 (145.5 MB), newafaul.e00 (35.8 MB), newafold.e00 (128.5 MB), and newadike.e00 (8.9 MB). Appendix A-1 contains data used to convert the original coverages to a vector coverage and finally an Arc GRID with uniform geologic map unit designations (Appendix

A-2). Metadata (geolunit.met) describing these five files is included in Appendix C. These files were combined and compressed using Winzip and made into a self-extracting file (newagrid.exe, 3 MB). The geologic map data (geologic units, dikes, folds, faults) are shown on Figure 2 as they appear in the grid format.

Description of items identifying geologic units in the value attribute table, NEWAGEOL.VAT are as follows:

Item name	Item type	Width	Attribute description
Value	B	4	Unique number
Count	B	4	Number of cells with s_value
S_value	C	13	Geologic unit-time code (see Appendix A-2)

Description of items identifying geologic units in the value attribute table, NEWAFOLD.VAT are as follows:

Item name	Item type	Width	Attribute description
Value	B	4	Unique number (see Appendix table B-1)
count	B	4	Number of cells with unique value

Description of items identifying geologic units in the value attribute table, NEWAFAUL.VAT are as follows:

Item name	Item type	Width	Attribute description
Value	B	4	Unique number (see Appendix table B-2)
count	B	4	Number of cells with unique value

Description of items identifying geologic units in the value attribute table, NEWADIKE.VAT are as follows:

Item name	Item type	Width	Attribute description
Value	B	4	Unique number (see Appendix B-3)
count	B	4	Number of cells with s_value
S_value	C	12	Geologic unit-time code

Obtaining Digital Data

The set of digital files are available in ArcInfo exchange format (.e00) file. Data in the .e00 format are available for import and use in Arc/Info or ArcView. The data are maintained in a Universal Transverse Mercator projection:

Projection: UTM
Zone: 11
Units: Meters
Datum: North American Datum, 1927

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

3. Download the digital file from the USGS public access World Wide Web site on the Internet: URL = http://geopubs.wr.usgs.gov/open-file/of00-495/

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The Internet sites contain the self-extracting zipped file (newagrid.exe) described in the previous section. To expand this file, use the Run command in Windows (95, 98, and NT) or type the file name and select? "enter" at the DOS prompt.

They contain the following files:

_README	(ascii)
of00-495.doc	(text of report, figures, metadata, appendixes, PDF)
of00-495.met	(metadata, text)
newa	(zip file)

The zipped file, newa, contains the following files:

newageol.e00	(raster file of geologic map)
newafold.e00	(raster file of folds)
newafaul.e00	(raster file of faults)
newadike.e00	(raster file of dikes)
fig1	(jpeg image, letter size)
fig2ab	(jpeg image, letter size)
fig2cd	(jpeg image, letter size)

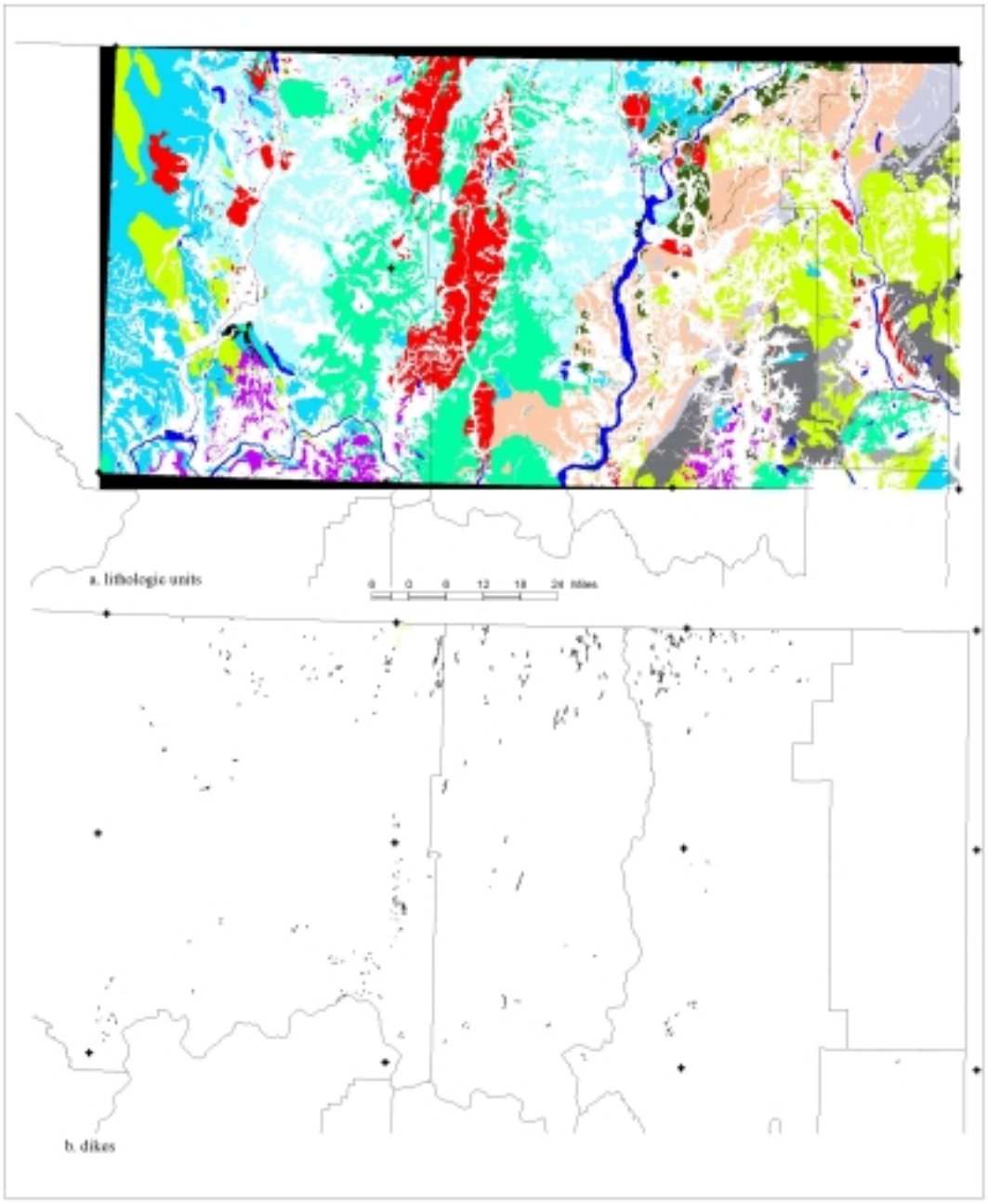

Figure 2. Geologic map data in grid format.

a. Shows generalized geologic units as follows: pre-CambrianZ-light gray, pre-CambrianY-dark gray, Cambrian-Ordovician-light brown, Ordovician-Carboniferous –dark green, Paleozoic-Triassic metamorphic rocks-light blue, Jurassic-Cretaceous metamorphic rocks-medium blue, Cretaceous intrusive rocks-yellow green, Eocene intrusive rocks-light green, Eocene volcanic and sedimentary rocks-red, Miocene-Pliocene volcanic and sedimentary rocks-purple, Quaternary-white; b. dikes

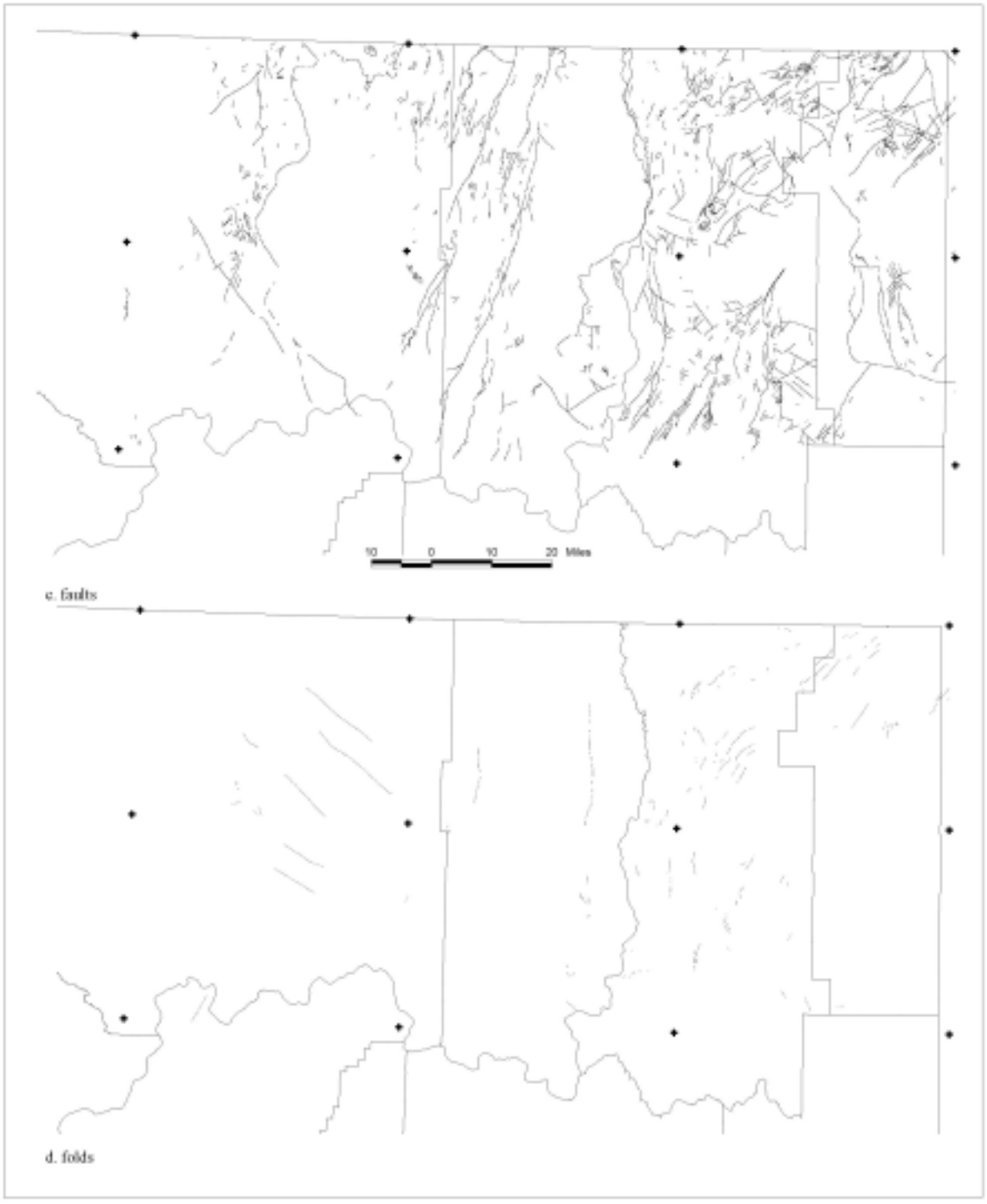

Figure 2. Geologic map data in grid format (continued)

c. faults, d. folds

References

Gulick, C.W., and Korosec, M.A., 1990, Geologic map of the Omak 1:100,000 quadrangle, Washington: Washington Department of Natural Resources, Open File Report 90-12, 52 p.

Joseph, N.L., 1990a, Geologic map of the Colville 1:100,000 quadrangle, Washington: Washington Department of Natural Resources, Open File Report 90-13, 78 p.

____, 1990b, revised 1992, Geologic map of the Nespelem 1:100,000 quadrangle, Washington: Washington Department of Natural Resources, Open File Report 90-16, 47 p.

Stoffel, K., 1990a, revised 1992, Geologic map of the Republic 1:100,000 quadrangle, Washington: Washington Department of Natural Resources, Open File Report 90-10, 62 p.

____, 1990b, Geologic map of the Oroville 1:100,000 quadrangle, Washington: Washington Department of Natural Resources, Open File Report 90-11, 58 p.

Waggoner, S.Z., 1990, revised 1992, Geologic map of the Chewelah 1:100,000 quadrangle, Washington: Washington Department of Natural Resources, Open File Report 90-14, 63 p.

Appendix A-1 Correlation Table for Geologic Map Unit Designations

New label [2](s_label)	New description	Map no[3]	Old Label (gunit.label.cd)	Old Name	Old description
bx	Breccia	206	bx	Tectonic breccia	Tectonic breccia
bx	Breccia	208	bx	Tectonic breccia	Tectonic breccia
Ccbl	Carbonate	208	Ccb(l)	Limekiln Hill	Carbonate
Ccbm	Carbonate	107	Ccb(m)	Maitlen Phyllite	Carbonate
Ccbm	Carbonate	108	Ccb(m)	Maitlen Phyllite	Carbonate
CDcb	Carbonate	108	CDcb	Carbonate	Carbonate
CDmm	Metavolcanic, metasediment	108	CDmm	Meta-sedimentary	Meta-sedimentary
CDmm	Metavolcanic, metasediment	107	CDmm(k)	Kelly Hill	Phyllite
CDmm	Metavolcanic, metasediment	108	CDmt	Meta-sedimentary meta-volcanic	Meta-sedimentary meta-volcanic
CDmv	Metavolcanic	108	CDmv	Greenstone	Greenstone
CDmv	Metavolcanic	107	CDmv(m)	Mission Lake	Meta-volcanic
COcb	Carbonate	108	COcb	Echo Valley	Carbonate
COcb	Carbonate	207	COcb	Bradeen Hill	Carbonate
COcg	Chert-pebble conglomerate	108	COcg	Echo Valley	Conglomerate
COcg	Chert-pebble conglomerate	207	COcg	Bradeen Hill	Chert, pebble conglomerate
COm	Chert-quartz-bearing metasediment	207	COar	Bradeen Hill	Chert, argillite, phyllite
COm	Chert-quartz-bearing metasediment	108	COmm	Echo Valley	Meta-sedimentary
COm	Chert-quartz-bearing metasediment	207	COmm	Bradeen Hill	Chert-quartz meta-sedimentary
COm	Chert-quartz-bearing metasediment	108	COq	Echo Valley	Quartzite
COmv	Tuff, greenstone, argillite, quartzite, wacke	108	COmt	Echo Valley	Argillite, tuff
COmv	Tuff, greenstone, argillite, quartzite, wacke	207	COmv	Bradeen Hill	Greenstone
COmv	Tuff, greenstone, argillite, quartzite, wacke	108	COmv	Echo Valley	Greenstone, greenschist
COmv	Tuff, greenstone, argillite, quartzite, wacke	207	COw	Bradeen Hill	Chert-quartz quartzite-wacke
Cphm	Phyllite	107	Cph(m)	Maitlen	Carbonate
Cphm	Phyllite	108	Cph(m)	Maitlen Phyllite	Phyllite
Cphm	Phyllite	207	Cph(m)	Maitlen Phyllite	Phyllite
Cphm	Phyllite	208	Cph(m)	Maitlen Phyllite	Phyllite
Czq	Quartzite	108	CZq	Addy Quartzite	Undivided
Czq	Quartzite	208	CZq(1a)	Addy Quartzite	Quartzite
Czq	Quartzite	108	CZq(2)	Addy Quartzite	Coarse argillite, quartzite
Czq	Quartzite	108	CZq(3)	Addy Quartzite	Purple quartzite
Czq	Quartzite	208	CZq(3a)	Addy Quartzite	Quartzite
Czq	Quartzite	108	CZq(4)	Addy Quartzite	Lower argillite
Czq	Quartzite	208	CZq(4a)	Addy Quartzite	Quartzite
Czq	Quartzite	108	CZq(5)	Addy Quartzite	Basal quartzite
Czq	Quartzite	208	CZq(5a)	Addy Quartzite	Quartzite
Czq	Quartzite	107	CZq(a)	Addy Quartzite	Quartzite
Czq	Quartzite	207	CZq(a)	Addy Quartzite	Quartzite
Czq	Quartzite	208	CZq(a)	Addy Quartzite	Quartzite
Dcb	Limestone, conglomerate	207	Dcb	Carbonate	Carbonate
Dcb	Limestone, conglomerate	108	Dcb(l)	Metaline Falls	Limestone
Dcb	Limestone, conglomerate	208	Dcb(v)	Valley	Carbonate
Dcb	Limestone, conglomerate	108	Dcg	Metaline Falls	Limestone, conglomerate
Ecg	Conglomerate	106	Ec	Sandstone	Sandstone
Ecg	Conglomerate	106	Ecg	Conglomerate	Conglomerate
Ecg	Conglomerate	108	Ecg(o)	O'Brien Cr.	Conglomerate
Eck	Sediments, volcanics	106	Ec(k)	Klondike Mountain	Sediments, volcanics
Eck	Sediments, volcanics	107	Ec(k)	Sandstone	Sandstone
Eco	Sediment, tuff	106	Ec(o)	O'Brien Cr.	Sediments and tuff
Eco	Sediment, tuff	107	Ec(o)	O'Brien Cr.	Sediments and volcanics
Eco	Sediment, tuff	108	Ec(o)	O'Brien Cr.	Sediments and volcanics
Eco	Sediment, tuff	207	Ec(o)	O'Brien Cr.	Sediments and volcanics
Ei	Plagioclase porphyry	107	Ei	Plagioclase porphyry	Plagioclase porphyry
Eia	Andesite, trachyandesite dikes, sills, plugs	106	Eian	Porphyritic Andesite	Porphyritic Andesite
Eia	Andesite, trachyandesite dikes, sills, plugs	107	Eian	Andesite plugs	Andesite plugs
Eia	Andesite, trachyandesite dikes, sills, plugs	106	Eian(o)	Oroville	Augite trachyandesite plugs
Eia	Andesite, trachyandesite dikes, sills, plugs	107	Eian(r)	Near Republic	Basalt, andesite sills

[2] corresponds to "s_value" field in newageol.vat and "label" field in Appendix A-2

[3] 106 = Oroville (Stoffel, 1990b), 107 = Republic (Stoffel, 1990a), 108 = Colville (Joseph, 1990a), 206 = Omak (Gulick and Korosec, 1990), 207 = Nespelem (Joseph, 1990b), 208 = Chewelah (Waggoner, 1990).

Eia	Andesite, trachyandesite dikes, sills, plugs	107	Eidaa	Porphyritic andesite	Porphyritic andesite
Eia	Andesite, trachyandesite dikes, sills, plugs	107	Eitr	Porphyritic trachyte dikes	Porphyritic trachyte dikes
Eib	Basic intrusives and dikes	107	Eib(k)	Kettle Falls	Basic intrusions
Eib	Basic intrusives and dikes	107	Eib(t)	Toroda	Basic intrusions
Eib	Basic intrusives and dikes	108	Eii	Mafic dikes	Mafic dikes
Eid	Hypabyssal dacite and andesite dikes	208	Ei	Dikes	Dikes
Eid	Hypabyssal dacite and andesite dikes	108	Eid	Dacite dikes	Dacite dikes
Eid	Hypabyssal dacite and andesite dikes	207	Eid(l)	Hypabyssal dacite	Hypabyssal dacite
Eid	Hypabyssal dacite and andesite dikes	106	Eida	Porphyritic dacite dikes	Porphyritic dacite dikes
Eid	Hypabyssal dacite and andesite dikes	107	Eida	Porphyritic dacite dikes	Porphyritic dacite dikes
Eid	Hypabyssal dacite and andesite dikes	207	Eida	Hypabyssal dacite	Hypabyssal dacite
Eid	Hypabyssal dacite and andesite dikes	206	Eida(c)	Hypabyssal dike	Hypabyssal dike
Eid	Hypabyssal dacite and andesite dikes	206	Eida(g)	Goat Mtn.	Porphyry dike
Eid	Hypabyssal dacite and andesite dikes	108	Eidaa	Andesite dikes	Andesite dikes
Eig	Granite, minor granodiorite	108	Eia(s)	Shephard	Granite
Eig	Granite, minor granodiorite	207	Eig(dh)	Deadhorse	Granite
Eig	Granite, minor granodiorite	207	Eig(gm)	Granite Mtn.	Granite, granodiorite
Eig	Granite, minor granodiorite	107	Eig(h)	Herron Cr.	Granite
Eig	Granite, minor granodiorite	107	Eig(o)	Orient	Granite
Eig	Granite, minor granodiorite	206	Eig(s)	Stepstone Cr.	Granite
Eig	Granite, minor granodiorite	207	Eig(s)	Stepstone Cr.	Granite
Eig	Granite, minor granodiorite	107	Eig(u)	US Cr.	Granite
Eig	Granite, minor granodiorite	108	Eigd(r)	Hooknose Cr.	Undivided granite
Eigd	Diorite, granodiorite	107	Eia(f)	Fifteen Mile	Various intrusions
Eigd	Diorite, granodiorite	106	Eid		Diorite
Eigd	Diorite, granodiorite	206	Eid(l)	Little Moses	Diorite
Eigd	Diorite, granodiorite	107	Eigd(b)	Barstow	Granodiorite
Eigd	Diorite, granodiorite	206	Eigd(cm)	Conconully	Granodiorite
Eigd	Diorite, granodiorite	107	Eigd(h)	Herron Cr.	Granodiorite
Eigd	Diorite, granodiorite	207	Eigd(j)	Joe Moses Cr.	Granodiorite
Eigd	Diorite, granodiorite	206	Eigd(n)	No Name	Granodiorite
Eigd	Diorite, granodiorite	107	Eii	Intermediate intrusions	Intermediate intrusions
Eigd	Diorite, granodiorite	206	Eii(g)	Intrusives (?)	Intrusives (?)
Eik	Shonkinite, monzonite, syenite	107	Eik	Alkalic intrusions	Alkalic intrusions
Eik	Shonkinite, monzonite, syenite	108	Eik(w)	Williams Lake	Shonkinite
Eik	Shonkinite, monzonite, syenite	108	Eis(c)	Coryell	Syenite, monzonite, shonkinite
Eim	Monzonite	107	Eim(h)	Herron Cr.	Monzonite
Eim	Monzonite	107	Eim(ho)	Monzonite	Monzonite
Eimd	Monzogranite Monzodiorite	207	Eimd(d)	Devil's Elbow	Monzodiorite
Eimd	Monzogranite Monzodiorite	107	Eimd(h)	Devil's Elbow	Monzodiorite
Eimd	Monzogranite Monzodiorite	107	Eimd(k)	Kettle Cr.	Monzodiorite
Eimd	Monzogranite Monzodiorite	207	Eimd(k)	Kettle Crest	Monzodiorite
Eimd	Monzogranite Monzodiorite	207	Eiqm(f)	Fire Mtn.	Monzonite, monzogranite
Eiqm	Quartz monzonite	208	Eia(sp)	Silver Point	Quartz monzonite
Eiqm	Quartz monzonite	208	Eii(s)	Springdale	Quartz monzonite
Eiqm	Quartz monzonite	106	Eimd(s)	Swimptkin Cr.	Quartz monzonite
Eiqm	Quartz monzonite	206	Eimd(s)	Swimptkin Cr.	Quartz monzonite
Eiqm	Quartz monzonite	107	Eiqm(d)	Deep Cr.	Quartz monzonite
Eiqm	Quartz monzonite	107	Eiqm(h)	Herron Cr.	Quartz monzonite
Eiqm	Quartz monzonite	107	Eiqm(k)	Kerry Cr.	Quartz monzonite
Eiqm	Quartz monzonite	208	Eiqm(l)	Loon Lake	Quartz monzonite
Eir	Rhyolite intrusives	108	Eir	Rhyolite granophyre	Rhyolite granophyre
Eir	Rhyolite intrusives	207	Eir(w)	West Fork	Rhyolite intrusions
EPia	Alaskite	206	EPAia(cc)	Coyote Cr.	Alaskite
EPia	Alaskite	106	EPAiaa(b)	Mt. Bonaparte	Pegmatite, alaskite
EPid	Diorite	106	EPAid(b)	Mt. Bonaparte	Diorite
EPig	Granite	206	EPAig(a)	Armstrong Mtn.	Granite
EPig	Granite	207	EPAig(cc)	Coyote Cr.	Granite
EPig	Granite	206	EPAig(cc)	Coyote Cr.	Granite
EPig	Granite	206	EPAig(cs)	Condon Spring	Granite
EPigb	Granite	106	EPAia(b)	Mt. Bonaparte	Granite
EPigb	Granite	107	EPAia(b)	Keller Butte pluton: Mt. Bonaparte	Granite
EPigd	Granodiorite	207	EPAia(mc)	Keller Butte Pluton	Porphyritic granodiorite
EPigd	Granodiorite	206	EPAigd(mc)	Manila Cr.	Granodiorite
EPigd	Granodiorite	206	EPAigd(o)	Omak Lake	Granodiorite
EPigk	Granite	207	EPAia(j)	Johnny George Pluton	Granite; lower plate of Lincoln Gneiss Dome
EPigk	Granite	207	EPAia(s)	Keller Butte Pluton: Swawilla Basin	Granite
EPigk	Granite	207	EPAiaa(mg)	Keller Butte Pluton: McInnis Lake	Garnetiferous granite
EPigk	Granite	207	EPAig(d)	Daisy Trail of the Keller Butte Pluton	Granite
EPigk	Granite	207	EPAig(kb)	Keller Butte	Porphyritic granite
EPigk	Granite	207	EPAig(mc)	Meadow Cr. of the Keller Butte Pluton	Granite
EPigm	Granite	106	EPAia(m)	Moses pluton	Granite
EPigm	Granite	107	EPAia(m)	Keller Butte pluton: Moses	Granite
EPigm	Granite	206	EPAia(mw)	Moses pluton	Leucogranite

EPigm	Granite	207	EPAiaa(mm)	Moses pluton: Moses Mtn.	Granite
EPigm	Granite	206	EPAig(m)	Moses pluton	Granite
EPigm	Granite	206	EPAig(mcc)	Moses pluton	Granite
EPigm	Granite	207	EPAig(mm)	Moses pluton: Moses Mtn.	Granite
EPigm	Granite	207	EPAig(mmf)	Moses pluton: Moses Mtn.	Granite
EPiqp	Quartz porphyry	207	EPAig(mt)	Mt. Tolman	Quartz porphyry
Et	Silt, clay, conglomerate	208	Ec(t)	Tiger	Silt, clay
Et	Silt, clay, conglomerate	108	Ecg(t)	Tiger	Arkose conglomerate
Et	Tiger Formation: silt, clay, conglomerate	208	Ecg(t)	Tiger	Conglomerate
Etz	Tectonic zone	108	Etz	Tectonic zone	Tectonic zone
Etz	Tectonic zone	208	tz	Tectonic zone	Tectonic zone
Ev	Volcanics, undivided	106	Ev		Undivided volcanics
Evcg	Volcanic conglomerate	108	Evc	Volcanic conglomerate	Volcanic conglomerate
Evcl	Volcaniclastics	206	Evc	Volcaniclastic	Volcaniclastic
Evcl	Volcaniclastics	106	Evc(a)	Antoine Cr.	Volcaniclastic
Evcl	Volcaniclastics	106	Evc(o)	Oroville	Volcaniclastic
Evf	Flows	207	Ev(sc)	Cub Hill	Rhyolite-dacite tuff, flows
Evf	Flows	108	Eva	Andesite flows	Andesite flows
Evf	Flows	208	Eva(c)	Colville Valley	Andesite
Evf	Flows	106	Evd	Dacite and Andesite flows	Dacite and Andesite flows
Evf	Flows	206	Evd	Dacite flows	Dacite flows
Evkct	Volcanic tuff, breccia, conglomerate	107	Evc(k)	Klondike Mountain	Volcanic conglomerate
Evkct	Volcanic tuff, breccia, conglomerate	107	Evt(k)	Klondike Mountain	Tuff, tuff breccia
Evkf	Flows	107	Evd(k)	Klondike Mountain	Porphyritic Dacite and Andesite
Evkf	Flows	106	Evdv(k)	Klondike Mountain	Vitrophyre Dacite-Andesite
Evkf	Flows	107	Evdv(k)	Klondike Mountain	Vitrophyre Dacite Andesite flows
Evkf	Flows	107	Evr(k)	Klondike Mountain	Rhyolite flows
Evsf	Flows	107	Evd(s)	Sanpoil	Dacite-Andesite flows
Evsf	Flows	108	Evd(s)	Sanpoil	Flows
Evsf	Flows	207	Evd(s)	Sanpoil	Dacite flows
Evsf	Flows	106	Evt	Sanpoil	Tuff, tuff breccia
Evst	Volcanics, tuff and volcanic breccia	207	Evc(s)	Sanpoil	Volcanic breccia
Evst	Volcanics, tuff and volcanic breccia	106	Evd(s)	Sanpoil	Volcanic
Evst	Volcanics, tuff and volcanic breccia	206	Evd(s)	Sanpoil	Volcanics
Evst	Volcanics, tuff and volcanic breccia	208	Evd(s)	Sanpoil	Volcanics
Evst	Volcanics, tuff and volcanic breccia	108	Evdb(s)	Sanpoil	Breccia
Evst	Volcanics, tuff and volcanic breccia	107	Evt(s)	Sanpoil	Tuff, tuff breccia
Evsv	Volcaniclastics	207	Evs(s)	Sanpoil	Volcanics and sediments
Evsv	Volcaniclastics	208	Evt	Sanpoil	Tuff
Evsv	Volcaniclastics	207	Evt(s)	Sanpoil	Pyroclastic
Jib	Basic intrusives	107	Jib	Jurassic (?) basic intrusions	Jurassic (?) basic intrusions
Jib	Basic intrusives	108	Jib	Mesozoic diorite	Mesozoic diorite
Jik	Alkalic intrusives	106	Jik(sb)	Similkameen Shankers Bend	Alkalic intrusions
Jiqm	Quart monzonite, monzonite, granodiorite	106	Jia(s)	Similkameen	Granodiorite, monzonite, quartz. monzonite
Jiqm	Quart monzonite, monzonite, granodiorite	106	Jiqm(s)	South Fork	Quartz. monzonite
Jmc	Meta-conglomerate, meta-sedimentary	106	Jcg(e)	Ellemehan	Meta-conglomerate
Jmc	Meta-conglomerate, meta-sedimentary	107	Jcg(r)	Rossland	Meta-conglomerate
Jmc	Meta-conglomerate, meta-sedimentary	108	Jcg(r)	Rossland	Conglomerate
Jmc	Meta-conglomerate, meta-sedimentary	107	Jmm(r)	Rossland	Meta-sedimentary
Jmig	Hybrid gneiss	106	Jmi(n)	North Fork	Hybrid gneiss
Jmv	Meta-volcanic, greenstone	108	Jmt(r)	Rossland	Meta-sedimentary, meta-volcanics
Jmv	Meta-volcanic, greenstone	106	Jmv(e)	Ellemehan	Meta-volcanics
Jmv	Meta-volcanic, greenstone	107	Jmv(r)	Rossland	Meta-volcanics
Jmv	Meta-volcanic, greenstone	108	Jmv(r)	Rossland	Greenstone
JTigd	Granodiorite	208	Ji(l)	Plutonic rocks west of Jump-Off Joe Fault Lane Mountain	Granodiorite, monzodiorite
JTigd	Granodiorite	106	JTRigd(b)	Blue Goat	Granodiorite
JTigd	Granodiorite	106	JTRigd(l)	Loomis	Granodiorite
JTigd	Granodiorite	208	JTRii(f)	Flowery Trail	Granodiorite
JTiqd	Quartz diorite	107	Jiq	Jurassic (?) quartz diorite	Jurassic (?) quartz diorite
JTiqd	Quartz diorite	106	JTRog(t)	Tiffany Mtn.	Tonalitic gneiss
Ju	Serpentinite	108	Ju	Jurassic (?) serpentinite intrusions	Jurassic (?) serpentinite intrusions
Kcg	Mesozoic sedimentary	108	Kcg(s)	Sophie Mountain	Mesozoic sedimentary
Kid	Granodiorite, diorite	106	Kid(a)	Aeneas Creek pluton	Diorite
Kid	Granodiorite, diorite	106	Kiq(l)	Lone Frank	Diorite, quartz diorite
Kig	Granite, alaskite	208	Kia(m)	Plutonic rocks west of Jump-Off Joe Fault, Midnite Mine	Granite, quartz monzonite
Kig	Granite, alaskite	108	Kia(n)	Narcisse Creek	Biotite granite
Kig	Granite, alaskite	207	Kia(o)	Owl Creek	Pegmatite, monzogranite
Kig	Granite, alaskite	108	Kia(sp)	Spirit	Biotite granite
Kig	Granite, alaskite	206	Kia(v)	Virginia Lake	Equigranular granite (aplitic phase)
Kig	Granite, alaskite	208	Kiaa	Alaskite	Alaskite
Kig	Granite, alaskite	108	Kiaa(sp)	Spirit	Alaskite
Kig	Granite, alaskite	206	Kig(f)	Felix Creek	Granite
Kig	Granite, alaskite	206	Kig(v)	Virginia Lake	Equigranular granite
Kigd	Granodiorite	106	Kia(a)	Aeneas Creek	Quartz monzonite granodiorite
Kigd	Granodiorite	106	Kia(b)	Bottle Spring	Quartz monzonite granodiorite

Kigd	Granodiorite	106	Kia(cb)	Cathedral	Quartz monzonite granodiorite
Kigd	Granodiorite	206	Kia(cl)	Cook Lake	Porphyritic granite, granodiorite
Kigd	Granodiorite	206	Kia(e)	Evans Lake	Quartz monzonite granodiorite
Kigd	Granodiorite	106	Kia(e)	Evans Lake	Quartz monzonite granodiorite
Kigd	Granodiorite	208	Kia(fl)	Fan Lake	Granodiorite
Kigd	Granodiorite	108	Kia(gp)	Galena Point	Granodiorite
Kigd	Granodiorite	208	Kia(gp)	Located in upper plate of Newport Fault, Galena Point	Granodiorite
Kigd	Granodiorite	108	Kia(l)	Located in upper plate of Newport Fault, Le Clerc Creek	Granodiorite
Kigd	Granodiorite	208	Kiat(d)	Located in upper plate of Newport Fault, Dubious Creek	Granodiorite
Kigd	Granodiorite	208	Kiat(g)	Located in upper plate of Newport Fault, Hall Mtn.	Granodiorite
Kigd	Granodiorite	108	Kiat(m)	Located in upper plate of Newport Fault, Molybdenite Mountain	Granodiorite
Kigd	Granodiorite	208	Kiat(p)	Phillips Lake	Granodiorite
Kigd	Granodiorite	108	Kiat(r)	Reeder Creek	Granodiorite
Kigd	Granodiorite	208	Kiat(s)	Spring Valley	Granodiorite
Kigd	Granodiorite	108	Kigd(bg)	Bunchgrass Meadows	Granodiorite
Kigd	Granodiorite	106	Kigd(c)	Conconully	Granodiorite, quartz diorite
Kigd	Granodiorite	206	Kigd(c)	Conconully	Granodiorite (main phase)
Kigd	Granodiorite	206	Kigd(cm)	Conconully	Granodiorite (Mineral Hill phase)
Kigd	Granodiorite	206	Kigd(cr)	Conconully	Granodiorite (Ritchie Ridge phase)
Kigd	Granodiorite	207	Kigd(f)	Fruitland	Granodiorite
Kigd	Granodiorite	206	Kigd(g)	Gavoita Bend	Granodiorite
Kigd	Granodiorite	108	Kigd(mc)	Mills Creek	Granodiorite
Kigd	Granodiorite	108	Kigd(pl)	Priest Lake	Granodiorite
Kigd	Granodiorite	206	Kigd(sl)	Soap Lake Mtn.	Granodiorite
Kigd	Granodiorite	108	Kigd(sm)	Sema Meadows	Granodiorite
Kigd	Granodiorite	108	Kigd(y)	Yocum Lake	Granodiorite
Kigd	Granodiorite	207	Kia(m)	Midnite Mine	2-mica granite
Kigd	Granodiorite	108	Kiat	Undivided 2-mica granite	Undivided 2-mica granite
Kigd	Granodiorite	107	Kiat(mm)	Mingo Mountain	2-mica granite
Kihgd	Granodiorite	108	Kiat(h)	Located in upper plate of Newport Fault, Hall Mountain	Granodiorite
Kihgd	Granodiorite	108	Kiat(hb)	Hall Mountain Boulder Mtn.	Granodiorite
Kihgd	Granodiorite	108	Kiat(hh)	Hall Mountain Harvey Cr.	Granodiorite
Kihgd	Granodiorite	108	Kiat(hl)	Hall Mountain Loop Cr.	Granodiorite
Kihgd	Granodiorite	108	Kiat(ho)	Hall Mountain Orwig Hump	Granodiorite
Kihgd	Granodiorite	108	Kiat(hp)	Hall Mountain Paupac Cr.	Granodiorite
Kihgd	Granodiorite	108	Kiat(ht)	Hall Mountain Tillicum Peak	Granodiorite
Kim	Monzogranite	208	Kia(c)	Camden	Monzogranite
Kim	Monzogranite	208	Kia(n)	Plutonic rocks west of Jump-Off Joe Fault, Narcisse Cr.	Monzogranite
Kim	Monzogranite	108	Kiaa(m)	Located in upper plate of Newport Fault, Middle Creek	Monzogranite
Kim	Monzogranite	208	Kiat(bm)	Plutonic rocks west of Jump-Off Joe Fault, Big Meadows	Monzogranite
Kim	Monzogranite	208	Kiat(e)	Eloika Lake	Monzogranite
Kim	Monzogranite	108	Kiat(gm)	Located in upper plate of Newport Fault, Gleason Mountain	Monzogranite
Kim	Monzogranite	108	Kiat(gp)	Granite Pass	Monzogranite
Kim	Monzogranite	108	Kiat(hm)	Located in upper plate of Newport Fault, Hall Mountain, Hungry Mountain	Monzogranite
Kim	Monzogranite	207	Kig(g)	Germania Mine	Monzogranite
Kim	Monzogranite	208	Kig(lr)	Little Roundtop	Monzogranite
Kim	Monzogranite	108	Kig(s)	Sand Creek	Monzogranite
Kiqm	Qurartz monzonite	108	Kia(s)	Starvation Flat	Quartz monzonite
Kiqm	Qurartz monzonite	208	Kia(s)	Plutonic rocks west of Jump-Off Joe Fault, Starvation Flat	Quartz monzonite
Kiqm	Qurartz monzonite	108	Kia(spb)	Spirit	Biotite, quartz monzonite
Kiqm	Qurartz monzonite	208	Kiat(b)	Located in upper plate of Newport Fault, Blickensderfer	Quartz monzonite
Kiqm	Qurartz monzonite	106	Kiqm(h)	Horseshoe Mtn.	Quartz monzonite
Kiqm	Qurartz monzonite	107	Kiqm(k)	Kettle Falls	Quartz monzonite
Kiqm	Qurartz monzonite	206	Kiqm(l)	Leader Lake	Quartz monzonite
Kiqm	Qurartz monzonite	206	Kiqm(p)	Pogue Mtn.	Quartz monzonite
KJid	Quartz diorite, diorite	106	KJid(b)	Buckhorn Mtn.	Diorite
KJid	Quartz diorite, diorite	107	KJid(b)	Buckhorn Mtn.	Diorite
KJid	Quartz diorite, diorite	206	KJid(i)	Summit-Frazer Complex, Indian Dan Canyon	Diorite
KJid	Quartz diorite, diorite	207	KJid(s)	Stepstone Cr.	Diorite
KJid	Quartz diorite, diorite	106	KJii(s)	Silver Nail Lk.	Quartz diorite, diorite
KJid	Quartz diorite, diorite	106	KJii(w)	Whiskey Mtn.	Quartz diorite, monzonite
KJid	Quartz diorite, diorite	106	KJiq(b)	Bowers	Quartz diorite
KJigb	Gabbro	106	KJigb(g)	Goat	Gabbro
KJigb	Gabbro	206	KJigb(r)	Red Shirt	Gabbro
KJigd	Granodiorite	207	KJia(bc)	Barnaby Creek	Granodiorite
KJigd	Granodiorite	207	KJia(g)	Gold Creek	Granodiorite
KJigd	Granodiorite	207	KJia(m)	Meteor	Granodiorite, granite
KJigd	Granodiorite	106	KJia(w)	Whiskey Mountain	Quartz monzonite, granodiorite
KJigd	Granodiorite	106	KJigd(a)	Anderson Cr.	Quartz diorite, diorite, granodiorite
KJigd	Granodiorite	107	KJigd(b)	Buckhorn Mountain	Granodiorite
KJigd	Granodiorite	106	KJigd(b)	Buckhorn Mtn.	Granodiorite

KJigd	Granodiorite	206	KJigd(br)	Summit-Frazer Complex, Brewster	Granodiorite
KJigd	Granodiorite	106	KJigd(d)	Dunn Mtn.	Granodiorite
KJigd	Granodiorite	206	KJigd(m)	Summit-Frazer Complex, Bridgeport	Megacrystic granodiorite
KJigd	Granodiorite	207	KJigd(r)	Rogers Bar	Granodiorite
KJigd	Granodiorite	107	KJigd(w)	Wauconda	Granodiorite, quartz monzodiorite
KJigd	Granodiorite	106	KJigd(w)	Wauconda	Quartz monzonite diorite, granodiorite
KJik	Alkalic rocks	107	KJik(s)	Shasket Creek	Hornblende syenite, pyroxene syenite, shonkinite, monzonite
KJmgg	Granite gneiss	208	Kog(ms)	Mt. Spokane	Deformed granite & gneiss
KJmgg	Granite gneiss	208	Kog(n)	Newman Lake	Gneiss
KJmig	Trondjemitic gneiss	206	KJit(s)	Summit-Frazer Complex	Trondjemitic gneiss, tonalite
KJmig	Trondjemitic gneiss	106	KJmi(t)	Tiffany Mountain	Trondjemitic gneiss
KJmig	Trondjemitic gneiss	206	KJog(g)	Summit-Frazer Complex	Trondjemitic gneiss, garnetiferous granitic gneiss
KJmix	Meta-diorite, meta-quartz diorite, meta-gabbro	206	KJmi(b)	Summit-Frazer Complex, Boot Mountain	Quartz diorite, granodiorite, diorite
KJmix	Meta-diorite, meta-quartz diorite, meta-gabbro	206	KJmi(bm)	Buck Mountain	Mixed meta-igneous
KJmix	Meta-diorite, meta-quartz diorite, meta-gabbro	206	KJmi(lc)	Lightning Creek	Mixed meta-igneous
KJmix	Meta-diorite, meta-quartz diorite, meta-gabbro	206	KJmi(s)	Summit-Frazer Complex	Quartz diorite, granodiorite, diorite
KJmix	Meta-diorite, meta-quartz diorite, meta-gabbro	106	KJmi(tx)	Tiffany Mountain	Mixed meta-igneous
KJmix	Meta-diorite, meta-quartz diorite, meta-gabbro	108	KYhm	Flodelle Cr.	Heterogeneous metamorphics
KJmm	Migmatite	206	KJmg(a)	Alta Lake	Migmatite
KJmm	Migmatite	206	KJmg(sf)	Summit-Frazer	Migmatite
KJmo	Orthgneiss	206	KJmi(w)	Wakefield	Orthogneiss
KJmo	Orthgneiss	206	KJmi(w)	Wakefield	Orthogneiss
KJmo	Orthgneiss	206	KJog(s)	Salmon Cr.	Orthogneiss
KJmo	Orthgneiss	106	KJog(w)	Windy Peak	Orthogneiss
KJmog	Granodioritic orthogneiss	206	KJog(gm)	Granite Mountain	Granodioritic gneiss
KJmog	Granodioritic orthogneiss	106	KJog(l)	Leader Mountain	Granodioritic gneiss
KJmqd	Quartz diorite, gneiss	206	KJog(c)	Summit-Frazer Complex Coyote Ridge	Quartz diorite gneiss
KJmqd	Quartz diorite, gneiss	206	KJog(m)	Summit-Frazer Complex Malot	Quartz diorite gneiss
Mc	Sedimentary	206	Mc	Sedimentary	Sedimentary
MDcb	Carbonate rocks east of Chewelah	208	MDcb(1c)	Carbonate rocks east of Chewelah	Lower carbonates
MDcb	Carbonate rocks east of Chewelah	208	MDcb(2c)	Carbonate rocks east of Chewelah	Middle carbonates
MDcb	Carbonate rocks east of Chewelah	208	MDcb(3c)	Carbonate rocks east of Chewelah	Upper carbonates
Mvg	Basalt	206	Mv(gN2)	Columbia River Basalt	Grande Rhonde member
Mvg	Basalt	207	Mv(gN2)	Columbia River Basalt	Grande Rhonde member
Mvg	Basalt	208	Mv(gN2)	Columbia River Basalt	Grande Rhonde member
Mvg	Basalt	206	Mv(gR2)	Columbia River Basalt	Grande Rhonde member
Mvw	Basalt	206	Mv(wpr)	Columbia River Basalt	Wanapum member, Priest Rapids
Mvw	Basalt	207	Mv(wpr)	Columbia River Basalt	Wanapum member
Mvw	Basalt	208	Mv(wpr)	Columbia River Basalt	Wanapum member
Mvw	Basalt	206	Mv(wr)	Columbia River Basalt	Wanapum, Roca
MZia	Acidic intrusives	106	MZia	Acidic intrusions	Acidic intrusions
MZid	Plugs, dikes, sills	106	MZi	Dikes, sills	Dikes, sills
MZmg	Gabbro	206	MZigb(d)	Darling Lake	Gabbro
MZmgg	Granodiorite gneiss	206	MZog(l)	Leader Mountain	Granodiorite gneiss
MZmgg	Granodiorite gneiss	106	MZog(s)	Salmon Cr.	Granodiorite gneiss
MZmqd	Quartz diorite-gneiss, meta-quartz diorite, meta-diorite	107	MZid(s)	Swan Lake	Meta-diorite
MZmqd	Quartz diorite-gneiss, meta-quartz diorite, meta-diorite	106	MZog(ll)	Lemansky Lake	Meta-quartz diorite, diorite
MZmqd	Quartz diorite-gneiss, meta-quartz diorite, meta-diorite	206	MZog(r)	Reed Creek	Quartz diorite orthogneiss
MZmqd	Quartz diorite-gneiss, meta-quartz diorite, meta-diorite	206	MZog(w)	Windy Hill	Quartz diorite orthogneiss
MZu	Ultrabasic	107	MZu	Ultra basic intrusives	Ultra basic intrusives
MZu	Ultrabasic	206	u	Ultra basic intrusives	Ultra basic intrusives
MZu	Ultrabasic	207	u	Serpentinite near Parmenter Creek	Serpentinite near Parmenter Creek
Occ	Meta-carbonates	107	Ocb(c)	Covada Group	Meta-carbonates
Occ	Meta-carbonates	207	Ocb(c)	Covada Group	Carbonates
Occ	Meta-carbonates	107	Omm(c)	Covada Group	Meta-sedimentary
Ocs	Sandstone conglomerate, wacke, quartzite	207	Omm(c)	Covada Group	Sandstone, conglomerate
Ocs	Sandstone conglomerate, wacke, quartzite	207	Ow(c)	Covada Group	Wacke, quartzite
Ocv	Meta-volcanics	107	Omv(c)	Covada Group	Meta-volcanic
Ocv	Meta-volcanics	207	Omv(c)	Covada Group	Greenstone
Oig	Gabbro	207	Oigb	Gabbro	Gabbro
Ols	Slate, meta-sedimentary	107	Omm(l)	Ledbetter	Meta-sedimentary
Ols	Slate, meta-sedimentary	207	Omm(l)	Ledbetter	Slate
Ols	Slate, meta-sedimentary	208	Omm(l)	Letbetter	Slate
Ols	Slate, meta-sedimentary	108	Omm(l)	Ledbetter	Slate
Ols	Slate, meta-sedimentary	108	Omm(r)	Red Top Mountain	Argillite
Omd	Dolomite	108	OCcb(d)	Metaline Formation	Dolomite
Omd	Dolomite	208	OCcb(d)	Metaline Formation	Dolomite
Oml	Limestone, carbonates	108	OCcb(b)	Metaline Formation	Limestone
Oml	Limestone, carbonates	108	OCcb(b)	Metaline Formation	Limestone
Oml	Limestone, carbonates	208	OCcb(l)	Metaline Formation	Limestone

Oml	Limestone, carbonates	108	OCcb(l)	Metaline Formation	Limestone
Oml	Limestone, carbonates	207	OCcb(m)	Metaline Formation	
Oml	Limestone, carbonates	208	OCcb(m)	Metaline Formation	Undivided
Oml	Limestone, carbonates	107	OCcb(m)	Metaline Formation	Meta-carbonates
pCbg	Gneiss	208	pCbg(h)	Hauser Lake	Gneiss
pChm	Mixed metamorphic	208	pChm	Mixed metamorphic	Mixed metamorphic
pJmm	Marble	106	pJmb(c)	Conconully	Marble
pJmsg	Schist, gneiss	206	pJhm(s)	Salmon Creek	Schist, gneiss
pJmsg	Schist, gneiss	206	pJmb(s)	Salmon Creek	Schist, gneiss, marble
pJmsg	Schist, gneiss	206	pJqz(s)	Salmon Creek	Schist, gneiss, quartzite
pJmx	Mixed metamorphic	206	pJhm(b)	Boot Mountain	Mixed metamorphic
pJmx	Mixed metamorphic	106	pJhm(c)	Conconully	Mixed metamorphic
pJmx	Mixed metamorphic	206	pJhm(t)	Trefry Ridge	Mixed metamorphic
pJmx	Mixed metamorphic	206	pJhm(t)	Trefry Ridge	Mixed metamorphic
pJmx	Mixed metamorphic	106	pJhm(tc)	Toats Coulee	Mixed metamorphics
pJtz	Tectonic zone	206	pJtz	Tectonic zone	Tectonic zone
pKma	Amphibolite or calc-silicate	206	pKam(f)	Summit-Frazer	Amphibolite
pKma	Amphibolite or calc-silicate	206	pKcs(b)	Brown Lake	Calc-silicate
pKma	Amphibolite or calc-silicate	206	pKhm(a)	Alta Lake	Amphibolite, gneiss, schist
pKmog	Orthgneiss	207	pKid(n)	North Star	Meta-diorite
pKmog	Orthgneiss	206	pKog(m)	Methow	Meta-igneous gneiss
pKmu	Mafic or ultramafic intrusives	207	pKigb(b)	Bridge Creek	Ultramafic, mafic
pKmu	Mafic or ultramafic intrusives	207	pKigb(s)	Stranger Creek	Mafic intrusives
pKmx	Mixed metamorphic	206	pKhm(l)	Leecher	Mixed metamorphics
PLMcg	Conglomerate	208	PLMcg(c)	Chamokone Creek	Conglomerate
PMmc	Carbonate meta-carbonates	107	PMcb	Permian	Meta-carbonates
PMmc	Carbonate meta-carbonates	108	PMcb(k)	Kettle Falls	Carbonates
PMmc	Carbonate meta-carbonates	106	PMcb(s)	Anarchist Group Spectacle Formation	Meta-carbonates
PMmc	Carbonate meta-carbonates	108	PMmm(k)	Kettle Falls	Argillite, limestone
PMms	Meta-sedimentary	107	PMmm	Permian	Meta-sedimentary
PMms	Meta-sedimentary	207	PMmm	West of Manila Pass Fault	Meta-sedimentary
PMms	Meta-sedimentary	106	PMmm(a)	Anarchist Group	Meta-sedimentary
PMms	Meta-sedimentary	106	PMmm(b)	Anarchist Group Bullfrog Mountain Formation	Slate, meta-wacke, meta-conglomerate
PMms	Meta-sedimentary	106	PMmm(s)	Anarchist Group Spectacle Formation	Meta-sedimentary
PMmv	Meta-volcanics	106	PMmv(s)	Anarchist Group Spectacle Formation	Meta-volcanic
pTma	Amphibolite, mafic gneiss	107	pTam	Meta-Igneous rocks of Tenas Mary Creek	Amphibolite
pTma	Amphibolite, mafic gneiss	207	pTam	West of Sherman Fault	Amphibolite
pTma	Amphibolite, mafic gneiss	206	pTam(t)	Layered Tonasket Gneiss of Okanogan metamorphic core complex	Amphibolite
pTma	Amphibolite, mafic gneiss	207	pTgn(h)	Hall Creek	Mafic gneiss
pTmbg	Banded gneiss	106	pTbg(t)	Layered metamorphic rocks of Okanogan metamorphic core complex, Tonasket	Banded gneiss
pTmbg	Banded gneiss	206	pTbg(t)	Layered Tonasket Gneiss of Okanogan metamorphic core complex	Banded gneiss
pTmbg	Banded gneiss	106	pTbg(tm)	Layered metamorphic rocks of Okanogan metamorphic core complex, Tonasket	Banded gneiss
pTmgg	Granodiorite gneiss	206	pTog(f)	Meta-igneous rocks of Okanogan metamorphic core complex, French Valley	Gneissic granodiorite
pTmgg	Granodiorite gneiss	106	pTog(m)	Metamorphic rocks of Okanogan metamorphic core complex, Mission Creek	Gneissic granodiorite
pTmgg	Granodiorite gneiss	206	pTog(m)	Meta-igneous rocks of Okanogan core complex Mission Creek	Gneissic granodiorite
pTmi	Migmatite	107	pTmg	Tenas Mary Creek	Migmatite
pTmi	Migmatite	107	pTmg	Tenas Mary Creek	Migmatite
pTmn	Marble	106	pTmb	Layered metamorphic rocks of Okanogan metamorphic core complex, Bonaparte Lake	Marble
pTmn	Marble	107	pTmb	Marble	Marble
pTmn	Marble	107	pTmb(1)	Layered metamorphics of Tenas Mary Creek	Marble
pTmn	Marble	107	pTmb(2)	Layered metamorphics of Tenas Mary Creek	Marble
pTmog	Orthogneiss	106	pTgn	Layered metamorphic rocks of Okanogan metamorphic core complex	Monzonite syenite gneiss
pTmog	Orthogneiss	107	pTog	Orthogneiss	Orthogneiss
pTmog	Orthogneiss	106	pTog(a)	Metamorphic rocks of Okanogan metamorphic core complex, Anglin	Orthogneiss
pTmog	Orthogneiss	206	pTog(c)	Meta-igneous rocks of Okanogan metamorphic core complexCrawfish Lake	Quartz diorite gneiss
pTmog	Orthogneiss	106	pTog(c)	Metamorphic rocks of Okanogan metamorphic core complex, Crawfish Lake	Quartz diorite gneiss
pTmog	Orthogneiss	207	pTog(d)	Deerborn Creek	Gneiss, mylonite
pTmog	Orthogneiss	107	pTog(e)	Meta-Igneous rocks of Tenas Mary Creek	Meta-igneous orthogneiss
pTmog	Orthogneiss	207	pTog(h)	Hall Cr.	Granite, orthogneiss
pTmog	Orthogneiss	107	pTogp	Meta-Igneous rocks of Tenas Mary Creek	Meta-igneous orthogneiss
pTmpg	Paragneiss	107	pTpg(2)	Layered metamorphics of Tenas Mary Creek	Paragneiss
pTmqs	Quartzite and/or schist	107	pTqz(2)	Layered metamorphics of Tenas Mary Creek	Quartzite
pTmqs	Quartzite and/or schist	107	pTqz(4)	Layered metamorphics of Tenas Mary Creek	Quartzite
pTmqs	Quartzite and/or schist	207	pTqz(h)	Hall Creek	Quartzite
pTmqs	Quartzite and/or schist	106	pTsc	Layered metamorphic rocks of Okanogan metamorphic core complex, Bonaparte Lake	Schist
pTmqs	Quartzite and/or schist	207	pTsc	West of Sherman Fault	Schist
pTmqs	Quartzite and/or schist	107	pTsc	Schist	Schist
pTmqs	Quartzite and/or schist	107	pTsc(1)	Layered metamorphics of Tenas Mary Creek	Schist
pTmqs	Quartzite and/or schist	107	pTsc(3)	Layered metamorphics of Tenas Mary Creek	Schist
pTmqs	Quartzite and/or schist	207	pTsc(h)	Hall Creek	Quartzite, schist
pTmx	Mixed metamorphics	207	pThm(h)	Hall Creek	Mixed metamorphics

PZmc	Carbonate meta-carbonates	207	PZcb	West of Manila Pass Fault	Carbonates
PZmc	Carbonate meta-carbonates	208	PZcb	Undivided carbonates	Undivided carbonates
PZmc	Carbonate meta-carbonates	108	PZcb(gl)	Quartzite of Miller (1974)	Lower carbonates
PZmc	Carbonate meta-carbonates	107	PZcb(s)	Swan Lake	Meta-carbonates
PZmd	Dolomite	208	PZcb(gl)	Gardiner Creek	Lower dolomite
PZmd	Dolomite	108	PZcb(gu)	Quartzite of Miller (1974)	Upper dolomite
PZmd	Dolomite	208	PZcb(gu)	Gardiner Creek	Upper dolomite
PZmq	Quartzite	208	PZmm(g)	Gardiner Creek	Phyllite, quartzite
PZmq	Quartzite	108	PZq(g)	Quartzite of Miller (1974)	Quartzite
PZmq	Quartzite	207	PZw	West of Manila Pass Fault	Wacke, quartzite
PZms	Meta-sedimentary	207	PZar	West of Manila Pass Fault	Argillite
PZms	Meta-sedimentary	106	PZmm	Near Tonasket, Bonner Lake	Meta-sedimentary
PZms	Meta-sedimentary	207	PZmm	West of Manila Pass Fault	Meta-sedimentary
PZms	Meta-sedimentary	107	PZmm(h)	Heidegger Hill	Meta-sedimentary
PZms	Meta-sedimentary	107	PZmm(s)	Swan Lake	Meta-sedimentary
PZmu	Mixed metamorphic, undivided	207	PZhm	Metamorphic	Metamorphic
PZmu	Mixed metamorphic, undivided	206	PZhm(c)	Crawfish Lake	Mixed metamorphic rocks
PZmu	Mixed metamorphic, undivided	206	PZhm(p)	Parmenter Creek	Mixed metamorphic rocks
Q	Non-glacial alluvium, dunes, peat, landslides	107	Qa	Alluvium	Alluvium
Q	Non-glacial alluvium, dunes, peat, landslides	108	Qa	Alluvium	Alluvium
Q	Non-glacial alluvium, dunes, peat, landslides	206	Qa	Alluvium	Alluvium
Q	Non-glacial alluvium, dunes, peat, landslides	207	Qa	Alluvium	Alluvium
Q	Non-glacial alluvium, dunes, peat, landslides	208	Qa	Alluvium	Alluvium
Q	Non-glacial alluvium, dunes, peat, landslides	106	Qa	Aluvium	Aluvium
Q	Non-glacial alluvium, dunes, peat, landslides	106	Qd	Dune	Dune
Q	Non-glacial alluvium, dunes, peat, landslides	107	Qd	Dune	Dune
Q	Non-glacial alluvium, dunes, peat, landslides	206	Qd	Dune	Dune
Q	Non-glacial alluvium, dunes, peat, landslides	208	Qla	Lacustirne	Lacustirne
Q	Non-glacial alluvium, dunes, peat, landslides	108	Qls	Mass wasting	Mass wasting
Q	Non-glacial alluvium, dunes, peat, landslides	207	Qls	Landslide	Landslide
Q	Non-glacial alluvium, dunes, peat, landslides	208	Qls	Landslide	Landslide
Q	Non-glacial alluvium, dunes, peat, landslides	107	Qls	Mass wasting	Mass wasting
Q	Non-glacial alluvium, dunes, peat, landslides	206	Qls	Landslide	Landslide
Q	Non-glacial alluvium, dunes, peat, landslides	106	Qls	Mass wasting	Mass wasting
Q	Non-glacial alluvium, dunes, peat, landslides	106	Qoa	Older alluvium	Older alluvium
Q	Non-glacial alluvium, dunes, peat, landslides	107	Qoa	Older alluvium	Older alluvium
Q	Non-glacial alluvium, dunes, peat, landslides	106	Qp	Peat	Peat
Q	Non-glacial alluvium, dunes, peat, landslides	208	Qp	Peat	Peat
Q	Non-glacial alluvium, dunes, peat, landslides	207	Qs	Sediments	Sediments
Q	Non-glacial alluvium, dunes, peat, landslides	208	Qs	Unconsolidated sediments	Unconsolidated sediments
Q	Glacial flood and lacustrine	208	Qfg	Flood gravels	Flood gravels
Q	Glacial flood and lacustrine	206	Qfg	Flood gravels	Flood gravels
Q	Glacial flood and lacustrine	208	Qfg	Flood gravels	Flood gravels
Q	Glacial flood and lacustrine	206	Qfs	Flood slackwater	Flood slackwater
Q	Glacial flood and lacustrine	208	Qfs	Flood, sand silt	Flood, sand silt
Q	Glacial flood and lacustrine	106	Qgl	Glacial lacustrine	Glacial lacustrine
Q	Glacial flood and lacustrine	107	Qgl	Glacial lacustrine	Glacial lacustrine
Q	Glacial flood and lacustrine	108	Qgl	Glacial lacustrine	Glacial lacustrine
Q	Glacial flood and lacustrine	208	Qgl	Glacial lacustrine	Glacial lacustrine
Q	Glacial flood and lacustrine	207	Qgl(n)	Glacial lacustrine	Glacial lacustrine
Q	Glacial flood and lacustrine	206	Qgl(n)	Glacial lacustrine	Glacial lacustrine
Q	Glacial flood and lacustrine	208	Qglf	Glacial lacustrine and flood	Glacial lacustrine and flood
Q	Glacial flood and lacustrine	207	Qglf(n)	Glacial lacustrine and flood	Glacial lacustrine and flood
Q	Glacial outwash, till, drift, loess	106	Qgd	Drift	Drift
Q	Glacial outwash, till, drift, loess	107	Qgd	Drift	Drift
Q	Glacial outwash, till, drift, loess	108	Qgd	Drift	Drift
Q	Glacial outwash, till, drift, loess	206	Qgd	Drift	Drift
Q	Glacial outwash, till, drift, loess	207	Qgd	Drift	Drift
Q	Glacial outwash, till, drift, loess	208	Qgd	Drift	Drift
Q	Glacial outwash, till, drift, loess	206	Qgo	Outwash	Outwash
Q	Glacial outwash, till, drift, loess	207	Qgo	Outwash	Outwash
Q	Glacial outwash, till, drift, loess	208	Qgo	Outwash	Outwash
Q	Glacial outwash, till, drift, loess	106	Qgo	Outwash	Outwash

Q	Glacial outwash, till, drift, loess	107	Qgo	Outwash	Outwash
Q	Glacial outwash, till, drift, loess	108	Qgo	Outwash	Outwash
Q	Glacial outwash, till, drift, loess	208	Qgp	Till	Till
Q	Glacial outwash, till, drift, loess	207	Qgpt	Older till	Older till
Q	Glacial outwash, till, drift, loess	206	Qgt	Till	Till
Q	Glacial outwash, till, drift, loess	106	Qgt	Till	Till
Q	Glacial outwash, till, drift, loess	107	Qgt	Till	Till
Q	Glacial outwash, till, drift, loess	108	Qgt	Till	Till
Q	Glacial outwash, till, drift, loess	207	Qgt	Till	Till
Q	Glacial outwash, till, drift, loess	208	Qgt	Till	Till
Q	Glacial outwash, till, drift, loess	207	Ql	Loess	Loess
Q	Glacial outwash, till, drift, loess	208	Ql	Loess	Loess
Scg	Granule conglomerate	108	Scg	Basalt Hill	Quartz granule comglomerate
Smm	Meta-sedimentary	108	Smm	Meta-sedimentary	Meta-sedimentary
TKia	Leucocratic granite, granodiorite	207	TKia(h)	Huckleberry Range	Leucocratic granite, granodiorite
TKiaa	Leucocratic alaskite, quartz monzonite	208	TKiaa(s)	Scotia Area	Leucocratic alaskite, quartz monzonite
TKigd	Granodiorite	206	TKigd(v)	Victor Spring	Granodiorite
TKik	Alkalic intrusives	106	TKik	Oroville and Bimetallic Mountain	Alkalic intrusives
TRmc	Meta-carbonates	107	TRcb	Meta-carbonate	Meta-carbonate
TRmc	Meta-carbonates	108	TRcb	Meta-carbonate	Meta-carbonate
TRmc	Meta-carbonates	106	TRcb(c)	Cave Mountain Formation	Meta-carbonate
TRmc	Meta-carbonates	206	TRcb(c)	Cave Mountain Formation	Meta-carbonate
TRmig	Orthogneiss	106	TRog(o)	Osoyoos	Orthogneiss
TRms	Meta-sedimentary	108	TRmm		Meta-sedimentary
TRms	Meta-sedimentary	106	TRmm(c)	Cave Mountain Formation	Meta-sedimentary
TRms	Meta-sedimentary	206	TRmm(c)	Cave Mountain Formation	Undivided
TRms	Meta-sedimentary	106	TRmm(cx)	Conconully metamorphic complex	Meta-sedimentary
TRms	Meta-sedimentary	206	TRmm(cx)	Conconully metamorphic complex	Metamorphic
TRmu	Meta-gabbro, amphibolite	106	TRib(m)	Mud Lake	Meta-gabbro amphibolite
TRmv	Meta-volcanics	106	TRmv(c)	Cave Mountain Formation	Meta-volcanic
TRmv	Meta-volcanics	206	TRmv(c)	Cave Mountain Formation	Meta-volcanic
TRPMmb	Basic intrusive	106	TRPMib	Basic intrusives	Basic intrusives
TRPMmb	Basic intrusive		TRPMib(c)	Chopoka intrusive complex	Meta-gabbro
TRPMmd	Meta-diorite	107	TRPMid(b)	Buckhorn Mountain	Meta-diorite
TRPMms	Meta-sedimentary	107	TRPMmm	Meta-sedimentary	Meta-sedimentary
TRPMmsv	Meta-sedimentary and metamorphic undivided	107	TRPMmt	Meta-sedimentary meta-volcanic	Meta-sedimentary meta-volcanic
TRPMmsv	Meta-sedimentary and metamorphic undivided	106	TRPMmt(k)	Kobau Formation	Meta-sedimentary meta-volcanic
TRPMmsv	Meta-sedimentary and metamorphic undivided	106	TRPMmv(p)	Palmer Mountain	Greenstone
TRPMmv	Meta-volcanics	107	TRPMmv	Meta-volcanic	Meta-volcanic
TRPMu	Ultrabasic	106	TRPMu(c)	Chopaka intrusive complex	Ultra basic
Ybbs	SIltite	108	Yms(rb)	Belt Supergroup, Ravalli Group, Burke Formation	Siltite
Ybbs	SIltite	208	Yms(rb)	Belt Supergroup, Ravalli Group, Burke Formation	Siltite
Ybha	Argillite	207	Yar(b)	Deer Trail Group, Buffalo Hump Formation	Argillite
Ybha	Argillite	208	Yar(b)	Deer Trail Group, Buffalo Hump Formation	Argillite
Ybha	Argillite	208	Yar(dt)	Deer Trail Group undivided	Argillite siltite
Ybhq	Quartzite	207	Yq(b)	Deer Trail Group, Buffalo Hump Formation	Quartzite
Ybhq	Quartzite	208	Yq(b)	Buffalo Hump Formation	Quartzite
Ybi	Meta-diorite meta-gabbro	208	Yib	Purcell Sills	Meta-diorite meta-gabbro
Ybi	Meta-diorite meta-gabbro	108	Yib(p)	Purcell Sills	Intrusives
Ybms	Upper Belt Supergroup undivided	208	Yms(bu)	Upper Belt Supergroup, undivided	Argillite, siltite
Ybps	Argillite, siltite	108	Yms(p)	Belt Supergroup, Prichard Formation	Argillite
Ybps	Argillite, siltite	208	Yms(p)	Belt Supergroup Prichard	Argillite, siltite, quartzite
Ybrq	Quartzite	108	Yms(rr)	Belt Supergroup, Ravalli Group, Revett Formation	Quartzite
Ybrq	Quartzite	208	Yms(rr)	Belt Supergroup, Ravalli Group, Revett Formation	Quartzite
Ybsrs	Siltite, argillite	108	Yms(sr)	Belt Supergroup, Ravalli Group, St. Regis Formation	Siltite
Ybsrs	Siltite, argillite	208	Yms(sr)	Belt Supergroup, Ravalli Group, St. Regis Formation	Siltite, argillite
Ybss	Siltite, argillite	108	Yms(s)	Belt Supergroup, Missoula Group, Striped Peak Formation	Siltite quartzite
Ybss	Siltite, argillite	208	Yms(s)	Belt Supergroup, Missoula Group, Striped Peak Formation	Siltite, argillite, quartzite, dolomite
Ybwq	Lower quartzite	208	Yms(w)	Belt Supergroup, Wallace Formation undivided	Siltite, argillite, quartzite, dolomite
Ybwq	Lower quartzite	108	Yms(wl)	Belt Supergroup, Lower Wallace Formation	Calc-silicate siltite
Ybwq	Lower quartzite	208	Yms(wl)	Belt Supergroup, Lower Wallace Formation	Quartzite, siltite
Ybwua	Dolomite, siltite upper argillite	108	Yms(wu)	Belt Supergroup, Upper Wallace Formation	Argillite
Ybwua	Dolomite, siltite upper argillite	208	Yms(wu)	Belt Supergroup, Upper Wallace Formation	Argillite
Yed	Dolomite	207	Ycb(e)	Deer Trail Group, Edna Dolomite	Dolomite
Yed	Dolomite	208	Ycb(e)	Deer Trail Group, Edna Dolomite	Dolomite
Ymcs	Slate	207	Yar(m)	Deer Trail Group, McHale Slate	Slate
Ymcs	Slate	208	Yar(m)	Deer Trail Group, McHale Slate	Slate
Yprc	Carbonates	108	Ycb(p)	Priest River Group	Carbonates
Yprcs	Calc-silicate	108	Ycs(p)	Priest River Group	Calc-silicates
Yprl	Lower argillite	108	Yar(pl)	Priest River Group	Lower argillite
Yprq	Quartzite	108	Yq(p)	Priest River Group	Quartzite
Ypru	Upper argillite	108	Yar(pu)	Priest River Group	Upper argillite
Ysd	Dolomite	207	Ycb(s)	Deer Trail Group, Stensgar Dolomite	Dolomite

Ysd	Dolomite	208	Ycb(s)	Deer Trail Group, Stensgar Dolomite	Dolomite
Ytar	Quartzite Argillite	207	Yar(t)	Deer Trail Group, Togo Formation	Meta-sedimentary
Ytar	Quartzite Argillite	208	Yar(t)	Deer Trail Group, Togo Formation	Argillite
Ytar	Quartzite Argillite	207	Yq(t)	Deer Trail Group, Togo Formation	Quartzite
Ytar	Quartzite Argillite	208	Yq(t)	Deer Trail Group, Togo Formation	Quartzite
Zhcg	Greenstone, flows	207	Zmv(h)	Windermere Group, Huckleberry Formation	Greenstone
Zhcg	Greenstone, flows	208	Zmv(h)	Windermere Group, Huckleberry Formation	Greenstone
Zhmv	Conglomerate	207	Zcg(h)	Windermere Group, Huckleberry Formation	Conglomerate
Zhmv	Conglomerate	208	Zcg(h)	Windermere Group, Huckleberry Formation	Conglomerate
Zi	Greenstone meta-diorite meta-gabbro	108	Zib	Intrusive	Greenstone intrusive
Zi	Greenstone meta-diorite meta-gabbro	207	Zib	Intrusive Sills	Meta-diorite meta-gabbro
Zi	Greenstone meta-diorite meta-gabbro	208	Zib	Intrusive Sills	Basic intrusives
Zlmv	Greenstone, flows, breccia, tuff, volcanic conglomerate	108	Zmv(l)	Windermere Group, Leola Volcanics	Meta-volcanics
Zmlv	Argillite, siltite, limestone	107	Zcb(m)	Windermere Group, Monk Formation	Meta-carbonates
Zmlv	Argillite, siltite, limestone	108	Zmm(m)	Windermere Group, Monk Formation	Argillite, siltite, limestone
Zmlv	Argillite, siltite, limestone	208	Zmm(m)	Windermere Group, Monk Formation	Argillite, siltite, limestone
Zmlv	Argillite, siltite, limestone	107	Zmt(m)	Windermere Group, Monk Formation	Meta-carbonates
Zscg	Conglomerate	108	Zcg(s)	Shedroof Conglomerate	Conglomerate
Zsl	Limestone	108	Zcb(s)	Shedroof Conglomerate	Limestone
Zsp	Phyllite	108	Zph(s)	Shedroof Conglomerate	Phyllite
Zsq	Quartzite	108	Zq(s)	Shedroof Conglomerate	Quartzite
Ztq	Quartzite	108	Zq(t)	Windermere Group, Three Sisters Formation	Quartzite
Zu	Undivided	208	Zmt(w)	Windermere Group undivided	

Appendix A-2 Description of Lithologies

Sedimentary			
Age	label	Name	Description
Quaternary	Qa	Non-glacial alluvium, dunes, peat, landslides	Non-glacial alluvium, dunes, peat, landslides
	Qgfl	Glacial flood and lacustrine	Glacial flood and lacustrine
	Qgot	Glacial outwash, till, drift, loess	Glacial outwash, till, drift, loess
Pliocene-Miocene	PLMcg	Chamokane Creek	Conglomerate
Miocene	Mc	Sedimentary	Sedimentary
Tertiary	bx	Tectonic breccia	breccia
	Ecg	Conglomerate	Conglomerate
Eocene	Eck	Klondike Mountain	sediments, volcanics
	Eco	O'Brien Creek	sediment, tuff
	Et	Tiger Formation	Silt, clay, conglomerate
	Etz	Tectonic zone	Tectonic zone
Mesozoic	Kcg	Mesozoic sedimentary	Mesozoic sedimentary
Paleozoic	PZmd	Dolomite	Dolomite
	PZmq	Quartzite	Quartzite
Mississippian-Devonian	MDcb	Carbonate rocks east of Chewelah	Carbonate rocks east of Chewelah
Carboniferous	Ccbl	Limekiln Hill carbonate	Carbonate
Carboniferous-	CDcb	Carbonate	Carbonate

Devonian			
Carboniferous-Ordovician	COcb	Carbonate	Carbonate
	COcg	Chert-pebble conglomerate	Chert-pebble conglomerate
Devonian	Dcb	Limestone, conglomerate	Limestone, conglomerate
Silurian	Scg	Granule conglomerate	Granule conglomerate
Ordovician	Occ	Covada Group	Meta-carbonates
	Ocs	Covada Group	Sandstone conglomerate, wacke, quartzite
	Ocv	Covada Group	Meta-volcanics
	Oig	Gabbro	Gabbro
	Ols	Ledbetter	Slate, meta-sedimentary
Ordovician-Cambrian	Omd	Metaline	Dolomite
	Oml	Metaline	Limestone, carbonates
Cambrian	Ccbm	Maitlen Phyllite, includes Reeves Limestone member	Carbonate
	Cphm	Maitlen Phyllite	Phyllite
	Czq	Addy Quartzite	Quartzite
Volcanic			
Age	Label	Name	Description
Miocene	Mvg	Columbia River Basalt, Grande Rhonde member	Basalt
	Mvw	Columbia River Basalt, Wanapum Member	Basalt
Eocene	Ev	Volcanics, undivided	Volcanics, undivided
	Evcg	Volcanic conglomerate	Volcanic conglomerate
	Evcl	Volcaniclastics	Volcaniclastics
	Evf	Flows	Flows
	Evkct	Klondike Mtn.	Volcanic tuff, breccia, conglomerate
	Evkf	Klondike Mtn.	Flows
	Evsf	Sanpoil Volcanics	Flows
	Evst	Sanpoil Volcanics	Volcanics, tuff and volcanic breccia
	Evsv	Sanpoil Volcanics	Volcaniclastics
Plutonic			
Age	Label	Name	Description
Eocene	Ei	Plagioclase porphyry	Plagioclase porphyry
	Eia	Andesite, trachyandesite dikes, sills, and plugs	Andesite, trachyandesite dikes, sills, plugs
	Eib	Basic intrusives and dikes	Basic intrusives and dikes
	Eid	Hypabyssal dacite and andesite dikes	Hypabyssal dacite and andesite dikes
	Eig	Acid to intermediate plutons	Granite, minor granodiorite
	Eigd	Diorite and granodiorite	Diorite, granodiorite
	Eik	Alkalic rocks	shonkinite, monzonite, syenite
	Eim	Monzonite	Monzonite
	Eimd	Monzogranite and Monzodiorite	Monzogranite Monzodiorite
	Eiqm	Quartz monzonite	Quartz monzonite
	Eir	Acid hypabyssal	Rhyolite intrusives
Eocene-Paleocene	EPia	Mt. Bonaparte Alaskite	Alaskite
	EPid	Mt. Bonaparte Diorite	Diorite
	EPig	Granite	Granite
	EPigb	Mt. Bonaparte Granite	Granite
	EPigd	Granodiorite	Granodiorite

	EPigk	Keller Butte Granite	Granite
	EPigm	Moses pluton	Granite
	EPiqp	Mt. Tolman quartz porphyry	Quartz porphyry
Tertiary-Cretaceous	TKia	Huckleberry Range	Leucocratic granite, granodiorite
	TKiaa	Scotia Area	Leucocratic alaskite, quartz monzonite
	TKigd	Victor Spring	Granodiorite
	TKik	Oroville and Bimetallic Mountain	Alkalic intrusives
Mesozoic	MZia	Acidic intrusives	Acidic intrusives
	MZid	Plugs, dikes, and sills	Plugs, dikes, sills
	MZu	Ultrabasic	Ultrabasic
Cretaceous	Kid	Granodiorite and diorite	Granodiorite, diorite
	Kig	Granite and alaskite	Granite, alaskite
	Kigd	Granodiorite and two-mica granite	Granodiorite and two-mica granite
	Kihgd	Hall Mountain granodiorite	Granodiorite
	Kim	Monzogranite	Monzogranite
	Kiqm	Quartz monzonite	Quartz monzonite
Jurassic-Cretaceous	KJid	Quartz diorite, diorite	Quartz diorite, diorite
	KJigb	Gabbro	Gabbro
	KJigd	Granodiorite	Granodiorite
	KJik	Alkalic rocks	Alkalic rocks
Jurassic	Jib	Basic intrusives	Basic intrusives
	Jik	Alkalic intrusives	Alkalic intrusives
	Jiqm	Quartz monzonite, monzonite, and granodiorite	Quartz monzonite, monzonite, granodiorite
Mesozoic or Paleozoic	TRPMu	Ultrabasic	Ultrabasic
	TRPMmb	Basic intrusive	Basic intrusive
Jurassic-Triassic	Jtiqd	Quartz diorite	Quartz diorite
	JTigd	Granodiorite	Granodiorite

Meta-sedimentary, Meta-volcanic

Age	Label	Name	Description
Pre-Tertiary	pTmn	Marble	Marble
	pTmpg	Paragneiss	Paragneiss
	pTmqs	Quartzite and/or schist	Quartzite and/or schist
Mesozoic	TRmc	Meta-carbonates	Meta-carbonates
	TRmv	Meta-volcanic	Meta-volcanics
	TRms	Meta-sedimentary	Meta-sedimentary
Jurassic	Jmc	Ellemeham Formation and Rossland Group	Meta-conlgomerate, meta-sedimentary
	Jmv	Ellemeham Formation and Rossland Group	Meta-volcanic, greenstone
Pre-Jurassic	pJmm	Marble	Marble
Mesozoic or Paleozoic	TRPMmd	Meta-diorite	Meta-diorite
	TRPMms	Meta-sedimentary	Meta-sedimentary
	TRPMmsv	Meta-sedimentary and metamorphic undivided	Meta-sedimentary and metamorphic undivided
	TRPMmv	Meta-volcanic	Meta-volcanics
Paleozoic	PZms	Meta-sedimentary	Meta-sedimentary
	PZmu	Mixed metamorphic, undivided	Mixed metamorphic, undivided

	PZmc	Carbonates, meta-carbonates	Carbonates, meta-carbonates
Mississippian-Pemian	PMmc	Anarchist Group	Carbonate meta-carbonates
	PMms	Anarchist Group	Meta-sedimentary
	PMmv	Anarchist Group	Meta-volcanics
Carboniferous-Devonian	CDmm	Metavolcanic, meta-sediment	Metavolcanic, meta-sediment
	CDmv	Metavolcanic	Metavolcanic
Carboniferous-Ordovician	COm	Chert-quartz-bearing metasediment	Chert-quartz-bearing metasediment
	COmv	Tuff, greenstone, argillite, quartzite, wacke	Tuff, greenstone, argillite, quartzite, wacke
Silurian	Smm	Meta-sedimentary	Meta-sedimentary
Pre-Cambrian Z (Upper Proterozoic)	Zu	Windermere Group 1, undivided	Undivided
	Ztq	Windermere Group 1.1, Three Sisters Formation	Quartzite
	Zmlv	Windermere Group 2, Monk Formation	Argillite, siltite, limestone
	Zlmv	Windermere Group 3.1, Leola Volcanics	Greenstone, flows, breccia, tuff, volcanic conglomerate
	Zhcg	Windermere Group 3.2, Huckleberry Formation	Greenstone, flows
	Zhmv	Windermere Group 4, Huckleberry Formation	Conglomerate
	Zsq	Windermere Group 5, Shedroof Conglomerate	Quartzite
	Zsl	Windermere Group 5.1, Shedroof Conglomerate	Limestone
	Zsp	Windermere Group 5.2, Shedroof Conglomerate	Phyllite
	Zscg	Windermere Group 5.3, Shedroof Conglomerate	Conglomerate
Pre-Cambrian Y (Middle Proterozoic)	Ybms	Belt Supergroup 1 (upper) undivided	Upper Belt Supergroup undivided
	Ybss	Belt Supergroup 1.1, Missoula Group, Striped Peak Formation	Siltite, argillite
	Ybwua	Belt Supergroup 2, Missoula Group, Wallace (upper) Formation	Dolomite, siltite upper argillite
	Ybwq	Belt Supergroup 3, Missoula Group, Wallace (lower) Formation	Lower quartzite
	Ybsrs	Belt Supergroup 4, Ravalli Group, St. Regis Formation	Siltite, argillite
	Ybrq	Belt Supergroup 5, Ravalli Group, Revett Formation	Quartzite
	Ybbs	Belt Supergroup 6, Ravalli Group, Burke Formation	Siltite
	Ybps	Belt Supergroup 7, Prichard Formation	Argillite, siltite
	Ybhq	Deer Trail Group 1, Buffalo Hump Formation, undivided	Quartzite
	Ybha	Deer Trail Group 2, Buffalo Hump Formation	Argillite

	Ysd	Deer Trail Group 3, Stensgar Dolomite	Dolomite
	Ymcs	Deer Trail Group 4, McHale Slate	Slate
	Yed	Deer Trail Group 5, Edna Dolomite	Dolomite
	Ytar	Deer Trail Group 6, Togo Formation	Quartzite, Argillite
	Ypru	Priest River Group 1	Upper argillite
	Yprq	Priest River Group 2	Quartzite
	Yprl	Priest River Group 3	Lower argillite
	Yprc	Priest River Group 4	Carbonates
	Yprcs	Priest River Group 5	Calc-silicate

Metamorphic, undivided, meta-igneous

Age	Label	Name	Description
Pre-Tertiary	pTma	Amphibolite, mafic gneiss	Amphibolite, mafic gneiss
	pTmbg	Banded gneiss	Banded gneiss
	pTmgg	Granodiorite gneiss	Granodiorite gneiss
	pTmi	Migmatite	Migmatite
	pTmog	Orthogneiss	Orthogneiss
	pTmx	Mixed metamorphics	Mixed metamorphics
Mesozoic	MZmg	Gabbro	Gabbro
	MZmgg	Granodiorite, gneiss	Granodiorite gneiss
	MZmqd	Quartz diorite-gneiss, meta-quartz diorite, meta-diorite	Quartz diorite-gneiss, meta-quartz diorite, meta-diorite
	TRmig	Orthogneiss	Orthogneiss
	TRmu	Meta-gabbro, amphibolite	Meta-gabbro, amphibolite
Jurassic-Cretaceous	KJmgg	Granite, gneiss	Granite gneiss
	KJmig	Trondjemitic gneiss	Trondjemitic gneiss
	Kjmix	Varied metamorphic and meta-igneous	Meta-diorite, meta-quartz diorite, meta-gabbro
	KJmm	Migmatite	Migmatite
	KJmo	Orthogneiss	Orthgneiss
	KJmog	Granodioritic orthogneiss	Granodioritic orthogneiss
	KJmqd	Quartz diorite, gneiss	Quartz diorite, gneiss
Pre-Cretaceous	pKma	Amphibolite or calc-silicate	Amphibolite or calc-silicate
	pKmog	Orthogneiss	Orthgneiss
	pKmu	Mafic or ultramafic intrusives	Mafic or ultramafic intrusives
	pKmx	Mixed metamorphic	Mixed metamorphic
Jurassic	Jmig	Hybrid gneiss	Hybrid gneiss
	Ju	Serpentinite	Serpentinite
Pre-Jurassic	pJmsg	Schist, gneiss	Schist, gneiss
	pJmx	Mixed metamorphic	Mixed metamorphic
	pJtz	Tectonic zone	Tectonic zone
Pre-Cambrian Z	Zi	Windermere Group 3, Meta-igneous, meta-volcanic	Greenstone meta-diorite meta-gabbro
Pre-Cambrian Y	Ybi	Purcell sills, intrusives	Meta-diorite meta-gabbro
Pre-Cambrian X(?)	pCbg	Hauser Lake Gneiss	Gneiss
	pChm	Mixed metamorphic	Mixed metamorphic

Appendix B. Values Descriptions

B-1. Description of Value item in newafold.vat

Value	Description
1	Anticline
2	Anticline, approximate location
3	Anticline, concealed
7	Overturned Anticline
8	Overturned Anticline, approximate location
9	Overturned Anticline, concealed
13	Syncline
15	Syncline, concealed
19	Overturned Syncline
20	Overturned Syncline, approximate location
21	Overturned Syncline, concealed
31	Monocline, Anticlinal Bend
32	Monocline, Anticlinal Bend, approximate location
33	Monocline, Anticlinal Bend, concealed
No data	No folds mapped in this area

B-2. Description of Value item in newafaul.vat

Value	Description
0	Unknown fault type
1	Fault, unknown offset
2	Fault, unknown offset, approximate location
3	Fault , unknown offset, concealed
4	Fault, unknown offset, queried
7	Thrust Fault
8	Thrust Fault, approx. location
9	Thrust Fault, concealed
10	Thrust fault, queried
31	Low Angle Normal Fault
33	Low Angle Normal Fault, concealed
43	Normal Fault
44	Normal Fault, concealed
45	Normal Fault, concealed
No data	No faults mapped in this area

B-3. Description of Value item in newadike.vat

Value	S_value	Description
1	Ei	Eocene dikes, undivided (Republic) and plagioclase porphyry dikes near Lone Ranch Creek (Chewelah)
2	Eian	Eocene augite trachyandesite and porphyritic andesite plugs (Oroville) and andesite and basalt sills and porphyritic andesite plugs (Republic)
3	Eib	Eocene basic intrusive rocks near Toroda and Kettle Falls (Republic)
4	Eid	Eocene diorite plugs (Oroville), dacite dikes and plugs (Colville, Nespelem), and diorite at Little Moses (Omak)
5	Eida	Eocene porphyritic dacite dikes (Oroville, Republic)
6	Eida(c)	Eocene hypabyssal and porphyry dikes (Omak)
7	Eidaa	Eocene porphyritic andesite and andesite dikes (Republic, Colville)
8	Eii	Eocene intermediate intrusives (Republic, Omak), mafic dikes (Colville), and quartz monzonite near Springdale (Chewelah)
9	Eir	Eocene rhyolite granophyre (Colville), and intrusive rhyolite near West Fork (Nespelem)
10	Eis(c)	Eocene Coryell syenite-monzonite, shonkinite (Colville)
11	Eitr	Eocene porphyritic trachyte dikes (Republic)
12	KJia(b)	Cretaceous-Jurassic alaskite and fine-grained hornblende diorite dikes on Buckhorn Mountain (Republic)
13	Mzi	Mezozoic dikes and sills undivided (Oroville)
14	TKia	Tertiary-Cretaceous dikes and sills of Huckleberry Range (Nespelem)
15	No data	

Appendix C - Metadata (geolunit.met)

IDENTIFICATION_INFORMATION

Citation:
Citation_Information:
Originator: David E. Boleneus
Originator: J. Douglas Causey
Publication_Date: 2000
Title: Geologic data sets for weights-of-evidence analysis in northeast Washington-1. Geologic raster data
Edition: version 1.0
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: Open file report
Issue_Identification: OF 00-495
Publication_Information:
Publication_Place: Menlo Park, WA
Publisher: U.S. Geological Survey
Other_Citation_Details:
This is a compilation of geologic coverages, all produced
by Washington Department of Natural Resources.
Online_Linkage: geopubs.wr.usgs.gov/open-file/
Description:
Abstract:
This dataset contains the combination of geology data
(geologic units, faults, folds, and dikes) from 6
1;100,000 scale digital coverages in eastern Washington
(Chewelah, Colville, Omak, Oroville, Nespelem, Republic).
The data was converted to an Arc grid in ArcView using
the Spatial Analyst extension.
Purpose:
Four grids (newageol, newafaul, newafold, newadike) were built to use in a weights-of-evidence analysis of mineral deposits and mineral activity. These grids accompany this report.
Supplemental_Information:
Geologic data sets were preliminary ArcInfo coverages
obtained from Washington Department of Natural Resources.
Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1998
Ending_Date: 1998
Currentness_Reference: 1998
Status:
Progress: Complete
Maintenance_and_Update_Frequency: None planned
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -120
East_Bounding_Coordinate: -117
North_Bounding_Coordinate: 49

South_Bounding_Coordinate: 48
Keywords:
Theme:
Theme_Keyword_Thesaurus: None
Theme_Keyword: geology
Theme_Keyword: Raster
Theme_Keyword: Weights-of-evidence
Theme_Keyword: GIS
Place:
Place_Keyword_Thesaurus: None
Place_Keyword: Colville
Place_Keyword: Washington
Place_Keyword: Chewelah
Place_Keyword: Omak
Place_Keyword: Okanogan
Place_Keyword: Republic
Place_Keyword: Nespelem
Access_Constraints:
None
Use_Constraints:
None
Point_of_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: U.S. Geological Survey
Contact_Person: Dave Boleneus
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: 99201-1087
Country: USA
Contact_Voice_Telephone: 509.368.3110
Contact_Facsimile_Telephone: 509.368.3199
Contact_Electronic_Mail_Address: dboleneu@usgs.gov
Hours_of_Service: 8 -4:30 PST
Native_Data_Set_Environment:
ArcView 3.1, Spatial Analyst Extension, Win NT 4.0

DATA_QUALITY_INFORMATION

Attribute_Accuracy:
Attribute_Accuracy_Report:
These data are preliminary. There may be errors in attributes.
Logical_Consistency_Report:
These data are preliminary. There may be errors in the
logical consistancy. No proofing of data has been done.
Completeness_Report:
Original vector data was assumed to be complete.
Positional_Accuracy:

Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
Data originally digitized from 1:100,000-scale geologic maps. Errors may be due to original drafting errors on map, digitizing errors, projection rounding, Arc Clean command, and conversion from raster to grid.
Vertical_Positional_Accuracy:
Vertical_Positional_Accuracy_Report:
No vertical data.
Lineage:
Source_Information:
Source_Citation:
Citation_Information:
Originator: J.E. Schuster
Originator: C.F.T. Harris
Publication_Date: Unpublished (1997 dataset)
Title: Geologic map of the Chewelah 1:100,000 quadrangle, Washington-Idaho, compiled by S.Z. Waggoner, Washington Division of Geology and Earth Resources Open File Report 90-14, 1990: Washington Division of Geology and Earth Resources preliminary digital map.
Edition: Unpublished preliminary
Geospatial_Data_Presentation_Form: digital
Publication_Information:
Publication_Place: Olympia, WA
Publisher: Washington Department of Natural Resources
Other_Citation_Details:
The geologic spatial data files (Arc/Info vector format) were produced by Washington Department of Natural Resources.
Source_Scale_Denominator: 100,000
Type_of_Source_Media: digital
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1997
Ending_Date: 1998
Source_Currentness_Reference: Date of completion of preliminary digital files
Source_Citation_Abbreviation: Schuster and Harris, 1997a
Source_Contribution:
Source was geologic ArcInfo coverages

Originator: J.E. Schuster
Originator: C.F.T. Harris
Publication_Date: Unpublished (1997 dataset)
Title: Geologic map of the Nespelem 1:100,000 quadrangle, Washington-Idaho, compiled by N.L.Joseph, Washington Division of Geology and Earth Resources Open File Report 90-16, 1990: Washington Division of Geology and Earth Resources preliminary digital map.
Edition: preliminary
Geospatial_Data_Presentation_Form: digital
Publication_Information:
Publication_Place: Olympia, WA
Publisher: Washington Department of Natural Resources
Other_Citation_Details:

The geologic spatial data files (Arc/Info vector format) were produced by Washington Department of Natural Resources.

Source_Scale_Denominator: 100,000
Type_of_Source_Media: digital
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1997
Ending_Date: 1997
Source_Currentness_Reference: Date of completion of preliminary digital files
Source_Citation_Abbreviation: Schuster and Harris, 1997b
Source_Contribution:
Source was geologic ArcInfo coverages

Originator: J.E. Schuster
Originator: C.F.T. Harris
Publication_Date: Unpublished (1997 dataset)
Title: Geologic map of the Oroville 1:100,000 quadrangle, Washington-Idaho, compiled by K.L. Stoffel, Washington Division of Geology and Earth Resources Open File Report 90-11, 1990: Washington Division of Geology and Earth Resources preliminary digital map.
Edition: preliminary
Geospatial_Data_Presentation_Form: digital
Publication_Information:
Publication_Place: Olympia, WA
Publisher: Washington Department of Natural Resources
Other_Citation_Details:
The geologic spatial data files (Arc/Info vector format) were produced by Washington Department of Natural Resources.

Source_Scale_Denominator: 100,000
Type_of_Source_Media: digital
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1997
Ending_Date: 1997
Source_Currentness_Reference: Date of completion of preliminary digital files
Source_Citation_Abbreviation: Schuster and Harris, 1997c
Source_Contribution:
Source was geologic ArcInfo coverages

Originator: J.E. Schuster
Originator: C.F.T. Harris
Publication_Date: Unpublished (1997 dataset)
Title: Geologic map of the Republic 1:100,000 quadrangle, Washington-Idaho, compiled by K.L. Stoffel, Washington Division of Geology and Earth Resources Open File Report 90-10, 1990: Washington Division of Geology and Earth Resources preliminary digital map.
Edition: preliminary
Geospatial_Data_Presentation_Form: digital
Publication_Information:
Publication_Place: Olympia, WA
Publisher: Washington Department of Natural Resources
Other_Citation_Details:

The geologic spatial data files (Arc/Info vector format) were produced by Washington Department of Natural Resources.

Source_Scale_Denominator: 100,000
Type_of_Source_Media: digital
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1997
Ending_Date: 1997
Source_Currentness_Reference: Date of completion of preliminary digital files
Source_Citation_Abbreviation: Schuster and Harris, 1997d
Source_Contribution:
Source was geologic ArcInfo coverages

Originator: J.E. Schuster
Originator: C.F.T. Harris
Publication_Date: Unpublished (1998 dataset)
Title: Geologic map of the Omak 1:100,000 quadrangle, Washington-Idaho, compiled by C.W. Gulick and M.A. Korosec, Washington Division of Geology and Earth Resources Open File Report 90-12, 1990: Washington Division of Geology and Earth Resources preliminary digital map.
Edition: preliminary
Geospatial_Data_Presentation_Form: digital
Publication_Information:
Publication_Place: Olympia, WA
Publisher: Washington Department of Natural Resources
Other_Citation_Details:
The geologic spatial data files (Arc/Info vector format) were produced by Washington Department of Natural Resources.

Source_Scale_Denominator: 100,000
Type_of_Source_Media: digital
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1998
Ending_Date: 1998
Source_Currentness_Reference: Date of completion of preliminary digital files
Source_Citation_Abbreviation: Schuster and Harris, 1998a
Source_Contribution:
Source was geologic ArcInfo coverages

Originator: J.E. Schuster
Originator: C.F.T. Harris
Publication_Date: Unpublished (1998 dataset)
Title: Geologic map of the Colville 1:100,000 quadrangle, Washington-Idaho, compiled by N.L. Joseph, Washington Division of Geology and Earth Resources Open File Report 90-13, 1990: Washington Division of Geology and Earth Resources preliminary digital map.
Edition: preliminary
Geospatial_Data_Presentation_Form: digital
Publication_Information:
Publication_Place: Olympia, WA
Publisher: Washington Department of Natural Resources
Other_Citation_Details:

The geologic coverages all were produced by Washington
Department of Natural Resources.
Source_Scale_Denominator: 100,000
Type_of_Source_Media: digital
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1998
Ending_Date: 1998
Source_Currentness_Reference: Date of completion of preliminary digital files
Source_Citation_Abbreviation: Schuster and Harris, 1998b
Source_Contribution:
Source was geologic ArcInfo coverages
Process_Step:
Process_Description:
ArcInfo vector coverages for six 1:100,000-scale quadrangles were combined using the PUT command in ArcEdit for each of four themes (geology, faults, folds, and dikes. The combined coverages were cleaned using default tolerances. The four resulting coverages were converted to a GRID in ArcView 3.1 with Spatial Analyst Extension. The cell sizes were set at 50 meters for newageol and newafold; 100 meters for newfaul; and 200 meters for newadike. The extents were the extent of the compiled coverages.
Process_Date: 1998
Process_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Organization: U.S. Geological Survey
Contact_Person: Gary L. Raines
Contact_Position: Geologist
Contact_Address:
Address_Type: mailing and physical address
Address: Mackay School of Mines, MS 176, University of Nevada, Reno
City: Reno
State_or_Province: NV
Postal_Code: 89557-0047
Country: USA
Contact_Voice_Telephone: 775.784.5596
Contact_Facsimile_Telephone: 775.784.5079
Contact_Electronic_Mail_Address: graines@usgs.gov
Hours_of_Service: 8 -4:30 PST

SPATIAL_DATA_ORGANIZATION_INFORMATION
(newageol)
Direct_Spatial_Reference_Method: Raster
Raster_Object_Information:
Raster_Object_Type: Grid Cell
Row_Count: 2310
Column_Count: 4476
(newafold)
Direct_Spatial_Reference_Method: Raster
Raster_Object_Information:
Raster_Object_Type: Grid Cell
Row_Count: 2224
Column_Count: 4109

(newafaul)
Direct_Spatial_Reference_Method: Raster
Raster_Object_Information:
Raster_Object_Type: Grid Cell
Row_Count: 1143
Column_Count: 2224
(newadike)
Direct_Spatial_Reference_Method: Raster
Raster_Object_Information:
Raster_Object_Type: Grid Cell
Row_Count: 571
Column_Count: 1110

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: 0.999600
Longitude_of_Central_Meridian: -117.000000
Latitude_of_Projection_Origin: 0.000000
False_Easting: 500000.000000
False_Northing: 0.000000
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: Row and column
Coordinate_Representation:
Abscissa_Resolution: Unknown
Ordinate_Resolution: Unknown
Planar_Distance_Units: Meters
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Clarke 1866
Semi-major_Axis: 6378206.4000000
Denominator_of_Flattening_Ratio: 294.98

ENTITY_AND_ATTRIBUTE_INFORMATION
Overview_Description:
Entity_and_Attribute_Overview:
These four ArcInfo Grids (newageol, newafaul, newafold, newadike) were attributed with geologic codes from the vector coverages obtained from Washington Department of Natural Resources. They were created from a vector coverage. Newageol.vat and newadike.vat have 3 items of information - value, count, and s-value. Value is a number, while s-value is a character item containing geologic symbol code for a geologic unit and its age. Count is how many cells have that value. The other two grid tables (newafold.vat and newafaul.vat) only have count and value items. The value item is a number, which is a fold or fault type. These are described in appendix b, Causey, and others, 2000.
Entity_and_Attribute_Detail_Citation: Schuster and Harris, 1997a, 1997b, 1997c, 1997d, 1998a, 1998b (unpublished data)

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://geopubs.wr.usgs.gov/open-file/OF00-495 or via anonymous FTP from geopubs.wr.usgs.gov, in the directory pub/open-file/of00-xxx
File_Decompression_Technique: Files are compressed with Zip compression. They are self-extracting. In Windows, use run or double click on the file name in a file manager program.
Distribution_Liability:
The U.S. Geological Survey (USGS) provides these geographic data "as is." The USGS makes no guarantee or warranty concerning the accuracy of information contained in the geographic data. The USGS further makes no warranties, either expressed or implied as to any other matter whatsoever, including, without limitation, the condition of the product, or its fitness for any particular purpose. The burden for determining fitness for use lies entirely with the user. Although these data have been processed successfully on computers at the USGS, no warranty, expressed or implied, is made by the USGS regarding the use of these data on any other system, nor does the fact of distribution constitute or imply any such warranty. In no event shall the USGS have any liability whatsoever for payment of any consequential, incidental, indirect, special, or tort damages of any kind, including, but not limited to, any loss of profits arising out of use of or reliance on the geographic data or arising out of the delivery, installation, operation, or support by USGS.

METADATA_REFERENCE_INFORMATION

Metadata_Date: 1999
Metadata_Review_Date: 1999
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: U.S. Geological Survey
Contact_Person: J. Douglas Causey
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: 99201-1087
Country: USA
Contact_Voice_Telephone: 509.368.3116
Contact_Facsimile_Telephone: 509.368.3199
Contact_Electronic_Mail_Address: dcausey@usgs.gov
Hours_of_Service: 8 -4:30 PST
Metadata_Standard_Name: FGDC CSDGM
Metadata_Standard_Version: FGDC-STD-001-1998

Appendix D – List of digital files in the NE Washington GIS

ArcInfo Grids in Arc exchange format:
newageol.e00 – geologic map units
newafaul.e00 - faults
newafold.e00 - folds
newadike.e00 - dikes

Report:
of00-495.doc

Metadata:
geolunit.met

Self-extracting file:
newagrid.exe – contains the ArcInfo and ArcView gridded raster files, metadata, and this document.