Geologic Map of the Peck Quadrangle, Clearwater, Lewis, and Nez Perce Counties, Idaho

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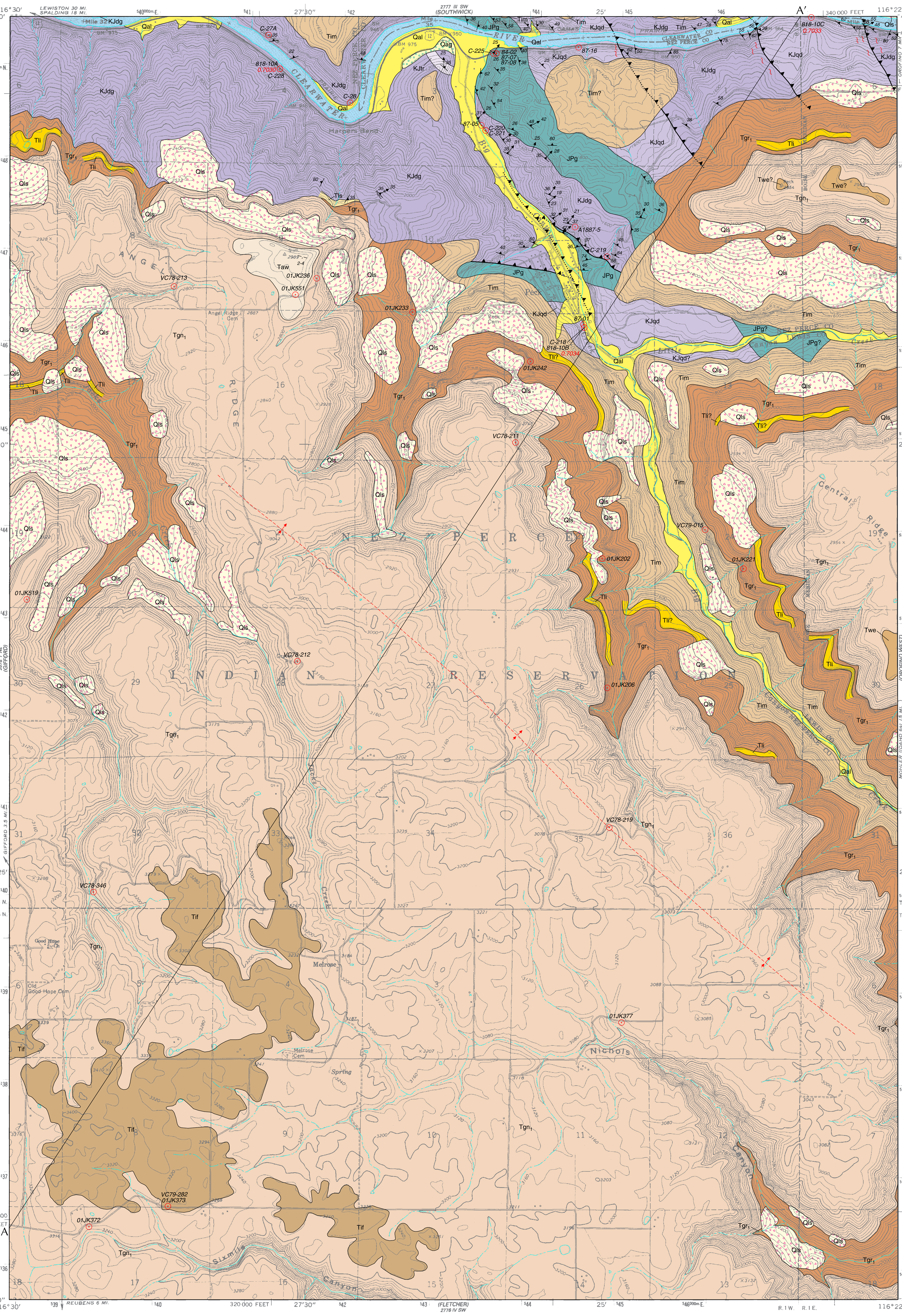
2005



Base map from USGS digital raster graphic 1967.

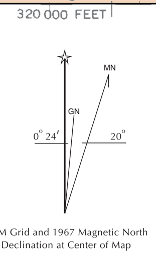
Topography by photogrammetric methods from aerial photographs taken 1966. Field checked 1967.

1927 North American Datum.

Projection and 10,000-foot grid ticks based on Idaho coordinate system, west zone.

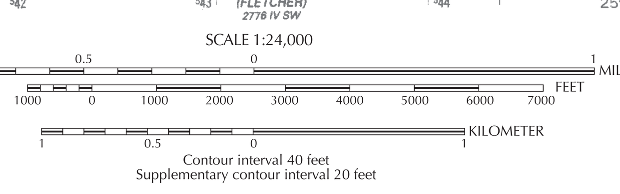
1000-meter Universal Transverse Mercator grid ticks, zone 11

National geodetic vertical datum of 1929.



UTM Grid and 1967 Magnetic North Declination at Center of Map

SCALE 1:24,000



Contour interval 40 feet
Supplementary contour interval 20 feet

QUADRANGLE LOCATION

Field work conducted 1987, 1988, 2001, and 2002.

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.

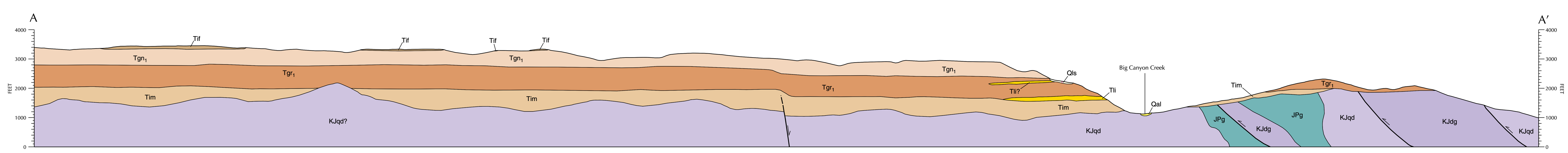
Map reviewed by S.P. Reidel, Battelle, Pacific Northwest National Laboratory and S.A. Kattenhorn, Geological Sciences, University of Idaho.

Digital cartography by B. Benjamin E. Studer, Jane S. Freed, and Loudon R. Stanford at the Idaho Geological Survey's Digital Mapping Lab.

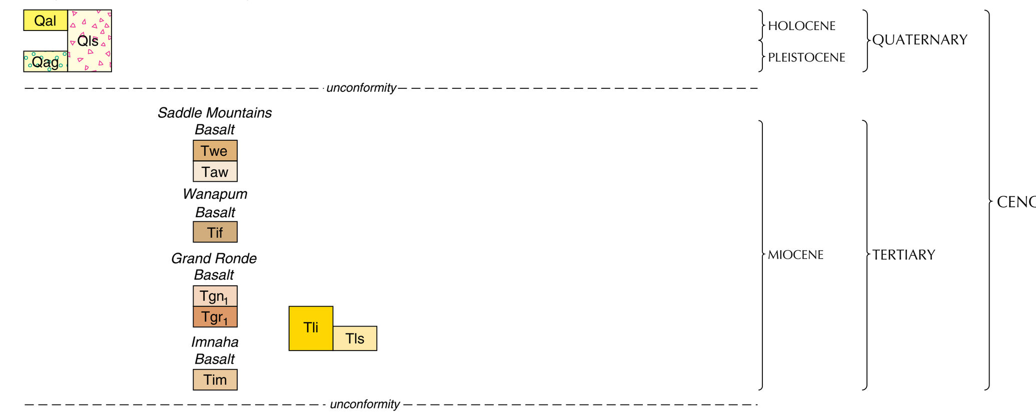
Map edited by Roger C. Stewart.

Note on printing: The map is reproduced at a high resolution of 600 dots per inch. The inks are resistant to run but not to the fading caused by long-term exposure to light.

Map version 2-7-2005.



CORRELATION OF MAP UNITS



INTRODUCTION

The geologic map of the Peck quadrangle is based largely on field work completed by Davidson in 1987 and 1988 and Kauffman, Lewis, and Burmester in 2001 and 2002 . The work by Davidson (1990) was part of an $^{40}Ar/^{39}Ar$ thermochronologic and mapping study of the Orofino area. Mapping of the prebasalt basement was supplemented with work by Hietanen (1962), reconnaissance mapping by Paul E. Myers (written commun., 1999), and geochemical sampling by Bill Bonnichsen (written commun., 2001). Basalt mapping relied extensively on reconnaissance mapping and sampling in the area from 1978 to 1980 (Swanson and others, 1979a; Camp, 1981). Much of the surficial geology is from Othberg and others (2002).

Basalt units were identified using hand sample characteristics, paleomagnetic signatures, geochemical signatures, and data from previous work. Representative samples of most basalt units were collected for analysis. These samples supplemented previous ones collected by V.E. Camp (written commun., 2002). Our sample locations and those of Camp are identified on the map. Analytical results of all samples are listed in Table 1. Samples were analyzed at Washington State University's GeoAnalytical Laboratory. Intrusive rocks are classified according to IUGS nomenclature using normalized values of modal quartz (Q), alkali feldspar (A) and plagioclase (P) on a ternary diagram (Streckeisen, 1976). Mineral modifiers are listed in increasing order of abundance for both igneous and metamorphic rocks.

DESCRIPTION OF MAP UNITS

QUATERNARY DEPOSITS

Qal **Alluvial deposits (Holocene)**—Mostly stream alluvium but may include some slope-wash and fan deposits. Primarily coarse channel gravels deposited during high-energy stream flow. Subrounded to rounded pebbles, cobbles, and boulders in a sand matrix. Moderately stratified and sorted. Includes intercalated colluvium and debris-flow deposits from steep side slopes.

Qag **Alluvial gravel (Pleistocene)**—Well-rounded pebble and cobble gravel of remnant point bars whose upper surface is about 80 to 100 feet above the Clearwater River. The gravel was deposited by the ancestral Clearwater River before the latest Lake Missoula Floods.

Qls **Landslide and slump deposits (Pleistocene to Holocene)**—Poorly sorted and poorly stratified angular basalt fragments mixed with silt and clay. Landslide deposits include debris slides as well as blocks of basalt and sedimentary interbeds that have been rotated and moved downslope. Commonly form as a result of slumping of Latah Formation sediments.

TERTIARY SEDIMENTS

Latah Formation

Tli **Latah Formation, sedimentary interbeds (Miocene)**—Sediment interbedded with basalt flows. Deposits include pebbles, cobbles, and clay but typically consist of sand locally containing tuff or arkosic tuff. Stratigraphically equivalent to the Ellensberg Formation of the Columbia Plateau in Washington (Swanson and others, 1979b).

Tls **Latah Formation sediment (Miocene)**—Sediment beneath basalt flows and overlying basement rock. Mapped at one locality 1.5 miles northwest of Peck.

COLUMBIA RIVER BASALT GROUP

The stratigraphic nomenclature for the Columbia River Basalt Group follows that of Swanson and others (1979b) and used in Reidel and Hooper (1989). In Idaho, the group is divided into four formations. From oldest to youngest, these are the Imnaha Basalt, Grande Ronde Basalt, Wanapum Basalt, and Saddle Mountains Basalt. Imnaha Basalt flows are exposed along the incised drainages of the Clearwater River, Jacks Creek, Big Canyon Creek, and Little Canyon Creek. Grande Ronde Basalt has been further subdivided, from oldest to youngest, into the informal R_1, N_1, R_2, and N_2 magnetostratigraphic units (Swanson and others, 1979b). No basalts from the R_2 or N_2 units were identified in the map area. Well-exposed outcrops of the R_1 and N_1 Grande Ronde units occur along the canyon walls and tributaries of Jacks Creek, Big Canyon Creek, and Little Canyon Creek, and N_1 units form the plateau surface over most of the southwest part of the quadrangle. Wanapum Basalt is limited to the basalt of Icicle Flat, although this unit was previously included in the Saddle Mountains Basalt and given member status by Camp (1981). The Icicle Flat caps Grande Ronde units in the southwest part of the quadrangle. Saddle Mountains Basalt units, from oldest to youngest, are undivided flows of the Asotin Member and Wilbur Creek Member and the basalt of Weippe. A small area of the Asotin Member overlies Grande Ronde Basalt on Angel Ridge, and the basalt of Weippe forms the capping unit on Grande Ronde east of Big Canyon Creek. Interbedded in the basalt sequence are sediments of the Latah Formation.

Saddle Mountains Basalt

Twe **Basalt of Weippe (Miocene)**—Medium- to coarse-grained basalt with scattered to common plagioclase phenocrysts 2-5 mm long; abundant olivine crystals and clots generally visible to the naked eye. Reverse magnetic polarity, although field magnetometer readings are commonly conflicting and weak. Similar chemically to Pomona Member which occurs near Lewiston (Swanson and others, 1979a) but is distinguished by the properties discussed below. Consists of one flow 50-100 feet thick. Mapped in several small areas along the east edge of the quadrangle where the unit caps Grande Ronde N_1 Basalt.

Camp (1981) included the basalt of Weippe in the Pomona Member because of the chemical similarity to Pomona flows, although no physical connection of the two was found. Analytical results of samples collected in the Orofino West quadrangle also reveal the chemistry of the Weippe, for both major and trace elements, to be nearly identical to that of the Pomona Member. However, paleomagnetic directions determined for the basalt of Weippe from two sites near Grangemont, reported by Kauffman (2004), are somewhat different from those determined for the Pomona Member by Rietman (1966) and Choiniere and Swanson (1979; Table 2), indicating that the two units may not be coeval. One whole rock K-Ar age determination on a basalt of Weippe sample from one of the sites near Grangemont resulted in a date of 12.9 ± 0.8 Ma (Kauffman, 2004). This date is not significantly different from the 12 Ma age reported for the Pomona Member by McKee and others (1977).

Taw **Asotin Member and Wilbur Creek Member, undivided (Miocene)**—One small area mapped 2 miles west of Peck, just northeast of the Angel Ridge Cemetery near Slim point, where a vesicular flow top forms a pavement outcrop along the road. At this location, the chemical signature was that of the Asotin Member. At locations on adjacent quadrangles, the basalt is fine grained with scattered plagioclase phenocrysts 1-5 mm long and a few olivine phenocrysts 1-2 mm in diameter. Upper part of flows commonly has abundant small spherical vesicles, many with a pale bluish lining. Both members have normal magnetic polarity.

Wanapum Basalt

Tif **Basalt of Icicle Flat (Miocene)**—Fine- to medium-grained, plagioclase-phyric basalt; common to abundant plagioclase phenocrysts 3-10 mm long; olivine 1-2 mm in diameter common in coarser grained variety; olivine less common and <1 mm in diameter in finer grained variety. Normal magnetic polarity. Consists of one flow with a thickness of less than 50-100 feet. Chemically and paleomagnetically similar to the basalt of Dodge (Eckler Mountain Member; Swanson and others, 1979b). Forms large-diameter columns that spheroidally weather to large rounded boulders. Occurrence is limited to the southwest quarter of the quadrangle where the unit overlies Grande Ronde N_1. May fill shallow structural or erosional troughs developed on the Grande Ronde Basalt.

Camp (1981) gave this unit member status (Icicle Flat Member) and included it in the Saddle Mountains Basalt because he considered it younger than the Asotin Member. Mapping in the Gifford area, however, indicates that it actually underlies the Asotin Member and rests on Grande Ronde Basalt, and that it may be equivalent to the basalt of Dodge, which it closely resembles chemically and paleomagnetically (Kauffman, 2004). Hooper and others (1995) suggested raising the Eckler Mountain Member to formational status. Under their proposed revision, the basalt of Icicle Flat would be included in the Eckler Mountain Basalt rather than in the Wanapum Basalt.

Grande Ronde Basalt

Tgn_1 **Grande Ronde, N_1 magnetostratigraphic unit (Miocene)**—Texture varies. Mostly fine-grained, dark gray to black, aphyric to plagioclase-microphyric basalt. Entablature of one flow or series of flows forms cliffs along upper canyon walls. Uppermost flows usually medium gray, medium grained with occasional plagioclase phenocrysts 2-5 mm long, or fine grained but with sugary texture; diktytaxitic in places. Normal magnetic polarity. Flows range in thickness from 50 feet to several hundred feet. Thin flows are characterized by large stocky columns grading upward into vesicular flow tops typically with crude columnar structure. Thick flows have a lower colonnade with columns 2-5 feet in diameter, and above that an abrupt change to a blocky, hackly thick entablature that becomes vesicular near the top. Estimated to consist of three to five flows. Total thickness is 500-600 feet. Some units are similar chemically to the China Creek and Downy Gulch units of Reidel and others (1989).

Tgr_1 **Grande Ronde, R_1 magnetostratigraphic unit (Miocene)**—Typically dense, dark gray to black, fine- to very fine-grained aphyric to plagioclase-microphyric basalt. Less commonly medium-grained with scattered small plagioclase phenocrysts. Reverse magnetic polarity. Field magnetometer readings commonly inconsistent and weak, especially in flows near the R_1-N_1 contact; therefore the mapped contact is within this zone of inconsistent magnetometer readings. Outcrop characteristics similar to N_1 flows. Number of flows not determined but estimated at three to six. Total thickness is about 600 feet. Locally contains massive arkosic tuffaceous deposits or sedimentary interbeds of the Latah Formation (*Tli*). Interbeds consist mostly of arkosic sand and silt but commonly contain both quartz and quartzite pebbles and cobbles.

Tim **Imnaha Basalt (Miocene)**—Medium- to coarse-grained, sparsely to abundantly plagioclase-phyric to glomerophyric basalt; olivine common; plagioclase phenocrysts as large as 1 cm in length common; glomerocrysts as large as 3 cm in diameter are less common. Units examined have normal polarity. Outcrops usually deeply weathered or degraded, commonly forming grus-like detritus. Outcrops of fresh basalt are characterized by well-formed columns 1 to 3 feet in diameter and commonly fanning or radiating. Number of individual flows not determined. About 500 feet of section occurs along Big Canyon Creek. Two areas south of the Clearwater River east and west of the mouth of Big Canyon Creek are mapped as Imnaha Basalt because of float fragments, but these fragments may instead be transported and highly weathered Imnaha Basalt river gravels.

INTRUSIVE ROCKS

KJtr **Trondhjemite (Jurassic or Cretaceous)**—Foliated and lineated, medium-grained, muscovite-biotite trondhjemite. Single small exposure west of the mouth of Big Canyon Creek. Contains about 63 percent plagioclase, 25 percent quartz, 7 percent potassium feldspar, 3 percent biotite, and 2 percent muscovite. Similar to trondhjemite along the Clearwater River south of Greer, except for the presence of potassium feldspar. May be a granodiorite.

KJqd **Quartz diorite (Jurassic or Cretaceous)**—Medium- to coarse-grained, equigranular, massive to foliated quartz diorite. Contains 8-32 percent hornblende, 6-10 percent biotite, and 1-5 percent epidote. Some of the epidote appears to be primary. Apatite is a conspicuous accessory mineral, and sphene, allanite, and rutile (in biotite) were noted in some of the samples. The exposure south of Peck and west of Big Canyon Creek contains about 1 percent potassium feldspar, and the exposures along the Clearwater River contain none. However, an outcrop in Big Canyon Creek, south of Peck, contains an unusual amount of potassium feldspar (about 8-10 percent microcline) relative to other exposures of this unit. Initial $^{87}Sr/^{86}Sr$ values are low (0.7033-0.7034; Criss and Fleck, 1987) and are shown accompanying the sample number on the map. Hornblende $^{40}Ar/^{39}Ar$ plateaus of 138.0 ± 0.4 Ma and 134.4 ± 0.5 Ma have been obtained from the quartz diorite exposed immediately south of Peck (Table 3). A hornblende $^{40}Ar/^{39}Ar$ plateau of 121.9 ± 0.5 Ma was obtained from the quartz diorite exposed along the Clearwater River east of the mouth of Big Canyon Creek (Table 3).

KJdg **Diorite and gabbro (Jurassic or Cretaceous)**—Hornblende-rich igneous and meta-igneous rocks, primarily diorite and gabbro. Exposures west of Big Canyon Creek are medium- to coarse-grained hornblende-plagioclase rocks with abundant secondary epidote and minor quartz. Minor hornblendite and pyroxene-bearing ultramafic rocks are also present. Initial $^{87}Sr/^{86}Sr$ value is low (0.7030; Criss and Fleck, 1987) and is shown accompanying the sample number on the map. Exposures along the east side of Big Canyon Creek are finer grained, typically gneissic, and include abundant amphibolite. Also exposed there are lenses of less mafic rock interpreted by Bill Bonnichsen (written commun., 2001) as dacite metatuff, along with andesite metatuff and metabasalt (samples C-220, C-221, and C-219; Table 4). Two samples of hornblende gneiss from this area yielded hornblende $^{40}Ar/^{39}Ar$ plateaus of 123.9 ± 0.7 Ma and 119.4 ± 0.2 Ma (Table 4). Exposures along the Clearwater River east of the mouth of Big Canyon Creek are less metamorphosed, generally medium grained, and dominated by rocks that are clearly plutonic. Compositions include hornblende-pyroxene diorite or gabbro, hornblende quartz diorite, and hornblendite. Numerous narrow, discreet mylonitic shear zones cut these rocks.

ISLAND-ARC METAVOLCANIC(?) AND METASEDIMENTARY ROCKS

Metasedimentary and metavolcanic(?) rocks mapped by Hietanen (1962) as part of the Orofino series. Davidson (1990) distinguished these rocks from the Orofino series and called them "island arc rocks" and postulated affinities with the Wallowa terrane south of the map area. Hietanen (1962) also noted that the metamorphic rocks near Peck differ in appearance, texture, and mineralogy from the metasedimentary rocks near Orofino. Davidson (1990) noted that the rocks near Peck are lower metamorphic grade (lower amphibolite facies) and farther outboard from the initial $^{87}Sr/^{86}Sr$ 0.704/0.706 line. However, they may be similar in age to the Orofino series.

JPg **Gneissic and hornfelsic rocks (Permian? to Jurassic?)**—Mixed unit containing biotite-quartz-plagioclase gneiss, biotite-hornblende gneiss, calc-silicate hornfels, muscovite-quartz schist, and lenses of gabbro and amphibolite. The biotite-quartz-plagioclase gneiss is dark gray and fine grained and contains 15-50 percent quartz and a similar range of plagioclase. Biotite content is 15 percent or less. These rocks have been interpreted as metatuff by Bill Bonnichsen (written commun., 2001). Those with high quartz content do not have igneous compositions and must be metasedimentary (clastic or volcaniclastic). The unit is more calcareous to the south, and calc-silicate hornfels is common in exposures at and near Peck. These rocks contain epidote, diopside, actinolite, quartz, plagioclase, garnet, and cordierite(?). Minor marble is associated with the hornfels. A hornblende $^{40}Ar/^{39}Ar$ plateau of 129.1 ± 1.0 Ma reflects a cooling age for hornblende in an amphibolite from the outcrop just east of the mouth of Big Canyon Creek (Table 4). A biotite $^{40}Ar/^{39}Ar$ plateau of 78.6 ± 0.2 Ma from a biotite-quartz-plagioclase gneiss at the same outcrop reflects a cooling age for the biotite. A felsic dike cutting the schist at the same outcrop contains muscovite that gave a $^{40}Ar/^{39}Ar$ plateau of 77.3 ± 0.2 Ma, similar to that of the biotite (Table 4).

MAJOR STRUCTURAL FEATURES

The major structural features are thrust faults exposed in prebaslt basement rocks in the northern part of the area. These faults, first mapped by Davidson (1990), are located on the basis of mylonitic zones and lithologic contrasts. Most or all are relatively steep, probably greater than 45 degrees. East of the map area, the mylonitic zones are wider, and the basement rocks are more pervasively sheared.

SYMBOLS

Contact: approximately located.

Thrust fault: teeth on upper plate; approximately located; dotted where concealed.

Fold axis.

Monocline: shorter arrow indicates steeper dips.

52 Strike and dip of foliation.

80 Strike and dip of mylonitic foliation.

20 Strike and dip of basalt flows visually estimated from slope of upland surfaces or from flow boundaries on canyon walls.

65 Bearing and plunge of lineation, type unknown.

40 Bearing and plunge of mineral lineation.

50 Bearing and plunge of mylonitic lineation.

Mylonite.

02RL802 Sample location and number.

0.7040 Initial $^{87}Sr/^{86}Sr$ ratio (from Criss and Fleck, 1987).

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Table 1. Major oxide and trace element chemistry of basalt samples collected in the Peck quadrangle

Sample number	Latitude	Longitude	Unit name	Map unit	Major elements in weight percent: SiO_2	Al_2O_3	TiO_2	FeO*	MnO	CaO	MgO	K_2O	Na_2O	P_2O_5	Trace elements in parts per million: Ni	Cr	Sc	V	Ba	Rb	Sr	Zr	Y	Nb	Ga	Cu	Zn	Pb	La	Ce	Th
01JK202	46.4472	-116.4166	Grande Ronde R_1	Tgr_1	54.49	13.80	2.156	11.94	0.191	8.02	4.47	1.38	3.21	0.331	21	52	34	350	495	34	322	185	36	13.1	20	72	110	6	13	54	2
01JK206	46.4346	-116.4159	Grande Ronde R_1	Tgr_1	57.45	13.50	2.200	11.31	0.189	6.67	3.04	2.26	3.06	0.326	3	17	34	351	695	50	309	199	38	13.3	22	6	115	4	44	43	5
01JK221	46.4462	-116.3967	Grande Ronde R_1	Tgr_1	54.64	13.89	2.229	12.02	0.189	7.78	4.18	1.50	3.22	0.351	17	37	31	328	549	41	314	194	39	14.2	18	54	117	13	15	45	10
01JK233	46.4712	-116.4433	Grande Ronde R_1	Tgr_1	54.43	14.04	2.159	11.64	0.193	8.22	4.45	1.39	3.17	0.320	17	41	32	341	506	33	337	184	36	12.3	24	59	115	6	23	65	1
01JK236	46.4745	-116.4568	Grande Ronde N_1	Tgn_1	55.73	13.99	2.242	10.68	0.207	7.91	4.05	1.71	3.08	0.403	8	26	41	382	762	34	339	172	40	11.3	24	3	124	6	20	33	5
01JK242	46.4664	-116.4267	Grande Ronde R_1	Tgr_1	54.95	14.09	2.293	11.33	0.181	7.93	4.10	1.49	3.27	0.354	13	38	35	340	549	35	328	193	38	13.8	22	55	123	5	31	27	6
01JK372	46.3821	-116.4888	Grande Ronde N_1	Tgn_1	54.89	13.70	2.115	12.19	0.197	7.88	4.11	1.27	3.29	0.356	11	30	39	372	554	27	314	160	35	11.4	21	5	113	3	26	54	2
01JK373	46.3841	-116.4777	Icicle Flat	Tif	51.83	15.38	1.454	11.35	0.217	9.81	5.73	0.73	3.16	0.331	31	96	38	357	434	5	342	101	33	8.0	20	64	103	0	0	14	0
01JK377	46.4020	-116.4139	Grande Ronde N_1	Tgn_1	54.39	13.90	2.198	12.57	0.214	7.81	3.96	1.26	3.33	0.372	8	24	40	376	610	24	330	159	36	12.1	22	7	119	7	0	47	8
01JK519	46.4432	-116.4976	Grande Ronde N_1	Tgn_1	55.13	13.93	2.250	11.80	0.201	7.72	3.98	1.57	3.03	0.384	7	25	39	377	687	38	333	170	39	13.3	22	16	127	5	5	28	4
01JK551	46.4729	-116.4598	Asotin	Taw	50.31	16.13	1.413	9.59	0.165	11.36	8.12	0.48	2.27	0.157	126	281	26	240	326	7	250	102	23	8.9	16	76	70	5	17	42	0
**VC78-211	46.4585	-116.4288	Grande Ronde N_1	Tgn_1	53.76	14.94	2.22	12.52	0.19	7.74	3.78	1.37	2.93	0.35																	
**VC78-212	46.4372	-116.4595	Grande Ronde N_1	Tgn_1	54.84	14.78	2.19	11.03	0.20	7.84	4.02	1.64	2.87	0.38																	
**VC78-213	46.4737	-116.4769	Grande Ronde N_1	Tgn_1	53.70	14.67	2.16	12.96	0.20	7.74	3.91	1.47	2.63	0.34																	
**VC78-219	46.4210	-116.4156	Grande Ronde N_1	Tgn_1	53.46	14.73	2.17	13.11	0.19	7.72	3.76	1.51	2.80	0.34																	
**VC78-346	46.4147	-116.4882	Grande Ronde N_1	Tgn_1	54.16	15.26	1.80	11.76	0.21	8.19	4.27	1.42	2.41	0.30																	
**VC79-015	46.4500	-116.4021	Imnaha	Tim	50.79	19.59	1.83	9.44	0.15	9.79	4.56	1.05	2.37	0.24																	
**VC79-282	46.3841	-116.4777	Icicle Flat	Tif	51.92	15.86	1.46	11.43	0.31	9.81	4.96	0.86	2.87	0.33																	

* Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
** Samples collected by V. Camp in 1978. Analytical results used with permission (Camp, written commun., 2002).
Analyses performed at Washington State University GeoAnalytical Laboratory, Pullman, Washington.

Table 2. Comparison of paleomagnetic directions for Pomona-Weippe and Dodge-Icicle Flat units

Sample number	Unit	n	D	I	α_{95}	k	Polarity	Demag level(mT)	Source
PO1	Pomona	6	187.8	-51.9	1.7		R	*	(1)
PO2	Pomona	6	186.3	-53.4	2.2		R	*	(1)
PO3	Pomona	6	203.4	-54.6	2.0		R	*	(1)
PO4	Pomona	6	195.4	-50.6	2.9		R	*	(1)
PO-1	Pomona	8	192.8	-52.7	3.6	234.7	R	*	(2)
PO-2	Pomona	7	191.9	-52.1	4.8	161.3	R	*	(2)
PO-3	Pomona	6	191.9	-47.8	4.6	208.8	R	*	(2)
PO-4	Pomona	6	193.3	-50.1	5.6	146.2	R	*	(2)
PO-5	Pomona	7	185.7	-54.4	4.6	174.8	R	*	(2)
PO-6	Pomona	6	186.2	-51.8	13.3	26.3	R	*	(2)
PO-7	Pomona	6	192.9	-46.7	10.9	38.8	R	*	(2)
PO-8	Pomona	8	185.8	-48.4	8.1	48.0	R	*	(2)
PO-9	Pomona	8	191.7	-48.8	5.5	104.1	R	*	(2)
PO-10	Pomona	5	197.7	-51.5	7.5	104.2	R	*	(2)
PO-11	Pomona	7	182.1	-52.4	3.8	250.3	R	*	(2)
070201-4	Weippe	8	156.8	-57.8	1.5	1337.9	R	15	(3)
070201-5	Weippe	8	157.2	-57.8	2.3	609.5	R	15	(3)
DJ1	Dodge	6	3.5	62.6	1.2		N	*	(1)
DJ2	Dodge	6	0.9	59.5	3.6		N	*	(1)
070301-1	Icicle Flat	7	1.7	59.1	6.0	100.5	N	10	(3)
070301-2	Icicle Flat	8	5.9	64.8	2.1	667.7	N	10	(3)

* See source for demagnetization level.
mT = milliTesla (1 mT = 10 oersted
n = number of oriented cores
D = site mean declination of remanent magnetism in degrees east of north
I = site mean inclination of remanent magnetism in degrees with respect to horizontal
α_{95}= confidence limit for the mean direction at the 95% level
k = precision parameter
R = reverse polarity
N = normal polarity
070201-4 site is in sec. 17, T. 37 N., R. 3 E., Grangemont 7.5′ quadrangle.
070201-5 site is in sec. 35, T. 37 N., R. 3 E., Grangemont 7.5′ quadrangle.
070301-1 site is in sec. 8, T. 35 N., R. 1 W., Peck, 7.5′ quadrangle; chemistry samples 01JK373and VC79-282 (Table1).
070301-2 site is in sec. 32, T. 36 N., R. 2 W., Gifford 7.5′ quadrangle.
Sources
(1) Choiniere and Swanson (1979)
(2) Reitman (1966)
(3) Analyses performed in 2001 at the Idaho Geological Survey Paleomagnetism Laboratory

Table 4. Major chemistry of basement samples collected in the Peck quadrangle by Bill Bonnichsen

Sample number	Latitude	Longitude	Unit name	Rock name	Map unit	Major elements in weight percent: SiO_2	Al_2O_3	TiO_2	Fe_2O_3*	MnO	CaO	MgO	K_2O	Na_2O	P_2O_5	Total
C-27A	46.4982	-116.4636	Diorite and gabbro	Metagabbro	KJdg	42.06	19.29	1.35	16.24	0.21	12.43	6.04	0.27	1.93	0.04	99.86
C-28	46.4916	-116.4521	Diorite and gabbro	Gabbro	KJdg	46.04	15.88	1.16	15.46	0.25	10.98	7.72	0.19	1.99	0.12	99.79
C-218	46.4697	-116.4191	Quartz diorite	Quartz diorite	KJqd	60.75	16.79	0.72	6.01	0.13	6.37	3.15	1.41	3.97	0.17	99.47
C-219	46.4766	-116.4159	Diorite and gabbro	Metabasalt	KJdg	49.69	15.82	0.82	9.68	0.26	11.33	8.88	0.5	2.6	0.08	99.66
C-220	46.4889	-116.4330	Diorite and gabbro	Andesite metatuff	KJdg	53.43	17.52	0.96	9.97	0.26	8.07	5.2	0.19	4.21	0.15	99.96
C-221	46.4889	-116.4330	Diorite and gabbro	Dacite metatuff	KJdg	65.66	15.63	0.54	5.24	0.11	5.81	2.29	0.15	4.28	0.09	99.80
C-225	46.4964	-116.4319	Gneissic and hornfelsic rocks	Dacite dike	JPg	72.9	16.87	0.11	1.24	0.02	2.08	0.23	0	5.13	0.06	100.32
C-228	46.4949	-116.4620	Diorite and gabbro	Ultramafic rock	KJdg	42.85	11.47	0.38	14.4	0.18	10.19	20.27	0.03	0.15	0	99.92

* Total Fe expressed as Fe_2O_3.
Analyses by XRF method, University of Massachussets at Amherst; analyzed by Ronald B. Gilmore.

Table 3. $^{40}Ar/^{39}Ar$ plateau ages of prebasalt basement rocks in the Peck quadrangle

Sample number	Map unit	Rock name	Mineral	Age (Ma)	1 sigma (Ma)	Source
87-01	KJqd	Quartz diorite	Biotite	135.1	0.4	Davidson (1990)
818-10B	KJqd	Quartz diorite	Hornblende	134.4	0.5	Criss and Fleck (1987)
87-01	KJqd	Quartz diorite	Hornblende	138.0	0.4	Davidson (1990)
87-16	KJqd	Quartz diorite	Hornblende	121.9	0.5	Davidson (1990)
87-05	KJdg	Hornblende gneiss	Hornblende	119.4	1.2	Davidson (1990)
A1887-5	KJdg	Hornblende gneiss	Hornblende	123.9	0.7	Davidson (1990)
87-08	JPg	Biotite schist	Biotite	78.6	0.2	Davidson (1990)
84-02	JPg	Amphibolite	Hornblende	129.1	1.0	Davidson (1990)
87-07	JPg	Felsic dike	Muscovite	77.3	0.2	Davidson (1990)

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